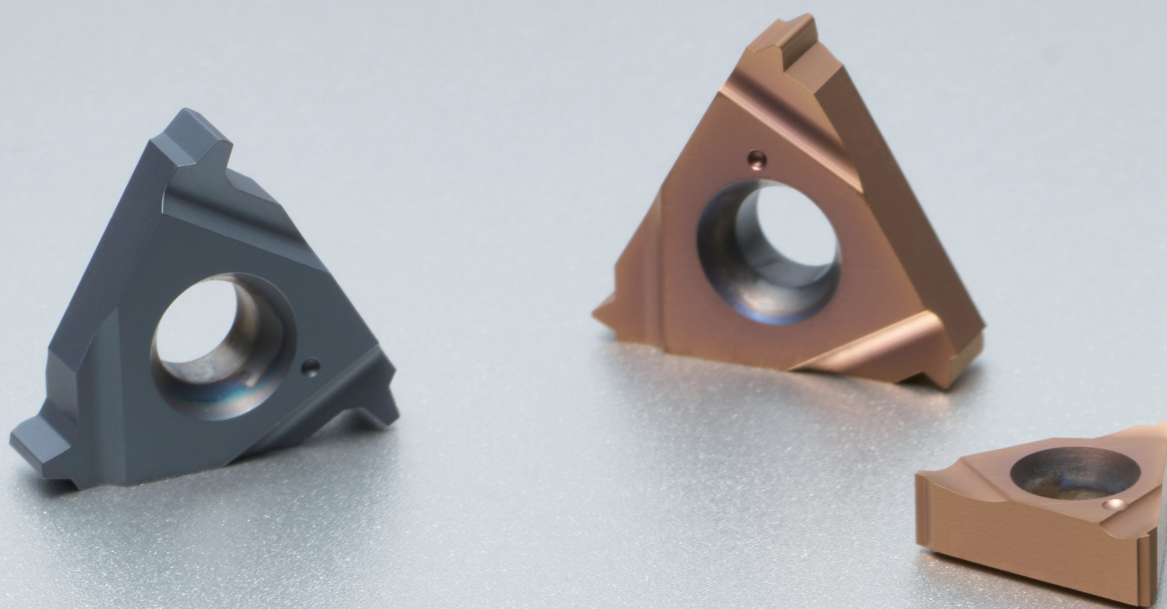


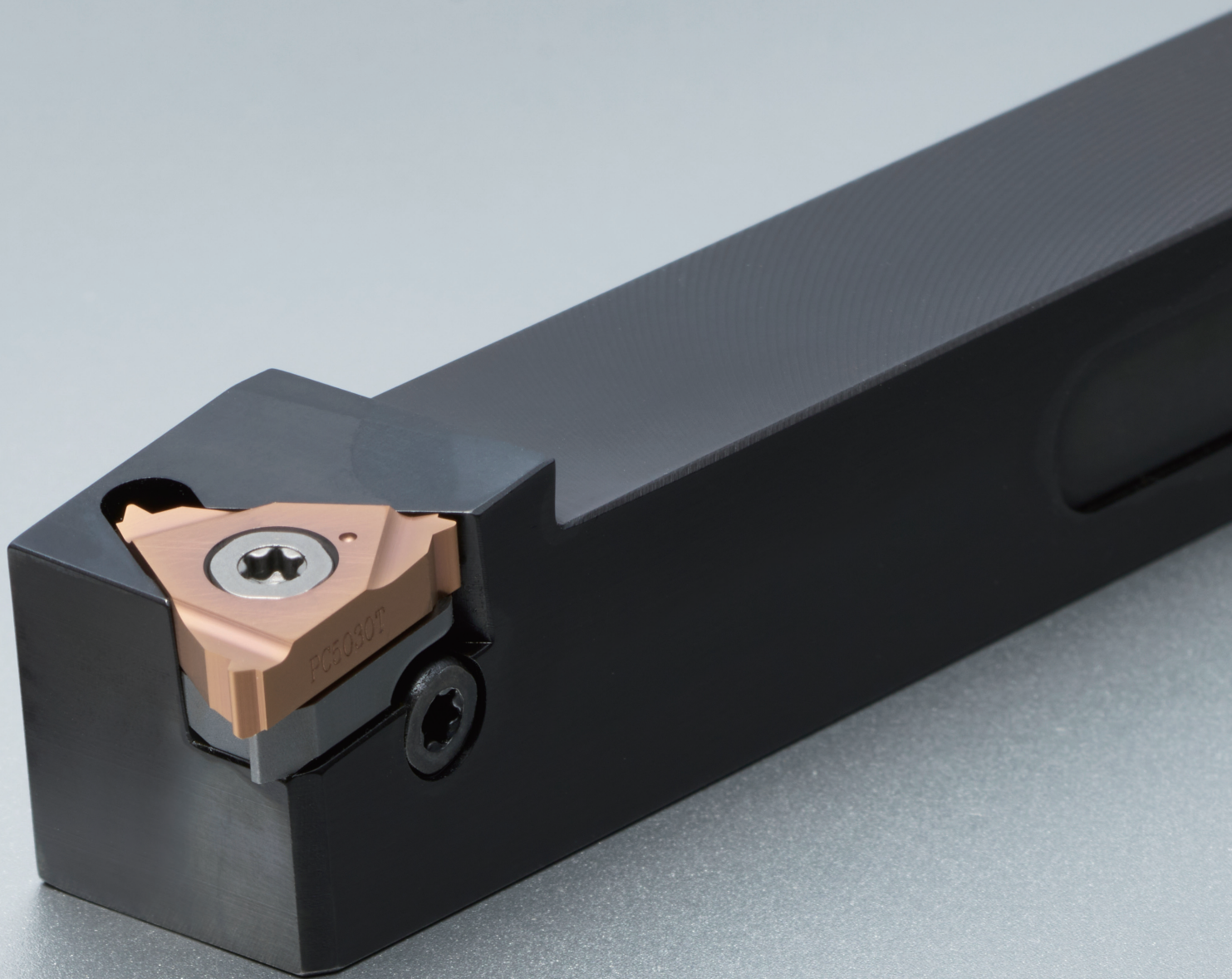
Thread Turning

Thread Turning solution for
High Performance and Productivity

Thread Turning Contents

04	_____	Grade Features
06	_____	Grade Selection Guide
07	_____	Technical Information on Threading
13	_____	Threading Inserts with Chip Breaker
14	_____	Threading Insert & Holder Code System
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16	_____	Threading Inserts
37	_____	Threading Holders (External & Internal)







Thread Turning

THREAD TURNING

KORLOY, known for superior, highly precise threading technology, introduces a thread turning which offers a high efficiency in a manufacturing process. KORLOY's thread turning tools ensure excellent performance in a challenging thread operations. For example, in high helix and small diameter internal machining, it effectively resolves a common issues during manufacturing process like chip evacuation problems, bad surface finish, and shorter tool life.

KORLOY's thread turning tools feature precisely ground thread inserts and outstanding chip control technology. Chips are smoothly evacuated, minimizing machining halts due to chip blocking and supporting the achievement of high-quality threading. In addition, the application of PC5030T, premium PVD AlTiN coating, enhances cutting speed and maximizes tool life. This system is also adaptable to various thread forms, enabling a wide range of machining in a single setup.

KORLOY's thread turning is a smart solution that simultaneously increases both thread quality and productivity, demonstrating enhanced competitiveness in manufacturing sites through substantial improvements in efficiency and cost reduction for customers.

Experience a new standard in threading with KORLOY's thread turning





Feature

- **High-quality surface finish** - Achieves excellent surface quality during threading with precisely ground inserts.
- **Various Thread Form Compatibility** - A wide range of operations is possible in a single system.
- **Perfect Chip Evacuation** - Smooth and uninterrupted chip evacuation during machining with chip breaker, preventing from chip blocking.
- **Increased Productivity** - Longer tool life and cost savings through premium coating design

Insert features

Reinforced shape and edge angle

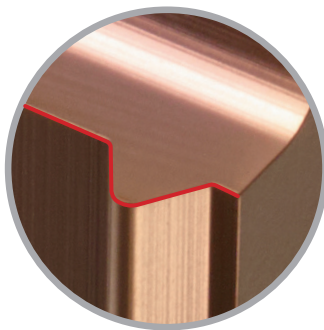
Reinforced shape to reduce cutting resistance

Grade

Premium and general grade with improved wear resistance

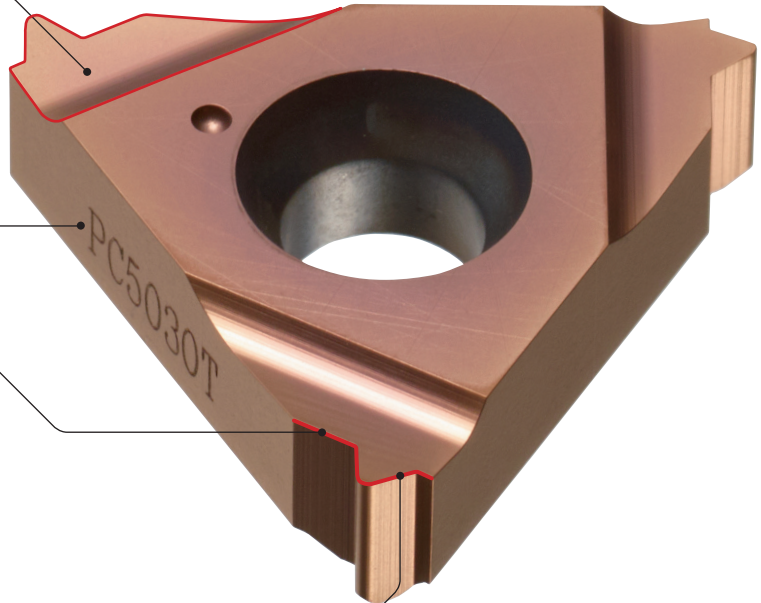
Optimized cutting edge design

Excellent surface finish of thread



Advanced surface treatment

Reinforced cutting edge and improved surface treatment

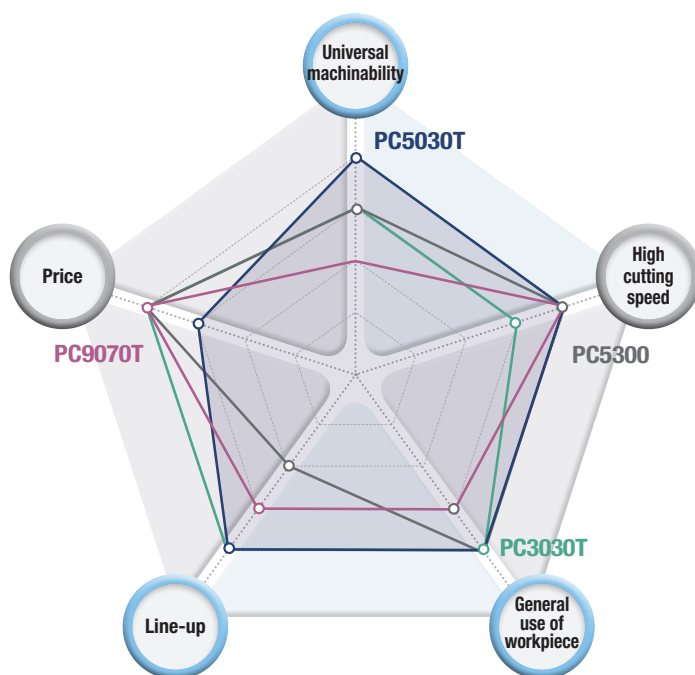


Grade features

Grade	Feature		Available insert type
PC5030T 	Premium general use	• New PVD- coated versatile thread grade • Enhanced productivity through improved wear resistance and stabilized tool life due to post-coating treatment	Ground insert (ER/IR)
PC5300	Universal grade	• For chip breaker type only • Stable machining on a wide application due to fine-grained carbide substrate with balanced heat resistance and toughness • Excellent wear resistance and oxidation resistance due to AlTiN coating film Outstanding performance on high speed machining	ERM/IRM (Insert with Chip breaker)
PC3030T	Grade for threading inserts	• A tough sub-micron substrate with TiAlN coating provides good fracture toughness and excellent wear resistance • Outstanding performance on STS and hard to cut materials	Ground insert (ER/IR)
PC9070T	Grade for threading inserts	• Strong wear resistance in stainless machining thanks to multilayer PVD coatings	Ground insert (ER/IR)



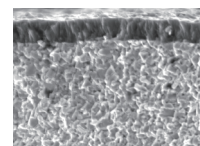
Grade selection guide



PC5030T

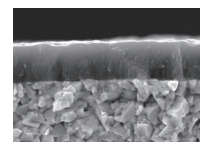
New

- New PVD versatile coating
- Improved wear resistance and extended tool life through post-coating treatment



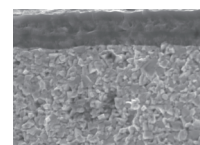
PC5300

- Exclusive grade for chip breaker
- Ultra-fine grain grade and stable performance



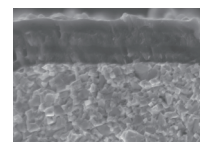
PC3030T

- Strengthened cutting edge with high-toughness fine-grain substrate application
- Chipping resistance through optimized geometry



PC9070T

- Excellent wear resistance in stainless steel machining
- Multi-layer PVD coating



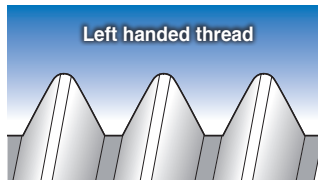
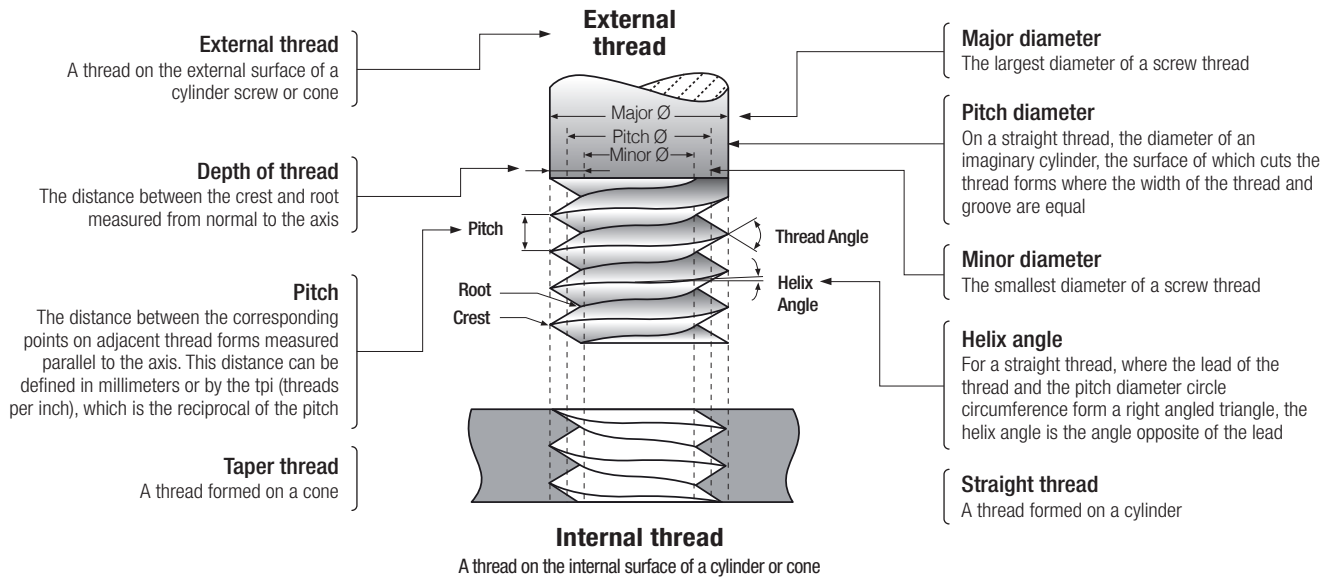
Grade	Universal machinability	High cutting speed	General use of workpiece	Line-up	Price
PC5030T <i>New</i>	★★★★★	★★★★★	★★★★★	★★★★★	★★★
PC5300	★★★	★★★★★	★★★★★	★★	★★★★★
PC3030T	★★★	★★★	★★★★★	★★★★★	★★★★★
PC9070T	★★	★★★★★	★★★	★★★	★★★★★

