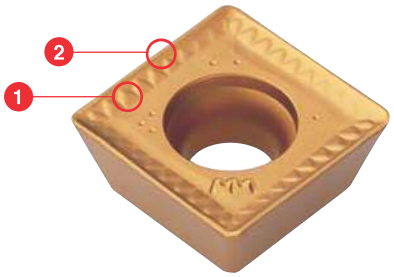
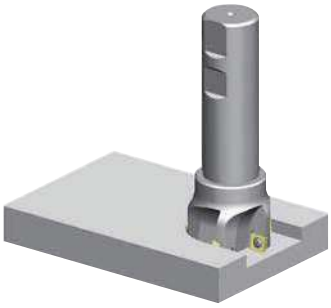
Future Mill (FMP)

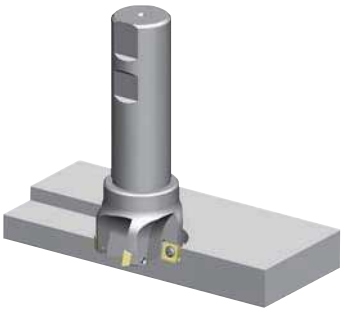
Features

- The strong cutting-edge ensures excellent tool life in high feed and high speed, deep depth of cut, with low cutting loads
- Optimal grades for most workpieces make high efficiency cutting possible
- Unique chip breaker makes good chip evacuation and lower cutting loads (1)
- Innovative curve cutting-edge lowers cutting load and provides a stronger cutting-edge (2)



Machining examples





Features of chip breaker

- Innovative special cutting-edge and chip breaker design ensures ideal 90°cutting and low cutting load
- Various applications are available with multi functional cutters (Facing, Slotting, Shouldering)
- Improved tool life due to special coated grades
- Superior cutting quality at deep cutting depth through the low cutting load and strong cutting-edge

Recommended C/B and grade as per workpiece

Insert		Cutting-edge	Uses	Recommended C/B and grade as per workpiece (●: 1st)									
				Low carbon steel/Mild steel		High carbon steel/Mild steel		Stainless steel		Cast iron		Aluminum alloy	
				C/B	Grades	C/B	Grades	C/B	Grades	C/B	Grades	C/B	Grades
MF			Low cutting load type	●	○NCM325 ○NC5330 ●NCM335		●NCM325 ○NC5330 ○NCM335	●	○NCM325 ○NC5330 ●NCM335	●	●PC6510 ○PC215K	-	-
MM			Reinforced cutting edge type		○NCM325 ○NC5330 ●NCM335		●NCM325 ○NC5330 ○NCM335		○NCM325 ○NC5330 ●NCM335		●PC6510 ○PC215K	-	-
MA			Sharp cutting edge type	-	-	-	-	-	-	-	-	●	●H01 ○G10

Recommended cutting condition

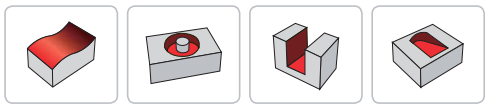
ISO	Cutting Speed vc (m/min)								
	CVD Coated		PVD Coated						Carbide
	NCM325	NCM335	PC3500	PC3600	PC6510	PC5300	PC9530	PC5400	H01
P	190~310	180~290	160-270	160-270	-	150-240	-	130-210	-
M	110~180	100~160	-	-	-	90-150	90-150	70-120	-
K	-	-	-	-	140-230	120-200	-	100-160	-
N	-	-	-	-	-	-	-	-	260-440

Future Mill (FMR)

Features

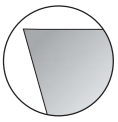
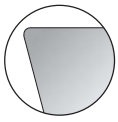
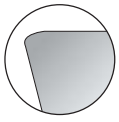
- Wide coverage for medium to roughing, general steel to high hardness mold materials
- 2 step shape of insert provides strong clamping and can minimize components to replace the shim
- 4-8 cutting-edge available per insert (Inscribed circle 05, 06, 07, 08, 10, 12, 16, 20)
- Uneven flute spacing prevents vibration on high speed applications and provides more stable machining
- Precise design of the insert seat prevents insert from chattering
- Special design of the insert bottom prevents movement and chatter of insert
- Easy to change cutting-edge due to the rotation prevention design of the insert

Machining examples



Copying | Helical | Slotting & Side cutting | Ramping

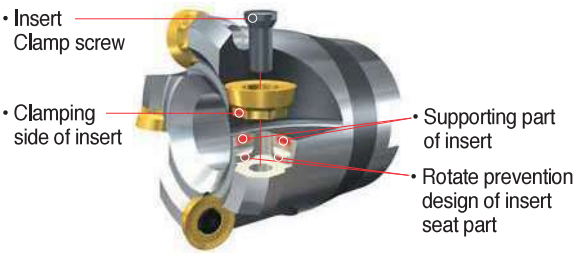
FMR Insert cutting-edge shape

Designation	RDHW□□□□M0F	RDHW□□□□M0E	RDHW□□□□M0S
Cutting edge shape (G calss)			

Features of chip breaker

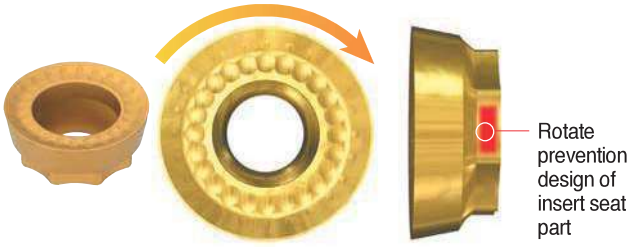
Insert		Cutting-edge	Uses	Features
MF			Finishing	Low cutting resistance chip breaker design guarantees long tool life good performance at finishing and difficult-to-cut material machining
MM			Medium	Suitable for general milling at wide application range
MA			Aluminum	Sharp cutting-edge and buffed top face for aluminum machining prevent welding and control chip flow

Clamping system



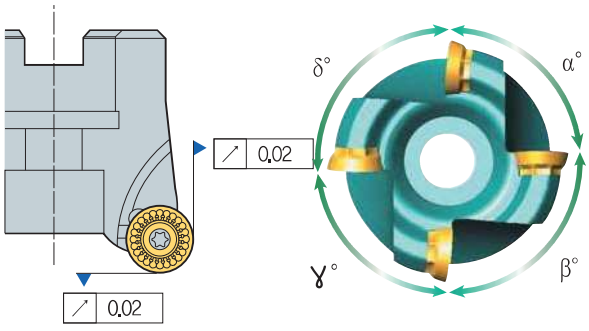
FMR□3000 type
FMR□4000 type

FMR□5000 type
FMR□6000 type



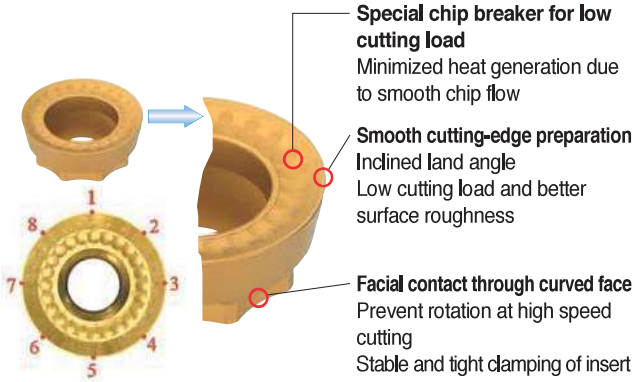
RDKT10T3M0-□□
RDKT1204M0-□□

RDKT1605M0-MM
RDKT2006M0-MM



Good surface finish due to the precise design of insert seat part of cutter

Uneven flute spacing prevents vibration at high speed application and provides stable machining



4-8 cutting-edge available per insert

Special chip breaker for low cutting load
Minimized heat generation due to smooth chip flow

Smooth cutting-edge preparation
Inclined land angle
Low cutting load and better surface roughness

Facial contact through curved face
Prevent rotation at high speed cutting
Stable and tight clamping of insert
Good positioning of insert repeatedly

Future Mill (FMR)

Chip removal rate (cm^3/min)

Workpiece		Grades	Ø8	Ø10	Ø12	Ø15	Ø16	Ø20	Ø21	Ø25	Ø26	Ø32	Ø33	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125	Ø160
P	General structure steel (under 200HB)	PC3500 PC5300	4.97	9.94	9.94	14.92	31.83	31.83	47.74	47.74	47.74	71.61	38.19	95.49	119.36	143.23	167.11	190.98	133.69	509.29
			vc = 250, fz = 0.25, ap = 0.5, ae = 0.5D				vc = 300, fz = 0.4 ap = 1.0, ae = 0.5D		vc = 250, fz = 0.4, ap = 1.5, ae = 0.5D											vc = 200, fz = 0.5 ap = 4.0, ae = 0.5D
	General carbon steel (under 30 HRC)		3.97	7.95	7.95	11.93	25.46	25.46	38.19	38.19	38.19	57.29	38.19	76.39	95.49	114.59	133.69	152.78	133.69	458.36
			vc = 200, fz = 0.25, ap = 0.5, ae = 0.5D				vc = 250, fz = 0.4 ap = 1.0, ae = 0.5D		vc = 200, fz = 0.4, ap = 1.5, ae = 0.5D											vc = 180, fz = 0.5 ap = 4.0, ae = 0.5D
	High carbon steel, Alloy steel (30~40 HRC)		2.86	5.72	5.72	8.59	22.91	22.91	34.37	34.37	34.37	51.56	34.37	68.75	85.94	103.13	120.32	137.5	120.32	407.43
			vc = 180, fz = 0.20, ap = 0.5, ae = 0.5D				vc = 200, fz = 0.4 ap = 1.0, ae = 0.5D		vc = 180, fz = 0.4, ap = 1.5, ae = 0.5D											vc = 160, fz = 0.5 ap = 4.0, ae = 0.5D
	High carbon steel, Alloy steel (40~50 HRC)		1.24	2.48	2.48	3.72	11.45	11.45	14.32	17.18	14.32	21.48	14.32	28.64	35.8	42.97	50.13	57.29	50.13	249.55
			vc = 130, fz = 0.15, ap = 0.4, ae = 0.5D				vc = 170, fz = 0.3 ap = 0.9, ae = 0.5D		vc = 150, fz = 0.3, ap = 1.0, ae = 0.5D											vc = 140, fz = 0.4 ap = 3.5, ae = 0.5D
	Alloy steel (over 50 HRC)		0.95	1.9	1.9	2.86	7.63	7.63	9.54	11.45	9.54	14.32	9.54	19.09	23.87	28.64	33.42	38.19	33.42	152.78
			vc = 100, fz = 0.15, ap = 0.4, ae = 0.5D				vc = 130, fz = 0.3 ap = 0.9, ae = 0.5D		vc = 100, fz = 0.3, ap = 1.0, ae = 0.5D											vc = 100, fz = 0.4 ap = 3.0, ae = 0.5D
M	Stainless steel	PC5300	2.06	4.13	4.13	6.2	16.55	16.55	12.41	24.82	12.41	18.62	12.41	24.82	31.03	37.24	43.44	49.65	43.44	331.04
			vc = 130, fz = 0.20, ap = 0.5, ae = 0.5D				vc = 200, fz = 0.2 ap = 1.0, ae = 0.5D		vc = 100, fz = 0.3, ap = 1.0, ae = 0.5D											vc = 130, fz = 0.5 ap = 4.0, ae = 0.5D
K	Cast iron	PC5300	2.86	5.72	5.72	8.59	14.32	14.32	21.48	21.48	21.48	32.22	21.48	42.97	53.71	64.45	75.2	85.94	75.2	366.69
			vc = 180, fz = 0.20, ap = 0.5, ae = 0.5D				vc = 180, fz = 0.2 ap = 1.0, ae = 0.5D		vc = 180, fz = 0.2, ap = 1.5, ae = 0.5D											vc = 180, fz = 0.4 ap = 4.0, ae = 0.5D

Required machine power (P_{KW} = 0.75 x P_{HP})

•RDKT10□□

Workpiece		Grades	Ø21	Ø25	Ø26	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Cutting condition vc	fz	ap	ae
P	General structure steel (under 200HB)	PC3500 PC5300	2.2	2.2	2.2	3.3	4.4	5.5	6.6	7.7	8.8	250	0.4	1.5	0.5D
	General carbon steel (under 30 HRC)		2.1	2.1	2.1	3.1	4.1	5.2	6.2	7.3	8.3	200	0.4	1.5	0.5D
	High carbon steel, Alloy steel (30~40 HRC)		2.2	2.2	2.2	3.3	4.5	5.6	6.7	7.9	9	180	0.4	1.5	0.5D
	High carbon steel, Alloy steel (40~50 HRC)		1.1	1.1	1.1	1.6	2.1	2.6	3.2	3.7	4.2	150	0.3	1.0	0.5D
	Alloy steel (over 50 HRC)		0.7	0.7	0.7	1.1	1.4	1.7	2.1	2.4	2.8	100	0.3	1.0	0.5D
M	Stainless steel	PC5300	0.6	0.6	0.6	0.8	1.2	1.5	1.7	2	2.3	130	0.2	1.5	0.5D
K	Cast iron	PC5300	0.6	0.6	0.6	0.9	1.2	1.5	1.8	2.1	2.4	180	0.2	1.5	0.5D

• The figures in the above chart means Php value.

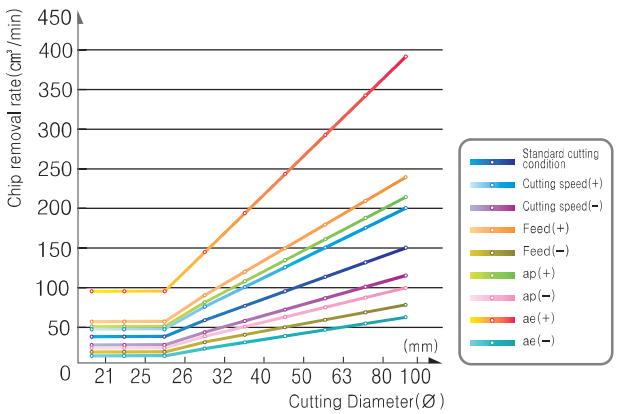
•RDKT12□□

Workpiece		Grades	Ø32	Ø33	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125	Cutting condition vc	fz	ap	ae
P	General structure steel (under 200HB)	PC3500 PC5300	1.7	1.7	2.6	3.5	3.5	4.4	5.3	6.1	200	0.4	1.5	0.5D
	General carbon steel (under 30 HRC)		2	2	3.1	4.1	2.6	5.2	6.2	7.2	180	0.4	1.5	0.5D
	High carbon steel, Alloy steel (30~40 HRC)		2.2	2.2	3.3	4.4	2.8	5.6	6.7	7.8	160	0.4	1.5	0.5D
	High carbon steel, Alloy steel (40~50 HRC)		1	1	1.5	1.6	2.1	2.6	3.1	3.6	140	0.3	1.0	0.5D
	Alloy steel (over 50 HRC)		0.7	0.7	1	1.4	0.8	1.7	2.1	2.4	100	0.3	1.0	0.5D
M	Stainless steel	PC5300	0.5	0.5	0.8	1.1	0.7	1.4	1.7	2	130	0.2	1.5	0.5D
K	Cast iron	PC5300	0.6	0.6	0.9	1.2	0.7	1.5	1.8	2.1	180	0.2	1.5	0.5D

• The figures in the above chart means Php value.

Chip removal rate by cutting condition

• Used insert: RDKT10□□



• Variation of cutting condition

Standard	ISO vc = 200 fz = 0.4 ap = 1.5 ae = 0.5D
Speed (+)	250
Speed (–)	150
Feed (+)	0.6
Feed (–)	0.2
ap (+)	2
ap (–)	1
ae (+)	D
ae (–)	0.2D

Recommended cutting condition

• Side milling, slotting, ramping, copying

Workpiece		Hardness	Grades	Cutting speed (m/min)	FMR1000		FMR1500		FMR2000		FMR2500		FMR3000		FMR4000		FMR5000		FMR6000	
					ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)
P	Cabon steel	200HB ≤	PC5300	280	≤ 1.0	≤ 0.4	≤ 1.2	≤ 0.4	≤ 1.5	≤ 0.4	≤ 1.7	≤ 0.4	≤ 2.0	≤ 0.5	≤ 2.4	≤ 0.6	≤ 3.0	≤ 0.7	≤ 4.0	≤ 0.8
			PC5400	245																
		30HRC ≤	PC5300	250	≤ 0.7	≤ 0.4	≤ 1.2	≤ 0.4	≤ 1.5	≤ 0.4	≤ 1.7	≤ 0.4	≤ 2.0	≤ 0.5	≤ 2.4	≤ 0.6	≤ 3.0	≤ 0.7	≤ 4.0	≤ 0.8
			PC5400	210																
	Alloy steel	30~40HRC	PC5300	195	≤ 0.7	≤ 0.2	≤ 0.9	≤ 0.2	≤ 1.2	≤ 0.2	≤ 1.5	≤ 0.2	≤ 1.7	≤ 0.3	≤ 2.0	≤ 0.4	≤ 2.7	≤ 0.5	≤ 3.7	≤ 0.6
			PC5400	170																
	High alloy steel (alloy constituent > 5%)	40~50HRC	PC5300	150	≤ 0.7	≤ 0.2	≤ 0.9	≤ 0.2	≤ 1.2	≤ 0.2	≤ 1.5	≤ 0.2	≤ 1.7	≤ 0.3	≤ 2.0	≤ 0.4	≤ 2.7	≤ 0.5	≤ 3.7	≤ 0.6
			PC5400	130																
		Tensile strength 350MPa ≤	PC5300	120	≤ 0.7	≤ 0.2	≤ 0.9	≤ 0.2	≤ 1.2	≤ 0.2	≤ 1.5	≤ 0.2	≤ 1.7	≤ 0.3	≤ 2.0	≤ 0.4	≤ 2.7	≤ 0.5	≤ 3.7	≤ 0.6
			PC5400	105																
M	Stainless steel	270HB≤	PC5300	130	≤ 0.7	≤ 0.2	≤ 0.9	≤ 0.2	≤ 1.2	≤ 0.2	≤ 1.5	≤ 0.2	≤ 1.7	≤ 0.3	≤ 2.0	≤ 0.4	≤ 2.7	≤ 0.5	≤ 3.7	≤ 0.6
			PC5400	110																
K	Cast iron, Ductile cast iron	Low tensile	PC5300	145	≤ 0.7	≤ 0.4	≤ 1.2	≤ 0.4	≤ 1.5	≤ 0.4	≤ 1.7	≤ 0.4	≤ 2.0	≤ 0.5	≤ 2.4	≤ 0.6	≤ 3.0	≤ 0.7	≤ 4.0	≤ 0.8
			PC5400	110																

• Plunging

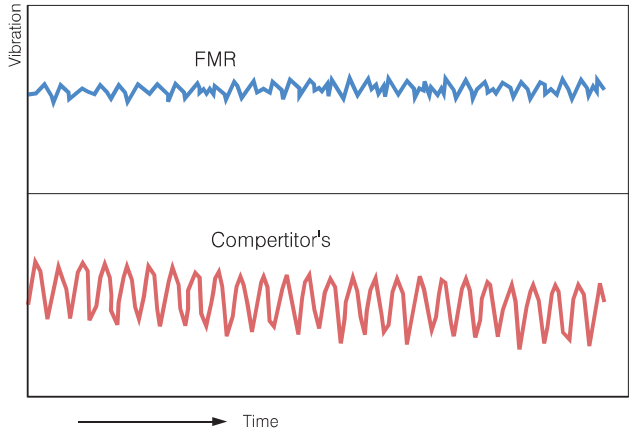
Workpiece		Hardness	Grades	Cutting speed (m/min)	FMR1000		FMR1500		FMR2000		FMR2500		FMR3000		FMR4000		FMR5000		FMR6000	
					ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)
P	Cabon steel	200HB ≤	PC5300	280	≤ 2.5	≤ 0.2	≤ 3.0	≤ 0.2	≤ 3.5	≤ 0.2	≤ 4.0	≤ 0.2	≤ 5.0	≤ 0.3	≤ 6.0	≤ 0.4	≤ 8.0	≤ 0.5	≤ 10.0	≤ 0.6
			PC5400	245																
		30HRC ≤	PC5300	250	≤ 2.5	≤ 0.2	≤ 3.0	≤ 0.2	≤ 3.5	≤ 0.2	≤ 4.0	≤ 0.2	≤ 5.0	≤ 0.3	≤ 6.0	≤ 0.4	≤ 8.0	≤ 0.5	≤ 10.0	≤ 0.6
			PC5400	210																
	Alloy steel	30~40HRC	PC5300	195	≤ 2.5	≤ 0.1	≤ 3.0	≤ 0.1	≤ 3.5	≤ 0.1	≤ 4.0	≤ 0.1	≤ 5.0	≤ 0.2	≤ 6.0	≤ 0.3	≤ 8.0	≤ 0.4	≤ 10.0	≤ 0.5
			PC5400	170																
	High alloy steel (alloy constituent > 5%)	40~50HRC	PC5300	150	≤ 2.5	≤ 0.1	≤ 3.0	≤ 0.1	≤ 3.5	≤ 0.1	≤ 4.0	≤ 0.1	≤ 5.0	≤ 0.2	≤ 6.0	≤ 0.3	≤ 8.0	≤ 0.4	≤ 10.0	≤ 0.5
			PC5400	130																
		Tensile strength 350MPa ≤	PC5300	120	≤ 2.5	≤ 0.1	≤ 3.0	≤ 0.1	≤ 3.5	≤ 0.1	≤ 4.0	≤ 0.1	≤ 5.0	≤ 0.2	≤ 6.0	≤ 0.3	≤ 8.0	≤ 0.4	≤ 10.0	≤ 0.5
			PC5400	105																
M	Stainless steel	270HB≤	PC5300	130	≤ 2.5	≤ 0.1	≤ 3.0	≤ 0.1	≤ 3.5	≤ 0.1	≤ 4.0	≤ 0.1	≤ 5.0	≤ 0.2	≤ 6.0	≤ 0.3	≤ 8.0	≤ 0.4	≤ 10.0	≤ 0.5
			PC5400	110																
K	Cast iron, Ductile cast iron	Low tensile	PC5300	145	≤ 2.5	≤ 0.2	≤ 3.0	≤ 0.2	≤ 3.5	≤ 0.2	≤ 4.0	≤ 0.2	≤ 5.0	≤ 0.3	≤ 6.0	≤ 0.4	≤ 8.0	≤ 0.5	≤ 10.0	≤ 0.6
			PC5400	110																

• Helical cutting

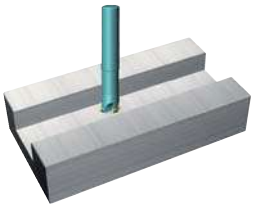
Workpiece		Hardness	Grades	Cutting speed (m/min)	FMR1000		FMR1500		FMR2000		FMR2500		FMR3000		FMR4000		FMR5000		FMR6000	
					ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)
P	Cabon steel	200HB ≤	PC5300	280	≤ 1.0	≤ 0.2	≤ 1.0	≤ 0.2	≤ 1.0	≤ 0.2	≤ 1.0	≤ 0.2	≤ 2.0	≤ 0.3	≤ 2.0	≤ 0.4	≤ 4.0	≤ 0.5	≤ 4.0	≤ 0.6
			PC5400	245																
		30HRC ≤	PC5300	250	≤ 0.7	≤ 0.2	≤ 0.7	≤ 0.2	≤ 0.7	≤ 0.2	≤ 0.7	≤ 0.2	≤ 2.0	≤ 0.3	≤ 2.0	≤ 0.4	≤ 4.0	≤ 0.5	≤ 4.0	≤ 0.6
			PC5400	210																
	Alloy steel	30~40HRC	PC5300	195	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 1.7	≤ 0.2	≤ 1.7	≤ 0.3	≤ 3.7	≤ 0.4	≤ 3.7	≤ 0.5
			PC5400	170																
	High alloy steel (alloy constituent > 5%)	40~50HRC	PC5300	150	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 1.7	≤ 0.2	≤ 1.7	≤ 0.3	≤ 3.7	≤ 0.4	≤ 3.7	≤ 0.5
			PC5400	130																
		Tensile strength 350MPa ≤	PC5300	120	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 1.7	≤ 0.2	≤ 1.7	≤ 0.3	≤ 3.7	≤ 0.4	≤ 3.7	≤ 0.5
			PC5400	105																
M	Stainless steel	270HB≤	PC5300	130	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 0.7	≤ 0.1	≤ 1.7	≤ 0.2	≤ 1.7	≤ 0.3	≤ 3.7	≤ 0.4	≤ 3.7	≤ 0.5
			PC5400	110																
K	Cast iron, Ductile cast iron	Low tensile	PC5300	145	≤ 1.0	≤ 0.2	≤ 1.0	≤ 0.2	≤ 1.0	≤ 0.2	≤ 1.0	≤ 0.2	≤ 2.0	≤ 0.3	≤ 2.0	≤ 0.4	≤ 4.0	≤ 0.5	≤ 4.0	≤ 0.6
			PC5400	110																

Future Mill (FMR)

FMR Vibration test



Machining example



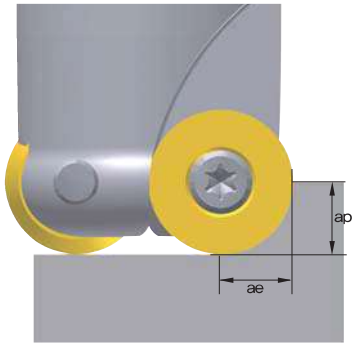
- **Workpiece** STD11
- **Cutting condition** vc (m/min) = 200
  fz (mm/t) = 0.40
  ap (mm) = 2.0
  ae (mm) = 4.0
- **Tools**
  Insert RDKT10T3M0-MM (PC3500)
  Holder FMRS3032RD-S

Cutting condition formulas for milling

Cutting speed	RPM
$vc = \frac{\pi \times D \times n}{1000}$ (m/min)	$n = \frac{vc \times 1000}{\pi \times D}$ (min^{-1})

Feed (per tooth)	Feed (per minute)
$fz = \frac{vf}{Z \times n}$ (mm/t)	$vf = fz \times n \times z$ (mm/min)

Chip removal rate	Required machine power
$Q = \frac{ap \times ae \times vf}{1000}$ (cm^3/min)	$Pkw = \frac{Q \times kc}{60 \times 102 \times \eta}$ (kW) $Php = \frac{Pc}{0.75}$ (hp)



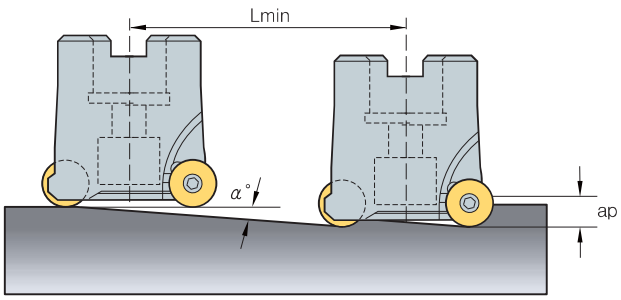
vc = Cutting speed (m/min)	**Pkw** = Required machine power (kW)
n = Revolution per a minute (min^{-1})	**Php** = Horsepower requirement (hp)
D = Cutting diameter (mm)	**Q** = Chip removal amount (cm^3/min)
De = Efficient cutting diameter (mm)	**ap** = Depth of cut (mm)
vf = Feed per a minute (mm/min)	**ae** = Width of cut (mm)
fz = Feed per tooth (mm/t)	**kc** = Specific cutting resistance (MPa)
z = Number of tooth	**η** = Mechanical efficiency (%)
Pc = Power requirement (kW)	

Feed as per cutting depth

Designation	Chip breaker	Depth of cut (mm)								
		0.2~0.5	0.5~1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
RDHW0501M0	-	0.25	0.15	-	-	-	-	-	-	-
RDHW06T1M0	-	0.30	0.20	0.10	-	-	-	-	-	-
RDHW0702M0	-	0.35	0.25	0.10	0.07	-	-	-	-	-
RDHW0803M0	-	0.40	0.30	0.15	0.01	-	-	-	-	-
RDKT10T3M0 -	MF/MM	-	0.40	0.35	0.30	0.20	-	-	-	-
RDKT1204M0 -	MF/MM	-	0.50	0.45	0.30	0.25	0.22	-	-	-
RDHW1605M0	-	-	0.60	0.50	0.45	0.35	0.30	0.20	0.10	-
RDHW2006M0	-	-	-	0.60	0.50	0.40	0.30	0.25	0.15	0.10
RDKT1605M0 -	MM	-	0.60	0.50	0.45	0.35	0.30	0.20	0.10	-
RDKT2006M0 -	MM	-	-	0.60	0.50	0.40	0.30	0.25	0.15	0.10

Future Mill (FMR)

Ramping technical data



$$Lmin = \frac{ap}{\tan \alpha^\circ} \text{ (mm)}$$

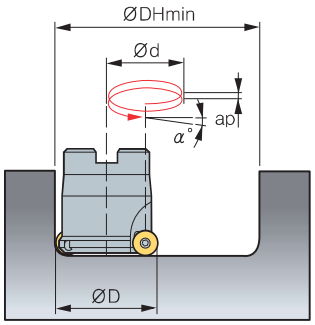
※ Lmin: Min. inclination cutting length
α°: Max. ramping angle
ap: Depth of cut

(mm)

Section	Tool dia.	Ramping angle α° (Max)	Cutting length L (mm) by ramping angle									
			ap = 1	ap = 2	ap = 2.5	ap = 3	ap = 3.5	ap = 4	ap = 5	ap = 6	ap = 8	ap = 10
FMR1000	08	18.14	3	6	8	-	-	-	-	-	-	-
	10	11.7	5	10	12	-	-	-	-	-	-	-
	12	8.43	7	13	17	-	-	-	-	-	-	-
	15	5.93	10	19	24	-	-	-	-	-	-	-
FMR1500	10	20.67	21	5	7	8	-	-	-	-	-	-
	12	10.05	10	11	14	17	-	-	-	-	-	-
	16	6.12	6	19	23	28	-	-	-	-	-	-
	20	4.36	4	26	33	39	-	-	-	-	-	-
FMR2000	15	9.42	6	12	15	18	21	-	-	-	-	-
	20	5.85	10	20	24	29	34	-	-	-	-	-
FMR2500	16	13.7	4	8	10	12	14	16	-	-	-	-
	20	9.29	6	12	15	18	21	24	-	-	-	-
	25	6.56	9	17	22	26	30	35	-	-	-	-
FMR3000	25	21.8	3	5	6	8	9	10	13	-	-	-
	32	13.24	4	9	11	13	15	17	21	-	-	-
	40	9.09	6	13	16	19	22	25	31	-	-	-
	50	6.52	9	17	22	26	31	35	44	-	-	-
	63	4.76	12	24	30	36	42	48	60	-	-	-
	80	3.52	16	33	41	49	57	65	81	-	-	-
	100	2.69	21	43	53	64	74	85	106	-	-	-
FMR4000	32	15.95	3	7	9	10	12	14	17	21	-	-
	40	10.3	6	11	14	17	19	22	28	33	-	-
	50	7.13	8	16	20	24	28	32	40	48	-	-
	63	5.08	11	22	28	34	39	45	56	67	-	-
	80	3.69	16	31	39	47	54	62	78	93	-	-
	100	2.79	21	41	51	62	72	82	103	123	-	-
	125	2.14	27	54	67	80	94	107	134	161	-	-
FMR5000	40	7.4	8	15	19	23	27	31	38	46	62	-
	50	5.22	11	22	27	33	38	44	55	66	88	-
	63	3.79	15	30	38	45	53	60	75	91	121	-
	80	2.97	19	39	48	58	67	77	96	116	154	-
	100	2.09	27	55	69	82	96	110	137	164	219	-
	125	1.63	35	70	88	105	123	141	176	211	281	-
FMR6000	40	7.44	8	15	19	23	27	31	38	46	61	77
	50	4.97	11	23	29	34	40	46	57	69	92	46
	63	3.69	16	31	39	47	54	62	78	93	124	62
	80	2.72	21	42	53	63	74	84	105	126	168	84
	100	2.12	27	54	68	81	95	108	135	162	216	108
	125	1.57	36	73	91	109	128	146	182	219	292	146

Future Mill (FMR)

Helical cutting technical data - ØDH Min



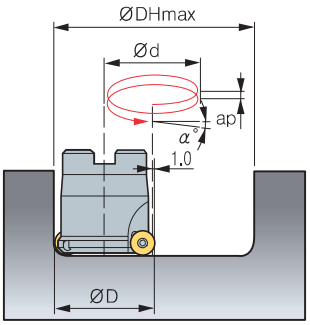
- ØD = Tool dia. (mm), ØDH Min, Max = Min, Max diameter (mm)
- Ød = Tool path (mm)
- ØDH Min (Min diameter) = ØD × 2 - Insert size, ØDH Max (Max diameter) = ØD × 2 - 2
- Ød (Tool path) = ØDH Min, Max - ØD

(mm)

Section	Insert	Tool dia.	ØDH Min	Ød	Ramping angle (α°)									
					ap = 1	ap = 2	ap = 2.5	ap = 3	ap = 3.5	ap = 4	ap = 5	ap = 6	ap = 8	ap = 10
FMR1000	5	08	11	3	6.11	12.35	15.57	-	-	-	-	-	-	-
	5	10	15	5	3.65	7.34	7.34	-	-	-	-	-	-	-
	5	12	19	7	2.61	5.23	5.23	-	-	-	-	-	-	-
	5	15	25	10	1.83	3.65	3.65	-	-	-	-	-	-	-
FMR1500	6	10	14	4	4.57	9.20	9.20	13.95	-	-	-	-	-	-
	6	12	18	6	3.04	6.11	6.11	9.20	-	-	-	-	-	-
	6	16	26	10	1.83	3.65	3.65	5.49	-	-	-	-	-	-
	6	20	34	14	1.30	2.61	2.61	3.92	-	-	-	-	-	-
FMR2000	7	15	23	8	2.28	4.57	4.57	6.88	8.04	-	-	-	-	-
	7	20	33	13	1.40	2.81	2.81	4.22	4.92	-	-	-	-	-
FMR2500	8	16	24	8	2.28	4.57	4.57	6.88	8.04	9.20	-	-	-	-
	8	20	32	12	1.52	3.04	3.04	4.57	5.34	6.11	-	-	-	-
	8	25	42	17	1.07	2.15	2.15	3.22	3.76	4.30	-	-	-	-
FMR3000	10	25	40	15	1.22	2.43	2.43	3.65	4.27	4.88	6.11	-	-	-
	10	32	54	22	0.83	1.66	1.66	2.49	2.91	3.32	4.15	-	-	-
	10	40	70	30	0.61	1.22	1.22	1.83	2.13	2.43	3.04	-	-	-
	10	50	90	40	0.46	0.91	0.91	1.37	1.60	1.83	2.28	-	-	-
	10	63	116	53	0.34	0.69	0.69	1.03	1.21	1.38	1.72	-	-	-
	10	80	150	70	0.26	0.52	0.52	0.78	0.91	1.04	1.30	-	-	-
	10	100	190	90	0.20	0.41	0.41	0.61	0.71	0.81	1.01	-	-	-
FMR4000	12	32	52	20	0.91	1.83	1.83	2.74	3.20	3.65	4.57	5.49	-	-
	12	40	68	28	0.65	1.30	1.30	1.96	2.28	2.61	3.26	3.92	-	-
	12	50	88	38	0.48	0.96	0.96	1.44	1.68	1.92	2.40	2.88	-	-
	12	63	114	51	0.36	0.72	0.72	1.07	1.25	1.43	1.79	2.15	-	-
	12	80	148	68	0.27	0.54	0.54	0.81	0.94	1.07	1.34	1.61	-	-
	12	100	188	88	0.21	0.41	0.41	0.62	0.73	0.83	1.04	1.24	-	-
	12	125	238	113	0.16	0.32	0.32	0.48	0.57	0.65	0.81	0.97	-	-
FMR5000	16	40	64	24	0.76	1.52	1.52	2.28	2.66	3.04	3.81	4.57	6.11	-
	16	50	84	34	0.54	1.07	1.07	1.61	1.88	2.15	2.69	3.22	4.30	-
	16	63	110	47	0.39	0.78	0.78	1.16	1.36	1.55	1.94	2.33	3.11	-
	16	80	144	64	0.29	0.57	0.57	0.86	1.00	1.14	1.43	1.71	2.28	-
	16	100	184	84	0.22	0.43	0.43	0.65	0.76	0.87	1.09	1.30	1.74	-
	16	125	234	109	0.17	0.33	0.33	0.50	0.59	0.67	0.84	1.00	1.34	-
FMR6000	20	50	80	30	0.61	1.22	1.22	1.83	2.13	2.43	3.04	3.65	4.88	6.11
	20	63	106	43	0.42	0.85	0.85	1.27	1.49	1.70	2.12	2.55	3.40	4.25
	20	80	140	60	0.30	0.61	0.61	0.91	1.06	1.22	1.52	1.83	2.43	3.04
	20	100	180	80	0.23	0.46	0.46	0.68	0.80	0.91	1.14	1.37	1.83	2.28
	20	125	230	105	0.17	0.35	0.35	0.52	0.61	0.70	0.87	1.04	1.39	1.74
	20	160	300	140	0.13	0.26	0.26	0.39	0.46	0.52	0.65	0.78	1.04	1.30

Future Mill (FMR)

Helical cutting technical data - ØDH Max



- ØD = Tool dia. (mm), ØDH Min, Max = Min, Max diameter (mm)
- Ød = Tool path (mm)
- ØDH Min (Min diameter) = ØD × 2 - Insert size, ØDH Max (Max diameter) = ØD × 2 - 2
- Ød (Tool path) = ØDH Min, Max - ØD

(mm)

Section	Insert	Tool dia.	ØDH Max	Ød	Ramping angle (α°)									
					ap = 1	ap = 2	ap = 2.5	ap = 3	ap = 3.5	ap = 4	ap = 5	ap = 6	ap = 8	ap = 10
FMR1000	5	08	14	6	3.04	6.11	7.65	-	-	-	-	-	-	-
	5	10	18	8	2.28	4.57	5.72	-	-	-	-	-	-	-
	5	12	22	10	1.83	3.65	4.57	-	-	-	-	-	-	-
	5	15	28	13	1.40	2.81	3.51	-	-	-	-	-	-	-
FMR1500	6	10	18	8	2.28	4.57	5.72	6.88	-	-	-	-	-	-
	6	12	22	10	1.83	3.65	4.57	5.49	-	-	-	-	-	-
	6	16	30	14	1.30	2.61	3.26	3.92	-	-	-	-	-	-
	6	20	38	18	1.01	2.03	2.54	3.04	-	-	-	-	-	-
FMR2000	7	15	28	13	1.40	2.81	3.51	4.22	4.92	-	-	-	-	-
	7	20	38	18	1.01	2.03	2.54	3.04	3.55	-	-	-	-	-
FMR2500	8	16	30	14	1.30	2.61	3.26	3.92	4.57	5.23	-	-	-	-
	8	20	38	18	1.01	2.03	2.54	3.04	3.55	4.06	-	-	-	-
	8	25	48	23	0.79	1.59	1.98	2.38	2.78	3.18	-	-	-	-
FMR3000	10	25	48	23	0.79	1.59	1.98	2.38	2.78	3.18	3.97	-	-	-
	10	32	62	30	0.61	1.22	1.52	1.83	2.13	2.43	3.04	-	-	-
	10	40	78	38	0.48	0.96	1.20	1.44	1.68	1.92	2.40	-	-	-
	10	50	98	48	0.38	0.76	0.95	1.14	1.33	1.52	1.90	-	-	-
	10	63	124	61	0.30	0.60	0.75	0.90	1.05	1.20	1.50	-	-	-
	10	80	158	78	0.23	0.47	0.58	0.70	0.82	0.94	1.17	-	-	-
	10	100	198	98	0.19	0.37	0.47	0.56	0.65	0.74	0.93	-	-	-
FMR4000	12	32	62	30	0.61	1.22	1.52	1.83	2.13	2.43	3.04	3.65	-	-
	12	40	78	38	0.48	0.96	1.20	1.44	1.68	1.92	2.40	2.88	-	-
	12	50	98	48	0.38	0.76	0.95	1.14	1.33	1.52	1.90	2.28	-	-
	12	63	124	61	0.30	0.60	0.75	0.90	1.05	1.20	1.50	1.80	-	-
	12	80	158	78	0.23	0.47	0.58	0.70	0.82	0.94	1.17	1.40	-	-
	12	100	198	98	0.19	0.37	0.47	0.56	0.65	0.74	0.93	1.12	-	-
	12	125	248	123	0.15	0.30	0.37	0.45	0.52	0.59	0.74	0.89	-	-
FMR5000	16	40	78	38	0.48	0.96	1.20	1.44	1.68	1.92	2.40	2.88	3.85	-
	16	50	98	48	0.38	0.76	0.95	1.14	1.33	1.52	1.90	2.28	3.04	-
	16	63	124	61	0.30	0.60	0.75	0.90	1.05	1.20	1.50	1.80	2.39	-
	16	80	158	78	0.23	0.47	0.58	0.70	0.82	0.94	1.17	1.40	1.87	-
	16	100	198	98	0.19	0.37	0.47	0.56	0.65	0.74	0.93	1.12	1.49	-
	16	125	248	123	0.15	0.30	0.37	0.45	0.52	0.59	0.74	0.89	1.19	-
FMR6000	20	50	98	48	0.38	0.76	0.95	1.14	1.33	1.52	1.90	2.28	3.04	3.81
	20	63	124	61	0.30	0.60	0.75	0.90	1.05	1.20	1.50	1.80	2.39	2.99
	20	80	158	78	0.23	0.47	0.58	0.70	0.82	0.94	1.17	1.40	1.87	2.34
	20	100	198	98	0.19	0.37	0.47	0.56	0.65	0.74	0.93	1.12	1.49	1.86
	20	125	248	123	0.15	0.30	0.37	0.45	0.52	0.59	0.74	0.89	1.19	1.48
	20	160	318	158	0.12	0.23	0.29	0.35	0.40	0.46	0.58	0.69	0.92	1.16

Future Mill series for mold making

FMR P-positive

- Stable clamping system enables stable machining and productivity
- Varied product line-up ensures wide application range
- Optimal shape and grade with high hardness for hard-to-cut material machining

Features

- P-positive relief angle (11˚) ensures high rigidity and high machinability in die steel and high-resistant alloy machining
- Flat clearance face of insert prevents interference and revolution while machining
- Optimal grades and chip breakers for various workpieces
- Chip breaker
  - Concave shape ensures wide chip pocket and lowers cutting temperature
- Clearance face for preventing rotation
  - Prevents rotation in machining
  - Divides corners
  - Prevents interference in high-feed machining
  - Ensures stable clamping
- Through-coolant system
  - Superb chip evacuation
  - Low cutting heat ensures long tool life

Features of chip breaker

Insert		Cutting-edge	Uses	Features
MA			Aluminum machining	Optimal cutting-edge for aluminum machining and buffed surface ensure high machinability
ML			Titanium & Inconel machining	Excellent results in titanium machining thanks to a high hardness cutting-edge and the chip breaker reducing the cutting load
MF			Fine finishing	Chip breaker for low cutting resistance enables fine finishing.
MM			General machining	Optimal for general machining
None C/B			Super hard material machining	Optimal for high hardness die steel and heat resistant alloy

Recommended cutting condition

∗Recommended chip breaker: ● First ○Second

Workpiece			Hardness	Grades	Cutting conditions				Chip breaker					
					vc (m/min)	fz (mm/t)	ap (mm)	ae (mm)	MA	ML	MF	MM	None C/B 1	None C/B 2
P	Low carbon steel		HB80~180	PC5400	100~250	0.12~0.70	0.3~6.0	0.7D~0.1D	-	-	●	○	-	-
	High carbon steel		HB180~280	PC5400	100~220	0.12~0.70	0.3~6.0	0.7D~0.1D	-	-	●	○	-	-
	Low alloy steel		Under HRC27	PC3600	180~290	0.20~0.60	0.3~6.0	0.7D~0.1D	-	-	-	●	○	-
				PC5400/PC5300	100~200	0.20~0.60	0.3~6.0	0.7D~0.1D	-	-	-	●	○	-
	Low pre-hardened steel		HRC20~50	PC3600	130~250	0.30~0.50	~0.5	0.7D~0.1D	-	-	-	-	●	○
				PC2510/PC5300	50~150	0.30~0.50	~0.5	0.7D~0.1D	-	-	-	-	●	○
	High alloy steel		Under HRC27	PC3600	130~250	0.30~0.50	~0.5	0.7D~0.1D	-	-	-	●	○	-
				PC5300	100~220	0.30~0.50	~0.5	0.7D~0.1D	-	-	-	●	○	-
	High pre-hardened steel		HRC20~48	PC2510/PC5300	50~150	0.30~0.50	~0.5	0.7D~0.1D	-	-	-	-	●	○
M	Stainless steel		Under HB270	PC5300/PC5400	100~150	0.20~0.60	0.3~6.0	0.7D~0.1D	-	-	○	●	-	-
K	Gray cast iron, Ductile cast iron		Under 350MPa	PC5300	120~210	0.20~0.60	0.3~6.0	0.7D~0.1D	-	-	○	●	-	-
N	Aluminum		-	H01	300~800	0.30~0.60	0.3~6.0	0.7D~0.1D	●	-	-	-	-	-
S	Heat resistant alloy	Fe	HRC20~30	PC5300/PC5400	35~60	0.30~0.50	~0.5	0.7D~0.1D	-	●	○	-	-	-
		Ni or Co	HRC40~45	PC5300/PC5400	30~50	0.30~0.50	~0.5	0.7D~0.1D	-	●	○	-	-	-
	Titanium		HRC35~45	PC5300/PC5400	40~70	0.30~0.50	~1.5	0.7D~0.1D	-	●	○	-	-	-
H	High hardened materials		Over HRC50	PC2505/PC2510	30~50	0.30~0.50	~0.5	0.7D~0.1D	-	-	-	-	●	○

Feed per tooth according to ap (fz, mm/t)

(mm)

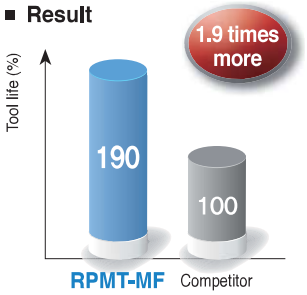
Insert	Insert size (d)	Feed per tooth according to ap							
		ap = 1	ap = 2	ap = 3	ap = 4	ap = 5	ap = 6	ap = 8	ap = 10
RPMT08	8	0.30	0.22	0.18	0.15	-	-	-	-
RPMT10	10	0.40	0.28	0.25	0.20	0.12	-	-	-
RPMT12	12	0.60	0.45	0.35	0.30	0.25	0.20	-	-
RPMT16	16	0.65	0.45	0.40	0.32	0.30	0.28	0.23	-
RPMT20	20	0.70	0.50	0.42	0.35	0.32	0.29	0.25	0.22

Performance evaluation

Alloy steel (SM490A Heat treatment, HRC 38~40)

- **Cutting conditions**: vc (m/min) = 250, fz (mm/tooth) = 0.6, ap (mm) = 1, wet
- **Tools**: **Insert** RPMT1204M0E-MF (PC5300), **Holder** FMRS4032HRP-3L25

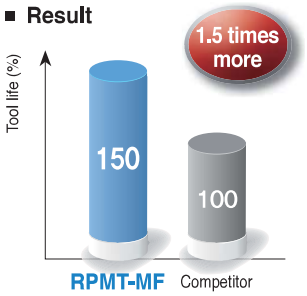
■ Result



Low pre-hardened steel (KP4M Heat treatment, HRC 30~45)

- **Cutting conditions**: vc (m/min) = 178, fz (mm/tooth) = 0.72, ap (mm) = 1.5, dry
- **Tools**: **Insert** RPMT1606M0S-MM (PC5300), **Holder** FMRCM5063HRP-4

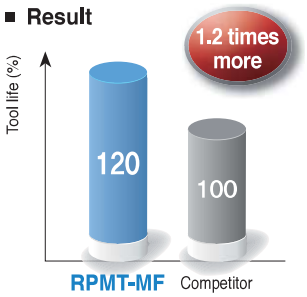
■ Result



Low pre-hardened steel (KP1, HRC 28~33)

- **Cutting conditions**: vc (m/min) = 178, fz (mm/tooth) = 0.74, ap (mm) = 0.8, dry
- **Tools**: **Insert** RPMT1204M0E-MF (PC5300), **Holder** FMRCM4063HRP-6

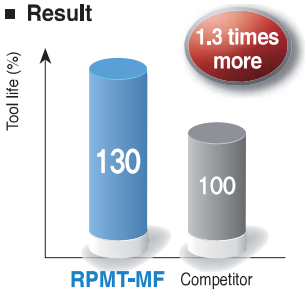
■ Result



High pre-hardened steel (STD61, HRC 50~52)

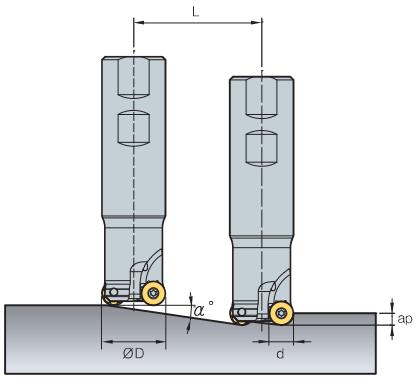
- **Cutting conditions**: vc (m/min) = 50, fz (mm/tooth) = 0.15, ap (mm) = 4.0, dry
- **Tools**: **Insert** RPMW1204M0S1 (PC5300), **Holder** FMRS4032HRP-3L25

■ Result



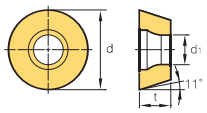
FMR P-positive

Maximum angle table for ramping machining



$$Lmin = \frac{ap}{\tan \alpha°} (mm)$$

※ L (mm): Cutting length
α°: Max. ramping angle
ap: Depth of cut



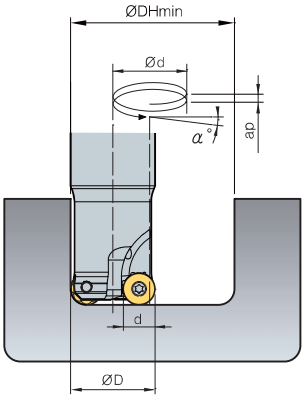
(mm)

Section	Insert size (d)	Tool dia. (ØD)	Ramping angle α° (max)	Cutting length L (mm) by ap									
				ap = 1	ap = 2	ap = 2.5	ap = 3	ap = 3.5	ap = 4	ap = 5	ap = 6	ap = 8	ap = 10
FMR2500	8	17	4.7	12	24	30	36	42	48	-	-	-	-
	8	18	4.1	14	28	34	41	48	55	-	-	-	-
	8	20	15.4	4	7	9	11	13	14	-	-	-	-
	8	21	13.9	4	8	10	12	14	16	-	-	-	-
	8	25	9.8	6	12	14	17	20	23	-	-	-	-
	8	26	9.2	6	12	16	19	22	25	-	-	-	-
FMR3000	10	25	13.8	4	8	10	12	14	16	20	-	-	-
	10	26	12.6	4	9	11	13	16	18	22	-	-	-
	10	32	8.4	7	14	17	20	24	27	34	-	-	-
	10	33	8.0	7	14	18	21	25	29	36	-	-	-
	10	40	5.8	10	20	25	30	34	39	49	-	-	-
	10	50	4.2	14	27	34	41	48	55	68	-	-	-
	10	63	3.1	19	37	47	56	65	75	93	-	-	-
	10	66	2.9	20	40	50	60	69	79	99	-	-	-
FMR4000	12	25	4.5	13	25	32	38	44	51	63	76	-	-
	12	26	4.1	14	28	35	42	49	56	70	84	-	-
	12	32	14.7	4	8	10	11	13	15	19	23	-	-
	12	33	13.8	4	8	10	12	14	16	20	24	-	-
	12	40	9.6	6	12	15	18	21	24	30	36	-	-
	12	50	6.7	9	17	21	26	30	34	43	51	-	-
	12	63	4.8	12	24	30	36	42	48	60	72	-	-
	12	66	4.5	13	26	32	38	45	51	64	77	-	-
	12	80	3.5	17	33	41	50	58	66	83	99	-	-
	12	100	2.6	22	44	55	65	76	87	109	131	-	-
FMR5000	16	40	17.8	3	6	8	9	11	12	16	19	25	-
	16	50	11.3	5	10	13	15	18	20	25	30	40	-
	16	63	7.6	7	15	19	22	26	30	37	45	60	-
	16	66	7.1	8	16	20	24	28	32	40	48	64	-
	16	80	5.3	11	21	27	32	37	43	53	64	85	-
	16	100	4.0	14	29	36	43	51	58	72	87	116	-
	16	125	3.0	19	38	48	58	67	77	96	115	154	-
	16	160	2.2	26	52	65	78	90	103	129	155	207	-
FMR6000	20	50	17.8	3	6	8	9	11	12	16	19	25	31
	20	63	11.1	5	10	13	15	18	20	25	30	41	51
	20	80	7.4	8	15	19	23	27	31	38	46	61	77
	20	100	5.3	11	21	27	32	37	43	53	64	85	107
	20	125	4.0	14	29	36	43	51	58	72	87	116	145
	20	160	2.9	20	40	49	59	69	79	99	119	158	198
	20	200	2.2	26	52	65	78	90	103	129	155	207	258
	20	250	1.7	33	67	84	100	117	134	167	200	267	334

* Insert size (d): Please refer page E19, E20 applicable insert drawing.

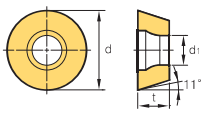
FMR P-positive

Minimum hole diameter table for helical machining (ØDH Min)



- ØD = Tool dia. (mm)
- Ød (Tool path, mm) = ØDH Min, Max - ØD
- ØDH Min (Minimum hole diameter) = ØD × 2 - Insert size (d)
- ØDH Max (Maximum hole diameter) = ØD × 2 - 2
- Ramping angle by ap (α°) = $\tan^{-1}\left(\frac{ap}{\pi \times Ød}\right)$

  Helical angle adjusted by ap cannot exceed maximum angle
- ap = Depth of cut



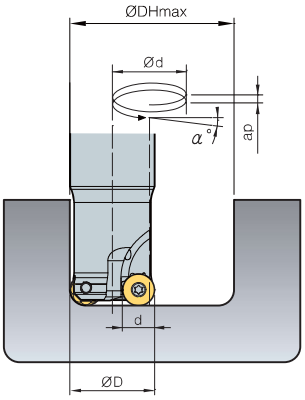
(mm)

Section	Insert size (d)	Tool dia. (ØD)	Ramping angle α° (max)	ØDH Min	Ød	Ramping angle (α°) by ap									
						ap = 1	ap = 2	ap = 2.5	ap = 3	ap = 3.5	ap = 4	ap = 5	ap = 6	ap = 8	ap = 10
FMR2500	8	17	4.7	26	9	2.03	4.06	-	-	-	-	-	-	-	-
	8	18	4.1	28	10	1.83	3.65	-	-	-	-	-	-	-	-
	8	20	15.4	32	12	1.52	3.04	3.81	4.57	5.34	6.11	-	-	-	-
	8	21	13.9	34	13	1.40	2.81	3.51	4.22	4.92	5.63	-	-	-	-
	8	25	9.8	42	17	1.07	2.15	2.69	3.22	3.76	4.30	-	-	-	-
	8	26	9.2	44	18	1.01	2.03	2.54	3.04	3.55	4.06	-	-	-	-
FMR3000	10	25	13.8	40	15	1.22	2.43	3.04	3.65	4.27	4.88	-	-	-	-
	10	26	12.6	42	16	1.14	2.28	2.85	3.43	4.00	4.57	-	-	-	-
	10	32	8.4	54	22	0.83	1.66	2.07	2.49	2.91	3.32	-	-	-	-
	10	33	8.0	56	23	0.79	1.59	1.98	2.38	2.78	3.18	-	-	-	-
	10	40	5.8	70	30	0.61	1.22	1.52	1.83	2.13	2.43	-	-	-	-
	10	50	4.2	90	40	0.46	0.91	1.14	1.37	1.60	1.83	-	-	-	-
	10	63	3.1	116	53	0.34	0.69	0.86	1.03	1.21	1.38	-	-	-	-
	10	66	2.9	122	56	0.33	0.65	0.81	0.98	1.14	1.30	-	-	-	-
FMR4000	12	25	4.5	38	13	1.40	2.81	3.51	-	-	-	-	-	-	-
	12	26	4.1	40	14	1.30	2.61	3.26	-	-	-	-	-	-	-
	12	32	14.7	52	20	0.91	1.83	2.28	2.74	3.20	3.65	4.57	5.49	-	-
	12	33	13.8	54	21	0.87	1.74	2.17	2.61	3.04	3.48	4.35	5.23	-	-
	12	40	9.6	68	28	0.65	1.30	1.63	1.96	2.28	2.61	3.26	3.92	-	-
	12	50	6.7	88	38	0.48	0.96	1.20	1.44	1.68	1.92	2.40	2.88	-	-
	12	63	4.8	114	51	0.36	0.72	0.89	1.07	1.25	1.43	1.79	2.15	-	-
	12	66	4.5	120	54	0.34	0.68	0.84	1.01	1.18	1.35	1.69	2.03	-	-
	12	80	3.5	148	68	0.27	0.54	0.67	0.81	0.94	1.07	1.34	1.61	-	-
	12	100	2.6	188	88	0.21	0.41	0.52	0.62	0.73	0.83	1.04	1.24	-	-
FMR5000	16	40	17.8	64	24	0.76	1.52	1.90	2.28	2.66	3.04	3.81	4.57	6.11	-
	16	50	11.3	84	34	0.54	1.07	1.34	1.61	1.88	2.15	2.69	3.22	4.30	-
	16	63	7.6	110	47	0.39	0.78	0.97	1.16	1.36	1.55	1.94	2.33	3.11	-
	16	66	7.1	116	50	0.36	0.73	0.91	1.09	1.28	1.46	1.83	2.19	2.92	-
	16	80	5.3	144	64	0.29	0.57	0.71	0.86	1.00	1.14	1.43	1.71	2.28	-
	16	100	4.0	184	84	0.22	0.43	0.54	0.65	0.76	0.87	1.09	1.30	1.74	-
	16	125	3.0	234	109	0.17	0.33	0.42	0.50	0.59	0.67	0.84	1.00	1.34	-
	16	160	2.2	304	144	0.13	0.25	0.32	0.38	0.44	0.51	0.63	0.76	1.01	-
FMR6000	20	50	17.8	80	30	0.61	1.22	1.52	1.83	2.13	2.43	3.04	3.65	4.88	6.11
	20	63	11.1	106	43	0.42	0.85	1.06	1.27	1.49	1.70	2.12	2.55	3.40	4.25
	20	80	7.4	140	60	0.30	0.61	0.76	0.91	1.06	1.22	1.52	1.83	2.43	3.04
	20	100	5.3	180	80	0.23	0.46	0.57	0.68	0.80	0.91	1.14	1.37	1.83	2.28
	20	125	4.0	230	105	0.17	0.35	0.43	0.52	0.61	0.70	0.87	1.04	1.39	1.74
	20	160	2.9	300	140	0.13	0.26	0.33	0.39	0.46	0.52	0.65	0.78	1.04	1.30
	20	200	2.2	380	180	0.10	0.20	0.25	0.30	0.35	0.41	0.51	0.61	0.81	1.01
	20	250	1.7	480	230	0.08	0.16	0.20	0.24	0.28	0.32	0.40	0.48	0.63	0.79

* Insert size (d): Please refer page E19, E20 applicable insert drawing.

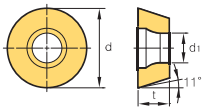
FMR P-positive

Maximum hole diameter table for helical machining (ØDH Max)



- ØD = Tool dia. (mm)
- Ød (Tool path, mm) = ØDH Min, Max - ØD
- ØDH Min (Minimum hole diameter) = ØD × 2 - Insert size (d)
- ØDH Max (Maximum hole diameter) = ØD × 2 - 2
- Ramping angle by ap (α°) = $\tan^{-1}\left(\frac{ap}{\pi \times Ød}\right)$

  Helical angle adjusted by ap cannot exceed maximum angle
- ap = Depth of cut



(mm)

Section	Insert size (d)	Tool dia. (ØD)	Ramping angle α°(max)	ØDH Max	Ød	Ramping angle (α°) by ap									
						ap = 1	ap = 2	ap = 2.5	ap = 3	ap = 3.5	ap = 4	ap = 5	ap = 6	ap = 8	ap = 10
FMR2500	8	17	4.7	32	15	1.22	2.43	3.04	3.65	-	-	-	-	-	-
	8	18	4.1	34	16	1.14	2.28	2.85	3.43	-	-	-	-	-	-
	8	20	15.4	38	18	1.01	2.03	2.54	3.04	3.55	4.06	-	-	-	-
	8	21	13.9	40	19	0.96	1.92	2.40	2.88	3.37	3.85	-	-	-	-
	8	25	9.8	48	23	0.79	1.59	1.98	2.38	2.78	3.18	-	-	-	-
	8	26	9.2	50	24	0.76	1.52	1.90	2.28	2.66	3.04	-	-	-	-
FMR3000	10	25	13.8	48	23	0.79	1.59	1.98	2.38	2.78	3.18	-	-	-	-
	10	26	12.6	50	24	0.76	1.52	1.90	2.28	2.66	3.04	-	-	-	-
	10	32	8.4	62	30	0.61	1.22	1.52	1.83	2.13	2.43	-	-	-	-
	10	33	8.0	64	31	0.59	1.18	1.47	1.77	2.06	2.36	-	-	-	-
	10	40	5.8	78	38	0.48	0.96	1.20	1.44	1.68	1.92	-	-	-	-
	10	50	4.2	98	48	0.38	0.76	0.95	1.14	1.33	1.52	-	-	-	-
	10	63	3.1	124	61	0.30	0.60	0.75	0.90	1.05	1.20	-	-	-	-
	10	66	2.9	130	64	0.29	0.57	0.71	0.86	1.00	1.14	-	-	-	-
FMR4000	12	25	4.5	48	23	0.79	1.59	1.98	2.38	2.78	3.18	-	-	-	-
	12	26	4.1	50	24	0.76	1.52	1.90	2.28	2.66	3.04	-	-	-	-
	12	32	14.7	62	30	0.61	1.22	1.52	1.83	2.13	2.43	3.04	3.65	-	-
	12	33	13.8	64	31	0.59	1.18	1.47	1.77	2.06	2.36	2.95	3.54	-	-
	12	40	9.6	78	38	0.48	0.96	1.20	1.44	1.68	1.92	2.40	2.88	-	-
	12	50	6.7	98	48	0.38	0.76	0.95	1.14	1.33	1.52	1.90	2.28	-	-
	12	63	4.8	124	61	0.30	0.60	0.75	0.90	1.05	1.20	1.50	1.80	-	-
	12	66	4.5	130	64	0.29	0.57	0.71	0.86	1.00	1.14	1.43	1.71	-	-
	12	80	3.5	158	78	0.23	0.47	0.58	0.70	0.82	0.94	1.17	1.40	-	-
	12	100	2.6	198	98	0.19	0.37	0.47	0.56	0.65	0.74	0.93	1.12	-	-
FMR5000	16	40	17.8	78	38	0.48	0.96	1.20	1.44	1.68	1.92	2.40	2.88	3.85	-
	16	50	11.3	98	48	0.38	0.76	0.95	1.14	1.33	1.52	1.90	2.28	3.04	-
	16	63	7.6	124	61	0.30	0.60	0.75	0.90	1.05	1.20	1.50	1.80	2.39	-
	16	66	7.1	130	64	0.29	0.57	0.71	0.86	1.00	1.14	1.43	1.71	2.28	-
	16	80	5.3	158	78	0.23	0.47	0.58	0.70	0.82	0.94	1.17	1.40	1.87	-
	16	100	4.0	198	98	0.19	0.37	0.47	0.56	0.65	0.74	0.93	1.12	1.49	-
	16	125	3.0	248	123	0.15	0.30	0.37	0.45	0.52	0.59	0.74	0.89	1.19	-
	16	160	2.2	318	158	0.12	0.23	0.29	0.35	0.40	0.46	0.58	0.69	0.92	-
FMR6000	20	50	17.8	98	48	0.38	0.76	0.95	1.14	1.33	1.52	1.90	2.28	3.04	3.81
	20	63	11.1	124	61	0.30	0.60	0.75	0.90	1.05	1.20	1.50	1.80	2.39	2.99
	20	80	7.4	158	78	0.23	0.47	0.58	0.70	0.82	0.94	1.17	1.40	1.87	2.34
	20	100	5.3	198	98	0.19	0.37	0.47	0.56	0.65	0.74	0.93	1.12	1.49	1.86
	20	125	4.0	248	123	0.15	0.30	0.37	0.45	0.52	0.59	0.74	0.89	1.19	1.48
	20	160	2.9	318	158	0.12	0.23	0.29	0.35	0.40	0.46	0.58	0.69	0.92	1.16
	20	200	2.2	398	198	0.09	0.18	0.23	0.28	0.32	0.37	0.46	0.55	0.74	0.92
	20	250	1.7	498	248	0.07	0.15	0.18	0.22	0.26	0.29	0.37	0.44	0.59	0.74

∗ Insert size (d): Please refer page E19, E20 applicable insert drawing.

FMAC(M)3000

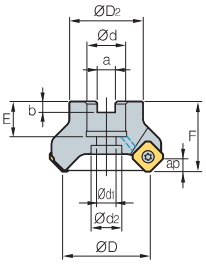


Fig. 1

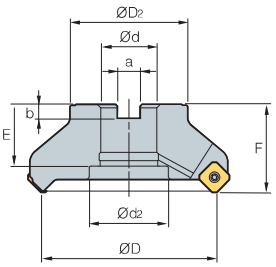


Fig. 2

AA 45°

- AR: 21°
- RR: -17°~ -12°

(mm)

Designation			ØD	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg	Fig.
FMACM	3050HR	4	50	42	22	10.4	6.3	20	40	11	17.5	4.0	0.4	1
	3050HR-H	6	50	42	22	10.4	6.3	20	40	11	17.5	4.0	0.4	1
	3063HR	5	63	49	22	10.4	6.3	20	40	11	17.5	4.0	0.5	1
	3063HR-H	8	63	49	22	10.4	6.3	20	40	11	17.5	4.0	0.6	1
FMAC (FMACM)	3080HR	6	80	57	25.4 (27)	9.5 (12.4)	6 (7)	25 (23)	50	14	20	4.0	1.1	1
	3080HR-H	10	80	57	25.4 (27)	9.5 (12.4)	6 (7)	25 (23)	50	14	20	4.0	1.2	1
	3100HR	7	100	67	31.75 (32)	12.7 (14.4)	8 (8)	35 (25.5)	50	(18)	45 (26)	4.0	1.7	2 (1)
	3100HR-H	12	100	67	31.75 (32)	12.7 (14.4)	8 (8)	35 (25.5)	50	(18)	45 (26)	4.0	1.7	2 (1)
	3125HR	8	125	87	38.1 (40)	15.9 (16.4)	10 (9)	42 (29)	63	(22)	55 (32)	4.0	3.3 (3.5)	2 (1)
	3125HR-H	14	125	87	38.1 (40)	15.9 (16.4)	10 (9)	42 (29)	63	(22)	55 (32)	4.0	3.3 (3.5)	2 (1)

( )Metric size

Available inserts

SEET-MF SEET-MM SEET-MA SEXT-MF SEXT-MM SEXT-MR SEEW

Designation		Cermet		Coated												Uncoated				page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	H05	
SEET	0903AGFN-MA																		●	●	E19 E20
	0903AGSN-MF											●	●		●	●					
	0903AGSN-MM			●								●			●	●					
SEXT	0903AGSN-MF									●		●			●	●					
	0903AGSN-MM									●	●	●			●	●					
	0903AGSN-MR																				
SEEW	0903AGTN																				

Available arbors

Designation		Ød	NC arbors
FMACM	3050HR-□ 3063HR-□	22	BT□□-FMC22-□□
FMAC (FMACM)	3080HR-□	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	3100HR-□	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	3125HR-□	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMB/FMC40-□□

Parts

Specification	Screw	Insert wrench
Ø50~Ø125	FTKA0307	TW09S

Available inserts E19, E20 Available arbors and bolt E400~E402

FMAC(M)4000

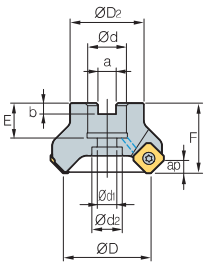


Fig. 1

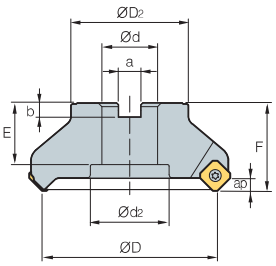


Fig. 2

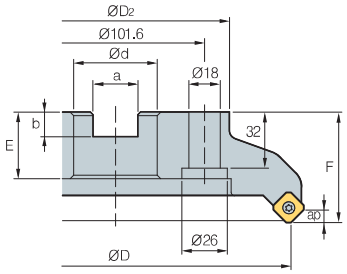


Fig. 3

AA 45°

- AR: 21°
- RR: -17°~ -12°

(mm)

Designation		⌀	ØD	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg	Fig.
FMACM	4050HR	3	50	42	22	10.4	6.3	20	40	11	18	6.5	0.4	1
	4063HR	4	63	49	22	10.4	6.3	20	40	11	18	6.5	0.6	1
	4063HR-M	5	63	49	22	10.4	6.3	20	40	11	18	6.5	0.6	1
	4063HR-H	6	63	49	22	10.4	6.3	20	40	11	18	6.5	0.6	1
FMAC (FMACM)	4080HR	5	80	57	25.4 (27)	9.5 (12.4)	6 (7)	25 (23)	50	14	20	6.5	1.1	1
	4080HR-M	6	80	57	25.4 (27)	9.5 (12.4)	6 (7)	25 (23)	50	14	20	6.5	1.1	1
	4080HR-H	8	80	57	25.4 (27)	9.5 (12.4)	6 (7)	25 (23)	50	14	20	6.5	1.1	1
	4100HR	5	100	67	31.75 (32)	12.7 (14.4)	8 (8)	33 (25)	63 (50)	18	26	6.5	2 (1.6)	1
	4100HR-M	7	100	67	31.75 (32)	12.7 (14.4)	8 (8)	33 (25)	63 (50)	18	26	6.5	2 (1.6)	1
	4100HR-H	10	100	67	31.75 (32)	12.7 (14.4)	8 (8)	33 (25)	63 (50)	18	26	6.5	2 (1.6)	1
	4125HR	6	125	87	38.1 (40)	15.9 (16.4)	10 (9)	35 (29)	63	22	32	6.5	3.1	1
	4125HR-M	8	125	87	38.1 (40)	15.9 (16.4)	10 (9)	35 (29)	63	22	32	6.5	3.1	1
	4125HR-H	12	125	87	38.1 (40)	15.9 (16.4)	10 (9)	35 (29)	63	22	32	6.5	3.1	1
	4160R	7	160	107	50.8 (40)	19.0 (16.4)	11 (9)	38 (35)	63	-	-	6.5	4.8	2
	4160R-M	10	160	107	50.8 (40)	19.0 (16.4)	11 (9)	38 (35)	63	-	-	6.5	4.8	2
	4160R-H	16	160	107	50.8 (40)	19.0 (16.4)	11 (9)	38 (35)	63	-	-	6.5	4.8	2
	4200R	8	200	130	47.625 (60)	25.4 (25.7)	14	38 (32)	63	-	-	6.5	6.1	3
	4200R-M	12	200	130	47.625 (60)	25.4 (25.7)	14	38 (32)	63	-	-	6.5	6.1	3
	4200R-H	18	200	130	47.625 (60)	25.4 (25.7)	14	38 (32)	63	-	-	6.5	6.1	3

Available inserts

( )Metric size

SEET-MF SEET-MM SEET-MA SEXT-MF SEXT-MM SEXT-MR SEEW SEEW-W

Designation		Cermet		Coated														Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	H01	H05	
SEET	14M4AGFN-MA														●	●	●	●	E19 E20
	14M4AGSN-MF									●	●		●	●					
	14M4AGSN-MM									●	●		●	●					
SEXT	14M4AGSN-MF							●		●			●	●					
	14M4AGSN-MM			●				●	●	●	●		●	●					

Designation		Cermet		Coated														Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	H01	H05	
SEXT	14M4AGSN-MR												●	●					E19 E20
SEEW	14M4AGTN		●																
	14M4AGFN-W																		
	14M4AGSN-W														●				
	14M4AGTN-W									●		●							

Available arbors

Designation		Ød	NC arbors
FMACM	4050HR-□ 4063HR-□	22	BT□□-FMC22-□□
FMAC (FMACM)	4080HR-□	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	4100HR-□	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□

Designation		Ød	NC arbors
FMAC (FMACM)	4125HR-□	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMB40-□□
	4160R-□	50.8	BT□□-FMA50.8-□□
		40	BT□□-FMB/FMC40-□□
	4200R-□	47.625	BT□□-FMA47.625-□□
		60	BT□□-FMB60-□□

Parts

Specification	Screw	Shim	Shim screw	Insert wrench	Shim wrench
Ø50~Ø200	FTGA03512	SS42SAF	SHXN0509F	TW15S	HW35L

Available inserts E19, E20 Available arbors and bolt E400~E402

FMAC(M)3000-A

Aluminum body

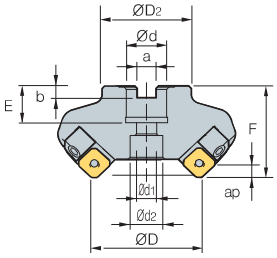


Fig. 1

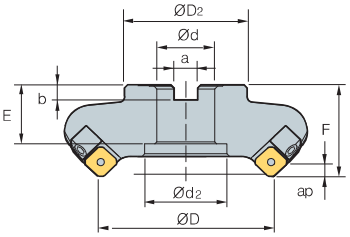


Fig. 2

AA
45°

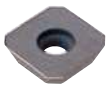
- AR: 21°
- RR: -16°~ -12°

(mm)

Designation		⊚	ØD	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg	Fig.
FMACM	3063R-A	3	63	49	22	10.4	6.3	20	40	11	18	4	0.5	1
FMAC (FMACM)	3080R-A	4	80	57	25.4 (27)	9.5 (12.4)	6 (7)	25	50	13.5	20	4	0.6	1
	3100R-A	5	100	67	31.75 (32)	12.7 (14.4)	8 (8)	32	50	-	45	4	0.8	2
	3100R-25.4-A	5	100	67	25.4	9.5	6	25	50	-	38	4	0.9	2
	3125R-A	6	125	87	38.1 (40)	15.9 (16.4)	10 (9)	38	63	-	56	4	1.6	2
	3125R-25.4-A	6	125	70	25.4	9.5	6	25	63	-	38	4	1.7	2

( )Metric size

Available inserts

SEET-MF	SEET-MM	SEET-MA	SEXT-MF	SEXT-MM	SEXT-MR	SEEW
						

Designation		Cermet		Coated												Uncoated				page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	H05	
SEET	0903AGFN-MA																		●	●	E19 E20
	0903AGSN-MF											●	●		●	●					
	0903AGSN-MM			●								●			●	●					
SEXT	0903AGSN-MF									●		●			●	●					
	0903AGSN-MM									●	●	●			●	●					
	0903AGSN-MR																				
SEEW	0903AGTN																				

Available arbors

Designation		Ød	NC arbors
FMACM	3063R-□	22	BT□□-FMC22-□□
FMAC (FMACM)	3080R-□	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	3100R-□	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	3125R-□	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMB40-□□

Parts

Specification	Screw	Insert wrench	Locator wrench	Locator	Locator screw
Ø63~Ø125	FTKA0307	TW09S	HW30L	LFMA3R-A	DHA620

Available inserts E19, E20 Available arbors and bolt E400~E402

FMAC(M)4000-A

Aluminum body

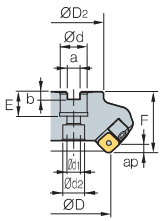


Fig. 1

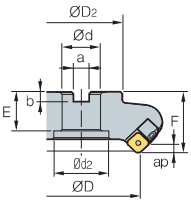


Fig. 2

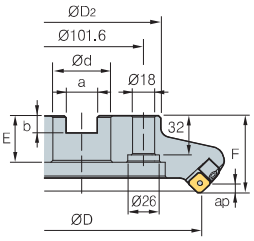


Fig. 3

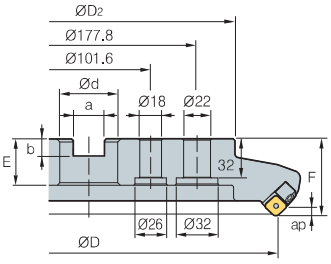


Fig. 4

AA
45°

- AR: 21°
- RR: -16°~ -12°

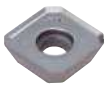
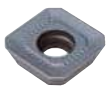
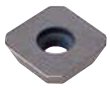
(mm)

Designation			ØD	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg	Fig.
FMACM	4063R-A	3	63	49	22	10.4	6.3	20	50	11	18	6.5	0.6	1
FMAC (FMACM)	4080R-A	4	80	67	25.4 (27)	9.5 (12.4)	6 (7)	25 (22)	50	13.5	20	6.5	0.8	1
	4100R-A	5	100	67	31.75 (32)	12.7 (14.4)	8(8)	32	50	-	45	6.5	1.1	2
	4100R-25.4-A	5	100	67	25.4	9.5	6	25	50	-	38	6.5	1.2	2
	4125R-A	6	125	87	38.1 (40)	15.9 (16.4)	10 (9)	38 (35)	63	-	56	6.5	1.7	2
	4125R-25.4-A	6	125	70	25.4	9.5	6	25	63	-	38	6.5	1.8	2
	4160R-A	7	160	107	50.8 (40)	19.0 (16.4)	11 (9)	38 (35)	63	-	75	6.5	2.5	2
	4200R-A	8	200	130	47.625 (60)	25.4 (25.7)	14 (14)	38 (32)	63	-	-	6.5	3.2	3
	4250R-A	10	250	180	47.625 (60)	25.4 (25.7)	14 (14)	38	63	-	-	6.5	4.1	3
	4315R-A	12	315	240	47.625 (60)	25.4 (25.7)	14 (14)	38	63	-	-	6.5	6.7	4

Note) Through coolant type between Ø50~Ø125

( )Metric size

Available inserts

SEET-MF	SEET-MM	SEET-MA	SEXT-MF	SEXT-MM	SEXT-MR	SEEW	SEEW-W
							

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	H01	H05	
SEET	14M4AGFN-MA														●	●	●	●	E19 E20
	14M4AGSN-MF									●	●		●	●					
	14M4AGSN-MM				●					●	●		●	●					
SEXT	14M4AGSN-MF							●		●			●	●					
	14M4AGSN-MM			●				●	●	●	●		●	●					

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	H01	H05	
SEXT	14M4AGSN-MR												●		●				E19 E20
SEEW	14M4AGTN	●																	
	14M4AGFN-W																		
	14M4AGSN-W														●				
	14M4AGTN-W									●		●							

Available arbors

Designation		Ød	NC arbors
FMACM	4063R-□	22	BT□□-FMC22-□□
FMAC (FMACM)	4080R-□	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	4100HR-□	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	4125R-□	38.1	BT□□-FMA38.1-□□

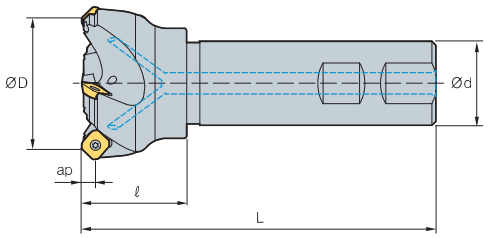
Designation		Ød	NC arbors
FMAC (FMACM)	4125R-□	40	BT□□-FMB40-□□
	4160R-□	50.8	BT□□-FMA50.8-□□
		40	BT□□-FMB/FMC40-□□
	4200R-□	47.625	BT□□-FMA47.625-□□
	4250R-□	60	BT□□-FMB60-□□
	4315R-□	60	BT□□-FMB60-□□

Parts

Specification	Screw	Insert wrench	Locator wrench	Locator	Locator screw
Ø63~Ø315	FTGA03512	TW15S	HW40L	LFMA4R-A	DHA0830

Available inserts E19, E20 Available arbors and bolt E400~E402

FMAS3000



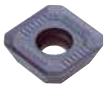
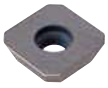
AA 45°

- AR: 23°
- RR: -17°~ -13°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
FMAS	3025HR	2	25	25	35	115	4	0.4
	3032HR	3	32	25	40	125	4	0.5
	3032HR-S32	3	32	32	40	130	4	0.8
	3040HR	3	40	32	40	130	4	0.9
	3040HR-S40	3	40	40	40	140	4	1.3
	3040HR-S42	3	40	42	40	140	4	1.4
	3050HR	4	50	32	40	135	4	1
	3050HR-S40	4	50	40	40	140	4	1.3
	3050HR-S42	4	50	42	40	140	4	1.5
	3063HR	5	63	32	45	135	4	1.2
	3063HR-S40	5	63	40	45	145	4	1.6
	3063HR-S42	5	63	42	45	145	4	1.7

Available inserts

	SEET-MF	SEET-MM	SEET-MA	SEXT-MF	SEXT-MM	SEXT-MR	SEEW
							

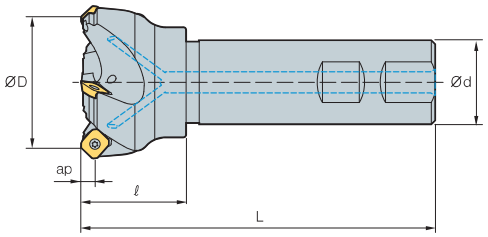
Designation		Cermet		Coated											Uncoated				page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	H05	
SEET	0903AGFN-MA																		●	●	E19 E20
	0903AGSN-MF											●	●		●	●					
	0903AGSN-MM			●								●			●	●					
SEXT	0903AGSN-MF									●		●			●	●					
	0903AGSN-MM									●	●	●			●	●					
	0903AGSN-MR																				
SEEW	0903AGTN																				

Parts

Specification	Screw	Insert wrench
Ø25~Ø63	FTKA0307	TW09S

Available inserts E19, E20

FMAS4000



AA 45°

- AR: 23°
- RR: -17°~-13°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
FMAS	4050HR	3	50	32	45	135	6.5	1
	4050HR-S40	3	50	40	45	135	6.5	1.3
	4050HR-S42	3	50	42	45	135	6.5	1.45
	4063HR	4	63	32	45	135	6.5	1.2
	4063HR-S40	4	63	40	45	135	6.5	1.5
	4063HR-S42	4	63	42	45	135	6.5	1.6

