BIG KAISER

# Volume 3

## HIGH PERFORMANCE TOOLING SOLUTIONS

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BROTECH

## MEGA Micro Chuck

Ultra slim design eliminates any interference.

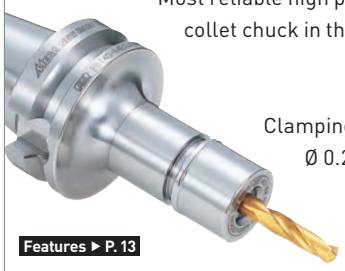
Clamping range:
Ø 0.45 - 8.05

Features ▶ P. 12


| | |
|---|---|
| BBT Shank | 46 |
| BDV Shank | 94 |
| HSK Shank | 126/162/169 |
| BIG CAPTO Shank | 176 |
| Cylindrical Shank | 206 |
| For N/C Lathe | 242 |


## MEGA New Baby Chuck

Most reliable high precision collet chuck in the world.



Clamping range:
Ø 0.25 - 25.4

Features ▶ P. 13


| | |
|---|---|
| BBT Shank | 48 |
| BDV Shank | 95 |
| HSK Shank | 128/164/170 |
| BIG CAPTO Shank | 177 |


## MEGA E Chuck

Original and exclusive design for small endmilling.

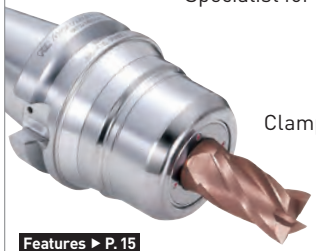
Clamping range:
Ø 3 - 12

Features ▶ P. 14


| | |
|---|---|
| BBT Shank | 52 |
| BDV Shank | 97 |
| HSK Shank | 132/171 |
| BIG CAPTO Shank | 180 |


## MEGA Double Power Chuck

Specialist for heavy-duty cutting.



Clamping range:
Ø 3 - 42

Features ▶ P. 15


| | |
|---|---|
| BBT Shank | 53 |
| BDV Shank | 98 |
| HSK Shank | 133/172 |
| BIG CAPTO Shank | 181 |


## New Baby Chuck

High precision collet chuck for various applications.

Clamping range:
Ø 0.25 - 20

Features ▶ P. 16


| | |
|---|---|
| BT Shank | 56 |
| DV Shank | 100 |
| HSK Shank | 136 |
| Cylindrical Shank | 207 |
| For N/C Lathe | 238 |


## New Hi-Power Milling Chuck

Reliable milling chuck with slim design.

Clamping range:
Ø 3 - 42

Features ▶ P. 17


| | |
|---|---|
| BBT Shank | 58 |
| BDV Shank | 102 |
| HSK Shank | 137 |
| BIG CAPTO Shank | 183 |
| CK Shank | 199 |
| Cylindrical Shank | 209 |


## MEGA Perfect Grip

Unique design anti pulling out cutter milling chuck.

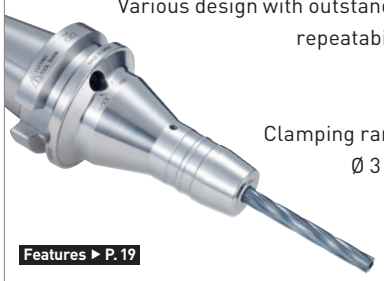
Clamping range:
Ø 16 - 32

Features ▶ P. 18


| | |
|---|---|
| BBT Shank | 55 |
| DV Shank | 99 |
| HSK Shank | 135 |


## Hydraulic Chuck

Various design with outstanding repeatability.



Clamping range:
Ø 3 - 32

Features ▶ P. 19


| | |
|---|---|
| BBT Shank | 60 |
| BDV Shank | 104 |
| HSK Shank | 139/166 |
| BIG CAPTO Shank | 184 |
| Cylindrical Shank | 208 |


## MEGA Synchro Tapping Holder

Improves thread quality and tool life.

Tapping range:
M1 - M36

Features ▶ P. 20/21


| | |
|---|---|
| BBT Shank | 66 |
| BDV Shank | 107 |
| HSK Shank | 144 |
| BIG CAPTO Shank | 185 |
| CK Shank | 201 |
| Cylindrical Shank | 213 |
| For N/C Lathe | 242 |

## Shrink Chucks

Shrink fit solution with BIG-PLUS® interface.

Clamping range: Ø 4 - 25

| | |
|---|---|
| BBT Shank | 64 |
| BDV Shank | 106 |
| HSK Shank | 142 |
| Cylindrical Shank | 210 |


## Face Mill Arbors

Eliminates chatter for smoother finish.

| | |
|---|---|
| BBT Shank | 72 |
| BDV Shank | 110 |
| HSK Shank | 146 |
| BIG CAPTO Shank | 188 |


## Smart Damper for Milling

Unique modular damping face mill arbor.

Features ▶ P. 22


| | |
|---|---|
| BBT Shank | 73 |
| BDV Shank | 111 |
| HSK Shank | 148 |


## Side Lock Holders

Clamping range: Ø 6 - 50

| | |
|---|---|
| BBT Shank | 68 |
| BDV Shank | 108 |
| HSK Shank | 147 |
| BIG CAPTO Shank | 186 |


## CK Shanks

Various CK shanks for boring systems.

Features ▶ P. 27


| | |
|---|---|
| BBT Shank | 74 |
| BDV Shank | 112 |
| HSK Shank | 149/167 |
| BIG CAPTO Shank | 190 |
| Reductions, Extensions | 194 |
| Cylindrical Shank | 212 |


## Dyna Test

Precision measuring tools of the highest quality for machine tool maintenance.

Features ▶ P. 41


| | |
|---|---|
| BBT Shank | 92 |
| BDV Shank | 123 |
| HSK Shank | 173 |
| BIG CAPTO Shank | 191 |


## Millturn Tooling HSK-T

Unique modular turning system.

| | |
|---|---|
| Modular Turning Tools | 216 |


## Millturn Tooling BIG CAPTO

Modular turning tools and high precision rotary tool holders.

| | |
|---|---|
| Rotary Tool Holders | 176 |
| Modular Turning Tools | 226 |


## Smart Damper Turning

For boring applications on turning machines.

Features ▶ P. 23


| | |
|---|---|
| Cylindrical Shank | 237 |

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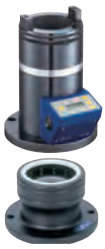
## N/C Lathe Tooling

For improved efficiency and reliability of production on NC lathe.

For N/C Lathe 238


## Tool Assembly Stations



**Torque Fit**
With integrated torque measuring system.

**Kombi Grip**
For HSK and BIG CAPTO.

Features ▶ P. 41


Tooling Mate 283
Kombi Grip 283
Torque Fit 284

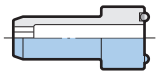

## Cleaners

Maintain accuracy of high precision collet chucks.

α Taper Cleaners 286
TK Cleaner 286
α Wiper Cleaners 286
α Tooling Cleaners 287
Spindle Cleaners 287


## Pull Stud Bolts / Coolant Pipes

**Pull Stud Bolt**



**Coolant Pipe**
For HSK form A and E.


Coolant Pipes 174
Pullstud Bolts 288
Pullstud Wrenches 289


## Angle Heads

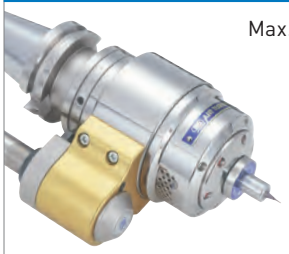
Eliminates multiple set up.

Features ▶ P. 24


BBT Shank 78
BDV Shank 114
HSK Shank 151
Stop Block 290


## Air Turbine Spindles

Max. 120 000 $min^{-1}$



Features ▶ P. 25


BBT Shank 88
BDV Shank 119
HSK Shank 159/168


## Rough Boring Heads

Features ▶ P. 34


MW, Ø 16 - 21 296
SW, Ø 20 - 203 297
TW, Ø 20 - 203 307


## Digital Fine Boring Heads EWE

Features ▶ P. 30


EWE, Ø 2 - 152 314/334
EWE, Ø 41 - 203 353


## Fine Boring Heads EWN/EWB

EWN 04-7: The smallest boring head in the world.

Features ▶ P. 32


EWN, Ø 0.4 - 152 315/335/346
EWB, Ø 2 - 50 316/336
EWN, Ø 20 - 203 355
EWB, Ø 32 - 105 362
EWB-AL, Ø 100 - 203 362
EWB-UP, Ø 25 - 100 364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## Smart Damper Boring Heads

Anti-vibration boring bars.

Features ▶ P. 22


| | |
|---|---|
| BBT Smart Damper Shanks | 75 |
| BDV Smart Damper Shanks | 112 |
| HSK Smart Damper Shanks | 150 |
| Smart Damper Extensions | 195 |
| SW Smart Damper | 299 |
| EWD/EWN Smart Damper | 354 |


## Large Diameter Boring Tools

Lightweight tools Ø 200 - 3 000 mm.

Features ▶ P. 35


| | |
|---|---|
| Series 318, Ø 200 - 620 | 373 |
| Series 318, Ø 620 - 3 000 | 380 |
| Series 317, Ø 200 - 620 | 385 |

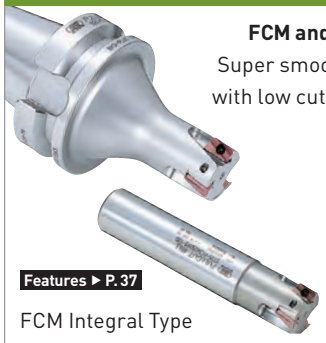

## Indexable Inserts

Specially selected inserts for boring operations.

Features ▶ P. 36


| | |
|---|---|
| Indexable Inserts | 392 |
| CBN/PCD Inserts | 412 |
| Inserts for Turning | 416 |
| Boring Cutters | 422 |


## Fullcut Mill



**FCM and FCR type**
Super smooth cutting with low cutting force.

Features ▶ P. 37


| | |
|---|---|
| FCM Integral Type | 452 |
| FCM Cylindrical Type | 458 |
| FCM Arbor Type | 459 |
| FCR Integral Type | 463 |
| FCR Cylindrical Type | 466 |
| Contact Grip | 470 |


## Speed Finisher

High speed cutter for incredibly smooth surface finish.

Features ▶ P. 39


| | |
|---|---|
| Speed Finisher | 476 |


## Surface Mill

Unique design face mill cutter.


| | |
|---|---|
| Surface Mill | 475 |


## C-Cutter Mini

Ultra high feed chamfer mill.

Features ▶ P. 40


| | |
|---|---|
| Multi Insert Type | 484 |
| Single Insert Type | 485 |
| Bolt Hole Type | 486 |
| Spot Facing Type | 487 |
| CKB Type | 488 |


## C-Cutter

Extensive chamfering range.

| | |
|---|---|
| Standard Type | 491 |
| CKB Type | 491 |
| Universal Type | 492 |


## R-Cutter

Automated R-chamfering.

| | |
|---|---|
| CKB Type | 497 |
| Front and Back Chamfering | 498 |
| Front Chamfering | 499 |

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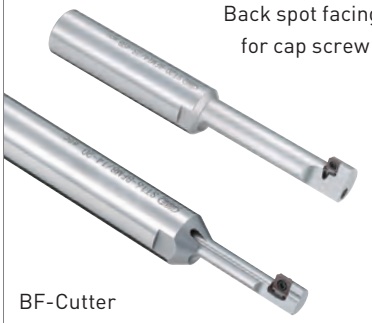
## Slot Milling Cutters

Cylindrical Type 504
CK Type 504
Arbor Type 504


## BF-Cutter

Back spot facing tool for cap screw hole.




BF-Cutter 503


## Center Boy

Center and chamfer in one.

C-Centering Cutter 496
Center Boy 501


## Edge Detector

3D and 2D touch sensor detecting work position.

Point Master 508
Accu Center 513


## Tool Offset Sensor

Magnetic tool offset sensor.

Base Master 511
Tool Master 513


## Alignment Tool for ATC Arm

For maintenance of machine tool spindle.

ATC Alignment Tool 514


## Dyna Contact

A ceramic taper gauge for machine taper inspection.

Dyna Contact 516


## Level Master

2-axis simultaneous detection leveler.

Features ▶ P. 42


Level Master 517


## Centering Tool for Lathes

Easy centering for lathes with static dial gauge.

Features ▶ P. 42


Centering Tool for Lathes 518

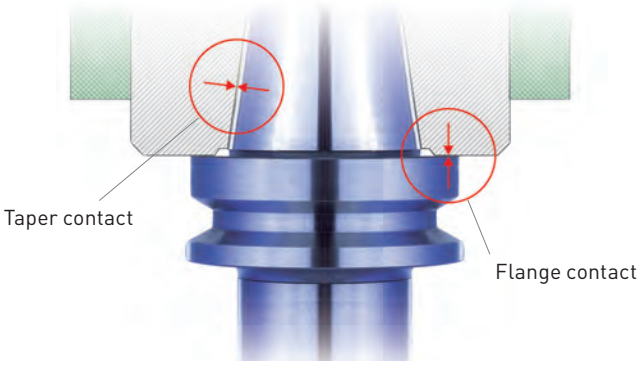
# The Original Simultaneous Taper and Flange Fit Spindle System for Steep Taper

BIG-PLUS® SPINDLE SYSTEM DUAL CONTACT

The BIG-PLUS® spindle system exceeds all other interface concepts thanks to simultaneous taper and face contact between machine spindle and tool holder. Furthermore the system offers full interchangeability with existing machines and tool holders.

In a first step a taper contact is resulting during entering the tool into the machine spindle. Due to the pull-in force the tool taper expands the spindle in the elastic range. The tool is pulled further into the spindle until the tool flange reaches the surface of the spindle nose.

**Advantages**
- Improved surface finish & dimensional accuracy
- Extended tool life
- Prevention of fretting corrosion caused by heavy cutting
- Improvement of ATC repeatability
- Elimination of Z-axial movement at high speeds
- Improved roundness of boring operation



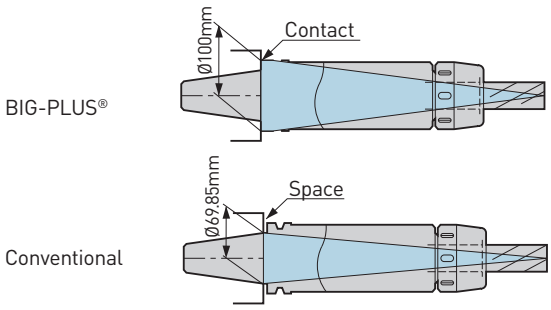

**Basic concept**

The BIG-PLUS® Spindle System is based on the most current available standards in JIS B6339 and DIN 69871.

A conventional steep taper tool holder is supported on a reference diameter called the gauge face. On the contrary, a BIG-PLUS® tool holder is supported on the flange face, which brings remarkable improvement to rigidity.

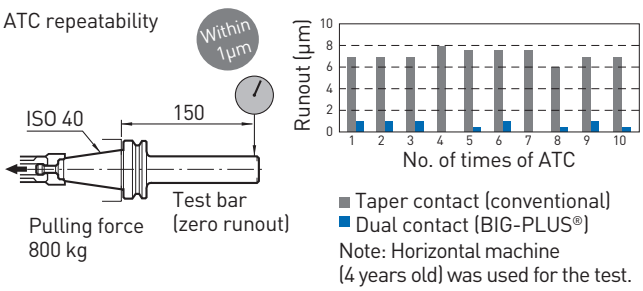
| | Conventional | BIG-PLUS® |
|---|---|---|
| BT50 | Ø 69.85 | Ø 100 |
| BT40 | Ø 44.45 | Ø 63 |
| BT30 | Ø 31.75 | Ø 46 |

**Increased contact diameter (example of BT50)**



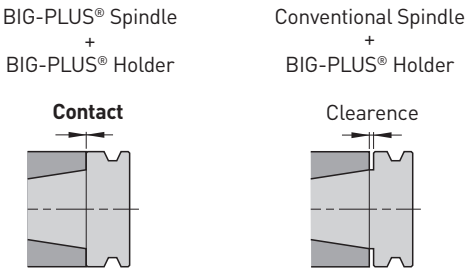

**Improvement of ATC repeatability**

The BIG-PLUS® spindle System assures the highest precision location of the tool holder in the spindle when using the ATC for loading tools, as a result of the dual contact which precisely positions the tool holder within 1 micron.



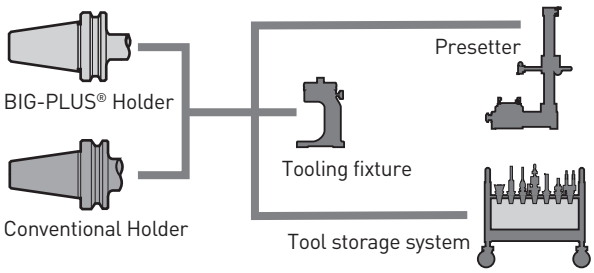

**Perfect interchangeability**

BIG-PLUS® tool holders can be used on existing standard machine spindles. Existing standard tool holders can also be used on BIG-PLUS® spindles. In this case, simultaneous contact cannot be attained.




Although other simultaneous contact systems require exclusive new accessories, the BIG-PLUS® spindle uses existing accessories such as a presetter and tool holder fixture as it is based on a conventional steep taper shank. Further, it is not necessary to modify tool magazines and ATC devices of existing machines.

**Existing accessories utilized**




**Note:**

BIG-PLUS® tools are available as BBT or BDV in page 45 - 92 and 93 - 123.



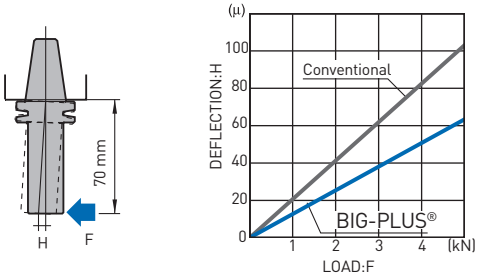
BROTECH

**Minimized deflection for maximum machining, accuracy and superior finish**

With BIG-PLUS® simultaneous contact, machining rigidity is greatly enhanced due to the larger contact diameter of the tool holder flange face. This larger face contact combined with the taper contact works together to resist deflection. With less deflection, greater machining accuracy and superior finish can be achieved.

Comparison of deflection

**BT40**




Deflection of machine spindle is included. Vertical machine was used for the test.

**Face milling application**



BIG-PLUS®

Standard

| | |
|---|---|
| Machine tool: | #40 (horizontal machining center) |
| Cutter: | Face milling Ø 125 (6 cutting edges) |
| Work material: | A2017 Duralumin |
| Cutting depth: | 2.4 mm |

## Caution: The Original Simultaneous Taper and Flange fit Spindle System for Steep Taper

**More than 85% of not original dual contact BIG-PLUS® are not in tollerance**

There are many manufacturers who claim to have dual contact tooling system:
But only a few have an official license of BIG-PLUS®. Without a license, these manufacturers haven't the master gauges nor the measuring devices or the tolerances for defining the critical dimension of the distance between the taper gauge line and the tool flange.
However, according to our inspection*, 85% of the tested tool holders are out of the official BIG-PLUS® tolerance. Only original BIG-PLUS® tool holders enable the benefits and strengths of a BIG-PLUS® spindle system. BIG KAISER controls 100% of its BIG-PLUS® tool holders and therefore guarantees that all products are in the tight BIG-PLUS® tolerance.

BIG-PLUS® SPINDLE SYSTEM DUAL CONTACT

BIG-PLUS® is the trademark guarantee to maximize your machine capability.

* Inspection results or samples of non-licensed dual contact tooling measured according to the BIG-PLUS® standard.

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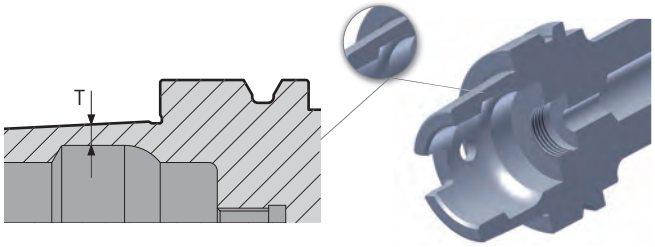
# HSK Tooling Systems

Selected materials and strict control of dimensional accuracy for the optimum quality. Wide range of standard holders to meet all production requirements.

**Premium material selection**

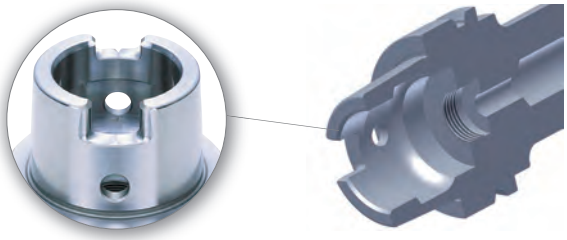
Since HSK is a hollow taper shank, the material has a critical role for optimum performance. BIG KAISER uses carefully selected high grade alloy steels. Particularly, BIG KAISER uses premium materials for HSK 40 and smaller where the cross section of shank taper is very thin.




| HSK Size | 25 | 32 | 40 | 50 | 63 | 100 |
|---|---|---|---|---|---|---|
| T | 1.09 | 1.25 | 1.92 | 2.60 | 3.47 | 5.17 |

**Drive key form**

HSK shanks according to form A are designed to carry out torque transmission by the round shaped key-way at the end of the taper. Because of the importance of this round shaped geometry, BIG KAISER provides finishing of this feature after heat treatment.



**HSK turning tools**

HSK-T63 / T100 (ISO 12164-3)

Unique modular type of turning system offer various solution for turning applications.

**Great variety of HSK**

Following HSK types are standardized to offer the best possible solution. Other types are also available upon request.

HSK-A32/A40/A50/A63/A100/A125

HSK-E25/E32/E40/E50

HSK-F63/F80M

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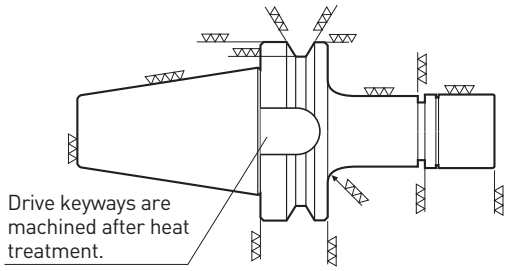
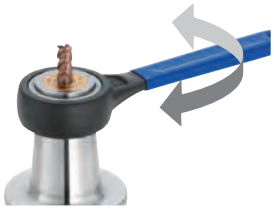
MEGA CHUCK SERIES

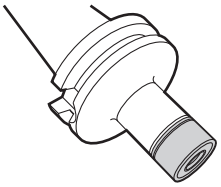
**Precision ground and balanced for high speed machining**
MEGA Chucks are micro mirror ground finished on all surfaces to assure perfect concentricity for high speed machining. The drive keyway is machined after heat treatment.




**Easy and firm clamping by the MEGA Wrench**
The unique MEGA Wrench has a one way clutch system with roller bearings and a ratchet function which is capable of safely and evenly applying force to the entire nut periphery.



**Notch-free design MEGA NUT prevents vibration and reduces noise**
Vibration at high speeds is eliminated with the use of notch free designed nuts, which offer superior balance and concentricity.



**Perfect quality control**

All tools are marked with serial no. as a proof of a high quality and good traceability. 100% tools are inspected its quality to guarantee high performance.

**Tool identification service available**

As an experienced partner for tool management solutions, BIG KAISER is ready to provide its tooling with various solutions for tool identification such as data matrix codes or ID sensors.

**4 chuck types for different high speed machining requirements**

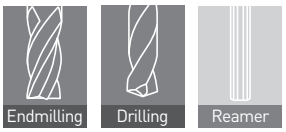
**MEGA Micro Chuck**
For micro drills and end mills
Clamping range:
Ø 0.45 - 8.05 mm

**MEGA New Baby Chuck**
For carbide drills,
reamers and end mills
Clamping range:
Ø 0.25 - 25 mm

**MEGA E Chuck**
For end mills and reamers
Clamping range:
Ø 3 - 12 mm

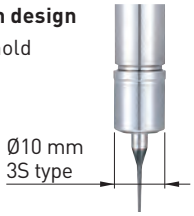
**MEGA Double Power Chuck**
For end mills
Clamping range:
Ø 3 - 42 mm

MEGA MICRO CHUCK®

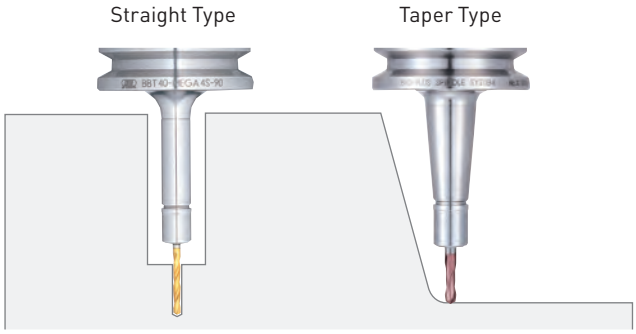



- max. 50 000 min$^{-1}$
- Clamping range: Ø 0.45 - 8.05
- 0.1 mm increments for higher precision

**Nut diameter 10, 12, 14 & 18mm, extremely slim design**
Slim design avoids interference. Ideal for small mold making combining high speed and high precision capability.



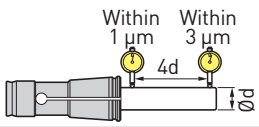

**Three versions are available**
Straight Type: where access is restricted
Taper Type: for increased rigidity
Cylindrical Shank Type: for increased versatility




**High concentricity**
100% concentricity inspection. Within 1 µm at nose is guaranteed.

High precision Micro Collet

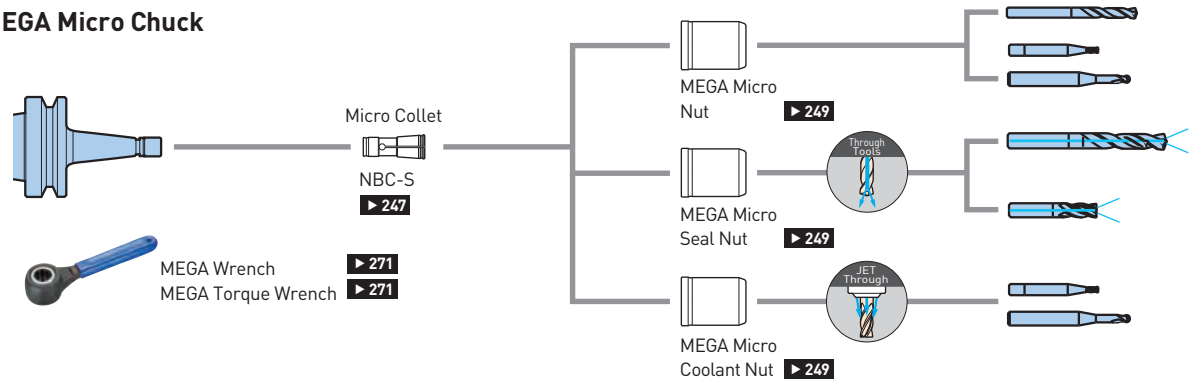
Collet concentricity




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

**Cylindrical Shank Type**
Flexible tool layout, for tighter and deeper area

**MEGA Micro Chuck**

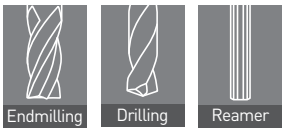




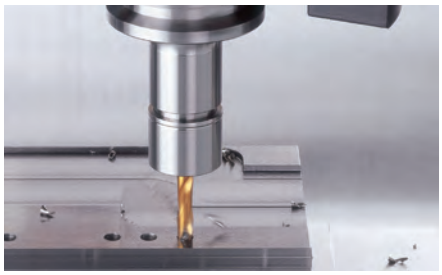

BROTECH

# MEGA NEW BABY CHUCK®

High speed design, offered in six different size collet series, utilizes ultra precision New Baby Collets which guarantee a runout at the collet nose of less than 1 micron.




- max. 40 000 min$^{-1}$
- Clamping range: Ø 0.25 - 25.4

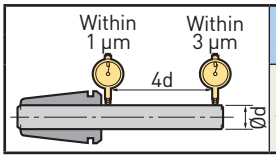


**High precision collet, close to submicron**

100% inspection to guarantee accuracy. Material, production, heat treatment, everything is selected for precision.

High precision NBC Collet

Collet concentricity




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

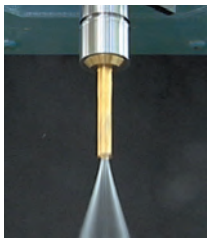
**Various collet and nut selection**

Various type of collet and nut can bring the best solution for your demand.

**2 way coolant supply**

Sealed collet nut MEGA Perfect Seal

- Standard NBC Collet is used
- High dust resistance
- Max. coolant pressure 7 MPa



Through Tools
Tools with holes

Jet Through
Tools without holes

NBC Standard
For general

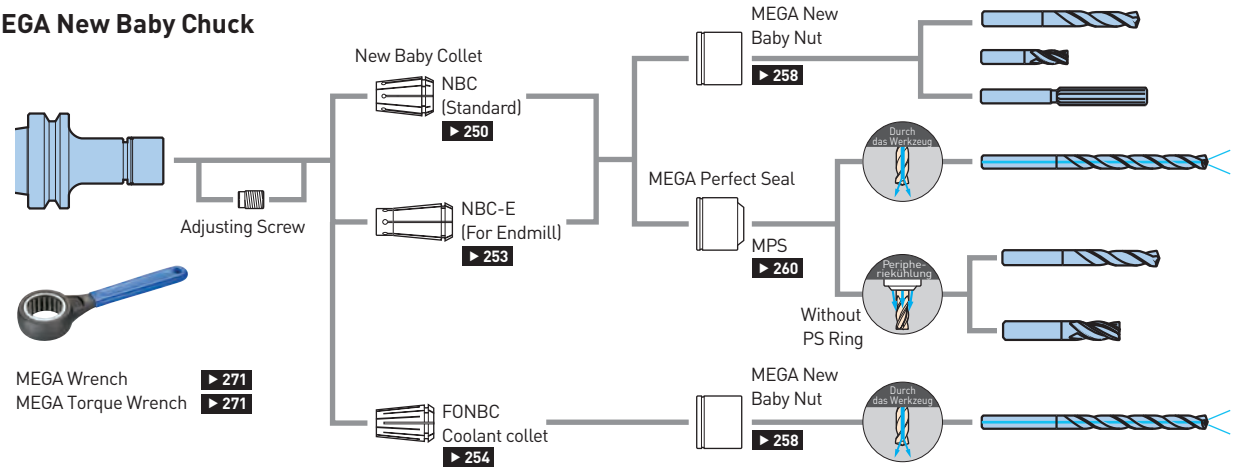
NBC-E collet
For end mill

FONBC collet
For coolant-through tools

MGN nut
For high speed

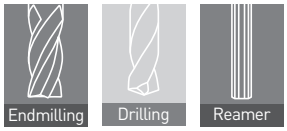
MPS nut
For efficient coolant supply

## MEGA New Baby Chuck

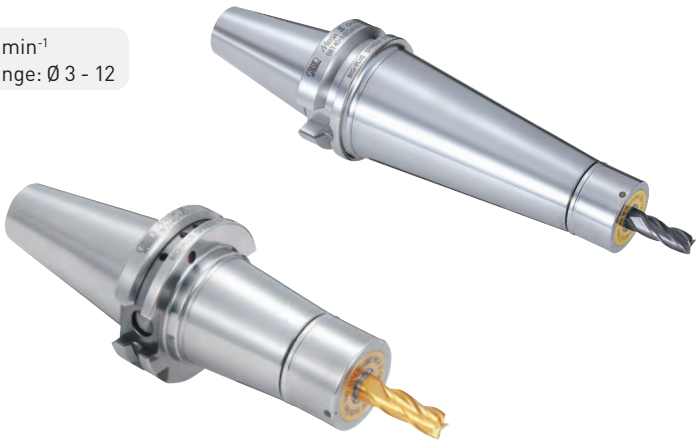


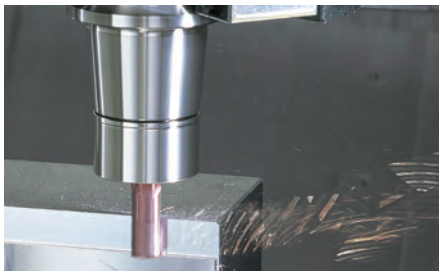
# MEGA E CHUCK®

Collet chuck designed exclusively for endmilling up to Ø 12 mm with high concentricity and rigidity.




- max. 40 000 min$^{-1}$
- Clamping range: Ø 3 - 12



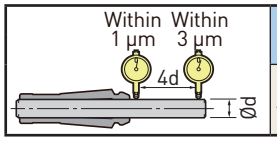


### High concentricity

100% inspection to guarantee accuracy within 1µm runout at collet nose.

High precision MEGA E Collet

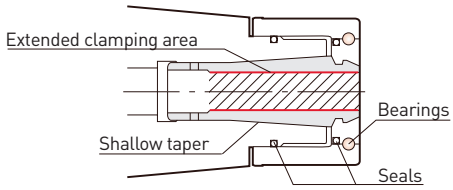
Collet concentricity



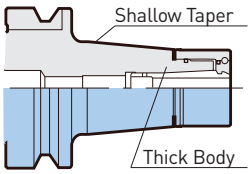

| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

### High grip collet

Gripping force is an important element for endmilling with a collet chuck. The long gripping length of the collet in the MEGA E series provides a powerful gripping force. The shallower taper of the collet improves concentricity in order to achieve better surface finishes and longer cutting tool life.




### Substantial and tapered body design




Thick body eliminates chatter and deflection. Tapered extension provides the rigidity to prevent vibration.

### Slit-through coolant

Coolant is reliably directed to cutting surface through slits in the collet. Tool life is extended together with improved surface finish as a result of smooth chip evacuation.

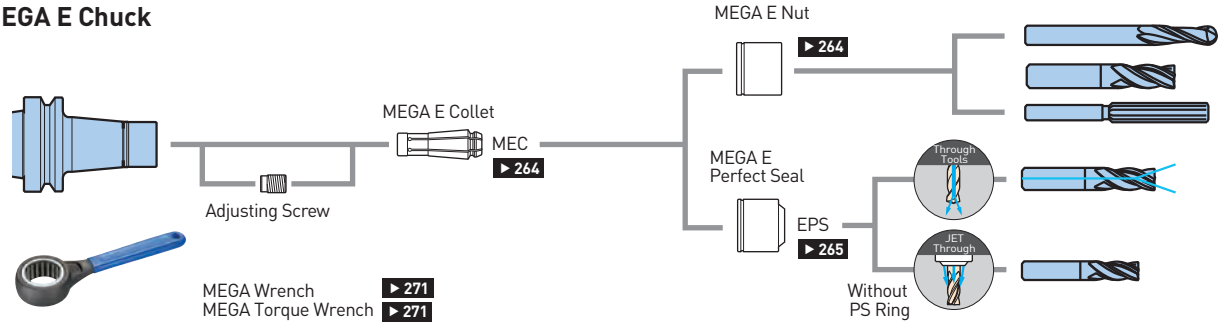
- Max. coolant pressure 7 MPa

For coolant-through tools
Sealed collet nut to supply coolant reliably through cutting tool.

Ideal for burnishing drills and reamers due to extended gripping length.

MEGA E Perfect Seal

## MEGA E Chuck





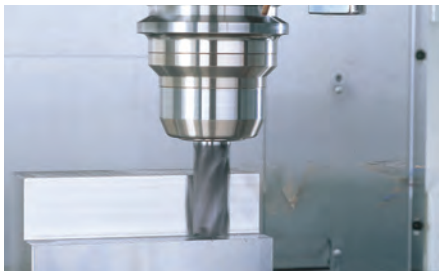

BROTECH

# MEGA DOUBLE POWER CHUCK®

Flange contacting nut and simultaneous taper & flange contact assure highest rigidity.

Endmilling | Drilling | Reamer

- max. 30 000 min$^{-1}$
- Clamping range: Ø 3 - 42
- Ideal for solid machines



**Stabilizing contact between flange and nut provides exceptional rigidity**

The expanded contact diameter of the nut of the MEGA Double Power Chuck to the flange provides the highest rigidity as if the chuck and nut were one solid piece. This superior rigidity assures heavier duty machining without chatter.

Released | Tightened

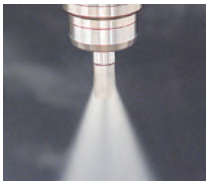
Cutting conditions

| Coated carbide endmill<br>Ø 32, 4-flutes<br>Workpiece: SS400 (JIS)<br>V282 m/min<br>S 2 800 min$^{-1}$<br>F1 120 mm/min | BBT50-MEGA32D-105<br>Radial d = 14 mm<br>Power 15.2KW | Other manufacturer<br>(L = 90)<br>Radial d = 9.5 mm<br>Power 9.2 KW |
|---|---|---|
| | | |

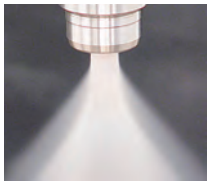
**Secure coolant supply**

Two types are designed for the most effective coolant supply.

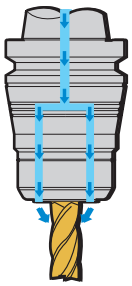
- Improved surface finish
- Extended tool life
- Smoother chip evacuation
- Cooling & lubrication of tools



Type D
through tools



Type DS
jet through



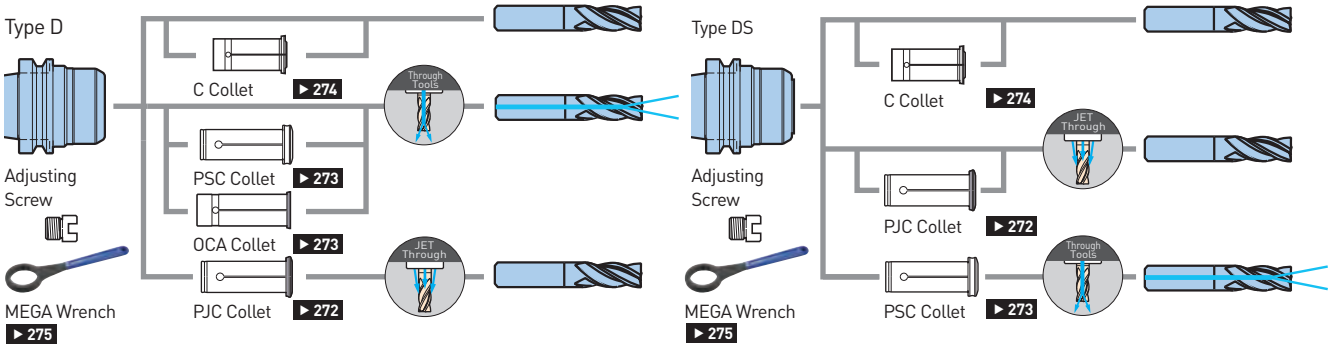
Various type of straight collets are available.

For jet through
PJC collet

For through tools
PSC collet

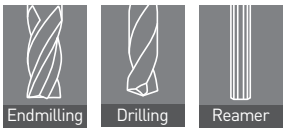
For through tools
OCA collet

## MEGA Double Power Chuck



# New Baby Chuck

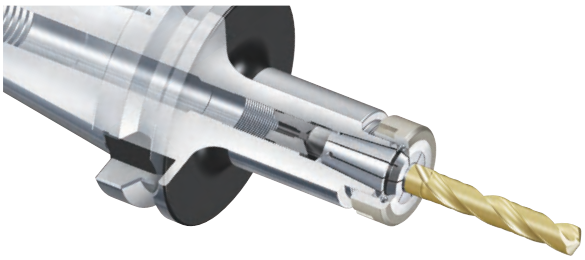
New Baby Chuck is capable of achieving high spindle speeds as required for drilling and end milling with smaller diameter cutting tools.




- Clamping range: Ø 0.25 - 20

**Ideal combination of taper angle and collet projection length**

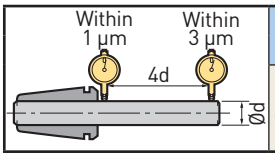
New Baby Chuck satisfies all requirements for accuracy, clamping force and clamping range, by utilizing the ideal 12° taper angle.



**High concentricity**

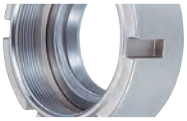
Each collet is inspected and double checked to meet maximum runout tolerance permitted.

Collet concentricity




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

**The nut is a key to achieve the highest precision of a collet**



- Since the threads greatly influences accuracy, they are finished after heat treatment. Therefore, bad influence from clamping action is eliminated, which enhance clamping performance.
- A nut incorporates a thrust bearing with steel balls that prevents stress to a collet and allows a smooth clamping force to a collet.

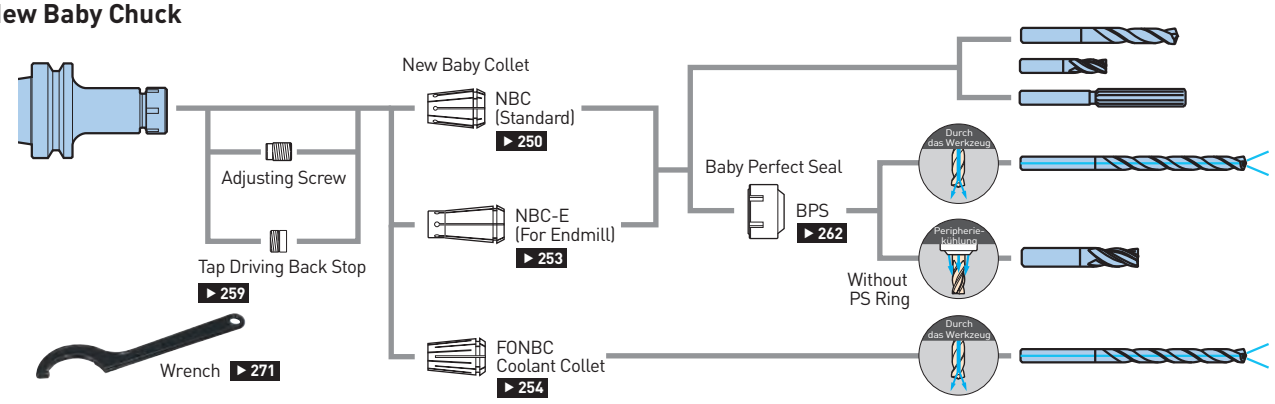
**For high pressure coolant supply**

- Standard NBC Collet is used.
- High dust resistance
- Max. coolant pressure 7 MPa

Through Tools
Tools with holes

Jet Through
Tools without holes

## New Baby Chuck

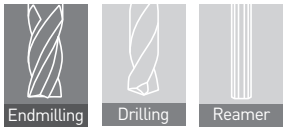





BROTECH

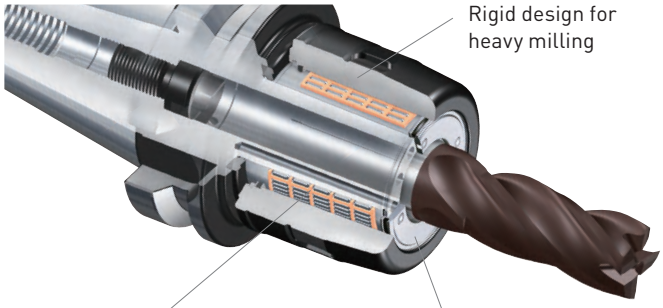
# New Hi-Power Milling Chuck

New Hi-Power Milling Chuck combines the high accuracy with high torque capability and rigidity.



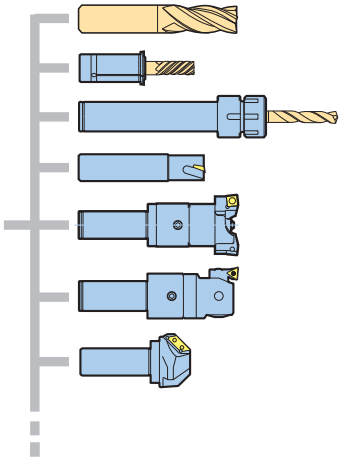

- Clamping range: Ø 3 - 42

### High rigidity design for heavy cutting



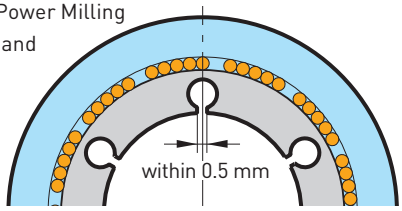

### Basic tool for various applications

New Hi-Power Milling Chuck is a good basic tool. Not only for milling tool, but also for boring tools, chamfering tools and various applications.



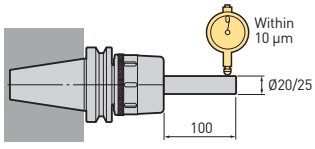
### Secure and reliable slit design

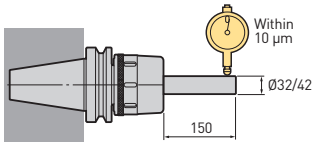
The annular section needs to be substantial in order to provide rigidity but retain the ability to collapse in order to provide sufficient grip. The section of the Hi-Power Milling Chuck has combined holes and slits at regular intervals in order to combine both requirements.




### Precise concentricity

Concentricity is assured by the integral design and clamping by mechanical compression of the annular section by the rolling bearing system. All models are inspected and double checked to meet maximum runout tolerance permitted. (within 10µm at 4D).

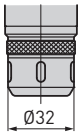


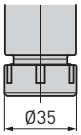

### HMC12J type

Super slim design milling chuck with peripheral coolant supply function is also available.

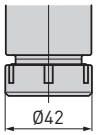
HMC12J




NBS13




NBS16



# MEGA Perfect GRIP®

Features 100% security against pulling out the cutting tool under any torque load.

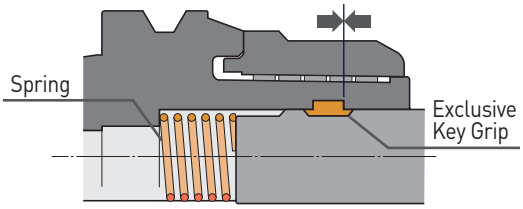
- Accepts industry standard Weldon flat milling cutters
- No special grinding of milling cutter required
- Flood jet-through coolant
- Available with BBT40/50/DV50 and HSK-A63/100/125

**Simple, easy handling with secure clamping**

1. Place the exclusive key grip into the Weldon flat of the end mill shank.
2. Insert the end mill with the key grip in alignment with one of the three key grip grooves inside the milling chuck.
3. Rotate the end mill approximately 20° clockwise until the key grip stops securely against the stopper pin.
4. Finish clamping the tool until the clamping nut contacts the positive stop of the chuck body.

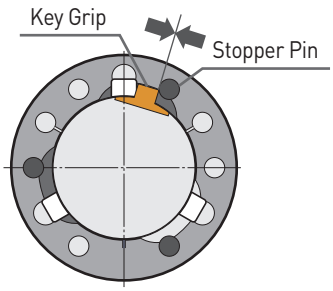
**Non-Pullout mechanism**

The Key Grip engages in the groove of the chuck body to ensure no tool pullout.




**Non-Slip mechanism**

The Key Grip maintains contact with the stopper pin to prevent any slip under high torque.

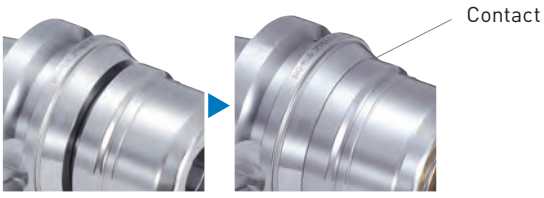


**Flood jet-through coolant**

The key grip grooves provide channels for high volume coolant to the cutter. Effective end milling of HRSA's requires a high volume of coolant to the cutting edge to dissipate heat and aid in the removal of chips.

**Perfect contact between flange and nut**

The expanded contact diameter of the nut of the MEGA Perfect Grip to the flange provides the highest rigidity.




Released Tightened



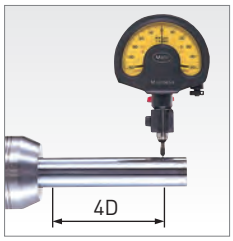
BROTECH

# HYDRAULIC CHUCK

Ultra precision hydraulic clamping chuck holder with various additional features.

Endmilling | Drilling | Reamer

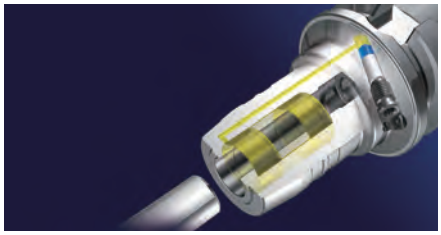
**Runout accuracy less than 3 µm**



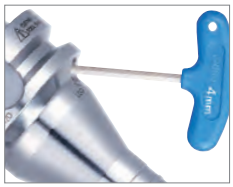

High precision runout accuracy less than 3µm at 4d improves the workpiece surface finish and extends tool life.

**Integral sleeve construction**

Compared with the traditional two-part construction sealed with O-rings, BIG KAISER Hydraulic Chucks are long lasting and maintenance free. Also the rigidity is greatly improved by the short projection length and dual pressure points.



**Easy clamping with 1 wrench**



The cutting tool can be clamped or unclamped easily and securely with just 1 wrench. Extremely good repeatability and runout accuracy are guaranteed.

**Various selection of Hydraulic Chuck**

The Hydraulic Chucks come in a variety of design and function to cover specific demands within high precision application.

- Slim and high speed
- Slim design available from Ø 3 mm
- Jet-through coolant supply

Super Slim Type

Super compact and high speed (max. 60 000 $min^{-1}$)

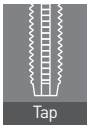
Cylindrical shank with coolant-through

Jet-through coolant supply (max. 30 000 $min^{-1}$)

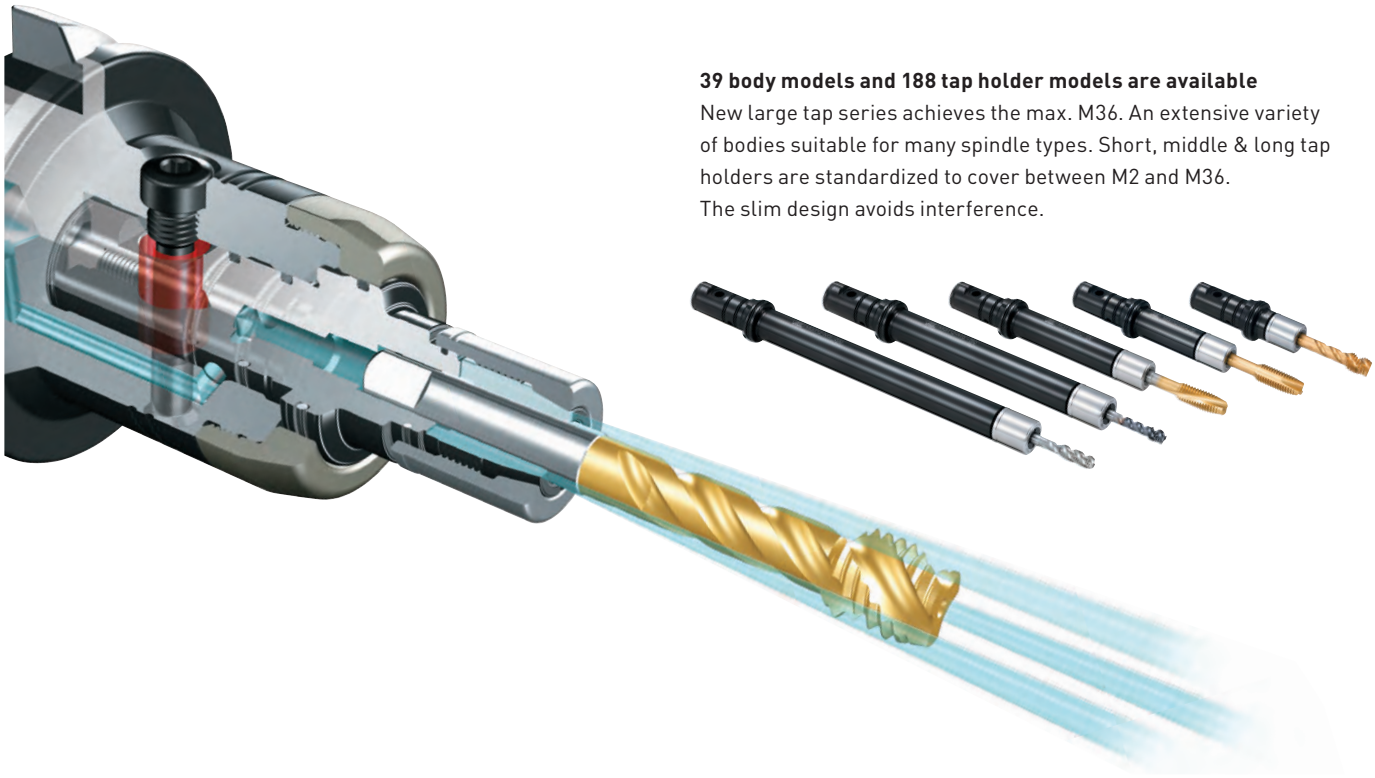
Coolant to cutting tool periphery

## MEGA SYNCHRO® Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.




- Tapping range: M1 - M36



**39 body models and 188 tap holder models are available**
New large tap series achieves the max. M36. An extensive variety of bodies suitable for many spindle types. Short, middle & long tap holders are standardized to cover between M2 and M36.
The slim design avoids interference.

**Tool periphery**
Coolant is supplied through slits of the tap holder.

**Through tool**
Coolant is supplied through both the tool and the slits of tap holder.

**Secure drive system**
Body and tap holder are fixed with a drive key in the rotation direction as well as the square of the tap.

**Coolant through center capability for all models**
Coolant is supplied both through the tool and to the tool periphery simultaneously.



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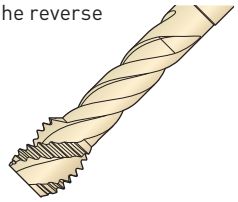
**MEGA Synchro Tapping Holder compensates for synchronization errors with any type of tap**

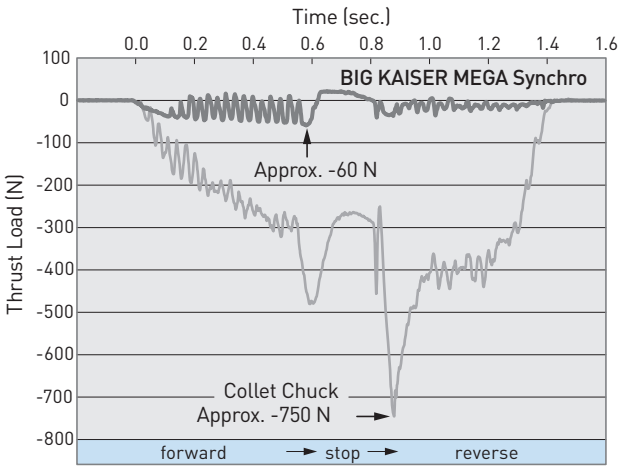
Minimized thrust load to both the tap and workpiece improves thread quality and tap life.

**Load to tap – spiral tap**

Spiral grooves on spiral tap cause loading in the reverse direction, similar to an end mill.

- M6 P1
- V: 20 m/min (1 060 $min^{-1}$)
- Measured by Kistler dynamometer






**Result**

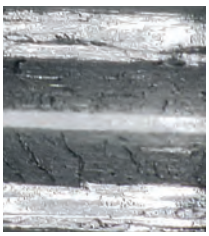
MEGA Synchro reduces load to approx. 60N. This is less than 1/10th of the load compared to a collet chuck. Approx. 750N of reversal load is applied to a tap held with a collet chuck.

**Comparison of surface finish**

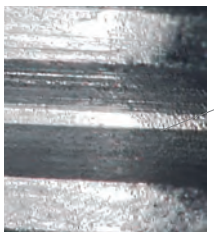
Tapping of exotic materials tends to cause a compressed burr on the thread surface. BIG KAISER MEGA Synchro compensates for synchronization errors and minimizes cutting load.

Spiral tap

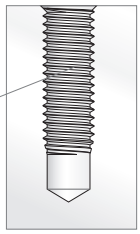
M5 P0.8 Material : SNCM420(41CrNiMo2)



Collet chuck

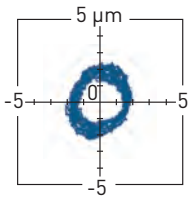


MEGA Synchro



**For small tap MGT3 (M1 - M3)**

Eliminated synchronization errors and minimized dynamic runout. Plotted position of a test bar (at 16 mm distance on 4 mm diameter).




**For large tap MGT36 (M22 - M36)**

Smooth tapping for large tapping.

# Smart Damper Series

Unique dynamic damping system eliminates vibration for higher productivity.

Anti-Vibration

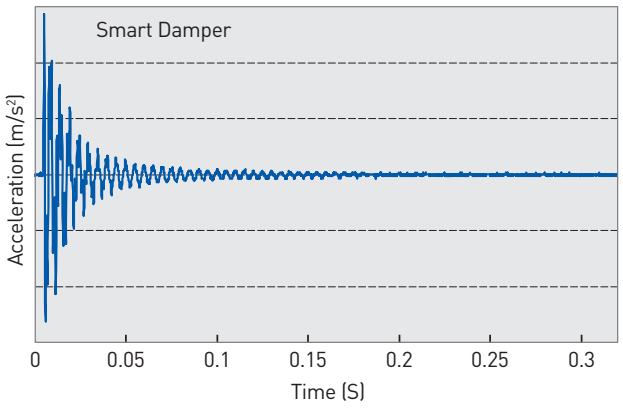
- Unique damping system for milling and boring
- Center through coolant supply

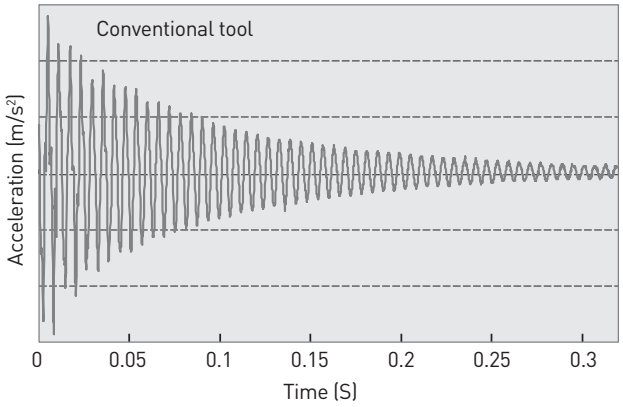
**Damping mechanism**

Smart Damper incorporates unique damping mechanism functioning both counter and friction dampers. Patent-pending counter weight maximizes effect of the friction damper. Vibration is absorbed effectively and higher machining accuracy is achieved.

Face Mill Arbor Type FMH

**Comparison of oscillatory waveforms**




Face milling of C55 with high feed cutter

| Holder | Radial depth of cut (mm) | | | | Condition |
|---|---|---|---|---|---|
| | 5 | 10 | 20 | 30 | |
| Standard Holder | ○ | X | X | | V=90 m/min<br>Fz=1.0/tooth<br>Ap=2.0 mm<br>Overhang=<br>347 mm |
| Smart Damper | ○ | ○ | ○ | | |

Smart Damper achieves 6x deeper depth of cut.

Super finish surface with tough condition
Fine boring of ductile cast iron (FCD500) with horizontal MC
BIG-PLUS® BBT50

| Holder | Cutting speed (m/min) | | | | Condition |
|---|---|---|---|---|---|
| | 25 | 50 | 100 | 150 | |
| Holder without damper | ○ | X | X | | Dia=Ø68 mm<br>Depth=408 mm<br>(L/D=6)<br>Insert radius=<br>R0.4<br>Feed=0.2 mm/<br>rev<br>Depth of cut=<br>0.3 mm/Ø |
| Built-in Damper Smart Damper BBT50-CK-6DP-451 | ○ | ○ | ○ | | |

X = Chattering ○ = Good ◎ = Excellent surface finish

6 times greater productivity. Superior surface finish and better tool life due to increased cutting speed.



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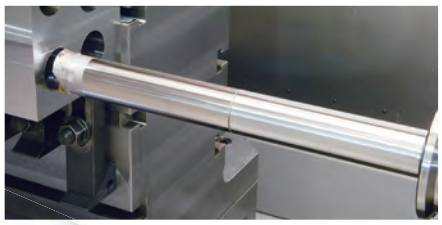
## Smart Damper CK Boring Tools

Wide variety, such as extension type, integral type, fine boring, rough boring are available depending on your application.



**EWD/EWN Fine Boring Type**
Damping function integrated in the head achieves the best surface finish.

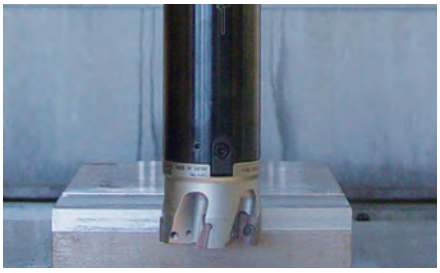
**SW Rough Boring Type**
Damping function integrated in the head maximizes cutting performance.

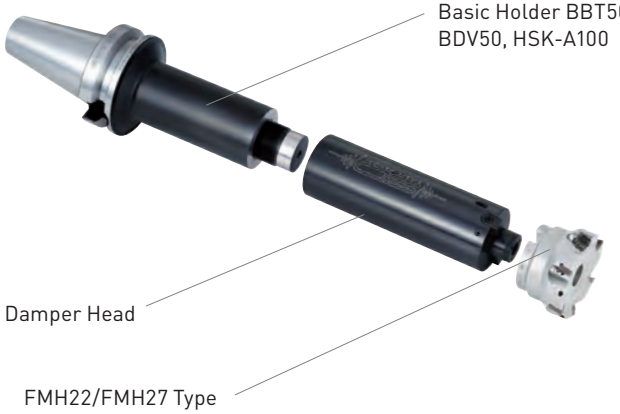
**CK Shank Integral Type**
Damping function integrated in CK shank offers more flexibility in selecting the boring head.

**CK Extension Type**
Easy update of the existing CK boring to a damping boring tool.

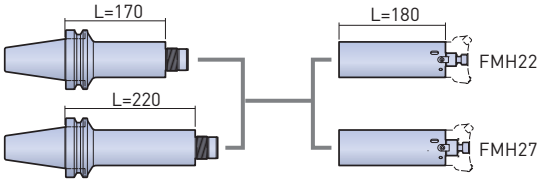
## Smart Damper Face Mill Arbor

Replaceable damper head enables use on various basic holders.



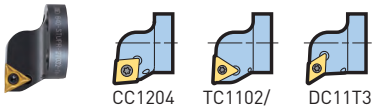



Combination examples BBT50




## Smart Damper Turning

Newly developed for boring applications on turning machines. It performs perfectly in both roughing and finishing. Several cartridges are available for ISO insert, depending on the application.



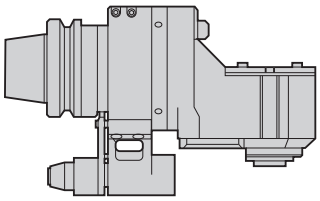
# Angle Head

Angle Heads eliminate multiple set-ups, combine vertical, horizontal and angular operations on one machine. One original set-up saves time, speeds production and guarantees accuracy.

- Max. 6 000 $min^{-1}$
- Coolant-through from the locating pin

**Compact design assures rigidity**

Overhang is minimized for added rigidity and strength. As a result, the projection length with cutting tool is shorter, which reduces the overall load on the Angle Head and thus improves the unit's cutting capability. The minimized overhang helps to eliminate interference with the ATC and adjacent storage pockets in the tool magazine. High Rigidity S-type, which has a steel housing and a stronger locating pin assembly, is also available.



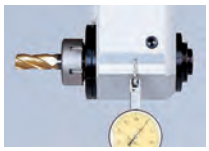
**Unique coolant jacket**

Jacket allows coolant coming through the stop block to be efficiently directed to the tool cutting edge while simultaneously cooling the Angle Head.

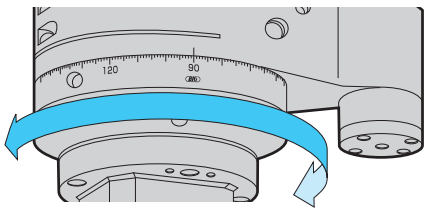
**Innovative sealing method**

The advanced non-contact sealing method prevents coolant and particle contamination better than any other sealing method.

**Cutter head adjustable 360°**



Reference faces are provided on both sides of all heads for easier setting of a cutter direction.




**Superior quality components**

For smooth and powerful operation and to minimize noise and vibration, all Angle Heads are equipped with hardened and ground chrome-nickel steel spiral bevel gears, super precision hardened and ground spindles, and high precision angular contact ball bearing.

**Various executions of Angle Head**

More types are available to offer the best solution for your demand.

AG90 NBS type

AG90 Build-Up type

AGU type

Small bore type

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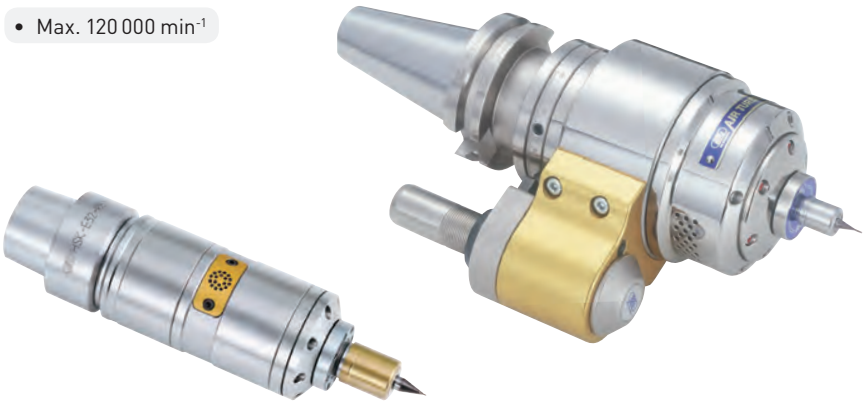
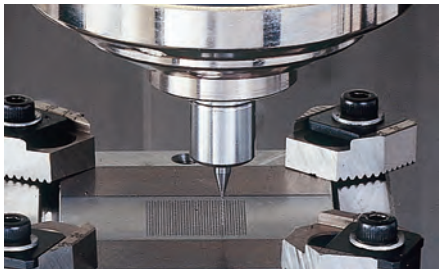
# AIR TURBINE SPINDLE

High-speed micro-machining can be done on a normal machining center, eliminating the need of an expensive high-speed machine.

- Max. 120 000 min$^{-1}$



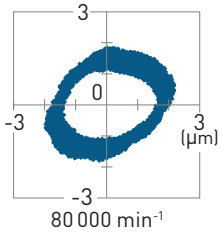


**Dynamic runout accuracy**

Most problems associated with micro-machining are caused by poor dynamic runout of a machine spindle. We have established a runout measuring system that can detect spindle movement during rotation at high speed and achieved the best dynamic runout accuracy.

- Improved machining accuracy
- Superior surface finish
- Extended tool life

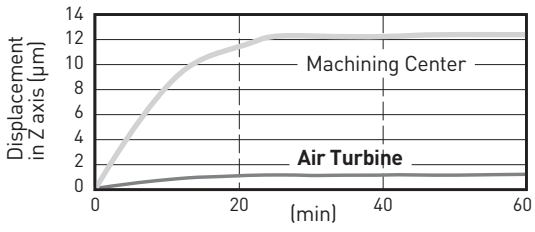
Plotted position of a test bar at the max. spindle speed (see image on the right).




**Minimal thermal displacement**

Air turbine drive prevents thermal expansion of the spindle, which is essential for high accuracy micro-machining.

Axial displacement compared to operating time

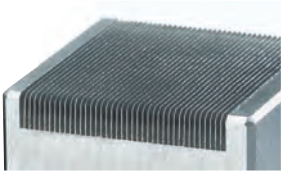


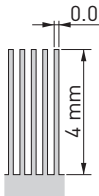

**Application examples**

**RBX7**

**Aluminum A2017**

Outstanding runout accuracy permits perfect thin wall cutting.



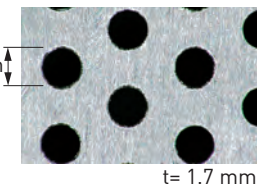



| | |
|---|---|
| Cutter | Ø 0.5 mm rib-endmill |
| Spindle Speed | 70 000 min$^{-1}$ |
| Cutting Feed | 1 500 mm/min |
| D.O.C | ap = 0.02 mm |

**RBX5**

**Stainless steel SUS303**

Tool life is doubled with over 1 200 holes and cutting time is reduced to 1/3.




| | |
|---|---|
| Cutter | Ø 0.5 mm solid drill |
| Spindle Speed | 40 000 min$^{-1}$ |
| Cutting Feed | 20 mm/min |
| Peck | 0.01 mm |

**Automatic tool change**

ATC type is available by supplying air via a stop block to enhance productivity with unmanned operation.

**3 types of Air Turbine Spindle**

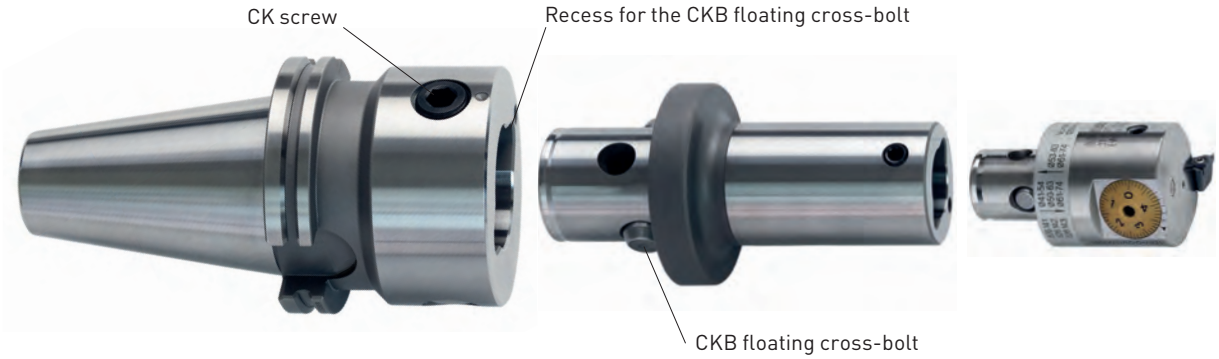
RBX5 = 50 000 min$^{-1}$
RBX7 = 80 000 min$^{-1}$
RBX12 = 120 000 min$^{-1}$

| Application Range | | RBX5 | RBX7 | RBX12 |
|---|---|---|---|---|
| Drill | Ø < 0.1 mm | △ | △ | ○ |
| | Ø 0.1 - 0.3 mm | ○ | ○ | ⊙ |
| | Ø 0.3 - 0.5 mm | ○ | ⊙ | ○ |
| | Ø 0.5 - 1.0 mm | ⊙ | ○ | x |
| | Ø 1.0 - 1.5 mm | △ | x | x |
| End Mill | Ø < 0.5 mm | ○ | ⊙ | ⊙ |
| | Ø 0.1 - 1.0 mm | ⊙ | ⊙ | △ |
| | Ø 1.0 - 1.5 mm | ⊙ | △ | x |
| Jig Grinding | | ⊙ | ⊙ | ○ |

⊙ Optimum
○ Acceptable
△ Dependent upon cutting conditions
x Not recommended for use

# CK, CKB, CKN: Various Connections - One System

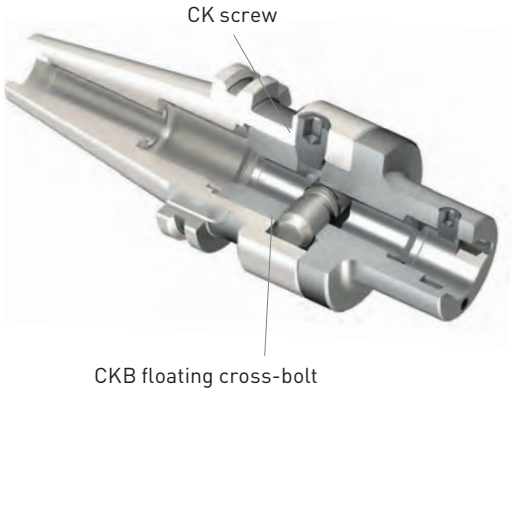
Based on a cylindrical connection with radial locking screw, the world-famous modular precision tool system BIG KAISER CK has continuously been improved over the years, and has adapted to customer's needs and the increases in machine tool performance. Compatibility to existing tools has always been a requirement for newer designs. This means that all BIG KAISER connections are almost 100% compatible, and all the components are kept in stock.

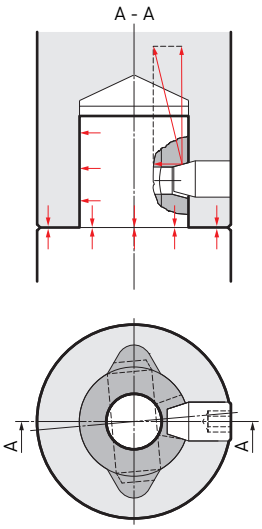



## CKB Connection: Highly Efficient and Easy to Handle

The modular components are clamped with the lateral locking screw (CK-screw). The floating cross bolt is automatically centred in the trapezoid-shaped recesses in the mating part and ensures an absolutely uniform distribution of the torque forces.

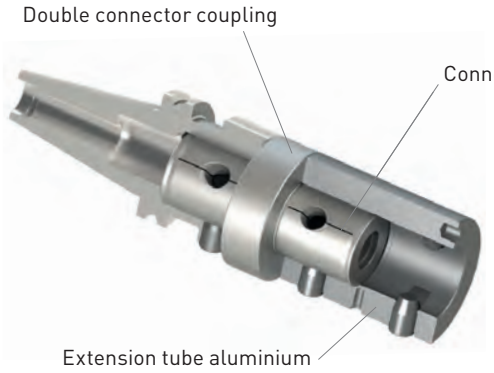
- Simple, efficient operation -no special equipment or tools needed
- Maximum rigidity due to high preloading forces and large contact surfaces
- Precise cutting edge location even when using several adapters
- High interchange accuracy, maximum radial change error is 0.002 mm

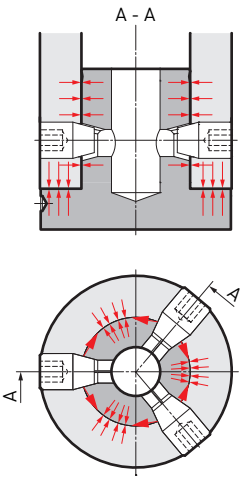


# CKN Connection: for Lightweight and High Performance Tools

Based on a 3-screw-connection and a male pilot with 3 partial slits, the CKN connection is designed for lightweight- and high performance tools. The main components for the lightweight program are double connector couplings made of steel and extension tubes made of aluminium. The high performance program for enhanced radial stiffness is entirely made of steel components.

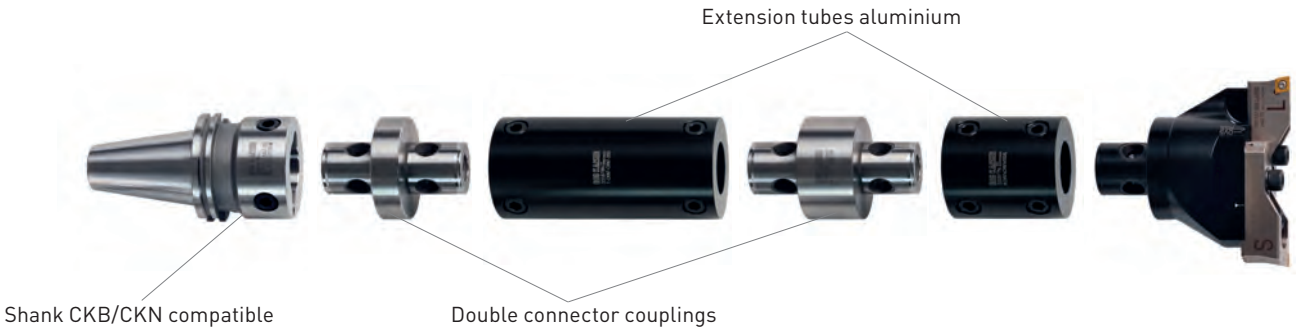



## CKN Connection: Lightweight Program

The double connector coupling enables the use of aluminium extension tubes which result in a considerable weight reduction for larger tools. The torque transmission from the aluminium tube to the connector made of steel over three screws guarantees no reduction of cutting performance in comparison to tool combinations made of steel only.

CKN: the strongest tool connection for lightweight tools



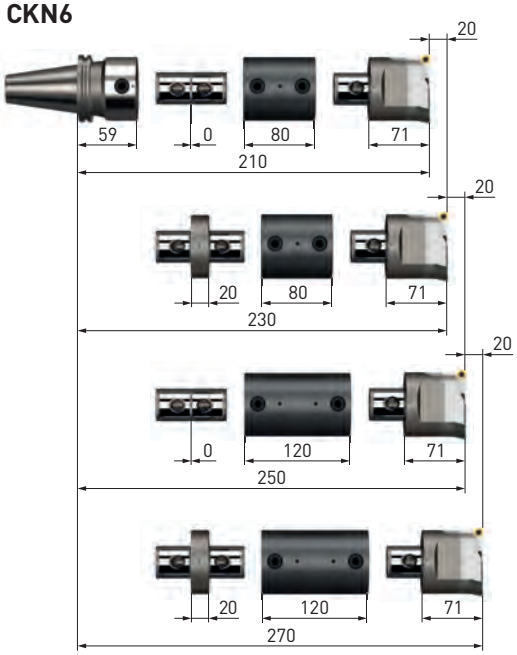

## CKN Connection: High Performance Program

Tool combinations made of steel components, offer highest bending resistance for heavy duty milling with long tools.

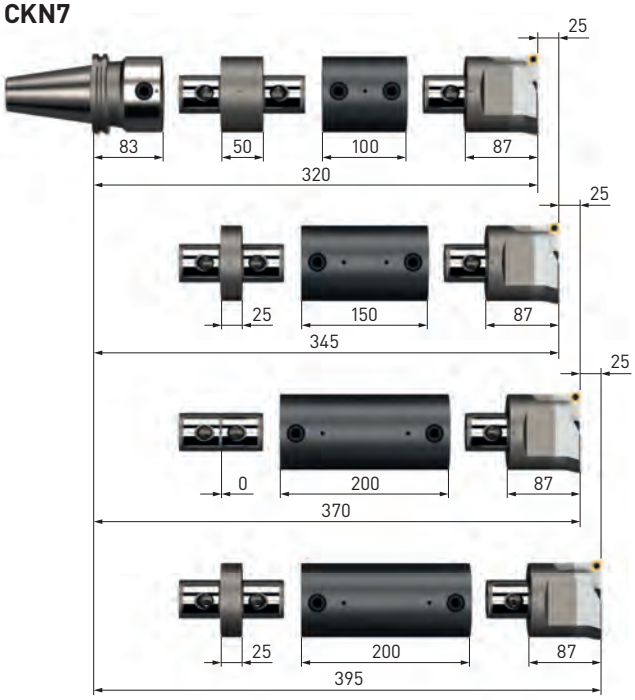
# Optimized Tool Lengths

A few millimeters difference in tool lengths can determine whether a boring operation will be successful or not. The CKN components are made with a very fine length graduation of 20 mm for CKN6 and 25 mm for CKN7.

**CKN6**



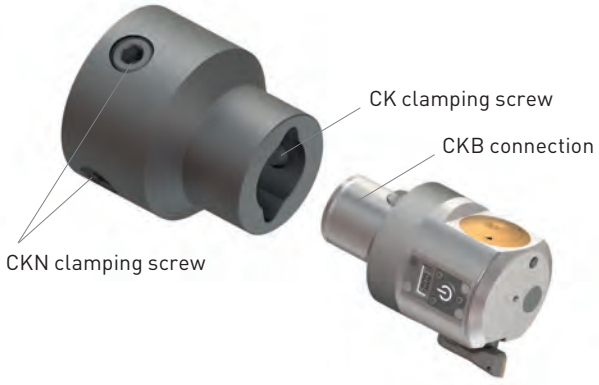

**CKN7**

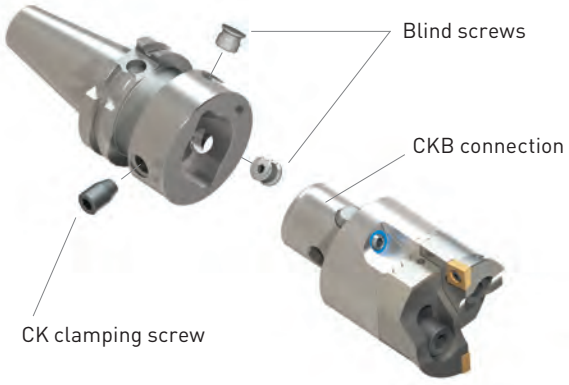



- Double connector coupling made of steel and aluminium extensions for the transmission of high torques
- Weight reductions up to 50% and equal cutting performance, compared to tool combinations made of steel
- Reduced weight allows easier handling and eliminates manual tool change in many cases
- Max. rigidity of the tool connection due to high clamping force and expansion of the slotted tool connector
- Vibration damping due to the use of different materials.

## Compatibility CKN - CKB

For compatibility reasons, the CKN shanks will be delivered with only one CK screw and two blind screws assembled. For CKN assemblies, the remaining two CK screws will be supplied with the mating component having the male CKN connection.






BROTECH

# EWE Digital Fine Boring Heads

Fine boring heads EWE with digital display and direct electronic measuring system on the tool carrier, feature absolute setting accuracy. The boring heads are designed for ultra precise boring operations in the range from Ø 2 to Ø 152 mm with highest spindle speeds.

**Same accessories for fine boring heads EWE and EWN.**

- Boring range: Ø 2 - 152

EWE 2-152

EWE 2-32

**Body protection grade: IP 69K**
The high quality coating of the tool body ensures a complete protection against corrosion. The built in electronic is safe from dust and high pressure spray water according to the protection category IP69K.

**Digital display with a resolution of 0,001 mm Ø and Piezo button**

Automatic switch off function which always stores the last displayed value and integrated power management for optimized battery life.

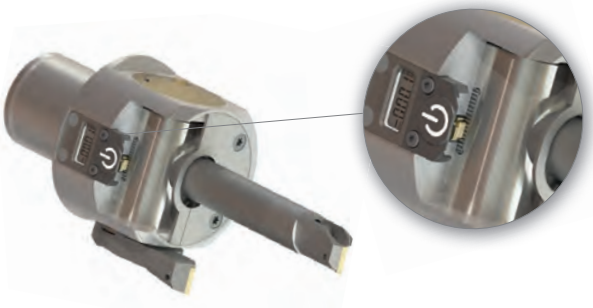
Piezo button for maintenance-free use

**Integral execution available**
Can be used for cylindrical bar from dia 2-80 and with peripherical insert holders from dia 80-152mm.

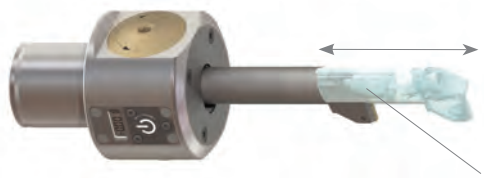
EWE 2-152 HSK-A63

**Maximum rotation speed: 14 000 min$^{-1}$**
Tool carrier in center position allows n max. of 14 000 min$^{-1}$ due to minimized imbalance.

**Electronic components – made by BIG KAISER**
All electronic components are entirely developed and manufactured in the electronic lab of BIG KAISER in Switzerland. Before shipping, every digital boring head is calibrated and tested separately.



**Variable length adjustment of the tool holder**
Best cutting results are only reachable if the tool holder is as short as possible. The EWE features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



Tool holder

EWE is defined as "Evolution" model of original digital boring head called EWD. Accessories of EWE are fully compatible with EWD and EWN.

# EWN Fine Boring Heads

Fine boring heads with centric boring bars in modular and integral execution for accurate, high performance boring operations.

**Same accessories for fine boring heads EWN and EWE.**

- Boring range: Ø 0.4 - 152

EWN 2-152

EWN 2-32

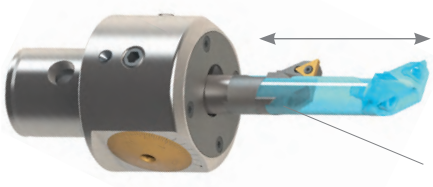
EWN 04-22

EWN 04-15

EWN 04-12

EWN 04-7

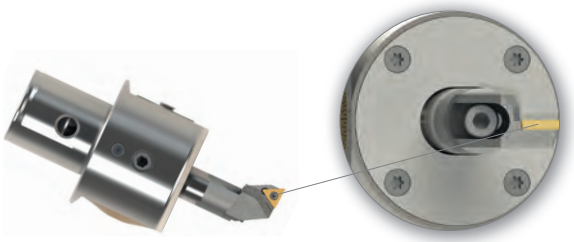
**Variable tool length adjustment of the tool holder**
Best cutting results are only reachable if the tool holder is as short as possible. The EWN features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.




**Large dial disc for a parallax-free reading**
Thanks to the use of a vernier, diameter adjustments of 0.001 mm can be executed precisely.

**Many integral executions available**
In addition to the boring heads with CK-connection integral executions of the EWN 2-152 are available for DV, HSK, BT and BIG CAPTO spindles.

**Fine balanced when tool carrier is set in center position**
Tool holders made of carbide with adjustable insert holders permit diameter setting on the insert holder. The heavy tool holder remains in the center position and does not create any imbalance. The imbalance created by the insert holder is in most cases insignificant.



**EWN 2-152: Huge boring range with just one tool**
Additional boring range with peripherical insert holders from Ø 80 - 152 mm.

Ø 2 - 54 mm

Ø 54 - 80 mm

Ø 80 - 152 mm

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# EWE Digital Fine Boring Heads

The boring heads EWE with digital technology combine all advantages of the analogue boring heads EWN. Thanks to the large display with a resolution of 0.001 mm Ø bores with extremely tight tolerances can be machined.

**Fine boring heads EWE and EWN feature equal boring ranges and body dimensions and allow the use of the same accessories.**

- Boring range: Ø 41 - 203

EWE 68

**Digital display with a resolution of 0,001 mm Ø**

Automatic switch off function which always stores the last displayed value and integrated power management for optimized battery life.

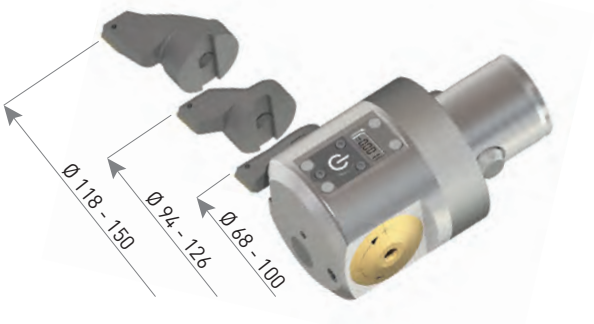
Piezo button for maintenance-free use.

**Body protection grade: IP 69K**

The high quality coating of the tool body ensures a complete protection against corrosion. The built in electronic is safe form dust and high pressure spray water according to the protection category IP69K.

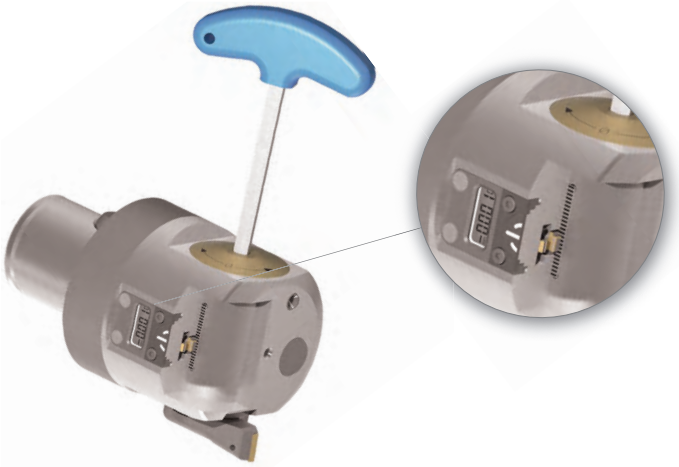
**Large boring range**

Every EWE has a large work range due to three different insert holders. For example: The EWE 68 can manufacture a diameter range from Ø 68 to 150 mm.




**Direct measuring diameter allows corrections in both directions**

With a direct electronic measuring system on the tool carrier and a resolution of 0.001 mm Ø, the fine boring heads EWE enable diameter corrections with an unmatched accuracy.



EWE is defined as "Evolution" model of original digital boring head called EWD. Accessories of EWE are fully compatible with EWD and EWN.

# EWN Fine Boring Heads

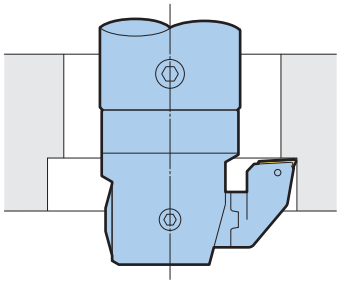
The fine boring heads EWN series 310 cover a range of Ø 20 - 203 mm with only 7 fine boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.

**Fine boring heads EWN and EWE feature equal boring ranges and body dimensions and allow the use of the same accessories.**

- Boring range: Ø 20 - 203

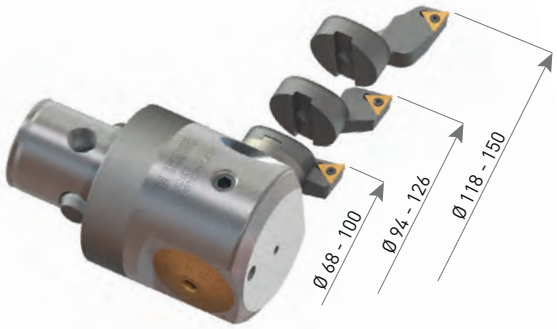
EWN 53

**Back boring**
Insert holder can be mounted in opposite direction for an easy changeover to back boring.



**Versatile tool**
Insert holders for many types of inserts (TP, TC, CC with different angles) as well as accessories for face grooving are available.

**Large boring range**
Every EWN fine boring head has a large work range due to three different insert holders. For example: The EWN 68 can manufacture a diameter range from Ø 68 to 150 mm.




**Suitable with outer diameter turning system**
Fine boring heads EWN/EWE are suitable for OD turning applications in the diameter range Ø 16 - 2856 mm. There are two different OD turning systems available.

Ø 16 - 120 mm

Ø 49 - 2856 mm

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# EWB Balanced Fine Boring Head

The precision balancing of the EWB with peripherical insert holder occurs automatically by the adjustment of the diameter. The EWB with centric boring bar is precisely balanceable via a balancing ring. To balance the whole tool combination there are prebalanced shanks and components available. Even at max. speeds, balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.

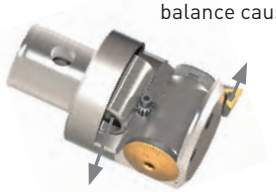
- Max. speed: 2 000 m/min

EWB 41

**Ready to work**
The EWB fine boring heads will be delivered with assembled insert holder.

**Aluminium executions available**
The fine boring heads EWB-AL are made of high tensile aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%. This means that weight problems during ATC and handling are eliminated.

**Self balancing mechanism**
A counterweight built into the boring head compensates for the imbalance caused by the movement of the tool carrier.

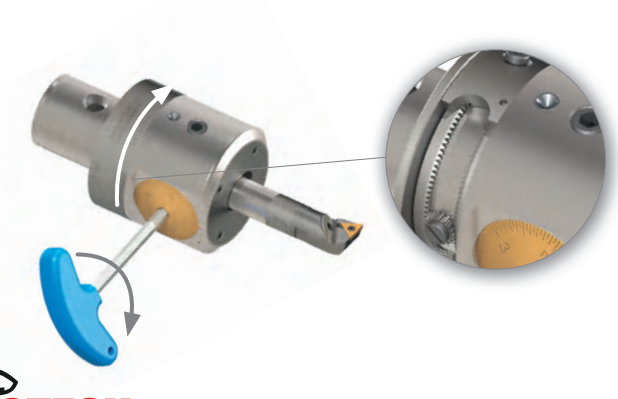


EWB 2-50

EWB 2-32

**Precisely balanceable**
The EWB fine boring heads have an integrated balancing mechanism. The imbalance of the boring head is compensated by a unique manually adjustable balancing ring.

**Variable length adjustment of the tool holder**
Best cutting results are only reachable if the tool holder is as short as possible. The EWB features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



**Boring bars made of carbide**
For optimized cutting results dedicated boring bars made of carbide are available.

# SW Rough Boring Heads

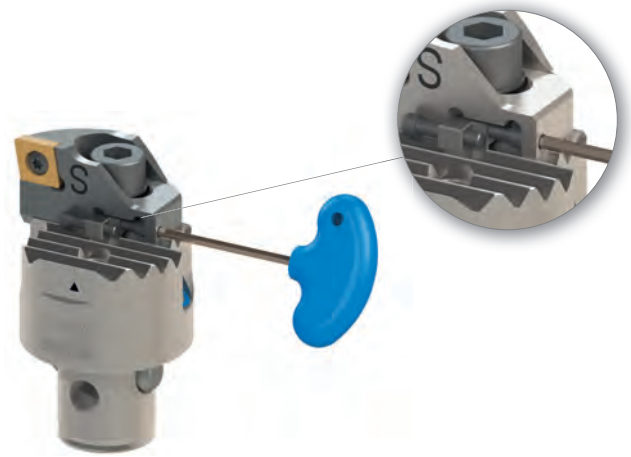
The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance.

- Boring range: Ø 20 - 203

SW 68

**Accessories for different applications**
On the same body insert holders for back boring, chamfering or face grooving can be mounted.

**Precise presetting**
Presetting of the tool diameter and length without presetter thanks to fixed tool length and diameter scale.

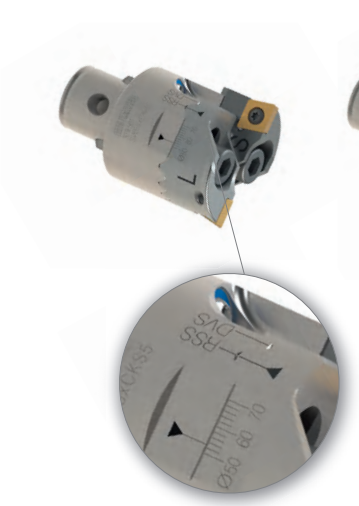


**SW AL: Aluminium executions available**

The rough boring heads SW AL of BIG KAISER set new standards for high performance roughing. The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance. Moreover it is more economical than circular interpolation milling when you have to execute deep bores. The rough boring heads are available in the sizes from SW 68 AL up to SW 148 AL.

**BALANCE/STEP cut: Simply switch insert holders**
A tool body with supports for insert holders of different heights, and insert holders of different lengths, provide an unmatched versatility to the new roughing tool. Without changing any components and without length adjustment, two different roughing methods, the rotationally-symmetrical-roughing (RSS/BALANCE) and the double offset roughing (DVS/STEP), can be executed.

RSS/BALANCE



DVS/STEP

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# Series 318 Large Diameter Boring Tools

The series 318 is based on aluminum extension slides of different lengths, which support a variety of aluminum and steel components for roughing and finishing tool assemblies. The mounting components are pinned to fit onto specific locations on the slides, and secured with steel bolts. The precise positioning of the components on the slide along with incremental adjustment scales for insert holders permit diameter and length setting without a tool presetter.

- Boring range: Ø 200 - 620
- Boring range: Ø 620 - 3 000

**DV40 and HSK-A63 up to 340 mm**
Even on machines with smaller spindles the series 318 can be operated.

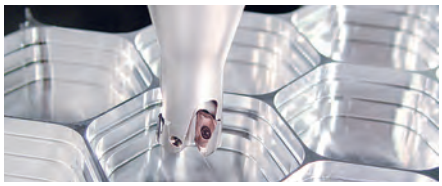
**Innovative construction**
Coolant supply through all components directly to the cutting edge. High strength and hard coated aluminium, and nickel coated steel components for scratch resistant and rust protected surfaces.

**Versatile system**
Series 318 is for various applications such as rough boring, fine boring, OD turning, and face grooving.

Roug Boring | Fine Boring | Face Grooving | OD Turning

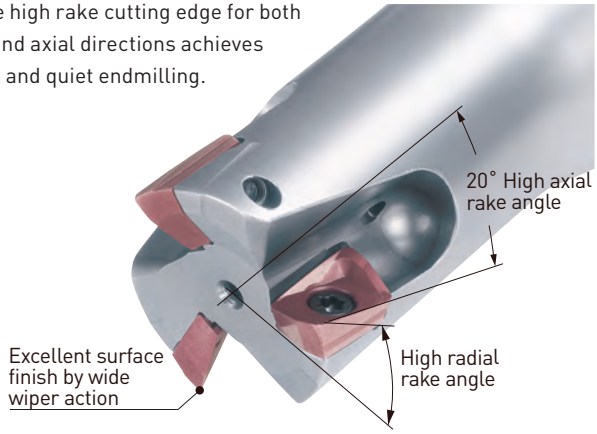
# FULLCUT MILL

Indexable insert endmills with both excellent sharpness and toughness, achieving the performance of solid endmills.



**Sharp cutting edge by both high radial and axial rake angles**

Positive high rake cutting edge for both radial and axial directions achieves smooth and quiet endmilling.



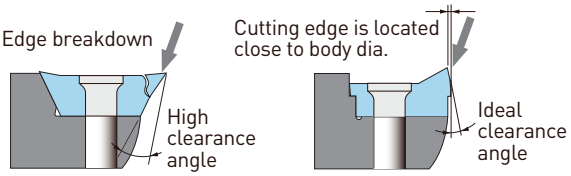

**Amazing cutting performance, brought by integral deign and face contact body**

Integral design style with taper shank and flange contact with the machine spindle provides higher precision and rigidity thus achieving cutting conditions only otherwise available on larger machines.

BBT and BDV type

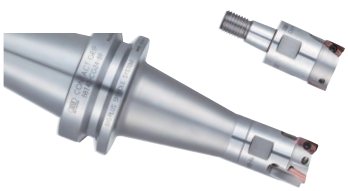
HSK type

**Strong cutting edge reduces edge chipping**




**Contact Grip**

- Threaded coupling with taper and face contact
- Resistant to chatter due to the dual contact connection
- FCM or FCR heads can be installed on the base holder



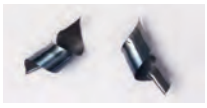
Ø 16 - 32 mm

**Amazing cutting performance even on #40 taper machine**

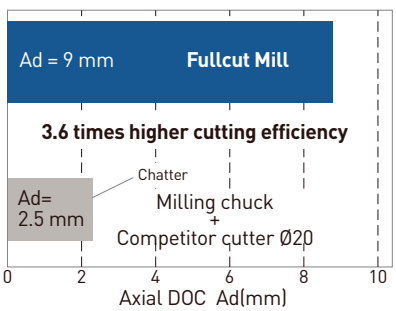
Comparison of axial DOC between integral type with face contact and straight shank type. 3.6 times higher cutting performance than other manufacturer.

**Cutting condition**

| | |
|---|---|
| Machine: | BBT40 (BIG-PLUS®) |
| Slot milling: | 20 mm |
| Work material: | C50 (S50C) |
| Spindle speed: | 2400 min$^{-1}$ |
| Speed: | V = 150 m/min |
| Feed: | 0.12 mm/tooth |



Excellent surface






BROTECH

## Fullcut Mill Type FCR

Unique inserts designed for ramping make multi-functional cutting possible.

- Cutter: Ø 16 - 33

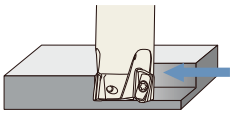
Higher rigidity with integral body with dual contact system.

BBT and BDV Type

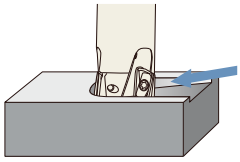
HSK Type

Cylindrical Shank Type

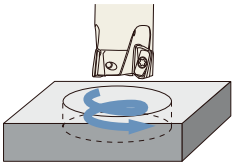
**Shoulder Milling**



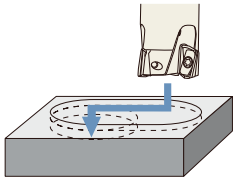
**Ramping**



**Helical Milling**

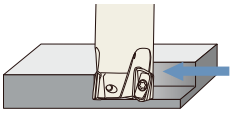


**Peck-Drilling**



## Fullcut Mill Type FCM

**Shoulder Milling**



- Cutter: Ø 12 - 100

A variety of shanks including simultaneous fit with integral body.

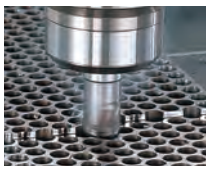
BBT and BDV Type

HSK Type

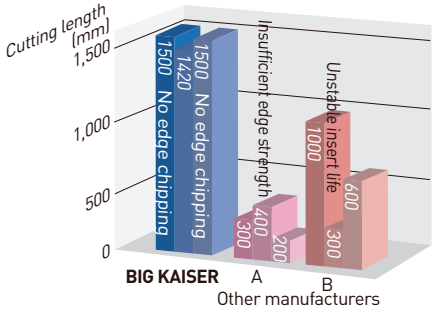
Cylindrical Shank Type

Arbor Type

**Tough cutting edge of Fullcut Mill is proven**



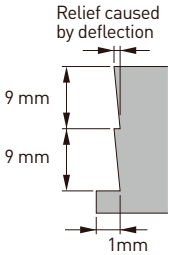
An evaluation of cutting length/life as measured when machining the most arduous workpiece by milling over a continuous series of holes. This is the condition most likely to cause edge chipping.



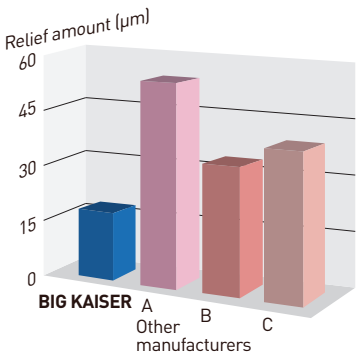

**Finishing with indexable endmill - Why not?**

Insert with the minimum nose radius of 0.2 mm and superb squareness to achieve high precision end milling comparable with solid carbide tools.

| | |
|---|---|
| Work material: | SUS304 |
| Vertical M/C: | No. 40 |
| Cutter dia.: | Ø 25 mm |
| Feed: | 0.12 mm/tooth |




Squareness is influenced by the cutting parameters, work materials, rigidity of machine and workpiece, etc.



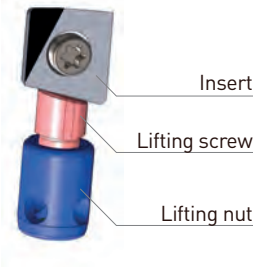
# SPEED Finisher

Amazing improvement of surface finish at high speed cutting.
RZ = 0.55 µm with aluminum die casting ADC12
RZ = 0.67 µm with gray cast iron FC250

- Cutter: Ø 50, Ø 63, Ø 80, Ø 100, Ø 125

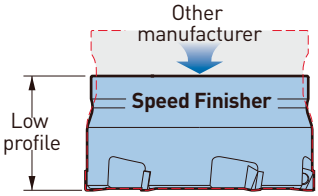
**Quick adjustment of cutting edge height**

After clamping the insert, lifting screw lifts up the insert directly by revolving the lifting nut from its side. Simple construction aids easy adjusting operation. Fine pitch thread of the lifting screw ensures precise adjustment.



**Lightweight & high rigidity**

Low-profile cutter body enhances rigidity, minimizes vibration and distortion, leading to the minimized height difference of the machined surface. Lighter weight resulted from reduced mass aids performance on small machine tools such as BT30 spindle.




**PL Presetter**

Exclusive PL Presetter shortens the setup time further up to 15 sec./insert while avoiding chipping of the cutting edge.

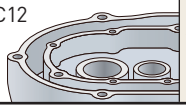
- The cutting edge presetting is required

**Secure coolant supply to the cutting edges**

Coolant is supplied to the cutting edge directly in combination with the Face Mill Arbor type FMH. Especially effective to avoid built-up edges when cutting aluminum and possible re-cutting of the swarf.

**Application example**

(Cutter: Ø 80 mm)

| Workpiece | Conditions | Surface Roughness | Height Difference | No. of Workpieces | Result |
|---|---|---|---|---|---|
| Crankcase ADC12  | Cutting speed: 4 000 m/min<br>Spindle speed: 15 900 $min^{-1}$<br>Feed rate: 9 550 mm/min<br>Depth of cut: 2.5 mm | Ra=0.08 µm<br>Rz=0.55 µm | Within 1 µm | 24 000 | Rough and finish processes are combined in a single operation. |



BROTECH

# C-CUTTER mini

Compact design with 4 inserts and small cutting diameter. High performance chamfer cutter to achieve ultra high feed rate by reducing the cutting diameter to the lowest limit.

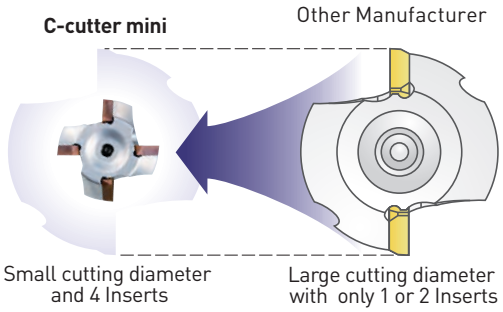
- For multi-functional cutting: chamfering, back chamfering and face milling

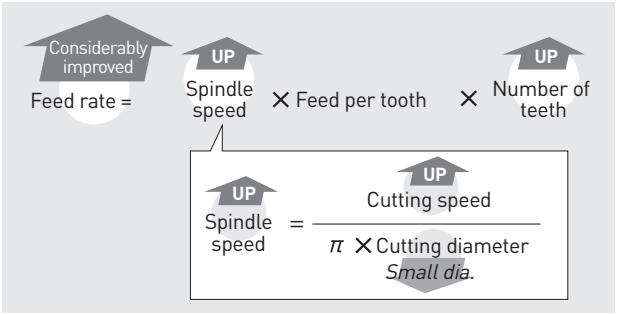
**4 Inserts, small diameter and new coating achieve triple effect**

**1. Superb design. Ultra high feed by 4 Inserts.**
Compared with 1 or 2 inserts per cutter, a 4 insert cutter multiplies feed rate.

**2. Increased spindle speed by ultra compact diameter**
A smaller tool diameter means faster spindle speeds.

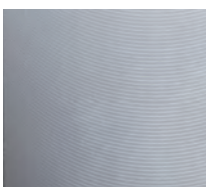
**3. Latest coating (ACP200) increases the cutting speed.**
Wear resistant multi layer PVD coating increases the cutting speed.




**World smallest hex insert**
Highly-efficient back chamfering from 6 mm starting hole diameter. 3-corner insert saves cost.

**Versatility of the insert**
Sharp cutting edge of C-Cutter mini insert make superior surface finish. The same insert can be used with BIG KAISER's original design face mill arbor, Surface Mill.

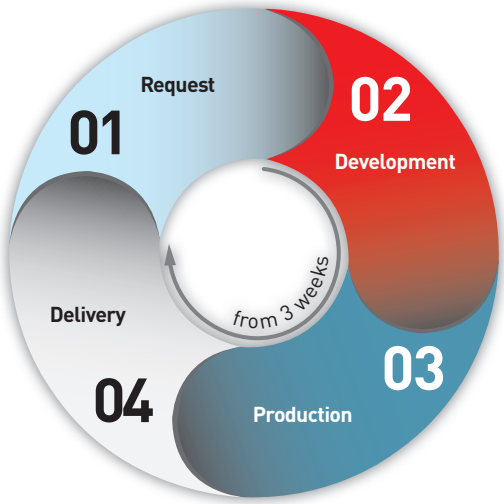


**Surface Mill Rz = 1.42**
Material = C50
V = 200 m/min
Fz = 0.2 mm/min
Ap = 3
Ad = 75

**New series for starting hole for tapping are available from M8 to M20 range**

# BIG KAISER Special Tools

You need an insert holder or a shank in a special execution for your BIG KAISER boring head? No problem: the BIG KAISER team for special tools will quickly and professionally deal with your request.




**Your advantages**
- Offer in 24h
- Delivery from 3 weeks
- Competent advice from our experienced team

**Insert holders**
- Roughing with free insert selection for the SW rough boring heads
- Insert holder in any shape and size for the EWN/EWE fine boring heads
- For contouring, chamfering or OD turning

**Tools for several diameters**
- Rough boring tool with fixed insert pockets and cartridges. Thanks to CKB connection, the tool is independent of a spindle system
- Fine boring tool with BIG KAISER adjustment cartridges
  Adjustment precision: 0.01mm Ø

## BIG KAISER Insert Development

The customer shall reach the best possible results in terms of performance, precision and cost efficiency for all boring operations with BIG KAISER rough and fine boring tools. Therefore, not only outstanding boring tools are required, but also inserts, specially designed for boring, which fulfil the highest demands.

*«The selection of the indexable insert is decisive for the machining process and reduces production costs.»*

Marco Siragna, Head of Product Management BIG KAISER

The results of the developments and tests are shown in the BIG KAISER app. In there, you'll find the most suitable inserts for the variety of workpiece materials and machining processes in relation to the tool configuration. The app shows precise cutting data for all applications.

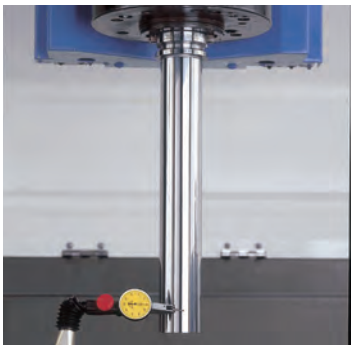
BK

Download on the App Store

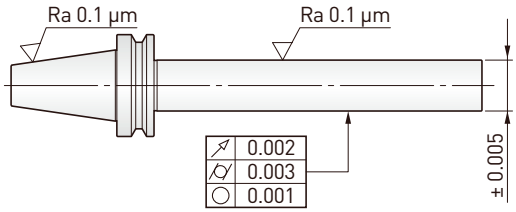
GET IT ON Google Play

BROTECH

# DynaTest



**Precision standard of BIG KAISER Test Arbors**
BIG KAISER provides high quality test bars, produced under a strict quality control system.




| | |
|---|---|
| Runout | 0.002 mm |
| Roundness | 0.001 mm |
| Cylindricity | 0.003 mm |
| Roughness | Ra: 0.1 µm |
| Diameter tol. | ± 0.005 mm |

**Alminum case**
An aluminum case is provided to protect and store the test bars. (Some models are provided in a wooden box.)

**Calibration certificate and traceability system**
BIG KAISER can offer a calibration certificate with traceability on request as per ISO9000 requirements.

## Torque Fit

Controlling tightening torque for BIG KAISER Tool assembly station with integrated torque measuring system.

- Digital display helps to reach the proper torque
- Tightening values for BIG KAISER collet chuck series data are preset
- Beeping on & after the proper tightening
- User mode for the customized torque value
- Error LED lightening at the overtightening
- Replaceable adaptors available for different interfaces

**The starting point for the high precision cutting is proper tightening.**

| | | |
|---|---|---|
| **Insufficient tightening** | Variant cutting | Cutting Error |
| | edge position | Dimensional Error |
| **Over tightening** | Collet deformation | Shorter Cutter Life |
| | Deteriorted runout | Shorter Tool Holder Life |

BROTECH

## Level Master

2-axis simultaneous detection leveler. LED displays level conditions for both axis simultaneously. LED and buzzer indication when leveling is complete.

Wireless

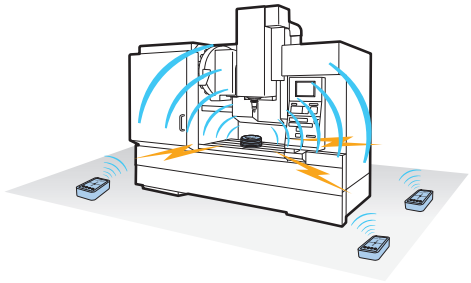
- LED lamp + beep sound
- Simultaneous 2-axis detection saves the extra time & cost of using 2 levelers.
- 0.01 mm/m readable value

**Standard Type**

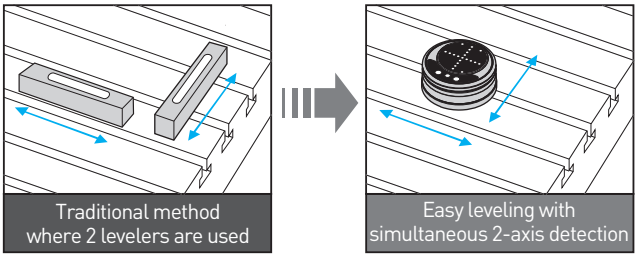
**Wireless Type**

**Easy leveling with the remote display**

Leveling by the single operator can be achievable by the use of the remote display while 2 operators have been necessary until now to allow them to conduct the level detecting inside the machine housing and the table leveling from outside of the machine separately.



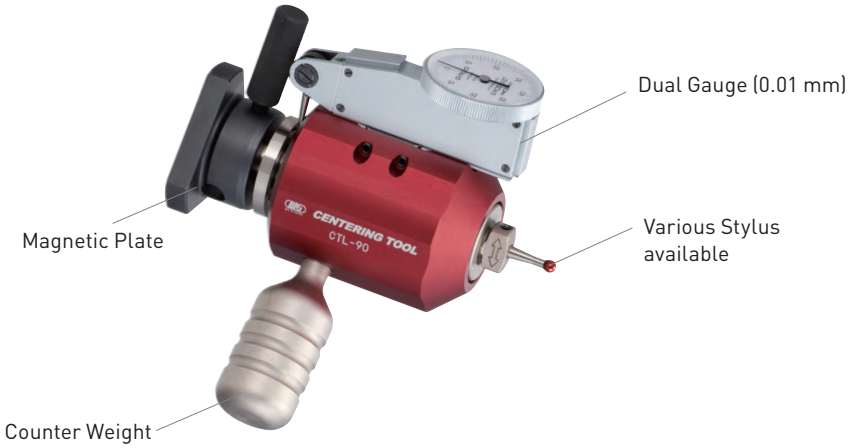
**Simultaneous 2-axis detection**

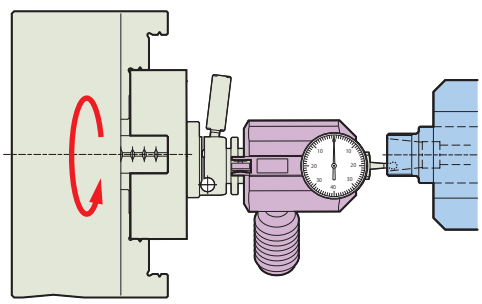



## Centering Tool for Lathes

Revolutionary centering tool for lathe machines that allows the operator to fix the center very easily and quickly.

- Centering the tool holder while watching the dial gauge is possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 0.01 mm)
- Magnet base allows for flexible mounting positions



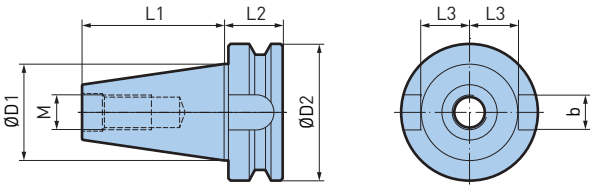





BROTECH

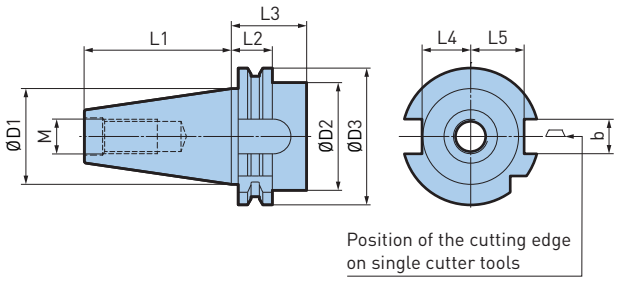
## Steep taper shanks JIS B6339 / BT / BBT

| Model | ØD1 | ØD2 | L1 | L2 | L3 | b | M |
|---|---|---|---|---|---|---|---|
| BT30 | 31.75 | 46 | 48.4 | 20 | 16.3 | 16.1 | M12 |
| BT40 | 44.45 | 63 | 65.4 | 25 | 22.6 | 16.1 | M16 |
| BT50 | 69.85 | 100 | 101.8 | 35 | 35.4 | 25.7 | M24 |



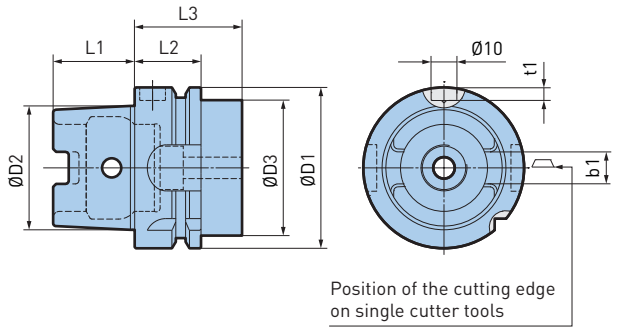

## Steep taper shanks DIN 69871 / DV / BDV

| Model | ØD1 | ØD2 max. | ØD3 | L1 | L2 | L3 min. | L4 | L5 | b | M |
|---|---|---|---|---|---|---|---|---|---|---|
| DV30 | 31.75 | 45 | 50 | 47.8 | 19.1 | 35 | 16.4 | 19 | 16.1 | M12 |
| DV40 | 44.45 | 50 | 63.55 | 68.4 | 19.1 | 35 | 22.8 | 25 | 16.1 | M16 |
| DV50 | 69.85 | 80 | 97.5 | 101.75 | 19.1 | 35 | 35.5 | 37.7 | 25.7 | M24 |



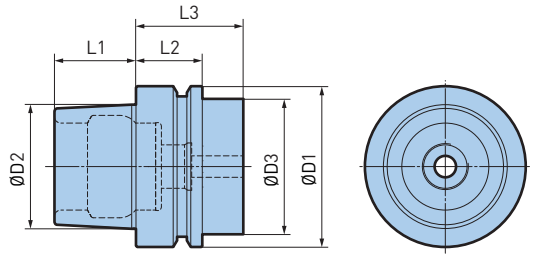

## Hollow taper shanks DIN 69893, form A

| Model | ØD1 | ØD2 | ØD3 max. | L1 | L2 | L3 min. | b1 | t1 |
|---|---|---|---|---|---|---|---|---|
| HSK-A32 | 32 | 24.007 | 26 | 16 | 20 | 35 | 7.05 | 5.4 |
| HSK-A40 | 40 | 30.007 | 34 | 20 | 20 | 35 | 8.05 | 5.2 |
| HSK-A50 | 50 | 38.009 | 42 | 25 | 26 | 42 | 10.54 | 5.1 |
| HSK-A63 | 63 | 48.010 | 53 | 32 | 26 | 42 | 12.54 | 5.0 |
| HSK-A80 | 80 | 60.012 | 68 | 40 | 26 | 42 | 16.04 | 4.9 |
| HSK-A100 | 100 | 75.013 | 88 | 50 | 29 | 45 | 20.02 | 4.9 |



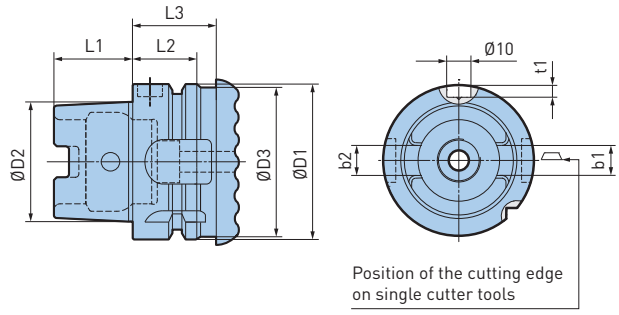

## Hollow taper shanks DIN 69893, form E

| Model | ØD1 | ØD2 | ØD3 max. | L1 | L2 | L3 min. |
|---|---|---|---|---|---|---|
| HSK-E25 | 25 | 19.006 | 20 | 13 | 10 | 20 |
| HSK-E32 | 32 | 24.007 | 26 | 16 | 20 | 35 |
| HSK-E40 | 40 | 30.007 | 34 | 20 | 20 | 35 |
| HSK-E50 | 50 | 38.009 | 42 | 25 | 26 | 42 |
| HSK-E63 | 63 | 48.010 | 53 | 32 | 26 | 42 |



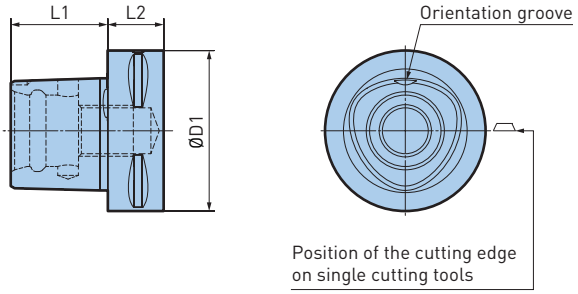

## Hollow taper shanks ISO 12164-3, form T

| Model | ØD1 | ØD2 | ØD3 max. | L1 | L2 | L3 min. | b1 | b2 | t1 |
|---|---|---|---|---|---|---|---|---|---|
| HSK-T50 | 50 | 38.009 | 49 | 25 | 26 | 30 | 10.54 | 10.425 | 5.1 |
| HSK-T63 | 63 | 48.010 | 62 | 32 | 26 | 30 | 12.54 | 12.425 | 5.0 |
| HSK-T80 | 80 | 60.012 | 79 | 40 | 26 | 30 | 16.04 | 15.93 | 4.9 |
| HSK-T100 | 100 | 75.013 | 99 | 50 | 29 | 34 | 20.02 | 19.91 | 4.9 |




## BIG CAPTO (compatible with ISO 26623-1, polygonal hollow shank taper with face contact)

| Model | ØD1 | L1 | L2 |
|---|---|---|---|
| C3 | 32 | 19 | 15 |
| C4 | 40 | 24 | 20 |
| C5 | 50 | 30 | 20 |
| C6 | 63 | 38 | 22 |
| C8 | 80 | 48 | 30 |



## BIG KAISER Balancing according to ISO 16084

**What does balancing / unbalance / balance quality mean?**

BIG KAISER toolholders are designed for high speed machines. If a rotating tool holder (Fig. 1) is not rotationally symmetrical, imbalance occurs (Fig. 2). As a result, when the rotational speed is increased, non-symmetrical centrifugal forces occur at the toolholder and the cutting tool, causing vibration and premature spindle bearing failure. To correct for the imbalance, the tool is balanced by various methods such as drilling (Fig. 3), milling, or grinding a flat, moving the center of mass as close as possible to the center of the axis of rotation.

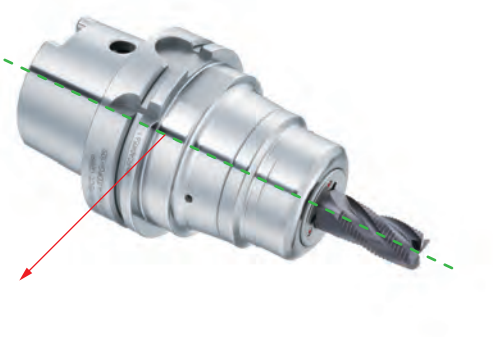


Fig. 1

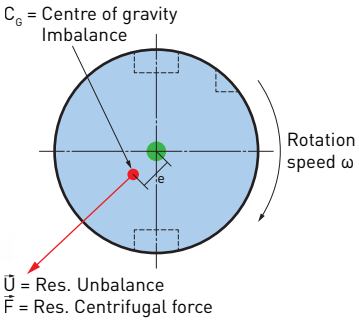



Fig. 2: unbalanced

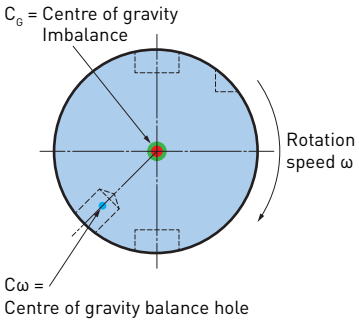



Fig. 3: balanced

**Balancing requirements in practice using G2.5**

The balancing quality G2.5 is widely used in the industry and is described in the ISO 1940-1 (issued in 2003) standard. However, this quality class is often overspecified and is in many cases not economically or technically feasible, especially when applied to smaller and lighter tools. The standard described above is designed for rigid rotors and is practical in a broader use for balancing. However, it cannot be applied to a complete system of spindles, tool holders and tools adequately and within technical constraints. For example, a tool to be compliant will have to be balanced to less than 1 gmm/kg at a speed of 25,000 rpm, which in turn corresponds to a mass eccentricity of less than 1 µm. This allowable tolerance is less than the interchange accuracy for even HSK, essentially negating all the costs and time for balancing the tool to such a strict tolerance.

**BIG KAISER balancing policy**

For this reason, all BIG KAISER tool holders are balanced according ISO 16084 (issued in 2017) specifically developed for rotating tool systems. ISO16084 focuses on the interaction between spindle and tool factoring in the allowable load on the spindle bearings generated by the tool's imbalance. This load must not exceed 1% of the dynamic load capacity of the spindle bearings. According to ISO 16084, the allowable unbalance tolerance is specified in [gmm], and is not expressed using a special quality grade [G].

In conclusion, BIG KAISER does not indicate any G-values for balancing quality, **but rather the maximum rotational speeds of the individual tool holder. The values shown for each item number in the catalogue are in compliance with the requirements for standard balance quality according to ISO 16084.**



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# Tool Holders BBT/BT, JIS B 6339


| | |
|---|---|
| MEGA Micro Chuck | 46 - 47 |
| MEGA New Baby Chuck | 48 - 51 |
| MEGA E Chuck | 52 |
| MEGA Double Power Chuck | 53 - 54 |
| MEGA Perfect Grip | 55 |
| New Baby Chuck | 56 - 57 |
| New Hi-Power Milling Chuck | 58 - 59 |
| Hydraulic Chucks | 60 - 63 |
| Shrink Chucks | 64 - 65 |
| MEGA Synchro Tapping Holder | 66 - 67 |
| Side Lock Holders | 68 - 69 |
| Morse Taper Holders | 70 |
| Holders for Screw-On Cutters / Side Cutter Arbors | 71 |
| Face Mill Arbors | 72 |
| Smart Damper | 73 |
| CK Shanks | 74 - 76 |
| BIG CAPTO Basic Holder | 77 |
| Angle Heads | 78 - 87 |
| Air Turbine Spindle | 88 - 91 |
| Dyna Test | 92 |






● Preferred selected items

BROTECH

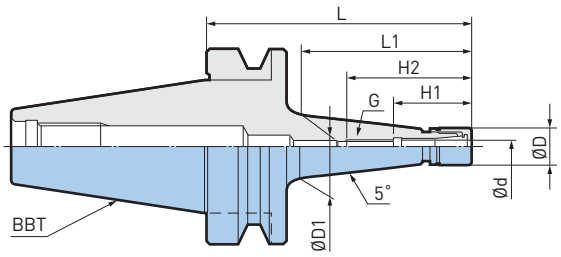
# MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1




BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 0.45 - 8.05 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H1 | H2 | G | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30-MEGA3S - 45T | **969.209** | 0.45 - 3.25 | 10 | 11.5 | 45 | 20 | 22 | 38 | M4 P0.7 | 40 000 | NBC3S- | MGN3S | 0.42 |
| - 75T | **969.210** | | | 16 | 75 | 48 | | | | | | | 0.45 |
| - 90T | **969.211** | | | 18.5 | 90 | 63 | | | | 35 000 | | | 0.48 |
| -MEGA4S - 75T | **969.214** | 0.45 - 4.05 | 12 | 17.5 | 75 | 48 | 26.5 | 47 | M5 P0.8 | 40 000 | NBC4S- | MGN4S | 0.47 |
| - 90T | **969.215** | | | 20.0 | 90 | 63 | | | | 35 000 | | | 0.50 |
| ● -MEGA6S - 60T | **969.218** | 0.45 - 6.05 | 14 | 16.5 | 60 | 33 | 28.5 | 49 | M7 P0.75 | 40 000 | NBC6S- | MGN6S | 0.45 |
| - 75T | **969.319** | | | 19 | 75 | 48 | | | | | | | 0.47 |
| ● - 90T | **969.220** | | | 22 | 90 | 63 | | | | 35 000 | | | 0.51 |
| -105T | **969.221** | | | 24.5 | 105 | 78 | | | | 30 000 | | | 0.56 |
| -120T | **969.222** | | | 22 | 120 | 93 | | | | 25 000 | | | 0.62 |
| ● -MEGA8S - 75T | **803.597** | 2.95 - 8.05 | 18 | 23.0 | 75 | 48 | 31 | 50.5 | M9 P0.75 | 40 000 | NBC8S- | MGN8S | 0.51 |
| -105T | **803.598** | | | 28.0 | 105 | 78 | | | | 30 000 | | | 0.62 |
| BBT40-MEGA3S - 90T | **969.322** | 0.45 - 3.25 | 10 | 17.5 | 90 | 58 | 22 | 38 | M4 P0.7 | 28 000 | NBC3S- | MGN3S | 1.1 |
| -120T | **969.323** | | | 23 | 120 | 88 | | | | 22 000 | | | 1.2 |
| -MEGA4S - 60T | **969.324** | 0.45 - 4.05 | 12 | 14 | 60 | 28 | 26.5 | 47 | M5 P0.8 | 35 000 | NBC4S- | MGN4S | 1.0 |
| - 90T | **969.326** | | | 19.5 | 90 | 58 | | | | 28 000 | | | 1.1 |
| -120T | **969.328** | | | 24.5 | 120 | 88 | | | | 22 000 | | | 1.2 |
| -MEGA6S - 60T | **969.330** | 0.45 - 6.05 | 14 | 15.5 | 60 | 28 | 28.5 | 49 | M7 P0.75 | 35 000 | NBC6S- | MGN6S | 1.1 |
| - 75T | **969.331** | | | 18.0 | 75 | 43 | | | | 32 000 | | | 1.1 |
| ● - 90T | **969.332** | | | 21 | 90 | 58 | | | | 28 000 | | | 1.1 |
| ● -105T | **969.333** | | | 23.5 | 105 | 73 | | | | 25 000 | | | 1.1 |
| -120T | **969.334** | | | 26 | 120 | 88 | | | | 22 000 | | | 1.2 |
| ● -135T | **969.335** | | | 29 | 135 | 103 | | | | 20 000 | | | 1.3 |
| -MEGA8S - 90T | **801.720** | 2.95 - 8.05 | 18 | 24.5 | 90 | 58 | 31 | 50.5 | M9 P0.75 | 30 000 | NBC8S- | MGN8S | 1.2 |
| -120T | **803.601** | | | 30 | 120 | 88 | | | | 22 000 | | | 1.2 |

1. MEGA nut is included.

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▸ 247 | Micro Seal Nut ▸ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **961.280** |
| MEGA8S | MGN8S | **804.108** | MGR18 | **801.705** | NBC8S- | MGN8S-PS | NBB8S | **805.802** | SC-NBC8S | **805.827** |



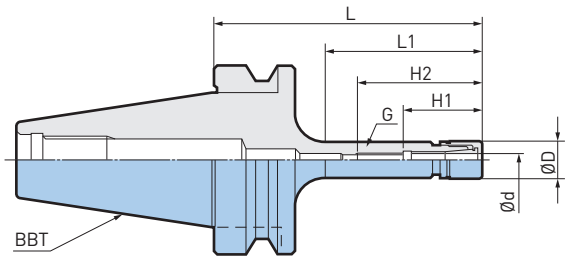
BROTECH

# MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

BIG-PLUS Dual-Contact

Coolant Through Hole




BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 0.45 - 8.05 mm**

| Model | Order No. | Ød | ØD | L | L1 | H1 | H2 | G | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30-MEGA6S - 90 | **969.504** | 0.45 - 6.05 | 14 | 90 | 62 | 28.5 | 49 | M7 P0.75 | 40 000 | NBC6S- | MGN6S | 0.47 |
| -105 | **800.058** | | | 105 | 73 | | | | | | | 0.49 |
| -MEGA8S - 90 | **803.608** | 2.95 - 8.05 | 18 | 90 | 60 | 31 | 50.5 | M9 P0.75 | 35 000 | NBC8S- | MGN8S | 0.51 |
| BBT40-MEGA4S - 90 | **969.506** | 0.45 - 4.05 | 12 | 90 | 53 | 26.5 | 47 | M5 P0.8 | 35 000 | NBC4S- | MGN4S | 1.0 |
| -MEGA6S - 90 | **969.508** | 0.45 - 6.05 | 14 | | | 28.5 | 49 | M7 P0.75 | | NBC6S- | MGN6S | 1.0 |
| -MEGA8S - 90 | **803.599** | 2.95 - 8.05 | 18 | | 55 | 31 | 50.5 | M9 P0.75 | 30 000 | NBC8S- | MGN8S | 1.1 |

1. MEGA nut is included.

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▸ 247 | Micro Seal Nut ▸ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **961.280** |
| MEGA8S | MGN8S | **804.108** | MGR18 | **801.705** | NBC8S- | MGN8S-PS | NBB8S | **805.802** | SC-NBC8S | **805.827** |

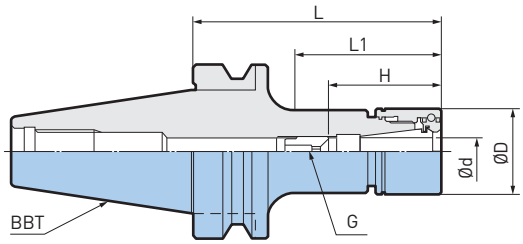
# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

BIG-PLUS® Dual-Contact

Coolant Through Hole

A.1

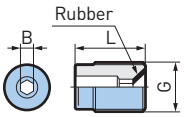



BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

**Ø 0.25 - 25.4 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | max. min⁻¹ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -MEGA6N - 60 | 969.509 | 0.25 - 6 | 20 | 60 | 32 | 23 - 43 | 40 000 | NBC 6- | MGN6 | 0.47 |
| - 75 | 969.341 | | | 75 | 47 | | 35 000 | | | 0.50 |
| - 90 | 969.510 | | | 90 | 62 | | 30 000 | | | 0.53 |
| -105 | 969.342 | | | 105 | 77 | | 20 000 | | | 0.56 |
| -120 | 969.343 | | | 120 | 90 | | | | | 0.59 |
| -MEGA8N - 60 | 969.511 | 0.5 - 8 | 25 | 60 | 34 | 26 - 45 | 40 000 | NBC 8- | MGN8 | 0.51 |
| - 75 | 969.344 | | | 75 | 49 | | 35 000 | | | 0.56 |
| - 90 | 969.512 | | | 90 | 64 | | 30 000 | | | 0.61 |
| -105 | 969.345 | | | 105 | 79 | | 18 000 | | | 0.67 |
| -120 | 969.346 | | | 120 | 92 | | | | | 0.72 |
| -MEGA10N - 60 | 969.513 | 1.5 - 10 | 30 | 60 | 34 | 38 - 48 | 40 000 | NBC10- | MGN10 | 0.54 |
| - 75 | 969.347 | | | 75 | 49 | | 30 000 | | | 0.61 |
| - 90 | 969.534 | | | 90 | 64 | | 25 000 | | | 0.68 |
| -105 | 969.348 | | | 105 | 79 | | 18 000 | | | 0.75 |
| -120 | 978.207 | | | 120 | 94 | | 15 000 | | | 0.82 |
| -MEGA13N - 60 | 969.516 | 2.5 - 13 | 35 | 60 | 34 | 44 - 63 | 40 000 | NBC13- | MGN13 | 0.57 |
| - 75 | 969.349 | | | 75 | 49 | | 30 000 | | | 0.67 |
| - 90 | 969.517 | | | 90 | 64 | | 25 000 | | | 0.77 |
| -105 | 969.350 | | | 105 | 79 | | 18 000 | | | 0.87 |
| -120 | 969.518 | | | 120 | 94 | | 15 000 | | | 0.97 |
| -MEGA16N - 60 | 969.519 | 2.5 - 16 | 42 | 60 | 37 | 48 - 63 | 35 000 | NBC16- | MGN16 | 0.61 |
| - 75 | 969.351 | | | 75 | 52 | | 25 000 | | | 0.75 |
| - 90 | 969.520 | | | 90 | 67 | 48 - 68 | 20 000 | | | 0.89 |
| -105 | 969.352 | | | 105 | 82 | | 18 000 | | | 1.04 |
| -MEGA20N - 60 * | 969.521 | 2.5 - 20 | 46 | 60 | - | 70 | 30 000 | NBC20- | MGN20 | 0.64 |
| - 75 | 969.353 | | | 75 | - | | 20 000 | | | 0.78 |
| - 90 | 969.522 | | | 90 | - | 51 - 68 | 15 000 | | | 0.93 |
| -105 | 969.354 | | | 105 | - | | 13 000 | | | 1.08 |
| -MEGA25N - 85 * | 806.379 | 15.5 - 25.4 | 60 | 85 | - | 80 | 12 000 | NBC25- | MGN25 | 1.13 |

1. MEGA nut is included.
2. * Adjusting screw cannot be used.
3. Nut-less model available upon request.
4. "G" is the adjusting screw (optional).
5. "H" indicates the adjustment length with an adjusting screw.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▶ 250 | MEGA Perfect Seal ▶ 260 | Adjusting Screw |   | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | 969.483 | MGR20 | 969.454 | NBC6- | MPS6- | NBA6B | 961.527 | M7 | 12 | 2 |
| MEGA8N | MGN8 | 969.484 | MGR25 | 969.456 | NBC8- | MPS8- | NBA8B | 961.550 | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | 969.485 | MGR30 | 969.458 | NBC10- | MPS10- | NBA10B | 961.572 | M11 | 16 | 3 |
| MEGA13N | MGN13 | 969.486 | MGR35 | 969.460 | NBC13- | MPS13- | NBA13B | 961.598 | M14 | 20 | 4 |
| MEGA16N | MGN16 | 969.487 | MGR42 | 969.462 | NBC16- | MPS16- | NBA16B | 961.632 | M18 | 20 | 4 |
| MEGA20N | MGN20 | 969.488 | MGR46 | 969.465 | NBC20- | MPS20- | NBA20B | 961.680 | M21 | 20 | 4 |
| MEGA25N | MGN25 | 806.388 | MGR60L | 969.468L | NBC25- | - | NBA25B | 806.389 | M27 | 20 | 4 |

Ø 0.25 - 25.4 mm

| Model | Order No. | Ød | ØD | L | L1 | H | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT40 -MEGA6N - 60 | 969.523 | 0.25 - 6 | 20 | 60 | 27 | 23 - 43 | 35 000 | NBC6- | MGN6 | 1.0 |
| - 75 | 969.361 | | | 75 | 38 | | | | | 1.1 |
| • - 90 | 969.524 | | | 90 | 53 | | | | | 1.1 |
| -105 | 969.362 | | | 105 | 68 | | 20 000 | | | 1.2 |
| -120 | 969.363 | | | 120 | 83 | | | | | 1.2 |
| -135 | 969.525 | | | 135 | 98 | | | | | 1.2 |
| -165 | 969.526 | | | 165 | 128 | | 14 000 | | | 1.2 |
| -200 | 969.527 | | | 200 | 163 | | 9 000 | | | 1.3 |
| -MEGA8N - 60 | 969.528 | 0.5 - 8 | 25 | 60 | 27 | 26 - 45 | 35 000 | NBC8- | MGN8 | 1.0 |
| - 75 | 969.364 | | | 75 | 38 | | | | | 1.1 |
| - 90 | 969.529 | | | 90 | 53 | | | | | 1.1 |
| -105 | 969.365 | | | 105 | 68 | | 20 000 | | | 1.2 |
| -120 | 969.366 | | | 120 | 83 | | | | | 1.2 |
| -135 | 969.530 | | | 135 | 98 | | | | | 1.3 |
| -165 | 969.531 | | | 165 | 128 | | 14 000 | | | 1.3 |
| -200 | 969.532 | | | 200 | 163 | | 9 000 | | | 1.4 |
| -MEGA10N - 60 | 969.533 | 1.5 - 10 | 30 | 60 | 27 | 38 - 48 | 35 000 | NBC10- | MGN10 | 1.1 |
| - 75 | 969.367 | | | 75 | 38 | | | | | 1.2 |
| - 90 | 969.514 | | | 90 | 53 | | | | | 1.2 |
| -105 | 969.368 | | | 105 | 68 | | 20 000 | | | 1.3 |
| -120 | 969.369 | | | 120 | 83 | | | | | 1.4 |
| -135 | 969.535 | | | 135 | 98 | | | | | 1.4 |
| -165 | 969.536 | | | 165 | 128 | | 15 000 | | | 1.5 |
| -200 | 969.537 | | | 200 | 163 | | 10 000 | | | 1.7 |
| -MEGA13N - 60 | 969.538 | 2.5 - 13 | 35 | 60 | 31 | 44 - 63 | 35 000 | NBC13- | MGN13 | 1.1 |
| - 75 | 969.370 | | | 75 | 40 | | | | | 1.2 |
| • - 90 | 969.539 | | | 90 | 55 | | | | | 1.3 |
| -105 | 969.371 | | | 105 | 70 | | 20 000 | | | 1.4 |
| -120 | 969.372 | | | 120 | 85 | | | | | 1.5 |
| -135 | 969.540 | | | 135 | 100 | | | | | 1.6 |
| -165 | 969.541 | | | 165 | 130 | | 15 000 | | | 1.8 |
| -200 | 969.542 | | | 200 | 165 | | 10 000 | | | 2.0 |
| -MEGA16N - 60 | 969.543 | 2.5 - 16 | 42 | 60 | 31 | 48 - 68 | 30 000 | NBC16- | MGN16 | 1.2 |
| - 75 | 969.373 | | | 75 | 40 | | | | | 1.3 |
| - 90 | 969.544 | | | 90 | 55 | | | | | 1.4 |
| -105 | 969.374 | | | 105 | 70 | | 20 000 | | | 1.6 |
| -120 | 969.375 | | | 120 | 85 | | | | | 1.7 |
| -135 | 969.545 | | | 135 | 100 | | | | | 1.8 |
| -165 | 969.546 | | | 165 | 130 | | 15 000 | | | 2.0 |
| -200 | 969.547 | | | 200 | 165 | | 10 000 | | | 2.3 |
| • -MEGA20N - 60 | 969.548 | 2.5 - 20 | 46 | 60 | 31 | 51 - 68 | 30 000 | NBC20- | MGN20 | 1.1 |
| - 75 | 969.376 | | | 75 | 42 | | | | | 1.3 |
| • - 90 | 969.549 | | | 90 | 57 | | | | | 1.4 |
| -105 | 969.377 | | | 105 | 72 | | 20 000 | | | 1.6 |
| -120 | 969.378 | | | 120 | 87 | | | | | 1.8 |
| -135 | 969.550 | | | 135 | 102 | | | | | 1.9 |
| -165 | 969.551 | | | 165 | 132 | | 15 000 | | | 2.1 |
| -200 | 969.552 | | | 200 | 167 | | 10 000 | | | 2.5 |
| -MEGA25N - 75 | 806.380 | 15.5 - 25.4 | 60 | 75 | 47 | 64 - 74 | 24 000 | NBC25- | MGN25 | 1.6 |
| - 90 | 806.381 | | | 90 | 62 | | 20 000 | | | 1.9 |
| -105 | 806.382 | | | 105 | 77 | | 19 000 | | | 2.2 |
| -120 | 806.383 | | | 120 | 92 | | 17 000 | | | 2.5 |

1. MEGA nut is included.
2. Nut-less model available upon request.
3. "H" indicates the adjustment length with an adjusting screw.

For BBT50, refer to the following page.

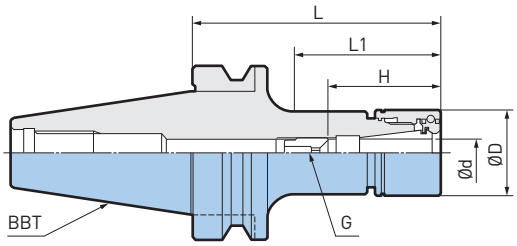
# MEGA New Baby Chuck

Dual-Contact

Coolant Through Hole

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

A.1

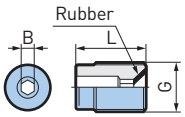



BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

**Ø 0.25 - 25.4 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT50 -MEGA6N - 90 | **969.553** | 0.25 - 6 | 20 | 90 | 37 | 23 - 43 | 20 000 | NBC 6- | MGN6 | 3.7 |
| -120 | **969.554** | | | 120 | 67 | | | | | 3.8 |
| -165 | **969.555** | | | 165 | 112 | | 14 000 | | | 3.9 |
| -200 | **969.556** | | | 200 | 147 | | 9 000 | | | 4.0 |
| -MEGA8N - 90 | **969.557** | 0.5 - 8 | 25 | 90 | 42 | 26 - 45 | 20 000 | NBC 8- | MGN8 | 3.8 |
| -120 | **969.558** | | | 120 | 67 | | | | | 3.9 |
| -165 | **969.559** | | | 165 | 112 | | 16 000 | | | 4.1 |
| -200 | **969.560** | | | 200 | 147 | | 11 000 | | | 4.2 |
| -MEGA10N - 90 | **969.561** | 1.5 - 10 | 30 | 90 | 42 | 38 - 48 | 20 000 | NBC10- | MGN10 | 3.9 |
| -120 | **969.562** | | | 120 | 67 | | | | | 4.0 |
| -165 | **969.563** | | | 165 | 112 | | 16 000 | | | 4.3 |
| -200 | **969.564** | | | 200 | 147 | | 13 000 | | | 4.7 |
| -250 | **969.565** | | | 250 | 197 | | 8 000 | | | 4.7 |
| -300 | **969.566** | | | 300 | 247 | | 5 500 | | | 4.9 |
| -MEGA13N - 90 | **969.567** | 2.5 - 13 | 35 | 90 | 42 | 44 - 63 | 18 000 | NBC13- | MGN13 | 4.0 |
| -120 | **969.568** | | | 120 | 67 | | | | | 4.2 |
| -165 | **969.569** | | | 165 | 112 | | 16 000 | | | 4.5 |
| -200 | **969.570** | | | 200 | 147 | | 12 000 | | | 4.7 |
| -250 | **969.571** | | | 250 | 197 | | 8 000 | | | 5.0 |
| -300 | **969.572** | | | 300 | 247 | | 5 500 | | | 5.3 |

1. MEGA nut is included.
2. Nut-less model available upon request.
3. "G" is the adjusting screw (optional).
4. "H" indicates the adjustment length with an adjusting screw.

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▶ 250 | MEGA Perfect Seal ▶ 260 | Adjusting Screw   | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |
| MEGA25N | MGN25 | **806.388** | MGR60L | **969.468L** | NBC25- | - | NBA25B | **806.389** | M27 | 20 | 4 |

| Model | Order No. | Ød | ØD | L | L1 | H | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT50 -MEGA16N - 75 | **969.573** | 2.5 - 16 | 42 | 75 | 31 | 48 - 68 | 17 000 | NBC16- | MGN16 | 4.0 |
| - 90 | **969.574** | | | 90 | 42 | | | | | 4.2 |
| -120 | **969.575** | | | 120 | 72 | | | | | 4.4 |
| -165 | **969.576** | | | 165 | 117 | | 16 000 | | | 4.8 |
| -200 | **969.577** | | | 200 | 152 | | 13 000 | | | 5.1 |
| -250 | **969.578** | | | 250 | 202 | | 10 000 | | | 5.5 |
| -MEGA20N - 75 | **969.579** | 2.5 - 20 | 46 | 75 | 31 | 51 - 68 | 16 000 | NBC20- | MGN20 | 4.1 |
| - 90 | **969.580** | | | 90 | 42 | | | | | 4.2 |
| -120 | **969.581** | | | 120 | 72 | | | | | 4.5 |
| -165 | **969.582** | | | 165 | 117 | | 15 000 | | | 4.9 |
| -200 | **969.583** | | | 200 | 152 | | 13 000 | | | 5.3 |
| -250 | **969.584** | | | 250 | 202 | | 10 000 | | | 5.7 |
| -MEGA25N- 90 | **806.384** | 15.5 - 25.4 | 60 | 90 | 46 | 64 - 74 | 19000 | NBC25- | MGN25 | 4.3 |
| -120 | **806.385** | | | 120 | 72 | | 17 000 | | | 4.9 |
| -165 | **806.386** | | | 165 | 117 | | 15 000 | | | 5.8 |
| -200 | **806.387** | | | 200 | 152 | | 13 000 | | | 6.4 |

1. MEGA nut is included.
2. Nut-less model available upon request.
3. "H" indicates the adjustment length with an adjusting screw.

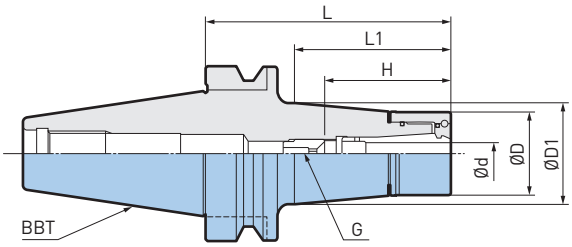
# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

BIG-PLUS Dual-Contact

Coolant Through Hole

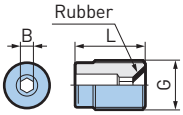
A.1




BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 3 - 12 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -MEGA6E - 75 | 968.167 | 3 - 6 | 25 | 30 | 75 | 50 | 37 - 45 | 35 000 | MEC6- | MEN 6 | 0.62 |
| -MEGA8E - 50 | 968.170 | 3 - 8 | 30 | 30.5 | 50 | 25 | 42 - 51 | 40 000 | MEC8- | MEN 8 | 0.53 |
| - 75 | 968.171 | | | 35 | 75 | 50 | | 35 000 | | | 0.68 |
| -MEGA10E - 50 | 968.174 | 3 - 10 | 35 | 35.5 | 50 | 25 | 48 - 58 | 39 000 | MEC10- | MEN10 | 0.57 |
| - 75 | 968.175 | | | 40 | 75 | 51 | | 35 000 | | | 0.77 |
| -MEGA13E - 50 | 968.178 | 3 - 12 | 42 | 42.5 | 50 | 27 | 50 - 58 | 38 000 | MEC13- | MEN13 | 0.61 |
| - 75 | 968.179 | | | 42 | 75 | 52 | 50 - 60 | 34 000 | | | 0.86 |
| - 90 | 968.180 | | | | 90 | 67 | | 25 000 | | | 1.01 |
| -105 | 968.181 | | | | 105 | 82 | | | | | 1.17 |
| BBT40 -MEGA6E - 60 | 968.183 | 3 - 6 | 25 | 26.5 | 60 | 28 | 37 - 45 | 30 000 | MEC6- | MEN 6 | 1.1 |
| - 90 | 968.185 | | | 31.5 | 90 | 58 | | | | | 1.3 |
| -135 | 968.188 | | | 39 | 135 | 103 | | 27 000 | | | 1.6 |
| -MEGA8E - 60 | 968.191 | 3 - 8 | 30 | 31 | 60 | 28 | 42 - 48 | 30 000 | MEC8- | MEN 8 | 1.2 |
| - 90 | 968.193 | | | 36 | 90 | 58 | 42 - 51 | | | | 1.3 |
| -135 | 968.196 | | | 44 | 135 | 103 | | 27 000 | | | 1.8 |
| -MEGA10E - 60 | 968.199 | 3 - 10 | 35 | 36 | 60 | 29 | 48 - 58 | 30 000 | MEC10- | MEN10 | 1.3 |
| - 90 | 968.201 | | | 41 | 90 | 58 | | | | | 1.5 |
| -135 | 968.204 | | | 49 | 135 | 103 | | 27 000 | | | 2.0 |
| -MEGA13E - 60 | 968.207 | 3 - 12 | 42 | 43 | 60 | 29 | 50 - 60 | 30 000 | MEC13- | MEN13 | 1.3 |
| - 75 | 968.208 | | | 45 | 75 | 43 | | | | | 1.5 |
| - 90 | 968.209 | | | 48 | 90 | 59 | | | | | 1.7 |
| -105 | 968.210 | | | 51 | 105 | 75 | | 29 000 | | | 1.9 |
| -120 | 968.211 | | | 53.5 | 120 | 91 | | | | | 2.1 |
| -135 | 968.212 | | | 56 | 135 | 106 | | 26 000 | | | 2.4 |
| -165 | 968.213 | | | 57.5 | 165 | 137 | | 22 000 | | | 2.8 |
| -200 | 968.214 | | | 62.5 | 200 | 173 | | 16 000 | | | 3.7 |
| BBT50 -MEGA6E -120 | 968.217 | 3 - 6 | 25 | 36 | 120 | 77 | 37 - 45 | 20 000 | MEC 6- | MEN 6 | 4.0 |
| -MEGA8E -120 | 968.221 | 3 - 8 | 30 | 40.5 | | | 42 - 51 | | MEC 8- | MEN 8 | 4.1 |
| -MEGA10E -120 | 968.225 | 3 - 10 | 35 | 45.5 | | | 48 - 58 | | MEC10- | MEN10 | 4.2 |
| -MEGA13E - 90 | 968.228 | 3 - 12 | 42 | 46.5 | 90 | 47 | 50 - 60 | 18 000 | MEC13- | MEN13 | 4.0 |
| -120 | 968.229 | | | 52 | 120 | 77 | | | | | 4.4 |
| -165 | 968.230 | | | 59 | 165 | 121 | | 16 000 | | | 5.2 |

1. MEGA E nut is included.
2. Nut-less model available upon request.
3. "G" is the adjusting screw (optional).
4. "H" indicates the adjustment length with an adjusting screw.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA E Nut | | MEGA Wrench | | MEGA E Collet ▸ 264 | MEGA E Perfect Seal ▸ 265 | Adjusting Screw | Rubber   | | | |
| MEGA E Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6E | MEN6 | 968.461 | MGR25 | 969.456 | MEC6- | EPS6- | NBA6B | 961.527 | M7 | 12 | 2 |
| MEGA8E | MEN8 | 968.462 | MGR30 | 969.458 | MEC8- | EPS8- | NBA8B | 961.550 | M9 | 13 | 2.5 |
| MEGA10E | MEN10 | 968.463 | MGR35 | 969.460 | MEC10- | EPS10- | NBA10B | 961.572 | M14 | 16 | 3 |
| MEGA13E | MEN13 | 968.464 | MGR42 | 969.462 | MEC13- | EPS13- | NBA13B | 961.598 | M18 | 20 | 4 |



BROTECH

# MEGA Double Power Chuck Type D

Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and type DS to feed coolant to cutting tool periphery.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

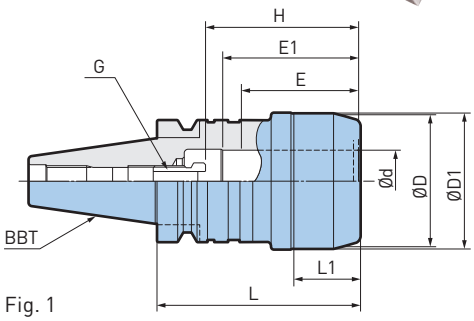



Fig. 1

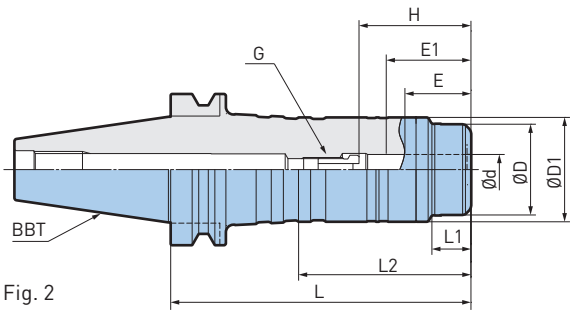



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 3 - 32 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | L2 | H | E | E1 | max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT40 -MEGA16D - 75A | 801.711 | 2 | 16 | 42 | 53 | 75 | 25 | 38 | 71 | 48 | 55 | 30 000 | 1.5 |
| -105A | 801.730 | | | | | 105 | | | | | | | 2.1 |
| -MEGA20D - 75A | 803.148 | | 20 | 50 | 55 | 75 | 34 | 44 | 69 - 79 | 50 | 56 | | 1.6 |
| -105A | 803.116 | | | | | 105 | | | | | | | 2.0 |
| -MEGA25D - 75A | 801.731 | 1 | 25 | 62 | 63 | 75 | 39 | - | 73 - 83 | 56 | 57 | 27 000 | 2.0 |
| -105A | 803.198 | | | | | 105 | | | 71 - 81 | | | 26 000 | 2.3 |
| -MEGA32D - 90A | 803.199 | | 32 | 70 | 71 | 90 | 33 | - | 71 - 81 | 60 | 64 | | 2.1 |
| -105A | 803.131 | | | | | 105 | | | 79 - 89 | | | | 2.4 |
| -135A | 803.135 | | | | | 135 | | | | | | 22 000 | 3.1 |
| BBT50 -MEGA20D -105 | 969.593 | 2 | 20 | 60 | 69 | 105 | 25 | 36 | 69 - 79 | 50 | 56 | 20 000 | 5.1 |
| -MEGA25D -105 | 969.595 | | 25 | 70 | 77 | 105 | 32 | 45 | 76 - 86 | 56 | 65 | | 5.4 |
| -135 | 969.596 | | | | | 135 | | | | | | 19 000 | 6.5 |
| -165 | 968.033 | | | | | 165 | | | | | | 17 000 | 7.6 |
| -MEGA32D -105 | 969.597 | | 32 | 80 | 86 | 105 | 39 | 54 | 78 - 95 | 60 | 71 | 20 000 | 5.4 |
| -165 | 968.037 | | | | | 165 | | | | | | 15 000 | 8.5 |
| -200 | 968.038 | | | | | 200 | | 129 | | | | 12 000 | 9.9 |

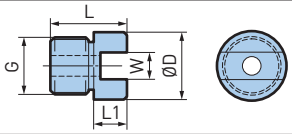
1. Wrench and axial adjusting screw are to be ordered separately.
2. As a back stop for cutting tools for the MEGA16D models, a commercially available hex socket head screw can be used.
3. "E" is the min. clamping length.
4. "E1" is the min. clamping length for optimum use with center through coolant.
5. "G" is the adjusting screw (optional).
6. "H" indicates the adjustment length with an adjusting screw.

For Straight Collet ▶ 272

**Accessories**

MEGA Wrench

Adjusting Screw




| MEGA Double Power Chuck | Model | Order No. | Model | Order No. | ØD | L | L1 | G | W |
|---|---|---|---|---|---|---|---|---|---|
| BBT30 -MEGA16DS | MGR46L | 969.465L | - | - | - | - | - | - | - |
| -MEGA20DS | MGR50L | 969.464L | HMA-16 | 962.311 | 19 | 27 | 6 | M16P1.5 | 8 |
| BBT40 -MEGA16D/DS | MGR42L | 969.462L | - | - | - | - | - | - | - |
| -MEGA20D/DS | MGR50L | 969.464L | HMA-M16 | 962.311 | 19 | 27 | 6 | M16P1.5 | 8 |
| -MEGA25D/DS | MGR62L | 969.469L | | | | | | | |
| -MEGA32D/DS | MGR70L | 969.470L | HMA-M16S | 962.312 | | | | | 10 |
| BBT50 -MEGA16DS | MGR46L | 969.465L | - | - | - | - | - | - | - |
| -MEGA20D/DS | MGR60L | 969.468L | HMA-M16 | 962.311 | 19 | 27 | 6 | M16P1.5 | 8 |
| -MEGA25D/DS | MGR70L | 969.470L | | | | | | | |
| -MEGA32D/DS | MGR80L | 969.471L | HMA-M24 | 962.313 | 30 | 36 | 9.5 | M24P1.5 | 10 |

# MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

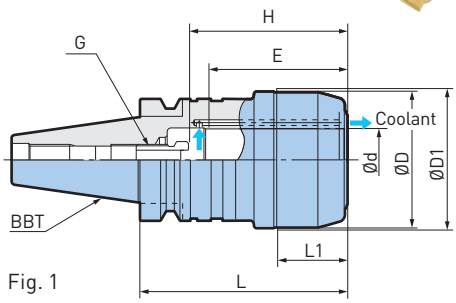



Fig. 1

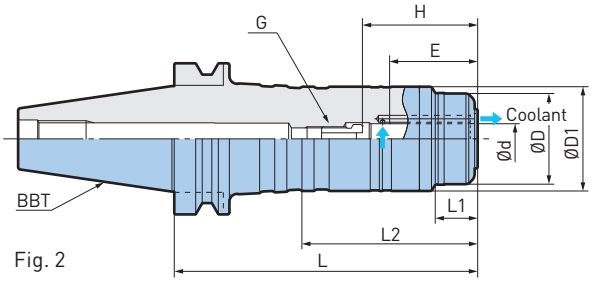



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 3 - 32 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | L2 | H | E | max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -MEGA16DS - 60 | 978.030 | 1 | 16 | 46 | 47 | 62.5 | 28 | - | 64 | 52 | 30 000 | 0.76 |
| -MEGA20DS- 65 | 978.184 | | 20 | 50 | 51 | 67.5 | 33 | | 62 | | 25 000 | 0.82 |
| BBT40 -MEGA16DS - 75A | 801.712 | 2 | 16 | 42 | 53 | 77 | 27 | 40 | 73 | 57 | 30 000 | 1.5 |
| -105A | 803.149 | | | | | 107 | | | | | | 2.1 |
| -135A | 803.117 | | | | | 137 | | | | | 25 000 | 2.7 |
| -165A | 803.200 | | | | | 167 | | | | | 22 000 | 3.3 |
| ● -MEGA20DS- 75A | 803.150 | | 20 | 50 | 55 | 77 | 36 | 46 | 71 - 81 | 58 | 30 000 | 1.6 |
| -105A | 803.118 | | | | | 107 | | | | | | 2.0 |
| -120A | 803.201 | | | | | 122 | | | | | 27 000 | 2.3 |
| -135A | 803.132 | | | | | 137 | | | | | 25 000 | 2.6 |
| -165A | 803.161 | | | | | 167 | | | | | 22 000 | 3.2 |
| -200A | 803.189 | | | | | 202 | | | | | 20 000 | 4.1 |
| -MEGA25DS- 75A | 803.119 | 1 | 25 | 62 | 63 | 77 | 41 | - | 75 - 85 | 59 | 27 000 | 2.0 |
| -105A | 801.713 | | | | | 107 | | | 73 - 83 | | 26 000 | 2.3 |
| -135A | 803.162 | | | | | 137 | | | | | 24 000 | 3.0 |
| -165A | 803.136 | | | | | 167 | | | | | 21 000 | 3.7 |
| ● -MEGA32DS- 90A | 803.202 | | 32 | 70 | 71 | 92 | 35 | - | 73 - 83 | 66 | 26 000 | 2.1 |
| ● -105A | 803.133 | | | | | 107 | | | 81 - 91 | | | 2.4 |
| -135A | 803.137 | | | | | 137 | | | | | 22 000 | 3.1 |
| -165A | 803.163 | | | | | 167 | | | | | 16 000 | 3.7 |
| -200A | 803.187 | | | | | 202 | | | | | 16 000 | 4.5 |
| BBT50 -MEGA16DS -105 | 968.708 | 2 | 16 | 46 | 55 | 107.5 | 26 | 36 | 73 | 52 | 21 000 | 4.6 |
| ● -135 | 968.076 | | | | | 137.5 | | | | | | 5.2 |
| -165 | 968.077 | | | | | 167.5 | | | | | 19 000 | 5.7 |
| ● -MEGA20DS-105 | 968.709 | | 20 | 60 | 69 | 107.5 | 28 | 38 | 71 - 81 | 58 | 20 000 | 5.1 |
| -135 | 968.710 | | | | | 137.5 | | | | | 19 000 | 6.0 |
| -165 | 968.080 | | | | | 167.5 | | | | | 17 000 | 6.8 |
| -MEGA25DS-105 | 968.711 | | 25 | 70 | 77 | 107.5 | 34 | 47 | 78 - 88 | 67 | 20 000 | 5.4 |
| -135 | 968.712 | | | | | 137.5 | | | | | 19 000 | 6.5 |
| -165 | 968.083 | | | | | 167.5 | | | | | 17 000 | 7.6 |
| -MEGA32DS- 90 | 968.086 | | 32 | 80 | 86 | 94.5 | 42 | 57 | 80 - 97 | 73 | 20 000 | 4.8 |
| -105 | 968.713 | | | | | 107.5 | | | | | | 5.4 |
| -135 | 968.714 | | | | | 137.5 | | | | | 18 000 | 7.0 |
| -165 | 968.087 | | | | | 167.5 | | | | | 15 000 | 8.5 |
| -200 | 968.088 | | | | | 202.5 | | 131 | | | 12 000 | 9.9 |

1. Wrench and axial adjusting screw are to be ordered separately.
2. As a back stop for cutting tools for MEGA16DS, a commercially available hex socket head screw can be used.
3. "E" is the min. clamping length.
4. "G" is the adjusting screw (optional).
5. "H" indicates the adjustment length with an adjusting screw.

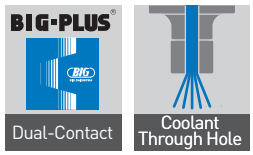
For Straight Collet ▶ 272
For Adjusting Screw ▶ 274
For MEGA Wrench ▶ 275

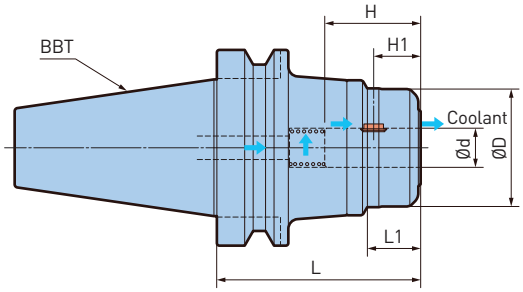


BROTECH

# MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.





BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 16 - 32 mm**

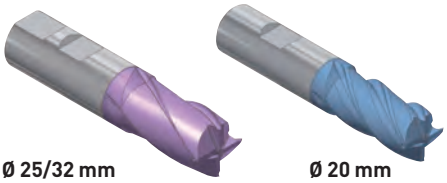
| Model | Order No. | Ød | ØD | L | L1 | H | H1 | MEGA Wrench | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BBT40 -MEGA16DPG - 75 | **806.362** | 16 | 46 | 75 | 24 | 47 | 23 | MGR46L | 1.7 |
| -MEGA20DPG -100 | **806.363** | 20 | 60 | 100 | 27 | 49 | 24 | MGR60L | 2.1 |
| BBT50 -MEGA16DPG -105 | **805.449** | 16 | 46 | 105 | 24 | 47 | 23 | MGR46L | 4.6 |
| -165 | **805.450** | | | 165 | | | | | 5.8 |
| -MEGA20DPG -105 | **805.451** | 20 | 60 | 105 | 27 | 49 | 24 | MGR60L | 5.1 |
| -165 | **805.452** | | | 165 | | | | | 6.9 |
| -MEGA25DPG -105 | **805.453** | 25 | 70 | 105 | 33 | 55 | 23 | MGR70L | 5.4 |
| -165 | **805.454** | | | 165 | | | | | 7.7 |
| -MEGA32DPG -105 | **805.455** | 32 | 80 | 105 | 41 | 59 | | MGR80L | 5.6 |
| -165 | **805.456** | | | 165 | | | | | 8.4 |

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

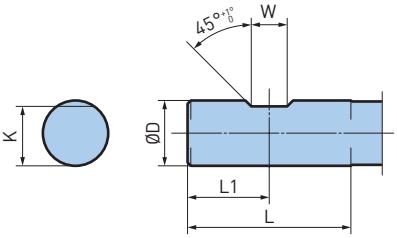
## Weldon Shank Standards

(DIN 1835-1)

The following standard shank is required for MEGA Perfect Grip.



**Ø 25/32 mm** **Ø 20 mm**




| ØD | | L | L1 | W | | K | |
|---|---|---|---|---|---|---|---|
| Nominal | Tolerance | | | Nominal | Tolerance | Nominal | Tolerance |
| 16 | h6 | 48 | 24 | 10 | + 0.05 0 | 14.2 | h13 |
| 20 | | 50 | 25 | 11 | | 18.2 | |
| 25 | | 56 | 32 | 12 | | 23 | |
| 32 | | 60 | 36 | 14 | | 30 | |

**Caution**

In case you are adding your own flat, the tool projection length in the MEGA Perfect Grip will be decided by the flat position. Refer to H1 in the MEGA Perfect Grip chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

| Spare Parts | | | | | Accessories | |
|---|---|---|---|---|---|---|
| | Key Grip | | Spring | | MEGA Wrench | |
| MEGA Perfect Grip | Model | Order No. | Model | Order No. | Model | Order No. |
| MEGA16DPG | PKG16-2P | **805.492** | PSP1519 | **805.496** | MGR46L | **969.465L** |
| MEGA20DPG | PKG20-2P | **805.493** | PSP1823 | **805.497** | MGR60L | **969.468L** |
| MEGA25DPG | PKG25-2P | **805.494** | PSP2420 | **805.498** | MGR70L | **969.470L** |
| MEGA32DPG | PKG32-2P | **805.495** | PSP3128 | **805.499** | MGR80L | **969.471L** |

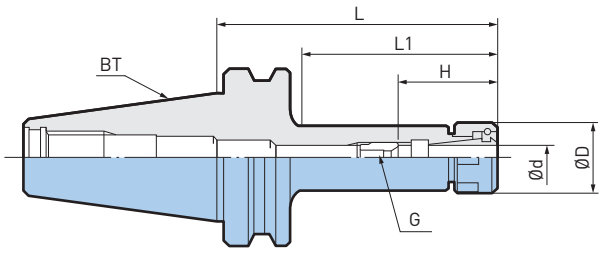
1. Key grip is available in a package of 2 pcs.

# New Baby Chuck

The original high precision collet chuck to perform all machining applications.

Coolant Through Hole

A.1




**Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BT30 -NBS6 - 60 | 961.917 | 0.25 - 6 | 20 | 60 | 32 | 20 - 40 | NBC6- | NBN6 | 0.44 |
| - 75 | 961.902 | | | 75 | 47 | | | | 0.47 |
| - 90 | 961.918 | | | 90 | 62 | | | | 0.51 |
| -120 | 800.031 | | | 120 | 90 | | | | 0.57 |
| -NBS8 - 60 | 961.919 | 0.5 - 8 | 25 | 60 | 33 | 23 - 42 | NBC8- | NBN8 | 0.46 |
| - 90 | 961.920 | | | 90 | 63 | | | | 0.55 |
| -NBS10 - 60 | 961.921 | 1.5 - 10 | 30 | 60 | 34 | 35 - 45 | NBC10- | NBN10 | 0.51 |
| - 75 | 961.908 | | | 75 | 49 | | | | 0.58 |
| - 90 | 961.922 | | | 90 | 64 | | | | 0.66 |
| -120 | 800.597 | | | 120 | 94 | | | | 0.81 |
| -NBS13 - 60 | 961.923 | 2.5 - 13 | 35 | 60 | 34 | 41 - 60 | NBC13- | NBN13 | 0.50 |
| - 90 | 961.924 | | | 90 | 64 | | | | 0.72 |
| -NBS16 - 60 | 961.925 | 2.5 - 16 | 42 | 60 | 37 | 45 - 65 | NBC16- | NBN16 | 0.53 |
| - 90 | 961.926 | | | 90 | 67 | | | | 0.81 |
| -NBS20 - 60 | 961.915 | 2.5 - 20 | 46 | 60 | 38 | 48 - 58 | NBC20- | NBN20 | 0.55 |
| - 90 | 961.916 | | | 90 | 68 | 48 - 65 | | | 0.90 |
| -120 | 800.029 | | | 120 | 98 | | | | 1.26 |
| BT40 -NBS6 - 90 | 961.932 | 0.25 - 6 | 20 | 90 | 53 | 20 - 40 | NBC6- | NBN6 | 1.2 |
| -135 | 961.933 | | | 135 | 98 | | | | 1.3 |
| -NBS8 - 90 | 961.935 | 0.5 - 8 | 25 | 90 | 53 | 23 - 42 | NBC8- | NBN8 | 1.2 |
| -135 | 961.936 | | | 135 | 98 | | | | 1.3 |
| -NBS10 - 90 | 961.938 | 1.5 - 10 | 30 | 90 | 53 | 35 - 45 | NBC10- | NBN10 | 1.2 |
| -120 | 968.604 | | | 120 | 83 | | | | 1.4 |
| -135 | 961.939 | | | 135 | 98 | | | | 1.5 |
| -NBS13 - 90 | 961.941 | 2.5 - 13 | 35 | 90 | 55 | 41 - 60 | NBC13- | NBN13 | 1.4 |
| -135 | 961.942 | | | 135 | 100 | | | | 1.7 |
| -NBS16 - 90 | 961.944 | 2.5 - 16 | 42 | 90 | 55 | 45 - 65 | NBC16- | NBN16 | 1.5 |
| -120 | 968.610 | | | 120 | 85 | | | | 1.8 |
| -135 | 961.945 | | | 135 | 100 | | | | 1.9 |
| -NBS20 - 60 | 961.946 | 2.5 - 20 | 46 | 60 | 28 | 48 - 65 | NBC20- | NBN20 | 1.2 |
| - 90 | 961.947 | | | 90 | 57 | | | | 1.5 |
| -120 | 968.613 | | | 120 | 87 | | | | 1.9 |
| -135 | 961.948 | | | 135 | 102 | | | | 2.1 |
| -165 | 961.959 | | | 165 | 132 | | | | 2.5 |

1. New baby nut is included.
2. Nut-less model available upon request.
3. "G" is the adjusting screw (optional).
4. "H" indicates the adjustment length with an adjusting screw.

For Tap Driving Back Stop ▶ 259



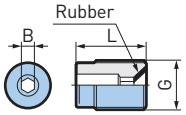
BROTECH

**Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BT50 -NBS6 -120 | **961.962** | 0.25 - 6 | 20 | 120 | 67 | 20 - 40 | NBC6- | NBN6 | 4.0 |
| -165 | **961.963** | | | 165 | 112 | | | | 4.1 |
| -200 | **961.964** | | | 200 | 147 | | | | 4.2 |
| -NBS8 -120 | **961.966** | 0.5 - 8 | 25 | 120 | 67 | 23 - 42 | NBC8- | NBN8 | 4.1 |
| -165 | **961.967** | | | 165 | 112 | | | | 4.2 |
| -NBS10 -120 | **961.970** | 1.5 - 10 | 30 | 120 | 67 | 35 - 45 | NBC10- | NBN10 | 4.1 |
| -165 | **961.971** | | | 165 | 112 | | | | 4.4 |
| -200 | **961.972** | | | 200 | 147 | | | | 4.6 |
| -NBS13 - 90 | **961.975** | 2.5 - 13 | 35 | 90 | 42 | 41 - 60 | NBC13- | NBN13 | 4.2 |
| -120 | **961.976** | | | 120 | 67 | | | | 4.4 |
| -165 | **961.977** | | | 165 | 112 | | | | 4.7 |
| -200 | **961.978** | | | 200 | 147 | | | | 5.0 |
| -NBS16 -120 | **961.983** | 2.5 - 16 | 42 | 120 | 72 | 45 - 65 | NBC16- | NBN16 | 4.4 |
| -165 | **961.984** | | | 165 | 117 | | | | 4.8 |
| -200 | **961.985** | | | 200 | 152 | | | | 5.2 |
| -NBS20 - 90 | **961.988** | 2.5 - 20 | 46 | 90 | 42 | 48 - 65 | NBC20- | NBN20 | 4.2 |
| -120 | **961.989** | | | 120 | 72 | | | | 4.5 |
| -165 | **961.990** | | | 165 | 117 | | | | 4.9 |
| -200 | **961.991** | | | 200 | 152 | | | | 5.3 |
| -250 * | **961.992** | | | 250 | 202 | | | | 5.9 |

1. New baby nut is included.
2. Nut-less model available upon request.
3. "H" indicates the adjustment length with an adjusting screw.
4. * Coolant-through hole is not available.

For Tap Driving Back Stop ▶ 259

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | New Baby Nut | | Wrench | | NBC Collet ▶ 250 | Baby Perfect Seal ▶ 262 | Adjusting Screw |   | | | |
| New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| NBS6 | NBN6 | **961.526** | NBK6 | **961.525** | NBC6- | BPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| NBS8 | NBN8 | **961.549** | NBK8 | **961.548** | NBC8- | BPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| NBS10 | NBN10 | **961.571** | NBK10 | **961.570** | NBC10- | BPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| NBS13 | NBN13 | **961.597** | NBK13 | **961.596** | NBC13- | BPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| NBS16 | NBN16 | **961.631** | NBK16 | **961.630** | NBC16- | BPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| NBS20 | NBN20 | **961.679** | NBK20 | **961.678** | NBC20- | BPS20- | NBA20B | **961.680** | M21 | 20 | 4 |

# New Hi-Power Milling Chuck Type S

The original design of slit structure assures heavy and finish end milling with high power and precision.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

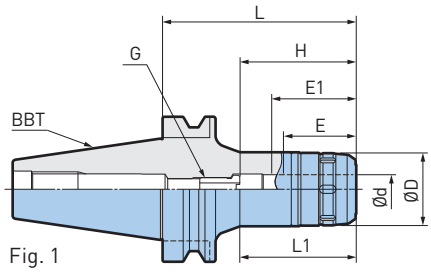


Fig. 1

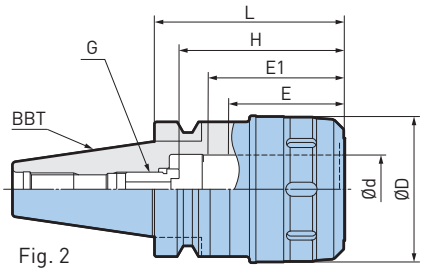


Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 3 - 42 mm**

| Model | Order No. | Fig. | Ød | ØD | L | L1 | H | E | E1 | Wrench | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -HMC16S - 70 * | 964.101S | 1 | 16 | 43 | 70 | 47 | 71 | 48 | 55 | FK45-50L | 0.78 |
| -HMC20S - 75 | 964.102S | 2 | 20 | 50 | 75 | - | 56 - 66 | 50 | 56 | | 0.93 |
| -HMC25S - 90 | 964.103S | | 25 | 55 | 90 | | 64 - 74 | 56 | 57 | FK52-55 | 1.12 |
| -HMC32S -105 | 978.181S | | 32 | 62 | 105 | | 70 - 80 | 60 | 58 | FK58-62L | 1.41 |
| BBT40 -HMC16S - 75 * | 964.190S | 1 | 16 | 43 | 75 | 45 | 71 | 48 | 55 | FK45-50L | 1.3 |
| -120 * | 800.144 | | | | 120 | 90 | | | | | 1.8 |
| • -HMC20S - 75 | 964.191S | | 20 | 50 | 75 | 46 | 69 - 79 | 50 | 56 | | 1.4 |
| -105 | 964.194S | | | | 105 | 75 | | | | | 1.9 |
| -120 | 964.196S | | | | 120 | 90 | | | | | 2.1 |
| -HMC25S - 75 | 964.192S | | 25 | 59 | 75 | 47 | 73 - 83 | 56 | 57 | FK58-62L | 1.5 |
| -105 | 964.195S | | | | 105 | 77 | | | | | 2.1 |
| -135 | 800.146 | | | | 135 | 107 | | | | | 2.8 |
| -HMC32S - 90 | 978.279S | 2 | 32 | 68 | 90 | - | 71 - 81 | 60 | 64 | FK68-75L | 2.0 |
| • -105 | 800.147 | | | | 105 | | 79 - 89 | | | | 2.3 |
| -135 | 800.148 | | | | 135 | | | | | | 3.0 |
| BBT50 -HMC16S -105 * | 800.278 | 1 | 16 | 43 | 105 | 57 | 71 | 48 | 55 | FK45-50L | 4.2 |
| -135 * | 800.279 | | | | 135 | 80 | | | | | 4.6 |
| -165 * | 800.280 | | | | 165 | 100 | | | | | 5.0 |
| -200 * | 800.281 | | | | 200 | 120 | | | | | 5.8 |
| • -HMC20S -105 | 800.282 | | 20 | 50 | 105 | 57 | 69 - 79 | 50 | 56 | | 4.3 |
| -135 | 800.283 | | | | 135 | 80 | | | | | 4.8 |
| -165 | 800.284 | | | | 165 | 100 | | | | | 5.4 |
| -200 | 800.285 | | | | 200 | 125 | | | | | 6.0 |
| -HMC25S -105 | 800.287 | | 25 | 59 | 105 | 57 | 76 - 86 | 56 | 57 | FK58-62L | 4.5 |
| -135 | 800.288 | | | | 135 | 87 | | | | | 5.2 |
| -165 | 800.289 | | | | 165 | 105 | | | | | 5.9 |
| -200 | 800.290 | | | | 200 | 125 | | | | | 7.5 |
| • -HMC32S -105 | 800.291 | | 32 | 68 | 105 | 64 | 88 - 98 | 60 | 72 | FK68-75L | 4.6 |
| -135 | 800.292 | | | | 135 | 89 | | | | | 5.4 |
| -165 | 800.293 | | | | 165 | 105 | | | | | 6.4 |
| -200 | 800.294 | | | | 200 | 130 | | | | | 7.4 |
| -HMC42S -105 | 806.709 | | 42 | 85 | 105 | 65 | 93 - 105 | 70 | 73 | FK80-90L | 5.2 |

1. Wrench and axial adjusting screw are to be ordered separately.
2. * As a back stop for cutting tools for the HMC16S models, a commercially available hex socket head screw can be used.
3. "E" is the min. clamping length.
4. "E1" is the min. clamping length for optimum use with center through coolant.
5. "G" is the adjusting screw (optional).
6. "H" indicates the adjustment length with an adjusting screw.

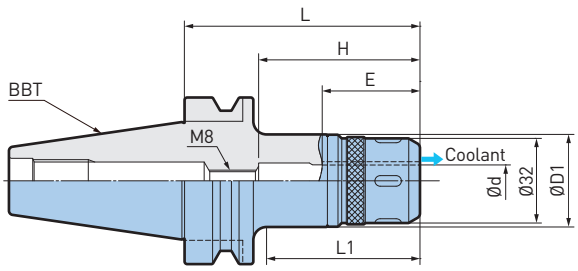
For Straight Collet ▶ 272 - 274
For Wrench ▶ 275



BROTECH

# New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.



BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

**Ø 6 - 12 mm**

| Model | Order No. | Ød | ØD1 | L | L1 | H | E | Wrench | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BBT30 -HMC12J - 60 | **805.814** | 12 | 35 | 60 | 38 | 65 | 43 | FK31-33 | 0.58 |
| BBT40 -HMC12J - 90 | **805.815** | | | 90 | 63 | | | | 1.4 |
| -120 | **805.816** | | | 120 | 70 | | | | 1.6 |
| BBT50 -HMC12J -105 | **805.817** | | | 105 | 67 | | | | 4.0 |
| -135 | **805.818** | | | 135 | 70 | | | | 4.3 |
| -165 | **805.819** | | | 165 | 90 | | | | 4.7 |

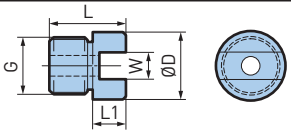
1. Wrench is to be ordered separately.
2. "E" is the min. clamping length.
3. "H" is the max. tool shank length can be inserted for these models.

For Straight Collet ▶ 272

**Accessories**

Wrench

Adjusting Screw




| New Hi-Power Milling Chuck | Model | Order No. | Model | Order No. | ØD | L | L1 | G | W |
|---|---|---|---|---|---|---|---|---|---|
| BBT30/40/50 -HMC12J | FK31-33 | **806.462** | - | - | - | - | - | - | - |
| -HMC16S | FK45-50L | **801.037** | - | - | - | - | - | - | - |
| -HMC20S | | | HMA-M16 | **962.311** | 19 | 27 | 6 | M16P1.5 | 8 |
| BBT30 -HMC25S | FK52-55 | **962.294** | HMA-M16 | **962.311** | 19 | 27 | 6 | M16P1.5 | 8 |
| -HMC32S | FK58-62L | **801.038** | HMA-M16S | **962.312** | | | | | 10 |
| BBT40/50 -HMC25S | FK58-62L | **801.038** | HMA-M16 | **962.311** | 19 | 27 | 6 | M16P1.5 | 8 |
| -HMC32S | FK68-75L | **801.039** | HMA-M16S | **962.312** | | | | | 10 |
| -HMC42S | FK80-90L | **804.771** | HMA-M24 | **062.313** | 30 | 36 | 95 | M24P1.5 | 10 |

# Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

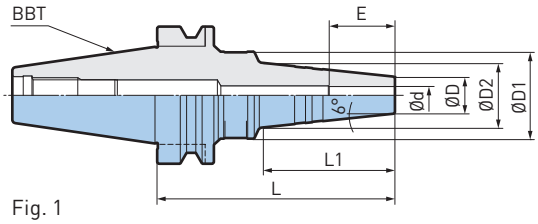



Fig. 1

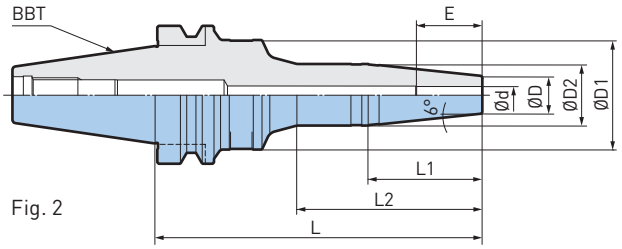



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

**Ø 3 - 12 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | ØD2 | L | L1 | L2 | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -HDC3S - 90 | 805.462 | 1 | 3 | 14 | 42 | 25 | 90 | 50 | - | 16 | 0.65 |
| -HDC4S - 60 | 803.053 | | 4 | | 46 | 20 | 60 | 28 | | 19 | 0.51 |
| - 90 | 805.820 | | | | 42 | 25 | 90 | 50 | | | 0.65 |
| -HDC5S - 90 | 805.821 | | 5 | | | | | | | 22 | 0.65 |
| -HDC6S - 90 | 803.054 | | 6 | | | | | | | 25 | 0.65 |
| -HDC8S - 90 | 803.055 | | 8 | 17 | | 28 | | | | 31 | 0.67 |
| -HDC10S - 90 | 803.051 | | 10 | 19 | 44 | 30 | | | | 33 | 0.70 |
| -HDC12S - 90 | 803.052 | | 12 | 21 | 46 | 32 | | | | 36 | 0.72 |
| BBT40 -HDC3S - 90 | 805.463 | 1 | 3 | 14 | 38 | 24 | 90 | 44 | - | 16 | 1.3 |
| -HDC4S - 60 | 803.060 | | 4 | | | 19 | 60 | 22 | | 19 | 1.2 |
| - 90 | 803.061 | | | | | 24 | 90 | 45 | | | 1.3 |
| -135 | 805.464 | 2 | | | 44 | 26 | 135 | 57 | 84 | | 1.4 |
| -HDC6S -110 | 803.062 | 1 | 6 | | 38 | 27 | 110 | 60 | - | 25 | 1.3 |
| -150 | 803.063 | 2 | | | 48 | 26 | 150 | 57 | 85 | | 1.6 |
| -HDC8S -110 | 803.064 | 1 | 8 | 17 | 40 | 30 | 110 | 60 | - | 31 | 1.4 |
| -150 | 803.065 | 2 | | | 50 | 28 | 150 | 52 | 85 | | 1.7 |
| -HDC10S -110 | 803.056 | 1 | 10 | 19 | 42 | 32 | 110 | 60 | - | 33 | 1.4 |
| -150 | 803.057 | 2 | | | 50 | 30 | 150 | 52 | 85 | | 1.7 |
| -HDC12S -110 | 803.058 | 1 | 12 | 21 | 44 | 34 | 110 | 60 | - | 36 | 1.4 |
| -150 | 803.059 | 2 | | | 50 | 32 | 150 | 52 | 85 | | 1.8 |
| BBT50 -HDC4S -150 | 807.232 | 2 | 4 | 14 | 52 | 26 | 150 | 57 | 83 | 19 | 4.2 |
| -HDC6S -150 | 803.068 | | 6 | | | | | | | 25 | 4.2 |
| -200 | 805.822 | | | | 56 | | 200 | | 100 | | 4.6 |
| -HDC8S -150 | 803.069 | | 8 | 17 | 54 | 28 | 150 | 52 | 83 | 31 | 4.3 |
| -200 | 805.823 | | | | 58 | | 200 | | 100 | | 4.7 |
| -HDC10S -150 | 803.066 | | 10 | 19 | 56 | 30 | 150 | | 83 | 33 | 4.3 |
| -200 | 805.824 | | | | 60 | | 200 | | 100 | | 4.8 |
| -HDC12S -150 | 803.067 | | 12 | 21 | 58 | 32 | 150 | | 83 | 36 | 4.4 |
| -200 | 805.825 | | | | 62 | | 200 | | 100 | | 4.8 |

1. Adjusting screw and straight collet can not be used.
2. "E" is the min. clamping length.

For Inner Bore Cleaner ▶ 286

**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

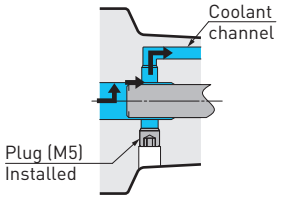
# Hydraulic Chuck Jet Through

Coolant or oil-mist is supplied to cutting edge securely. Maximum performance to high-precision operation at 5-axis machining.

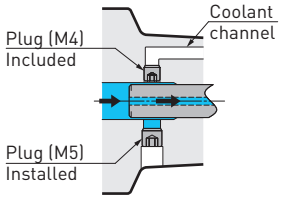
BIG-PLUS Dual-Contact

Coolant Through Hole

Peripheric




Center Through



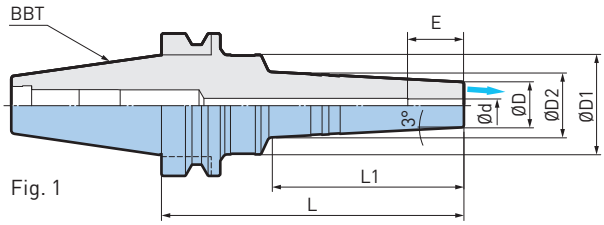



Fig. 1

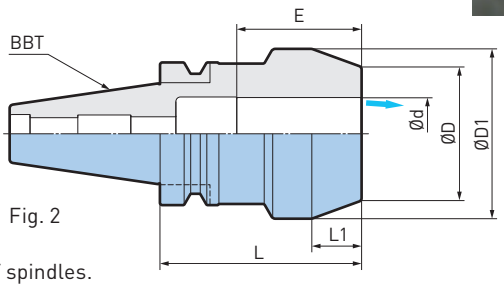



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

**Ø 3 - 32 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | ØD2 | L | L1 | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -HDC4J - 60 | 805.077 | 1 | 4 | 20 | 46 | 23 | 60 | 28 | 19 | 0.54 |
| -HDC6J - 90 | 805.078 | | 6 | | 42 | 26 | 90 | 50 | 25 | 0.69 |
| -HDC8J - 90 | 805.079 | | 8 | 22 | | 28 | | | 31 | 0.71 |
| -HDC10J - 90 | 805.080 | | 10 | 24 | 44 | 30 | | | 33 | 0.74 |
| -HDC12J - 90 | 805.081 | | 12 | 26 | 46 | 32 | | | 36 | 0.76 |
| -HDC16J - 90 | 805.480 | | 16 | 34 | | 40 | | 49 | 43 | 0.86 |
| -HDC20J - 90 | 805.481 | | 20 | 38 | 52 | 43 | | 40 | | 0.96 |
| BBT40 -HDC4J - 90 | 805.082 | | 4 | 20 | 38 | 25 | 90 | 45 | 19 | 1.3 |
| -135 | 805.549 | | | | 44 | 30 | 135 | 85 | | 1.5 |
| -HDC6J - 90 | 805.083 | | 6 | | 38 | 25 | 90 | 45 | 25 | 1.3 |
| -135 | 805.084 | | | | 44 | 29 | 135 | 85 | | 1.5 |
| -HDC8J - 90 | 805.085 | | 8 | 22 | 40 | 27 | 90 | 45 | 31 | 1.3 |
| -135 | 805.086 | | | | 46 | 31 | 135 | 85 | | 1.6 |
| -HDC10J - 90 | 805.087 | | 10 | 24 | 42 | 29 | 90 | 45 | 33 | 1.3 |
| -135 | 805.088 | | | | 48 | 33 | 135 | 85 | | 1.6 |
| -HDC12J - 90 | 805.089 | | 12 | 26 | 44 | 31 | 90 | 45 | 36 | 1.3 |
| -135 | 805.090 | | | | 50 | 35 | 135 | 85 | | 1.7 |
| -HDC16J - 90 | 805.482 | | 16 | 34 | 46 | 40 | 90 | 46 | 43 | 1.4 |
| -135 | 805.483 | | | | 50 | 44 | 135 | 89 | | 1.9 |
| -HDC20J - 90 | 805.484 | | 20 | 38 | 48 | | 90 | 47 | | 1.5 |
| -135 | 805.485 | | | | 53 | 48 | 135 | 90 | | 2.0 |
| -HDC25J - 90 | 805.677 | | 25 | 51 | 63 | 56 | 90 | 41 | 49 | 1.9 |
| -HDC32J - 90 | 805.678 | 2 | 32 | 59 | 75 | - | | 20 | 56 | 2.3 |
| BBT50 -HDC6J -120 | 805.091 | 1 | 6 | 20 | 48 | 26 | 120 | 55 | 25 | 4.1 |
| -HDC8J -120 | 805.092 | | 8 | 22 | 50 | 28 | | | 31 | 4.1 |
| -HDC10J -120 | 805.093 | | 10 | 24 | 52 | 30 | | | 33 | 4.2 |
| -HDC12J -120 | 805.094 | | 12 | 26 | 54 | 32 | | | 36 | 4.2 |
| -HDC16J -120 | 805.486 | | 16 | 34 | 58 | 41 | | 56 | 43 | 4.4 |
| -HDC20J -120 | 805.487 | | 20 | 38 | 62 | 45 | | | | 4.5 |
| -HDC25J -120 | 805.679 | | 25 | 48 | 70 | 58 | | 59 | 49 | 5.2 |
| -HDC32J -120 | 805.680 | | 32 | 58 | 78 | 67 | | 60 | 56 | 5.6 |

1. Adjusting screw cannot be used.
2. Straight collet can be used for HDC16J or bigger Ød size models.
3. Larger diameter models, HDC16J, 20J are available with only peripherical coolant supply.
4. "E" is the min. clamping length.

For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286

**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# Hydraulic Chuck Standard

For high precision machining in automotive, aerospace, medical and die & mold.

BIG-PLUS® Dual-Contact

Coolant Through Hole

A.1

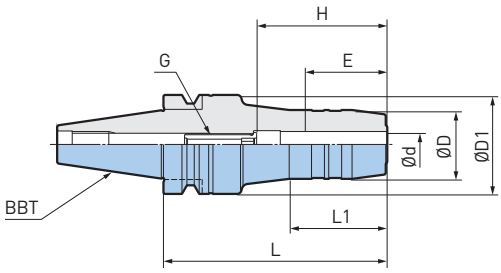



Fig. 1

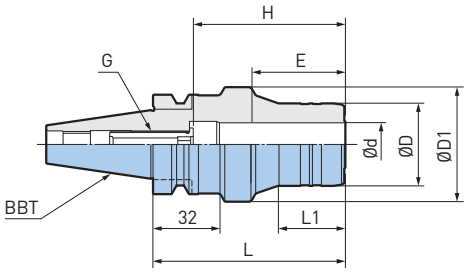



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 3 - 25 mm**

| Model | | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | H | E | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -HDC6 | - 45 | **978.071** | 1 | 6 | 30 | 46 | 45 | 7 | 35 - 50 | 28 | HDA6-05020 | 0.61 |
| | - 75 | **978.034** | | | 26 | | 75 | 40 | 28 - 50 | | HDA6-05032 | 0.67 |
| | -105 | **978.073** | | | | | 105 | 43 | | | | 0.82 |
| -HDC8 | - 45 | **978.075** | 1 | 8 | 32 | 46 | 45 | 7 | 35 - 50 | | HDA8-06020 | 0.61 |
| | - 75 | **978.076** | | | 28 | | 75 | 41 | 28 - 50 | | HDA8-06032 | 0.69 |
| | -105 | **978.078** | | | | | 105 | 44 | | | | 0.84 |
| -HDC10 | - 45 | **978.080** | 1 | 10 | 34 | 46 | 45 | 7 | 45 - 55 | 33 | HDA10-08015 | 0.60 |
| | - 75 | **978.081** | | | 30 | | 75 | 36 | 33 - 55 | | HDA10-08032 | 0.74 |
| | -105 | **978.083** | | | | | 105 | 45 | | | | 0.91 |
| -HDC12 | - 45 | **978.085** | 1 | 12 | 36 | 46 | 45 | 7 | 55 - 60 | 38 | HDA12-10010 | 0.58 |
| | - 75 | **978.086** | | | 32 | | 75 | 36 | 38 - 60 | | HDA12-10032 | 0.75 |
| | -105 | **978.088** | | | | | 105 | 45 | | | | 0.94 |
| -HDC16 | - 45 ** | **978.092** | 1 | 16 | 42 | 46 | 45 | 7 | 70 | 43 | - | 0.55 |
| | - 75 | **978.025** | | | 38 | | 75 | 35 | 43 - 70 | | HDA16-12030 | 0.77 |
| | -105 | **805.550** | | | | | 105 | 47 | | | HDA16-12037 | 1.06 |
| -HDC20 | - 60 * | **978.095** | 2 | 20 | 38 | 53 | 60 | - | 43 - 54 | | HDA16-12030 | 0.77 |
| | - 75 | **978.038** | | | | | 75 | 16 | 46 - 70 | | | 0.85 |
| | -105 | **805.551** | 1 | | | 46 | 105 | 40 | 43 - 70 | | HDA16-12037 | 1.02 |
| -HDC25 | -105 | **978.097** | 2 | 25 | 55 | 63 | 105 | 44 | 52 - 80 | 52 | HDA25-16039 | 1.60 |

1. Straight collet (reduction sleeve) is available.
2. * Straight collet can not be used.
3. ** Adjusting screw can not be used.
4. "E" is the min. clamping length.
5. "G" is the adjusting screw (optional).
6. "H" indicates the adjustment length with an adjusting screw.

For Straight Collet ▸ 272
For Inner Bore Cleaner ▸ 286
For Adjusting Screw ▸ 282

**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# Hydraulic Chuck Standard

BIG-PLUS Dual-Contact

Coolant Through Hole

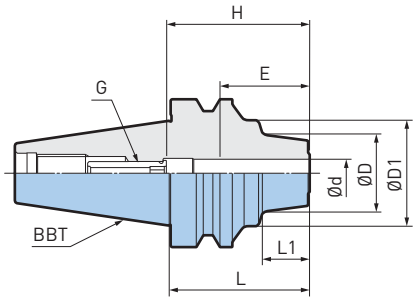



Fig. 1

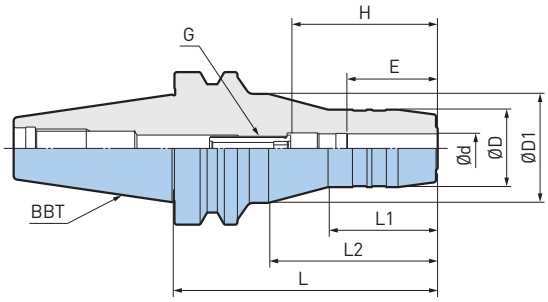



Fig. 2

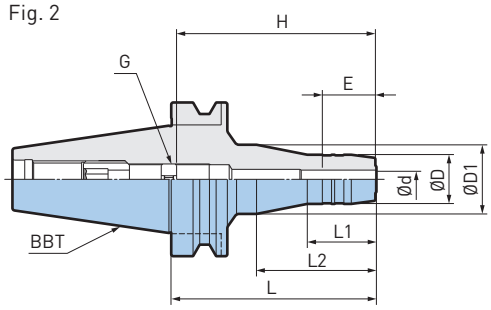



Fig. 3

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 3 - 31 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | L2 | H | E | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT40 -HDC6 - 60 | 800.131 | 1 | 6 | 27 | 45 | 60 | 19 | - | 28 - 50 | 28 | HDA6-05032 | 1.2 |
| - 90 | 978.343 | 2 | | 26 | | 90 | 44 | 50 | | | | 1.4 |
| -110 | 800.128 | | | | | 110 | | 70 | | | | 1.5 |
| -HDC8 - 90 | 978.192 | | 8 | 28 | 45 | 90 | | 50 | | | HDA8-06032 | 1.4 |
| -HDC10 - 60 | 800.088 | 1 | 10 | 31 | 45 | 60 | 20 | - | 33 - 55 | 33 | HDA10-08032 | 1.2 |
| - 90 | 978.027 | 2 | | 30 | | 90 | 45 | 50 | | | | 1.4 |
| -110 | 800.085 | | | | | 110 | | 70 | | | | 1.5 |
| -HDC12 - 60 | 978.046 | 1 | 12 | 33 | 45 | 60 | 20 | - | 38 - 60 | 38 | HDA12-10032 | 1.2 |
| - 90 | 800.096 | 2 | | 32 | | 90 | 45 | 49 | | | | 1.4 |
| -110 | 800.093 | | | | | 110 | | 69 | | | | 1.6 |
| -HDC14 - 90 | 978.028 | | 14 | 34 | 45 | 90 | 46 | 49 | | | | 1.4 |
| -HDC16 - 90 | 978.193 | | 16 | 38 | 45 | | 47 | | 43 - 70 | 43 | HDA16-12037 | 1.4 |
| -HDC18 - 90 | 978.194 | | 18 | 40 | 45 | | 48 | | | | | 1.5 |
| -HDC19 - 75 * | 800.111 | | 19 | 49.2 | - | 75 | 43 | - | 111 | | - | 1.4 |
| -HDC20 - 90 | 800.115 | | 20 | 42 | 45 | 90 | 48 | 50 | 43 - 70 | | HDA16-12037 | 1.4 |
| -110 | 800.112 | | | | 50 | 110 | | 70 | | | | 1.7 |
| -HDC24 - 75 * | 800.116 | | 24 | 63 | - | 75 | 47 | - | 104 | 45 | - | 1.6 |
| -HDC31 - 75 * | 805.826 | | 31 | 74 | | | 30 | | 76 | 56 | | 1.8 |
| BBT50 -HDC6L -105 | 800.023 | 3 | 6 | 26 | 45 | 105 | 44 | 48 | 80 - 120 | 28 | HDA6-20010 | 4.2 |
| -HDC8L -105 | 800.027 | | 8 | 28 | | | 45 | | | | | 4.2 |
| -HDC10L -105 | 800.264 | | 10 | 30 | | | | | | 33 | | 4.2 |
| -HDC12L -105 | 800.268 | | 12 | 32 | | | | | | 38 | | 4.2 |
| -HDC16L -105 | 800.272 | | 16 | 38 | 47 | | 47 | | | 43 | | 4.3 |
| -HDC19L - 90 * | 800.001 | | 19 | 49.2 | - | 90 | 45 | - | 149 | | - | 4.2 |
| -HDC20L -105 | 800.002 | | 20 | 42 | 50 | 105 | 47 | 48 | 71 - 111 | | HDA20-12047 | 4.4 |
| -HDC24L - 90 * | 800.008 | | 24 | 63 | - | 90 | 41 | - | 149 | 45 | - | 4.5 |
| -HDC31L - 90 * | 800.015 | | 31 | 72 | | | 45 | | 147 | 56 | | 4.5 |

1. Straight collet (reduction sleeve) is available.
2. * Adjusting screw cannot be used.
3. "E" is the min. clamping length.
4. "G" is the adjusting screw (optional).
5. "H" is the max. tool shank length can be inserted for these models.

For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286
For Adjusting Screw ▶ 282

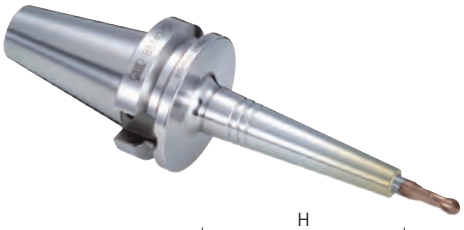
A.1

## Shrink Chuck Slim

Slim design avoids interference with the side wall and draft of the mold.

BIG-PLUS Dual-Contact

Coolant Through Hole



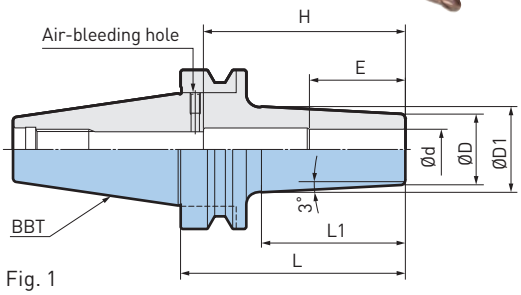



Fig. 1

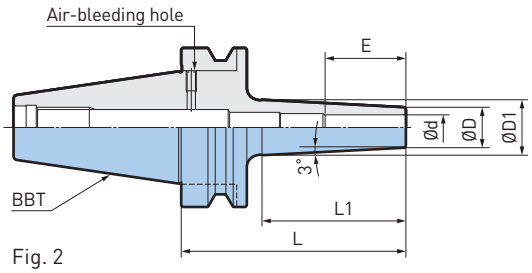



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 6 - 12 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | E | H | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -SRC6S -105 | 978.179 | 1 | 6 | 10 | 18 | 105 | 77 | 26 | - | 0.48 |
| -SRC8S -105 | 978.180 | | 8 | 13 | 21 | | | | | 0.51 |
| -SRC10S -105 | 800.063 | 2 | 10 | 16 | 24 | | | 32 | 62 | 0.55 |
| -SRC12S -105 | 978.007 | | 12 | 19 | 27 | | | 36 | 72 | 0.60 |
| BBT40 -SRC6S -120 | 800.168 | 1 | 6 | 10 | 19 | 120 | 86 | 26 | - | 1.1 |
| -165 | 978.136 | | | | 23.5 | 165 | 127 | | | 1.3 |
| -SRC8S -120 | 978.205 | | 8 | 13 | 22 | 120 | 86 | | | 1.2 |
| -165 | 978.137 | | | | 26.5 | 165 | 129 | | | 1.3 |
| -SRC10S -120 | 978.367 | | 10 | 16 | 25 | 120 | 86 | 32 | | 1.2 |
| -165 | 978.138 | | | | 29.5 | 165 | 129 | | | 1.4 |
| -SRC12S -120 | 800.163 | | 12 | 19 | 28 | 120 | 87 | 36 | | 1.3 |
| -165 | 978.139 | | | | 33 | 165 | 131 | | | 1.5 |

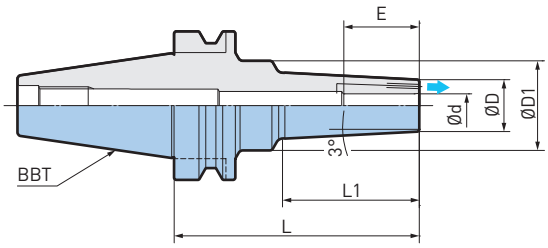
1. Use carbide cutter within a tolerance of h6.
2. "E" is the min. clamping length.
3. "H" is the max. tool shank length can be inserted for these models.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

## Shrink Chuck Jet Through

Efficient coolant supply to the cutting tool periphery.




BIG-PLUS Dual-Contact

Coolant Through Hole

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 6 - 12 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| BBT40 -SRC6J -105 | 804.751 | 6 | 16 | 32 | 105 | 55 | 26 | 1.3 |
| -SRC8J -105 | 804.752 | 8 | 19 | 35 | | | | 1.3 |
| -SRC10J -105 | 804.749 | 10 | 22 | 38 | | 58 | 32 | 1.4 |
| -SRC12J -105 | 804.750 | 12 | 24 | 40 | | 63 | 36 | 1.4 |
| BBT50 -SRC6J -165 | 804.755 | 6 | 16 | 42 | 165 | 93 | 26 | 4.1 |
| -SRC8J -165 | 804.756 | 8 | 19 | 45 | | 99 | | 4.2 |
| -SRC10J -165 | 804.753 | 10 | 22 | 48 | | 103 | 32 | 4.3 |
| -SRC12J -165 | 804.754 | 12 | 24 | 50 | | 108 | 36 | 4.3 |

1. Use carbide cutter within a tolerance of h6.
2. "E" is the min. clamping length.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

# Shrink Chuck Standard

Substantial body provides higher rigidity. Available from 4 mm clamping diameter.

BIG-PLUS Dual-Contact

Coolant Through Hole

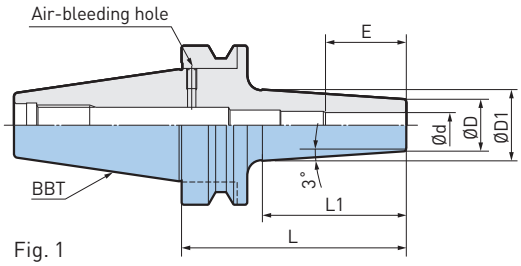



Fig. 1

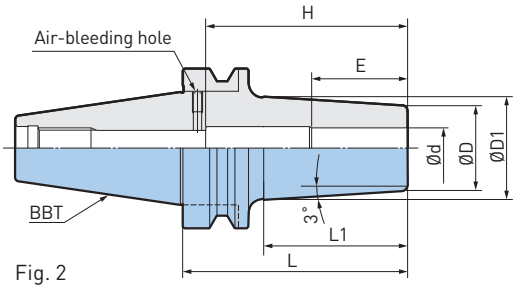



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 4 - 20 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | E | H | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -SRC4 - 75 * | 978.001 | 1 | 4 | 10 | 15 | 75 | 44 | 16 | - | 0.45 |
| -SRC6 - 75 | 978.002 | | 6 | 14 | 19 | | 47 | 26 | | 0.47 |
| -SRC8 - 75 | 978.003 | | 8 | 18 | 23 | | | | | 0.51 |
| -SRC10 - 75 | 978.004 | 2 | 10 | 22 | 27 | | | 32 | 62 | 0.56 |
| -SRC12 - 75 | 978.005 | | 12 | 24 | 29 | | | 36 | 72 | 0.58 |
| -SRC16 - 75 | 978.006 | | 16 | 28 | 33 | | 48 | 38 | 80 | 0.62 |
| BBT40 -SRC4 - 90 * | 978.291 | 1 | 4 | 10 | 15.5 | 90 | 52 | 16 | - | 1.1 |
| -SRC6 - 90 | 978.056 | | 6 | 14 | 20 | | 57 | 26 | | 1.1 |
| -SRC8 - 90 | 978.057 | | 8 | 18 | 24 | | | | | 1.2 |
| -SRC10 - 90 | 978.058 | | 10 | 22 | 28 | | | 32 | | 1.2 |
| -SRC12 - 90 | 978.059 | | 12 | 24 | 30 | | | 36 | | 1.2 |
| -SRC16 - 90 | 978.060 | 2 | 16 | 28 | 34 | | | 38 | 80 | 1.3 |
| -165 | 800.164 | | | | 42 | 165 | 132 | | | 1.9 |
| -SRC20 - 90 | 978.061 | | 20 | 34 | 40 | 90 | 57 | 42 | 100 | 1.4 |
| -165 | 800.165 | | | | 48 | 165 | 132 | | | 2.1 |
| BBT50 -SRC6 -105 | 978.105 | 1 | 6 | 14 | 20.5 | 105 | 61 | 26 | - | 3.7 |
| -165 | 800.354 | | | | 26 | 165 | 116 | | | 3.9 |
| -SRC8 -105 | 978.107 | | 8 | 18 | 24.5 | 105 | 61 | | | 3.8 |
| -165 | 800.355 | | | | 30 | 165 | 116 | | | 4.0 |
| -SRC10 -105 | 978.109 | | 10 | 22 | 28.5 | 105 | 61 | 32 | | 3.8 |
| -165 | 800.350 | | | | 34 | 165 | 116 | | | 4.2 |
| -SRC12 -105 | 978.111 | | 12 | 24 | 30.5 | 105 | 61 | 36 | | 3.9 |
| -165 | 800.351 | | | | 36 | 165 | 116 | | | 4.2 |
| -SRC16 -105 | 978.113 | | 16 | 28 | 34.5 | 105 | 61 | 38 | | 3.9 |
| -165 | 978.114 | | | | 40.0 | 165 | 116 | | | 4.3 |
| -SRC20 -105 | 978.115 | | 20 | 34 | 40 | 105 | 61 | 42 | | 4.0 |
| -165 | 800.352 | | | | 46.0 | 165 | 116 | | | 4.6 |

1. Use carbide cutter within a tolerance of h6.
2. * Use carbide cutter within a tolerance of h5.
3. "E" is the min. clamping length.
4. "H" is the max. tool shank length can be inserted for these models.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

BROTECH

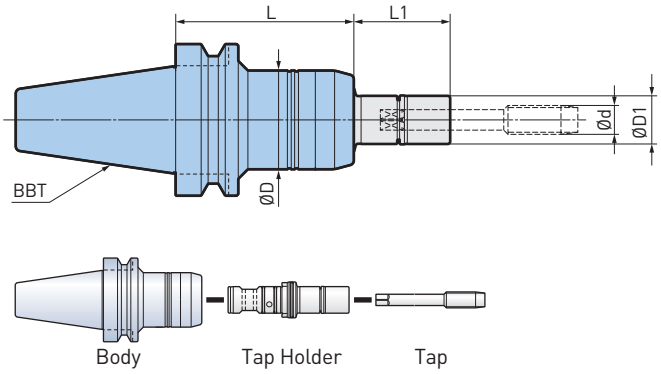
# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1




BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **M3 - M20**

| Model | Order No. | Tap Holder Model | Ød | ØD | ØD1 | L | L1 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| BBT30 -MGT6 - 70 | **965.401** | MGT6 | M3 - M8 | 36 | 16 | 70 | 30-200 | 0.69 |
| -MGT12 - 70 | **965.402** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 70 | 30-200 | 0.74 |
| -MGT20 -110 | **965.403** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 110 | 35-150 | 1.45 |
| BBT40 -MGT6 - 75 | **965.404** | MGT6 | M3 - M8 | 36 | 16 | 75 | 30-200 | 1.3 |
| -MGT12 - 75 | **965.405** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 75 | 30-200 | 1.4 |
| -MGT20 - 95 | **965.406** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 95 | 35-150 | 1.8 |
| BBT50 -MGT6 - 90 | **965.407** | MGT6 | M3 - M8 | 36 | 16 | 90 | 30-200 | 3.9 |
| -MGT12 - 90 | **965.408** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 90 | 30-200 | 4.0 |
| -MGT20 -105 | **965.409** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 105 | 35-150 | 4.4 |

1. Tap holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.

For Tap Holder ▶ 276
For Accessories ▶ 281
For MEGA Wrench ▶ 281

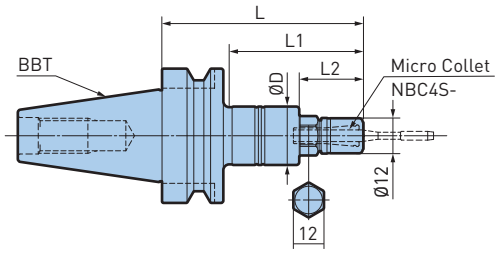


BROTECH

# MEGA Synchro Tapping Holder

## For small Tap MGT3

BIG-PLUS Dual-Contact



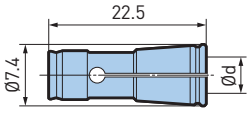

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **M1 - M3**

| Model | Order No. | Tapping Range | ØD | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BBT30 -MGT3 -70 | **965.400** | M1 - M3 | 20 | 70 | 46 | 22 | 0.49 |
| BBT40 -MGT3 -90 | **805.723** | | | 90 | 61 | | 1.2 |

1. Nut is included. MEGA Wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the hex portion of the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

For Accessories ▶ 281
For MEGA Wrench ▶ 281

### Micro Collet for MGT3




| Model | Order No. | Tapping Range | | | Tap Shank |
|---|---|---|---|---|---|
| | | DIN 371 | ISO 529 | JIS | Ød |
| NBC4S-2.5AA | **961.468** | M1 - M1.8 | M2 | | 2.5 |
| -2.8AA | **968.353** | M2 - M2.6 | M2.2, M2.5 | | 2.8 |
| -3.0AA | **961.470** | - | - | M1 - M2.6 | 3.0 |
| -3.1AA | **968.355** | - | M3 | | 3.15 |
| -3.5AA | **961.472** | M3 | - | | 3.5 |
| -4.0AA | **961.474** | - | - | M3 | 4.0 |

1. Other sizes available. Please refer to micro collet.

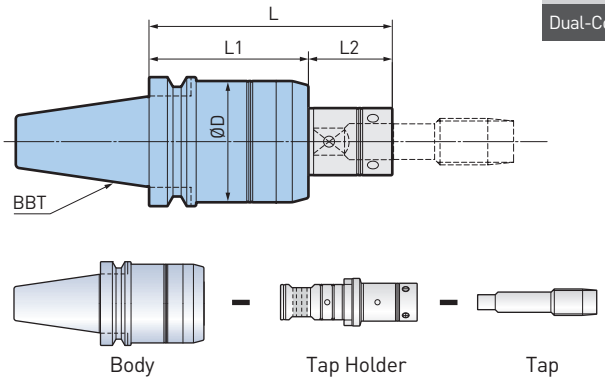
For Micro Collet ▶ 247

## For large Tap MGT36

BIG-PLUS Dual-Contact

Coolant Through Hole

Compensation for synchronization error eliminates heavy thrust load of large diameter tapping.




BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **M22 - M36**

| Model | Order No. | Tapping Range | ØD | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BBT50-MGT36-125 | **800.323** | M22 - M36<br>P5/8 - P1 | 94 | 190 | 125 | 65 | 7.2 |

1. Tap holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.

For MGT36 Tap Holder ▶ 279
For Accessories ▶ 281

# Side Lock Holders for Weldon

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

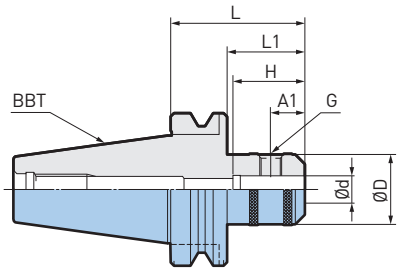



Fig. 1

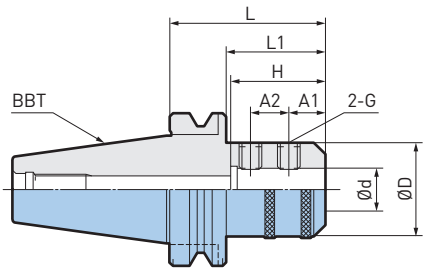



Fig. 2

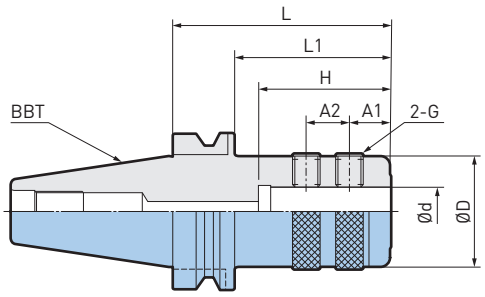
BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

**Ø 6 - 50 mm**

| Model | Order No. | Fig. | Ød (H5) | ØD | L | L1 | A1 | A2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -ISL6 - 60 | **961.394** | 1 | 6 | 25 | 60 | 38 | 18 | - | 85 * | M6 | 0.52 |
| -ISL8 - 60 | **961.395** | | 8 | 28 | | | | | | M8 | 0.55 |
| -ISL10 - 60 | **961.396** | | 10 | 35 | | | 20 | | 45 | M10 | 0.64 |
| -ISL12 - 60 | **961.397** | | 12 | 42 | | | 22.5 | | 48 | M12 | 0.74 |
| -ISL16 - 60 | **966.341** | | 16 | 48 | | | 24 | | 53 | M14 | 0.81 |
| BBT40 -ISL6 - 75 | **807.200** | 1 | 6 | 25 | 75 | 48 | 18 | - | 110 * | M6 | 1.2 |
| -ISL8 - 75 | **807.201** | | 8 | 28 | | | | | | M8 | 1.3 |
| -ISL10 - 75 | **807.202** | | 10 | 35 | | | 20 | | | M10 | 1.4 |
| -ISL12 - 75 | **961.362** | | 12 | 42 | | | 22.5 | | | M12 | 1.5 |
| -ISL16 - 75 | **961.363** | | 16 | 48 | | | 24 | | 53 | M14 | 1.5 |
| -ISL20 - 75 | **961.364** | | 20 | 52 | | | 25 | | 55 | M16 | 1.6 |
| -ISL25 - 90 | **961.365** | 2 | 25 | 63.5 | 90 | 63 | 24 | 25 | 60 | M18xP2 | 2.1 |
| -ISL32 -105 | **961.366** | | 32 | 72 | 105 | - | | 28 | 82 | M20xP2 | 2.9 |
| BBT50 -ISL16 - 90 | **961.367** | 1 | 16 | 48 | 90 | 52 | 24 | - | 145 * | M14 | 4.4 |
| -ISL20 - 90 | **961.368** | | 20 | 52 | | | 25 | | | M16 | 4.5 |
| -ISL25 -105 | **961.369** | 2 | 25 | 65 | 105 | 67 | 24 | 25 | 60 | M18xP2 | 4.6 |
| -ISL32 -105 | **978.017** | | 32 | 72 | | | | 28 | 90 | M20xP2 | 5.3 |
| -ISL40 -120 | **978.018** | | 40 | 90 | 120 | 82 | 30 | 32 | | | 6.5 |
| -ISL50 -121 | **978.294** | | 50 | 99.5 | 121 | 83 | 35 | 35 | | M24xP2 | 7.2 |

1. "H" is the max. tool shank length that can be inserted into the holder.
2. H dimension marked with * indicates this dimension to the back end of the retention knob.
3. Use a cutting tool in accordance to DIN 1835 B/DIN 6535 HB.

# Side Lock Holders for Drills

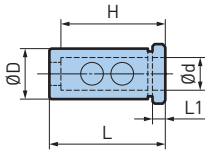



BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 20 - 40 mm**

| Model | Order No. | Ød | ØD | L | L1 | A1 | A2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -TSL20 - 75 | **978.314** | 20 | 48 | 75 | - | 14 | 14 | 50 | M10 | 0.98 |
| -TSL25 - 80 | **978.315** | 25 | | 80 | | 15 | 20 | 56 | M16 | 0.97 |
| -TSL32 - 85 | **805.243** | 32 | 63 | 85 | | | 20 | 60 | | 1.38 |
| BBT40 -TSL16 - 90 | **800.175** | 16 | 48 | 90 | 63 | 14 | 14 | 48 | M10 | 1.7 |
| -TSL20 - 90 | **800.177** | 20 | | 90 | 63 | | | 50 | | 1.7 |
| -TSL25 - 90 | **800.179** | 25 | | | | 15 | 20 | 56 | M16 | 1.6 |
| -TSL32 -105 | **978.318** | 32 | 63 | 105 | 78 | | | 60 | | 2.4 |
| -TSL40 -105 | **978.317** | 40 | 68 | | - | | 25 | 70 | | 2.4 |
| BBT50 -TSL16 - 90 | **800.369** | 16 | 48 | 90 | 52 | 14 | 14 | 48 | M10 | 4.2 |
| -TSL20 - 90 | **800.374** | 20 | | | | | | 50 | | 4.2 |
| -TSL25 -105 | **800.375** | 25 | | 105 | 67 | 15 | 20 | 56 | M16 | 4.3 |
| -TSL32 -105 | **800.380** | 32 | 63 | | | | | 60 | | 4.8 |
| -TSL40 -105 | **800.385** | 40 | 68 | | | | 25 | 70 | | 4.8 |

1. "H" is the max. tool shank length that can be inserted into the holder.
2. Not compatible with Weldon DIN 1835B.

## SL Sleeves for TSL Side Lock Holder



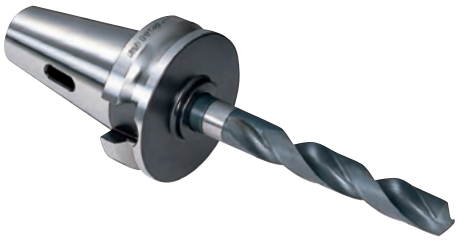

| Model | Order No. | Ød | ØD | L | L1 | H |
|---|---|---|---|---|---|---|
| OSL25 -16 | **962.596** | 16 | 25 | 62 | 5.5 | 48 |
| -20 | **962.597** | 20 | | | | 50 |
| OSL32 -16 | **962.586** | 16 | 32 | 66 | 5.5 | 48 |
| -20 | **962.598** | 20 | | | | 50 |
| -25 | **962.599** | 25 | | | | 56 |
| OSL40 -16 | **804.678** | 16 | 40 | 76 | 5.5 | 48 |
| -20 | **804.679** | 20 | | | | 50 |
| -25 | **962.581** | 25 | | | | 56 |
| -32 | **962.582** | 32 | | | | 60 |

# Morse Taper Holders

Precise finish of inner taper guarantees high concentricity.

BIG-PLUS® Dual-Contact

A.1



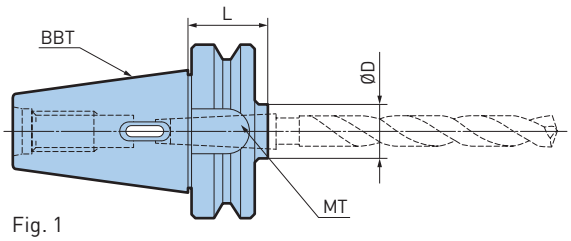



Fig. 1

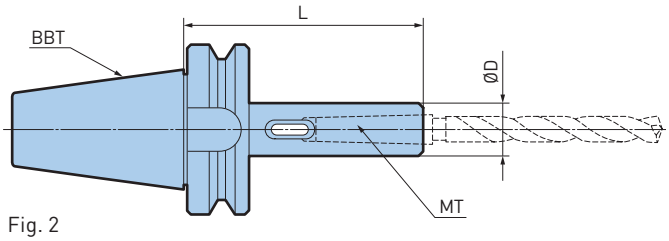



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

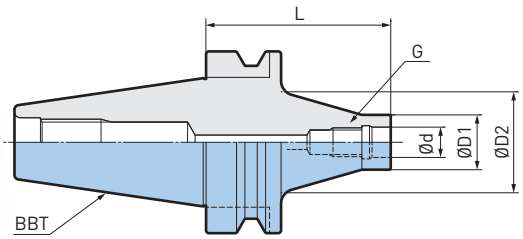
| Model | Order No. | Fig. | MT No. | ØD | L | Weight (kg) |
|---|---|---|---|---|---|---|
| BBT30 -MTA1 - 60 | **978.274** | 1 | 1 | 25 | 60 | 0.52 |
| -MTA2 - 60 | **978.254** | | 2 | 32 | | 0.55 |
| -MTA3 - 80 | **978.255** | | 3 | 40 | 80 | 0.74 |
| BBT40 -MTA1 - 45 | **978.399** | 1 | 1 | 25 | 45 | 1.0 |
| -120 | **800.158** | 2 | | | 120 | 1.3 |
| -MTA2 - 45 | **978.164** | 1 | 2 | 32 | 45 | 1.0 |
| -120 | **800.159** | 2 | | | 120 | 1.6 |
| -MTA3 - 75 | **978.400** | 1 | 3 | 40 | 75 | 1.0 |
| -135 | **800.160** | 2 | | | 135 | 1.7 |
| -MTA4 - 90 | **978.165** | | 4 | 50 | 90 | 1.6 |
| BBT50 -MTA1 - 45 | **800.329** | 1 | 1 | 25 | 45 | 3.9 |
| -120 | **800.325** | 2 | | | 120 | 4.2 |
| -MTA2 - 45 | **800.335** | 1 | 2 | 32 | 45 | 3.9 |
| -135 | **800.330** | 2 | | | 135 | 4.3 |
| -MTA3 - 45 | **800.341** | 1 | 3 | 40 | 45 | 3.8 |
| -150 | **800.336** | 2 | | | 150 | 4.6 |
| -MTA4 - 75 | **800.347** | 1 | 4 | 50 | 75 | 3.9 |



BROTECH

## Holders for Screw-On Cutter

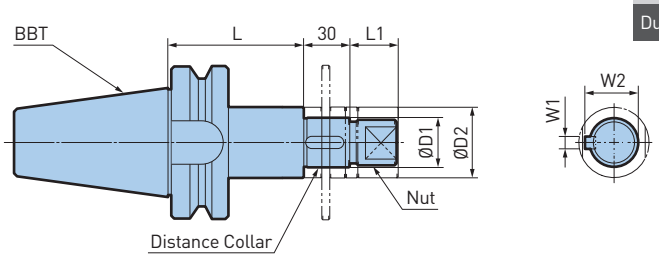
General metric screw-on type cutting tools can be used with these models.




BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Ød | ØD1 | ØD2 | L | G | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BBT30 -M10 - 19 - 45 | **806.601** | 10.5 | 19 | 35 | 45 | M10 | 0.45 |
| -M12 - 24 - 40 | **806.602** | 12.5 | 24 | 40 | 40 | M12 | 0.45 |
| -M16 - 29 - 35 | **806.603** | 17 | 29 | | 35 | M16 | 0.41 |
| BBT40 -M10 - 19 - 65 | **806.604** | 10.5 | 19 | 35 | 65 | M10 | 1.1 |
| -M12 - 24 - 60 | **806.605** | 12.5 | 24 | 40 | 60 | M12 | 1.1 |
| -M16 - 29 - 55 | **806.606** | 17 | 29 | 45 | 55 | M16 | 1.2 |

## Side Cutter Arbors



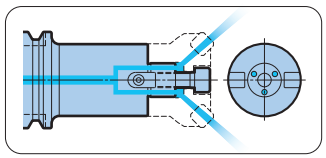

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | ØD1 (h6) | W1 | W2 | ØD2 | L | L1 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| BBT40 -SCA25.4 - 75 | **804.760** | 25.4 | 6.35 | 27.78 | 40 | 75 | 25 | 1.9 |
| -120 | **804.762** | | | | | 120 | | 2.3 |
| -SCA31.75 - 75 | **804.761** | 31.75 | 7.92 | 34.92 | 46 | 75 | 30 | 2.4 |
| BBT50 -SCA25.4 - 90 | **804.757** | 25.4 | 6.35 | 27.78 | 40 | 90 | 25 | 4.7 |
| -135 | **804.763** | | | | | 135 | | 5.1 |
| -SCA31.75 - 90 | **804.758** | 31.75 | 7.92 | 34.92 | 46 | 90 | 30 | 5.1 |
| -135 | **804.764** | | | | | 135 | | 5.7 |
| -SCA38.1 - 90 | **804.759** | 38.1 | 9.52 | 42.06 | 55 | 90 | 36 | 5.8 |
| -135 | **804.765** | | | | | 135 | | 6.8 |

1. Nut is included.
2. Distance collars of 5 mm, 8 mm, 10 mm and 12 mm are included.

# Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.



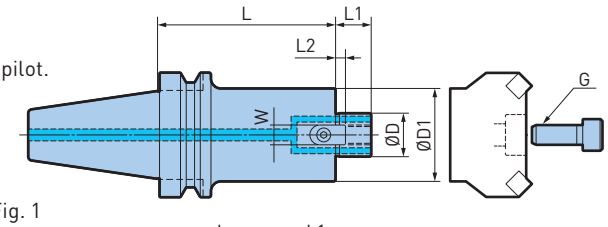



Fig. 1

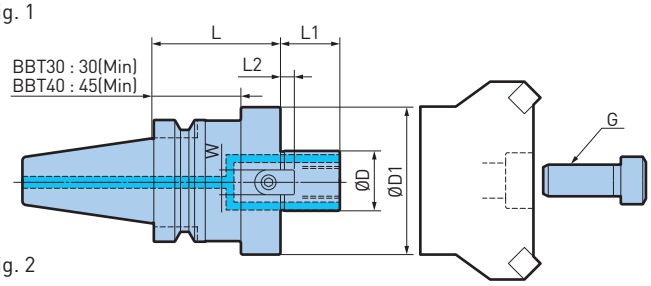



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Fig. | ØD (H6) | ØD1 | L | L1 | Drive Keys | | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L2 | W | | |
| BBT30 -FMH16 - 37 - 35 | 978.326 | 1 | 16 | 37 | 35 | 16 | 5 | 8 | M8 | 0.55 |
| -FMH22 - 47 - 45 | 978.259 | 2 | 22 | 47 | 45 | 18 | 5 | 10 | M10 | 0.77 |
| -FMH22 - 60 - 45 | 805.569 | | | 60 | 45 | 18 | 5 | 10 | M10 | 0.90 |
| -FMH27 - 60 - 45 | 978.273 | | 27 | 60 | 45 | 20 | 6 | 12 | M12 | 0.94 |
| BBT40 -FMH16 - 37 - 40 | 800.066 | 1 | 16 | 37 | 40 | 16 | 5 | 8 | M8 | 1.1 |
| -FMH22 - 47 - 45 | 978.145 | 1 | 22 | 47 | 45 | 18 | 5 | 10 | M10 | 1.3 |
| - 60 | 978.324 | | | | 60 | | | | | 1.5 |
| - 90 | 800.074 | | | | 90 | | | | | 1.9 |
| -150 | 978.378 | | | | 150 | | | | | 2.7 |
| -FMH22 - 60 - 45 | 978.368 | 1 | 22 | 60 | 45 | 18 | 5 | 10 | M10 | 1.5 |
| - 60 | 800.075 | | | | 60 | | | | | 1.8 |
| - 90 | 978.208 | | | | 90 | | | | | 2.5 |
| -FMH27 - 60 - 45 | 978.219 | 1 | 27 | | 45 | 20 | 6 | 12 | M12 | 1.5 |
| - 60 | 800.079 | | | | 60 | | | | | 1.8 |
| - 90 | 978.128 | | | | 90 | | | | | 2.5 |
| -FMH27 - 76 - 60 | 800.080 | 2 | 27 | 76 | 60 | 20 | 6 | 12 | M12 | 2.1 |
| - 90 | 800.081 | | | | 90 | | | | | 2.8 |
| -FMH32 - 96 - 60 | 978.035 | 2 | 32 | 96 | 60 | 22 | 7 | 14 | M16 | 2.4 |
| BBT50 -FMH16 - 37 - 60 | 800.207 | 1 | 16 | 37 | 60 | 16 | 5 | 8 | M8 | 3.8 |
| -105 | 800.204 | | | | 105 | | | | | 4.1 |
| -150 | 800.205 | | | | 150 | | | | | 4.5 |
| -200 | 800.206 | | | | 200 | | | | | 4.9 |
| -FMH22 - 47 - 60 | 978.129 | 1 | 22 | 47 | 60 | 18 | 5 | 10 | M10 | 4.1 |
| -105 | 978.130 | | | | 105 | | | | | 4.7 |
| -150 | 978.131 | | | | 150 | | | | | 5.3 |
| -200 | 978.148 | | | | 200 | | | | | 6.0 |
| -250 | 800.221 | | | | 250 | | | | | 6.7 |
| -FMH22 - 60 - 60 | 978.403 | 1 | 22 | 60 | 60 | 18 | 5 | 10 | M10 | 4.2 |
| -105 | 978.167 | | | | 105 | | | | | 5.2 |
| -150 | 800.224 | | | | 150 | | | | | 5.2 |
| -FMH27 - 60 - 45 | 800.237 | 1 | 27 | 60 | 45 | 20 | 6 | 12 | M12 | 3.9 |
| - 90 | 978.174 | | | | 90 | | | | | 5.0 |
| -150 | 978.175 | | | | 150 | | | | | 6.3 |
| -200 | 800.235 | | | | 200 | | | | | 7.4 |
| -250 | 978.029 | | | | 250 | | | | | 8.5 |
| -300 | 800.236 | | | | 300 | | | | | 9.6 |
| -FMH32 - 96 - 45 | 978.132 | 1 | 32 | 96 | 45 | 22 | 7 | 14 | M16 | 4.2 |
| - 90 | 978.133 | | | | 90 | | | | | 6.8 |
| -150 | 978.143 | | | | 150 | | | | | 10.2 |
| -200 | 978.183 | | | | 200 | | | | | 13.3 |
| -300 | 800.256 | | | | 300 | | | | | 19.0 |
| -FMH40 -100 - 45 | 978.149 | 1 | 40 | 100 | 45 | 26 | 8.5 | 16 | M20 (MBA-M20H) | 4.4 |
| - 75 | 961.371 | | | | 75 | | | | | 6.2 |
| -105 | 961.372 | | | | 105 | | | | | 8.1 |

1. Hexagon socket head cap screw is included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

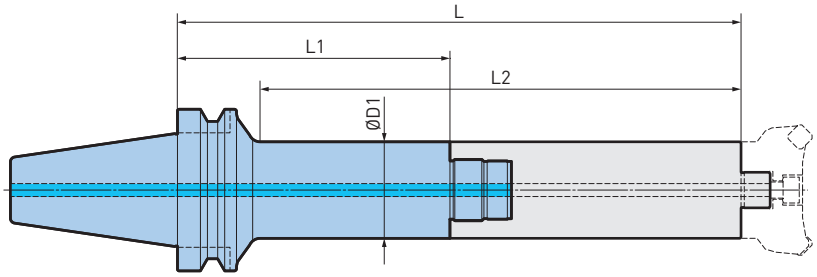
For Clamp Bolt ▶ 282



BROTECH

## Smart Damper Basic Holders for Mills

Anti-Vibration | Dual-Contact | Coolant Through Hole

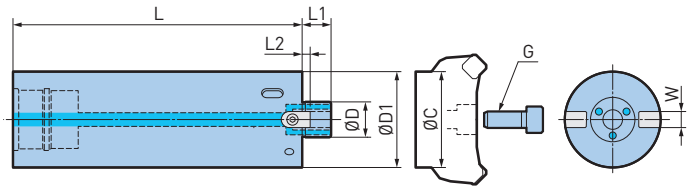



BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | ØD1 | L | L1 | L2 | Damper Head Model | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BBT50 -SDF36 - 47 - 70 | 806.579 | 47 | 250 | 70 | 197 | FMH_DP-47 | 4.3 |
| -120 | 806.580 | | 300 | 120 | 247 | | 5.0 |
| -170 | 804.975 | | 350 | 170 | 297 | | 5.6 |
| -220 | 804.970 | | 400 | 220 | 347 | | 6.3 |
| BBT50 -SDF36 - 60 - 70 | 806.581 | 60 | 250 | 70 | 197 | FMH_DP-60 | 4.6 |
| -120 | 806.582 | | 300 | 120 | 247 | | 5.7 |
| -170 | 804.973 | | 350 | 170 | 297 | | 6.7 |
| -220 | 804.974 | | 400 | 220 | 347 | | 7.8 |

## Smart Damper Damper Heads for Mills

Anti-Vibration | Coolant Through Hole

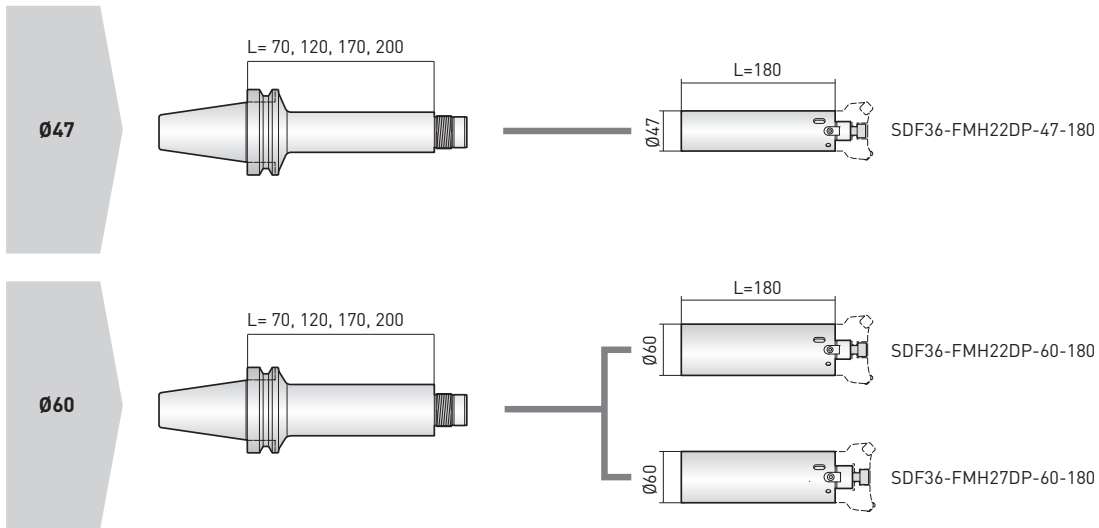



| Model | Order No. | ØD | ØD1 | L | L1 | L2 | W | G | Wrench | ØC min. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SDF36-FMH22DP -47 -180 | 804.969 | 22 | 47 | 180 | 18 | 5 | 10 | M10 | FK45-50L | 36 | 3.0 |
| -60 -180 | 804.971 | 22 | 60 | | 18 | 5 | 10 | M10 | FK58-62L | 49 | 4.5 |
| FMH27DP -60 -180 | 804.972 | 27 | 60 | | 20 | 6 | 12 | M12 | | 46 | 4.5 |

1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ 282
For Wrench ▶ 275

**Combinations**

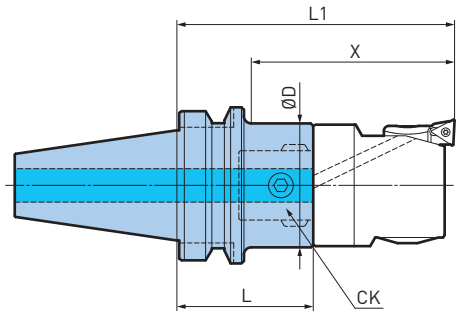


# CK Shanks with Center Through Coolant

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1



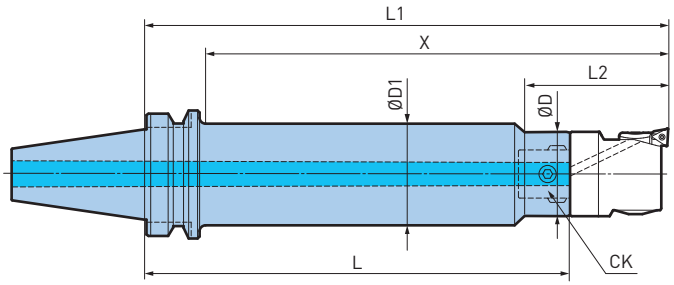

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BBT30 -CKB1 - 72 | 328.308 | CKB1 | 19 | 72 | 104 | 73 | 0.51 |
| -CKB2 - 83 | 328.260 | CKB2 | 24 | 82.5 | 118 | 93 | 0.57 |
| -CKB3 - 39 | 328.272 | CKB3 | 31 | 39 | 79 | 53 | 0.45 |
| -CKB4 - 73 | 328.261 | CKB4 | 39 | 73 | 120 | 93 | 0.78 |
| -CKB5 - 63 | 328.262 | CKB5 | 50 | 63 | 120 | 93 | 0.80 |
| -CKB6 - 64 | 328.289 | CKB6 | 64 | 64 | 135 | 108 | 0.93 |
| BBT40 -CKB1 - 72 | 869.017 | CKB1 | 19 | 72 | 104 | 73 | 1.1 |
| -CKB2 - 43 | 807.184 | CKB2 | 24 | 42.5 | 78 | 48 | 1.0 |
| - 83 | 806.680 | CKB2 | 24 | 82.5 | 118 | 88 | 1.2 |
| -CKB3 - 44 | 807.150 | CKB3 | 31 | 44 | 84 | 53 | 1.1 |
| - 124 | 806.681 | CKB3 | 31 | 124 | 164 | 133 | 1.5 |
| -CKB4 - 43 | 806.328 | CKB4 | 39 | 43 | 90 | 58 | 1.2 |
| - 118 | 806.284 | CKB4 | 39 | 118 | 165 | 133 | 1.8 |
| -CKB5 - 48 | 806.902 | CKB5 | 50 | 48 | 105 | 73 | 1.2 |
| - 108 | 806.682 | CKB5 | 50 | 108 | 165 | 133 | 2.1 |
| -CKN6 - 46 | 323.832N | CKN6 | 63.5 | 46 | 117 | 85 | 1.0 |
| - 61 | 323.831N | CKN6 | 63.5 | 61 | 132 | 100 | 1.3 |
| -CKB6 - 94 | 869.008 | CKB6 | 64 | 94 | 165 | 133 | 2.3 |
| BBT50 -CKB1 - 102 | 869.002 | CKB1 | 19 | 102 | 134 | 73 | 4.0 |
| -CKB2 - 53 | 869.003 | CKB2 | 24 | 53 | 88 | 47 | 3.8 |
| - 113 | 869.011 | CKB2 | 24 | 112.5 | 148 | 107 | 4.0 |
| -CKB3 - 54 | 869.004 | CKB3 | 31 | 54 | 94 | 52 | 3.9 |
| - 124 | 806.683 | CKB3 | 31 | 124 | 164 | 122 | 4.3 |
| -CKB4 - 58 | 869.005 | CKB4 | 39 | 58 | 105 | 62 | 4.3 |
| - 118 | 869.013 | CKB4 | 39 | 118 | 165 | 122 | 4.5 |
| - 178 | 869.015 | CKB4 | 39 | 178 | 225 | 182 | 4.9 |
| - 208 | 869.012 | CKB4 | 39 | 208 | 255 | 212 | 5.1 |
| -CKB5 - 63 | 869.001 | CKB5 | 50 | 63 | 120 | 77 | 4.0 |
| - 108 | 869.014 | CKB5 | 50 | 108 | 165 | 122 | 4.7 |
| - 183 | 806.684 | CKB5 | 50 | 183 | 240 | 197 | 5.9 |
| - 228 | 807.071 | CKB5 | 50 | 228 | 285 | 242 | 6.5 |
| - 263 | 806.685 | CKB5 | 50 | 263 | 320 | 277 | 7.0 |
| -CKN6 - 72 | 323.874N | CKN6 | 63.5 | 72 | 143 | 100 | 4.0 |
| -CKB6 - 94 | 869.007 | CKB6 | 64 | 94 | 165 | 122 | 4.8 |
| - 169 | 807.183 | CKB6 | 64 | 169 | 240 | 197 | 6.7 |
| - 229 | 806.686 | CKB6 | 64 | 229 | 300 | 257 | 8.2 |
| - 289 | 806.687 | CKB6 | 64 | 289 | 360 | 317 | 9.7 |
| -CKN7 - 86 | 323.871N | CKN7 | 90 | 86 | 203 (173) | 160 (130) | 4.9 |
| -CKB7 - 136 | 323.875 | CKB7 | 90 | 136 | 253 (223) | 210 (180) | 7.4 |
| - 183 | 806.688 | CKB7 | 90 | 183 | 300 (270) | 257 (227) | 9.9 |
| - 243 | 806.689 | CKB7 | 90 | 243 | 360 (330) | 317 (287) | 12.7 |

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B

## Extra Long CK Shanks with Center Through Coolant




BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

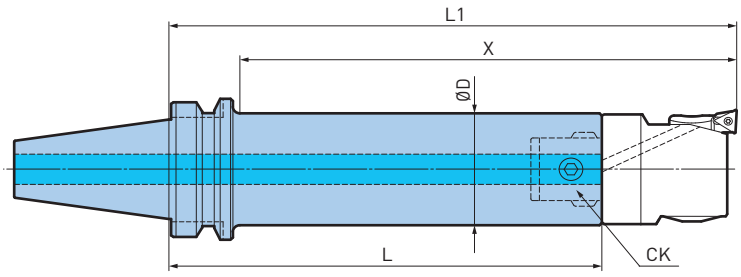
| Model | Order No. | CK | ØD | ØD1 | L | L1 | L2 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BBT50 -CKB4 - 48 - 193 | **806.690** | CKB4 | 39 | 48 | 193 | 240 | 65 | 197 | 5.5 |
| - 238 | **806.692** | | | | 238 | 285 | | 242 | 6.1 |
| -CKB5 - 62 - 243 | **806.693** | CKB5 | 50 | 62 | 243 | 300 | 80 | 257 | 8.1 |
| - 303 | **806.694** | | | | 303 | 360 | | 317 | 9.5 |
| -CKB6 - 72 - 259 | **806.695** | CKB6 | 64 | 72 | 259 | 330 | 100 | 287 | 10.3 |
| - 314 | **869.018** | | | | 314 | 385 | | 342 | 12.0 |
| - 80 - 289 | **806.696** | | | 80 | 289 | 360 | | 317 | 12.9 |
| - 349 | **806.697** | | | | 349 | 420 | | 377 | 15.2 |

1. L1, L2 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

Fine Boring Heads ▶ Chapter B

## Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole finish boring.




BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BBT50 -CKB5DP - 314 | **328.228** | CKB5 | 50 | 314 | 371 | 318 | 7.8 |
| -CKB6DP - 380 | **328.230** | CKB6 | 64 | 380 | 451 | 408 | 12.3 |

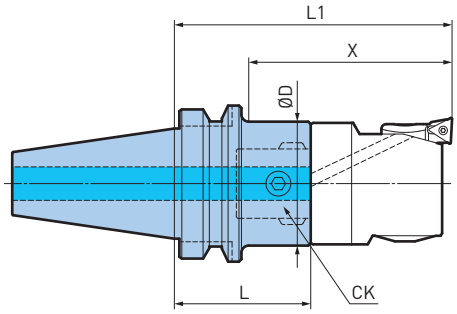
1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B

A.1

## CK Shanks with Center Through Coolant

Coolant Through Hole



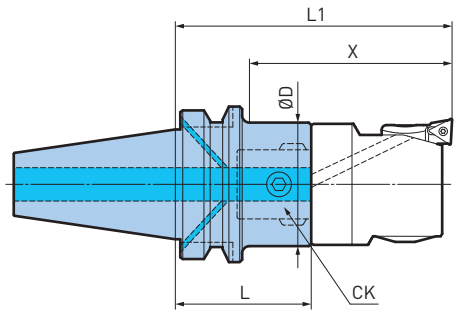

| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BT30 -CKB1 - 35 | **323.707** | CKB1 | 19 | 34.5 | 67 | 40 | 0.35 |
| -CKB5 - 38 | **329.866** | CKB5 | 50 | 38 | 95 | 68 | 0.48 |
| BT40 -CKB6 - 46 | **326.160** | CKB6 | 63.5 | 46 | 117 | 85 | 1.0 |
| -CKB6 - 61 | **323.731** | CKB6 | 63.5 | 61 | 132 | 100 | 1.3 |
| BT50 -CKB6 - 72 | **323.770** | CKB6 | 63.5 | 72 | 143 | 100 | 4.0 |
| -CKB7 - 86 | **323.771** | CKB7 | 90 | 86 | 203 (173) | 160 (130) | 5.0 |

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B

## CK Shanks with Center and Flange Through Coolant

Coolant Through Hole

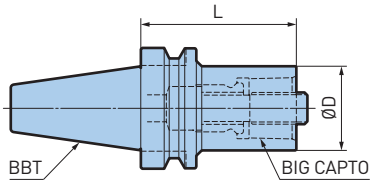



| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BT30 -CKB3 - 34ADF | **323.705** | CKB3 | 31 | 34 | 74 | 47 | 0.39 |
| BT40 -CKB3 - 42ADF | **323.738** | CKB3 | 31 | 42 | 82 | 50 | 0.97 |
| -CKB4 - 65ADF | **326.141** | CKB4 | 39 | 65 | 112 | 80 | 1.2 |
| -CKB5 - 55ADF | **323.730** | CKB5 | 50 | 55 | 112 | 80 | 1.2 |
| -CKB5 - 105ADF | **326.153** | CKB5 | 50 | 105 | 162 | 130 | 1.9 |
| -CKN6 - 46ADF | **323.735N** | CKN6 | 63.5 | 46 | 117 | 85 | 1.0 |
| -CKN6 - 61ADF | **323.736N** | CKN6 | 63.5 | 61 | 132 | 100 | 1.3 |
| -CKB6 - 91ADF | **326.163** | CKB6 | 63.5 | 91 | 162 | 130 | 2.2 |
| BT50 -CKN6 - 72ADF | **323.775N** | CKN6 | 63.5 | 72 | 143 | 100 | 3.9 |
| -CKB6 - 132ADF | **323.777** | CKB6 | 63.5 | 132 | 203 | 160 | 5.4 |
| -CKN7 - 86ADF | **323.776N** | CKN7 | 90 | 86 | 203 (173) | 160 (130) | 5.0 |

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Heads ▶ Chapter B

# BIG CAPTO Basic Holders




BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | BIG CAPTO | ØD | L | Weight (kg) |
|---|---|---|---|---|---|
| BBT40 -C3 - 30 | **973.598** | C3 | 32 | 30 | 1.0 |
| -C4 - 40 | **802.350** | C4 | 40 | 40 | 1.1 |
| -C5 - 50 | **973.600** | C5 | 50 | 50 | 1.2 |
| -C6 - 75 | **973.601** | C6 | 63 | 75 | 1.7 |
| BBT50 -C3 - 40 | **973.602** | C3 | 32 | 40 | 3.6 |
| -C4 - 40 | **973.603** | C4 | 40 | | 3.6 |
| -C5 - 40 | **973.604** | C5 | 50 | | 3.5 |
| -C6 - 50 | **973.605** | C6 | 63 | 50 | 3.5 |
| -C8 - 70 | **803.736** | C8 | 80 | 70 | 4.0 |

1. Clamp bolt is included.

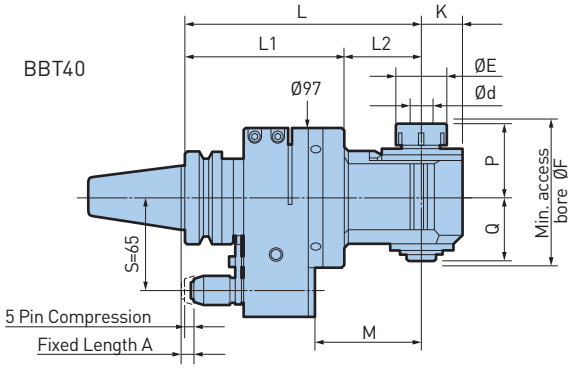
For BIG CAPTO Tools ▶ Chapter A4

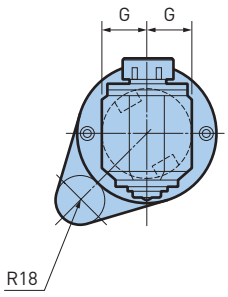
## New Baby Chuck Type

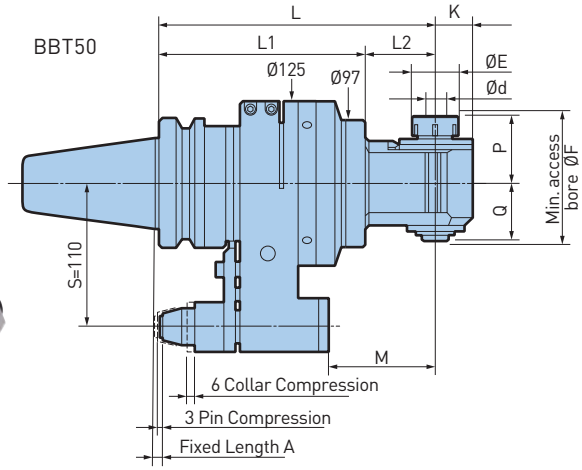
BIG-PLUS Dual-Contact

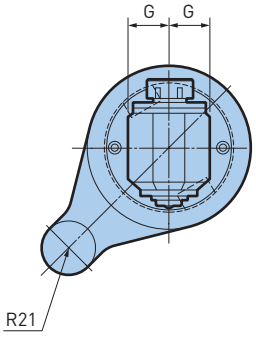
It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.

A.1





Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

**Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØE | G | K | L | L1 | L2 | M | P | Q | ØF | Collet Model | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT40 -AG90/NBS6 -170 | **802.463** | 0.25 - 6 | 20 | 21 | 17 | 170 | 115 | 55 | 77 | 33 | 29 | 67 | NBC6 | 6 000 | 5.1 |
| -200 | **802.465** | | | | | 200 | | 85 | 107 | | | | | | 5.3 |
| -230 | **802.467** | | | | | 230 | | 115 | 137 | | | | | | 5.5 |
| -260 | **802.469** | | | | | 260 | | 145 | 167 | | | | | | 5.7 |
| -AG90/NBS10 -170 | **802.449** | 1.5 - 10 | 30 | 30 | 25 | 170 | 115 | 55 | 77 | 45 | 43 | 91 | NBC10 | 6 000 | 5.5 |
| -200 | **802.451** | | | | | 200 | | 85 | 107 | | | | | | 5.9 |
| -230 | **802.453** | | | | | 230 | | 115 | 137 | | | | | | 6.2 |
| -AG90/NBS13 -170 | **802.455** | 2.5 - 13 | 35 | 31 | 28 | 170 | 115 | 55 | 77 | 52 | 45 | 101 | NBC13 | 6 000 | 5.6 |
| -200 | **802.457** | | | | | 200 | | 85 | 107 | | | | | | 6.0 |
| -230 | **802.459** | | | | | 230 | | 115 | 137 | | | | | | 6.3 |
| -AG90/NBS20S -165S | **802.462** | 2.5 - 20 | 46 | 35 | 33 | 165 | 112 | 53 | 72 | 65 | 62 | 132 | NBC20 | 3 000 | 8.0 |
| BBT50 -AG90/NBS6 -215 | **802.515** | 0.25 - 6 | 20 | 21 | 17 | 215 | 160 | 55 | 82 | 33 | 29 | 67 | NBC6 | 6 000 | 12.6 |
| -245 | **802.518** | | | | | 245 | | 85 | 112 | | | | | | 12.8 |
| -275 | **802.521** | | | | | 275 | | 115 | 142 | | | | | | 13.0 |
| -305 | **802.524** | | | | | 305 | | 145 | 172 | | | | | | 13.2 |
| -AG90/NBS10 -215 | **802.494** | 1.5 - 10 | 30 | 30 | 25 | 215 | 160 | 55 | 82 | 45 | 43 | 91 | NBC10 | 6 000 | 13.0 |
| -245 | **802.497** | | | | | 245 | | 85 | 112 | | | | | | 13.4 |
| -275 | **802.500** | | | | | 275 | | 115 | 142 | | | | | | 13.7 |
| -AG90/NBS13 -215 | **802.503** | 2.5 - 13 | 35 | 31 | 28 | 215 | 160 | 55 | 82 | 52 | 45 | 101 | NBC13 | 6 000 | 13.1 |
| -245 | **802.506** | | | | | 245 | | 85 | 112 | | | | | | 13.5 |
| -275 | **802.509** | | | | | 275 | | 115 | 142 | | | | | | 13.8 |
| -AG90/NBS20 -230 | **802.512** | 2.5 - 20 | 46 | 35 | 35 | 230 | 160 | 70 | 97 | 65 | 62 | 132 | NBC20 | 3 000 | 14.2 |

1. The standard fixed length A is 8 mm for BBT40 and 6 mm for BBT50. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250
For Stop Block ▶ 290



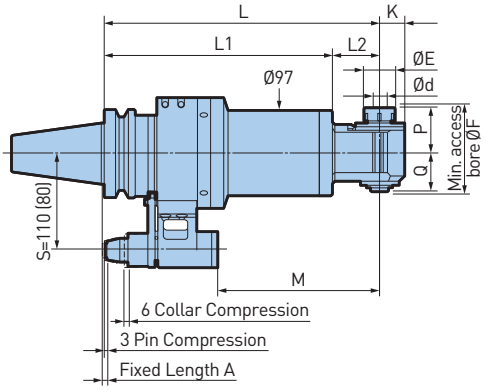
BROTECH

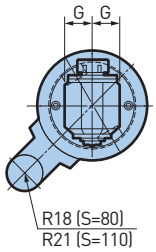
# New Baby Chuck Type Extra Long Type

BIG-PLUS Dual-Contact

A.1

For drilling and key slotting in deep hole of large workpiece.



Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles. **Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØE | G | K | L | L1 | L2 | M | P | Q | ØF | Collet Model | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT50 -AG90/NBS6 -315LS | 805.035 | 0.25 - 6 | 20 | 21 | 17 | 315 | 260 | 55 | 182 | 33 | 29 | 67 | NBC6 | 6 000 | 18.9 |
| -345LS | 805.036 | | | | | 345 | | 85 | 212 | | | | | | 19.1 |
| -375LS | 805.037 | | | | | 375 | | 115 | 242 | | | | | | 19.3 |
| -405LS | 805.038 | | | | | 405 | | 145 | 272 | | | | | | 19.5 |
| -AG90/NBS10 -315LS | 805.047 | 1.5 - 10 | 30 | 30 | 25 | 315 | 260 | 55 | 182 | 45 | 43 | 91 | NBC10 | | 19.3 |
| -345LS | 805.048 | | | | | 345 | | 85 | 212 | | | | | | 19.7 |
| -375LS | 805.049 | | | | | 375 | | 115 | 242 | | | | | | 20.0 |
| -AG90/NBS13 -315LS | 805.057 | 2.5 - 13 | 35 | 31 | 28 | 315 | 260 | 55 | 182 | 52 | 45 | 101 | NBC13 | | 19.4 |
| -345LS | 805.058 | | | | | 345 | | 85 | 212 | | | | | | 19.8 |
| -375LS | 805.060 | | | | | 375 | | 115 | 242 | | | | | | 20.1 |
| -AG90/NBS20 -330LS | 805.067 | 2.5 - 20 | 46 | 35 | 35 | 330 | 260 | 70 | 197 | 65 | 62 | 132 | NBC20 | 3 000 | 20.5 |
| BBT50 -AG90/NBS6 -415LS | 805.039 | 0.25 - 6 | 20 | 21 | 17 | 415 | 360 | 55 | 282 | 33 | 29 | 67 | NBC6 | 6 000 | 23.3 |
| -445LS | 805.040 | | | | | 445 | | 85 | 312 | | | | | | 23.5 |
| -475LS | 805.041 | | | | | 475 | | 115 | 342 | | | | | | 23.7 |
| -505LS | 805.042 | | | | | 505 | | 145 | 372 | | | | | | 23.9 |
| -AG90/NBS10 -415LS | 805.050 | 1.5 - 10 | 30 | 30 | 25 | 415 | 360 | 55 | 282 | 45 | 43 | 91 | NBC10 | | 23.7 |
| -445LS | 805.051 | | | | | 445 | | 85 | 312 | | | | | | 24.1 |
| -475LS | 805.052 | | | | | 475 | | 115 | 342 | | | | | | 24.4 |
| -AG90/NBS13 -415LS | 805.061 | 2.5 - 13 | 35 | 31 | 28 | 415 | 360 | 55 | 282 | 52 | 45 | 101 | NBC13 | | 23.8 |
| -445LS | 805.062 | | | | | 445 | | 85 | 312 | | | | | | 24.2 |
| -475LS | 805.063 | | | | | 475 | | 115 | 342 | | | | | | 24.5 |
| -AG90/NBS20 -430LS | 805.069 | 2.5 - 20 | 46 | 35 | 35 | 430 | 360 | 70 | 297 | 65 | 62 | 132 | NBC20 | 3 000 | 24.9 |
| BBT50 -AG90/NBS6 -515LS | 805.043 | 0.25 - 6 | 20 | 21 | 17 | 515 | 460 | 55 | 382 | 33 | 29 | 67 | NBC6 | 6 000 | 27.7 |
| -545LS | 805.044 | | | | | 545 | | 85 | 412 | | | | | | 27.9 |
| -575LS | 805.045 | | | | | 575 | | 115 | 442 | | | | | | 28.1 |
| -605LS | 805.046 | | | | | 605 | | 145 | 472 | | | | | | 28.3 |
| -AG90/NBS10 -515LS | 805.053 | 1.5 - 10 | 30 | 30 | 25 | 515 | 460 | 55 | 382 | 45 | 43 | 91 | NBC10 | | 28.1 |
| -545LS | 805.054 | | | | | 545 | | 85 | 412 | | | | | | 28.5 |
| -575LS | 805.055 | | | | | 575 | | 115 | 442 | | | | | | 28.8 |
| -AG90/NBS13 -515LS | 805.064 | 2.5 - 13 | 35 | 31 | 28 | 515 | 460 | 55 | 382 | 52 | 45 | 101 | NBC13 | | 28.2 |
| -545LS | 805.065 | | | | | 545 | | 85 | 412 | | | | | | 28.6 |
| -575LS | 805.066 | | | | | 575 | | 115 | 442 | | | | | | 28.9 |
| -AG90/NBS20 -530LS | 805.070 | 2.5 - 20 | 46 | 35 | 35 | 530 | 460 | 70 | 397 | 65 | 62 | 132 | NBC20 | 3 000 | 29.3 |

1. The standard fixed length A is 6 mm. Other lengths are available upon request.
2. Clamping nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmill model NBC - EAA can not be used.
4. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250
For Stop Block ▶ 290

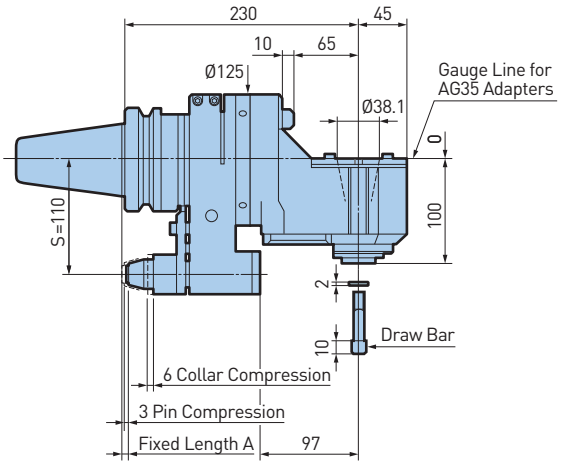
BROTECH

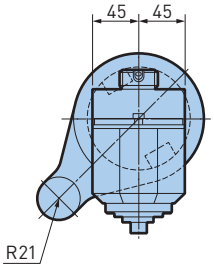
## Build-Up Type

BIG-PLUS Dual-Contact

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle.
Also helps minimize interference problems with ATC and storage problems within the magazine.

A.1



Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

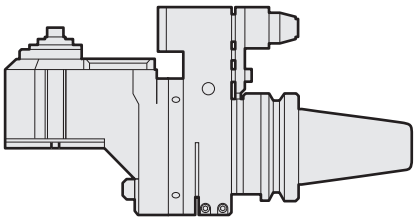
| Model | Order No. | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|
| BBT50 -AG90/AGH35-230 | **802.489** | 3 000 | 15.0 |
| -AG90/AGH35-230S | **802.490** | 3 000 | 16.3 |

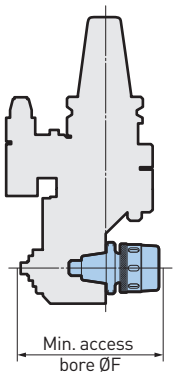
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.

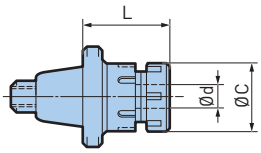
For Stop Block ▶ 290
For Adapters ▶ 81


BROTECH

## AG35 adapters





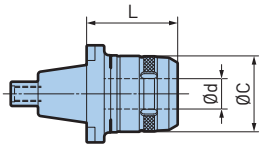




### New Baby Chuck

| Model | Order No. | Ød | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|
| AG35 -NBS10 | **962.793** | 1.5 - 10 | 47 | 30 | 162 | 0.6 |
| -NBS13 | **962.794** | 2.5 - 13 | 54 | 35 | 168 | 0.7 |
| -NBS16 | **962.795** | 2.5 - 16 | | 42 | 170 | 0.8 |
| -NBS20 | **962.796** | 2.5 - 20 | | 46 | | 0.9 |

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250
For Wrench ▶ 271

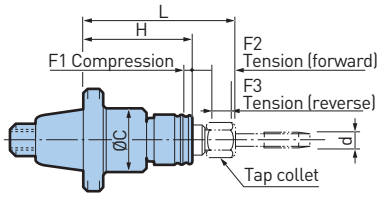



### New Hi-Power Milling Chuck

| Model | Order No. | Ød | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|
| AG35 -HMC20S | **802.742** | 20 | 60 | 50 | 178 | 1.5 |

1. Wrench (FK45-50L) is included.

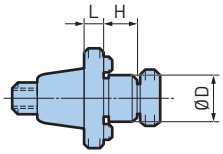
For Straight Collet ▶ 272




### Auto Tapper Type B (automatic depth control)

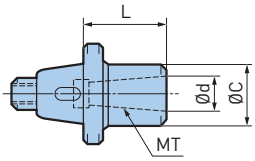
| Model | Order No. | d | L | ØC | H | F1 | F2 | F3 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| AG35 -ATB12 | **802.435** | M4 - M12 | 80 | 40.5 | 72 | 0.5 | 5 | 4 | 1.0 |
| -ATB20 | **802.436** | M8 - M20 | 115 | 57.5 | 102.5 | | 6.5 | 5 | 1.7 |

1. Please contact BIG KAISER agent for tap collet.




### Face Mill Arbor

| Model | Order No. | ØD | L | H | Weight (kg) |
|---|---|---|---|---|---|
| AG35 -FMH22 -30 | **802.740** | 22 | 30 | 18 | 1.0 |
| -FMH27 -20 | **802.741** | 27 | 20 | 20 | 1.0 |




### Morse Taper Adapter

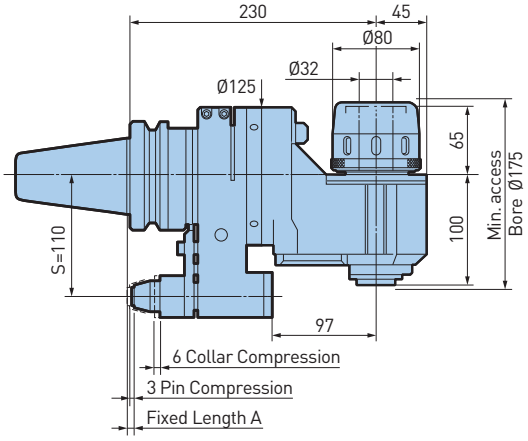
| Model | Order No. | Ød | MT. No. | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|
| AG35 -MT1 | **962.785** | 12.065 | 1 | 50 | 24 | 164 | 0.6 |
| -MT2 | **962.786** | 17.78 | 2 | 60 | 32 | 180 | 0.7 |

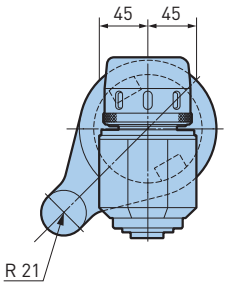
## HMC Type

BIG-PLUS Dual-Contact

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.

A.1



Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|
| BBT50 -AG90/HMC32-230 | **802.492** | 3 000 | 16.8 |
| -AG90/HMC32-230S | **802.493** | 3 000 | 18.1 |

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. The standard fixed length A is 6 mm, other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.

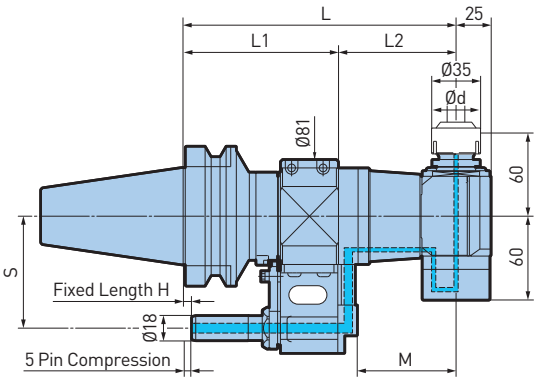
For Stop Block ▶ 290
For Straight Collet ▶ 272

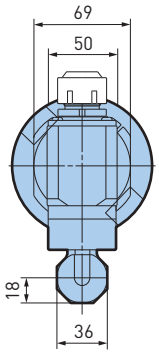


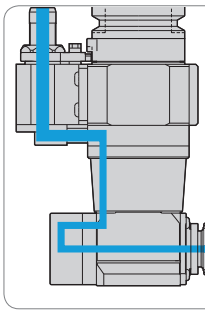
BROTECH

## OAG Type

BIG-PLUS Dual-Contact



**Max. coolant pressure 20 bar**
Coolant is supplied from the Stop Block through the cutting tool.

Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

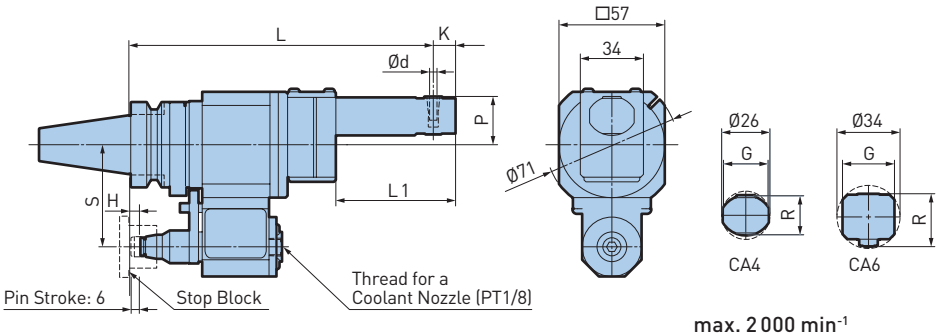
| Model | Order No. | Ød | L | L1 | L2 | M | Collet Model | Nut Model | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT40 -OAG90-13-170 | **802.482** | 2.5 - 13 | 170 | 86 | 84 | 70.5 | NBC13 | BPS13 | 5 000 | 6.0 |
| BBT50 -OAG90-13-195 | **802.545** | | 195 | 111 | | | | | | 9.2 |

1. The standard fixed length A is 6 mm other lengths are available upon request.
2. Standard "S" is 80 mm for BBT50 and 65 mm for BBT40.
3. New baby nut and wrench are included. New baby collet is to be ordered separately.

For New Baby Collet ▶ 250
For Baby Perfect Seal ▶ 262
For Stop Block ▶ 290

## Light Weight Type for BBT30

Exclusive Stop Block is required.




max. 2 000 min$^{-1}$

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Ød | L | L1 | K | P | G | R | Ratio | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -AG90-CA4SG-164 | **805.570** | 3 - 4 | 164 | 64.5 | 12 | 26 | 24 | 21 | 1 : 1.13 | CA4 - | 1.90 |
| -AG90-CA6SG-164 | **805.571** | 3 - 6 | 164 | 67 | 14.5 | 28 | 28 | 28.5 | 1 : 0.91 | CA6 - | 1.98 |

1. H and S dimension and angle must be indicated before ordering.
2. Tolerance of the cutting tool shank must be within h7.
3. Exclusive collet is to be ordered separately.

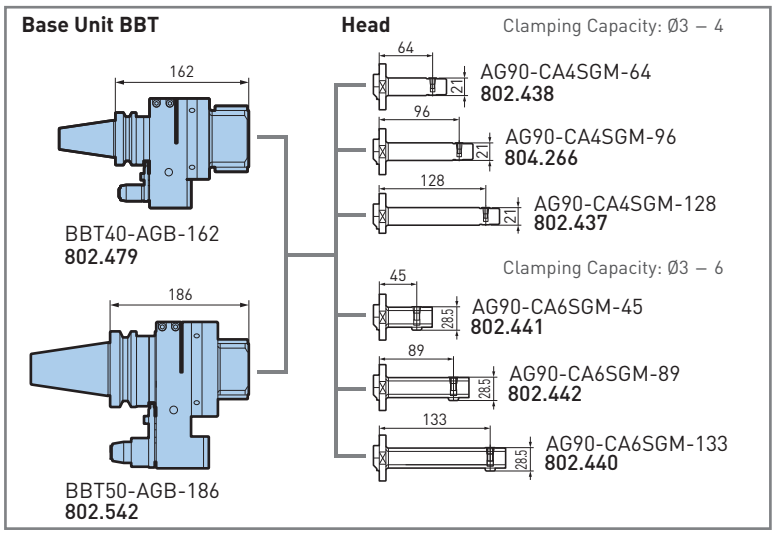
For Exclusive Collet ▶ 84
For Stop Block ▶ 290

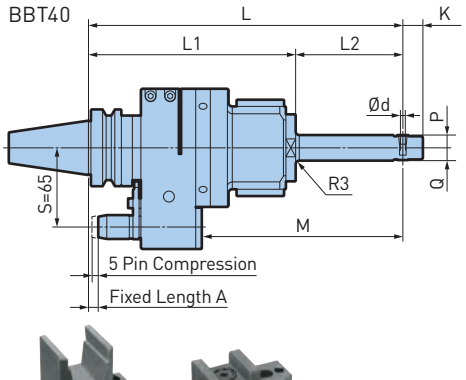
A.1

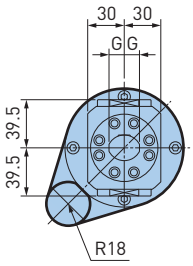
## Small Bore Type

Angular operation in a Ø 30 mm bore (min.) is possible. Modular heads enhance versatility. Head is aligned with spindle center for easy programing.

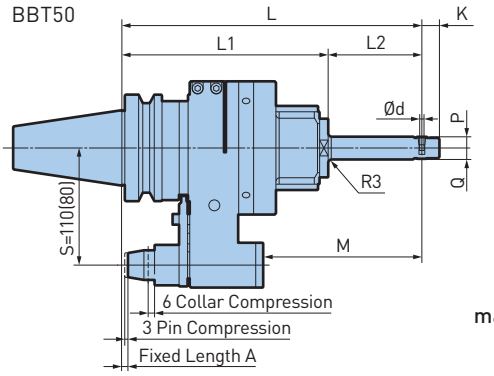
BIG-PLUS Dual-Contact

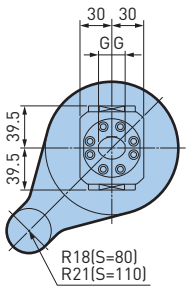



max. 2 000 min$^{-1}$




max. 2 000 min$^{-1}$

Exclusive Stop Block is required.

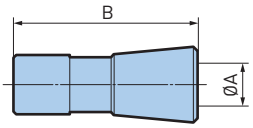
BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Base | Head | Ød | G | K | L | L1 | L2 | M | P | Q | Speed Ratio | Weight (kg) S=65 | Weight (kg) S=80 | Weight (kg) S=110 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT40-AG90 -CA4SGM -226 | 802.473 | BBT40-AGB-162 | AG90-CA4SGM - 64 | 3 - 4 | 12.5 | 16.5 | 226 | 170 | 56 | 133 | 10.5 | 10.5 | 1:1.06 | 5.6 | - | - |
| -258 | 802.474 | | - 96 | | | | 258 | | 88 | 165 | | | | 5.7 | | |
| -290 | 802.475 | | -128 | | | | 290 | | 120 | 197 | | | | 5.8 | | |
| -CA6SGM -207 | 802.476 | | AG90-CA6SGM - 45 | 3 - 6 | 15 | 20 | 207 | | 37 | 114 | 12.5 | 16 | 1:0.77 | 5.7 | | |
| -251 | 802.477 | | - 89 | | | | 251 | | 81 | 158 | | | | 5.9 | | |
| -295 | 802.478 | | -133 | | | | 295 | | 125 | 202 | | | | 6.1 | | |
| BBT50-AG90 -CA4SGM -250 | 802.529 | BBT50-AGB-186 | AG90-CA4SGM - 64 | 3 - 4 | 12.5 | 16.5 | 250 | 194 | 56 | 117 | 10.5 | 10.5 | 1:1.06 | - | 11.9 | 12.5 |
| -282 | 802.531 | | - 96 | | | | 282 | | 88 | 149 | | | | | 12 | 12.6 |
| -314 | 802.533 | | -128 | | | | 314 | | 120 | 181 | | | | | 12.1 | 12.7 |
| -CA6SGM -231 | 802.535 | | AG90-CA6SGM - 45 | 3 - 6 | 15 | 20 | 231 | | 37 | 98 | 12.5 | 16 | 1:0.77 | - | 12 | 12.6 |
| -275 | 802.537 | | - 89 | | | | 275 | | 81 | 142 | | | | | 12.2 | 12.8 |
| -319 | 802.539 | | -133 | | | | 319 | | 125 | 186 | | | | | 12.4 | 13 |

1. Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40. Other lengths are available upon request.
2. Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
3. Internal coolant can not be used.
4. Exclusive collet is to be ordered separately.

For Stop Block ▶ 290

### Exclusive Collet for Small Bore Type and Light Weight




| Model | Order No. | ØA | B |
|---|---|---|---|
| CA4 -3 | 804.666 | 3 | 16.5 |
| -3.5 | 804.667 | 3.5 | |
| -4 | 804.668 | 4 | |

| Model | Order No. | ØA | B |
|---|---|---|---|
| CA6 -3 | 804.669 | 3 | 22 |
| -4 | 804.670 | 4 | |
| -5 | 804.671 | 5 | |
| -6 | 804.672 | 6 | |



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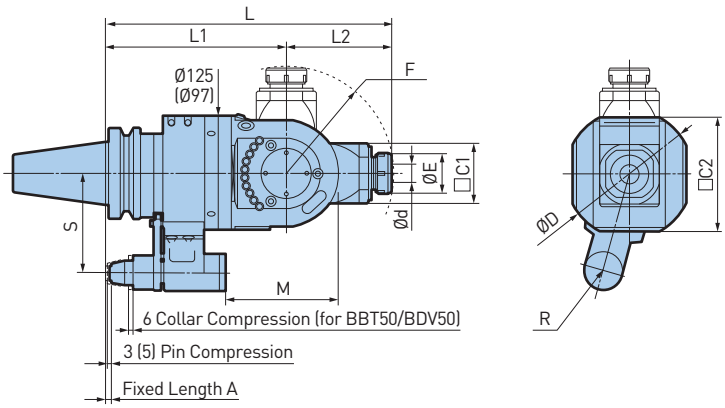
## Universal Type

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.

BIG-PLUS Dual-Contact



Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Ød | ØE | ØD | □C1 | □C2 | L | L1 | L2 | M | F | R | S | Collet Model | Max. $min^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT40 -AGU/NBS13-270 | **802.480** | 2.5 - 13 | 35 | 115 | 51 | 97 | 270 | 170 | 100 | 124 | 102 | 18 | 65 | NBC13 | 6 000 | 9.7 |
| BBT50 -AGU/NBS20-315 | **802.318** | 2.5 - 20 | 46 | 140 | 65 | 125 | 315 | 200 | 115 | 125 | 118 | 21 | 110 | NBC20 | 4 000 | 20.8 |

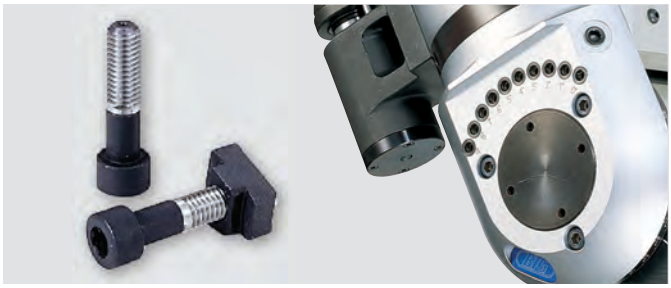
1. Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40. Other lengths are available upon request.
2. Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
3. Figures in ( ) in the drawing indicate dimensions for BBT40.
4. New baby nut and wrench are included.
5. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250

For Stop Block ▶ 290

Easily adjustable spindle angle from 0° to 90°.

Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.



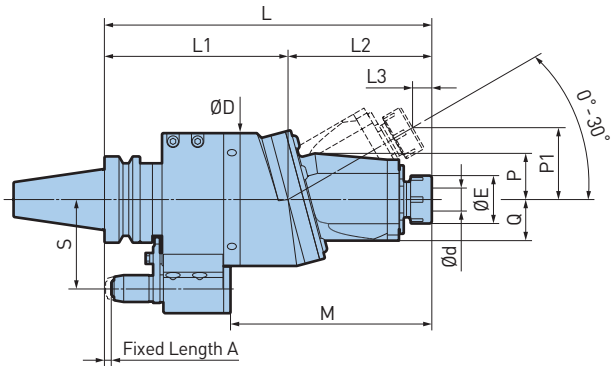
Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

## AGU30 Type

Spindle angle is adjustable from 0° to 30°. Large swivel flange assures high rigidity.

BIG-PLUS Dual-Contact

A.1



Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

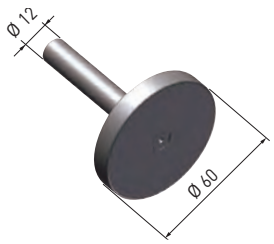
| Model | Order No. | Ød | ØD | ØE | G | L | L1 | L2 | L3 max. | Q | P | P1 max. | R | S | M | Collet Model | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBT40 -AGU30/NBS13-240 | **802.481** | 2.5 - 13 | 97 | 35 | 29 | 240 | 135 | 105 | 14 | 30 | 34 | 52.5 | 18 | 65 | 147 | NBC13 | 6 000 | 6.9 |
| BBT50 -AGU30/NBS20-295 | **802.544** | 2.5 - 20 | 125 | 46 | 36.5 | 295 | 165 | 130 | 17 | 39 | 45 | 65 | 21 | 110 | 162 | NBC20 | 4 000 | 16.1 |

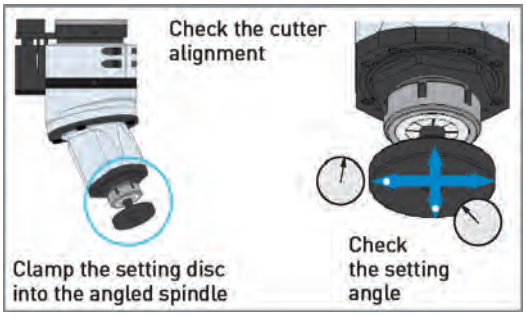
1. Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40.
   Other lengths are available upon request.
2. Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
3. New baby nut, wrench and setting disc are included.
4. Coolant can be supplied through the locating pin.

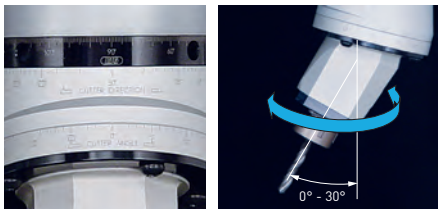
For New Baby Collet ▶ 250
For Stop Block ▶ 290

### Setting Disc (Included Accessory)

For precise adjustment of the spindle angle or direction.




Spindle angle is easily adjustable from 0° to 30° using the scale indication on the body.



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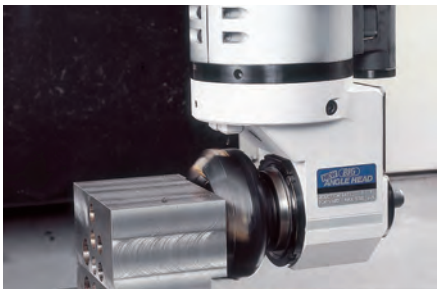
## Application Examples



### AG90-Series (Build-Up Type)

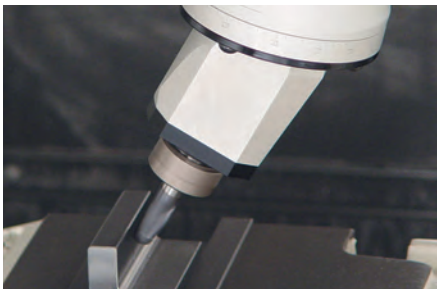
**Standard Type**
BBT50-AG90/AGH35-230
(with AG35-FMA25.4-20)
**Workpiece:** Carbon Steel C55
**Cutter:** 80 mm Face Mill
**Cutting Depth:** 2 mm
**Spindle Speed:** 600 $min^{-1}$
**Cutting Speed:** 150 m/min
**Cutting Feed:** 360 mm/min

**S-Type**
BBT50-AG90/AGH35-230S
(with AG35-FMA25.4-20)
**Workpiece:** Carbon Steel C55
**Cutter:** 80 mm Face Mill
**Cutting Depth:** 3 mm
**Spindle Speed:** 600 $min^{-1}$
**Cutting Speed:** 150 m/min
**Cutting Feed:** 360 mm/min

### AG90-Series (HMC Type)

**Standard Type**
BBT50-AG90/HMC32-230
**Workpiece:** Carbon Steel C55
**Cutter:** 20 mm Face Mill
**Cutting Depth:** 3 mm
**Spindle Speed:** 400 $min^{-1}$
**Cutting Speed:** 25 m/min
**Cutting Feed:** 72 mm/min

**S-Type**
BBT50-AG90/HMC32-230S
**Workpiece:** Carbon Steel C55
**Cutter:** 20 mm Face Mill
**Cutting Depth:** 4 mm
**Spindle Speed:** 400 $min^{-1}$
**Cutting Speed:** 25 m/min
**Cutting Feed:** 72 mm/min



### AGU-Series (AGU30 Type)

BBT40-AGU30/NBS13-240
**Workpiece:** Pre-hardened steel (HRC40)
**Cutter:** R5 2-flute carbide ball end mill
**Cutting Depth:** Ad = 0.1 mm
**Spindle Speed:** 6 000 $min^{-1}$
**Peck Feed:** Pf = 0.4
**Cutting Speed:** 90 m/min
**Cutting Feed:** 900 mm/min

## Special Designs

Our long experience and expertise enables us to design and manufacture special custom made Angle Heads for almost any customer application.

Special angle

Special length

Coolant feeder

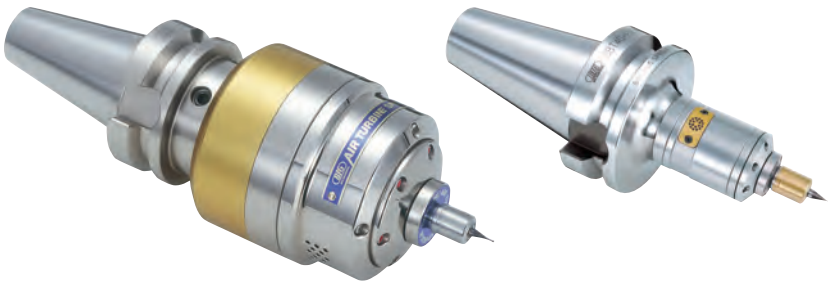
BBT30

# Air Turbine Spindle

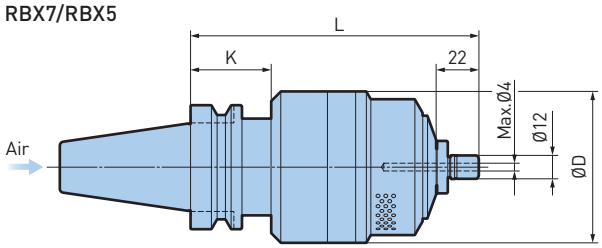
## Center Through Type

BIG-PLUS Dual-Contact

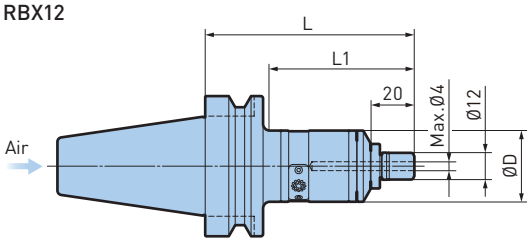
A.1



RBX7/RBX5




RBX12




BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Operation Speed (min$^{-1}$) | L | L1 | ØD | K | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| BBT30 -RBX12C -4S- 95 | **804.890** | 100 000 - 120 000 | 95 | 70 | 32 | - | MGN4S-HG | 0.7 |
| BBT40 -RBX5C -4S-150 | **802.403** | 40 000 - 50 000 | 150 | - | 96 | 43 | MGN4S | 4.1 |
| -RBX7C -4S-150 | **802.409** | 60 000 - 80 000 | | | 78 | | | 3.1 |
| -RBX12C -4S- 95 | **804.891** | 100 000 - 120 000 | 95 | 65 | 32 | - | MGN4S-HG | 1.3 |
| BBT50 -RBX5C -4S-160 | **802.415** | 40 000 - 50 000 | 160 | - | 96 | 53 | MGN4S | 7.3 |
| -RBX7C -4S-160 | **802.420** | 60 000 - 80 000 | | | 78 | | | 6.3 |

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247
For Air Filter ▶ 90

**Caution**

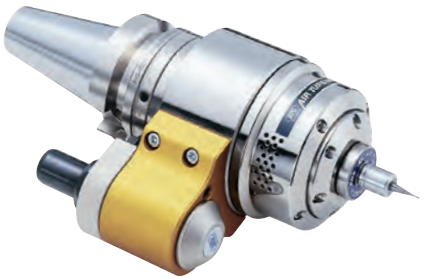
Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

# Air Turbine Spindle

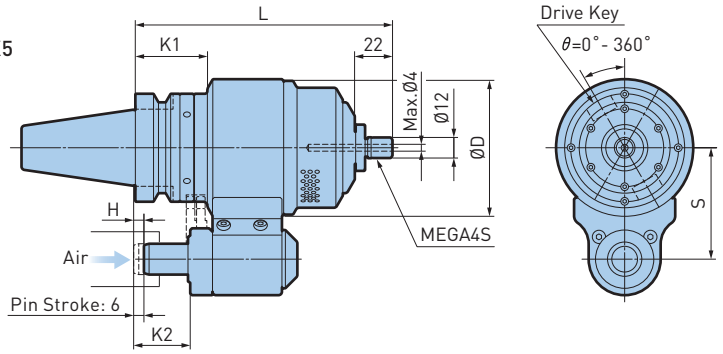
## Side Through Type

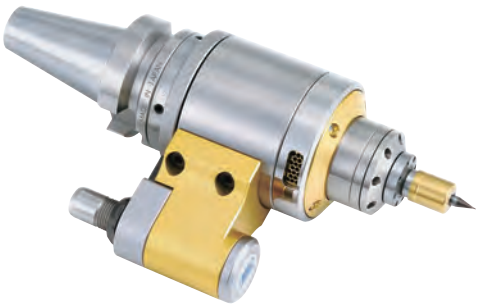
BIG-PLUS Dual-Contact



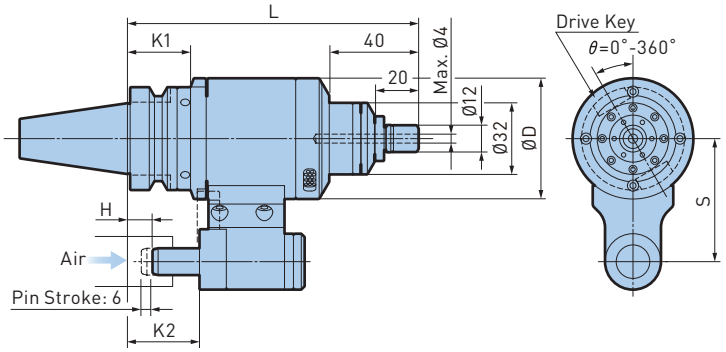


RBX7/RBX5



RBX12



Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Operation Speed (min⁻¹) | L | ØD | K1 | K2 | S | H | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -RBX7 -4S-152-55 | **802.395** | 60 000 - 80 000 | 152 | 80 | 28 | 33 | 55 | -10 - 22 | MGN4S | 2.7 |
| -RBX12 -4S-130-55 | **804.883** | 100 000 - 120 000 | 130 | 54 | 28 | 32 | 55 | 0 - 20 | MGN4S-HG | 1.7 |
| BBT40 -RBX5 -4S-151-65 | **802.398** | 40 000 - 50 000 | 151 | 96 | 43 | 33 | 65 | -24 - 21 | MGN4S | 5.0 |
| -RBX7 -4S-151-65 | **802.404** | 60 000 - 80 000 | 151 | 80 | 43 | 33 | 65 | -24 - 21 | MGN4S | 4.0 |
| -RBX12 -4S-135-65 | **804.885** | 100 000 - 120 000 | 135 | 63 | - | 33 | 65 | -24 - 21 | MGN4S-HG | 3.0 |
| BBT50 -RBX5 -4S-166-80 | **802.411** | 40 000 - 50 000 | 166 | 100 | 58 | 48 | 80 | -9 - 36 | MGN4S | 9.7 |
| -RBX7 -4S-166-80 | **802.416** | 60 000 - 80 000 | | | | | | | | 8.7 |

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

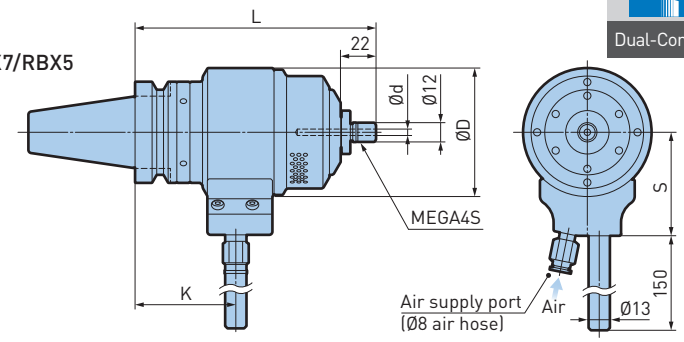
For Micro Collet ▶ 247
For Air Filter ▶ 90
For Stop Block ▶ 290

# Air Turbine Spindle

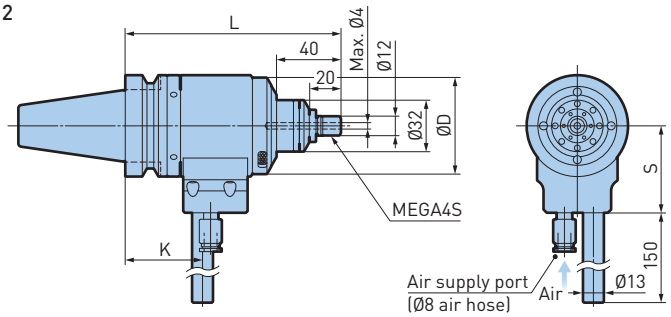
BIG-PLUS
Dual-Contact

## Manual Type

RBX7/RBX5




RBX12



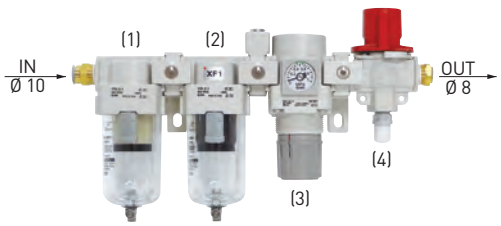
Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | Operation Speed ($min^{-1}$) | L | ØD | K | S | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| BBT30 -RBX7 -4S-152H | **802.396** | 60 000 - 80 000 | 152 | 80 | 64.5 | 65 | MGN4S | 2.7 |
| -RBX12 -4S-130H | **804.886** | 100 000 - 120 000 | 130 | 54 | 46 | 50 | MGN4S-HG | 1.7 |
| BBT40 -RBX5 -4S-151H | **802.399** | 40 000 - 50 000 | 151 | 96 | 63 | 71 | MGN4S | 5.0 |
| -RBX7 -4S-151H | **802.405** | 60 000 - 80 000 | | 80 | | 65 | | 4.0 |
| -RBX12 -4S-135H | **804.887** | 100 000 - 120 000 | 135 | 63 | 49 | 54 | MGN4S-HG | 2.7 |
| BBT50 -RBX5 -4S-166H | **802.412** | 40 000 - 50 000 | 166 | 100 | 78 | 80 | MGN4S | 9.7 |
| -RBX7 -4S-166H | **802.417** | 60 000 - 80 000 | | | | | | 8.7 |

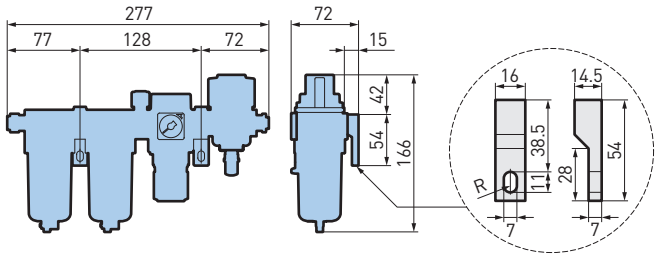
1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

# Air Filter Regulator for RBX




**Model XF1**

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).




| Model | Order No. |
|---|---|
| XF1 | **962.661** |

## Accessories for RBX

| Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|
| | MEGA Nut | | Exclusive Nut | | MEGA Wrench | | Micro Collet ▶ 247 |
| Air Turbine Spindle | Model | Order No. | Model | Order No. | Model | Order No. | Model |
| RBX12-4S | - | - | MGN4S-HG | 805.747 | MGR12 | **969.450** | NBC4S- |
| RBX7-4S | MGN4S | **969.481** | - | - | | | |
| RBX5-4S | MGN4S | **969.481** | - | - | | | |



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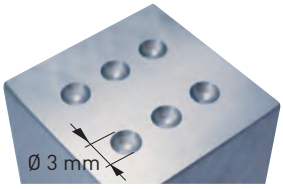
## Application Examples

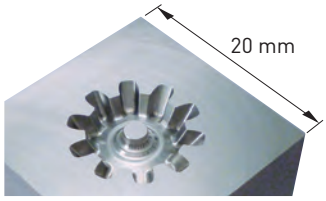
### RBX12

**Dimpling on sintered HSS**
Machining time 90 sec./hole




| | |
|---|---|
| Cutter | Ball nose endmill CBN |
| Spindle Speed | 120 000 min$^{-1}$ |
| Cutting Feed | 1 500 mm/min |
| D.O.C | ap = 0.01 mm |

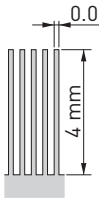
**Milling on die steel**
Machining time 23 min.

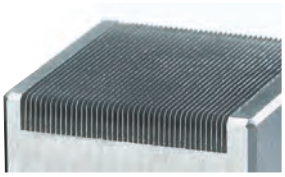



| | |
|---|---|
| Cutter | Ball nose endmill CBN |
| Spindle Speed | 120 000 min$^{-1}$ |
| Cutting Feed | 2 400 mm/min |
| D.O.C | ap = 0.01 mm |

### RBX7

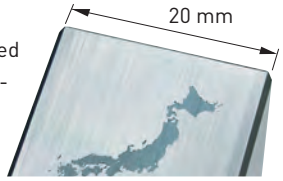
**Aluminium A2017**
Outstanding runout accuracy permits perfect thin wall cutting.



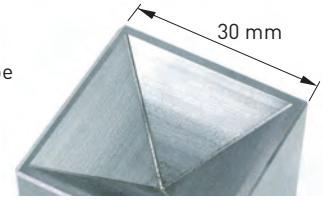
| | |
|---|---|
| Cutter | Ø 0.5 mm Rib-endmill |
| Spindle Speed | 70 000 min$^{-1}$ |
| Cutting Feed | 1 500 mm/min |
| D.O.C | ap = 0.02 mm |

**Prehardened steel HRC40**
Drastic time reduction by ultra high speed rotation. Excellent dynamic runout accuracy makes DOC of 5 µm clearly visible.



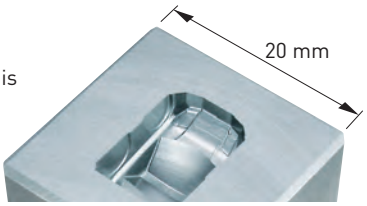

| | |
|---|---|
| Cutter | R0.1 mm Ball nose endmill |
| Spindle Speed | 80 000 min$^{-1}$ |
| Cutting Feed | 400 mm/min |
| D.O.C | ap = 0.01 mm |

**Prehardened steel HRC40**
Overall cutting length of 656 m can be achieved with one ball nose endmill. Drastically extended tool life.



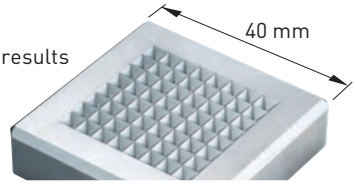

| | |
|---|---|
| Cutter | R0.5 mm Ball nose endmill |
| Spindle Speed | 65 000 min$^{-1}$ |
| Cutting Feed | 4 200 mm/min |
| D.O.C | ap = 0.02 mm; ae = 0.05 mm |

**Prehardened steel HRC40**
Original 5hour operation in MC is reduced to 2 hours.



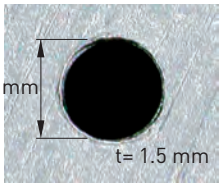

| | |
|---|---|
| Cutter | R0.2 mm Ball nose endmill |
| Spindle Speed | 70 000 min$^{-1}$ |
| Cutting Feed | 1 000 mm/min |
| D.O.C | ap = 0.01 mm |

**Prehardened steel HRC40**
No thermal expansion of spindle results in finely detailed surface finish.




| | |
|---|---|
| Cutter | R0.5 mm Ball nose endmill |
| Spindle Speed | 75 000 min$^{-1}$ |
| Cutting Feed | 400 mm/min |
| D.O.C | ap = 0.02 mm |

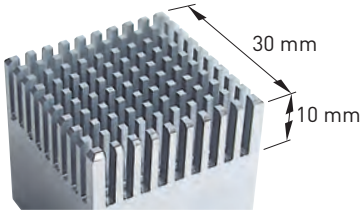
**Aluminium A2017**
High-precision drilling is possible without center drill operation. Even after 3500 holes, no problems can be found on the cutting edge.




| | |
|---|---|
| Cutter | Ø 0.3 mm Solid drill |
| Spindle Speed | 75 000 min$^{-1}$ |
| Cutting Feed | 200 mm/min |
| Peck | ap = 0.03 mm |

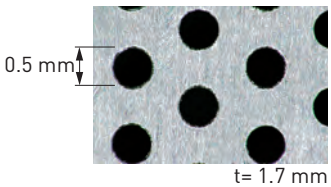
### RBX5

**Prehardened steel HRC40**
Even a taper endmill that has high cutting forces can achieve stable cutting.




| | |
|---|---|
| Cutter | Ø 1.5 mm Rib-endmill |
| Spindle Speed | 40 000 min$^{-1}$ |
| Cutting Feed | 1 000 mm/min |
| D.O.C | ap = 0.05 mm |

**Stainless steel SUS303**
Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.




| | |
|---|---|
| Cutter | Ø 0.5 mm Solid drill |
| Spindle Speed | 40 000 min$^{-1}$ |
| Cutting Feed | 20 mm/min |
| Peck | ap = 0.01 mm |

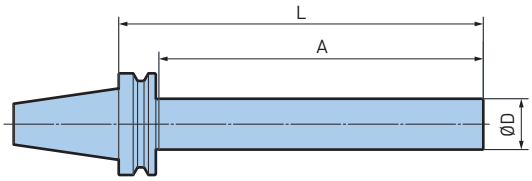
# Dyna Test

Periodic inspection of machine tools to control production stability.
Shorter models are ideal for measuring ATC repeatability.

BIG-PLUS Dual-Contact

A.1

## BIG-PLUS BT Type

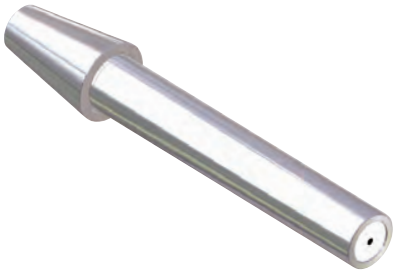


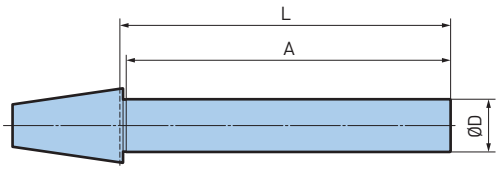

BIG-PLUS® tools can be used in machining centers with conventional BT spindles.

| Model | Order No. | L | A | ØD | Weight (Kg) |
|---|---|---|---|---|---|
| BBT30 -32 - L150 | **800.054** | 150 | 125 | 32 | 1.1 |
| - L235 | **961.264** | 235 | 210 | | 1.5 |
| BBT40 -50 - L200 | **800.065** | 200 | 170 | 50 | 2.8 |
| - L350 | **978.119** | 350 | 320 | | 4.3 |
| BBT50 -50 - L200 | **800.184** | 200 | 159 | 50 | 5.2 |
| - L360 | **978.290** | 360 | 319 | | 6.9 |

1. Taper length is in accordance with JIS BT standard.

## Basic Type






| Model | Order No. | L | A | ØD | Weight (Kg) |
|---|---|---|---|---|---|
| NT30 -32 - L150 | **801.759** | 150 | 142 | 32 | 1.0 |
| - L225 | **978.253** | 225 | 217 | | 1.4 |
| NT40 -50 - L200 | **801.760** | 200 | 184 | 50 | 2.5 |
| - L335 | **801.761** | 335 | 319 | | 3.9 |
| NT50 -50 - L200 | **801.762** | 200 | 191 | 50 | 3.8 |
| - L335 | **801.763** | 335 | 326 | | 5.3 |



BROTECH

# Tool Holders DV/BDV, DIN 69871


| | |
|---|---|
| MEGA Micro Chuck | 94 |
| MEGA New Baby Chuck | 95 - 96 |
| MEGA E Chuck | 97 |
| MEGA Double Power Chuck | 98 |
| MEGA Perfect Grip | 99 |
| New Baby Chuck | 101 - 102 |
| New Hi-Power Milling Chuck | 103 - 104 |
| Hydraulic Chucks | 104 - 105 |
| Shrink Chucks | 106 |
| MEGA Synchro Tapping Holder | 107 |
| Side Lock Holders | 108 |
| Holders for Screw-On Cutter | 109 |
| Face Mill Arbors | 110 |
| Smart Damper | 111 |
| CK Shanks | 112 - 113 |
| Angle Heads | 114 - 118 |
| Air Turbine Spindle | 119 - 122 |
| Dyna Test | 123 |






● Preferred selected items

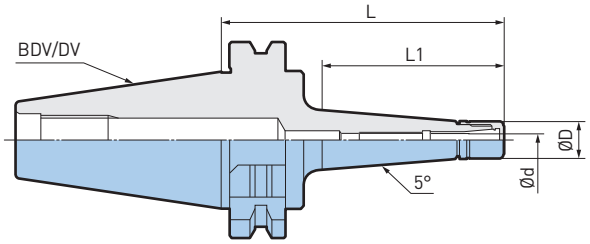
## MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.2




BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 0.45 - 8.05 mm**

| Model | Order No. | Ød | ØD | L | L1 | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| DV30 -MEGA6S - 60T | **805.016** | 0.45 - 6.05 | 14 | 60 | 36 | 40 000 | NBC6S- | MGN6S | 0.41 |
| -MEGA8S - 75T | **805.246** | 2.95 - 8.05 | 18 | 75 | 51 | 35 000 | NBC8S- | MGN8S | 0.48 |
| BDV40 -MEGA3S - 90T | **969.302** | 0.45 - 3.25 | 10 | 90 | 60 | 28 000 | NBC3S- | MGN3S | 0.9 |
| -MEGA4S - 90T | **969.305** | 0.45 - 4.05 | 12 | 90 | 60 | 28 000 | NBC4S- | MGN4S | 1.0 |
| -MEGA6S - 60T | **969.307** | 0.45 - 6.05 | 14 | 60 | 30 | 35 000 | NBC6S- | MGN6S | 0.9 |
| - 90T | **969.308** | | | 90 | 60 | 28 000 | | | 1.0 |
| -120T | **969.309** | | | 120 | 90 | 22 000 | | | 1.1 |
| -MEGA8S - 90T | **806.747** | 2.95 - 8.05 | 18 | 90 | 60 | 28 000 | NBC8S- | MGN8S | 1.0 |

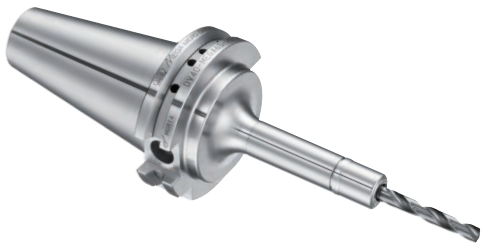
1. MEGA nut is included.

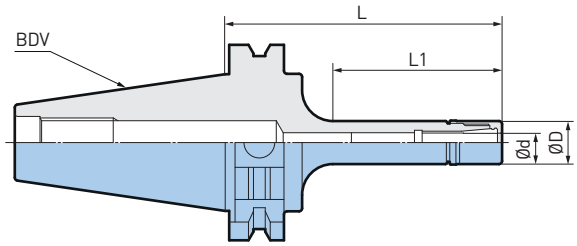
## MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

BIG-PLUS Dual-Contact

Coolant Through Hole






BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 0.45 - 6.05 mm**

| Model | Order No. | Ød | ØD | L | L1 | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BDV40 -MEGA6S -90 | **969.208** | 0.45 - 6.05 | 14 | 90 | 55 | 35 000 | NBC6S- | MGN6S | 1.1 |

1. MEGA nut is included.

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▸ 247 | Micro Seal Nut ▸ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **961.280** |
| MEGA8S | MGN8S | **804.108** | MGR18 | **801.705** | NBC8S- | MGN8S-PS | NBB8S | **805.802** | SC-NBC8S | **805.827** |



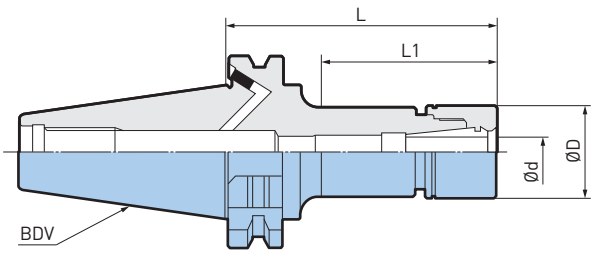
BROTECH

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

BIG-PLUS Dual-Contact

Coolant Through Hole






BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 0.25 - 25.4 mm**

| Model | Order No. | Ød | ØD | L | L1 | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| DV30 -MEGA10N - 75 | **805.247** | 1.5 - 10 | 30 | 75 | 54 | 30 000 | NBC10- | MGN10 | 0.60 |
| BDV40-MEGA6N - 90 | **969.224** | 0.25 - 6 | 20 | 90 | 55 | 35 000 | NBC6- | MGN6 | 1.1 |
| -135 | **969.225** | | | 135 | 100 | 20 000 | | | 1.2 |
| -MEGA8N - 90 | **969.229** | 0.5 - 8 | 25 | 90 | 57 | 35 000 | NBC8- | MGN8 | 1.1 |
| -135 | **969.230** | | | 135 | 102 | 20 000 | | | 1.3 |
| -MEGA10N - 90 | **969.234** | 1.5 - 10 | 30 | 90 | 59 | 35 000 | NBC10- | MGN10 | 1.2 |
| -135 | **969.235** | | | 135 | 104 | 20 000 | | | 1.4 |
| -MEGA13N - 90 | **969.239** | 2.5 - 13 | 35 | 90 | 61 | 35 000 | NBC13- | MGN13 | 1.3 |
| -135 | **969.240** | | | 135 | 106 | 20 000 | | | 1.6 |
| -165 | **969.241** | | | 165 | 136 | 15 000 | | | 1.8 |
| -MEGA16N - 90 | **969.244** | 2.5 - 16 | 42 | 90 | 65 | 30 000 | NBC16- | MGN16 | 1.5 |
| -135 | **969.245** | | | 135 | 110 | 20 000 | | | 1.9 |
| -165 | **969.246** | | | 165 | 140 | 15 000 | | | 2.2 |
| -MEGA20N - 60 | **969.248** | 2.5 - 20 | 46 | 60 | 40 | 30 000 | NBC20- | MGN20 | 1.3 |
| - 90 | **969.249** | | | 90 | 70 | | | | 1.6 |
| -135 | **969.250** | | | 135 | 115 | 20 000 | | | 2.0 |
| -165 | **969.251** | | | 165 | 145 | 15 000 | | | 2.3 |
| -200 | **969.252** | | | 200 | 180 | 10 000 | | | 2.6 |
| -MEGA25N - 90 | **806.375** | 15.5 - 25.4 | 60 | 90 | 70 | 19 000 | NBC25- | MGN25 | 1.8 |
| -120 | **806.376** | | | 120 | 100 | 16 000 | | | 2.3 |

1. MEGA nut is included.
2. Nut-less model available upon request.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▸ 250 | MEGA Perfect Seal ▸ 260 | Adjusting Screw | | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |
| MEGA25N | MGN25 | **806.388** | MGR60L | **969.468L** | NBC25- | - | NBA25B | **806.389** | M27 | 20 | 4 |

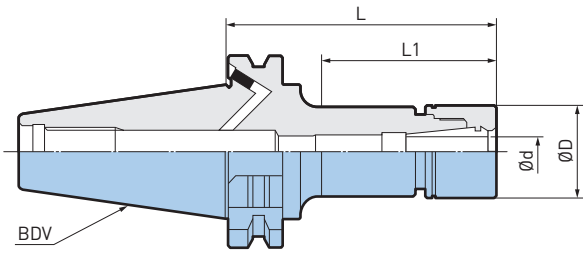
BROTECH

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

BIG-PLUS Dual-Contact

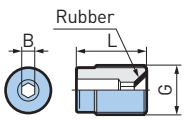
Coolant Through Hole




BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 0.25 - 25.4 mm**

| Model | Order No. | Ød | ØD | L | L1 | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BDV50 -MEGA6N - 90 | **969.253** | 0.25 - 6 | 20 | 90 | 50 | 20 000 | NBC6- | MGN6 | 3.0 |
| -120 | **969.254** | | | 120 | 80 | | | | 3.0 |
| -165 | **969.255** | | | 165 | 125 | 14 000 | | | 3.1 |
| -MEGA10N - 90 | **969.261** | 1.5 - 10 | 30 | 90 | 55 | 20 000 | NBC10- | MGN10 | 3.2 |
| -120 | **969.262** | | | 120 | 80 | | | | 3.3 |
| -165 | **969.263** | | | 165 | 125 | 16 000 | | | 3.5 |
| -MEGA13N - 90 | **969.267** | 2.5 - 13 | 35 | 90 | 55 | 18 000 | NBC13- | MGN13 | 3.2 |
| -120 | **969.268** | | | 120 | 80 | | | | 3.4 |
| -165 | **969.269** | | | 165 | 125 | 16 000 | | | 3.7 |
| -MEGA16N - 90 | **969.274** | 2.5 - 16 | 42 | 90 | 55 | 17 000 | NBC16- | MGN16 | 3.4 |
| -120 | **969.275** | | | 120 | 85 | | | | 3.7 |
| -165 | **969.276** | | | 165 | 130 | 16 000 | | | 4.1 |
| -200 | **969.277** | | | 200 | 165 | 13 000 | | | 4.4 |
| -MEGA20N - 90 | **969.280** | 2.5 - 20 | 46 | 90 | 55 | 16 000 | NBC20- | MGN20 | 3.5 |
| -120 | **969.281** | | | 120 | 85 | | | | 3.8 |
| -165 | **969.282** | | | 165 | 130 | 15 000 | | | 4.3 |
| -200 | **969.283** | | | 200 | 165 | 13 000 | | | 4.6 |
| -MEGA25N -105 | **806.377** | 15.5 - 25.4 | 60 | 105 | 77 | 16 000 | NBC25- | MGN25 | 4.0 |
| -135 | **806.378** | | | 135 | 107 | 15 000 | | | 4.6 |

1. MEGA nut is included.
2. Nut-less model available upon request.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▸ 250 | MEGA Perfect Seal ▸ 260 | Adjusting Screw |   | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |
| MEGA25N | MGN25 | **806.388** | MGR60L | **969.468L** | NBC25- | - | NBA25B | **806.389** | M27 | 20 | 4 |



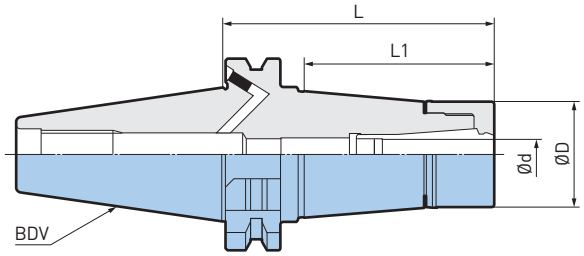
BROTECH

# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

BIG-PLUS Dual-Contact

Coolant Through Hole



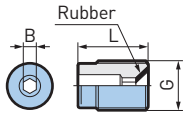



BIG-PLUS® tools can be used in machining centers with conventional spindles.

**Ø 3 - 12 mm**

| Model | Order No. | Ød | ØD | L | L1 | max. min$^{-1}$ | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BDV40 -MEGA6E - 90 | **968.142** | 3 - 6 | 25 | 90 | 60 | 30 000 | MEC6- | MEN6 | 1.2 |
| -MEGA8E - 60 | **968.144** | 3 - 8 | 30 | 60 | 30 | | MEC8- | MEN8 | 1.2 |
| - 90 | **968.145** | | | 90 | 63 | | | | 1.3 |
| -MEGA10E - 60 | **968.147** | 3 - 10 | 35 | 60 | 33 | | MEC10- | MEN10 | 1.3 |
| - 90 | **968.148** | | | 90 | 64 | | | | 1.4 |
| -MEGA13E - 60 | **968.150** | 3 - 12 | 42 | 60 | 35 | | MEC13- | MEN13 | 1.5 |
| - 90 | **968.151** | | | 90 | 61 | | | | 1.7 |
| -120 | **968.152** | | | 120 | 95 | 29 000 | | | 1.9 |
| BDV50 -MEGA6E -120 | **968.154** | 3 - 6 | 25 | 120 | 90 | 20 000 | MEC6- | MEN6 | 3.3 |
| -MEGA8E -120 | **968.156** | 3 - 8 | 30 | | | | MEC8- | MEN8 | 3.4 |
| -MEGA10E -120 | **968.159** | 3 - 10 | 35 | | | | MEC10- | MEN10 | 3.6 |
| -MEGA13E - 90 | **968.161** | 3 - 12 | 42 | 90 | 60 | 18 000 | MEC13- | MEN13 | 3.6 |
| -120 | **968.162** | | | 120 | 90 | | | | 3.8 |
| -165 | **968.163** | | | 165 | 137 | 16 000 | | | 4.4 |

1. MEGA E nut is included.
2. Nut-less model available upon request.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA E Nut | | MEGA Wrench | | MEGA E Collet ▶ 264 | MEGA E Perfect Seal ▶ 265 | Adjusting Screw   | | | | |
| MEGA E Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6E | MEN6 | **968.461** | MGR25 | **969.456** | MEC6- | EPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8E | MEN8 | **968.462** | MGR30 | **969.458** | MEC8- | EPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10E | MEN10 | **968.463** | MGR35 | **969.460** | MEC10- | EPS10- | NBA10B | **961.572** | M14 | 16 | 3 |
| MEGA13E | MEN13 | **968.464** | MGR42 | **969.462** | MEC13- | EPS13- | NBA13B | **961.598** | M18 | 20 | 4 |

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# MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique design ensures efficient coolant supply to the cutting tool periphery.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.2

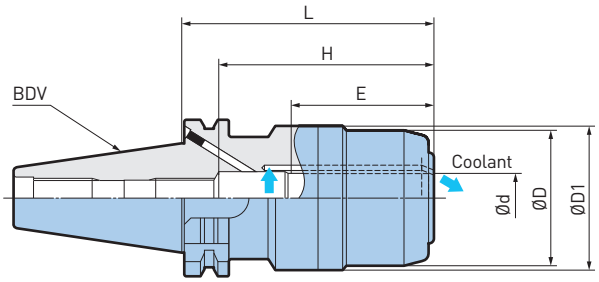



Fig. 1

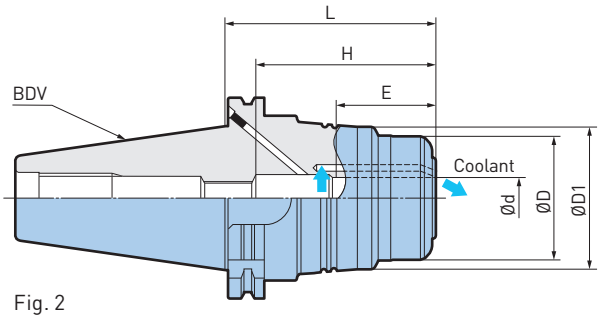



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 3 - 42 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | H | E | max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BDV40 -MEGA16DS - 90A * | **803.075** | 1 | 16 | 42 | 52.6 | 92 | 73 | 57 | 25 000 | 1.8 |
| -MEGA20DS -100A | **803.076** | | 20 | 50 | 55 | 102 | 71 - 81 | 58 | 22 000 | 1.9 |
| -135A | **805.596** | | | | | 137 | | | 20 000 | 2.5 |
| -MEGA25DS -100A | **803.077** | | 25 | 62 | 62.7 | 102 | 73 - 83 | 59 | 18 000 | 2.4 |
| -135A | **805.597** | | | | | 137 | | | 16 000 | 3.0 |
| -MEGA32DS -100A | **803.078** | | 32 | 70 | 70.7 | 102 | 78 - 88 | 66 | 12 000 | 2.2 |
| -135A | **805.598** | | | | | 137 | | | 10 000 | 3.0 |
| BDV50 -MEGA16DS - 70 * | **969.023** | 2 | 16 | 46 | 55 | 72.5 | 73 | 52 | 20 000 | 3.5 |
| -MEGA20DS -100 | **969.025** | | 20 | 60 | 69 | 102.5 | 71 - 81 | 58 | 20 000 | 4.9 |
| -135 | **805.753** | | | | | 137.5 | | | 19 000 | 5.7 |
| -MEGA25DS -105 | **968.059** | | 25 | 70 | 77 | 107.5 | 78 - 88 | 67 | 18 000 | 5.4 |
| -135 | **805.600** | | | | | 137.5 | | | 17 000 | 6.3 |
| -MEGA32DS -105 | **968.060** | | 32 | 80 | 86 | 107.5 | 80 - 97 | 73 | 15 000 | 5.7 |
| -135 | **805.601** | | | | | 137.5 | | | 13 000 | 6.7 |
| -MEGA42DS -105 | **968.061** | 1 | 42 | 99 | 99.7 | 107 | 90 - 107 | 73 | 12 000 | 6.1 |

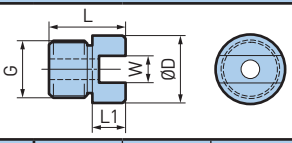
1. Wrench and axial adjusting screw are to be ordered separately.
2. * Adjusting screw can not be used.
3. "E" is the min. clamping length.
4. "H" indicates the adjustment length with an adjusting screw.

For Straight Collet ▶ 272

**Accessories**

MEGA Wrench

Adjusting Screw



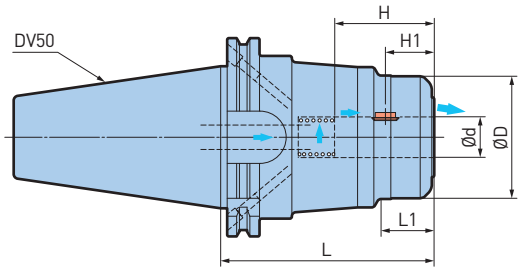

| MEGA Double Power Chuck | Model | Order No. | Model | Order No. | ØD | L | L1 | G | W |
|---|---|---|---|---|---|---|---|---|---|
| BDV40 -MEGA16DS | MGR42L | **969.462L** | - | - | - | - | - | - | - |
| -MEGA20DS | MGR50L | **969.464L** | HMA-M16 | **962.311** | 19 | 27 | 6 | M16P1.5 | 8 |
| -MEGA25DS | MGR62L | **969.469L** | | | | | | | |
| -MEGA32DS | MGR70L | **969.470L** | HMA-M16S | **962.312** | | | | | 10 |
| BDV50 -MEGA16DS | MGR46L | **969.465L** | - | - | - | - | - | - | - |
| -MEGA20DS | MGR60L | **969.468L** | HMA-M16 | **962.311** | 19 | 27 | 6 | M16P1.5 | 8 |
| -MEGA25DS | MGR70L | **969.470L** | | | | | | | |
| -MEGA32DS | MGR80L | **969.471L** | HMA-M24 | **962.313** | 30 | 36 | 9.5 | M24P1.5 | 10 |
| -MEGA42DS | MGR99L | **969.472L** | | | | | | | |



BROTECH

# MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.



**Ø 20 - 32 mm**

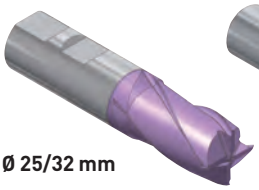
| Model | Order No. | Ød | ØD | L | L1 | H | H1 | MEGA Wrench | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| DV50 -MEGA20DPG -105ADF | **805.808** | 20 | 60 | 105 | 27 | 49 | 24 | MGR60L | 5.1 |
| -MEGA25DPG -105ADF | **805.809** | 25 | 70 | | 33 | 55 | 23 | MGR70L | 5.4 |
| -MEGA32DPG -105ADF | **805.810** | 32 | 80 | | 41 | 59 | | MGR80L | 5.6 |

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

## Weldon Shank Standards

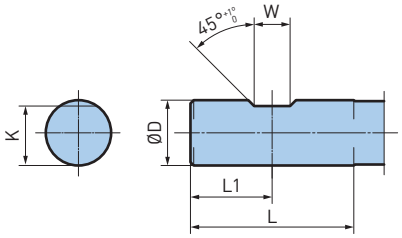
(DIN 1835-1)

The following standard shank is required for MEGA Perfect Grip.



**Ø 25/32 mm**

**Ø 20 mm**




| ØD | | L | L1 | W | | K | |
|---|---|---|---|---|---|---|---|
| Nominal | Tolerance | | | Nominal | Tolerance | Nominal | Tolerance |
| 20 | h6 | 50 | 25 | 11 | + 0.05 0 | 18.2 | h13 |
| 25 | | 56 | 32 | 12 | | 23 | |
| 32 | | 60 | 36 | 14 | | 30 | |

**Caution**

In case you are adding your own flat, the tool projection length in the MEGA Perfect Grip will be decided by the flat position. Refer to H1 in the MEGA Perfect Grip chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

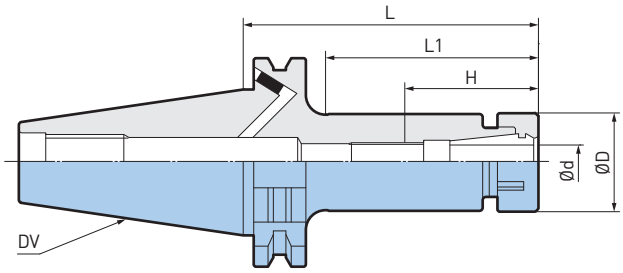
| Spare Parts | | | | | Accessories | |
|---|---|---|---|---|---|---|
| | Key Grip | | Spring | | MEGA Wrench | |
| MEGA Perfect Grip | Model | Order No. | Model | Order No. | Model | Order No. |
| MEGA20DPG | PKG20-2P | **805.493** | PSP1823 | **805.497** | MGR60L | **969.468L** |
| MEGA25DPG | PKG25-2P | **805.494** | PSP2420 | **805.498** | MGR70L | **969.470L** |
| MEGA32DPG | PKG32-2P | **805.495** | PSP3128 | **805.499** | MGR80L | **969.471L** |

1. Key grip is available in a package of 2 pcs.

# New Baby Chuck

The original high precision collet chuck to perform all machining applications.

Coolant Through Hole




A.2

**Ø 0.25 - 20 mm**

| Model | | Order No. | Ød | ØD | L | L1 | H | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| DV40 -NBS6 | - 60 | **961.831** | 0.25 - 6 | 20 | 60 | 34 | 20 - 40 | NBC6- | NBN6 | 0.9 |
| | - 90 | **969.032** | | | 90 | 60 | | | | 1.0 |
| | -135 | **961.833** | | | 135 | 105 | | | | 1.0 |
| -NBS8 | - 60 | **969.034** | 0.5 - 8 | 25 | 60 | 34 | 23 - 42 | NBC8- | NBN8 | 0.9 |
| | - 90 | **961.835** | | | 90 | 62 | | | | 1.0 |
| | -135 | **969.036** | | | 135 | 107 | | | | 1.2 |
| -NBS10 | - 60 | **969.037** | 1.5 - 10 | 30 | 60 | 34 | 35 - 45 | NBC10- | NBN10 | 1.0 |
| | - 90 | **969.038** | | | 90 | 64 | | | | 1.1 |
| | -135 | **961.839** | | | 135 | 104 | | | | 1.4 |
| -NBS13 | - 60 | **969.040** | 2.5 - 13 | 35 | 60 | 37 | 41 - 60 | NBC13- | NBN13 | 1.0 |
| | - 90 | **969.041** | | | 90 | 66 | | | | 1.2 |
| | -135 | **969.042** | | | 135 | 106 | | | | 1.6 |
| -NBS16 | - 60 | **969.043** | 2.5 - 16 | 42 | 60 | 38 | 45 - 65 | NBC16- | NBN16 | 1.1 |
| | - 90 | **969.044** | | | 90 | 68 | | | | 1.4 |
| | -135 | **969.045** | | | 135 | 113 | | | | 1.8 |
| -NBS20 | - 60 | **969.046** | 2.5 - 20 | 46 | 60 | 40 | 48 - 65 | NBC20- | NBN20 | 1.3 |
| | - 90 | **969.047** | | | 90 | 70 | | | | 1.6 |
| | -135 | **969.048** | | | 135 | 115 | | | | 2.0 |
| | -165 | **969.059** | | | 165 | 145 | | | | 2.3 |
| | -200 | **969.060** | | | 200 | 180 | | | | 2.6 |

1. New baby nut is included.
2. Nut-less model available upon request.
3. "H" indicates the adjustment length with an adjusting screw.

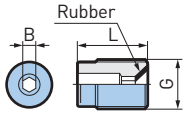
For Tap Driving Back Stop ▶ 259

**Ø 0.25 - 20 mm**

| Model | | Order No. | Ød | ØD | L | L1 | H | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| DV50 -NBS6 | -120 | **969.062** | 0.25 - 6 | 20 | 120 | 85 | 20 - 40 | NBC6- | NBN6 | 2.8 |
| | -165 | **969.063** | | | 165 | 125 | | | | 3.1 |
| -NBS8 | -120 | **969.066** | 0.5 - 8 | 25 | 120 | 80 | 23 - 42 | NBC8- | NBN8 | 3.2 |
| | -165 | **969.067** | | | 165 | 130 | | | | 3.0 |
| -NBS10 | - 90 | **969.069** | 1.5 - 10 | 30 | 90 | 60 | 35 - 45 | NBC10- | NBN10 | 2.9 |
| | -120 | **969.070** | | | 120 | 85 | | | | 3.0 |
| | -165 | **969.071** | | | 165 | 130 | | | | 3.2 |
| -NBS13 | - 90 | **969.075** | 2.5 - 13 | 35 | 90 | 60 | 41 - 60 | NBC13- | NBN13 | 3.0 |
| | -120 | **961.876** | | | 120 | 80 | | | | 3.4 |
| | -165 | **969.077** | | | 165 | 125 | | | | 3.7 |
| -NBS16 | - 90 | **969.082** | 2.5 - 16 | 42 | 90 | 60 | 45 - 65 | NBC16- | NBN16 | 3.0 |
| | -120 | **969.083** | | | 120 | 85 | | | | 3.9 |
| | -165 | **969.084** | | | 165 | 130 | | | | 4.3 |
| | -200 | **969.085** | | | 200 | 165 | | | | 4.6 |
| -NBS20 | - 75 | **969.087** | 2.5 - 20 | 46 | 75 | 45 | 48 - 65 | NBC20- | NBN20 | 3.1 |
| | - 90 | **969.088** | | | 90 | 60 | | | | 3.2 |
| | -120 | **961.889** | | | 120 | 85 | | | | 4.0 |
| | -165 | **969.090** | | | 165 | 130 | | | | 4.5 |
| | -200 | **969.091** | | | 200 | 165 | | | | 4.8 |

1. New baby nut is included.
2. Nut-less model available upon request.

For Tap Driving Back Stop ▶ 259

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | New Baby Nut | | Wrench | | NBC Collet ▶ 250 | Baby Perfect Seal ▶ 262 | Adjusting Screw |   | | | |
| New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| NBS6 | NBN6 | **961.526** | NBK6 | **961.525** | NBC6- | BPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| NBS8 | NBN8 | **961.549** | NBK8 | **961.548** | NBC8 | BPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| NBS10 | NBN10 | **961.571** | NBK10 | **961.570** | NBC10- | BPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| NBS13 | NBN13 | **961.597** | NBK13 | **961.596** | NBC13- | BPS13 | NBA13B | **961.598** | M14 | 20 | 4 |
| NBS16 | NBN16 | **961.631** | NBK16 | **961.630** | NBC16- | BPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| NBS20 | NBN20 | **961.679** | NBK20 | **961.678** | NBC20- | BPS20- | NBA20B | **961.680** | M21 | 20 | 4 |

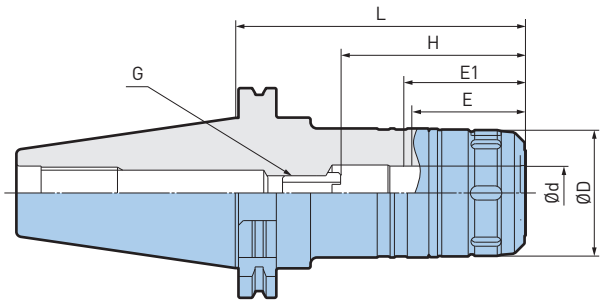
# New Hi-Power Milling Chuck Type S

The original design of slit structure assures heavy and finish end milling with high power and precision.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.2




BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 3 - 42 mm**

| Model | Order No. | Ød | ØD | L | H | E | E1 | Wrench | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BDV40 -HMC20S - 85 | **962.121S** | 20 | 50 | 85 | 69 - 79 | 50 | 56 | FK45-50L | 1.6 |
| -105 | **800.972** | | | 105 | | | | | 1.9 |
| -120 | **800.973** | | | 120 | | | | | 2.1 |
| -HMC25S - 95 | **800.975** | 25 | 59 | 95 | 71 - 81 | 56 | 57 | FK58-62L | 2.0 |
| -105 | **800.974** | | | 105 | | | | | 2.2 |
| -HMC32S - 95 | **962.124S** | 32 | 68 | 95 | 79 - 89 | 60 | 64 | FK68-75L | 2.1 |
| -105 | **800.976** | | | 105 | | | | | 2.3 |
| -135 | **800.977** | | | 135 | | | | | 3.0 |
| BDV50 -HMC20S -105 | **805.430** | 20 | 50 | 105 | 69 - 79 | 50 | 56 | FK45-50L | 3.9 |
| -135 | **805.431** | | | 135 | | | | | 4.3 |
| -HMC25S -105 | **805.424** | 25 | 59 | 105 | 76 - 86 | 56 | 57 | FK58-62L | 4.2 |
| -135 | **805.433** | | | 135 | | | | | 4.8 |
| -HMC32S -105 | **804.995** | 32 | 68 | 105 | 88 - 98 | 60 | 72 | FK68-75L | 4.4 |
| -135 | **805.435** | | | 135 | | | | | 5.2 |
| -165 | **805.436** | | | 165 | | | | | 6.0 |
| -HMC42S -135 | **805.438** | 42 | 85 | 135 | 93 - 105 | 70 | 73 | FK80-90L | 6.3 |

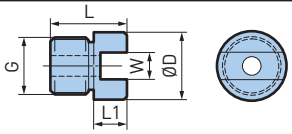
1. Wrench and axial adjusting screw are to be ordered separately.
2. "E" is the min. clamping length.
3. "E1" is the min. clamping length for optimum use with center through coolant.
4. "G" is the adjusting screw (optional).
5. "H" indicates the adjustment length with an adjusting screw.

For Straight Collet ▶ 272

**Accessories**

Wrench

Adjusting Screw




| New Hi-Power Milling Chuck | Model | Order No. | Model | Order No. | ØD | L | L1 | G | W |
|---|---|---|---|---|---|---|---|---|---|
| BDV40 -HMC20S | FK45-50L | **801.037** | HMA-M16 | **962.311** | 19 | 27 | 6 | M16P1.5 | 8 |
| -HMC25S | FK58-62L | **801.038** | | | | | | | |
| -HMC32S | FK68-75L | **801.039** | HMA-M16S | **962.312** | | | | | 10 |
| BDV50 -HMC20S | FK45-50L | **801.037** | HMA-M16 | **962.311** | 19 | 27 | 6 | M16P1.5 | 8 |
| -HMC25S | FK58-62L | **801.038** | | | | | | | |
| -HMC32S | FK68-75L | **801.039** | HMA-M16S | **962.312** | | | | | 10 |
| -HMC42S | FK80-90L | **804.771** | HMA-M24 | **962.313** | 30 | 36 | 9.5 | M24P1.5 | |



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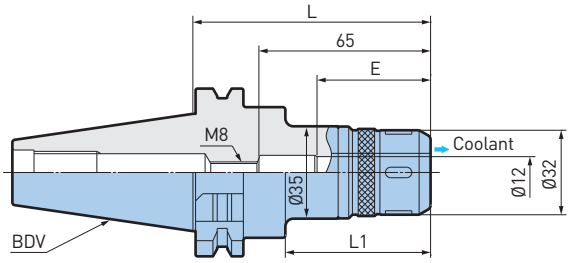
# New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.



BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 6 - 12 mm**

| Model | Order No. | L | L1 | E | Wrench | Weight (kg) |
|---|---|---|---|---|---|---|
| BDV40 -HMC12J - 90 | **806.810** | 90 | 55 | 43 | FK31-33 | 1.4 |
| -120 | **806.811** | 120 | 70 | | | 1.6 |
| BDV50 -HMC12J -105 | **806.812** | 105 | 70 | 43 | FK31-33 | 3.5 |
| -135 | **806.813** | 135 | | | | 3.8 |

1. Wrench is to be ordered seperately.
2. "E" is the min. clamping length.

For Straight Collet ▶ 272

| Accessories | | |
|---|---|---|
| | Wrench | |
| New Hi-Power Milling Chuck | Model | Order No. |
| BDV-40/50-HMC12J | FK31-33 | **806.462** |

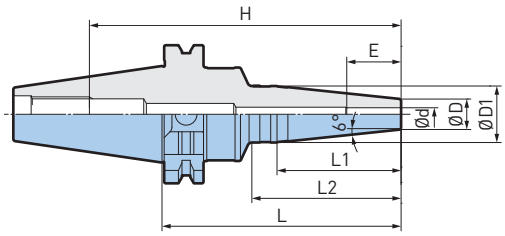
A.2

## Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.

BIG-PLUS Dual-Contact

Coolant Through Hole




BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 4 - 12 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | L2 | H | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BDV40 -HDC 4S -110 | 806.347 | 4 | 14 | 26 | 110 | 57 | 68 | 145 | 19 | 1.2 |
| -HDC 6S -110 | 806.348 | 6 | | | | | | | 25 | 1.2 |
| -HDC 8S -110 | 806.349 | 8 | 17 | 28 | | 52 | 69 | | 31 | 1.3 |
| -HDC10S -110 | 806.350 | 10 | 19 | 30 | | | | | 33 | 1.3 |
| -HDC12S -110 | 806.351 | 12 | 21 | 32 | | | 70 | | 36 | 1.3 |

1. "E" indicates the minimum clamping length.
2. Adjusting Screw and straight collet cannot be used.
3. "H" indicates the maximum cutting tool insertion length.

For Inner Bore Cleaner ▶ 286

## Hydraulic Chuck Standard

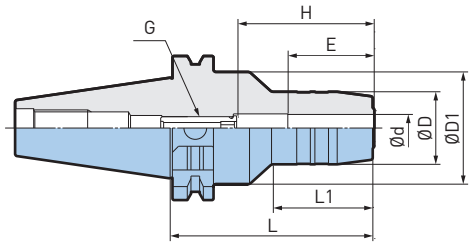



Fig. 1

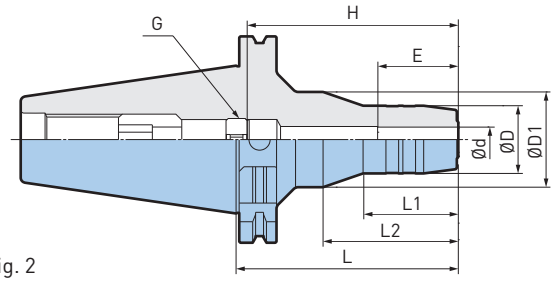



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 3 - 31 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | L2 | H | E | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BDV40 -HDC 6 - 90 | 806.352 | 1 | 6 | 26 | 49.5 | 90 | 43 | - | 28 - 50 | 28 | HDA6-05032 | 1.3 |
| -HDC 8 - 90 | 806.353 | | 8 | 28 | | | | | | | HDA8-06032 | |
| -HDC10 - 90 | 806.354 | | 10 | 30 | | | 44 | - | 33 - 55 | 33 | HDA10-08032 | |
| -HDC12 - 90 | 806.355 | | 12 | 32 | | | | | 38 - 60 | 38 | HDA12-10032 | |
| -HDC14 - 90 | 806.356 | | 14 | 34 | | | | | | | | 1.4 |
| -HDC16 - 90 | 806.357 | | 16 | 38 | | | 47 | - | 43 - 70 | 43 | HDA16-12037 | |
| -HDC18 - 90 | 806.358 | | 18 | 40 | | | 49 | - | | | | |
| -HDC20 - 90 | 806.359 | | 20 | 42 | | | 51 | - | | | | |
| -HDC31 - 90 | 806.441 | | 31 | 62 | 74 | | 22 | - | 91 | 56 | - | 1.9 |
| BDV50 -HDC12L -105 | 806.360 | 2 | 12 | 32 | 45 | 105 | 44 | 63 | 100 - 120 | 38 | HDA6-20010 | 3.2 |
| -HDC20L -105 | 806.361 | | 20 | 42 | 50 | | 46 | 63 | 71 - 111 | 43 | HDA20-12047 | 3.3 |

1. "E" indicates the minimum clamping length.
2. "G" is the adjusting screw (optional).
3. "H" indicates the adjustment length with an adjusing screw.

For Adjusting Screw ▶ 282
For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286

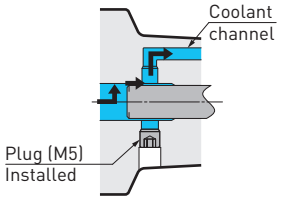


BROTECH

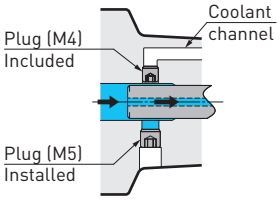
# Hydraulic Chuck Jet Through

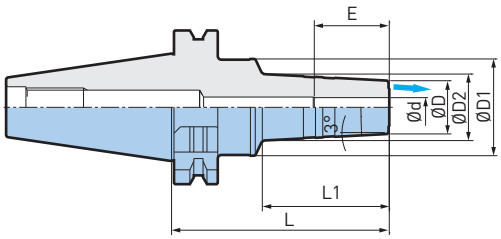
Coolant or oil-mist is supplied to cutting edge securely. Maximum performance to high-precision operation at 5-axis machining.

Peripheric




Center Through






BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 4 - 12 mm**

| Model | Order No. | Ød | ØD | ØD1 | ØD2 | L | L1 | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BDV40 -HDC4J - 90 | **807.203** | 4 | 20 | 46 | 23 | 90 | 50 | 19 | 1.1 |
| -HDC6J - 90 | **807.204** | 6 | | 42 | 26 | | | 25 | 1.1 |
| -HDC8J - 90 | **807.205** | 8 | 22 | | 28 | | | 31 | 1.2 |
| -HDC10J - 90 | **807.206** | 10 | 24 | 44 | 30 | | | 33 | 1.2 |
| -HDC12J - 90 | **807.207** | 12 | 26 | 46 | 32 | | | 36 | 1.2 |

1. Adjusting screw cannot be used.

For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286

**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

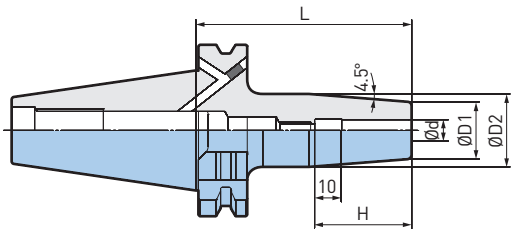
# Shrink Chuck Standard

Substantial body provides higher rigidity.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.2




BIG-PLUS® tools can be used in machining centers with conventional spindles. **Ø 6 - 25 mm**

| Model | Order No. | Ød | ØD1 | ØD2 | L | H | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BDV40 -SRC6D - 80 | 490.506 | 6 | 21 | 27 | 80 | 36 | 1.0 |
| -120 | 490.556 | | | | 120 | | 1.2 |
| -SRC8D - 80 | 490.508 | 8 | | | 80 | | 1.0 |
| -120 | 490.558 | | | | 120 | | 1.2 |
| -SRC10D - 80 | 490.510 | 10 | 24 | 32 | 80 | 42 | 1.1 |
| -120 | 490.560 | | | | 120 | | 1.3 |
| -SRC12D - 80 | 490.512 | 12 | | | 80 | 47 | 1.1 |
| -120 | 490.562 | | | | 120 | | 1.3 |
| -SRC14D - 80 | 490.514 | 14 | 27 | 34 | 80 | | 1.1 |
| -SRC16D - 80 | 490.516 | 16 | | | | 50 | 1.1 |
| -120 | 490.566 | | | | 120 | | 1.4 |
| -SRC18D - 80 | 490.518 | 18 | 33 | 42 | 80 | | 1.3 |
| -SRC20D - 80 | 490.520 | 20 | | | | 52 | 1.2 |
| -120 | 490.570 | | | | 120 | | 1.6 |
| BDV50 -SRC6D - 80 | 490.606 | 6 | 21 | 27 | 80 | 36 | 2.8 |
| -160 | 490.656 | | | 38 | 160 | | 3.5 |
| -SRC8D - 80 | 490.608 | 8 | | 27 | 80 | | 3.5 |
| -160 | 490.658 | | | 38 | 160 | | 3.5 |
| -SRC10D - 80 | 490.610 | 10 | 24 | 32 | 80 | 42 | 2.8 |
| -160 | 490.660 | | | 41 | 160 | | 3.5 |
| -SRC12D - 80 | 490.612 | 12 | | 32 | 80 | 47 | 2.8 |
| -160 | 490.662 | | | 41 | 160 | | 3.5 |
| -SRC14D - 80 | 490.614 | 14 | 27 | 34 | 80 | | 2.9 |
| -160 | 490.664 | | | 44 | 160 | | 3.6 |
| -SRC16D - 80 | 490.616 | 16 | | 34 | 80 | 50 | 2.8 |
| -160 | 490.666 | | | 44 | 160 | | 3.6 |
| -SRC18D - 80 | 490.618 | 18 | 33 | 42 | 80 | | 3.0 |
| -160 | 490.668 | | | 50 | 160 | | 3.9 |
| -SRC20D - 80 | 490.620 | 20 | | 42 | 80 | 52 | 3.0 |
| -160 | 490.670 | | | 50 | 160 | | 3.9 |
| -SRC25D -100 | 490.625 | 25 | 44 | 53 | 100 | 58 | 3.5 |
| -160 | 490.675 | | | 61 | 160 | | 4.5 |

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286



BROTECH

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

BIG-PLUS® Dual-Contact

Coolant Through Hole

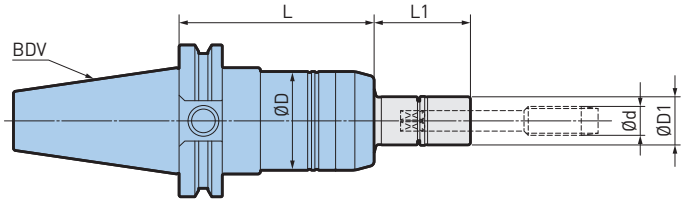



Fig. 1

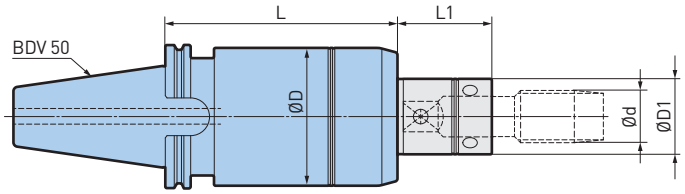
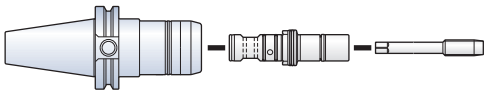



Fig. 2




BIG-PLUS® tools can be used in machining centers with conventional spindles.

**M3 - M36**

| Model | Order No. | Fig. | Tap Holder Model | Ød | ØD | ØD1 | L | L1 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| BDV40 -MGT6 - 80 | **963.401** | 1 | MGT6 | M3 - M8 | 36 | 16 | 80 | 30-200 | 1.3 |
| -MGT12 - 80 | **963.402** | | MGT12 | M5 - M12 P1/8 | 41 | 20 | 80 | 30-200 | 1.3 |
| -MGT20 -105 | **963.403** | | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 105 | 35-150 | 1.9 |
| BDV50 -MGT6 - 85 | **963.404** | 1 | MGT6 | M3 - M8 | 36 | 16 | 85 | 30-200 | 3.2 |
| -MGT12 - 85 | **963.405** | | MGT12 | M5 - M12 P1/8 | 41 | 20 | 85 | 30-200 | 3.2 |
| -MGT20 -105 | **963.406** | | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 105 | 35-150 | 3.8 |
| -MGT36 -160 | **805.002** | 2 | MGT36 | M22 - M36 P5/8 - P1 | 94 | 38 - 52 | 160 | 65 | 8.7 |

1. Tap Holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.
3. MEGA Wrench is not required for MGT36.

For Tap Holder ▶ 276
For Accessories ▶ 281
For MEGA Wrench ▶ 281

# Side Lock Holders for Weldon

BIG-PLUS Dual-Contact

Coolant Through Hole

A.2

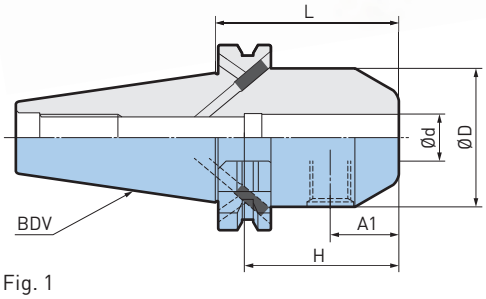



Fig. 1

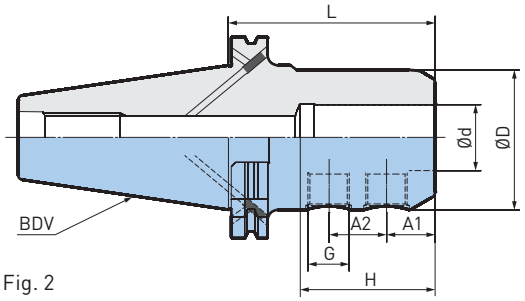



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional spindles.

**Ø 6 - 40 mm**

| Model | Order No. | Fig. | Ød | ØD | L | A1 | A2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BDV40 -ISL6 - 50 | **490.106** | 1 | 6 | 25 | 50 | 18 | - | 85 * | M6 | 0.9 |
| -ISL8 - 50 | **490.108** | | 8 | 28 | | | - | | M8 | 0.9 |
| -ISL10 - 50 | **490.110** | | 10 | 35 | | 20 | - | | M10 | 1.0 |
| -ISL12 - 50 | **490.112** | | 12 | 42 | | 22.5 | - | | M12 | 1.1 |
| -ISL14 - 50 | **490.114** | | 14 | 44 | | | - | | | 1.1 |
| -ISL16 - 63 | **490.116** | | 16 | 48 | 63 | 24 | - | 53 | M14 | 1.3 |
| -ISL18 - 63 | **490.118** | | 18 | 50 | | | - | | | 1.3 |
| -ISL20 - 63 | **490.120** | | 20 | 52 | | 25 | - | 55 | M16 | 1.4 |
| -ISL25 -100 | **490.125** | 2 | 25 | 65 | 100 | 24 | 25 | 60 | 2 - M18 | 2.5 |
| -ISL32 -100 | **490.132** | | 32 | 72 | | 24 | 28 | 66 | 2 - M20 | 2.6 |
| BDV50 -ISL6 - 63 | **490.206** | 1 | 6 | 25 | 63 | 18 | - | 116 * | M6 | 2.7 |
| -ISL8 - 63 | **490.208** | | 8 | 28 | | | - | | M8 | 2.8 |
| -ISL10 - 63 | **490.210** | | 10 | 35 | | 20 | - | | M10 | 2.9 |
| -ISL12 - 63 | **490.212** | | 12 | 42 | | 22.5 | - | | M12 | 3.0 |
| -ISL14 - 63 | **490.214** | | 14 | 44 | | | - | | | 3.0 |
| -ISL16 - 63 | **490.216** | | 16 | 48 | | 24 | - | | M14 | 3.1 |
| -ISL18 - 63 | **490.218** | | 18 | 50 | | | - | | | 3.1 |
| -ISL20 - 63 | **490.220** | | 20 | 52 | | 25 | - | | M16 | 3.2 |
| -ISL25 - 80 | **490.225** | 2 | 25 | 65 | 80 | 24 | 25 | 60 | 2 - M18 | 3.9 |
| -ISL32 -100 | **490.232** | | 32 | 70 | 100 | | 28 | 66 | 2 - M20 | 4.5 |
| -ISL40 -100 | **490.240** | | 40 | 90 | | 30 | 32 | 76 | | 5.5 |

1. "H" is the max. tool shank length that can be inserted into the holder.
2. H dimension marked with * indicates this dimension to the back end of the retention knob.
3. Use a cutting tool in accordance to DIN 1835 B / DIN 6538 HB



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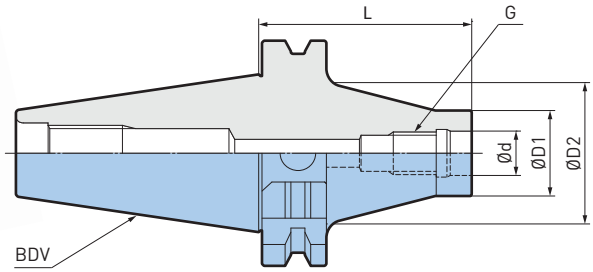
# Holders for Screw-On Cutter

General metric screw-on type cutting tools can be used with these models.




BIG-PLUS® tools can be used in machining centers with conventional spindles.

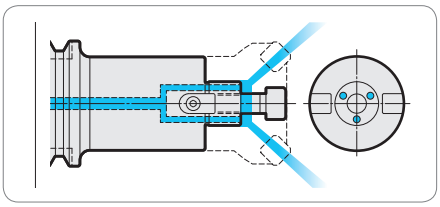
| Model | | Order No. | Ød | ØD1 | ØD2 | L | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| BDV40 | -M10-19 - 65 | **806.607** | 10.5 | 19 | 35 | 65 | M10 | 1.0 |
| | -M12-24 - 60 | **806.608** | 12.5 | 24 | 40 | 60 | M12 | 1.0 |
| | -M16-29 - 55 | **806.609** | 17 | 29 | 45 | 55 | M16 | 1.1 |

# Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.

BIG-PLUS Dual-Contact

Coolant Through Hole



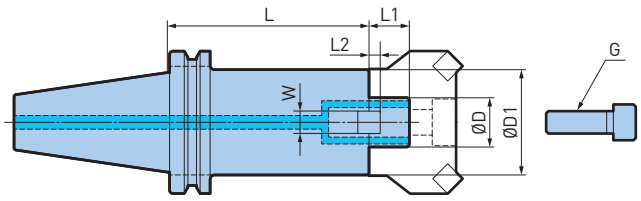



Fig. 1

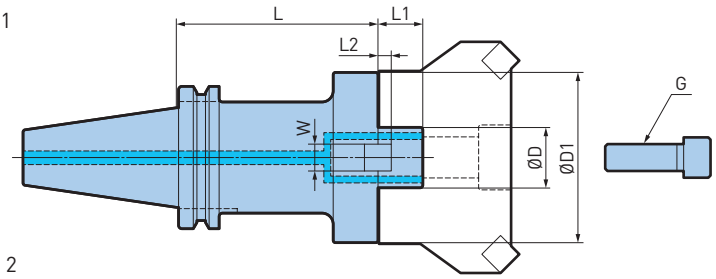



Fig. 2

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | Fig. | ØD | ØD1 | L | L1 | Drive Keys | | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L2 | W | | |
| BDV40 -FMH16 - 37 - 40 | 806.896 | 1 | 16 | 37 | 40 | 16 | 5 | 8 | M8 | 1.1 |
| -FMH22 - 47 - 45 | 805.584 | | 22 | 47 | 45 | 18 | | 10 | M10 | 1.2 |
| - 60 | 807.208 | | | | 60 | | | | | 1.4 |
| - 90 | 805.585 | | | | 90 | | | | | 1.8 |
| -150 | 805.604 | | | | 150 | | | | | 2.5 |
| - 60 - 50 | 805.605 | 2 | | 60 | 50 | | | | | 1.4 |
| - 90 | 805.606 | | | | 90 | | | | | 2.0 |
| -FMH27 - 60 - 50 | 805.586 | | 27 | 60 | 50 | 20 | 6 | 12 | M12 | 1.4 |
| - 90 | 805.608 | | | | 90 | | | | | 2.0 |
| - 76 - 60 | 805.609 | | | 76 | 60 | | | | | 1.9 |
| - 90 | 805.610 | | | | 90 | | | | | 2.3 |
| -FMH32 - 96 - 60 | 805.611 | | 32 | 96 | 60 | 22 | 7 | 14 | M16 | 2.1 |
| BDV50 -FMH16 - 37 -105 | 807.209 | 1 | 16 | 37 | 105 | 16 | 5 | 8 | M8 | 3.4 |
| -FMH22 - 47 - 60 | 805.758 | | 22 | 47 | 60 | 18 | | 10 | M10 | 3.1 |
| -105 | 805.623 | | | | 105 | | | | | 3.7 |
| -150 | 805.624 | | | | 150 | | | | | 4.3 |
| -200 | 978.226 | | | | 200 | | | | | 4.9 |
| -250 | 807.210 | | | | 250 | | | | | 7.4 |
| - 60 - 60 | 805.626 | | | 60 | 60 | | | | | 3.5 |
| -105 | 805.627 | | | | 105 | | | | | 4.4 |
| -150 | 805.628 | | | | 150 | | | | | 5.4 |
| -200 | 805.629 | | | | 200 | | | | | 6.5 |
| -FMH27 - 60 - 45 | 805.630 | | 27 | 60 | 45 | 20 | 6 | 12 | M12 | 3.2 |
| - 90 | 805.631 | | | | 90 | | | | | 4.1 |
| -150 | 805.632 | | | | 150 | | | | | 5.4 |
| -200 | 805.633 | | | | 200 | | | | | 6.5 |
| - 76 - 45 | 805.635 | | | 76 | 45 | | | | | 3.6 |
| - 90 | 805.636 | | | | 90 | | | | | 5.1 |
| -150 | 805.637 | | | | 150 | | | | | 7.2 |
| -200 | 805.638 | | | | 200 | | | | | 8.9 |
| -FMH32 - 96 - 50 | 805.639 | 2 | 32 | 96 | 50 | 22 | 7 | 14 | M16 | 4.1 |
| - 90 | 805.640 | | | | 90 | | | | | 6.2 |
| -150 | 805.641 | | | | 150 | | | | | 8.4 |
| -200 | 805.642 | | | | 200 | | | | | 10.4 |
| -FMH40 -100 - 50 | 805.643 | | 40 | 100 | 50 | 26 | 8.5 | 16 | M20 | 4.3 |
| - 75 | 805.644 | | | | 75 | | | | | 5.6 |
| -105 | 805.645 | | | | 105 | | | | | 6.9 |

1. Hexagon socket head cap screw is included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

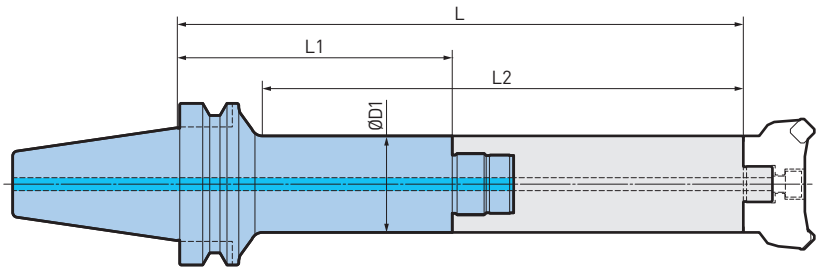
For Clamp Bolt ▶ 282



BROTECH

## Smart Damper Basic Holders for Mills

Anti-Vibration | Dual-Contact | Coolant Through Hole

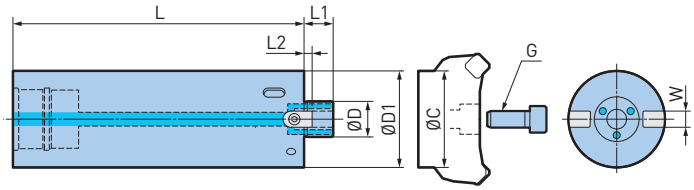



BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | ØD1 | L | L1 | L2 | Damper Head | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BDV50 -SDF36 - 47 -170 | **805.296** | 47 | 350 | 170 | 325 | FMH DP-47 | 4.9 |
| - 60 -170 | **805.298** | 60 | 350 | 170 | 325 | FMH DP-60 | 6.2 |
| -220 | **805.299** | | 400 | 220 | 375 | | 7.3 |

## Smart Damper Damper Heads for Mills

Anti-Vibration | Coolant Through Hole

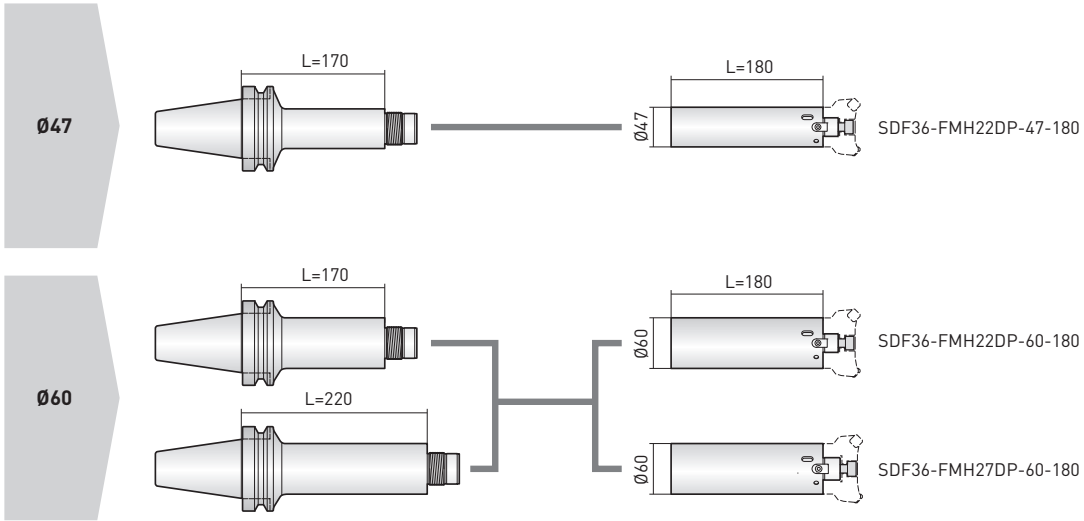



| Model | Order No. | ØD | ØD1 | L | L1 | L2 | W | G | Wrench | ØC min. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SDF36-FMH22DP - 47 -180 | **804.969** | 22 | 47 | 180 | 18 | 5 | 10 | M10 | FK45-50L | 36 | 3.0 |
| - 60 -180 | **804.971** | | 60 | | | | | | FK58-62L | 49 | 4.5 |
| -FMH27DP - 60 -180 | **804.972** | 27 | | | 20 | 6 | 12 | M12 | | 46 | 4.5 |

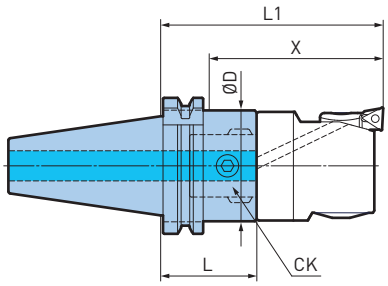
1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ 282
For Wrench ▶ 275

**Combinations** Basic Holder Damper Head



## CK Shanks with Center Through Coolant




BIG-PLUS® tools can be used in machining centers with conventional spindles.

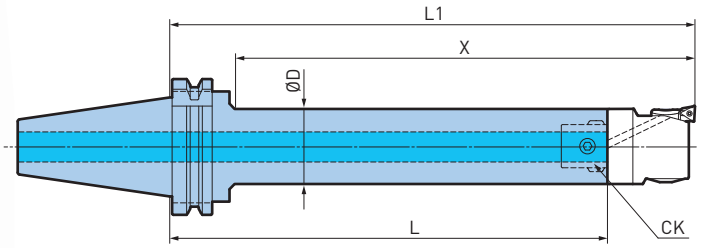
| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BDV40 -CKB4 - 73ADF | **323.826** | CKB4 | 39 | 73 | 120 | 80 | 0.9 |
| -CKB5 - 43ADF | **323.825** | CKB5 | 50 | 43 | 100 | 60 | 1.0 |
| -CKN6 - 59 | **323.821N** | CKN6 | 63.5 | 59 | 130 | 90 | 1.1 |
| BDV50 -CKB5 - 83ADF | **323.868** | CKB5 | 50 | 83 | 140 | 100 | 2.9 |
| -CKN6 - 69 | **323.860N** | CKN6 | 63.5 | 69 | 140 | 100 | 3.4 |
| -CKN6 - 129 | **323.864N** | CKN6 | 63.5 | 129 | 200 | 160 | 4.8 |
| -CKN6 - 229 | **323.865N** | CKN6 | 63.5 | 229 | 300 | 260 | 7.0 |
| -CKN7 - 83 | **323.861N** | CKN7 | 90 | 83 | 200 (170) | 160 (130) | 4.5 |
| -CKB7 - 133 | **323.862** | CKB7 | 90 | 133 | 250 (220) | 210 (180) | 7.0 |
| -CKN7 - 243 | **323.866N** | CKN7 | 90 | 243 | 360 (330) | 320 (290) | 13.2 |

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Head ▶ Chapter B

## Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole fine boring.



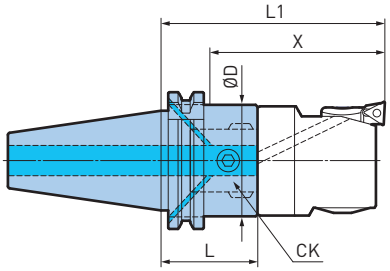

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BDV50 -CKB5DP -301 | **328.233** | CKB5 | 50 | 301 | 358 | 318 | 7.5 |
| -CKB6DP -377 | **328.235** | CKB6 | 64 | 377 | 448 | 408 | 12.1 |

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Head ▶ Chapter B

## CK Shanks with Center and Flange Through Coolant




Coolant Through Hole

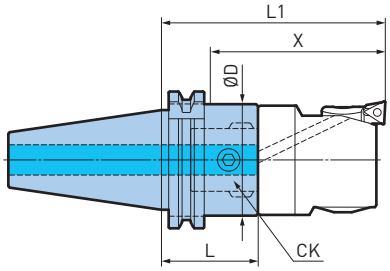
A.2

| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| DV30 -CKB3 - 31ADF | **323.701** | CKB3 | 31 | 31 | 71 | 47 | 0.38 |
| DV40 -CKB1 - 91ADF | **326.011** | CKB1 | 19 | 90.5 | 123 | 83 | 1.2 |
| -CKB2 - 85ADF | **326.021** | CKB2 | 24 | 84.5 | 120 | 80 | 1.2 |
| -CKB3 - 35ADF | **323.728** | CKB3 | 31 | 35 | 75 | 50 | 0.9 |
| -CKB3 - 80ADF | **326.031** | CKB3 | 31 | 80 | 120 | 80 | 1.3 |
| -CKB4 - 73ADF | **326.041** | CKB4 | 39 | 73 | 120 | 80 | 1.3 |
| -CKB5 - 43ADF | **326.057** | CKB5 | 50 | 43 | 100 | 60 | 1.1 |
| -CKB5 -143ADF | **326.054** | CKB5 | 50 | 143 | 200 | 160 | 2.6 |
| -CKN6 - 59ADF | **323.726N** | CKN6 | 63.5 | 59 | 130 | 90 | 1.2 |
| -CKB6 - 99ADF | **323.722** | CKB6 | 63.5 | 99 | 170 | 130 | 2.1 |
| -CKB6 -129ADF | **326.064** | CKB6 | 63.5 | 129 | 200 | 160 | 2.8 |
| DV50 -CKB3 -130ADF | **325.933** | CKB3 | 31 | 130 | 170 | 130 | 3.8 |
| -CKB4 - 93ADF | **325.942** | CKB4 | 39 | 93 | 140 | 100 | 3.7 |
| -CKB4 -153ADF | **325.944** | CKB4 | 39 | 153 | 200 | 160 | 4.3 |
| -CKB5 - 83ADF | **325.952** | CKB5 | 50 | 83 | 140 | 100 | 3.8 |
| -CKB5 -143ADF | **325.954** | CKB5 | 50 | 143 | 200 | 160 | 4.7 |
| -CKB5 -183ADF | **325.955** | CKB5 | 50 | 183 | 240 | 200 | 4.6 |
| -CKN6 - 69ADF | **323.765N** | CKN6 | 63.5 | 69 | 140 | 100 | 3.5 |
| -CKN6 -129ADF | **323.767N** | CKN6 | 63.5 | 129 | 200 | 160 | 4.9 |
| -CKB6 -169ADF | **325.965** | CKB6 | 63.5 | 169 | 240 | 200 | 5.5 |
| -CKN6 -229ADF | **323.768N** | CKN6 | 63.5 | 229 | 300 | 260 | 7.2 |
| -CKN7 - 83ADF | **323.766N** | CKN7 | 90 | 83 | 200 (170) | 160 (130) | 4.8 |
| -CKN7 -273ADF | **323.769N** | CKN7 | 90 | 273 | 390 (360) | 350 (320) | 13.7 |

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Head ▶ Chapter B

## CK Shanks with Center Through Coolant




Coolant Through Hole

| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| DV30 -CKB1 - 32 | **323.703** | CKB1 | 19 | 31.5 | 64 | 40 | 0.35 |
| -CKB5 - 50 | **326.005** | CKB5 | 50 | 50 | 107 | 83 | 0.6 |
| DV40 -CKB5 - 43 | **326.050** | CKB5 | 50 | 43 | 100 | 60 | 0.9 |
| -CKB6 - 59 | **323.721** | CKB6 | 63.5 | 59 | 130 | 90 | 1.2 |
| DV50 -CKB6 - 69 | **323.760** | CKB6 | 63.5 | 69 | 140 | 100 | 3.4 |
| -CKB6 - 129 | **325.964** | CKB6 | 63.5 | 129 | 200 | 160 | 4.7 |
| -CKB7 - 83 | **323.761** | CKB7 | 90 | 83 | 200 (170) | 160 (130) | 4.6 |

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Head ▶ Chapter B

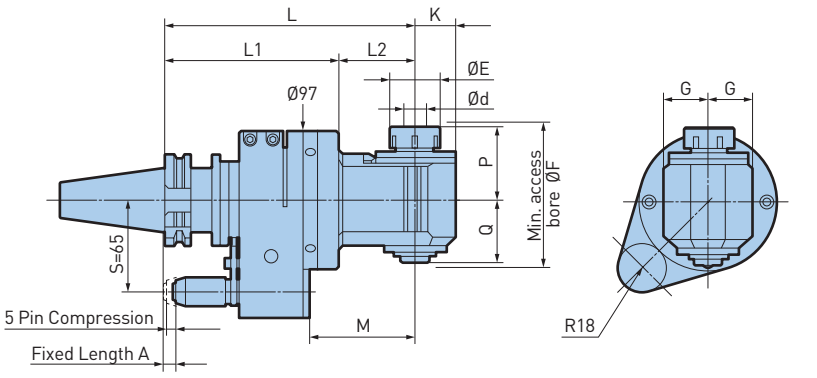
A.2

## New Baby Chuck Type

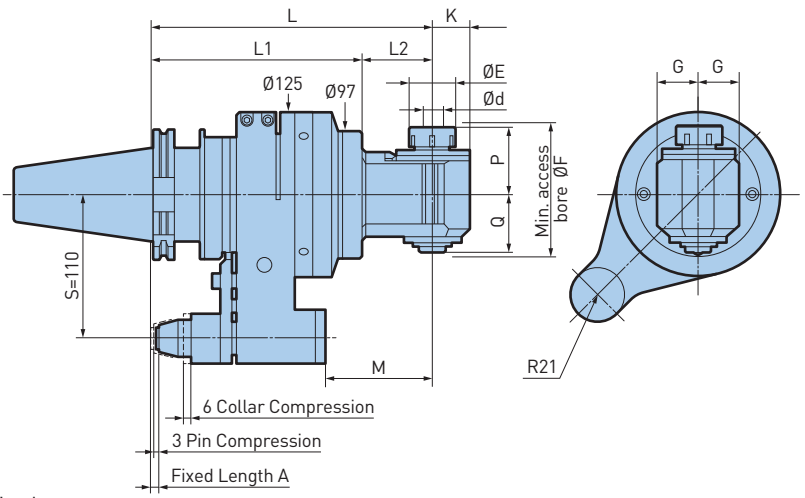
BIG-PLUS Dual-Contact

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.

BDV40



BDV50



Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | Ød | ØE | G | K | L | L1 | L2 | M | P | Q | ØF | Collet Model | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BDV40 -AG90/NBS6 -180 | 802.553 | 0.25 - 6 | 20 | 21 | 17 | 180 | 125 | 55 | 77 | 33 | 29 | 67 | NBC6 | 6 000 | 5.1 |
| -210 | 802.554 | | | | | 210 | | 85 | 107 | | | | | | 5.3 |
| -240 | 802.555 | | | | | 240 | | 115 | 137 | | | | | | 5.5 |
| -270 | 802.556 | | | | | 270 | | 145 | 167 | | | | | | 5.7 |
| -AG90/NBS10 -180 | 802.546 | 1.5 - 10 | 30 | 30 | 25 | 180 | 125 | 55 | 77 | 45 | 43 | 91 | NBC10 | 6 000 | 5.5 |
| -210 | 802.547 | | | | | 210 | | 85 | 107 | | | | | | 5.9 |
| -240 | 802.548 | | | | | 240 | | 115 | 137 | | | | | | 6.2 |
| -AG90/NBS13 -180 | 802.549 | 2.5 - 13 | 35 | 31 | 28 | 180 | 125 | 55 | 77 | 52 | 45 | 101 | NBC13 | 6 000 | 5.6 |
| -210 | 802.550 | | | | | 210 | | 85 | 107 | | | | | | 6.0 |
| -240 | 802.551 | | | | | 240 | | 115 | 137 | | | | | | 6.3 |
| -AG90/NBS20S -175S | 802.552 | 2.5 - 20 | 46 | 35 | 33 | 175 | 122 | 53 | 72 | 65 | 62 | 132 | NBC20 | 3 000 | 8.0 |
| BDV50 -AG90/NBS6 -215 | 802.569 | 0.25 - 6 | 20 | 21 | 17 | 215 | 160 | 55 | 82 | 33 | 29 | 67 | NBC6 | 6 000 | 12.6 |
| -245 | 802.570 | | | | | 245 | | 85 | 112 | | | | | | 12.8 |
| -275 | 802.571 | | | | | 275 | | 115 | 142 | | | | | | 13.0 |
| -305 | 802.572 | | | | | 305 | | 145 | 172 | | | | | | 13.2 |
| -AG90/NBS10 -215 | 802.562 | 1.5 - 10 | 30 | 30 | 25 | 215 | 160 | 55 | 82 | 45 | 43 | 91 | NBC10 | 6 000 | 13.0 |
| -245 | 802.563 | | | | | 245 | | 85 | 112 | | | | | | 13.4 |
| -275 | 802.564 | | | | | 275 | | 115 | 142 | | | | | | 13.7 |
| -AG90/NBS13 -215 | 802.565 | 2.5 - 13 | 35 | 31 | 28 | 215 | 160 | 55 | 82 | 52 | 45 | 101 | NBC13 | 6 000 | 13.1 |
| -245 | 802.566 | | | | | 245 | | 85 | 112 | | | | | | 13.5 |
| -275 | 802.567 | | | | | 275 | | 115 | 142 | | | | | | 13.8 |
| -AG90/NBS20 -230 | 802.568 | 2.5 - 20 | 46 | 35 | 35 | 230 | 160 | 70 | 97 | 65 | 62 | 132 | NBC20 | 3 000 | 14.2 |

1. The standard fixed length A is 8 mm for BDV40 and 6 mm for BDV50. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250
For Stop Block ▶ 290

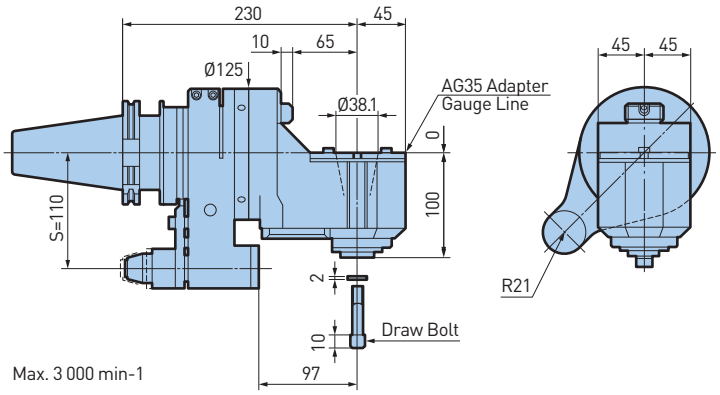


BROTECH

## Build-Up Type

BIG-PLUS Dual-Contact

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle. Also helps minimize interference problems with ATC and storage problems within the magazine.



Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional spindles.

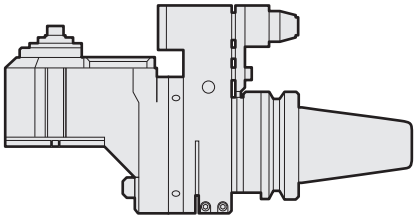
| Model | | Order No. | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|
| BDV50 | -AG90/AGH35-230 | **802.558** | 3 000 | 15.0 |
| | -AG90/AGH35-230S | **802.559** | 3 000 | 16.3 |

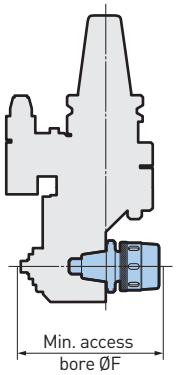
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.

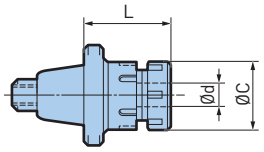
For Stop Block ▶ 290
For Adapters ▶ 116

A.2

## AG35 adapters





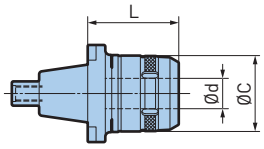




### New Baby Chuck

| Model | Order No. | Ød | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|
| AG35 -NBS10 | **962.793** | 1.5 - 10 | 47 | 30 | 162 | 0.6 |
| -NBS13 | **962.794** | 2.5 - 13 | 54 | 35 | 168 | 0.7 |
| -NBS16 | **962.795** | 2.5 - 16 | | 42 | 170 | 0.8 |
| -NBS20 | **962.796** | 2.5 - 20 | | 46 | | 0.9 |

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250
For Wrench ▶ 271

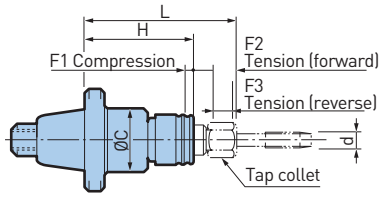



### New Hi-Power Milling Chuck

| Model | Order No. | Ød | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|
| AG35 -HMC20S | **802.742** | 20 | 60 | 50 | 178 | 1.5 |

1. Wrench (FK45-50L) is included.

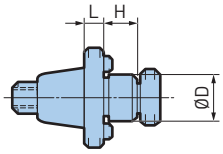
For Straight Collet ▶ 272




### Auto Tapper Type B (automatic depth control)

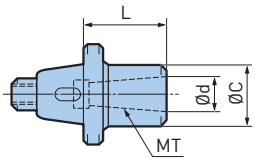
| Model | Order No. | d | L | ØC | H | F1 | F2 | F3 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| AG35 -ATB12E | **802.435** | M4 - M12 | 80 | 40.5 | 72 | 0.5 | 5 | 4 | 1.0 |
| -ATB20E | **802.436** | M8 - M20 | 115 | 57.5 | 102.5 | | 6.5 | 5 | 1.7 |

1. Please contact BIG KAISER agent for tap collet.




### Face Mill Arbor

| Model | Order No. | ØD | L | H | Weight (kg) |
|---|---|---|---|---|---|
| AG35 -FMH22 -30 | **802.740** | 22 | 30 | 18 | 1.0 |
| -FMH27 -20 | **802.741** | 27 | 20 | 20 | 1.0 |




### Morse Taper Adapter

| Model | Order No. | Ød | MT. No. | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|
| AG35 -MT1 | **962.785** | 12.065 | 1 | 50 | 24 | 164 | 0.6 |
| -MT2 | **962.786** | 17.78 | 2 | 60 | 32 | 180 | 0.7 |

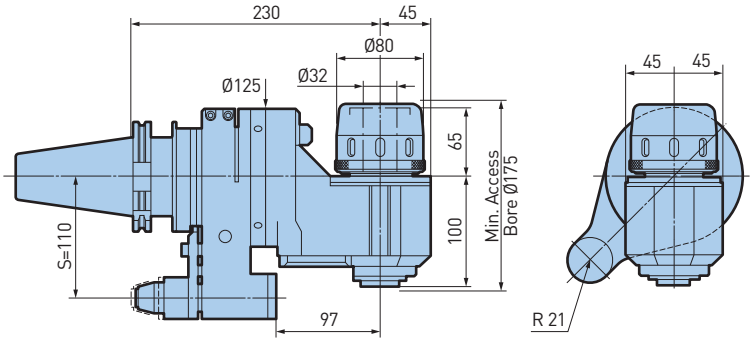


BROTECH

## HMC Type

BIG-PLUS Dual-Contact

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.




Max. 3 000 min-1

Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | | Order No. | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|
| BDV50 | -AG90/HMC32 -230 | **802.560** | 3 000 | 16.8 |
| | -AG90/HMC32 -230S | **802.561** | 3 000 | 18.1 |

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.

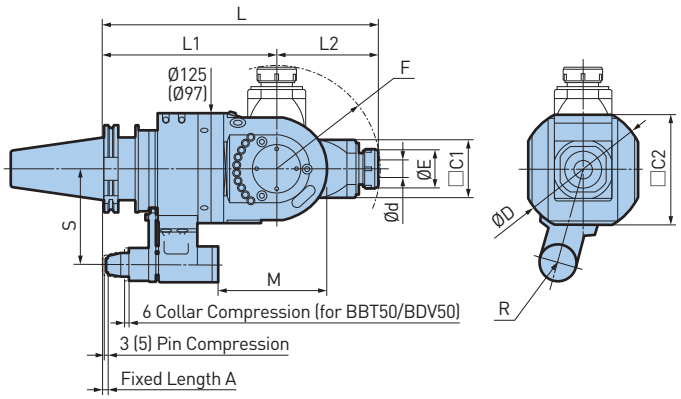
For Stop Block ▶ 290
For Straight Collet ▶ 272

# Universal Type

BIG-PLUS Dual-Contact

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.

A.2



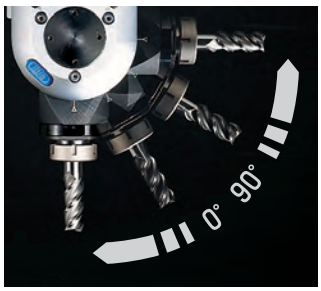
Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | Ød | ØE | ØD | □C1 | □C2 | L | L1 | L2 | M | F | R | S | Collet Model | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BDV40 -AGU/NBS13-280 | **802.557** | 2.5 - 13 | 35 | 115 | 51 | 97 | 280 | 180 | 100 | 124 | 102 | 18 | 65 | NBC13 | 6 000 | 9.7 |
| BDV50 -AGU/NBS20-315 | **802.573** | 2.5 - 20 | 46 | 140 | 65 | 125 | 315 | 200 | 115 | 125 | 118 | 21 | 110 | NBC20 | 4 000 | 20.8 |

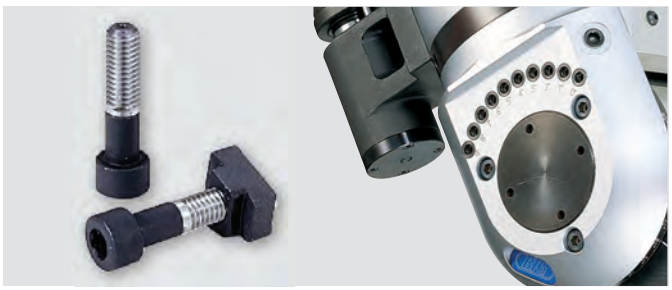
1. Standard fixed length A is 6 mm for BDV50 and 8 mm for BDV40. Other lengths are available upon request.
2. Order No. for BDV50 is with S = 110. S = 80 type for BDV50 is available upon request.
3. Figures in ( ) in the drawing indicate dimensions for BDV40.
4. New baby nut and wrench are included.
5. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250
For Stop Block ▶ 290




Easily adjustable spindle angle from 0° to 90°.

Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.



Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

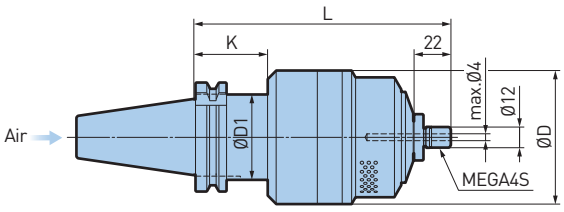


BROTECH

# Air Turbine Spindle

## Center Through Type

BIG-PLUS
Dual-Contact




A.2

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | Operation Speed (min⁻¹) | L | ØD | ØD1 | K | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| BDV40 -RBX5C -4S-150 | **962.642** | 40 000 - 50 000 | 150 | 96 | 49.6 | 43 | MGN4S | 4.1 |
| -RBX7C -4S-150 | **801.040** | 60 000 - 80 000 | | 78 | | | | 3.1 |
| BDV50 -RBX5C -4S-145 | **802.422** | 40 000 - 50 000 | 145 | 96 | 68 | 38 | MGN4S | 6.8 |
| -RBX7C -4S-145 | **802.424** | 60 000 - 80 000 | | 78 | | | | 5.8 |

1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

For Air Filter ▶ 121
For Micro Collet ▶ 247

**Caution**

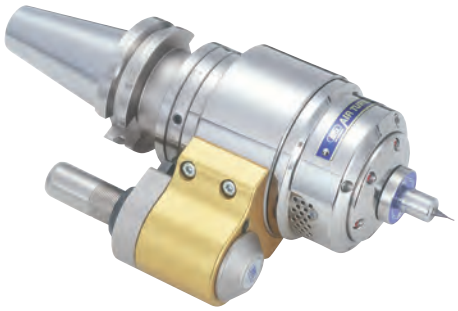
Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

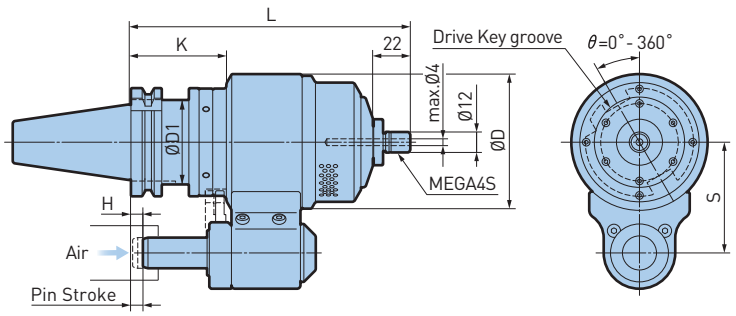
# Air Turbine Spindle

## Side Through Type

BIG-PLUS Dual-Contact

A.2





Exclusive Stop Block is required.

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | | | Order No. | Operation Speed (min$^{-1}$) | L | ØD | ØD1 | K | S | H | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BDV40 | -RBX5 | -4S-165-65 | **962.668** | 40 000 - 50 000 | 165 | 96 | 49.6 | 57 | 65 | -10 - 35 | MGN4S | 5.0 |
| | -RBX7 | -4S-165-65 | **962.667** | 60 000 - 80 000 | | 80 | | | | | | 4.0 |
| BDV50 | -RBX5 | -4S-170-80 | **962.670** | 40 000 - 50 000 | 170 | 100 | 68 | 62 | 80 | -5 - 40 | MGN4S | 9.7 |
| | -RBX7 | -4S-170-80 | **962.669** | 60 000 - 80 000 | | | | | | | | 8.7 |

1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247
For Air Filter ▶ 121
For Stop Block ▶ 290

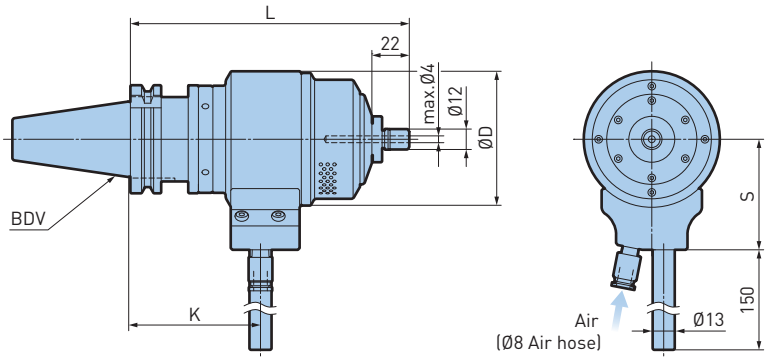


BROTECH

# Air Turbine Spindle

## Manual Type

BIG-PLUS Dual-Contact




A.2

BIG-PLUS® tools can be used in machining centers with conventional spindles.

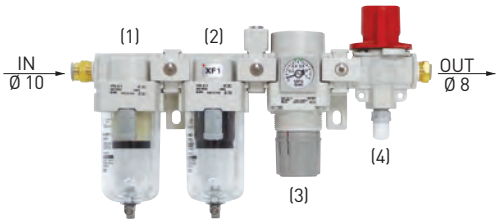
| Model | Order No. | Operation Speed (min⁻¹) | L | ØD | K | S | Weight (kg) |
|---|---|---|---|---|---|---|---|
| BDV40 -RBX5 -4S-165H | **962.649** | 40 000 - 50 000 | 151 | 96 | 63 | 71 | 5.0 |
| -RBX7 -4S-165H | **801.681** | 60 000 - 80 000 | | 80 | | 65 | 4.0 |
| BDV50 -RBX5 -4S-170H | **802.421** | 40 000 - 50 000 | 166 | 100 | 78 | 80 | 9.7 |
| -RBX7 -4S-170H | **802.423** | 60 000 - 80 000 | | | | | 8.7 |

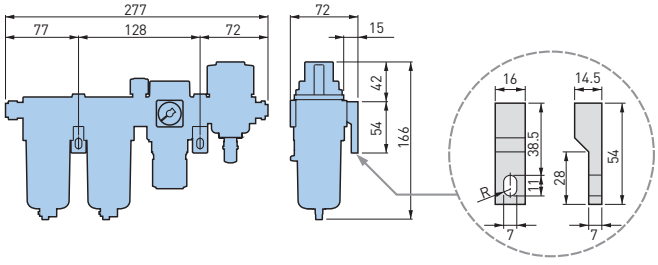
1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

# Air Filter Regulator for RBX

**Model XF1**

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).




| Model | Order No. |
|---|---|
| XF1 | **962.661** |

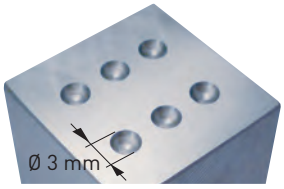
## Accessories for RBX

| Accessories | | | | | |
|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▸ 247 |
| Air Turbine Spindle | Model | Order No. | Model | Order No. | Model |
| RBX7-4S<br>RBX5-4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- |

## Application Examples

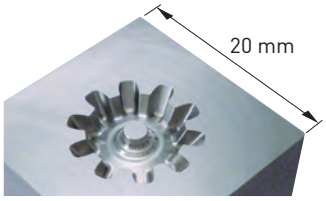
### RBX12

**Dimpling on sintered HSS**
Machining time 90 sec./hole




| | |
|---|---|
| Cutter | Ball nose endmill CBN |
| Spindle Speed | 120 000 min$^{-1}$ |
| Cutting Feed | 1 500 mm/min |
| D.O.C | ap = 0.01 mm |

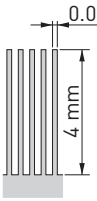
**Milling on die steel**
Machining time 23 min.

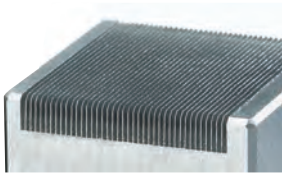



| | |
|---|---|
| Cutter | Ball nose endmill CBN |
| Spindle Speed | 120 000 min$^{-1}$ |
| Cutting Feed | 2 400 mm/min |
| D.O.C | ap = 0.01 mm |

### RBX7

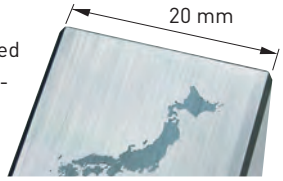
**Aluminium A2017**
Outstanding runout accuracy permits perfect thin wall cutting.



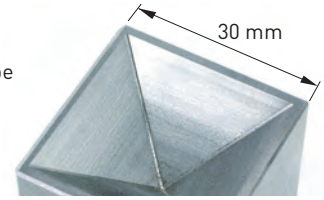
| | |
|---|---|
| Cutter | Ø 0.5 mm Rib-endmill |
| Spindle Speed | 70 000 min$^{-1}$ |
| Cutting Feed | 1 500 mm/min |
| D.O.C | ap = 0.02 mm |

**Prehardened steel HRC40**
Drastic time reduction by ultra high speed rotation. Excellent dynamic runout accuracy makes DOC of 5 µm clearly visible.



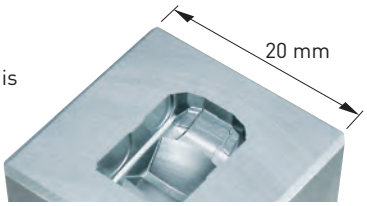

| | |
|---|---|
| Cutter | R0.1 mm Ball nose endmill |
| Spindle Speed | 80 000 min$^{-1}$ |
| Cutting Feed | 400 mm/min |
| D.O.C | ap = 0.01 mm |

**Prehardened steel HRC40**
Overall cutting length of 656 m can be achieved with one ball nose endmill. Drastically extended tool life.



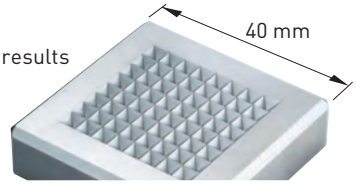

| | |
|---|---|
| Cutter | R0.5 mm Ball nose endmill |
| Spindle Speed | 65 000 min$^{-1}$ |
| Cutting Feed | 4 200 mm/min |
| D.O.C | ap = 0.02 mm; ae = 0.05 mm |

**Prehardened steel HRC40**
Original 5hour operation in MC is reduced to 2 hours.



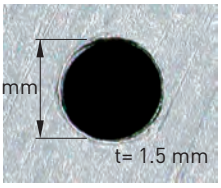

| | |
|---|---|
| Cutter | R0.2 mm Ball nose endmill |
| Spindle Speed | 70 000 min$^{-1}$ |
| Cutting Feed | 1 000 mm/min |
| D.O.C | ap = 0.01 mm |

**Prehardened steel HRC40**
No thermal expansion of spindle results in finely detailed surface finish.




| | |
|---|---|
| Cutter | R0.5 mm Ball nose endmill |
| Spindle Speed | 75 000 min$^{-1}$ |
| Cutting Feed | 400 mm/min |
| D.O.C | ap = 0.02 mm |

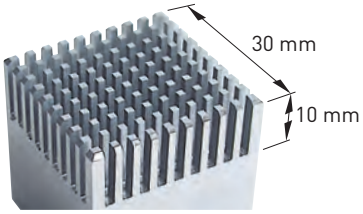
**Aluminium A2017**
High-precision drilling is possible without center drill operation. Even after 3500 holes, no problems can be found on the cutting edge.




| | |
|---|---|
| Cutter | Ø 0.3 mm Solid drill |
| Spindle Speed | 75 000 min$^{-1}$ |
| Cutting Feed | 200 mm/min |
| Peck | ap = 0.03 mm |

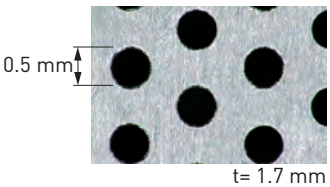
### RBX5

**Prehardened steel HRC40**
Even a taper endmill that has high cutting forces can achieve stable cutting.




| | |
|---|---|
| Cutter | Ø 1.5 mm Rib-endmill |
| Spindle Speed | 40 000 min$^{-1}$ |
| Cutting Feed | 1 000 mm/min |
| D.O.C | ap = 0.05 mm |

**Stainless steel SUS303**
Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.




| | |
|---|---|
| Cutter | Ø 0.5 mm Solid drill |
| Spindle Speed | 40 000 min$^{-1}$ |
| Cutting Feed | 20 mm/min |
| Peck | ap = 0.01 mm |

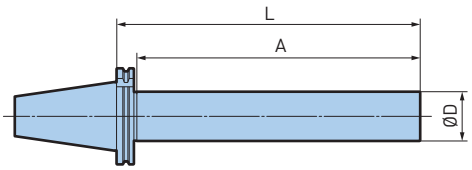
# Dyna Test

Periodic inspection of machine tools to control production stability.

BIG-PLUS Dual-Contact



## BIG-PLUS® DV Type




BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | L | A | ØD | Weight (Kg) |
|---|---|---|---|---|---|
| BDV40 -50 - L340SD | **802.834** | 340 | 310 | 50 | 4.2 |
| BDV50 -50 - L340SD | **961.269** | 340 | 318 | | 5.9 |

1. The drive key slot are symmetrical to allow BDV dyna test bar to be indexed 180 degrees.

# Tool Holders HSK, DIN 69893, ISO 12164


| | HSK-A | HSK-E | HSK-F |
|---|---|---|---|
| MEGA Micro Chuck | 126 - 127 | 162 - 163 | 169 |
| MEGA New Baby Chuck | 128 - 131 | 164 - 165 | 170 |
| MEGA E Chuck | 132 | | 171 |
| MEGA Double Power Chuck | 133 - 134 | | 172 |
| MEGA Perfect Grip | 135 | | |
| New Baby Chuck | 136 | | |
| New Hi-Power Milling Chuck | 137 - 138 | | |
| Hydraulic Chucks | 139 - 141 | 166 | |
| Shrink Chucks | 142 - 143 | | |
| MEGA Synchro Tapping Holder | 144 - 145 | | |
| Face Mill Arbors | 146 | | |
| Side Lock Holders | 147 | | |
| Smart Damper | 148 | | |
| CK Shanks | 149 - 150 | 167 | |
| Angle Heads | 151 - 158 | | |
| Air Turbine Spindle | 159 - 161 | 168 | |
| Dyna Test | 173 | 173 | 173 |
| Coolant Pipes | 174 | 174 | 174 |





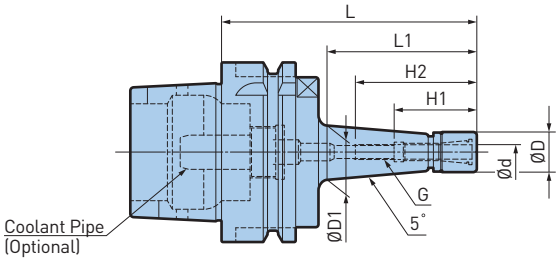

● Preferred selected items

# MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

Coolant Through Hole

A.3




**Ø 0.45 - 8.05 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H1 | H2 | G | max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A32-MEGA6S - 50T* | **806.804** | 0.45 - 6.05 | 14 | 14.8 | 50 | 22 | 28.5 | 33 | - | 45 000 | NBC6S- | 0.17 |
| - 60T* | **978.370** | | | 16.0 | 60 | 30 | | 43 | - | 40 000 | | 0.18 |
| -105T | **978.372** | | | 22.1 | 105 | 76 | | 63 | M7 P0.75 | 35 000 | | 0.27 |
| ● HSK-A40-MEGA3S - 75T | **968.936** | 0.45 - 3.25 | 10 | 16.0 | 75 | 44 | 22 | 38 | M4 P0.7 | 32 000 | NBC3S- | 0.28 |
| - 90T | **968.937** | | | 18.0 | 90 | 60 | | | | 28 000 | | 0.31 |
| -MEGA4S - 60T | **968.934** | 0.45 - 4.05 | 12 | 14.0 | 60 | 27 | 26.5 | 44 | M5 P0.8 | 35 000 | NBC4S- | 0.27 |
| - 90T | **802.355** | | | 20.0 | 90 | 60 | | 47 | | 28 000 | | 0.33 |
| -105T | **802.356** | | | 23.0 | 105 | 76 | | | | 25 000 | | 0.37 |
| ● -MEGA6S - 60T* | **968.925** | 0.45 - 6.05 | 14 | 16.0 | 60 | 29 | - | 40 | - | 35 000 | NBC6S- | 0.28 |
| ● - 75T | **968.926** | | | 19.0 | 75 | 45 | 28.5 | 49 | M7 P0.75 | 32 000 | | 0.31 |
| - 90T | **968.927** | | | 21.5 | 90 | 60 | | | | 28 000 | | 0.34 |
| -105T | **802.357** | | | 25.0 | 105 | 76 | | | | 25 000 | | 0.39 |
| HSK-A50-MEGA6S - 75T | **805.828** | 0.45 - 6.05 | 14 | 17.0 | 75 | 36 | 28.5 | 49 | M7 P0.75 | 30 000 | NBC6S- | 0.52 |
| -105T | **805.251** | | | 22.5 | 105 | 66 | | | | 25 000 | | 0.60 |
| HSK-A63-MEGA3S - 75T | **968.961** | 0.45 - 3.25 | 10 | 14.0 | 75 | 36 | 22 | 38 | M4 P0.7 | 32 000 | NBC3S- | 0.8 |
| -120T | **968.963** | | | 21.5 | 120 | 81 | | | | 25 000 | | 0.9 |
| -MEGA4S - 75T | **805.259** | 0.45 - 4.05 | 12 | 15.5 | 75 | 36 | 26.5 | 47 | M5 P0.8 | 32 000 | NBC4S- | 0.9 |
| - 90T | **968.966** | | | 18.0 | 90 | 51 | | | | 28 000 | | 0.9 |
| -120T | **968.968** | | | 23.5 | 120 | 81 | | | | 25 000 | | 1.1 |
| -MEGA6S - 60T | **968.970** | 0.45 - 6.05 | 14 | 15.5 | 60 | 23 | 28.5 | 37 | M7 P0.75 | 35 000 | NBC6S- | 0.8 |
| ● - 75T | **968.971** | | | 17.0 | 75 | 36 | | 48 | | 32 000 | | 0.9 |
| ● - 90T | **805.260** | | | 20.0 | 90 | 51 | | 49 | | 28 000 | | 0.9 |
| -105T | **968.973** | | | 22.5 | 105 | 66 | | | | 25 000 | | 0.9 |
| -120T | **805.261** | | | 25.0 | 120 | 81 | | | | 22 000 | | 1.0 |
| -135T | **968.975** | | | 27.5 | 135 | 96 | | | | 20 000 | | 1.0 |
| ● -MEGA8S - 90T | **801.724** | 2.95 - 8.05 | 18 | 23.5 | 90 | 51 | 31 | 50.5 | M9 P0.75 | 30 000 | NBC8S- | 0.9 |
| -120T | **803.603** | | | 28.5 | 120 | 81 | | | | 22 000 | | 1.1 |

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Internal thread (G) is not available.

For Coolant Pipe ▶ 174

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▶ 247 | Micro Seal Nut ▶ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **961.280** |
| MEGA8S | MGN8S | **804.108** | MGR18 | **801.705** | NBC8S- | MGN8S-PS | NBB8S | **805.802** | SC-NBC8S | **805.827** |

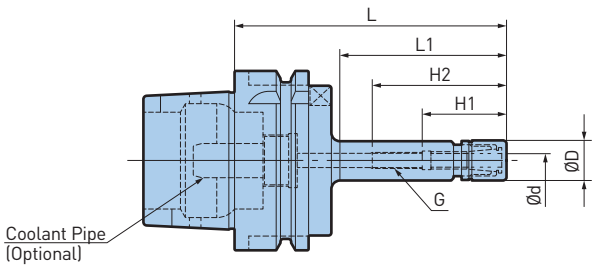


BROTECH

# MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

Coolant Through Hole






**Ø 0.45 - 8.05 mm**

| Model | Order No. | Ød | ØD | L | L1 | H1 | H2 | G | max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A32 -MEGA6S - 60 * | **805.174** | 0.45 - 6.05 | 14 | 60 | 30 | 23.5 | 43 | - | 38 000 | NBC6S- | 0.18 |
| -105 | **978.104** | | | 105 | 76 | | 49 | M7 P0.75 | 32 000 | | 0.26 |
| HSK-A40 -MEGA3S - 60 | **968.933** | 0.45 - 3.25 | 10 | 60 | 26 | 22 | 39 | M4 P0.7 | 30 000 | NBC3S- | 0.26 |
| -MEGA4S - 60 | **968.931** | 0.45 - 4.05 | 12 | | 27 | 26.5 | 44 | M5 P0.8 | | NBC4S- | 0.26 |
| - 90 | **968.932** | | | 90 | 57 | | 47 | | 25 000 | | 0.29 |
| ● -MEGA6S - 60 * | **968.929** | 0.45 - 6.05 | 14 | 60 | 28 | - | 40 | - | 30 000 | NBC6S- | 0.27 |
| - 90 | **968.930** | | | 90 | 58 | 28.5 | 49 | M7 P0.75 | 25 000 | | 0.30 |
| HSK-A50 -MEGA6S - 75 | **805.250** | 0.45 - 6.05 | 14 | 75 | 36 | 28.5 | 49 | M7 P0.75 | 30 000 | NBC6S- | 0.6 |
| HSK-A63 -MEGA4S - 75 | **968.965** | 0.45 - 4.05 | 12 | 75 | 36 | 26.5 | 48 | M5 P0.8 | 30 000 | NBC4S- | 0.8 |
| ● -105 | **805.257** | | | 105 | 61 | | 47 | | 25 000 | | 0.9 |
| -MEGA6S - 75 | **968.803** | 0.45 - 6.05 | 14 | 75 | 36 | - | 48 | M7 P0.75 | 30 000 | NBC6S- | 0.9 |
| ● -105 | **805.258** | | | 105 | 61 | 28.5 | 49 | | 25 000 | | 0.9 |
| -MEGA8S - 90 | **803.600** | 2.95 - 8.05 | 18 | 90 | 48 | 31 | 50.5 | M9 P0.75 | 30 000 | NBC8S- | 0.9 |

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Internal thread (G) is not available.

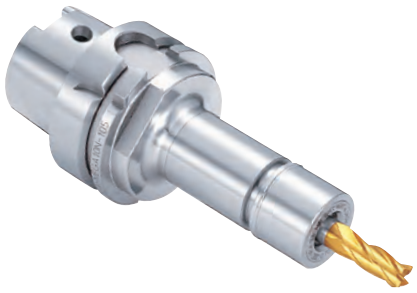
For Coolant Pipe ▶ 174

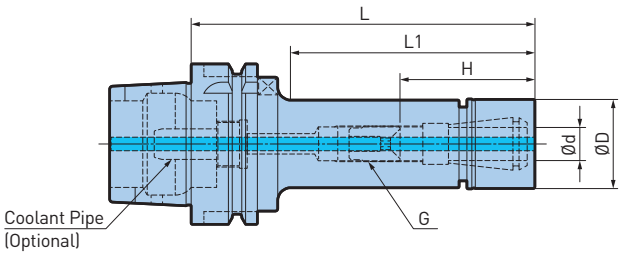
| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▶ 247 | Micro Seal Nut ▶ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| **MEGA Micro Chuck** | **Model** | **Order No.** | **Model** | **Order No.** | **Model** | **Model** | **Model** | **Order No.** | **Model** | **Order No.** |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **961.280** |
| MEGA8S | MGN8S | **804.108** | MGR18 | **801.705** | NBC8S- | MGN8S-PS | NBB8S | **805.802** | SC-NBC8S | **805.827** |

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole






A.3

**Ø 0.25 - 25.4 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-A32 -MEGA6N - 75 | 979.010 | 0.25 - 6 | 20 | 75 | 37 | 23 - 43 | 30 000 | NBC6- | 0.25 |
| -MEGA8N - 50 * | 806.800 | 0.5 - 8 | 25 | 50 | 26 | 32 | 33 000 | NBC8- | 0.23 |
| HSK-A40 -MEGA6N - 60 * | 968.940 | 0.25 - 6 | 20 | 60 | 30 | 33 | 35 000 | NBC6- | 0.31 |
| - 75 | 968.941 | | | 75 | 45 | 23 - 38 | 30 000 | | 0.34 |
| - 90 | 968.942 | | | 90 | 60 | 23 - 43 | | | 0.37 |
| -MEGA8N - 60 * | 968.943 | 0.5 - 8 | 25 | 60 | 30 | 41 | 35 000 | NBC8- | 0.35 |
| - 90 | 968.945 | | | 90 | 60 | 26 - 44 | 30 000 | | 0.44 |
| -MEGA10N - 60 * | 968.946 | 1.5 - 10 | 30 | 60 | 26 | 40 | 35 000 | NBC10- | 0.42 |
| - 90 | 968.948 | | | 90 | 54 | 38 - 48 | 30 000 | | 0.56 |
| -MEGA13N - 75 * | 968.949 | 2.5 - 13 | 35 | 75 | 55 | 55 | 25 000 | NBC13- | 0.55 |
| - 90 * | 968.950 | | | 90 | 70 | 64 | | | 0.64 |
| -MEGA16N - 75 * | 968.951 | 2.5 - 16 | 42 | 75 | 55 | 53 | 20 000 | NBC16- | 0.65 |
| - 90 * | 968.952 | | | 90 | 70 | 63 | 15 000 | | 0.78 |
| -MEGA20N - 90 * | 968.953 | 2.5 - 20 | 46 | | | 66 | | NBC20- | 0.86 |
| HSK-A50 -MEGA6N - 75 | 805.252 | 0.25 - 6 | 20 | 75 | 37 | 23 - 43 | 30 000 | NBC6- | 0.6 |
| -100 | 978.031 | | | 100 | 60 | | 25 000 | | 0.6 |
| -135 | 968.745 | | | 135 | 93 | | 20 000 | | 0.7 |
| -165 | 803.625 | | | 165 | 123 | | 15 000 | | 0.8 |
| -MEGA8N - 75 | 968.738 | 0.5 - 8 | 25 | 75 | 37 | 26 - 37 | 30 000 | NBC8- | 0.6 |
| -100 | 978.239 | | | 100 | 62 | 26 - 45 | 28 000 | | 0.7 |
| -135 | 803.629 | | | 135 | 96 | | 20 000 | | 0.8 |
| -165 | 803.616 | | | 165 | 125 | | 15 000 | | 0.9 |
| -MEGA10N - 75 * | 805.253 | 1.5 - 10 | 30 | 75 | 38 | 46 | 33 000 | NBC10- | 0.7 |
| -100 | 978.261 | | | 100 | 63 | 38 - 48 | 25 000 | | 0.8 |
| -135 | 803.622 | | | 135 | 98 | | 20 000 | | 1.0 |
| -165 | 803.627 | | | 165 | 128 | | 15 000 | | 1.2 |
| -MEGA13N - 75 * | 805.254 | 2.5 - 13 | 35 | 75 | 40 | 46 | 28 000 | NBC13- | 0.7 |
| -100 | 801.179 | | | 100 | 65 | 44 - 56 | 25 000 | | 0.9 |
| -135 | 803.620 | | | 135 | 100 | 44 - 63 | 18 000 | | 1.1 |
| -165 | 978.262 | | | 165 | 130 | | 15 000 | | 1.3 |
| -MEGA16N - 75 * | 805.255 | 2.5 - 16 | 42 | 75 | 49 | 48 | 28 000 | NBC16- | 1.0 |
| -100 | 803.623 | | | 100 | 74 | 48 - 55 | 20 000 | | 1.1 |
| -135 | 803.619 | | | 135 | 109 | 48 - 68 | 15 000 | | 1.4 |
| -165 | 803.626 | | | 165 | 139 | | 10 000 | | 1.7 |
| -MEGA20N - 75 ** | 805.256 | 2.5 - 20 | 46 | 75 | 49 | 47 | 20 000 | NBC20- | 1.1 |
| -100 | 968.742 | | | 100 | 74 | 51 - 54 | 15 000 | | 1.5 |
| -135 | 803.624 | | | 135 | 109 | 51 - 68 | 10 000 | | 1.8 |
| -165 | 803.621 | | | 165 | 139 | | 10 000 | | 2.3 |
| -MEGA25N - 95 * | 806.370 | 15.5 - 25.4 | 60 | 95 | 69 | 65 | 12 000 | NBC25- | 1.3 |

For Coolant Pipe ▶ 174

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
4. ** NBC-E collet and adjusting screw can not be used.
5. Nut-less model available upon request.
6. "G" is the adjusting screw (optional).
7. "H" indicates the adjustment length with an adjusting screw.



BROTECH

**Ø 0.25 - 25.4 mm**

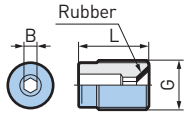


| Model | Order No. | Ød | ØD | L | L1 | H | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -MEGA6N - 75 | **968.811** | 0.25 - 6 | 20 | 75 | 35 | 23 - 38 | 35 000 | NBC6- | 0.9 |
| - 90 | **805.262** | | | 90 | 48 | 23 - 43 | 30 000 | | 0.9 |
| -105 | **968.812** | | | 105 | 63 | | | | 0.9 |
| -120 | **968.981** | | | 120 | 76 | | 25 000 | | 1.0 |
| -135 | **968.813** | | | 135 | 91 | | 20 000 | | 1.0 |
| -165 | **968.814** | | | 165 | 121 | | 15 000 | | 1.0 |
| -MEGA8N - 75 | **968.815** | 0.5 - 8 | 25 | 75 | 35 | 26 - 38 | 35 000 | NBC8- | 0.9 |
| - 90 | **805.263** | | | 90 | 50 | 26 - 45 | 30 000 | | 1.0 |
| -105 | **968.816** | | | 105 | 63 | | | | 1.0 |
| -120 | **968.982** | | | 120 | 76 | | 25 000 | | 1.1 |
| -135 | **805.264** | | | 135 | 91 | | 20 000 | | 1.1 |
| -165 | **968.818** | | | 165 | 121 | | 15 000 | | 1.2 |
| -MEGA10N - 75 * | **968.819** | 1.5 - 10 | 30 | 75 | 36 | 50 | 33 000 | NBC10- | 1.0 |
| - 90 | **805.265** | | | 90 | 50 | 38 - 45 | | | 1.0 |
| -105 | **968.820** | | | 105 | 65 | 38 - 48 | 25 000 | | 1.1 |
| -120 | **968.983** | | | 120 | 80 | | | | 1.2 |
| -135 | **805.266** | | | 135 | 93 | | 20 000 | | 1.3 |
| -165 | **968.822** | | | 165 | 123 | | 15 000 | | 1.4 |
| -MEGA13N - 75 * | **968.823** | 2.5 - 13 | 35 | 75 | 37 | 49 | 30 000 | NBC13- | 1.0 |
| - 90 * | **805.267** | | | 90 | 51 | 64 | | | 1.1 |
| -105 | **968.824** | | | 105 | 66 | 44 - 56 | 25 000 | | 1.2 |
| -120 | **968.984** | | | 120 | 81 | 44 - 63 | 20 000 | | 1.3 |
| -135 | **805.268** | | | 135 | 96 | | | | 1.4 |
| -165 | **968.826** | | | 165 | 125 | | 15 000 | | 1.7 |
| -MEGA16N - 75 * | **968.827** | 2.5 - 16 | 42 | 75 | 39 | 48 | 30 000 | NBC16- | 1.1 |
| - 90 * | **805.269** | | | 90 | 54 | 63 | 25 000 | | 1.3 |
| -105 | **968.828** | | | 105 | 69 | 48 - 54 | 20 000 | | 1.4 |
| -120 | **968.985** | | | 120 | 84 | 48 - 68 | 15 000 | | 1.5 |
| -135 | **968.829** | | | 135 | 99 | | | | 1.7 |
| -165 | **968.830** | | | 165 | 129 | | 10 000 | | 2.0 |
| -200 | **968.831** | | | 200 | 164 | | 8 000 | | 2.4 |
| -MEGA20N - 75 * | **968.832** | 2.5 - 20 | 46 | 75 | 39 | 51 | 30 000 | NBC20- | 1.2 |
| - 90 * | **805.270** | | | 90 | 54 | 61 | 25 000 | | 1.4 |
| -105 | **968.833** | | | 105 | 69 | 51 - 54 | 20 000 | | 1.5 |
| -120 | **968.986** | | | 120 | 84 | 51 - 68 | 15 000 | | 1.7 |
| -135 | **805.271** | | | 135 | 99 | | | | 1.8 |
| -165 | **968.835** | | | 165 | 129 | | 10 000 | | 2.3 |
| -200 | **968.836** | | | 200 | 164 | | 8 000 | | 2.7 |
| -MEGA25N - 90 * | **806.371** | 15.5 - 25.4 | 60 | 90 | - | 63 | 20 000 | NBC25- | 1.8 |
| -120 * | **806.372** | | | 120 | | 90 | 12 000 | | 2.2 |

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Adjusting screws can not be used.
4. Nut-less model available upon request.
5. "H" indicates the adjustment length with an adjusting screw.

For Coolant Pipe ▶ 174

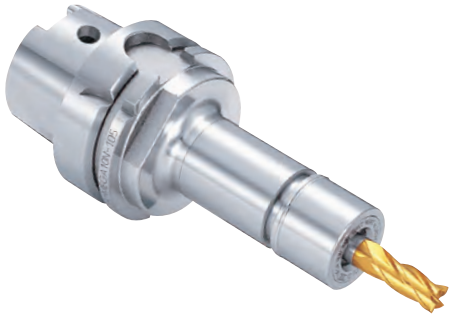
For A100 + 125, refer to the following pages.

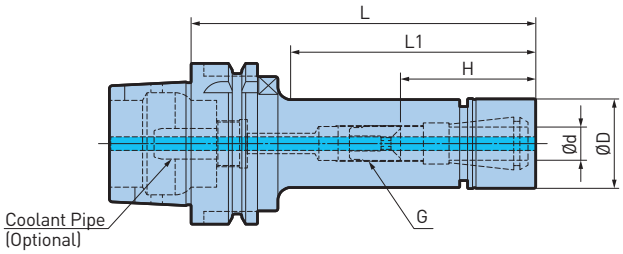
| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▶ 250 | MEGA Perfect Seal ▶ 260 | Adjusting Screw   | | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |
| MEGA25N | MGN25 | **806.388** | MGR60L | **969.468L** | NBC25- | - | NBA25B | **806.389** | M27 | 20 | 4 |

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole






A.3

**Ø 0.25 - 25.4 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-A100-MEGA6N - 90 | **968.841** | 0.25 - 6 | 20 | 90 | 43 | 23 - 43 | 20 000 | NBC6- | 2.5 |
| -105 | **801.146** | | | 105 | 58 | | 18 000 | | 2.5 |
| -120 | **968.842** | | | 120 | 73 | | | | 2.5 |
| -135 | **801.147** | | | 135 | 88 | | 14 000 | | 2.5 |
| -165 | **968.843** | | | 165 | 113 | | 12 000 | | 2.6 |
| -MEGA8N - 90 | **968.844** | 0.5 - 8 | 25 | 90 | 43 | 26 - 45 | 20 000 | NBC8- | 2.5 |
| -105 | **968.989** | | | 105 | 58 | | 18 000 | | 2.6 |
| -120 | **968.845** | | | 120 | 73 | | | | 2.6 |
| -135 | **968.990** | | | 135 | 88 | | 14 000 | | 2.7 |
| -165 | **968.846** | | | 165 | 113 | | | | 2.7 |
| -MEGA10N - 90 | **968.847** | 1.5 - 10 | 30 | 90 | 43 | 38 - 45 | 20 000 | NBC10- | 2.6 |
| -105 | **968.991** | | | 105 | 58 | 38 - 48 | 18 000 | | 2.7 |
| -120 | **968.848** | | | 120 | 73 | | | | 2.7 |
| -135 | **968.992** | | | 135 | 88 | | 14 000 | | 2.8 |
| -165 | **968.849** | | | 165 | 113 | | | | 3.0 |
| -MEGA13N - 90 * | **968.850** | 2.5 - 13 | 35 | 90 | 43 | 55 | 18 000 | NBC13- | 2.7 |
| -105 * | **968.993** | | | 105 | 58 | 70 | 16 000 | | 2.8 |
| -120 | **968.851** | | | 120 | 73 | 44 - 63 | | | 2.9 |
| -135 | **968.994** | | | 135 | 88 | | 14 000 | | 3.0 |
| -165 | **968.852** | | | 165 | 118 | | | | 3.2 |
| -200 | **968.853** | | | 200 | 148 | | 10 000 | | 3.5 |
| -MEGA16N - 90 * | **968.854** | 2.5 - 16 | 42 | 90 | 47 | 55 | 15 000 | NBC16- | 2.8 |
| -105 * | **968.995** | | | 105 | 58 | 70 | 14 000 | | 2.9 |
| -120 | **968.855** | | | 120 | 73 | 48 - 68 | | | 3.1 |
| -135 | **968.996** | | | 135 | 88 | | 13 000 | | 3.2 |
| -165 | **968.856** | | | 165 | 118 | | | | 3.6 |
| -200 | **968.857** | | | 200 | 151 | | 10 000 | | 4.0 |
| -MEGA20N - 90 * | **968.858** | 2.5 - 20 | 46 | 90 | 47 | 55 | 15 000 | NBC20- | 2.9 |
| -105 * | **968.997** | | | 105 | 58 | 70 | 14 000 | | 3.0 |
| -120 | **968.859** | | | 120 | 73 | 51 - 68 | | | 3.2 |
| -135 | **968.998** | | | 135 | 88 | | 13 000 | | 3.3 |
| -165 | **968.860** | | | 165 | 118 | | | | 3.8 |
| -200 | **968.861** | | | 200 | 153 | | 10 000 | | 4.3 |
| -MEGA25N -120 * | **806.373** | 15.5 - 25.4 | 60 | 120 | 78 | 85 | 12 000 | NBC25- | 3.8 |
| -165 | **806.374** | | | 165 | 123 | 64 - 74 | 10 000 | | 4.6 |

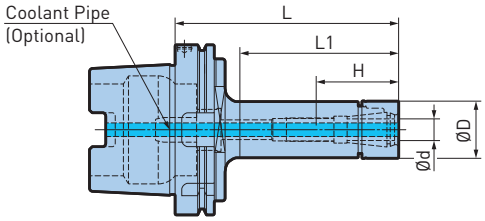
1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
4. Nut-less model available upon request.
5. "G" is the adjusting screw (optional).
6. "H" indicates the adjustment length with an adjusting screw.

For Coolant Pipe ▶ 174



BROTECH

Coolant Through Hole



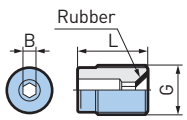

A.3

**Ø 2.5 - 20 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | Max. min-1 | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-A125-MEGA20N-120 | **805.290** | 2.5 - 20 | 46 | 120 | 72 | 51 - 68 | 12 000 | NBC20- | 4.7 |
| -165 | **806.575** | | | 165 | 117 | | 10 000 | | 5.2 |

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. Nut-less model available upon request.
4. "H" indicates the adjustment length with an adjusting screw.

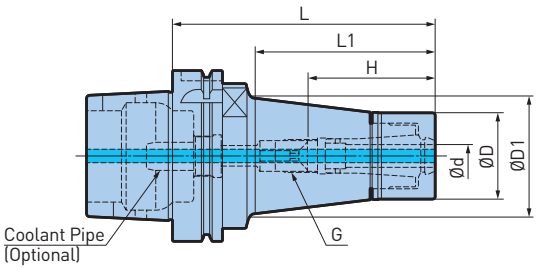
For Coolant Pipe ▶ 174

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▶ 250 | MEGA Perfect Seal ▶ 260 | Adjusting Screw   | | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |
| MEGA25N | MGN25 | **806.388** | MGR60L | **969.468L** | NBC25- | - | NBA25B | **806.389** | M27 | 20 | 4 |

# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

Coolant Through Hole



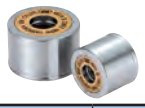
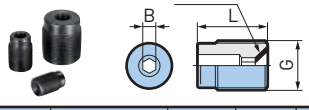

A.3

**Ø 3 - 12 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A40 -MEGA6E - 60 * | **968.235** | 3 - 6 | 25 | 26 | 60 | 24 | 41 | 35 000 | MEC6- | 0.39 |
| -MEGA8E - 65 * | **968.238** | 3 - 8 | 30 | 34 | 65 | 30 | 44 | | MEC8- | 0.46 |
| -MEGA10E - 70 * | **968.241** | 3 - 10 | 35 | 35 | 70 | 35 | 48 | 30 000 | MEC10- | 0.52 |
| - 90 | **968.242** | | | | 90 | 55 | 48 - 52 | 25 000 | | 0.67 |
| -MEGA13E - 70 * | **968.243** | 3 - 12 | 42 | 42 | 70 | 35 | 50 | 30 000 | MEC13- | 0.62 |
| HSK-A50 -MEGA8E - 75 * | **803.222** | 3 - 8 | 30 | 33 | 75 | 40 | 42 | 30 000 | MEC8- | 0.7 |
| -MEGA10E - 75 * | **978.170** | 3 - 10 | 35 | 38 | | | 48 | | MEC10- | 0.8 |
| -MEGA13E - 75 * | **978.010** | 3 - 12 | 42 | - | | 49 | 50 | | MEC13- | 0.9 |
| -100 | **803.220** | | | - | 100 | 74 | 50 - 55 | 25 000 | | 1.1 |
| HSK-A63 -MEGA6E - 65 * | **968.247** | 3 - 6 | 25 | 26.5 | 65 | 28 | 43 | 30 000 | MEC6- | 0.9 |
| - 90 | **968.248** | | | 30 | 90 | 51 | 37 - 45 | | | 1.0 |
| -105 | **968.249** | | | 33 | 105 | 66 | | 29 000 | | 1.1 |
| -MEGA8E - 67 * | **968.252** | 3 - 8 | 30 | 31.5 | 67 | 30 | 45 | 30 000 | MEC8- | 0.9 |
| - 90 | **968.253** | | | 35 | 90 | 52 | 37 - 45 | | | 1.1 |
| -105 | **968.254** | | | 38 | 105 | 68 | 42 - 51 | 29 000 | | 1.2 |
| -MEGA10E - 75 * | **968.257** | 3 - 10 | 35 | 37.5 | 75 | 37 | 48 | 30 000 | MEC10- | 1.1 |
| - 90 * | **968.258** | | | 40 | 90 | 53 | 64 | | | 1.2 |
| -105 | **968.259** | | | 43 | 105 | 69 | 48 - 58 | 29 000 | | 1.4 |
| -120 | **968.260** | | | 46 | 120 | 85 | | 28 000 | | 1.5 |
| -MEGA13E - 75 * | **968.262** | 3 - 12 | 42 | 44 | 75 | 31 | 49 | 30 000 | MEC13- | 1.2 |
| - 90 * | **968.263** | | | 45 | 90 | 46 | 64 | | | 1.4 |
| -105 | **968.264** | | | 46 | 105 | 61 | 50 - 57 | 29 000 | | 1.6 |
| -120 | **968.265** | | | 47.5 | 120 | 77 | | 28 000 | | 1.8 |
| -135 | **968.266** | | | 47 | 135 | 92 | | 26 000 | | 1.9 |
| HSK-A100-MEGA13E - 90 * | **968.287** | 3 - 12 | 42 | 46 | 90 | 48 | 50 | 18 000 | MEC13- | 2.9 |
| -105 | **968.288** | | | 48.5 | 105 | 63 | 50 - 61 | | | 3.1 |
| -120 | **968.289** | | | 51.5 | 120 | 78 | | 16 000 | | 3.3 |
| -135 | **968.290** | | | 54 | 135 | 93 | | 14 000 | | 3.6 |
| -165 | **968.291** | | | 59 | 165 | 123 | | | | 4.2 |

1. MEGA E nut is included.
2. Coolant pipe is to be ordered separately.
3. * Adjusting screws can not be used. "H" is the max. tool shank length can be inserted for these models.
4. Nut-less model available upon request.
5. "G" is the adjusting screw (optional).
6. "H" indicates the adjustment length with an adjusting screw.

For Coolant Pipe ▶ 174

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA E Nut  | | MEGA Wrench | | MEGA E Collet ▶ 264 | MEGA E Perfect Seal ▶ 265 | Adjusting Screw   | | | | |
| MEGA E Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6E | MEN6 | **968.461** | MGR25 | **969.456** | MEC6- | EPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8E | MEN8 | **968.462** | MGR30 | **969.458** | MEC8- | EPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10E | MEN10 | **968.463** | MGR35 | **969.460** | MEC10- | EPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13E | MEN13 | **968.464** | MGR42 | **969.462** | MEC13- | EPS13- | NBA13B | **961.598** | M14 | 20 | 4 |

# MEGA Double Power Chuck Type D

Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and type DS to feed coolant to cutting tool periphery.

Coolant Through Hole

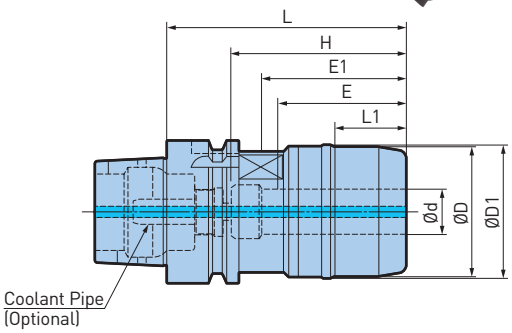



Fig. 1

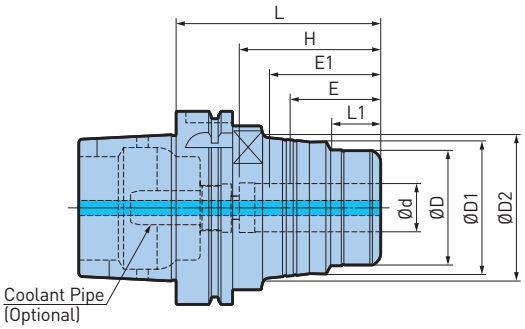



Fig. 2

**Ø 3 - 32 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | ØD2 | L | L1 | H | E | E1 | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A40 -MEGA16D - 80 | **803.105** | 1 | 16 | 46 | - | - | 80 | 25 | 62 | 48 | 50 | 18 000 | 0.75 |
| HSK-A50 -MEGA16D - 85 | **803.085** | 1 | 16 | 46 | - | - | 85 | 25 | 62 | 48 | 50 | 25 000 | 1.0 |
| -MEGA20D - 85 * | **978.011** | | 20 | 50 | | | 86 | 30 | 63 | 50 | 51 | 20 000 | 1.1 |
| HSK-A63 -MEGA16D - 90A | **801.734** | 2 | 16 | 42 | 53 | - | 90 | 25 | 65 | 48 | 55 | 28 000 | 1.5 |
| -MEGA20D - 90A | **801.737** | | 20 | 50 | 55 | | | 34 | | 50 | 56 | | 1.6 |
| -MEGA25D -100A | **803.101** | 1 | 25 | 62 | 63 | | 100 | 39 | 75 | 56 | 57 | 24 000 | 2.0 |
| -MEGA32D -105A | **803.080** | | 32 | 70 | 70.7 | | 105 | 33 | 80 | 60 | 64 | | 2.2 |
| HSK-A100-MEGA20D -105 | **968.105** | 2 | 20 | 60 | 69 | 74 | 105 | 25 | 73 | 50 | 56 | 18 000 | 4.1 |
| -MEGA25D -105 | **968.108** | | 25 | 70 | 77 | 85 | | 32 | | 56 | 65 | | 4.5 |
| -MEGA32D -115 | **968.111** | | 32 | 80 | 86 | - | 115 | 39 | 83 | 60 | 71 | | 5.0 |
| -135 | **968.112** | | | | | | 135 | | 103 | | | 16 000 | 5.8 |

1. Wrench and coolant pipe is to be ordered separately.
2. * Adjustable straight collet (AC20-) can not be used.
3. "E" is the min. clamping length.
4. "E1" is the min. clamping length for optimum use with center through coolant.
5. "H" is the max. tool shank length that can be inserted.

For Straight Collet ▶ 272
For Coolant Pipe ▶ 174

## MEGA Wrench

| MEGA Double Power Chuck | Model | Order No. | MEGA Double Power Chuck | Model | Order No. |
|---|---|---|---|---|---|
| HSK -A40/A50 -MEGA16D,16DS | MGR46L | **969.465L** | HSK -A100 -MEGA16DS | MGR46L | **969.465L** |
| HSK -A50 -MEGA20D,20DS | MGR50L | **969.464L** | -MEGA20D,20DS | MGR60L | **969.468L** |
| HSK -A63 -MEGA16D,16DS | MGR42L | **969.462L** | -MEGA25D,25DS | MGR70L | **969.470L** |
| -MEGA20D,20DS | MGR50L | **969.464L** | -MEGA32D,32DS | MGR80L | **969.471L** |
| -MEGA25D,25DS | MGR62L | **969.469L** | -MEGA42DS | MGR99L | **969.472L** |
| -MEGA32D,32DS | MGR70L | **969.470L** | HSK -A125 -MEGA20DS | MGR60L | **969.468L** |
| | | | -MEGA25DS | MGR70L | **969.470L** |
| | | | -MEGA32DS | MGR80L | **969.471L** |
| | | | -MEGA42DS | MGR99L | **969.472L** |

# MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique design ensures efficient coolant supply to the cutting tool periphery.

Coolant Through Hole

A.3

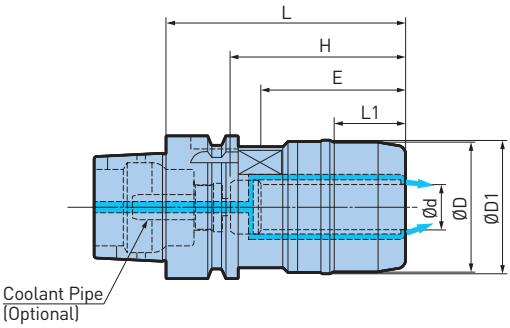



Fig. 1

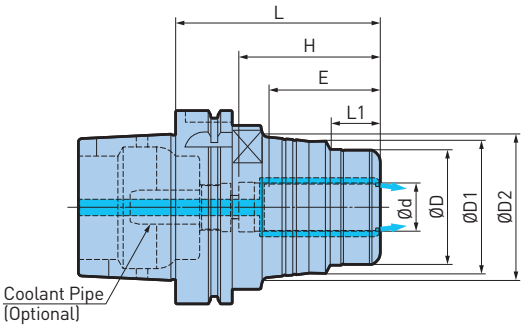



Fig. 2

**Ø 3 - 42 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | ØD2 | L | L1 | H | E | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A40 -MEGA16DS - 80 | **803.106** | 1 | 16 | 46 | - | - | 82.5 | 28 | 64 | 52 | 18 000 | 0.75 |
| HSK-A50 -MEGA16DS - 85 | **801.688** | 1 | 16 | 46 | - | - | 87.5 | 28 | 64 | 52 | 25 000 | 1.0 |
| -MEGA20DS - 85 | **803.088** | | 20 | 50 | | | 88.5 | 33 | 65 | 53 | 20 000 | 1.05 |
| HSK-A63 -MEGA16DS - 80A | **803.089** | 2 | 16 | 42 | 53 | - | 82 | 27 | 57 | 52 | 25 000 | 1.3 |
| -MEGA20DS - 90A | **803.090** | | 20 | 50 | 55 | | 92 | 36 | 67 | 58 | | 1.6 |
| -120A | **801.740** | | | | | | 122 | | 87 | | 23 000 | 2.1 |
| -MEGA25DS -100A | **803.102** | 1 | 25 | 62 | - | | 102 | 41 | 77 | 59 | 22 000 | 2.0 |
| -MEGA32DS -105A | **803.081** | | 32 | 70 | - | | 107.5 | 35 | 82 | 66 | | 2.2 |
| HSK-A100-MEGA16DS -105 | **968.131** | 2 | 16 | 46 | 55 | 63 | 107.5 | 26 | 73 | 52 | 18 000 | 3.5 |
| -MEGA20DS -105 | **968.121** | | 20 | 60 | 69 | 74 | 107.5 | 28 | 75 | 58 | | 4.1 |
| -135 | **968.122** | | | | | | 137.5 | | 87 | | 16 000 | 5.0 |
| -165 * | **968.123** | | | | | | 167.5 | | | | 15 000 | 5.9 |
| -MEGA25DS -105 | **968.124** | | 25 | 70 | 77 | 85 | 107.5 | 34 | 75 | 67 | 18 000 | 4.5 |
| -135 | **968.125** | | | | | | 137.5 | | 92 | | 16 000 | 5.6 |
| -MEGA32DS -115 | **968.127** | | 32 | 80 | 86 | - | 117.5 | 42 | 85 | 73 | 18 000 | 5.0 |
| -135 | **968.128** | | | | | | 137.5 | | 105 | | 16 000 | 5.8 |
| -165 | **968.129** | | | | | | 167.5 | | 107 | | 14 000 | 7.1 |
| -MEGA42DS -115 | **968.130** | 1 | 42 | 99 | - | - | 117 | 42 | 85 | 80 | | 5.5 |
| HSK-A125-MEGA20DS -135 | **805.658** | 2 | 20 | 60 | 69 | 80 | 137.5 | 64.4 | 87 | 58 | 8 000 | 6.7 |
| -165 * | **805.659** | | | | | 79 | 167.5 | 124.4 | | | 7 000 | 7.6 |
| -MEGA25DS -135 | **805.660** | | 25 | 70 | 77 | 83 | 137.5 | 94.4 | 92 | 67 | 8 000 | 7.1 |
| -MEGA32DS -135 | **805.750** | | 32 | 80 | 86 | 93 | 137.5 | 87.4 | | 73 | | 7.8 |
| -165 | **805.661** | | | | | | 167.5 | 117.4 | 107 | | 6 000 | 9.1 |
| -MEGA42DS -120 | **805.662** | 1 | 42 | 99 | 99.7 | - | 122.5 | 77.7 | 85 | 80 | 7 000 | 7.9 |

1. Wrench and coolant pipe is to be ordered separately.
2. * Adjusting screw (HMA-M16) can be used.
3. "E" is the min. clamping length.
4. "H" is the max. tool shank length that can be inserted.

For Coolant Pipe ▶ 174
For Straight Collet ▶ 272
For Adjusting Screw ▶ 274
For MEGA Wrench ▶ 275

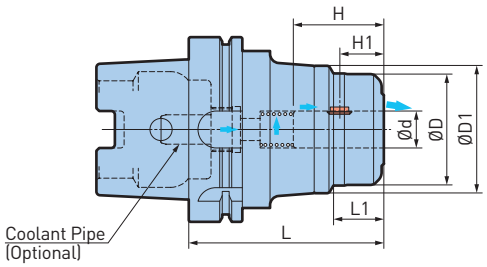


BROTECH

# MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.

Coolant Through Hole



A.3

**Ø 16 - 32 mm**

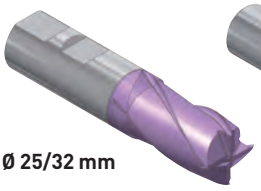
| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H | H1 | MEGA Wrench | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -MEGA16DPG - 90 | **806.364** | 16 | 46 | 55 | 90 | 24 | 47 | 23 | MGR46L | 1.6 |
| -MEGA20DPG-100 | **806.365** | 20 | 60 | 69 | 100 | 27 | 49 | 24 | MGR60L | 2.1 |
| HSK-A100-MEGA20DPG-105 | **805.457** | 20 | 60 | 69 | 105 | 27 | 49 | 24 | MGR60L | 4.1 |
| -MEGA25DPG-105 | **805.458** | 25 | 70 | 77 | | 33 | 55 | 23 | MGR70L | 4.5 |
| -MEGA32DPG-115 | **805.459** | 32 | 80 | 86 | 115 | 41 | 59 | | MGR80L | 5.0 |
| HSK-A125-MEGA20DPG-135 | **806.627** | 20 | 60 | 69 | 135 | 27 | 49 | 24 | MGR60L | 6.8 |
| -MEGA25DPG-135 | **806.628** | 25 | 70 | 77 | | 33 | 55 | 23 | MGR70L | 7.2 |
| -MEGA32DPG-135 | **806.629** | 32 | 80 | 86 | | 41 | 59 | | MGR80L | 7.9 |

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.
4. Coolant pipe is to be ordered separately.

## Weldon Shank Standards

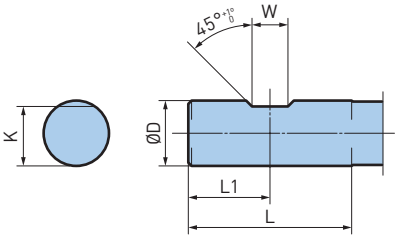
(DIN 1835-1)

The following standard shank is required for MEGA Perfect Grip.



**Ø 25/32 mm**

**Ø 20 mm**




| ØD | | L | L1 | W | | K | |
|---|---|---|---|---|---|---|---|
| Nominal | Tolerance | | | Nominal | Tolerance | Nominal | Tolerance |
| 16 | h6 | 48 | 24 | 10 | + 0.05 0 | 14.2 | h13 |
| 20 | | 50 | 25 | 11 | | 18.2 | |
| 25 | | 56 | 32 | 12 | | 23 | |
| 32 | | 60 | 36 | 14 | | 30 | |

**Caution**

In case you are adding your own flat, the tool projection length in the MEGA Perfect GRIP will be decided by the flat position. Refer to H1 in the MEGA Perfect GRIP chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

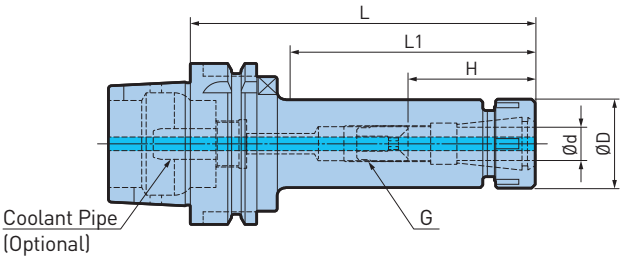
| Spare Parts | | | | | Accessories | |
|---|---|---|---|---|---|---|
| | Key Grip | | Spring | | MEGA Wrench | |
| MEGA Perfect Grip | Model | Order No. | Model | Order No. | Model | Order No. |
| MEGA20DPG | PKG20-2P | **805.493** | PSP1823 | **805.497** | MGR60L | **969.468L** |
| MEGA25DPG | PKG25-2P | **805.494** | PSP2420 | **805.498** | MGR70L | **969.470L** |
| MEGA32DPG | PKG32-2P | **805.495** | PSP3128 | **805.499** | MGR80L | **969.471L** |

1. Key grip is available in a package of 2 pcs.

# New Baby Chuck

Coolant Through Hole

The original high precision collet chuck to perform all machining applications.




A.3

**Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | Collet Model | Nut Model | Gewicht (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -NBS6 - 75 | 968.771 | 0.25 - 6 | 20 | 75 | 35 | 20 - 35 | NBC6- | NBN6 | 0.9 |
| -105 | 968.772 | | | 105 | 63 | 20 - 40 | | | 0.9 |
| -135 | 968.773 | | | 135 | 91 | | | | 1.0 |
| -NBS8 - 75 | 968.775 | 0.5 - 8 | 25 | 75 | 35 | 23 - 37 | NBC8- | NBN8 | 0.9 |
| -105 | 968.776 | | | 105 | 61 | 23 - 42 | | | 1.0 |
| -135 | 968.777 | | | 135 | 91 | | | | 1.1 |
| -NBS10 - 75 * | 968.779 | 1.5 - 10 | 30 | 75 | 35 | 48 | NBC10- | NBN10 | 1.0 |
| -105 | 968.780 | | | 105 | 63 | 35 - 45 | | | 1.1 |
| -135 | 968.781 | | | 135 | 93 | | | | 1.3 |
| -NBS13 - 75 * | 968.783 | 2.5 - 13 | 35 | 75 | 37 | 48 | NBC13- | NBN13 | 1.0 |
| -105 | 968.784 | | | 105 | 67 | 41 - 55 | | | 1.2 |
| -135 | 968.785 | | | 135 | 97 | 41 - 60 | | | 1.5 |
| -NBS16 - 75 * | 968.787 | 2.5 - 16 | 42 | 75 | 37 | 45 | NBC16- | NBN16 | 1.1 |
| -105 | 968.788 | | | 105 | 67 | 45 - 55 | | | 1.4 |
| -135 | 968.789 | | | 135 | 97 | 45 - 65 | | | 1.8 |
| -165 | 968.790 | | | 165 | 127 | | | | 2.0 |
| -200 | 968.791 | | | 200 | 162 | | | | 2.4 |
| -NBS20 - 75 * | 968.792 | 2.5 - 20 | 46 | 75 | 39 | 48 | NBC20- | NBN20 | 1.2 |
| -105 | 968.793 | | | 105 | 69 | 48 - 53 | | | 1.5 |
| -135 | 968.794 | | | 135 | 99 | 48 - 65 | | | 1.9 |
| -165 | 968.795 | | | 165 | 129 | | | | 2.3 |
| -200 | 968.796 | | | 200 | 164 | | | | 2.7 |
| HSK-A100 -NBS6 -120 | 968.572 | 0.25 - 6 | 20 | 120 | 68 | 20 - 40 | NBC6- | NBN6 | 2.5 |
| -165 | 968.573 | | | 165 | 113 | | | | 2.6 |
| -NBS8 -120 | 968.575 | 0.5 - 8 | 25 | 120 | 73 | 23 - 42 | NBC8- | NBN8 | 2.6 |
| -165 | 968.578 | | | 165 | 113 | | | | 2.7 |
| -NBS10 -120 | 968.580 | 1.5 - 10 | 30 | 120 | 73 | 35 - 45 | NBC10- | NBN10 | 2.7 |
| -165 | 968.581 | | | 165 | 113 | | | | 2.9 |
| -NBS13 -120 | 968.583 | 2.5 - 13 | 35 | 120 | 73 | 41 - 60 | NBC13- | NBN13 | 2.9 |
| -165 | 968.584 | | | 165 | 113 | | | | 3.2 |
| -NBS16 -120 | 968.587 | 2.5 - 16 | 42 | 120 | 73 | 45 - 65 | NBC16- | NBN16 | 3.1 |
| -165 | 968.588 | | | 165 | 118 | | | | 3.5 |
| -NBS20 - 90 | 968.592 | 2.5 - 20 | 46 | 90 | 47 | 56 | NBC20- | NBN20 | 2.9 |
| -120 | 968.593 | | | 120 | 73 | 48 - 65 | | | 3.3 |
| -165 | 968.594 | | | 165 | 118 | | | | 3.8 |

1. New baby nut is included. Coolant pipe is to be ordered separately.
2. Nut-less model available upon request.
3. * Adjusting screws can not be used.
   "H" is the max. tool shank length can be inserted into these models.
4. "G" is the adjusting screw (optional).
5. "H" indicates the adjustment length with an adjusting screw.

For Coolant Pipe ▶ 174
For Tap Driving Back Stop ▶ 259

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | New Baby Nut | | Wrench | | NBC Collet ▶ 250 | Baby Perfect Seal ▶ 262 | Adjusting Screw | | | | |
| New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| NBS6 | NBN6 | 961.526 | NBK6 | 961.525 | NBC6- | BPS6- | NBA6B | 961.527 | M7 | 12 | 2 |
| NBS8 | NBN8 | 961.549 | NBK8 | 961.548 | NBC8- | BPS8- | NBA8B | 961.550 | M9 | 13 | 2.5 |
| NBS10 | NBN10 | 961.571 | NBK10 | 961.570 | NBC10- | BPS10- | NBA10B | 961.572 | M11 | 16 | 3 |
| NBS13 | NBN13 | 961.597 | NBK13 | 961.596 | NBC13- | BPS13- | NBA13B | 961.598 | M14 | 20 | 4 |
| NBS16 | NBN16 | 961.631 | NBK16 | 961.630 | NBC16- | BPS16- | NBA16B | 961.632 | M18 | 20 | 4 |
| NBS20 | NBN20 | 961.679 | NBK20 | 961.678 | NBC20- | BPS20- | NBA20B | 961.680 | M21 | 20 | 4 |



BROTECH

# New Hi-Power Milling Chuck Type S

Coolant Through Hole

The original design of slit structure assures heavy and finish end milling with high power and precision.

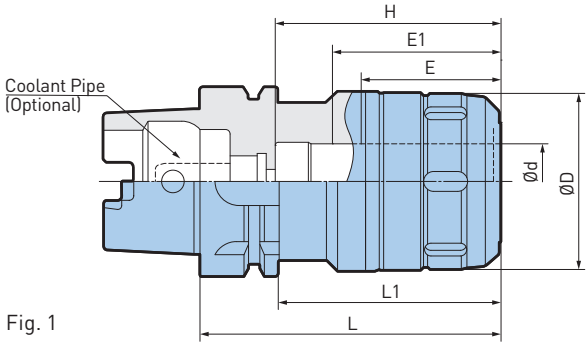



Fig. 1

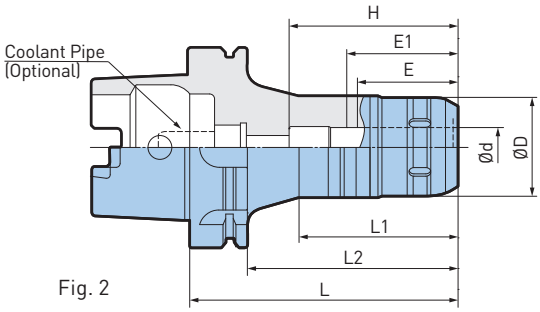



Fig. 2

**Ø 3 - 42 mm**

| Model | Order No. | Fig. | Ød | ØD | L | L1 | L2 | H | E | E1 | Wrench | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A40 -HMC20S - 85 | 805.100 | 1 | 20 | 50 | 85 | 65 | - | 66 | 50 | 56 | FK45-50L | 0.9 |
| HSK-A50 -HMC20S - 90 | 805.101 | 1 | 20 | 50 | 90 | 64 | - | 66 | 50 | 56 | FK45-50L | 1.2 |
| -HMC32S -115 **** | 806.595 | | 32 | 62 | 115 | 89 | - | 69 | 56 | 58 | FK58-62L | 1.6 |
| HSK-A63 -HMC20S - 90 | 965.511S | 1 | 20 | 50 | 90 | 64 | - | 65 | 50 | 56 | FK45-50L | 1.5 |
| -120 ** | 805.102 | | | | 120 | 94 | | 85 | | | | 1.9 |
| -HMC25S -100 | 968.136S | | 25 | 59 | 100 | 74 | | 75 | 56 | 57 | FK58-62L | 1.9 |
| -135 * | 805.103 | | | | 135 | 109 | | 66 - 76 | | | | 2.5 |
| -HMC32S -110 | 968.137S | | 32 | 68 | 110 | 84 | | 85 | 60 | 64 | FK68-75L | 2.3 |
| -135 ** | 805.104 | | | | 135 | 109 | | 90 | | | | 2.6 |
| -165 * | 805.105 | | | | 165 | 139 | | 79 - 89 | | | | 3.2 |
| HSK-A100 -HMC20S -105 | 805.106 | 1 | 20 | 50 | 105 | 76 | - | 73 | 50 | 56 | FK45-50L | 3.0 |
| -135 *** | 805.107 | 2 | | | 135 | 80 | 106 | 85 | | | | 3.5 |
| -165 * | 805.108 | | | | 165 | 100 | 136 | 69 - 79 | | | | 4.1 |
| -HMC25S -105 | 805.110 | 1 | 25 | 59 | 105 | 76 | - | 73 | 56 | 57 | FK58-62L | 3.3 |
| -135 *** | 804.917 | | | | 135 | 106 | | 90 | | | | 3.9 |
| -165 * | 805.111 | 2 | | | 165 | 105 | 136 | 76 - 86 | | | | 4.8 |
| -HMC32S -115 | 805.112 | 1 | 32 | 68 | 115 | 86 | - | 83 | 60 | 72 | FK68-75L | 3.9 |
| -135 | 805.113 | | | | 135 | 106 | | 103 | | | | 4.4 |
| -165 *** | 805.114 | 2 | | | 165 | 105 | 136 | 105 | | | | 5.4 |
| -200 * | 805.115 | | | | 200 | 130 | 171 | 90 - 100 | | | | 6.4 |
| -HMC42S -115 | 805.117 | 1 | 42 | 85 | 115 | 86 | - | 83 | 70 | 73 | FK80-90L | 4.9 |

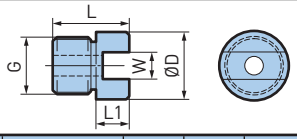
1. Wrench and coolant pipe are to be ordered separately.
2. * Axial length adjusting screw can be used. **/ *** Commercially available hex socket head screws can be used as a back stop (**=M8 /***=M12). Coolant is blocked by utilizing these commercial screws.
3. **** Only the straight collet (C32- ) can be used.
4. "E" is the min. clamping length.
5. "E1" is the min. clamping length for optimum use with center through coolant.
6. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ 174
For Straight Collet ▶ 272

**Accessories**

Wrench

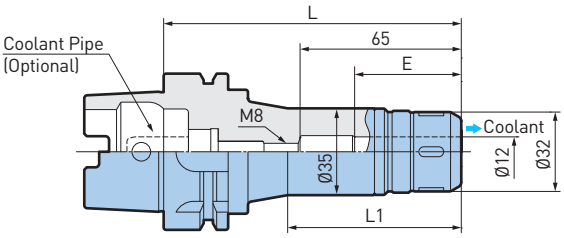
Adjusting Screw




| New Hi-Power Milling Chuck | Model | Order No. | Model | Order No. | D | L | L1 | G | W |
|---|---|---|---|---|---|---|---|---|---|
| HSK -A40/A50/A63/A100 -HMC20S | FK45-50L | 801.037 | HMA-M16 | 962.311 | 19 | 27 | 6 | M16P1.5 | 8 |
| HSK -A63/A100 -HMC25S | FK58-62L | 801.038 | | 962.312 | | | | | |
| HSK -A50 -HMC32S | FK58-62L | 801.038 | | | | | | | |
| HSK -A63/A100 -HMC32S | FK68-75L | 801.039 | HMA-M16S | | | | | | 10 |
| HSK -A100 -HMC42S | FK80-90L | 804.771 | - | - | - | - | - | - | - |

# New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.



Ø 6 - 12 mm

| Model | Order No. | L | L1 | E | Wrench | Weight (kg) |
|---|---|---|---|---|---|---|
| HSK-A63 -HMC12J - 90 | 805.829 | 90 | 52 | 43 | FK31-33 | 1.1 |
| -120 * | 805.830 | 120 | 70 | | | 1.4 |

1. Wrench is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. * Hex socked head screw (M8) can be used as an adjusting screw.
4. "E" is the min. clamping length.

For Straight Collet ▶ 272
For Coolant Pipe ▶ 174

| Accessories | | |
|---|---|---|
| | Wrench | |
| New Hi-Power Milling Chuck | Model | Order No. |
| HSK -A63 -HMC12J | FK31-33 | 806.462 |

# Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.

Coolant Through Hole

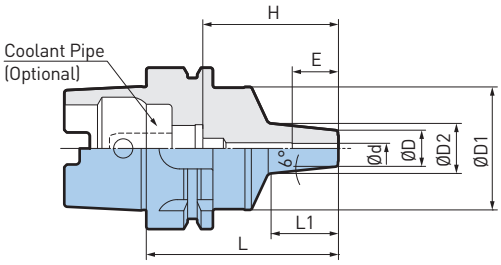



Fig. 1

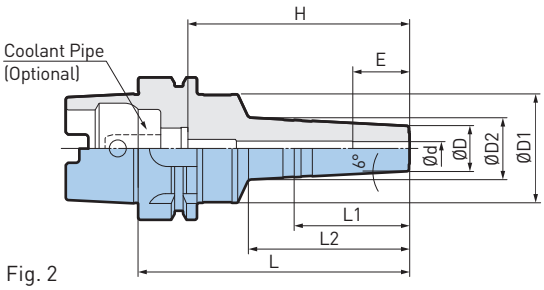



Fig. 2

**Ø 4 - 12 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | ØD2 | L | L1 | L2 | H | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A40 -HDC4S - 65 | **805.527** | 1 | 4 | 14 | 33 | 21 | 65 | 28 | - | 49 | 19 | 0.33 |
| HSK-A50 -HDC4S - 75 | **805.548** | 1 | 4 | 14 | 40 | 21 | 75 | 31 | - | 55 | 19 | 0.8 |
| HSK-A63 -HDC3S - 90 | **805.465** | 1 | 3 | 14 | 48 | 24 | 90 | 43 | - | 68 | 16 | 1.1 |
| -HDC4S - 75 | **803.072** | | 4 | | | 20 | 75 | 26 | | 53 | 19 | 1.0 |
| -120 | **805.466** | 2 | | | | 26 | 120 | 57 | 72 | 98 | | 1.1 |
| -HDC6S -120 | **803.073** | | 6 | | | | | | 70 | 98 | 25 | 1.1 |
| -HDC8S -120 | **803.074** | | 8 | 17 | | 28 | | 52 | | 95 | 31 | 1.2 |
| -HDC10S -120 | **803.070** | | 10 | 19 | | 30 | | | | 94 | 33 | 1.2 |
| -HDC12S -120 | **803.071** | | 12 | 21 | | 32 | | | | 93 | 36 | 1.2 |

1. Adjusting screw and straight collet can not be used.
2. Coolant pipe is to be ordered separately.
3. "E" is the min. clamping length.
4. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ 174
For Inner Bore Cleaner ▶ 286

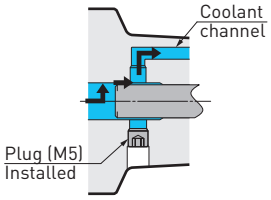
**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

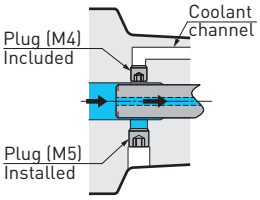
# Hydraulic Chuck Jet Through

Coolant or oil-mist is supplied to cutting edge securely. Exert maximum performance to high-precision operation at 5-axis machining.

Peripheric




Center Through



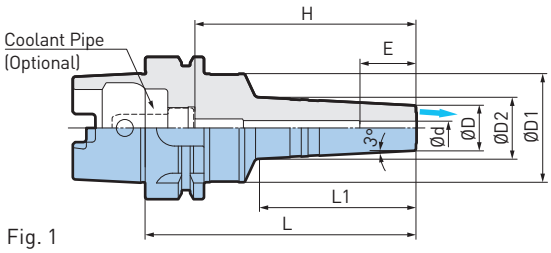



Fig. 1

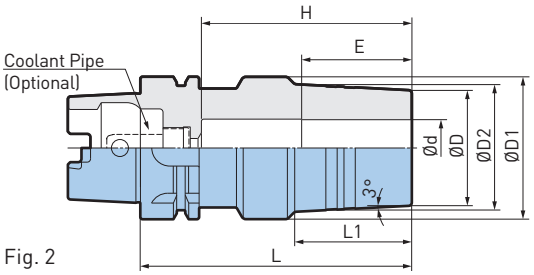



Fig. 2

**Ø 3 - 32 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | ØD2 | L | L1 | H | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -HDC4J - 75 | **805.477** | 1 | 4 | 20 | 48 | 23 | 75 | 29 | 53 | 19 | 1.0 |
| -HDC6J -120 | **805.096** | | 6 | | | 28 | 120 | 70 | 98 | 25 | 1.2 |
| -HDC8J -120 | **805.097** | | 8 | 22 | | 30 | | | 95 | 31 | 1.2 |
| -HDC10J -120 | **805.098** | | 10 | 24 | | 32 | | | 94 | 33 | 1.3 |
| -HDC12J -120 | **805.099** | | 12 | 26 | | 34 | | | 93 | 36 | 1.3 |
| -HDC16J -120 | **805.478** | | 16 | 34 | | 43 | | 76 | 92 | 43 | 1.5 |
| -HDC20J -120 | **805.479** | | 20 | 38 | | | | | 91 | | 1.5 |
| -HDC25J -120 | **805.831** | 2 | 25 | 51 | 63 | 57 | | 50 | 93 | 49 | 2.1 |
| -HDC32J -120 | **805.832** | | 32 | 60 | 69 | - | | 53 | | 56 | 2.3 |

1. Adjusting screw can not be used.
2. Straight collet can be used for HDC16J or bigger Ød size models.
3. Coolant pipe is to be ordered separately.
4. Larger diameter models, HDC16J, 20J, 25J, 32J are available with only peripherical coolant supply.
5. "E" is the min. clamping length.
6. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ 174
For Inner Bore Cleaner ▶ 286
For Straight Collet ▶ 272

**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# Hydraulic Chuck Standard

For high precision machining in automotive, aerospace, medical and die & mold.

Coolant Through Hole

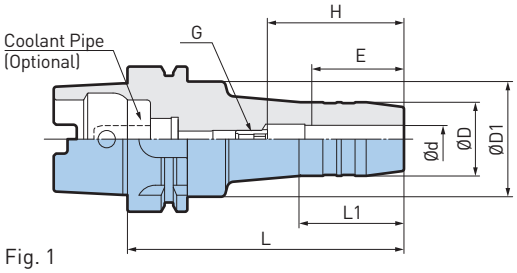



Fig. 1

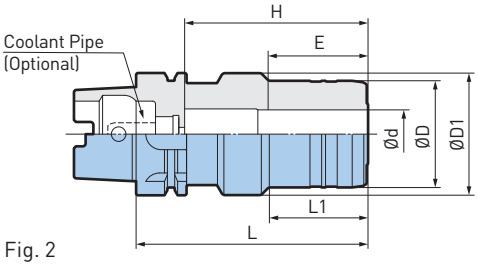



Fig. 2

**Ø 3 - 32 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | H | E | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -HDC6 - 70 * | 801.222 | 1 | 6 | 26 | 50 | 70 | 24 | 46 | 28 | - | 1.0 |
| -120 | 978.402 | | | | | 120 | 44 | 28 - 48 | | HDA 6-05032 | 1.2 |
| -150 | 801.221 | | | | | 150 | | | | | 1.4 |
| -HDC8 -120 | 979.202 | | 8 | 28 | | 120 | | 28 - 48 | | HDA 8-06032 | 1.3 |
| -HDC10 - 80 * | 801.196 | | 10 | 30 | | 80 | 35 | 55 | 33 | - | 1.1 |
| -120 | 979.203 | | | | | 120 | 45 | 33 - 53 | | HDA 10-08032 | 1.3 |
| -HDC12 - 85 * | 801.201 | | 12 | 32 | | 85 | 40 | 60 | | - | 1.1 |
| -120 | 979.204 | | | | | 120 | 45 | 38 - 58 | 38 | HDA 12-10025 | 1.4 |
| -HDC14 -120 | 801.205 | | 14 | 34 | | | | | | | 1.4 |
| -HDC15 -120 | 801.208 | | 15 | 37 | | | | 58 - 68 | 43 | HDA 16-12015 | 1.5 |
| -HDC16 -120 | 978.404 | | 16 | 38 | | | 46 | | | | 1.5 |
| -HDC18 - 90 * | 801.215 | | 18 | 40 | | 90 | | 65 | | - | 1.3 |
| -HDC20 - 90 * | 801.217 | | 20 | 42 | | | 48 | | | | 1.3 |
| -120 | 979.206 | | | | | 120 | | 58 - 68 | | HDA 20-16015 | 1.6 |
| -HDC31 - 95 | 806.444 | 2 | 31 | 63 | 74 | 95 | 27 | 70 | 56 | - | 1.7 |
| -HDC32 -125 * | 801.219 | | 32 | 60 | 69 | 125 | 59 | 100 | 56 | - | 2.4 |
| HSK-A100-HDC8 -120 | 801.143 | 1 | 8 | 28 | 50 | 120 | 44 | 28 - 48 | 28 | HDA 8-06032 | 2.6 |
| -HDC10 -120 | 801.126 | | 10 | 30 | | | 45 | 33 - 53 | 33 | HDA 10-08032 | 2.7 |
| -HDC12 -120 | 801.129 | | 12 | 32 | | | 47 | 38 - 58 | 38 | HDA 12-10025 | 2.7 |
| -HDC16 -135 | 801.133 | | 16 | 38 | | 135 | 53 | 43 - 68 | 43 | HDA 16-12030 | 3.0 |
| -HDC20 -135 | 801.136 | | 20 | 42 | | | 59 | 58 - 68 | | HDA 20-16015 | 3.1 |
| -HDC32 -110 * | 801.139 | | 32 | 64 | 75 | 110 | 62 | 78 | 56 | - | 3.7 |

1. * Adjusting screw cannot be used.
2. Coolant pipe is to be ordered separately.
3. "E" is the min. clamping length.
4. "G" is the adjusting screw (optional).
5. "H" indicates the adjustment length with an adjusting screw.

For Coolant Pipe ▶ 174
For Inner Bore Cleaner ▶ 286
For Straight Collet ▶ 272
For Adjusting Screw ▶ 282

**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# Shrink Chuck Slim

Coolant Through Hole

Optimal operation with eliminated workpiece/jig interference is achieved in deep endmilling, wall machining and precision mold machining.

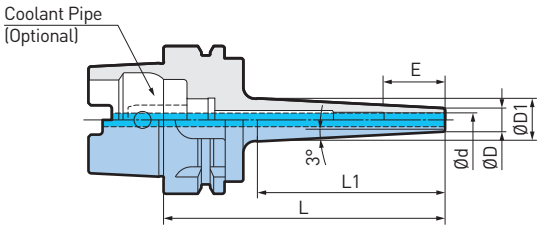



Fig. 1

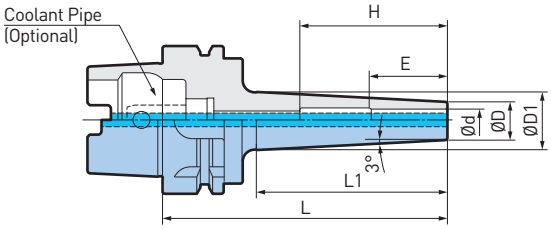



Fig. 2

**Ø 6 - 12 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | H | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -SRC6S - 120 | **801.264** | 1 | 6 | 10 | 19 | 120 | 81 | (98) | 26 | 0.9 |
| - 165 | **801.265** | | | | 23 | 165 | 121 | (143) | | 1.0 |
| -SRC8S - 120 | **801.267** | 2 | 8 | 13 | 22 | 120 | 81 | (98) | | 1.0 |
| - 165 | **801.268** | | | | 26 | 165 | 123 | (143) | | 1.1 |
| -SRC10S - 120 | **801.253** | | 10 | 16 | 25 | 120 | 81 | 62 | 32 | 1.0 |
| - 165 | **801.254** | | | | 29 | 165 | 123 | | | 1.2 |
| -SRC12S - 120 | **801.256** | | 12 | 19 | 28 | 120 | 81 | 72 | 36 | 1.0 |
| - 165 | **801.257** | | | | 32 | 165 | 125 | | | 1.3 |

1. Use carbide cutter within a tolerance of h6.
2. Coolant pipe is to be ordered separately.
3. "E" is the min. clamping length.
4. "H" dimensions in ( ) are reference length up to the coolant pipe.

For Coolant Pipe ▶ 174
For Inner Boring Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

# Shrink Chuck Standard

Substantial body provides higher rigidity. Available from 4mm clamping diameter.

Coolant Through Hole

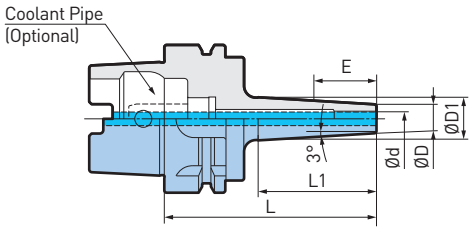



Fig. 1

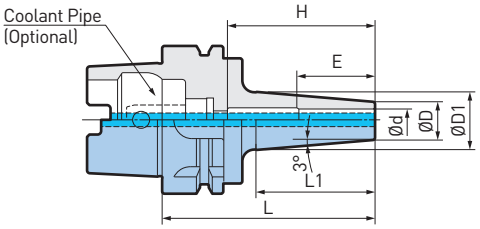



Fig. 2

**Ø 4 - 20 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | L | L1 | H | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -SRC4 - 90 * | **801.262** | 1 | 4 | 10 | 15 | 90 | 46 | (68) | 16 | 0.9 |
| -SRC6 - 90 | **978.295** | | 6 | 14 | 20 | | 51 | (68) | 26 | 0.9 |
| - 150 | **801.263** | | | | 26 | 150 | 108 | (128) | | 1.1 |
| -SRC8 - 90 | **978.296** | 2 | 8 | 18 | 24 | 90 | 51 | (68) | | 1.0 |
| - 150 | **801.266** | | | | 30 | 150 | 110 | (128) | | 1.2 |
| -SRC10 - 90 | **978.297** | | 10 | 22 | 28 | 90 | 51 | 62 | 32 | 1.0 |
| - 150 | **801.252** | | | | 34 | 150 | 111 | | | 1.3 |
| -SRC12 - 90 | **978.298** | | 12 | 24 | 30 | 90 | 51 | 65 | 36 | 1.0 |
| - 150 | **801.255** | | | | 36 | 150 | 112 | 72 | | 1.4 |
| -SRC16 - 90 | **978.299** | | 16 | 28 | 34 | 90 | 51 | 65 | 38 | 1.1 |
| - 165 | **801.258** | | | | 41 | 165 | 119 | 80 | | 1.8 |
| -SRC20 - 90 | **801.260** | | 20 | 34 | 40 | 90 | 53 | 65 | 42 | 1.2 |
| - 165 | **801.259** | | | | 47 | 165 | 122 | 100 | | 1.9 |

1. Use carbide cutter within a tolerance of h6.
2. * Use carbide cutter within a tolerance of h5.
3. Coolant pipe is to be ordered separately.
4. "E" is the min. clamping length.
5. "H" dimensions in ( ) are reference length up to the coolant pipe.

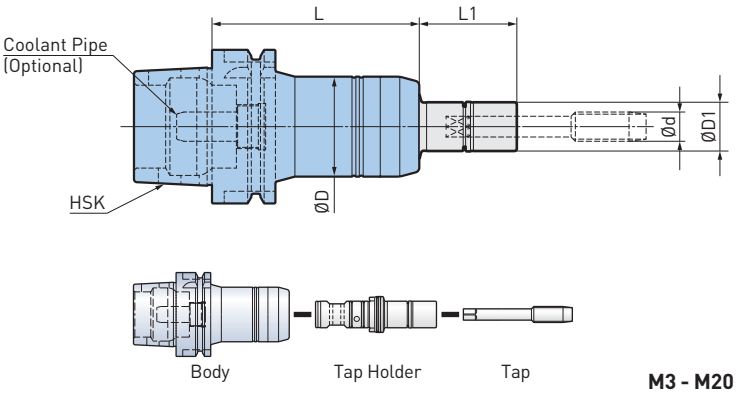
For Coolant Pipe ▶ 174
For Inner Boring Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

Coolant Through Hole







**M3 - M20**

| Model | Order No. | Tap Holder Model | Ød | ØD | ØD1 | L | L1 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| HSK-A40 -MGT6 - 80 | **965.601** | MGT6 | M3 - M8 | 36 | 16 | 80 | 30-200 | 0.6 |
| -MGT12 - 85 | **965.602** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 85 | 30-200 | 0.7 |
| HSK-A50 -MGT6 - 85 | **965.603** | MGT6 | M3 - M8 | 36 | 16 | 85 | 30-200 | 0.8 |
| -MGT12 - 85 | **965.604** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 85 | 30-200 | 0.9 |
| -MGT20 -125 | **978.325** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 125 | 35-150 | 1.6 |
| HSK-A63 -MGT6 - 85 | **965.606** | MGT6 | M3 - M8 | 36 | 16 | 85 | 30-200 | 1.1 |
| -MGT12 - 85 | **965.607** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 85 | 30-200 | 1.2 |
| -MGT20 -110 | **965.608** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 110 | 35-150 | 1.8 |
| HSK-A100 -MGT6 - 95 | **965.609** | MGT6 | M3 - M8 | 36 | 16 | 95 | 30-200 | 2.6 |
| -MGT12 - 95 | **965.610** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 95 | 30-200 | 2.7 |
| -MGT20 -115 | **965.611** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 115 | 35-150 | 3.3 |
| HSK-A125 -MGT12 -105 | **805.655** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 105 | 30-200 | 4.1 |
| -MGT20 -120 | **805.656** | MGT20 | M12 - M20 P1/4 - P1/2 | 54 | 30 | 120 | 35-150 | 4.7 |

1. Tap holder is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. Rigid tapping function is required on the machine tool.

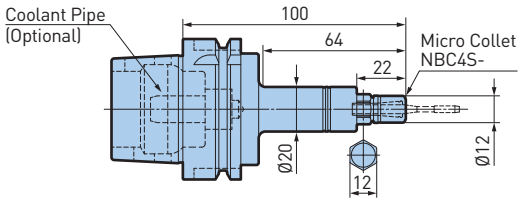
For Coolant Pipe ▶ 174
For Tap Holder ▶ 276
For MEGA Wrench ▶ 281
For Accessories ▶ 280



BROTECH

# MEGA Synchro Tapping Holder

## For small Tap MGT3



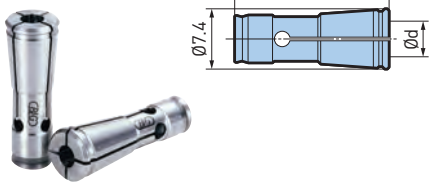

**M1 - M3**

| Model | Order No. | Weight (kg) |
|---|---|---|
| HSK-A63-MGT3-100 | 805.542 | 1.0 |

For Accessories ▶ 281

1. Nut is included. MEGA wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the hex portion of the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

## Micro Collet for MGT3

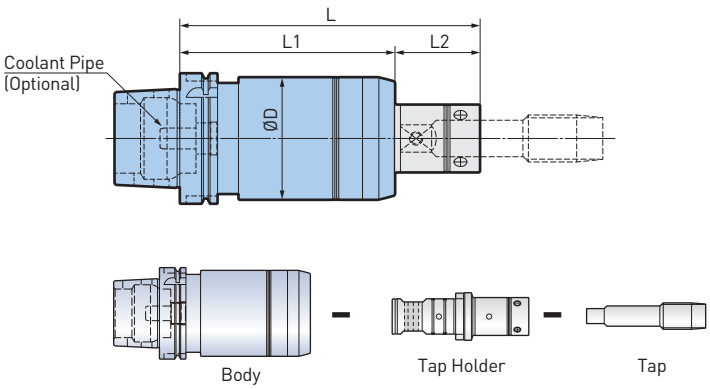



| Model | Order No. | Tapping Range | | | Tap Shank |
|---|---|---|---|---|---|
| | | DIN 371 | ISO 529 | JIS | Ød |
| NBC4S-2.5AA | 961.468 | M1 - M1.8 | M2 | | 2.5 |
| -2.8AA | 968.353 | M2 - M2.6 | M2.2, M2.5 | | 2.8 |
| -3.0AA | 961.470 | - | - | M1 - M2.6 | 3.0 |
| -3.1AA | 968.355 | - | M3 | | 3.15 |
| -3.5AA | 961.472 | M3 | - | | 3.5 |
| -4.0AA | 961.474 | - | - | M3 | 4.0 |

1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ 247

## For large Tap MGT36




Coolant Through Hole

**M22 - M36**

| Model | Order No. | Tapping Range d | ØD | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|
| HSK-A100-MGT36-165 | 801.164 | M22 - M36 P5/8 - 1 | 94 | 230 | 165 | 65 | 8.2 |
| HSK-A125-MGT36-170 | 805.657 | | 94 | 235 | 170 | 65 | 10.1 |

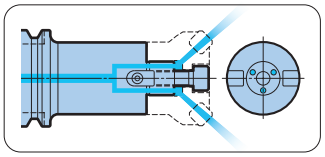
1. Tap holder is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. Rigid tapping function is required on the machine tool.

For Accessories ▶ 280
For MGT36 Tap Holder ▶ 277 / 279
For Coolant Pipe ▶ 174

# Face Mill Arbors Type FMH

Coolant Through Hole

For cutters that require a coolant hole through the pilot.



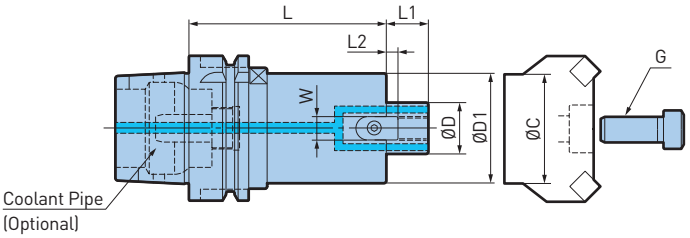



Fig. 1

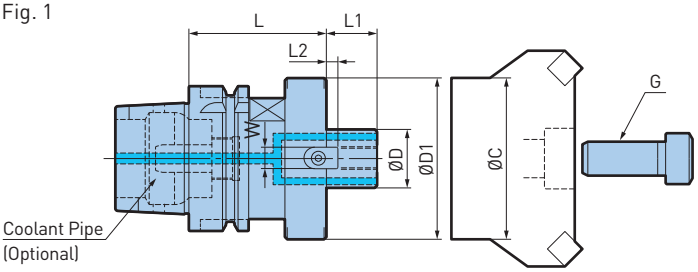



Fig. 2

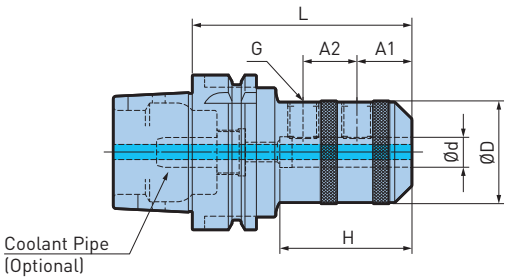
A.3

| Model | Order No. | Fig. | ØD (h6) | ØD1 | L | L1 | Drive Keys L2 | Drive Keys W | G | ØC min. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A50 -FMH22 - 47 - 60 | 805.833 | 2 | 22 | 47 | 60 | 18 | 5 | 10 | M10 | 36 | 0.8 |
| -FMH27 - 60 - 60 | 805.834 | | 27 | 60 | | 20 | 6 | 12 | M12 | 46 | 1.0 |
| HSK-A63 -FMH16 - 37 - 45 | 979.194 | 1 | 16 | 37 | 45 | 16 | 5 | 8 | M8 | 28 | 1.0 |
| -FMH22 - 47 - 60 | 801.189 | | 22 | 47 | 60 | 18 | 5 | 10 | M10 | 36 | 1.3 |
| - 90 | 978.186 | | | | 90 | | | | | | 1.7 |
| -150 | 801.188 | | | | 150 | | | | | | 2.5 |
| -FMH22 - 60 - 60 | 805.573 | 2 | 22 | 60 | 60 | 18 | 5 | 10 | M10 | 38 | 1.4 |
| - 90 | 805.574 | | | | 90 | | | | | | 1.8 |
| -FMH27 - 60 - 60 | 978.185 | | 27 | 60 | 60 | 20 | 6 | 12 | M12 | 46 | 1.6 |
| - 90 | 979.196 | | | | 90 | | | | | | 2.3 |
| -FMH32 - 96 - 60 | 805.646 | | 32 | 96 | 60 | 22 | 7 | 14 | M16 | 58 | 2.0 |
| HSK-A100 -FMH22 - 47 -105 | 965.523 | 1 | 22 | 47 | 105 | 18 | 5 | 10 | M10 | 36 | 3.4 |
| -150 | 978.120 | | | | 150 | | | | | | 4.0 |
| -200 | 978.121 | | | | 200 | | | | | | 4.7 |
| -FMH22 - 60 -105 | 801.092 | 1 | 22 | 60 | 105 | 18 | 5 | 10 | M10 | 38 | 3.9 |
| -150 | 801.093 | | | | 150 | | | | | | 5.4 |
| -200 | 801.094 | | | | 200 | | | | | | 6.1 |
| -FMH27 - 60 - 60 | 801.102 | 1 | 27 | 60 | 60 | 20 | 6 | 12 | M12 | 46 | 2.9 |
| - 90 | 801.103 | | | | 90 | | | | | | 3.7 |
| -150 | 801.101 | | | | 150 | | | | | | 5.5 |
| -200 | 807.130 | | | | 200 | | | | | | 6.2 |
| -250 | 807.114 | | | | 250 | | | | | | 6.9 |
| - 76 - 60 | 801.105 | 1 | 27 | 76 | 60 | 20 | 6 | 12 | M12 | 62 | 3.2 |
| - 90 | 801.106 | | | | 90 | | | | | | 4.3 |
| -150 | 801.104 | | | | 150 | | | | | | 6.8 |
| -FMH32 - 96 - 60 | 801.118 | 2 | 32 | 96 | 60 | 22 | 7 | 14 | M16 | 80 | 3.8 |
| - 90 | 801.119 | | | | 90 | | | | | | 5.5 |
| -150 | 801.117 | | | | 150 | | | | | | 8.0 |
| -FMH40 -100 - 75 | 801.125 | 2 | 40 | 100 | 75 | 26 | 8.5 | 16 | M20 (MBA-M20H) | 80 | 4.9 |
| -105 | 801.124 | | | | 105 | | | | | | 6.8 |
| HSK-A125 -FMH22A - 49 - 50 | 806.585 | 1 | 22 | 49 | 50 | 18 | 5 | 10 | M10 | 40 | 4.0 |
| -100 | 806.586 | | | | 100 | | | | | | 4.8 |
| -150 | 806.587 | | | | 150 | | | | | | 5.4 |
| -200 | 806.588 | | | | 200 | | | | | 36 | 6.7 |
| -FMH27A - 60 - 90 | 806.589 | | 27 | 60 | 90 | 20 | 6 | 12 | M12 | 46 | 5.1 |
| -150 | 806.590 | | | | 150 | | | | | | 6.3 |
| -FMH32A - 78 - 60 | 806.591 | | 32 | 76 | 60 | 22 | 7 | 14 | M16 | 58 | 4.8 |
| - 96 -105 | 806.592 | | | 98 | 105 | | | | | | 7.8 |
| -FMH40A - 80 - 90 | 806.593 | | 40 | 80 | 90 | 28 | 8.5 | 16 | M20 | 70 | 6.0 |

1. Hexagon Socket Head Cap Screw is included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174
For Clamp Bolt ▶ 282

# Side Lock Holders for Weldon




Coolant Through Hole

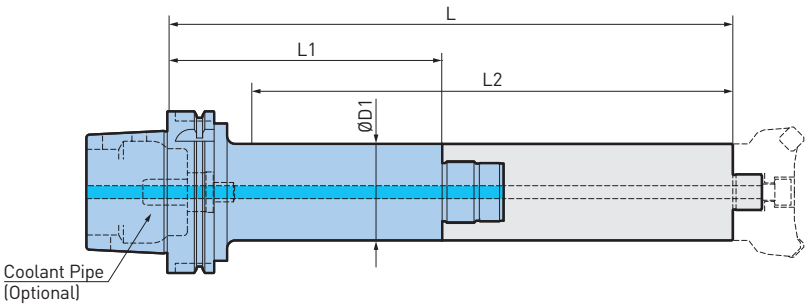
A.3

**Ø 6 - 50 mm**

| Model | Order No. | Ød (H5) | ØD | L | A1 | A2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -ISL6 - 80 | **807.321** | 6 | 25 | 80 | 18 | - | 58 | M6 | 0.9 |
| -ISL8 - 80 | **807.322** | 8 | 28 | | | | 58 | M8 | 1.0 |
| -ISL10 - 80 | **807.323** | 10 | 35 | | 20 | | 44 | M10 | 1.1 |
| -ISL12 - 80 | **805.732** | 12 | 42 | | 22.5 | | 50 | M12 | 1.2 |
| -ISL16 - 80 | **807.319** | 16 | 48 | | 24 | | 52 | M14 | 1.4 |
| -ISL20 - 80 | **806.050** | 20 | 52 | 80 | 25 | - | 54 | M16 | 1.5 |
| -ISL25 -105 | **805.019** | 25 | 65 | 105 | 24 | 25 | 60 | M18 | 2.3 |
| -ISL32 -115 | **805.018** | 32 | 72 | 115 | | 28 | 64 | M20 | 2.7 |
| HSK-A100 -ISL20 - 90 | **805.152** | 20 | 52 | 90 | 25 | - | 54 | M16 | 3.4 |
| -135 | **807.227** | | | 135 | | | | | 4.1 |
| -ISL25 -105 | **806.051** | 25 | 65 | 105 | 24 | 25 | 60 | M18 | 4.3 |
| -135 | **807.228** | | | 135 | | | | | 5.0 |
| -ISL32 -125 | **805.151** | 32 | 72 | 125 | | 28 | 90 | M20 | 4.9 |
| -165 | **807.229** | | | 165 | | | | | 6.3 |
| -ISL40 -125 | **805.201** | 40 | 90 | 125 | 30 | 32 | | | 5.8 |
| -165 | **807.230** | | | 165 | | | | | 8.1 |
| -ISL50 -135 | **806.052** | 50 | 99.5 | 135 | 35 | 35 | | M24 | 6.7 |
| -165 | **807.231** | | | 165 | | | | | 8.5 |

1. "H" is the max. tool shank length that can be inserted into the holder.
2. Use a cutting tool in accordance to DIN 1835 B/DIN 6535 HB.

## Smart Damper Basic Holders for Mills

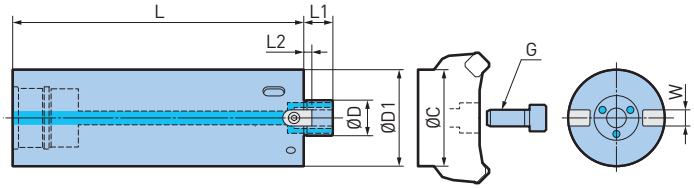



| Model | Order No. | ØD1 | L | L1 | L2 | Damper Head | Weight (kg) |
|---|---|---|---|---|---|---|---|
| HSK-A100 -SDF36 - 47 -170 | **804.976** | 47 | 350 | 170 | 310 | FMH DP-47 | 4.4 |
| - 47 -220 | **804.978** | | 400 | 220 | 360 | | 5.0 |
| -SDF36 - 60 -170 | **804.977** | 60 | 350 | 170 | 310 | FMH DP-60 | 5.5 |
| - 60 -220 | **804.979** | | 400 | 220 | 360 | | 6.5 |
| HSK-A125 -SDF36 - 47 -250 | **806.630** | 47 | 430 | 250 | 380 | FMH DP-47 | 6.9 |
| -SDF36 - 60 -250 | **806.631** | 60 | | | | FMH DP-60 | 8.0 |

1. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174

## Smart Damper Damper Heads for Mills

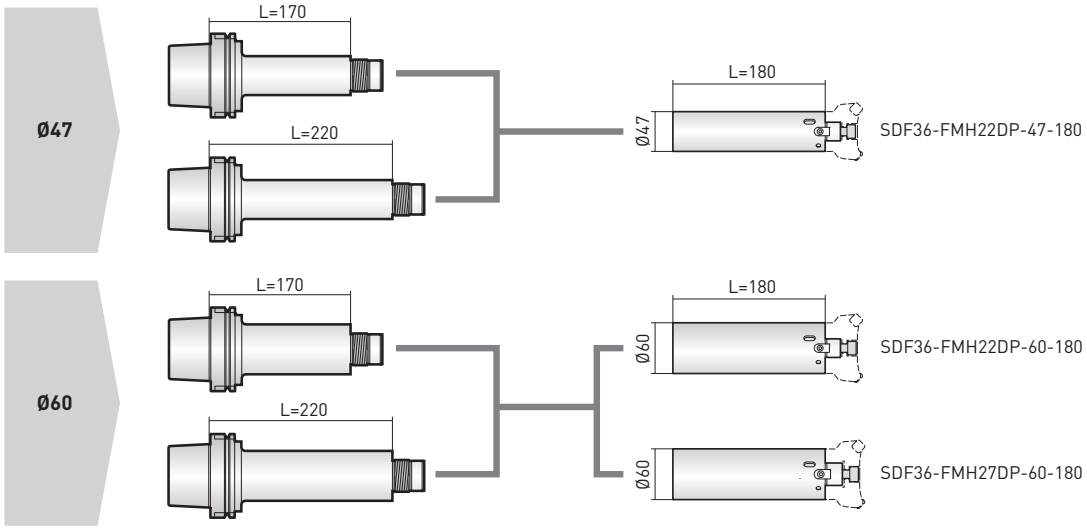



| Model | Order No. | ØD | ØD1 | L | L1 | L2 | W | G | Wrench | ØC min. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SDF36-FMH22DP - 47 -180 | **804.969** | 22 | 47 | 180 | 18 | 5 | 10 | M10 | FK45-50L | 36 | 3.0 |
| - 60 -180 | **804.971** | | 60 | | | | | | FK58-62L | 49 | 4.5 |
| -FMH27DP - 60 -180 | **804.972** | 27 | | | 20 | 6 | 12 | M12 | | 46 | 4.5 |

1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ 282
For Wrench ▶ 275

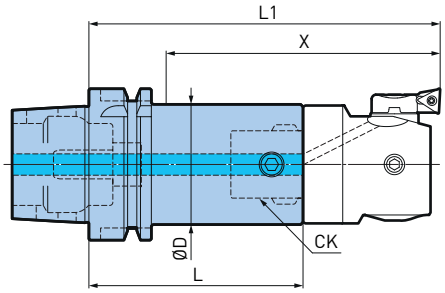
**Combinations** Basic Holder Damper Head



# CK Shanks with Center Through Coolant

With drive key grooves and orientation notch.