Application range

Workpiece		
P	Carbon steel, Alloy steel, Cast steel	PC5300
		PC5030T
K	Cast steel	PC3030T
		PC5300
M	Stainless steel	PC5030T
		PC3030T
N	Aluminum, Copper	PC9070T
		PC5300



Special features



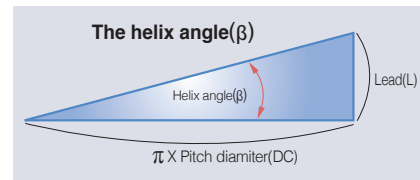
Left handed thread

A thread which, when viewed axially, winds in a counter clockwise and receding direction. All left handed threads are designated LH



Right handed thread

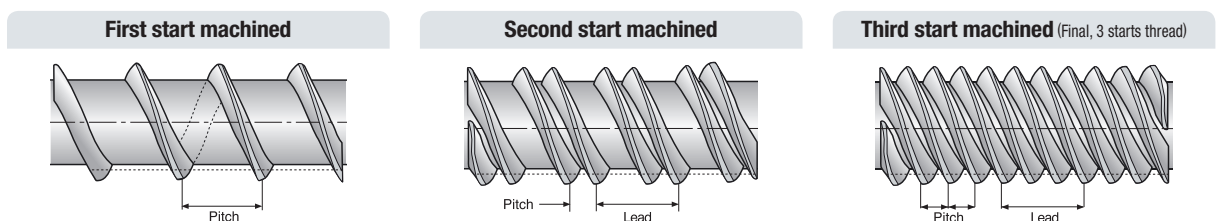
A thread which, when viewed axially, winds in a clockwise and receding direction. Threads are always right handed unless they are specified



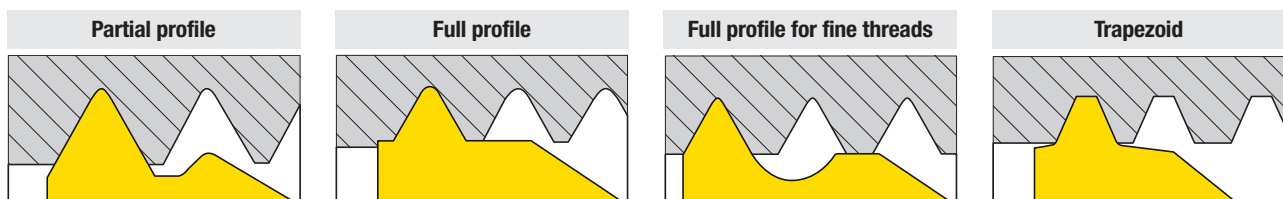
For a straight thread, where the lead of the thread and the pitch diameter circle circumference form a right angled triangle, the helix angle is the angle opposite of the lead

Machining a multi-start thread

- A thread in which the lead is an integral multiple, greater than one, of the pitch. A multi-start thread permits a more rapid advance without a coarser (larger) thread form



Shape of insert cutting edge



- Cutting without machining the outer diameter of the thread
- Usable for various pitches sharing the same helix angle

Advantage: High versatility

- Complete machining the entire thread form, including the crest
- Required dedicated insert for each pitch and specification

Advantage: Precise finished shape

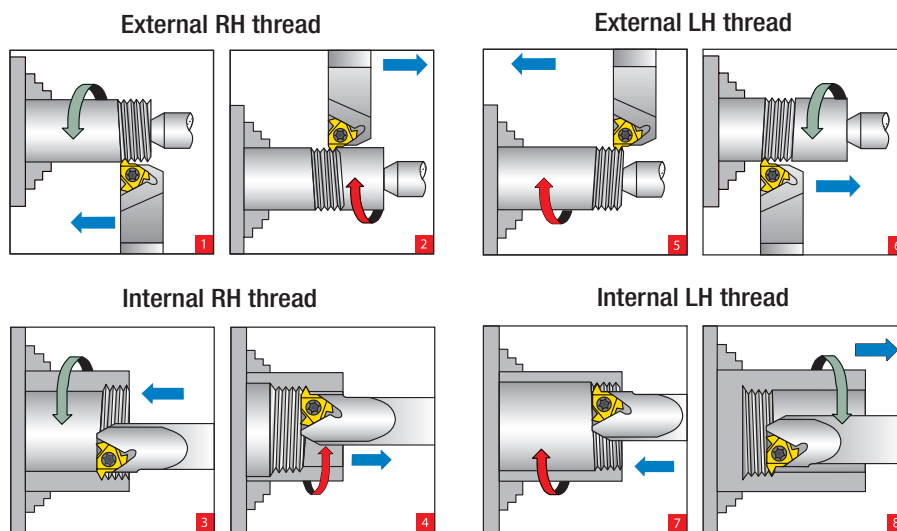
- Machining the full profile for fine threads
- Machining outer diameter by the minor cutting edge

- Machining the complete thread form without outer diameter finishing
- Mainly used for trapezoidal threads

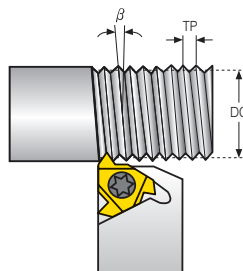


Thread turning method

Thread	Inserts & Tool holder	Rotation	Feed direction	Helix method	Drawing no.
Right Handed External	EX RH	Counter clockwise	Towards chuck	Regular	1
	EX LH	Clockwise	From chuck	Reversed	2
Right Handed Internal	IN RH	Counter clockwise	Towards chuck	Regular	3
	IN LH	Clockwise	From chuck	Reversed	4
Left Handed External	EX LH	Clockwise	Towards chuck	Regular	5
	EX RH	Counter clockwise	From chuck	Reversed	6
Left Handed Internal	IN LH	Clockwise	Towards chuck	Regular	7
	IN RH	Counter clockwise	From chuck	Reversed	8



Calculating the helix angle (β)



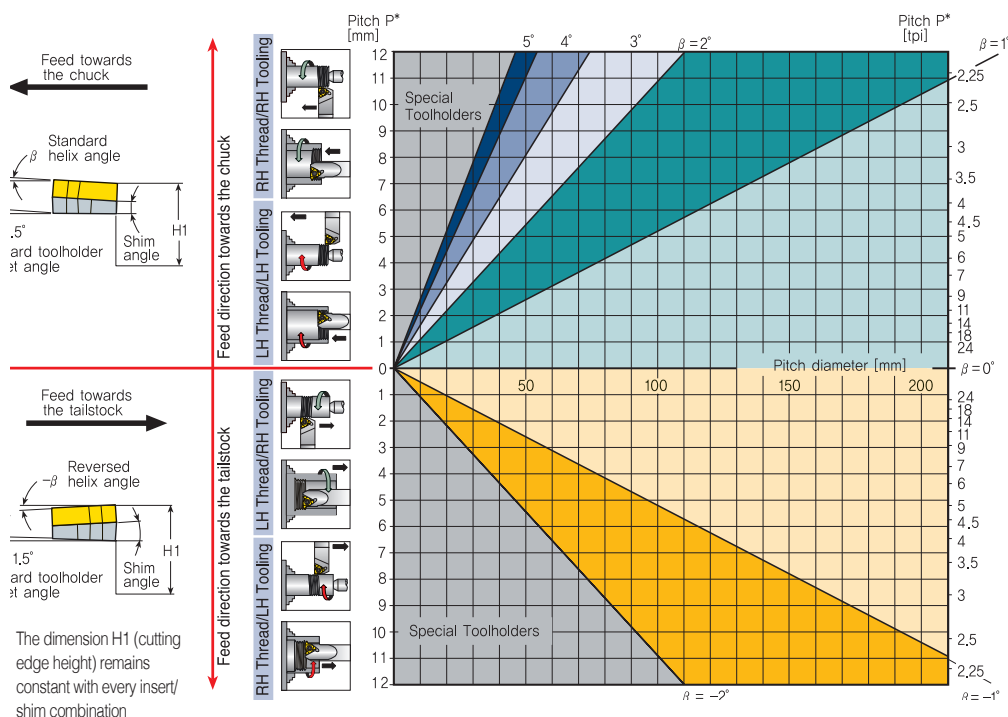
- The helix angle is calculated by the following formula:

$$\beta = \tan^{-1} \frac{TP \times N}{\pi \times DC}$$

β : Helix angle ($^{\circ}$)
 P: Pitch (mm)
 N: No. of starts
 D: Pitch diameter (mm)
 Lead = P x N

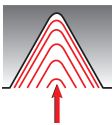
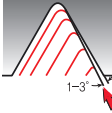
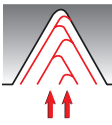
- The helix angle can also be found from the diagram below

(Helix angle diagram)





Thread infeed method

Infeed	Application	
 Radial infeed	- When the pitch is smaller than 16 tpi - For material with short chips - For work with hardened material	Radial infeed is the simplest and quickest method The feed is perpendicular to the turning axis, and both flanks of the insert perform the cutting operation Radial infeed is recommended in 3 cases
 Flank infeed (modified)	When the thread pitch is greater than 16 tpi. Using the radial method, the effective cutting edge length is too large, resulting in chatter. For TRAPEZ and ACME. The radial method results in three cutting edges, making chip flow very difficult	Flank infeed is recommended in the following cases
 Alternate flank infeed	This method divides the load equally on both flanks, resulting in equal wear along the cutting edges Alternate flank infeed requires more complicated programming, and is not available on all lathes	Use of the alternate flank method is recommended especially in large pitches and for materials with long chips

Number of passes

Pitch	TP	0.5	0.75	1	1.25	1.5	1.75	2	2.5	3	3.5	4	4.5	5	5.5	6	8
	TPI	48	32	24	20	16	14	12	10	8	7	6	5.5	5	4.5	4	3
No. of passes		4~6	4~7	4~8	5~9	6~10	7~12	7~12	8~14	9~16	10~18	11~18	11~19	12~20	12~20	12~20	15~24

※ One cutting depth is calculated by total cutting depth divided into machining times

ex) ER16-1.5ISO, HMIN 0.92: If 10 times machining, one cutting depth is 0.092 (0.92/10)

Shim

Standard	ATE(External) 	IC		3/8"	9.525mm	1/2"	12.7mm	5/8"	15.875mm
		L		16mm		22mm		27mm	
		Holder		ER/IL	EL/IR	ER/IL	EL/IR	ER/IL	EL/IR
	Helix angle	ATI(EThrough) 	4.5°	ATE16-3P	ATI16-3P	ATE22-3P	ATI22-3P	ATE27-3P	ATI27-3P
			3.5°	ATE16-2P	ATI16-2P	ATE22-2P	ATI22-2P	ATE27-2P	ATI27-2P
			2.5°	ATE16-1P	ATI16-1P	ATE22-1P	ATI22-1P	ATE27-1P	ATI27-1P
			* 1.5°	ATE16	ATI16	ATE22	ATI22	ATE27	ATI27
			0.5°	ATE16-1N	ATI16-1N	ATE22-1N	ATI22-1N	ATE27-1N	ATI27-1N
			0°	ATE16-1.5N	ATI16-1.5N	ATE22-1.5N	ATI22-1.5N	ATE27-1.5N	ATI27-1.5N
-0.5°			ATE16-2N	ATI16-2N	ATE22-2N	ATI22-2N	ATE27-2N	ATI27-2N	
-1.5°	ATE16-3N	ATI16-3N	ATE22-3N	ATI22-3N	ATE27-3N	ATI27-3N			

* Standard shim has Resultant Helix Angle 1.5

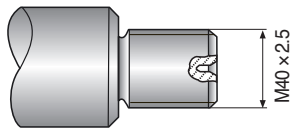


➔ Recommended cutting speed as per workpiece

Workpiece			Brinell hardness (HB)	vc(m/min)		
ISO	Workpiece material			PC5030T PC3030T	PC9070T	PC5300
P	Carbon steel	Low carbon (C : 0.1~0.25%)	125	115~190		110~190
		Medium carbon (C : 0.25~0.55%)	150	100~175		100~165
		High carbon (C : 0.55~0.85%)	170	90~165		90~155
	Low alloy steel (alloying elements ≤ 5%)	Non-hardened	180	100~180		100~180
		Hardened	275	75~140		75~140
		Hardened	350	70~135		70~135
	High alloy steel (alloying elements > 5%)	Annealed	200	80~120		80~120
		Hardened	325	50~100		50~100
	Cast steel	Low alloy (alloying elements < 5%)	200	70~130		70~130
		High alloy (alloying elements > 5%)	225	60~120		60~120
K	Malleable cast iron	Ferritic (short chips)	130	60~70		80~120
		Pearlitic (long chips)	230	60~145		30~100
	Gray cast iron	Normal tensile strength	180	70~130		90~120
		High tensile strength	260	60~115		65~110
	Nodular Sg Iron	Ferritic	160	125~160		85~110
		Pearlitic	260	90~120		60~100
M	Ferritic series	Non-hardened	200	70~130	70~150	70~120
		Hardened	330	60~115	60~125	70~120
	Austenitic series	Austenitic	180	90~140	90~160	70~130
		Super austenitic	200	40~110	40~120	60~100
	Cast ferritic	Non-hardened	200	90~120	90~150	125~160
		Hardened	330	65~110	65~120	90~120
	Cast austenitic	Austenitic	200	85~110	85~120	70~130
		Hardened	330	60~100	60~110	50~95
S	High Temperature Alloys	Annealed (iron based)	200	45~60		80~180
		Aged (iron based)	280	30~50		200~400
		Annealed (nickel or cobalt based)	250	20~30		200~280
		Aged (nickel or cobalt based)	350	15~25		60~180
	Titanium Alloys	Pure 99.5 Ti	400 Rm	140~170		80~210
		α+β Alloys	1050 Rm	50~70		80~210
N	Aluminum alloy wrought	Non-aging	60	100~365		45~60
		Aged	100	80~220		30~50
	Aluminum alloy	Cast	75	200~400		20~30
		Cast & aged	90	200~280		15~25
		Cast Si 13-22%	130	60~180		140~170
	Copper alloy	Brass	90	80~225		50~70
		Bronze and non-leaded copper	100	80~255		100~250
H	Extra Hard Steel	Hardened & Tempered	45-50 HrC	45~60		45~60
			51-55 HRC	40~50		40~50



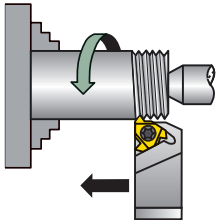
Step by step thread turning



Application

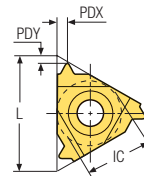
- Thread: External right Handed ISO metric M40x2.5
- Material: 42CrMo4