Available inserts

SEET-MF	SEET-MM	SEET-MA	SEXT-MF	SEXT-MM	SEXT-MR	SEEW	SEEW-W
							

Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NCM335	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	H01	H05	
SEET	14M4AGFN-MA															●	●		●	●	
	14M4AGSN-MF										●	●		●	●						
	14M4AGSN-MM				●						●	●		●	●						
SEXT	14M4AGSN-MF								●		●			●	●						
	14M4AGSN-MM			●					●	●	●	●		●	●						E19
	14M4AGSN-MR											●		●							E20
SEEW	14M4AGTN		●																		
	14M4AGFN-W																				
	14M4AGSN-W													●							
	14M4AGTN-W								●		●										

Parts

Specification	Screw	Shim	Shim screw	Insert wrench	Shim wrench
Ø50~Ø63	FTGA03512	SS42SAF	SHXN0509F	TW15S	HW35L

Available inserts E19, E20

FMPC(M)3000

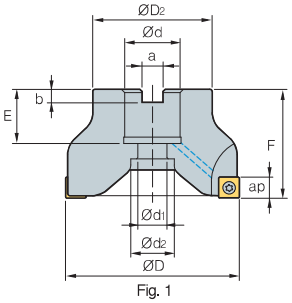


Fig. 1

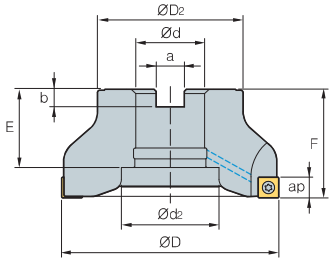


Fig. 2

AA 90°

- AR: 10°
- RR: -9°~ -8°

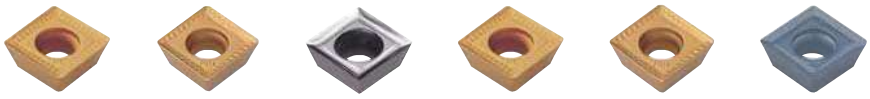
(mm)

Designation		⌀	ØD	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg	Fig.
FMPCM	3050HS	5	50	40	22	10.4	6.3	20	40	11	18	7	0.3	1
	3063HS	6	63	40	22	10.4	6.3	20	40	11	18	7	0.5	1
FMPC (FMPCM)	3080HS	7	80	55	25.4 (27)	9.5 (12.4)	6 (7)	25 (22)	50	14	20	7	1.0	1
	3100HS	8	100	67	31.75 (32)	12.7 (14.4)	8 (8)	36 (26)	50	18	45 (26)	7	1.5	2 (1)

( )Metric size

Available inserts

SDET-MF | SDET-MM | SDET-MA | SDXT-MF | SDXT-MM | SDXT-MA



Designation		Cermet		Coated												Uncoated				page
		CN2000	CN30	NCM325	NCM335	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	ST30A	G10	H01	H05	
SDET	09M402R-MA															●			●	●	
	09M405R-MF																				
	09M405R-MM																				
SDXT	09M405R-MF			●					●	●	●	●		●	●						E17
	09M405L-MF																				E18
	09M405R-MM			●	●				●	●	●	●		●	●						
	09M405L-MM								●		●										
	09M405R-MA																		●	●	

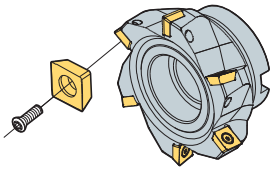
Available arbors

Designation		Ød	NC arbors
FMPCM	3050HS 3063HS	22	BT□□-FMC22-□□
FMPC (FMPCM)	3080HS	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	3100HS	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□

Parts

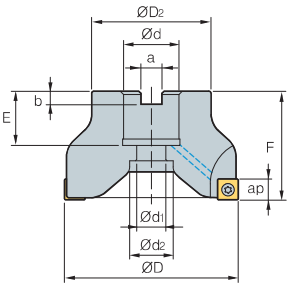
Specification	Screw	Wrench
Ø50~Ø100	FTGA03508	TW15S

Assembling



Available inserts **E17, E18** Available arbors and bolt **E400~E402**

FMPC(M)4000



AA 90°

- AR: 10°
- RR: -9°~ -8°

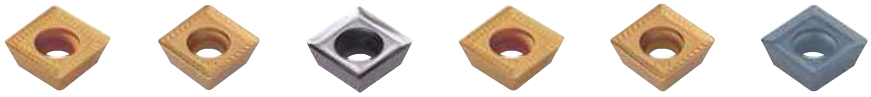
(mm)

Designation			ØD	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg
FMPCM	4063HS	5	63	49	22	10.4	6.3	20 (20)	50 (50)	11	18	11	0.4
FMPC (FMPCM)	4080HS	6	80	57	25.4 (27)	9.5 (12.4)	6 (7)	25 (23)	50 (50)	14	20	11	0.9
	4100HS	7	100	67	31.75 (32)	12.7 (14.4)	8 (8)	33 (25)	63 (50)	18	26	11	1.9 (1.5)
	4125HS	8	125	87	38.1 (40)	15.9 (16.4)	10 (9)	35 (29)	63	22	32	11	3.1

( )Metric size

Available inserts

SDET-MF SDET-MM SDET-MA SDXT-MF SDXT-MM SDXT-MA



Designation		Cermet		Coated												Uncoated				page
		CN2000	CN30	NCM325	NCM335	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1010	ST30A	G10	H01	H05	
SDET	130504R-MA															●			●	●	
	130508R-MF																				
	130508R-MM																				E17
SDXT	130508R-MF			●					●		●	●		●	●						E18
	130508R-MM			●	●				●	●	●	●		●	●						
	130508R-MA																		●	●	

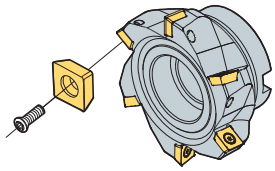
Available arbors

Designation		Ød	NC arbors
FMPCM	4063HS	22	BT□□-FMC22-□□
FMPC (FMPCM)	4080HS	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	4100HS	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	4125HS	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMB/FMC40-□□

Parts

Specification	Screw	Wrench
Ø63~Ø125	FTNC04511	TW20S

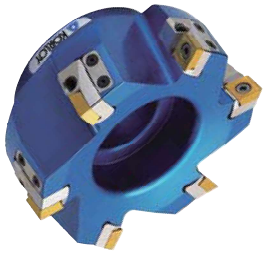
Assembling



Available inserts E17,E18 Available arbors and bolt E400~E402

FMPC(M)3000-A

Aluminum body



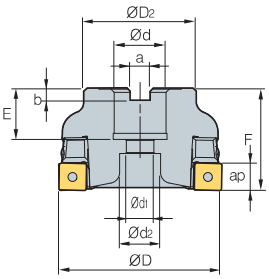


Fig. 1

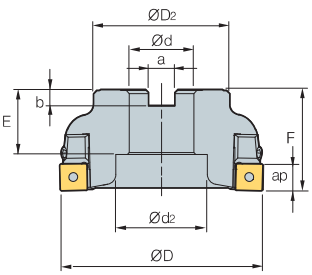


Fig. 2

AA 90°

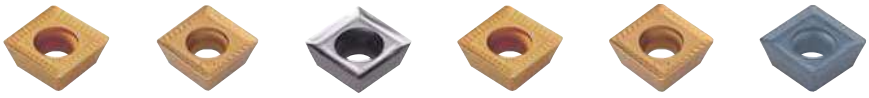
- AR: 10°
- RR: -9°~ -7.3°

(mm)

Designation		⊙	ØD	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg	Fig.
FMPCM	3063S-A	3	63	40	22	10.4	6.3	20	40	11.0	18	7	0.2	1
FMPC (FMPCM)	3080S-A	4	80	55	25.4 (27)	9.5 (12.4)	6 (7)	25 (22)	50	13.5	20	7	0.4	1
	3100S-A	5	100	67	31.75 (32)	12.7 (14.4)	8 (8)	32	50	-	45	7	0.6	2
	3100S-25.4-A	5	100	67	25.4	9.5	6	25	50	-	38	7	0.7	2

( )Metric size

Available inserts



Designation		Cermet		Coated											Uncoated				page
		CN2000	CN30	NCM325	NCM335	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	ST30A	G10	H01	H05	
SDET	09M402R-MA															●			●	●	
	09M405R-MF																				
	09M405R-MM																				
SDXT	09M405R-MF			●					●	●	●	●		●	●						E17
	09M405L-MF																				E18
	09M405R-MM			●	●				●	●	●	●		●	●						
	09M405L-MM								●		●										
	09M405R-MA																		●	●	

Available arbors

Designation		Ød	NC arbors
FMPCM	3063S-□	22	BT□□-FMC22-□□
FMPC (FMPCM)	3080S-□	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	3100S-□	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	3125S-□	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMB/FMC40-□□

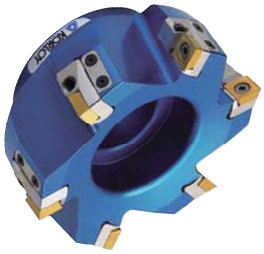
Parts

Specification	Screw	Insert wrench	Locator wrench	Locator	Locator screw	Chip cover	Chip cover screw
Ø63	FTGA03508	TW15S	HW30L	LFMP3R-A	DHA0624	CFMP3R14R1-A	PXMA0306
Ø80~Ø100	FTGA03508	TW15S	HW30L	LFMP3R-A	DHA0624	CFMP3R-A	PXMA0306

Available inserts E17, E18 Available arbors and bolt E400~E402

FMPC(M)4000-A

Aluminum body



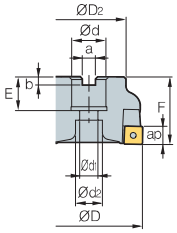


Fig. 1

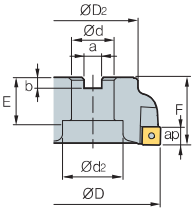


Fig. 2

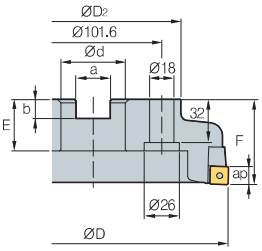


Fig. 3

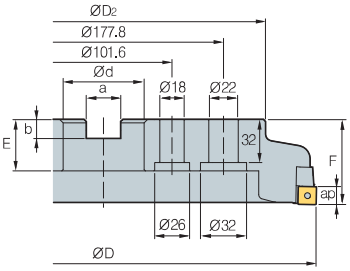


Fig. 4


AA
90°

- AR: 10°
- RR: -9°~ -7.3°

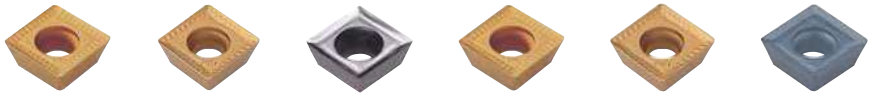
(mm)

Designation			ØD	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg	Fig.
FMPCM	4063S-A	3	63	49	22	10.4	6.3	20	50	11	18	11	0.6	1
FMPC (FMPCM)	4080S-A	4	80	67	25.4 (27)	9.5 (12.4)	6 (7)	25 (22)	50	13.5	20	11	0.8	1
	4100S-A	5	100	67	31.75 (32)	12.7 (14.4)	8 (8)	32	50	-	45	11	1.1	2
	4100S-25.4-A	5	100	67	25.4	9.5	6	25	50	-	38	11	1.2	2
	4125S-A	6	125	87	38.1 (40)	15.9 (16.4)	10 (9)	38 (35)	63	-	56	11	1.7	2
	4125S-25.4-A	6	125	70	25.4	9.5	6	25	63	-	38	11	1.8	2
	4160S-A	8	160	107	50.8 (40)	19.0 (16.4)	11 (9)	38 (35)	63	-	75	11	2.5	2
	4200S-A	10	200	130	47.625 (60)	25.4 (25.7)	14 (14)	38 (32)	63	-	-	11	3.2	3
	4250S-A	12	250	180	47.625 (60)	25.4 (25.7)	14 (14)	38	63	-	-	11	4.1	3
	4315S-A	15	315	240	47.625 (60)	25.4 (25.7)	14 (14)	38	63	-	-	11	6.7	4

( )Metric size

Available inserts

SDET-MF | SDET-MM | SDET-MA | SDXT-MF | SDXT-MM | SDXT-MA



Designation		Cermet		Coated												Uncoated				page
		CN2000	CN30	NCM325	NCM335	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1010	ST30A	G10	H01	H05	
SDET	130504R-MA															●			●	●	
	130508R-MF																				
	130508R-MM																				E17
SDXT	130508R-MF			●					●		●	●		●	●						E18
	130508R-MM			●	●				●	●	●	●		●	●						
	130508R-MA																		●	●	

Available arbors

Designation		Ød	NC arbors
FMPCM	4063R-□	22	BT□□-FMC22-□□
FMPC (FMPCM)	4080R-□	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	4100HR-□	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	4125R-□	38.1	BT□□-FMA38.1-□□

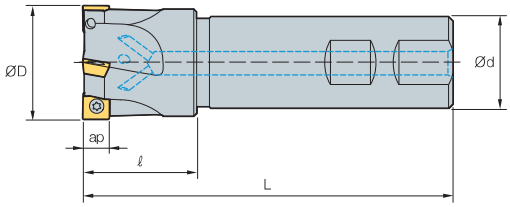
Designation		Ød	NC arbors
FMPC (FMPCM)	4125R-□	40	BT□□-FMB40-□□
	4160R-□	50.8	BT□□-FMA50.8-□□
		40	BT□□-FMB/FMC40-□□
	4200R-□	47.625	BT□□-FMA47.625-□□
	4250R-□	60	BT□□-FMB60-□□
	4315R-□	60	BT□□-FMB60-□□

Parts

Specification	Screw	Insert wrench	Locator wrench	Locator	Locator screw	Chip cover	Chip cover screw
Ø63~Ø80	FTNC04509	TW20S	HW40L	LFMP4R1-A	DHA0825	CFMP3R14R1-A	PXMA0306
Ø100~Ø315	FTNC04509	TW20S	HW40L	LFMP4R-A	DHA0830	CFMP4R-A	PXMA0306

Available inserts E17, E18 Available arbors and bolt E400~E402

FMPS3000



AA 90°

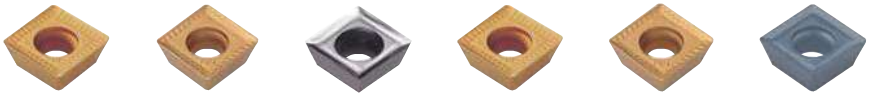
- AR: 10°
- RR: -9°~-8°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
FMPS	3025HS	2	25	25	35	115	7	0.4
	3032HS	3	32	25	40	125	7	0.5
	3040HS	4	40	32	40	130	7	0.8
	3040HS-S40	4	40	40	45	140	7	1.2
	3040HS-S42	4	40	42	45	140	7	1.3
	3050HS	5	50	32	40	135	7	1
	3050HS-S40	5	50	40	40	140	7	1.3
	3050HS-S42	5	50	42	40	140	7	1.4
	3063HS	6	63	32	45	135	7	1.2
	3063HS-S40	6	63	40	45	145	7	1.6
	3063HS-S42	6	63	42	45	145	7	1.7

Available inserts

SDET-MF SDET-MM SDET-MA SDXT-MF SDXT-MM SDXT-MA

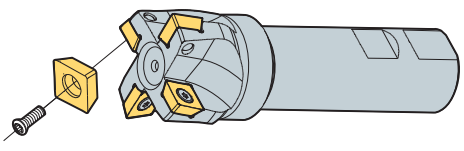


Designation		Cermet		Coated												Uncoated				page
		CN2000	CN30	NCM325	NCM335	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	ST30A	G10	H01	H05	
SDET	09M402R-MA															●			●	●	
	09M405R-MF																				
	09M405R-MM																				
SDXT	09M405R-MF			●					●	●	●	●		●	●						E17
	09M405L-MF																				E18
	09M405R-MM			●	●				●	●	●	●		●	●						
	09M405L-MM								●		●										
	09M405R-MA																		●	●	

Parts

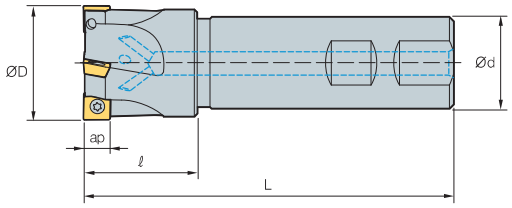
Specification	Screw	Wrench
Ø25~Ø63	FTGA03508	TW15S

Assembling



Available inserts E17, E18

FMPS4000



AA 90°

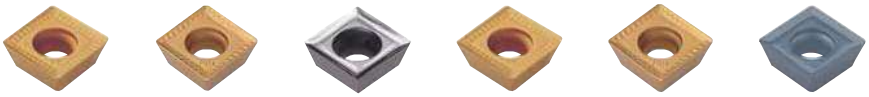
- AR: 10°
- RR: -9°~ -8°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
FMPS	4040HS	3	40	32	40	130	11	1
	4040HS-S40	3	40	40	40	140	11	1.3
	4040HS-S42	3	40	42	40	140	11	1.4
	4050HS	4	50	32	45	135	11	1.5
	4050HS-S40	4	50	40	45	145	11	1.7
	4050HS-S42	4	50	42	45	145	11	1.6
	4063HS	5	63	32	45	135	11	2.1
	4063HS-S40	5	63	40	45	145	11	2.4
	4063HS-S42	5	63	42	45	145	11	2.6

Available inserts

SDET-MF | SDET-MM | SDET-MA | SDXT-MF | SDXT-MM | SDXT-MA

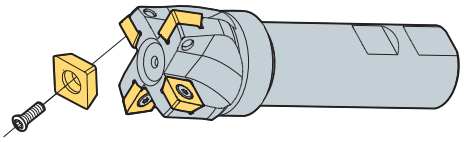


Designation		Cermet		Coated												Uncoated				page
		CN2000	CN30	NCM325	NCM335	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1010	ST30A	G10	H01	H05	
SDET	130504R-MA															●			●	●	
	130508R-MF																				
	130508R-MM																				E17
SDXT	130508R-MF			●					●		●	●		●	●						E18
	130508R-MM			●	●				●	●	●	●		●	●						
	130508R-MA																		●	●	

Parts

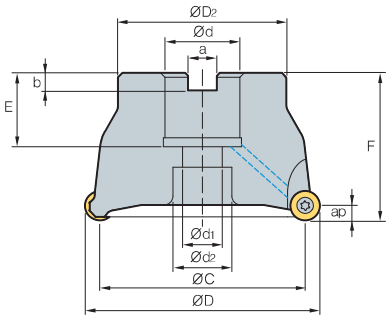
Specification	Screw	Wrench
Ø40~Ø63	FTNC04511	TW20S

Assembling



Available inserts E17, E18

FMRC(M)3000



- AR: 5°
- RR: -5°

(mm)

Designation			ØD	ØC	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg
FMRCM	3040HRD	3	40	30	36	16	8.4	5.6	18	40	9	14	5.0	0.2
	3040HRD-H	4	40	30	36	16	8.4	5.6	18	40	9	14	5.0	0.2
	3050HRD	4	50	40	42	22	10.4	6.3	20	40	11	16.5	5.0	0.3
	3050HRD-H	5	50	40	42	22	10.4	6.3	20	40	11	16.5	5.0	0.3
	3063HRD	5	63	53	49	22	10.4	6.3	20	50	11	16.5	5.0	0.64
	3063HRD-H	6	63	53	49	22	10.4	6.3	20	50	11	16.5	5.0	0.64
FMRC (FMRCM)	3080HRD	6	80	70	57	25.4 (27)	9.5 (12.4)	6 (7.0)	25 (22)	50 (50)	14	19	5.0	1.1
	3080HRD-H	7	80	70	57	25.4 (27)	9.5 (12.4)	6 (7.0)	25 (22)	50 (50)	14	19	5.0	1.1
	3100HRD	7	100	90	67	31.75 (32)	12.7 (14.4)	8 (8.0)	32 (28)	63 (63)	18	26	5.0	2.1
	3100HRD-H	8	100	90	67	31.75 (32)	12.7 (14.4)	8 (8.0)	32 (28)	63 (63)	18	26	5.0	2.1

Note) It's general that you measure of inner diameter when the diameter of FMRC/FMRCM is Ø40~Ø63

( )Metric size

Available inserts

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDCT	10T3M0-MA																	●	E15 E16
RDKT	10T3M0-MF												●		●				
	10T3M0-MM			●							●	●	●		●				

Available arbors

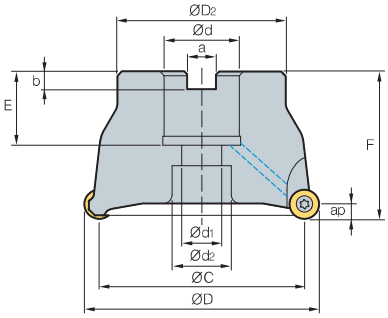
Designation		Ød	NC arbors
FMRCM	3040HRD 3040HRD-H	16	BT□□-FMC16-□□
	3050HRD 3050HRD-H 3063HRD 3063HRD-H	22	BT□□-FMC22-□□
FMRC (FMRCM)	3080HRD	25.4	BT□□-FMA/FMB25.4-□□
	3080HRD-H	27	BT□□-FMB/FMC27-□□
	3100HRD	31.75	BT□□-FMA31.75-□□
	3100HRD-H	32	BT□□-FMC32-□□

Parts

Specification	Screw	Wrench
Ø40~Ø100	FTGA03508	TW15S

Available inserts E15, E16 Available arbors and bolt E400~E402

FMRC(M)4000



• AR: 5°
• RR: -5°

(mm)

Designation			ØD	ØC	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg
FMRCM	4050HRD	4	50	38	42	22	10.4	6.3	20	50	11	18	6.0	0.4
	4063HRD	4	63	51	49	22	10.4	6.3	20	50	11	18	6.0	0.6
	4063HRD-M	5	63	51	49	22	10.4	6.3	20	50	11	18	6.0	0.6
FMRC (FMRCM)	4080HRD	5	80	68	57	25.4 (27)	9.5 (12.4)	6 (7.0)	25 (23)	50 (50)	14	20	6.0	1.0
	4080HRD-M	6	80	68	57	25.4 (27)	9.5 (12.4)	6 (7.0)	25 (23)	50 (50)	14	20	6.0	1.0
	4100HRD	6	100	88	67	31.75 (32)	12.7 (14.4)	8 (8.0)	33 (25)	63 (50)	18	26	6.0	1.9 (1.5)
	4100HRD-M	7	100	88	67	31.75 (32)	12.7 (14.4)	8 (8.0)	33 (25)	63 (50)	18	26	6.0	1.9 (1.5)
	4125HRD	7	125	113	87	38.1 (40)	15.9 (16.4)	10 (9.0)	35 (29)	63 (63)	22	32	6.0	3.0
	4125HRD-M	8	125	113	87	38.1 (40)	15.9 (16.4)	10 (9.0)	35 (29)	63 (63)	22	32	6.0	3.0

Note) It's general that you measure of inner diameter when the diameter of FMRC/FMRCM is Ø40~Ø63

( )Metric size

Available inserts

RDKT-MF RDKT-MM RDCT-MA

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDCT	1204M0-MA																	●	E15 E16
RDKT	1204M0-MF										●		●		●				
	1204M0-MM			●							●	●	●		●				

Available arbors

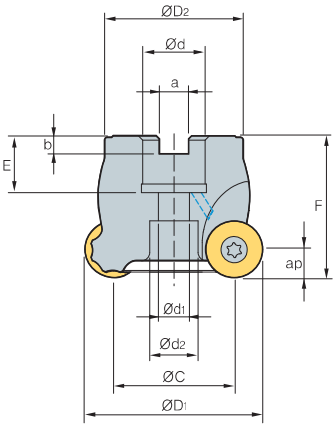
Designation		Ød	NC arbors
FMRCM	4063HRD	22	BT□□-FMC22-□□
	4063HRD-M		
FMRC (FMRCM)	4080HRD		
	4080HRD	25.4	BT□□-FMA/FMB25.4-□□
	4080HRD-M	27	BT□□-FMB/FMC27-□□
	4100HRD	31.75	BT□□-FMA31.75-□□
	4100HRD-M	32	BT□□-FMC32-□□
	4125HRD	38.1	BT□□-FMA/FMB38.1-□□
	4125HRD-M	40	BT□□-FMB/FMC40-□□

Parts

Specification	Screw	Wrench
Ø50~Ø125	FTKA0410	TW15S

Available inserts E15, E16 Available arbors and bolt E400~E402

FMRC(M)5000



• AR: 5°
• RR: -5°

(mm)

Designation			ØD	ØC	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg
FMRCM	5050HRD	3	50	34	42	22	10.4	6.3	20	50	11	16.5	8.0	0.4
	5063HRD	4	63	47	49	22	10.4	6.3	20	50	11	18	8.0	0.6
	5063HRD-H	5	63	47	49	22	10.4	6.3)	20	50	11	18	8.0	0.6
FMRC (FMRCM)	5080HRD	5	80	64	57	25.4 (27)	9.5 (12.4)	6 (7.0)	25 (23)	50 (50)	14	20	8.0	0.9
	5080HRD-H	6	80	64	57	25.4 (27)	9.5 (12.4)	6 (7.0)	25 (23)	50 (50)	14	20	8.0	0.9
	5100HRD	6	100	84	67	31.75 (32)	12.7 (14.4)	8 (8)	33 (25)	63 (50)	18	26	8.0	1.9 (1.4)
	5100HRD-H	7	100	84	67	31.75 (32)	12.7 (14.4)	8 (8)	33 (25)	63 (50)	18	26	8.0	1.9 (1.4)
	5125HRD	7	125	109	87	38.1 (40)	15.9 (16.4)	10 (9)	35 (29)	63 (63)	22	32	8.0	3
	5125HRD-H	8	125	109	87	38.1 (40)	15.9 (16.4)	10 (9)	35 (29)	63 (63)	22	32	8.0	3

Note) It's general that you measure of inner diameter when the diameter of FMRC/FMRCM is Ø50~Ø63 ( )Metric size

Available inserts

RDHW-E,F,S | RDKT-MF | RDKT-ML | RDKT-MM

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDHW	1605M0E																		
	1605M0F																		
	1605M0S																		E15
RDKT	1605M0-MM										●								E16
	1605M0-MF																		
	1605M0-ML																		

Available arbors

Designation		Ød	NC arbors
FMRCM	5050HRD	22	BT□□-FMC22-□□
	5063HRD		
	5063HRD-H		
FMRC (FMRCM)	5080HRD	25.4	BT□□-FMA/FMB25.4-□□
	5080HRD-H	27	BT□□-FMB/FMC27-□□
	5100HRD	31.75	BT□□-FMA31.75-□□
	5100HRD-H	32	BT□□-FMC32-□□
	5125HRD	38.1	BT□□-FMA/FMB38.1-□□
	5125HRD-H	40	BT□□-FMB/FMC40-□□

Parts

Specification	Screw	Wrench
Ø50~Ø125	FTGA0513-P	TW20-100

Available inserts E15, E16 Available arbors and bolt E400~E402

FMRC(M)6000

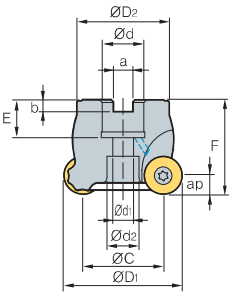


Fig. 1

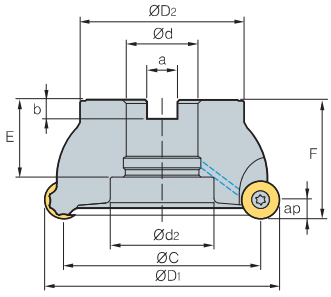


Fig. 2

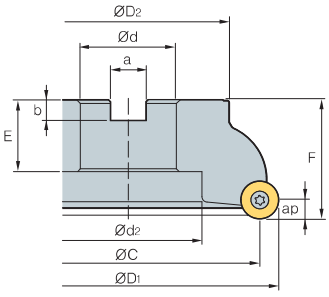


Fig. 3

• AR: 5°
• RR: -5°

(mm)

Designation			ØD	ØC	ØD2	Ød	a	b	E	F	Ød1	Ød2	ap	kg	Fig.
FMRCM	6063HRD	3	63	43	49	22	10.4	6.3	20	50	11	17	10.0	0.5	1
	6063HRD-M	4	63	43	49	22	10.4	6.3	20	50	11	17	10.0	0.5	1
FMRC (FMRCM)	6080HRD	4	80	60	57	25.4 (27)	9.5 (12.4)	6 (7.0)	25 (22)	50	14	20	10.0	0.8	1
	6080HRD-M	5	80	60	57	25.4 (27)	9.5 (12.4)	6 (7.0)	25 (22)	50	14	20	10.0	0.8	1
	6100HRD	5	100	80	67	31.75 (32)	12.7 (14.4)	8 (8)	32 (28)	63	18	26	10.0	1.6	1
	6100HRD-M	6	100	80	67	31.75 (32)	12.7 (14.4)	8 (8)	32 (28)	63	18	26	10.0	1.6	1
	6125HRD	6	125	105	87	38.1 (40)	15.9 (16.4)	10 (9)	41 (29)	63	- (22)	55 (32)	10.0	2.7 (2.9)	2 (1)
	6125HRD-M	7	125	105	87	38.1 (40)	15.9 (16.4)	10 (9)	41 (29)	63	- (22)	55 (32)	10.0	2.7 (2.9)	2 (1)
	6160RD	7	160	140	107	50.8 (40)	19 (16.4)	11 (9)	38 (35)	63	-	78	10.0	4.4	3
	6160RD-M	8	160	140	107	50.8 (40)	19 (16.4)	11 (9)	38 (35)	63	-	78	10.0	4.4	3

( )Metric size

Available inserts

RDHW-E,F,S

RDKT-MM

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDHW	2006M0E																		
	2006M0F																		E15
	2006M0S																		E16
RDKT	2006M0-MM										●								

Available arbors

Designation		Ød	NC arbors
FMRCM	6063HRD	22	BT□□-FMC22-□□
	6063HRD-M		
FMRC (FMRCM)	6080HRD	25.4	BT□□-FMA/FMB25.4-□□
	6080HRD-M	27	BT□□-FMB/FMC27-□□
	6100HRD	31.75	BT□□-FMA31.75-□□
	6100HRD-M	32	BT□□-FMC32-□□
	6125HRD	38.1	BT□□-FMA/FMB38.1-□□
	6125HRD-M	40	BT□□-FMB/FMC40-□□
	6160RD	50.8	BT□□-FMA50.8-□□
	6160RD-M	40	BT□□-FMB/FMC40-□□

Parts

Specification	Screw	Wrench
Ø63~Ø160	FTGA0515-P	TW20-100

Available inserts E15, E16 Available arbors and bolt E400~E402

FMRS1000/1500

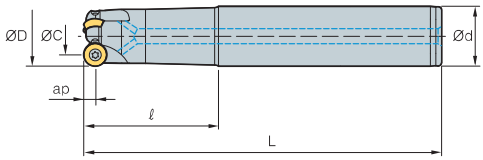


Fig. 1

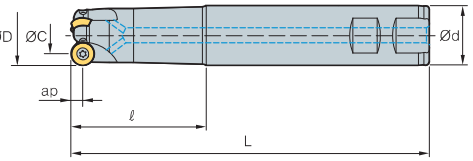


Fig. 2

• AR: 5°
• RR: -5°~-1°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Fig.
FMRS	1008HRD-M	1	8	5.5	10	30	80	2.5	0.2	1
	1008HRD-L	1	8	5.5	10	50	100	2.5	0.2	1
	1010HRD-M	2	10	5	12	44	100	2.5	0.2	1
	1010HRD-L	2	10	5	12	64	120	2.5	0.2	1
	1012HRD-M	2	12	7	12	44	100	2.5	0.3	1
	1012HRD-L	2	12	7	16	80	160	2.5	0.3	1
	1015HRD-M	3	15	10	16	80	160	2.5	0.3	1
	1015HRD-L	3	15	10	16	100	200	2.5	0.4	1
FMRS	1510HRD-M	1	10	6	12	44	100	3.0	0.2	1
	1510HRD-L	1	10	6	12	64	120	3.0	0.2	1
	1512HRD-M	2	12	6	12	54	110	3.0	0.3	1
	1512HRD-L	2	12	6	16	80	160	3.0	0.3	1
	1516HRD-M	3	16	10	16	60	130	3.0	0.3	1
	1516HRD-L	3	16	10	20	90	180	3.0	0.4	1
	1520HRD-M	3	20	14	20	80	150	3.0	0.4	1
	1520HRD-L	3	20	14	20	90	200	3.0	0.5	1

Available inserts

RDHW-E,F,S

RDKW

Type	Designation		Cermet		Coated												Uncoated		page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
1000 type	RDHW	0501M0E												●						
		0501M0F																		
		0501M0S																		
	RDKW	0501M0E										●								E15
1500 type	RDHW	06T1M0E												●						E16
		06T1M0F																		
		06T1M0S																		
	RDKW	06T1M0E										●								

Parts

Specification	Screw	Wrench
Ø8~Ø15 (1000 type)	FTNA0203	TW06P
Ø10~Ø20 (1500 type)	FTNA02205	TW06P

Available inserts E15, E16

FMRS2000/2500

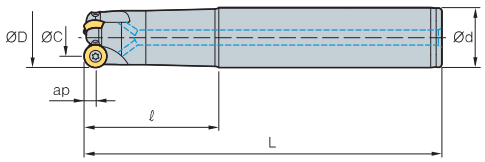


Fig. 1

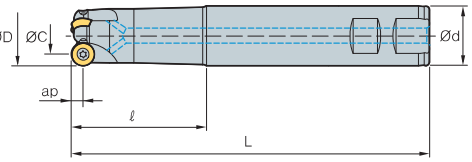


Fig. 2

• AR: 5°
• RR: -5°~ -1°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Fig.
FMRS	2015HRD-S	2	15	8	16	55	115	3.5	0.3	2
	2015HRD-M	2	15	8	20	80	150	3.5	0.4	1
	2015HRD-L	2	15	8	20	90	200	3.5	0.5	1
	2020HRD-S	3	20	14	20	65	125	3.5	0.3	2
	2020HRD-M	3	20	14	20	80	150	3.5	0.4	1
	2020HRD-L	3	20	14	25	90	200	3.5	0.5	1
FMRS	2516HRD-S	2	16	8	16	65	125	4.0	0.3	2
	2516HRD-M	2	16	8	16	80	150	4.0	0.4	1
	2516HRD-L	2	16	8	20	90	200	4.0	0.5	1
	2520HRD-S	2	20	12	20	65	125	4.0	0.4	2
	2520HRD-M	2	20	12	20	80	150	4.0	0.5	1
	2520HRD-L	2	20	12	25	90	200	4.0	0.6	1
	2525HRD-S	3	25	17	25	55	125	4.0	0.5	2
	2525HRD-M	3	25	17	25	90	200	4.0	0.6	1
	2525HRD-L	3	25	17	32	110	250	4.0	0.7	1

Available inserts

RDHW-E,F,S

RDKW

Type	Designation		Cermet		Coated												Uncoated		page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
2000 type	RDHW	0702M0E												●						
		0702M0F																		
		0702M0S																		
	RDKW	0702M0E										●								E15
2500 type	RDHW	0803M0E												●						E16
		0803M0F																		
		0803M0S																		
	RDKW	0803M0E										●								

Parts

Specification	Screw	Wrench
Ø15~Ø20 (2000 type)	FTNA02555	TW07S
Ø16~Ø25 (2500 type)	FTNA0305 FTNA0306 (Ø20 over)	TW09S

Available inserts E15, E16

FMRS3000

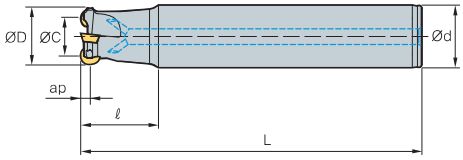


Fig. 1

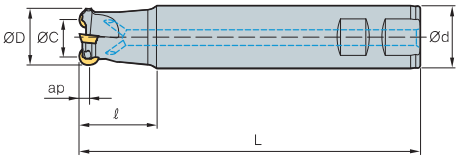


Fig. 2

• AR: 5°
• RR: -8°~ -5°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Fig.
FMRS	3021HRD-M	1	21	11	20	40	150	5	0.4	1
	3021HRD-M2	2	21	11	20	40	150	5	0.4	1
	3021HRD-L	1	21	11	20	50	200	5	0.6	1
	3021HRD-L2	2	21	11	20	50	200	5	0.6	1
	3025HRD-S	2	25	15	25	35	115	5	0.5	2
	3025HRD-M	2	25	15	25	70	200	5	0.7	1
	3025HRD-L	2	25	15	25	100	250	5	1	1
	3026HRD-M	2	26	16	25	70	200	5	0.65	1
	3026HRD-L	2	26	16	25	100	250	5	0.7	1
	3032HRD-S	3	32	22	32	40	125	5	1	2
	3032HRD-M	3	32	22	32	70	200	5	1.3	1
	3032HRD-L	3	32	22	32	150	300	5	1.6	1
	3040HRD-S	4	40	30	32	40	125	5	1.3	2
	3040HRD-M	4	40	30	32	70	200	5	1.5	1
	3040HRD-L	4	40	30	32	150	300	5	1.8	1

Available inserts

RDKT-MF

RDKT-MM

RDCT-MA

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDCT	10T3M0-MA																	●	E15 E16
RDKT	10T3M0-MF												●		●				
	10T3M0-MM			●							●	●	●		●				

Parts

Specification	Screw	Wrench
Ø21	FTGA03507	TW15S
Ø25~Ø40	FTGA03508	

Available inserts E15, E16

FMRS4000

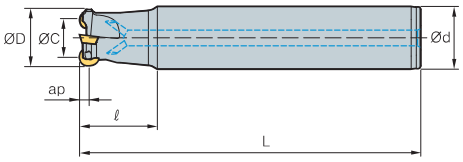


Fig. 1

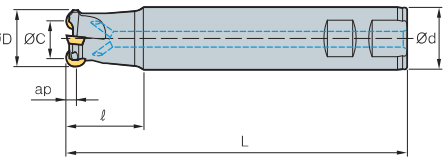


Fig. 2

• AR: 5°
• RR: -8°~ -5°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Fig.
FMRS	4032HRD-S	2	32	20	32	40	125	6	0.8	2
	4032HRD-M	2	32	20	32	70	200	6	1.1	1
	4032HRD-L	2	32	20	32	150	300	6	1.6	1
	4033HRD-S	2	33	21	32	40	125	6	0.9	2
	4033HRD-M	2	33	21	32	70	200	6	1.1	1
	4033HRD-L	2	33	21	32	150	300	6	1.7	1
	4040HRD-S	3	40	28	32	40	125	6	1	2
	4040HRD-M	3	40	28	32	70	200	6	1.6	1
	4040HRD-L	3	40	28	32	150	300	6	1.8	1
	4040HRD-S40	3	40	28	40	40	125	6	1.3	2
	4040HRD-M40	3	40	28	40	70	200	6	2	1
	4040HRD-L40	3	40	28	40	150	300	6	2.4	1
	4040HRD-S42	3	40	28	42	40	125	6	1.6	2
	4040HRD-M42	3	40	28	42	70	200	6	2.4	1
	4040HRD-L42	3	40	28	42	150	300	6	2.8	1
	4050HRD-S	4	50	38	42	50	125	6	1.5	2
	4050HRD-M	4	50	38	42	50	250	6	2.1	1
	4050HRD-L	4	50	38	42	50	300	6	2.7	1
	4050HRD-S40	4	50	38	40	50	150	6	2	2
	4050HRD-M40	4	50	38	40	50	250	6	2.6	1
	4050HRD-L40	4	50	38	40	50	300	6	3.2	1

Available inserts

RDKT-MF

RDKT-MM

RDCT-MA

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDCT	1204M0-MA																	●	E15 E16
RDKT	1204M0-MF										●		●		●				
	1204M0-MM			●							●	●	●		●				

Parts

Specification	Screw	Wrench
Ø32~Ø50	FTKA0410	TW15S

Available inserts E15, E16

FMRS5000

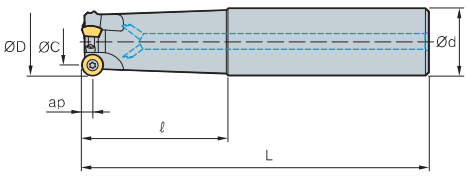


Fig. 1

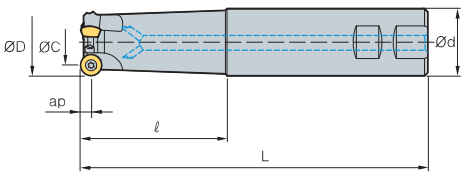


Fig. 2

• AR: 5°
• RR: -8°~ -5°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Fig.
FMRS	5040HRD-S	2	40	24	32	40	125	8	1.4	2
	5040HRD-M	2	40	24	32	70	200	8	1.8	1
	5040HRD-L	2	40	24	32	150	300	8	2.0	1
	5040HRD-S40	2	40	24	40	40	125	8	1.6	2
	5040HRD-M40	2	40	24	40	70	200	8	2.0	1
	5040HRD-L40	2	40	24	40	150	300	8	2.4	1
	5040HRD-S42	2	40	24	42	40	125	8	2.0	2
	5040HRD-M42	2	40	24	42	70	200	8	2.4	1
	5040HRD-L42	2	40	24	42	150	300	8	2.8	1
	5050HRD-S40	3	50	34	40	50	150	8	2.0	2
	5050HRD-M40	3	50	34	40	50	250	8	2.4	1
	5050HRD-L40	3	50	34	40	50	300	8	2.6	1
	5050HRD-S	3	50	34	42	50	150	8	1.5	2
	5050HRD-M	3	50	34	42	50	250	8	1.8	1
	5050HRD-L	3	50	34	42	50	300	8	2.0	1
	5063HRD-S40	4	63	47	40	50	150	8	1.7	2
	5063HRD-M40	4	63	47	40	50	250	8	2.0	1
	5063HRD-L40	4	63	47	40	50	300	8	2.3	1
	5063HRD-S	4	63	47	42	50	150	8	1.6	2
	5063HRD-M	4	63	47	42	50	250	8	1.8	1
	5063HRD-L	4	63	47	42	50	300	8	2.0	1

Available inserts

RDHW-E,F,S | RDKT-MF | RDKT-ML | RDKT-MM

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDHW	1605M0E																		
	1605M0F																		
	1605M0S																		E15
RDKT	1605M0-MF										●								E16
	1605M0-MM																		
	1605M0-ML																		

Parts

Specification	Screw	Wrench
Ø40~Ø63	FTGA0513-P	TW20-100

Available inserts E15, E16

FMRS6000

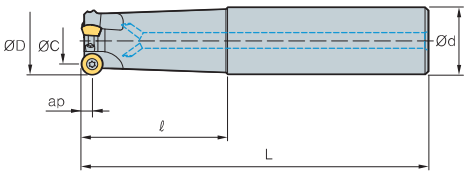


Fig. 1

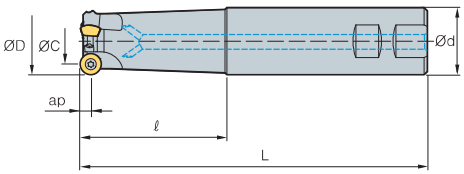


Fig. 2

• AR: 5°
• RR: -8°~ -5°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Fig.
FMRS	6050HRD-S40	3	50	31	40	50	150	10	1.3	2
	6050HRD-S42	3	50	31	42	50	150	10	1.4	2
	6050HRD-M40	3	50	31	40	50	250	10	2.2	1
	6050HRD-M42	3	50	31	42	50	250	10	2.4	1
	6050HRD-L40	3	50	31	40	50	300	10	2.7	1
	6050HRD-L42	3	50	31	42	50	300	10	3.0	1
	6063HRD-S40	4	63	44	40	50	150	10	1.5	2
	6063HRD-S42	4	63	44	42	50	150	10	1.6	2
	6063HRD-M40	4	63	44	40	50	250	10	2.5	1
	6063HRD-M42	4	63	44	42	50	250	10	2.7	1
	6063HRD-L40	4	63	44	40	50	300	10	3.0	1
	6063HRD-L42	4	63	44	42	50	300	10	3.2	1

Available inserts

RDHW-E,F,S

RDKT-MM

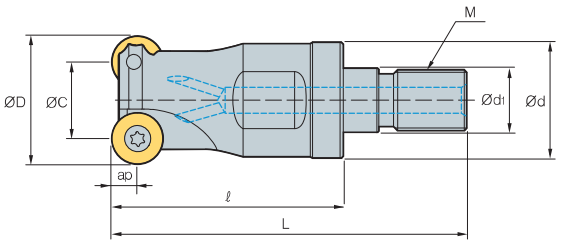
Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDHW	2006M0E																		E15
	2006M0F																		E15
	2006M0S																		E16
RDKT	2006M0-MM										●								

Parts

Specification	Screw	Wrench
Ø50~Ø63	FTGA0515-P	TW20-100

Available inserts E15, E16

FMRM1000/1500



• AR: 0°~5°
• RR: -5°~-1°

(mm)

Designation			ØD	ØC	Ød	Ød1	ℓ	L	M	ap	kg
FMRM	1008HRD-M06	1	8	5.5	9.5	6.5	25	40	M06	2.5	0.02
	1010HRD-M06	2	10	5	9.5	6.5	25	40	M06	2.5	0.02
	1012HRD-M06	2	12	7	11	6.5	25	40	M06	2.5	0.02
	1015HRD-M08	3	15	10	14.5	8.5	30	47	M08	2.5	0.04
	1510HRD-M06	1	10	7	9.5	6.5	25	40	M06	3.0	0.02
	1512HRD-M06	2	12	6	11	6.5	25	40	M06	3.0	0.02
	1516HRD-M08	3	16	10	14.5	8.5	30	47	M08	3.0	0.02
	1520HRD-M10	3	20	14	18	10.5	35	56	M10	3.0	0.07

Available inserts

RDHW-E,F,S

RDKW

Type	Designation		Cermet		Coated												Uncoated		page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
1000 type	RDHW	0501M0E												●						
		0501M0F																		
		0501M0S																		
	RDKW	0501M0E										●								E15
1500 type	RDHW	06T1M0E												●						E16
		06T1M0F																		
		06T1M0S																		
	RDKW	06T1M0E										●								

Available adaptor

Designation		Available adaptor
FMRM	1008HRD-M06	MAT-M06
	1010HRD-M06	
	1012HRD-M06	
	1015HRD-M08	MAT-M08
	1510HRD-M06	MAT-M06
	1512HRD-M06	
	1515HRD-M08	MAT-M08
	1520HRD-M10	MAT-M10

Designation: FMRM1008HRD-M06
Modular head threading measure size (M06)

=

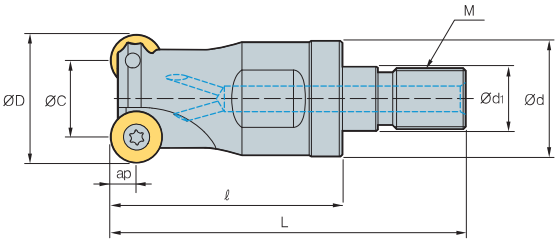
Adaptor spec.: MAT-M06-020-S10S
Adaptor threading measure (M06)

Parts

Specification	Screw	Wrench
Ø8~Ø15 (1000 type)	FTNA0203	TW06P
Ø10~Ø20 (1500 type)	FTNA02205	TW06P

Available inserts E15, E16 Available adaptor E371~E372

FMRM2000/2500



• AR: 0°~5°
• RR: -5°~ -1°

(mm)

Designation			ØD	ØC	Ød	Ød1	ℓ	L	M	ap	kg
FMRM	2015HRD-M08	2	15	8	14.5	8.5	30	47	M08	3.5	0.04
	2020HRD-M10	3	20	13	18	10.5	35	56	M10	3.5	0.07
	2516HRD-M08	2	16	8	14.5	8.5	30	47	M08	4.0	0.04
	2520HRD-M10	2	20	12	18	10.5	35	56	M10	4.0	0.07
	2525HRD-M12	3	25	17	22.5	12.5	45	69	M12	4.0	0.13

Available inserts

RDHW-E,F,S

RDKW

Type	Designation		Cermet		Coated												Uncoated		page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
2000 type	RDHW	0702M0E												●						
		0702M0F																		
		0702M0S																		
	RDKW	0702M0E										●								E15
2500 type	RDHW	0803M0E												●						E16
		0803M0F																		
		0803M0S																		
	RDKW	0803M0E										●								

Available adaptor

Designation		Available adaptor
FMRM	2015HRD-M08	MAT-M08
	2020HRD-M10	MAT-M10
	2516HRD-M08	MAT-M08
	2520HRD-M10	MAT-M10
	2525HRD-M12	MAT-M12

Designation: FMRM1008HRD-M06
Modular Head Threading Measure size (M06)

II

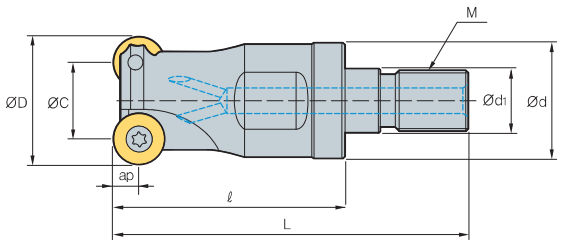
Adaptor spec.: MAT-M06-020-S10S
Adaptor Threading Measure (M06)

Parts

Specification	Screw	Wrench
Ø15~Ø20 (2000 type)	FTNA02555	TW07S
Ø16~Ø25 (2500 type)	FTNA0305	TW09S

Available inserts E15, E16 Available adaptor E371~E372

FMRM3000



• AR: 5°
•RR:-8°~ -5°

(mm)

Designation			ØD	ØC	Ød	Ød1	ℓ	L	M	ap	kg
FMRM	3021HRD-M10	2	21	11	18	10.5	35	56	M10	5.0	0.1
	3025HRD-M12	2	25	15	22.5	12.5	45	69	M12	5.0	0.15
	3032HRD-M16	3	32	22	29	17	50	77	M16	5.0	0.2
	3042HRD-M16	4	42	32	29	17	50	77	M16	5.0	0.24

Available inserts

RDHW-E,F,S | RDCT-MA | RDKT-MF | RDKT-ML | RDKT-MM

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RDCT	10T3M0-MA																	●	E15 E16
RDKT	10T3M0-MF												●		●				
	10T3M0-MM			●							●	●	●		●				

Available adaptor

Designation		Available adaptor
FMRM	3021HRD-M10	MAT-M10
	3025HRD-M12	MAT-M12
	3032HRD-M16	MAT-M16
	3042HRD-M16	

Designation: FMRM1008HRD-M06
Modular Head Threading Measure size (M06)

=

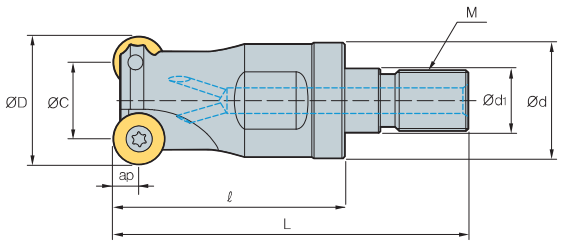
Adaptor spec.: MAT-M06-020-S10S
Adaptor Threading Measure (M06)

Parts

Specification	Screw	Wrench
Ø21	FTGA03507	TW15S
Ø25~Ø42	FTGA03508	

Available inserts E15, E16 Available adaptor E371~E372

FMRM4000/5000



• AR: 5°
•RR:-8°~ -5°

(mm)

Designation			ØD	ØC	Ød	Ød1	ℓ	L	M	ap	kg
FMRM	4025HRD-M12	2	25	13	22.5	12.5	45	69	M12	6.0	0.12
	4032HRD-M16	2	32	20	29	17	50	77	M16	6.0	0.22
	4040HRD-M16	3	40	28	29	17	50	77	M16	6.0	0.23
	4042HRD-M16	4	42	28	29	17	50	77	M16	6.0	0.25
	5040HRD-M16	2	40	24	29	17	50	77	M16	8.0	0.25

Available inserts

RDHW-E RDCT-MA RDKT-MF RDKT-ML RDKT-MM

Type	Designation		Cermet		Coated												Uncoated		page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
4000 type	RDCT	1204M0-MA																	●	E15 E16
	RDKT	1204M0-MF										●		●		●				
		1204M0-MM			●							●	●	●		●				
5000 type	RDHW	1605M0-E																		
	RDKT	1605M0-MF																		
		1605M0-ML																		
		1605M0-MM										●								

Available adaptor

Designation		Available adaptor
FMRM	4025HRD-M12	MAT-M12
	4032HRD-M16	MAT-M16
	4040HRD-M16	
	4042HRD-M16	
	5040HRD-M16	MAT-M16

Designation: FMRM1008HRD-M06
Modular head threading measure size (M06)

II

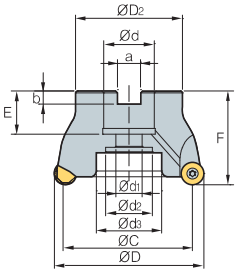
Adaptor spec.: MAT-M06-020-S10S
Adaptor threading measure (M06)

Parts

Specification	Screw	Wrench
Ø25~Ø42 (4000 type)	FTKA0410	TW15S
Ø40 (5000 type)	FTGA0513-P	TW20-100

Available inserts E15, E16 Available adaptor E371~E372

FMRCM3000 new



• AR: 5°
• RR: -4°~ 0°

(mm)

Designation			ØD	ØC	ØD2	Ød	Ød1	Ød2	d3	a	b	E	F	ap	kg	Insert size
FMRCM	3040HRP-5	5	40	30	38	16	9	14	-	8.4	5.6	19	40	5	0.22	10
	3050HRP-6	6	50	40	45	22	11	18	-	10.4	6.3	20	40	5	0.35	10
	3052HRP-6	6	52	42	45	22	11	18	-	10.4	6.3	20	40	5	0.37	10
	3063HRP-6	6	63	53	50	22	11	18	-	10.4	6.3	20	40	5	0.55	10
	3063HRP-7	7	63	53	50	22	11	18	-	10.4	6.3	20	40	5	0.56	10
	3066HRP-7	7	66	56	50	22	11	18	-	10.4	6.3	20	40	5	0.60	10

Available inserts

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	10T3M0-MA																	●	E16
RPET	10T3M0E-ML														●	●			
RPMT	10T3M0E-MF									●					●	●			
	10T3M0S-MM							●	●	●	●				●	●			
RPMW	10T3M0E1							●	●	●					●	●			

Available arbors

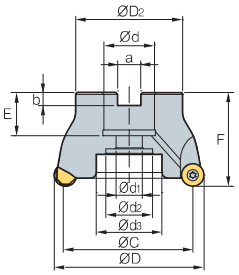
Designation		Ød	NC arbors
FMRCM	3040HRP-5	16	BT□□-FMC16-□□
	3050HRP-6	22	BT□□-FMC22-□□
	3052HRP-6	22	BT□□-FMC22-□□
	3063HRP-6	22	BT□□-FMC22-□□
	3063HRP-7	22	BT□□-FMC22-□□
	3066HRP-7	22	BT□□-FMC22-□□

Parts

Specification	Screw	Wrench
Ø40~Ø66	FTGA03508	TW15S

Available inserts E16 Available arbors and bolt E400~E402

FMRC(M)4000 new



• AR: 5°
• RR: -2°~ 0°

(mm)

Designation			ØD	ØC	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg	Insert size
FMRCM	4050HRP-4	4	50	38	45	22	11	18	-	10.4	6.3	20	40	6	0.26	12
	4050HRP-5	5	50	38	45	22	11	18	-	10.4	6.3	20	40	6	0.28	12
	4052HRP-5	5	52	40	45	22	11	18	-	10.4	6.3	20	40	6	0.30	12
	4063HRP-5	5	63	51	50	22	11	18	-	10.4	6.3	20	40	6	0.44	12
	4063HRP-6	6	63	51	50	22	11	18	-	10.4	6.3	20	40	6	0.48	12
	4066HRP-6	6	66	54	50	22	11	18	-	10.4	6.3	20	40	6	0.50	12
FMRC (FMRCM)	4080HRP-6	6	80	68	57	25.4 (27)	14	25	35	9.5 (12.4)	6 (7)	24 (23)	50	6	0.92	12
	4080HRP-7	7	80	68	57	25.4 (27)	14	25	35	9.5 (12.4)	6 (7)	24 (23)	50	6	0.90	12
	4100HRP-7	7	100	88	67	31.75 (32)	18	26	42	12.7 (14.4)	8 (8)	32 (25)	63 (53)	6	1.46	12

( )Metric size

Available inserts

RPCT-MA | RPET-ML | RPMT-MF | RPMT-MM | RPMW

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	1204M0-MA																	●	E16
RPET	1204M0E-ML														●	●			
RPMT	1204M0E-MF									●				●	●	●			
	1204M0S-MM							●	●	●	●			●	●	●			
RPMW	1204M0S1							●	●	●	●				●	●			
	1204M0S2														●	●			

Available arbors

Designation		Ød	Available arbors
FMRCM	4050HRP-4	22	BT□□-FMC22-□□
	4050HRP-5		
	4052HRP-5		
	4063HRP-5		
	4063HRP-6		
	4066HRP-6		
FMRC (FMRCM)	4080HRP-6	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	4080HRP-7	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	4100HRP-7	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□

Parts

Specification	Screw	Wrench
Ø50~Ø100	FTKA0410	TW15S

Available inserts E16 Available arbors and bolt E400~E402

FMRC(M)5000 new

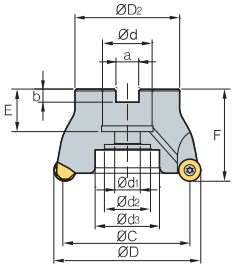


Fig. 1

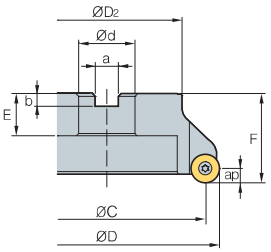


Fig. 2

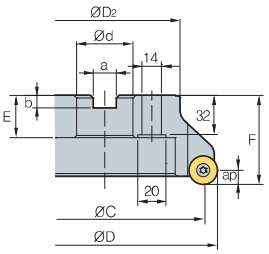


Fig. 3

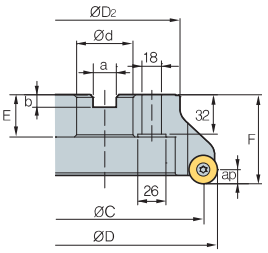


Fig. 4

• AR: 5°
• RR: -1°~ 0°

(mm)

Designation		ØD	ØC	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg	Fig.	Insert size
FMRCM	5063HRP-4	4	63	47	50	22	11	18	-	10.4	6.3	20	40	8	0.43	1	16
	5063HRP-5	5	63	47	50	22	11	18	-	10.4	6.3	20	40	8	0.44	1	16
	5066HRP-5	5	66	50	50	22	11	18	-	10.4	6.3	20	40	8	0.48	1	16
FMRC (FMRCM)	5080HRP-5	5	80	64	57	25.4 (27)	14	25	35	9.5 (12.4)	6 (7)	24 (23)	50	8	0.77	1	16
	5080HRP-6	6	80	64	57	25.4 (27)	14	25	35	9.5 (12.4)	6 (7)	24 (23)	50	8	0.82	1	16
	5100HRP-6	6	100	84	67	31.75 (32)	18	26	42	12.7 (14.4)	8 (8)	32 (25)	63 (55)	8	1.42	1	16
	5125HRP-7	7	125	109	87	38.1 (40)	22	32	52	15.9 (16.4)	10 (9)	35 (29)	68 (63)	8	2.78	1	16
	5125HRP-8	8	125	109	87	38.1 (40)	22	32	52	15.9 (16.4)	10 (9)	35 (29)	68 (63)	8	2.79	1	16
	5160RP-8	8	160	144	107	50.8 (40)	-	-	100	19 (16.4)	11 (9)	38 (32)	63	8	4.01	2 (3)	16

( )Metric size

Available inserts

RPCT-MA | RPET-ML | RPMT-MF | RPMT-MM | RPMW

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	1606M0-MA																	●	E16
RPET	1606M0E-ML														●	●			
RPMT	1606M0E-MF									●					●	●			
	1606M0S-MM							●	●	●	●				●	●			
RPMW	1606M0S1							●	●	●					●	●			

Available arbors

Designation		Ød	Available arbors
FMRCM	5063HRP-4	22	BT□□-FMC22-□□
	5063HRP-5		
	5066HRP-5		
FMRC (FMRCM)	5080HRP-5	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	5080HRP-6	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	5100HRP-6	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	5125HRP-7	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMC40-□□
	5125HRP-8	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMC40-□□
	5160RP-8	50.8	BT□□-FMA50.8-□□
		40	BT□□-FMC40-□□

Parts

Specification	Screw	Wrench
Ø63~Ø160	FTGA0512-P	TW20-100

Available inserts E16 Available arbors and bolt E400~E402

FMRC(M)6000 new

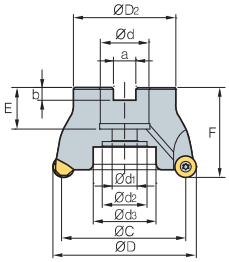


Fig. 1

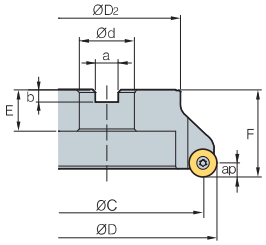


Fig. 2

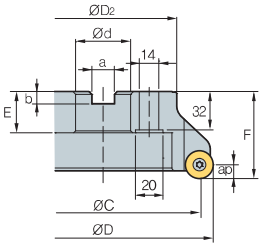


Fig. 3

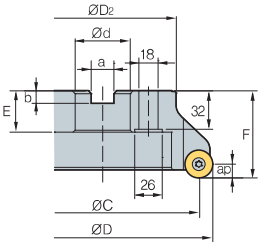


Fig. 4

• AR: 5°
• RR: 0°

(mm)

Designation		ØD	ØC	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg	Fig.	Insert size
FMRCM	6063HRP-4	4	63	43	50	22	11	18	-	10.4	6.3	20	40	10	0.37	1	20
FMRC (FMRCM)	6080HRP-5	5	80	60	57	25.4 (27)	14	25	35	9.5 (12.4)	6 (7)	24 (23)	50	10	0.87	1	20
	6100HRP-5	5	100	80	67	31.75 (32)	18	26	42	12.7 (14.4)	8 (8)	32 (25)	63 (55)	10	1.31	1	20
	6100HRP-6	6	100	80	67	31.75 (32)	18	26	42	12.7 (14.4)	8 (8)	32 (25)	63 (55)	10	1.40	1	20
	6125HRP-5	5	125	105	87	38.1 (40)	22	32	52	15.9 (16.4)	10 (9)	35 (29)	68 (63)	10	2.77	1	20
	6125HRP-7	7	125	105	87	38.1 (40)	22	32	52	15.9 (16.4)	10 (9)	35 (29)	68 (63)	10	2.89	1	20
	6160RP-6	6	160	140	107	50.8 (40)	-	-	100	19 (16.4)	11 (9)	38 (32)	63	10	3.58	2 (3)	20
	6160RP-8	8	160	140	107	50.8 (40)	-	-	100	19 (16.4)	11 (9)	38 (32)	63	10	3.53	2 (3)	20
	6200RP-8	8	200	180	130	47.625 (60)	-	-	132	25.4 (25.7)	14 (14)	38	63	10	5.15	4	20
	6250RP-9	9	250	230	180	47.625 (60)	-	-	180	25.4 (25.7)	14 (14)	38	63	10	9.72	4	20

( )Metric size

Available inserts

	RPCT-MA	RPET-ML	RPMT-MF	RPMT-MM	RPMW
					

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	2007M0-MA																	●	E16
RPET	2007M0E-ML														●	●			
RPMT	2007M0E-MF									●					●	●			
	2007M0S-MM							●	●	●	●				●	●			
RPMW	2007M0S1							●	●	●					●	●			

Available arbors

Designation		Ød	Available arbors
FMRCM	6063HRP-4	22	BT□□-FMC22-□□
FMRC (FMRCM)	6080HRP-5	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	6100HRP-5	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	6100HRP-6	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	6125HRP-5	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMC40-□□

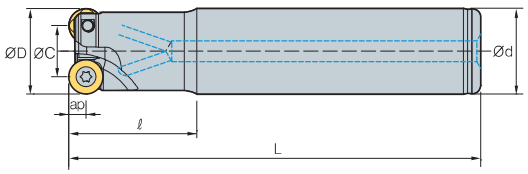
Designation		Ød	Available arbors
FMRC (FMRCM)	6125HRP-7	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMC40-□□
	6160RP-6	50.8	BT□□-FMA50.8-□□
		40	BT□□-FMC40-□□
	6160RP-8	50.8	BT□□-FMA50.8-□□
		40	BT□□-FMC40-□□
	6200RP-8	47.625	BT□□-FMA47.625-□□
		60	BT□□-FMC60-□□
	6250RP-9	47.625	BT□□-FMA47.625-□□
		60	BT□□-FMC60-□□

Parts

Specification	Screw	Wrench
Ø63~Ø250	FTKA0615-P	TW25-100

Available inserts E16 Available arbors and bolt E400~E402

FMRS2500 new



• AR: -4°
• RR: -4°~-1°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Insert size
FMRS	2517HRP-2S16	2	17	9	16	35	90	4	0.11	8
	2517HRP-2M16	2	17	9	16	35	150	4	0.20	8
	2517HRP-2L16	2	17	9	16	35	200	4	0.27	8
	2518HRP-2M16	2	18	10	16	35	150	4	0.20	8
	2518HRP-2L16	2	18	10	16	35	200	4	0.28	8
	2520HRP-3S20	3	20	12	20	35	130	4	0.27	8
	2520HRP-3M20	3	20	12	20	100	180	4	0.36	8
	2520HRP-3L20	3	20	12	20	130	250	4	0.50	8
	2521HRP-3S20	3	21	13	20	35	130	4	0.28	8
	2521HRP-3M20	3	21	13	20	35	180	4	0.40	8
	2521HRP-3L20	3	21	13	20	35	250	4	0.55	8
	2525HRP-4S25	4	25	17	25	35	150	4	0.48	8
	2525HRP-4M25	4	25	17	25	60	180	4	0.60	8
	2525HRP-4L25	4	25	17	25	130	250	4	0.81	8
	2526HRP-4S25	4	26	18	25	35	150	4	0.48	8
	2526HRP-4L25	4	26	18	25	130	250	4	0.85	8

Available inserts

RPET-ML RPMT-MF RPMT-MM RPMW

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPET	0803M0E-ML														●	●			E16
RPMT	0803M0E-MF									●					●	●			
	0803M0S-MM							●	●	●					●	●			
RPMW	0803M0E1							●	●	●					●	●			

Parts

Specification	Screw	Wrench
Ø17	FTNA0305	TW09S
Ø18~Ø26	FTNA0306	

Available inserts E16

FMRS3000 new

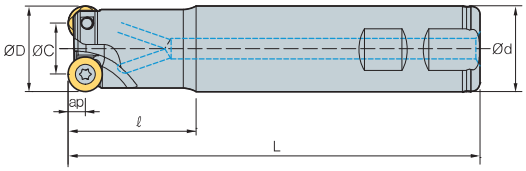


Fig. 1

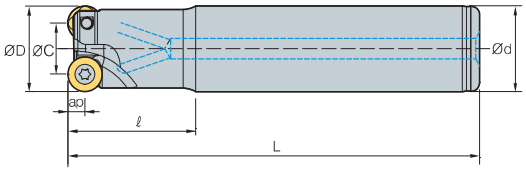


Fig. 2

• AR: -4°
• RR: -1°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Fig.	Insert size
FMRS	3025HRP-2M20	2	25	15	20	40	170	5	0.40	2	10
	3025HRP-2S25	2	25	15	25	40	120	5	0.39	1	10
	3025HRP-2M25	2	25	15	25	60	160	5	0.52	2	10
	3025HRP-2L25	2	25	15	25	130	250	5	0.80	2	10
	3026HRP-2L25	2	26	16	25	30	200	5	0.69	2	10
	3032HRP-3S32	3	32	22	32	40	125	5	0.68	1	10
	3032HRP-3L32	3	32	22	32	60	200	5	1.08	2	10
	3032HRP-4S32	4	32	22	32	40	125	5	0.66	1	10
	3032HRP-4L25	4	32	22	25	60	200	5	0.74	2	10
	3033HRP-4S32	4	33	23	32	40	125	5	0.67	1	10
	3033HRP-4M32	4	33	23	32	60	180	5	1.00	2	10
	3033HRP-4L32	4	33	23	32	180	300	5	1.64	2	10

Available inserts

RPCT-MA | RPET-ML | RPMT-MF | RPMT-MM | RPMW

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	10T3M0-MA																	●	E16
RPET	10T3M0E-ML														●	●			
RPMT	10T3M0E-MF									●					●	●			
	10T3M0S-MM							●	●	●	●				●	●			
RPMW	10T3M0E1							●	●	●					●	●			

Parts

Specification	Screw	Wrench
Ø25~Ø26 Ø32~Ø33	FTGA03507 FTGA03508	TW15S

Available inserts E16

FMRS4000 new

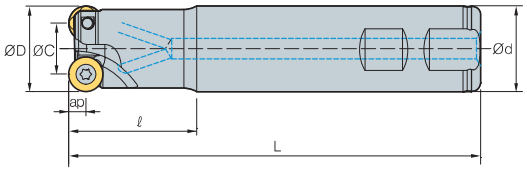


Fig. 1

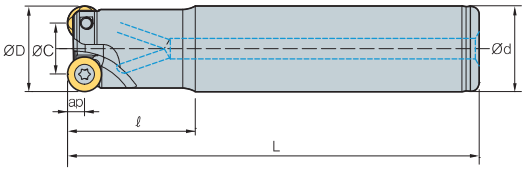


Fig. 2

• AR: -4°
• RR: -2°~ 0°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Fig.	Insert size
FMRS	4025HRP-2S25	2	25	13	25	60	160	6	0.46	1	12
	4026HRP-2L25	2	26	14	25	60	200	6	0.48	2	12
	4032HRP-2L25	2	32	20	25	40	190	6	0.68	2	12
	4032HRP-2S32	2	32	20	32	50	125	6	0.64	1	12
	4032HRP-2L32	2	32	20	32	50	250	6	1.40	2	12
	4032HRP-3S32	3	32	20	32	50	125	6	0.64	1	12
	4032HRP-3M32	3	32	20	32	60	160	6	0.85	2	12
	4033HRP-3M32	3	33	21	32	60	200	6	1.01	2	12
	4033HRP-3L32	3	33	21	32	60	300	6	1.67	2	12
	4040HRP-3S32	3	40	28	32	35	105	6	0.60	1	12
	4040HRP-3M32	3	40	28	32	50	160	6	0.96	2	12
	4040HRP-4S32	4	40	28	32	35	105	6	0.60	1	12
	4040HRP-4M32	4	40	28	32	35	150	6	0.87	2	12
	4040HRP-4L32	4	40	28	32	35	250	6	1.46	2	12
	4050HRP-4M32	4	50	38	32	50	150	6	1.10	2	12
	4050HRP-4M40	4	50	38	40	50	150	6	1.44	2	12
	4050HRP-4M42	4	50	38	42	50	150	6	1.55	2	12

Available inserts

		RPCT-MA	RPET-ML	RPMT-MF	RPMT-MM	RPMW
						

Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	1204M0-MA																	●	E16
RPET	1204M0E-ML														●	●			
RPMT	1204M0E-MF									●				●	●	●			
	1204M0S-MM							●	●	●	●			●	●	●			
RPMW	1204M0S1							●	●	●	●				●	●			
	1204M0S2														●	●			

Parts

Specification	Screw	Wrench
Ø25~Ø26	FTKA0408	TW15S
Ø32~Ø50	FTKA0410	

Available inserts E16

FMRS5000/6000 new

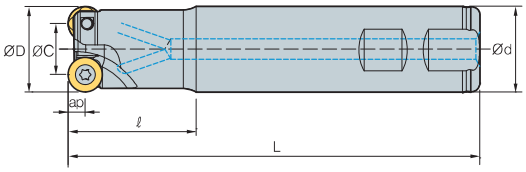


Fig. 1

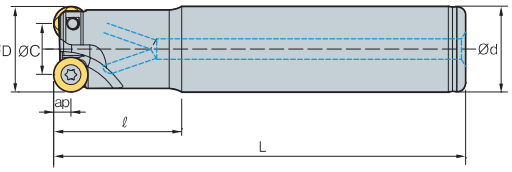


Fig. 2

• AR: -4°
• RR: 0°

(mm)

Designation			ØD	ØC	Ød	ℓ	L	ap	kg	Insert size	Fig.
FMRS	5040HRP-2M32	2	40	24	32	50	160	8	0.92	16	2
	5040HRP-2L32	2	40	24	32	50	250	8	1.45	16	2
	5050HRP-3M40	3	50	34	40	50	160	8	1.48	16	2
	5050HRP-3L40	3	50	34	40	50	300	8	2.86	16	2
	6050HRP-3S32	3	50	30	32	50	160	10	1.06	20	1
	6050HRP-3M32	3	50	30	32	50	200	10	1.30	20	2
	6050HRP-3S40	3	50	30	40	50	125	10	1.45	20	1
	6050HRP-3M40	3	50	30	40	50	200	10	1.85	20	2

Available inserts

RPCT-MA | RPET-ML | RPMT-MF | RPMT-MM | RPMW

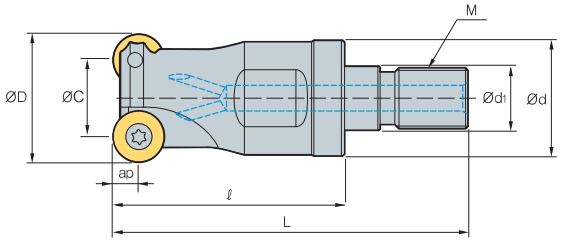
Type	Designation		Cermet		Coated												Uncoated		page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
5000 type	RPCT	1606M0-MA																	●	E16
	RPET	1606M0E-ML														●	●			
	RPMT	1606M0E-MF									●					●	●			
		1606M0S-MM							●	●	●	●				●	●			
	RPMW	1606M0S1							●	●	●					●	●			
5000 type	RPCT	2007M0-MA																	●	E16
	RPET	2007M0E-ML														●	●			
	RPMT	2007M0E-MF									●					●	●			
		2007M0S-MM							●	●	●	●				●	●			
	RPMW	2007M0S1							●	●	●					●	●			

Parts

Specification	Screw	Wrench
Ø40~Ø50 (5000 type)	FTGA0511-P	TW20-100
Ø50 (6000 type)	FTKA0615-P	TW25-100

Available inserts E16

FMRM2500 new



• AR: -4°
• RR: -4°~ 0°

(mm)

Designation			ØD	ØC	Ød	Ød1	ℓ	L	M	ap	kg	Insert size
FMRM	2517HRP-M08	2	17	9	14.5	8.5	25	42	M08	4	0.03	8
	2521HRP-M10	3	21	13	18	10.5	30	51	M10	4	0.06	8
	2526HRP-M12	4	26	18	23	12.5	35	59	M12	4	0.11	8
	2533HRP-M16	4	33	25	29	17	40	67	M16	4	0.22	8
	2540HRP-M16	5	40	32	29	17	40	67	M16	4	0.26	8

Available inserts

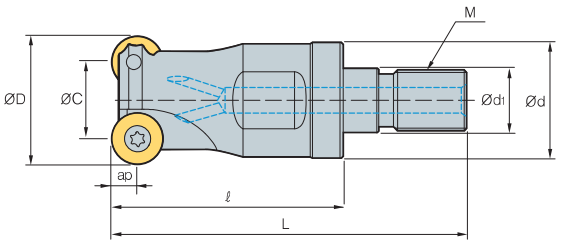
Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPET	0803M0E-ML														●	●			E16
RPMT	0803M0E-MF									●					●	●			
	0803M0S-MM							●	●	●					●	●			
RPMW	0803M0E1							●	●	●					●	●			

Parts

Specification	Screw	Wrench
Ø17 Ø21~Ø40	FTNA0305 FTNA0306	TW09S

Available inserts E16 Available adaptor E371~E372

FMRM3000 new



• AR: -4°
• RR: -1°~ 0°

(mm)

Designation			ØD	ØC	Ød	Ød1	ℓ	L	M	ap	kg	Insert size
FMRM	3026HRP-M12	3	26	16	23	12.5	35	59	M12	5	0.10	10
	3033HRP-M16	3	33	23	29	17	40	67	M16	5	0.20	10
	3035HRP-M16	3	35	25	29	17	40	67	M16	5	0.22	10
	3040HRP-M16	3	40	30	29	17	40	67	M16	5	0.25	10
	3042HRP-M16	3	42	32	29	17	40	67	M16	5	0.27	10

Available inserts

RPCT-MA | RPET-ML | RPMT-MF | RPMT-MM | RPMW

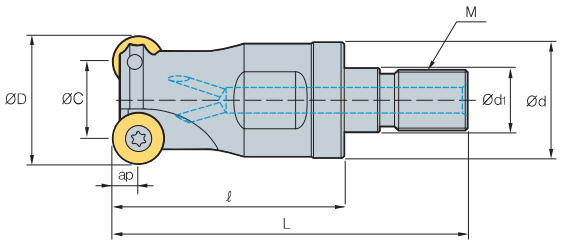
Designation		Cermet		Coated												Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	10T3M0-MA																	●	E16
RPET	10T3M0E-ML														●	●			
RPMT	10T3M0E-MF									●					●	●			
	10T3M0S-MM							●	●	●	●				●	●			
RPMW	10T3M0E1							●	●	●					●	●			

Parts

Specification	Screw	Wrench
Ø26	FTGA03507	TW15S
Ø33~Ø42	FTGA03508	

Available inserts E16 Available adaptor E371~E372

FMRM4000 new



• AR: -4°
• RR: 0°

(mm)

Designation			ØD	ØC	Ød	Ød1	ℓ	L	M	ap	kg	Insert size
FMRM	4026HRP-M12	2	26	14	23	12.5	35	59	M12	6	0.10	12
	4033HRP-M16	3	33	21	29	17	40	67	M16	6	0.21	12
	4035HRP-M16	3	35	23	29	17	40	67	M16	6	0.21	12
	4040HRP-M16	4	40	28	29	17	40	67	M16	6	0.24	12
	4042HRP-M16	4	42	30	29	17	40	67	M16	6	0.25	12

Available inserts

	RPCT-MA	RPET-ML	RPMT-MF	RPMT-MM	RPMW
					

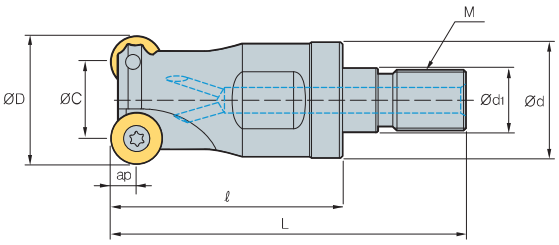
Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	1204M0-MA																	●	E16
RPET	1204M0E-ML														●	●			
RPMT	1204M0E-MF									●				●	●	●			
	1204M0S-MM							●	●	●	●			●	●	●			
RPMW	1204M0S1							●	●	●	●				●	●			
	1204M0S2														●	●			

Parts

Specification	Screw	Wrench
Ø26	FTKA0408	TW15S
Ø33~Ø42	FTKA0410	

Available inserts E16 Available adaptor E371~E372

FMRM5000 new



• AR: -4°
• RR: 0°

(mm)

Designation			ØD	ØC	Ød	Ød1	ℓ	L	M	ap	kg	Insert size
FMRM	5040HRP-M16	2	40	24	29	17	40	67	M16	8	0.21	16
	5042HRP-M16	2	42	26	29	17	40	67	M16	8	0.23	16

Available inserts

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
RPCT	1606M0-MA																	●	E16
RPET	1606M0E-ML														●	●			
RPMT	1606M0E-MF									●					●	●			
	1606M0S-MM							●	●	●	●				●	●			
RPMW	1606M0S1							●	●	●					●	●			

Parts

Specification	Screw	Wrench	Wrench
Ø40~Ø42	FTGA0511-P	-	TW20-100

Available inserts E16 Available adaptor E371~E372

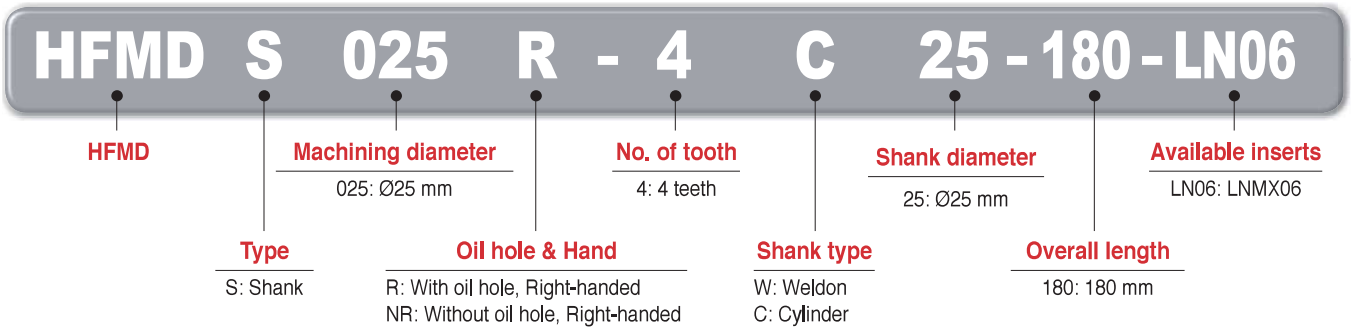
High Feed Milling Tool with 4 Corners for Small Diameter

HFMD new

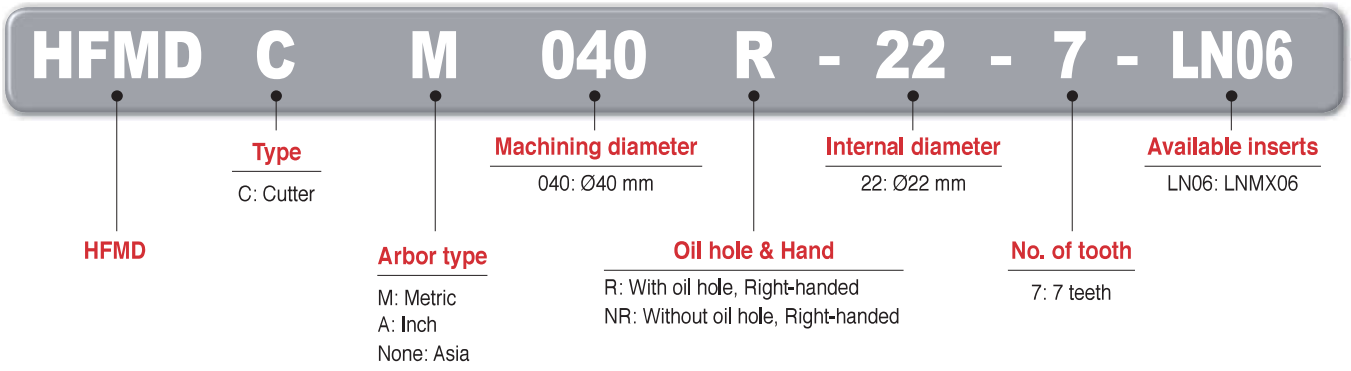
- Economical 4-corner double sided insert
- Increased productivity due to thinner and elongated shape of the insert which makes fine pitch available
- Insert designed for low cutting resistance with high rake angle and helix angle which reduces cutting load
- Inhibiting chipping and breakage due to concave clamping system and stronger screw