Coolant Through Hole




A.3

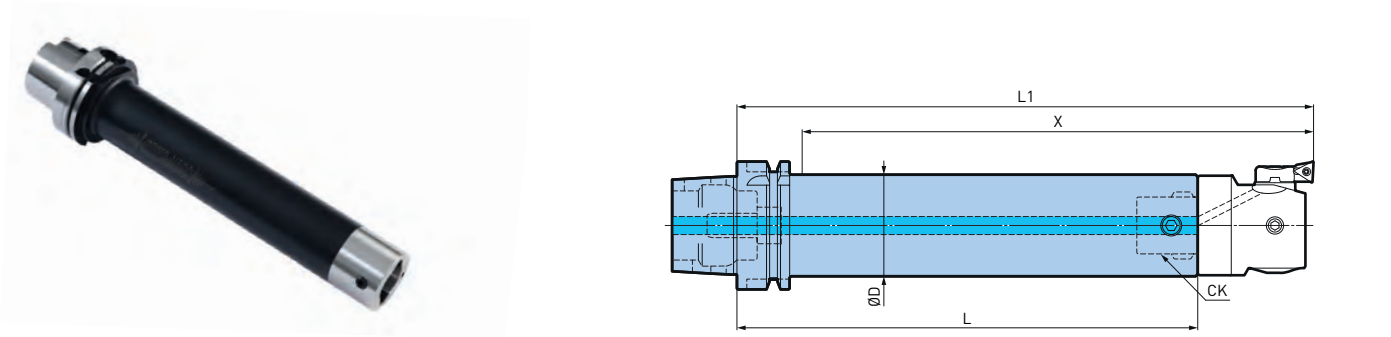
| Taper Size | Order No. | CK | ØD | L | L1 | X | Weight (Kg) |
|---|---|---|---|---|---|---|---|
| HSK-A25 -CKB2 - 30 | 328.279F * | CKB2 | 24 | 30 | 66 | 50 | 0.18 |
| HSK-A32 -CKB2 - 33 | 328.278F | CKB2 | 24 | 33 | 69 | 43 | 0.20 |
| HSK-A40 -CKB1 - 32 | 324.112F | CKB1 | 19 | 31.5 | 64 | 40 | 0.22 |
| -CKB2 - 35 | 328.277F | CKB2 | 24 | 35 | 71 | 45 | 0.22 |
| -CKB3 - 40 | 324.132F | CKB3 | 31 | 40 | 80 | 55 | 0.26 |
| -CKB4 - 50 | 324.142F | CKB4 | 39 | 50 | 97 | 72 | 0.34 |
| HSK-A50 -CKB3 - 44 | 324.232F | CKB3 | 31 | 44 | 84 | 53 | 0.5 |
| -CKB4 - 48 | 324.242F | CKB4 | 39 | 48 | 95 | 64 | 0.5 |
| -CKB5 - 61 | 324.252F | CKB5 | 50 | 61 | 118 | 87 | 0.7 |
| HSK-A63 -CKB1 - 79 | 324.312F | CKB1 | 19 | 78.5 | 111 | 80 | 0.8 |
| -CKB2 - 96 | 324.322F | CKB2 | 24 | 95.5 | 131 | 100 | 0.9 |
| -CKB3 - 71 | 324.331 | CKB3 | 31 | 71 | 111 | 80 | 0.9 |
| -CKB3 - 71FB | 324.331F | CKB3 | 31 | 71 | 111 | 80 | 0.9 |
| -CKB3 - 121 | 324.332 | CKB3 | 31 | 121 | 161 | 130 | 1.2 |
| -CKB4 - 94 | 324.341 | CKB4 | 39 | 94 | 141 | 110 | 1.2 |
| -CKB4 - 94FB | 324.341F | CKB4 | 39 | 94 | 141 | 110 | 1.2 |
| -CKB4 - 114 | 324.342 | CKB4 | 39 | 114 | 161 | 130 | 1.4 |
| -CKB5 - 59 | 324.352 | CKB5 | 50 | 59 | 116 | 85 | 1.0 |
| -CKB5 - 59FB | 324.352F | CKB5 | 50 | 59 | 116 | 85 | 1.0 |
| -CKB5 - 89 | 324.353 | CKB5 | 50 | 89 | 146 | 115 | 1.4 |
| -CKB5 - 134 | 324.354 | CKB5 | 50 | 134 | 191 | 160 | 2.0 |
| -CKB6 - 70 | 324.361 | CKB6 | 63.5 | 70 | 141 | 110 | 1.3 |
| -CKB6 - 70FB | 324.361F | CKB6 | 63.5 | 70 | 141 | 110 | 1.3 |
| -CKN6 - 70 | 324.361N | CKN6 | 63.5 | 70 | 141 | 110 | 1.3 |
| -CKB6 - 100 | 324.362 | CKB6 | 63.5 | 100 | 171 | 140 | 1.9 |
| -CKN6 - 160 | 324.367N | CKN6 | 63.5 | 160 | 231 | 200 | 3.2 |
| HSK-A80 -CKB6 - 75 | 324.461 | CKB6 | 63.5 | 75 | 146 | 115 | 2.0 |
| HSK-A100 -CKB3 - 124 | 324.531 | CKB3 | 31 | 124 | 164 | 130 | 2.5 |
| -CKB4 - 147 | 324.541 | CKB4 | 39 | 147 | 194 | 160 | 2.9 |
| -CKB5 - 107 | 324.551 | CKB5 | 50 | 107 | 164 | 130 | 3.0 |
| -CKB5 - 177 | 324.552 | CKB5 | 50 | 177 | 234 | 200 | 3.8 |
| -CKB6 - 78 | 324.561 | CKB6 | 63.5 | 78 | 149 | 115 | 2.9 |
| -CKN6 - 78 | 324.561N | CKN6 | 63.5 | 78 | 149 | 115 | 2.8 |
| -CKB6 - 108 | 324.563 | CKB6 | 63.5 | 108 | 179 | 145 | 3.5 |
| -CKN6 - 108 | 324.563N | CKN6 | 63.5 | 108 | 179 | 145 | 3.4 |
| -CKN6 - 223 | 324.566N | CKN6 | 63.5 | 223 | 294 | 260 | 6.0 |
| -CKB7 - 87 | 324.571 | CKB7 | 90 | 87 | 204 (174) | 170 (140) | 4.1 |
| -CKN7 - 87 | 324.571N | CKN7 | 90 | 87 | 204 (174) | 170 (140) | 4.1 |
| -CKB7 - 127 | 324.572 | CKB7 | 90 | 127 | 244 (214) | 210 (180) | 5.8 |
| -CKN7 - 127 | 324.572N | CKN7 | 90 | 127 | 244 (214) | 210 (180) | 5.8 |
| -CKN7 - 267 | 324.575N | CKN7 | 90 | 267 | 384 (354) | 350 (320) | 12.0 |
| HSK-A125 -CKB6 - 94 | 869.024 | CKB6 | 63.5 | 94 | 165 | 125 | 4.9 |
| -CKB7 - 123 | 869.025 | CKB7 | 90 | 123 | 240 (210) | 195 (165) | 7.5 |

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. HSK shanks with index "F" are precision balanced.
3. Coolant pipe is to be ordered separately.
4. * Only on request, not available from stock.

For Coolant Pipe ▶ 174
For Boring Heads ▶ Chapter B

# Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole fine boring.











| Model | Order No. | CK | ØD | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|
| HSK-A100 -CKB5DP - 303 | **328.238** | CKB5 | 50 | 303 | 360 | 310 | 6.5 |
| -CKB6DP - 379 | **328.240** | CKB6 | 64 | 379 | 450 | 400 | 11.2 |

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174
For Boring Heads ▶ Chapter B

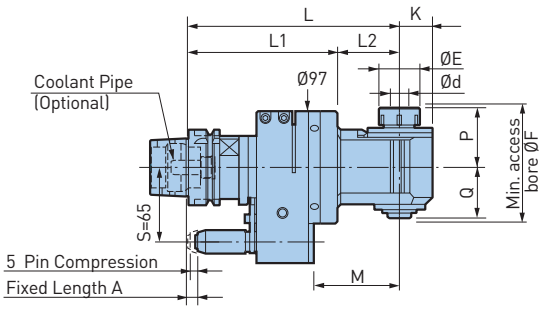


BROTECH

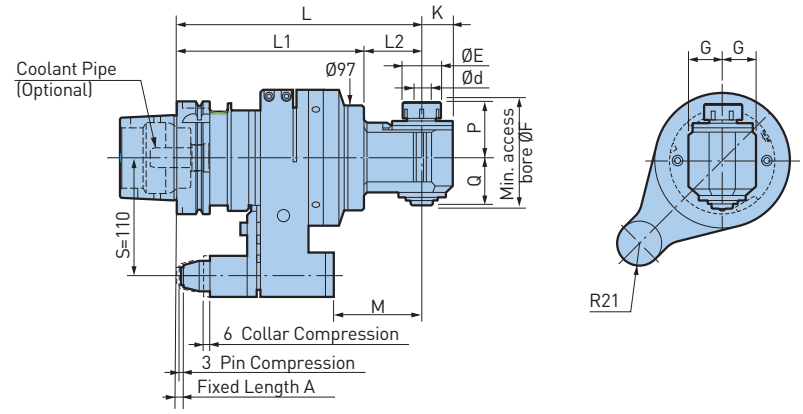
# New Baby Chuck Type

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.

HSK-A63




HSK-A100




Exclusive Stop Block is required.

| Model | Order No. | Ød | ØE | G | K | L | L1 | L2 | M | P | Q | ØF | Collet Model | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63-AG90/NBS6 -185 | 802.717 | 0.25 - 6 | 20 | 21 | 17 | 185 | 130 | 55 | 77 | 33 | 29 | 67 | NBC6 | 6 000 | 5.0 |
| -215 | 802.719 | | | | | 215 | | 85 | 107 | | | | | | 5.2 |
| -245 | 802.721 | | | | | 245 | | 115 | 137 | | | | | | 5.4 |
| -275 | 802.723 | | | | | 275 | | 145 | 167 | | | | | | 5.6 |
| -AG90/NBS10 -185 | 802.702 | 1.5 - 10 | 30 | 30 | 25 | 185 | 130 | 55 | 77 | 45 | 43 | 91 | NBC10 | 6 000 | 5.4 |
| -215 | 802.704 | | | | | 215 | | 85 | 107 | | | | | | 5.8 |
| -245 | 802.706 | | | | | 245 | | 115 | 137 | | | | | | 6.1 |
| -AG90/NBS13 -185 | 802.708 | 2.5 - 13 | 35 | 31 | 28 | 185 | 130 | 55 | 77 | 52 | 45 | 101 | NBC13 | 6 000 | 5.5 |
| -215 | 802.710 | | | | | 215 | | 85 | 107 | | | | | | 5.9 |
| -245 | 802.712 | | | | | 245 | | 115 | 137 | | | | | | 6.2 |
| -AG90/NBS20S -180S | 802.716 | 2.5 - 20 | 46 | 35 | 33 | 180 | 127 | 53 | 72 | 65 | 62 | 132 | NBC20 | 3 000 | 7.9 |
| HSK-A100 -AG90/NBS6 -225 | 802.666 | 0.25 - 6 | 20 | 21 | 17 | 225 | 170 | 55 | 82 | 33 | 29 | 67 | NBC6 | 6 000 | 11.8 |
| -255 | 802.669 | | | | | 255 | | 85 | 112 | | | | | | 12.0 |
| -285 | 802.672 | | | | | 285 | | 115 | 142 | | | | | | 12.2 |
| -315 | 802.675 | | | | | 315 | | 145 | 172 | | | | | | 12.4 |
| -AG90/NBS10 -225 | 802.645 | 1.5 - 10 | 30 | 30 | 25 | 225 | 170 | 55 | 82 | 45 | 43 | 91 | NBC10 | 6 000 | 12.2 |
| -255 | 802.648 | | | | | 255 | | 85 | 112 | | | | | | 12.6 |
| -285 | 802.651 | | | | | 285 | | 115 | 142 | | | | | | 12.9 |
| -AG90/NBS13 -225 | 802.654 | 2.5 - 13 | 35 | 31 | 28 | 225 | 170 | 55 | 82 | 52 | 45 | 101 | NBC13 | 6 000 | 12.3 |
| -255 | 802.657 | | | | | 255 | | 85 | 112 | | | | | | 12.7 |
| -285 | 802.660 | | | | | 285 | | 115 | 142 | | | | | | 13.0 |
| -AG90/NBS20 -240 | 802.663 | 2.5 - 20 | 46 | 35 | 35 | 240 | 170 | 70 | 97 | 65 | 62 | 132 | NBC20 | 3 000 | 13.4 |

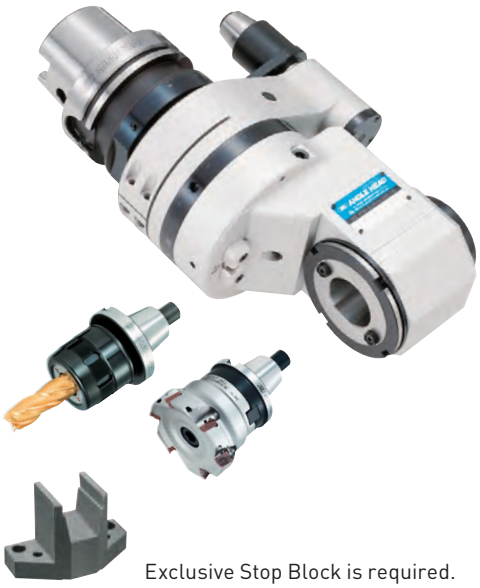
1. The standard fixed length A is 8 mm for HSK-A63 and 6 mm for HSK-A100. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.
5. Coolant pipe is to be ordered separately.

For New Baby Collet ▶ 250
For Stop Block ▶ 290

A.3

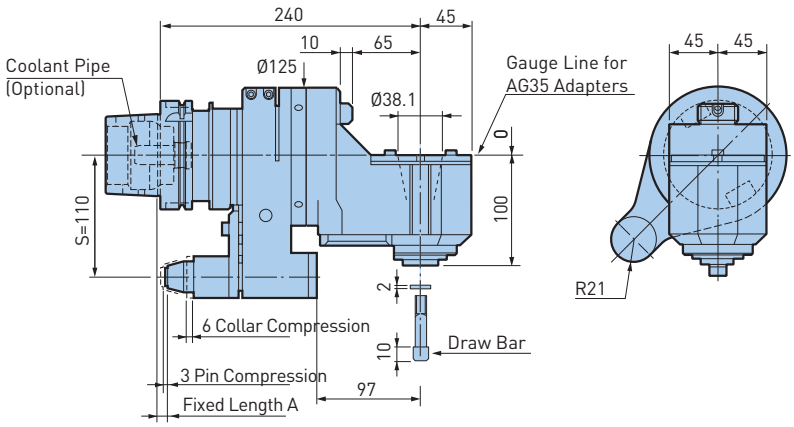
## Build-Up Type

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle.
Also helps minimize interference problems with ATC and storage problems within the magazine.





Exclusive Stop Block is required.

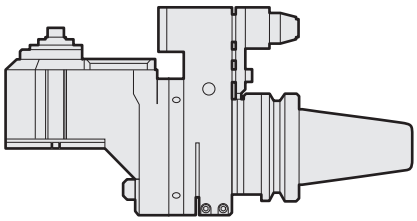


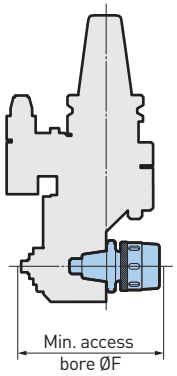

| Model | Order No. | Max. $min^{-1}$ | Weight (kg) |
|---|---|---|---|
| HSK-A100 -AG90/AGH35-240 | **802.639** | 3 000 | 14.2 |
| -AG90/AGH35-240S | **802.640** | 3 000 | 15.5 |

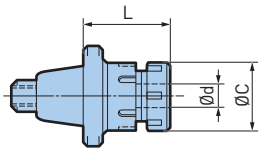
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.
5. Coolant pipe is to be ordered separately.

For Stop Block ▶ 290
For Adapters ▶ 153

## AG35 adapters





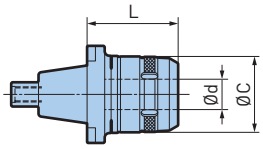

### New Baby Chuck

| Model | Order No. | Ød | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|
| AG35 -NBS10 | **962.793** | 1.5 - 10 | 47 | 30 | 162 | 0.6 |
| -NBS13 | **962.794** | 2.5 - 13 | 54 | 35 | 168 | 0.7 |
| -NBS16 | **962.795** | 2.5 - 16 | | 42 | 170 | 0.8 |
| -NBS20 | **962.796** | 2.5 - 20 | | 46 | | 0.9 |

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250

For Wrench ▶ 271

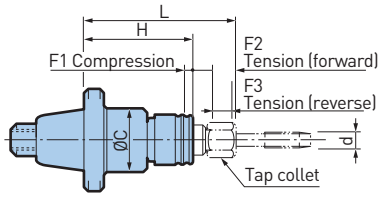



### New Hi-Power Milling Chuck

| Model | Order No. | Ød | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|
| AG35 -HMC20S | **802.742** | 20 | 60 | 52 | 178 | 1.5 |

1. Wrench (FK45-50L) is included.

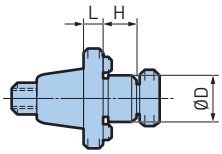
For Straight Collet ▶ 272




### Auto Tapper Type B (automatic depth control)

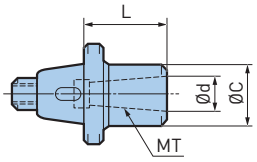
| Model | Order No. | Ød | L | ØC | H | F1 | F2 | F3 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| AG35 -ATB12E | **802.435** | M4 - M12 | 80 | 40.5 | 72 | 0.5 | 5 | 4 | 1.0 |
| -ATB20E | **802.436** | M8 - M20 | 115 | 57.5 | 102.5 | | 6.5 | 5 | 1.7 |

1. Please contact BIG KAISER agent for tap collet.




### Face Mill Arbor

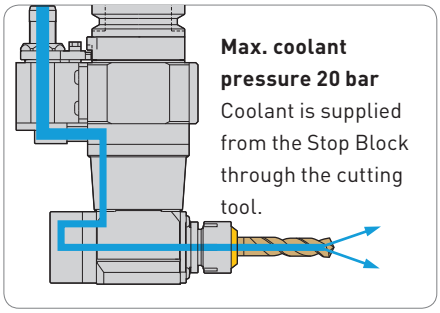
| Model | Order No. | ØD | L | H | Weight (kg) |
|---|---|---|---|---|---|
| AG35 -FMH22 -30 | **802.740** | 22 | 30 | 18 | 1.0 |
| -FMH27 -20 | **802.741** | 27 | 20 | 20 | 1.0 |



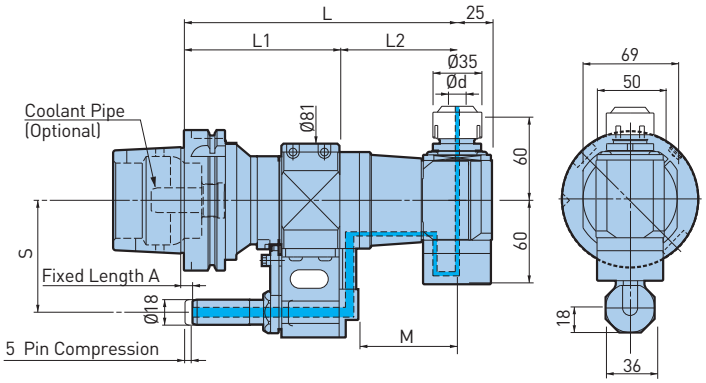

### Morse Taper Adapter

| Model | Order No. | Ød | MT. No. | L | ØC | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|
| AG35 -MT1 | **962.785** | 12.065 | 1 | 50 | 24 | 164 | 0.6 |
| -MT2 | **962.786** | 17.78 | 2 | 60 | 32 | 180 | 0.7 |

## OAG Type



**Max. coolant pressure 20 bar**
Coolant is supplied from the Stop Block through the cutting tool.



Exclusive Stop Block is required.

| Model | Order No. | Ød | L | L1 | L2 | M | Collet Model | Nut Model | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -OAG90-13-185 | **802.736** | 2.5 -13 | 185 | 101 | 84 | 70.5 | NBC13 | BPS13 | 5 000 | 5.9 |
| HSK-A100 -OAG90-13-195 | **802.697** | | 195 | 111 | | | | | | 8.4 |

1. Standard fixed length A is 6 mm. Other lengths are available upon request.
2. Standard "S" is 80 mm for HSK-A63 and 65 mm for HSK-A100.
3. New baby nut and wrench are included. New baby collet is to be ordered separately.
4. Coolant pipe is to be ordered separately.

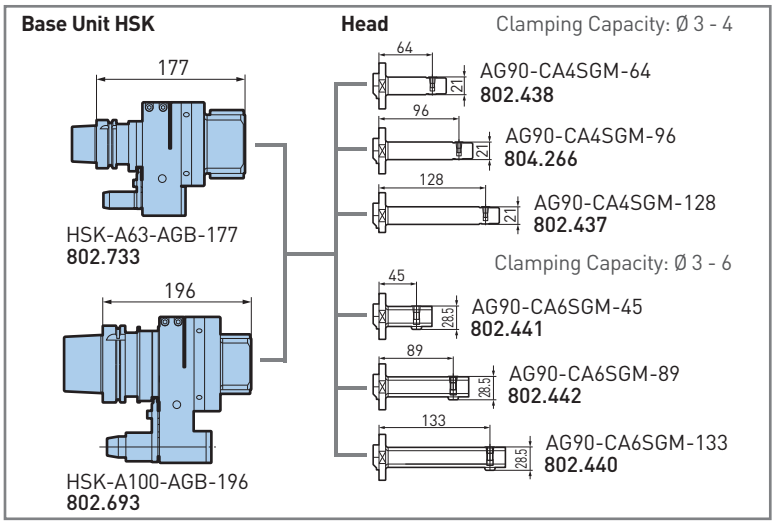
For New Baby Collet ▸ 250
For Baby Perfect Seal ▸ 262
For Stop Block ▸ 290

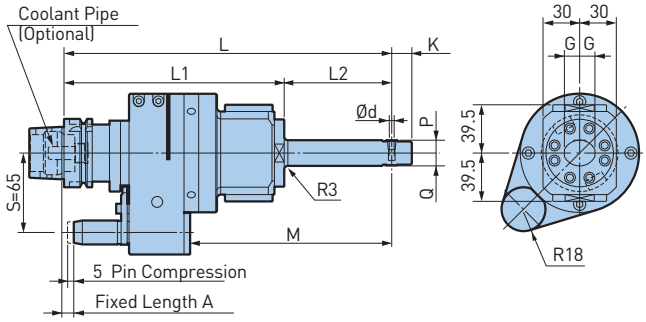


BROTECH

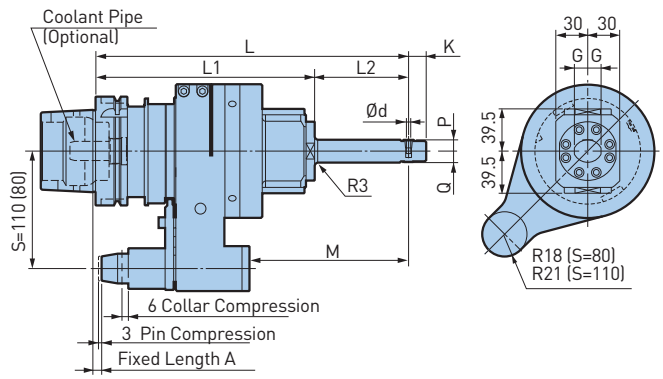
# Small Bore Type

Angular operation in a Ø 30 mm bore (min.) is possible. Modular heads enhance versatility. Head is aligned with spindle center for easy programing.




HSK-A63 max. 2000 min$^{-1}$



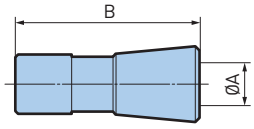

HSK-A100 max. 2000 min$^{-1}$

| Model | Order No. | Base | Head | Ød | G | K | L | L1 | L2 | M | P | Q | Speed Ratio | Weight (kg) S=65 | S=80 | S=110 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63-AG90 -CA4SGM -241 | 802.727 | HSK-A63-AGB-177 | AG90-CA4SGM - 64 | 3 - 4 | 12.5 | 16.5 | 241 | 185 | 56 | 133 | 10.5 | 10.5 | 1:1.06 | 5.5 | - | - |
| -273 | 802.728 | | - 96 | | | | 273 | | 88 | 165 | | | | 5.6 | | |
| -305 | 802.729 | | -128 | | | | 305 | | 120 | 197 | | | | 5.7 | | |
| -CA6SGM -222 | 802.730 | | AG90-CA6SGM - 45 | 3 - 6 | 15 | 20 | 222 | | 37 | 114 | 12.5 | 16 | 1:0.77 | 5.6 | | |
| -266 | 802.731 | | - 89 | | | | 266 | | 81 | 158 | | | | 5.8 | | |
| -310 | 802.732 | | -133 | | | | 310 | | 125 | 202 | | | | 6.0 | | |
| HSK-A100-AG90-CA4SGM-260 | 802.680 | HSK-A100-AGB-196 | AG90-CA4SGM - 64 | 3 - 4 | 12.5 | 16.5 | 260 | 204 | 56 | 117 | 10.5 | 10.5 | 1:1.06 | - | 11.1 | 11.7 |
| -292 | 802.682 | | - 96 | | | | 292 | | 88 | 149 | | | | | 11.2 | 11.8 |
| -324 | 802.684 | | -128 | | | | 324 | | 120 | 181 | | | | | 11.3 | 11.9 |
| -CA6SGM -241 | 802.686 | | AG90-CA6SGM - 45 | 3 - 6 | 15 | 20 | 241 | | 37 | 98 | 12.5 | 16 | 1:0.77 | - | 11.2 | 11.8 |
| -285 | 802.688 | | - 89 | | | | 285 | | 81 | 145 | | | | | 11.4 | 12.0 |
| -329 | 802.690 | | -133 | | | | 329 | | 125 | 186 | | | | | 11.6 | 12.2 |

1. Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
2. Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
3. Internal coolant can not be used.
4. Exclusive collet is to be ordered separately.
5. Coolant pipe is to be ordered separately.

For Stop Block ▶ 290

## Exclusive collet for Small Bore Angle Head

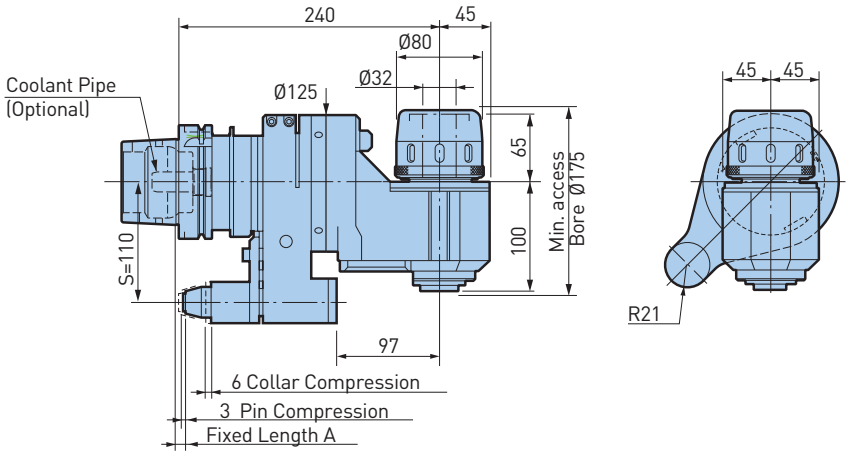



| Model | | Order No. | ØA | B |
|---|---|---|---|---|
| CA4 | -3 | 804.666 | 3 | 16.5 |
| | -3.5 | 804.667 | 3.5 | |
| | -4 | 804.668 | 4 | |

| Model | | Order No. | ØA | B |
|---|---|---|---|---|
| CA6 | -3 | 804.669 | 3 | 22 |
| | -4 | 804.670 | 4 | |
| | -5 | 804.671 | 5 | |
| | -6 | 804.672 | 6 | |

## HMC Type

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.



Exclusive Stop Block is required.

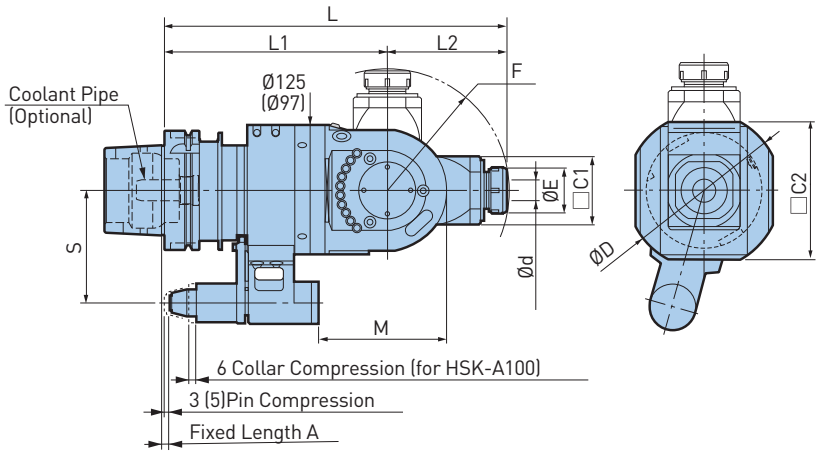
| Model | Order No. | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|
| HSK-A100-AG90/HMC32-240 | **802.642** | 3 000 | 16.0 |

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.
6. Coolant pipe is to be ordered separately.

For Stop Block ▶ 290
For Straight Collet ▶ 272

## Universal Type

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.

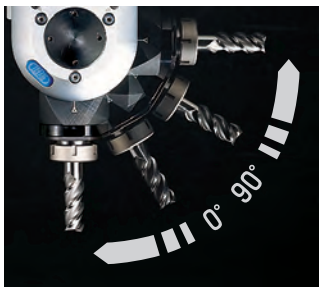


Exclusive Stop Block is required.

| Model | Order No. | Ød | ØE | ØD | □C1 | □C2 | L | L1 | L2 | M | F | S | Collet Model | Max. $min^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -AGU/NBS13 -285 | **802.734** | 2.5 - 13 | 35 | 115 | 51 | 97 | 285 | 185 | 100 | 124 | 102 | 65 | NBC13 | 6000 | 9.6 |
| HSK-A100 -AGU/NBS20 -325 | **802.695** | 2.5 - 20 | 46 | 140 | 65 | 125 | 325 | 210 | 115 | 125 | 118 | 110 | NBC20 | 4000 | 20.0 |

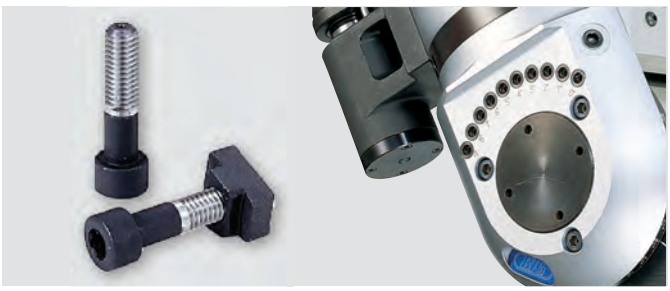
1. Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
2. Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
3. Figures in ( ) in the drawing indicate dimensions for HSK-A63.
4. New baby nut and wrench are included.
5. Coolant can be supplied through the locating pin.
6. Coolant pipe is to be ordered separately.

For New Baby Collet ▶ 250
For Stop Block ▶ 290




Easily adjustable spindle angle from 0° to 90°.

Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.

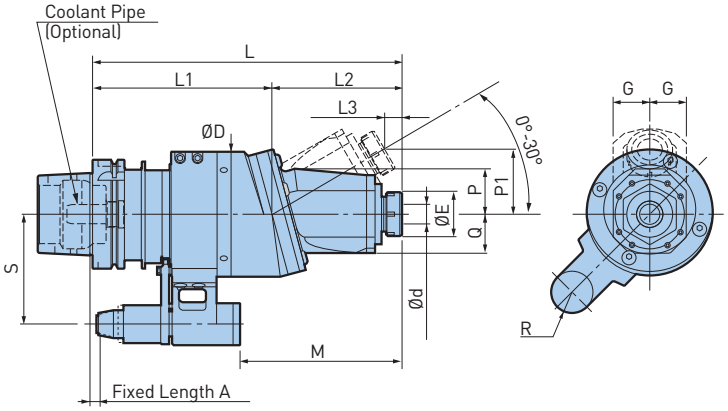


Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

A.3

# AGU30 Type

Spindle angle is adjustable from 0° to 30°. Large swivel flange assures high rigidity.



Exclusive Stop Block is required.

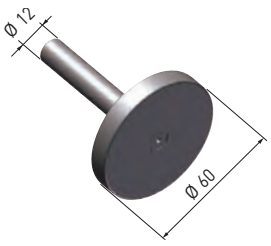
| Model | Order No. | Ød | ØD | ØE | G | L | L1 | L2 | L3 max. | Q | P | P1 max. | R | S | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -AGU30/NBS13 -255 | **802.735** | 2.5 - 13 | 97 | 35 | 29 | 255 | 150 | 105 | 14 | 30 | 34 | 52.5 | 18 | 65 | 6 000 | NBC13 | 6.8 |
| HSK-A100-AGU30/NBS20 -305 | **802.696** | 2.5 - 20 | 125 | 46 | 36.5 | 305 | 175 | 130 | 17 | 39 | 45 | 65 | 21 | 110 | 4 000 | NBC20 | 15.3 |

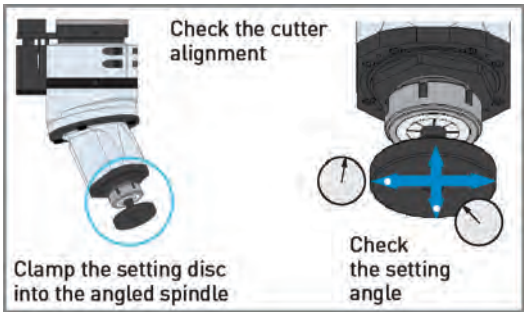
1. Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
2. Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
3. New baby nut, wrench and setting disk are included.
4. Coolant can be supplied through the locating pin.
5. Coolant pipe is to be ordered separately.

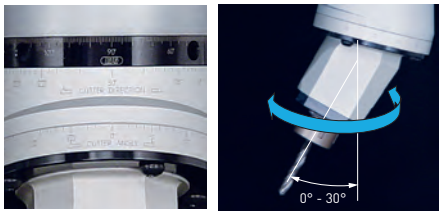
For New Baby Collet ▶ 250
For Stop Block ▶ 290

## Setting Disc (included accessory)

For precise adjustment of the spindle angle or direction.




Spindle angle is easily adjustable from 0° to 30° using the scale indication on the body.

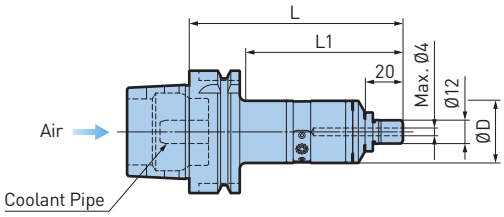


BROTECH

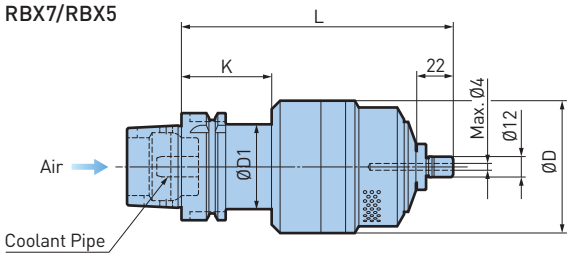
# Air Turbine Spindle

## Center Through Type

RBX12




RBX7/RBX5




| Model | Order No. | Spindle Speed (min$^{-1}$) | L | L1 | ØD | ØD1 | K | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -RBX5C -4S-160 | **965.506** | 40 000 - 50 000 | 160 | - | 96 | 50 | 53 | MGN4S | 3.9 |
| -RBX7C -4S-160 | **965.505** | 60 000 - 80 000 | | - | 78 | | | | 2.9 |
| -RBX12C -4S-110 | **805.749** | 100 000 - 120 000 | 110 | 81 | 32 | - | - | MGN4S-HG | 1.0 |
| HSK-A100 -RBX5C -4S-165 | **802.427** | 40 000 - 50 000 | 165 | - | 96 | 68 | 58 | MGN4S | 5.9 |
| -RBX7C -4S-165 | **802.430** | 60 000 - 80 000 | | - | 78 | | | | 4.9 |

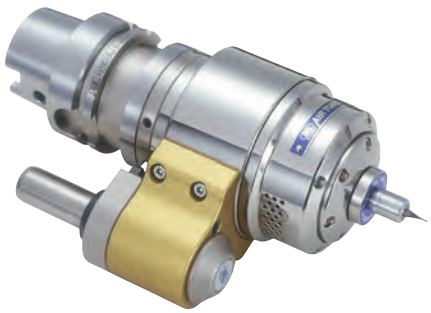
1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.
3. Coolant pipe is to be ordered separately.

For Micro Collet ▶ 247
For Air Filter ▶ 161

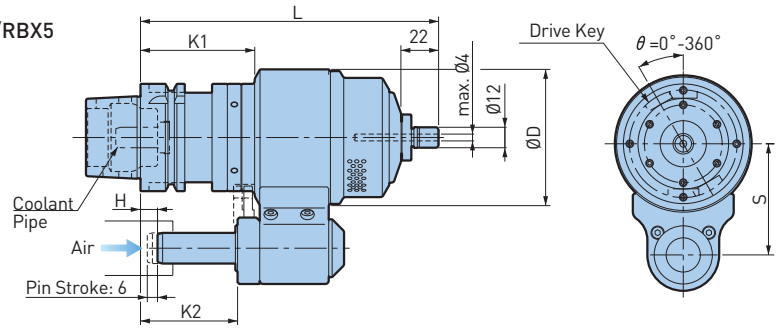
**Caution**

Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

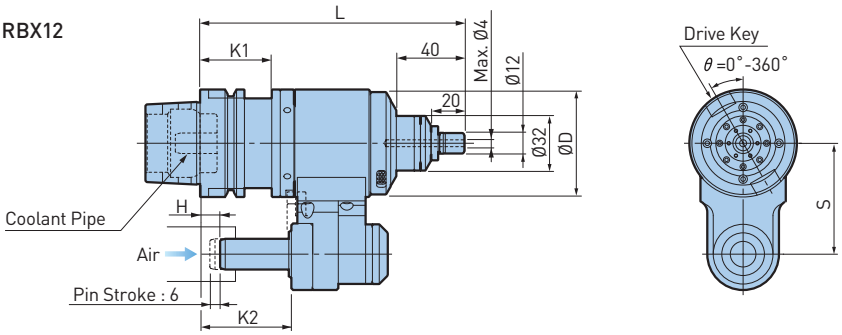
# Air Turbine Spindle



RBX7/RBX5




RBX12



Exclusive Stop Block is required.

| Model | Order No. | Operation Speed (min$^{-1}$) | L | ØD | K1 | K2 | S | H | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -RBX5 -4S-175-65 | **802.431** | 40 000 - 50 000 | 175 | 96 | 67 | 57 | 65 | 0 - 45 | MGN4S | 4.8 |
| -RBX7 -4S-175-65 | **802.433** | 60 000 - 80 000 | | 80 | | | | | | 3.8 |
| -RBX12 -4S-155-65 | **805.748** | 100 000 - 120 000 | 155 | 63 | 42 | 53 | 65 | -4 - 41 | MGN4S-HG | 3.0 |
| HSK-A100 -RBX5 -4S-180-80 | **802.425** | 40 000 - 50 000 | 180 | 100 | 72 | 62 | 80 | 5 - 50 | MGN4S | 9.4 |
| -RBX7 -4S-180-80 | **802.428** | 60 000 - 80 000 | | | | | | | | 8.4 |

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247
For Air Filter ▶ 161
For Stop Block ▶ 290

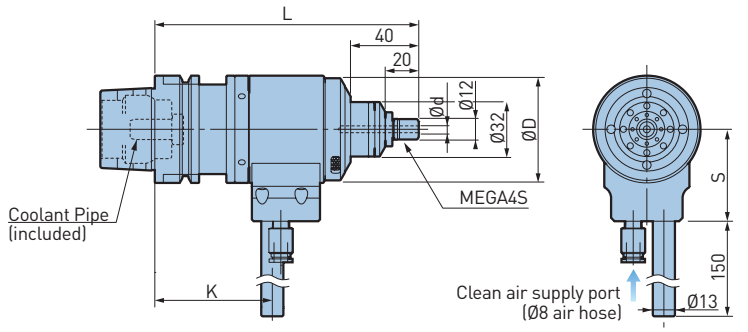


BROTECH

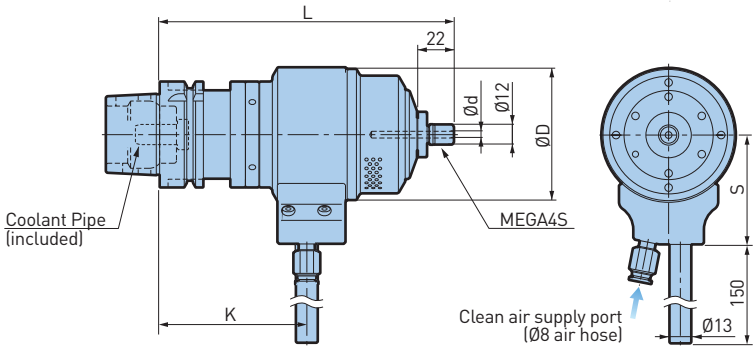
# Air Turbine Spindle

## Manual Type

RBX12




RBX7/RBX5



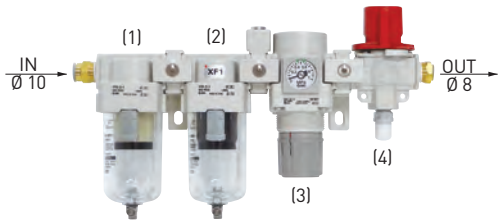

A.3

| Model | Order No. | Spindle Speed (min$^{-1}$) | Ød | ØD | L | K | S | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -RBX5 -4S-175H | **802.432** | 40 000 - 50 000 | 0.45 - 4.05 | 96 | 175 | 87 | 71 | MGN4S | 4.8 |
| -RBX7 -4S-175H | **802.434** | 60 000 - 80 000 | | 80 | | | 65 | MGN4S-HG | 3.8 |
| -RBX12 -4S-155H | **806.710** | 100 000 - 120 000 | | 63 | 155 | 69 | 54 | | 2.7 |
| HSK-A100 -RBX5 -4S-180H | **802.426** | 40 000 - 50 000 | 0.45 - 4.05 | 100 | 180 | 92 | 80 | MGN4S | 9.4 |
| -RBX7 -4S-180H | **802.429** | 60 000 - 80 000 | | | | | | | 8.4 |

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

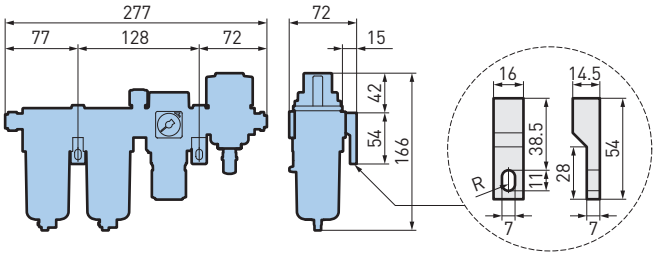
For Micro Collet ▶ 247

# Air Filter Regulator for RBX




**Model XF1**

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).




| Model | Order No. |
|---|---|
| XF1 | **962.661** |

## Accessories for RBX

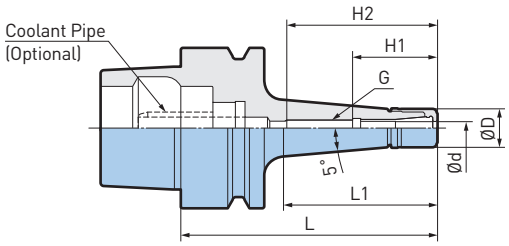
| Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|
| | MEGA Nut | | Exclusive Nut | | MEGA Wrench | | Micro Collet ▶ 247 |
| Air Turbine Spindle | Model | Order No. | Model | Order No. | Model | Order No. | Model |
| RBX12-4S | - | - | MGN4S-HG | 805.747 | MGR12 | **969.450** | NBC4S- |
| RBX7-4S | MGN4S | **969.481** | - | - | | | |
| RBX5-4S | MGN4S | **969.481** | - | - | | | |

# MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

Coolant Through Hole

A.3




**Ø 0.45 - 8.05 mm**

| Model | Order No. | Ød | ØD | L | L1 | H1 | H2 | G | max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-E25 -MEGA3S - 45T * | **968.870** | 0.45 - 3.25 | 10 | 45 | 32 | 22 | 32 | - | 50 000 | NBC3S- | 0.06 |
| - 60T | **968.871** | | | 60 | 48 | | 38 | M4 P0.7 | 40 000 | | 0.08 |
| ● -MEGA6S - 45T * | **968.874** | 0.45 - 6.05 | 14 | 45 | 33 | 28.5 | 31 | - | 50 000 | NBC6S- | 0.08 |
| - 60T | **968.875** | | | 60 | 49 | | 40 | M7 P0.75 | 40 000 | | 0.10 |
| HSK-E32 -MEGA3S - 60T | **968.917** | 0.45 - 3.25 | 10 | 60 | 35 | 22 | 38 | M4 P0.7 | 40 000 | NBC3S- | 0.15 |
| -MEGA4S - 45T * | **968.880** | 0.45 - 4.05 | 12 | 45 | 23 | 26.5 | 26 | - | 50 000 | NBC4S- | 0.14 |
| - 60T | **968.881** | | | 60 | 35 | | 46 | M5 P0.8 | 40 000 | | 0.16 |
| ● -MEGA6S - 45T * | **968.882** | 0.45 - 6.05 | 14 | 45 | 23 | 28.5 | 28 | - | 50 000 | NBC6S- | 0.14 |
| ● - 60T | **968.883** | | | 60 | 36 | | 38 | M7 P0.75 | 40 000 | | 0.17 |
| -MEGA8S - 60T * | **803.604** | 2.95 - 8.05 | 18 | | 38 | 31 | 43 | - | | NBC8S- | 0.20 |
| HSK-E40 -MEGA3S - 60T | **968.919** | 0.45 - 3.25 | 10 | 60 | 35 | 22 | 39 | M4 P0.7 | 40 000 | NBC3S- | 0.23 |
| - 75T | **968.920** | | | 75 | 50 | | 38 | | | | 0.25 |
| -MEGA4S - 60T | **968.890** | 0.45 - 4.05 | 12 | 60 | 35 | 26.5 | 44 | M5 P0.8 | | NBC4S- | 0.24 |
| - 75T | **968.891** | | | 75 | 50 | | 47 | | | | 0.27 |
| ● -MEGA6S - 60T * | **968.892** | 0.45 - 6.05 | 14 | 60 | 35 | 28.5 | 42 | - | | NBC6S- | 0.24 |
| ● - 75T | **968.893** | | | 75 | 50 | | 49 | M7 P0.75 | | | 0.28 |
| - 90T | **968.894** | | | 90 | 65 | | 49 | | | | 0.32 |
| HSK-E50 -MEGA6S - 80T | **968.907** | 0.45 - 6.05 | 14 | 80 | 49 | 28.5 | 49 | M7 P0.75 | 40 000 | NBC6S- | 0.48 |
| -120T | **806.636** | | | 120 | 89 | | | | 35 000 | | 0.55 |

1. MEGA nut is included.
2. * Internal thread (G) is not available.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▶ 247 | Micro Seal Nut ▶ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **261.280** |
| MEGA8S | MGN8S | **804.108** | MGR18 | **801.705** | NBC8S- | MGN8S-PS | NBB8S | **805.802** | SC-NBC8S | **805.827** |



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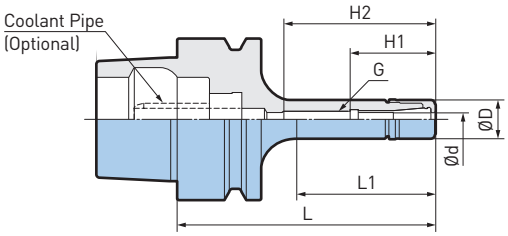
# MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

Coolant Through Hole






**Ø 0.45 - 6.05 mm**

| Model | Order No. | Ød | ØD | L | L1 | H1 | H2 | G | max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-E25 -MEGA6S - 45 * | **968.868** | 0.45 - 6.05 | 14 | 45 | 32 | 28 | 31 | - | 50 000 | NBC6S- | 0.07 |
| - 60 | **968.869** | | | 60 | 47 | 28.5 | 41 | M7 P0.75 | 40 000 | | 0.08 |
| HSK-E32 -MEGA3S - 45 * | **968.914** | 0.45 - 3.25 | 10 | 45 | 23 | 22 | 31 | - | 50 000 | NBC3S- | 0.13 |
| -MEGA4S - 45 | **968.876** | 0.45 - 4.05 | 12 | 45 | 22 | 26.5 | | M5 P0.8 | | NBC4S- | 0.14 |
| - 60 | **968.877** | | | 60 | 34 | | 46 | | 40 000 | | 0.15 |
| -MEGA6S - 45 * | **968.878** | 0.45 - 6.05 | 14 | 45 | 22 | 28.5 | 28 | - | 50 000 | NBC6S- | 0.14 |
| - 60 | **968.879** | | | 60 | 35 | | 38 | M7 P0.75 | 40 000 | | 0.15 |
| HSK-E40 -MEGA3S - 40 * | **968.915** | 0.45 - 3.25 | 10 | 40 | 19 | 22 | 24 | - | 50 000 | NBC3S- | 0.21 |
| -MEGA6S - 45 * | **968.716** | 0.45 - 6.05 | 14 | 45 | 23 | 27.5 | 27 | | | NBC6S- | 0.22 |
| - 60 * | **968.757** | | | 60 | 35 | 28.5 | 42 | | 40 000 | | 0.23 |
| HSK-E50 -MEGA6S - 55 * | **978.100** | 0.45 - 6.05 | 14 | 55 | 26 | 28.5 | 35 | - | 45 000 | NBC6S- | 0.44 |
| - 80 | **968.760** | | | 80 | 44 | | 49 | M7 P0.75 | 40 000 | | 0.46 |

1. MEGA nut is included.
2. * Internal thread (G) is not available.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▶ 247 | Micro Seal Nut ▶ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **261.280** |

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole

A.3

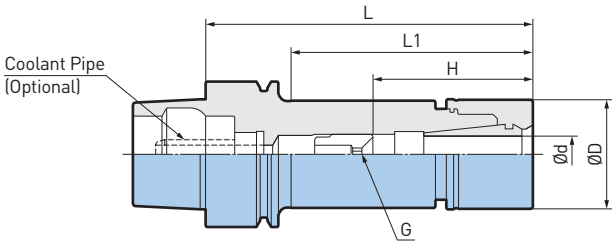



Fig. 1

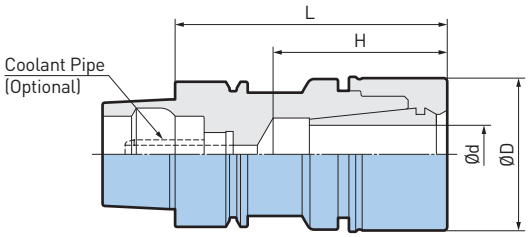



Fig. 2

**Ø 0.25 - 16 mm**

| Model | Order No. | Fig. | Ød | ØD | L | L1 | H | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-E25 -MEGA6N - 40 * | **968.752** | 1 | 0.25 - 6 | 20 | 40 | 29 | 25 | 30 000 | NBC6- | 0.10 |
| -MEGA8N - 45 * | **968.753** | 2 | 0.5 - 8 | 25 | 45 | - | 30 | 25 000 | NBC8- | 0.12 |
| -MEGA10N - 60 ** | **968.754** | 2 | 1.5 - 10 | 30 | 60 | | 45 | 20 000 | NBC10- | 0.17 |
| HSK-E32 -MEGA6N - 45 * | **968.884** | 1 | 0.25 - 6 | 20 | 45 | 24 | 28 | 40 000 | NBC6- | 0.17 |
| - 60 | **968.885** | | | | 60 | 37 | 23 - 27 | 35 000 | | 0.20 |
| -MEGA8N - 50 * | **968.886** | 1 | 0.5 - 8 | 25 | 50 | 29 | 33 | 40 000 | NBC8- | 0.22 |
| -MEGA10N - 65 * | **968.888** | 2 | 1.5 - 10 | 30 | 65 | - | 47 | 30 000 | NBC10- | 0.28 |
| -MEGA13N - 70 * | **968.889** | | 2.5 - 13 | 35 | 70 | - | 44 | 25 000 | NBC13- | 0.31 |
| HSK-E40 -MEGA6N - 50 * | **968.717** | 1 | 0.25 - 6 | 20 | 50 | 26 | 31 | 40 000 | NBC6- | 0.26 |
| - 60 | **968.895** | | | | 60 | 34 | 23 - 26 | 35 000 | | 0.28 |
| - 75 | **968.718** | | | | 75 | 49 | 23 - 41 | 30 000 | | 0.31 |
| - 90 | **968.896** | | | | 90 | 64 | 23 - 43 | 28 000 | | 0.35 |
| -120 | **968.897** | | | | 120 | 94 | | 25 000 | | 0.41 |
| -MEGA8N - 55 * | **968.719** | 1 | 0.5 - 8 | 25 | 55 | 31 | 36 | 40 000 | NBC8- | 0.31 |
| - 75 | **968.720** | | | | 75 | 51 | 26 - 41 | 30 000 | | 0.38 |
| -MEGA10N - 60 * | **968.721** | 1 | 1.5 - 10 | 30 | 60 | 37 | 40 | 35 000 | NBC10- | 0.39 |
| - 75 * | **968.899** | | | | 75 | 52 | 55 | 30 000 | | 0.46 |
| - 90 | **968.722** | | | | 90 | 67 | 38 - 48 | 28 000 | | 0.53 |
| -MEGA13N - 65 * | **968.900** | 1 | 2.5 - 13 | 35 | 65 | 44 | 44 | 30 000 | NBC13- | 0.45 |
| - 75 * | **968.723** | | | | 75 | 54 | 55 | 25 000 | | 0.53 |
| - 90 | **968.901** | | | | 90 | 69 | 44 - 48 | | | 0.62 |
| -MEGA16N - 75 * | **968.905** | 2 | 2.5 - 16 | 42 | 75 | - | 48 | 20 000 | NBC16- | 0.60 |

For Coolant Pipe ▶ 174

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Adjusting screws can not be used.
4. ** NBC-E collet and adjusting screw can not be used.
5. Nut-less model available upon request.
6. "G" is the adjusting screw (optional).
7. "H" indicates the adjustment length with an adjusting screw.

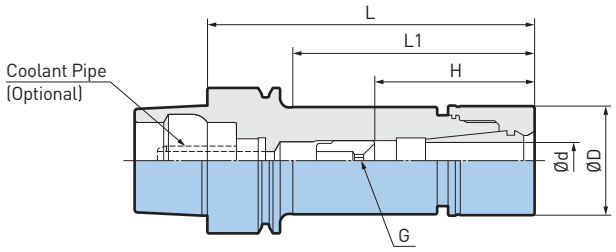


BROTECH

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole






**Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-E50 -MEGA6N - 70 | **968.728** | 0.25 - 6 | 20 | 70 | 38 | 23 - 39 | 30 000 | NBC6- | 0.50 |
| -MEGA8N - 60 * | **968.729** | 0.5 - 8 | 25 | 60 | 30 | 37 | 40 000 | NBC8- | 0.52 |
| - 90 | **968.730** | | | 90 | 56 | 26 - 45 | 30 000 | | 0.62 |
| -MEGA10N - 60 ** | **968.731** | 1.5 - 10 | 30 | 60 | 30 | 35 | 35 000 | NBC10- | 0.56 |
| -MEGA13N - 70 * | **968.733** | 2.5 - 13 | 35 | 70 | 40 | 45 | 28 000 | NBC13- | 0.67 |
| - 90 | **968.734** | | | 90 | 60 | 44 - 47 | 25 000 | | 0.80 |
| -150 | **968.910** | | | 150 | 120 | 44 - 63 | 15 000 | | 1.24 |
| -MEGA16N - 90 * | **968.736** | 2.5 - 16 | 42 | 90 | 63 | 65 | 25 000 | NBC16- | 1.00 |
| -MEGA20N - 75 ** | **968.764** | 2.5 - 20 | 46 | 75 | - | 49 | | NBC20- | 0.80 |
| -100 | **968.911** | | | 100 | | 51 - 54 | 20 000 | | 1.10 |

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
4. ** NBC-E collet and adjusting screw can not be used.
5. Nut-less model available upon request.
6. "G" is the adjusting screw (optional).
7. "H" indicates the adjustment length with an adjusting screw.

For Coolant Pipe ▶ 174

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▶ 250 | MEGA Perfect Seal ▶ 260 | Adjusting Screw | | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |

# Hydraulic Chuck Super Slim

Extremely slim design eliminates interference.

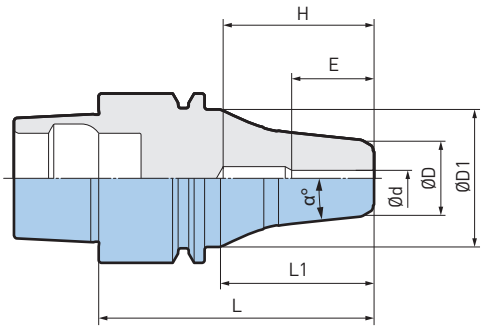



Fig. 1

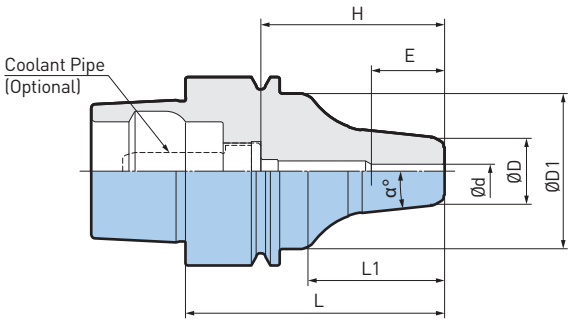



Fig. 2

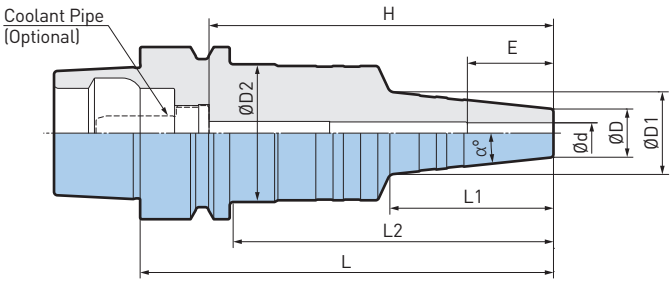



Fig. 3

**Ø 3 - 12 mm**

| Model | Order No. | Fig. | Ød | ØD | ØD1 | ØD2 | L | L1 | L2 | E | α° | H max. | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-E25 -HDC3S - 40 | **806.430** | 1 | 3 | 14 | 20 | - | 40 | 27 | - | 16 | 6 | 22 | 60 000 | 0.09 |
| -HDC4S - 40 | **806.431** | | 4 | | | | | | | | | 21 | | 0.09 |
| -HDC6S - 45 | **806.734** | | 6 | 12 | 23 | | 45 | 31 | | | 8 | 26 | | 0.11 |
| HSK-E32 -HDC3S - 52 | **805.471** | 1 | 3 | 14 | 26 | - | 52 | 29 | - | 16 | 6 | 28 | 45 000 | 0.19 |
| -HDC4S - 52 | **805.472** | | 4 | | | | | | | 19 | | | | 0.19 |
| -HDC6S - 57 | **805.473** | | 6 | | | | 57 | 34 | | 25 | | 33 | | 0.20 |
| HSK-E40 -HDC3S - 55 | **805.474** | 2 | 3 | 14 | 33 | - | 55 | 29 | - | 16 | 6 | 39 | 40 000 | 0.31 |
| -HDC4S - 55 | **805.475** | | 4 | | | | | | | 19 | | | | 0.31 |
| -HDC6S - 60 | **805.476** | | 6 | | | | 60 | 34 | | 25 | | 40 | | 0.32 |
| HSK-E50 -HDC4S -120 | **807.115** | 3 | 4 | 14 | 24 | 40 | 120 | 47 | 93 | 19 | 6 | 100 | 30 000 | 0.90 |
| -HDC6S -120 | **807.088** | | 6 | | | | | | | 25 | | | | 0.90 |
| -HDC8S -120 | **807.089** | | 8 | 17 | 28 | | | 48 | | 31 | | 85 | | 0.92 |
| -HDC10S -120 | **807.090** | | 10 | 19 | 30 | | | | | 33 | | | | 0.92 |
| -HDC12S -120 | **807.091** | | 12 | 21 | 32 | | | 49 | | 36 | | | | 0.93 |

1. Center through coolant is not available for HSK-E25 and HSK-E32.
2. Coolant pipe for HSK-E40 AND HSK-E50 are to be ordered seperately.
3. Adjusting screw can not be used.
4. "E" is the min. clamping length.
5. "H" is the max. tool shank length can be inserted for these models.

For Coolant Pipe ▶ 174
For Inner Bore Cleaner ▶ 286

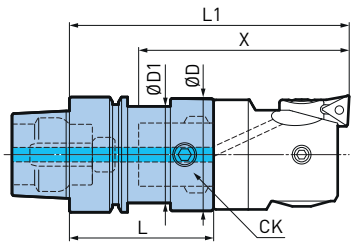
**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# CK Shanks with Center Through Hole

Symmetrical execution for high speed machine spindles

Coolant Through Hole




A.3

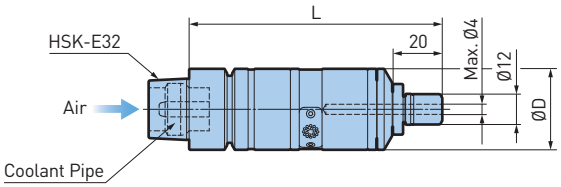
| Model | | | Order No. | CK | ØD | ØD1 | L | L1 | X | Weight (Kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-E25 | -CKB1 | -22 | **328.249F **** | CKB1 | 19 | 19 | 22 | 55 | 40 | 0.05 |
| | -CKB2 | -30 | **328.281F *** | CKB2 | 24 | 24 * | 30 | 66 | 50 | 0.08 |
| HSK-E32 | -CKB1 | -40 | **328.257F** | CKB1 | 19 | 19 | 40 | 73 | 50 | 0.16 |
| | -CKB2 | -33 | **328.280F** | CKB2 | 24 | 24 | 33 | 69 | 43 | 0.14 |
| | -CKB3 | -48 | **328.151F** | CKB3 | 31 | 25.8 | 48 | 88 | 68 | 0.22 |
| | -CKB4 | -68 | **328.218F** | CKB4 | 39 | 26 | 68 | 115 | 90 | 0.40 |
| HSK-E40 | -CKB1 | -32 | **324.111F** | CKB1 | 19 | 19 | 31.5 | 64 | 40 | 0.22 |
| | -CKB2 | -35 | **324.121F** | CKB2 | 24 | 24 | 35 | 71 | 45 | 0.20 |
| | -CKB3 | -40 | **324.131F** | CKB3 | 31 | 31 | 40 | 80 | 55 | 0.27 |
| | -CKB4 | -50 | **324.141F** | CKB4 | 39 | 33 | 50 | 97 | 72 | 0.36 |
| HSK-E50 | -CKB3 | -44 | **324.231F** | CKB3 | 31 | 31 | 44 | 84 | 53 | 0.47 |
| | -CKB4 | -48 | **324.241F** | CKB4 | 39 | 39 | 48 | 95 | 64 | 0.52 |
| | -CKB5 | -61 | **324.251F** | CKB5 | 50 | 41 | 61 | 118 | 87 | 0.71 |

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. * The dimension ØD1 does not correspond to the HSK standard.
3. ** Center through coolant is not available.
4. All shanks are precision balanced (± 2 gmm).
5. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174

# Air Turbine Spindle

## Center Through Type




A.3

**Ø 0.45 - 4.05 mm**

| Model | Order No. | Spindle Speed (min$^{-1}$) | L | ØD | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|
| HSK-E32 -RBX12C-4S-100 | **803.226** | 100 000 - 120 000 | 100 | 32 | MGN4S-HG | 0.45 |

1. Nut, wrench (RBX12 : XW20), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

For Air Filter ▶ 161

**Caution**

Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

## Accessories for RBX

| Accessories | | | | | |
|---|---|---|---|---|---|
| | Exclusive Nut | | MEGA Wrench | | Micro Collet ▶ 247 |
| Air Turbine Spindle | Model | Order No. | Model | Order No. | Model |
| RBX12-4S | MGN4S-HG | **805.747** | MGR12 | **969.450** | NBC4S- |



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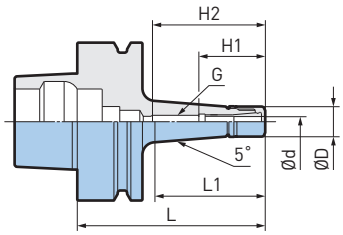
## MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

Coolant Through Hole




A.3

**Ø 0.45 - 8.05 mm**

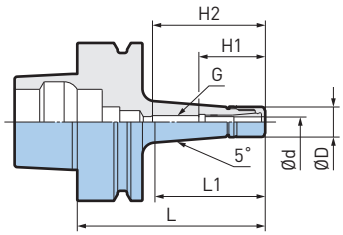
| Model | Order No. | Ød | ØD | L | L1 | H1 | H2 | G | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-F63 -MEGA6S - 75T | **803.589** | 0.45 - 6.05 | 14 | 75 | 44 | 28.5 | 41 | M7 P0.75 | 32 000 | NBC6S- | 0.7 |
| -MEGA8S - 75T | **805.576** | 2.95 - 8.05 | 18 | | | 31 | 58 | M9 P0.75 | | NBC8S- | 0.7 |

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174

## MEGA Micro Chuck Type S

Coolant Through Hole




**Ø 0.45 - 6.05 mm**

| Model | Order No. | Ød | ØD | L | L1 | H1 | H2 | G | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-F63 -MEGA6S - 90 | **803.592** | 0.45 - 6.05 | 14 | 90 | 61 | 28.5 | 49 | M7 P0.75 | 27 000 | NBC6S- | 0.8 |
| -105 | **803.591** | | | 105 | 76 | | | | 25 000 | | 0.8 |

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.

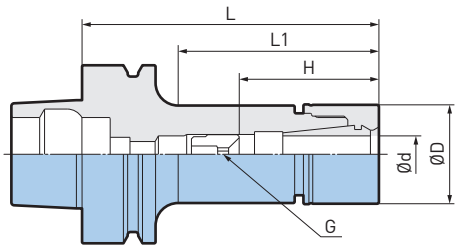
For Coolant Pipe ▶ 174

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▶ 247 | Micro Seal Nut ▶ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **961.280** |
| MEGA8S | MGN8S | **804.108** | MGR18 | **801.705** | NBC8S- | MGN8S-PS | NBB8S | **805.802** | SC-NBC8S | **805.827** |

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole

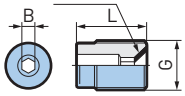



**Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | Max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| HSK-F63 -MEGA6N - 90 | **801.287** | 0.25 - 6 | 20 | 90 | 53 | 23 - 43 | 30 000 | NBC6- | 0.8 |
| -135 | **801.677** | | | 135 | 99 | | 20 000 | | 0.9 |
| -MEGA8N - 90 | **978.199** | 0.5 - 8 | 25 | 90 | 54 | 26 - 45 | 30 000 | NBC8- | 0.9 |
| -120 | **804.962** | | | 120 | 84 | | 25 000 | | 0.9 |
| -MEGA10N - 90 | **978.146** | 1.5 - 10 | 30 | 90 | 54 | 38 - 48 | 30 000 | NBC10- | 0.9 |
| -120 | **978.152** | | | 120 | 84 | | 25 000 | | 1.1 |
| -MEGA13N - 75 * | **978.190** | 2.5 - 13 | 35 | 75 | 43 | 47 | 30 000 | NBC13- | 0.9 |
| - 90 * | **978.215** | | | 90 | 56 | 61 | | | 1.0 |
| -105 | **801.283** | | | 105 | 71 | 44 - 53 | 25 000 | | 1.1 |
| -MEGA16N - 75 * | **978.102** | 2.5 - 16 | 42 | 75 | 43 | 48 | 30 000 | NBC16- | 1.0 |
| - 90 * | **978.151** | | | 90 | 58 | 61 | 25 000 | | 1.2 |
| -MEGA20N - 75 * | **978.047** | 2.5 - 20 | 46 | 75 | 45 | 51 | 30 000 | NBC20- | 1.1 |
| - 90 * | **978.147** | | | 90 | 60 | 61 | 25 000 | | 1.3 |
| -105 | **978.124** | | | 105 | 75 | 51 - 58 | 20 000 | | 1.4 |

1. MEGA nut is included.
2. * Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted for these models.
3. Nut-less model available upon request.
4. Coolant pipe is to be ordered separately.
5. "G" is the adjusting screw (optional).
6. "H" indicates the adjustment length with an adjusting screw.

For Coolant Pipe ▶ 174

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▶ 250 | MEGA Perfect Seal ▶ 260 | Adjusting Screw   | | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |



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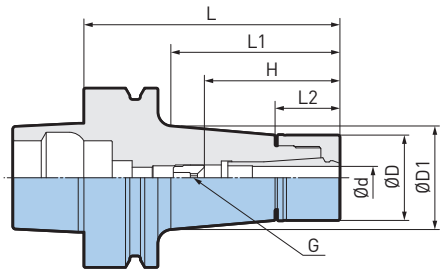
# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

Coolant Through Hole



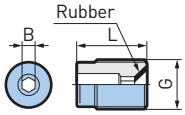



**Ø 3 - 12 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | L2 | H | max. min$^{-1}$ | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-F63 -MEGA6E - 65 * | **803.214** | 3 - 6 | 25 | 28.5 | 65 | 34 | 21 | 39 | 30 000 | MEC6- | 0.8 |
| -MEGA8E - 65 * | **803.218** | 3 - 8 | 30 | 33 | | | 22.5 | 41 | | MEC8- | 0.8 |
| -MEGA10E -120 | **803.213** | 3 - 10 | 35 | 47 | 120 | 91 | 23 | 48 - 58 | 29 000 | MEC10- | 1.6 |
| -MEGA13E -135 | **803.216** | 3 - 12 | 42 | 52 | 135 | 108 | 25 | 50 - 60 | 26 000 | MEC13- | 2.0 |

1. MEGA E nut is included.
2. * Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted for these models.
3. Nut-less model available up on request.
4. Coolant pipe is to be ordered separately.
5. "G" is the adjusting screw (optional).
6. "H" indicates the adjustment length with an adjusting screw.

For Coolant Pipe ▶ 174

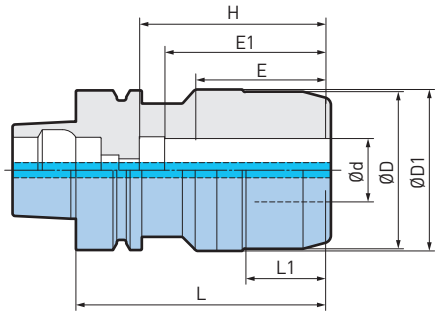
| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA E Nut | | MEGA Wrench | | MEGA E Collet ▶ 264 | MEGA E Perfect Seal ▶ 265 | Adjusting Screw   | | | | |
| MEGA E Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6E | MEN6 | **968.461** | MGR25 | **969.456** | MEC6- | EPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8E | MEN8 | **968.462** | MGR30 | **969.458** | MEC8- | EPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10E | MEN10 | **968.463** | MGR35 | **969.460** | MEC10- | EPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13E | MEN13 | **968.464** | MGR42 | **969.462** | MEC13- | EPS13- | NBA13B | **961.598** | M14 | 20 | 4 |

A.3

## MEGA Double Power Chuck Type D

Coolant Through Hole

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and Type DS to feed coolant to cutting tool periphery.




Ø 3 - 32 mm

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H | E | E1 | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HSK-F63 -MEGA16D - 80A | **803.092** | 16 | 42 | 52.6 | 80 | 25 | 55 | 48 | 50 | 28 000 | 1.2 |
| -MEGA20D - 90A | **803.093** | 20 | 50 | 55 | 90 | 34 | 65 | 50 | 56 | | 1.4 |
| -MEGA25D -100A | **803.103** | 25 | 62 | 62.7 | 100 | 39 | 75 | 56 | 57 | 25 000 | 1.8 |
| -MEGA32D -105A | **803.082** | 32 | 70 | 70.7 | 105 | 33.5 | 80 | 60 | 64 | 24 000 | 2.0 |

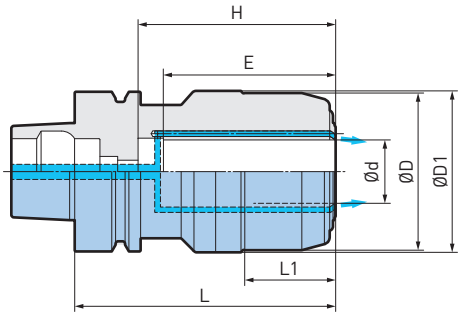
1. Wrench and coolant pipe are to be ordered separately.
2. "E" is the min. clamping length.
3. "E1" is the min. clamping length for optimum use with center through coolant.
4. "H" is the max. tool length that can be inserted.

For Straight Collet ▶ 272
For Coolant Pipe ▶ 174

## MEGA Double Power Chuck Type DS

Coolant Through Hole

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



Ø 3 - 32 mm

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H | E | Max. min$^{-1}$ | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-F63 -MEGA16DS - 80A | **803.095** | 16 | 42 | 52.6 | 82 | 27 | 57 | 52 | 28 000 | 1.2 |
| -MEGA20DS - 90A | **803.096** | 20 | 50 | 55 | 92 | 36 | 67 | 58 | | 1.4 |
| -MEGA25DS -100A | **803.104** | 25 | 62 | 62.7 | 102 | 41 | 77 | 59 | 25 000 | 1.8 |
| -MEGA32DS -105A | **803.083** | 32 | 70 | 70.7 | 107 | 35.5 | 82 | 66 | 24 000 | 2.0 |

1. Wrench and coolant pipe are to be ordered separately.
2. "H" is the max. tool length that can be inserted.

For Straight Collet ▶ 272
For Coolant Pipe ▶ 174

| Accessories | | |
|---|---|---|
| | MEGA Wrench | |
| **MEGA Double Power Chuck** | **Model** | **Order No.** |
| HSK -F63 -MEGA16D/DS | MGR42L | **969.462L** |
| -MEGA20D/DS | MGR50L | **969.464L** |
| -MEGA25D/DS | MGR62L | **969.469L** |
| -MEGA32D/DS | MGR70L | **969.470L** |



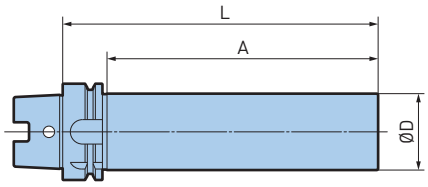
BROTECH

# Dyna Test

Periodic inspection of machine tools to control production stability.

## HSK-A Type

DIN 69893-1 & ISO 12164-1

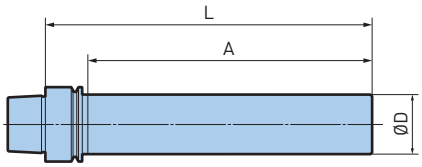



| Model | Order No. | L | A | ØD | Weight (Kg) |
|---|---|---|---|---|---|
| HSK -A40-32 -L180SD | **801.169** | 180 | 157 | 32 | 1.1 |
| -A50-32 -L240SD | **978.198** | 240 | 211 | | 1.9 |
| -A63-50 -L350SD | **978.222** | 350 | 321 | 50 | 4.1 |
| -A100-50 -L350SD | **801.073** | 350 | 318 | | 5.4 |

1. The drive key slots are symmetrical to allow the HSK form A dyna test bar to be indexed 180 degrees.

## HSK-E Type

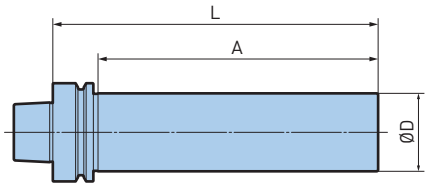
DIN 69893-5




| Model | Order No. | L | A | ØD | Weight (Kg) |
|---|---|---|---|---|---|
| HSK -E25-20 -L175 | **978.307** | 175 | 163 | 20 | 0.45 |
| -E32-20 -L180 | **802.831** | 180 | 158 | | 0.5 |
| -E40-32 -L180 | **978.178** | | 157 | 32 | 1.1 |
| -E50-32 -L240 | **979.140** | 240 | 211 | | 1.6 |

## HSK-F Type

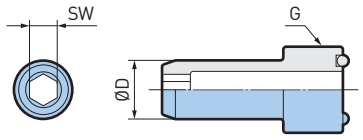
DIN V 69893-6




| Model | Order No. | L | A | ØD | Weight (Kg) |
|---|---|---|---|---|---|
| HSK -F63-50 -L350 | **802.832** | 350 | 321 | 50 | 4.1 |

# Coolant Pipes

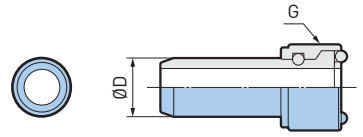
## Integral type for Form A/E




| Model | Order No. | ØD | G | SW |
|---|---|---|---|---|
| HSK 25 -CP | 978.921 | 5 | M8 x P1 | 2.5 |
| 32 -CP | 978.909 | 6 | M10 x P1 | 3 |
| 40 -CP | 978.913 | 8 | M12 x P1 | 4 |
| 50 -CP | 801.071 | 10 | M16 x P1 | 5 |
| 63 -CP | 969.475 | 12 | M18 x P1 | 6 |
| 80 -CP | 802.828 | 14 | M20 x P1.5 | 8 |
| 100 -CP | 802.351 | 16 | M24 x P1.5 | 8 |
| 125 -CP | 805.684 | 18 | M30 x P1.5 | 10 |

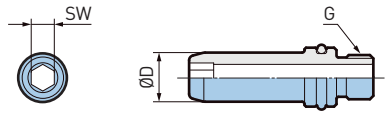
A.3

## 1° swing type (DIN) for Form A/E




| Model | Order No. | ØD | G |
|---|---|---|---|
| HSK 40 -CPM | 978.907 | 8 | M12 x P1 |
| 50 -CPM | 801.690 | 10 | M16 x P1 |
| 63 -CPM | 978.910 | 12 | M18 x P1 |
| 80 -CPM | 802.827 | 14 | M20 x P1.5 |
| 100 -CPM | 802.314 | 16 | M24 x P1.5 |

## Coolant Pipe Form F




| Model | Order No. | ØD | G | SW |
|---|---|---|---|---|
| HSK F63-CP | 801.280 | 10 | M9xP0.751 | 5 |

1. This model can be used for BIG KAISER Original Tool Holder only

# HSK Plug Screw

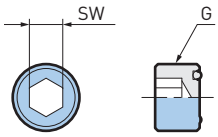



Fig. 1

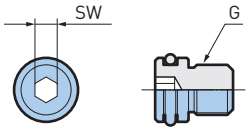
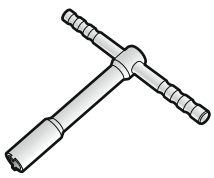



Fig. 2

| Model | Order No. | Fig. | G | SW |
|---|---|---|---|---|
| HSK 25 -PG | 807.215 | 1 | M8 x P1 | 4 |
| 32 -PG | 807.216 | | M10 x P1 | 5 |
| 40 -PG | 807.189 | | M12 x 1 | 6 |
| F63 -PG | 807.190 | 2 | M9 x 0.75 | 4 |

1. In case our HSK tool holders are used in the machine which do not recommend the center through coolant, the plug screw should be mounted to our tools.
2. HSK-F63-PG can only be used in original BIG KAISER HSK-F63 tool holders, not compatible with other manufacturers.

# Clamping Wrench



| Clamping Wrench | Order No. |
|---|---|
| CPW-40 | 802.825 |
| CPW-50 | 802.315 |
| CPW-63 | 978.911 |
| CPW-80 | 802.824 |
| CPW-100 | 802.316 |

**Caution**

For machines capable of supplying coolant through spindle, the coolant pipe should be fitted to all HSK holders to protect against accidental selection of coolant.



BROTECH

# Tool Holders BIG CAPTO, ISO 26623


| | |
|---|---|
| MEGA Micro Chuck | 176 |
| MEGA New Baby Chuck | 177 - 179 |
| MEGA E Chuck | 180 |
| MEGA Double Power Chuck | 181 - 182 |
| New Hi-Power Milling Chuck | 183 |
| Hydraulic Chucks | 184 |
| MEGA Synchro Tapping Holder | 185 |
| Side Lock Holders | 186 |
| Side Cutter Arbors / Morse Taper Holders | 187 |
| Face Mill Arbors FMH | 188 |
| Extensions / Reductions | 189 |
| CK Shanks | 190 |
| Dyna Test | 191 |



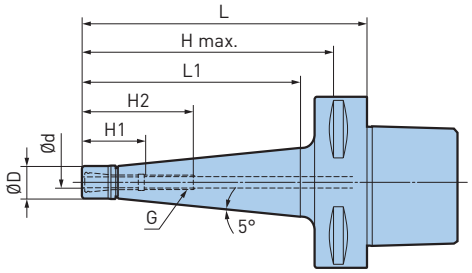



● Preferred selected items

## MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

Coolant Through Hole




A.4

**Ø 0.45 - 6.05 mm**

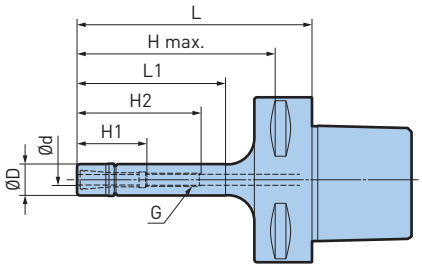
| Model | Order No. | Ød | ØD | L | L1 | H1 | H2 | H max. | G | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C4 -MEGA3S - 60T | **973.954** | 0.45 - 3.25 | 10 | 60 | 35 | 22 | 38 | 54 | M4 P0.7 | NBC3S- | 0.3 |
| -MEGA6S - 60T | **973.955** | 0.45 - 6.05 | 14 | | | 28 | 47 | 54 | M7 P0.75 | NBC6S- | 0.3 |
| - 90T | **805.194** | | | 90 | 65 | | 49 | 84 | | | 0.4 |
| C5 -MEGA6S - 105T | **973.203** | 0.45 - 6.05 | 14 | 105 | 79 | 28.5 | 49 | 98 | M7 P0.75 | NBC6S- | 0.6 |
| - 120T | **800.746** | | | 120 | 94 | | | 113 | | | 0.6 |
| C6 -MEGA3S - 120T | **973.204** | 0.45 - 3.25 | 10 | 120 | 92 | 22.5 | 38.5 | 111 | M4 P0.7 | NBC3S- | 1.3 |
| -MEGA4S - 120T | **973.205** | 0.45 - 4.05 | 12 | | | 26.5 | 47 | 111 | M5 P0.8 | NBC4S- | 1.3 |
| - 135T | **800.557** | | | 135 | 107 | | | 126 | | | 1.4 |
| -MEGA6S - 120T | **973.206** | 0.45 - 6.05 | 14 | 120 | 92 | 28.5 | 49 | 111 | M7 P0.75 | NBC6S- | 1.3 |
| - 135T | **978.134** | | | 135 | 107 | | | 126 | | | 1.4 |

1. MEGA nut is included.

## MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

Coolant Through Hole




**Ø 0.45 - 6.05 mm**

| Model | Order No. | Ød | ØD | L | L1 | H1 | H2 | H max. | G | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C5 -MEGA4S - 75 | **973.208** | 0.45 - 4.05 | 12 | 75 | 50 | 26.5 | 47 | 68 | M5 P0.8 | NBC4S | 0.4 |
| -MEGA6S - 75 | **973.209** | 0.45 - 6.05 | 14 | | | 28.5 | 49 | | M7 P0.75 | NBC6S | 0.4 |
| C6 -MEGA3S - 90 | **973.210** | 0.45 - 3.25 | 10 | 90 | 50 | 22.5 | 38 | 81 | M4 P0.7 | NBC3S | 1.1 |
| -MEGA4S - 90 | **973.211** | 0.45 - 4.05 | 12 | | 58 | 26.5 | 47 | | M5 P0.8 | NBC4S | 1.2 |
| -MEGA6S - 90 | **973.212** | 0.45 - 6.05 | 14 | | | 28.5 | 49 | | M7 P0.75 | NBC6S | 1.2 |

1. MEGA nut is included.

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▸ 247 | Micro Seal Nut ▸ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **961.280** |

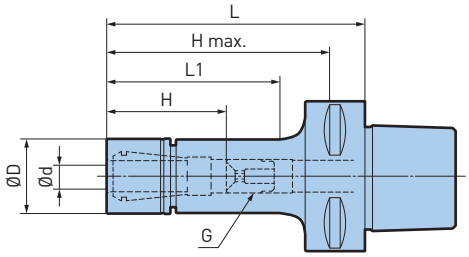


BROTECH

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole

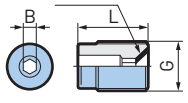



A.4

**Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | H max. | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| C4 -MEGA6N - 75 | **978.196** | 0.25 - 6 | 20 | 75 | 48 | 23 - 43 | 69 | NBC6- | 0.4 |
| -MEGA8N - 75 | **978.201** | 0.5 - 8 | 25 | | 49 | 26 - 45 | 69 | NBC8- | 0.5 |
| -MEGA10N- 75 | **978.202** | 1.5 - 10 | 30 | | 52 | 38 - 48 | 69 | NBC10- | 0.6 |
| -MEGA13N- 75 | **978.197** | 2.5 - 13 | 35 | | 54 | 64 | 64 | NBC13- | 0.7 |
| -MEGA16N- 55 * | **978.203** | 2.5 - 16 | 42 | 55 | - | 48 | 48 | NBC16- | 0.7 |
| -MEGA20N- 60 * | **978.204** | 2.5 - 20 | 46 | 60 | - | 53 | 53 | NBC20- | 0.8 |
| C5 -MEGA6N - 60 | **973.213** | 0.25 - 6 | 20 | 60 | 34 | 23 - 36 | 53 | NBC6- | 0.5 |
| - 75 | **973.214** | | | 75 | 49 | 23 - 43 | 68 | | 0.5 |
| - 90 | **973.215** | | | 90 | 62 | | 83 | | 0.5 |
| -MEGA8N - 60 | **973.218** | 0.50 - 8 | 25 | 60 | 33 | 26 - 36 | 53 | NBC8- | 0.5 |
| - 75 | **973.219** | | | 75 | 49 | 26 - 45 | 68 | | 0.6 |
| ● - 90 | **973.220** | | | 90 | 64 | | 83 | | 0.6 |
| -MEGA10N- 55 * | **973.223** | 1.50 - 10 | 30 | 55 | 31 | 48 | 48 | NBC10- | 0.5 |
| - 75 | **973.224** | | | 75 | 49 | 38 - 48 | 68 | | 0.6 |
| ● - 90 | **973.225** | | | 90 | 64 | | 83 | | 0.7 |
| -MEGA13N- 55 * | **973.229** | 2.50 - 13 | 35 | 55 | 31 | 48 | 48 | NBC13- | 0.6 |
| - 75 | **973.230** | | | 75 | 49 | 44 - 48 | 68 | | 0.7 |
| - 90 | **973.231** | | | 90 | 64 | 44 - 63 | 83 | | 0.8 |
| -MEGA16N- 60 * | **973.235** | 2.50 - 16 | 42 | 60 | 38 | 53 | 53 | NBC16- | 0.7 |
| - 75 * | **973.236** | | | 75 | 53 | 68 | 68 | | 0.9 |
| - 90 | **973.237** | | | 90 | 69 | 48 - 63 | 83 | | 1.0 |
| -MEGA20N- 60 * | **973.241** | 2.50 - 20 | 46 | 60 | 39 | 51 | 51 | NBC20- | 0.8 |
| - 75 * | **973.242** | | | 75 | 54 | 66 | 66 | | 1.0 |
| ● - 90 | **973.243** | | | 90 | 69 | 51 - 60 | 83 | | 1.1 |

1. MEGA nut is included.
2. * Adjusting screw cannot be used.
3. Nut-less model available up on request.
4. "G" is the adjusting screw (optional).
5. "H" indicates the adjustment length with an adjusting screw.

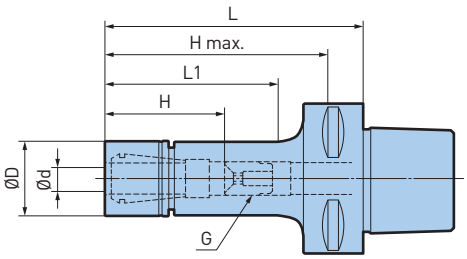
| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▶ 250 | MEGA Perfect Seal ▶ 260 | Adjusting Screw | Rubber   | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |

BROTECH

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole




A.4

**Ø 0.25 - 20 mm**

| Model | Order No. | Ød | ØD | L | L1 | H | H max. | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| C6 -MEGA6N - 60 | 973.247 | 0.25 - 6 | 20 | 60 | 30 | 23 - 33 | 51 | NBC6- | 1.2 |
| - 75 | 973.248 | | | 75 | 43 | 23 - 43 | 66 | | 1.2 |
| - 90 | 973.249 | | | 90 | 58 | | 81 | | 1.2 |
| -105 | 973.250 | | | 105 | 73 | | 96 | | 1.3 |
| -120 | 973.251 | | | 120 | 88 | | 111 | | 1.3 |
| -135 | 973.252 | | | 135 | 103 | | 126 | | 1.3 |
| -165 | 973.253 | | | 165 | 128 | | 156 | | 1.4 |
| -MEGA8N - 60 | 973.254 | 0.5 - 8 | 25 | 60 | 29 | 26 - 31 | 51 | NBC8- | 1.3 |
| - 75 | 973.255 | | | 75 | 43 | 26 - 45 | 66 | | 1.3 |
| - 90 | 973.256 | | | 90 | 58 | | 81 | | 1.3 |
| -105 | 973.257 | | | 105 | 73 | | 96 | | 1.4 |
| -120 | 973.258 | | | 120 | 88 | | 111 | | 1.4 |
| -135 | 973.259 | | | 135 | 103 | | 126 | | 1.5 |
| -165 | 973.260 | | | 165 | 133 | | 156 | | 1.6 |
| -MEGA10N- 60 * | 973.261 | 1.5 - 10 | 30 | 60 | 32 | 51 | 51 | NBC10- | 1.3 |
| - 75 | 973.262 | | | 75 | 43 | 38 - 45 | 66 | | 1.4 |
| - 90 | 973.263 | | | 90 | 58 | 38 - 48 | 81 | | 1.4 |
| -105 | 973.264 | | | 105 | 73 | | 96 | | 1.5 |
| -120 | 973.265 | | | 120 | 88 | | 111 | | 1.6 |
| -135 | 973.266 | | | 135 | 103 | | 126 | | 1.6 |
| -165 | 973.267 | | | 165 | 133 | | 156 | | 1.8 |
| -MEGA13N- 60 * | 973.269 | 2.5 - 13 | 35 | 60 | 32 | 51 | 51 | NBC13- | 1.3 |
| - 75 * | 973.270 | | | 75 | 45 | 66 | 66 | | 1.4 |
| - 90 | 973.271 | | | 90 | 60 | 44 - 55 | 81 | | 1.5 |
| -105 | 973.272 | | | 105 | 73 | 44 - 63 | 96 | | 1.6 |
| -120 | 973.273 | | | 120 | 90 | | 111 | | 1.7 |
| -135 | 973.274 | | | 135 | 103 | | 126 | | 1.8 |
| -165 | 973.275 | | | 165 | 133 | | 156 | | 2.0 |
| -MEGA16N- 65 * | 973.277 | 2.5 - 16 | 42 | 65 | 37 | 56 | 56 | NBC16- | 1.5 |
| - 75 * | 973.278 | | | 75 | 47 | 66 | 66 | | 1.6 |
| - 90 | 973.279 | | | 90 | 60 | 48 - 57 | 81 | | 1.7 |
| -105 | 973.280 | | | 105 | 75 | 48 - 68 | 96 | | 1.8 |
| -120 | 973.281 | | | 120 | 90 | | 111 | | 2.0 |
| -135 | 973.282 | | | 135 | 105 | | 126 | | 2.1 |
| -165 | 973.283 | | | 165 | 135 | | 156 | | 2.4 |
| -MEGA20N- 65 * | 973.285 | 2.5 - 20 | 46 | 65 | 37 | 51 | 51 | NBC20- | 1.5 |
| - 75 * | 973.286 | | | 75 | 47 | 65 | 65 | | 1.6 |
| - 90 | 973.287 | | | 90 | 62 | 51 - 56 | 76 | | 1.8 |
| -105 | 973.288 | | | 105 | 77 | 51 - 68 | 91 | | 2.0 |
| -120 | 973.289 | | | 120 | 92 | | 104 | | 2.1 |
| -135 | 973.290 | | | 135 | 107 | | 111 | | 2.3 |
| -165 | 973.291 | | | 165 | 137 | | | | 2.6 |
| -200 | 973.292 | | | 200 | 172 | | | | 2.9 |

1. MEGA nut is included.
2. * Adjusting screw cannot be used.
3. Nut-less model available upon request.
4. "G" is the adjusting screw (optional).
5. "H" indicates the adjustment length with an adjusting screw.



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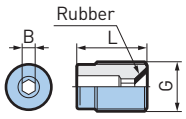
Ø 0.25 - 20 mm

| Model | Order No. | Ød | ØD | L | L1 | H | H max. | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| C8 -MEGA6N - 90 | **973.293** | 0.25 - 6 | 20 | 90 | 45 | 23 - 43 | 90 | NBC6- | 2.4 |
| -120 | **973.295** | | | 120 | 75 | | 120 | | 2.6 |
| -165 | **973.297** | | | 165 | 120 | | 165 | | 2.7 |
| -MEGA8N - 90 | **973.298** | 0.5 - 8 | 25 | 90 | 46 | 26 - 45 | 90 | NBC8- | 2.6 |
| -120 | **973.300** | | | 120 | 75 | | 120 | | 2.7 |
| -165 | **973.302** | | | 165 | 120 | | 165 | | 2.8 |
| ● -MEGA10N- 90 | **973.304** | 1.5 - 10 | 30 | 90 | 45 | 38 - 48 | 90 | NBC10- | 2.7 |
| -120 | **973.306** | | | 120 | 75 | | 120 | | 2.8 |
| -165 | **973.308** | | | 165 | 120 | | 165 | | 3.0 |
| ● -MEGA13N- 90 | **973.311** | 2.5 - 13 | 35 | 90 | 50 | 44 - 63 | 90 | NBC13- | 2.8 |
| -120 | **973.313** | | | 120 | 80 | | 120 | | 2.9 |
| -165 | **973.315** | | | 165 | 120 | | 165 | | 3.2 |
| -200 | **973.316** | | | 200 | 155 | | 200 | | 3.5 |
| -MEGA16N- 90 | **973.318** | 2.5 - 16 | 42 | 90 | 50 | 48 - 66 | 90 | NBC16- | 2.9 |
| -120 | **973.320** | | | 120 | 80 | 48 - 68 | 120 | | 3.2 |
| -165 | **973.322** | | | 165 | 125 | | 165 | | 3.6 |
| ● -MEGA20N- 90 | **973.325** | 2.5 - 20 | 46 | 90 | 50 | 51 - 68 | 83 | NBC20- | 3.0 |
| ● -120 | **973.327** | | | 120 | 80 | | 113 | | 3.3 |
| -165 | **973.329** | | | 165 | 125 | | | | 3.8 |
| -200 | **973.330** | | | 200 | 160 | | | | 4.1 |

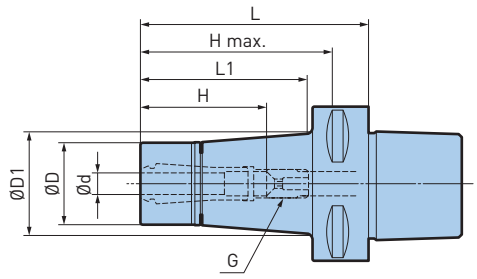
1. MEGA nut is included.
2. * Adjusting screw cannot be used.
3. Nut-less model available upon request.
4. "H" indicates the adjustment length with an adjusting screw.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | NBC Collet ▶ 250 | MEGA Perfect Seal ▶ 260 | Adjusting Screw |   | | | |
| MEGA New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6N | MGN6 | **969.483** | MGR20 | **969.454** | NBC6- | MPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA8N | MGN8 | **969.484** | MGR25 | **969.456** | NBC8- | MPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| MEGA10N | MGN10 | **969.485** | MGR30 | **969.458** | NBC10- | MPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA13N | MGN13 | **969.486** | MGR35 | **969.460** | NBC13- | MPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA16N | MGN16 | **969.487** | MGR42 | **969.462** | NBC16- | MPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA20N | MGN20 | **969.488** | MGR46 | **969.465** | NBC20- | MPS20- | NBA20B | **961.680** | M21 | 20 | 4 |

# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

Coolant Through Hole

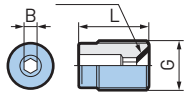



A.4

**Ø 3 - 12 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H | H max. | Collet Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| C4 -MEGA13E- 60* | 800.678 | 3 - 12 | 42 | - | 60 | - | 50 | 50 | MEC13- | 0.6 |
| C5 -MEGA13E- 60 * | 973.347 | 3 - 12 | 42 | 44.4 | 60 | 39 | 50 | 50 | MEC13- | 0.8 |
| - 75 * | 973.348 | | | 44.8 | 75 | 54 | 68 | 68 | | 0.9 |
| - 90 * | 973.349 | | | | 90 | 69 | 50 - 60 | 83 | | 1.1 |
| C6 -MEGA6E - 75 * | 973.354 | 3 - 6 | 25 | 29.5 | 75 | 48 | 37 - 45 | 66 | MEC6- | 1.3 |
| - 90 | 973.355 | | | 32.1 | 90 | 63 | | 81 | | 1.4 |
| -105 | 973.356 | | | 34.7 | 105 | 78 | | 96 | | 1.5 |
| -120 | 973.357 | | | 37.3 | 120 | 93 | | 111 | | 1.6 |
| -MEGA8E - 75 | 973.361 | 3 - 8 | 30 | 34.2 | 75 | 48 | 42 - 46 | 66 | MEC8- | 1.4 |
| - 90 | 973.362 | | | 36.7 | 90 | 63 | 42 - 51 | 81 | | 1.5 |
| -105 | 973.363 | | | 39.5 | 105 | 78 | | 96 | | 1.7 |
| -120 | 973.364 | | | 42.1 | 120 | 93 | | 111 | | 1.8 |
| -MEGA10E- 75 * | 973.368 | 3 - 10 | 35 | 39.1 | 75 | 48 | 66 | 66 | MEC10- | 1.5 |
| - 90 | 973.369 | | | 41.6 | 90 | 63 | 48 - 58 | 81 | | 1.6 |
| -105 | 973.370 | | | 44.4 | 105 | 78 | | 96 | | 1.8 |
| -120 | 973.371 | | | 47.0 | 120 | 93 | | 111 | | 2.0 |
| -MEGA13E- 65 * | 973.374 | 3 - 12 | 42 | 45.1 | 65 | 39 | 56 | 56 | MEC13- | 1.5 |
| - 90 | 973.376 | | | 49.0 | 90 | 66 | 50 - 55 | 81 | | 1.8 |
| -105 | 973.377 | | | 51.4 | 105 | 80 | | 96 | | 2.1 |
| -120 | 973.378 | | | 54.2 | 120 | 96 | 50 - 60 | 111 | | 2.3 |
| -135 | 973.379 | | | 56.8 | 135 | 112 | | 126 | | 2.6 |
| -165 | 973.380 | | | 62.3 | 165 | 141 | | 156 | | 3.2 |
| C8 -MEGA6E - 90 | 973.382 | 3 - 6 | 25 | 30.7 | 90 | 55 | 37 - 45 | 90 | MEC6- | 2.6 |
| -135 | 973.385 | | | 38.5 | 135 | 100 | | 135 | | 3.0 |
| -MEGA8E - 90 | 973.388 | 3 - 8 | 30 | 35.4 | 90 | 55 | 42 - 51 | 90 | MEC8- | 2.7 |
| -135 | 973.391 | | | 43.3 | 135 | 100 | | 135 | | 3.2 |
| -MEGA10E- 90 | 973.394 | 3 - 10 | 35 | 40.3 | 90 | 55 | 48 - 58 | 90 | MEC10- | 2.8 |
| -120 | 973.396 | | | 45.6 | 120 | 85 | | 120 | | 3.2 |
| -135 | 973.397 | | | 48.2 | 135 | 100 | | 135 | | 3.4 |
| -MEGA13E- 90 | 973.400 | 3 - 12 | 42 | 47.0 | 90 | 55 | 50 - 60 | 90 | MEC13- | 3.0 |
| -120 | 973.402 | | | 52.3 | 120 | 85 | | 120 | | 3.4 |
| -135 | 973.403 | | | 54.9 | 135 | 100 | | 135 | | 3.7 |
| -165 | 973.404 | | | 60.1 | 165 | 130 | | 165 | | 4.3 |

1. MEGA E nut is included.
2. * Adjusting screw cannot be used.
3. Nut-less model available upon request.
4. "G" is the adjusting screw (optional).
5. "H" indicates the adjustment length with an adjusting screw.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA E Nut | | MEGA Wrench | | MEGA E Collet ▶264 | MEGA E Perfect Seal ▶265 | Adjusting Screw   | | | | |
| MEGA E Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| MEGA6E | MEN6 | 968.461 | MGR25 | 969.456 | MEC6- | EPS6- | NBA6B | 961.527 | M7 | 12 | 2 |
| MEGA8E | MEN8 | 968.462 | MGR30 | 969.458 | MEC8- | EPS8- | NBA8B | 961.550 | M9 | 13 | 2.5 |
| MEGA10E | MEN10 | 968.463 | MGR35 | 969.460 | MEC10- | EPS10- | NBA10B | 961.572 | M11 | 16 | 3 |
| MEGA13E | MEN13 | 968.464 | MGR42 | 969.462 | MEC13- | EPS13- | NBA13B | 961.598 | M14 | 20 | 4 |

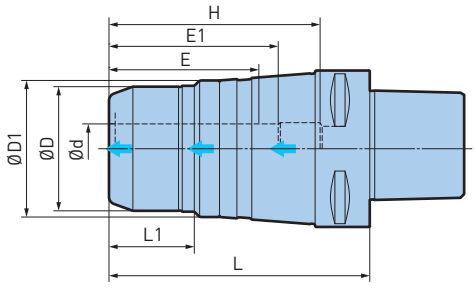


BROTECH

# MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and Type DS to feed coolant to cutting tool periphery.

Coolant Through Hole




A.4

Ø 3 - 32 mm

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H | E | E1 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| C4 -MEGA16D - 70 | **800.679** | 16 | 46 | 46.7 | 70 | - | 64 | 48 | 50 | 0.8 |
| -MEGA20D - 65 * | **800.681** | 20 | 50 | 50.7 | 65 | - | 59 | 50 | 51 | 0.8 |
| C5 -MEGA16D - 65A | **803.140** | 16 | 42 | 53 | 65 | 25 | 58 | 48 | 55 | 0.8 |
| - 90A | **803.142** | | | | 90 | | 71 | | | 1.3 |
| -MEGA20D - 75A | **803.107** | 20 | 50 | 55 | 75 | 34 | 68 | 50 | 56 | 1.1 |
| - 90A | **803.180** | | | | 90 | | 83 | | | 1.4 |
| -MEGA25D - 75A * | **803.146** | 25 | 62 | 63 | 75 | 39 | 68 | 56 | 57 | 1.4 |
| - 90A | **803.178** | | | | 90 | | 83 | | | 1.7 |
| C6 -MEGA20D - 75A | **803.182** | 20 | 50 | 55 | 75 | 34 | 66 | 50 | 56 | 2.0 |
| - 90A | **803.123** | | | | 90 | | 81 | | | 2.2 |
| -105A | **803.110** | | | | 105 | | 85 | | | 2.5 |
| -135A * | **803.164** | | | | 135 | | | | | 3.1 |
| -MEGA25D - 75A *** | **804.904** | 25 | 62 | 62.7 | 75 | 39 | 66 | 56 | 57 | 2.1 |
| -105A | **803.126** | | | | 105 | | 85 | | | 2.8 |
| -135A * | **803.194** | | | | 135 | | | | | 3.3 |
| -MEGA32D - 90A | **803.127** | 32 | 70 | 70.7 | 90 | 33 | 81 | 60 | 64 | 2.5 |
| -135A * | **803.120** | | | | 135 | | 90 | | | 3.4 |
| C8 -MEGA16D - 70 | **973.427** | 16 | 46 | 55 | 70 | 23.5 | 71 | 48 | 50 | 2.8 |
| -105 *** | **973.428** | | | | 105 | | | | | 3.5 |
| -MEGA20D - 75 | **973.431** | 20 | 60 | 69 | 75 | 25.5 | 75 | 50 | 56 | 3.3 |
| -105 | **973.432** | | | | 105 | | 85 | | | 4.2 |
| -135 * | **973.433** | | | | 135 | | | | | 5.0 |
| -MEGA25D - 75 | **973.435** | 25 | 70 | 77 | 75 | 32 | 75 | 56 | 65 | 3.4 |
| -105 | **801.666** | | | | 105 | | 90 | | | 4.5 |
| -165 * | **973.438** | | | | 165 | | | | | 6.4 |
| -MEGA32D - 90 | **973.436** | 32 | 80 | 86 | 90 | 39.5 | 90 | 60 | 71 | 4.3 |
| -105 | **973.440** | | | | 105 | | 100 | | | 4.8 |
| -135 | **973.441** | | | | 135 | | 105 | | | 6.0 |

For Straight Collet ▶ 272

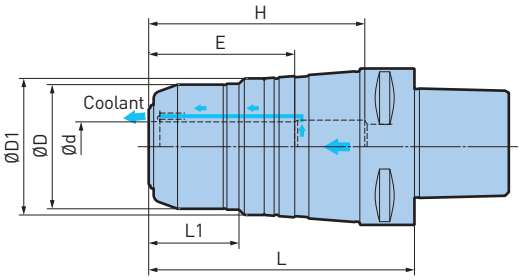
1. * Axial length adjusting screw can be used.
2. *** Commercially available hex socket head screws (M8) can be used as a back stop.
3. Wrench is to be ordered separately.
4. "E" is the min. clamping length.
5. "E1" is the min. clamping length for optimum use with center through coolant.
6. "H" is max. tool shank length that can be inserted into the holder.

## MEGA Wrench

| MEGA Double Power Chuck | Model | Order No. | MEGA Double Power Chuck | Model | Order No. | MEGA Double Power Chuck | Model | Order No. |
|---|---|---|---|---|---|---|---|---|
| C4 -MEGA16D | MGR46L | **969.465L** | C6 -MEGA16DS | MGR42L | **969.462L** | C8 -MEGA16D/DS | MGR46L | **969.465L** |
| -MEGA20D | MGR50L | **969.464L** | -MEGA20D/DS | MGR50L | **969.464L** | -MEGA20D/DS | MGR60L | **969.468L** |
| C5 -MEGA16DS | MGR42L | **969.462L** | -MEGA25D/DS | MGR62L | **969.469L** | -MEGA25D/DS | MGR70L | **969.470L** |
| -MEGA20DS | MGR50L | **969.464L** | -MEGA32D/DS | MGR70L | **969.470L** | -MEGA32D/DS | MGR80L | **969.471L** |
| -MEGA25DS | MGR62L | **969.469L** | | | | | | |

# MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



A.4

**Ø 3 - 32 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | H | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| C5 -MEGA16DS - 65A | 803.141 | 16 | 42 | 52.6 | 67 | 27 | 60 | 57 | 0.8 |
| - 90A | 803.144 | | | | 92 | | 73 | | 1.3 |
| -MEGA20DS - 75A | 803.108 | 20 | 50 | 55 | 77 | 36 | 70 | 58 | 1.1 |
| - 90A | 803.183 | | | | 92 | | 85 | | 1.4 |
| -MEGA25DS - 75A | 803.147 | 25 | 62 | 62.7 | 77 | 41 | 70 | 59 | 1.4 |
| - 90A | 803.179 | | | | 92 | | 85 | | 1.7 |
| C6 -MEGA16DS - 70A | 803.145 | 16 | 42 | 52.6 | 72 | 27 | 63 | 57 | 1.6 |
| - 90A | 803.206 | | | | 92 | | 83 | | 2.0 |
| - 105A *** | 803.184 | | | | 107 | | 73 | | 2.3 |
| - 135A *** | 803.112 | | | | 137 | | | | 2.9 |
| -MEGA20DS - 75A | 803.185 | 20 | 50 | 55 | 77 | 36 | 68 | 58 | 1.9 |
| - 90A | 803.125 | | | | 92 | | 83 | | 2.1 |
| - 105A | 803.113 | | | | 107 | | 87 | | 2.4 |
| - 135A * | 803.166 | | | | 137 | | 71-81 | | 3.0 |
| -MEGA25DS - 75A ** | 803.114 | 25 | 62 | 62.7 | 77 | 41 | 68 | 59 | 2.1 |
| - 90A | 803.177 | | | | 92 | | 83 | | 2.4 |
| - 105A | 803.128 | | | | 107 | | 87 | | 2.8 |
| - 135A * | 803.195 | | | | 137 | | 73-83 | | 3.3 |
| -MEGA32DS - 90A | 803.129 | 32 | 70 | 70.7 | 92 | 35 | 83 | 66 | 2.5 |
| - 105A | 803.167 | | | | 107 | | 92 | | 2.9 |
| - 135A * | 803.121 | | | | 137 | | 81-91 | | 3.4 |
| C8 -MEGA16DS - 70 | 973.465 | 16 | 46 | 55 | 72.5 | 26 | 73 | 52 | 2.8 |
| - 105 *** | 973.466 | | | | 107.5 | | | | 3.5 |
| -MEGA20DS - 75 | 973.469 | 20 | 60 | 69 | 77.5 | 28 | 77 | 58 | 3.3 |
| - 135 * | 973.471 | | | | 137.5 | | 71-81 | | 5.0 |
| -MEGA25DS - 75 | 973.473 | 25 | 70 | 77 | 77.5 | 34 | 77 | 67 | 3.4 |
| - 135 * | 973.475 | | | | 137.5 | | 78-88 | | 5.4 |
| - 165 * | 973.476 | | | | 167.5 | | | | 6.4 |
| -MEGA32DS - 90 | 973.477 | 32 | 80 | 86 | 92.5 | 42 | 92 | 73 | 4.3 |
| - 105 | 973.478 | | | | 107.5 | | 102 | | 4.8 |
| - 165 * | 973.480 | | | | 167.5 | | 80-97 | | 7.3 |

For Straight Collet ▶ 272

1. * Axial length adjusting screw can be used.
2. ** Only the straight collet (C25-) can be used.
3. *** Commercially available hex socket head screws (M8) can be used as a back stop.
4. Wrench is to be ordered separately.
5. "E" is the min. clamping length.
6. "H" is max. tool shank length that can be inserted into the holder.

## MEGA Wrench

| MEGA Double Power Chuck | Model | Order No. | MEGA Double Power Chuck | Model | Order No. | MEGA Double Power Chuck | Model | Order No. |
|---|---|---|---|---|---|---|---|---|
| C4 -MEGA16D | MGR46L | **969.465L** | C6 -MEGA16DS | MGR42L | **969.462L** | C8 -MEGA16D/DS | MGR46L | **969.465L** |
| -MEGA20D | MGR50L | **969.464L** | -MEGA20D/DS | MGR50L | **969.464L** | -MEGA20D/DS | MGR60L | **969.468L** |
| C5 -MEGA16DS | MGR42L | **969.462L** | -MEGA25D/DS | MGR62L | **969.469L** | -MEGA25D/DS | MGR70L | **969.470L** |
| -MEGA20DS | MGR50L | **969.464L** | -MEGA32D/DS | MGR70L | **969.470L** | -MEGA32D/DS | MGR80L | **969.471L** |
| -MEGA25DS | MGR62L | **969.469L** | | | | | | |



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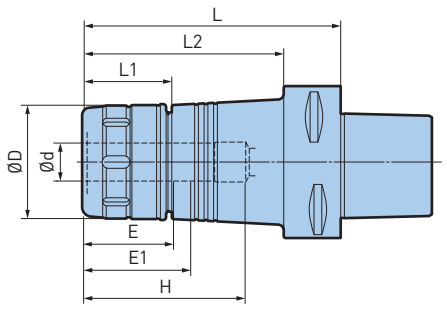
# New Hi-Power Milling Chuck

The original design of slit structure assures heavy and finish end milling with high power and precision.

Coolant Through Hole




A.4

**Ø 3 - 32 mm**

| Model | Order No. | Ød | ØD | L | L1 | L2 | H | E | E1 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| C5 -HMC16S - 65 | **800.734** | 16 | 43 | 65 | 44 | 45 | 58 | 48 | 55 | 0.8 |
| -HMC20S - 105 | **800.735** | 20 | 50 | 105 | | - | 85 | 50 | 56 | 1.4 |
| -HMC25S - 105 | **803.041** | 25 | 55 | | 47 | - | 87 | 56 | 57 | 1.7 |
| -HMC32S - 85 | **803.043** | 32 | 62 | 85 | 56 | - | 78 | 60 | 58 | 1.6 |
| C6 -HMC16S - 70 | **800.842** | 16 | 43 | 70 | 44 | 48 | 61 | 48 | 55 | 1.5 |
| -HMC20S - 75 | **800.845** | 20 | 50 | 75 | 44 | 53 | 66 | 50 | 56 | 1.7 |
| - 105 | **800.843** | | | 105 | | 83 | 85 | | | 2.3 |
| - 120 * | **800.844** | | | 120 | | 98 | | | | 2.5 |
| -HMC25S - 75 ** | **800.848** | 25 | 59 | 75 | 45 | 53 | 66 | 56 | 57 | 2.0 |
| - 105 | **800.846** | | | 105 | | 81 | 87 | | | 2.5 |
| - 135 * | **800.847** | | | 135 | | 133 | | | | 3.1 |
| -HMC32S - 90 | **800.851** | 32 | 68 | 90 | 54 | - | 81 | 60 | 64 | 2.4 |
| - 105 | **800.849** | | | 105 | | - | 90 | | | 2.7 |
| - 135 * | **800.850** | | | 135 | | - | | | | 3.3 |
| C8 -HMC20 - 80 | **973.680** | 20 | 60 | 80 | 46 | 50 | 80 | 50 | 56 | 3.3 |
| - 135 * | **973.682** | | | 135 | | 105 | 85 | | | 4.7 |
| -HMC25 - 85 | **973.684** | 25 | 62 | 85 | 55 | - | | 56 | 65 | 3.5 |
| - 135 * | **973.686** | | | 135 | | 105 | 90 | | | 4.7 |
| -HMC32 - 95 | **973.688** | 32 | 80 | 95 | 63 | - | 95 | 60 | 71 | 4.5 |
| - 135 | **973.690** | | | 135 | | - | 105 | | | 5.8 |

1. Wrench is to be ordered separatly.
2. * Axial length adjusting screw can be used.
3. ** Only the straight collet (C25- )can be used.
4. "E" is the min. clamping length.
5. "E1" is the min. clamping length for optimum use with center through coolant.
6. "H" is max. tool shank length that can be inserted into the holder.

For Straight Collet ▶ 272

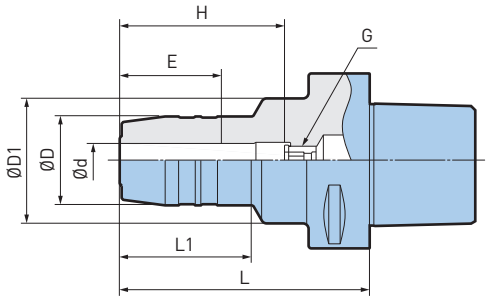
## Wrench

| New Hi-Power Milling Chuck | Model | Order No. | New Hi-Power Milling Chuck | Model | Order No. | New Hi-Power Milling Chuck | Model | Order No. |
|---|---|---|---|---|---|---|---|---|
| C5 -HMC16S | FK45-50L | **801.037** | C6 -HMC16S | FK45-50L | **801.037** | C8 -HMC20 | FK58-62 | **962.291** |
| -HMC20S | | | -HMC20S | | | -HMC25 | | |
| -HMC25S | FK52-55 | **962.294** | -HMC25S | FK58-62L | **801.038** | -HMC32 | FK80-90 | **962.292** |
| -HMC32S | FK58-62L | **801.038** | -HMC32S | FK68-75L | **801.039** | | | |

# Hydraulic Chuck

For high precision machining in automotive, aerospace, medical and die & mold.

Coolant Through Hole




A.4

**Ø 3- 32 mm**

| Model | Order No. | Ød | ØD | ØD1 | L | L1 | E | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| C5 -HDC6 - 90 | **800.726** | 6 | 26 | 45 | 90 | 45 | 28 | 33 - 50 | HDA 6-05020 | 1.0 |
| -HDC8 - 90 | **800.731** | 8 | 28 | | | | | | HDA 8-06020 | 1.1 |
| -HDC10 - 90 | **800.703** | 10 | 30 | | | | 33 | 43 - 55 | HDA10-08015 | 1.1 |
| -HDC12 - 90 | **800.708** | 12 | 32 | | | 48 | 38 | 53 - 60 | HDA12-10010 | 1.1 |
| -HDC14 - 90 | **800.712** | 14 | 34 | | | | | | | 1.1 |
| -HDC16 - 90 * | **800.717** | 16 | 38 | 48 | | | 43 | 83 | - | 1.2 |
| -HDC20 - 90 * | **800.722** | 20 | 42 | 50 | | | | 83 | - | 1.2 |
| -HDC25 - 90 * | **800.723** | 25 | 55 | 63 | | | 52 | | - | 1.7 |
| C6 -HDC6 - 90 | **800.831** | 6 | 26 | 45 | 90 | 48 | 28 | 33 - 50 | HDA 6-05020 | 1.5 |
| -HDC8 - 90 | **800.838** | 8 | 28 | | | | | | HDA 8-06020 | 1.6 |
| -HDC10 - 90 | **800.795** | 10 | 30 | | | | 33 | 43 - 55 | HDA10-08015 | 1.6 |
| -HDC12 - 90 | **800.802** | 12 | 32 | | | | 38 | 48 - 60 | | 1.6 |
| - 120 | **800.799** | | | | 120 | | | 38 - 60 | HDA10-08032 | 1.8 |
| -HDC14 - 120 | **800.806** | 14 | 34 | | 120 | | | | | 1.9 |
| -HDC16 - 90 * | **800.815** | 16 | 38 | 47 | 90 | | 43 | 81 | - | 1.7 |
| - 120 | **800.812** | | | 48 | 120 | | | 43 - 70 | HDA16-12037 | 2.0 |
| -HDC18 - 120 | **800.816** | 18 | 40 | 49 | 120 | | | | | 2.0 |
| -HDC20 - 90 * | **800.822** | 20 | 42 | 50 | 90 | | | 72 | - | 1.8 |
| - 120 | **800.819** | | | | 120 | | | 43 - 70 | HDA16-12037 | 2.1 |
| -HDC25 - 90 * | **800.825** | 25 | 55 | 63 | 90 | 46 | 52 | 80 | - | 2.2 |
| - 120 | **800.823** | | | | 120 | 51 | | 67 - 79 | HDA20-16015 | 2.8 |
| -HDC32 - 120 | **800.826** | 32 | 63 | - | 120 | - | 56 | 66 - 78 | | 3.0 |

1. * Adjusting screw cannot be used.
2. "E" is the min. clamping length.
3. "G" is the adjusting screw (optional).
4. "H" indicates the adjustment length with an adjusting screw.

For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286
For Adjusting Screw ▶ 282

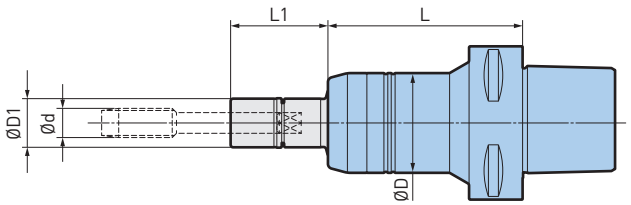
**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

Coolant Through Hole






M3 - M20

| Model | Order No. | Tap Holder Model | Ød | ØD | ØD1 | L | L1 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| C5 -MGT6 - 75 | **800.767** | MGT6 | M3 - M8 | 36 | 16 | 75 | 30-200 | 0.8 |
| -MGT12 - 75 | **800.765** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 75 | 30-200 | 0.9 |
| -MGT20 - 100 | **800.766** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 100 | 35-150 | 1.4 |
| C6 -MGT6 - 80 | **973.754** | MGT6 | M3 - M8 | 36 | 16 | 80 | 30-200 | 1.1 |
| -MGT12 - 80 | **973.755** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 80 | 30-200 | 1.2 |
| -MGT20 - 100 | **973.756** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 100 | 35-150 | 1.8 |
| C8 -MGT6 - 80 | **800.935** | MGT6 | M3 - M8 | 36 | 16 | 80 | 30-200 | 2.1 |
| -MGT12 - 80 | **800.933** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 80 | 30-200 | 2.2 |
| -MGT20 - 95 | **800.934** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 95 | 35-150 | 2.6 |

1. Tap holder and wrench are to be ordered separately.
2. Rigid tapping function is required on the machine tool.

For Tap Holder ▶ 276
For MEGA Wrench ▶ 281
For Accessories ▶ 280

**Tapping range for DIN & ISO standard**

| MGT Size | DIN Standard | | | ISO Standard | |
|---|---|---|---|---|---|
| | DIN 371 | DIN 376 | DIN 353 | ISO 529 | ISO 2284 |
| MGT6 | M3 - M6 | M5 - M8 | - | M3 - M5 | - |
| MGT12 | M5 - M8 | M8 - M12 | 1/8 | M6, M8, M12 | 1/8 |
| MGT20 | M10 | M12 - M20 | 1/4 - 1/2 | M10 - M20 | 1/4 - 3/8 |

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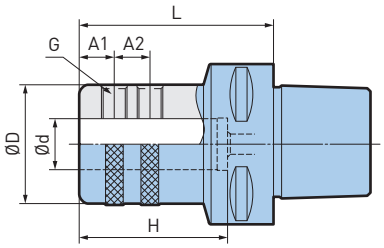
# Side Lock Holders for Drills

Coolant Through Hole



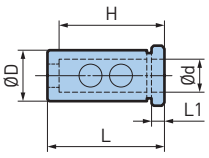

A.4

**Ø 16 - 40 mm**

| Model | | | Order No. | Ød | ØD | L | A1 | A2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C4 | -TSL16 | -56 | **800.687** | 16 | 48 | 56 | 14 | 14 | 48 | M10 P1.25 | 0.8 |
| | -TSL20 | -60 | **800.688** | 20 | | 60 | | | 50 | | 0.7 |
| | -TSL25 | -77 | **800.689** | 25 | | 77 | 15 | 20 | 56 | M16 P1.5 | 0.8 |
| C5 | -TSL16 | -60 | **973.115** | 16 | 48 | 60 | 14 | 14 | 48 | M10 P1.25 | 0.8 |
| | -TSL20 | -60 | **973.116** | 20 | | | | | 50 | | 0.9 |
| | -TSL25 | -75 | **973.117** | 25 | | 75 | 15 | 20 | 56 | M16 P1.5 | 0.9 |
| | -TSL32 | -85 | **800.775** | 32 | 63 | 85 | | | 60 | | 1.6 |
| C6 | -TSL16 | -70 | **973.119** | 16 | 48 | 70 | 14 | 14 | 48 | M10 P1.25 | 1.7 |
| | -TSL20 | -70 | **973.120** | 20 | | | | | 50 | | 1.7 |
| | -TSL25 | -70 | **973.121** | 25 | | | 15 | 20 | 56 | M16 P1.5 | 1.6 |
| | -TSL32 | -75 | **973.122** | 32 | 63 | 75 | | | 60 | | 2.0 |
| | -TSL40 | -85 | **973.123** | 40 | 68 | 85 | | 25 | 70 | | 2.2 |
| C8 | -TSL16 | -80 | **973.124** | 16 | 48 | 80 | 14 | 14 | 48 | M10 P1.25 | 3.1 |
| | -TSL20 | -80 | **973.125** | 20 | | | | | 50 | | 3.1 |
| | -TSL25 | -85 | **973.126** | 25 | | 85 | 15 | 20 | 56 | M16 P1.5 | 3.0 |
| | -TSL32 | -90 | **973.127** | 32 | 63 | 90 | | | 60 | | 3.5 |
| | -TSL40 | -95 | **973.128** | 40 | 68 | 95 | | 25 | 70 | | 3.5 |

1. "H" is the max. tool shank length that can be inserted into the holder.
2. Not compatible with Weldon DIN 1835B.

## SL Sleeve for TSL Side Lock Holder




| Model | | Order No. | Ød | ØD | L | L1 | H |
|---|---|---|---|---|---|---|---|
| OSL25 | -16 | **962.596** | 16 | 25 | 62 | 5.5 | 48 |
| | -20 | **962.597** | 20 | | | | 50 |
| OSL32 | -16 | **962.586** | 16 | 32 | 66 | 5.5 | 48 |
| | -20 | **962.598** | 20 | | | | 50 |
| | -25 | **962.599** | 25 | | | | 56 |
| OSL40 | -16 | **804.678** | 16 | 40 | 76 | 5.5 | 48 |
| | -20 | **804.679** | 20 | | | | 50 |
| | -25 | **962.581** | 25 | | | | 56 |
| | -32 | **962.582** | 32 | | | | 60 |



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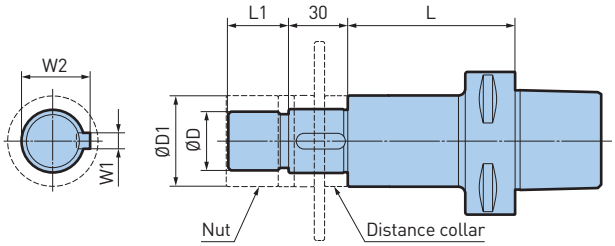
## Side Cutter Arbors

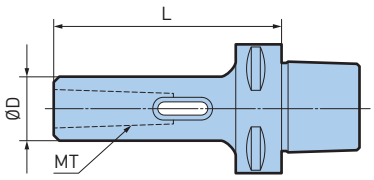





| Model | | | Order No. | ØD | ØD1 | L | L1 | W1 | W2 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| C6 | -SCA25.4 | -75 | **800.887** | 25.4 | 40 | 75 | 25 | 6.35 | 27.78 | 2.0 |
| | -SCA31.75 | -75 | **800.888** | 31.75 | 46 | | 30 | 7.92 | 34.92 | 2.4 |
| C8 | -SCA25.4 | -90 | **800.940** | 25.4 | 40 | 90 | 25 | 6.35 | 27.78 | 3.3 |
| | -SCA31.75 | -90 | **800.942** | 31.75 | 46 | | 30 | 7.92 | 34.92 | 3.7 |

1. Nut is included.
2. Distance collars of 5 mm, 8 mm, 10 mm and 12 mm are included.

## Morse Taper Holders

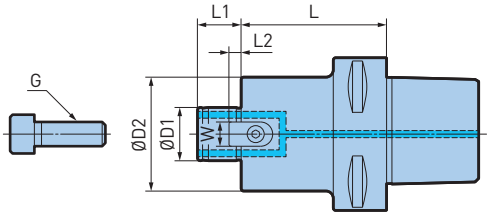


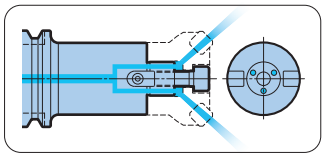

| Model | | | Order No. | MT No. | ØD | L | Weight (kg) |
|---|---|---|---|---|---|---|---|
| C5 | -MTA1 | - 95 | **973.572** | 1 | 25 | 95 | 0.6 |
| | -MTA2 | -110 | **973.573** | 2 | 32 | 110 | 0.8 |
| | -MTA3 | -130 | **973.574** | 3 | 40 | 130 | 1.2 |
| C6 | -MTA1 | - 95 | **973.575** | 1 | 25 | 95 | 1.3 |
| | -MTA2 | -110 | **973.576** | 2 | 32 | 110 | 1.5 |
| | -MTA3 | -130 | **973.577** | 3 | 40 | 130 | 1.9 |
| C8 | -MTA1 | -105 | **973.578** | 1 | 25 | 105 | 2.6 |
| | -MTA2 | -120 | **973.579** | 2 | 32 | 120 | 2.8 |
| | -MTA3 | -140 | **973.580** | 3 | 40 | 140 | 3.2 |

# Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.

Coolant Through Hole



A.4

| Model | Order No. | ØD1 | ØD2 | L | L1 | L2 | W | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| C5 - FMH22 - 47 - 60 | 973.718 | 22 | 47 | 60 | 18 | 5 | 10 | M10 | 1.2 |
| - 90 | 800.695 | | | 90 | | | | | 1.6 |
| -FMH22 - 60 - 60 | 973.720 | | 60 | 60 | | | | | 1.4 |
| -FMH27 - 60 - 60 | 800.698 | 27 | | | 20 | 6 | 12 | M12 | 1.5 |
| C6 -FMH22 - 47 - 45 | 973.721 | 22 | 47 | 45 | 18 | 5 | 10 | M10 | 1.5 |
| - 60 | 973.722 | | | 60 | | | | | 1.8 |
| - 90 | 973.723 | | | 90 | | | | | 2.2 |
| -150 | 800.783 | | | 150 | | | | | 3.0 |
| -FMH22 - 60 - 45 | 973.724 | | 60 | 45 | | | | | 1.8 |
| - 60 | 973.725 | | | 60 | | | | | 2.1 |
| - 90 | 973.726 | | | 90 | | | | | 2.8 |
| -FMH27 - 60 - 45 | 800.788 | 27 | 60 | 45 | 20 | 6 | 12 | M12 | 1.9 |
| - 60 | 800.789 | | | 60 | | | | | 2.2 |
| - 90 | 800.790 | | | 90 | | | | | 2.8 |
| -150 | 800.787 | | | 150 | | | | | 4.2 |
| C8 -FMH22 - 47 - 60 | 973.727 | 22 | 47 | 60 | 18 | 5 | 10 | M10 | 2.9 |
| -105 | 973.728 | | | 105 | | | | | 3.5 |
| -150 | 973.729 | | | 150 | | | | | 4.1 |
| -FMH22 - 60 - 60 | 973.730 | | 60 | 60 | | | | | 3.2 |
| -105 | 973.731 | | | 105 | | | | | 4.2 |
| -150 | 973.732 | | | 150 | | | | | 5.2 |
| -FMH27 - 60 -105 | 800.903 | 27 | 60 | 105 | 20 | 6 | 12 | M12 | 4.3 |
| -150 | 800.904 | | | 150 | | | | | 5.3 |
| -FMH32 - 96 -105 | 800.910 | 32 | 96 | 105 | 22 | 7 | 14 | M16 | 6.1 |
| -150 | 800.911 | | | 150 | | | | | 7.8 |

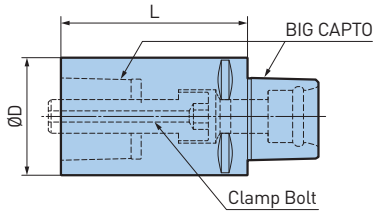
1. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
2. Hexagon socket head cap screw is included.

For Clamp Bolt ▶ 282



BROTECH

## Extensions



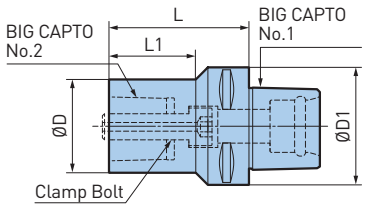

Coolant Through Hole

| Model | Order No. | BIG CAPTO | ØD | L | Clamp Bolt | | | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | | | | Thread Size | Hex. | Tightening Torque | |
| C6-C6-100 | 803.738 | C6 | 63 | 100 | M20xP2 | 14 mm | 170N·m | 1.2 |
| C8-C8-100 | 803.740 | C8 | 80 | | | | | 1.7 |

1. Clamp bolt is included.

A.4

## Reductions

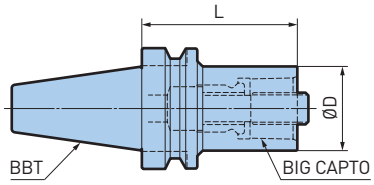



Coolant Through Hole

| Model | Order No. | BIG CAPTO No. 1 | BIG CAPTO No. 2 | ØD | ØD1 | L | L1 | Clamp Bolt | | | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Thread Size | Hex. | Tightening Torque | |
| C6-C5-75 | 803.737 | C6 | C5 | 50 | 63 | 75 | 46 | M16xP1.5 | 10 mm | 95N·m | 0.5 |
| C8-C6-85 | 803.739 | C8 | C6 | 63 | 80 | 85 | 50 | M20xP2 | 14 mm | 170N·m | 0.8 |

1. Clamp bolt is included.

## BIG CAPTO Basic Holders




BIG-PLUS Dual-Contact

Coolant Through Hole

| Model | Order No. | BIG CAPTO | ØD | L | Weight (kg) |
|---|---|---|---|---|---|
| BBT40 -C3-30 | 973.598 | C3 | 32 | 30 | 1.0 |
| -C4-40 | 802.350 | C4 | 40 | 40 | 1.1 |
| -C5-50 | 973.600 | C5 | 50 | 50 | 1.2 |
| -C6-75 | 973.601 | C6 | 63 | 75 | 1.7 |
| BBT50 -C3-40 | 973.602 | C3 | 32 | 40 | 3.6 |
| -C4-40 | 973.603 | C4 | 40 | | 3.6 |
| -C5-40 | 973.604 | C5 | 50 | | 3.5 |
| -C6-50 | 973.605 | C6 | 63 | 50 | 3.5 |
| -C8-70 | 803.736 | C8 | 80 | 70 | 4.0 |

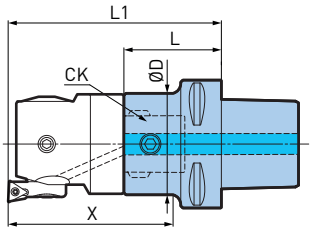
1. Clamp bolt is included.

BROTECH

# CKB/CKN Shanks with Center Through Coolant

Basic Holder for rough and finish boring heads of the proven BIG KAISER Boring System.

Coolant Through Hole



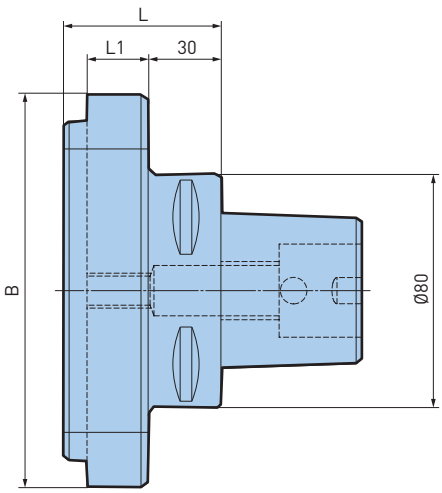

A.4

| Taper Size | | Order No. | CK | ØD | L | L1 | X | Weight (Kg) |
|---|---|---|---|---|---|---|---|---|
| C4 | -CKB1 - 48 | **806.698** | CKB1 | 19 | 47.5 | 80 | 55 | 0.4 |
| | -CKB2 - 45 | **806.699** | CKB2 | 24 | 44.5 | | | 0.4 |
| | -CKB3 - 40 | **806.700** | CKB3 | 31 | 40 | | 57 | 0.5 |
| | -CKB4 - 33 | **806.701** | CKB4 | 39 | 33 | | 62 | 0.5 |
| C5 | -CKB1 - 73 | **806.702** | CKB1 | 19 | 72.5 | 105 | 80 | 0.5 |
| | -CKB2 - 85 | **328.273** | CKB2 | 24 | 84.5 | 120 | 96 | 0.6 |
| | -CKB3 - 55 | **328.223** | CKB3 | 31 | 55 | 95 | 70 | 0.6 |
| | -CKB4 - 48 | **328.224** | CKB4 | 39 | 48 | 95 | | 0.6 |
| | -CKB5 - 50 | **328.226** | CKB5 | 50 | 50 | 107 | - | 0.6 |
| | -CKN6 - 50 | **328.037N** | CKN6 | 63.5 | 50 | 121 | - | 1.0 |
| C6 | -CKB1 - 78 | **328.321** | CKB1 | 19 | 77.5 | 110 | 83 | 1.2 |
| | -CKB2 - 90 | **328.322** | CKB2 | 24 | 89.5 | 125 | 98 | 1.3 |
| | -CKB3 - 65 | **328.036** | CKB3 | 31 | 65 | 105 | 78 | 1.3 |
| | -CKB4 - 58 | **328.035** | CKB4 | 39 | 58 | | | 1.3 |
| | -CKB5 - 48 | **328.034** | CKB5 | 50 | 48 | | 79 | 1.3 |
| | -CKN6 - 59 | **328.033N** | CKN6 | 63.5 | 59 | 130 | - | 1.6 |
| C8 | -CKB4 - 118 | **806.703** | CKB4 | 39 | 118 | 165 | 130 | 2.4 |
| | - 178 | **806.704** | | | 178 | 225 | 190 | 3.0 |
| | -CKB5 - 108 | **806.705** | CKB5 | 50 | 108 | 165 | 130 | 2.7 |
| | - 183 | **806.706** | | | 183 | 240 | 205 | 3.8 |
| | -CKN6 - 74 | **328.053N** | CKN6 | 63.5 | 74 | 145 | 110 | 2.5 |
| | -CKB6 - 169 | **806.707** | CKB6 | | 169 | 240 | 206 | 4.8 |
| | -CKN7 - 73 | **328.032N** | CKN7 | 90 | 73 | 190 (160) | - | 3.1 |
| | -CKB7 - 123 | **806.708** | CKB7 | | 123 | 240 (210) | - | 5.6 |

1. L1 and X dimensions in the table are the reference values when EWN/EWE head is attached.

For Boring Heads ▶ Chapter B

## Flange for Large Diameter Boring: Ø 200 - 620 mm




| Model | Order No. | Boring Tool Series | B | L | L1 | Weight (Kg) |
|---|---|---|---|---|---|---|
| C8-FL135-318 | **328.210** | 318 | Ø135 | 55 | 55 | 3.7 |
| C8-FL135-318-90 | **328.211** | | | | | |
| C8-FL135-317 | **328.086** | 317 | Ø135 | 55 | 22 | 3.8 |
| C8-FL135-317-90 | **328.162** | | | | | |

For Large Boring Tools ▶ 372



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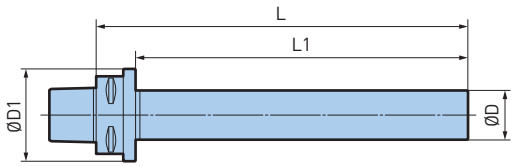
# Dyna Test

Periodic inspection of machine tools to control production stability.






| Model | Order No. | ØD | ØD1 | L | L1 | Weight (kg) |
|---|---|---|---|---|---|---|
| C5 -40 -L250 | **800.045** | 40 | 63 | 280 | 250 | 2.8 |
| C6 -40 -L200 | **973.737** | | 75 | 232 | 200 | 2.8 |
| -L320 | **973.738** | | | 352 | 320 | 3.8 |
| C8 -40 -L320 | **973.740** | | 85 | 360 | 320 | 4.9 |

# Tool Holders and Components CK


| | |
|---|---|
| CKB/CKN Reductions Steel | 194 |
| CKB/CKN Extensions Steel / Smart Damper Extensions | 195 |
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| ER Collet Chucks / ER Collet Adapters | 200 |
| Tapping Holders | 201 |
| DIN 2080 / Morse Taper Shanks | 202 |
| WTO Quickflex Adapters | 203 |

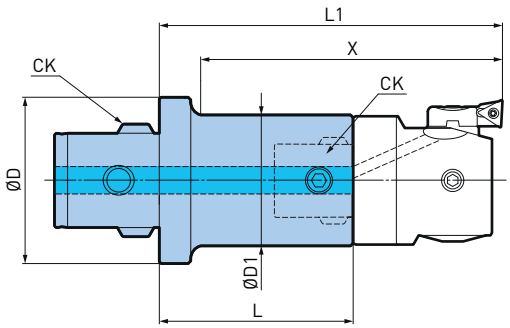



A.5

BROTECH

# CKB/CKN Reductions Steel

Coolant Through Hole




A.5

| Model | Order No. | CK | ØD | CK | ØD1 | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| CKB2 -CKB1 - 36 | 332.210 | CKB2 | 24 | CKB1 | 19 | 36 | 68.5 | 55 | 0.09 |
| CKB3 -CKB1 - 41 | 332.310 | CKB3 | 31 | CKB1 | 19 | 40.5 | 73 | 60 | 0.15 |
| -CKB2 - 35 | 332.320 | | | CKB2 | 24 | 34.5 | 70 | 60 | 0.16 |
| CK4 -CKB1 - 58 | 332.410 | CK4 | 39 | CKB1 | 19 | 57.5 | 90 | 75 | 0.23 |
| CKB4 -CKB2 - 52 | 332.420 | CKB4 | 39 | CKB2 | 24 | 51.5 | 87 | 75 | 0.25 |
| -CKB3 - 47 | 332.430 | | | CKB3 | 31 | 47 | 87 | 75 | 0.30 |
| CK5 -CKB1 - 58 | 332.511 | CK5 | 50 | CKB1 | 19 | 57.5 | 90 | 70 | 0.44 |
| - 88 | 332.510 | | | | | 87.5 | 120 | 100 | 0.44 |
| -CKB2 - 52 | 332.521 | | | CKB2 | 24 | 51.5 | 87 | 70 | 0.42 |
| - 82 | 332.520 | | | | | 81.5 | 117 | 100 | 0.55 |
| CKB5 -CKB3 - 47 | 332.531 | CKB5 | 50 | CKB3 | 31 | 47 | 87 | 70 | 0.44 |
| - 77 | 332.530 | | | | | 77 | 117 | 100 | 0.67 |
| -CKB4 - 40 | 332.541 | | | CKB4 | 39 | 40 | 87 | 70 | 0.54 |
| - 70 | 332.545 | | | | | 70 | 117 | 100 | 0.70 |
| CK6 -CKB1 - 67 | 332.611 | CK6 | 63.5 | CKB1 | 19 | 66.5 | 99 | 65 | 0.79 |
| - 102 | 332.610 | | | | | 101.5 | 134 | 100 | 0.91 |
| -CKB2 - 61 | 332.621 | | | CKB2 | 24 | 60.5 | 96 | 80 | 0.70 |
| - 96 | 332.620 | | | | | 95.5 | 131 | 115 | 0.80 |
| -CKB3 - 56 | 332.631 | | | CKB3 | 31 | 56 | 96 | 80 | 0.75 |
| - 91 | 332.630 | | | | | 91 | 131 | 115 | 0.96 |
| - 136 | 332.632 | | | | | 136 | 176 | 160 | 1.2 |
| CKB6 -CKB4 - 49 | 332.641 | CKB6 | 63.5 | CKB4 | 39 | 49 | 96 | 80 | 0.8 |
| - 84 | 332.645 | | | | | 84 | 131 | 115 | 1.1 |
| - 129 | 332.642 | | | | | 129 | 176 | 160 | 1.5 |
| -CKB5 - 39 | 332.651 | | | CKB5 | 50 | 39 | 96 | 80 | 0.8 |
| - 74 | 332.655 | | | | | 74 | 131 | 115 | 1.2 |
| - 119 | 332.652 | | | | | 119 | 176 | 160 | 2.0 |
| CKB7 -CKB4 - 70 | 332.741 | CKB7 | 90 | CKB4 | 39 | 70 | 117 | 100 | 1.5 |
| - 100 | 332.745 | | | | | 100 | 147 | 130 | 1.7 |
| -CKB5 - 60 | 332.751 | | | CKB5 | 50 | 60 | 117 | 100 | 1.7 |
| - 90 | 332.755 | | | | | 90 | 147 | 130 | 2.0 |
| - 120 | 332.750 | | | | | 120 | 177 | 160 | 2.5 |
| -CKB6 - 76 | 332.765 | | | CKB6 | 63.5 | 76 | 147 | 130 | 2.3 |
| - 106 | 332.766 | | | | | 106 | 177 | 160 | 2.9 |
| CKN7 -CKN6 - 76 | 332.765N | CKN7 | 90 | CKN6 | 63.5 | 76 | 147 | 160 | 2.3 |

1. L1 and X dimensions in the table are the reference values when EWN/EWE head is attached.

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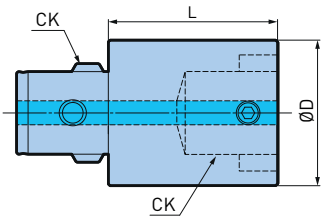
## CKB/CKN Extensions Steel




| Model | Order No. | CK | ØD | L | Weight (kg) |
|---|---|---|---|---|---|
| CKB1 -CKB1 - 20 | 331.110 | CKB1 | 19 | 20 | 0.05 |
| - 30 | 331.111 | | | 30 | 0.07 |
| CKB2 -CKB2 - 30 | 331.220 | CKB2 | 24 | 30 | 0.10 |
| - 45 | 331.221 | | | 45 | 0.15 |
| CKB3 -CKB3 - 30 | 331.330 | CKB3 | 31 | 30 | 0.16 |
| - 45 | 331.331 | | | 45 | 0.25 |
| CKB4 -CKB4 - 40 | 331.440 | CKB4 | 39 | 40 | 0.35 |
| - 60 | 331.445 | | | 60 | 0.47 |
| CKB5 -CKB5 - 60 | 331.550 | CKB5 | 50 | 60 | 0.85 |
| - 90 | 331.555 | | | 90 | 1.2 |
| CKB6 -CKB6 - 60 | 331.660 | CKB6 | 63.5 | 60 | 1.4 |
| - 100 | 331.665 | | | 100 | 2.2 |
| CKB7 -CKB7 - 100 | 331.775 | CKB7 | 90 | 100 | 4.4 |
| - 160 | 331.776 | | | 160 | 7.3 |
| CKN6 -CKN6 - 60 | 331.660N * | CKN6 | 63.5 | 60 | 1.4 |
| - 100 | 331.665N * | | | 100 | 2.2 |
| CKN7 -CKN7 - 100 | 331.775N * | CKN7 | 90 | 100 | 4.4 |
| - 160 | 331.776N * | | | 160 | 7.3 |

1. * Two pieces of CK-screws are included.

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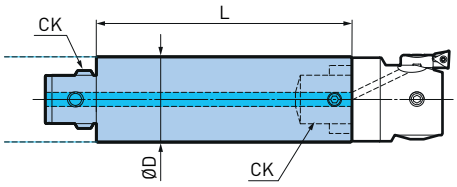
## Smart Damper Extensions

Extension with integrated damping system for highly efficient deep hole finish boring.




| Model | Order No. | CK | ØD | L | Weight (kg) |
|---|---|---|---|---|---|
| CKB44DP - 120 | 389.365 | CKB4 | 39 | 120 | 1.3 |
| CKB55DP - 150 | 389.366 | CKB5 | 50 | 150 | 2.6 |
| CKB66DP - 180 | 389.367 | CKB6 | 64 | 180 | 5.3 |

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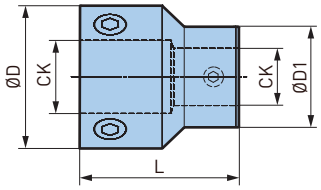
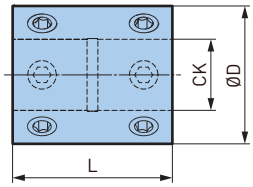
# CKN Reductions and Extensions System




| Model | Order No. | CK | CK | ØD | ØD1 | L | Weight (kg) |
|---|---|---|---|---|---|---|---|
| CKN7-CKB6-100 | 332.870N | CKN7 | CKB6 | 90 | 63.5 | 100 | 1.1 |

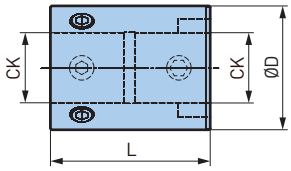
## CKN Extensions Aluminium

A.5




| Model | Order No. | CK | ØD | L | Weight (kg) |
|---|---|---|---|---|---|
| T-CKN6-CKN6- 80 | 331.867N | CKN6 | 63.5 | 80 | 0.52 |
| -120 | 331.868N | | | 120 | 0.82 |
| T-CKN7-CKN7-100 | 331.877N | CKN7 | 90 | 100 | 1.5 |
| -150 | 331.879N | | | 150 | 2.3 |
| -200 | 331.878N | | | 200 | 3.0 |

## CKN - CKB Extensions Aluminium




| Model | Order No. | CK | CK | ØD | L | Weight (kg) |
|---|---|---|---|---|---|---|
| T-CKN6-CKB6- 80 | 331.860N | CKN6 | CKB6 | 63.5 | 80 | 0.55 |
| -120 | 331.861N | | | | 120 | 0.80 |
| T-CKN7-CKB7-100 | 331.870N | CKN7 | CKB7 | 90 | 100 | 1.4 |
| -150 | 331.871N | | | | 150 | 2.2 |

## CKN Double Connector Couplings

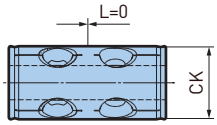



Fig. 1

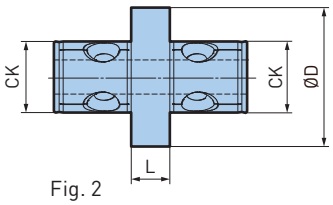
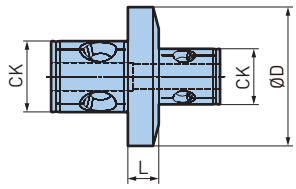



Fig. 2

| Model | Order No. | Fig. | CK | ØD | L | Weight (kg) |
|---|---|---|---|---|---|---|
| DC-CKN6-CKN6- 0 | 331.864N | 1 | CKN6 | 63.5 | 0 | 0.45 |
| -20 | 331.865N | 2 | | | 20 | 0.95 |
| DC-CKN7-CKN7- 0 | 331.874N | 1 | CKN7 | 90 | 0 | 0.95 |
| -25 | 331.875N | 2 | | | 25 | 1.5 |
| -50 | 331.876N | | | | 50 | 2.7 |

## CKN7 - CKN6 Double Connector Reductions




| Model | Order No. | CK | CK | ØD | L | Weight (kg) |
|---|---|---|---|---|---|---|
| DC-CKN7-CKN6-20 | 332.875N | CKN7 | CKN6 | 90 | 20 | 1.7 |

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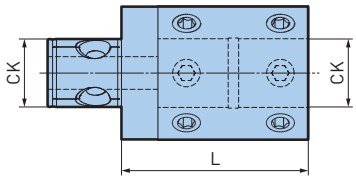
## Combination Example of Extensions and Reduction

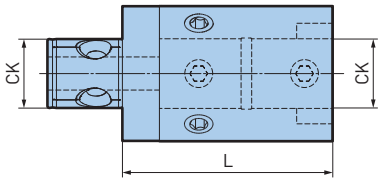
### CKN-CKN Extensions




| CK | CK | L | Double Connector | Extension | Weight (kg) |
|---|---|---|---|---|---|
| CKN6 | CKN6 | 80 | 331.864N | 331.867N | 0.97 |
| | | 100 | 331.865N | | 1.5 |
| | | 120 | 331.864N | 331.868N | 1.3 |
| | | 140 | 331.865N | | 1.8 |
| CKN7 | CKN7 | 100 | 331.874N | 331.877N | 2.5 |
| | | 125 | 331.875N | | 3.1 |
| | | 150 | 331.874N | 331.879N | 3.2 |
| | | 150 | 331.876N | 331.877N | 4.2 |
| | | 175 | 331.875N | 331.879N | 3.8 |
| | | 200 | 331.874N | 331.878N | 4.0 |
| | | 200 | 331.876N | 331.879N | 5.0 |
| | | 225 | 331.875N | 331.878N | 4.5 |
| | | 250 | 331.876N | | 5.7 |

1. L and weight shown are as a combination of the double connector and extension.

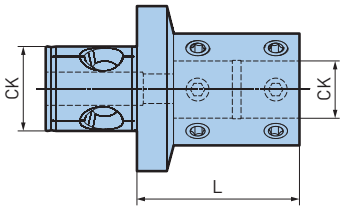
### CKN-CKB Extensions




| CK | CK | L | Double Connector | Extension | Weight (kg) |
|---|---|---|---|---|---|
| CKN6 | CKB6 | 80 | 331.864N | 331.860N | 1.0 |
| | | 100 | 331.865N | | 1.5 |
| | | 120 | 331.864N | 331.861N | 1.3 |
| | | 140 | 331.865N | | 1.8 |
| CKN7 | CKB7 | 100 | 331.874N | 331.870N | 2.4 |
| | | 125 | 331.875N | | 4.0 |
| | | 150 | 331.874N | 331.871N | 3.2 |
| | | 150 | 331.876N | 331.870N | 4.1 |
| | | 175 | 331.875N | 331.871N | 3.7 |
| | | 200 | 331.876N | | 4.9 |

1. L and weight shown are as a combination of the double connector and extension.

### CKN-CKN Reductions




| CK | CK | L | Double Connector | Extension | Weight (kg) |
|---|---|---|---|---|---|
| CKN7 | CKN6 | 100 | 332.875N | 331.867N | 2.2 |
| | | 140 | | 331.868N | 2.5 |

1. L and weight shown are as a combination of the double connector and extension.

### CKN-CKB Reductions

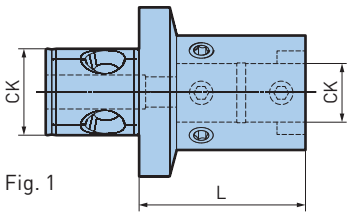



Fig. 1

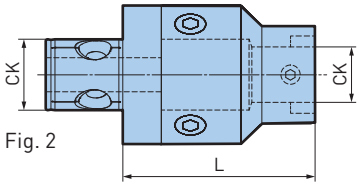


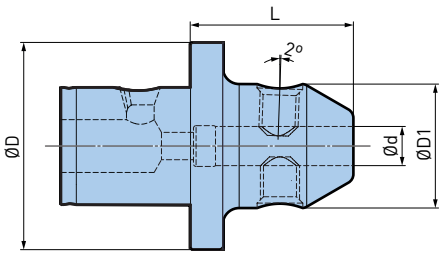

Fig. 2

| CK | CK | Fig. | L | Double Connector | Extension/Reduction | Weight (kg) |
|---|---|---|---|---|---|---|
| CKN7 | CKB6 | 1 | 100 | 332.875N | 331.860N | 2.1 |
| | | | 140 | 332.875N | 331.861N | 2.2 |
| | | 2 | 100 | 331.874N | 332.870N | 3.3 |
| | | | 125 | 331.875N | 332.870N | 2.5 |
| | | | 150 | 331.875N | 332.870N | 3.8 |

1. L and weight shown are as a combination of the double connector and extension/reduction.

## End Mill Holders

For end mills with cylindrical shank and clamping surface according to DIN 1835B (Weldon system) and to DIN 1835E (Whistle notch system).





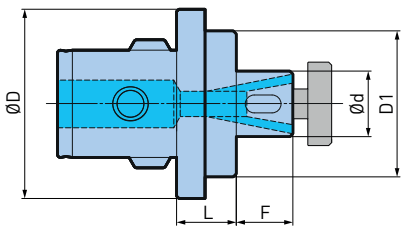

| Model | Order No. | CK | Ød | ØD | ØD1 | L | Weight (kg) |
|---|---|---|---|---|---|---|---|
| CKB4-MC6 | 335.230 | CKB4 | 6 | 39 | 24 | 50 | 0.23 |
| -MC8 | 335.231 | | 8 | | 26 | 50 | 0.30 |
| -MC10 | 335.232 | | 10 | | 32 | 55 | 0.39 |
| -MC12 | 335.233 | | 12 | | 39 | 60 | 0.55 |
| CKB5-MC6 | 335.234 | CKB5 | 6 | 50 | 24 | 50 | 0.41 |
| -MC8 | 335.235 | | 8 | | 26 | 50 | 0.43 |
| -MC10 | 335.236 | | 10 | | 32 | 55 | 0.54 |
| -MC12 | 335.237 | | 12 | | 38 | 60 | 0.67 |
| -MC14 | 335.238 | | 14 | | 40 | 60 | 0.69 |
| -MC16 | 335.239 | | 16 | | 45 | 62 | 0.79 |
| -MC20 | 335.249 | | 20 | | 48 | 60 | 0.80 |
| CKB6-MC6 | 335.240 | CKB6 | 6 | 63.5 | 24 | 45 | 0.61 |
| -MC8 | 335.241 | | 8 | | 26 | 45 | 0.63 |
| -MC10 | 335.242 | | 10 | | 32 | 45 | 0.69 |
| -MC12 | 335.243 | | 12 | | 38 | 50 | 0.82 |
| -MC14 | 335.244 | | 14 | | 40 | 50 | 0.84 |
| -MC16 | 335.245 | | 16 | | 45 | 50 | 0.90 |
| -MC18 | 335.246 | | 18 | | 47 | 50 | 0.92 |
| -MC20 | 335.247 | | 20 | | 48 | 55 | 1.1 |
| -MC25 | 335.248 | | 25 | | 63.5 | 65 | 1.7 |
| CKB7-MC32 | 335.250 * | CKB7 | 32 | 90 | 72 | 78 | 2.9 |
| -MC40 | 335.251 * | | 40 | | 80 | 90 | 3.4 |

1. * Only DIN 1835B (Weldon system).

For Spare Parts ▸ 448

## Milling Cutter Arbors

For milling cutters with longitudinal or transverse key ways according to DIN 841, 842, 1880 and cutter heads according to DIN 1830.




| Model | Order No. | CK | Ød | ØD | ØD1 | L | F | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| CKB4-CMA16 | 335.420 | CKB4 | 16 | 39 | 37 | 18 | 17 | 0.27 |
| -CMA22 | 335.421 | | 22 | | 42 | | 19 | 0.35 |
| CKB5-CMA16 | 335.423 | CKB5 | 16 | 50 | 40 | 20 | 17 | 0.42 |
| -CMA22 | 335.424 | | 22 | | 47 | | 19 | 0.51 |
| -CMA27 | 335.425 | | 27 | | 53 | | 21 | 0.64 |
| CKB6-CMA16 | 335.430 | CKB6 | 16 | 63.5 | 40 | 20 | 17 | 0.70 |
| -CMA22 | 335.431 | | 22 | | 50 | | 19 | 0.77 |
| -CMA27 | 335.432 | | 27 | | 58 | | 21 | 0.93 |
| -CMA32 | 335.433 | | 32 | | 70 | 28 | 24 | 1.3 |
| -CMA40 | 335.434 | | 40 | | 80 | | 27 | 1.8 |
| CKN6-CMA16 | 335.430N * | CKN6 | 16 | 63.5 | 40 | 20 | 17 | 0.70 |
| -CMA22 | 335.431N * | | 22 | | 50 | | 19 | 0.77 |
| CKB7-CMA32 | 335.435 | CKB7 | 32 | 90 | 83 | 28 | 24 | 2.1 |
| -CMA40 | 335.436 | | 40 | | 93 | | 27 | 2.5 |

1. * As long as stock lasts.

For Spare Parts ▸ 448



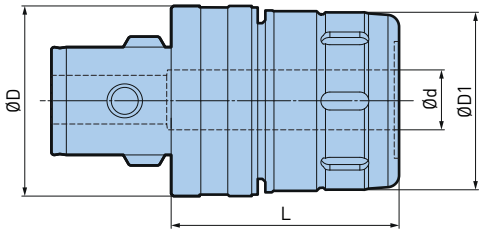
BROTECH

## Milling Chucks

With needle-bearing chucking nut for maximum clamping force and high concentricity.

| Model | Order No. | CK | Ød | ØD | ØD1 | L | Wrench | | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Model | Order No. | |
| CKB6-HMC20 | **335.066** | CKB6 | 20 | 63.5 | 60 | 80 | FK58-62 | **962.291** | 2.0 |
| CKB7-HMC32 | **335.077** | CKB7 | 32 | 90 | 80 | 112 | FK80-90 | **962.292** | 4.8 |

For Straight Collet ▶ 272



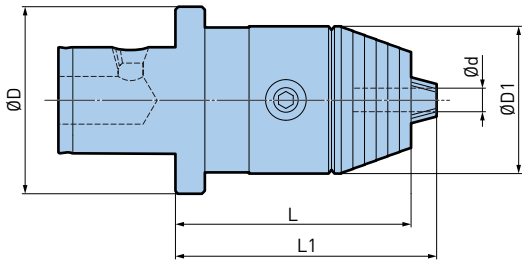



## Universal Drill Chucks

With strong clamping force and high runout accuracy. Quick and simple clamping over a bevel gear.

| Model | Order No. | CK | Ød | ØD | ØD1 | L | L1 | Wrench Order No. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| CK6-DC13 | **335.042** | CK6 | 1 -13 | 63.5 | 50 | 81 | 90 | **690.817** | 1.4 |
| -DC16 | **335.044** | | 3 -16 | | 57 | 86 | 92 | | 1.5 |

For Spare Parts ▶ 448



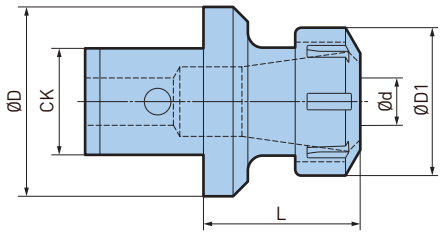
## ER Collet Chucks

For double-taper collets slitted on both sides with extraction groove.

| Model | Order No. | CK | Ød | Collet | ØD | ØD1 | L | Nut Order No. | Wrench Order No. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| CKB4-ER25 | **335.140** | CKB4 | 1 - 16 | ER25 | 39 | 42 | 47 | **951.076** | **951.077** | 0.59 |
| CKB5-ER25 | **335.142** | CKB5 | 2 - 20 | ER25 | 50 | 42 | 47 | **951.076** | **951.077** | 0.74 |
| CK6 -ER32 | **335.164** | CK6 | 2 - 25 | ER32 | 64 | 50 | 53 | **951.065** | **951.009** | 1.2 |
| CKB6-ER40 | **335.165** | CKB6 | 2 - 25 | ER40 | 64 | 63 | 65 | **951.060** | **951.061** | 1.7 |

1. Nut is included.
2. ER collets are to be ordered separately.

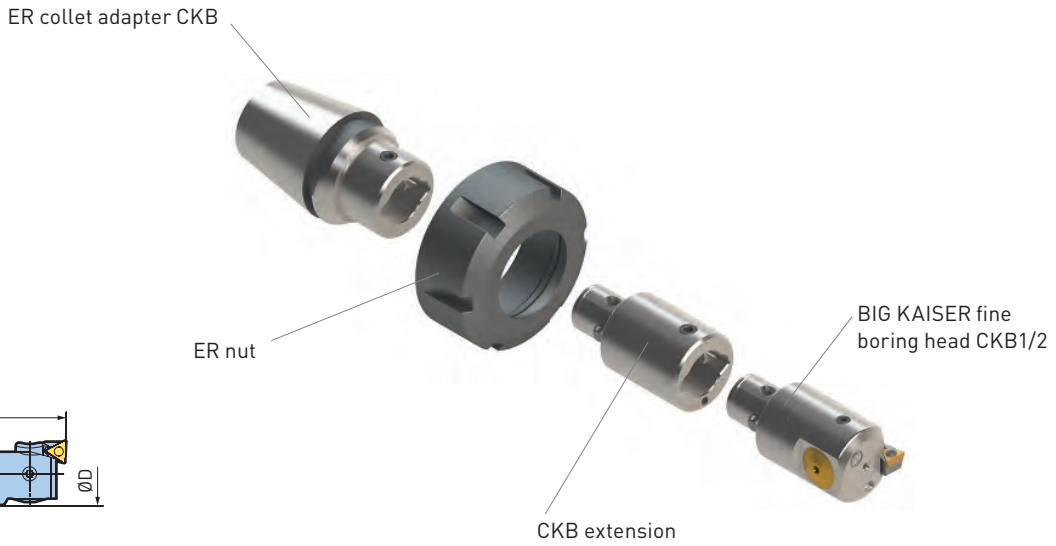
For ER Collets ▶ 266
For ER Nut ▶ 268

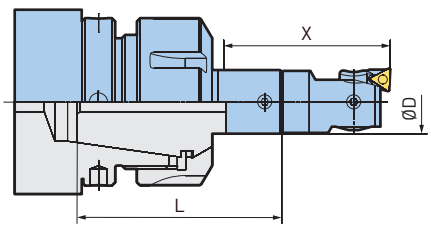





## ER Collet Adapters

Enable the use of all BIG KAISER fine and rough boring heads of corresponding sizes (CKB1/CKB2) on ER collet chucks.




| Model | Order No. | CK | ØD | L | X |
|---|---|---|---|---|---|
| ER25 -CKB1 -50 | **335.130** | CKB1 | 19 | 55 | 50 |
| ER32 -CKB1 -50 | **335.131** | CKB1 | 19 | 61 | 50 |
| -CKB2 -50 | **335.132** | CKB2 | 24 | 58 | 50 |

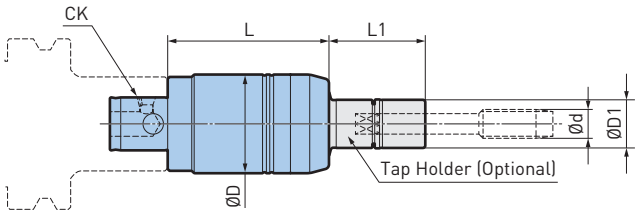
For ER Nut ▶ 268
For Boring Head ▶ Chapter B



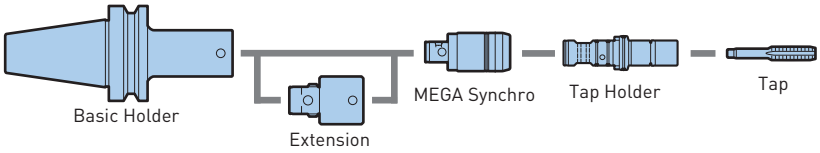
BROTECH

## MEGA Synchro Tapping Holders

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



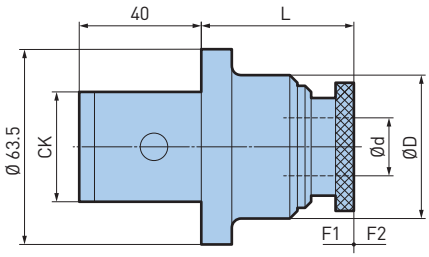

| Model | Order No. | CK | Ød | ØD | ØD1 | L | L1 | Tap Holder | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| CKB4-MGT6 - 62 | 335.764 | CKB4 | M2 - M6 | 36 | 16 | 62 | 30-200 | MGT 6 | 0.5 |
| -MGT12 - 67 | 335.768 | | M6 - M12 | 41 | 20 | 67 | 30-200 | MGT12 | 0.6 |
| CKB5-MGT20- 87 | 335.769 | CKB5 | M12 - M20 | 54 | 30 | 87 | 35-150 | MGT20 | 1.2 |
| CKB7-MGT36-137 | 800.949 | CKB7 | M20 - M36 | 94 | 38-52 | 137 | 65 | MGT36 | 6.8 |



For Tap Holder ▶ 276
For Accessories ▶ 280
For MEGA Wrench ▶ 281



## Tapping Holders

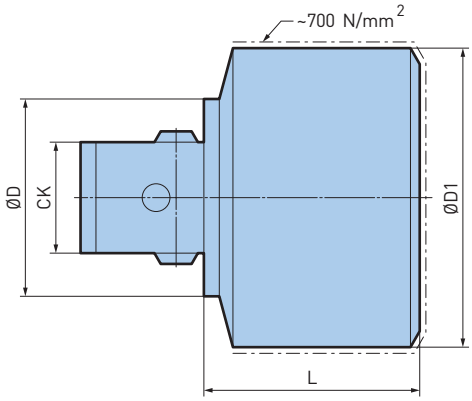



| Model | Order No. | CK | Range | ØD | Ød | L | F1 | F2 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| CK6-ATE12E | 335.762 | CK6 | M4 - M12 | 47 | 19 | 50 | 5 | 10 | 0.87 |
| -ATE24E | 335.763 | | M10 - M24 | 64 | 31 | 80 | 7 | 14 | 1.6 |

1. F1 = length compensation compression.
2. F2 = length compensation extension.
3. Please contact BIG KAISER agent for tap collet.

## Blanks

The CK connector is hardened and ground. In the marked areas ( –·–·– ) the blanks are unhardened and unground.

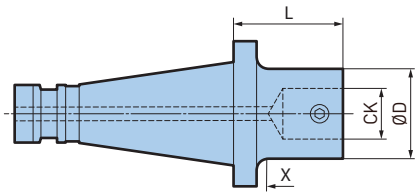



| Model | Order No. | CK | ØD | ØD1 | L |
|---|---|---|---|---|---|
| CKB3 -31 - 65 | 335.531 | CKB3 | 31 | 31 | 65 |
| -42 - 50 | 335.532 | | | 42 | 50 |
| CKB4 -39 - 80 | 335.541 | CKB4 | 39 | 39 | 80 |
| -54 - 50 | 335.542 | | | 54 | 50 |
| CKB5 -50 -100 | 335.551 | CKB5 | 50 | 50 | 100 |
| -70 - 60 | 335.552 | | | 70 | 60 |
| CKB6 -64 -120 | 335.561 | CKB6 | 64 | 64 | 120 |
| -64 -220 | 335.563 | | | 64 | 220 |
| -97 - 70 | 335.562 | | | 97 | 70 |
| CKB7 -90 -180 | 335.571 | CKB7 | 90 | 90 | 180 |

BROTECH

# DIN 2080 Tool Holders

For manual tool change.



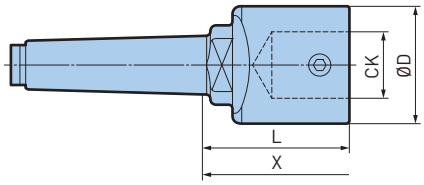

| Model | Order No. | CK | ØD | L | X | Weight (kg) |
|---|---|---|---|---|---|---|
| DV40-DIN2080 -CKB5-39 | **321.451** | CKB5 | 50 | 39 | 80 | 2.2 |
| -CKB6-45 | **321.462** | CKB6 | 63.5 | 45 | 100 | 2.4 |
| DV50-DIN2080 -CKB6-49 | **323.780 *** | CKB6 | 63.5 | 49 | 100 | 5.1 |
| -CKB7-63 | **323.781 *** | CKB7 | 90 | 63 | 160 (130) | 7.2 |

1. * Shanks DV50 without OTT ring groove.

A.5

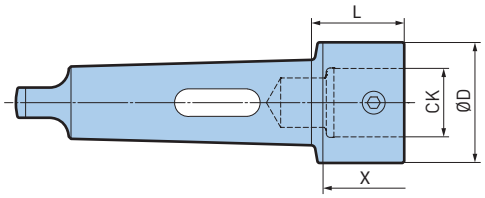
# Morse Taper Shanks

**With thread (SIP/Hauser)**

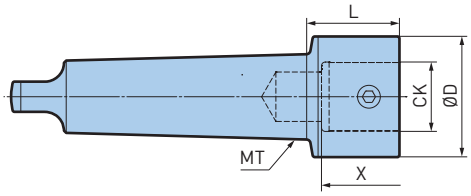



| Model | Order No. | CK | ØD | L | X | Weight (kg) |
|---|---|---|---|---|---|---|
| MK4-CKB6-81 | **322.563** | CKB6 | 63.5 | 81 | 130 | 1.6 |

**With tang**




| Model | Order No. | CK | ØD | L | X | Weight (kg) |
|---|---|---|---|---|---|---|
| MK5-CKB6-55 | **323.563** | CKB6 | 63.5 | 55 | 115 | 2.5 |




| Model | Order No. | CK | ØD | L | X | Weight (kg) |
|---|---|---|---|---|---|---|
| MT3 -CKB1 -47 | **806.671** | CKB1 | 19 | 47 | 80 | 0.34 |
| -CKB2 -68 | **806.712** | CKB2 | 24 | 67.5 | 103 | 0.46 |
| -CKB3 -64 | **806.713** | CKB3 | 31 | 64 | 104 | 0.56 |
| -CKB5 -48 | **806.714** | CKB5 | 50 | 48 | 105 | 0.74 |
| MT4 -CKB1 -52 | **806.715** | CKB1 | 19 | 51.5 | 84 | 0.65 |
| -CKB2 -74 | **806.716** | CKB2 | 24 | 74 | 110 | 0.78 |
| -CKB3 -66 | **806.717** | CKB3 | 31 | 65.5 | 106 | 0.86 |
| -CKB4 -60 | **806.718** | CKB4 | 39 | 59.5 | 107 | 0.97 |
| -CKB5 -50 | **806.719** | CKB5 | 50 | 49.5 | | 1.1 |
| -CKB6 -61 | **806.720** | CKB6 | 64 | 60.5 | 132 | 1.6 |
| MT5 -CKB4 -86 | **806.721** | CKB4 | 39 | 85.5 | 133 | 2.2 |
| -CKB5 -75 | **806.722** | CKB5 | 50 | 74.5 | 132 | 2.4 |
| -CKB6 -61 | **806.723** | CKB6 | 64 | 60.5 | | 2.5 |
| MT6 -CKB6 -61 | **806.724** | CKB6 | 64 | 60.5 | 132 | 5.1 |

1. In case the cutter slot is necessary, machine specifications need to be informed.

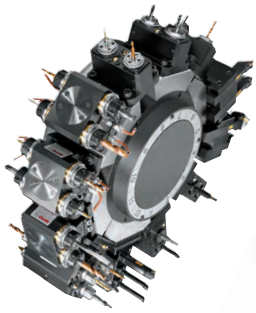


BROTECH

# WTO QuickFlex® Adapter with CK Connection

For the WTO quick change tooling system QuickFlex®, there are adapters for BIG KAISER rough- and fine boring heads available. This offers the possibility for precise and fast machining of cross holes in the diameter range from 0.4 – 74 mm on turning machines.

| QuickFlex® Adapter | | | | | | | Spare Parts | |
|---|---|---|---|---|---|---|---|---|
| Model | Order No. | CK | F1 | F2 | L1 | L2 | Screw | Wrench |
| ER25QF-CKB1 | **470.721** | CKB1 | 49 | 19 | 15.5 | 8.5 | **690.431** | **690.801** |
| -CKB3 | **470.723** | CKB3 | 49 | 31 | 19.5 | 12.5 | **690.433** | **690.803** |
| ER32QF-CKB1 | **470.731** | CKB1 | 58 | 19 | 15.5 | 8.5 | **690.431** | **690.801** |
| -CKB3 | **470.733** | CKB3 | 58 | 31 | 19.5 | 12.5 | **690.433** | **690.803** |
| ER40QF-CKB2 | **470.742** | CKB2 | 71 | 24 | 18 | 10 | **690.432** | **690.802** |
| -CKB4 | **470.744** | CKB4 | 71 | 39 | 23 | 15 | **690.434** | **690.804** |
| ER50QF-CKB2 | **470.752** | CKB2 | 82 | 24 | 19 | 10 | **690.432** | **690.802** |
| -CKB4 | **470.754** | CKB4 | 82 | 39 | 24 | 15 | **690.434** | **690.804** |



WTO QuickFlex® tool holder

QuickFlex® adapter with BIG KAISER connection

BIG KAISER fine boring head

BIG KAISER boring tools

A.5

# Tool Holders Cylindrical Shank


| | |
|---|---|
| MEGA Micro Chuck | 206 |
| New Baby Chuck | 207 |
| Hydraulic Chucks | 208 |
| New Hi-Power Milling Chuck | 209 |
| Shrink Chucks | 210 - 211 |
| CK Shanks | 212 |
| MEGA Synchro Tapping Holder | 213 |
| Other Products | 214 |



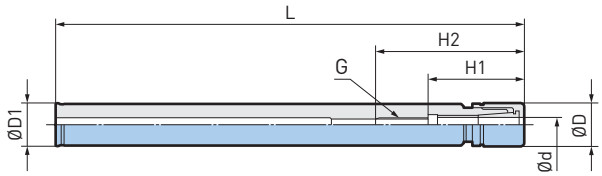

A.6

BROTECH

# MEGA Micro Chuck

Ultra small diameter (Ø 10 - Ø 18) to avoid interference. High precision is maintained by combination with MEGA New Baby Chuck.

Coolant Through Hole




**Ø 0.45 - 8.05 mm**

| Model | | | Order No. | Ød | ØD | ØD1 | L | H1 | H2 | G | Collet Model | Nut Model | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST10 | -MEGA3S | -120 | **961.777** | 0.45 - 3.25 | 10 | 10 | 120 | 22 | 38 | M4 P0.7 | NBC3S- | MGN3S | 0.06 |
| ST12 | -MEGA4S | -130 | **961.773** | 0.45 - 4.05 | 12 | 12 | 130 | 26.5 | 47 | M5 P0.8 | NBC4S- | MGN4S | 0.11 |
| | | -160 | **961.778** | | | | 160 | | | | | | 0.13 |
| ST14 | -MEGA6S | -160 | **961.774** | 0.45 - 6.05 | 14 | 14 | 160 | 28.5 | 49 | M7 P0.75 | NBC6S- | MGN6S | 0.18 |
| | | -200 | **961.779** | | | | 200 | | | | | | 0.21 |
| ST16 | -MEGA8S | -160 | **803.596** | 2.95 - 8.05 | 18 | 16 | 160 | 31 | 50.5 | M9 P0.75 | NBC8S- | MGN8S | 0.23 |
| | | -200 | **805.575** | | | | 200 | | | | | | 0.25 |

1. MEGA nut is included.

A.6

| Spare Parts | | | Accessories | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MEGA Nut | | MEGA Wrench | | Micro Collet ▶ 247 | Micro Seal Nut ▶ 249 | Micro Collet Protective Case | | α Taper Cleaner | |
| MEGA Micro Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | Model | Order No. |
| MEGA3S | MGN3S | **969.480** | MGR10 | **969.449** | NBC3S- | - | NBB3S | **968.330** | SC-NBC3S | **961.278** |
| MEGA4S | MGN4S | **969.481** | MGR12 | **969.450** | NBC4S- | - | NBB4S | **968.364** | SC-NBC4S | **961.279** |
| MEGA6S | MGN6S | **969.482** | MGR14 | **969.452** | NBC6S- | MGN6S-PS | NBB6S | **961.498** | SC-NBC6S | **961.280** |
| MEGA8S | MGN8S | **804.108** | MGR18 | **801.705** | NBC8S- | MGN8S-PS | NBB8S | **805.802** | SC-NBC8S | **805.827** |

## MEGA Micro Chuck Set

Including convenient storage case.

| Set Model | Order No. |
|---|---|
| SST12-MEGA4S-130 | **961.775** |

**Contents**

- Body / ST12 - MEGA4S - 130 (with MGN4S nut)
- Collet / NBC4S - 3.0 & 4.0 (2 pcs.)
- Wrench / MGR12

| Set Model | Order No. |
|---|---|
| SST14-MEGA6S-160 | **961.776** |

**Contents**

- Body / ST14 - MEGA6S - 160 (with MGN6S nut)
- Collet / NBC6S - 3.0,4.0,5.0 & 6.0 (4 pcs.)
- Wrench / MGR14

| Set Model | Order No. |
|---|---|
| SST16-MEGA8S-160 | **805.412** |

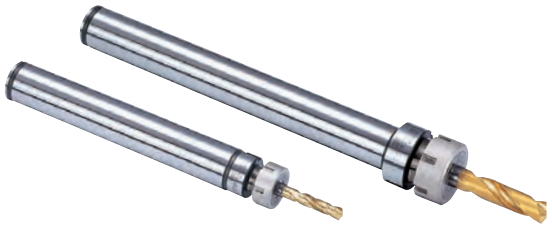
**Contents**

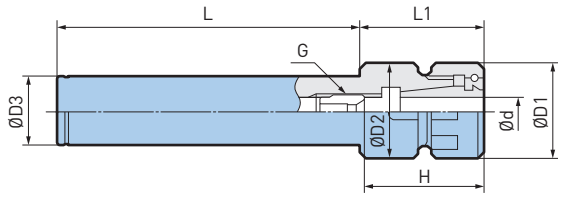
- Body / ST16 - MEGA8S - 160 (with MGN8S nut)
- Collet / NBC8S - 3.0,4.0,6.0 & 8.0 (4 pcs.)
- Wrench / MGR18

# New Baby Chuck

Avoids interference when used in combination with BIG KAISER New Hi-Power Milling Chuck.

Coolant Through Hole

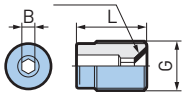





**Ø 0.25 - 20 mm**

| Model | | | Order No. | Ød | ØD1 | ØD2 | ØD3 | L | L1 | H | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST20 | -NBS6 | -100 | **961.701** | 0.25 - 6 | 20 | 19.5 | 20 | 100 | 24 | 20 - 40 | 0.27 |
| | | -150 | **961.702** | | | | | 150 | | | 0.39 |
| | | -250 | **961.703** | | | | | 250 | | | 0.64 |
| | -NBS8 | -100 | **961.706** | 0.5 - 8 | 25 | 24.5 | | 100 | 26 | 23 - 43 | 0.29 |
| | | -150 | **961.707** | | | | | 150 | | | 0.41 |
| | | -250 | **961.708** | | | | | 250 | | | 0.66 |
| | -NBS10 | -100 | **961.711** | 1.5 - 10 | 30 | 29.5 | | 100 | 28 | 35 - 45 | 0.32 |
| | | -150 | **961.712** | | | | | 150 | | | 0.44 |
| | | -250 | **961.713** | | | | | 250 | | | 0.69 |
| | | -350 | **961.714** | | | | | 350 | | | 0.93 |
| ST25 | -NBS8 | -150 | **961.721** | 0.5 - 8 | 25 | 24.5 | 25 | 150 | 26 | 23 - 42 | 0.62 |
| | | -200 | **961.722** | | | | | 200 | | | 0.81 |
| | | -250 | **961.723** | | | | | 250 | | | 1.00 |
| | -NBS10 | -150 | **961.726** | 1.5 - 10 | 30 | 29.5 | | 150 | 28 | 35 - 45 | 0.65 |
| | | -200 | **961.727** | | | | | 200 | | | 0.84 |
| | | -250 | **961.728** | | | | | 250 | | | 1.03 |
| | -NBS13 | -150 | **961.731** | 2.5 - 13 | 35 | 34.5 | | 150 | 34 | 41 - 60 | 0.67 |
| | | -200 | **961.732** | | | | | 200 | | | 0.86 |
| | | -250 | **961.733** | | | | | 250 | | | 1.05 |
| ST32 | -NBS8 | -150 | **961.741** | 0.5 - 8 | 25 | 24.5 | 32 | 150 | 26 | 23 - 42 | 0.99 |
| | -NBS10 | -150 | **961.746** | 1.5 - 10 | 30 | 29.5 | | | 28 | 35 - 45 | 1.02 |
| | | -200 | **961.747** | | | | | 200 | | | 1.33 |
| | | -250 | **961.748** | | | | | 250 | | | 1.64 |
| | | -350 | **961.749** | | | | | 350 | | | 1.95 |
| | -NBS13 | -150 | **961.751** | 2.5 - 13 | 35 | 34.5 | | 150 | 34 | 41 - 60 | 1.04 |
| | | -200 | **961.752** | | | | | 200 | | | 1.35 |
| | | -250 | **961.753** | | | | | 250 | | | 1.67 |
| | | -300 | **961.754** | | | | | 300 | | | 2.30 |
| | -NBS16 | -150 | **961.756** | 2.5 - 16 | 42 | 41.5 | | 150 | | 45 - 65 | 1.05 |
| | | -200 | **961.757** | | | | | 200 | | | 1.37 |
| | | -300 | **961.758** | | | | | 300 | | | 2.00 |
| | -NBS20 | -150 | **961.761** | 2.5 - 20 | 46 | 45.5 | | 150 | | 48 - 65 | 1.05 |
| | | -200 | **961.762** | | | | | 200 | | | 1.37 |
| | | -300 | **961.763** | | | | | 300 | | | 2.00 |

1. New baby nut is included.
2. "G" is the adjusting screw (optional).
3. "H" indicates the adjustment length with an adjustment screw.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | New Baby Nut | | Wrench | | NBC Collet ▸ 250 | Baby Perfect Seal ▸ 262 | Adjusting Screw | Rubber  | | | |
| New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| NBS6 | NBN6 | **961.526** | NBK6 | **961.525** | NBC6- | BPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| NBS8 | NBN8 | **961.549** | NBK8 | **961.548** | NBC8- | BPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| NBS10 | NBN10 | **961.571** | NBK10 | **961.570** | NBC10- | BPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| NBS13 | NBN13 | **961.597** | NBK13 | **961.596** | NBC13- | BPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| NBS16 | NBN16 | **961.631** | NBK16 | **961.630** | NBC16- | BPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| NBS20 | NBN20 | **961.679** | NBK20 | **961.678** | NBC20- | BPS20- | NBA20B | **961.680** | M21 | 20 | 4 |

# Hydraulic Chuck Super Slim

Ultra precise Hydraulic Chuck with cylindrical body eliminates any interface problem.

Coolant Through Hole

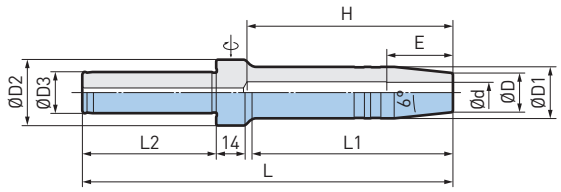



Fig. 1

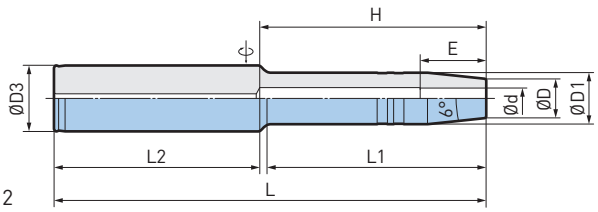



Fig. 2

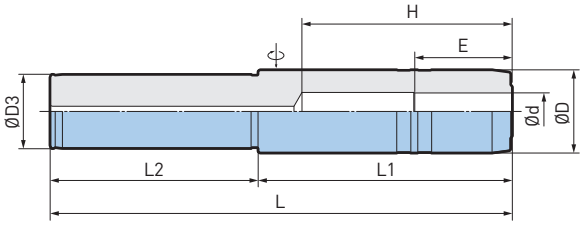



Fig. 3

**Ø 4 - 20 mm**

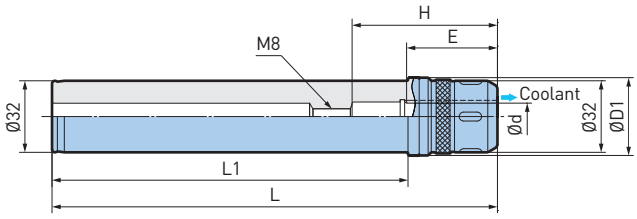
| Model | | | Order No. | Fig. | Ød | ØD | ØD1 | ØD2 | ØD3 | L | L1 | L2 | E | H | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST20 | -HDC4S | -180 | **805.835** | 1 | 4 | 14 | 18 | 32 | 20 | 180 | 94 | 65 | 19 | - | 0.40 |
| | -HDC6S | -180 | **805.836** | | 6 | | 20 | | | | 95 | | 25 | 101 | 0.43 |
| | -HDC8S | -180 | **805.837** | | 8 | 17 | 23 | | | | 96 | | 31 | | 0.50 |
| | -HDC10S | -180 | **805.838** | | 10 | 19 | 25 | | | | 97 | | 33 | 100 | 0.54 |
| | -HDC12S | -180 | **805.839** | | 12 | 21 | 28 | | | | 99 | | 36 | | 0.61 |
| ST32 | -HDC10S | -210 | **805.595** | 2 | 10 | 19 | 25 | - | 32 | 210 | 106 | 100 | 33 | 110 | 0.98 |
| | -HDC12S | -210 | **805.560** | | 12 | 21 | 28 | | | | 108 | | 36 | 109 | 1.06 |
| | -HDC16 | -200 | **805.840** | 3 | 16 | 36 | - | | | 200 | 110 | 90 | 43 | 91 | 1.27 |
| | -HDC20 | -200 | **805.841** | | 20 | 38 | | | | | | | | 90 | 1.28 |

1. Adjusting screw cannot be used.
2. Use only cutting tools that have a shank tolerance within h6.
3. "E" is the min. clamping length.
4. "H" is max. tool shank length that can be inserted into the holder.

For Inner Bore Cleaner ▶ 286
For Straight Collet ▶ 272

# New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.




A.6

**Ø 6 - 12 mm**

| Model | Order No. | Ød | ØD1 | L | L1 | H | E | Wrench | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| ST32 -HMC12J -120 | **805.842** | 12 | 35 | 120 | 80 | 65 | 43 | FK31-33 | 0.7 |
| -160 | **805.843** | | | 160 | 120 | | | | 0.9 |
| -200 | **805.844** | | | 200 | 160 | | | | 1.1 |

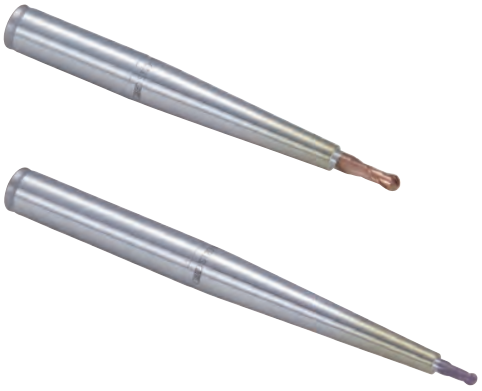
1. Wrench is to be ordered separately.
2. "E" is the min. clamping length.
3. "H" is max. tool shank length that can be inserted into the holder.

For Straight Collet ▶ 272
For Wrench ▶ 275

# Shrink Chuck Super Slim

Extremley slim design avoids interference with the side wall and draft of the mold.

Coolant Through Hole



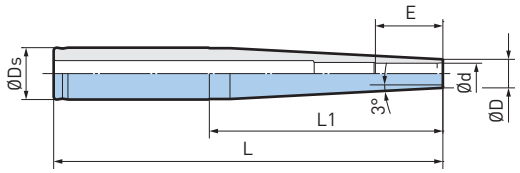



Fig. 1

A.6

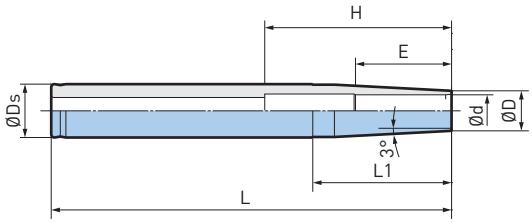



Fig. 2

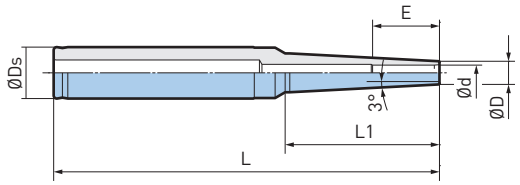



Fig. 3

**Ø 4 - 12 mm**

| Model | Order No. | Fig. | Ød | ØD | ØDs | L | L1 | H | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST12 -SRC4SS -120 | **802.189** | 1 | 4 | 7 | 12 | 120 | 51 | - | 16 | 0.10 |
| -SRC6SS -120 | **802.190** | 2 | 6 | 9 | | | 32 | 52 | 26 | 0.10 |
| ST20 -SRC4SS -150-K40 | **802.205** | 3 | 4 | 7 | 20 | 150 | 40 | - | 16 | 0.25 |
| -SRC6SS -150-K60 | **802.209** | | 6 | 9 | 20 | 150 | 60 | - | 26 | 0.25 |
| -200 | **802.210** | 1 | | | | 200 | 110 | | | 0.30 |
| -250 | **802.212** | | | | | 250 | 110 | | | 0.35 |
| -SRC8SS -150 | **802.217** | 1 | 8 | 11 | 20 | 150 | 90 | - | 26 | 0.25 |
| -200 | **802.218** | | | | | 200 | | | | 0.30 |
| -250 | **802.219** | | | | | 250 | | | | 0.40 |
| -SRC10SS -150 | **802.197** | 2 | 10 | 13 | 20 | 150 | 71 | 60 | 32 | 0.25 |
| -200 | **802.198** | | | | | 200 | | | | 0.35 |
| -250 | **802.199** | | | | | 250 | | | | 0.40 |
| -SRC12SS -150 | **802.200** | 2 | 12 | 15 | 20 | 150 | 52 | 70 | 36 | 0.25 |
| -200 | **802.201** | | | | | 200 | | | | 0.35 |
| -250 | **802.202** | | | | | 250 | | | | 0.45 |

1. Use carbide cutter within a tolerance of h6.
2. "E" is the min. clamping length.
3. "H" is max. tool shank length that can be inserted into the holder.

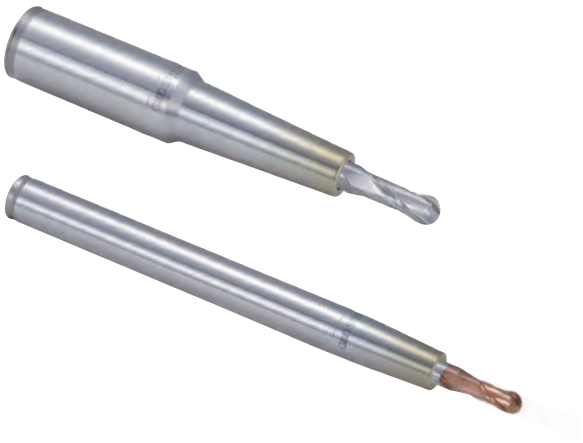
For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

# Shrink Chuck Slim

Slim design avoids interference with the workpiece.

Coolant Through Hole



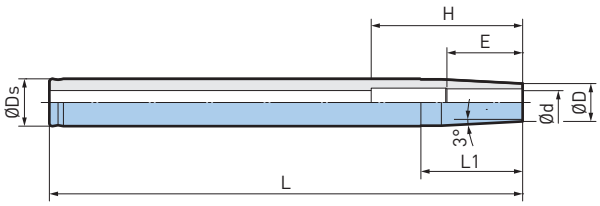



Fig. 1

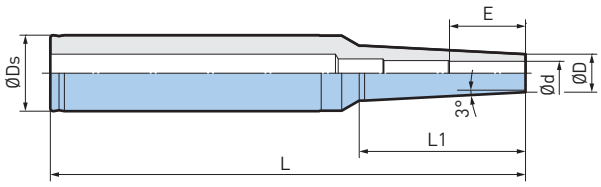



Fig. 2

**Ø 12 - 20 mm**

| Model | | | Order No. | Fig. | Ød | ØD | ØDs | L | L1 | H | E | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST32 | -SRC12S | -150-K70 | **802.238** | 2 | 12 | 19 | 32 | 150 | 70 | - | 36 | 0.55 |
| | | -200-K70 | **802.239** | | | | | 200 | | | | 0.80 |
| | | -300-K70 | **802.241** | 3 | | | | 300 | 70 | | | 1.25 |
| | -SRC16S | -150 | **802.245** | 1 | 16 | 24 | 32 | 150 | 83 | 70 | 38 | 0.60 |
| | | -200 | **802.246** | | | | | 200 | | 80 | | 0.85 |
| | | -300 | **802.247** | | | | | 300 | | | | 1.30 |
| | -SRC20S | -150 | **802.248** | 1 | 20 | 28 | 32 | 150 | 50 | 80 | 38 | 0.60 |
| | | -200 | **802.249** | | | | | 200 | | | | 0.85 |
| | | -300 | **802.250** | | | | | 300 | | | | 1.30 |

1. Use carbide cutter within a tolerance of h6.
2. "E" is the min. clamping length.
3. "H" is max. tool shank length that can be inserted into the holder.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

# CK Shanks

Coolant Through Hole

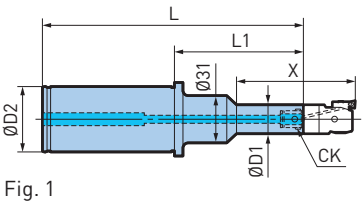


Fig. 1

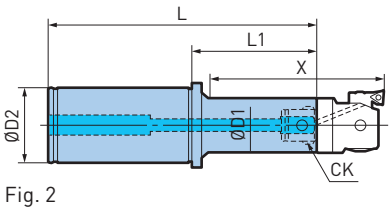


Fig. 2

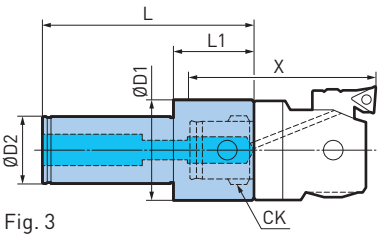


Fig. 3

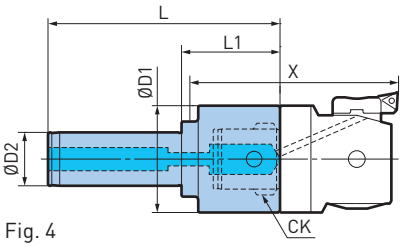


Fig. 4

A.6

| Model | | | Order No. | Fig. | CK | ØD1 | ØD2 | L | L1 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST32 | -CKB1 | -77 | **806.725** | 1 | CKB1 | 19 | 32 | 157 | 77 | 73 | 0.7 |
| | -CKB2 | -73 | **978.413** | 2 | CKB2 | 24 | | 152.5 | 72.5 | 100 | 0.7 |
| | -CKB3 | -69 | **806.726** | | CKB3 | 31 | | 149 | 69 | | 0.8 |
| | -CKB4 | -58 | **978.406** | 3 | CKB4 | 39 | | 138 | 58 | | 0.9 |
| | -CKB5 | -48 | **806.727** | 4 | CKB5 | 50 | | 128 | 48 | | 0.9 |
| | -CKB6 | -59 | **978.357** | | CKB6 | 64 | | 139 | 59 | 125 | 1.5 |
| ST42 | -CKB1 | -77 | **806.728** | 1 | CKB1 | 19 | 42 | 157 | 77 | 73 | 1.0 |
| | -CKB2 | -73 | **806.729** | 2 | CKB2 | 24 | | 152.5 | 72.5 | 100 | 1.0 |
| | -CKB3 | -69 | **806.730** | | CKB3 | 31 | | 149 | 69 | | 1.1 |
| | -CKB4 | -63 | **806.731** | | CKB4 | 39 | | 143 | 63 | | 1.2 |
| | -CKB5 | -48 | **806.732** | 3 | CKB5 | 50 | | 128 | 48 | | 1.3 |
| | -CKB6 | -59 | **806.733** | 4 | CKB6 | 64 | | 139 | 59 | 125 | 1.8 |

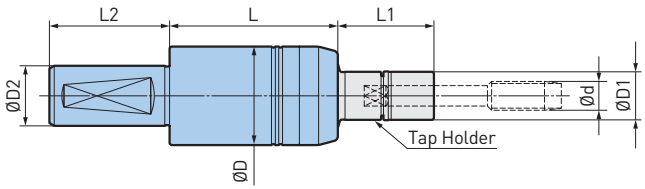
1. Boring head and insert are to be ordered separately.

For Boring Head ▶ Chapter B

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

Coolant Through Hole




**M3 - M20**

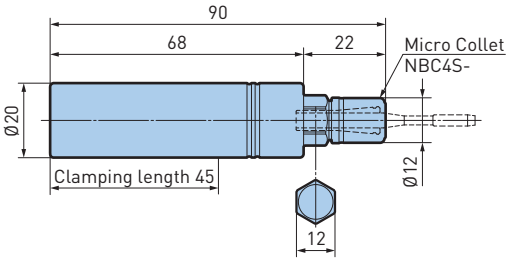
| Model | Order No. | Tap Holder Model | Ød | ØD | ØD1 | ØD2 | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST20 -MGT6 - 65 | **963.601** | MGT6 | M3 - M8 | 36 | 16 | 20 | 65 | 30-200 | 40 | 0.5 |
| ST25 -MGT12 - 70 | **963.602** | MGT12 | M5 - M12 P1/8 | 41 | 20 | 25 | 70 | 30-200 | 50 | 0.8 |
| ST32 -MGT20 - 90 | **963.603** | MGT20 | M10 - M20 P1/4 - P1/2 | 54 | 30 | 32 | 90 | 35-150 | 55 | 1.5 |

1. Tap holder and wrench are to be ordered separately.
2. Rigid tapping function is required on the machine tool.
3. Side lock holder model TSL is recommended as a basic holder.

For Tap Holders ▶ 276
For Accessories ▶ 280
For Side Lock Holder BBT ▶ 68
For Side Lock Holder BDV ▶ 108
For Side Lock Holder BIG CAPTO ▶ 186



## For small Tap MGT3




**M1 - M3**

| Model | Order No. |
|---|---|
| ST20-MGT3-90 | **978.356** |

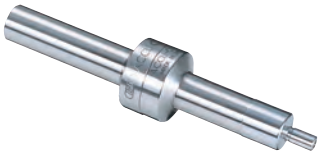
For Collet ▶ 281

1. Nut is included. MEGA Wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

## Other products with cylindrical shank

▶ 508

**Point Master**
- Touch probe and edge finder
- High precision stroke and interchangeable stylus for measuring different applications



▶ 513

**Accu Center**
- Edge finder
- Simple and precise edge finder offering repeatability within 3 µm

▶ 451

**Fullcut Mill**
- Indexable insert endmill
- Shoulder and slot milling cutter with both high radial and axial rake angle

▶ 484

**C-Cutter Mini**
- Ultra high feed chamfer mill
- 4 inserts and small tool diameter minimize cutting speed

▶ 491

**C-Cutter**
- Wide range chamfer mill
- Reduced number of tools and tool change time

▶ 497

**R-Cutter**
- Corner rounding mill
- Front & back chamfering
- 4 inserts multiply feed rate

▶ 503

**BF-Cutter**
- Back spot facing tool for cap screw hole
- Selected spot facing diameters suitable for cap screws

▶ 501

**Center Boy**
- Center and chamfer in one
- Accurate centering and chamfering can be obtained in a single operation

▶ 296

**MW Rough Boring Head**
- Twin-cutter boring head
- Fast and efficient roughing of small bores Ø 16 - 21 mm

▶ 496

**C-Centering Cutter**
- Centering and chamfer with insert
- Stable and long life time operation with insert

# Modular Turning / Lathe Tools


HSK-T SERIES

Selection Guide 216 - 217

Modular Turning Tools 218 - 225

BIG CAPTO SERIES

Selection Guide 226 - 227

Modular Turning Tools 228 - 234

N/C LATHE TOOLING

Side Lock Holders 235 - 236

Smart Damper Turning 237

Collet Chucks 238 - 242

Hydraulic Chucks 243

Centering Tool / Lathe Master 244




A.7

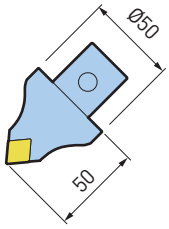
BROTECH

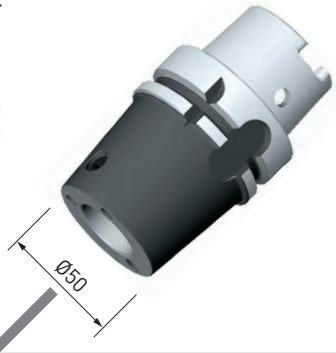
45°

## S50
## Type S basic holder

HSK-T 63 -S50 - 60
- 75
-100
HSK-T100 -S50 -115

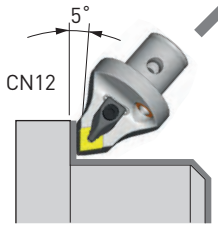
▶ 218



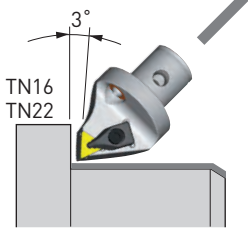

### Type S cartridge ▶ 219

**No. 1**



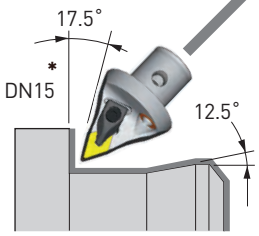

S50-DCLNN-00050-12

**No. 2**



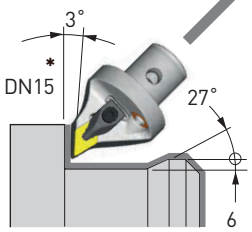

S50-DTJNR-00050-16(22)
-DTJNL-00050-16(22)

**No. 3**



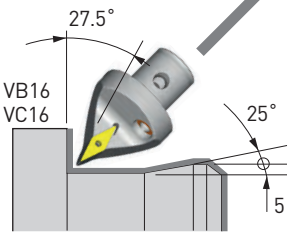

S50-DDHNN-00050-15

**No. 4**




S50-DDJNR-00050-15
-DDJNL-00050-15

**No. 5**




S50-SVQBN-00050-16

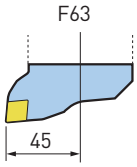
* In case of DN1506 insert (thickness of 6.35mm), please replace the standard Carbide Shim by DNS1506 (option).

90°

## F63
## Type F
## basic holder

HSK-T 63-F63
HSK-T100-F63

▶ 220



## S63
## Type S
## basic holder

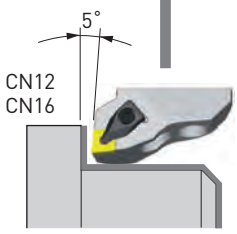
▶ 218

### Type S cartridge ▶ 219

**No. 1**
**No. 3**
**No. 5**
**No. 8**

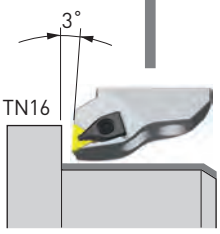
### Type F cartridge ▶ 221

**No. 10**



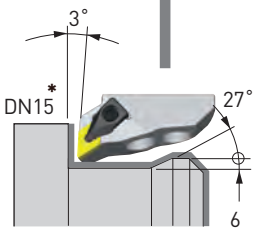

F63-DCLNR-45035-12(16)
-DCLNL-45035-12(16)

**No. 12**




F63-DTJNR-45035-16
-DTJNL-45035-16

**No. 13**




F63-DDJNR-45035-15
-DDJNL-45035-15

* In case of DN1506 insert (thickness of 6.35mm), please replace the standard Carbide Shim by DNS1506 (option).

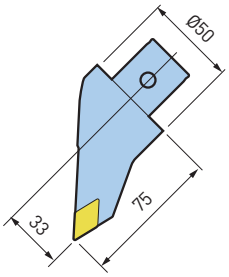
A.7

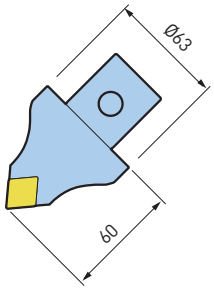


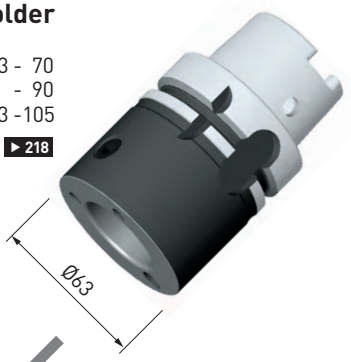
BROTECH

## S63
### Type S basic holder

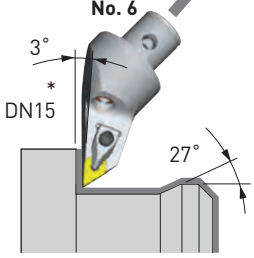
HSK-T 63 -S63 - 70
- 90
HSK-T100 -S63 -105
▶ 218



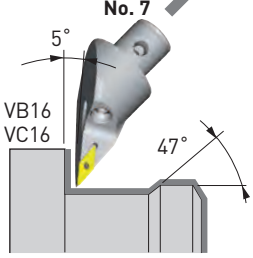




**No. 6**



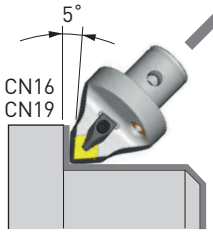

S50-DDJNR-33075-15
-DDJNL-33075-15

**No. 7**




S50-SVLBR-33075-16
-SVLBL-33075-16

**No. 8**

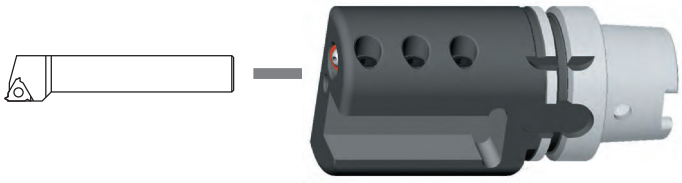



S63-DCLNN-00060-16
-DCLNN-00060-19

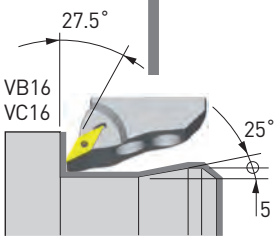


## Boring bar holder
▶ 224

## Square tool holder 180°
▶ 222

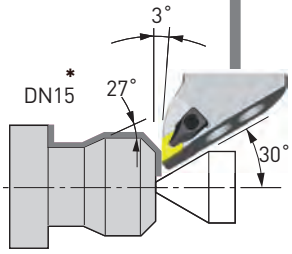


**No. 15**




F63-SVQBR-45035-16
-SVQBL-45035-16

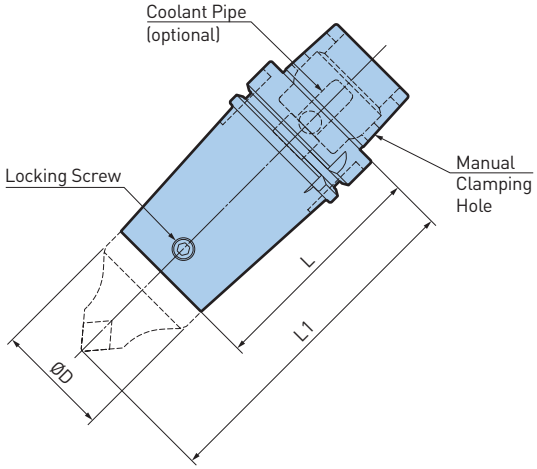
**No. 18**




F63-DDJNR-45055-15
-DDJNL-45055-15

# 45° Basic Holders Type S

Coolant Through Hole




A.7

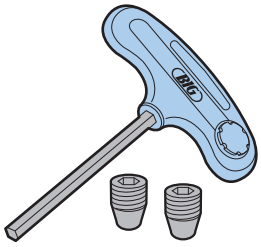
| Type | Model | Order No. | ØD | L | L1 | Locking Screw | Weight (kg) |
|---|---|---|---|---|---|---|---|
| S50 | HSK-T63 -S50 - 60 | **801.303** | 50 | 60 | 110 | CK5S | 1.1 |
| | - 75 | **974.006** | | 75 | 125 | | 1.4 |
| | -100 | **801.302** | | 100 | 150 | | 1.8 |
| S63 | -S63 - 70 | **805.874** | 63 | 70 | 130 | CK6S | 1.4 |
| | - 90 | **805.875** | | 90 | 150 | | 1.9 |
| S50 | HSK-T100 -S50 -115 | **805.876** | 50 | 115 | 165 | CK5S | 3.7 |
| S63 | -S63 -105 | **805.877** | 63 | 105 | 165 | CK6S | 4.0 |

1. Basic holders include a locking screw.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174

## Locking screw set (optional)

For type S basic holder



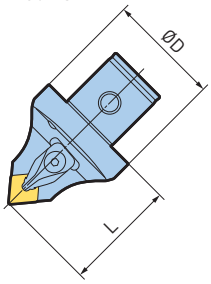
| Type | Set-Model | Order No. | Screw (2p) | T-Wrench (1p) |
|---|---|---|---|---|
| S50 | CK5S | **805.891** | M10 x P1.0 | CK-T5 |
| S63 | CK6S | **805.892** | M12 x P1.0 | CK-T6 |



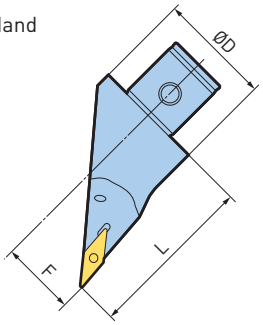
BROTECH

# 45° Cartridges Type S

Neutral




Left Hand




A.7

| Entering Angle | No. | Hand | Model | Order No. | Insert | F | L | ØD | Clamp Piece |
|---|---|---|---|---|---|---|---|---|---|
| 95° | 1 | N | S50 -DCLNN -00050-12 | **973.014** | CN1204 Rhombic 80° | 0 | 50 | 50 | CP2 |
| 95° | 8 | N | S63 -DCLNN -00060-16 | **973.025** | CN1606 Rhombic 80° | 0 | 60 | 63 | CP3 |
| | | | -00060-19 | **805.724** | CN1906 Rhombic 80° | | | | CP5 |
| 93° | 2 - 1 | R | S50 -DTJNR -00050-16 | **973.015** | TN1604 Triangle 60° | 0 | 50 | 50 | CP1 |
| | | L | -DTJNL -00050-16 | **973.016** | | | | | |
| 93° | 2 - 2 | R | S50 -DTJNR -00050-22 | **802.130** | TN2204 Triangle 60° | 0 | 50 | 50 | CP2 |
| | | L | -DTJNL -00050-22 | **802.129** | | | | | |
| 93° | 4 | R | S50 -DDJNR -00050-15 | **973.017** | DN1504 * (DN1506) Rhombic 55° | 0 | 50 | 50 | CP2 |
| | | L | -DDJNL -00050-15 | **973.018** | | | | | |
| 93° | 6 | R | S50 -DDJNR -33075-15 | **973.019** | | 33 | 75 | | |
| | | L | -DDJNL -33075-15 | **973.020** | | | | | |
| 107.5° | 3 | N | S50 -DDHNN -00050-15 | **973.021** | | 0 | 50 | | |
| 95° | 7 | R | S50 -SVLBR -33075-16 | **973.022** | VB1604 ** VC1604 ** Rhombic 35° | 33 | 75 | 50 | M3.5 |
| | | L | -SVLBL -33075-16 | **973.023** | | | | | |
| 117.5° | 5 | N | S50 -SVQBN -00050-16 | **973.024** | | 0 | 50 | | |

1. Wrench is to be ordered separately. Inserts are not included.
2. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 (option).
3. ** VB1604 and VC1604 inserts are suitable.

For Spare Parts ▶ 225
For Inserts ▶ 416 - 418

## Coding system for cartridge

S50 - D C L N N - 00 050 - 12

- 12 – Insert Size
- 050 – Length
- 00 – Offset Value
- N – Hand
- N – Relief Angle
- L – Entering Angle
- C – Insert Shape
- D – Clamping Method
- S50 – Cartridge Type and Size

| Clamping Method | |
|---|---|
| D | Double-Clamp |
| S | Screw-On |

| Insert Shape | |
|---|---|
| C | Rhombic 80° |
| T | Triangle 60° |
| D | Rhombic 55° |
| V | Rhombic 35° |

| Entering Angle | |
|---|---|
| J | 93° |
| L | 95° |
| H | 107.5° |
| Q | 117.5° |

| Relief Angle | |
|---|---|
| N | 0° Negative |
| B | 5° Positive |

| Hand | |
|---|---|
| R | Right Hand |
| L | Left Hand |
| N | Neutral |

# 90° Basic Holders Type F

Coolant Through Hole

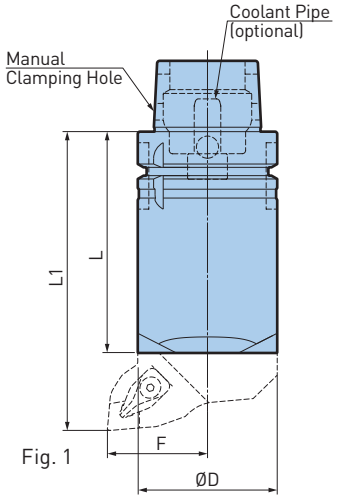



Fig. 1

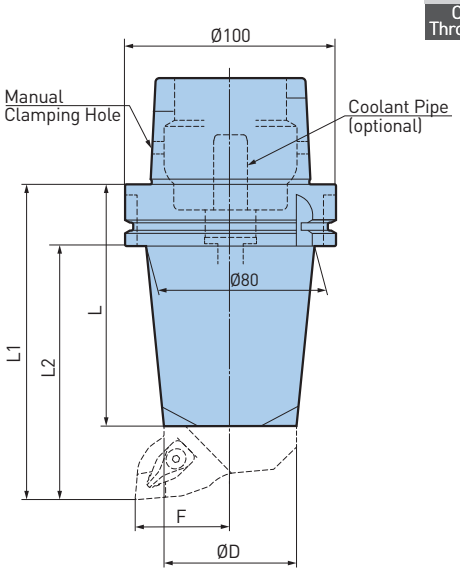



Fig. 2

A.7

| Type | Model | Order No. | Fig. | ØD | L | L1 | L2 | F | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| F63 | HSK-T63 -F63 - 50 | **801.301** | 1 | 63 | 50 | 85 | - | 45 | 1.2 |
| | - 75 | **974.056** | | | 75 | 110 | | | 1.8 |
| | -100 | **974.057** | | | 100 | 135 | | | 2.4 |
| | -130 | **801.299** | | | 130 | 165 | | | 3.1 |
| | -170 | **801.300** | | | 170 | 205 | | | 4.1 |
| F63 | HSK-T100 -F63 -100 | **805.878** | 2 | 63 | 100 | 135 | 105 | 45 | 4.2 |
| | -150 | **805.879** | | | 150 | 185 | 155 | | 6.1 |

1. Basic holders include M10x22L and M10x25L screws for clamping cartridges.
2. Hexagon wrench is required to clamp cartridge (not included).
3. Coolant pipe is to be ordered separately.

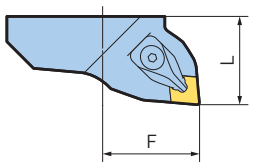
For Coolant Pipe ▶ 174



BROTECH

# 90° Cartridges Type F63

Right Hand



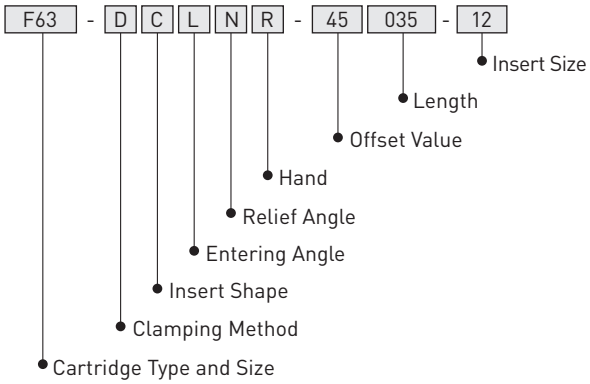



| Entering Angle | No. | Hand | Model | Order No. | Insert | F | L | Clamp Piece |
|---|---|---|---|---|---|---|---|---|
| 95° | 10 - 1 | R | F63 -DCLNR -45035-12 | **973.076** | CN1204 Rhombic 80° | 45 | 35 | CP2 |
| | | L | -DCLNL -45035-12 | **973.077** | | | | |
| 95° | 10 - 2 | R | F63 -DCLNR -45035-16 | **973.078** | CN1606 Rhombic 80° | 45 | 35 | CP3 |
| | | L | -DCLNL -45035-16 | **973.079** | | | | |
| 93° | 12 | R | F63 -DTJNR -45035-16 | **973.080** | TN1604 Triangle 60° | 45 | 35 | CP1 |
| | | L | -DTJNL -45035-16 | **973.081** | | | | |
| 93° | 13 | R | F63 -DDJNR -45035-15 | **973.082** | DN1504 * (DN1506) Rhombic 55° | 45 | 35 | CP2 |
| | | L | -DDJNL -45035-15 | **973.083** | | | | |
| 93° | 18 | R | F63 -DDJNR -45055-15 | **973.084** | | 45 | 55 | CP2 |
| | | L | -DDJNL -45055-15 | **973.085** | | | | |
| 117.5° | 15 | R | F63 -SVQBR -45035-16 | **973.086** | VB1604 ** VC1604 ** Rhombic 35° | 45 | 35 | M3.5 |
| | | L | -SVQBL -45035-16 | **973.087** | | | | |

1. Wrench is to be ordered separately. Inserts are not included. Inserts are not included.
2. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 (option).
3. ** VB1604 and VC1604 inserts are suitable.

For Spare Parts ▶ 225
For Inserts ▶ 416 - 418

## Coding system for cartridge




| Clamping Method | |
|---|---|
| D | Double-Clamp |
| S | Screw-On |

| Insert Shape | |
|---|---|
| C | Rhombic 80° |
| T | Triangle 60° |
| D | Rhombic 55° |
| V | Rhombic 35° |

| Entering Angle | |
|---|---|
| J | 93° |
| L | 95° |
| H | 107.5° |
| Q | 117.5° |
| U | 93° |

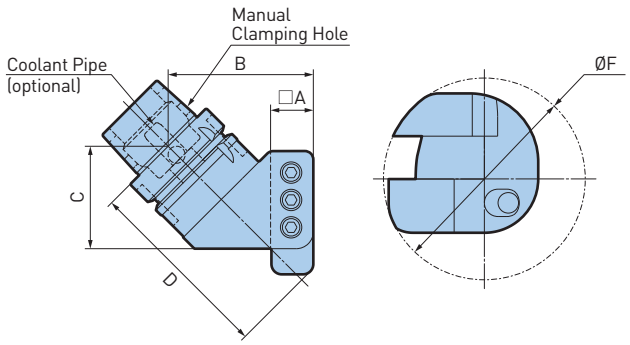
| Relief Angle | |
|---|---|
| N | 0° Negative |
| B | 5° Positive |

| Hand | |
|---|---|
| R | Right Hand |
| L | Left Hand |
| N | Neutral |

# Square Tool Holders

Coolant Through Hole

45 Type



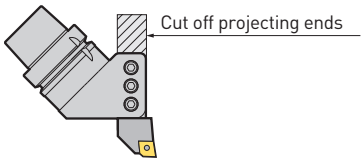

| Hand | Model | Order No. | □A | B | C | D | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| R | HSK-T63 -45 -BH25R -110 | **974.028** | 25 | 85 | 60 | 110 | 118 | 2.7 |
| L | -BH25L -110 | **801.294** | | | | | | |

For Coolant Pipe ▶ 174

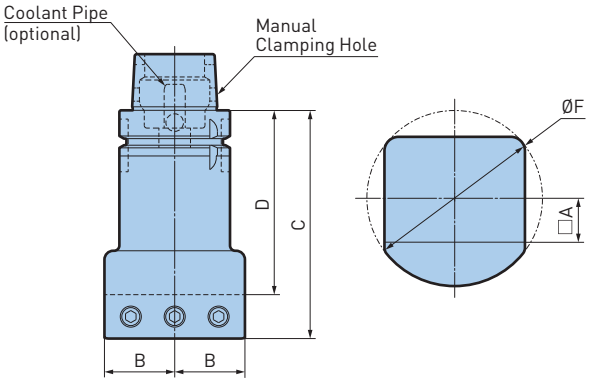
A.7

**Caution**

The projecting end of a turning tool must be cut off to avoid interference with an ATC arm.




90 Type

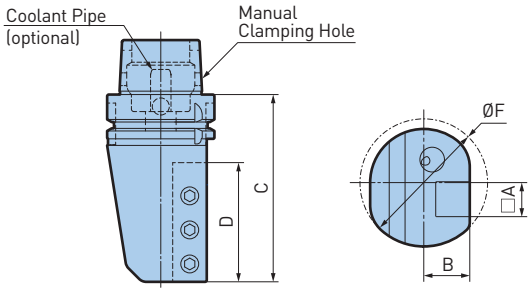



| Hand | Model | Order No. | □A | B | C | D | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| N | HSK-T63 -90 -BH20N- 85 | **806.246** | 20 | 32 | 85 | 65 | 80 | 2.2 |
| | -BH25N -100 | **801.296** | 25 | 40 | 100 | 75 | 100 | 3.3 |
| | -BH25N -130 | **801.297** | | | 130 | 105 | | 4.0 |
| N | HSK-T100-90-BH25N -150 | **805.537** | 25 | 55 | 150 | 125 | 128 | 6.7 |

For Coolant Pipe ▶ 174

Coolant Through Hole

180 Type

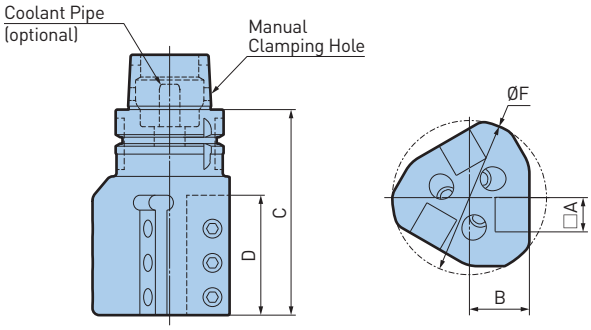



| Hand | Model | Order No. | □A | B | C | D | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| R | HSK-T63 -180-BH20R-120 | 806.248 | 20 | 27 | 120 | 70 | 75 | 2.7 |
| L | -BH20L-120 | 806.247 | | | | | | |
| R | HSK-T63 -180-BH25R-125 | 806.250 | 25 | 29.5 | 127 | 80 | 90 | 3.2 |
| L | -BH25L-125 | 806.249 | | | | | | |
| R | HSK-T100-180-BH25R-140 | 805.306 | 25 | 50 | 140 | 90 | 120 | 7.5 |
| L | -BH25L-140 | 805.305 | | | | | | |
| R | -BH25R-180 | 805.536 | | | 180 | 90 | | 9.7 |
| L | -BH25L-180 | 805.535 | | | | | | |

For Coolant Pipe ▶ 174

A.7

180 Multi Type




| Hand | Model | Order No. | □A | B | C | D | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| R | HSK-T63-180-3BH20R-120 | 801.290 | 20 | 35 | 120 | 70 | 90 | 3.3 |
| L | -3BH20L-120 | 801.289 | | | | | | |
| R | HSK-T63-180-3BH25R-125 | 806.252 | 25 | 45 | 127 | 80 | 110 | 5.0 |
| L | -3BH25L-125 | 806.255 | | | | | | |

For Coolant Pipe ▶ 174

**Caution**

60° indexing is required to the machine tool spindle.

# Boring Bar Holders

Application: boring and thread cutting

Coolant Through Hole

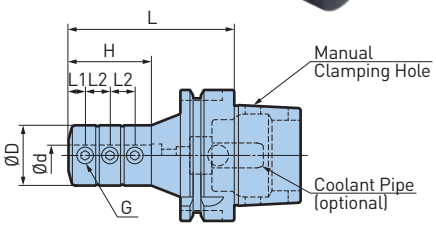



Fig. 1

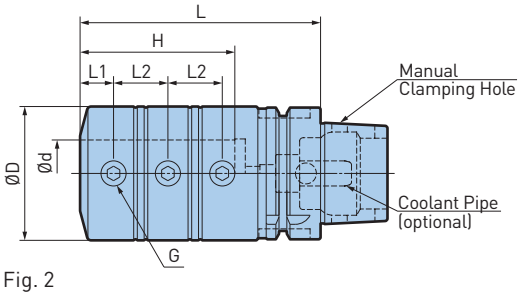



Fig. 2

A.7

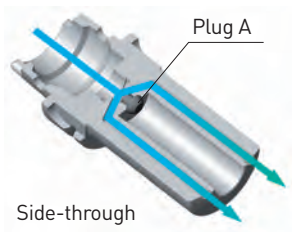
**Ø 6 - 40 mm**

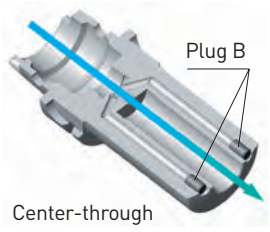
| Model | Order No. | Fig. | Ød | ØD | L | L1 | L2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-T63 -BSL6 - 70 | **979.198** | | 6 | 23 | 70 | 5 | 8 | 24 | M5 P0.8 | 0.9 |
| -BSL8 - 75 | **801.298** | | 8 | 25 | 75 | 6 | 10 | 32 | M6 P1.0 | 0.9 |
| -BSL10 - 80 | **979.199** | 1 | 10 | 29 | 80 | 8 | 12 | 40 | M8 P1.0 | 0.9 |
| -BSL12 - 85 | **974.100** | | 12 | 34 | 85 | | 16 | 45 | | 1.1 |
| -BSL16 -100 | **978.135** | | 16 | 40 | 100 | 10 | 21 | 60 | M10 P1.25 | 1.3 |
| -BSL20 -100 | **974.102** | 2 | 20 | 50 | | 12 | 20 | | | 1.6 |
| -BSL25 -110 | **806.243** | | 25 | 55 | 110 | 14 | 23 | 67 | M12 P1.5 | 1.8 |
| -BSL32 -125 | **806.244** | | 32 | 64 | 125 | 16 | 26 | 74 | | 2.6 |
| -BSL40 -145 | **806.245** | | 40 | 80 | 145 | 18 | 32 | 91 | M16 P1.5 | 4.0 |
| HSK-T100-BSL16 -105 | **805.880** | | 16 | 40 | 105 | 10 | 21 | 60 | M10 P1.25 | 2.7 |
| -BSL20 -110 | **805.881** | | 20 | 50 | 110 | 12 | 20 | | | 3.2 |
| -BSL25 -120 | **805.538** | 1 | 25 | 55 | 120 | 14 | 23 | 67 | M12 P1.5 | 3.5 |
| -BSL32 -125 | **805.539** | | 32 | 64 | 125 | 16 | 26 | 74 | | 4.0 |
| -BSL40 -135 | **805.540** | | 40 | 80 | 135 | 18 | 32 | 90 | M16 P1.5 | 5.2 |

1. Coolant pipe is to be ordered separately.
2. For sealing purpose, please use plugs according to drawing below. Both, plug A and B are included as standard.
3. Reduction sleeve (BSL) is available on request.

For Coolant Pipe ▸ 174
For BSL Sleeve ▸ 282

Interchangeable between center-through and side-through coolant supply by using plugs.
Adjustment for either right hand or left hand is also possible.



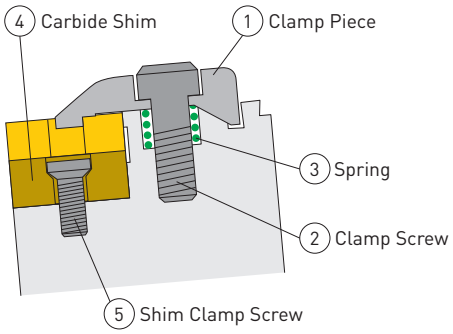

| Chuck Model | Plug A | Plug B |
|---|---|---|
| BSL 6 | M5 P0.8 | M4 P0.7 |
| 8 | M6 P1.0 | |
| 10 | | M5 P0.8 |
| 12 | | M6 P1.0 |
| 16 | M6 P1.0 | |
| 20 | | |
| 25 | T63: M6 P1.0<br>T100: M8 P1.25 | |
| 32 | M8 P1.25 | |
| 40 | | |

1. Both plugs are included as standard.



BROTECH

# Spare Parts for Carbide




Clamp Piece Set

| Set Model | Order No. | (1) Clamp Piece | (2) Clamp Screw | (3) Spring | Compartible Insert |
|---|---|---|---|---|---|
| | | | | | |
| SCP1 | **973.181** | CP1 | M5 x 20 | Ø8 x 10 | TN16 |
| SCP2 | **973.182** | CP2 | | | CN12, TN22 DN15 |
| SCP3 | **973.183** | CP3 | | | CN16 |
| SCP5 | **802.133** | CP5 | | | CN19 |

1. 1 pce. each of the clamp piece, clamp screw and spring are included in the set.
2. The tightening wrench is a 4mm hex wrench. T-type hex wrench is sold as Model T-4.

Carbide Shim Set

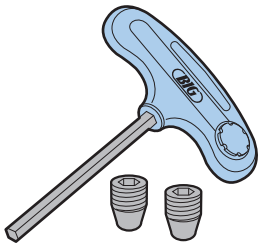
| Compartible Insert | Set Model | Order No. | (4) Carbide Shim | (5) Shim Clamp Screw | Torx size |
|---|---|---|---|---|---|
| TN1604 | STNS1604 | **973.184** | TNS1604 | M3 x 7 | T10 |
| TN2204 | STNS2204 | **804.821** | TNS2204 | M4 x 8 | T15 |
| DN1504 | SDNS1504 | **973.186** | DNS1504 | M4 x 8 | T15 |
| DN1506 | SDNS1506 | **973.187** | DNS1506 | M4 x 8 | T15 |
| CN1204 | SCNS1204 | **973.185** | CNS1204 | M4 x 8 | T15 |
| CN1606 | SCNS1606 | **973.188** | CNS1606 | M5 x 12 | T20 |
| CN1906 | SCNS1906 | **802.131** | CNS1906 | M5 x 12 | T20 |

1. 1 pce. each of the carbide shim and shim clamp screw are included in the set.
2. The tightening wrench is a torx wrench. Driver-type torx wrench is sold as models DA-T10, DA-T15, and DA-T20.

A.7

# For S Type (Tilt Type) Basic Holders

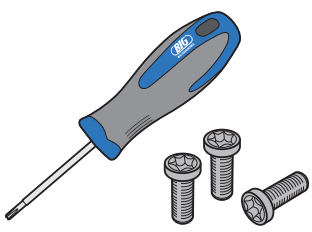
## Clamping Screw Set

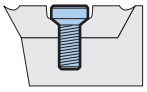


| Type | Set-Model | Order No. | Screw (2p) | T-Wrench (1p) |
|---|---|---|---|---|
| S50 | CK5S | **805.891** | M10 x P1.0 | CK-T5 |
| S63 | CK6S | **805.892** | M12 x P1.0 | CK-T6 |

## Insert Clamping Screw Set

For VB16, VC16 Insert



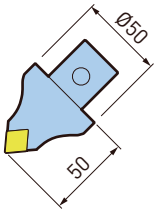


| Set Model | Order No. |
|---|---|
| S3508DS | **966.273** |
| S3510DS | **966.278** |

1. Set content M3.5 screw (10 pcs)
2. Driver-type wrench...DA-T15 (1 pc)

45°

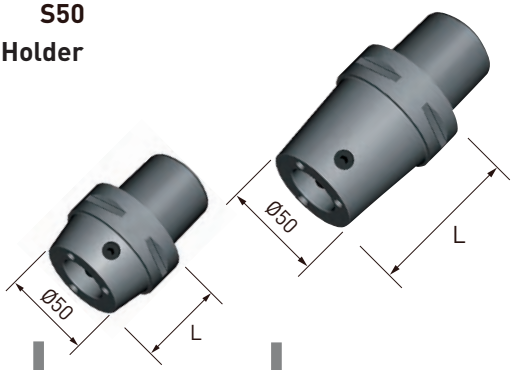
## S50
### Type S Basic Holder




L

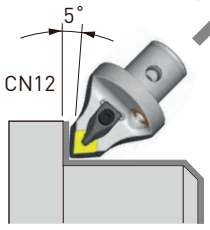
C5-S50- 40
- 55
- 75
C6-S50- 75
-100
C8-S50-135

▶ 228



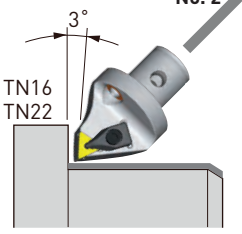

### Type S Cartridge ▶ 229

**No. 1**



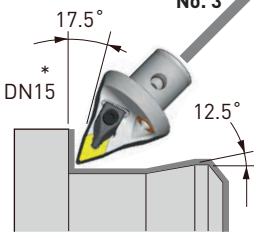

S50-DCLNN-00050-12

**No. 2**



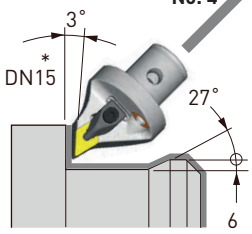

S50-DTJNR-00050-16
-DTJNL-00050-16
S50-DTJNR-00050-22
-DTJNL-00050-22

**No. 3**



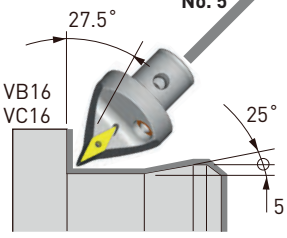

S50-DDHNN-00050-15

**No. 4**




S50-DDJNR-00050-15
-DDJNL-00050-15

**No. 5**




S50-SVQBN-00050-16

* In case of DN1506 insert (thickness of 6.35 mm), please replace the standard Carbide Shim by DNS1506 (option).

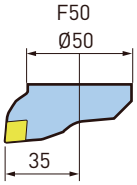
A.7

90°

## F50
### Type F basic holder

C5-F50- 25
- 50
- 85
-125

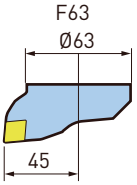
▶ 230




## F63
### Type F basic holder

C6-F63- 30
- 75
-100
-130
-170
C8-F63- 45
-100
-130
-170

▶ 230



## S50/S63
### Type S basic holder

▶ 228

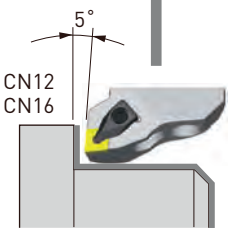
### Type S cartridge

▶ 229

**No. 1**
**No. 3**
**No. 5**
**No. 8**

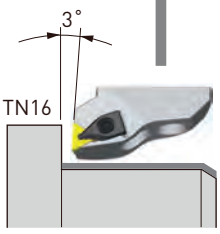
### Type F cartridge ▶ 230 / 231

**No. 10**



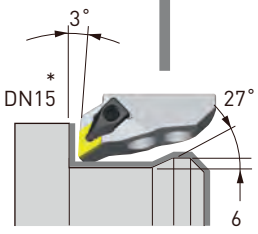

F50-DCLNR-35035-12(16)
-DCLNL-35035-12(16)
F63-DCLNR-45035-12(16)
-DCLNL-45035-12(16)

**No. 12**




F50-DTJNR-35035-16
-DTJNL-35035-16
F63-DTJNR-45035-16
-DTJNL-45035-16

**No. 13**




F50-DDJNR-35035-15
-DDJNL-35035-15
F63-DDJNR-45035-15
-DDJNL-45035-15

* In case of DN1506 insert (thickness of 6.35 mm), please replace the standard Carbide Shim by DNS1506 (option).



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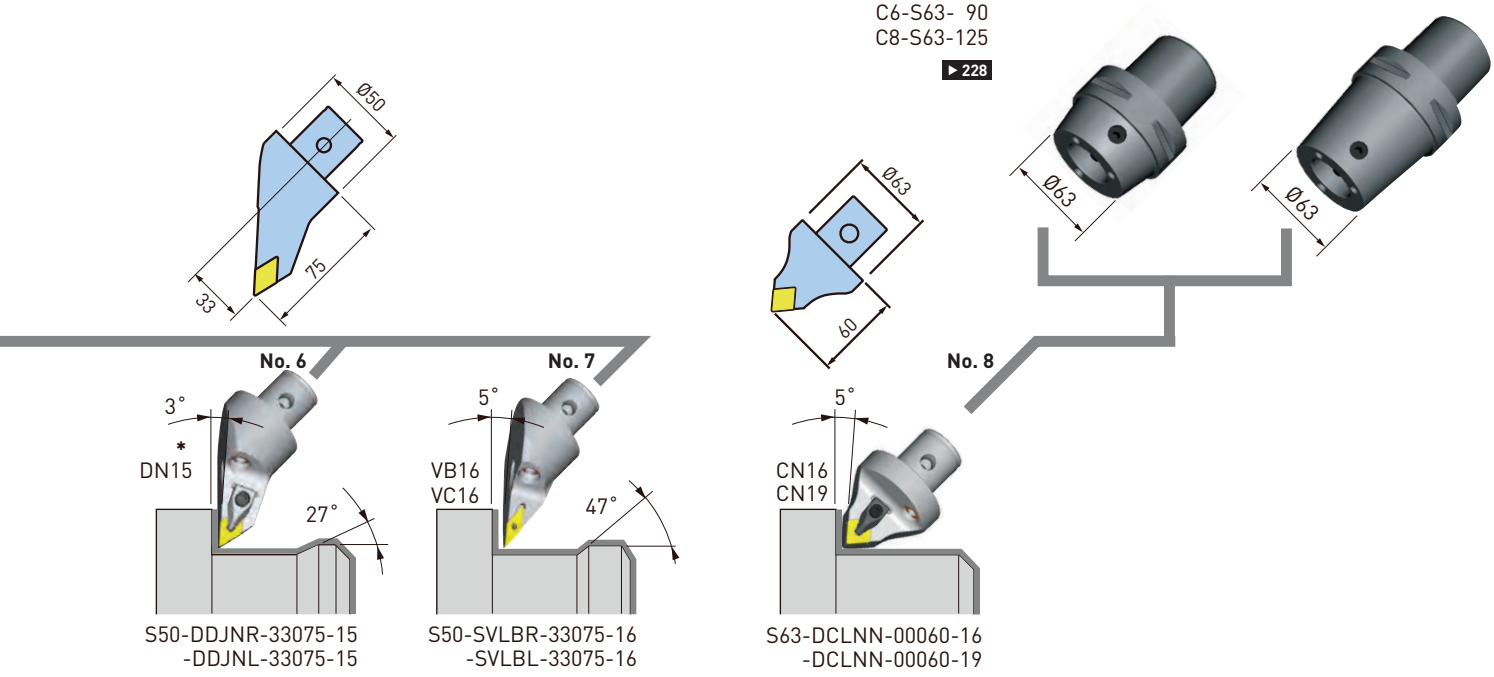
## S63
### Type S basic holder

C6-S63- 90
C8-S63-125
▶ 228



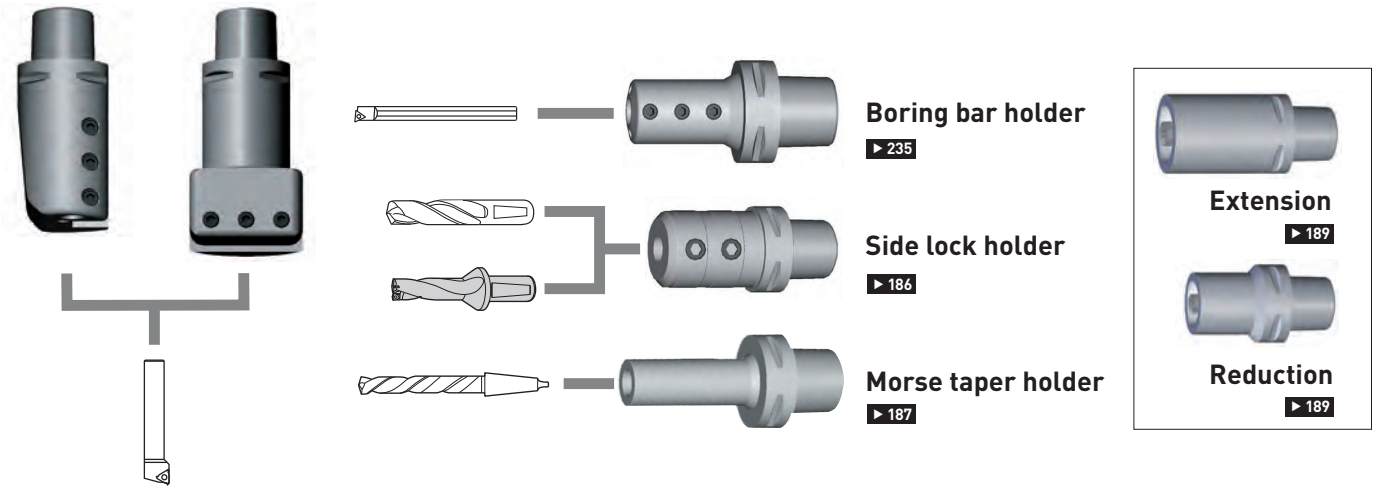

S50-DDJNR-33075-15
-DDJNL-33075-15

S50-SVLBR-33075-16
-SVLBL-33075-16

S63-DCLNN-00060-16
-DCLNN-00060-19

A.7

### Square tool holder
▶ 232



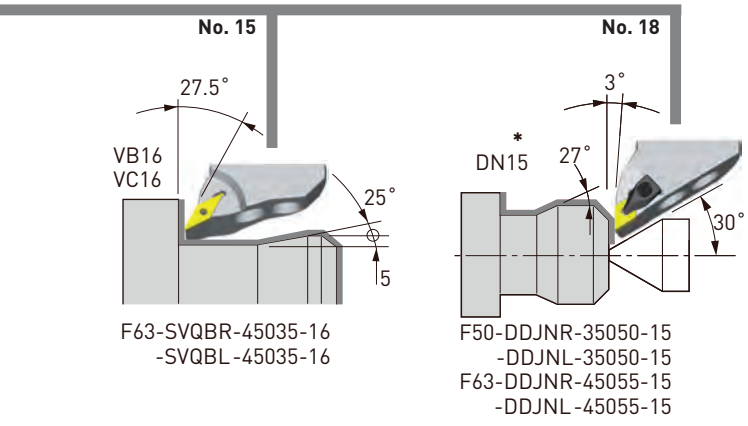
Boring bar holder
▶ 235

Side lock holder
▶ 186

Morse taper holder
▶ 187

Extension
▶ 189

Reduction
▶ 189




F63-SVQBR-45035-16
-SVQBL-45035-16

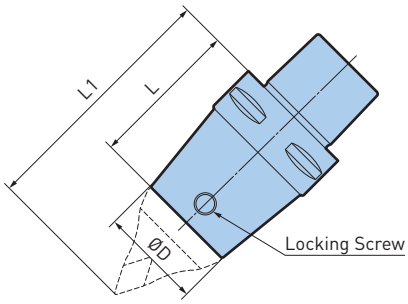
F50-DDJNR-35050-15
-DDJNL-35050-15
F63-DDJNR-45055-15
-DDJNL-45055-15

### 90° Integral Tool Holder Type F

▶ 234

# 45° Basic Holders Type S

Coolant Through Hole



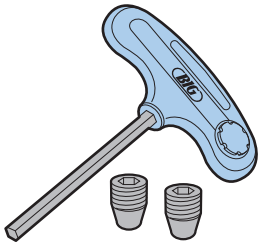

| Type | Model | Order No. | ØD | L | L1 | Locking Screw | Weight (kg) |
|---|---|---|---|---|---|---|---|
| S50 | C5 -S50 - 40 | **973.001** | 50 | 40 | 90 | CK5S | 0.6 |
| | - 55 | **973.002** | | 55 | 105 | | 0.8 |
| | - 75 | **973.003** | | 75 | 125 | | 1.1 |
| S50 | C6 -S50 - 75 | **973.006** | 50 | 75 | 125 | CK5S | 1.5 |
| | -100 | **973.007** | | 100 | 150 | | 2.0 |
| S63 | -S63 - 90 | **805.530** | 63 | 90 | 150 | CK6S | 2.1 |
| S50 | C8 -S50 -135 | **973.011** | 50 | 135 | 185 | CK5S | 4.0 |
| S63 | -S63 -125 | **973.013** | 63 | 125 | 185 | CK6S | 4.2 |

1. Basic holders include a locking screw.

A.7

## Locking Screw Set (optional)

For type S basic holder



| Type | Set-Model | Order No. | Screw (2p) | T-Wrench (1p) |
|---|---|---|---|---|
| S50 | CK5S | **805.891** | M10 x P1.0 | CK-T5 |
| S63 | CK6S | **805.892** | M12 x P1.0 | CK-T6 |



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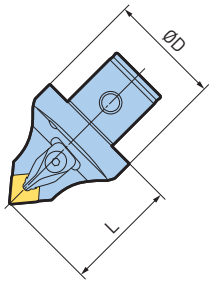
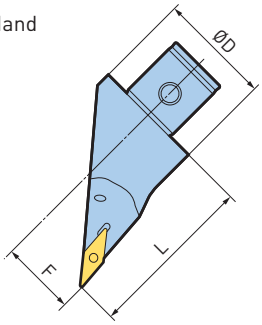
# 45° Cartridges Type S

Neutral




Left Hand




| Entering Angle | No. | Hand | Model | Order No. | Insert | F | L | ØD | Clamp Piece |
|---|---|---|---|---|---|---|---|---|---|
| 95° | 1 | N | S50 -DCLNN -00050-12 | **973.014** | CN1204 Rhombic 80° | 0 | 50 | 50 | CP2 |
| 95° | 8 | N | S63 -DCLNN -00060-16 | **973.025** | CN1606 Rhombic 80° | 0 | 60 | 63 | CP3 |
| | | | -00060-19 | **805.724** | CN1906 Rhombic 80° | | | | CP5 |
| 93° | 2 - 1 | R | S50 -DTJNR -00050-16 | **973.015** | TN1604 Triangle 60° | 0 | 50 | 50 | CP1 |
| | | L | -DTJNL -00050-16 | **973.016** | | | | | |
| 93° | 2 - 2 | R | S50 -DTJNR -00050-22 | **802.130** | TN2204 Triangle 60° | 0 | 50 | 50 | CP2 |
| | | L | -DTJNL -00050-22 | **802.129** | | | | | |
| 93° | 4 | R | S50 -DDJNR -00050-15 | **973.017** | DN1504 * (DN1506) Rhombic 55° | 0 | 50 | 50 | CP2 |
| | | L | -DDJNL -00050-15 | **973.018** | | | | | |
| 93° | 6 | R | S50 -DDJNR -33075-15 | **973.019** | | 33 | 75 | | |
| | | L | -DDJNL -33075-15 | **973.020** | | | | | |
| 107.5° | 3 | N | S50 -DDHNN -00050-15 | **973.021** | | 0 | 50 | | |
| 95° | 7 | R | S50 -SVLBR -33075-16 | **973.022** | VB1604 ** VC1604 ** Rhombic 35° | 33 | 75 | 50 | M3.5 |
| | | L | -SVLBL -33075-16 | **973.023** | | | | | |
| 117.5° | 5 | N | S50 -SVQBN -00050-16 | **973.024** | | 0 | 50 | | |

1. Wrench is to be ordered separately. Inserts are not included.
2. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 (option).
3. ** Both VB1604 and VC1604 inserts are suitable.