1 Choose the thread turning method



Feed direction towards the chuck was chosen
Therefore an external right Handed insert and an
external right Handed holder will be used

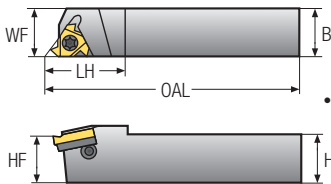
2 Choose the insert size



• Chosen insert : ER16-2.5 ISO

Insert size	Pitch	Ordering code	Shim	Tool holder
IC	TP	RH (Right Handed)	RH (Right Handed)	
9.525	2.5	ER16-2.5ISO	ATE16	ERH□□-16

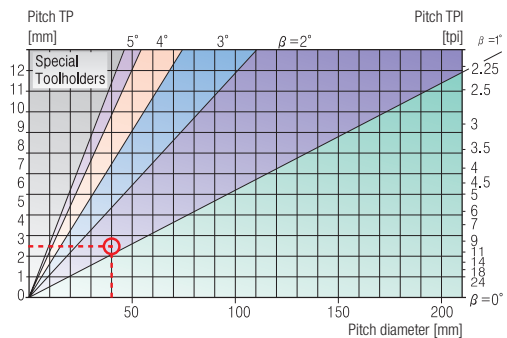
3 Choose the tool holder



• Chosen tool holder : ERH25-16

Insert size	Pitch	Dimensions (mm)				
IC	RH (Right Handed)	H=HF	B	WF	OAL	LH
9.525	ERH25-16	25	25	25	153.6	30

4 Determine



• From the table, using a pitch of 2.5 mm (10 tpi) and a workpiece diameter of 40 mm (1.57"), we find the helix angle to be 1.5°

5 Choose the correct shim

Resultant Helix angle		1.5°
Insert size (mm)	IC	9.525
	L	16
Ordering code		ATE16

6 Choose the carbide grade and cutting speed

• Carbide grade chosen : PC3030T • Cutting speed : 140 m/min

Workpiece		HB	vc (m/min) PC3030T
P Low alloy steel	Non-hardened	180	85~145
	Hardened	275	75~140
	Hardened	350	70~135

7 Determine the number of passes

• Carbide grade chosen : PC3030T • Cutting speed : 140 m/min

Pitch	TP	1.50	1.75	2.00	2.50	3.00	3.50	4.00
	TPI	16	14	12	10	8	7	6
No. of passes		6~10	7~12	7~12	8~14	9~16	10~18	11~18

8 Summary

Thread type	ISO M40 x 2.5 External right handed
1. Feed direction	Towards the chuck
2. Insert and grade	ER16-2.5ISO, PC3030T
3. Tool holder	ERH25-16
4. Helix angle	1.5°
5. Shim	ATE16
6. Cutting speed	140 m/min
7. Number of passes	10



➔ Cutting condition depending on

Workpiece	Material type	
	Material dimension	
	Diameter and length chipflow character	
	Material hardness	
Thread application	External or internal	
	Profile shape	
	Surface finish	
	Machine stability	
Machine	Max. RPM	
	Clamping system stability	
Coolant	Coolant type	
	Holder cross section area	
	Holder overhang	
	Through coolant option	
Holders	Shank type: Carbide, alloy	
	Carbide implant grade	
	Profile shape: Pitch and depth	
	Nose radius	
Insert	Chip breaker style	

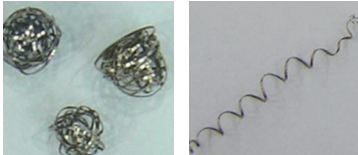
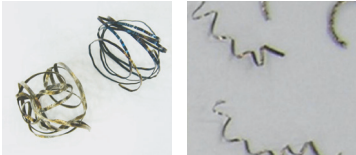
➔ Trouble shooting

Problem		Possible cause	Solution
	Increased flank wear	Cutting speed too high	Reduce cutting speed/use coated insert
		Depth of cut too low/too many passes	Increase the depth of cut per pass
		Unsuitable carbide grade	Use a coated carbide grade
		Insufficient cooling	Increase coolant flow rate
	Uneven cutting edge wear	Incorrect helix angle	Choose the correct shim
		Wrong infeed method	Use the alternating flank infeed method
	Extreme plastic deformation	Depth of cut too large	Decrease depth of cut/ increase number of passes
		Insufficient cooling	Increase coolant flow rate
		Cutting speed too high	Reduce cutting speed
		Unsuitable carbide grade	Use a tougher carbide
		Nose radius too small	Use an insert with a larger radius, if possible
	Cutting edge breakage	Depth of cut too large	Decrease depth of cut/ increase number of passes.
		Extreme plastic deformation	Use a tougher carbide
		Insufficient cooling	Increase flow rate and/ or correct flow direction
		Unsuitable carbide grade	Use a tougher carbide
		Instability	Check stability of the system
	Built-up edge	Incorrect cutting speed	Change the cutting speed
		Unsuitable carbide grade	Use a coated carbide
	Thread profile is too shallow	The tool is not at the workpiece axis height	Change tool height
		Insert is not machining the thread crest	Measure the workpiece diameter
		Worn insert	Change the cutting edge sooner
	Poor surface quality	Too low cutting speed	Increase cutting speed
		Wrong shim	Choose correct shim
		Flank infeed method is not appropriate	Use the alternate flank or radial infeed method

Threading Inserts with Chip Breaker

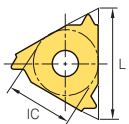
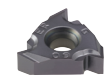
- Economical insert
- Good toughness and high accuracy as ground type inserts
- Exclusive insert design improves chip control
- New grade for general application of various kinds of workpieces

Feature

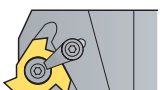
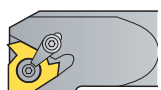
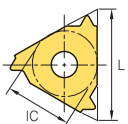
Type	Ground insert		Insert with a chip breaker			
C/B Code	None		None		U	
Designation	ER16-1.5ISO		ERM16-1.5ISO		ERM16-1.5ISO-U	
Machining	External	Internal	External	Internal	External	Internal
Insert Shape						
Chip Shape						
Class	P, M, K, N, S		P, M, K		P, M, K	
Application	G-Class		M-Class		M-Class	
Features	• Groove-shaped chip breaker with superior chip evacuation lowers cutting load • Enables high precision machining • Applicable for machining of various shapes of threads • Applicable for machining of various workpieces		• Unique 3 dimensional chip breaker improves machinability with good chip control • Excellent cutting edge treatment technology ensures high precision sharp cutting edge		• Groove-shaped chip breaker with superior chip evacuation lowers cutting load • Reduces machining pass by 10~30% • Excellent cutting edge treatment achieves high precision sharp cutting edge	



Threading Insert Code System

1	2	3	4	5	6																												
Insert type	Hand of insert	Chip breaker	Insert size	Pitch	Type																												
1 Insert type E R M 16 - 1.5 ISO E: For External I: For Internal	2 Hand of insert E R M 16 - 1.5 ISO R: Right handed L: Left handed	3 Chip breaker E R M 16 - 1.5 ISO M: With chip breaker	4 Insert size (mm) E R M 16 - 1.5 ISO 11 : IC = 6.35 16 : IC = 9.525 22 : IC = 12.7 27 : IC = 15.875  Insert shape  < ER / IR >  < ERM / IRM >	5 Pitch E R M 16 - 1.5 ISO <table border="1"> <thead> <tr> <th colspan="2">Full profile</th> <th colspan="2">Partial profile</th> </tr> <tr> <th>TP</th> <th>TPI</th> <th>TP</th> <th>TPI</th> </tr> </thead> <tbody> <tr> <td>0.35 - 6.0</td> <td>72 - 3</td> <td>A 0.5 - 1.5</td> <td>48 - 16</td> </tr> <tr> <td></td> <td></td> <td>AG 0.5 - 3.0</td> <td>48 - 8</td> </tr> <tr> <td></td> <td></td> <td>G 1.75 - 3.0</td> <td>14 - 8</td> </tr> <tr> <td></td> <td></td> <td>N 3.5 - 5.0</td> <td>7 - 5</td> </tr> <tr> <td></td> <td></td> <td>Q 5.5 - 6.0</td> <td>4.5 - 4</td> </tr> </tbody> </table>	Full profile		Partial profile		TP	TPI	TP	TPI	0.35 - 6.0	72 - 3	A 0.5 - 1.5	48 - 16			AG 0.5 - 3.0	48 - 8			G 1.75 - 3.0	14 - 8			N 3.5 - 5.0	7 - 5			Q 5.5 - 6.0	4.5 - 4	6 Type E R M 16 - 1.5 ISO • Partial profile 60° • Partial Profile 55° • ISO Metric (Full Profile) • American UN (Full Profile) UN, UNC, UNF, UNEF • Whitworth (Full Profile) BSW, BSF, BSP • British Standard Pipe thread (Full Profile) BSPT • National Pipe Thread (Full Profile) NPT • National Pipe Threads-Dryseal (Full Profile) NPTF • Round DIN 405 • Trapez DIN 103 • American ACME • Stub ACME • UNJ • American Buttress • British Buttress • Metric Buttress-Sagengewinde • API • API Buttress Casing • API Round Casing & Tubing • EL-Extreme Line Casing
Full profile		Partial profile																															
TP	TPI	TP	TPI																														
0.35 - 6.0	72 - 3	A 0.5 - 1.5	48 - 16																														
		AG 0.5 - 3.0	48 - 8																														
		G 1.75 - 3.0	14 - 8																														
		N 3.5 - 5.0	7 - 5																														
		Q 5.5 - 6.0	4.5 - 4																														

Threading Holder Code System

1	2	3	4	5	6	7
Holder type	Hand of insert	Name	Height of shank(Ø)	Shim	Insert size	Clamping system
1 Holder type E R H 10 (N) - 11 (C) E: For External I: For Internal	2 Hand of insert E R H 10 (N) - 11 (C) R: Right handed L: Left handed	3 Name E R H 10 (N) - 11 (C) H : Holder	4 Height of shank (Ø) E R H 10 (N) - 11 (C)  • External 8, 10, 12, 16, 20, 25, 32, 40, 50  • Internal 10, 12, 13, 16, 20, 25, 32, 49, 50, 60 * Refer to the specification for shank diameter information	5 Shim E R H 10 (N) - 11 (C) No code: Shim required N: No shim required	6 Insert size (mm) E R H 10 (N) - 11 (C) 11 : IC = 6.35 16 : IC = 9.525 22 : IC = 12.7 27 : IC = 15.875 	7 Clamping system E R H 10 (N) - 11 (C) No code: Screw on system C: Clamp on system



Line-up

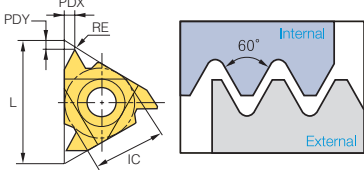
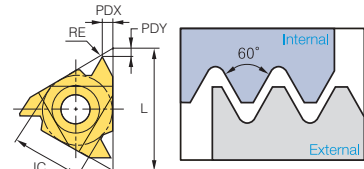
Division	Application	Geometry	Unit	Grinding	M-type	U-type
Partial profile (55°)	General threading		TP	0.5~6.0	0.5~5.0	0.5~3.0
			TPI	48~4	48~5	48~8
Partial profile (60°)	General threading		TP	0.5~6.0	0.5~5.0	0.5~3.0
			TPI	48~4	48~5	48~8
ISO metric	General industry		TP	0.35~6.0	1.0~3.0	1.5~2.0
American UN	General industry		TPI	72~4	-	-
Withworth (BSW, BSF)	Industrial pipe		TPI	72~4	14~11	14~11
British standard pipe (BSPT)	Gas and water pipe (55°)		TPI	28~11	-	-
National pipe (NPT)	Gas and water pipe		TPI	27~8	-	-
National pipe (NPTF) Dryseal	Gas and water pipe		TPI	27~8	-	-
Round DIN405 (RD)	Fire-fighting and food industry		TPI	10~4	-	-
Trapez DIN103 (TR)	Power transfer		TP	1.5~6.0	-	-
American ACME	Power transfer (feed screw)		TPI	16~4	-	-
Stub ACME (STACME)	Power transfer (thin shape)		TPI	16~3	-	-
UNJ	Aero-space industry		TPI	48~4	-	-
American buttress (ABUT)	One direction		TPI	20~6	-	-
British buttress (BBUT)	One direction		TPI	16~8	-	-
Metric buttress (SAGE)	One direction (DIN513)		TP	2.0~4.0	-	-
API	Oil and gas industry		TPI	6~4	-	-
API buttress casing (BUT)	Oil and gas industry (tube, casing)		TPI	5	-	-
API round casing (APIRD)	Oil and gas industry		TPI	10~8	-	-
Extreme line casing (EL)	Oil and gas industry (tube, casing)		TPI	6~5	-	-

※ Unit : TP(mm), TP(tpi)



Partial profile 60°

(mm)

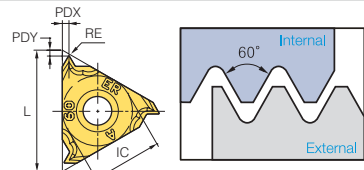
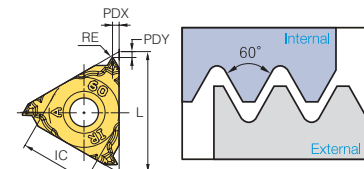
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	TPI	IC	L	RE	PDY	PDX	Geometry
External	ER 11-A60	●	●	●		EL 11-A60	●	●			0.5~1.5	48~16	6.35	11	0.05	0.8	0.9	
	16-A60	●	●	●		16-A60	●	●			0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G60	●	●			16-G60	●	●			1.75~3.0	14~8	9.525	16	0.27	1.2	1.7	
	16-AG60	●	●	●		16-AG60	●	●			0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
	22-N60	●	●	●		22-N60	●	●			3.5~5.0	7~5	12.7	22	0.53	1.7	2.5	
	27-Q60	●	●	●		27-Q60	●	●			5.5~6.0	4.5~4	15.875	27	0.64	2.1	3.1	
Internal	IR 11-A60	●	●	●		IL 11-A60	●	●	●		0.5~1.5	48~16	6.35	11	0.05	0.8	0.9	
	16-A60	●	●			16-A60	●	●			0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G60	●	●			16-G60	●	●			1.75~3.0	14~8	9.525	16	0.16	1.2	1.7	
	16-AG60	●	●	●		16-AG60	●	●			0.5~3.0	48~8	9.525	16	0.05	1.2	1.7	
	22-N60	●	●	●		22-N60	●	●			3.5~5.0	7~5	12.7	22	0.30	1.7	2.5	
	27-Q60	●	●	●		27-Q60	●	●			5.5~6.0	4.5~4	15.875	27	0.30	1.8	2.7	

➡ Applicable holders page 37, 38

●: Stock item

Partial profile 60° (M chip breaker)

(mm)