Code system

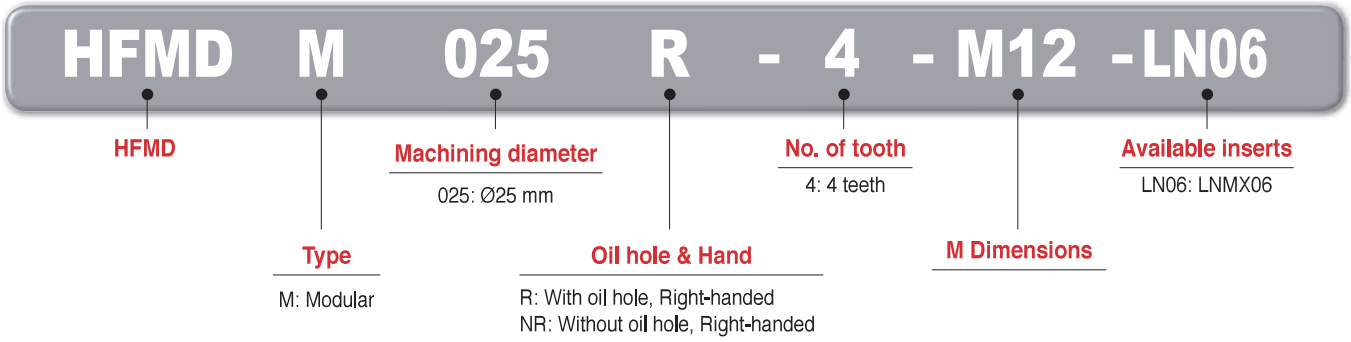
• Shank type



• Cutter type



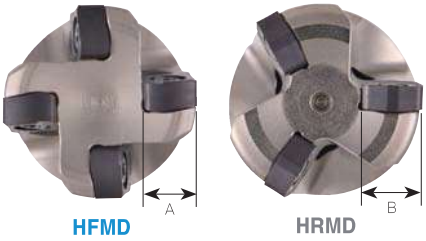
• Modular type



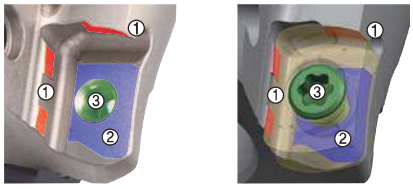
Features

- **Highly efficient insert due to fine pitch**
  - Able to use fine pitch at the same machining diameter with typical types of milling cutters due to smaller inscribed circle (A < B)

※ Tool diameter: Ø25 mm

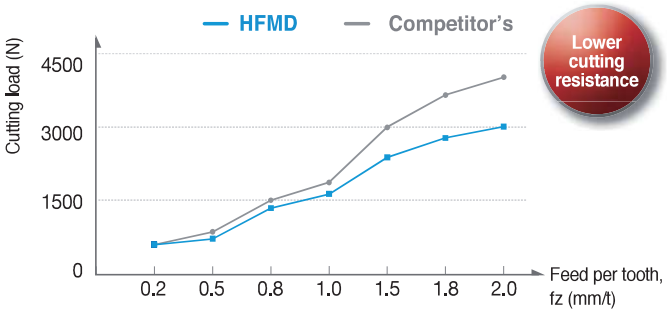


- **Insert with strong clamping force**
  - ① Concave clamping system ② Wider bottom face clamping area ③ Applied a bigger size of screw



- **Insert designed for low cutting resistance**
  - High rake angle and helix angle minimize cutting resistance compared to competitors' products and positive type of inserts

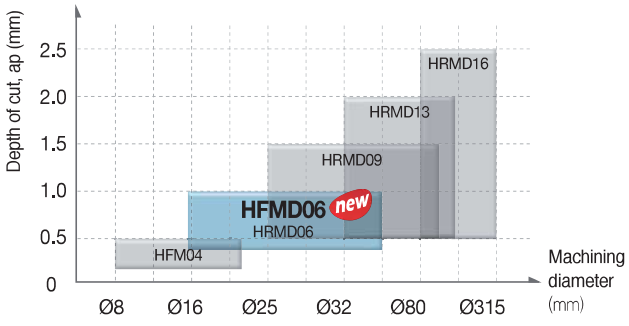
- **Economical 4-corner insert**
  - Can use 4 corners with 1 insert by utilizing front/back face; High feed due to finer pitch

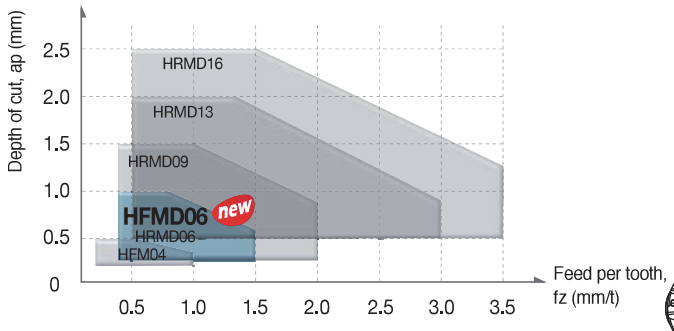


Features of chip breaker

Insert		Cutting-edge	Uses	Features
ML			For hard-to-cut materials For Ti & inconel	Ensures superior machining quality by applying a low cutting resistance chip breaker and high-strength cutting edge design suitable for machining hard-to-cut materials
MF			For light cutting	Suitable for light cutting with a low cutting resistance chip breaker design
MM			For multi-purpose	Available for most cutting area with its exclusive design suitable for general high feed machining

Application area





Recommended cutting condition

※ Recommended chip breaker: ●1st ○2nd

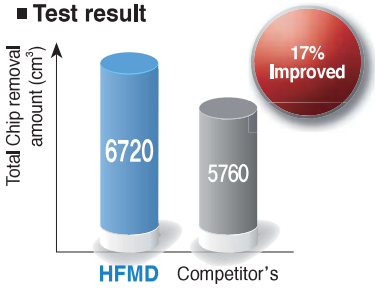
Workpiece					HB (HRC)	Grade	Cutting conditions				Available chip breaker		
ISO	Workpiece materials	KS	AISI	ISO (DIN)*			vc (m/min)	fz (mm/t)	ap (mm)	ae (mm)	ML	MF	MM
P	Mild steel	SM20C	1020	C25 (CK22)*	120~180	PC5400 (PC5300)	100~220	0.3~1.2	0.2~1.0	0.7D~0.1D	○	●	-
	Carbon steel	SM45C	1042 1045	C45/C45E4 (C45/CK45)*	200	PC5400 (PC5300)	100~200	0.3~1.2	0.2~1.0	0.7D~0.1D	○	●	-
	Alloy steel	SCM440	4140	41CrMo4	270(28)	PC3700 (PC5300)	100~200	0.3~1.2	0.2~1.0	0.7D~0.1D	○	●	-
	Pre-hardened steel	KP4M	P20 (Improved)	- (1,2738)*	300(32)	PC3700 (PC5300)	100~180	0.3~1.0	0.2~0.8	0.7D~0.1D	-	●	○
		NIMAX	P21 (Improved)	-	370(40)	PC3700 (PC5300)	100~180	0.3~1.0	0.2~0.8	0.7D~0.1D	-	●	○
		CENA1	P21 (Improved)	-	370(40)	PC3700 (PC5300)	100~180	0.3~1.0	0.2~0.8	0.7D~0.1D	-	●	○
		NAK80	P21 (Improved)	-	400(43)	PC3700 (PC5300)	100~180	0.3~1.0	0.2~0.8	0.7D~0.1D	-	●	○
		STAVAX	420	- (X30Cr13)*	510(52)	PC3700 (PC2510)	80~150	0.3~0.7	0.2~0.8	0.7D~0.1D	-	●	○
	Alloy tool steel	STD11 STD61	D2 H13	- (X165CrVMo12-1 X40CrMoV5-1)*	- (40~50)	PC2510 (PC3700)	80~130	0.3~0.65	0.2~0.6	0.7D~0.1D	-	○	●
M	Stainless steel	STS316	316	- (X5CrNiMo17-12-2)*	Under 270	PC5400	90~180	0.3~0.8	0.2~0.8	0.7D~0.1D	●	○	-
K	Grey cast iron, Ductile cast iron	GCD450	65-45-12	450-10 (GGG40.3)*	Tensile Strength Over 450Mpa	PC5300 (PC5400)	130~220	0.3~0.9	0.2~1.0	0.7D~0.1D	-	●	○
S	HRSA Fe series	Incoloy901	N09901	- (WS 2.4662)*	- (25~35)	PC5300	30~100	0.3~0.6	0.2~0.6	0.4D~0.7D	●	○	-
	HRSA Ni or Co series	Inconel718	N07718	- (WS 2.4668)*	- (35~45)	PC5300	30~45	0.3~0.7	0.2~0.6	0.4D~0.7D	○	●	-
	Titanium	Ti-6Al-4V	R56400	- (TiAl6V4)*	- (40~45)	PC5300	30~50	0.3~1.0	0.2~0.6	0.7D~0.1D	●	○	-

Performance evaluation

Alloy steel (SCM440, HB250)

- **Workpiece** Steel rectangular tube (300×200×100)
- **Cutting conditions** vc (m/min) = 180, fz (mm/t) = 1.0, ap (mm) = 0.8, ae (mm) = 20, dry
- **Tools** **Insert** LNMX060310R-MF
  Holder HFMDS032R-5C32-200-LN06 (Ø32, 5T)

■ **Test result**

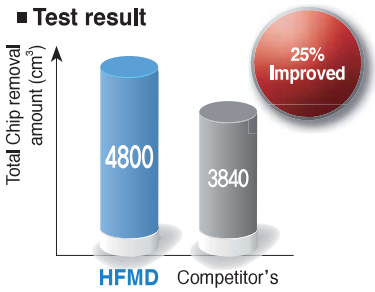


- Chip removal rate Q (cm^3/min): 143.2
- Cutting time (min): 46.9

Pre-hardened steel (KP4M, HRC30)

- **Workpiece** Steel rectangular tube (300×200×100)
- **Cutting conditions** vc (m/min) = 160, fz (mm/t) = 1.2, ap (mm) = 0.8, ae (mm) = 20, dry
- **Tools** **Insert** LNMX060310R-MF
  Holder HFMDS032R-5C32-200-LN06 (Ø32, 5T)

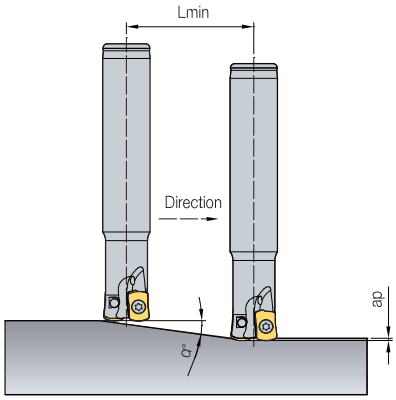
■ **Test result**



- Chip removal rate Q (cm^3/min): 152.8
- Cutting time (min): 31.4

Ramping and helical cutting

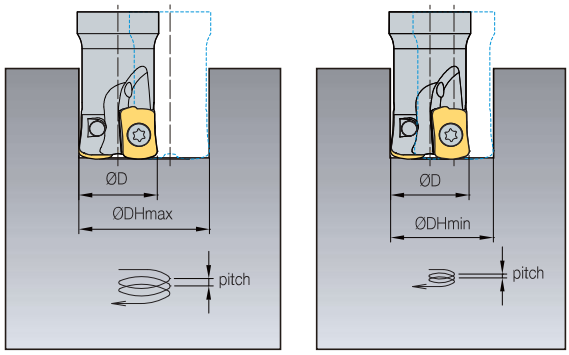
Ramping



$$Lmin = \frac{ap}{\tan \alpha^{\circ}} \text{ (mm)}$$

※ Lmin: Min. inclination cutting length
α°: Max. ramping angle
ap: Depth of cut

Helical cutting



• ØD = Tool dia. (mm)
• Ød = Tool path (mm) = ØDH Min, Max - ØD

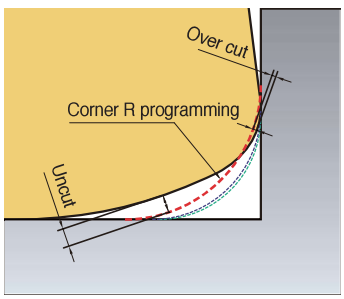
(mm)

Designation	Tool dia. ØD	Depth of cut ap	Ramping		Blind hole helical cutting				Thru hole helical cutting	
			Max ramping angle α (°)	Lmin	Min diameter ØDH Min	Max pitch dmax	Max diameter ØDH Max	Max pitch dmax	Min diameter ØDH Min	Max pitch dmax
HFMDS016	16	0.7	3.0	13	30	0.7	22	0.7	21	0.7
HFMDS017	17	1.0	2.3	25	32	1.0	24	1.0	22	1.0
HFMDS018	18	1.0	2.1	27	34	1.0	26	1.0	24	1.0
HFMDS019	19	1.0	1.9	30	36	1.0	28	1.0	26	1.0
HFMDS020	20	1.0	1.5	37	38	1.0	30	1.0	28	1.0
HFMDS021	21	1.0	1.5	39	40	1.0	32	1.0	30	1.0
HFMDS025	25	1.0	1.4	40	48	1.0	40	1.0	38	1.0
HFMDS026	26	1.0	1.4	42	50	1.0	42	1.0	40	1.0
HFMDS030	30	1.0	1.1	51	58	1.0	50	1.0	48	1.0
HFMDS032	32	1.0	1.0	55	62	1.0	54	1.0	52	1.0
HFMDS033	33	1.0	1.0	57	64	1.0	56	1.0	54	1.0
HFMDS035	35	1.0	0.9	61	68	1.0	60	1.0	58	1.0
HFMDS040	40	1.0	0.8	71	78	1.0	70	1.0	68	1.0
HFMDC042	42	1.0	0.8	76	82	1.0	74	1.0	72	1.0
HFMDC050	50	1.0	0.6	92	98	1.0	90	1.0	88	1.0
HFMDC052	52	1.0	0.6	96	102	1.0	94	1.0	92	1.0
HFMDC063	63	1.0	0.5	119	124	1.0	116	1.0	114	1.0
HFMDC066	66	1.0	0.5	126	130	1.0	122	1.0	120	1.0

• Adjust feed to under 70% of recommended cutting condition when ramping & helical cutting
• In helical ramping, max. cutting depth per 1 helical revolution of cutter should not exceed max. cutting depth as per insert size
• In ramping, max. cutting depth per 1 ramping process of cutter should not exceed max. depth of cut as per used insert size

Corner R programming

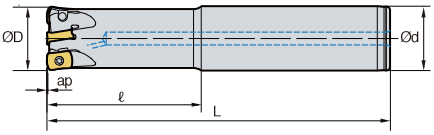
(mm)

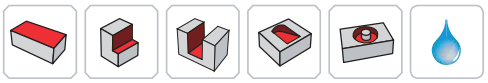


Insert	Corner R programming	Cutting conditions		Over Cut	Uncut
		Nose R	Max. ap		
LNMX060310R-ML LNMX060310R-MF LNMX060310R-MM	R1.5	1.0	1.0	0	0.41
	R1.6 (Standard)			0	0.38
	R2.0			0.057	0.27

• During usage of CNC program, over cut & uncut would be occurred on the corner processing site if entering the correct program corner R value for each insert
• To prevent overcut, you will need to complete a CNC program considering the above overcut

HFMDS-LN06 new





• AR: -9°
• RR: 10°~ 15°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HFMDS	016R-2C16-100-LN06	2	16	16	30	100	0.7	0.13
	016R-2C16-150-LN06	2	16	16	50	150	0.7	0.19
	017R-2C16-100-LN06	2	17	16	30	100	1.0	0.13
	017R-2C16-150-LN06	2	17	16	40	150	1.0	0.20
	017R-2C16-200-LN06	2	17	16	40	200	1.0	0.27
	018R-2C16-100-LN06	2	18	16	40	100	1.0	0.14
	018R-2C16-160-LN06	2	18	16	40	160	1.0	0.18
	018R-2C16-200-LN06	2	18	16	40	200	1.0	0.28
	019R-2C16-100-LN06	2	19	16	40	100	1.0	0.15
	019R-2C16-160-LN06	2	19	16	40	160	1.0	0.19
	019R-2C16-200-LN06	2	19	16	40	200	1.0	0.29
	020R-3C20-100-LN06	3	20	20	40	100	1.0	0.20
	020R-3C20-130-LN06	3	20	20	50	130	1.0	0.26
	020R-3C20-160-LN06	3	20	20	80	160	1.0	0.31
	020R-3C20-200-LN06	3	20	20	120	200	1.0	0.40

Available inserts

		LNMX-ML	LNMX-MF	LNMX-MM
				

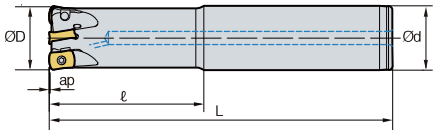
Designation		Coated				page
		PC2510	PC3700	PC5300	PC5400	
LNMX	060310R-ML			●	●	E11
	060310R-MF	●	●	●	●	
	060310R-MM	●	●	●	●	

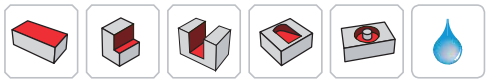
Parts

Specification	Screw	Wrench
Ø16~Ø40	FTNA0306	TW09S

Available inserts E11

HFMDS-LN06 new





• AR: -9°
• RR: 10°~ 15°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HFMDS	021R-3C20-100-LN06	3	21	20	30	100	1.0	0.21
	021R-3C20-130-LN06	3	21	20	40	130	1.0	0.27
	021R-3C20-160-LN06	3	21	20	40	160	1.0	0.34
	021R-3C20-200-LN06	3	21	20	40	200	1.0	0.42
	025R-4C25-100-LN06	4	25	25	40	100	1.0	0.33
	025R-4C25-140-LN06	4	25	25	60	140	1.0	0.46
	025R-4C25-180-LN06	4	25	25	100	180	1.0	0.58
	025R-4C25-250-LN06	4	25	25	150	250	1.0	0.67
	026R-4C25-100-LN06	4	26	25	30	100	1.0	0.34
	026R-4C25-140-LN06	4	26	25	40	140	1.0	0.48
	026R-4C25-180-LN06	4	26	25	40	180	1.0	0.63
	026R-4C25-250-LN06	4	26	25	40	250	1.0	0.72
	032R-5C32-150-LN06	5	32	32	70	150	1.0	0.82
	032R-5C32-200-LN06	5	32	32	120	200	1.0	1.08
	032R-5C32-250-LN06	5	32	32	150	250	1.0	1.20
	033R-5C32-150-LN06	5	33	32	40	150	1.0	0.82
	033R-5C32-200-LN06	5	33	32	40	200	1.0	1.08
	033R-5C32-250-LN06	5	33	32	40	250	1.0	1.20
	035R-5C32-150-LN06	5	35	32	40	150	1.0	0.87
	035R-5C32-200-LN06	5	35	32	40	200	1.0	1.13
	035R-5C32-250-LN06	5	35	32	40	250	1.0	1.25
	040R-6C32-150-LN06	6	40	32	40	150	1.0	0.97
	040R-6C32-200-LN06	6	40	32	40	200	1.0	1.28
	040R-6C32-250-LN06	6	40	32	40	250	1.0	1.38

Available inserts

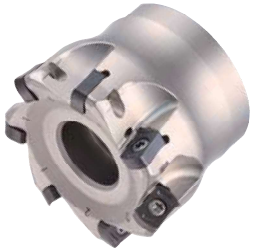
Designation		Coated				page
		PC2510	PC3700	PC5300	PC5400	
LNMX	060310R-ML			●	●	E11
	060310R-MF	●	●	●	●	
	060310R-MM	●	●	●	●	

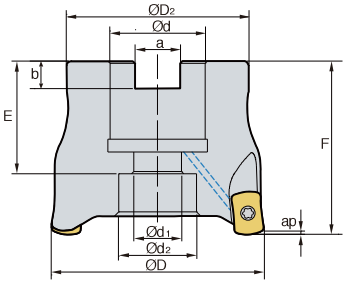
Parts

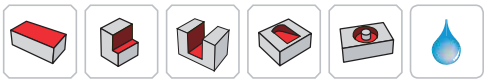
Specification	Screw	Wrench
Ø16~Ø40	FTNA0306	TW09S

Available inserts E11

HFMDCM-LN06 new







• AR: -9°
• RR: 10°~ 12°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	a	b	E	F	ap	kg
HFMDCM	032R-16-5-LN06	5	32	30	16	9	13.5	8.4	5.6	19	40	1.0	0.12
	040R-16-6-LN06	6	40	34	16	9	14	8.4	5.6	19	40	1.0	0.21
	050R-22-6-LN06	6	50	42	22	11	18	10.4	6.3	21	40	1.0	0.32
	050R-22-7-LN06	7	50	42	22	11	18	10.4	6.3	21	40	1.0	0.32
	050R-22-8-LN06	8	50	42	22	11	18	10.4	6.3	21	40	1.0	0.32
	052R-22-7-LN06	7	52	42	22	11	18	10.4	6.3	21	40	1.0	0.34
	052R-22-8-LN06	8	52	42	22	11	18	10.4	6.3	21	40	1.0	0.34
	063R-22-8-LN06	8	63	49	22	11	18	10.4	6.3	21	40	1.0	0.53
	063R-22-9-LN06	9	63	49	22	11	18	10.4	6.3	21	40	1.0	0.53
	066R-22-8-LN06	8	66	49	22	11	18	10.4	6.3	21	40	1.0	0.57
	066R-22-9-LN06	9	66	49	22	11	18	10.4	6.3	21	40	1.0	0.57

Available inserts

	LNMX-ML	LNMX-MF	LNMX-MM
			

Designation		Coated				page
		PC2510	PC3700	PC5300	PC5400	
LNMX	060310R-ML			●	●	E11
	060310R-MF	●	●	●	●	
	060310R-MM	●	●	●	●	

Available arbors

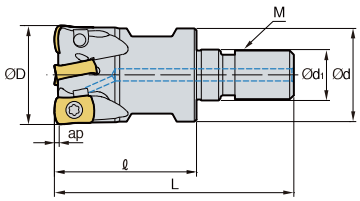
Designation		Available arbors
HFMDCM	032R-16-□-LN06	BT□□-FMC16-□□
	040R-16-□-LN06	
	050R-22-□-LN06	BT□□-FMC22-□□
	052R-22-□-LN06	
	063R-22-□-LN06	
	066R-22-□-LN06	

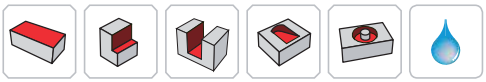
Parts

Specification	Screw	Wrench
Ø32~Ø66	FTNA0306	TW09S

Available inserts E11 Available arbors and bolt E400~E402

HFMDM-LN06 new





• AR: -9°
• RR: 10°~ 15°

(mm)

Designation			ØD	Ød	Ød1	ℓ	L	M	ap	kg
HFMDM	016R-2-M08-LN06	2	16	14.5	8.5	25	42	M08	0.7	0.03
	017R-2-M08-LN06	2	17	14.5	8.5	25	42	M08	1.0	0.03
	018R-2-M08-LN06	2	18	14.5	8.5	25	42	M08	1.0	0.04
	019R-2-M08-LN06	2	19	14.5	8.5	25	42	M08	1.0	0.05
	020R-3-M10-LN06	3	20	18	10.5	30	51	M10	1.0	0.06
	021R-3-M10-LN06	3	21	18	10.5	30	51	M10	1.0	0.07
	025R-4-M12-LN06	4	25	23	12.5	35	59	M12	1.0	0.10
	026R-4-M12-LN06	4	26	23	12.5	35	59	M12	1.0	0.10
	032R-5-M16-LN06	5	32	29	17	40	67	M16	1.0	0.20
	033R-5-M16-LN06	5	33	29	17	40	67	M16	1.0	0.20
	035R-5-M16-LN06	5	35	29	17	40	67	M16	1.0	0.21
	040R-6-M16-LN06	6	40	29	17	40	67	M16	1.0	0.24
	042R-6-M16-LN06	6	42	29	17	40	67	M16	1.0	0.25

Available inserts

	LNMX-ML	LNMX-MF	LNMX-MM
			

Designation		Coated				page
		PC2510	PC3700	PC5300	PC5400	
LNMX	060310R-ML			●	●	E11
	060310R-MF	●	●	●	●	
	060310R-MM	●	●	●	●	

Parts

Specification	Screw	Wrench
Ø16~Ø42	FTNA0306	TW09S

Available inserts E11 Available adaptor E371~E372

Stable machining, high efficiency milling tools for small diameter machining

HFM new

- Increase productivity through improved insert shape and size, high feed per tooth, and many cutting-edges, for small diameter machining
- Stable tool life through the combination of the reinforced toughness on corner and suitable grades of high hardness in the area of high speed and high hardness

Code system

• Shank type

HFM	S	1	010	H	R	- 2	L	10
High Feed Mill	Tool type	Inscribed circle of insert	Tool dia.	Coolant type	Hand	No. of tooth	Shank length	Shank Dia.
	S: Shank	1: 04 type insert	010: Ø10	No code: None H: Thru-hole	R: Right L: Left	2: 2 teeth	S: Standard type M: Middle type L: Long type	10: Ø10

• Modular type

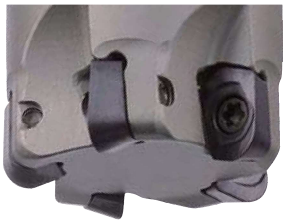
HFM	M	1	010	H	R	- M06
High Feed Mill	Tool type	Inscribed circle of insert	Tool dia.	Coolant type	Hand	M Dimensions
	M: Modular	1: 04 type insert	010: Ø10	No code: None H: Thru-hole	R: Right L: Left	

• Modular adapter

MAT -	M10 -	010 -	S20	S	-	C -	170
Modular Adaptor	M Dimensions	Neck length	Shank Dia.	Neck type		Adaptor material	Adaptor length
	M10	010: 10 mm	S20: Ø20	T: Taper S: Straight		Unmarked: Steel C: Carbide	170: 170 mm

Features

- Apply helix cutting-edge on insert, low cutting load and reinforce toughness on corner
- Increased rigidity with double relief angle (11, 13), prevent interference with high feed
- To apply the negative axial rake angle when set up the holder, increased chipping resistance
- Tool life is increased with suitable C/B and grade for every material



• Holder setup
- To set up the negative axial rake angle, increased chipping resistance

• No. of tooth
- Increased tool life with increased flutes
- HRM(D) Ø20 (2 flutes) ➔ HFM Ø20 (5 flutes)

• Relief angle
- 11, 13 double relief angle increase rigidity and prevent interference

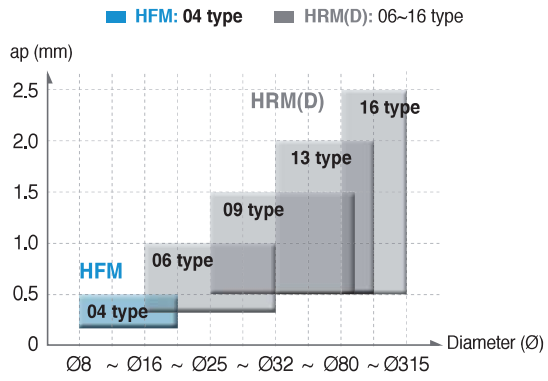
• Major cutting-edge
- Improved sharpness of principle edge
- Improved toughness of corner edge

Features of chip breaker

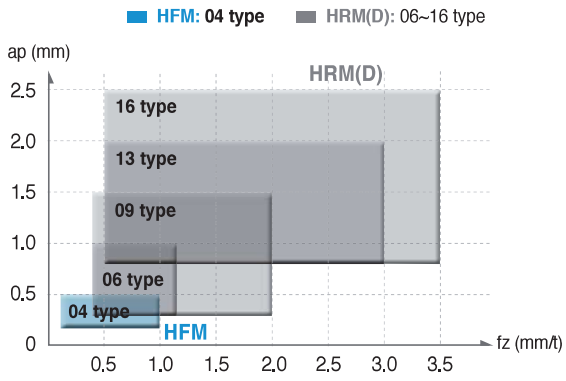
Insert		Cutting-edge	Uses	Features
MF			Fine finishing Titanium & Inconel machining	Low cutting resistance C/B, suitable for light cutting
None C/B			Super hard material machining	High toughness shape, suitable for hard die steel cutting

Application area

Application area (ap & Diameter)



Application area (ap & fz)



Recommended cutting condition

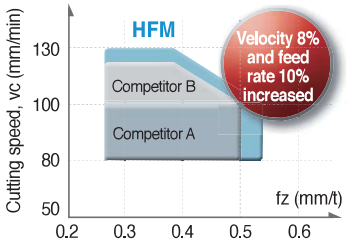
(●: 1st, ○: 2nd)

Workpiece			KOR (KS)	USA (AISI)	GER (DIN)	HB (HRC)	Grades	Cutting conditions vc (m/min)	fz (mm/t)	ap (mm)	ae (mm)	Chip breaker MF	Chip breaker None C/B
P	Mild steel		SM20C	1020	C22	120~180	PC5400 (PC5300)	100~220	0.5~1.0	~0.5	0.7D~0.1D	●	-
	Carbon steel		SM45C	1045	C45	200	PC5400 (PC5300)	100~200	0.5~1.0	~0.5	0.7D~0.1D	●	-
	Alloy steel		SCM440	4140	41CrMo4	270(28)	PC5300	100~200	0.5~1.0	~0.5	0.7D~0.1D	●	-
	Pre-hardened steel		KP4M	P20 (Improved)	1.2738 (Improved)	300(32)	PC5300 new (PC2510)	100~180	0.5~0.9	~0.4	0.7D~0.1D	●	○
			NIMAX	P21 (Improved)	-	370(40)	PC5300 new (PC2510)	100~180	0.5~0.9	~0.4	0.7D~0.1D	●	○
			CENA1	P21 (Improved)	-	370(40)	PC5300 new (PC2510)	100~180	0.5~0.9	~0.4	0.7D~0.1D	●	○
			NAK80	P21 (Improved)	-	400(43)	PC5300	100~160	0.5~0.7	~0.4	0.7D~0.1D	○	-
								100~180	0.5~0.9	~0.4	0.7D~0.1D	-	●
			STAVAX	420	X30Cr13	510(52)	PC2510 new (PC5300)	80~150	0.3~0.6	~0.4	0.7D~0.1D	●	-
	Alloy tool steel		STD11 STD61	D2 H13	X155CrVMo12-1 X40CrMoV5-1	- (40~50)	PC2510 new (PC2505) new	80~130	0.3~0.55	~0.3	0.7D~0.1D	-	●
			STD11 (Cold forging)	D2	X155CrVMo12-1	630(60)	PC2505 new	30~75	0.3~0.5	~0.2	0.7D~0.1D	-	●
M	Stainless steel		STS316	316	X5CrNiMo17-12-2	Under 270	PC5400 (PC5300)	70~150	0.5~0.7	~0.5	0.7D~0.1D	●	-
K	Gray cast iron, Ductile cast iron		GCD450	65-45-12	GGG40.3	Tensile Strength Over 450Mpa	PC5300	130~220	0.6~0.8	~0.5	0.7D~0.1D	●	-
S	HRSA	Fe series	Incoloy901	N09901	- (WS 2.4662)	- (25~35)	PC5300 (PC5400)	30~100	0.3~0.5	~0.3	0.4D~0.7D	●	○
		Ni or Co series	Inconel718	N07718	NiCr19FeNbMo (WS 2.4668)	- (35~45)	PC5300 (PC5400)	20~50	0.3~0.6	~0.3	0.4D~0.7D	●	○
	Titanium		Ti-6Al-4V	R56400	TiAl6V4	- (40~45)	PC5300	30~50	0.4~1.0	~0.3	0.7D~0.1D	●	-

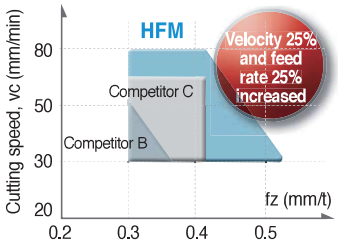
Performance evaluation

High speed machining

- **Workpiece**
  STD11 (HRC40~45)
- **Insert**
  LPM(E)W0402□□R
- **Recommended grade**
  PC2505 (1st), PC2510 (2nd)

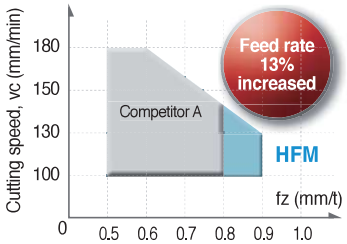


- **Workpiece**
  STD11(Over HRC60)
- **Insert**
  LPM(E)W0402□□R
- **Recommended grade**
  PC2505 (1st), PC2510 (2nd)

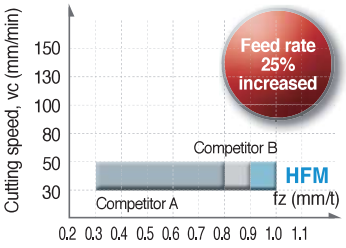


High feed machining

- **Workpiece**
  KP4M (HRC32),
  NAK80 (HRC43)
- **Insert**
  LPMT0402□□R-MF
- **Recommended grade**
  PC5300 (1st), PC2510 (2nd)

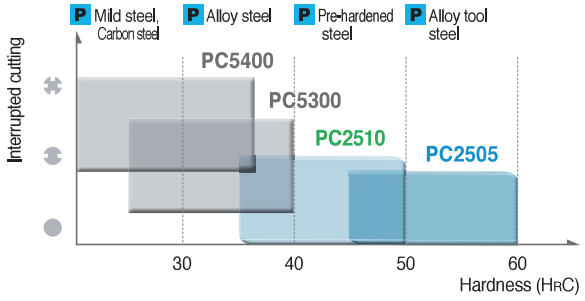


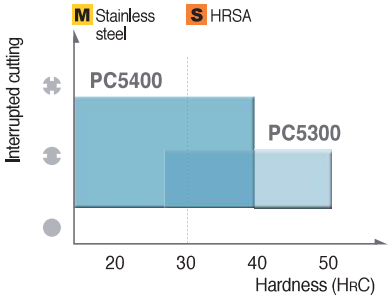
- **Workpiece**
  Ti-6AL-4V (HRC40~45)
- **Insert**
  LPMT0402□□R-MF
- **Recommended grade**
  PC5300 (1st), PC5400 (2nd)



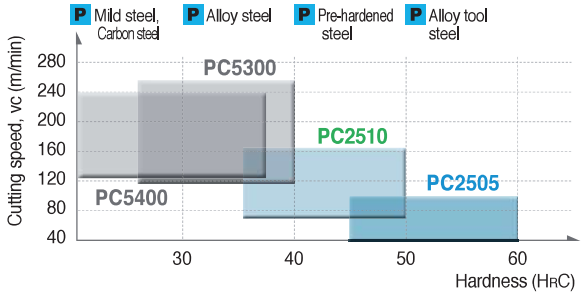
High hardness machining

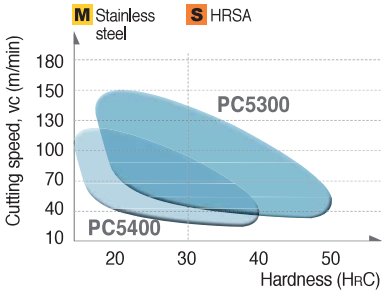
• Recommended grades according to interruption





• Recommended grades according to velocity

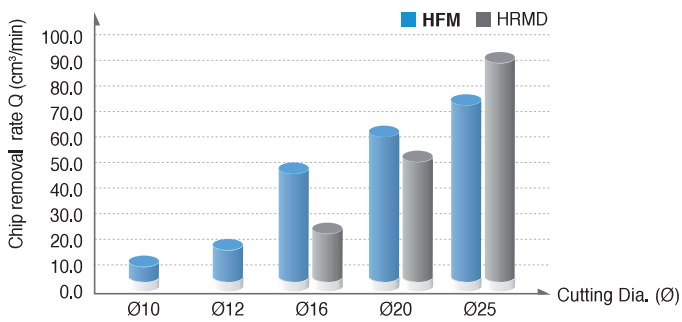




Effective machining

- **Machining center**
  - BT40 and under, HFM recommended
  - BT50 and above, HRM(D) recommended

- **Chip removal rate Q (cm³/min)**
  - Ø8~Ø20, HFM recommended
  - Ø20 and above, HRM(D) recommended

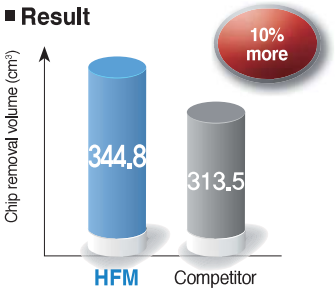


Performance evaluation

Carbon steel [C45 (DIN)/1045 (AISI)/SM45C (KS), HB200]

- **Workpiece** Mold
- **Cutting conditions** vc (m/min) = 150, fz (mm/t) = 0.6
  ap (mm) = 0.4, ae (mm) = 5
  dry
- **Tools** **Insert** LPMT040210R-MF (PC5300)
  Holder HFMS1010HR-2S10

Result

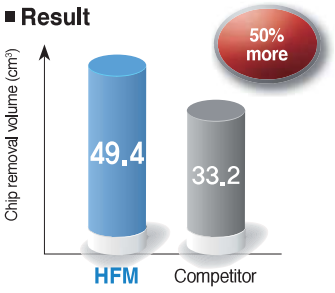


- Chip removal rate Q (cm^3/min): 11.5
- Cutting time (min): 30

Pre-hardened steel [P21 (Improved) (AISI)/NAK80 (KS), HRC40~41]

- **Workpiece** Mold
- **Cutting conditions** vc (m/min) = 100, fz (mm/t) = 1.26
  ap (mm) = 0.3, ae (mm) = 10
  dry
- **Tools** **Insert** LPMT040210R-MF (PC5300)
  Holder HFMS1016HR-4S16

Result

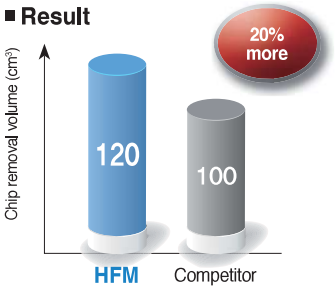


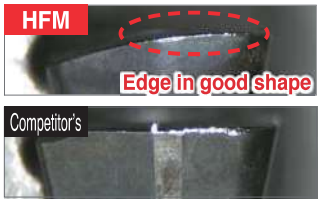
- Chip removal rate Q (cm^3/min): 15
- Cutting time (min): 3.29

Alloy tool steel [X155CrVMo12-1 (DIN)/D2 (AISI)/STD11 (KS), HRC40~45]

- **Workpiece** Mold
- **Cutting conditions** vc (m/min) = 80, fz (mm/t) = 0.5
  ap (mm) = 0.3, ae (mm) = 10
  dry
- **Tools** **Insert** LPMW040210R (PC2510)
  Holder HFMS1016HR-4S16

Result



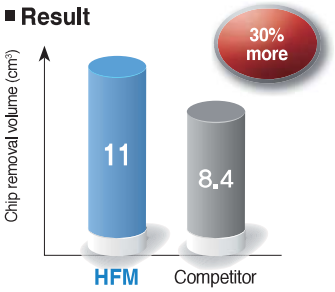


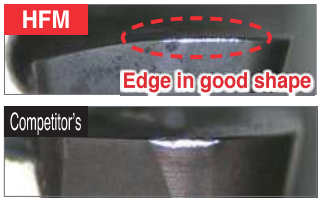
- Chip removal rate Q (cm^3/min): 4.8
- Cutting time (min): 25

Alloy tool steel [X155CrVMo12-1 (DIN)/D2 (AISI)/STD11 (KS), HRC60]

- **Workpiece** Mold
- **Cutting conditions** vc (m/min) = 75, fz (mm/t) = 0.4
  ap (mm) = 0.15, ae (mm) = 5
  dry
- **Tools** **Insert** LPMW040210R (PC2505)
  Holder HFMS1010HR-2S10

Result



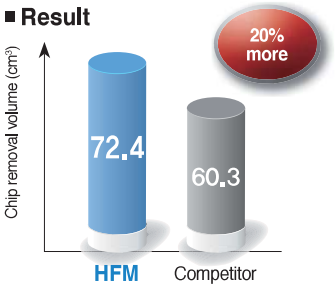


- Chip removal rate Q (cm^3/min): 1.4
- Cutting time (min): 7.85

HRSA [TiAl6V4 (DIN)/R56400 (AISI)/Ti-6Al-4V (KS), HRC48]

- **Workpiece** Aviation parts
- **Cutting conditions** vc (m/min) = 50, fz (mm/t) = 1.2
  ap (mm) = 0.3, ae (mm) = 10
  wet
- **Tools** **Insert** LPMT040210R-MF (PC5300)
  Holder HFMS1016HR-4S16

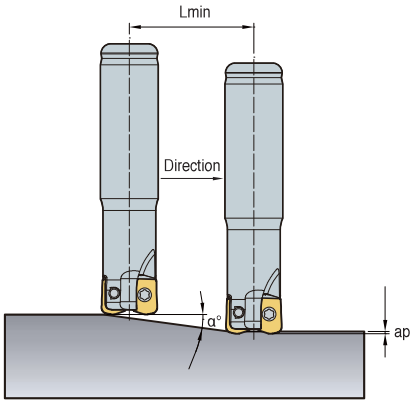
Result



- Chip removal rate Q (cm^3/min): 7.2
- Cutting time (min): 10.05

Ramping and helical cutting

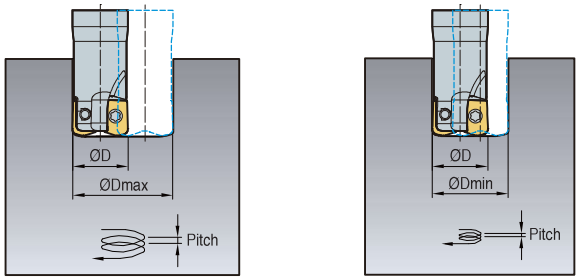
Ramping



$$Lmin = \frac{ap}{\tan \alpha^\circ} \text{ (mm)}$$

※ Lmin: Min. inclination cutting length
α°: Max. ramping angle
ap: Depth of cut

Helical cutting



- ØD = Tool dia. (mm)
- Ød = Tool path (mm) = ØDH Min, Max - ØD
- ØDH Min (Min diameter, mm) = ØD × 2 - 5.4
- ØDH Max (Max diameter, mm) = ØD×2 - 2

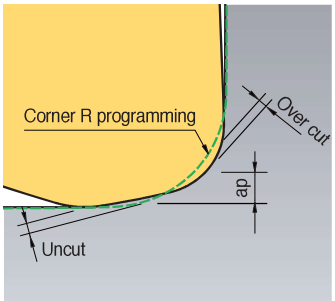
(mm)

Designation	Tool dia. ØD	Depth of cut ap	Ramping		Helical cutting		
			Max ramping angle α (°)	Lmin	Max diameter ØDH Max	Min diameter ØDH Min	Max pitch dmax
HFMS1010HR	10	0.4~0.5	3.5	7	18	15	0.4
HFMS1011HR	11	0.4~0.5	3.1	8	20	17	0.4
HFMS1012HR	12	0.4~0.5	2.7	9	22	19	0.4
HFMS1013HR	13	0.4~0.5	2.4	10	24	21	0.4
HFMS1014HR	14	0.4~0.5	2.2	11	26	23	0.4
HFMS1015HR	15	0.4~0.5	2.0	12	28	25	0.4
HFMS1016HR	16	0.4~0.5	1.8	13	30	27	0.4
HFMS1017HR	17	0.4~0.5	1.7	14	32	29	0.4
HFMS1018HR	18	0.4~0.5	1.6	15	34	31	0.4
HFMS1019HR	19	0.4~0.5	1.5	16	36	33	0.4
HFMS1020HR	20	0.4~0.5	1.4	17	38	35	0.4
HFMS1021HR	21	0.4~0.5	1.3	18	40	37	0.4
HFMM1025HR	25	0.4~0.5	1.1	22	48	45	0.4
HFMM1026HR	26	0.4~0.5	1.0	23	50	47	0.4
HFMM1030HR	30	0.4~0.5	0.9	27	58	55	0.4
HFMM1032HR	32	0.4~0.5	0.8	29	62	59	0.4
HFMM1033HR	33	0.4~0.5	0.8	30	64	61	0.4

- Adjust feed to under 70% of recommended cutting condition when ramping & helical cutting
- In helical ramping, max. cutting depth per 1 helical revolution of cutter should not exceed max. cutting depth as per insert size
- In ramping, max. cutting depth per 1 ramping process of cutter should not exceed max. depth of cut as per used insert size

Corner R programming

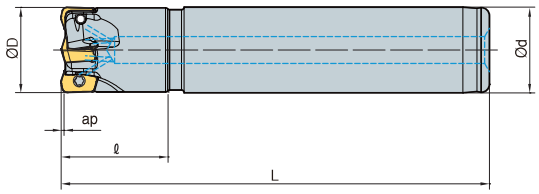
(mm)



Insert	Corner R programming	Cutting conditions		Over Cut	Uncut
		Nose R	Max. ap		
LPMT040210R-MF LPMW040210R LPEW040210R	R1.0 (Standard)	1.0	0.4	0	0.17
	R1.5			0.10	0.08
	R2.0			0.31	0
LPMT040220R-MF LPMW040220R LPEW040220R	R1.0	2.0	0.5	0	0.41
	R1.5			0	0.2
	R2.0 (Standard)			0	0

- When using CNC program, overcut & uncut occurs on the corner processing site if entering the correct program corner R value for each insert
- To prevent overcut, you will need to complete a CNC program considering the above overcut

HFMS1000 new








AA 13°

- AR: -4°
- RR: -14°~ -7°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HFMS	1008HR-1S10	1	8	10	20	80	0.4~0.5	0.03
	1008HR-1M10	1	8	10	25	100	0.4~0.5	0.03
	1008HR-1L10	1	8	10	35	120	0.4~0.5	0.03
	1010HR-2S08	2	10	8	20	80	0.4~0.5	0.03
	1010HR-2M08	2	10	8	25	100	0.4~0.5	0.04
	1010HR-2L08	2	10	8	35	120	0.4~0.5	0.04
	1010HR-2S10	2	10	10	20	80	0.4~0.5	0.04
	1010HR-2M10	2	10	10	25	105	0.4~0.5	0.05
	1010HR-2L10	2	10	10	35	120	0.4~0.5	0.06
	1011HR-2S10	2	11	10	20	80	0.4~0.5	0.04
	1011HR-2M10	2	11	10	25	105	0.4~0.5	0.06
	1011HR-2L10	2	11	10	35	120	0.4~0.5	0.07
	1012HR-3S10	3	12	10	20	80	0.4~0.5	0.05
	1012HR-3M10	3	12	10	25	105	0.4~0.5	0.06
	1012HR-3L10	3	12	10	35	120	0.4~0.5	0.07
	1012HR-3S12	3	12	12	20	80	0.4~0.5	0.06
	1012HR-3M12	3	12	12	25	105	0.4~0.5	0.08
	1012HR-3L12	3	12	12	35	120	0.4~0.5	0.09
	1013HR-3S12	3	13	12	20	80	0.4~0.5	0.06
	1013HR-3M12	3	13	12	25	105	0.4~0.5	0.09
	1013HR-3L12	3	13	12	40	120	0.4~0.5	0.10
	1014HR-3S12	3	14	12	20	80	0.4~0.5	0.07
	1014HR-3M12	3	14	12	25	105	0.4~0.5	0.09
	1014HR-3L12	3	14	12	40	120	0.4~0.5	0.10

Available inserts

LPMT-MF new　LPMW new　LPEW new

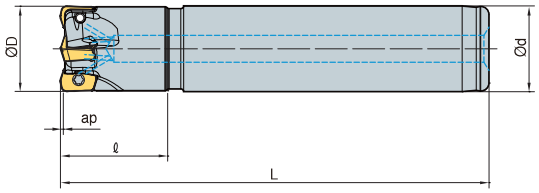
Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LPMT	040210R-MF								●		●				●	●				E11 E12
	040220R-MF								●		●				●	●				
LPMW	040210R							●	●						●					
	040220R							●	●						●					
LPEW	040210R							●	●						●					
	040220R							●	●						●					

Parts

Specification	Screw	Wrench
Ø8~Ø10	FTKA01840	TW06S-A
Ø11~Ø14	FTKA01842	

Available inserts E11, E12

HFMS1000 new



AA 13°

- AR: -4°
- RR: -6°~ -3°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HFMS	1015HR-4S12	4	15	12	20	80	0.4~0.5	0.07
	1015HR-4M12	4	15	12	25	105	0.4~0.5	0.09
	1015HR-4L12	4	15	12	40	120	0.4~0.5	0.11
	1016HR-4S16	4	16	16	20	80	0.4~0.5	0.11
	1016HR-4M16	4	16	16	25	105	0.4~0.5	0.14
	1016HR-4L16	4	16	16	40	120	0.4~0.5	0.16
	1017HR-4S16	4	17	16	20	80	0.4~0.5	0.11
	1017HR-4M16	4	17	16	25	105	0.4~0.5	0.15
	1017HR-4L16	4	17	16	40	120	0.4~0.5	0.17
	1018HR-4S16	4	18	16	20	80	0.4~0.5	0.11
	1018HR-4M16	4	18	16	25	105	0.4~0.5	0.15
	1018HR-4L16	4	18	16	40	120	0.4~0.5	0.17
	1019HR-4S16	4	19	16	20	80	0.4~0.5	0.12
	1019HR-4M16	4	19	16	25	105	0.4~0.5	0.16
	1019HR-4L16	4	19	16	40	120	0.4~0.5	0.18
	1020HR-4S20	4	20	20	20	80	0.4~0.5	0.17
	1020HR-4M20	4	20	20	25	105	0.4~0.5	0.22
	1020HR-4L20	4	20	20	40	120	0.4~0.5	0.26
	1020HR-5S20	5	20	20	20	80	0.4~0.5	0.17
	1020HR-5M20	5	20	20	25	105	0.4~0.5	0.23
	1020HR-5L20	5	20	20	40	120	0.4~0.5	0.27
	1021HR-5S20	5	21	20	20	80	0.4~0.5	0.17
	1021HR-5M20	5	21	20	25	105	0.4~0.5	0.23
	1021HR-5L20	5	21	20	40	120	0.4~0.5	0.27

Available inserts

LPMT-MF new | LPMW new | LPEW new

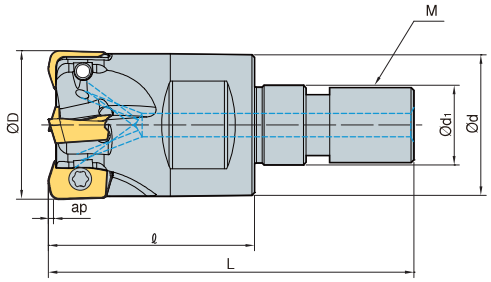
Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LPMT	040210R-MF								●		●				●	●				
	040220R-MF								●		●				●	●				
LPMW	040210R							●	●						●					E11
	040220R							●	●						●					E12
LPEW	040210R							●	●						●					
	040220R							●	●						●					

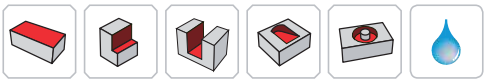
Parts

Specification	Screw	Wrench
Ø15~Ø21	FTKA01842	TW06S-A

Available inserts E11, E12

HFMM new





AA 13°

- AR: -4°
- RR: -14°~ -3°

(mm)

Designation			ØD	Ød	Ød1	ℓ	L	M	ap	kg
HFMM	1008HR-M06	1	8	9.5	6.5	17	32	M06	0.4~0.5	0.01
	1010HR-M06	2	10	9.5	6.5	17	32	M06	0.4~0.5	0.01
	1011HR-M06	2	11	9.5	6.5	17	32	M06	0.4~0.5	0.01
	1012HR-M06	3	12	11	6.5	19	34	M6B	0.4~0.5	0.01
	1013HR-M06	3	13	11	6.5	19	34	M6B	0.4~0.5	0.01
	1016HR-M08	4	16	14.5	8.5	22	39	M08	0.4~0.5	0.03
	1017HR-M08	4	17	14.5	8.5	22	39	M08	0.4~0.5	0.03
	1020HR-M10	5	20	18	10.5	25	46	M10	0.4~0.5	0.06
	1021HR-M10	5	21	18	10.5	25	46	M10	0.4~0.5	0.06
	1025HR-M12	6	25	23	12.5	27	51	M12	0.4~0.5	0.11
	1026HR-M12	6	26	23	12.5	27	51	M12	0.4~0.5	0.11
	1030HR-M16	7	30	29	17	30	60	M16	0.4~0.5	0.17
	1032HR-M16	8	32	29	17	30	60	M16	0.4~0.5	0.18
	1033HR-M16	8	33	29	17	30	60	M16	0.4~0.5	0.18

Available inserts

LPMT-MF new | LPMW new | LPEW new

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LPMT	040210R-MF								●		●				●	●				E11 E12
	040220R-MF								●		●				●	●				
LPMW	040210R							●	●						●					
	040220R							●	●						●					
LPEW	040210R							●	●						●					
	040220R							●	●						●					

Parts

Specification	Screw	Wrench
Ø8~Ø10	FTKA01840	TW06S-A
Ø11~Ø33	FTKA01842	

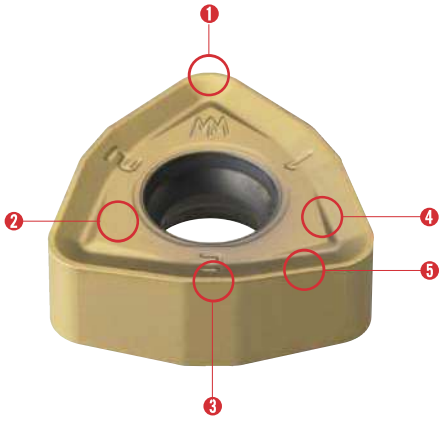
Available inserts E11, E12 Available adaptor E371~E372

HRMD is more economical due to the use of 6 cutting-edges compared to HRM tool with a 3-edge positive insert

HRMDouble

- HRMD is more economical due to the use of 6 cutting-edges compared to HRM tool with a 3-edge positive insert
- High-rake angle cutting-edge and chip breaker reduces cutting load
- Negative geometry has been designed for rigidity of cutting-edge and double-sided function
- Screw on system and stable support achieves strong clamping force
- Unique insert design for high feed and multifunctional machining
- HRMD insert with symmetrical cutting-edge is applicable for both R and L type machining

Features of insert



1 Nose-R

- Security of rigid edge in ramping pocket machining
- Round edge suitable for high feed rates insert geometry
- Possible to use R/L type machining

2 Clamping surface

- Design for stable clamping
- Prevention of friction by chip

3 Minor cutting-edge

- Improvement of surface roughness in high feed machining
- Special design for decreasing thrust force
- Symmetrical insert design for R/L type tool

4 Chip breaker

- Reduction of cutting load due to High-rake angle
- Improvement of chip flow and evacuation in various applications
- Prevention of damage on clamping face of insert

5 Major cutting-edge

- Symmetrical design insert for R/L type tool
- Superior cutting performance due to high rake angle cutting-edge
- Low cutting resistance in high feed
- Special design for decreasing thrust force

Features of cutter

Inner coolant system

- Improvement of chip control and evacuation
- Longer tool life due to reduced cutting temperature

3-surface constrained system

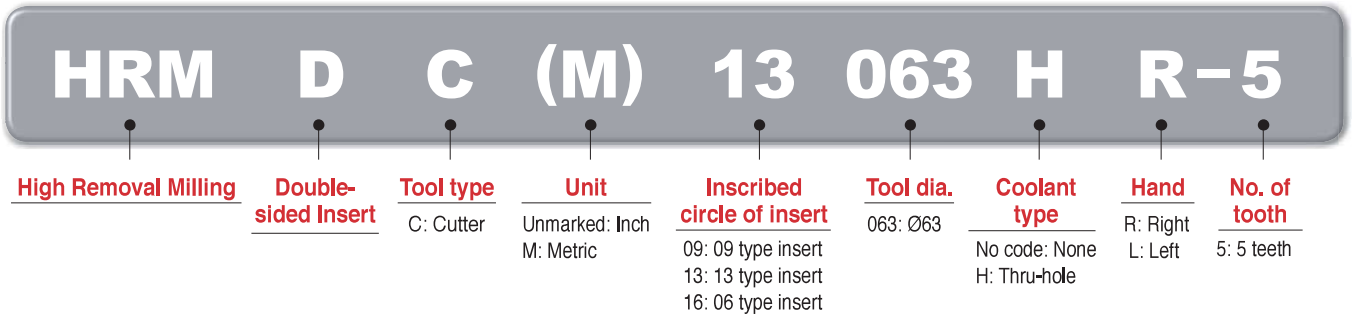
- Strong clamping system
- Stable clamping system against different cutting resistances in various machining applications

Simple screw on system

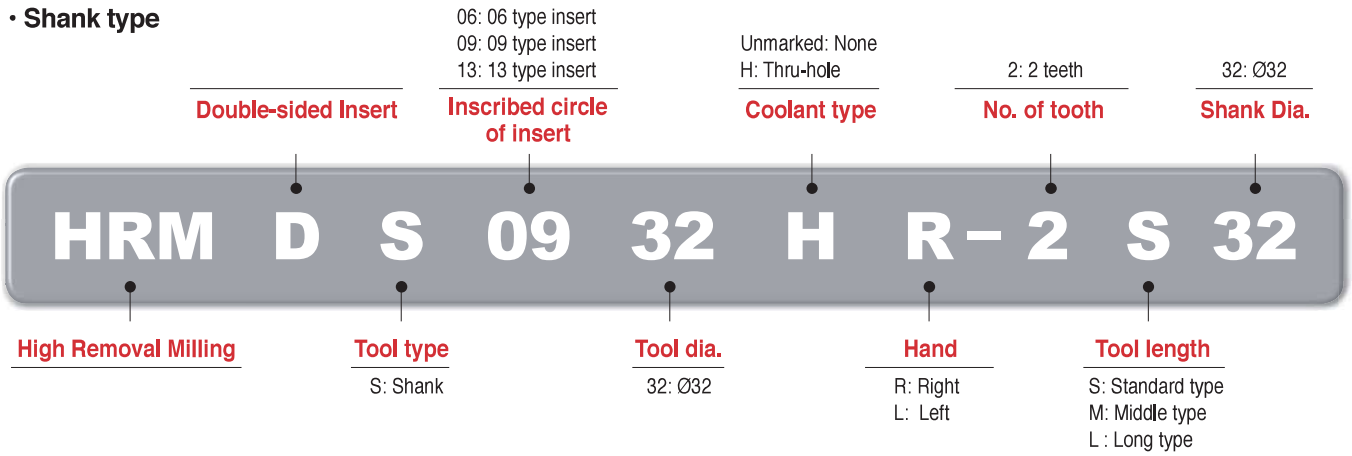
- Strong clamping of screw on system
- Convenient clamping system
- Wide chip pocket for better chip evacuation

Code system

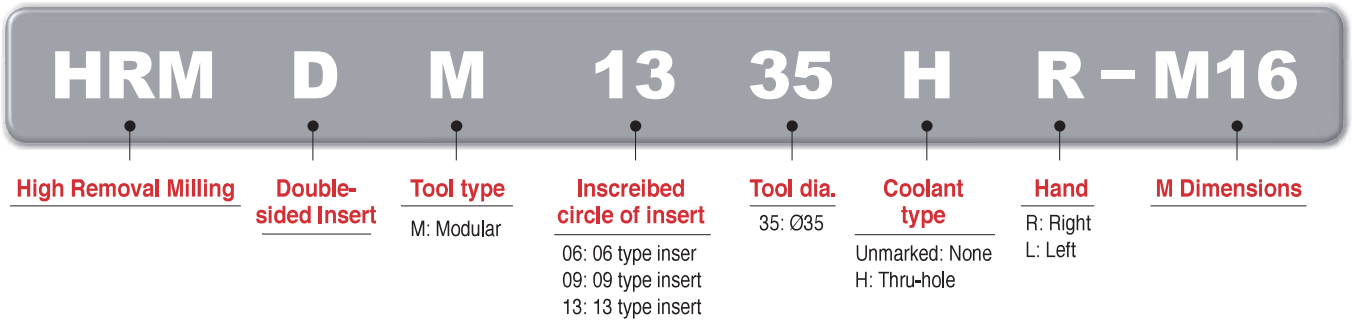
• Cutter type



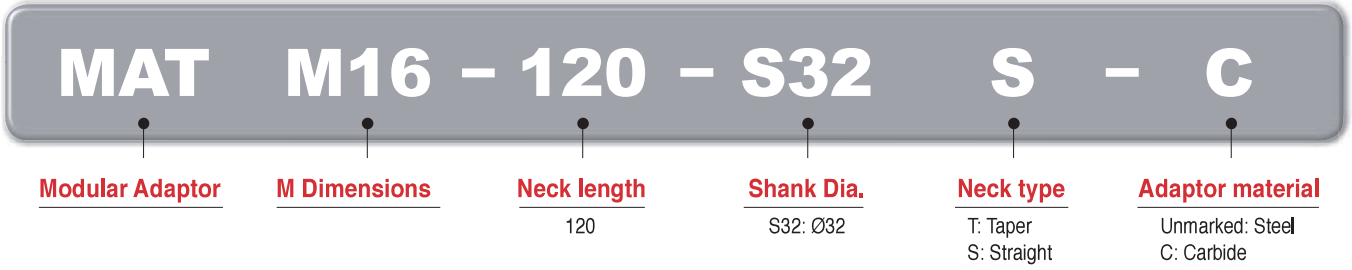
• Shank type



• Modular head



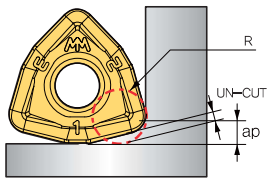
• Modular adaptor



Corner R programming

Designation	Cutting condition		Approx. R (mm)	
	Max.ap (mm)	Max.fz (mm/t)	Input. R	Uncut
WNMX060312ZNN-□□	1.0	1.2	1.8	0.4
WNMX09T316ZNN-□□	1.5	2.0	2.5	0.6
WNMX130520ZNN-□□	2.0	3.0	3.0	0.8
WNMX160720ZNN-□□	2.5	3.5	3.5	1.2

·Information for uncut part by using "Input.R" for CAM program

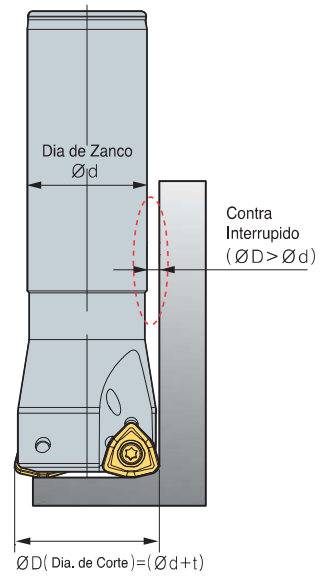


· Uncut part can be changed by poor machine condition or weak clamp of workpiece, etc

Interference prevent system

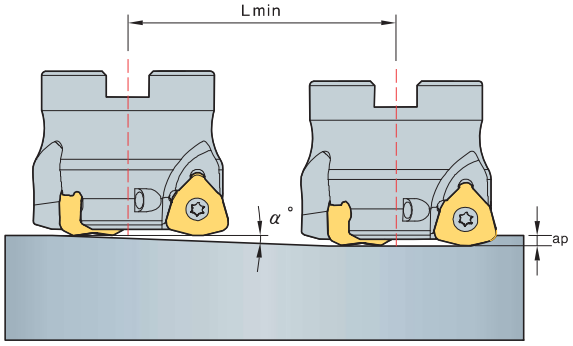
Designation	ØD (mm)	Ød (mm)	t (mm)
HRMDS0617HR-2□16	17	16	1
HRMDS0618HR-2□16	18	16	2
HRMDS0621HR-2□20	21	20	1
HRMDS0626HR-3□25	26	25	1
HRMDS0633HR-4□32	33	32	1
HRMDS0926HR-2□25	26	25	1
HRMDS0933HR-3□32	33	32	1
HRMDS0935HR-4□32	35	32	3
HRMDS0940HR-4□32	40	32	8
HRMDS0950HR-5□32	50	32	18
HRMDS0950HR-5□40	50	40	10
HRMDS0950HR-5□42	50	42	8
HRMDS1333HR-3□32	33	32	1
HRMDS1335HR-4□32	35	32	3
HRMDS1340HR-4□30	40	30	8
HRMDS1350HR-4□32	50	32	18
HRMDS1350HR-4□40	50	40	10
HRMDS1350HR-4□42	50	42	8
HRMDS1363HR-5□32	63	32	31
HRMDS1363HR-5□40	63	40	23
HRMDS1363HR-5□42	63	42	21

• The side clearance prevents to interference between tool and workpiece even in deep hole machining

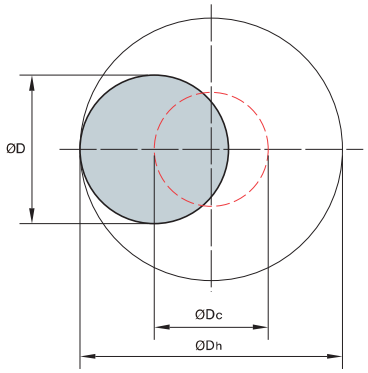


Ramping & helical cutting technical data

Ramping



Helical cutting



$$L_{min} = \frac{ap}{\tan \alpha^{\circ}} \ (mm)$$

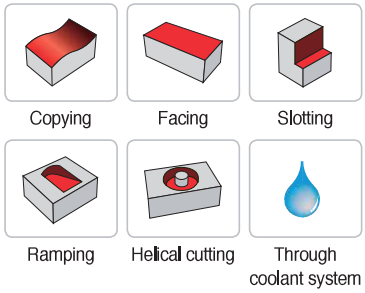
$\varnothing Dc = \varnothing Dh - \varnothing D$

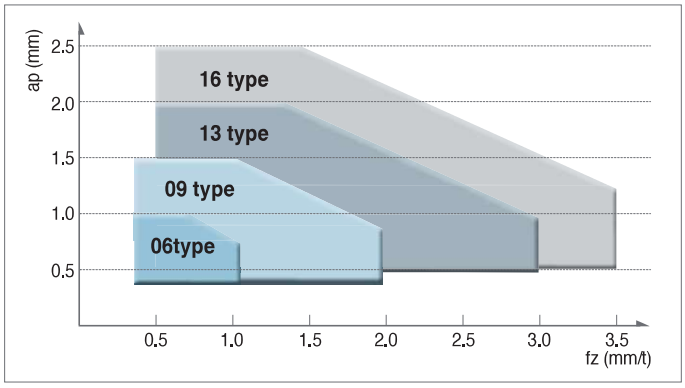
$\varnothing Dc$ = Tool pass of tool center
$\varnothing Dh$ = Desirable hole diameter on workpiece
$\varnothing D$ = Tool dia.

- Adjust feed to under 70% of Recommended cutting condition when ramping & helical cutting
- In helical ramping, max. cutting depth per 1 helical revolution of cutter should not exceed max. cutting depth as per insert size
- in ramping, max. cutting depth for 1 ramping process should not exceed max. depth of cut as per used insert size

Designation	Tool dia. ØD (mm)	Efficient cutting diameter ØDe (mm)	Ramping			Helical ramping	
			Max. ap (mm)	Max. angle α°	Cutting Length Lmin (mm)	Dh Min. Cutting diameter (mm)	Dh Max. Cutting diameter (mm)
HRMDS0616HR	16	9.5	1	4.8	11	23.8	29.6
HRMDS0617HR	17	10.5	1	4.1	13	25.8	31.6
HRMDS0618HR	18	11.5	1	3.5	16	27.8	33.6
HRMDS0620HR	20	13.5	1	2.5	22	31.8	37.6
HRMDS0621HR	21	14.5	1	2.2	26	33.8	39.6
HRMDS0625HR	25	18.5	1	1.3	44	41.8	47.6
HRMDS0626HR	26	19.5	1	1.2	47	43.8	49.6
HRMDS0632HR	32	25.5	1	0.6	95	55.8	61.6
HRMDS0633HR	33	26.5	1	0.5	114	57.8	63.6
HRMDS0925HR	25	15.4	1.5	5.4	15.8	37.6	46.8
HRMDS0926HR	26	16.4	1.5	5.0	17.0	39.6	48.8
HRMDS0930HR	30	20.4	1.5	3.9	22.0	47.6	56.8
HRMDS0932HR	32	22.3	1.5	3.5	24.5	51.6	60.8
HRMDS0933HR	33	23.3	1.5	3.3	25.8	53.6	62.8
HRMDS0935HR	35	25.4	1.5	3.0	28.3	57.6	66.8
HRMDS0940HR	40	30.2	1.5	2.5	34.5	67.6	76.8
HRMDS0950HR	50	40.2	1.5	1.8	47.0	87.6	96.8
HRMDS1332HR	32	19.3	2	5.7	20.0	47	60
HRMDS1333HR	33	20.3	2	5.4	21.3	49	62
HRMDS1335HR	35	22.3	2	4.8	24.0	53	66
HRMDS1340HR	40	27.2	2	3.7	30.7	63	76
HRMDS1350HR	50	37	2	2.6	44.0	83	96
HRMDS1363HR	63	50	2	1.9	61.3	109	122
HRMDCM09040HR	40	30.2	1.5	2.5	34.5	67.6	76.8
HRMDCM09050HR	50	40.2	1.5	1.8	47.0	87.6	96.8
HRMDCM09063HR	63	53.1	1.5	1.4	63.3	113.6	122.8
HRMDC(M)09080HR	80	70.1	1.5	1.0	84.5	147.6	156.8
HRMDC(M)09100HR	100	90	1.5	0.8	109.5	187.6	196.8
HRMDCM13050HR	50	37	2	2.6	44.0	83	96
HRMDCM13063HR	63	50	2	1.9	61.3	109	122
HRMDC(M)13080HR	80	66.9	2	1.4	84.0	143	156
HRMDC(M)13100HR	100	86.9	2	1.0	110.7	183	196
HRMDC(M)13125HR	125	111.9	2	0.8	144.0	233	246
HRMDC(M)16080HR	80	63.3	2.5	1.4	102	138	156
HRMDC(M)16100HR	100	83.3	2.5	1	143	178	196
HRMDC(M)16125HR	125	108.3	2.5	0.7	204	228	246
HRMDC(M)16160R	160	143.3	2.5	0.5	286	298	316
HRMDC(M)16200R	200	183.3	2.5	0.3	477	378	396
HRMDC(M)16250R	250	233.3	2.5	0.2	716	478	496
HRMDC(M)16315R	315	298.3	2.5	0.1	1432	608	626

Application area





Recommended cutting condition

ISO	Workpiece		Material	Grades	Cutting speed, vc (m/min)
P	Carbon steel	Low carbon steel	SUM22, C = 0.1~25	PC5300	280
				PC5400	245
		General carbon steel	C = 0.30~55	PC5300	255
				PC5400	220
		High carbon steel	C = 0.55~80	PC5300	240
				PC5400	205
	Low alloy steel (Alloy constituent < 5%)	-	SCM415(H), SCM420, SCM440	PC5300	195
				PC5400	170
		Hardened		PC5300	115
				PC5400	100
	High alloy steel (Alloy constituent > 5%)	Annealed	SKD61	PC5300	150
				PC5400	130
		Hardened	SKH51, SKH55	PC5300	120
				PC5400	105
M	Stainless steel	Ferritic/Martensitic	SUS410, SUS420, SUS430	PC5300	160
				PC5400	135
		Austenitic	SUS303, SUS304, SUS316	PC5300	130
				PC5400	110
		Duplex (Austenitic/Ferritic)	F51	PC5300	100
				PC5400	85
K	Gray cast iron	Low tensile	GC200, GC250	PC5300	170
				PC5400	150
		Hight tensile	GC300, GC350	PC5300	150
				PC5400	130
	Ductile cast iron	Ferric	GCD400, GCD500	PC5300	170
				PC5400	150
		Pearlitic	GCD600, GCD700	PC5300	150
				PC5400	130
S	Fe Base	-	Incoloy	PC5300	60
				PC5400	50
	Ni Base	-	Inconel, Nimonic, Hastelloy	PC5300	55
				PC5400	45
	Co Base	-	stelite	PC5300	25
				PC5400	20
	Titanium alloys	-	pure Ti	PC5300	130
				PC5400	105
			alloy (TiAl6V4)	PC5300	65
				PC5400	55

Machining example

Working condition

- **Workpiece** SM45C (H_RC22)
- **Cutting conditions** vc = 283 m/min (1,803^{-1})
  fz = 1.4 mm/tooth
  vf = 10,097 mm/min
  ap = 0.8 mm
  ae = 35 mm
  Coolant: Dry, Machining: Copying
  Machine: Horizontal MCT
  Overhang of tool: 250 mm
- **Tools** **Insert** WNMX130520ZNN-MM (PC3500)
  Holder HRMDCM13050HR-4

40% Increased productivity
80% Reduced tool cost

Test result In comparing HRMD with our competitor using the same cutting conditions, the cutting speed of HRMD was higher with the same depth of cut (ap×ae), the cycle time was reduced by 40% and the tool life was increased to over 60%. HRMD is economically more efficient due to the use of 6 cutting-edges compared to EDNW type with positive insert

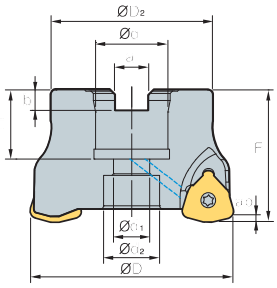
Working condition

- **Workpiece** STS304
- **Cutting conditions** vc = 130 m/min (414^{-1})
  fz = 1.2 mm/tooth
  vf = 2,981 mm/min
  ap = 1.0 mm
  ae = 80 mm
  Coolant: Wet, Machining: Facing and Slotting
  Machine: Vertical MCT
  Overhang of tool: 250 mm
- **Tools** **Insert** WNMX130520ZNN-MM (PC3545)
  Holder HRMDCM13100HR-6

80% Increased productivity
25% Reduced tool cost

Test result In comparing HRMD with our competitor using the same cutting conditions, the cutting speed of HRMD was higher with the same depth of cut (ap×ae), the cycle time was reduced by 80% and the tool life was same, but HRMD is economically more efficient due to the use of 6 cutting-edges compared to SDKN type with positive insert

HRMDC(M)09



AA 14°

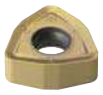
- AR: -7°
- RR: -12°~ -18°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	a	b	E	F	ap	kg	Bolt
HRMDCM	09040HR-3	3	40	34	16	9	14	8.4	5.6	19	40	1.5	0.2	SB0825
	09040HR-4	4	40	34	16	9	14	8.4	5.6	19	40	1.5	0.2	
	09050HR-4	4	50	42	22	11	18	10.4	6.3	21	40	1.5	0.3	SB1025
	09050HR-5	5	50	42	22	11	18	10.4	6.3	21	40	1.5	0.3	
	09063HR-5	5	63	49	22	11	18	10.4	6.3	21	40	1.5	0.5	SB1025
	09063HR-6	6	63	49	22	11	18	10.4	6.3	21	40	1.5	0.5	
	09080HR-6	6	80	57	27	14	20	12.4	7	23	50	1.5	1.1	SB1230
	09080HR-7	7	80	57	27	14	20	12.4	7	23	50	1.5	1.1	
	09100HR-7	7	100	67	32	18	26	14.4	8	25	50	1.5	1.7	SB1630
	09100HR-8	8	100	67	32	18	26	14.4	8	25	50	1.5	1.7	
HRMDC	09080HR-6	6	80	57	25.4	14	20	9.5	6	24	50	1.5	1.1	SB1230
	09080HR-7	7	80	57	25.4	14	20	9.5	6	24	50	1.5	1.1	
	09080HR-31.75-6	6	80	67	31.75	18	26	12.7	8	32	63	1.5	1.5	SB1630
	09080HR-31.75-7	7	80	67	31.75	18	26	12.7	8	32	63	1.5	1.5	
	09100HR-7	7	100	67	31.75	18	26	12.7	8	32	63	1.5	2.1	SB1630
	09100HR-8	8	100	67	31.75	18	26	12.7	8	32	63	1.5	2.1	

Available inserts

WNMX-MF WNMX-ML WNMX-MM

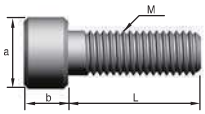


Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	09T316ZNN-MF									●	●				●	●				E28
	09T316ZNN-ML														●	●				
	09T316ZNN-MM							●		●	●		●		●	●				

Available arbors

Designation		NC arbors
HRMDCM	09040HR-□	BT□□-FMC16-□□
		SK□□-FMC16-□□
	09050HR-□	BT□□-FMC22-□□
	09063HR-□	SK□□-FMC22-□□
	09080HR-□	BT□□-FMC27-□□
		SK□□-FMC27-□□
	09100HR-□	BT□□-FMC32-□□
		SK□□-FMC32-□□
HRMDC	09080HR-□	BT□□-FMA25.4-□□
		SK□□-FMA25.4-□□
	09080HR-31.75-□	BT□□-FMA31.75-□□
	09100HR-□	SK□□-FMA31.75-□□

Bolt



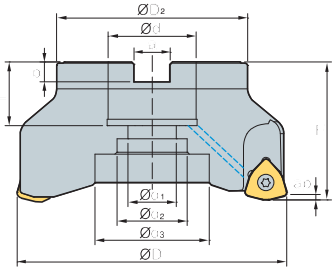
Designation	Dimensions (mm)				
	M	a	b	L	pitch
SB0825	M08	13	8	25	1.25
SB1025	M10	16	10	25	1.5
SB1230	M12	18	12	30	1.75
SB1630	M16	24	16	30	2.0

Parts

Specification	Screw	Wrench
Ø40~Ø100	FTKA0307	TW09S

Available inserts E28 Available arbors and bolt E400~E402

HRMDC(M)13







AA 14°

- AR: -7°
- RR: -12°~ -4°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg	Bolt
HRMDCM	13050HR-3	3	50	42	22	11	17	-	10.4	6.3	21	40	2	0.3	SB1025
	13050HR-4	4	50	42	22	11	17	-	10.4	6.3	21	40	2	0.3	
	13063HR-4	4	63	49	22	11	18	-	10.4	6.3	21	40	2	0.5	SB1025
	13063HR-5	5	63	49	22	11	18	-	10.4	6.3	21	40	2	0.5	
	13080HR-5	5	80	57	27	14	20	-	12.4	7	23	50	2	1	SB1230
	13080HR-6	6	80	57	27	14	20	-	12.4	7	23	50	2	1	
	13100HR-6	6	100	67	32	18	26	-	14.4	8	25	50	2	1.6	SB1630
	13100HR-7	7	100	67	32	18	26	-	14.4	8	25	50	2	1.6	
	13125HR-7	7	125	87	40	22	32	52	16.4	9	29	63	2	3.2	SB2040 MBA-M20
	13125HR-8	8	125	87	40	22	32	52	16.4	9	29	63	2	3.2	
HRMDC	13080HR-5	5	80	57	25.4	14	20	-	9.5	6	24	50	2	1	SB1230
	13080HR-6	6	80	57	25.4	14	20	-	9.5	6	24	50	2	1	
	13080HR-31.75-5	5	80	67	31.75	18	26	-	12.7	8	32	63	2	1.4	SB1630
	13080HR-31.75-6	6	80	67	31.75	18	26	-	12.7	8	32	63	2	1.4	
	13100HR-6	6	100	67	31.75	18	26	-	12.7	8	32	63	2	2.1	SB1630
	13100HR-7	7	100	67	31.75	18	26	-	12.7	8	32	63	2	2.1	
	13125HR-7	7	125	87	38.1	22	32	52	15.9	10	35	63	2	3.3	SB2040 MBA-M20
	13125HR-8	8	125	87	38.1	22	32	52	15.9	10	35	63	2	3.3	

Available inserts

WNMX-MF

WNMX-ML

WNMX-MM

Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	130520ZNN-MF									●					●	●				E28
	130520ZNN-ML									●					●	●				
	130520ZNN-MM							●	●	●	●		●	●	●	●				

Available arbors

Designation		NC arbors
HRMDCM	13050HR-□	BT□□-FMC22-□□
		SK□□-FMC22-□□
	13063HR-□	BT□□-FMC22-□□
	13080HR-□	SK□□-FMC27-□□
	13100HR-□	BT□□-FMC32-□□
		SK□□-FMC32-□□
	13125HR-□	BT□□-FMC40-□□
		SK□□-FMC40-□□
HRMDC	13080HR-□	BT□□-FMA25.4-□□
	13080HR-31.75-□	SK□□-FMA25.4-□□
	13100HR-□	BT□□-FMA31.75-□□
		SK□□-FMA31.75-□□
	13125HR-□	BT□□-FMA38.1-□□
		SK□□-FMA38.1-□□

Bolt

Fig. 1

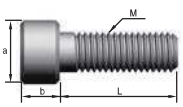
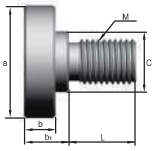


Fig. 2



Designation	Dimensions (mm)							Fig.
	M	a	b	b1	C	L	pitch	
SB1025	M10	16	10	-	-	25	1.5	1
SB1230	M12	18	12	-	-	30	1.75	1
SB1630	M16	24	16	-	-	30	2.0	1
SB2040	M20	30	20	-	-	40	2.5	1
MBA-M20	M20	50	14	20	27	30	2.5	2