For Spare Parts ▶ 225
For Inserts ▶ 416 - 418



## Coding system for cartridge

S50 - D C L N N - 00 050 - 12

- 12 – Insert Size
- 050 – Length
- 00 – Offset Value
- N – Hand
- N – Relief Angle
- L – Entering Angle
- C – Insert Shape
- D – Clamping Method
- S50 – Cartridge Type and Size

| Clamping Method | |
|---|---|
| D | Double-Clamp |
| S | Screw-On |

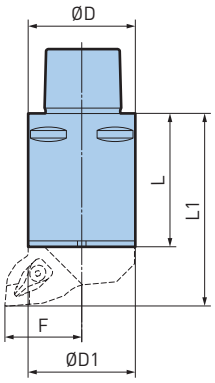
| Insert Shape | |
|---|---|
| C | Rhombic 80° |
| T | Triangle 60° |
| D | Rhombic 55° |
| V | Rhombic 35° |

| Entering Angle | |
|---|---|
| J | 93° |
| L | 95° |
| H | 107.5° |
| Q | 117.5° |

| Relief Angle | |
|---|---|
| N | 0° Negative |
| B | 5° Positive |

| Hand | |
|---|---|
| R | Right Hand |
| L | Left Hand |
| N | Neutral |

## 90° Basic Holders Type F




Coolant Through Hole

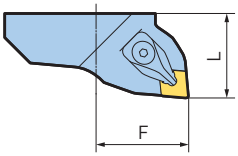
| Type | Model | Order No. | ØD | ØD1 | L | L1 | F | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| F50 | C5 -F50 - 25 | **801.657** | 50 | 50 | 25 | 60 | 35 | 0.5 |
| | - 50 | **973.052** | | | 50 | 85 | | 0.9 |
| | - 85 | **973.053** | | | 85 | 120 | | 1.4 |
| | -125 | **973.054** | | | 125 | 160 | | 2.0 |
| F63 | C6 -F63 - 30 | **973.055** | 63 | 63 | 30 | 65 | 45 | 0.9 |
| | - 75 | **973.056** | | | 75 | 110 | | 2.0 |
| | -100 | **973.057** | | | 100 | 135 | | 2.6 |
| | -130 | **973.058** | | | 130 | 165 | | 3.3 |
| | -170 | **973.059** | | | 170 | 205 | | 4.2 |
| F63 | C8 -F63 - 45 | **973.060** | 80 | 63 | 45 | 80 | 45 | 2.1 |
| | -100 | **973.061** | | | 100 | 135 | | 3.7 |
| | -130 | **973.062** | | | 130 | 165 | | 4.5 |
| | -170 | **973.063** | | | 170 | 205 | | 5.6 |

1. Basic holders include M10x22L and M10x25L screws for clamping cartridges.
2. Hexagon wrench is required to clamp cartridge (not included).

A.7

## 90° Cartridges Type F50

Right Hand




| Entering Angle | No. | Hand | Model | Order No. | Insert | F | L | Clamp Piece |
|---|---|---|---|---|---|---|---|---|
| 95° | 10 - 1 | R | F50 -DCLNR -35035-12 | **973.064** | CN1204 Rhombic 80° | 35 | 35 | CP2 |
| | | L | -DCLNL -35035-12 | **973.065** | | | | |
| 95° | 10 - 2 | R | F50 -DCLNR -35035-16 | **973.066** | CN1606 Rhombic 80° | 35 | 35 | CP3 |
| | | L | -DCLNL -35035-16 | **973.067** | | | | |
| 93° | 12 - 1 | R | F50 -DTJNR -35035-16 | **973.068** | TN1604 Triangle 60° | 35 | 35 | CP1 |
| | | L | -DTJNL -35035-16 | **973.069** | | | | |
| 93° | 13 | R | F50 -DDJNR -35035-15 | **973.070** | DN1504 * (DN1506) Rhombic 55° | 35 | 35 | CP2 |
| | | L | -DDJNL -35035-15 | **973.071** | | | | |
| 93° | 18 | R | F50 -DDJNR -35050-15 | **973.072** | | 35 | 50 | CP2 |
| | | L | -DDJNL -35050-15 | **973.073** | | | | |

1. Wrench is to be ordered separately. Inserts are not included.
2. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim DNS1506 with (option).

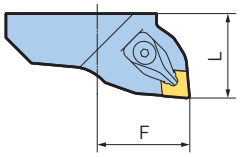
For Spare Parts ▶ 225
For Inserts ▶ 416 - 418



BROTECH

# 90° Cartridges Type F63

Right Hand




| Entering Angle | No. | Hand | Model | Order No. | Insert | F | L | Clamp Piece |
|---|---|---|---|---|---|---|---|---|
| 95° | 10 - 1 | R | F63 -DCLNR -45035-12 | **973.076** | CN1204 Rhombic 80° | 45 | 35 | CP2 |
| | | L | -DCLNL -45035-12 | **973.077** | | | | |
| 95° | 10 - 2 | R | F63 -DCLNR -45035-16 | **973.078** | CN1606 Rhombic 80° | 45 | 35 | CP3 |
| | | L | -DCLNL -45035-16 | **973.079** | | | | |
| 93° | 12 | R | F63 -DTJNR -45035-16 | **973.080** | TN1604 Triangle 60° | 45 | 35 | CP1 |
| | | L | -DTJNL -45035-16 | **973.081** | | | | |
| 93° | 13 | R | F63 -DDJNR -45035-15 | **973.082** | DN1504 * (DN1506) Rhombic 55° | 45 | 35 | CP2 |
| | | L | -DDJNL -45035-15 | **973.083** | | | | |
| 93° | 18 | R | F63 -DDJNR -45055-15 | **973.084** | | 45 | 55 | CP2 |
| | | L | -DDJNL -45055-15 | **973.085** | | | | |
| 117.5° | 15 | R | F63 -SVQBR -45035-16 | **973.086** | VB1604 ** VC1604 ** Rhombic 35° | 45 | 35 | M3.5 |
| | | L | -SVQBL -45035-16 | **973.087** | | | | |

1. Wrench is to be ordered separately. Inserts are not included.
2. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim by with DNS1506 (option).
3. ** Both VB1604 and VC1604 inserts are suitable.

For Spare Parts ▶ 225
For Inserts ▶ 416 - 418



## Coding system for cartridge

F63 - D C L N R - 45 035 - 12

- 12 – Insert Size
- 035 – Length
- 45 – Offset Value
- R – Hand
- N – Relief Angle
- L – Entering Angle
- C – Insert Shape
- D – Clamping Method
- F63 – Cartridge Type and Size

| Clamping Method | |
|---|---|
| D | Double-Clamp |
| S | Screw-On |

| Insert Shape | |
|---|---|
| C | Rhombic 80° |
| T | Triangle 60° |
| D | Rhombic 55° |
| V | Rhombic 35° |

| Entering Angle | |
|---|---|
| J | 93° |
| L | 95° |
| H | 107.5° |
| Q | 117.5° |
| U | 93° |

| Relief Angle | |
|---|---|
| N | 0° Negative |
| B | 5° Positive |

| Hand | |
|---|---|
| R | Right Hand |
| L | Left Hand |
| N | Neutral |

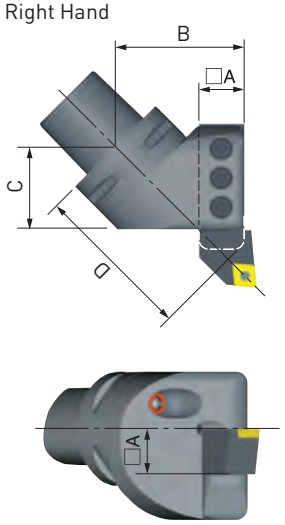
BROTECH

# Square Tool Holders

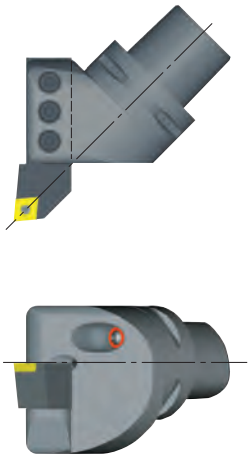
45 Type

Coolant Through Hole

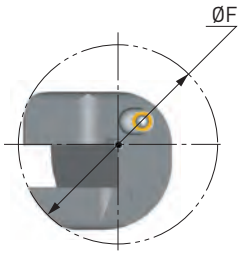
Right Hand

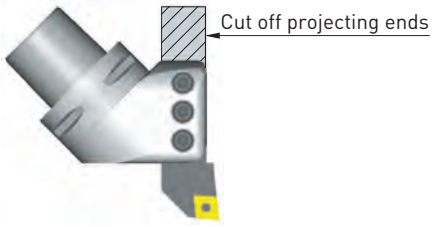



Left Hand



| Hand | Model | Order No. | □A | B | C | D | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| R | C5-45-BH20R-5838 | **973.026** | 20 | 58 | 38 | 73 | 94 | 1.2 |
| L | -BH20L-5838 | **973.027** | | | | | | 1.2 |
| R | C6-45-BH25R-7752 | **973.028** | 25 | 77 | 52 | 100 | 118 | 2.5 |
| L | -BH25L-7752 | **800.776** | | | | | | 2.5 |
| R | C8-45-BH32R-85109 | **973.030** | 32 | 85 | 109 | 145 | 135 | 7.3 |
| L | -BH32L-85109 | **973.031** | | | | | | 7.3 |

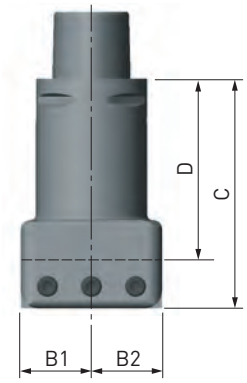



**Caution:**
The projecting end of a turning tool must be cut off to avoid interference with an ATC arm.

A.7

90 Type




| Hand | Model | Order No. | Fig. | □A | B1 | B2 | C | D | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| R | C4-90-BH20R-2854 | **806.956** | 2 | 20 | 28 | 32 | 54 | 34 | 80 | 0.96 |
| L | -BH20L-2854 | **806.957** | | | | | | | | |
| N | C5-90-BH20N-32058 | **978.476** | 1 | 20 | 32 | 32 | 58 | 38 | 80 | 0.9 |
| | -32105 | **801.653** | | | | | 105 | 85 | | 2.2 |
| N | C6-90-BH20N-32060 | **800.777** | 1 | 20 | 32 | 32 | 60 | 40 | 80 | 2.4 |
| | -32115 | **800.778** | | | | | 115 | 95 | | 3.4 |
| | -BH25N-40071 | **800.779** | | 25 | 40 | 40 | 71 | 46 | 100 | 3.3 |
| | -40130 | **801.664** | | | | | 130 | 105 | | 4.2 |
| N | C8-90-BH25N-40071 | **328.380** | 1 | 25 | 40 | 40 | 71 | 45 | 100 | 3.3 |
| N | C8-90-BH32N-51085 | **800.889** | 1 | 32 | 51 | 51 | 85 | 53 | 128 | 6.0 |
| | -51165 | **801.665** | | | | | 165 | 133 | | 8.7 |

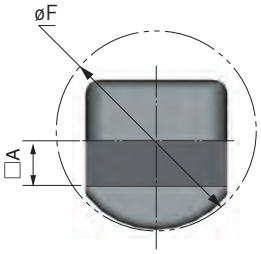



Fig. 1

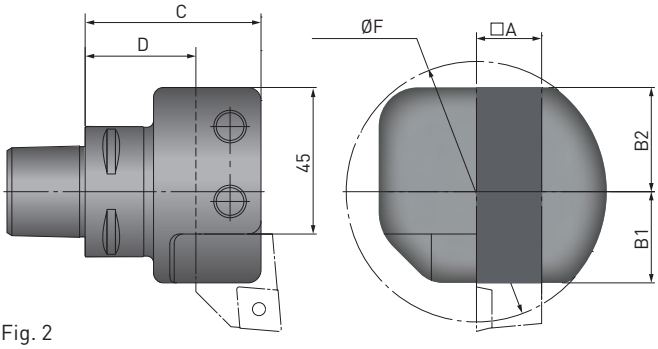



Fig. 2
Right Hand

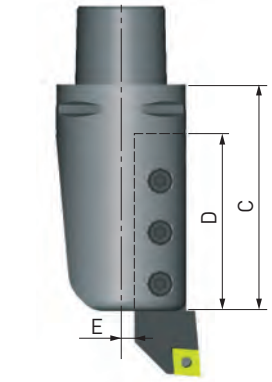


BROTECH

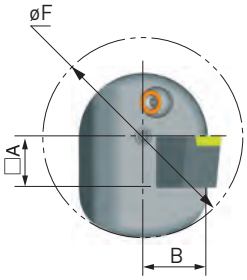
Coolant Through Hole

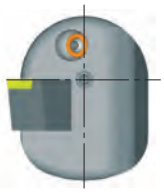
## 180 Type

Right Hand




Left Hand



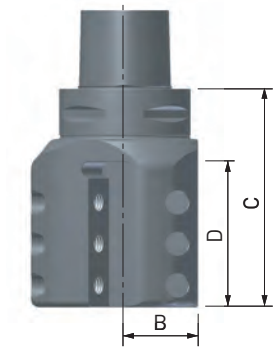



| Hand | Model | Order No. | □A | B | C | D | E | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| R | C4-180 -BH20R -2265 | **806.958** | 20 | 22 | 65 | 40 | 2 | 70 | 0.84 |
| L | -BH20L -2265 | **806.959** | | | | | | | |
| R | C5-180 -BH20R -2590 | **973.032** | 20 | 25 | 90 | 65 | 5 | 80 | 1.6 |
| L | -BH20L -2590 | **973.033** | | | | | | | |
| R | C6-180 -BH20R -32100 | **973.753** | 20 | 31.5 | 100 | 65 | 11.5 | 80 | 2.6 |
| L | -BH20L -32100 | **801.663** | | | | | | | |
| R | -BH25R -32120S | **973.034** | 25 | 29.5 | 120 | 80 | 4.5 | 90 | 3.1 |
| L | -BH25L -32120S | **973.035** | | | | | | | |
| R | C8-180 -BH25R -32120 | **328.378** | 25 | 38 | 120 | 82 | 13 | 100 | 5.1 |
| L | -BH25L -32120 | **328.379** | | | | | | | |
| R | C8-180 -BH32R -40125 | **973.038** | 32 | 40 | 125 | 85 | 8 | 128 | 6.0 |
| L | -BH32L -40125 | **973.039** | | | | | | | |

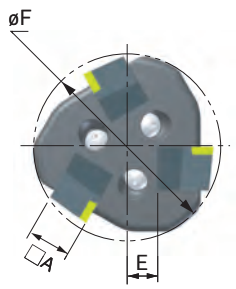
A.7

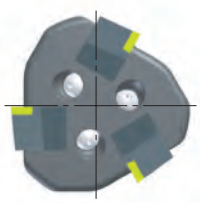
## 180 Multi Type

Right Hand




Left Hand



| Hand | Model | Order No. | □A | B | C | D | E | ØF | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| R | C5-180 -3BH20R -100 | **973.040** | 20 | 35 | 100 | 70 | 15 | 90 | 2.6 |
| L | -3BH20L -100 | **973.041** | | | | | | | |
| R | C6-180 -3BH20R -110 | **806.254** | 20 | 35 | 110 | 70 | 15 | 90 | 3.3 |
| L | -3BH20L -110 | **806.253** | | | | | | | |
| R | -3BH25R -125 | **806.256** | 25 | 45 | 125 | 80 | 20 | 110 | 5.0 |
| L | -3BH25L -125 | **973.045** | | | | | | | |
| R | C8-180 -3BH25R -130 | **973.046** | 25 | 45 | 130 | 90 | 20 | 110 | 6.1 |
| L | -3BH25L -130 | **973.047** | | | | | | | |

**Caution**

60° indexing is required to the machine tool spindle.

# 90° Integral Tool Holder Typ F

Right Hand Left Hand

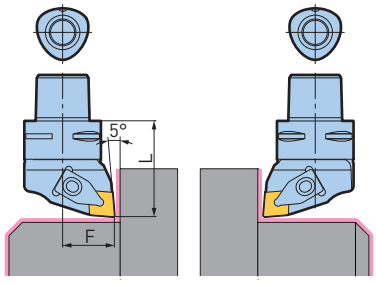



Fig. 1

Right Hand Left Hand

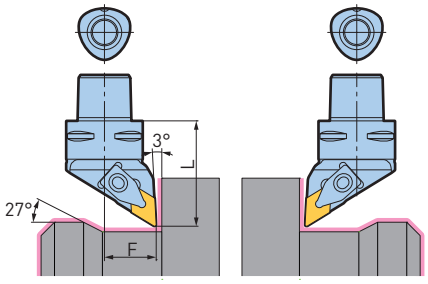



Fig. 2

Right Hand Left Hand

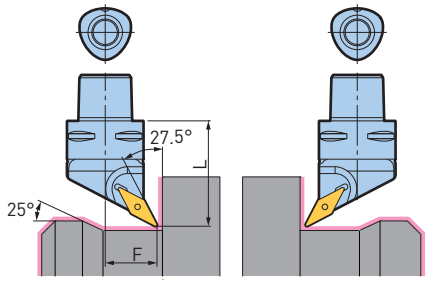



Fig. 3

| Hand | Model | Order No. | Fig. | L | F | Insert | Clamp Piece | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| R | C4-DCLNR-27050-12 | **806.950** | 1 | 50 | 27 | CN1204<br>Rhombic 80° | CP2 | 0.45 |
| L | -DCLNL-27050-12 | **806.951** | | | | | | |
| R | -DDJNR-27055-15 | **806.952** | 2 | 55 | 27 | DN1504 *<br>(DN1506)<br>Rhombic 55° | CP2 | 0.42 |
| L | -DDJNL-27055-15 | **806.953** | | | | | | |
| R | -SVQBR-27055-16 | **806.954** | 3 | 55 | 27 | VB1604 *<br>VC1604 **<br>Rhombic 35° | M3.5 | 0.40 |
| L | -SVQBL-27055-16 | **806.955** | | | | | | |

1. Inserts are not included. Wrench is to be ordered separately.
2. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 / 973.187.
3. ** VB1604 and VC1604 inserts are suitable.

For Spare Parts ▸ 225
For Inserts ▸ 416 - 418

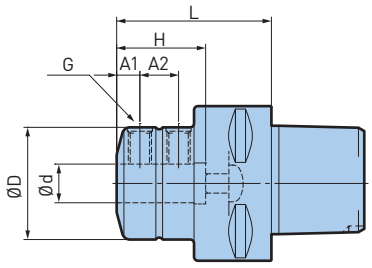


BROTECH

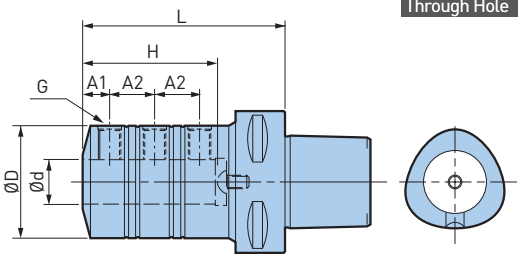
# Boring Bar Holders

Application: boring and thread cutting

Coolant Through Hole




Type 1



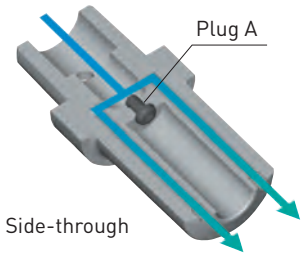

Type 2

Ø 6 - 40 mm

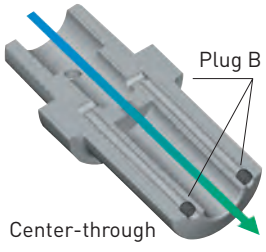
| Model | Order No. | Type | Ød | ØD | L | A1 | A2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| C4 -BSL 6 - 40 | 806.960 | 1 | 6 | 23 | 40 | 5 | 9 | 23 | M 5P0.8 | 0.3 |
| -BSL 8 - 40 | 806.961 | | 8 | 25 | | 6 | 10 | | M 6P1.0 | 0.3 |
| -BSL10 - 40 | 806.962 | | 10 | 29 | | | | | | 0.3 |
| -BSL12 - 45 | 806.963 | | 12 | 34 | 45 | 8 | 12 | 28 | M 8P1.0 | 0.4 |
| -BSL16 - 50 | 806.964 | | 16 | 40 | 50 | 10 | 14 | 33 | M10P1.25 | 0.5 |
| -BSL20 - 60 | 806.965 | | 20 | 50 | 60 | 12 | 15 | 43 | | 0.7 |
| C5 -BSL 6 - 70 | 973.088 | 2 | 6 | 23 | 70 | 5 | 8 | 41 | M5 P0.8 | 0.6 |
| -BSL 8 - 70 | 973.089 | | 8 | 25 | | 6 | 10 | | M6 P1.0 | 0.6 |
| -BSL10 - 70 | 973.090 | | 10 | 29 | | 8 | 12 | 42 | M8 P1.0 | 0.6 |
| -BSL12 - 80 | 973.091 | | 12 | 34 | 80 | | 16 | 53 | | 0.8 |
| -BSL16 - 90 | 973.092 | | 16 | 40 | 90 | 10 | 21 | 65 | M10 P1.25 | 1.0 |
| -BSL20 - 90 | 973.093 | | 20 | 50 | | 12 | 20 | 60 | | 1.3 |
| -BSL25 -100 | 973.094 | | 25 | 55 | 100 | 14 | 23 | 70 | M12 P1.5 | 1.6 |
| -BSL32 -110 | 973.095 | | 32 | 64 | 110 | 16 | 26 | 78 | | 2.1 |
| -BSL40 -130 | 973.096 | | 40 | 80 | 130 | 18 | 32 | 93 | M16 P1.5 | 3.7 |
| C6 -BSL 6 - 70 | 973.097 | 2 | 6 | 23 | 70 | 5 | 8 | 41 | M5 P0.8 | 1.4 |
| -BSL 8 - 70 | 973.098 | | 8 | 25 | | 6 | 10 | | M6 P1.0 | 1.3 |
| -BSL10 - 70 | 973.099 | | 10 | 29 | | 8 | 12 | 42 | M8 P1.0 | 1.3 |
| -BSL12 - 80 | 973.100 | | 12 | 34 | 80 | | 16 | 53 | | 1.5 |
| -BSL16 - 90 | 973.101 | | 16 | 40 | 90 | 10 | 21 | 65 | M10 P1.25 | 1.7 |
| -BSL20 - 90 | 973.102 | | 20 | 50 | | 12 | 22 | 60 | | 2.0 |
| -BSL25 -100 | 973.103 | | 25 | 55 | 100 | 14 | 26 | 70 | M12 P1.5 | 2.3 |
| -BSL32 -110 | 973.104 | | 32 | 64 | 110 | 16 | 30 | 78 | | 2.8 |
| -BSL40 -130 | 973.105 | | 40 | 80 | 130 | 18 | 32 | 93 | M16 P1.5 | 4.3 |
| C8 -BSL16 - 90 | 973.110 | 2 | 16 | 40 | 90 | 10 | 21 | 65 | M10 P1.25 | 2.9 |
| -BSL20 -100 | 973.111 | | 20 | 50 | 100 | 12 | 22 | 70 | | 3.3 |
| -BSL25 -110 | 973.112 | | 25 | 55 | 110 | 14 | 26 | 80 | M12 P1.5 | 3.6 |
| -BSL32 -120 | 973.113 | | 32 | 64 | 120 | 16 | 30 | 88 | | 4.1 |
| -BSL40 -130 | 973.114 | | 40 | 80 | 130 | 18 | 32 | 93 | M16 P1.5 | 5.3 |

1. For sealing purpose, please use plugs according to drawing below. Both, plug A and B, are included as standard.

For BSL Sleeve ▶ 282




Side-through




Center-through

Type 1

| Chuck Model | Plug A | Plug B |
|---|---|---|
| BSL 6 | M5 P0.8 | M4 P0.7 |
| 8 | | |
| 10 | | M5 P0.8 |
| 12 | | M6 P1.0 |
| 16 | | |
| 20 | | |

1. Plug A is mounted from the shank side.

Type 2

| Chuck Model | Plug A | Plug B |
|---|---|---|
| BSL 6 | M8P1.25 | M4 P0.7 |
| 8 | M10P1.0 | |
| 10 | M12P1.5 | M5 P0.8 |
| 12 | M14P1.5 | M6 P1.0 |
| 16 | M18P1.5 (C5:M6P1.0) | |
| 20 | M6P1.0 | |
| 25 | | |
| 32 | M8P1.25 | |
| 40 | | |

1. Both plugs are included as standard.

# Side Lock Holders for Weldon

Coolant Through Hole

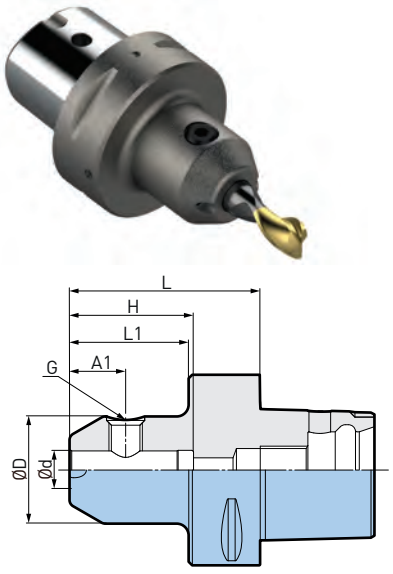



Fig. 1 (with coolant supply/lockable)

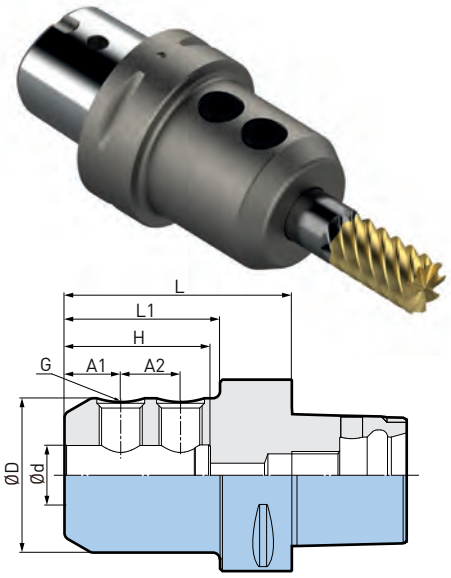



Fig. 2 (without coolant supply)

A.7

**Ø 6 - 40 mm**

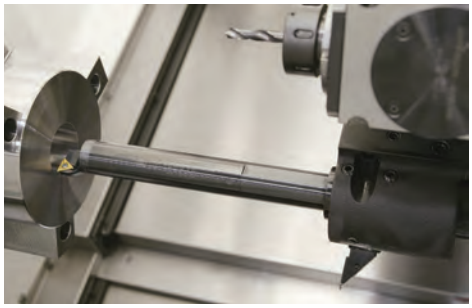
| Model | Order No. | Fig. | Ød | ØD | L | L1 | A1 | A2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C8 -ISL6 - 80 | **328.370** | 1 | 6 | 24 | 80 | 50 | 17.5 | - | 40 | M6 | 1.9 |
| -ISL8 - 80 | **328.371** | | 8 | 26 | | | | | | M8 | |
| -ISL10 - 80 | **328.372** | | 10 | 32 | | | 19.5 | | 44 | M10 | 2.0 |
| -ISL12 - 80 | **328.373** | | 12 | 38 | | | 22 | | 49 | M12 | 2.1 |
| -ISL14 - 80 | **328.374** | | 14 | 40 | | | | | | | |
| -ISL16 - 80 | **328.375** | | 16 | 45 | | | 23.5 | | 52 | M14 | 2.2 |
| -ISL18 - 80 | **328.376** | | 18 | 47 | | | | | | | |
| -ISL20 - 85 | **328.419** | | 20 | 52 | 85 | 55 | 24.5 | | 54 | M16 | 2.4 |
| -ISL25 - 95 | **328.420** | 2 | 25 | 64.4 | 95 | 65 | 23.5 | 25 | 61 | M18xP2 | 3.1 |
| -ISL32 - 95 | **328.421** | | 32 | 71.5 | | | | 28 | 65 | M20xP2 | 3.3 |
| -ISL40 -105 | **328.422** | | 40 | 80 | 105 | - | 29.5 | 32 | 75 | | 3.9 |

1. "H" indicates the maximum length at which the cutting tool can be clamped in to the holder.
2. Please use a cutting tool according to DIN 1835 B / DIN 6535 HB.

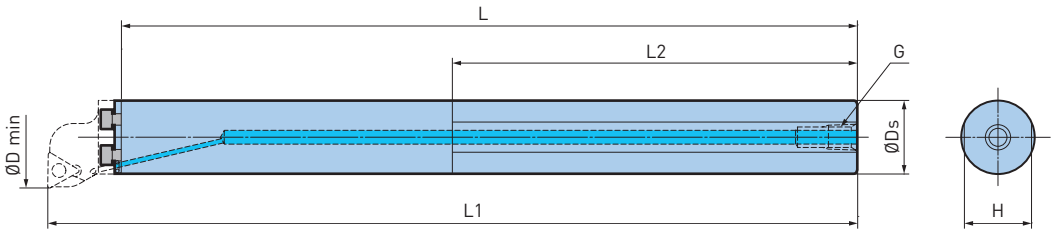


BROTECH

# Smart Damper Turning








| Model | Order No. | Cartridge | ØD min | ØDs | L | L1 | L2 | H | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST32-SDB40DP-320 | **806.422** | B32 | 40 | 32 | 320 | 352 | 176 | 30 | PT1/4 | 2.3 |
| ST40-SDB50DP-410 | **806.423** | B40 | 50 | 40 | 410 | 442 | 240 | 37 | PT3/8 | 4.5 |

1. Clamp bolts (3 pcs.) and o-rings (2 pcs.) are included.
2. Cartridge is to be ordered separately.

# Cartridges

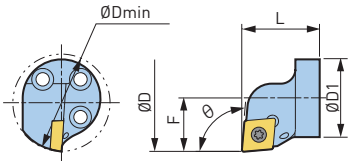



Fig. 1

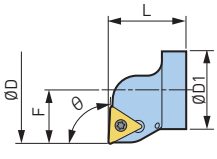



Fig. 2

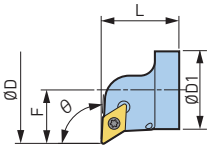



Fig. 3

| Model | Order No. | Type | Fig. | Insert | Hand | ØD | ØD min. | F | L | Entering Angle |
|---|---|---|---|---|---|---|---|---|---|---|
| B32 -SCLCR -22032 -12 | **806.424** | B32 | 1 | CC1204 | R | 32 | 40 | 22 | 32 | 95° |
| -STUCR -22032 -11 | **806.802** | | 2 | TC1102 | | | | | | 93° |
| -STUPR -22032 -16 | **806.425** | | | TP1604 | | | | | | |
| -SDUCR -22032 -11 | **806.426** | | 3 | DC11T3 | | | | | | |
| B40 -SCLCR -27032 -12 | **806.427** | B40 | 1 | CC1204 | R | 40 | 50 | 27 | 32 | 95° |
| -STUCR -27032 -11 | **806.803** | | 2 | TC1102 | | | | | | 93° |
| -STUPR -27032 -16 | **806.428** | | | TP1604 | | | | | | |
| -SDUCR -27032 -11 | **806.429** | | 3 | DC11T3 | | | | | | |

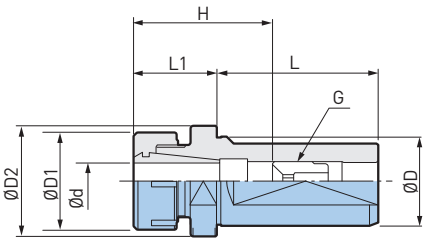
1. Insert must be ordered separately.

For Insert ▶ 414 - 417

# New Baby Chuck Stopper

Flange as a stopper enables presetting of the tool away from machine and minimizes downtime. Shank is designed to be directly mounted into the drill holder of turret.

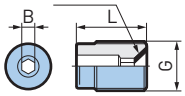
Coolant Through Hole




**Ø 2.5 - 20 mm**

| Model | | | Order No. | Ød | ØD | ØD1 | ØD2 | L | L1 | H |
|---|---|---|---|---|---|---|---|---|---|---|
| SLS25 | -NBS13 | - 30 | **804.285** | 2.5 - 13 | 25 | 35 | 32 | 54 | 30 | 41 - 60 |
| | | - 60 | **804.286** | | | | | | 60 | |
| SLS32 | -NBS13 | - 30 | **804.288** | 2.5 - 13 | 32 | 35 | 39.5 | 58 | 30 | 41 - 60 |
| | | - 60 | **804.289** | | | | | | 60 | |
| | | -100 | **804.287** | | | | | | 100 | |
| | -NBS20 | - 30 | **804.291** | 2.5 - 20 | | 46 | 45.5 | | 30 | 48 - 65 |
| | | - 60 | **804.292** | | | | | | 60 | |
| | | -100 | **804.290** | | | | | | 100 | |
| SLS40 | -NBS13 | - 30 | **804.294** | 2.5 - 13 | 40 | 35 | 49.5 | 68 | 30 | 41 - 60 |
| | | - 60 | **804.295** | | | | | | 60 | |
| | | -100 | **804.293** | | | | | | 100 | |
| | -NBS20 | - 30 | **804.297** | 2.5 - 20 | | 46 | | | 30 | 48 - 65 |
| | | - 60 | **804.298** | | | | | | 60 | |
| | | -100 | **804.296** | | | | | | 100 | |

1. New baby nut is included.
2. "G" is the adjusting screw (optional).
3. "H" indicates the adjustment length with an adjusting screw.

| Spare Parts | | | Accessories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | New Baby Nut | | Wrench | | NBC Collet ▸ 250 | Baby Perfect Seal ▸ 262 | Adjusting Screw   | | | | |
| New Baby Chuck | Model | Order No. | Model | Order No. | Model | Model | Model | Order No. | G | L | B |
| NBS6 | NBN6 | **961.526** | NBK6 | **961.525** | NBC6- | BPS6- | NBA6B | **961.527** | M7 | 12 | 2 |
| NBS8 | NBN8 | **961.549** | NBK8 | **961.548** | NBC8- | BPS8- | NBA8B | **961.550** | M9 | 13 | 2.5 |
| NBS10 | NBN10 | **961.571** | NBK10 | **961.570** | NBC10- | BPS10- | NBA10B | **961.572** | M11 | 16 | 3 |
| NBS13 | NBN13 | **961.597** | NBK13 | **961.596** | NBC13- | BPS13- | NBA13B | **961.598** | M14 | 20 | 4 |
| NBS16 | NBN16 | **961.631** | NBK16 | **961.630** | NBC16- | BPS16- | NBA16B | **961.632** | M18 | 20 | 4 |
| NBS20 | NBN20 | **961.679** | NBK20 | **961.678** | NBC20- | BPS20- | NBA20B | **961.680** | M21 | 20 | 4 |

# New Baby Chuck Standard

Versatile as a basic holder for drills, taps, reamers and small tool bits.

Coolant Through Hole

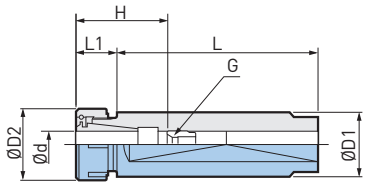



Fig. 1

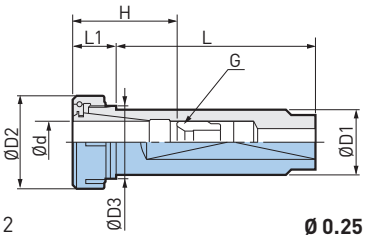



Fig. 2

**Ø 0.25 - 20 mm**

| Model | | | Order No. | Fig. | Ød | ØD1 | ØD2 | ØD3 | L | L1 | H |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SL16 | -NBS6 | - 40 | 802.154 | 1 | 0.25 - 6 | 16 | 20 | - | 40 | 15 | 20 - 40 |
| | | - 80 | 802.155 | | | | | | 80 | | |
| | -NBS8 | - 40 | 802.156 | | 0.5 - 8 | | 25 | | 40 | 16.5 | 23 - 42 |
| | | - 80 | 802.157 | | | | | | 80 | | |
| | -NBS10 | - 40 | 802.152 | 2 | 1.5 - 10 | | 30 | 21 | 40 | 37 | 35 - 45 |
| | | - 80 | 802.153 | | | | | | 80 | | |
| SL20 | -NBS6 | - 40 | 802.162 | 1 | 0.25 - 6 | 20 | 20 | - | 40 | 15 | 20 - 40 |
| | | - 80 | 802.163 | | | | | | 80 | | |
| | -NBS8 | - 40 | 802.164 | | 0.5 - 8 | | 25 | | 40 | 16.5 | 23 - 42 |
| | | - 80 | 802.165 | | | | | | 80 | | |
| | -NBS10 | - 40 | 802.158 | 2 | 1.5 - 10 | | 30 | 21 | 40 | 18 | 35 - 45 |
| | | - 80 | 802.159 | | | | | | 80 | | |
| | -NBS13 | - 40 | 802.160 | | 2.5 - 13 | | 35 | 26 | 40 | 43 | 41 - 60 |
| | | - 80 | 802.161 | | | | | | 80 | | |
| SL22 | -NBS6 | - 40 | 804.271 | 1 | 0.25 - 6 | 22 | 20 | - | 40 | 15 | 20 - 40 |
| | | - 80 | 804.272 | | | | | | 80 | | |
| | -NBS8 | - 40 | 804.273 | | 0.5 - 8 | | 25 | | 40 | 16.5 | 23 - 42 |
| | | - 80 | 804.274 | | | | | | 80 | | |
| | -NBS10 | - 40 | 804.267 | | 1.5 - 10 | | 30 | | 40 | 18 | 35 - 45 |
| | | - 80 | 804.268 | | | | | | 80 | | |
| | -NBS13 | - 40 | 804.269 | 2 | 2.5 - 13 | | 35 | 26 | 40 | 21.5 | 41 - 47 |
| | | - 80 | 804.270 | | | | | | 80 | | 41 - 60 |
| SL25 | -NBS6 | - 80 | 802.173 | 1 | 0.25 - 6 | 25 | 20 | - | 80 | 15 | 20 - 40 |
| | | -120 | 802.172 | | | | | | 120 | | |
| | -NBS8 | - 80 | 802.175 | | 0.5 - 8 | | 25 | | 80 | 16.5 | 23 - 42 |
| | | -120 | 802.174 | | | | | | 120 | | |
| | -NBS10 | - 80 | 802.167 | | 1.5 - 10 | | 30 | | 80 | 18 | 35 - 45 |
| | | -120 | 802.166 | | | | | | 120 | | |
| | -NBS13 | - 80 | 802.169 | 2 | 2.5 - 13 | | 35 | 26 | 80 | 21.5 | 41 - 60 |
| | | -120 | 802.168 | | | | | | 120 | | |
| | -NBS16 | - 80 | 802.171 | | 2.5 - 16 | | 42 | 32 | 80 | 48 | 45 - 65 |
| | | -120 | 802.170 | | | | | | 120 | | |
| SL25.4 | -NBS6 | - 80 | 804.282 | 1 | 0.25 - 6 | 25.4 | 20 | - | 80 | 15 | 20 - 40 |
| | | -120 | 804.281 | | | | | | 120 | | |
| | -NBS8 | - 80 | 804.284 | | 0.5 - 8 | | 25 | | 80 | 16.5 | 23 - 42 |
| | | -120 | 804.283 | | | | | | 120 | | |
| | -NBS10 | - 80 | 804.276 | | 1.5 - 10 | | 30 | | 80 | 18 | 35 - 45 |
| | | -120 | 804.275 | | | | | | 120 | | |
| | -NBS13 | - 80 | 804.278 | 2 | 2.5 - 13 | | 35 | 26 | 80 | 21.5 | 41 - 50 |
| | | -120 | 804.277 | | | | | | 120 | | |
| | -NBS16 | - 80 | 804.280 | | 2.5 - 16 | | 42 | 32 | 80 | 48 | 45 - 65 |
| | | -120 | 804.279 | | | | | | 120 | | |
| SL32 | -NBS13 | -100 | 802.176 | 1 | 2.5 - 13 | 32 | 35 | - | 100 | 21.5 | 41 - 60 |
| | | -150 | 802.177 | | | | | | 150 | | |
| | -NBS16 | -100 | 802.178 | | 2.5 - 16 | | 42 | | 100 | | 45 - 65 |
| | | -150 | 802.179 | | | | | | 150 | | |
| | -NBS20 | -100 | 802.180 | 2 | 2.5 - 20 | | 46 | 36 | 100 | | 48 - 65 |
| | | -150 | 802.181 | | | | | | 150 | | |

1. New baby nut is included.
2. "G" is the adjusting screw (optional).
3. "H" indicates the adjustment length with an adjusting screw.

For New Baby Collet ▶ 250

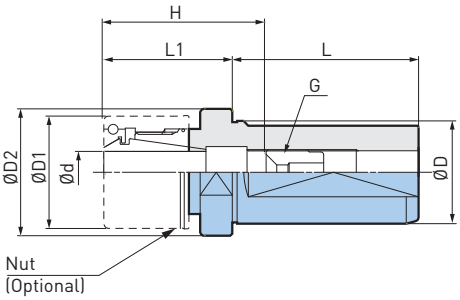


BROTECH

# MEGA ER Grip Stopper

High precision components outperform standard ER collet system.

Coolant Through Hole




**Ø 2.75 - 20 mm**

| Model | Order No. | Ød | ØD | ØD1 | ØD2 | L | L1 | H |
|---|---|---|---|---|---|---|---|---|
| SLS25-MEGA ER20-45/NL | **803.571** | 2.75 - 13 | 25 | 35 | 32 | 54 | 45 | 42 - 62 |
| -75/NL | **803.572** | | | | | | 75 | |
| SLS32-MEGA ER20-45/NL | **803.573** | 2.75 - 13 | 32 | 35 | 39.5 | 58 | 45 | 42 - 62 |
| -75/NL | **803.574** | | | | | | 75 | |
| -MEGA ER32-45/NL | **803.575** | 2.75 - 20 | | 50 | 50 | | 45 | 47 - 68 |
| -75/NL | **803.576** | | | | | | 75 | 50 - 68 |
| SLS40-MEGA ER20-45/NL | **803.577** | 2.75 - 13 | 40 | 35 | 49.5 | 68 | 45 | 42 - 62 |
| -75/NL | **803.578** | | | | | | 75 | |
| -MEGA ER32-45/NL | **803.579** | 2.75 - 20 | | 50 | 50 | | 45 | 50 - 68 |
| -75/NL | **803.580** | | | | | | 75 | |

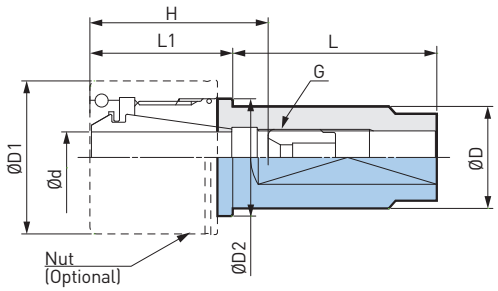
1. Nut is not included. Refer to the "accessories" table on the next page and select the suitable nut according to applications.
2. "G" is the adjusting screw (optional).
3. "H" indicates the adjustment length with an adjusting screw.

For ER Collet ▶ 266

# MEGA ER Grip Standard

Flat is provided on the shank to be mounted in the tool post of the NC lathe directly.

Coolant Through Hole




**Ø 1.9 - 16 mm**

| Model | Order No. | Ød | ØD | ØD1 | ØD2 | L | L1 | H |
|---|---|---|---|---|---|---|---|---|
| SL16 -MEGA ER11 - 40/NL | **803.554** | 2.75 - 6 | 16 | 19 | - | 40 | 19 | 23 - 40 |
| - 80/NL | **803.555** | | | | | 80 | | |
| SL20 -MEGA ER11 - 40/NL | **803.560** | 2.75 - 6 | 20 | 19 | - | 40 | 19 | 23 - 40 |
| - 80/NL | **803.561** | | | | | 80 | | |
| -MEGA ER16 - 40/NL | **801.714** | 1.9 - 10 | | 30 | 23 | 40 | 28 | 35 - 47 |
| - 80/NL | **803.562** | | | | | 80 | | |
| SL25 -MEGA ER11 - 60/NL | **803.564** | 2.75 - 6 | 25 | 19 | - | 60 | 19 | 23 - 40 |
| -100/NL | **803.563** | | | | | 100 | | |
| -MEGA ER16 - 60/NL | **803.566** | 1.9 - 10 | | 30 | - | 60 | 28 | 35 - 47 |
| -100/NL | **803.565** | | | | | 100 | | |
| -MEGA ER20 - 60/NL | **803.568** | 2.75 - 13 | | 35 | 27 | 60 | 30 | 42 - 62 |
| -100/NL | **803.567** | | | | | 100 | | |
| -MEGA ER25 - 60/NL | **803.570** | 2.75 - 16 | | 42 | 33.5 | 60 | 48 | 44 - 67 |
| -100/NL | **803.569** | | | | | 100 | | |
| SL19.05-MEGA ER11 - 40/NL | **803.556** | 2.75 - 6 | 19.05 | 19 | - | 40 | 19 | 23 - 40 |
| - 80/NL | **803.557** | | | | | 80 | | |
| -MEGA ER16 - 40/NL | **803.558** | 1.9 - 10 | | 30 | 23 | 40 | 28 | 35 - 47 |
| - 80/NL | **803.559** | | | | | 80 | | |

1. Nut is not included. Refer to the "accessories" table below and select the suitable nut according to applications.
2. "G" is the adjusting screw (optional).
3. "H" indicates the adjustment length with an adjusting screw.

For ER Collet ▶ 266

A.7

**Accessories**

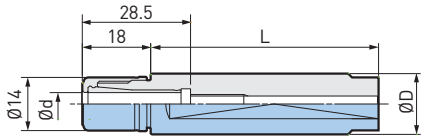
| MEGA ER Grip | MEGA ER Nut Model | MEGA ER Nut Order No. | MEGA ER Perfect Seal Model ▶ 269 | MEGA Wrench Model | MEGA Wrench Order No. | ER Nut Model | ER Nut Order No. | Wrench Model | Wrench Order No. | Adjusting Screw Model | Adjusting Screw Order No. | G | L | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEGA ER11 | - | - | - | - | - | ERN11 | **803.581** | NBK 6 | **961.525** | NBA6B | **961.527** | M7 | 12 | 2 |
| MEGA ER16 | MERN16 | **967.801** | MERPS16- | MGR30L | **969.448** | ERN16 | **803.582** | NBK10 | **961.570** | NBA10B | **961.572** | M11 | 16 | 3 |
| MEGA ER20 | MERN20 | **967.802** | MERPS20- | MGR35L | **969.460L** | ERN20 | **803.583** | NBK13 | **961.596** | NBA13B | **961.598** | M14 | 20 | 4 |
| MEGA ER25 | MERN25 | **967.803** | MERPS25- | MGR42L | **969.462L** | ERN25 | **803.584** | NBK16 | **961.630** | NBA16B | **961.632** | M18 | 20 | 4 |
| MEGA ER32 | MERN32 | **967.804** | MERPS32- | MGR50L | **969.464L** | ERN32 | **803.585** | FK45-50L | **801.037** | NBA20B | **961.680** | M21 | 20 | 4 |

1. MEGA wrench is required for MEGA nut and MEGA ER perfect seal.
2. Wrench is for ER nut.

## MEGA Micro Chuck

Smaller nut diameter than body allows installation into toolholder of small lathes from the back side.

Coolant Through Hole




**Ø 0.45 - 6.05 mm**

| Model | Order No. | Ød | ØD | L | Collet Model |
|---|---|---|---|---|---|
| SL16 -MEGA6S -60 | 803.594 | 0.45 - 6.05 | 16 | 60 | NBC6S- |
| SL20 -MEGA6S -40 | 803.595 | | 20 | 40 | |
| -80 | 803.602 | | | 80 | |
| SL15.875-MEGA6S -60 | 803.593 | | 15.875 | 60 | |

1. MEGA nut is included.
2. Designed to be capable of supplying coolant through the body.
3. MEGA wrench (MGR14) is to be ordered separately.

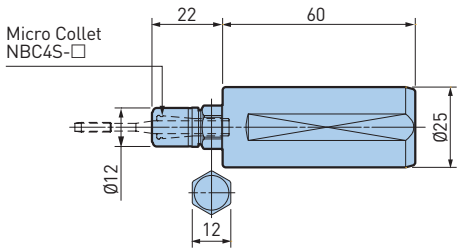
For MEGA Wrench ▶ 271
For Micro Collet ▶ 247

A.7

## MEGA Synchro Tapping Holder

**Rigid tapping attachment with error compensation**

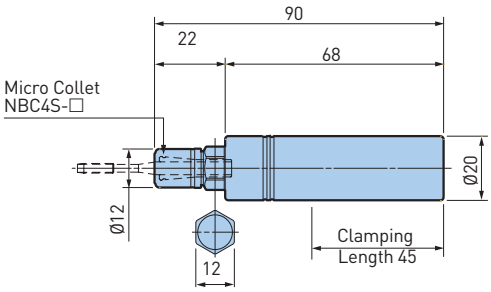
Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.




| Model | Order No. |
|---|---|
| SLS25-MGT3-22 | 804.115 |

For Accessories ▶ 281

1. MEGA nut is included.
2. MEGA wrench (MGR12) and common spanner (12 mm) are required to clamp/unclamp the tap.



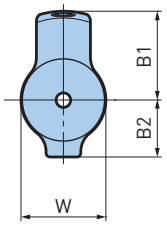

| Model | Order No. |
|---|---|
| ST20-MGT3-90 | 978.356 |

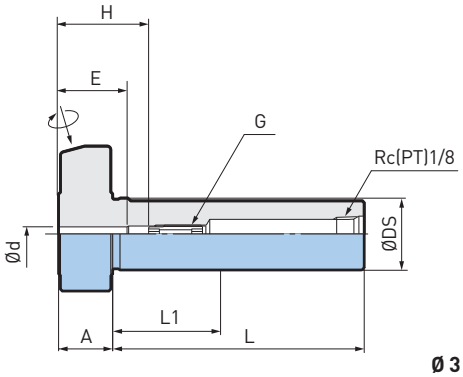
For Accessories ▶ 281

1. MEGA nut is included.
2. MEGA wrench (MGR12) and common spanner (12 mm) are required to clamp/unclamp the tap.
3. There is no flat on the shank.

# Hydraulic Chuck Lathe Type

Single wrench enables the easy cutting tool exchange on the turret. High precision cutting by the Hydraulic Chuck is achieved on the Automatic Lathe!




**Ø 3 - 8 mm**

| Model | | | Order No. | Ød | ØDS | L | L1 | A | B1 | B2 | W | H | E | G | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SL19.05 | -HDC3 | -60 | **807.220** | 3 | 19.05 | 60 | 30 | 15 | 24.5 | 15.8 | 22 | 20 - 32 | 16 | HDA4-05015W | 0.18 |
| | -HDC4 | -60 | **806.991** | 4 | | | | | | | | 23 - 32 | 19 | | 0.18 |
| | -HDC6 | -60 | **806.992** | 6 | | | | | | | | 31 - 48 | 25 | NBA6B | 0.18 |
| | -HDC8 | -60 | **806.993** | 8 | | | | | 25.5 | | | 65 | 31 | - | 0.18 |
| SL20 | -HDC3 | -70 | **807.221** | 3 | 20 | 70 | 30 | 15 | 24.5 | 15.8 | 23 | 20 - 32 | 16 | HDA4-05015W | 0.22 |
| | -HDC4 | -70 | **807.222** | 4 | | | | | | | | 23 - 32 | 19 | | 0.22 |
| | -HDC6 | -70 | **807.223** | 6 | | | | | | | | 31 - 48 | 25 | NBA6B | 0.22 |
| | -HDC8 | -70 | **807.224** | 8 | | | | | 25.5 | | | 75 | 31 | - | 0.21 |
| SL22 | -HDC3 | -70 | **807.225** | 3 | 22 | 70 | 30 | 15 | 24.5 | 15.8 | 25 | 20 - 32 | 16 | HDA4-05015W | 0.26 |
| | -HDC4 | -70 | **806.994** | 4 | | | | | | | | 23 - 32 | 19 | | 0.26 |
| | -HDC6 | -70 | **806.995** | 6 | | | | | | | | 31 - 48 | 25 | NBA6B | 0.26 |
| | -HDC8 | -70 | **806.996** | 8 | | | | | 25.5 | | | 75 | 31 | - | 0.25 |

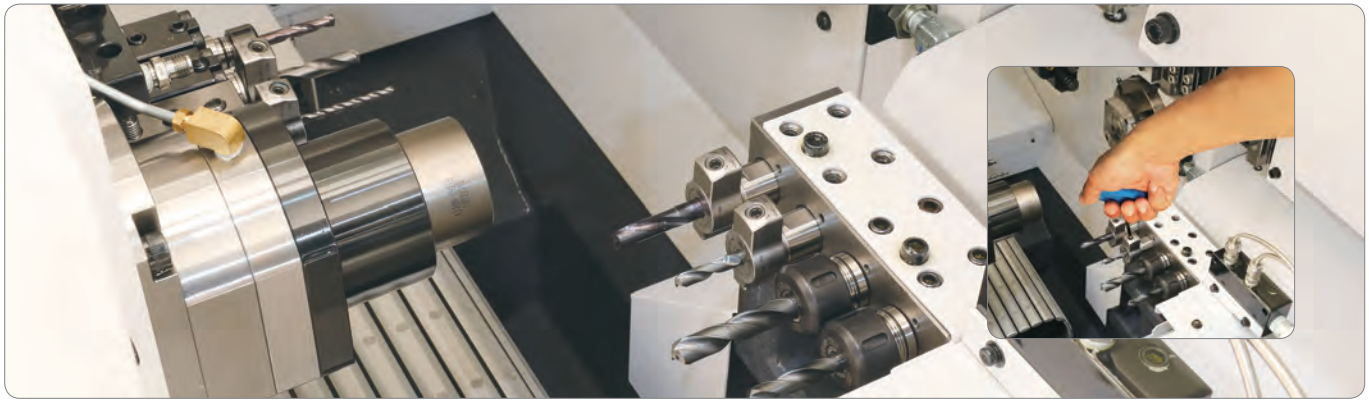
1. Adjusting screw cannot be used for HDC8. Adjusting screw HDA4-05015W is available with 807.254.
2. "E" is the min. clamping length.
3. "G" is the adjusting screw (optional).
4. "H" indicates the adjustment length with an adjusting screw.
5. "H" at HDC8 is the max. tool shank length can be inserted for these models.
6. L1 is the minimum length, in case of shortening the shank.

NBA6B ▶ 258



**Caution:**

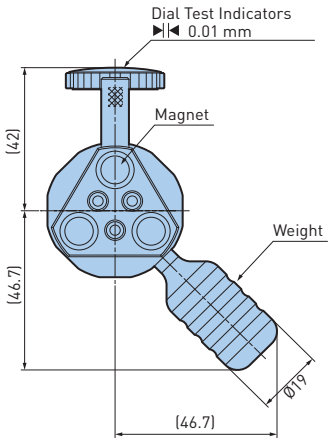
- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon Type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

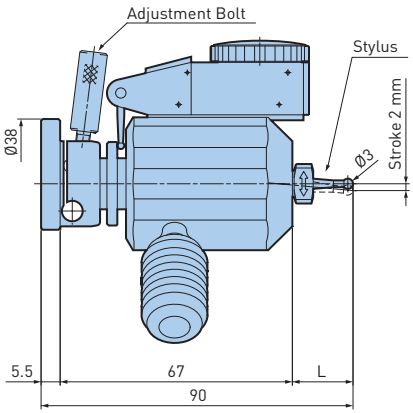


# Centering Tool for Lathes

## Easy Centering with Static Dial Gauge

- Centering the tool holder while watching the dial gauge is possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 0.01 mm)
- Magnet base allows for flexible mounting positions



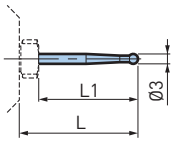




A.7

| Model | Order No. | Min. Scale | Max. Spindle Speed | Weight (kg) | Stylus |
|---|---|---|---|---|---|
| CTL-90 | 806.436 | 0.01 mm | 50 U/min | 0.4 kg | ST3-CT90 |

1. Stylus ST3-CT90 is included.

### Stylus for CTL-90

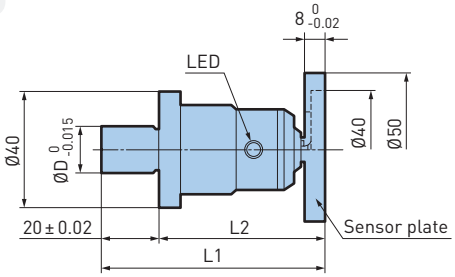



| Model | Order No. | L | L1 | Material |
|---|---|---|---|---|
| ST3-CT90 | 806.437 | 17.5 | 11.5 | Ruby |
| ST3-CT90L | 806.912 | 37.5 | 31.5 | |

# Lathe Master

Tool setting without measuring cut.

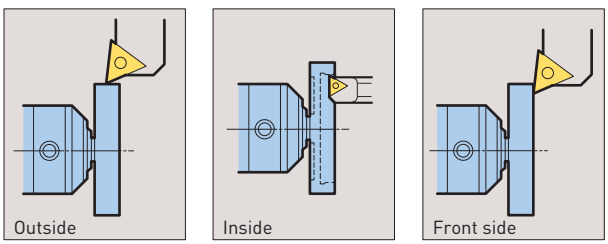
- Reduces set-up time for NC lathes
- Applicable for tuning tools for external, internal and face turning.




| Model | Order No. | ØD | L1 | L2 | Repeatability Accuracy | Battery |
|---|---|---|---|---|---|---|
| LM -15 | 806.997 | 15 | 75 | 55 | ±2 µm | CR425 |
| LM -30 | 805.397 | 30 | 65 | 45 | | SR44 x 2 |

**Caution:**

- Machines and tools must be electrically conductive.




Clamp the shank (ØD) of the Lathe Master in the collet chuck of the lathe. The LED lights up as soon as the tip of the tool touches the sensor plate.



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# Collets & Accessories


| | |
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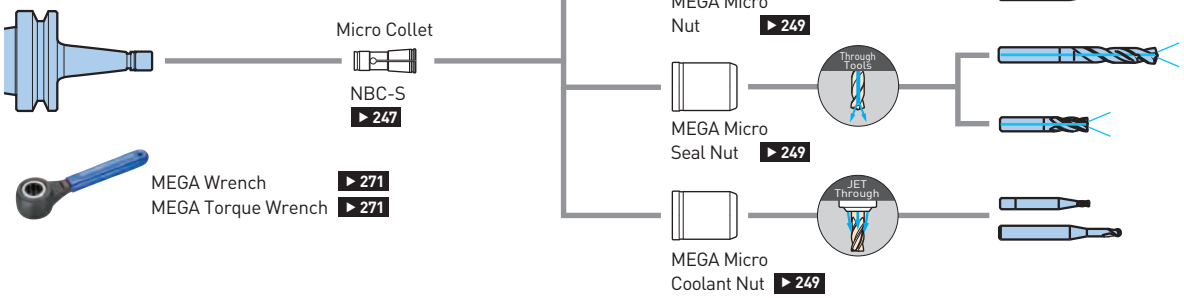
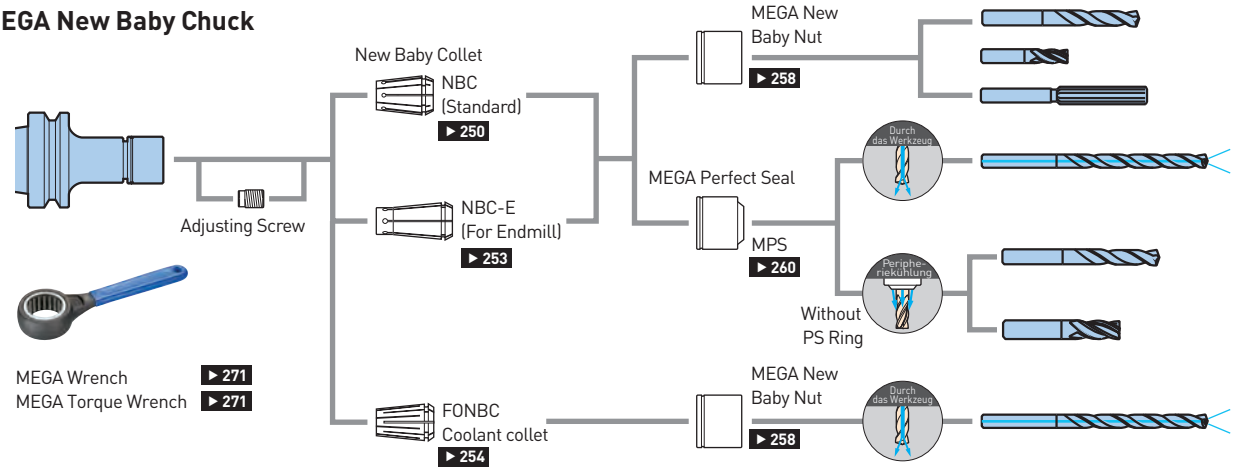
## MEGA Micro Chuck

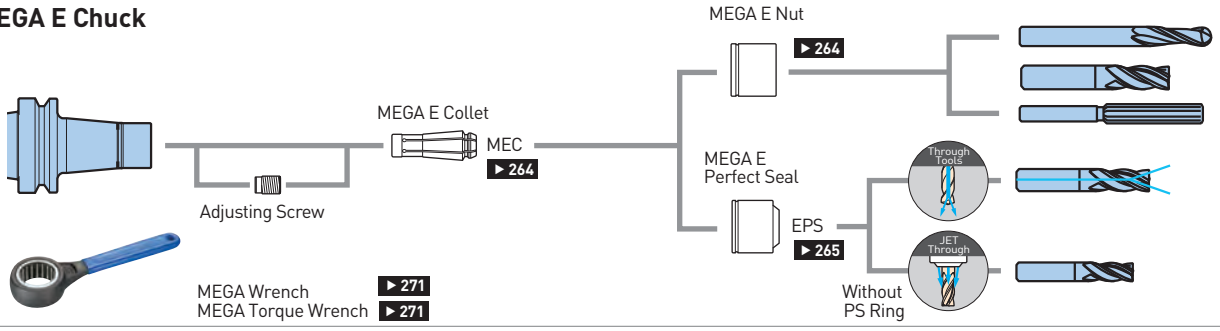



## MEGA New Baby Chuck

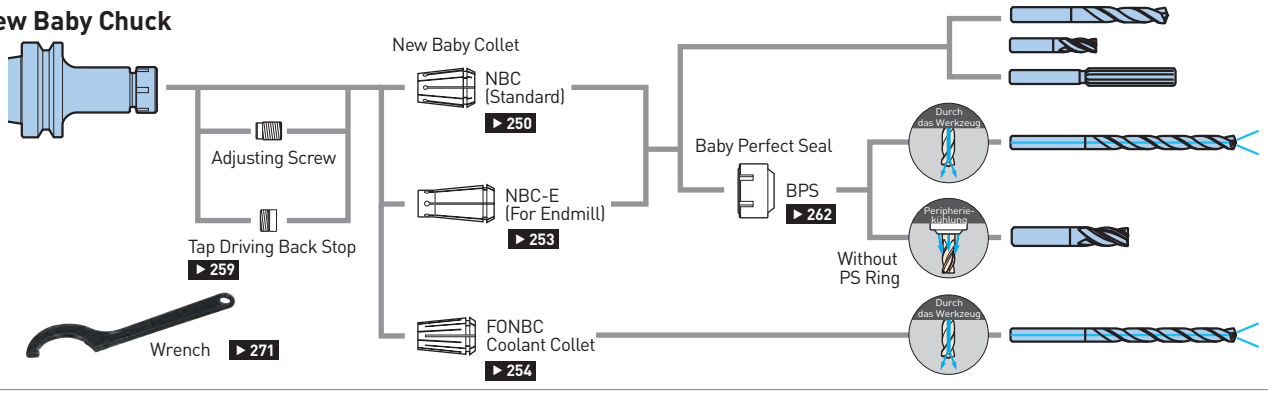



A.8

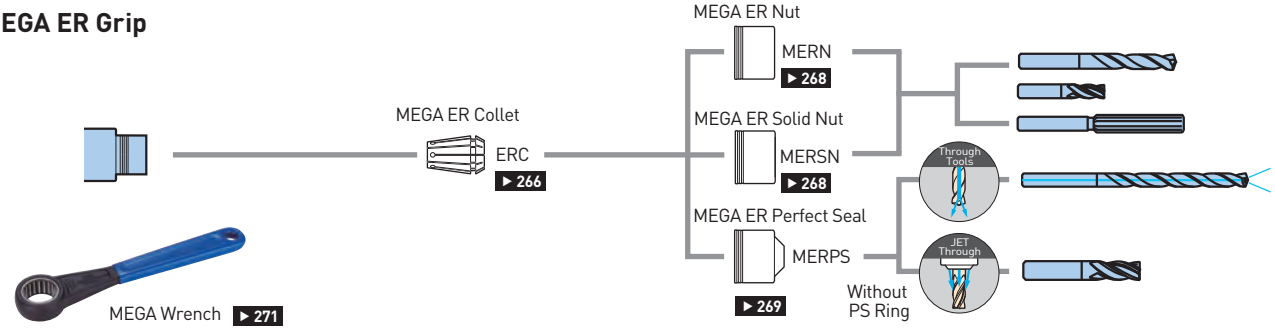
## MEGA E Chuck




## New Baby Chuck




## MEGA ER Grip



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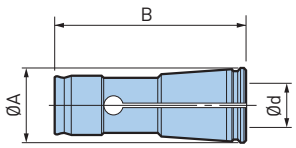
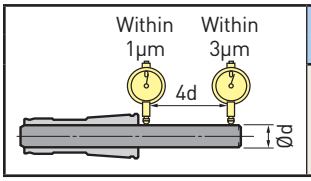
# Micro Collets

**For MEGA Micro Chuck**

Available in 0.1 mm diameter increments to suit all the cutting tool shank sizes with maximum accuracy.
Despite their compact size, high clamping force and accuracy are achieved.




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

Clamping diameter: Ø 0.45 - Ø 3.25

| MEGA3S | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC3S -0.5 AA | **968.301** | 0.45 - 0.55 |
| -0.6 AA | **968.302** | 0.55 - 0.65 |
| -0.7 AA | **968.303** | 0.65 - 0.75 |
| -0.8 AA | **968.304** | 0.75 - 0.85 |
| -0.9 AA | **968.305** | 0.85 - 0.95 |
| -1.0 AA | **968.306** | 0.95 - 1.05 |
| -1.1 AA | **968.307** | 1.05 - 1.15 |
| -1.2 AA | **968.308** | 1.15 - 1.25 |
| -1.3 AA | **968.309** | 1.25 - 1.35 |
| -1.4 AA | **968.310** | 1.35 - 1.45 |
| -1.5 AA | **968.311** | 1.45 - 1.55 |
| -1.6 AA | **968.312** | 1.55 - 1.65 |
| -1.7 AA | **968.313** | 1.65 - 1.75 |
| -1.8 AA | **968.314** | 1.75 - 1.85 |
| -1.9 AA | **968.315** | 1.85 - 1.95 |
| -2.0 AA | **968.316** | 1.95 - 2.05 |
| -2.1 AA | **968.317** | 2.05 - 2.15 |
| -2.2 AA | **968.318** | 2.15 - 2.25 |
| -2.3 AA | **968.319** | 2.25 - 2.35 |
| -2.4 AA | **968.320** | 2.35 - 2.45 |
| -2.5 AA | **968.321** | 2.45 - 2.55 |
| -2.6 AA | **968.322** | 2.55 - 2.65 |
| -2.7 AA | **968.323** | 2.65 - 2.75 |
| -2.8 AA | **968.324** | 2.75 - 2.85 |
| -2.9 AA | **968.325** | 2.85 - 2.95 |
| -3.0 AA | **968.326** | 2.95 - 3.05 |
| -3.1 AA | **968.327** | 3.05 - 3.15 |
| -3.175 AA | **968.328** | 3.125 - 3.225 |
| -3.2 AA | **968.329** | 3.15 - 3.25 |

Ø A=6.06 B=18.8

Clamping diameter: Ø 0.45 - Ø 4.05

| MEGA4S | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC4S -0.5 AA | **968.334** | 0.45 - 0.55 |
| -0.6 AA | **968.335** | 0.55 - 0.65 |
| -0.7 AA | **968.336** | 0.65 - 0.75 |
| -0.8 AA | **968.337** | 0.75 - 0.85 |
| -0.9 AA | **968.338** | 0.85 - 0.95 |
| -1.0 AA | **961.462** | 0.95 - 1.05 |
| -1.1 AA | **968.339** | 1.05 - 1.15 |
| -1.2 AA | **968.340** | 1.15 - 1.25 |
| -1.3 AA | **968.341** | 1.25 - 1.35 |
| -1.4 AA | **968.342** | 1.35 - 1.45 |
| -1.5 AA | **961.464** | 1.45 - 1.55 |
| -1.6 AA | **968.343** | 1.55 - 1.65 |
| -1.7 AA | **968.344** | 1.65 - 1.75 |
| -1.8 AA | **968.345** | 1.75 - 1.85 |
| -1.9 AA | **968.346** | 1.85 - 1.95 |
| -2.0 AA | **961.466** | 1.95 - 2.05 |
| -2.1 AA | **968.347** | 2.05 - 2.15 |
| -2.2 AA | **968.348** | 2.15 - 2.25 |
| -2.3 AA | **968.349** | 2.25 - 2.35 |
| -2.4 AA | **968.350** | 2.35 - 2.45 |
| -2.5 AA | **961.468** | 2.45 - 2.55 |
| -2.6 AA | **968.351** | 2.55 - 2.65 |
| -2.7 AA | **968.352** | 2.65 - 2.75 |
| -2.8 AA | **968.353** | 2.75 - 2.85 |
| -2.9 AA | **968.354** | 2.85 - 2.95 |
| -3.0 AA | **961.470** | 2.95 - 3.05 |
| -3.1 AA | **968.355** | 3.05 - 3.15 |
| -3.175 AA | **968.356** | 3.125 - 3.225 |
| -3.2 AA | **968.357** | 3.15 - 3.25 |
| -3.3 AA | **968.358** | 3.25 - 3.35 |
| -3.4 AA | **968.359** | 3.35 - 3.45 |
| -3.5 AA | **961.472** | 3.45 - 3.55 |
| -3.6 AA | **968.360** | 3.55 - 3.65 |
| -3.7 AA | **968.361** | 3.65 - 3.75 |
| -3.8 AA | **968.362** | 3.75 - 3.85 |
| -3.9 AA | **968.363** | 3.85 - 3.95 |
| -4.0 AA | **961.474** | 3.95 - 4.05 |

Ø A=7.4 B=22.5

For MEGA6S/8S, refer to the following pages.



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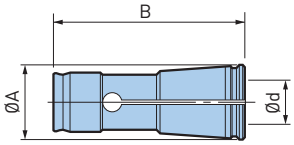
# Micro Collets

**For MEGA Micro Chuck**




Clamping diameter: Ø 0.45 - Ø 6.05

| MEGA6S | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC6S -0.5 AA | 968.369 | 0.45 - 0.55 |
| -0.6 AA | 968.370 | 0.55 - 0.65 |
| -0.7 AA | 968.371 | 0.65 - 0.75 |
| -0.8 AA | 968.372 | 0.75 - 0.85 |
| -0.9 AA | 968.373 | 0.85 - 0.95 |
| -1.0 AA | 961.477 | 0.95 - 1.05 |
| -1.1 AA | 968.374 | 1.05 - 1.15 |
| -1.2 AA | 968.375 | 1.15 - 1.25 |
| -1.3 AA | 968.376 | 1.25 - 1.35 |
| -1.4 AA | 968.377 | 1.35 - 1.45 |
| -1.5 AA | 961.479 | 1.45 - 1.55 |
| -1.6 AA | 968.378 | 1.55 - 1.65 |
| -1.7 AA | 968.379 | 1.65 - 1.75 |
| -1.8 AA | 968.380 | 1.75 - 1.85 |
| -1.9 AA | 968.381 | 1.85 - 1.95 |
| -2.0 AA | 961.481 | 1.95 - 2.05 |
| -2.1 AA | 968.382 | 2.05 - 2.15 |
| -2.2 AA | 968.383 | 2.15 - 2.25 |
| -2.3 AA | 968.384 | 2.25 - 2.35 |
| -2.4 AA | 968.385 | 2.35 - 2.45 |
| -2.5 AA | 961.483 | 2.45 - 2.55 |
| -2.6 AA | 968.386 | 2.55 - 2.65 |
| -2.7 AA | 968.387 | 2.65 - 2.75 |
| -2.8 AA | 968.388 | 2.75 - 2.85 |
| -2.9 AA | 968.389 | 2.85 - 2.95 |
| -3.0 AA | 961.485 | 2.95 - 3.05 |
| -3.1 AA | 968.390 | 3.05 - 3.15 |
| -3.175 AA | 968.391 | 3.125 - 3.225 |
| -3.2 AA | 968.392 | 3.15 - 3.25 |
| -3.3 AA | 968.393 | 3.25 - 3.35 |
| -3.4 AA | 968.394 | 3.35 - 3.45 |
| -3.5 AA | 961.487 | 3.45 - 3.55 |
| -3.6 AA | 968.395 | 3.55 - 3.65 |
| -3.7 AA | 968.396 | 3.65 - 3.75 |
| -3.8 AA | 968.397 | 3.75 - 3.85 |
| -3.9 AA | 968.398 | 3.85 - 3.95 |
| -4.0 AA | 961.489 | 3.95 - 4.05 |
| -4.1 AA | 968.399 | 4.05 - 4.15 |
| -4.2 AA | 968.400 | 4.15 - 4.25 |
| -4.3 AA | 968.401 | 4.25 - 4.35 |
| -4.4 AA | 968.402 | 4.35 - 4.45 |
| -4.5 AA | 961.491 | 4.45 - 4.55 |
| -4.6 AA | 968.403 | 4.55 - 4.65 |
| -4.7 AA | 968.404 | 4.65 - 4.75 |
| -4.7625 AA | 801.743 | 4.7125 - 4.8125 |
| -4.8 AA | 968.405 | 4.75 - 4.85 |
| -4.9 AA | 968.406 | 4.85 - 4.95 |
| -5.0 AA | 961.493 | 4.95 - 5.05 |
| -5.1 AA | 968.408 | 5.05 - 5.15 |
| -5.2 AA | 968.409 | 5.15 - 5.25 |
| -5.3 AA | 968.410 | 5.25 - 5.35 |
| -5.4 AA | 968.411 | 5.35 - 5.45 |
| -5.5 AA | 961.495 | 5.45 - 5.55 |
| -5.6 AA | 968.412 | 5.55 - 5.65 |
| -5.7 AA | 968.413 | 5.65 - 5.75 |
| -5.8 AA | 968.414 | 5.75 - 5.85 |
| -5.9 AA | 968.415 | 5.85 - 5.95 |
| -6.0 AA | 961.497 | 5.95 - 6.05 |

Ø A=9.4 B=24.5

Clamping diameter: Ø 2.95 - Ø 8.05

| MEGA8S | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC8S -3.0 AA | 801.709 | 2.95 - 3.05 |
| -3.1 AA | 804.132 | 3.05 - 3.15 |
| -3.2 AA | 804.134 | 3.15 - 3.25 |
| -3.3 AA | 804.135 | 3.25 - 3.35 |
| -3.4 AA | 804.136 | 3.35 - 3.45 |
| -3.5 AA | 804.137 | 3.45 - 3.55 |
| -3.6 AA | 804.138 | 3.55 - 3.65 |
| -3.7 AA | 804.139 | 3.65 - 3.75 |
| -3.8 AA | 804.140 | 3.75 - 3.85 |
| -3.9 AA | 804.141 | 3.85 - 3.95 |
| -4.0 AA | 801.742 | 3.95 - 4.05 |
| -4.1 AA | 804.142 | 4.05 - 4.15 |
| -4.2 AA | 804.143 | 4.15 - 4.25 |
| -4.3 AA | 804.144 | 4.25 - 4.35 |
| -4.4 AA | 804.145 | 4.35 - 4.45 |
| -4.5 AA | 804.146 | 4.45 - 4.55 |
| -4.6 AA | 804.147 | 4.55 - 4.65 |
| -4.7 AA | 804.148 | 4.65 - 4.75 |
| -4.8 AA | 804.149 | 4.75 - 4.85 |
| -4.9 AA | 804.150 | 4.85 - 4.95 |
| -5.0 AA | 801.702 | 4.95 - 5.05 |
| -5.1 AA | 804.151 | 5.05 - 5.15 |
| -5.2 AA | 804.152 | 5.15 - 5.25 |
| -5.3 AA | 804.153 | 5.25 - 5.35 |
| -5.4 AA | 804.154 | 5.35 - 5.45 |
| -5.5 AA | 804.155 | 5.45 - 5.55 |
| -5.6 AA | 804.156 | 5.55 - 5.65 |
| -5.7 AA | 804.157 | 5.65 - 5.75 |
| -5.8 AA | 804.158 | 5.75 - 5.85 |
| -5.9 AA | 801.746 | 5.85 - 5.95 |
| -6.0 AA | 801.703 | 5.95 - 6.05 |
| -6.1 AA | 804.159 | 6.05 - 6.15 |
| -6.2 AA | 804.160 | 6.15 - 6.25 |
| -6.3 AA | 804.161 | 6.25 - 6.35 |
| -6.4 AA | 804.162 | 6.35 - 6.45 |
| -6.5 AA | 804.163 | 6.45 - 6.55 |
| -6.6 AA | 804.164 | 6.55 - 6.65 |
| -6.7 AA | 804.165 | 6.65 - 6.75 |
| -6.8 AA | 804.166 | 6.75 - 6.85 |
| -6.9 AA | 804.167 | 6.85 - 6.95 |
| -7.0 AA | 804.168 | 6.95 - 7.05 |
| -7.1 AA | 804.169 | 7.05 - 7.15 |
| -7.2 AA | 804.170 | 7.15 - 7.25 |
| -7.3 AA | 804.171 | 7.25 - 7.35 |
| -7.4 AA | 804.172 | 7.35 - 7.45 |
| -7.5 AA | 804.173 | 7.45 - 7.55 |
| -7.6 AA | 804.174 | 7.55 - 7.65 |
| -7.7 AA | 804.175 | 7.65 - 7.75 |
| -7.8 AA | 804.176 | 7.75 - 7.85 |
| -7.9 AA | 804.177 | 7.85 - 7.95 |
| -8.0 AA | 801.704 | 7.95 - 8.05 |

Ø A=12 B=27

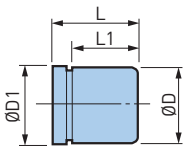




BROTECH

## MEGA Nut

**For MEGA Micro Chuck**

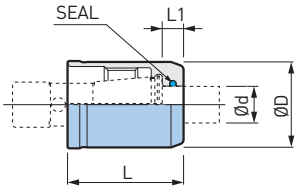



| Model | Order No. | MEGA Micro Chuck | D | ØD1 | L | L1 |
|---|---|---|---|---|---|---|
| MGN3S | **969.480** | MEGA3S | 10 | 10.3 | 13.0 | 11.0 |
| MGN4S | **969.481** | MEGA4S | 12 | 12.2 | 14.5 | 12.0 |
| MGN6S | **969.482** | MEGA6S | 14 | 14.2 | 17.0 | 14.5 |
| MGN8S | **804.108** | MEGA8S | 18 | 18.3 | 18.5 | 15.5 |

## Micro Seal Nut

**For MEGA Micro Chuck**

Sealed nut for coolant-through tools.




**MEGA6S**

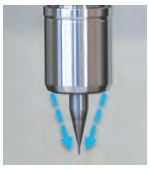
| Model | Order No. | Ød | ØD | L | L1 |
|---|---|---|---|---|---|
| MGN6S -PS3 | **978.516** | 3.0 | 14 | 19 | 3.5 |
| -PS4 | **978.513** | 4.0 | | | |
| -PS5 | **978.517** | 5.0 | | | |
| -PS6 | **978.511** | 6.0 | | | |

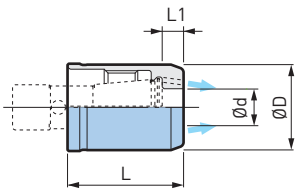
**MEGA8S**

| Model | Order No. | Ød | ØD | L | L1 |
|---|---|---|---|---|---|
| MGN8S -PS3 | **804.109** | 3.0 | 18 | 20.2 | 3.5 |
| -PS4 | **804.110** | 4.0 | | | |
| -PS5 | **804.111** | 5.0 | | | |
| -PS6 | **804.112** | 6.0 | | | |
| -PS7 | **804.113** | 7.0 | | | |
| -PS8 | **804.114** | 8.0 | | | |

## MEGA Micro Coolant Nut

MEGA Micro Coolant Nut, only for MEGA Micro Chuck 6S for more efficient coolant supply for micro cutting tool.






| Model | Order No. | Cutting Tool shank dia. Ød | ØD | L | L1 |
|---|---|---|---|---|---|
| MGN6S-2J | **806.862** | 2 | 14 | 19 | 3.5 |
| MGN6S-3J | **806.863** | 3 | | | |
| MGN6S-4J | **806.864** | 4 | | | |
| MGN6S-5J | **806.865** | 5 | | 17 | 1.5 |
| MGN6S-6J | **806.866** | 6 | | | |

## Micro Collet Protective Cases

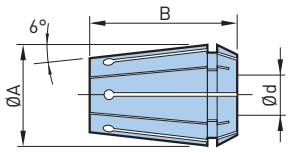
Exclusive case for MEGA Micro Collet.

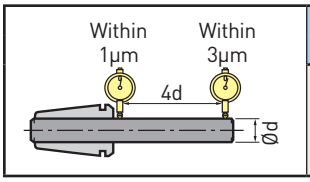
| Model | Order No. | Micro Collet | No. of Spot | Size |
|---|---|---|---|---|
| NBB3S | **968.330** | NBC3S | 50 | 200 x 170 x 50 |
| NBB4S | **968.364** | NBC4S | | |
| NBB6S | **961.498** | NBC6S | 60 | 200 x 170 x 50 |
| NBB8S | **805.802** | NBC8S | | |

1. Micro collet is not included.

# New Baby Collets Standard

**For MEGA New Baby Chuck and New Baby Chuck**




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

Clamping diameter: Ø 0.25 - Ø 6.0

| MEGA6N / NBS6 | | | | |
|---|---|---|---|---|
| Model | | | Order No. | Clamping Range Ød |
| NBC6 | -0.5 | AA | 961.500 | 0.25 - 0.50 |
| • | -0.75 | AA | 961.501 | 0.50 - 0.75 |
| • | -1 | AA | 961.502 | 0.75 - 1.00 |
| • | -1.25 | AA | 961.503 | 1.00 - 1.25 |
| • | -1.5 | AA | 961.504 | 1.25 - 1.50 |
| • | -1.75 | AA | 961.505 | 1.50 - 1.75 |
| • | -2 | AA | 961.506 | 1.75 - 2.00 |
| • | -2.25 | AA | 961.507 | 2.00 - 2.25 |
| • | -2.5 | AA | 961.508 | 2.25 - 2.50 |
| • | -2.75 | AA | 961.509 | 2.50 - 2.75 |
| • | -3 | AA | 961.510 | 2.75 - 3.00 |
| | -3.175 | AA | 801.738 | 2.925 - 3.175 |
| • | -3.25 | AA | 961.511 | 3.00 - 3.25 |
| • | -3.5 | AA | 961.512 | 3.25 - 3.50 |
| • | -3.75 | AA | 961.513 | 3.50 - 3.75 |
| • | -4 | AA | 961.514 | 3.75 - 4.00 |
| • | -4.25 | AA | 961.515 | 4.00 - 4.25 |
| • | -4.5 | AA | 961.516 | 4.25 - 4.50 |
| • | -4.75 | AA | 961.517 | 4.50 - 4.75 |
| • | -5 | AA | 961.518 | 4.75 - 5.00 |
| • | -5.25 | AA | 961.519 | 5.00 - 5.25 |
| • | -5.5 | AA | 961.520 | 5.25 - 5.50 |
| • | -5.75 | AA | 961.521 | 5.50 - 5.75 |
| • | -6 | AA | 961.522 | 5.75 - 6.00 |

Ø A=9.5 B=14

Clamping diameter: Ø 0.5 - Ø 8.0

| MEGA8N / NBS8 | | | | |
|---|---|---|---|---|
| Model | | | Order No. | Clamping Range Ød |
| • NBC8 | -0.75 | AA | 978.507 | 0.50 - 0.75 |
| • | -1 | AA | 961.531 | 0.75 - 1.00 |
| • | -1.25 | AA | 978.500 | 1.00 - 1.25 |
| • | -1.5 | AA | 961.532 | 1.25 - 1.50 |
| • | -1.75 | AA | 801.744 | 1.50 - 1.75 |
| • | -2 | AA | 961.533 | 1.75 - 2.00 |
| • | -2.25 | AA | 978.505 | 2.00 - 2.25 |
| • | -2.5 | AA | 961.534 | 2.25 - 2.50 |
| • | -2.75 | AA | 978.506 | 2.50 - 2.75 |
| • | -3 | AA | 961.535 | 2.75 - 3.00 |
| | -3.175 | AA | 978.499 | 2.675 - 3.175 |
| • | -3.5 | AA | 961.536 | 3.00 - 3.50 |
| • | -4 | AA | 961.537 | 3.50 - 4.00 |
| • | -4.5 | AA | 961.538 | 4.00 - 4.50 |
| • | -5 | AA | 961.539 | 4.50 - 5.00 |
| | -5.25 | AA | 801.750 | 4.75 - 5.25 |
| • | -5.5 | AA | 961.540 | 5.00 - 5.50 |
| | -5.75 | AA | 801.751 | 5.25 - 5.75 |
| • | -6 | AA | 961.541 | 5.50 - 6.00 |
| • | -6.5 | AA | 961.542 | 6.00 - 6.50 |
| • | -7 | AA | 961.543 | 6.50 - 7.00 |
| • | -7.5 | AA | 961.544 | 7.00 - 7.50 |
| • | -8 | AA | 961.545 | 7.50 - 8.00 |

Ø A=12.5 B=18

Clamping diameter: Ø 1.5 - Ø 10.0

| MEGA10N / NBS10 | | | | |
|---|---|---|---|---|
| Model | | | Order No. | Clamping Range Ød |
| • NBC10 | - 1.75 | AA | 961.599 | 1.50 - 1.75 |
| • | - 2 | AA | 961.551 | 1.75 - 2.00 |
| • | - 2.25 | AA | 978.508 | 2.00 - 2.25 |
| • | - 2.5 | AA | 961.552 | 2.25 - 2.50 |
| • | - 2.75 | AA | 978.509 | 2.50 - 2.75 |
| • | - 3 | AA | 961.553 | 2.75 - 3.00 |
| | - 3.175 | AA | 961.120 | 2.675 - 3.175 |
| | - 3.25 | AA | 801.651 | 2.75 - 3.25 |
| • | - 3.5 | AA | 961.554 | 3.00 - 3.50 |
| | - 3.75 | AA | 801.652 | 3.25 - 3.75 |
| • | - 4 | AA | 961.555 | 3.50 - 4.00 |
| | - 4.25 | AA | 801.655 | 3.75 - 4.25 |
| • | - 4.5 | AA | 961.556 | 4.00 - 4.50 |
| | - 4.75 | AA | 801.656 | 4.25 - 4.75 |

| MEGA10N / NBS10 | | | | |
|---|---|---|---|---|
| Model | | | Order No. | Clamping Range Ød |
| • NBC10 | - 5 | AA | 961.557 | 4.50 - 5.00 |
| | - 5.25 | AA | 801.659 | 4.75 - 5.25 |
| • | - 5.5 | AA | 961.558 | 5.00 - 5.50 |
| | - 5.75 | AA | 801.660 | 5.25 - 5.75 |
| • | - 6 | AA | 961.559 | 5.50 - 6.00 |
| • | - 6.5 | AA | 961.560 | 6.00 - 6.50 |
| • | - 7 | AA | 961.561 | 6.50 - 7.00 |
| • | - 7.5 | AA | 961.562 | 7.00 - 7.50 |
| • | - 8 | AA | 961.563 | 7.50 - 8.00 |
| • | - 8.5 | AA | 961.564 | 8.00 - 8.50 |
| • | - 9 | AA | 961.565 | 8.50 - 9.00 |
| • | - 9.5 | AA | 961.566 | 9.00 - 9.50 |
| • | -10 | AA | 961.567 | 9.50 - 10.00 |

Ø A=16.5 B=27

Clamping diameter: Ø 2.5 - Ø 13.0

| MEGA13N / NBS13 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| • NBC13 - 3 AA | **961.573** | 2.50 - 3.00 |
| - 3.175 AA | **961.127** | 2.675 - 3.175 |
| - 3.25 AA | **801.671** | 2.75 - 3.25 |
| • - 3.5 AA | **961.574** | 3.00 - 3.50 |
| - 3.75 AA | **801.672** | 3.25 - 3.75 |
| • - 4 AA | **961.575** | 3.50 - 4.00 |
| - 4.25 AA | **801.675** | 3.75 - 4.25 |
| • - 4.5 AA | **961.576** | 4.00 - 4.50 |
| - 4.75 AA | **801.676** | 4.25 - 4.75 |
| • - 5 AA | **961.577** | 4.50 - 5.00 |
| - 5.25 AA | **801.679** | 4.75 - 5.25 |
| • - 5.5 AA | **961.578** | 5.00 - 5.50 |
| - 5.75 AA | **801.680** | 5.25 - 5.75 |
| • - 6 AA | **961.579** | 5.50 - 6.00 |
| • - 6.5 AA | **961.580** | 6.00 - 6.50 |
| • - 7 AA | **961.581** | 6.50 - 7.00 |
| • - 7.5 AA | **961.582** | 7.00 - 7.50 |
| • - 8 AA | **961.583** | 7.50 - 8.00 |
| • - 8.5 AA | **961.584** | 8.00 - 8.50 |
| • - 9 AA | **961.585** | 8.50 - 9.00 |
| • - 9.5 AA | **961.586** | 9.00 - 9.50 |
| • -10 AA | **961.587** | 9.50 - 10.00 |
| • -10.5 AA | **961.588** | 10.00 - 10.50 |
| • -11 AA | **961.589** | 10.50 - 11.00 |
| • -11.5 AA | **961.590** | 11.00 - 11.50 |
| • -12 AA | **961.591** | 11.50 - 12.00 |
| • -12.5 AA | **961.592** | 12.00 - 12.50 |
| • -13 AA | **961.593** | 12.50 - 13.00 |

Ø A=20.5 B=31

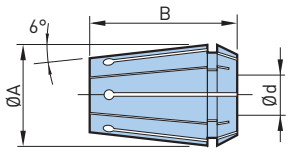
Clamping diameter: Ø 2.5 - Ø 16.0

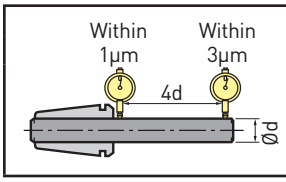
| MEGA16N / NBS16 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| • NBC16 - 3 AA | **961.601** | 2.50 - 3.00 |
| - 3.25 AA | **801.694** | 2.75 - 3.25 |
| • - 3.5 AA | **961.602** | 3.00 - 3.50 |
| - 3.75 AA | **801.695** | 3.25 - 3.75 |
| • - 4 AA | **961.603** | 3.50 - 4.00 |
| - 4.25 AA | **801.697** | 3.75 - 4.25 |
| • - 4.5 AA | **961.604** | 4.00 - 4.50 |
| - 4.75 AA | **801.698** | 4.25 - 4.75 |
| • - 5 AA | **961.605** | 4.50 - 5.00 |
| - 5.25 AA | **801.700** | 4.75 - 5.25 |
| • - 5.5 AA | **961.606** | 5.00 - 5.50 |
| - 5.75 AA | **801.701** | 5.25 - 5.75 |
| • - 6 AA | **961.607** | 5.50 - 6.00 |
| • - 6.5 AA | **961.608** | 6.00 - 6.50 |
| • - 7 AA | **961.609** | 6.50 - 7.00 |
| • - 7.5 AA | **961.610** | 7.00 - 7.50 |
| • - 8 AA | **961.611** | 7.50 - 8.00 |
| • - 8.5 AA | **961.612** | 8.00 - 8.50 |
| • - 9 AA | **961.613** | 8.50 - 9.00 |
| • - 9.5 AA | **961.614** | 9.00 - 9.50 |
| • -10 AA | **961.615** | 9.50 - 10.00 |
| • -10.5 AA | **961.616** | 10.00 - 10.50 |
| • -11 AA | **961.617** | 10.50 - 11.00 |
| • -11.5 AA | **961.618** | 11.00 - 11.50 |
| • -12 AA | **961.619** | 11.50 - 12.00 |
| • -12.5 AA | **961.620** | 12.00 - 12.50 |
| • -13 AA | **961.621** | 12.50 - 13.00 |
| • -13.5 AA | **961.622** | 13.00 - 13.50 |
| • -14 AA | **961.623** | 13.50 - 14.00 |
| • -14.5 AA | **961.624** | 14.00 - 14.50 |
| • -15 AA | **961.625** | 14.50 - 15.00 |
| • -15.5 AA | **961.626** | 15.00 - 15.50 |
| • -16 AA | **961.627** | 15.50 - 16.00 |

Ø A=25.5 B=35

1. • Models are included in new baby collet set ▸256.

# New Baby Collets Standard




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

Clamping diameter: Ø 2.5 - Ø 20.0

| MEGA20N / NBS20 | | | |
|---|---|---|---|
| Model | | Order No. | Clamping Range Ød |
| • NBC20 | - 3 AA | 961.641 | 2.50 - 3.00 |
| | - 3.25 AA | 801.718 | 2.75 - 3.25 |
| • | - 3.5 AA | 961.642 | 3.00 - 3.50 |
| | - 3.75 AA | 801.719 | 3.25 - 3.75 |
| • | - 4 AA | 961.643 | 3.50 - 4.00 |
| | - 4.25 AA | 801.722 | 3.75 - 4.25 |
| • | - 4.5 AA | 961.644 | 4.00 - 4.50 |
| | - 4.75 AA | 801.723 | 4.25 - 4.75 |
| • | - 5 AA | 961.645 | 4.50 - 5.00 |
| | - 5.25 AA | 801.726 | 4.75 - 5.25 |
| • | - 5.5 AA | 961.646 | 5.00 - 5.50 |
| | - 5.75 AA | 801.727 | 5.25 - 5.75 |
| • | - 6 AA | 961.647 | 5.50 - 6.00 |
| • | - 6.5 AA | 961.648 | 6.00 - 6.50 |
| • | - 7 AA | 961.649 | 6.50 - 7.00 |
| • | - 7.5 AA | 961.650 | 7.00 - 7.50 |
| • | - 8 AA | 961.651 | 7.50 - 8.00 |
| • | - 8.5 AA | 961.652 | 8.00 - 8.50 |
| • | - 9 AA | 961.653 | 8.50 - 9.00 |
| • | - 9.5 AA | 961.654 | 9.00 - 9.50 |
| • | -10 AA | 961.655 | 9.50 - 10.00 |
| • | -10.5 AA | 961.656 | 10.00 - 10.50 |
| • | -11 AA | 961.657 | 10.50 - 11.00 |
| • | -11.5 AA | 961.658 | 11.00 - 11.50 |
| • | -12 AA | 961.659 | 11.50 - 12.00 |
| • | -12.5 AA | 961.660 | 12.00 - 12.50 |
| • | -13 AA | 961.661 | 12.50 - 13.00 |
| • | -13.5 AA | 961.662 | 13.00 - 13.50 |
| • | -14 AA | 961.663 | 13.50 - 14.00 |
| • | -14.5 AA | 961.664 | 14.00 - 14.50 |
| • | -15 AA | 961.665 | 14.50 - 15.00 |
| • | -15.5 AA | 961.666 | 15.00 - 15.50 |
| • | -16 AA | 961.667 | 15.50 - 16.00 |
| • | -16.5 AA | 961.668 | 16.00 - 16.50 |
| • | -17 AA | 961.669 | 16.50 - 17.00 |
| • | -17.5 AA | 961.670 | 17.00 - 17.50 |
| • | -18 AA | 961.671 | 17.50 - 18.00 |
| • | -18.5 AA | 961.672 | 18.00 - 18.50 |
| • | -19 AA | 961.673 | 18.50 - 19.00 |
| • | -19.5 AA | 961.674 | 19.00 - 19.50 |
| • | -20 AA | 961.675 | 19.50 - 20.00 |

Ø A=28.5 B=38

Clamping diameter: Ø 15.5 - Ø 25.4

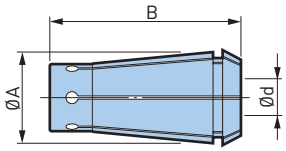
| MEGA25N | | | |
|---|---|---|---|
| Model | | Order No. | Clamping Range Ød |
| • NBC25 | -16 AA | 806.390 | 15.5 - 16.0 |
| • | -16.5 AA | 806.391 | 16.0 - 16.5 |
| • | -17 AA | 806.392 | 16.5 - 17.0 |
| • | -17.5 AA | 806.393 | 17.0 - 17.5 |
| • | -18 AA | 806.394 | 17.5 - 18.0 |
| • | -18.5 AA | 806.395 | 18.0 - 18.5 |
| • | -19 AA | 806.396 | 18.5 - 19.0 |
| • | -19.5 AA | 806.397 | 19.0 - 19.5 |
| • | -20 AA | 806.398 | 19.5 - 20.0 |
| • | -20.5 AA | 806.399 | 20.0 - 20.5 |
| • | -21 AA | 806.400 | 20.5 - 21.0 |
| • | -21.5 AA | 806.401 | 21.0 - 21.5 |
| • | -22 AA | 806.402 | 21.5 - 22.0 |
| • | -22.5 AA | 806.403 | 22.0 - 22.5 |
| • | -23 AA | 806.404 | 22.5 - 23.0 |
| • | -23.5 AA | 806.405 | 23.0 - 23.5 |
| • | -24 AA | 806.406 | 23.5 - 24.0 |
| • | -24.5 AA | 806.407 | 24.0 - 24.5 |
| • | -25 AA | 806.408 | 24.5 - 25.0 |
| | -25.4 AA | 806.409 | 24.9 - 25.4 |

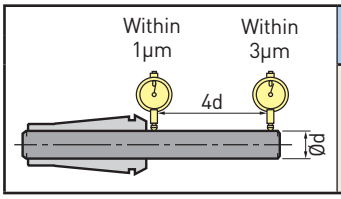
ØA=35.5 B=52

1. • Models are included in new baby collet set ▸256.

# New Baby Collets for Endmills

**For MEGA New Baby Chuck and New Baby Chuck**




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

| MEGA6N / NBS6 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC6 -3E AA | 961.148 | 3 |
| -4E AA | 961.149 | 4 |
| -5E AA | 961.150 | 5 |
| -6E AA | 961.151 | 6 |

Ø A=9.2 B=17

| MEGA8N / NBS8 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC8 -3E AA | 961.152 | 3 |
| -4E AA | 961.153 | 4 |
| -5E AA | 961.154 | 5 |
| -6E AA | 961.155 | 6 |
| -8E AA | 961.156 | 8 |

Ø A=12 B=20

| MEGA10N / NBS10 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC10 - 3E AA | 801.654 | 3 |
| - 4E AA | 801.658 | 4 |
| - 5E AA | 801.662 | 5 |
| - 6E AA | 961.160 | 6 |
| - 8E AA | 961.161 | 8 |
| -10E AA | 961.146 | 10 |

Ø A=16 B=32

| MEGA13N / NBS13 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC13 - 3E AA | 801.674 | 3 |
| - 4E AA | 801.678 | 4 |
| - 5E AA | 801.682 | 5 |
| - 6E AA | 961.165 | 6 |
| - 8E AA | 961.166 | 8 |
| -10E AA | 961.147 | 10 |
| -12E AA | 961.167 | 12 |

Ø A=20 B=38

| MEGA16N / NBS16 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC16 - 3E AA | 961.168 | 3 |
| - 4E AA | 961.169 | 4 |
| - 5E AA | 961.170 | 5 |
| - 6E AA | 961.171 | 6 |
| - 8E AA | 961.172 | 8 |
| -10E AA | 961.173 | 10 |
| -12E AA | 961.174 | 12 |
| -14E AA | 961.175 | 14 |
| -16E AA | 961.176 | 16 |

Ø A=25 B=42

| MEGA20N / NBS20 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| NBC20 - 3E AA | 801.721 | 3 |
| - 4E AA | 801.725 | 4 |
| - 5E AA | 801.729 | 5 |
| - 6E AA | 961.180 | 6 |
| - 8E AA | 801.733 | 8 |
| -10E AA | 961.182 | 10 |
| -12E AA | 961.183 | 12 |
| -14E AA | 961.184 | 14 |
| -16E AA | 961.185 | 16 |
| -20E AA | 961.186 | 20 |

Ø A=28 B=45

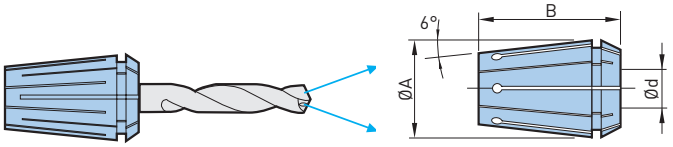
- Use only a cutting tool shank with exactly the same diameter as the collet bore diameter.
- The tolerance of the cutting tool shank must be within h7.

# FONBC Coolant Collets

**For MEGA New Baby Chuck and New Baby Chuck**

Optimum collet for center-through coolant applications with coolant-through cutting tools.

- Max. Coolant pressure 7 MPa




Clamping diameter: Ø 3.0 - Ø 6.0

| MEGA6N / NBS6 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| FONBC6 -3 AA | **969.601** | 3.00 * |
| -3.25 AA | **969.602** | 3.15 - 3.25 |
| -3.5 AA | **969.603** | 3.40 - 3.50 |
| -3.75 AA | **969.604** | 3.65 - 3.75 |
| -4 AA | **969.605** | 3.90 - 4.00 |
| -4.25 AA | **969.606** | 4.15 - 4.25 |
| -4.5 AA | **969.607** | 4.40 - 4.50 |
| -4.75 AA | **969.608** | 4.65 - 4.75 |
| -5 AA | **969.609** | 4.90 - 5.00 |
| -5.25 AA | **969.610** | 5.15 - 5.25 |
| -5.5 AA | **969.611** | 5.40 - 5.50 |
| -5.75 AA | **969.612** | 5.65 - 5.75 |
| -6 AA | **969.613** | 5.90 - 6.00 |

Ø A=9.5 B=14 * No collapsibility

Clamping diameter: Ø 2.9 - Ø 8.0

| MEGA8N / NBS8 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| FONBC8 -3 AA | **969.615** | 2.90 - 3.00 |
| -3.5 AA | **969.616** | 3.40 - 3.50 |
| -4 AA | **969.617** | 3.90 - 4.00 |
| -4.5 AA | **969.618** | 4.40 - 4.50 |
| -5 AA | **969.619** | 4.90 - 5.00 |
| -5.5 AA | **969.620** | 5.40 - 5.50 |
| -6 AA | **969.621** | 5.90 - 6.00 |
| -6.5 AA | **969.622** | 6.40 - 6.50 |
| -7 AA | **969.623** | 6.90 - 7.00 |
| -7.5 AA | **969.624** | 7.40 - 7.50 |
| -8 AA | **969.625** | 7.90 - 8.00 |

Ø A=12.5 B=18

Clamping diameter: Ø 2.9 - Ø 10.0

| MEGA10N / NBS10 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| FONBC10 - 3 AA | **969.627** | 2.90 - 3.00 |
| - 3.5 AA | **969.628** | 3.40 - 3.50 |
| - 4 AA | **969.629** | 3.90 - 4.00 |
| - 4.5 AA | **969.630** | 4.40 - 4.50 |
| - 5 AA | **969.631** | 4.90 - 5.00 |
| - 5.5 AA | **969.632** | 5.40 - 5.50 |
| - 6 AA | **969.633** | 5.90 - 6.00 |
| - 6.5 AA | **969.634** | 6.40 - 6.50 |
| - 7 AA | **969.635** | 6.90 - 7.00 |
| - 7.5 AA | **969.636** | 7.40 - 7.50 |
| - 8 AA | **969.637** | 7.90 - 8.00 |
| - 8.5 AA | **969.638** | 8.40 - 8.50 |
| - 9 AA | **969.639** | 8.90 - 9.00 |
| - 9.5 AA | **969.640** | 9.40 - 9.50 |
| -10 AA | **969.641** | 9.90 - 10.00 |

Ø A=16.5 B=27

Clamping diameter: Ø 3.0 - Ø 13.0

| MEGA13N / NBS13 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| FONBC13 - 3 AA | **969.643** | 3.00 * |
| - 3.5 AA | **969.644** | 3.40 - 3.50 |
| - 4 AA | **969.645** | 3.90 - 4.00 |
| - 4.5 AA | **969.646** | 4.40 - 4.50 |
| - 5 AA | **969.647** | 4.90 - 5.00 |
| - 5.5 AA | **969.648** | 5.40 - 5.50 |
| - 6 AA | **969.649** | 5.90 - 6.00 |
| - 6.5 AA | **969.650** | 6.40 - 6.50 |
| - 7 AA | **969.651** | 6.90 - 7.00 |
| - 7.5 AA | **969.652** | 7.40 - 7.50 |
| - 8 AA | **969.653** | 7.90 - 8.00 |
| - 8.5 AA | **969.654** | 8.40 - 8.50 |
| - 9 AA | **969.655** | 8.90 - 9.00 |
| - 9.5 AA | **969.656** | 9.40 - 9.50 |
| -10 AA | **969.657** | 9.90 - 10.00 |
| -10.5 AA | **969.658** | 10.40 - 10.50 |
| -11 AA | **969.659** | 10.90 - 11.00 |
| -11.5 AA | **969.660** | 11.40 - 11.50 |
| -12 AA | **969.661** | 11.90 - 12.00 |
| -12.5 AA | **969.662** | 12.40 - 12.50 |
| -13.0 AA | **969.663** | 12.90 - 13.00 |

Ø A=20.5 B=31 * No collapsibility





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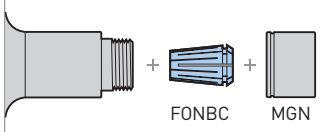
Clamping diameter: Ø 4.9 - Ø 16.0

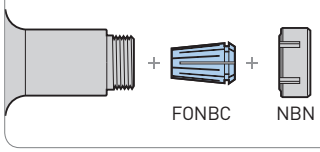
| MEGA16N / NBS16 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| FONBC16 - 5 AA | **969.669** | 4.90 - 5.00 |
| - 5.5 AA | **969.670** | 5.40 - 5.50 |
| - 6 AA | **969.671** | 5.90 - 6.00 |
| - 6.5 AA | **969.672** | 6.40 - 6.50 |
| - 7 AA | **969.673** | 6.90 - 7.00 |
| - 7.5 AA | **969.674** | 7.40 - 7.50 |
| - 8 AA | **969.675** | 7.90 - 8.00 |
| - 8.5 AA | **969.676** | 8.40 - 8.50 |
| - 9 AA | **969.677** | 8.90 - 9.00 |
| - 9.5 AA | **969.678** | 9.40 - 9.50 |
| -10 AA | **969.679** | 9.90 - 10.00 |
| -10.5 AA | **969.680** | 10.40 - 10.50 |
| -11 AA | **969.681** | 10.90 - 11.00 |
| -11.5 AA | **969.682** | 11.40 - 11.50 |
| -12 AA | **969.683** | 11.90 - 12.00 |
| -12.5 AA | **969.684** | 12.40 - 12.50 |
| -13 AA | **969.685** | 12.90 - 13.00 |
| -13.5 AA | **969.686** | 13.40 - 13.50 |
| -14 AA | **969.687** | 13.90 - 14.00 |
| -14.5 AA | **969.688** | 14.40 - 14.50 |
| -15 AA | **969.689** | 14.90 - 15.00 |
| -15.5 AA | **969.690** | 15.40 - 15.50 |
| -16 AA | **969.691** | 15.90 - 16.00 |

Ø A=25.5 B=35

**For MEGA New Baby Chuck use the standard MGN nut.**




**For New Baby Chuck use the standard NBN nut.**




**Note**

Collapsibility is different from standard NBC collet.

Clamping diameter: Ø 4.9 - Ø 20.0

| MEGA20N / NBS20 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| FONBC20 - 5 AA | **969.697** | 4.90 - 5.00 |
| - 5.5 AA | **969.698** | 5.40 - 5.50 |
| - 6 AA | **969.699** | 5.90 - 6.00 |
| - 6.5 AA | **969.700** | 6.40 - 6.50 |
| - 7 AA | **969.701** | 6.90 - 7.00 |
| - 7.5 AA | **969.702** | 7.40 - 7.50 |
| - 8 AA | **969.703** | 7.90 - 8.00 |
| - 8.5 AA | **969.704** | 8.40 - 8.50 |
| - 9 AA | **969.705** | 8.90 - 9.00 |
| - 9.5 AA | **969.706** | 9.40 - 9.50 |
| -10 AA | **969.707** | 9.90 - 10.00 |
| -10.5 AA | **969.708** | 10.40 - 10.50 |
| -11 AA | **969.709** | 10.90 - 11.00 |
| -11.5 AA | **969.710** | 11.40 - 11.50 |
| -12 AA | **969.711** | 11.90 - 12.00 |
| -12.5 AA | **969.712** | 12.40 - 12.50 |
| -13 AA | **969.713** | 12.90 - 13.00 |
| -13.5 AA | **969.714** | 13.40 - 13.50 |
| -14 AA | **969.715** | 13.90 - 14.00 |
| -14.5 AA | **969.716** | 14.40 - 14.50 |
| -15 AA | **969.717** | 14.90 - 15.00 |
| -15.5 AA | **969.718** | 15.40 - 15.50 |
| -16 AA | **969.719** | 15.90 - 16.00 |
| -16.5 AA | **969.720** | 16.40 - 16.50 |
| -17 AA | **969.721** | 16.90 - 17.00 |
| -17.5 AA | **969.722** | 17.40 - 17.50 |
| -18 AA | **969.723** | 17.90 - 18.00 |
| -18.5 AA | **969.724** | 18.40 - 18.50 |
| -19 AA | **969.725** | 18.90 - 19.00 |
| -19.5 AA | **969.726** | 19.40 - 19.50 |
| -20 AA | **969.727** | 19.90 - 20.00 |

Ø A=28.5 B=38

Clamping diameter: Ø 15.9 - Ø 25.4

| MEGA25N | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| FONBC25 -16 AA | **806.412** | 15.9 - 16.0 |
| -17 AA | **806.413** | 16.9 - 17.0 |
| -18 AA | **806.414** | 17.9 - 18.0 |
| -19 AA | **806.415** | 18.9 - 19.0 |
| -20 AA | **806.416** | 19.9 - 20.0 |
| -21 AA | **806.417** | 20.9 - 21.0 |
| -22 AA | **806.418** | 21.9 - 22.0 |
| -23 AA | **806.419** | 22.9 - 23.0 |
| -24 AA | **806.420** | 23.9 - 24.0 |
| -25 AA | **806.421** | 24.9 - 25.0 |
| -25.4 AA | **806.739** | 25.3 - 25.4 |

Ø A=35.5 B=52

## New Baby Collet Sets

**For MEGA New Baby Chuck and New Baby Chuck**

Contains all the major collet models to cover entire clamping range.

| Model | Order No. | Capacity | Number of Collet | Case Size (Width x Length) | Corresponding Chuck Model |
|---|---|---|---|---|---|
| SNBC6AA -22 | **802.187** | 0.5 - 6 | 22 | 200 x 170 x 50 | MEGA 6N / NBS 6 |
| SNBC8AA -20 | **802.188** | 0.5 - 8 | 20 | 200 x 170 x 50 | MEGA 8N / NBS 8 |
| SNBC10AA -20 | **802.183** | 1.5 - 10 | 20 | 200 x 170 x 50 | MEGA10N / NBS10 |
| SNBC13AA -21 | **802.184** | 2.5 - 13 | 21 | 245 x 210 x 60 | MEGA13N / NBS13 |
| SNBC16AA -27 | **802.185** | 2.5 - 16 | 27 | 275 x 230 x 65 | MEGA16N / NBS16 |
| SNBC20AA -35 | **961.676** | 2.5 - 20 | 35 | 310 x 260 x 75 | MEGA20N / NBS20 |
| SNBC25AA -19 | **806.656** | 15.5 - 25 | 19 | 310 x 260 x 75 | MEGA25N |

1. Collets included in a set are shown in ▸ 250 - 252.

## Cases for New Baby Collets



Exclusive case to protect and maintain the high precision collets.

| Model | Order No. | Number of Holes | Case Size (Width x Length) | Corresponding Collet Model |
|---|---|---|---|---|
| NBB6 | **961.524** | 60 | 200 x 170 x 50 | NBC 6 / FONBC 6 |
| NBB8 | **961.547** | 50 | 200 x 170 x 50 | NBC 8 / FONBC 8 |
| NBB10 | **961.569** | 40 | 200 x 170 x 50 | NBC10 / FONBC10 |
| NBB13 | **961.595** | 35 | 245 x 210 x 60 | NBC13 / FONBC13 |
| NBB16 | **961.629** | 35 | 275 x 230 x 65 | NBC16 / FONBC16 |
| NBB20 | **961.677** | 45 | 310 x 260 x 75 | NBC20 / FONBC20 |
| NBB25 | **806.657** | 28 | 310 x 260 x 75 | NBC25 / FONBC25 |

1. All cases can not be used with new baby collet for endmill (NBC-E).



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## Collet Ejectors

Easily and quickly remove New Baby Collet from MEGA nuts and New Baby Nut.

**For New Baby Collet**

| Model | Order No. | Nut Model | Collet Model |
|---|---|---|---|
| NBC6 -CE | **969.492** | MGN6 / NBN6 | NBC6 / FONBC6 |
| NBC8 -CE | **969.493** | MGN8 / NBN8 | NBC8 / FONBC8 |
| NBC10 -CE | **969.494** | MGN10 / NBN10 | NBC10 / FONBC10 |
| NBC13 -CE | **969.495** | MGN13 / NBN13 | NBC13 / FONBC13 |

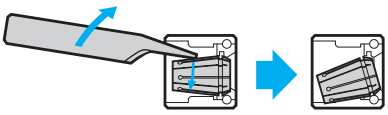
**For New Baby Endmill Collet**

| Model | Order No. | Nut Model | Collet Model |
|---|---|---|---|
| NBC6E -CE | **969.496** | MGN6 / NBN6 | NBC6E |
| NBC8E -CE | **969.497** | MGN8 / NBN8 | NBC8E |
| NBC10E -CE | **969.498** | MGN10 / NBN10 | NBC10E |
| NBC13E -CE | **969.499** | MGN13 / NBN13 | NBC13E |

## Collet Removers

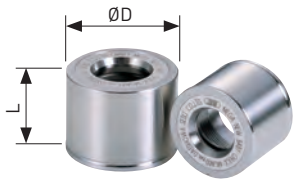
For MEGA New Baby Chuck and New Baby Chuck

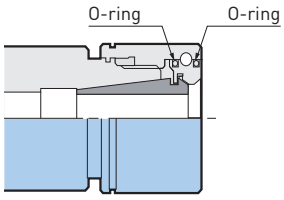
| Model | Order No. |
|---|---|
| NBJ | **969.491** |

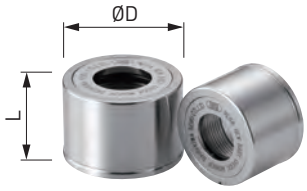


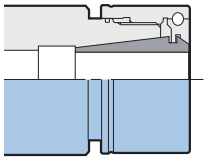
# MEGA Nut

**For MEGA New Baby Chuck**



**Standard Type**

| Model | Order No. | ØD | L | Chuck Body |
|---|---|---|---|---|
| MGN6 | **969.483** | 20 | 20.5 | MEGA6N |
| MGN8 | **969.484** | 25 | 23 | MEGA8N |
| MGN10 | **969.485** | 30 | 24 | MEGA10N |
| MGN13 | **969.486** | 35 | 27 | MEGA13N |
| MGN16 | **969.487** | 42 | 27 | MEGA16N |
| MGN20 | **969.488** | 46 | 27 | MEGA20N |
| MGN25 | **806.388** | 60 | 31 | MEGA25N |

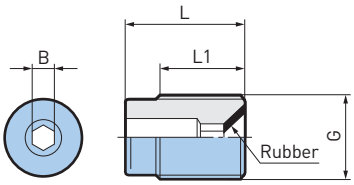
**Short Type**

| Model | Order No. | ØD | L | Chuck Body |
|---|---|---|---|---|
| MGN6F | **805.668** | 20 | 18 | MEGA6N |
| MGN8F | **805.669** | 25 | 20 | MEGA8N |
| MGN10F | **805.670** | 30 | 21 | MEGA10N |
| MGN13F | **805.671** | 35 | 24 | MEGA13N |
| MGN16F | **805.672** | 42 | 24.5 | MEGA16N |
| MGN20F | **805.673** | 46 | 24.5 | MEGA20N |

A.8

# Adjusting Screws

**For MEGA New Baby Chuck, MEGA E Chuck, New Baby Chuck and MEGA ER Grip**




| Model | Order No. | G | L | L1 | B | Chuck Body |
|---|---|---|---|---|---|---|
| NBA6B | **961.527** | M7 | 12 | 10 | 2 | MEGA6N / MEGA6E / NBS6 |
| NBA8B | **961.550** | M9 | 13 | 10 | 2.5 | MEGA8N / MEGA8E / NBS8 |
| NBA10B | **961.572** | M11 | 16 | 12 | 3 | MEGA10N / MEGA10E / NBS10 / MEGA ER16 |
| NBA13B | **961.598** | M14 | 20 | 15 | 4 | MEGA13N / MEGA13E / NBS13 / MEGA ER20 |
| NBA16B | **961.632** | M18 | 20 | 15 | 4 | MEGA16N / NBS16 / MEGA ER25 |
| NBA20B | **961.680** | M21 | 20 | 15 | 4 | MEGA20N / NBS20 / MEGA ER32 |
| NBA25B | **806.389** | M27 | 20 | 15 | 4 | MEGA25N |



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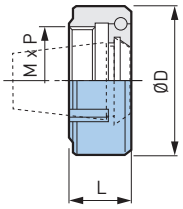
# New Baby Nut

**For New Baby Chuck**



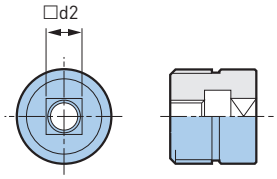

| Model | Order No. | ØD | L | M x P | Chuck Body |
|---|---|---|---|---|---|
| NBN6 | **961.526** | 20 | 9.5 | 12 x 1 | NBS6 |
| NBN8 | **961.549** | 25 | 11 | 16 x 1 | NBS8 |
| NBN10 | **961.571** | 30 | 12.5 | 21 x 1 | NBS10 |
| NBN13 | **961.597** | 35 | 16 | 26 x 1 | NBS13 |
| NBN16 | **961.631** | 42 | 16 | 32 x 1 | NBS16 |
| NBN20 | **961.679** | 46 | 16 | 36 x 1 | NBS20 |

# Tap Driving Back Stops

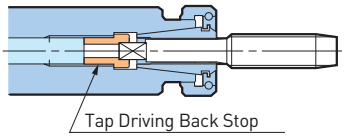


**For New Baby Chuck**

To suit synchronized tapping.




The square of the tap is positively located by fitting the tap driving back stop.




| Tapping Tool | | | NBS10 | | NBS13 | | NBS16 | | NBS20 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Tap Size | Standard | □ d2 | Model | Order No. | Model | Order No. | Model | Order No. | Model | Order No. |
| M8 | DIN 371 | 6.2 | - | | NBA13 -M8DD | **804.847** | - | | - | |
| | JIS | 5.0 | NBA10 -M8 | **961.681** | NBA13 -M8 | **961.683** | - | | - | |
| M10 | DIN 371 | 8.0 | - | | NBA13 -M14M10DD | **804.846** | NBA16 -M14M10DD | **804.852** | - | |
| | JIS | 5.5 | NBA10 -M10 | **804.844** | NBA13 -M10 | **961.684** | NBA16 -M10 | **804.848** | - | |
| M12 | DIN 376 | 7.0 | - | | NBA13 -M12D | **961.685** | NBA16 -M12D | **804.850** | NBA20 -M12D | **804.855** |
| | JIS | 6.5 | - | | NBA13 -M12 | **804.845** | NBA16 -M12 | **804.849** | NBA20 -M12 | **804.854** |
| M14 | DIN 376 | 9.0 | - | | - | | NBA16 -M14DM16D | **804.851** | NBA20 -M14DM16D | **804.857** |
| | JIS | 8.0 | - | | NBA13 -M14M10DD | **804.846** | NBA16 -M14M10DD | **804.852** | NBA20 -M14 | **804.856** |
| M16 | DIN 376 | 9.0 | - | | - | | NBA16 -M14DM16D | **804.851** | NBA20 -M14DM16D | **804.857** |
| | JIS | 10.0 | - | | - | | NBA16 -M16 | **804.853** | NBA20 -M16 | **804.858** |
| M20 | DIN 376 | 12.0 | - | | - | | - | | NBA20 -M20M20D | **804.860** |
| | JIS | 12.0 | - | | - | | - | | | |

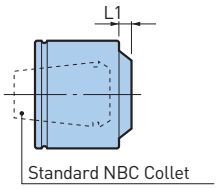
1. Rigid tapping function is required on the machine tool.

# MEGA Perfect Seal

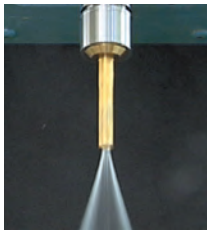
**For MEGA New Baby Chuck**

Unique design increases sealing performance with higher coolant pressure to create a „perfect seal".
Remove the PS Ring, to supply coolant to the cutting tool periphery.

- Max. Coolant pressure 7 MPa

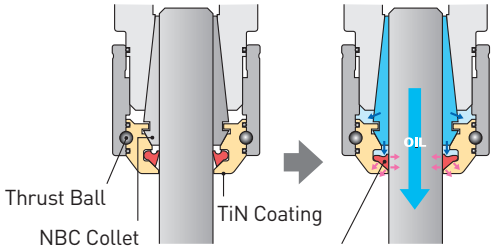



**2way coolant**



Through tools with PS ring

Jet through without PS ring




A.8

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| MPS6 -03035 | **961.401** | 3 - 3.5 | 2.3 | NBC6 -3 - 3.75 |
| -0304 | **969.861** | 3 - 4 | | -3 - 4.25 |
| -04045 | **961.402** | 4 - 4.5 | | -4 - 4.75 |
| -0405 | **969.862** | 4 - 5 | | -4 - 5.25 |
| -05055 | **961.403** | 5 - 5.5 | | -5 - 5.75 |
| -0506 | **969.863** | 5 - 6 | | -5 - 6 |
| MPS8 -03035 | **961.404** | 3 - 3.5 | 3.9 | NBC8 -3 - 4 |
| -0304 | **969.864** | 3 - 4 | | -3 - 4.5 |
| -04045 | **961.405** | 4 - 4.5 | | -4 - 5 |
| -0405 | **969.865** | 4 - 5 | | -4 - 5.5 |
| -05055 | **961.406** | 5 - 5.5 | | -5 - 6 |
| -0506 | **969.866** | 5 - 6 | | -5 - 6.5 |
| -06065 | **961.407** | 6 - 6.5 | 3.4 | -6 - 7 |
| -0607 | **969.867** | 6 - 7 | | -6 - 7.5 |
| -07075 | **961.408** | 7 - 7.5 | | -7 - 8 |
| -0708 | **969.868** | 7 - 8 | | -7 - 8 |
| MPS10 -03035 | **801.524** | 3 - 3.5 | 3.9 | NBC10 -3 - 4 |
| -0304 | **969.869** | 3 - 4 | | -3 - 4.5 |
| -04045 | **801.525** | 4 - 4.5 | | -4 - 5 |
| -0405 | **969.870** | 4 - 5 | | -4 - 5.5 |
| -05055 | **801.526** | 5 - 5.5 | | -5 - 6 |
| -0506 | **969.871** | 5 - 6 | | -5 - 6.5 |
| -06065 | **979.986** | 6 - 6.5 | 4.3 | -6 - 7 |
| -0607 | **969.872** | 6 - 7 | | -6 - 7.5 |
| -07075 | **801.527** | 7 - 7.5 | | -7 - 8 |
| -0708 | **969.873** | 7 - 8 | | -7 - 8.5 |
| -08085 | **979.987** | 8 - 8.5 | 3.5 | -8 - 9 |
| -0809 | **969.874** | 8 - 9 | | -8 - 9.5 |
| -09095 | **801.528** | 9 - 9.5 | | -9 -10 |
| -0910 | **969.875** | 9 - 10 | | -9 -10 |

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| MPS13 -03035 | **801.529** | 3 - 3.5 | 4.3 | NBC13 - 3 - 4 |
| -0304 | **969.876** | 3 - 4 | | - 3 - 4.5 |
| -04045 | **801.530** | 4 - 4.5 | | - 4 - 5 |
| -0405 | **969.877** | 4 - 5 | | - 4 - 5.5 |
| -05055 | **801.531** | 5 - 5.5 | | - 5 - 6 |
| -0506 | **969.878** | 5 - 6 | | - 5 - 6.5 |
| -06065 | **961.417** | 6 - 6.5 | 4.6 | - 6 - 7 |
| -0607 | **969.879** | 6 - 7 | | - 6 - 7.5 |
| -07075 | **801.532** | 7 - 7.5 | | - 7 - 8 |
| -0708 | **969.880** | 7 - 8 | | - 7 - 8.5 |
| -08085 | **961.418** | 8 - 8.5 | 4.9 | - 8 - 9 |
| -0809 | **969.881** | 8 - 9 | | - 8 - 9.5 |
| -09095 | **801.533** | 9 - 9.5 | | - 9 -10 |
| -0910 | **969.882** | 9 - 10 | | - 9 -10.5 |
| -10105 | **978.518** | 10 - 10.5 | 4.2 | -10 -11 |
| -1011 | **969.883** | 10 - 11 | | -10 -11.5 |
| -11115 | **801.534** | 11 - 11.5 | | -11 -12 |
| -1112 | **969.884** | 11 - 12 | | -11 -12.5 |
| -12125 | **961.420** | 12 - 12.5 | | -12 -13 |
| -1213 | **969.885** | 12 - 13 | | -12 -13 |

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.



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| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| MPS16 -03035 | **801.535** | 3 - 3.5 | 4.0 | NBC16 - 3 - 4 |
| -0304 | **969.886** | 3 - 4 | | - 3 - 4.5 |
| -04045 | **801.536** | 4 - 4.5 | | - 4 - 5 |
| -0405 | **969.887** | 4 - 5 | | - 4 - 5.5 |
| -05055 | **801.537** | 5 - 5.5 | | - 5 - 6 |
| -0506 | **969.888** | 5 - 6 | | - 5 - 6.5 |
| -06065 | **801.538** | 6 - 6.5 | 4.3 | - 6 - 7 |
| -0607 | **969.889** | 6 - 7 | | - 6 - 7.5 |
| -07075 | **801.539** | 7 - 7.5 | | - 7 - 8 |
| -0708 | **969.890** | 7 - 8 | | - 7 - 8.5 |
| -08085 | **801.540** | 8 - 8.5 | 4.6 | - 8 - 9 |
| -0809 | **969.891** | 8 - 9 | | - 8 - 9.5 |
| -09095 | **801.541** | 9 - 9.5 | | - 9 - 10 |
| -0910 | **969.892** | 9 - 10 | | - 9 - 10.5 |
| -10105 | **801.542** | 10 - 10.5 | 5.1 | -10 - 11 |
| -1011 | **969.893** | 10 - 11 | | -10 - 11.5 |
| -11115 | **801.543** | 11 - 11.5 | | -11 - 12 |
| -1112 | **969.894** | 11 - 12 | | -11 - 12.5 |
| -12125 | **801.544** | 12 - 12.5 | 4.1 | -12 - 13 |
| -1213 | **969.895** | 12 - 13 | | -12 - 13.5 |
| -1314 | **969.896** | 13 - 14 | | -13 - 14.5 |
| -1415 | **969.897** | 14 - 15 | | -14 - 15.5 |
| -1516 | **969.898** | 15 - 16 | | -15 - 16 |

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| MPS20 -03035 | **978.504** | 3 - 3.5 | 4.0 | NBC20 - 3 - 4 |
| -0304 | **969.899** | 3 - 4 | | - 3 - 4.5 |
| -04045 | **801.545** | 4 - 4.5 | | - 4 - 5 |
| -0405 | **969.900** | 4 - 5 | | - 4 - 5.5 |
| -05055 | **801.546** | 5 - 5.5 | | - 5 - 6 |
| -0506 | **969.901** | 5 - 6 | | - 5 - 6.5 |
| -06065 | **801.547** | 6 - 6.5 | 4.3 | - 6 - 7 |
| -0607 | **969.902** | 6 - 7 | | - 6 - 7.5 |
| -07075 | **801.548** | 7 - 7.5 | | - 7 - 8 |
| -0708 | **969.903** | 7 - 8 | | - 7 - 8.5 |
| -08085 | **801.549** | 8 - 8.5 | 4.6 | - 8 - 9 |
| -0809 | **969.904** | 8 - 9 | | - 8 - 9.5 |
| -09095 | **801.550** | 9 - 9.5 | | - 9 - 10 |
| -0910 | **969.905** | 9 - 10 | | - 9 - 10.5 |
| -10105 | **801.551** | 10 - 10.5 | 5.1 | -10 - 11 |
| -1011 | **969.906** | 10 - 11 | | -10 - 11.5 |
| -11115 | **801.552** | 11 - 11.5 | | -11 - 12 |
| -1112 | **969.907** | 11 - 12 | | -11 - 12.5 |
| -12125 | **978.512** | 12 - 12.5 | | -12 - 13 |
| -1213 | **969.908** | 12 - 13 | | -12 - 13.5 |
| -1314 | **969.909** | 13 - 14 | 5.2 | -13 - 14.5 |
| -1415 | **969.910** | 14 - 15 | | -14 - 15.5 |
| -1516 | **969.911** | 15 - 16 | | -15 - 16.5 |
| -1617 | **969.912** | 16 - 17 | 4.6 | -16 - 17.5 |
| -1718 | **969.913** | 17 - 18 | | -17 - 18.5 |
| -1819 | **969.914** | 18 - 19 | | -18 - 19.5 |
| -1920 | **969.915** | 19 - 20 | | -19 - 20 |

## PS Rings

Replaceable seal is installed in the MEGA perfect seal. Replacement seal is recommended when coolant leaks due to damage of the PS Ring.

| Model | Order No. | Corresponding MPS Model |
|---|---|---|
| PS -0304 | **969.981** | MPS ☐ -03035, 0304 |
| -0405 | **969.982** | -04045, 0405 |
| -0506 | **969.983** | -05055, 0506 |
| -0607 | **969.984** | -06065, 0607 |
| -0708 | **969.985** | -07075, 0708 |
| -0809 | **969.986** | -08085, 0809 |
| -0910 | **969.987** | -09095, 0910 |
| -1011 | **969.988** | -10105, 1011 |
| -1112 | **969.989** | -11115, 1112 |
| -1213 | **969.990** | -12125, 1213 |

1. 1 package contains 5 pcs. (1 size).

| Model | Order No. | Corresponding MPS Model |
|---|---|---|
| PS -1314 | **969.991** | MPS ☐ -1314 |
| -1415 | **969.992** | -1415 |
| -1516 | **969.993** | -1516 |
| -1617 | **969.994** | -1617 |
| -1718 | **969.995** | -1718 |
| -1819 | **969.996** | -1819 |
| -1920 | **969.997** | -1920 |

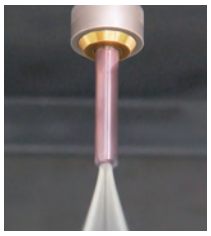
# Baby Perfect Seal

**For New Baby Chuck**

Unique design increases sealing performance with higher coolant pressure to create a "perfect seal".
Remove the PS Ring, to supply coolant to the cutting tool periphery.

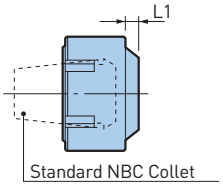
- Max. Coolant pressure 7 MPa

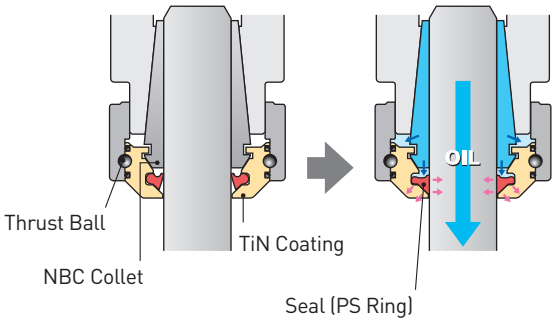
**2way coolant**



Through tools with PS ring

Jet through without PS ring




A.8

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| BPS6 -03035 | **961.409** | 3 - 3.5 | 2.3 | NBC6 -3 - 3.75 |
| -0304 | **969.921** | 3 - 4 | | -3 - 4.25 |
| -04045 | **961.410** | 4 - 4.5 | | -4 - 4.75 |
| -0405 | **969.922** | 4 - 5 | | -4 - 5.25 |
| -05055 | **961.411** | 5 - 5.5 | | -5 - 5.75 |
| -0506 | **969.923** | 5 - 6 | | -5 - 6 |
| BPS8 -03035 | **961.412** | 3 - 3.5 | 3.9 | NBC8 -3 - 4 |
| -0304 | **969.924** | 3 - 4 | | -3 - 4.5 |
| -04045 | **961.413** | 4 - 4.5 | | -4 - 5 |
| -0405 | **969.925** | 4 - 5 | | -4 - 5.5 |
| -05055 | **961.414** | 5 - 5.5 | | -5 - 6 |
| -0506 | **969.926** | 5 - 6 | | -5 - 6.5 |
| -06065 | **961.415** | 6 - 6.5 | 3.4 | -6 - 7 |
| -0607 | **969.927** | 6 - 7 | | -6 - 7.5 |
| -07075 | **961.416** | 7 - 7.5 | | -7 - 8 |
| -0708 | **969.928** | 7 - 8 | | -7 - 8 |
| BPS10 -03035 | **800.403** | 3 - 3.5 | 3.9 | NBC10 -3 - 4 |
| -0304 | **969.929** | 3 - 4 | | -3 - 4.5 |
| -04045 | **800.404** | 4 - 4.5 | | -4 - 5 |
| -0405 | **969.930** | 4 - 5 | | -4 - 5.5 |
| -05055 | **800.405** | 5 - 5.5 | | -5 - 6 |
| -0506 | **969.931** | 5 - 6 | | -5 - 6.5 |
| -06065 | **800.406** | 6 - 6.5 | 4.3 | -6 - 7 |
| -0607 | **969.932** | 6 - 7 | | -6 - 7.5 |
| -07075 | **800.407** | 7 - 7.5 | | -7 - 8 |
| -0708 | **969.933** | 7 - 8 | | -7 - 8.5 |
| -08085 | **800.408** | 8 - 8.5 | 3.5 | -8 - 9 |
| -0809 | **969.934** | 8 - 9 | | -8 - 9.5 |
| -09095 | **800.409** | 9 - 9.5 | | -9 -10 |
| -0910 | **969.935** | 9 - 10 | | -9 -10 |

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| BPS13 -03035 | **800.410** | 3 - 3.5 | 4.3 | NBC13 - 3 - 4 |
| -0304 | **969.936** | 3 - 4 | | - 3 - 4.5 |
| -04045 | **800.411** | 4 - 4.5 | | - 4 - 5 |
| -0405 | **969.937** | 4 - 5 | | - 4 - 5.5 |
| -05055 | **800.412** | 5 - 5.5 | | - 5 - 6 |
| -0506 | **969.938** | 5 - 6 | | - 5 - 6.5 |
| -06065 | **800.413** | 6 - 6.5 | 4.6 | - 6 - 7 |
| -0607 | **969.939** | 6 - 7 | | - 6 - 7.5 |
| -07075 | **800.414** | 7 - 7.5 | | - 7 - 8 |
| -0708 | **969.940** | 7 - 8 | | - 7 - 8.5 |
| -08085 | **800.415** | 8 - 8.5 | 4.9 | - 8 - 9 |
| -0809 | **969.941** | 8 - 9 | | - 8 - 9.5 |
| -09095 | **800.416** | 9 - 9.5 | | - 9 - 10 |
| -0910 | **969.942** | 9 - 10 | | - 9 - 10.5 |
| -10105 | **800.417** | 10 - 10.5 | 4.2 | -10 - 11 |
| -1011 | **969.943** | 10 - 11 | | -10 - 11.5 |
| -11115 | **800.418** | 11 - 11.5 | | -11 - 12 |
| -1112 | **969.944** | 11 - 12 | | -11 - 12.5 |
| -12125 | **800.419** | 12 - 12.5 | | -12 - 13 |
| -1213 | **969.945** | 12 - 13 | | -12 - 13 |

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.



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| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| BPS16 -03035 | **800.420** | 3 - 3.5 | 4.0 | NBC16 - 3 - 4 |
| -0304 | **969.946** | 3 - 4 | | - 3 - 4.5 |
| -04045 | **800.421** | 4 - 4.5 | | - 4 - 5 |
| -0405 | **969.947** | 4 - 5 | | - 4 - 5.5 |
| -05055 | **800.422** | 5 - 5.5 | | - 5 - 6 |
| -0506 | **969.948** | 5 - 6 | | - 5 - 6.5 |
| -06065 | **800.423** | 6 - 6.5 | 4.3 | - 6 - 7 |
| -0607 | **969.949** | 6 - 7 | | - 6 - 7.5 |
| -07075 | **800.424** | 7 - 7.5 | | - 7 - 8 |
| -0708 | **969.950** | 7 - 8 | | - 7 - 8.5 |
| -08085 | **800.425** | 8 - 8.5 | 4.6 | - 8 - 9 |
| -0809 | **969.951** | 8 - 9 | | - 8 - 9.5 |
| -09095 | **800.426** | 9 - 9.5 | | - 9 - 10 |
| -0910 | **969.952** | 9 - 10 | | - 9 - 10.5 |
| -10105 | **800.427** | 10 - 10.5 | 5.1 | -10 - 11 |
| -1011 | **969.953** | 10 - 11 | | -10 - 11.5 |
| -11115 | **800.428** | 11 - 11.5 | | -11 - 12 |
| -1112 | **969.954** | 11 - 12 | | -11 - 12.5 |
| -12125 | **800.429** | 12 - 12.5 | 4.1 | -12 - 13 |
| -1213 | **969.955** | 12 - 13 | | -12 - 13.5 |
| -1314 | **969.956** | 13 - 14 | | -13 - 14.5 |
| -1415 | **969.957** | 14 - 15 | | -14 - 15.5 |
| -1516 | **969.958** | 15 - 16 | | -15 - 16 |

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| BPS20 -03035 | **800.430** | 3 - 3.5 | 4.0 | NBC20 - 3 - 4 |
| -0304 | **969.959** | 3 - 4 | | - 3 - 4.5 |
| -04045 | **800.431** | 4 - 4.5 | | - 4 - 5 |
| -0405 | **969.960** | 4 - 5 | | - 4 - 5.5 |
| -05055 | **800.432** | 5 - 5.5 | | - 5 - 6 |
| -0506 | **969.961** | 5 - 6 | | - 5 - 6.5 |
| -06065 | **800.433** | 6 - 6.5 | 4.3 | - 6 - 7 |
| -0607 | **969.962** | 6 - 7 | | - 6 - 7.5 |
| -07075 | **800.434** | 7 - 7.5 | | - 7 - 8 |
| -0708 | **969.963** | 7 - 8 | | - 7 - 8.5 |
| -08085 | **800.435** | 8 - 8.5 | 4.6 | - 8 - 9 |
| -0809 | **969.964** | 8 - 9 | | - 8 - 9.5 |
| -09095 | **800.436** | 9 - 9.5 | | - 9 - 10 |
| -0910 | **969.965** | 9 - 10 | | - 9 - 10.5 |
| -10105 | **800.437** | 10 - 10.5 | 5.1 | -10 - 11 |
| -1011 | **969.966** | 10 - 11 | | -10 - 11.5 |
| -11115 | **800.438** | 11 - 11.5 | | -11 - 12 |
| -1112 | **969.967** | 11 - 12 | | -11 - 12.5 |
| -12125 | **800.439** | 12 - 12.5 | | -12 - 13 |
| -1213 | **969.968** | 12 - 13 | | -12 - 13.5 |
| -1314 | **969.969** | 13 - 14 | 5.2 | -13 - 14.5 |
| -1415 | **969.970** | 14 - 15 | | -14 - 15.5 |
| -1516 | **969.971** | 15 - 16 | | -15 - 16.5 |
| -1617 | **969.972** | 16 - 17 | 4.6 | -16 - 17.5 |
| -1718 | **969.973** | 17 - 18 | | -17 - 18.5 |
| -1819 | **969.974** | 18 - 19 | | -18 - 19.5 |
| -1920 | **969.975** | 19 - 20 | | -19 - 20 |

## PS Rings

Replaceable seal is installed in the baby perfect seal.
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.

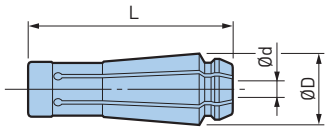
| Model | Order No. | Corresponding BPS Model |
|---|---|---|
| PS -0304 | **969.981** | BPS ☐ -03035, 0304 |
| -0405 | **969.982** | -04045, 0405 |
| -0506 | **969.983** | -05055, 0506 |
| -0607 | **969.984** | -06065, 0607 |
| -0708 | **969.985** | -07075, 0708 |
| -0809 | **969.986** | -08085, 0809 |
| -0910 | **969.987** | -09095, 0910 |
| -1011 | **969.988** | -10105, 1011 |
| -1112 | **969.989** | -11115, 1112 |
| -1213 | **969.990** | -12125, 1213 |

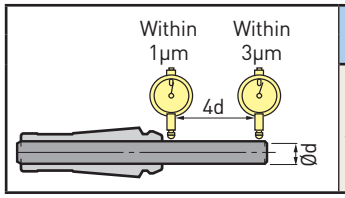
1. 1 package contains 5 pcs. (1 size).

| Model | Order No. | Corresponding BPS Model |
|---|---|---|
| PS -1314 | **969.991** | BPS ☐ -1314 |
| -1415 | **969.992** | -1415 |
| -1516 | **969.993** | -1516 |
| -1617 | **969.994** | -1617 |
| -1718 | **969.995** | -1718 |
| -1819 | **969.996** | -1819 |
| -1920 | **969.997** | -1920 |

# MEGA E Collets

**For MEGA E Chuck**




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

| MEGA6E | | | |
|---|---|---|---|
| Model | Order No. | Ød | Min. Clamping Length |
| MEC6 -3AA | **968.421** | 3 | 19 |
| -4AA | **968.423** | 4 | 22 |
| -5AA | **968.424** | 5 | 25 |
| -6AA | **968.425** | 6 | 27 |

L=34.9 ØD=11.3

| MEGA8E | | | |
|---|---|---|---|
| Model | Order No. | Ød | Min. Clamping Length |
| MEC8 -3AA | **968.427** | 3 | 19 |
| -4AA | **968.429** | 4 | 22 |
| -5AA | **968.430** | 5 | 25 |
| -6AA | **968.431** | 6 | 28 |
| -7AA | **801.317** | 7 | 29 |
| -8AA | **968.433** | 8 | 31 |

L=39.4 ØD=14.1

| MEGA10E | | | |
|---|---|---|---|
| Model | Order No. | Ød | Min. Clamping Length |
| MEC10 - 3AA | **968.434** | 3 | 19 |
| - 4AA | **968.436** | 4 | 22 |
| - 5AA | **968.437** | 5 | 25 |
| - 6AA | **968.438** | 6 | 28 |
| - 7AA | **801.313** | 7 | 29.5 |
| - 8AA | **968.440** | 8 | 31 |
| - 9AA | **801.314** | 9 | 33 |
| -10AA | **968.442** | 10 | 37 |

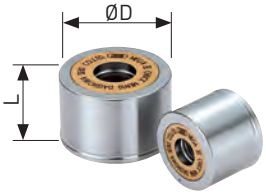
L=45.7 ØD=17.1

| MEGA13E | | | |
|---|---|---|---|
| Model | Order No. | Ød | Min. Clamping Length |
| MEC13 - 3AA | **968.443** | 3 | 19 |
| - 4AA | **968.445** | 4 | 22 |
| - 5AA | **968.446** | 5 | 25 |
| - 6AA | **968.447** | 6 | 28 |
| - 7AA | **968.448** | 7 | 29.5 |
| - 8AA | **968.449** | 8 | 31 |
| - 9AA | **801.316** | 9 | 33 |
| -10AA | **968.451** | 10 | 35 |
| -11AA | **801.315** | 11 | 37 |
| -12AA | **968.453** | 12 | 39 |

L=47.9 ØD=20.6

# MEGA E Nut

**For MEGA E Chuck**

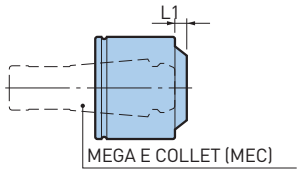



| Model | Order No. | ØD | L | MEGA E Chuck |
|---|---|---|---|---|
| MEN6 | **968.461** | 25 | 20.5 | MEGA6E |
| MEN8 | **968.462** | 30 | 22.0 | MEGA8E |
| MEN10 | **968.463** | 35 | 22.5 | MEGA10E |
| MEN13 | **968.464** | 42 | 24.5 | MEGA13E |

# MEGA E Perfect Seal

**For MEGA E Chuck**

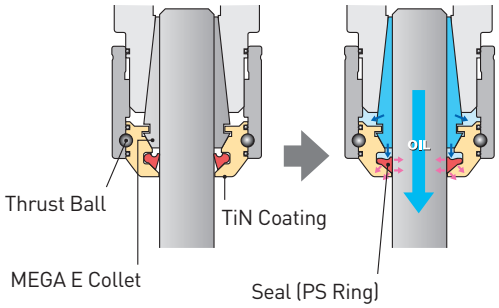
- Max. Coolant pressure 7 MPa




**2way coolant**

Through tools with PS ring

Jet through without PS ring






| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| EPS6 -03 | 968.468 | 3 | 5.6 | MEC6 - 3 |
| -04 | 968.469 | 4 | 5.2 | - 4 |
| -05 | 968.470 | 5 | | - 5 |
| -06 | 968.471 | 6 | | - 6 |
| EPS8 -03 | 968.472 | 3 | 6.4 | MEC8 - 3 |
| -04 | 968.473 | 4 | 6.0 | - 4 |
| -05 | 968.474 | 5 | | - 5 |
| -06 | 968.475 | 6 | | - 6 |
| -07 | 968.476 | 7 | 5.6 | - 7 |
| -08 | 968.477 | 8 | | - 8 |
| EPS10 -03 | 968.478 | 3 | 6.4 | MEC10 - 3 |
| -04 | 968.479 | 4 | 6.0 | - 4 |
| -05 | 968.480 | 5 | | - 5 |
| -06 | 968.481 | 6 | | - 6 |
| -07 | 968.482 | 7 | 6.3 | - 7 |
| -08 | 968.483 | 8 | | - 8 |
| -09 | 968.484 | 9 | 5.7 | - 9 |
| -10 | 968.485 | 10 | | -10 |

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| EPS13 -03 | 968.486 | 3 | 6.4 | MEC13 - 3 |
| -04 | 968.487 | 4 | 6.0 | - 4 |
| -05 | 968.488 | 5 | | - 5 |
| -06 | 968.489 | 6 | | - 6 |
| -07 | 968.490 | 7 | 6.3 | - 7 |
| -08 | 968.491 | 8 | 6.5 | - 8 |
| -09 | 968.492 | 9 | | - 9 |
| -10 | 968.493 | 10 | | -10 |
| -11 | 968.494 | 11 | 6.2 | -11 |
| -12 | 968.495 | 12 | | -12 |

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

## PS Rings

Replaceable seal is installed in the MEGA E perfect seal. Replacement seal is recommended when coolant leaks due to damage of the PS Ring.

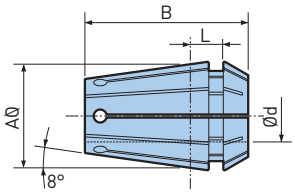
| Model | Order No. | Corresponding EPS Model |
|---|---|---|
| PS -0304 | 969.981 | EPS □ -03 |
| | | -04 |
| -0405 | 969.982 | -05 |
| -0506 | 969.983 | -06 |
| -0607 | 969.984 | -07 |
| -0708 | 969.985 | -08 |
| -0809 | 969.986 | -09 |
| -0910 | 969.987 | -10 |
| -1011 | 969.988 | -11 |
| -1112 | 969.989 | -12 |

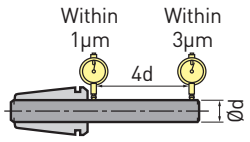
1. 1 package contains 5 pcs. (1 size).

# MEGA ER Collets

**For MEGA ER Grip**

All ERC collets are inspected twice to guarantee high runout accuracy.




| Collet class | Max. runout | |
|---|---|---|
| | At nose | At end of test bar |
| AA | Within 1 µm | Within 3 µm |

Clamping diameter: Ø 2.75 - Ø 6.0

| MEGA ER 11 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| ERC11 -3AA | 802.836 | 2.75 - 3.00 |
| -3.25AA | 802.837 | 3.00 - 3.25 |
| -3.5AA | 802.838 | 3.25 - 3.50 |
| -3.75AA | 802.839 | 3.50 - 3.75 |
| -4AA | 802.840 | 3.75 - 4.00 |
| -4.25AA | 802.841 | 4.00 - 4.25 |
| -4.5AA | 802.842 | 4.25 - 4.50 |
| -4.75AA | 802.843 | 4.50 - 4.75 |
| -5AA | 802.844 | 4.75 - 5.00 |
| -5.25AA | 802.845 | 5.00 - 5.25 |
| -5.5AA | 802.846 | 5.25 - 5.50 |
| -5.75AA | 802.847 | 5.50 - 5.75 |
| -6AA | 802.848 | 5.50 - 6.00 |

Ø A=11 B=18 L =3.8

Clamping diameter: Ø 2.75 - Ø 13.0

| MEGA ER 20 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| ERC20 - 3AA | 967.532 | 2.75 - 3.00 |
| - 3.25AA | 967.533 | 3.00 - 3.25 |
| - 3.5AA | 967.534 | 3.25 - 3.50 |
| - 3.75AA | 967.535 | 3.50 - 3.75 |
| - 4AA | 967.536 | 3.75 - 4.00 |
| - 4.25AA | 967.537 | 4.00 - 4.25 |
| - 4.5AA | 967.538 | 4.25 - 4.50 |
| - 4.75AA | 967.539 | 4.50 - 4.75 |
| - 5AA | 967.540 | 4.75 - 5.00 |
| - 5.25AA | 967.541 | 5.00 - 5.25 |
| - 5.5AA | 967.542 | 5.25 - 5.50 |
| - 5.75AA | 967.543 | 5.50 - 5.75 |
| - 6AA | 967.544 | 5.50 - 6.00 |
| - 6.5AA | 967.545 | 6.00 - 6.50 |
| - 7AA | 967.546 | 6.50 - 7.00 |
| - 7.5AA | 967.547 | 7.00 - 7.50 |
| - 8AA | 967.548 | 7.50 - 8.00 |
| - 8.5AA | 967.549 | 8.00 - 8.50 |
| - 9AA | 967.550 | 8.50 - 9.00 |
| - 9.5AA | 967.551 | 9.00 - 9.50 |
| -10AA | 967.552 | 9.50 - 10.00 |
| -10.5AA | 967.553 | 10.00 - 10.50 |
| -11AA | 967.554 | 10.50 - 11.00 |
| -11.5AA | 967.555 | 11.00 - 11.50 |
| -12AA | 967.556 | 11.50 - 12.00 |
| -12.5AA | 967.557 | 12.00 - 12.50 |
| -13AA | 967.558 | 12.50 - 13.00 |

Ø A=20 B=31.5 L =6.36

Clamping diameter: Ø 1.9 - Ø 10.0

| MEGA ER 16 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| ERC16 - 2AA | 967.501 | 1.90 - 2.00 |
| - 2.1AA | 967.502 | 2.00 - 2.10 |
| - 2.2AA | 967.503 | 2.10 - 2.20 |
| - 2.3AA | 967.504 | 2.20 - 2.30 |
| - 2.4AA | 967.505 | 2.30 - 2.40 |
| - 2.5AA | 967.506 | 2.40 - 2.50 |
| - 2.6AA | 967.507 | 2.50 - 2.60 |
| - 2.7AA | 967.508 | 2.60 - 2.70 |
| - 2.8AA | 967.509 | 2.70 - 2.80 |
| - 2.9AA | 967.510 | 2.80 - 2.90 |
| - 3AA | 967.511 | 2.75 - 3.00 |
| - 3.25AA | 967.512 | 3.00 - 3.25 |
| - 3.5AA | 967.513 | 3.25 - 3.50 |
| - 3.75AA | 967.514 | 3.50 - 3.75 |
| - 4AA | 967.515 | 3.75 - 4.00 |
| - 4.25AA | 967.516 | 4.00 - 4.25 |
| - 4.5AA | 967.517 | 4.25 - 4.50 |
| - 4.75AA | 967.518 | 4.50 - 4.75 |
| - 5AA | 967.519 | 4.75 - 5.00 |
| - 5.25AA | 967.520 | 5.00 - 5.25 |
| - 5.5AA | 967.521 | 5.25 - 5.50 |
| - 5.75AA | 967.522 | 5.50 - 5.75 |
| - 6AA | 967.523 | 5.50 - 6.00 |
| - 6.5AA | 967.524 | 6.00 - 6.50 |
| - 7AA | 967.525 | 6.50 - 7.00 |
| - 7.5AA | 967.526 | 7.00 - 7.50 |
| - 8AA | 967.527 | 7.50 - 8.00 |
| - 8.5AA | 967.528 | 8.00 - 8.50 |
| - 9AA | 967.529 | 8.50 - 9.00 |
| - 9.5AA | 967.530 | 9.00 - 9.50 |
| -10AA | 967.531 | 9.50 - 10.00 |

Ø A=16 B=27.5 L =6.26





BROTECH

Clamping diameter: Ø 2.75 - Ø 16.0

| MEGA ER 25 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| ERC25 - 3AA | **967.559** | 2.75 - 3.00 |
| - 3.25AA | **967.560** | 3.00 - 3.25 |
| - 3.5AA | **967.561** | 3.25 - 3.50 |
| - 3.75AA | **967.562** | 3.50 - 3.75 |
| - 4AA | **967.563** | 3.75 - 4.00 |
| - 4.25AA | **967.564** | 4.00 - 4.25 |
| - 4.5AA | **967.565** | 4.25 - 4.50 |
| - 4.75AA | **967.566** | 4.50 - 4.75 |
| - 5AA | **967.567** | 4.75 - 5.00 |
| - 5.25AA | **967.568** | 5.00 - 5.25 |
| - 5.5AA | **967.569** | 5.25 - 5.50 |
| - 5.75AA | **967.570** | 5.50 - 5.75 |
| - 6AA | **967.571** | 5.50 - 6.00 |
| - 6.5AA | **967.572** | 6.00 - 6.50 |
| - 7AA | **967.573** | 6.50 - 7.00 |
| - 7.5AA | **967.574** | 7.00 - 7.50 |
| - 8AA | **967.575** | 7.50 - 8.00 |
| - 8.5AA | **967.576** | 8.00 - 8.50 |
| - 9AA | **967.577** | 8.50 - 9.00 |
| - 9.5AA | **967.578** | 9.00 - 9.50 |
| -10AA | **967.579** | 9.50 - 10.00 |
| -10.5AA | **967.580** | 10.00 - 10.50 |
| -11AA | **967.581** | 10.50 - 11.00 |
| -11.5AA | **967.582** | 11.00 - 11.50 |
| -12AA | **967.583** | 11.50 - 12.00 |
| -12.5AA | **967.584** | 12.00 - 12.50 |
| -13AA | **967.585** | 12.50 - 13.00 |
| -13.5AA | **967.586** | 13.00 - 13.50 |
| -14AA | **967.587** | 13.50 - 14.00 |
| -14.5AA | **967.588** | 14.00 - 14.50 |
| -15AA | **967.589** | 14.50 - 15.00 |
| -15.5AA | **967.590** | 15.00 - 15.50 |
| -16AA | **967.591** | 15.50 - 16.00 |

Ø A=25 B=34 L =6.66

Clamping diameter: Ø 2.75 - Ø 20.0

| MEGA ER 32 | | |
|---|---|---|
| Model | Order No. | Clamping Range Ød |
| ERC32 - 3AA | **967.592** | 2.75 - 3.00 |
| - 3.25AA | **967.593** | 3.00 - 3.25 |
| - 3.5AA | **967.594** | 3.25 - 3.50 |
| - 3.75AA | **967.595** | 3.50 - 3.75 |
| - 4AA | **967.596** | 3.75 - 4.00 |
| - 4.25AA | **967.597** | 4.00 - 4.25 |
| - 4.5AA | **967.598** | 4.25 - 4.50 |
| - 4.75AA | **967.599** | 4.50 - 4.75 |
| - 5AA | **967.600** | 4.75 - 5.00 |
| - 5.25AA | **967.601** | 5.00 - 5.25 |
| - 5.5AA | **967.602** | 5.25 - 5.50 |
| - 5.75AA | **967.603** | 5.50 - 5.75 |
| - 6AA | **967.604** | 5.50 - 6.00 |
| - 6.5AA | **967.605** | 6.00 - 6.50 |
| - 7AA | **967.606** | 6.50 - 7.00 |
| - 7.5AA | **967.607** | 7.00 - 7.50 |
| - 8AA | **967.608** | 7.50 - 8.00 |
| - 8.5AA | **967.609** | 8.00 - 8.50 |
| - 9AA | **967.610** | 8.50 - 9.00 |
| - 9.5AA | **967.611** | 9.00 - 9.50 |
| -10AA | **967.612** | 9.50 - 10.00 |
| -10.5AA | **967.613** | 10.00 - 10.50 |
| -11AA | **967.614** | 10.50 - 11.00 |
| -11.5AA | **967.615** | 11.00 - 11.50 |
| -12AA | **967.616** | 11.50 - 12.00 |
| -12.5AA | **967.617** | 12.00 - 12.50 |
| -13AA | **967.618** | 12.50 - 13.00 |
| -13.5AA | **967.619** | 13.00 - 13.50 |
| -14AA | **967.620** | 13.50 - 14.00 |
| -14.5AA | **967.621** | 14.00 - 14.50 |
| -15AA | **967.622** | 14.50 - 15.00 |
| -15.5AA | **967.623** | 15.00 - 15.50 |
| -16AA | **967.624** | 15.50 - 16.00 |
| -16.5AA | **967.625** | 16.00 - 16.50 |
| -17AA | **801.013** | 16.50 - 17.00 |
| -17.5AA | **967.627** | 17.00 - 17.50 |
| -18AA | **967.628** | 17.50 - 18.00 |
| -18.5AA | **967.629** | 18.00 - 18.50 |
| -19AA | **967.630** | 18.50 - 19.00 |
| -19.5AA | **967.631** | 19.00 - 19.50 |
| -20AA | **967.632** | 19.50 - 20.00 |

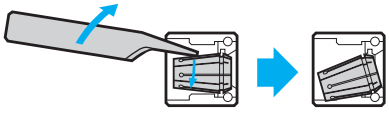
Ø A=32 B=40 L =7.16



## Collet Remover

Collet Remover eases removal of the collet from the nut.

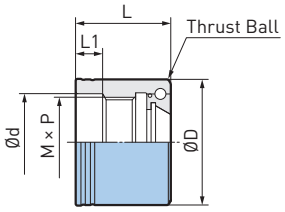
| Model | Order No. |
|---|---|
| NBJ | 969.491 |



# MEGA ER Nut

**For MEGA ER Grip**

High precision nut with ball bearing ensure outstanding runout repeatability.




| Model | Order No. | ØD | L | M x P | Ød | L1 | Wrench Type | Body Type |
|---|---|---|---|---|---|---|---|---|
| MERN16 | **967.801** | 30 | 25.0 | M22 x P1.5 | 23.0 | 7.5 | MGR30L | MEGA ER 16 |
| MERN20 | **967.802** | 35 | 26.5 | M25 x P1.5 | 27.0 | 7.5 | MGR35L | MEGA ER 20 |
| MERN25 | **967.803** | 42 | 27.5 | M32 x P1.5 | 33.5 | 7.5 | MGR42L | MEGA ER 25 |
| MERN32 | **967.804** | 50 | 30.2 | M40 x P1.5 | 41.0 | 7.7 | MGR50L | MEGA ER 32 |

1. MEGA ER nut can not be used with some of conventional ER chuck. Please check dimensions carefully in that case.
2. To maximize the cutting performance, using with MEGA ER grip is recommended.

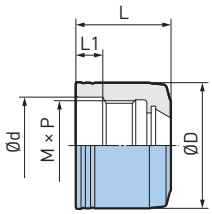
Wrench ▶ 271

# MEGA ER Solid Nut



**For MEGA ER Grip**

Free-notch design nut for high speed machining.




| Model | Order No. | ØD | L | M x P | Ød | L1 | Wrench Type | Body Type |
|---|---|---|---|---|---|---|---|---|
| MER16SN | **805.663** | 30 | 25.0 | M22 x P1.5 | 23.0 | 7.5 | MGR30L | MEGA ER 16 |
| MER20SN | **805.664** | 35 | 26.5 | M25 x P1.5 | 27.0 | 7.5 | MGR35L | MEGA ER 20 |
| MER25SN | **805.665** | 42 | 27.5 | M32 x P1.5 | 33.5 | 7.5 | MGR42L | MEGA ER 25 |
| MER32SN | **805.666** | 50 | 30.2 | M40 x P1.5 | 41.0 | 7.7 | MGR50L | MEGA ER 32 |

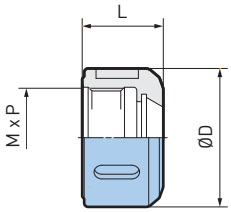
1. MEGA ER solid nut can not be used with some of conventional ER chuck. Please check dimensions carefully in that case.
2. To maximize the cutting performance, using with MEGA ER grip is recommended.

Wrench ▶ 271

# ER Nut

**For MEGA ER Grip**

Conventional ER Nut




| Model | Order No. | ØD | L | M x P | Wrench Type | Body Type |
|---|---|---|---|---|---|---|
| ERN11 | **803.581** | 19 | 12.3 | M14 x 0.75 | NBK6 | ER11 |
| ERN16 | **803.582** | 30 | 19 | M22 x P1.5 | NBK10 | ER16 |
| ERN20 | **803.583** | 35 | 20.5 | M25 x P1.5 | NBK13 | ER20 |
| ERN25 | **803.584** | 42 | 21.5 | M32 x P1.5 | NBK16 | ER25 |
| ERN32 | **803.585** | 50 | 24 | M40 x P1.5 | FK45-50L | ER32 |

Wrench ▶ 271



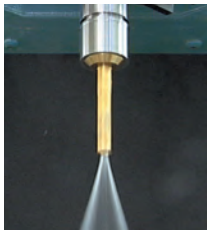
BROTECH

# MEGA ER Perfect Seal

**For MEGA ER Grip**

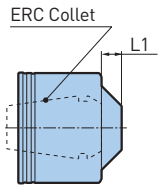
- Max. Coolant pressure 7 MPa

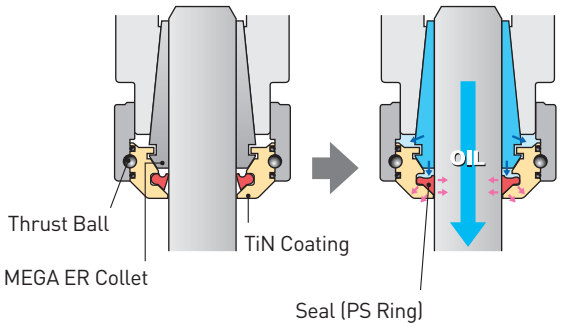
**2way coolant**



Through tools with PS ring

Jet through without PS ring




A.8

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| MERPS16-030035 | **967.850** | 3.0 - 3.5 | 6.4 | ERC16 - 3 - 3.75 |
| -035040 | **967.851** | 3.5 - 4.0 | | - 3.5 - 4.25 |
| -040045 | **967.852** | 4.0 - 4.5 | | - 4 - 4.75 |
| -045050 | **967.853** | 4.5 - 5.0 | | - 4.5 - 5.25 |
| -050055 | **967.854** | 5.0 - 5.5 | | - 5 - 6 |
| -055060 | **967.855** | 5.5 - 6.0 | | - 5.5 - 6.5 |
| -060065 | **967.856** | 6.0 - 6.5 | 6.8 | - 6 - 7 |
| -065070 | **967.857** | 6.5 - 7.0 | | - 6.5 - 7.5 |
| -070075 | **967.858** | 7.0 - 7.5 | | - 7 - 8 |
| -075080 | **967.859** | 7.5 - 8.0 | | - 7.5 - 8.5 |
| -080085 | **967.861** | 8.0 - 8.5 | 6.1 | - 8 - 9 |
| -085090 | **967.862** | 8.5 - 9.0 | | - 8.5 - 9.5 |
| -090095 | **967.863** | 9.0 - 9.5 | | - 9 -10 |
| -095100 | **967.864** | 9.5 - 10.0 | | - 9.5 -10 |

1. 1 pce. of ps ring is included.

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| MERPS20-030035 | **967.865** | 3.0 - 3.5 | 6.4 | ERC20 - 3 - 3.75 |
| -035040 | **967.866** | 3.5 - 4.0 | | - 3.5 - 4.25 |
| -040045 | **967.867** | 4.0 - 4.5 | | - 4 - 4.75 |
| -045050 | **967.868** | 4.5 - 5.0 | | - 4.5 - 5.25 |
| -050055 | **967.869** | 5.0 - 5.5 | | - 5 - 6 |
| -055060 | **967.870** | 5.5 - 6.0 | | - 5.5 - 6.5 |
| -060065 | **967.871** | 6.0 - 6.5 | 6.8 | - 6 - 7 |
| -065070 | **967.872** | 6.5 - 7.0 | | - 6.5 - 7.5 |
| -070075 | **967.873** | 7.0 - 7.5 | | - 7 - 8 |
| -075080 | **967.874** | 7.5 - 8.0 | | - 7.5 - 8.5 |
| -080085 | **967.875** | 8.0 - 8.5 | 6.9 | - 8 - 9 |
| -085090 | **967.876** | 8.5 - 9.0 | | - 8.5 - 9.5 |
| -090095 | **967.877** | 9.0 - 9.5 | | - 9 -10 |
| -095100 | **967.878** | 9.5 - 10.0 | | - 9.5 -10.5 |
| -100105 | **967.879** | 10.0 - 10.5 | 6.6 | -10 -11 |
| -105110 | **967.880** | 10.5 - 11.0 | | -10.5 -11.5 |
| -110115 | **967.881** | 11.0 - 11.5 | | -11 -12 |
| -115120 | **967.882** | 11.5 - 12.0 | | -11.5 -12.5 |
| -120125 | **967.883** | 12.0 - 12.5 | | -12 -13 |
| -125130 | **967.884** | 12.5 - 13.0 | | -12.5 -13 |

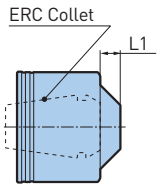
1. 1 pce. of ps ring is included.

For MERS25/32, refer to the following pages.

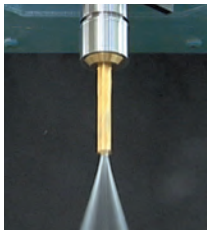
# MEGA ER Perfect Seal

**For MEGA ER Grip**

- Max. Coolant pressure 7 MPa




**2way coolant**



Through tools with PS ring

Jet through without PS ring

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| MERPS25-030035 | **967.885** | 3.0 - 3.5 | 6.3 | ERC25 - 3 - 3.75 |
| -035040 | **967.886** | 3.5 - 4.0 | | - 3.5 - 4.25 |
| -040045 | **967.887** | 4.0 - 4.5 | | - 4 - 4.75 |
| -045050 | **967.888** | 4.5 - 5.0 | | - 4.5 - 5.25 |
| -050055 | **967.889** | 5.0 - 5.5 | | - 5 - 6 |
| -055060 | **967.890** | 5.5 - 6.0 | | - 5.5 - 6.5 |
| -060065 | **967.891** | 6.0 - 6.5 | 6.7 | - 6 - 7 |
| -065070 | **967.892** | 6.5 - 7.0 | | - 6.5 - 7.5 |
| -070075 | **967.893** | 7.0 - 7.5 | | - 7 - 8 |
| -075080 | **967.894** | 7.5 - 8.0 | | - 7.5 - 8.5 |
| -080085 | **967.895** | 8.0 - 8.5 | 6.8 | - 8 - 9 |
| -085090 | **967.896** | 8.5 - 9.0 | | - 8.5 - 9.5 |
| -090095 | **967.897** | 9.0 - 9.5 | | - 9 -10 |
| -095100 | **967.898** | 9.5 - 10.0 | | - 9.5 -10.5 |
| -100105 | **967.899** | 10.0 - 10.5 | 7.3 | -10 -11 |
| -105110 | **967.900** | 10.5 - 11.0 | | -10.5 -11.5 |
| -110115 | **967.901** | 11.0 - 11.5 | | -11 -12 |
| -115120 | **967.902** | 11.5 - 12.0 | | -11.5 -12.5 |
| -120125 | **967.903** | 12.0 - 12.5 | | -12 -13 |
| -125130 | **967.904** | 12.5 - 13.0 | | -12.5 -13 |
| -130140 | **967.905** | 13.0 - 14.0 | 6.6 | -13 -14.5 |
| -140150 | **967.906** | 14.0 - 15.0 | | -14 -15.5 |
| -150160 | **801.318** | 15.0 - 16.0 | | -15 -16 |

1. 1 pce. of ps ring is included.

| Model | Order No. | Cutter Shank Dia. | L1 | Collet Model |
|---|---|---|---|---|
| MERPS32-030035 | **967.908** | 3.0 - 3.5 | 6.2 | ERC32 - 3 - 3.75 |
| -035040 | **967.909** | 3.5 - 4.0 | | - 3.5 - 4.25 |
| -040045 | **967.910** | 4.0 - 4.5 | | - 4 - 4.75 |
| -045050 | **967.911** | 4.5 - 5.0 | | - 4.5 - 5.25 |
| -050055 | **967.912** | 5.0 - 5.5 | | - 5 - 6 |
| -055060 | **967.913** | 5.5 - 6.0 | | - 5.5 - 6.5 |
| -060065 | **967.914** | 6.0 - 6.5 | 6.6 | - 6 - 7 |
| -065070 | **967.915** | 6.5 - 7.0 | | - 6.5 - 7.5 |
| -070075 | **967.916** | 7.0 - 7.5 | | - 7 - 8 |
| -075080 | **967.917** | 7.5 - 8.0 | | - 7.5 - 8.5 |
| -080085 | **967.918** | 8.0 - 8.5 | 6.7 | - 8 - 9 |
| -085090 | **967.919** | 8.5 - 9.0 | | - 8.5 - 9.5 |
| -090095 | **967.920** | 9.0 - 9.5 | | - 9 -10 |
| -095100 | **967.921** | 9.5 - 10.0 | | - 9.5 -10.5 |
| -100105 | **967.922** | 10.0 - 10.5 | 7.2 | -10 -11 |
| -105110 | **967.923** | 10.5 - 11.0 | | -10.5 -11.5 |
| -110115 | **967.924** | 11.0 - 11.5 | | -11 -12 |
| -115120 | **967.925** | 11.5 - 12.0 | | -11.5 -12.5 |
| -120125 | **967.926** | 12.0 - 12.5 | | -12 -13 |
| -125130 | **967.927** | 12.5 - 13.0 | | -12.5 -13 |
| -130140 | **967.928** | 13.0 - 14.0 | 7.3 | -13 -14.5 |
| -140150 | **967.929** | 14.0 - 15.0 | | -14 -15.5 |
| -150160 | **967.930** | 15.0 - 16.0 | | -15 -16.5 |
| -160170 | **967.931** | 16.0 - 17.0 | 7.8 | -16 -17.5 |
| -170180 | **967.932** | 17.0 - 18.0 | | -17 -18.5 |
| -180190 | **967.933** | 18.0 - 19.0 | | -18 -19.5 |
| -190200 | **967.934** | 19.0 - 20.0 | | -19 -20 |

1. 1 pce. of ps ring is included.

## PS Rings

Replaceable seal is installed in the MEGA ER Perfect Seal. Replacement seal is recommended when coolant leaks due to damage of the PS Ring.

| Model | Order No. | Corresponding MERPS Model |
|---|---|---|
| PS -0304 | **969.981** | MERPS ☐ -030035, 035040 |
| -0405 | **969.982** | -040045, 045050 |
| -0506 | **969.983** | -050055, 055060 |
| -0607 | **969.984** | -060065, 065070 |
| -0708 | **969.985** | -070075, 075080 |

1. 1 package contains 5 pcs. (1 size).

| Model | Order No. | Corresponding MERPS Model |
|---|---|---|
| PS -0809 | **969.986** | MERPS ☐ -080085, 085090 |
| -0910 | **969.987** | -090095, 095100 |
| -1011 | **969.988** | -100105, 105110 |
| -1112 | **969.989** | -110115, 115120 |
| -1213 | **969.990** | -120125, 125130 |
| -1314 | **969.991** | -130140 |
| -1415 | **969.992** | -140150 |
| -1516 | **969.993** | -150160 |
| -1617 | **969.994** | -160170 |
| -1718 | **969.995** | -170180 |
| -1819 | **969.996** | -180190 |
| -1920 | **969.997** | -190200 |





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## MEGA Wrench for Collet Chucks

**For MEGA Micro Chuck, MEGA New Baby Chuck, MEGA E Chuck and MEGA ER Grip**

| Model | Order No. | Ød | Applicable Tool Models | | | |
|---|---|---|---|---|---|---|
| | | | MEGA Micro Chuck | MEGA New Baby Chuck | MEGA E Chuck | MEGA ER Grip |
| MGR10 | **969.449** | 10 | MEGA3S | | | |
| MGR12 | **969.450** | 12 | MEGA4S | | | |
| MGR14 | **969.452** | 14 | MEGA6S | | | |
| MGR18 | **801.705** | 18 | MEGA8S | | | |
| MGR20 | **969.454** | 20 | | MEGA6N | | |
| MGR25 | **969.456** | 25 | | MEGA8N | MEGA6E | |
| MGR30 | **969.458** | 30 | | MEGA10N | MEGA8E | |
| MGR30L | **969.448** | | | | | MEGA ER16 |
| MGR35 | **969.460** | 35 | | MEGA13N | MEGA10E | |
| MGR35L | **969.460L** | | | | | MEGA ER20 |
| MGR42 | **969.462** | 42 | | MEGA16N | MEGA13E | |
| MGR42L | **969.462L** | | | | | MEGA ER25 |
| MGR46 | **969.465** | 46 | | MEGA20N | | |
| MGR50L | **969.464L** | 50 | | | | MEGA ER32 |
| MGR60L | **969.468L** | 60 | | MEGA25N | | |

## MEGA Torque Wrench

**For MEGA Micro Chuck, MEGA New Baby Chuck and MEGA E Chuck**

With torque limiter.

| Model | Order No. | Ød | Applicable Tool Models | | |
|---|---|---|---|---|---|
| | | | MEGA Micro Chuck | MEGA New Baby Chuck | MEGA E Chuck |
| MGR10TL | **805.460** | 10 | MEGA3S | | |
| MGR12TL | **969.451** | 12 | MEGA4S | | |
| MGR12TLS | **804.117** | | | | |
| MGR14TL | **969.453** | 14 | MEGA6S | | |
| MGR14TLS | **978.379** | | | | |
| MGR18TL | **805.553** | 18 | MEGA8S | | |
| MGR20TL | **969.455** | 20 | | MEGA6N | |
| MGR20TLS | **804.119** | | | | |
| MGR25TL | **969.457** | 25 | | MEGA8N | MEGA6E |
| MGR25TLS | **804.121** | | | | |
| MGR30TL | **969.459** | 30 | | MEGA10N | MEGA8E |
| MGR35TL | **969.461** | 35 | | MEGA13N | MEGA10E |
| MGR42TL | **969.463** | 42 | | MEGA16N | MEGA13E |
| MGR46TL | **969.466** | 46 | | MEGA20N | |

1. TLS models are recommended to tighten 3 mm or smaller inner diameter collets.

## New Baby Wrench

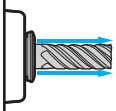
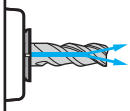
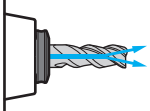
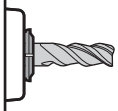
**For New Baby Chuck and MEGA ER Grip**

| Model | Order No. | L | Applicable Nut |
|---|---|---|---|
| NBK6 | **961.525** | 65 | NBN6/BPS6/ERN11 |
| NBK8 | **961.548** | 94 | NBN8/BPS8 |
| NBK10 | **961.570** | 104 | NBN10/BPS10/ERN16 |
| NBK13 | **961.596** | 113 | NBN13/BPS13/ERN20 |
| NBK16 | **961.630** | 122 | NBN16/BPS16/ERN25 |
| NBK20 | **961.678** | 131 | NBN20/BPS20 |

# Straight Collets

**For MEGA Double Power Chuck, New Hi-Power Milling Chuck and Hydraulic Chuck**

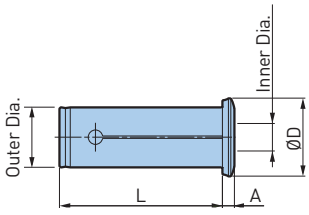
## Straight Collet Selection Guide

| | PJC Collet | OCA Collet | PSC Collet | C Collet |
|---|---|---|---|---|
| |  |  |  |  |
| | Periferical Coolant Supply | Through Tool Coolant Supply | Through Tool Coolant Supply | W/O Center Coolant |
| MEGA-D<br>MEGA Double Power Chuck | ○ | ○ | ○ | ○ |
| MEGA-DS<br>MEGA Double Power Chuck | ○ | | ○ | ○ |
| HMC<br>New Hi-Power Milling Chuck | ○ | ○ | ○ | ○ |
| HDC<br>Hydraulic Chuck | ○ | | ○ | |

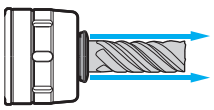
A.8

## PJC Collets for MEGA-D/DS, HMC and HDC

For coolant to cutting tool periphery.




**Jet Through**



**Regardless of the type of chucks, coolant is supplied to cutting tool periphery.**

| Model | Order No. | A | ØD | L |
|---|---|---|---|---|
| PJC12 - 6 | 805.882 | 5.4 | 20.4 | 40 |
| - 8 | 805.883 | | | |
| -10 | 805.884 | 5.6 | | |
| PJC16 - 6 | 962.468 | 6.0 | 23 | 54 |
| - 8 | 962.469 | 6.3 | | |
| -10 | 962.470 | | | |
| -12 | 962.471 | | | |
| PJC20 - 3 | 962.472 | 5.2 | 27 | 61 |
| - 4 | 962.473 | | | |
| - 5 | 962.474 | | | |
| - 6 | 962.475 | | | |
| - 7 | 962.476 | 5.7 | | |
| - 8 | 962.477 | | | |
| - 9 | 962.478 | | | |
| -10 | 962.479 | | | |
| -11 | 962.480 | 6.4 | | |
| -12 | 962.481 | | | |
| -13 | 804.834 | 6.8 | | |
| -14 | 962.488 | 7.3 | | |
| -15 | 804.835 | | | |
| -16 | 962.483 | | | |

| Model | Order No. | A | ØD | L |
|---|---|---|---|---|
| PJC25 - 6 | 962.484 | 5.0 | 32.5 | 68 |
| - 8 | 962.485 | | | |
| -10 | 962.486 | | | |
| -12 | 962.487 | | | |
| -16 | 962.489 | 5.4 | | |
| -18 | 801.685 | 5.8 | | |
| -20 | 962.491 | 6.5 | | |
| PJC32 - 6 | 962.492 | 5.0 | 39 | 74 |
| - 8 | 962.493 | | | |
| -10 | 962.494 | | | |
| -12 | 962.495 | | | |
| -14 | 962.496 | | | |
| -16 | 962.497 | | | |
| -20 | 962.499 | | | |
| -25 | 962.500 | 5.4 | | |
| PJC42 -16 | 801.982 | 5.0 | 50.5 | 83 |
| -20 | 801.983 | | | |
| -25 | 801.984 | | | |
| -32 | 801.985 | | | |

1. Model name indicates its outer dia. and inner dia. (e.g) PJC12-6: outer dia. 12 mm / inner dia. 6 mm.
2. Replacement O-ring for PJC and PSC collet are available (PJC□OR). Please contact BIG KAISER agent.
3. PJC 12 can not be used for Hydraulic Chuck (HDC12).



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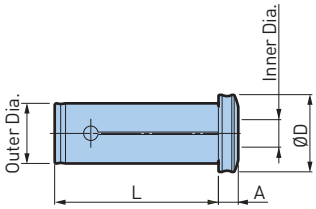
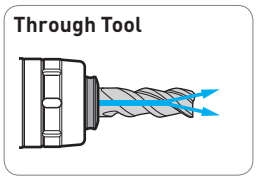
## PSC Collets for MEGA-D/DS, HMC and HDC

For coolant-through tools.



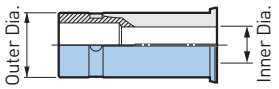
**Regardless of the type of chucks, coolant is supplied through cutting tool.**

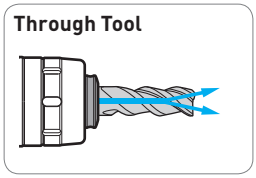
| Model | Order No. | A | ØD | L |
|---|---|---|---|---|
| PSC20 - 3 | 962.437 | 7.7 | 27 | 61 |
| - 4 | 962.438 | 7.5 | | |
| - 5 | 962.439 | | | |
| - 6 | 962.440 | | | |
| - 7 | 962.441 | 8.2 | | |
| - 8 | 962.442 | | | |
| - 9 | 962.443 | | | |
| -10 | 962.444 | | | |
| -11 | 962.445 | 8.7 | | |
| -12 | 962.446 | | | |
| -13 | 804.827 | | | |
| -14 | 962.447 | | | |
| -15 | 804.828 | | 28 | |
| -16 | 962.448 | | | |

1. Model name indicates its outer dia. and inner dia. (e.g) PSC20-3: outer dia. 20 mm / inner dia. 3 mm.
2. Replacement O-ring for PJC and PSC collet are available (PJC□OR). Please contact BIG KAISER agent.

| Model | Order No. | A | ØD | L |
|---|---|---|---|---|
| PSC32 - 6 | 962.457 | 7.5 | 38 | 74 |
| - 7 | 804.829 | 8.2 | | |
| - 8 | 962.458 | | | |
| - 9 | 804.830 | | | |
| -10 | 962.459 | | | |
| -11 | 804.831 | 8.7 | | |
| -12 | 962.460 | | | |
| -13 | 804.832 | | | |
| -14 | 962.461 | | | |
| -15 | 804.833 | | | |
| -16 | 962.462 | | | |
| -18 | 962.463 | 9.2 | | |
| -19 | 802.063 | | | |
| -20 | 962.464 | | | |
| -21 | 802.064 | | | |
| -22 | 802.065 | 9.5 | | |
| -23 | 802.066 | | | |
| -24 | 802.067 | | | |
| -25 | 962.465 | | | |

## OCA Collets for MEGA-D and HMC




| Model | Order No. | Chuck Model |
|---|---|---|
| OCA16 - 6 | 805.156 | MEGA16D HMC16(S) |
| - 8 | 805.157 | |
| -10 | 805.158 | |
| -12 | 805.159 | |
| OCA20 - 6 | 962.401 | MEGA20D HMC20(S) |
| - 8 | 962.402 | |
| -10 | 962.403 | |
| -12 | 962.404 | |
| -14 | 978.501 | |
| -16 | 962.405 | |
| OCA25 - 6 | 801.747 | MEGA25D HMC25(S) |
| - 8 | 801.748 | |
| -10 | 805.413 | |
| -12 | 801.752 | |
| -14 | 805.244 | |
| -16 | 962.406 | |
| -18 | 805.245 | |
| -20 | 962.407 | |

| Model | Order No. | Chuck Model |
|---|---|---|
| OCA32 - 6 | 962.408 | MEGA32D HMC32(S) |
| - 8 | 962.409 | |
| -10 | 962.410 | |
| -12 | 962.411 | |
| -13 | 962.412 | |
| -14 | 962.413 | |
| -15 | 962.414 | |
| -16 | 962.415 | |
| -17 | 962.416 | |
| -18 | 962.417 | |
| -19 | 962.418 | |
| -20 | 962.419 | |
| -21 | 962.420 | |
| -22 | 962.421 | |
| -23 | 962.422 | |
| -24 | 962.423 | |
| -25 | 962.424 | |
| -27 | 806.442 | |
| -28 | 805.356 | |
| -29 | 806.443 | |

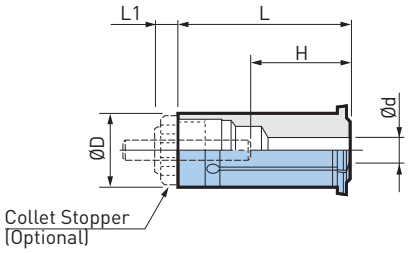
| Model | Order No. | Chuck Model |
|---|---|---|
| OCA42 - 6 | 801.774 | MEGA42D HMC42 |
| - 8 | 801.775 | |
| -10 | 801.764 | |
| -12 | 801.765 | |
| -16 | 801.767 | |
| -19 | 801.768 | |
| -20 | 801.769 | |
| -24 | 801.770 | |
| -25 | 801.771 | |
| -31 | 801.772 | |
| -32 | 801.773 | |

1. Model name indicates its outer dia. and inner dia. (e.g) OCA16-6: outer dia. 16 mm / inner dia. 6 mm.

# Straight Collets

## C Collets for MEGA-D/DS and HMC

Tool projection adjustable straight collet.




| Model | Order No. | Ød | ØD | L | H | |
|---|---|---|---|---|---|---|
| | | | | | Min. | Max. |
| C16 - 6 | 806.465 | 6 | 16 | 52 | 30 | 47 |
| - 8 | 806.466 | 8 | | | 32 | |
| -10 | 806.467 | 10 | | | 37 | |
| -12 | 806.468 | 12 | | | | |
| C20 - 6 | 962.260 | 6 | 20 | 60 | 30 | 48 |
| - 8 | 962.262 | 8 | | | 32 | |
| -10 | 962.263 | 10 | | | 37 | |
| -12 | 962.264 | 12 | | | | |
| -14 | 962.265 | 14 | | | 40 | |
| -16 * | 962.266 | 16 | | | 46 | - |
| -18 * | 800.664 | 18 | | | 50 | |
| AC20 -16 | 962.205 | 16 | | | 46 | 48 |
| C25 - 6 | 962.271 | 6 | 25 | 68.5 | 30 | 58 |
| - 8 | 962.272 | 8 | | | 32 | |
| -10 | 962.273 | 10 | | | 37 | |
| -12 | 962.274 | 12 | | | | |
| -14 | 806.478 | 14 | | | 45 | |
| -16 | 962.276 | 16 | | | 46 | |
| -18 | 806.477 | 18 | | | 48 | |
| -20 | 962.278 | 20 | | | 52 | |

| Model | Order No. | Ød | ØD | L | H | |
|---|---|---|---|---|---|---|
| | | | | | Min. | Max. |
| C32 - 6 | 962.281 | 6 | 32 | 74 | 30 | 62 |
| - 8 | 962.282 | 8 | | | 32 | |
| -10 | 962.283 | 10 | | | 37 | |
| -12 | 962.284 | 12 | | | | |
| -14 | 962.285 | 14 | | | 40 | |
| -16 | 962.286 | 16 | | | 46 | |
| -18 | 962.287 | 18 | | | 50 | |
| -19 | 962.248 | 19 | | | 50 | |
| -20 | 962.288 | 20 | | | 52 | |
| -22 | 962.249 | 22 | | | 52 | |
| -24 | 962.250 | 24 | | | 55 | |
| -25 | 962.289 | 25 | | | 55 | |
| -30 * | 806.476 | 30 | 65 | 60 | - | - |
| C42 - 6 | 800.674 | 6 | 42 | 89 | 30 | 77 |
| - 8 | 800.675 | 8 | | | 34 | |
| -10 | 800.665 | 10 | | | 40 | |
| -12 | 800.666 | 12 | | | | |
| -16 | 800.668 | 16 | | | 46 | |
| -20 | 800.670 | 20 | | | 52 | |
| -25 | 800.671 | 25 | | | 57 | |
| -31 | 800.672 | 31 | | | 62 | |
| -32 | 800.673 | 32 | | | 62 | |
| -40 * | 806.198 | 40 | | 79 | 77 | - |

1. Model name indicates its outer dia. and inner dia.
   (e.g) C16-6: outer dia. 16 mm / inner dia. 6 mm.
2. * Collet Stopper cannot be used.
3. AC20-16 includes Collet Stopper.

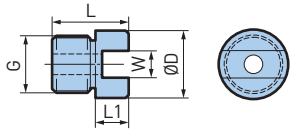
## Collet Stoppers for C Collet

| C Collet Model | Model | Order No. | L1 |
|---|---|---|---|
| C16 - | AC16CS | 806.197 | 6 |
| C20 - | AC20CS | 972.321 | 8 |
| C25 - | AC25CS | 804.772 | 8 |

| C Collet Model | Model | Order No. | L1 |
|---|---|---|---|
| C32 - | AC32CS | 972.322 | 10 |
| C42 - | AC42CS | 804.773 | 10 |

# Adjusting Screws

### For MEGA Double Power Chuck and New Hi-Power Milling Chuck




| Model | Order No. | ØD | L | L1 | G | W | Body | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | MEGA Double Power Chuck | New Hi-Power Milling Chuck |
| HMA-M16 | 962.311 | 19 | 27 | 6 | M16P1.5 | 8 | MEGA 20D/DS<br>MEGA25D/DS | HMC20S/HMC20<br>HMC25S/HMC25 |
| HMA-M16S | 962.312 | 19 | 27 | 6 | M16P1.5 | 10 | MEGA32D/DS (BBT30/40) | HMC32S |
| HMA-M24 | 962.313 | 30 | 36 | 9.5 | M24P1.5 | | MEGA32D/DS (BBT50)<br>MEGA42D/DS (BBT50)<br>MEGA50D/DS (BBT50) | HMC32<br>HMC42S<br>HMC42 |

1. For MEGA16D/DS and HMC16S a commercially available hex socket head screw with M8 can be used.

# MEGA Wrench for Milling Chuck

**For MEGA Double Power Chuck and MEGA Perfect Grip**

| Model | Order No. | Ød | Applicable Tool Models | |
|---|---|---|---|---|
| | | | MEGA Double Power Chuck | MEGA Perfect Grip |
| MGR42L | **969.462L** | 42 | MEGA16D/DS-□A(BBT40, HSK-A63/F63) | |
| MGR46L | **969.465L** | 46 | MEGA16D/DS (BBT30/50, HSK-A40/A50/A100) | MEGA16DPG |
| MGR50L | **969.464L** | 50 | MEGA20D/DS (BBT30/40, HSK-A50/A63/F63) | |
| MGR60L | **969.468L** | 60 | MEGA20D/DS (BBT50, HSK-A100) | MEGA20DPG |
| MGR62L | **969.469L** | 62 | MEGA25D/DS-□A(BBT40, HSK-A63/F63) | |
| MGR70L | **969.470L** | 70 | MEGA25D/DS (BBT50, HSK-A100)<br>MEGA32D/DS (BBT40, HSK-A63/F63) | MEGA25DPG |
| MGR80L | **969.471L** | 80 | MEGA32D/DS (BBT50, HSK-A100) | MEGA32DPG |
| MGR99L | **969.472L** | 99 | MEGA42D/DS | |

A.8

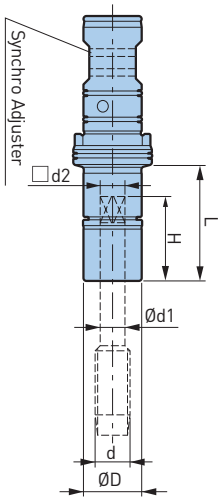
# FK Wrench

**For New Hi-Power Milling Chuck and MEGA ER Grip**

| Model | Order No. | L | Clamping Range | Applicable Tool Models |
|---|---|---|---|---|
| FK31-33 | **806.462** | 153 | 31 - 33 | HMC12J |
| FK45- 50L | **801.037** | 242 | 43 - 50 | HMC16S/HMC20S ERN32 |
| FK52- 55 | **962.294** | 220 | 52 - 55 | HMC25S (BBT30) |
| FK58- 62 | **962.291** | 240 | 58 - 62 | HMC20/HMC25 (BBT50) |
| FK58- 62L | **801.038** | 293 | | HMC25S (BBT40/50)<br>HMC32S (BBT30) |
| FK68- 75L | **801.039** | 319 | 68 - 75 | HMC32S (BBT40/50) |
| FK80- 90 | **962.292** | 280 | 80 - 90 | HMC32 (BBT50) |
| FK80- 90L | **804.771** | 390 | | HMC42S |
| FK92- 100 | **962.293** | 280 | 92 - 100 | HMC42 |

# Tap Holders for MEGA Synchro Tapping Holder

Available in short, long and extra long length (150 mm, 200 mm) to meet all production requirements.




**MGT6** (Tap size **DIN**: M3 - M8; **ISO**: M3 - M5)

| Model | Order No. | Tap Size d | | | Ød1 | □d2 | H | L | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | DIN 371 | DIN 376 | ISO 529 | | | | | | |
| MGT6 -031025 - 30 | 963.611 | | | | | | | 30 | | 0.12 |
| - 70 | 963.612 | | | M3 | 3.15 | 2.5 | 20 | 70 | | 0.18 |
| -100 | 963.613 | | | | | | | 100 | | 0.23 |
| -150 | 963.614 | | | | | | | 150 | | 0.31 |
| -035027 - 30 | 963.615 | | | | | | | 30 | | 0.12 |
| - 70 | 963.616 | M3 | M5 | | 3.5 | 2.7 | 21 | 70 | | 0.18 |
| -100 | 963.617 | | | | | | | 100 | | 0.23 |
| -150 | 963.618 | | | | | | | 150 | | 0.31 |
| -040032 - 30 | 963.619 | | | | | | | 30 | | 0.12 |
| - 70 | 963.620 | | | M4 | 4.0 | 3.15 | 21 | 70 | | 0.18 |
| -100 | 963.621 | | | | | | | 100 | | 0.23 |
| -150 | 963.622 | | | | | | | 150 | | 0.31 |
| -045034 - 30 | 963.623 | | | | | | | 30 | 16 | 0.12 |
| - 70 | 963.624 | M4 | M6 | | 4.5 | 3.4 | 21 | 70 | | 0.18 |
| -100 | 963.625 | | | | | | | 100 | | 0.22 |
| -150 | 963.626 | | | | | | | 150 | | 0.30 |
| -050040 - 30 | 963.627 | | | | | | | 30 | | 0.12 |
| - 70 | 963.628 | | | | | | | 70 | | 0.18 |
| -100 | 963.629 | | | M5 | 5.0 | 4.0 | 25 | 100 | | 0.22 |
| -150 | 963.630 | | | | | | | 150 | | 0.30 |
| -200 | 963.631 | | | | | | | 200 | | 0.37 |
| -060049 - 30 | 963.632 | | | | | | | 30 | | 0.12 |
| - 70 | 963.633 | | | | | | | 70 | | 0.17 |
| -100 | 963.634 | M5, M6 | M8 | | 6.0 | 4.9 | 26 | 100 | | 0.22 |
| -150 | 963.635 | | | | | | | 150 | | 0.30 |
| -200 | 963.636 | | | | | | | 200 | | 0.37 |

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

**MGT12** (Tap size **DIN**: M5 - M12; **ISO**: M6 - M12)

| Model | Order No. | Tap Size d | | | Ød1 | □d2 | H | L | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | DIN 371 | DIN 376 | ISO 529 | | | | | | |
| MGT12 -060049 - 30 | 963.637 | | | | | | | 30 | | 0.19 |
| - 70 | 963.638 | | | | | | | 70 | | 0.29 |
| -100 | 963.639 | M5, M6 | M8 | | 6.0 | 4.9 | 28 | 100 | | 0.36 |
| -150 | 963.640 | | | | | | | 150 | | 0.48 |
| -200 | 963.641 | | | | | | | 200 | | 0.60 |
| -063050 - 30 | 963.642 | | | | | | | 30 | 20 | 0.19 |
| - 70 | 963.643 | | | | | | | 70 | | 0.29 |
| -100 | 963.644 | | | M6 | 6.3 | 5.0 | 28 | 100 | | 0.36 |
| -150 | 963.645 | | | | | | | 150 | | 0.48 |
| -200 | 963.646 | | | | | | | 200 | | 0.60 |
| -070055 - 30 | 963.647 | | | | | | | 30 | | 0.19 |
| - 70 | 963.648 | | | | | | | 70 | | 0.28 |
| -100 | 963.649 | | M10 | | 7.0 | 5.5 | 28 | 100 | | 0.35 |
| -150 | 963.650 | | | | | | | 150 | | 0.47 |
| -200 | 963.651 | | | | | | | 200 | | 0.59 |
| -080063 - 30 | 963.652 | | | | | | | 30 | | 0.18 |
| - 70 | 963.653 | | | | | | | 70 | | 0.28 |
| -100 | 963.654 | M8 | | M8 | 8.0 | 6.3 | 29 | 100 | 20 | 0.35 |
| -150 | 963.655 | | | | | | | 150 | | 0.46 |
| -200 | 963.656 | | | | | | | 200 | | 0.58 |
| -090071 - 30 | 963.657 | | | | | | | 30 | | 0.18 |
| - 70 | 963.658 | | | | | | | 70 | | 0.27 |
| -100 | 963.659 | | M12 | M12 | 9.0 | 7.1 | 30 | 100 | | 0.34 |
| -150 | 963.660 | | | | | | | 150 | | 0.46 |
| -200 | 963.661 | | | | | | | 200 | | 0.58 |

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

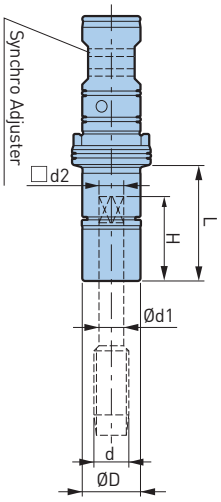
**MGT12** (Tap size **DIN**: M5 - M12; **ISO**: M6 - M12)

| Model | Order No. | Tap Size d | | | Ød1 | □d2 | H | L | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | DIN 371 | DIN 376 | ISO 529 | | | | | | |
| MGT12 -100080 - 35 | **807.211** | M10 | | M10 | 10.0 | 8.0 | 33 | 35 | 30 | 0.28 |
| - 85 | **807.212** | | | | | | | 85 | | 0.49 |
| -115 | **807.213** | | | | | | | 115 | | 0.61 |
| -150 | **807.214** | | | | | | | 150 | | 0.76 |

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

**MGT20** (Tap size **DIN**: M10 - M20; **ISO**: M10 - M20)

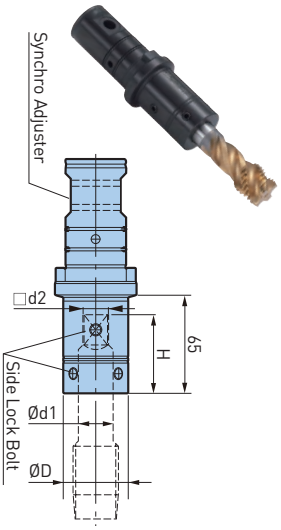



| Model | Order No. | Tap Size d | | | Ød1 | □d2 | H | L | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | DIN 371 | DIN 376 | ISO 529 | | | | | | |
| MGT20 -090071 - 35 | **963.662** | | M12 | M12 | 9.0 | 7.1 | 30 | 35 | 30 | 0.55 |
| - 85 | **963.663** | | | | | | | 85 | | 0.82 |
| -115 | **963.664** | | | | | | | 115 | | 0.98 |
| -150 | **963.665** | | | | | | | 150 | | 1.17 |
| -100080 - 35 | **963.666** | M10 | | M10 | 10.0 | 8.0 | 33 | 35 | | 0.54 |
| - 85 | **963.667** | | | | | | | 85 | | 0.80 |
| -115 | **963.668** | | | | | | | 115 | | 0.96 |
| -150 | **963.669** | | | | | | | 150 | | 1.15 |
| -110090 - 35 | **963.670** | | M14 | | 11.0 | 9.0 | 34 | 35 | | 0.53 |
| - 85 | **963.671** | | | | | | | 85 | | 0.79 |
| -115 | **963.672** | | | | | | | 115 | | 0.95 |
| -150 | **963.673** | | | | | | | 150 | | 1.14 |
| -112090 - 35 | **963.674** | | | M14 | 11.2 | 9.0 | 34 | 35 | | 0.53 |
| - 85 | **963.675** | | | | | | | 85 | | 0.79 |
| -115 | **963.676** | | | | | | | 115 | | 0.95 |
| -150 | **963.677** | | | | | | | 150 | | 1.14 |
| -120090 - 35 | **963.678** | | M16 | | 12.0 | 9.0 | 34 | 35 | | 0.52 |
| - 85 | **963.679** | | | | | | | 85 | | 0.78 |
| -115 | **963.680** | | | | | | | 115 | | 0.94 |
| -150 | **963.681** | | | | | | | 150 | | 1.13 |
| -125100 - 35 | **963.682** | | | M16 | 12.5 | 10.0 | 35 | 35 | | 0.52 |
| - 85 | **963.683** | | | | | | | 85 | | 0.77 |
| -115 | **963.684** | | | | | | | 115 | | 0.93 |
| -150 | **963.685** | | | | | | | 150 | | 1.11 |
| -140110 - 35 | **963.686** | | M18 | | 14.0 | 11.0 | 36 | 35 | | 0.51 |
| - 85 | **963.687** | | | | | | | 85 | | 0.76 |
| -115 | **963.688** | | | | | | | 115 | | 0.92 |
| -150 | **963.689** | | | | | | | 150 | | 1.10 |
| -140112 - 35 | **963.690** | | | M18, M20 | 14.0 | 11.2 | 36 | 35 | | 0.51 |
| - 85 | **963.691** | | | | | | | 85 | | 0.76 |
| -115 | **963.692** | | | | | | | 115 | | 0.92 |
| -150 | **963.693** | | | | | | | 150 | | 1.10 |
| -160120 - 35 | **805.173** | | M20 | | 16.0 | 12.0 | 37 | 35 | | 0.51 |
| -150 | **805.172** | | | | | | | 150 | | 1.10 |

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

**MGT36** (Tap size **DIN**: M22 - M36)




| Tap Holder Model | Order No. | Tap size | | Ød1 | □ d2 | H | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | DIN 376 | DIN 353 | | | | | |
| MGT36-180145-65 | **805.240** | M22, 24 | P5/8 | 18 | 14.5 | 45 | 38 | 1.4 |
| -200160-65 | **805.241** | M27 | P3/4 | 20 | 16 | 51 | 40 | 1.4 |
| -220180-65 | **805.238** | M30 | P7/8 | 22 | 18 | 53 | 42 | 1.5 |
| -250200-65 | **805.242** | M33 | P1 | 25 | 20 | 58 | 49 | 1.6 |
| -280220-65 | **805.239** | M36 | - | 28 | 22 | 62 | 52 | 1.6 |

1. Wrench is not required.

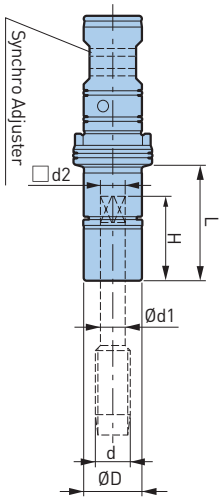
For Accessories ▶ 280

**Caution**

Tap shank (Ød1) and square (□ d2) must be matched. Please carefully check before order.

# Tap Holders for MEGA Synchro Tapping Holder

Available in short, long and extra long length (150 mm, 200 mm) to meet all production requirements.




**MGT6** (Tap size **JIS**: M2 - M6)

| Model | | Order No. | Tap Size d | | | Ød1 | □d2 | H | L | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric | Pipe | Unify | | | | | | |
| MGT6 -M2 | - 30 | 963.400 | M2 | | No. 3 No. 4 | 3 | 2.5 | 19 | 30 | 16 | 0.12 |
| | - 70 | 801.481 | | | | | | | 70 | | 0.18 |
| | -100 | 801.479 | | | | | | | 100 | | 0.23 |
| | -150 | 801.480 | | | | | | | 150 | | 0.31 |
| -M3 | - 30 | 801.484 | M3 | | No. 5 No. 6 | 4 | 3.2 | 21 | 30 | | 0.12 |
| | - 70 | 801.485 | | | | | | | 70 | | 0.18 |
| | -100 | 801.482 | | | | | | | 100 | | 0.23 |
| | -150 | 801.483 | | | | | | | 150 | | 0.31 |
| -M4 | - 30 | 801.489 | M4 | | No. 8 | 5 | 4 | 25 | 30 | | 0.12 |
| | - 70 | 801.490 | | | | | | | 70 | | 0.18 |
| | -100 | 801.486 | | | | | | | 100 | | 0.22 |
| | -150 | 801.487 | | | | | | | 150 | | 0.30 |
| | -200 | 801.488 | | | | | | | 200 | | 0.37 |
| -M5 | - 30 | 801.494 | M5 | | No. 10 No. 12 | 5.5 | 4.5 | 25 | 30 | | 0.12 |
| | - 70 | 801.495 | | | | | | | 70 | | 0.18 |
| | -100 | 801.491 | | | | | | | 100 | | 0.22 |
| | -150 | 801.492 | | | | | | | 150 | | 0.30 |
| | -200 | 801.493 | | | | | | | 200 | | 0.37 |
| -M6, U1/4 | - 30 | 801.499 | M6 | | U1/4 | 6 | 4.5 | 25 | 30 | | 0.12 |
| | - 70 | 801.500 | | | | | | | 70 | | 0.17 |
| | -100 | 801.496 | | | | | | | 100 | | 0.22 |
| | -150 | 801.497 | | | | | | | 150 | | 0.30 |
| | -200 | 801.498 | | | | | | | 200 | | 0.37 |

1. Nut is included. Wrench is to be ordered separately.

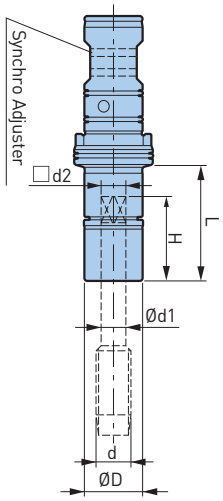
For Accessories ▶ 280

**MGT12** (Tap size **JIS**: M6 - M12)

| Model | | Order No. | Tap Size d | | | Ød1 | □d2 | H | L | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric | Pipe | Unify | | | | | | |
| MGT12 -M6, U1/4 | - 30 | 978.286 | M6 | | U1/4 | 6 | 4.5 | 27 | 30 | 20 | 0.19 |
| | - 70 | 801.415 | | | | | | | 70 | | 0.29 |
| | -100 | 801.412 | | | | | | | 100 | | 0.36 |
| | -150 | 801.413 | | | | | | | 150 | | 0.48 |
| | -200 | 801.414 | | | | | | | 200 | | 0.60 |
| -U5/16 | - 30 | 801.424 | | | U5/16 | 6.1 | 5 | 28 | 30 | | 0.19 |
| | - 70 | 801.425 | | | | | | | 70 | | 0.29 |
| | -100 | 801.421 | | | | | | | 100 | | 0.36 |
| | -150 | 801.422 | | | | | | | 150 | | 0.48 |
| | -200 | 801.423 | | | | | | | 200 | | 0.60 |
| -M8 | - 30 | 978.287 | M8 | | | 6.2 | 5 | 28 | 30 | | 0.19 |
| | - 70 | 801.419 | | | | | | | 70 | | 0.29 |
| | -100 | 801.416 | | | | | | | 100 | | 0.36 |
| | -150 | 801.417 | | | | | | | 150 | | 0.48 |
| | -200 | 801.418 | | | | | | | 200 | | 0.60 |
| -M10, U3/8 | - 30 | 978.288 | M10 | | U3/8 | 7 | 5.5 | 28 | 30 | | 0.19 |
| | - 70 | 801.408 | | | | | | | 70 | | 0.28 |
| | -100 | 801.405 | | | | | | | 100 | | 0.35 |
| | -150 | 801.406 | | | | | | | 150 | | 0.47 |
| | -200 | 801.407 | | | | | | | 200 | | 0.59 |
| -U7/16,P1/8 | - 30 | 801.429 | | P1/8 | U7/16 | 8 | 6 | 29 | 30 | | 0.18 |
| | - 70 | 801.430 | | | | | | | 70 | | 0.28 |
| | -100 | 801.426 | | | | | | | 100 | | 0.35 |
| | -150 | 801.427 | | | | | | | 150 | | 0.46 |
| | -200 | 801.428 | | | | | | | 200 | | 0.58 |
| -M12 | - 30 | 978.289 | M12 | | | 8.5 | 6.5 | 29 | 30 | | 0.18 |
| | - 70 | 801.411 | | | | | | | 70 | | 0.27 |
| | -100 | 801.409 | | | | | | | 100 | | 0.34 |
| | -150 | 963.399 | | | | | | | 150 | | 0.46 |
| | -200 | 801.410 | | | | | | | 200 | | 0.58 |

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

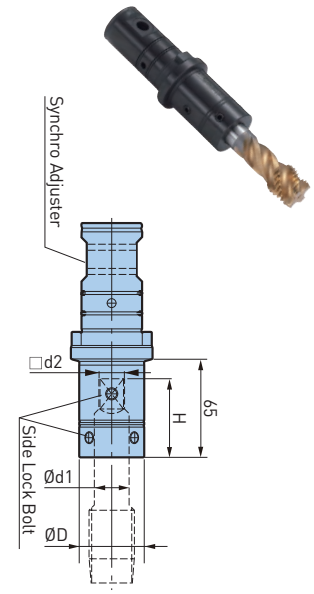



**MGT20** (Tap size **JIS**: M12 - M20)

| Model | | Order No. | Tap Size d | | | Ød1 | □d2 | H | L | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metric | Pipe | Unify | | | | | | |
| MGT20-M12 | - 35 | 801.433 | M12 | | | 8.5 | 6.5 | 29 | 35 | 30 | 0.55 |
| | - 85 | 801.434 | | | | | | | 85 | | 0.82 |
| | -115 | 801.431 | | | | | | | 115 | | 0.98 |
| | -150 | 801.432 | | | | | | | 150 | | 1.17 |
| -U1/2 | - 35 | 801.460 | | | U1/2 | 9 | 7 | 30 | 35 | | 0.55 |
| | - 85 | 801.461 | | | | | | | 85 | | 0.82 |
| | -115 | 804.130 | | | | | | | 115 | | 0.98 |
| | -150 | 804.128 | | | | | | | 150 | | 1.17 |
| -M14, U9/16 | - 35 | 801.437 | M14 | | U9/16 | 10.5 | 8 | 33 | 35 | | 0.53 |
| | - 85 | 801.438 | | | | | | | 85 | | 0.79 |
| | -115 | 801.435 | | | | | | | 115 | | 0.95 |
| | -150 | 801.436 | | | | | | | 150 | | 1.14 |
| -P1/4 | - 35 | 801.454 | | P1/4 | | 11 | 9 | 31 | 35 | | 0.53 |
| | - 85 | 801.455 | | | | | | | 85 | | 0.79 |
| | -115 | 801.452 | | | | | | | 115 | | 0.95 |
| | -150 | 801.453 | | | | | | | 150 | | 1.14 |
| -U5/8 | - 35 | 801.462 | | | U5/8 | 12 | 9 | 34 | 35 | | 0.52 |
| | - 85 | 801.463 | | | | | | | 85 | | 0.78 |
| | -115 | 804.131 | | | | | | | 115 | | 0.94 |
| | -150 | 804.129 | | | | | | | 150 | | 1.13 |
| -M16 | - 35 | 801.441 | M16 | | | 12.5 | 10 | 35 | 35 | | 0.52 |
| | - 85 | 801.442 | | | | | | | 85 | | 0.77 |
| | -115 | 801.439 | | | | | | | 115 | | 0.93 |
| | -150 | 801.440 | | | | | | | 150 | | 1.11 |
| -M18, U3/4 | - 35 | 801.445 | M18 | | U3/4 | 14 | 11 | 36 | 35 | | 0.51 |
| | - 85 | 801.446 | | | | | | | 85 | | 0.76 |
| | -115 | 801.443 | | | | | | | 115 | | 0.92 |
| | -150 | 801.444 | | | | | | | 150 | | 1.10 |
| -P3/8 | - 35 | 801.458 | | P3/8 | | 14 | 11 | 33 | 35 | | 0.51 |
| | - 85 | 801.459 | | | | | | | 85 | | 0.76 |
| | -115 | 801.456 | | | | | | | 115 | | 0.92 |
| | -150 | 801.457 | | | | | | | 150 | | 1.10 |
| -M20 | - 35 | 801.449 | M20 | | | 15 | 12 | 37 | 35 | | 0.49 |
| | - 85 | 801.450 | | | | | | | 85 | | 0.74 |
| | -115 | 801.447 | | | | | | | 115 | | 0.89 |
| | -150 | 801.448 | | | | | | | 150 | | 1.06 |

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280




**MGT36** (Tap size **JIS**: M20 - M36; P1/4, P3/4, P1)

| Tap Holder Model | | Order No. | Tap size | | Ød1 | □ d2 | H | ØD | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Size | l | | | | | |
| MGT36 -M20 | -65 | 801.465 | M20 | 65 - 68 | 15 | 12 | 40 | 32 | 1.2 |
| -M22 | -65 | 801.466 | M22 | 71 - 74 | 17 | 13 | 44 | 34 | 1.3 |
| -M24 | -65 | 978.330 | M24 | 74 - 77 | 19 | 15 | 46 | 39 | 1.4 |
| -M27 | -65 | 801.467 | M27 | 80 - 83 | 20 | | 50 | 40 | 1.4 |
| -M30 | -65 | 801.468 | M30 | 83 - 86 | 23 | 17 | 52 | 43 | 1.5 |
| -M33 | -65 | 801.469 | M33 | 88 - 91 | 25 | 19 | 57 | 49 | 1.6 |
| -M36 | -65 | 978.331 | M36 | 94 - 97 | 28 | 21 | 61 | 52 | 1.6 |
| -P1/2 | -65 | 801.471 | P1/2 | 38 - 41 | 18 | 14 | 42 | 35 | 1.3 |
| -P3/4 | -65 | 801.473 | P3/4 | | 23 | 17 | 47 | 43 | 1.5 |
| -P1 | -65 | 801.472 | P1 | 49 - 52 | 26 | 21 | 46 | 50 | 1.7 |

1. Wrench is not required.

For Accessories ▶ 280

**Caution**

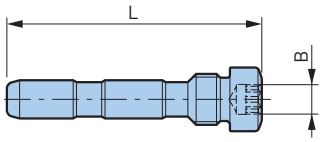
Tap shank (Ød1) and square (□ d2) must be matched. Please carefully check before order.

# Spare Parts for MEGA Synchro Tapping Holder

## MGT Set Screw

**For MGT6, MGT12, MGT20, MGT36**

Made of high-strength material. Secures the tap holder into body.




| Model | Order No. | Wrench size B | L | Body |
|---|---|---|---|---|
| MGT6SS | **963.711** | 4 | 35 | MGT 6 |
| MGT12SS | **963.432** | 4 | 40 | MGT12 |
| MGT20SS | **963.713** | 5 | 53 | MGT20 |
| MGT36SS | **801.478** | 8 | 92 | MGT36 |

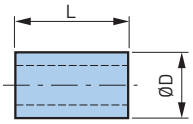
## Synchro Adjuster

**For MGT6, MGT12, MGT20, MGT36**

Made of special material. Replaceable bushing in tap holder.

**Soft Type**

Standard execution



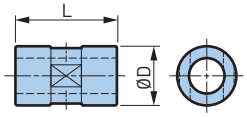

**Soft Type**

| Model | Order No. | ØD | L | Tap Holder |
|---|---|---|---|---|
| MGT6SA | **963.721** | 9 | 11 | MGT 6-d- |
| MGT12SA | **963.722** | 10 | 15 | MGT12-d- |
| MGT20SA | **963.723** | 14 | 24 | MGT20-d- |
| MGT36SA | **801.474** | 20 | 32 | MGT36-d- |

1. Set content 5 pieces.
2. Soft type is included in our standard MEGA Synchro tapping holders.

**Hard Type**

Use for the eccentric relief taps




**Hard Type**

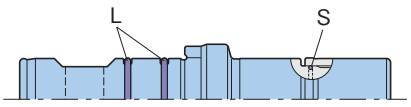
| Model | Order No. | ØD | L | Tap Holder |
|---|---|---|---|---|
| MGT6SAH | **807.197** | 9 | 11 | MGT 6-d- |
| MGT12SAH | **807.198** | 10 | 15 | MGT12-d- |
| MGT20SAH | **807.199** | 14 | 24 | MGT20-d- |

1. Single piece.

## O-Ring Set

**For MGT6, MGT12, MGT20**

Set includes 1 small, 2 large size.

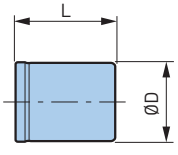



| Model | Order No. | Nut. Dia | Tap Holder |
|---|---|---|---|
| MGT6 OR | **801.501** | Ø 16 | MGT 6-d- |
| MGT12 OR | **801.420** | Ø 20 | MGT12-d- |
| MGT20 OR | **801.451** | Ø 30 | MGT20-d- |
| MGT36 OR | **801.470** | - | MGT36-d- |

## MGT Nut

**For MGT6, MGT12, MGT20**

Exclusive nut for MEGA synchro tapping holder.

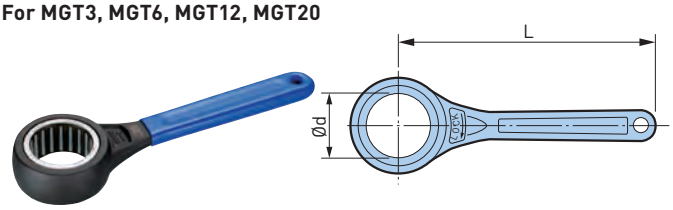



| Model | Order No. | ØD | L | Tap Holder |
|---|---|---|---|---|
| MGN6T | **963.700** | 16 | 19 | MGT 6-d- |
| MGN12T | **963.702** | 20 | 21 | MGT12-d- |
| MGN20T | **963.703** | 30 | 24 | MGT20-d- |

# Accessories for MEGA Synchro Tapping Holder

## MEGA Wrench

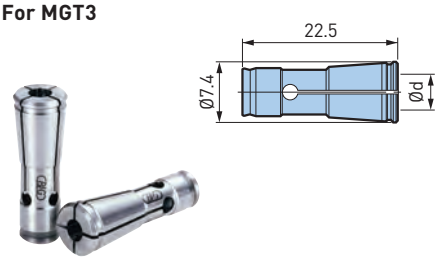
**For MGT3, MGT6, MGT12, MGT20**




| Model | Order No. | Ød | L | Tap Holder |
|---|---|---|---|---|
| MGR12 | **969.450** | 12 | 90 | MGT 3 |
| MGR16 | **969.446** | 16 | 90 | MGT 6-d- |
| MGR20L | **969.447** | 20 | 160 | MGT12-06,-07,-08,-09 |
| MGR30L | **969.448** | 30 | 220 | MGT12-10 / MGT20-d |

## Micro Collet

**For MGT3**




| Model | Order No. | Tapping Range | | | Tap Shank |
|---|---|---|---|---|---|
| | | DIN 371 | ISO 529 | JIS | Ød |
| NBC4S-2.5AA | **961.468** | M1 - M1.8 | M2 | - | 2.5 |
| -2.8AA | **968.353** | M2 - M2.6 | M2.2, M2.5 | - | 2.8 |
| -3.0AA | **961.470** | - | - | M1 - M2.6 | 3.0 |
| -3.1AA | **968.355** | - | M3 | - | 3.15 |
| -3.5AA | **961.472** | M3 | - | - | 3.5 |
| -4.0AA | **961.474** | - | - | M3 | 4.0 |

1. Other sizes available. Please refer to micro collet.

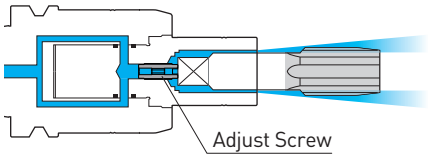
For Micro Collet ▶ 247

## Adjusting Screw for MGT36

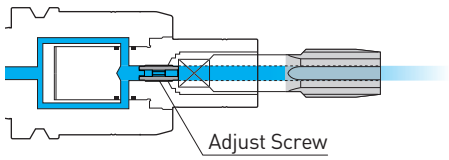
Adjustment of tap projection length (Adjustable amount: 3 mm). Coolant supply is also adjustable in 2 ways by reversing the adjust screw.

| Model | Order No. |
|---|---|
| MGT36AJ | **801.464** |

Tap without hole




Tap with hole



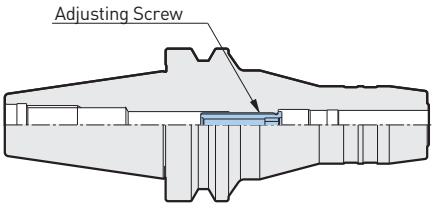

## Side Lock Bolt Set for MGT36

Spare locking screw to clamp a tap.

| | | Tap Holder Model | | |
|---|---|---|---|---|
| Set Model | Order No. | DIN | JIS | Bolt size |
| MGT36SL6 | **801.476** | - | MGT36 -M20 -65 | M6 x 8L (x4) + M6 x 10L (x2) |
| | | - | -M22 -65 | |
| | | - | -P1/2 -65 | |
| MGT36SL8 | **801.477** | MGT36 -180145-65 | -M24 -65 | M8 x 10L (x4) + M8 x 12L (x2) |
| | | -200160-65 | -M27 -65 | |
| | | -220180-65 | -M30 -65 | |
| | | | -P3/4 -65 | |
| MGT36SL10 | **801.475** | MGT36 -250200-65 | MGT36 -M33 -65 | M10 x 12L (x4) + M10 x 14L (x2) |
| | | -280220-65 | -M36 -65 | |
| | | | -P1 -65 | |

## Adjusting Screws

**For Hydraulic Chuck**




| One Side Hexagon Socket Type | | Both Side Hexagon Socket Type | |
|---|---|---|---|
| Model | Order No. | Model | Order No. |
| HDA6 -05020 | 803.742 | HDA6 -05020W | 802.393 |
| -05032 | 803.743 | -05032W | 802.394 |
| -20010 | 802.390 | - | - |
| HDA8 -06020 | 803.745 | HDA8 -06020W | 803.759 |
| -06032 | 803.746 | -06032W | 803.760 |
| HDA10 -08015 | 803.747 | HDA10 -08015W | 803.761 |
| -08032 | 803.748 | -08032W | 803.762 |
| HDA12 -10010 | 803.749 | - | - |
| -10025 | 803.750 | HDA12 -10025W | 803.763 |
| -10032 | 803.751 | -10032W | 802.383 |
| HDA16 -12015 | 803.752 | HDA16 -12015W | 802.384 |
| -12030 | 802.337 | -12030W | 802.385 |
| -12037 | 803.754 | -16037W | 802.386 |
| HDA20 -12047 | 802.391 | - | - |
| HDA20 -16015 | 803.755 | HDA20 -16015W | 802.387 |
| HDA25 -16039 | 803.757 | HDA25 -16039W | 802.389 |
| HDA16 -12015 | 803.752 | HDA16 -12015W | 802.384 |
| HDA20 -16015 | 803.755 | HDA20 -16015W | 802.387 |

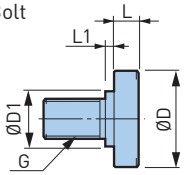
1. One side hexagon socket type can be clamped only from chuck side.

A.8

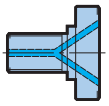
## Clamp Bolts

**For Face Mill Arbor FMH and Smart Damper FMH type**

Clamp Bolt




Clamp Bolt with Coolant Hole



| Model | Order No. | Model | Order No. | ØD | ØD1 | L | L1 | G |
|---|---|---|---|---|---|---|---|---|
| MBA -M12 | 802.757 | TMBA -M12 | 802.767 | 33 | 23 | 10 | 2 | 12 |
| -M12H | 802.758 | - | - | | - | | - | |
| -M16 | 802.759 | -M16 | 802.768 | 40 | 23 | 10 | 6 | 16 |
| -M16H | 802.760 | - | - | | - | | - | |
| -M20 | 802.761 | -M20 | 802.769 | 50 | 27 | 14 | 6 | 20 |
| -M20H | 802.762 | - | - | | - | | - | |

## Sleeve for BSL Side Lock Holder

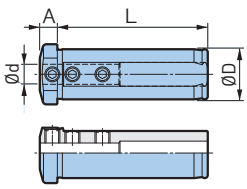



Fig. 1

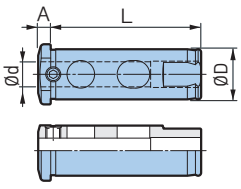



Fig. 2

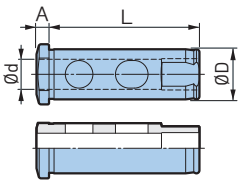



Fig. 3

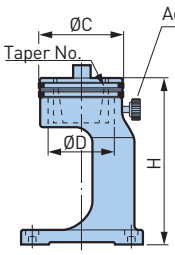
| Model | Order No. | Fig. | Ød | ØD | L | A |
|---|---|---|---|---|---|---|
| BSLA20 - 6 | 805.728 | 1 | 6 | 20 | 60 | 5 |
| - 8 | 805.733 | | 8 | | | 7 |
| -10 | 805.734 | 2 | 10 | | | 5 |
| -12 | 805.735 | 3 | 12 | | | |
| -16 | 805.736 | | 16 | | | |
| BSLA32 -10 | 805.737 | 1 | 10 | 32 | 75 | 9 |
| -12 | 805.738 | | 12 | | | |
| -16 | 805.739 | 2 | 16 | | | 6 |
| -20 | 805.740 | 3 | 20 | | | |



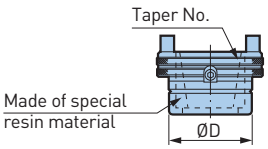
BROTECH

# Tooling Mate

**For BBT (BT) and BDV (DV)**




**Replaceable Adapter**




| Model | Order No. | Taper No. | ØC | ØD | H | □W | □P | ØM | Weight (kg) | Adapter Model |
|---|---|---|---|---|---|---|---|---|---|---|
| TMS40 -20 | **805.489** | BT20 | 76 | 60 | 150 | 110 | 90 | 7 (for M6) | 2.6 | TMA40 -20 |
| -30 | **961.270** | BT30 | | | | | | | 2.6 | -30 |
| -40 | **961.271** | BT40/DV40 | | | | | | | 2.4 | -40 |
| TMS50 -40 | **961.272** | BT40/DV40 | 105 | 88 | 190 | 160 | 130 | 9 (for M8) | 7.0 | TMA50 -40 |
| -50 | **961.273** | BT50/DV50 | | | | | | | 6.0 | -50 |

1. 1 pce. of adapter is included.
2. Adapter can be ordered individually.

For Adapter ▶ 284

**For HSK and BIG CAPTO**

Innovative "Two-way clutch needle roller clamping system" assures secure clamping at the tool flange periphery.

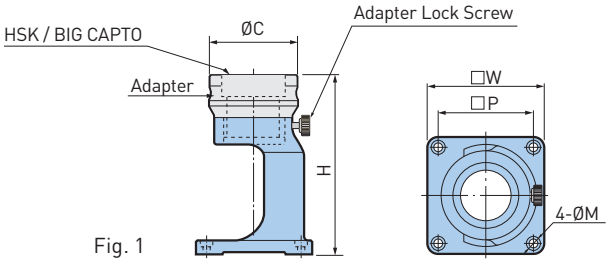



Fig. 1

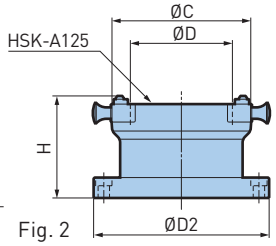
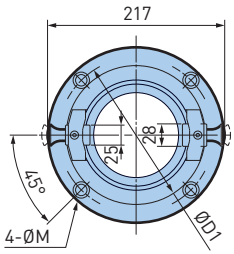



Fig. 2




| Model | Order No. | Fig. | HSK / BIG CAPTO No. | ØC | H | □W | □P | ØM | Weight (kg) | Adapter Model |
|---|---|---|---|---|---|---|---|---|---|---|
| TMS40 - 32R | **961.339** | 1 | 32/C3 | 76 | 165 | 110 | 90 | 7 (for M6) | 3.2 | TMA40 - 32R |
| - 40R | **961.342** | | 40/C4 | | | | | | 3.0 | - 40R |
| - 50R | **961.346** | | 50/C5 | | | | | | 2.7 | - 50R |
| - 63R | **961.338** | | 63/C6 | 87 | 172 | | | | 2.7 | - 63R |
| TMS50 - 80R | **802.308** | 1 | 80/C8 | 114 | 215 | 160 | 130 | 9 (for M8) | 7.1 | TMA50 - 80R |
| -100R | **802.307** | | 100 | 124 | 219 | | | | 6.5 | -100R |

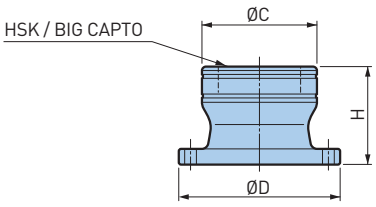
1. 1 pce. of adapter is included.
2. Adapter can be ordered individually.

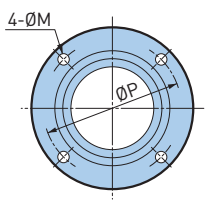
For Adapter ▶ 284

| Model | Order No. | Fig. | HSK | ØC | H | ØD | ØD1 | ØD2 | ØM | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| TMS-HSK - A125 | **806.795** | 2 | 125 | 170 | 125 | 125 | 190 | 215 | 13 (for M12) | 6.0 |

# Kombi Grip

**For HSK and BIG CAPTO**



| Model | Order No. | HSK No. | BIG CAPTO No. | ØC | ØD | H | ØP | ØM |
|---|---|---|---|---|---|---|---|---|
| KG 25R | **961.291** | 25 | - | 48 | 79 | 65 | 62 | 7 (for M6) |
| 32R | **961.292** | 32 | C3 | 55 | 85 | | 69 | |
| 40R | **961.293** | 40 | C4 | 63 | 93 | 70 | 77 | |
| 50R | **961.294** | 50 | C5 | 75 | 105 | | 89 | |
| 63R | **961.295** | 63 | C6 | 88 | 123.5 | 75 | 105.5 | 9 (for M8) |
| 80R | **961.296** | 80 | C8 | 107 | 142 | 90 | 124 | |
| 100R | **961.297** | 100 | - | 127 | 162 | 100 | 144 | |

1. 4 pcs. of cap bolts to mount on the table are not included.

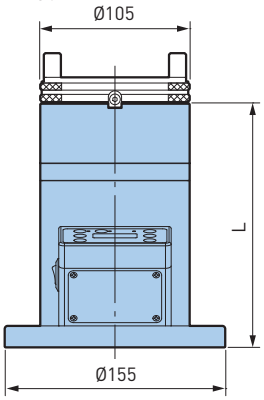


BROTECH

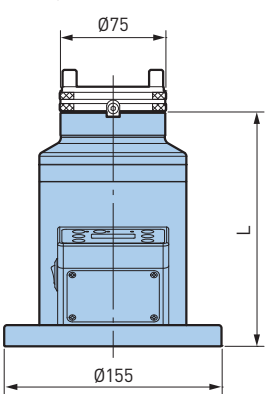
# Torque Fit

Tooling Fixture with Tightening Torque Indicate function

TF-50

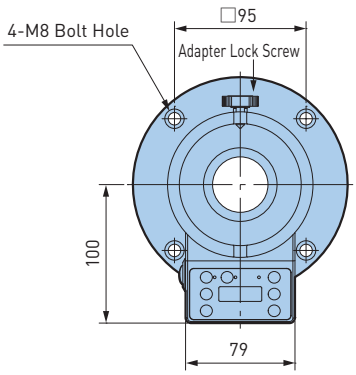



TF-40




- Torque values of all BIG KAISER collet chucks are presetted.
- Notification by buzzer near the correct torque.
- USER-Mode allows setting of desired torque value.

A.8

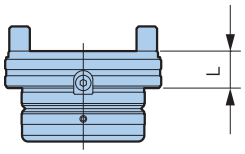



| Model | Order No. | Torque Setting Range | L | Adapter | Input Voltage | Weight (kg) |
|---|---|---|---|---|---|---|
| TF-40 | **806.737** | 4 - 80 Nm | 167 | TMA40- | 100 - 240V | 8.0 |
| TF-50 | **806.738** | | 172 | TMA50- | | |

1. Adapter is to be ordered seperately.

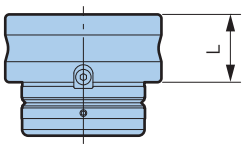
## Adapter (optional)

For BT/DV




| Model | Order No. | Body Model | Taper No. | L | Weight (kg) |
|---|---|---|---|---|---|
| TMA40 - 20 | **805.894** | TF-40 | ISO20 | 18 | 0.8 |
| - 30 | **802.944** | | BT30 | | 0.8 |
| - 40 | **802.945** | | BT/DV40 | | 0.6 |
| TMA50 - 40 | **802.942** | TF-50 | BT/DV40 | | 2.3 |
| - 50 | **802.943** | | BT/DV50 | | 1.3 |

For HSK/BIG CAPTO



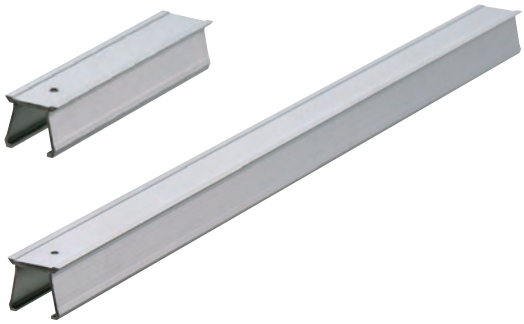

| Model | Order No. | Body Model | HSK No. | BIG Capto No. | L | Weight (kg) |
|---|---|---|---|---|---|---|
| TMA40 - 32R | **802.948** | TF-40 | 32 | - | 33 | 1.4 |
| - 40R | **802.949** | | 40 | C4 | | 1.2 |
| - 50R | **802.950** | | 50 | C5 | | 0.9 |
| - 63R | **972.331** | | 63 | C6 | 40 | 0.9 |
| TMA50 - 80R | **802.946** | TF-50 | 80 | C8 | 43 | 2.5 |
| - 100R | **802.947** | | 100 | - | 47 | 1.8 |

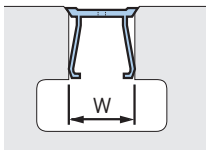


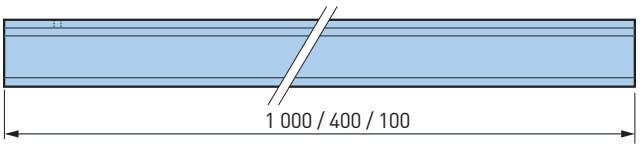
BROTECH

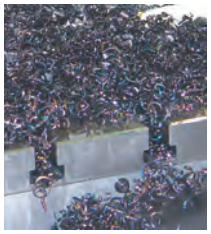
# T-Slot Clean

Improve efficiency of table cleaning. Save you from cleaning T-slots packed with swarf. Quick discharge of swarf out of a machine.

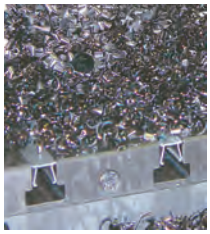




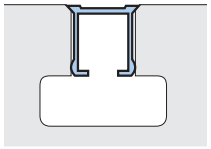



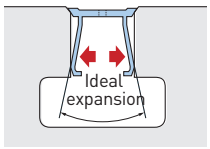
Before



After



Other manufacturer




BIG KAISER

Due to the uniquely angled shape of the table T-shot contact part, slipout is prevented and chips are completely shut out.

A.8

### Standard Set

| Set Model | Order No. | W | Contents of Set |
|---|---|---|---|
| TS14-S | **961.252** | 14 | 400 mm x 4 pieces<br>100 mm x 4 pieces<br>Removal pin x 1 piece |
| TS18-S | **961.253** | 18 | |
| TS22-S | **961.254** | 22 | |

### 400 mm Set

| Set Model | Order No. | W | Contents of Set |
|---|---|---|---|
| TS14-400L-100P | **961.255** | 14 | 400 mm x 100 pieces<br>Removal pin x 10 piece |
| TS18-400L-100P | **961.256** | 18 | |
| TS22-400L-100P | **961.257** | 22 | |

### 1000 mm Set

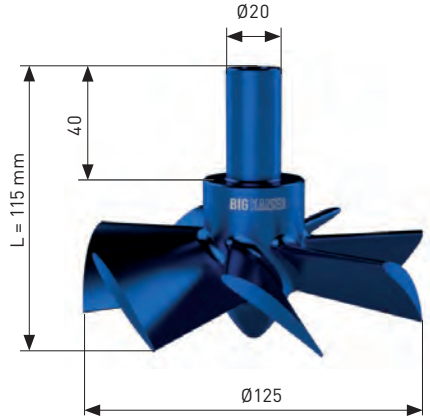
**For large machines**

1000 mm (1 m) long version is available.

| Set Model | Order No. | W | Contents of Set |
|---|---|---|---|
| TS18-1000L-10P | **802.785** | 18 | 1000 mm x 10 pieces<br>Removal pin x 1 piece |
| TS22-1000L-10P | **802.787** | 22 | |

# Chip Fan

Remove chips and coolant from tools without interrupting production.

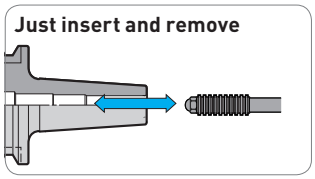


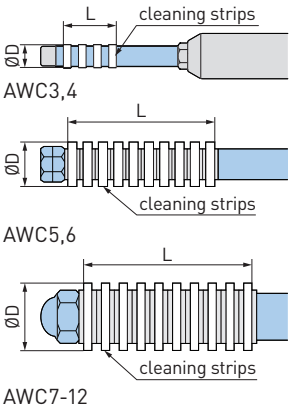

| Set Model | Order No. | No. of Wings |
|---|---|---|
| ST20-CF125 | **335.625** | 7 |

## α Wiper Cleaners, Ø3 - 12

**Perfect for Hydraulic Chuck and Shrink Fit Holder**

Easy cleaning by simply inserting and removing.




| Model | Order No. | ØD | L |
|---|---|---|---|
| AWC3 | 978.898 | 3 | 7 |
| AWC4 | 978.899 | 4 | 7 |
| AWC5 | 978.900 | 5 | 20 |
| AWC6 | 978.901 | 6 | |
| AWC7 | 802.781 | 7 | |
| AWC8 | 978.902 | 8 | |
| AWC9 | 802.782 | 9 | 26 |
| AWC10 | 978.903 | 10 | |
| AWC11 | 802.783 | 11 | 31 |
| AWC12 | 978.904 | 12 | |

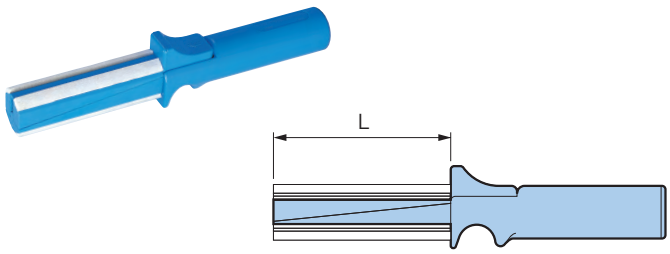
1. ØD is the inner bore of correspondent tool holders.

## TK Cleaners, Ø14 - 42

**Perfect for Hydraulic Chuck and Milling Chuck Holder**

Absolute cleaning of clamping bore by unique "slide" feature.

A.8

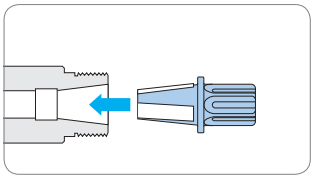


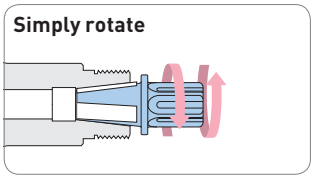

| Model | Order No. | Bore Diameter (Ø) | L | Leather Strips Qty. |
|---|---|---|---|---|
| TKC 14 | 802.805 | 14 | 60 | 2 |
| 16 | 802.807 | 16 | 70 | |
| 18 | 802.808 | 18 | | |
| 20 | 802.809 | 20 | | |
| 25 | 802.810 | 25 | 80 | 3 |
| 32 | 802.811 | 32 | 100 | 4 |
| 40 | 802.812 | 40 | 105 | |
| 42 | 978.905 | 42 | | |

## α Taper Cleaners

**For internal collet taper**

Maintain accuracy of high precision collet chucks.






**For MEGA Micro Chuck**

| Model | Order No. | Suitable Model |
|---|---|---|
| SC-NBC3S | 961.278 | MEGA3S |
| SC-NBC4S | 961.279 | MEGA4S |
| SC-NBC6S | 961.280 | MEGA6S |
| SC-NBC8S | 805.827 | MEGA8S |

**For MEGA E Chuck**

| Model | Order No. | Suitable Model |
|---|---|---|
| SC-MEC6 | 961.287 | MEGA6E |
| SC-MEC8 | 961.288 | MEGA8E |
| SC-MEC10 | 961.289 | MEGA10E |
| SC-MEC13 | 961.290 | MEGA13E |

**For MEGA New Baby Chuck and New Baby Chuck**

| Model | Order No. | Suitable Model | |
|---|---|---|---|
| SC-NBC6 | 961.281 | MEGA6N | NBS6 |
| SC-NBC8 | 961.282 | MEGA8N | NBS8 |
| SC-NBC10 | 961.283 | MEGA10N | NBS10 |
| SC-NBC13 | 961.284 | MEGA13N | NBS13 |
| SC-NBC16 | 961.285 | MEGA16N | NBS16 |
| SC-NBC20 | 961.286 | MEGA20N | NBS20 |

**For ER Collet Chuck**

| Model | Order No. | Suitable Model |
|---|---|---|
| SC-MER11 | 967.810 | ER11 |
| SC-MER16 | 967.811 | ER16 |
| SC-MER20 | 967.812 | ER20 |
| SC-MER25 | 967.813 | ER25 |
| SC-MER32 | 967.814 | ER32 |

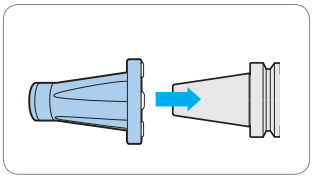


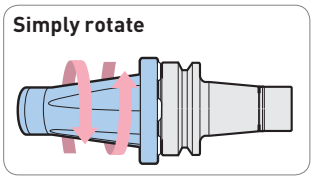
BROTECH

# α Tooling Cleaners

**For tool shank taper and flange**

Particles and oil on both taper and flange of 7/24 taper holder are easily removed.






| Model | Order No. | Shank Size |
|---|---|---|
| SCE-30 | 961.276 | No. 30 |
| SCE-40 | 961.277 | No. 40 |

## Spindle Cleaners

**For machine spindle**

Easy cleaning of oil or particles from the machine spindle.

A.8

**For ISO taper spindle**

| Model | Order No. | Taper Size |
|---|---|---|
| SC20 | 804.945 | No. 20 |
| SC30 | 802.791 | No. 30 |
| SC40 | 802.793 | No. 40 |
| SC45 | 802.794 | No. 45 |
| SC50 | 802.796 | No. 50 |

**For Morse taper spindle**

| Model | Order No. | Taper Size |
|---|---|---|
| SC1 | 802.788 | MT1 |
| SC2 | 802.789 | MT2 |
| SC3 | 802.790 | MT3 |
| SC4 | 802.792 | MT4 |
| SC5 | 802.795 | MT5 |
| SC6 | 802.797 | MT6 |

**For HSK spindle**

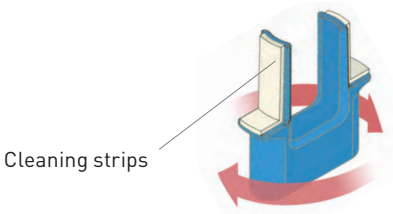
| Model | Order No. | Taper Size |
|---|---|---|
| SC-HSK 32 | 802.799 | HSK-A32 |
| 40 | 979.997 | HSK-A40 |
| 50 | 802.800 | HSK-A50 |
| 63 | 802.802 | HSK-A63 |
| 80 | 802.803 | HSK-A80 |
| 100 | 802.798 | HSK-A100 |

| Model | Order No. | Taper Size |
|---|---|---|
| SC-HSK25E | 979.995 | HSK-E25 |
| 32E | 979.996 | HSK-E32 |
| 40E | 979.998 | HSK-E40 |
| 50E | 802.801 | HSK-E50 |

## Spindle Cleaners

**For BIG CAPTO**

Easy cleaning of BIG CAPTO polygon taper.

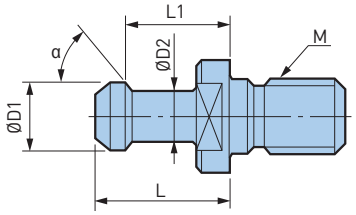


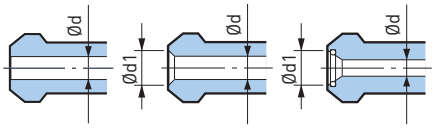

| Model | Order No. | BIG CAPTO No. |
|---|---|---|
| SC -C3 | 973.194 | C3 |
| -C4 | 973.195 | C4 |
| -C5 | 973.196 | C5 |
| -C6 | 973.197 | C6 |
| -C8 | 973.198 | C8 |

# Pullstud Bolts

**Before ordering**

Ensure to check the dimensions of the required pullstud bolt by referring to the specification sheet of the machine tool. In the case of machines with coolant-through-spindle capability especially, provide us a copy of the pullstud bolt drawing, as sealing method may vary even among machines with the same model number.