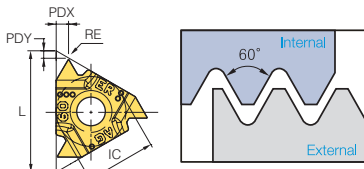
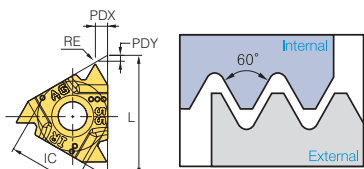
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	TPI	IC	L	RE	PDY	PDX	Geometry
External	ERM 16-A60	●									0.5~1.5	48~16	9.525	16	0.08	0.8	0.9	
	16-G60	●									1.75~3.0	14~8	9.525	16	0.27	1.2	1.7	
	16-AG60	●									0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
	22-N60	●									3.5~5.0	7~5	12.7	22	0.53	1.7	2.5	
Internal	IRM 11-A60	●									0.5~1.5	48~16	6.35	11	0.08	0.8	0.9	
	16-A60	●									0.5~1.5	48~16	9.525	16	0.08	0.8	0.9	
	16-G60	●									1.75~3.0	14~8	9.525	16	0.12	1.2	1.7	
	16-AG60	●									0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
	22-N60	●									3.5~5.0	7~5	12.7	22	0.30	1.7	2.5	

➡ Applicable holders page 37, 38

●: Stock item

Partial profile 60° (U chip breaker)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	TPI	IC	L	RE	PDY	PDX	Geometry
External	ERM 16-AG60-U										0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
Internal	IRM 16-AG60-U										0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	

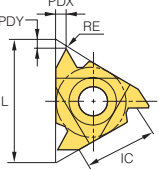
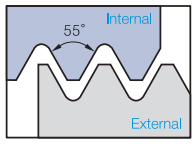
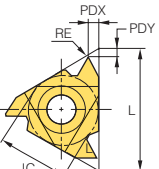
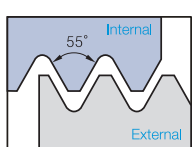
➡ Applicable holders page 37, 38

●: Stock item



Partial profile 55°

(mm)

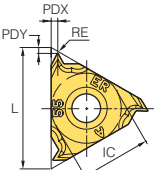
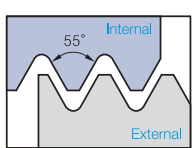
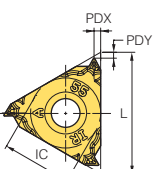
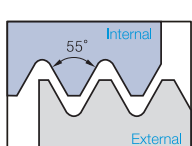
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	TPI	IC	L	RE	PDY	PDX	Geometry
External	ER 11-A55	●	●			EL 11-A55	●				0.5~1.5	48~16	6.35	11	0.05	0.8	0.9	 
	16-A55	●	●			16-A55	●				0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G55	●	●			16-G55	●				1.75~3.0	14~8	9.525	16	0.21	1.2	1.7	
	16-AG55	●	●			16-AG55	●	●			0.5~3.0	48~8	9.525	16	0.07	1.2	1.7	
	22-N55	●	●			22-N55	●				3.5~5.0	7~5	12.7	22	0.43	1.7	2.5	
	27-Q55	●	●			27-Q55	●				5.5~6.0	4.5~4	15.875	27	0.60	2.0	2.9	
Internal	IR 11-A55	●	●			IL 11-A55	●	●			0.5~1.5	48~16	6.35	11	0.05	0.8	0.9	 
	16-A55	●	●			16-A55	●				0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G55	●	●			16-G55	●				1.75~3.0	14~8	9.525	16	0.21	1.2	1.7	
	16-AG55	●	●			16-AG55	●				0.5~3.0	48~8	9.525	16	0.07	1.2	1.7	
	22-N55	●	●			22-N55	●				3.5~5.0	7~5	12.7	22	0.43	1.7	2.5	
	27-Q55	●	●			27-Q55	●	●			5.5~6.0	4.5~4	15.875	27	0.60	2.0	2.9	

Applicable holders page 37, 38

● : Stock item

Partial profile 55° (M chip breaker)

(mm)

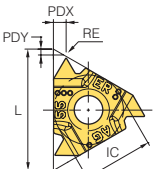
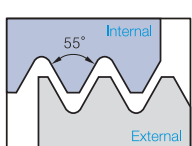
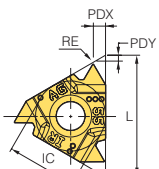
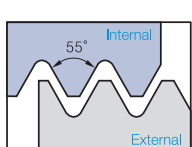
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	TPI	IC	L	RE	PDY	PDX	Geometry
External	ERM 16-A55										0.5~1.5	48~16	9.525	16	0.08	0.8	0.9	 
	16-G55		●								1.75~3.0	14~8	9.525	16	0.21	1.2	1.7	
	16-AG55		●								0.5~3.0	48~8	9.525	16	0.07	1.2	1.7	
	22-N55		●								3.5~5.0	7~5	12.7	22	0.43	1.7	2.5	
Internal	IRM 11-A55		●								0.5~1.5	48~16	6.35	11	0.08	0.8	0.9	 
	16-A55										0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G55										1.75~3.0	14~8	9.525	16	0.08	1.2	1.7	
	16-AG55		●								0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
	22-N55		●								3.5~5.0	7~5	12.7	22	0.43	1.7	2.5	

Applicable holders page 37, 38

● : Stock item

Partial profile 60° (U chip breaker)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	TPI	IC	L	RE	PDY	PDX	Geometry
External	ERM 16-AG55-U										0.5~3.0	48~8	9.525	16	0.07	1.2	1.7	 
Internal	IRM 16-AG55-U										0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	 

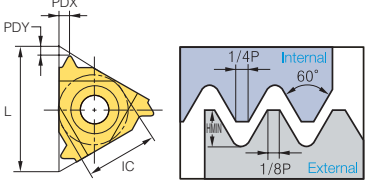
Applicable holders page 37, 38

● : Stock item



ISO metric

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-0.35ISO	●				EL 11-0.35ISO					0.35	6.35	11	0.21	0.8	0.4	
	11-0.4ISO	●				11-0.4ISO					0.4	6.35	11	0.25	0.7	0.4	
	11-0.45ISO	●	●			11-0.45ISO	●				0.45	6.35	11	0.28	0.7	0.4	
	11-0.5ISO	●				11-0.5ISO	●				0.5	6.35	11	0.31	0.6	0.4	
	11-0.6ISO	●				11-0.6ISO					0.6	6.35	11	0.37	0.6	0.6	
	11-0.7ISO	●	●			11-0.7ISO					0.7	6.35	11	0.43	0.6	0.6	
	11-0.75ISO	●	●			11-0.75ISO	●				0.75	6.35	11	0.46	0.6	0.6	
	11-0.8ISO	●	●			11-0.8ISO					0.8	6.35	11	0.49	0.6	0.6	
	11-1.0ISO	●	●			11-1.0ISO	●				1.0	6.35	11	0.61	0.7	0.7	
	11-1.25ISO	●	●	●		11-1.25ISO	●	●			1.25	6.35	11	0.77	0.8	0.9	
	11-1.5ISO	●	●			11-1.5ISO	●	●			1.5	6.35	11	0.92	0.8	1.0	
	11-1.75ISO	●	●			11-1.75ISO					1.75	6.35	11	1.07	0.8	1.1	
	16-0.35ISO	●				16-0.35ISO					0.35	9.525	16	0.21	0.8	0.4	
	16-0.4ISO	●	●			16-0.4ISO	●				0.4	9.525	16	0.25	0.7	0.4	
	16-0.45ISO	●	●			16-0.45ISO					0.45	9.525	16	0.28	0.7	0.4	
	16-0.5ISO	●	●			16-0.5ISO	●	●			0.5	9.525	16	0.31	0.6	0.4	
	16-0.6ISO	●	●			16-0.6ISO					0.6	9.525	16	0.37	0.6	0.6	
	16-0.7ISO	●	●			16-0.7ISO	●				0.7	9.525	16	0.43	0.6	0.6	
	16-0.75ISO	●	●			16-0.75ISO	●	●			0.75	9.525	16	0.46	0.6	0.6	
	16-0.8ISO	●	●	●		16-0.8ISO	●				0.8	9.525	16	0.49	0.6	0.6	
	16-1.0ISO	●	●	●		16-1.0ISO	●	●			1.0	9.525	16	0.61	0.7	0.7	
	16-1.25ISO	●	●	●		16-1.25ISO	●	●			1.25	9.525	16	0.77	0.8	0.9	
	16-1.5ISO	●	●	●		16-1.5ISO	●	●			1.5	9.525	16	0.92	0.8	1.0	
	16-1.75ISO	●	●	●		16-1.75ISO	●				1.75	9.525	16	1.07	0.9	1.2	
	16-2.0ISO	●	●	●		16-2.0ISO	●	●			2.0	9.525	16	1.23	1.0	1.3	
	16-2.5ISO	●	●	●		16-2.5ISO	●	●			2.5	9.525	16	1.53	1.1	1.5	
	16-3.0ISO	●	●	●		16-3.0ISO	●	●			3.0	9.525	16	1.84	1.2	1.6	
	22-3.5ISO	●	●	●		22-3.5ISO	●	●			3.5	12.7	22	2.15	1.6	2.3	
	22-4.0ISO	●	●	●		22-4.0ISO	●	●			4.0	12.7	22	2.45	1.6	2.3	
	22-4.5ISO	●	●	●		22-4.5ISO	●	●			4.5	12.7	22	2.78	1.7	2.4	
	22-5.0ISO	●	●	●		22-5.0ISO	●	●			5.0	12.7	22	3.07	1.7	2.5	
	27-5.5ISO	●	●			27-5.5ISO	●				5.5	15.875	27	3.37	1.9	2.7	
	27-6.0ISO	●	●	●		27-6.0ISO	●	●			6.0	15.875	27	3.68	2.0	2.9	

Applicable holders page 37

●: Stock item



ISO metric(M chip breaker)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	IC	L	HMIN	PDY	PDX	Geometry
External	ERM 16-1.0ISO	●									1.0	9.525	16	0.61	0.7	0.7	
	16-1.25ISO										1.25	9.525	16	0.77	0.8	0.9	
	16-1.5ISO	●									1.5	9.525	16	0.93	0.8	1.0	
	16-1.75ISO	●									1.75	9.525	16	1.09	0.9	1.2	
	16-2.0ISO	●									2.0	9.525	16	1.25	1.0	1.3	
	16-2.5ISO	●									2.5	9.525	16	1.55	1.1	1.5	
	16-3.0ISO	●									3.0	9.525	16	1.87	1.2	1.6	

Applicable holders page 37

● : Stock item

ISO metric(U chip breaker)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	IC	L	HMIN	PDY	PDX	Geometry
External	ERM 16-1.5ISO-U										1.5	9.525	16	0.93	0.8	1.0	
	16-2.0ISO-U										2.0	9.525	16	1.25	1.0	1.3	

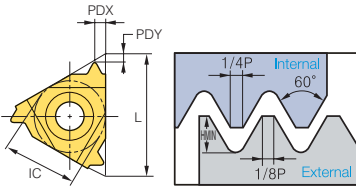
Applicable holders page 37

● : Stock item



ISO metric

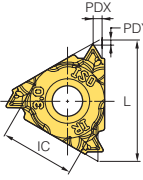
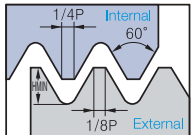
(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	IC	L	HMIN	PDY	PDX	Geometry
Internal	IR 11-0.35ISO	●	●			IL 11-0.35ISO					0.35	6.35	11	0.20	0.8	0.3	
	11-0.4ISO	●	●			11-0.4ISO					0.4	6.35	11	0.23	0.8	0.4	
	11-0.45ISO	●	●			11-0.45ISO					0.45	6.35	11	0.26	0.8	0.4	
	11-0.5ISO	●	●			11-0.5ISO	●	●			0.5	6.35	11	0.29	0.6	0.4	
	11-0.6ISO	●	●			11-0.6ISO					0.6	6.35	11	0.35	0.6	0.6	
	11-0.7ISO	●	●			11-0.7ISO					0.7	6.35	11	0.40	0.6	0.6	
	11-0.75ISO	●	●			11-0.75ISO	●	●			0.75	6.35	11	0.43	0.6	0.6	
	11-0.8ISO	●	●			11-0.8ISO	●				0.8	6.35	11	0.46	0.6	0.6	
	11-1.0ISO	●	●			11-1.0ISO	●				1.0	6.35	11	0.58	0.6	0.7	
	11-1.25ISO	●	●	●		11-1.25ISO	●	●			1.25	6.35	11	0.72	0.8	0.9	
	11-1.5ISO	●	●	●		11-1.5ISO	●	●	●		1.5	6.35	11	0.87	0.8	1.0	
	11-1.75ISO	●		●		11-1.75ISO	●				1.75	6.35	11	1.01	0.9	1.1	
	11-2.0ISO	●	●	●		11-2.0ISO	●	●			2.0	6.35	11	1.15	0.9	1.1	
	11-2.5ISO	●	●			11-2.5ISO	●	●			2.5	6.35	11	1.44	0.8	1.1	
	16-0.35ISO		●			16-0.35ISO					0.35	9.525	16	0.20	0.8	0.3	
	16-0.4ISO	●	●			16-0.4ISO					0.4	9.525	16	0.23	0.8	0.4	
	16-0.45ISO		●			16-0.45ISO					0.45	9.525	16	0.26	0.8	0.4	
	16-0.5ISO	●	●			16-0.5ISO					0.5	9.525	16	0.29	0.6	0.4	
	16-0.6ISO	●	●			16-0.6ISO					0.6	9.525	16	0.35	0.6	0.6	
	16-0.7ISO	●	●			16-0.7ISO					0.7	9.525	16	0.40	0.6	0.6	
	16-0.75ISO	●	●			16-0.75ISO	●				0.75	9.525	16	0.43	0.6	0.6	
	16-0.8ISO	●	●			16-0.8ISO	●				0.8	9.525	16	0.46	0.6	0.6	
	16-1.0ISO	●	●	●		16-1.0ISO	●	●			1.0	9.525	16	0.58	0.6	0.7	
	16-1.25ISO	●	●	●		16-1.25ISO	●				1.25	9.525	16	0.72	0.8	0.9	
	16-1.5ISO	●	●	●		16-1.5ISO	●	●			1.5	9.525	16	0.87	0.8	1.0	
	16-1.75ISO	●	●	●		16-1.75ISO	●				1.75	9.525	16	1.01	0.9	1.2	
	16-2.0ISO	●	●	●		16-2.0ISO	●	●			2.0	9.525	16	1.15	1.0	1.3	
	16-2.5ISO	●	●	●		16-2.5ISO	●	●			2.5	9.525	16	1.44	1.1	1.5	
	16-3.0ISO	●	●	●		16-3.0ISO	●	●			3.0	9.525	16	1.73	1.1	1.5	
	22-3.5ISO	●	●	●		22-3.5ISO	●	●			3.5	12.7	22	2.02	1.6	2.3	
	22-4.0ISO	●	●	●		22-4.0ISO	●	●			4.0	12.7	22	2.31	1.6	2.3	
	22-4.5ISO	●	●	●		22-4.5ISO	●				4.5	12.7	22	2.60	1.6	2.4	
	22-5.0ISO	●	●	●		22-5.0ISO	●	●			5.0	12.7	22	2.89	1.6	2.3	
	27-5.5ISO	●	●			27-5.5ISO					5.5	15.875	27	3.17	1.6	2.3	
	27-6.0ISO	●	●			27-6.0ISO	●				6.0	15.875	27	3.46	1.8	2.5	



ISO metric(M chip breaker)

(mm)