Parts

Specification	Screw	Wrench
Ø50~Ø125	FTKA0412B	TW15S

Available inserts E28 Available arbors and bolt E400~E402

HRMDC(M)16 new

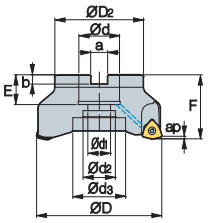


Fig. 1

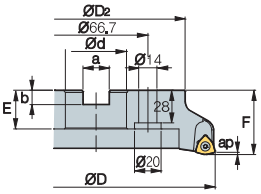


Fig. 2

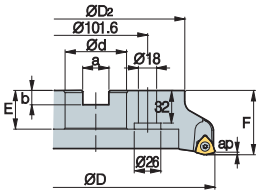


Fig. 3

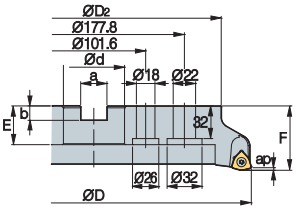


Fig. 4





AA 14°

- AR: -7°
- RR: -12°~ -4°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg	Bolt	Fig.
HRMDC (HRMDCM)	16080HR-4	4	80	65	25.4 (27)	14	20	-	9.5 (12.4)	6 (7)	25 (23)	50	2.5	0.99	SB1230	1
	16080HR-5	5	80	65	25.4 (27)	14	20	-	9.5 (12.4)	6 (7)	25 (23)	50	2.5	0.91		
	16100HR-5	5	100	85	31.75 (32)	18	26	-	12.7 (14.4)	8	33 (25)	63 (50)	2.5	1.68	SB1630	1
	16100HR-6	6	100	85	31.75 (32)	18	26	-	12.7 (14.4)	8	33 (25)	63 (50)	2.5	1.64		
	16125HR-6	6	125	100	38.1 (40)	22	32	52	15.9 (16.4)	10 (9)	36 (29)	63	2.5	3.23	SB2040 MBA-M20	1
	16125HR-7	7	125	100	38.1 (40)	22	32	52	15.9 (16.4)	10 (9)	36 (29)	63	2.5	3.24		
	16160R-7	7	160	107	50.8 (40)	-	90	-	19 (16.4)	11 (9)	38 (32)	63	2.5	3.73	MBA-M24	2
	16160R-8	8	160	107	50.8 (40)	-	90	-	19 (16.4)	11 (9)	38 (32)	63	2.5	3.77		
	16200R-8	8	200	145	47.625 (60)	-	132	-	25.4 (25.7)	14	38	63	2.5	6.48	-	3
	16200R-10	10	200	145	47.625 (60)	-	132	-	25.4 (25.7)	14	38	63	2.5	6.61		
	16250R-10	10	250	190	47.625 (60)	-	190	-	25.4 (25.7)	14	38	63	2.5	11.01	-	3
	16250R-12	12	250	190	47.625 (60)	-	190	-	25.4 (25.7)	14	38	63	2.5	11.04		
	16315R-12	12	315	250	47.625 (60)	-	238	-	25.4 (25.7)	14	38	63	2.5	18.34	-	4
	16315R-14	14	315	250	47.625 (60)	-	238	-	25.4 (25.7)	14	38	63	2.5	18.35		

( )Metric size

Available inserts

WNMX-MF new | WNMX-ML new | WNMX-MM



Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	160720ZNN-MF									●					●	●				E28
	160720ZNN-ML														●					
	160720ZNN-MM									●	●				●	●				

Available arbors

Designation		HRMDC	HRMDCM
HRMDC (HRMDCM)	16080HR-4	BT□□-FMA25.4-□□	BT□□-FMC27-□□
	16080HR-5		
	16100HR-5	BT□□-FMA31.75-□□	BT□□-FMC32-□□
	16100HR-6		
	16125HR-6	BT□□-FMA38.1-□□	BT□□-FMB40-□□ BT□□-FMC40-□□
	16125HR-7		
	16160R-7	BT□□-FMA50.8-□□	
	16160R-8		
	16200R-8	BT□□-FMA47.625-□□	BT□□-FMB60-□□
	16200R-10		
	16250R-10		
	16250R-12		
	16315R-12		
	16315R-14		

Bolt

Fig. 1

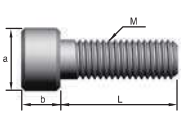
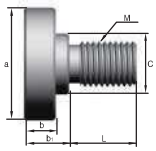


Fig. 2



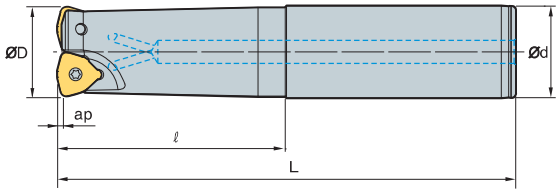
Designation	Dimensions (mm)							Fig.
	M	a	b	b1	C	L	pitch	
SB1025	M10	16	10	-	-	25	1.5	1
SB1230	M12	18	12	-	-	30	1.75	1
SB1630	M16	24	16	-	-	30	2.0	1
SB2040	M20	30	20	-	-	40	2.5	1
MBA-M20	M20	50	14	20	27	30	2.5	2
MBA-M24	M24	65	14	24	37	36	3.0	2

Parts

Specification	Screw	Wrench
Ø80~Ø315	FTGA0513-P	TW20-100

Available inserts E28 Available arbors and bolt E400~E402

HRMDS06 new



AA 14°

- AR: -7°
- RR: -17°~ -25°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HRMDS	0616HR-2S16	2	16	16	30	110	1.0	0.15
	0616HR-2M16	2	16	16	70	150	1.0	0.20
	0616HR-2L16	2	16	16	100	200	1.0	0.26
	0617HR-2S16	2	17	16	20	110	1.0	0.15
	0617HR-2M16	2	17	16	20	150	1.0	0.21
	0617HR-2L16	2	17	16	20	200	1.0	0.28
	0618HR-2S16	2	18	16	20	110	1.0	0.15
	0618HR-2M16	2	18	16	20	150	1.0	0.21
	0618HR-2L16	2	18	16	20	200	1.0	0.28
	0620HR-2S20	2	20	20	50	130	1.0	0.28
	0620HR-2M20	2	20	20	100	180	1.0	0.38
	0620HR-2L20	2	20	20	130	250	1.0	0.53
	0621HR-2S20	2	21	20	20	130	1.0	0.29
	0621HR-2M20	2	21	20	20	180	1.0	0.40
	0621HR-2L20	2	21	20	20	250	1.0	0.57
	0625HR-3S25	3	25	25	60	140	1.0	0.44
	0625HR-3M25	3	25	25	80	180	1.0	0.57
	0625HR-3L25	3	25	25	120	250	1.0	0.80
	0626HR-3S25	3	26	25	30	140	1.0	0.46
	0626HR-3M25	3	26	25	30	180	1.0	0.60
	0626HR-3L25	3	26	25	30	250	1.0	0.84
	0632HR-4S32	4	32	32	70	150	1.0	0.82
	0632HR-4M32	4	32	32	100	200	1.0	1.10
	0632HR-4L32	4	32	32	180	300	1.0	1.66
	0633HR-4S32	4	33	32	40	200	1.0	1.14
	0633HR-4M32	4	33	32	40	250	1.0	1.43
	0633HR-4L32	4	33	32	40	300	1.0	1.73

Available inserts

WNMX-MF

WNMX-ML

WNMX-MM

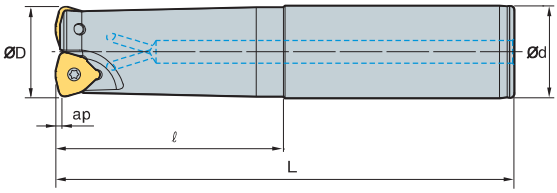
Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	060312ZNN-MF									●					●	●				E28
	060312ZNN-ML														●	●				
	060312ZNN-MM							●	●	●	●				●	●				

Parts

Specification	Screw	Wrench
Ø16~Ø33	ETNA02506	TW07S

Available inserts E28

HRMDS09







AA 14°

- AR: -7°
- RR: -17°~ -25°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HRMDS	0925HR-2S25	2	25	25	60	140	1.5	0.5
	0925HR-2M25	2	25	25	120	200	1.5	0.6
	0925HR-2L25	2	25	25	180	300	1.5	1
	0926HR-2S25	2	26	25	60	140	1.5	0.5
	0926HR-2M25	2	26	25	60	200	1.5	0.7
	0926HR-2L25	2	26	25	60	300	1.5	1
	0930HR-3S32	3	30	32	70	150	1.5	0.8
	0930HR-3M32	3	30	32	120	200	1.5	1
	0930HR-3L32	3	30	32	180	300	1.5	1.5
	0932HR-3S32	3	32	32	70	150	1.5	0.8
	0932HR-3M32	3	32	32	120	200	1.5	1.1
	0932HR-3L32	3	32	32	180	300	1.5	1.7
	0933HR-3S32	3	33	32	70	150	1.5	0.8
	0933HR-3M32	3	33	32	70	200	1.5	1.1
	0933HR-3L32	3	33	32	70	300	1.5	1.7
	0935HR-4S32	4	35	32	50	150	1.5	0.9
	0935HR-4M32	4	35	32	50	200	1.5	1.1
	0935HR-4L32	4	35	32	50	300	1.5	1.7
	0940HR-4S32	4	40	32	50	150	1.5	0.9
	0940HR-4M32	4	40	32	50	250	1.5	1.5
	0940HR-4L32	4	40	32	50	300	1.5	1.8
	0940HR-4S40	4	40	40	60	150	1.5	1.3

Available inserts

WNMX-MF

WNMX-ML

WNMX-MM

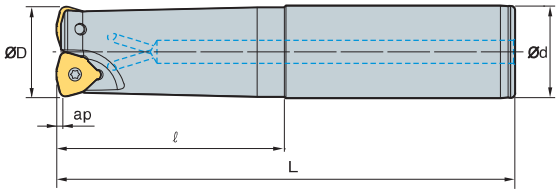
Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	09T316ZNN-MF									●	●				●	●				E28
	09T316ZNN-ML														●	●				
	09T316ZNN-MM							●		●	●		●		●	●				

Parts

Specification	Screw	Wrench
Ø25~Ø40	FTKA0307	TW09S

Available inserts E28

HRMDS09



AA 14°
- AR: -7°
- RR: -17°~ -25°

(mm)

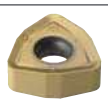
Designation			ØD	Ød	ℓ	L	ap	kg
HRMDS	0940HR-4M40	4	40	40	130	250	1.5	2.2
	0940HR-4L40	4	40	40	180	300	1.5	2.7
	0940HR-4S42	4	40	42	60	150	1.5	1.4
	0940HR-4M42	4	40	42	130	250	1.5	2.3
	0940HR-4L42	4	40	42	180	300	1.5	2.8
	0950HR-4S32	4	50	32	40	150	1.5	1.1
	0950HR-4M32	4	50	32	40	250	1.5	1.6
	0950HR-4L32	4	50	32	40	300	1.5	2
	0950HR-4S40	4	50	40	40	150	1.5	1.4
	0950HR-4M40	4	50	40	40	250	1.5	2.4
	0950HR-4L40	4	50	40	40	300	1.5	2.9
	0950HR-4S42	4	50	42	40	150	1.5	1.6
	0950HR-4M42	4	50	42	40	250	1.5	2.6
	0950HR-4L42	4	50	42	40	300	1.5	3.1
	0950HR-5S32	5	50	32	40	150	1.5	1.1
	0950HR-5M32	5	50	32	40	250	1.5	1.6
	0950HR-5L32	5	50	32	40	300	1.5	2
	0950HR-5S40	5	50	40	40	150	1.5	1.4
	0950HR-5M40	5	50	40	40	250	1.5	2.4
	0950HR-5L40	5	50	40	40	300	1.5	2.9
	0950HR-5S42	5	50	42	40	150	1.5	1.6
	0950HR-5M42	5	50	42	40	250	1.5	2.6
	0950HR-5L42	5	50	42	40	300	1.5	3.1

Available inserts

WNMX-MF

WNMX-ML

WNMX-MM



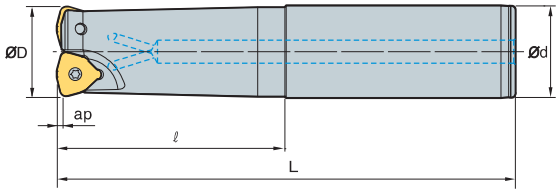
Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	09T316ZNN-MF									●	●				●	●				E28
	09T316ZNN-ML														●	●				
	09T316ZNN-MM							●		●	●		●		●	●				

Parts

Specification	Screw	Wrench
Ø40~Ø50	FTKA0307	TW09S

Available inserts E28

HRMDS13



AA 14°

- AR: -7°
- RR: -14°~ -16°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HRMDS	1332HR-2S32	2	32	32	70	150	2	0.8
	1332HR-2M32	2	32	32	120	200	2	1
	1332HR-2L32	2	32	32	180	300	2	1.6
	1333HR-2S32	2	33	32	70	150	2	0.8
	1333HR-2M32	2	33	32	70	200	2	1.1
	1333HR-2L32	2	33	32	70	300	2	1.7
	1335HR-2S32	2	35	32	50	150	2	0.8
	1335HR-2M32	2	35	32	50	200	2	1.1
	1335HR-2L32	2	35	32	50	300	2	1.7
	1340HR-3S32	3	40	32	50	150	2	0.8
	1340HR-3M32	3	40	32	50	250	2	1.4
	1340HR-3L32	3	40	32	50	300	2	1.7
	1340HR-3S40	3	40	40	60	150	2	1.2
	1340HR-3M40	3	40	40	130	250	2	2.1
	1340HR-3L40	3	40	40	180	300	2	2.6
	1340HR-3S42	3	40	42	60	150	2	1.4
	1340HR-3M42	3	40	42	130	250	2	2.3
	1340HR-3L42	3	40	42	180	300	2	2.7
	1350HR-3S32	3	50	32	50	150	2	1.1
	1350HR-3M32	3	50	32	50	250	2	1.7
	1350HR-3L32	3	50	32	50	300	2	2
	1350HR-3S40	3	50	40	50	150	2	1.5
	1350HR-3M40	3	50	40	50	250	2	2.4
	1350HR-3L40	3	50	40	50	300	2	2.9
	1350HR-3S42	3	50	42	50	150	2	1.6
	1350HR-3M42	3	50	42	50	250	2	2.6
	1350HR-3L42	3	50	42	50	300	2	3.1

Available inserts

WNMX-MF

WNMX-ML

WNMX-MM

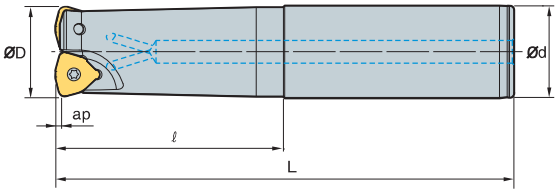
Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	130520ZNN-MF									●					●	●				E28
	130520ZNN-ML														●	●				
	130520ZNN-MM							●	●	●	●		●	●	●	●				

Parts

Specification	Screw	Wrench
Ø32~Ø50	FTKA0412B	TW15S

Available inserts E28

HRMDS13



AA 14°

- AR: -7°
- RR: -14°~ -16°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HRMDS	1350HR-4S32	4	50	32	50	150	2	1.1
	1350HR-4M32	4	50	32	50	250	2	1.7
	1350HR-4L32	4	50	32	50	300	2	2
	1350HR-4S40	4	50	40	50	150	2	1.5
	1350HR-4M40	4	50	40	50	250	2	2.4
	1350HR-4L40	4	50	40	50	300	2	2.9
	1350HR-4S42	4	50	42	50	150	2	1.6
	1350HR-4M42	4	50	42	50	250	2	2.6
	1350HR-4L42	4	50	42	50	300	2	3.1
	1363HR-4S32	4	63	32	50	150	2	1.4
	1363HR-4M32	4	63	32	50	250	2	2.1
	1363HR-4L32	4	63	32	50	300	2	2.4
	1363HR-4S40	4	63	40	50	150	2	1.8
	1363HR-4M40	4	63	40	50	250	2	2.8
	1363HR-4L40	4	63	40	50	300	2	3.2
	1363HR-4S42	4	63	42	50	150	2	1.9
	1363HR-4M42	4	63	42	50	250	2	3
	1363HR-4L42	4	63	42	50	300	2	3.5
	1363HR-5S32	5	63	32	50	150	2	1.5
	1363HR-5M32	5	63	32	50	250	2	2
	1363HR-5L32	5	63	32	50	300	2	2.3
	1363HR-5S40	5	63	40	50	150	2	1.8
	1363HR-5M40	5	63	40	50	250	2	2.8
	1363HR-5L40	5	63	40	50	300	2	3.2
	1363HR-5S42	5	63	42	50	150	2	1.9
	1363HR-5M42	5	63	42	50	250	2	3
	1363HR-5L42	5	63	42	50	300	2	3.5

Available inserts

WNMX-MF

WNMX-ML

WNMX-MM

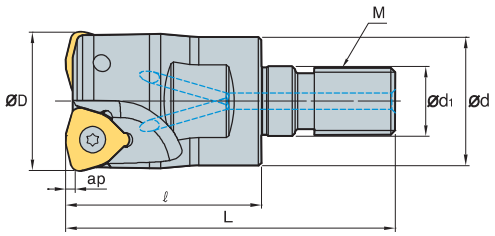
Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	130520ZNN-MF									●					●	●				E28
	130520ZNN-ML														●	●				
	130520ZNN-MM							●	●	●	●		●	●	●	●				

Parts

Specification	Screw	Wrench
Ø50~Ø63	FTKA0412B	TW15S

Available inserts E28

HRMDM06 new







AA 14°

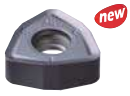
- AR: -7°
- RR: -18°~ -25°

(mm)

Designation			ØD	Ød	Ød1	ℓ	L	M	ap	kg
HRMDM	0616HR-M08	2	16	14.5	8.5	25	42	M08	1.0	0.03
	0617HR-M08	2	17	14.5	8.5	25	42	M08	1.0	0.03
	0618HR-M08	2	18	14.5	8.5	25	42	M08	1.0	0.03
	0620HR-M10	2	20	18	10.5	30	51	M10	1.0	0.06
	0621HR-M10	2	21	18	10.5	30	51	M10	1.0	0.07
	0625HR-M12	3	25	23	12.5	35	59	M12	1.0	0.10
	0626HR-M12	3	26	23	12.5	35	59	M12	1.0	0.11
	0632HR-M16	4	32	29	17	40	67	M16	1.0	0.21
	0633HR-M16	4	33	29	17	40	67	M16	1.0	0.22

Available inserts

WNMX-MF | WNMX-ML | WNMX-MM


Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	060312ZNN-MF									●					●	●				E28
	060312ZNN-ML									●					●	●				
	060312ZNN-MM							●	●	●	●				●	●				

Available adaptor

Designation		Available adaptor
HRMDM	0616HR-M08	MAT- M08
	0617HR-M08	MAT- M08
	0618HR-M08	MAT- M08
	0620HR-M10	MAT- M10
	0621HR-M10	MAT- M10

Designation		Available adaptor
HRMDM	0625HR-M12	MAT- M12
	0626HR-M12	MAT- M12
	0632HR-M16	MAT- M16
	0633HR-M16	MAT- M16

Designation: HRMDM0625HR-M12
Modular head threading measure size (M12)

II

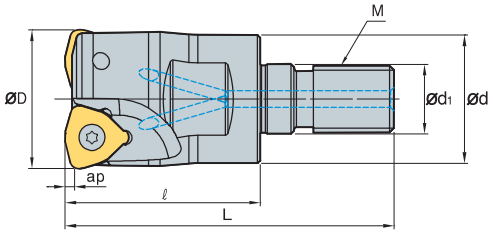
Adaptor spec.: MAT-M12-030-S20S
Adaptor threading measure (M12)

Parts

Specification	Screw	Wrench
Ø16~Ø33	ETNA02506	TW07S

Available inserts E28 Available adaptor E371~E372

HRMDM09



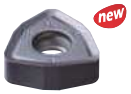
AA 14°
- AR: -7°
- RR: -18°~ -25°

(mm)

Designation			ØD	Ød	ød1	ℓ	L	M	ap	kg
HRMDM	0925HR-M12	2	25	23	12.5	35	59	M12	1.5	0.10
	0926HR-M12	2	26	23	12.5	35	59	M12	1.5	0.11
	0930HR-M16	3	30	29	17	40	67	M16	1.5	0.19
	0932HR-M16	3	32	29	17	40	67	M16	1.5	0.20
	0933HR-M16	3	33	29	17	40	67	M16	1.5	0.21
	0935HR-M16	4	35	29	17	40	67	M16	1.5	0.22
	0940HR-M16	4	40	29	17	40	67	M16	1.5	0.25

Available inserts

WNMX-MF WNMX-ML WNMX-MM



Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	09T316ZNN-MF									●	●				●	●				E28
	09T316ZNN-ML														●	●				
	09T316ZNN-MM							●		●	●		●		●	●				

Available adaptor

Designation		Available adaptor
HRMDM	0925HR-M12	MAT- M12
	0926HR-M12	
	0930HR-M16	MAT- M16
	0932HR-M16	
	0933HR-M16	
	0935HR-M16	
	0940HR-M16	

Designation: HRMDM0932HR-M16
Modular head threading measure size (M16)

=

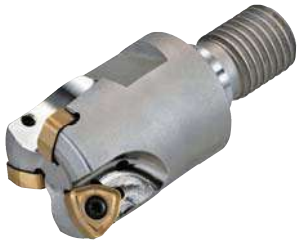
Adaptor spec.: MAT-M16-035-S32S
Adaptor threading measure (M16)

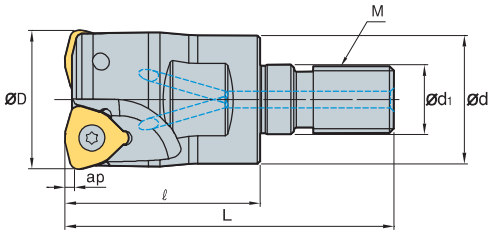
Parts

Specification	Screw	Wrench
Ø25~Ø40	FTKA0307	TW09S

Available inserts E28 Available adaptor E371~E372

HRMDM13





AA 14°

- AR: -7°
- RR: -18°~ -25°

(mm)

Designation			ØD	Ød	ød1	ℓ	L	M	ap	kg
HRMDM	1332HR-M16	2	32	29	17	40	67	M16	2	0.20
	1333HR-M16	2	33	29	17	40	67	M16	2	0.20
	1335HR-M16	2	35	29	17	40	67	M16	2	0.22
	1340HR-M16	3	40	29	17	45	72	M16	2	0.26

Available inserts

WNMX-MF WNMX-ML WNMX-MM

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WNMX	130520ZNN-MF									●					●	●				E28
	130520ZNN-ML									●					●	●				
	130520ZNN-MM							●	●	●	●		●	●	●	●				

Available adaptor

Designation		Available adaptor
HRMDM	1332HR-M16	MAT-M16
	1333HR-M16	
	1335HR-M16	
	1340HR-M16	

Designation: HRMDM0932HR-M16
Modular head threading measure size (M16)

=

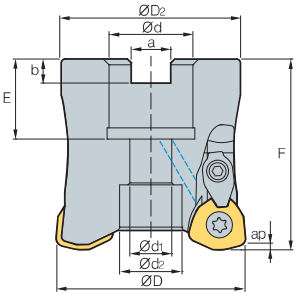
Adaptor spec.: MAT-M16-120-S32T
Adaptor threading measure (M16)

Parts

Specification	Screw	Wrench
Ø32~Ø40	FTKA0412B	TW15S

Available inserts E28 Available adaptor E371~E372

HRMC(M)13



AA 15°

- AR: 7°
- RR: -15°~ -5°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	a	b	E	F	ap	kg	Bolt
HRMC (HRMCM)	13050HR-3	3	50	47	22.225 (22)	11	16.4	8.0 (10.4)	5 (6.3)	20 (21)	50	2.0	0.4	SB1035
	13050HR-4	4	50	47	22.225 (22)	11	16.4	8.0 (10.4)	5 (6.3)	20 (21)	50	2.0	0.4	SB1035
	13063HR-4	4	63	60	22.225 (22)	11	17	8.0 (10.4)	5 (6.3)	20 (21)	50	2.0	0.7	SB1035
	13080HR-5	5	80	76	31.75 (27)	18 (13)	26 (20)	12.7 (12.4)	8 (7)	32 (23)	70	2.0	1.6	SB16 (12)45

( )Metric size

Available inserts

WDKT-MH

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WDKT	130520ZDSR-MH							●	●	●		●	●		●	●				E27

Available arbors

Designation		HRMDC	HRMDCM
HRMC (HRMCM)	13050HR-3	BT□□-FMA22.225-□□	BT□□-FMC22-□□ SK□□-FMC22-□□
	13050HR-4		
	13063HR-4		
	13080HR-5	BT□□-FMA31.75-□□ SK□□-FMA31.75-□□	BT□□-FMC27-□□ SK□□-FMC27-□□

Bolt

Fig. 1

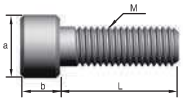
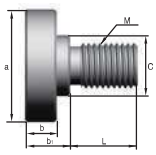


Fig. 2



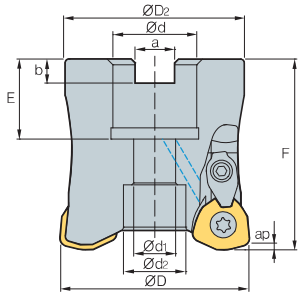
Designation	Dimensions (mm)							Fig.
	M	a	b	b1	C	L	pitch	
SB1035	M10	16	10	-	-	35	1.5	1
SB1245	M12	18	12	-	-	45	1.75	1
SB1645	M16	24	16	-	-	45	2.0	1
SB2040	M20	30	20	-	-	40	2.5	1
MBA-M20	M20	50	14	20	27	30	2.5	2
MBA-M24	M24	65	14	24	37	36	3.0	2

Parts

Specification	Screw	Clamp	Clamp screw	C-ring	Wrench
Ø50~Ø80	FTGA0513-P	CHH4.5R1	CTX04513H	CR03	TW20-100

Available inserts E27 Available arbors and bolt E400~E402

HRMC(M)15



AA 15°
- AR: 7°
- RR: -15°~ -5°

(mm)

Designation			ØD	ØD	Ød	Ød1	Ød2	a	b	E	F	ap	kg	Bolt
HRMC (HRMCM)	15063HR-3	3	63	60	22.225 (22)	11	17	8.0 (10.4)	5 (6.3)	20 (21)	50	2.5	0.7	SB1035
	15080HR-4	4	80	76	31.75 (27)	18 (13)	26 (20)	12.7 (12.4)	8 (7)	32 (23)	70	2.5	1.7	SB16 (12)45
	15100HR-5	5	100	96	31.75 (32)	18	26	12.7 (14.4)	8 (8)	32 (26)	70	2.5	2.8	SB1645
	15100HR-6	6	100	96	31.75 (32)	18	26	12.7 (14.4)	8 (8)	32 (26)	70	2.5	3.2	SB1645
	15125HR-6	6	125	98	38.1 (40)	22	32	15.9 (16.4)	10 (9)	35 (29)	63	2.5	3.3	SB2040
	15160R-7	7	160	100	50.8 (40)	-	72	19.0 (16.4)	11 (9)	38 (35)	63	2.5	4.3	MBA-M24 (M20)

( )Metric size

Available inserts

WDKT-MH

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WDKT	150625ZDSR-MH									●	●	●	●		●	●				E27

Available arbors

Designation		HRMDC	HRMDCM
HRMC (HRMCM)	15063HR-3	BT□□-FMA22.225-□□	BT□□-FMC22-□□ SK□□-FMC22-□□
	15080HR-4	BT□□-FMA31.75-□□ SK□□-FMA31.75-□□	BT□□-FMC27-□□ SK□□-FMC27-□□
	15100HR-5 15100HR-6		BT□□-FMC32-□□ SK□□-FMC32-□□
	15125HR-6	BT□□-FMA38.1-□□ SK□□-FMA38.1-□□	BT□□-FMB40-□□ BT□□-FMC40-□□ SK□□-FMC40-□□
	15160R-7	BT□□-FMA50.8-□□	

Bolt

Fig. 1

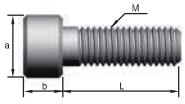
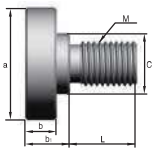


Fig. 2



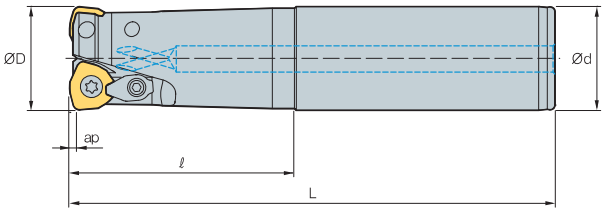
Designation	Dimensions (mm)							Fig.
	M	a	b	b1	C	L	pitch	
SB1035	M10	16	10	-	-	35	1.5	1
SB1245	M12	18	12	-	-	45	1.75	1
SB1645	M16	24	16	-	-	45	2.0	1
SB2040	M20	30	20	-	-	40	2.5	1
MBA-M20	M20	50	14	20	27	30	2.5	2
MBA-M24	M24	65	14	24	37	36	3.0	2

Parts

Specification	Screw	Clamp	Clamp screw	C-ring	Wrench
Ø63~Ø160	FTGA0513-P	CHH5.5R1	CTX0515	CR04	TW20-100

Available inserts E27 Available arbors and bolt E400~E402

HRMS08/10



AA 15°

- AR: 7°
- RR: -11°~ -5°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HRMS	0820HR-2S20	2	20	20	50	130	1.0	0.3
	0820HR-2M20	2	20	20	100	180	1.0	0.4
	0820HR-2L20	2	20	20	130	250	1.0	0.5
	0821HR-2S20	2	21	20	50	130	1.0	0.3
	0821HR-2M20	2	21	20	50	180	1.0	0.4
	0821HR-2L20	2	21	20	50	250	1.0	0.5
	1025HR-2S25	2	25	25	60	140	1.5	0.4
	1025HR-2M25	2	25	25	120	200	1.5	0.6
	1025HR-2L25	2	25	25	180	300	1.5	0.9
	1026HR-2S25	2	26	25	60	140	1.5	0.4
	1026HR-2M25	2	26	25	60	200	1.5	0.6
	1026HR-2L25	2	26	25	60	300	1.5	1.0
	1030HR-2S32	2	30	32	70	150	1.5	0.8
	1030HR-2M32	2	30	32	120	200	1.5	1.0
	1030HR-2L32	2	30	32	180	300	1.5	1.5

Available inserts

WDKT-MH

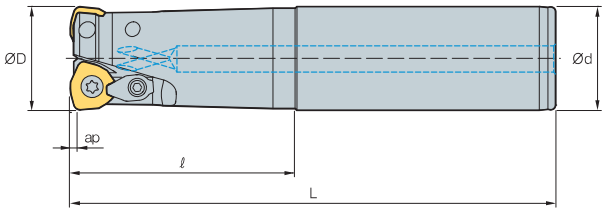
Type	Designation	Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
08 type	WDKT 080316ZDSR-MH							●	●	●	●	●	●		●	●				E27
10 type	WDKT 10T320ZDSR-MH							●	●	●	●	●	●		●	●				

Parts

Specification	Screw	Clamp	Clamp screw	C-ring	Wrench
Ø20~Ø21 (08 type)	FTNA0306	-	-	-	TW09P
Ø25~Ø30 (10 type)	FTKA0408	CHH3.5R1	CTX03510	CR03	TW15S

Available inserts E27

HRMS13



AA 15°

- AR: 7°
- RR: -11°~-5°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HRMS	1332HR-2S32	2	32	32	70	150	2.0	0.8
	1332HR-2M32	2	32	32	120	200	2.0	1.0
	1332HR-2L32	2	32	32	180	300	2.0	1.6
	1333HR-2S32	2	33	32	70	150	2.0	0.8
	1333HR-2M32	2	33	32	70	200	2.0	1.1
	1333HR-2L32	2	33	32	70	300	2.0	1.7
	1335HR-2S32	2	35	32	50	150	2.0	0.8
	1335HR-2M32	2	35	32	50	200	2.0	1.1
	1335HR-2L32	2	35	32	50	300	2.0	1.7
	1340HR-3S32	3	40	32	50	150	2.0	0.8
	1340HR-3M32	3	40	32	50	250	2.0	1.4
	1340HR-3L32	3	40	32	50	300	2.0	1.7
	1340HR-3S40	3	40	40	60	150	2.0	1.2
	1340HR-3M40	3	40	40	130	250	2.0	2.1
	1340HR-3L40	3	40	40	180	300	2.0	2.6
	1340HR-3S42	3	40	42	60	150	2.0	1.4
	1340HR-3M42	3	40	42	130	250	2.0	2.3
	1340HR-3L42	3	40	42	180	300	2.0	2.7

Available inserts

WDKT-MH

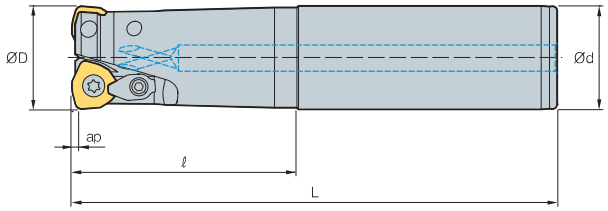
Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WDKT	130520ZDSR-MH							●	●	●		●	●		●	●				E27

Parts

Specification	Screw	Clamp	Clamp screw	C-ring	Wrench
Ø32,33,35	FTGA0510-P	CHH4.5R1	CTX04513H	CR03	TW20
Ø40	FTGA0512-P	CHH5.5R1	CTX04513H	CR03	TW20

Available inserts E27

HRMS15



AA 15°
- AR: 7°
- RR: -8°~ -6°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
HRMS	1550HR-3S32	3	50	32	50	150	2.5	1.0
	1550HR-3M32	3	50	32	50	250	2.5	1.6
	1550HR-3L32	3	50	32	50	300	2.5	1.9
	1550HR-3S40	3	50	40	50	150	2.5	1.4
	1550HR-3M40	3	50	40	50	250	2.5	2.3
	1550HR-3L40	3	50	40	50	300	2.5	2.8
	1550HR-3S42	3	50	42	50	150	2.5	1.5
	1550HR-3M42	3	50	42	50	250	2.5	2.5
	1550HR-3L42	3	50	42	50	300	2.5	3.0
	1563HR-4S32	4	63	32	50	150	2.5	1.3
	1563HR-4M32	4	63	32	50	250	2.5	1.9
	1563HR-4L32	4	63	32	50	300	2.5	2.2
	1563HR-4S40	4	63	40	50	150	2.5	1.7
	1563HR-4M40	4	63	40	50	250	2.5	2.6
	1563HR-4L40	4	63	40	50	300	2.5	3.1
	1563HR-4S42	4	63	42	50	150	2.5	1.8
	1563HR-4M42	4	63	42	50	250	2.5	2.8
	1563HR-4L42	4	63	42	50	300	2.5	3.3

Available inserts

WDKT-MH

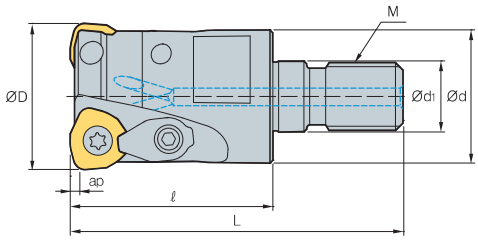
Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WDKT	150625ZDSR-MH									●	●	●	●		●	●				E27

Parts

Specification	Screw	Clamp	Clamp screw	C-ring	Wrench
Ø50~Ø63	FTGA0513-P	CHH5.5R1	CTX0515	CR04	TW20

Available inserts E27

HRMM08



AA 15°

- AR: 7°
- RR: -11°~ -5°

(mm)

Designation			ØD	Ød	ød1	ℓ	L	M	ap	kg
HRMM	0820HR-M10	2	20	18	10.5	30	51	M10	1	0.06
	0821HR-M10	2	21	18	10.5	30	51	M10	1	0.06
	0825HR-M12	3	25	23	12.5	35	59	M12	1	0.11
	0826HR-M12	3	26	23	12.5	35	59	M12	1	0.11
	0828HR-M12	3	28	23	12.5	35	59	M12	1	0.12
	0832HR-M16	4	32	29	17	40	67	M16	1	0.21
	0833HR-M16	4	33	29	17	40	67	M16	1	0.21
	0835HR-M16	4	35	29	17	40	67	M16	1	0.23
	0840HR-M16	5	40	29	17	40	67	M16	1	0.25

Available inserts

WDKT-MH

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
WDKT	080316ZDSR-MH							●	●	●	●	●	●		●	●				E27

Available adaptor

Designation		Available adaptor
HRMM	0820HR-M10	MAT-M10
	0821HR-M10	
	0825HR-M12	MAT-M12
	0826HR-M12	
	0828HR-M12	
	0832HR-M16	MAT-M16
	0833HR-M16	
	0835HR-M16	
	0840HR-M16	

Designation: HRMM0820HR-M10
Modular head threading measure size (M10)

II

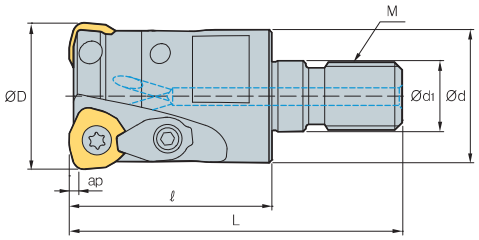
Adaptor spec.: MAT-M10-030-S20S
Adaptor threading measure (M10)

Parts

Specification	Screw	Clamp	Clamp screw	C-ring	Wrench	Wrench
Ø20~Ø40	FTNA0306	-	-	-	-	-

Available inserts E27 Available adaptor E371~E372

HRMM10/13



AA 15°

- AR: 7°
- RR: -11°~ -5°

(mm)

Designation			ØD	Ød	ød1	ℓ	L	M	ap	kg
HRMM	1025HR-M12	2	25	23	12.5	35	59	M12	1.5	0.1
	1026HR-M12	2	26	23	12.5	35	59	M12	1.5	0.1
	1030HR-M16	2	30	29	17	40	67	M16	1.5	0.2
	1032HR-M16	3	32	29	17	45	72	M16	1.5	0.26
	1035HR-M16	3	35	29	17	45	72	M16	1.5	0.23
	1040HR-M16	4	40	29	17	45	72	M16	1.5	0.27
HRMM	1332HR-M16	2	32	29	17	40	67	M16	2	0.17
	1333HR-M16	2	33	29	17	40	67	M16	2	0.17
	1335HR-M16	2	35	29	17	40	67	M16	2	0.19
	1340HR-M16	3	40	29	17	45	72	M16	2	0.24

Available inserts

WDKT-MH

Type	Designation		Cermet		Coated											Uncoated			page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
10 type	WDKT	10T320ZDSR-MH							●	●	●	●	●	●		●	●				E27
13 type	WDKT	130520ZDSR-MH							●	●	●		●	●		●	●				

Available adaptor

Designation		Available adaptor
HRMM	1025HR-M12	MAT-M12
	1026HR-M12	
	1030HR-M16	MAT-M16
	1032HR-M16	
	1035HR-M16	
	1040HR-M16	
	1332HR-M16	MAT-M16
	1333HR-M16	
	1335HR-M16	
	1340HR-M16	

Designation: HRMM0820HR-M10
Modular head threading measure size (M10)

II

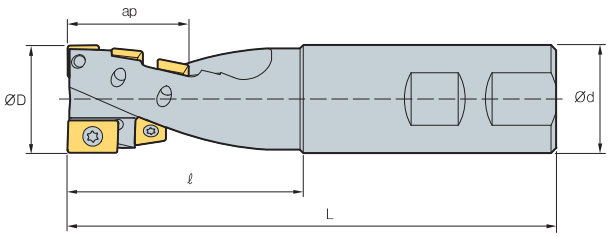
Adaptor spec.: MAT-M10-030-S20S
Adaptor threading measure (M10)

Parts

Specification	Screw	Clamp	Clamp screw	C-ring	Wrench	Wrench
Ø25~Ø40 (10 type)	FTKA0408	CHH3.5R1	CTX03510	CR03	TW15S	-
Ø32, 33, 35 (13 type)	FTGA0510-P	CHH4.5R1	CTX04513H	CR03	-	TW20
Ø40 (13 type)	FTGA0512-P	CHH5.5R1	CTX04513H	CR03	-	TW20

Available inserts E27 Available adaptor E371~E372

THE



AA 90°

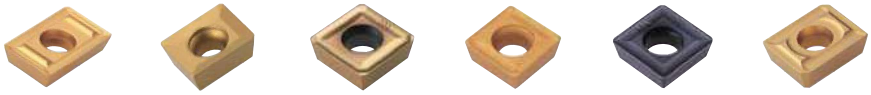
- AR: 5°, 10°
- RR: -5°

(mm)

Designation		ØD	Ød	ℓ	L	ap	No. of flute	kg	Available inserts	
									Lower cutting-edge	External cutting-edge
THE	25R	25	25	55	120	25	2	0.4	APLT070304R 1z	SPMT060304 4z
	32R	32	32	70	145	40	2	0.5	ADLT150308R 1z	SDMT090308-MM 5z
	40R	40	42	88	175	54	2	1.3	ZPMT1504PPSR-MM 1z	SPMT120408-MM 5z
	50R	50	42	85	175	54	4	1.4	ZPMT1504PPSR-MM 2z	SPMT120408-MM 10z

Available inserts

ADLT APLT SPMT-MM SPMT SDMT-MM ZPMT-MM



Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
SPMT	060304			●																E04 E05 E18 E25 E31
SDMT	090308-MM										●				●					
SPMT	120408-MM										●				●					
APLT	070304R														●					
ADLT	150308R			●											●					
ZPMT	1504PPSR-MM										●				●					

Recommended cutting condition

- Grooving

Workpiece	Cutting Condition		Grades
	vc (m/min)	fz (mm/t)	
P	90~140	0.05~0.2	PC5300
M	50~90	0.05~0.2	PC5300
K	70~120	0.05~0.25	PC5300

- Side cutting

Workpiece	Cutting Condition		Grades
	vc (m/min)	fz (mm/t)	
P	150 ~240	0.05~0.2	PC5300
M	90~150	0.05~0.2	PC5300
K	120~200	0.10~0.25	PC5300

Parts

Specification	Screw	Wrench	Wrench
Ø25	ETNA02506	TW07P	-
Ø32	ETNA0408	-	TW15S
Ø40	ETNA0511	-	TW20S
Ø50	ETNA0511	-	TW20S

Available inserts E04, E05, E18, E25, E31

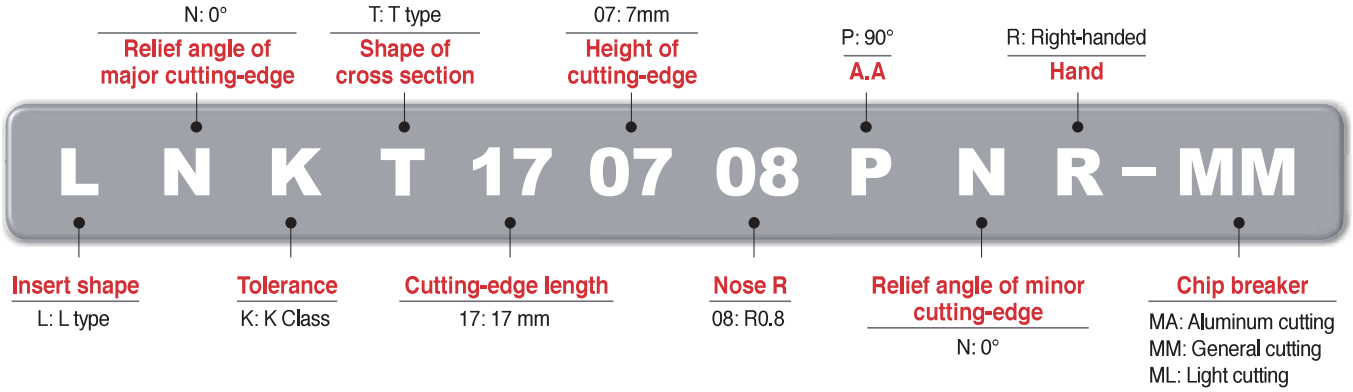
This milling tool series with its tangential clamping system increases stable machining and productivity, while improving perpendicularity

Tangen-Pro TP2P new

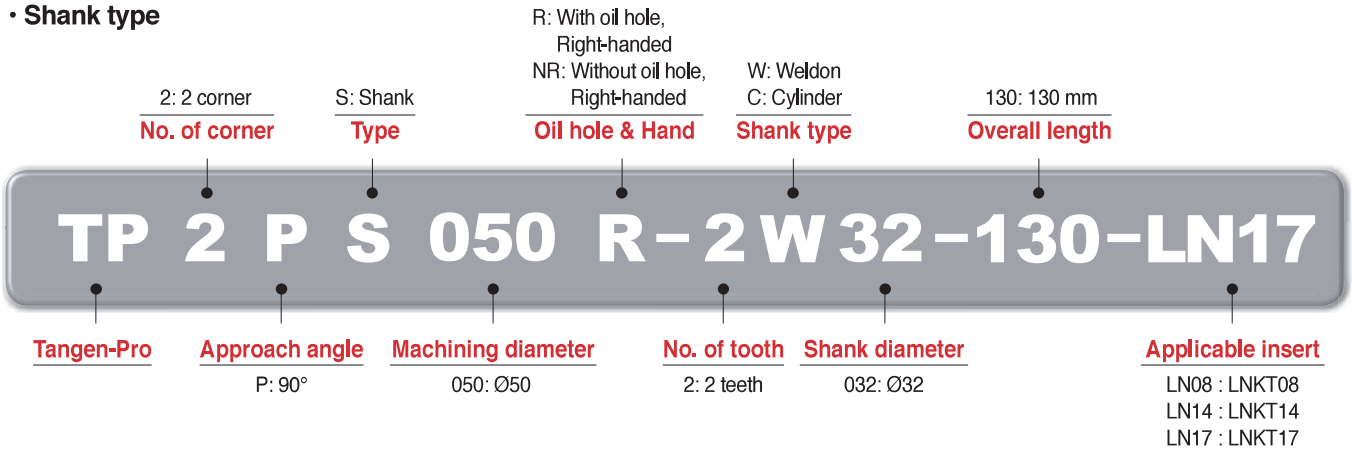
- Clamping stability gained through tangential clamping system and wedge-shaped inserts
- Excellent surface finish nearly perfect perpendicularity, and highly even flank surface compared to competitors' designs
- Improved productivity due to High-rake angles and sharp cutting-edges which lead to lower cutting resistance → Ideally suited for high speed and high feed machining

Code system

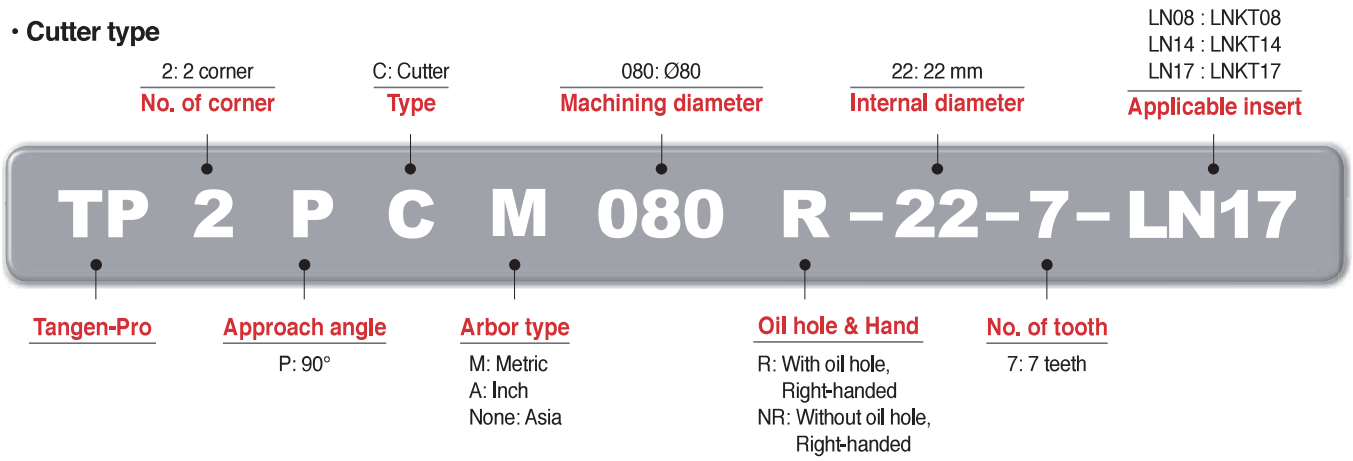
• Insert



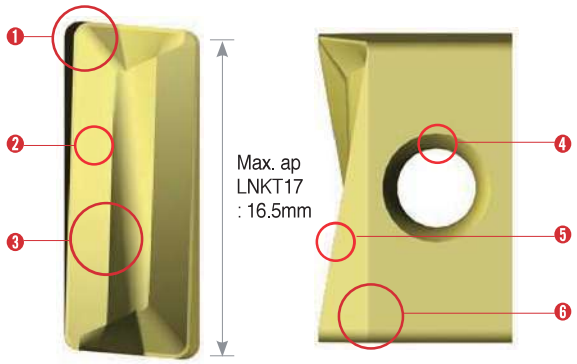
• Shank type



• Cutter type



Features of insert



1 Wedge type clamping area

- Clamping in wedge form on seats
  → Creates strong clamping force

2 High-rake angle chip breaker

- High-rake angle applied
- Produces smooth chip flow
  → Extended insert life

3 Convex projection

- Improved chip evacuation
- Enhances rigidity

4 Side hole (tangential type)

- Higher clamping stability

5 High-rake angle cutting-edges

- Improves cutting performance while reducing cutting load

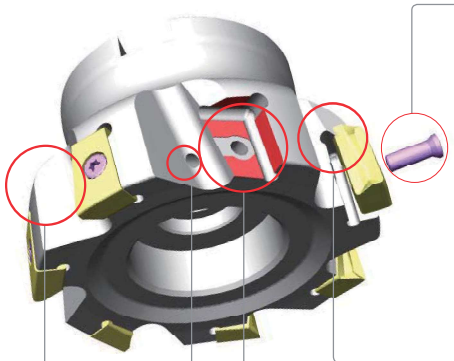
6 2-level flank relief surface

- 1st reverse positive relief surface enhances rigidity
- 2nd negative relief surface enables stable clamping
  → Improved chipping resistance and surface finish

Features of cutter

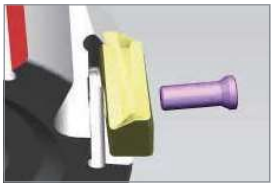
- Tangential clamping system, wedge-shaped inserts and wide seat area
  → Higher clamping stability
  → Lower vibrations and cutting resistance during machining

- Optimized H/D design with curved surface for smooth chip flow
  → Excellent chip evacuation in ramping or deep shouldering



Tangential clamping

- Multi-corner use
  → High feed machining availability

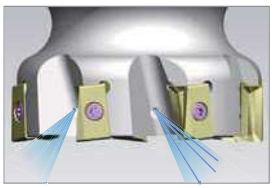


Efficient holder design

- Smoother chip evacuation in slotting or deep shouldering

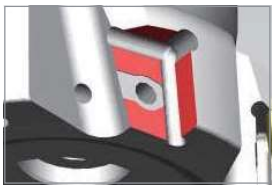
Through coolant system

- Improved chip evacuation
- Longer tool life due to insert cooling



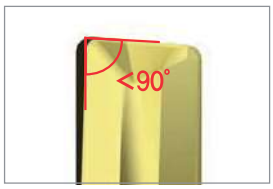
Wide seat area

- Strong clamping force



Wedge type clamping

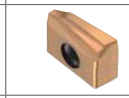
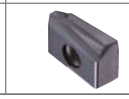
- Stable insert life



Application guideline for grade

Workpiece		P		K	N
		Carbon steel	Alloy steel	Cast iron	Aluminum
Grades	High speed cutting	PC5300	PC5300	PC6510	H01
	General cutting	PC5400	PC5300	PC6510	H01
	Interrupted cutting	PC5400	PC5400	PC5300	H01

Features of chip breaker

Insert		Cutting-edge	Uses	Features
MA			Aluminu	Exclusive sharp cutting edge for aluminum machining ensures good chip flow due to surface buffing treatment and high welding resistance.
ML			Light cutting	Chip breaker design for low cutting resistance that provides excellent tool life and quality surface finishes in light cutting and hard-to-cut materials
MM			General cutting	Universal design for general shoulder milling operations, highly suitable in most applications

Recommended cutting condition

• LNKT08

Workpiece		Grades	vc (m/min)	fz (mm/t)	Max. ap (mm)	Applicable insert
P	Steel	PC5300	150~240	0.25~0.05	8.0	LNKT0804□□PNR-MM
		PC5400	130~210	0.25~0.05	8.0	
K	Cast iron	PC6510	100~250	0.25~0.05	8.0	LNKT0804□□PNR-ML
		PC5300	100~200	0.25~0.05	8.0	
N	Aluminum	H01	500~1000	0.25~0.05	8.0	LNKT0804□□PNR-MA

※ The above data refer to general cutting conditions and can be adjustable to the speed of 300m/min and the feed per tooth of 0.5 mm/t depending on user environment.

• LNKT14

Workpiece		Grades	vc (m/min)	fz (mm/t)	Max. ap (mm)	Applicable insert
P	Steel	PC5300	150~240	0.25~0.05	12.7	LNKT1406□□PNR-MM
		PC5400	130~210	0.25~0.05	12.7	
K	Cast iron	PC6510	100~250	0.25~0.05	12.7	LNKT1406□□PNR-ML
		PC5300	100~200	0.25~0.05	12.7	
N	Aluminum	H01	500~1000	0.25~0.05	12.7	LNKT1406□□PNR-MA

※ The above data refer to general cutting conditions and can be adjustable to the speed of 300m/min and the feed per tooth of 0.5 mm/t depending on user environment.

• LNKT17

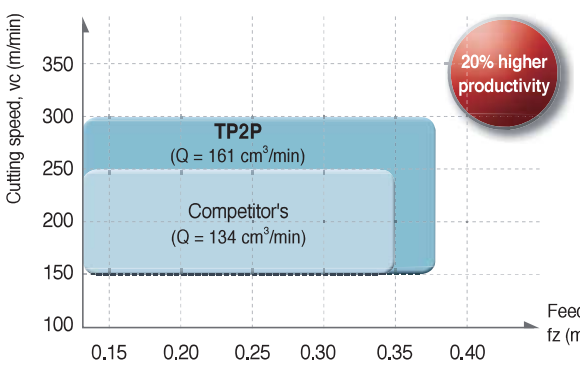
Workpiece		Grades	vc (m/min)	fz (mm/t)	Max. ap (mm)	Applicable insert
P	Steel	PC5300	150~240	0.25~0.05	16.5	LNKT1707□□PNR-MM
		PC5400	130~210	0.25~0.05	16.5	
K	Cast iron	PC6510	100~250	0.25~0.05	16.5	LNKT1707□□PNR-ML
		PC5300	100~200	0.25~0.05	8.0	
N	Aluminum	H01	500~1000	0.25~0.05	16.5	LNKT1707□□PNR-MA

※ The above data refer to general cutting conditions and can be adjustable to the speed of 300m/min and the feed per tooth of 0.5 mm/t depending on user environment.

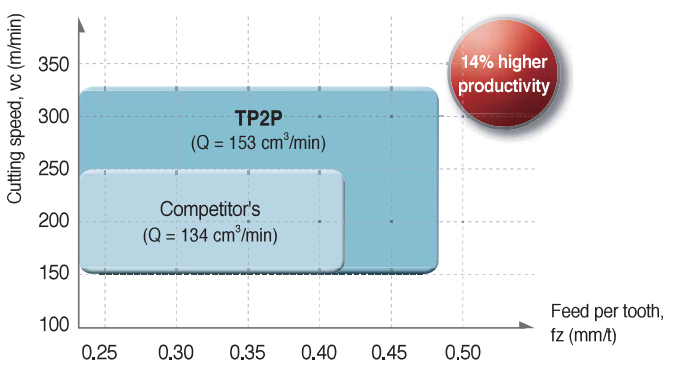
Application area

▶ **Higher speed and feed machining than competitor's increases machinability.**

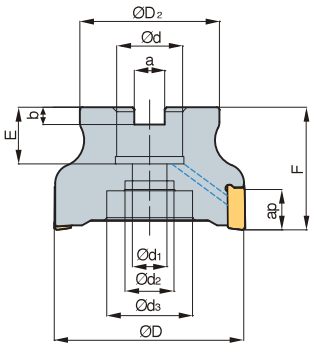
Application area: ap (mm) = 14, ae (mm) = 10



Application area: ap (mm) = 8, ae (mm) = 10



TP2PCM-LN08 new



AA
90°

- AR: -6°
- RR: -26°~ -22°

(mm)

	Designation		ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg
TP2PCM	040R-16-6-LN08	6	40	35	16	9	14	-	8.4	5.6	16	40	8.0	0.19
	040R-16-7-LN08	7	40	35	16	9	14	-	8.4	5.6	16	40	8.0	0.19
	050R-22-7-LN08	7	50	41	22	11	18	-	10.4	6.3	20	40	8.0	0.31
	050R-22-10-LN08	10	50	41	22	11	18	-	10.4	6.3	20	40	8.0	0.31
	063R-22-10-LN08	10	63	49	22	11	18	-	10.4	6.3	20	40	8.0	0.49
	063R-22-11-LN08	11	63	49	22	11	18	-	10.4	6.3	20	40	8.0	0.49

Available inserts

LNKT-MA new | LNKT-ML new | LNKT-MM new



	Designation	Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LNKT	080404PNR-MA																			E10
	080408PNR-MA																			
	080404PNR-ML																			
	080408PNR-ML																			
	080404PNR-MM																			
	080408PNR-MM																			

Available arbors

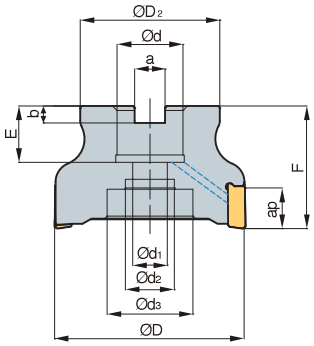
Designation		NC arbors
TP2PCM	040R-16-6-LN08	BT□□-FMC16-□□
	040R-16-7-LN08	
	050R-22-7-LN08	BT□□-FMC22-□□
	050R-22-10-LN08	
	063R-22-10-LN08	
	063R-22-11-LN08	

Parts

Specification	Screw	Wrench
Ø40~Ø63	FTKA02565S	TW07S

Available inserts E10 Available arbors and bolt E400~E402

TP2PC(M)-LN14 new



AA 90°

- AR: -6°
- RR: -22°~ -12°

(mm)

	Designation		ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg
TP2PCM	040R-16-4-LN14	4	40	35	16	9	14	–	8.4	5.6	19	40	12.7	0.19
	040R-16-5-LN14	5	40	35	16	9	14	–	8.4	5.6	19	40	12.7	0.19
	050R-22-5-LN14	5	50	42	22	11	18	–	10.4	6.3	20	40	12.7	0.29
	050R-22-6-LN14	6	50	42	22	11	18	–	10.4	6.3	20	40	12.7	0.29
	063R-22-6-LN14	6	63	49	22	11	18	–	10.4	6.3	20	40	12.7	0.49
	063R-22-8-LN14	8	63	49	22	11	18	–	10.4	6.3	20	40	12.7	0.49
	080R-27-7-LN14	7	80	57	27	14	20	35	12.4	7	23	50	12.7	0.94
	080R-27-10-LN14	10	80	57	27	14	20	35	12.4	7	23	50	12.7	0.94
	100R-32-8-LN14	8	100	70	32	18	28	45	14.4	8	28	63	12.7	1.73
	100R-32-13-LN14	13	100	70	32	18	28	45	14.4	8	28	63	12.7	1.73
	125R-40-9-LN14	9	125	90	40	22	32	54	16.4	9	30	63	12.7	2.98
	125R-40-17-LN14	17	125	90	40	22	32	54	16.4	9	30	63	12.7	3.04
TP2PC	080R-25.4-7-LN14	7	80	57	25.4	14	25	38	9.5	6	25	50	12.7	0.95
	080R-25.4-10-LN14	10	80	57	25.4	14	25	38	9.5	6	25	50	12.7	0.96
	100R-31.75-8-LN14	8	100	70	31.75	18	28	45	12.7	8	32	63	12.7	1.76
	100R-31.75-13-LN14	13	100	70	31.75	18	28	45	12.7	8	32	63	12.7	1.81
	125R-38.1-9-LN14	9	125	90	38.1	22	32	54	15.9	10	35	63	12.7	2.99
	125R-38.1-17-LN14	17	125	90	38.1	22	32	54	15.9	10	35	63	12.7	3.07

Available inserts

LNKT-MA new LNKT-ML new LNKT-MM new



Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LNKT	140608PNR-MA																			E10
	140608PNR-ML																			
	140608PNR-MM																			

Available arbors

Designation		NC arbors
TP2PCM	040R-16-4-LN14	BT□□-FMC16-□□
	040R-16-5-LN14	
	050R-22-5-LN14	BT□□-FMC22-□□
	050R-22-6-LN14	
	063R-22-6-LN14	
	063R-22-8-LN14	
	080R-27-7-LN14	BT□□-FMC27-□□
	080R-27-10-LN14	
	100R-32-8-LN14	BT□□-FMC32-□□

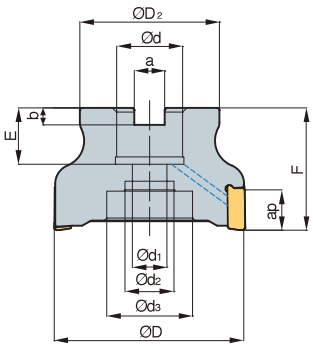
Designation		NC arbors
TP2PCM	100R-32-13-LN14	BT□□-FMC32-□□
	125R-40-9-LN14	BT□□-FMC40-□□
	125R-40-17-LN14	
TP2PC	080R-25.4-7-LN14	BT□□-FMA25.4-□□
	080R-25.4-10-LN14	
	100R-31.75-8-LN14	BT□□-FMA31.75-□□
	100R-31.75-13-LN14	
	125R-38.1-9-LN14	BT□□-FMA38.1-□□
	125R-38.1-17-LN14	

Parts

Specification	Screw	Wrench
Ø40 ~ Ø125	FTKA03510	TW15S

Available inserts E10 Available arbors and bolt E400~E402

TP2PC(M)-LN17 new



AA 90°

- AR: -6°
- RR: -21°~ -15°

(mm)

	Designation		ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg
TP2PCM	040R-16-3-LN17	3	40	35	16	9	14	-	8.4	5.6	16	40	16.5	0.17
	040R-16-4-LN17	4	40	35	16	9	14	-	8.4	5.6	16	40	16.5	0.17
	050R-22-4-LN17	4	50	41	22	11	18	-	10.4	6.3	20	40	16.5	0.27
	050R-22-5-LN17	5	50	41	22	11	18	-	10.4	6.3	20	40	16.5	0.26
	063R-22-6-LN17	6	63	49	22	11	18	-	10.4	6.3	20	40	16.5	0.46
	063R-22-7-LN17	7	63	49	22	11	18	-	10.4	6.3	20	40	16.5	0.47
	080R-27-7-LN17	7	80	57	27	14	20	35	12.4	7	23	50	16.5	0.89
	080R-27-8-LN17	8	80	57	27	14	20	35	12.4	7	23	50	16.5	0.91
	100R-32-8-LN17	8	100	67	32	18	28	45	14.4	8	25	63	16.5	1.68
	100R-32-9-LN17	9	100	67	32	18	28	45	14.4	8	25	63	16.5	1.75
	125R-40-10-LN17	10	125	90	40	22	32	52	16.4	10	30	63	16.5	2.88
	125R-40-11-LN17	11	125	90	40	22	32	52	16.4	10	30	63	16.5	2.88
TP2PC	080R-25.4-7-LN17	7	80	57	25.4	14	20	35	9.5	6	25	50	16.5	0.92
	080R-25.4-8-LN17	8	80	57	25.4	14	20	35	9.5	6	25	50	16.5	0.93
	100R-31.75-8-LN17	8	100	67	31.75	18	28	45	12.7	8	32	63	16.5	1.73
	100R-31.75-9-LN17	9	100	67	31.75	18	28	45	12.7	8	32	63	16.5	1.73
	125R-38.1-10-LN17	10	125	90	38.1	22	32	52	15.9	9	35	63	16.5	3.06
	125R-38.1-11-LN17	11	125	90	38.1	22	32	52	15.9	9	35	63	16.5	2.91

Available inserts

LNKT-MA new

LNKT-ML new

LNKT-MM new

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
LNKT	170704PNR-MA																		E10
	170708PNR-MA																		
	170712PNR-MA																		
	170716PNR-MA																		
	170720PNR-MA																		
	170704PNR-ML																		
	170708PNR-ML											●		●	●				
	170712PNR-ML																		

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
LNKT	170716PNR-ML																		E10
	170720PNR-ML																		
	170704PNR-MM																		
	170708PNR-MM														●	●			
	170712PNR-MM																		
	170716PNR-MM																		
	170720PNR-MM																		

Available arbors

Designation		NC arbors
TP2PCM	040R-16-3-LN17	BT□□-FMC16-□□
	040R-16-4-LN17	
	050R-22-4-LN17	BT□□-FMC22-□□
	050R-22-5-LN17	
	063R-22-6-LN17	
	063R-22-7-LN17	
	080R-27-7-LN17	BT□□-FMC27-□□
	080R-27-8-LN17	
	100R-32-8-LN17	BT□□-FMC32-□□

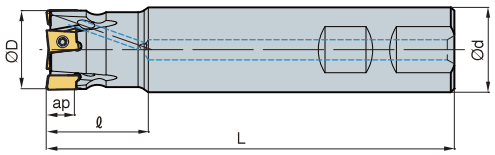
Designation		NC arbors
TP2PCM	100R-32-9-LN17	BT□□-FMC32-□□
	125R-40-10-LN17	BT□□-FMC40-□□
	125R-40-11-LN17	
TP2PC	080R-25.4-7-LN17	BT□□-FMA25.4-□□
	080R-25.4-8-LN17	
	100R-31.75-8-LN17	BT□□-FMA31.75-□□
	100R-31.75-9-LN17	
	125R-38.1-10-LN17	BT□□-FMA38.1-□□
	125R-38.1-11-LN17	

Parts

Specification	Screw	Wrench
Ø40~Ø125	FTKA0412B	TW15S

Available inserts E10 Available arbors and bolt E400~E402

TP2PS-LN08 new



AA 90°

- AR: -6°
- RR: -35°~ -26°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
TP2PS	020R-2W20-120-LN08	2	20	20	30	120	8.0	0.25
	020R-3W20-120-LN08	3	20	20	30	120	8.0	0.25
	025R-3W25-120-LN08	3	25	25	30	120	8.0	0.39
	025R-4W25-120-LN08	4	25	25	30	120	8.0	0.39

Available inserts


LNKT-MA


LNKT-ML


LNKT-MM

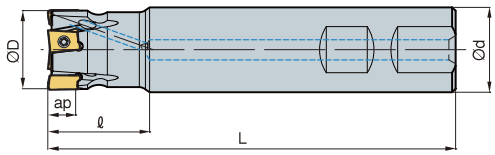
Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LNKT	080404PNR-MA																			E10
	080408PNR-MA																			
	080404PNR-ML																			
	080408PNR-ML																			
	080404PNR-MM																			
	080408PNR-MM																			

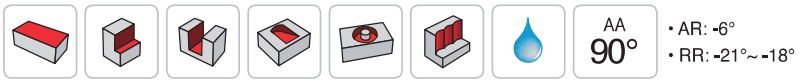
Parts

Specification	Screw	Wrench
Ø16~Ø25	FTKA02565S	TW07S

Available inserts E10

TP2PS-LN14 new





- AR: -6°
- RR: -21°~-18°

(mm)

	Designation		ØD	Ød	ℓ	L	ap	kg
TP2PS	025R-2W25-130-LN14	2	25	25	40	130	12.7	0.41
	032R-3W32-130-LN14	3	32	32	40	130	12.7	0.69
	040R-3W32-130-LN14	3	40	32	40	130	12.7	0.75
	040R-4W32-130-LN14	4	40	32	40	130	12.7	0.76
	050R-4W32-130-LN14	4	50	32	40	130	12.7	0.85
	050R-5W32-130-LN14	5	50	32	40	130	12.7	0.84

Available inserts

LNKT-MA LNKT-ML LNKT-MM

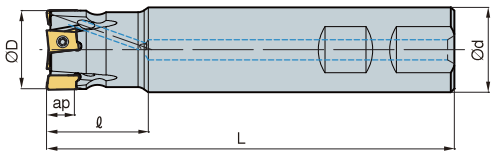
	Designation	Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LNKT	140608PNR-MA																			E10
	140608PNR-ML																			
	140608PNR-MM																			

Parts

Specification	Screw	Wrench
Ø25 ~ Ø50	FTKA03510	TW15S

Available inserts E10

TP2PS-LN17 new



AA 90°

- AR: -6°
- RR: -26°~ -18°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
TP2PS	032R-2W32-130-LN17	2	32	32	40	130	16.5	0.68
	032R-3W32-130-LN17	3	32	32	40	130	16.5	0.67
	040R-3W32-130-LN17	3	40	32	40	130	16.5	0.73
	040R-4W32-130-LN17	4	40	32	40	130	16.5	0.73
	050R-4W32-130-LN17	4	50	32	40	130	16.5	0.83
	050R-5W32-130-LN17	5	50	32	40	130	16.5	0.83

Available inserts

LNKT-MA new | LNKT-ML new | LNKT-MM new

Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LNKT	170704PNR-MA																			E10
	170708PNR-MA																			
	170712PNR-MA																			
	170716PNR-MA																			
	170720PNR-MA																			
	170704PNR-ML																			
	170708PNR-ML											●			●	●				
	170712PNR-ML																			
	170716PNR-ML																			
	170720PNR-ML																			
	170704PNR-MM																			
	170708PNR-MM														●	●				
	170712PNR-MM																			
	170716PNR-MM																			
	170720PNR-MM																			

Parts

Specification	Screw	Wrench
Ø32~Ø50	FTKA0412B	TW15S

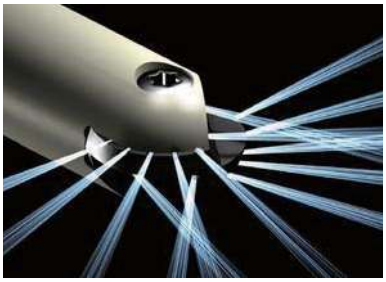
Available inserts E10

Longer tool life guaranteed thanks to the excellent cutting performance of our grades

Laser Mill

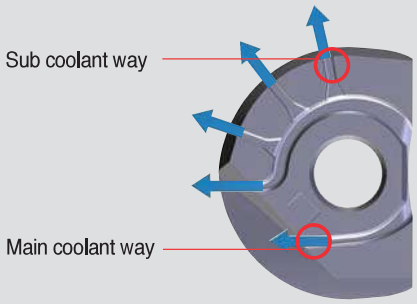
- Long tool life has been achieved due to the excellent cutting performance of the insert grade
- Optimum machining of molds has been achieved with the MQL available system
- Easy clamping with simple screw on system
- Various holder line up: steel shank, carbide shank, modular type
- High accuracy indexable endmills for mold finishing

MQL System

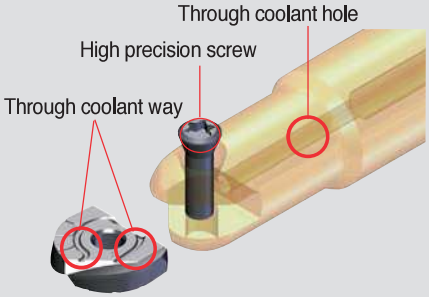


- Environmental friendly system
- Decreased coolant cost
- Lubrication of cutting-edge
- Improved chip control property
- Increased tool life & improved surface quality

Clamping system



- High precision (ground internal diameter) Run-out: 0.02 mm Accuracy of 'R part: below 0.01
- Through coolant system

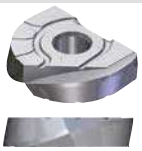
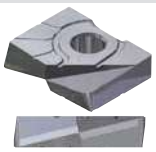
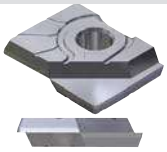


Features

LBE

- Six types of inserts are available with one holder
- Single screw for clamping of insert: Easy clamping system
- Various types of holders (Steel shank, Carbide shank, Modular type)
- MQL applicable- environmentally responsible with longer tool life & improved surface quality.

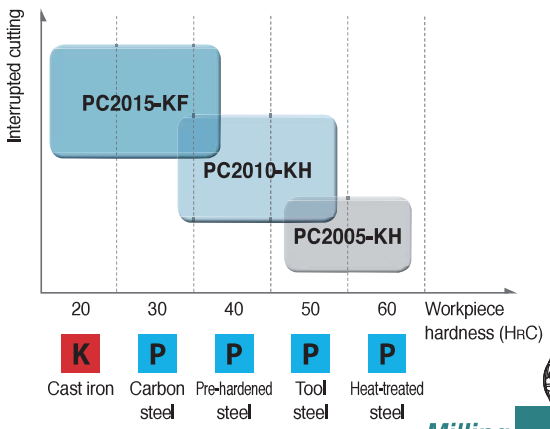
LBS, LR Order-made items

LBH-Ball	LRH-Corner radius	LFH-High feed	LCF-Chamfer	LBS-Ball type	LR-Corner R type
					
• Helical cutting-edge • Suitable for harder material with high feed	• Helical cutting-edge • Variety of nose-R	• Helical cutting-edge • Suitable for high feed	• Straight cutting-edge • Center drilling and chamfering	• Straight cutting-edge • Suitable for precise	• Straight cutting-edge • Variety of nose-R

Features of Laser Mill grades

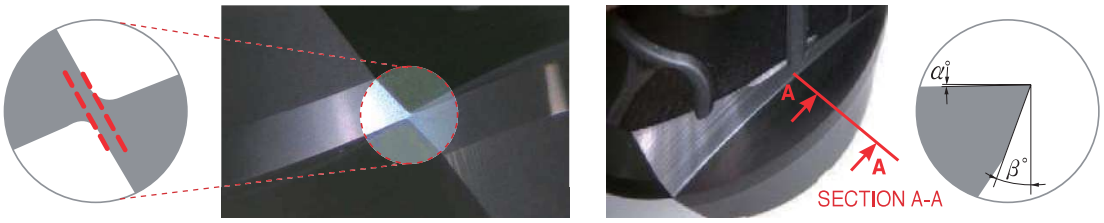
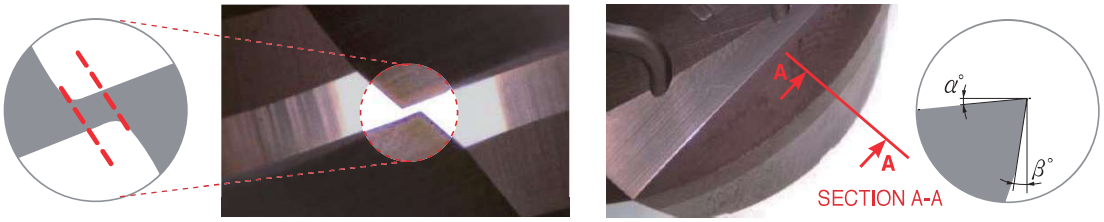
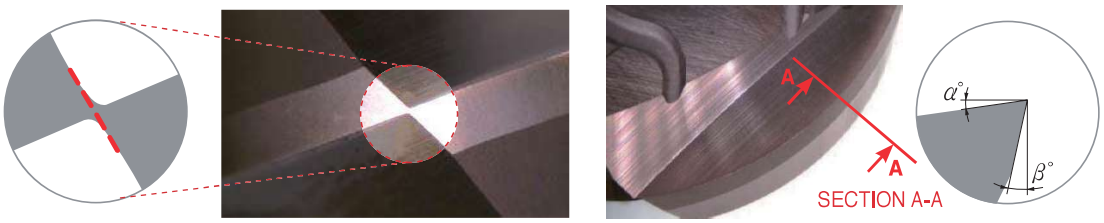
PC2005	• Extremely high hardness grade • The harmony between improved blade design and strong chip breaker • Optimized for machining heat-treated steel and high hardness steel
PC2010	• High wear resistance and excellent toughness • The harmony between excellent thermal shock resistance and strong cutting-edges. • Optimized for machining tool steel and pre-hardened steel
PC2015	• High welding resistance and excellent toughness • The harmony between tough grade and excellent cutting-edge design • Optimized for machining carbon steel

Application guideline per workpiece



Features of KF/KH chip breaker

- KF: Exclusive chip breaker for stable machining of carbon steel with its characteristics of high wear resistance at center part and improved blade design
- KH: Stronger insert with the combination of rake angle and relief angle that are ideal for machining high hardness workpiece

Type	Shape comparison
Standard (For general cutting)	 • Proper to general cutting • Insert shape for uniform performance
KH (For high hardness steel)	 • Center shaper proper for machining high hardness workpiece and uniformed tool life at center part • Improved cutting-edge design by higher rake angle (α°) • Lower relief angle (ß°) increases strength of cutting-edges than universal inserts.
KF (For carbon steel)	 • Smaller chisel improves wear resistance at center for machining carbon steel. • Improved cutting-edge design by higher rake angle (α°) • Longer tool life and better cutting performance with the use of excellent blade design

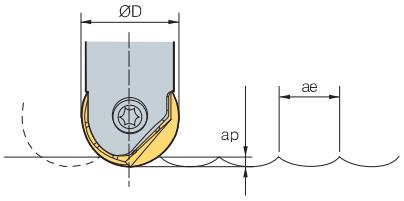
Recommended cutting condition

Workpiece				Grades	Chip breaker	Recommended cutting conditions			
ISO		Material	HB (HRC)			vc (m/min)	fz (mm/t)	ap (mm)	ae (mm)
K	Gray cast iron	GC250	180 (8)	PC2015 PC2010 PC2005	KF	130~210	0.2~0.5	0.07D	0.07D
K	Ductile cast iron	GCD600	250 (24)						
P	Carbon steel	S20C~S50C	150			170~250	0.2~0.5	0.07D	0.07D
P	Alloy steel	SCM21~SCM5H	270 (28)	PC2010 PC2015 PC210F	KH	130~210	0.1~0.3	0.7D	0.7D
P	Pre-hardened steel	KP4M	300 (32)			100~160	0.1~0.3	0.5D	0.5D
P	Pre-hardened steel	NIMAX	370 (40)						
P	Pre-hardened steel	CENA1	370 (40)						
P	Pre-hardened steel	NAK80	400 (43)						
P	Pre-hardened steel	STAVAX	510 (52)						
P	High speed tool steel	SKH51~SKH59	550 (55)	PC2005 PC2010	KH	80~130	0.1~0.2	0.3D	0.3D
P	Alloy tool steel	STD61 (Hot forging)	630 (60)			70~120	0.1~0.2	0.3D	0.3D
P	Alloy tool steel	STD11 (Cold forging)							

Overhang	vc (m/min)	fz (mm/t)
Under 3D	100%	100%
3D~5D	70%	70%
5D~8D	60%	60%
8D~10D	50%	50%

Cutting condition formula for milling

Practical cutting speed	RPM
$vce = \frac{\pi \times De \times n}{1000}$ (m/min)	$n = \frac{vce \times 1000}{\pi \times De}$ (min^{-1})
Feed per tooth	**Feed per minute**
$fz = \frac{vf}{z \times n}$ (mm/t)	$vf = fz \times z \times n$ (mm/min)
Chip removal amount	**Power requirement**
$Q = \frac{ap \times ae \times vf}{1000}$ (cm^3/min)	$Pkw = \frac{Q \times kc}{60 \times 102 \times \eta}$ (kW) $Php = \frac{Pc}{0.75}$ (hp)



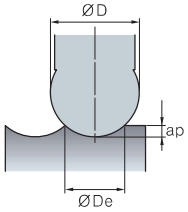
vc = Cutting speed (m/min)	**Pkw** = Power requirement (kW)
vce = Practical cutting speed (m/min)	**Php** = Horsepower requirement (hp)
n = Revolution per minute (min^{-1})	**Q** = Chip removal amount (cm^3/min)
D = Cutting diameter (mm)	**ap** = Depth of cut (mm)
De = Actual diameter (mm)	**ae** = Width of cut (mm)
vf = Feed per minute (mm/min)	**kc** = Specific cutting resistance (kg/mm^2)
fz = Feed per tooth (mm/t)	**η** = Mechanical efficiency (%)
z = Number of tooth	

Practical cutting speed calculation formulas

1. Formula of actual diameter

• **Formula**
: Actual diameter

$De = 2\sqrt{ap\,(D - ap)}$



2. θ°Using: Calculating cutting speed at P point
(Cutting speed according to depth of cut when ramping)

• **Formula**
: Practical cutting speed

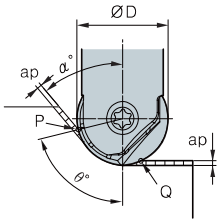
$vce = \frac{\pi\, Dsin\theta \times n}{1000}$ (m/min)

$\theta = \cos^{-1}\left(\frac{D - 2ap}{D}\right) + (90 - \alpha°)$

3. In case of using ap: Calculating cutting speed at Q point

• **Formula**
: Pratical cutting speed

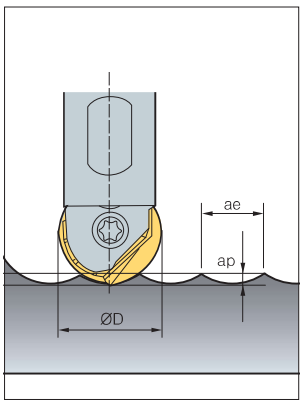
$vce = \frac{2\pi n\sqrt{ap\,(D - ap)}}{1000}$



Practical cutting speed calculation formulas

ae (mm) / R (mm)	h (surface roughness) (μm)									
	0.1	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
5	0.3	1.0	2.3	4.0	6.3	9.0	12.3	16.0	20.3	25.0
6	0.2	0.8	1.9	3.3	5.2	7.5	10.2	13.3	16.9	20.8
8	0.2	0.6	1.4	2.5	3.9	5.6	7.7	10.0	12.7	15.6
10	0.1	0.5	1.1	2.0	3.1	4.5	6.1	8.0	10.1	12.5
12.5	0.1	0.4	0.9	1.6	2.5	3.6	4.9	6.4	8.1	10.0
15	0.1	0.3	0.8	1.3	2.1	3.0	4.1	5.3	6.8	8.3
16	0.1	0.3	0.7	1.3	2.0	2.8	3.8	5.0	6.3	7.8

Formula of surface roughness: h (surface finish) = $\frac{(ae)^2}{8R} \times 1000$ (μm)



Actual diameter data

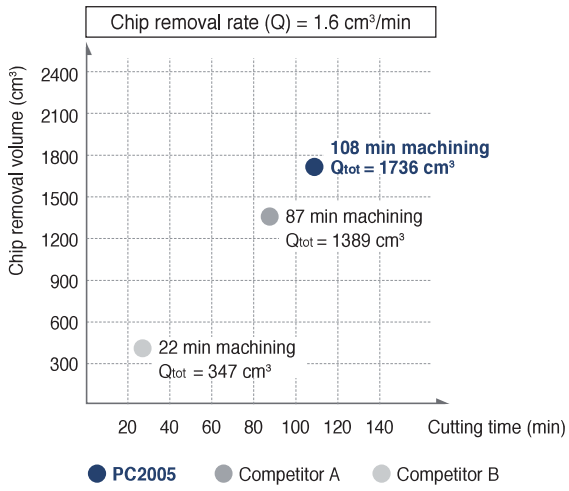
ap \ ØD	Ø08	Ø10	Ø12	Ø16	Ø20	Ø25	Ø30	Ø32
0.1	1.8	2.0	2.2	2.5	2.8	3.2	3.5	3.6
0.2	2.5	2.8	3.1	3.6	4.0	4.5	4.9	5.0
0.3	3.0	3.4	3.7	4.3	4.9	5.4	6.0	6.2
0.5	3.9	4.4	4.8	5.6	6.2	7.0	7.7	7.9
1.0	5.3	6.0	6.6	7.7	8.7	9.8	10.8	11.1
1.5	6.2	7.1	7.9	9.3	10.5	11.9	13.1	13.5
2.0	6.9	8.0	8.9	10.6	12.0	13.6	15.0	15.5
2.5	7.4	8.7	9.7	11.6	13.2	15.0	16.6	17.2
3.0	7.7	9.2	10.4	12.5	14.3	16.2	18.0	18.7
3.5	7.9	9.5	10.9	13.2	15.2	17.3	19.3	20.0
4.0	8.0	9.8	11.3	13.9	16.0	18.3	20.4	21.2
5.0			11.8	14.8	17.3	20.0	22.4	23.2
6.0			12.0	15.5	18.3	21.4	24.0	25.0
7.0				15.9	19.1	22.4	25.4	26.5
8.0				16.0	19.6	23.3	26.5	27.7
10.0					20.0	24.5	28.3	29.7

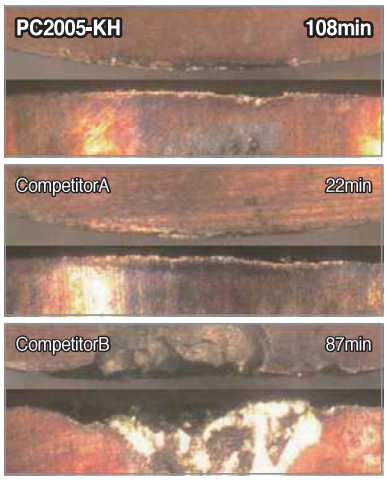
Performance evaluation

PC2005 tool life test — High hardness heat-treated steel (X100CrMoV5 1, heat-treated HRC60)

■ **Cutting conditions**
vc (m/min) = 140
fz (mm/t) = 0.15
ap (mm) = 1.2
ae (mm) = 1.2
Coolant (Air)

■ **Tools**
Insert LBH120-KH (PC2005)

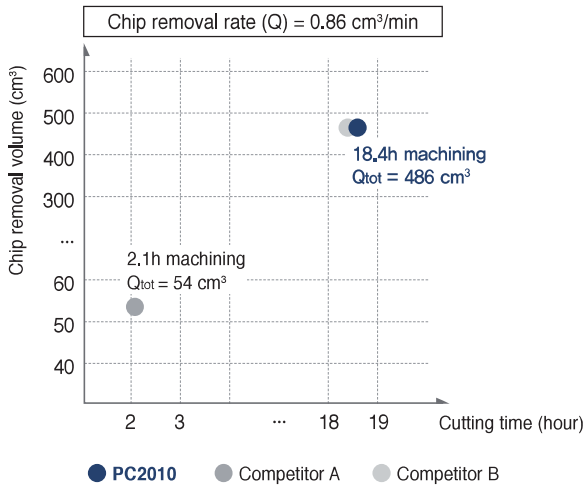


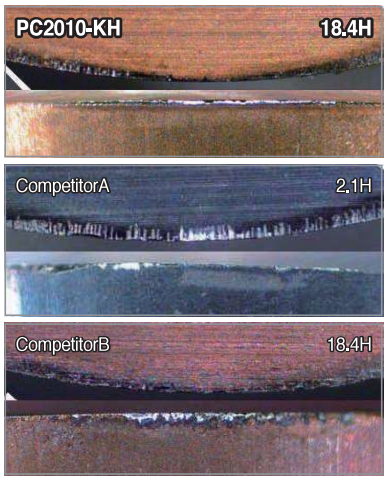


PC2010 tool life test — Pre-hardened steel (X40CrMnNiMo8-6-4)

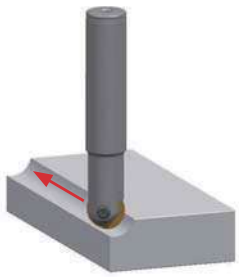
■ **Cutting conditions**
vc (m/min) = 276
fz (mm/t) = 0.15
ap (mm) = 0.3
ae (mm) = 1.2
Wet

■ **Tools**
Insert LBH120-KH (PC2010)



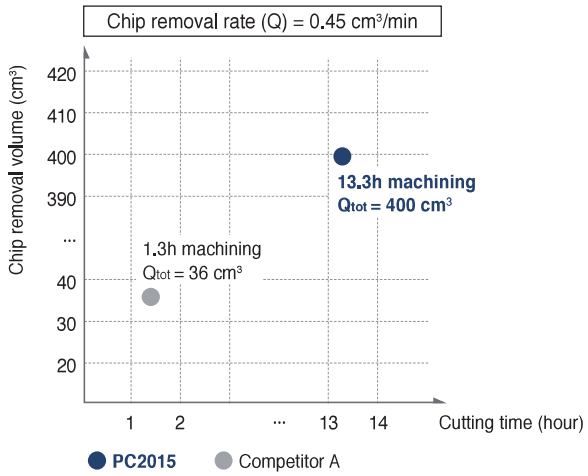


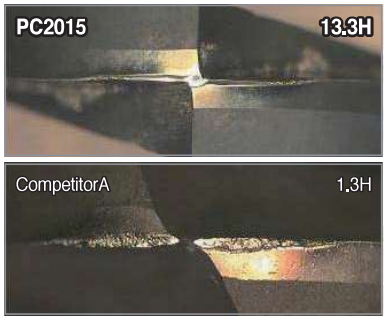
PC2015 tool life test — Carbon steel (C45)



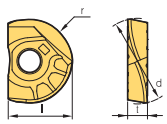
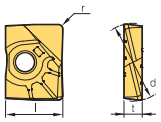
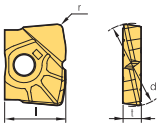
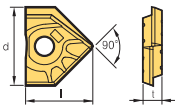
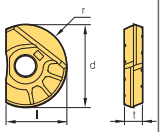
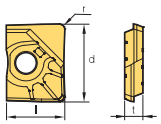
■ **Cutting conditions**
vc (m/min) = 250
fz (mm/t) = 0.35
ap (mm) = 0.3
ae (mm) = 0.3
Coolant (MQL)

■ **Tools**
Insert LBH120 (PC2015)





Available inserts

Holders	LBH (Ball type)	LRH (Corner radius type)	LFH (High feed type)	LCF (Chamfer type)	LBS (Ball type)	LR (Corner radius type)
	 R accuracy ±0.005	 Corner R ±0.015			 R accuracy ±0.005	 Corner R ±0.015
LBE080	LBH080 LBH090 LBH080-KF LBH090-KF LBH080-KH LBH090-KH				LBS080 LBS090	
LBE100 **LRE100**	LBH100 LBH110 LBH100-KF LBH110-KF LBH100-KH LBH110-KH	LRH100-R05 LRH100-R10 LRH110-R05 LRH100-R20	LFH100		LBS100 LBS110	LR100-R05 LR100-R20 LR100-R10 LR110-R05
LBE120 **LRE120**	LBH120 LBH130 LBH120-KF LBH130-KF LBH120-KH LBH130-KH	LRH120-R05 LRH120-R10 LRH130-R05 LRH120-R20	LFH120		LBS120 LBS130	LR120-R05 LR120-R20 LR120-R10 LR130-R05
LBE160 **LRE160**	LBH160 LBH170 LBH160-KF LBH170-KF LBH160-KH LBH170-KH	LRH160-R05 LRH160-R10 LRH160-R20 LRH170-R05 LRH160-R30	LFH160	LCF160-D90	LBS160 LBS170	LR160-R05 LR160-R30 LR160-R10 LR170-R05 LR160-R20
LBE200 **LRE200**	LBH200 LBH210 LBH200-KF LBH210-KF LBH200-KH LBH210-KH	LRH200-R05 LRH200-R10 LRH200-R20 LRH210-R05 LRH200-R30	LFH200	LCF200-D90	LBS200 LBS210	LR200-R05 LR200-R30 LR200-R10 LR210-R05 LR200-R20
LBE250 **LRE250**	LBH250 LBH260 LBH250-KF LBH260-KF LBH250-KH LBH260-KH	LRH250-R05 LRH250-R10 LRH250-R20 LRH260-R05 LRH250-R30	LFH250	LCF250-D90	LBS250 LBS260	LR250-R05 LR250-R30 LR250-R10 LR260-R05 LR250-R20
LBE300 **LRE300**	LBH300 LBH310 LBH300-KF LBH310-KF LBH300-KH LBH310-KH	LRH300-R10 LRH300-R20 LRH310-R05 LRH300-R30	LFH300		LBS300 LBS310	LR300-R10 LR300-R30 LR300-R20 LR310-R05
LBE320 **LRE320**	LBH320 LBH330 LBH320-KF LBH330-KF LBH320-KH LBH330-KH	LRH320-R10 LRH330-R10 LRH320-R20 LRH330-R20 LRH320-R30 LRH330-R30	LFH320		LBS320	LR320-R10 LR320-R30 LR320-R20

Available inserts **E08, E09**

* LBH for general cutting, LBH-KF for carbon steel, and LBH-KH for high hardened steel.