Type 1 Type 2 Type 3

| Spindle | Model | Order No. | Standard | ØD1 | ØD2 | L | L1 | α | Ød | Ød1 | Hole Type | Specification / Feature |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 (M12) | 30PMG | 978.956 | JIS | 12 | 8 | 23.4 | 18.4 | 75 | None | - | - | JIS BT30 |
| | 30PMGH | 978.972 | | | | | | | 4.0 | - | 1 | JIS BT30 with hole |
| | 30PMGH2 | 800.450 | | | | | | | 2.5 | 5.5 | 3 | YASDA |
| | P30T-1MG | 978.978 | MAS-I | 11 | 7 | 23 | 18 | 45 | None | - | - | MAS-1 BT30 |
| | P30T-1MGH | 978.953 | | | | | | | 2.5 | - | 1 | MAS-1 BT30 with hole |
| | P30T-2MG | 978.979 | MAS-II | | | | | 60 | None | - | - | MAS-2 BT30 |
| | P30T-2MGH | 801.785 | | | | | | | 2.5 | - | 1 | MAS-2 BT30 with hole |
| | 30P-1MGH | 978.951 | Original | 11 | 8 | 23 | 18 | 45 | 4.0 | - | 1 | FANUC |
| | P30T-2MGH3 | 801.787 | | 11 | 7.5 | 23 | 18 | 60 | 2.5 | - | 1 | BROTHER |
| | PMO30MG | 802.001 | | 11 | 7 | 23 | 18 | 45 | 2.5 | 6.5 | 3 | DMG MORI |
| 40 (M16) | 40PMG | 800.463 | JIS | 19 | 14 | 29 | 23 | 75 | None | - | - | JIS BT40 |
| | 40PMGH | 978.954 | | | | | | | 7.0 | - | 1 | JIS BT40 with hole |
| | 40PMGH2 | 800.464 | | | | | | | 7.0 | - | 1 | MAKINO (Face G) * |
| | 40PMGH7 | 978.958 | | | | | | | 4.0 | 5.0 | 2 | OKUMA (Face G) * |
| | 40PMGH4A | 978.955 | | | | | | | 7.0 | - | 1 | YASDA Ø3 side hole |
| | 40PMGH11 | 978.977 | | | | | | | | 10.0 | 3 | YASDA |
| | 40PMGH12 | 805.885 | | | | | | | 5.0 | - | 1 | MITSUI |
| | P40T-1MG | 801.807 | MAS-I | 15 | 10 | 35 | 28 | 45 | None | - | - | MAS-1 BT40 |
| | P40T-1MGHA | 801.814 | | | | | | | 3.0 | - | 1 | MAS-1 BT40 with hole |
| | P40T-1MGH1 | 801.808 | | | | | | | 3.5 | 5.5 | 2 | |
| | P40T-1MGH4 | 801.810 | | | | | | | 3.0 | 7.0 | 3 | OKUMA |
| | P40T-1MGH7 | 801.812 | | | | | | | 4.0 | - | 1 | MAKINO (Face G) * |
| | P40T-1MGH8A | 801.813 | | | | | | | 3.0 | 7.0 | 3 | JTEKT |
| | P40T-2MG | 801.831 | MAS-II | 15 | 10 | 35 | 28 | 60 | None | - | - | MAS-2 BT40 |
| | P40T-2MGHA | 801.834 | | | | | | | 3.0 | - | 1 | MAS-2 BT40 with hole |
| | P40T-2MGH8 | 801.833 | | | | | | | 3.5 | 5.5 | 2 | |
| | P40T-2MGH1 | 801.832 | | | | | | | 3.0 | 7.0 | 3 | OKUMA |
| | PVD40MG | 978.975 | DIN | 19 | 14 | 26 | 20 | 75 | 7.0 | - | 1 | DIN 69872 form A |
| | MP40MG | 801.507 | Original | 15 | 10 | 25 | 18 | 90 | None | | - | MITSUI |
| | POM40MG | 802.023 | | 15 | 10 | 35 | 28 | 90 | None | - | - | DMG MORI w/o hole |
| | PMO40MG | 978.971 | | 19 | 14 | 29 | 23 | 75 | 7.0 | 10.0 | 3 | DMG MORI with hole |
| | PYN40MG | 802.112 | | 18.8 | 12.45 | 19.11 | 14.03 | 45 | 7.0 | - | 1 | MAZAK |

1. Machine tool builders have used many various shapes and sizes of pull stud bolts.
2. The use of the incorrect bolts may result in injury or property damage for your machining center.
3. * End face was ground for the sealing.
4. Other sizes are also available. Contact BIG KAISER agent for pullstud bolts.

## MEGA Pullstud Bolt

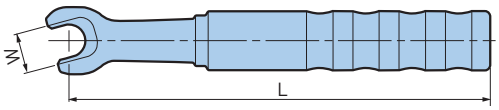
MG in the model numbers stand for MEGA Pullstud Bolt. Tensile strength is improved by utilizing tool steel. Especially recommended for the BIG-PLUS dual contact applications. (Material: X40CrMOV51)

| Spindle | Model | Order No. | Standard | ØD1 | ØD2 | L | L1 | α | Ød | Ød1 | Hole Type | Specification / Feature |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 (M24) | 50PH | 978.965 | JIS | 28 | 21 | 34 | 25 | 75 | 10.0 | - | 1 | JIS 50 with hole |
| | 50PMGH | 800.472 | | | | | | | | | | |
| | 50PH2 | 800.468 | | | | | | | | | | MAKINO (Face G) * |
| | P50T-1 | 961.331 | MAS-I | 23 | 17 | 45 | 35 | 45 | None | - | - | MAS-1 BT50 |
| | P50T-1MG | 801.883 | | | | | | | | | | |
| | P50T-1H | 801.860 | | | | | | | 8.0 | - | 1 | MAS-1 BT50 with hole |
| | P50T-1MGH | 801.885 | | | | | | | 6.0 | - | 1 | |
| | P50T-1H1 | 801.861 | | | | | | | 6.0 | - | 1 | MAKINO (Face G) * |
| | P50T-1H4 | 801.873 | | | | | | | 6.0 | 10.4 | 3 | JTEKT |
| | P50T-1H5 | 961.332 | | | | | | | 5.5 | 11.2 | 3 | YASDA |
| | P50T-1H8 | 801.876 | | | | | | | 8.0 | 11.0 | 3 | DMG MORI (Face G) * |
| | P50T-1MGH25 | 801.889 | | | | | | | 6.0 | 7.0 | 2 | OKUMA (Face G) * |
| | P50T-1H19 | 801.868 | | | | | | | 4.5 | - | 1 | TOSHIBA |
| | P50T-2 | 801.898 | MAS-II | 23 | 17 | 45 | 35 | 60 | None | - | - | MAS-2 BT50 |
| | P50T-2MG | 801.942 | | | | | | | | | | |
| | P50T-2H | 801.925 | | | | | | | 8.0 | - | 1 | MAS-2 BT50 with hole |
| | P50T-2MGH25 | 801.948 | | | | | | | 6.0 | - | 1 | |
| | P50T-2H4 | 801.938 | | | | | | | 8.0 | 11.0 | 3 | DMG MORI (Face G) * |
| | P50T-2H14 | 801.929 | | | | | | | 6.0 | 7.0 | 2 | OKUMA (Face G) * |
| | P50T-2MGH14 | 801.944 | | | | | | | 6.0 | 7.0 | 2 | |
| | P50T-2H11 | 801.927 | | | | | | | 6.0 | 9.5 | 3 | OKUMA |
| | P50T-2H15 | 801.930 | | | | | | | 6.0 | 10.4 | 3 | JTEKT |
| | P50T-2H16 | 801.931 | | | | | | | 5.5 | 11.2 | 3 | YASDA |
| | PVD50 | 978.966 | DIN | 28 | 21 | 34 | 25 | 75 | 11.5 | - | 1 | DIN 69872 form A |
| | MP50 | 801.509 | Original | 24 | 18 | 31 | 23 | 90 | None | - | - | MITSUI |
| | MP50H1 | 801.517 | | | | | | | 8.0 | - | 1 | MITSUI with hole |
| | POM50 | 978.967 | | 23 | 17 | 45 | 35 | 90 | None | - | - | DMG MORI |
| | POM50H | 961.336 | | | | | | | 8.0 | - | 1 | DMG MORI with hole |
| | POM50H1 | 961.333 | | | | | | | 8.0 | 12.4 | 3 | |
| | POM50H8 | 802.046 | | 23 | 17 | 45 | 35 | 90 | 6.0 | - | 1 | OKK (Face O) ** |
| | PYN50-5 | 802.120 | | 28.96 | 20.83 | 25.2 | 17.58 | 45 | 10.0 | - | 1 | MAZAK (Face G) * |

1. Machine tool builders have used many various shapes and sizes of pull stud bolts.
2. The use of the incorrect bolts may result in injury or property damage for your machining center.
3. * End face was ground for the sealing.
4. ** End face has O-ring for the sealing.
5. Other sizes are also available. Contact BIG KAISER agent for pullstud bolts.



## Pullstud Wrenches




| Taper Size | Model | Order No. | W | L | Suitable pullstud specification |
|---|---|---|---|---|---|
| BBT30<br>BT30 | PLW30 | 805.544 | 13 | 140 | JIS, MAS-I, MAS-II,<br>30P-1MGH, P30T-2MGH3, PMO30MG |
| BBT40<br>BT40 | PLW-40P | 805.886 | 19 | 200 | JIS |
| | PLW-P40T | 805.887 | | | MAS-I, MAS-II, POM40MG |
| | PLW-PMO40 | 805.888 | | | PMO40MG |
| | PLW-PYN40 | 805.889 | | | PYN40MG |

1. If appearance shape is the same, the specification other than above is also usable.

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# Set Up Information

**Preparing the Stop Block**

The Angle Head utilizes a Locating Pin that engages with the Stop Block, which is mounted to the machine spindle to prevent radial movement of the Angle Head during operation. Therefore, it is necessary to use a Stop Block with the proper dimensions to match the Locating Pin of the Angle Head.

## 1. Standard Setup of the Locating Pin

**"S" Dimension**

The distance from the centerline of the Angle Head spindle to the centerline of the Locating Pin.

**Fixed Length "A" and "H"**

The axial distance from the gauge line to the top of the Locating Pin, when the Locating Pin is properly engaged in the Stop Block.

**Fixed Length "A" for Angle Head (Fig.1)**

This is not adjustable by the customer. If the standard dimensional values shown below are not suitable for your machine,please contact us.

**Fixed Length "H" for Air Turbine spindle and High Spindle (Fig.2)**

We will deliver a set at the standard 6 mm. Otherwise, This dimension is adjustable by the customer. Four (4) Locating Pin models are available, please contact us.

A.8

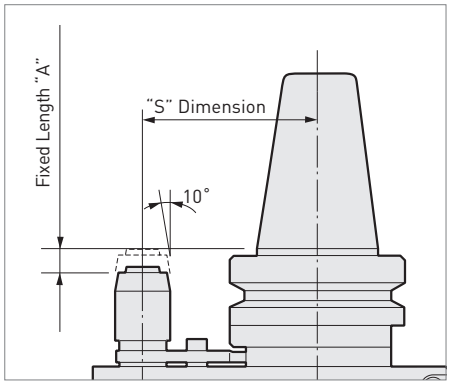



Fig. 1

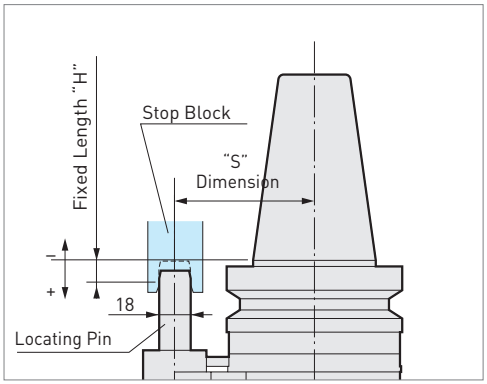



Fig. 2

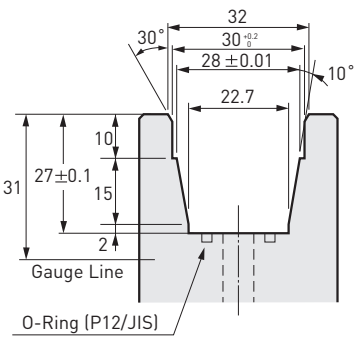
| Standard Dimension | Angle Head Fig. 1 | | Air Turbine and High Spindle Fig. 2 | |
|---|---|---|---|---|
| | "S" | "A" | "S" | "H" |
| BDV40 / BBT40 / HSK-A63 | 65 | 8 | 65 | 6 |
| BDV50 / BBT50 / HSK-A100 | 80 | 8 | 80 | 6 |
| | 110 | 6 | | |

## 2. Stop Block Dimensions

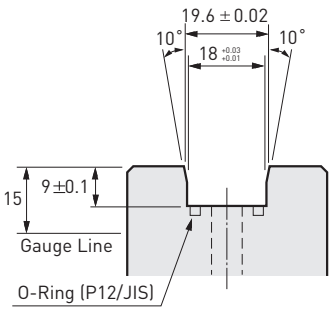
Please order a Stop Block from the machine tool builder. Refer to the following diagrams for the proper Stop Block groove dimensions.

Stop Block

**For "S" = 110 Angle Head**




**Others**



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## 3. Semi-Finished Stop Block

A semi-finished Stop Block has the proper groove form for use with the Angle Head, as well as additional material to allow the user to machine the block to the correct height.

If a pre-made Stop Block is unobtainable from the machine tool builder, a semi-finished Stop Block can be used. Please consult with the machine tool builder for selection, machining, and mounting of a semi-finished Stop Block.

Fig. 1

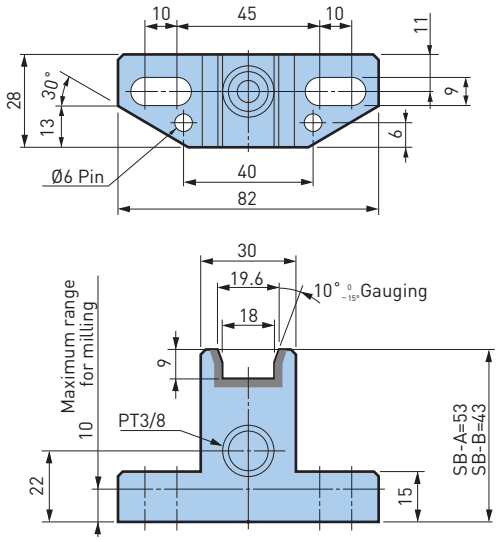



Fig. 2

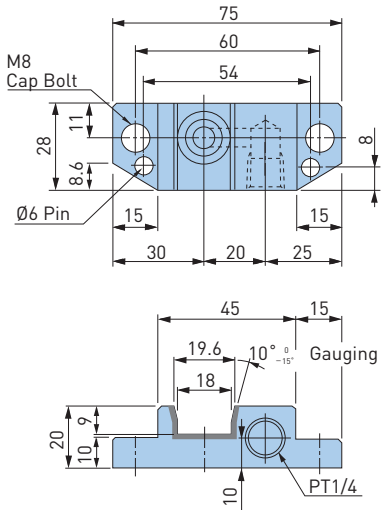
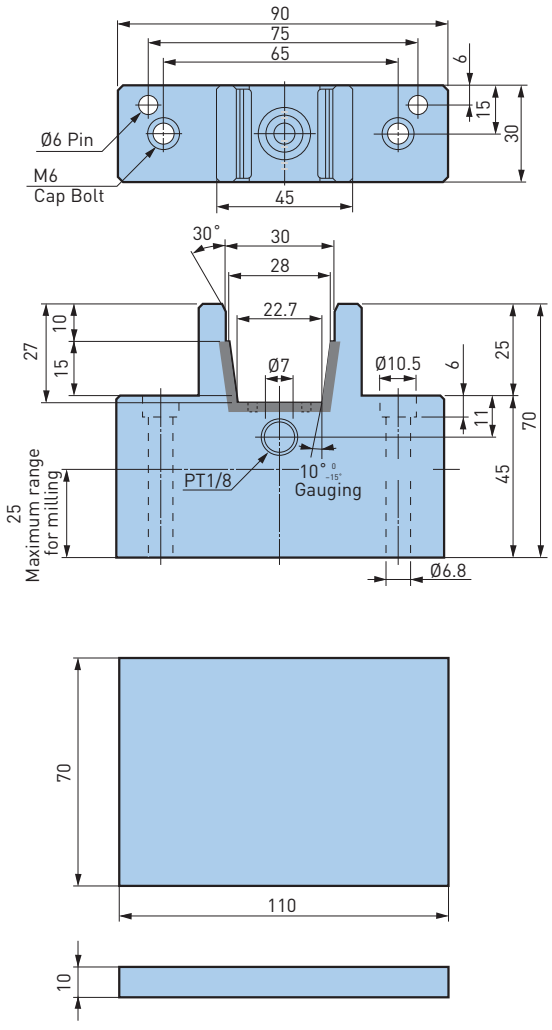



Fig. 3




**Note**

The sketch indicates heat treatment (HRC45-50), all other surfaces can be milled.

| Model | Order No. | Fig. | For "S" |
|---|---|---|---|
| SB - A | 962.571 | 1 | 65 / 80 |
| SB - B | 962.572 | | |
| SB - F | 962.574 | 2 | |
| SB - G/E | 802.329 | 3 | 110 |

1. SB-F is not height-adjustable.
2. "S" is corresponding to page 290.

# Rough Boring Heads


| | |
|---|---|
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| Application Examples for SW | 295 |
| MW Rough Boring Heads | 296 |
| SW Rough Boring Heads | 297 |
| SW-AL Rough Boring Heads | 298 |
| SW Smart Damper Rough Boring Heads | 299 |
| SW Rough Boring Heads BIG CAPTO | 300 |
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| Face Grooving Holders for SW | 306 |
| TWN Rough Boring Heads | 307 |
| Guidelines & Troubleshooting | 308 - 309 |




B.1

BROTECH

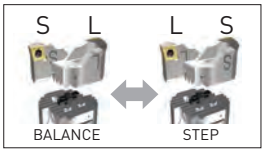
## MW Rough Boring Head

Small and powerful rough boring head: The MW comes with cylindrical shank and permits extremely fast roughing of small holes.
**Ø 16 - 21 mm, ST20**

▶ 296

## SW Rough Boring Head

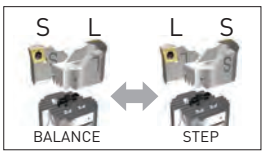
Super-versatile rough boring head for highest cutting performance: Thanks to its clever design, the SW can be used for stepped and balances roughing by simply switching the insert holders. Various accessories are available for chamfering, back boring and face grooving.
**Ø 20 - 203 mm, CKB1-CKB7 and CKN6-CKN7**



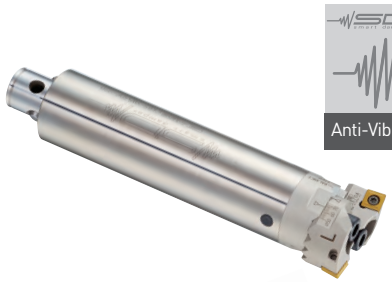

▶ 297

## SW-AL Rough Boring Head

The fastest solution for deep roughing: SW-AL, built of high quality aluminum, fits perfectly on CKN components. Long tool combinations are therefore up to 50% lighter than similar tools built of steel which enhances the productivity drastically.
**Ø 68 - 203 mm, CKN6-CKN7**




▶ 298




## SW Smart Damper Rough Boring Head

The solution for vibration-free rough boring. Its built-in patented Smart Damper technology is located close to the cutting edge and lifts the performance of rough boring on a new level.
**Ø 41 - 100 mm, CKB4-CKB6**

▶ 299

## TWN Rough Boring Head

The TWN rough boring heads have been developed for economical rough boring.
**Ø 20 - 153 mm, CKB1-CKB7**

▶ 307





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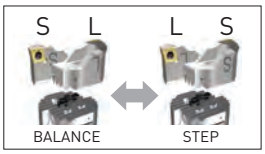
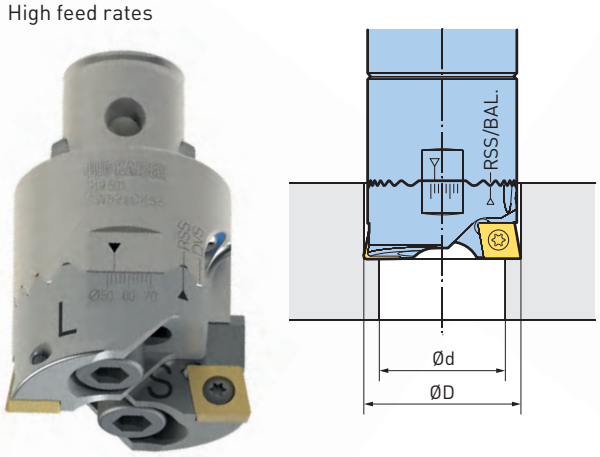
# Application Examples for SW



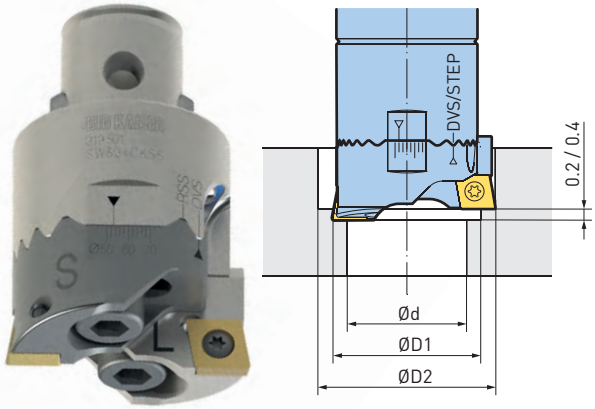

## Rough Boring Balance

Insert Holders: Type CC/SP/SC
Ø 20 - 203 mm
High feed rates



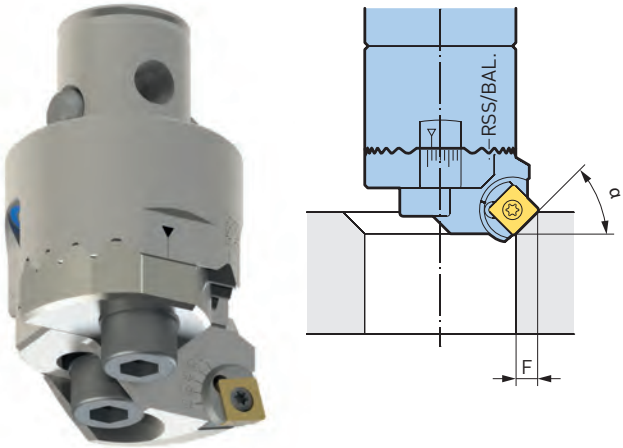

## Rough Boring Step

Insert Holders: Type CC
Ø 20 - 203 mm
Double stock removal, half the feed rate



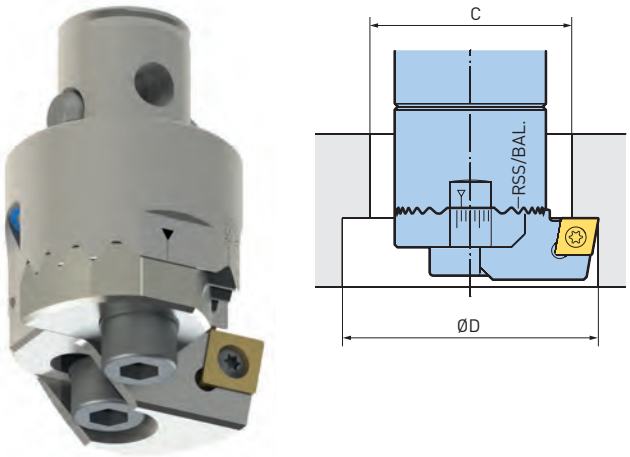

## Chamfering

Ø 33 - 210 mm
Adjustable chamfer angle 15° - 75°




## Back Boring

Ø 44 - 211 mm
Lead angle 90°



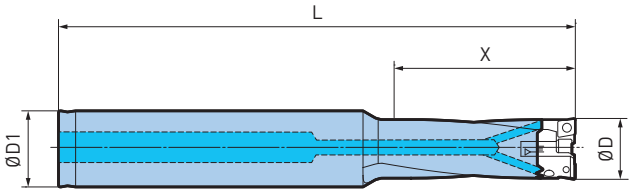

B.1

# MW Rough Boring Heads, Ø 16 - 21

The MW rough boring heads permit extremely fast roughing of small holes (Ø 16-21 mm).

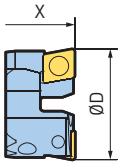
Blind holes

Through holes




| Model | Order No. | ØD | ØD1 | L | X | Weight (kg) |
|---|---|---|---|---|---|---|
| ST20-MW1619-64 | **472.051** | 16 - 19 | 20 | 150 | 64 | 0.26 |
| ST20-MW1821-72 | **472.061** | 18 - 21 | 20 | 155 | 72 | 0.28 |

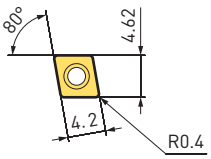
## Insert Holders




| Model | Order No. | ØD | X | |
|---|---|---|---|---|
| MW16-19-SET | **472.052** | 16 - 19 | 64 | MW 04 |
| MW18-21-SET | **472.062** | 18 - 21 | 72 | |

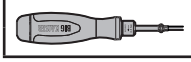
1. Consisting of two insert holders.

B.1

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Grade | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |
|  | MW0404-Z30P | **655.942** | 0.4 | P30 | C (TiAlN-AlCrN) | + | ++ | ++ | | | | | | ++ | + | + | | |
| | MW0404-Z30K | **655.941** | 0.4 | K30 | C (TiAlN-AlCrN) | | | | ++ | ++ | | | | ++ | + | + | | |
| | MW0404-D15N | **655.940** | 0.4 | N15 | C (DLC) | | | | | | ++ | | | ++ | + | + | | |



| | Model | Order No. |
|---|---|---|
| | Torx T6 M1.6x4.2 | **694.105** |

|  | Model | Order No. |
|---|---|---|
| | Torx T6 | **694.181** |

Clamping screw (10 screws and 1 wrench)
Inserts are sold in packages of 10 pieces.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |



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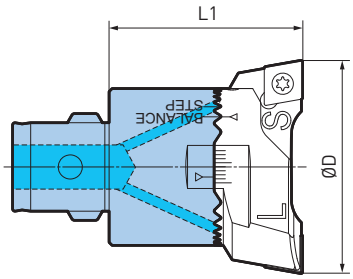
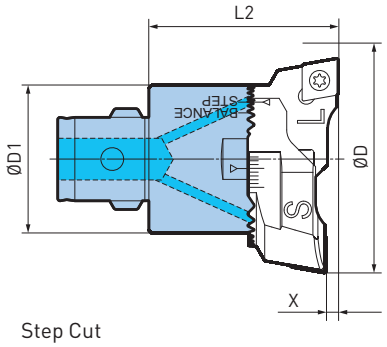
# SW Rough Boring Heads, Ø 20 - 203

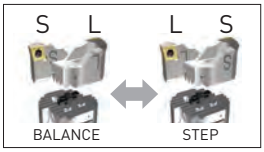
The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance.




Balance Cut




Step Cut



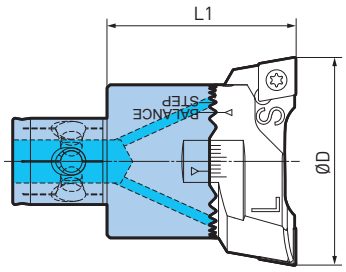

| Model | Order No. | CK | ØD | ØD1 | L1 | L2 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| SW20-31CKB1 | **319.101** | CKB1 | 20 - 31 | 19 | 32.5 | 32.6 | 0.2 | 0.05 |
| SW25-40CKB2 | **319.201** | CKB2 | 25 - 40 | 24 | 35.5 | 35.6 | | 0.11 |
| SW32-51CKB3 | **319.301** | CKB3 | 32 - 51 | 31 | 40 | 40.1 | | 0.19 |
| SW41-66CKB4 | **319.401** | CKB4 | 41 - 66 | 39 | 47 | 47.2 | 0.4 | 0.36 |
| SW53-86CKB5 | **319.501** | CKB5 | 53 - 86 | 50 | 57 | 57.2 | | 0.66 |
| SW68-110CKB6 | **319.601** | CKB6 | 68 - 110 | 63.5 | 71 | 71.2 | | 1.18 |
| SW68-110CKN6 | **319.601N** | CKN6 | | | | | | 1.18 |
| SW98-153CKB6 | **319.602** | CKB6 | 98 - 153 | 90 | 71 | 71.2 | | 1.90 |
| SW98-153CKN6 | **319.602N** | CKN6 | | | | | | 1.90 |
| SW148-203CKB6 | **319.603** | CKB6 | 148 - 203 | 140 | 71 | 71.2 | | 2.52 |
| SW148-203CKN6 | **319.603N** | CKN6 | | | | | | 2.52 |
| SW98-153CKB7-87 | **319.701** | CKB7 | 98 - 153 | 90 | 87 | 87.2 | | 3.10 |
| SW98-153CKN7-87 | **319.701N** | CKN7 | | | | | | 3.10 |
| SW98-153CKB7-117 | **319.702** | CKB7 | 98 - 153 | 90 | 117 | 117.2 | | 4.50 |
| SW98-153CKN7-117 | **319.702N** | CKN7 | | | | | | 4.50 |
| SW148-203CKB7 | **319.703** | CKB7 | 148 - 203 | 140 | 117 | 117.2 | | 5.60 |
| SW148-203CKN7 | **319.703N** | CKN7 | | | | | | 5.60 |

1. X = difference length of insert holders for DVS step rough boring
2. For information on CKN and CKB connections, kindly see introduction pages.

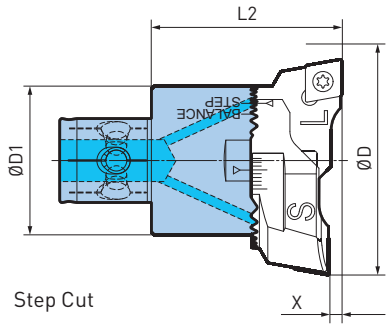
For Spare Parts ▸ 429
Insert Holders ▸ 301 - 305

# SW-AL Rough Boring Heads, Ø 68 - 203

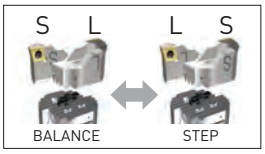
Tool body made of high strength aluminium with CKN connection.




Balance Cut




Step Cut




| Model | Order No. | CK | ØD | ØD1 | L1 | L2 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| SW68-110CKN6AL | **319.604N** | CKN6 | 68 - 110 | 63.5 | 71 | 71.2 | 0.4 | 0.5 |
| SW98-153CKN6AL | **319.605N** | CKN6 | 98 - 153 | 90 | 71 | 71.2 | | 0.9 |
| SW148-203CKN6AL | **319.607N** | CKN6 | 148 - 203 | 140 | 71 | 71.2 | | 1.1 |
| SW98-153CKN7-87AL | **319.705N** | CKN7 | 98 - 153 | 90 | 87 | 87.2 | | 1.3 |
| SW98-153CKN7-117AL | **319.706N** | CKN7 | 98 - 153 | 90 | 117 | 117.2 | | 1.9 |
| SW148-203CKN7AL | **319.707N** | CKN7 | 148 - 203 | 140 | 117 | 117.2 | | 2.3 |

1. X = difference length of insert holders for step cut.

For Spare Parts ▶ 429
For Insert Holder ▶ 301 / 302

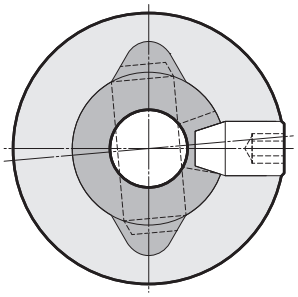


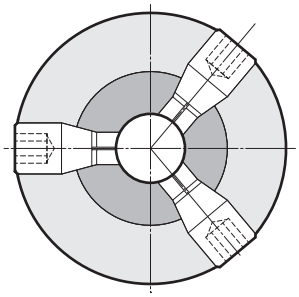
Especially made to fit on CKN components

## Difference CKB and CKN Connection

**CKB:** The most common CK connection with single clamping CK srew. Ideal for simple, efficient operations.

**CKN:** The most powerful CK connection with triple clamping CK screw. Ideal for long tool combinations and challenging operations. High interchange accuracy, less than 0.002 mm radial change error, is guaranteed.

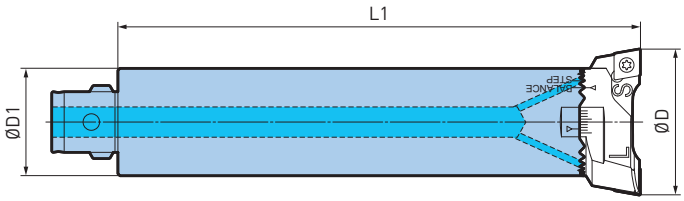


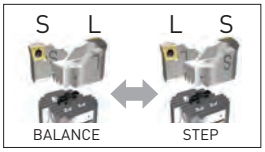


# SW Smart Damper Rough Boring Heads, Ø 41 - 100

The well established dynamic damper eliminates chatter in high work loads.

Anti-Vibration

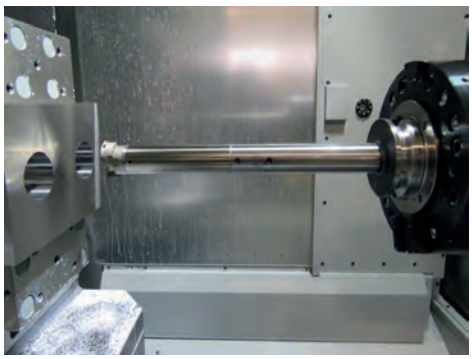



| Model | Order No. | CK | ØD | ØD1 | L | Weight (kg) |
|---|---|---|---|---|---|---|
| SW41-66CKB4-200DP | **389.405** | CKB4 | 41 - 66 | 39 | 200 | 2.4 |
| SW53-86CKB5-225DP | **389.406** | CKB5 | 53 - 86 | 50 | 220 | 4.5 |
| SW68-110CKB6-260DP | **389.407** | CKB6 | 68 - 110 | 64 | 260 | 8.3 |

For Spare Parts ▶ 429
For Insert Holder ▶ 301 / 302

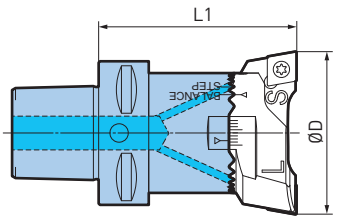




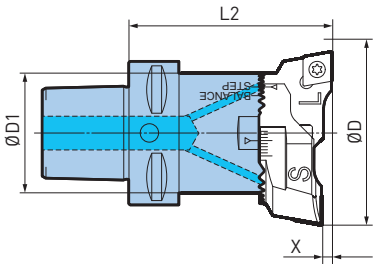
| Horizontal Machine | |
|---|---|
| Smart Damper | SW41-66CKB4-200DP |
| Holder | BBT50-CKB4-178 |
| Cutting Speed | 200 m/min |
| D.O.C | Ø 4 mm |
| Feed | 0.35 mm/rev |
| Coolant | Emulsion |
| Material | C55 |

# SW BIG CAPTO Rough Boring Heads, Ø 25 - 203

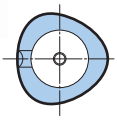
BIG CAPTO monobloc execution provide highest rigidity.

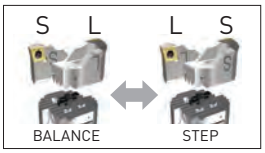



Balance Cut




Step Cut






| Model | Order No. | BIG CAPTO | ØD | ØD1 | L1 | L2 | X | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| SW25-40C3 | **472.201** | C3 | 25 - 40 | 24 | 80 | 80.1 | 0.2 | 0.22 |
| SW32-51C3 | **472.301** | C3 | 32 - 51 | 31 | 55 | 55.1 | | 0.25 |
| SW41-66C4 | **472.401** | C4 | 41 - 66 | 39 | 67 | 67.2 | 0.4 | 0.56 |
| SW53-86C5 | **472.501** | C5 | 53 - 86 | 50 | 77 | 77.2 | | 1.03 |
| SW68-110C6 | **472.601** | C6 | 68 - 110 | 63.5 | 92 | 92.2 | | 1.98 |
| SW98-153C6 * | **472.602** | C6 | 98 - 153 | 90 | 92.4 | 92.6 | | 2.17 |
| SW98-153C8 | **472.701** | C8 | 98 - 153 | 90 | 117 | 117.2 | | 4.93 |
| SW148-203C8 | **472.703** | C8 | 148 - 203 | 140 | 117 | 117.2 | | 5.98 |

1. X = difference length of insert holders for step cut.
2. * Only on request, not available from stock.

For Spare Parts ▸ 429
Insert Holders ▸ 301 - 305

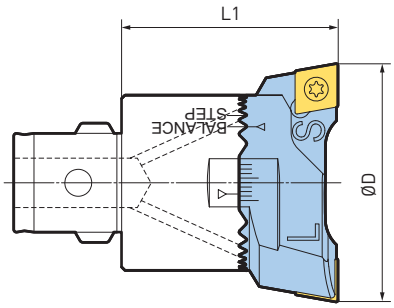


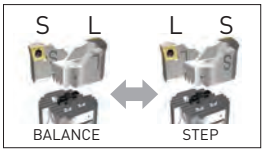


BROTECH

# Insert Holders Type CC

Standard insert holders for CC- type inserts with 90° lead angle.
Suitable for through and blind holes, as well as for rotationally-symmetrical- and double-offset-roughing.



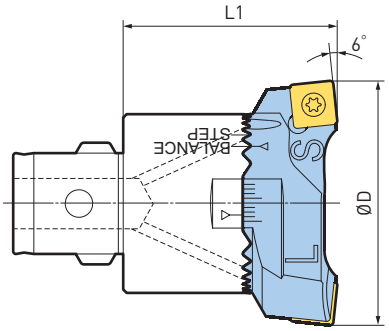

| For Boring Head | Model | Order No. | ØD | L1 | |
|---|---|---|---|---|---|
| SW20 | IH1SW20C | **639.413** | 20 - 26 | 32.5 | CC 06 |
| | IH2SW20C | **639.417** | 25 - 31 | 32.5 | |
| SW25 | IH1SW25C | **639.423** | 25 - 33 | 35.5 | |
| | IH2SW25C | **639.427** | 32 - 40 | 35.5 | |
| SW32 | IH1SW32C | **639.433** | 32 - 42 | 40 | CC 09 |
| | IH2SW32C | **639.437** | 41 - 51 | 40 | |
| SW41 | IH1SW41C | **639.443** | 41 - 54 | 47 | |
| | IH2SW41C | **639.447** | 53 - 66 | 47 | |
| SW53 | IH1SW53C | **639.453** | 53 - 70 | 57 | CC 12 |
| | IH2SW53C | **639.457** | 69 - 86 | 57 | |
| SW68 | IH1SW68C | **639.463** | 68 - 90 | 71 | |
| | IH1SW68C | **639.467** | 88 - 110 | 71 | |
| SW98 | IH1SW98C | **639.473** | 98 - 126 | 71 / 87 / 117 * | |
| | IH2SW98C | **639.477** | 125 - 153 | 71 / 87 / 117 * | |
| SW148 | IH1SW148C | **639.483** | 148 - 176 | 71 / 117 * | |
| | IH2SW148C | **639.487** | 175 - 203 | 71 / 117 * | |
| SW68 | IH1SW68C16 | **639.563** | 68 - 90 | 71 | CC 16 |
| | IH2SW68C16 | **639.567** | 88 - 110 | 71 | |
| SW98 | IH1SW98C16 | **639.573** | 98 - 126 | 71 / 87 / 117 * | |
| | IH2SW98C16 | **639.577** | 125 - 153 | 71 / 87 / 117 * | |
| SW148 | IH1SW148C16 | **639.583** | 148 - 176 | 71 / 117 * | |
| | IH2SW148C16 | **639.587** | 175 - 203 | 71 / 117 * | |

1. Consisting of two insert holders with different lengths, type S (short) and L (long).
   The insert holders are also available by the piece as spare parts.
2. * L1 depends on the length of the boring head.

For Spare Parts ▸ 430
For Insert ▸ 399 - 405

# Insert Holders Type SC/SP

Inserts inclined 6° for improved entry stability under unfavourable conditions (rolled or scaled surfaces, stacked plates etc.). Only for rotationally-symmetrical application (RSS).



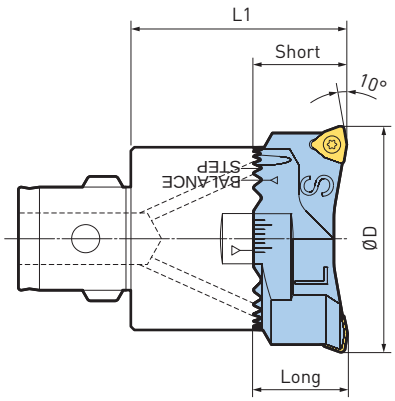

| For Boring Head | Model | Order No. | ØD | L1 | |
|---|---|---|---|---|---|
| SW20 | IH1SW20S | **639.113** | 20 - 26 | 32.5 | SP 06 |
| SW25 | IH1SW25S | **639.123** | 25 - 33 | 35.5 | |
| SW32 | IH1SW32S | **639.133** | 32 - 42 | 40 | SC 09 |
| | IH2SW32S | **639.137** | 41 - 51 | 40 | |
| SW41 | IH1SW41S | **639.143** | 41 - 54 | 47 | |
| | IH2SW41S | **639.147** | 53 - 66 | 47 | |
| SW53 | IH1SW53S | **639.153** | 53 - 70 | 57 | SC 12 |
| | IH2SW53S | **639.157** | 69 - 86 | 57 | |
| SW68 | IH1SW68S | **639.163** | 68 - 90 | 71 | |
| | IH2SW68S | **639.167** | 88 - 110 | 71 | |
| SW98 | IH1SW98S | **639.173** | 98 - 126 | 71 / 87 / 117 * | |
| | IH2SW98S | **639.177** | 125 - 153 | 71 / 87 / 117 * | |
| SW148 | IH1SW148S | **639.183** | 148 - 176 | 71 / 117 * | |
| | IH2SW148S | **639.187** | 175 - 203 | 71 / 117 * | |

1. Set consisting of two insert holders with different lengths, type S (short) and L (long).
   The insert holders are also available by the piece as spare parts.
2. * L1 depends on the length of the boring head.

For Spare Parts ▸ 430
For Insert ▸ 403 - 405

# Insert Holders Type WC

Full profile roughing permits boring with large stock allowances (30 mm and more in Ø) in a single operation with relatively low drive power.




| For Boring Head | Model | Order No. | ØD | L1 | |
|---|---|---|---|---|---|
| SW41 | IH1SW41W | **639.243** | 49 - 62 | 47 | WC 04 |
| SW53 | IH1SW53W | **639.253** | 59 - 76 | 57 | WC 05 |
| | IH2SW53W | **639.257** * | 69 - 86 | 57 | |
| SW68 | IH1SW68W | **639.263** | 73 - 95 | 71 | WC 06 |
| | IH2SW68W | **639.267** | 90 - 112 | 71 | |
| SW98 | IH1SW98W | **639.273** | 106 - 134 | 71 / 87 /117 ** | |
| | IH2SW98W | **639.277** | 131 - 159 | 71 / 87 /117 ** | |
| SW148 | IH1SW148W | **639.283** | 156 - 184 | 71 / 117 ** | |
| | IH2SW148W | **639.287** | 191 - 209 | 71 / 117 ** | |

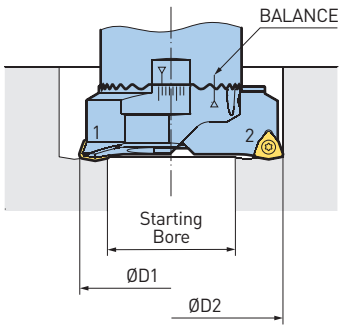
1. Consisting of two insert holders with different lengths, type S (short) and L (long).
2. * Set consisting of two insert holders with different lengths, Type S (short) and L (long) and for different boring ranges (639.255: Ø 69 - 86 mm, 639.252: Ø 59 - 76 mm).
3. ** L1 depends on the length of the boring head.
4. For full-profile-roughing only. Insert holders available by the piece also.

For Spare Parts ▸ 430
For Insert ▸ 408 - 412



**Adjustment Instructions**

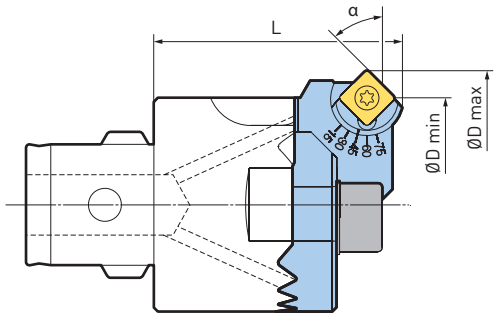
- Mount the insert holders on mark «RSS/BALANCE»
- Set cutting edge 2 to the final bore diameter (ØD2)
- Set cutting edge 1 corresponding to the starting bore diameter, according to the table (column ØD1).




| For Boring Head | Insert Holder Order No. | Starting Bore Ø | ØD1 | ØD2 |
|---|---|---|---|---|
| SW41 | **639.243** | 35 - 37.9 | 49 | 51 - 62 |
| | | 38 - 41 | 52 | 54 - 62 |
| SW53 | **639.253** | 41 - 44.9 | 59 | 61 - 76 |
| | | 45 - 50 | 63 | 65 - 76 |
| | **639.257** | 51 - 54.9 | 69 | 76 - 86 |
| | | 55 - 60 | 73 | 81 - 86 |
| SW68 | **639.263** | 50 - 55.9 | 73 | 75 - 93 |
| | | 56 - 61.9 | 79 | 81 - 93 |
| | | 62 - 67 | 85 | 87 - 93 |
| | **639.267** | 67 - 72.9 | 90 | 92 - 110 |
| | | 73 - 78.9 | 96 | 98 - 110 |
| | | 79 - 85 | 102 | 104 - 110 |
| SW98 | **639.273** | 84 - 89.9 | 107 | 109 - 129 |
| | | 90 - 95.9 | 113 | 115 - 133 |
| | | 96 - 102.9 | 119 | 121 - 133 |
| | | 103 - 109 | 126 | 128 - 133 |
| | **639.277** | 108 - 114.9 | 131 | 133 - 154 |
| | | 115 - 121.9 | 138 | 140 - 159 |
| | | 122 - 128.9 | 145 | 147 - 159 |
| | | 129 - 135 | 152 | 154 - 159 |
| SW148 | **639.283** | 134 - 139.9 | 157 | 159 - 179 |
| | | 140 - 145.9 | 163 | 165 - 183 |
| | | 146 - 152.9 | 169 | 171 - 183 |
| | | 153 - 159 | 176 | 178 - 183 |
| | **639.287** | 158 - 164.9 | 181 | 183 - 204 |
| | | 165 - 171.9 | 188 | 190 - 209 |
| | | 172 - 178.9 | 195 | 197 - 209 |
| | | 179 - 185 | 202 | 204 - 209 |

# Insert Holders Chamfering for SW

These insert holders with step-less adjustable chamfer angle from 15° to 75° are made for front chamfering and, with limitations also for back chamfering, on the rough heads for roughing SW 41 to SW 148.




| For Boring Head | Model | Order No. | | Diameter Range ØD 15° min - max | 30° min - max | 45° min - max | 60° min - max | 75° min - max | L |
|---|---|---|---|---|---|---|---|---|---|
| SW41 | IH1SW41CF | **639.104** | SC 09 | 33 - 60 | 36 - 62 | 39 - 63 | 43 - 63 | 45 - 62 | 51 |
| SW53 | IH1SW53CF | **639.105** | | 45 - 76 | 48 - 78 | 51 - 79 | 55 - 79 | 57 - 78 | 58 |
| SW68 | IH1SW68CF | **639.106** | | 61 - 97 | 64 - 99 | 67 - 100 | 71 - 100 | 73 - 99 | 68 |
| SW98 | IH1SW98CF | **639.107** | SC 12 | 77 - 126 | 81 - 128 | 86 - 129 | 90 - 128 | 94 - 127 | 73 |
| | IH2SW98CF | **639.108** | | 104 - 153 | 108 - 155 | 113 - 156 | 117 - 155 | 121 - 154 | |
| SW148 | IH1SW148CF | **639.109** | | 131 - 180 | 135 - 182 | 140 - 183 | 144 - 182 | 148 - 181 | 73 |
| | IH2SW148CF | **639.110** | | 158 - 207 | 162 - 209 | 167 - 210 | 171 - 209 | 175 - 208 | |
| SW98 | IH1SW98CF | **639.107** | SC 12 | 77 - 126 | 81 - 128 | 86 - 129 | 90 - 128 | 94 - 127 | 89 / 119 |
| | IH2SW98CF | **639.108** | | 104 - 153 | 108 - 155 | 113 - 156 | 117 - 155 | 121 - 154 | |
| SW148 | IH1SW148CF | **639.109** | | 131 - 180 | 135 - 182 | 140 - 183 | 144 - 182 | 148 - 181 | 119 |
| | IH2SW148CF | **639.110** | | 158 - 207 | 162 - 209 | 167 - 210 | 171 - 209 | 175 - 208 | |

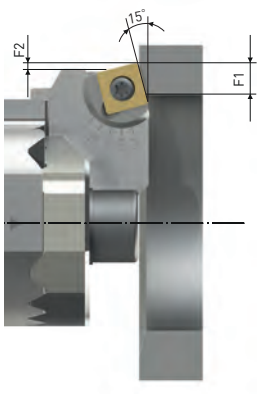
1. Insert holders must be set for balance cut.
2. L in chart indicates max. tool length with 45° chamfer angle.

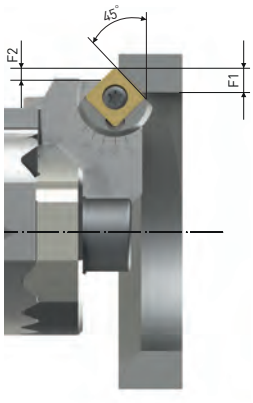
For Spare Parts ▸ 431
For Insert ▸ 398 - 399

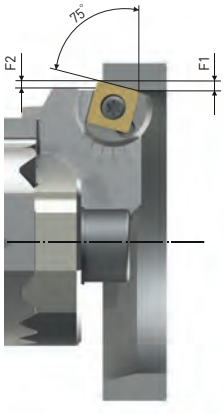
**Max. radial chamfer length for front and back chamfering**

Applicable for inserts with nose radius 0.4 mm

| For Boring Head | | Chamfer Angle 15° F1 | F2 | 30° F1 | F2 | 45° F1 | F2 | 60° F1 | F2 | 75° F1 | F2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SW41 | SC 09 | 7.7 | 0.7 | 6.9 | 1.4 | 5.7 | 1.8 | 4.0 | 1.7 | 2.1 | 1.2 |
| SW53 | | | | | | | | | | | |
| SW68 | | | | | | | | | | | |
| SW98 | SC 12 | 10.6 | 1.2 | 9.5 | 2.2 | 7.8 | 2.6 | 5.5 | 2.5 | 2.8 | 1.8 |
| SW148 | | | | | | | | | | | |



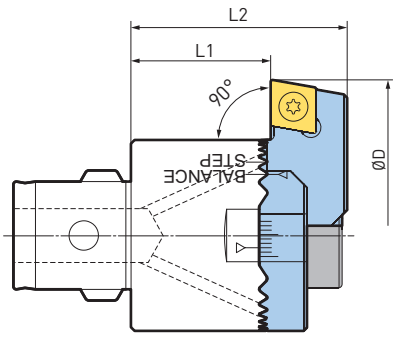



# Insert Holders Back Boring for SW

These insert holders are made for back boring with the rough boring heads for roughing SW 32 to SW 148 and cover the diameter range from Ø 44 - 211 mm.

Insert holder with dead piece are available as set or as individual components.




| For Boring Head | Model | Order No. | | ØD | ØD1 | B | L1 * | L2 * |
|---|---|---|---|---|---|---|---|---|
| SW32 | IH1SW32BB | **639.403** | CC 09 | 44 - 54 | 31 | ØD-17 / min. 31 | 24 | 38 |
| SW41 | IH1SW41BB | **639.404** | | 53 - 66 | 39 | ØD-21 / min. 39 | 29 | 44 |
| SW53 | IH1SW53BB | **639.405** | CC 12 | 65 - 82 | 50 | ØD-28 / min. 50 | 34 | 55 |
| SW68 | IH1SW68BB | **639.406** | | 81 - 103 | 63.5 | ØD-27 / min. 63.5 | 41 | 66 |
| SW98 | IH1SW98BB | **639.407** | | 102 - 130 | 90 | 90 | 38 | 69 |
| | IH2SW98BB | **639.408** | | 129 - 157 | | | | |
| SW148 | IH1SW148BB | **639.409** | | 156 - 184 | 140 | 140 | 38 | 69 |
| | IH2SW148BB | **639.410** | | 183 - 211 | | | | |
| SW98 | IH1SW98BB | **639.407** | | 102 - 130 | 90 | 90 | 47 / 77 | 78 / 108 |
| | IH2SW98BB | **639.408** | | 129 - 157 | | | | |
| SW148 | IH1SW148BB | **639.409** | | 156 - 184 | 140 | 140 | 77 | 108 |
| | IH2SW148BB | **639.410** | | 183 - 211 | | | | |

1. * Insert holders must be set for balance cut.

For Spare Parts ▸ 431
For Insert ▸ 400 / 401



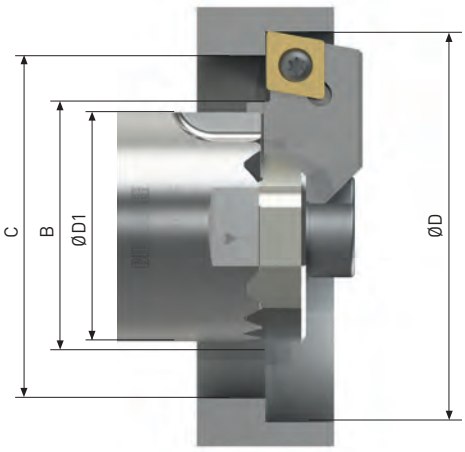
**Back boring**

The back bore diameter «ØD» the diameter of the entry bore «C», the diameter of the interfering edge «B», respectively of the tool body «ØD1» are related to each other. In order to check the feasibility of the back boring operation and to select the best possible tool combination, these values can be calculated as follows:

Minimum entry bore diameter «C»: $C = \frac{ØD + B}{2} + 0.5$

Max. diameter of the interfering edge «B»: $B = 2\,(C - 0.5) - ØD$

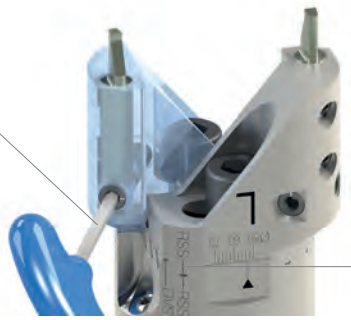
Clearance: 0.5 mm



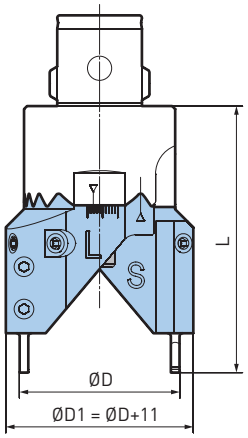
# Face Grooving Holders for SW

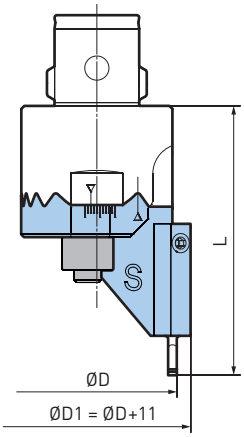
Upgrade your existing rough boring heads SW: the face grooving holder provide the possiblity to manufacture grooves in the diameter range from Ø 53 to 203 mm.

Extremley accurate tool length adjustment by eccentric bolt



Attention: Mount the face grooving holder on mark "RSS/ BALANCE"






B.1

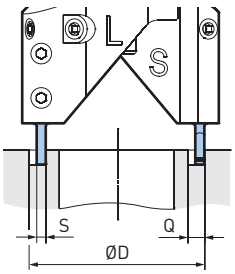
## Twin Cutter Set

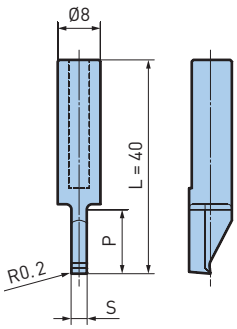
| For Boring Head | Model | Order No. | ØD | L |
|---|---|---|---|---|
| SW53 | IH1SW53FG | **639.653** | 53 - 70 | 88 |
| SW68 | IH1SW68FG | **639.663** | 68 - 90 | 95 |
| | IH2SW68FG | **639.667** | 88 - 110 | 95 |
| SW98 | IH1SW98FG | **639.673** | 98 - 126 | 113 |
| | IH2SW98FG | **639.677** | 125 - 153 | 113 |
| SW148 | IH1SW148FG | **639.683** | 148 - 176 | 143 |
| | IH2SW148FG | **639.687** | 175 - 203 | 143 |

## Single Cutter Set

| For Boring Head | Model | Order No. | ØD | L |
|---|---|---|---|---|
| SW53 | IH1SW53FG-S | **639.654** | 53 - 70 | 88 |
| SW68 | IH1SW68FG-S | **639.664** | 68 - 90 | 95 |
| | IH2SW68FG-S | **639.668** | 88 - 110 | 95 |
| SW98 | IH1SW98FG-S | **639.674** | 98 - 126 | 113 |
| | IH2SW98FG-S | **639.678** | 125 - 153 | 113 |
| SW148 | IH1SW148FG-S | **639.684** | 148 - 176 | 143 |
| | IH2SW148FG-S | **639.688** | 175 - 203 | 143 |

## Cutters



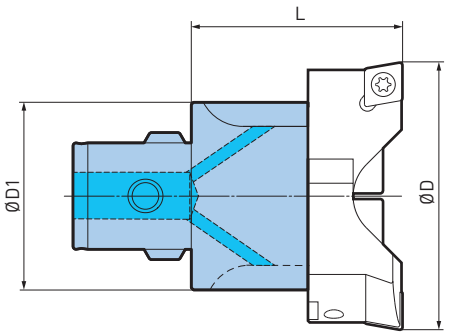

| Model | Order No. | Width Cutter S | Max. Groove Width Double Cutters Q | Cutting Edge | Max. Groove Depth P |
|---|---|---|---|---|---|
| FG2-ST8-40K40 | **958.601** | 2 | 3.5 | uncoated K40 | 12 |
| FG3-ST8-40K40 | **958.602** | 3 | 5.5 | | |
| FG4-ST8-40K40 | **958.603** | 4 | 7.5 | | |
| FG5-ST8-40K40 | **958.604** | 5 | 9.5 | | |
| FG2-ST8-40K40C | **958.611** | 2 | 3.5 | coated P40C | |
| FG3-ST8-40K40C | **958.612** | 3 | 5.5 | | |
| FG4-ST8-40K40C | **958.613** | 4 | 7.5 | | |
| FG5-ST8-40K40C | **958.614** | 5 | 9.5 | | |



BROTECH

# TWN Rough Boring Heads, Ø 20 - 153

The heads of the TWN series have been developed for economical heavy duty rough boring.



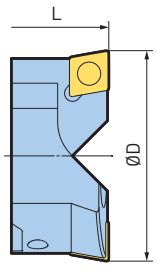

| Model | Order No. | CK | ØD | ØD1 | L | Weight (kg) |
|---|---|---|---|---|---|---|
| TWN20-31CKB1 | **315.101** | CKB1 | 20 - 31 | 18.5 | 32.5 | 0.05 |
| TWN25-40CKB2 | **315.201** | CKB2 | 25 - 40 | 23.4 | 35.5 | 0.10 |
| TWN32-51CKB3 | **315.301** | CKB3 | 32 - 51 | 30 | 40 | 0.17 |
| TWN41-66CKB4 | **315.401** | CKB4 | 41 - 66 | 39 | 47 | 0.34 |
| TWN53-86CKB5 | **315.501** | CKB5 | 53 - 86 | 49 | 57 | 0.64 |
| TWN68-110CKB6 | **315.601** | CKB6 | 68 - 110 | 63 | 71 | 1.29 |
| TWN98-153CKB6 | **315.602** | CKB6 | 98 - 153 | 90 | 71 | 1.85 |
| TWN98-153CKB7 | **315.701** | CKB7 | 98 - 153 | 90 | 87 | 3.10 |

For Spare Parts ▶ 432



# Insert Holders Type CC (Sold in Pairs)

Standard insert holders for CC- type inserts with 90° lead angle. For through- and blind holes. Symmetrical and double offset cutting edge arrangement possible.




| For Boring Head | Model | Order No. | ØD | L | |
|---|---|---|---|---|---|
| TW20 | IH1TW20C | **638.411** | 20 - 26 | 32.5 | CC 06 |
| | IH2TW20C | **638.412** | 25 - 31 | 32.5 | |
| TW25 | IH1TW25C | **638.421** | 25 - 33 | 35.5 | |
| | IH2TW25C | **638.422** | 32 - 40 | 35.5 | |
| TW32 | IH1TW32C | **638.431** | 32 - 42 | 40 | CC 09 |
| | IH2TW32C | **638.432** | 41 - 51 | 40 | |
| TW41 | IH1TW41C | **638.441** | 41 - 54 | 47 | |
| | IH2TW41C | **638.442** | 53 - 66 | 47 | |
| TW53 | IH1TW53C | **638.451** | 53 - 70 | 57 | CC 12 |
| | IH2TW53C | **638.452** | 69 - 86 | 57 | |
| TW68 | IH1TW68C | **638.461** | 68 - 90 | 71 | |
| | IH2TW68C | **638.462** | 88 - 110 | 71 | |
| TW98 | IH1TW98C | **638.471** | 98 - 126 | 71 / 87 | |
| | IH2TW98C | **638.472** | 125 - 153 | 71 / 87 | |

For Spare Parts ▶ 432
For Insert ▶ 400 - 402

# Guidelines

**Insert Selection & Stock Allowance**

BIG KAISER indexable inserts outlined in the Insert selection & cutting data tables have been selected to give optimum results. Grades and geometry do not have to be specified at time of order.

**Insert radius is based upon 2 major factors:**

1. Length/diameter ratio of tool
2. Depth of cut or material allowance
   - Select the largest nose radius available for cutting edge strength & higher feeds
   - Use small nose radius for light depth of cut & extreme L/D ratio

| Insert Radius | Minimum D.O.C. | Maximum D.O.C. | L/D Ratio |
|---|---|---|---|
| 0.2 | 0.25 | 1.5 | >6:1 |
| 0.4 | 0.50 | 3.0 | ≤5:1 |
| 0.8 | 1.00 | 5.0 | ≤4:1 |
| 1.2 | 1.50 | 8.0 | ≤4:1 |

- D.O.C. is stock allowance/side (radius)

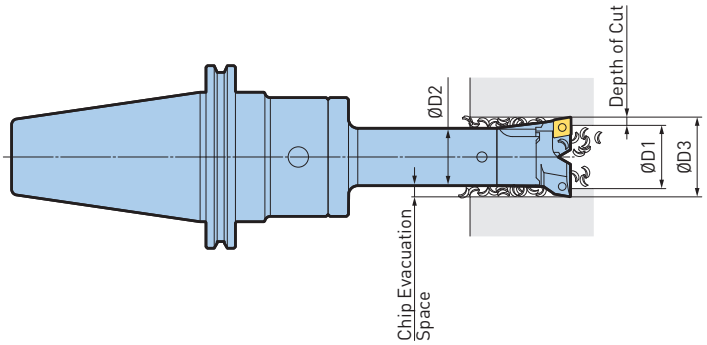
**Feed**

1. Feed: based on effective number of inserts, depending on roughing method
   - Balanced cutting: 2 effective inserts
   - Stepped cutting: 1 effective insert
   - Full profile cutting: 1 effective insert
2. Under normal rough boring operations, the effective feed rate is about 50% of nose radius

| Insert Radius | Feed (mm/rev) | |
|---|---|---|
| | Balanced Cutting | Stepped Cutting |
| 0.2 | 0.2 - 0.3 | 0.1 - 0.15 |
| 0.4 | 0.3 - 0.4 | 0.15 - 0.2 |
| 0.8 | 0.4 - 0.5 | 0.3 - 0.4 |
| 1.2 | 0.5 - 0.7 | 0.3 - 0.5 |

**General Rule:**

Boring bar should always be smaller than original hole size.




**Caution**

- It is very important to allow for clearance between boring bar and rough bore diameter.

## Troubleshooting

Under certain conditions, it may be necessary to modify or adapt recommended cutting data and/or tooling configurations of the application. Below are general solutions to common problems.

| Problem | Possible Cause | Remedy |
|---|---|---|
| Poor Chip Control | Feed rate too low | Increase feed rate |
| | Width of chip excessive (D.O.C.) | Preset tool for stepped cutting method |
| | Excessive stock allowance | Consult cutting data tables |
| Chatter & Vibration | Excessive speed | Reduce Vc, check cutting data tables |
| | Extreme length/diameter ratio | Shorten tool to increase stiffness |
| | | Increase boring bar diameter to larger size |
| | | Change boring bar to carbide or heavy metal |
| | Insert radius too large | Reduce nose radius of insert |
| | Unstable workpiece | Improve fixture and clamping support |
| | Lead angle on insert holders | Change to 90 degree insert holders (type CC) |
| Inserts Chipping or Breaking | Wrong insert | Change to tougher grade of carbide insert |
| | | Use larger radius if available |
| | Severe interruption | Increase speed, decrease feed |
| | Chips packing and re-cutting | Check for boring bar/bore diameter clearance |
| | | Improve chip control,increase feed |
| Poor Tool Life | Wrong insert | Change to higher wear resistant grade |
| | Excessive cutting speed | Reduce speed |
| | Inserts chipping | Check stock allowance and feed rate |
| | Coolant pressure too low | Increase through tool coolant pressure |
| | | Adjust coolant ports of head if available |
| Chips Not Evacuating | Boring bar diameter too large | Reduce to smaller head and extended range holder |
| | Excessive stock allowance | Re-set tool for stepped cutting |
| | Inadequate space below bore | Elevate workpiece from table more |
| | Poor chip control | See above problem |
| Insufficient Machine Power | Excessive feed rate | Reduce feed; minimum 25% of insert radius |
| | Stock allowance excessive | Reset tool for stepped cutting method |
| | Low machine torque | RPM in area of low spindle torque; increase speed |
| | | RPM in area of gear change; adjust RPM |
| | | Change insert to higher rake angle |
| | | Reduce depth of cut |
| Excessive Exit Burr | Excessive feed rate | Reduce feed rate |
| | CC type insert holders | Use square insert holders with 6 degree lead |
| | Cutting forces too high | Reduce depth of cut |
| | | Reduce insert radius |

# Fine Boring Heads with Centric Cutting Edge


| | |
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| EWN 04-7 Fine Boring Head | 349 |




B.2

BROTECH

Wireless

## EWE 2-152 Digital Fine Boring Head

Wireless communication for easy readout with the BIG KAISER app: The brandnew EWE fine boring head revolutionates fine boring process. Less operator mistakes, easier setup and a huge diameter range of Ø 2 - 152 mm. Also available as integral solution with HSK-A63. Accessories of EWD and EWN are fully compatible.

**Ø 2 - 152 mm, CK6/HSK-A63**

▶ 314

## EWN 2-152 Fine Boring Head

Fine boring head with centric boring bars in modular and integral execution for accurate, high performance operations. The head comes with variable length adjustment of the boring bar and large dial disc for parallax-free readout.

**Ø 2 - 152 mm, CK6/DV40/HSK-A63/BIG CAPTO C6**

▶ 315

Wireless

## EWE 2-32 Digital Fine Boring Head

Smallest digital fine boring head with wireless communication to the BIG KAISER app and centric boring bar. Especially manufactured for the use on small machine tools. Accessories of EWN and EWD are fully compatible.

**Ø 2 - 32 mm, CK5**

▶ 334

B.2

## EWN 2-32 Fine Boring Head

Fine boring head with centric boring bar in integral, modular and screw-on execution for precise machining. Developped for the use on machine tools with spindles 30 taper, HSK-A50 and bigger, as well as on lathe machines with driven tools.

**Ø 2 - 32 mm, CK5/DV30/ES32**

▶ 335

## EWN 04-15 Fine Boring Head

Machining of small bores with high speeds on machine tools with spindles DV20, HSK-E32 and bigger.

**Ø 0.4 - 15 mm, CK3/ST16**

▶ 346

## EWN 04-7 Fine Boring Head

World's smallest fine boring head: Thanks to its body diameter of only Ø 18.5 mm, the EWN 04-7 is the perfect solution for micro machining applications.

**Ø 0.4 - 7 mm, CK1/ST6/ST10**

▶ 349



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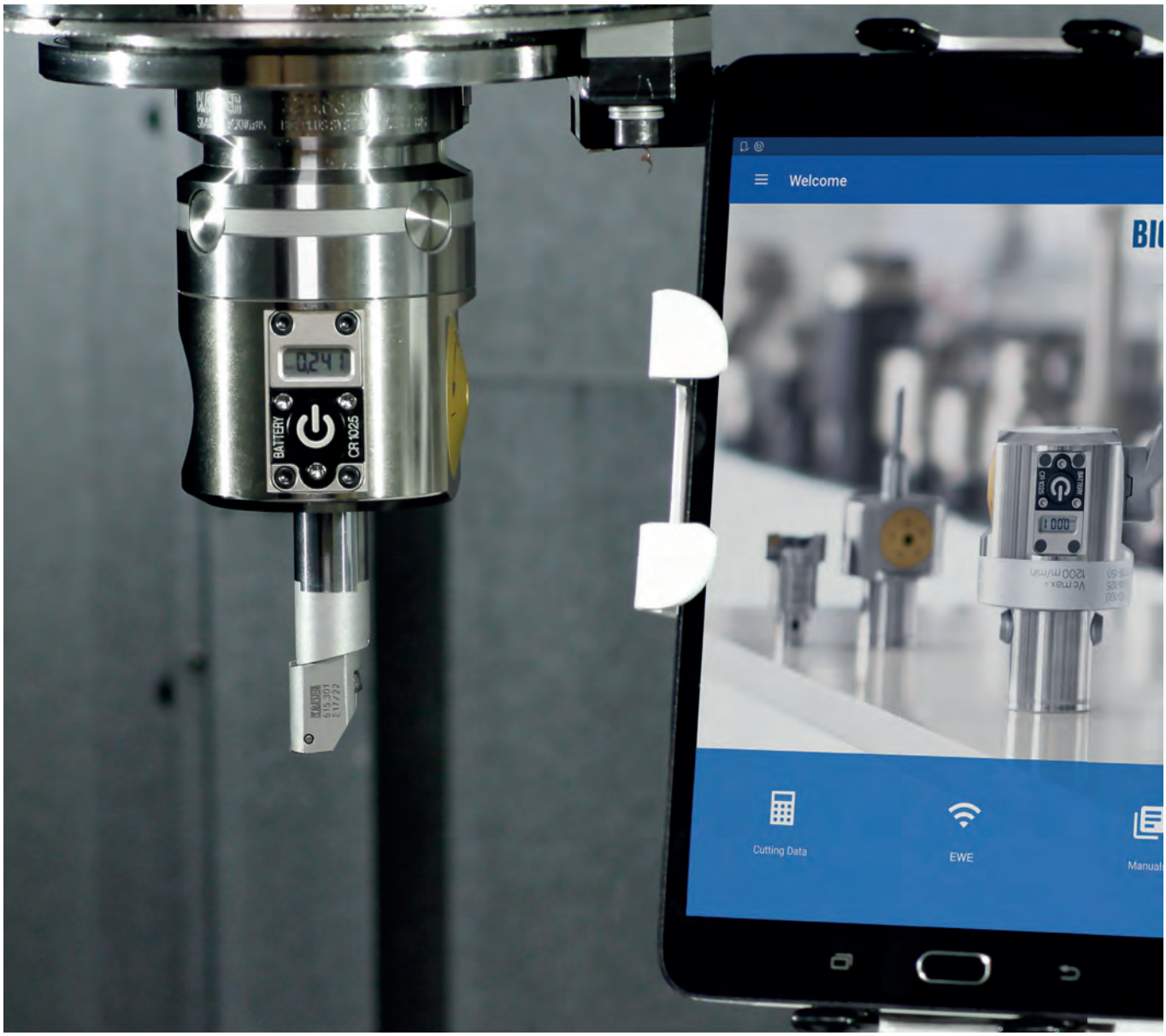




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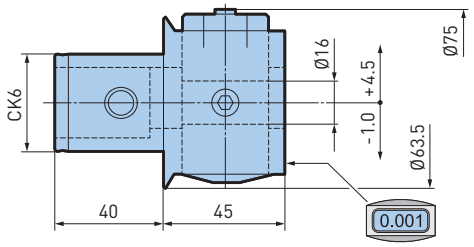
Quick Guide

# EWE 2-152 Digital Fine Boring Head, Ø 2 - 152

Digital fine boring head in modular and integral execution for accurate, high performance boring operations. With wireless communication to the BIG KAISER app.

Wireless




| Model | Order No. |
|---|---|
| EWE2-152CK6 | 112.110 |

**Other executions**

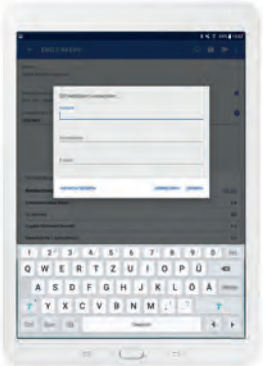
EWE2-152HSK-A63
**112.126A**

## BIG KAISER App

B.2

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.

Cutting data


Send your data to...

History (made automatically)

**This is how the app is going to support your daily challenges**

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore middle tolerance

Download on the App Store

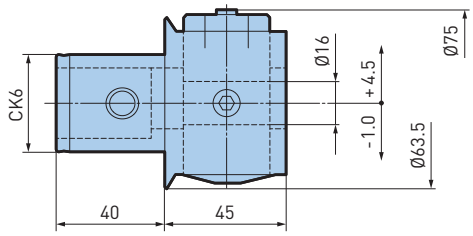
GET IT ON Google Play



BROTECH

# EWN 2-152 Fine Boring Head, Ø 2 - 152

Fine boring heads in modular and integral execution for accurate, high performance boring operations on machine tools with spindles DV40, HSK-A63, BIG CAPTO C6 and bigger.




| Model | Order No. |
|---|---|
| EWN2-152CK6 | 112.108 |

**Other executions**

EWN2-152DV40
**112.121**

EWN2-152BT40
**112.122**

EWB2-50CK6
**112.107**

Balanceable

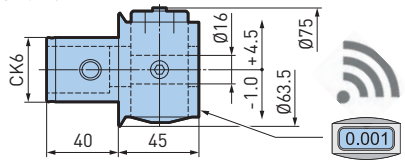
EWN2-152HSK-A63
**112.123**

EWN2-152C6
**470.108**

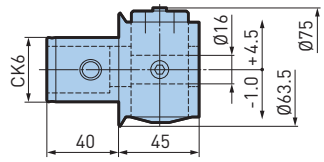
B.2

**Boring Head** **Order No.**

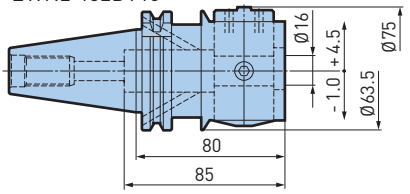
EWE2-152CK6 **112.110**



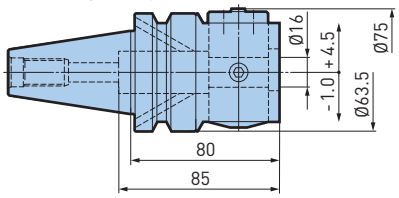

EWN2-152CK6 **112.108**



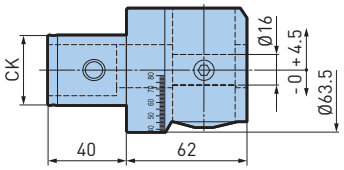

EWN2-152DV40 **112.121**



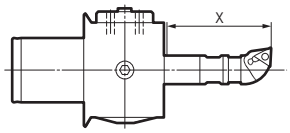

EWN2-152BT40 **112.122**




EWB2-50CK6 **112.107**




X = Boring depth

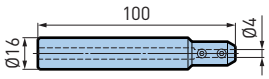



**ØD**

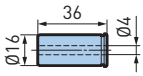
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø

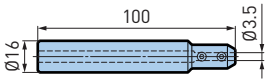
RB16-4-100 **613.424** ♦



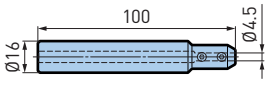

RB16-4 **613.404**



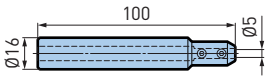

RB16-3.5-100 **613.422** ♦



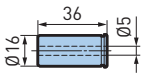

RB16-4.5-100 **613.423** ♦



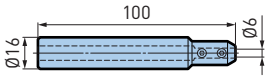

RB16-5-100 **613.425** ♦



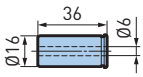

RB16-5 **613.405**



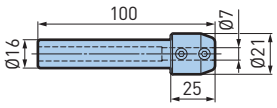

RB16-6-100 **613.426** ♦



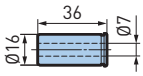

RB16-6 **613.406**



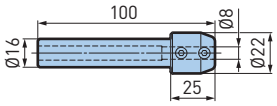

RB16-7-100 **613.427** ♦



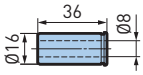

RB16-7 **613.407**



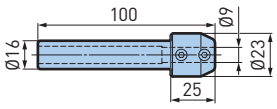

RB16-8-100 **613.428** ♦



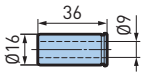

RB16-8 **613.408**



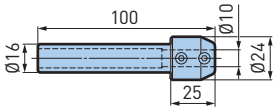

RB16-9-100 **613.429** ♦



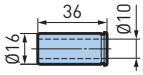

RB16-9 **613.409**




RB16-10-100 **613.430** ♦



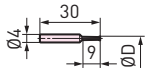

RB16-10 **613.410**



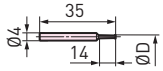

Carbide tool holders

♦ Recommended for EWB 2-50

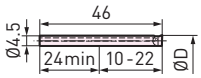
## Fixed Tool Holder



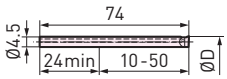

E2-4K10 **611.155** ♦
**ØD 2.0 - 3.0**



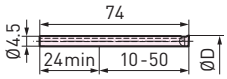

E3-4K10 **611.156** ♦
**ØD 3.0 - 4.0**



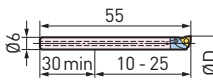

E5-ST4.5-46K10 **615.081**
**ØD 4.9 - 5.9**



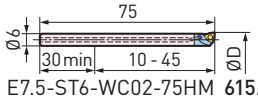

E5-ST4.5-74K10 **615.204** ♦
**ØD 4.9 - 5.9**



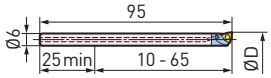

E5-ST4.5-74K10C **615.204A** ♦
**ØD 4.9 - 5.9**



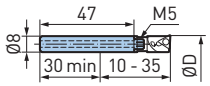

E7.5-ST6-WC02-55HM **615.084**
**ØD 7.3 - 8.8**



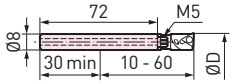

E7.5-ST6-WC02-75HM **615.085**
**ØD 7.3 - 8.8**



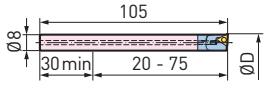

E7.5-ST6-WC02-95HM **615.202** ♦
**ØD 7.3 - 8.8**



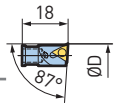

ST8-47 **615.211**
**ØD 8.8 - 11.8**



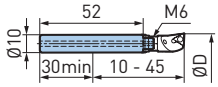

ST8-72HM **615.212** ♦
**ØD 8.8 - 11.8**



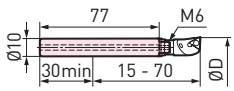

E9-ST8-TP07-105HM **615.213** ♦
**ØD 8.8 - 11.8**



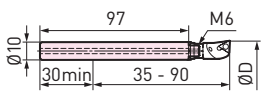

E9T
**615.271** ♦
**ØD 8.8 - 11.8**



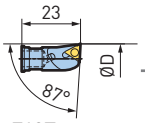

ST10-52 **615.214**
**ØD 11.8 - 13.8**



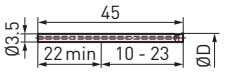

ST10-77HM **615.215** ♦
**ØD 11.8 - 13.8**



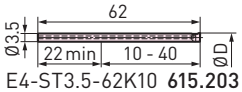

ST10-97HM **615.223** ♦
**ØD 11.8 - 13.8**



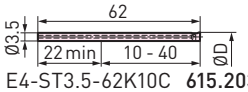

E12T
**615.272** ♦
**ØD 11.8 - 13.8**



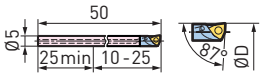

E4-ST3.5-45K10 **615.080**
**ØD 3.9 - 4.9**



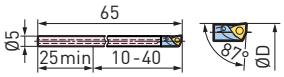

E4-ST3.5-62K10 **615.203** ♦
**ØD 3.9 - 4.9**



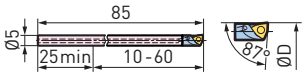

E4-ST3.5-62K10C **615.203A** ♦
**ØD 3.9 - 4.9**




E6-ST5-WC02-50HM **615.082**
**ØD 5.8 - 7.3**



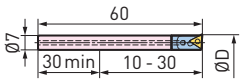

E6-ST5-WC02-65HM **615.083**
**ØD 5.8 - 7.3**



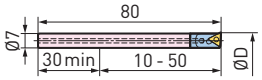

E6-ST5-WC02-85HM **615.201** ♦
**ØD 5.8 - 7.3**

WC 02

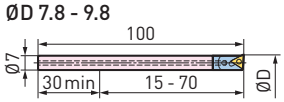
WC 02



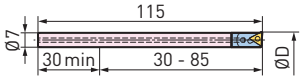

E8-ST7-TP07-60HM **615.086**
**ØD 7.8 - 9.8**




E8-ST7-TP07-80HM **615.207** ♦
**ØD 7.8 - 9.8**



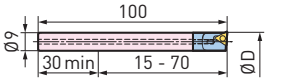

E8-ST7-TP07-100HM **615.087** ♦
**ØD 7.8 - 9.8**



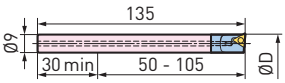

E8-ST7-TP07-115HM **615.205**
**ØD 7.8 - 9.8**

TP 07

TP 07




E10-ST9-TP07-100HM **615.208** ♦
**ØD 9.8 - 11.8**




E10-ST9-TP07-135HM **615.206** ♦
**ØD 9.8 - 11.8**

TP 07

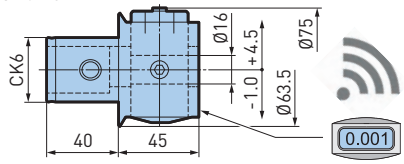
TP 07

B.2

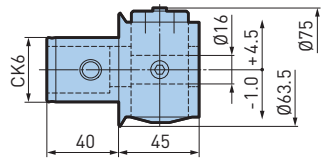
For Insert ▶ 394 / 395

**Boring Head** **Order No.**

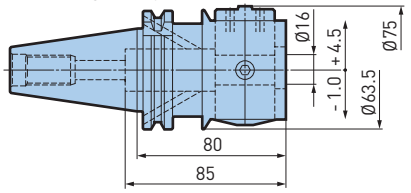
EWE2-152CK6 **112.110**



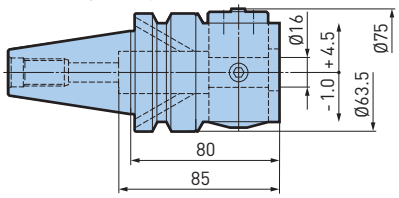

EWN2-152CK6 **112.108**



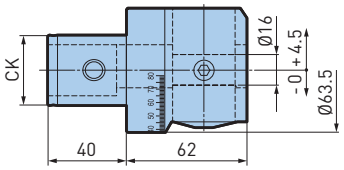

EWN2-152DV40 **112.121**



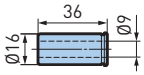

EWN2-152BT40 **112.122**



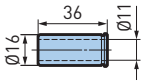

EWB2-50CK6 **112.107**



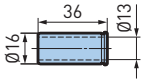

RB16-9
**613.409**



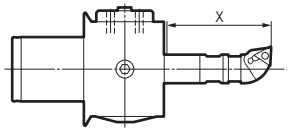

RB16-11
**613.411**




RB16-13
**613.413**




X = Boring depth




**ØD**

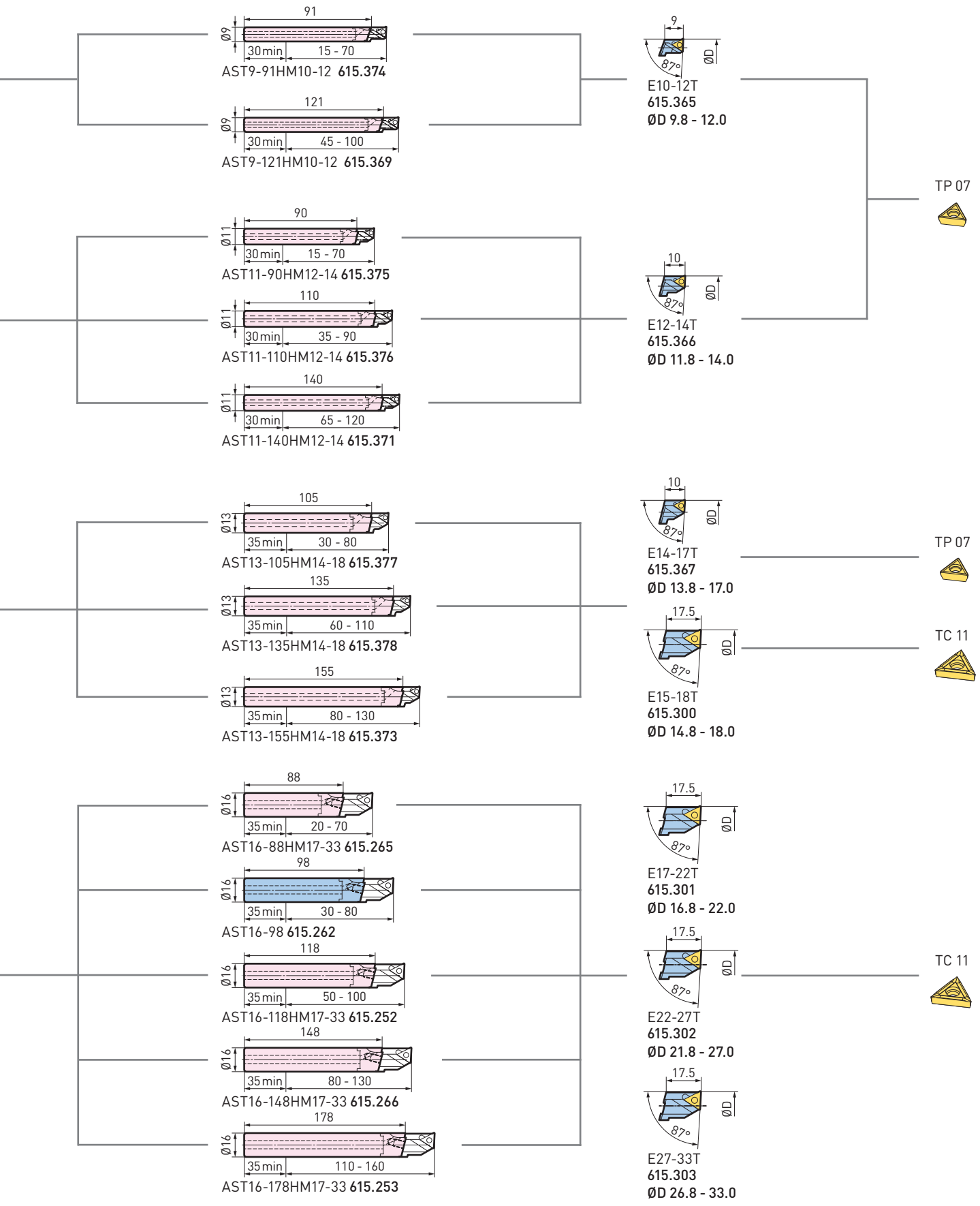
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø

Carbide tool holders

## Adjustable Tool Holder

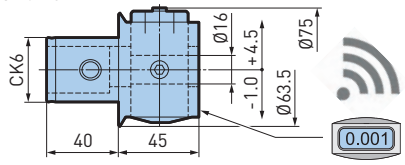
The adjustable tool holder allows the coarse diameter setting on the insert holder. This leads to the possibility to machine bores from Ø 9.8 - 54 mm with the tool holder in the centre position and as a result, with the best possible balancing of the tool combination.



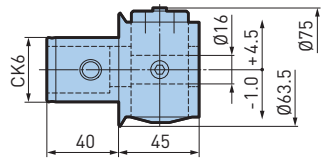

For Insert ▶ 395 - 397

**Boring Head** **Order No.**

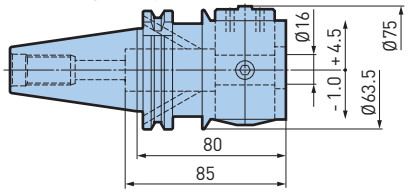
EWE2-152CK6 **112.110**



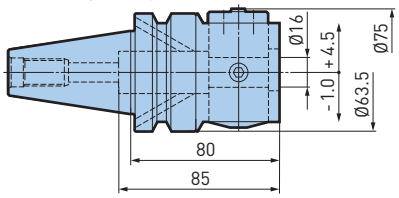

EWN2-152CK6 **112.108**



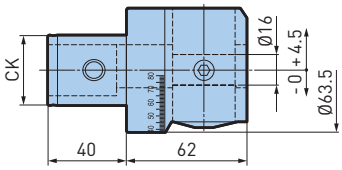

EWN2-152DV40 **112.121**



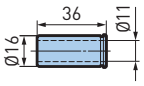

EWN2-152BT40 **112.122**



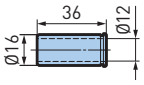

EWB2-50CK6 **112.107**



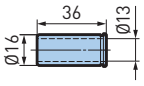

RB16-11 **613.411** ♦



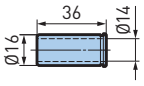

RB16-12 **613.412** ♦



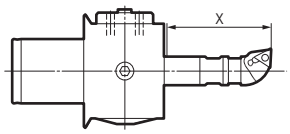

RB16-13 **613.413** ♦




RB16-14 **613.414** ♦




X = Boring depth




**ØD**

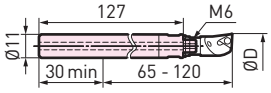
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø

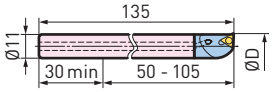
Carbide tool holders

♦ Recommended for EWB 2-50

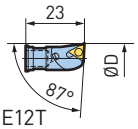
## Fixed Tool Holder



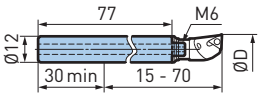

ST11-127HM **615.250** ♦
**ØD 11.8 - 13.8**



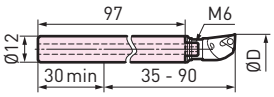

E12-ST11-TP07-135HM **615.209** ♦
**ØD 11.8 - 13.8**



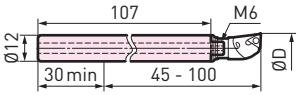

E12T
**615.272** ♦
**ØD 11.8 - 13.8**



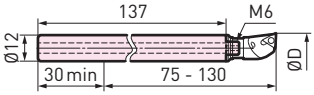

ST12-77 **615.218**
**ØD 13.8 - 15.8**



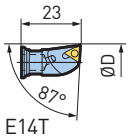

ST12-97HM **615.225**
**ØD 13.8 - 15.8**




ST12-107HM **615.219** ♦
**ØD 13.8 - 15.8**

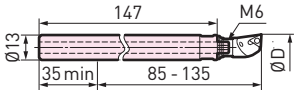



ST12-137HM **615.224** ♦
**ØD 13.8 - 15.8**

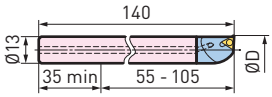



E14T
**615.273** ♦
**ØD 13.8 - 15.8**

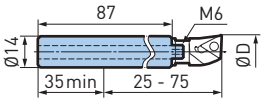
TP 07



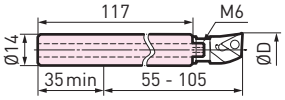

ST13-147HM **615.251** ♦
**ØD 13.8 - 15.8**



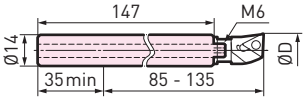

E14-ST13-TP07-140HM **615.210** ♦
**ØD 13.8 - 15.8**



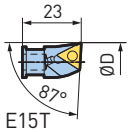

ST14-87 **615.232**
**ØD 14.8 - 17.8**



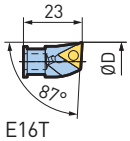

ST14-117HM **615.233** ♦
**ØD 14.8 - 17.8**




ST14-147HM **615.221** ♦
**ØD 14.8 - 17.8**

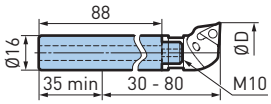



E15T
**615.280** ♦
**ØD 14.8 - 16.8**

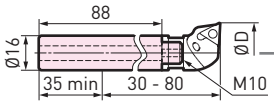



E16T
**615.281** ♦
**ØD 15.8 - 17.8**

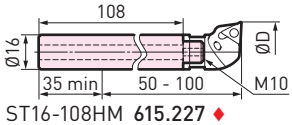
TC 11



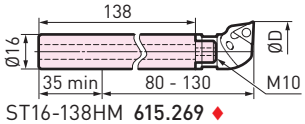

ST16-88 **615.226**
**ØD 17.8 - 50.0**



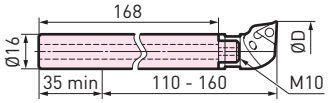

ST16-88HM **615.268**
**ØD 17.8 - 50.0**



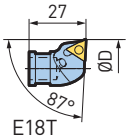

ST16-108HM **615.227** ♦
**ØD 17.8 - 50.0**



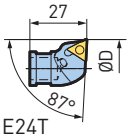

ST16-138HM **615.269** ♦
**ØD 17.8 - 50.0**



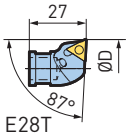

ST16-168HM **615.229** ♦
**ØD 17.8 - 50.0**



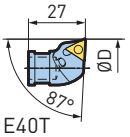

E18T
**615.282** ♦
**ØD 17.8 - 19.8**



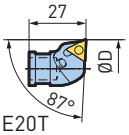

E24T
**615.290** ♦
**ØD 23.8 - 24.8**



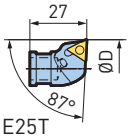

E28T
**615.284** ♦
**ØD 27.8 - 31.8**



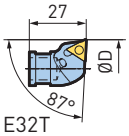

E40T
**615.287** ♦
**ØD 39.8 - 44.8**



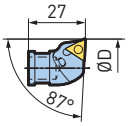

E20T
**615.289** ♦
**ØD 19.8 - 21.8**



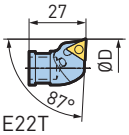

E25T
**615.288** ♦
**ØD 24.8 - 25.8**



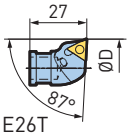

E32T
**615.285** ♦
**ØD 31.8 - 35.8**



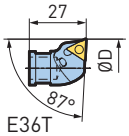

E45T
**615.292** ♦
**ØD 44.8 - 50.0**




E22T
**615.283** ♦
**ØD 21.8 - 23.8**




E26T
**615.291** ♦
**ØD 25.8 - 27.8**

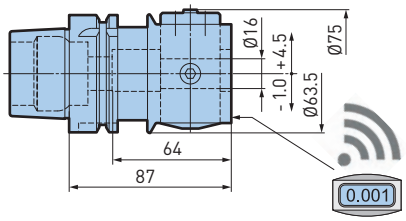



E36T
**615.286** ♦
**ØD 35.8 - 39.8**

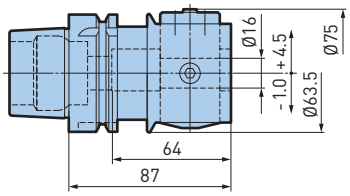
For Insert ▶ 395 - 397

**Boring Head** **Order No.**

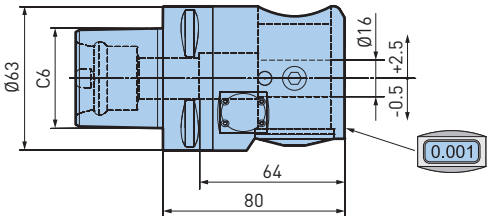
EWE2-152HSK-A63 **112.126A**



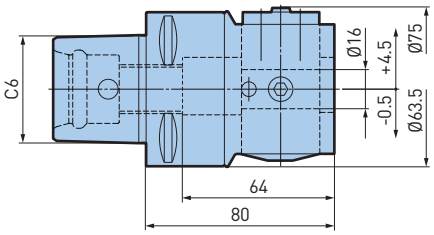

EWN2-152HSK-A63 **112.123**



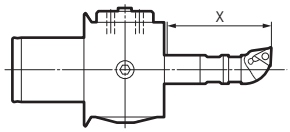

EWD2-54C6 **470.109**




EWN2-152C6 **470.108**




X = Boring depth

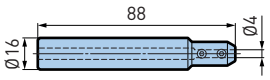



**ØD**

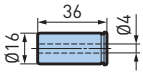
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

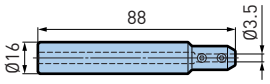
RB16-4-88 **613.434**



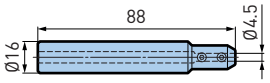

RB16-4 **613.404**



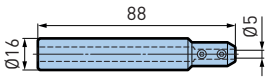

RB16-3.5-88 **613.432**



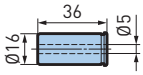

RB16-4.5-88 **613.433**



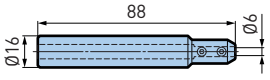

RB16-5-88 **613.435**



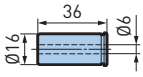

RB16-5 **613.405**



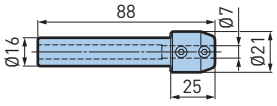

RB16-6-88 **613.436**



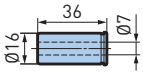

RB16-6 **613.406**



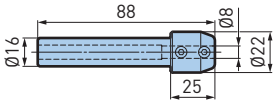

RB16-7-88 **613.437**



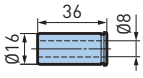

RB16-7 **613.407**



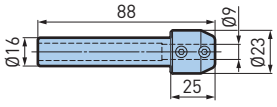

RB16-8-88 **613.438**



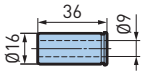

RB16-8 **613.408**



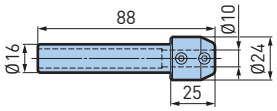

RB16-9-88 **613.439**



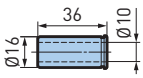

RB16-9 **613.409**




RB16-10-88 **613.440**

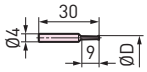



RB16-10 **613.410**

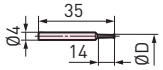



Carbide tool holders

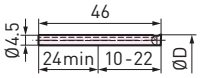
## Fixed Tool Holder



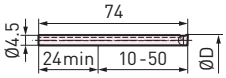

E2-4K10 **611.155**
**ØD 2.0 - 3.0**



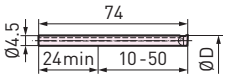

E3-4K10 **611.156**
**ØD 3.0 - 4.0**



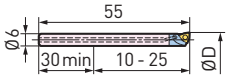

E5-ST4.5-46K10 **615.081**
**ØD 4.9 - 5.9**



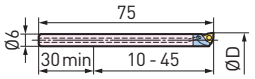

E5-ST4.5-74K10 **615.204**
**ØD 4.9 - 5.9**



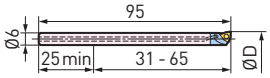

E5-ST4.5-74K10C **615.204A**
**ØD 4.9 - 5.9**



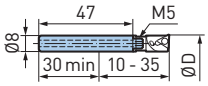

E7.5-ST6-WC02-55HM **615.084**
**ØD 7.3 - 8.8**



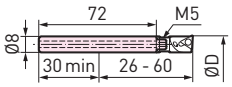

E7.5-ST6-WC02-75HM **615.085**
**ØD 7.3 - 8.8**



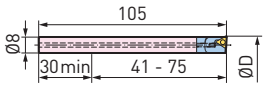

E7.5-ST6-WC02-95HM **615.202**
**ØD 7.3 - 8.8**



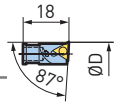

ST8-47 **615.211**
**ØD 8.8 - 11.8**



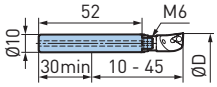

ST8-72HM **615.212**
**ØD 8.8 - 11.8**



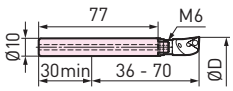

E9-ST8-TP07-105HM **615.213**
**ØD 8.8 - 11.8**



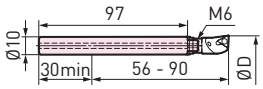

E9T
**615.271**
**ØD 8.8 - 11.8**



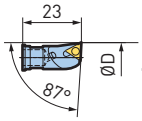

ST10-52 **615.214**
**ØD 11.8 - 13.8**



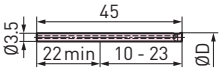

ST10-77HM **615.215**
**ØD 11.8 - 13.8**



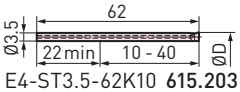

ST10-97HM **615.223**
**ØD 11.8 - 13.8**



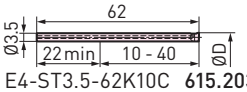

E12T
**615.272**
**ØD 11.8 - 13.8**



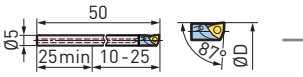

E4-ST3.5-45K10 **615.080**
**ØD 3.9 - 4.9**



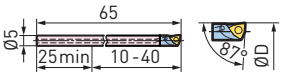

E4-ST3.5-62K10 **615.203**
**ØD 3.9 - 4.9**



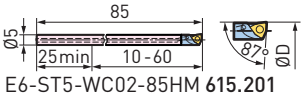

E4-ST3.5-62K10C **615.203A**
**ØD 3.9 - 4.9**




E6-ST5-WC02-50HM **615.082**
**ØD 5.8 - 7.3**



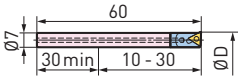

E6-ST5-WC02-65HM **615.083**
**ØD 5.8 - 7.3**



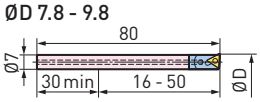

E6-ST5-WC02-85HM **615.201**
**ØD 5.8 - 7.3**

WC 02

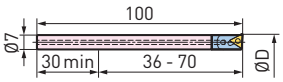
WC 02



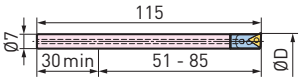

E8-ST7-TP07-60HM **615.086**
**ØD 7.8 - 9.8**




E8-ST7-TP07-80HM **615.207**
**ØD 7.8 - 9.8**



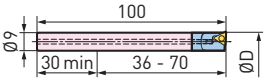

E8-ST7-TP07-100HM **615.087**
**ØD 7.8 - 9.8**



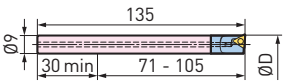

E8-ST7-TP07-115HM **615.205**
**ØD 7.8 - 9.8**

TP 07

TP 07




E10-ST9-TP07-100HM **615.208**
**ØD 9.8 - 11.8**




E10-ST9-TP07-135HM **615.206**
**ØD 9.8 - 11.8**

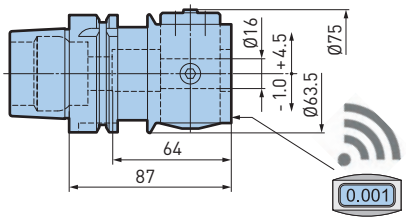
TP 07

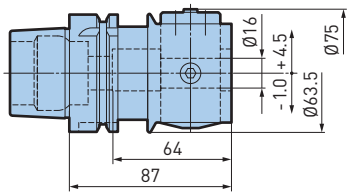
TP 07

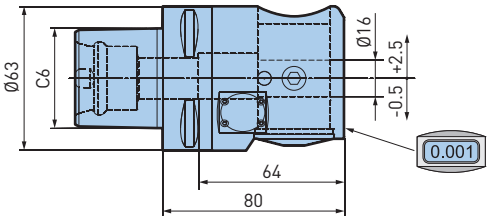
B.2

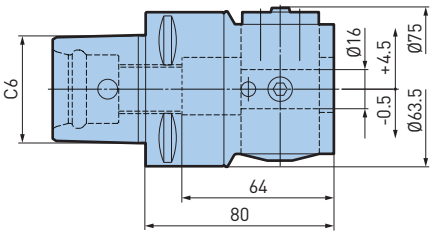
For Insert ▶ 394/395

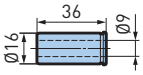
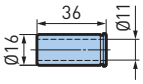
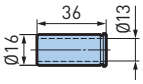
| Boring Head | Order No. |
|---|---|
| EWE2-152HSK-A63 | 112.126A |
| EWN2-152HSK-A63 | 112.123 |
| EWD2-54C6 | 470.109 |
| EWN2-152C6 | 470.108 |



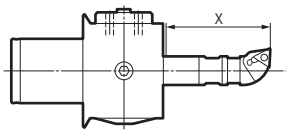




| | | |
|---|---|---|
| RB16-9 **613.409** |  | 36, Ø16, Ø9 |
| RB16-11 **613.411** |  | 36, Ø16, Ø11 |
| RB16-13 **613.413** |  | 36, Ø16, Ø13 |

X = Boring depth




**ØD**

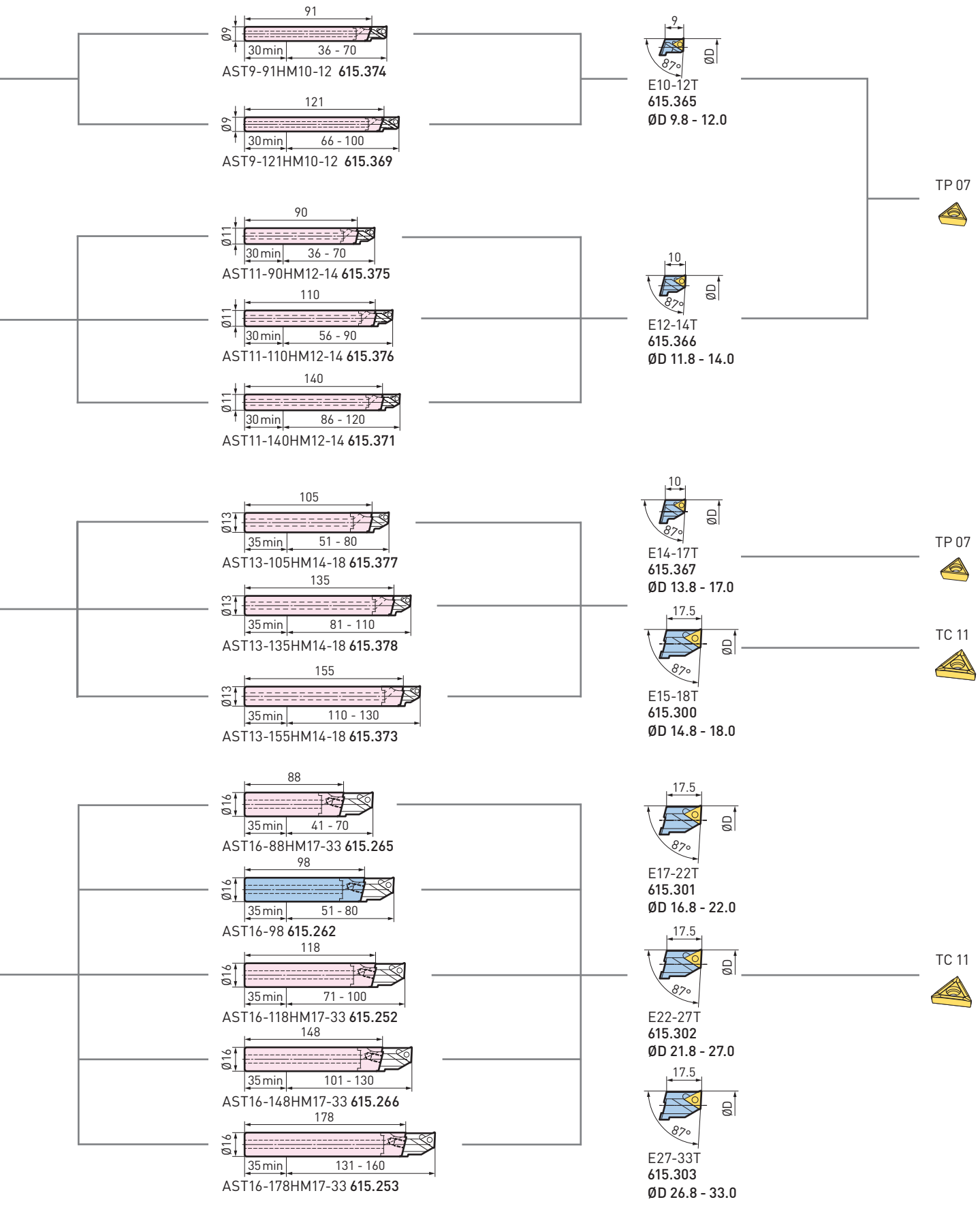
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

Carbide tool holders

## Adjustable Tool Holder

The adjustable tool holder allows the coarse diameter setting on the insert holder. This leads to the possibility to machine bores from Ø 9.8 - 54 mm with the tool holder in the centre position and as a result, with the best possible balancing of the tool combination.

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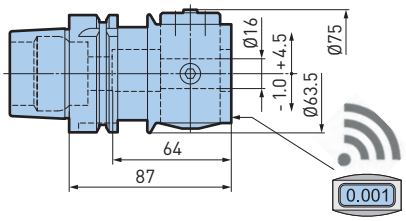
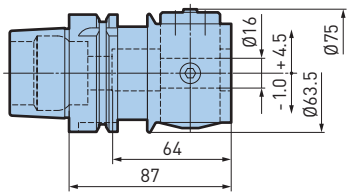
**Boring Head** **Order No.**

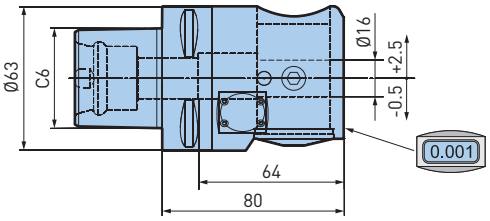
EWE2-152HSK-A63 **112.126A**



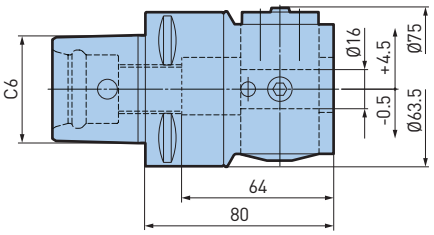

EWN2-152HSK-A63 **112.123**



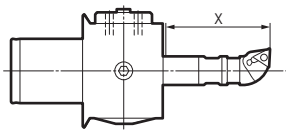

EWD2-54C6 **470.109**



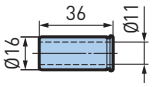

EWN2-152C6 **470.108**



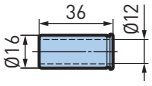

X = Boring depth



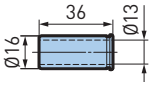

RB16-11 **613.411**



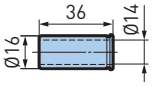

RB16-12 **613.412**




RB16-13 **613.413**




RB16-14 **613.414**



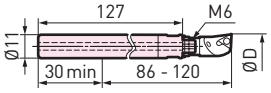

**ØD**

Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

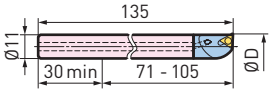
- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

Carbide tool holders

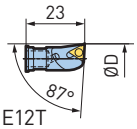
## Fixed Tool Holder



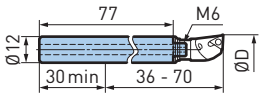

ST11-127HM **615.250**
**ØD 11.8 - 13.8**



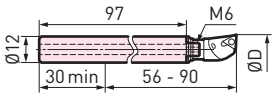

E12-ST11-TP07-135HM **615.209**
**ØD 11.8 - 13.8**



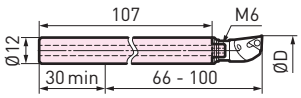

E12T
**615.272**
**ØD 11.8 - 13.8**



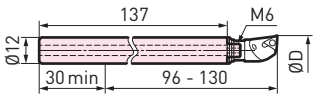

ST12-77 **615.218**
**ØD 13.8 - 15.8**



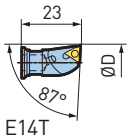

ST12-97HM **615.225**
**ØD 13.8 - 15.8**




ST12-107HM **615.219**
**ØD 13.8 - 15.8**

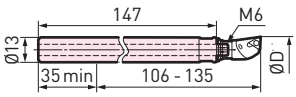



ST12-137HM **615.224**
**ØD 13.8 - 15.8**

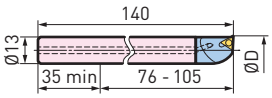



E14T
**615.273**
**ØD 13.8 - 15.8**

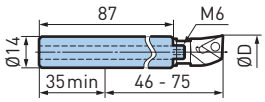
TP 07



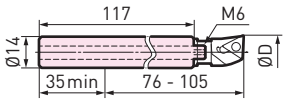

ST13-147HM **615.251**
**ØD 13.8 - 15.8**



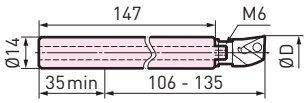

E14-ST13-TP07-140HM **615.210**
**ØD 13.8 - 15.8**



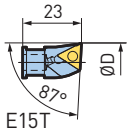

ST14-87 **615.232**
**ØD 14.8 - 17.8**



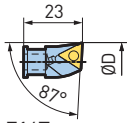

ST14-117HM **615.233**
**ØD 14.8 - 17.8**




ST14-147HM **615.221**
**ØD 14.8 - 17.8**

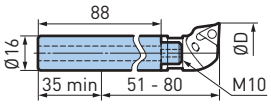



E15T
**615.280**
**ØD 14.8 - 16.8**

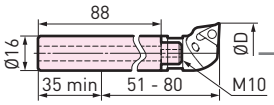



E16T
**615.281**
**ØD 15.8 - 17.8**

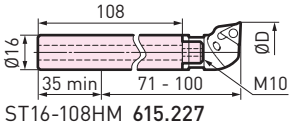
TC 11



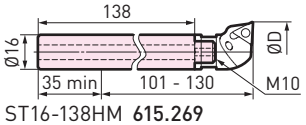

ST16-88 **615.226**
**ØD 17.8 - 50.0**



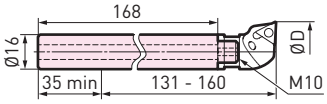

ST16-88HM **615.268**
**ØD 17.8 - 50.0**



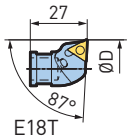

ST16-108HM **615.227**
**ØD 17.8 - 50.0**



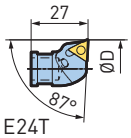

ST16-138HM **615.269**
**ØD 17.8 - 50.0**



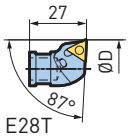

ST16-168HM **615.229**
**ØD 17.8 - 50.0**



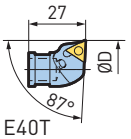

E18T
**615.282**
**ØD 17.8 - 19.8**



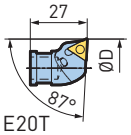

E24T
**615.290**
**ØD 23.8 - 24.8**



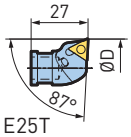

E28T
**615.284**
**ØD 27.8 - 31.8**



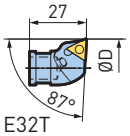

E40T
**615.287**
**ØD 39.8 - 44.8**



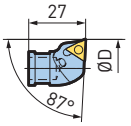

E20T
**615.289**
**ØD 19.8 - 21.8**



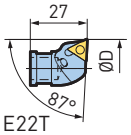

E25T
**615.288**
**ØD 24.8 - 25.8**



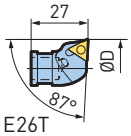

E32T
**615.285**
**ØD 31.8 - 35.8**



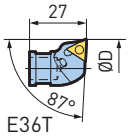

E45T
**615.292**
**ØD 44.8 - 50.0**




E22T
**615.283**
**ØD 21.8 - 23.8**




E26T
**615.291**
**ØD 25.8 - 27.8**




E36T
**615.286**
**ØD 35.8 - 39.8**

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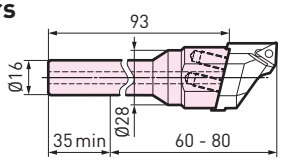
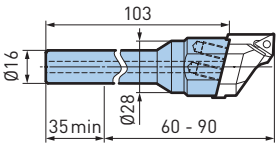
## Adjustable Tool Holders

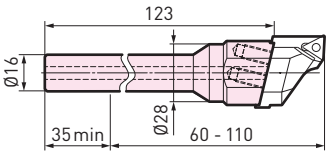
AST16-93HM32-54 **615.267**
**ØD 31.8 - 54.0**



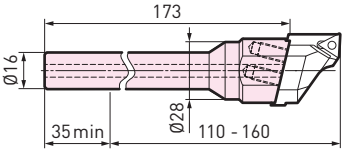

AST16-103 **615.264**
**ØD 31.8 - 54.0**



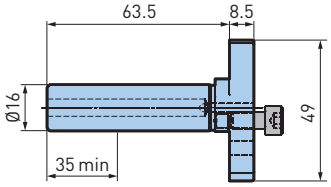

AST16-123HM32-54 **615.257**
**ØD 31.8 - 54.0**

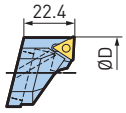



AST16-173HM32-54 **615.258**
**ØD 31.8 - 54.0**

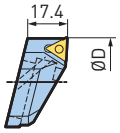



AST16-72 **615.387B**
**ØD 54.0 - 80.0**

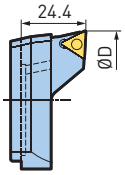



E32-40T
**615.304**
**ØD 31.8 - 40.0**



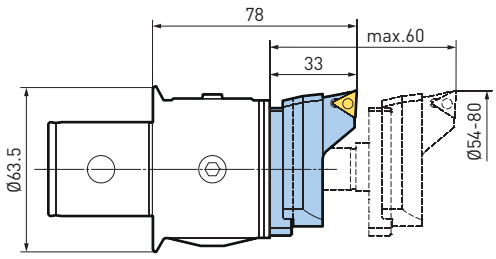

E40-54T
**615.305**
**ØD 39.8 - 54.0**




E54-80T
**615.306**
**ØD 54.0 - 80.0**

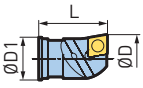
TC 11

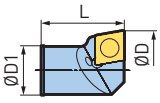
For Insert ▸ 396 - 398




B.2

## 90° Insert Holders



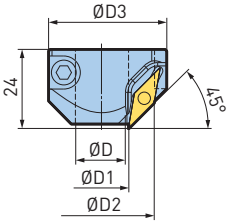

| Model | Order No. | ØD1 | L | ØD | |
|---|---|---|---|---|---|
| E12C | **615.420** | 10 | 23 | 11.8 - 14.5 | CC 06 |
| E14C | **615.421** | 12 | 23 | 13.8 - 16.5 | |
| E16C | **615.422** | 14 | 23 | 15.8 - 18.5 | |
| E18C | **615.423** | 16 | 27 | 17.8 - 20.5 | CC 09 |
| E20C | **615.424** | 16 | 27 | 19.8 - 22.5 | |

| Model | Order No. | ØD1 | L | ØD | |
|---|---|---|---|---|---|
| E22C | **615.425** | 16 | 27 | 21.8 - 24.5 | CC 09 |
| E24C | **615.426** | 16 | 27 | 23.8 - 25.5 | |
| E26C | **615.427** | 16 | 27 | 25.8 - 28.5 | |
| E28C | **615.428** | 16 | 27 | 27.8 - 32.5 | |
| E30C | **615.429** | 16 | 27 | 29.8 - 34.5 | |

For Insert ▸ 400

## Chamfering Rings

Chamfering rings for tool holders made of steel and carbide Ø 12 and Ø 16 mm, for 45° chamfering right after boring, without tool change.




| Model | Order No. | Dimensions ØD | ØD1 | ØD2 | ØD3 | |
|---|---|---|---|---|---|---|
| CR13-27ST12V | **615.394** | 12 | 12.6 | 27.7 | 35 | VC 11 |
| CR17-31ST16V | **615.395** | 16 | 16.6 | 31.7 | 39.5 | |

For Insert ▸ 421

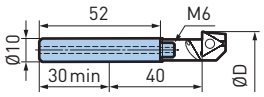
Carbide tool holders



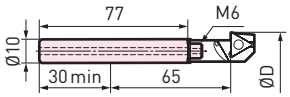
BROTECH

## Back Boring Holders

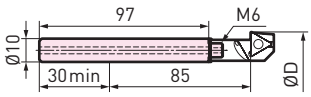
ST10-52 **615.214**
**ØD 15.8 - 20.5**



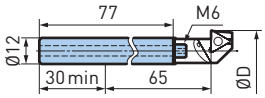

ST10-77HM **615.215**
**ØD 15.8 - 20.5**



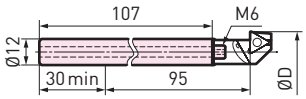

ST10-97HM **615.223**
**ØD 15.8 - 20.5**



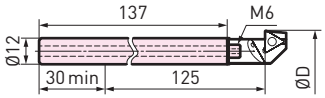

ST12-77 **615.218**
**ØD 19.8 - 25.8**



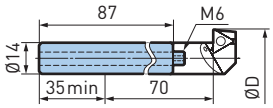

ST12-107HM **615.219**
**ØD 19.8 - 25.8**



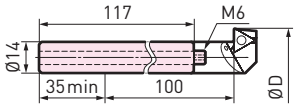

ST12-137HM **615.224**
**ØD 19.8 - 25.8**



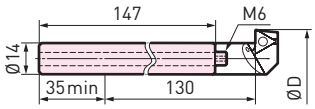

ST14-87 **615.232**
**ØD 25.8 - 28.8**



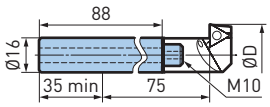

ST14-117HM **615.233**
**ØD 25.8 - 28.8**



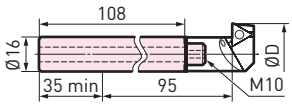

ST14-147HM **615.221**
**ØD 25.8 - 28.8**



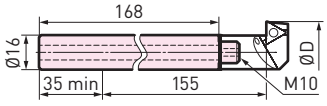

ST16-88 **615.226**
**ØD 28.8 - 44.5**

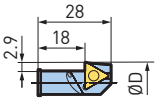



ST16-108HM **615.227**
**ØD 28.8 - 44.5**

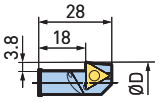



ST16-168HM **615.229**
**ØD 28.8 - 44.5**

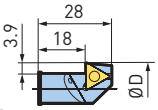


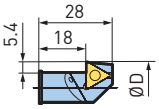

E16T-BB
**615.401**
**ØD 15.8 -18.5**
**Entry- Ø 13.0**



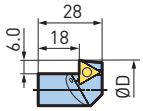

E18T-BB
**615.402**
**ØD 17.8 - 20.5**
**Entry- Ø 13.9**



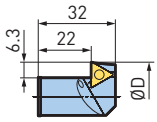

E20T-BB
**615.403**
**ØD 19.8 - 22.8**
**Entry- Ø 15.9**



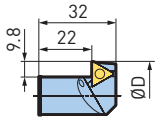

E23T-BB
**615.404**
**ØD 22.8 - 25.8**
**Entry- Ø 17.4**



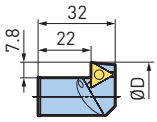

E26T-BB
**615.405**
**ØD 25.8 - 28.8**
**Entry- Ø 19.9**



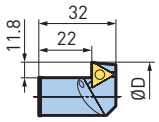

E29T-BB **615.406**
**ØD 28.8 - 33.5**
**Entry- Ø 22.4**




E36T-BB
**615.408**
**ØD 35.8 - 40.5**
**Entry- Ø 25.9**




E32T-BB
**615.407**
**ØD 31.5 - 36.5**
**Entry- Ø 23.9**




E40T-BB
**615.409**
**ØD 39.8 - 44.5**
**Entry- Ø 27.9**

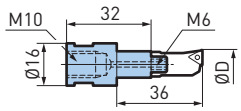
TC 11

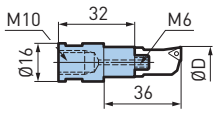
For Insert ▶ 396 - 398

B.2

### Reducers

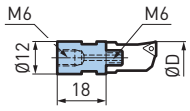
| Model | Order No. | ØD | Model | Order No. | ØD |
|---|---|---|---|---|---|
| ST16-10-32 | 615.230 | 11.8 - 14.5 | ST16-12-32 | 615.231 | 13.8 - 18.5 |

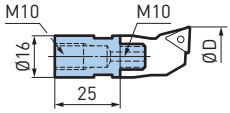



### Extensions

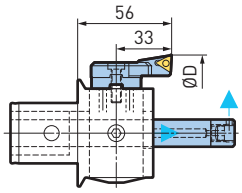
| Model | Order No. | ØD | Model | Order No. | ØD |
|---|---|---|---|---|---|
| ST12-18 | 615.220 | 13.8 - 16.5 | ST16-25 | 615.228 | 17.8 - 50.0 |



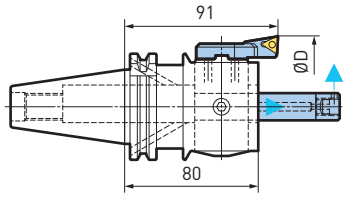



# Insert Holders for EWN/EWE, Ø 80 - 152

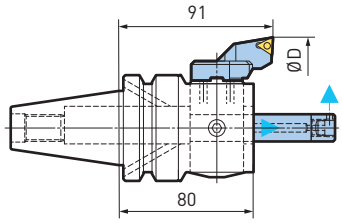
EWN2-152CK6



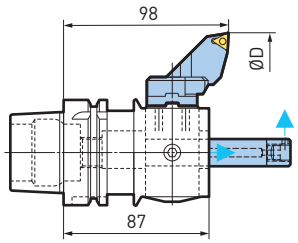

EWN2-152DV40

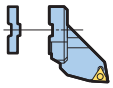



EWN2-152BT40




EWN2-152HSK-A63



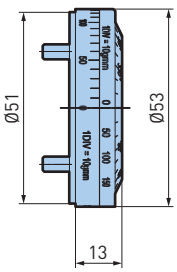

| | Parts | Model | Order No. | Insert | Front Bore ØD | Back Bore ØD |
|---|---|---|---|---|---|---|
| | Insert Holder | EK80-104T | **626.908** | | 80 - 92 | - |
| | Spacer | DD30-6 | **626.907** | | 92 - 104 | 92 - 104 |
| | Insert Holder | EK80-104T | **626.908** | | | |
| | Insert Holder | EK104-128T | **626.909** | | 104 - 116 | 104 - 116 |
| | Spacer | DD30-6 | **626.907** | TC 11 | 116 - 128 | 116 - 128 |
| | Insert Holder | EK104-128T | **626.909** | | | |
| | Insert Holder | EK128-152T | **626.910** | | 128 - 140 | 128 - 140 |
|  | Spacer | DD30-6 | **626.907** | | 140 - 152 | 140 - 152 |
| | Insert Holder | EK128-152T | **626.910** | | | |
| | Tool Holder | ST16-88 | **615.226** | | | |
| | Coolant Nozzle | CN2-50 | **615.392** | | | |

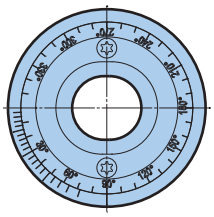
For Insert ▶ 396 - 398

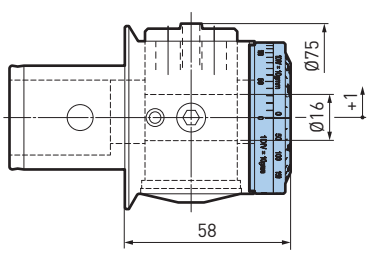
## Balancing Rings

After removing the front cover plate, the balancing rings can be mounted on to the boring heads. The imbalance has to be measured on a balancing machine. The correction of the imbalance is done by moving the scale rings.

| Model | Order No. |
|---|---|
| BR2-152 | 112.806 |

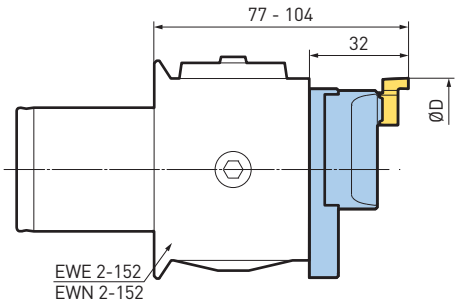




# Face Grooving Holders for EWN/EWE, Ø 14 - 53

Tool holder, insert holder, and grooving insert are made for face grooving with the fine boring head EWN/EWE 2-152.




## Tool- and Insert Holder

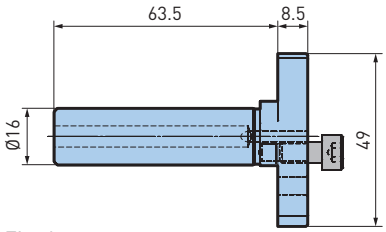



Fig. 1

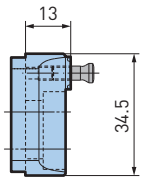



Fig. 2

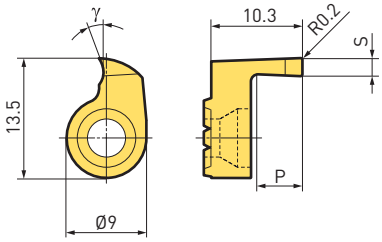
| Model | Order No. | Fig. | ØD |
|---|---|---|---|
| AST16-72 | **615.387B** | 1 | 14 - 53 |
| FGH14-54 | **615.388** | 2 | 14 - 53 |

For Boring Head ▶ 314
For Spare Parts ▶ 439



## Grooving Inserts

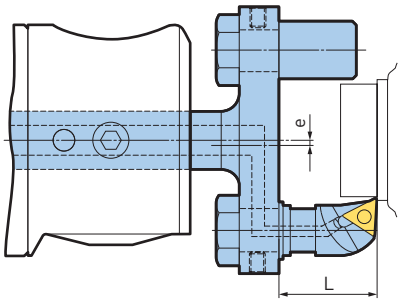
For all materials.



| Model | Order No. | S | P | γ |
|---|---|---|---|---|
| RD1420P30C | **958.501** | 2.0 | 5 | 20° |
| RD1425P30C | **958.502** | 2.5 | | |
| RD1430P30C | **958.503** | 3.0 | | |

# OD Turning Holders for EWN/EWE, Ø 1 - 32

By using an eccentric bar on the fine boring heads EWN/EWE 2-152, it is possible to turn outside diameters up to 32 mm with lengths up to 50 mm. The counterweight is moveable on the eccentric bar. By moving the counterweight, the imbalance can be compensated to a minimum.



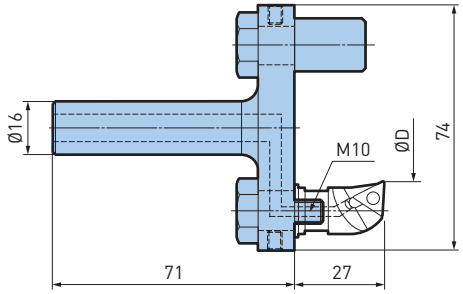

| Max. Spindle Speeds | | |
|---|---|---|
| e [mm] | L = 27 [min $^{-1}$] | L = 52 [min $^{-1}$] |
| 0 | 7 000 | 5 500 |
| 0.5 | 5 000 | 4 500 |
| 2.5 | 4 000 | 3 500 |
| 4.5 | 3 000 | 2 500 |

**Attention: Counter-clockwise rotation of spindle!**

**Remark:**
Adjustment of the scale in clockwise direction and eccentric bar with cutting edge positioned as shown on the drawing, results in a smaller pin diameter.

B.2

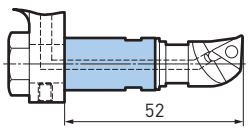
## Eccentric Bar

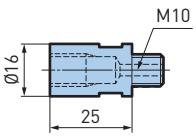



| Model | Order No. | ØD |
|---|---|---|
| ST16-OD-32 | 615.390 | 1 - 32 |

For Boring Head ▶ 314
For Spare Parts ▶ 446

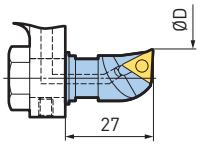
## Extension

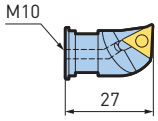



| Model | Order No. |
|---|---|
| ST16-25 | 615.228 |

## Insert Holders




| Model | Order No. | ØD | Insert |
|---|---|---|---|
| E18T | 615.282 | 28 - 32 | TC 11 |
| E22T | 615.283 | 24 - 28 | |
| E26T | 615.291 | 20 - 24 | |
| E32T | 615.285 | 15 - 20 | |
| E36T | 615.286 | 11 - 15 | |
| E40T | 615.287 | 6 - 11 | |
| E45T | 615.292 | 1 - 6 | |

For Insert ▶ 396 - 398

# Tool Kit EWN/EWE 2-152, Ø 17.8 - 152

The tool kit EWN 2-152 and EWE 2-152, Ø 17.8 – 152 mm, is available in different versions. The versions differ in the length and the material of the tool holders and in the quantity of the inserts.

| Model | Order No. |
|---|---|
| EWN2-152-18-152SET | 112.837 * |

| Model | Order No. | Qty. |
|---|---|---|
| Boring head | | |
| EWN2-152CK6 | 112.108 * | 1 |
| Tool holder | | |
| AST16-72 | 615.387B | 1 |
| ST16-88 | 615.226 * | 1 |
| Insert holder | | |
| E18T | 615.282 | 1 |
| E25T | 615.288 | 1 |
| E32T | 615.285 | 1 |
| E40T | 615.287 | 1 |
| E45T | 615.292 | 1 |
| E54-80TC | 615.306 | 1 |
| DD30-6 | 626.907 | 1 |
| EK80-104T | 626.908 | 1 |
| EK104-128T | 626.909 | 1 |
| EK128-152TC11 | 626.910 | 1 |

| Model | Order No. | Qty. |
|---|---|---|
| Insert | | |
| TCGT-110204-M10C | 655.389 * | 10 |
| Screw | | |
| ETL-M6x20A-DIN6912 | 690.156 | 2 |
| Wrench | | |
| ETL-GRS-SW5x80 | 690.816 | 1 |
| ETL-GRS-TORX-PLUS-T7-IP | 694.807 | 1 |
| Coolant nozzle | | |
| CN2-50 | 615.392 | 1 |
| Case | | |
| CASE-EWN2-150 | 671.150 | 1 |

*** Other versions available**

| Order No. | Model | Order No. | Qty. |
|---|---|---|---|
| 112.837A | Tool holder made of steel | | |
| | ST16-88 | 615.226 | 1 |
| | Insert | | |
| | TCGT-110204-M10C | 655.389 | 2 |
| | Boring head | | |
| | EWN2-152CK6 | 112.108 | 1 |
| 112.837B | Tool holder made of carbide | | |
| | ST16-108HM | 615.227 | 1 |
| | Insert | | |
| | TCGT-110204-M10C | 655.389 | 10 |
| | Boring head | | |
| | EWN2-152CK6 | 112.108 | 1 |
| 112.837C | Tool holder made of carbide | | |
| | ST16-108HM | 615.227 | 1 |
| | Insert | | |
| | TCGT-110204-M10C | 655.389 | 2 |
| | Boring head | | |
| | EWN2-152CK6 | 112.108 | 1 |

| Order No. | Model | Order No. | Qty. |
|---|---|---|---|
| 112.837E | Tool holder made of carbide | | |
| | ST16-108HM | 615.227 | 1 |
| | Insert | | |
| | TCGT-110204-M20C | 655.318 | 2 |
| | Boring head | | |
| | EWE2-152CK6 | 112.110 | 1 |

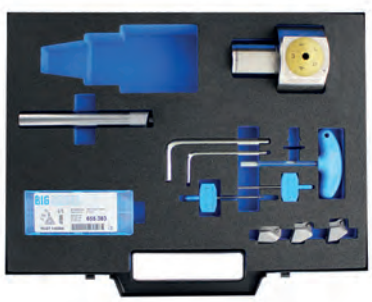
For tool kit with EWE 2-152, order 112.837E.

B.2

# Tool Kit EWN/EWE 2-152, Ø 16.8 - 33

| Model | Order No. |
|---|---|
| EWN2-152-17-33SET | 112.097A |
| EWE2-152-17-33SET | 112.097C * |

1. * For tool kit with EWE 2-152 (digital), order 112.097C.



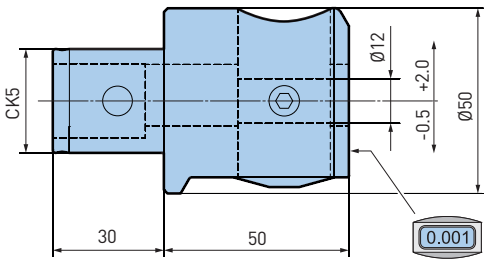
| Contents | Order No. | Qty. |
|---|---|---|
| Boring head | | |
| EWN2-152CK6 | 112.108 * | 1 |
| Tool holder | | |
| AST16-118HM17-33 | 615.252 | 1 |
| Adjustable tool holder | | |
| E17-22T | 615.301 | 1 |
| E22-27T | 615.302 | 1 |
| E27-33T | 615.303 | 1 |

| Contents | Order No. | Qty. |
|---|---|---|
| Insert | | |
| TCGT-110204-K10C | 655.383 | 10 |
| Wrench | | |
| ETL-GRS-SW5x80 | 690.816 | 1 |
| ETL-STS-SW6 | 690.806 | 1 |
| ETL-STS-SW4 | 690.804 | 1 |
| ETL-GRS-TORX-PLUS-T7-IP | 694.807 | 1 |
| Case | | |
| CASE-EWD/EWN16.8-33 | 671.151 | 1 |

# EWE 2-32 Digital Fine Boring Head, Ø 2 - 32

The EWE 2-32 is the smallest digital fine boring head with centre insert holder. It is especially suitable for the use on small machines.

Wireless




| Model | Order No. |
|---|---|
| EWE2-32CK5 | 112.310 |

**Other execution**

EWD2-32C5
**470.103**

## BIG KAISER App

B.2

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.

Cutting data

Send your data to...

History (made automatically)

**This is how the app is going to support your daily challenges**

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore middle tolerance

Download on the App Store

GET IT ON Google Play



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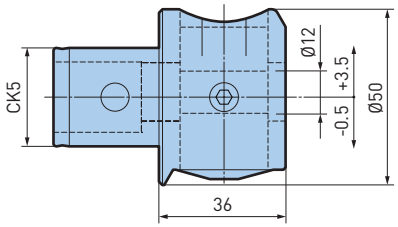
# EWN 2-32 Fine Boring Head, Ø 2 - 32

Fine boring head in integral, modular, and screw-on execution for the precise machining of bores.




| Model | Order No. |
|---|---|
| EWN2-32CK5 | 112.301A |

**Other executions**

EWB2-32CK5
**112.306**

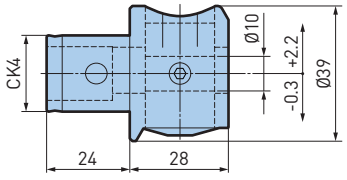
Balanced

EWN2-32ES32
**112.304A**

EWN2-32DV30
**112.303A**

B.2

# EWN 04-22 Fine Boring Head, Ø 0.4 - 22




| Model | Order No. |
|---|---|
| EWN04-22CK4 | 112.206 |

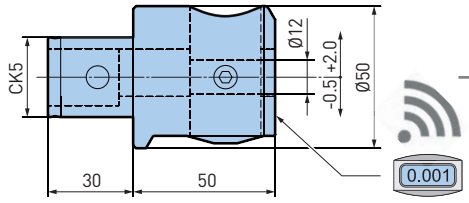
**Other executions**

EWN04-22HSK-E40
**112.207**

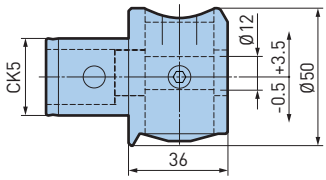
EWN04-22ES25
**112.205**

**Boring Head** **Order No.**

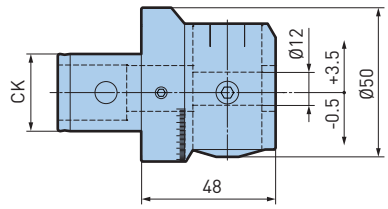
EWE2-32CK5 **112.310**



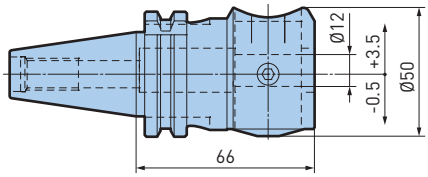

EWN2-32CK5 **112.301A**



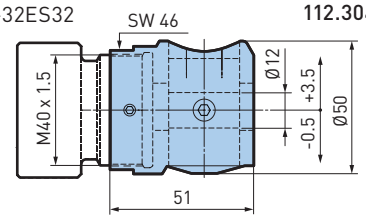

EWB2-32CK5 **112.306**



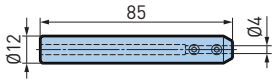

EWN2-32DV30 **112.303A**



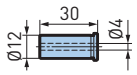

EWN2-32ES32 **112.304A**



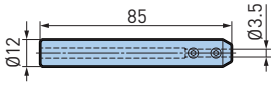

RB12-4-85 **613.324** ♦



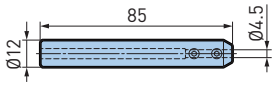

RB12-4 **613.304** ♦



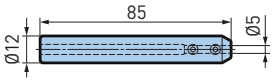

RB12-3.5-85 **613.323** ♦



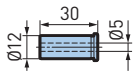

RB12-4.5-85 **613.326** ♦



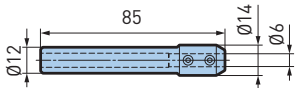

RB12-5-85 **613.325** ♦



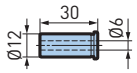

RB12-5 **613.305** ♦



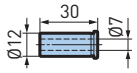

RB12-6-85 **613.327** ♦



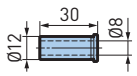

RB12-6 **613.306** ♦



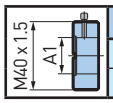

RB12-7 **613.307** ♦




RB12-8 **613.308** ♦




**Sleeve for ER Tool Holder**




| Model | Order No. | A1 |
|---|---|---|
| TB-ES32-ES25 | **112.353** | M32 x 1.5 |
| TB-ES32-ES16 | **112.385** | M22 x 1.5 |

**ØD**

Boring range for the fine boring head EWN 2-32.
Under full use of the adjustment range, the max boring range will be,

- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range + 4 mm Ø

Carbide tool holders

♦ Recommended for EWB 2-32

B.2



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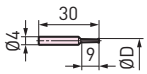
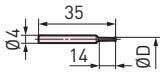
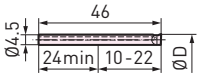
## Fixed Tool Holder



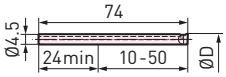

E2-4K10 **611.155** ♦
**ØD 2.0 - 3.0**



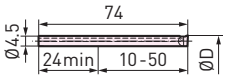

E3-4K10 **611.156** ♦
**ØD 3.0 - 4.0**



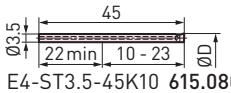

E5-ST4.5-46K10 **615.081**
**ØD 4.9 - 5.9**



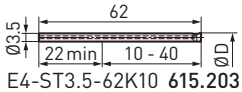

E5-ST4.5-74K10 **615.204** ♦
**ØD 4.9 - 5.9**



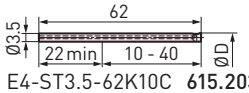

E5-ST4.5-74K10C **615.204A** ♦
**ØD 4.9 - 5.9**



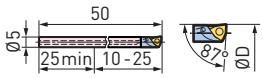

E4-ST3.5-45K10 **615.080**
**ØD 3.9 - 4.9**



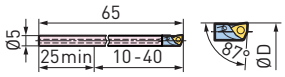

E4-ST3.5-62K10 **615.203** ♦
**ØD 3.9 - 4.9**



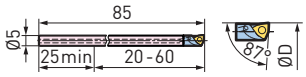

E4-ST3.5-62K10C **615.203A** ♦
**ØD 3.9 - 4.9**




E6-ST5-WC02-50HM **615.082**
**ØD 5.8 - 7.3**

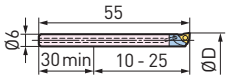



E6-ST5-WC02-65HM **615.083**
**ØD 5.8 - 7.3**

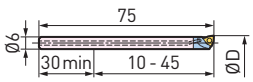



E6-ST5-WC02-85HM **615.201** ♦
**ØD 5.8 - 7.3**

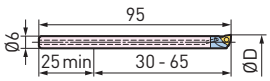
WC 02




E7.5-ST6-WC02-55HM **615.084**
**ØD 7.3 - 8.8**

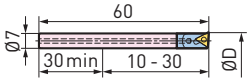



E7.5-ST6-WC02-75HM **615.085**
**ØD 7.3 - 8.8**

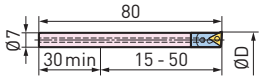



E7.5-ST6-WC02-95HM **615.202** ♦
**ØD 7.3 - 8.8**

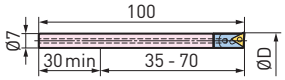
WC 02



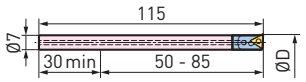

E8-ST7-TP07-60HM **615.086**
**ØD 7.8 - 9.8**




E8-ST7-TP07-80HM **615.207** ♦
**ØD 7.8 - 9.8**

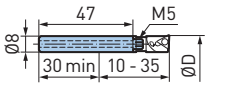



E8-ST7-TP07-100HM **615.087**
**ØD 7.8 - 9.8**

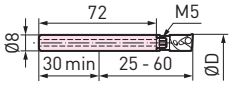



E8-ST7-TP07-115HM **615.205** ♦
**ØD 7.8 - 9.8**

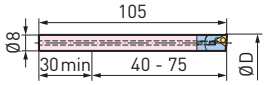
TP 07



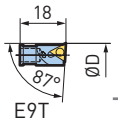

ST8-47 **615.211**
**ØD 8.8 - 11.8**




ST8-72HM **615.212** ♦
**ØD 8.8 - 11.8**




E9-ST8-TP07-105HM **615.213** ♦
**ØD 8.8 - 11.8**



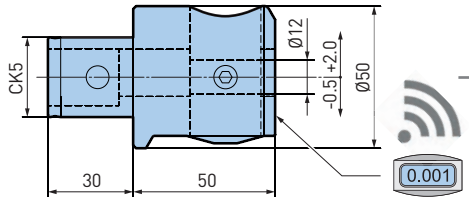

E9T
**615.271** ♦
**ØD 8.8 - 11.8**

TP 07

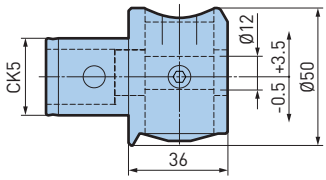
For Insert ▶ 394 / 395

**Boring Head** **Order No.**

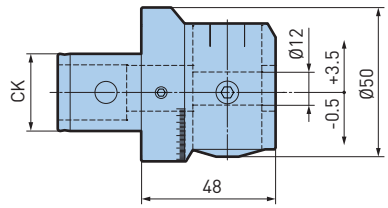
EWE2-32CK5 **112.310**



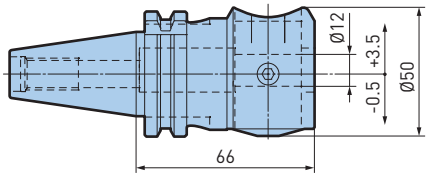

EWN2-32CK5 **112.301A**



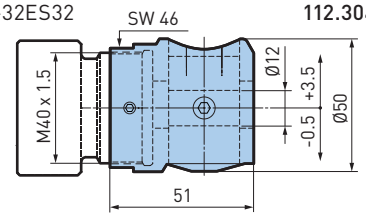

EWB2-32CK5 **112.306**



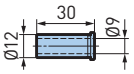

EWN2-32DV30 **112.303A**



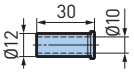

EWN2-32ES32 **112.304A**



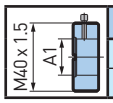

RB12-9
**613.309**




RB12-10
**613.310**




**Sleeve for ER Tool Holder**




| Model | Order No. | A1 |
|---|---|---|
| TB-ES32-ES25 | **112.353** | M32 x 1.5 |
| TB-ES32-ES16 | **112.385** | M22 x 1.5 |

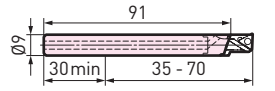
**ØD**

Boring range for the fine boring head EWN 2-32.
Under full use of the adjustment range, the max boring range will be,

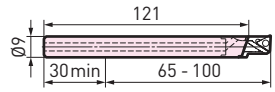
- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range + 4 mm Ø

Carbide tool holders

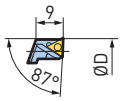
## Adjustable Tool Holder



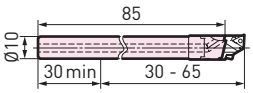

AST9-91HM10-12 **615.374**
**ØD 9.8 - 12.0**



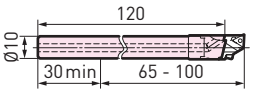

AST9-121HM10-12 **615.369**
**ØD 9.8 - 12.0**



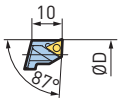

E10-12T
**615.365**
**ØD 9.8 - 12.0**




AST10-85HM12-14 **615.354**
**ØD 11.8 - 14.0**

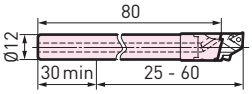



AST10-120HM12-14 **615.370**
**ØD 11.8 - 14.0**

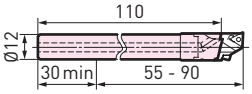



E12-14T
**615.366**
**ØD 11.8 - 14.0**

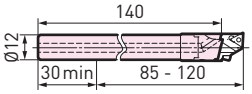
TP 07



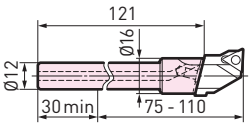

AST12-80HM14-18 **615.355**
**ØD 13.8 - 18.0**



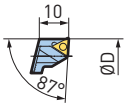

AST12-110HM14-18 **615.356**
**ØD 13.8 - 18.0**



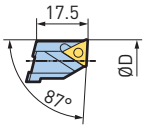

AST12-140HM14-18 **615.372**
**ØD 13.8 - 18.0**




AST12-121HM17-33 **615.256**
**ØD 16.8 - 33.0**

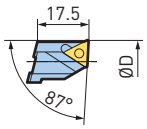



E14-17T
**615.367**
**ØD 13.8 - 17.0**

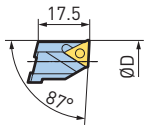



E15-18T
**615.300**
**ØD 14.8 - 18.0**

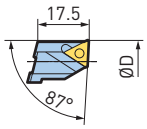
TC 11




E17-22T
**615.301**
**ØD 16.8 - 22.0**




E22-27T
**615.302**
**ØD 21.8 - 27.0**



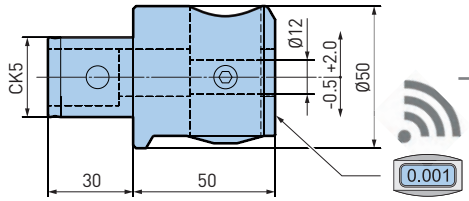

E27-33T
**615.303**
**ØD 26.8 - 33.0**

B.2

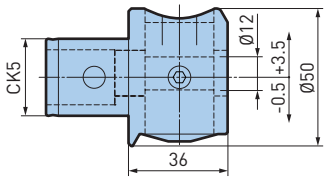
For Insert ▶ 395 - 398

**Boring Head** **Order No.**

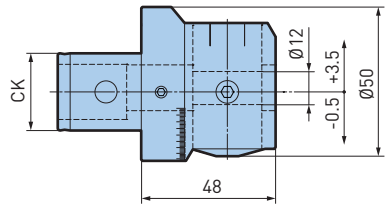
EWE2-32CK5 **112.310**



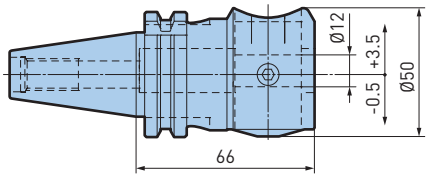

EWN2-32CK5 **112.301A**



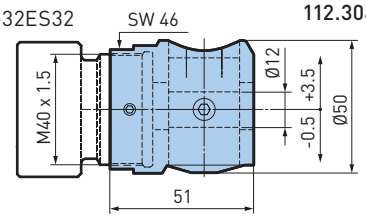

EWB2-32CK5 **112.306**



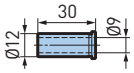

EWN2-32DV30 **112.303A**



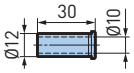

EWN2-32ES32 **112.304A**



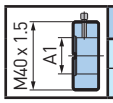

RB12-9 **613.309**




RB12-10 **613.310**




**Sleeve for ER Tool Holder**




| Model | Order No. | A1 |
|---|---|---|
| TB-ES32-ES25 | **112.353** | M32 x 1.5 |
| TB-ES32-ES16 | **112.385** | M22 x 1.5 |

**ØD**

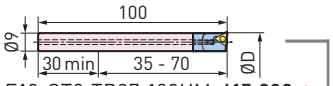
Boring range for the fine boring head EWN 2-32.
Under full use of the adjustment range, the max boring range will be,

- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range + 4 mm Ø

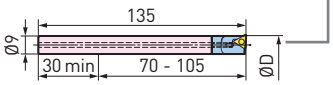
Carbide tool holders

♦ Recommended for EWB 2-32

## Fixed Tool Holder

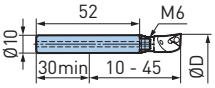



E10-ST9-TP07-100HM **615.208** ♦
**ØD 10.0 - 11.8**

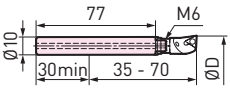



E10-ST9-TP07-135HM **615.206** ♦
**ØD 10.0 - 11.8**

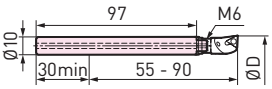
TP 07




ST10-52 **615.214**
**ØD 11.8 - 13.8**

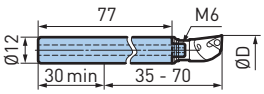



ST10-77HM **615.215** ♦
**ØD 11.8 - 13.8**

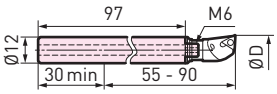



ST10-97HM **615.223** ♦
**ØD 11.8 - 13.8**

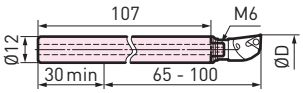
E12TP
**615.272** ♦
**ØD 11.8 - 13.8**



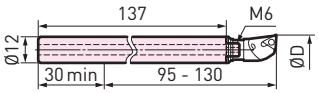

ST12-77 **615.218**
**ØD 13.8 - 17.8**



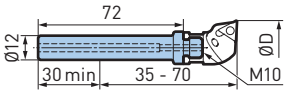

ST12-97HM **615.225** ♦
**ØD 13.8 - 17.8**



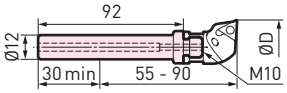

ST12-107HM **615.219**
**ØD 13.8 - 17.8**



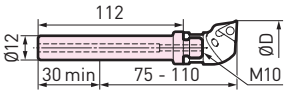

ST12-137HM **615.224** ♦
**ØD 13.8 - 17.8**



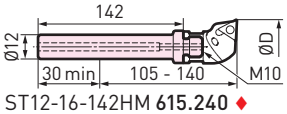

ST12-16-72 **615.234**
**ØD 17.8 - 31.8**



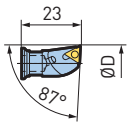

ST12-16-92HM **615.243** ♦
**ØD 17.8 - 31.8**




ST12-16-112HM **615.239** ♦
**ØD 17.8 - 31.8**

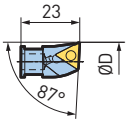



ST12-16-142HM **615.240** ♦
**ØD 17.8 - 31.8**

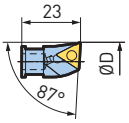



E14T
**615.273** ♦
**ØD 13.8 - 15.8**

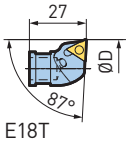
TP 07



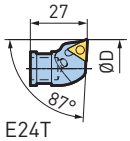

E15T
**615.280** ♦
**ØD 14.8 - 16.8**



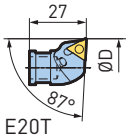

E16T
**615.281** ♦
**ØD 15.8 - 17.8**



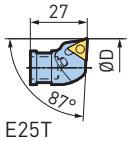

E18T
**615.282**
**ØD 17.8 - 19.8**



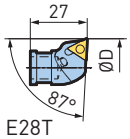

E24T
**615.290**
**ØD 23.8 - 24.8**



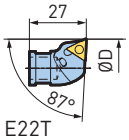

E20T
**615.289**
**ØD 19.8 - 21.8**



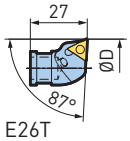

E25T
**615.288**
**ØD 24.8 - 25.8**




E28T
**615.284**
**ØD 27.8 - 31.8**




E22T
**615.283**
**ØD 21.8 - 23.8**



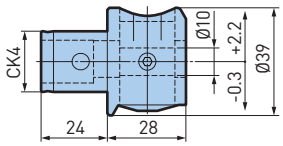

E26T
**615.291**
**ØD 25.8 - 27.8**

TC 11

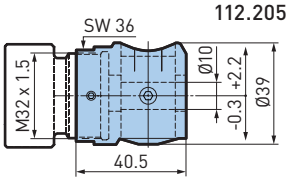
For Insert ▶ 396 - 398

**Boring Head** **Order No.**

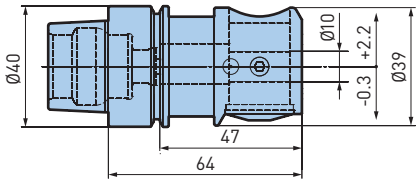
EWN04-22CK4 **112.206**



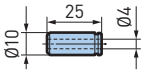

EWN04-22ES25 **112.205**



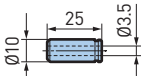

EWN04-22HSK-E40 **112.207**



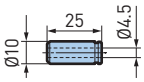

RB10-4 **613.204**



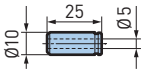

RB10-3.5 **613.202**



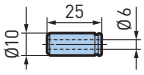

RB10-4.5 **613.203**



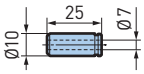

RB10-5 **613.205**



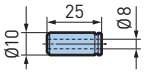

RB10-6 **613.206**



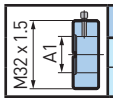

RB10-7 **613.207**




RB10-8 **613.208**




**Sleeve for ER Tool Holder**




| Model | Order No. | A1 |
|---|---|---|
| TB-ES25-ES20 | 112.271 | M25 x 1.5 |
| TB-ES25-ES16 | 112.272 | M22 x 1.5 |

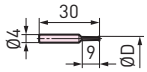
B.2

Carbide tool holders

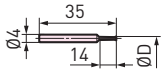


BROTECH

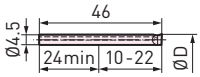
## Fixed Tool Holder



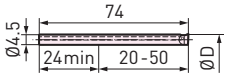

E2-4K10 **611.155**
**ØD 2.0 - 3.0**



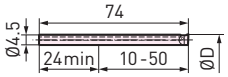

E3-4K10 **611.156**
**ØD 3.0 - 4.0**



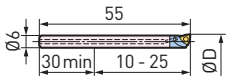

E5-ST4.5-46K10 **615.081**
**ØD 4.9 - 5.9**



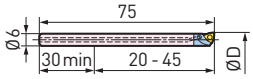

E5-ST4.5-74K10 **615.204**
**ØD 4.9 - 5.9**



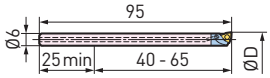

E5-ST4.5-74K10C **615.204A**
**ØD 4.9 - 5.9**



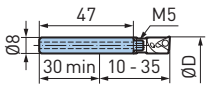

E7.5-ST6-WC02-55HM **615.084**
**ØD 7.3 - 8.8**



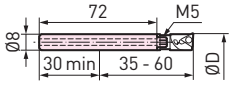

E7.5-ST6-WC02-75HM **615.085**
**ØD 7.3 - 8.8**



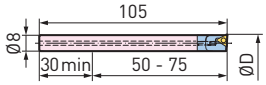

E7.5-ST6-WC02-95HM **615.202**
**ØD 7.3 - 8.8**



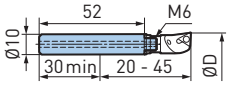

ST8-47 **615.211**
**ØD 8.8 - 11.8**



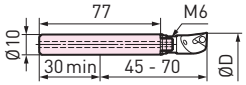

ST8-72HM **615.212**
**ØD 8.8 - 11.8**



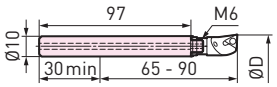

E9-ST8-TP07-105HM **615.213**
**ØD 8.8 - 11.8**



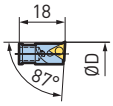

ST10-52 **615.214**
**ØD 11.8 - 13.8**



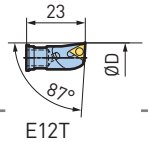

ST10-77HM **615.215**
**ØD 11.8 - 13.8**



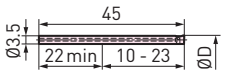

ST10-11.8-13.8-M6-97 **615.223**
**ØD 11.8 - 13.8**



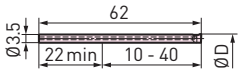

E9T
**615.271**
**ØD 8.8 - 11.8**



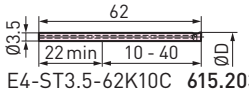

E12T
**615.272**
**ØD 11.8 - 13.8**



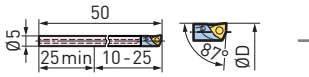

E4-ST3.5-45K10 **615.080**
**ØD 3.9 - 4.9**



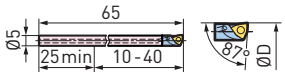

E4-ST3.5-62K10 **615.203**
**ØD 3.9 - 4.9**



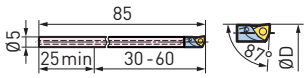

E4-ST3.5-62K10C **615.203A**
**ØD 3.9 - 4.9**




E6-ST5-WC02-50HM **615.082**
**ØD 5.8 - 7.3**



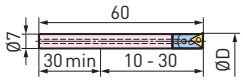

E6-ST5-WC02-65HM **615.083**
**ØD 5.8 - 7.3**



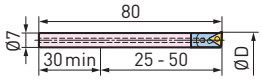

E6-ST5-WC02-85HM **615.201**
**ØD 5.8 - 7.3**

WC 02

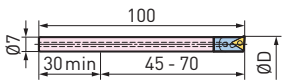
WC 02



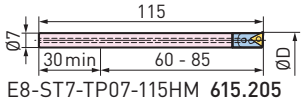

E8-ST7-TP07-60HM **615.086**
**ØD 7.8 - 9.5**




E8-ST7-TP07-80HM **615.207**
**ØD 7.8 - 9.5**




E8-ST7-TP07-100HM **615.087**
**ØD 7.8 - 9.5**




E8-ST7-TP07-115HM **615.205**
**ØD 7.8 - 9.5**

TP 07

TP 07

TP 07

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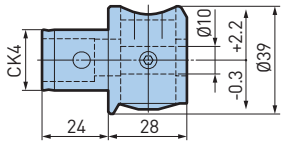
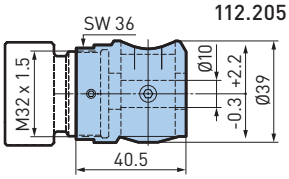
B.2

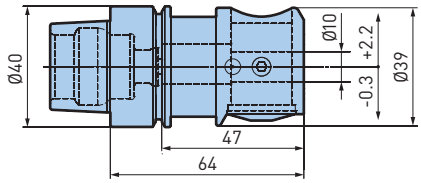
| Boring Head | Order No. |
|---|---|
| EWN04-22CK4 | 112.206 |




| | |
|---|---|
| EWN04-22ES25 | 112.205 |

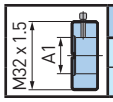



| | |
|---|---|
| EWN04-22HSK-E40 | 112.207 |




B.2

**Sleeve for ER Tool Holder**




| Model | Order No. | A1 |
|---|---|---|
| TB-ES25-ES20 | 112.271 | M25 x 1.5 |
| TB-ES25-ES16 | 112.272 | M22 x 1.5 |



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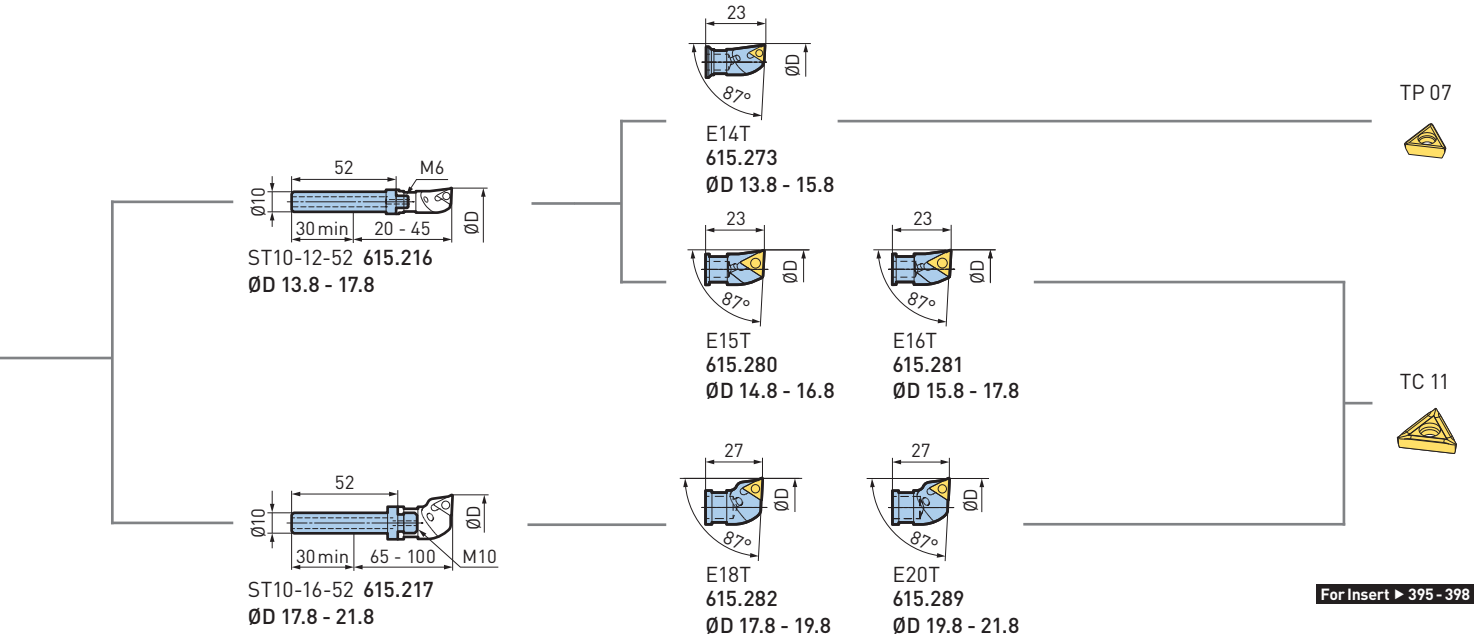
## Fixed Tool Holder




For Insert ▶ 395 - 398

# EWN 04-15 Fine Boring Head, Ø 0.4 - 15

Fine boring heads for the machining of smallest bores with highest spindle speeds on small machine tools. The boring heads are available with both modular CK3 connection and cylindrical shanks Ø 16 mm.

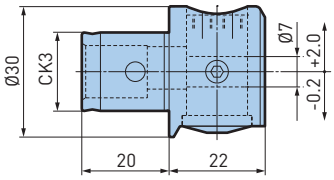
| Model | Order No. |
|---|---|
| EWN04-15CK3 | 112.505 |

**Other execution**

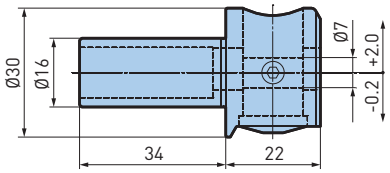
EWN04-15ST16
**112.506**

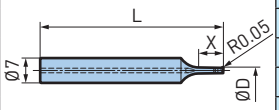
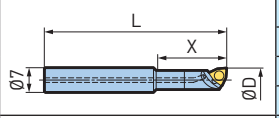
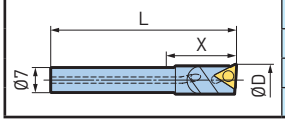
**Boring Head** **Order No.**

EWN04-15CK3 **112.505**




EWN04-15ST16 **112.506**




| Boring Cutter | Model | Order No. | L | X | Cutting Edge | ØD |
|---|---|---|---|---|---|---|
|  | E0.4-ST7-52K10C | 615.522 | 52 | 1.5 | K10C | 0.4 - 1.0 |
| | E0.9-ST7-52K10C | 615.524 | | 3 | | 0.9 - 1.5 |
| | E1.4-ST7-52K10C | 615.525 | | 5 | | 1.4 - 2.0 |
| | E2-ST7-52K10C | 615.501 | | 6 | | 1.9 - 3.0 |
| | E3-ST7-52K10C | 615.502 | | 10 | | 2.9 - 4.0 |
| | E4-ST7-52K10C | 615.503 | | 13 | | 3.9 - 5.0 |
| | E5-ST7-52K10C | 615.504 | | 16 | | 4.9 - 6.0 |
|  | | | | | | |
| | E6-ST7-WC02-52HM | 615.505 | | 20 | WC 02 | 5.8 - 7.0 |
| | E7-ST7-WC02-52HM | 615.506 | | 20 | | 6.8 - 8.0 |
|  | | | | | | |
| | E8-ST7-TP07-52HM | 615.507 | | 30 | TP 07 | 7.8 - 9.0 |
| | E9-ST7-TP07-52HM | 615.508 | | 30 | | 8.8 - 10.0 |
| | E10-ST7-TP07-52HM | 615.509 | | 30 | | 9.8 - 12.0 |
| | E12-ST7-TP07-52HM | 615.511 | | 30 | | 11.8 - 15.5 |

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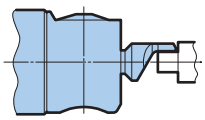
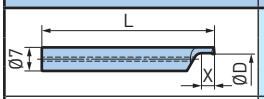
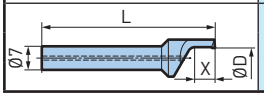
**OD Turning**



| OD Turning Cutter | Model | Order No. | L | X | Cutting Edge | ØD |
|---|---|---|---|---|---|---|
|  | OD-0-3-ST7-52K10C | 615.530 | 52 | 2.5 | K10C | 0.2 - 3.0 |
|  | OD-2-6-ST7-52K10C | 615.531 | | 6 | | 2.0 - 6.0 |



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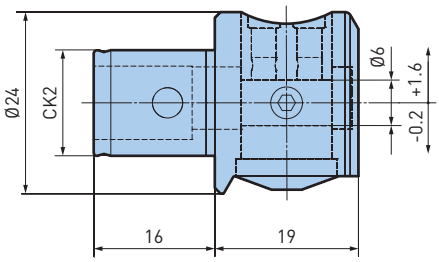
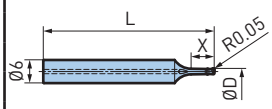
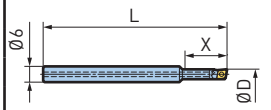
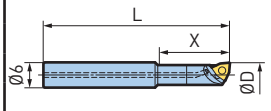
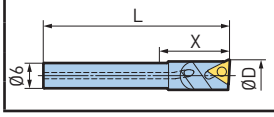
# EWN 04-12 Fine Boring Head, Ø 0.4 - 12

Fine boring heads for the machining of smallest bores with highest spindle speeds on machine tools with spindles ISO 20, HSK-E25 and bigger. The boring heads are available with the modular CK2 connection.

| Model | Order No. |
|---|---|
| EWN04-12CK2 | 112.507 |

| Boring Head | Order No. |
|---|---|
| EWN04-12CK2 | 112.507 |




| Boring Cutter | Model | Order No. | L | X | Cutting Edge | ØD |
|---|---|---|---|---|---|---|
|  | E0.4-ST6-52K10C | 615.580 | 52 | 1.5 | K10C | 0.4 - 1.0 |
| | E0.9-ST6-52K10C | 615.581 | | 3 | | 0.9 - 1.5 |
| | E1.4-ST6-52K10C | 615.582 | | 5 | | 1.4 - 2.0 |
| | E2-ST6-52K10C | 615.583 | | 6 | | 1.9 - 3.0 |
| | E3-ST6-52K10C | 615.584 | | 10 | | 2.9 - 4.0 |
|  | | | | | EC03 | |
| | ST06W-EB4-16 | 807.019 | 70 | 16 | | 3.9 - 5.0 |
| | ST06W-EB5-20 | 807.020 | 75 | 20 | | 4.9 - 6.0 |
|  | | | 52 | | WC 02 | |
| | E6-ST6-WC02-52HM | 615.585 | | 20 | | 5.8 - 7.0 |
| | E7-ST6-WC02-52HM | 615.586 | | 20 | | 6.8 - 8.0 |
|  | | | | | TP 07 | |
| | E8-ST6-TP07-52HM | 615.587 | | 30 | | 7.8 - 9.0 |
| | E9-ST6-TP07-52HM | 615.588 | | 30 | | 8.8 - 10.0 |
| | E10-ST6-TP07-52HM | 615.589 | | 30 | | 9.8 - 12.0 |

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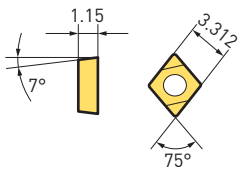
B.2

## Insert

ECGM03



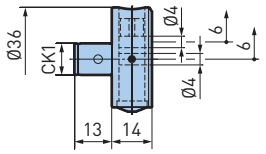

| Model | Order No. | Radius | Workpiece | Grade | Material |
|---|---|---|---|---|---|
| ECGM03X102ELA | 807.017 | 0.2 | Carbon Steel, Alloy Steel | T1500A | Cermet |
| ECGM03X102ELA | 807.018 | | Aluminium | H1 | Carbide (K10) |

1. Inserts are available in a packet of 10 pcs.

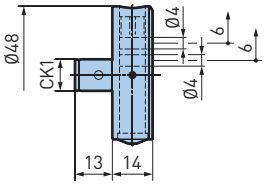
# EWN 04-24/12-36 Fine Boring Head, Ø 0.4 - 36

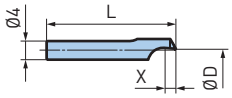
Special fine boring heads with huge diameter range for the micro industry. Dedicated cutters for OD turning and face grooving available.

| Boring Head | Order No. |
|---|---|
| EWN04-24CK1 | 188.133 |

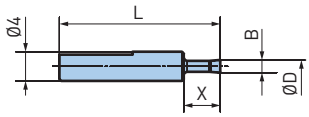



| Boring Head | Order No. |
|---|---|
| EWN12-36CK1 | 188.134 |




| OD Turning Cutters | Model | Order No. | L | X | Cutter | ØD |
|---|---|---|---|---|---|---|
|  | OD-0.2-2.3-ST4-25K10C | **615.590** | 25 | 2.2 | K10C | 0.2 - 2.3 |



| Face Grooving Cutters | Model | Order No. | L | X | B | Cutter | ØD |
|---|---|---|---|---|---|---|---|
|  | FG2-ST4-22K10C * | **689.290 *** | 22 | 5 | 1.75 | K10C | › 12 |



1. * Special execution, delivery time on request.
2. For fine boring cutters refer to page 349 OD turning.

B.2

OD Turning

Fine Boring

Face Grooving

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# EWN 04-7 Fine Boring Head, Ø 0.4 - 7

World's smallest fine boring head: Thanks to its body diameter of only Ø 18.5 mm, the EWN 04-7 is the perfect solution for micro machining applications.

| Model | Order No. |
|---|---|
| EWN04-7CK1 | 112.503 |

World's smallest fine boring head.

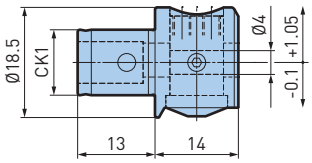
**Other executions**

EWN04-7ST10
**112.504**

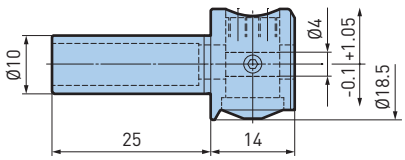
EWN04-7ST6
**112.508**

**Model** **Order No.**

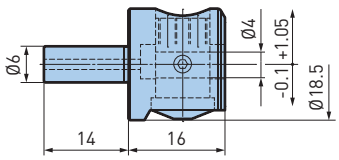
EWN04-7CK1 **112.503**

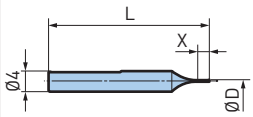
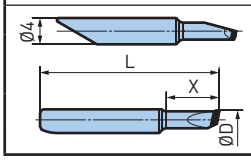



EWN04-7ST10 **112.504**



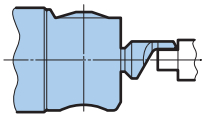

EWN04-7ST6 **112.508**

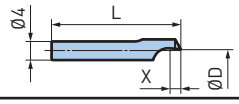



| Boring Cutter | Model | Order No. | L | X | R | Cutting Edge | ØD |
|---|---|---|---|---|---|---|---|
|  | E0.4-ST4-30K10C | 615.541 | 30 | 1.5 | 0.05 | K10C | 0.4 - 0.9 |
| | E0.9-ST4-30K10C | 615.542 | | 3 | | | 0.9 - 1.4 |
| | E1.4-ST4-30K10C | 615.543 | | 5 | | | 1.4 - 2.0 |
| | E2-ST4-30K10C | 615.544 | | 6 | | | 1.9 - 3.0 |
| | E3-ST4-30K10C | 615.545 | | 10 | | | 2.9 - 4.0 |
| | E4-ST4-30K10C | 615.546 | | 13 | | | 3.9 - 5.0 |
| | E5-ST4-30K10C | 615.547 | | 16 | | | 4.9 - 7.0 |
| | E0.4-ST4-25K10C | 615.561 | 25 | 1.1 | 0.1 | | 0.4 - 1.6 |
| | E0.6-ST4-25K10C | 615.562 | | 1.5 | | | 0.6 - 0.8 |
| | E0.8-ST4-25K10C | 615.563 | | 2 | | | 0.8 - 1.2 |
| | E1.2-ST4-25K10C | 615.564 | | 2.5 | | | 1.2 - 1.5 |
| | E1.5-ST4-25K10C | 615.565 | | 3.5 | 0.2 | | 1.5 - 1.9 |
| | E1.9-ST4-25K10C | 615.566 | | 4.5 | | | 1.9 - 3.0 |
| | E0.4-ST4-25K10 | 615.551 | | 1.1 | 0.1 | K10 | 0.4 - 0.6 |
| | E0.6-ST4-25K10 | 615.552 | | 1.5 | | | 0.6 - 0.8 |
| | E0.8-ST4-25K10 | 615.553 | | 2 | | | 0.8 - 1.2 |
| | E1.2-ST4-25K10 | 615.554 | | 2.5 | | | 1.2 - 1.5 |
| | E1.5-ST4-25K10 | 615.555 | | 3.5 | 0.2 | | 1.5 - 1.9 |
|  | E1.4-ST4-24CBN20 | 615.571 | 23.4 | 3.5 | 0.1 | CBN-20 | 1.4 - 2.0 |
| | E1.9-ST4-24CBN20 | 615.572 | 24.1 | 4.5 | | | 1.9 - 3.0 |
| | E2.9-ST4-27CBN20 | 615.573 | 27.2 | 8 | | | 2.9 - 4.0 |
| | E3.9-ST4-30CBN20 | 615.574 | 29.7 | 11 | | | 3.9 - 5.0 |
| | E4.9-ST4-30CBN20 | 615.575 | 30.3 | 16 | | | 4.9 - 6.0 |

The boring cutters are made with flat for cutting edge orientation.
Other lengths and geometries on request.

**OD Turning**



| OD Turning Cutter | Model | Order No. | L | X | Cutting Edge | ØD |
|---|---|---|---|---|---|---|
|  | OD-0.2-2.3-ST4-25K10C | 615.590 | 25 | 2.2 | K10C | 0.2 - 2.3 |

# Fine Boring Heads with Peripherical Cutting Edge


| | |
|---|---|
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| EWN BIG CAPTO Fine Boring Heads | 356 |
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B.3

BROTECH

Wireless

## EWE Digital Fine Boring Heads

Wireless communication for easy readout with the BIG KAISER app: The brandnew EWE fine boring heads revolutionate fine boring.
**Ø 41 - 203 mm, CKB1-CKB7**

▶ 353

Anti-Vibration

## EWD Smart Damper Digital Fine Boring Heads

The combination of the most advanced technologies to a powerful and highly productive tool: an integral digital fine boring head with an innovative and patented damping technology.
**Ø 41 - 150 mm, CKB4-CKB6**

▶ 354

## EWN Fine Boring Heads

The EWN single cutter boring tool program for fine boring covers a range of Ø 20 - 203 mm with only 7 precision boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.
**Ø 20 - 203 mm, CKB1-CKB7/BIG CAPTO C3-C8**

▶ 355

## EWB Balanced Fine Boring Heads

Even at max. speeds the balanced EWB fine boring heads guarantee vibration-free boring, resulting in increased productivity and highest precision.
**Ø 32 - 105 mm, CK3-CK6**

▶ 362

## EWB-AL Balanced Fine Boring Head

The fine boring heads EWB AL are made of high strength aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%.
**Ø 100 - 203 mm, CK6-CK7**

▶ 362

## EWB-UP Balanceable Fine Boring Heads

The ultra-precision EWB-UP series sets higher standards for boring heads concerning adjustment accuracy and balance quality.
**Ø 25 - 100 mm, CK2-CK6**

▶ 364

## EW Fine Boring Heads

These heads are designed to be used in combination with the steel or carbide-boring bars Ø 14 and Ø 16 mm out of the accessory program. In conjunction with the long carbide bar, the tool is well suited for vibration-free finishing operations in bores with unfavorable Ø/L-ratios.
**Ø 15 - 22 mm, ES15/ES18**

▶ 365



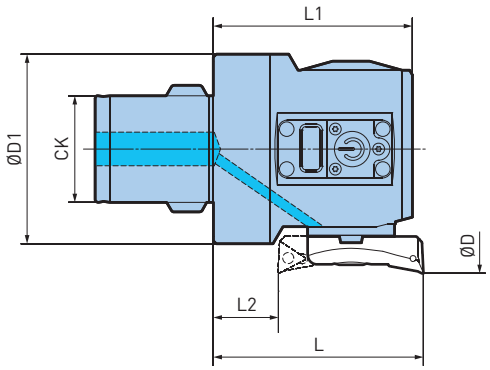


BROTECH

# EWE Digital Fine Boring Heads, Ø 41 - 203

Thanks to wireless communication with the BIG KAISER app, manufacturing precise bores has become very easy.

Wireless




| Model | Order No. | CK | Front Bore ØD | Back Bore ØD | ØD1 | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| EWE41-74CKB4 | **310.840** | CKB4 | 41 - 74 | 53 - 74 | 38 | 47 | 43 | 14 | 0.33 |
| EWE53-95CKB5 | **310.850** | CKB5 | 53 - 95 | 62 - 95 | 49 | 57 | 53 | 19 | 0.76 |
| EWE68-150CKB6 | **310.860** | CKB6 | 68 - 150 | 80 - 150 | 64 | 71 | 67.2 | 22 | 1.7 |
| EWE100-203CKB6 | **310.865** | CKB6 | 100 - 203 | 112 - 203 | 66.5/90 * | 71 | 67.2 | 22 | 2.5 |
| EWE100-203CKB7 | **310.870** | CKB7 | | | 90 | 87 | 83.2 | 38 | 4.0 |

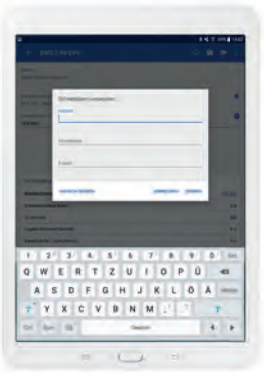
1. * Max. body diameter: 90 mm
2. Insert holder is to be ordered separately.

For Spare Parts ▶ 440
For Insert Holder ▶ 357 - 359

## BIG KAISER App

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.

Cutting data



Send your data to...

History (made automatically)

**This is how the app is going to support your daily challenges**

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore middle tolerance

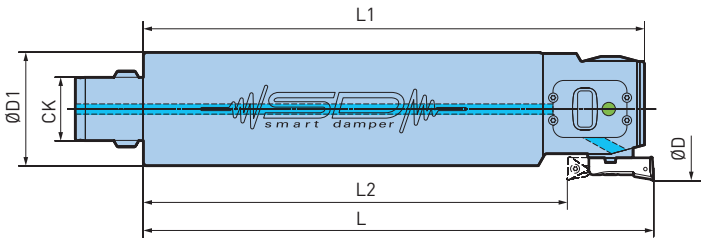
Download on the App Store

GET IT ON Google Play

# EWD Smart Damper Digital Fine Boring Heads, Ø 41 - 150

With the new EWD Smart Damper BIG KAISER combines its most advanced technologies to a powerful and highly productive tool: a digital fine boring head with an innovative and patented damping technology.

Anti-Vibration



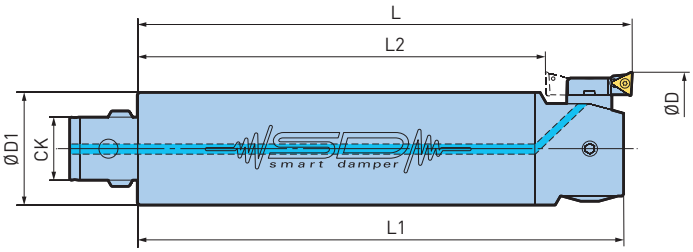

| Model | Order No. | CK | Front Bore ØD | Back Bore ØD | ØD1 | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| EWD41-74CKB4-200DP | **389.395** | CKB4 | 41 - 74 | 53 - 74 | 39 | 200 | 196 | 167 | 2.4 |
| EWD53-95CKB5-225DP | **389.396** | CKB5 | 53 - 95 | 62 - 95 | 50 | 225 | 221 | 187 | 4.5 |
| EWD68-150CKB6-260DP | **389.397** | CKB6 | 68 - 150 | 80 - 150 | 64 | 260 | 256 | 211 | 9.5 |

1. Insert holder is to be ordered separately.

For Spare Parts ▶ 440
For Insert Holder ▶ 357 - 359

B.3

# EWN Smart Damper Fine Boring Head, Ø 32 - 203




| Model | Order No. | CK | Front Bore ØD | Back Bore ØD | ØD1 | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| CKB3-EWN32DP-160 | **807.016** | CKB3 | 32 - 60 | 57 - 60 ** | 31 | 160 | 155 | 130 | 1.2 |
| CKB4-EWN41DP-185 | **806.742** | CKB4 | 41 - 74 | 61 - 74 * | 39 | 185 | 181 | 152 | 2.3 |
| CKB5-EWN53DP-210 | **806.743** | CKB5 | 53 - 95 | 74 - 95 * | 50 | 210 | 206 | 172 | 4.4 |
| CKB6-EWN68DP-240 | **806.744** | CKB6 | 68 - 150 | 90 - 150 | 64 | 240 | 236.2 | 191 | 8.3 |
| CKB6-EWN100DP-240 | **807.185** | CKB6 | 100 - 203 | 107 - 203 | | | | | 8.8 |
| CKB7-EWN100DP-240 | **807.186** | CKB7 | | 116 - 203 | 90 | | | | 16.4 |

1. Insert holder (type 1) included. Other sizes are available.
2. * Use insert holders type 2 or 3 for back boring.
3. ** Use insert holders Type 3 for back boring.

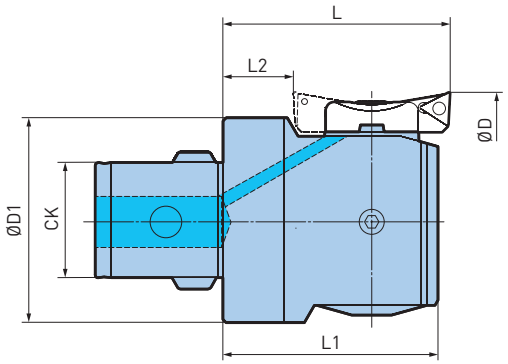
For Spare Parts ▶ 440
For Insert Holder ▶ 357 - 359



BROTECH

# EWN Fine Boring Heads, Ø 20 - 203

The EWN single cutter boring tool program for fine boring covers a range of Ø 20 - 203 mm with only 7 fine boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.

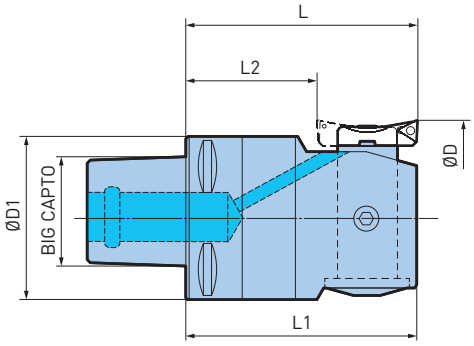



| Model | Order No. | CK | Front Bore ØD | Back Bore ØD | ØD1 | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| EWN20-36CKB1 | **310.101** | CKB1 | 20 - 36 | 28 - 36 | 18.5 | 32.5 | 29.5 | 10.5 | 0.075 |
| EWN25-47CKB2 | **310.201** | CKB2 | 25 - 47 | 36 - 47 | 23.4 | 35.5 | 32.5 | 11.5 | 0.13 |
| EWN32-60CKB3 | **310.301** | CKB3 | 32 - 60 | 46 - 60 | 30 | 40 | 35 | 10 | 0.21 |
| EWN41-74CKB4 | **310.401** | CKB4 | 41 - 74 | 53 - 74 | 38 | 47 | 43 | 14 | 0.40 |
| EWN53-95CKB5 | **310.501** | CKB5 | 53 - 95 | 62 - 95 | 49 | 57 | 53 | 19 | 0.83 |
| EWN68-150CKB6 | **310.601** | CKB6 | 68 - 150 | 80 - 150 | 64 | 71 | 67.2 | 22 | 1.7 |
| EWN100-203CKB6 | **310.602** | CKB6 | 100 - 203 | 112 - 203 | 90 | 71 | 67.2 | 22 | 2.4 |
| EWN100-203CKB7 -87 | **310.701** | CKB7 | | | 90 | 87 | 83.2 | 38 | 3.9 |
| EWN100-203CKB7L -117 | **310.708** | CKB7 | | | 90 | 117 | 113.2 | 68 | 5.4 |

For Spare Parts ▸ 440
For Insert Holder ▸ 357 - 359

# EWN BIG CAPTO Fine Boring Heads, Ø 32 - 203

With only 5 fine boring heads, the diameter range from Ø 32-203 mm is completely covered. The boring heads can be clamped in BIG CAPTO shanks and other polygonal basic holders, or directly in BIG CAPTO machine spindles.




| Model | Order No. | BIG CAPTO | Front Bore ØD | Back Bore ØD | ØD1 | L | L1 | L2 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| EWN32- 60C3 | **470.301** | C3 | 33 - 60 | 46 - 60 | 32 | 55 | 50 | 25 | 0.3 |
| EWN41- 74C4 | **470.401** | C4 | 41 - 74 | 53 - 74 | 40 | 67 | 63 | 34 | 0.6 |
| EWN53- 95C5 | **470.501** | C5 | 53 - 95 | 62 - 95 | 50 | 77 | 73 | 39 | 1.1 |
| EWN68- 150C6 | **470.601** | C6 | 68 - 150 | 80 - 150 | 64 | 92 | 88 | 43 | 2.2 |
| EWN100- 203C6 | **470.602** | C6 | 100 - 203 | 112 - 203 | 90 | 92 | 88 | 43 | 2.9 |
| EWN100- 203C8 | **470.801** | C8 | 100 - 203 | 112 - 203 | 90 | 117 | 113 | 68 | 5.2 |

For Spare Parts ▸ 440
For Insert Holder ▸ 357 - 359

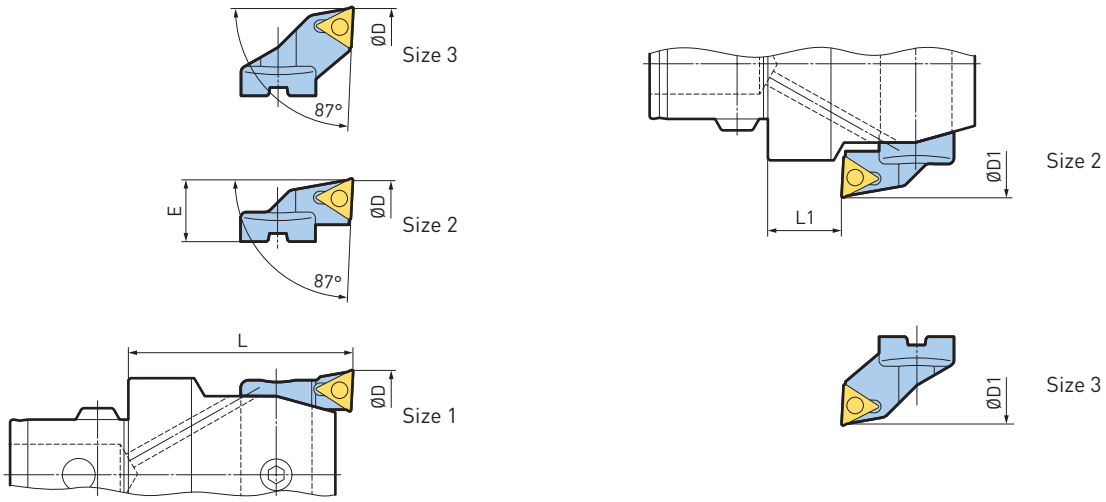
B.3



BROTECH

# Insert Holders Type E

Standard holder with 87° entering angle, suitable for fine boring in through and blind holes. Three different insert holders for the extension of the diameter range and for back boring applications.

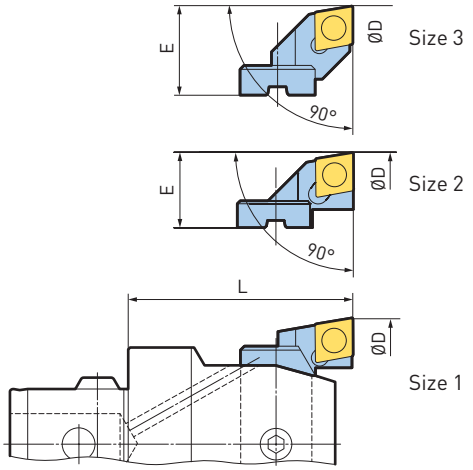


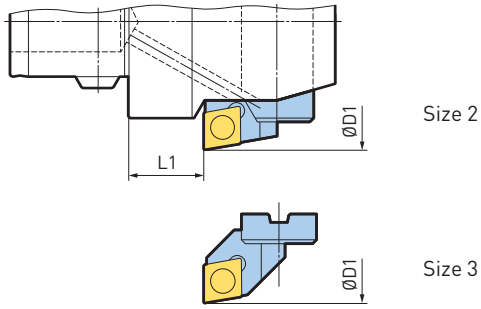

| For Boring Head | Model | Order No. | Insert Holder Size | Front Bore ØD | Back Bore ØD1 | E | L | L1 | |
|---|---|---|---|---|---|---|---|---|---|
| EWN20 | ENH1-1T | **626.111** | 1 | 20 - 26 | | 4.65 | 32.5 | 10.5 | TP 07 |
| | ENH1-2T | **626.112** | 2 | 25 - 31 | 28 - 31 | 7.15 | | | |
| | ENH1-3T | **626.113** | 3 | 30 - 36 | 30 - 36 | 9.65 | | | |
| EWN25 | ENH2-1T | **626.121** | 1 | 25 - 33 | | 5.45 | 35.5 | 11.5 | |
| | ENH2-2T | **626.122** | 2 | 32 - 40 | 36 - 40 | 8.95 | | | |
| | ENH2-3T | **626.123** | 3 | 39 - 47 | 39 - 47 | 12.45 | | | |
| EWN32 | ENH3-1T | **626.131** | 1 | 32 - 42 | | 7.4 | 40 | 10 | TC 11 |
| | ENH3-2T | **626.132** | 2 | 41 - 51 | 46 - 51 | 11.9 | | | |
| | ENH3-3T | **626.133** | 3 | 50 - 60 | 50 - 60 | 16.4 | | | |
| EWE/EWN41 | ENH4-1T | **626.141** | 1 | 41 - 54 | | 8.1 | 47 | 14 | |
| | ENH4-2T | **626.142** | 2 | 50 - 63 | 53 - 63 | 12.6 | | | |
| | ENH4-3T | **626.143** | 3 | 61 - 74 | 61 - 74 | 18.1 | | | |
| EWE/EWN53 | ENH5-1T | **626.151** | 1 | 53 - 70 | 62 - 70 | 10 | 57 | 19 | |
| | ENH5-2T | **626.152** | 2 | 65 - 82 | 69 - 82 | 16 | | | |
| | ENH5-3T | **626.153** | 3 | 78 - 95 | 78 - 95 | 22.5 | | | |
| EWE/EWN68 | ENH6-1T | **626.161** | 1 | 68 - 100 | 80 - 100 | 12.5 | 71 | 22 | |
| | ENH6-2T | **626.162** | 2 | 94 - 126 | 94 - 126 | 25.5 | | | |
| | ENH6-3T | **626.163** | 3 | 118 - 150 | 118 - 150 | 37.5 | | | |
| EWE/EWN100 | ENH6-1T | **626.161** | 1 | 100 - 153 | 112 - 153 | 12.5 | 71 / 87 / 117 | 22 / 38 / 68 | |
| | ENH6-2T | **626.162** | 2 | 126 - 179 | 126 - 179 | 25.5 | | | |
| | ENH6-3T | **626.163** | 3 | 150 - 203 | 150 - 203 | 37.5 | | | |

For Insert ▶ 395 - 398

# Insert Holder Type C

With 90° approach angle, suitable for semi-finish and finish boring and for stepped bores. For each boring head, insert holders with different projections are available for the extension of the boring range and for back boring.



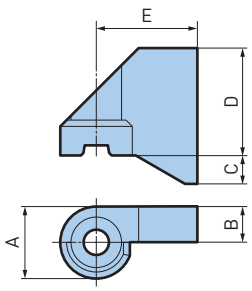

| For Boring Head | Model | Order No. | Insert Holder Size | Front Bore ØD | Back Bore ØD1 | E | L | L1 | |
|---|---|---|---|---|---|---|---|---|---|
| EWN25 | ENH 2-2C | **626.322** | 2 | 33 - 41 | 37 - 41 | 9.5 | 35.5 | 11.5 | CC 06 |
| | ENH 2-3C | **626.323** | 3 | 39 - 47 | 39 - 47 | 12.5 | | | |
| EWN32 | ENH 3-1C | **626.331** | 1 | 32 - 42 | - | 7.4 | 40 | 10 | |
| | ENH 3-2C | **626.332** | 2 | 41 - 51 | 47 - 51 | 11.9 | | | |
| | ENH 3-3C | **626.333** | 3 | 50 - 60 | 50 - 60 | 16.4 | | | |
| EWE/EWN41 | ENH 4-1C | **626.341** | 1 | 41 - 54 | - | 8.1 | 47 | 14 | |
| | ENH 4-2C | **626.342** | 2 | 50 - 63 | 54 - 63 | 12.6 | | | |
| | ENH 4-3C | **626.343** | 3 | 61 - 74 | 61 - 74 | 18.1 | | | |
| EWE/EWN53 | ENH 5-1C | **626.351** | 1 | 53 - 70 | 62 - 70 | 10 | 57 | 19 | |
| | ENH 5-2C | **626.352** | 2 | 62 - 79 | 67 - 79 | 14.5 | 57 | 19 | CC 09 |
| | ENH 5-3C | **626.353** | 3 | 78 - 95 | 78 - 95 | 22.5 | | | |
| EWE/EWN68 | ENH 6-1C | **626.361** | 1 | 68 - 100 | 80 - 100 | 12.5 | 71 | 22 | |
| | ENH 6-2C | **626.362** | 2 | 78 - 110 | 82 - 110 | 17.5 | | | |
| | ENH 6-3C | **626.363** | 3 | 108 - 140 | 108 - 140 | 32.5 | | | |
| EWE/EWN100 | ENH 6-1C | **626.361** | 1 | 100 - 153 | 112 - 153 | 12.5 | 71 / 87 / 117 | 22 / 38 / 68 | |
| | ENH 6-2C | **626.362** | 2 | 110 - 163 | 110 - 163 | 17.5 | | | |
| | ENH 6-3C | **626.363** | 3 | 140 - 193 | 140 - 193 | 32.5 | | | |

For Insert ▶ 399 - 406



## Blank Insert Holder Type ENH

If required, the blanks can be hardened. (Mat. 1.2343)

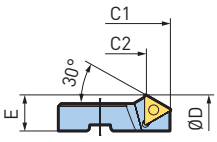



| For Boring Head | Model | Order No. | A | B | C | D | E |
|---|---|---|---|---|---|---|---|
| EWN20 | ENH1-B | **626.901** | 8.4 | 4.2 | 2.61 | 11 | 11.8 |
| EWN25 | ENH2-B | **626.902** | 10.4 | 5.2 | 3.16 | 10 | 17.2 |
| EWN32 | ENH3-B | **626.903** | 11.4 | 5.7 | 4.5 | 17 | 16 |
| EWN41 | ENH4-B | **626.904** | 15.4 | 7.7 | 5 | 20 | 20 |
| EWN53 | ENH5-B | **626.905** | 19 | 9.5 | | 25 | 20 |
| EWN68/100 | ENH6-B | **626.906** | 29 | 14.5 | | 40 | 26 |
| | | **626.916** | | | | | 50 |



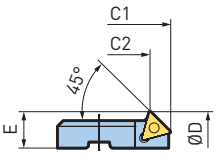
BROTECH

## Insert Holders 30°



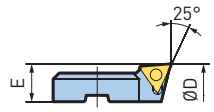

| For Boring Head | Model | Order No. | ØD | E | C1 | C2 | |
|---|---|---|---|---|---|---|---|
| EWN25 | ENH2-1T30 | **626.422** | 28 - 36 | 6.95 | 35.5 | 29.8 | TP 07 |
| EWN32 | ENH3-1T30 | **626.432** | 36 - 46 | 9.4 | 42 | 33.3 | |
| EWN41 | ENH4-1T30 | **626.442** | 45 - 58 | 10.1 | 49 | 40.3 | |
| EWN/EWE53 | ENH5-1T30 | **626.452** | 56 - 73 | 11.5 | 57 | 48.4 | TC 11 |
| EWN/EWE68 | ENH6-1T30 | **626.462** | 68 - 100 | 12.5 | 71 | 62.3 | |
| EWN/EWE100 | ENH6-1T30 | **626.462** | 100 - 153 | 12.5 | 87 | 78.3 | |

## Insert Holders 45°




| For Boring Head | Model | Order No. | ØD | E | C1 | C2 | |
|---|---|---|---|---|---|---|---|
| EWN25 | ENH2-1T45 | **626.423** | 28 - 36 | 6.95 | 35.5 | 30.8 | TP 07 |
| EWN32 | ENH3-1T45 | **626.433** | 36 - 46 | 9.4 | 42 | 34.8 | |
| EWN41 | ENH4-1T45 | **626.443** | 45 - 58 | 10.1 | 49 | 41.8 | |
| EWN/EWE53 | ENH5-1T45 | **626.453** | 56 - 73 | 11.5 | 57 | 49.8 | TC 11 |
| EWN/EWE68 | ENH6-1T45 | **626.463** | 68 - 100 | 12.5 | 71 | 63.8 | |
| EWN/EWE100 | ENH6-1T45 | **626.463** | 100 - 153 | 12.5 | 87 | 79.8 | |

## Insert Holders 25°




| For Boring Head | Model | Order No. | ØD | E | |
|---|---|---|---|---|---|
| EWN32 | ENH3-1T25 | **689.197** | 32 - 42 | 7.4 | |
| EWN41 | ENH4-1T25 | **689.198** | 41 - 54 | 8.1 | |
| EWN/EWE53 | ENH5-1T25 | **689.001** | 53 - 70 | 10 | TC 11 |
| EWN/EWE68 | ENH6-1T25 | **689.007** | 68 - 100 | 12.5 | |
| EWN/EWE100 | ENH6-1T25 | **689.007** | 100 - 153 | 12.5 | |

For Insert ▶ 396 - 398



### Back Boring Instructions

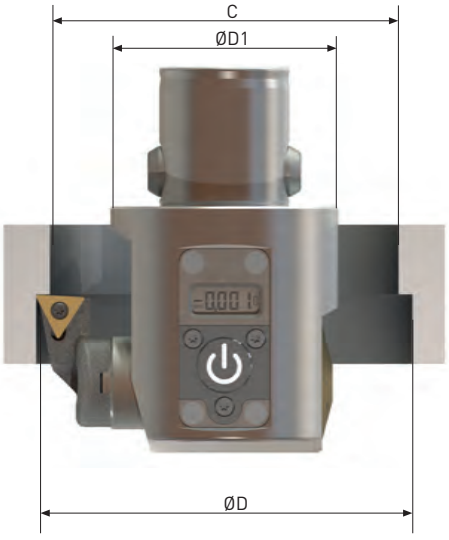
For back boring, it is required to enter into the bore off centre, with a tool adjusted to the back bore diameter. In this respect, the back bore diameter «ØD» as well as the diameters of the entry bore «C» and the tool body «ØD1», are related to each other. In order to check the feasibility of the back boring operation and to select the best possible tool combination, these values can be calculated as follows:

**Example:**
Calculation of the minimum entry bore diameter «C».

**Given:**
- Back bore diameter ØD = 93 mm
- Tool combination EWN53, with Insert holder no. 3, ØD1 = 50 mm

$$C = \frac{ØD + ØD1}{2} = \frac{93 + 50}{2} = 71.5 \text{ mm}$$

**Caution:**
- Counter clockwise spindle rotation is required for back boring operations.
- The cutting edge is at a shorter length than the boring head. Consider total length of tool. Check the space at the back side of the work piece.




Min. entry bore diameter «C»

$$C = \frac{ØD + ØD1}{2}$$

Max. back bore diameter «ØD»

ØD = 2C - ØD1

Max. tool body diameter «ØD1»

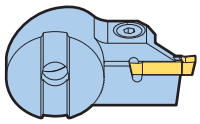
ØD1 = 2C - ØD

# Face Grooving with EWN/EWE, Ø 53 - 3040

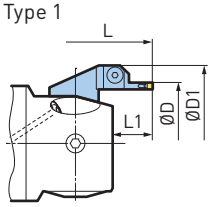
The insert holders and inserts are made for face grooving with the fine boring heads EWN and EWE Series 310 and with the large diameter boring tools Series 317 und 318.

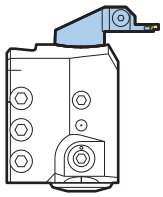
## Insert Holders

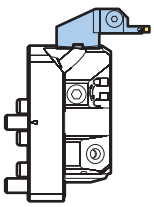
Type 1



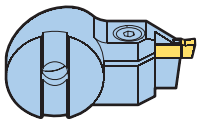
Type 1



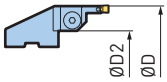



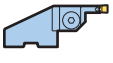


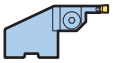
Type 2



Type 2





EWN/EWE 310 ▸ 353 - 355

EWN 150 ▸ 389

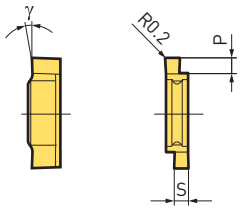
EWN/EWE 200 ▸ 375

| For Boring Head | Insert holder | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Type 1 | | | | Type 2 | | | | | |
| | ØD | ØD1 | Model | Order No. | ØD | ØD2 | Model | Order No. | L * | L1 |
| EWN/EWE53 (310.501)/(310.850) | 53 - 70 | ØD + 22 | ENH5-1FG4 | **626.935** | 73 - 90 | ØD - 30 | ENH5-1FG4R | **626.945** | 73 | 20 |
| EWN/EWE68 (310.601)/(310.860) | 68 - 100 | ØD + 24 | ENH6-1FG4 | **626.936** | 88 - 120 | ØD - 28 | ENH6-2FG4R | **626.946** | 88 | 21 |
| | 94 - 126 | | ENH6-2FG4 | **626.937** | 114 - 146 | | ENH6-3FG4R | **626.947** | | |
| EWN/EWE100 (310.602)/(310.865) | 100 - 153 | ØD + 24 | ENH6-1FG4 | **626.936** | 120 - 173 | ØD - 28 | ENH6-2FG4R | **626.946** | 88 | 21 |
| | 126 - 179 | | ENH6-2FG4 | **626.937** | 146 - 199 | | ENH6-3FG4R | **626.947** | | |
| EWN/EWE100 (310.701)/(310.870) | 100 - 153 | ØD + 24 | ENH6-1FG4 | **626.936** | 120 - 173 | ØD - 28 | ENH6-2FG4R | **626.946** | 104 | 21 |
| | 126 - 179 | | ENH6-2FG4 | **626.937** | 146 - 199 | | ENH6-3FG4R | **626.947** | | |
| EWN100L (310.708) | 100 - 153 | ØD + 24 | ENH6-1FG4 | **626.936** | 120 - 173 | ØD - 28 | ENH6-2FG4R | **626.946** | 134 | 21 |
| | 126 - 179 | | ENH6-2FG4 | **626.937** | 146 - 199 | | ENH6-3FG4R | **626.947** | | |
| EWN150 (317.102A) | 200 - 613 | ØD + 24 | ENH6-1FG4 | **626.936** | 220 - 633 | ØD - 28 | ENH6-2FG4R | **626.946** | 134 | 21 |
| | 226 - 639 | | ENH6-2FG4 | **626.937** | 246 - 659 | | ENH6-3FG4R | **626.947** | | |
| EWN/EWE200 (318.101)/(318.104) | 200 - 3000 | ØD + 21 | ENH7-1FG4 | **626.938** | 220 - 3040 | ØD - 28 | ENH7-2FG4R | **626.948** | 134 | 21 |

1. * Tool length to the CK connection.

For Spare Parts ▸ 447

## Inserts

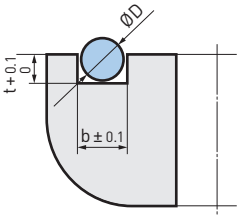



| Inserts for Steel and Cast Iron | | | |
|---|---|---|---|
| S | P | γ | Order No. |
| 2.5 | 2.7 | 5° | **958.425** |
| 3.0 | 3.3 | 5° | **958.430** |
| 3.3 | 3.6 | 5° | **958.433** |
| 3.5 | 3.8 | 5° | **958.435** |
| 4.0 | 4.3 | 5° | **958.440** |

| Inserts for Aluminium | | | |
|---|---|---|---|
| S | P | γ | Order No. |
| 2.5 | 2.7 | 15° | **958.475** |
| 3.0 | 3.3 | 15° | **958.480** |
| 3.3 | 3.6 | 15° | **958.483** |
| 3.5 | 3.8 | 15° | **958.485** |
| 4.0 | 4.3 | 15° | **958.490** |

## Groove Dimensions

Recommended groove dimensions for given cross section diameters of O-rings, for static sealing.

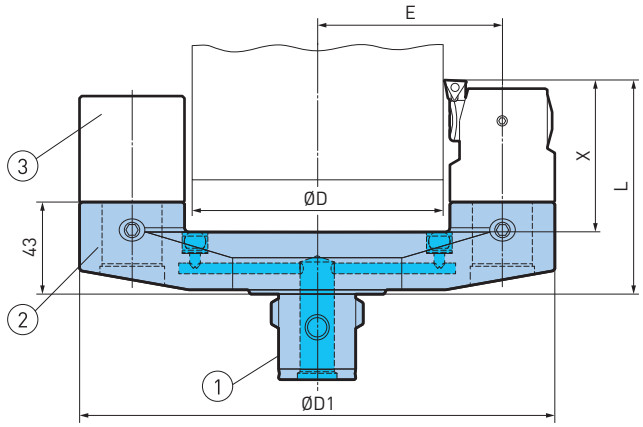



| ØD | Groove Width b | Groove Depth t |
|---|---|---|
| 1.78 | 2.5 | 1.3 |
| 2.0 | 2.5 | 1.6 |
| 2.5 | 3.3 | 1.9 |
| 2.62 | 3.5 | 2.05 |
| 3.0 | 4.0 | 2.4 |

| Work Piece Material | Vc m/min | fn mm/rev |
|---|---|---|
| Construction-heat treatable steels | 120 - 200 | 0.01 - 0.03 |
| Stainless steels | 60 - 120 | 0.01 - 0.02 |
| Cast iron | 80 - 160 | 0.02 - 0.04 |
| Aluminium | 200 - 400 | 0.02 - 0.04 |
| Non-ferrous metals | | |

# OD Turning with EWN/EWE/SW, Ø 16 - 120

This program consists of tool holders with CKB5 and CKB6 connectors, made for different turning ranges and with tool connections in the sizes CKB3, CKB4 and CKB5. The corresponding precision finish or rough boring heads and counterweights can be mounted on the tool holder either directly or by means of an extension. With this program, outer diameters in the range from Ø 16 -120 mm can be machined.




**Attention: Counter-clockwise rotation of spindle! Vc max 450 m/min**

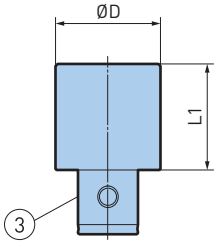
| ØD | Model | Order No. | Tool Holder ① CK | ② CK | ØD1 | E | L * | X * | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 - 44 | OD16-44CKB5-CKB3 | **335.906** | CKB5 | CKB3 | 107 | 38 | 83 (113) (128) | 51 (81) (96) | 2.7 |
| 16 - 44 | OD16-44CKB6-CKB3 | **335.905** | CKB6 | CKB3 | 107 | 38 | 83 (113) (128) | 51 (81) (96) | 1.5 |
| 34 - 67 | OD34-67CKB6-CKB4 | **335.904** | CKB6 | CKB4 | 147 | 54 | 90 (130) (150) | 58 (98) (118) | 1.8 |
| 57 - 90 | OD57-90CKB6-CKB4 | **335.903** | CKB6 | CKB4 | 170 | 65.5 | 90 (130) (150) | 58 (98) (118) | 2.1 |
| 78 - 120 | OD78-120CKB6-CKB5 | **335.902** | CKB6 | CKB5 | 222 | 86.5 | 100 (160) (190) | 68 (128) (158) | 2.8 |

1. * The numbers in brackets indicate the tool length (L) and the max. pin length (X) with the use of the corresponding extensions.

For Extension ▶ 196



## Counter Weight for OD Turning




| Model | Order No. | Counter Weight ③ CK | ØD | L1 | Weight (kg) |
|---|---|---|---|---|---|
| CW-CK3 | **335.915** | CK3 | 31.3 | 35 | 0.20 |
| CW-CK4 | **335.913** | CK4 | 39 | 36.4 | 0.40 |
| CW-CK5 | **335.912** | CK5 | 49 | 49.5 | 0.85 |

For EWE ▶ 334
For EWN ▶ 335
For SW ▶ 297

## Selection of the Insert Holder

Fine Boring

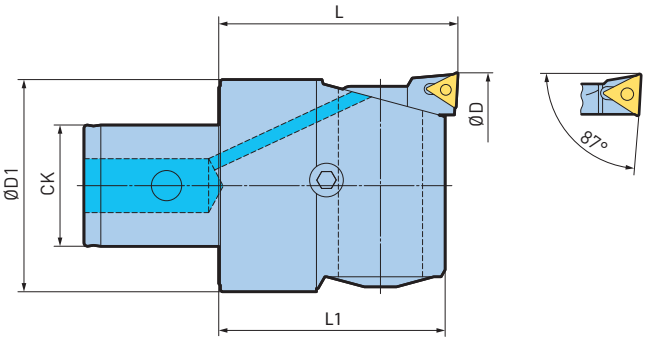
| ØD | Tool Holder | For Boring Head | Range ØD Insert Holder Order No. | | |
|---|---|---|---|---|---|
| 16 - 44 | **335.905** | EWN32 | 16 - 26 | 25 - 35 | 34 - 44 |
| 16 - 44 | **335.906** | EWN32 | 16 - 26 | 25 - 35 | 34 - 44 |
| | | **310.301** | **626.133** | **626.132** | **626.131** |
| 34 - 67 | **335.904** | EWE/EWN41 | 34 - 47 | 45 - 58 | 54 - 67 |
| 57 - 90 | **335.903** | EWE/EWN41 | 57 - 70 | 68 - 81 | 77 - 90 |
| | | **310.840/310.401** | **626.143** | **626.142** | **626.141** |
| 78 - 120 | **335.902** | EWE/EWN53 | 78 - 95 | 91 - 108 | 103 - 120 |
| | | **310.850/310.501** | **626.153** | **626.152** | **626.151** |

Rough Boring

| ØD | Tool Holder | For Boring Head | Range ØD Insert Holder Order No. | |
|---|---|---|---|---|
| 25 - 44 | **335.905** | SW32 | 25 - 35 | 34 - 44 |
| 25 - 44 | **335.906** | SW32 | 25 - 35 | 34 - 44 |
| | | **319.301** | **639.437** | **639.433** |
| 42 - 67 | **335.904** | SW41 | 42 - 55 | 54 - 67 |
| 65 - 90 | **335.903** | SW41 | 65 - 78 | 77 - 90 |
| | | **319.401** | **639.447** | **639.443** |
| 87 - 120 | **335.902** | SW53 | 87 - 104 | 103 - 120 |
| | | **319.501** | **639.457** | **639.453** |

## EWB Balanced Fine Boring Head, Ø 32 - 105

Even at max. speeds balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.




| Model | Order No. | CK | ØD | ØD1 | L | L1 | Weight (kg) | |
|---|---|---|---|---|---|---|---|---|
| EWB32-42CK3 | **310.305A** | CK3 | 32 - 42 | 30 | 40 | 37 | 0.22 | TP 07 |
| EWB41-54CK4 | **310.405A** | CK4 | 41 - 54 | 38 | 47 | 43 | 0.41 | TC 11 |
| EWB53-70CK5 | **310.505A** | CK5 | 53 - 70 | 49 | 57 | 53 | 0.81 | |
| EWB68-88CK6 | **310.605A** | CK6 | 68 - 88 | 63 | 71 | 67.2 | 1.7 | |
| EWB85-105CK6 | **310.606A** | CK6 | 85 - 105 | 63 | 71 | 67.2 | 1.7 | |

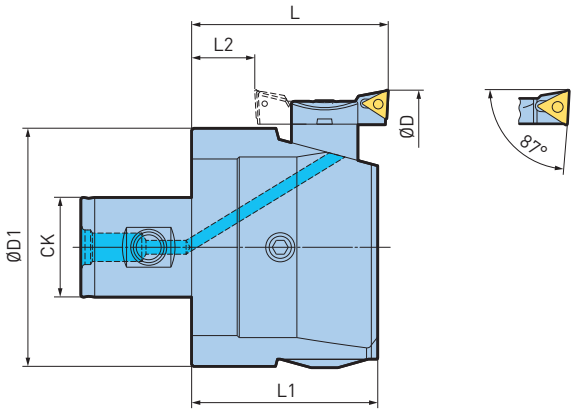
1. EWB boring heads will be delivered with assembled insert holder.

For Spare Parts ▶ 440
For Insert ▶ 395 - 398

## EWB-AL Balanced Fine Boring Head, Ø 100 - 203

B.3

The fine boring heads EWB-AL are made of high strength aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%.




| Model | Order No. | CK | Front Bore ØD | Back Bore ØD | ØD1 | L | L2 | L1 | Weight (kg) | |
|---|---|---|---|---|---|---|---|---|---|---|
| EWB100-153CK6AL | **310.607A** | CK6 | 100 - 153 | 112 - 153 | 90 | 71 | 25 | 67 | 0.6 | TC 11 |
| EWB150-203CK6AL | **310.608A** | | 150 - 203 | 150 - 203 | 126 | 71 | 25 | 67 | 0.8 | |
| EWB100-153CK7AL | **310.705A** | CK7 | 100 - 153 | 112 - 153 | 90 | 87 | 41 | 83 | 0.9 | |
| EWB150-203CK7AL | **310.706A** | | 150 - 203 | 150 - 203 | 126 | 87 | 41 | 83 | 1.2 | |

1. EWB-AL boring heads will be delivered with assembled insert holder.

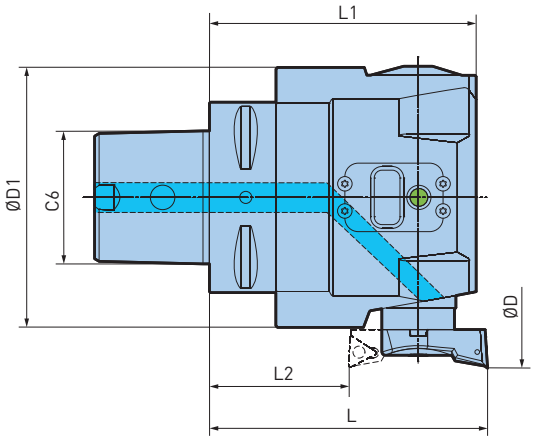
For Spare Parts ▶ 440
For Insert ▶ 396 - 398



BROTECH

# EWBD BIG CAPTO Digital and Balanced Fine Boring Heads, Ø 68 - 153

The fine boring heads EWBD combine the most advanced technologies in one spectacular tool: digital and self-balanced. In addition the ultra-light fine boring head EWBD 100 AL is the worlds first tool with BIG CAPTO shank, completely made of aluminium.




| Model | Order No. | BIG CAPTO | Front Bore ØD | Back Bore ØD | Material | ØD1 | L | L2 | L1 | Weight (kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EWBD68-102C6 | **470.606** | C6 | 68 - 102 | 80 - 102 | Steel | 64 | 92 | 46 | 88 | 2.1 | TC 11 |
| EWBD100-153C6AL | **470.609** | C6 | 100 - 153 | 112 - 153 | Aluminium | 90 | 92 | 46 | 88 | 1.4 | |

1. EWBD boring heads will be delivered with assembled insert holder.

For Spare Parts ▶ 440
For Insert ▶ 396 - 398

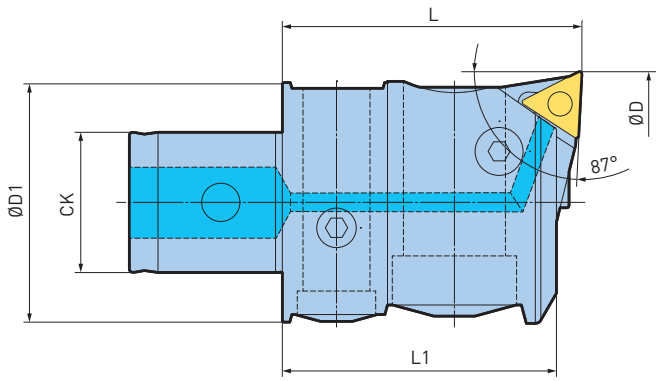


**Other execution**

EWBD68-102C6 (Steel)
**470.606**

# EWB-UP Balanceable Fine Boring Head, Ø 25 - 100

The ulta-precise EWB-UP series sets higher standards for boring heads concerning adjustment accuracy and balance quality. Cutting speed up to Vc max. = 2 000 m/min.



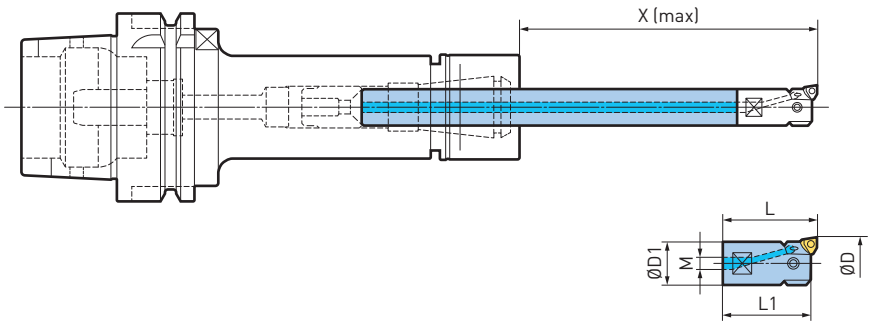

| Model | Order No. | CK | ØD | ØD1 | L | L1 | Max. Imbalance [gmm] | Weight (kg) | |
|---|---|---|---|---|---|---|---|---|---|
| EWB25-33UP-CK2 | **309.201** | CK2 | 25 - 33 | 23.4 | 35.5 | 32.5 | 3 | 0.12 | TP 07 |
| EWB32-42UP-CK3 | **309.301** | CK3 | 32 - 42 | 30 | 40 | 37 | 5 | 0.22 | TC 11 |
| EWB41-54UP-CK4 | **309.401** | CK4 | 41 - 54 | 38 | 47 | 43 | 5 | 0.40 | |
| EWB53-70UP-CK5 | **309.501** | CK5 | 53 - 70 | 49 | 57 | 53 | 10 | 0.85 | |
| EWB68-100UP-CK6 | **309.601** | CK6 | 68 - 100 | 64 | 71 | 67.2 | 30 | 1.8 | |

1. EWB-UP boring heads will be delivered with assembled insert holder.

For Spare Parts ▸ 441
For Insert ▸ 396 - 398

# EW Fine Boring Heads, Ø 15 - 22

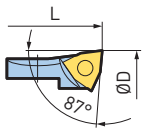
These heads are designed to be used in combination with the steel or carbide-boring bars Ø 14 and Ø 16 mm out of the accessory program. In conjunction with the long carbide bar, the tool is well suited for vibration-free finishing operations in bores with unfavorable Ø/L-ratios.




| Model | Order No. | ØD | ØD1 | L | M | L1 | Weight (kg) |
|---|---|---|---|---|---|---|---|
| EW15M6 | **310.020** | 15 - 18.5 | 14 | 30 | M6 | 27.5 | 0.03 |
| EW18M10 | **310.030** | 18 - 22 | 16 | 36 | M10 | 33 | 0.05 |

For Spare Parts ▸ 441

## Insert Holders

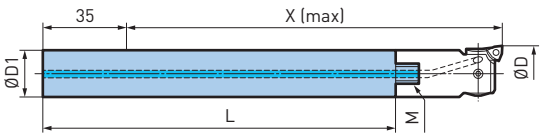



| For Boring Head | Model | Order No. | ØD | L | |
|---|---|---|---|---|---|
| EW15 | 15EKWC02 | **625.020** | 15 - 18.5 | 30 | WC 02 |
| EW18 | | **625.020** | 18 - 22 | 36 | |

For Insert ▸ 394



## Boring Bars

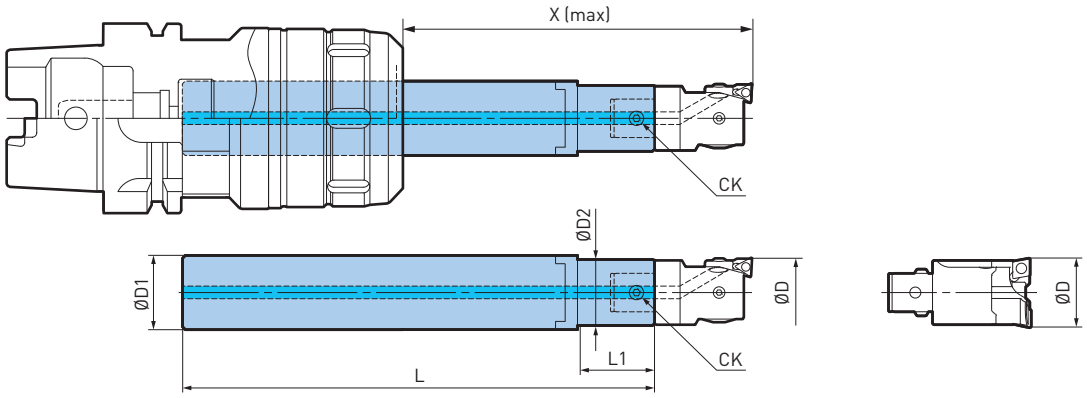



| For Boring Head Type | ØD | Model | Order No. | Boring Bar ØD1 | M | L | X (max) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| EW15 | 15 - 18.5 | ST14-87 | **615.232** | 14 | M6 | 87 | 82 | 0.09 |
| | | ST14-117HM | **615.233** | | | 117 | 112 | 0.25 |
| | | ST14-147HM | **615.221** | | | 147 | 142 | 0.30 |
| EW18 | 18 - 22 | ST16-88 | **615.226** | 16 | M10 | 88 | 89 | 0.12 |
| | | ST16-108HM | **615.227** | | | 108 | 109 | 0.26 |
| | | ST16-168HM | **615.229** | | | 168 | 169 | 0.40 |

# Carbide Bars

Due to maximum rigidity, a carbide bar, optimized in length and with the biggest possible diameter, guarantees the best result when machining deep bores.

For the work range from Ø 20 - 33 [47] mm, the fine graduated carbide bar program contains bars with 6 different diameters and 3 different lengths per diameter. Therefore, for every deep bore machining in this range, the optimal carbide bar is always available. The program is completed with carbide bars Ø 31 and ø 40 mm in 3 different lengths each, for the boring range from Ø 32 - 54 [74] mm.




| For Boring Heads | Model | Order No. | CK | Boring Range | ØD1 | ØD2 | L | L1 | HMC * X (max) | MEGA25N X (max) | HDC X (max) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW20, EWN20 | ST19-CKB1-140HM | 335.320 | CKB1 | 20 - 26 (31/36) | 19 | 19 | 140 | - | 98 | 120 | 130 | 0.47 |
| | ST19-CKB1-190HM | 335.321 | | | | | 190 | | 148 | 170 | 180 | 0.74 |
| | ST19-CKB1-240HM | 335.322 | | | | | 240 | | 198 | 220 | 230 | 0.95 |
| | ST21-CKB1-140HM | 335.380 | CKB1 | 20 - 26 (31/36) | 21 | 19 | 140 | 26 | 98 | 120 | - | 0.57 |
| | ST21-CKB1-190HM | 335.381 | | | | | 190 | | 148 | 170 | - | 0.81 |
| | ST21-CKB1-240HM | 335.382 | | | | | 240 | | 198 | 220 | - | 1.0 |
| | ST23-CKB1-140HM | 335.383 | CKB1 | 20 - 26 (31/36) | 23 | 19 | 140 | 26 | 98 | 120 | - | 0.70 |
| | ST23-CKB1-190HM | 335.384 | | | | | 190 | | 148 | 170 | - | 0.97 |
| | ST23-CKB1-240HM | 335.385 | | | | | 240 | | 198 | 220 | - | 1.3 |
| SW25, EWN25 | ST24-CKB2-160HM | 335.323 | CKB2 | 25 - 33 (40/47) | 24 | 24 | 160 | - | 121 | 140 | 150 | 0.86 |
| | ST24-CKB2-220HM | 335.324 | | | | | 220 | | 181 | 200 | 210 | 1.1 |
| | ST24-CKB2-290HM | 335.325 | | | | | 290 | | 251 | 270 | 280 | 1.8 |
| | ST27-CKB2-160HM | 335.386 | | | 27 | | 160 | 28 | 121 | - | - | 1.1 |
| | ST27-CKB2-220HM | 335.387 | | | | | 220 | | 181 | - | - | 1.5 |
| | ST27-CKB2-290HM | 335.388 | | | | | 290 | | 251 | - | - | 2.1 |
| | ST29-CKB2-160HM | 335.389 | | | 29 | | 160 | 28 | 121 | - | - | 1.2 |
| | ST29-CKB2-220HM | 335.390 | | | | | 220 | | 181 | - | - | 1.8 |
| | ST29-CKB2-290HM | 335.391 | | | | | 290 | | 251 | - | - | 2.4 |
| SW32, EWN32 | ST31-CKB3-200HM | 335.326 | CKB3 | 32 - 42 (51/60) | 31 | 31 | 200 | - | 168 | - | 184 | 1.8 |
| | ST31-CKB3-260HM | 335.331 | | | | | 260 | | 228 | - | 244 | 2.5 |
| | ST31-CKB3-350HM | 335.327 | | | | | 350 | | 318 | - | 334 | 3.7 |
| SW41, EWN41, EWE41 | ST40-CKB4-235HM | 335.328 | CKB4 | 41 - 54 (66/74) | 40 | 40 | 235 | - | 207 | - | - | 3.7 |
| | ST40-CKB4-335HM | 335.329 | | | | | 335 | | 307 | - | - | 5.4 |
| | ST40-CKB4-435HM | 335.330 | | | | | 435 | | 407 | - | - | 7.2 |

1. * X (max and min) for HMC shanks varies depending on the type (HSK, BBT, BDV, BIG CAPTO). Please contact BIG KAISER team for detailed information.

For Spare Parts ▸ 426





BROTECH

Hydraulic Chuck

Hi-Power Milling Chuck

MEGA New Baby Chuck

To clamp BIG KAISER carbide bars with shank diameter Ø 19, 21, 23, 24, 27, 29, 31 and 40 milling chuck are highly recommended, Additional clamping possibilities are MEGA NEW Baby Chucks or Hydraulic Chucks.

Clamping options for carbide bares ≥ Ø 19mm

| Schank | Holder | Carbide bare size | Collet |
|---|---|---|---|
| HSK-A50 | MEGA25N | Ø19 / Ø21 / Ø23 / Ø24 | NBC25 |
| HSK-A63 | HMC32S | Ø19 / Ø21 / Ø23 / Ø24 / Ø27 / Ø29 | OCA32 |
| HSK-A63 | HDC31 | Ø31 direct clamping | |
| HSK-A100 | HMC32 | Ø19 / Ø24 / Ø31 | OCA32 |
| HSK-A100 | HMC42 | Ø19 / Ø24 / Ø31 | OCA42 |
| | | Ø31 / Ø40 | C42 |
| BBT30 | MEGA25N | Ø19 / Ø21 / Ø23 / Ø24 | NBC25 |
| BBT30 | HMC32S | Ø19 / Ø21 / Ø23 / Ø24 / Ø27 / Ø29 | OCA32 |
| BBT40 | MEGA25N | Ø19 / Ø21 / Ø23 / Ø24 | NBC25 |
| BBT40 | HMC32S | Ø19 / Ø21 / Ø23 / Ø24 / Ø27 / Ø29 | OCA32 |
| BBT40 | HDC31 | Ø31 direct clamping | |
| BBT50 | MEGA25N | Ø19 / Ø21 / Ø23 / Ø24 | NBC25 |
| BBT50 | HMC32S | Ø19 / Ø21 / Ø23 / Ø24 / Ø27 / Ø29 | OCA32 |
| BBT50 | HDC19 | Ø19 direct clamping | |
| BBT50 | HDC24 | Ø24 direct clamping | |
| BBT50 | HDC31 | Ø31 direct clamping | |
| BBT50 | HMC42 | Ø19 / Ø24 / Ø31 | OCA42 |
| | | Ø31 / Ø40 | C42 |
| BVD40 | MEGA25N | Ø19 / Ø21 / Ø23 / Ø24 | NBC25 |
| BVD40 | HMC32S | Ø19 / Ø21 / Ø23 / Ø24 / Ø27 / Ø29 | OCA32 |
| BVD40 | HDC31 | Ø31 direct clamping | |
| BVD50 | MEGA25N | Ø19 / Ø21 / Ø23 / Ø24 | NBC25 |
| BVD50 | HMC32S | Ø19 / Ø21 / Ø23 / Ø24 / Ø27 / Ø29 | OCA32 |
| BVD50 | HMC42 | Ø19 / Ø24 / Ø31 | OCA42 |
| | | Ø31 / Ø40 | C42 |
| C6 | HMC32S | Ø19 / Ø21 / Ø23 / Ø24 / Ø27 / Ø29 | OCA32 |
| C8 | HMC32S | Ø19 / Ø21 / Ø23 / Ø24 / Ø27 / Ø29 | OCA32 |

For OCA Collet ▶ 273
For NBC Collet ▶ 252

# Guidelines

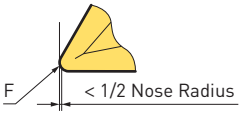
**Major Influences of Fine Boring**

- The amount of stock to be removed (D.O.C.)
- Feed rate
- Cutting speed

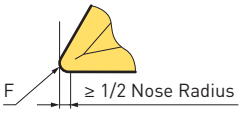
For all of these influences, a balance must be obtained for optimal machining. Too much stock or too heavy of a feed rate will generate excessive cutting forces that can result in inconsistent bore size. When stock or feed rates are too light, the possibility of chatter increases due to deflection.

---

D.O.C




**High Possibility for Deflection & Chatter:**
When D.O.C. is less than half the insert nose radius, the resulting forces (F) are almost 100% radial.

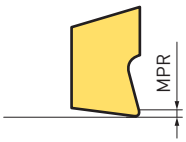



**Good Stable Cut:**
When D.O.C. is greater than or equal to half the insert nose radius, the resulting forces (F) are almost 100% axial.

---

Feed Rate

**High Possibility for Deflection & Chatter:**
When the feed rate is less than the hone on the insert tip, the risk of vibration increases.




**Good Stable Cut:**
When the feed rate is larger than the hone on the insert tip, full use of the chip breaker is allowed. This results in lower cutting forces.

---

## Cutting Speed

**Higher Speeds:**

- Better surface finish
- Shorter machining times
- Better chip evacuation

As a general rule, the tool's length/diameter ratio and insert radius will determine optimum cutting speed.
*For smaller diameter bores, carbide or heavy metal bars may be required to eliminate vibration & chatter

**Lower Speeds:**

- Poorer surface finish
- Low chance for chatter
- Longer machining times
- High chance for built-up edge, results in shorter insert life

| L/D Ratio | Max. Insert Radius | Speed Reduction |
|---|---|---|
| ≤ 4:1 | 0.8 | 100% of optimum |
| ≤ 5:1 | 0.4 | 75% of optimum |
| ≤ 6:1 | 0.2 | 60% of optimum |
| ≥ 7:1 | 0.2 | 50% of optimum |

## Troubleshooting

Under certain conditions, it may be necessary to modify or adapt recommended cutting data and/or tooling configurations of the application. Below are general solutions to common problems.

| Problem | Possible Cause | Remedy |
|---|---|---|
| Poor Tool Life | Wrong insert grade | Change to higher wear resistant grade |
| | Excessive speed | Reduce Vc |
| | Poor cooling of insert | Apply through-tool coolant |
| | Excessive stock allowance | Decrease depth of cut |
| Chatter & Vibration | Excessive speed | Reduce Vc, check cutting data tables |
| | Extreme length/diameter ratio | Shorten tool to increase stiffness |
| | | Increase boring bar diameter to larger size |
| | | Change boring bar to carbide or heavy metal |
| | Wrong insert | Reduce nose radius of insert |
| | | Use ground geometry inserts |
| | Incorrect stock allowance | Check cutting data tables |
| Poor Size Repeatability | Inaccurate tool changes | Worn and/or damaged tool shank; replace |
| | | Clean spindle and tool shank |
| | Variation of stock allowance | Semi-finish with rough insert boring head |
| | Excessive spindle looseness | Use ground geometry inserts |
| Unacceptable Roundness | Excessive boring tool imbalance | Change to auto-balance or balanceable head |
| | | Balance tool assembly |
| | | Reduce speed |
| | Excessive cutting forces | Check stock allowance and feed rate |
| | Insufficient workpiece clamping | Check for uniform workpiece clamping |
| | Workpiece non-symmetrical | Reduce cutting forces; change to ground insert |
| | | Increase cutting speed, reduce feed |
| Unacceptable Position | Original bore off position | Semi-finish with rough insert boring head |
| | Excessive stock allowance | Decrease depth of cut |
| | | Decrease insert radius |
| | | Reduce cutting forces; change to ground insert |
| Poor Surface Finish | Wrong insert radius | Use larger insert radius |
| | Excessive feed rate | Reduce feed; maximum 25% of insert radius |
| | Poor chip evacuation | Increase bore to boring bar clearances |
| | | Apply through-tool coolant; adjust nozzles |
| | | Change insert to higher rake angle |
| | | Check depth of cut |
| Taper | Premature insert wear | Change to higher wear resistance insert grade |
| | | Increase insert radius |
| | | Change from ground to pressed geometry insert |
| | | Increase coolant flow |

# Large Diameter Boring Tools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B.4

BROTECH

# Large Diameter Boring Tools Series 318

The system is based on aluminum extension slides of different lengths, which support a variety of aluminum and steel components for roughing and finishing tool assemblies. The mounting components are pinned to fit onto specific locations on the slides, and secured with steel bolts. The precise positioning of the components on the slide along with incremental adjustment scales for insert holders permit diameter and length setting without a tool presetter.

## Series 318 with Flange Only

Execution with flange only. Especially built to fit on machine tools with 40 taper spindle. For rough and fine boring, OD turning, chamfering and face grooving.
**Ø 200 - 340 mm, CKB6/CKN6**

▶ 377

## Series 318 with Flange and Extension Slide

Edition with flange and extension slides. For rough and fire boring, OD turning, chamfering and face grooving.
**Ø 200 - 620 mm, CKB7/CKN7**

▶ 377

## Series 318 with Bridge and Extension Slides

Edition with shanks, large bridges and extension slides. For rough and fine boring, OD turning and face grooving.
**Ø 620 - 3000 mm, DV50/BT50/HSK-A100**

▶ 380



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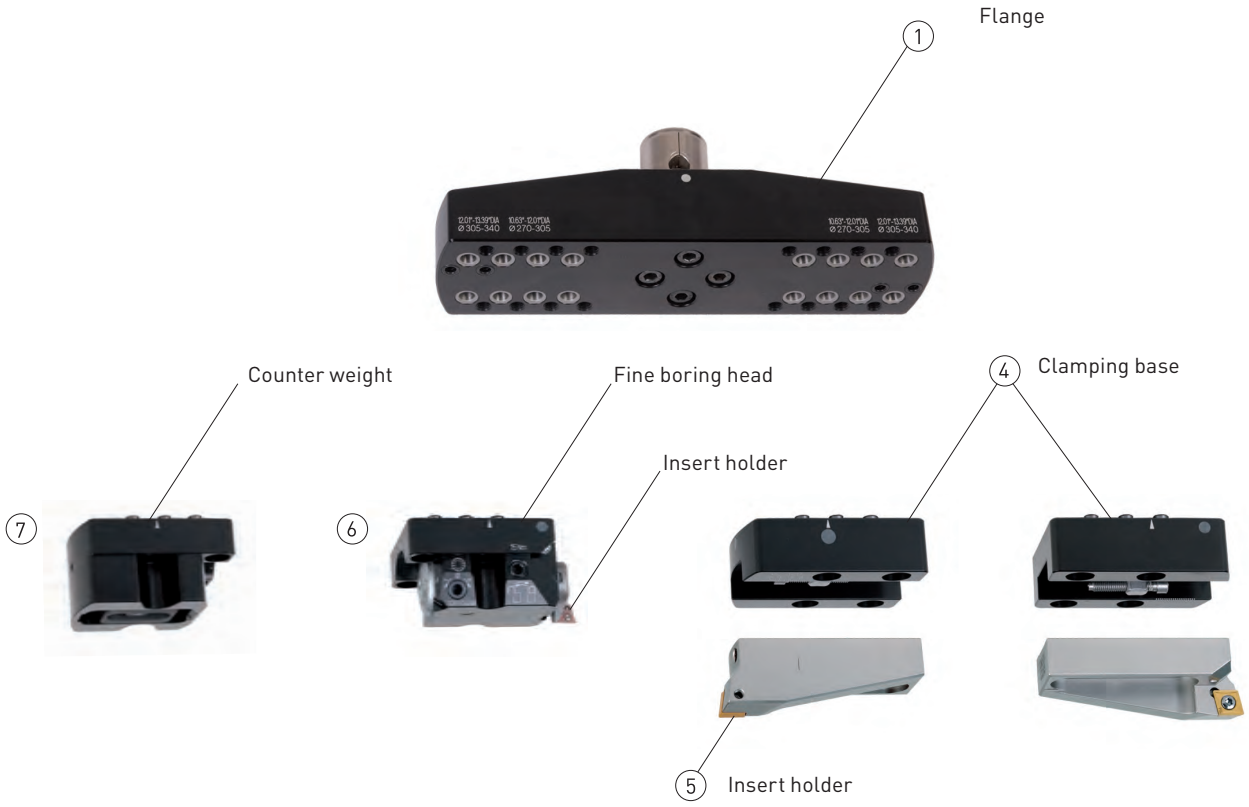
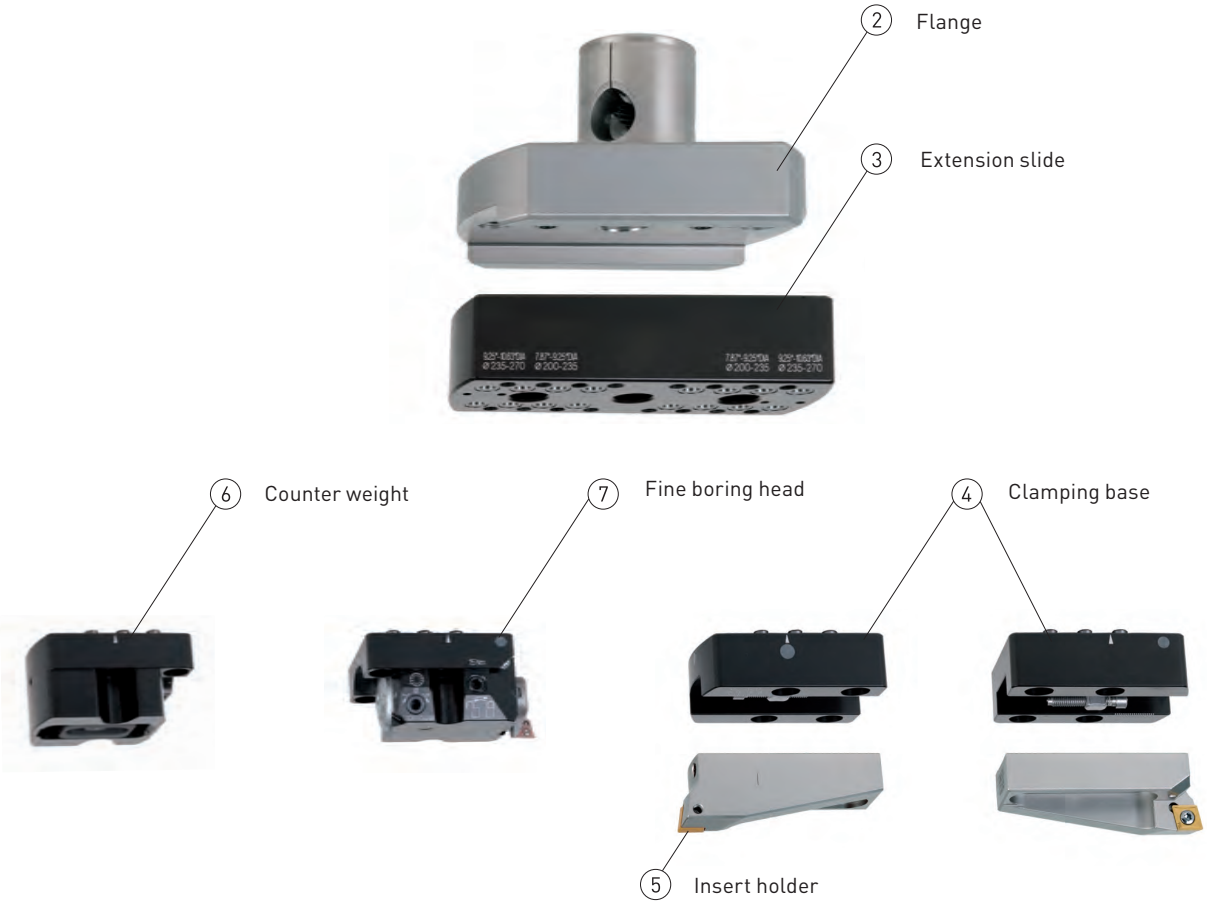
## Series 318 with Flange Only, Ø 200 - 340




## Series 318 with Flange and Extension Slide, Ø 200 - 620



## Flanges

①

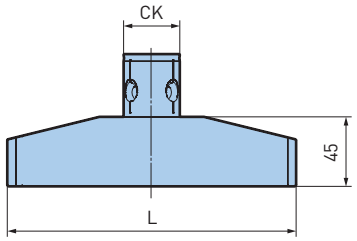



Fig. 1

②

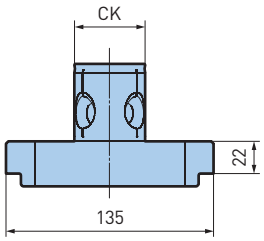



Fig. 2

Standard execution

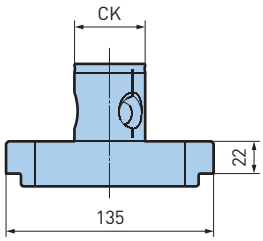



Fig. 3

Flange with cutter position rotated 90°

①

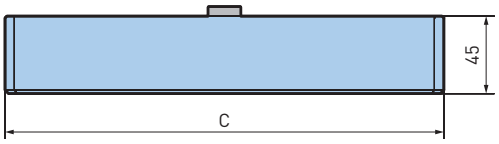
| Model | Order No. | Fig. | ØD | CK | L | Weight (kg) |
|---|---|---|---|---|---|---|
| CKN6-FL200-270 | **318.205N** | 1 | 200 - 270 | CKN6 | 185 | 1.83 |
| CKB6-FL200-270 | **318.205** | 1 | 200 - 270 | CKB6 | | 1.83 |
| CKN6-FL270-340 | **318.206N** | 1 | 270 - 340 | CKN6 | 255 | 2.32 |
| CKB6-FL270-340 | **318.206** | 1 | 270 - 340 | CKB6 | | 2.32 |

②

| Model | Order No. | Fig. | CK | Weight (kg) |
|---|---|---|---|---|
| CKN7-FL135 | **318.201N** | 2 | CKN7 | 2.80 |
| CKB7-FL135 | **318.201** | | CKB7 | 2.75 |
| CKN7-FL135-90 | **318.202N** | 3 | CKN7 | 2.73 |
| CKB7-FL135-90 | **318.202** | | CKB7 | 2.73 |

## Extension Slides

③

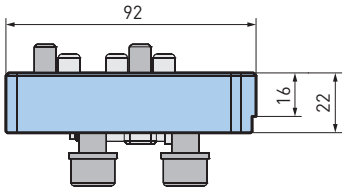



| Model | Order No. | C | ØD | Max. Speed (min $^{-1}$) | Weight (kg) |
|---|---|---|---|---|---|
| SLN200-270AL | **318.222** | 185 | 200 - 270 | 3 200 | 1.50 |
| SLN270-340AL | **318.223** | 255 | 270 - 340 | 2 400 | 2.04 |
| SLN340-410AL | **318.224** | 325 | 340 - 410 | 1 900 | 2.62 |
| SLN410-480AL | **318.225** | 395 | 410 - 480 | 1 600 | 3.21 |
| SLN480-550AL | **318.226** | 465 | 480 - 550 | 1 300 | 3.90 |
| SLN550-620AL | **318.227** | 535 | 550 - 620 | 1 200 | 4.40 |

B.4

## Clamp Bases

④

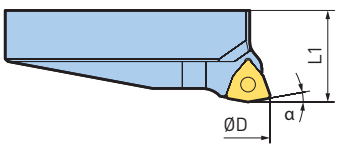



| Model | Order No. | Weight (kg) |
|---|---|---|
| CB200 | **318.240** | 1.50 |

1. Clamp bases are sold in pairs.

## Insert Holders

⑤




| Model | Order No. | ØD | L1 | Angle α | Insert | Weight (kg) |
|---|---|---|---|---|---|---|
| IHTW200C | **637.940** | 200 - 620 | 34 | 0° | CC 12 | 0.71 |
| IHTW200C16 | **637.941** | | 34 | 0° | CC 16 | 0.71 |
| IHTW200S | **637.942** | | 34 | 6° | SC 12 | 0.75 |
| IHTW200W | **637.943** | | 34 | 10° | WC 08 | 0.7 |
| IHTW200C-DVS* | **637.951** | | 34.4 | 0° | CC 12 | 0.35 |
| IHTW200C16-DVS* | **637.953** | | 34.4 | 0° | CC 16 | 0.35 |

1. Insert holders is composed of 2 pcs. of holders.
* Step cut Insert holder are delivered individually.

For Insert ▸ 395 - 405
For Spare Parts ▸ 434



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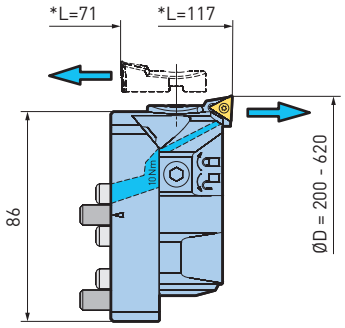
# EWN/EWE Fine Boring Heads, Ø 200 - 3000

⑥

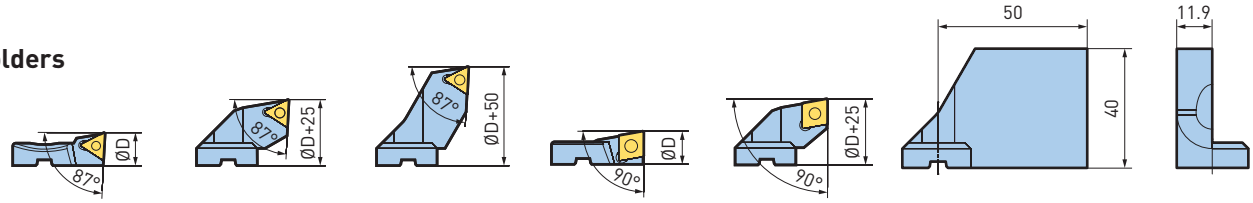
EWE200AL



EWN200AL

| Model | Order No. |
|---|---|
| EWE200AL | 318.104 |
| EWN200AL | 318.101 |

## Insert Holders




| Order No. | 626.271 | 626.272 | 626.273 | 626.371 | 626.372 | 626.917 |
|---|---|---|---|---|---|---|
| Model | ENH7-1T | ENH7-2T | ENH7-3T | ENH7-1C | ENH7-2C | ENH7-BLANK L |
| Type | TC 11 | | | CC 09 | | Blank |

For Insert ▶ 396 - 398 / 400

## Insert Holders for Chamfering and Undercuts

Fig. 1

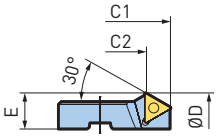



Fig. 2

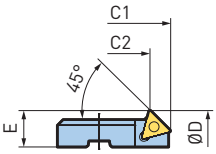
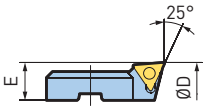



Fig. 3




| Model | Order No. | Fig. | Type | C1 | C2 | E | |
|---|---|---|---|---|---|---|---|
| EWH7-1T30 | 626.472 | 1 | 30° | 117 | 108.3 | 12.5 | TC 11 |
| EWH7-1T45 | 626.473 | 2 | 45° | | 109.8 | | |
| EWH7-1T25 | 689.189 | 3 | 25° | | - | | |

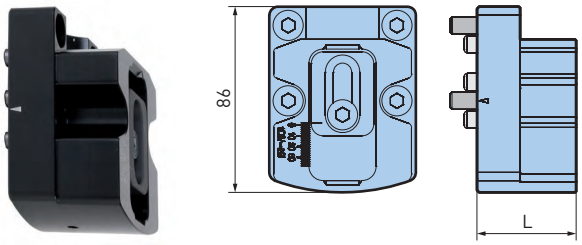
For Insert ▶ 396 - 398

Min. diameter for back boring / back chamfering = ØD min. (of the respective boring range) + 12 mm.
Example for the lowest range: Min. diameter = 200 + 12 = 212 mm

# Counter Weights

There are two different counter weights available. Type 1 is made of steel and is used for coarse balancing. Type 2 is made of aluminum and contains a slide with a graduated scale for fine balancing of the tool assembly.