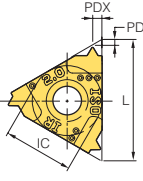
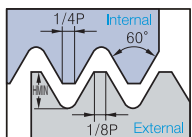
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	IC	L	HMIN	PDY	PDX	Geometry
Internal	IRM 11-1.5ISO	●									1.5	6.35	11	0.85	0.8	1.0	 
	16-1.0ISO	●									1.0	9.525	16	0.58	0.6	0.7	
	16-1.25ISO										1.25	9.525	16	0.72	0.8	0.9	
	16-1.5ISO	●									1.5	9.525	16	0.85	0.8	1.0	
	16-1.75ISO										1.75	9.525	16	1.01	0.9	1.2	
	16-2.0ISO	●									2.0	9.525	16	1.12	1.0	1.3	
	16-2.5ISO	●									2.5	9.525	16	1.44	1.1	1.5	
	16-3.0ISO	●									3.0	9.525	16	1.69	1.1	1.5	

Applicable holders page 38

● : Stock item

ISO metric(U chip breaker)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	IC	L	HMIN	PDY	PDX	Geometry
Internal	IRM 16-1.5ISO-U										1.5	9.525	16	0.85	0.8	1.0	 
	16-2.0ISO-U										2.0	9.525	16	1.12	1.0	1.3	

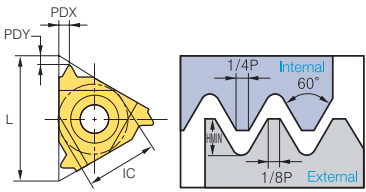
Applicable holders page 38

● : Stock item



American UN(UN, UNC, UNF, UNEF, UNS)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-72UN	●				EL 11-72UN					72	6.35	11	0.22	0.8	0.4	
	11-64UN	●				11-64UN					64	6.35	11	0.24	0.8	0.4	
	11-56UN	●				11-56UN					56	6.35	11	0.28	0.7	0.4	
	11-48UN	●				11-48UN					48	6.35	11	0.32	0.6	0.6	
	11-44UN	●				11-44UN					44	6.35	11	0.35	0.6	0.6	
	11-40UN	●	●			11-40UN					40	6.35	11	0.39	0.6	0.6	
	11-36UN	●				11-36UN					36	6.35	11	0.43	0.6	0.6	
	11-32UN	●	●			11-32UN					32	6.35	11	0.49	0.6	0.6	
	11-28UN	●	●			11-28UN					28	6.35	11	0.56	0.6	0.7	
	11-27UN		●			11-27UN					27	6.35	11	0.58	0.7	0.8	
	11-24UN	●	●			11-24UN					24	6.35	11	0.65	0.7	0.8	
	11-20UN	●	●			11-20UN					20	6.35	11	0.78	0.8	0.9	
	11-18UN	●	●			11-18UN					18	6.35	11	0.87	0.8	1.0	
	11-16UN	●	●			11-16UN					16	6.35	11	0.97	0.9	1.1	
	11-14UN		●			11-14UN					14	6.35	11	1.11	0.9	1.1	
	16-72UN	●				16-72UN					72	9.525	16	0.22	0.8	0.4	
	16-64UN	●				16-64UN					64	9.525	16	0.24	0.8	0.4	
	16-56UN	●				16-56UN					56	9.525	16	0.28	0.7	0.4	
	16-48UN	●				16-48UN					48	9.525	16	0.32	0.6	0.6	
	16-44UN	●				16-44UN					44	9.525	16	0.35	0.6	0.6	
	16-40UN	●	●			16-40UN	●				40	9.525	16	0.39	0.6	0.6	
	16-36UN	●	●			16-36UN					36	9.525	16	0.43	0.6	0.6	
	16-32UN	●	●			16-32UN	●				32	9.525	16	0.49	0.6	0.6	
	16-28UN	●	●			16-28UN	●				28	9.525	16	0.56	0.6	0.7	
	16-27UN	●	●			16-27UN					27	9.525	16	0.58	0.7	0.8	
	16-24UN	●	●	●		16-24UN	●				24	9.525	16	0.65	0.7	0.8	
	16-20UN	●	●	●		16-20UN	●				20	9.525	16	0.78	0.8	0.9	
	16-18UN	●	●	●		16-18UN	●	●			18	9.525	16	0.87	0.8	1.0	
	16-16UN	●	●	●		16-16UN	●	●			16	9.525	16	0.97	0.9	1.1	
	16-14UN	●	●	●		16-14UN	●				14	9.525	16	1.11	1.0	1.2	
	16-13UN	●	●			16-13UN	●				13	9.525	16	1.20	1.0	1.3	
	16-12UN	●	●	●		16-12UN	●				12	9.525	16	1.30	1.1	1.4	
	16-11.5UN	●				16-11.5UN					11.5	9.525	16	1.35	1.1	1.5	
	16-11UN	●	●	●		16-11UN	●				11	9.525	16	1.42	1.1	1.5	
	16-10UN	●	●	●		16-10UN	●	●			10	9.525	16	1.56	1.1	1.5	
	16-9UN	●	●			16-9UN					9	9.525	16	1.73	1.2	1.7	
	16-8UN	●	●	●		16-8UN	●	●			8	9.525	16	1.95	1.2	1.6	
	22-7UN	●				22-7UN					7	12.7	22	2.22	1.6	2.3	
	22-6UN	●	●			22-6UN					6	12.7	22	2.60	1.6	2.3	
	22-5UN	●	●			22-5UN					5	12.7	22	3.12	1.7	2.5	
	27-4.5UN	●				27-4.5UN					4.5	15.875	27	3.46	1.9	2.7	
	27-4UN	●				27-4UN					4	15.875	27	3.89	2.1	3.0	

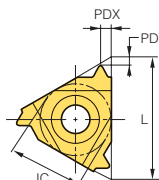
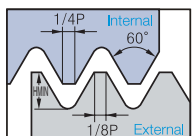
➔ Applicable holders page 37

● : Stock item



American UN (UN, UNC, UNF, UNEF, UNS)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
Internal	IR 11-72UN					IL 11-72UN					72	6.35	11	0.20	0.8	0.3	 
	11-64UN					11-64UN					64	6.35	11	0.23	0.8	0.4	
	11-56UN					11-56UN					56	6.35	11	0.26	0.7	0.4	
	11-48UN	●				11-48UN					48	6.35	11	0.31	0.6	0.6	
	11-44UN					11-44UN					44	6.35	11	0.33	0.6	0.6	
	11-40UN	●				11-40UN					40	6.35	11	0.37	0.6	0.6	
	11-36UN					11-36UN					36	6.35	11	0.41	0.6	0.6	
	11-32UN	●	●			11-32UN					32	6.35	11	0.46	0.6	0.6	
	11-28UN	●	●			11-28UN					28	6.35	11	0.52	0.6	0.7	
	11-27UN	●				11-27UN					27	6.35	11	0.54	0.7	0.8	
	11-24UN	●	●			11-24UN	●				24	6.35	11	0.61	0.7	0.8	
	11-20UN	●	●	●		11-20UN	●				20	6.35	11	0.73	0.8	0.9	
	11-18UN	●	●			11-18UN	●				18	6.35	11	0.81	0.8	1.0	
	11-16UN	●	●	●		11-16UN	●				16	6.35	11	0.92	0.9	1.1	
	11-14UN	●				11-14UN					14	6.35	11	1.05	0.9	1.1	
	11-12UN	●	●	●		11-12UN	●				12	6.35	11	1.22	0.8	1.1	
	11-11UN	●	●			11-11UN	●	●			11	6.35	11	1.33	0.8	1.1	
	16-72UN					16-72UN					72	9.525	16	0.20	0.8	0.3	
	16-64UN					16-64UN					64	9.525	16	0.23	0.8	0.4	
	16-56UN					16-56UN					56	9.525	16	0.26	0.7	0.4	
	16-48UN	●				16-48UN					48	9.525	16	0.31	0.6	0.6	
	16-44UN					16-44UN					44	9.525	16	0.33	0.6	0.6	
	16-40UN	●				16-40UN					40	9.525	16	0.37	0.6	0.6	
	16-36UN					16-36UN					36	9.525	16	0.41	0.6	0.6	
	16-32UN	●	●			16-32UN					32	9.525	16	0.51	0.6	0.6	
	16-28UN	●	●			16-28UN					28	9.525	16	0.52	0.6	0.7	
	16-27UN					16-27UN					27	9.525	16	0.54	0.7	0.8	
	16-24UN	●	●			16-24UN	●				24	9.525	16	0.61	0.7	0.8	
	16-20UN	●	●			16-20UN	●				20	9.525	16	0.73	0.8	0.9	
	16-18UN	●	●	●		16-18UN	●				18	9.525	16	0.81	0.8	1.0	
	16-16UN	●	●	●		16-16UN	●				16	9.525	16	0.92	0.9	1.1	
	16-14UN	●	●			16-14UN	●				14	9.525	16	1.05	0.9	1.2	
	16-13UN	●				16-13UN					13	9.525	16	1.13	1.0	1.3	
	16-12UN	●	●	●		16-12UN	●				12	9.525	16	1.22	1.1	1.4	
	16-11.5UN	●	●			16-11.5UN					11.5	9.525	16	1.28	1.1	1.5	
	16-11UN	●	●	●		16-11UN					11	9.525	16	1.33	1.1	1.5	
	16-10UN	●	●			16-10UN	●	●			10	9.525	16	1.47	1.1	1.5	
	16-9UN	●	●	●		16-9UN					9	9.525	16	1.63	1.2	1.7	
	16-8UN	●	●	●		16-8UN	●	●			8	9.525	16	1.83	1.2	1.5	
	22-7UN	●				22-7UN					7	12.7	22	2.09	1.6	2.3	
	22-6UN	●				22-6UN	●				6	12.7	22	2.44	1.6	2.3	
	22-5UN	●				22-5UN					5	12.7	22	2.93	1.7	2.3	
	27-4.5UN	●				27-4.5UN					4.5	15.875	27	3.26	1.9	2.4	
	27-4UN	●				27-4UN					4	15.875	27	3.67	2.1	2.7	

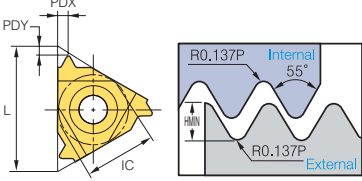
Applicable holders page 38

● : Stock item



Withworth (BSW, BSF, BSP, BSB)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-72W	●				EL 11-72W					72	6.35	11	0.23	0.7	0.4	
	11-60W	●				11-60W					60	6.35	11	0.27	0.7	0.4	
	11-56W	●				11-56W					56	6.35	11	0.29	0.7	0.4	
	11-48W	●				11-48W					48	6.35	11	0.34	0.6	0.6	
	11-40W	●				11-40W					40	6.35	11	0.41	0.6	0.6	
	11-36W	●				11-36W					36	6.35	11	0.45	0.6	0.6	
	11-32W	●				11-32W					32	6.35	11	0.51	0.6	0.6	
	11-28W	●	●			11-28W					28	6.35	11	0.58	0.6	0.7	
	11-26W	●				11-26W					26	6.35	11	0.63	0.7	0.8	
	11-24W	●				11-24W					24	6.35	11	0.68	0.7	0.8	
	11-22W	●				11-22W					22	6.35	11	0.74	0.8	0.9	
	11-20W	●				11-20W					20	6.35	11	0.81	0.8	0.9	
	11-19W	●	●			11-19W					19	6.35	11	0.86	0.8	1.0	
	11-18W	●				11-18W					18	6.35	11	0.90	0.8	1.0	
	11-16W	●				11-16W					16	6.35	11	1.02	0.9	1.1	
	11-14W	●				11-14W	●				14	6.35	11	1.16	1.0	1.2	
	16-72W	●				16-72W					72	9.525	16	0.23	0.7	0.4	
	16-60W	●				16-60W					60	9.525	16	0.27	0.7	0.4	
	16-56W	●				16-56W					56	9.525	16	0.29	0.7	0.4	
	16-48W	●				16-48W					48	9.525	16	0.34	0.6	0.6	
	16-40W	●	●			16-40W					40	9.525	16	0.41	0.6	0.6	
	16-36W	●	●			16-36W					36	9.525	16	0.45	0.6	0.6	
	16-32W	●				16-32W					32	9.525	16	0.51	0.6	0.6	
	16-30W	●				16-30W					30	9.525	16	0.55	0.6	0.7	
	16-28W	●	●	●		16-28W					28	9.525	16	0.58	0.6	0.7	
	16-26W	●	●			16-26W					26	9.525	16	0.63	0.7	0.8	
	16-24W	●	●			16-24W					24	9.525	16	0.68	0.7	0.8	
	16-22W	●	●			16-22W					22	9.525	16	0.74	0.8	0.9	
	16-20W	●	●			16-20W	●				20	9.525	16	0.81	0.8	0.9	
	16-19W	●	●	●		16-19W	●				19	9.525	16	0.86	0.8	1.0	
	16-18W	●	●			16-18W					18	9.525	16	0.90	0.8	1.0	
	16-16W	●	●			16-16W					16	9.525	16	1.02	0.9	1.1	
	16-14W	●	●	●		16-14W	●				14	9.525	16	1.16	1.0	1.2	
	16-12W	●	●			16-12W	●				12	9.525	16	1.36	1.1	1.4	
	16-11W	●	●	●		16-11W	●				11	9.525	16	1.48	1.1	1.5	
	16-10W	●	●			16-10W					10	9.525	16	1.63	1.1	1.5	
	16-9W	●	●			16-9W					9	9.525	16	1.81	1.2	1.7	
	16-8W	●	●			16-8W					8	9.525	16	2.03	1.2	1.5	
	22-7W	●	●			22-7W					7	12.7	22	3.32	1.6	2.3	
	22-6W	●	●			22-6W	●				6	12.7	22	2.71	1.6	2.3	
	22-5W	●	●			22-5W					5	12.7	22	3.25	1.7	2.4	
	27-4.5W	●	●			27-4.5W					4.5	15.875	27	3.61	1.8	2.6	
	27-4W	●				27-4W					4	15.875	27	4.07	2.0	2.9	



Withworth(M chip breaker)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ERM 16-19W	●									19	9.525	16	0.86	0.8	1.0	
	16-14W	●									14	9.525	16	1.48	1.1	1.5	
	16-11W	●									11	9.525	16	1.16	1.0	1.2	

Applicable holders page 37

● : Stock item

Withworth(U chip breaker)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ERM 16-14W-U										14	9.525	16	1.16	1.0	1.2	
	16-11W-U										11	9.525	16	1.48	1.1	1.5	

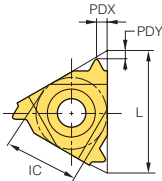
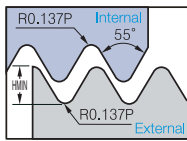
Applicable holders page 37