Long tool life due to high hardness grade

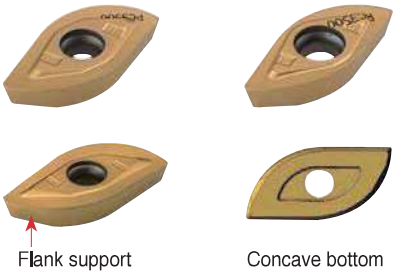
GBE

- Indexable ball nose endmill for molds in medium & roughing applications
- Long tool life with high hardness grade
- Helical high accuracy cutting-edge
- Optimized mold machining process with our internal coolant system
- Able to adjust to medium processing in middle & big roughing mold process
- Wide variety of holders in normal & long style holders

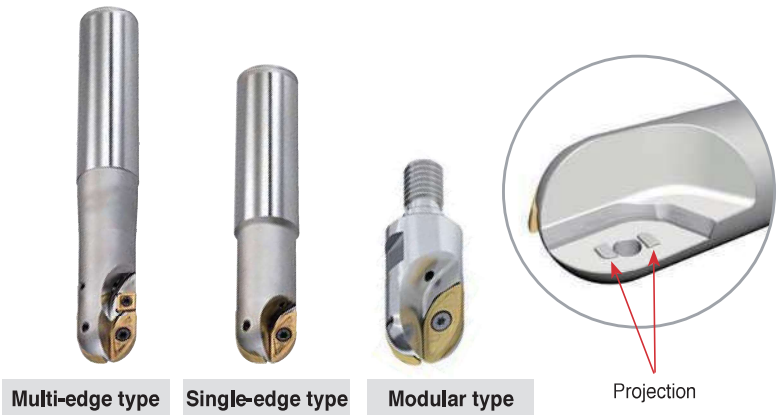
Holder code system

GBE	300	–	S	32
Product Name	**Machining Dia.**		**Type**	**Shank Dia.**
General Indexable Ball Endmill	Ø16, Ø18, Ø20, Ø22, Ø25, Ø26, Ø28, Ø30, Ø32, Ø40, Ø50		S: Standard shank L: Long shank	32: Ø32

Internal | **External**



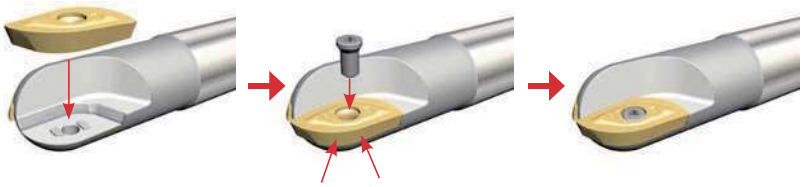
- High accuracy machining & large depth of cut applications
  - Run-out: within 0.05 mm
  - R accuracy: within 0.05 mm
- Various diameters (Ø16, Ø18, Ø20, Ø22, Ø25, Ø26, Ø28, Ø30, Ø32, Ø40, Ø50)
- Minimal cutting resistance due to Helical cutting-edge
- Anti-rotation of insert due to concave bottom & stable setting by flank support
- Long tool life & better processing due to 2 cutting inserts
- Better tool life with new grade



Multi-edge type | **Single-edge type** | **Modular type**

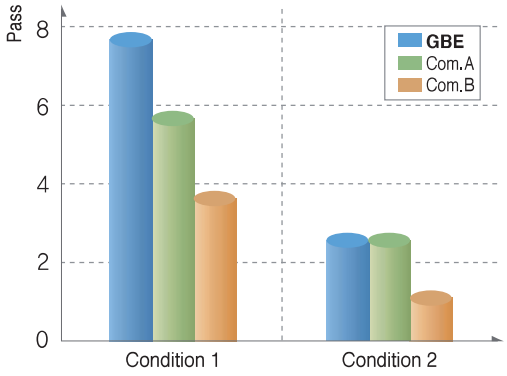
- Various diameters (Ø16, Ø18, Ø20, Ø22, Ø25, Ø26, Ø28, Ø30, Ø32, Ø40, Ø50)
- Improved chip treatment with internal coolant (cutting-edge portion)
- Long tool life & better processing
- Easy insert setting with projection part to prevent vibration during processing

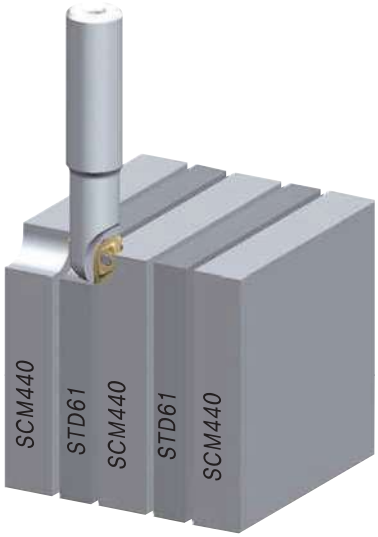
How to set insert



1. Set the insert onto the holder projection seat
2. Push the insert into the pocket as shown by red arrows and screw down with wrench

Performance evaluation





Cutting condition

Class.	Cutting speed (vc)	Feed (fz)	Depth of cut (ap)	Depth of cut (ae)	Workpiece	Etc.
Condition 1	150 m/min	0.15 mm/t	5 mm	8 mm	STD61 (HRC50) + SCM440 (HRC20)	Dry
Condition 2	100 m/min	0.1 mm/t	8 mm	8 mm		

Inserts/parts

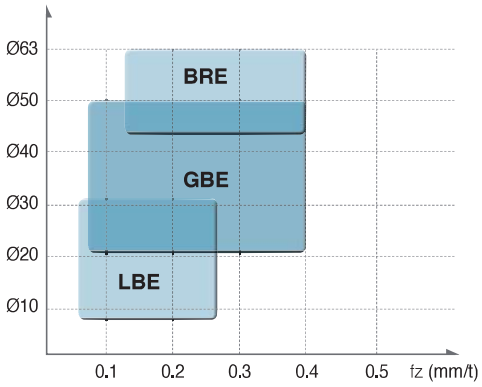
Type	Insert			Parts	
					

Dia.	Internal I/S	External I/S	External main I/S	Screw		Wrench	
				Int./Ext. type	Ext. main type	Int./Ext. type	Ext. main type
Ø16	ZPET080M-MM	ZPET080S-MM	-	FTKA02555S	-	TW08S	-
Ø18	ZPET090M-MM	ZPET090S-MM	-	FTKA0307	-	TW09S	-
Ø20	ZPET100M-MM	ZPET100S-MM	SPMT060304	FTKA0307	ETNA02506	TW09S	TW07P
Ø22	ZPET110M-MM	ZPET110S-MM	SPMT060304	FTKA0408	ETNA02506	TW15S	TW07P
Ø25	ZPET125M-MM	ZPET125S-MM	SPMT060304	FTKA0409	ETNA02506	TW15S	TW07P
Ø26	ZPET130M-MM	ZPET130S-MM	SDMT090308-MM	FTKA0409	ETNA0408	TW15S	TW15S
Ø28	ZPET140M-MM	ZPET140S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20	TW15S
Ø30	ZPET150M-MM	ZPET150S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20-100	TW15S
Ø32	ZPET160M-MM	ZPET160S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20-100	TW15S
Ø40	ZPET200M-MM	ZPET200S-MM	SPMT120408-MM	FTGA0614	ETNA0511	TW20-100	TW20S
Ø50	ZPET250M-MM	ZPET250S-MM	SPMT120408-MM	FTGA0818	ETNA0511	TW25S	TW20S

Recommended cutting condition

Workpiece	Machining type	Hardness (HRC)	vc (m/min)	fz (mm/t)	ap (mm)	ae (mm)
Carbon, Alloy steel	Flank Groove Deep flank	Under 25	160~250 120~200 160~250	0.1~0.5 0.1~0.5 0.1~0.5	0.3~0.5D 0.3~0.5D 1.0~1.5D	0.2~0.3D - 0.1~0.2D
Carbon, Alloy steel	Flank Groove Deep flank	Under 45	120~200 120~160 120~200	0.1~0.5 0.1~0.5 0.1~0.5	0.3~0.5D 0.3~0.5D 1.0~1.5D	0.2~0.3D - 0.1~0.2D
Mold Alloy steel	Flank Groove Deep flank	30~40	120~200 120~160 120~200	0.1~0.3 0.1~0.3 0.1~0.3	0.3~0.5D 0.3~0.5D 1.0~1.5D	0.2~0.3D - 0.1~0.2D
Cast iron (GC, GCD)	Flank Groove Deep flank	20~30	150~300 150~300 150~300	0.2~0.7 0.2~0.7 0.2~0.7	0.3~0.5D 0.3~0.5D 1.0~1.5D	0.2~0.3D - 0.1~0.2D
Heat-treated steel	Flank Groove Deep flank	50~60	40~100 40~100 40~100	0.1~0.3 0.1~0.3 0.1~0.3	0.3~0.5D 0.3~0.5D 1.0~1.5D	0.2~0.3D - 0.1~0.2D

Line-up for indexable ball endmill



Type	Application				
	Quality	Machining Efficiency	Machining Dia. Equivalence	Economical	Flank Machining with LongEdge
Laser Mill	●	○	◐	○	○
GBE	◐	●	◐	◐	●
BRE	○	●	●	●	●

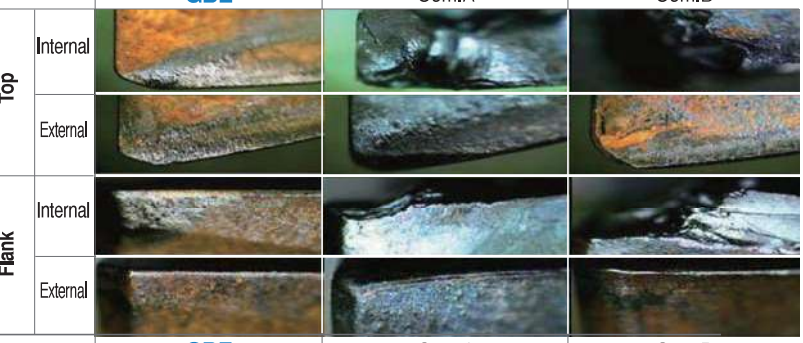
●: Very Good ◐: Good ○: Normal

Test result for wear resistance

Cutting condition	Wear resistance photos

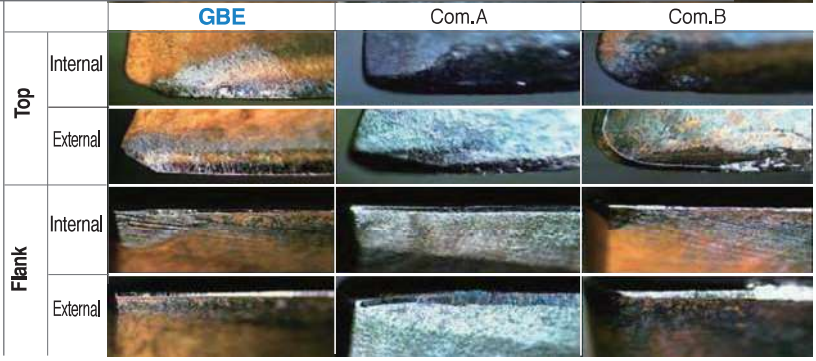
Time engaged : 4 Pass

■ **Workpiece**
KP4M (HRC33), Dry
■ **Condition**
vc = 280 m/min
fz = 0.25 mm/t
ap = 5~10 mm
ae = 5~10 mm
vf = 1,486 mm/min
n = 2,971 rpm
■ **Tool**
Holder: GBE300-S32
Insert: ZPET150M-MM (PC3500)
ZPET150S-MM (PC3500)



Time engaged : 4 Pass

■ **Workpiece**
STD11 (HRC20), Dry
■ **Condition**
vc = 250 m/min
fz = 0.2 mm/t
ap = 5 mm
ae = 5 mm
vf = 1,062 mm/min
n = 2,653 rpm
■ **Tool**
Holder: GBE300-S32
Insert: ZPET150M-MM (PC3500)
ZPET150S-MM (PC3500)



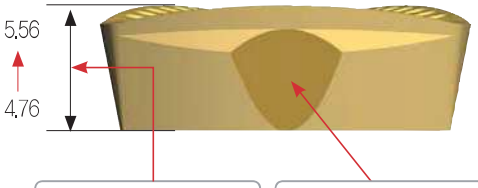
Better tool life with its anti-breakage special surface treatment

BRE

- Cutting performance: Good chip control & Superior cutting performance with optimal cutting-edge line
- High rigidity body: Better tool life and special surface treatment to strengthen the holder
  Easy to set and good durability with TCRX screw
  Good chip control with our 3D flute design & improved external quality
- Insert: Grade available for high speed & feed applications due to it's high wear and breakage resistance providing a stable cutting performance with high cutting-edge toughness and a chip breaker featuring a high rake angle

Multi-edge holder ISO View

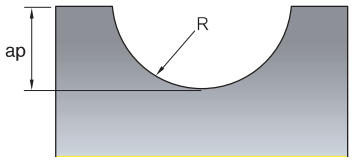
- Good chip flow
- Good heat emission



- Wider insert ensures cutting-edge strength
- Better setting force by recess

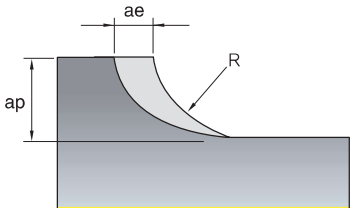
BRE machining type for roughing & Recommended cutting condition

Machining type 1



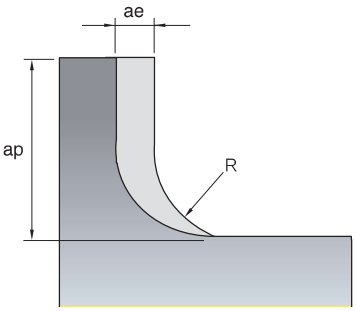
ap = 0.3D-0.5D

Machining type 2



ae = 0.2D-0.3D ap = 0.3D-0.5D

Machining type 3



ae = 0.1D-0.5D ap = 1.2D-1.5D

Workpiece	Machining type	Cutting speed (m/min)	Feed (mm/t)	Grades
Carbon/alloy steel	1 2 3	120~220 120~220 100~180	0.1~0.4 0.2~0.4 0.1~0.3	**NCM325** **NCM325** **NCM325**
Alloy steel	1 2 3	100~200 100~200 80~160	0.1~0.4 0.2~0.4 0.1~0.3	**NCM325** **NCM325** **NCM325**
Tool steel	1 2 3	80~150 80~150 60~120	0.1~0.3 0.15~0.35 0.1~0.3	**NCM325** **NCM325** **NCM325**
High hardness material (HRC35~45)	1 2 3	60~120 60~120 50~80	0.1~0.3 0.1~0.3 0.1~0.2	**NCM325** **NCM325** **NCM325**
Cast iron	1 2 3	100~180 100~180 80~160	0.2~0.5 0.2~0.5 0.15~0.4	**NCM325** **NCM325** **NCM325**

LBE 08/10/12/16/20/25/30/32

Straight type

Carbide Shank (Ball type)

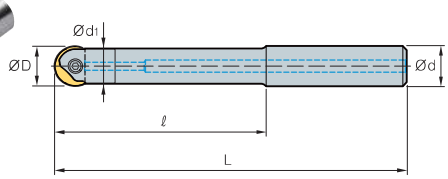


Fig. 1

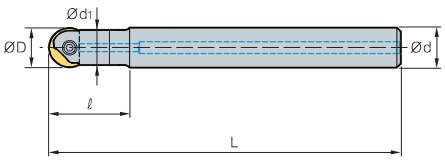


Fig. 2

(mm)

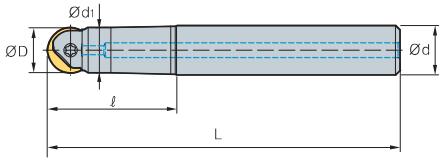
	Designation	Dimensions					Parts		Available inserts (Ø)	Fig.
		ØD	Ød	Ød1	ℓ	L	Clamp screw	Wrench		
LBE	080080S-S08C	8, 9	8	7.5	80	136	ETND02506F	TWP07S	8, 9	1
	080100S-S08C	8, 9	8	7.5	100	156				
	080020S-S08C-130	8, 9	8	7.5	20	130	ETND02506F	TWP07S	8, 9	2
	080020S-S08C-150	8, 9	8	7.5	20	150				
	100080S-S10C	10, 11	10	9.5	80	136	ETND0307F	TWP08S	10, 11	1
	100120S-S10C	10, 11	10	9.5	120	176				
	100023S-S10C-130	10, 11	10	9.5	23	130	ETND0307F	TWP08S	10, 11	2
	100023S-S10C-170	10, 11	10	9.5	23	170				
	120100S-S12C	12, 13	12	11.5	100	156	ETND03509	TWP10S	12, 13	1
	120150S-S12C	12, 13	12	11.5	150	206				
	120025S-S12C-150	12, 13	12	11.5	25	150	ETND03509	TWP10S	12, 13	2
	120025S-S12C-200	12, 13	12	11.5	25	200				
	160100S-S16C	16, 17	16	15.5	100	160	ETND0413	TWP15S	16, 17	1
	160150S-S16C	16, 17	16	15.5	150	210				
	160030S-S16C-160	16, 17	16	15.5	30	160	ETND0413	TWP15S	16, 17	2
	160030S-S16C-210	16, 17	16	15.5	30	210				
	200120S-S20C	20, 21	20	19.5	120	190	ETKD0516	TWP20	20, 21	1
	200170S-S20C	20, 21	20	19.5	170	240				
	200035S-S20C-190	20, 21	20	19.5	35	190	ETKD0516	TWP20	20, 21	2
	200035S-S20C-240	20, 21	20	19.5	35	240				
	250140S-S25C	25, 26	25	24.5	140	220	ETKD0620	TWP25	25, 26	1
	250170S-S25C	25, 26	25	24.5	170	250				
	250040S-S25C-220	25, 26	25	24.5	40	220	ETKD0620	TWP25	25, 26	2
	250040S-S25C-250	25, 26	25	24.5	40	250				
	300140S-S32C	30, 31	32	29.5	140	230	ETGD0825	TWP40	30, 31	1
	300170S-S32C	30, 31	32	29.5	170	260				
	300050S-S32C-230	30, 31	32	29.5	50	230	ETGD0825	TWP40	30, 31	2
	300050S-S32C-260	30, 31	32	29.5	50	260				
	320140S-S32C	32	32	31.5	140	230	ETGD0825	TWP40	32, 33	1
	320170S-S32C	32	32	31.5	170	260				
	320050S-S32C-230	32	32	31.5	50	230	ETGD0825	TWP40	32, 33	2
	320050S-S32C-260	32	32	31.5	50	260				

Available inserts **E08, E09**

LBE 08/10/12/16/20/25/30/32

Taper type

Steel Shank (Ball type)



(mm)

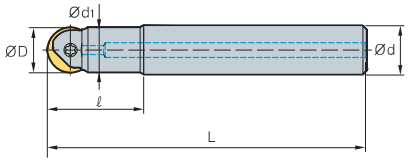
	Designation	Dimensions					Parts		Available inserts (Ø)
		ØD	Ød	Ød1	ℓ	L	Clamp screw	Wrench	
LBE	080035T-S12	8, 9	12	7.5	35	91	ETND02506F	TWP07S	8, 9
	080055T-S12	8, 9	12	7.5	55	111			
	080075T-S12	8, 9	12	7.5	75	131			
	100035T-S12	10, 11	12	9.5	35	91	ETND0307F	TWP08S	10, 11
	100055T-S12	10, 11	12	9.5	55	111			
	100075T-S12	10, 11	12	9.5	75	131			
	120055T-S12	12, 13	12	10.4	55	111	ETND03509	TWP10S	12, 13
	120085T-S16	12, 13	16	11.5	85	145			
	160065T-S16	16, 17	16	14	65	125	ETND0413	TWP15S	16, 17
	160100T-S20	16, 17	20	15.5	100	170			
	200075T-S20	20, 21	20	17.5	75	145	ETKD0516	TWP20	20, 21
	200115T-S25	20, 21	25	19.5	115	195			
	250090T-S25	25, 26	25	22	90	170	ETKD0620	TWP25	25, 26
	250135T-S32	25, 26	32	24.5	135	225			
	300105T-S32	30, 31	32	29.5	105	195	ETGD0825	TWP40	30, 31
	300160T-S32	30, 31	32	29.5	160	250			
	320105T-S32	32	32	29	105	195	ETGD0825	TWP40	32, 33
	320160T-S32	32	32	29	160	250			

Available inserts **E08, E09**

LBE12/16/20/25/30/32

Straight type

Steel Shank (Ball type)



(mm)

	Designation	Dimensions					Parts		Available inserts (Ø)
		ØD	Ød	Ød1	ℓ	L	Clamp screw	Wrench	
LBE	120035S-S12	12, 13	12	11.5	35	91	ETND03509	TWP10S	12, 13
	160035S-S16	16, 17	16	15.5	35	95	ETND0413	TWP15S	16, 17
	200040S-S20	20, 21	20	19.5	40	110	ETKD0516	TWP20	20, 21
	250045S-S25	25, 26	25	24.5	40	125	ETKD0620	TWP25	25, 26
	300055S-S32	30, 31	32	29.5	55	145	ETGD0825	TWP40	30, 31
	320055S-S32	32	32	31.5	55	145	ETGD0825	TWP40	32, 33

Available inserts **E08, E09**

LRE 10/12/16/20/25/30/32

Straight type

Carbide Shank (Corner R type)

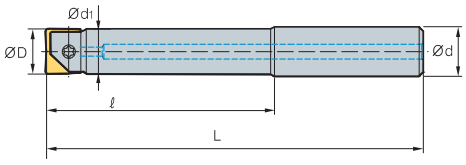


Fig. 1

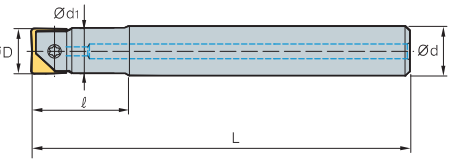


Fig. 2

(mm)

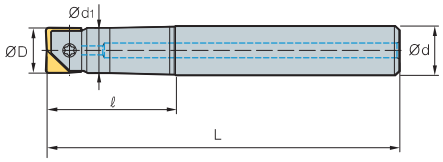
Designation		Dimensions					Parts		Available inserts (Ø)	Fig.
		ØD	Ød	Ød1	ℓ	L	Clamp screw	Wrench		
LRE	100080S-S10C	10, 11	10	9.5	80	136	ETND0307F	TWP08S	10, 11	1
	100120S-S10C	10, 11	10	9.5	120	176				
	100023S-S10C-130	10, 11	10	9.5	23	130	ETND0307F	TWP08S	10, 11	2
	100023S-S10C-170	10, 11	10	9.5	23	170				
	120100S-S12C	12, 13	12	11.5	100	156	ETND03509	TWP10S	12, 13	1
	120150S-S12C	12, 13	12	11.5	150	206				
	120025S-S12C-150	12, 13	12	11.5	25	150	ETND03509	TWP10S	12, 13	2
	120025S-S12C-200	12, 13	12	11.5	25	200				
	160100S-S16C	16, 17	16	15.5	100	160	ETND0413	TWP15S	16, 17	1
	160150S-S16C	16, 17	16	15.5	150	210				
	160030S-S16C-160	16, 17	16	15.5	30	160	ETND0413	TWP15S	16, 17	2
	160030S-S16C-210	16, 17	16	15.5	30	210				
	200120S-S20C	20, 21	20	19.5	120	190	ETKD0516	TWP20	20, 21	1
	200170S-S20C	20, 21	20	19.5	170	240				
	200035S-S20C-190	20, 21	20	19.5	35	190	ETKD0516	TWP20	20, 21	2
	200035S-S20C-240	20, 21	20	19.5	35	240				
	250140S-S25C	25, 26	25	24.5	140	220	ETKD0620	TWP25	25, 26	1
	250170S-S25C	25, 26	25	24.5	170	250				
	250040S-S25C-220	25, 26	25	24.5	40	220	ETKD0620	TWP25	25, 26	2
	250040S-S25C-250	25, 26	25	24.5	40	250				
	300140S-S32C	30, 31	32	29.5	140	230	ETGD0825	TWP40	30, 31	1
	300170S-S32C	30, 31	32	29.5	170	260				
	300050S-S32C-230	30, 31	32	29.5	50	230	ETGD0825	TWP40	30, 31	2
	300050S-S32C-260	30, 31	32	29.5	50	260				
	320140S-S32C	32	32	31.5	140	230	ETGD0825	TWP40	32, 33	1
	320170S-S32C	32	32	31.5	170	260				
	320050S-S32C-230	32	32	31.5	50	230	ETGD0825	TWP40	32, 33	2
	320050S-S32C-260	32	32	31.5	50	260				

Available inserts **E08, E09**

LRE 10/12

Taper type

Steel Shank (Corner R type)



(mm)

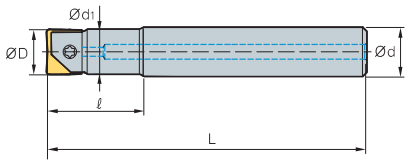
	Designation	Dimensions					Parts		Available inserts (Ø)
		ØD	Ød	Ød1	ℓ	L	Clamp screw	Wrench	
LRE	100025T-S12	10, 11	12	9.5	25	111	ETND0307F	TWP08S	10,11
	100050T-S12	10, 11	12	9.5	50	150			
	120060T-S16	12, 13	16	11.5	60	160	ETND03509	TWP10S	12,13

Available inserts **E08, E09**

LRE 12/16/25/30/32

Straight type

Steel Shank (Corner R type)

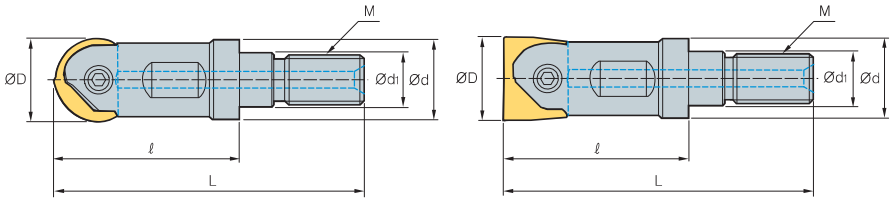


(mm)

	Designation	Dimensions					Parts		Available inserts (Ø)
		ØD	Ød	Ød1	ℓ	L	Clamp screw	Wrench	
LRE	120030S-S12	12, 13	12	11.5	30	111	ETND03509	TWP10S	12, 13
	160050S-S16	16, 17	16	15.5	50	131	ETND0413	TWP15S	16, 17
	160060S-S16	16, 17	16	15.5	60	160			
	200060S-S20	20, 21	20	19.5	60	145	ETKD0516	TWP20	20, 21
	200080S-S20	20, 21	20	19.5	80	180			
	250070S-S25	25, 26	25	24.5	70	145	ETKD0620	TWP25	25, 26
	250100S-S25	25, 26	25	24.5	100	225			
	300070S-S32	30, 31	32	29.5	70	160	ETGD0825	TWP40	30, 31
	300100S-S32	30, 31	32	29.5	100	225			
	320080S-S32	32	32	31.5	80	160	ETGD0825	TWP40	32, 33
	320100S-S32	32	32	31.5	100	225			

Available inserts **E08, E09**

LBE-MHD



(mm)

	Designation	Dimensions						Parts		Available inserts (Ø)
		M	ØD	L	ℓ	Ød	Ød1	Clamp screw	Wrench	
LBE	100-MHD-M06	M06	10, 11	40	25	9.5	6.5	ETND0307F	TWP08S	10, 11
	120-MHD-M06	M06	12, 13	40	25	11	6.5	ETND03509	TWP10S	12, 13
	160-MHD-M08	M08	16, 17	47	30	14.5	8.5	ETND0413	TWP15S	16, 17
	200-MHD-M10	M10	20, 21	56	35	18	10.5	ETKD0516	TWP20	20, 21
	250-MHD-M12	M12	25, 26	69	45	22.5	12.5	ETKD0620	TWP25	25, 26
	300-MHD-M16	M16	30, 31	77	50	28	17	ETGD0825	TWP40	30, 31
	320-MHD-M16	M16	32	77	50	29	17	ETGD0825	TWP40	32, 33

Available inserts **E08, E09** Available adaptors **E371~E372**

Designation: LBE320-MHD-M16
Modular head threading measure size (M16)

=

Adaptor spec.: MAT-M16-035-S32S
Adaptor threading measure (M16)

BFE

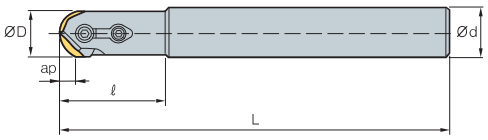


Fig. 1

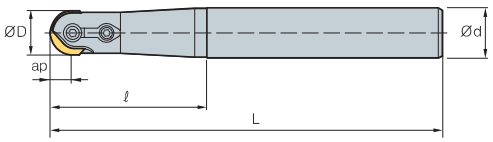
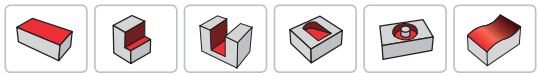


Fig. 2



(mm)

Designation		ØD	Ød	ℓ	L	ap	kg	Fig.	Available inserts
BFE	16-S	16	16	36	140	8.0	0.2	1	RC16
	16-M	16	20	65	170	8.0	0.3	2	
	16-L	16	25	65	200	8.0	0.5	2	
	20-S	20	20	45	160	10.0	0.4	1	RC20
	20-M	20	25	80	200	10.0	0.6	2	
	20-L	20	25	80	250	10.0	0.8	2	
	25-S	25	25	45	160	12.5	0.7	1	RC25
	25-M	25	32	90	210	12.5	1.1	2	
	25-L	25	32	90	300	12.5	1.7	2	
	30-S	30	32	65	175	15.0	0.9	2	RC30
	30-M	30	32	100	250	15.0	1.4	2	
	30-L	30	32	100	350	15.0	2.0	2	
	32-S	32	32	56	175	16.0	0.9	1	RC32
	32-M	32	32	100	250	16.0	1.4	1	
	32-L	32	32	100	350	16.0	2.0	1	

Available inserts

RC

Designation		Coated PC210F	page
RC	16	●	E15
	20	●	
	25	●	
	30		
	32	●	

Recommended cutting condition

Workpiece		Cutting condition vc (m/min)	Cutting condition fz (mm/t)
P	General steel (SS41, SM25C) Over HB180	150 ~ 250	0.10 ~ 0.30
P	Alloy steel (SM55C, SCM) Under HB300	100 ~ 200	0.10 ~ 0.20
K	Cast iron Under HB300	100 ~ 200	0.10 ~ 0.30

Parts

Specification	Screw	Clamp	Clamp screw	Stopper Ring	Wrench
Ø16	FTGA0513	CBH4.5R1	CTX04513	ER03	TW20
Ø20	FTGA0517	CBH4.5R2	CTX04513	ER03	TW20
Ø25	FTGA0621	CBH5R1	CTX0517	ER04	TW20
Ø30, 32	FTGA0826	CBH6R1	CTX0621	ER05	TW25

Available inserts E15

GBE (Single-edge)

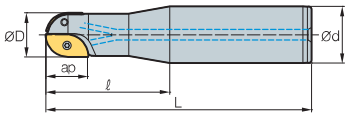


Fig. 1

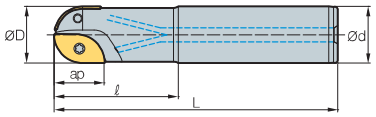


Fig. 2

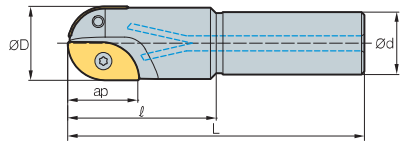


Fig. 3

(mm)

Designation		Dimensions					Available inserts		Parts		Fig.
		ØD	Ød	ℓ	L	ap	Internal	External	Screw Int./Ext. type	Wrench Ext. main type	
GBE	160-S20	16	20	50	130	15	ZPET080M-MM	ZPET080S-MM	FTKA02555S	TW08S	1
	160-L20	16	20	90	200	15	ZPET080M-MM	ZPET080S-MM	FTKA02555S	TW08S	
	180-S20	18	20	60	130	17	ZPET090M-MM	ZPET090S-MM	FTKA0307	TW09S	
	180-L20	18	20	80	200	17	ZPET090M-MM	ZPET090S-MM	FTKA0307	TW09S	
	200-S25	20	25	60	140	18	ZPET100M-MM	ZPET100S-MM	FTKA0307	TW09S	
	200-L25	20	25	80	250	18	ZPET100M-MM	ZPET100S-MM	FTKA0307	TW09S	
	220-S25	22	25	70	140	21	ZPET110M-MM	ZPET110S-MM	FTKA0408	TW15S	
	220-L25	22	25	100	250	21	ZPET110M-MM	ZPET110S-MM	FTKA0408	TW15S	
	250-S32	25	32	70	150	23	ZPET125M-MM	ZPET125S-MM	FTKA0409	TW15S	
	250-L32	25	32	100	300	23	ZPET125M-MM	ZPET125S-MM	FTKA0409	TW15S	
	260-S32	26	32	70	150	24.5	ZPET130M-MM	ZPET130S-MM	FTKA0409	TW15S	
	260-L32	26	32	100	300	24.5	ZPET130M-MM	ZPET130S-MM	FTKA0409	TW15S	
	280-S32	28	32	70	150	26	ZPET140M-MM	ZPET140S-MM	FTGA0511-P	TW20	
	280-L32	28	32	120	300	26	ZPET140M-MM	ZPET140S-MM	FTGA0511-P	TW20	
	300-S32	30	32	70	160	27	ZPET150M-MM	ZPET150S-MM	FTGA0511-P	TW20-100	2
	300-L32	30	32	120	350	27	ZPET150M-MM	ZPET150S-MM	FTGA0511-P	TW20-100	
	320-S32	32	32	70	160	28	ZPET160M-MM	ZPET160S-MM	FTGA0511-P	TW20-100	
	320-L32	32	32	120	350	28	ZPET160M-MM	ZPET160S-MM	FTGA0511-P	TW20-100	
	400-S42	40	42	100	200	37	ZPET200M-MM	ZPET200S-MM	FTGA0614	TW20-100	
	400-L42	40	42	150	350	37	ZPET200M-MM	ZPET200S-MM	FTGA0614	TW20-100	
	500-S42	50	42	100	200	47	ZPET250M-MM	ZPET250S-MM	FTGA0818	TW25-100	3
	500-L42	50	42	100	350	47	ZPET250M-MM	ZPET250S-MM	FTGA0818	TW25-100	

Available inserts E31

GBE-M (Multi-edge)

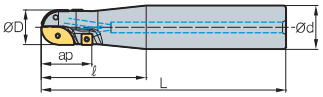


Fig. 1

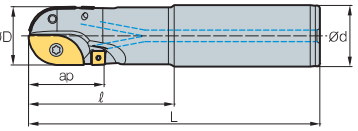


Fig. 2

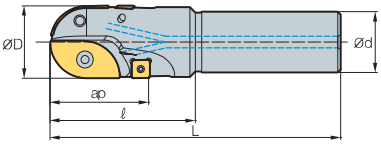


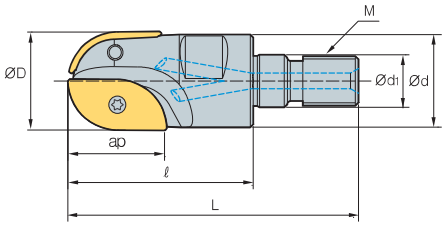
Fig. 3

(mm)

Designation		Dimensions					Available inserts			Parts				Fig.
		ØD	Ød	ℓ	L	ap	Internal	External	Ext. main	Screw		Wrench		
										Int./Ext. type	Ext. main type	Int./Ext. type	Ext. main type	
GBE	200M-S25	20	25	70	150	28	ZPET100M-MM	ZPET100S-MM	SPMT060304	FTKA0307	ETNA02506	TW09S	TW07P	1
	200M-L25	20	25	70	250	28	ZPET100M-MM	ZPET100S-MM	SPMT060304	FTKA0307	ETNA02506	TW09S	TW07P	
	220M-S25	22	25	80	150	31	ZPET110M-MM	ZPET110S-MM	SPMT060304	FTKA0408	ETNA02506	TW15S	TW07P	
	220M-L25	22	25	80	250	31	ZPET110M-MM	ZPET110S-MM	SPMT060304	FTKA0408	ETNA02506	TW15S	TW07P	
	250M-S32	25	32	80	180	33	ZPET125M-MM	ZPET125S-MM	SPMT060304	FTKA0409	ETNA02506	TW15S	TW07P	
	250M-L32	25	32	80	300	33	ZPET125M-MM	ZPET125S-MM	SPMT060304	FTKA0409	ETNA02506	TW15S	TW07P	
	260M-S32	26	32	80	180	39	ZPET130M-MM	ZPET130S-MM	SDMT090308-MM	FTKA0409	ETNA0408	TW15S	TW15S	
	260M-L32	26	32	80	300	39	ZPET130M-MM	ZPET130S-MM	SDMT090308-MM	FTKA0409	ETNA0408	TW15S	TW15S	
	280M-S32	28	32	80	180	41	ZPET140M-MM	ZPET140S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20	TW15S	
	280M-L32	28	32	80	300	41	ZPET140M-MM	ZPET140S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20	TW15S	
	300M-S32	30	32	100	200	41	ZPET150M-MM	ZPET150S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20-100	TW15S	
	300M-L32	30	32	100	350	41	ZPET150M-MM	ZPET150S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20-100	TW15S	
	320M-S32	32	32	100	200	42	ZPET160M-MM	ZPET160S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20-100	TW15S	2
	320M-L32	32	32	100	350	42	ZPET160M-MM	ZPET160S-MM	SDMT090308-MM	FTGA0511-P	ETNA0408	TW20-100	TW15S	
	400M-S42	40	42	100	200	56	ZPET200M-MM	ZPET200S-MM	SPMT120408-MM	FTGA0614	ETNA0511	TW20-100	TW20S	
	400M-L42	40	42	100	350	56	ZPET200M-MM	ZPET200S-MM	SPMT120408-MM	FTGA0614	ETNA0511	TW20-100	TW20S	
	500M-S42	50	42	100	200	67	ZPET250M-MM	ZPET250S-MM	SPMT120408-MM	FTGA0818	ETNA0511	TW25-100	TW20S	3
	500M-L42	50	42	100	350	67	ZPET250M-MM	ZPET250S-MM	SPMT120408-MM	FTGA0818	ETNA0511	TW25-100	TW20S	

Available inserts **E25, E31**

GBEM



(mm)

Designation		Dimensions							Available inserts	
		ØD	Ød	Ød1	ℓ	L	M	ap	Internal	External
GBEM	160-M08	16	15	8.5	30	47	M08	15	ZPET080M-MM	ZPET080S-MM
	200-M10	20	18.6	10.5	35	56	M10	18	ZPET100M-MM	ZPET100S-MM
	250-M12	25	23.2	12.5	45	69	M12	23	ZPET125M-MM	ZPET125S-MM
	300-M16	30	27.8	17	50	77	M16	27	ZPET150M-MM	ZPET150S-MM
	320-M16	32	29.8	17	50	77	M16	28	ZPET160M-MM	ZPET160S-MM

Available inserts

ZPET-MM Internal

ZPET-MM External

SPMT Ext. main

SPMT-MM Ext. main

Designation		Coated				page	Designation		Coated				page
		NCM325	PC2510	PC3700	PC5300				NCM325	PC2510	PC3700	PC5300	
SPMT	060304	●				E25	ZPET	080S-MM					
	120408-MM			●	●	E25		090S-MM					
SDMT	090308-MM			●	●	E18		100S-MM		●	●	●	
ZPET	080M-MM							110S-MM					
	090M-MM							125S-MM		●	●	●	
	100M-MM		●	●	●			130S-MM					E31
	110M-MM							140S-MM					
	125M-MM		●		●			150S-MM			●	●	
	130M-MM					E31		160S-MM		●		●	
	140M-MM							200S-MM			●		
	150M-MM			●	●			250S-MM					
	160M-MM		●		●								
	200M-MM			●									
	250M-MM												

Parts

Specification	Screw		Wrench	
	Int./Ext. type	Ext. main type	Int./Ext. type	Ext. main type
Ø16	FTKA02555	-	TW08S	-
Ø20	FTKA0307	ETNA02506	TW09S	TW07P
Ø25	FTKA0409	ETNA02506	TW15S	TW07P
Ø30	FTGA0511-P	ETNA0408	TW20-100	TW15S
Ø32	FTGA0511-P	ETNA0408	TW20-100	TW15S

Designation: GBEM320-M16
Modular head threading measure size (M16)

II

Adaptor spec.: MAT-M16-035-S32S
Adaptor threading measure (M16)

Available inserts E18, E25, E31 Available adaptors E371~E372

BRE

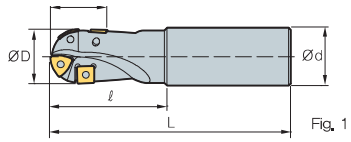


Fig. 1

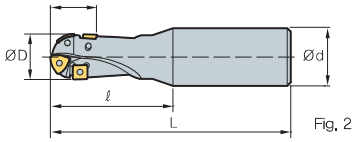


Fig. 2

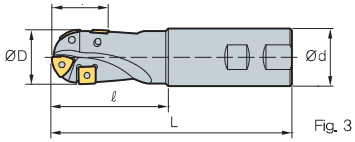


Fig. 3

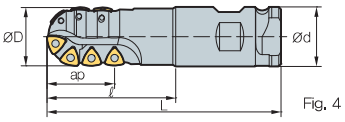


Fig. 4


• AR: 0°~10°
• RR: -3°~0°

(mm)

Designation		Dimensions					Available inserts		Parts		kg	Fig.
		ØD	Ød	ℓ	L	ap	Internal	External	Screw	Wrench		
BRE	20R-S	20	20	50	125	20	ZDMT080310R-MM	SPMT060304	ETNA02506	TW07P	0.25	1
	20R-M	20	20	75	150	20					0.31	
	20R-L	20	25	100	200	20					0.57	2
	20R-SL	20	25	65	125	20					0.33	3
	25R-S	25	25	70	150	23	ZDMT110312.5R-MM	SPMT060304	ETNA02506	TW07P	0.47	1
	25R-M	25	25	95	175	23					0.56	
	25R-L	25	32	100	200	23					0.92	2
	25R-SL	25	25	75	135	23					0.41	3
	32R-S	32	32	85	175	31	ZDMT130416R-MM	SDMT090308-MM	ETNA0408	TW15S	0.87	1
	32R-M	32	32	100	200	31					1.02	
	32R-L	32	32	150	250	31					1.3	
	32R-SL	32	32	75	150	31					0.71	3

Available inserts

SDMT-MM SPMT ZDMT-R-MM



Designation		Coated					page
		NCM325	PC3700	PC5300	PC3525	PC6510	
SDMT	090308-MM		●	●			E18
SPMT	060304	●					E25
ZDMT	080310R-MM		●	●			E30
	110312.5R-MM			●			
	130416R-MM		●	●			

Parts

Specification	Screw	Wrench	Wrench
Ø20~Ø25	ETNA02506	-	TW07P
Ø32	ETNA0408	TW15S	-

Available inserts **E18, E25, E30**

BRE

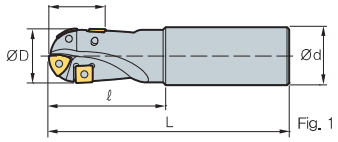


Fig. 1

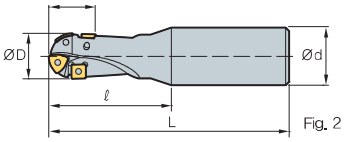


Fig. 2

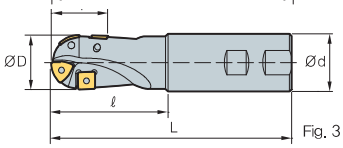


Fig. 3

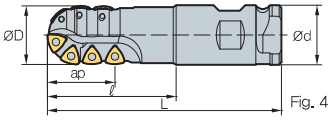


Fig. 4

• AR: 0°~10°
• RR: -3°~0°

(mm)

Designation		Dimensions					Available inserts		Parts		kg	Fig.
		ØD	Ød	ℓ	L	ap	Main	Ext. main	Screw	Wrench		
BRE	40R-S	40	42	85	175	41	ZPMT160520R-MM	SPMT120408-MM SPMT120508-MMN	ETNA0511	TW20-100	1.37	1
	40R-S-40	40	40	85	175	41					1.35	
	40R-M	40	42	100	200	41					1.62	
	40R-M-40	40	40	100	200	41					1.6	
	40R-L	40	42	150	250	41					2.1	
	40R-L-40	40	40	150	250	41					2	
	40R-SL	40	42	80	160	41					1.21	3
	40R-SL-40	40	40	80	160	41					1.2	
	50R-S	50	42	100	200	45	ZPMT160525R-MM	SPMT120408-MM SPMT120508-MMN	ETNA0511	TW20-100	2.02	1
	50R-S-40	50	40	100	200	45					1.93	
	50R-L	50	42	100	300	45					3.1	
	50R-L-40	50	40	100	300	45					2.92	
	50R-SL	50	42	100	250	45					2.56	3
	50R-SL-40	50	40	100	250	45					2.5	
	63R-S	63	42	100	200	52	ZPMT160531.5R-MM	SPMT120408-MM SPMT120508-MMN	ETNA0511	TW20-100	2.41	1
	63R-S-40	63	40	100	200	52					2.4	
	63R-L	63	42	100	300	52					3.5	
	63R-L-40	63	40	100	300	52					3.3	
	63R-SL	63	42	100	250	52					2.95	3
	63R-SL-40	63	40	100	250	52					2.9	
	40XR-SC40	40	40	110	200	54	ZPMT160520R-MM		ETNA0511	TW20-100	1.43	4
	40XR-LC40	40	40	150	250	54					1.89	
	50XR-SC50.8	50	50.8	110	200	57	ZPMT160525R-MM ZPMT160525R-MR		ETNA0511	TW20-100	2.34	4
	50XR-LC50.8	50	50.8	150	250	57					3.06	

Available inserts

SPMT-MM ZPMT-R-MM ZPMT-R-MR

Designation		Coated					page
		NCM325	PC3700	PC5300	PC3525	PC6510	
SPMT	120408-MM		●	●			E25
	120508-MMN						
ZPMT	160520R-MM		●	●			E31
	160525R-MM		●	●			
	160525R-MR						
	160531.5R-MM			●			

Parts

Specification	Screw	Wrench
Ø40~Ø63	ETNA0511	TW20-100

Available inserts E25, E31

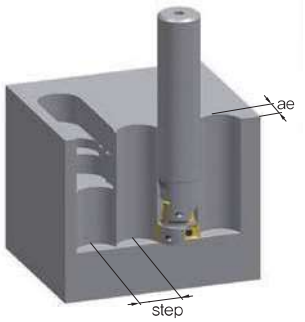
Multifunctional milling tool for mold making

HAVE

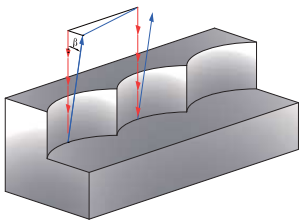
- Tools for Z-axis feed plunge machining to cut faster and more effectively in vertical machining
- Able to utilize the full diameter of the tools, thanks to the position and design of the inserts

Maximum step in vertical machining

ae	Diameter										
	16	17	20	21	25	26	32	33	35	40	50
	max step (mm)										
1	7.7	8	8.7	8.9	9.7	10	11.1	11.3	11.6	12.4	14
2	10.5	10.9	12	12.3	13.5	13.8	15.4	15.7	16.2	17.4	19.5
3	12.4	12.9	14.2	14.6	16.2	16.6	18.6	18.9	19.5	21	23.7
4	13.8	14.4	16	16.4	18.3	18.7	21.1	21.5	22.2	24	27.1
5	14.8	15.4	17.3	17.8	20	20.4	23.2	23.6	24.4	26.4	30
6	15.4	16.2	18.3	18.9	21.3	21.9	24.9	25.4	26.3	28.5	32.4
7	15.8	16.7	19	19.7	22.4	23	26.4	26.9	28	30.3	34.6
8	16	16.9	19.5	20.3	23.3	24	27.7	28.2	29.3	32	36.6
9	15.8	16.9	19.9	20.7	24	24.7	28.7	29.3	30.5	33.4	38.4
10	15.4	16.7	20	20.9	24.4	25.2	29.6	30.3	31.6	34.6	40
11	14.8	16.2	19.9	20.9	24.8	25.6	30.3	31.1	32.4	35.7	41.4
12	13.8	15.4	19.5	20.7	24.9	25.9	30.9	31.7	33.2	36.6	42.7
13	12.4	14.4	19	20.3	24.9	26	31.4	32.2	33.8	37.4	43.8
14	10.5	12.9	18.3	19.7	24.8	25.9	31.7	32.6	34.2	38.1	44.9
15	7.7	10.9	17.3	18.9	24.4	25.6	31.9	32.8	34.6	38.7	45.8
16	-	8	16	17.8	24	25.2	32	32.9	34.8	39.1	46.6
17	-	-	14.2	16.4	23.3	24.7	31.9	32.9	34.9	39.5	47.3
18	-	-	12	14.6	22.4	24	31.7	32.8	34.9	39.7	48
19	-	-	8.7	12.3	21.3	23	31.4	32.6	34.8	39.9	48.5
20	-	-	-	8.9	20	21.9	30.9	32.2	34.6	40	48.9
21	-	-	-	-	18.3	20.4	30.3	31.7	34.2	39.9	49.3
22	-	-	-	-	16.2	18.7	29.6	31.1	33.8	39.7	49.6
23	-	-	-	-	13.5	16.6	28.7	30.3	33.2	39.5	49.8
24	-	-	-	-	9.7	13.8	27.7	29.3	32.4	39.1	49.9
25	-	-	-	-	-	10	26.4	28.2	31.6	38.7	50



Programming in vertical cutting



Vertical machining route

Rapid feed

β Angle between tool and workpiece (β ≥ 1°)

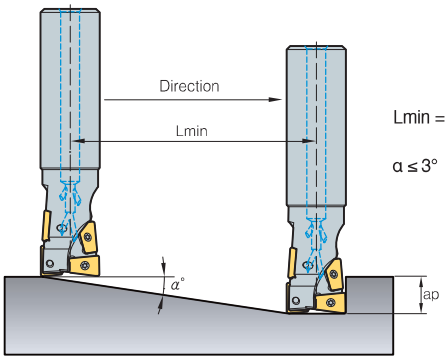
- Reduce 30% of feed till 3 mm machining
- Have the tool be away from the workpiece more than 1° (b) after finishing the machining or when moving the tool to the next step.

Cutting condition

Designation		Hardness	Grades	Cutting condition	Ø16, 17		Ø20, 21		Ø25, 26		Ø32, 33		Ø35		Ø40		Ø50	
				vc (m/min)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)
P	Mild steel, Low Carbon steel (SS400)	Under 200HB	PC3500	200 (150~250)	0.03	0.20	0.04	0.30	0.05	0.30	0.05	0.30	0.06	0.30	0.06	0.30	0.07	0.30
P	Carbon steel, Alloy steel (SM50C, SCM440)	Under 100HRC	PC3500	180 (120~220)	0.03	0.20	0.04	0.30	0.05	0.30	0.05	0.30	0.05	0.30	0.06	0.30	0.06	0.30
M	Stainless steel (STS)	Under 270HB	PC5300	160 (120~200)	0.03	0.15	0.04	0.25	0.05	0.25	0.05	0.25	0.05	0.25	0.06	0.25	0.06	0.25
K	Cast iron (GC, GCD)	350N/mm²	PC5300	200 (150~250)	0.04	0.40	0.05	0.50	0.06	0.50	0.06	0.50	0.06	0.50	0.07	0.50	0.07	0.50
H	Hardened steel	40~55HRC	PC5300	80 (50~120)	0.03	0.15	0.03	0.25	0.04	0.25	0.04	0.25	0.04	0.25	0.04	0.25	0.05	0.25

※ Please note - Step machining is required for aspect ratio under 0.5D or initial drilling

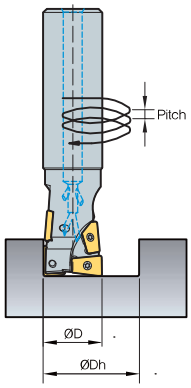
1. Ramping

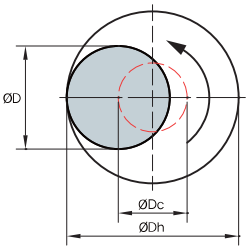


$$L_{min} = \frac{ap}{\tan \alpha} \text{ (mm)}$$

$\alpha \leq 3°$

2. Helical cutting





ØDc = ØDh-ØD

ØDc = Tool pass of tool center
ØDh = Desirable hole diameter on workpiece
ØD = Tool diameter

Cutting condition for ramping and helical operation

Designation		Hardness	Grades	Cutting Speed	Ø16, 17				Ø20, 21				Ø25, 26				Ø32, 33				Ø35				Ø40				Ø50			
				vc (m/min)	ØDh (mm)	ap (mm/t)	fz (mm/t)	max pitch (mm)	ØDh (mm)	ap (mm/t)	fz (mm/t)	max pitch (mm)	ØDh (mm)	ap (mm/t)	fz (mm/t)	max pitch (mm)	ØDh (mm)	ap (mm/t)	fz (mm/t)	max pitch (mm)	ØDh (mm)	ap (mm/t)	fz (mm/t)	max pitch (mm)	ØDh (mm)	ap (mm/t)	fz (mm/t)	max pitch (mm)	ØDh (mm)	ap (mm/t)	fz (mm/t)	max pitch (mm)
P	Mild steel, Low Carbon steel (SS400)	≤ 200HB	PC3500	200 (150~250)	19 ~30	0.5D ~1D	0.15 ~0.12	0.35 ~1.61	23 ~28	0.5D ~1D	0.18 ~0.12	0.35 ~2.07	29 ~47	0.5D ~1D	0.2 ~0.15	0.46 ~2.53	37 ~60	0.5D ~1D	0.25 ~0.2	0.58 ~3.23	41 ~65	0.5D ~1D	0.28 ~0.2	0.69 ~3.46	47 ~75	0.5D ~1D	0.3 ~0.2	0.81 ~4.03	58 ~95	0.5D ~1D	0.35 ~0.25	0.92 ~5.18
P	Carbon steel, Alloy Steel (SM50C,SCM440)	≤ 100HB	PC3500	180 (120~220)	19 ~30	0.5D ~1D	0.15 ~0.1	0.26 ~1.23	23 ~28	0.5D ~1D	0.16 ~0.12	0.26 ~1.58	29 ~47	0.5D ~1D	0.18 ~0.12	0.35 ~1.93	37 ~60	0.5D ~1D	0.2 ~0.15	0.44 ~2.46	41 ~65	0.5D ~1D	0.22 ~0.17	0.53 ~2.63	47 ~75	0.5D ~1D	0.25 ~0.2	0.61 ~3.07	58 ~95	0.5D ~1D	0.28 ~0.25	0.70 ~3.95
M	Stainless steel (STS)	≤ 270HB	PC5300	160 (120~200)	19 ~30	0.2D ~0.5D	0.13 ~0.1	0.18 ~0.84	23 ~28	0.2D ~0.5D	0.15 ~0.12	0.18 ~1.09	29 ~47	0.2D ~0.5D	0.18 ~0.12	0.24 ~1.33	37 ~60	0.2D ~0.5D	0.2 ~0.15	0.24 ~1.33	41 ~65	0.2D ~0.5D	0.22 ~0.17	0.36 ~1.81	47 ~75	0.2D ~0.5D	0.25 ~0.2	0.42 ~2.11	58 ~95	0.2D ~0.5D	58 ~95	0.48 ~2.71
K	Cast iron (GC, GCD)	≤ 350N/mm²	PC5300	200 (150~250)	19 ~30	0.7D ~1D	0.17 ~0.12	0.43 ~2.0	23 ~28	0.7D ~1D	0.2 ~0.12	0.42 ~2.57	29 ~47	0.7D ~1D	0.2 ~0.15	0.57 ~3.14	37 ~60	0.7D ~1D	0.25 ~0.2	0.71 ~3.99	41 ~65	0.7D ~1D	0.28 ~0.2	0.86 ~4.28	47 ~75	0.7D ~1D	0.3 ~0.2	1.0 ~4.99	58 ~95	0.7D ~1D	0.35 ~0.25	1.14 ~6.42
H	Hardened steel	40~55HRC	PC5300	80 (50~120)	19 ~30	0.2D ~0.5D	0.1 ~0.05	0.18 ~0.84	23 ~28	0.2D ~0.5D	0.12 ~0.07	0.18 ~1.09	29 ~47	0.2D ~0.5D	0.13 ~0.1	0.24 ~1.33	37 ~60	0.2D ~0.5D	0.15 ~0.12	0.30 ~1.69	41 ~65	0.2D ~0.5D	0.17 ~0.13	0.36 ~1.81	47 ~75	0.2D ~0.5D	0.18 ~0.15	0.42 ~2.11	58 ~95	0.2D ~0.5D	0.2 ~0.15	0.48 ~2.71

Recommended cutting condition in shouldering

Designation		Hardness	Grades	Cutting Speed	Ø16,17			Ø20,21			Ø25,26			Ø32,33			Ø35			Ø40			Ø50		
				vc (m/min)	max ap (mm)	max ae (mm)	max fz (mm/t)	max ap (mm)	max ae (mm)	max fz (mm/t)	max ap (mm)	max ae (mm)	max fz (mm/t)	max ap (mm)	max ae (mm)	max fz (mm/t)	max ap (mm)	max ae (mm)	max fz (mm/t)	max ap (mm)	max ae (mm)	max fz (mm/t)	max ap (mm)	max ae (mm)	max fz (mm/t)
P	Mild steel, Low Carbon steel (SS400)	≤ 200HB	PC3500	200 (150~250)	17	8	0.25	22	10	0.3	27	13	0.35	35	16	0.4	40	18	0.45	44	20	0.5	55	25	0.6
P	Carbon steel, Alloy Steel (SM50C,SCM440)	≤ 100HB	PC3500	180 (120~220)	17	8	0.2	22	10	0.25	27	13	0.3	35	16	0.35	40	18	0.4	44	20	0.4	55	25	0.5
M	Stainless steel (STS)	≤ 270HB	PC5300	160 (120~200)	17	8	0.2	22	10	0.25	27	13	0.3	35	16	0.35	40	18	0.4	44	20	0.4	55	25	0.5
K	Cast iron (GC, GCD)	≤ 350N/mm²	PC5300	200 (150~250)	17	8	0.25	22	10	0.3	27	13	0.35	35	16	0.4	40	18	0.45	44	20	0.5	55	25	0.6
H	Hardened steel	40~55HRC	PC5300	80 (50~120)	17	5	0.15	22	6	0.2	27	7	0.22	35	8	0.25	40	9	0.3	44	10	0.3	55	14	0.35

Recommended cutting condition in grooving

Designation		Hardness	Grades	Cutting Speed	Ø16,17		Ø20,21		Ø25,26		Ø32,33		Ø35		Ø40		Ø50	
				vc (m/min)	max ap (mm)	max fz (mm/t)	max ap (mm)	max fz (mm/t)	max ap (mm)	max fz (mm/t)	max ap (mm)	max fz (mm/t)	max ap (mm)	max fz (mm/t)	max ap (mm)	max fz (mm/t)	max ap (mm)	max fz (mm/t)
P	Mild steel, Low Carbon steel (SS400)	≤ 200HB	PC3500	200 (150~250)	17	0.15	22	0.18	27	0.2	35	0.25	40	0.27	44	0.3	55	0.35
P	Carbon steel, Alloy Steel (SM50C,SCM440)	≤ 100HB	PC3500	180 (120~220)	17	0.15	22	0.15	27	0.18	35	0.2	40	0.22	44	0.25	55	0.3
M	Stainless steel (STS)	≤ 270HB	PC5300	160 (120~200)	17	0.15	22	0.15	27	0.18	35	0.2	40	0.22	44	0.25	55	0.3
K	Cast iron (GC, GCD)	≤ 350N/mm²	PC5300	200 (150~250)	17	0.15	22	0.18	27	0.2	35	0.25	40	0.27	44	0.3	55	0.35
H	Hardened steel	40~55HRC	PC5300	80 (50~120)	12	0.1	14	0.12	17	0.15	22	0.15	25	0.18	28	0.18	35	0.22

HAVE (Multi-edge)

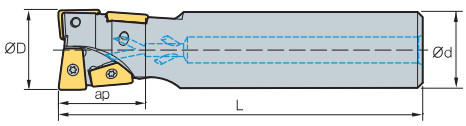


Fig. 1

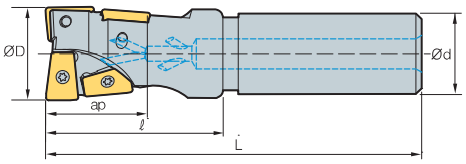


Fig. 2

AA 90°

- AR: 7°~12°
- RR: -12°~ -4°

(mm)

Designation			ØD	Ød	ℓ	L	ap	Available inserts	kg	Fig.
HAVE	0816HR-S16M	4	16	16	30	120	17.6	XPMT0802ER-MM	0.15	1
	0816HR-L16M	4	16	16	30	200	17.6		0.26	
	0817HR-S16M	4	17	16	30	120	17.6		0.18	2
	0817HR-L16M	4	17	16	30	200	17.6		0.27	
	1020HR-S20M	4	20	20	35	130	22	XPMT1003ER-MM	0.26	1
	1020HR-L20M	4	20	20	35	210	22		0.44	
	1021HR-S20M	4	21	20	35	130	22		0.26	2
	1021HR-L20M	4	21	20	35	210	22		0.45	
	1325HR-S25M	4	25	25	45	140	27	XPMT13T3ER-MM	0.41	1
	1325HR-L25M	4	25	25	45	220	27		0.71	
	1326HR-S25M	4	26	25	45	140	27		0.45	2
	1326HR-L25M	4	26	25	45	220	27		0.68	
	1632HR-S32M	4	32	32	50	150	35.2	XPMT1604ER-MM	0.72	1
	1632HR-L32M	4	32	32	50	250	35.2		1.32	
	1633HR-S32M	4	33	32	50	150	35.2		0.76	2
	1633HR-L32M	4	33	32	50	250	35.2		1.27	
	1835HR-S32M	4	35	32	50	150	40	XPMT1805ER-MM	0.75	1
	1835HR-L32M	4	35	32	50	230	40		1.23	
	2040HR-S32M	4	40	32	55	160	44	XPMT2006ER-MM	0.74	2
	2040HR-L32M	4	40	32	55	240	44		1.35	
	2550HR-S42M	4	50	42	70	170	55	XPMT2507ER-MM	1.53	2
	2550HR-L42M	4	50	42	70	250	55		2.60	

Available inserts

XPMT-MM

Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
XPMT	0802ER-MM														●					E30
	1003ER-MM										●				●					
	13T3ER-MM														●					
	1604ER-MM														●					
	1805ER-MM														●					
	2006ER-MM														●					
	2507ER-MM														●					

Parts

Specification	Screw	Wrench
Ø16~Ø17	FTNA0204	TW06S
Ø20~Ø21	FTNA02205	
Ø25~Ø26	FTKA0307	TW09S
Ø32~Ø33	FTKA0408	TW15S
Ø35		
Ø40	FTGA0511-P	TW20S
Ø50	FTNA0615	

Available inserts E30

HAVE (Single-edge)

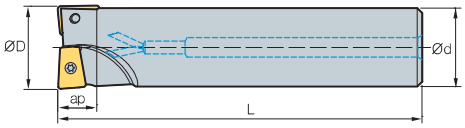


Fig. 1

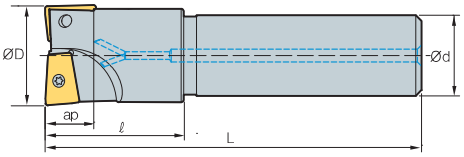


Fig. 2

AA 90°

- AR: 7°~12°
- RR: -12°~ -4°

(mm)

Designation			ØD	Ød	ℓ	L	ap	Available inserts	kg	Fig.
HAVE	0816HR-S16	2	16	16	30	120	7.5	XPMT0802ER-MM	0.16	1
	0816HR-L16	2	16	16	30	200	7.5		0.27	
	0817HR-S16	2	17	16	30	120	7.5		0.16	2
	0817HR-L16	2	17	16	30	200	7.5		0.27	
	1020HR-S20	2	20	20	35	130	9.5	XPMT1003ER-MM	0.28	1
	1020HR-L20	2	20	20	35	210	9.5		0.46	
	1021HR-S20	2	21	20	35	130	9.5		0.28	2
	1021HR-L20	2	21	20	35	210	9.5		0.46	
	1325HR-S25	2	25	25	45	140	12	XPMT13T3ER-MM	0.44	1
	1325HR-L25	2	25	25	45	220	12		0.76	
	1326HR-S25	2	26	25	45	140	12		0.47	2
	1326HR-L25	2	26	25	45	220	12		0.76	
	1632HR-S32	2	32	32	50	150	15.4	XPMT1604ER-MM	0.77	1
	1632HR-L32	2	32	32	50	250	15.4		1.36	
	1633HR-S32	2	33	32	50	150	15.4		0.81	2
	1633HR-L32	2	33	32	50	250	15.4		1.41	
	1835HR-S32	2	35	32	50	150	16.7	XPMT1805ER-MM	0.81	1
	1835HR-L32	2	35	32	50	230	16.7		1.28	
	2040HR-S32	2	40	32	55	160	19.3	XPMT2006ER-MM	0.95	2
	2040HR-L32	2	40	32	55	240	19.3		1.45	
	2550HR-S42	2	50	42	70	170	24	XPMT2507ER-MM	1.68	2
	2550HR-L42	2	50	42	70	250	24		2.54	

Available inserts

XPMT-MM

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
XPMT	0802ER-MM														●					E30
	1003ER-MM										●				●					
	13T3ER-MM														●					
	1604ER-MM														●					
	1805ER-MM														●					
	2006ER-MM														●					
	2507ER-MM														●					

Parts

Specification	Screw	Wrench
Ø16~Ø17	FTNA0204	TW06S
Ø20~Ø21	FTNA02205	
Ø25~Ø26	FTKA0307	TW09S
Ø32~Ø33	FTKA0408	TW15S
Ø35		
Ø40	FTGA0511-P	TW20S
Ø50	FTNA0615	

Available inserts E30

High productivity with optimized grade for high speed machining

O-ring Cutter

- Optimized for grooving the seat of an O-ring in a plastic mold
- Guarantees superior surface roughness compared to HSS and brazed tool
- High productivity with optimized grade for high speed machining
- Reduced time for regrinding and tool alignment
- Special types are available for quotation

Holder code system

ORC – P30

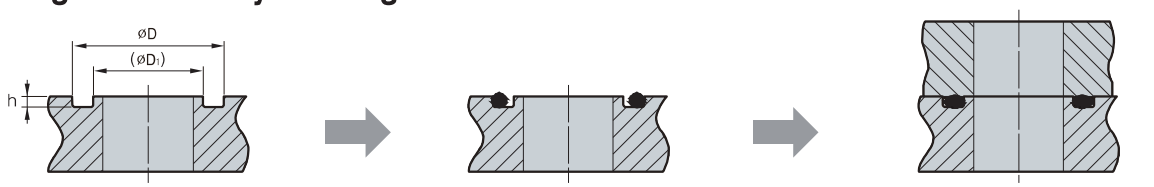
- ORC: O-ring Cutter
- P30: O-ring size

Insert code system

ORG – 325

- ORG: O-ring Groove (Grooving insert)
- 325: Width of groove (325: 3.25)

Grooving and assembly of O-ring



Grooving seat for O-ring (O-ring cutter) → O-ring on the seat → Engaging the upper punch and lower punch of a plastic mold

(mm)

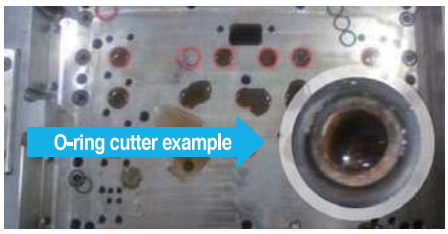
O-ring size	ØD	(ØD1)	h ± 0.05
P08	11.0	5.8	1.40
P09	12.0	6.8	
P10	13.0	7.8	
P11	15.0	8.5	1.80
P12	16.0	9.5	
P14	18.0	11.5	
P15	19.0	12.5	
P16	20.0	13.5	
P18	22.0	15.5	
P20	24.0	17.5	
P21	25.0	18.5	
P22	26.0	19.5	
P24	30.0	20.6	2.70
P25	31.0	21.6	

O-ring size	ØD	(ØD1)	h ± 0.05
P26	32.0	22.6	2.70
P28	34.0	24.6	
P29	35.0	25.6	
P30	36.0	26.6	
P31	37.0	27.6	
P32	38.0	28.6	
P34	40.0	30.6	
P35	41.0	31.6	
P38	44.0	34.6	
G40	46.0	36.6	
G25	30.0	21.8	2.40
G30	35.0	26.8	
G35	40.0	31.8	
G40	45.0	36.8	

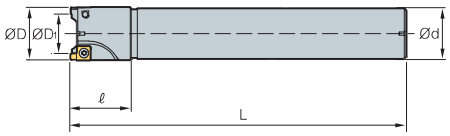
Recommended cutting condition

Workpiece	fz (mm/t)	vc (m/min)
		Coating
		PC3500
Stainless Steel (STS304)	0.03~0.12	60~130
Carbon Steel (SM□□C)	0.05~0.15	80~150
Alloy Steel (SCM)	0.05~0.15	80~150
Hardened Steel (STD, NAK)	0.03~0.12	60~130

Machining Example



ORC



(mm)

Designation			ØD	Ød1	Ød	ℓ	L	Available inserts	O-Ring size
ORC -	P08	1	11.0	5.7	16	30	150	ORG265	P08
	P09	1	12.0	6.7	16	30	150	ORG265	P09
	P10	1	13.0	7.7	16	30	150	ORG265	P10
	P11	1	15.0	8.5	16	30	150	ORG325	P11
	P12	2	16.0	9.5	16	30	200	ORG325	P12
	P14	2	18.0	11.5	20	30	200	ORG325	P14
	P15	2	19.0	12.5	20	30	200	ORG325	P15
	P16	2	20.0	13.5	20	30	200	ORG325	P16
	P18	2	22.0	15.5	20	30	200	ORG325	P18
	P20	2	24.0	17.5	25	30	200	ORG325	P20
	P21	2	25.0	18.5	25	30	200	ORG325	P21
	P22	2	26.0	19.5	25	30	200	ORG325	P22
	P24	2	30.0	20.6	32	40	250	ORG470	P24
	P25	2	31.0	21.6	32	40	250	ORG470	P25
	P26	2	32.0	22.6	32	40	250	ORG470	P26
	P28	2	34.0	24.6	32	40	250	ORG470	P28
	P29	2	35.0	25.6	32	40	250	ORG470	P29
	P30	2	36.0	26.6	32	40	250	ORG470	P30
	P31	2	37.0	27.6	32	40	250	ORG470	P31
	P32	2	38.0	28.6	32	40	250	ORG470	P32
	P34	2	40.0	30.6	42	40	250	ORG470	P34
	P35	2	41.0	31.6	42	40	250	ORG470	P35
	P38	2	44.0	34.6	42	40	250	ORG470	P38
	P40	2	46.0	36.6	42	40	250	ORG470	P40
ORC -	G25	2	30.0	21.9	32	40	250	ORG405	G25
	G30	2	35.0	26.9	32	40	250	ORG405	G30
	G35	2	40.0	31.9	42	40	250	ORG405	G35
	G40	2	45.0	36.9	42	40	250	ORG405	G40

Available inserts

ORG

Cutter Designation	Designation		Cermet		Coated												Uncoated			page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
ORC-P08~P10	ORG	265																			E14
ORC-P11~P22		325										●									
ORC-P24~P40		470																			
ORC-G25~G40		405										●									

Parts

Specification	Screw	Wrench
Ø11~Ø26	FTKA0307	TW09S
Ø30~Ø46	FTGA03508	TW15S
Ø30~Ø45		

Available inserts E14

All applications for chamfers

Chamfer Tool

- All chamfer applications
- Chamfer angles 15°, 30°, 45°, 60° for a variety of customer's needs
- The long cutting-edge provides a wide chamfering range

Back & Front Chamfer Tools

Long Chamfer Tools

Code system

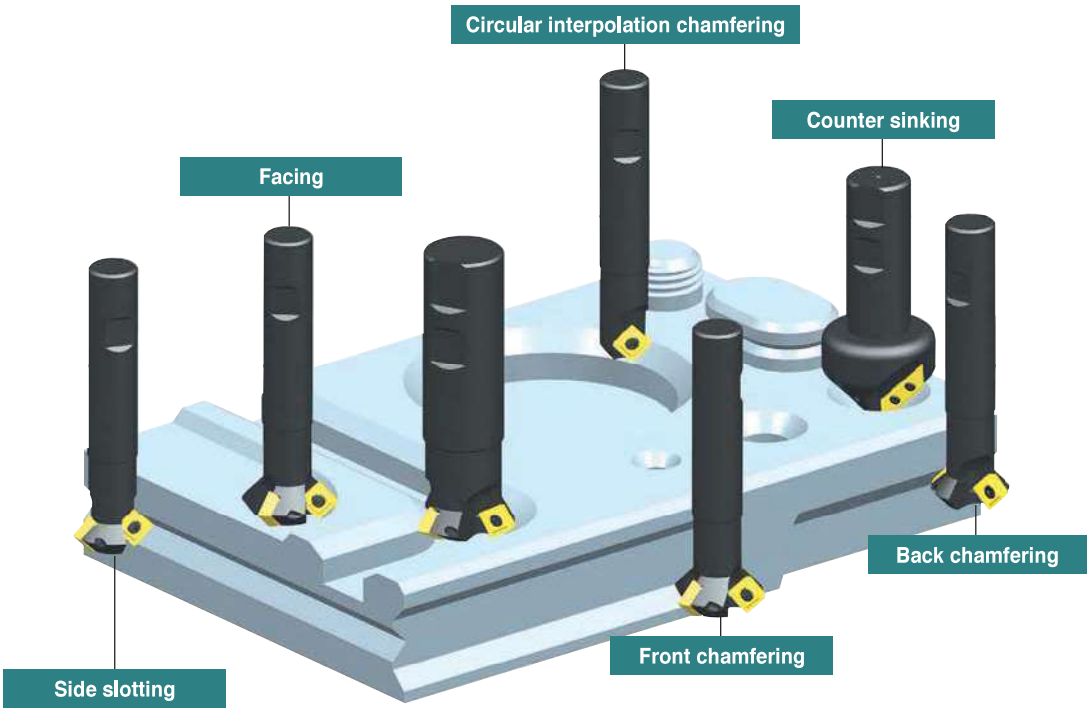
CE 45 – 11 25 R – S 20

Chamfer Endmill	Chamfer angle	Inscribed circle of insert	Min. Cutting Dia.	Hand	Overall length	Shank Dia.
	45°	11: SPMT110408-KC 12: SPMN120308 31: XCET310404ER-KC	Ø25	R: Right L: Left	S: Standard M: Middle L: Long	Ø20