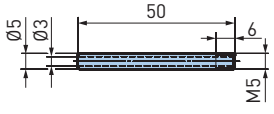
⑦




| Model | Order No. | L | Material |
|---|---|---|---|
| CW200AL | 318.105 | 46 | Aluminium |
| CW200 | 318.107 | 22.5 | Steel |

For Spare Parts ▶ 442

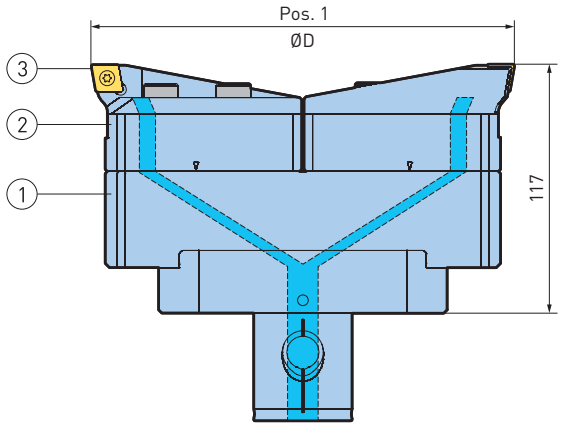
# Coolant Pipe

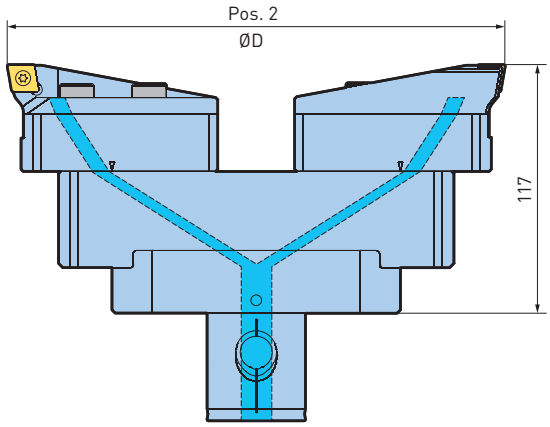



| Model | Order No. |
|---|---|
| CP-DM5-50-M5 | 692.415 |

# Rough Boring Component Selection

The table below determines the components such as extension slide (1), clamp bases (2) and insert holders (3) for each diameter range (ØD) and shows in which position (1 or 2) the clamp bases (2) have to be mounted on the extension slide (1). Further, this table also serves for the coarse diameter setting of the cutting edges by means of the scale on the clamp base (2) and the marking on the insert holder (3). The required scale value is calculated by the difference between bore diameter and correction value (α). The insert holder has to be adjusted to the scale value. See example below.




| Range ØD | Extension Slide | Fixed Position/Range | | Clamp Bases | Insert Holders | Correction α | | Max. Speed |
|---|---|---|---|---|---|---|---|---|
| | ① | Pos. 1/ØD | Pos. 2/ØD | ② | ③ | Pos. 1 | Pos. 2 | |
| 200 - 270 | 318.205N | 199 - 236 | | 318.240 | See page 374 | 200 | - | 3 200 |
| | 318.222 | | 234 - 271 | | | - | 235 | |
| 270 - 340 | 318.206N | 269 - 306 | | | | 270 | - | 2 400 |
| | 318.223 | | 304 - 341 | | | - | 305 | |
| 340 - 410 | 318.224 | 339 - 376 | | | | 340 | - | 1 900 |
| | | | 374 - 411 | | | - | 375 | |
| 410 - 480 | 318.225 | 409 - 446 | | | | 410 | - | 1 600 |
| | | | 444 - 481 | | | - | 445 | |
| 480 - 550 | 318.226 | 479 - 516 | | | | 480 | | 1 300 |
| | | | 514 - 551 | | | - | 515 | |
| 550 - 620 | 318.227 | 549 - 586 | | | | 550 | - | 1 200 |
| | | | 584 - 621 | | | - | 585 | |

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B.4

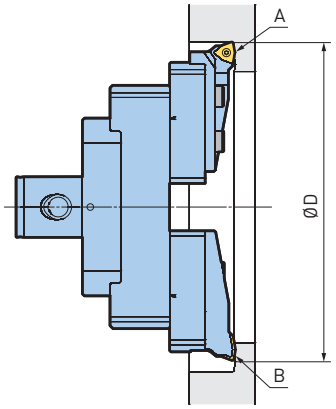
**Example: Diameter setting according to scale**

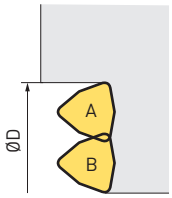
ØD: 430 Position: 1 Scale value: ØD - α = 430 - 410 = 20

Extension slide: **318.225** Correction value α: 410

## Full Profile Roughing

Full profile roughing permits boring with large stock allowance (up to 60 mm in diameter) in a single operation with relatively low drive power. Set cutting edge A to the final bore diameter, and cutting edge B according to the machining allowance, as listed in the table above.




| Stock Allowance [mm Ø] | Cutting Edge A [mm Ø] | Cutting Edge B [mm Ø] |
|---|---|---|
| 22 - 29.9 | ØD | D - 2 |
| 30 - 35.9 | | D - 6 |
| 36 - 41.9 | | D - 12 |
| 42 - 47.9 | | D - 18 |
| 48 - 53.9 | | D - 24 |
| 54 - 60 | | D - 30 |

| Cutting Data Vc [m/min] | fn [mm/rev] |
|---|---|
| 100 - 180 | 0.1 - 0.2 |

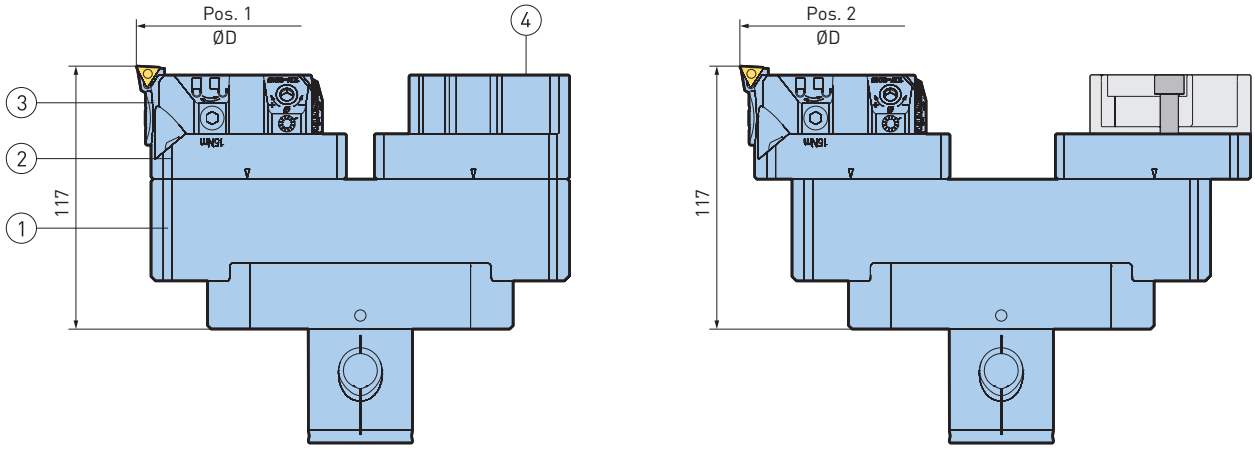


BROTECH

# Fine Boring Component Selection

The table below determines the components such as extension slide (1), boring head (2), insert holder (3) and counter weight (4) for each diameter range and shows in which position the boring head and the counter weight have to be mounted on the extension slide.

Balancing of the tool combination takes place by adjusting the slide on the counter weight according to the scale. The correction value (α) is shown on the table. See example below.




| Range ØD | Extension Slide | Fixed Position/Range | | Boring Head | Insert Holder | Counter Weight | Correction α | | Max. Speed |
|---|---|---|---|---|---|---|---|---|---|
| | ① | Pos. 1/ØD | Pos. 2/ØD | ② | ③ | ④ | Pos. 1 | Pos. 2 | |
| 200 - 270 | **318.205N** | 199 - 236 | | **318.101** | **626.271** | **318.105** (for fine balancing) **318.107** | 200 | | 3 200 |
| | **318.222** | | 234 - 271 | | | | | 235 | |
| 270 - 340 | **318.206N** | 269 - 306 | | | | | 270 | | 2 400 |
| | **318.223** | | 304 - 341 | | | | | 305 | |
| 340 - 410 | **318.224** | 339 - 376 | | | | | 340 | | 1 900 |
| | | | 374 - 411 | | | | | 375 | |
| 410 - 480 | **318.225** | 409 - 446 | | | | | 410 | | 1 600 |
| | | | 444 - 481 | | | | | 445 | |
| 480 - 550 | **318.226** | 479 - 516 | | | | | 480 | | 1 300 |
| | | | 514 - 551 | | | | | 515 | |
| 550 - 620 | **318.227** | 549 - 586 | | | | | 550 | | 1 200 |
| | | | 584 - 621 | | | | | 585 | |

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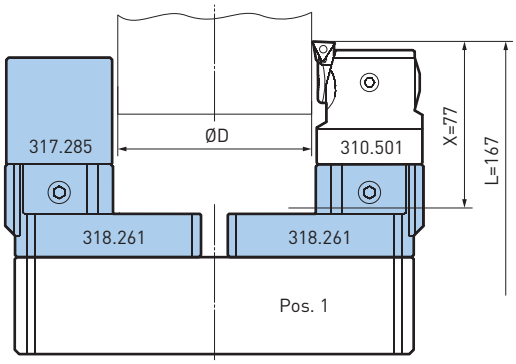
**Example: Diameter setting according to scale**

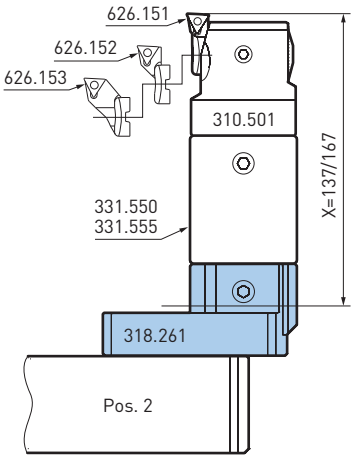
| | | | |
|---|---|---|---|
| ØD: | 335 H7 | Counter weight: | **318.105** |
| Extension slide: | **318.223** | Correction value: | 305 |
| Position: | 2 | Scale: | D - α = 335 - 305 = 30 |

# OD Turning Holders, Ø 49 - 476

The tool holder with CKB5 connection can be mounted on any extension slide. For OD turning it is required to connect the fine boring head EWN53-95CKB5 either directly or by means of an extension to the holder. To compensate the imbalance, a second tool holder and a special counter weight have to be mounted on the opposite side of the extension slide.

**Attention: Counter-clockwise rotation of spindle!**

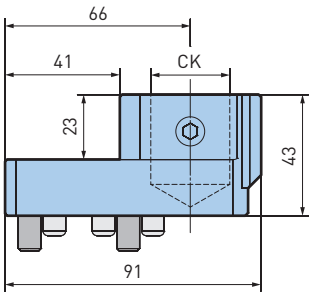



L = Distance to the CK connection.

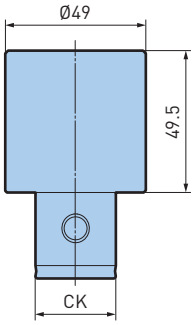
## Tool Holder

| Model | Order No. | CK |
|---|---|---|
| CB200CKB5 | **318.261** | CKB5 |




## Counter Weight

| Model | Order No. | CK |
|---|---|---|
| CW-CK5-DM49-50 | **317.285** | CK5 |




## Adjusting Table

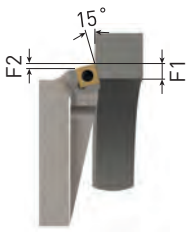
| Range | Extension Slide | Pos. 1 | | | Pos. 2 | | |
|---|---|---|---|---|---|---|---|
| | | Range with Insert Holder No.: | | | Range with Insert Holder No.: | | |
| ØD | | 626.153 ØD | 626.152 ØD | 626.151 ØD | 626.153 ØD | 626.152 ØD | 626.151 ØD |
| 49 - 126 | **318.222** | 49 - 66 | 62 - 79 | 74 - 91 | 84 - 101 | 97 - 114 | 109 - 126 |
| 119 - 196 | **318.223** | 119 - 136 | 132 - 149 | 144 - 161 | 154 - 171 | 167 - 184 | 179 - 196 |
| 189 - 266 | **318.224** | 189 - 206 | 202 - 219 | 214 - 231 | 224 - 241 | 237 - 254 | 249 - 266 |
| 259 - 336 | **318.225** | 259 - 276 | 272 - 289 | 284 - 301 | 294 - 311 | 307 - 324 | 319 - 336 |
| 329 - 406 | **318.226** | 329 - 346 | 342 - 359 | 354 - 371 | 364 - 381 | 377 - 394 | 389 - 406 |
| 399 - 476 | **318.227** | 399 - 416 | 412 - 429 | 424 - 441 | 434 - 451 | 447 - 464 | 459 - 476 |

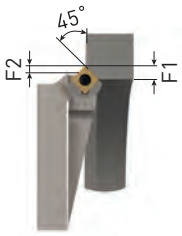
# Insert Holders for Chamfering

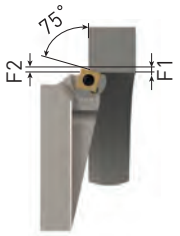
The insert holder with step-less adjustable chamfer angle from 15-75° is made for front chamfering and with limitations also for back chamfering.

| Model | Order No. |
|---|---|
| CFTW200S | 637.959 |

| ØD | Chamfer Angle α | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 15° | | 30° | | 45° | | 60° | | 75° | |
| | min Ø | max Ø | min Ø | max Ø | min Ø | max Ø | min Ø | max Ø | min Ø | max Ø |
| 200 - 270 | 182 | 276 | 186 | 278 | 190 | 279 | 195 | 278 | 199 | 277 |
| 270 - 340 | 252 | 346 | 256 | 348 | 260 | 349 | 265 | 348 | 269 | 347 |
| 340 - 410 | 322 | 416 | 326 | 418 | 330 | 419 | 335 | 418 | 339 | 417 |
| 410 - 480 | 392 | 486 | 396 | 488 | 400 | 489 | 405 | 488 | 409 | 487 |
| 480 - 550 | 462 | 556 | 466 | 558 | 470 | 559 | 475 | 558 | 479 | 557 |
| 550 - 620 | 532 | 626 | 536 | 628 | 540 | 629 | 545 | 628 | 549 | 627 |



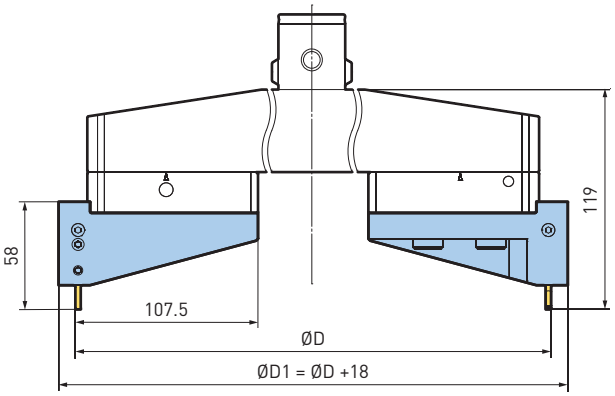




| Max. Radial Chamfer Length for Front and Back Chamfering | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Insert | 15° | | 30° | | 45° | | 60° | | 75° | |
| | F1 | F2 | F1 | F2 | F1 | F2 | F1 | F2 | F1 | F2 |
| SC12 | 11.4 | 3 | 10.3 | 4 | 8.4 | 4.2 | 5.9 | 3.9 | 3 | 3 |

For Insert ▶ 405

# Face Grooving Holders




## Tool Holder

| Model | Order No. | ØD |
|---|---|---|
| FGHTW200 | 637.961 | 198 - 3 002 |

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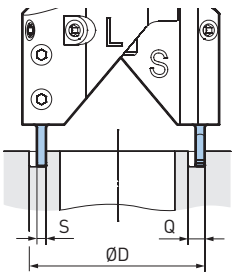
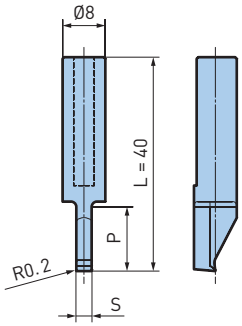
## Cutters



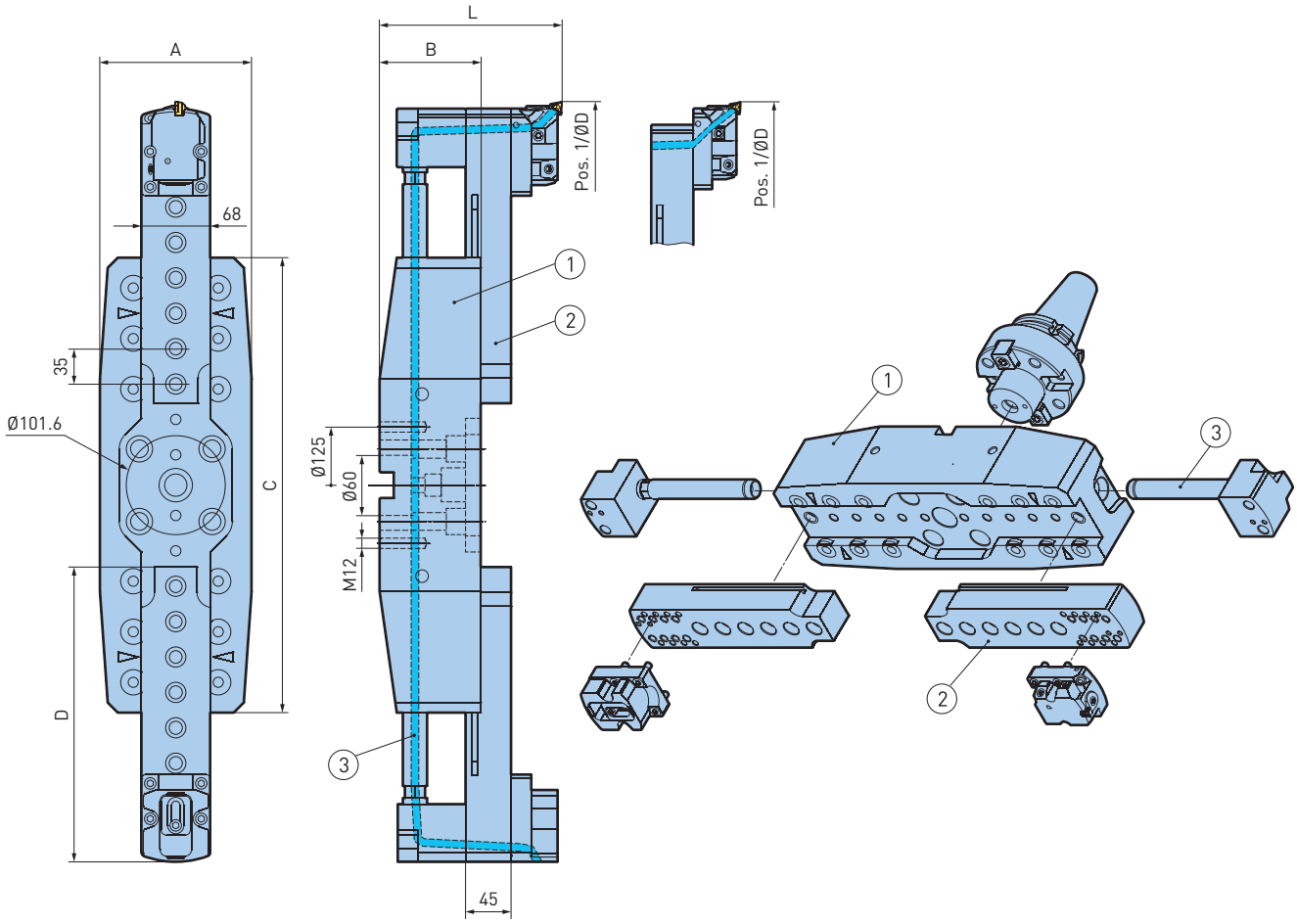




| Model | Order No. | Cutter | Width of Cutter S | Max. Width of Groove Q | Max. Depth of Groove P |
|---|---|---|---|---|---|
| FG2-ST8-40K40 | 958.601 | uncoated K40/AL * | 2 | 3.5 | 12 |
| FG3-ST8-40K40 | 958.602 | | 3 | 5.5 | |
| FG4-ST8-40K40 | 958.603 | | 4 | 7.5 | |
| FG5-ST8-40K40 | 958.604 | | 5 | 9.5 | |
| FG2-ST8-40K40C | 958.611 | coated P40C/ST, GG * | 2 | 3.5 | |
| FG3-ST8-40K40C | 958.612 | | 3 | 5.5 | |
| FG4-ST8-40K40C | 958.613 | | 4 | 7.5 | |
| FG5-ST8-40K40C | 958.614 | | 5 | 9.5 | |

* Application
AL = Aluminium
ST = Steel
GG = Cast iron

# Series 318 with Bridge and Extension Slides, Ø 620 - 3000

The boring range from Ø 620 – 3 000 mm is covered with only five aluminium bridges and five pairs of extension slides. All other components such as boring head, clamp bases and insert holders are the same as for the existing light weight boring tool system Ø 200 – 620 mm.




| ØD | L | A | B | C | D |
|---|---|---|---|---|---|
| 620 - 830 | 180 | 150 | 100 | 450 | 292.5 |
| 830 - 1110 | 180 | 150 | 100 | 660 | 397.5 |
| 1110 - 1530 | 180 | 150 | 100 | 940 | 537.5 |
| 1530 - 2020 | 200 | 170 | 120 | 1360 | 642.5 |
| 2020 - 2510 | 210 | 190 | 130 | 1850 | 642.5 |
| 2510 - 3000 | 210 | 190 | 130 | 1850 | 1167.5 |

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# Rough and Fine Boring Component Selection

The table below refers to the drawings on page 380. It determines the components such as bridge (1), extension slide (2) and coolant supply (3) for each diameter range (ØD) and shows in which position (1 or 2) the roughing or finishing tools have to be mounted.

In addition, this table also serves to determine the scale values for the coarse diameter setting of the cutting edges for finishing, and to adjust the slide on the counter weight for precise balancing of finish tools. The required scale values are calculated by the difference between bore diameter and correction value (α). See example below.

| | ① Bridge | | ②* Extension Slide | | Position | | α | | ③* Coolant Supply | |
|---|---|---|---|---|---|---|---|---|---|---|
| ØD | Model | Order No. | Model | Order No. | Pos. 1/ØD | Pos. 2/ØD | Pos. 1 | Pos. 2 | Model | Order No. |
| 620 - 690 | BR620-830AL | **318.421** | SL620-830AL | **318.431** | 619 - 656 | 654 - 691 | 620 | 655 | CS620-1110 | **318.441** |
| 690 - 760 | | | | | 689 - 726 | 724 - 761 | 690 | 725 | | |
| 760 - 830 | | | | | 759 - 796 | 794 - 831 | 760 | 795 | | |
| 830 - 900 | BR830-1110 | **318.422** | SL830-1110 | **318.432** | 829 - 866 | 864 - 901 | 830 | 865 | CS620-1110 | **318.441** |
| 900 - 970 | | | | | 899 - 936 | 934 - 971 | 900 | 935 | | |
| 900 - 1040 | | | | | 969 - 1006 | 1004 - 1041 | 970 | 1005 | | |
| 1040 - 1110 | | | | | 1039 - 1076 | 1074 - 1111 | 1040 | 1075 | | |
| 1110 - 1180 | BR1110-1530 | **318.423** | SL1110-1530 | **318.433** | 1109 - 1146 | 1144 - 1181 | 1110 | 1145 | CS1110-1530 | **318.442** |
| 1180 - 1250 | | | | | 1179 - 1216 | 1214 - 1251 | 1180 | 1215 | | |
| 1250 - 1320 | | | | | 1249 - 1286 | 1284 - 1321 | 1250 | 1285 | | |
| 1320 - 1390 | | | | | 1319 - 1356 | 1354 - 1391 | 1320 | 1355 | | |
| 1390 - 1460 | | | | | 1389 - 1426 | 1424 - 1461 | 1390 | 1425 | | |
| 1460 - 1530 | | | | | 1459 - 1496 | 1494 - 1531 | 1460 | 1495 | | |
| 1530 - 1600 | BR1530-2020 | **318.424** | SL1530-2510 | **318.434** | 1529 - 1566 | 1564 - 1601 | 1530 | 1565 | CS1530-2510 | **318.443** |
| 1600 - 1670 | | | | | 1599 - 1636 | 1634 - 1671 | 1600 | 1635 | | |
| 1670 - 1740 | | | | | 1669 - 1706 | 1704 - 1741 | 1670 | 1705 | | |
| 1740 - 1810 | | | | | 1739 - 1776 | 1774 - 1811 | 1740 | 1775 | | |
| 1810 - 1880 | | | | | 1809 - 1846 | 1844 - 1881 | 1810 | 1845 | | |
| 1880 - 1950 | | | | | 1879 - 1916 | 1914 - 1951 | 1880 | 1915 | | |
| 1950 - 2020 | | | | | 1949 - 1986 | 1984 - 2021 | 1950 | 1985 | | |
| 2020 - 2090 | BR2020-2510 | **318.425** | SL1530-2510 | **318.434** | 2019 - 2056 | 2054 - 2091 | 2020 | 2055 | CS1530-2510 | **318.443** |
| 2090 - 2160 | | | | | 2089 - 2126 | 2124 - 2161 | 2090 | 2125 | | |
| 2160 - 2230 | | | | | 2159 - 2196 | 2194 - 2231 | 2160 | 2195 | | |
| 2230 - 2300 | | | | | 2229 - 2266 | 2264 - 2301 | 2230 | 2265 | | |
| 2300 - 2370 | | | | | 2299 - 2336 | 2334 - 2371 | 2300 | 2335 | | |
| 2370 - 2440 | | | | | 2369 - 2406 | 2404 - 2441 | 2370 | 2405 | | |
| 2440 - 2510 | | | | | 2439 - 2476 | 2474 - 2511 | 2440 | 2475 | | |
| 2510 - 2580 | BR2020-2510 | **318.425** | SL2510-3000 | **318.435** | 2509 - 2546 | 2544 - 2581 | 2510 | 2545 | CS2510-3000 | **318.444** |
| 2580 - 2650 | | | | | 2579 - 2616 | 2614 - 2651 | 2580 | 2615 | | |
| 2650 - 2720 | | | | | 2649 - 2686 | 2684 - 2721 | 2650 | 2685 | | |
| 2720 - 2790 | | | | | 2719 - 2756 | 2754 - 2791 | 2720 | 2755 | | |
| 2790 - 2860 | | | | | 2789 - 2826 | 2824 - 2861 | 2790 | 2825 | | |
| 2860 - 2930 | | | | | 2859 - 2896 | 2894 - 2931 | 2860 | 2895 | | |
| 2930 - 3000 | | | | | 2929 - 2966 | 2964 - 3001 | 2930 | 2965 | | |

1. * Single pieces.

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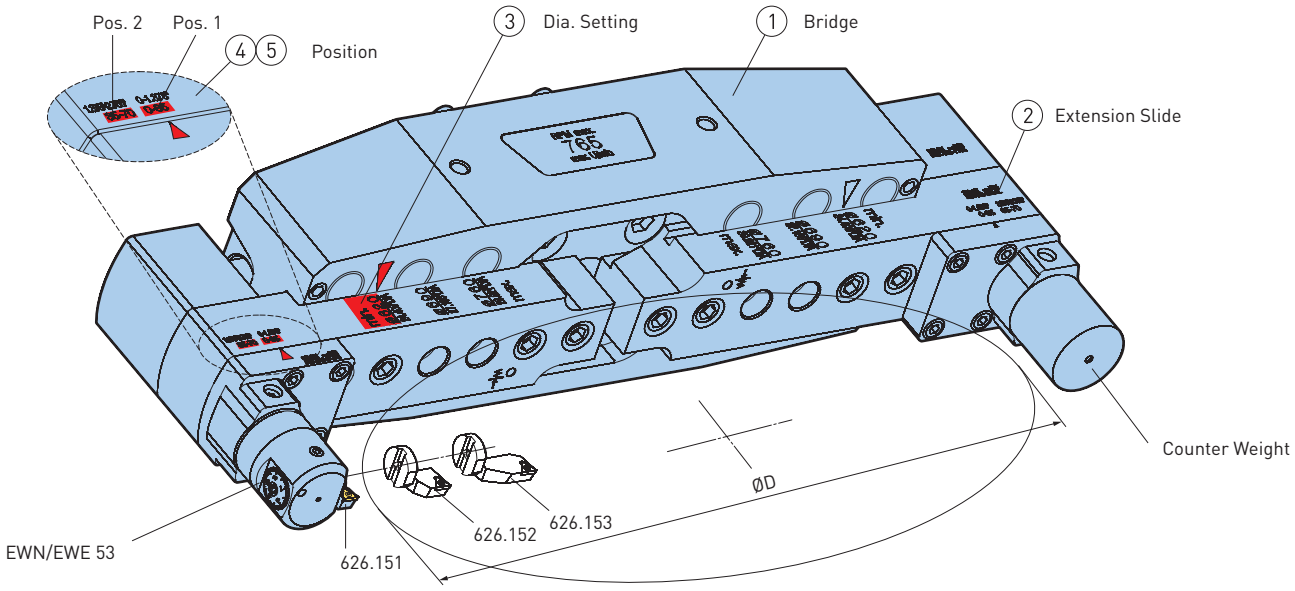
**Example: Diameter setting according to scale**

| | |
|---|---|
| ØD: | 1170 H7 |
| Bridge: | **318.423** |
| Extension slide: | **318.433** |
| Position: | 2 |
| Counter weight: | **318.105** |
| Coolant supply: | **318.442** |
| Correction value α: | 1145 |
| Scale: | ØD - α = 1170 - 1145 = 25 |

# OD Turning Holders, Ø 469 - 2856

**Attention: Counter-clockwise rotation of spindle!**




| ① | ② | | ③ | ④ Pos. 1 | | | ⑤ Pos. 2 | | |
|---|---|---|---|---|---|---|---|---|---|
| Bridge | Extension Slide | | Dia. Setting | Range with Insert Holder Order No.: | | | Range with Insert Holder Order No.: | | |
| | | | | 626.153 | 626.152 | 626.151 | 626.153 | 626.152 | 626.151 |
| Order No. | Order No. | ØD | | ØD | ØD | ØD | ØD | ØD | ØD |
| 318.421 | 318.431 | 469 - 546 | 620 | 469 - 486 | 482 - 499 | 494 - 511 | 504 - 521 | 517 - 534 | 529 - 546 |
| | | 539 - 616 | 690 | 539 - 556 | 552 - 569 | 564 - 581 | 574 - 591 | 587 - 604 | 599 - 616 |
| | | 609 - 686 | 760 | 609 - 626 | 622 - 639 | 634 - 651 | 644 - 661 | 657 - 674 | 669 - 686 |
| 318.422 | 318.432 | 679 - 756 | 830 | 679 - 696 | 692 - 709 | 704 - 721 | 714 - 731 | 727 - 744 | 739 - 756 |
| | | 749 - 826 | 900 | 749 - 766 | 762 - 779 | 774 - 791 | 784 - 801 | 797 - 814 | 809 - 826 |
| | | 819 - 896 | 970 | 819 - 836 | 832 - 849 | 844 - 861 | 854 - 871 | 867 - 884 | 879 - 896 |
| | | 889 - 966 | 1040 | 889 - 906 | 902 - 919 | 914 - 931 | 924 - 941 | 937 - 954 | 949 - 966 |
| 318.423 | 318.433 | 959 - 1036 | 1110 | 959 - 976 | 972 - 989 | 984 - 1001 | 994 - 1011 | 1007 - 1024 | 1019 - 1036 |
| | | 1029 - 1106 | 1180 | 1029 - 1046 | 1042 - 1059 | 1054 - 1071 | 1064 - 1081 | 1077 - 1094 | 1089 - 1106 |
| | | 1099 - 1176 | 1250 | 1099 - 1116 | 1112 - 1129 | 1124 - 1141 | 1134 - 1151 | 1147 - 1164 | 1159 - 1176 |
| | | 1169 - 1246 | 1320 | 1169 - 1186 | 1182 - 1199 | 1194 - 1211 | 1204 - 1221 | 1217 - 1234 | 1229 - 1246 |
| | | 1239 - 1316 | 1390 | 1239 - 1256 | 1252 - 1269 | 1264 - 1281 | 1274 - 1291 | 1287 - 1304 | 1299 - 1316 |
| | | 1309 - 1386 | 1460 | 1309 - 1326 | 1322 - 1339 | 1334 - 1351 | 1344 - 1361 | 1357 - 1374 | 1369 - 1386 |
| 318.424 | 318.434 | 1379 - 1456 | 1530 | 1379 - 1396 | 1392 - 1409 | 1404 - 1421 | 1414 - 1431 | 1427 - 1444 | 1439 - 1456 |
| | | 1449 - 1526 | 1600 | 1449 - 1466 | 1462 - 1479 | 1474 - 1491 | 1484 - 1501 | 1497 - 1514 | 1509 - 1526 |
| | | 1519 - 1596 | 1670 | 1519 - 1536 | 1532 - 1549 | 1544 - 1561 | 1554 - 1571 | 1567 - 1584 | 1579 - 1596 |
| | | 1589 - 1666 | 1740 | 1589 - 1606 | 1602 - 1619 | 1614 - 1631 | 1624 - 1641 | 1637 - 1654 | 1649 - 1666 |
| | | 1659 - 1736 | 1810 | 1659 - 1676 | 1672 - 1689 | 1684 - 1701 | 1694 - 1711 | 1707 - 1724 | 1719 - 1736 |
| | | 1729 - 1806 | 1880 | 1729 - 1746 | 1742 - 1759 | 1754 - 1771 | 1764 - 1781 | 1777 - 1794 | 1789 - 1806 |
| | | 1799 - 1876 | 1950 | 1799 - 1816 | 1812 - 1829 | 1824 - 1841 | 1834 - 1851 | 1847 - 1864 | 1859 - 1876 |
| 318.425 | | 1869 - 1946 | 2020 | 1869 - 1886 | 1882 - 1899 | 1894 - 1911 | 1904 - 1921 | 1917 - 1934 | 1929 - 1946 |
| | | 1939 - 2016 | 2090 | 1939 - 1956 | 1952 - 1969 | 1964 - 1981 | 1974 - 1991 | 1987 - 2004 | 1999 - 2016 |
| | | 2009 - 2086 | 2160 | 2009 - 2026 | 2022 - 2039 | 2034 - 2051 | 2044 - 2061 | 2057 - 2074 | 2069 - 2086 |
| | | 2079 - 2156 | 2230 | 2079 - 2096 | 2092 - 2109 | 2104 - 2121 | 2114 - 2131 | 2127 - 2144 | 2139 - 2156 |
| | | 2149 - 2226 | 2300 | 2149 - 2166 | 2162 - 2179 | 2174 - 2191 | 2184 - 2201 | 2197 - 2214 | 2209 - 2226 |
| | | 2219 - 2296 | 2370 | 2219 - 2236 | 2232 - 2249 | 2244 - 2261 | 2254 - 2271 | 2267 - 2284 | 2279 - 2296 |
| | | 2289 - 2366 | 2440 | 2289 - 2306 | 2302 - 2319 | 2314 - 2331 | 2324 - 2341 | 2337 - 2354 | 2349 - 2366 |
| 318.425 | 318.435 | 2359 - 2436 | 2510 | 2359 - 2376 | 2372 - 2389 | 2384 - 2401 | 2394 - 2411 | 2407 - 2424 | 2419 - 2436 |
| | | 2429 - 2506 | 2580 | 2429 - 2446 | 2442 - 2459 | 2454 - 2471 | 2464 - 2481 | 2477 - 2494 | 2489 - 2506 |
| | | 2499 - 2576 | 2650 | 2499 - 2516 | 2512 - 2529 | 2524 - 2541 | 2534 - 2551 | 2547 - 2564 | 2559 - 2576 |
| | | 2569 - 2646 | 2720 | 2569 - 2586 | 2582 - 2599 | 2594 - 2611 | 2604 - 2621 | 2617 - 2634 | 2629 - 2646 |
| | | 2639 - 2716 | 2790 | 2639 - 2656 | 2652 - 2669 | 2664 - 2681 | 2674 - 2691 | 2687 - 2704 | 2699 - 2716 |
| | | 2709 - 2786 | 2860 | 2709 - 2726 | 2722 - 2739 | 2734 - 2751 | 2744 - 2761 | 2757 - 2774 | 2769 - 2786 |
| | | 2779 - 2856 | 2930 | 2779 - 2796 | 2792 - 2809 | 2804 - 2821 | 2814 - 2831 | 2827 - 2844 | 2836 - 2856 |

For Spare Parts ▶ 443

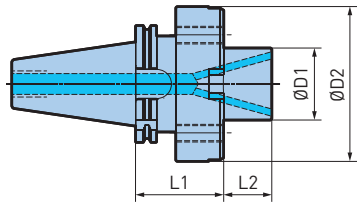




BROTECH

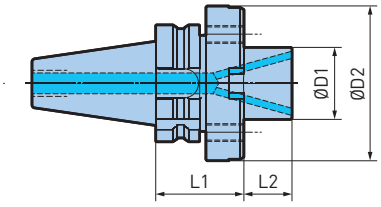
# Shanks and Tool Holders for Bridge Tool Series 318, Ø 620 - 3 000

### BDV, DIN 69871 AD



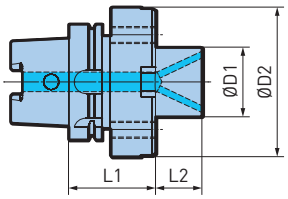

| Model | Order No. | Taper Size | ØD1 | ØD2 | L1 | L2 |
|---|---|---|---|---|---|---|
| BDV50-F60-75 | 328.215 | DV50 | 60 | 129 | 75 | 40 |

### BBT50, MAS 403/BT



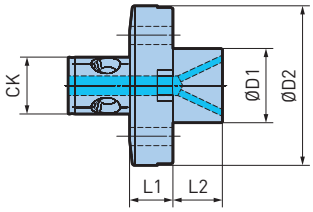

| Model | Order No. | Taper Size | ØD1 | ØD2 | L1 | L2 |
|---|---|---|---|---|---|---|
| BBT50-F60-85 | 328.213 | BT50 | 60 | 129 | 85 | 40 |

### HSK-A100, DIN 69893A



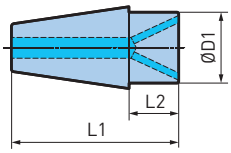

| Model | Order No. | Taper Size | ØD1 | ØD2 | L1 | L2 |
|---|---|---|---|---|---|---|
| HSK-A100-F60-75 | 328.214 | HSK-A100 | 60 | 129 | 75 | 40 |

### BIG KAISER CKN




| Model | Order No. | CK | ØD1 | ØD2 | L1 | L2 |
|---|---|---|---|---|---|---|
| CKN7-F60 | 328.217N | CKN7 | 60 | 129 | 35 | 40 |

### Centering Shank ISO 50




| Model | Order No. | Taper Size | ØD1 | ØD2 | L1 | L2 |
|---|---|---|---|---|---|---|
| DV50-F60 | 328.216 | ISO 50, M24 | 60 | - | 140 | 40 |

Adapter rings and spacers available on request.

B.4

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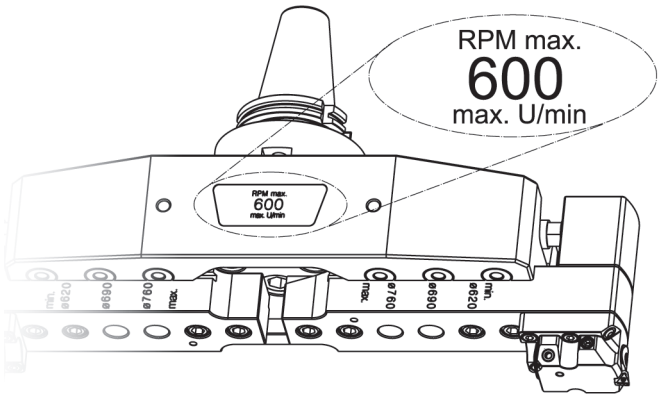
# Safety Instructions

The max. speed allowed for series 318 boring tools is in relation to the boring diameter and the extension slide used. All extension slides are marked with max. speed allowed [n max.].




| ØD | Max. Speed [min -1] | Bridge Aluminium |
|---|---|---|
| 619 - 831 | 600 | 318.421 |
| 829 - 1 111 | 450 | 318.422 |
| 1 109 - 1 531 | 350 | 318.423 |
| 1 529 - 2 021 | 250 | 318.424 |
| 2 019 - 2 511 | 190 | 318.425 |
| 2 509 - 3 001 | 150 | 318.425 |

## Application Notes

**1. Roughing**
**Ø 620 – 1 110 mm**
Up to Ø 830 mm the bridge tool can be connected to the machine spindle over a tool shank, but only on a machine with good spindle taper, good spindle bearings and with the nominal retraction force available. For the range between Ø 830 – 1 110 mm, roughing is possible with the bridge bolted on to the machine spindle. If vibration occurs use just one cutting edge.

**Ø > 1 110 mm**
Roughing is not recommended

**2. Finishing**
**Ø 620 – 1 110 mm**
Finishing is possible with the bridge tool connected to the machine spindle over a tool shank, providing that the machine spindle is in good condition.

**Ø > 1 110 mm**
The bridge tool must be bolted on to the machine spindle, either directly or if required over a special flange.

## Connecting the Bridge to the Machine Spindle

The bridge tool can be connected to the machine spindle over a tool shank (Fig. 1) or it can be bolted on to the spindle face (Fig. 2). A combination of both variants is also possible. A bolted connection is recommended for bore sizes Ø 1 110 mm and bigger.

Fig. 1

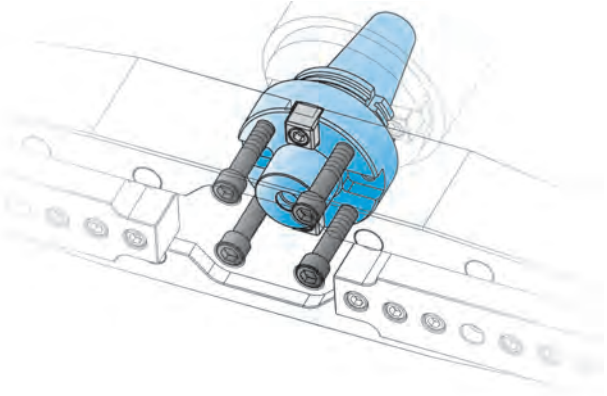
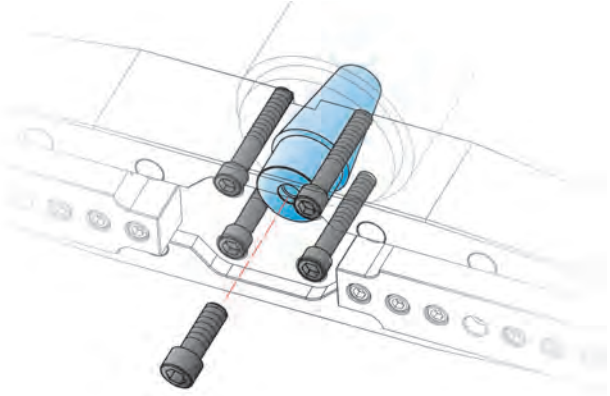
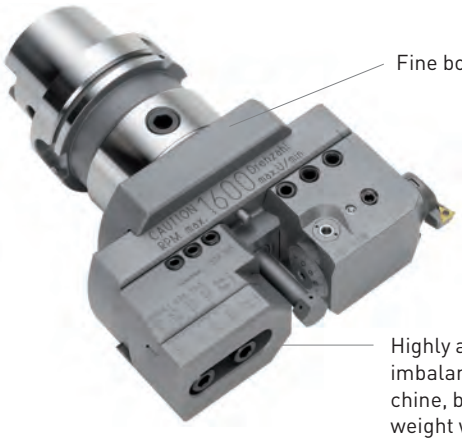


Fig. 2



# Series 317, Ø 200 - 620

The modular components such as flange, extension slide, tool holder and boring head, can easily be assembled to single cutter-, rough cutter- and OD turning tools.



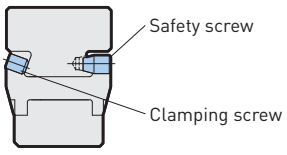
Fine boring tool for finishing

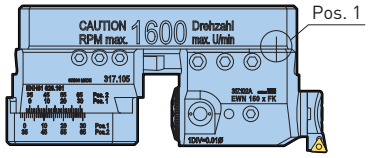
Highly accurate correction of the imbalance without a balancing machine, by means of a compensation weight with slide and scale

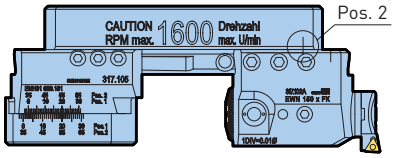
Twin cutter boring tool for roughing



With the introduction of the safety screws on roughing and finishing components as well as on the compensation weight, and with the corresponding bores in the extension slides, these components can be mounted in two fixed positions (Pos. 1 and Pos. 2) on the extension slide.



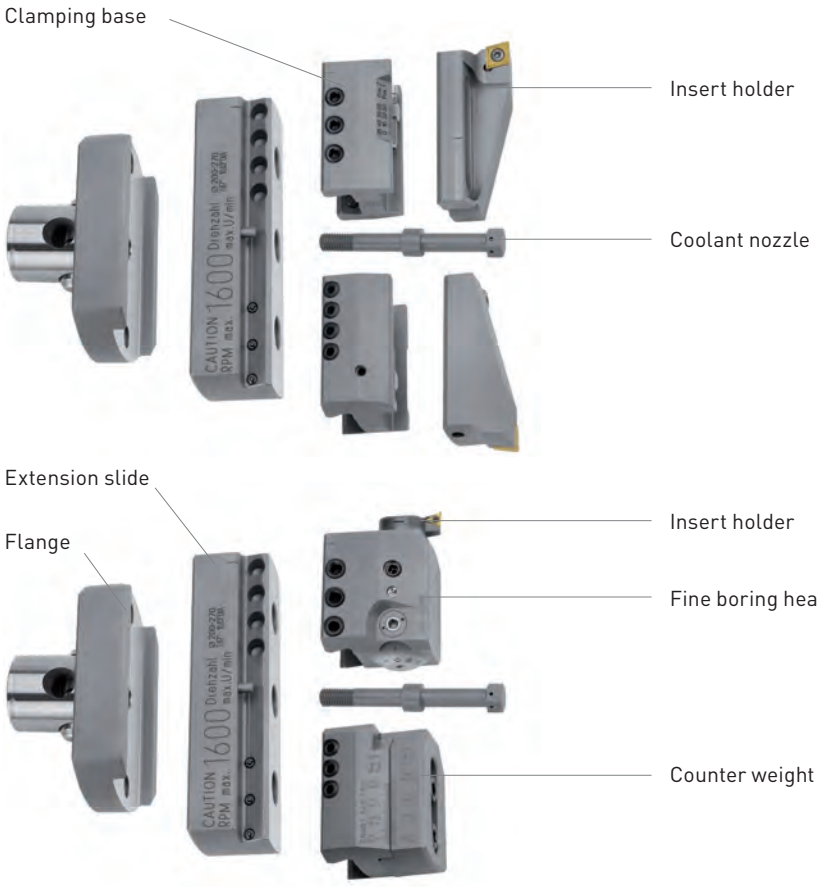

**Compatibility**

New components with safety screws can be mounted on existing extension slides without any restrictions whereas the safety screws have to be removed. Existing components without safety screws can as well be mounted without any restrictions on the new extension slides.

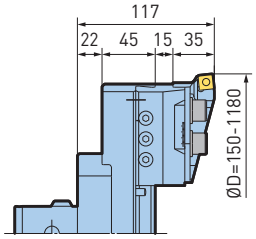
**Modification**

On request, safety screw modifications can be made to existing precision boring heads and extension slides to prevent tool breakage from accidentally high spindle speeds.

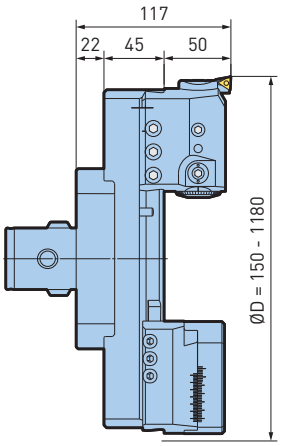
# Series 317, Ø 200 - 620




Rough boring tool

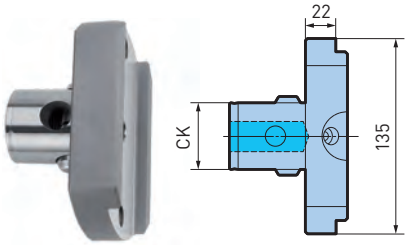



Fine boring tool




## Flanges

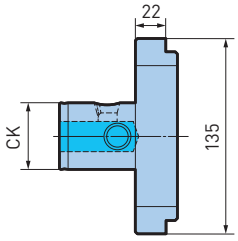
**Preferred execution**




| Model | Order No. |
|---|---|
| CKB7/Ø46 | 317.202 |

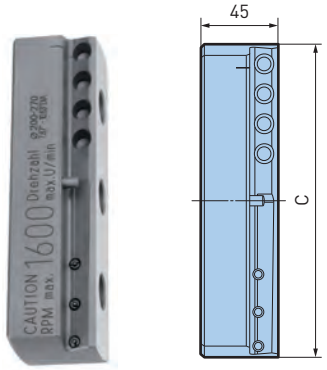
**Additional executions**

Flange with cutter position 90° twisted.



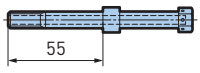

| Model | Order No. |
|---|---|
| CKB7/Ø46 | 317.206 |

### ① Extension Slide Steel




**Ø 150 - 620**

| C | Order No. | ØD [1] |
|---|---|---|
| 183 | 317.222 | 200 - 270 |
| 253 | 317.223 | 270 - 340 |
| 323 | 317.224 | 340 - 410 |
| 393 | 317.225 | 410 - 480 |
| 463 | 317.226 | 480 - 550 |
| 533 | 317.227 | 550 - 620 |

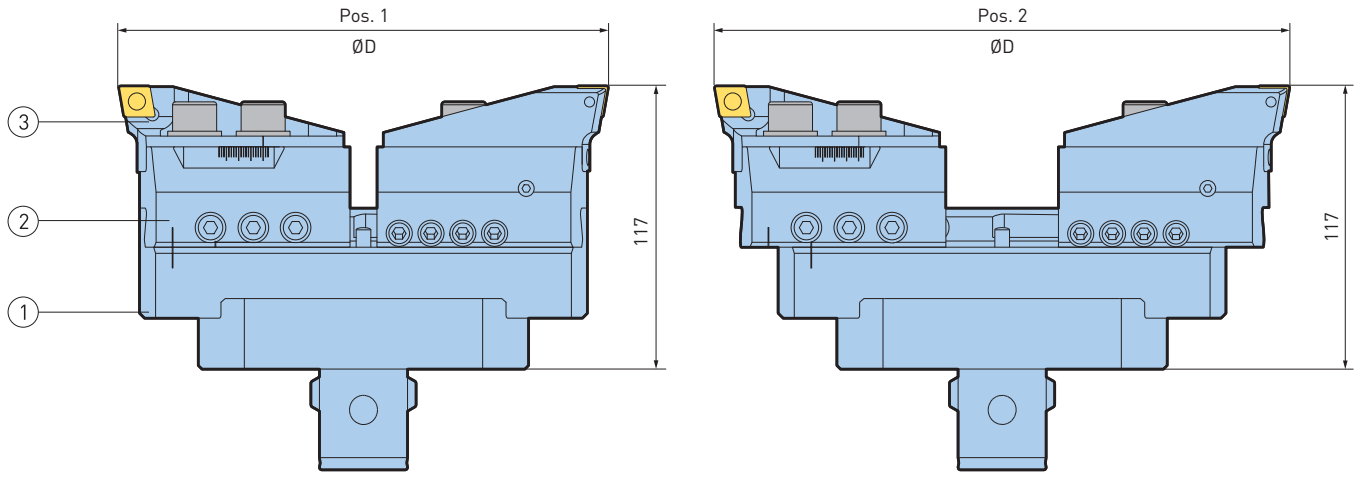
| Coolant Nozzle | Order No. |
|---|---|
|   | 317.205 |

For Spare Parts ▶ 442 / 443

[1] The diameter ranges D are valid for the tool program for roughing. With the tool program for finishing, the work ranges starting from Ø 200 mm will become bigger; with insert holder type 2, order No. 626.162 by 26 mm and with insert holder type 3, order No. 626.163 by 50 mm. The minimum diameter of the respective work range will be reached with insert holder type 1, order No. 626.161.

# Rough Boring Component Selection

The table below determines the components such as extension slide (1), clamping bases (2) and insert holders (3) for each diameter range and shows in which position the clamping bases have to be mounted on the extension slide. Further, this table also serves for the coarse diameter setting of the cutting edges by means of the scale on the clamping bases (2). The required scale value can be found under consideration of the correction value α on the table. See example below.




| ØD | Extension Slide ① | Fixed Position/Range | | Correction α |
|---|---|---|---|---|
| | | Pos. 1/ØD | Pos. 2/ØD | |
| 200 - 270 | 317.222 | 197 - 235 | 232 - 270 | 200 |
| 270 - 340 | 317.223 | 267 - 305 | 302 - 340 | 270 |
| 340 - 410 | 317.224 | 337 - 375 | 372 - 410 | 340 |
| 410 - 480 | 317.225 | 407 - 445 | 442 - 480 | 410 |
| 480 - 550 | 317.226 | 477 - 515 | 512 - 550 | 480 |
| 550 - 620 | 317.227 | 547 - 585 | 582 - 620 | 550 |

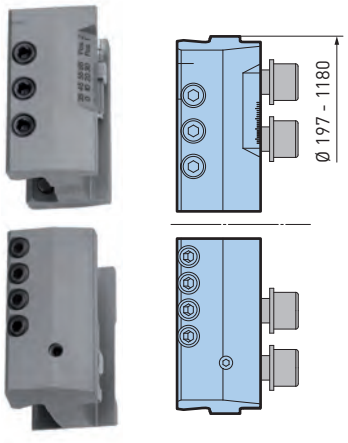
For Spare Parts ▶ 442 / 443

**Example: Diameter setting according to scale**

| | |
|---|---|
| ØD: | 430 |
| Extension slide: | **317.225** |
| Position: | 1 |
| Clamping base: | **317.289** |
| Insert holder: | Ø 200 - 620 |
| Correction value α: | 410 |
| Scale: | ØD - α = 430 - 410 = 20 |

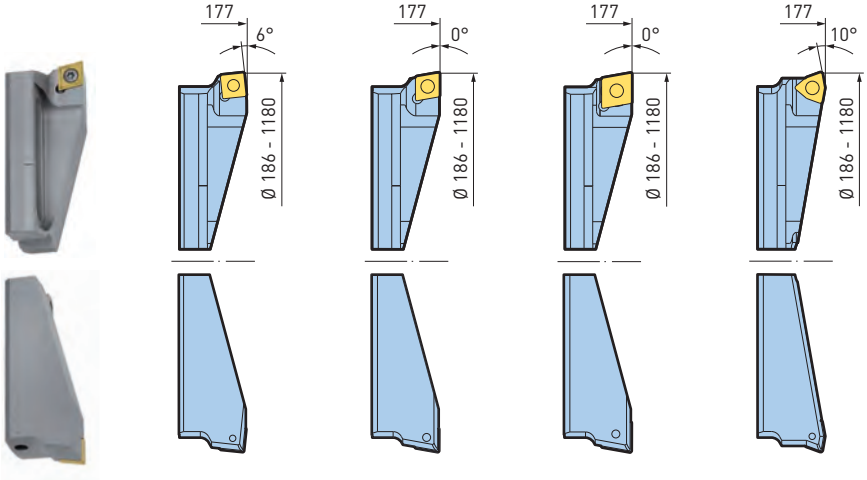
B.4

## ② Clamping Bases, Ø 200 - 620




| Order No. |
|---|
| 317.289 |

## ③ Insert Holders, Ø 200 - 620




| Order No. | 637.814 | 637.830 | 637.834 | 637.846 |
|---|---|---|---|---|
| Type | SC12 | CC12 | CC16 | WC08 |

For Insert ▶ 394 - 416

## Double offset roughing

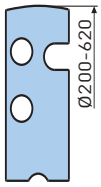
In diameter and height offset cutters allow the removal of twice the stock and with half the feed rate compared with symmetrical roughing.

The cutting edge adjusted to half the stock has to be set in front by means of the spacer.

## Spacers

### For double offset roughing

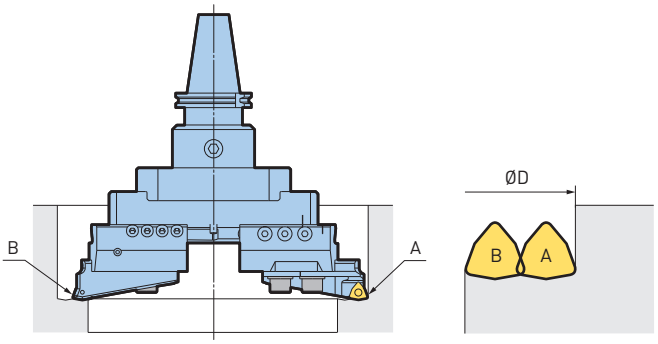
| Spacer 0.5 mm | Order No. |
|---|---|
| Ø 200 - 620 | 317.287 |




## Full Profile Roughing (VPS)

### Adjustment instructions

Full profile roughing permits boring with large stock allowance (up to 60 mm in diameter) in a single operation with relatively low drive power. Set cutting edge A to the final bore diameter, and cutting edge B according to the machining allowance, as listed in the table below.




| Machining Allowance [mm Ø] | Cutting Edge A [mm Ø] | Cutting Edge B [mm Ø] |
|---|---|---|
| 24 - 29.9 | ØD | D - 2 |
| 30 - 35.9 | | D - 6 |
| 36 - 41.9 | | D - 12 |
| 42 - 47.9 | | D - 18 |
| 48 - 53.9 | | D - 24 |
| 54 - 60 | | D - 30 |

### Example for adjustment

Given: Boring diameter 580 mm Machining allowance 46 mm Ø
Result: Cutting edge A: Ø 580 mm
Cutting edge B: Ø 580 - 18 = Ø 562 mm

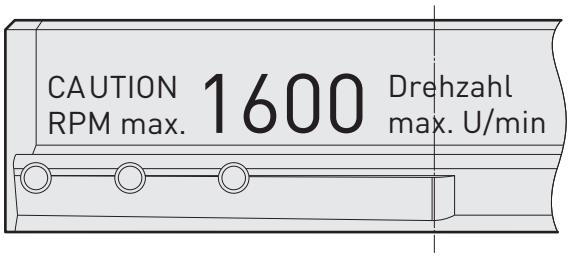
### Cutting data-guide values

Cutting speed: Vc = 80-180 m/min
Feed: f = 0.1-0.2 mm/rev

## Safety Instructions

The max. speed allowed for series 317 boring tools is in relation to the boring diameter and the extension slide used. All extension slides are marked with max. speed allowed [n max.].

### Extension slide

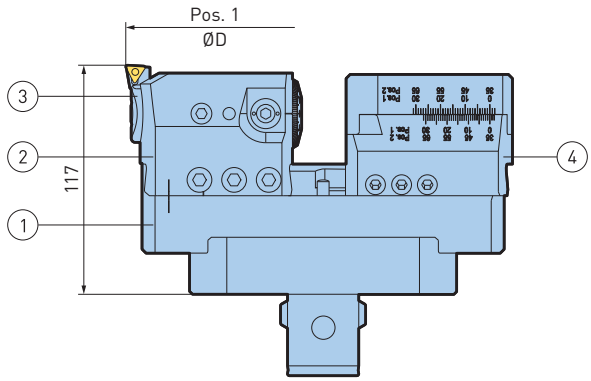


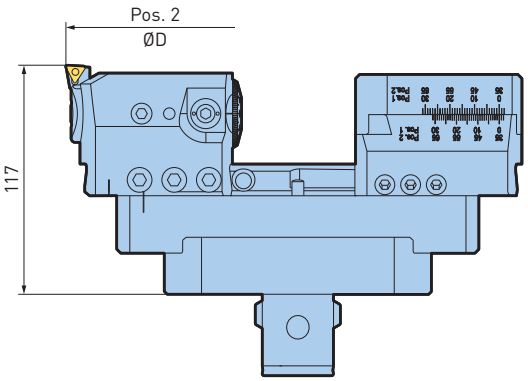

| ØD | Max. Speed [min $^{-1}$] | Extension Slide Steel | Extension Slide Aluminium |
|---|---|---|---|
| 200 - 270 | 1600 | 317.222 | 317.252 * |
| 270 - 340 | 1200 | 317.223 | - |
| 340 - 410 | 900 | 317.224 | 317.254 * |
| 410 - 480 | 750 | 317.225 | 317.255 * |
| 480 - 550 | 650 | 317.226 | 317.256 * |
| 550 - 620 | 600 | 317.227 | 317.257 * |

1. * As long as stock lasts.

# Fine Boring Component Selection

The table below determines the components such as extension slide (1), boring head (2), insert holder (3) and compensation weight (4) for each diameter range and shows in which position the boring head and the compensation weight have to be mounted on the extension slide.




| Range ØD | Extension Slide ① | Fixed Position/Range Pos. 1/ØD | Pos. 2/ØD | Insert Holder ③ | Correction α |
|---|---|---|---|---|---|
| 200 - 270 | 317.222 | 198 - 228 | 233 - 263 | 626.161 | 200 |
| | | 224 - 254 | 259 - 289 | 626.161 | |
| 270 - 340 | 317.223 | 268 - 298 | 303 - 333 | 626.161 | 270 |
| | | 294 - 324 | 329 - 359 | 626.162 | |
| 340 - 410 | 317.224 | 338 - 368 | 373 - 403 | 626.161 | 340 |
| | | 364 - 394 | 399 - 429 | 626.162 | |
| 410 - 480 | 317.225 | 408 - 438 | 443 - 473 | 626.161 | 410 |
| | | 434 - 464 | 469 - 499 | 626.162 | |
| 480 - 550 | 317.226 | 478 - 508 | 513 - 543 | 626.161 | 480 |
| | | 504 - 534 | 539 - 569 | 626.162 | |
| 550 - 620 | 317.227 | 548 - 578 | 583 - 613 | 626.161 | 550 |
| | | 574 - 604 | 609 - 639 | 626.162 | |

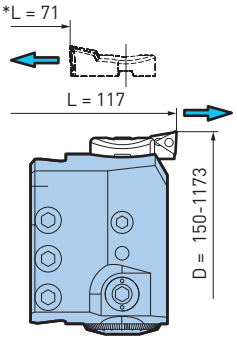
**Example: Balancing**

Balancing of the tool combination takes place by adjusting the slide (5) on the compensation weight according to the scale. The correction value α is shown on the table.

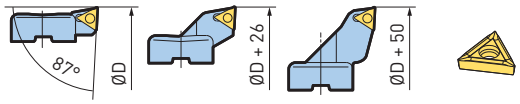
| | |
|---|---|
| ØD: | 335 H7 |
| Extension slide: | **317.223** |
| Position: | 2 |
| Insert holder: | **626.162** |
| Counter weight: | **317.105** |
| Correction value α: | 270 |
| Scale: | ØD - α = 335 - 270 = 65 |

## ② Boring Head

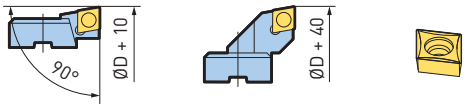
| Model | Order No. |
|---|---|
| EWN150FK | 317.102A |




## ③ Insert Holders




| Order No. | 626.161 | 626.162 | 626.163 | TC 11 |
|---|---|---|---|---|



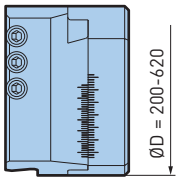

| Order No. | 626.362 | 626.363 | CC 09 |
|---|---|---|---|

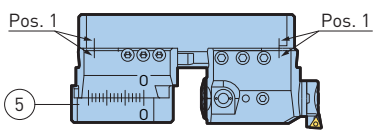
For Insert ▶ 396/400
For Spare Parts ▶ 444

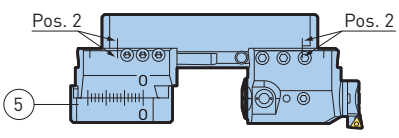
## ④ Counter Weight

By fixing the compensation weight in the same position (pos. 1 or pos. 2) as the boring head and with the slide (5) on the compensation weight in zero position, a large amount of the imbalance will be compensated. Fine balancing which also compensates the position of the cutting edge as well as the size of the insert holder is possible by adjusting the slide to the corresponding scale value according to the balancing table.

| Order No. |
|---|
| 317.105 |



# Indexable Inserts and Cutters


| | |
|---|---|
| Application Advice | 392 - 393 |
| WC-Inserts for Fine Boring Heads | 394 |
| TP/TC-Inserts for Fine Boring Heads | 395 - 398 |
| MW/CC-Inserts for Fine and Rough Boring Heads | 399 - 402 |
| SP/SC/SD-Inserts for Rough Boring Heads | 403 - 405 |
| WP 337/WC-Inserts for Indexable Insert Drills and Rough Boring Heads | 406 - 411 |
| CBN/PCD-Inserts for Fine and Rough Boring Heads | 412 - 415 |
| Inserts for Different Applications | 416 - 421 |
| Solide Carbide Boring Cutters for Fine Boring Heads | 422 - 424 |




B.5

BROTECH

## ISO Code for inserts for boring and turning

| V | B | M | T | - | 16 | 04 | 04 | F | N | - | M | P 10 | H |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | | 5 | 6 | 7 | 8 | 9 | | 10 | 11 | 12 |

### 1 Insert Shape

C 80° · D 55° · S 90° · T 60° · V 35° · W 80°

### 2 Clearance angle

B 5° · C 7° · D 15° · N · P 11°

### 3 Tolerance class

| Class | IC | m | s |
|---|---|---|---|
| C | ± 0.025 | ± 0.013 | ± 0.025 |
| G | ± 0.025 | ± 0.025 | ± 0.13 |
| M | ± 0.05 - 0.1 1) | ± 0.08 - 0.20 1) | ± 0.13 |

1) Dependent upon insert size

### 4 Chip breaker/ Mounting criteria

A · G · T (β = 40°-60°) · W (β = 40°-60°)

**X** = Special execution

### 5 Insert size

| Size | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 15 | 16 | 19 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | | | | | | | | | | | 12.9 | | 16.1 | 19.3 | |
| IC | | | | | | | | | | | 12.7 | | 15.88 | 19.05 | |
| L | | | | | | | | | | | | 15.5 | | 19.4 | |
| IC | | | | | | | | | | | | 12.7 | | 15.875 | |
| L | | | | | 6.35 | | 8 | 9.52 | | | 12.7 | | | | |
| IC | | | | | 6.35 | | 8.0 | 9.52 | | | 12.7 | | | | |
| L | | | | | | | | | | 11 | | | 16.5 | | 22 |
| IC | | | | | | | | | | 6.35 | | | 9.525 | | 12.7 |
| L | | | | | | | | | | 11.1 | | | 16.6 | | 22.1 |
| IC | | | | | | | | | | 6.35 | | | 9.525 | | 12.7 |
| L | 2 | 3 | 4 | 5 | 6 | | 8 | | 10 | | | | | | |
| IC | 3.97 | 5.56 | 6.35 | 7.94 | 9.52 | | 12.7 | | 15.88 | | | | | | |

### 6 Insert thickness

| | | |
|---|---|---|
| **01** | s = 1.59 | |
| **02** | s = 2.38 (2.5*) | |
| **03** | s = 3.18 (3.0*) | |
| **T3** | s = 3.97 | |
| **04** | s = 4.76 | |
| **05** | s = 5.56 | |
| **06** | s = 6.35 | |

*) Special size

### 7 Corner radius

| | |
|---|---|
| **01** | R = 0.1 |
| **02** | R = 0.2 |
| **03** | R = 0.3 |
| **04** | R = 0.4 |
| **06** | R = 0.6 |
| **08** | R = 0.8 |
| **10** | R = 1.0 |
| **12** | R = 1.2 |

### 8 Cutting edge

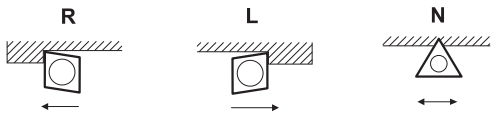
F · E · T · S

W Wiper geometry

## ISO Code for inserts for boring and turning

| V | B | M | T | - | 16 | 04 | 04 | F | N | - | M | P 10 | H |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | | 5 | 6 | 7 | 8 | 9 | | 10 | 11 | 12 |

### 9 Cutting direction




### 10 Processing

F = Finishing
M = Medium
R = Roughing

### 11 Cutting Materials

| ISO main groups | Work piece materials | ISO application groups | | | | |
|---|---|---|---|---|---|---|
| P | Carbon steels<br>Cast steel | P10 | P20 | P30 | P40 | P50 |
| M | Stainless steels | M10 | M20 | M30 | M40 | |
| K | Cast iron | K10 | K20 | K30 | | |
| N | Aluminium<br>Non-ferrous metals<br>Synthetic materials | N10 | | | | |
| H | Hardened materials | H10 | H20 | | | |
| S | Titanium<br>NiCo Alloys<br>High temperature alloys | S10 | S20 | | | |

Increasing fracture strength/Toughness

Increasing abrasion resistance

### 12 Features

H = uncoated carbide
C = coated carbide
CT = cermet
CTC = silicon nitride
SN = polycrystalline cubic boron nitride
CBN
PKD = polycrystalline diamond

## Features

B.5

**Uncoated carbide H**

Uncoated hard metal cutting materials are based on tungsten carbide with the addition of titanium carbide, tantalum carbide and cobalt as binding agents. Depending on the allotted ISO group, they are suitable for rough machining and finishing of metallic and non-metallic materials.

**Coated carbide C**

Coated hard metal is characterised by its high resistance to wear, its low friction coefficient and minimal built-up edge formation. The multiple coating is a good precondition for cost-effective production machining of all commonly available materials.

**Cermet CT**

Cermet cutting materials consist of titanium carbide and titanium nitride. They are characterised by high thermal and abrasion resistance and are suitable for finish machining and light rough-machining of steel, cast iron and light metal at high cutting speeds.

**Silicon nitride SN**

Ceramic cutting edges are extremely temperature-stable, highly impact-resistant and accommodate the highest cutting speeds when machining cast iron in continuous as well as in interrupted cutting.

**Polycrystalline cubic boron nitride CBN**

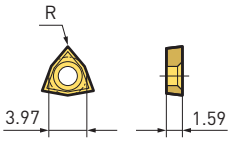
CBN cutting materials feature an extremely high wear and heat resistance. Depending on the design, CBN cutting edges are suitable for boring hardened steel, up to 70 HRC, hard cast steel, cast iron and hard nickel alloys.

**Polycrystalline diamond PCD**

PCD cutting edges are extremely hard and abrasion-resistant. They permit high speed finish machining of non-ferrous materials and composites.

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |

## WCGT 0201




Circumference ground, chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCGT-020102FN-MP10CT | **655.600** | 02 | 15° | | + | + | | | + | | | | + | | | | |
| | | | | | | | | | | | | | | | | | | |

Circumference and chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCGT-020101FL-FK10CT | **655.604** | 01 | 23° | | | | | | | ++ | | | | ++ | + | | |
| | WCGT-020102FL-FK10CT | **655.601** | 02 | 23° | | | | | | | ++ | | | ++ | | + | | |
| | WCGT-020101FL-FK10C | **655.605** | 01 | 23° | TiAlN | + | + | + | ++ | ++ | + | + | + | | ++ | | | |
| | WCGT-020102FL-FK10C | **655.603** | 02 | 23° | TiAlN | + | + | + | ++ | ++ | + | + | + | ++ | + | + | | |
| | WCGT-020101FL-FM10C | **655.606** | 01 | 23° | AlCrN | ++ | ++ | ++ | + | + | + | + | + | + | ++ | | | |
| | WCGT-020102FL-FM10C | **655.602** | 02 | 23° | AlCrN | ++ | ++ | ++ | + | + | + | ++ | ++ | ++ | + | + | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 IP M2x3.6 | **694.101** |

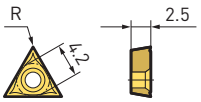
| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 IP | **694.188** |

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |
| **TPGT 0702** | | | | | | Circumference ground, chip-breakers pressed & polished | | | | | | | | | | | | |
| | TPGT-070202FN-MP10CT | **651.802** | 02 | 15° | | ++ | ++ | | | + | | | | ++ | | | | |
| | TPGT-070204FN-MP10CT | **651.702** | 04 | 15° | | ++ | ++ | | | + | | | | ++ | | | | |
| | | | | | | | | | | | | | | | | | | |
| | TPGT-070202FL-FP10CT | **651.835** | 02 | 18° | | ++ | ++ | | | + | + | | | | ++ | | | |
| | TPGT-070201FL-FK10C | **651.824** | 01 | 25° | TiAlN | + | + | + | + | + | + | | + | | ++ | | | |
| | TPGT-070203FL-FK10C | **651.735** | 03 | 25° | TiAlN | ++ | ++ | + | ++ | ++ | + | ++ | + | ++ | | + | | |
| | TPGT-070201FL-FK10H | **651.823** | 01 | 25° | | | | | | | ++ | | | | ++ | | | |
| | TPGT-070203FL-FK10H | **651.723** | 03 | 25° | | | | | | | ++ | | | ++ | | ++ | + | |
| | | | | | | | | | | | | | | | | | | |
| **TPMT 0702** | | | | | | Chip-breakers pressed | | | | | | | | | | | | |
| | TPMT-070204FN-MP10CT | **651.713** | 04 | 15° | AlCrN | ++ | ++ | + | + | + | + | | | ++ | | + | | |
| | TPMT-070202FN-MP10CT | **651.813** | 02 | 15° | AlCrN | ++ | ++ | + | + | + | + | | | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |
| **TPGT 0702** | | | | | | Circumference and chip-breakers ground | | | | | | | | | | | | |
| | TPGT-070202FL-FP10C | **651.833** | 02 | 15° | TiAlN | + | + | + | + | + | | + | + | + | ++ | + | | |
| | TPGT-070202FL-FP10CTC | **651.838** | 02 | 18° | TiAlN | ++ | ++ | + | + | + | + | + | | + | ++ | | | |
| | TPGT-070203FL-FP10CTC | **651.738** | 03 | 18° | TiAlN | ++ | ++ | + | + | + | + | + | | ++ | | + | | |
| | TPGT-070202FL-FS10C | **651.839** | 02 | 15° | TiAlN | | | + | | | | | ++ | ++ | + | ++ | + | |
| | TPGT-070203FL-MP10CT | **651.736** | 03 | 18° | | ++ | ++ | | | + | + | | | ++ | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | TPGT-070202FL-MP10C | **651.834** | 02 | 20° | TiAlN | + | + | + | + | + | | ++ | + | + | ++ | + | | |
| | TPGT-070204FL-MP10C | **651.734** | 04 | 20° | TiAlN | ++ | ++ | + | ++ | ++ | | ++ | + | ++ | | + | | |
| | TPGT-070202FL-FM10C | **651.837** | 02 | 25° | AlCrN | ++ | ++ | ++ | + | + | + | ++ | ++ | + | ++ | | | |
| | TPGT-070203FL-FM10C | **651.737** | 03 | 25° | AlCrN | ++ | ++ | ++ | + | + | + | ++ | ++ | ++ | | + | | |
| | TPGT-070202FL-FK10H | **651.825** | 02 | 25° | | | | | | | ++ | | | ++ | ++ | | | ++ |
| | TPGT-070204FL-FK10H | **651.725** | 04 | 25° | | | | | | | ++ | | | ++ | | | | ++ |
| | | | | | | | | | | | | | | | | | | |
| | TPGT-070201FL-FM20C | **651.840** | 01 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | + | + | |
| | TPGT-070202FL-FM20C | **651.841** | 02 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | + | + | |
| | TPGT-070203FL-FM20C | **651.842** | 03 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | + | + | |
| | TPGT-070204FL-FM20C | **651.843** | 04 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | + | + | |
| **TPGW 0702** | | | | | | Circumference ground without chip-breakers | | | | | | | | | | | | |
| | TPGW-070203FN-MK10C | **651.632** | 03 | 5° | TiAlN | + | + | + | ++ | + | | ++ | | ++ | | | + | |
| | TPGW-070203FN-MK10H | **651.623** | 03 | 5° | | | | | + | | | + | | | | | + | |
| | | | | | | | | | | | | | | | | | | |



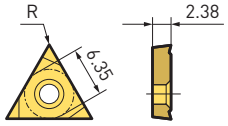

| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 IP M2x4.8 | **694.103** |
| | Torx Plus T6 IP M2x4.1 | **694.102** [1] |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 IP | **694.188** |

[1] For insert holders **615.205/615.207/615.507/615.508/615.271**
Inserts are sold in packages of 10 pieces.

B.5

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |




## TCMT 1102

Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCMT-110204FN-MP10CT | **655.322** | 04 | 15° | | ++ | ++ | | | + | | | | ++ | | + | | |
| | TCMT-110204FN-FP10CT | **655.322A** | 04 | 15° | | ++ | ++ | | | + | | | | ++ | | + | | |
| | TCMT-110204FN-MP10CTC | **655.324** | 04 | 15° | TiAlN | ++ | ++ | + | + | + | + | | | ++ | | + | | |
| | TCMT-110208FN-MP10CTC | **655.334** | 08 | 15° | TiAlN | ++ | ++ | + | + | + | + | | | ++ | | + | | |
| | TCMT-110202FN-MS10C | **655.316** | 02 | 15° | TiAlN | | | + | + | | | | ++ | ++ | + | ++ | + | |
| | TCMT-110204FN-MS10C | **655.326** | 04 | 15° | TiAlN | | | + | + | | | | ++ | ++ | + | ++ | + | |
| | TCMT-110202FN-MP20C | **655.311A** | 02 | 15° | $Al_2O_3$-TiCN | + | + | | | | | | | + | + | + | | |
| | TCMT-110204FN-MP20C | **655.321A** | 04 | 15° | $Al_2O_3$-TiCN | + | + | | | | | | | + | | ++ | + | |
| | TCMT-110208FN-MP20C | **655.331A** | 08 | 15° | $Al_2O_3$-TiCN | + | + | | | | | | | ++ | | ++ | + | |
| | TCMT-110204FN-MM30C | **655.354** | 04 | 20° | TiAlN+ $Al_2O_3$ | ++ | ++ | ++ | + | + | | | ++ | ++ | ++ | ++ | ++ | |
| | TCMT-110208FN-MM30C | **655.364** | 08 | 20° | TiAlN+ $Al_2O_3$ | ++ | ++ | ++ | + | + | | | ++ | ++ | + | ++ | ++ | |
| | | | | | | | | | | | | | | | | | | |

## TCGT 1102

Circumference ground with chip-breakers pressed

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCGT-110202FN-MK10C | **655.301B** | 02 | 12° | TiCN-$Al_2O_3$ | ++ | ++ | ++ | + | + | | ++ | | + | + | + | | |
| | TCGT-110204FN-MK10C | **655.302B** | 04 | 12° | TiCN-$Al_2O_3$ | ++ | ++ | ++ | + | + | | ++ | | + | | + | + | |
| | TCGT-110208FN-MK10C | **655.303B** | 08 | 12° | TiCN-$Al_2O_3$ | ++ | ++ | ++ | + | + | | ++ | | + | | + | ++ | |
| | TCGT-110202FL-FS20C | **689.517** | 02 | 30° | TIN ALOX SN² | | | ++ | | | | | ++ | | | | | |
| | TCGT-110204FL-FS20C | **689.516** | 04 | 30° | TIN ALOX SN² | | | ++ | | | | | ++ | | | | | |
| | TCGT-110208FL-FS20C | **689.518** | 08 | 30° | TIN ALOX SN² | | | ++ | | | | | ++ | | | | | |
| | TCGT-110202FN-MP10CT | **655.313** | 02 | 15° | | ++ | ++ | | | | | | | | ++ | | | |
| | TCGT-110208FN-MM30C | **655.314** | 08 | 15° | TiCN- Al2O3TiN | + | + | ++ | + | + | | + | | ++ | | ++ | ++ | |
| | | | | | | | | | | | | | | | | | | |

## TCGW 1102

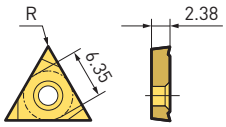
Circumference ground without chip-breakers

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCGW-110202FN-MK10C | **655.301A** | 02 | 0° | TiCN-$Al_2O_3$-TiN | | | | ++ | ++ | | | | ++ | | | | |
| | TCGW-110204FN-MK10C | **655.302A** | 04 | 0° | TiCN-$Al_2O_3$-TiN | | | | ++ | ++ | | | | ++ | | | | |
| | TCGW-110208FN-MK10C | **655.303A** | 08 | 0° | TiCN-$Al_2O_3$-TiN | | | | ++ | ++ | | | | ++ | | | | |
| | TCGW-110204FN-MK10H | **655.305** | 04 | 0° | | | | | + | | | | | | | | ++ | |
| | TCGW-110208FN-MK10H | **655.306** | 08 | 0° | | | | | + | | | | | | | | ++ | |
| | | | | | | | | | | | | | | | | | | |

B.5



BROTECH




## TCGT 1102

Circumference ground, chip-breakers pressed & polished

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |
| | TCGT-110201FL-FM10C | 655.369 | 01 | 23° | AlCrN | ++ | + | ++ | + | + | + | ++ | + | + | ++ | | | |
| | TCGT-110202FL-FM10C | 655.379 | 02 | 23° | AlCrN | ++ | + | ++ | + | + | + | ++ | + | + | ++ | | | |
| | TCGT-110204FL-FM10C | 655.389 | 04 | 23° | AlCrN | ++ | + | ++ | + | + | + | ++ | + | ++ | + | + | | |
| | TCGT-110208FL-FM10C | 655.399 | 08 | 23° | AlCrN | ++ | + | ++ | + | + | + | ++ | + | ++ | | ++ | + | |
| | TCGT-110201FL-FK10C | 655.363 | 01 | 23° | TiAlN | + | + | + | + | + | + | | | | ++ | | | |
| | TCGT-110202FL-FK10C | 655.373 | 02 | 23° | TiAlN | + | + | + | + | + | + | | | | + | | | |
| | TCGT-110204FL-FK10C | 655.383 | 04 | 23° | TiAlN | ++ | ++ | + | ++ | ++ | + | ++ | + | ++ | | + | | |
| | TCGT-110208FL-FK10C | 655.393 | 08 | 23° | TiAlN | ++ | ++ | + | ++ | ++ | + | ++ | + | ++ | | + | | |
| | TCGT-110202FL-FK10H | 655.378 | 02 | 23° | | | | | | | ++ | | | + | ++ | | | |
| | TCGT-110204FL-FK10H | 655.388 | 04 | 23° | | | | | | | ++ | | | ++ | + | + | | |
| | TCGT-110208FL-FK10H | 655.398 | 08 | 23° | | | | | | | ++ | | | ++ | | + | | |
| | TCGT-110202FL-FP10C | 655.371 | 02 | 15° | TiAlN | + | + | | + | + | | + | | | ++ | | | |
| | TCGT-110204FL-FP10C | 655.381 | 04 | 18° | TiAlN | + | + | + | + | + | + | + | + | | | + | | |

## TCGT 1102

Circumference and chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCGT-110202FL-FK20C | 655.370 | 02 | 10° | TiAlN | ++ | ++ | + | ++ | ++ | + | ++ | | + | ++ | ++ | + | |
| | TCGT-110204FL-FK20C | 655.380 | 04 | 10° | TiAlN | ++ | ++ | + | ++ | ++ | + | ++ | | ++ | | ++ | ++ | |
| | TCGT-110208FL-FK20C | 655.390 | 08 | 10° | TiAlN | ++ | ++ | + | ++ | ++ | + | ++ | | ++ | | ++ | ++ | |
| | TCGT-110202FN-FP10CT | 655.372 | 02 | 20° | | + | + | | | | | | | | ++ | | | |
| | TCGT-110204FL-FP10CT | 655.386 | 04 | 18° | | ++ | ++ | | | + | + | | | ++ | | | | |
| | TCGT-110202FL-FP10CTC | 655.375 | 02 | 15° | TiAlN | ++ | ++ | + | + | + | + | + | | + | ++ | | | |
| | TCGT-110204FL-FP10CTC | 655.385 | 04 | 18° | TiAlN | ++ | ++ | + | + | + | + | + | | ++ | + | | | |
| | TCGT-110208FL-FP10CTC | 655.395 | 08 | 18° | TiAlN | ++ | ++ | + | + | + | + | + | | ++ | | | | |
| | TCGT-110204FL-FK20H | 655.387 | 04 | 20° | | | | | | | ++ | | | ++ | + | | | ++ |
| | TCGT-110208FL-FK20H | 655.397 | 08 | 20° | | | | | | | ++ | | | ++ | | | | ++ |
| | TCGT-110202FL-FM20C | 655.319 | 02 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | ++ | + | |
| | TCGT-110203FL-FM20C | 655.327 | 03 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | ++ | + | |
| | TCGT-110204FL-FM20C | 655.318 | 04 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | ++ | + | |
| | TCGT-110206FL-FM20C | 655.328 | 06 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | ++ | + | |
| | TCGT-110208FL-FM20C | 655.320 | 08 | 23° | AlCrN | + | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + | ++ | + | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.5x6.5 | 694.122 |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | 694.189 |

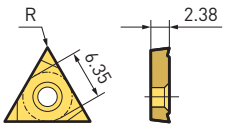
γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |




## Wiper TCGX 1102

Circumference and chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCGX-110204WL-FK10H | 655.317 | 04 | 20° | | | | | | | ++ | | ++ | ++ | | + | + | ++ |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | TCGX-110204WL-FP10CTC | 655.315 | 04 | 20° | TiAlN-TiN | ++ | ++ | | | + | + | + | | ++ | | + | + | ++ |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | TCGX-110204WL-FK10C | 655.310 | 04 | 20° | AlCrN | ++ | ++ | ++ | ++ | + | + | + | + | ++ | | + | + | ++ |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

## Wiper TCGX 1102

Circumference ground, chip-breakers pressed

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCGX-110204WL-FK20C | 655.374 | 04 | 15° | PVD Oxid | ++ | ++ | + | + | + | | | | ++ | | | ++ | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | TCGX-110204WL-FP10CT | 655.384 | 04 | 15° | | ++ | ++ | | | + | + | | | ++ | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.5x6.5 | 694.122 |

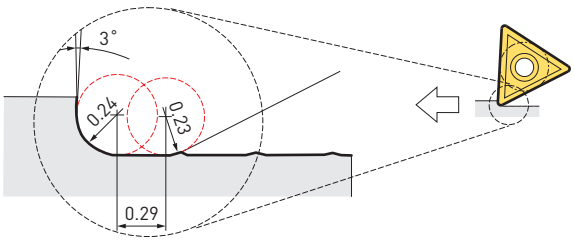
| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | 694.189 |

B.5

**Wiper geometry**

Comparison with standard nose radius 0.4 mm

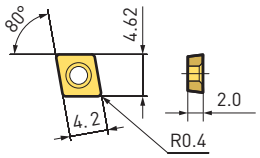
Wiper: Two times the feed rate → Same surface finish
Same feed rate → Two times better surface finish






BROTECH

## MW 0404



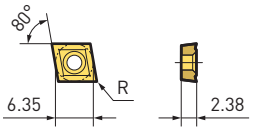

Chip-breakers pressed & polished

| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MW0404-Z30P | **655.942** | 04 | | TiAlN-AlCrN | + | ++ | ++ | | | | | | ++ | + | + | | |
| | MW0404-Z30K | **655.941** | 04 | | TiAlN-AlCrN | | | | ++ | ++ | | | | ++ | + | + | | |
| | MW0404-D15N | **655.940** | 04 | | DLC | | | | | | ++ | | | ++ | + | + | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 M1.6x4.2 | **694.105** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 | **694.181** |

## CCMT 0602




Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-060202FN-RP30C | **654.840A** | 02 | 15° | $Al_2O_3$-TiN | + | + | + | + | + | | | + | | + | | | |
| | CCMT-060204FN-RK20H | **654.858** | 04 | 15° | | | | | + | + | | | | | | | + | |
| | CCMT-060204FN-RP30C | **654.851A** | 04 | 15° | TiAlN | ++ | ++ | + | + | + | | + | + | ++ | | + | | |
| | CCMT-060208FN-RP30C | **654.853** | 08 | 15° | TiAlN | ++ | ++ | + | ++ | ++ | | + | + | ++ | + | + | + | |
| | CCMT-060204FN-RK20C | **654.852** | 04 | 15° | $Al_2O_3$-TiN | + | + | + | ++ | ++ | | + | + | ++ | | + | | |
| | CCMT-060202FN-RP35C | **654.846** | 02 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | + | + | | + | + | ++ | | ++ | ++ | |
| | CCMT-060204FN-RP35C | **654.856** | 04 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | ++ | | ++ | ++ | |
| | CCMT-060204FN-RP20C | **654.850A** | 04 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | ++ | | | | |

## CCGT 0602

Circumference ground, chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCGT-060202FN-RS10C | **654.837** | 02 | 8° | TiAlN | | | ++ | | | | | ++ | ++ | ++ | + | | |
| | CCGT-060204FN-RS10C | **654.847** | 04 | 8° | TiAlN | | | ++ | | | | | ++ | ++ | + | + | | |

## CCMT 0602

Chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-060202FL-RK10H | **654.877** | 02 | 23° | | | | | | | ++ | | | ++ | + | + | | |
| | CCMT-060204FL-RK10H | **654.888** | 04 | 23° | | | | | | | ++ | | + | ++ | | + | | |
| | CCMT-060202FL-RN10C | **654.879** | 02 | 23° | AlCrN | | | | | | ++ | | + | ++ | + | + | | |
| | CCMT-060204FL-RN10C | **654.889** | 04 | 23° | AlCrN | | | | | | ++ | | + | ++ | | + | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.5x6.5 | **694.122** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | **694.189** |

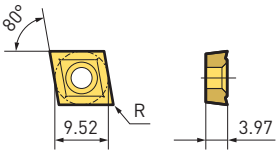
γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

## CCMT 09T3




Chip-breakers pressed & polished

| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-09T304FN-RK20C | **654.942** | 04 | 15° | $Al_2O_3$-TiN | | | | ++ | ++ | | | + | ++ | | + | | |
| | CCMT-09T308FN-RK20C | **654.952** | 08 | 15° | $Al_2O_3$-TiN | | | | ++ | ++ | | | + | ++ | | + | | |
| | CCMT-09T308FN-RP30C | **654.950** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | ++ | | ++ | + | |
| | CCMT-09T302FN-RP35C | **654.935** | 02 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | + | + | | + | + | + | ++ | ++ | + | |
| | CCMT-09T304FN-RP35C | **654.945** | 04 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | + | + | | + | + | ++ | | ++ | ++ | |
| | CCMT-09T308FN-RP35C | **654.955** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | + | + | | + | + | ++ | | ++ | ++ | |
| | CCMT-09T302FN-RP30C | **654.930A** | 02 | 15° | $Al_2O_3$-TiN | + | + | + | + | + | | | | | + | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-09T304FN-RP20C | **654.940A** | 04 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

## CCGT 09T3

Circumference ground, chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCGT-09T302FN-RS10C | **654.937** | 02 | 8° | TiAlN | | | ++ | | | | | ++ | ++ | ++ | + | | |
| | CCGT-09T304FN-RS10C | **654.947** | 04 | 8° | TiAlN | | | ++ | | | | | ++ | ++ | + | + | | |
| | CCGT-09T308FN-RS10C | **654.957** | 08 | 8° | TiAlN | | | ++ | | | | | ++ | ++ | | + | | |

## CCMT 09T3

Chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-09T304FL-MK10H | **654.977** | 04 | 23° | | | | | | | ++ | | | ++ | + | + | | |
| | CCMT-09T308FL-MK10H | **654.987** | 08 | 23° | | | | | | | ++ | | | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-09T304FL-MN10C | **654.949** | 04 | 23° | AlCrN | | | | | | ++ | | + | ++ | + | + | | |
| | CCMT-09T308FL-MN10C | **654.959** | 08 | 23° | AlCrN | | | | | | ++ | | + | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |

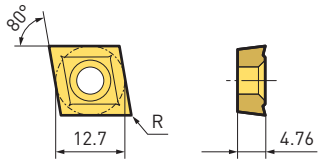
## CCGW 09T3

Circumference ground, without chip-breakers

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCGW-09T304TN-RK10SN | **654.941** | 04 | 0° | | | | | ++ | + | | | | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP M4x9.2 | **694.141** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP | **694.183** |




## CCMT 1204

Chip-breakers pressed & polished

| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-120404FN-RK20C | **654.989** | 04 | 15° | TiAlN | | | | ++ | ++ | | | + | ++ | | + | | |
| | CCMT-120408FN-RK20C | **654.991** | 08 | 15° | TiAlN | | | | ++ | ++ | | | + | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-120404FN-RP35C | **654.964** | 04 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | + | + | | + | + | ++ | ++ | ++ | ++ | |
| | CCMT-120408FN-RP35C | **654.965** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | + | + | | + | + | ++ | ++ | ++ | ++ | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-120404FN-RP30C | **654.993A** | 04 | 15° | $Al_2O_3$-TiN | + | + | + | + | + | | | | | + | | | |
| | CCMT-120408FN-RP30C | **654.988** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | ++ | | ++ | + | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-120408FN-RP20C | **654.990A** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-120404FN-RS10C | **654.968** | 04 | 8° | TiAlN | | | ++ | | | | | ++ | ++ | | + | | |
| | CCMT-120408FN-RS10C | **654.969** | 08 | 8° | TiAlN | | | ++ | | | | | ++ | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |

Chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-120404FL-MK10H | **654.995** | 04 | 23° | | | | | | | ++ | | | ++ | + | + | | |
| | CCMT-120408FL-MK10H | **654.992** | 08 | 23° | | | | | | | ++ | | | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-120404FL-MN10C | **654.978** | 04 | 23° | AlCrN | | | | | | ++ | | ++ | ++ | + | + | + | |
| | CCMT-120408FL-MN10C | **654.979** | 08 | 23° | AlCrN | | | | | | ++ | | ++ | ++ | | + | + | |
| | | | | | | | | | | | | | | | | | | |

## CCGW 1204

Circumference ground, without chip-breakers

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCGW-120408TN-RK10SN | **654.980** | 08 | 0° | | | | | ++ | + | | | | ++ | | + | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP M5x13.3 | **694.150** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP | **694.194** |

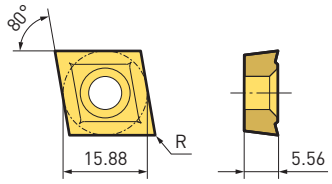
γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |




## CCMT 1605

Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-160508FN-RK10H | **654.997** | 08 | 15° | | | | | + | + | | | + | | | + | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-160508FN-RK20C | **654.983** | 08 | 15° | $Al_2O_3$-TiN | | | | ++ | ++ | | | + | ++ | | | + | |
| | CCMT-160508FN-RP30C | **654.996** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | ++ | | ++ | + | |
| | | | | | | | | | | | | | | | | | | |
| | CCMT-160508FN-RP35C | **654.986** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | ++ | | ++ | ++ | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Chip-breakers ground

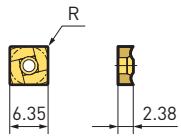
| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-160508FL-MK10H | **654.998** | 08 | 23° | | | | | | | ++ | | + | ++ | | | + | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP M5x13.3 | **694.150** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP | **694.194** |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |

## SPMT 0602




Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SPMT-060204FN-RP20C | **654.150** | 04 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | + | + | | + | + | + | | | + | |
| | SPMT-060204FN-RK20H | **654.158 *** | 04 | 15° | | | | | + | | | | | | | | ++ | |
| | SPMT-060204FN-RK20C | **654.152** | 04 | 15° | $Al_2O_3$-TiN | | | | ++ | ++ | | + | + | + | | | + | |

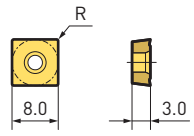
Chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SPMT-060204FL-MK10H | **654.168** | 04 | 23° | | | | | | | ++ | | + | + | | | + | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.5x6.5 | **694.122** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | **694.189** |

## SPGW 0803




Circumference ground, without chip-breakers

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SPGW-080305FN-RK20H | **654.128** | 05 | 0° | | | | | ++ | | | | | | | | + | |

## SPGT 0803

Circumference ground, without chip-breakers

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SPGT-080305FL-MP20H | **654.183** | 05 | 5° | | ++ | ++ | ++ | | + | ++ | + | | | | | + | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.5x5.5 | **694.121** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | **694.189** |

γ Rake angle with insert on tool.

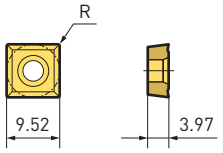
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |




## SCMT 09T3

Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SCMT-09T308FN-RK30H | **654.259 *** | 08 | 15° | | | | | + | + | | | | | | | + | |
| | SCMT-09T304FN-RP20C | **654.240** | 04 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | ++ | ++ | | + | | + | + | + | | |
| | SCMT-09T308FN-RP20C | **654.250** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | ++ | ++ | | + | | + | | + | | |
| | SCMT-09T308FN-RP30C | **654.251** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | | ++ | | ++ | ++ | |

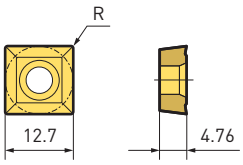
Chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SCMT-09T304FL-MK10C | **654.277** | 04 | 23° | | | | | | | ++ | | | + | + | + | | |
| | SCMT-09T308FL-MK10C | **654.287** | 08 | 23° | | | | | | | ++ | | | + | | | + | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP M4x9.2 | **694.141** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP | **694.193** |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | NiCo Alloys/Titanium | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |




## SCMT 1204

Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SCMT-120404FN-RP20C | **654.340** | 04 | 15° | $Al_2O_3$-TiN | + | + | + | + | + | | + | | | + | + | | |
| | SCMT-120408FN-RP20C | **654.350** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | ++ | ++ | + | | + | | + | | | + | |
| | SCMT-120408FN-RP30H | **654.354 *** | 08 | 15° | | + | + | + | | + | | | | | | ++ | ++ | |
| | SCMT-120408FN-RP30C | **654.351** | 08 | 15° | $Al_2O_3$-TiN | ++ | ++ | + | + | + | | + | + | + | | ++ | ++ | |

Chip-breakers ground

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SCMT-120408FL-MK10H | **654.387** | 08 | 23° | | | | | | | ++ | | | + | | | + | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP M4x11.6 | **694.142** |
| | For insert holder RW53 | |
| | Torx Plus T20 IP M4x15 | **694.144** |
| | For insert holder RW68/RW100 | |
| | Torx Plus T20 IP M5x13.3 | **694.150** |
| | For insert holder «TW» and «SW» | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP | **694.194** |

B.5

γ Rake angle with insert on tool.

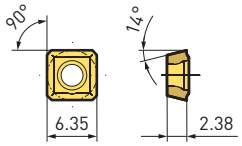
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

## WP 337-1, Ø 16 - 20 mm




Chip-breakers pressed & polished

| Insert Shape | Model | Order No. | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast iron GG | Cast iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 54 HRC | NiCo Alloys/Titanium | Long Chipping Materials | Tough Materials | Inner Insert | Outer Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WP337-1-16/20-RP35C | 655.910 | 15° | TiCN-$Al_2O_3$-TiN | ++ | ++ | + | ++ | + | | | | | | + | + |
| | WP337-1-16/20-RP40C | 655.911 | 15° | TiCN | + | + | + | + | + | | + | + | | ++ | ++ | + |

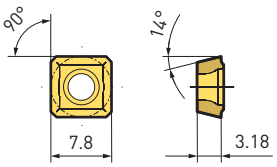
Circumference ground, chip-breakers pressed

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WP337-1-16/20-RM35C | 655.912 | 15° | TiCN | + | + | + | + | + | + | | | ++ | | + | ++ |
| | WP337-1-16/20-RK40H | 655.913 | 15° | | | | | | | ++ | | | | | + | + |

| Model | Order No. |
|---|---|
| Torx Plus T7 IP M2.5x5.8 | 694.123 |

| Model | Order No. |
|---|---|
| Torx Plus T7 IP | 694.189 |

## WP 337-2, Ø 21 - 25 mm




Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WP337-2-21/25-RP35C | 655.920 | 15° | TiCN-$Al_2O_3$-TiN | ++ | ++ | + | ++ | + | | | | | | + | + |
| | WP337-2-21/25-RP40C | 655.921 | 15° | TiCN | + | + | + | + | + | | + | + | | ++ | ++ | + |

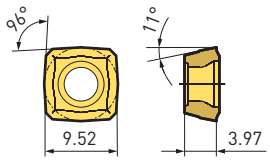
Circumference ground, chip-breakers pressed

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WP337-2-21/25-RM35C | 655.922 | 15° | TiCN | + | + | + | + | + | + | | | ++ | | + | ++ |
| | WP337-2-21/25-RK40H | 655.923 | 15° | | | | | | | ++ | | | | | + | + |

| Model | Order No. |
|---|---|
| Torx Plus T7 IP M3x6 | 694.130 |

| Model | Order No. |
|---|---|
| Torx Plus T7 IP | 694.189 |

| Insert | | | | | Work Piece Material | | | | | | | | Machining | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast iron GG | Cast iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 54 HRC | NiCo Alloys/Titanium | Long Chipping Materials | Tough Materials | Inner Insert | Outer Insert |




## WP 337-3, Ø 26 - 30 mm

Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WP337-3-26/30-RP35C | **655.930** | 15° | TiCN-$Al_2O_3$-TiN | ++ | ++ | + | ++ | + | | | | | | + | + |
| | WP337-3-26/30-RP40C | **655.931** | 15° | TiCN | + | + | + | + | + | | + | + | | ++ | ++ | + |

Circumference ground, chip-breakers pressed with dimples

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WP337-3-26/30-RM35C | **655.932** | 15° | TiCN | + | + | + | + | + | + | | | ++ | | + | ++ |
| | WP337-3-26/30-RK40H | **655.933** | 15° | | | | | | | ++ | | | | | + | + |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T10 IP M3.5x8.2 | **694.136** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T10 IP | **694.192** |

B.5

γ Rake angle with insert on tool.

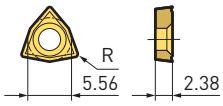
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 54 HRC | NiCo Alloys/Titanium | Long Chipping Materials | Tough Materials | Inner Insert | Outer Insert |

## WCMT 0302



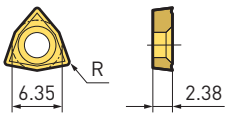

Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-030208FN-RP45C | **655.620** | 08 | 15° | TiCN-TiN | ++ | ++ | | + | + | | | | | | + | + |
| | WCMT-030208FN-RM40C | **655.622 *** | 08 | 15° | TiCN | + | + | ++ | | | | | | | | + | + |
| | WCMT-030208FN-RK20C | **655.621** | 08 | 15° | $Al_2O_3$-TiN | | | | ++ | ++ | + | | | | | + | + |

|  | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.2x6 | **694.110** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | **694.189** |

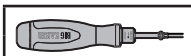
## WCMT 0402



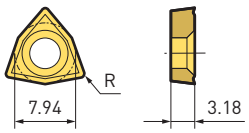

Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-040208FN-RP45C | **655.630** | 08 | 15° | TiCN-TiN | ++ | ++ | | + | + | | | | | | + | + |
| | WCMT-040208FN-RM40C | **655.632** | 08 | 15° | TiCN | + | + | ++ | | | | | | | | + | + |
| | WCMT-040208FN-RK20C | **655.631** | 08 | 15° | $Al_2O_3$-TiN | | | | ++ | ++ | + | | | | | + | + |

|  | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.5x6.3 | **694.124** |

|  | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | **694.189** |

## WCMT 0503




Chip-breakers pressed & polished

| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 54 HRC | NiCo Alloys/Titanium | Long Chipping Materials | Tough Materials | Inner Insert | Outer Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-050308FN-MP45C | 655.640 | 08 | 15° | TiN | ++ | ++ | ++ | + | + | | | | | | + | + |
| | WCMT-050308FN-RP40C | 655.644 | 08 | 15° | TiN | ++ | ++ | ++ | + | + | | | | | ++ | ++ | + |
| | | | | | | | | | | | | | | | | | |
| | WCMT-050308FN-RK20C | 655.641 | 08 | 15° | TiCN-$Al_2O_3$ | | | | ++ | ++ | + | | | | | + | + |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

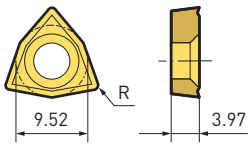
Chip-breakers pressed with dimples

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-050308FN-RP45C | 655.642 | 08 | 15° | TiN | ++ | | + | | | | | | ++ | | | ++ |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T9 IP M3x8.2 | 694.131 |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T9 IP | 694.191 |

## WCMT 06T3




Chip-breakers pressed & polished

| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 54 HRC | NiCo Alloys/Titanium | Long Chipping Materials | Tough Materials | Inner Insert | Outer Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-06T308FN-MP45C | 655.650 | 08 | 15° | TiN | ++ | ++ | ++ | + | + | | | | | | + | + |
| | WCMT-06T308FN-RP40C | 655.654 | 08 | 15° | TiN | ++ | ++ | ++ | + | + | | | | | ++ | ++ | + |
| | | | | | | | | | | | | | | | | | |
| | WCMT-06T308FN-RK20C | 655.651 | 08 | 15° | TiCN-$Al_2O_3$ | | | | ++ | ++ | + | | | | | + | + |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

Chip-breakers pressed with dimples

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-06T308FN-RP45C | 655.652 | 08 | 15° | TiN | ++ | | + | | | | | | ++ | | | ++ |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T10 IP M3.5x9.2 | 694.137 |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T10 IP | 694.192 |

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

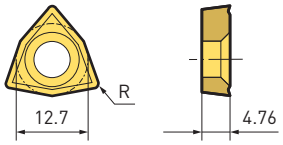
Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 54 HRC | NiCo Alloys/Titanium | Long Chipping Materials | Tough Materials | Inner Insert | Outer Insert |

## WCMT 0804




Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-080412FN-MP45C | **655.660** | 12 | 15° | TiN | ++ | ++ | ++ | + | + | | | | | | + | + |
| | WCMT-080412FN-RP40C | **655.664** | 12 | 15° | TiN | ++ | ++ | ++ | + | + | | | | | ++ | ++ | + |
| | | | | | | | | | | | | | | | | | |
| | WCMT-080412FN-RK20C | **655.661** | 12 | 15° | TiCN-$Al_2O_3$ | | | | ++ | ++ | + | | | | | + | + |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

Chip-breakers pressed with dimples

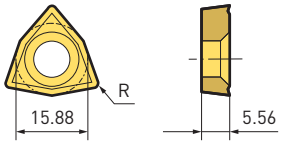
| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-080412FN-RP45C | **655.662** | 12 | 15° | TiN | + | | + | | | | | | ++ | | | ++ |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP M4x11.8 | **694.143** |
| | Torx T15 M4x8.2 | **336.905** |
| | For drills with pockets | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP | **694.193** |

| Insert | | | | | | Work Piece Material | | | | | | | | Machining | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Coating | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 54 HRC | NiCo Alloys/Titanium | Long Chipping Materials | Tough Materials | Inner Insert | Outer Insert |

## WCMT 1005




Chip-breakers pressed & polished

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCMT-100512FN-RP45C | **655.670** | 12 | 15° | TiCN | ++ | ++ | ++ | ++ | ++ | | | | | | + | + |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | WCMT-100512FN-RK20H | **655.671** | 12 | 15° | | | | | + | + | + | | | | | + | + |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP M5x13.3 | **694.150** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP | **694.194** |

γ Rake angle with insert on tool.

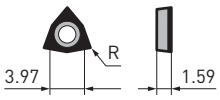
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

| Insert | | | | | | Work Piece Material | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Grade | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≥ 52 HRC | NiCo Alloys/Titanium | Carbon Fiber | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |

## WCGW 02




Full face made with CBN/PCD, 3 cutting edges

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCGW-020102FN-FN10PKD-X3 | **938.883** | 02 | 0° | PCD | | | ++ | | | ++ | ++ | | + | | + |
| | WCGW-020102FN-FK10CBN-X3 | **938.884** | 02 | 0° | CBN-10 | | ++ | | | | | ++ | + | + | | |
| | WCGW-020102FN-FH10CBN-X3 | **938.885** | 02 | 0° | CBN-25 | | | | ++ | + | | ++ | | | | |

One cutting edge made with CBN

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WCGW-020102TN-FH10CBN | **948.101** | 02 | 0° | CBN-30 | | | | ++ | | | ++ | | ++ | ++ | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 IP M2x3.6 | **694.101** |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 IP | **694.188** |

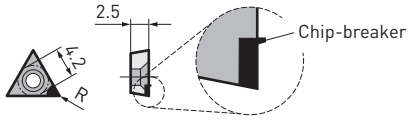
γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

CBN/PCD inserts are sold individually.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

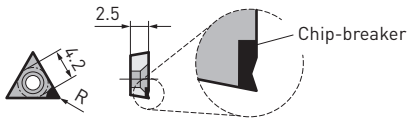
| Insert | | | | | | Work Piece Material | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake angle γ | Grade | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≥ 52 HRC | NiCo Alloys/Titanium | Carbon Fiber | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |




## TPGT 07

One cutting edge made with PCD

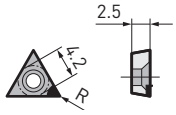
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPGT-070204FL-MN10PKD | 948.201 | 04 | 5° | PCD | | | + | | | ++ | ++ | | + | | ++ |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |




## TPGT 07

One cutting edge made with PCD

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPGT-070202FL-FN10PKD | 948.202 | 02 | 8° | PCD | | | ++ | | | | | | | | |
| | TPGT-070204FL-FN10PKD | 948.203 | 04 | 8° | PCD | | | ++ | | | | | | | | |
| | | | | | | | | | | | | | | | | |




## TPGW 07

One cutting edge made with PCD/CBN

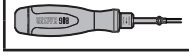
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPGW-070203FN-FN10PKD | 938.840 | 03 | 5° | PCD | | | ++ | | | ++ | ++ | | + | | + |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | TPGW-070202FN-FK10CBN | 948.210 | 02 | 5° | CBN-15 | ++ | ++ | | | + | | + | + | | | |
| | TPGW-070203FN-FK10CBN | 938.837 | 03 | 5° | CBN-10 | ++ | + | | | + | | + | | | | |
| | TPGW-070204FN-FK10CBN | 948.211 | 04 | 5° | CBN-15 | ++ | ++ | | | + | | + | | + | | |
| | TPGW-070202TN-FK10CBN | 948.230 | 02 | 5° | CBN-15 | ++ | ++ | | | | | ++ | + | ++ | | |
| | TPGW-070203TN-FK10CBN | 938.879 | 03 | 5° | CBN-10 | ++ | + | | | | | ++ | | ++ | | |
| | TPGW-070204TN-FK10CBN | 948.231 | 04 | 5° | CBN-15 | ++ | ++ | | | | | ++ | | ++ | + | |
| | TPGW-070201TN-FH10CBN | 948.270 | 01 | 5° | CBN-30 | | | | ++ | | | ++ | + | + | | |
| | TPGW-070203TN-FH10CBN | 948.271 | 03 | 5° | CBN-30 | | | | ++ | | | ++ | | ++ | + | |
| | TPGW-070203TN-MH10CBN | 938.880* | 03 | 5° | CBN-25 | | | | ++ | | | ++ | | + | + | |

## TPGW 07

Three cutting edges made with CBN

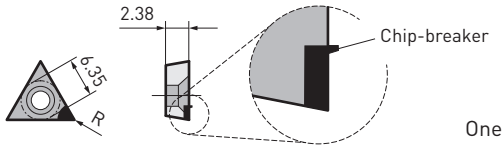
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPGW-070202FN-FH10CBN-X3 | 948.252 | 02 | 0° | CBN-30 | | | | ++ | ++ | | + | + | | | |
| | TPGW-070203FN-FH10CBN-X3 | 948.251A | 03 | 0° | CBN-30 | | | | ++ | ++ | | + | | | | |
| | TPGW-070204FN-FH10CBN-X3 | 948.253 | 04 | 0° | CBN-30 | | | | ++ | ++ | | + | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T6 IP M2x4.8 | 694.103 |
| | Torx Plus T6 IP M2x4.1 | 694.102 [1] |

| | Model | Order No. |
|---|---|---|
|  | Torx Plus T6 IP | 694.188 |

[1] For insert holders 615.205 / 615.207 / 615.507 / 615.508 / 615.271

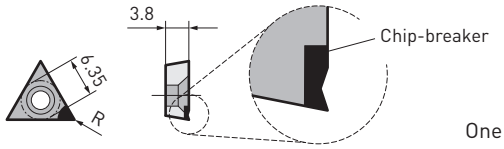
| Insert | | | | | | Work Piece Material | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Grade | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≥ 52 HRC | NiCo Alloys/Titanium | Carbon Fiber | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |




**TCMW 11**

One cutting edge made with PCD

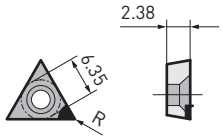
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCMW-110204FL-MN10PKD | 948.301 | 04 | 0° | PCD | | | + | | | ++ | ++ | | + | | ++ |
| | TCMW-110208FL-MN10PKD | 948.302 | 08 | 0° | PCD | | | + | | | ++ | ++ | | + | | ++ |
| | | | | | | | | | | | | | | | | |




**TCGT 11**

One cutting edge made with PCD

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCGT-110202FL-FN10PKD | 948.373 | 02 | 8° | PCD | | | ++ | | | ++ | ++ | | + | | ++ |
| | TCGT-110204FL-FN10PKD | 948.374 | 04 | 8° | PCD | | | ++ | | | ++ | ++ | | + | | ++ |
| | TCGT-110208FL-FN10PKD | 948.375 | 08 | 8° | PCD | | | ++ | | | ++ | ++ | | + | | ++ |




**TCMW 11**

One cutting edge made with PCD/CBN

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCMW-110204FN-FN10PKD | 938.841 | 04 | 5° | PCD | | | ++ | | | + | ++ | | + | | + |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | TCMW-110202FN-FK10CBN | 948.310 | 02 | 0° | CBN-15 | ++ | ++ | | | + | | ++ | ++ | | | |
| | TCMW-110204FN-FK10CBN | 948.311 | 04 | 0° | CBN-15 | ++ | ++ | | | + | | ++ | + | + | | |
| | TCMW-110208FN-FK10CBN | 948.312 | 08 | 0° | CBN-15 | ++ | ++ | | | + | | ++ | | + | | |
| | TCMW-110204FN-NK10CBN | 938.834 | 04 | 0° | CBN-10 | ++ | + | | | + | | ++ | + | + | | |
| | TCMW-110202TN-FK10CBN | 948.330 | 02 | 0° | CBN-15 | ++ | ++ | | | | | ++ | | + | | |
| | TCMW-110204TN-FK10CBN | 948.331 | 04 | 0° | CBN-15 | ++ | ++ | | | | | ++ | | + | | |
| | TCMW-110208TN-FK10CBN | 948.332 | 08 | 0° | CBN-15 | ++ | ++ | | | | | ++ | | ++ | + | |
| | TCMW-110202TN-NK10CBN | 938.876 | 08 | 0° | CBN-10 | ++ | + | | | | | ++ | | + | | |
| | TCMW-110202TN-FH10CBN | 948.370 | 02 | 0° | CBN-30 | | | | ++ | | | ++ | + | + | | |
| | TCMW-110204TN-FH10CBN | 948.371 | 04 | 0° | CBN-30 | | | | ++ | | | ++ | | ++ | | |
| | TCMW-110208TN-FH10CBN | 948.372 | 08 | 0° | CBN-30 | | | | ++ | | | ++ | | ++ | + | |

**TCMW 11**

Three cutting edges made with CBN

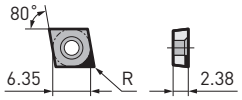
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TCMW-110202FN-FH10CBN-X3 | 948.350A | 02 | 0° | CBN-30 | | | | ++ | ++ | | + | + | | | |
| | TCMW-110204FN-FH10CBN-X3 | 948.351A | 04 | 0° | CBN-30 | | | | ++ | ++ | | + | | | | |
| | TCMW-110208FN-FH10CBN-X3 | 948.352A | 08 | 0° | CBN-30 | | | | ++ | ++ | | ++ | | + | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.5x6.5 | 694.122 |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | 694.189 |

| Insert | | | | | | Work Piece Material | | | | | | Machining | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Rake Angle γ | Grade | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≥ 52 HRC | NiCo Alloys/Titanium | Carbon Fiber | High Volume Machining | Unfavorable Conditions | Slightly Interrupted Cut | Heavily Interrupted Cut | HSC |

## CCGT / W 06



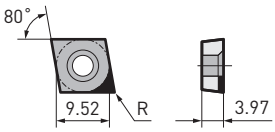

One cutting edge made with PCD/CBN

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCGT-060204FL-FN10PKD | 938.866 | 04 | 5° | PCD | | | ++ | | | ++ | ++ | | + | | |
| | CCGW-060204FN-FK10CBN | 938.867 | 04 | 0° | CBN-10 | ++ | + | | | | | ++ | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP M2.5x6.5 | 694.122 |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T7 IP | 694.189 |

## CCGT / W 09



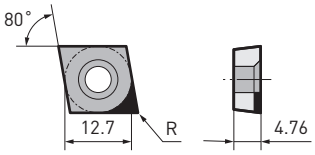

One cutting edge made with PCD/CBN

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCGT-09T304FL-FN10PKD | 938.868 | 04 | 5° | PCD | | | ++ | | | ++ | ++ | | + | | |
| | CCGW-09T304FN-FK10CBN | 938.869 | 04 | 0° | CBN-10 | ++ | + | | | | | ++ | | | | |
| | CCGW-09T308FN-FK10CBN | 938.835 | 08 | 0° | CBN-10 | ++ | + | | | | | ++ | | + | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP M4x9.2 | 694.141 |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP | 694.193 |

## CCGT / W 12




One cutting edge made with PCD/CBN

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCGT-120404FL-FN10PKD | 938.870 | 04 | 5° | PCD | | | ++ | | | ++ | ++ | + | + | | |
| | CCGT-120408FL-FN10PKD | 938.871 | 08 | 5° | PCD | | | ++ | | | ++ | ++ | | + | | |
| | CCGW-120408FN-FK10CBN | 938.862 | 08 | 0° | CBN-10 | ++ | + | | | | | ++ | | + | | |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP M5x13.3 | 694.150 |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T20 IP | 694.194 |

* As long as stock lasts.

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

CBN/PCD inserts are sold individually.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

B.5

| Insert | | | | | | | Work Piece Material | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | Titanium | High temperature Steel | Availability |

## CNMG / CNGA

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CNMG-120404FN-MP10C | **656.000** | 0.4 | ++ | ++ | | + | + | | | | | ▲ |
| | CNMG-120408FN-MP10C | **656.001** | 0.8 | ++ | ++ | | + | + | | | | | ▲ |
| | CNMG-160608FN-MP10C | **656.004** | 0.8 | ++ | ++ | | + | + | | | | | ○ |
| | CNMG-190608FN-MP10C | **656.005** | 0.8 | ++ | ++ | | + | + | | | | | ○ |
| | CNMG-120404FN-MM20C | **656.011** | 0.4 | | | ++ | | | | | | + | ○ |
| | | | | | | | | | | | | | |
| | CNMG-120408FN-MM20C | **656.012** | 0.8 | | | ++ | | | | | | + | ○ |
| | CNMG-160608FN-MM20C | **656.016** | 0.8 | | | ++ | | | | | | + | ○ |
| | CNMG-190608FN-MM20C | **656.015** | 0.8 | | | ++ | | | | | | + | ○ |
| | CNMG-120404FN-MK10C | **656.020** | 0.4 | | + | | ++ | ++ | | | | | ○ |
| | CNMG-120408FN-MK10C | **656.021** | 0.8 | | + | | ++ | ++ | | | | | ○ |
| | CNMG-160608FN-MK10C | **656.022** | 0.8 | | + | | ++ | ++ | | | | | ○ |
| | CNMG-120404FN-MS20H | **656.040** | 0.4 | | | | | | | | ++ | | ○ |
| | CNMG-120408FN-MS20H | **656.041** | 0.8 | | | | | | | | ++ | | ○ |
| | CNMG-120404FN-MS20C | **656.042** | 0.4 | | | + | | | | | | ++ | ▲ |
| | CNMG-120408FN-MS20C | **656.043** | 0.8 | | | + | | | | | | ++ | ▲ |
| | CNGA-120404TN-MH20CBN | **656.050** | 0.4 | | | | | | | ++ | | | ○ |
| | CNGA-120408TN-MH20CBN | **656.051** | 0.8 | | | | | | | ++ | | | ○ |

## CCMT / CCGT

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CCMT-120404FN-MP10C | **656.002** | 0.4 | ++ | ++ | | + | + | | | | | ○ |
| | CCMT-120408FN-MP10C | **656.003** | 0.8 | ++ | ++ | | + | + | | | | | ○ |
| | CCMT-120404FN-MM20C | **656.013** | 0.4 | | | ++ | | | | | | + | ○ |
| | CCMT-120408FN-MM20C | **656.014** | 0.8 | | | ++ | | | | | | + | ○ |
| | CCGT-120404FN-FN10H | **656.030** | 0.4 | | + | + | + | | ++ | | | | ○ |
| | CCGT-120408FN-FN10H | **656.031** | 0.8 | | + | + | + | | ++ | | | | ○ |

| Insert | | | | | | | Work Piece Material | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | Titanium | High temperature Steel | Availability |
| **DNMG / DNGA** | | | | | | | | | | | | | |
| | DNMG-150604FN-MP10C | **656.102** | 0.4 | ++ | ++ | | + | + | | | | | ▲ |
| | DNMG-150608FN-MP10C | **656.103** | 0.8 | ++ | ++ | | + | + | | | | | ▲ |
| | DNMG-150604FN-MM20C | **656.112** | 0.4 | | | ++ | | | | | | + | o |
| | | | | | | | | | | | | | |
| | DNMG-150608FN-MM20C | **656.113** | 0.8 | | | ++ | | | | | | + | o |
| | | | | | | | | | | | | | |
| | DNMG-150604FN-MK10C | **656.122** | 0.4 | | + | | ++ | ++ | | | | | o |
| | DNMG-150608FN-MK10C | **656.123** | 0.8 | | + | | ++ | ++ | | | | | o |
| | DNMG-150604FN-MS20H | **656.142** | 0.4 | | | | | | | | ++ | | o |
| | DNMG-150608FN-MS20H | **656.143** | 0.8 | | | | | | | | ++ | | o |
| | DNMG-150604FN-MS20C | **656.146** | 0.4 | | | + | | | | | | ++ | ▲ |
| | DNMG-150608FN-MS20C | **656.147** | 0.8 | | | + | | | | | | ++ | ▲ |
| | DNGA-150604TN-MH20CBN | **656.152** | 0.4 | | | | | | | ++ | | | o |
| | DNGA-150608TN-MH20CBN | **656.153** | 0.8 | | | | | | | ++ | | | o |
| **DCMT / DCGT / DCGW** | | | | | | | | | | | | | |
| | DCMT-11T304FN-MP10C | **656.100** | 0.4 | ++ | ++ | | + | + | | | | | ▲ |
| | DCMT-11T308FN-MP10C | **656.101** | 0.8 | ++ | ++ | | + | + | | | | | ▲ |
| | DCMT-11T304FN-MM20C | **656.110** | 0.4 | | | ++ | | | | | | + | o |
| | DCMT-11T308FN-MM20C | **656.111** | 0.8 | | | ++ | | | | | | + | o |
| | DCMT-11T304FN-MK10C | **656.120** | 0.4 | | + | | ++ | ++ | | | | | o |
| | DCMT-11T308FN-MK10C | **656.121** | 0.8 | | + | | ++ | ++ | | | | | o |
| | DCGT-11T304FN-FN10H | **656.130** | 0.4 | | + | + | + | | ++ | | | | ▲ |
| | DCGT-11T308FN-FN10H | **656.131** | 0.8 | | + | + | + | | ++ | | | | ▲ |
| | DCMT-11T304FN-MS10H | **656.140** | 0.4 | | | | | | | | ++ | | o |
| | DCMT-11T308FN-MS10H | **656.141** | 0.8 | | | | | | | | ++ | | o |
| | DCMT-11T304FN-MS20C | **656.144** | 0.4 | | | + | | | | | | ++ | ▲ |
| | DCMT-11T308FN-MS20C | **656.145** | 0.8 | | | + | | | | | | ++ | ▲ |
| | DCGW-11T304TN-MH20CBN | **656.150** | 0.4 | | | | | | | ++ | | | o |
| | DCGW-11T308TN-MH20CBN | **656.151** | 0.8 | | | | | | | ++ | | | o |

Inserts are sold in packages of 10 pieces.
CBN Inserts are available in pieces.

o delivery time 1 week
▲ from stock

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

B.5

| Insert | | | | | | | Work Piece Material | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Radius [mm] | Construction Steels | Heat Treatable Steels | Stainless Steels | Cast Iron GG | Cast Iron GGG | AL / Non-Ferrous Metals | Hardened Steel ≤ 56 HRC | Titan | High temperature Steel | Availability |
| **VNMG** | | | | | | | | | | | | | |
| | VNMG-160404FN-MP10C | **656.300** | 0.4 | ++ | ++ | | + | + | | | | | ○ |
| | VNMG-160408FN-MP10C | **656.301** | 0.8 | ++ | ++ | | + | + | | | | | ○ |
| | VNMG-160404FN-MM20C | **656.310** | 0.4 | | | ++ | | | | | | + | ○ |
| | VNMG-160408FN-MM20C | **656.311** | 0.8 | | | ++ | | | | | | + | ○ |
| **VBMT / VBGW** | | | | | | | | | | | | | |
| | VBMT-160404FN-MP10C | **656.302** | 0.4 | ++ | ++ | | + | + | | | | | ▲ |
| | VBMT-160408FN-MP10C | **656.303** | 0.8 | ++ | ++ | | + | + | | | | | ▲ |
| | VBMT-160404FN-MM20C | **656.312** | 0.4 | | | ++ | | | | | | + | ○ |
| | VBMT-160408FN-MM20C | **656.313** | 0.8 | | | ++ | | | | | | + | ○ |
| | VBMT-160404FN-MK10C | **656.320** | 0.4 | | + | | ++ | ++ | | | | | ○ |
| | VBMT-160408FN-MK10C | **656.321** | 0.8 | | + | | ++ | ++ | | | | | ○ |
| | VBMT-160404FN-MS10H | **656.340** | 0.4 | | | | | | | | ++ | | ○ |
| | VBMT-160408FN-MS10H | **656.341** | 0.8 | | | | | | | | ++ | | ○ |
| | VBMT-160404FN-MS20C | **656.342** | 0.4 | | | + | | | | | | ++ | ○ |
| | VBMT-160408FN-MS20C | **656.343** | 0.8 | | | + | | | | | | ++ | ○ |
| | VBGW-160404TN-MH20CBN | **656.351** | 0.4 | | | | | | | ++ | | | ○ |
| | VBGW-160408TN-MH20CBN | **656.352** | 0.8 | | | | | | | ++ | | | ○ |
| **VCGT** | | | | | | | | | | | | | |
| | VCGT-160404FN-FN10H | **656.330** | 0.4 | | + | + | + | | ++ | | | | ▲ |
| | VCGT-160408FN-FN10H | **656.331** | 0.8 | | + | + | + | | ++ | | | | ▲ |
| **TNMG** | | | | | | | | | | | | | |
| | TNMG-160404FN-MP10C | **656.201** | 0.4 | ++ | ++ | | + | + | | | | | ○ |
| | TNMG-160408FN-MP10C | **656.202** | 0.8 | ++ | ++ | | + | + | | | | | ○ |
| | TNMG-220404FN-MP10C | **656.203** | 0.4 | ++ | ++ | | + | + | | | | | ○ |
| | TNMG-220408FN-MP10C | **656.204** | 0.8 | ++ | ++ | | + | + | | | | | ○ |
| | TNMG-160404FN-MM20C | **656.210** | 0.4 | | | ++ | | | | | | + | ○ |
| | | | | | | | | | | | | | |
| | TNMG-160408FN-MM20C | **656.211** | 0.8 | | | ++ | | | | | | + | ○ |
| | TNMG-220408FN-MM20C | **656.212** | 0.8 | | | ++ | | | | | | + | ○ |

B.5

Inserts are sold in packages of 10 pieces.
CBN Inserts are available in pieces.

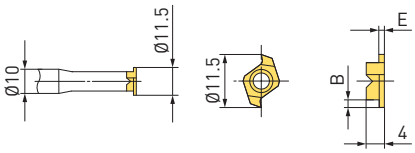
○ delivery time 1 week
▲ from stock

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

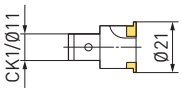


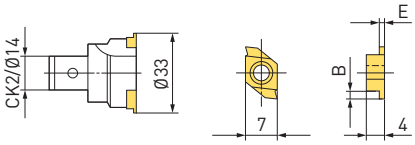
BROTECH

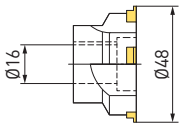
## Carbide inserts for circlip grooves as per DIN 472




| Insert | | | Dimensions | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|
| Insert Shape | Order No. | Grade | Capacity ØD | Width of Groove E | Depth of Groove B | Cast Iron | Steel | Aluminium |
| Type 0 | 958.052 | K20 | 12 - 24 | 1.15 | 0.9 | ++ | | |
| | 958.051 | P20 | | | | | ++ | |
| | 958.053 | K20 | | | | | | ++ |
| | 958.056 | K20 | 12 - 24 | 1.35 | 1.3 | ++ | | |
| | 958.055 | P20 | | | | | ++ | |
| | 958.057 | K20 | | | | | | ++ |
| Blank | 958.313 | K20 | | | | | | |
| | 958.314 | P20 | | | | | | |



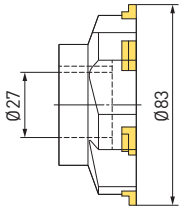



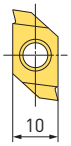



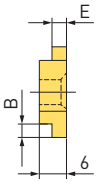

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type 1 | 958.062 | K20 | 22 - 34 | 1.15 | 1.1 | ++ | | |
| | 958.061 | P20 | | | | | ++ | |
| | 958.063 | K20 | | | | | | ++ |
| | 958.066 | K20 | 22 - 34 | 1.35 | 1.5 | ++ | | |
| | 958.065 | P20 | | | | | ++ | |
| | 958.067 | K20 | | | | | | ++ |
| | 958.072 | K20 | 34 - 50 | 1.65 | 1.6 | ++ | | |
| | 958.071 | P20 | | | | | ++ | |
| | 958.073 | K20 | | | | | | ++ |
| | 958.076 | K20 | 34 - 50 | 1.90 | 2.0 | ++ | | |
| | 958.075 | P20 | | | | | ++ | |
| | 958.077 | K20 | | | | | | ++ |
| | 958.082 | K20 | 50 - 85 | 2.20 | 2.2 | ++ | | |
| | 958.081 | P20 | | | | | ++ | |
| | 958.083 | K20 | | | | | | ++ |
| | 958.086 | K20 | 50 - 85 | 2.70 | 2.6 | ++ | | |
| | 958.085 | P20 | | | | | ++ | |
| | 958.087 | K20 | | | | | | ++ |
| Blank | 958.157 | K20 | | | | | | |
| | 958.158 | P20 | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx T8 M3x9.0 | 958.048 |

| | Model | Order No. |
|---|---|---|
| | Torx T8 | 694.183 |




| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type 2 | 958.092 | K20 | > 85 | 3.20 | 3.0 | ++ | | |
| | 958.091 | P20 | | | | | ++ | |
| | 958.093 | K20 | | | | | | ++ |
| | 958.096 | K20 | > 85 | 4.20 | 3.5 | ++ | | |
| | 958.095 | P20 | | | | | ++ | |
| | 958.097 | K20 | | | | | | ++ |
| Blank | 958.155 | K20 | | | | | | |
| | 958.156 | P20 | | | | | | |

| | Model | Order No. |
|---|---|---|
| | Torx T20 M5x16.5 | 958.049 |

| | Model | Order No. |
|---|---|---|
| | Torx T20 | 694.187 |

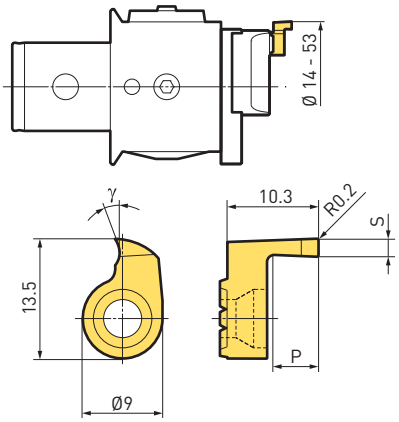


Clamping screw (10 screws and 1 wrench)
Inserts are available in pieces.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

## Inserts for face grooves, Ø 14 - 53

(Insert holder, boring head EWN/EWE 2 - 152)



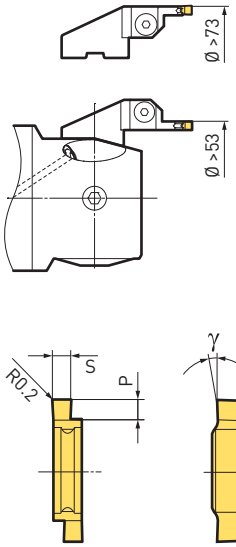

| Insert | | | Dimensions | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|
| Insert Shape | Order No. | Grade | Rake Angle γ | Width of Groove S | Depth of Groove P | Cast iron | Steel | Aluminium |
| | 958.501 | P30C | 20° | 2.0 | 5.0 | ++ | ++ | ++ |
| | 958.502 | | | 2.5 | | ++ | ++ | ++ |
| | 958.503 | | | 3.0 | | ++ | ++ | ++ |

| | Model | Order No. |
|---|---|---|
| | Torx Plus T15 IP M4x11.8 | 694.143 |

| | Model | Order No. |
|---|---|---|
| | Torx T15 IP | 694.193 |

## Inserts for face grooves, Ø 53 - 3040

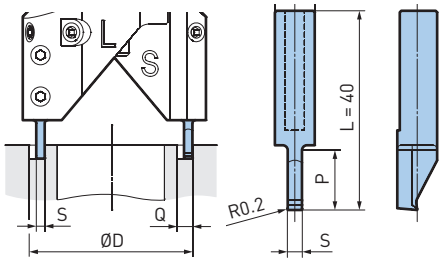
(Insert holder, boring heads EWN/EWE 53 - 100, EWN 150, EWN/EWE 200, Series 310/317/318)




| Insert | | | Dimensions | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|
| Insert Shape | Order No. | Grade | Rake Angle γ | Width of Groove S | Depth of Groove P | Cast iron | Steel | Aluminium |
| | 958.425 | P20C | 5° | 2.5 | 2.7 | ++ | ++ | |
| | 958.430 | | | 3.0 | 3.3 | ++ | ++ | |
| | 958.433 | | | 3.3 | 3.6 | ++ | ++ | |
| | 958.435 | | | 3.5 | 3.8 | ++ | ++ | |
| | 958.440 | | | 4.0 | 4.3 | ++ | ++ | |
| | 958.475 | K10 | 15° | 2.5 | 2.7 | | | ++ |
| | 958.480 | | | 3.0 | 3.3 | | | ++ |
| | 958.483 | | | 3.3 | 3.6 | | | ++ |
| | 958.485 | | | 3.5 | 3.8 | | | ++ |
| | 958.490 | | | 4.0 | 4.3 | | | ++ |

1. Further sizes on request

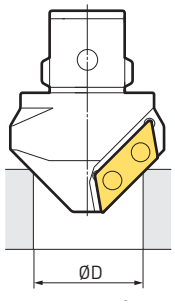
(Insert holder, boring head SW 53 - 148, Series 318)

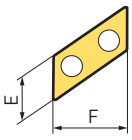



| Grooving Cutter | | | Dimensions | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|
| Insert Shape | Order No. | Grade | Rake Angle γ | Width of Groove S | Depth of Groove P | Cast iron | Steel | Aluminium |
| | 958.611 | K40C | 7° | 2.0 | 12 | ++ | ++ | |
| | 958.612 | | | 3.0 | | ++ | ++ | |
| | 958.613 | | | 4.0 | | ++ | ++ | |
| | 958.614 | | | 5.0 | | ++ | ++ | |
| | 958.601 | K40 | 7° | 2.0 | 12 | | | ++ |
| | 958.602 | | | 3.0 | | | | ++ |
| | 958.603 | | | 4.0 | | | | ++ |
| | 958.604 | | | 5.0 | | | | ++ |

K10/K40 = Uncoated carbide
P20C/30C/P40C = Coated carbide AlCrN

## Inserts for chamfering mills C-Cutter 45°



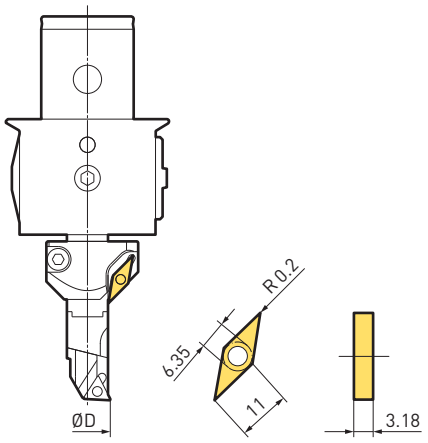




| Insert | | | | | Dimensions | | Screws/Wrench | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insert Shape | Insert Type | Order No. | Grade | Capacity ØD | E | F | Screws | Type | Wrench | Cast Iron | Steel | Aluminium |
| | CW1206 | 978.283 | P30 | 5 - 25 | 6.35 | 12.7 | 978.284 | T6 | 690.834 | ++ | + | |
| | | 800.951 | P20C | | | | | | | + | ++ | |
| | | 801.753 | N20C | | | | | | | | | ++ |
| | CW1909 | 978.817 | P30 | 10 - 40 and 30 - 60 | 9.525 | 19.05 | 801.696 | T10 | 690.837 | ++ | + | |
| | | 800.952 | P20C | | | | | | | + | ++ | |
| | | 801.754 | N20C | | | | | | | | | ++ |
| | CW3115 | 978.826 | P30 | 50 - 100 | 18.875 | 31.75 | 801.699 | T20 | 690.838 | ++ | + | |
| | | 800.953 | P20C | | | | | | | + | ++ | |
| | | 801.755 | N20C | | | | | | | | | ++ |

1. Inserts are available in pieces.

## Inserts for chamfering rings 45°, diameter range Ø 12.6 - 39.5 mm

(Boring heads EWN/EWE 2 - 32, EWN/EWE 2 - 152, Series 112)



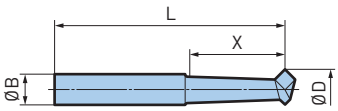

| Insert | | | | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|
| Insert Shape | Model | Order No. | Grade | Capacity ØD | Rake Angle γ | Cast Iron | Steel | Aluminium |
| | VCMT 110302 | 655.821 | P20C | 12.6 - 39.5 | 15° | ++ | ++ | |
| | VCGT 110302 | 655.822 | K20 | | 23° | | | ++ |
| | | | | | | | | |

1. Inserts are sold in packages of 10 pieces.

| | Model | Order No. |
|---|---|---|
| | Torx Plus T8 IP M2.5x8.7 | 694.125 |

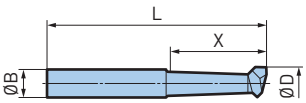
| | Model | Order No. |
|---|---|---|
| | Torx Plus T8 IP | 694.190 |

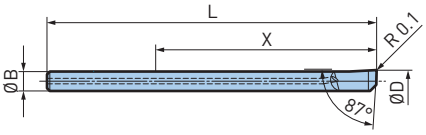
## Boring cutters for fine boring heads




| Boring Cutter | | | | Dimensions | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|---|
| Shape | Order No. | Grade | Capacity ØD | X | ØB | L | Cast Iron | Steel | Aluminium |
| | 612.110 * | HSS | 0.4 - 0.7 | 3 | 4 | 27 | | + | + |
| | 612.111 * | | 0.6 - 1.0 | 3 | | 28 | | + | + |
| | 612.112 * | | 0.9 - 1.5 | 4 | | 28 | | + | + |
| | 612.113 * | | 1.2 - 1.8 | 5 | | 29 | | + | + |
| | 612.114 * | | 1.5 - 3.5 | 7 | | 31 | | + | + |
| | 612.116 * | | 3.0 - 5.5 | 14 | | 38 | | + | + |
| | 612.117 * | | 5.0 - 7.5 | 22 | | 38 | | + | + |
| | 612.213 * | HSS | 7.0 - 9.5 | 28 | 10 | 56 | | + | + |
| | 612.215 * | | 13.0 - 17.5 | 54 | | 80 | | + | + |
| | 611.115 | K10 | 2.0 - 3.5 | 9 | 4 | 33 | + | + | + |
| | 611.116 | | 3.0 - 5.5 | 14 | | 38 | + | + | + |
| | 611.117 | | 5.0 - 7.5 | 22 | | 38 | + | + | + |
| | 611.212 | K10 | 5.0 - 7.5 | 22 | 10 | 50 | + | + | + |
| | 611.213 | | 7.0 - 9.5 | 28 | | 56 | + | + | + |
| | 611.214 | | 9.0 - 13.5 | 32 | | 64 | + | + | + |
| | 611.215 | | 13.0 - 17.5 | 54 | | 80 | + | + | + |

## Counter boring cutters for fine boring heads, Series 112



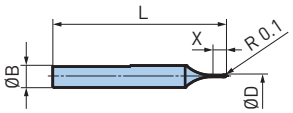




| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 611.152 | K10 | 0.9 - 1.5 | 4 | 4 | 25 | + | + | + |
| | 611.153 | | 1.2 - 1.8 | 6 | | 27 | + | + | + |
| | 611.154 | | 1.5 - 3.5 | 7 | | 28 | + | + | + |
| | 611.155 | | 2.0 - 3.5 | 9 | | 30 | + | + | + |
| | 611.156 | | 3.0 - 5.5 | 14 | | 35 | + | + | + |
| | 611.157 | | 5.0 - 7.5 | 22 | | 38 | + | + | + |
| | 611.253 * | | 7.0 - 9.5 | 28 | 10 | 56 | + | + | + |
| | 611.255 * | | 13.0 - 17.5 | 55 | | 80 | + | + | + |
| | 612.255 * | HSS | 13.0 - 17.5 | 55 | 10 | 80 | | + | + |
| | 615.203 | K10 | 4.0 - 6.0 | 42 | 3.5 | 62 | | + | + |
| | 615.203A | K10C | | | | | + | ++ | |
| | 615.204 | K10 | 5.0 - 7.0 | 54 | 4.5 | 74 | | + | + |
| | 615.204A | K10C | | | | | + | ++ | |

K10 = Uncoated carbide
HSS = High speed steel
K10C = Coated carbide AlCrN
* As long as stock lasts.

| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

## Counter boring cutters for fine boring heads, EWN 04-7

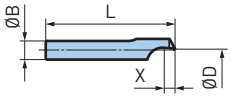



| Boring Cutter | | | | Dimensions | | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Shape | Order No. | Grade | Capacity ØD | X | ØB | L | R | Cast Iron | Steel | Aluminium |
| | 615.541 | K10C | 0.4 - 0.9 | 1.5 | 4 | 30 | 0.05 | + | ++ | ++ |
| | 615.542 | | 0.9 - 1.4 | 3 | | | | + | ++ | ++ |
| | 615.543 | | 1.4 - 2.0 | 5 | | | | + | ++ | ++ |
| | 615.544 | | 1.9 - 3.0 | 6 | | | | + | ++ | ++ |
| | 615.545 | | 2.9 - 4.0 | 10 | | | | + | ++ | ++ |
| | 615.546 | | 3.9 - 5.0 | 13 | | | | + | ++ | ++ |
| | 615.547 | | 4.9 - 7.0 | 16 | | | | + | ++ | ++ |
| | 615.561 | | 0.4 - 0.6 | 1.1 | | 25 | 0.1 | + | ++ | ++ |
| | 615.562 | | 0.6 - 0.8 | 1.5 | | | | + | ++ | ++ |
| | 615.563 | | 0.8 - 1.2 | 2 | | | | + | ++ | ++ |
| | 615.564 | | 1.2 - 1.5 | 2.5 | | | | + | ++ | ++ |
| | 615.565 | | 1.5 - 1.9 | 3.5 | | | 0.2 | + | ++ | ++ |
| | 615.566 | | 1.9 - 3.0 | 4.5 | | | | + | ++ | ++ |
| | 615.551 | K10 | 0.4 - 0.6 | 1.1 | | | 0.1 | + | + | + |
| | 615.552 | | 0.6 - 0.8 | 1.5 | | | | + | + | + |
| | 615.553 | | 0.8 - 1.2 | 2 | | | | + | + | + |
| | 615.554 | | 1.2 - 1.5 | 2.5 | | | | + | + | + |
| | 615.555 | | 1.5 - 1.9 | 3.5 | | | 0.2 | + | + | + |
| | 615.571 | CBN -20 | 1.4 - 2.0 | 3.5 | | 25 | 0.1 | + | ++ | |
| | 615.572 | | 1.9 - 3.0 | 4.5 | | | | + | ++ | |
| | 615.573 | | 2.9 - 4.0 | 8 | | | | + | ++ | |
| | 615.574 | | 3.9 - 5.0 | 11 | | | | + | ++ | |
| | 615.575 | | 4.9 - 6.0 | 16 | | | | + | ++ | |

B.5

### OD turning

The boring cutters are made with flat for cutting edge orientation.

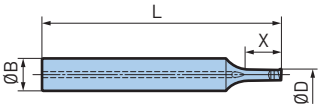



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 615.590 | K10C | 0.2 - 2.3 | 2.2 | 4 | 25 | | + | ++ | ++ |

K10 = Uncoated carbide
K10C = Coated carbide AlCrN

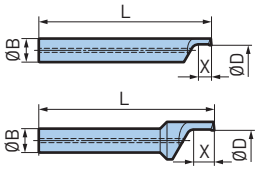
| | |
|---|---|
| | = less suitable |
| + | = suitable |
| ++ | = first choice |

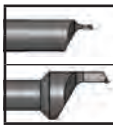
## Counter boring cutters for fine boring heads, EWB 04-12 / EWN04-15 / EWN04-12




| Boring Cutter | | | | Dimensions | | | Work Piece Material | | |
|---|---|---|---|---|---|---|---|---|---|
| Shape | Order No. | Grade | Capacity ØD | X | ØB | L | Cast Iron | Steel | Aluminium |
| | 615.580 | K10C | 0.4 - 1.0 | 1.5 | 6 | 52 | + | ++ | ++ |
| | 615.581 | | 0.9 - 1.5 | 3 | | | + | ++ | ++ |
| | 615.582 | | 1.4 - 2.0 | 5 | | | + | ++ | ++ |
| | 615.583 | | 1.9 - 3.0 | 6 | | | + | ++ | ++ |
| | 615.584 | | 2.9 - 4.0 | 10 | | | + | ++ | ++ |
| | 615.522 | | 0.4 - 1.0 | 1.5 | 7 | | + | ++ | ++ |
| | 615.524 | | 0.9 - 1.5 | 3 | | | + | ++ | ++ |
| | 615.525 | | 1.4 - 2.0 | 5 | | | + | ++ | ++ |
| | 615.501 | | 1.9 - 3.0 | 6 | | | + | ++ | ++ |
| | 615.502 | | 2.9 - 4.0 | 10 | | | + | ++ | ++ |
| | 615.503 | | 3.9 - 5.0 | 13 | | | + | ++ | ++ |
| | 615.504 | | 4.9 - 6.0 | 16 | | | + | ++ | ++ |

### OD turning




| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
|  | 615.530 | K10C | 0.2 - 3.0 | 4 | 7 | 52 | + | ++ | ++ |
| | | | | | | | | | |
| | 615.531 | K10C | 2.0 - 6.0 | 6 | 7 | 52 | + | ++ | ++ |
| | | | | | | | | | |

# Spare Parts


| | |
|---|---|
| Modular Components Shanks | 426 - 428 |
| Indexable Insert Drills / Rough Boring Heads / Insert Holders | 429 - 436 |
| Fine Boring Heads / Centric Insert Holders | 437 - 439 |
| Fine Boring Heads / Peripherical Insert Holders | 440 - 441 |
| Series 318/317 Large Diameter Boring Tools | 442 - 445 |
| Face Grooving / OD Turning / Chamfering / Milling | 446 - 447 |
| Tool Holders / Tapping Attachments | 448 |
| Screws and Wrenches | 449 - 450 |

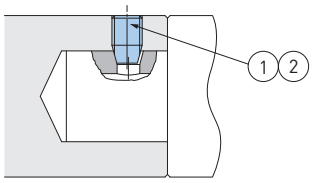


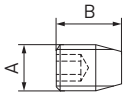

B.6

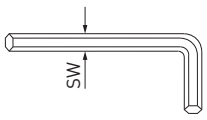
BROTECH

## CKB connection

### CK- screws and allen wrenches



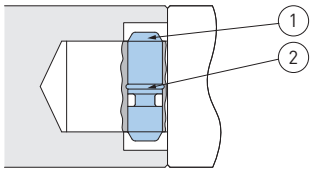



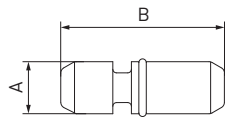




| Clamping Screw | | | | | Allen Wrench | | |
|---|---|---|---|---|---|---|---|
| CK | A | B | ① | M [Nm] * | CK | SW | ② |
| CK1 | M4 x 0.5 | 5 | **690.431** | 1.5 | CK1 | 2 | **690.801** |
| CK2 | M5 x 0.5 | 6.5 | **690.432** | 3.0 | CK2 | 2.5 | **690.802** |
| CK3 | M6 x 0.75 | 8.5 | **690.433** | 4.5 | CK3 | 3 | **690.803** |
| CK4 | M8 x 0.75 | 11 | **690.434** | 7.0 | CK4 | 4 | **690.804** |
| CK5 | M10 x 1 | 14 | **690.435** | 14.0 | CK5 | 5 | **690.805** |
| CK5 | M10 x 1 | 12 | **690.594** * | 14.0 | CK5 | 5 | **690.805** |
| CK6 | M12 x 1 | 18 | **690.436** | 24.0 | CK6 | 6 | **690.806** |
| CK7 | M20 x 1.5 | 29 | **690.437** | 45.0 | CK7 | 10 | **690.808** |

1. * Shanks **326.005 / 329.866**

### Cross bolts and locking rings



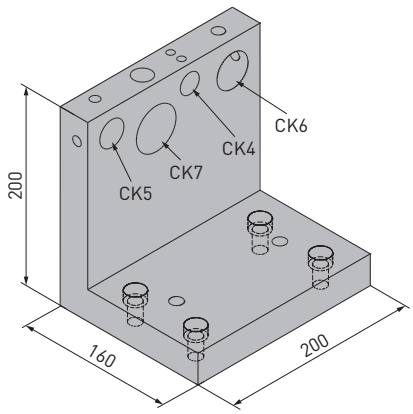
| Cross Bolts | | | | O-Ring | Snap Ring |
|---|---|---|---|---|---|
| CK | A | B | ① | ② | ② |
| CKB1 | 4 | 13.5 | **691.501** | **692.270** | |
| CKB2 | 5 | 17 | **691.502** | **692.271** | |
| CKB3 | 7 | 22 | **691.503** | **692.272** | |
| CKB4 | 8.5 | 26.5 | **691.504** | **692.286** | |
| CKB5 | 11 | 33 | **691.505** | | **693.304** |
| CKB6 | 14 | 43 | **691.506** | | **693.305** |
| CKB7 | 18 | 56 | **691.507** | | **693.306** |

## CKS connection

B.6

### Assembling device for reductions and extensions

The assembly device is used to tighten and loosen the CKS thread bushings in reductions and extensions. The CK connectors of reductions and extensions in the system sizes CK4 - CK7 can be mounted from both sides into the assembly device.




| Order No. |
|---|
| 662.600 |

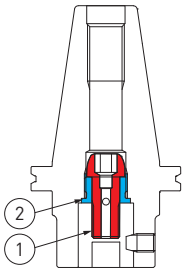
* M = Recommended torque for tightening the screws

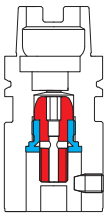


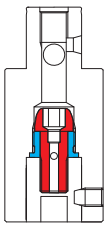
BROTECH

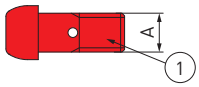
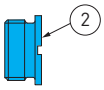
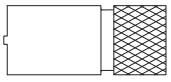
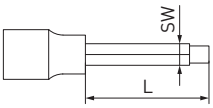
## CKS connection

### CKS components





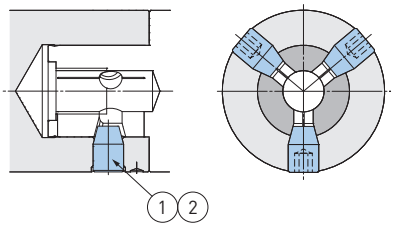
| | | Tension Screw | | | Thread Bushing | Socket Wrench with Thread | Socket Wrench | | |
|---|---|---|---|---|---|---|---|---|---|
| | |   | | |   |  |   | | |
| ISO | CKS | A | | M [Nm] * | | | L | SW | |
| 40 | CKS4 | M12 x 1.5 | 690.126 | 100 | 690.654 | 690.851 | 140 | 8 | 690.847 |
| | CKS5 | M14 x 1.5 | 690.127 | 100 | 690.655 | 690.852 | 140 | 8 | 690.847 |
| | CKS6 | M18 x 2 | 690.128 | 120 | 690.656 | 690.853 | 140 | 10 | 690.848 |
| 50 | CKS5 | M14 x 1.5 | 690.127 | 100 | 690.655 | 690.852 | 140 | 8 | 690.847 |
| | CKS6 | M18 x 2 | 690.129 | 160 | 690.656 | 690.853 | 180 | 12 | 690.855 |
| | CKS7 | M24 x 2 | 690.130 | 200 | 690.657 | 690.854 | 150 | 14 | 690.850 |

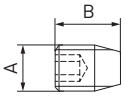
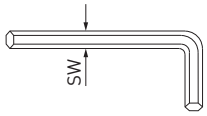
| HSK | CKS | A | | M [Nm] * | | | L | SW | |
|---|---|---|---|---|---|---|---|---|---|
| 63 | CKS4 | M12 x 1.5 | 690.126 | 100 | 690.654 | 690.851 | 140 | 8 | 690.847 |
| | CKS5 | M14 x 1.5 | 690.127 | 100 | 690.655 | 690.852 | 140 | 8 | 690.847 |
| | CKS6 | M18 x 2 | 690.167 | 100 | 690.656 | 690.853 | 140 | 8 | 690.847 |
| 100 | CKS5 | M14 x 1.5 | 690.127 | 100 | 690.655 | 690.852 | 140 | 8 | 690.847 |
| | CKS6 | M18 x 2 | 690.128 | 120 | 690.656 | 690.853 | 140 | 10 | 690.848 |
| | CKS7 | M24 x 2 | 690.168 | 120 | 690.657 | 690.854 | 140 | 10 | 690.848 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CKS4 | M12 x 1.5 | 690.126 | 100 | 690.654 | 690.851 | 140 | 8 | 690.847 |
| | CKS5 | M14 x 1.5 | 690.127 | 100 | 690.655 | 690.852 | 140 | 8 | 690.847 |
| | CKS6 | M18 x 2 | 690.129 | 160 | 690.656 | 690.853 | 140 | 12 | 690.849 |
| | CKS7 | M24 x 2 | 690.130 | 200 | 690.657 | 690.854 | 150 | 14 | 690.850 |

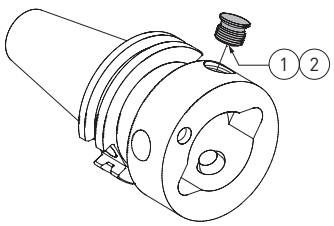
## CKN connection

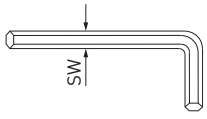
### CK- screws and allen wrenches




| | Clamping Screws | | | Allen Wrenches | |
|---|---|---|---|---|---|
| |   | | |   | |
| CKN | A | B | ① | M [Nm] * | SW | ② |
| CKN6 | M12 x 1 | 18 | 690.436 | 24 | 6 | 690.806 |
| CKN7 | M20 x 1.5 | 29 | 690.437 | 45 | 10 | 690.808 |

### Blind screws

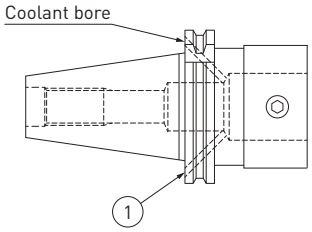



| Blind Screws | | Allen Wrenches | |
|---|---|---|---|
| | |   | |
| Type | ① | SW | ② |
| CKN6 | 690.666 | 6 | 690.806 |
| CKN7 | 690.667 | 10 | 690.810 |

* M = Recommended torque for tightening the screws

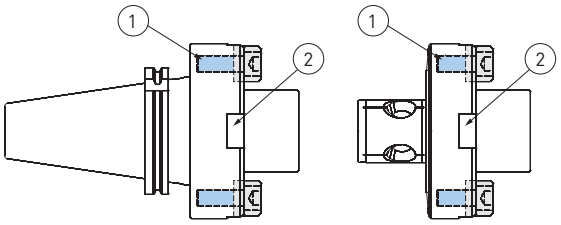
## Shanks

### Set screws for coolant bores




| | | |
|---|---|---|
| ISO | ① | Remarks |
| 30 | 690.451 | |
| 40 | 690.451 | |
| | 690.576 | Only for shanks 323.826, 326.041 |
| | 690.419 | Only for shank 326.163 |
| 50 | 690.576 | |

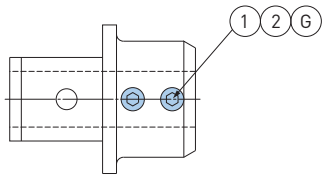
## Shanks and tool holders for bridge tools Series 318, Ø 620 - 3 000 mm




| | | |
|---|---|---|
| Type | ① | ② |
| 328.215 | 690.131 | 691.637 |
| 328.213 | 690.131 | |
| 328.214 | 690.131 | |
| 328.217N | 690.172 | |

## Tool holders and shanks for carbide boring bars

### Clamp screws and Allen wrenches for tool holders with CK connection




| | | | | |
|---|---|---|---|---|
| Type | ① | M [Nm] * | G | ② |
| 335.301 | 690.460 | 8 | M8 | 690.804 |
| 335.302 | 690.452 | 15 | M10 | 690.805 |
| 335.312 | 690.469 | 15 | M10 | 690.805 |
| 335.313 | 690.484 | 75 | M20 | 690.810 |

B.6

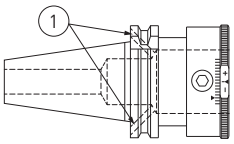
* M = Recommended torque for tightening the screws



BROTECH

## Adjustable drill holder

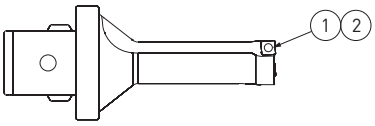
### Set screws for coolant bores



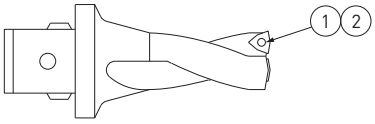

| | |
|---|---|
| Type | ① |
| 336.301 | 690.451 |
| 336.302 | 690.419 |
| 336.303 | 690.419 |
| 336.304 | 690.573 |

## Indexable insert drills, Series 336/337

### Clamp screws for inserts

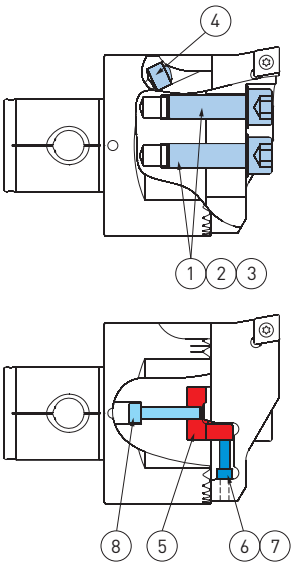



| | | | |
|---|---|---|---|
| Type | ① ** | M [Nm] * | ② |
| WP 337-1 | 694.123 | 0.7 | 694.807 |
| WP 337-2 | 694.130 | 0.7 | 694.807 |
| WP 337-3 | 694.136 | 1.8 | 694.810 |




| | | | |
|---|---|---|---|
| Type | ① ** | M [Nm] * | ② |
| WC 03 | 694.110 | 0.7 | 694.807 |
| WC 04 | 694.124 | 0.7 | 694.807 |
| WC 05 | 694.131 | 0.5 | 694.809 |
| WC 06 | 694.137 | 1.8 | 694.810 |
| WC 08 | 694.143 | 3.0 | 694.815 |
| WC 10 | 694.150 | 6.0 | 694.820 |

## Boring heads for roughing SW, Series 319

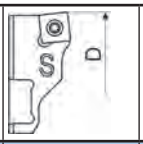
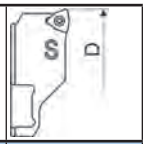



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Type | ① | ② | M [Nm] * | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
| SW20 | 690.188 | 693.175 | 4.0 | 690.803 | | 319.150 | 690.191 | 690.819 | 690.184 |
| SW25 | 690.157 | 693.176 | 7.0 | 690.804 | | 319.250 | 690.192 | 690.819 | 690.186 |
| SW32 | 690.108 | 693.177 | 12.0 | 690.805 | | 319.350 | 690.193 | 690.811 | 690.189 |
| SW41 | 690.163 | 693.178 | 20.0 | 690.806 | | 319.450 | 690.194 | 690.812 | 690.189 |
| SW53 | 690.105 | 693.179 | 35.0 | 690.807 | 692.409 | 319.550 | 690.195 | 690.812 | 690.189 |
| SW68 | 690.106 | 693.179 | 35.0 | 690.807 | 692.406 | 319.650 | 690.196 | 690.813 | 690.101 |
| SW98 x CKB6 | 690.970 | 693.187 | 40.0 | 690.810 | 692.406 | 319.750 | 690.197 | 690.814 | 690.108 |
| SW98 x CKB7 | 690.970 | 693.187 | 40.0 | 690.810 | 692.406 | 319.750 | 690.197 | 690.814 | 690.173 |
| SW148 x CKB6 | 690.970 | 693.187 | 40.0 | 690.810 | 692.406 | 319.750 | 690.197 | 690.814 | 690.108 |
| SW148 x CK7 | 690.970 | 693.187 | 40.0 | 690.810 | 692.406 | 319.750 | 690.197 | 690.814 | 690.173 |

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

## Insert holders

| | Type CC | | | Type SC/SP |  | | Type WC |  | |
|---|---|---|---|---|---|---|---|---|---|
| Type | D | | | D | | | D | | |
| Preferential line | | | | | | | | | |
| SW20 | 20 - 26 | 639.411 | 639.412 | 20 - 26 | 639.111 | 639.112 | | | |
| | 25 - 31 | 639.415 | 639.416 | | | | | | |
| SW25 | 25 - 33 | 639.421 | 639.422 | 25 - 33 | 639.121 | 639.122 | | | |
| | 32 - 40 | 639.425 | 639.426 | | | | | | |
| SW32 | 32 - 42 | 639.431 | 639.432 | 32 - 42 | 639.131 | 639.132 | | | |
| | 41 - 51 | 639.435 | 639.436 | 41 - 51 | 639.135 | 639.136 | | | |
| SW41 | 41 - 54 | 639.441 | 639.442 | 41 - 54 | 639.141 | 639.142 | 49 - 62 | 639.241 | 639.242 |
| | 53 - 66 | 639.445 | 639.446 | 53 - 66 | 639.145 | 639.146 | | | |
| SW53 | 53 - 70 | 639.451 | 639.452 | 53 - 70 | 639.151 | 639.152 | 59 - 76 | 639.251 | 639.252 |
| | 69 - 86 | 639.455 | 639.456 | 69 - 86 | 639.155 | 639.156 | 69 - 86 | 639.255 | 639.252 |
| SW68 | 68 - 90 | 639.461 | 639.462 | 68 - 90 | 639.161 | 639.162 | 73 - 95 | 639.261 | 639.262 |
| | 88 - 110 | 639.465 | 639.466 | 88 - 110 | 639.165 | 639.166 | 90 - 112 | 639.265 | 639.266 |
| SW98 | 98 - 126 | 639.471 | 639.472 | 98 - 126 | 639.171 | 639.172 | 106 - 134 | 639.271 | 639.272 |
| | 125 - 153 | 639.475 | 639.476 | 125 - 153 | 639.175 | 639.176 | 131 - 159 | 639.275 | 639.276 |
| SW148 | 148 - 176 | 639.481 | 639.482 | 148 - 176 | 639.181 | 639.182 | 156 - 184 | 639.281 | 639.282 |
| | 175 - 203 | 639.485 | 639.486 | 175 - 203 | 639.185 | 639.186 | 181 - 209 | 639.285 | 639.286 |

Additional line

| | | | |
|---|---|---|---|
| SW68 | 68 - 90 | 639.561 | 639.562 |
| | 88 - 110 | 639.565 | 639.566 |
| SW98 | 98 - 126 | 639.571 | 639.572 |
| | 125 - 153 | 639.575 | 639.576 |
| SW148 | 148 - 176 | 639.581 | 639.582 |
| | 175 - 203 | 639.585 | 639.586 |

### Clamp screws for inserts

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| CC 06 | 694.122 | 0.7 | 694.807 |
| CC 09 | 694.141 | 3.0 | 694.815 |
| CC 12 | 694.150 | 6.0 | 694.820 |
| CC 16 | 694.150 | 6.0 | 694.820 |

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| SP 06 | 694.122 | 0.7 | 694.807 |
| SC 09 | 694.141 | 3.0 | 694.815 |
| SC 12 | 694.150 | 6.0 | 694.820 |

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| WC 04 | 694.124 | 0.7 | 694.807 |
| WC 05 | 694.131 | 1.5 | 694.809 |
| WC 06 | 694.137 | 1.8 | 694.810 |

B.6

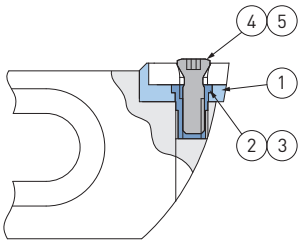
* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench



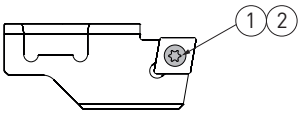
BROTECH

### Insert holders SW, for chamfering




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Type | ① | ② | ③ | | ④ ** | M [Nm] * | ⑤ |
| 639.191 | 695.101 | 691.756 | 690.899 | SC 09 | 694.138 | 3.0 | 694.815 |
| 639.192 | 695.101 | 691.756 | 690.899 | | 694.138 | | 694.815 |
| 639.193 | 695.101 | 691.755 | 690.899 | | 694.138 | | 694.815 |
| 639.194 | 695.102 | 691.757 | 690.804 | SC 12 | 694.145 | 3.0 | 694.815 |
| 639.195 | 695.102 | 691.757 | 690.804 | | 694.145 | | 694.815 |
| 639.196 | 695.102 | 691.757 | 690.804 | | 694.145 | | 694.815 |
| 639.197 | 695.102 | 691.757 | 690.804 | | 694.145 | | 694.815 |

### Insert holders SW, back boring




| | | | |
|---|---|---|---|
| Type | ① ** | M [Nm] * | ② |
| 639.490 | 694.141 | 3.0 | 694.815 |
| 639.491 | 694.141 | | 694.815 |
| 639.492 | 694.150 | 3.0 | 694.820 |
| 639.493 | 694.150 | | 694.820 |

| | | | |
|---|---|---|---|
| Type | ① ** | M [Nm] * | ② |
| 639.494 | 694.150 | 3.0 | 694.820 |
| 639.495 | 694.150 | | 694.820 |
| 639.496 | 694.150 | | 694.820 |
| 639.497 | 694.150 | | 694.820 |

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

## Insert holders for chamfering

Fig. 1

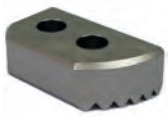


Fig. 2

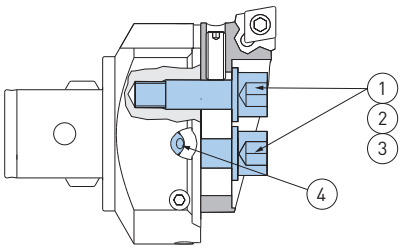
| Model | Fig. 1 | Model | Fig. 2 | | Diameter Range 15° min - max | 30° min - max | 45° min - max | 60° min - max | 75° min - max | L *** |
|---|---|---|---|---|---|---|---|---|---|---|
| CHF-SW41SC09 | 639.191 | DP-SW41 | 639.914 | SC 09 | 33 - 60 | 36 - 62 | 39 - 63 | 43 - 63 | 45 - 62 | 51 |
| CHF-SW53SC09 | 639.192 | DP-SW53 | 639.915 | | 45 - 76 | 48 - 78 | 51 - 79 | 55 - 79 | 57 - 78 | 58 |
| CHF-SW68SC09 | 639.193 | DP-SW68 | 639.916 | | 61 - 97 | 64 - 99 | 67 - 100 | 71 - 100 | 73 - 99 | 68 |
| CHF1-SW98SC12 | 639.194 | DP-SW98 | 639.917 | SC 12 | 77 - 126 | 81 - 128 | 86 - 129 | 90 - 128 | 94 - 127 | 73 / 89 / 119 |
| CHF2-SW98SC12 | 639.195 | | | | 104 - 153 | 108 - 155 | 113 - 156 | 117 - 155 | 121 - 154 | |
| CHF1-SW148SC12 | 639.196 | DP-SW148 | 639.918 | | 131 - 180 | 135 - 182 | 140 - 183 | 144 - 182 | 148 - 181 | 73 / 119 |
| CHF2-SW148SC12 | 639.197 | | | | 158 - 207 | 162 - 209 | 167 - 210 | 171 - 209 | 175 - 208 | |

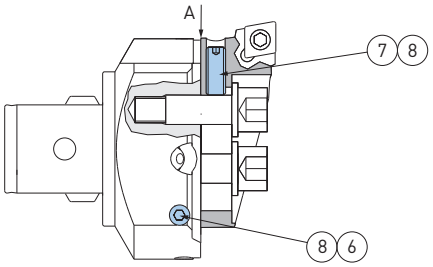
1. *** Adjustment RSS

## Insert holders SW for back boring

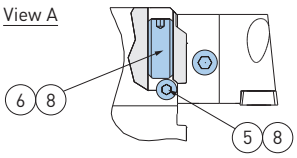
| Model | Fig. 1 | Model | Fig. 2 | | ØD | A | B | L1 | L2 |
|---|---|---|---|---|---|---|---|---|---|
| BB44-54SW32CC09 | 639.490 | DP-SW32 | 639.913 | CC 09 | 44 - 54 | 31 | D-17 / min. 31 | 24 | 38 |
| BB53-66SW41CC09 | 639.491 | DP-SW41 | 639.914 | | 53 - 66 | 39 | D-21 / min. 39 | 29 | 44 |
| BB65-82SW53CC12 | 639.492 | DP-SW53 | 639.915 | CC 12 | 65 - 82 | 50 | D-28 / min. 50 | 34 | 55 |
| BB81-103SW68CC12 | 639.493 | DP-SW68 | 639.916 | | 81 - 103 | 63.5 | D-27 / min. 63.5 | 41 | 66 |
| BB102-130SW98CC12 | 639.494 | DP-SW98 | 639.917 | | 102 - 130 | 90 | 90 | 38 | 69 / 78 / 108 |
| BB129-157SW98CC12 | 639.495 | | | | 129 - 157 | | | | |
| BB156-184SW148CC12 | 639.496 | DP-SW148 | 639.918 | | 156 - 184 | 140 | 140 | 38 | 69 / 108 |
| BB183-211SW148CC12 | 639.497 | | | | 183 - 211 | | | | |

## Boring heads for roughing TW, Series 315

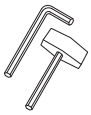


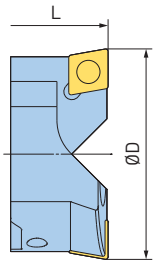

View A




| | | | | | |
|---|---|---|---|---|---|
| Type | ① | ② | M [Nm] * | ③ | ④ |
| TW20 | 315.160 | 693.180 | 4.0 | 690.803 | |
| TW25 | 315.250 | 693.181 | 7.0 | 690.804 | |
| TW32 | 315.350 | 693.182 | 12.0 | 690.805 | |
| TW41 | 315.450 | 693.183 | 20.0 | 690.806 | |
| TW53 | 315.550 | 693.184 | 35.0 | 690.807 | 692.409 |
| TW68 | 315.650 | 693.184 | 35.0 | 690.807 | 692.406 |
| TW98 | 315.750 | 693.185 | 40.0 | 690.810 | 692.406 |
| TW148 | 315.750 | 693.185 | 40.0 | 690.810 | 692.406 |

| | | | | | |  |
|---|---|---|---|---|---|---|
| Type | ⑤ | ⑥ | M [Nm] * | ⑦ | M [Nm] * | ⑧ |
| TW20 | 315.161 | 690.529 | 0.3 | 690.900 | 0.3 | 690.800 |
| TW25 | 315.251 | 690.538 | 0.3 | 690.901 | 0.3 | 690.800 |
| TW32 | 315.351 | 690.451 | 0.8 | 690.902 | 0.8 | 690.811 |
| TW41 | 315.451 | 690.541 | 1.5 | 690.903 | 1.5 | 690.812 |
| TW53 | 315.551 | 690.583 | 2.5 | 690.904 | 2.5 | 690.813 |
| TW68 | 315.651 | 690.586 | 2.5 | 690.906 | 2.5 | 690.813 |
| TW98 | 315.751 | 690.585 | 2.5 | 690.908 | 2.5 | 690.814 |
| TW148 | 315.751 | 690.585 | 2.5 | 690.908 | 2.5 | 690.814 |

## Insert holders TW, Type CC for RSS



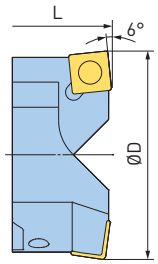

**Additional line**

| Insert Holders Type | ØD | L | Order No. | |
|---|---|---|---|---|
| TW68 | 68 - 90 | 71 | 638.561 | CC 16 |
| | 88 - 110 | 71 | 638.562 | |
| TW98 | 98 - 126 | 71 | 638.571 | |
| | 125 - 153 | 71 | 638.572 | |
| TW98 | 98 - 126 | 87 | 638.571 | |
| | 125 - 153 | 87 | 638.572 | |
| TW98 L | 98 - 126 | 117 | 638.571 | |
| | 125 - 153 | 117 | 638.572 | |
| TW148 | 148 - 176 | 71 | 638.571 | |
| | 175 - 203 | 71 | 638.572 | |
| TW148 | 148 - 176 | 117 | 638.571 | |
| | 175 - 203 | 117 | 638.572 | |

1. The insert holders are sold in pairs.

* M = Recommended torque for tightening the screws

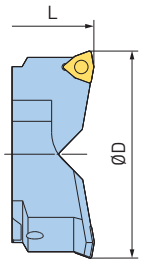
### Insert holders TW, Type SC/SP for RSS




| Insert Holders Type | ØD | L | Order No. | |
|---|---|---|---|---|
| TW20 | 20 - 26 | 32.5 | 638.111 | SP 06 |
| TW25 | 25 - 33 | 35.5 | 638.121 | |
| TW32 | 32 - 42 | 40 | 638.131 | SC 09 |
| | 41 - 51 | 40 | 638.132 | |
| TW41 | 41 - 54 | 47 | 638.141 | |
| | 53 - 66 | 47 | 638.142 | |
| TW53 | 53 - 70 | 57 | 638.151 | SC 12 |
| | 69 - 86 | 57 | 638.152 | |
| TW68 | 68 - 90 | 71 | 638.161 | |
| | 88 - 110 | 71 | 638.162 | |
| TW98 | 98 - 126 | 71 | 638.171 | |
| | 125 - 153 | 71 | 638.172 | |
| TW98 | 98 - 126 | 87 | 638.171 | |
| | 125 - 153 | 87 | 638.172 | |
| TW98 L | 98 - 126 | 117 | 638.171 | |
| | 125 - 153 | 117 | 638.172 | |
| TW148 | 148 - 176 | 71 | 638.171 | |
| | 175 - 203 | 71 | 638.172 | |
| TW148 | 148 - 176 | 117 | 638.171 | |
| | 175 - 203 | 117 | 638.172 | |

1. The insert holders are sold in pairs.

### Insert holders TW, Type WC for RSS and VPS




| Insert Holders Type | ØD | L | Order No. | |
|---|---|---|---|---|
| TW41 | 49 - 62 | 47 | 638.241 | WC 04 |
| TW53 | 59 - 76 | 57 | 638.251 | WC 05 |
| | 69 - 86 | 57 | 638.252 *** | |
| TW68 | 73 - 95 | 71 | 638.261 | WC 06 |
| | 90 - 112 | 71 | 638.262 | |
| TW98 | 106 - 134 | 71 | 638.271 | |
| | 131 - 159 | 71 | 638.272 | |
| TW98 | 106 - 134 | 87 | 638.271 | |
| | 131 - 159 | 87 | 638.272 | |
| TW98 L | 106 - 134 | 117 | 638.271 | |
| | 131 - 159 | 117 | 638.272 | |
| TW148 | 156 - 184 | 71 | 638.271 | |
| | 181 - 209 | 71 | 638.272 | |
| TW148 | 156 - 184 | 117 | 638.271 | |
| | 181 - 209 | 71 | 638.272 | |

1. The insert holders are sold in pairs.

### Clamp screws for inserts

| Type | ** | M [Nm] * | |
|---|---|---|---|
| CC 06 | 694.122 | 0.7 | 694.807 |
| CC 09 | 694.141 | 3.0 | 694.815 |
| CC 12 | 694.150 | 6.0 | 694.820 |
| CC 16 | 694.150 | 6.0 | 694.820 |

| Type | ** | M [Nm] * | |
|---|---|---|---|
| SP 06 | 694.122 | 0.7 | 694.807 |
| SC 09 | 694.141 | 3.0 | 694.815 |
| SC 12 | 694.150 | 6.0 | 694.820 |

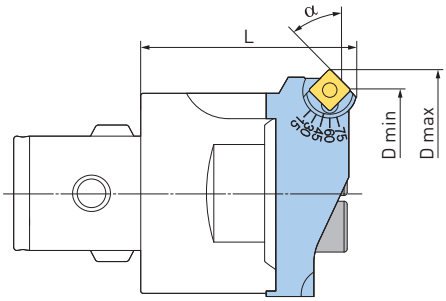
| Type | ** | M [Nm] * | |
|---|---|---|---|
| WC 04 | 694.124 | 0.7 | 694.807 |
| WC 05 | 694.131 | 1.5 | 694.809 |
| WC 06 | 694.137 | 1.8 | 694.810 |

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

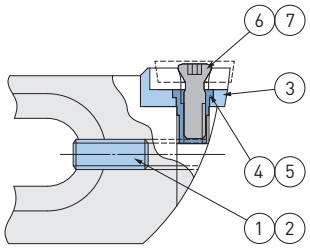
***Pair consisting of insert holders of different size. Only for full profile roughing (VPS).

## Chamfering tool TW, with adjustable chamfering angle



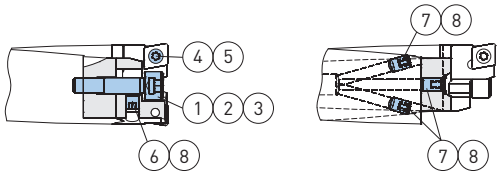

| Boring Head Type | Chamfering Tool Order No. | | Ø-Range |
|---|---|---|---|
| TW41 | 638.104 | SC 09 | 29 - 58 |
| TW53 | 638.105 | | 43 - 75 |
| TW68 | 638.106 | | 61 - 98 |
| TW98 | 638.107 | SC 12 | 79 - 128 |
| | 638.108 | | 109 - 158 |
| TW148 | 638.107 | | 129 - 178 |
| | 638.108 | | 159 - 208 |

### Clamp screws for inserts




| Type | ① | ② | ③ | ④ | ⑤ | ⑥ ** | M [Nm] * | ⑦ | |
|---|---|---|---|---|---|---|---|---|---|
| 638.104 | 690.903 | 690.802 | 695.101 | 691.756 | 690.899 | 694.138 | 3.0 | 694.815 | SC 09 |
| 638.105 | 690.904 | 690.803 | 695.101 | 691.755 | 690.899 | 694.138 | 3.0 | 694.815 | SC 09 |
| 638.106 | 690.905 | 690.803 | 695.101 | 691.755 | 690.899 | 694.138 | 3.0 | 694.815 | SC 09 |
| 638.107 | 690.907 | 690.804 | 695.102 | 691.757 | 690.804 | 694.145 | 3.0 | 694.815 | SC 12 |
| 638.108 | 690.908 | 690.804 | 695.102 | 691.757 | 690.804 | 694.145 | 3.0 | 694.815 | SC 12 |

### Rough boring heads MW




| Type | ① | ② | M [Nm] * | ③ | ④ ** | M [Nm] * | ⑤ | ⑥ ** | ⑦ ** | ⑧ |
|---|---|---|---|---|---|---|---|---|---|---|
| MW1619 | 690.159 | 693.186 | 1 | 690.802 | 694.105 | 0.3 | 694.806 | 690.413 | 690.668 | 690.833 |
| MW1821 | 690.159 | 693.186 | 1 | 680.802 | 694.105 | 0.3 | 694.806 | 690.668 | 690.668 | 690.833 |

B.6

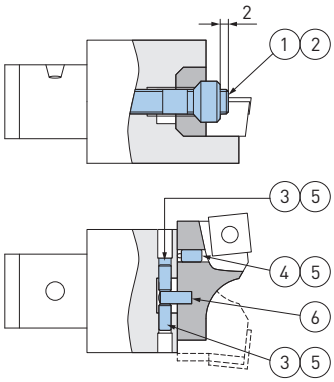
* M = Recommended torque for tightening the screws

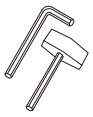
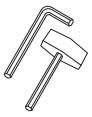
** Per package: 10 screws and 1 wrench



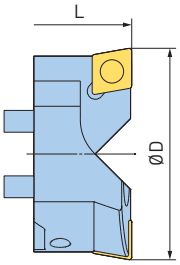
BROTECH

## Boring heads for roughing RW, Series 314




| | | |  | | | |  | |
|---|---|---|---|---|---|---|---|---|
| Type | ① | M [Nm] * | ② | ③ | M [Nm] * | ④ | ⑤ | ⑥ |
| RW25 | 690.603 | 2.0 | 690.811 | 690.467 | 0.2 | 690.467 | 690.833 | 691.371 |
| RW32 | 690.604 | 3.5 | 690.812 | 690.462 | 0.3 | 690.462 | 690.800 | 691.370 |
| RW41 | 690.605 | 10.0 | 690.814 | 690.425 | 0.8 | 690.425 | 690.811 | 691.369 |
| RW53 | 690.606 | 18.0 | 690.805 | 690.464 | 1.5 | 690.466 | 690.812 | 691.372 |
| RW68 | 690.607 | 25.0 | 690.806 | 690.464 | 2.0 | 690.466 | 690.812 | 691.372 |
| RW100 | 690.607 | 25.0 | 690.806 | 690.465 | 2.0 | 690.466 | 690.812 | 691.372 |

### Insert holders RW, Type CC




| Insert Holder Type | ØD | Order No. |
|---|---|---|
| Preferential line | | |
| RW25 | 25 - 33 | 637.421 *** |
| | 30 - 37 | 637.422 *** |
| RW32 | 32 - 42 | 637.431 *** |
| | 40 - 48 | 637.432 *** |
| RW41 | 41 - 54 | 637.441 *** |
| | 51 - 62 | 637.442 *** |
| RW53 | 53 - 70 | 637.451 *** |
| | 66 - 81 | 637.452 *** |
| RW68 | 68 - 88 | 637.461 *** |
| | 86 - 106 | 637.462 *** |
| RW100 | 100 - 125 | 637.463 *** |
| | 125 - 150 | 637.464 *** |
| Additional line | | |
| RW68 | 68 - 88 | 637.561 *** |
| | 86 - 106 | 637.562 *** |
| RW100 | 100 - 125 | 637.563 *** |
| | 125 - 150 | 637.564 *** |

1. The insert holders are sold in pairs.

### Clamp screws for inserts

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| CC 06 | 694.122 | 0.7 | 694.807 |
| CC 09 | 694.141 | 3.0 | 694.815 |
| CC 12 | 694.150 | 6.0 | 694.820 |
| CC 16 | 694.150 | 6.0 | 694.820 |

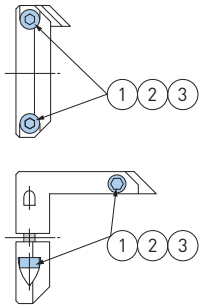
B.6

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

*** As long as stock lasts.

## Clamp screws for chamfering rings

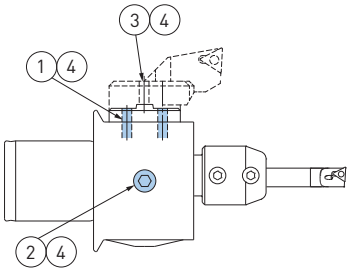


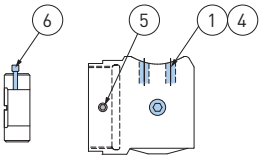

| | | | | |
|---|---|---|---|---|
| Type | ① | ② | M [Nm] * | ③ |
| 20 | 690.101 | 693.175 | 4.0 | 690.803 |
| 25 | 690.102 | 693.176 | 7.0 | 690.804 |
| 32 | 690.103 | 693.176 | 7.0 | 690.804 |
| 41 | 690.104 | 693.176 | 7.0 | 690.804 |
| 53 | 690.105 | 693.131 | 25.0 | 690.807 |
| 68 | 690.106 | 693.131 | 25.0 | 690.807 |
| 90 | 690.106 | 693.131 | 25.0 | 690.807 |

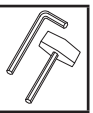
B.6

* M = Recommended torque for tightening the screws

## Fine boring heads EWN, Series 112

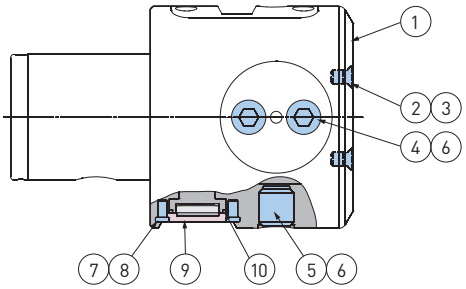


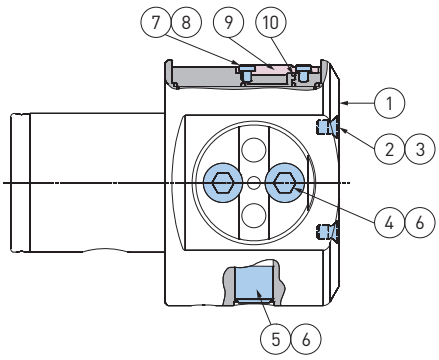



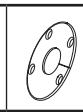

| | | | | | | |  |
|---|---|---|---|---|---|---|---|
| Type | ① | M [Nm] * | ② | M [Nm] * | ③ | M [Nm] * | ④ |
| EWN 04-7 | 690.538 | 0.8 | 690.978 | 0.8 | | | 690.800 |
| EWN 04-12 | 690.417 | 1.2 | 690.417 | 1.2 | | | 690.811 |
| EWN 04-15 | 690.440 | 1.5 | 690.418 | 1.5 | | | 690.812 |
| EWN 04-22 | 690.421 | 2.5 | 690.489 | 2.5 | | | 690.813 |
| EWN 2-32 | 690.460 | 5.0 | 690.449 | 5.0 | | | 690.814 |
| EWN 2-152 | 690.595 | 10.0 | 690.452 | 10.0 | 690.156 | 12.0 | 690.816 |

| | | | |
|---|---|---|---|
| Type | ⑤ | Type | ⑥ |
| EWN 04-22 x ES | 690.417 | 112.271 | 195.003 |
| | | 112.272 | 195.001 |
| EWN 2-32 x ES | 690.582 | 112.353 | 195.001 |
| | | 112.385 | 195.007 |

## Fine boring heads EWD/EWE, Series 112



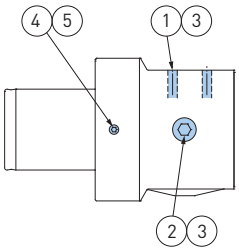




| |  | | | | | | |
|---|---|---|---|---|---|---|---|
| Type | ① | ② | ③ | ④ | M [Nm] | ⑤ | M [Nm] |
| EWD 2-54 | 195.081 [1]<br>195.127 [2] | 690.981 [1]<br>690.614 [2] | 690.843 | 690.457 | 10.0 | 690.469 [1]<br>690.995 [2] | 10.0 |
| EWD 2-32 | 112.371 | 690.611 | 690.836 | 690.460 | 5.0 | 690.996 | 5.0 |
| EWE 2-152 | 112.804 | 690.614 | 690.843 | 690.457 | 10.0 | 690.995 | 10.0 |
| EWE 2-32 | 112.371 | 690.611 | 690.836 | 690.460 | 5.0 | 690.996 | 5.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Type | ⑥ | ⑦ | M [Nm] | ⑨ | ⑩ | ⑧ |
| EWD 2-54 | 690.816 | 690.320 [1] | 4.0 | 112.080 [1] | 692.296 [1] | 690.843 |
| | | 690.994 [2] | 1.0 | 310.905 [2] | 692.381 [2] | 694.808 |
| EWD 2-32 | 690.814 | 690.994 | 1.0 | 310.905 | 692.381 | 694.808 |
| EWE 2-152 | 690.816 | 690.326 | 1.0 | 395.170 | 395.161 | 694.808 |
| EWE 2-32 | 690.814 | 690.326 | 1.0 | 395.170 | 395.161 | 694.808 |

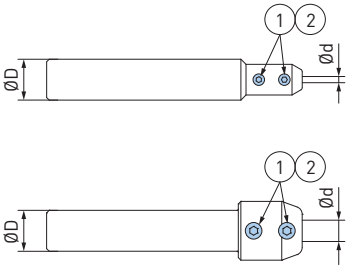
1. [1] Spare parts for boring heads with Order No. 112.109A
2. [2] Spare parts for boring heads with Order No. 112.109B

## Fine boring heads EWB, Series 112



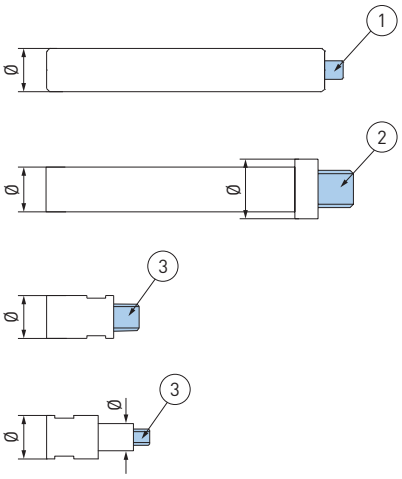

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type | ① | M [Nm] * | ② | M [Nm] * | ③ | ④ | M [Nm] * | ⑤ |
| EWB 2-32 | 690.460 | 4.0 | 690.449 | 4.0 | 690.814 | 112.381 | 0.5 | 690.811 |
| EWB 2-50 | 690.457 | 8.0 | 690.452 | 8.0 | 690.816 | 690.208 | 1.5 | 690.812 |

## Reducers




| Type | Type | | | |
|---|---|---|---|---|
| Ø D - d | Ø D - d | ① | M [Nm] * | ② |
| 12 - 3.5 | 16 - 3.5 | 690.459 | 0.5 | 690.801 |
| 12 - 4.0 | 16 - 4.0 | | | |
| 12 - 4.5 | 16 - 4.5 | | | |
| 12 - 5.0 | 16 - 5.0 | | | |
| 12 - 6.0 | 16 - 6.0 | | | |
| | 16 - 7.0 | 690.489 | 2.5 | 690.803 |
| | 16 - 8.0 | | | |
| | 16 - 9.0 | | | |
| | 16 - 10.0 | | | |

## Tool holders




| Ø | Type | G | ① |
|---|---|---|---|
| 8 | 615.088 | M5 | 690.486 |
| | 615.211 | | 690.486 |
| | 615.212 | | 690.486 |
| 10 | 615.089 | M6 | 690.487A |
| | 615.214 | | 690.487A |
| | 615.215 | | 690.487A |
| | 615.223 | | 690.487A |
| 11 | 615.250 | M6 | 690.487A |

| Ø | Type | G | ① |
|---|---|---|---|
| 12 | 615.218 | M6 | 690.487A |
| | 615.219 | | 690.487A |
| | 615.224 | | 690.487A |
| | 615.225 | | 690.487A |
| 13 | 615.251 | M6 | 690.487A |
| 14 | 615.232 | M6 | 690.487A |
| 16 | 615.226 | M10 | 690.488 |

| Type | Ø | G | ② |
|---|---|---|---|
| 615.216 | 10 / 12 | M6 | 690.487A |
| 615.239 | 12 / 16 | M10 | 690.488 |
| 615.240 | 12 / 16 | M10 | 690.488 |
| 615.243 | 12 / 16 | M10 | 690.488 |

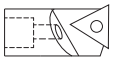
| Type | Ø | G | ③ |
|---|---|---|---|
| 615.220 | 12 | M6 | 690.487A |
| 615.230 | 16 / 10 | M6 | 690.487A |
| 615.231 | 16 / 12 | M6 | 690.487A |

Screws glued in with Locite 270 or Ergo 4101.

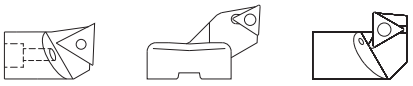
B.6

### Clamp screws for inserts

| Type | ** | M [Nm] * | |
|---|---|---|---|
| WC 02 | 694.101 | 0.5 | 694.806 |



| Type | ** | M [Nm] * | |
|---|---|---|---|
| TP 07 | 694.102 [1] | 0.5 | 694.806 |
| TP 07 | 694.103 | 0.5 | 694.806 |



| Type | ** | M [Nm] * | |
|---|---|---|---|
| TC 11 | 694.122 | 0.7 | 694.807 |

| Type | ** | M [Nm] * | |
|---|---|---|---|
| CC 06 | 694.122 | 0.7 | 694.807 |
| CC 09 | 694.141 | 3.0 | 694.815 |

[1] For Insert holder 615.086/615.207/615.087/615.205/615.271/615.507/615.508

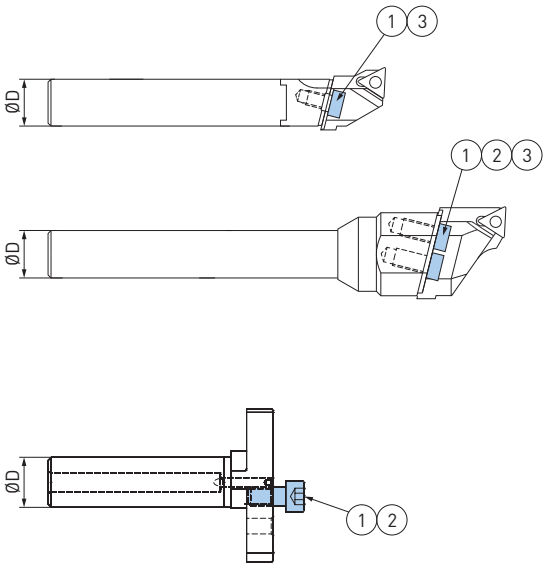
* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench



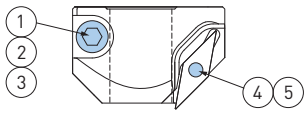
BROTECH

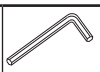
## Adjustable tool holder



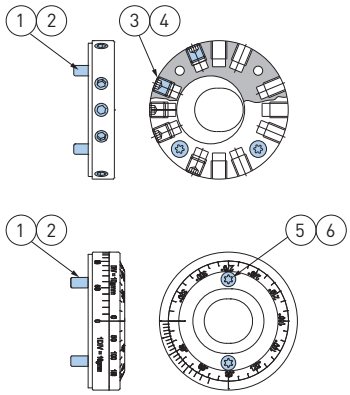

| | | | | | |
|---|---|---|---|---|---|
| ØD | Type | ① | ② | M [Nm] * | ③ |
| 9 | 615.369 | 690.323 | | 1.0 | 690.837 |
| | 615.374 | 690.323 | | 1.0 | 690.837 |
| 11 | 615.371 | 690.324 | | 2.0 | 690.838 |
| | 615.375 | 690.324 | | 2.0 | 690.838 |
| | 615.376 | 690.324 | | 2.0 | 690.838 |
| 13 | 615.373 | 690.183 | | 4.0 | 690.803 |
| | 615.377 | 690.183 | | 4.0 | 690.803 |
| | 615.378 | 690.183 | | 4.0 | 690.803 |
| 16 | 615.252 | 690.113 | | 10.0 | 690.804 |
| | 615.253 | 690.113 | | 10.0 | 690.804 |
| | 615.262 | 690.113 | | 10.0 | 690.804 |
| | 615.265 | 690.113 | | 10.0 | 690.804 |
| | 615.266 | 690.113 | | 10.0 | 690.804 |
| 16 | 615.257 | 690.150 | 615.904 | 17.0 | 690.805 |
| | 615.258 | 690.150 | 615.904 | 17.0 | 690.805 |
| | 615.264 | 690.150 | 615.904 | 17.0 | 690.805 |
| | 615.267 | 690.150 | 615.904 | 17.0 | 690.805 |
| 16 | 615.387B | 690.107 | 693.182 | 12.0 | 690.805 |

## Chamfering rings




| | | | |  | |  | | |
|---|---|---|---|---|---|---|---|---|
| Type | ① | ② | M [Nm] * | ③ | | ④ | M [Nm] * | ⑤ |
| 615.394<br>615.395 | 690.157 | 693.181 | 10.0 | 690.814 | VC 11 | 694.125 | 0.8 | 694.808 |

## Balancing rings

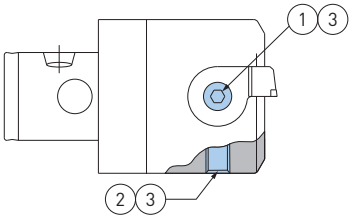



| | | | | | | |
|---|---|---|---|---|---|---|
| Type | ① | ② | ③ ** | ④ | ⑤ | ⑥ |
| 112.387 | 690.611 | 690.836 | 690.541 | 690.812 | | |
| 112.805 | 690.614 | 690.843 | 690.964 | 690.813 | | |
| 112.806 | 690.614 | 690.843 | | | 694.141 | 690.965 |

* M = Recommended torque for tightening the screws

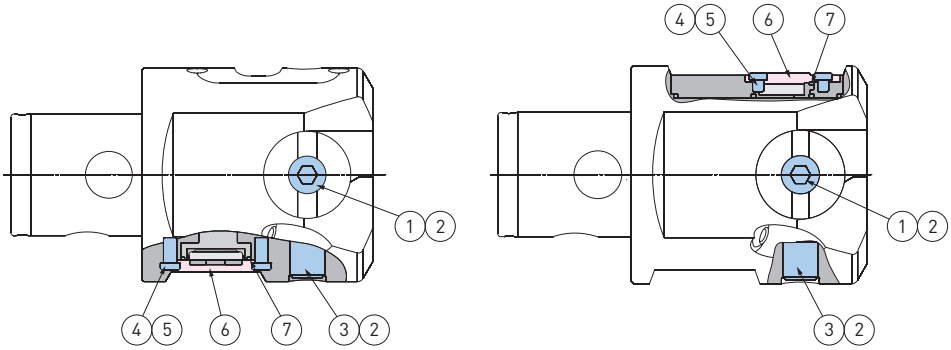
** Per package: 10 screws and 1 wrench

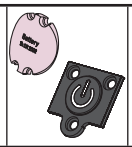
## Fine boring heads EWN, Series 310



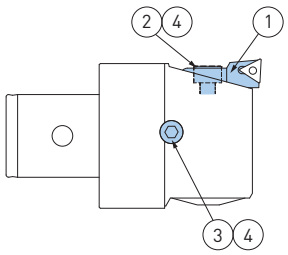

| | | | | | |
|---|---|---|---|---|---|
| Type | ① | M [Nm] * | ② | M [Nm] * | ③ |
| EWN 20 | 690.135 | 1.0 | 690.410 | 0.5 | 690.811 |
| EWN 25 | 690.136 | 1.0 | 690.549 | 0.5 | 690.811 |
| EWN 32 | 690.137 | 2.5 | 690.550 | 1.5 | 690.812 |
| EWN 41 | 690.138 | 3.0 | 690.551 | 2.5 | 690.813 |
| EWN 53 | 690.139 | 6.0 | 690.552 | 6.0 | 690.814 |
| EWN 68 | 690.141 | 12.0 | 690.553 | 10.0 | 690.816 |
| EWN 100 | 690.141 | 12.0 | 690.553 | 10.0 | 690.816 |

## Fine boring heads EWD/EWE, Series 310/318/BIG CAPTO




| | | | | | | | | |  | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type | ① | M [Nm] * | ③ | M [Nm] * | ② | ④ | M [Nm] * | ⑤ | ⑥ | ⑦ |
| EWD 41 | 690.138 | 3.0 | 690.997 | 2.5 | 690.813 | 690.994 | 1.0 | 694.808 | 310.905 | 692.381 |
| EWD 53 | 690.139 | 6.0 | 690.996 | 6.0 | 690.814 | | | | | |
| EWD 68 | 690.141 | 12.0 | 690.469 | 10.0 | 690.816 | | | | | |
| EWD 100 | | | 690.553 | | | | | | | |
| EWD 200 | 690.140 | | 690.469 | | | | | | | |
| EWBD 68 | | | 690.580 | 12.0 | | | | | | |
| EWBD 100 AL | | | | | | | | | | |
| EWE 41 | 690.138 | 3.0 | 690.997 | 2.5 | 690.813 | 690.326 | 1.0 | 694.808 | 395.170 | 395.161 |
| EWE 53 | 690.139 | 6.0 | 690.996 | 6.0 | 690.814 | | | | | |
| EWE 68 | 690.141 | 12.0 | 690.469 | 10.0 | 690.816 | | | | | |
| EWE 100 | 690.141 | | 690.553 | | 690.816 | | | | | |
| EWE 200 | 690.140 | | 690.469 | | 690.816 | | | | | |

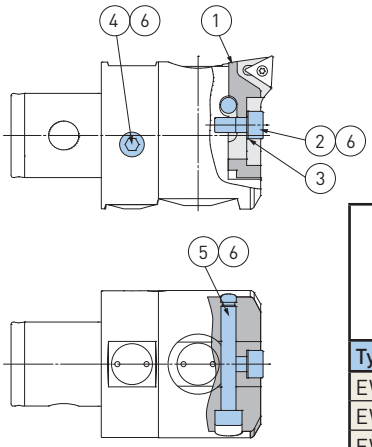
## Fine boring heads EWB, Series 310

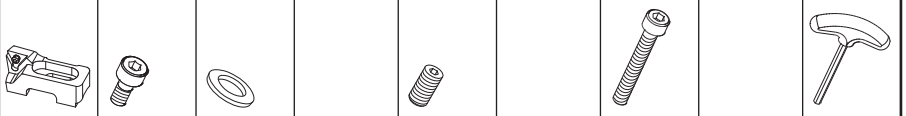



| | | | | | | |
|---|---|---|---|---|---|---|
| Type | ① | ② | M [Nm] * | ③ | M [Nm] * | ④ |
| EWB 32 | 626.231 | 690.137 | 2.5 | 690.577 | 2.5 | 690.812 |
| EWB 41 | 626.241 | 690.138 | 3.0 | 690.578 | 3.0 | 690.813 |
| EWB 53 | 626.251 | 690.139 | 6.0 | 690.579 | 6.0 | 690.814 |
| EWB 68 | 626.261 | 690.140 | 12.0 | 690.580 | 12.0 | 690.816 |
| EWB 85 | 626.261 | 690.140 | 12.0 | 690.580 | 12.0 | 690.816 |
| EWB 100 AL | 626.261 | 690.140 | 12.0 | 690.580 | 12.0 | 690.816 |
| EWB 150 AL | 626.261 | 690.140 | 12.0 | 690.580 | 12.0 | 690.816 |

* M = Recommended torque for tightening the screws

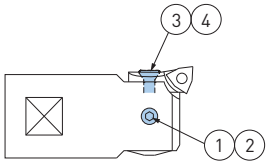
## Fine boring heads EWB-UP, Series 309



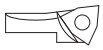
| Type | ① | ② | ③ | M [Nm] * | ④ | M [Nm] * | ⑤ | M [Nm] * | ⑥ |
|---|---|---|---|---|---|---|---|---|---|
| EWB 25 UP | 627.121 | 690.182 | 693.289 | 1.0 | | 1.0 | 690.940 | 1.0 | 690.811 |
| EWB 32 UP | 627.131 | 690.179 | 693.186 | 1.5 | 690.550 | 1.5 | 690.180 | 1.5 | 690.812 |
| EWB 41 UP | 627.141 | 690.176 | 693.175 | 2.5 | 690.943 | 2.5 | 690.115 | 2.5 | 690.813 |
| EWB 53 UP | 627.151 | 690.177 | 693.176 | 4.0 | 690.658 | 4.0 | 690.178 | 4.0 | 690.814 |
| EWB 68 UP | 627.161 | 690.953 | 693.177 | 5.0 | 690.591 | 5.0 | 690.954 | 6.5 | 690.816 |

## Boring heads with thread connection EW 15/EW 18, Series 310



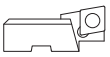
| Type | ① | M [Nm] * | ② | ③ ** | M [Nm] * | ④ |
|---|---|---|---|---|---|---|
| EW 15 | 690.414 | 0.5 | 690.819 | 694.120 | 1.2 | 694.807 |
| EW 18 | 690.416 | 0.5 | 690.819 | 694.120 | 1.2 | 694.807 |

### Clamp screws for inserts



| Type | ** | M [Nm] * | |
|---|---|---|---|
| WC 02 | 694.101 | 0.5 | 694.806 |

| Type | ** | M [Nm] * | |
|---|---|---|---|
| TP 07 | 694.103 | 0.5 | 694.806 |
| TC 11 | 694.122 | 0.7 | 694.807 |



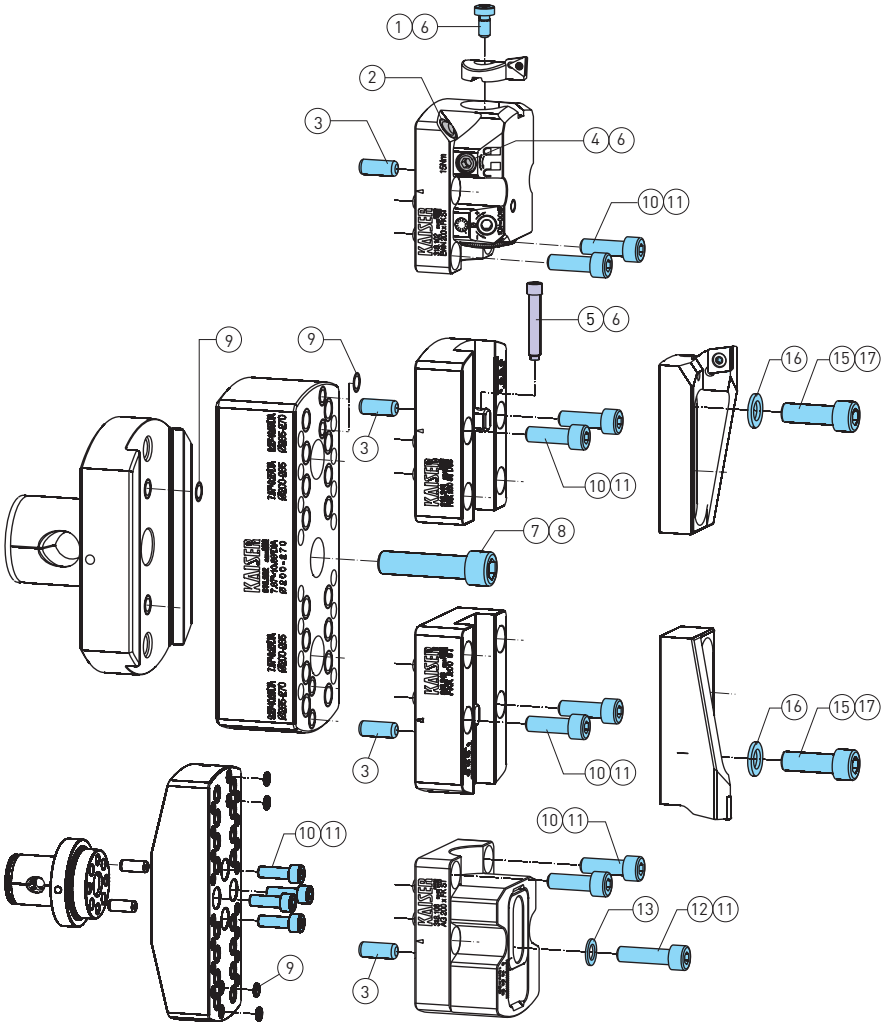
| Type | ** | M [Nm] * | |
|---|---|---|---|
| CC 06 | 694.122 | 0.7 | 694.807 |
| CC 09 | 694.141 | 3.0 | 694.815 |

B.6

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

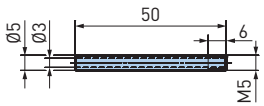
## Lightweight boring tools, Ø 200 - 620 mm, Series 318




| | | | |
|---|---|---|---|
| | | | |
| ① | M [Nm] * | ② | ③ |
| 690.140 | 12.0 | 692.406 | 691.390 |
| | | | |
| ④ | M [Nm] * | ⑤ | ⑥ |
| 690.553 | 10.0 | 317.193 | 690.816 |
| | | | |
| ⑦ | M [Nm] * | ⑧ | ⑨ |
| 690.121 | 45.0 | 690.808 | 692.295 |
| | | | |
| ⑩ | M [Nm] * | ⑪ | |
| 690.163 | 20.0 | 690.806 | |
| | | | |
| ⑫ | ⑬ | M [Nm] * | ⑪ |
| 690.124 | 693.183 | 15.0 | 690.806 |
| | | | |
| ⑮ | ⑯ | M [Nm] * | ⑰ |
| 690.105 | 693.184 | 30.0 | 690.807 |

## Coolant pipe, series 318

| Model | Order No. |
|---|---|
| CP-DM5-50-M5 | 692.415 |




B.6

### Clamp screws for inserts

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| CC 12 | 694.150 | 5.0 | 694.820 |
| CC 16 | 694.150 | 5.0 | 694.820 |

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| SC 12 | 694.144 | 5.0 | 694.820 |

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| WC 08 | 694.143 | 3.0 | 694.815 |

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| TC 11 | 694.122 | 0.7 | 694.807 |

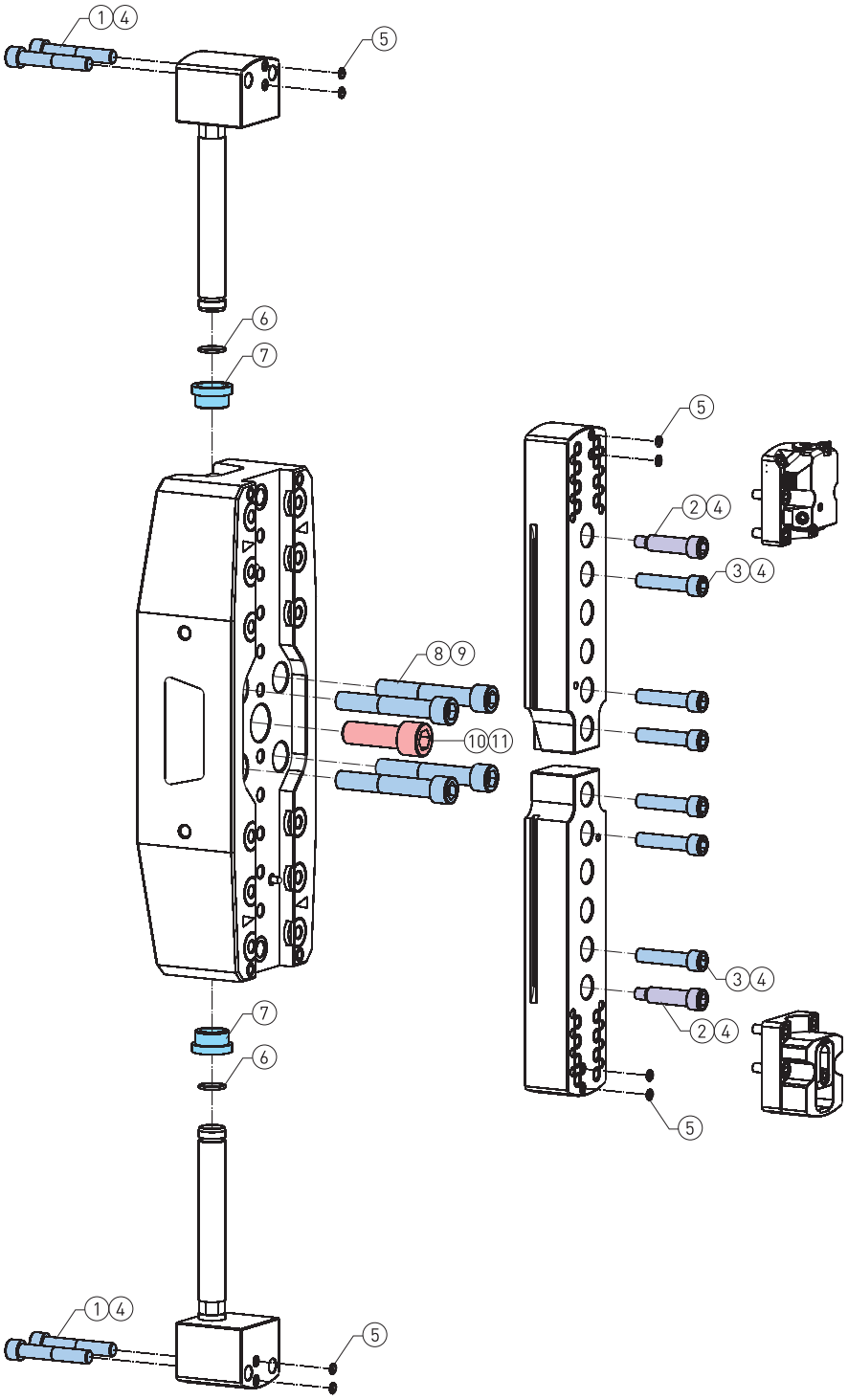
* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench



BROTECH

## Lightweight boring tools, Ø 620 - 3 000 mm, Series 318



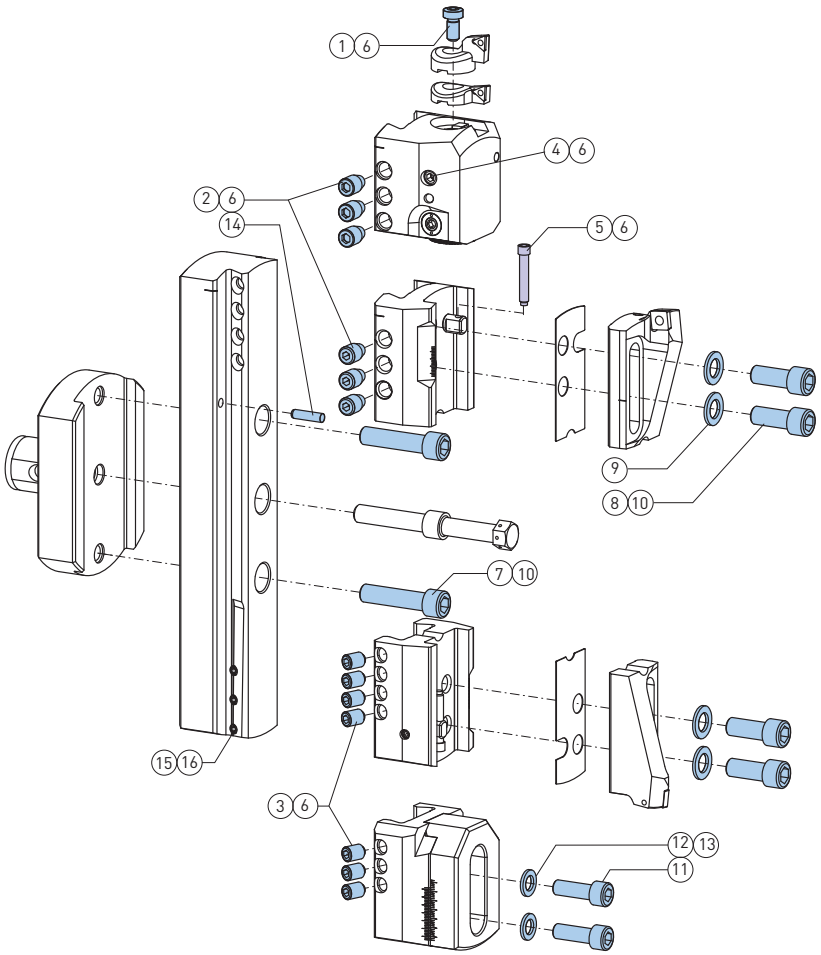

| | | |
|---|---|---|
| | | |
| ① | M [Nm] * | |
| 690.991 | 50 | |
| | | |
| ② | M [Nm] * | |
| 690.989 | 30 | |
| | | |
| ③ | M [Nm] * | ④ |
| 690.132 | 50 | 690.810 |
| | | |
| ⑤ | ⑥ | ⑦ |
| 692.295 | 692.298 | 690.990 |
| | | |
| ⑧ | M [Nm] * | ⑨ |
| 690.984 [1] | 125 | 690.832 |
| 690.985 [2] | | |
| 690.986 [3] | | |
| | | |
| ⑩ | M [Nm] * | ⑪ |
| 690.987 | 250 | 690.861 |

[1] For bridges 318.421/318.422/318.424
[2] For bridge 318.423
[3] For bridge 318.425

B.6

* M = Recommended torque for tightening the screws

## Large diameter boring tools, Series 317




| | | | |
|---|---|---|---|
| | | | |
| ① | M [Nm] * | ② | M [Nm] * |
| 690.141 | 15 | 690.596 | 10 |
| | | | |
| ③ | M [Nm] * | ④ | M [Nm] * |
| 690.469 | | 690.553 | 15 |
| | | | |
| ⑤ | ⑥ | ⑦ | M [Nm] * |
| 317.193 | 690.816 | 690.121 | 120 |
| | | | |
| ⑧ | ⑨ | M [Nm] * | ⑩ |
| 690.172 | 693.185 | 100 | 690.808 |
| | | | |
| ⑪ | ⑫ | M [Nm] * | ⑬ |
| 690.105 | 693.184 | 70 | 690.807 |
| | | | |
| ⑭ | ⑮ | ⑯ | |
| 691.373 | 317.274 | 690.845 | |

### Clamp screws for inserts

B.6

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| CC 12 | 694.150 | 6.0 | 694.820 |
| CC 16 | 694.150 | 6.0 | 694.820 |

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| SC 12 | 694.144 | 5.0 | 694.820 |
| SD 12 | 694.144 | 5.0 | 694.820 |

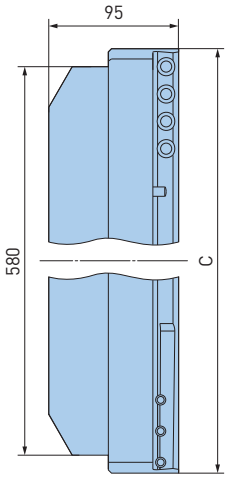
| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| WC 08 | 694.143 | 3.0 | 694.815 |

| | | | |
|---|---|---|---|
| Type | ** | M [Nm] * | |
| TC 11 | 694.122 | 0.7 | 694.807 |

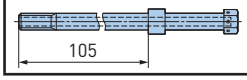
* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

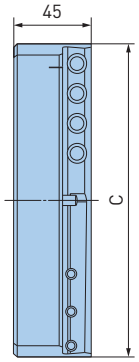
## Extension slides steel




| C | Boring Range | Order No. |
|---|---|---|
| 743 | 760 - 830 | 317.233 * |
| 813 | 830 - 900 | 317.234 * |
| 953 | 970 -1040 | 317.236 * |
| 1023 | 1040 - 1110 | 317.237 * |

| Coolant Nozzle | Order No. |
|---|---|
|   | 389.221 |

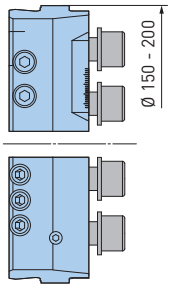
## Extension slides aluminium




| C | Boring Range | Order No. |
|---|---|---|
| 183 | 200 - 270 | 317.252 * |
| 323 | 340 - 410 | 317.254 * |
| 393 | 410 - 480 | 317.255 * |
| 463 | 480 - 550 | 317.256 * |
| 533 | 550 - 620 | 317.257 * |

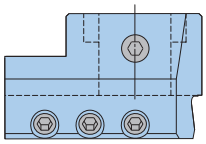
## Clamping bases Ø 150 - 200

| Order No. |
|---|
| 317.288 * |



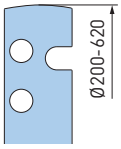

## Tool holders for OD turning

| Type | Order No. |
|---|---|
| CKB5/28 | 317.284 |



## Spacers

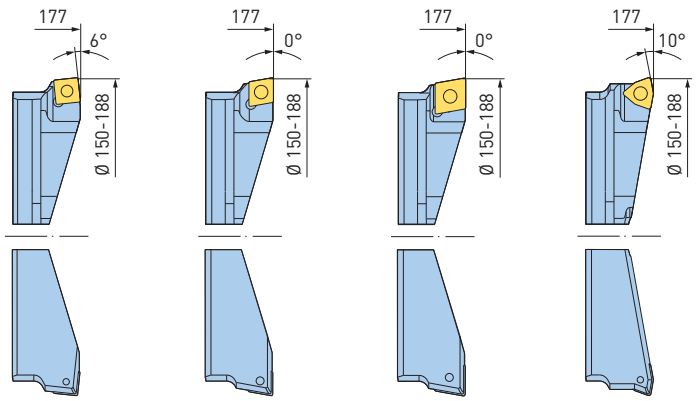
| Spacer 0.5 mm | Order No. |
|---|---|
| Ø 150 - 200 | 317.286 |



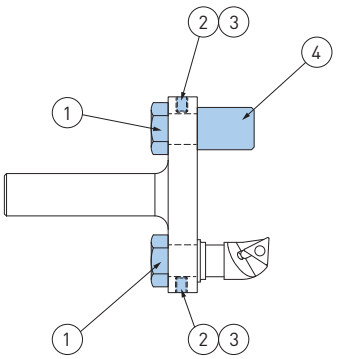

* As long as stock lasts.

## Insert holders Ø 150 - 188

| Order No. | 637.813 | 637.829 | 637.833 | 637.845 |
|---|---|---|---|---|
| Type | SC 12 | CC 12 | CC 16 | WC 08 |

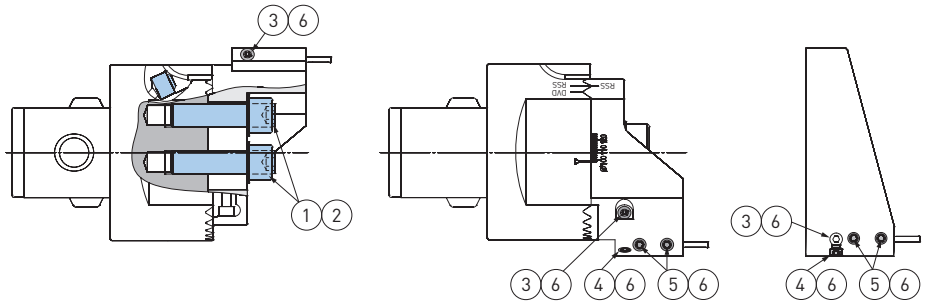


## OD turning / Eccentric bar




| | | | | |
|---|---|---|---|---|
| Type | ① | ② | ③ | ④ |
| 615.390 | 690.716 | 690.573 | 690.813 | 615.903 |

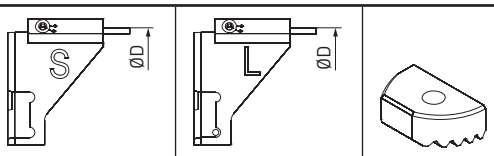
## Face grooving holder SW, Series 318




| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type | ① | M [Nm] * | ② | ③ | ④ | ⑤ | M [Nm] * | ⑥ |
| SW53 | 639.691 | 16 | 690.805 | 639.690 | 690.400 | 690.511 | 2.5 | 690.813 |
| SW68 | 639.691 | 16 | 690.805 | 639.690 | 690.400 | 690.622 | 2.5 | 690.813 |
| SW98xCKN6 | 639.693 | 20 | 690.806 | 639.690 | 690.400 | 690.912 | 2.5 | 690.813 |
| SW98xCKN7 | 639.693 | 20 | 690.806 | 639.690 | 690.400 | 690.912 | 2.5 | 690.813 |
| SW148xCKN6 | 639.693 | 20 | 690.806 | 639.690 | 690.400 | 690.913 | 2.5 | 690.813 |
| SW148xCKN7 | 639.693 | 20 | 690.806 | 639.690 | 690.400 | 690.913 | 2.5 | 690.813 |
| FKW200 (Serie 318) | - | - | - | 637.962 | 690.400 | 690.511 | 2.5 | 690.813 |

B.6

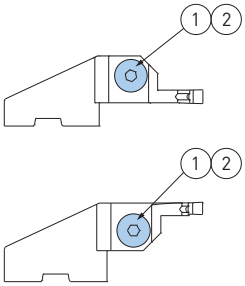
### Face grooving holder / Blind Piece

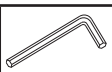


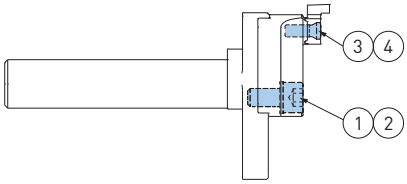

| | | | | |
|---|---|---|---|---|
| Type | ØD | | | |
| SW53 | 53 - 70 | 639.651 | 639.652 | 639.915 |
| SW68 | 68 - 90 | 639.661 | 639.662 | 639.916 |
| | 88 - 110 | 639.665 | 639.666 | |
| SW98 | 98 - 126 | 639.671 | 639.672 | 639.917 |
| | 125 - 153 | 639.675 | 639.676 | |
| SW148 | 148 - 176 | 639.681 | 639.682 | 639.918 |
| | 175 - 203 | 639.685 | 639.686 | |

* M = Recommended torque for tightening the screws

## Insert holders for face grooving



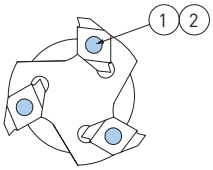

| | | | |  |
|---|---|---|---|---|
| Type | Type | ① | M [Nm] * | ② |
| 626.935 | 626.945 | 690.183 | 4.0 | 690.813 |
| 626.936 | 626.946 | | | |
| 626.937 | 626.947 | | | |
| 626.938 | 626.948 | | | |




| | | | | | | |
|---|---|---|---|---|---|---|
| Type | ① | ② | M [Nm] * | ③ ** | M [Nm] * | ④ |
| 615.387 | 690.107 | 693.182 | 12.0 | 694.143 | 3.0 | 694.815 |
| 615.388 | | | | | | |

## Slot milling cutters

### Clamp screws for inserts



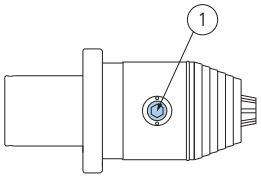

| | | | |
|---|---|---|---|
| Type | ① ** | M [Nm] * | ② |
| 0 | 958.048 | 0.8 | 690.836 |
| 1 | 958.048 | 0.8 | 690.836 |
| 2 | 958.049 | 6.0 | 690.838 |



* M = Recommended torque for tightening the screws

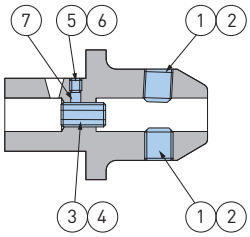
** Per package: 10 screws and 1 wrench

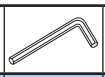
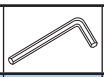
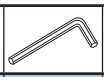
## Drill chuck



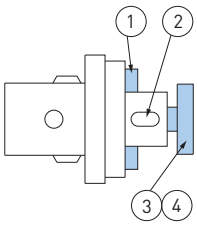

| | | |
|---|---|---|
| Type | ① | M [Nm] * |
| 335.042 | 690.817 | 20 |
| 335.044 | 690.817 | 20 |

## End mill holders




| | | |  | |  | |  | |
|---|---|---|---|---|---|---|---|---|
| Type | ① | M [Nm] * | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 6 | 690.477 | 5 | 690.803 | 690.512 | 690.802 | 690.419 | 690.802 | 691.318 |
| 8 | 690.478 | 10 | 690.804 | 690.513 | 690.803 | 690.489 | 690.803 | 691.316 |
| 10 | 690.479 | 16 | 690.805 | 690.514 | 690.804 | 690.489 | 690.803 | 691.316 |
| 12 | 690.480 | 28 | 690.806 | 690.515 | 690.805 | 690.489 | 690.803 | 691.315 |
| 14 | 690.480 | 28 | 690.806 | 690.515 | 690.805 | 690.489 | 690.803 | 691.315 |
| 16 | 690.481 | 28 | 690.806 | 690.510 | 690.806 | 690.489 | 690.803 | 691.315 |
| 18 | 690.481 | 28 | 690.806 | 690.510 | 690.806 | 690.489 | 690.803 | 691.315 |
| 20 | 690.482 | 42 | 690.807 | 690.510 | 690.806 | 690.489 | 690.803 | 691.315 |
| 25 | 690.483 | 50 | 690.810 | 690.510 | 690.806 | 690.489 | 690.803 | 691.315 |
| 32 | 690.484 | 72 | 690.810 | | | | | |
| 40 | 690.484 | 72 | 690.810 | | | | | |

## Universal milling cutter holders




| | | | | | |
|---|---|---|---|---|---|
| Type | ① | ② | ③ | M [Nm] * | ④ |
| 16 | 691.605 | 691.600 | 690.703 | 18 | 690.805 |
| 22 | 691.606 | 691.601 | 690.704 | 35 | 690.806 |
| 27 | 691.607 | 691.602 | 690.705 | 70 | 690.807 |
| 32 | 691.608 | 691.604 | 690.706 | 80 | 690.810 |
| 40 | 691.609 | 691.603 | 690.707 | 80 | 690.809 |

B.6

* M = Recommended torque for tightening the screws



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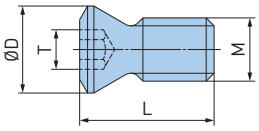
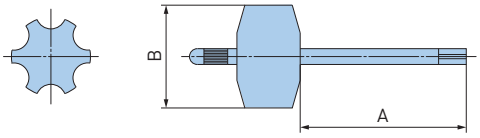
## Clamp screws and wrenches for inserts



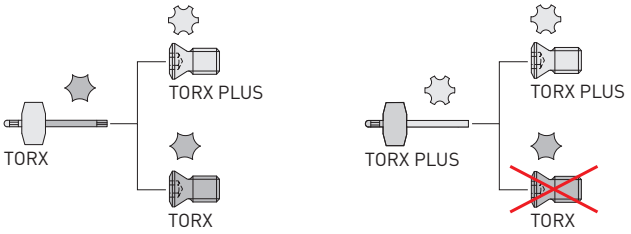

### Screws

| Dimensions | | | | | Torx | Torx Plus |
|---|---|---|---|---|---|---|
| Torx/Torx Plus | Thread M | ØD | L | Nm [1] | Order No. | Order No. |
| T6 | M2 | 3.0 | 4.0 | 0.5 | 335.035 | |
| T6 IP | M2 | 2.7 | 3.6 | | | 694.101 |
| T6 IP | M2 | 2.7 | 4.1 | | | 694.102 |
| T6 IP | M2 | 2.7 | 4.8 | | | 694.103 |
| T7 IP | M2.2 | 3.5 | 6.0 | 0.7 | | 694.110 |
| T7 IP | M2.5 | 3.5 | 6.5 | | | 694.122 |
| T7 IP | M2.5 | 3.5 | 5.8 | | | 694.123 |
| T7 IP | M2.5 | 3.5 | 6.3 | | | 694.124 |
| T7 IP | M2.5 | 4.3 | 5.5 | | | 694.121 |
| T7 IP | M3 | 4.6 | 6.0 | | | 694.130 |
| T8 | M3 | 4.4 | 9.0 | 0.8 | 958.048 | |
| T8 IP | M2.5 | 3.5 | 8.7 | | | 694.125 |
| T9 IP | M3 | 4.4 | 8.2 | 1.5 | | 694.131 |
| T10 | M3 | 4.1 | 7.0 | 1.8 | 335.036 | |
| T10 IP | M3.5 | 4.8 | 9.2 | | | 694.137 |
| T10 IP | M3.5 | 5.5 | 8.2 | | | 694.136 |
| T15 | M4 | 5.7 | 8.2 | 3.0 | 336.905 | |
| T15 IP | M4 | 5.1 | 9.2 | | | 694.141 |
| T15 IP | M4 | 5.5 | 11.8 | | | 694.143 |
| T20 | M5 | 6.6 | 16.5 | 6.0 | 658.049 | |
| T20 | M5 | 7.0 | 12.0 | | 335.037 | |
| T20 IP | M4 | 6.4 | 15.0 | | | 694.144 |
| T20 IP | M4 | 6.5 | 11.6 | | | 694.142 |
| T20 IP | M5 | 7.0 | 13.3 | | | 694.150 |

### Wrench

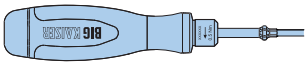
| Dimensions | | | Torx | Torx Plus |
|---|---|---|---|---|
| Torx/Torx Plus | A | B | Order No. | Order No. |
| T6 | 42 | 26 | 690.834 | |
| T6 IP | | | | 694.806 |
| T7 IP | | | | 694.807 |
| T8 | | | 690.836 | |
| T8 IP | | | | 694.808 |
| T9 IP | | | | 694.809 |
| T10 | 50 | 34 | 690.837 | |
| T10 IP | | | | 694.810 |
| T15 | | | 690.843 | |
| T15 IP | | | | 694.815 |
| T20 | | | 690.838 | |
| T20 IP | | | | 694.820 |

### Compatibility TORX - TORX PLUS




| Size | Torque | Set | | Order No. |
|---|---|---|---|---|
| | | Torque Wrench | Torx Blade | |
| Torx 6 | 0.5 Nm | 694.160 | 694.167 | 694.181 |
| Torx 7 | 0.7 Nm | 694.161 | 694.168 | 694.182 |
| Torx 8 | 0.8 Nm | 694.162 | 694.169 | 694.183 |
| Torx 9 | 1.5 Nm | 694.163 | 694.170 | 694.184 |
| Torx 10 | 1.8 Nm | 694.164 | 694.171 | 694.185 |
| Torx 15 | 3.0 Nm | 694.165 | 694.172 | 694.186 |
| Torx 20 | 5.0 Nm | 694.166 | 694.173 | 694.187 |

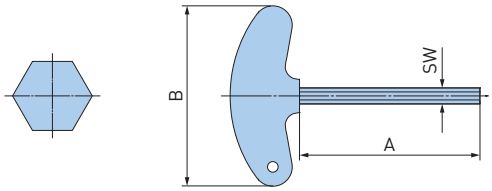
| Size | Torque | Set | | Order No. |
|---|---|---|---|---|
| | | Torque Wrench | Torx Plus Blade | |
| Torx 6 | 0.5 Nm | 694.160 | 694.174 | 694.188 |
| Torx 7 | 0.7 Nm | 694.161 | 694.175 | 694.189 |
| Torx 8 | 0.8 Nm | 694.162 | 694.176 | 694.190 |
| Torx 9 | 1.5 Nm | 694.163 | 694.177 | 694.191 |
| Torx 10 | 1.8 Nm | 694.164 | 694.178 | 694.192 |
| Torx 15 | 3.0 Nm | 694.165 | 694.179 | 694.193 |
| Torx 20 | 5.0 Nm | 694.166 | 694.180 | 694.194 |



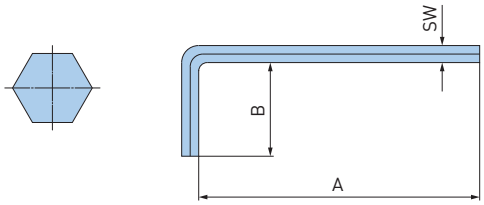
[1] Maximum tightening torque

The clamping screws for the inserts are supplied in packages of 10 pieces with a corresponding wrench.

## Wrenches



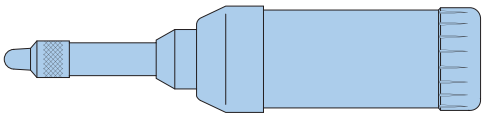

| A | B | SW | Order No. |
|---|---|---|---|
| 50 | 45 | 1.5 | 690.819 |
| | | 2 | 690.811 |
| | | 2.5 | 690.812 |
| | | 3 | 690.813 |
| | | 4 | 690.814 |
| 70 | 65 | 5 | 690.816 |
| | | 6 | 690.817 |




| A | B | SW | Order No. |
|---|---|---|---|
| 42 | 14 | 1.3 | 690.833 |
| 50 | | 1.5 | 690.800 |
| 50 | 16 | 2 | 690.801 |
| 56 | 18 | 2.5 | 690.802 |
| 63 | 20 | 3 | 690.803 |
| 67 | 24 | 3.5 | 690.899 |
| 71 | 25 | 4 | 690.804 |
| 80 | 28 | 5 | 690.805 |
| 90 | 32 | 6 | 690.806 |
| 100 | 36 | 8 | 690.807 |
| 112 | 40 | 10 | 690.810 |
| 200 | | | 690.808 |
| 125 | 45 | 12 | 690.809 |
| 140 | 56 | 14 | 690.832 |
| 140 | 63 | 17 | 690.861 |

## Lubrication gun

| Order No. |
|---|
| 692.404A |



**Lubricant**

For lubricating the fine boring heads type AW, EW, EWN, EWD, EWB, EWB-UP a light machine oil of the following types is recommended:

- Mobil Vactra Oil No. 2
- BP Energol HLP-32

The lubricating instructions are shown in the operating instructions that are included with each head.

# Indexable End Mills


| | |
|---|---|
| Fullcut Mill FCM | 452 - 458 |
| Fullcut Mill FCM Arbor Type | 459 |
| Fullcut Mill FCM Inserts | 460 - 462 |
| Fullcut Mill FCR | 463 - 466 |
| Fullcut Mill FCR Inserts | 467 - 469 |
| Contact Grip | 470 - 473 |
| Spare Parts | 474 |
| Surface Mill | 475 |
| Speed Finisher | 476 - 477 |




C.1

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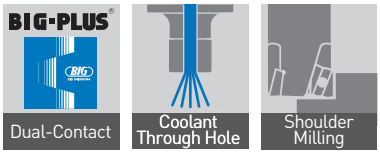
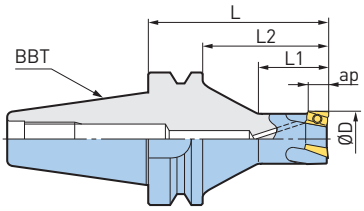
# Fullcut Mill FCM




The indexable endmill that combines sharpness and rigidity.

## For Standard Type with FCM

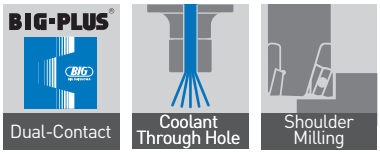



BIG-PLUS® tools can be used in machining centers with conventional spindles.