● : Stock item



Withworth (BSW, BSF, BSP, BSB)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
Internal	IR 11-72W	●				IL 11-72W					72	6.35	11	0.23	0.7	0.4	 
	11-60W	●				11-60W					60	6.35	11	0.27	0.7	0.4	
	11-56W	●				11-56W					56	6.35	11	0.29	0.7	0.4	
	11-48W	●				11-48W					48	6.35	11	0.34	0.6	0.6	
	11-40W	●				11-40W					40	6.35	11	0.41	0.6	0.6	
	11-36W	●				11-36W					36	6.35	11	0.45	0.6	0.6	
	11-32W	●				11-32W					32	6.35	11	0.51	0.6	0.6	
	11-28W	●	●			11-28W					28	6.35	11	0.58	0.6	0.7	
	11-26W	●	●			11-26W					26	6.35	11	0.63	0.7	0.8	
	11-24W	●	●			11-24W					24	6.35	11	0.68	0.7	0.8	
	11-22W	●	●			11-22W					22	6.35	11	0.74	0.8	0.9	
	11-20W	●	●			11-20W					20	6.35	11	0.81	0.8	0.9	
	11-19W	●	●	●		11-19W	●	●			19	6.35	11	0.86	0.8	1.0	
	11-18W	●	●			11-18W	●	●			18	6.35	11	0.90	0.8	1.0	
	11-16W	●	●			11-16W	●	●			16	6.35	11	1.02	0.9	1.1	
	11-14W	●	●			11-14W	●	●			14	6.35	11	1.16	0.9	1.1	
	11-12W	●	●			11-12W	●	●			12	6.35	11	1.32	0.9	1.2	
	16-72W	●				16-72W					72	9.525	16	0.23	0.7	0.4	
	16-60W	●				16-60W					60	9.525	16	0.27	0.7	0.4	
	16-56W	●				16-56W					56	9.525	16	0.29	0.7	0.4	
	16-48W	●				16-48W					48	9.525	16	0.34	0.6	0.6	
	16-40W	●				16-40W					40	9.525	16	0.41	0.6	0.6	
	16-36W	●				16-36W					36	9.525	16	0.45	0.6	0.6	
	16-32W	●				16-32W					32	9.525	16	0.51	0.6	0.6	
	16-30W	●				16-30W					30	9.525	16	0.55	0.6	0.7	
	16-28W	●	●			16-28W					28	9.525	16	0.58	0.6	0.7	
	16-26W	●	●			16-26W					26	9.525	16	0.63	0.7	0.8	
	16-24W	●	●			16-24W					24	9.525	16	0.68	0.7	0.8	
	16-22W	●	●			16-22W					22	9.525	16	0.74	0.8	0.9	
	16-20W	●	●			16-20W					20	9.525	16	0.81	0.8	0.9	
	16-19W	●	●			16-19W					19	9.525	16	0.86	0.8	1.0	
	16-18W	●	●			16-18W					18	9.525	16	0.90	0.8	1.0	
	16-16W	●	●			16-16W					16	9.525	16	1.02	0.9	1.1	
	16-14W	●	●	●		16-14W	●	●			14	9.525	16	1.16	1.0	1.2	
	16-12W	●	●			16-12W	●	●			12	9.525	16	1.36	1.1	1.4	
	16-11W	●	●	●		16-11W	●	●			11	9.525	16	1.48	1.1	1.5	
	16-10W	●	●			16-10W					10	9.525	16	1.63	1.1	1.5	
	16-9W	●	●			16-9W					9	9.525	16	1.81	1.2	1.7	
	16-8W	●	●			16-8W					8	9.525	16	2.03	1.2	1.5	
	22-7W	●				22-7W					7	12.7	22	3.32	1.6	2.3	
	22-6W	●	●			22-6W					6	12.7	22	2.71	1.6	2.3	
	22-5W	●	●			22-5W					5	12.7	22	3.25	1.7	2.4	
	27-4.5W	●	●			27-4.5W					4.5	15.875	27	3.61	1.8	2.6	
	27-4W	●	●			27-4W					4	15.875	27	4.07	2.0	2.9	

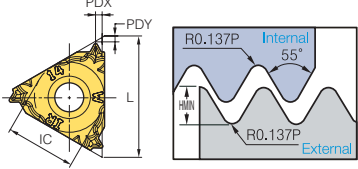
Applicable holders page 38

●: Stock item



Withworth(M chip breaker)

(mm)

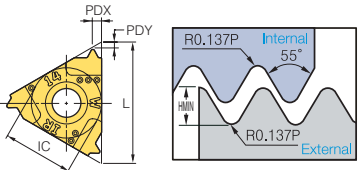
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Internal	IRM 16-14W										14	9.525	16	1.16	1.0	1.2	
	16-11W	●									11	9.525	16	1.48	1.1	1.5	

Applicable holders page 38

● : Stock item

Withworth(U chip breaker)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
Internal	IRM 16-14W-U										14	9.525	16	1.16	1.0	1.2	
	16-11W-U										11	9.525	16	1.48	1.1	1.5	

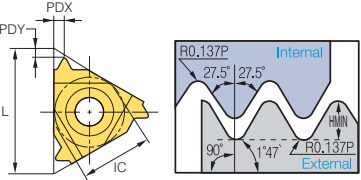
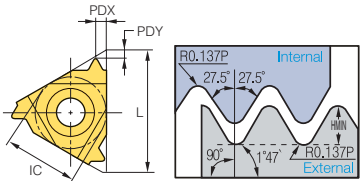
Applicable holders page 38

● : Stock item



British Standard Pipe Thread (BSPT)

(mm)

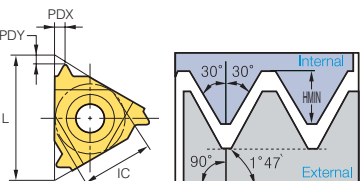
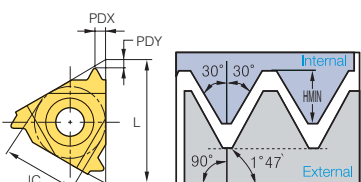
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-28BSPT					EL 11-28BSPT					28	6.35	11	0.58	0.6	0.6	
	11-19BSPT					11-19BSPT					19	6.35	11	0.86	0.8	0.9	
	11-14BSPT					11-14BSPT					14	6.35	11	1.16	0.9	1.0	
	16-28BSPT					16-28BSPT					28	9.525	16	0.58	0.6	0.6	
	16-19BSPT	●				16-19BSPT					19	9.525	16	0.86	0.8	0.9	
	16-14BSPT		●			16-14BSPT					14	9.525	16	1.16	1.0	1.2	
	16-11BSPT	●	●			16-11BSPT					11	9.525	16	1.48	1.1	1.5	
Internal	IR 11-28BSPT					IL 11-28BSPT					28	6.35	11	0.58	0.6	0.6	
	11-19BSPT		●			11-19BSPT					19	6.35	11	0.86	0.8	0.9	
	11-14BSPT		●			11-14BSPT					14	6.35	11	1.16	0.9	1.0	
	16-28BSPT					16-28BSPT					28	9.525	16	0.58	0.6	0.6	
	16-19BSPT	●				16-19BSPT					19	9.525	16	0.86	0.8	0.9	
	16-14BSPT	●				16-14BSPT					14	9.525	16	1.16	1.0	1.2	
	16-11BSPT	●				16-11BSPT					11	9.525	16	1.48	1.1	1.5	

➔ Applicable holders page 37, 38

● : Stock item

National Pipe Thread (NPT)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-27NPT					EL 11-27NPT					27	6.35	11	0.66	0.7	0.8	
	11-18NPT					11-18NPT					18	6.35	11	1.01	0.8	1.0	
	11-14NPT					11-14NPT					14	6.35	11	1.33	0.8	1.0	
	16-27NPT					16-27NPT					27	9.525	16	0.66	0.7	0.8	
	16-18NPT	●	●			16-18NPT					18	9.525	16	1.01	0.8	1.0	
	16-14NPT	●	●			16-14NPT					14	9.525	16	1.33	0.9	1.2	
	16-11.5NPT	●				16-11.5NPT					11.5	9.525	16	1.64	1.1	1.5	
Internal	IR 11-27NPT					IL 11-27NPT					27	6.35	11	0.66	0.7	0.8	
	11-18NPT	●				11-18NPT					18	6.35	11	1.01	0.8	1.0	
	11-14NPT	●	●			11-14NPT					14	6.35	11	1.33	0.8	1.0	
	16-27NPT					16-27NPT					27	9.525	16	0.66	0.7	0.8	
	16-18NPT					16-18NPT					18	9.525	16	1.01	0.8	1.0	
	16-14NPT	●	●			16-14NPT					14	9.525	16	1.33	0.9	1.2	
	16-11.5NPT	●	●			16-11.5NPT					11.5	9.525	16	1.64	1.1	1.5	
Internal	IR 16-8NPT	●				IL 16-8NPT					8	9.525	16	2.42	1.3	1.8	

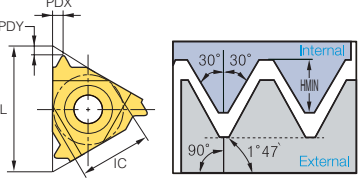
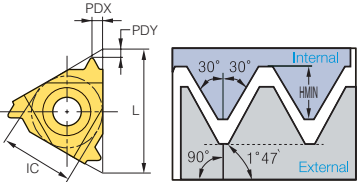
➔ Applicable holders page 37, 38

● : Stock item



National Pipe Threads-Dryseal(NPTF)

(mm)

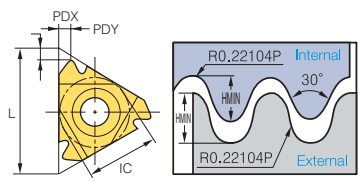
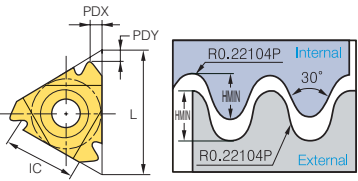
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-27NPTF					EL 11-27NPTF					27	6.35	11	0.64	0.7	0.8	
	11-18NPTF					11-18NPTF					18	6.35	11	1.00	0.8	1.0	
	11-14NPTF					11-14NPTF					14	6.35	11	1.35	0.8	1.0	
	16-27NPTF					16-27NPTF					27	9.525	16	0.64	0.7	0.8	
	16-18NPTF					16-18NPTF					18	9.525	16	1.00	0.8	1.0	
	16-14NPTF					16-14NPTF					14	9.525	16	1.35	0.9	1.2	
	16-11.5NPTF					16-11.5NPTF					11.5	9.525	16	1.63	1.1	1.5	
	16-8NPTF					16-8NPTF					8	9.525	16	2.38	1.3	1.8	
Internal	IR 11-27NPTF					IL 11-27NPTF					27	6.35	11	0.64	0.7	0.8	
	11-18NPTF					11-18NPTF					18	6.35	11	1.00	0.8	1.0	
	11-14NPTF					11-14NPTF					14	6.35	11	1.35	0.8	1.0	
	16-27NPTF					16-27NPTF					27	9.525	16	0.64	0.7	0.8	
	16-18NPTF					16-18NPTF					18	9.525	16	1.00	0.8	1.0	
	16-14NPTF					16-14NPTF					14	9.525	16	1.35	0.9	1.2	
	16-11.5NPTF					16-11.5NPTF					11.5	9.525	16	1.63	1.1	1.5	
	16-8NPTF					16-8NPTF					8	9.525	16	2.38	1.3	1.8	

Applicable holders page 37, 38

● : Stock item

Round DIN405(RD)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 16-10RD					EL 16-10RD					10	9.525	16	1.27	1.1	1.2	
	16-8RD					16-8RD					8	9.525	16	1.59	1.4	1.3	
	16-6RD					16-6RD					6	9.525	16	2.12	1.5	1.7	
	22-6RD					22-6RD					6	12.7	22	2.12	1.5	1.7	
	22-4RD					22-4RD					4	12.7	22	3.18	2.2	2.3	
	27-4RD					27-4RD					4	15.875	27	3.18	2.2	2.3	
Internal	IR 16-10RD					IL 16-10RD					10	9.525	16	1.27	1.1	1.2	
	16-8RD					16-8RD					8	9.525	16	1.59	1.4	1.4	
	16-6RD	●				16-6RD					6	9.525	16	2.12	1.4	1.5	
	22-6RD					22-6RD					6	12.7	22	2.12	1.5	1.7	
	22-4RD					22-4RD					4	12.7	22	3.18	2.2	2.3	
	27-4RD					27-4RD					4	15.875	27	3.18	2.2	2.3	

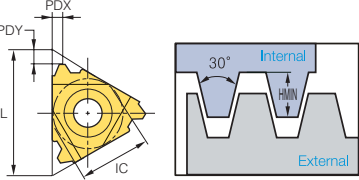
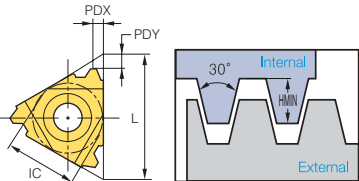
Applicable holders page 37, 38

● : Stock item



Trapez DIN103(TR)

(mm)

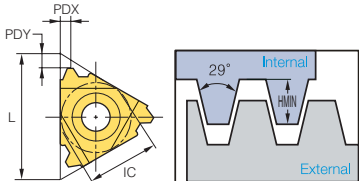
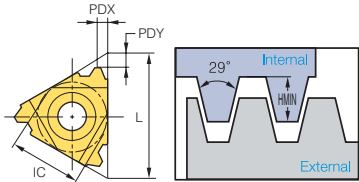
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-1.5TR					EL 11-1.5TR					1.5	6.35	11	0.90	0.8	0.9	
	16-1.5TR					16-1.5TR					1.5	9.525	16	0.90	1.0	1.1	
	16-2.0TR	●				16-2.0TR	●				2.0	9.525	16	1.25	1.1	1.3	
	16-3.0TR	●	●			16-3.0TR					3.0	9.525	16	1.75	1.3	1.5	
	22-4.0TR	●	●			22-4.0TR	●				4.0	12.7	22	2.25	1.7	1.9	
	22-5.0TR	●	●			22-5.0TR					5.0	12.7	22	2.75	2.1	2.5	
	27-6.0TR	●	●			27-6.0TR					6.0	15.875	27	3.50	2.3	2.7	
Internal	IR 11-1.5TR					IL 11-1.5TR					1.5	6.35	11	0.90	0.8	0.9	
	16-1.5TR					16-1.5TR					1.5	9.525	16	0.90	1.0	1.1	
	16-2.0TR					16-2.0TR					2.0	9.525	16	1.25	1.1	1.3	
	16-2.5TR					16-2.5TR					2.5	9.525	16	1.53	1.2	1.4	
	16-3.0TR	●				16-3.0TR					3.0	9.525	16	1.75	1.3	1.5	
	22-4.0TR	●				22-4.0TR					4.0	12.7	22	2.25	1.7	1.9	
	22-5.0TR	●	●			22-5.0TR					5.0	12.7	22	2.75	2.1	2.5	
	27-6.0TR	●	●			27-6.0TR					6.0	15.875	27	3.50	2.3	2.7	