Recommended cutting condition

Workpiece	Grades	ØD (Ø5~Ø20)		ØD (Ø25~Ø35)	
		vc (m/min)	fz (mm/t)	vc (m/min)	fz (mm/t)
P	PC3500	160~270	0.05~0.25	160~270	0.05~0.25
	PC5300	190~310		190~310	
	ST30A	60~100		60~100	
M	PC5300	100~160	0.05~0.20	100~160	0.10~0.30
	PC5400	70~120		70~~120	
K	PC5300	110~180	0.10~0.30	110~180	0.30~0.50
	G10	50~90		50~90	

Application example



Multi-functional Chamfer Tool

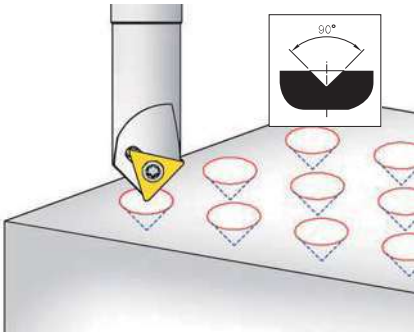
Code system

CE 45 – 16 00 R – S 20

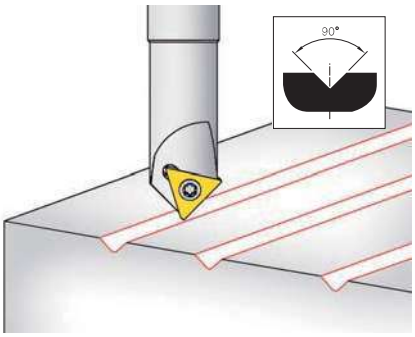
Chamfer Endmill	Chamfer angle	Inscribed circle of insert	Min. Cutting Dia.	Hand	Overall length	Shank Dia.
	45°	16: TWX16R-KC 22: TWX22R-KC	Ø0	R: Right L: Left	S: 90,110 L: 200	Ø12 Ø20 Ø25

Application area and recommended cutting condition

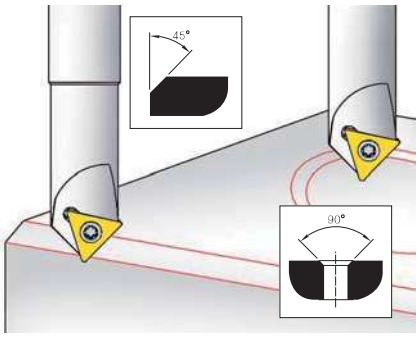
Centering



Grooving



Chamfering



Workpiece	Hardness (HRC)	Centering, Grooving		Chamfering	
		vc (m/min)	fz (mm/t)	vc (m/min)	fz (mm/t)
Mild steel, Carbon steel, Alloy steel	Under HRC 30	80~200	0.01~0.04	100~250	0.04~0.06
High Carbon steel, Alloy steel	HRC 30, 40	150~250	0.02~0.06	150~300	0.05~0.10
Aluminum, Copper	-	150~300	0.04~0.08	150~350	0.05~0.10
Cast iron	-	80~150	0.02~0.06	100~250	0.05~0.10
Stainless steel	-	60~120	0.01~0.03	60~150	0.03~0.06
HRSA		60~80	0.01~0.03	60~100	0.03~0.06

Note) Please keep fz. backtouch & chipping one caused by wrong fz

Machining example

Chamfering

Grooving

Centering

Solid Chamfer Tool

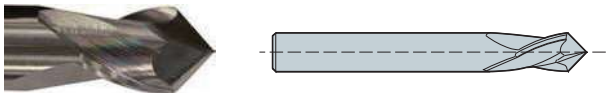
Code system

CCT 090 T – 080 L

Type	Chamfer angle	Cutting-edge	Diameter	Tool length
CCT: Centering & Chamfering Tool CET: Centering & Chamfering Endmill Tool	060: 60° 090: 90° 120: 120°	None: Single T: Twin	080: Ø8.0	None: Standard L: Long

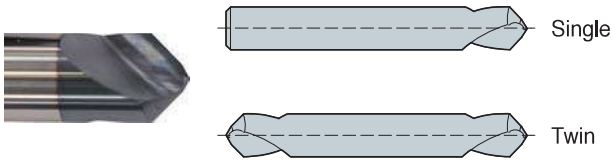
Features

CET (Centering & Chamfering Endmill Tool)



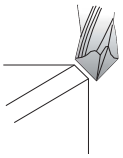
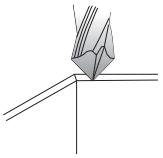
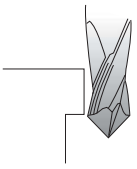
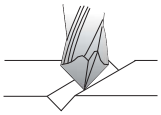
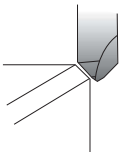
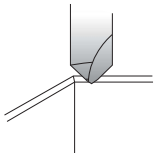
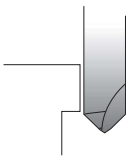
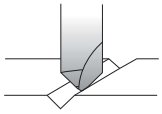
- For internal chamfering up to 0.5 mm
- Can be applied to side milling and easy to regrinding

CCT (Centering & Chamfering Tool)



- Chipping resistance realizes machining in high speed due to double point angle
- Lowers cutting load due to web thinning

CET/CCT Application example

Type	Centering	Hole Chamfering	Chamfering (External)	Chamfering (Internal)	Side milling	Slot milling
Applications (CET)						
60°	×	●	●	●~▲	●	×
90°	▲	●	●	●	●	●~▲
120°	●	●	●	●	●	●
Applications (CCT)						
60°	●	●	●~▲	▲~×	×	×
90°	●	●	●~▲	▲~×	×	×
120°	●	●	●	●	×	●

CE (Back & Front)

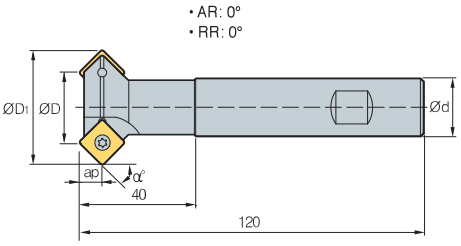


Fig. 1

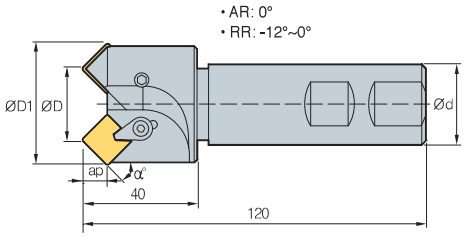


Fig. 2

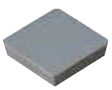
(mm)

Designation			ØD	ØD1	Ød	ap	Fig.	Available inserts	α° (Chamfer angle)		Machining range (Min~Max)	Uses
									Front	Back		
CE	15-1125R-S20	2	25	30.5	20	9.5	1	SPMT110408-KC	15°	-	Ø25~Ø30	Front chamfering
	30-1125R-S20	2	25	35.5	20	8.5	1		30°	60°	Ø25~Ø35	Front, Back chamfering
	45-1107R-S20	1	7	21.9	20	7.0	1		45°	-	Ø7~Ø21	Front chamfering
	45-1119R-S20	2	19	33.9	20	7.0	1		45°	45°	Ø19~Ø33	Front, Back chamfering
	45-1125R-S20	3	25	39.9	20	7.0	1		45°	45°	Ø25~Ø39	Front, Back chamfering
	60-1125R-S32	3	25	43.3	32	5.0	1		60°	30°	Ø25~Ø42	Front, Back chamfering
	45-1207R-S32	1	7	23.3	32	7.8	2	SPMN120308	45°	-	Ø7~Ø22	Front chamfering
	45-1220R-S32	2	20	37.3	32	7.8	2		45°	-	Ø21~Ø36	Front chamfering
	45-1225R-S32	2	25	42.3	32	7.8	2		45°	-	Ø26~Ø41	Front chamfering
	45-1235R-S32	2	35	52.3	32	7.8	2		45°	-	Ø36~Ø51	Front chamfering

Available inserts

SPMT-KC

SPMN



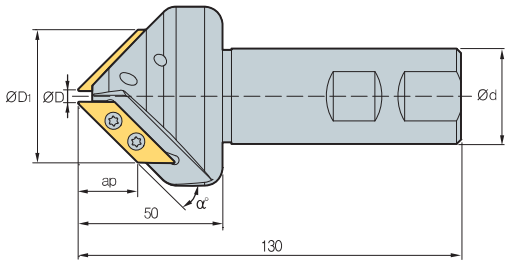
Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
SPMT	110408-KC										●						●	●		E25
SPMN	120308																●			

Parts

Specification	Screw	Clamp	C-Ring	Wrench	Wrench
Ø7~Ø25 (1100 type)	FTKA0408	-	-	TW15S	-
Ø7~Ø35 (1200 type)	CHX0617L	CH6R2	CR05	-	HW30L

Available inserts E25

CE (Long chamfer)



• AR: -5°~1°
• RR: 0°

(mm)

Designation			ØD	ØD1	Ød	ap	α° (Chamfer angle)	Machining range (Min~Max)	Uses
CE	30-3105R-S32	1	5	35	32	26	30°	Ø5~Ø35	Front Chamfering
	45-3105R-S32	2	5	48	32	21	45°	Ø5~Ø48	Front Chamfering
	60-3105R-S32	2	5	57	32	15	60°	Ø5~Ø57	Front Chamfering

Available inserts

XCET-KC

Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
XCET	310404ER-KC										●						●	●		E29

Parts

Specification	Screw	Wrench
Ø5	FTKA03510	TW15S

Available inserts E29

CE (Multi-functional)

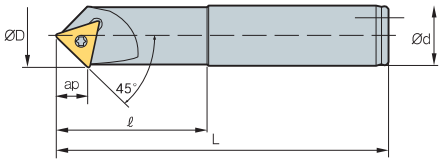


Fig. 1

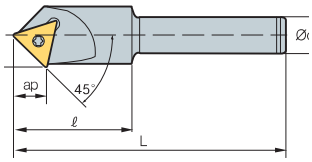
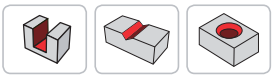


Fig. 2



• AR: -12°~15°
• RR: 0°

(mm)

Designation		ØD	Ød	ℓ	L	ap	Fig.	Available Inserts	Machining range (Min~Max)	Uses
CE	45-1600R-S12	21.2	12	40	90	10	2	TWX16R-KC	Ø0 ~ Ø20	Centering Grooving Chamfering
	45-1600R-S20	21.2	20	50	110	10	1	TWX16R-KC	Ø0 ~ Ø20	
	45-1600R-L20	21.2	20	60	200	10	1	TWX16R-KC	Ø0 ~ Ø20	
	45-2200R-S12	28.8	12	40	90	14	2	TWX22R-KC	Ø0 ~ Ø27	
	45-2200R-S25	28.8	25	50	110	14	1	TWX22R-KC	Ø0 ~ Ø27	
	45-2200R-L25	28.8	25	60	200	14	1	TWX22R-KC	Ø0 ~ Ø27	

Available inserts

TWX-KC

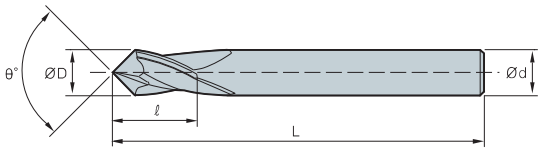
Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
TWX	16R-KC										●				●					E27
	22R-KC										●									

Parts

Specification	Screw	Wrench
Ø22~Ø29	FTNA0408	TW15L

Available inserts E27

CET



(mm)

Designation		ØD	Ød	ℓ	L	θ°
CET060 -	030	3	3	5.5	50	60°
	040	4	4	7	50	
	060	6	6	10	60	
	080	8	8	13	70	
	100	10	10	16	70	
	120	12	12	18	80	
	160	16	16	24	100	
CET090 -	030	3	3	5.5	50	90°
	040	4	4	7	50	
	060	6	6	10	60	
	080	8	8	13	70	
	100	10	10	16	70	
	120	12	12	18	80	
	160	16	16	24	100	
CET120 -	030	3	3	5.5	50	120°
	040	4	4	7	50	
	060	6	6	10	60	
	080	8	8	13	70	
	100	10	10	16	70	
	120	12	12	18	80	
	160	16	16	24	100	

CCT

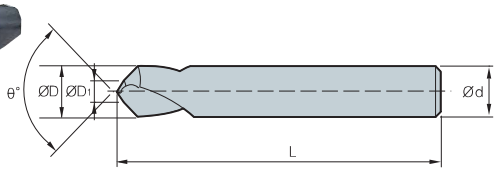


Fig. 1

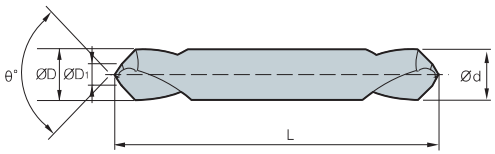
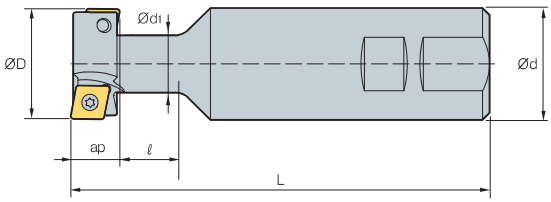


Fig. 2

(mm)

Designation		ØD = Ød	ØD1	L	θ°	Fig.
CCT060 -	030	3	1.0	40	60°	1
	040	4	1.5	40		
	060	6	2.0	50		
	080	8	2.5	60		
	100	10	3.0	70		
	120	12	4.0	80		
	160	16	5.0	100		
CCT060T -	030	3	1.0	40		2
	040	4	1.5	40		
	060	6	2.0	50		
	080	8	2.5	60		
	100	10	3.0	70		
	120	12	4.0	80		
	160	16	5.0	100		
CCT060T -	030L	3	1.0	100		
	040L	4	1.5	100		
	060L	6	2.0	100		
	080L	8	2.5	120		
	100L	10	3.0	120		
	120L	12	4.0	150		
CCT090 -	030	3	1.0	40	90°	1
	040	4	1.5	40		
	060	6	2.0	50		
	080	8	2.5	60		
	100	10	3.0	70		
	120	12	4.0	80		
	160	16	5.0	100		
CCT090T -	030	3	1.0	40		2
	040	4	1.5	40		
	060	6	2.0	50		
	080	8	2.5	60		
	100	10	3.0	70		
	120	12	4.0	80		
	160	16	5.0	100		
CCT090T -	030L	3	1.0	100		
	040L	4	1.5	100		
	060L	6	2.0	100		
	080L	8	2.5	120		
	100L	10	3.0	120		
	120L	12	4.0	150		
CCT120 -	030	3	1.0	40	120°	1
	040	4	1.5	40		
	060	6	2.0	50		
	080	8	2.5	60		
	100	10	3.0	70		
	120	12	4.0	80		
	160	16	5.0	100		
CCT120T -	030	3	1.0	40		2
	040	4	1.5	40		
	060	6	2.0	50		
	080	8	2.5	60		
	100	10	3.0	70		
	120	12	4.0	80		
	160	16	5.0	100		
CCT120T -	030L	3	1.0	100		
	040L	4	1.5	100		
	060L	6	2.0	100		
	080L	8	2.5	120		
	100L	10	3.0	120		
	120L	12	4.0	150		

TFE



AA
90°

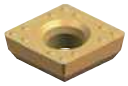
- AR: 5°
- RR: -5°

(mm)

Designation			ØD	Ød	Ød1	ℓ	L	ap	Available inserts
TFE	2125R/L	2	21	25	10.5	20	109	9	CPMT06
	2525R/L	2	25	25	12.5	21	112	11	CPMT08
	3232R/L	2	32	32	16.5	26	120	14	CPMT09
	4032R/L	2	40	32	20.5	32	130	18	CPMH12
	5032R/L	4	50	32	26.5	38	140	22	CPMH12

Available inserts

CPMT CPMH

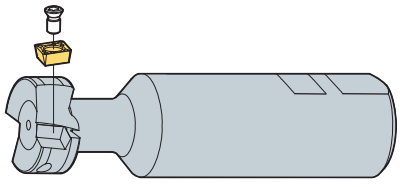



Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
CPMT	060204-MM										●									E07
	080308-MM										●									
	09T308-MM										●									
CPMH	120408-MM										●									

Parts

Specification	Screw	Wrench
Ø21	FTNA02555	TW08S
Ø25	FTNA0306	TW09S
Ø32	FTNA0407	TW15S
Ø40	PTMA0511A	TW15S
Ø50		

Assembling



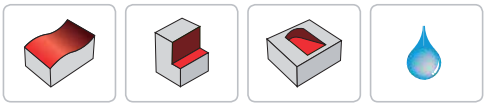
Available inserts E07

Inserts feature a buffed top surface ensuring better chip control and reducing built-up edge

Pro-A Mill

- Buffed top face of insert ensures good chip control and reduces built-up edge
- Small size modular type for aluminum machining
- Various line up of modular system for aluminum machining
- For shouldering, curved surface and ramping
- High rake angle chip breaker ensures excellent surface roughness, improved cooling effects, and chip control by through coolant system, even in deep pocket machining

Uses



Copying | Shouldering | Ramping | Through coolant system

Pro-A Mill series

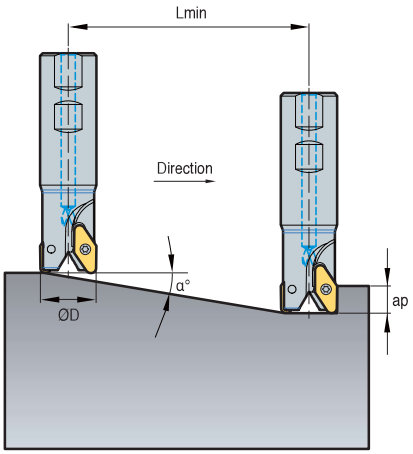
Type		Available inserts and tool holders	Through coolant system
Application of small-sized Aluminum machining	**Pro-A 2000**	 • Modular: Ø12~Ø42 • Shank: Ø12~Ø42 • Insert: VDKT11T210N-MA VDKT11T220N-MA	O
General application of Aluminum machining	**Pro-A 4000**	 • cutter: Ø40~Ø100 • Shank: Ø32~Ø40 • Insert: VCKT220530N-MA	O

Recommended cutting condition

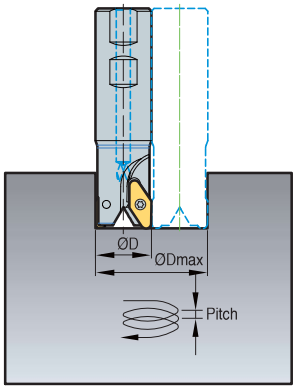
Workpiece		Cutting speed vc (m/min)
Aluminum alloy	Rm < 280 MPa	1000
	Rm > 280 MPa	800
Copper alloy	Long chip	250
Thermo plastic	-	300
Aluminum alloy	Si < 12%	800
Copper alloy	Short chip	400
Magnesium alloy	-	400
Duroplastics	-	150

Pro-A Mill ramping & helical cutting technical data

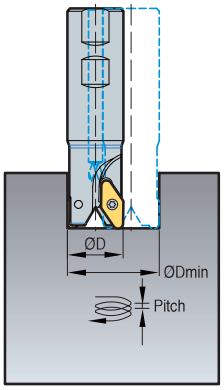
1. Ramping



2. Blind hole helical cutting



3. Thru hole helical cutting



(mm)

Designation	ØD (mm)	Ramping		Blind hole helical cutting				Thru hole helical cutting	
		α° (max)	Lmin (mm)	ØDH Min (mm)	dmax (mm)	ØDH Max (mm)	dmax (mm)	ØDH Min (mm)	dmax (mm)
PAS2012HR	12	11.9	38	21	4.4	23	4.8	19	4.0
PAS2016HR	16	12.5	36	29	6.4	31	6.9	27	6.0
PAS2020HR	20	9.7	47	37	6.3	39	6.7	35	6.0
PAS2025HR	25	7.6	60	47	6.3	49	6.5	45	6.0
PAS2032HR	32	5.8	79	61	6.2	63	6.4	59	6.0
PAS2042HR	42	4.3	105	81	6.2	83	6.3	79	6.0
PAS4032HR	32	24.4	22	54	15.0	59	26.8	40	15.0
PAS4040HR	40	18.4	30	70	15.0	75	25.0	56	15.0
PAS4050HR	50	14.0	40	90	15.0	95	23.8	76	15.0
PAS4063HR	63	10.7	53	116	15.0	121	22.8	102	15.0
PAC(M)4080HR	80	8.1	70	150	15.0	155	22.1	136	15.0
PAC(M)4100HR	100	6.3	90	190	15.0	195	21.7	176	15.0

- Lmin: When ap = 8 mm
- Lmin: Minimum inclination cutting length

$$Lmin = \frac{ap}{\tan \alpha^\circ} \text{ (mm)}$$

α°: Max. rampig angle

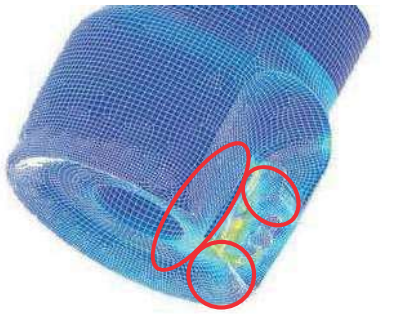
ap: Depth of cut

Features a strong clamping provided by the concave grooves on the back surface of the inserts

Pro-X Mill

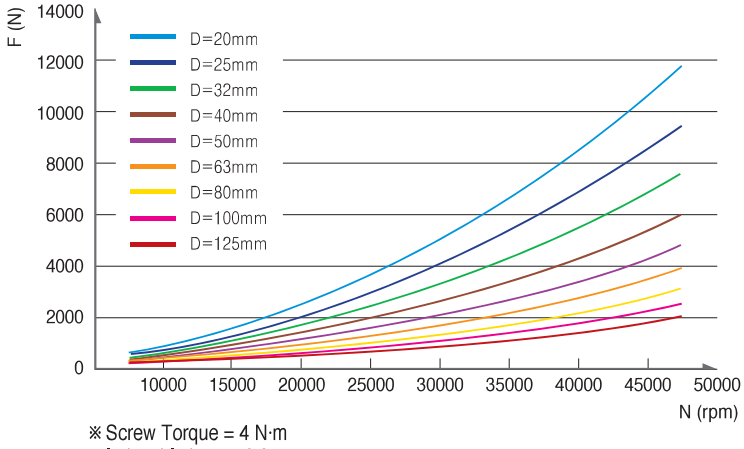
- Inserts feature a buffed top surface ensuring a smoother chip evacuation and reducing built-up edge
- High rake angle of insert provides good surface finish and low cutting load
- Specially designed for high speed machining of aluminum
- Suitable for square shouldering and curved surface machining

Clamping system for high speed



- Clamping design as per FEM analysis
- Strong clamping of insert

Centrifugal force as per RPM



※ Screw Torque = 4 N·m
※ Indexable insert: 6.8g

Marking [· Designation · Max. RPM]

Max. RPM as per cutting diameter

Cutting diameter ØD (mm)	5000 type		6000 type	
	n (min^{-1})	vc (m/min)	n (min^{-1})	vc (m/min)
20	14,000	879	-	-
25	28,000	2,199	15,000	1,178
32	25,000	2,513	23,000	2,312
40	22,000	2,764	20,000	2,513
50	20,000	3,141	18,000	2,827
63	18,000	3,562	16,000	3,166
80	16,000	4,021	14,000	3,518
100	14,000	4,398	13,000	4,084
125	13,000	5,105	11,000	4,319

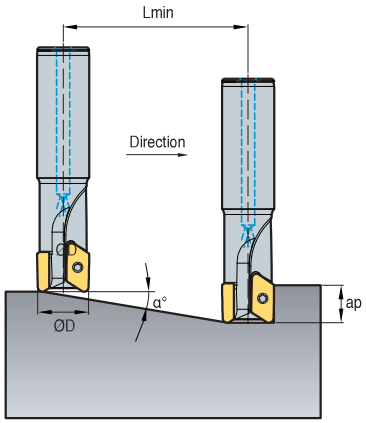
※ In case of actual machining accidental breakage of insert or tool could happen even under the written RPM special cover or door is necessary to prevent damage from broken insert or broken tool

Recommended cutting condition

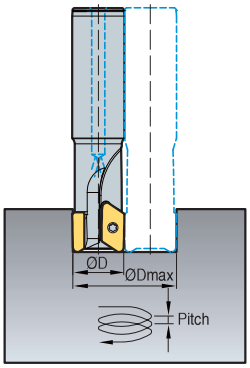
Workpiece		Cutting Speed vc (m/min)	Feed fz (mm/t)
Aluminum alloy	Rm280 < MPa	1200	0.30
	Rm280 > MPa	1000	0.25
Copper alloy	Long chipping	400	0.20
Thermo plastic	-	350	0.15
Aluminum alloy	Si < 12%	1000	0.25
	Si ≥ 12%	300	0.23
Copper alloy	Short chipping	500	0.20
Magnesium alloy	-	450	0.20
Duroplastics	-	200	0.15

Pro-X Mill ramping & helical cutting technical data

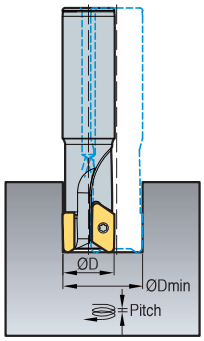
1. Ramping



2. Blind hole helical cutting



3. Thru hole helical cutting



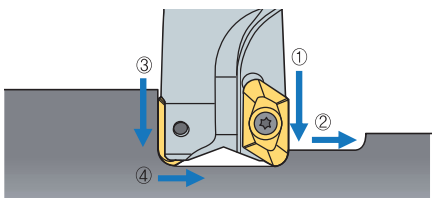
(mm)

Designation	ØD (mm)	Ramping		Blind hole Helical cutting				Thru hole Helical cutting	
		α° (max)	Lmin (mm)	ØDH Min (mm)	dmax (mm)	ØDH Max (mm)	dmax (mm)	ØDH Max (mm)	dmax (mm)
PAXS5020HR	20	8.4	68	32	4.7	34	5.0	27	4.0
PAXS5025HR	25	13.2	43	42	9.9	44	10.4	34	8.0
PAXS5032HR	32	9.5	60	56	9.3	58	9.7	48	8.0
PAXS5040HR	40	7.1	80	72	9.0	74	9.3	64	8.0
PAXCM5050HR	50	5.4	105	92	8.8	94	9.0	84	8.0
PAXCM5063HR	63	4.2	138	118	8.6	120	8.7	110	8.0
PAXC(M)5080HR	80	3.2	180	152	8.4	154	8.6	144	8.0
PAXC(M)5100HR	100	2.5	230	192	8.3	194	8.4	184	8.0
PAXC(M)5125HR	125	2.0	293	242	8.3	244	8.3	234	8.0
PAXS6025HR	25	9.0	63	42	6.6	44	6.9	38	6.0
PAXS6032HR	32	6.6	87	56	6.5	58	6.7	52	6.0
PAXS6040HR	40	12.1	47	72	15.4	74	15.9	56	12.0
PAXCM6050HR	50	9.0	63	92	14.5	94	14.8	76	12.0
PAXCM6063HR	63	6.7	85	118	13.9	120	14.1	102	12.0
PAXC(M)6080HR	80	5.0	113	152	13.4	154	13.6	136	12.0
PAXC(M)6100HR	100	3.9	147	192	13.1	194	13.2	176	12.0
PAXC(M)6125HR	125	3.0	188	242	12.8	244	13.0	226	12.0

- Lmin: When ap = 10mm
- Lmin: Minimum inclination cutting length
  α°: Max. rampig angle
  ap: Depth of cut

$$Lmin = \frac{ap}{\tan \alpha^\circ} \text{ (mm)}$$

Plunging, slotting, drilling technical data



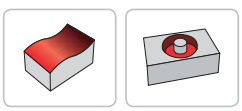
1. When drilling, grooving machining sequence is ① → ② → ③ → ④
2. When drilling, grooving, decrease the feed and cutting speed 30%~50% from the recommended data

· Cutting condition for drilling

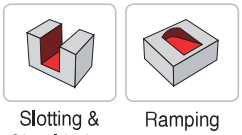
Holder	ap (mm)	
	5000 type	6000 type
Ø20	8	-
Ø25	4	11
Ø32	4	6
Ø40~125	4	6

Insert	ap (mm)
XETK19	4
XETK25	6

Uses



Copying | Helical cutting



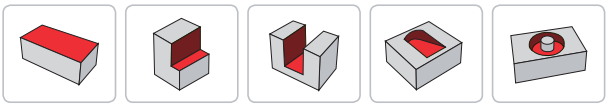
Slotting & Shouldering | Ramping

New indexable milling tool for the machining of high quality workpieces

Pro-L Mill

- Improved perpendicularity and lower cutting resistance due to the combined design of the clearance face and high helix edge of these inserts
- Productivity increase due to more than half as much of depth of cut comparing to existing product
- Strong clamping design by adaption of double screw on system
- Improved chip flow due to helical type design of chip pocket and application of coolant system

Uses



Facing | Shouldering | Slotting | Ramping | Helical cutting

Code system

• Shank type

PAL S 050 H R – 3 S 40

Pro-L Mill	Tool type	Tool Dia.	Coolant type	Hand	No. of tooth	Tool length	Shank Dia.
	S: Shank	050: Ø50	H: Thru-hole Unmarked: None	R: Right M: Multi-edge	3: 3 teeth	S: Standard type M: Middle type L: Long type	40: Ø40

• Cutter type

PAL C M 063 H R

Pro-L Mill	Tool type	Unit	Tool Dia.	Coolant type	Hand
	C: Cutter	M: Metric	063: Ø63	H: Thru-hole Unmarked: None	R: Right M: Multi-edge

Features

- Enhanced chip flow and increased tool life by inner coolant system
- Set of various Nose-R
- Strong clamping by 2 screw on system
- Improved perpendicularity and decreased cutting resistance due to application of high helix

Features of chip breakers

Insert		Cutting-edge	Uses	Features
MA			Al	Edge optimized for aluminum machining and buffed finish ensuring an excellent machining quality
ML			Hard-to-cut material	Design of low cutting resistance chip breaker ensures excellent machining quality for light cutting and hard-to-cut material

Selection of grades and chip breaker

Category	M (Stainless steel)	N (Aluminum alloy)	S (HRSA)
Grades	PC5300/PC5400	H01	PC5300/PC5400
MA	-	○	-
ML	○	-	○

Application examples

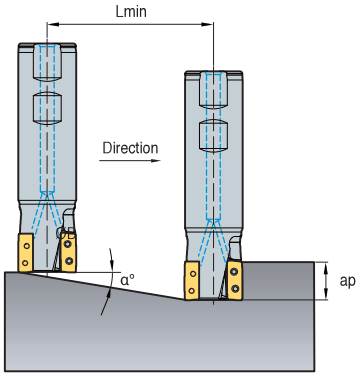
Al6061 (HRC30)

■ **Cutting condition**

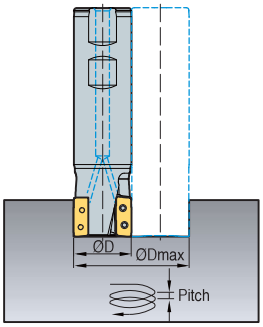
vc = 500 m/min, fz = 0.2 mm/t,
ap = 30~60 mm,
ae = 1~5 mm (finishing: 1 mm, roughing: 5 mm)
z = 3

Pro-L Mill ramping & helical cutting technical data

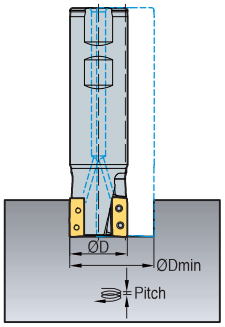
1. Ramping



2. Blind hole helical cutting



3. Thru hole helical cutting



(mm)

Designation	ØD (mm)	Ramping		Blind hole helical cutting				Thru hole helical cutting	
		α° (max)	Lmin (mm)	ØDH Min (mm)	dmax (mm)	ØDH Max (mm)	dmax (mm)	ØDH Min (mm)	dmax (mm)
PALS032HR-2S20	32	3.37	170	60	3.5	62	3.6	55	3.2
PALS032HR-2S25	32	3.37	170	60	3.5	62	3.6	55	3.2
PALS032HR-2S32	32	3.37	170	60	3.5	62	3.6	55	3.2
PALS040HR-2S32	40	2.12	270	76	2.8	78	2.9	71	2.6
PALS040HR-2S40	40	2.12	270	76	2.8	78	2.9	71	2.6
PALS040HR-2S42	40	2.12	270	76	2.8	78	2.9	71	2.6
PALS040HR-3S32	40	2.12	270	76	2.8	78	2.9	71	2.6
PALS040HR-3S40	40	2.12	270	76	2.8	78	2.9	71	2.6
PALS040HR-3S42	40	2.12	270	76	2.8	78	2.9	71	2.6
PALS050HR-3S32	50	2.08	275	96	3.5	98	3.6	91	3.3
PALS050HR-3S40	50	2.08	275	96	3.5	98	3.6	91	3.3
PALS050HR-3S42	50	2.08	275	96	3.5	98	3.6	91	3.3
PALS063HR-4S32	63	1.76	325	122	3.8	124	3.8	117	3.6
PALS063HR-4S40	63	1.76	325	122	3.8	124	3.8	117	3.6
PALS063HR-4S42	63	1.76	325	122	3.8	124	3.8	117	3.6
PALS063HM-4S32	63	1.76	325	122	3.8	124	3.8	117	3.6
PALS063HM-4S40	63	1.76	325	122	3.8	124	3.8	117	3.6
PALS063HM-4S42	63	1.76	325	122	3.8	124	3.8	117	3.6
PALCM063HR	63	1.76	325	122	3.8	124	3.8	117	3.6

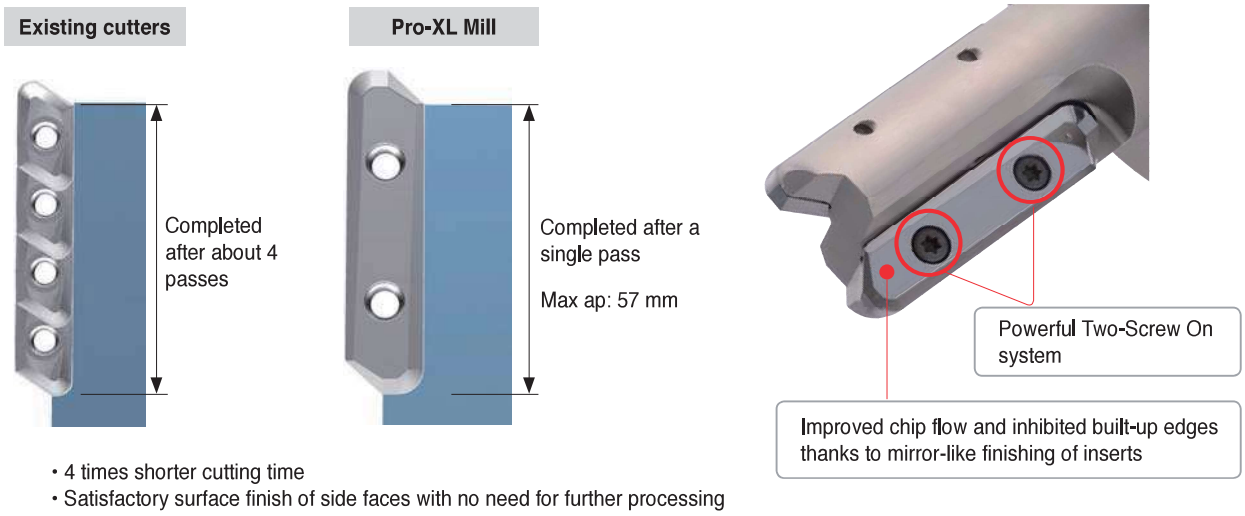
• Lmin: When ap = 10 mm
• Lmin: Minimum inclination cutting length $Lmin = \frac{ap}{\tan \alpha^\circ}$ (mm)
α° : Max. rampig angle
ap : Depth of cut

Deep cutting milling tools to maximize productivity in aluminum machining

Pro-XL Mill new

- **Productivity -** Cutting time is shortened by finishing the process with a single pass of deep shouldering in aluminum machining
- **High quality -** Shouldering within a single pass enables walls with perfect perpendicularity
- **Clamping stability -** Two-Screw On system secures clamping stability

Features of Pro-XL Mill



- 4 times shorter cutting time
- Satisfactory surface finish of side faces with no need for further processing

Application examples

Al7075

■ **Cutting condition**
vc = 500 m/min, fz = 0.25 mm/t
ap = 56 mm, ae = 1 mm
z = 2

■ **Tools**
Insert LDET650550PPFR-MA
Grades H01
Holder BT50-PXL04090HR-2F (ØD = 40 mm)

The Premium High-Speed Milling Tool for Aluminum

Pro-V Mill new

- **Enhanced productivity-** Increased productivity due to high speed capability
- **Improved surface finish-** Excellent surface finish and perpendicularity with high-precision products
- **Excellent clamping stability-** Satisfactory clamping force of inserts by the use of the key shape

Code system

• Shank type

PAV S 032 R - 2 C 32 - 150 - XD19 - A

Pro-V Mill	**Type** S: Shank	**Machining Dia.** 032: Ø32	**Oil hole and hand** R: Right hand with oil holes NR: Right hand without oil holes	**No. of tooth** 2: 2 teeth	**Shank type** C: Cylinder W: Weldon	**Shank Dia.** 032: Ø32	**Overall length** 150: 150 mm	**Applicable insert** XD19: XDET19	**Insert nose R** A: Nose R 3.2 or lower B: Nose R 4.0 or higher

• Cutter Type

PAV C M 050 R - 22 - 4 - XD19 - A

Pro-V Mill	**Type** C: Cutter	**Arbor type** M: Metric A: Inch None: Asia	**Machining Dia.** 050: Ø50	**Oil hole and hand** R: Right hand with oil holes NR: Right hand without oil holes	**Internal Dia.** 22: 22 mm	**No. of tooth** 4: 4 teeth	**Applicable insert** XD19: XDET19	**Insert nose R** A: Nose R 3.2 or lower B: Nose R 4.0 or higher

• Tooling System

HSK63A PAV 050 R - 4 - 100 - XD19 - A

Arbor type	**Pro-V Mill**	**Machining Dia.** 050: Ø50	**Oil hole and hand** R: Right hand with oil holes NR: Right hand without oil	**No. of tooth** 4: 4 teeth	**Overall length** 100: 100 mm	**Applicable insert** XD19: XDET19	**Insert nose R** A: Nose R 3.2 or lower B: Nose R 4.0 or higher

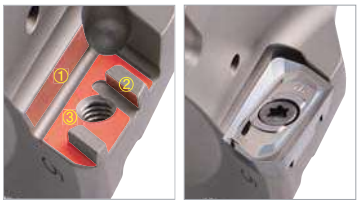
Cutter Features

- The combined clamping system of the key to key slot structure and simple screw-on type ensures strong clamping force
  - Stable machining / prevention of insert breakage
- Avoiding uplifting problems of insert due to axial acute-angle clamping of cutters
  - Reduced vibrations and excellent surface finish

Axial acute-angle clamping
Inhibition of the axial force

Screw-on clamping
New screw shape

Insert clamping area
Stable clamping force due to the key to key slot structure

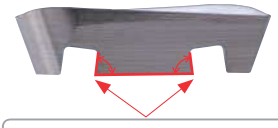


Insert Features

Wide minor cutting edges
Improved surface finish

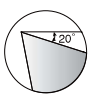
Mirror-like finish of the rake surface of insert
Avoiding build-up edges through smooth chip flow

High-rake chip breaker and helix cutting edges
High rake and lower cutting load



Application of the key slot design
The bottom key of insert and the key slot in an acute angle
High clamping stability of the holder contact area
→ Improved clamping force

Features of chip breaker

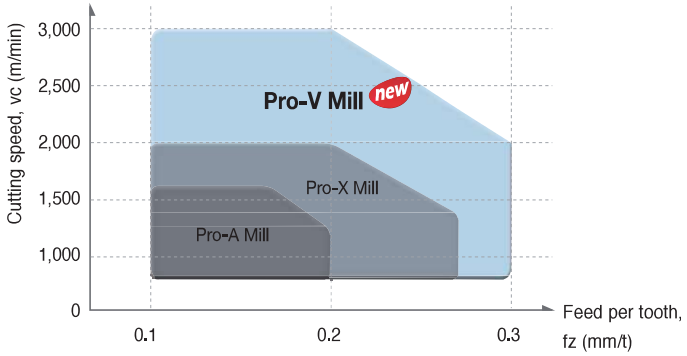
Insert		Cutting-edge	Uses	Features
MA			For non-ferrous metals	Ensuring satisfactory machining quality with the application of mirror-like cutting edges optimized for aluminum machining

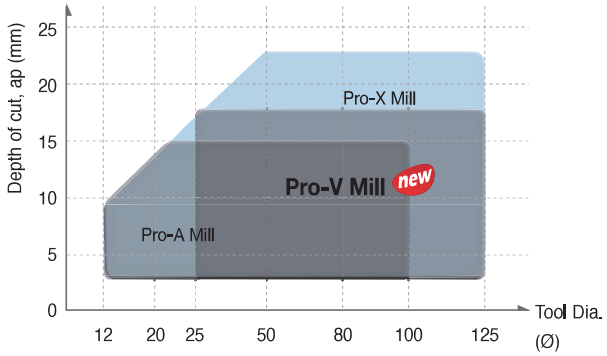
Recommended cutting condition

Workpiece			Grade	vc (m/min)	Max. ap (mm)
N	Aluminum	Si ≤ 5% (Si Lower than 5%)	H01	1,300 (500 - 2,200)	17
			H05	1,000 (300 - 1,700)	
			PD1005	1,500 (500 - 3,000)	
		Si ≤ 10% (Si Lower than 10%)	PD1010	1,200 (300 - 2,200)	

※ The recommended cutting conditions above are a general guideline. Their details may vary depending on the machining method of users and other conditions.

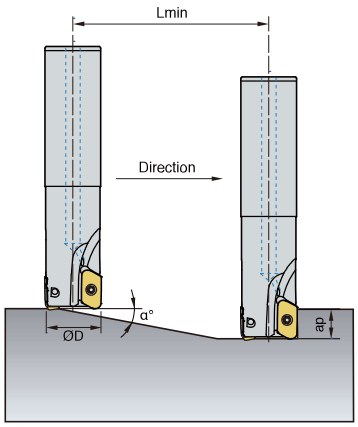
Application area



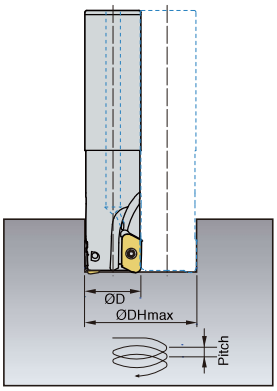


Pro-V Mill ramping & helical cutting technical data

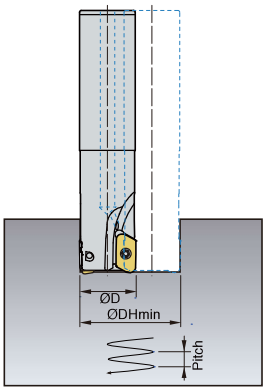
1. Ramping



2. Blind hole helical cutting



3. Thru hole helical cutting

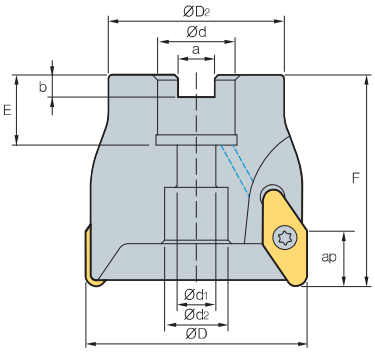


ØD (mm)	Ramping		Blind hole helical cutting				Thru hole helical cutting	
	α° (max)	Lmin (mm)	ØDH Min (mm)	dmax (mm)	ØDH Max (mm)	dmax (mm)	ØDH Min (mm)	dmax (mm)
25	15.0	59	41	13.0	44	15.5	27	2.0
32	10.0	99	55	11.0	58	12.5	41	4.5
40	7.0	142.5	71	10.5	74	11.5	57	6.0
50	5.0	200	91	10.0	94	10.5	77	6.5
63	3.5	286	117	9.2	120	9.5	103	7.0
80	2.6	385	151	9.0	154	9.5	137	7.3
100	2.0	501	191	9.0	194	9.0	177	7.6
125	1.5	668	241	8.5	244	8.5	227	7.5

- When ramping and helical milling, table feed, vf (mm/min) should be lower than 70% of the recommended cutting conditions.
- When helical milling, Max. pitch, DHmax should be lower than max. depth of cut, ap.
- When ramping, the depth of cut should be lower than max. depth of cut, ap.

- Lmin: ap/tan(α°) (mm)
- Lmin: Minimum inclination cutting length
  α° : Max. rampig angle
  ap : Depth of cut

PAC(M)2000/4000



AA 90°
• AR: 0°
• RR: -3°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	a	b	E	F	ap	kg
PACM	2040HR	3	40	34	16	9	14	8.4	5.6	18	40	8.7	0.2
	2050HR	4	50	42	22	11	18	10.4	6.3	22	50	8.7	0.4
	2063HR	5	63	49	22	11	18	10.4	6.3	22	50	8.7	0.6
	2080HR	5	80	57	27	14	20	12.4	7.0	25	50	8.7	0.9
	2100HR	6	100	67	32	18	26	14.4	8.0	30	63	8.7	1.9
	4040HR	3	40	32	16	9	11.5	8.4	5.6	20	55	15	0.2
	4050HR	3	50	40	22	11	18	10.4	6.3	20	55	15	0.3
	4063HR	4	63	50	22	11	18	10.4	6.3	20	60	15	0.6
	4080HR	4	80	60	27	14	20	12.4	7.0	25	60	15	1.0
	4100HR	5	100	80	32	18	26	14.4	8.0	26	60	15	1.6
PAC	2080HR	5	80	57	25.4	14	20	9.5	6.0	25	50	8.7	0.9
	2100HR	6	100	67	31.75	-	44	12.7	8.0	37	63	8.7	1.9
	4080HR	4	80	60	25.4	14	20	9.5	6.0	25	60	15	1.0
	4100HR	5	100	80	31.75	-	44	12.7	8.0	37	60	15	1.6

Available inserts

VCKT-MA

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
VCKT	220530N-MA																		●	E27

Available arbors

Designation		Ød	Available arbors
PACM	2040HR	16	BT□□-FMC16-□□
	2050HR	22	BT□□-FMC22-□□
	2063HR	22	BT□□-FMC22-□□
PAC	2080HR	25.4	BT□□-FMC25.4-□□
		27	BT□□-FMC27-□□
	2100HR	31.75	BT□□-FMC31.75-□□
		32	BT□□-FMC32-□□

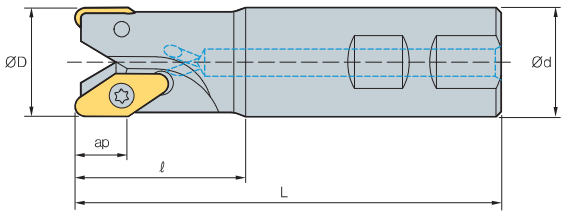
Designation		Ød	NC arbors
PACM	4040HR	16	BT□□-FMC16-□□
	4050HR	22	BT□□-FMC22-□□
	4063HR	22	BT□□-FMC22-□□
PAC	4080HR	25.4	BT□□-FMC25.4-□□
		27	BT□□-FMC27-□□
	4100HR	31.75	BT□□-FMC31.75-□□
		32	BT□□-FMC32-□□

Parts

Specification	Screw	Wrench	Arbor Bolt
Ø40~Ø100	FTNC04509(Ø40) FTNC04511	TW 20S	PHMA0834(Ø40)

Available inserts E27 Available arbors and bolt E400~E402

PAS2000/4000



AA
90°

- AR: 0°~7°
- RR: -21°~ -3°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
PAS	2012HR	1	12	16	25	85	8	0.1
	2016HR	2	16	16	25	90	8	0.11
	* 2016HR-R2.0	2	16	16	25	90	6	0.11
	2020HR	2	20	20	30	100	8	0.2
	* 2020HR-R2.0	2	20	20	30	100	6	0.2
	2025HR	3	25	25	35	115	8	0.36
	2032HR	4	32	32	40	125	8	0.66
	2042HR	5	42	32	42	130	8	0.84
	4032HR	2	32	32	50	125	15	0.6
	4040HR	3	40	32	50	140	15	0.8
	4040HR-S40	3	40	40	60	150	15	1.2
	4040HR-S42	3	40	42	60	150	15	1.2

Holders marked with an asterisk (*) are only for VDKT11T220N-MA.

Available inserts

VDKT-MA VCKT-MA


Type	Designation		Cermet		Coated												Uncoated			page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
2000 type	VDKT	11T210N-MA																		●	E27
		11T220N-MA																			
4000 type	VCKT	220530N-MA																		●	

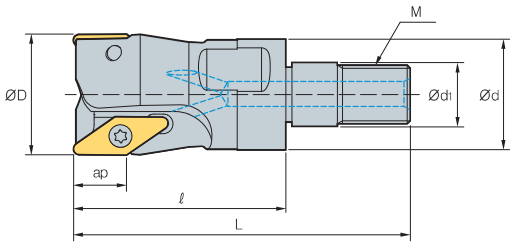
Parts

Specification	Screw	Wrench
Ø12~Ø42 (2000 type)	ETNA02505* / ETNA02506	TW 07S
Ø32~Ø40 (4000 type)	FTNC04509	TW 20S

Available inserts E27

* For PAS2012·2016

PAM2000









AA 90°

- AR: 7°~10°
- RR: -21°~ -9°

(mm)

Designation			ØD	Ød	Ød1	ℓ	L	M	ap	kg
PAM	2012HR-M06	1	12	11.0	6.5	33	48	M06	8	0.02
	2016HR-M08	2	16	14.5	8.5	36	53	M08	8	0.04
	2020HR-M10	2	20	18.0	10.5	36	57	M10	8	0.06
	2025HR-M12	3	25	22.5	12.5	41	65	M12	8	0.1
	2032HR-M16	4	32	28.5	17.0	45	72	M16	8	0.18
	2042HR-M16	5	42	28.5	17.0	45	72	M16	8	0.27

Available inserts

VDKT-MA

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
VDKT	11T210N-MA																		●	E27

Available adaptors

Designation		Available adaptors
PAM	2012HR-M06	MAT-M06
	2016HR-M08	MAT-M08
	2020HR-M10	MAT-M10
	2025HR-M12	MAT-M12
	2032HR-M16	MAT-M16
	2042HR-M16	MAT-M16

Designation: PAM2012HR-M06
Modular head threading measure size (M06)

II

Adaptor spec.: MAT-M06-030-S20S
Adaptor threading measure (M06)

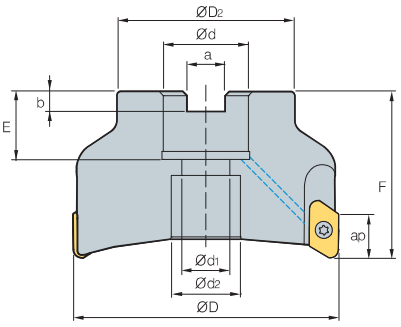
Parts

Specification	Screw	Wrench
Ø12~Ø42	ETNA02505*	TW 07S
	ETNA02506	

* For PAS2012·2016

Available inserts E27 Available adaptors E371~E372

PAXC(M)5000



AA 90°

- AR: 8°~17.5°
- RR: -9.5°~ -5°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	a	b	E	F	Max rpm	ap	kg
PAXCM	5040HR-A,B	3	40	34	16	9	14	8.4	5.6	19	40	25,800	17	0.15
	5050HR-A,B	4	50	42	22	11	18	10.4	6.3	21	50	23,000	17	0.3
	5063HR-A,B	5 (4)	63	49	22	11	18	10.4	6.3	21	50	20,500	17	0.56
PAXC (PAXCM)	5080HR-A,B	5	80	57	25.4 (27)	14	20	9.5 (12.4)	6 (7)	2 4(23)	50	18,200	17	1.0
	5100HR-A,B	6	100	67	31.75 (32)	18	26	12.7 (14.4)	8(8)	32 (26)	63	16,300	17	2.3
	5125HR-A,B	7	125	87	38.1 (40)	22	32	15.9 (16.4)	10 (9)	35 (29)	63	14,600	17	3.2

• A type: Insert NoseR 0.4~3.2, B type: Insert NoseR 4.0~5.0

( )Metric size

Available inserts

XEKT-MA

XEKT-ML

Designation	Cermet		Coated												Uncoated				page
	CN2000	CN30	NC5330	NCM535	NCM545	PC2505	PC2510	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	G10	H01	H05	
XEKT 19M504FR-MA													●	●			●	●		E29
19M508FR-MA													●	●			●	●		
19M512FR-MA													●	●			●	●		
19M516FR-MA														●			●	●		
19M518FR-MA																				
19M520FR-MA													●	●			●	●		
19M530FR-MA														●			●	●		
19M532FR-MA													●	●			●	●		
19M540FR-MA													●	●			●	●		
19M550FR-MA													●	●			●	●		

Designation	Cermet		Coated												Uncoated				page
	CN2000	CN30	NC5330	NCM535	NCM545	PC2505	PC2510	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	G10	H01	H05	
XEKT 19M504ER-ML																				E29
19M508ER-ML																				
19M512ER-ML																				
19M516ER-ML																				
19M518ER-ML																				
19M520ER-ML																				
19M530ER-ML																				
19M532ER-ML																				
19M540ER-ML																				
19M550ER-ML																				

Available arbors

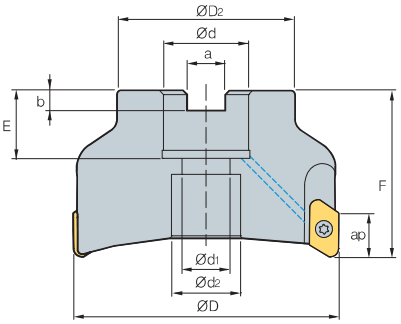
Designation		Ød	Available arbors
PAXCM	5040HR-A,B	16	BT□□-FMC16-□□
	5050HR-A,B	22	BT□□-FMC22-□□
	5063HR-A,B		
PAXC (PAXCM)	5080HR-A,B	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	5100HR-A,B	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	5125HR-A,B	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMC40-□□

Parts

Specification	Screw	Wrench
Ø40~Ø125	PTKA0408	TW 15S

Available inserts E29 Available arbors and bolt E400~E402

PAXC(M)6000



AA 90°

- AR: 8°~17.5°
- RR: -9.5°~ -5°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	a	b	E	F	Max rpm	ap	kg
PAXCM	6050HR-A,B	2	50	42	16	9	14	8.4	5.6	18	50	23,000	23	0.32
	6063HR-A,B	3	63	49	22	11	18	10.4	6.3	21	50	20,500	23	0.53
PAXC (PAXCM)	6080HR-A,B	4	80	57	25.4 (27)	14	20	9.5 (12.4)	6 (7)	25 (23)	50	18,200	23	0.73
	6100HR-A,B	5	100	67	31.75 (32)	18	26	12.7 (14.4)	8 (8)	32.5 (26)	63	16,300	23	1.7
	6125HR-A,B	6	125	87	38.1 (40)	22	32	15.9 (16.4)	10 (9)	35 (29)	63	14,600	23	3.06

- A type: Insert NoseR 0.4~3.2, B type: Insert NoseR 4.0~5.0

( )Metric size

Available inserts

XEKT-MA

XEKT-ML

Designation	Cermet		Coated												Uncoated				page
	CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	H05	
XEKT 250604FR-MA																		●	●	
250608FR-MA																		●	●	
250612FR-MA																		●	●	
250616FR-MA																				
250620FR-MA																		●	●	E29
250630FR-MA																				
250632FR-MA																		●	●	
250640FR-MA																				
250650FR-MA																		●	●	

Designation	Cermet		Coated												Uncoated				page
	CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	H05	
XEKT 250604ER-ML																				
250608ER-ML																				
250612ER-ML																				
250616ER-ML																				
250620ER-ML																				E29
250630ER-ML																				
250632ER-ML																				
250640ER-ML																				
250650ER-ML																				

Available arbors

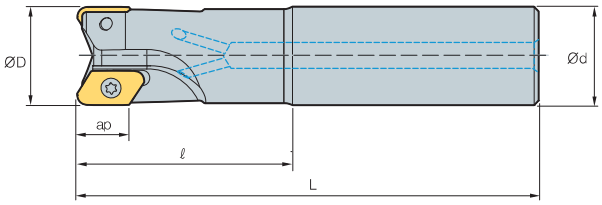
Designation		Ød	Available arbors
PAXCM	6050HR-A,B	16	BT□□-FMC16-□□
	6063HR-A,B	22	BT□□-FMC22-□□
PAXC (PAXCM)	6080HR-A,B	25.4	BT□□-FMA25.4-□□
		27	BT□□-FMC27-□□
	6100HR-A,B	31.75	BT□□-FMA31.75-□□
		32	BT□□-FMC32-□□
	6125HR-A,B	38.1	BT□□-FMA38.1-□□
		40	BT□□-FMC40-□□

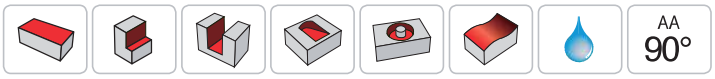
Parts

Specification	Screw	Wrench
Ø50~Ø125	FTGA0513-P	TW 20-100

Available inserts E29 Available arbors and bolt E400~E402

PAXS5000





- AR: 5°~10°
- RR: -14°~ -5°

(mm)

Designation			ØD	Ød	ℓ	L	Max rpm	ap	kg
PAXS	5020HR-A,B	1	20	20	60	130	15,000	17	0.24
	5025HR-A,B	2	25	25	60	140	32,600	17	0.4
	5025HR-A,B-L200	2	25	25	60	200	32,600	17	0.63
	5032HR-A,B	2	32	32	70	150	28,800	17	0.74
	5032HR-A,B-L220	2	32	32	70	220	28,800	17	1.2
	5040HR-A,B-S32	3	40	32	70	160	25,800	17	1.0
	5040HR-A,B-L220	3	40	32	70	220	25,800	17	1.4
	5040HR-A,B-S40	3	40	40	70	160	25,800	17	1.3
	5040HR-A,B-S42	3	40	42	70	160	25,800	17	1.4

- A type: Insert NoseR 0.4~3.2, B type: Insert NoseR 4.0~5.0

Available inserts

XEKT-MA

XEKT-ML

Designation		Cermet		Coated											Uncoated				page
		CN2000	CN30	NC5330	NCM535	NCM545	PC2505	PC2510	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	G10	H01	H05	
XEKT	19M504FR-MA														●	●			●	●	E29
	19M508FR-MA														●	●			●	●	
	19M512FR-MA														●	●			●	●	
	19M516FR-MA															●			●	●	
	19M518FR-MA																				
	19M520FR-MA														●	●			●	●	
	19M530FR-MA															●			●	●	
	19M532FR-MA														●	●			●	●	
	19M540FR-MA														●	●			●	●	
	19M550FR-MA														●	●			●	●	

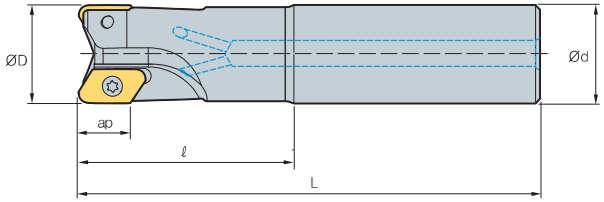
Designation		Cermet		Coated											Uncoated				page
		CN2000	CN30	NC5330	NCM535	NCM545	PC2505	PC2510	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	G10	H01	H05	
XEKT	19M504ER-ML																				E29
	19M508ER-ML																				
	19M512ER-ML																				
	19M516ER-ML																				
	19M518ER-ML																				
	19M520ER-ML																				
	19M530ER-ML																				
	19M532ER-ML																				
	19M540ER-ML																				
	19M550ER-ML																				

Parts

Specification	Screw	Wrench
Ø20	PTKA0407	TW 15S
Ø25~Ø40	PTKA0408	

Available inserts E29

PAXS6000



AA 90°

- AR: 5°~10°
- RR: -14°~ -5°

(mm)

Designation			ØD	Ød	ℓ	L	Max rpm	ap	kg
PAXS	6025HR-A,B	1	25	25	60	140	32,600	23	0.42
	6025HR-A,B-L200	1	25	25	60	200	32,600	23	0.63
	6032HR-A,B	1	32	32	70	150	28,800	23	0.72
	6032HR-A,B-L220	1	32	32	70	220	28,800	23	1.14
	6040HR-A,B-S32	2	40	32	70	160	25,800	23	0.88
	6040HR-A,B-L220	2	40	32	70	220	25,800	23	1.23
	6040HR-A,B-S40	2	40	40	70	160	25,800	23	1.2
	6040HR-A,B-S42	2	40	42	70	160	25,800	23	1.3

- A type: Insert NoseR 0.4~3.2, B type: Insert NoseR 4.0~5.0

Available inserts

XEKT-MA

XEKT-ML

Designation		Cermet		Coated											Uncoated				page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	H05	
XEKT	250604FR-MA																		●	●	E29
	250608FR-MA																		●	●	
	250612FR-MA																		●	●	
	250616FR-MA																				
	250620FR-MA																		●	●	
	250630FR-MA																				
	250632FR-MA																		●	●	
	250640FR-MA																				
	250650FR-MA																		●	●	

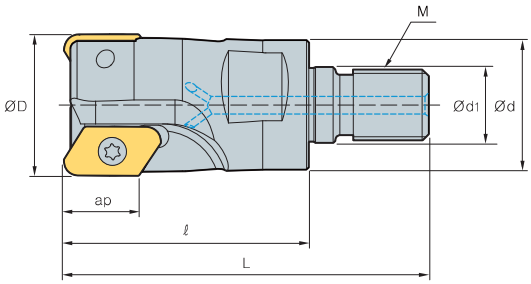
Designation		Cermet		Coated											Uncoated				page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	H05	
XEKT	250604ER-ML																				E29
	250608ER-ML																				
	250612ER-ML																				
	250616ER-ML																				
	250620ER-ML																				
	250630ER-ML																				
	250632ER-ML																				
	250640ER-ML																				
	250650ER-ML																				

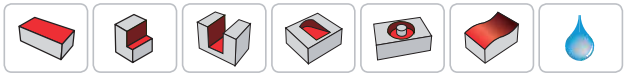
Parts

Specification	Screw	Wrench
Ø25~Ø32	FTGA0510-P	TW 20-100
Ø40	FTGA0513-P	

Available inserts E29

PAXM5000





• AR: 6°~8°
• RR: -7°~ -5°

(mm)

Designation			ØD	Ød	Ød1	ℓ	L	M	ap	kg
PAXM	5025HR-A,B-M12	2	25	23	12.5	55	79	M12	17	0.12
	5032HR-A,B-M16	2	32	29	17.0	55	82	M16	17	0.2
	5040HR-A,B-M16	3	40	29	17.0	55	82	M16	17	0.4

• A type: Insert NoseR 0.4~3.2, B type: Insert NoseR 4.0~5.0

Available inserts

XEKT-MA

XEKT-ML

Designation		Cermet		Coated										Uncoated				page
		CN2000	CN30	NC5330	NCM535	NCM545	PC2505	PC2510	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	G10	H01	H05	
XEKT	19M504FR-MA														●	●			●	●	E29
	19M508FR-MA														●	●			●	●	
	19M512FR-MA														●	●			●	●	
	19M516FR-MA															●			●	●	
	19M518FR-MA																				
	19M520FR-MA														●	●			●	●	
	19M530FR-MA															●			●	●	
	19M532FR-MA														●	●			●	●	
	19M540FR-MA														●	●			●	●	
	19M550FR-MA														●	●			●	●	

Designation		Cermet		Coated										Uncoated				page
		CN2000	CN30	NC5330	NCM535	NCM545	PC2505	PC2510	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	G10	H01	H05	
XEKT	19M504ER-ML																				E29
	19M508ER-ML																				
	19M512ER-ML																				
	19M516ER-ML																				
	19M518ER-ML																				
	19M520ER-ML																				
	19M530ER-ML																				
	19M532ER-ML																				
	19M540ER-ML																				
	19M550ER-ML																				

Available adaptor

Designation		Available adaptor
PAXM	5025HR-A,B-M12	MAT-M12
	5032HR-A,B-M16	MAT-M16
	5040HR-A,B-M16	

Designation: PAXM5025HR-M12
Modular head threading measure size (M12)

II

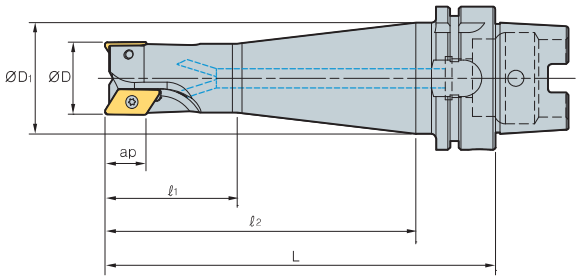
Adaptor spec.: MAT-M12-030-S25S
Adaptor threading measure (M12)

Parts

Specification	Screw	Wrench
Ø25~Ø40	PTKA0408	TW 15S

Available inserts E29 Available adaptors E371~E372

HSK63A/100A PAX5000



AA 90°

- AR: 5°~17.5°
- RR: -14°~ -5°

(mm)

Designation			ØD	ØD1	ℓ1	ℓ2	L	ap	kg
HSK63A	PAX5032HR-A, B	2	32	53	58	137	163	17	1.14
HSK100A	PAXCM5080HR-A, B	5	80	-	-	66	95	17	4
	PAXCM5100HR-A, B	6	100	-	-	66	95	17	4.6

- A type: Insert NoseR 0.4~3.2, B type: Insert NoseR 4.0~5.0
- For the maximum rake angle and the rpm limit, please refer to technical information on pp. E346~E347.

Available inserts

XEKT-MA

XEKT-ML

Designation	Cermet		Coated												Uncoated				page
	CN2000	CN30	NC5330	NCM535	NCM545	PC2505	PC2510	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	G10	H01	H05	
XEKT 19M504FR-MA														●	●			●	●	E29
19M508FR-MA														●	●			●	●	
19M512FR-MA														●	●			●	●	
19M516FR-MA															●			●	●	
19M518FR-MA																				
19M520FR-MA														●	●			●	●	
19M530FR-MA															●			●	●	
19M532FR-MA														●	●			●	●	
19M540FR-MA														●	●			●	●	
19M550FR-MA														●	●			●	●	

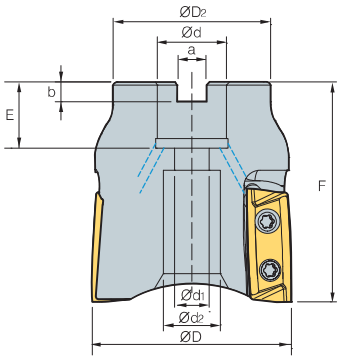
Designation	Cermet		Coated												Uncoated				page
	CN2000	CN30	NC5330	NCM535	NCM545	PC2505	PC2510	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD2000	PD1010	ST30A	G10	H01	H05	
XEKT 19M504ER-ML																				E29
19M508ER-ML																				
19M512ER-ML																				
19M516ER-ML																				
19M518ER-ML																				
19M520ER-ML																				
19M530ER-ML																				
19M532ER-ML																				
19M540ER-ML																				
19M550ER-ML																				

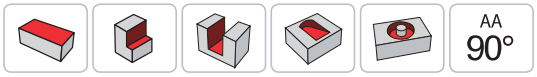
Parts

Specification	Screw	Wrench
Ø32~Ø100	PTKA0407 PTKA0408	TW 15S

Available inserts E29

PALCM





• AR: 16°
• RR: -8°

(mm)

Designation		⊙	ØD	ØD2	Ød	Ød1	Ød2	a	b	E	F	ap	kg
PALCM	063HR	4	63	50	22	11	21	10	6.3	20	70	34	0.57

Available inserts

LXET-MA LXET-ML

Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LXET	340504PEFR-63-MA																			E12
	3405PEFR-63-MA																		●	
	340512PEFR-63-MA																			
	340516PEFR-63-MA																			
	340504PEER-63-ML																			
	3405PEER-63-ML																			
	340512PEER-63-ML																			
	340516PEER-63-ML																			

Available arbors

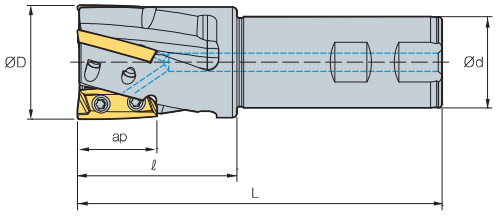
Designation		Ød	Available arbors
PALCM	063HR	22	BT□□-FMC22-□□

Parts

Specification	Screw	Wrench
Ø63	FTGA0511-P	TW20-100

Available inserts E12 Available arbors and bolt E400~E402

PALS (Single-edge)







AA
90°

- AR: 12°~16°
- RR: -5°~ -9°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
PALS	032HR-2S20	2	32	20	50	140	25	0.36
	032HR-2S25	2	32	25	50	140	25	0.48
	032HR-2S32	2	32	32	50	140	25	0.71
	040HR-2S32	2	40	32	50	140	25	0.85
	040HR-2S40	2	40	40	50	140	25	1.16
	040HR-2S42	2	40	42	50	140	25	1.26
	040HR-3S32	3	40	32	50	140	25	0.80
	040HR-3S40	3	40	40	50	140	25	1.10
	040HR-3S42	3	40	42	50	140	25	1.20

Available inserts

LXET-MA

LXET-ML

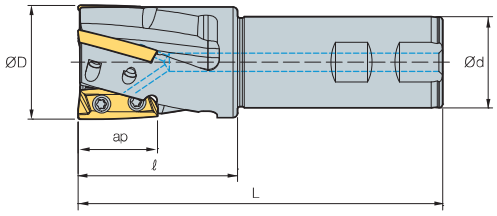
Type	Designation		Cermet		Coated												Uncoated			page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
Ø32	LXET	250404PEFR-32-MA																			E12
		2504PEFR-32-MA																		●	
		250412PEFR-32-MA																			
		250416PEFR-32-MA																			
		250404PEER-32-ML																			
		2504PEER-32-ML																			
		250412PEER-32-ML																			
		250416PEER-32-ML																			
Ø40	LXET	250404PEFR-40-MA																			
		2504PEFR-40-MA																			
		250412PEFR-40-MA																			
		250416PEFR-40-MA																			
		250404PEER-40-ML																			
		2504PEER-40-ML																			
		250412PEER-40-ML																			
		250416PEER-40-ML																			

Parts

Specification	Screw	Wrench
Ø32	FTKA0408	TW15S
Ø40	FTKA0410	TW15S

Available inserts E12

PALS (Single-edge)



- AR: 12°~16°
- RR: -5°~ -9°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
PALS	050HR-3S32	3	50	32	70	160	34	1.10
	050HR-3S40	3	50	40	70	160	34	1.40
	050HR-3S42	3	50	42	70	160	34	1.50
	063HR-4S32	4	63	32	70	160	34	1.60
	063HR-4S40	4	63	40	70	160	34	1.92
	063HR-4S42	4	63	42	70	160	34	2.00

Available inserts

LXET-MA

LXET-ML

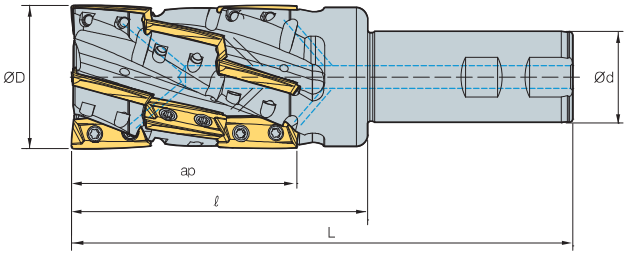
Type	Designation		Cermet		Coated												Uncoated			page
			CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
Ø50	LXET	340504PEFR-50-MA																		●	E12
		3405PEFR-50-MA																		●	
		340512PEFR-50-MA																			
		340516PEFR-50-MA																			
		340504PEER-50-ML																			
		3405PEER-50-ML														●					
		340512PEER-50-ML																			
		340516PEER-50-ML																			
Ø63	LXET	340504PEFR-63-MA																			
		3405PEFR-63-MA																		●	
		340512PEFR-63-MA																			
		340516PEFR-63-MA																			
		340504PEER-63-ML																			
		3405PEER-63-ML																			
		340512PEER-63-ML																			
		340516PEER-63-ML																			

Parts

Specification	Screw	Wrench
Ø50	FTGA0510-P	TW20-100
Ø63	FTGA0511-P	TW20-100

Available inserts E12

PALS (Multi-edge)



AA
90°

- AR: 16°
- RR: -8°

(mm)

Designation			Ød	Ød1	ℓ	L	ap	kg
PALS	063HM-4S32	12	63	32	130	220	96	1.60
	063HM-4S40	12	63	40	130	220	96	1.92
	063HM-4S42	12	63	42	130	220	96	2.00

Available inserts

LXET-MA LXET-ML

Designation		Cermet		Coated												Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LXET	340504PEFR-63-MA																			E12
	3405PEFR-63-MA																		●	
	340512PEFR-63-MA																			
	340516PEFR-63-MA																			
	340504PEER-63-ML																			
	3405PEER-63-ML																			
	340512PEER-63-ML																			
	340516PEER-63-ML																			

Parts

Specification	Screw	Wrench
Ø63	FTGA0511-P	TW20-100

Available inserts E12

PXL(S) new

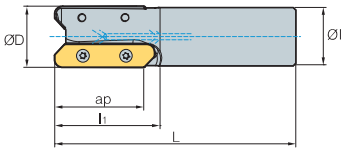


Fig. 1

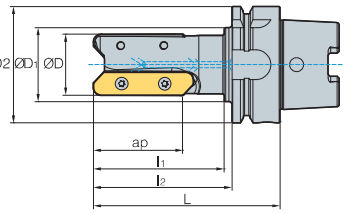


Fig. 2

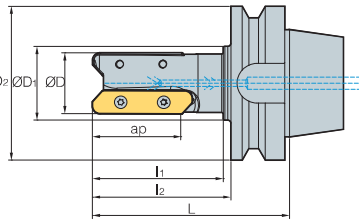
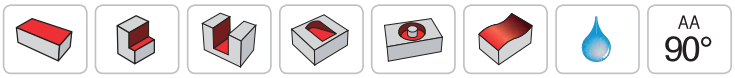


Fig. 3



AA 90°

- AR: 5°~17.5°
- RR: -14°~ -5°

(mm)

Designation			ØD	ØD1	ØD2	l1	l2	L	ap	kg	Fig.
PXLS	040HR-2S40	2	40	40	-	85	-	175	57	1.23	1
	040HR-3S40	3	40	40	-	85	-	175	57	1.11	1
	050HR-3S40	3	50	40	-	85	-	185	57	1.51	1
HSK63A	PXL04090HR-2F	2	40	48	63	85	90	116	57	1.13	2
HSK100A	PXL04090HR-3F	3	40	70	100	90	100	129	57	2.74	2
	PXL08090HR-5F	5	80	77	100	-	90	119	57	4.29	2
BT50	PXL04090HR-2F	2	40	48	100	85	90	128	57	4.13	3

Available inserts

LDET-MA

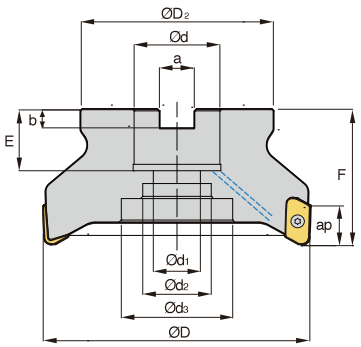
Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LDET	650540PPFR-MA																			E10
	650550PPFR-MA																			

Parts

Specification	Screw	Wrench
Ø40~80	FTGA0511-P	TW20-100

Available inserts E10

PAVCM-XD19



AA 90°

- AR: 11°~14°
- RR: -11°~ -9°

(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg
PAVCM	040R-16-3-XD19-A,B	3	40	34	16	9	13.5	-	8.4	5.6	16	45	17	0.17
	050R-22-4-XD19-A,B	4	50	42	22	11	18	-	10.4	6.3	21	50	17	0.35
	063R-22-5-XD19-A,B	5	63	42	22	11	18	-	10.4	6.3	21	50	17	0.53
	080R-27-5-XD19-A,B	5	80	60	27	14	20	-	12.4	7.0	24	50	17	0.88
	100R-32-6-XD19-A,B	6	100	70	32	18	26	42	14.4	8.0	25	63	17	1.72
	125R-40-7-XD19-A,B	7	125	90	40	22	32	52	16.4	9.0	29	63	17	2.82

- Type A uses Insert Nose R 0.4~3.2, and Type B uses Nose R 4.0 ~ 5.0
- When using a spindle at high speed, please check the balance of tool and use it after replacing with the new screw.

Available inserts

XDET-MA

Designation		Cermet		Coated										Uncoated		page	Designation		Cermet		Coated										Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1005	PD1010	H01	H05				CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1005	PD1010	H01	H05	
XDET	190504PEFR-MA																●		E10	XDET	190524PEFR-MA															●		
	190508PEFR-MA																●	●			190530PEFR-MA															●	●	
	190512PEFR-MA																●				190532PEFR-MA															●		E10
	190516PEFR-MA																●	●			190540PEFR-MA															●		
	190520PEFR-MA																●				190550PEFR-MA															●		

Available arbors

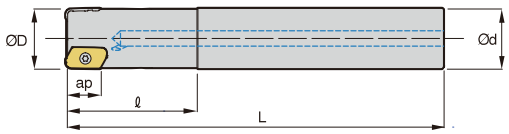
Designation		Available arbors
PAVCM	040R-16-3-XD19	BT□□-FMC16-□□
	050R-22-4-XD19	BT□□-FMC22-□□
	063R-22-5-XD19	BT□□-FMC22-□□
	080R-27-5-XD19	BT□□-FMC27-□□
	100R-32-6-XD19	BT□□-FMC32-□□
	125R-40-7-XD19	BT□□-FMC40-□□

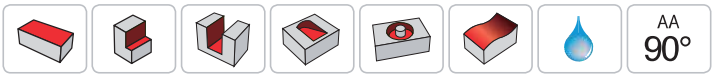
Parts

Specification	Screw	Wrench
Ø40~Ø125	PTKA0408-A	TW 15S

Available inserts E10 Available arbors and bolt E400~E402

PAVS-XD19





AA 90°

- AR: 8°~11°
- RR: -14°~-11°

(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
PAVS	025R-2C25-140-XD19-A,B	2	25	25	60	140	17	0.40
	032R-2C32-150-XD19-A,B	2	32	32	70	150	17	0.76
	032R-2C32-200-XD19-A,B	2	32	32	70	200	17	1.06
	040R-3C40-200-XD19-A,B	3	40	40	70	200	17	1.71

- Type A uses Insert Nose R 0.4~3.2, and Type B uses Nose R 4.0~5.0
- When using a spindle at high speed, please check the balance of tool and use it after replacing with the new screw.

Available inserts

XDET-MA

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1005	PD1010	H01	H05	
XDET	190504PEFR-MA																	●	E10
	190508PEFR-MA																●	●	
	190512PEFR-MA																	●	
	190516PEFR-MA																●	●	
	190520PEFR-MA																	●	

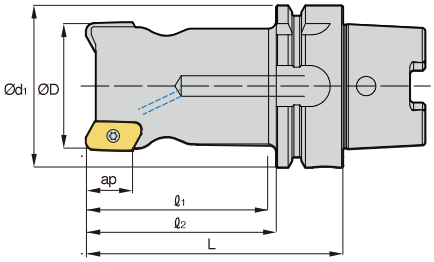
Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1005	PD1010	H01	H05	
XDET	190524PEFR-MA																	●	E10
	190530PEFR-MA																●	●	
	190532PEFR-MA																	●	
	190540PEFR-MA																	●	
	190550PEFR-MA																	●	

Parts

Specification	Screw	Wrench
Ø25~Ø40	PTKA0408-A	TW 15S

Available inserts E10 Available arbors and bolt E400~E402

HSK-XD19



AA 90°

- AR: 9°~13°
- RR: -11°~ -13°

(mm)

Designation			ØD	Ød1	ℓ1	ℓ2	L	ap	kg
HSK63A	PAV032R-3-100-XD19-A,B	3	32	63	60	74	100	17	0.97
	PAV050R-3-100-XD19-A,B	3	50	63	72	74	100	17	1.37

- Type A uses Insert Nose R 0.4~3.2, and Type B uses Nose R 4.0 ~ 5.0
- When using a spindle at high speed, please check the balance of tool and use it after replacing with the new screw.