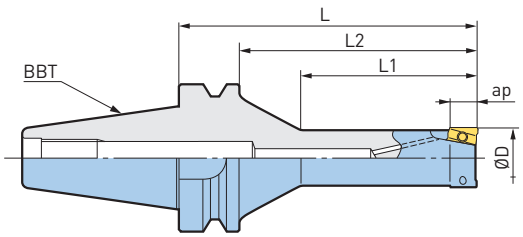
| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | BBT30 -FCM16092 - 65 | **966.216** | 9 | 65 | 23 | 43 | 2 | ARG16 | 0.50 |
| 20 | -FCM20093 - 65 | **966.217** | | | 28 | 43 | 3 | ARG20 | 0.51 |
| 25 | -FCM25093 - 65 | **966.218** | | | 33 | 43 | 3 | ARG25 | 0.55 |
| 32 | -FCM32113 - 65 | **966.219** | 11 | | 38 | 43 | 3 | ARG32 | 0.60 |
| 40 | -FCM40114 - 50 | **966.220** | | 50 | 25 | 28 | 4 | ARG40 | 0.60 |
| 50 | -FCM50115 - 50 | **966.120** | | | 28 | | 5 | | 0.73 |
| 16 | BBT40 -FCM16092 - 85 | **966.221** | 9 | 85 | 23 | 58 | 2 | ARG16 | 1.2 |
| | -105 | **966.121** | | 105 | 30 | 78 | | | 1.3 |
| | -120 | **966.122** | | 120 | 25 | 93 | | | 1.4 |
| | -150 | **966.123** | | 150 | | 123 | | | 1.7 |
| 20 | -FCM20093 - 85 | **966.222** | 9 | 85 | 28 | 58 | 3 | ARG20 | 1.2 |
| | -105 | **966.124** | | 105 | 35 | 78 | | | 1.3 |
| | -120 | **966.125** | | 120 | 30 | 93 | | | 1.4 |
| | -150 | **966.126** | | 150 | | 123 | | | 1.7 |
| 25 | -FCM25093 - 85 | **966.223** | 9 | 85 | 33 | 58 | 3 | ARG25 | 1.2 |
| | -120 | **966.127** | | 120 | 45 | 93 | | | 1.4 |
| | -135 | **966.128** | | 135 | 40 | 108 | | | 1.6 |
| | -165 | **966.129** | | 165 | | 138 | | | 1.9 |
| 32 | -FCM32113 - 85 | **966.224** | 11 | 85 | 38 | 58 | 3 | ARG32 | 1.3 |
| | -120 | **966.130** | | 120 | 60 | 93 | | | 1.5 |
| | -135 | **966.131** | | 135 | 50 | 108 | | | 1.7 |
| | -165 | **966.132** | | 165 | 40 | 138 | | | 2.1 |
| 40 | -FCM40114 - 85 | **966.225** | 11 | 85 | 43 | 58 | 4 | ARG40 | 1.4 |
| | -120 | **966.133** | | 120 | 65 | 93 | | | 1.7 |
| | -135 | **966.134** | | 135 | 60 | 108 | | | 2.0 |
| | -165 | **966.135** | | 165 | 50 | 138 | | | 2.4 |
| 50 | -FCM50115 - 70 | **966.226** | 11 | 70 | 38 | 43 | 5 | | 1.5 |
| | -120 | **966.136** | | 120 | 65 | 93 | | | 2.2 |
| | -135 | **966.137** | | 135 | 60 | 108 | | | 2.4 |
| | -165 | **966.138** | | 165 | 50 | 138 | | | 3.0 |

1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 460
For Cutting Condition ▶ 459
For BBT50 Adapter ▶ 453




## For Long Nose Type with BBT




BIG-PLUS® tools can be used in machining centers with conventional spindles.

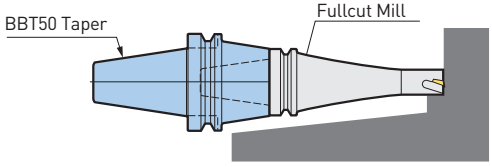
| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | BBT30 -FCM16092L - 85 | **966.081** | 9 | 85 | 45 | 63 | 2 | ARG16 | 0.52 |
| 20 | -FCM20092L - 85 | **966.082** | | | 50 | 63 | | ARG20 | 0.55 |
| 25 | -FCM25092L - 85 | **966.083** | | | 50 | 63 | | ARG25 | 0.62 |
| 32 | -FCM32112L - 85 | **966.084** | 11 | | 60 | 63 | | ARG32 | 0.71 |
| 16 | BBT40 -FCM16092L -105 | **966.085** | 9 | 105 | 45 | 78 | 2 | ARG16 | 1.3 |
| | -120 | **966.086** | | 120 | | 93 | | | 1.4 |
| 20 | -FCM20092L -120 | **966.087** | 9 | 120 | 60 | 93 | 2 | ARG20 | 1.4 |
| | -135 | **966.088** | | 135 | | 108 | | | 1.5 |
| 25 | -FCM25092L -135 | **966.089** | 9 | 135 | 75 | 108 | 2 | ARG25 | 1.5 |
| | -150 | **966.090** | | 150 | | 123 | | | 1.7 |
| 32 | -FCM32112L -135 | **966.091** | 11 | 135 | 80 | 108 | 2 | ARG32 | 1.7 |
| | -150 | **966.092** | | 150 | 90 | 123 | | | 1.9 |

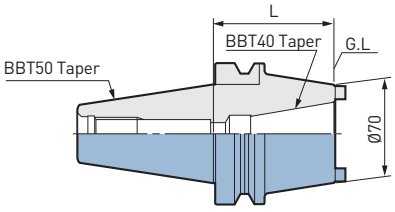
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 460
For Cutting Condition ▶ 459

## Adapter for BBT50 taper shank (FCR & FCM)

An adapter for use of the BBT40 (Fullcut Mill) on BBT50/BT50 to machines.

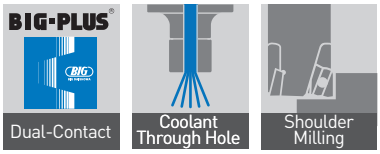



| Model | Order No. | L |
|---|---|---|
| BBT50 -BBT40 -50 | **803.730** | 50 |
| -90 | **803.731** | 90 |

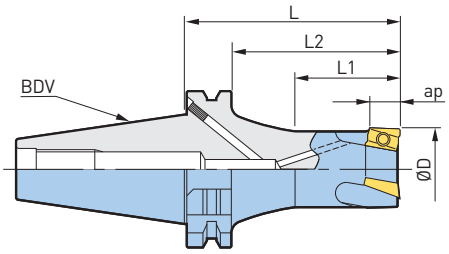
Combination with the long type enables further workpiece interference countermeasures.

# Fullcut Mill FCM




The indexable endmill that combines sharpness and rigidity has no match.

## For Standard Type with BDV




BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | BDV40 -FCM16092 - 85 | **966.206** | 9 | 85 | 23 | 65 | 2 | ARG16 | 1.2 |
| | -105 | **966.161** | | 105 | 35 | 85 | | | 1.3 |
| | -120 | **966.162** | | 120 | 34 | 100 | | | 1.4 |
| 20 | -FCM20093 - 85 | **966.207** | | 85 | 35 | 65 | 3 | ARG20 | 1.2 |
| | -105 | **966.163** | | 105 | 40 | 85 | | | 1.3 |
| | -120 | **966.164** | | 120 | 39 | 100 | | | 1.4 |
| 25 | -FCM25093 - 85 | **966.208** | | 85 | 33 | 65 | | ARG25 | 1.2 |
| | -120 | **966.165** | | 120 | 45 | 100 | | | 1.4 |
| | -135 | **966.166** | | 135 | 40 | 115 | | | 1.6 |
| 32 | -FCM32113 - 85 | **966.209** | 11 | 85 | 38 | 65 | | ARG32 | 1.3 |
| | -120 | **966.167** | | 120 | 60 | 100 | | | 1.5 |
| | -135 | **966.168** | | 135 | 50 | 115 | | | 1.7 |
| 40 | -FCM400114 - 85 | **966.210** | | 85 | 45 | 65 | 4 | ARG40 | 1.4 |
| | -120 | **966.169** | | 120 | 65 | 100 | | | 1.7 |
| | -135 | **966.170** | | 135 | 60 | 115 | | | 2.0 |
| 50 | -FCM50115 - 70 | **966.211** | | 70 | 50 | 50 | 5 | ARG40 | 1.5 |
| | -120 | **966.171** | | 120 | 100 | 100 | | | 2.2 |
| | -135 | **966.172** | | 135 | 115 | 115 | | | 2.4 |

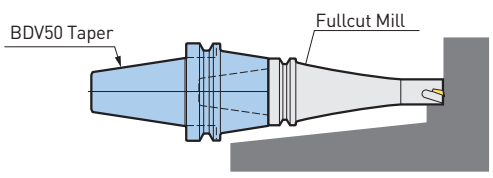
1. Wrench is included. Inserts are to be ordered separately.

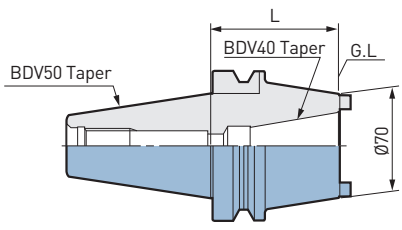
For Insert ▶ 460
For Cutting Condition ▶ 459

## Adapter for BDV50 taper shank (FCR & FCM)

C.1

An adapter for use of the BDV40 (Fullcut Mill) on BDV50/DV50 to machines.




| Model | Order No. | L |
|---|---|---|
| BDV50 -BDV40 -50 | **805.856** | 50 |
| -90 | **805.857** | 90 |

Combination with the long type enables further workpiece interference countermeasures.



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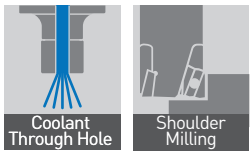
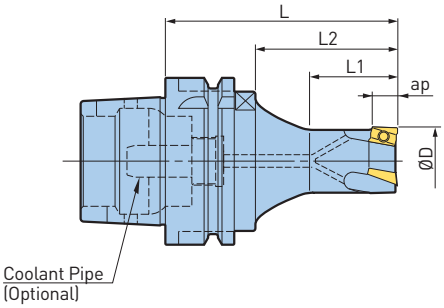



## For Standard Type with HSK-A



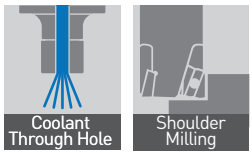

| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | HSK-A40 -FCM16092 - 65 | **966.101** | 9 | 65 | 23 | 37 | 2 | ARG16 | 0.3 |
| 20 | -FCM20093 - 65 | **966.102** | | | 28 | | 3 | ARG20 | 0.3 |
| 25 | -FCM25093 - 65 | **966.103** | | | 35 | | | ARG25 | 0.4 |
| 32 | -FCM32113 - 65 | **966.104** | 11 | | | | | ARG32 | 0.5 |
| 40 | -FCM40114 - 65 | **966.105** | | | 45 | - | 4 | ARG40 | 0.6 |
| 50 | -FCM50115 - 65 | **966.106** | | | | | 5 | | 0.7 |
| 16 | HSK-A50 -FCM16092 - 75 | **966.107** | 9 | 75 | 23 | 41 | 2 | ARG16 | 0.6 |
| 20 | -FCM20093 - 75 | **966.108** | | | 28 | | 3 | ARG20 | 0.6 |
| 25 | -FCM25093 - 75 | **966.109** | | | 33 | | | ARG25 | 0.6 |
| 32 | -FCM32113 - 75 | **966.110** | 11 | | 39 | | | ARG32 | 0.7 |
| 40 | -FCM40114 - 75 | **966.111** | | | 48 | - | 4 | ARG40 | 0.9 |
| 50 | -FCM50115 - 75 | **966.112** | | | | - | 5 | | 1.0 |
| 16 | HSK-A63 -FCM16092 - 85 | **966.231** | 9 | 85 | 23 | 51 | 2 | ARG16 | 0.9 |
| | -105 | **966.141** | | 105 | 30 | 71 | | | 1.0 |
| | -120 | **966.142** | | 120 | 25 | 86 | | | 1.1 |
| | -150 | **966.143** | | 150 | 25 | 116 | | | 1.3 |
| 20 | -FCM20093 - 85 | **966.232** | | 85 | 28 | 51 | 3 | ARG20 | 1.0 |
| | -105 | **966.144** | | 105 | 35 | 71 | | | 1.1 |
| | -120 | **966.145** | | 120 | 30 | 86 | | | 1.2 |
| | -150 | **966.146** | | 150 | 30 | 116 | | | 1.4 |
| 25 | -FCM25093 - 85 | **966.233** | | 85 | 33 | 51 | | ARG25 | 1.0 |
| | -120 | **966.147** | | 120 | 45 | 86 | | | 1.2 |
| | -135 | **966.148** | | 135 | 40 | 101 | | | 1.3 |
| | -165 | **966.149** | | 165 | 40 | 131 | | | 1.5 |
| 32 | -FCM32113 - 85 | **966.234** | 11 | 85 | 38 | 51 | | ARG32 | 1.1 |
| | -120 | **966.150** | | 120 | 60 | 86 | | | 1.3 |
| | -135 | **966.151** | | 135 | 50 | 101 | | | 1.4 |
| | -165 | **966.152** | | 165 | 40 | 131 | | | 1.7 |
| 40 | -FCM40114 - 85 | **966.235** | | 85 | 43 | 51 | 4 | ARG40 | 1.3 |
| | -120 | **966.153** | | 120 | 65 | 86 | | | 1.5 |
| | -135 | **966.154** | | 135 | 60 | 101 | | | 1.7 |
| | -165 | **966.155** | | 165 | 50 | 131 | | | 2.1 |
| 50 | -FCM50115 - 70 | **966.236** | | 70 | 28 | 28 | 5 | ARG40 | 1.3 |
| | -120 | **966.156** | | 120 | 78 | 78 | | | 1.9 |
| | -135 | **966.157** | | 135 | 93 | 93 | | | 2.2 |
| | -165 | **966.158** | | 165 | 123 | 123 | | | 2.8 |

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

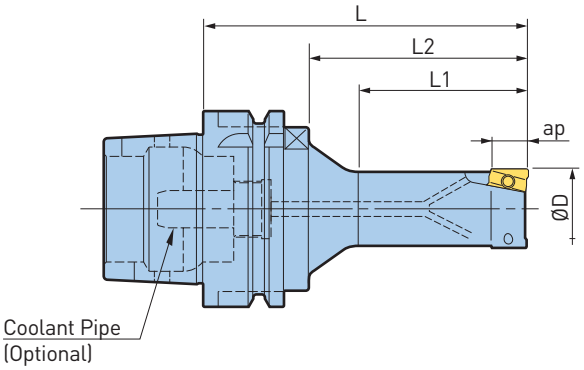
For Insert ▶ 460
For Cutting Condition ▶ 459
For Coolant Pipe ▶ 174

# Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.




## For Long Nose Type with HSK-A

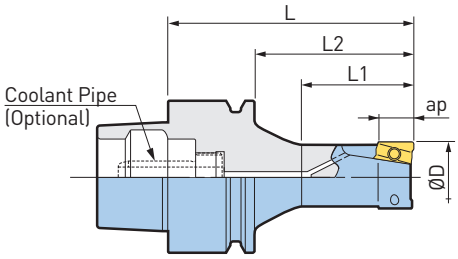



| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | HSK-A63 -FCM16092L- 85 | **966.093** | 9 | 85 | 40 | 51 | 2 | ARG16 | 0.9 |
| | -120 | **966.094** | | 120 | 45 | 86 | | | 1.0 |
| 20 | -FCM20092L-105 | **966.095** | 9 | 105 | 50 | 71 | 2 | ARG20 | 1.1 |
| | -120 | **966.096** | | 120 | 60 | 86 | | | 1.2 |
| 25 | -FCM25092L-105 | **966.097** | 9 | 105 | 55 | 71 | 2 | ARG25 | 1.1 |
| | -120 | **966.098** | | 120 | 65 | 86 | | | 1.2 |
| 32 | -FCM32112L -120 | **966.099** | 11 | 120 | 70 | 86 | 2 | ARG32 | 1.3 |
| | -135 | **966.100** | | 135 | 80 | 101 | | | 1.4 |

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 460
For Cutting Condition ▶ 459
For Coolant Pipe ▶ 174

## For Standard Type with HSK-E




C.1

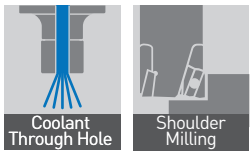
| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | HSK -E25 -FCM16092 -45 | **966.173** | 9 | 45 | 23 | 35 | 2 | ARG16 | 0.17 |
| | -E32 -FCM16092 -55 | **966.174** | | 55 | 23 | 35 | | | 0.20 |
| | -E40 -FCM16092 -65 | **966.115** | | 65 | 28 | 45 | | | 0.45 |

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

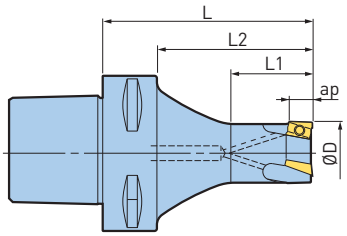
For Insert ▶ 460
For Cutting Condition ▶ 459
For Coolant Pipe ▶ 174

**Caution**

As the HSK-E type interface does not have drive key grooves, there is a risk that it may slip in the machine spindle and damage it if cutting load exceeds clamping force of the machine tool. Starting from the lowest possible conditions, increase them gradually while observing the cutting status, and find the optimum with sufficient safety margin.




## For Standard Type with BIG CAPTO




| Cutter Dia. ØD | Model | Order No. | L | L1 | L2 | ap | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | C5 -FCM16092 -65 | **805.858** | 65 | 23 | 45 | 9 | 2 | ARG16 | 0.5 |
| | -90 | **805.859** | 90 | 30 | 70 | | | | 0.6 |
| 20 | -FCM20093 -65 | **973.609** | 65 | 28 | 45 | 9 | 3 | ARG20 | 0.5 |
| | -90 | **805.860** | 90 | 35 | 70 | | | | 0.6 |
| 25 | -FCM25093 -65 | **805.861** | 65 | 33 | 45 | 9 | 3 | ARG25 | 0.6 |
| | -90 | **805.862** | 90 | 40 | 70 | | | | 0.7 |
| 32 | -FCM32113 -65 | **805.863** | 65 | 38 | 45 | 11 | 3 | ARG32 | 0.6 |
| | -90 | **805.864** | 90 | 45 | 70 | | | | 0.8 |
| 40 | -FCM40114 -50 | **805.865** | 50 | 25 | 30 | 11 | 4 | ARG40 | 0.6 |
| | -90 | **805.866** | 90 | 60 | 70 | | | | 1.0 |
| 50 | -FCM50115 -50 | **805.867** | 50 | 25 | 30 | 11 | 5 | | 0.7 |
| | -90 | **805.868** | 90 | 65 | 70 | | | | 1.0 |

1. Wrench is included.
2. Inserts are to be ordered separately.

For Insert ▶ 460
For Cutting Condition ▶ 459



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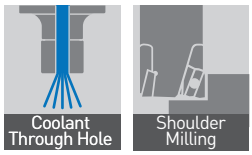
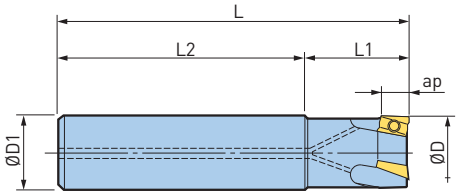
# Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.




## For Long Nose Type with Cylindrical Shank



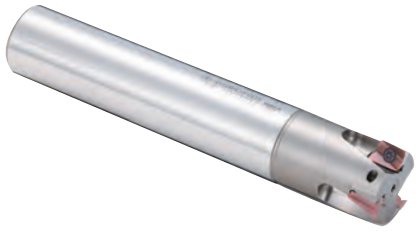

| Cutter Dia. ØD | Model | | | Order No. | ØD1 | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | ST16 | -FCM12091 | - 90 | **966.237** | 16 | 9 | 90 | 15 | 70 | 1 | ARG16 | 0.1 |
| 14 | | -FCM14091 | - 90 | **966.238** | | | | 17 | | | | 0.1 |
| 16 | | -FCM16092 | - 90 | **966.239** | | | | 25 | 65 | 2 | | 0.1 |
| 20 | ST20 | -FCM20093 | -110 | **966.240** | 20 | 9 | 110 | 30 | 80 | 3 | ARG20 | 0.2 |
| 25 | ST25 | -FCM25093 | -120 | **966.241** | 25 | 9 | 120 | 35 | 85 | 3 | ARG25 | 0.4 |
| 32 | ST32 | -FCM32113 | -130 | **966.242** | 32 | 11 | 130 | 35 | 95 | 3 | ARG32 | 0.7 |
| 40 | | -FCM40114 | -130 | **966.243** | | | | 40 | 90 | 4 | ARG40 | 0.8 |
| | | | -180 | **802.963** | | | 180 | | 140 | | | 1.2 |
| 50 | | -FCM50115 | -130 | **966.244** | | | 130 | | 90 | 5 | | 1.0 |

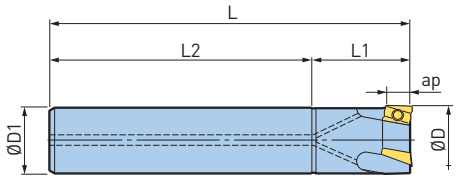
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 460
For Cutting Condition ▶ 459

## For Oversize Type with Cylindrical Shank

"Thin wall" at deep pocket & deep shoulder endmilling.






| Cutter Dia. ØD | Model | | | Order No. | ØD1 | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | ST16 | -FCM17092 | -120 | **966.181** | 16 | 9 | 120 | 25 | 95 | 2 | ARG16 | 0.2 |
| 21 | ST20 | -FCM21092 | -165 | **966.182** | 20 | 9 | 165 | 30 | 135 | 2 | ARG20 | 0.4 |
| | | -FCM21093 | -135 | **966.183** | | | 135 | | 105 | 3 | | 0.3 |
| 26 | ST25 | -FCM26092 | -165 | **966.184** | 25 | 9 | 165 | 38 | 127 | 2 | ARG25 | 0.6 |
| | | -FCM26093 | -150 | **966.185** | | | 150 | | 112 | 3 | | 0.6 |
| 33 | ST32 | -FCM33112 | -180 | **966.186** | 32 | 11 | 180 | 48 | 132 | 2 | ARG32 | 1.1 |
| | | -FCM33113 | -180 | **966.187** | | | 180 | | 132 | 3 | | 1.0 |

1. Wrench is included. Inserts are to be ordered separately.
2. For medium-heavy or heavy slot milling with projection longer than 2.5 times of diameter, 2-flutes models are recommended.

For Insert ▶ 460
For Cutting Condition ▶ 459

### Application Example

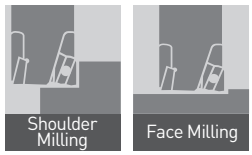
| | |
|---|---|
| Model | ST32-FCM33112-180 |
| Material | C55 (S55C) |
| Cutting Speed Vc (m/min.) | 120 |
| Feed Rate fz (mm/tooth) | 0.1 |
| Axial DOC ap (mm) | 10 mm x 10 steps |
| Radial DOC ae (mm) | Max. 33 mm |

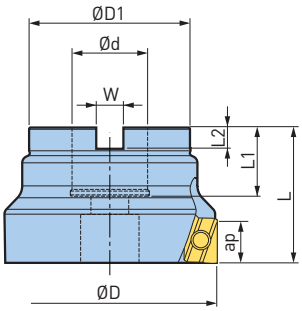
**Result**

Deep shoulder endmilling is achieved with 110 mm projection length and 10 mm axial depth.

# Fullcut Mill FCM, Arbor Type

Corresponding to Form FMH of new standard face milling adapter.






## Form FMH

| Cutter Dia. ØD | Model | Order No. | ap | Ød | ØD1 | L | L1 | L2 | W | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | FMH22 -FCM50115 -40 | **966.212** | 11 | 22 | 47 | 40 | 20 | 6 | 10.4 | 5 | ARG40 | 0.5 |
| 63 | -FCM63116 -40 | **966.213** | | | | | | | | 6 | ARG63 | 0.7 |
| 80 | FMH27 -FCM80116 -50 | **966.214** | 11 | 27 | 60 | 50 | 22 | 7 | 12.4 | 6 | ARG80 | 1.2 |
| 100 | -FCM100116-50 | **805.461** | | | 76 | | | | | | ARG80 | 2.0 |

1. Wrench is included. Inserts are to be ordered separately.

For FMH Type BBT ▶ 72
For FMH Type BDV ▶ 111
For FMH Type HSK ▶ 146
For Insert ▶ 460

## Application Example

**Indexable Insert Endmill, achieving the excellent squareness and fine surface finish**
Machined by Fullcut Mill model: FMH22-FCM63116-40
Arbor model: BBT40-FMH22-47-45

**Squareness**

| | |
|---|---|
| Cutting Speed Vc (m/min.) | 150 |
| Feed Rate fz (mm/tooth) | 0.1 |
| Axial DOC ap (mm) | 5 |
| Radial DOC ae (mm) | 0.1 |

| | |
|---|---|
| **BIG KAISER** | 10 µm |
| Other manufacturer | 40 µm |

**Wiper cutting edge**

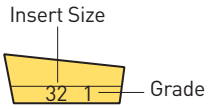
| | |
|---|---|
| Cutting Speed Vc (m/min.) | 250 |
| Feed Rate fz (mm/tooth) | 0.2 |
| Axial DOC ap (mm) | 0.1 |
| Radial DOC ae (mm) | 50 |

| | |
|---|---|
| **BIG KAISER** | Ra=0.51 µm |
| Other manufacturer | Ra=1.56 µm |

# Fullcut Mill FCM

## Indexable Inserts

**Marking Description**




1: ACZ310
2: DS20
P2: ACP200
M3: ACM300S
P3: ACP300

| Model | Cutter Dia. ØD | ap | Nose R | P | | M | K | N |
|---|---|---|---|---|---|---|---|---|
| | | | | ACP200 | ACP300 | ACM300S | ACZ310 | DS20 |
| ARG160902 | 12 - 17 | 9 | 0.2 | - | 978.812 | 978.833 | 800.488 | 978.801 |
| ARG160904 | | | 0.4 | 978.827 | 966.245 | 805.869 | 966.248 | 966.249 |
| ARG200902 | 20, 21 | 9 | 0.2 | - | 978.813 | 978.834 | 800.046 | 978.807 |
| ARG200904 | | | 0.4 | 978.804 | 966.250 | 805.870 | 966.253 | 966.254 |
| ARG250902 | 25, 26 | 9 | 0.2 | - | 978.814 | 978.835 | 800.047 | 978.803 |
| ARG250904 | | | 0.4 | 800.048 | 966.255 | 805.871 | 966.258 | 966.259 |
| ARG321102 | 32, 33 | 11 | 0.2 | - | 978.828 | 978.836 | 800.049 | 966.270 |
| ARG321104 | | | 0.4 | 800.051 | 966.260 | 805.872 | 966.263 | 966.264 |
| ARG401102 | 40, 50 | 11 | 0.2 | - | 800.052 | 978.837 | 800.053 | 978.821 |
| ARG401104 | | | 0.4 | 978.809 | 966.265 | 805.873 | 966.268 | 966.269 |
| ARG631104 | 63 | 11 | 0.4 | | 978.829 | 806.257 | | 978.830 |
| ARG631108 | | | 0.8 | 978.810 | 966.280 | 978.838 | 966.283 | 966.284 |
| ARG801104 | 80, 100 | 11 | 0.4 | | 978.831 | 806.258 | | 978.832 |
| ARG801108 | | | 0.8 | 978.811 | 966.285 | 978.839 | 966.288 | 966.289 |

1. ACP300 is first recommendation for steel and ACM300S is first recommendation for stainless steel.

For Spare Parts ▸ 474

**Caution**

- It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.
- Nose radius 0.2 inserts are suitable for light cutting.
- There is no compatibility with those of FCR type.

**Insert classifications**

| ISO | Grade | Material | Coating |
|---|---|---|---|
| P20 | ACP200 | Prehardened steel | TiAlN / AlCrN |
| P30 | ACP300 | General steel | |
| M30 | ACM300S | Stainless steel | TiAlN / TiCN |
| K10 | ACZ310 | Cast iron | |
| N20 | DS20 | Aluminium | DLC |

C.1

**Note**

It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.



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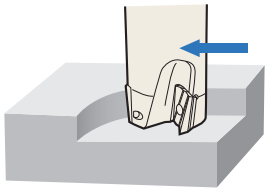
# Fullcut Mill FCM

## Recommended Cutting Condition

**Shoulder milling and slot milling**



## Finish-light cutting

| Cutter Dia. | Work Material | Carbon Steel Alloy Steel | Unalloyed Steel | Prehardened Steel < HRC40 | Stainless Steel | Cast Iron | Aluminium |
|---|---|---|---|---|---|---|---|
| | Insert Grade | ACP300 | | ACP200 | ACM300S (ACZ350S) | ACZ310 | DS20 |
| | Cutting Fluid | Dry | | | Dry/Wet | Dry | Dry/Wet |
| Ø12 - Ø14 | Speed (m/min) | 150 - 250 | 180 - 250 | 80 - 140 | 140 - 180 | 100 - 200 | 200 - 750 |
| | Feed (mm/tooth) | 0.1 - 0.2 | 0.1 - 0.2 | 0.08 - 0.12 | 0.12 - 0.18 | 0.1 - 0.2 | 0.1 - 0.3 |
| Ø16 - Ø21 | Speed (m/min) | 150 - 250 | 180 - 250 | 80 - 140 | 140 - 180 | 100 - 200 | 200 - 1000 |
| | Feed (mm/tooth) | 0.1 - 0.2 | 0.1 - 0.2 | 0.08 - 0.12 | 0.12 - 0.18 | 0.1 - 0.2 | 0.1 - 0.3 |
| Ø25 - Ø33 | Speed (m/min) | 180 - 280 | 200 - 280 | 80 - 140 | 140 - 200 | 100 - 200 | 200 - 1500 |
| | Feed (mm/tooth) | 0.1 - 0.24 | 0.1 - 0.22 | 0.08 - 0.14 | 0.12 - 0.2 | 0.1 - 0.2 | 0.1 - 0.35 |
| Ø40 - Ø50 | Speed (m/min) | 180 - 280 | 200 - 280 | 80 - 140 | 140 - 200 | 80 - 200 | 200 - 1500 |
| | Feed (mm/tooth) | 0.1 - 0.24 | 0.1 - 0.22 | 0.08 - 0.14 | 0.12 - 0.2 | 0.1 - 0.2 | 0.1 - 0.35 |
| Ø63 - Ø100 | Speed (m/min) | 100 - 220 | 150 - 240 | 80 - 120 | 120 - 180 | 100 - 200 | 200 - 1500 |
| | Feed (mm/tooth) | 0.1 - 0.24 | 0.1 - 0.22 | 0.08 - 0.14 | 0.12 - 0.2 | 0.1 - 0.25 | 0.1 - 0.35 |

**Caution**

Fullcut Mill, FCM type, cannot be used for feeding in Z-axis such as ramping, plunging and boring.

## Medium-heavy cutting

| Cutter Dia. | Work Material | Carbon Steel Alloy Steel | Unalloyed Steel | Stainless Steel | Cast Iron | Aluminium |
|---|---|---|---|---|---|---|
| | Insert Grade | ACP300 | | ACM300S (ACZ350S) | ACZ310 | DS20 |
| | Cutting Fluid | Dry | | Dry/Wet | Dry | Dry/Wet |
| Ø12 - Ø14 | Speed (m/min) | 100 - 200 | 150 - 200 | 120 - 180 | 100 - 180 | 200 - 750 |
| | Feed (mm/tooth) | 0.08 - 0.14 | 0.1 - 0.15 | 0.12 - 0.15 | 0.08 - 0.18 | 0.1 - 0.2 |
| Ø16 - Ø21 | Speed (m/min) | 100 - 200 | 150 - 200 | 120 - 180 | 100 - 180 | 200 - 1000 |
| | Feed (mm/tooth) | 0.08 - 0.14 | 0.1 - 0.15 | 0.12 - 0.15 | 0.08 - 0.18 | 0.1 - 0.2 |
| Ø25 - Ø50 | Speed (m/min) | 100 - 200 | 160 - 220 | 120 - 180 | 100 - 200 | 200 - 1500 |
| | Feed (mm/tooth) | 0.1 - 0.16 | 0.1 - 0.15 | 0.12 - 0.15 | 0.08 - 0.2 | 0.1 - 0.3 |
| Ø63 - Ø100 | Speed (m/min) | 100 - 200 | 150 - 200 | 120 - 180 | 100 - 180 | 200 - 750 |
| | Feed (mm/tooth) | 0.08 - 0.18 | 0.1 - 0.16 | 0.12 - 0.15 | 0.1 - 0.2 | 0.1 - 0.3 |

**Caution**

- Nose radius 0.2 inserts are suitable for light cutting.
- Care should be taken in the selection of both axial & radial depth of cut as well as the feed rate.
- This table is a general guideline for cutting data. Please adjust according to machine and workpiece conditions, as well as width of cutting.
- Dry cutting (including air blow) is recommended when cutting of steel, except for finishing.
- Dry cutting is recommended for stainless steel. However use soluble oil in a case where severe built-up edge occurs.

# Fullcut Mill FCM

## Application Examples

### Slot milling

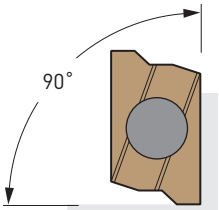
| | |
|---|---|
| Fullcut Mill | BBT40-FCM32113-85 |
| Insert | ARG321104 (ACP300) |
| Work Material | C50 (S50C) |
| Cutting Speed Vc (m/min.) | 150 |
| Feed Rate fz (mm/tooth) | 0.12 |
| Axial DOC ap (mm) | 9 |

Only Fullcut Mill was capable of achieving this data in a No.40 spindle taper machine.

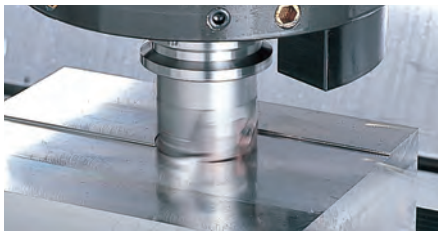
### Shoulder milling

| | |
|---|---|
| Fullcut Mill | BBT40-FCM32113-85 |
| Insert | ARG321104 (ACP300) |
| Work Material | C50 (S50C) |
| Cutting Speed Vc (m/min.) | 200 |
| Feed Rate fz (mm/tooth) | 0.15 |
| Axial DOC ap (mm) | 11 |
| Radial DOC ae (mm) | 5 |

Excellent perpendicularity is achieved.




### Face milling



| | |
|---|---|
| Fullcut Mill | BBT40-FCM50115-70 |
| Insert | ARG401104 (ACP300) |
| Work Material | C50 (S50C) |
| Cutting Speed Vc (m/min.) | 200 |
| Feed Rate fz (mm/tooth) | 0.15 |
| Axial DOC ap (mm) | 1 |
| Radial DOC ae (mm) | 30 |

Finishing surface roughness was Ry = 2.53 at Vc = 200, fz = 0.15 cutting data.

| | Surface Roughness Ry |
|---|---|
| BIG KAISER | 2.53 |
| Manufacturer A | 3.75 |
| Manufacturer B | 4.32 |

### Material of low machinability

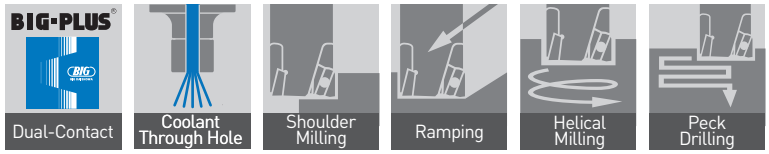
| | |
|---|---|
| Fullcut Mill | ST25-FCM25093-120 |
| Holder | BBT50-MEGA25D-105 |
| Insert | ARG250904 (ACM300S) |
| Work Material | SUS304 Stainless steel |
| Cutting Speed Vc (m/min.) | 150 |
| Feed Rate fz (mm/tooth) | 0.2 |
| Axial DOC ap (mm) | 9 |
| Radial DOC ae (mm) | 3 |

High efficiency and stable milling (Vf = 1140 mm/min.) is achieved.

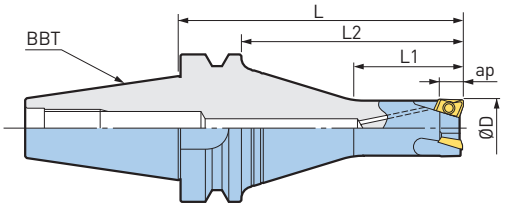
BROTECH

# Fullcut Mill FCR

Unique inserts designed for ramping make multi-functional cutting possible.




## For Standard Type with BBT



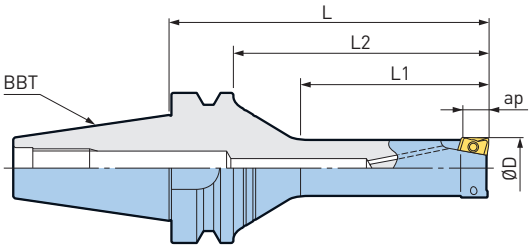

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | BBT30 -FCR16082 - 65 | 966.683 | 8 | 65 | 28 | 43 | 2 | BRG16 | 0.5 |
| 20 | -FCR20083 - 65 | 966.685 | | | | | 3 | BRG20 | 0.5 |
| 25 | -FCR25083 - 65 | 966.687 | | | 33 | | | BRG25 | 0.6 |
| 32 | -FCR32103 - 65 | 966.689 | 10 | | 40 | | | BRG32 | 0.6 |
| 16 | BBT40 -FCR16082 - 85 | 966.616 | 8 | 85 | 25 | 58 | 2 | BRG16 | 1.3 |
| | -120 | 966.617 | | 120 | 30 | 93 | | | 1.5 |
| | -135 | 966.618 | | 135 | 25 | 108 | | | 1.6 |
| 20 | -FCR20083 - 85 | 966.619 | | 85 | 35 | 58 | 3 | BRG20 | 1.2 |
| | -120 | 966.620 | | 120 | 30 | 93 | | | 1.6 |
| | -135 | 966.621 | | 135 | | 108 | | | 1.7 |
| 25 | -FCR25083 - 85 | 966.622 | | 85 | 40 | 58 | | BRG25 | 1.3 |
| | -120 | 966.623 | | 120 | 45 | 93 | | | 1.6 |
| | -135 | 966.624 | | 135 | 35 | 108 | | | 1.8 |
| 32 | -FCR32103 - 85 | 966.625 | 10 | 85 | 45 | 58 | | BRG32 | 1.4 |
| | -120 | 966.626 | | 120 | 50 | 93 | | | 1.7 |
| | -135 | 966.627 | | 135 | 40 | 108 | | | 1.9 |

1. Wrench is included. Inserts are to be ordered separately.
2. Long nose type shown below is recommended for medium-heavy or heavy slot milling with long projection, exceeding L = 120 mm for 16 and 20 mm diameters / L = 135 mm for 25 or larger diameters.

For Insert ▶ 467
For Cutting Condition ▶ 468
For BBT50 Adapter ▶ 453

## For Long Nose Type with BBT




BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | BBT30 -FCR16082L - 85 | 966.684 | 8 | 85 | 45 | 63 | 2 | BRG16 | 0.5 |
| 20 | -FCR20082L - 85 | 966.686 | | | 50 | | | BRG20 | 0.5 |
| 25 | -FCR25082L - 85 | 966.688 | | | | | | BRG25 | 0.6 |
| 32 | -FCR32102L - 85 | 966.690 | 10 | | 60 | | | BRG32 | 0.7 |
| 16 | BBT40 -FCR16082L -105 | 966.691 | 8 | 105 | 45 | 78 | 2 | BRG16 | 1.3 |
| | -120 | 966.692 | | 120 | | 93 | | | 1.4 |
| 20 | -FCR20082L -120 | 966.693 | | 120 | 60 | | | BRG20 | 1.4 |
| | -135 | 966.694 | | 135 | | 108 | | | 1.5 |
| 25 | -FCR25082L -135 | 966.695 | | 135 | 75 | | | BRG25 | 1.5 |
| | -150 | 966.696 | | 150 | | 123 | | | 1.7 |
| 32 | -FCR32102L -135 | 966.697 | 10 | 135 | 80 | 108 | | BRG32 | 1.7 |
| | -150 | 966.698 | | 150 | 90 | 123 | | | 1.9 |

1. Wrench is included. Inserts are to be ordered separately.

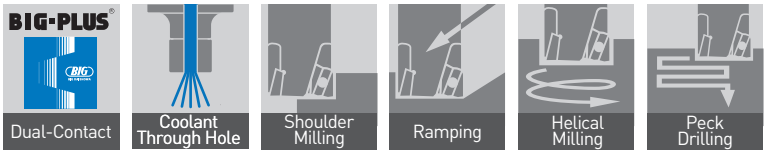
For Insert ▶ 467
For Cutting Condition ▶ 468
For BBT50 Adapter ▶ 453



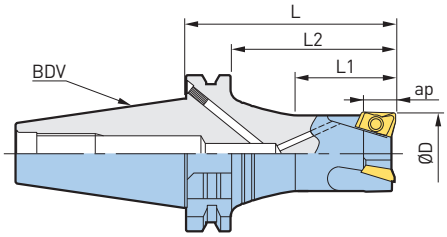
BROTECH

# Fullcut Mill FCR

Unique inserts designed for ramping make multi-functional cutting possible.




## For Standard Type with BDV

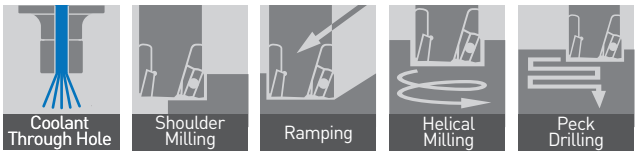



BIG-PLUS® tools can be used in machining centers with conventional spindles.

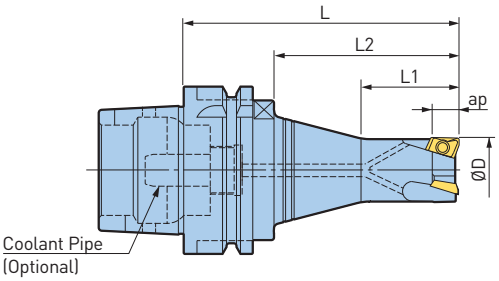
| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | BDV40 -FCR16082 - 85 | **966.601** | 8 | 85 | 25 | 65 | 2 | BRG16 | 1.3 |
| | -120 | **966.602** | | 120 | 30 | 100 | | | 1.5 |
| | -135 | **966.603** | | 135 | 25 | 115 | | | 1.6 |
| 20 | -FCR20083 - 85 | **966.604** | | 85 | 35 | 65 | 3 | BRG20 | 1.2 |
| | -120 | **966.605** | | 120 | 30 | 100 | | | 1.6 |
| | -135 | **966.606** | | 135 | | 115 | | | 1.7 |
| 25 | -FCR25083 - 85 | **966.607** | | 85 | 40 | 65 | | BRG25 | 1.3 |
| | -120 | **966.608** | | 120 | 45 | 100 | | | 1.6 |
| | -135 | **966.609** | | 135 | 35 | 115 | | | 1.8 |
| 32 | -FCR32103 - 85 | **966.610** | 10 | 85 | 45 | 65 | | BRG32 | 1.4 |
| | -120 | **966.611** | | 120 | 50 | 100 | | | 1.7 |
| | -135 | **966.612** | | 135 | 40 | 115 | | | 1.9 |

1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 467
For Cutting Condition ▶ 468
For BDV50 Adapter ▶ 453




## For Standard Type with HSK-A

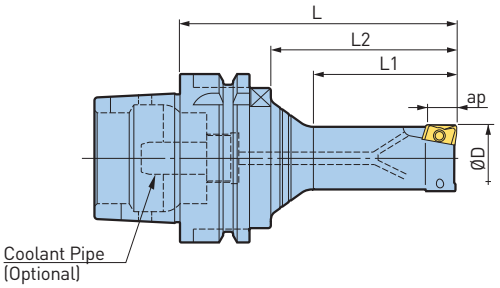



| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | HSK-A50 -FCR16082 - 75 | 966.671 | 8 | 75 | 27 | 41 | 2 | BRG16 | 0.5 |
| 20 | -FCR20083 - 75 | 966.672 | | | 28 | | 3 | BRG20 | 0.6 |
| 25 | -FCR25083 - 75 | 966.673 | | | 33 | | | BRG25 | 0.6 |
| 32 | -FCR32103 - 75 | 966.674 | 10 | | 39 | | | BRG32 | 0.7 |
| 16 | HSK-A63 -FCR16082 - 85 | 966.631 | 8 | 85 | 25 | 51 | 2 | BRG16 | 0.9 |
| | -120 | 966.632 | | 120 | 30 | 86 | | | 1.1 |
| | -135 | 966.633 | | 135 | 25 | 101 | | | 1.2 |
| 20 | -FCR20083 - 85 | 966.634 | | 85 | 32 | 51 | 3 | BRG20 | 1.0 |
| | -120 | 966.635 | | 120 | 30 | 86 | | | 1.2 |
| | -135 | 966.636 | | 135 | 30 | 101 | | | 1.3 |
| 25 | -FCR25083 - 85 | 966.637 | | 85 | 35 | 51 | | BRG25 | 1.0 |
| | -120 | 966.638 | | 120 | 45 | 86 | | | 1.2 |
| | -135 | 966.639 | | 135 | 35 | 101 | | | 1.4 |
| 32 | -FCR32103 - 85 | 966.640 | 10 | 85 | 40 | 51 | | BRG32 | 1.1 |
| | -120 | 966.641 | | 120 | 50 | 86 | | | 1.4 |
| | -135 | 966.642 | | 135 | 40 | 101 | | | 1.5 |

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 467
For Cutting Condition ▶ 468
For Coolant Pipe ▶ 174

## For Long Nose Type with HSK-A



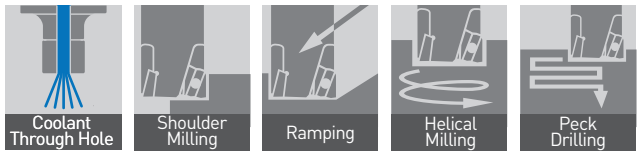

| Cutter Dia. ØD | Model | Order No. | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 16 | HSK-A63 -FCR16082L - 85 | 966.675 | 8 | 85 | 40 | 51 | 2 | BRG16 | 0.9 |
| | -120 | 966.676 | | 120 | 45 | 86 | | | 1.0 |
| 20 | -FCR20082L -105 | 966.677 | | 105 | 50 | 71 | | BRG20 | 1.1 |
| | -120 | 966.678 | | 120 | 60 | 86 | | | 1.2 |
| 25 | -FCR25082L -105 | 966.679 | | 105 | 55 | 71 | | BRG25 | 1.1 |
| | -120 | 966.680 | | 120 | 65 | 86 | | | 1.1 |
| 32 | -FCR32102L -120 | 966.681 | 10 | | 70 | | | BRG32 | 1.4 |
| | -135 | 966.682 | | 135 | 80 | 101 | | | 1.4 |

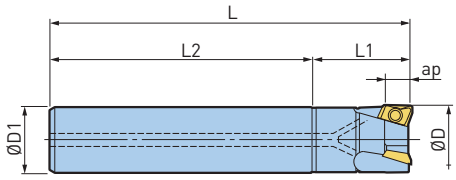
1. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 467
For Cutting Condition ▶ 468
For Coolant Pipe ▶ 174

# Fullcut Mill FCR

For Oversize Type with Cylindrical Shank.






| Cutter Dia. ØD | Model | Order No. | ØD1 | ap | L | L1 | L2 | No. of Inserts | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | ST15 -FCR16082 -120 | **805.849** | 15 | 8 | 120 | 25 | 95 | 2 | BRG16 | 0.2 |
| 17 | ST16 -FCR17082 -120 | **802.191** | 16 | 8 | 120 | 25 | 95 | 2 | BRG16 | 0.2 |
| 20 | ST19 -FCR20082 -165 | **805.850** | 19 | 8 | 165 | 30 | 135 | 2 | BRG20 | 0.4 |
| | -FCR20083 -135 | **805.851** | | | 135 | | 105 | 3 | | 0.3 |
| 21 | ST20 -FCR21082 -165 | **802.192** | 20 | 8 | 165 | 30 | 135 | 2 | BRG20 | 0.4 |
| | -FCR21083 -135 | **802.193** | | | 135 | | 105 | 3 | | 0.3 |
| 25 | ST24 -FCR25082 -180 | **805.852** | 24 | 8 | 180 | 35 | 145 | 2 | BRG25 | 0.7 |
| | -FCR25083 -150 | **805.853** | | | 150 | | 115 | 3 | | 0.6 |
| 26 | ST25 -FCR26082 -165 | **802.220** | 25 | 8 | 165 | 38 | 127 | 2 | BRG25 | 0.6 |
| | -FCR26083 -150 | **802.221** | | | 150 | | 112 | 3 | | 0.6 |
| 32 | ST28 -FCR32102 -180 | **805.854** | 28 | 10 | 180 | 48 | 132 | 2 | BRG32 | 1.1 |
| | -FCR32103 -180 | **805.855** | | | 180 | | 132 | 3 | | 1.0 |
| 33 | ST32 -FCR33102 -180 | **802.225** | 32 | 10 | 180 | 48 | 132 | 2 | BRG32 | 1.1 |
| | -FCR33103 -180 | **802.226** | | | 180 | | 132 | 3 | | 1.0 |

1. Wrench is included. Inserts are to be ordered separately.
2. Lower cutting parameters appropriately for applications with either long projection or 3-flutes models.
3. For medium-heavy or heavy slot milling or ramping with projection longer than 2.5 times of diameter, 2-flutes models are recommended.

For Insert ▶ 467
For Cutting Condition ▶ 468

# Fullcut Mill FCR

## Indexable Inserts

| Model | Cutter Dia. ØD | ap | Nose R | P | M | K | N |
|---|---|---|---|---|---|---|---|
| | | | | ACP300 | ACM300F | ACZ310 | DS20 |
| BRG160808 | 16, 17 | 8 | 0.8 | 807.131 | 807.135 | 966.652 | 966.653 |
| BRG200808 | 20, 21 | 8 | 0.8 | 807.132 | 807.136 | 800.587 | 966.658 |
| BRG250808 | 25, 26 | 8 | 0.8 | 807.133 | 807.137 | 966.662 | 966.663 |
| BRG321008 | 32, 33 | 10 | 0.8 | 807.134 | 807.138 | 966.667 | 966.668 |
| BRG321032 | | 10 | 3.2 | - | | - | 966.669 |

1. Inserts are available in packets of 10 pcs.

For Spare Parts ▶ 474

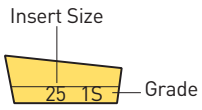
**Caution**

- It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.
- There is no compatibility with those of FCM type.

**Insert classifications**

| ISO | Grade | Material | Coating |
|---|---|---|---|
| P30 | ACP300 | General steel | TiAlN / TiCN |
| M30 | ACM300F | Stainless steel | |
| K10 | ACZ310 | Cast iron | |
| N20 | DS20 | Aluminium | DLC |

**Marking Description**




1: ACZ310
2: DS20
P3: ACP300
3F: ACM300F



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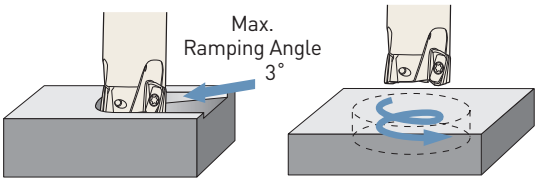
# Fullcut Mill FCR

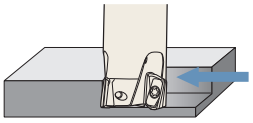
## Recommended Cutting Condition




| Cutter Dia. | Flat Bottom | | Through Hole |
|---|---|---|---|
| | Max. Hole Dia. | Min. Hole Dia. | Min. Hole Dia. |
| Ø16 | Ø30 | Ø27 | Ø22 |
| Ø20 | Ø38 | Ø36 | Ø29 |
| Ø25 | Ø48 | Ø45 | Ø39 |
| Ø32 | Ø62 | Ø59 | Ø48 |

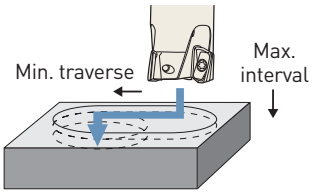
### Ramping and helical interpolation

| Cutter Dia. | Work Material | Carbon Steel Alloy Steel | Unalloyed Steel | Prehardened Steel < HRC40 | Stainless Steel | Die Steel | Cast Iron | Aluminium |
|---|---|---|---|---|---|---|---|---|
| | Insert Grade | ACP300 | | ACM300F | | | ACZ310 | DS20 |
| | Cutting Fluid | Dry | | Dry | Dry | Dry | | Dry/Wet |
| Ø16, Ø17 | Speed (m/min) | 100 - 200 | 150 - 220 | 60 - 80 | 100 - 150 | 60 - 80 | 100 - 180 | 200 - 1000 |
| | Feed (mm/tooth) | 0.06 - 0.12 | 0.06 - 0.12 | 0.05 - 0.08 | 0.08 - 0.16 | 0.06 - 0.1 | 0.08 - 0.18 | 0.06 - 0.24 |
| Ø20, Ø25, Ø26 | Speed (m/min) | 100 - 200 | 150 - 200 | 60 - 100 | 120 - 150 | 60 - 100 | 100 - 180 | 200 - 1000 |
| | Feed (mm/tooth) | 0.08 - 0.2 | 0.08 - 0.2 | 0.05 - 0.1 | 0.12 - 0.2 | 0.06 - 0.1 | 0.02 - 0.18 | 0.1 - 0.35 |
| Ø32, Ø33 | Speed (m/min) | 100 - 200 | 150 - 200 | 60 - 100 | 120 - 150 | 60 - 120 | 100 - 180 | 200 - 1000 |
| | Feed (mm/tooth) | 0.08 - 0.2 | 0.08 - 0.2 | 0.05 - 0.1 | 0.12 - 0.2 | 0.08 - 0.12 | 0.06 - 0.2 | 0.1 - 0.35 |



### Shoulder milling and slot milling

| Cutter Dia. | Work Material | Carbon Steel Alloy Steel | Unalloyed Steel | Prehardened Steel < HRC40 | Stainless Steel | Die Steel | Cast Iron | Aluminium |
|---|---|---|---|---|---|---|---|---|
| | Insert Grade | ACP300 | | ACM300F | | | ACZ310 | DS20 |
| | Cutting Fluid | Dry | | Dry | Dry | Dry | | Dry/Wet |
| Ø16, Ø20, Ø21 | Speed (m/min) | 100 - 200 | 100 - 200 | 60 - 80 | 120 - 180 | 80 - 120 | 100 - 180 | 200 - 1000 |
| | Feed (mm/tooth) | 0.08 - 0.18 | 0.08 - 0.18 | 0.05 - 0.1 | 0.12 - 0.18 | 0.08 - 0.12 | 0.08 - 0.18 | 0.1 - 0.3 |
| Ø25, Ø32, Ø33 | Speed (m/min) | 100 - 200 | 100 - 200 | 60 - 100 | 120 - 180 | 80 - 120 | 100 - 180 | 200 - 1500 |
| | Feed (mm/tooth) | 0.08 - 0.2 | 0.08 - 0.2 | 0.05 - 0.1 | 0.12 - 0.2 | 0.08 - 0.12 | 0.08 - 0.2 | 0.1 - 0.35 |




| Cutter Dia. | Max. Interval | Min. Traverse |
|---|---|---|
| Ø16 | 0.5 | 14 |
| Ø20 | 1 | 18 |
| Ø25 | 1 | 23 |
| Ø32 | 2 | 30 |

### Plunge milling

| Cutter Dia. | Work Material | Carbon Steel Alloy Steel | Unalloyed Steel | Prehardened Steel < HRC40 | Stainless Steel | Die Steel | Cast Iron | Aluminium |
|---|---|---|---|---|---|---|---|---|
| | Insert Grade | ACP300 | | ACM300F | | | ACZ310 | DS20 |
| | Cutting Fluid | Dry | | Dry | Dry | Dry | | Dry/Wet |
| Ø16, Ø17 | Speed (m/min) | 80 - 120 | 80 - 120 | 60 | 80 - 120 | 60 - 80 | 80 - 160 | 200 - 350 |
| | Feed (mm/tooth) | 0.06 - 0.1 | 0.06 - 0.1 | 0.04 - 0.06 | 0.05 - 0.08 | 0.05 - 0.08 | 0.06 - 0.1 | 0.06 - 0.1 |
| Ø20, Ø25, Ø26 | Speed (m/min) | 100 - 160 | 100 - 160 | 60 - 100 | 100 - 160 | 60 - 100 | 80 - 180 | 200 - 500 |
| | Feed (mm/tooth) | 0.1 - 0.25 | 0.1 - 0.25 | 0.1 - 0.25 | 0.12 - 0.25 | 0.1 - 0.2 | 0.08 - 0.3 | 0.1 - 0.3 |
| Ø32, Ø33 | Speed (m/min) | 100 - 160 | 100 - 160 | 60 - 100 | 100 - 160 | 60 - 100 | 80 - 180 | 200 - 600 |
| | Feed (mm/tooth) | 0.1 - 0.3 | 0.1 - 0.3 | 0.1 - 0.3 | 0.12 - 0.3 | 0.1 - 0.2 | 0.08 - 0.4 | 0.1 - 0.3 |

**Caution**

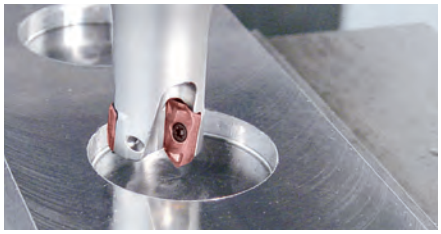
- The table is just a reference to determine cutting conditions. It should be adjusted according to a condition of a machine tool or workpiece.
- Since chips may scatter, utilize safety enclosures.

# Fullcut Mill FCR

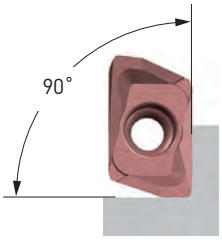
## Application Examples

### Bore

Dia. 38 with Helical milling



| | |
|---|---|
| Fullcut Mill | BBT40-FCR20083-120 |
| Insert | BRG200808 (ACP300) |
| Work Material | C50 (S50C) / Air blow |
| Cutting Speed Vc (m/min.) | 150 |
| Feed Rate Vf (mm/min.) | 1 100 |
| Axial DOC ap (mm) | 2 mm x 3 times |
| Hole dia. | Ø 38 |

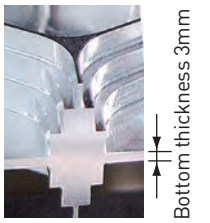



For carbon steel of C50, very smooth cutting with feed rate of 1 100 mm/min and excellent squareness are achieved.

### Honeycombed

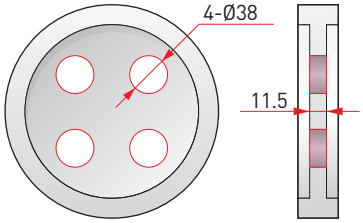
Pocket with Ramping

| | |
|---|---|
| Fullcut Mill | BBT40-FCR20083-85 |
| Insert | BRG200808 (DS20) |
| Work Material | A2017 Duralumin / Air blow |
| Cutting Speed Vc (m/min.) | 750 |
| Feed Rate Vf (mm/min.) | 4 300 |
| Axial DOC ap (mm) | 6 mm x 3 times |
| Radial DOC ae (mm) | max. 20 |




For less rigid workpiece with 3 mm thickness clamped by a vise, feed rate of 4 300 mm/min on both sides of the workpiece is achieved.

### Helical milling



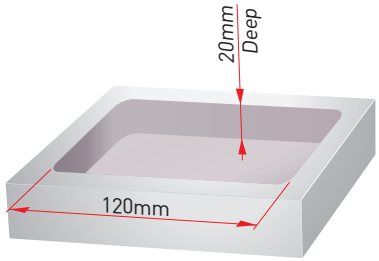

| | |
|---|---|
| Fullcut Mill | BBT40-FCR20083-120 |
| Insert | BRG200808 (ACP300) |
| Work Material | 15CrMo5 (SCM415) |
| Cutting Speed Vc (m/min.) | 150 |
| Feed Rate Vf (mm/min.) | 480 |
| Axial DOC ap (mm) | 4 mm x 3 times |
| Hole dia. | Ø 38 |

Compared to another manufacturer

| | |
|---|---|
| Axial DOC | **1.3 times** |
| Insert life | **2 times** |

Stable helical milling with 4 mm axial DOC on less rigid workpiece.

### Ramping




| | |
|---|---|
| Fullcut Mill | BBT50-BBT40-50<br>BBT40-FCR16082-120 |
| Insert | BRG160808 (ACP300) |
| Work Material | C50 (S50C) |
| Cutting Speed Vc (m/min.) | 120 |
| Feed Rate Vf (mm/min.) | 480 |
| Axial DOC ap (mm) | 4 mm x 5 times |

Compared to another manufacturer

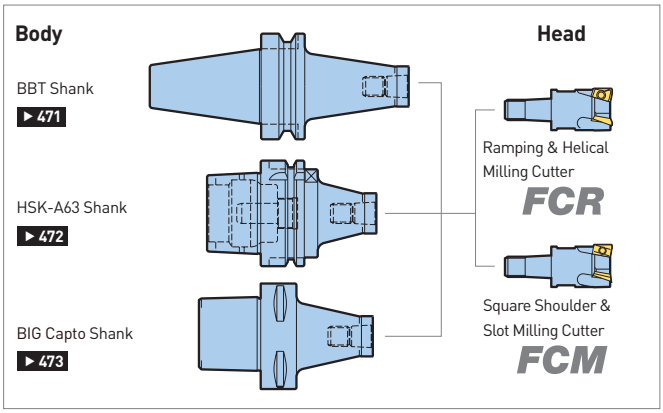
No chatter even at higher resistance corner.

Smooth chip evacuation eliminates re-cutting of the swarf and edge chipping of the inserts.

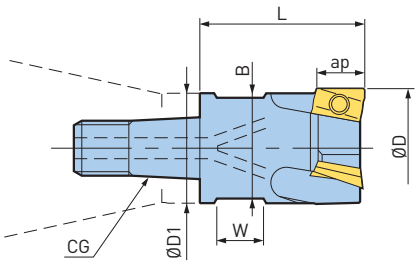
Example of use of BBT50-BBT40 adapter. An improved result is obtained compared to the product from another manufacturer.

# Contact Grip

A threaded coupling with taper and face contact. Improved rigidity and accuracy from the BIG-PLUS® dual contact system.




## FCM Head

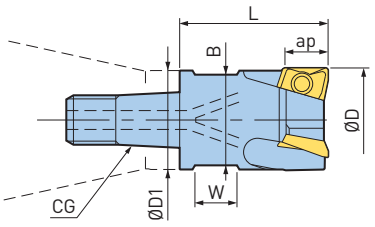



| Cutter Dia. ØD | Model | Order No. | CG No. | ØD1 | ap | L | No. of Inserts | Spanner Flats B | Spanner Flats W | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | CG15 -FCM16092 -25 | 966.701 | CG15 | 15 | 9 | 25 | 2 | 12 | 6.2 | ARG16 | 0.03 |
| 20 | CG19 -FCM20092 -32 | 966.702 | CG19 | 19 | 9 | 32 | 2 | 17 | 8.2 | ARG20 | 0.07 |
| | -FCM20093 -32 | 966.703 | | | | | 3 | | | | |
| 25 | CG24 -FCM25092 -36 | 966.704 | CG24 | 24 | 9 | 36 | 2 | 22 | 10.2 | ARG25 | 0.13 |
| | -FCM25093 -36 | 966.705 | | | | | 3 | | | | |
| 32 | CG31 -FCM32112 -43 | 966.706 | CG31 | 31 | 11 | 43 | 2 | 27 | 12.2 | ARG32 | 0.26 |
| | -FCM32113 -43 | 966.707 | | | | | 3 | | | | |

1. Wrench is included. Inserts are to be ordered separately.
2. Standard single-ended wrench is required to clamp the head.

For Insert ▶ 460
For Cutting Condition ▶ 459

## FCR Head




| Cutter Dia. ØD | Model | Order No. | CG No. | ØD1 | ap | L | No. of Insert | Spanner Flats B | Spanner Flats W | Insert Size | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | CG15 -FCR16082 -25 | 966.708 | CG15 | 15 | 8 | 25 | 2 | 12 | 6.2 | BRG16 | 0.03 |
| 20 | CG19 -FCR20082 -32 | 966.709 | CG19 | 19 | 8 | 32 | 2 | 17 | 8.2 | BRG20 | 0.07 |
| | -FCR20083 -32 | 966.710 | | | | | 3 | | | | |
| 25 | CG24 -FCR25082 -36 | 966.711 | CG24 | 24 | 8 | 36 | 2 | 22 | 10.2 | BRG25 | 0.13 |
| | -FCR25083 -36 | 966.712 | | | | | 3 | | | | |
| 32 | CG31 -FCR32102 -43 | 966.713 | CG31 | 31 | 10 | 43 | 2 | 27 | 12.2 | BRG32 | 0.26 |
| | -FCR32103 -43 | 966.714 | | | | | 3 | | | | |

1. Wrench to clamp inserts is included. Inserts are to be ordered separately.
2. Standard single-ended wrench is required to clamp the head.

For Insert ▶ 467
For Cutting Condition ▶ 468

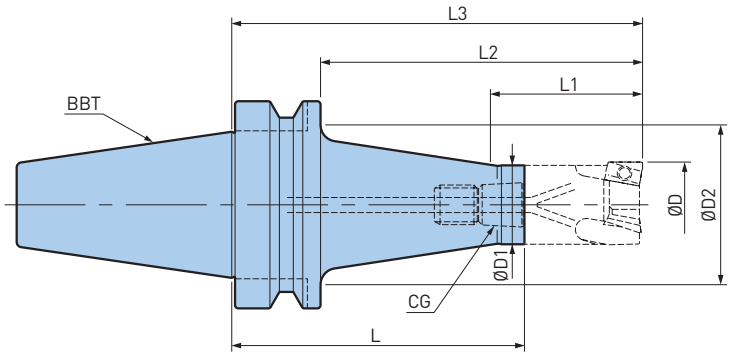


BROTECH

BIG-PLUS Dual-Contact

Coolant Through Hole

## For Contact Grip with BBT




**Body**

BBT Shank

**Head**

FCR Ramping & Helical Milling Cutter

FCM Square Shoulder & Slot Milling Cutter

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | ØD | CG No. | ØD1 | ØD2 | L | L1 | L2 | L3 | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| BBT30 -CG15 - 50 | **966.721** | 16 | CG15 | 15 | 40 | 50 | 31 | 53 | 75 | 0.5 |
| - 80 | **966.722** | | | | | 80 | 32 | 83 | 105 | 0.6 |
| -CG19 - 43 | **966.723** | 20 | CG19 | 19 | | 43 | 39 | 53 | 75 | 0.5 |
| - 73 | **966.724** | | | | 42 | 73 | 40 | 83 | 105 | 0.6 |
| -CG24 - 39 | **966.725** | 25 | CG24 | 24 | 41 | 39 | 45 | 53 | 75 | 0.5 |
| - 69 | **966.726** | | | | 42 | 69 | | 83 | 105 | 0.6 |
| -CG31 - 32 | **966.727** | 32 | CG31 | 31 | 41 | 32 | 49 | 53 | 75 | 0.5 |
| - 62 | **966.728** | | | | 40 | 62 | 53 | 83 | 105 | 0.6 |
| BBT40 -CG15 - 50 | **966.731** | 16 | CG15 | 15 | 46 | 50 | 30 | 48 | 75 | 1.1 |
| - 80 | **966.732** | | | | 48 | 80 | 32 | 78 | 105 | 1.2 |
| -100 | **966.733** | | | | 49 | 100 | | 98 | 125 | 1.3 |
| -CG19 - 43 | **966.734** | 20 | CG19 | 19 | 45 | 43 | 36 | 48 | 75 | 1.1 |
| - 73 | **966.735** | | | | 48 | 73 | 40 | 78 | 105 | 1.2 |
| - 93 | **966.736** | | | | 49 | 93 | | 98 | 125 | 1.3 |
| -CG24 - 39 | **966.737** | 25 | CG24 | 24 | 39 | 39 | 41 | 48 | 75 | 1.0 |
| - 69 | **966.738** | | | | 48 | 69 | 45 | 78 | 105 | 1.2 |
| - 89 | **966.739** | | | | 49 | 89 | | 98 | 125 | 1.3 |
| -CG31 - 37 | **966.740** | 32 | CG31 | 31 | 43 | 37 | 48 | 53 | 80 | 1.0 |
| - 77 | **966.741** | | | | 57 | 77 | 53 | 93 | 120 | 1.4 |
| - 92 | **966.742** | | | | | 92 | | 108 | 135 | 1.5 |
| BBT50 -CG15 -115 | **800.185** | 16 | CG15 | 15 | 90 | 115 | 30 | 102 | 140 | 4.4 |
| -145 | **966.746** | | | | 80 | 145 | 45 | 132 | 170 | 4.4 |
| -CG19 -108 | **800.186** | 20 | CG19 | 19 | 90 | 108 | 38 | 102 | 140 | 4.4 |
| -153 | **966.747** | | | | 80 | 153 | 60 | 147 | 185 | 4.5 |
| -CG24 -114 | **800.187** | 25 | CG24 | 24 | 90 | 114 | 42 | 112 | 150 | 4.5 |
| -164 | **966.748** | | | | | 164 | 75 | 162 | 200 | 4.9 |
| -CG31 -107 | **800.188** | 32 | CG31 | 31 | 95 | 107 | 50 | 112 | 150 | 4.7 |
| -157 | **966.749** | | | | 90 | 157 | 90 | 162 | 200 | 5.0 |

1. Standard single-ended wrench is required to clamp the head.

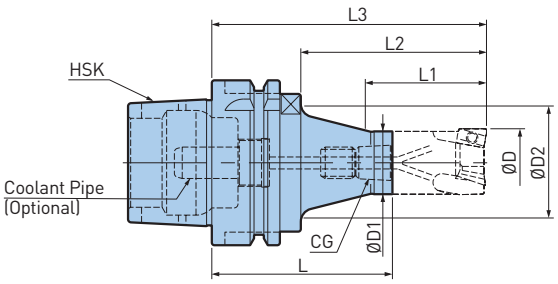
For FCM/FCR Head ▶ 470

# Contact Grip

A threaded coupling with taper and face contact.

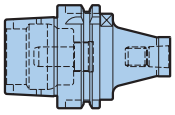
Coolant Through Hole

## For Contact Grip with HSK-A

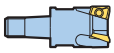



**Body**

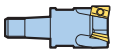
HSK-A63 Shank



**Head**



FCR — Ramping & Helical Milling Cutter



FCM — Square Shoulder & Slot Milling Cutter

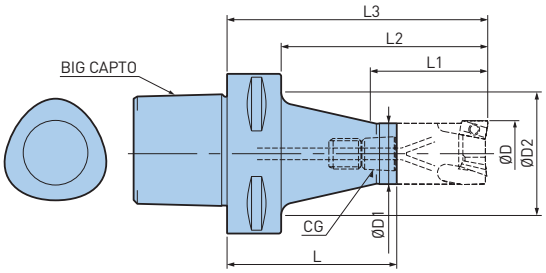
| Model | Order No. | ØD | CG No. | ØD1 | ØD2 | L | L1 | L2 | L3 | Weight (Kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| HSK-A63 -CG15 - 50 | **966.751** | 16 | CG15 | 15 | 36 | 50 | 30 | 41 | 75 | 0.8 |
| - 80 | **966.752** | | | | 45 | 80 | 31 | 71 | 105 | 1.0 |
| -100 | **966.753** | | | | | 100 | 32 | 91 | 125 | |
| -CG19 - 73 | **966.754** | 20 | CG19 | 19 | | 73 | 39 | 71 | 105 | |
| - 93 | **966.755** | | | | | 93 | 40 | 91 | 125 | |
| -CG24 - 69 | **966.756** | 25 | CG24 | 24 | | 69 | 44 | 71 | 105 | |
| - 89 | **966.757** | | | | | 89 | 45 | 91 | 125 | 1.1 |
| -CG31 - 77 | **966.758** | 32 | CG31 | 31 | | 77 | 53 | 86 | 120 | 1.0 |
| - 92 | **966.759** | | | | | 92 | | 101 | 135 | 1.1 |

1. Standard single-ended wrench is required to clamp the head.
2. Coolant pipe is to be ordered separately.

For FCM/FCR Head ▶ 470
For Coolant Pipe ▶ 174

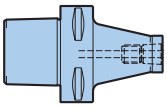
Coolant Through Hole

## For Contact Grip with BIG CAPTO

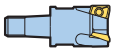



**Body**

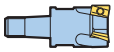
BIG CAPTO Shank



**Head**



FCR — Ramping & Helical Milling Cutter



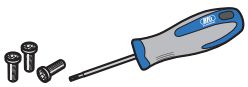
FCM — Square Shoulder & Slot Milling Cutter

| Model | Order No. | ØD | CG No. | ØD1 | ØD2 | L | L1 | L2 | L3 | Weight (Kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| C6 -CG15 - 50 | 802.822 | 16 | CG15 | 15 | 46 | 50 | 31 | 53 | 75 | 0.9 |
| - 80 | 802.819 | | | | 48 | 80 | | 83 | 105 | 1.0 |
| -100 | 802.815 | | | | 49 | 100 | 32 | 103 | 125 | 1.1 |
| -CG19 - 43 | 802.823 | 20 | CG19 | 19 | 45 | 43 | 39 | 53 | 75 | 0.9 |
| - 73 | 802.820 | | | | 48 | 73 | 39 | 83 | 105 | 1.0 |
| - 93 | 802.816 | | | | 49 | 93 | 40 | 103 | 125 | 1.1 |
| -CG24 - 69 | 802.821 | 25 | CG24 | 24 | | 69 | 44 | 83 | 105 | 1.0 |
| - 89 | 802.817 | | | | | 89 | 45 | 103 | 125 | 1.1 |
| -CG31 - 77 | 802.818 | 32 | CG31 | 31 | 57 | 77 | 53 | 98 | 120 | 1.2 |
| - 92 | 802.814 | | | | | 92 | | 113 | 135 | 1.3 |

1. Standard single-ended wrench is required to clamp the head.

For FCM/FCR Heads ▶ 470

## Spare Parts for Fullcut Mill, FCM and FCR

| | | | | Insert Clamping Screw Set  | | Wrench | | |
|---|---|---|---|---|---|---|---|---|
| FCM | | FCR | | Model | Order No. | Model | Order No. | Torx |
| Cutter Dia. Ø | Insert | Cutter Dia. Ø | Insert | | | | | Size |
| 12 | ARG1609 | - | - | S2505DS | 966.271 | DA-T8 | 966.274 | T-8 |
| 14, 16, 17 | | 16, 17 | BRG1608 | S2506DS | 966.272 | | | |
| 20, 21 | ARG2009 | 20, 21 | BRG2008 | | | | | |
| 25, 26 | ARG2509 | 25, 26 | BRG2508 | | | | | |
| 32, 33 | ARG3211 | 32, 33 | BRG3210 | S3508DS | 966.273 | DA-T15 | 966.275 | T-15 |
| 40, 50 | ARG4011 | | | | | | | |
| 63 | ARG6311 | | | | | | | |
| 80, 100 | ARG8011 | | | | | | | |

1. Insert clamping set contains 10 pcs screw and 1 pcs wrench.

## Torque Wrench for Fullcut Mill

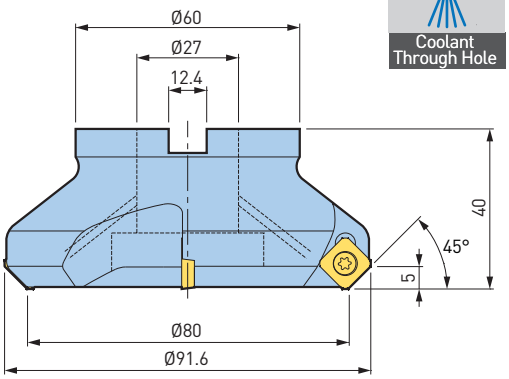
Torque wrench with fix Nm more precision. Ergonomic multi-component handle, particulary light and compact.

| | | Torque Wrench Set | Torque Wrench Body | Torque Wrench Bit |
|---|---|---|---|---|
| Torx Size | Fixed Torque | Order No. | Order No. | Order No. |
| T8 | 0.8 Nm | 694.183 | 694.162 | 694.169 |
| T15 | 3.0 Nm | 694.186 | 694.165 | 694.172 |

1. Torque wrench set contains 1 pcs wrench body and 1 pcs wrench bit.

# Surface Mill

For superior surface finishing.

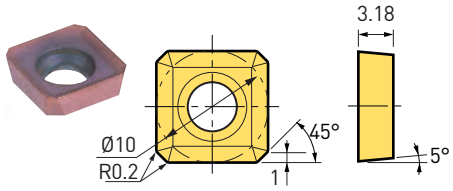


| Model | Order No. | No. of Inserts | Weight (kg) | Insert Clamping Screw Set | Order No. |
|---|---|---|---|---|---|
| FM27-SFM804-40 | 805.890 | 4 | 0.9 | S4S-T15DS | 805.897 |

1. Wrench and screws are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in Insert clamping screw set.
3. MBA - M12H is required to be mounted on FMH.

For FMH Type BBT ▶ 72
For FMH Type BDV ▶ 111
For FMH Type HSK ▶ 146
For MBA - M12H ▶ 282

## Indexable Inserts




| Model | Order No. | Coating |
|---|---|---|
| CM10C1 ACP200 | 966.445 | Multi-layer TiAlN & AlCrN for general steel |
| CM10C1 DS20 | 966.446 | DLC coating for aluminum & non-ferrous |

1. Inserts are available in packet of 10 pcs.

## Insert Clamp Screw Set

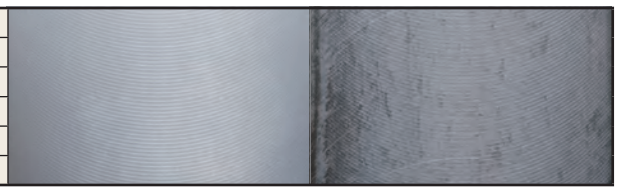
| Insert clamping screw set (10) screws & (1) wrench | | Driver-Type Wrench | |
|---|---|---|---|
| Model | Order No. | Model | Order No. |
| S4S-T15DS | 805.897 | DA-T15 | 966.275 |

## Recommended Cutting Condition

| Work Material | Insert Grade | Cutting Speed Vc (m/min) | Feed Rate fz (mm/t) | Axial DOC ap max (mm) |
|---|---|---|---|---|
| General Steel | ACP200 | 150-200-250 | 0.10-0.20-0.30 | 3 |
| Prehardened Steel | | 180-240-300 | 0.10-0.25-0.40 | 4 |
| Stainless Steel | | 160-205-250 | 0.15-0.23-0.30 | 3 |
| Cast Iron | | 100-175-250 | 0.15-0.23-0.30 | 4 |
| Aluminium, Non-ferrous | DS20 | 500-750-1000 | 0.15-0.23-0.30 | 5 |

## Application Example

| Work Material | C50 |
|---|---|
| Cutting Speed V (m/min.) | 200 |
| Feed Rate f (mm/min.) | 0.2 |
| Axial DOC ap (mm) | 3 |
| Radial DOC ae (mm) | 75 |
| Coolant | Dry |

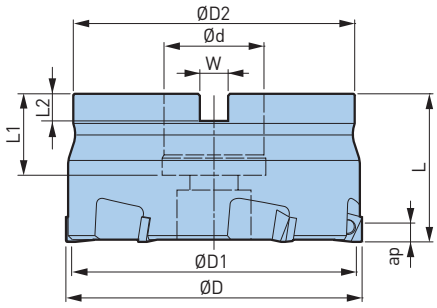


Surface Mill
Rz = 1.42

Other Manufacturer
Rz = 9.04

# Speed Finisher

Amazing improvement of surface finish at high speed cutting.



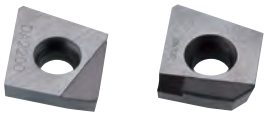

Coolant Through Hole

| Model | Order No. | ØD | ØD1 | | ØD2 | Ød | L | L1 | L2 | W | No. of Insert | max. min$^{-1}$ | Clamp Bolt | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | DA2200 | CBN | | | | | | | | | | |
| FM22 -PLS505 -35 | **978.276** | 50 | 46.9 | 44.9 | 47 | 22 | 35 | 19 | 6 | 10.4 | 5 | 20 000 | M10 Cap Screw | 0.4 |
| -PLS636 -35 | **978.313** | 63 | 59.9 | 57.9 | 60 | 22 | 35 | 19 | 6 | 10.4 | 6 | | | 0.7 |
| FM27 -PLS806 -40 | **978.277** | 80 | 76.9 | 74.9 | 76 | 27 | 40 | 22 | 7 | 12.4 | 6 | 16 000 | M12 Cap Screw | 1.2 |
| -PLS1006 -35 * | **805.847** | 100 | 69.9 | 94.9 | 60 | 27 | 35 | 24 | 7 | 12.4 | | 12 800 | MBA-M12 | 1.3 |
| -PLS1256 -35 * | **805.848** | 125 | 121.9 | 119.9 | 60 | 27 | 35 | 24 | 7 | 12.4 | | 10 200 | MBA-M12 | 1.9 |
| FM32 -PLS1006 -42 | **801.684** | 100 | 96.9 | 94.9 | 96 | 32 | 42 | 24 | 8 | 14.4 | 6 | 12 800 | MBA-M16 | 2.0 |
| FM40 -PLS1258 -50 | **805.284** | 125 | 121.9 | 119.9 | 100 | 40 | 50 | 28 | 9 | 16.4 | 8 | 10 200 | MBA-M20 | 3.3 |
| -PLS16010 -50 | **805.283** | 160 | 156.9 | 154.9 | 100 | 40 | 50 | 28 | 9 | 16.4 | 10 | 8 000 | | 4.1 |

1. Wrench and screws are included. Inserts are to be ordered separately.
2. When using at 12 000 min$^{-1}$ or higher speed, contact agent for balancing of the cutter and arbor assembly.
3. Effective cutting edge length ap varies depending on insert models. Refer to the table for insert shown below.
4. Adjusting amount of cutting edge is 0.1 mm. Note this when using reground insert.
5. * Light weight design exclusive for BT30.

For FMH Type BBT ▶ 72
For FMH Type BDV ▶ 111
For FMH Type HSK ▶ 146

## Indexable Inserts



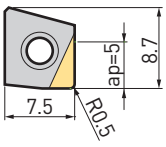



Fig. 1

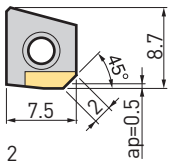



Fig. 2

| Insert Model | Order No. | Workpiece | Fig. | Material | Cutting Edge Length |
|---|---|---|---|---|---|
| PL0705 DA2200 | **978.278** | Aluminium & nonferrous | 1 | PCD | 5.0 |
| PL0705 CBN | **978.820** | Cast Iron | 2 | CBN | 0.5 |

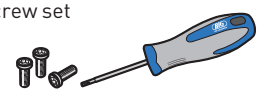
## Insert Grade

| DA2200 | CBN |
|---|---|
| High density sintered material made of ultra-micro diamond particles. Superior hardness comparable to carbide alloy and wear resistance. | Newly designed CBN sintered body with high content rate of CBN improves toughness and thermal conductivity. |

## Recommended Cutting Condition

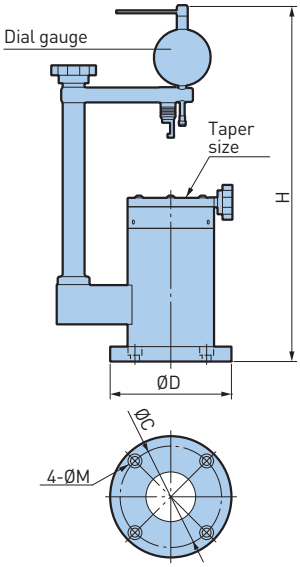
| Workpiece Material | | Insert Material | Cutting Speed (m/min) | Feed Rate (mm/tooth) | Coolant |
|---|---|---|---|---|---|
| Aluminium Alloy | Si Content ≤ 13% | DA2200 | 2 000 - 4 000 | 0.05 - 0.2 | Wet |
| | Si Content > 13% | | 400 - 800 | | |
| Copper Alloy | | DA2200 | 500 - 2 500 | 0.05 - 0.2 | Wet |
| Gray Cast Iron | | CBN | 800 - 2 000 | 0.1 - 0.3 | Dry |

The table is a reference to determine cutting conditions. It should be adjusted according to cutting width, conditions of the machine tool and workpiece.

| Spare Parts | | | | | |
|---|---|---|---|---|---|
| Lifting screw set (1) lifting screw & (1) lifting nut | | Insert clamping screw set (10) screws & (1) wrench  | | Wrench | |
| **Model** | **Order No.** | **Model** | **Order No.** | **Model** | **Order No.** |
| LSN35 | **804.796** | S2506DS | **966.272** | DA-T8 | **966.274** |

Insert clamping screws and wrenches are consumables. Regular replacement and storage are recommended.

# Presetter for Speed Finisher

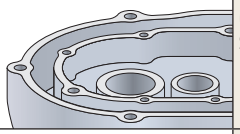
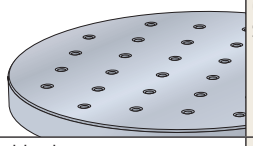
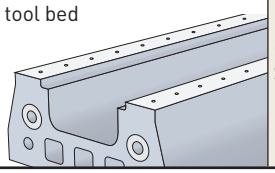



| Model | Order No. | Taper Size | H | ØD | ØC | ØM | Max. Tool Length | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| PLP -BBT30 | **804.644** | BBT30 | > 417 | 122 | 102 | 9 (for M8) | 150 | 7.5 |
| -BBT40 | **804.645** | BBT40 | | | | | | 7.6 |
| -BBT50 | **804.646** | BBT50 | > 502 | 172 | 149 | 11 (for M10) | 160 | 17.5 |
| -HSK63 | **978.275** | HSK-A63 | > 417 | 122 | 102 | 9 (for M8) | 150 | 7.7 |

1. Dial gauge and indicator stabilizer (2 pcs. AAA batteries included) are standard accessories.
2. Min. reading of the accessory dial gauge is 0.001mm.
3. BT shank cannot be used.
4. Max. tool length indicated in the table is the dimension from the gauge line of the arbor to the cutting edge.
5. Max. cutter diameter is Ø160mm.

## Application Examples

(Cutter diameter: Ø 80)

| Workpiece | Conditions | Surface Roughness | Height Difference | No. of Workpieces | Result |
|---|---|---|---|---|---|
| Crankcase<br>ADC12  | Cutting speed: 4 000 m/min<br>Spindle speed: 15 900 $min^{-1}$<br>Feed rate: 9 550 mm/min<br>Depth of cut: 2.5 mm | Ra = 0.08 µm<br>Rz = 0.55 µm | Within 1 µm | 24 000 | Rough and finish processes are combined in a single operation. |
| Parts of semiconductor manufacturing equipment<br>A5052  | Cutting speed: 4 000 m/min<br>Spindle speed: 15 900 $min^{-1}$<br>Feed rate: 9 550 mm/min<br>Depth of cut: 2.0 mm | Ra = 0.07 µm<br>Rz = 0.32 µm | Within 1 µm | 320 | Mirror finish is achieved. |
| Machine tool bed<br>FC250  | Cutting speed: 1 500 m/min<br>Spindle speed: 6 000 $min^{-1}$<br>Feed rate: 3 600 mm/min<br>Depth of cut: 0.5 mm | Ra = 0.12 µm<br>Rz = 0.67 µm | Within 2 µm | 20 | 1 to 2 µm flatness is obtained. |

# Indexable Insert Drills and Chamfer Mills


| | |
|---|---|
| Indexable Insert Drills | 480 - 483 |
| C-Cutter Mini | 484 - 490 |
| C-Cutter | 491 - 494 |
| Chamfer Rings for Boring Heads | 495 |
| C-Centering Cutter | 496 |
| R-Cutter | 497 - 500 |
| Center Boy | 501 |
| C-Cutter Boy | 502 |
| BF-Cutter | 503 |
| Slot Milling Cutters | 504 - 505 |

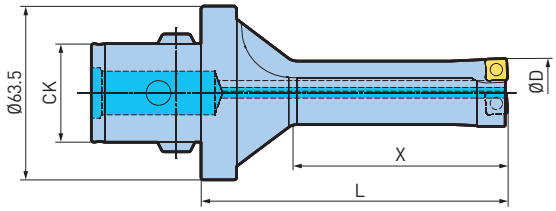



C.2

BROTECH

# Indexable Insert Drills, Ø 16 - 30

The BIG KAISER indexable insert drills series 337 are made with straight flutes. This design guarantees a short distance for chip evacuation and a high radial and torsional rigidity.




**L/D = 3 and 4**

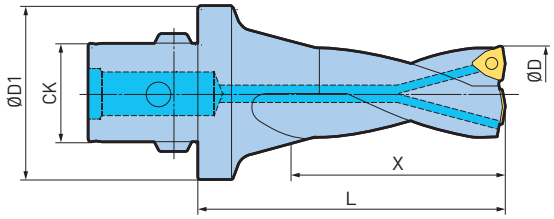
| Bore Dia. ØD | Boring Depth 3 x D | | | | Boring Depth 4 x D | | | | Insert Type | CK No. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Model | Order No. | X | L | For CKB6 Model | Order No. | X | L | | |
| 16 | ID16-48CKB6 | **337.316** | 48 | 85 | ID16-64CKB6 | **337.416** | 64 | 101 | WP 337-1 | CKB6 |
| 17 | ID17-51CKB6 | **337.317** | 51 | 88 | ID17-68CKB6 | **337.417** | 68 | 105 | | |
| 18 | ID18-54CKB6 | **337.318** | 54 | 91 | ID18-72CKB6 | **337.418** | 72 | 109 | | |
| 19 | ID19-57CKB6 | **337.319** | 57 | 94 | ID19-76CKB6 | **337.419** | 76 | 113 | | |
| 20 | ID20-60CKB6 | **337.320** | 60 | 97 | ID20-80CKB6 | **337.420** | 80 | 117 | | |
| 21 | ID21-63CKB6 | **337.321** | 63 | 100 | ID21-84CKB6 | **337.421** | 84 | 121 | WP 337-2 | |
| 22 | ID22-66CKB6 | **337.322** | 66 | 103 | ID22-88CKB6 | **337.422** | 88 | 125 | | |
| 23 | ID23-69CKB6 | **337.323** | 69 | 106 | ID23-92CKB6 | **337.423** | 92 | 129 | | |
| 24 | ID24-72CKB6 | **337.324** | 72 | 109 | ID24-96CKB6 | **337.424** | 96 | 133 | | |
| 25 | ID25-75CKB6 | **337.325** | 75 | 112 | ID25-100CKB6 | **337.425** | 100 | 137 | | |
| 26 | ID26-78CKB6 | **337.326** | 78 | 118 | ID26-104CKB6 | **337.426** | 104 | 146 | WP 337-3 | |
| 27 | ID27-81CKB6 | **337.327** | 81 | 121 | ID27-108CKB6 | **337.427** | 108 | 150 | | |
| 28 | ID28-84CKB6 | **337.328** | 84 | 124 | ID28-112CKB6 | **337.428** | 112 | 154 | | |
| 29 | ID29-87CKB6 | **337.329** | 87 | 127 | ID29-116CKB6 | **337.429** | 116 | 158 | | |
| 30 | ID30-90CKB6 | **337.330** | 90 | 130 | ID30-120CKB6 | **337.430** | 120 | 162 | | |

1. Inserts are to be ordered seperately.
2. Adjustable drill holder is recommended for clamping.

For Spare Parts ▶ 429
For Insert ▶ 406-407
For Drill Holder ▶ 482

# Indexable Insert Drills, Ø 19.5 - 74

Insert drills in two length graduations (2xD and 3xD) with CKB tool connections.




**L/D = 2**

| Bore Dia. ØD | Boring Depth 2 x D | | | | Insert Type | | CK No. | ØD1 |
|---|---|---|---|---|---|---|---|---|
| | Model | Order No. | X | L | Inside | Outside | | |
| 19.5 | ID19.5-39CKB5 | **336.171** | 39 | 75 | WC 04 | WC 03 | CKB5 | 50 |
| 25.5 | ID25.5-56CKB5 | **336.172** | 56 | 90 | WC 05 | WC 04 | | |
| 29.5 | ID29.5-65CKB5 | **336.173** | 65 | 100 | WC 05 | WC 05 | | |
| 34.5 | ID34.5-76CKB5 | **336.174** | 76 | 110 | WC 06 | WC 06 | | |
| 39.5 | ID39.5-87CKB5 | **336.175** | 87 | 125 | | | | |

1. Inserts are to be ordered seperately.
2. Adjustable drill holder is recommended for clamp.

For Spare Parts ▶ 429
For Insert ▶ 408 - 409
For Drill Holder ▶ 482

**L/D = 2 and 3**

| Bore Dia. ØD | Boring Depth 2 x D | | | | Boring Depth 3 x D | | | | Insert Type | CK No. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Model | Order No. | X | L | Model | Order No. | X | L | | |
| 31 | ID31-62CKB6 | **336.631** | 62 | 100 | ID31-93CKB6 | **336.731** | 93 | 130 | WC 06 | CKB6 |
| 32 | ID32-64CKB6 | **336.632** | 64 | 100 | ID32-96CKB6 | **336.732** | 96 | 130 | | |
| 33 | ID33-66CKB6 | **336.633** | 66 | 110 | ID33-99CKB6 | **336.733** | 99 | 140 | | |
| 34 | ID34-68CKB6 | **336.634** | 68 | 110 | ID34-102CKB6 | **336.734** | 102 | 140 | | |
| 35 | ID35-70CKB6 | **336.635** | 70 | 110 | ID35-105CKB6 | **336.735** | 105 | 150 | | |
| 36 | ID36-72CKB6 | **336.636** | 72 | 110 | ID36-108CKB6 | **336.736** | 108 | 150 | | |
| 37 | ID37-74CKB6 | **336.637** | 74 | 110 | ID37-111CKB6 | **336.737** | 111 | 150 | | |
| 38 | ID38-76CKB6 | **336.638** | 76 | 125 | ID38-114CKB6 | **336.738** | 114 | 160 | | |
| 39 | ID39-78CKB6 | **336.639** | 78 | 125 | ID39-117CKB6 | **336.739** | 117 | 160 | | |
| 40 | ID40-80CKB6 | **336.640** | 80 | 125 | ID40-120CKB6 | **336.740** | 120 | 165 | | |
| 41 | ID41-82CKB6 | **336.641** | 82 | 125 | ID41-123CKB6 | **336.741** | 123 | 165 | | |
| 42 | ID42-84CKB6 | **336.642** | 84 | 125 | ID42-126CKB6 | **336.742** | 126 | 165 | | |
| 43 | ID43-86CKB6 | **336.643** | 86 | 140 | ID43-129CKB6 | **336.743** | 129 | 180 | | |
| 44 | ID44-88CKB6 | **336.644** | 88 | 140 | ID44-132CKB6 | **336.744** | 132 | 180 | | |
| 45 | ID45-90CKB6 | **336.645** | 90 | 140 | ID45-135CKB6 | **336.745** | 135 | 180 | WC 08 | |
| 47 | ID47-94CKB6 | **336.647** | 94 | 140 | ID47-141CKB6 | **336.747** | 141 | 190 | | |
| 49 | ID49-98CKB6 | **336.649** | 98 | 150 | ID49-147CKB6 | **336.749** | 147 | 200 | | |
| 51 | ID51-102CKB6 | **336.651** | 102 | 150 | ID51-153CKB6 | **336.751** | 153 | 200 | | |
| 53 | ID53-106CKB6 | **336.653** | 106 | 160 | ID53-159CKB6 | **336.753** | 159 | 215 | | |
| 55 | ID55-110CKB6 | **336.655** | 110 | 160 | ID55-165CK6 | **336.755** | 165 | 215 | | |
| 57 | ID57-114CKB6 | **336.657** | 114 | 165 | ID57-171CKB6 | **336.757** | 171 | 220 | | |
| 59 | ID59-118CKB6 | **336.659** | 118 | 165 | ID59-177CKB6 | **336.759** | 177 | 220 | | |
| 61 | ID61-122CKB6 | **336.661** | 122 | 165 | ID61-183CKB6 | **336.761** | 183 | 220 | WC 10 | |
| 69 | ID69-153CKB6 | **336.569** | 153 | 200 | | | | | | |
| 65 | ID65-153CKB7 | **336.665** | 153 | 210 | | | | | | CKB7 |
| 74 | ID74-153CKB7 | **336.674** | 153 | 210 | | | | | | |

1. Inserts are to be ordered seperately.
2. Adjustable drill holder is recommended for clamping.

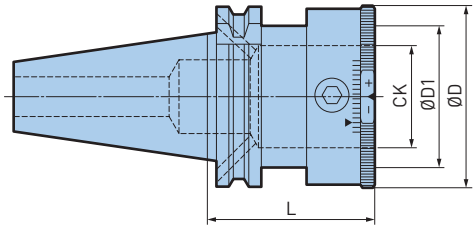
For Insert ▶ 409 - 411

# Adjustable Drill Holders for Indexable Drill

Drill holders in accordance to IT9 quality with double eccentric bush for stepless diameter adjustment of BIG KAISER insert drills with CKB6 tool connection.

Coolant Through Hole

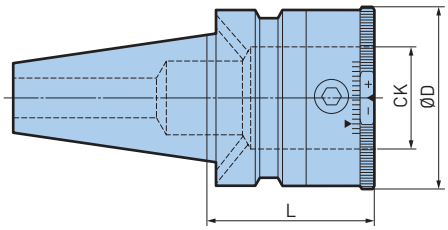
### DV (DIN 69871 Form B/D)




Adjustable range: nominal dia. Ø + 1.0/-0.2 mm

| Model | Order No. | CK | ØD | ØD1 | L | Weight (kg) |
|---|---|---|---|---|---|---|
| DV40-ADH-CKB6ADF | **336.301** | CKB6 | 65 | 50 | 59 | 1.2 |
| DV50-ADH-CKB6ADF | **336.303** | CKB6 | 65 | - | 69 | 3.3 |

### BT (MAS 403/BT)

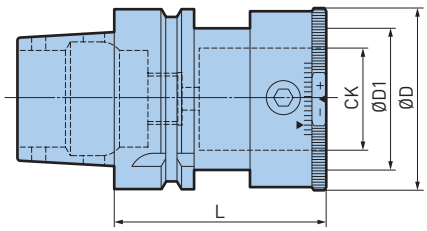



Adjustable range: nominal dia. Ø + 1.0/-0.2 mm

| Model | Order No. | CK | ØD | L | Weight (kg) |
|---|---|---|---|---|---|
| BT40-ADH-CKB6ADF | **336.302** | CKB6 | 65 | 51 | 1.1 |
| BT50-ADH-CKB6 | **336.304** | CKB6 | 65 | 72 | 3.9 |

C.2

### HSK-A (ISO 12164)




Adjustable range: nominal dia. Ø + 1.0/-0.2 mm

| Model | Order No. | CK | ØD | ØD1 | L | Weight (kg) |
|---|---|---|---|---|---|---|
| HSK-A63-ADH-CKB6 | **336.309** | CKB6 | 65 | 52.5 | 70 | 1.2 |
| HSK-A100-ADH-CKB6 | **336.310** | CKB6 | 65 | - | 83 | 2.9 |

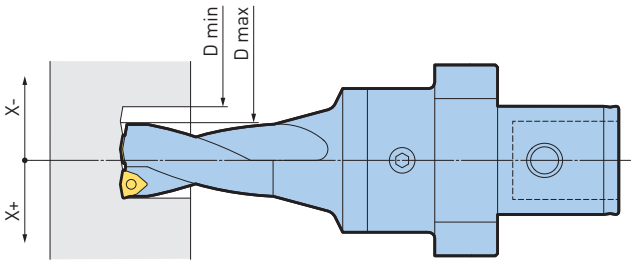
1. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 174
For Spare Parts ▶ 429



BROTECH

# Off-Axis Use Instructions




| Drill Ø | Difficult work | | | Favourable work | | |
|---|---|---|---|---|---|---|
| | +X | D min. | D max. | +X | D min. | D max. |
| 16 | 1.0 | 16.0 | 18.0 | 1.7 | 16.0 | 19.4 |
| 17 | 0.8 | 17.0 | 18.6 | 1.5 | 17.0 | 20.0 |
| 18 | 0.7 | 18.0 | 19.4 | 1.3 | 18.0 | 20.6 |
| 19 | 0.5 | 19.0 | 20.0 | 1.0 | 19.0 | 20.6 |
| 20 | 0.3 | 20.0 | 20.6 | 0.8 | 20.0 | 21.6 |
| 21 | 1.1 | 21.0 | 23.2 | 2.0 | 21.0 | 25.0 |
| 22 | 0.9 | 22.0 | 23.8 | 1.7 | 22.0 | 25.4 |
| 23 | 0.8 | 23.0 | 24.6 | 1.5 | 23.0 | 26.0 |
| 24 | 0.6 | 24.0 | 25.2 | 1.2 | 24.0 | 26.4 |
| 25 | 0.4 | 25.0 | 25.8 | 1.0 | 25.0 | 27.0 |
| 26 | 1.0 | 26.0 | 28.0 | 1.7 | 26.0 | 29.4 |
| 27 | 0.8 | 27.0 | 28.6 | 1.4 | 27.0 | 29.8 |
| 28 | 0.6 | 28.0 | 29.2 | 1.2 | 28.0 | 30.4 |
| 29 | 0.4 | 29.0 | 29.8 | 0.9 | 29.0 | 30.8 |
| 30 | 0.3 | 30.0 | 30.6 | 0.7 | 30.0 | 31.4 |

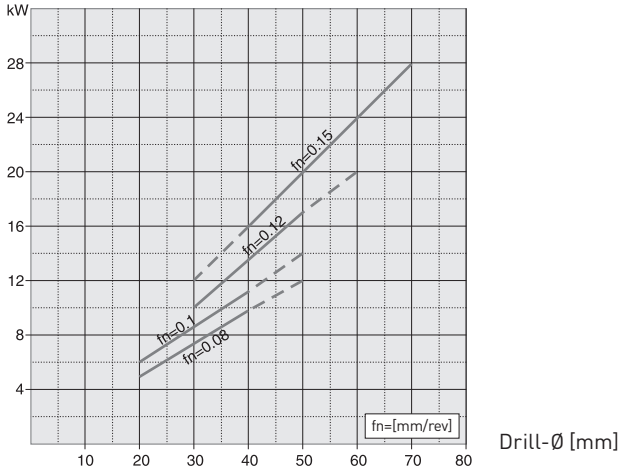
| Drill Ø | Adjustable Range | | Boring Dia | |
|---|---|---|---|---|
| | -X | +X | D min. | D max. |
| 31 | 0.25 | 3.5 | 30.5 | 38.0 |
| 32 | | 3.25 | 31.5 | 38.5 |
| 33 | | 3.0 | 32.5 | 39.0 |
| 34 | | 2.75 | 33.5 | 39.5 |
| 35 | | 2.5 | 34.5 | 40.0 |
| 36 | | 2.25 | 35.5 | 40.5 |
| 37 | | 2.0 | 36.5 | 41.0 |
| 38 | | 1.75 | 37.5 | 41.5 |
| 39 | | 1.5 | 38.5 | 42.0 |
| 40 | | 1.25 | 39.5 | 42.5 |
| 41 | | 1.0 | 40.5 | 43.0 |
| 42 | | 0.75 | 41.5 | 43.5 |
| 43 | | 0.5 | 42.5 | 44.0 |
| 44 | | 0.25 | 43.5 | 44.5 |
| 45 | 0.5 | 4.0 | 44.0 | 53.0 |
| 47 | | 3.5 | 46.0 | 54.0 |
| 49 | | 3.0 | 48.0 | 55.0 |
| 51 | | 2.5 | 50.0 | 56.0 |
| 53 | | 2.0 | 52.0 | 57.0 |
| 55 | | 1.5 | 54.0 | 58.0 |
| 57 | | 1.0 | 56.0 | 59.0 |
| 59 | | 0.5 | 58.0 | 60.0 |
| 61 | | 3.5 | 60.0 | 68.0 |
| 65 | | 3.0 | 64.0 | 71.0 |
| 69 | | 2.0 | 68.0 | 73.0 |
| 74 | | 1.0 | 73.0 | 76.0 |

1. * Adjustment range with adjustable drill holder or with stationary off axis use.

**Driving power**

Vc=220 m/min; Material St 60

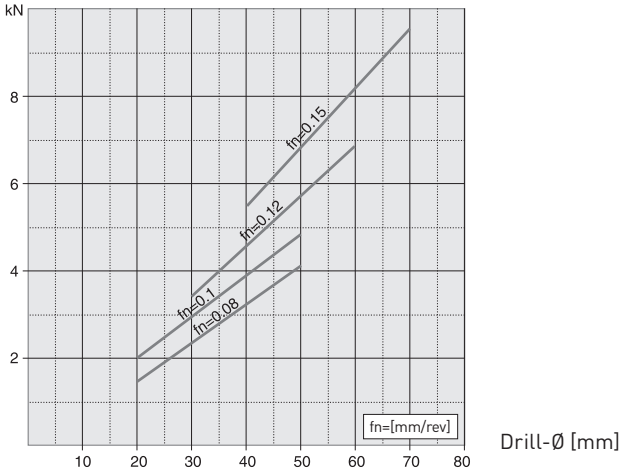
kc 1 = 2 110 N/mm²




**Feed force**

Material St 60

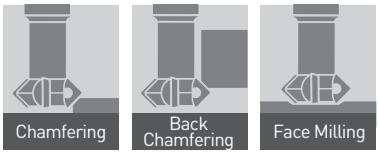
kc 1 = 2 110 N/mm²

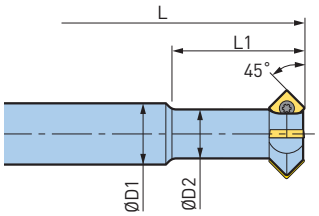



C.2

# C-Cutter Mini, Multi Insert Type

## Front & Back Chamfering





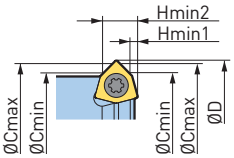




Fig. 1

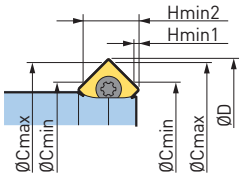



Fig. 2

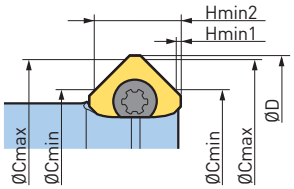


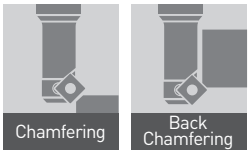

Fig. 3

| Model | Order No. | Face Milling | Fig. | ØD | ØD1 | ØD2 | L | L1 | ØCmin. | ØCmax. | Hmin1 | Hmin2 | Insert Model | No. of Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST10 -C0810 -45B - 15 | **807.192** | - | 1 | 10.5 | 10 | 7.4 | 78 | 15 | 8 | 10 | 0.7 | 3.2 | CM03 | 3 |
| - 27 | **807.193** | | | | | | 90 | 27 | | | | | | |
| ST12 -C1012 -45B - 20 | **966.461** | - | 1 | 12.7 | 12 | 9 | 93 | 20 | 10 | 12 | 1.0 | 3.7 | CM04 | 3 |
| - 35 | **966.462** | | | | | | 108 | 35 | | | | | | |
| -C1116 -45B - 25 | **966.433** | - | 2 | 17.1 | 12 | 9.6 | 98 | 25 | 11 | 16 | 0.4 | 6.2 | CM05 | 4 |
| - 40 | **966.463** | | | | | | 113 | 40 | | | | | | |
| ST16 -C1520 -45B - 50 | **966.464** | - | 2 | 20.7 | 16 | 13.2 | 123 | 50 | 15 | 20 | 0.6 | 6.3 | CM05 | 4 |
| ST20 -C1924 -45B - 60 | **966.465** | - | 2 | 24.7 | 20 | 17.2 | 143 | 60 | 19 | 24 | 0.6 | 6.3 | CM05 | 4 |
| -C2232 -45B - 50 | **966.434** | ✓ | 3 | 32.7 | 20 | 19.2 | 130 | 50 | 22 | 32 | 0.4 | 12.4 | CM10 | |
| - 80 | **966.466** | | | | | | 160 | 80 | | | | | | |
| ST32 -C3242 -45B - 65 | **966.435** | ✓ | 3 | 42.7 | 32 | 30.6 | 175 | 65 | 32 | 42 | 0.4 | 12.4 | CM10 | 4 |
| -100 | **966.467** | | | | | | 211 | 100 | | | | | | |

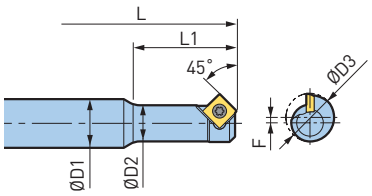
1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in Insert clamping screw set.
3. In case of chamfering with 4 insert type, chatter may occur due to increased cutting resistance when plunge cutting. Please try the different types with less inserts, 1 or 2.

For Insert ▶ 489
For Cutting Condition ▶ 489

# C-Cutter Mini, Single Insert Type




## Front & Back Chamfering



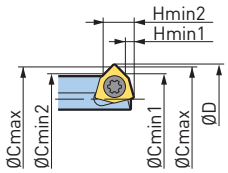




Fig. 1

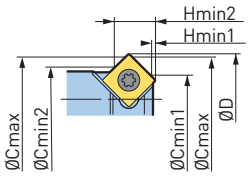



Fig. 2

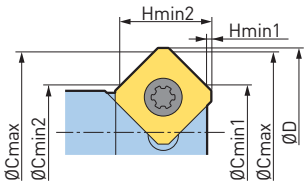


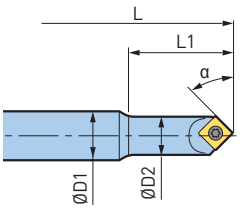

Fig. 3

| Model | Order No. | Fig. | ØD | ØD1 | ØD2 | ØD3 | L | L1 | ØC min1 | ØC min2 | ØC max. | H min1 | H min2 | Offset F | Insert Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST8 -CM06 -45B- 14 | 807.194 | 1 | 7 | 8 | 4.6 | 4.6 | 66 | 14 | 4.9 | 4.9 | 6.3 | 0.9 | 3.1 | 1.2 | CM03 |
| - 26 | 807.195 | | | | | | 78 | 26 | | | | | | | |
| ST10 -C0608 -45B - 16 | 966.468 | 1 | 8.8 | 10 | 5.7 | 5.7 | 78 | 16 | 6 | 6 | 8 | 1.0 | 3.8 | 1.55 | CM04 |
| ST10 -C0409 -45B - 20 | 966.469 | 2 | 9.8 | 10 | 5.4 | 7.7 | 86 | 20 | 4 | 6 | 9 | 0.5 | 5.4 | 1.1 | CM05 |
| ST10 -C0611 -45B - 20 | 966.432 | 2 | 12.0 | 10 | 7.4 | 9.8 | 81 | 20 | 6 | 8 | 11 | 0.4 | 5.5 | 1.1 | CM05 |
| - 35 | 966.470 | | | | | | 96 | 35 | | | | | | | |
| ST16 -C1222 -45B - 40 | 966.471 | 3 | 22.6 | 16 | 11.0 | 16.9 | 117 | 40 | 12 | 12 | 22 | 0.3 | 12.4 | 2.9 | CM10 |

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.

For Insert ▸ 489
For Cutting Condition ▸ 489

## Front Chamfering



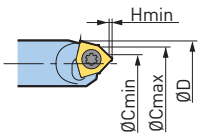




Fig. 1

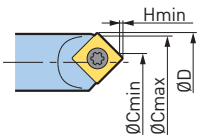



Fig. 2

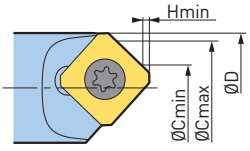



Fig. 3

| Model | Order No. | Fig. | α | ØD | ØD1 | ØD2 | L | L1 | ØC min. | ØC max. | H min. | Insert Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST8 -C0103 -45 - 16 | 807.196 | 1 | 45° | 4.9 | 8 | 4.7 | 68 | 16 | 1 | 3 | 0.3 | CM03 |
| ST10 -C0204 -45 - 15 | 966.486 | 1 | 45° | 6.3 | 10 | 6 | 78 | 15 | 2 | 4 | 0.4 | CM04 |
| - 25 | 966.487 | | | | | | 88 | 25 | | | | |
| ST10 -C0207 -45 - 20 | 966.431 | 2 | 45° | 8.1 | 10 | 7.8 | 81 | 20 | 2 | 7 | 0.4 | CM05 |
| - 35 | 966.488 | | | | | | 96 | 35 | | | | |
| ST16 -C0515 -45 - 50 | 966.489 | 3 | 45° | 15.8 | 16 | 15.2 | 122 | 50 | 5 | 15 | 0.4 | CM10 |
| ST16 -C0214 -30 - 40 | 966.436 | 3 | 30° | 15.9 | 16 | 15.4 | 105 | 40 | 2 | 14 | 0.2 | CM10 |
| ST16 -C0916 -60 - 40 | 966.437 | 3 | 60° | 16.5 | 16 | 15.6 | 105 | 40 | 9 | 16 | 0.8 | CM10 |

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set. Centering is not possible.

For Insert ▸ 489
For Cutting Condition ▸ 489

# C-Cutter Mini, Bolt Hole & Tap Starting Hole

Tap hole Chamfering

## Front & Back Chamfering

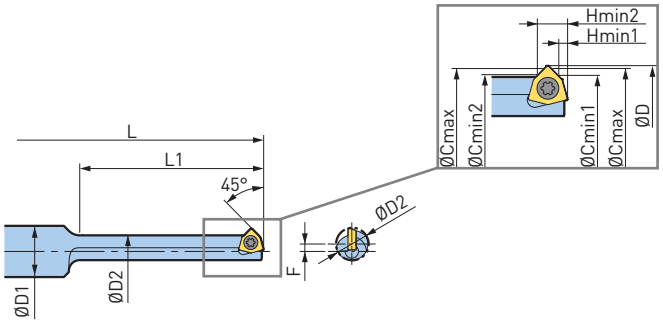



Fig. 1

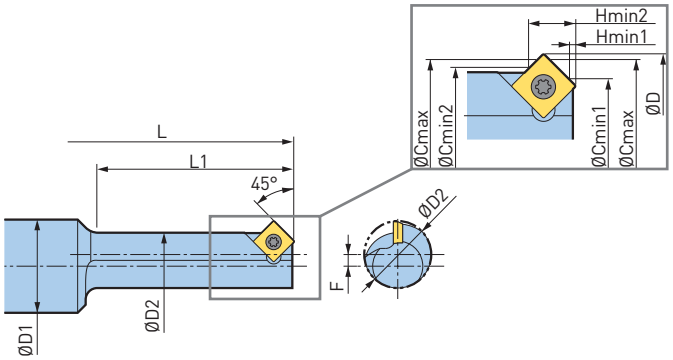


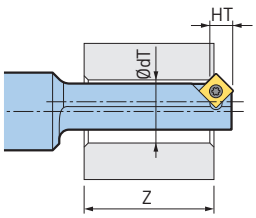

Fig. 2

| Model | Order No. | Fig. | ØD | ØD1 | ØD2 | L | L1 | ØC min1 | ØC min2 | ØC max. | H min1 | H min2 | Offset F | Insert Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST10 -CM08 -45B - 19 | 966.472 | 1 | 9.2 | 10 | 6.3 | 81 | 19 | 6.4 | 6.6 | 8.4 | 1.0 | 3.7 | 1.45 | CM04 |
| - 35 * | 966.473 | | | | | 97 | 35 | | | | | | | |
| ST12 -CM10 -45B - 25 | 966.474 | 2 | 11.3 | 12 | 8.0 | 99 | 25 | 5.5 | 8.3 | 10.5 | 0.5 | 5.0 | 1.65 | CM05 |
| - 45 * | 966.475 | | | | | 119 | 45 | | | | | | | |
| ST12 -CM12 -45B - 29 | 966.476 | 2 | 13.4 | 12 | 9.7 | 102 | 29 | 7.6 | 10.0 | 12.6 | 0.5 | 5.2 | 1.85 | |
| - 53 * | 966.477 | | | | | 126 | 53 | | | | | | | |
| ST16 -CM14 -45B - 33 | 966.478 | 2 | 15.5 | 16 | 11.5 | 107 | 33 | 9.7 | 11.8 | 14.7 | 0.5 | 5.3 | 2.00 | |
| - 61 * | 966.479 | | | | | 135 | 61 | | | | | | | |
| ST16 -CM16 -45B - 37 | 966.480 | 2 | 17.6 | 16 | 13.5 | 110 | 37 | 11.8 | 13.8 | 16.8 | 0.5 | 5.4 | 2.05 | |
| - 69 * | 966.481 | | | | | 142 | 69 | | | | | | | |
| ST20 -CM18 -45B - 42 | 966.482 | 2 | 19.7 | 20 | 14.9 | 126 | 42 | 13.9 | 15.2 | 18.9 | 0.5 | 5.7 | 2.40 | |
| - 78 * | 966.483 | | | | | 162 | 78 | | | | | | | |
| ST20 -CM20 -45B - 46 | 966.484 | 2 | 21.8 | 20 | 16.9 | 129 | 46 | 16.0 | 17.2 | 21.0 | 0.5 | 5.8 | 2.45 | |
| - 86 * | 966.485 | | | | | 169 | 86 | | | | | | | |

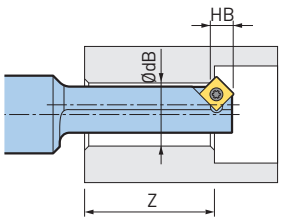
1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.
3. For * long type, standard insert is recommended rather than "SE" sharp edge insert to avoid chipping.

For Insert ▶ 489
For Cutting Condition ▶ 489

**Tap starting hole**



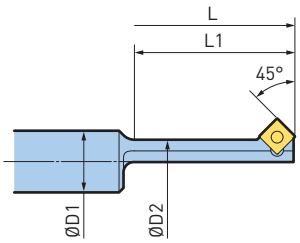

**Bolt hole**




| Cutter Type | Tap Starting Hole | | Bolt Hole | | Z | |
|---|---|---|---|---|---|---|
| | ØdT | HT | ØdB | HB | Standard Type | Long Type |
| CM08 | 6.8 (M8) | 3.6 | 6.6 (M6) | 3.7 | 13 | 29 |
| CM10 | 8.5 (M10) | 4.9 | 9 (M8) | 4.6 | 17 | 37 |
| CM12 | 10.3 (M12) | 5.0 | 11 (M10) | 4.7 | 21 | 45 |
| CM14 | 12.0 (M14) | 5.2 | - | - | 25 | 53 |
| CM16 | 14.0 (M16) | 5.3 | 14 (M12) | 5.3 | 29 | 61 |
| CM18 | 15.5 (M18) | 5.6 | 16 (M14) | 5.3 | 33 | 69 |
| CM20 | 17.5 (M20) | 5.6 | 18 (M16) | 5.4 | 37 | 77 |

# C-Cutter Mini, Spot Facing Type

## Back Side focus



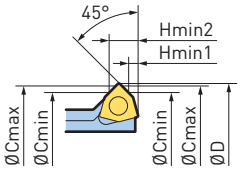




Fig. 1

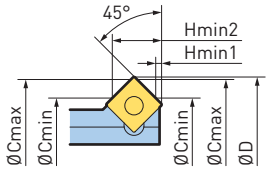



Fig. 2

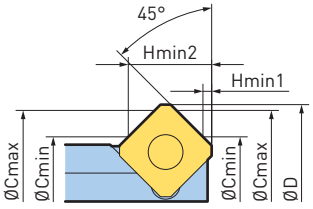


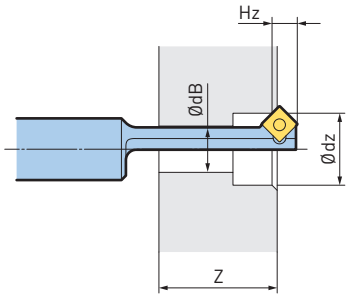

Fig. 3

| Model | Order No. | Fig. | ØD | ØD1 | ØD2 | L | L1 | ØC min | ØC max. | H min1 | H min2 | Offset F | Insert Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST10 -CZ06 -45B - 23 | **806.966** | 1 | 12.8 | 10 | 6.1 | 85 | 23 | 10.0 | 12.0 | 1.0 | 3.8 | 3.35 | CM04 |
| ST12 -CZ08 -45B - 31 | **806.967** | 2 | 26.8 | 12 | 8.5 | 104 | 31 | 11.0 | 16.0 | 0.5 | 6.3 | 4.15 | CM05 |
| ST16 -CZ10 -45B - 37 | **806.968** | 2 | 20.3 | 16 | 10.5 | 111 | 37 | 14.5 | 19.5 | 0.5 | 6.3 | 4.90 | CM05 |
| -CZ12 -45B - 50 | **806.969** | 3 | 24.8 | | 13.5 | 124 | 50 | 14.0 | 24.0 | 0.3 | 12.0 | 5.65 | CM10 |
| ST20 -CZ14 -45B - 56 | **806.970** | 3 | 27.8 | 20 | 15.5 | 139 | 56 | 17.0 | 27.0 | 0.3 | 12.0 | 6.15 | CM10 |

1. Wrench and screw are included. Inserts are to be ordered separately.

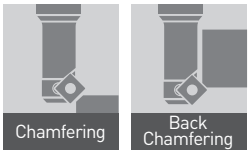
For Insert ▶ 489
For Cutting Condition ▶ 489

### Bolt hole

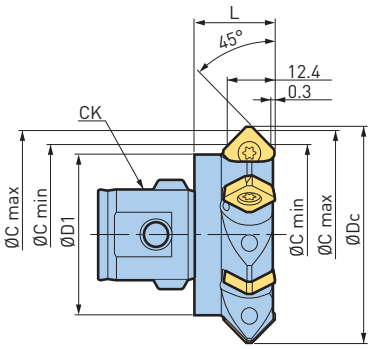



| Cutter Type | ØdB | Spot Facing Hole | | Z |
|---|---|---|---|---|
| | | Ødz | Hz | |
| CZ06 | 6.6 (M6) | 11.0 (M6) | 3.3 | 17 |
| CZ08 | 9.0 (M8) | 14.0 (M8) | 4.9 | 23 |
| CZ10 | 11.0 (M10) | 17.5 (M10) | 4.9 | 29 |
| CZ12 | 14.0 (M12) | 20.0 (M12) | 9.4 | 37 |
| CZ14 | 16.0 (M14) | 23.0 (M14) | 14.0 (M12) | 43 |

# C-Cutter Mini CKB Type




The C-Cutter mini is a high performance tool for chamfering, back chamfering and face milling. The large number of cutting edges (4 -6) combined with the small tool diameter permit extremely high feed rates.

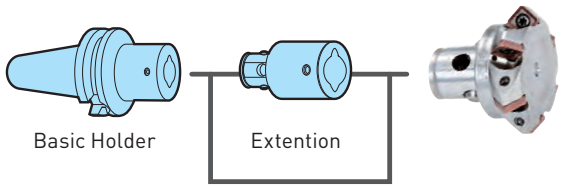



| Model | Order No. | Chamfer | | CK No. | ØDc | ØD1 | L | No. of Inserts | Insert Model |
|---|---|---|---|---|---|---|---|---|---|
| | | ØC min | ØC max. | | | | | | |
| CKB1-C2232-45B-20 | **335.070** | 22 | 32 | CKB1 | 32.7 | 19 | 20 | 4 | CM10 |
| CKB3-C3242-45B-20 | **335.071** | 32 | 42 | CKB3 | 42.7 | 31 | 20 | 4 | CM10 |
| -C5262-45B-20 | **335.072** | 52 | 62 | | 62.7 | 31 | | 6 | |
| CKB4-C4252-45B-20 | **335.073** | 42 | 52 | CKB4 | 52.7 | 39 | 20 | 6 | CM10 |
| CKB5-C5262-45B-20 | **335.074** | 52 | 62 | CKB5 | 62.7 | 51 | 20 | 6 | CM10 |

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. Can be used with through coolant.

For Insert ▶ 489
For Cutting Condition ▶ 489

**BIG KAISER Moduler Tooling System**



# Indexable Inserts for C-Cutter Mini

## Indexable Inserts

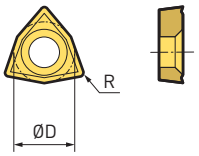



Fig. 1

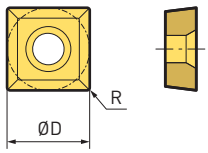



Fig. 2

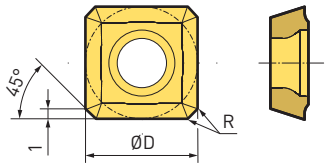



Fig. 3

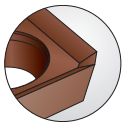
The suffix SE designates a sharp cutting edge version.

| Model | Fig. | ØD | Nose R | P/K | | M | N | Clamping Screw Set | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | ACP200 | ACP300 | ACM250F | DS20 | Model | Order No. |
| CM0302 | 1 | 3.31 | 0.2 | - | 807.226 | - | - | S1.6S-T3 | 807.041 |
| CM0402 | | 3.97 | 0.2 | - | 966.440 | - | - | S2SS-T6 | 966.448 |
| CM0502 | 2 | 5 | 0.2 | 966.441 | - | 807.187 | 966.442 | S2TS-T6 | 966.449 |
| CM0502SE | | | | 966.443 | 800.950 | - | - | | |
| CM10C1 | 3 | 10 | 0.2 | 966.445 | - | 807.188 | 966.446 | S4S-T15 | 966.450 |
| CM10C1SE | | | | 966.447 | - | - | - | | |

1. Inserts are available in packets of 10 pcs.
2. It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.

**Sharp cutting edge insert for „SE" type**

Sharp cutting edge minimises the generation of burrs. This is especially beneficial when cutting stainless and mild steel materials.



## Recommended Cutting Condition

**A (Standard conditions)**

| Work Material | Insert Grade | Cutting Speed Vc (m/min) | Feed Rate fz (mm/tooth) | | Coolant |
|---|---|---|---|---|---|
| | | | Chamfering | Face Milling (CM10 insert only) | |
| General Steel, Alloy Steel, High-Alloy Steel | ACP200 ACP300 | 100 - 350 | 0.05 - 0.4 | 0.05 - 0.2 | Dry |
| Prehardened Steel (Less than HRC40) | | 60 - 100 | 0.05 - 0.1 | 0.05 - 0.1 | Wet |
| Cast Iron | | 100 - 350 | 0.1 - 0.5 | 0.05 - 0.25 | Dry |
| Stainless Steel | ACM250F | 100 - 250 | 0.08 - 0.3 | 0.08 - 0.2 | Dry / Wet |
| Aluminium, Non-Ferrous | DS20, ACP300 | 100 - 800 | 0.1 - 0.5 | 0.05 - 0.3 | Dry / Wet |

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. Wet cutting is recommended to obtain the good surface quality.
3. In case built-up edge occurs when cutting aluminum and stainless steel, use soluble oil.

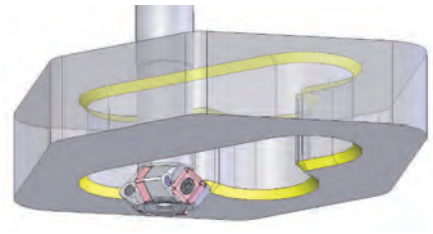
**B (For long models of „bolt hole and starting hole for tapping type")**

| Work Material | Insert Grade | Cutting Speed Vc (m/min) | Feed Rate fz (mm/tooth) | Coolant |
|---|---|---|---|---|
| General Steel, Alloy Steel, High-Alloy Steel | ACP200 ACP300 | 20 - 100 | 0.03 - 0.12 | Wet |
| Cast Iron | | 50 - 160 | 0.05 - 0.20 | Dry |
| Aluminium, Non-Ferrous | | 30 - 100 | 0.03 - 0.12 | Wet |

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. For stainless steel and hardened steel, shorter models are recommended.

# Application Examples C-Cutter Mini

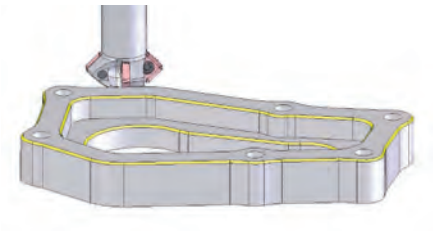
### Front & Back chamfering for stainless steel



| | Competitor's Tool (with TiAlN Coated Carbide Insert) | C-Cutter Mini (ST20-C2232-45B-50) |
|---|---|---|
| Chamfering Dia. | Ø 30 | Ø 28 |
| Number of Teeth | 1 | 4 |
| Cutting Speed (m/min) | 140 | 180 |
| Spindle Speed (min$^{-1}$) | 1 490 | 2 050 |
| Feed (mm/min) | 149 | 819 |
| Result | 5 times better cutting efficiency | |

Material: X5CrNi18-9
Chamfer: 3 mm x 45°
Feed: 0.1 mm/tooth

### Chamfering for aluminium



| | Competitor's Tool | C-Cutter Mini (ST12-C1116-45B-25) |
|---|---|---|
| Chamfering Dia. | Ø 40 | Ø 12 |
| Number of Teeth | 3 | 4 |
| Cutting Speed (m/min) | 200 | 600 |
| Spindle Speed (min$^{-1}$) | 1 590 | 15 920 |
| Feed (mm/min) | 477 | 6 370 |
| Result | 13 times better cutting efficiency | |

Material: Al-Si7Mg(Fe)
Chamfer: 0.5 mm x 45°
Feed: 0.1 mm/tooth

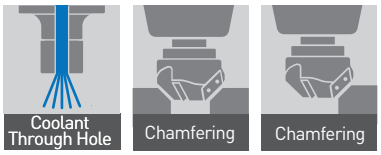
### Front & Back chamfering of starting holes for M8 tapping

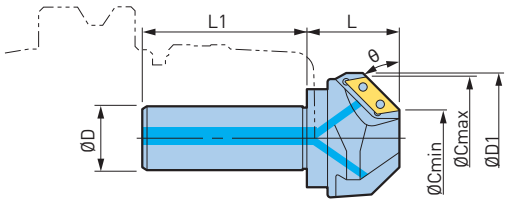
| | Competitor's Tool (with Non-Coated Carbide Insert) | C-Cutter Mini (ST10-CM08-45B-19) |
|---|---|---|
| Cutting Speed (m/min) | 30 | 150 |
| Spindle Speed (min$^{-1}$) | 1 140 | 5 680 |
| Feed per Tooth (mm/rev) | 0.05 | 0.1 |
| Feed (mm/min) | 57 | 568 |

Material: FC250
Tapped hole: Ø 6.6
Chamfering dia.: Ø 8.4

## C-Cutter Standard Type

One C-Cutter to cover a wide chamfering range 45°: Ø 5 - Ø 25, Ø 10 - Ø 40, Ø 30 - Ø 60, Ø 50 - Ø 100





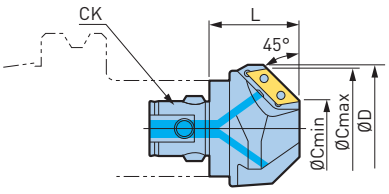

| Model | Order No. | Chamfering Angle θ | Chamfer | | ØD | ØD1 | L | L1 | No. of Inserts | Insert Model | Screw Set | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ØC min | ØC max | | | | | | | Model | Order No. |
| ST32 -C1652C -30 | 978.336 | 30° | 16 | 52 | 32 | 68 | 48 | 80 | 2 | CW19 | S3S | 801.696 |
| ST42 -C5085C -30 | 802.251 | | 50 | 85 | 42 | 96 | 52 | 80 | 3 | | | |
| ST20 -C0525C | 966.401 | 45° | 5 | 25 | 20 | 33 | 25 | 60 | 1 | CW12 | S2S-B | 978.284 |
| ST25 -C1040C | 966.406 | | 10 | 40 | 25 | 45 | 35 | 70 | 2 | CW19 | S3S | 801.696 |
| ST32 -C3060C | 802.224 | | 30 | 60 | 32 | 65 | 45 | 80 | 3 | | | |
| ST42 -C50100C | 966.404 | | 50 | 100 | 42 | 106 | 70 | 80 | 3 | CW31 | S5S | 801.699 |
| ST25 -C1434C -60 | 966.405 | 60° | 14 | 34 | 25 | 38 | 37 | 70 | 2 | CW19 | S3S | 801.696 |
| ST32 -C3050C -60 | 978.338 | | 30 | 50 | 32 | 54 | 45 | 80 | 3 | | | |
| ST32 -C4565C -60 | 978.339 | | 45 | 65 | 32 | 69 | 50 | 80 | 3 | | | |

1. Wrench and screws are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.

For Insert ▶ 493

## C-Cutter CKB type

Chamfering mill with indexable inserts for efficient and vibration-free 45° chamfering. The long cutting edge provides a wide chamfering range which reduces the number of tools, tool changes, and magazine pots.

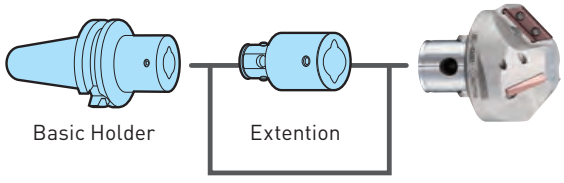



| Model | Order No. | Chamfer | | CK No. | ØD | L | No. of Inserts | Insert Model | Screw Set | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ØC min | ØC max | | | | | | Model | Order No. |
| CKB2 -C0525C | 335.021 | 5 | 25 | CKB2 | 28.5 | 25 | 1 | CW12 | S2S-B | 978.284 |
| CKB4 -C1040C | 335.022 | 10 | 40 | CKB4 | 45 | 35 | 2 | CW19 | S3S | 801.696 |
| CKB5 -C3060C | 335.023 | 30 | 60 | CKB5 | 65 | 40 | 3 | | | |
| CKB6 -C50100C | 335.024 | 50 | 100 | CKB6 | 106 | 65 | 3 | CW31 | S5S | 801.699 |

1. A wrench and a screw are included. Inserts must be ordered separately.
2. Can be used with through coolant.

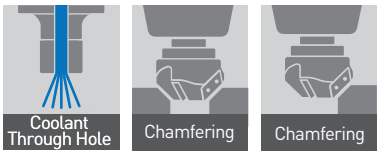
For Insert ▶ 493

**BIG KAISER Moduler Tooling System**



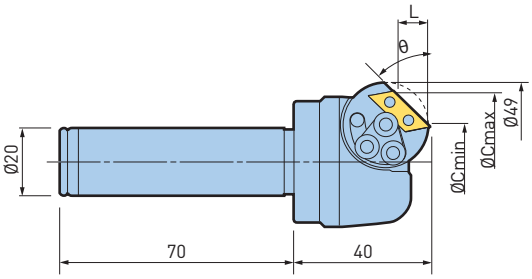
## C-Cutter Universal Type

Chamfering angle adjustment from 5° to 85° with a hex key.




| Model | Order No. |
|---|---|
| ST20-C5/85A-40 | 966.407 |

Insert Model: CW12




**Easy angle adjustment with a hex key.**

**Chamfering range**

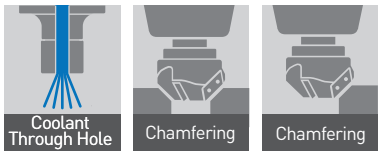
| Angle θ | Chamfer | | L |
|---|---|---|---|
| | ØC min | ØC max | |
| 5° | 5.5 | 33.5 | 1.2 |
| 10° | 7.3 | 34.7 | 2.4 |
| 15° | 9.0 | 36.2 | 3.6 |
| 20° | 11.2 | 37.4 | 4.7 |
| 25° | 13.0 | 38.6 | 5.9 |
| 30° | 15.2 | 39.6 | 7.0 |
| 35° | 17.4 | 40.5 | 8.0 |
| 40° | 19.6 | 41.2 | 9.0 |
| 45° | 21.8 | 41.8 | 10.0 |

| Angle θ | Chamfer | | L |
|---|---|---|---|
| | ØC min | ØC max | |
| 50° | 24.0 | 42.2 | 10.8 |
| 55° | 26.4 | 42.4 | 11.4 |
| 60° | 28.5 | 42.5 | 12.1 |
| 65° | 30.7 | 42.4 | 12.5 |
| 70° | 32.9 | 42.1 | 12.6 |
| 75° | 34.9 | 41.7 | 12.7 |
| 80° | 36.9 | 41.1 | 11.9 |
| 85° | 38.8 | 40.3 | 8.6 |

For Insert ▶ 493

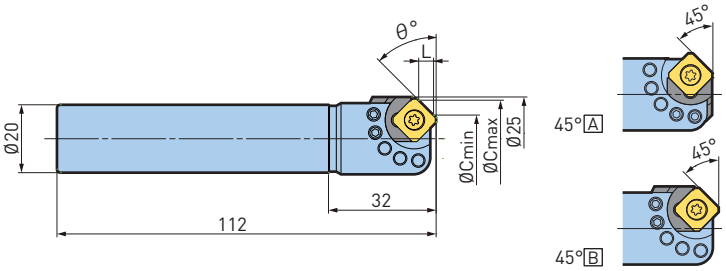
## C-Cutter Mini Universal

Slim body C-Cutter with chamfering angle adjustment from 5° to 85°.



| Model | Order No. |
|---|---|
| ST20-CM5 / 85A-30 | 806.541 |

Insert Model: CM10C1




**Application examples**

47.5° chamfer
Plunging

5° chamfer
Traverse

**Chamfering Range**

| Chamfering angle θ | Min. hole ØC min | Max. chamfer diameter ØC max | L |
|---|---|---|---|
| 5° | 5.7 | 18.8 | 0.6 |
| 10° | 6.7 | 19.7 | 1.2 |
| 15° | 7.6 | 20.5 | 1.7 |
| 20° | 8.5 | 21.2 | 2.3 |
| 25° | 9.6 | 21.8 | 2.9 |
| 30° | 10.6 | 22.3 | 3.4 |
| 35° | 11.6 | 22.7 | 3.9 |
| 40° | 12.7 | 23.0 | 4.4 |
| 45° A | 13.7 | 23.3 | 4.8 |
| 45° B | 13.4 | 23.0 | 4.8 |

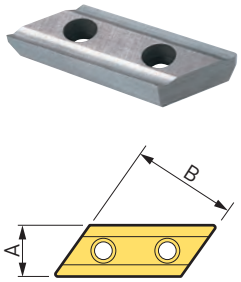
| Chamfering angle θ | Min. hole ØC min | Max. chamfer diameter ØC max | L |
|---|---|---|---|
| 50° | 14.4 | 23.2 | 5.2 |
| 55° | 15.5 | 23.3 | 5.6 |
| 60° | 16.4 | 23.3 | 5.9 |
| 65° | 17.4 | 23.2 | 6.2 |
| 70° | 18.3 | 23.0 | 6.4 |
| 75° | 19.1 | 22.7 | 6.6 |
| 80° | 19.9 | 22.3 | 6.7 |
| 85° | 20.7 | 21.9 | 6.8 |

Values in the table are reference only. Measure accurate values with a presetter.

For Insert ▶ 489

# Indexable Inserts for C-Cutter

## Indexable Inserts

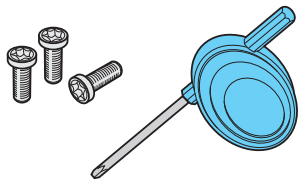



ZX = TiCN+TiAlN multilayer coating

| Model | A | B | t | P30 | P20 | N20 |
|---|---|---|---|---|---|---|
| | | | | Non-Coat | ZX | DLC |
| CW1206A | 6.35 | 12.7 | 2.7 | 978.283 | 800.951 | 801.753 |
| CW1206A-10P | | | | 802.134 | 978.918 | - |
| CW1909A | 9.525 | 19.05 | 4.5 | 978.817 | 800.952 | 801.754 |
| CW1909A-10P | | | | 802.135 | 802.136 | - |
| CW3115A | 15.875 | 31.75 | 7.0 | 978.826 | 800.953 | 801.755 |
| CW3115A-10P | | | | 802.137 | 802.138 | - |

1. 10P: Set contains 10 inserts.
2. DLC coated insert is only available with 1 pce.

## Insert Clamping Screw Set



| Insert | Set Model | Order No. |
|---|---|---|
| CW1206A | S2S-B | 978.284 |
| CW1909A | S3S | 801.696 |
| CW3115A | S5S | 801.699 |

1. The set contains 10 screws and 1 wrench.
2. Wrenches are also available separately.

# C-Cutter

## Recommended Cutting Condition

| Cutter Type | Max. Chamfer | Chamfering | General Steel Alloy Steel | | Stainless Steel | | Cast Iron | | Aluminium | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Vc (m/min) | f (mm/rev) | Vc (m/min) | f (mm/rev) | Vc (m/min) | f (mm/rev) | Vc (m/min) | f (mm/rev) |
| ST20-C5/85A-40 | 2 mm * | Plunge Cutting | 50 | 0.1 | 30 | 0.08 | 40 | 0.1 | 80 | 0.1 |
| | | Side Cutting | 80 | 0.15 | 60 | 0.1 | 50 | 0.15 | 100 | 0.2 |
| C0525C | C2 | Plunge Cutting | 50 | 0.1 | 30 | 0.08 | 40 | 0.1 | 80 | 0.1 |
| | | Side Cutting | 80 | 0.15 | 60 | 0.1 | 50 | 0.15 | 100 | 0.15 |
| C1040C | C3 | Plunge Cutting | 90 | 0.15 | 40 | 0.12 | 60 | 0.15 | 100 | 0.2 |
| C1434C-60<br>C1652C-30 | 3 mm * | Side Cutting | 120 | 0.3 | 60 | 0.2 | 90 | 0.3 | 150 | 0.3 |
| C3060C / C3060 | C4 | Plunge Cutting | 120 | 0.3 | 60 | 0.18 | 90 | 0.25 | 150 | 0.3 |
| C3050C-60<br>C4565C-60<br>C5085C-30 | 4 mm * | Side Cutting | 150 | 0.45 | 60 | 0.3 | 120 | 0.6 | 200 | 0.6 |
| C50100C | C4 | Plunge Cutting | 150 | 0.4 | 80 | 0.25 | 120 | 0.35 | 180 | 0.4 |
| | | Side Cutting | 150 | 0.45 | 60 | 0.36 | 120 | 0.6 | 240 | 0.6 |

Vc: Cutting speed (m/min.) f: Feed per revolution (mm/rev.)

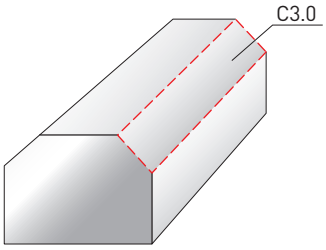
1. Cutting condition is the same for both non-coated and coated inserts. Coated inserts will achieve better surface finish and extended insert life.
2. Peck feed is necessary in case cutting chips are too long.
3. Reduce cutting speed if a larger chamfer than the max. amount shown in the table is required.
4. A high rigidity toolholder is recommended, such as BIG KAISER HMC or MEGA D Chuck.
5. Max. chamfering amount with * in 30, 60 degree type and Universal type indicates the chamfering length of the longer side.

## Application Example

C3 traverse chamfering. Workmaterial: C55 (S55C)

**High cutting parameter was achieved without chattering**

| | |
|---|---|
| C-Cutter | ST25-C1040 |
| Insert Model | CW1909A |
| Spindle speed | 3 000 $min^{-1}$ |
| Feed | 1800 mm/min |



# Chamfer Rings for Boring Heads

Chamfering rings for single- and rough-cutter boring bars for 30° or 45° chamfering immediately after boring without tool change.

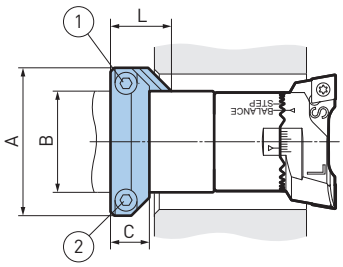



Fig. 1

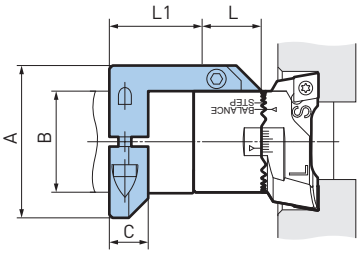



Fig. 2

| Bore Ø | Model | Order No. | Fig. | CK No. | A | B | C | L1 | Inserts Model |
|---|---|---|---|---|---|---|---|---|---|
| 20 - 35 | CR20 | **663.110** | 1 | CK1 | 35 | 19 | 13 | - | CRP 20-45<br>CRP 20-30 |
| 25 - 40 | CR25 | **663.120** | 1 | CK2 | 42 | 24 | 15 | - | |
| | CR25S | **663.121** | 2 | | | | | 27 | |
| 32 - 47 | CR32 | **663.130** | 1 | CK3 | 49 | 31 | 15 | - | |
| | CR32S | **663.131** | 2 | | 51 | | | 31.5 | |
| 41 - 55 | CR41 | **663.140** | 1 | CK4 | 57 | 39 | 15 | - | |
| | CR41S | **663.141** | 2 | | | | | 38.5 | |
| 53 - 90 | CR53 | **663.150** | 1 | CK5 | 85 | 50 | 25 | - | CRP 53-45<br>CRP 53-30 |
| | CR53S | **663.151** | 2 | | 90 | | | 39 | |
| 68 - 104 | CR68 | **663.160** | 1 | CK6 | 100 | 64 | 25 | - | |
| | CR68S | **663.161** | 2 | | 104 | | | 53 | |
| 90 - 130 | CR93-125 | **663.170** | 1 | CK6 | 130 | 64 | 25 | - | |

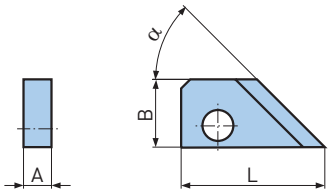
1. Dimension "L" is defined according to the Insert. Please refer to the chart below.

**Assembly instructions:**

- Mount both ring parts on tool shank and adjust them in length.
- Assemble cutting insert or insert holder between the ring parts and fasten screw ① tightly.
- Fasten clamp screw ②.

## Inserts 45°and 30°

Carbide inserts with ground chip breaker for machining of cast iron and steel.




| α | Model | Order No. | Range Ø | A | B | L |
|---|---|---|---|---|---|---|
| 45° | CRP20-45 | **663.191** | 20 - 55 | 4 | 9 | 23.5 |
| | CRP53-45 | **663.195** | 53 - 130 | 8 | 20 | 43 |
| 30° | CRP20-30 | **663.181** | 20 - 55 | 4 | 9 | 27.5 |
| | CRP53-30 | **663.185** | 53 - 100 | 8 | 20 | 52 |

C.2

## Insert Holder for Indexable Type

For different work piece materials and a quick change of the insert.

Fig. 1

Fig. 2

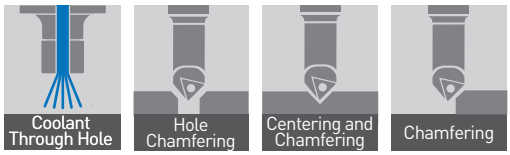
| α | Model | Order No. | Fig. | Ring Type | Range Ø | Insert Model |
|---|---|---|---|---|---|---|
| 45° | CB2-45CW12A | **805.811** | 1 | CR53 | 55 - 75 | CW1206A |
| | | | | CR68 | 69 - 89 | |
| | | | | CR93-125 | 95 - 115 | |
| | CB2-45CW12B | **805.812** | 2 | CR53 | 70 - 90 | |
| | | | | CR68 | 84 - 105 | |
| | | | | CR93-125 | 110 - 130 | |

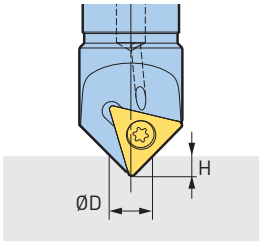
1. A wrench and screw are included. Inserts to be ordered separately.

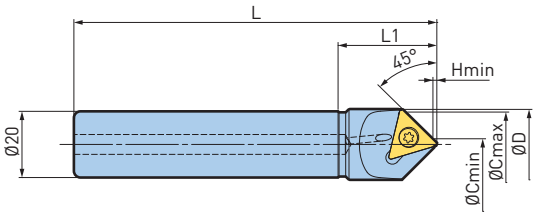
For Insert ▶ 493

# C-Centering Cutter

A multifunction cutter capable of both spot drilling and chamfering.





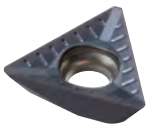



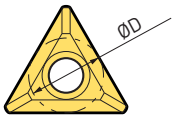

H = D/2 - 0.7 mm

| Model | Order No. | ØD | L | L1 | ØC min. | ØC max. | H min. | Insert Model |
|---|---|---|---|---|---|---|---|---|
| ST20-CN0220-45-110 | 806.622 | 22 | 110 | 30 | 2 | 20 | 0.3 | CN0906 |

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. As the insert has a nose radius, spot drilled tip is not acute.
3. Use with hand feed is not recommended.

## Inserts for C-Centering Cutter






| Model | Order No. | ØD | Workpiece Material |
|---|---|---|---|
| CN0906 ACM250F | 807.139 | 9.525 | Steel / Cast Iron / Stainless Steel |
| CN0906 DS20 | 807.158 | | Aluminum |

1. Insert grade coated carbide P15C.
2. Inserts are available in a packet of 10 pcs.
3. The insert clamping screw set contains 10 screws and 1 wrench.

| Clamping Screw Set | Order No. |
|---|---|
| S45-15IP | 806.624 |

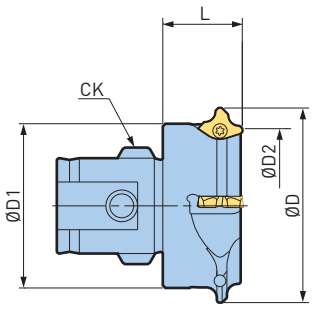
## Recommended Cutting Condition

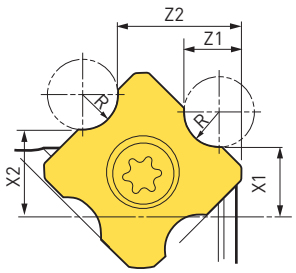
| Workpiece Material | Cutting Speed Vc (m/min) | Feed (mmv/rev) | |
|---|---|---|---|
| | | Spot Drilling | Traverse Chamfering |
| Carbon Steel, Alloy Steel | 50 - 150 | 0.02 - 0.08 | 0.05 - 0.2 |
| Stainless Steel | 50 - 120 | 0.02 - 0.05 | |
| Cast Iron | 70 - 200 | 0.02 - 0.08 | |
| Aluminum | 100 - 300 | | |

1. The table is just a reference to determine cutting conditions.
   It should be adjusted according to the condition of the machine tool and workpiece.

# R-Cutter CKB Type

The R-Cutter is a high performance tool for chamfering, back chamfering and face milling.
Combined with the small tool diameter permit extremely high feed rates.



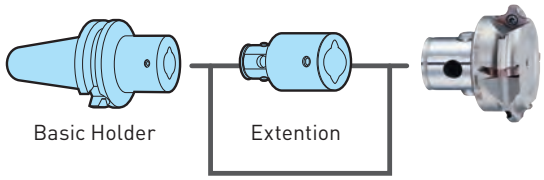

R-Dimensions

| Model | Order No. | CK No. | ØD | ØD1 | ØD2 | L | R | X1 | Z1 | X2 | Z2 | No. of Insert | Insert Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CKB3-RC064B-15 | **806.439** | CKB3 | 37 | 31 | 29.2 | 15 | 0.5 | 15.9 | 1.9 | 16.6 | 5.8 | 4 | RC06 |
| | | | | | | | 1.0 | 15.6 | 2.2 | 16.3 | 5.5 | | |
| | | | | | | | 1.5 | 154 | 2.4 | 16.1 | 5.3 | | |
| | | | | | | | 2.0 | 15.1 | 2.7 | 15.8 | 5 | | |
| CKB5-RC124B-25 | **806.440** | CKB5 | 62 | 50 | 46.3 | 25 | 1 | 25.8 | 3.8 | 27.2 | 11.6 | 4 | RC12 |
| | | | | | | | 2 | 25.3 | 4.3 | 26.7 | 11.1 | | |
| | | | | | | | 3 | 24.8 | 4.8 | 26.2 | 10.6 | | |
| | | | | | | | 4 | 24.3 | 5.3 | 25.7 | 10.1 | | |

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. Can be used with through coolant.

For Insert ▶ 500

**BIG KAISER Moduler Tooling System**






BROTECH

# R-Cutter

Front & back R-chamfering are available. 4 inserts multiply feed rate.

## Front & Back R Chamfering

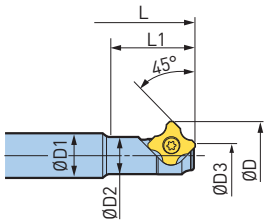



Fig. 1

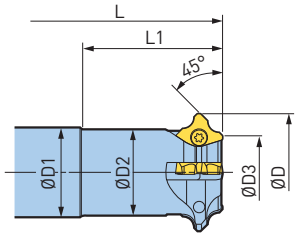
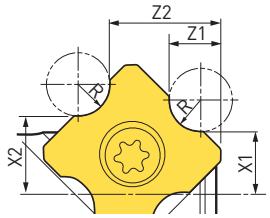



Fig. 2




R-dimensions

| Model | Order No. | Fig. | ØD | ØD1 | ØD2 | ØD3 | L | L1 | No. of Inserts | R | X1 | Z1 | X2 | Z2 | Insert Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST10 -RC061B - 15 | **966.501** | 1 | 12.3 | 10 | 6.6 | 4.4 | 78 | 15 | 1 | 0.5 | 3.61 | 1.93 | 4.30 | 5.78 | RC06 |
| | | | | | | | | | | 1 | 3.35 | 2.18 | 4.04 | 5.53 | |
| | | | | | | | | | | 1.5 | 3.09 | 2.43 | 3.78 | 5.28 | |
| | | | | | | | | | | 2 | 2.83 | 2.68 | 3.52 | 5.03 | |
| ST16 -RC121B - 30 | **966.502** | 1 | 24.4 | 16 | 13.3 | 8.6 | 103 | 30 | 1 | 1 | 7.17 | 3.79 | 8.56 | 11.63 | RC12 |
| | | | | | | | | | | 2 | 6.65 | 4.29 | 8.03 | 11.13 | |
| | | | | | | | | | | 3 | 6.13 | 4.79 | 7.51 | 10.63 | |
| | | | | | | | | | | 4 | 5.60 | 5.29 | 6.99 | 10.13 | |
| ST16 -RC064B - 30 | **966.503** | 2 | 21 | 16 | 15.2 | 13.2 | 101 | 30 | 4 | 0.5 | 7.89 | 1.93 | 8.59 | 5.78 | RC06 |
| | | | | | | | | | | 1 | 7.64 | 2.18 | 8.34 | 5.53 | |
| | | | | | | | | | | 1.5 | 7.39 | 2.43 | 8.09 | 5.28 | |
| | | | | | | | | | | 2 | 7.13 | 2.68 | 7.84 | 5.03 | |
| ST32 -RC124B - 50 | **966.504** | 2 | 42 | 32 | 30.8 | 26.3 | 141 | 50 | 4 | 1 | 15.85 | 3.79 | 17.26 | 11.63 | RC12 |
| | | | | | | | | | | 2 | 15.33 | 4.29 | 16.75 | 11.13 | |
| | | | | | | | | | | 3 | 14.83 | 4.79 | 16.24 | 10.63 | |
| | | | | | | | | | | 4 | 14.31 | 5.29 | 15.73 | 10.13 | |

1. Wrench and screw are included. Inserts are to be ordered separately.

For Insert ▶ 500

## Front R Chamfering

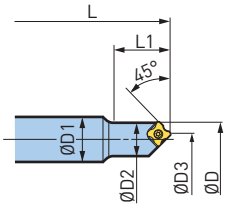



Fig. 1

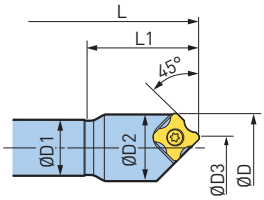
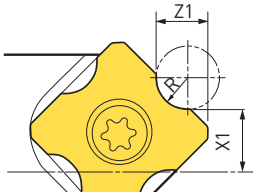



Fig. 2




R-dimensions

| Model | Order No. | Fig. | ØD | ØD1 | ØD2 | ØD3 | L | L1 | No. of Inserts | R | X1 | Z1 | Insert Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST16 -RC061 - 20 | **966.505** | 1 | 12.3 | 16 | 11.9 | 4.5 | 94 | 20 | 1 | 0.5 | 3.61 | 1.93 | RC06 |
| | | | | | | | | | | 1 | 3.35 | 2.18 | |
| | | | | | | | | | | 1.5 | 3.09 | 2.43 | |
| | | | | | | | | | | 2 | 2.83 | 2.68 | |
| ST20 -RC121 - 40 | **966.506** | 2 | 24.4 | 20 | 23.8 | 8.9 | 121 | 40 | 1 | 1 | 7.17 | 3.79 | RC12 |
| | | | | | | | | | | 2 | 6.65 | 4.29 | |
| | | | | | | | | | | 3 | 6.13 | 4.79 | |
| | | | | | | | | | | 4 | 5.60 | 5.29 | |

1. Wrench and screw are included. Inserts are to be ordered separately.

For Insert ▶ 500

# Indexable Inserts for R-Cutter

## Indexable Inserts

| Type | Insert Model | Order No. | Radius | Insert Clamping Screw Set | |
|---|---|---|---|---|---|
| | | | | Model | Order No. |
| RC06 | RC06050 ACP300 | **966.530** | R0.5 | S2TS-T6 | **966.449** |
| | RC06100 ACP300 | **966.531** | R1.0 | | |
| | RC06150 ACP300 | **966.532** | R1.5 | | |
| | RC06200 ACP300 | **966.533** | R2.0 | | |
| RC12 | RC12100 ACP300 | **966.534** | R1.0 | S4S-T15 | **966.450** |
| | RC12200 ACP300 | **966.535** | R2.0 | | |
| | RC12300 ACP300 | **966.536** | R3.0 | | |
| | RC12400 ACP300 | **966.537** | R4.0 | | |

1. Inserts are available in packet of 10 pcs.
2. Material is coated carbide.
3. 10 screws and 1 wrench are included in insert clamping screw set.

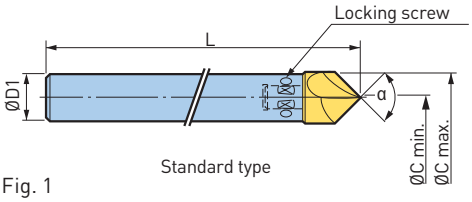
## Recommended Cutting Condition

| Workpiece Material | Cutting Speed (m/min) | Feed Rate (mm/tooth) | Coolant |
|---|---|---|---|
| Structural, Carbon or Alloy Steel | 100 - 350 | 0.05 - 0.2 | Dry |
| Prehardened Steel (less than HRC40) | 60 - 80 | 0.05 - 0.1 | Wet |
| Stainless Steel | 100 - 250 | 0.08 - 0.2 | Dry / Wet |
| Cast Iron | 100 - 350 | 0.05 - 0.25 | Dry |
| Aluminium | 100 - 800 | 0.05 - 0.25 | Dry / Wet |

1. The table is a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. Wet cutting is generally recommended to obtain good surface quality.
3. In case of built-up edge occurs when cutting aluminum and stainless steel, use soluble oil.

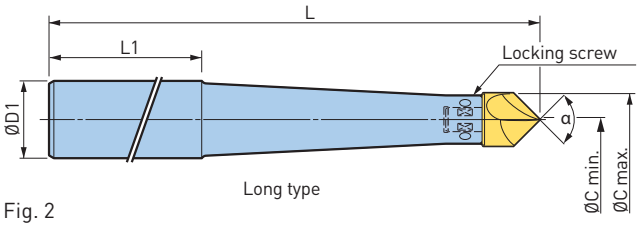
# Center Boy

Accurate centering and chamfering can be obtained in a single operation.




Standard type

Fig. 1




Long type

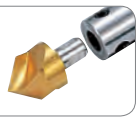
Fig. 2

| Model | Order No. | Fig. | Chamfering Angle α | Chamfer | | ØD1 | L | L1 | Bit Model | Spare Locking Screw |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ØC min | ØC max | | | | | |
| ST10 -CBY09010 | **966.415** | 1 | 90° | 0.9 | 10 | 10 | 150 | - | CBY09010 | H0403-5P |
| ST12 -CBY09013 | **966.416** | 1 | 90° | 0.9 | 13 | 12 | 150 | - | CBY09013 | H0403-5P |
| ST16 -CBY09016 | **966.417** | 1 | 90° | 1.0 | 16 | 16 | 180 | - | CBY09016 | H0504-5P |
| ST20 -CBY09022 | **966.418** | 1 | 90° | 1.5 | 22 | 20 | 180 | - | CBY09022 | H0505-5P |
| ST20 -CBY09013 -220 | **966.411** | 2 | 90° | 0.9 | 13 | 20 | 220 | 120 | CBY09013 | H0403-5P |
| -260 | **966.412** | | | | | | 260 | | | |
| ST32 -CBY09022 -260 | **966.413** | 2 | 90° | 1.5 | 22 | 32 | 260 | 120 | CBY09022 | H0505-5P |
| -300 | **966.414** | | | | | | 300 | | | |
| ST12 -CBY12013 | **802.756** | 1 | 120° | 0.9 | 13 | 12 | 150 | - | CBY12013 | H0403-5P |

1. 2 pcs of indexable Bits and 2 pcs of locking screws are included as standard accessories.
2. Spare locking screws are available in a packet of 5 pcs.

## Indexable Bit for Center Boy

Highly accurate
Replaceable bit



| Bit Model | Chamfering Angle α | Order No. |
|---|---|---|
| CBY09010-5P | 90° | **966.422** |
| CBY09013-5P | | **966.423** |
| CBY09016-5P | | **966.424** |
| CBY09022-5P | | **966.425** |
| CBY12013-5P | 120° | **800.945** |

1. Bits are available in packages of 5 pcs.
2. Bit grade is HSS with TiN coating.

| Locking Screw Model | Order No. |
|---|---|
| H0403-5P | **978.256** |
| H0504-5P | **801.046** |
| H0505-5P | **801.047** |

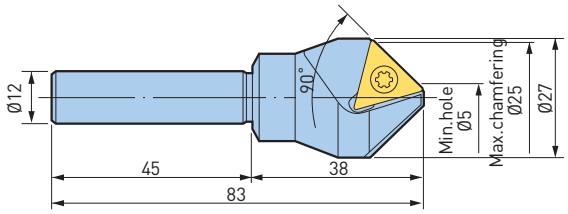
## Recommended Cutting Condition

| Workpiece Material | Cutter Type | Chamfering | | Centering | |
|---|---|---|---|---|---|
| | | Vc (m/min) | f (mm/rev) | Vc (m/min) | f (mm/rev) |
| General Steel Alloy Steel | Standard | 20 - 35 | 0.10 | 25 - 50 | 0.08 |
| | long | 20 - 35 | 0.08 | 20 - 50 | 0.08 |
| Stainless Steel | Standard | 15 - 30 | 0.08 | 20 - 40 | 0.08 |
| | long | 15 - 30 | 0.06 | 15 - 30 | 0.06 |
| Cast Iron | Standard | 20 - 40 | 0.12 | 30 - 45 | 0.10 |
| | long | 20 - 40 | 0.10 | 30 - 45 | 0.10 |
| Aluminium | Standard | 45 - 60 | 0.15 | 50 - 65 | 0.15 |
| | long | 40 - 60 | 0.12 | 40 - 60 | 0.12 |

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. In case vibration occurs, reduce cutting speed V.
3. Projection length should be as short as possible. Vc: Cutting speed (m/min.) f: Feed per revolution (mm/rev.)

# C-Cutter Boy

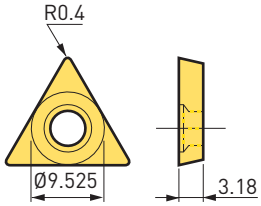
For bench drill machine only. Smooth guide with carbide support pad. Never get irregular chamfering. Long tool life with carbide insert. Economical with its 3 cutting edges.




| Model | Order No. |
|---|---|
| ST12B-C0525 | **966.408** |

1. Including 1 pce. of insert.

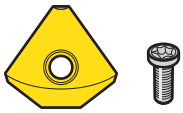
## Indexable Insert for C-Cutter Boy




| Model | Order No. |
|---|---|
| C1603B | **966.409** |

1. Inserts are available in packages of 10 pcs.

## Guide Pad Set



| Set Model | Order No. | Carbide Guide | Thread Size |
|---|---|---|---|
| CG0525S | **978.908** | CG0525 | M4 x 7 |

1. 1 pce. of carbide set and clamping screw are included.

## Insert Clamping Screw Set

| Set Model | Order No. | Thread Size |
|---|---|---|
| S4S | **806.148** | M4 x 8 |

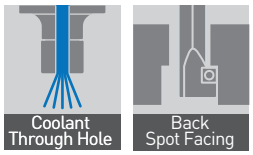
1. 10 pce. of clamping screw and 1 pce. of wrench are included.

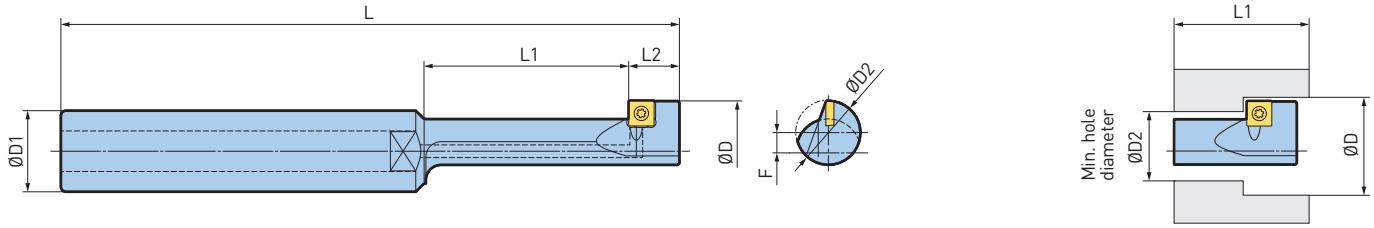
## Recommended Cutting Condition

| Hole Dia. Ø | Spindle Speed ($min^{-1}$) | | |
|---|---|---|---|
| | Steel | Cast Iron | Aluminium |
| 5 | 600 | 800 | 1 000 |
| 10 | 500 | 600 | 800 |
| 15 | 400 | 500 | 600 |
| 20 | 300 | 400 | 500 |

# BF-Cutter

Selected spot facing diameters suitable for cap screws.

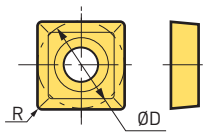





| Model | Order No. | ØD | ØD1 | ØD2 | L | L1 | L2 | Offset F | Insert Model |
|---|---|---|---|---|---|---|---|---|---|
| ST16 -BFM6/11 - 12 | **802.752** | 11 | 16 | 6.5 | 102 | 12 | 9 | 2.40 | CM0502 |
| -BFM8/14 - 20 | **802.753** | 14 | 16 | 8.5 | 108 | 20 | 9 | 2.90 | |
| -BFM10/17.5 - 25 | **802.750** | 17.5 | 16 | 10.5 | 112 | 25 | 10 | 3.65 | |
| -BFM12/20 - 36 | **802.751** | 20 | 16 | 13 | 122 | 36 | 10 | 3.65 | |
| ST20 -BFM14/23 - 49 | **802.754** | 23 | 20 | 15 | 136 | 49 | 10 | 4.15 | CM0502 |
| -BFM16/26 - 56 | **802.755** | 26 | 20 | 17 | 142 | 56 | 10 | 4.65 | |

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.

## Indexable Inserts for BF-Cutter




| Model | ØD | Nose R | P | M | N |
|---|---|---|---|---|---|
| | | | ACP200 | ACM250F | DS20 |
| CM0502 | Ø5 | 0.2 | **966.441** | **807.187** | **966.442** |

1. Inserts are available in a packet of 10 pcs.

## Spare Parts

| Cutting Type | Insert Clamping Screw Set | Order No. |
|---|---|---|
| BFM6/11 | S2SS-T6 | **966.448** |
| BFM8/14 | | |
| BFM10/17.5 | S2TS-T6 | **966.449** |
| BFM12/20 | | |
| BFM14/23 | | |
| BFM16/26 | | |

C.2

## Recommended Cutting Condition

| Workpiece Material | Insert Grade | Cutting Speed (m/min) | Feed Rate (mm/rev) |
|---|---|---|---|
| General Steel, High-Alloy Steel | ACP200 | 30 | 0.03 |
| Cast Iron | | 30 | 0.03 |
| Aluminium, Non-Ferrous | DS20 | 30 - 50 | 0.03 |

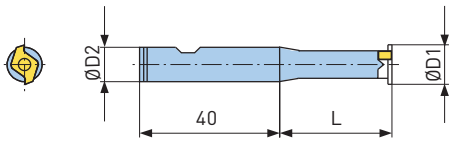
### Insert grade

| ACP200 | ACM250F | DS20 |
|---|---|---|
| General steel | Stainless Steel | Aluminium & non-ferrous |
| High wear-resistant PVD coating on carbide substrate with ultra multilayer TiAlN and AlCrN in micron order. | PDV-coated carbide with excellent smoothness and resistance to welding and chapping, due to the AlTin and TiAiCrN. | Ultra smooth and low friction DLC coating on carbide substrate having excellent anti-adhesive property. |

# Slot Milling Cutter

Slot milling cutter with indexable inserts for circlip grooves as per DIN472.

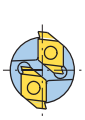
## Cylindrical Shank Type

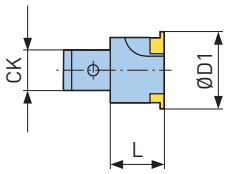



| Model | Order No. | Range | ØD1 | ØD2 | L | Cutting Edges | Insert Model |
|---|---|---|---|---|---|---|---|
| DNF12-22XW10 | 958.008 | 12 - 24 | 11.5 | 10 | 32 | 2 | Type 0 |

For Insert ▶ 505

## CK Shank Type

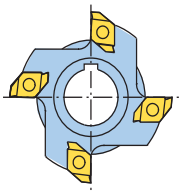


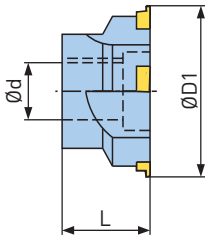



| Model | Order No. | Range | CK | ØD1 | L | No. of Inserts | Insert Model |
|---|---|---|---|---|---|---|---|
| DNF22-34XCK1 | 958.010 | 22 - 34 | CK1 | 21 | 15 | 2 | Type 1 |
| DNF34-50XCK2 | 958.021 | 34 - 50 | CK2 | 33 | 20 | 3 | |

For Insert ▶ 505

## Arbor Type

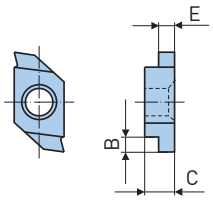





| Model | Order No. | Range | Ød | ØD1 | L | No. of Inserts | Insert Model |
|---|---|---|---|---|---|---|---|
| DNF50-85XF16 | 958.031 | 50 - 85 | 16 | 48 | 26 | 4 | Type 1 |
| DNF85-210XF27 | 958.041 | 85 - 210 | 27 | 83 | 32 | 6 | Type 2 |

For Insert ▶ 505

# Inserts for Slot Milling Cutter



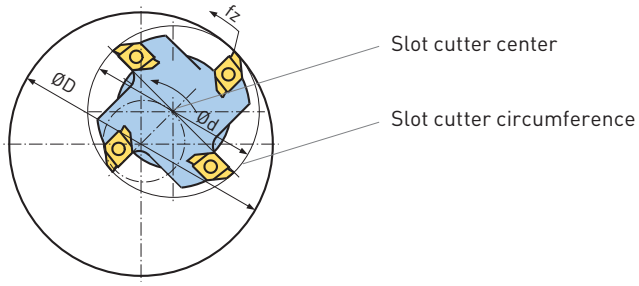

| Insert | E | B | C | P20 Steel | K20 Cast Iron | N10 Aluminium |
|---|---|---|---|---|---|---|
| Type 0 | 1.15 | 0.9 | 4 | 958.051 | 958.052 | 958.053 |
| | 1.35 | 1.3 | | 958.055 | 958.056 | 958.057 |
| | Blank | | | 958.314 | 958.313 | |
| Type 1 | 1.15 | 1.1 | 4 | 958.061 | 958.062 | 958.063 |
| | 1.35 | 1.5 | | 958.065 | 958.066 | 958.067 |
| | 1.65 | 1.6 | | 958.071 | 958.072 | 958.073 |
| | 1.9 | 2 | | 958.075 | 958.076 | 958.077 |
| | 2.2 | 2.2 | | 958.081 | 958.082 | 958.083 |
| | 2.7 | 2.6 | | 958.085 | 958.086 | 958.087 |
| | Blank | | | 958.158 | 958.157 | |
| Type 2 | 3.2 | 3 | 6 | 958.091 | 958.092 | 958.093 |
| | 4.2 | 3.5 | | 958.095 | 958.096 | 958.097 |
| | Blank | | | 958.156 | 958.155 | |

1. Insert type is corresponding to Page 504.

## Recommended Cutting Condition

These values relate to the milling cutter circumference and apply under normal working conditions. Climb-cut milling is recommended with helical or tangential plunging to groove depth assuming a continuous program cycle without feed interruption.

| Work Piece Material | Cutting Speed Vc [m/min] | Feed per Tooth fz [mm] |
|---|---|---|
| Cast Iron | 80 - 130 | 0.12 - 0.25 |
| Steel | 120 - 200 | 0.10 - 0.20 |
| Aluminium | 200 - 400 | 0.15 - 0.30 |




ØD Circular slot diameter
Ød Slot cutter circumference
Vf Feed rate at the circumference of the milling cutter
Vf1 Feed rate at the center of the milling cutter

C.2

In all circular milling operations the programmed feed rate [Vf1] applies to the centre of the milling cutter. This may be computed as follows:

$$Vf1 = Vf - \frac{ØD - Ød}{ØD}$$

# Measuring Instruments

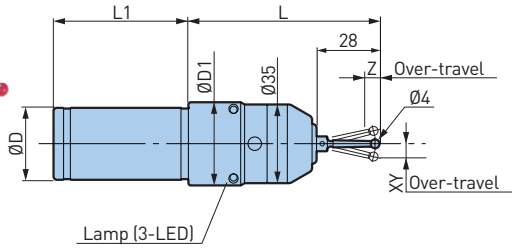

| | |
|---|---|
| Point Master Series | 508 - 510 |
| Base Master Series | 511 - 512 |
| Tool Master | 513 |
| Accu Center | 513 |
| Alignment Tool for ATC Arm | 514 |
| Dyna Force | 515 |
| Dyna Contact | 516 |
| Level Master | 517 |
| Centering Tool for Lathe | 518 |

# Point Master Pro Series

Point Master Pro Series is a precision 3-D touch sensor operating in non-conductive as well as conductive applications, resin, ceramic or coated workpieces, machines with ceramic spindle taper or bearings can all be accommodated.

- LED lamp
- Repeatability ± 1 µm
- For all materials

## Cylindrical Type




| Model | Order No. | ØD (h7) | ØD1 | L | L1 | Over-Travel | | Measuring Pressure (N) | | Battery (not included) | Standard Stylus (included) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | XY | Z | XY | Z | | | |
| PMP -10 | **978.976** | 10 | 35 | 75 | 49 | ± 12 | 5 | 0.4 | 1.5 | Panasonic Lithium BR435x1 | ST28-4R | 0.4 |
| -20 | **961.237** | 20 | 37 | 90 | 50 | | | | | LR1x2 | | 0.5 |

1. PMP-10 has one LED only.
2. Above table indicates the specification when using stylus ST28-4R.
3. There is approx 5 µm lag in X and Y directions and approx. 2 µm lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
4. Battery is not included.

For Stylus ▸ 510
For Battery ▸ 513

## BBT Type

JIS B 6339 (BIG-PLUS®)

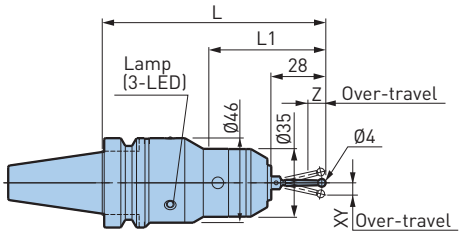



Fig. 1

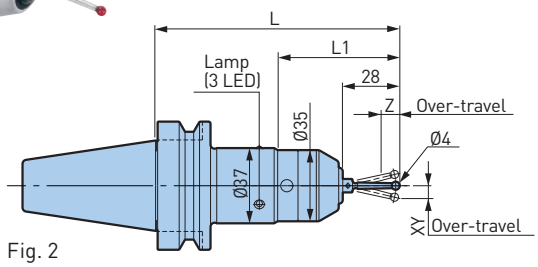



Fig. 2

D.1

BIG-PLUS® tools can be used in machining centers with conventional spindles.

| Model | Order No. | Fig. | BBT No. | L | L1 | Over-Travel | | Measuring Pressure (N) | | Battery (not included) | Standard Stylus (included) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | XY | Z | XY | Z | | | |
| BBT30-PMP-115 | **802.313** | 1 | 30 | 115 | 63 | ± 12 | 5 | 0.4 | 1.5 | CR2x1 | ST28-4R | 0.8 |
| BBT40-PMP-120 | **804.649** | 2 | 40 | 120 | 60 | | | | | LR1x2 | | 1.3 |

1. Above table indicates the specification when using stylus ST28-4R.
2. There is approx 5 µm lag in X and Y directions and approx. 2 µm lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
3. Battery is not included.

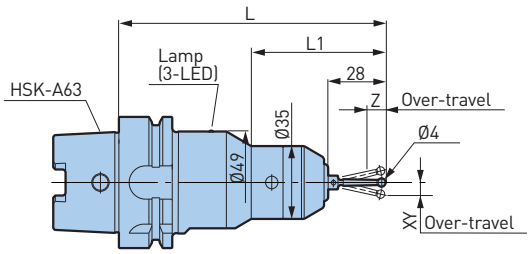
For Stylus ▸ 510
For Battery ▸ 513



BROTECH

### HSK Type

ISO 12164(DIN 69893-1) & DIN 69893-5




| Model | Order No. | Fig. | HSK No. | L | L1 | Over-Travel | | Measuring Pressure (N) | | Battery (not included) | Standard Stylus (included) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | XY | Z | XY | Z | | | |
| HSK-A63-PMP-130 | **804.656** | 1 | HSK-A63 | 130 | 65 | ± 12 | 5 | 0.4 | 1.5 | CR2x1 | ST28-4R | 1.3 |

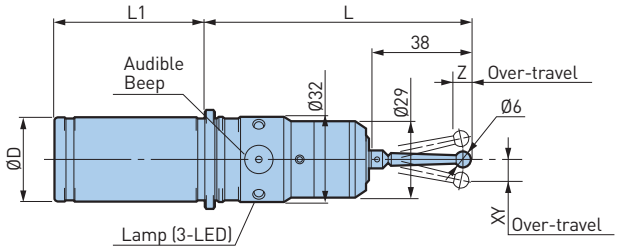
1. There is approx 5 µm lag in X and Y directions and approx. 2 µm lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
2. Above table indicates the specification when using stylus ST28-4R.
3. Battery is not included.

For Stylus ▸ 510
For Battery ▸ 513

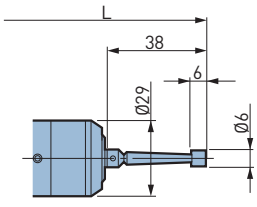
## Point Master PMC Series

Point Master PMC series is ideal touch sensor for electric conductive materials. LED lamp illuminates when the stylus touches the workpiece. Stroke of stylus provides sufficient over-travel for safety.

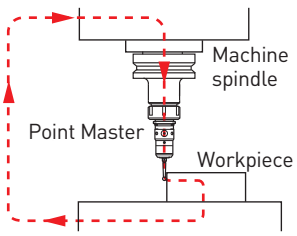
- LED lamp + beep sound
- Repeatability ± 1 µm
- For electric conductive materials




With stylus ST38-6P




With stylus ST38-6x6




| Model | Order No. | ØD h7 | L | L1 | Over-Travel | | Measuring Pressure (N) | | Battery (not included) | Standard Stylus (included) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | XY | Z | XY | Z | | | |
| PMC-20 | **961.238** | 20 | 110 | 50 | ± 12 | 5 | 0.6 | 2.7 | LR1x2 | ST38-6P | 0.4 |
| PMC-20S | **804.658** | | | | | | | | | ST38-6x6 | 0.4 |

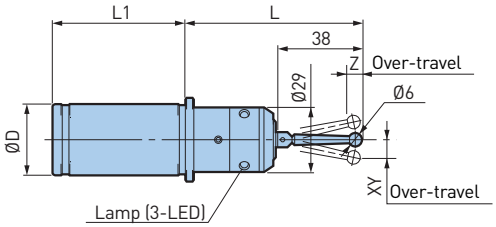
1. Measurement is not possible with non-conductive machine or workpiece.
2. Point Master PMC utilizes conductivity from the machine, toolholder, Point Master through workpiece.
3. Battery is not included.

For Stylus ▸ 510
For Battery ▸ 513

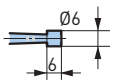
# Point Master PMG Series

LED lamp illuminates when the stylus touches the workpiece.

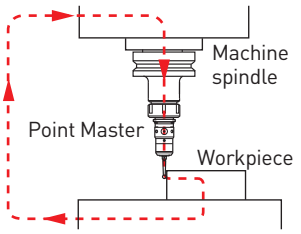
- LED lamp
- Repeatability ± 1 µm
- For electric conductive materials




With stylus ST38-6P




With stylus ST38-6x6




| Model | Order No. | ØD h7 | L | L1 | Over-travel | | Measuring Pressure (N) | | Battery | Standard Stylus (included) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | XY | Z | XY | Z | | | |
| PMG-10 | **961.200** | 10 | 75 | 50 | ± 12 | 5 | 0.6 | 2.7 | BR435x1 | ST38-6P | 0.2 |
| PMG-10S | **804.662** | | | | | | | | | ST38-6x6 | 0.2 |
| PMG-20 | **961.205** | 20 | 90 | 50 | ± 12 | 5 | 0.6 | 2.7 | LR1x2 | ST38-6P | 0.3 |
| PMG-20S | **961.206** | | | | | | | | | ST38-6x6 | 0.3 |

1. Measurement is not possible with non-conductive machine or workpiece.
2. Point Master PMG utilizes conductivity from the machine, tool holder, point master through workpiece.
3. Battery is not included.

For Battery ▸ 513

## Alternative Stylus

The stylus (M3 thread) is replaceable. Please replace when different model of stylus required or if damaged.

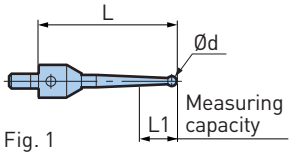



Fig. 1

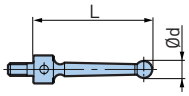



Fig. 2

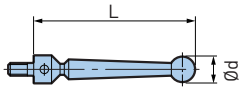



Fig. 3

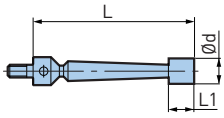
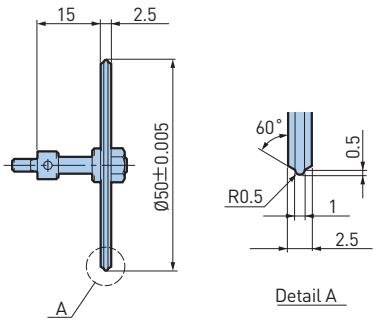



Fig. 4




| Model | Order No. | Fig. | L | L1 | Ød | Material | Series |
|---|---|---|---|---|---|---|---|
| ST28 -1P | **802.222** | 1 | 28 | 2 | 1 | Carbide | PMC·PMP PMG |
| -2P | **802.223** | | | 8 | 2 | | |
| -3P | **972.309** | 2 | | - | 3 | | |
| -4P | **972.311** | | | | 4 | | |
| ST38 -6P | **972.304** | 3 | 38 | - | 6 | Steel (SUS) | PMC, PMG |
| ST38 -6x6 | **972.306** | 4 | | 6 | 6 | | PMC PMG |
| ST28 -4R | **972.310** | 2 | 28 | - | 4 | Ruby | PMP |

1. Stylus model ST38-6x6 is exclusive for PMC-20S and PMG-20S. Runout accuracy may worsen when used on other models.

| Model | Order No. |
|---|---|
| ST15-50K | **804.842** |

1. Ideal for peculiarly shaped workpiece or tapered portion of plastic mold.
2. PMC-series only.

# Base Master Series

Base Master Series is a precision touch sensor to determine workpiece offsets and tool length. Mounted on workpiece surface or machine table, LED lamp illuminates immediately when the cutting edge touches the sensor plate and the position is detected.

## Base Master

The most popular Base Master model with 1μm accuracy. Operates when a conductive circuit is completed.

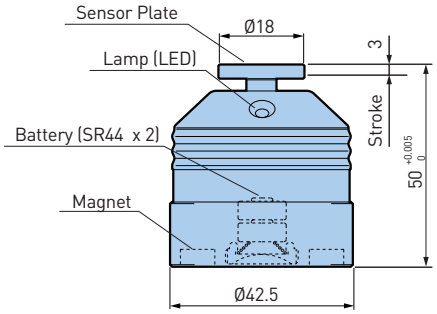
- LED lamp
- For use with conductive cutting tools, workpieces, and machine tools

| Model | Order No. |
|---|---|
| BM-50 | 961.201 |

| | |
|---|---|
| Height Accuracy | $50^{+0.005}_{0}$ mm |
| Measureable Pressure | 3N |
| Repeatability Accurary | ± 1 μm (2σ) |
| Min. Measurable Tool Diameter | Ø 1 mm |
| Battery Life | 10 hours (continuous use) |
| Weight | 0.23 kg |
| Battery | SR44x2 |

1. Battery is not included.

For Battery ▶ 513




## Base Master Gold

Suitable for various tools and workpieces, including non-conductive materials such as ceramics.

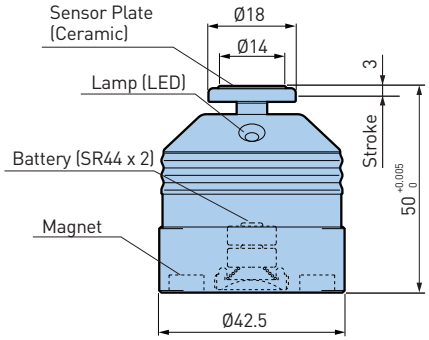
- LED lamp
- For all materials, including non-conductive cutting tools,workpieces, and machine tools

| Model | Order No. |
|---|---|
| BM-50G | 961.211 |

| | |
|---|---|
| Height Accuracy | $50^{+0.005}_{0}$ mm |
| Measureable Pressure | 2N |
| Repeatability Accurary | ± 1 μm (2σ) |
| Min. Measurable Tool Diameter | Ø 1 mm |
| Battery Life | 10 hours (continuous use) |
| Weight | 0.24 kg |
| Battery | SR44x2 |

1. Battery is not included.

For Battery ▶ 513




## Base Master Micro

Specifically designed for micro cutting tools. Low measuring pressure protects the cutting edge.

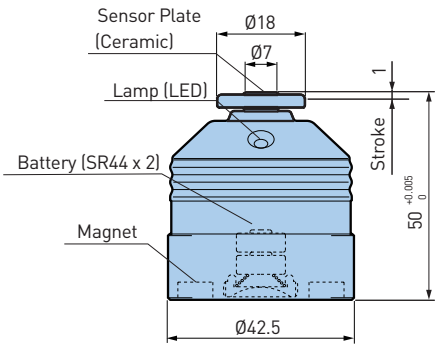
- LED lamp
- For all materials, including non-conductive cutting tools,workpieces, and machine tools

| Model | Order No. |
|---|---|
| BM-50M | 961.212 |

| | |
|---|---|
| Height Accuracy | $50^{+0.005}_{0}$ mm |
| Measureable Pressure | 0.3N |
| Repeatability Accurary | ± 1 μm (2σ) |
| Min. Measurable Tool Diameter | Ø 0.05 mm |
| Battery Life | 10 hours (continuous use) |
| Weight | 0.24 kg |
| Battery | SR44x2 |

1. Battery is not included.

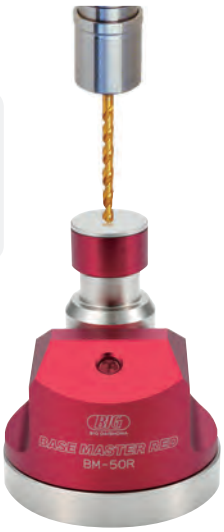
For Battery ▶ 513

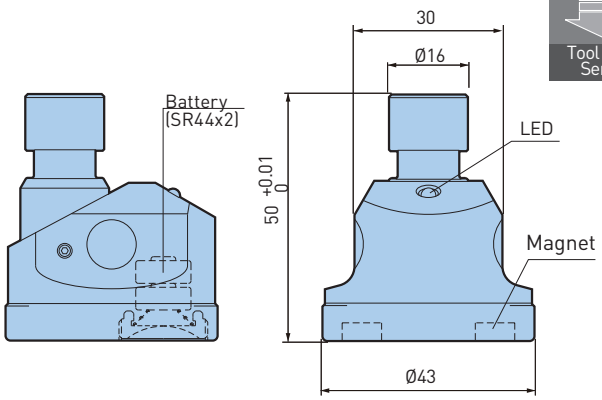


# Base Master Series

## Base Master Red

- LED lamp
- For all materials, including non-conductive cutting tools,workpieces, and machine tools
- Replaceable sensor plate, BM-MEG, is available as individual part




Tool Offset Sensor

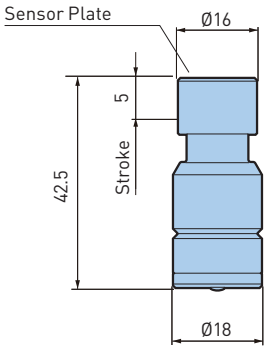
### Body Set

| Model | Order No. |
|---|---|
| BM-50R | 805.675 |

1. BM-MEG is included.

### Sensor Part

| Model | Order No. |
|---|---|
| BM-MEG | 805.674 |



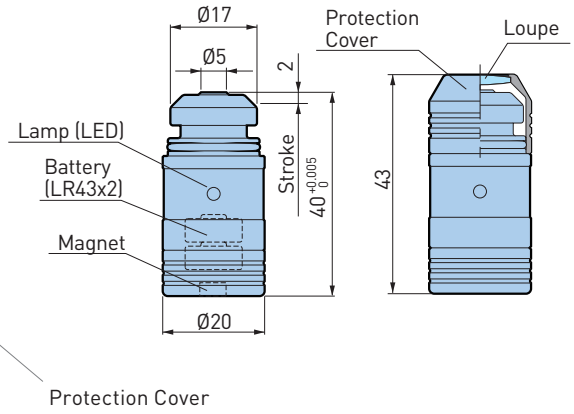

| | |
|---|---|
| Height Accuracy | $50^{+0.01}_{0}$ mm |
| Repeatability Accuracy | ± 1 µm (2 σ) |
| Min. Measureable Tool Diameter | Ø 1 mm |
| Measureable Pressure | 2 N |
| Sensor Stroke | 5 mm |
| Signal | LED (red) |
| Battery | SR44 x 2 |
| Weight | 0.2 kg |

1. Battery is not included.

For Battery ▶ 513

## Base Master Mini

- LED Lamp
- For all materials, including non-conductive cutting tools,workpieces, and machine tools
- World smallest 20 mm body diameter




| Model | Order No. |
|---|---|
| BMM-20 | 961.213 |

1. Protection cover is included.

| | |
|---|---|
| Height Accuracy | $40^{+0.005}_{0}$ mm |
| Measureable Pressure | 1.8 N |
| Repeatability Accuracy | ± 1 µm (2σ) |
| Min. Measureable Tool Diameter | Ø 0.1 mm |
| Battery | LR43 x 2 |
| Battery Life | 40 hours (continuous use) |
| Weight | 55 g |

1. Battery is not included.

For Battery ▶ 513



BROTECH

## Tool Master

Tool Master is a precision touch sensor with a large dial gauge. LED lamp and sound pre-indicate approach to 100 mm height to ease the detecting operation.

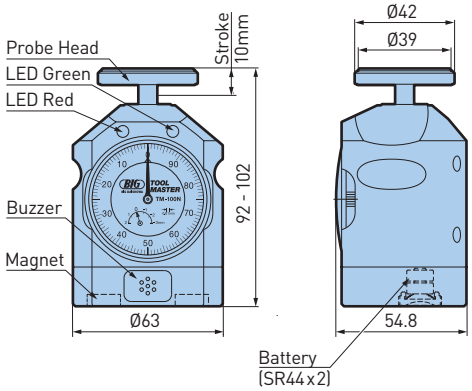
- LED lamp
- Visible dial indicator

| Model | Order No. |
|---|---|
| TM-100N | 961.347N |

| | | |
|---|---|---|
| Height Accuracy | | 100 $^{+0.02}_{0}$ mm |
| Stroke | | 10 mm |
| Stroke Range | | 97 - 102 mm |
| Measureable Pressure | | 3N (100 mm) |
| Battery | | SR44x2 |
| Weight | | 1.0 kg |
| Dial Guage | Graduation | 0.01 mm |
| | Indication Tolerance | ± 15 µm |
| | Repeatability | 5 µm |
| | Return Tolerance | 5 µm |

1. Battery is not included.

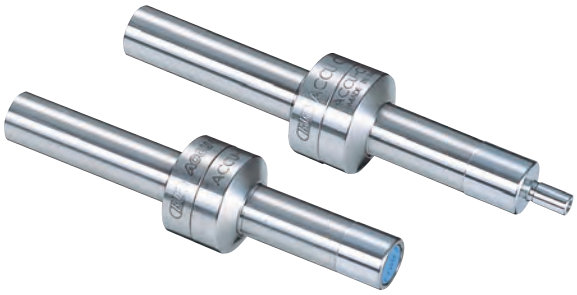
For Battery ▶ 513



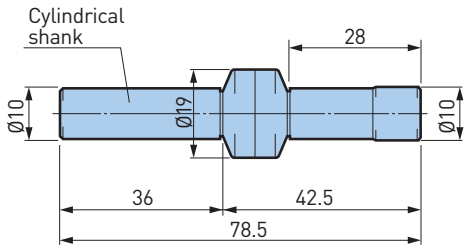

## Accu Center

Accu Center is a simple and precise edge finder offering repeatability within 3 µm.
Hard chrome plated stylus offers extended life.

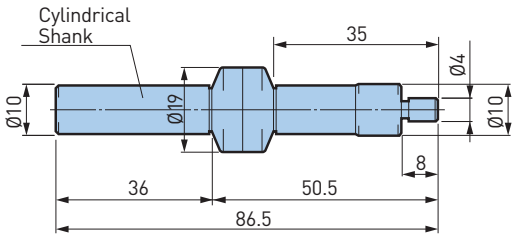
- For all material
- Not for use with horizontal machine tools



| Model | Order No. |
|---|---|
| ACCU-C10 | 800.483 |




| Model | Order No. |
|---|---|
| ACCU-C104 | 800.484 |




## Batteries

| Model | Order No. |
|---|---|
| Panasonic Lithium BR435 | 961.210 |
| LR1 | 961.207 |
| CR2 | 805.543 |
| SR44 | 961.202 |
| LR43 | 961.214 |
| CR425 | 807.165 |



BROTECH

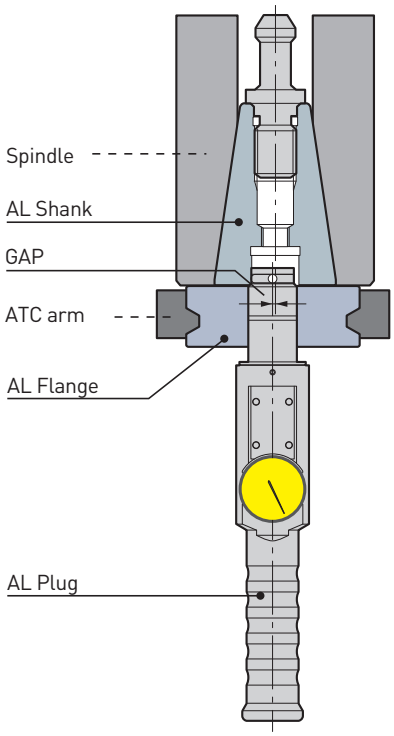
# Alignment Tool for ATC arm

For maintenance of machine tool spindle. Measuring equipment of misalignment between the ATC arm and machine tool spindle or magazine pot center.

**How to use**

- Load the AL Shank in the machine spindle and mount the AL Flange on the ATC arm.
- Insert the AL Plug into the AL Flange.
- Rotate the AL Plug and read the highest and lowest values of the dial indicator.
  This direction is the eccentric direction. Half of the gap of the values is the eccentric amount.
- Adjust the position of the ATC arm so that the front end of the AL Plug will be inserted into the AL Flange fully.

Exclusive storage case



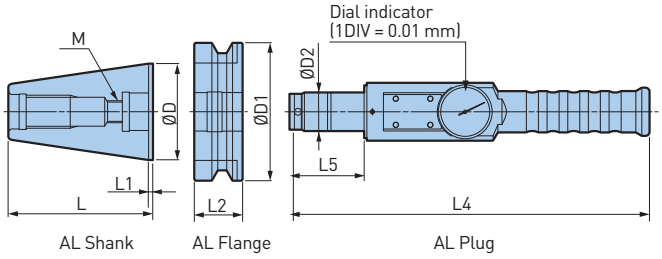




Fig. 1

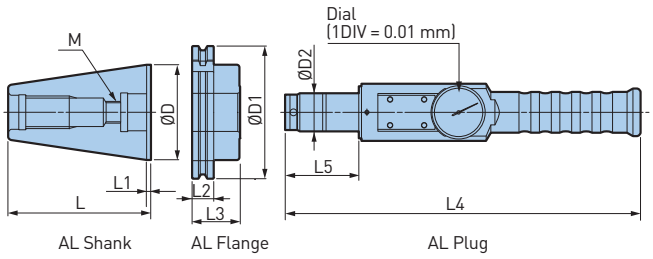



Fig. 2

| Model | Order No. | Fig. | ØD | D1 | D2 | L | L1 | L2 | L3 | L4 | L5 | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BT30-ATC18 | **978.238** | 1 | 31.75 | 46.00 | 18 | 50.40 | 2.0 | 20.0 | - | 251 | 44 | 12 |
| BT40-ATC20 | **978.237** | | 44.45 | 63.00 | 20 | 67.40 | 2.0 | 25.0 | - | 251 | 44 | 12 |
| BT50-ATC28 | **978.236** | | 69.85 | 100.00 | 28 | 104.80 | 3.0 | 35.0 | - | 261 | 54 | 16 |
| DV40-ATC20 | **801.042** | 2 | 44.45 | 63.55 | 20 | 71.60 | 3.2 | 15.9 | 24.3 | 251 | 44 | 12 |
| DV50-ATC28 | **801.043** | | 69.85 | 97.50 | 28 | 104.95 | 3.2 | 15.9 | 35.3 | 261 | 54 | 16 |

1. For HSK is also available upon request. Please contact BIG KAISER agent.

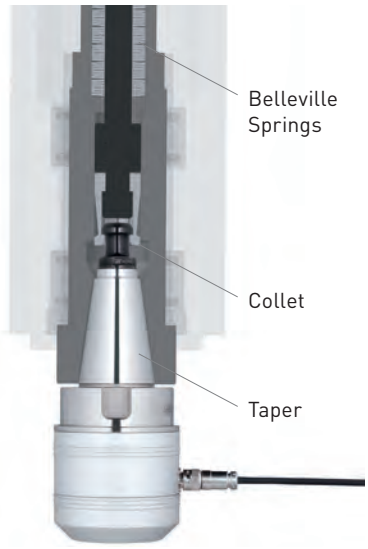


BROTECH

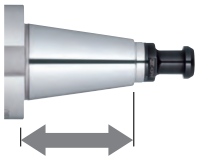
# Dyna Force

Measuring device for pulling force of machine tool spindle.

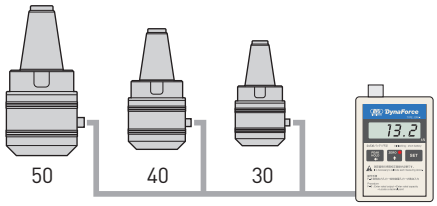
- Periodical measurement avoids reduced rigidity leading to vibrations, loss of machining quality, shortened tool life




**Longer taper shank to enhance reliability**
Long taper supports itself in long span and stabilizes the value of measurement.



**Only one display for all taper sizes**
One common display can be used for all taper sizes.




## Specification

Corresponding JIS, DIN, ANSI

**Measuring device**

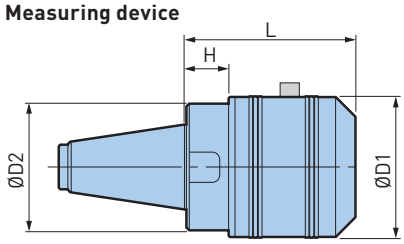



Fig. 1

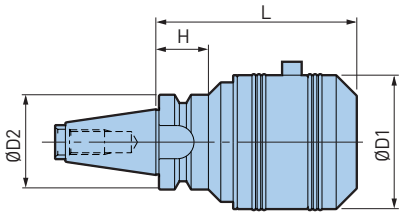



Fig. 2

**Display**

**Cable**

**Case**

| Set Model | Order No. | Contents of Set | | | | Taper Size | Rated Capacity | ØD1 | ØD2 | L | H | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Measuring Device | Fig. | Display | Cable | | | | | | | |
| SNT30 -DF10 | 805.845 | NT30 -DF10 | 1 | DFA-1 (AA batteryx2) | DFC-1 (2 m) | 30 | 10kN (980 kgf) | 65 | 58 | 80 | 20 | 1.5 |
| SBT30 -DF10 | 805.442 | BT30 -DF10 | 2 | | | | | | 46 | 98 | 26 | 1.6 |
| SNT40 -DF30 | 804.949 | NT40 -DF30 | 1 | | | 40 | 30kN (2 940 kgf) | 73 | 66 | 90 | 24 | 2.5 |
| SNT50 -DF50 | 805.423 | NT50 -DF50 | 1 | | | 50 | 50kN (4 900 kgf) | 96 | 90 | 110 | 33 | 6.0 |
| -DF30 * | 805.846 | -DF30 | 1 | | | | 30kN (2 940 kgf) | 73 | 70 | 86 | 20 | 3.9 |

1. Each component is also available separately. Please contact BIG KAISER agent if individual component is required.
2. SBT30-DF10 is designed exclusively for machines not capable of manual tool change.
3. SBT30-DF10 is suitable for BT/BBT30 machines only.
4. Pull stud bolt is to be ordered separately. For DIN, ISO, ANSI & CAT standard machines, exclusive pull stud bolt for dyna force is required.
5. SNT50-DF30 marked with * is a light-weight model.

## Exclusive pull stud bolts for Dyna Force

An exclusive pull stud bolt is needed for a machine spindle in DIN, ANSI or CAT standard.
Pull stud bolts in MAS and JIS standards can be used. These pull stud bolts are not suitable for the SBT30-DF10.

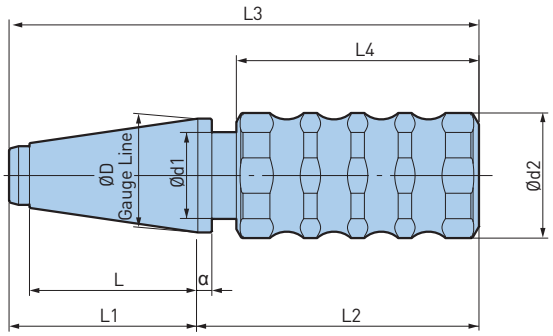
| Standard No. | | Shank No. 30 | | Shank No. 40 | | Shank No. 50 | |
|---|---|---|---|---|---|---|---|
| | | Model | Order No. | Model | Order No. | Model | Order No. |
| DIN 69872 | | DF-PDV30 | 804.683 | DF-PDV40A | 804.685 | DF-PDV50A | 804.686 |
| ISO 7388 | Type A | - | | | | | |
| | Type B | - | | DF-PAV40 | 804.681 | DF-PAV50 | 804.682 |
| ANSI B5.50 | | DF-PAV30 | 804.680 | | | | |
| ASME B5.50 | | DF-PCV30 | 804.684 | DF-PCV40 | 804.687 | DF-PCV50 | 804.688 |

# Dyna Contact

A ceramic taper gauge allowing inspection of machine spindle tapers at a glance.

- Made of ceramic
- Clearly shows up prussian blue

**Taper Angle: 8° 17' 50" ±1"**




| Model | Order No. | Taper No. | ØD | Ød1 | Ød2 | L | L1 | L2 | L3 | L4 | α | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DC -30P | **806.806** | 30 | 31.75 | 23 | 36 | 48.4 | 56.4 | 106.6 | 163 | 93.6 | 6 | 0.52 |
| -40P | **806.807** | 40 | 44.45 | 34 | 49 | 65.4 | 73.4 | 110.6 | 184 | 95 | 6 | 1.22 |
| -50P | **806.808** | 50 | 69.85 | 49 | 49 | 101.8 | 111.8 | 113.2 | 225 | 95 | 8 | 2.62 |

1. It can be used for BBT (BT=JISB 6339), BDV (DV=DIN 69871) and BCV (CV = ANSI)

**Supplied in Aluminium Case**

# Level Master

2-axis simultaneous detection leveler. LED displays level conditions for both axis simultaneously.
LED and buzzer indication when leveling is completed.

Wireless

**Standart Type**

| Model | Order No. |
|---|---|
| LVM-01 | 801.673 |

**Wireless Type**

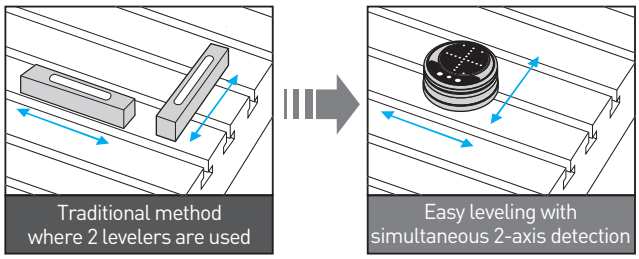
Body

Receiver

| Model | Order No. |
|---|---|
| LVM-WL | 806.805 |

1. Body and receiver are available only as a set.

**Simultaneous 2-axis detection**




**LED & buzzer indicate leveling completion**

**High Mode**

when the required level condition is within 0.01 mm / 1 m

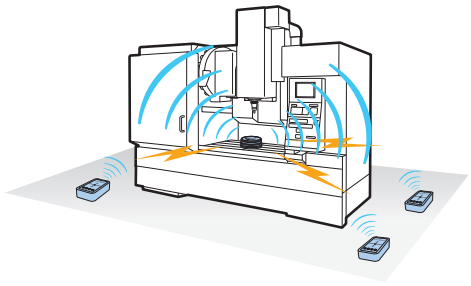
**Low Mode**

when the required level condition is within 0.1 mm / 1 m

LED (blue) & buzzer are simultaneously activated

**Remote Work solution Wireless Type**

Easy and quick leveling with a single operator.



**Supplied in Aluminium Case**

| | LVM-01 | LVM-WL | |
|---|---|---|---|
| | | Body | Receiver |
| Minimum Read Value | 0.01 mm Inclination/m | 0.01 mm / 1 m | |
| Power Source | Alkaline batteries (AAA x 4 pcs) | Alkaline batteries (AAA x 4 pcs) | |
| Auto Power Off | 30 minutes after power is turned on | 30 minutes after power is turned on | |
| Operational Temperature | 0-40°C (Recommended 20°C ± 5°) | 0-40°C (Recommended 20°C ± 5°) | |
| Battery Life | 50 hours | 50 hours | |
| Dimensions | Ø 109 mm x H46 mm | Ø 109 mm x H43 mm | H141 x W81 x D43 mm |
| Weight | 0.99 Kg | 0.99 Kg | 0.28 Kg |

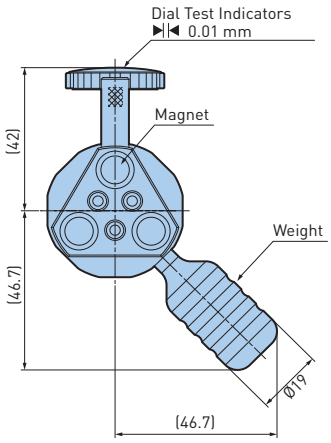
1. Batteries are not included.

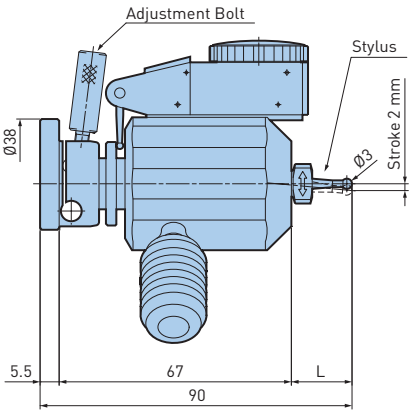
Note: In the case of high precision leveling, we recommend to check the Level Master in advance on a reference level, such as a level block.

# Centering Tool for Lathes

## Easy Centering with Static Dial Gauge

- Centering the tool holder while watching the dial gauge is possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 0.01 mm)
- Magnet base allows for flexible mounting positions

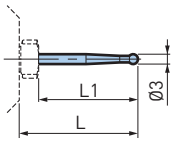



| Model | Order No. | Min. Scale | Max. Spindle Speed | Weight (kg) | Stylus |
|---|---|---|---|---|---|
| CTL-90 | 806.436 | 0.01 mm | 50 U/min | 0.4 kg | ST3-CT90 |

1. Stylus ST3-CT90 is included.

### Stylus for CTL-90

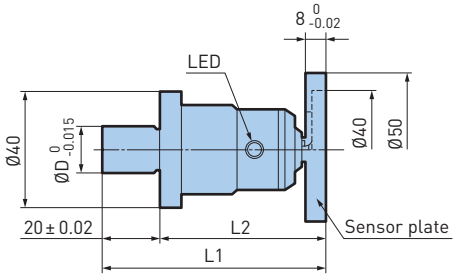



| Model | Order No. | L | L1 | Material |
|---|---|---|---|---|
| ST3-CT90 | 806.437 | 17.5 | 11.5 | Ruby |
| ST3-CT90L | 806.912 | 37.5 | 31.5 | |

# Lathe Master

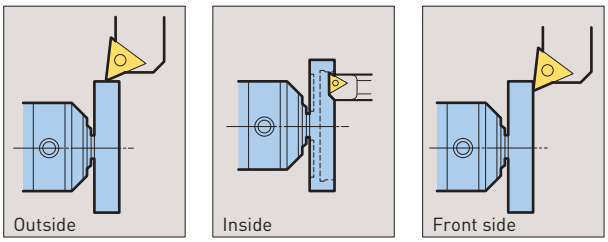
Tool setting without measuring cut.

- Reduces set-up time for NC lathes
- Applicable for tuning tools for external, internal and face turning.




| Model | Order No. | ØD | L1 | L2 | Repeatability Accuracy | Battery |
|---|---|---|---|---|---|---|
| LM -15 | 806.997 | 15 | 75 | 55 | ±2μ | CR425 |
| LM -30 | 805.397 | 30 | 65 | 45 | | SR44 x 2 |

For Battery ▶ 513




Clamp the shank (ØD) of the LATHE MASTER in the collet chuck of the lathe. The LED lights up as soon as the tip of the tool touches the sensor plate.