➔ Applicable holders page 37, 38

● : Stock item

American ACME(ACME)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-16ACME					EL 11-16ACME					16	6.35	11	0.92	1.0	1.1	
	16-16ACME					16-16ACME					16	9.525	16	0.92	1.0	1.1	
	16-14ACME					16-14ACME					14	9.525	16	1.03	1.0	1.2	
	16-12ACME					16-12ACME					12	9.525	16	1.19	1.1	1.2	
	16-10ACME					16-10ACME					10	9.525	16	1.52	1.3	1.4	
	16-8ACME					16-8ACME					8	9.525	16	1.84	1.4	1.5	
	16-6ACME					16-6ACME					6	9.525	16	2.37	1.7	1.9	
	22-6ACME	●				22-6ACME					6	12.7	22	2.37	1.8	2.1	
	22-5ACME					22-5ACME					5	12.7	22	2.79	2.0	2.3	
	27-4ACME					27-4ACME					4	15.875	27	3.43	2.4	2.7	
Internal	IR 11-16ACME					IL 11-16ACME					16	6.35	11	0.92	0.9	0.9	
	16-16ACME					16-16ACME					16	9.525	16	0.92	1.0	1.1	
	16-14ACME					16-14ACME					14	9.525	16	1.03	1.1	1.2	
	16-12ACME					16-12ACME					12	9.525	16	1.19	1.2	1.3	
	16-10ACME					16-10ACME					10	9.525	16	1.52	1.2	1.3	
	16-8ACME					16-8ACME					8	9.525	16	1.84	1.4	1.5	
	16-6ACME					16-6ACME					6	9.525	16	2.37	1.7	1.9	
	22-6ACME					22-6ACME					6	12.7	22	2.37	1.8	2.1	
	22-5ACME					22-5ACME					5	12.7	22	2.79	2.0	2.3	
	27-4ACME	●				27-4ACME					4	15.875	27	3.43	2.3	2.6	

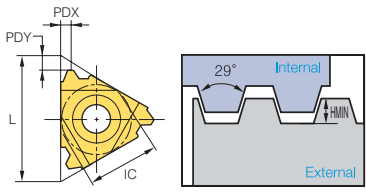
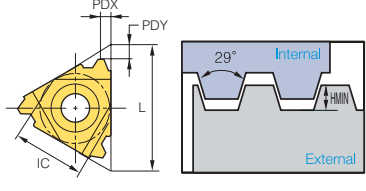
➔ Applicable holders page 37, 38

● : Stock item



Stub ACME (STACME)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-16STACME					EL 11-16STACME					16	6.35	11	0.60	1.0	1.0	
	16-16STACME					16-16STACME					16	9.525	16	0.60	1.0	1.0	
	16-14STACME					16-14STACME					14	9.525	16	0.67	1.1	1.1	
	16-12STACME					16-12STACME					12	9.525	16	0.76	1.2	1.2	
	16-10STACME					16-10STACME					10	9.525	16	1.02	1.2	1.3	
	16-8STACME					16-8STACME					8	9.525	16	1.21	1.4	1.5	
	16-6STACME					16-6STACME					6	9.525	16	1.52	1.7	1.8	
	22-6STACME					22-6STACME					6	12.7	22	1.52	1.7	1.8	
	22-5STACME					22-5STACME					5	12.7	22	1.78	2.1	2.3	
	27-4STACME					27-4STACME					4	15.875	27	2.16	2.3	2.4	
	27-3STACME					27-3STACME					3	15.875	27	2.79	2.9	2.9	
Internal	IR 11-16STACME					IL 11-16STACME					16	6.35	11	0.60	1.0	1.0	
	16-16STACME					16-16STACME					16	9.525	16	0.60	1.0	1.0	
	16-14STACME					16-14STACME					14	9.525	16	0.67	1.1	1.1	
	16-12STACME					16-12STACME					12	9.525	16	0.76	1.1	1.2	
	16-10STACME					16-10STACME					10	9.525	16	1.02	1.2	1.3	
	16-8STACME					16-8STACME					8	9.525	16	1.21	1.4	1.5	
	16-6STACME					16-6STACME					6	9.525	16	1.52	1.7	1.8	
	22-6STACME					22-6STACME					6	12.7	22	1.52	1.7	1.8	
	22-5STACME					22-5STACME					5	12.7	22	1.78	2.1	2.3	
	27-4STACME					27-4STACME					4	15.875	27	2.16	2.3	2.4	
	27-3STACME					27-3STACME					3	15.875	27	2.79	2.9	2.9	

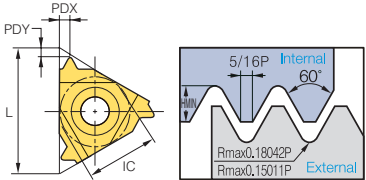
Applicable holders page 37, 38

● : Stock item



UNJ (Unified Constant Thread)

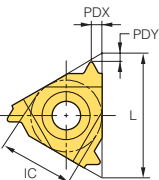
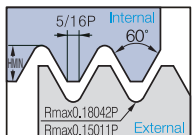
(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-48UNJ					EL 11-48UNJ					48	6.35	11	0.31	0.6	0.5	
	11-44UNJ					11-44UNJ					44	6.35	11	0.33	0.6	0.6	
	11-40UNJ					11-40UNJ					40	6.35	11	0.37	0.6	0.6	
	11-36UNJ					11-36UNJ					36	6.35	11	0.41	0.6	0.6	
	11-32UNJ					11-32UNJ					32	6.35	11	0.46	0.6	0.7	
	11-28UNJ					11-28UNJ					28	6.35	11	0.52	0.7	0.7	
	11-24UNJ					11-24UNJ					24	6.35	11	0.61	0.7	0.8	
	11-20UNJ					11-20UNJ					20	6.35	11	0.73	0.8	0.9	
	11-18UNJ					11-18UNJ					18	6.35	11	0.81	0.8	1.0	
	11-16UNJ					11-16UNJ					16	6.35	11	0.92	0.9	1.1	
	11-14UNJ					11-14UNJ					14	6.35	11	1.05	1.0	1.2	
	16-48UNJ					16-48UNJ					48	9.525	16	0.31	0.6	0.5	
	16-44UNJ					16-44UNJ					44	9.525	16	0.33	0.6	0.6	
	16-40UNJ					16-40UNJ					40	9.525	16	0.37	0.6	0.6	
	16-36UNJ					16-36UNJ					36	9.525	16	0.41	0.6	0.6	
	16-32UNJ					16-32UNJ					32	9.525	16	0.46	0.6	0.7	
	16-28UNJ					16-28UNJ					28	9.525	16	0.52	0.7	0.7	
	16-24UNJ					16-24UNJ					24	9.525	16	0.61	0.7	0.8	
	16-20UNJ					16-20UNJ					20	9.525	16	0.73	0.8	0.9	
	16-18UNJ					16-18UNJ					18	9.525	16	0.81	0.8	1.0	
	16-16UNJ					16-16UNJ					16	9.525	16	0.92	0.9	1.1	
	16-14UNJ					16-14UNJ					14	9.525	16	1.05	1.0	1.2	
	16-13UNJ					16-13UNJ					13	9.525	16	1.13	1.0	1.3	
	16-12UNJ					16-12UNJ					12	9.525	16	1.22	1.1	1.3	
	16-11UNJ					16-11UNJ					11	9.525	16	1.33	1.2	1.5	
	16-10UNJ					16-10UNJ					10	9.525	16	1.47	1.2	1.5	
	16-9UNJ					16-9UNJ					9	9.525	16	1.63	1.3	1.7	
	16-8UNJ					16-8UNJ					8	9.525	16	1.83	1.2	1.6	
	22-7UNJ					22-7UNJ					7	12.7	22	2.09	1.7	2.3	
	22-6UNJ					22-6UNJ					6	12.7	22	2.44	1.7	2.3	
	22-5UNJ					22-5UNJ					5	12.7	22	2.93	1.8	2.5	
	27-4.5UNJ					27-4.5UNJ					4.5	15.875	27	3.26	2.0	2.7	
	27-4UNJ					27-4UNJ					4	15.875	27	3.67	2.2	3.0	



UNJ (Unified Constant Thread)

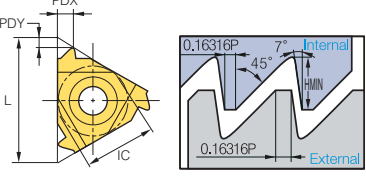
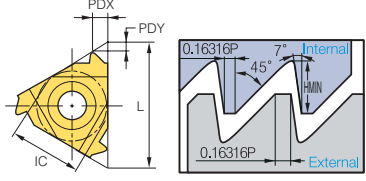
(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
Internal	IR 11-48UNJ					IL 11-48UNJ					48	6.35	11	0.28	0.6	0.5	 
	11-44UNJ					11-44UNJ					44	6.35	11	0.30	0.6	0.6	
	11-40UNJ					11-40UNJ					40	6.35	11	0.33	0.6	0.6	
	11-36UNJ					11-36UNJ					36	6.35	11	0.37	0.6	0.6	
	11-32UNJ					11-32UNJ					32	6.35	11	0.42	0.6	0.7	
	11-28UNJ					11-28UNJ					28	6.35	11	0.47	0.7	0.7	
	11-24UNJ					11-24UNJ					24	6.35	11	0.55	0.7	0.8	
	11-20UNJ					11-20UNJ					20	6.35	11	0.66	0.8	0.9	
	11-18UNJ					11-18UNJ					18	6.35	11	0.74	0.8	1.0	
	11-16UNJ					11-16UNJ					16	6.35	11	0.83	0.9	1.1	
	11-14UNJ					11-14UNJ					14	9.525	11	0.95	1.0	1.2	
	16-48UNJ					16-48UNJ					48	9.525	16	0.28	0.6	0.5	
	16-44UNJ					16-44UNJ					44	9.525	16	0.30	0.6	0.6	
	16-40UNJ					16-40UNJ					40	9.525	16	0.33	0.6	0.6	
	16-36UNJ					16-36UNJ					36	9.525	16	0.37	0.6	0.6	
	16-32UNJ					16-32UNJ					32	9.525	16	0.42	0.6	0.7	
	16-28UNJ					16-28UNJ					28	9.525	16	0.47	0.7	0.7	
	16-24UNJ					16-24UNJ					24	9.525	16	0.55	0.7	0.8	
	16-20UNJ					16-20UNJ					20	9.525	16	0.66	0.8	0.9	
	16-18UNJ					16-18UNJ					18	9.555	16	0.74	0.8	1.0	
	16-16UNJ					16-16UNJ					16	9.525	16	0.83	0.9	1.1	
	16-14UNJ					16-14UNJ					14	9.525	16	0.95	1.0	1.2	
	16-13UNJ					16-13UNJ					13	9.525	16	1.02	1.0	1.3	
	16-12UNJ					16-12UNJ					12	9.525	16	1.11	1.1	1.3	
	16-11UNJ					16-11UNJ					11	9.525	16	1.21	1.2	1.5	
	16-10UNJ					16-10UNJ					10	9.525	16	1.33	1.2	1.5	
	16-9UNJ					16-9UNJ					9	9.525	16	1.48	1.3	1.7	
	16-8UNJ					16-8UNJ					8	9.525	16	1.66	1.2	1.6	
	22-7UNJ					22-7UNJ					7	12.7	22	1.90	1.7	2.3	
	22-6UNJ					22-6UNJ					6	12.7	22	2.21	1.7	2.3	
	22-5UNJ					22-5UNJ					5	12.7	22	2.66	1.8	2.5	
	27-4.5UNJ					27-4.5UNJ					4.5	15.875	27	2.95	2.0	2.7	
	27-4UNJ					27-4UNJ					4	15.875	27	3.32	2.2	3.0	



American buttress (ABUT)

(mm)

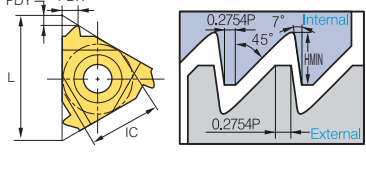
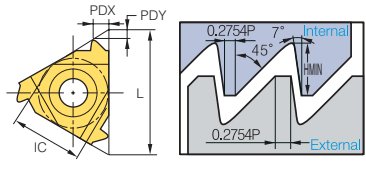
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 11-20ABUT					EL 11-20ABUT					20	6.35	11	0.84	1.0	1.4	
	11-16ABUT					11-16ABUT					16	6.35	11	1.05	1.3	1.9	
	16-20ABUT					16-20ABUT					20	9.525	16	0.84	1.0	1.4	
	16-16ABUT					16-16ABUT					16	9.525	16	1.05	1.3	1.9	
	16-12ABUT					16-12ABUT					12	9.525	16	1.40	1.4	2.0	
	16-10ABUT					16-10ABUT					10	9.525	16	1.68	1.5	2.3	
	22-8ABUT					22-8ABUT					8	12.7	22	2.10	2.0	3.2	
	22-6ABUT					22-6ABUT					6	12.7	22	2.80	2.2	3.5	
Internal	IR 11-20ABUT					IL 11-20ABUT					20	6.35	11	0.84	1.0	1.4	
	11-16ABUT					11-16ABUT					16	6.35	11	1.05	1.3	1.9	
	16-20ABUT					16-20ABUT					20	9.525	16	0.84	1.0	1.4	
	16-16ABUT					16-16ABUT					16	9.525	16	1.05	1.3	1.9	
	16-12ABUT					16-12ABUT					12	9.525	16	1.40	1.4	2.0	
	16-10ABUT					16-10ABUT					10	9.525	16	1.68	1.5	2.3	
	22-8ABUT					22-8ABUT					8	12.7	22	2.10	2.0	3.2	
	22-6ABUT					22-6ABUT					6	12.7	22	2.80	2.2	3.5	

➔ Applicable holders page 37, 38

● : Stock item

British buttress (BBUT)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 16-16BBUT					EL 16-16BBUT					16	9.525	16	0.80	1.1	1.6	
	16-12BBUT					16-12BBUT					12	9.525	16	1.07	1.4	2.1	
	16-10BBUT					16-10BBUT					10	9.525	16	1.28	1.4	2.2	
	16-8BBUT					16-8BBUT					8	9.525	16	1.61	1.6	2.5	
	22-8BBUT					22-8BBUT					8	12.7	22	1.61	1.6	2.5	
Internal	IR 16-16BBUT					IL 16-16BBUT					16	9.525	16	0.80	1.1	1.6	
	16-12BBUT					16-12BBUT					12	9.525	16	1.07	1.4	2.1	
	16-10BBUT					16-10BBUT					10	9.525	16	1.28	1.4	2.2	
	16-8BBUT					16-8BBUT					8	9.525	16	1.61	1.6	2.5	
	22-8BBUT					22-8BBUT					8	12.7	22	1.61	1.6	2.5	

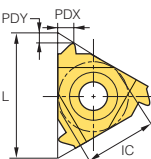
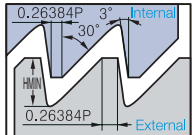
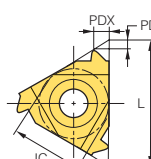
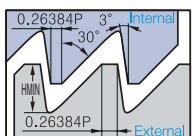
➔ Applicable holders page 37, 38

● : Stock item



Metric buttress(SAGE)

(mm)

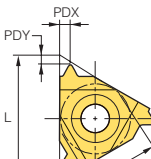
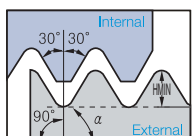
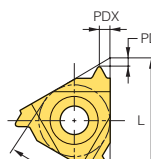
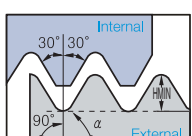
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TP	IC	L	HMIN	PDY	PDX	Geometry
External	ER 16-2.0SAGE					EL 16-2.0SAGE					2.0	9.525	16	1.74	1.47	2.08	 
	22-2.0SAGE					22-2.0SAGE					2.0	12.7	22	1.74	1.47	2.08	
	22-3.0SAGE	●				22-3.0SAGE					3.0	12.7	22	2.60	1.79	2.60	
	27-4.0SAGE					27-4.0SAGE					4.0	15.875	27	3.55	1.93	3.20	
Internal	IR 16-2.0SAGE	●				IL 16-2.0SAGE					2.0	9.525	16	1.50	1.52	2.2	 
	22-3.0SAGE					22-3.0SAGE					3.0	12.7	22	2.25	1.66	2.9	
	27-4.0SAGE					27-4.0SAGE					4.0	15.875	27	3.09	2.12	3.2	