Available inserts

XDET-MA

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1005	PD1010	H01	H05	
XDET	190504PEFR-MA																	●	E10
	190508PEFR-MA																	●●	
	190512PEFR-MA																	●	
	190516PEFR-MA																	●●	
	190520PEFR-MA																	●	

Designation		Cermet		Coated											Uncoated		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	PD1005	PD1010	H01	H05	
XDET	190524PEFR-MA																	●	E10
	190530PEFR-MA																	●●	
	190532PEFR-MA																	●	
	190540PEFR-MA																	●	
	190550PEFR-MA																	●	

Parts

Specification	Screw	Wrench
Ø32~Ø50	PTKA0408-A	TW 15S

Available inserts E10 Available arbors and bolt E400~E402

MAT (Steel shank type)

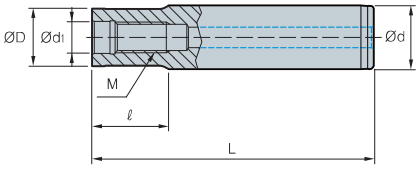


Fig. 1

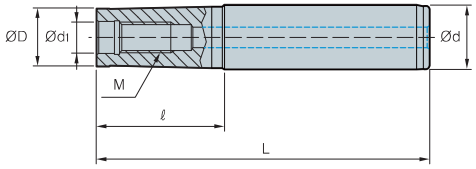


Fig. 2

(mm)

Designation		ØD	Ød	Ød1	ℓ	L	M	Fig.
MAT-	M06-020-S10S	9.5	10	6.5	20	70	M06	1
	M6B-020-S12S	11.0	12	6.5	20	76	M06	1
	M6B-040-S12S	11.0	12	6.5	40	96	M06	1
	M08-020-S16S	14.5	16	8.5	20	80	M08	1
	M10-030-S20S	18.0	20	10.5	30	100	M10	1
	M12-030-S25S	22.5	25	12.5	29	110	M12	1
	M16-035-S32S	28.5	32	17.0	35	125	M16	1
	M06-040-S12T	9.5	12	6.5	40	96	M06	2
	M06-065-S16T	9.5	16	6.5	65	125	M06	2
	M6B-065-S16T	11.0	16	6.5	65	125	M06	2
	M6B-080-S16T	11.0	16	6.5	80	140	M06	2
	M08-040-S16T	14.5	16	8.5	40	100	M08	2
	M08-065-S16T	14.5	16	8.5	65	125	M08	2
	M08-080-S20T	14.5	20	8.5	80	150	M08	2
	M08-110-S25T	14.5	25	8.5	110	190	M08	2
	M10-050-S20T	18.0	20	10.5	50	120	M10	2
	M10-070-S20T	18.0	20	10.5	70	140	M10	2
	M10-090-S25T	18.0	25	10.5	90	170	M10	2
	M10-110-S25T	18.0	25	10.5	110	190	M10	2
	M10-130-S32T	18.0	32	10.5	130	220	M10	2
	M12-050-S25T	22.5	25	12.5	50	130	M12	2
	M12-070-S25T	22.5	25	12.5	70	150	M12	2
	M12-090-S25T	22.5	25	12.5	90	170	M12	2
	M12-110-S32T	22.5	32	12.5	110	200	M12	2
	M12-175-S40T	22.5	40	12.5	175	300	M12	2
	M16-055-S32T	28.5	32	17.0	55	145	M16	2
	M16-080-S32T	28.5	32	17.0	80	170	M16	2
	M16-120-S32T	28.5	32	17.0	120	210	M16	2
	M16-175-S40T	28.5	40	17.0	175	300	M16	2

• S: straight neck adaptor • T: taper neck adaptor

FMRM type	LBE-MHD type	PAM/PAXM type	AMM type	RM3PM type	RM4PM/RM4ZM type
					
E244~247, E256~259	E322	E356, 361	E180~182	E94	E107, 109

RM6PM type	HFMDM type	HFMM type	HRMM type	HRMDM type	GBEM type
					
E114	E267	E275	E297, 298	E289~291	E326

Applicable Modular **E42, E43** (FMRM, LBE, PAM, AMM, RM4PM, HFMM, RM4ZM, HRMM, PAXM)

MAT-C (Carbide shank type)

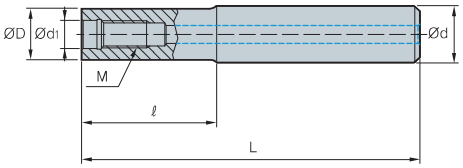


Fig. 1

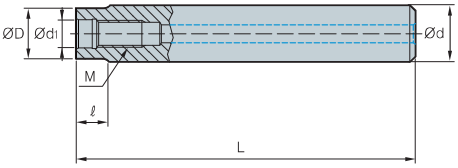


Fig. 2

(mm)

Designation		ØD	Ød	Ød1	ℓ	L	M	Fig.
MAT-	M06-030-S10S-C-80	9.5	10	6.5	30	80	M06	1
	M06-050-S10S-C-100	9.5	10	6.5	50	100	M06	1
	M06-080-S10S-C-130	9.5	10	6.5	80	130	M06	1
	M6B-030-S12S-C-80	11	12	6.5	30	80	M06	1
	M6B-050-S12S-C-100	11	12	6.5	50	100	M06	1
	M6B-080-S12S-C-130	11	12	6.5	80	130	M06	1
	M08-080-S16S-C	14.5	16	8.5	80	150	M08	1
	M08-110-S16S-C	14.5	16	8.5	110	180	M08	1
	M08-150-S16S-C	14.5	16	8.5	150	250	M08	1
	M08-010-S16S-C-150	14.5	16	8.5	10	150	M08	2
	M08-010-S16S-C-180	14.5	16	8.5	10	180	M08	2
	M08-010-S16S-C-250	14.5	16	8.5	10	250	M08	2
	M10-090-S20S-C	18	20	10.5	90	170	M10	1
	M10-110-S20S-C	18	20	10.5	110	200	M10	1
	M10-175-S20S-C	18	20	10.5	175	300	M10	1
	M10-010-S20S-C-170	18	20	10.5	10	170	M10	2
	M10-010-S20S-C-200	18	20	10.5	10	200	M10	2
	M10-010-S20S-C-300	18	20	10.5	10	300	M10	2
	M12-090-S25S-C	22.5	25	12.5	90	170	M12	1
	M12-110-S25S-C	22.5	25	12.5	110	200	M12	1
	M12-175-S25S-C	22.5	25	12.5	175	300	M12	1
	M12-015-S25S-C-170	22.5	25	12.5	15	170	M12	2
	M12-015-S25S-C-200	22.5	25	12.5	15	200	M12	2
	M12-015-S25S-C-300	22.5	25	12.5	15	300	M12	2
	M16-090-S32S-C	28.5	32	17	90	180	M16	1
	M16-120-S32S-C	28.5	32	17	120	210	M16	1
	M16-175-S32S-C	28.5	32	17	175	300	M16	1
	M16-020-S32S-C-180	28.5	32	17	20	180	M16	2
	M16-020-S32S-C-210	28.5	32	17	20	210	M16	2
	M16-020-S32S-C-300	28.5	32	17	20	300	M16	2

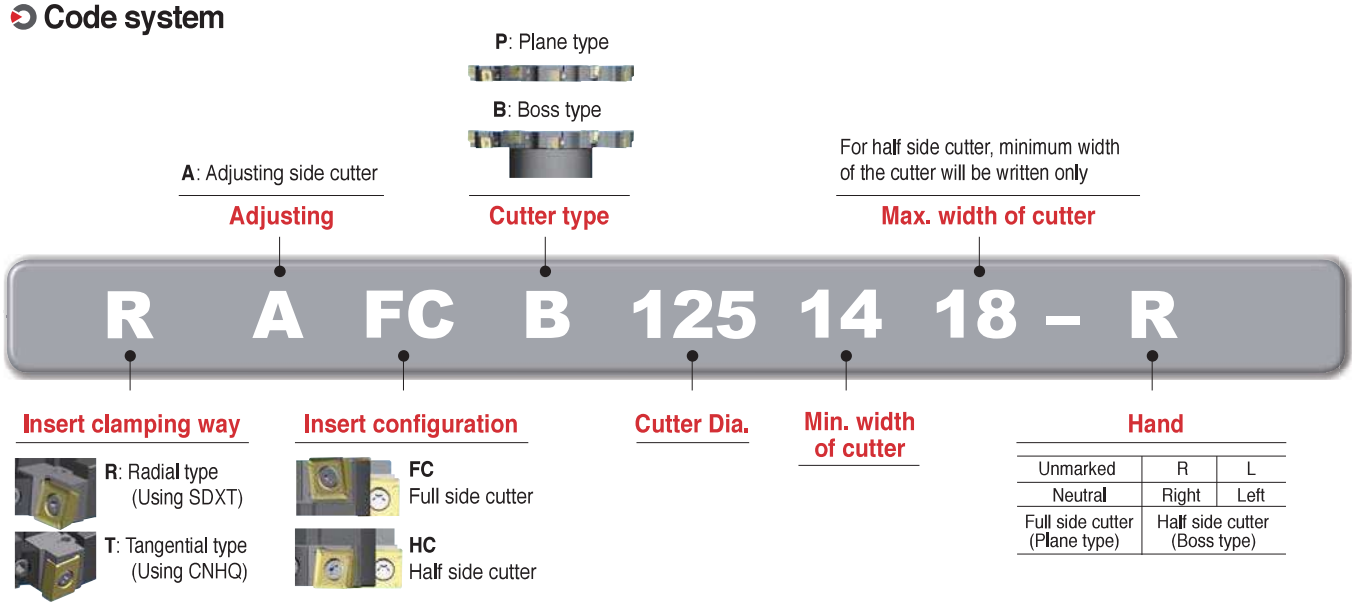
FMRM type	LBE-MHD type	PAM/PAXM type	AMM type	RM3PM type	RM4PM/RM4ZM type
					
E244~247, E256~259	E322	E356, 361	E180~182	E94	E107, 109

RM6PM type	HFMDM type	HFMM type	HRMM type	HRMDM type	GBEM type
					
E114	E267	E275	E297, 298	E289~291	E326

Applicable Modular **E42, E43** (FMRM, LBE, PAM, AMM, RM4PM, HFMM, RM4ZM, HRMM, PAXM)

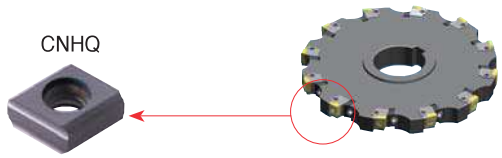
Adjusting side cutter

Code system



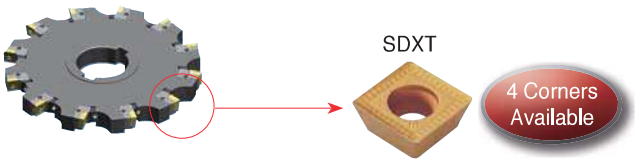
Unmarked	R	L
Neutral	Right	Left
Full side cutter (Plane type)	Half side cutter (Boss type)	

Tangential type (High rigidity)



- Medium/Roughing
- Excellent performance at medium to roughing range (14~30 mm) table operation due to the strong rigidity of the cutter
- Good performance in heavy interruption and deep depth of cut application

Radial type (Low cutting load)

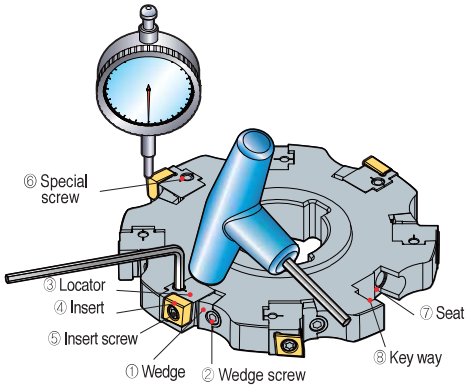


- Medium/Finishing
- Suitable for small width cutting operation (12~24 mm)
- 3 dimensional chip breaker provides smooth cutting operation
- Several chip breakers as per applications are available (MF, MM, FA)
- Economical insert using 4 cutting-edges per insert

Insert features

- Precise adjustable side cutter can control the width of the cutter by 5㎛ unit
- Since the width of the cutter is adjustable up to ±1.5 mm, single cutter can cover various cutting width
- Specially designed clamping system of the locator provides excellent rigidity by using elastic deformation of the locator
- Tangential type clamping system of insert provides enough strength can withstand large width cutting operations
- 3-dimensional chip breaker of insert provides smooth cutting with low cutting load at medium to finishing range

Operating manual



• How to assemble the adjusting side cutter

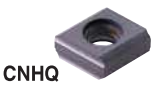
1. Clamp ①wedge slightly on ⑦locator-wedge pocket by using ②wedge screw
2. Put ③locator on ⑦locator-wedge pocket along with the ⑧key-way
3. Tighten the ⑥taper screw little bit to set proper position of locator
4. Tighten the ②wedge screw tightly by using 70~80N.m torque
5. After, put the ④insert on insert pocket of ③locator, clamp it with ⑤insert screw by using 40~50N.m torque

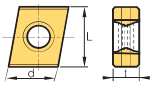
• How to adjust Run-out & cutting width

1. Settle the adjusting side cutter after cleaning to the jig for measurement
2. Un-screw the ②Wedge screw first, then tighten ①wedge slightly again by using 8N.m torque
3. Adjusting the height of cutting-edge by using a dial gauge to set the width of the cutter
4. Tighten the ②wedge screw tightly by using 70~80N.m torque
5. To finish the setting, tighten the ⑥taper screw for strong clamp

Tangential type

Cutting width per insert & type of cutter

CNHQ 



(mm)

Designation		Coated		Cutting width for half side cutter (ap)	Cutting width for full side cutter (ap)	L	d	t
		NCM325	PC6510					
CNHQ1005	- C0.5			9.0	14~18	10	10	5.4
	- R0.5							
	- C1.0			8.5	14~17			
	- R1.0							
CNHQ1305	- C0.5			12	18~21/21~24	12.7	10	5.4
	- R0.5							
	- C1.0			11.5	18~21/21~23			
	- R1.0							
	- C1.5			11	18~21/21~22			
	- R1.5							
CNHQ1606	- C0.5			15	24~27/27~30	16	12	6.4
	- R0.5							
	- C1.0			14.5	24~27/27~29			
	- R1.0							
	- C1.5			14	24~27/27~28			
	- R1.5							
	- C2.0			13.5	24~27			
	- R2.0							

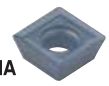
Applicable holder **E375, E376** Available arbors and bolt **E400~E402**

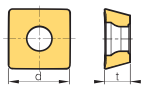
Recommended cutting condition

ISO	Grades	vc (m/min)	fz (mm/t)
P	NCM325	190~310	0.10~0.30
	PC3700	160~270	
M	PC5300	90~150	0.10~0.30
	NCM335	180~290	
K	PC6510	140~230	0.10~0.30

Radial type

Cutting width as per insert & type of cutter

MA  MF  MM 



(mm)

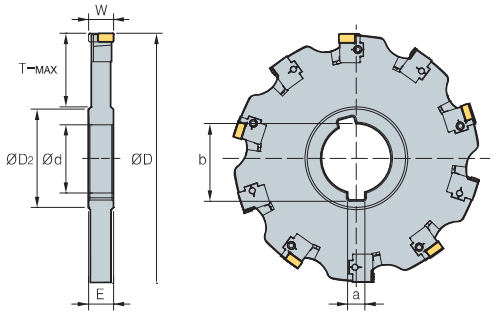
Designation		Coated												Uncoated		Cutting width for half side cutter (ap)	Cutting width for full side cutter (ap)	d	t
		NCM325	NC5330	NCM535	NCM545	PC2505	PC2510	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	H01	H05			
SDXT	09M405R-MA														●	●	8	12~14 14~16	9.525	4
	09M405L-MA																			
	09M405R-MF	●						●		●	●		●	●						
	09M405L-MF																			
	09M405R-MM	●						●		●	●		●	●						
	09M405L-MM							●		●										
	130508R-MA														●	●	10.5	16~18 18~20 20~22 22~24	13.5	5.56
	130508L-MA																			
	130508R-MF	●						●		●	●		●	●						
	130508L-MF																			
	130508R-MM	●						●		●	●		●	●						
	130508L-MM																			

Applicable holder **E377, E378** Available arbors and bolt **E400~E402**

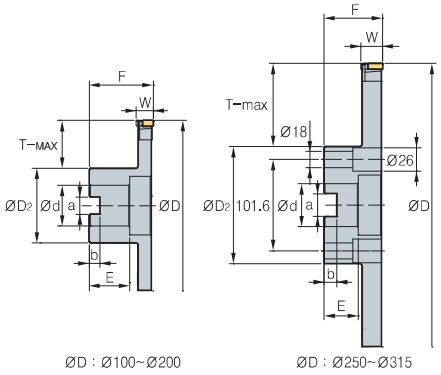
Recommended cutting condition

ISO	Grades	vc (m/min)	fz (mm/t)
P	NCM325	190~310	0.08~0.30
	NCM335	180~290	0.08~0.25
	PC3700	160~270	0.10~0.25
M	PC9530	90~150	0.10~0.25
	PC5300	90~150	
K	PC8110	140~230	0.10~0.25
	PC6510	140~230	

Tangential type (Full side cutter)



• TAFCP(M)



• TAFCB(M)

(mm)

Designation		Ød	E	ØD2	a	b	T-MAX	Designation		Ød	F	ØD2	a	b	E	T-MAX	Dimensions ØD	W	No. of tooth
TAFCP (M)	1001418	31.75 (32)	14	48	7.92 (8)	35.2	24	TAFCB (M)	1001418R/L	31.75 (32)	50	54	12.7 (14.4)	8	28	21	100	14-18	6
	1251418	38.1 (40)	14	56	9.52 (10)	42.3	32		1251418R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	14-18	8
	1601418	38.1 (40)	14	56	9.52 (10)	42.3	50		1601418R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	14-18	10
	2001418	50.8 (50)	14	72	12.7 (12)	55.8	61		2001418R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	14-18	12
	2501418	50.8 (50)	14	72	12.7 (12)	55.8	86		2501418R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	14-18	16
	3151418	50.8 (50)	14	72	12.7 (12)	55.8	118		3151418R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	14-18	20
TAFCP (M)	1001821	31.75 (32)	18	48	7.92 (8)	35.2	24	TAFCB (M)	1001821R/L	31.75 (32)	50	50	12.7 (14.4)	8	28	21	100	18-21	6
	1251821	38.1 (40)	18	56	9.52 (10)	42.3	32		1251821R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	18-21	8
	1601821	38.1 (40)	18	56	9.52 (10)	42.3	50		1601821R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	18-21	10
	2001821	50.8 (50)	18	72	12.7 (12)	55.8	61		2001821R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	18-21	12
	2501821	50.8 (50)	18	72	12.7 (12)	55.8	86		2501821R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	18-21	16
	3151821	50.8 (50)	18	72	12.7 (12)	55.8	118		3151821R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	18-21	20
TAFCP (M)	1002124	31.75 (32)	21	48	7.92 (8)	35.2	24	TAFCB (M)	1002124R/L	31.75 (32)	50	54	12.7 (14.4)	8	28	21	100	21-24	6
	1252124	38.1 (40)	21	56	9.52 (10)	42.3	32		1252124R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	21-24	8
	1602124	38.1 (40)	21	56	9.52 (10)	42.3	50		1602124R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	21-24	10
	2002124	50.8 (50)	21	72	12.7 (12)	55.8	61		2002124R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	21-24	12
	2502124	50.8 (50)	21	72	12.7 (12)	55.8	86		2502124R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	21-24	16
	3152124	50.8 (50)	21	72	12.7 (12)	55.8	118		3152124R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	21-24	20
TAFCP (M)	1252427	38.1 (40)	24	56	9.52 (10)	42.3	32	TAFCB (M)	1252427R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	24-27	8
	1602427	38.1 (40)	24	56	9.52 (10)	42.3	50		1602427R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	24-27	10
	2002427	50.8 (50)	24	72	12.7 (12)	55.8	61		2002427R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	24-27	12
	2502427	50.8 (50)	24	72	12.7 (12)	55.8	86		2502427R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	24-27	16
	3152427	50.8 (50)	24	72	12.7 (12)	55.8	118		3152427R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	24-27	20
TAFCP (M)	1252730	38.1 (40)	27	56	9.52 (10)	42.3	32	TAFCB (M)	1252730R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	27-30	8
	1602730	38.1 (40)	27	56	9.52 (10)	42.3	50		1602730R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	27-30	10
	2002730	50.8 (50)	27	72	12.7 (12)	55.8	61		2002730R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	27-30	12
	2502730	50.8 (50)	27	72	12.7 (12)	55.8	86		2502730R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	27-30	16
	3152730	50.8 (50)	27	72	12.7 (12)	55.8	118		3152730R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	27-30	20

Available inserts and Recommended cutting condition **E374** • The ap (Maximum width of cutter) size written above is the number when using insert having corner size C0.5 or R0.5

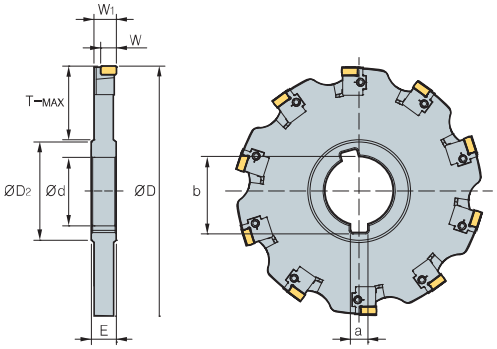
( )Metric size

Parts

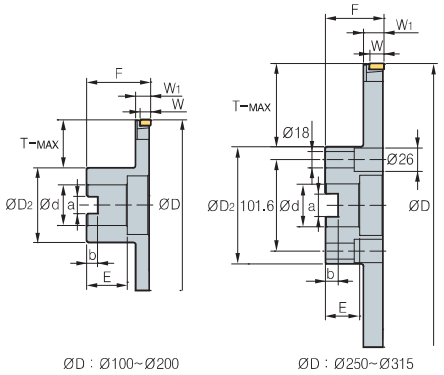
Specification Edge width (TAHCP/B)	Insert	Locator	Wedge	Insert screw	Wedge screw	Locator screw	Insert wrench	Wedge Wrench	Locator Wrench
□□□1418R/L	CNHQ1005-□□□	LSA-CH10R/L	WSA10N	FTKA0410	DHA0617	SHGA0411	TW15S	HW30	-
□□□1821R/L	CNHQ1305-□□□	LSA-CH13R/L	WSA13N	FTKA0410	DHA0821F	SHGA0411	TW15S	HW40	HW30L
□□□2124R/L	CNHQ1305-□□□	LSA-CH13R/L	WSA13N	FTKA0410	DHA0821F	SHGA0411	TW15S	HW40	HW30L
□□□2427R/L	CNHQ1606-□□□	LSA-CH16R/L	WSA13N	FTGA0513-P	DHA0821F	SHGA0411	TW20S	HW40	HW30L
□□□2730R/L	CNHQ1606-□□□	LSA-CH16R/L	WSA13N	FTGA0513-P	DHA0821F	SHGA0411	TW20S	HW40	HW30L

• Note) The Wedge screw for 1001821, 1002124 cutter is DHA0818F

Tangential type (Half side cutter)



• TAHCP(M)



• TAHCB(M)

(mm)

Designation		Ød	E	ØD2	a	b	T-MAX
TAHCP (M)	10014R/L	31.75 (32)	14	48	7.92 (8)	35.2	24
	12514R/L	38.1 (40)	14	56	9.52 (10)	42.3	32
	16014R/L	38.1 (40)	14	56	9.52 (10)	42.3	50
	20014R/L	50.8 (50)	14	72	12.7 (12)	55.8	61
	25014R/L	50.8 (50)	14	72	12.7 (12)	55.8	86
	31514R/L	50.8 (50)	14	72	12.7 (12)	55.8	118
TAHCP (M)	10018R/L	31.75 (32)	18	48	7.92 (8)	35.2	24
	12518R/L	38.1 (40)	18	56	9.52 (10)	42.3	32
	16018R/L	38.1 (40)	18	56	9.52 (10)	42.3	50
	20018R/L	50.8 (50)	18	72	12.7 (12)	55.8	61
	25018R/L	50.8 (50)	18	72	12.7 (12)	55.8	86
	31518R/L	50.8 (50)	18	72	12.7 (12)	55.8	118
TAHCP (M)	10021R/L	31.75 (32)	21	48	7.92 (8)	35.2	24
	12521R/L	38.1 (40)	21	56	9.52 (10)	42.3	32
	16021R/L	38.1 (40)	21	56	9.52 (10)	42.3	50
	20021R/L	50.8 (50)	21	72	12.7 (12)	55.8	61
	25021R/L	50.8 (50)	21	72	12.7 (12)	55.8	86
	31521R/L	50.8 (50)	21	72	12.7 (12)	55.8	118
TAHCP (M)	12524R/L	38.1 (40)	24	56	9.52 (10)	42.3	32
	16024R/L	38.1 (40)	24	56	9.52 (10)	42.3	50
	20024R/L	50.8 (50)	24	72	12.7 (12)	55.8	61
	25024R/L	50.8 (50)	24	72	12.7 (12)	55.8	86
	31524R/L	50.8 (50)	24	72	12.7 (12)	55.8	118
TAHCP (M)	12527R/L	38.1 (40)	27	56	9.52 (10)	42.3	32
	16027R/L	38.1 (40)	27	56	9.52 (10)	42.3	50
	20027R/L	50.8 (50)	27	72	12.7 (12)	55.8	61
	25027R/L	50.8 (50)	27	72	12.7 (12)	55.8	86
	31527R/L	50.8 (50)	27	72	12.7 (12)	55.8	118

Designation		Ød	F	ØD2	a	b	E	T-MAX
TAHCB (M)	10014R/L	31.75 (32)	50	54	12.7 (14.4)	8	28	21
	12514R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25
	16014R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43
	20014R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53
	25014R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58
	31514R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90
TAHCB (M)	10018R/L	31.75 (32)	50	50	12.7 (14.4)	8	28	21
	12518R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25
	16018R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43
	20018R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53
	25018R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58
	31518R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90
TAHCB (M)	10021R/L	31.75 (32)	50	54	12.7 (14.4)	8	28	21
	12521R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25
	16021R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43
	20021R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53
	25021R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58
	31521R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90
TAHCB (M)	12524R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25
	16024R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43
	20024R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53
	25024R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58
	31524R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90
TAHCB (M)	12527R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25
	16027R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43
	20027R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53
	25027R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58
	31527R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90

Dimensions			
ØD	W	W1	No. of tooth
100	9	13.25	6
125	9	13.25	8
160	9	13.25	10
200	9	13.25	12
250	9	13.25	16
315	9	13.25	20
100	12	16.75	6
125	12	16.75	8
160	12	16.75	10
200	12	16.75	12
250	12	16.75	16
315	12	16.75	20
100	12	19.75	6
125	12	19.75	8
160	12	19.75	10
200	12	19.75	12
250	12	19.75	16
315	12	19.75	20
125	15	22.75	8
160	15	22.75	10
200	15	22.75	12
250	15	22.75	16
315	15	22.75	20
125	15	25.75	8
160	15	25.75	10
200	15	25.75	12
250	15	25.75	16
315	15	25.75	20

Available inserts and Recommended cutting condition **E374** • The ap (Maximum width of cutter) size written above is the number when using insert having corner size C0.5 or R0.5

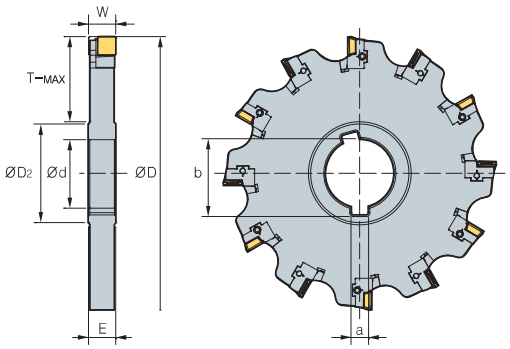
( )Metric size

Parts

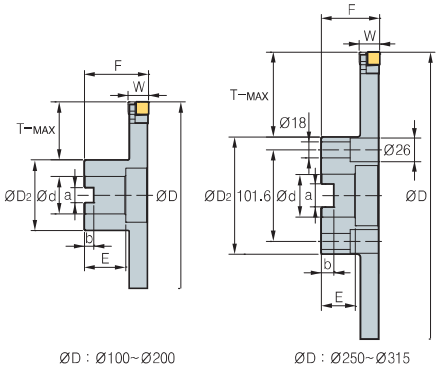
Specification Edge width (TAHCP/B)	Insert	Locator	Wedge	Insert screw	Wedge screw	Locator screw	Insert wrench	Wedge Wrench	Locator Wrench
□□□1418R/L	CNHQ1005-□□□	LSA-CH10R/L	WSA10N	FTKA0410	DHA0617	SHGA0411	TW15S	HW30	-
□□□1821R/L	CNHQ1305-□□□	LSA-CH13R/L	WSA13N	FTKA0410	DHA0821F	SHGA0411	TW15S	HW40	HW30L
□□□2124R/L	CNHQ1305-□□□	LSA-CH13R/L	WSA13N	FTKA0410	DHA0821F	SHGA0411	TW15S	HW40	HW30L
□□□2427R/L	CNHQ1606-□□□	LSA-CH16R/L	WSA13N	FTGA0513-P	DHA0821F	SHGA0411	TW20S	HW40	HW30L
□□□2730R/L	CNHQ1606-□□□	LSA-CH16R/L	WSA13N	FTGA0513-P	DHA0821F	SHGA0411	TW20S	HW40	HW30L

• Note) The Wedge screw for 10018, 10021 cutter is DHA0818F

Radial type (Full side cutter)



• RAFCP(M)



• RAFCB(M)

(mm)

Designation		Ød	E	ØD2	a	b	T-MAX	Designation		Ød	F	ØD2	a	b	E	T-MAX	Dimensions ØD	W	No. of tooth
RAFCP (M)	1001214	31.75 (32)	12	48	7.92 (8)	35.2	24	RAFCB (M)	1001214R/L	31.75 (32)	50	54	12.7 (14.4)	8	28	21	100	12-14	6
	1251214	38.1 (40)	12	56	9.52 (10)	42.3	32		1251214R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	12-14	8
	1601214	38.1 (40)	12	56	9.52 (10)	42.3	50		1601214R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	12-14	10
	2001214	50.8 (50)	12	72	12.7 (12)	55.8	61		2001214R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	12-14	12
	2501214	50.8 (50)	12	72	12.7 (12)	55.8	86		2501214R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	12-14	16
	3151214	50.8 (50)	12	72	12.7 (12)	55.8	118		3151214R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	12-14	20
RAFCP (M)	1001416	31.75 (32)	14	48	7.92 (8)	35.2	24	RAFCB (M)	1001416R/L	31.75 (32)	50	50	12.7 (14.4)	8	28	21	100	14-16	6
	1251416	38.1 (40)	14	56	9.52 (10)	42.3	32		1251416R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	14-16	8
	1601416	38.1 (40)	14	56	9.52 (10)	42.3	50		1601416R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	14-16	10
	2001416	50.8 (50)	14	72	12.7 (12)	55.8	61		2001416R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	14-16	12
	2501416	50.8 (50)	14	72	12.7 (12)	55.8	86		2501416R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	14-16	16
	3151416	50.8 (50)	14	72	12.7 (12)	55.8	118		3151416R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	14-16	20
RAFCP (M)	1251618	38.1 (40)	16	56	9.52 (10)	42.3	32	RAFCB (M)	1251618R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	16-18	8
	1601618	38.1 (40)	16	56	9.52 (10)	42.3	50		1601618R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	16-18	10
	2001618	50.8 (50)	16	72	12.7 (12)	55.8	61		2001618R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	16-18	12
	2501618	50.8 (50)	16	72	12.7 (12)	55.8	86		2501618R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	16-18	16
	3151618	50.8 (50)	16	72	12.7 (12)	55.8	118		3151618R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	16-18	20
RAFCP (M)	1251820	38.1 (40)	18	56	9.52 (10)	42.3	32	RAFCB (M)	1251820R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	18-20	8
	1601820	38.1 (40)	18	56	9.52 (10)	42.3	50		1601820R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	18-20	10
	2001820	50.8 (50)	18	72	12.7 (12)	55.8	61		2001820R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	18-20	12
	2501820	50.8 (50)	18	72	12.7 (12)	55.8	86		2501820R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	18-20	16
	3151820	50.8 (50)	18	72	12.7 (12)	55.8	118		3151820R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	18-20	20
RAFCP (M)	1252022	38.1 (40)	20	56	9.52 (10)	42.3	32	RAFCB (M)	1252022R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	20-22	8
	1602022	38.1 (40)	20	56	9.52 (10)	42.3	50		1602022R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	20-22	10
	2002022	50.8 (50)	20	72	12.7 (12)	55.8	61		2002022R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	20-22	12
	2502022	50.8 (50)	20	72	12.7 (12)	55.8	86		2502022R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	20-22	16
	3152022	50.8 (50)	20	72	12.7 (12)	55.8	118		3152022R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	20-22	20
RAFCP (M)	1252224	38.1 (40)	22	56	9.52 (10)	42.3	32	RAFCB (M)	1252224R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	22-24	8
	1602224	38.1(40)	22	56	9.52 (10)	42.3	50		1602224R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	22-24	10
	2002224	50.8 (50)	22	72	12.7 (12)	55.8	61		2002224R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	22-24	12
	2502224	50.8 (50)	22	72	12.7 (12)	55.8	86		2502224R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	22-24	16
	3152224	50.8 (50)	22	72	12.7 (12)	55.8	118		3152224R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	22-24	20

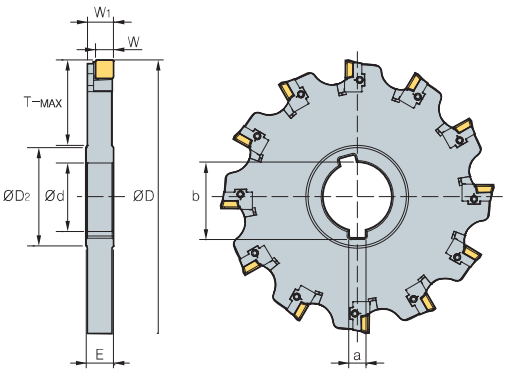
Available inserts and Recommended cutting condition **E374** • The ap (Maximum width of cutter) size written above is the number when using insert having corner size C0.5 or R0.5

( )Metric size

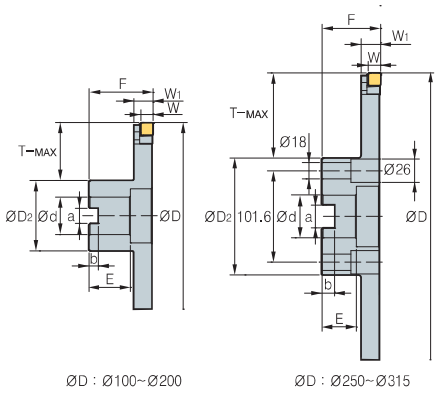
Parts

Specification Edge width (TAHCP/B)	Insert	Locator	Wedge (WSD09N / WSA10N)	Insert screw	Wedge screw	Locator screw	Insert wrench	Wedge, locator wrench
□□□1214R/L	SDXT09M40□R/L	LSD09R/L	WSD09N	FTGA03508	DHA0617	SHGA0409	TW15S	HW30
□□□1416R/L	SDXT09M40□R/L	LSD09R/L	WSD09N	FTGA03508	DHA0617	SHGA0409	TW15S	HW30
□□□1618R/L	SDXT13050□R/L	LSD13R/L	WSA10N	FTNC04509	DHA0617	SHGA0411	TW20S	HW30
□□□1820R/L	SDXT13050□R/L	LSD13R/L	WSA10N	FTNC04509	DHA0617	SHGA0411	TW20S	HW30
□□□2022R/L	SDXT13050□R/L	LSD13R/L	WSA10N	FTNC04509	DHA0617	SHGA0411	TW20S	HW30
□□□2224R/L	SDXT13050□R/L	LSD13R/L	WSA10N	FTNC04509	DHA0617	SHGA0411	TW20S	HW30

Radial type (Half side cutter)



• RAHCP(M)



• RAHCB(M)

(mm)

Designation		Ød	E	ØD2	a	b	T-MAX	Designation		Ød	F	ØD2	a	b	E	T-MAX	Dimensions ØD	W	W1	No. of tooth
RAHCP (M)	10012R/L	31.75 (32)	12	48	7.92 (8)	35.2	24	RAHCB (M)	10012R/L	31.75 (32)	50	54	12.7 (14.4)	8	28	21	100	8	11.1	6
	12512R/L	38.1 (40)	12	56	9.52 (10)	42.3	32		12512R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	8	11.1	8
	16012R/L	38.1 (40)	12	56	9.52 (10)	42.3	50		16012R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	8	11.1	10
	20012R/L	50.8 (50)	12	72	12.7 (12)	55.8	61		20012R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	8	11.1	12
	25012R/L	50.8 (50)	12	72	12.7 (12)	55.8	86		25012R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	8	11.1	16
	31512R/L	50.8 (50)	12	72	12.7 (12)	55.8	118		31512R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	8	11.1	20
RAHCP (M)	10014R/L	31.75 (32)	14	48	7.92 (8)	35.2	24	RAHCB (M)	10014R/L	31.75 (32)	50	50	12.7 (14.4)	8	28	21	100	8	13.1	6
	12514R/L	38.1 (40)	14	56	9.52 (10)	42.3	32		12514R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	8	13.1	8
	16014R/L	38.1 (40)	14	56	9.52 (10)	42.3	50		16014R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	8	13.1	10
	20014R/L	50.8 (50)	14	72	12.7 (12)	55.8	61		20014R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	8	13.1	12
	25014R/L	50.8 (50)	14	72	12.7 (12)	55.8	86		25014R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	8	13.1	16
	31514R/L	50.8 (50)	14	72	12.7 (12)	55.8	118		31514R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	8	13.1	20
RAHCP (M)	12516R/L	38.1 (40)	16	56	9.52 (10)	42.3	32	RAHCB (M)	12516R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	10.5	15	8
	16016R/L	38.1 (40)	16	56	9.52 (10)	42.3	50		16016R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	10.5	15	10
	20016R/L	50.8 (50)	16	72	12.7 (12)	55.8	61		20016R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	10.5	15	12
	25016R/L	50.8 (50)	16	72	12.7 (12)	55.8	86		25016R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	10.5	15	16
	31516R/L	50.8 (50)	16	72	12.7 (12)	55.8	118		31516R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	10.5	15	20
RAHCP (M)	12518R/L	38.1 (40)	18	56	9.52 (10)	42.3	32	RAHCB (M)	12518R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	10.5	17	8
	16018R/L	38.1 (40)	18	56	9.52 (10)	42.3	50		16018R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	10.5	17	10
	20018R/L	50.8 (50)	18	72	12.7 (12)	55.8	61		20018R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	10.5	17	12
	25018R/L	50.8 (50)	18	72	12.7 (12)	55.8	86		25018R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	10.5	17	16
	31518R/L	50.8 (50)	18	72	12.7 (12)	55.8	118		31518R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	10.5	17	20
RAHCP (M)	12520R/L	38.1 (40)	20	56	9.52 (10)	42.3	32	RAHCB (M)	12520R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	10.5	19	8
	16020R/L	38.1 (40)	20	56	9.52 (10)	42.3	50		16020R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	10.5	19	10
	20020R/L	50.8 (50)	20	72	12.7 (12)	55.8	61		20020R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	10.5	19	12
	25020R/L	50.8 (50)	20	72	12.7 (12)	55.8	86		25020R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	10.5	19	16
	31520R/L	50.8 (50)	20	72	12.7 (12)	55.8	118		31520R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	10.5	19	20
RAHCP (M)	12522R/L	38.1 (40)	22	56	9.52 (10)	42.3	32	RAHCB (M)	12522R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	25	125	10.5	21	8
	16022R/L	38.1 (40)	22	56	9.52 (10)	42.3	50		16022R/L	38.1 (40)	60	70	15.9 (16.4)	10	30	43	160	10.5	21	10
	20022R/L	50.8 (50)	22	72	12.7 (12)	55.8	61		20022R/L	50.8 (40)	65	90	19.0 (16.4)	11	30	53	200	10.5	21	12
	25022R/L	50.8 (50)	22	72	12.7 (12)	55.8	86		25022R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	58	250	10.5	21	16
	31522R/L	50.8 (50)	22	72	12.7 (12)	55.8	118		31522R/L	47.625 (60)	65	130	25.4 (25.7)	14	38	90	315	10.5	21	20

Available inserts and Recommended cutting condition **E374**

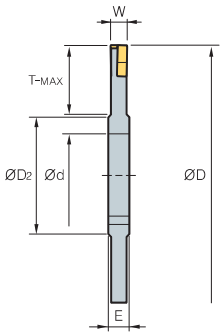
- The ap (Maximum width of cutter) size written above is the number when using insert having corner size R0.5. The ap is subject to change as per insert corner size
- The ap (Maximum width of cutter) size written above is the number when using SDXT09M405R-MM. The ap is subject to change as per insert corner size

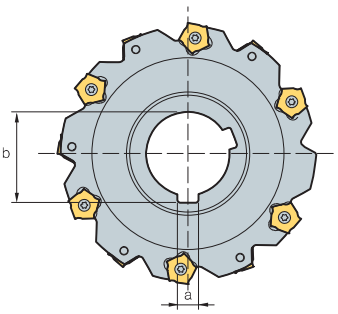
( ) Metric size

Parts

Specification Edge width (TAHCP/B)	Insert	Locator	Wedge (WSD09N / WSA10N)	Insert screw	Wedge screw	Locator screw	Insert wrench	Wedge, locator wrench
□□□1214R/L	SDXT09M40□R/L	LSD09R/L	WSD09N	FTGA03508	DHA0617	SHGA0409	TW15S	HW30
□□□1416R/L	SDXT09M40□R/L	LSD09R/L	WSD09N	FTGA03508	DHA0617	SHGA0409	TW15S	HW30
□□□1618R/L	SDXT13050□R/L	LSD13R/L	WSA10N	FTNC04509	DHA0617	SHGA0411	TW20S	HW30
□□□1820R/L	SDXT13050□R/L	LSD13R/L	WSA10N	FTNC04509	DHA0617	SHGA0411	TW20S	HW30
□□□2022R/L	SDXT13050□R/L	LSD13R/L	WSA10N	FTNC04509	DHA0617	SHGA0411	TW20S	HW30
□□□2224R/L	SDXT13050□R/L	LSD13R/L	WSA10N	FTNC04509	DHA0617	SHGA0411	TW20S	HW30

SPP(M)





•AR: -2°
•RR: -28°

(mm)

Designation			ØD	W	T-MAX	Ød	a	b	E	ØD2	Insert	Screw	Wrench
SPP (SPPM)	080-04	8	80	4	20	25.4 (27)	6.35 (7)	28.04 (29.8)	8	40	PNEJ1223N	PTMA0403F	TW15S
	080-05	8	80	5	20	25.4 (27)	6.35 (7)	28.04 (29.8)	8	40	PNEJ1230N	PTMA0404F	TW15S
	080-06	8	80	6	20	25.4 (27)	6.35 (7)	28.04 (29.8)	8	40	PNEJ1235N	PTMA0405F	TW15S
	100-04	10	100	4	24	31.75 (32)	7.94 (8)	35.18 (34.8)	8	47	PNEJ1223N	PTMA0403F	TW15S
	100-05	10	100	5	24	31.75 (32)	7.94 (8)	35.18 (34.8)	8	47	PNEJ1230N	PTMA0404F	TW15S
	100-06	10	100	6	25	31.75 (32)	7.94 (8)	35.18 (34.8)	8	47	PNEJ1235N	PTMA0405F	TW15S
	100-07	10	100	7	25	31.75 (32)	7.94 (8)	35.18 (34.8)	10	47	PNEJ1240N	PTMA0406F	TW15S
	100-08	10	100	8	25	31.75 (32)	7.94 (8)	35.18 (34.8)	10	47	PNEJ1245N	PTKA0407F	TW15S
	100-09	10	100	9	25	31.75 (32)	7.94 (8)	35.18 (34.8)	12	47	PNEJ1250N	PTKA0408F	TW15S
	100-10	10	100	10	25	31.75 (32)	7.94 (8)	35.18 (34.8)	12	47	PNEJ1255N	PTKA0409F	TW15S
	125-04	12	125	4	30	38.1 (40)	9.53 (10)	42.32 (43.5)	8	56	PNEJ1223N	PTMA0403F	TW15S
	125-05	12	125	5	32	38.1 (40)	9.53 (10)	42.32 (43.5)	8	56	PNEJ1230N	PTMA0404F	TW15S
	125-06	12	125	6	32	38.1 (40)	9.53 (10)	42.32 (43.5)	8	56	PNEJ1235N	PTMA0405F	TW15S
	125-07	12	125	7	32	38.1 (40)	9.53 (10)	42.32 (43.5)	10	56	PNEJ1240N	PTMA0406F	TW15S
	125-08	12	125	8	32	38.1 (40)	9.53 (10)	42.32 (43.5)	10	56	PNEJ1245N	PTKA0407F	TW15S
	125-09	12	125	9	32	38.1 (40)	9.53 (10)	42.32 (43.5)	12	56	PNEJ1250N	PTKA0408F	TW15S
	125-10	12	125	10	32	38.1 (40)	9.53 (10)	42.32 (43.5)	12	56	PNEJ1255N	PTKA0409F	TW15S
	160-04	16	160	4	45	38.1 (40)	9.53 (10)	42.32 (43.5)	8	66	PNEJ1223N	PTMA0403F	TW15S
	160-05	16	160	5	45	38.1 (40)	9.53 (10)	42.32 (43.5)	8	66	PNEJ1230N	PTMA0404F	TW15S
	160-06	16	160	6	45	38.1 (40)	9.53 (10)	42.32 (43.5)	8	66	PNEJ1235N	PTMA0405F	TW15S
	160-07	16	160	7	45	38.1 (40)	9.53 (10)	42.32 (43.5)	10	66	PNEJ1240N	PTMA0406F	TW15S
	160-08	16	160	8	45	38.1 (40)	9.53 (10)	42.32 (43.5)	10	66	PNEJ1245N	PTKA0407F	TW15S
	160-09	16	160	9	45	38.1 (40)	9.53 (10)	42.32 (43.5)	12	66	PNEJ1250N	PTKA0408F	TW15S
	160-10	16	160	10	45	38.1 (40)	9.53 (10)	42.32 (43.5)	12	66	PNEJ1255N	PTKA0409F	TW15S
	160-11	16	160	11	45	38.1 (40)	9.53 (10)	42.32 (43.5)	14	66	PNEJ1260N	PTKA0410F	TW15S
	160-12	16	160	12	45	38.1 (40)	9.53 (10)	42.32 (43.5)	14	66	PNEJ1265N	PTKA0411F	TW15S
	160-13	16	160	13	45	38.1 (40)	9.53 (10)	42.32 (43.5)	16	66	PNEJ1270N	PTKA0412F	TW15S
	160-14	16	160	14	45	38.1 (40)	9.53 (10)	42.32 (43.5)	16	66	PNEJ1275N	PTKA0413F	TW15S
	200-06	18	200	6	60	50.8 (50)	12.7 (12)	55.83 (53.5)	8	70	PNEJ1235N	PTMA0405F	TW15S
	200-07	18	200	7	60	50.8 (50)	12.7 (12)	55.83 (53.5)	10	70	PNEJ1240N	PTMA0406F	TW15S
	200-08	18	200	8	60	50.8 (50)	12.7 (12)	55.83 (53.5)	10	70	PNEJ1245N	PTKA0407F	TW15S
	200-09	18	200	9	60	50.8 (50)	12.7 (12)	55.83 (53.5)	12	70	PNEJ1250N	PTKA0408F	TW15S
	200-10	18	200	10	60	50.8 (50)	12.7 (12)	55.83 (53.5)	12	70	PNEJ1255N	PTKA0409F	TW15S
	200-11	18	200	11	60	50.8 (50)	12.7 (12)	55.83 (53.5)	14	70	PNEJ1260N	PTKA0410F	TW15S
	200-12	18	200	12	60	50.8 (50)	12.7 (12)	55.83 (53.5)	14	70	PNEJ1265N	PTKA0411F	TW15S
	200-13	18	200	13	60	50.8 (50)	12.7 (12)	55.83 (53.5)	16	70	PNEJ1270N	PTKA0412F	TW15S
	200-14	18	200	14	60	50.8 (50)	12.7 (12)	55.83 (53.5)	16	70	PNEJ1275N	PTKA0413F	TW15S

( )Metric size

Available arbors

Designation		NC arbors		
		BT30	BT40	BT50
SPP	080-04~06	BT30-SCA25.4-60	BT40-SCA25.4-75/120	BT50-SCA25.4-90/135
	100-04~10	-	BT40-SCA31.75-105	BT50-SCA31.75-90/135
	125-04~09	-	-	BT50-SCA38.1-90/135
	160-04~14	-	-	BT50-SCA38.1-90/135
	200-06~14	-	-	-
SPPM	080-04~06	-	BT40-SCA27-75/120	BT50-SCA27-90/135
	100-04~10	-	BT40-SCA32-105	BT50-SCA32-90/135
	125-04~09	-	-	BT50-SCA40-90/135
	160-04~14	-	-	BT50-SCA40-90/135
	200-06~14	-	-	-

Recommended cutting condition

Workpiece	Cutting condition		Grades
	vc (m/min)	fz (mm/t)	
P	190~310	0.10~0.25	NCM325
	160~270	0.10~0.30	PC3700
	60~100	0.10~0.25	ST30A
M	90~150	0.10~0.25	PC9530
	80~150	0.10~0.30	ST30A
K	140~230	0.10~0.35	PC6510
	50~90	0.10~0.40	G10

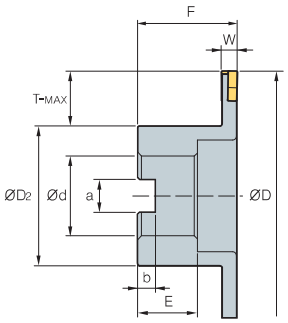
Code system

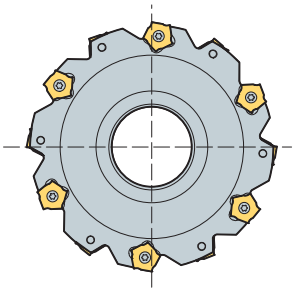
S P P 160 - 06 R

- S: Cutter use (S - Side cutter)
- P: Insert Shape (P - Pentagonal Insert)
- P: Cutter type (P - Plane type, B - Boss type)
- 160: Cutter diameter (ØD)
- 06: Width of cut (W)
- R: Hand of tool (R/L)

Available inserts E15 Available arbors and bolt E400~E402

SPB(M)





•AR: -2°
•RR: 28°

(mm)

Designation		⊙	ØD	W	T-MAX	ØD2	Ød	a	b	F	E	Insert	Screw	Wrench
SPB (SPBM)	080-04R/L	8	80	4	18	40	25.4 (27)	9.5 (12.4)	6 (7)	50	25 (22)	PNEJ1223N	PTMA0403F	TW15S
	080-05R/L	8	80	5	18	40	25.4 (27)	9.5 (12.4)	6 (7)	50	25 (22)	PNEJ1230N	PTMA0404F	TW15S
	080-06R/L	8	80	6	18	40	25.4 (27)	9.5 (12.4)	6 (7)	50	25 (22)	PNEJ1235N	PTMA0405F	TW15S
	100-04R/L	10	100	4	21	54	31.75 (32)	12.7 (14.4)	8 (8)	50	32 (28)	PNEJ1223N	PTMA0403F	TW15S
	100-05R/L	10	100	5	21	54	31.75 (32)	12.7 (14.4)	8 (8)	50	32 (28)	PNEJ1230N	PTMA0404F	TW15S
	100-06R/L	10	100	6	21	54	31.75 (32)	12.7 (14.4)	8 (8)	50	32 (28)	PNEJ1235N	PTMA0405F	TW15S
	100-07R/L	10	100	7	21	54	31.75 (32)	12.7 (14.4)	8 (8)	50	32 (28)	PNEJ1240N	PTMA0406F	TW15S
	100-08R/L	10	100	8	21	54	31.75 (32)	12.7 (14.4)	8 (8)	50	32 (28)	PNEJ1245N	PTMA0407F	TW15S
	100-09R/L	10	100	9	21	54	31.75 (32)	12.7 (14.4)	8 (8)	50	32 (28)	PNEJ1250N	PTMA0408F	TW15S
	100-10R/L	10	100	10	21	54	31.75 (32)	12.7 (14.4)	8 (8)	50	32 (28)	PNEJ1255N	PTMA0409F	TW15S
	125-04R/L	12	125	4	25	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1223N	PTMA0403F	TW15S
	125-05R/L	12	125	5	25	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1230N	PTMA0404F	TW15S
	125-06R/L	12	125	6	25	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1235N	PTMA0405F	TW15S
	125-07R/L	12	125	7	25	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1240N	PTMA0406F	TW15S
	125-08R/L	12	125	8	25	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1245N	PTKA0407F	TW15S
	125-09R/L	12	125	9	25	70	38. (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1250N	PTKA0408F	TW15S
	125-10R/L	12	125	10	25	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1255N	PTKA0409F	TW15S
	160-04R/L	16	160	4	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1223N	PTMA0403F	TW15S
	160-05R/L	16	160	5	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1230N	PTMA0404F	TW15S
	160-06R/L	16	160	6	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1235N	PTMA0405F	TW15S
	160-07R/L	16	160	7	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1240N	PTMA0406F	TW15S
	160-08R/L	16	160	8	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1245N	PTKA0407F	TW15S
	160-09R/L	16	160	9	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1250N	PTKA0408F	TW15S
	160-10R/L	16	160	10	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1255N	PTKA0409F	TW15S
	160-11R/L	16	160	11	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1260N	PTKA0410F	TW15S
	160-12R/L	16	160	12	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1265N	PTKA0411F	TW15S
	160-13R/L	16	160	13	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1270N	PTKA0412F	TW15S
	160-14R/L	16	160	14	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60 (50)	38 (30)	PNEJ1275N	PTKA0413F	TW15S
	200-06R/L	18	200	6	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1235N	PTMA0405F	TW15S
	200-07R/L	18	200	7	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1240N	PTMA0406F	TW15S
	200-08R/L	18	200	8	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1245N	PTKA0407F	TW15S
	200-09R/L	18	200	9	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1250N	PTKA0408F	TW15S
	200-10R/L	18	200	10	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1255N	PTKA0409F	TW15S
	200-11R/L	18	200	11	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1260N	PTKA0410F	TW15S
	200-12R/L	18	200	12	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1265N	PTKA0411F	TW15S
	200-13R/L	18	200	13	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1270N	PTKA0412F	TW15S
	200-14R/L	18	200	14	53	90	50.8 (40)	19 (16.4)	11 (9)	65	38 (30)	PNEJ1275N	PTKA0413F	TW15S

( )Metric size

Notice (When mounting inserts)

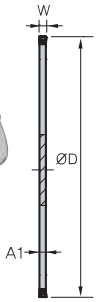
- Insert chip breaker should face chip pocket of the cutter
- Fasten screw after insert contacts securely on its seat
- If there is a gap between insert and its seat after mounting it may cause tool troubles

Recommended cutting condition

Workpiece	Cutting condition		Grades
	vc (m/min)	fz (mm/t)	
P	190~310 160~270 60~100	0.10~0.25 0.10~0.30 0.10~0.25	**NCM325** **PC3700** **ST30A**
M	90~150 80~150	0.10~0.25 0.10~0.30	**PC9530** **ST30A**
K	140~230	0.10~0.35 0.10~0.40	**PC6510** **G10**

Available inserts **E15** Available arbors and bolt **E400~E402**

SPS



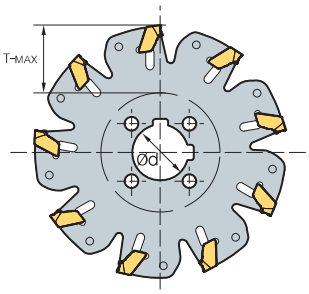


Fig. 1

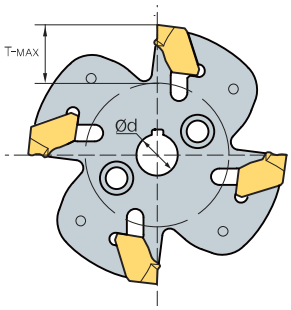


Fig. 2

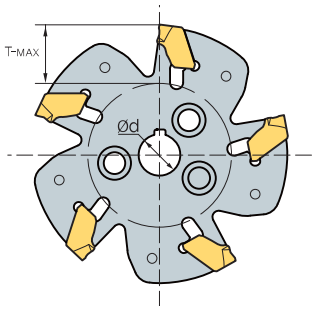


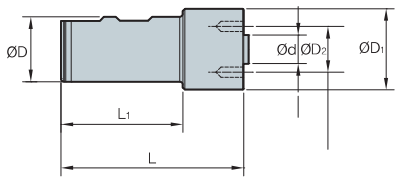
Fig. 3

(mm)

Designation			ØD	W	T-MAX	Ød	A_1	Fig.	Insert	Adaptor		Wrench
										WS	DF	
SPS	050-0204-08R	4	50	2.2	11	8	1.8	2	SPFN 200 - ( )	WS2528-M4	-	SW17P (separately ordered)
	063-0205-10R	5	63	2.2	15.5	10	1.8	3		WS2532-M5	-	
	080-0207-22R/F	7	80	2.2	20 (17)	22	1.8	1		WS3240-M5	DF22-46	
	100-0209-22R/F	9	100	2.2	30 (27)	22	1.8	1		WS3240-M5	DF22-46	
	125-0211-32F	11	125	2.2	35	32	1.8	1		-	DF32-55	
	160-0214-32F	14	160	2.2	52.5	32	1.8	3		-	DF32-55	
	063-0305-10R	5	63	3	15.5	10	2.55	1	SPFN 300 - ( )	WS2532-M5	-	
	080-0307-22R/F	7	80	3	20 (17)	22	2.55	1		WS3240-M5	DF22-46	
	100-0309-22R/F	9	100	3	30 (27)	22	2.55	1		WS3240-M5	DF22-46	
	125-0311-32F	11	125	3	35	32	2.55	1		-	DF32-55	
	160-0314-32F	14	160	3	52.5	32	2.55	1		-	DF32-55	
	200-0318-40F	18	200	3	60	40	2.55	1	SPFN 400 - ( )	-	DF40-80	
	080-0406-22R/F	6	80	4	20 (17)	22	3.4	1		WS3240-M5	DF22-46	
	100-0408-22R/F	8	100	4	30 (27)	22	3.4	1		WS3240-M5	DF22-46	
	125-0410-32F	10	125	4	35	32	3.4	1		-	DF32-55	
	160-0413-32F	13	160	4	52.5	32	3.4	1		-	DF32-55	
	200-0417-40F	17	200	4	60	40	3.4	1		-	DF40-80	

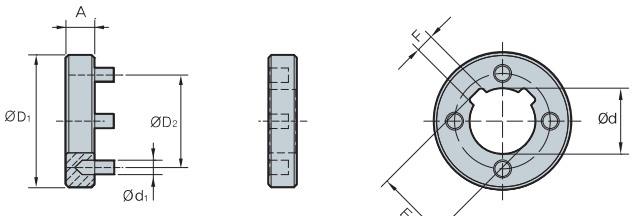
( )Metric size

WS( )-( ) (Weldon Shank)



Designation	L	L_1	D	D_1	D_2	d	Screw
WS2528-M4	110	85	25	28	18	8	PTKA0408
WS2532-M5	110	85	25	32	22	10	PTKA0515
WS3240-M5	120	90	32	40	32	22	PTKA0515

DF( )-( ) (Drive Flange set)



Designation	D_1	D_2	d	d_1	A	E	F
DF22-46	46	32	22	5	10	24.1	6
DF32-55	55	45	32	6	10	34.8	8
DF40-80	80	63	40	11	12	43.5	10
DF50-110	110	80	50	14	14	53.6	12

Recommended cutting condition

Workpiece	Cutting condition		Grades
	vc (m/min)	fz (mm/t)	
P	160~270	0.13~0.25	PC3700
M	90~150	0.10~0.22	PC5300
K	110~180	0.10~0.25	PC6510

Available inserts E25 Available arbors and bolt E400~E402

For slotting workpieces with corner radii of varying sizes and widths

Wind Mill

- Optimal machining for slotting applications
- A unique recess design on the minor cutting-edge reduces cutting load and improves tool life
- Special clamping system prevents incorrect clamping and fracture

Item description

• Insert

• Cutter

WFSP(M) - Plane type

WFSB(M) - Boss type

Cutter code system

W	FS	P(B)	100	–	T04
Wind Mill	Insert arrangement	Cutter type	ØD		W
	FS: Full side HS: Half side	P: Plane type B: Boss type			

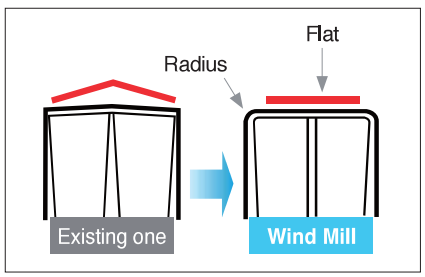
Insert code system

S	N	H	T	12	045	08	R/L	–	WX
Insert shape	Relief angle of major cutting-edge	tolerance	Shape of cross section	Ød	Height of cutting-edge	Nose R	R/L		Chip breaker

Features

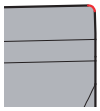
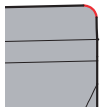
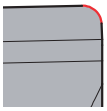
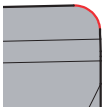
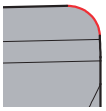
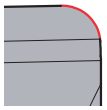
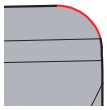
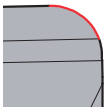
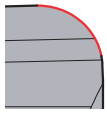
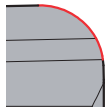
• Ideal geometry for superior surface roughness and extended tool life

• Perpendicular slot



• Protruded part on tip seat prevents wrong clamping and fracture

• Workpieces with corner radii of varying size and width (R0.2~R2.0)

R0.2	R0.4	R0.6	R0.8	R1.0	R1.2	R1.4	R1.6	R1.8	R2.0
									

Application example

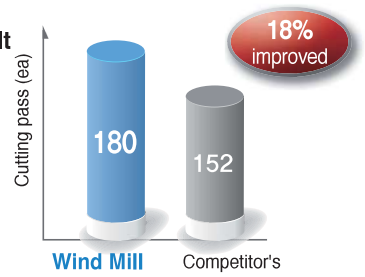
■ **Use** Carriers for Motor Vehicles

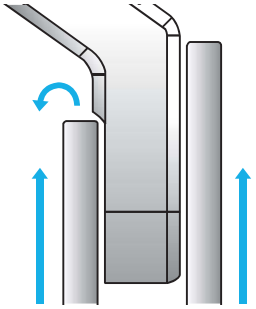
■ **Workpiece** FCD500K

■ **Cutting conditions**
vc (m/min) = 200
fz (mm/t) = 0.2
vf (mm/min) = 600
ap (mm) = 2~3

■ **Tool**
KSF140R-T14-HM-2
SNHT1205408R/L-WX (PC5300)

■ **Test result**





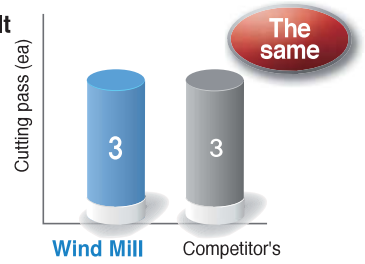
■ **Use** Lug for Vessel

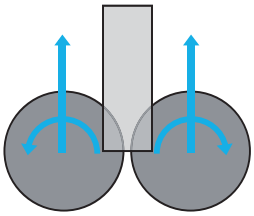
■ **Workpiece** Mild steel

■ **Cutting conditions**
vc (m/min) = 560
fz (mm/t) = 0.09
vf (mm/min) = 750
ap (mm) = 6

■ **Tool**
WFSP178R/L-T06
SNHT1203508R/L-WX (PC5300)

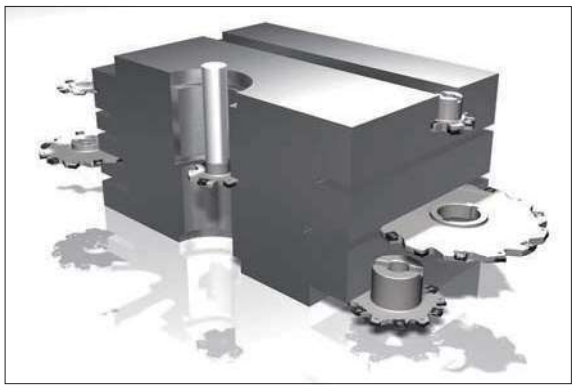
■ **Test result**





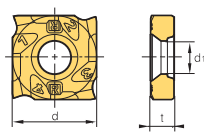
Recommended cutting condition

Workpiece	Cutting conditions		Grades
	vc (m/min)	fz (mm/t)	
P	150~250	0.10~0.25	PC5300
M	120~200	0.10~0.30	PC5300
K	100~150	0.10~0.30	PC5300



Available inserts

Designation		Coated	Dimensions (mm)				Nose R	Configuration
		PC5300	Ød	Ød1	t	W		
SNHT	1102308R/L-WX	●	11.0	4	2.30	4.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6	
	110308R/L-WX	●	11.0	4	3.00	5.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6	
	120308R/L-WX		12.7	5	3.25	5.5	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	1203508R/L-WX	●	12.7	5	3.54	6.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	120408R/L-WX		12.7	5	4.00	7.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	1204508R/L-WX	●	12.7	5	4.54	8.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	120508R/L-WX	●	12.7	5	5.00	9.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	1205408R/L-WX	●	12.7	5	5.47	10.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	120608R/L-WX		12.7	5	6.00	11.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	1206508R/L-WX		12.7	5	6.50	12.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	120708R/L-WX		12.7	5	7.00	13.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	
	1207508R/L-WX		12.7	5	7.50	14.0	0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 2.0	



• Available cutter stock requires to be asked separately

WFSB(M)(Boss type)

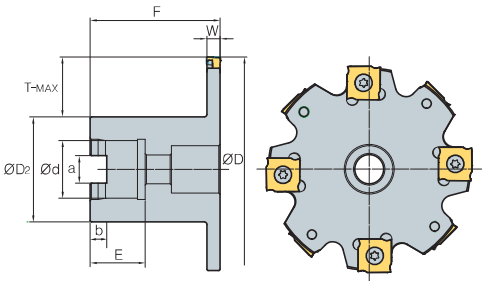


Fig. 1

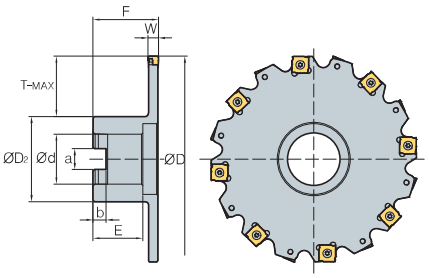


Fig. 2

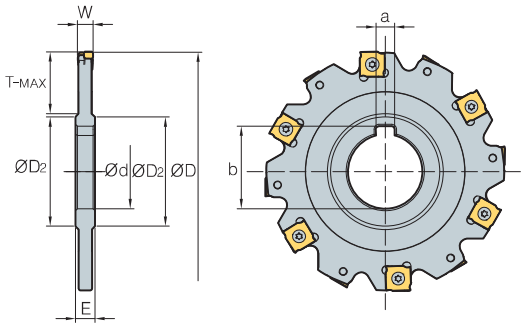
•AR: -2°
•RR:-12°

(mm)

Designation			ØD	W	T-MAX	ØD2	Ød	a	b	F	E	Insert	Screw	Wrench
WFSBM	080R/L-T04	8	80	4	17	40	22	10.4	6.3	50	21	SNHT11023R/L-WX	PTMA03503	TW09S
	080R/L-T05	8	80	5	17	40	22	10.4	6.3	50	21	SNHT1103R/L-WX	PTMA03504	TW09S
	080R/L-T06	8	80	6	17	40	22	10.4	6.3	50	21	SNHT12035R/L-WX	PTMA04045F	TW15S
WFSB (WFSBM)	100R/L-T04	10	100	4	21	50 (48)	25.4 (27)	9.5 (12.4)	6 (7)	50	25	SNHT11023R/L-WX	PTMA03503	TW09S
	100R/L-T05	10	100	5	21	50 (48)	25.4 (27)	9.5 (12.4)	6 (7)	50	25	SNHT1103R/L-WX	PTMA03504	TW09S
	100R/L-T06	10	100	6	21	50 (48)	25.4 (27)	9.5 (12.4)	6 (7)	50	25	SNHT12035R/L-WX	PTMA04045F	TW15S
	100R/L-T07	10	100	7	21	50 (48)	25.4 (27)	9.5 (12.4)	6 (7)	50	25	SNHT1204R/L-WX	PTMA0405F	TW15S
	100R/L-T08	10	100	8	21	50 (48)	25.4 (27)	9.5 (12.4)	6 (7)	50	25	SNHT12045R/L-WX	PTMA0406F	TW15S
	100R/L-T09	10	100	9	21	50 (48)	25.4 (27)	9.5 (12.4)	6 (7)	50	25	SNHT1205R/L-WX	PTMA0407F	TW15S
	100R/L-T10	10	100	10	21	50 (48)	25.4 (27)	9.5 (12.4)	6 (7)	50	25	SNHT12054R/L-WX	PTMA0408F	TW15S
	125R/L-T04	12	125	4	30	60 (58)	31.75 (32)	12.7 (14.4)	8	50	32 (30)	SNHT11023R/L-WX	PTMA03503	TW09S
	125R/L-T05	12	125	5	30	60 (58)	31.75 (32)	12.7 (14.4)	8	50	32 (30)	SNHT1103R/L-WX	PTMA03504	TW09S
	125R/L-T06	12	125	6	30	60 (58)	31.75 (32)	12.7 (14.4)	8	50	32 (30)	SNHT12035R/L-WX	PTMA04045F	TW15S
	125R/L-T07	12	125	7	30	60 (58)	31.75 (32)	12.7 (14.4)	8	50	32 (30)	SNHT1204R/L-WX	PTMA0405F	TW15S
	125R/L-T08	12	125	8	30	60 (58)	31.75 (32)	12.7 (14.4)	8	50	32 (30)	SNHT12045R/L-WX	PTMA0406F	TW15S
	125R/L-T09	12	125	9	30	60 (58)	31.75 (32)	12.7 (14.4)	8	50	32 (30)	SNHT1205R/L-WX	PTM A0407F	TW15S
	125R/L-T10	12	125	10	30	60 (58)	31.75 (32)	12.7 (14.4)	8	50	32 (30)	SNHT12054R/L-WX	PTMA0408F	TW15S
	160R/L-T04	16	160	4	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT11023R/L-WX	PTMA03503	TW09S
	160R/L-T05	16	160	5	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT1103R/L-WX	PTMA03504	TW09S
	160R/L-T06	16	160	6	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT12035R/L-WX	PTMA04045F	TW15S
	160R/L-T07	16	160	7	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT1204R/L-WX	PTMA0405F	TW15S
	160R/L-T08	16	160	8	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT12045R/L-WX	PTMA0406F	TW15S
	160R/L-T09	16	160	9	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT1205R/L-WX	PTMA0407F	TW15S
	160R/L-T10	16	160	10	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT12054R/L-WX	PTMA0408F	TW15S
	160R/L-T11	16	160	11	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT1206R/L-WX	PTKA0409F	TW15S
	160R/L-T12	16	160	12	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT12065R/L-WX	PTKA0410F	TW15S
	160R/L-T13	16	160	13	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT1207R/L-WX	PTKA0411F	TW15S
	160R/L-T14	16	160	14	43	70	38.1 (40)	15.9 (16.4)	10 (9)	60	38 (32)	SNHT12075R/L-WX	PTKA0412F	TW15S
	200R/L-T06	18	200	6	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12035R/L-WX	PTMA04045F	TW15S
	200R/L-T07	18	200	7	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT1204R/L-WX	PTMA0405F	TW15S
	200R/L-T08	18	200	8	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12045R/L-WX	PTMA0406F	TW15S
	200R/L-T09	18	200	9	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT1205R/L-WX	PTMA0407F	TW15S
	200R/L-T10	18	200	10	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12054R/L-WX	PTMA0408F	TW15S
	200R/L-T11	18	200	11	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT1206R/L-WX	PTKA0409F	TW15S
	200R/L-T12	18	200	12	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12065R/L-WX	PTKA0410F	TW15S
	200R/L-T13	18	200	13	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT1207R/L-WX	PTKA0411F	TW15S
	200R/L-T14	18	200	14	53	90	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12075R/L-WX	PTKA0412F	TW15S
	250R/L-T06	20	250	6	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12035R/L-WX	PTMA04045F	TW15S
	250R/L-T07	20	250	7	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT1204R/L-WX	PTMA0405F	TW15S
	250R/L-T08	20	250	8	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12045R/L-WX	PTMA0406F	TW15S
	250R/L-T09	20	250	9	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT1205R/L-WX	PTMA0407F	TW15S
	250R/L-T10	20	250	10	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12054R/L-WX	PTMA0408F	TW15S
	250R/L-T11	20	250	11	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT1206R/L-WX	PTKA0409F	TW15S
	250R/L-T12	20	250	12	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12065R/L-WX	PTKA0410F	TW15S
	250R/L-T13	20	250	13	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT1207R/L-WX	PTKA0411F	TW15S
	250R/L-T14	20	250	14	73 (78)	100 (90)	50.8 (40)	19.1 (16.4)	11 (9)	65	38 (32)	SNHT12075R/L-WX	PTKA0412F	TW15S

• Ø80: Fig.1 , Ø100~Ø250: Fig.2 ( )Metric size Available inserts E23

WFSP(M)(Plane type)



•AR: -2°
•RR:-12°

(mm)

Designation			ØD	W	T-MAX	ØD2	Ød	a	b	E	Insert	Screw	Wrench
WFSP (WFSBM)	080-T04	8	80	4	20	40	25.4 (27)	6.35 (7)	28 (29.8)	8	SNHT11023R/L-WX	PTMA03503	TW09S
	080-T05	8	80	5	20	40	25.4 (27)	6.35 (7)	28 (29.8)	8	SNHT1103R/L-WX	PTMA03504	TW09S
	080-T06	8	80	6	20	40	25.4 (27)	6.35 (7)	28 (29.8)	8	SNHT12035R/L-WX	PTMA04045F	TW15S
	100-T04	10	100	4	24	47	31.75 (32)	7.92 (8)	35.2 (34.8)	8	SNHT11023R/L-WX	PTMA03503	TW09S
	100-T05	10	100	5	24	47	31.75 (32)	7.92 (8)	35.2 (34.8)	8	SNHT1103R/L-WX	PTMA03504	TW09S
	100-T06	10	100	6	24	47	31.75 (32)	7.92 (8)	35.2 (34.8)	8	SNHT12035R/L-WX	PTMA04045F	TW15S
	100-T07	10	100	7	24	47	31.75 (32)	7.92 (8)	35.2 (34.8)	10	SNHT1204R/L-WX	PTMA0405F	TW15S
	100-T08	10	100	8	24	47	31.75 (32)	7.92 (8)	35.2 (34.8)	10	SNHT12045R/L-WX	PTMA0406F	TW15S
	100-T09	10	100	9	24	47	31.75 (32)	7.92 (8)	35.2 (34.8)	12	SNHT1205R/L-WX	PTMA0407F	TW15S
	100-T10	10	100	10	24	47	31.75 (32)	7.92 (8)	35.2 (34.8)	12	SNHT12054R/L-WX	PTMA0408F	TW15S
	125-T04	12	125	4	32	56	38.1 (40)	9.52 (10)	42.3 (43.5)	8	SNHT11023R/L-WX	PTMA03503	TW09S
	125-T05	12	125	5	32	56	38.1 (40)	9.52 (10)	42.3 (43.5)	8	SNHT1103R/L-WX	PTMA03504	TW09S
	125-T06	12	125	6	32	56	38.1 (40)	9.52 (10)	42.3 (43.5)	8	SNHT12035R/L-WX	PTMA04045F	TW15S
	125-T07	12	125	7	32	56	38.1 (40)	9.52 (10)	42.3 (43.5)	10	SNHT1204R/L-WX	PTMA0405F	TW15S
	125-T08	12	125	8	32	56	38.1 (40)	9.52 (10)	42.3 (43.5)	10	SNHT12045R/L-WX	PTMA0406F	TW15S
	125-T09	12	125	9	32	56	38.1 (40)	9.52 (10)	42.3 (43.5)	12	SNHT1205R/L-WX	PTMA0407F	TW15S
	125-T10	12	125	10	32	56	38.1 (40)	9.52 (10)	42.3 (43.5)	12	SNHT12054R/L-WX	PTMA0408F	TW15S
	160-T04	16	160	4	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	8	SNHT11023R/L-WX	PTMA03503	TW09S
	160-T05	16	160	5	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	8	SNHT1103R/L-WX	PTMA03504	TW09S
	160-T06	16	160	6	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	8	SNHT12035R/L-WX	PTMA04045F	TW15S
	160-T07	16	160	7	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	10	SNHT1204R/L-WX	PTMA0405F	TW15S
	160-T08	16	160	8	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	10	SNHT12045R/L-WX	PTMA0406F	TW15S
	160-T09	16	160	9	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	12	SNHT1205R/L-WX	PTMA0407F	TW15S
	160-T10	16	160	10	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	12	SNHT12054R/L-WX	PTMA0408F	TW15S
	160-T11	16	160	11	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	14	SNHT1206R/L-WX	PTKA0409F	TW15S
	160-T12	16	160	12	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	14	SNHT12065R/L-WX	PTKA0410F	TW15S
	160-T13	16	160	13	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	16	SNHT1207R/L-WX	PTKA0411F	TW15S
	160-T14	16	160	14	45	66	38.1 (40)	9.52 (10)	42.3 (43.5)	16	SNHT12075R/L-WX	PTKA0412F	TW15S
	200-T06	18	200	6	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	8	SNHT12035R/L-WX	PTMA04045F	TW15S
	200-T07	18	200	7	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	10	SNHT1204R/L-WX	PTMA0405F	TW15S
	200-T08	18	200	8	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	10	SNHT12045R/L-WX	PTMA0406F	TW15S
	200-T09	18	200	9	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	12	SNHT1205R/L-WX	PTMA0407F	TW15S
	200-T10	18	200	10	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	12	SNHT12054R/L-WX	PTMA0408F	TW15S
	200-T11	18	200	11	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	14	SNHT1206R/L-WX	PTKA0409F	TW15S
	200-T12	18	200	12	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	14	SNHT12065R/L-WX	PTKA0410F	TW15S
	200-T13	18	200	13	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	16	SNHT1207R/L-WX	PTKA0411F	TW15S
	200-T14	18	200	14	60	70	50.8 (50)	12.7 (12)	55.8 (53.5)	16	SNHT12075R/L-WX	PTKA0412F	TW15S
	250-T06	20	250	6	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	8	SNHT12035R/L-WX	PTMA04045F	TW15S
	250-T07	20	250	7	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	10	SNHT1204R/L-WX	PTMA0405F	TW15S
	250-T08	20	250	8	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	10	SNHT12045R/L-WX	PTMA0406F	TW15S
	250-T09	20	250	9	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	12	SNHT1205R/L-WX	PTMA0407F	TW15S
	250-T10	20	250	10	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	12	SNHT12054R/L-WX	PTMA0408F	TW15S
	250-T11	20	250	11	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	14	SNHT1206R/L-WX	PTKA0409F	TW15S
	250-T12	20	250	12	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	14	SNHT12065R/L-WX	PTKA0410F	TW15S
	250-T13	20	250	13	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	16	SNHT1207R/L-WX	PTKA0411F	TW15S
	250-T14	20	250	14	88	70	50.8 (50)	12.7 (12)	55.8 (53.5)	16	SNHT12075R/L-WX	PTKA0412F	TW15S

Available inserts **E23**

( )Metric size

High feed cutter with extra pitch for cast iron and light alloy steels

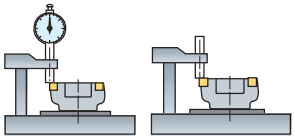
High feed Cutter

- High feed cutter employs extra pitch for cast iron and light alloy steels
- Quick change type for reduction of cutter change time
- Cutting-edge chatter is controlled
- Quick change type for cutter size under ø160, 2 piece types for cutter size over ø200

Guide of insert setting

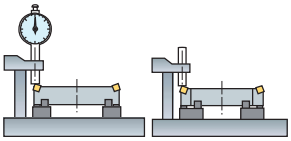
• Special equipment has to be used to get precise run out with high feed cutter.

Adaptor type



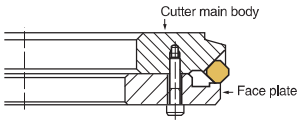
- Mainly under ø160 diameter is used in 1 piece type
- Available for fixed size of cutter and assembling & checking can be done at the same time

Roller type



- Mainly over ø200 diameter is used in 2 piece type
- Due to 3 adjustable guide rollers, variety size of cutter can be assembled

Plate type



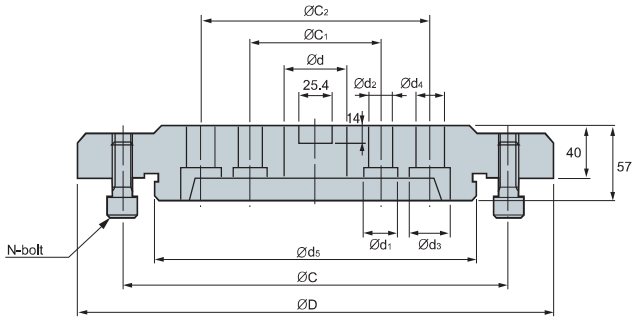
- Suitable for small size cutter due to the simple structure
- It is unnecessary to unclamp the cutter from the machine, it's possible to reassemble the cutter as it mounted on the machine
- You should make plate by yourself

• Guide of insert setting in adaptor/roller type

1. Clean the cutter and equipment
2. Pointer should be assembled with same height with cutter
3. Move to each insert on tip seat to end of pointer and tighten (torque 2 N.m) wedge
4. Exchange pointer to dial gauge
5. Measure the run-out totally
6. When a insert over run-out, loosen wedge and adjust run-out. (for roughing 10~20 μ, for finishing 5~10 μ)
7. Tighten (torque 7-8 N.m) wedge
8. Measure the final run-out by dial gauge

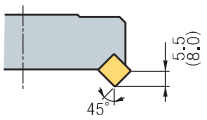
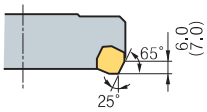
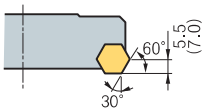
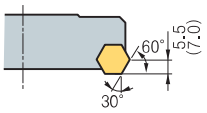
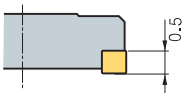
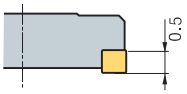
Note: When you clamp wedge too tightly, run-out will get worse due to cutter distortion.
When you clamp the wedge, use torque wrench to set precisely.