**Caution:**

- Machines and tools must be electrically conductive.

| Order No. | Page | Weight (kg) |
|---|---|---|
| 112.080 | 437 | 0.020 |
| 112.097A | 333 | 2.150 |
| 112.097C | 333 | 2.150 |
| 112.107 | 315 | 1.370 |
| 112.108 | 315 | 1.100 |
| 112.109B | 437 | 1.300 |
| 112.110 | 314 | 1.300 |
| 112.121 | 315 | 1.770 |
| 112.122 | 315 | 1.890 |
| 112.123 | 315 | 1.710 |
| 112.126A | 322 | 1.600 |
| 112.205 | 335 | 0.260 |
| 112.206 | 335 | 0.265 |
| 112.207 | 335 | 0.310 |
| 112.271 | 342 | 0.025 |
| 112.272 | 342 | 0.035 |
| 112.301A | 335 | 0.540 |
| 112.303A | 335 | 0.880 |
| 112.304A | 335 | 0.540 |
| 112.306 | 335 | 0.670 |
| 112.310 | 334 | 0.400 |
| 112.353 | 336 | 0.048 |
| 112.371 | 437 | 0.010 |
| 112.381 | 437 | 0.001 |
| 112.385 | 336 | 0.096 |
| 112.503 | 349 | 0.030 |
| 112.504 | 349 | 0.030 |
| 112.505 | 346 | 0.130 |
| 112.506 | 346 | 0.150 |
| 112.507 | 347 | 0.050 |
| 112.508 | 349 | 0.030 |
| 112.804 | 437 | 0.016 |
| 112.806 | 439 | 0.160 |
| 112.837 | 333 | 2.570 |
| 112.837A | 333 | 2.570 |
| 112.837B | 333 | 2.570 |
| 112.837C | 333 | 2.570 |
| 112.837E | 333 | 2.570 |
| 188.133 | 348 | 0.190 |
| 188.134 | 348 | 0.190 |
| 195.001 | 437 | 0.001 |
| 195.003 | 437 | 0.001 |
| 195.007 | 437 | 0.001 |
| 195.081 | 437 | 0.030 |
| 195.127 | 437 | 0.030 |
| 309.201 | 364 | 0.120 |
| 309.301 | 364 | 0.220 |
| 309.401 | 364 | 0.400 |
| 309.501 | 364 | 0.850 |
| 309.601 | 364 | 1.850 |
| 310.020 | 365 | 0.033 |
| 310.030 | 365 | 0.050 |
| 310.101 | 355 | 0.075 |
| 310.201 | 355 | 0.130 |
| 310.301 | 355 | 0.210 |
| 310.305A | 362 | 0.220 |
| 310.401 | 355 | 0.400 |
| 310.405A | 362 | 0.410 |
| 310.501 | 355 | 0.825 |
| 310.505A | 362 | 0.810 |
| 310.601 | 355 | 1.650 |
| 310.602 | 355 | 2.400 |
| 310.605A | 362 | 1.700 |
| 310.606A | 362 | 1.730 |
| 310.607 | 362 | 1.350 |
| 310.607A | 362 | 1.250 |
| 310.608 | 362 | 1.770 |
| 310.608A | 362 | 1.750 |
| 310.701 | 355 | 3.850 |
| 310.705 | 362 | 1.700 |
| 310.705A | 362 | 1.700 |
| 310.706 | 362 | 2.260 |
| 310.706A | 362 | 1.830 |
| 310.708 | 355 | 5.360 |
| 310.840 | 353 | 0.400 |
| 310.850 | 353 | 0.780 |
| 310.860 | 353 | 1.650 |
| 310.865 | 353 | 1.650 |
| 310.870 | 353 | 4.000 |
| 310.905 | 437 | 0.030 |
| 315.101 | 307 | 0.050 |
| 315.160 | 432 | 0.005 |
| 315.161 | 432 | 0.001 |
| 315.201 | 307 | 0.100 |
| 315.250 | 432 | 0.005 |
| 315.251 | 432 | 0.001 |
| 315.301 | 307 | 0.165 |
| 315.350 | 432 | 0.008 |
| 315.351 | 432 | 0.002 |
| 315.401 | 307 | 0.340 |
| 315.450 | 432 | 0.017 |
| 315.451 | 432 | 0.005 |
| 315.501 | 307 | 0.635 |
| 315.550 | 432 | 0.033 |
| 315.551 | 432 | 0.010 |
| 315.601 | 307 | 1.290 |
| 315.602 | 307 | 1.850 |
| 315.650 | 432 | 0.036 |
| 315.651 | 432 | 0.013 |
| 315.701 | 307 | 3.100 |
| 315.750 | 432 | 0.061 |
| 315.751 | 432 | 0.024 |
| 317.102A | 360 | 1.800 |
| 317.105 | 389 | 1.890 |
| 317.193 | 442 | 0.001 |
| 317.202 | 386 | 2.750 |
| 317.205 | 386 | 0.090 |
| 317.206 | 386 | 2.750 |
| 317.222 | 386 | 3.450 |
| 317.223 | 386 | 4.900 |
| 317.224 | 386 | 6.200 |
| 317.225 | 386 | 7.700 |
| 317.226 | 386 | 9.100 |
| 317.227 | 386 | 10.600 |
| 317.233 | 445 | 30.000 |
| 317.234 | 445 | 32.000 |
| 317.236 | 445 | 35.000 |
| 317.237 | 445 | 36.000 |
| 317.252 | 388 | 1.240 |
| 317.253 | 445 | 1.770 |
| 317.254 | 388 | 2.260 |
| 317.255 | 388 | 2.960 |
| 317.256 | 388 | 3.270 |
| 317.257 | 388 | 3.800 |
| 317.274 | 444 | 0.001 |
| 317.284 | 445 | 0.985 |
| 317.285 | 378 | 0.846 |
| 317.286 | 445 | 0.009 |
| 317.287 | 388 | 0.012 |
| 317.288 | 445 | 1.720 |
| 317.289 | 387 | 2.200 |
| 318.101 | 377 | 0.820 |
| 318.104 | 360 | 0.800 |
| 318.105 | 377 | 0.840 |
| 318.107 | 377 | 0.830 |
| 318.201 | 374 | 2.750 |
| 318.201N | 374 | 2.800 |
| 318.202 | 374 | 2.730 |
| 318.202N | 374 | 2.730 |
| 318.205 | 376 | 1.830 |
| 318.205N | 376 | 1.830 |
| 318.206 | 376 | 2.320 |
| 318.206N | 376 | 2.320 |
| 318.222 | 376 | 1.500 |
| 318.223 | 376 | 2.040 |
| 318.224 | 376 | 2.620 |
| 318.225 | 376 | 3.210 |
| 318.226 | 376 | 3.900 |
| 318.227 | 376 | 4.400 |
| 318.240 | 376 | 1.100 |
| 318.261 | 378 | 1.210 |
| 318.421 | 381 | 14.660 |
| 318.422 | 381 | 21.450 |
| 318.423 | 381 | 33.000 |
| 318.424 | 381 | 55.000 |
| 318.425 | 381 | 90.000 |
| 318.431 | 381 | 2.110 |
| 318.432 | 381 | 2.900 |
| 318.433 | 381 | 3.000 |
| 318.434 | 381 | 3.400 |
| 318.435 | 381 | 4.000 |
| 318.441 | 381 | 1.280 |
| 318.442 | 381 | 1.500 |
| 318.443 | 381 | 1.500 |
| 318.444 | 381 | 1.500 |
| 319.101 | 297 | 0.050 |
| 319.150 | 429 | 0.001 |
| 319.201 | 297 | 0.110 |
| 319.250 | 429 | 0.005 |
| 319.301 | 361 | 0.190 |
| 319.350 | 429 | 0.001 |
| 319.401 | 361 | 0.360 |
| 319.450 | 429 | 0.001 |
| 319.501 | 361 | 0.660 |
| 319.550 | 429 | 0.002 |
| 319.601 | 297 | 1.180 |
| 319.601N | 297 | 1.180 |
| 319.602 | 297 | 1.900 |
| 319.602N | 297 | 1.900 |
| 319.603 | 297 | 2.520 |
| 319.603N | 297 | 2.520 |
| 319.604N | 298 | 0.545 |
| 319.605N | 298 | 0.850 |
| 319.607N | 298 | 1.300 |
| 319.650 | 429 | 0.005 |
| 319.701 | 297 | 3.100 |
| 319.701N | 297 | 3.100 |
| 319.702 | 297 | 4.500 |
| 319.702N | 297 | 4.500 |
| 319.703 | 297 | 5.600 |
| 319.703N | 297 | 5.600 |
| 319.705N | 298 | 1.600 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 319.706N | 298 | 1.920 |
| 319.707N | 298 | 2.300 |
| 319.750 | 429 | 0.005 |
| 321.451 | 202 | 1.000 |
| 321.462 | 202 | 1.090 |
| 322.563 | 202 | 1.800 |
| 323.563 | 202 | 2.060 |
| 323.701 | 113 | 0.380 |
| 323.703 | 113 | 0.350 |
| 323.705 | 76 | 0.390 |
| 323.707 | 76 | 0.350 |
| 323.721 | 113 | 1.130 |
| 323.722 | 113 | 2.060 |
| 323.726N | 113 | 1.120 |
| 323.728 | 113 | 0.820 |
| 323.730 | 76 | 1.200 |
| 323.731 | 76 | 1.320 |
| 323.735N | 76 | 1.300 |
| 323.736N | 76 | 1.300 |
| 323.738 | 76 | 0.965 |
| 323.760 | 113 | 3.400 |
| 323.761 | 113 | 4.600 |
| 323.765N | 113 | 3.450 |
| 323.766N | 113 | 4.750 |
| 323.767N | 113 | 4.850 |
| 323.768N | 113 | 7.200 |
| 323.769N | 113 | 13.700 |
| 323.770 | 76 | 4.000 |
| 323.771 | 76 | 5.000 |
| 323.775N | 76 | 3.900 |
| 323.776N | 76 | 4.950 |
| 323.777 | 76 | 5.400 |
| 323.780 | 202 | 3.000 |
| 323.781 | 202 | 3.850 |
| 323.821N | 112 | 1.100 |
| 323.825 | 112 | 0.920 |
| 323.826 | 112 | 1.150 |
| 323.831N | 74 | 1.300 |
| 323.832N | 74 | 0.990 |
| 323.860N | 112 | 3.350 |
| 323.861 | 112 | 4.500 |
| 323.861N | 112 | 4.450 |
| 323.862 | 112 | 7.000 |
| 323.864N | 112 | 4.920 |
| 323.865N | 112 | 7.000 |
| 323.866N | 112 | 13.200 |
| 323.868 | 112 | 3.250 |
| 323.871N | 74 | 4.900 |
| 323.874N | 74 | 3.950 |
| 323.875 | 74 | 7.370 |
| 324.111F | 167 | 0.220 |
| 324.112F | 149 | 0.220 |
| 324.121F | 167 | 0.200 |
| 324.131F | 167 | 0.265 |
| 324.132F | 149 | 0.255 |
| 324.141F | 167 | 0.364 |
| 324.142F | 149 | 0.340 |
| 324.231F | 167 | 0.465 |
| 324.232F | 149 | 0.440 |
| 324.241F | 167 | 0.520 |
| 324.242F | 149 | 0.500 |
| 324.251F | 167 | 0.710 |
| 324.252F | 149 | 0.665 |
| 324.312F | 149 | 0.730 |
| 324.322F | 149 | 0.830 |
| 324.331 | 149 | 0.850 |
| 324.331F | 149 | 0.850 |
| 324.332 | 149 | 1.120 |
| 324.341 | 149 | 1.150 |
| 324.341F | 149 | 1.150 |
| 324.342 | 149 | 1.305 |
| 324.352 | 149 | 0.960 |
| 324.352F | 149 | 0.960 |
| 324.353 | 149 | 1.320 |
| 324.354 | 149 | 1.940 |
| 324.361 | 149 | 1.250 |
| 324.361F | 149 | 1.250 |
| 324.361N | 149 | 1.250 |
| 324.362 | 149 | 1.820 |
| 324.367N | 149 | 3.230 |
| 324.461 | 149 | 1.950 |
| 324.531 | 149 | 2.450 |
| 324.541 | 149 | 2.870 |
| 324.551 | 149 | 2.905 |
| 324.552 | 149 | 3.770 |
| 324.561 | 149 | 2.900 |
| 324.561N | 149 | 2.800 |
| 324.563 | 149 | 3.450 |
| 324.563N | 149 | 3.350 |
| 324.566N | 149 | 6.000 |
| 324.571 | 149 | 4.050 |
| 324.571N | 149 | 4.100 |
| 324.572 | 149 | 5.800 |
| 324.572N | 149 | 5.750 |
| 324.575N | 149 | 11.930 |
| 325.933 | 113 | 3.750 |
| 325.942 | 113 | 3.650 |
| 325.944 | 113 | 4.250 |
| 325.952 | 113 | 3.800 |
| 325.954 | 113 | 4.700 |
| 325.955 | 113 | 4.550 |
| 325.964 | 113 | 4.700 |
| 325.965 | 113 | 5.500 |
| 326.005 | 113 | 0.600 |
| 326.011 | 113 | 1.200 |
| 326.021 | 113 | 1.200 |
| 326.031 | 113 | 1.300 |
| 326.041 | 428 | 1.300 |
| 326.050 | 113 | 0.920 |
| 326.054 | 113 | 2.550 |
| 326.057 | 113 | 1.100 |
| 326.064 | 113 | 2.750 |
| 326.141 | 76 | 1.180 |
| 326.153 | 76 | 1.850 |
| 326.160 | 76 | 0.990 |
| 326.163 | 76 | 2.200 |
| 328.032N | 190 | 3.100 |
| 328.033N | 190 | 1.350 |
| 328.034 | 190 | 0.970 |
| 328.035 | 190 | 0.940 |
| 328.036 | 190 | 0.880 |
| 328.037N | 190 | 0.850 |
| 328.053N | 190 | 2.420 |
| 328.086 | 190 | 3.700 |
| 328.151F | 167 | 0.220 |
| 328.162 | 190 | 3.800 |
| 328.210 | 190 | 3.800 |
| 328.211 | 190 | 3.740 |
| 328.213 | 383 | 7.500 |
| 328.214 | 383 | 7.500 |
| 328.215 | 383 | 7.500 |
| 328.216 | 383 | 2.600 |
| 328.217N | 383 | 4.740 |
| 328.218F | 167 | 0.400 |
| 328.223 | 190 | 0.590 |
| 328.224 | 190 | 0.600 |
| 328.226 | 190 | 0.600 |
| 328.228 | 75 | 7.500 |
| 328.230 | 75 | 12.100 |
| 328.233 | 112 | 7.500 |
| 328.235 | 112 | 12.100 |
| 328.238 | 150 | 6.800 |
| 328.240 | 150 | 11.400 |
| 328.249F | 167 | 0.050 |
| 328.257F | 167 | 0.155 |
| 328.260 | 74 | 0.550 |
| 328.261 | 74 | 0.750 |
| 328.262 | 74 | 0.700 |
| 328.272 | 74 | 0.640 |
| 328.273 | 190 | 0.600 |
| 328.277F | 149 | 0.215 |
| 328.278F | 149 | 0.200 |
| 328.279F | 149 | 0.180 |
| 328.280F | 167 | 0.140 |
| 328.281F | 167 | 0.075 |
| 328.289 | 74 | 0.890 |
| 328.308 | 74 | 0.480 |
| 328.321 | 190 | 0.850 |
| 328.322 | 190 | 0.940 |
| 328.370 | 236 | 1.900 |
| 328.371 | 236 | 1.900 |
| 328.372 | 236 | 2.000 |
| 328.373 | 236 | 2.100 |
| 328.374 | 236 | 2.100 |
| 328.375 | 236 | 2.200 |
| 328.376 | 236 | 2.200 |
| 328.378 | 233 | 5.100 |
| 328.379 | 233 | 5.100 |
| 328.380 | 232 | 3.300 |
| 328.419 | 236 | 2.400 |
| 328.420 | 236 | 3.100 |
| 328.421 | 236 | 3.300 |
| 328.422 | 236 | 3.900 |
| 329.866 | 76 | 0.480 |
| 331.110 | 195 | 0.050 |
| 331.111 | 195 | 0.070 |
| 331.220 | 195 | 0.100 |
| 331.221 | 195 | 0.150 |
| 331.330 | 195 | 0.160 |
| 331.331 | 195 | 0.250 |
| 331.440 | 195 | 0.350 |
| 331.445 | 195 | 0.470 |
| 331.550 | 195 | 0.850 |
| 331.555 | 195 | 1.210 |
| 331.660 | 195 | 1.360 |
| 331.660N | 195 | 1.360 |
| 331.665 | 195 | 2.200 |
| 331.665N | 195 | 2.200 |
| 331.775 | 195 | 4.400 |
| 331.775N | 195 | 4.400 |
| 331.776 | 195 | 7.250 |
| 331.776N | 195 | 7.250 |



BROTECH

| Order No. | Page | Weight (kg) |
|---|---|---|
| 331.860N | 196 | 0.550 |
| 331.861N | 196 | 0.800 |
| 331.864N | 196 | 0.450 |
| 331.865N | 196 | 0.950 |
| 331.867N | 196 | 0.520 |
| 331.868N | 196 | 0.820 |
| 331.870N | 196 | 1.410 |
| 331.871N | 196 | 2.190 |
| 331.874N | 196 | 0.950 |
| 331.875N | 196 | 2.000 |
| 331.876N | 196 | 3.100 |
| 331.877N | 196 | 1.530 |
| 331.878N | 196 | 3.000 |
| 331.879N | 196 | 2.250 |
| 332.210 | 194 | 0.090 |
| 332.310 | 194 | 0.150 |
| 332.320 | 194 | 0.160 |
| 332.410 | 194 | 0.230 |
| 332.420 | 194 | 0.250 |
| 332.430 | 194 | 0.300 |
| 332.510 | 194 | 0.440 |
| 332.511 | 194 | 0.440 |
| 332.520 | 194 | 0.550 |
| 332.521 | 194 | 0.420 |
| 332.530 | 194 | 0.670 |
| 332.531 | 194 | 0.435 |
| 332.541 | 194 | 0.540 |
| 332.545 | 194 | 0.700 |
| 332.610 | 194 | 0.910 |
| 332.611 | 194 | 0.790 |
| 332.620 | 194 | 0.800 |
| 332.621 | 194 | 0.700 |
| 332.630 | 194 | 0.960 |
| 332.631 | 194 | 0.750 |
| 332.632 | 194 | 1.200 |
| 332.641 | 194 | 0.820 |
| 332.642 | 194 | 1.450 |
| 332.645 | 194 | 1.050 |
| 332.651 | 194 | 0.840 |
| 332.652 | 194 | 1.950 |
| 332.655 | 194 | 1.230 |
| 332.741 | 194 | 1.500 |
| 332.745 | 194 | 1.730 |
| 332.750 | 194 | 2.460 |
| 332.751 | 194 | 1.650 |
| 332.755 | 194 | 2.010 |
| 332.765 | 194 | 2.250 |
| 332.765N | 194 | 2.250 |
| 332.766 | 194 | 2.900 |
| 332.870N | 196 | 1.110 |
| 332.875N | 196 | 1.660 |
| 335.021 | 491 | 0.085 |
| 335.022 | 491 | 0.255 |
| 335.023 | 491 | 0.710 |
| 335.024 | 491 | 2.680 |
| 335.035 | 449 | 0.010 |
| 335.036 | 449 | 0.010 |
| 335.037 | 449 | 0.020 |
| 335.042 | 448 | 1.350 |
| 335.044 | 448 | 1.520 |
| 335.066 | 199 | 1.980 |
| 335.070 | 488 | 0.081 |
| 335.071 | 488 | 0.181 |
| 335.072 | 488 | 0.311 |
| 335.073 | 488 | 0.281 |
| 335.074 | 488 | 0.450 |
| 335.077 | 199 | 4.750 |
| 335.130 | 200 | 0.130 |
| 335.131 | 200 | 0.230 |
| 335.132 | 200 | 0.235 |
| 335.140 | 200 | 0.590 |
| 335.142 | 200 | 0.740 |
| 335.164 | 200 | 1.150 |
| 335.165 | 200 | 1.700 |
| 335.230 | 198 | 0.280 |
| 335.231 | 198 | 0.300 |
| 335.232 | 198 | 0.390 |
| 335.233 | 198 | 0.550 |
| 335.234 | 198 | 0.410 |
| 335.235 | 198 | 0.425 |
| 335.236 | 198 | 0.535 |
| 335.237 | 198 | 0.670 |
| 335.238 | 198 | 0.690 |
| 335.239 | 198 | 0.790 |
| 335.240 | 198 | 0.610 |
| 335.241 | 198 | 0.630 |
| 335.242 | 198 | 0.690 |
| 335.243 | 198 | 0.820 |
| 335.244 | 198 | 0.840 |
| 335.245 | 198 | 0.900 |
| 335.246 | 198 | 0.920 |
| 335.247 | 198 | 1.050 |
| 335.248 | 198 | 1.660 |
| 335.249 | 198 | 0.800 |
| 335.250 | 198 | 2.900 |
| 335.251 | 198 | 3.400 |
| 335.320 | 366 | 0.470 |
| 335.321 | 366 | 0.740 |
| 335.322 | 366 | 0.950 |
| 335.323 | 366 | 0.860 |
| 335.324 | 366 | 1.100 |
| 335.325 | 366 | 1.750 |
| 335.326 | 366 | 1.810 |
| 335.327 | 366 | 3.650 |
| 335.328 | 366 | 3.690 |
| 335.329 | 366 | 5.400 |
| 335.330 | 366 | 7.150 |
| 335.331 | 366 | 2.500 |
| 335.380 | 366 | 0.570 |
| 335.381 | 366 | 0.810 |
| 335.382 | 366 | 1.005 |
| 335.383 | 366 | 0.700 |
| 335.384 | 366 | 0.970 |
| 335.385 | 366 | 1.300 |
| 335.386 | 366 | 1.050 |
| 335.387 | 366 | 1.530 |
| 335.388 | 366 | 2.050 |
| 335.389 | 366 | 1.230 |
| 335.390 | 366 | 1.770 |
| 335.391 | 366 | 2.400 |
| 335.420 | 198 | 0.265 |
| 335.421 | 198 | 0.350 |
| 335.423 | 198 | 0.420 |
| 335.424 | 198 | 0.510 |
| 335.425 | 198 | 0.640 |
| 335.430 | 198 | 0.700 |
| 335.430N | 198 | 0.700 |
| 335.431 | 198 | 0.770 |
| 335.431N | 198 | 0.770 |
| 335.432 | 198 | 0.930 |
| 335.433 | 198 | 1.300 |
| 335.434 | 198 | 1.750 |
| 335.435 | 198 | 2.100 |
| 335.436 | 198 | 2.500 |
| 335.531 | 201 | 0.440 |
| 335.532 | 201 | 0.560 |
| 335.541 | 201 | 0.820 |
| 335.542 | 201 | 0.940 |
| 335.551 | 201 | 1.700 |
| 335.552 | 201 | 1.850 |
| 335.561 | 201 | 3.300 |
| 335.562 | 201 | 4.050 |
| 335.563 | 201 | 5.800 |
| 335.571 | 201 | 9.500 |
| 335.625 | 285 | 0.350 |
| 335.762 | 201 | 0.870 |
| 335.763 | 201 | 1.550 |
| 335.764 | 201 | 0.500 |
| 335.768 | 201 | 0.780 |
| 335.769 | 201 | 1.000 |
| 335.902 | 361 | 2.750 |
| 335.903 | 361 | 2.100 |
| 335.904 | 361 | 1.750 |
| 335.905 | 361 | 1.450 |
| 335.906 | 361 | 2.700 |
| 335.912 | 361 | 0.850 |
| 335.913 | 361 | 0.400 |
| 335.915 | 361 | 0.200 |
| 336.171 | 481 | 0.410 |
| 336.172 | 481 | 0.485 |
| 336.173 | 481 | 0.580 |
| 336.174 | 481 | 0.690 |
| 336.175 | 481 | 0.845 |
| 336.301 | 482 | 1.160 |
| 336.302 | 482 | 1.070 |
| 336.303 | 482 | 3.330 |
| 336.304 | 482 | 3.850 |
| 336.309 | 482 | 1.195 |
| 336.310 | 482 | 2.900 |
| 336.569 | 481 | 3.300 |
| 336.631 | 481 | 0.930 |
| 336.632 | 481 | 0.920 |
| 336.633 | 481 | 1.000 |
| 336.634 | 481 | 0.980 |
| 336.635 | 481 | 0.960 |
| 336.636 | 481 | 1.030 |
| 336.637 | 481 | 1.150 |
| 336.638 | 481 | 1.140 |
| 336.639 | 481 | 1.160 |
| 336.640 | 481 | 1.160 |
| 336.641 | 481 | 1.190 |
| 336.642 | 481 | 1.220 |
| 336.643 | 481 | 1.330 |
| 336.644 | 481 | 1.350 |
| 336.645 | 481 | 1.400 |
| 336.647 | 481 | 1.460 |
| 336.649 | 481 | 1.590 |
| 336.651 | 481 | 1.750 |
| 336.653 | 481 | 1.770 |
| 336.655 | 481 | 2.150 |
| 336.657 | 481 | 2.000 |
| 336.659 | 481 | 2.090 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 336.661 | 481 | 2.270 |
| 336.665 | 481 | 4.100 |
| 336.674 | 481 | 5.000 |
| 336.731 | 481 | 0.990 |
| 336.732 | 481 | 1.010 |
| 336.733 | 481 | 1.040 |
| 336.734 | 481 | 1.100 |
| 336.735 | 481 | 1.190 |
| 336.736 | 481 | 1.240 |
| 336.737 | 481 | 1.250 |
| 336.738 | 481 | 1.270 |
| 336.739 | 481 | 1.400 |
| 336.740 | 481 | 1.370 |
| 336.741 | 481 | 1.380 |
| 336.742 | 481 | 1.600 |
| 336.743 | 481 | 1.520 |
| 336.744 | 481 | 1.560 |
| 336.745 | 481 | 1.600 |
| 336.747 | 481 | 1.750 |
| 336.749 | 481 | 1.920 |
| 336.751 | 481 | 2.000 |
| 336.753 | 481 | 2.400 |
| 336.755 | 481 | 2.430 |
| 336.757 | 481 | 2.600 |
| 336.759 | 481 | 2.950 |
| 336.761 | 481 | 2.840 |
| 336.905 | 410 | 0.020 |
| 337.316 | 480 | 0.740 |
| 337.317 | 480 | 0.750 |
| 337.318 | 480 | 0.760 |
| 337.319 | 480 | 0.765 |
| 337.320 | 480 | 0.785 |
| 337.321 | 480 | 0.785 |
| 337.322 | 480 | 0.795 |
| 337.323 | 480 | 0.820 |
| 337.324 | 480 | 0.840 |
| 337.325 | 480 | 0.855 |
| 337.326 | 480 | 0.885 |
| 337.327 | 480 | 0.920 |
| 337.328 | 480 | 0.935 |
| 337.329 | 480 | 0.960 |
| 337.330 | 480 | 0.990 |
| 337.416 | 480 | 0.750 |
| 337.417 | 480 | 0.750 |
| 337.418 | 480 | 0.780 |
| 337.419 | 480 | 0.790 |
| 337.420 | 480 | 0.800 |
| 337.421 | 480 | 0.805 |
| 337.422 | 480 | 0.830 |
| 337.423 | 480 | 0.855 |
| 337.424 | 480 | 0.875 |
| 337.425 | 480 | 0.905 |
| 337.426 | 480 | 0.960 |
| 337.427 | 480 | 0.995 |
| 337.428 | 480 | 1.020 |
| 337.429 | 480 | 1.055 |
| 337.430 | 480 | 1.095 |
| 389.221 | 445 | 0.140 |
| 389.365 | 195 | 1.250 |
| 389.366 | 195 | 2.550 |
| 389.367 | 195 | 5.180 |
| 389.395 | 354 | 2.350 |
| 389.396 | 354 | 5.000 |
| 389.397 | 354 | 8.520 |
| 389.405 | 299 | 2.400 |
| 389.406 | 299 | 5.000 |
| 389.407 | 299 | 8.600 |
| 395.161 | 437 | 0.010 |
| 395.170 | 437 | 0.020 |
| 470.103 | 334 | 0.900 |
| 470.108 | 315 | 1.800 |
| 470.109 | 322 | 1.800 |
| 470.301 | 356 | 0.295 |
| 470.401 | 356 | 0.585 |
| 470.501 | 356 | 1.125 |
| 470.601 | 356 | 2.190 |
| 470.602 | 356 | 2.890 |
| 470.606 | 363 | 2.200 |
| 470.609 | 363 | 1.380 |
| 470.721 | 203 | 0.300 |
| 470.723 | 203 | 0.300 |
| 470.731 | 203 | 0.300 |
| 470.733 | 203 | 0.300 |
| 470.742 | 203 | 0.300 |
| 470.744 | 203 | 0.300 |
| 470.752 | 203 | 0.300 |
| 470.754 | 203 | 0.300 |
| 470.801 | 356 | 5.200 |
| 472.051 | 296 | 0.260 |
| 472.052 | 296 | 0.005 |
| 472.061 | 296 | 0.280 |
| 472.062 | 296 | 0.007 |
| 472.201 | 300 | 0.300 |
| 472.301 | 300 | 0.300 |
| 472.401 | 300 | 0.550 |
| 472.501 | 300 | 1.100 |
| 472.601 | 300 | 2.100 |
| 472.602 | 300 | 3.200 |
| 472.701 | 300 | 4.900 |
| 472.703 | 300 | 5.900 |
| 490.106 | 108 | 0.880 |
| 490.108 | 108 | 0.905 |
| 490.110 | 108 | 0.980 |
| 490.112 | 108 | 1.070 |
| 490.114 | 108 | 1.085 |
| 490.116 | 108 | 1.270 |
| 490.118 | 108 | 1.285 |
| 490.120 | 108 | 1.315 |
| 490.125 | 108 | 2.410 |
| 490.132 | 108 | 2.600 |
| 490.206 | 108 | 2.670 |
| 490.208 | 108 | 2.710 |
| 490.210 | 108 | 2.810 |
| 490.212 | 108 | 2.940 |
| 490.214 | 108 | 2.975 |
| 490.216 | 108 | 3.040 |
| 490.218 | 108 | 3.050 |
| 490.220 | 108 | 3.110 |
| 490.225 | 108 | 3.850 |
| 490.232 | 108 | 4.500 |
| 490.240 | 108 | 5.500 |
| 490.506 | 106 | 0.990 |
| 490.508 | 106 | 0.985 |
| 490.510 | 106 | 1.050 |
| 490.512 | 106 | 1.035 |
| 490.514 | 106 | 1.085 |
| 490.516 | 106 | 1.065 |
| 490.518 | 106 | 1.250 |
| 490.520 | 106 | 1.175 |
| 490.556 | 106 | 1.150 |
| 490.558 | 106 | 1.145 |
| 490.560 | 106 | 1.290 |
| 490.562 | 106 | 1.250 |
| 490.566 | 106 | 1.310 |
| 490.570 | 106 | 1.560 |
| 490.606 | 106 | 2.725 |
| 490.608 | 106 | 2.715 |
| 490.610 | 106 | 2.780 |
| 490.612 | 106 | 2.770 |
| 490.614 | 106 | 2.820 |
| 490.616 | 106 | 2.800 |
| 490.618 | 106 | 2.940 |
| 490.620 | 106 | 2.915 |
| 490.625 | 106 | 3.500 |
| 490.656 | 106 | 3.500 |
| 490.658 | 106 | 3.500 |
| 490.660 | 106 | 3.500 |
| 490.662 | 106 | 3.500 |
| 490.664 | 106 | 3.600 |
| 490.666 | 106 | 3.600 |
| 490.668 | 106 | 3.900 |
| 490.670 | 106 | 3.900 |
| 490.675 | 106 | 4.710 |
| 611.115 | 422 | 0.003 |
| 611.116 | 422 | 0.004 |
| 611.117 | 422 | 0.004 |
| 611.152 | 422 | 0.002 |
| 611.153 | 422 | 0.003 |
| 611.154 | 422 | 0.003 |
| 611.155 | 422 | 0.003 |
| 611.156 | 422 | 0.004 |
| 611.157 | 422 | 0.004 |
| 611.212 | 422 | 0.015 |
| 611.213 | 422 | 0.020 |
| 611.214 | 422 | 0.025 |
| 611.215 | 422 | 0.040 |
| 611.253 | 422 | 0.020 |
| 611.254 | 422 | 0.025 |
| 611.255 | 422 | 0.040 |
| 612.110 | 422 | 0.002 |
| 612.111 | 422 | 0.002 |
| 612.112 | 422 | 0.002 |
| 612.113 | 422 | 0.003 |
| 612.114 | 422 | 0.003 |
| 612.116 | 422 | 0.004 |
| 612.117 | 422 | 0.004 |
| 612.213 | 422 | 0.020 |
| 612.215 | 422 | 0.040 |
| 612.253 | 422 | 0.020 |
| 612.254 | 422 | 0.025 |
| 612.255 | 422 | 0.040 |
| 613.202 | 342 | 0.012 |
| 613.203 | 342 | 0.011 |
| 613.204 | 342 | 0.012 |
| 613.205 | 342 | 0.010 |
| 613.206 | 342 | 0.009 |
| 613.207 | 342 | 0.007 |
| 613.208 | 342 | 0.005 |
| 613.304 | 336 | 0.012 |
| 613.305 | 336 | 0.020 |
| 613.306 | 336 | 0.019 |
| 613.307 | 336 | 0.019 |



BROTECH

| Order No. | Page | Weight (kg) |
|---|---|---|
| 613.308 | 336 | 0.015 |
| 613.309 | 338 | 0.019 |
| 613.310 | 338 | 0.008 |
| 613.323 | 336 | 0.020 |
| 613.324 | 336 | 0.065 |
| 613.325 | 336 | 0.060 |
| 613.326 | 336 | 0.060 |
| 613.327 | 336 | 0.060 |
| 613.411 | 318 | 0.029 |
| 613.412 | 320 | 0.025 |
| 613.413 | 318 | 0.018 |
| 613.414 | 320 | 0.015 |
| 613.422 | 316 | 0.125 |
| 613.423 | 316 | 0.120 |
| 613.424 | 316 | 0.130 |
| 613.425 | 316 | 0.130 |
| 613.426 | 316 | 0.120 |
| 613.427 | 316 | 0.120 |
| 613.428 | 316 | 0.150 |
| 613.429 | 316 | 0.120 |
| 613.430 | 316 | 0.130 |
| 613.432 | 322 | 0.110 |
| 613.433 | 322 | 0.110 |
| 613.434 | 322 | 0.110 |
| 613.435 | 322 | 0.110 |
| 613.436 | 322 | 0.110 |
| 613.437 | 322 | 0.130 |
| 613.438 | 322 | 0.130 |
| 613.439 | 322 | 0.130 |
| 613.440 | 322 | 0.120 |
| 615.080 | 317 | 0.010 |
| 615.081 | 317 | 0.010 |
| 615.082 | 317 | 0.020 |
| 615.083 | 317 | 0.020 |
| 615.084 | 317 | 0.030 |
| 615.085 | 317 | 0.030 |
| 615.086 | 317 | 0.030 |
| 615.087 | 317 | 0.050 |
| 615.089 | 438 | 0.050 |
| 615.201 | 317 | 0.020 |
| 615.202 | 317 | 0.040 |
| 615.203 | 422 | 0.008 |
| 615.203A | 422 | 0.008 |
| 615.204 | 422 | 0.015 |
| 615.204A | 422 | 0.016 |
| 615.205 | 395 | 0.020 |
| 615.206 | 317 | 0.115 |
| 615.207 | 395 | 0.045 |
| 615.208 | 317 | 0.085 |
| 615.209 | 321 | 0.160 |
| 615.210 | 321 | 0.235 |
| 615.211 | 317 | 0.016 |
| 615.212 | 317 | 0.045 |
| 615.213 | 317 | 0.035 |
| 615.214 | 317 | 0.025 |
| 615.215 | 317 | 0.070 |
| 615.216 | 345 | 0.025 |
| 615.217 | 345 | 0.040 |
| 615.218 | 321 | 0.060 |
| 615.219 | 321 | 0.140 |
| 615.220 | 329 | 0.015 |
| 615.221 | 321 | 0.300 |
| 615.223 | 317 | 0.100 |
| 615.224 | 321 | 0.200 |
| 615.225 | 321 | 0.140 |
| 615.226 | 321 | 0.125 |
| 615.227 | 333 | 0.260 |
| 615.228 | 332 | 0.035 |
| 615.229 | 365 | 0.400 |
| 615.230 | 329 | 0.030 |
| 615.231 | 329 | 0.035 |
| 615.232 | 321 | 0.093 |
| 615.233 | 321 | 0.250 |
| 615.234 | 341 | 0.065 |
| 615.239 | 341 | 0.170 |
| 615.240 | 341 | 0.215 |
| 615.243 | 341 | 0.155 |
| 615.250 | 321 | 0.140 |
| 615.251 | 321 | 0.250 |
| 615.252 | 325 | 0.300 |
| 615.253 | 325 | 0.450 |
| 615.256 | 339 | 0.180 |
| 615.257 | 328 | 0.370 |
| 615.258 | 328 | 0.520 |
| 615.262 | 319 | 0.140 |
| 615.264 | 328 | 0.240 |
| 615.265 | 319 | 0.210 |
| 615.266 | 319 | 0.370 |
| 615.267 | 328 | 0.290 |
| 615.268 | 321 | 0.220 |
| 615.269 | 321 | 0.350 |
| 615.271 | 395 | 0.010 |
| 615.272 | 317 | 0.012 |
| 615.273 | 321 | 0.015 |
| 615.280 | 321 | 0.015 |
| 615.281 | 321 | 0.019 |
| 615.282 | 333 | 0.025 |
| 615.283 | 332 | 0.030 |
| 615.284 | 321 | 0.035 |
| 615.285 | 333 | 0.040 |
| 615.286 | 332 | 0.040 |
| 615.287 | 333 | 0.050 |
| 615.288 | 333 | 0.030 |
| 615.289 | 321 | 0.030 |
| 615.290 | 321 | 0.030 |
| 615.291 | 332 | 0.030 |
| 615.292 | 333 | 0.035 |
| 615.300 | 319 | 0.016 |
| 615.301 | 333 | 0.015 |
| 615.302 | 333 | 0.018 |
| 615.303 | 333 | 0.020 |
| 615.304 | 328 | 0.055 |
| 615.305 | 328 | 0.060 |
| 615.306 | 333 | 0.080 |
| 615.354 | 339 | 0.080 |
| 615.355 | 339 | 0.105 |
| 615.356 | 339 | 0.150 |
| 615.365 | 319 | 0.005 |
| 615.366 | 319 | 0.010 |
| 615.367 | 319 | 0.015 |
| 615.369 | 319 | 0.105 |
| 615.370 | 339 | 0.120 |
| 615.371 | 319 | 0.170 |
| 615.372 | 339 | 0.200 |
| 615.373 | 319 | 0.260 |
| 615.374 | 319 | 0.070 |
| 615.375 | 319 | 0.100 |
| 615.376 | 319 | 0.130 |
| 615.377 | 319 | 0.170 |
| 615.378 | 319 | 0.220 |
| 615.387B | 328 | 0.140 |
| 615.388 | 331 | 0.040 |
| 615.390 | 332 | 0.340 |
| 615.392 | 330 | 0.012 |
| 615.394 | 328 | 0.050 |
| 615.395 | 328 | 0.050 |
| 615.401 | 329 | 0.015 |
| 615.402 | 329 | 0.015 |
| 615.403 | 329 | 0.015 |
| 615.404 | 329 | 0.015 |
| 615.405 | 329 | 0.015 |
| 615.406 | 329 | 0.015 |
| 615.407 | 329 | 0.015 |
| 615.408 | 329 | 0.015 |
| 615.409 | 329 | 0.015 |
| 615.420 | 328 | 0.015 |
| 615.421 | 328 | 0.015 |
| 615.422 | 328 | 0.015 |
| 615.423 | 328 | 0.015 |
| 615.424 | 328 | 0.020 |
| 615.425 | 328 | 0.020 |
| 615.426 | 328 | 0.020 |
| 615.427 | 328 | 0.020 |
| 615.428 | 328 | 0.020 |
| 615.429 | 328 | 0.020 |
| 615.501 | 424 | 0.022 |
| 615.502 | 424 | 0.021 |
| 615.503 | 424 | 0.021 |
| 615.504 | 424 | 0.021 |
| 615.505 | 346 | 0.020 |
| 615.506 | 346 | 0.022 |
| 615.507 | 395 | 0.023 |
| 615.508 | 395 | 0.023 |
| 615.509 | 346 | 0.024 |
| 615.511 | 346 | 0.030 |
| 615.522 | 424 | 0.020 |
| 615.524 | 424 | 0.020 |
| 615.525 | 424 | 0.020 |
| 615.530 | 424 | 0.020 |
| 615.531 | 424 | 0.030 |
| 615.541 | 423 | 0.003 |
| 615.542 | 423 | 0.003 |
| 615.543 | 423 | 0.003 |
| 615.544 | 423 | 0.003 |
| 615.545 | 423 | 0.003 |
| 615.546 | 423 | 0.004 |
| 615.547 | 423 | 0.004 |
| 615.551 | 423 | 0.003 |
| 615.552 | 423 | 0.003 |
| 615.553 | 423 | 0.003 |
| 615.554 | 423 | 0.003 |
| 615.555 | 423 | 0.003 |
| 615.561 | 423 | 0.003 |
| 615.562 | 423 | 0.003 |
| 615.563 | 423 | 0.003 |
| 615.564 | 423 | 0.003 |
| 615.565 | 423 | 0.003 |
| 615.566 | 423 | 0.003 |
| 615.571 | 423 | 0.003 |
| 615.572 | 423 | 0.003 |
| 615.573 | 423 | 0.003 |
| 615.574 | 423 | 0.004 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 615.575 | 423 | 0.004 |
| 615.580 | 347 | 0.020 |
| 615.581 | 347 | 0.020 |
| 615.582 | 347 | 0.020 |
| 615.583 | 347 | 0.022 |
| 615.584 | 347 | 0.022 |
| 615.585 | 347 | 0.022 |
| 615.586 | 347 | 0.023 |
| 615.587 | 347 | 0.023 |
| 615.588 | 347 | 0.023 |
| 615.589 | 347 | 0.024 |
| 615.590 | 423 | 0.003 |
| 615.903 | 446 | 0.025 |
| 615.904 | 439 | 0.005 |
| 625.020 | 365 | 0.007 |
| 626.111 | 357 | 0.007 |
| 626.112 | 357 | 0.007 |
| 626.113 | 357 | 0.008 |
| 626.121 | 357 | 0.007 |
| 626.122 | 357 | 0.008 |
| 626.123 | 357 | 0.009 |
| 626.131 | 357 | 0.009 |
| 626.132 | 357 | 0.010 |
| 626.133 | 357 | 0.010 |
| 626.141 | 357 | 0.013 |
| 626.142 | 357 | 0.015 |
| 626.143 | 357 | 0.018 |
| 626.151 | 357 | 0.020 |
| 626.152 | 357 | 0.025 |
| 626.153 | 357 | 0.030 |
| 626.161 | 357 | 0.045 |
| 626.162 | 357 | 0.070 |
| 626.163 | 357 | 0.080 |
| 626.231 | 440 | 0.008 |
| 626.241 | 440 | 0.014 |
| 626.251 | 440 | 0.022 |
| 626.261 | 440 | 0.035 |
| 626.271 | 377 | 0.040 |
| 626.272 | 375 | 0.050 |
| 626.273 | 375 | 0.060 |
| 626.322 | 358 | 0.008 |
| 626.323 | 358 | 0.009 |
| 626.331 | 358 | 0.014 |
| 626.332 | 358 | 0.011 |
| 626.333 | 358 | 0.013 |
| 626.341 | 358 | 0.010 |
| 626.342 | 358 | 0.015 |
| 626.343 | 358 | 0.020 |
| 626.351 | 358 | 0.020 |
| 626.352 | 358 | 0.030 |
| 626.353 | 358 | 0.035 |
| 626.361 | 358 | 0.030 |
| 626.362 | 358 | 0.060 |
| 626.363 | 358 | 0.090 |
| 626.371 | 375 | 0.045 |
| 626.372 | 375 | 0.062 |
| 626.422 | 359 | 0.005 |
| 626.423 | 359 | 0.011 |
| 626.432 | 359 | 0.014 |
| 626.433 | 359 | 0.013 |
| 626.442 | 359 | 0.012 |
| 626.443 | 359 | 0.019 |
| 626.452 | 359 | 0.025 |
| 626.453 | 359 | 0.025 |
| 626.462 | 359 | 0.052 |
| 626.463 | 359 | 0.040 |
| 626.472 | 375 | 0.045 |
| 626.473 | 375 | 0.055 |
| 626.901 | 358 | 0.005 |
| 626.902 | 358 | 0.008 |
| 626.903 | 358 | 0.013 |
| 626.904 | 358 | 0.027 |
| 626.905 | 358 | 0.042 |
| 626.906 | 358 | 0.130 |
| 626.907 | 330 | 0.025 |
| 626.908 | 330 | 0.055 |
| 626.909 | 330 | 0.090 |
| 626.910 | 330 | 0.110 |
| 626.916 | 358 | 0.244 |
| 626.917 | 375 | 0.187 |
| 626.935 | 360 | 0.060 |
| 626.936 | 360 | 0.110 |
| 626.937 | 360 | 0.130 |
| 626.938 | 360 | 0.090 |
| 626.945 | 360 | 0.060 |
| 626.946 | 360 | 0.110 |
| 626.947 | 360 | 0.130 |
| 626.948 | 360 | 0.150 |
| 627.121 | 441 | 0.020 |
| 627.131 | 441 | 0.050 |
| 627.141 | 441 | 0.050 |
| 627.151 | 441 | 0.050 |
| 627.161 | 441 | 0.050 |
| 637.421 | 435 | 0.028 |
| 637.422 | 435 | 0.025 |
| 637.431 | 435 | 0.040 |
| 637.432 | 435 | 0.060 |
| 637.441 | 435 | 0.080 |
| 637.442 | 435 | 0.090 |
| 637.451 | 435 | 0.150 |
| 637.452 | 435 | 0.170 |
| 637.461 | 435 | 0.300 |
| 637.462 | 435 | 0.350 |
| 637.463 | 435 | 0.450 |
| 637.464 | 435 | 0.550 |
| 637.561 | 435 | 0.300 |
| 637.562 | 435 | 0.350 |
| 637.563 | 435 | 0.450 |
| 637.564 | 435 | 0.550 |
| 637.813 | 445 | 0.750 |
| 637.814 | 387 | 0.850 |
| 637.829 | 445 | 0.750 |
| 637.830 | 387 | 0.853 |
| 637.833 | 445 | 0.725 |
| 637.834 | 387 | 0.850 |
| 637.845 | 445 | 0.720 |
| 637.846 | 387 | 0.860 |
| 637.940 | 374 | 0.710 |
| 637.941 | 374 | 0.710 |
| 637.942 | 374 | 0.747 |
| 637.943 | 374 | 0.700 |
| 637.951 | 374 | 0.750 |
| 637.953 | 374 | 0.750 |
| 637.959 | 379 | 0.385 |
| 637.961 | 379 | 0.591 |
| 637.962 | 446 | 0.010 |
| 638.104 | 434 | 0.070 |
| 638.105 | 434 | 0.125 |
| 638.106 | 434 | 0.195 |
| 638.107 | 434 | 0.315 |
| 638.108 | 434 | 0.425 |
| 638.111 | 433 | 0.015 |
| 638.121 | 433 | 0.022 |
| 638.131 | 433 | 0.053 |
| 638.132 | 433 | 0.074 |
| 638.141 | 433 | 0.100 |
| 638.142 | 433 | 0.140 |
| 638.151 | 433 | 0.190 |
| 638.152 | 433 | 0.270 |
| 638.161 | 433 | 0.340 |
| 638.162 | 433 | 0.470 |
| 638.171 | 433 | 0.580 |
| 638.172 | 433 | 0.830 |
| 638.241 | 433 | 0.110 |
| 638.251 | 433 | 0.200 |
| 638.252 | 433 | 0.225 |
| 638.261 | 433 | 0.350 |
| 638.262 | 433 | 0.450 |
| 638.271 | 433 | 0.605 |
| 638.272 | 433 | 0.805 |
| 638.411 | 307 | 0.014 |
| 638.412 | 307 | 0.018 |
| 638.421 | 307 | 0.022 |
| 638.422 | 307 | 0.028 |
| 638.431 | 307 | 0.050 |
| 638.432 | 307 | 0.070 |
| 638.441 | 307 | 0.095 |
| 638.442 | 307 | 0.130 |
| 638.451 | 307 | 0.175 |
| 638.452 | 307 | 0.250 |
| 638.461 | 307 | 0.325 |
| 638.462 | 307 | 0.450 |
| 638.471 | 307 | 0.560 |
| 638.472 | 307 | 0.780 |
| 638.561 | 432 | 0.320 |
| 638.562 | 432 | 0.450 |
| 638.571 | 432 | 0.550 |
| 638.572 | 432 | 0.770 |
| 639.104 | 304 | 0.100 |
| 639.105 | 304 | 0.185 |
| 639.106 | 304 | 0.385 |
| 639.107 | 304 | 0.110 |
| 639.108 | 304 | 0.775 |
| 639.109 | 304 | 1.050 |
| 639.110 | 304 | 1.150 |
| 639.111 | 430 | 0.010 |
| 639.112 | 430 | 0.010 |
| 639.113 | 302 | 0.020 |
| 639.121 | 430 | 0.010 |
| 639.122 | 430 | 0.010 |
| 639.123 | 302 | 0.020 |
| 639.131 | 430 | 0.030 |
| 639.132 | 430 | 0.030 |
| 639.133 | 302 | 0.060 |
| 639.135 | 430 | 0.040 |
| 639.136 | 430 | 0.040 |
| 639.137 | 302 | 0.080 |
| 639.141 | 430 | 0.045 |
| 639.142 | 430 | 0.045 |
| 639.143 | 302 | 0.090 |
| 639.145 | 430 | 0.060 |
| 639.146 | 430 | 0.060 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 639.147 | 302 | 0.120 |
| 639.151 | 430 | 0.100 |
| 639.152 | 430 | 0.100 |
| 639.153 | 302 | 0.200 |
| 639.155 | 430 | 0.130 |
| 639.156 | 430 | 0.130 |
| 639.157 | 302 | 0.260 |
| 639.161 | 430 | 0.215 |
| 639.162 | 430 | 0.215 |
| 639.163 | 302 | 0.430 |
| 639.165 | 430 | 0.225 |
| 639.166 | 430 | 0.225 |
| 639.167 | 302 | 0.550 |
| 639.171 | 430 | 0.405 |
| 639.172 | 430 | 0.405 |
| 639.173 | 302 | 0.810 |
| 639.175 | 430 | 0.550 |
| 639.176 | 430 | 0.550 |
| 639.177 | 302 | 1.100 |
| 639.181 | 430 | 0.550 |
| 639.182 | 430 | 0.550 |
| 639.183 | 302 | 1.100 |
| 639.185 | 430 | 0.660 |
| 639.186 | 430 | 0.660 |
| 639.187 | 302 | 1.320 |
| 639.191 | 431 | 0.100 |
| 639.192 | 431 | 0.150 |
| 639.193 | 431 | 0.200 |
| 639.194 | 431 | 0.300 |
| 639.195 | 431 | 0.350 |
| 639.196 | 431 | 0.400 |
| 639.197 | 431 | 0.450 |
| 639.241 | 430 | 0.550 |
| 639.242 | 430 | 0.550 |
| 639.243 | 303 | 0.110 |
| 639.251 | 430 | 0.120 |
| 639.252 | 430 | 0.120 |
| 639.253 | 303 | 0.240 |
| 639.255 | 430 | 0.120 |
| 639.257 | 303 | 0.240 |
| 639.261 | 430 | 0.225 |
| 639.262 | 430 | 0.225 |
| 639.263 | 303 | 0.450 |
| 639.265 | 430 | 0.275 |
| 639.266 | 430 | 0.275 |
| 639.267 | 303 | 0.550 |
| 639.271 | 430 | 0.425 |
| 639.272 | 430 | 0.425 |
| 639.273 | 303 | 0.850 |
| 639.275 | 430 | 0.540 |
| 639.276 | 430 | 0.540 |
| 639.277 | 303 | 1.080 |
| 639.281 | 430 | 0.580 |
| 639.282 | 430 | 0.580 |
| 639.283 | 303 | 1.160 |
| 639.285 | 430 | 0.650 |
| 639.286 | 430 | 0.650 |
| 639.287 | 303 | 1.300 |
| 639.403 | 305 | 0.120 |
| 639.404 | 305 | 0.840 |
| 639.405 | 305 | 0.170 |
| 639.406 | 305 | 0.380 |
| 639.407 | 305 | 0.660 |
| 639.408 | 305 | 0.770 |
| 639.409 | 305 | 1.040 |
| 639.410 | 305 | 1.155 |
| 639.411 | 430 | 0.010 |
| 639.412 | 430 | 0.010 |
| 639.413 | 301 | 0.020 |
| 639.415 | 430 | 0.020 |
| 639.416 | 430 | 0.020 |
| 639.417 | 301 | 0.040 |
| 639.421 | 430 | 0.020 |
| 639.422 | 430 | 0.020 |
| 639.423 | 301 | 0.040 |
| 639.425 | 430 | 0.020 |
| 639.426 | 430 | 0.020 |
| 639.427 | 301 | 0.040 |
| 639.431 | 430 | 0.020 |
| 639.432 | 430 | 0.020 |
| 639.433 | 301 | 0.060 |
| 639.435 | 430 | 0.040 |
| 639.436 | 430 | 0.040 |
| 639.437 | 301 | 0.060 |
| 639.441 | 430 | 0.030 |
| 639.442 | 430 | 0.030 |
| 639.443 | 301 | 0.060 |
| 639.445 | 430 | 0.060 |
| 639.446 | 430 | 0.060 |
| 639.447 | 301 | 0.060 |
| 639.451 | 430 | 0.095 |
| 639.452 | 430 | 0.095 |
| 639.453 | 301 | 0.190 |
| 639.455 | 430 | 0.095 |
| 639.456 | 430 | 0.095 |
| 639.457 | 301 | 0.190 |
| 639.461 | 430 | 0.200 |
| 639.462 | 430 | 0.200 |
| 639.463 | 301 | 0.400 |
| 639.465 | 430 | 0.200 |
| 639.466 | 430 | 0.200 |
| 639.467 | 301 | 0.400 |
| 639.471 | 430 | 0.410 |
| 639.472 | 430 | 0.410 |
| 639.473 | 301 | 0.820 |
| 639.475 | 430 | 0.410 |
| 639.476 | 430 | 0.410 |
| 639.477 | 301 | 0.820 |
| 639.481 | 430 | 0.550 |
| 639.482 | 430 | 0.550 |
| 639.483 | 301 | 1.100 |
| 639.485 | 430 | 0.650 |
| 639.486 | 430 | 0.650 |
| 639.487 | 301 | 1.300 |
| 639.490 | 431 | 0.200 |
| 639.491 | 431 | 0.300 |
| 639.492 | 431 | 0.400 |
| 639.493 | 431 | 0.500 |
| 639.494 | 431 | 0.600 |
| 639.495 | 431 | 0.600 |
| 639.496 | 431 | 0.800 |
| 639.497 | 431 | 0.800 |
| 639.561 | 430 | 0.200 |
| 639.562 | 430 | 0.200 |
| 639.563 | 301 | 0.400 |
| 639.565 | 430 | 0.250 |
| 639.566 | 430 | 0.250 |
| 639.567 | 301 | 0.500 |
| 639.571 | 430 | 0.385 |
| 639.572 | 430 | 0.385 |
| 639.573 | 301 | 0.770 |
| 639.575 | 430 | 0.460 |
| 639.576 | 430 | 0.460 |
| 639.577 | 301 | 0.930 |
| 639.581 | 430 | 0.550 |
| 639.582 | 430 | 0.550 |
| 639.583 | 301 | 1.090 |
| 639.585 | 430 | 0.650 |
| 639.586 | 430 | 0.650 |
| 639.587 | 301 | 1.290 |
| 639.651 | 446 | 0.165 |
| 639.652 | 446 | 0.165 |
| 639.653 | 306 | 0.330 |
| 639.654 | 306 | 0.220 |
| 639.661 | 446 | 0.300 |
| 639.662 | 446 | 0.300 |
| 639.663 | 306 | 0.610 |
| 639.664 | 306 | 0.440 |
| 639.665 | 446 | 0.250 |
| 639.666 | 446 | 0.250 |
| 639.667 | 306 | 0.550 |
| 639.668 | 306 | 0.770 |
| 639.671 | 446 | 0.400 |
| 639.672 | 446 | 0.400 |
| 639.673 | 306 | 0.805 |
| 639.674 | 306 | 0.805 |
| 639.675 | 446 | 0.680 |
| 639.676 | 446 | 0.690 |
| 639.677 | 306 | 1.360 |
| 639.678 | 306 | 0.950 |
| 639.681 | 446 | 0.730 |
| 639.682 | 446 | 0.730 |
| 639.683 | 306 | 1.460 |
| 639.684 | 306 | 1.210 |
| 639.685 | 446 | 0.870 |
| 639.686 | 446 | 0.870 |
| 639.687 | 306 | 1.740 |
| 639.688 | 306 | 1.350 |
| 639.690 | 446 | 0.010 |
| 639.691 | 446 | 0.004 |
| 639.693 | 446 | 0.004 |
| 639.913 | 431 | 0.050 |
| 639.914 | 431 | 0.080 |
| 639.915 | 446 | 0.100 |
| 639.916 | 446 | 0.150 |
| 639.917 | 446 | 0.260 |
| 639.918 | 446 | 0.400 |
| 651.623 | 395 | 0.001 |
| 651.632 | 395 | 0.001 |
| 651.702 | 395 | 0.001 |
| 651.713 | 395 | 0.001 |
| 651.723 | 395 | 0.001 |
| 651.725 | 395 | 0.001 |
| 651.734 | 395 | 0.001 |
| 651.735 | 395 | 0.001 |
| 651.736 | 395 | 0.001 |
| 651.737 | 395 | 0.001 |
| 651.738 | 395 | 0.001 |
| 651.802 | 395 | 0.001 |
| 651.813 | 395 | 0.001 |
| 651.823 | 395 | 0.001 |
| 651.824 | 395 | 0.001 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 651.825 | 395 | 0.001 |
| 651.833 | 395 | 0.001 |
| 651.834 | 395 | 0.001 |
| 651.835 | 395 | 0.001 |
| 651.837 | 395 | 0.001 |
| 651.838 | 395 | 0.002 |
| 651.839 | 395 | 0.002 |
| 651.840 | 395 | 0.002 |
| 651.841 | 395 | 0.002 |
| 651.842 | 395 | 0.002 |
| 651.843 | 395 | 0.002 |
| 654.128 | 403 | 0.002 |
| 654.150 | 403 | 0.001 |
| 654.152 | 403 | 0.001 |
| 654.158 | 403 | 0.002 |
| 654.168 | 403 | 0.001 |
| 654.183 | 403 | 0.002 |
| 654.240 | 404 | 0.004 |
| 654.250 | 404 | 0.004 |
| 654.251 | 404 | 0.003 |
| 654.259 | 404 | 0.004 |
| 654.277 | 404 | 0.004 |
| 654.287 | 404 | 0.004 |
| 654.340 | 405 | 0.008 |
| 654.350 | 405 | 0.008 |
| 654.351 | 405 | 0.008 |
| 654.354 | 405 | 0.008 |
| 654.387 | 405 | 0.008 |
| 654.837 | 399 | 0.001 |
| 654.840A | 399 | 0.001 |
| 654.846 | 399 | 0.001 |
| 654.847 | 399 | 0.001 |
| 654.850A | 399 | 0.001 |
| 654.851A | 399 | 0.001 |
| 654.852 | 399 | 0.001 |
| 654.853 | 399 | 0.001 |
| 654.856 | 399 | 0.001 |
| 654.858 | 399 | 0.001 |
| 654.877 | 399 | 0.001 |
| 654.879 | 399 | 0.001 |
| 654.888 | 399 | 0.001 |
| 654.889 | 399 | 0.001 |
| 654.930A | 400 | 0.004 |
| 654.935 | 400 | 0.004 |
| 654.937 | 400 | 0.004 |
| 654.940A | 400 | 0.004 |
| 654.941 | 400 | 0.001 |
| 654.942 | 400 | 0.004 |
| 654.945 | 400 | 0.004 |
| 654.947 | 400 | 0.004 |
| 654.949 | 400 | 0.004 |
| 654.950 | 400 | 0.003 |
| 654.952 | 400 | 0.004 |
| 654.955 | 400 | 0.003 |
| 654.957 | 400 | 0.003 |
| 654.959 | 400 | 0.003 |
| 654.964 | 401 | 0.004 |
| 654.965 | 401 | 0.004 |
| 654.968 | 401 | 0.004 |
| 654.969 | 401 | 0.004 |
| 654.977 | 400 | 0.004 |
| 654.978 | 401 | 0.003 |
| 654.979 | 401 | 0.003 |
| 654.980 | 401 | 0.008 |
| 654.983 | 402 | 0.016 |
| 654.986 | 402 | 0.015 |
| 654.987 | 400 | 0.004 |
| 654.988 | 401 | 0.007 |
| 654.989 | 401 | 0.009 |
| 654.990A | 401 | 0.009 |
| 654.991 | 401 | 0.009 |
| 654.992 | 401 | 0.009 |
| 654.993A | 401 | 0.009 |
| 654.995 | 401 | 0.003 |
| 654.996 | 402 | 0.016 |
| 654.997 | 402 | 0.016 |
| 654.998 | 402 | 0.016 |
| 655.301 | 396 | 0.001 |
| 655.301A | 396 | 0.001 |
| 655.301B | 396 | 0.001 |
| 655.302 | 396 | 0.001 |
| 655.302A | 396 | 0.001 |
| 655.302B | 396 | 0.001 |
| 655.303 | 396 | 0.002 |
| 655.303A | 396 | 0.002 |
| 655.303B | 396 | 0.002 |
| 655.305 | 396 | 0.001 |
| 655.306 | 396 | 0.001 |
| 655.310 | 398 | 0.002 |
| 655.311A | 396 | 0.001 |
| 655.313 | 396 | 0.001 |
| 655.314 | 396 | 0.001 |
| 655.315 | 398 | 0.001 |
| 655.316 | 396 | 0.001 |
| 655.317 | 398 | 0.001 |
| 655.318 | 397 | 0.001 |
| 655.319 | 397 | 0.001 |
| 655.320 | 397 | 0.001 |
| 655.321A | 396 | 0.001 |
| 655.322 | 396 | 0.001 |
| 655.322A | 396 | 0.001 |
| 655.324 | 396 | 0.001 |
| 655.326 | 396 | 0.003 |
| 655.327 | 397 | 0.001 |
| 655.328 | 397 | 0.001 |
| 655.331A | 396 | 0.001 |
| 655.334 | 396 | 0.001 |
| 655.354 | 396 | 0.001 |
| 655.363 | 397 | 0.001 |
| 655.364 | 396 | 0.001 |
| 655.369 | 397 | 0.001 |
| 655.370 | 397 | 0.001 |
| 655.371 | 397 | 0.001 |
| 655.372 | 397 | 0.001 |
| 655.373 | 397 | 0.001 |
| 655.374 | 398 | 0.002 |
| 655.375 | 397 | 0.001 |
| 655.378 | 397 | 0.001 |
| 655.379 | 397 | 0.002 |
| 655.380 | 397 | 0.001 |
| 655.381 | 397 | 0.001 |
| 655.383 | 397 | 0.001 |
| 655.384 | 398 | 0.002 |
| 655.385 | 397 | 0.001 |
| 655.386 | 397 | 0.001 |
| 655.387 | 397 | 0.001 |
| 655.388 | 397 | 0.001 |
| 655.389 | 397 | 0.001 |
| 655.390 | 397 | 0.001 |
| 655.393 | 397 | 0.001 |
| 655.395 | 397 | 0.001 |
| 655.397 | 397 | 0.002 |
| 655.398 | 397 | 0.001 |
| 655.399 | 397 | 0.001 |
| 655.600 | 394 | 0.001 |
| 655.601 | 394 | 0.001 |
| 655.602 | 394 | 0.001 |
| 655.603 | 394 | 0.001 |
| 655.604 | 394 | 0.001 |
| 655.605 | 394 | 0.001 |
| 655.606 | 394 | 0.001 |
| 655.620 | 408 | 0.001 |
| 655.621 | 408 | 0.001 |
| 655.622 | 408 | 0.001 |
| 655.630 | 408 | 0.001 |
| 655.631 | 408 | 0.001 |
| 655.632 | 408 | 0.001 |
| 655.640 | 409 | 0.002 |
| 655.641 | 409 | 0.002 |
| 655.642 | 409 | 0.002 |
| 655.644 | 409 | 0.002 |
| 655.650 | 409 | 0.004 |
| 655.651 | 409 | 0.004 |
| 655.652 | 409 | 0.004 |
| 655.654 | 409 | 0.004 |
| 655.660 | 410 | 0.009 |
| 655.661 | 410 | 0.009 |
| 655.662 | 410 | 0.010 |
| 655.664 | 410 | 0.009 |
| 655.670 | 411 | 0.016 |
| 655.671 | 411 | 0.017 |
| 655.910 | 406 | 0.002 |
| 655.911 | 406 | 0.002 |
| 655.912 | 406 | 0.002 |
| 655.913 | 406 | 0.002 |
| 655.920 | 406 | 0.002 |
| 655.921 | 406 | 0.002 |
| 655.922 | 406 | 0.002 |
| 655.923 | 406 | 0.002 |
| 655.930 | 407 | 0.003 |
| 655.931 | 407 | 0.003 |
| 655.932 | 407 | 0.003 |
| 655.933 | 407 | 0.003 |
| 655.940 | 399 | 0.001 |
| 655.941 | 399 | 0.001 |
| 655.942 | 399 | 0.001 |
| 656.000 | 416 | 0.001 |
| 656.001 | 416 | 0.001 |
| 656.002 | 416 | 0.001 |
| 656.003 | 416 | 0.001 |
| 656.004 | 416 | 0.001 |
| 656.005 | 416 | 0.001 |
| 656.011 | 416 | 0.001 |
| 656.012 | 416 | 0.001 |
| 656.013 | 416 | 0.001 |
| 656.014 | 416 | 0.001 |
| 656.015 | 416 | 0.001 |
| 656.016 | 416 | 0.001 |
| 656.020 | 416 | 0.001 |
| 656.021 | 416 | 0.001 |
| 656.022 | 416 | 0.001 |
| 656.030 | 416 | 0.001 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 656.031 | 416 | 0.001 |
| 656.040 | 416 | 0.001 |
| 656.041 | 416 | 0.001 |
| 656.042 | 416 | 0.001 |
| 656.043 | 416 | 0.001 |
| 656.050 | 416 | 0.001 |
| 656.051 | 416 | 0.001 |
| 656.100 | 417 | 0.001 |
| 656.101 | 417 | 0.001 |
| 656.102 | 417 | 0.001 |
| 656.103 | 417 | 0.001 |
| 656.110 | 417 | 0.001 |
| 656.111 | 417 | 0.001 |
| 656.112 | 417 | 0.001 |
| 656.113 | 417 | 0.001 |
| 656.120 | 417 | 0.001 |
| 656.121 | 417 | 0.001 |
| 656.122 | 417 | 0.001 |
| 656.123 | 417 | 0.001 |
| 656.130 | 417 | 0.001 |
| 656.131 | 417 | 0.001 |
| 656.140 | 417 | 0.001 |
| 656.141 | 417 | 0.001 |
| 656.142 | 417 | 0.001 |
| 656.143 | 417 | 0.001 |
| 656.144 | 417 | 0.001 |
| 656.145 | 417 | 0.001 |
| 656.146 | 417 | 0.001 |
| 656.147 | 417 | 0.001 |
| 656.150 | 417 | 0.001 |
| 656.151 | 417 | 0.001 |
| 656.152 | 417 | 0.001 |
| 656.153 | 417 | 0.001 |
| 656.201 | 418 | 0.001 |
| 656.202 | 418 | 0.001 |
| 656.203 | 418 | 0.001 |
| 656.204 | 418 | 0.001 |
| 656.210 | 418 | 0.001 |
| 656.211 | 418 | 0.001 |
| 656.212 | 418 | 0.001 |
| 656.300 | 418 | 0.001 |
| 656.301 | 418 | 0.001 |
| 656.302 | 418 | 0.001 |
| 656.303 | 418 | 0.001 |
| 656.310 | 418 | 0.001 |
| 656.311 | 418 | 0.001 |
| 656.312 | 418 | 0.001 |
| 656.313 | 418 | 0.001 |
| 656.320 | 418 | 0.001 |
| 656.321 | 418 | 0.001 |
| 656.330 | 418 | 0.001 |
| 656.331 | 418 | 0.001 |
| 656.340 | 418 | 0.001 |
| 656.341 | 418 | 0.001 |
| 656.342 | 418 | 0.001 |
| 656.343 | 418 | 0.001 |
| 656.351 | 418 | 0.001 |
| 656.352 | 418 | 0.001 |
| 662.600 | 426 | 13.300 |
| 663.110 | 495 | 0.045 |
| 663.120 | 495 | 0.070 |
| 663.121 | 495 | 0.140 |
| 663.130 | 495 | 0.090 |
| 663.131 | 495 | 0.180 |
| 663.140 | 495 | 0.100 |
| 663.141 | 495 | 0.210 |
| 663.150 | 495 | 0.500 |
| 663.151 | 495 | 0.950 |
| 663.160 | 495 | 0.640 |
| 663.161 | 495 | 1.250 |
| 663.170 | 495 | 0.600 |
| 663.181 | 495 | 0.010 |
| 663.185 | 495 | 0.040 |
| 663.191 | 495 | 0.005 |
| 663.195 | 495 | 0.030 |
| 689.001 | 359 | 0.020 |
| 689.007 | 359 | 0.050 |
| 689.189 | 375 | 0.030 |
| 689.197 | 359 | 0.020 |
| 689.198 | 359 | 0.020 |
| 689.290 | 348 | 0.020 |
| 689.516 | 396 | 0.002 |
| 689.517 | 396 | 0.002 |
| 689.518 | 396 | 0.002 |
| 690.101 | 429 | 0.002 |
| 690.102 | 436 | 0.004 |
| 690.103 | 436 | 0.004 |
| 690.104 | 436 | 0.005 |
| 690.105 | 429 | 0.025 |
| 690.106 | 429 | 0.030 |
| 690.107 | 439 | 0.005 |
| 690.108 | 429 | 0.005 |
| 690.113 | 439 | 0.004 |
| 690.115 | 441 | 0.003 |
| 690.121 | 442 | 0.053 |
| 690.124 | 442 | 0.005 |
| 690.126 | 427 | 0.030 |
| 690.127 | 427 | 0.055 |
| 690.128 | 427 | 0.100 |
| 690.129 | 427 | 0.095 |
| 690.130 | 427 | 0.240 |
| 690.131 | 428 | 0.010 |
| 690.132 | 443 | 0.010 |
| 690.135 | 440 | 0.001 |
| 690.136 | 440 | 0.001 |
| 690.137 | 440 | 0.003 |
| 690.138 | 440 | 0.004 |
| 690.139 | 440 | 0.002 |
| 690.140 | 440 | 0.004 |
| 690.141 | 440 | 0.007 |
| 690.150 | 439 | 0.005 |
| 690.156 | 437 | 0.005 |
| 690.157 | 429 | 0.005 |
| 690.159 | 434 | 0.100 |
| 690.163 | 429 | 0.020 |
| 690.167 | 427 | 0.105 |
| 690.168 | 427 | 0.250 |
| 690.172 | 428 | 0.019 |
| 690.173 | 429 | 0.007 |
| 690.176 | 441 | 0.005 |
| 690.177 | 441 | 0.005 |
| 690.178 | 441 | 0.005 |
| 690.179 | 441 | 0.001 |
| 690.180 | 441 | 0.003 |
| 690.182 | 441 | 0.003 |
| 690.183 | 439 | 0.020 |
| 690.184 | 429 | 0.007 |
| 690.186 | 410 | 0.008 |
| 690.188 | 429 | 0.014 |
| 690.189 | 429 | 0.010 |
| 690.191 | 429 | 0.005 |
| 690.192 | 429 | 0.007 |
| 690.193 | 429 | 0.009 |
| 690.194 | 429 | 0.010 |
| 690.195 | 429 | 0.014 |
| 690.196 | 429 | 0.017 |
| 690.197 | 429 | 0.020 |
| 690.208 | 437 | 0.001 |
| 690.320 | 437 | 0.009 |
| 690.323 | 439 | 0.070 |
| 690.324 | 439 | 0.070 |
| 690.326 | 437 | 0.040 |
| 690.400 | 446 | 0.001 |
| 690.410 | 440 | 0.001 |
| 690.413 | 434 | 0.020 |
| 690.414 | 441 | 0.001 |
| 690.416 | 441 | 0.001 |
| 690.417 | 437 | 0.001 |
| 690.418 | 428 | 0.001 |
| 690.419 | 428 | 0.001 |
| 690.421 | 437 | 0.001 |
| 690.425 | 435 | 0.001 |
| 690.431 | 426 | 0.001 |
| 690.432 | 426 | 0.001 |
| 690.433 | 426 | 0.002 |
| 690.434 | 426 | 0.003 |
| 690.435 | 426 | 0.003 |
| 690.436 | 426 | 0.010 |
| 690.437 | 426 | 0.050 |
| 690.440 | 437 | 0.001 |
| 690.449 | 437 | 0.002 |
| 690.451 | 428 | 0.001 |
| 690.452 | 428 | 0.005 |
| 690.457 | 437 | 0.003 |
| 690.459 | 438 | 0.001 |
| 690.460 | 428 | 0.002 |
| 690.462 | 435 | 0.001 |
| 690.464 | 435 | 0.002 |
| 690.465 | 435 | 0.002 |
| 690.466 | 435 | 0.001 |
| 690.467 | 435 | 0.001 |
| 690.469 | 428 | 0.005 |
| 690.477 | 448 | 0.002 |
| 690.478 | 448 | 0.003 |
| 690.479 | 448 | 0.006 |
| 690.480 | 448 | 0.010 |
| 690.481 | 448 | 0.017 |
| 690.482 | 448 | 0.020 |
| 690.483 | 448 | 0.035 |
| 690.484 | 428 | 0.045 |
| 690.486 | 438 | 0.001 |
| 690.487A | 438 | 0.008 |
| 690.488 | 438 | 0.007 |
| 690.489 | 437 | 0.001 |
| 690.510 | 448 | 0.010 |
| 690.511 | 446 | 0.001 |
| 690.512 | 448 | 0.002 |
| 690.513 | 448 | 0.003 |
| 690.514 | 448 | 0.004 |
| 690.515 | 448 | 0.008 |
| 690.529 | 432 | 0.001 |
| 690.538 | 432 | 0.001 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 690.541 | 432 | 0.010 |
| 690.549 | 440 | 0.001 |
| 690.550 | 440 | 0.001 |
| 690.551 | 440 | 0.001 |
| 690.552 | 440 | 0.004 |
| 690.553 | 440 | 0.005 |
| 690.573 | 429 | 0.001 |
| 690.576 | 428 | 0.008 |
| 690.577 | 440 | 0.010 |
| 690.578 | 440 | 0.010 |
| 690.579 | 440 | 0.014 |
| 690.580 | 440 | 0.020 |
| 690.582 | 437 | 0.007 |
| 690.583 | 432 | 0.002 |
| 690.585 | 432 | 0.004 |
| 690.586 | 432 | 0.003 |
| 690.591 | 441 | 0.005 |
| 690.594 | 426 | 0.004 |
| 690.595 | 437 | 0.003 |
| 690.596 | 444 | 0.020 |
| 690.603 | 435 | 0.003 |
| 690.604 | 435 | 0.007 |
| 690.605 | 435 | 0.010 |
| 690.606 | 435 | 0.025 |
| 690.607 | 435 | 0.040 |
| 690.611 | 437 | 0.001 |
| 690.614 | 437 | 0.001 |
| 690.622 | 446 | 0.001 |
| 690.654 | 427 | 0.010 |
| 690.655 | 427 | 0.030 |
| 690.656 | 427 | 0.035 |
| 690.657 | 427 | 0.080 |
| 690.658 | 441 | 0.005 |
| 690.666 | 427 | 0.005 |
| 690.667 | 427 | 0.030 |
| 690.668 | 434 | 0.040 |
| 690.703 | 448 | 0.020 |
| 690.704 | 448 | 0.045 |
| 690.705 | 448 | 0.080 |
| 690.706 | 448 | 0.140 |
| 690.707 | 448 | 0.240 |
| 690.716 | 446 | 0.019 |
| 690.800 | 432 | 0.001 |
| 690.801 | 426 | 0.001 |
| 690.802 | 426 | 0.001 |
| 690.803 | 426 | 0.005 |
| 690.804 | 426 | 0.010 |
| 690.805 | 426 | 0.018 |
| 690.806 | 426 | 0.030 |
| 690.807 | 429 | 0.060 |
| 690.808 | 426 | 0.160 |
| 690.809 | 448 | 0.170 |
| 690.810 | 427 | 0.100 |
| 690.811 | 429 | 0.014 |
| 690.812 | 429 | 0.015 |
| 690.813 | 429 | 0.016 |
| 690.814 | 429 | 0.020 |
| 690.816 | 437 | 0.050 |
| 690.817 | 448 | 0.045 |
| 690.819 | 429 | 0.050 |
| 690.832 | 443 | 0.001 |
| 690.833 | 435 | 0.001 |
| 690.834 | 421 | 0.002 |
| 690.836 | 437 | 0.004 |
| 690.837 | 421 | 0.010 |
| 690.838 | 421 | 0.010 |
| 690.843 | 437 | 0.010 |
| 690.845 | 444 | 0.040 |
| 690.847 | 427 | 0.125 |
| 690.848 | 427 | 0.170 |
| 690.849 | 427 | 0.220 |
| 690.850 | 427 | 0.300 |
| 690.851 | 427 | 0.110 |
| 690.852 | 427 | 0.200 |
| 690.853 | 427 | 0.325 |
| 690.854 | 427 | 0.680 |
| 690.855 | 427 | 0.250 |
| 690.861 | 443 | 0.800 |
| 690.899 | 431 | 0.005 |
| 690.900 | 432 | 0.001 |
| 690.901 | 432 | 0.001 |
| 690.902 | 432 | 0.002 |
| 690.903 | 432 | 0.002 |
| 690.904 | 432 | 0.003 |
| 690.905 | 434 | 0.003 |
| 690.906 | 432 | 0.003 |
| 690.907 | 434 | 0.003 |
| 690.908 | 432 | 0.004 |
| 690.912 | 446 | 0.001 |
| 690.913 | 446 | 0.001 |
| 690.925 | 437 | 0.004 |
| 690.940 | 441 | 0.001 |
| 690.943 | 441 | 0.005 |
| 690.947 | 437 | 0.005 |
| 690.953 | 441 | 0.005 |
| 690.954 | 441 | 0.005 |
| 690.964 | 439 | 0.003 |
| 690.965 | 439 | 0.001 |
| 690.970 | 429 | 0.003 |
| 690.978 | 437 | 0.001 |
| 690.981 | 437 | 0.003 |
| 690.984 | 443 | 0.050 |
| 690.985 | 443 | 0.050 |
| 690.986 | 443 | 0.050 |
| 690.987 | 443 | 0.030 |
| 690.989 | 443 | 0.020 |
| 690.990 | 443 | 0.010 |
| 690.991 | 443 | 0.010 |
| 690.994 | 437 | 0.040 |
| 690.995 | 437 | 0.003 |
| 690.996 | 437 | 0.010 |
| 690.997 | 440 | 0.010 |
| 691.315 | 448 | 0.001 |
| 691.316 | 448 | 0.001 |
| 691.318 | 448 | 0.001 |
| 691.369 | 435 | 0.001 |
| 691.370 | 435 | 0.001 |
| 691.371 | 435 | 0.001 |
| 691.372 | 435 | 0.001 |
| 691.373 | 444 | 0.005 |
| 691.390 | 442 | 0.002 |
| 691.501 | 426 | 0.001 |
| 691.502 | 426 | 0.002 |
| 691.503 | 426 | 0.006 |
| 691.504 | 426 | 0.011 |
| 691.505 | 426 | 0.021 |
| 691.506 | 426 | 0.050 |
| 691.507 | 426 | 0.110 |
| 691.600 | 448 | 0.001 |
| 691.601 | 448 | 0.004 |
| 691.602 | 448 | 0.005 |
| 691.603 | 448 | 0.010 |
| 691.604 | 448 | 0.006 |
| 691.605 | 448 | 0.015 |
| 691.606 | 448 | 0.022 |
| 691.607 | 448 | 0.045 |
| 691.608 | 448 | 0.075 |
| 691.609 | 448 | 0.075 |
| 691.637 | 428 | 0.088 |
| 691.755 | 431 | 0.015 |
| 691.756 | 431 | 0.015 |
| 691.757 | 431 | 0.015 |
| 692.270 | 426 | 0.050 |
| 692.271 | 426 | 0.050 |
| 692.272 | 426 | 0.050 |
| 692.286 | 426 | 0.050 |
| 692.295 | 442 | 0.005 |
| 692.296 | 437 | 0.005 |
| 692.298 | 443 | 0.001 |
| 692.381 | 437 | 0.010 |
| 692.404A | 450 | 0.370 |
| 692.406 | 429 | 0.003 |
| 692.409 | 429 | 0.002 |
| 692.415 | 442 | 0.010 |
| 693.131 | 436 | 0.001 |
| 693.175 | 429 | 0.001 |
| 693.176 | 429 | 0.001 |
| 693.177 | 429 | 0.001 |
| 693.178 | 429 | 0.001 |
| 693.179 | 429 | 0.001 |
| 693.180 | 432 | 0.001 |
| 693.181 | 432 | 0.003 |
| 693.182 | 432 | 0.004 |
| 693.183 | 432 | 0.017 |
| 693.184 | 432 | 0.024 |
| 693.185 | 432 | 0.004 |
| 693.186 | 434 | 0.001 |
| 693.187 | 429 | 0.001 |
| 693.289 | 441 | 0.001 |
| 693.304 | 426 | 0.325 |
| 693.305 | 426 | 0.325 |
| 693.306 | 426 | 0.325 |
| 694.101 | 394 | 0.005 |
| 694.102 | 413 | 0.005 |
| 694.103 | 413 | 0.005 |
| 694.105 | 434 | 0.005 |
| 694.110 | 408 | 0.005 |
| 694.120 | 441 | 0.005 |
| 694.121 | 403 | 0.005 |
| 694.122 | 397 | 0.005 |
| 694.123 | 406 | 0.005 |
| 694.124 | 408 | 0.005 |
| 694.125 | 439 | 0.005 |
| 694.130 | 406 | 0.005 |
| 694.131 | 409 | 0.005 |
| 694.136 | 407 | 0.005 |
| 694.137 | 409 | 0.005 |
| 694.138 | 431 | 0.005 |
| 694.141 | 400 | 0.005 |
| 694.142 | 405 | 0.005 |
| 694.143 | 410 | 0.005 |
| 694.144 | 405 | 0.005 |



BROTECH

| Order No. | Page | Weight (kg) |
|---|---|---|
| 694.145 | 431 | 0.005 |
| 694.150 | 401 | 0.005 |
| 694.160 | 449 | 0.090 |
| 694.161 | 449 | 0.090 |
| 694.162 | 449 | 0.090 |
| 694.163 | 449 | 0.090 |
| 694.164 | 449 | 0.090 |
| 694.165 | 449 | 0.090 |
| 694.166 | 449 | 0.090 |
| 694.167 | 449 | 0.017 |
| 694.168 | 449 | 0.017 |
| 694.169 | 449 | 0.017 |
| 694.170 | 449 | 0.017 |
| 694.171 | 449 | 0.017 |
| 694.172 | 449 | 0.017 |
| 694.173 | 449 | 0.017 |
| 694.174 | 449 | 0.017 |
| 694.175 | 449 | 0.017 |
| 694.176 | 449 | 0.017 |
| 694.177 | 449 | 0.017 |
| 694.178 | 449 | 0.017 |
| 694.179 | 449 | 0.017 |
| 694.180 | 449 | 0.017 |
| 694.181 | 449 | 0.105 |
| 694.182 | 449 | 0.105 |
| 694.183 | 419 | 0.105 |
| 694.184 | 449 | 0.105 |
| 694.185 | 449 | 0.105 |
| 694.186 | 449 | 0.105 |
| 694.187 | 419 | 0.105 |
| 694.188 | 394 | 0.105 |
| 694.189 | 397 | 0.105 |
| 694.190 | 421 | 0.105 |
| 694.191 | 409 | 0.105 |
| 694.192 | 407 | 0.105 |
| 694.193 | 400 | 0.105 |
| 694.194 | 401 | 0.105 |
| 694.806 | 434 | 0.002 |
| 694.807 | 429 | 0.004 |
| 694.808 | 437 | 0.004 |
| 694.809 | 429 | 0.004 |
| 694.810 | 429 | 0.009 |
| 694.815 | 429 | 0.009 |
| 694.820 | 429 | 0.010 |
| 695.101 | 431 | 0.020 |
| 695.102 | 431 | 0.020 |
| 800.001 | 63 | 4.060 |
| 800.002 | 63 | 4.040 |
| 800.008 | 63 | 4.340 |
| 800.015 | 63 | 4.260 |
| 800.023 | 63 | 3.860 |
| 800.027 | 63 | 3.920 |
| 800.029 | 56 | 1.250 |
| 800.031 | 56 | 0.563 |
| 800.045 | 191 | 0.600 |
| 800.046 | 460 | 0.010 |
| 800.047 | 460 | 0.010 |
| 800.048 | 460 | 0.002 |
| 800.049 | 460 | 0.010 |
| 800.051 | 460 | 0.005 |
| 800.052 | 460 | 0.005 |
| 800.053 | 460 | 0.006 |
| 800.054 | 92 | 3.580 |
| 800.058 | 47 | 0.457 |
| 800.063 | 64 | 0.526 |
| 800.065 | 92 | 2.800 |
| 800.066 | 72 | 1.110 |
| 800.074 | 72 | 1.820 |
| 800.075 | 72 | 1.720 |
| 800.079 | 72 | 1.750 |
| 800.080 | 72 | 2.000 |
| 800.081 | 72 | 2.776 |
| 800.085 | 63 | 1.500 |
| 800.088 | 63 | 1.180 |
| 800.093 | 63 | 1.520 |
| 800.096 | 63 | 1.340 |
| 800.111 | 63 | 1.380 |
| 800.112 | 63 | 1.680 |
| 800.115 | 63 | 1.420 |
| 800.116 | 63 | 1.600 |
| 800.128 | 63 | 1.480 |
| 800.131 | 63 | 1.180 |
| 800.144 | 58 | 1.820 |
| 800.146 | 58 | 2.780 |
| 800.147 | 58 | 2.260 |
| 800.148 | 58 | 3.200 |
| 800.158 | 70 | 1.280 |
| 800.159 | 70 | 1.420 |
| 800.160 | 70 | 1.660 |
| 800.163 | 64 | 1.160 |
| 800.164 | 65 | 1.784 |
| 800.165 | 65 | 2.065 |
| 800.168 | 64 | 1.030 |
| 800.175 | 69 | 1.700 |
| 800.177 | 69 | 1.640 |
| 800.179 | 69 | 1.550 |
| 800.184 | 92 | 5.200 |
| 800.185 | 471 | 4.380 |
| 800.186 | 471 | 4.340 |
| 800.187 | 471 | 4.480 |
| 800.188 | 471 | 4.640 |
| 800.204 | 72 | 4.080 |
| 800.205 | 72 | 4.420 |
| 800.206 | 72 | 4.800 |
| 800.207 | 72 | 3.740 |
| 800.221 | 72 | 6.320 |
| 800.224 | 72 | 6.020 |
| 800.235 | 72 | 7.100 |
| 800.236 | 72 | 9.240 |
| 800.237 | 72 | 3.840 |
| 800.256 | 72 | 19.000 |
| 800.264 | 63 | 3.880 |
| 800.268 | 63 | 3.900 |
| 800.272 | 63 | 4.000 |
| 800.278 | 58 | 4.160 |
| 800.279 | 58 | 4.500 |
| 800.280 | 58 | 4.930 |
| 800.281 | 58 | 5.600 |
| 800.282 | 58 | 4.320 |
| 800.283 | 58 | 4.800 |
| 800.284 | 58 | 5.300 |
| 800.285 | 58 | 5.940 |
| 800.287 | 58 | 4.600 |
| 800.288 | 58 | 5.160 |
| 800.289 | 58 | 5.840 |
| 800.290 | 58 | 6.800 |
| 800.291 | 58 | 4.640 |
| 800.292 | 58 | 5.440 |
| 800.293 | 58 | 6.380 |
| 800.294 | 58 | 7.440 |
| 800.323 | 67 | 7.080 |
| 800.325 | 70 | 3.870 |
| 800.329 | 70 | 3.900 |
| 800.330 | 70 | 4.020 |
| 800.335 | 70 | 3.490 |
| 800.336 | 70 | 4.410 |
| 800.341 | 70 | 3.460 |
| 800.347 | 70 | 3.580 |
| 800.350 | 65 | 4.020 |
| 800.351 | 65 | 4.060 |
| 800.352 | 65 | 4.400 |
| 800.354 | 65 | 3.780 |
| 800.355 | 65 | 3.900 |
| 800.369 | 69 | 4.140 |
| 800.374 | 69 | 4.100 |
| 800.375 | 69 | 4.180 |
| 800.380 | 69 | 4.720 |
| 800.385 | 69 | 4.680 |
| 800.403 | 262 | 0.054 |
| 800.404 | 262 | 0.054 |
| 800.405 | 262 | 0.054 |
| 800.406 | 262 | 0.054 |
| 800.407 | 262 | 0.052 |
| 800.408 | 262 | 0.052 |
| 800.409 | 262 | 0.052 |
| 800.410 | 262 | 0.083 |
| 800.411 | 262 | 0.083 |
| 800.412 | 262 | 0.083 |
| 800.413 | 262 | 0.083 |
| 800.414 | 262 | 0.083 |
| 800.415 | 262 | 0.083 |
| 800.416 | 262 | 0.083 |
| 800.417 | 262 | 0.080 |
| 800.418 | 262 | 0.080 |
| 800.419 | 262 | 0.080 |
| 800.420 | 263 | 0.115 |
| 800.421 | 263 | 0.116 |
| 800.422 | 263 | 0.116 |
| 800.423 | 263 | 0.115 |
| 800.424 | 263 | 0.116 |
| 800.425 | 263 | 0.117 |
| 800.426 | 263 | 0.117 |
| 800.427 | 263 | 0.117 |
| 800.428 | 263 | 0.117 |
| 800.429 | 263 | 0.117 |
| 800.430 | 263 | 0.133 |
| 800.431 | 263 | 0.133 |
| 800.432 | 263 | 0.133 |
| 800.433 | 263 | 0.133 |
| 800.434 | 263 | 0.133 |
| 800.435 | 263 | 0.135 |
| 800.436 | 263 | 0.135 |
| 800.437 | 263 | 0.135 |
| 800.438 | 263 | 0.135 |
| 800.439 | 263 | 0.135 |
| 800.450 | 288 | 0.028 |
| 800.463 | 288 | 0.086 |
| 800.464 | 288 | 0.071 |
| 800.468 | 289 | 0.226 |
| 800.472 | 289 | 0.200 |
| 800.483 | 513 | 0.053 |
| 800.484 | 513 | 0.056 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 800.488 | 460 | 0.002 |
| 800.557 | 176 | 1.400 |
| 800.587 | 467 | 0.002 |
| 800.597 | 56 | 0.787 |
| 800.664 | 274 | 0.028 |
| 800.665 | 274 | 0.615 |
| 800.666 | 274 | 0.604 |
| 800.668 | 274 | 0.596 |
| 800.670 | 274 | 0.574 |
| 800.671 | 274 | 0.502 |
| 800.672 | 274 | 0.550 |
| 800.673 | 274 | 0.375 |
| 800.674 | 274 | 0.575 |
| 800.675 | 274 | 0.588 |
| 800.678 | 180 | 0.568 |
| 800.679 | 181 | 0.717 |
| 800.681 | 181 | 0.690 |
| 800.687 | 186 | 0.654 |
| 800.688 | 186 | 0.657 |
| 800.689 | 186 | 0.800 |
| 800.695 | 188 | 1.200 |
| 800.698 | 188 | 1.600 |
| 800.703 | 184 | 0.875 |
| 800.708 | 184 | 0.870 |
| 800.712 | 184 | 1.100 |
| 800.717 | 184 | 1.200 |
| 800.722 | 184 | 1.020 |
| 800.723 | 184 | 1.700 |
| 800.726 | 184 | 0.843 |
| 800.731 | 184 | 0.861 |
| 800.734 | 183 | 0.773 |
| 800.735 | 183 | 1.400 |
| 800.746 | 176 | 0.643 |
| 800.765 | 185 | 0.830 |
| 800.766 | 185 | 1.380 |
| 800.767 | 185 | 0.754 |
| 800.775 | 186 | 1.500 |
| 800.776 | 232 | 2.470 |
| 800.777 | 232 | 2.400 |
| 800.778 | 232 | 3.400 |
| 800.779 | 232 | 2.600 |
| 800.783 | 188 | 2.460 |
| 800.787 | 188 | 2.800 |
| 800.788 | 188 | 1.800 |
| 800.789 | 188 | 2.100 |
| 800.790 | 188 | 2.300 |
| 800.795 | 184 | 1.156 |
| 800.799 | 184 | 1.440 |
| 800.802 | 184 | 1.180 |
| 800.806 | 184 | 1.900 |
| 800.812 | 184 | 2.000 |
| 800.815 | 184 | 2.000 |
| 800.816 | 184 | 2.000 |
| 800.819 | 184 | 2.100 |
| 800.822 | 184 | 1.320 |
| 800.823 | 184 | 2.380 |
| 800.825 | 184 | 1.740 |
| 800.826 | 184 | 2.440 |
| 800.831 | 184 | 1.120 |
| 800.838 | 184 | 1.140 |
| 800.842 | 183 | 1.140 |
| 800.843 | 183 | 1.720 |
| 800.844 | 183 | 2.500 |
| 800.845 | 183 | 1.380 |
| 800.846 | 183 | 2.060 |
| 800.847 | 183 | 3.100 |
| 800.848 | 183 | 1.520 |
| 800.849 | 183 | 2.200 |
| 800.850 | 183 | 2.870 |
| 800.851 | 183 | 1.920 |
| 800.887 | 187 | 1.780 |
| 800.888 | 187 | 2.200 |
| 800.889 | 232 | 6.000 |
| 800.903 | 188 | 3.450 |
| 800.904 | 188 | 4.400 |
| 800.910 | 188 | 5.100 |
| 800.911 | 188 | 6.800 |
| 800.933 | 185 | 2.080 |
| 800.934 | 185 | 2.480 |
| 800.935 | 185 | 2.020 |
| 800.940 | 187 | 2.840 |
| 800.942 | 187 | 3.280 |
| 800.945 | 501 | 0.056 |
| 800.949 | 201 | 6.800 |
| 800.950 | 489 | 0.003 |
| 800.951 | 493 | 0.002 |
| 800.952 | 493 | 0.009 |
| 800.953 | 493 | 0.040 |
| 800.972 | 102 | 1.960 |
| 800.973 | 102 | 2.000 |
| 800.974 | 102 | 2.010 |
| 800.975 | 102 | 1.820 |
| 800.976 | 102 | 2.105 |
| 800.977 | 102 | 2.780 |
| 801.013 | 267 | 0.130 |
| 801.037 | 275 | 0.190 |
| 801.038 | 275 | 0.290 |
| 801.039 | 275 | 0.365 |
| 801.040 | 119 | 3.100 |
| 801.042 | 514 | 3.400 |
| 801.043 | 514 | 6.250 |
| 801.046 | 501 | 0.002 |
| 801.047 | 501 | 0.003 |
| 801.071 | 174 | 0.020 |
| 801.073 | 173 | 8.710 |
| 801.092 | 146 | 3.880 |
| 801.093 | 146 | 4.840 |
| 801.094 | 146 | 5.920 |
| 801.101 | 146 | 5.500 |
| 801.102 | 146 | 3.500 |
| 801.103 | 146 | 3.590 |
| 801.104 | 146 | 6.800 |
| 801.105 | 146 | 3.300 |
| 801.106 | 146 | 4.360 |
| 801.117 | 146 | 8.000 |
| 801.118 | 146 | 3.700 |
| 801.119 | 146 | 5.280 |
| 801.124 | 146 | 6.670 |
| 801.125 | 146 | 4.900 |
| 801.126 | 141 | 2.550 |
| 801.129 | 141 | 2.580 |
| 801.133 | 141 | 2.840 |
| 801.136 | 141 | 2.940 |
| 801.139 | 141 | 3.520 |
| 801.143 | 141 | 2.550 |
| 801.146 | 130 | 2.380 |
| 801.147 | 130 | 2.460 |
| 801.164 | 145 | 7.950 |
| 801.169 | 173 | 4.900 |
| 801.179 | 128 | 0.795 |
| 801.188 | 146 | 2.380 |
| 801.189 | 146 | 1.190 |
| 801.196 | 141 | 1.020 |
| 801.201 | 141 | 1.060 |
| 801.205 | 141 | 1.320 |
| 801.208 | 141 | 1.500 |
| 801.215 | 141 | 1.160 |
| 801.217 | 141 | 1.180 |
| 801.219 | 141 | 2.140 |
| 801.221 | 141 | 1.380 |
| 801.222 | 141 | 0.970 |
| 801.252 | 143 | 1.200 |
| 801.253 | 142 | 0.916 |
| 801.254 | 142 | 1.200 |
| 801.255 | 143 | 1.300 |
| 801.256 | 142 | 1.000 |
| 801.257 | 142 | 1.200 |
| 801.258 | 143 | 1.220 |
| 801.259 | 143 | 1.900 |
| 801.260 | 143 | 1.040 |
| 801.262 | 143 | 0.900 |
| 801.263 | 143 | 1.100 |
| 801.264 | 142 | 0.900 |
| 801.265 | 142 | 0.951 |
| 801.266 | 143 | 1.120 |
| 801.267 | 142 | 0.873 |
| 801.268 | 142 | 1.020 |
| 801.280 | 174 | 0.016 |
| 801.283 | 170 | 1.080 |
| 801.287 | 170 | 0.770 |
| 801.289 | 223 | 3.180 |
| 801.290 | 223 | 3.180 |
| 801.294 | 222 | 2.700 |
| 801.296 | 222 | 3.160 |
| 801.297 | 222 | 3.860 |
| 801.298 | 224 | 0.839 |
| 801.299 | 220 | 3.120 |
| 801.300 | 220 | 4.080 |
| 801.301 | 220 | 1.200 |
| 801.302 | 218 | 1.760 |
| 801.303 | 218 | 1.100 |
| 801.313 | 264 | 0.038 |
| 801.314 | 264 | 0.032 |
| 801.315 | 264 | 0.051 |
| 801.316 | 264 | 0.058 |
| 801.317 | 264 | 0.020 |
| 801.318 | 270 | 0.153 |
| 801.405 | 278 | 0.343 |
| 801.406 | 278 | 0.459 |
| 801.407 | 278 | 0.590 |
| 801.408 | 278 | 0.271 |
| 801.409 | 278 | 0.334 |
| 801.410 | 278 | 0.570 |
| 801.411 | 278 | 0.265 |
| 801.412 | 278 | 0.360 |
| 801.413 | 278 | 0.464 |
| 801.414 | 278 | 0.581 |
| 801.415 | 278 | 0.275 |
| 801.416 | 278 | 0.344 |
| 801.417 | 278 | 0.463 |
| 801.418 | 278 | 0.600 |
| 801.419 | 278 | 0.274 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 801.420 | 280 | 0.001 |
| 801.421 | 278 | 0.360 |
| 801.422 | 278 | 0.480 |
| 801.423 | 278 | 0.600 |
| 801.424 | 278 | 0.179 |
| 801.425 | 278 | 0.274 |
| 801.426 | 278 | 0.336 |
| 801.427 | 278 | 0.455 |
| 801.428 | 278 | 0.572 |
| 801.429 | 278 | 0.175 |
| 801.430 | 278 | 0.267 |
| 801.431 | 279 | 0.958 |
| 801.432 | 279 | 1.140 |
| 801.433 | 279 | 0.527 |
| 801.434 | 279 | 0.820 |
| 801.435 | 279 | 0.935 |
| 801.436 | 279 | 1.120 |
| 801.437 | 279 | 0.516 |
| 801.438 | 279 | 0.790 |
| 801.439 | 279 | 0.914 |
| 801.440 | 279 | 1.100 |
| 801.441 | 279 | 0.502 |
| 801.442 | 279 | 0.760 |
| 801.443 | 279 | 0.920 |
| 801.444 | 279 | 1.080 |
| 801.445 | 279 | 0.492 |
| 801.446 | 279 | 0.751 |
| 801.447 | 279 | 0.876 |
| 801.448 | 279 | 1.040 |
| 801.449 | 279 | 0.481 |
| 801.450 | 279 | 0.728 |
| 801.451 | 280 | 0.001 |
| 801.452 | 279 | 0.932 |
| 801.453 | 279 | 1.120 |
| 801.454 | 279 | 0.512 |
| 801.455 | 279 | 0.775 |
| 801.456 | 279 | 0.920 |
| 801.457 | 279 | 1.080 |
| 801.458 | 279 | 0.495 |
| 801.459 | 279 | 0.753 |
| 801.460 | 279 | 0.526 |
| 801.461 | 279 | 0.820 |
| 801.462 | 279 | 0.508 |
| 801.463 | 279 | 0.780 |
| 801.464 | 281 | 0.020 |
| 801.465 | 279 | 0.490 |
| 801.466 | 279 | 1.220 |
| 801.467 | 279 | 1.340 |
| 801.468 | 279 | 1.396 |
| 801.469 | 279 | 1.560 |
| 801.470 | 280 | 0.003 |
| 801.471 | 279 | 1.300 |
| 801.472 | 279 | 1.700 |
| 801.473 | 279 | 1.500 |
| 801.474 | 280 | 0.050 |
| 801.475 | 281 | 0.020 |
| 801.476 | 281 | 0.020 |
| 801.477 | 281 | 0.020 |
| 801.478 | 280 | 0.050 |
| 801.479 | 278 | 0.221 |
| 801.480 | 278 | 0.312 |
| 801.481 | 278 | 0.174 |
| 801.482 | 278 | 0.217 |
| 801.483 | 278 | 0.293 |
| 801.484 | 278 | 0.111 |
| 801.485 | 278 | 0.172 |
| 801.486 | 278 | 0.211 |
| 801.487 | 278 | 0.300 |
| 801.488 | 278 | 0.360 |
| 801.489 | 278 | 0.109 |
| 801.490 | 278 | 0.167 |
| 801.491 | 278 | 0.212 |
| 801.492 | 278 | 0.283 |
| 801.493 | 278 | 0.359 |
| 801.494 | 278 | 0.108 |
| 801.495 | 278 | 0.167 |
| 801.496 | 278 | 0.211 |
| 801.497 | 278 | 0.284 |
| 801.498 | 278 | 0.357 |
| 801.499 | 278 | 0.108 |
| 801.500 | 278 | 0.167 |
| 801.501 | 280 | 0.001 |
| 801.507 | 288 | 0.065 |
| 801.509 | 289 | 0.223 |
| 801.517 | 289 | 0.195 |
| 801.524 | 260 | 0.069 |
| 801.525 | 260 | 0.070 |
| 801.526 | 260 | 0.070 |
| 801.527 | 260 | 0.070 |
| 801.528 | 260 | 0.068 |
| 801.529 | 260 | 0.102 |
| 801.530 | 260 | 0.102 |
| 801.531 | 260 | 0.102 |
| 801.532 | 260 | 0.100 |
| 801.533 | 260 | 0.102 |
| 801.534 | 260 | 0.099 |
| 801.535 | 261 | 0.145 |
| 801.536 | 261 | 0.155 |
| 801.537 | 261 | 0.155 |
| 801.538 | 261 | 0.146 |
| 801.539 | 261 | 0.146 |
| 801.540 | 261 | 0.147 |
| 801.541 | 261 | 0.148 |
| 801.542 | 261 | 0.147 |
| 801.543 | 261 | 0.147 |
| 801.544 | 261 | 0.147 |
| 801.545 | 261 | 0.168 |
| 801.546 | 261 | 0.168 |
| 801.547 | 261 | 0.168 |
| 801.548 | 261 | 0.168 |
| 801.549 | 261 | 0.010 |
| 801.550 | 261 | 0.170 |
| 801.551 | 261 | 0.170 |
| 801.552 | 261 | 0.168 |
| 801.651 | 250 | 0.023 |
| 801.652 | 250 | 0.022 |
| 801.653 | 232 | 2.200 |
| 801.654 | 253 | 0.025 |
| 801.655 | 250 | 0.022 |
| 801.656 | 250 | 0.022 |
| 801.657 | 230 | 0.492 |
| 801.658 | 253 | 0.026 |
| 801.659 | 250 | 0.023 |
| 801.660 | 250 | 0.022 |
| 801.662 | 253 | 0.026 |
| 801.663 | 233 | 2.580 |
| 801.664 | 232 | 4.100 |
| 801.665 | 232 | 8.700 |
| 801.666 | 181 | 4.500 |
| 801.671 | 251 | 0.005 |
| 801.672 | 251 | 0.040 |
| 801.673 | 517 | 1.044 |
| 801.674 | 253 | 0.048 |
| 801.675 | 251 | 0.005 |
| 801.676 | 251 | 0.041 |
| 801.677 | 170 | 0.858 |
| 801.678 | 253 | 0.049 |
| 801.679 | 251 | 0.041 |
| 801.680 | 251 | 0.040 |
| 801.681 | 121 | 4.000 |
| 801.682 | 253 | 0.049 |
| 801.684 | 476 | 2.100 |
| 801.685 | 272 | 0.125 |
| 801.688 | 134 | 1.000 |
| 801.690 | 174 | 0.018 |
| 801.694 | 251 | 0.075 |
| 801.695 | 251 | 0.074 |
| 801.696 | 491 | 0.005 |
| 801.697 | 251 | 0.073 |
| 801.698 | 251 | 0.073 |
| 801.699 | 491 | 0.028 |
| 801.700 | 251 | 0.074 |
| 801.701 | 251 | 0.073 |
| 801.702 | 248 | 0.011 |
| 801.703 | 248 | 0.010 |
| 801.704 | 248 | 0.008 |
| 801.705 | 271 | 0.097 |
| 801.709 | 248 | 0.004 |
| 801.711 | 53 | 1.480 |
| 801.712 | 54 | 1.480 |
| 801.713 | 54 | 2.320 |
| 801.714 | 241 | 0.097 |
| 801.718 | 252 | 0.097 |
| 801.719 | 252 | 0.098 |
| 801.720 | 46 | 1.080 |
| 801.721 | 253 | 0.116 |
| 801.722 | 252 | 0.098 |
| 801.723 | 252 | 0.097 |
| 801.724 | 126 | 0.858 |
| 801.725 | 253 | 0.116 |
| 801.726 | 252 | 0.099 |
| 801.727 | 252 | 0.099 |
| 801.729 | 253 | 0.116 |
| 801.730 | 53 | 2.100 |
| 801.731 | 53 | 1.640 |
| 801.733 | 253 | 0.116 |
| 801.734 | 133 | 1.400 |
| 801.737 | 133 | 1.420 |
| 801.738 | 250 | 0.004 |
| 801.740 | 134 | 1.940 |
| 801.742 | 248 | 0.012 |
| 801.743 | 248 | 0.004 |
| 801.744 | 250 | 0.009 |
| 801.746 | 248 | 0.010 |
| 801.747 | 273 | 0.215 |
| 801.748 | 273 | 0.210 |
| 801.750 | 250 | 0.010 |
| 801.751 | 250 | 0.090 |
| 801.752 | 273 | 0.189 |
| 801.753 | 493 | 0.003 |
| 801.754 | 493 | 0.011 |
| 801.755 | 493 | 0.052 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 801.759 | 92 | 1.000 |
| 801.760 | 92 | 2.500 |
| 801.761 | 92 | 3.900 |
| 801.762 | 92 | 3.800 |
| 801.763 | 92 | 5.520 |
| 801.764 | 273 | 0.660 |
| 801.765 | 273 | 0.660 |
| 801.767 | 273 | 0.640 |
| 801.768 | 273 | 0.617 |
| 801.769 | 273 | 0.600 |
| 801.770 | 273 | 0.480 |
| 801.771 | 273 | 0.463 |
| 801.772 | 273 | 0.360 |
| 801.773 | 273 | 0.340 |
| 801.774 | 273 | 0.665 |
| 801.775 | 273 | 0.660 |
| 801.785 | 288 | 0.028 |
| 801.787 | 288 | 0.029 |
| 801.807 | 288 | 0.074 |
| 801.808 | 288 | 0.070 |
| 801.810 | 288 | 0.070 |
| 801.812 | 288 | 0.069 |
| 801.813 | 288 | 0.070 |
| 801.814 | 288 | 0.072 |
| 801.831 | 288 | 0.074 |
| 801.832 | 288 | 0.070 |
| 801.833 | 288 | 0.070 |
| 801.834 | 288 | 0.070 |
| 801.860 | 289 | 0.246 |
| 801.861 | 289 | 0.261 |
| 801.868 | 289 | 0.265 |
| 801.873 | 289 | 0.258 |
| 801.876 | 289 | 0.245 |
| 801.883 | 289 | 0.270 |
| 801.885 | 289 | 0.258 |
| 801.889 | 289 | 0.257 |
| 801.898 | 289 | 0.278 |
| 801.925 | 289 | 0.246 |
| 801.927 | 289 | 0.259 |
| 801.929 | 289 | 0.260 |
| 801.930 | 289 | 0.250 |
| 801.931 | 289 | 0.250 |
| 801.938 | 289 | 0.244 |
| 801.942 | 289 | 0.275 |
| 801.944 | 289 | 0.257 |
| 801.948 | 289 | 0.257 |
| 801.982 | 272 | 0.592 |
| 801.983 | 272 | 0.556 |
| 801.984 | 272 | 0.481 |
| 801.985 | 272 | 0.353 |
| 802.001 | 288 | 0.028 |
| 802.023 | 288 | 0.073 |
| 802.046 | 289 | 0.258 |
| 802.063 | 273 | 0.280 |
| 802.064 | 273 | 0.250 |
| 802.065 | 273 | 0.242 |
| 802.066 | 273 | 0.226 |
| 802.067 | 273 | 0.215 |
| 802.112 | 288 | 0.051 |
| 802.120 | 289 | 0.194 |
| 802.129 | 219 | 0.500 |
| 802.130 | 219 | 0.500 |
| 802.131 | 225 | 0.030 |
| 802.133 | 225 | 0.021 |
| 802.134 | 493 | 0.010 |
| 802.135 | 493 | 0.080 |
| 802.136 | 493 | 0.100 |
| 802.137 | 493 | 0.430 |
| 802.138 | 493 | 0.430 |
| 802.152 | 239 | 0.118 |
| 802.153 | 239 | 0.065 |
| 802.154 | 239 | 0.068 |
| 802.155 | 239 | 0.112 |
| 802.156 | 239 | 0.073 |
| 802.157 | 239 | 0.128 |
| 802.158 | 239 | 0.109 |
| 802.159 | 239 | 0.178 |
| 802.160 | 239 | 0.186 |
| 802.161 | 239 | 0.254 |
| 802.162 | 239 | 0.101 |
| 802.163 | 239 | 0.169 |
| 802.164 | 239 | 0.100 |
| 802.165 | 239 | 0.175 |
| 802.166 | 239 | 0.382 |
| 802.167 | 239 | 0.274 |
| 802.168 | 239 | 0.391 |
| 802.169 | 239 | 0.284 |
| 802.170 | 239 | 0.504 |
| 802.171 | 239 | 0.395 |
| 802.172 | 239 | 0.350 |
| 802.173 | 239 | 0.300 |
| 802.174 | 239 | 0.400 |
| 802.175 | 239 | 0.270 |
| 802.176 | 239 | 0.564 |
| 802.177 | 239 | 0.816 |
| 802.178 | 239 | 0.538 |
| 802.179 | 239 | 0.788 |
| 802.180 | 239 | 0.505 |
| 802.181 | 239 | 0.758 |
| 802.183 | 256 | 0.640 |
| 802.184 | 256 | 1.115 |
| 802.185 | 256 | 2.320 |
| 802.187 | 256 | 0.310 |
| 802.188 | 256 | 0.003 |
| 802.189 | 210 | 0.068 |
| 802.190 | 210 | 0.073 |
| 802.191 | 466 | 0.163 |
| 802.192 | 466 | 0.400 |
| 802.193 | 466 | 0.290 |
| 802.197 | 210 | 0.200 |
| 802.198 | 210 | 0.350 |
| 802.199 | 210 | 0.400 |
| 802.200 | 210 | 0.227 |
| 802.201 | 210 | 0.318 |
| 802.202 | 210 | 0.410 |
| 802.205 | 210 | 0.241 |
| 802.209 | 210 | 0.205 |
| 802.210 | 210 | 0.281 |
| 802.212 | 210 | 0.372 |
| 802.217 | 210 | 0.250 |
| 802.218 | 210 | 0.300 |
| 802.219 | 210 | 0.400 |
| 802.220 | 466 | 0.582 |
| 802.221 | 466 | 0.519 |
| 802.222 | 510 | 0.003 |
| 802.223 | 510 | 0.003 |
| 802.224 | 491 | 1.040 |
| 802.225 | 466 | 1.110 |
| 802.226 | 466 | 1.040 |
| 802.238 | 211 | 0.550 |
| 802.239 | 211 | 0.759 |
| 802.241 | 211 | 1.238 |
| 802.245 | 211 | 0.579 |
| 802.246 | 211 | 0.850 |
| 802.247 | 211 | 1.274 |
| 802.248 | 211 | 0.588 |
| 802.249 | 211 | 0.850 |
| 802.250 | 211 | 1.300 |
| 802.251 | 491 | 2.680 |
| 802.307 | 283 | 6.670 |
| 802.308 | 283 | 7.100 |
| 802.313 | 508 | 0.800 |
| 802.314 | 174 | 0.051 |
| 802.315 | 174 | 0.101 |
| 802.316 | 174 | 0.187 |
| 802.318 | 85 | 22.800 |
| 802.329 | 291 | 1.590 |
| 802.337 | 282 | 0.017 |
| 802.350 | 189 | 1.005 |
| 802.351 | 174 | 0.058 |
| 802.355 | 126 | 0.330 |
| 802.356 | 126 | 0.349 |
| 802.357 | 126 | 0.363 |
| 802.383 | 282 | 0.020 |
| 802.384 | 282 | 0.020 |
| 802.385 | 282 | 0.020 |
| 802.386 | 282 | 0.020 |
| 802.387 | 282 | 0.020 |
| 802.389 | 282 | 0.020 |
| 802.390 | 282 | 0.020 |
| 802.391 | 282 | 0.020 |
| 802.393 | 282 | 0.020 |
| 802.394 | 282 | 0.020 |
| 802.395 | 89 | 3.350 |
| 802.396 | 90 | 2.700 |
| 802.398 | 89 | 5.000 |
| 802.399 | 90 | 5.500 |
| 802.403 | 88 | 4.100 |
| 802.404 | 89 | 4.370 |
| 802.405 | 90 | 4.000 |
| 802.409 | 88 | 3.100 |
| 802.411 | 89 | 9.700 |
| 802.412 | 90 | 5.000 |
| 802.415 | 88 | 7.300 |
| 802.416 | 89 | 8.700 |
| 802.417 | 90 | 8.700 |
| 802.420 | 88 | 3.100 |
| 802.421 | 121 | 9.700 |
| 802.422 | 119 | 6.800 |
| 802.423 | 121 | 8.700 |
| 802.424 | 119 | 5.800 |
| 802.425 | 160 | 9.400 |
| 802.426 | 161 | 9.400 |
| 802.427 | 159 | 5.900 |
| 802.428 | 160 | 8.400 |
| 802.429 | 161 | 8.400 |
| 802.430 | 159 | 4.900 |
| 802.431 | 160 | 4.800 |
| 802.432 | 161 | 4.800 |
| 802.433 | 160 | 3.800 |
| 802.434 | 161 | 3.800 |
| 802.435 | 153 | 0.876 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 802.436 | 153 | 1.000 |
| 802.449 | 78 | 5.500 |
| 802.451 | 78 | 5.300 |
| 802.453 | 78 | 5.500 |
| 802.455 | 78 | 5.500 |
| 802.457 | 78 | 5.900 |
| 802.459 | 78 | 6.300 |
| 802.462 | 78 | 6.200 |
| 802.463 | 78 | 5.100 |
| 802.465 | 78 | 5.300 |
| 802.467 | 78 | 5.500 |
| 802.469 | 78 | 5.700 |
| 802.473 | 84 | 5.600 |
| 802.474 | 84 | 5.700 |
| 802.475 | 84 | 5.800 |
| 802.476 | 84 | 5.700 |
| 802.477 | 84 | 5.900 |
| 802.478 | 84 | 6.100 |
| 802.480 | 85 | 9.700 |
| 802.481 | 86 | 6.900 |
| 802.482 | 83 | 6.000 |
| 802.489 | 80 | 17.400 |
| 802.490 | 80 | 17.100 |
| 802.492 | 82 | 17.800 |
| 802.493 | 82 | 19.000 |
| 802.494 | 78 | 13.000 |
| 802.497 | 78 | 13.400 |
| 802.500 | 78 | 13.700 |
| 802.503 | 78 | 13.100 |
| 802.506 | 78 | 13.500 |
| 802.509 | 78 | 13.800 |
| 802.512 | 78 | 14.660 |
| 802.515 | 78 | 12.600 |
| 802.518 | 78 | 12.800 |
| 802.521 | 78 | 13.000 |
| 802.524 | 78 | 13.200 |
| 802.529 | 84 | 12.500 |
| 802.531 | 84 | 12.600 |
| 802.533 | 84 | 12.700 |
| 802.535 | 84 | 12.600 |
| 802.537 | 84 | 12.800 |
| 802.539 | 84 | 13.000 |
| 802.544 | 86 | 16.100 |
| 802.545 | 83 | 9.200 |
| 802.546 | 114 | 5.500 |
| 802.547 | 114 | 5.900 |
| 802.548 | 114 | 6.200 |
| 802.549 | 114 | 5.800 |
| 802.550 | 114 | 6.000 |
| 802.551 | 114 | 6.300 |
| 802.552 | 114 | 8.000 |
| 802.553 | 114 | 5.100 |
| 802.554 | 114 | 5.300 |
| 802.555 | 114 | 5.500 |
| 802.556 | 114 | 5.700 |
| 802.557 | 118 | 9.700 |
| 802.558 | 115 | 15.000 |
| 802.559 | 115 | 16.300 |
| 802.560 | 117 | 16.800 |
| 802.561 | 117 | 18.100 |
| 802.562 | 114 | 13.000 |
| 802.563 | 114 | 13.400 |
| 802.564 | 114 | 13.570 |
| 802.565 | 114 | 13.100 |
| 802.566 | 114 | 13.500 |
| 802.567 | 114 | 13.800 |
| 802.568 | 114 | 14.200 |
| 802.569 | 114 | 5.100 |
| 802.570 | 114 | 5.300 |
| 802.571 | 114 | 5.500 |
| 802.572 | 114 | 5.700 |
| 802.573 | 118 | 20.800 |
| 802.639 | 152 | 14.200 |
| 802.640 | 152 | 15.500 |
| 802.642 | 156 | 16.000 |
| 802.645 | 151 | 12.200 |
| 802.648 | 151 | 12.600 |
| 802.651 | 151 | 12.900 |
| 802.654 | 151 | 12.300 |
| 802.657 | 151 | 12.700 |
| 802.660 | 151 | 13.000 |
| 802.663 | 151 | 13.400 |
| 802.666 | 151 | 11.800 |
| 802.669 | 151 | 12.000 |
| 802.672 | 151 | 12.200 |
| 802.675 | 151 | 12.400 |
| 802.680 | 155 | 11.700 |
| 802.682 | 155 | 11.800 |
| 802.684 | 155 | 11.900 |
| 802.686 | 155 | 11.800 |
| 802.688 | 155 | 12.000 |
| 802.690 | 155 | 12.200 |
| 802.695 | 157 | 20.000 |
| 802.696 | 158 | 15.300 |
| 802.697 | 154 | 5.900 |
| 802.702 | 151 | 5.400 |
| 802.704 | 151 | 5.800 |
| 802.706 | 151 | 6.100 |
| 802.708 | 151 | 5.500 |
| 802.710 | 151 | 5.900 |
| 802.712 | 151 | 6.200 |
| 802.716 | 151 | 7.900 |
| 802.717 | 151 | 5.000 |
| 802.719 | 151 | 5.200 |
| 802.721 | 151 | 5.400 |
| 802.723 | 151 | 5.600 |
| 802.727 | 155 | 5.500 |
| 802.728 | 155 | 5.600 |
| 802.729 | 155 | 5.700 |
| 802.730 | 155 | 5.600 |
| 802.731 | 155 | 5.800 |
| 802.732 | 155 | 6.000 |
| 802.734 | 157 | 9.600 |
| 802.735 | 158 | 6.800 |
| 802.736 | 154 | 8.400 |
| 802.740 | 153 | 0.780 |
| 802.741 | 153 | 0.780 |
| 802.742 | 153 | 1.200 |
| 802.750 | 503 | 0.100 |
| 802.751 | 503 | 0.114 |
| 802.752 | 503 | 0.092 |
| 802.753 | 503 | 0.096 |
| 802.754 | 503 | 0.198 |
| 802.755 | 503 | 0.220 |
| 802.756 | 501 | 0.129 |
| 802.757 | 282 | 0.020 |
| 802.758 | 282 | 0.020 |
| 802.759 | 282 | 0.030 |
| 802.760 | 282 | 0.030 |
| 802.761 | 282 | 0.050 |
| 802.762 | 282 | 0.050 |
| 802.767 | 282 | 0.020 |
| 802.768 | 282 | 0.030 |
| 802.769 | 282 | 0.050 |
| 802.781 | 286 | 0.015 |
| 802.782 | 286 | 0.027 |
| 802.783 | 286 | 0.040 |
| 802.785 | 285 | 1.550 |
| 802.787 | 285 | 0.070 |
| 802.788 | 287 | 0.070 |
| 802.789 | 287 | 0.070 |
| 802.790 | 287 | 0.070 |
| 802.791 | 287 | 0.070 |
| 802.792 | 287 | 0.070 |
| 802.793 | 287 | 0.070 |
| 802.794 | 287 | 0.070 |
| 802.795 | 287 | 0.070 |
| 802.796 | 287 | 0.070 |
| 802.797 | 287 | 0.070 |
| 802.798 | 287 | 0.070 |
| 802.799 | 287 | 0.070 |
| 802.800 | 287 | 0.070 |
| 802.801 | 287 | 0.070 |
| 802.802 | 287 | 0.070 |
| 802.803 | 287 | 0.070 |
| 802.805 | 286 | 0.070 |
| 802.807 | 286 | 0.070 |
| 802.808 | 286 | 0.070 |
| 802.809 | 286 | 0.070 |
| 802.810 | 286 | 0.070 |
| 802.811 | 286 | 0.070 |
| 802.812 | 286 | 0.070 |
| 802.814 | 473 | 1.300 |
| 802.815 | 473 | 1.100 |
| 802.816 | 473 | 1.086 |
| 802.817 | 473 | 1.100 |
| 802.818 | 473 | 1.200 |
| 802.819 | 473 | 1.000 |
| 802.820 | 473 | 1.000 |
| 802.821 | 473 | 1.000 |
| 802.822 | 473 | 0.900 |
| 802.823 | 473 | 0.900 |
| 802.824 | 174 | 0.148 |
| 802.825 | 174 | 0.088 |
| 802.827 | 174 | 0.034 |
| 802.828 | 174 | 0.038 |
| 802.831 | 173 | 2.000 |
| 802.832 | 173 | 4.100 |
| 802.834 | 123 | 7.000 |
| 802.836 | 266 | 0.008 |
| 802.837 | 266 | 0.008 |
| 802.838 | 266 | 0.008 |
| 802.839 | 266 | 0.008 |
| 802.840 | 266 | 0.006 |
| 802.841 | 266 | 0.008 |
| 802.842 | 266 | 0.008 |
| 802.843 | 266 | 0.008 |
| 802.844 | 266 | 0.008 |
| 802.845 | 266 | 0.008 |
| 802.846 | 266 | 0.008 |
| 802.847 | 266 | 0.008 |
| 802.848 | 266 | 0.007 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 802.942 | 284 | 2.268 |
| 802.943 | 284 | 1.328 |
| 802.944 | 284 | 0.800 |
| 802.945 | 284 | 0.600 |
| 802.946 | 284 | 2.500 |
| 802.947 | 284 | 1.800 |
| 802.948 | 284 | 1.400 |
| 802.949 | 284 | 1.200 |
| 802.950 | 284 | 0.900 |
| 802.963 | 458 | 1.080 |
| 803.041 | 183 | 1.700 |
| 803.043 | 183 | 1.200 |
| 803.051 | 60 | 0.666 |
| 803.052 | 60 | 0.682 |
| 803.053 | 60 | 0.480 |
| 803.054 | 60 | 0.620 |
| 803.055 | 60 | 0.641 |
| 803.056 | 60 | 1.320 |
| 803.057 | 60 | 1.640 |
| 803.058 | 60 | 1.360 |
| 803.059 | 60 | 1.700 |
| 803.060 | 60 | 1.050 |
| 803.061 | 60 | 1.140 |
| 803.062 | 60 | 1.240 |
| 803.063 | 60 | 1.540 |
| 803.064 | 60 | 1.280 |
| 803.065 | 60 | 1.600 |
| 803.066 | 60 | 4.160 |
| 803.067 | 60 | 4.220 |
| 803.068 | 60 | 4.020 |
| 803.069 | 60 | 4.100 |
| 803.070 | 139 | 1.170 |
| 803.071 | 139 | 1.160 |
| 803.072 | 139 | 0.907 |
| 803.073 | 139 | 1.060 |
| 803.074 | 139 | 1.100 |
| 803.075 | 98 | 1.640 |
| 803.076 | 98 | 2.100 |
| 803.077 | 98 | 2.080 |
| 803.078 | 98 | 2.120 |
| 803.080 | 133 | 2.020 |
| 803.081 | 134 | 2.040 |
| 803.082 | 172 | 2.040 |
| 803.083 | 172 | 2.030 |
| 803.085 | 133 | 1.000 |
| 803.088 | 134 | 0.971 |
| 803.089 | 134 | 1.240 |
| 803.090 | 134 | 1.440 |
| 803.092 | 172 | 1.200 |
| 803.093 | 172 | 1.400 |
| 803.095 | 172 | 1.240 |
| 803.096 | 172 | 1.800 |
| 803.101 | 133 | 1.840 |
| 803.102 | 134 | 1.840 |
| 803.103 | 172 | 1.840 |
| 803.104 | 172 | 2.000 |
| 803.105 | 133 | 0.691 |
| 803.106 | 134 | 0.750 |
| 803.107 | 181 | 1.100 |
| 803.108 | 182 | 1.100 |
| 803.110 | 181 | 4.200 |
| 803.112 | 182 | 2.520 |
| 803.113 | 182 | 2.000 |
| 803.114 | 182 | 1.640 |
| 803.116 | 53 | 2.060 |
| 803.117 | 54 | 2.620 |
| 803.118 | 54 | 2.060 |
| 803.119 | 54 | 1.640 |
| 803.120 | 181 | 3.400 |
| 803.121 | 182 | 3.400 |
| 803.123 | 181 | 1.700 |
| 803.125 | 182 | 1.700 |
| 803.126 | 181 | 2.240 |
| 803.127 | 181 | 2.010 |
| 803.128 | 182 | 2.240 |
| 803.129 | 182 | 2.020 |
| 803.131 | 53 | 2.360 |
| 803.132 | 54 | 2.630 |
| 803.133 | 54 | 2.360 |
| 803.135 | 53 | 3.050 |
| 803.136 | 54 | 3.200 |
| 803.137 | 54 | 3.060 |
| 803.140 | 181 | 0.800 |
| 803.141 | 182 | 0.800 |
| 803.142 | 181 | 1.300 |
| 803.144 | 182 | 1.300 |
| 803.145 | 182 | 1.280 |
| 803.146 | 181 | 1.400 |
| 803.147 | 182 | 1.320 |
| 803.148 | 53 | 1.450 |
| 803.149 | 54 | 1.100 |
| 803.150 | 54 | 1.480 |
| 803.161 | 54 | 3.220 |
| 803.162 | 54 | 2.600 |
| 803.163 | 54 | 3.740 |
| 803.164 | 181 | 5.000 |
| 803.166 | 182 | 3.000 |
| 803.167 | 182 | 2.900 |
| 803.177 | 182 | 1.940 |
| 803.178 | 181 | 1.700 |
| 803.179 | 182 | 1.700 |
| 803.180 | 181 | 1.400 |
| 803.182 | 181 | 1.420 |
| 803.183 | 182 | 1.340 |
| 803.184 | 182 | 1.990 |
| 803.185 | 182 | 1.420 |
| 803.187 | 54 | 4.500 |
| 803.189 | 54 | 3.920 |
| 803.194 | 181 | 2.940 |
| 803.195 | 182 | 2.400 |
| 803.198 | 53 | 2.320 |
| 803.199 | 53 | 2.060 |
| 803.200 | 54 | 3.180 |
| 803.201 | 54 | 2.340 |
| 803.202 | 54 | 2.060 |
| 803.206 | 182 | 1.680 |
| 803.213 | 171 | 1.600 |
| 803.214 | 171 | 0.771 |
| 803.216 | 171 | 1.900 |
| 803.218 | 171 | 0.800 |
| 803.220 | 132 | 1.100 |
| 803.222 | 132 | 0.646 |
| 803.226 | 168 | 0.450 |
| 803.554 | 241 | 0.080 |
| 803.555 | 241 | 0.085 |
| 803.556 | 241 | 0.100 |
| 803.557 | 241 | 0.170 |
| 803.558 | 241 | 0.130 |
| 803.559 | 241 | 0.200 |
| 803.560 | 241 | 0.110 |
| 803.561 | 241 | 0.180 |
| 803.562 | 241 | 0.180 |
| 803.563 | 241 | 0.330 |
| 803.564 | 241 | 0.220 |
| 803.565 | 241 | 0.300 |
| 803.566 | 241 | 0.200 |
| 803.567 | 241 | 0.301 |
| 803.568 | 241 | 0.195 |
| 803.569 | 241 | 0.400 |
| 803.570 | 241 | 0.269 |
| 803.571 | 240 | 0.250 |
| 803.572 | 240 | 0.450 |
| 803.573 | 240 | 0.900 |
| 803.574 | 240 | 1.100 |
| 803.575 | 240 | 0.450 |
| 803.576 | 240 | 0.850 |
| 803.577 | 240 | 0.800 |
| 803.578 | 240 | 0.950 |
| 803.579 | 240 | 0.680 |
| 803.580 | 240 | 1.100 |
| 803.581 | 268 | 0.010 |
| 803.582 | 268 | 0.050 |
| 803.583 | 268 | 0.080 |
| 803.584 | 268 | 0.110 |
| 803.585 | 268 | 0.150 |
| 803.589 | 169 | 0.675 |
| 803.591 | 169 | 0.710 |
| 803.592 | 169 | 0.800 |
| 803.593 | 242 | 0.100 |
| 803.594 | 242 | 0.100 |
| 803.595 | 242 | 0.095 |
| 803.596 | 206 | 0.192 |
| 803.597 | 46 | 1.200 |
| 803.598 | 46 | 0.585 |
| 803.599 | 47 | 1.050 |
| 803.600 | 127 | 0.900 |
| 803.601 | 46 | 1.200 |
| 803.602 | 242 | 0.164 |
| 803.603 | 126 | 0.980 |
| 803.604 | 162 | 0.200 |
| 803.608 | 47 | 0.530 |
| 803.616 | 128 | 0.900 |
| 803.619 | 128 | 1.260 |
| 803.620 | 128 | 1.040 |
| 803.621 | 128 | 2.300 |
| 803.622 | 128 | 0.860 |
| 803.623 | 128 | 0.938 |
| 803.624 | 128 | 1.360 |
| 803.625 | 128 | 0.800 |
| 803.626 | 128 | 1.700 |
| 803.627 | 128 | 1.200 |
| 803.629 | 128 | 0.770 |
| 803.730 | 453 | 2.650 |
| 803.731 | 453 | 5.070 |
| 803.736 | 189 | 4.000 |
| 803.737 | 189 | 0.500 |
| 803.738 | 189 | 2.050 |
| 803.739 | 189 | 0.800 |
| 803.740 | 189 | 3.600 |
| 803.742 | 282 | 0.020 |
| 803.743 | 282 | 0.020 |
| 803.745 | 282 | 0.020 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 803.746 | 282 | 0.020 |
| 803.747 | 282 | 0.020 |
| 803.748 | 282 | 0.020 |
| 803.749 | 282 | 0.020 |
| 803.750 | 282 | 0.020 |
| 803.751 | 282 | 0.020 |
| 803.752 | 282 | 0.020 |
| 803.754 | 282 | 0.020 |
| 803.755 | 282 | 0.020 |
| 803.757 | 282 | 0.020 |
| 803.759 | 282 | 0.020 |
| 803.760 | 282 | 0.020 |
| 803.761 | 282 | 0.020 |
| 803.762 | 282 | 0.020 |
| 803.763 | 282 | 0.020 |
| 804.108 | 249 | 0.012 |
| 804.109 | 249 | 0.016 |
| 804.110 | 249 | 0.016 |
| 804.111 | 249 | 0.015 |
| 804.112 | 249 | 0.015 |
| 804.113 | 249 | 0.015 |
| 804.114 | 249 | 0.014 |
| 804.115 | 242 | 0.260 |
| 804.117 | 271 | 0.160 |
| 804.119 | 271 | 0.203 |
| 804.121 | 271 | 0.296 |
| 804.128 | 279 | 1.100 |
| 804.129 | 279 | 1.100 |
| 804.130 | 279 | 1.000 |
| 804.131 | 279 | 1.000 |
| 804.132 | 248 | 0.012 |
| 804.134 | 248 | 0.012 |
| 804.135 | 248 | 0.012 |
| 804.136 | 248 | 0.012 |
| 804.137 | 248 | 0.012 |
| 804.138 | 248 | 0.012 |
| 804.139 | 248 | 0.012 |
| 804.140 | 248 | 0.012 |
| 804.141 | 248 | 0.012 |
| 804.142 | 248 | 0.012 |
| 804.143 | 248 | 0.012 |
| 804.144 | 248 | 0.012 |
| 804.145 | 248 | 0.012 |
| 804.146 | 248 | 0.012 |
| 804.147 | 248 | 0.012 |
| 804.148 | 248 | 0.012 |
| 804.149 | 248 | 0.011 |
| 804.150 | 248 | 0.011 |
| 804.151 | 248 | 0.011 |
| 804.152 | 248 | 0.011 |
| 804.153 | 248 | 0.011 |
| 804.154 | 248 | 0.011 |
| 804.155 | 248 | 0.011 |
| 804.156 | 248 | 0.011 |
| 804.157 | 248 | 0.011 |
| 804.158 | 248 | 0.011 |
| 804.159 | 248 | 0.011 |
| 804.160 | 248 | 0.010 |
| 804.161 | 248 | 0.010 |
| 804.162 | 248 | 0.010 |
| 804.163 | 248 | 0.010 |
| 804.164 | 248 | 0.010 |
| 804.165 | 248 | 0.010 |
| 804.166 | 248 | 0.009 |
| 804.167 | 248 | 0.010 |
| 804.168 | 248 | 0.009 |
| 804.169 | 248 | 0.009 |
| 804.170 | 248 | 0.009 |
| 804.171 | 248 | 0.009 |
| 804.172 | 248 | 0.009 |
| 804.173 | 248 | 0.009 |
| 804.174 | 248 | 0.009 |
| 804.175 | 248 | 0.009 |
| 804.176 | 248 | 0.009 |
| 804.177 | 248 | 0.009 |
| 804.266 | 84 | 0.130 |
| 804.267 | 239 | 0.130 |
| 804.268 | 239 | 0.230 |
| 804.269 | 239 | 0.142 |
| 804.270 | 239 | 0.219 |
| 804.271 | 239 | 0.120 |
| 804.272 | 239 | 0.220 |
| 804.273 | 239 | 0.120 |
| 804.274 | 239 | 0.217 |
| 804.275 | 239 | 0.423 |
| 804.276 | 239 | 0.283 |
| 804.277 | 239 | 0.420 |
| 804.278 | 239 | 0.293 |
| 804.279 | 239 | 0.560 |
| 804.280 | 239 | 0.404 |
| 804.281 | 239 | 0.380 |
| 804.282 | 239 | 0.250 |
| 804.283 | 239 | 0.430 |
| 804.284 | 239 | 0.290 |
| 804.285 | 238 | 0.256 |
| 804.286 | 238 | 0.446 |
| 804.287 | 238 | 0.750 |
| 804.288 | 238 | 0.436 |
| 804.289 | 238 | 0.601 |
| 804.290 | 238 | 1.230 |
| 804.291 | 238 | 0.412 |
| 804.292 | 238 | 0.750 |
| 804.293 | 238 | 1.200 |
| 804.294 | 238 | 0.758 |
| 804.295 | 238 | 0.902 |
| 804.296 | 238 | 1.400 |
| 804.297 | 238 | 0.693 |
| 804.298 | 238 | 0.976 |
| 804.644 | 477 | 7.500 |
| 804.645 | 477 | 7.600 |
| 804.646 | 477 | 17.500 |
| 804.649 | 508 | 1.330 |
| 804.656 | 509 | 1.180 |
| 804.658 | 509 | 0.400 |
| 804.662 | 510 | 0.200 |
| 804.666 | 155 | 0.003 |
| 804.667 | 155 | 0.003 |
| 804.668 | 155 | 0.003 |
| 804.669 | 155 | 0.007 |
| 804.670 | 155 | 0.007 |
| 804.671 | 155 | 0.006 |
| 804.672 | 155 | 0.005 |
| 804.678 | 69 | 0.660 |
| 804.679 | 69 | 0.600 |
| 804.680 | 515 | 0.030 |
| 804.681 | 515 | 0.030 |
| 804.682 | 515 | 0.250 |
| 804.683 | 515 | 0.030 |
| 804.684 | 515 | 0.030 |
| 804.685 | 515 | 0.030 |
| 804.686 | 515 | 0.225 |
| 804.687 | 515 | 0.030 |
| 804.688 | 515 | 0.250 |
| 804.749 | 64 | 1.260 |
| 804.750 | 64 | 1.400 |
| 804.751 | 64 | 1.300 |
| 804.752 | 64 | 1.300 |
| 804.753 | 64 | 4.140 |
| 804.754 | 64 | 4.300 |
| 804.755 | 64 | 4.100 |
| 804.756 | 64 | 4.200 |
| 804.757 | 71 | 4.700 |
| 804.758 | 71 | 5.100 |
| 804.759 | 71 | 5.740 |
| 804.760 | 71 | 1.960 |
| 804.761 | 71 | 2.360 |
| 804.762 | 71 | 2.300 |
| 804.763 | 71 | 5.100 |
| 804.764 | 71 | 5.700 |
| 804.765 | 71 | 6.580 |
| 804.771 | 275 | 0.530 |
| 804.772 | 274 | 0.016 |
| 804.773 | 274 | 0.040 |
| 804.796 | 476 | 0.002 |
| 804.821 | 225 | 0.008 |
| 804.827 | 273 | 0.090 |
| 804.828 | 273 | 0.076 |
| 804.829 | 273 | 0.348 |
| 804.830 | 273 | 0.340 |
| 804.831 | 273 | 0.340 |
| 804.832 | 273 | 0.323 |
| 804.833 | 273 | 0.310 |
| 804.834 | 272 | 0.088 |
| 804.835 | 272 | 0.074 |
| 804.842 | 510 | 0.005 |
| 804.844 | 259 | 0.008 |
| 804.845 | 259 | 0.010 |
| 804.846 | 259 | 0.015 |
| 804.847 | 259 | 0.018 |
| 804.848 | 259 | 0.037 |
| 804.849 | 259 | 0.035 |
| 804.850 | 259 | 0.033 |
| 804.851 | 259 | 0.024 |
| 804.852 | 259 | 0.300 |
| 804.853 | 259 | 0.023 |
| 804.854 | 259 | 0.050 |
| 804.855 | 259 | 0.046 |
| 804.856 | 259 | 0.040 |
| 804.857 | 259 | 0.037 |
| 804.858 | 259 | 0.036 |
| 804.860 | 259 | 0.033 |
| 804.883 | 89 | 1.700 |
| 804.885 | 89 | 3.000 |
| 804.886 | 90 | 1.700 |
| 804.887 | 90 | 2.700 |
| 804.890 | 88 | 0.700 |
| 804.891 | 88 | 1.300 |
| 804.904 | 181 | 1.640 |
| 804.917 | 137 | 3.820 |
| 804.945 | 287 | 0.070 |
| 804.949 | 515 | 2.500 |
| 804.962 | 170 | 0.935 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 804.969 | 73 | 0.450 |
| 804.970 | 73 | 6.300 |
| 804.971 | 73 | 4.500 |
| 804.972 | 73 | 4.880 |
| 804.973 | 73 | 6.880 |
| 804.974 | 73 | 7.800 |
| 804.975 | 73 | 4.100 |
| 804.976 | 148 | 4.400 |
| 804.977 | 148 | 5.580 |
| 804.978 | 148 | 5.000 |
| 804.979 | 148 | 6.500 |
| 804.995 | 102 | 4.130 |
| 805.002 | 107 | 8.500 |
| 805.016 | 94 | 0.405 |
| 805.018 | 147 | 2.700 |
| 805.019 | 147 | 2.300 |
| 805.035 | 79 | 18.900 |
| 805.036 | 79 | 19.100 |
| 805.037 | 79 | 19.300 |
| 805.038 | 79 | 19.500 |
| 805.039 | 79 | 23.300 |
| 805.040 | 79 | 23.500 |
| 805.041 | 79 | 23.700 |
| 805.042 | 79 | 23.900 |
| 805.043 | 79 | 27.700 |
| 805.044 | 79 | 27.900 |
| 805.045 | 79 | 28.100 |
| 805.046 | 79 | 28.300 |
| 805.047 | 79 | 19.300 |
| 805.048 | 79 | 19.700 |
| 805.049 | 79 | 20.000 |
| 805.050 | 79 | 23.700 |
| 805.051 | 79 | 24.100 |
| 805.052 | 79 | 24.400 |
| 805.053 | 79 | 28.100 |
| 805.054 | 79 | 28.500 |
| 805.055 | 79 | 28.800 |
| 805.057 | 79 | 19.400 |
| 805.058 | 79 | 19.800 |
| 805.060 | 79 | 20.100 |
| 805.061 | 79 | 23.800 |
| 805.062 | 79 | 24.200 |
| 805.063 | 79 | 24.500 |
| 805.064 | 79 | 28.200 |
| 805.065 | 79 | 28.600 |
| 805.066 | 79 | 28.900 |
| 805.067 | 79 | 20.500 |
| 805.069 | 79 | 24.900 |
| 805.070 | 79 | 29.300 |
| 805.077 | 61 | 0.505 |
| 805.078 | 61 | 0.655 |
| 805.079 | 61 | 0.670 |
| 805.080 | 61 | 0.699 |
| 805.081 | 61 | 0.718 |
| 805.082 | 61 | 1.180 |
| 805.083 | 61 | 1.150 |
| 805.084 | 61 | 1.450 |
| 805.085 | 61 | 1.200 |
| 805.086 | 61 | 1.500 |
| 805.087 | 61 | 1.200 |
| 805.088 | 61 | 1.540 |
| 805.089 | 61 | 1.240 |
| 805.090 | 61 | 1.600 |
| 805.091 | 61 | 3.940 |
| 805.092 | 61 | 3.960 |
| 805.093 | 61 | 4.000 |
| 805.094 | 61 | 4.100 |
| 805.096 | 140 | 1.120 |
| 805.097 | 140 | 1.140 |
| 805.098 | 140 | 1.180 |
| 805.099 | 140 | 1.300 |
| 805.100 | 137 | 1.398 |
| 805.101 | 137 | 1.020 |
| 805.102 | 137 | 1.780 |
| 805.103 | 137 | 2.420 |
| 805.104 | 137 | 2.560 |
| 805.105 | 137 | 1.398 |
| 805.106 | 137 | 1.398 |
| 805.107 | 137 | 1.398 |
| 805.108 | 137 | 4.020 |
| 805.110 | 137 | 3.240 |
| 805.111 | 137 | 4.660 |
| 805.112 | 137 | 3.700 |
| 805.113 | 137 | 4.160 |
| 805.114 | 137 | 5.140 |
| 805.115 | 137 | 6.160 |
| 805.117 | 137 | 4.900 |
| 805.151 | 147 | 4.900 |
| 805.152 | 147 | 3.400 |
| 805.156 | 273 | 0.069 |
| 805.157 | 273 | 0.064 |
| 805.158 | 273 | 0.053 |
| 805.159 | 273 | 0.039 |
| 805.172 | 277 | 1.040 |
| 805.173 | 277 | 0.478 |
| 805.174 | 127 | 0.180 |
| 805.194 | 176 | 0.289 |
| 805.201 | 147 | 5.800 |
| 805.238 | 277 | 0.110 |
| 805.239 | 277 | 0.110 |
| 805.240 | 277 | 0.110 |
| 805.241 | 277 | 0.110 |
| 805.242 | 277 | 0.110 |
| 805.243 | 69 | 1.340 |
| 805.244 | 273 | 0.164 |
| 805.245 | 273 | 0.127 |
| 805.246 | 94 | 0.480 |
| 805.247 | 95 | 0.580 |
| 805.250 | 127 | 0.488 |
| 805.251 | 126 | 0.576 |
| 805.252 | 128 | 0.530 |
| 805.253 | 128 | 0.610 |
| 805.254 | 128 | 0.655 |
| 805.255 | 128 | 0.724 |
| 805.256 | 128 | 0.650 |
| 805.257 | 127 | 0.800 |
| 805.258 | 127 | 0.821 |
| 805.259 | 126 | 0.791 |
| 805.260 | 126 | 0.826 |
| 805.261 | 126 | 0.917 |
| 805.262 | 129 | 0.865 |
| 805.263 | 129 | 0.916 |
| 805.264 | 129 | 1.090 |
| 805.265 | 129 | 0.980 |
| 805.266 | 129 | 1.200 |
| 805.267 | 129 | 1.040 |
| 805.268 | 129 | 1.320 |
| 805.269 | 129 | 1.140 |
| 805.270 | 129 | 1.220 |
| 805.271 | 129 | 1.710 |
| 805.283 | 476 | 5.120 |
| 805.284 | 476 | 3.240 |
| 805.290 | 131 | 4.700 |
| 805.296 | 111 | 4.900 |
| 805.298 | 111 | 6.200 |
| 805.299 | 111 | 7.300 |
| 805.305 | 223 | 7.500 |
| 805.306 | 223 | 7.400 |
| 805.356 | 273 | 0.280 |
| 805.397 | 244 | 0.050 |
| 805.412 | 206 | 0.430 |
| 805.413 | 273 | 0.198 |
| 805.423 | 515 | 7.660 |
| 805.424 | 102 | 4.040 |
| 805.430 | 102 | 3.790 |
| 805.431 | 102 | 4.780 |
| 805.433 | 102 | 4.720 |
| 805.435 | 102 | 5.960 |
| 805.436 | 102 | 5.980 |
| 805.438 | 102 | 6.020 |
| 805.442 | 515 | 1.500 |
| 805.449 | 55 | 4.600 |
| 805.450 | 55 | 5.720 |
| 805.451 | 55 | 5.100 |
| 805.452 | 55 | 6.900 |
| 805.453 | 55 | 5.400 |
| 805.454 | 55 | 7.640 |
| 805.455 | 55 | 5.600 |
| 805.456 | 55 | 8.420 |
| 805.457 | 135 | 3.980 |
| 805.458 | 135 | 4.220 |
| 805.459 | 135 | 4.760 |
| 805.460 | 271 | 0.162 |
| 805.461 | 459 | 1.820 |
| 805.462 | 60 | 0.624 |
| 805.463 | 60 | 1.180 |
| 805.464 | 60 | 1.400 |
| 805.465 | 139 | 0.943 |
| 805.466 | 139 | 1.060 |
| 805.471 | 166 | 0.181 |
| 805.472 | 166 | 0.181 |
| 805.473 | 166 | 0.187 |
| 805.474 | 166 | 0.288 |
| 805.475 | 166 | 0.286 |
| 805.476 | 166 | 0.292 |
| 805.477 | 140 | 0.905 |
| 805.478 | 140 | 1.360 |
| 805.479 | 140 | 1.400 |
| 805.480 | 61 | 0.822 |
| 805.481 | 61 | 0.920 |
| 805.482 | 61 | 1.340 |
| 805.483 | 61 | 1.760 |
| 805.484 | 61 | 1.340 |
| 805.485 | 61 | 1.840 |
| 805.486 | 61 | 4.240 |
| 805.487 | 61 | 4.320 |
| 805.489 | 283 | 2.900 |
| 805.492 | 55 | 0.019 |
| 805.493 | 55 | 0.019 |
| 805.494 | 55 | 0.019 |
| 805.495 | 55 | 0.019 |
| 805.496 | 55 | 0.019 |



BROTECH

| Order No. | Page | Weight (kg) |
|---|---|---|
| 805.497 | 55 | 0.019 |
| 805.498 | 55 | 0.019 |
| 805.499 | 55 | 0.019 |
| 805.527 | 139 | 0.320 |
| 805.530 | 222 | 2.100 |
| 805.535 | 223 | 9.300 |
| 805.536 | 223 | 9.950 |
| 805.537 | 222 | 6.560 |
| 805.538 | 224 | 3.450 |
| 805.539 | 224 | 3.900 |
| 805.540 | 224 | 5.070 |
| 805.542 | 145 | 1.000 |
| 805.544 | 289 | 0.307 |
| 805.548 | 139 | 0.800 |
| 805.549 | 61 | 1.440 |
| 805.550 | 62 | 1.020 |
| 805.551 | 62 | 0.977 |
| 805.553 | 271 | 0.242 |
| 805.560 | 208 | 0.976 |
| 805.569 | 72 | 0.860 |
| 805.570 | 83 | 1.900 |
| 805.571 | 83 | 1.980 |
| 805.573 | 146 | 1.340 |
| 805.574 | 146 | 1.590 |
| 805.575 | 206 | 0.244 |
| 805.576 | 169 | 0.700 |
| 805.584 | 110 | 1.200 |
| 805.585 | 110 | 1.780 |
| 805.586 | 110 | 1.500 |
| 805.595 | 208 | 0.915 |
| 805.596 | 98 | 2.100 |
| 805.597 | 98 | 2.100 |
| 805.598 | 98 | 2.100 |
| 805.600 | 98 | 2.100 |
| 805.601 | 98 | 2.100 |
| 805.604 | 110 | 1.240 |
| 805.605 | 110 | 1.240 |
| 805.606 | 110 | 1.240 |
| 805.608 | 110 | 1.240 |
| 805.609 | 110 | 1.240 |
| 805.610 | 110 | 1.240 |
| 805.611 | 110 | 1.240 |
| 805.623 | 110 | 3.720 |
| 805.624 | 110 | 1.240 |
| 805.626 | 110 | 1.240 |
| 805.627 | 110 | 1.240 |
| 805.628 | 110 | 1.240 |
| 805.629 | 110 | 1.240 |
| 805.630 | 110 | 1.240 |
| 805.631 | 110 | 1.240 |
| 805.632 | 110 | 1.240 |
| 805.633 | 110 | 1.240 |
| 805.635 | 110 | 1.240 |
| 805.636 | 110 | 1.240 |
| 805.637 | 110 | 1.240 |
| 805.638 | 110 | 1.240 |
| 805.639 | 110 | 1.240 |
| 805.640 | 110 | 1.240 |
| 805.641 | 110 | 1.240 |
| 805.642 | 110 | 1.240 |
| 805.643 | 110 | 4.540 |
| 805.644 | 110 | 1.240 |
| 805.645 | 110 | 1.240 |
| 805.646 | 146 | 1.240 |
| 805.655 | 144 | 4.100 |
| 805.656 | 144 | 4.700 |
| 805.657 | 145 | 10.100 |
| 805.658 | 134 | 6.400 |
| 805.659 | 134 | 7.600 |
| 805.660 | 134 | 6.840 |
| 805.661 | 134 | 8.820 |
| 805.662 | 134 | 7.600 |
| 805.663 | 268 | 1.000 |
| 805.664 | 268 | 1.000 |
| 805.665 | 268 | 1.000 |
| 805.666 | 268 | 1.000 |
| 805.668 | 258 | 0.090 |
| 805.669 | 258 | 0.090 |
| 805.670 | 258 | 0.090 |
| 805.671 | 258 | 0.090 |
| 805.672 | 258 | 0.090 |
| 805.673 | 258 | 0.090 |
| 805.674 | 512 | 0.052 |
| 805.675 | 512 | 0.200 |
| 805.677 | 61 | 1.720 |
| 805.678 | 61 | 2.100 |
| 805.679 | 61 | 4.900 |
| 805.680 | 61 | 5.000 |
| 805.684 | 174 | 0.096 |
| 805.723 | 67 | 1.080 |
| 805.724 | 219 | 1.635 |
| 805.728 | 282 | 0.130 |
| 805.732 | 147 | 1.400 |
| 805.733 | 282 | 0.019 |
| 805.734 | 282 | 0.112 |
| 805.735 | 282 | 0.097 |
| 805.736 | 282 | 0.057 |
| 805.737 | 282 | 0.019 |
| 805.738 | 282 | 0.019 |
| 805.739 | 282 | 0.358 |
| 805.740 | 282 | 0.294 |
| 805.747 | 90 | 0.006 |
| 805.748 | 160 | 3.000 |
| 805.749 | 159 | 1.600 |
| 805.750 | 134 | 7.440 |
| 805.753 | 98 | 4.900 |
| 805.758 | 110 | 1.240 |
| 805.802 | 249 | 0.230 |
| 805.808 | 99 | 5.100 |
| 805.809 | 99 | 5.400 |
| 805.810 | 99 | 5.900 |
| 805.811 | 495 | 0.210 |
| 805.812 | 495 | 0.210 |
| 805.814 | 59 | 0.555 |
| 805.815 | 59 | 1.320 |
| 805.816 | 59 | 1.560 |
| 805.817 | 59 | 3.950 |
| 805.818 | 59 | 4.280 |
| 805.819 | 59 | 4.600 |
| 805.820 | 60 | 0.510 |
| 805.821 | 60 | 0.620 |
| 805.822 | 60 | 4.520 |
| 805.823 | 60 | 4.640 |
| 805.824 | 60 | 4.760 |
| 805.825 | 60 | 4.860 |
| 805.826 | 63 | 1.760 |
| 805.827 | 286 | 0.005 |
| 805.828 | 126 | 0.520 |
| 805.829 | 138 | 1.060 |
| 805.830 | 138 | 1.400 |
| 805.831 | 140 | 2.100 |
| 805.832 | 140 | 2.300 |
| 805.833 | 146 | 0.800 |
| 805.834 | 146 | 1.000 |
| 805.835 | 208 | 0.414 |
| 805.836 | 208 | 0.434 |
| 805.837 | 208 | 0.485 |
| 805.838 | 208 | 0.517 |
| 805.839 | 208 | 0.570 |
| 805.840 | 208 | 1.220 |
| 805.841 | 208 | 1.280 |
| 805.842 | 209 | 0.643 |
| 805.843 | 209 | 0.850 |
| 805.844 | 209 | 1.080 |
| 805.845 | 515 | 1.500 |
| 805.846 | 515 | 1.600 |
| 805.847 | 476 | 1.300 |
| 805.848 | 476 | 1.900 |
| 805.849 | 466 | 0.200 |
| 805.850 | 466 | 0.325 |
| 805.851 | 466 | 0.258 |
| 805.852 | 466 | 0.700 |
| 805.853 | 466 | 0.600 |
| 805.854 | 466 | 1.100 |
| 805.855 | 466 | 1.000 |
| 805.856 | 454 | 3.300 |
| 805.857 | 454 | 3.900 |
| 805.858 | 457 | 0.500 |
| 805.859 | 457 | 0.600 |
| 805.860 | 457 | 0.500 |
| 805.861 | 457 | 0.600 |
| 805.862 | 457 | 0.600 |
| 805.863 | 457 | 0.700 |
| 805.864 | 457 | 0.788 |
| 805.865 | 457 | 0.600 |
| 805.866 | 457 | 1.000 |
| 805.867 | 457 | 0.700 |
| 805.868 | 457 | 1.000 |
| 805.869 | 460 | 0.001 |
| 805.870 | 460 | 0.001 |
| 805.871 | 460 | 0.001 |
| 805.872 | 460 | 0.001 |
| 805.873 | 460 | 0.001 |
| 805.874 | 218 | 1.400 |
| 805.875 | 218 | 1.840 |
| 805.876 | 218 | 3.700 |
| 805.877 | 218 | 4.000 |
| 805.878 | 220 | 4.200 |
| 805.879 | 220 | 6.100 |
| 805.880 | 224 | 2.700 |
| 805.881 | 224 | 3.200 |
| 805.882 | 272 | 0.029 |
| 805.883 | 272 | 0.024 |
| 805.884 | 272 | 0.017 |
| 805.885 | 288 | 0.070 |
| 805.886 | 289 | 0.557 |
| 805.887 | 289 | 0.586 |
| 805.888 | 289 | 0.572 |
| 805.889 | 289 | 0.515 |
| 805.890 | 475 | 0.900 |
| 805.894 | 284 | 0.800 |
| 806.050 | 147 | 1.500 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 806.051 | 147 | 4.300 |
| 806.052 | 147 | 6.700 |
| 806.148 | 502 | 0.016 |
| 806.197 | 274 | 0.016 |
| 806.198 | 274 | 0.089 |
| 806.243 | 224 | 1.760 |
| 806.244 | 224 | 2.282 |
| 806.245 | 224 | 1.270 |
| 806.246 | 222 | 2.200 |
| 806.247 | 223 | 7.500 |
| 806.248 | 223 | 7.500 |
| 806.249 | 223 | 3.100 |
| 806.250 | 223 | 9.700 |
| 806.252 | 223 | 5.000 |
| 806.253 | 233 | 3.300 |
| 806.254 | 233 | 3.300 |
| 806.255 | 223 | 3.010 |
| 806.256 | 233 | 3.010 |
| 806.257 | 460 | 0.001 |
| 806.258 | 460 | 0.001 |
| 806.284 | 74 | 1.600 |
| 806.328 | 74 | 1.020 |
| 806.347 | 104 | 1.160 |
| 806.348 | 104 | 1.160 |
| 806.349 | 104 | 1.200 |
| 806.350 | 104 | 1.220 |
| 806.351 | 104 | 1.240 |
| 806.352 | 104 | 1.300 |
| 806.353 | 104 | 1.300 |
| 806.354 | 104 | 1.300 |
| 806.355 | 104 | 1.300 |
| 806.356 | 104 | 1.300 |
| 806.357 | 104 | 1.300 |
| 806.358 | 104 | 1.380 |
| 806.359 | 104 | 1.380 |
| 806.360 | 104 | 3.140 |
| 806.361 | 104 | 3.300 |
| 806.362 | 55 | 1.700 |
| 806.363 | 55 | 2.100 |
| 806.364 | 135 | 1.600 |
| 806.365 | 135 | 2.100 |
| 806.370 | 128 | 1.300 |
| 806.371 | 129 | 1.800 |
| 806.372 | 129 | 2.200 |
| 806.373 | 130 | 3.800 |
| 806.374 | 130 | 1.300 |
| 806.375 | 95 | 1.800 |
| 806.376 | 95 | 2.300 |
| 806.377 | 96 | 4.000 |
| 806.378 | 96 | 4.600 |
| 806.379 | 48 | 0.950 |
| 806.380 | 49 | 1.600 |
| 806.381 | 49 | 1.900 |
| 806.382 | 49 | 2.200 |
| 806.383 | 49 | 2.500 |
| 806.384 | 51 | 4.300 |
| 806.385 | 51 | 4.900 |
| 806.386 | 51 | 5.800 |
| 806.387 | 51 | 6.240 |
| 806.388 | 258 | 0.290 |
| 806.389 | 258 | 0.060 |
| 806.390 | 252 | 0.196 |
| 806.391 | 252 | 0.196 |
| 806.392 | 252 | 0.194 |
| 806.393 | 252 | 0.191 |
| 806.394 | 252 | 0.188 |
| 806.395 | 252 | 0.184 |
| 806.396 | 252 | 0.180 |
| 806.397 | 252 | 0.177 |
| 806.398 | 252 | 0.172 |
| 806.399 | 252 | 0.167 |
| 806.400 | 252 | 0.164 |
| 806.401 | 252 | 0.159 |
| 806.402 | 252 | 0.154 |
| 806.403 | 252 | 0.149 |
| 806.404 | 252 | 0.144 |
| 806.405 | 252 | 0.139 |
| 806.406 | 252 | 0.134 |
| 806.407 | 252 | 0.129 |
| 806.408 | 252 | 0.122 |
| 806.409 | 252 | 0.117 |
| 806.412 | 255 | 0.224 |
| 806.413 | 255 | 0.215 |
| 806.414 | 255 | 0.207 |
| 806.415 | 255 | 0.197 |
| 806.416 | 255 | 0.187 |
| 806.417 | 255 | 0.177 |
| 806.418 | 255 | 0.166 |
| 806.419 | 255 | 0.154 |
| 806.420 | 255 | 0.142 |
| 806.421 | 255 | 0.128 |
| 806.422 | 237 | 2.300 |
| 806.423 | 237 | 4.460 |
| 806.424 | 237 | 0.104 |
| 806.425 | 237 | 0.104 |
| 806.426 | 237 | 0.097 |
| 806.427 | 237 | 0.169 |
| 806.428 | 237 | 0.166 |
| 806.429 | 237 | 0.157 |
| 806.430 | 166 | 0.090 |
| 806.431 | 166 | 0.090 |
| 806.436 | 244 | 0.395 |
| 806.437 | 244 | 0.010 |
| 806.439 | 497 | 0.100 |
| 806.440 | 497 | 0.465 |
| 806.441 | 104 | 1.900 |
| 806.442 | 273 | 0.143 |
| 806.443 | 273 | 0.090 |
| 806.444 | 141 | 1.700 |
| 806.462 | 275 | 0.190 |
| 806.465 | 274 | 0.140 |
| 806.466 | 274 | 0.050 |
| 806.467 | 274 | 0.044 |
| 806.468 | 274 | 0.035 |
| 806.476 | 274 | 0.090 |
| 806.477 | 274 | 0.113 |
| 806.478 | 274 | 0.139 |
| 806.541 | 492 | 0.255 |
| 806.575 | 131 | 5.200 |
| 806.579 | 73 | 6.880 |
| 806.580 | 73 | 6.880 |
| 806.581 | 73 | 6.880 |
| 806.582 | 73 | 6.880 |
| 806.585 | 146 | 4.000 |
| 806.586 | 146 | 4.800 |
| 806.587 | 146 | 5.400 |
| 806.588 | 146 | 6.700 |
| 806.589 | 146 | 5.100 |
| 806.590 | 146 | 6.300 |
| 806.591 | 146 | 4.800 |
| 806.592 | 146 | 7.800 |
| 806.593 | 146 | 6.000 |
| 806.595 | 137 | 1.500 |
| 806.601 | 71 | 0.442 |
| 806.602 | 71 | 0.443 |
| 806.603 | 71 | 0.408 |
| 806.604 | 71 | 1.080 |
| 806.605 | 71 | 1.100 |
| 806.606 | 71 | 1.120 |
| 806.607 | 109 | 1.000 |
| 806.608 | 109 | 1.000 |
| 806.609 | 109 | 1.100 |
| 806.622 | 496 | 0.222 |
| 806.627 | 135 | 6.800 |
| 806.628 | 135 | 7.200 |
| 806.629 | 135 | 7.900 |
| 806.630 | 148 | 6.900 |
| 806.631 | 148 | 8.000 |
| 806.636 | 162 | 0.550 |
| 806.656 | 256 | 2.100 |
| 806.657 | 256 | 0.920 |
| 806.671 | 202 | 0.340 |
| 806.680 | 74 | 1.200 |
| 806.681 | 74 | 1.500 |
| 806.682 | 74 | 2.100 |
| 806.683 | 74 | 4.300 |
| 806.684 | 74 | 5.900 |
| 806.685 | 74 | 7.000 |
| 806.686 | 74 | 8.200 |
| 806.687 | 74 | 9.700 |
| 806.688 | 74 | 9.900 |
| 806.689 | 74 | 12.700 |
| 806.690 | 75 | 5.500 |
| 806.692 | 75 | 6.100 |
| 806.693 | 75 | 8.100 |
| 806.694 | 75 | 9.500 |
| 806.695 | 75 | 10.300 |
| 806.696 | 75 | 12.900 |
| 806.697 | 75 | 15.200 |
| 806.698 | 190 | 0.400 |
| 806.699 | 190 | 0.400 |
| 806.700 | 190 | 0.500 |
| 806.701 | 190 | 0.500 |
| 806.702 | 190 | 0.500 |
| 806.703 | 190 | 2.400 |
| 806.704 | 190 | 3.000 |
| 806.705 | 190 | 2.700 |
| 806.706 | 190 | 3.800 |
| 806.707 | 190 | 4.800 |
| 806.708 | 190 | 5.600 |
| 806.709 | 58 | 5.200 |
| 806.710 | 161 | 2.700 |
| 806.712 | 202 | 0.460 |
| 806.713 | 202 | 0.560 |
| 806.714 | 202 | 0.740 |
| 806.715 | 202 | 0.650 |
| 806.716 | 202 | 0.780 |
| 806.717 | 202 | 0.860 |
| 806.718 | 202 | 0.970 |
| 806.719 | 202 | 1.100 |
| 806.720 | 202 | 1.600 |
| 806.721 | 202 | 2.200 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 806.722 | 202 | 2.400 |
| 806.723 | 202 | 2.500 |
| 806.724 | 202 | 5.100 |
| 806.725 | 212 | 0.700 |
| 806.726 | 212 | 0.800 |
| 806.727 | 212 | 0.900 |
| 806.728 | 212 | 1.000 |
| 806.729 | 212 | 1.000 |
| 806.730 | 212 | 1.100 |
| 806.731 | 212 | 1.200 |
| 806.732 | 212 | 1.300 |
| 806.733 | 212 | 1.800 |
| 806.734 | 166 | 0.110 |
| 806.737 | 284 | 8.000 |
| 806.738 | 284 | 8.000 |
| 806.739 | 255 | 0.123 |
| 806.742 | 354 | 2.300 |
| 806.743 | 354 | 4.400 |
| 806.744 | 354 | 8.300 |
| 806.747 | 94 | 1.000 |
| 806.795 | 283 | 10.500 |
| 806.800 | 128 | 0.230 |
| 806.802 | 237 | 0.104 |
| 806.803 | 237 | 0.104 |
| 806.804 | 126 | 0.170 |
| 806.805 | 517 | 1.270 |
| 806.806 | 516 | 0.600 |
| 806.807 | 516 | 1.300 |
| 806.808 | 516 | 2.700 |
| 806.810 | 103 | 1.400 |
| 806.811 | 103 | 1.600 |
| 806.812 | 103 | 3.500 |
| 806.813 | 103 | 3.800 |
| 806.862 | 249 | 0.015 |
| 806.863 | 249 | 0.015 |
| 806.864 | 249 | 0.015 |
| 806.865 | 249 | 0.015 |
| 806.866 | 249 | 0.015 |
| 806.896 | 110 | 1.100 |
| 806.902 | 74 | 1.200 |
| 806.912 | 244 | 0.050 |
| 806.950 | 234 | 0.450 |
| 806.951 | 234 | 0.450 |
| 806.952 | 234 | 0.420 |
| 806.953 | 234 | 0.420 |
| 806.954 | 234 | 0.400 |
| 806.955 | 234 | 0.400 |
| 806.956 | 232 | 0.960 |
| 806.957 | 232 | 0.960 |
| 806.958 | 233 | 0.840 |
| 806.959 | 233 | 0.840 |
| 806.960 | 235 | 0.300 |
| 806.961 | 235 | 0.300 |
| 806.962 | 235 | 0.300 |
| 806.963 | 235 | 0.400 |
| 806.964 | 235 | 0.500 |
| 806.965 | 235 | 0.700 |
| 806.966 | 487 | 0.070 |
| 806.967 | 487 | 0.070 |
| 806.968 | 487 | 0.150 |
| 806.969 | 487 | 0.200 |
| 806.970 | 487 | 0.260 |
| 806.991 | 243 | 0.017 |
| 806.992 | 243 | 0.016 |
| 806.993 | 243 | 0.015 |
| 806.994 | 243 | 0.024 |
| 806.995 | 243 | 0.024 |
| 806.996 | 243 | 0.022 |
| 806.997 | 244 | 0.050 |
| 807.016 | 354 | 1.200 |
| 807.017 | 347 | 0.001 |
| 807.018 | 347 | 0.001 |
| 807.019 | 347 | 0.020 |
| 807.020 | 347 | 0.020 |
| 807.041 | 489 | 0.001 |
| 807.071 | 74 | 6.500 |
| 807.088 | 166 | 0.900 |
| 807.089 | 166 | 0.920 |
| 807.090 | 166 | 0.920 |
| 807.091 | 166 | 0.930 |
| 807.114 | 146 | 6.900 |
| 807.115 | 166 | 0.900 |
| 807.130 | 146 | 6.200 |
| 807.131 | 467 | 0.001 |
| 807.132 | 467 | 0.001 |
| 807.133 | 467 | 0.001 |
| 807.134 | 467 | 0.001 |
| 807.135 | 467 | 0.001 |
| 807.136 | 467 | 0.001 |
| 807.137 | 467 | 0.001 |
| 807.138 | 467 | 0.001 |
| 807.139 | 496 | 0.001 |
| 807.150 | 74 | 1.100 |
| 807.158 | 496 | 0.001 |
| 807.183 | 74 | 6.700 |
| 807.184 | 74 | 1.000 |
| 807.187 | 489 | 0.002 |
| 807.188 | 489 | 0.002 |
| 807.189 | 174 | 0.010 |
| 807.190 | 174 | 0.010 |
| 807.192 | 484 | 0.030 |
| 807.193 | 484 | 0.030 |
| 807.194 | 485 | 0.030 |
| 807.195 | 485 | 0.030 |
| 807.196 | 485 | 0.030 |
| 807.200 | 68 | 1.200 |
| 807.201 | 68 | 1.300 |
| 807.202 | 68 | 1.400 |
| 807.203 | 105 | 1.100 |
| 807.204 | 105 | 1.100 |
| 807.205 | 105 | 1.200 |
| 807.206 | 105 | 1.200 |
| 807.207 | 105 | 1.200 |
| 807.208 | 110 | 1.400 |
| 807.209 | 110 | 3.400 |
| 807.210 | 110 | 7.400 |
| 807.211 | 277 | 0.280 |
| 807.212 | 277 | 0.490 |
| 807.213 | 277 | 0.610 |
| 807.214 | 277 | 0.760 |
| 807.215 | 174 | 0.010 |
| 807.216 | 174 | 0.010 |
| 807.220 | 243 | 0.018 |
| 807.221 | 243 | 0.022 |
| 807.222 | 243 | 0.022 |
| 807.223 | 243 | 0.022 |
| 807.224 | 243 | 0.021 |
| 807.225 | 243 | 0.026 |
| 807.226 | 489 | 0.002 |
| 807.227 | 147 | 4.100 |
| 807.228 | 147 | 5.000 |
| 807.229 | 147 | 6.300 |
| 807.230 | 147 | 8.100 |
| 807.231 | 147 | 8.500 |
| 807.232 | 60 | 4.200 |
| 807.321 | 147 | 0.900 |
| 807.322 | 147 | 1.000 |
| 807.323 | 147 | 1.100 |
| 807.319 | 147 | 1.200 |
| 869.001 | 74 | 4.000 |
| 869.002 | 74 | 4.000 |
| 869.003 | 74 | 3.800 |
| 869.004 | 74 | 3.900 |
| 869.005 | 74 | 4.300 |
| 869.007 | 74 | 4.800 |
| 869.008 | 74 | 2.300 |
| 869.011 | 74 | 4.000 |
| 869.012 | 74 | 5.100 |
| 869.013 | 74 | 4.500 |
| 869.014 | 74 | 4.700 |
| 869.015 | 74 | 4.900 |
| 869.017 | 74 | 1.100 |
| 869.018 | 75 | 12.000 |
| 869.024 | 149 | 4.900 |
| 869.025 | 149 | 7.500 |
| 938.834 | 414 | 0.001 |
| 938.835 | 415 | 0.004 |
| 938.837 | 413 | 0.001 |
| 938.840 | 413 | 0.001 |
| 938.841 | 414 | 0.001 |
| 938.862 | 415 | 0.008 |
| 938.866 | 415 | 0.001 |
| 938.867 | 415 | 0.001 |
| 938.868 | 415 | 0.004 |
| 938.869 | 415 | 0.004 |
| 938.870 | 415 | 0.008 |
| 938.871 | 415 | 0.008 |
| 938.876 | 414 | 0.002 |
| 938.879 | 413 | 0.001 |
| 938.880 | 413 | 0.001 |
| 938.883 | 412 | 0.001 |
| 938.884 | 412 | 0.001 |
| 938.885 | 412 | 0.001 |
| 948.101 | 412 | 0.001 |
| 948.201 | 413 | 0.001 |
| 948.202 | 413 | 0.002 |
| 948.203 | 413 | 0.002 |
| 948.210 | 413 | 0.010 |
| 948.211 | 413 | 0.010 |
| 948.230 | 413 | 0.010 |
| 948.231 | 413 | 0.010 |
| 948.251 | 413 | 0.001 |
| 948.251A | 413 | 0.001 |
| 948.252 | 413 | 0.001 |
| 948.253 | 413 | 0.001 |
| 948.270 | 413 | 0.001 |
| 948.271 | 413 | 0.001 |
| 948.301 | 414 | 0.010 |
| 948.302 | 414 | 0.001 |
| 948.310 | 414 | 0.001 |
| 948.311 | 414 | 0.001 |
| 948.312 | 414 | 0.001 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 948.330 | 414 | 0.001 |
| 948.331 | 414 | 0.001 |
| 948.332 | 414 | 0.001 |
| 948.350 | 414 | 0.001 |
| 948.350A | 414 | 0.001 |
| 948.351 | 414 | 0.001 |
| 948.351A | 414 | 0.001 |
| 948.352 | 414 | 0.001 |
| 948.352A | 414 | 0.001 |
| 948.370 | 414 | 0.001 |
| 948.371 | 414 | 0.001 |
| 948.372 | 414 | 0.001 |
| 948.373 | 414 | 0.002 |
| 948.374 | 414 | 0.002 |
| 948.375 | 414 | 0.002 |
| 951.108 | 428 | 0.430 |
| 951.109 | 428 | 0.250 |
| 951.128 | 428 | 0.650 |
| 951.129 | 428 | 0.350 |
| 951.149 | 428 | 0.310 |
| 958.008 | 504 | 0.045 |
| 958.010 | 504 | 0.035 |
| 958.021 | 504 | 0.080 |
| 958.031 | 504 | 0.110 |
| 958.041 | 504 | 0.500 |
| 958.048 | 419 | 0.010 |
| 958.049 | 419 | 0.060 |
| 958.049 | 449 | 0.060 |
| 958.051 | 419 | 0.002 |
| 958.052 | 419 | 0.002 |
| 958.053 | 419 | 0.002 |
| 958.055 | 419 | 0.002 |
| 958.056 | 419 | 0.002 |
| 958.057 | 419 | 0.002 |
| 958.061 | 419 | 0.002 |
| 958.062 | 419 | 0.002 |
| 958.063 | 419 | 0.002 |
| 958.065 | 419 | 0.002 |
| 958.066 | 419 | 0.002 |
| 958.067 | 419 | 0.002 |
| 958.071 | 419 | 0.002 |
| 958.072 | 419 | 0.002 |
| 958.073 | 419 | 0.002 |
| 958.075 | 419 | 0.002 |
| 958.076 | 419 | 0.002 |
| 958.077 | 419 | 0.002 |
| 958.081 | 419 | 0.002 |
| 958.082 | 419 | 0.002 |
| 958.083 | 419 | 0.002 |
| 958.085 | 419 | 0.002 |
| 958.086 | 419 | 0.002 |
| 958.087 | 419 | 0.002 |
| 958.091 | 419 | 0.010 |
| 958.092 | 419 | 0.010 |
| 958.093 | 419 | 0.010 |
| 958.095 | 419 | 0.010 |
| 958.096 | 419 | 0.010 |
| 958.097 | 419 | 0.010 |
| 958.155 | 419 | 0.012 |
| 958.156 | 419 | 0.013 |
| 958.157 | 419 | 0.002 |
| 958.158 | 419 | 0.003 |
| 958.313 | 419 | 0.002 |
| 958.314 | 419 | 0.002 |
| 958.425 | 420 | 0.004 |
| 958.430 | 420 | 0.004 |
| 958.433 | 420 | 0.004 |
| 958.435 | 420 | 0.004 |
| 958.440 | 420 | 0.004 |
| 958.475 | 420 | 0.004 |
| 958.480 | 420 | 0.004 |
| 958.483 | 420 | 0.004 |
| 958.485 | 420 | 0.004 |
| 958.490 | 420 | 0.004 |
| 958.501 | 420 | 0.001 |
| 958.502 | 420 | 0.001 |
| 958.503 | 420 | 0.001 |
| 958.601 | 420 | 0.021 |
| 958.602 | 420 | 0.021 |
| 958.603 | 420 | 0.022 |
| 958.604 | 420 | 0.023 |
| 958.611 | 420 | 0.020 |
| 958.612 | 420 | 0.021 |
| 958.613 | 420 | 0.022 |
| 958.614 | 420 | 0.023 |
| 961.120 | 250 | 0.023 |
| 961.127 | 251 | 0.041 |
| 961.146 | 253 | 0.002 |
| 961.147 | 253 | 0.040 |
| 961.148 | 253 | 0.004 |
| 961.149 | 253 | 0.004 |
| 961.150 | 253 | 0.004 |
| 961.151 | 253 | 0.002 |
| 961.152 | 253 | 0.009 |
| 961.153 | 253 | 0.010 |
| 961.154 | 253 | 0.008 |
| 961.155 | 253 | 0.008 |
| 961.156 | 253 | 0.004 |
| 961.160 | 253 | 0.024 |
| 961.161 | 253 | 0.020 |
| 961.165 | 253 | 0.047 |
| 961.166 | 253 | 0.044 |
| 961.167 | 253 | 0.032 |
| 961.168 | 253 | 0.087 |
| 961.169 | 253 | 0.085 |
| 961.170 | 253 | 0.085 |
| 961.171 | 253 | 0.085 |
| 961.172 | 253 | 0.085 |
| 961.173 | 253 | 0.080 |
| 961.174 | 253 | 0.070 |
| 961.175 | 253 | 0.064 |
| 961.176 | 253 | 0.050 |
| 961.180 | 253 | 0.117 |
| 961.182 | 253 | 0.113 |
| 961.183 | 253 | 0.105 |
| 961.184 | 253 | 0.091 |
| 961.185 | 253 | 0.086 |
| 961.186 | 253 | 0.050 |
| 961.200 | 510 | 0.002 |
| 961.201 | 511 | 0.200 |
| 961.205 | 510 | 0.265 |
| 961.206 | 510 | 0.265 |
| 961.211 | 511 | 0.200 |
| 961.212 | 511 | 0.240 |
| 961.213 | 512 | 0.055 |
| 961.237 | 508 | 0.440 |
| 961.238 | 509 | 0.400 |
| 961.252 | 285 | 0.290 |
| 961.253 | 285 | 0.380 |
| 961.254 | 285 | 0.005 |
| 961.255 | 285 | 5.200 |
| 961.256 | 285 | 7.000 |
| 961.257 | 285 | 9.500 |
| 961.264 | 92 | 7.500 |
| 961.269 | 123 | 9.140 |
| 961.270 | 283 | 2.900 |
| 961.271 | 283 | 2.370 |
| 961.272 | 283 | 2.900 |
| 961.273 | 283 | 2.900 |
| 961.276 | 287 | 0.015 |
| 961.277 | 287 | 0.015 |
| 961.278 | 286 | 0.003 |
| 961.279 | 286 | 0.005 |
| 961.280 | 286 | 0.005 |
| 961.281 | 286 | 0.005 |
| 961.282 | 286 | 0.005 |
| 961.283 | 286 | 0.009 |
| 961.284 | 286 | 0.009 |
| 961.285 | 286 | 0.005 |
| 961.286 | 286 | 0.005 |
| 961.287 | 286 | 0.005 |
| 961.288 | 286 | 0.010 |
| 961.289 | 286 | 0.010 |
| 961.290 | 286 | 0.005 |
| 961.291 | 283 | 0.724 |
| 961.292 | 283 | 0.880 |
| 961.293 | 283 | 1.100 |
| 961.294 | 283 | 1.500 |
| 961.295 | 283 | 2.040 |
| 961.296 | 283 | 3.380 |
| 961.297 | 283 | 4.500 |
| 961.331 | 289 | 0.271 |
| 961.332 | 289 | 0.260 |
| 961.333 | 289 | 0.243 |
| 961.336 | 289 | 0.244 |
| 961.338 | 283 | 2.600 |
| 961.339 | 283 | 2.900 |
| 961.342 | 283 | 2.950 |
| 961.346 | 283 | 2.600 |
| 961.347N | 513 | 1.200 |
| 961.362 | 68 | 1.360 |
| 961.363 | 68 | 1.480 |
| 961.364 | 68 | 1.550 |
| 961.365 | 68 | 2.160 |
| 961.366 | 68 | 1.370 |
| 961.367 | 68 | 4.080 |
| 961.368 | 68 | 4.160 |
| 961.369 | 68 | 4.860 |
| 961.371 | 72 | 6.180 |
| 961.372 | 72 | 8.040 |
| 961.394 | 68 | 0.493 |
| 961.395 | 68 | 0.521 |
| 961.396 | 68 | 0.610 |
| 961.397 | 68 | 0.704 |
| 961.401 | 260 | 0.028 |
| 961.402 | 260 | 0.028 |
| 961.403 | 260 | 0.028 |
| 961.404 | 260 | 0.047 |
| 961.405 | 260 | 0.045 |
| 961.406 | 260 | 0.047 |
| 961.407 | 260 | 0.045 |
| 961.408 | 260 | 0.046 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 961.409 | 262 | 0.020 |
| 961.410 | 262 | 0.020 |
| 961.411 | 262 | 0.020 |
| 961.412 | 262 | 0.035 |
| 961.413 | 262 | 0.035 |
| 961.414 | 262 | 0.037 |
| 961.415 | 262 | 0.035 |
| 961.416 | 262 | 0.035 |
| 961.417 | 260 | 0.102 |
| 961.418 | 260 | 0.102 |
| 961.420 | 260 | 0.099 |
| 961.462 | 247 | 0.003 |
| 961.464 | 247 | 0.003 |
| 961.466 | 247 | 0.003 |
| 961.468 | 247 | 0.003 |
| 961.470 | 247 | 0.002 |
| 961.472 | 247 | 0.003 |
| 961.474 | 247 | 0.002 |
| 961.477 | 248 | 0.005 |
| 961.479 | 248 | 0.005 |
| 961.481 | 248 | 0.005 |
| 961.483 | 248 | 0.005 |
| 961.485 | 248 | 0.005 |
| 961.487 | 248 | 0.005 |
| 961.489 | 248 | 0.005 |
| 961.491 | 248 | 0.005 |
| 961.493 | 248 | 0.004 |
| 961.495 | 248 | 0.004 |
| 961.497 | 248 | 0.003 |
| 961.498 | 249 | 0.305 |
| 961.500 | 250 | 0.005 |
| 961.501 | 250 | 0.004 |
| 961.502 | 250 | 0.005 |
| 961.503 | 250 | 0.005 |
| 961.504 | 250 | 0.004 |
| 961.505 | 250 | 0.005 |
| 961.506 | 250 | 0.005 |
| 961.507 | 250 | 0.004 |
| 961.508 | 250 | 0.005 |
| 961.509 | 250 | 0.003 |
| 961.510 | 250 | 0.004 |
| 961.511 | 250 | 0.003 |
| 961.512 | 250 | 0.004 |
| 961.513 | 250 | 0.003 |
| 961.514 | 250 | 0.004 |
| 961.515 | 250 | 0.003 |
| 961.516 | 250 | 0.003 |
| 961.517 | 250 | 0.003 |
| 961.518 | 250 | 0.003 |
| 961.519 | 250 | 0.003 |
| 961.520 | 250 | 0.003 |
| 961.521 | 250 | 0.003 |
| 961.522 | 250 | 0.003 |
| 961.524 | 256 | 0.220 |
| 961.525 | 271 | 0.018 |
| 961.526 | 259 | 0.013 |
| 961.527 | 258 | 0.003 |
| 961.531 | 250 | 0.009 |
| 961.532 | 250 | 0.009 |
| 961.533 | 250 | 0.010 |
| 961.534 | 250 | 0.010 |
| 961.535 | 250 | 0.010 |
| 961.536 | 250 | 0.009 |
| 961.537 | 250 | 0.009 |
| 961.538 | 250 | 0.009 |
| 961.539 | 250 | 0.010 |
| 961.540 | 250 | 0.009 |
| 961.541 | 250 | 0.008 |
| 961.542 | 250 | 0.007 |
| 961.543 | 250 | 0.004 |
| 961.544 | 250 | 0.006 |
| 961.545 | 250 | 0.005 |
| 961.547 | 256 | 0.230 |
| 961.548 | 271 | 0.038 |
| 961.549 | 259 | 0.025 |
| 961.550 | 258 | 0.001 |
| 961.551 | 250 | 0.022 |
| 961.552 | 250 | 0.023 |
| 961.553 | 250 | 0.023 |
| 961.554 | 250 | 0.023 |
| 961.555 | 250 | 0.023 |
| 961.556 | 250 | 0.023 |
| 961.557 | 250 | 0.022 |
| 961.558 | 250 | 0.023 |
| 961.559 | 250 | 0.022 |
| 961.560 | 250 | 0.021 |
| 961.561 | 250 | 0.021 |
| 961.562 | 250 | 0.020 |
| 961.563 | 250 | 0.020 |
| 961.564 | 250 | 0.019 |
| 961.565 | 250 | 0.018 |
| 961.566 | 250 | 0.017 |
| 961.567 | 250 | 0.013 |
| 961.569 | 256 | 0.360 |
| 961.570 | 271 | 0.045 |
| 961.571 | 259 | 0.042 |
| 961.572 | 258 | 0.007 |
| 961.573 | 251 | 0.042 |
| 961.574 | 251 | 0.041 |
| 961.575 | 251 | 0.041 |
| 961.576 | 251 | 0.040 |
| 961.577 | 251 | 0.041 |
| 961.578 | 251 | 0.041 |
| 961.579 | 251 | 0.041 |
| 961.580 | 251 | 0.040 |
| 961.581 | 251 | 0.040 |
| 961.582 | 251 | 0.039 |
| 961.583 | 251 | 0.039 |
| 961.584 | 251 | 0.038 |
| 961.585 | 251 | 0.036 |
| 961.586 | 251 | 0.034 |
| 961.587 | 251 | 0.036 |
| 961.588 | 251 | 0.035 |
| 961.589 | 251 | 0.033 |
| 961.590 | 251 | 0.031 |
| 961.591 | 251 | 0.030 |
| 961.592 | 251 | 0.027 |
| 961.593 | 251 | 0.026 |
| 961.595 | 256 | 0.350 |
| 961.596 | 271 | 0.085 |
| 961.597 | 259 | 0.055 |
| 961.598 | 258 | 0.016 |
| 961.599 | 250 | 0.022 |
| 961.601 | 251 | 0.074 |
| 961.602 | 251 | 0.075 |
| 961.603 | 251 | 0.070 |
| 961.604 | 251 | 0.074 |
| 961.605 | 251 | 0.074 |
| 961.606 | 251 | 0.073 |
| 961.607 | 251 | 0.074 |
| 961.608 | 251 | 0.075 |
| 961.609 | 251 | 0.074 |
| 961.610 | 251 | 0.074 |
| 961.611 | 251 | 0.070 |
| 961.612 | 251 | 0.073 |
| 961.613 | 251 | 0.073 |
| 961.614 | 251 | 0.072 |
| 961.615 | 251 | 0.071 |
| 961.616 | 251 | 0.065 |
| 961.617 | 251 | 0.068 |
| 961.618 | 251 | 0.067 |
| 961.619 | 251 | 0.064 |
| 961.620 | 251 | 0.064 |
| 961.621 | 251 | 0.063 |
| 961.622 | 251 | 0.061 |
| 961.623 | 251 | 0.060 |
| 961.624 | 251 | 0.057 |
| 961.625 | 251 | 0.055 |
| 961.626 | 251 | 0.052 |
| 961.627 | 251 | 0.049 |
| 961.629 | 256 | 0.730 |
| 961.630 | 271 | 0.080 |
| 961.631 | 259 | 0.075 |
| 961.632 | 258 | 0.005 |
| 961.641 | 252 | 0.098 |
| 961.642 | 252 | 0.097 |
| 961.643 | 252 | 0.098 |
| 961.644 | 252 | 0.097 |
| 961.645 | 252 | 0.099 |
| 961.646 | 252 | 0.099 |
| 961.647 | 252 | 0.101 |
| 961.648 | 252 | 0.100 |
| 961.649 | 252 | 0.099 |
| 961.650 | 252 | 0.100 |
| 961.651 | 252 | 0.100 |
| 961.652 | 252 | 0.102 |
| 961.653 | 252 | 0.100 |
| 961.654 | 252 | 0.100 |
| 961.655 | 252 | 0.099 |
| 961.656 | 252 | 0.098 |
| 961.657 | 252 | 0.096 |
| 961.658 | 252 | 0.096 |
| 961.659 | 252 | 0.093 |
| 961.660 | 252 | 0.092 |
| 961.661 | 252 | 0.091 |
| 961.662 | 252 | 0.089 |
| 961.663 | 252 | 0.087 |
| 961.664 | 252 | 0.085 |
| 961.665 | 252 | 0.083 |
| 961.666 | 252 | 0.081 |
| 961.667 | 252 | 0.082 |
| 961.668 | 252 | 0.077 |
| 961.669 | 252 | 0.074 |
| 961.670 | 252 | 0.071 |
| 961.671 | 252 | 0.068 |
| 961.672 | 252 | 0.064 |
| 961.673 | 252 | 0.056 |
| 961.674 | 252 | 0.055 |
| 961.675 | 252 | 0.050 |
| 961.676 | 256 | 3.960 |
| 961.677 | 256 | 0.920 |
| 961.678 | 271 | 0.100 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 961.679 | 259 | 0.085 |
| 961.680 | 258 | 0.006 |
| 961.681 | 259 | 0.006 |
| 961.683 | 259 | 0.017 |
| 961.684 | 259 | 0.016 |
| 961.685 | 259 | 0.017 |
| 961.701 | 207 | 0.230 |
| 961.702 | 207 | 0.326 |
| 961.703 | 207 | 0.519 |
| 961.706 | 207 | 0.252 |
| 961.707 | 207 | 0.346 |
| 961.708 | 207 | 0.537 |
| 961.711 | 207 | 0.273 |
| 961.712 | 207 | 0.365 |
| 961.713 | 207 | 0.551 |
| 961.714 | 207 | 0.921 |
| 961.721 | 207 | 0.522 |
| 961.722 | 207 | 0.670 |
| 961.723 | 207 | 0.530 |
| 961.726 | 207 | 0.540 |
| 961.727 | 207 | 0.691 |
| 961.728 | 207 | 0.845 |
| 961.731 | 207 | 0.580 |
| 961.732 | 207 | 0.728 |
| 961.733 | 207 | 0.879 |
| 961.741 | 207 | 0.797 |
| 961.746 | 207 | 0.825 |
| 961.747 | 207 | 1.080 |
| 961.748 | 207 | 1.550 |
| 961.749 | 207 | 2.200 |
| 961.751 | 207 | 0.850 |
| 961.752 | 207 | 1.120 |
| 961.753 | 207 | 1.358 |
| 961.754 | 207 | 1.624 |
| 961.756 | 207 | 0.900 |
| 961.757 | 207 | 1.140 |
| 961.758 | 207 | 1.633 |
| 961.761 | 207 | 0.898 |
| 961.762 | 207 | 1.120 |
| 961.763 | 207 | 1.618 |
| 961.773 | 206 | 0.095 |
| 961.774 | 206 | 0.144 |
| 961.775 | 206 | 0.390 |
| 961.776 | 206 | 0.430 |
| 961.777 | 206 | 0.059 |
| 961.778 | 206 | 0.117 |
| 961.779 | 206 | 0.180 |
| 961.831 | 100 | 1.010 |
| 961.833 | 100 | 1.000 |
| 961.835 | 100 | 1.120 |
| 961.839 | 100 | 1.370 |
| 961.876 | 101 | 3.200 |
| 961.889 | 101 | 3.450 |
| 961.902 | 56 | 0.468 |
| 961.908 | 56 | 0.555 |
| 961.915 | 56 | 0.560 |
| 961.916 | 56 | 0.915 |
| 961.917 | 56 | 0.443 |
| 961.918 | 56 | 0.485 |
| 961.919 | 56 | 0.474 |
| 961.920 | 56 | 0.570 |
| 961.921 | 56 | 0.510 |
| 961.922 | 56 | 0.646 |
| 961.923 | 56 | 0.522 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 961.924 | 56 | 0.718 |
| 961.925 | 56 | 0.540 |
| 961.926 | 56 | 0.830 |
| 961.932 | 56 | 1.060 |
| 961.933 | 56 | 1.130 |
| 961.935 | 56 | 1.150 |
| 961.936 | 56 | 1.270 |
| 961.938 | 56 | 1.200 |
| 961.939 | 56 | 1.390 |
| 961.941 | 56 | 1.270 |
| 961.942 | 56 | 1.550 |
| 961.944 | 56 | 1.360 |
| 961.945 | 56 | 1.810 |
| 961.946 | 56 | 1.100 |
| 961.947 | 56 | 1.440 |
| 961.948 | 56 | 1.975 |
| 961.959 | 56 | 2.310 |
| 961.962 | 57 | 3.680 |
| 961.963 | 57 | 3.740 |
| 961.964 | 57 | 3.820 |
| 961.966 | 57 | 3.740 |
| 961.967 | 57 | 3.880 |
| 961.970 | 57 | 3.840 |
| 961.971 | 57 | 4.060 |
| 961.972 | 57 | 4.220 |
| 961.975 | 57 | 3.800 |
| 961.976 | 57 | 3.960 |
| 961.977 | 57 | 4.240 |
| 961.978 | 57 | 4.450 |
| 961.983 | 57 | 4.120 |
| 961.984 | 57 | 4.500 |
| 961.985 | 57 | 5.200 |
| 961.988 | 57 | 3.920 |
| 961.989 | 57 | 4.200 |
| 961.990 | 57 | 4.660 |
| 961.991 | 57 | 5.030 |
| 961.992 | 57 | 5.980 |
| 962.121S | 102 | 1.480 |
| 962.124S | 102 | 1.900 |
| 962.205 | 274 | 0.064 |
| 962.248 | 274 | 0.253 |
| 962.249 | 274 | 0.219 |
| 962.250 | 274 | 0.190 |
| 962.260 | 274 | 0.091 |
| 962.262 | 274 | 0.087 |
| 962.263 | 274 | 0.087 |
| 962.264 | 274 | 0.078 |
| 962.265 | 274 | 0.068 |
| 962.266 | 274 | 0.054 |
| 962.271 | 274 | 0.165 |
| 962.272 | 274 | 0.161 |
| 962.273 | 274 | 0.160 |
| 962.274 | 274 | 0.152 |
| 962.276 | 274 | 0.130 |
| 962.278 | 274 | 0.090 |
| 962.281 | 274 | 0.294 |
| 962.282 | 274 | 0.290 |
| 962.283 | 274 | 0.296 |
| 962.284 | 274 | 0.288 |
| 962.285 | 274 | 0.274 |
| 962.286 | 274 | 0.270 |
| 962.287 | 274 | 0.264 |
| 962.288 | 274 | 0.242 |
| 962.289 | 274 | 0.175 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 962.291 | 275 | 0.210 |
| 962.292 | 275 | 0.380 |
| 962.293 | 275 | 0.400 |
| 962.294 | 275 | 0.170 |
| 962.311 | 274 | 0.023 |
| 962.312 | 274 | 0.023 |
| 962.313 | 274 | 0.080 |
| 962.401 | 273 | 0.118 |
| 962.402 | 273 | 0.112 |
| 962.403 | 273 | 0.101 |
| 962.404 | 273 | 0.089 |
| 962.405 | 273 | 0.052 |
| 962.406 | 273 | 0.150 |
| 962.407 | 273 | 0.097 |
| 962.408 | 273 | 0.374 |
| 962.409 | 273 | 0.372 |
| 962.410 | 273 | 0.366 |
| 962.411 | 273 | 0.362 |
| 962.412 | 273 | 0.358 |
| 962.413 | 273 | 0.351 |
| 962.414 | 273 | 0.343 |
| 962.415 | 273 | 0.332 |
| 962.416 | 273 | 0.293 |
| 962.417 | 273 | 0.284 |
| 962.418 | 273 | 0.272 |
| 962.419 | 273 | 0.262 |
| 962.420 | 273 | 0.350 |
| 962.421 | 273 | 0.239 |
| 962.422 | 273 | 0.226 |
| 962.423 | 273 | 0.202 |
| 962.424 | 273 | 0.192 |
| 962.437 | 273 | 0.120 |
| 962.438 | 273 | 0.118 |
| 962.439 | 273 | 0.117 |
| 962.440 | 273 | 0.120 |
| 962.441 | 273 | 0.120 |
| 962.442 | 273 | 0.115 |
| 962.443 | 273 | 0.111 |
| 962.444 | 273 | 0.106 |
| 962.445 | 273 | 0.100 |
| 962.446 | 273 | 0.099 |
| 962.447 | 273 | 0.085 |
| 962.448 | 273 | 0.067 |
| 962.457 | 273 | 0.348 |
| 962.458 | 273 | 0.344 |
| 962.459 | 273 | 0.342 |
| 962.460 | 273 | 0.332 |
| 962.461 | 273 | 0.313 |
| 962.462 | 273 | 0.306 |
| 962.463 | 273 | 0.292 |
| 962.464 | 273 | 0.267 |
| 962.465 | 273 | 0.194 |
| 962.468 | 272 | 0.066 |
| 962.469 | 272 | 0.059 |
| 962.470 | 272 | 0.054 |
| 962.471 | 272 | 0.043 |
| 962.472 | 272 | 0.105 |
| 962.473 | 272 | 0.108 |
| 962.474 | 272 | 0.106 |
| 962.475 | 272 | 0.110 |
| 962.476 | 272 | 0.109 |
| 962.477 | 272 | 0.106 |
| 962.478 | 272 | 0.103 |
| 962.479 | 272 | 0.098 |



BROTECH

| Order No. | Page | Weight (kg) |
|---|---|---|
| 962.480 | 272 | 0.093 |
| 962.481 | 272 | 0.092 |
| 962.483 | 272 | 0.063 |
| 962.484 | 272 | 0.184 |
| 962.485 | 272 | 0.180 |
| 962.486 | 272 | 0.173 |
| 962.487 | 272 | 0.166 |
| 962.488 | 272 | 0.082 |
| 962.489 | 272 | 0.141 |
| 962.491 | 272 | 0.102 |
| 962.492 | 272 | 0.327 |
| 962.493 | 272 | 0.320 |
| 962.494 | 272 | 0.321 |
| 962.495 | 272 | 0.310 |
| 962.496 | 272 | 0.290 |
| 962.497 | 272 | 0.286 |
| 962.499 | 272 | 0.250 |
| 962.500 | 272 | 0.186 |
| 962.571 | 291 | 0.370 |
| 962.572 | 291 | 0.310 |
| 962.574 | 291 | 0.170 |
| 962.581 | 69 | 0.520 |
| 962.582 | 69 | 0.340 |
| 962.586 | 69 | 0.320 |
| 962.596 | 69 | 0.155 |
| 962.597 | 69 | 0.118 |
| 962.598 | 69 | 0.290 |
| 962.599 | 69 | 0.200 |
| 962.642 | 119 | 4.100 |
| 962.649 | 121 | 5.000 |
| 962.661 | 121 | 1.920 |
| 962.667 | 120 | 4.000 |
| 962.668 | 120 | 4.850 |
| 962.669 | 120 | 8.700 |
| 962.670 | 120 | 9.700 |
| 962.785 | 153 | 0.600 |
| 962.786 | 153 | 0.700 |
| 962.793 | 153 | 0.530 |
| 962.794 | 153 | 0.700 |
| 962.795 | 153 | 0.750 |
| 962.796 | 153 | 0.750 |
| 963.399 | 278 | 0.452 |
| 963.400 | 278 | 0.112 |
| 963.401 | 107 | 1.280 |
| 963.402 | 107 | 1.320 |
| 963.403 | 107 | 1.815 |
| 963.404 | 107 | 3.420 |
| 963.405 | 107 | 3.480 |
| 963.406 | 107 | 4.060 |
| 963.432 | 280 | 0.011 |
| 963.601 | 213 | 0.510 |
| 963.602 | 213 | 0.750 |
| 963.603 | 213 | 1.476 |
| 963.611 | 276 | 0.110 |
| 963.612 | 276 | 0.175 |
| 963.613 | 276 | 0.220 |
| 963.614 | 276 | 0.300 |
| 963.615 | 276 | 0.112 |
| 963.616 | 276 | 0.175 |
| 963.617 | 276 | 0.220 |
| 963.618 | 276 | 0.300 |
| 963.619 | 276 | 0.110 |
| 963.620 | 276 | 0.170 |
| 963.621 | 276 | 0.215 |
| 963.622 | 276 | 0.295 |
| 963.623 | 276 | 0.110 |
| 963.624 | 276 | 0.170 |
| 963.625 | 276 | 0.215 |
| 963.626 | 276 | 0.295 |
| 963.627 | 276 | 0.107 |
| 963.628 | 276 | 0.167 |
| 963.629 | 276 | 0.215 |
| 963.630 | 276 | 0.285 |
| 963.631 | 276 | 0.360 |
| 963.632 | 276 | 0.105 |
| 963.633 | 276 | 0.165 |
| 963.634 | 276 | 0.210 |
| 963.635 | 276 | 0.284 |
| 963.636 | 276 | 0.360 |
| 963.637 | 276 | 0.180 |
| 963.638 | 276 | 0.275 |
| 963.639 | 276 | 0.345 |
| 963.640 | 276 | 0.465 |
| 963.641 | 276 | 0.850 |
| 963.642 | 276 | 0.180 |
| 963.643 | 276 | 0.275 |
| 963.644 | 276 | 0.345 |
| 963.645 | 276 | 0.465 |
| 963.646 | 276 | 0.580 |
| 963.647 | 276 | 0.177 |
| 963.648 | 276 | 0.272 |
| 963.649 | 276 | 0.345 |
| 963.650 | 276 | 0.460 |
| 963.651 | 276 | 0.580 |
| 963.652 | 276 | 0.170 |
| 963.653 | 276 | 0.265 |
| 963.654 | 276 | 0.336 |
| 963.655 | 276 | 0.455 |
| 963.656 | 276 | 0.570 |
| 963.657 | 276 | 0.170 |
| 963.658 | 276 | 0.265 |
| 963.659 | 276 | 0.335 |
| 963.660 | 276 | 0.450 |
| 963.661 | 276 | 0.570 |
| 963.662 | 277 | 0.524 |
| 963.663 | 277 | 0.795 |
| 963.664 | 277 | 0.950 |
| 963.665 | 277 | 1.150 |
| 963.666 | 277 | 0.517 |
| 963.667 | 277 | 0.779 |
| 963.668 | 277 | 0.940 |
| 963.669 | 277 | 1.120 |
| 963.670 | 277 | 0.510 |
| 963.671 | 277 | 0.780 |
| 963.672 | 277 | 0.930 |
| 963.673 | 277 | 1.110 |
| 963.674 | 277 | 0.509 |
| 963.675 | 277 | 0.800 |
| 963.676 | 277 | 0.950 |
| 963.677 | 277 | 1.150 |
| 963.678 | 277 | 0.509 |
| 963.679 | 277 | 0.800 |
| 963.680 | 277 | 0.928 |
| 963.681 | 277 | 1.100 |
| 963.682 | 277 | 0.500 |
| 963.683 | 277 | 0.760 |
| 963.684 | 277 | 0.910 |
| 963.685 | 277 | 1.090 |
| 963.686 | 277 | 0.493 |
| 963.687 | 277 | 0.750 |
| 963.688 | 277 | 0.900 |
| 963.689 | 277 | 1.090 |
| 963.690 | 277 | 0.500 |
| 963.691 | 277 | 0.750 |
| 963.692 | 277 | 0.900 |
| 963.693 | 277 | 1.080 |
| 963.700 | 280 | 0.015 |
| 963.702 | 280 | 0.021 |
| 963.703 | 280 | 0.140 |
| 963.711 | 280 | 0.011 |
| 963.713 | 280 | 0.023 |
| 963.721 | 280 | 0.005 |
| 963.722 | 280 | 0.010 |
| 963.723 | 280 | 0.020 |
| 964.101S | 58 | 0.730 |
| 964.102S | 58 | 0.885 |
| 964.103S | 58 | 1.040 |
| 964.190S | 58 | 1.320 |
| 964.191S | 58 | 1.400 |
| 964.192S | 58 | 1.540 |
| 964.194S | 58 | 1.840 |
| 964.195S | 58 | 2.140 |
| 964.196S | 58 | 2.070 |
| 965.400 | 67 | 0.460 |
| 965.401 | 66 | 0.665 |
| 965.402 | 66 | 0.710 |
| 965.403 | 66 | 1.430 |
| 965.404 | 66 | 1.230 |
| 965.405 | 66 | 1.300 |
| 965.406 | 66 | 1.740 |
| 965.407 | 66 | 3.820 |
| 965.408 | 66 | 3.920 |
| 965.409 | 66 | 4.300 |
| 965.505 | 159 | 3.500 |
| 965.506 | 159 | 3.900 |
| 965.511S | 137 | 1.400 |
| 965.523 | 146 | 3.190 |
| 965.601 | 144 | 0.532 |
| 965.602 | 144 | 0.700 |
| 965.603 | 144 | 0.800 |
| 965.604 | 144 | 0.822 |
| 965.606 | 144 | 1.000 |
| 965.607 | 144 | 1.080 |
| 965.608 | 144 | 1.660 |
| 965.609 | 144 | 2.410 |
| 965.610 | 144 | 2.506 |
| 965.611 | 144 | 3.100 |
| 966.081 | 453 | 0.520 |
| 966.082 | 453 | 0.620 |
| 966.083 | 453 | 0.620 |
| 966.084 | 453 | 0.710 |
| 966.085 | 453 | 1.300 |
| 966.086 | 453 | 1.320 |
| 966.087 | 453 | 1.400 |
| 966.088 | 453 | 1.500 |
| 966.089 | 453 | 1.440 |
| 966.090 | 453 | 1.580 |
| 966.091 | 453 | 1.700 |
| 966.092 | 453 | 1.740 |
| 966.093 | 456 | 0.900 |
| 966.094 | 456 | 1.000 |
| 966.095 | 456 | 1.000 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 966.096 | 456 | 1.200 |
| 966.097 | 456 | 1.100 |
| 966.098 | 456 | 1.130 |
| 966.099 | 456 | 1.300 |
| 966.100 | 456 | 1.000 |
| 966.101 | 455 | 0.317 |
| 966.102 | 455 | 0.336 |
| 966.103 | 455 | 0.400 |
| 966.104 | 455 | 0.385 |
| 966.105 | 455 | 0.600 |
| 966.106 | 455 | 0.583 |
| 966.107 | 455 | 0.600 |
| 966.108 | 455 | 0.600 |
| 966.109 | 455 | 0.600 |
| 966.110 | 455 | 0.700 |
| 966.111 | 455 | 0.722 |
| 966.112 | 455 | 1.000 |
| 966.115 | 456 | 0.269 |
| 966.120 | 452 | 0.643 |
| 966.121 | 452 | 1.260 |
| 966.122 | 452 | 1.360 |
| 966.123 | 452 | 1.700 |
| 966.124 | 452 | 1.280 |
| 966.125 | 452 | 1.400 |
| 966.126 | 452 | 1.750 |
| 966.127 | 452 | 1.420 |
| 966.128 | 452 | 1.540 |
| 966.129 | 452 | 1.900 |
| 966.130 | 452 | 1.520 |
| 966.131 | 452 | 1.680 |
| 966.132 | 452 | 2.100 |
| 966.133 | 452 | 1.790 |
| 966.134 | 452 | 2.000 |
| 966.135 | 452 | 2.400 |
| 966.136 | 452 | 2.140 |
| 966.137 | 452 | 2.400 |
| 966.138 | 452 | 2.940 |
| 966.141 | 455 | 0.800 |
| 966.142 | 455 | 1.100 |
| 966.143 | 455 | 1.300 |
| 966.144 | 455 | 1.000 |
| 966.145 | 455 | 1.200 |
| 966.146 | 455 | 1.400 |
| 966.147 | 455 | 1.100 |
| 966.148 | 455 | 1.230 |
| 966.149 | 455 | 1.500 |
| 966.150 | 455 | 1.220 |
| 966.151 | 455 | 1.220 |
| 966.152 | 455 | 1.700 |
| 966.153 | 455 | 1.300 |
| 966.154 | 455 | 1.650 |
| 966.155 | 455 | 1.860 |
| 966.156 | 455 | 1.840 |
| 966.157 | 455 | 2.040 |
| 966.158 | 455 | 2.800 |
| 966.161 | 454 | 1.300 |
| 966.162 | 454 | 1.400 |
| 966.163 | 454 | 1.100 |
| 966.164 | 454 | 1.300 |
| 966.165 | 454 | 1.200 |
| 966.166 | 454 | 1.600 |
| 966.167 | 454 | 1.500 |
| 966.168 | 454 | 1.700 |
| 966.169 | 454 | 1.700 |
| 966.170 | 454 | 2.000 |
| 966.171 | 454 | 2.200 |
| 966.172 | 454 | 2.400 |
| 966.173 | 456 | 1.300 |
| 966.174 | 456 | 0.161 |
| 966.181 | 458 | 0.164 |
| 966.182 | 458 | 0.250 |
| 966.183 | 458 | 0.290 |
| 966.184 | 458 | 0.600 |
| 966.185 | 458 | 0.524 |
| 966.186 | 458 | 1.220 |
| 966.187 | 458 | 1.000 |
| 966.206 | 454 | 1.200 |
| 966.207 | 454 | 1.250 |
| 966.208 | 454 | 1.330 |
| 966.209 | 454 | 1.300 |
| 966.210 | 454 | 1.360 |
| 966.211 | 454 | 1.400 |
| 966.212 | 459 | 0.320 |
| 966.213 | 459 | 0.499 |
| 966.214 | 459 | 1.120 |
| 966.216 | 452 | 0.550 |
| 966.217 | 452 | 0.481 |
| 966.218 | 452 | 0.518 |
| 966.219 | 452 | 0.563 |
| 966.220 | 452 | 0.540 |
| 966.221 | 452 | 1.220 |
| 966.222 | 452 | 1.160 |
| 966.223 | 452 | 1.200 |
| 966.224 | 452 | 1.260 |
| 966.225 | 452 | 1.460 |
| 966.226 | 452 | 1.400 |
| 966.231 | 455 | 0.900 |
| 966.232 | 455 | 0.888 |
| 966.233 | 455 | 0.929 |
| 966.234 | 455 | 1.000 |
| 966.235 | 455 | 1.100 |
| 966.236 | 455 | 1.160 |
| 966.237 | 458 | 0.113 |
| 966.238 | 458 | 0.118 |
| 966.239 | 458 | 0.117 |
| 966.240 | 458 | 0.227 |
| 966.241 | 458 | 0.405 |
| 966.242 | 458 | 0.697 |
| 966.243 | 458 | 0.797 |
| 966.244 | 458 | 0.965 |
| 966.245 | 460 | 0.001 |
| 966.248 | 460 | 0.002 |
| 966.249 | 460 | 0.002 |
| 966.250 | 460 | 0.001 |
| 966.253 | 460 | 0.002 |
| 966.254 | 460 | 0.003 |
| 966.255 | 460 | 0.001 |
| 966.258 | 460 | 0.002 |
| 966.259 | 460 | 0.003 |
| 966.260 | 460 | 0.001 |
| 966.263 | 460 | 0.005 |
| 966.264 | 460 | 0.005 |
| 966.265 | 460 | 0.005 |
| 966.268 | 460 | 0.005 |
| 966.269 | 460 | 0.005 |
| 966.270 | 460 | 0.005 |
| 966.271 | 474 | 0.040 |
| 966.272 | 476 | 0.040 |
| 966.273 | 225 | 0.047 |
| 966.274 | 476 | 0.040 |
| 966.275 | 474 | 0.041 |
| 966.280 | 460 | 0.005 |
| 966.283 | 460 | 0.005 |
| 966.284 | 460 | 0.005 |
| 966.285 | 460 | 0.005 |
| 966.288 | 460 | 0.002 |
| 966.289 | 460 | 0.002 |
| 966.341 | 68 | 0.985 |
| 966.401 | 491 | 0.214 |
| 966.404 | 491 | 3.200 |
| 966.405 | 491 | 0.400 |
| 966.406 | 491 | 0.426 |
| 966.407 | 492 | 0.390 |
| 966.408 | 502 | 0.134 |
| 966.409 | 502 | 0.004 |
| 966.411 | 501 | 0.418 |
| 966.412 | 501 | 0.475 |
| 966.413 | 501 | 1.120 |
| 966.414 | 501 | 1.280 |
| 966.415 | 501 | 0.089 |
| 966.416 | 501 | 0.127 |
| 966.417 | 501 | 0.269 |
| 966.418 | 501 | 0.418 |
| 966.422 | 501 | 0.027 |
| 966.423 | 501 | 0.050 |
| 966.424 | 501 | 0.090 |
| 966.425 | 501 | 0.250 |
| 966.431 | 485 | 0.042 |
| 966.432 | 485 | 0.044 |
| 966.433 | 484 | 0.077 |
| 966.434 | 484 | 0.304 |
| 966.435 | 484 | 1.040 |
| 966.436 | 485 | 0.147 |
| 966.437 | 485 | 0.148 |
| 966.440 | 489 | 0.001 |
| 966.441 | 489 | 0.001 |
| 966.442 | 489 | 0.001 |
| 966.443 | 489 | 0.001 |
| 966.445 | 489 | 0.001 |
| 966.446 | 489 | 0.001 |
| 966.447 | 489 | 0.002 |
| 966.448 | 489 | 0.018 |
| 966.449 | 489 | 0.007 |
| 966.450 | 489 | 0.047 |
| 966.461 | 484 | 0.072 |
| 966.462 | 484 | 0.080 |
| 966.463 | 484 | 0.086 |
| 966.464 | 484 | 0.165 |
| 966.465 | 484 | 0.308 |
| 966.466 | 484 | 0.370 |
| 966.467 | 484 | 1.240 |
| 966.468 | 485 | 0.038 |
| 966.469 | 485 | 0.042 |
| 966.470 | 485 | 0.048 |
| 966.471 | 485 | 0.145 |
| 966.472 | 486 | 0.040 |
| 966.473 | 486 | 0.043 |
| 966.474 | 486 | 0.069 |
| 966.475 | 486 | 0.074 |
| 966.476 | 486 | 0.074 |
| 966.477 | 486 | 0.085 |
| 966.478 | 486 | 0.132 |



BROTECH

| Order No. | Page | Weight (kg) |
|---|---|---|
| 966.479 | 486 | 0.150 |
| 966.480 | 486 | 0.143 |
| 966.481 | 486 | 0.172 |
| 966.482 | 486 | 0.260 |
| 966.483 | 486 | 0.283 |
| 966.484 | 486 | 0.264 |
| 966.485 | 486 | 0.321 |
| 966.486 | 485 | 0.040 |
| 966.487 | 485 | 0.042 |
| 966.488 | 485 | 0.048 |
| 966.489 | 485 | 0.183 |
| 966.501 | 498 | 0.040 |
| 966.502 | 498 | 0.136 |
| 966.503 | 498 | 0.160 |
| 966.504 | 498 | 0.813 |
| 966.505 | 499 | 0.125 |
| 966.506 | 499 | 0.290 |
| 966.530 | 500 | 0.001 |
| 966.531 | 500 | 0.001 |
| 966.532 | 500 | 0.001 |
| 966.533 | 500 | 0.001 |
| 966.534 | 500 | 0.001 |
| 966.535 | 500 | 0.001 |
| 966.536 | 500 | 0.001 |
| 966.537 | 500 | 0.001 |
| 966.601 | 464 | 1.100 |
| 966.602 | 464 | 1.500 |
| 966.603 | 464 | 1.600 |
| 966.604 | 464 | 0.950 |
| 966.605 | 464 | 1.300 |
| 966.606 | 464 | 1.700 |
| 966.607 | 464 | 1.100 |
| 966.608 | 464 | 1.320 |
| 966.609 | 464 | 1.800 |
| 966.610 | 464 | 1.220 |
| 966.611 | 464 | 1.452 |
| 966.612 | 464 | 1.610 |
| 966.616 | 463 | 1.220 |
| 966.617 | 463 | 1.420 |
| 966.618 | 463 | 1.600 |
| 966.619 | 463 | 1.160 |
| 966.620 | 463 | 1.530 |
| 966.621 | 463 | 1.600 |
| 966.622 | 463 | 1.200 |
| 966.623 | 463 | 1.480 |
| 966.624 | 463 | 1.800 |
| 966.625 | 463 | 1.260 |
| 966.626 | 463 | 1.500 |
| 966.627 | 463 | 1.900 |
| 966.631 | 465 | 0.870 |
| 966.632 | 465 | 1.080 |
| 966.633 | 465 | 1.200 |
| 966.634 | 465 | 0.900 |
| 966.635 | 465 | 1.200 |
| 966.636 | 465 | 1.200 |
| 966.637 | 465 | 0.925 |
| 966.638 | 465 | 1.120 |
| 966.639 | 465 | 1.400 |
| 966.640 | 465 | 1.100 |
| 966.641 | 465 | 1.280 |
| 966.642 | 465 | 1.500 |
| 966.652 | 467 | 0.001 |
| 966.653 | 467 | 0.003 |
| 966.658 | 467 | 0.001 |
| 966.662 | 467 | 0.001 |
| 966.663 | 467 | 0.001 |
| 966.667 | 467 | 0.001 |
| 966.668 | 467 | 0.001 |
| 966.669 | 467 | 0.005 |
| 966.671 | 465 | 0.500 |
| 966.672 | 465 | 0.600 |
| 966.673 | 465 | 0.600 |
| 966.674 | 465 | 0.700 |
| 966.675 | 465 | 0.823 |
| 966.676 | 465 | 1.000 |
| 966.677 | 465 | 1.100 |
| 966.678 | 465 | 0.991 |
| 966.679 | 465 | 1.100 |
| 966.680 | 465 | 1.060 |
| 966.681 | 465 | 1.260 |
| 966.682 | 465 | 1.315 |
| 966.683 | 463 | 0.512 |
| 966.684 | 463 | 0.500 |
| 966.685 | 463 | 0.520 |
| 966.686 | 463 | 0.578 |
| 966.687 | 463 | 0.515 |
| 966.688 | 463 | 0.640 |
| 966.689 | 463 | 0.553 |
| 966.690 | 463 | 0.700 |
| 966.691 | 463 | 1.200 |
| 966.692 | 463 | 1.320 |
| 966.693 | 463 | 1.300 |
| 966.694 | 463 | 1.475 |
| 966.695 | 463 | 1.440 |
| 966.696 | 463 | 1.580 |
| 966.697 | 463 | 1.670 |
| 966.698 | 463 | 1.785 |
| 966.701 | 470 | 0.030 |
| 966.702 | 470 | 0.065 |
| 966.703 | 470 | 0.060 |
| 966.704 | 470 | 0.126 |
| 966.705 | 470 | 0.119 |
| 966.706 | 470 | 0.252 |
| 966.707 | 470 | 0.233 |
| 966.708 | 470 | 0.030 |
| 966.709 | 470 | 0.070 |
| 966.710 | 470 | 0.070 |
| 966.711 | 470 | 0.130 |
| 966.712 | 470 | 0.130 |
| 966.713 | 470 | 0.260 |
| 966.714 | 470 | 0.260 |
| 966.721 | 471 | 0.500 |
| 966.722 | 471 | 0.600 |
| 966.723 | 471 | 0.500 |
| 966.724 | 471 | 0.600 |
| 966.725 | 471 | 0.500 |
| 966.726 | 471 | 0.588 |
| 966.727 | 471 | 0.500 |
| 966.728 | 471 | 0.576 |
| 966.731 | 471 | 1.100 |
| 966.732 | 471 | 1.200 |
| 966.733 | 471 | 1.300 |
| 966.734 | 471 | 1.000 |
| 966.735 | 471 | 1.150 |
| 966.736 | 471 | 1.200 |
| 966.737 | 471 | 1.000 |
| 966.738 | 471 | 1.160 |
| 966.739 | 471 | 1.300 |
| 966.740 | 471 | 1.000 |
| 966.741 | 471 | 1.330 |
| 966.742 | 471 | 1.460 |
| 966.746 | 471 | 4.400 |
| 966.747 | 471 | 4.500 |
| 966.748 | 471 | 4.940 |
| 966.749 | 471 | 4.950 |
| 966.751 | 472 | 0.800 |
| 966.752 | 472 | 1.000 |
| 966.753 | 472 | 1.000 |
| 966.754 | 472 | 1.000 |
| 966.755 | 472 | 1.000 |
| 966.756 | 472 | 1.000 |
| 966.757 | 472 | 1.100 |
| 966.758 | 472 | 1.000 |
| 966.759 | 472 | 1.115 |
| 967.501 | 266 | 0.026 |
| 967.502 | 266 | 0.026 |
| 967.503 | 266 | 0.026 |
| 967.504 | 266 | 0.026 |
| 967.505 | 266 | 0.026 |
| 967.506 | 266 | 0.026 |
| 967.507 | 266 | 0.026 |
| 967.508 | 266 | 0.026 |
| 967.509 | 266 | 0.026 |
| 967.510 | 266 | 0.026 |
| 967.511 | 266 | 0.023 |
| 967.512 | 266 | 0.023 |
| 967.513 | 266 | 0.023 |
| 967.514 | 266 | 0.023 |
| 967.515 | 266 | 0.023 |
| 967.516 | 266 | 0.023 |
| 967.517 | 266 | 0.023 |
| 967.518 | 266 | 0.023 |
| 967.519 | 266 | 0.023 |
| 967.520 | 266 | 0.023 |
| 967.521 | 266 | 0.023 |
| 967.522 | 266 | 0.023 |
| 967.523 | 266 | 0.022 |
| 967.524 | 266 | 0.022 |
| 967.525 | 266 | 0.021 |
| 967.526 | 266 | 0.021 |
| 967.527 | 266 | 0.020 |
| 967.528 | 266 | 0.020 |
| 967.529 | 266 | 0.018 |
| 967.530 | 266 | 0.018 |
| 967.531 | 266 | 0.015 |
| 967.532 | 266 | 0.045 |
| 967.533 | 266 | 0.045 |
| 967.534 | 266 | 0.045 |
| 967.535 | 266 | 0.045 |
| 967.536 | 266 | 0.045 |
| 967.537 | 266 | 0.045 |
| 967.538 | 266 | 0.045 |
| 967.539 | 266 | 0.045 |
| 967.540 | 266 | 0.045 |
| 967.541 | 266 | 0.045 |
| 967.542 | 266 | 0.045 |
| 967.543 | 266 | 0.045 |
| 967.544 | 266 | 0.044 |
| 967.545 | 266 | 0.044 |
| 967.546 | 266 | 0.044 |
| 967.547 | 266 | 0.044 |
| 967.548 | 266 | 0.043 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 967.549 | 266 | 0.043 |
| 967.550 | 266 | 0.040 |
| 967.551 | 266 | 0.040 |
| 967.552 | 266 | 0.040 |
| 967.553 | 266 | 0.040 |
| 967.554 | 266 | 0.035 |
| 967.555 | 266 | 0.035 |
| 967.556 | 266 | 0.030 |
| 967.557 | 266 | 0.030 |
| 967.558 | 266 | 0.028 |
| 967.559 | 267 | 0.076 |
| 967.560 | 267 | 0.076 |
| 967.561 | 267 | 0.076 |
| 967.562 | 267 | 0.074 |
| 967.563 | 267 | 0.074 |
| 967.564 | 267 | 0.074 |
| 967.565 | 267 | 0.074 |
| 967.566 | 267 | 0.074 |
| 967.567 | 267 | 0.075 |
| 967.568 | 267 | 0.075 |
| 967.569 | 267 | 0.075 |
| 967.570 | 267 | 0.075 |
| 967.571 | 267 | 0.073 |
| 967.572 | 267 | 0.073 |
| 967.573 | 267 | 0.074 |
| 967.574 | 267 | 0.074 |
| 967.575 | 267 | 0.073 |
| 967.576 | 267 | 0.073 |
| 967.577 | 267 | 0.072 |
| 967.578 | 267 | 0.072 |
| 967.579 | 267 | 0.070 |
| 967.580 | 267 | 0.070 |
| 967.581 | 267 | 0.067 |
| 967.582 | 267 | 0.067 |
| 967.583 | 267 | 0.065 |
| 967.584 | 267 | 0.065 |
| 967.585 | 267 | 0.059 |
| 967.586 | 267 | 0.059 |
| 967.587 | 267 | 0.059 |
| 967.588 | 267 | 0.059 |
| 967.589 | 267 | 0.051 |
| 967.590 | 267 | 0.051 |
| 967.591 | 267 | 0.048 |
| 967.592 | 267 | 0.140 |
| 967.593 | 267 | 0.140 |
| 967.594 | 267 | 0.140 |
| 967.595 | 267 | 0.140 |
| 967.596 | 267 | 0.135 |
| 967.597 | 267 | 0.140 |
| 967.598 | 267 | 0.140 |
| 967.599 | 267 | 0.140 |
| 967.600 | 267 | 0.143 |
| 967.601 | 267 | 0.142 |
| 967.602 | 267 | 0.142 |
| 967.603 | 267 | 0.142 |
| 967.604 | 267 | 0.145 |
| 967.605 | 267 | 0.144 |
| 967.606 | 267 | 0.145 |
| 967.607 | 267 | 0.145 |
| 967.608 | 267 | 0.145 |
| 967.609 | 267 | 0.145 |
| 967.610 | 267 | 0.145 |
| 967.611 | 267 | 0.145 |
| 967.612 | 267 | 0.143 |
| 967.613 | 267 | 0.143 |
| 967.614 | 267 | 0.142 |
| 967.615 | 267 | 0.142 |
| 967.616 | 267 | 0.140 |
| 967.617 | 267 | 0.140 |
| 967.618 | 267 | 0.137 |
| 967.619 | 267 | 0.135 |
| 967.620 | 267 | 0.134 |
| 967.621 | 267 | 0.134 |
| 967.622 | 267 | 0.130 |
| 967.623 | 267 | 0.130 |
| 967.624 | 267 | 0.126 |
| 967.625 | 267 | 0.126 |
| 967.627 | 267 | 0.120 |
| 967.628 | 267 | 0.110 |
| 967.629 | 267 | 0.110 |
| 967.630 | 267 | 0.108 |
| 967.631 | 267 | 0.108 |
| 967.632 | 267 | 0.100 |
| 967.801 | 268 | 0.068 |
| 967.802 | 268 | 0.098 |
| 967.803 | 268 | 0.135 |
| 967.804 | 268 | 0.135 |
| 967.810 | 286 | 0.005 |
| 967.811 | 286 | 0.011 |
| 967.812 | 286 | 0.014 |
| 967.813 | 286 | 0.020 |
| 967.814 | 286 | 0.029 |
| 967.850 | 269 | 0.077 |
| 967.851 | 269 | 0.077 |
| 967.852 | 269 | 0.077 |
| 967.853 | 269 | 0.077 |
| 967.854 | 269 | 0.077 |
| 967.855 | 269 | 0.077 |
| 967.856 | 269 | 0.077 |
| 967.857 | 269 | 0.077 |
| 967.858 | 269 | 0.077 |
| 967.859 | 269 | 0.077 |
| 967.861 | 269 | 0.076 |
| 967.862 | 269 | 0.076 |
| 967.863 | 269 | 0.076 |
| 967.864 | 269 | 0.076 |
| 967.865 | 269 | 0.112 |
| 967.866 | 269 | 0.112 |
| 967.867 | 269 | 0.112 |
| 967.868 | 269 | 0.112 |
| 967.869 | 269 | 0.112 |
| 967.870 | 269 | 0.112 |
| 967.871 | 269 | 0.112 |
| 967.872 | 269 | 0.112 |
| 967.873 | 269 | 0.112 |
| 967.874 | 269 | 0.114 |
| 967.875 | 269 | 0.014 |
| 967.876 | 269 | 0.014 |
| 967.877 | 269 | 0.113 |
| 967.878 | 269 | 0.110 |
| 967.879 | 269 | 0.109 |
| 967.880 | 269 | 0.114 |
| 967.881 | 269 | 0.114 |
| 967.882 | 269 | 0.114 |
| 967.883 | 269 | 0.114 |
| 967.884 | 269 | 0.115 |
| 967.885 | 270 | 0.160 |
| 967.886 | 270 | 0.160 |
| 967.887 | 270 | 0.160 |
| 967.888 | 270 | 0.160 |
| 967.889 | 270 | 0.160 |
| 967.890 | 270 | 0.160 |
| 967.891 | 270 | 0.150 |
| 967.892 | 270 | 0.150 |
| 967.893 | 270 | 0.150 |
| 967.894 | 270 | 0.150 |
| 967.895 | 270 | 0.150 |
| 967.896 | 270 | 0.150 |
| 967.897 | 270 | 0.150 |
| 967.898 | 270 | 0.150 |
| 967.899 | 270 | 0.150 |
| 967.900 | 270 | 0.150 |
| 967.901 | 270 | 0.150 |
| 967.902 | 270 | 0.159 |
| 967.903 | 270 | 0.155 |
| 967.904 | 270 | 0.154 |
| 967.905 | 270 | 0.151 |
| 967.906 | 270 | 0.150 |
| 967.908 | 270 | 0.219 |
| 967.909 | 270 | 0.219 |
| 967.910 | 270 | 0.220 |
| 967.911 | 270 | 0.220 |
| 967.912 | 270 | 0.220 |
| 967.913 | 270 | 0.220 |
| 967.914 | 270 | 0.220 |
| 967.915 | 270 | 0.220 |
| 967.916 | 270 | 0.220 |
| 967.917 | 270 | 0.220 |
| 967.918 | 270 | 0.220 |
| 967.919 | 270 | 0.224 |
| 967.920 | 270 | 0.224 |
| 967.921 | 270 | 0.224 |
| 967.922 | 270 | 0.224 |
| 967.923 | 270 | 0.224 |
| 967.924 | 270 | 0.224 |
| 967.925 | 270 | 0.224 |
| 967.926 | 270 | 0.224 |
| 967.927 | 270 | 0.218 |
| 967.928 | 270 | 0.218 |
| 967.929 | 270 | 0.218 |
| 967.930 | 270 | 0.218 |
| 967.931 | 270 | 0.218 |
| 967.932 | 270 | 0.218 |
| 967.933 | 270 | 0.218 |
| 967.934 | 270 | 0.217 |
| 968.033 | 53 | 7.460 |
| 968.037 | 53 | 8.300 |
| 968.038 | 53 | 9.560 |
| 968.059 | 98 | 5.020 |
| 968.060 | 98 | 5.120 |
| 968.061 | 98 | 4.500 |
| 968.076 | 54 | 5.160 |
| 968.077 | 54 | 5.700 |
| 968.080 | 54 | 6.770 |
| 968.083 | 54 | 7.480 |
| 968.086 | 54 | 4.800 |
| 968.087 | 54 | 8.320 |
| 968.088 | 54 | 9.580 |
| 968.105 | 133 | 3.970 |
| 968.108 | 133 | 3.900 |
| 968.111 | 133 | 4.760 |
| 968.112 | 133 | 5.800 |



BROTECH

| Order No. | Page | Weight (kg) |
|---|---|---|
| 968.121 | 134 | 3.980 |
| 968.122 | 134 | 4.880 |
| 968.123 | 134 | 5.780 |
| 968.124 | 134 | 4.240 |
| 968.125 | 134 | 5.360 |
| 968.127 | 134 | 4.780 |
| 968.128 | 134 | 5.540 |
| 968.129 | 134 | 6.840 |
| 968.130 | 134 | 5.500 |
| 968.131 | 134 | 3.280 |
| 968.136S | 137 | 1.720 |
| 968.137S | 137 | 2.000 |
| 968.142 | 97 | 1.114 |
| 968.144 | 97 | 1.200 |
| 968.145 | 97 | 1.300 |
| 968.147 | 97 | 1.300 |
| 968.148 | 97 | 1.400 |
| 968.150 | 97 | 1.100 |
| 968.151 | 97 | 1.700 |
| 968.152 | 97 | 1.910 |
| 968.154 | 97 | 3.300 |
| 968.156 | 97 | 3.340 |
| 968.159 | 97 | 3.600 |
| 968.161 | 97 | 3.600 |
| 968.162 | 97 | 3.800 |
| 968.163 | 97 | 4.400 |
| 968.167 | 52 | 0.580 |
| 968.170 | 52 | 0.495 |
| 968.171 | 52 | 0.620 |
| 968.174 | 52 | 0.525 |
| 968.175 | 52 | 0.800 |
| 968.178 | 52 | 0.560 |
| 968.179 | 52 | 0.590 |
| 968.180 | 52 | 0.965 |
| 968.181 | 52 | 1.120 |
| 968.183 | 52 | 1.080 |
| 968.185 | 52 | 1.200 |
| 968.188 | 52 | 1.560 |
| 968.191 | 52 | 1.120 |
| 968.193 | 52 | 1.300 |
| 968.196 | 52 | 1.730 |
| 968.199 | 52 | 1.140 |
| 968.201 | 52 | 1.400 |
| 968.204 | 52 | 1.940 |
| 968.207 | 52 | 1.200 |
| 968.208 | 52 | 1.380 |
| 968.209 | 52 | 1.568 |
| 968.210 | 52 | 1.780 |
| 968.211 | 52 | 2.020 |
| 968.212 | 52 | 2.280 |
| 968.213 | 52 | 2.740 |
| 968.214 | 52 | 3.700 |
| 968.217 | 52 | 3.920 |
| 968.221 | 52 | 4.040 |
| 968.225 | 52 | 4.160 |
| 968.228 | 52 | 4.020 |
| 968.229 | 52 | 4.410 |
| 968.230 | 52 | 5.230 |
| 968.235 | 132 | 0.350 |
| 968.238 | 132 | 0.407 |
| 968.241 | 132 | 0.473 |
| 968.242 | 132 | 0.670 |
| 968.243 | 132 | 0.543 |
| 968.247 | 132 | 0.800 |
| 968.248 | 132 | 0.975 |
| 968.249 | 132 | 1.100 |
| 968.252 | 132 | 0.896 |
| 968.253 | 132 | 1.050 |
| 968.254 | 132 | 1.180 |
| 968.257 | 132 | 1.000 |
| 968.258 | 132 | 1.140 |
| 968.259 | 132 | 1.290 |
| 968.260 | 132 | 1.480 |
| 968.262 | 132 | 1.150 |
| 968.263 | 132 | 1.320 |
| 968.264 | 132 | 1.480 |
| 968.265 | 132 | 1.670 |
| 968.266 | 132 | 1.830 |
| 968.287 | 132 | 2.760 |
| 968.288 | 132 | 3.000 |
| 968.289 | 132 | 3.360 |
| 968.290 | 132 | 3.420 |
| 968.291 | 132 | 4.000 |
| 968.301 | 247 | 0.002 |
| 968.302 | 247 | 0.002 |
| 968.303 | 247 | 0.002 |
| 968.304 | 247 | 0.002 |
| 968.305 | 247 | 0.002 |
| 968.306 | 247 | 0.002 |
| 968.307 | 247 | 0.002 |
| 968.308 | 247 | 0.002 |
| 968.309 | 247 | 0.002 |
| 968.310 | 247 | 0.002 |
| 968.311 | 247 | 0.002 |
| 968.312 | 247 | 0.002 |
| 968.313 | 247 | 0.002 |
| 968.314 | 247 | 0.002 |
| 968.315 | 247 | 0.002 |
| 968.316 | 247 | 0.002 |
| 968.317 | 247 | 0.002 |
| 968.318 | 247 | 0.002 |
| 968.319 | 247 | 0.002 |
| 968.320 | 247 | 0.002 |
| 968.321 | 247 | 0.002 |
| 968.322 | 247 | 0.002 |
| 968.323 | 247 | 0.002 |
| 968.324 | 247 | 0.001 |
| 968.325 | 247 | 0.001 |
| 968.326 | 247 | 0.002 |
| 968.327 | 247 | 0.001 |
| 968.328 | 247 | 0.002 |
| 968.329 | 247 | 0.005 |
| 968.330 | 249 | 0.111 |
| 968.334 | 247 | 0.003 |
| 968.335 | 247 | 0.003 |
| 968.336 | 247 | 0.003 |
| 968.337 | 247 | 0.003 |
| 968.338 | 247 | 0.003 |
| 968.339 | 247 | 0.003 |
| 968.340 | 247 | 0.002 |
| 968.341 | 247 | 0.003 |
| 968.342 | 247 | 0.003 |
| 968.343 | 247 | 0.003 |
| 968.344 | 247 | 0.003 |
| 968.345 | 247 | 0.003 |
| 968.346 | 247 | 0.003 |
| 968.347 | 247 | 0.003 |
| 968.348 | 247 | 0.003 |
| 968.349 | 247 | 0.003 |
| 968.350 | 247 | 0.003 |
| 968.351 | 247 | 0.003 |
| 968.352 | 247 | 0.002 |
| 968.353 | 247 | 0.003 |
| 968.354 | 247 | 0.003 |
| 968.355 | 247 | 0.002 |
| 968.356 | 247 | 0.003 |
| 968.357 | 247 | 0.002 |
| 968.358 | 247 | 0.002 |
| 968.359 | 247 | 0.002 |
| 968.360 | 247 | 0.002 |
| 968.361 | 247 | 0.003 |
| 968.362 | 247 | 0.002 |
| 968.363 | 247 | 0.003 |
| 968.364 | 249 | 0.115 |
| 968.369 | 248 | 0.004 |
| 968.370 | 248 | 0.004 |
| 968.371 | 248 | 0.004 |
| 968.372 | 248 | 0.005 |
| 968.373 | 248 | 0.005 |
| 968.374 | 248 | 0.004 |
| 968.375 | 248 | 0.004 |
| 968.376 | 248 | 0.004 |
| 968.377 | 248 | 0.004 |
| 968.378 | 248 | 0.004 |
| 968.379 | 248 | 0.005 |
| 968.380 | 248 | 0.005 |
| 968.381 | 248 | 0.005 |
| 968.382 | 248 | 0.005 |
| 968.383 | 248 | 0.005 |
| 968.384 | 248 | 0.005 |
| 968.385 | 248 | 0.005 |
| 968.386 | 248 | 0.005 |
| 968.387 | 248 | 0.005 |
| 968.388 | 248 | 0.005 |
| 968.389 | 248 | 0.005 |
| 968.390 | 248 | 0.005 |
| 968.391 | 248 | 0.005 |
| 968.392 | 248 | 0.005 |
| 968.393 | 248 | 0.005 |
| 968.394 | 248 | 0.005 |
| 968.395 | 248 | 0.005 |
| 968.396 | 248 | 0.004 |
| 968.397 | 248 | 0.004 |
| 968.398 | 248 | 0.004 |
| 968.399 | 248 | 0.005 |
| 968.400 | 248 | 0.005 |
| 968.401 | 248 | 0.004 |
| 968.402 | 248 | 0.004 |
| 968.403 | 248 | 0.004 |
| 968.404 | 248 | 0.004 |
| 968.405 | 248 | 0.004 |
| 968.406 | 248 | 0.004 |
| 968.408 | 248 | 0.004 |
| 968.409 | 248 | 0.004 |
| 968.410 | 248 | 0.004 |
| 968.411 | 248 | 0.004 |
| 968.412 | 248 | 0.004 |
| 968.413 | 248 | 0.004 |
| 968.414 | 248 | 0.003 |
| 968.415 | 248 | 0.004 |
| 968.421 | 264 | 0.014 |
| 968.423 | 264 | 0.013 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 968.424 | 264 | 0.012 |
| 968.425 | 264 | 0.010 |
| 968.427 | 264 | 0.020 |
| 968.429 | 264 | 0.025 |
| 968.430 | 264 | 0.023 |
| 968.431 | 264 | 0.020 |
| 968.433 | 264 | 0.018 |
| 968.434 | 264 | 0.043 |
| 968.436 | 264 | 0.043 |
| 968.437 | 264 | 0.042 |
| 968.438 | 264 | 0.041 |
| 968.440 | 264 | 0.036 |
| 968.442 | 264 | 0.028 |
| 968.443 | 264 | 0.067 |
| 968.445 | 264 | 0.067 |
| 968.446 | 264 | 0.068 |
| 968.447 | 264 | 0.066 |
| 968.448 | 264 | 0.060 |
| 968.449 | 264 | 0.062 |
| 968.451 | 264 | 0.056 |
| 968.453 | 264 | 0.046 |
| 968.461 | 264 | 0.044 |
| 968.462 | 264 | 0.066 |
| 968.463 | 264 | 1.070 |
| 968.464 | 264 | 0.150 |
| 968.468 | 265 | 0.048 |
| 968.469 | 265 | 0.048 |
| 968.470 | 265 | 0.048 |
| 968.471 | 265 | 0.049 |
| 968.472 | 265 | 0.074 |
| 968.473 | 265 | 0.074 |
| 968.474 | 265 | 0.074 |
| 968.475 | 265 | 0.074 |
| 968.476 | 265 | 0.074 |
| 968.477 | 265 | 0.073 |
| 968.478 | 265 | 0.096 |
| 968.479 | 265 | 0.096 |
| 968.480 | 265 | 0.096 |
| 968.481 | 265 | 0.096 |
| 968.482 | 265 | 0.096 |
| 968.483 | 265 | 0.097 |
| 968.484 | 265 | 0.096 |
| 968.485 | 265 | 0.096 |
| 968.486 | 265 | 0.150 |
| 968.487 | 265 | 0.150 |
| 968.488 | 265 | 0.150 |
| 968.489 | 265 | 0.151 |
| 968.490 | 265 | 0.151 |
| 968.491 | 265 | 0.152 |
| 968.492 | 265 | 0.152 |
| 968.493 | 265 | 0.153 |
| 968.494 | 265 | 0.151 |
| 968.495 | 265 | 0.151 |
| 968.572 | 136 | 2.500 |
| 968.573 | 136 | 2.600 |
| 968.575 | 136 | 2.600 |
| 968.578 | 136 | 2.660 |
| 968.580 | 136 | 2.610 |
| 968.581 | 136 | 2.840 |
| 968.583 | 136 | 2.720 |
| 968.584 | 136 | 3.020 |
| 968.587 | 136 | 2.890 |
| 968.588 | 136 | 3.320 |
| 968.592 | 136 | 2.900 |
| 968.593 | 136 | 3.000 |
| 968.594 | 136 | 3.800 |
| 968.604 | 56 | 1.340 |
| 968.610 | 56 | 1.660 |
| 968.613 | 56 | 1.770 |
| 968.708 | 54 | 4.600 |
| 968.709 | 54 | 5.030 |
| 968.710 | 54 | 5.920 |
| 968.711 | 54 | 5.360 |
| 968.712 | 54 | 6.500 |
| 968.713 | 54 | 5.460 |
| 968.714 | 54 | 6.890 |
| 968.716 | 163 | 0.216 |
| 968.717 | 164 | 0.250 |
| 968.718 | 164 | 0.303 |
| 968.719 | 164 | 0.292 |
| 968.720 | 164 | 0.356 |
| 968.721 | 164 | 0.349 |
| 968.722 | 164 | 0.487 |
| 968.723 | 164 | 0.474 |
| 968.728 | 165 | 0.489 |
| 968.729 | 165 | 0.496 |
| 968.730 | 165 | 0.600 |
| 968.731 | 165 | 0.540 |
| 968.733 | 165 | 0.623 |
| 968.734 | 165 | 0.746 |
| 968.736 | 165 | 0.878 |
| 968.738 | 128 | 0.567 |
| 968.742 | 128 | 1.010 |
| 968.745 | 128 | 0.659 |
| 968.752 | 164 | 0.089 |
| 968.753 | 164 | 0.120 |
| 968.754 | 164 | 0.180 |
| 968.757 | 163 | 0.231 |
| 968.760 | 163 | 0.460 |
| 968.764 | 165 | 0.772 |
| 968.771 | 136 | 0.900 |
| 968.772 | 136 | 0.900 |
| 968.773 | 136 | 0.956 |
| 968.775 | 136 | 0.865 |
| 968.776 | 136 | 0.975 |
| 968.777 | 136 | 1.080 |
| 968.779 | 136 | 0.905 |
| 968.780 | 136 | 1.050 |
| 968.781 | 136 | 1.200 |
| 968.783 | 136 | 0.943 |
| 968.784 | 136 | 1.133 |
| 968.785 | 136 | 1.310 |
| 968.787 | 136 | 1.100 |
| 968.788 | 136 | 1.290 |
| 968.789 | 136 | 1.580 |
| 968.790 | 136 | 1.850 |
| 968.791 | 136 | 2.200 |
| 968.792 | 136 | 1.070 |
| 968.793 | 136 | 1.380 |
| 968.794 | 136 | 1.650 |
| 968.795 | 136 | 2.300 |
| 968.796 | 136 | 2.470 |
| 968.803 | 127 | 0.787 |
| 968.811 | 129 | 0.870 |
| 968.812 | 129 | 0.895 |
| 968.813 | 129 | 0.940 |
| 968.814 | 129 | 0.885 |
| 968.815 | 129 | 0.869 |
| 968.816 | 129 | 0.945 |
| 968.818 | 129 | 1.150 |
| 968.819 | 129 | 0.910 |
| 968.820 | 129 | 1.050 |
| 968.822 | 129 | 1.350 |
| 968.823 | 129 | 0.960 |
| 968.824 | 129 | 1.120 |
| 968.826 | 129 | 1.540 |
| 968.827 | 129 | 1.020 |
| 968.828 | 129 | 1.280 |
| 968.829 | 129 | 1.576 |
| 968.830 | 129 | 1.860 |
| 968.831 | 129 | 2.400 |
| 968.832 | 129 | 1.060 |
| 968.833 | 129 | 1.380 |
| 968.835 | 129 | 2.040 |
| 968.836 | 129 | 2.500 |
| 968.841 | 130 | 2.440 |
| 968.842 | 130 | 2.400 |
| 968.843 | 130 | 2.520 |
| 968.844 | 130 | 2.400 |
| 968.845 | 130 | 2.500 |
| 968.846 | 130 | 2.700 |
| 968.847 | 130 | 2.590 |
| 968.848 | 130 | 2.600 |
| 968.849 | 130 | 2.840 |
| 968.850 | 130 | 2.540 |
| 968.851 | 130 | 2.720 |
| 968.852 | 130 | 2.990 |
| 968.853 | 130 | 3.280 |
| 968.854 | 130 | 2.620 |
| 968.855 | 130 | 2.900 |
| 968.856 | 130 | 3.320 |
| 968.857 | 130 | 3.680 |
| 968.858 | 130 | 2.700 |
| 968.859 | 130 | 3.000 |
| 968.860 | 130 | 3.500 |
| 968.861 | 130 | 3.920 |
| 968.868 | 163 | 0.064 |
| 968.869 | 163 | 0.079 |
| 968.870 | 162 | 0.155 |
| 968.871 | 162 | 0.077 |
| 968.874 | 162 | 0.070 |
| 968.875 | 162 | 0.090 |
| 968.876 | 163 | 0.136 |
| 968.877 | 163 | 0.150 |
| 968.878 | 163 | 0.138 |
| 968.879 | 163 | 0.153 |
| 968.880 | 162 | 0.136 |
| 968.881 | 162 | 0.155 |
| 968.882 | 162 | 0.139 |
| 968.883 | 162 | 0.160 |
| 968.884 | 164 | 0.160 |
| 968.885 | 164 | 0.192 |
| 968.886 | 164 | 0.197 |
| 968.888 | 164 | 0.280 |
| 968.889 | 164 | 0.310 |
| 968.890 | 162 | 0.230 |
| 968.891 | 162 | 0.260 |
| 968.892 | 162 | 0.240 |
| 968.893 | 162 | 0.270 |
| 968.894 | 162 | 0.312 |
| 968.895 | 164 | 0.272 |
| 968.896 | 164 | 0.335 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 968.897 | 164 | 0.399 |
| 968.899 | 164 | 0.418 |
| 968.900 | 164 | 0.417 |
| 968.901 | 164 | 0.566 |
| 968.905 | 164 | 0.543 |
| 968.907 | 162 | 0.460 |
| 968.910 | 165 | 1.146 |
| 968.911 | 165 | 1.020 |
| 968.914 | 163 | 0.131 |
| 968.915 | 163 | 0.221 |
| 968.917 | 162 | 0.148 |
| 968.919 | 162 | 0.315 |
| 968.920 | 162 | 0.247 |
| 968.925 | 126 | 0.256 |
| 968.926 | 126 | 0.282 |
| 968.927 | 126 | 0.310 |
| 968.929 | 127 | 0.253 |
| 968.930 | 127 | 0.280 |
| 968.931 | 127 | 0.249 |
| 968.932 | 127 | 0.260 |
| 968.933 | 127 | 0.240 |
| 968.934 | 126 | 0.255 |
| 968.936 | 126 | 0.260 |
| 968.937 | 126 | 0.290 |
| 968.940 | 128 | 0.283 |
| 968.941 | 128 | 0.340 |
| 968.942 | 128 | 0.346 |
| 968.943 | 128 | 0.314 |
| 968.945 | 128 | 0.413 |
| 968.946 | 128 | 0.350 |
| 968.948 | 128 | 0.494 |
| 968.949 | 128 | 0.458 |
| 968.950 | 128 | 0.460 |
| 968.951 | 128 | 0.517 |
| 968.952 | 128 | 0.780 |
| 968.953 | 128 | 0.696 |
| 968.961 | 126 | 0.771 |
| 968.963 | 126 | 0.858 |
| 968.965 | 127 | 0.780 |
| 968.966 | 126 | 0.818 |
| 968.968 | 126 | 1.100 |
| 968.970 | 126 | 0.774 |
| 968.971 | 126 | 0.795 |
| 968.973 | 126 | 0.860 |
| 968.975 | 126 | 0.980 |
| 968.981 | 129 | 0.905 |
| 968.982 | 129 | 1.000 |
| 968.983 | 129 | 1.120 |
| 968.984 | 129 | 1.240 |
| 968.985 | 129 | 1.040 |
| 968.986 | 129 | 1.500 |
| 968.989 | 130 | 2.460 |
| 968.990 | 130 | 2.700 |
| 968.991 | 130 | 2.520 |
| 968.992 | 130 | 2.700 |
| 968.993 | 130 | 2.620 |
| 968.994 | 130 | 2.820 |
| 968.995 | 130 | 2.760 |
| 968.996 | 130 | 3.040 |
| 968.997 | 130 | 2.860 |
| 968.998 | 130 | 3.300 |
| 969.023 | 98 | 3.340 |
| 969.025 | 98 | 4.580 |
| 969.032 | 100 | 1.070 |
| 969.034 | 100 | 1.030 |
| 969.036 | 100 | 1.260 |
| 969.037 | 100 | 1.040 |
| 969.038 | 100 | 1.170 |
| 969.040 | 100 | 0.900 |
| 969.041 | 100 | 1.230 |
| 969.042 | 100 | 1.500 |
| 969.043 | 100 | 1.040 |
| 969.044 | 100 | 1.360 |
| 969.045 | 100 | 1.670 |
| 969.046 | 100 | 1.015 |
| 969.047 | 100 | 1.340 |
| 969.048 | 100 | 1.870 |
| 969.059 | 100 | 2.300 |
| 969.060 | 100 | 2.400 |
| 969.062 | 101 | 2.720 |
| 969.063 | 101 | 3.100 |
| 969.066 | 101 | 3.200 |
| 969.067 | 101 | 3.000 |
| 969.069 | 101 | 2.800 |
| 969.070 | 101 | 3.105 |
| 969.071 | 101 | 3.300 |
| 969.075 | 101 | 4.200 |
| 969.077 | 101 | 3.500 |
| 969.082 | 101 | 3.000 |
| 969.083 | 101 | 3.415 |
| 969.084 | 101 | 4.300 |
| 969.085 | 101 | 4.000 |
| 969.087 | 101 | 2.980 |
| 969.088 | 101 | 3.200 |
| 969.090 | 101 | 4.000 |
| 969.091 | 101 | 4.340 |
| 969.208 | 94 | 1.100 |
| 969.209 | 46 | 0.385 |
| 969.210 | 46 | 0.405 |
| 969.211 | 46 | 0.480 |
| 969.214 | 46 | 0.435 |
| 969.215 | 46 | 0.470 |
| 969.218 | 46 | 0.395 |
| 969.220 | 46 | 0.470 |
| 969.221 | 46 | 0.505 |
| 969.222 | 46 | 0.585 |
| 969.224 | 95 | 0.990 |
| 969.225 | 95 | 1.080 |
| 969.229 | 95 | 1.060 |
| 969.230 | 95 | 1.330 |
| 969.234 | 95 | 1.250 |
| 969.235 | 95 | 1.340 |
| 969.239 | 95 | 1.200 |
| 969.240 | 95 | 1.480 |
| 969.241 | 95 | 1.660 |
| 969.244 | 95 | 1.317 |
| 969.245 | 95 | 1.800 |
| 969.246 | 95 | 2.010 |
| 969.248 | 95 | 1.100 |
| 969.249 | 95 | 1.365 |
| 969.250 | 95 | 1.900 |
| 969.251 | 95 | 2.400 |
| 969.252 | 95 | 0.350 |
| 969.253 | 96 | 3.000 |
| 969.254 | 96 | 3.800 |
| 969.255 | 96 | 1.310 |
| 969.261 | 96 | 3.200 |
| 969.262 | 96 | 3.160 |
| 969.263 | 96 | 3.360 |
| 969.267 | 96 | 3.200 |
| 969.268 | 96 | 3.400 |
| 969.269 | 96 | 3.700 |
| 969.274 | 96 | 3.230 |
| 969.275 | 96 | 3.458 |
| 969.276 | 96 | 3.840 |
| 969.277 | 96 | 4.400 |
| 969.280 | 96 | 3.280 |
| 969.281 | 96 | 3.580 |
| 969.282 | 96 | 4.040 |
| 969.283 | 96 | 4.600 |
| 969.302 | 94 | 1.000 |
| 969.305 | 94 | 0.928 |
| 969.307 | 94 | 0.900 |
| 969.308 | 94 | 0.970 |
| 969.309 | 94 | 1.070 |
| 969.319 | 46 | 0.440 |
| 969.322 | 46 | 0.985 |
| 969.323 | 46 | 1.080 |
| 969.324 | 46 | 0.980 |
| 969.326 | 46 | 1.000 |
| 969.328 | 46 | 1.115 |
| 969.330 | 46 | 0.989 |
| 969.331 | 46 | 1.000 |
| 969.332 | 46 | 1.030 |
| 969.333 | 46 | 1.060 |
| 969.334 | 46 | 1.120 |
| 969.335 | 46 | 1.200 |
| 969.341 | 48 | 0.480 |
| 969.342 | 48 | 0.540 |
| 969.343 | 48 | 0.550 |
| 969.344 | 48 | 0.527 |
| 969.345 | 48 | 0.622 |
| 969.346 | 48 | 0.668 |
| 969.347 | 48 | 0.570 |
| 969.348 | 48 | 0.725 |
| 969.349 | 48 | 0.631 |
| 969.350 | 48 | 0.815 |
| 969.351 | 48 | 0.700 |
| 969.352 | 48 | 1.000 |
| 969.353 | 48 | 0.720 |
| 969.354 | 48 | 1.080 |
| 969.361 | 49 | 1.050 |
| 969.362 | 49 | 1.100 |
| 969.363 | 49 | 1.140 |
| 969.364 | 49 | 1.080 |
| 969.365 | 49 | 1.180 |
| 969.366 | 49 | 1.210 |
| 969.367 | 49 | 1.160 |
| 969.368 | 49 | 1.280 |
| 969.369 | 49 | 1.350 |
| 969.370 | 49 | 1.200 |
| 969.371 | 49 | 1.380 |
| 969.372 | 49 | 1.460 |
| 969.373 | 49 | 1.250 |
| 969.374 | 49 | 1.520 |
| 969.375 | 49 | 1.680 |
| 969.376 | 49 | 1.270 |
| 969.377 | 49 | 1.600 |
| 969.378 | 49 | 1.780 |
| 969.446 | 281 | 0.094 |
| 969.447 | 281 | 0.239 |
| 969.448 | 271 | 0.533 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 969.449 | 271 | 0.068 |
| 969.450 | 271 | 0.860 |
| 969.451 | 271 | 0.178 |
| 969.452 | 271 | 0.091 |
| 969.453 | 271 | 0.184 |
| 969.454 | 271 | 0.117 |
| 969.455 | 271 | 0.203 |
| 969.456 | 271 | 0.180 |
| 969.457 | 271 | 0.300 |
| 969.458 | 271 | 0.250 |
| 969.459 | 271 | 0.396 |
| 969.460 | 271 | 0.312 |
| 969.460L | 271 | 0.200 |
| 969.461 | 271 | 0.563 |
| 969.462 | 271 | 0.358 |
| 969.462L | 271 | 0.570 |
| 969.463 | 271 | 0.520 |
| 969.464L | 271 | 0.784 |
| 969.465 | 271 | 0.368 |
| 969.465L | 275 | 0.640 |
| 969.466 | 271 | 0.790 |
| 969.468L | 271 | 0.963 |
| 969.469L | 275 | 0.979 |
| 969.470L | 275 | 1.040 |
| 969.471L | 275 | 1.300 |
| 969.472L | 275 | 1.700 |
| 969.475 | 174 | 0.029 |
| 969.480 | 249 | 0.004 |
| 969.481 | 249 | 0.006 |
| 969.482 | 249 | 0.075 |
| 969.483 | 258 | 0.025 |
| 969.484 | 258 | 0.040 |
| 969.485 | 258 | 0.060 |
| 969.486 | 258 | 0.090 |
| 969.487 | 258 | 0.120 |
| 969.488 | 258 | 0.140 |
| 969.491 | 257 | 0.019 |
| 969.492 | 257 | 0.050 |
| 969.493 | 257 | 0.030 |
| 969.494 | 257 | 0.036 |
| 969.495 | 257 | 0.100 |
| 969.496 | 257 | 0.028 |
| 969.497 | 257 | 0.029 |
| 969.498 | 257 | 0.036 |
| 969.499 | 257 | 0.037 |
| 969.504 | 47 | 0.430 |
| 969.506 | 47 | 0.975 |
| 969.508 | 47 | 1.000 |
| 969.509 | 48 | 0.450 |
| 969.510 | 48 | 0.510 |
| 969.511 | 48 | 0.460 |
| 969.512 | 48 | 0.531 |
| 969.513 | 48 | 0.515 |
| 969.514 | 49 | 1.220 |
| 969.516 | 48 | 0.515 |
| 969.517 | 48 | 0.735 |
| 969.518 | 48 | 0.930 |
| 969.519 | 48 | 0.565 |
| 969.520 | 48 | 0.850 |
| 969.521 | 48 | 0.600 |
| 969.522 | 48 | 0.900 |
| 969.523 | 49 | 1.030 |
| 969.524 | 49 | 1.070 |
| 969.525 | 49 | 1.150 |
| 969.526 | 49 | 1.230 |
| 969.527 | 49 | 1.320 |
| 969.528 | 49 | 1.060 |
| 969.529 | 49 | 1.140 |
| 969.530 | 49 | 1.260 |
| 969.531 | 49 | 1.380 |
| 969.532 | 49 | 1.500 |
| 969.533 | 49 | 1.080 |
| 969.534 | 48 | 0.655 |
| 969.535 | 49 | 1.420 |
| 969.536 | 49 | 1.560 |
| 969.537 | 49 | 1.720 |
| 969.538 | 49 | 1.100 |
| 969.539 | 49 | 1.280 |
| 969.540 | 49 | 1.560 |
| 969.541 | 49 | 1.760 |
| 969.542 | 49 | 1.960 |
| 969.543 | 49 | 1.100 |
| 969.544 | 49 | 1.400 |
| 969.545 | 49 | 1.810 |
| 969.546 | 49 | 2.100 |
| 969.547 | 49 | 2.427 |
| 969.548 | 49 | 1.100 |
| 969.549 | 49 | 1.460 |
| 969.550 | 49 | 1.940 |
| 969.551 | 49 | 2.290 |
| 969.552 | 49 | 2.690 |
| 969.553 | 50 | 3.640 |
| 969.554 | 50 | 3.700 |
| 969.555 | 50 | 3.800 |
| 969.556 | 50 | 3.870 |
| 969.557 | 50 | 3.680 |
| 969.558 | 50 | 3.790 |
| 969.559 | 50 | 3.940 |
| 969.560 | 50 | 4.040 |
| 969.561 | 50 | 3.750 |
| 969.562 | 50 | 3.880 |
| 969.563 | 50 | 4.100 |
| 969.564 | 50 | 4.260 |
| 969.565 | 50 | 4.500 |
| 969.566 | 50 | 4.720 |
| 969.567 | 50 | 3.840 |
| 969.568 | 50 | 4.000 |
| 969.569 | 50 | 4.270 |
| 969.570 | 50 | 4.480 |
| 969.571 | 50 | 4.780 |
| 969.572 | 50 | 5.080 |
| 969.573 | 51 | 3.770 |
| 969.574 | 51 | 3.920 |
| 969.575 | 51 | 4.160 |
| 969.576 | 51 | 4.520 |
| 969.577 | 51 | 4.850 |
| 969.578 | 51 | 5.240 |
| 969.579 | 51 | 3.800 |
| 969.580 | 51 | 3.950 |
| 969.581 | 51 | 4.260 |
| 969.582 | 51 | 4.680 |
| 969.583 | 51 | 5.060 |
| 969.584 | 51 | 5.560 |
| 969.593 | 53 | 5.060 |
| 969.595 | 53 | 5.360 |
| 969.596 | 53 | 6.490 |
| 969.597 | 53 | 5.460 |
| 969.601 | 254 | 0.004 |
| 969.602 | 254 | 0.003 |
| 969.603 | 254 | 0.003 |
| 969.604 | 254 | 0.003 |
| 969.605 | 254 | 0.004 |
| 969.606 | 254 | 0.003 |
| 969.607 | 254 | 0.003 |
| 969.608 | 254 | 0.003 |
| 969.609 | 254 | 0.003 |
| 969.610 | 254 | 0.003 |
| 969.611 | 254 | 0.003 |
| 969.612 | 254 | 0.003 |
| 969.613 | 254 | 0.003 |
| 969.615 | 254 | 0.010 |
| 969.616 | 254 | 0.009 |
| 969.617 | 254 | 0.009 |
| 969.618 | 254 | 0.008 |
| 969.619 | 254 | 0.008 |
| 969.620 | 254 | 0.008 |
| 969.621 | 254 | 0.008 |
| 969.622 | 254 | 0.008 |
| 969.623 | 254 | 0.007 |
| 969.624 | 254 | 0.007 |
| 969.625 | 254 | 0.006 |
| 969.627 | 254 | 0.026 |
| 969.628 | 254 | 0.026 |
| 969.629 | 254 | 0.027 |
| 969.630 | 254 | 0.025 |
| 969.631 | 254 | 0.025 |
| 969.632 | 254 | 0.024 |
| 969.633 | 254 | 0.022 |
| 969.634 | 254 | 0.025 |
| 969.635 | 254 | 0.021 |
| 969.636 | 254 | 0.021 |
| 969.637 | 254 | 0.020 |
| 969.638 | 254 | 0.020 |
| 969.639 | 254 | 0.018 |
| 969.640 | 254 | 0.016 |
| 969.641 | 254 | 0.016 |
| 969.643 | 254 | 0.045 |
| 969.644 | 254 | 0.047 |
| 969.645 | 254 | 0.047 |
| 969.646 | 254 | 0.045 |
| 969.647 | 254 | 0.044 |
| 969.648 | 254 | 0.044 |
| 969.649 | 254 | 0.043 |
| 969.650 | 254 | 0.043 |
| 969.651 | 254 | 0.042 |
| 969.652 | 254 | 0.010 |
| 969.653 | 254 | 0.041 |
| 969.654 | 254 | 0.038 |
| 969.655 | 254 | 0.038 |
| 969.656 | 254 | 0.037 |
| 969.657 | 254 | 0.036 |
| 969.658 | 254 | 0.034 |
| 969.659 | 254 | 0.033 |
| 969.660 | 254 | 0.032 |
| 969.661 | 254 | 0.030 |
| 969.662 | 254 | 0.028 |
| 969.663 | 254 | 0.026 |
| 969.669 | 255 | 0.082 |
| 969.670 | 255 | 0.082 |
| 969.671 | 255 | 0.082 |
| 969.672 | 255 | 0.082 |
| 969.673 | 255 | 0.079 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 969.674 | 255 | 0.078 |
| 969.675 | 255 | 0.078 |
| 969.676 | 255 | 0.078 |
| 969.677 | 255 | 0.078 |
| 969.678 | 255 | 0.078 |
| 969.679 | 255 | 0.075 |
| 969.680 | 255 | 0.073 |
| 969.681 | 255 | 0.072 |
| 969.682 | 255 | 0.072 |
| 969.683 | 255 | 0.067 |
| 969.684 | 255 | 0.067 |
| 969.685 | 255 | 0.063 |
| 969.686 | 255 | 0.063 |
| 969.687 | 255 | 0.059 |
| 969.688 | 255 | 0.059 |
| 969.689 | 255 | 0.055 |
| 969.690 | 255 | 0.055 |
| 969.691 | 255 | 0.049 |
| 969.697 | 255 | 0.117 |
| 969.698 | 255 | 0.116 |
| 969.699 | 255 | 0.116 |
| 969.700 | 255 | 0.115 |
| 969.701 | 255 | 0.112 |
| 969.702 | 255 | 0.113 |
| 969.703 | 255 | 0.112 |
| 969.704 | 255 | 0.112 |
| 969.705 | 255 | 0.110 |
| 969.706 | 255 | 0.108 |
| 969.707 | 255 | 0.108 |
| 969.708 | 255 | 0.105 |
| 969.709 | 255 | 0.104 |
| 969.710 | 255 | 0.101 |
| 969.711 | 255 | 0.100 |
| 969.712 | 255 | 0.098 |
| 969.713 | 255 | 0.094 |
| 969.714 | 255 | 0.093 |
| 969.715 | 255 | 0.091 |
| 969.716 | 255 | 0.088 |
| 969.717 | 255 | 0.085 |
| 969.718 | 255 | 0.083 |
| 969.719 | 255 | 0.080 |
| 969.720 | 255 | 0.077 |
| 969.721 | 255 | 0.074 |
| 969.722 | 255 | 0.071 |
| 969.723 | 255 | 0.680 |
| 969.724 | 255 | 0.063 |
| 969.725 | 255 | 0.060 |
| 969.726 | 255 | 0.056 |
| 969.727 | 255 | 0.051 |
| 969.861 | 260 | 0.028 |
| 969.862 | 260 | 0.028 |
| 969.863 | 260 | 0.028 |
| 969.864 | 260 | 0.047 |
| 969.865 | 260 | 0.047 |
| 969.866 | 260 | 0.047 |
| 969.867 | 260 | 0.045 |
| 969.868 | 260 | 0.045 |
| 969.869 | 260 | 0.070 |
| 969.870 | 260 | 0.070 |
| 969.871 | 260 | 0.070 |
| 969.872 | 260 | 0.070 |
| 969.873 | 260 | 0.070 |
| 969.874 | 260 | 0.070 |
| 969.875 | 260 | 0.069 |
| 969.876 | 260 | 0.102 |
| 969.877 | 260 | 0.101 |
| 969.878 | 260 | 0.102 |
| 969.879 | 260 | 0.102 |
| 969.880 | 260 | 0.102 |
| 969.881 | 260 | 0.102 |
| 969.882 | 260 | 0.102 |
| 969.883 | 260 | 0.100 |
| 969.884 | 260 | 0.099 |
| 969.885 | 260 | 0.099 |
| 969.886 | 261 | 0.145 |
| 969.887 | 261 | 0.145 |
| 969.888 | 261 | 0.145 |
| 969.889 | 261 | 0.150 |
| 969.890 | 261 | 0.147 |
| 969.891 | 261 | 0.148 |
| 969.892 | 261 | 0.148 |
| 969.893 | 261 | 0.150 |
| 969.894 | 261 | 0.147 |
| 969.895 | 261 | 0.147 |
| 969.896 | 261 | 0.143 |
| 969.897 | 261 | 0.143 |
| 969.898 | 261 | 0.142 |
| 969.899 | 261 | 0.167 |
| 969.900 | 261 | 0.168 |
| 969.901 | 261 | 0.168 |
| 969.902 | 261 | 0.168 |
| 969.903 | 261 | 0.168 |
| 969.904 | 261 | 0.170 |
| 969.905 | 261 | 0.170 |
| 969.906 | 261 | 0.170 |
| 969.907 | 261 | 0.170 |
| 969.908 | 261 | 0.170 |
| 969.909 | 261 | 0.168 |
| 969.910 | 261 | 0.169 |
| 969.911 | 261 | 0.169 |
| 969.912 | 261 | 0.163 |
| 969.913 | 261 | 0.164 |
| 969.914 | 261 | 0.164 |
| 969.915 | 261 | 0.163 |
| 969.921 | 262 | 0.020 |
| 969.922 | 262 | 0.020 |
| 969.923 | 262 | 0.020 |
| 969.924 | 262 | 0.036 |
| 969.925 | 262 | 0.036 |
| 969.926 | 262 | 0.037 |
| 969.927 | 262 | 0.035 |
| 969.928 | 262 | 0.035 |
| 969.929 | 262 | 0.054 |
| 969.930 | 262 | 0.054 |
| 969.931 | 262 | 0.054 |
| 969.932 | 262 | 0.054 |
| 969.933 | 262 | 0.054 |
| 969.934 | 262 | 0.052 |
| 969.935 | 262 | 0.052 |
| 969.936 | 262 | 0.080 |
| 969.937 | 262 | 0.080 |
| 969.938 | 262 | 0.083 |
| 969.939 | 262 | 0.083 |
| 969.940 | 262 | 0.083 |
| 969.941 | 262 | 0.083 |
| 969.942 | 262 | 0.083 |
| 969.943 | 262 | 0.080 |
| 969.944 | 262 | 0.080 |
| 969.945 | 262 | 0.080 |
| 969.946 | 263 | 0.115 |
| 969.947 | 263 | 0.115 |
| 969.948 | 263 | 0.116 |
| 969.949 | 263 | 0.116 |
| 969.950 | 263 | 0.116 |
| 969.951 | 263 | 0.117 |
| 969.952 | 263 | 0.117 |
| 969.953 | 263 | 0.320 |
| 969.954 | 263 | 0.117 |
| 969.955 | 263 | 0.116 |
| 969.956 | 263 | 0.111 |
| 969.957 | 263 | 0.112 |
| 969.958 | 263 | 0.112 |
| 969.959 | 263 | 0.132 |
| 969.960 | 263 | 0.133 |
| 969.961 | 263 | 0.133 |
| 969.962 | 263 | 0.133 |
| 969.963 | 263 | 0.133 |
| 969.964 | 263 | 0.135 |
| 969.965 | 263 | 0.135 |
| 969.966 | 263 | 0.135 |
| 969.967 | 263 | 0.134 |
| 969.968 | 263 | 0.136 |
| 969.969 | 263 | 0.135 |
| 969.970 | 263 | 0.133 |
| 969.971 | 263 | 0.133 |
| 969.972 | 263 | 0.129 |
| 969.973 | 263 | 0.128 |
| 969.974 | 263 | 0.128 |
| 969.975 | 263 | 0.129 |
| 969.981 | 261 | 0.002 |
| 969.982 | 261 | 0.002 |
| 969.983 | 261 | 0.002 |
| 969.984 | 261 | 0.005 |
| 969.985 | 261 | 0.004 |
| 969.986 | 261 | 0.005 |
| 969.987 | 261 | 0.004 |
| 969.988 | 261 | 0.010 |
| 969.989 | 261 | 0.006 |
| 969.990 | 261 | 0.005 |
| 969.991 | 261 | 0.001 |
| 969.992 | 261 | 0.010 |
| 969.993 | 261 | 0.010 |
| 969.994 | 261 | 0.002 |
| 969.995 | 261 | 0.002 |
| 969.996 | 261 | 0.002 |
| 969.997 | 261 | 0.010 |
| 972.304 | 510 | 0.005 |
| 972.306 | 510 | 0.005 |
| 972.309 | 510 | 0.003 |
| 972.310 | 510 | 0.003 |
| 972.311 | 510 | 0.003 |
| 972.321 | 274 | 0.012 |
| 972.322 | 274 | 0.029 |
| 972.331 | 284 | 0.950 |
| 973.001 | 228 | 0.550 |
| 973.002 | 228 | 0.761 |
| 973.003 | 228 | 1.060 |
| 973.006 | 228 | 1.480 |
| 973.007 | 228 | 1.920 |
| 973.011 | 228 | 4.000 |
| 973.013 | 228 | 4.200 |
| 973.014 | 219 | 0.470 |

| Order No. | Page | Weight (kg) |
|---|---|---|
| 973.015 | 219 | 0.491 |
| 973.016 | 219 | 1.352 |
| 973.017 | 219 | 0.465 |
| 973.018 | 219 | 0.464 |
| 973.019 | 219 | 0.740 |
| 973.020 | 219 | 0.740 |
| 973.021 | 219 | 1.352 |
| 973.022 | 219 | 0.684 |
| 973.023 | 219 | 0.683 |
| 973.024 | 219 | 0.440 |
| 973.025 | 219 | 1.635 |
| 973.026 | 232 | 1.140 |
| 973.027 | 232 | 1.140 |
| 973.028 | 232 | 1.270 |
| 973.030 | 232 | 6.600 |
| 973.031 | 232 | 6.620 |
| 973.032 | 233 | 1.600 |
| 973.033 | 233 | 1.600 |
| 973.034 | 233 | 3.100 |
| 973.035 | 233 | 3.100 |
| 973.038 | 233 | 5.940 |
| 973.039 | 233 | 5.940 |
| 973.040 | 233 | 2.560 |
| 973.041 | 233 | 2.560 |
| 973.045 | 233 | 5.000 |
| 973.046 | 233 | 6.100 |
| 973.047 | 233 | 6.100 |
| 973.052 | 230 | 0.850 |
| 973.053 | 230 | 1.380 |
| 973.054 | 230 | 2.000 |
| 973.055 | 230 | 0.950 |
| 973.056 | 230 | 1.998 |
| 973.057 | 230 | 2.600 |
| 973.058 | 230 | 3.320 |
| 973.059 | 230 | 4.280 |
| 973.060 | 230 | 2.100 |
| 973.061 | 230 | 3.720 |
| 973.062 | 230 | 4.750 |
| 973.063 | 230 | 5.700 |
| 973.064 | 230 | 0.240 |
| 973.065 | 230 | 0.700 |
| 973.066 | 230 | 0.240 |
| 973.067 | 230 | 0.240 |
| 973.068 | 230 | 0.300 |
| 973.069 | 230 | 0.300 |
| 973.070 | 230 | 0.210 |
| 973.071 | 230 | 0.210 |
| 973.072 | 230 | 0.245 |
| 973.073 | 230 | 0.245 |
| 973.076 | 221 | 0.338 |
| 973.077 | 221 | 0.700 |
| 973.078 | 221 | 0.400 |
| 973.079 | 221 | 0.400 |
| 973.080 | 221 | 0.330 |
| 973.081 | 221 | 0.700 |
| 973.082 | 221 | 0.380 |
| 973.083 | 221 | 0.700 |
| 973.084 | 221 | 0.406 |
| 973.085 | 221 | 0.700 |
| 973.086 | 221 | 0.258 |
| 973.087 | 221 | 0.276 |
| 973.088 | 235 | 0.646 |
| 973.089 | 235 | 0.644 |
| 973.090 | 235 | 0.647 |
| 973.091 | 235 | 0.786 |
| 973.092 | 235 | 0.974 |
| 973.093 | 235 | 1.280 |
| 973.094 | 235 | 1.540 |
| 973.095 | 235 | 2.040 |
| 973.096 | 235 | 3.700 |
| 973.097 | 235 | 1.000 |
| 973.098 | 235 | 0.952 |
| 973.099 | 235 | 0.960 |
| 973.100 | 235 | 1.100 |
| 973.101 | 235 | 1.280 |
| 973.102 | 235 | 1.580 |
| 973.103 | 235 | 1.840 |
| 973.104 | 235 | 2.350 |
| 973.105 | 235 | 3.720 |
| 973.110 | 235 | 2.000 |
| 973.111 | 235 | 3.300 |
| 973.112 | 235 | 2.820 |
| 973.113 | 235 | 3.320 |
| 973.114 | 235 | 4.400 |
| 973.115 | 186 | 0.880 |
| 973.116 | 186 | 0.840 |
| 973.117 | 186 | 0.935 |
| 973.119 | 186 | 1.700 |
| 973.120 | 186 | 1.260 |
| 973.121 | 186 | 1.180 |
| 973.122 | 186 | 1.580 |
| 973.123 | 186 | 1.780 |
| 973.124 | 186 | 2.200 |
| 973.125 | 186 | 2.200 |
| 973.126 | 186 | 2.100 |
| 973.127 | 186 | 2.580 |
| 973.128 | 186 | 2.660 |
| 973.181 | 225 | 0.012 |
| 973.182 | 225 | 0.012 |
| 973.183 | 225 | 0.012 |
| 973.184 | 225 | 0.008 |
| 973.185 | 225 | 0.011 |
| 973.186 | 225 | 0.017 |
| 973.187 | 225 | 0.013 |
| 973.188 | 225 | 0.017 |
| 973.194 | 287 | 0.007 |
| 973.195 | 287 | 0.015 |
| 973.196 | 287 | 0.011 |
| 973.197 | 287 | 0.015 |
| 973.198 | 287 | 0.020 |
| 973.203 | 176 | 0.580 |
| 973.204 | 176 | 0.892 |
| 973.205 | 176 | 0.940 |
| 973.206 | 176 | 0.961 |
| 973.208 | 176 | 0.450 |
| 973.209 | 176 | 0.468 |
| 973.210 | 176 | 0.782 |
| 973.211 | 176 | 0.801 |
| 973.212 | 176 | 0.800 |
| 973.213 | 177 | 0.497 |
| 973.214 | 177 | 0.400 |
| 973.215 | 177 | 0.560 |
| 973.218 | 177 | 0.534 |
| 973.219 | 177 | 0.500 |
| 973.220 | 177 | 0.630 |
| 973.223 | 177 | 0.550 |
| 973.224 | 177 | 0.645 |
| 973.225 | 177 | 0.715 |
| 973.229 | 177 | 0.579 |
| 973.230 | 177 | 0.707 |
| 973.231 | 177 | 0.799 |
| 973.235 | 177 | 0.700 |
| 973.236 | 177 | 0.802 |
| 973.237 | 177 | 0.932 |
| 973.241 | 177 | 0.710 |
| 973.242 | 177 | 0.800 |
| 973.243 | 177 | 1.000 |
| 973.247 | 178 | 0.822 |
| 973.248 | 178 | 0.857 |
| 973.249 | 178 | 0.888 |
| 973.250 | 178 | 1.300 |
| 973.251 | 178 | 0.946 |
| 973.252 | 178 | 1.200 |
| 973.253 | 178 | 1.070 |
| 973.254 | 178 | 0.854 |
| 973.255 | 178 | 1.300 |
| 973.256 | 178 | 0.965 |
| 973.257 | 178 | 1.000 |
| 973.258 | 178 | 1.060 |
| 973.259 | 178 | 1.100 |
| 973.260 | 178 | 1.200 |
| 973.261 | 178 | 0.893 |
| 973.262 | 178 | 1.400 |
| 973.263 | 178 | 1.040 |
| 973.264 | 178 | 1.110 |
| 973.265 | 178 | 1.180 |
| 973.266 | 178 | 1.248 |
| 973.267 | 178 | 1.380 |
| 973.269 | 178 | 0.930 |
| 973.270 | 178 | 1.050 |
| 973.271 | 178 | 1.120 |
| 973.272 | 178 | 0.900 |
| 973.273 | 178 | 1.300 |
| 973.274 | 178 | 1.400 |
| 973.275 | 178 | 1.580 |
| 973.277 | 178 | 1.040 |
| 973.278 | 178 | 1.120 |
| 973.279 | 178 | 1.260 |
| 973.280 | 178 | 1.400 |
| 973.281 | 178 | 1.520 |
| 973.282 | 178 | 1.650 |
| 973.283 | 178 | 2.400 |
| 973.285 | 178 | 1.140 |
| 973.286 | 178 | 1.180 |
| 973.287 | 178 | 1.340 |
| 973.288 | 178 | 1.500 |
| 973.289 | 178 | 1.640 |
| 973.290 | 178 | 2.300 |
| 973.291 | 178 | 2.600 |
| 973.292 | 178 | 2.900 |
| 973.293 | 179 | 1.860 |
| 973.295 | 179 | 1.900 |
| 973.297 | 179 | 2.020 |
| 973.298 | 179 | 2.600 |
| 973.300 | 179 | 2.700 |
| 973.302 | 179 | 2.200 |
| 973.304 | 179 | 2.010 |
| 973.306 | 179 | 2.140 |
| 973.308 | 179 | 2.380 |
| 973.311 | 179 | 2.040 |
| 973.313 | 179 | 2.220 |
| 973.315 | 179 | 3.200 |



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| Order No. | Page | Weight (kg) |
|---|---|---|
| 973.316 | 179 | 2.720 |
| 973.318 | 179 | 2.160 |
| 973.320 | 179 | 2.420 |
| 973.322 | 179 | 2.800 |
| 973.325 | 179 | 2.220 |
| 973.327 | 179 | 2.520 |
| 973.329 | 179 | 3.040 |
| 973.330 | 179 | 3.410 |
| 973.347 | 180 | 0.756 |
| 973.348 | 180 | 0.900 |
| 973.349 | 180 | 1.080 |
| 973.354 | 180 | 0.951 |
| 973.355 | 180 | 1.040 |
| 973.356 | 180 | 1.140 |
| 973.357 | 180 | 1.280 |
| 973.361 | 180 | 1.020 |
| 973.362 | 180 | 1.140 |
| 973.363 | 180 | 1.280 |
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| 973.396 | 180 | 3.200 |
| 973.397 | 180 | 2.680 |
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| 973.431 | 181 | 2.585 |
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| 973.475 | 182 | 4.740 |
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| 973.480 | 182 | 6.500 |
| 973.572 | 187 | 0.660 |
| 973.573 | 187 | 0.900 |
| 973.574 | 187 | 1.200 |
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| 973.579 | 187 | 2.800 |
| 973.580 | 187 | 2.420 |
| 973.598 | 189 | 1.000 |
| 973.600 | 189 | 1.200 |
| 973.601 | 189 | 1.700 |
| 973.602 | 189 | 3.600 |
| 973.603 | 189 | 3.600 |
| 973.604 | 189 | 3.500 |
| 973.605 | 189 | 3.620 |
| 973.609 | 457 | 1.017 |
| 973.680 | 183 | 2.500 |
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| 973.690 | 183 | 4.780 |
| 973.718 | 188 | 1.000 |
| 973.720 | 188 | 1.180 |
| 973.721 | 188 | 1.110 |
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