Applicable holders page 37, 38

● : Stock item

API

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 22-4API382					EL 22-4API382					4	12.7	22	3.09	2.1	2.8	 
	22-4API383					22-4API383					4	12.7	22	3.08	2.1	2.8	
	22-4API502					22-4API502					4	12.7	22	3.75	2.0	2.9	
	22-4API503					22-4API503					4	12.7	22	3.74	2.0	2.9	
	22-5API403					22-5API403					5	12.7	22	2.99	1.8	2.6	
	22-6API551					22-6API551					6	12.7	22	1.41	2.6	2.0	
	27-4API382					27-4API382					4	15.875	27	3.09	2.1	2.8	
	27-4API383					27-4API383					4	15.875	27	3.08	2.1	2.8	
	27-4API502					27-4API502					4	15.875	27	3.75	2.1	3.1	
	27-4API503					27-4API503					4	15.875	27	3.74	2.1	3.1	
	27-5API403					27-5API403					5	15.875	27	2.99	1.9	2.7	
Internal	IR 22-4API382					IL 22-4API382					4	12.7	22	3.09	2.1	2.8	 
	22-4API383					22-4API383					4	12.7	22	3.08	2.1	2.8	
	22-4API502					22-4API502					4	12.7	22	3.75	2.1	3.1	
	22-4API503					22-4API503					4	12.7	22	3.74	2.0	2.9	
	22-5API403	●				22-5API403					5	12.7	22	2.99	1.8	2.6	
	22-6API551					22-6API551					6	12.7	22	1.41	2.6	2.0	
	27-4API382					27-4API382					4	15.875	27	3.09	2.1	2.8	
	27-4API383					27-4API383					4	15.875	27	3.08	2.1	2.8	
	27-4API502					27-4API502					4	15.875	27	3.75	2.1	3.1	
	27-4API503					27-4API503					4	15.875	27	3.74	2.1	3.1	
	27-5API403					27-5API403					5	15.875	27	2.99	1.9	2.7	

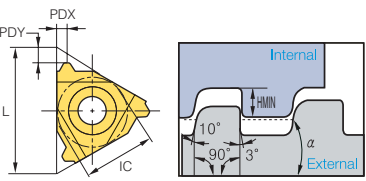
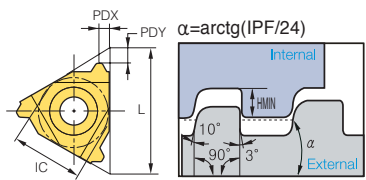
Applicable holders page 37, 38

● : Stock item



API buttress casing (BUT)

(mm)

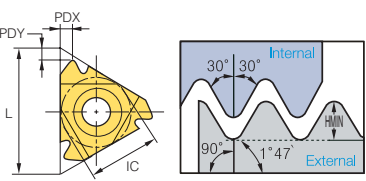
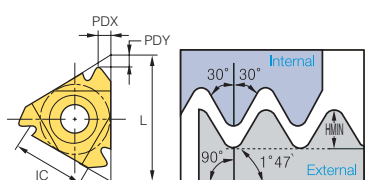
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 22-5BUT75	●				EL 22-5BUT75					5	12.7	22	1.55	3.1	1.9	
	22-5BUT1					22-5BUT1					5	12.7	22	1.55	3.1	1.9	
Internal	IR 22-5BUT75	●				IL 22-5BUT75					5	12.7	22	1.55	2.8	1.9	
	22-5BUT1					22-5BUT1					5	12.7	22	1.55	2.8	1.9	

➔ Applicable holders page 37, 38

● : Stock item

API round casing & Tubing (APIRD)

(mm)

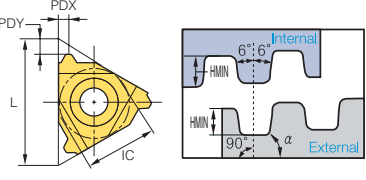
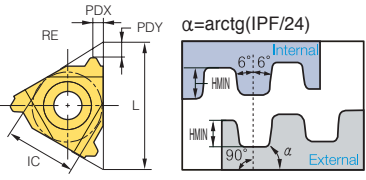
Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 16-10APIRD	●				EL 16-10APIRD					10	9.525	16	1.41	1.2	1.4	
	16-8APIRD	●				16-8APIRD					8	9.525	16	1.81	1.3	1.5	
Internal	IR 16-10APIRD	●				IL 16-10APIRD					10	9.525	16	1.41	1.2	1.4	
	16-8APIRD	●				16-8APIRD					8	9.525	16	1.81	1.3	1.5	

➔ Applicable holders page 37, 38

● : Stock item

Extreme line casing (EL)

(mm)

Type	Designation (Right)	PC5030T	PC3030T	PC9070T	PC5300	Designation (Left)	PC5030T	PC3030T	PC9070T	PC5300	TPI	IC	L	HMIN	PDY	PDX	Geometry
External	ER 22-6EL15					EL 22-6EL15					6	12.7	22	1.21	1.9	1.9	
	22-5EL125					22-5EL125					5	12.7	22	1.71	2.3	2.4	
Internal	IR 22-6EL15					IL 22-6EL15					6	12.7	22	1.39	1.8	1.9	
	22-5EL125					22-5EL125					5	12.7	22	1.91	2.2	2.4	

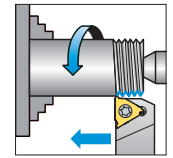
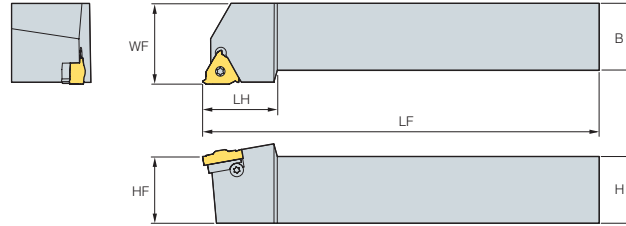
➔ Applicable holders page 37, 38

● : Stock item



ER(L)H

(Screw on system)



• R type holder

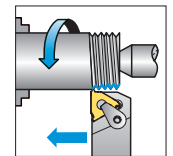
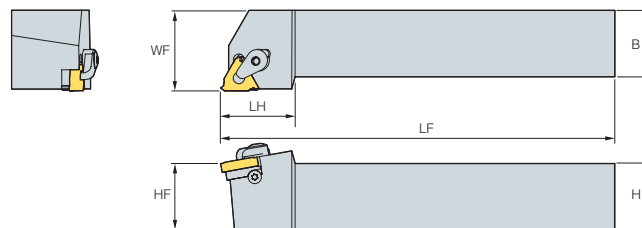
Designation		Stock		IC	H	B	LF	WF	HF	LH	(mm)				
		R	L								Insert screw	Shim screw	Shim RH	Shim LH	Wrench
ER(L)H	08N-11	●		6.35	8	8	136.4	11	8	17.5	ST11N	-	-	-	TW08P
	10N-11	●		6.35	10	10	70.0	11	10	17.5					
	12N-11	●	●	6.35	12	12	80.0	12	12	17.5					
	12N-16	●		9.525	12	12	83.2	16	12	22					
	09-16	●	●	9.525	9.52	9.52	63.6	16	9.52	20.5	ST16	STA16	ATE16	ATI22	TW10P
	12-16	●	●	9.525	12	12	83.2	16	12	22					
	16-16	●	●	9.525	16	16	100.0	16	16	20.5					
	20-16	●	●	9.525	20	20	128.6	20	20	30					
	25-16	●	●	9.525	25	25	153.6	25	25	30					
	32-16	●	●	9.525	32	32	173.6	32	32	30					
	25-22	●	●	12.7	25	25	155.7	25	25	36	ST22	STA22	ATE22	ATI22	TW20P
	32-22	●	●	12.7	32	32	175.7	32	32	36					
	40-22	●	●	12.7	40	40	205.7	40	40	36					
	25-27	●	●	15.875	25	25	151.6	32	25	35	ST27	STA27	ATE27	ATI27	TW25L
	32-27	●		15.875	32	32	176.6	32	32	40					
	40-27	●	●	15.875	40	40	206.6	40	40	40					
	50-27	●		15.875	50	50	256.6	50	50	40					

Applicable inserts page 16~19, 22, 24~25, 29~32, 34~36

• Helix angle is 1.5 ° for all holders • No shim needed for N type holder • : Stock item

ER(L)H-C

(Clamp on system)



• R type holder

Designation		Stock		IC	H	B	LF	WF	HF	LH	(mm)				
		R	L								Shim screw	Clamp	Shim RH	Shim LH	Wrench
ER(L)H	20-16C	●	●	9.525	20	20	128.6	20	20	30	STA16	CTH16	ATE16	ATI16	TW10P
	25-16C	●	●	9.525	25	25	153.6	25	25	30					
	32-16C	●	●	9.525	32	32	173.6	32	32	30					TW15P
	25-22C	●	●	12.7	25	25	155.7	25	25	36	STA22	CTH22	ATE22	ATI22	TW20P
	32-22C	●		12.7	32	32	175.7	32	32	36					
	40-22C	●		12.7	40	40	205.7	40	40	36					
	25-27C	●	●	15.875	25	25	151.6	25	25	35	STA27	CTH27	ATE27	ATI27	TW25L
	32-27C	●		15.875	32	32	176.6	32	32	40					
	40-27C	●		15.875	40	40	206.6	40	40	40					
	50-27C	●		15.875	50	50	256.6	50	50	40					

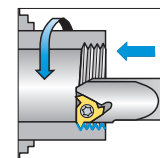
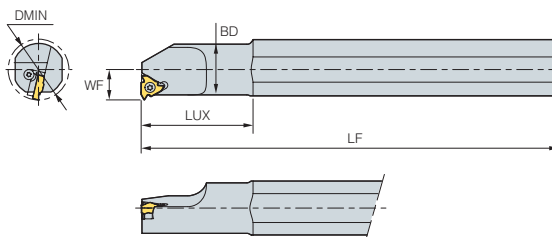
Applicable inserts page 16~19, 22, 24~25, 29~32, 34~36

• Helix angle is 1.5 ° for all holders • No shim needed for N type holder • : Stock item



IR(L)H

(Screw on system)



• R type holder

(mm)

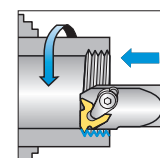
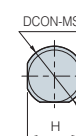
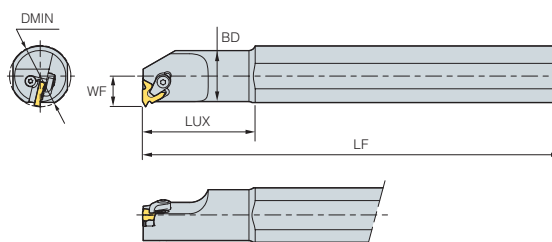
Designation	Stock		IC	DMIN	DCON-MS	BD	H	LF	WF	LUX	Insert screw	Shim screw	Shim RH	Shim LH	Wrench
	R	L													
IR(L)H 10DN-11	●	●	6.35	13	10	10.0	9.5	100	7.3	-	ST11N	-	-	-	TW08P
	●	●	6.35	13	20	10.0	18.0	180	7.3	25					
13N-11	●	●	6.35	16	20	13.0	18.0	180	8.9	32					
13N-16	●	●	9.525	17	20	12.7	18.0	180	10.3	32	ST16N	-	-	-	TW10P
16N-16	●	●	9.525	20	20	16.0	18.0	180	11.5	40					
16DN-16	●	●	9.525	20	16	16.0	15.2	150	11.3	32					
20-16	●	●	9.525	24	20	20.0	18.0	180	13.4	40	ST16	STA16	ATI16	ATE16	TW10P
25-16	●	●	9.525	29	32	25.0	29.0	250	16.3	60					
25D-16	●	●	9.525	29	25	24.5	22.6	200	16.1	45					
32-16	●	●	9.525	36	32	32.0	29.0	250	19.6	60					
40-16	●	●	9.525	44	40	40.0	36.0	300	23.8	60	ST22N	-	-	-	TW20P
20N-22	●	●	12.7	27	20	20.0	18.0	180	15.6	50					
25-22	●	●	12.7	32	32	25.0	29.0	250	17.4	60					
25D-22	●	●	12.7	32	25	24.6	22.6	200	17.2	45	ST22	STA22	ATI22	ATE22	TW20P
32-22	●	●	12.7	39	32	32.0	29.0	250	21.5	60					
40-22	●	●	12.7	47	40	40.0	36.0	300	25.8	60					
32-27	●	●	15.875	40	32	32.0	29.0	250	22.4	60	ST27	STA27	ATI27	ATE27	TW25L
40-27	●	●	15.875	48	40	40.0	36.0	300	26.4	60					
50-27	●	●	15.875	58	50	50.0	45.0	350	31.4	75					
60-27	●	●	15.875	69	60	60.0	54.0	400	36.4	75					

➔ Applicable inserts page 16~19, 22, 24~25, 29~32, 34~36

• Helix angle is 1.5 ° for all holders • No shim needed for N type holder • Processing smaller than DMIN uses NFFT or MSB • : Stock item

IR(L)H-C

(Clamp on system)



• R type holder

(mm)

Designation	Stock		IC	DMIN	DCON-MS	BD	H	LF	WF	LUX	Shim screw	Clamp	Shim RH	Shim LH	Wrench
	R	L													
IR(L)H 20-16C	●	●	9.525	24	20	20.0	18.0	180	13.4	50	STA16	CTH16	ATI16	ATE16	TW10P TW15P
	●	●	9.525	29	32	25.0	28.0	250	16.3	60					
25D-16C	●	●	9.525	29	25	24.6	22.6	200	16.1	45					
32-16C	●	●	9.525	36	32	32.0	29.0	250	19.6	60					
40-16C	●	●	9.525	44	40	40.0	36.0	300	23.8	60	STA22	CTH22	ATI22	ATE22	TW20P
25-22C	●	●	12.7	32	32	25.0	29.0	250	17.4	60					
25D-22C	●	●	12.7	32	25	24.6	22.6	200	17.2	45					
32-22C	●	●	12.7	39	32	32.0	29.0	250	21.5	60					
40-22C	●	●	12.7	47	40	40.0	36.0	300	25.8	60	STA27	CTH27	ATI27	ATE27	TW25L
32-27C	●	●	15.875	40	32	32.0	29.0	250	22.4	60					
40-27C	●	●	15.875	48	40	40.0	36.0	300	26.4	60					
50-27C	●	●	15.875	58	50	50.0	45.0	350	31.4	75					
60-27C	●	●	15.875	69	60	60.5	54.0	400	36.4	75					

➔ Applicable inserts page 16~19, 22, 24~25, 29~32, 34~36

• Helix angle is 1.5 ° for all holders • : Stock item

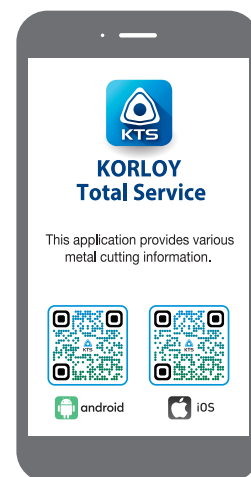
For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threat the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the tools can be pulled out due to centrifugal force while high speed machining.



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