Adaptor (Ø200~Ø450)



Designation		ØD	Ød	Ød1	Ød2	Ød3	Ød4	Ød5	ØC	ØC1	ØC2	N	Cutter
APR	200	180	47.625	26	18	-	-	80	120	101.6	-	4	Ø200
	250	230	47.625	26	18	-	-	120	170	101.6	-	4	Ø250
	315	295	47.625	26	18	32	22	180	230	101.6	177.8	6	Ø315
	355	335	63.50	26	18	32	22	220	270	101.6	177.8	6	Ø355
	400	370	63.50	26	18	32	22	250	300	101.6	177.8	8	Ø400
	450	420	63.50	26	18	32	22	300	350	101.6	177.8	8	Ø450

High feed cutters type and features

Designation	Cutter diameter	Workpiece, Application range	Min. surface roughness	Approach angle and Max. cutting depth is for 5000 type	Axial rake angle	Radial rake angle	Available insert
ANH4000 ANH5000	Ø100~Ø450	Cast iron Roughing	25Z		-5°	-6°	SNCN1204ENN SNCN1504ENN
CDH4000 CDH5000	Ø100~Ø450	Cast iron Roughing Finishing	18Z		+10°	+5°	SDCN42R SDCN53R
DEH5000	Ø100~Ø450	Al alloy Roughing	20Z		+14°	+6°	HECN090408FN
DPH5000	Ø100~Ø450	Cast iron Roughing Finishing	12Z		+5°	-3°	HPEN090408 HPEN090408-WC
PNH4000 PNH5000	Ø125~Ø450	Cast iron Finishing	12Z		-5°	-6°	SNEF435 SNEF535
PPH4000	Ø125~Ø450	Cast iron Finishing	12Z		+5°	-5°	SPEN120416-WC

Recommended cutting condition

Workpiece	Cutting condition		Grades	Remark
	vc (m/min)	fz (mm/t)		
Cast iron	100~230	0.05~0.20	**PC6510**	PVD Coated
	80~150	0.05~0.20	**H01, G10**	Uncoated
Al alloy	400	0.10~0.30	**PC6510**	PVD Coated
	400	0.05~0.20	**H01, G10**	Uncoated

Special Korloy cutter for cast iron roughing

Cube Mill

- Special Korloy cutter for cast iron roughing
- 8-corner using insert (maximum 16-corner available with 2 cutter, R/L cutter)
- Excellent cutting performance with positive rake angle made by 3-dimensional chip breaker
- Excellent tool life by a wide combination of grade varieties and chip breakers to match most working conditions
- 2 different type of inserts (chamfer/nose R) are available with 1 type cutter

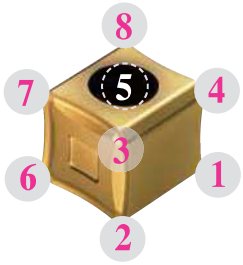
Roughing for cast iron

Code system

CBM	E	3	250	R	(2)	– 28Z
Cutter	AA	Inscribed circle of Insert	Cutter Dia	Hand	Cutter shape	No. of tooth (Z)
CBM: CUBE MILL	Q: 88° C: 65° F: 85° A: 45° E: 75°	3: 9.525 4: 12.7	Ø250	R: Right L: Left	Unmarked: Normal type 2: Quick change type (2 pieces type)	

• Cube Mill and Cube Mill Couple are available by order made.

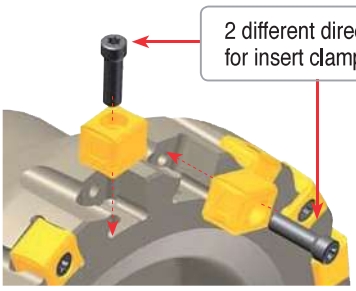
Insert (R/L type)

Chamfer type	Nose R type
	

Cutter body

Cutter diameter (Ø)	General	Quick change
	Ø80~315 mm	Ø200~450 mm
	3 1/4~12 1/2 Inch	8~18 Inch
AA: 88°, 85°, 75°, 65°, 45°		

Cutter



Screw on clamping system

Parts

	Screw	Wrench
 Cube Mill 3000	FTGA0417CBM	TW15-100
	ETGA0520CBM	TW20-100

Ideal combination of aluminum body with cast iron high feed cutter

Couple Mill

- Ideal combination of Aluminum body with cast iron high feed cutter
- Since the weight of the cutter has been reduced 50% vs. a steel cutter, it is very easy to handle and very effective in preventing loading accidents
- Applicable for Cube Mill, Storm Mill

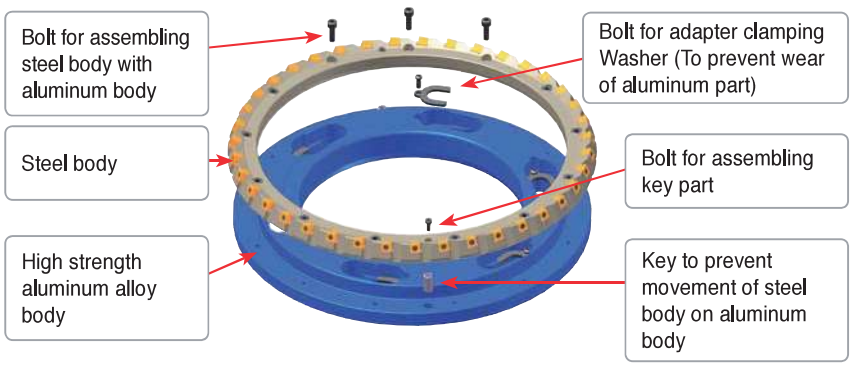
Cube-couple code system

CBM	E	3	355	R	28Z – CP
Cutter	**AA**	**Inscribed circle of Insert**	**Cutter Dia**	**Hand**	**No. of tooth (Z)**	**Couple Mill**
CBM: Cube Mill	Q: 88° C: 65° F: 85° A: 45° E: 75°	3: 9.525 4: 12.7	Ø355	R: Right L: Left	28Z: 28	

Storm-couple code system

S	Q	N	3	355	R	28Z – CP
Cutter	**AA**	**Relief angle of insert**	**Inscribed circle of Insert**	**Cutter Dia**	**Hand**	**No. of tooth (Z)**	**Couple Mill**
S: Storm Mill	Q: 88° E: 75° F: 85° A: 45°	N: Negative (0°)	3: 9.525 4: 12.7	Ø355	R: Right L: Left	28Z: 28	

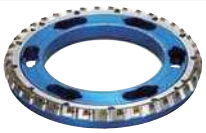
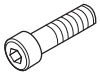
Assembling structure



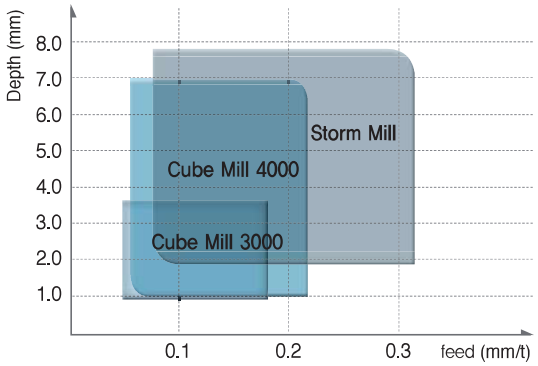
Cutter body

Cutter diameter (Ø)	Quick change	
	Metric	Ø355~450 mm
	Inch	14 1/4~18 Inch

Parts

			 Screw	 Wrench	 Wrench	 Bolt for body	 Bolt for key	 Key for body
Cube-Couple	**3000 type**	FTGA0417CBM	TW15-100	-		BHA0616	MHBO410	PN1019-DRV
	4000 type	ETGA0520CBM	TW20-100			BHA0620		
Storm-Couple	**3000 type**	FTNA0513	-	TW15S		-	-	-

Application range of high feed cutters for cast iron



Recommended cutting condition

Cube Mill		Gray cast iron		Ductile cast iron	
		vc (m/min)	fz (mm/t)	vc (m/min)	fz (mm/t)
PVD	PC6510	150~300	0.08~0.18	100~200	0.08~0.18
Uncoated	G10	90~120	0.05~0.18	60~130	0.05~0.18

Available arbors and adaptors

Designation		Available arbors and adaptors		
		Arbors	General arbor	Adaptor
CBMQ (CBMF) (CBME) (CBMC) (CBMA)	3080R/L-00Z	BT□□-FMA25.4-□□	NT*□□(M/U)-FMA25.4-25	
	3100R/L-00Z	BT□□-FMA31.75-□□	NT*□□(M/U)-FMA31.75-□□	
	3125R/L-00Z	BT□□-FMA38.1-□□	NT*□□(M/U)-FMA38.1-□□	
	3160R/L-00Z	BT□□-FMA50.8-□□	NT*□□(M/U)-FMA50.8-□□	
	3200R/L-00Z	BT□□-FMA47.625-□□	NT*□□(M/U)-FMA47.625-25, KCP-8***	
	3250R/L-00Z	BT□□-FMA47.625-□□	KNT*□□(M/U)-FMA47.625-25, KCP-8***	
	3315R/L-00Z		KCP-8*** (Centering Plug)	
	3200R/L2-00Z			APR200
	3250R/L2-00Z			APR250
	3315R/L2-00Z			APR315
	3355R/L2-00Z			APR355
	3400R/L2-00Z			APR400
	3450R/L2-00Z			APR450
SQN (SFN) (SEN) (SAN)	3080R/L-00Z	BT□□-FMA25.4-□□	NT*□□(M/U)-FMA25.4-25	
	3100R/L-00Z	BT□□-FMA31.75-□□	NT*□□(M/U)-FMA31.75-□□	
	3125R/L-00Z	BT□□-FMA38.1-□□	NT*□□(M/U)-FMA38.1-□□	
	3160R/L-00Z	BT□□-FMA50.8-□□	NT*□□(M/U)-FMA50.8-□□	
	3200R/L-00Z	BT□□-FMA47.625-□□	NT*□□(M/U)-FMA47.625-25, KCP-8***	
	3250R/L-00Z	BT□□-FMA47.625-□□	NT*□□(M/U)-FMA47.625-25, KCP-8***	
	3315R/L-00Z		KCP-8*** (Centering Plug)	
	3200R/L2-00Z			APR200
	3250R/L2-00Z			APR250
	3315R/L2-00Z			APR315
	3355R/L2-00Z			APR355
	3400R/L2-00Z			APR400
	3450R/L2-00Z			APR450

• *□□-NT number / **□□-BT number / ***Milling over 5
<Arbors **add>
ex) BT**□□

Excellent tool life achieved by the wide variety of grades to match work conditions

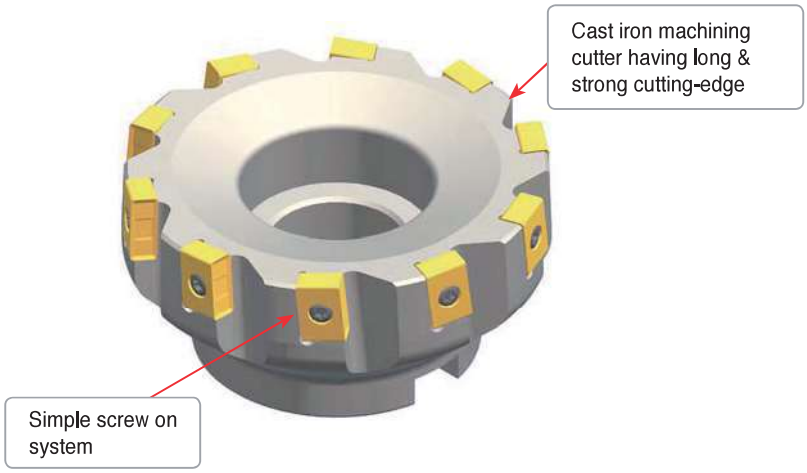
Storm Mill

- Conventional cutter with wide coverage
- Using 4 corners (Maximum 8 corner available with R/L type cutter)
- Effective on large depth of cut applications due to the long cutting-edge
- Excellent tool life guaranteed by wide variety of grades to suit any working conditions
- 2 different types of inserts (chamfer/nose R) are available with 1 type of cutter

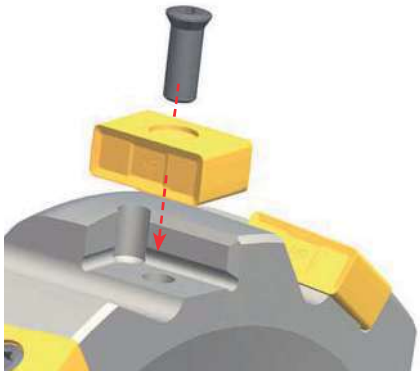
Code system

S	Q	N	3	250	R	(2) – 28Z
Cutter	**Approach angle**	**Relief angle of insert**	**Insert**	**Cutter Dia.**	**Hand**	**Cutter shape**	**No. of tooth**
S: Storm Mill	Q: 88° F: 85° A: 45° E: 75°	N: Negative (0°)	3: 9.525 mm 4: 12.7 mm	MM	R: Right L: Left	No code: Normal type 2: Quick change type (2 pieces type)	

Features



Clamping of insert



Recommended cutting condition

Designation / Grades	Gray cast iron		Ductile cast iron	
	GC		GCD	
	vc (m/min)	fz (mm/t)	vc (m/min)	fz (mm/t)
PC3500	150~250	0.08~0.28	100~180	0.08~0.28
PC6510	150~300	0.10~0.28	100~200	0.10~0.28
PC5400	150~250	0.08~0.22	100~180	0.08~0.22
H01	100~200	0.08~0.22	70~140	0.08~0.22
G10	90~120	0.08~0.28	60~130	0.08~0.28

Optimal cutter for steel and cast iron machining with easily adjustable run-out

Shave Mill

- Adjustable Range (Adjustable range: 0.1 mm, Adjustable allowance: within 2 μm)
- Wiper crown type 8-cornered insert reduces machining cost and realizes excellent surface roughness
- Grades with high toughness and wear resistance ensures long tool life
- The cBN grade achieves superior surface finish

Cutter code system

SVM	M	4	250	R	Z6
Shave Mill	Metric type M: Metric A: Inch	Inscribed Circle 4: 12.7mm	Cutter Dia. (Ø) Ø250	Hand of tool R: Right handed L: Left handed	No. of tooth (Z)

Insert code system

■ Carbide

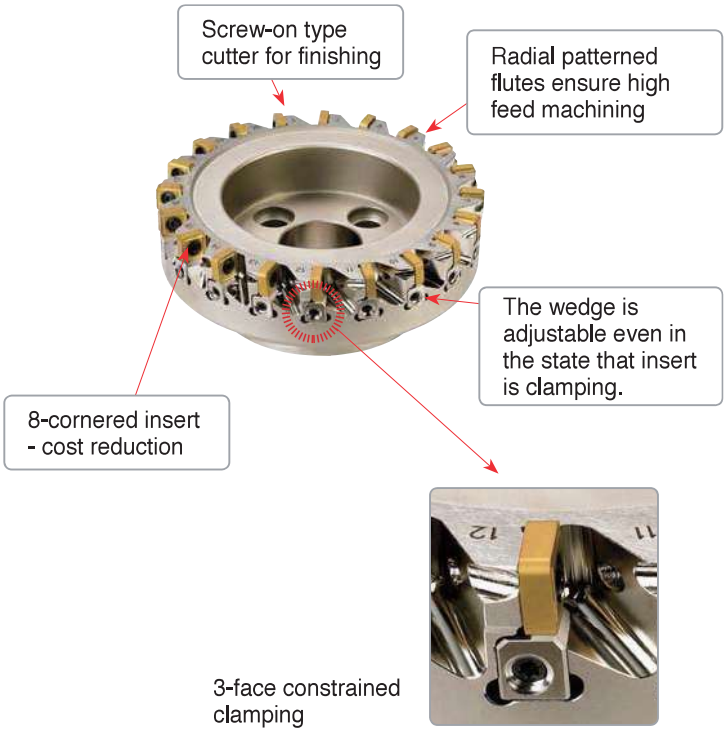
Nose R type	SNEU120420-MF
Chamfer type	SNEU1204ANN-MF
Low cutting type	SNEU1204-WMF

■ cBN

SNEU1204-TBW

T: Nagaland
B: cBN
W: Wiper

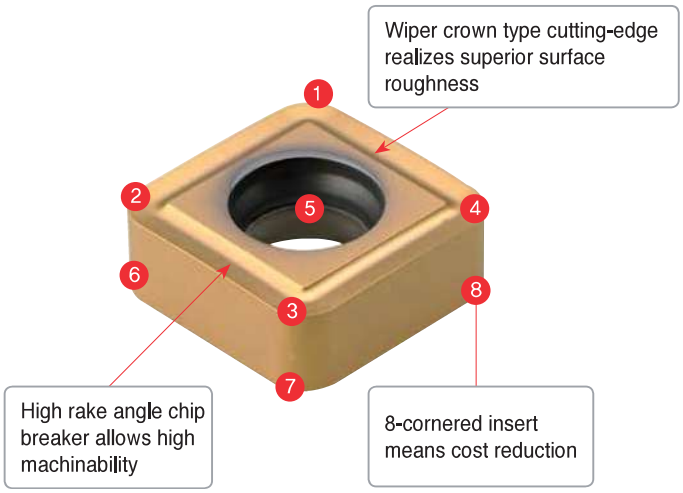
Features



Adjustment

- Adjustable range: 0.1 mm
- Adjustability: below 2 μ
- Operation: easy and simple

Features of insert



SNEU120420-MF	SNEU1204ANN-MF
	
Nose R type	Chamfer type
SNEU1204-WMF	**SNEU1204-TBW**
	
For low cutting load	Wiper for high speed machining

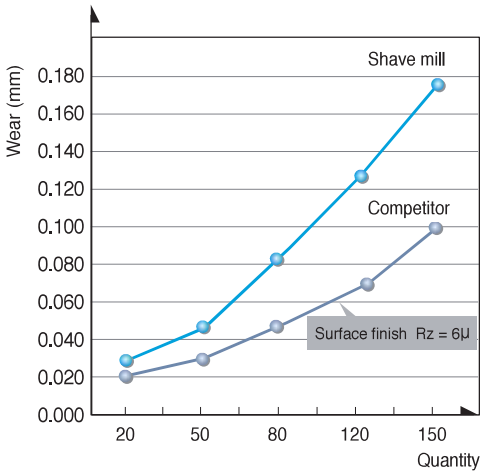
Recommended cutting condition

Workpiece	Cutting condition			Grades
	vc (m/min)	fz (mm/t)	ap (mm)	
P	160~270	0.05~0.2	~0.5	PC3700
K	140~230 600~1000	0.05~0.3 0.05~0.2	~0.5 ~0.5	PC6510 DBN920

Application example

■**Workpiece** Cylinder head (facing)
■**Cutting conditions** vc = 200, fz = 0.15, ap = 0.5, Dry
■**Tools** **Cutter** SVMM4250R
Insert PC6510 SNEU120420-MF

■**Workpiece** FC25 (HB250) Cylinder head (facing)
■**Cutting conditions** vc = 700, fz = 0.1, ap = 0.5, Dry
■**Tools** **Cutter** SVMM4160R
Insert DBN920 SNEU1204-cBN



• Results

	Tool life	Surface finish	Machinability
Shave Mill	250 pcs	Rz = 3μ	High
Competitor	180 pcs	Rz = 3.5μ	Normal

• Korloy's Shave Mills ensure twice the machinability, adjustability, and surface roughness than competitor's, along with twice the tool life.

Better tool life with special grade which has both toughness and wear resistance

Shave Mill-Ultra

- Superior surface roughness for this Finishing cutter when applied to heavy work pieces
- Easy to handle and good rigidity with simple screw on system
- Superior surface finishes due to the wiper crown cutting-edge
- Better tool life with special grade which has both toughness and wear resistance
- Two different types: economical normal type and adjustable run-out type 'B'

Code system of cutter

SVU	M	6	250	R	Z6	–	B
Shave Mill-Ultra	Metric type M: Metric A: Inch	Inscribed Circle 6: 19.05mm	Cutter Dia. (Ø) Ø250	Hand of tool R: Right L: Left	No. of tooth (Z)		Cutter type None: Normal B: Adjustable

Code System of Insert

L	N	C	S	1	9	0	7	–	R3.0	–	WC
			Shave Mill-Ultra						Corner type C: Chamfer R: Round		Wiper Crown

Features

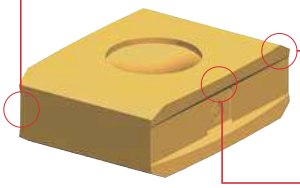
Normal type

Good rigidity and economical due to simple screw on type

Better surface roughness when you use only 1 insert but adjust the 'ap' under 0.03 mm

Adjustable cutting-edge (Type B)

Easy to handle the run-out due to Korloy exclusive high toughness cutting-edge special parts



Good cutting performance & chip flow due to positive rake angle chip breaker

Economical 4 corner insert

Good surface roughness by wiper crown cutting-edge design

Adjustable Range

· Range: 1.0 mm
· Allowance: Within 2 μ

Recommended cutting condition

Workpiece	Cutting condition			Tooth	Grades
	vc (m/min)	fz (mm/t)	ap (mm)		
P	160~270	0.05~0.20	~0.50	Full use	PC3700
	160~270	2~5	~0.03	1 use	
K	140~230	0.05~0.20	~0.50	Full use	PC6510
	140~230	2~5	~0.03	1 use	

PNH4000/5000

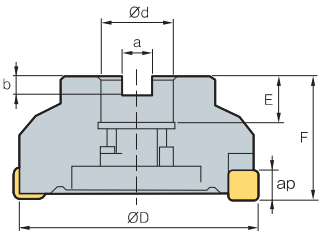


Fig. 1

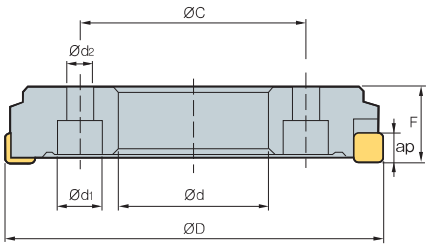


Fig. 2

AA
90°

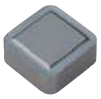
- AR: -5°
- RR: -6°

(mm)

Designation		⊚	ØD	Ød	Ød1	Ød2	a	b	E	F	ØC	ap	kg	Fig.
PNH	4125R/L	10	125	38.1	-	-	15.9	10	27	63	-	Max 0.5	3.4	1
	4160R/L	14	160	50.8	-	-	19.0	11	27	63	-	Max 0.5	5.5	1
	4200R/L	18	200	80	24	14	-	-	-	40	120	Max 0.5	5.5	2
	4250R/L	24	250	120	30	18	-	-	-	40	170	Max 0.5	7.7	2
	4315R/L	30	315	180	30	18	-	-	-	40	230	Max 0.5	10.5	2
	4355R/L	34	355	220	30	18	-	-	-	40	270	Max 0.5	12.9	2
	4400R/L	38	400	250	30	18	-	-	-	40	300	Max 0.5	16.1	2
	4450R/L	44	450	300	30	18	-	-	-	40	350	Max 0.5	19.1	2
PNH	5125R/L	10	125	38.1	-	-	15.9	10	27	63	-	Max 0.5	3.4	1
	5160R/L	14	160	50.8	-	-	19.0	11	27	63	-	Max 0.5	5.3	1
	5200R/L	18	200	80	24	14	-	-	-	40	120	Max 0.5	5.4	2
	5250R/L	24	250	120	30	18	-	-	-	40	170	Max 0.5	7.6	2
	5315R/L	30	315	180	30	18	-	-	-	40	230	Max 0.5	10.4	2
	5355R/L	34	355	220	30	18	-	-	-	40	270	Max 0.5	12.8	2
	5400R/L	38	400	250	30	18	-	-	-	40	300	Max 0.5	15.9	2
	5450R/L	44	450	300	30	18	-	-	-	40	350	Max 0.5	18.9	2

Available inserts

SNEF



Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
SNEF	435											●								E21

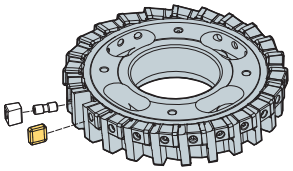
Available arbors

Designation		NC arbors	
PNH	125R/L	NT*□□(M/U)-FMA38.1-□□	-
	160R/L	NT*□□(M/U)-FMA50.8-□□	-
	200R/L	-	APR200
	250R/L	-	APR250
	315R/L	-	APR315
	355R/L	-	APR355
	400R/L	-	APR400
	450R/L	-	APR450

Recommended cutting condition

Workpiece	Cutting condition		Grades
	vc (m/min)	fz (mm/t)	
K	140~230	0.05~0.30	PC6510
	135~220	0.10~0.30	H01
	50~90	0.10~0.30	G10

Assembling



Parts

Specification	Wedge	Wedge screw	Wrench
Ø125~Ø450	WPNH4N	DHA0821F	HW40
Ø125~Ø450	WPNH5N		

Available inserts E21 Available arbors and bolt E400~E402

PPH4000

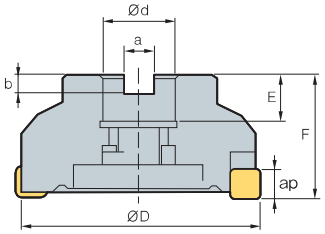


Fig. 1

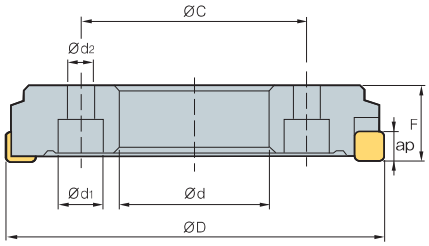


Fig. 2

AA
90°

- AR: 5°
- RR: -6°

(mm)

Designation		⚙	ØD	Ød	Ød1	Ød2	a	b	E	F	ØC	ap	kg	Fig.
PPH	4125R/L	10	125	38.1	-	-	15.9	10	27	63	-	Max 0.5	3.4	1
	4160R/L	14	160	50.8	-	-	19.0	11	27	63	-	Max 0.5	5.3	1
	4200R/L	18	200	80	24	14	-	-	-	40	120	Max 0.5	5.5	2
	4250R/L	24	250	120	24	14	-	-	-	40	170	Max 0.5	7.7	2
	4315R/L	30	315	180	30	18	-	-	-	40	230	Max 0.5	10.5	2
	4355R/L	34	355	220	30	18	-	-	-	40	270	Max 0.5	13	2
	4400R/L	38	400	250	30	18	-	-	-	40	300	Max 0.5	16	2
	4450R/L	44	450	300	30	18	-	-	-	40	350	Max 0.5	19	2

Available inserts

SPEN-WC

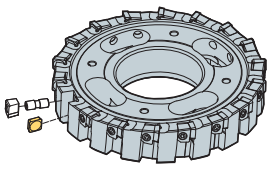
Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
SPEN	120416-WC																			E24

Available arbors

Designation		NC arbors	
PPH	4125R/L	NT*□□(M/U)-FMA38.1-□□	-
	4160R/L	NT*□□(M/U)-FMA50.8-□□	-
	4200R/L	-	APR200
	4250R/L	-	APR250
	4315R/L	-	APR315
	4355R/L	-	APR355
	4400R/L	-	APR400
	4450R/L	-	APR450

Recommended cutting condition

Workpiece	Cutting condition		Grades
	vc (m/min)	fz (mm/t)	
K	140~230	0.05~0.30	PC6510
	135~220	0.10~0.30	H01
	50~90	0.10~0.30	G10

Assembling	

Parts

Specification	Wedge	Wedge screw	Wrench
Ø125~Ø450	WPPH4R/L	DHA0821F	HW40

Available inserts E24 Available arbors and bolt E400~E402

SVM(M)4000

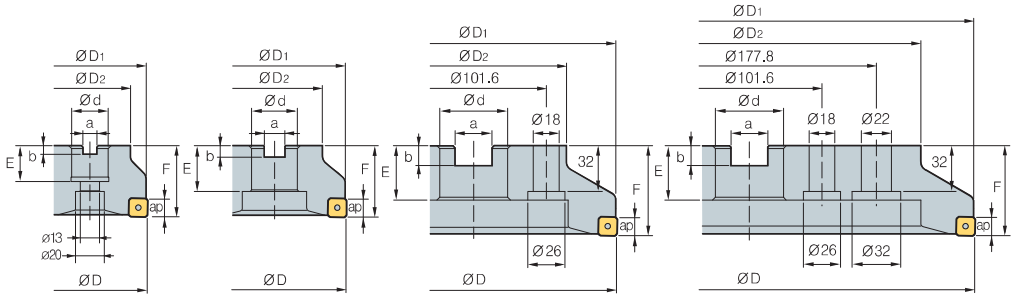


Fig. 1 Fig. 2 Fig. 3 Fig. 4

(mm)

Designation		⚙	ØD	ØD1	ØD2	Ød	a	b	E	F	ap	kg	Fig.
SVM	4080R/L-Z8	8	80	79	57	25.4	12.4	6	25	50	1.0	1.2	1
	4100R/L-Z12	12	100	99	67	31.75	14.4	8	32	63	1.0	2.3	1
	4125R/L-Z16	16	125	124	87	38.1	16.4	10	38	63	1.0	3.5	2
	4160R/L-Z20	20	160	159	107	50.8	16.4	11	38	63	1.0	5	2
	4200R/L-Z24	24	200	199	130	47.625	25.7	14	38	63	1.0	7.2	3
	4250R/L-Z30	30	250	249	180	47.625	25.7	14	38	63	1.0	12	3
	4315R/L-Z36	36	315	314	240	47.625	25.7	14	38	63	1.0	19.5	4
SVMM	4080R/L-Z8	8	80	79	57	27	12.4	7	22	50	1.0	1.2	1
	4100R/L-Z12	12	100	99	67	32	14.4	8	28	63	1.0	2.3	1
	4125R/L-Z16	16	125	124	87	40	16.4	9	30	63	1.0	3.5	2
	4160R/L-Z20	20	160	159	107	40	16.4	9	30	63	1.0	5	3
	4200R/L-Z24	24	200	199	130	60	25.7	14	38	63	1.0	7.2	3
	4250R/L-Z30	30	250	249	180	60	25.7	14	38	63	1.0	12	3
	4315R/L-Z36	36	315	314	240	60	25.7	14	38	63	1.0	19.5	4

Available inserts

		SNEU-MF	SNEU1204ANN-MF	SNEU-WMF	SNEU-TBW
					

Designation		Cermet		Coated												초경		page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	H01	
SNEU	120420-MF											●							E21 E22
	1204ANN-MF																		
	1204R-WMF																		
	1204-TBW																		

Parts

Specification	Wedge	Wedge screw	Contract Screw	Wrench
Ø80~Ø315	WKAJ3	DTA0619	XTKA0412	TW15-100

Available inserts E21, E22

SVUM6000

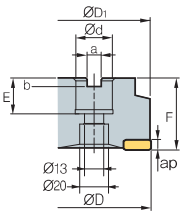


Fig. 1

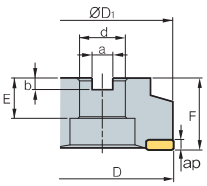


Fig. 2

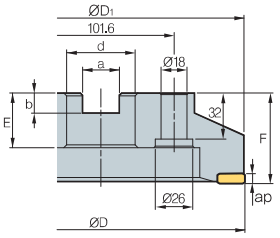


Fig. 3

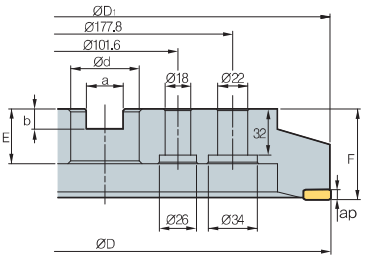


Fig. 4

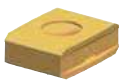
(mm)

Designation			ØD	ØD1	ØD2	Ød	a	b	E	F	ap	kg	Fig.
SVUM	6080R/L-Z4	4	80	79	57	27	12.4	7	22	50	0.5	1.2	1
	6100R/L-Z4	4	100	100	67	32	14.4	8	28	63	0.5	2.3	1
	6125R/L-Z4	4	125	125	87	40	16.4	9	30	63	0.5	3.5	2
	6160R/L-Z4	4	160	160	107	40	16.4	9	30	63	0.5	5	3
	6200R/L-Z6	6	200	200	130	60	25.7	14	38	63	0.5	7.2	3
	6250R/L-Z6	6	250	250	180	60	25.7	14	38	63	0.5	12	3
	6315R/L-Z8	8	315	315	240	60	25.7	14	38	63	0.5	19.5	4

Available inserts

LNCS (R3.0)

LNCS (C1.5)



Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LNCS	1907-R3.0-WC																			E10
	1907-C1.5-WC																			

Parts

Specification	Screw	Wrench
Ø80~Ø315	FTNA0513	TW20-100

Available inserts E10

SVUM6000-B

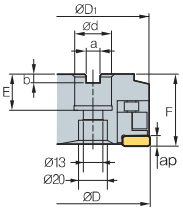


Fig. 1

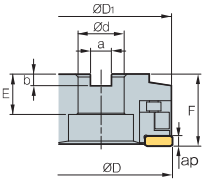


Fig. 2

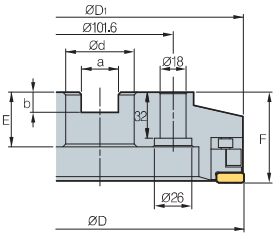


Fig. 3

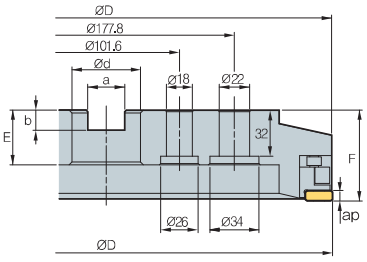


Fig. 4

(mm)

Designation			ØD	ØD1	ØD2	Ød	a	b	E	F	ap	kg	Fig.
SVUM	6080R/L-Z4-B	4	80	79	57	27	12.4	7	22	50	0.5	1.2	1
	6100R/L-Z4-B	4	100	99	67	32	14.4	8	28	63	0.5	2.3	1
	6125R/L-Z4-B	4	125	124	87	40	16.4	9	30	63	0.5	3.5	2
	6160R/L-Z4-B	4	160	160	107	40	16.4	9	30	63	0.5	5	3
	6200R/L-Z6-B	6	200	200	130	60	25.7	14	38	63	0.5	7.2	3
	6250R/L-Z6-B	6	250	250	180	60	25.7	14	38	63	0.5	12	3
	6315R/L-Z8-B	8	315	315	240	60	25.7	14	38	63	0.5	19.5	4

Available inserts

LNCS(R3.0)

LNCS(C1.5)

Designation		Cermet		Coated											Uncoated			page
		CN2000	CN30	NCM325	NC5330	NCM535	NCM545	PC2505	PC2010	PC3600	PC3700	PC6510	PC9530	PC9540	PC5300	PC5400	ST30A	G10	H01	
LNCS	1907-R3.0-WC																			E10
	1907-C1.5-WC																			

Parts

Specification	Locator	Wedge	Wedge screw	Adjust Screw	Contract Screw	Wrench
Ø80~Ø315	LSH4R	WSH4	DHA0724F	AZ0619F-D	FTNA0512	TW20-100

Available inserts E10

Inch

Actual designations of milling cutter

Fig. 1

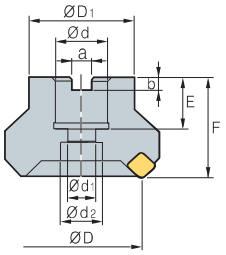


Fig. 2

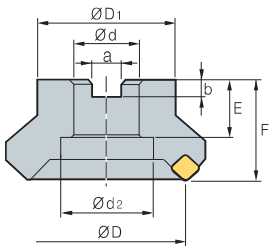


Fig. 3

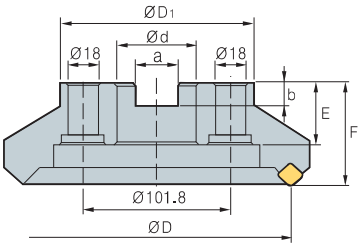
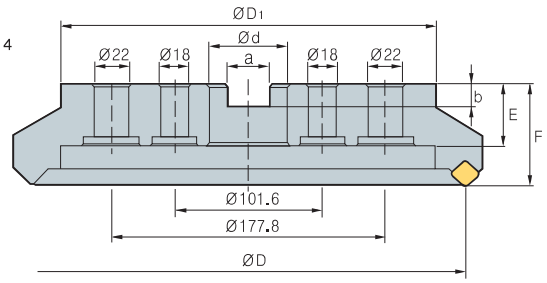


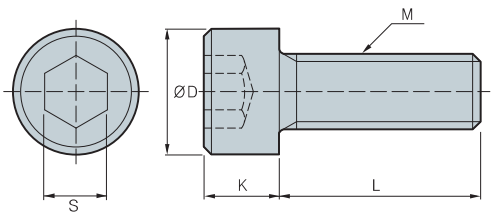
Fig. 4



Inch type

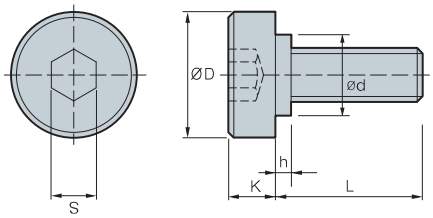
Dimensions (mm)									Fig.	Available arbors
ØD	Ød	a	b	E	F	ØD1	Ød1	Ød2		
40	16	8.4	5.6	18	40	34	9	14	1	FMC16, SMA16
50	22	10.4	6.3	20	40	42	11	18	1	FMC22
63	22	10.4	6.3	20	40	49	11	18	1	FMC22
80	25.4	9.5	6	25	50	57	14	20	1	FMA25.4
100	31.75	12.7	8	32	50	67	-	45	2	FMA31.75, SMB31.75
125	38.1	15.9	10	38	63	87	-	56	2	FMA38.1
160	50.8	19	11	38	63	107	-	-	2	FMA50.8
200	47.625	25.4	14	38	63	130	-	-	3	FMA47.625
250	47.625	25.4	14	38	63	180	-	-	3	FMA47.625
315	47.625	25.4	14	38	63	240	-	-	4	-

Wrench bolt



Designation	ØD	S	K	L	M	Cutter size
SB0825	13	6	8	25	M08×1.25	Ø40
SB1025	16	8	10	25	M10×1.50	Ø50, Ø63
SB1035	16	8	10	35	M10×1.50	Ø50, Ø63 (HRM)
SB1230	18	10	12	30	M12×1.75	Ø80
SB1630	24	14	16	30	M16×2.0	Ø100
SB1645	24	14	16	45	M16×2.0	Ø80, Ø100 (HRM)
SB2040	30	17	20	40	M20×2.5	Ø125

Clamp bolt



Designation	Dimensions (mm)						Cutter size
	D	L	K	S	h	d	
M8×1.25	20	20	7	6	-	-	Ø40
M10×1.5	28	24	9	8	-	-	Ø50, Ø63
M12×1.75	33	28	10	10	2	23	Ø80
M16×2	40	32	10	14	5	23	Ø100
M20×2.5	50	40	14	17	5	27	Ø125
M24×3	64	46	14	19	9	37	Ø160

Metric - ISO6462, DIN138

Clamping part of milling cutter

Fig. 1

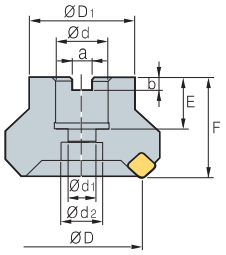


Fig. 2

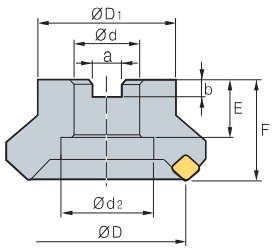


Fig. 3

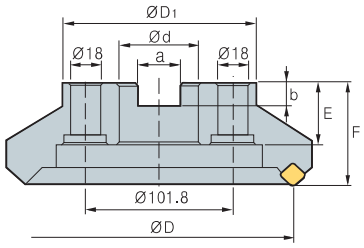
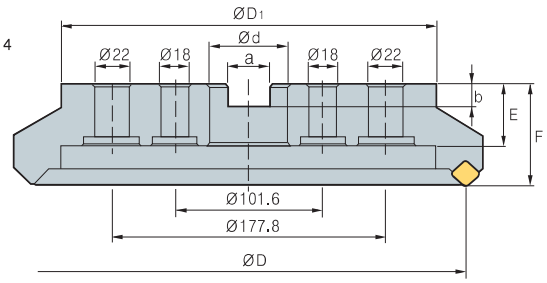


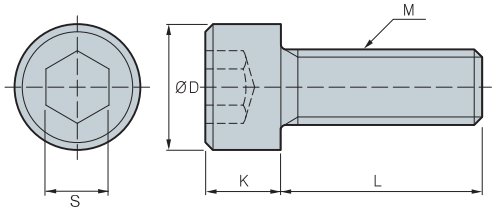
Fig. 4



Metric type

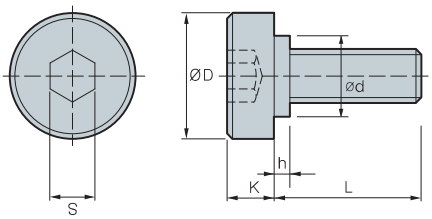
Dimensions (mm)									Fig.	Available arbors
ØD	Ød	a	b	E	F	ØD1	Ød1	Ød2		
40	16	8.4	5.6	18	40	34	9	14	1	FMC16, SMA16
50	22	10.4	6.3	20	40	42	11	18	1	FMC22
63	22	10.4	6.3	20	40	49	11	18	1	FMC22
80	27	12.4	7	22	50	57	14	20	1	FMC27
100	32	14.4	8	28	50	67	-	45	2	FMC32
125	40	16.4	9	32	63	87	-	56	2	FMB40
160	40	16.4	9	32	63	107	-	-	2	FMB40
200	60	25.7	14	38	63	130	-	-	3	FMB60
250	60	25.7	14	38	63	180	-	-	3	FMB60
315	60	25.7	14	38	63	240	-	-	4	-

Wrench bolt



Designation	ØD	S	K	L	M	Cutter size
SB0825	13	6	8	25	M08×1.25	Ø40
SB1025	16	8	10	25	M10×1.50	Ø50, Ø63
SB1035	16	8	10	35	M10×1.50	Ø50, Ø63 (HRM)
SB1230	18	10	12	30	M12×1.75	Ø80
SB1245	18	10	12	45	M12×1.75	Ø80 (HRM)
SB1630	24	14	16	30	M16×2.0	Ø100
SB1645	24	14	16	45	M16×2.0	Ø100 (HRM)
SB2040	30	17	20	40	M20×2.5	Ø125

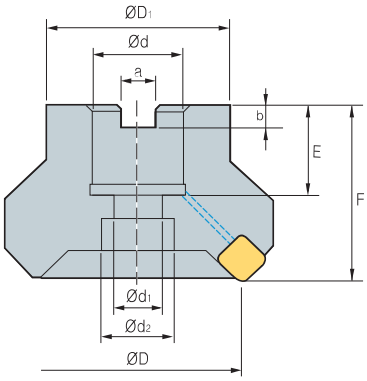
Clamp bolt



Specifications	Dimensions (mm)						Cutter size
	D	L	K	S	h	d	
M12×1.75	33	28	10	10	2	23	Ø80
M16×2	40	32	10	14	5	23	Ø100
M20×2.5	50	40	14	17	5	27	Ø125, Ø160

Clamping part of milling cutter (Oil-hole)

Clamping part of milling cutter



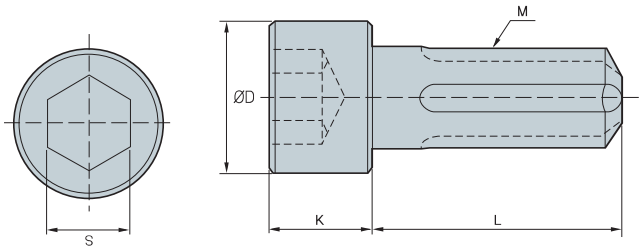
Inch type

Dimensions (mm)									Available arbors
ØD	Ød	a	b	E	F	ØD1	Ød1	Ød2	
40	16	8.4	5.6	19	40	34	9	14	FMC16, SMA16
50	22	10.4	6.3	21	40	42	11	18	FMC22
63	22	10.4	6.3	21	40	49	11	18	FMC22
80	25.4	9.5	6	24	50	57	14	20	FMA25.4, FMB25.4
100	31.75	12.7	8	32	63	67	18	26	FMA31.75, SMB31.75
125	38.1	15.9	10	35	63	87	22	32	FMA38.1, FMB38.1, FMC38.1

Metric type

Dimensions (mm)									Available arbors
ØD	Ød	a	b	E	F	ØD1	Ød1	Ød2	
40	16	8.4	5.6	19	40	34	9	14	FMC16, SMA16
50	22	10.4	6.3	21	40	42	11	18	FMC22
63	22	10.4	6.3	21	40	49	11	18	FMC22
80	27	12.4	7.0	23	50	57	14	20	FMC27
100	32	14.4	8.0	25	50	67	18	26	FMC32
125	40	16.4	9.0	29	63	87	22	32	FMB40/FMC40

Wrench bolt



Designation	ØD	S	K	L	M	Cutter size
CB0825	13	6	8	25	M08×1.25	Ø40
CB1025	16	8	10	25	M10×1.50	Ø50, Ø63
CB1035	16	8	10	35	M10×1.50	Ø50, Ø63 (HRM)
CB1230	18	10	12	30	M12×1.75	Ø80
CB1245	18	10	12	45	M12×1.75	Ø80 (HRM)
CB1630	24	14	16	30	M16×2.0	Ø100
CB1645	24	14	16	45	M16×2.0	Ø100 (HRM)
CB2040	30	17	20	40	M20×2.5	Ø125

Gear cutter applicable example

Applicable example-external tooth gear

Finishing: M20

- **Cutter Dia**: Ø400
- **Tooth No**: 20 tooth
- **External tooth gear**: Formal cutter for gear processing which can be expected to KS 4 level accuracy
- Cutter can simultaneously chamfer while milling

M20XZ130-EX

Semi-finishing

- **Cutter Dia**: Ø280
- **Tooth No**: 48 tooth
- Designed for processing of external gear involute curve line shape
- Possible to work for gear root portion R with optimal insert R design

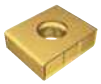
M20-M22-ROU

Roughing

- **Cutter Dia**: Ø300
- **Tooth No**: 60 tooth
- High feed rate with low cutting resistance due to V shape insert setting design

LNE333-02-1

LNE434-02-1



KEL1906-C0.6-MF

Applicable example-internal tooth gear

Finishing: M16

- **Cutter Dia**: Ø400
- **Tooth No**: 20 tooth
- **Internal tooth gear**: Formal cutter for gear processing which can be expected to KS 4 level accuracy
- Cutter can simultaneously chamfer while milling

M16XZ130

Semi-finishing

- **Cutter Dia**: Ø280
- **Tooth No**: 48 tooth
- The semi-finishing cutter was designed for processing of external gear involute curb line shape

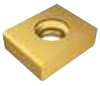
M16-M18-ROU

LNE433-R60

Roughing

- **Cutter Dia**: Ø560
- **Tooth No**: 40 tooth
- Possible to use for gear processing of all module due to step type of insert setting design

KEL1906-C0.6-MF

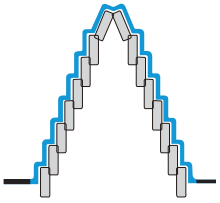
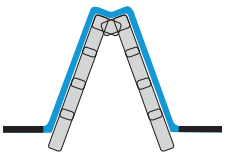
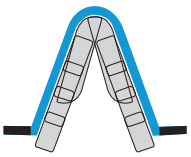
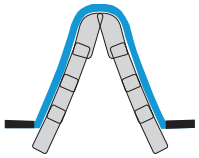
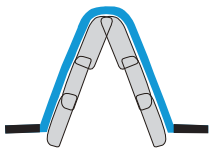
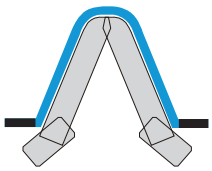
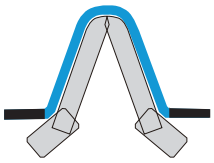
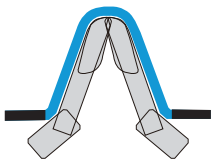


LNE434-02-1

Gear cutter machining example

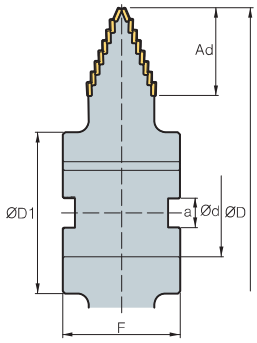
- **Machine**
  Gleason-PFAUTER CNC Hobbing Machine (Power: 52kW)
- **Cutting condition**
  vc = 119.98 m/min (n = 86.8 rpm)
  fz = 0.518 mm/t (vf = 450 mm/min)
  ae = 36 mm
  Dry
- **Tools**
  M16-PT-RACK-KOR03 (Ø440xW90)
- **Semi-finishing cutter (low cut, low resistance)**

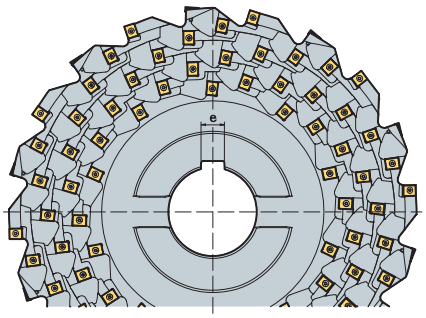
- **Machine**
  KARATS (30kw)
- **Cutting condition**
  vc = 150 m/min, n = 119 rpm
  fz = 0.09 mm/t, vf = 81.6 mm/min
  ae = 45 mm
  Dry
- **Tools**
  M24 Semi-finishing External type Applicable Insert
  M40-ROU (Main),
  CPE424-01 (Flank)

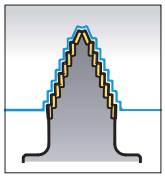
Type	Cutter shape	Cutting-edge shape	Type	Figure
Roughing			Step type	• Working for big sized gear tooth • Low cutting resistance with step type insert setting
			V shape type	• Low cutting resistance with V shape cutting insert setting • Optimal cutting-edge line setting according to Rach type & cutting-edge shape
Semi-finishing			Low cutting resistance type	• 4-Corner insert on Root portion • 3D chip breaker shape on flank • Optimal cutting-edge line setting for low cutting resistance
			External gear high rigidity type	• Optimal R type insert setting on Root portion • Superior Semi-finishing cutting with high rigidity shape of cutter & insert
			Internal gear high rigidity type	• Exclusive semi-finishing Internal Gear insert • Optimal cutting-edge line setting with Internal tooth shape
Finishing			External gear	• Concave shape of cutting-edge line according to external gear type • Optimal cutting insert setting design according to a customer conditions
			Internal gear	• 2-corner insert setting on right & left side and chamfering insert setting • Adjustable chamfering cartridge use for chamfering control
			2 STEP type	• Exclusive insert for machining the root part • 4-cornered insert

• Optimal cutting insert setting design according to customer condition

Gear Roughing Cutter (Step type)





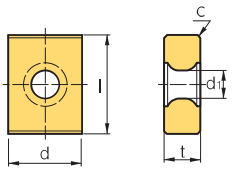
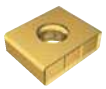


(mm)

m	⚙	ØD	Ad	Ød	ØD1	a	e	F
30	96	450	90	100	180	25	14	140
	108	500	90	100	180	25	14	140
	120	560	90	120	220	40	32	160
40	112	450	105	100	180	25	14	140
	126	500	105	100	180	25	14	140
	140	560	105	120	220	40	32	160
50	160	560	119	120	220	40	32	160

Available inserts

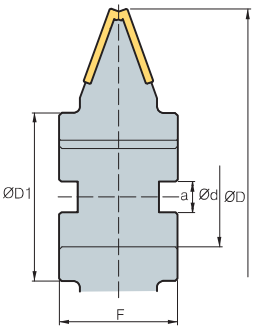
(mm)

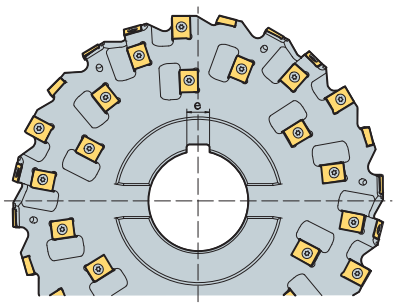
Picture	Designation		Coated				Uncoated		Dimensions					Configuration
			NC5330	PC9530	PC3500	PC5300	H01	G10	l	d	t	d_1	c	
 Reinforced cutting-edge	LNE	434-02-1			○	◎			19.05	14.29	6.35	5.4	0.6	
 Low cutting resistance	KEL	1906-C0.6-MF			○	◎			19.05	14.29	6.35	5.4	0.6	
		190610-MR			○	◎			19.05	14.29	6.35	5.4	-	

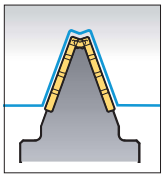
※ The above specification is subject to change according to customer related condition & Korloy technical condition

◎: 1st Rec ○: 2nd Rec

Gear Roughing Cutter (V shape type)





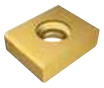
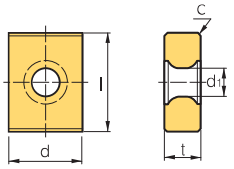
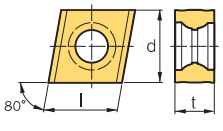


(mm)

m	Type	⊚	ØD	Ød	ØD1	a	e	F
20	rack	48	280	80	135	25	18	95
22	rack	48	280	80	135	25	18	95
24	rack	48	320	80	145	25	18	105
26	rack	60	320	80	145	25	18	105
28	rack	96	400	100	180	25	24	130
30	rack	96	400	100	180	25	24	130
32	rack	96	400	100	180	25	24	130
34	rack	112	400	100	180	25	24	130
36	rack	112	450	100	180	25	24	130
38	rack	112	450	100	180	25	24	130
40	rack	128	450	100	180	25	24	160
42	rack	128	450	100	180	25	24	160
44	rack	128	560	120	220	32	32	160
46	rack	144	560	120	220	32	32	160
48	rack	144	560	120	220	32	32	160
50	rack	144	560	120	220	32	32	160

Available inserts

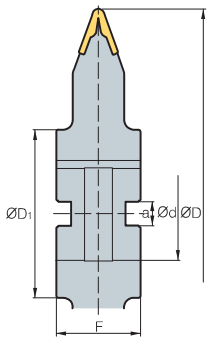
(mm)

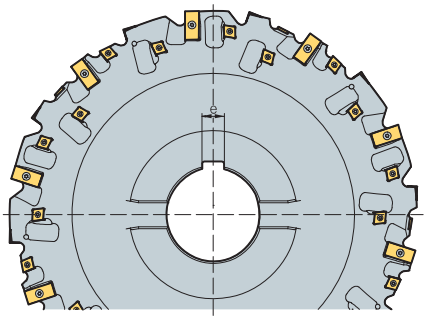
Picture	Designation		Coated				Uncoated		Dimensions					Configuration
			NC5330	PC9530	PC3500	PC5300	H01	G10	l	d	t	d1	c	
 Reinforced cutting-edge	LNE	434-02-1			○	◎			19.05	14.29	6.35	5.4	0.6	
 Low cutting resistance	LNE	1906-C0.6-MF			○	◎			19.05	14.29	6.35	5.4	0.6	
		190610-MR							19.05	14.29	6.35	5.4	-	
 Reinforced cutting-edge	KEL	333-02-1			○	◎			14.3	12.7	6.35	5.8	0.8	
	CNHQ	1005-C0.5							10	10	5.4	-	-	

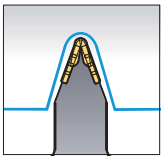
※ The above specification is subject to change according to customer related condition & Korloy technical condition

◎: 1st Rec ○: 2nd Rec

Gear Semi-finishing Cutter
(Low cutting resistance type)





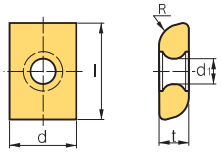
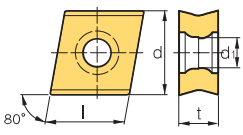


(mm)

m	No.of teeth	⚙	ØD	Ød	ØD1	a	e	F
6	30,60,120	18	250	60	100	25	18	70
8	30,60,120	18	250	60	100	25	18	80
10	30,60,120	24	250	60	100	25	18	80
12	30,60,120	24	250	60	100	25	18	90
14	30,60,120	24	280	80	135	25	24	95
16	30,60,120	32	280	80	135	25	24	100
18	30,60,120	32	320	80	145	25	24	105
20	30,60,120	64	400	100	180	25	24	110
22	30,60,120	64	400	100	180	25	24	110
24	30,60,120	64	400	100	180	25	24	120

Available inserts

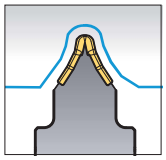
(mm)

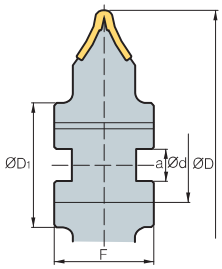
Picture	Designation		Coated				Uncoated		Dimensions					Configuration
			NC5330	PC9530	PC3500	PC5300	H01	G10	l	d	t	d1	c	
		M6-2ST			○	◎			19.05	11.6	3.8	4.4	2.25	
		M8-2ST			○	◎			19.05	11.6	4	4.4	3	
		M10-2ST			○	◎			19.05	11.6	4.76	4.4	3.75	
		M12-2ST			○	◎			19.05	14.3	6.35	5.5	4.5	
		M14-2ST			○	◎			25.4	14.3	6.35	5.5	5.25	
		M16-2ST			○	◎			31.8	14.3	7.14	5.5	6	
		M18-2ST			○	◎			31.8	14.3	7.14	5.5	6.75	
		M20-2ST			○	◎			31.8	14.3	9.52	5.5	7.5	
		M22-2ST			○	◎			31.8	14.3	9.52	5.5	8.25	
		M24-2ST			○	◎			31.8	14.3	9.52	5.5	9	
	KEC	120606-MX			○	◎			12	12.7	6.35	4.5	-	
		150708-MX			○	◎			15.15	15	7.6	5.8	-	

※ The above specification is subject to change according to customer related condition & Korloy technical condition

◎: 1st Rec ○: 2nd Rec

Gear Semi-finishing Cutter
(High rigid edge type, External gear)



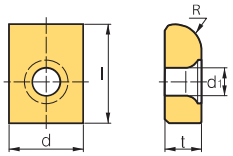
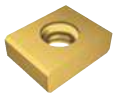
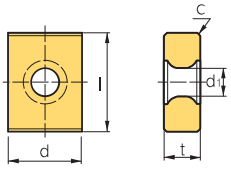


(mm)

m	No.of teeth		ØD	Ød	ØD1	a	e	F
12	30, 60, 120	24	250	60	100	25	14	70
14	30, 60, 120	36	250	60	100	25	14	80
16	30, 60, 120	36	250	60	100	25	14	80
18	30, 60, 120	36	250	60	100	25	14	90
20	30, 60, 120	48	280	80	135	25	18	95
22	30, 60, 120	48	280	80	135	25	18	100
24	30, 60, 120	48	320	80	145	25	18	105
26	30, 60, 120	72	400	100	180	25	24	110
28	30, 60, 120	72	400	100	180	25	24	110
30	30, 60, 120	72	400	100	180	25	24	120
32	30, 60, 120	84	400	100	180	25	24	130
34	30, 60, 120	84	400	100	180	25	24	130

Available inserts

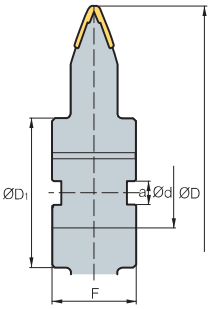
(mm)

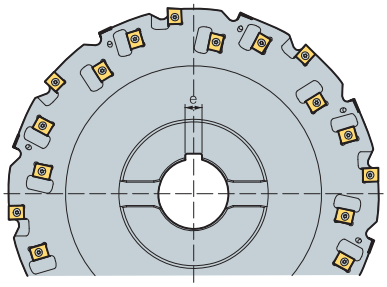
Picture	Designation	Coated				Uncoated		Dimensions						Configuration
		NC5330	PC9530	PC3500	PC5300	H01	G10	l	d	t	d1	R	c	
	M8-ROU			○	◎			15.875	11	4.76	4.6	4.6	-	
	M12-M14-ROU			○	◎			19.05	14.29	6.35	5.4	5.4	-	
	M16-M18-ROU			○	◎			19.05	14.29	7	5.4	5.4	-	
	M20-M22-ROU			○	◎			19.05	14.29	7.94	5.4	5.4	-	
	M40-ROU			○	◎			25.4	14.29	9.52	5.4	5.4	-	
	LNE 434-02-1			○	◎			19.05	14.29	6.35	5.4	-	0.6	
	KEL 1906-C0.6-MF			○	◎			19.05	14.29	6.35	5.4	-	0.6	
	190610-MR			○	◎			19.05	14.29	6.35	5.4		-	

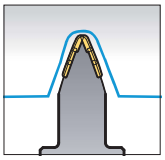
※ The above specification is subject to change according to customer related condition & Korloy technical condition

◎: 1st Rec ○: 2nd Rec

Gear Semi-finishing Cutter
(High rigid edge type, Internal gear)





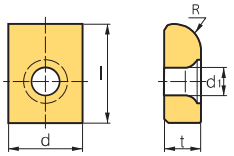
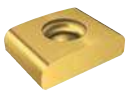
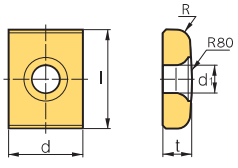


(mm)

m	No.of teeth		ØD	Ød	ØD1	a	e	F
12	30,60,120	24	250	60	100	25	14	70
14	30,60,120	36	250	60	100	25	14	80
16	30,60,120	36	250	60	100	25	14	80
18	30,60,120	36	250	60	100	25	14	90
20	30,60,120	48	280	80	135	25	18	95
22	30,60,120	48	280	80	135	25	18	100
24	30,60,120	48	320	80	145	25	18	105
26	30,60,120	72	400	100	180	25	24	110
28	30,60,120	72	400	100	180	25	24	110
30	30,60,120	72	400	100	180	25	24	120
32	30,60,120	84	400	100	180	25	24	130
34	30,60,120	84	400	100	180	25	24	130

Available inserts

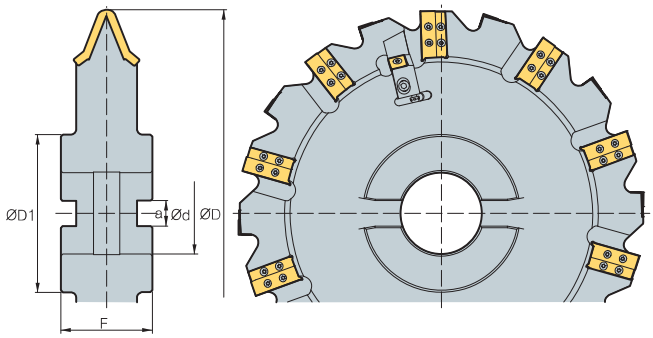
(mm)

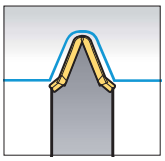
Picture	Designation	Coated				Uncoated		Dimensions					Configuration
		NC5330	PC9530	PC3500	PC5300	H01	G10	l	d	t	d1	c	
	M8-ROU			○	◎			15.875	11	4.76	4.6	2	
	M12-M14-ROU			○	◎			19.05	14.29	6.35	5.4	3	
	M16-M18-ROU			○	◎			19.05	14.29	7	5.4	5	
	M20-M22-ROU			○	◎			19.05	14.29	7.94	5.4	7	
	M40-ROU			○	◎			25.4	14.29	9.52	5.4	10	
	LNE 433-R80			○	◎			19.05	14.29	5.56	5.4	2.5	

※ The above specification is subject to change according to customer related condition & Korloy technical condition

◎: 1st Rec ○: 2nd Rec

Gear Finishing Cutter
(1 Step type, External gear)



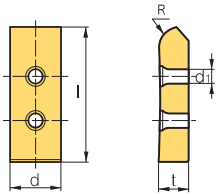
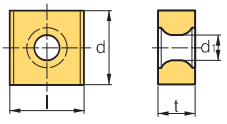


(mm)

m	⊙	ØD	Ød	ØD1	a	F
6	20	400	80	155	25	90
8	20	400	80	155	25	90
10	20	400	80	155	25	90
12	20	400	80	155	25	90
14	20	400	80	155	25	90
16	20	400	80	155	25	90
18	20	400	80	155	25	90
20	20	400	80	155	25	90
22	20	400	80	155	25	90
24	20	400	80	155	25	90

Available inserts

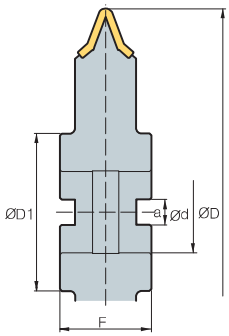
(mm)

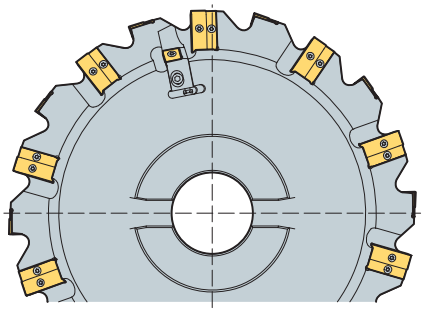
Picture	Designation		Coated				Uncoated		Dimensions					Configuration
			NC5330	PC9530	PC3500	PC5300	H01	G10	l	d	t	d_1	R	
		M6			○	◎			19	14.3	5	5.5	2.25	
		M8			○	◎			27	14.3	5.4	5.5	3	
		M10			○	◎			29	14.3	6.35	5.5	3.75	
		M12			○	◎			33	14.3	6.35	5.5	4.5	
		M14			○	◎			39	14.3	6.35	5.5	5.25	
		M16			○	◎			43	14.3	7.94	5.5	6	
		M18			○	◎			50	14.3	7.94	5.5	6.75	
		M20			○	◎			54	14.3	9.53	5.5	7.5	
		M22			○	◎			57	14.3	9.53	5.5	8.25	
		M24			○	◎			64	14.3	9.53	5.5	9	
	SNEQ	1507-C0.8			○	◎			15.875	15.875	7.94	-	-	

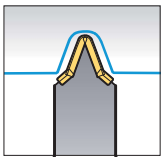
※ The above specification is subject to change according to customer related condition & Korloy technical condition

◎: 1st Rec ○: 2nd Rec

Gear Finishing Cutter
(1 Step type, Internal gear)





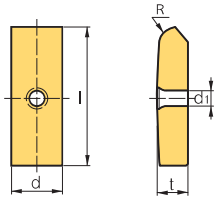
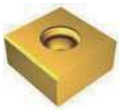
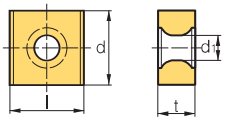


(mm)

m	⊙	ØD	Ød	ØD1	a	F
6	20	400	80	155	25	90
8	20	400	80	155	25	90
10	20	400	80	155	25	90
12	20	400	80	155	25	90
14	20	400	80	155	25	90
16	20	400	80	155	25	90
18	20	400	80	155	25	90
20	20	400	80	155	25	90
22	20	400	80	155	25	90
24	20	400	80	155	25	90

Available inserts

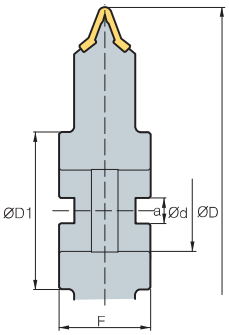
(mm)

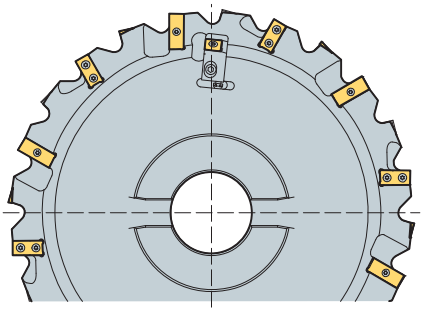
Picture	Designation		Coated				Uncoated		Dimensions					Configuration
			NC5330	PC9530	PC3500	PC5300	H01	G10	l	d	t	d1	R	
		M6			○	◎			19	14.3	5	5.5	2.25	
		M8			○	◎			27	14.3	5.4	5.5	3	
		M10			○	◎			29	14.3	6.35	5.5	3.75	
		M12			○	◎			33	14.3	6.35	5.5	4.5	
		M14			○	◎			39	14.3	6.35	5.5	5.25	
		M16			○	◎			43	14.3	7.94	5.5	6	
		M18			○	◎			50	14.3	7.94	5.5	6.75	
		M20			○	◎			54	14.3	9.53	5.5	7.5	
		M22			○	◎			57	14.3	9.53	5.5	8.25	
		M24			○	◎			64	14.3	9.53	5.5	9	
	SNEQ	1507-C0.8			○	◎			15.875	15.875	7.94	-	-	

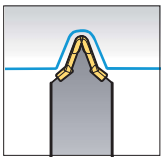
※ The above specification is subject to change according to customer related condition & Korloy technical condition

◎: 1st Rec ○: 2nd Rec

Gear Finishing Cutter
(2 Step type, Internal/Externa gear)





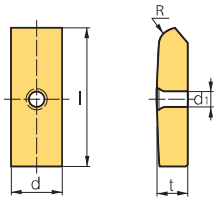
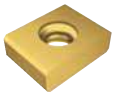
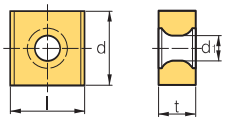
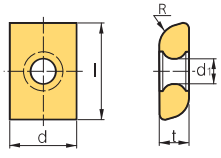


(mm)

m	⊙	ØD	Ød	ØD1	a	F
6	24	400	80	155	25	90
8	24	400	80	155	25	90
10	24	400	80	155	25	90
12	24	400	80	155	25	90
14	24	400	80	155	25	90
16	24	400	80	155	25	90
18	24	400	80	155	25	90
20	24	400	80	155	25	90
22	24	400	80	155	25	90
24	24	400	80	155	25	90

Available inserts

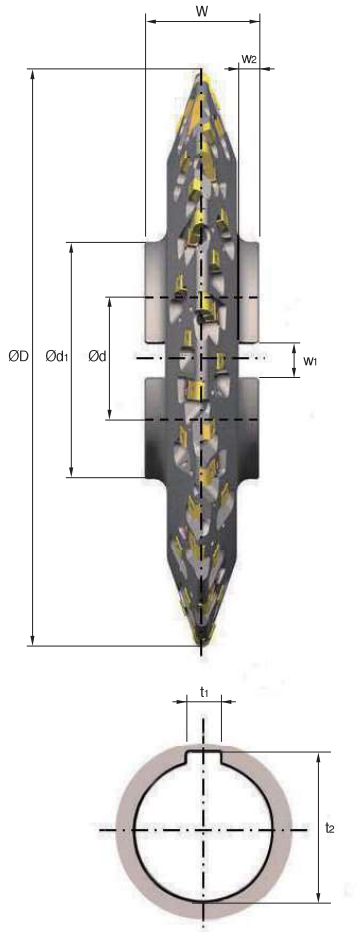
(mm)

Picture	Designation		Coated				Uncoated		Dimensions					Configuration
			NC5330	PC9530	PC3500	PC5300	H01	G10	l	d	t	d_1	R	
		M6		○		◎			19	14.3	5	5.5	2.25	
		M8		○		◎			27	14.3	5.4	5.5	3	
		M10		○		◎			29	14.3	6.35	5.5	3.75	
		M12		○		◎			33	14.3	6.35	5.5	4.5	
		M14		○		◎			39	14.3	6.35	5.5	5.25	
		M16		○		◎			43	14.3	7.94	5.5	6	
		M18		○		◎			50	14.3	7.94	5.5	6.75	
		M20		○		◎			54	14.3	9.53	5.5	7.5	
		M22		○		◎			57	14.3	9.53	5.5	8.25	
		M24		○		◎			64	14.3	9.53	5.5	9	
	SNEQ	1507-C0.8		○		◎			15.875	15.875	7.94	-	-	
		M6-2ST							19.05	11.6	3.8	4.4	2.25	
		M8-2ST							19.05	11.6	4	4.4	3	
		M10-2ST							19.05	11.6	4.76	4.4	3.75	
		M12-2ST							19.05	14.3	6.35	5.5	4.5	
		M14-2ST							25.4	14.3	6.35	5.5	5.25	
		M16-2ST							31.8	14.3	7.14	5.5	6	
		M18-2ST							31.8	14.3	7.14	5.5	6.75	
		M20-2ST							31.8	14.3	9.52	5.5	7.5	
		M22-2ST							31.8	14.3	9.52	5.5	8.25	
		M24-2ST							31.8	14.3	9.52	5.5	9	

※ The above specification is subject to change according to customer related condition & Korloy technical condition

◎: 1st Rec ○: 2nd Rec

Gear cutter order form



Cutter type

☐ **Roughing** ☐ **Semi-finishing** ☐ **Finishing**

☐ Step ☐ Low cutting resistance ☐ 1 Step

☐ V shape ☐ High rigid edge ☐ 2 Step

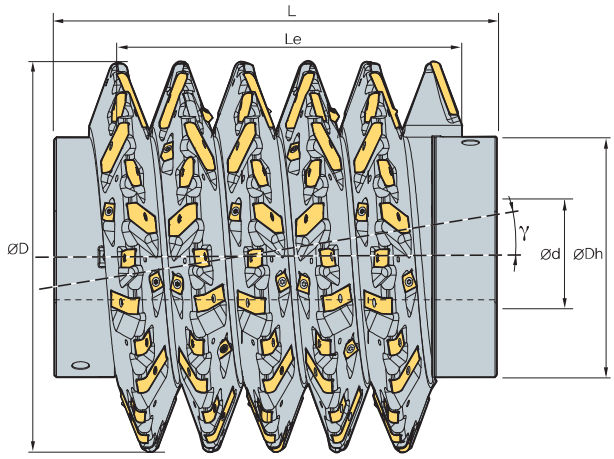
- Stock for finishing (one side) (mm):
- Outside diameter D (mm):
- Bore diameter d (mm):
- Hub diameter d1 (mm):
- Cutter width W (mm):
- Radial keyway w1 (mm):
- Radial keyway w2 (mm):
- Axial keyway t1 (mm):
- Axial keyway t2 (mm):

Involute gear data

☐ **External gear** ☐ **Internal gear** ☐ **Rack gear**

- Module M (mm):
- No.of teeth Z (mm):
- Pressure angle α (°):
- Helix angle β (°):
- Addendum modification coefficient x:
- Tip diameter da (mm):
- Root diameter d_f (mm):
- Root radius ρ_{fp} (mm)
- Base tangent length W_k (mm)
- No. of measuring teeth K:
- Dimensions/Dimension over balls M_d (mm):
- Ball diameter D_M (mm):
- Gear quality (DIN, JIS):

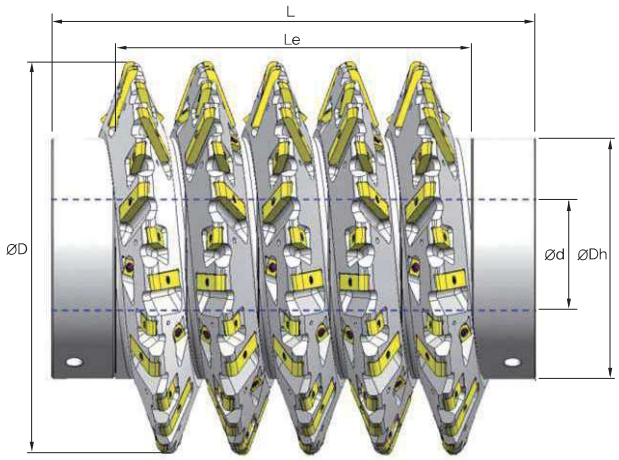
Indexable HOB



(mm)

Gear module	ØD	ØDh	Ød	No.Segm. (Pitch)	Le	Segment insert	Total insert	γ (Lead Ang.)
6	180	125	40	6	(113)	15	90	2.084
	210	125	50	6	(113)	17	102	1.763
	240	160	60	6	(113)	19	114	1.528
7	180	125	40	6	(132)	15	90	2.469
	210	125	50	6	(132)	17	102	2.084
	240	160	60	6	(132)	19	114	1.803
8	210	125	50	6	(151)	17	102	2.413
	240	160	60	6	(151)	19	114	2.084
	270	180	80	6	(151)	21	126	1.834
9	210	125	50	6	(169)	17	102	2.751
	240	160	60	6	(169)	19	114	2.372
	270	180	80	6	(169)	21	126	2.084
10	210	125	50	6	(189)	17	102	3.099
	240	160	60	6	(189)	19	114	2.666
	270	180	80	6	(189)	21	126	2.339
12	240	140	60	6	(226)	18	108	3.276
	270	180	80	6	(226)	22	132	2.866
	350	215	80	6	(226)	26	156	2.149
14	270	180	80	6	(264)	22	132	3.415
	350	215	80	6	(264)	26	156	2.547
16	270	160	80	6	(302)	22	132	3.989
	350	215	80	6	(302)	26	156	2.959
18	270	145	80	5	(283)	22	110	4.589
	350	215	80	5	(283)	26	130	3.383
20	350	215	80	5	(314)	26	130	3.823
	450	265	100	5	(314)	34	170	2.866

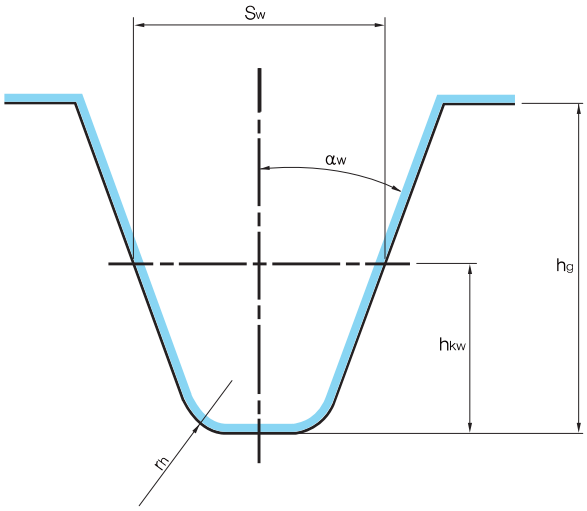
Indexable HOB



Tool SPEC.

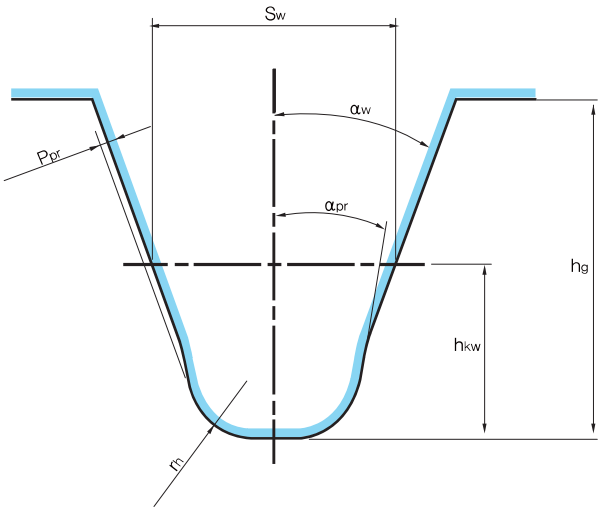
- Outside diameter ØD (mm):
- Bore diameter Ød (mm):
- Hub diameter ØDh (mm):
- Hob length L (mm):
- Cutting length Le (mm):
- Spiral direction RH/LH:
- Quality class acc. to DIN 3968:

Profile of hob [Module m6~]



- Module M (mm):
- Addendum hkw (mm):
- Tooth thickness Sw (mm):
- Tooth depth hg (mm):

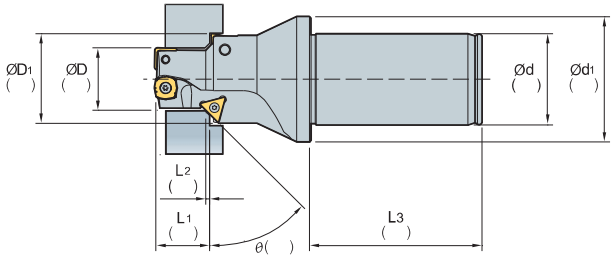
Profile of roughing hob [Module m8~]



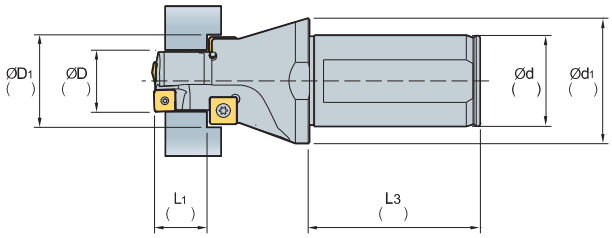
- Pressure angle αw (mm):
- Protuberance amount Ppr (mm):
- Protuberance angle αpr (mm):
- Tip radius rh (mm):

Special drill holder for multi-purpose

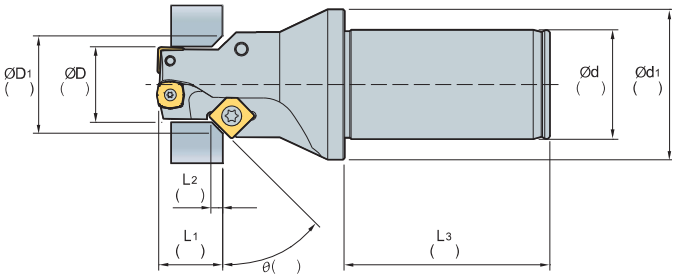
Drilling & Chamfering & Counter Boring



Drilling & Counter Boring



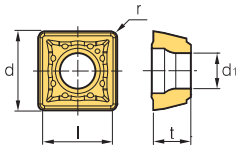
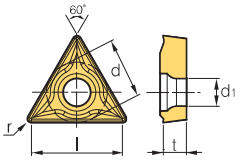
Drilling & Chamfering



※ Order-made items available outer above configulations

Available inserts

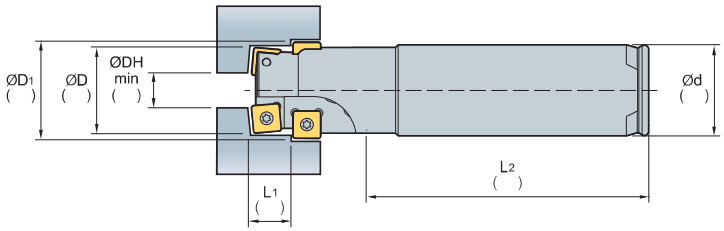
(mm)

Picture	Designation		Coated		Dimensions					Available screw	Configuration
			PC5300	PC3600	l	d	t	r	d_1		
	SPMT	050204-BC	●		4.2	5	2.48	0.4	2.25	FTNA0204	
		060204-BC	●		5.2	6	2.48	0.4	2.61	FTNA02205	
		07T308-BC	●		6.34	7.94	3.97	0.8	2.85	FTKA02565	
		090408-BC	●		7.9	9.525	4.3	0.8	4.05	FTNA03508	
		110408-BC	●		9.9	11.5	5	0.8	4.45	FTKA0408	
		120408-BC	●		11.1	12.7	5	0.8	4.45	FTKA0408	
		140512-BC	●		11.9	14.3	5.4	1.2	5.75	FTNA0510	
	TCMT	090204-MP			8.6	5.56	2.38	0.4	2.50	FTKA02206	
		090208-MP			7.6	5.56	2.38	0.8	2.50	FTKA02206	
		110202-MP			10.5	6.35	2.38	0.2	2.80	FTKA2565	
		110204-MP			10.0	6.35	2.38	0.4	2.80	FTKA2565	
		110208-MP	●		9.0	6.35	2.38	0.8	2.80	FTKA2565	
		16T304-MP	●		15.5	9.525	3.97	0.4	4.40	FTGA3512	
		16T308-MP	●		14.5	9.525	3.97	0.8	4.40	FTGA3512	

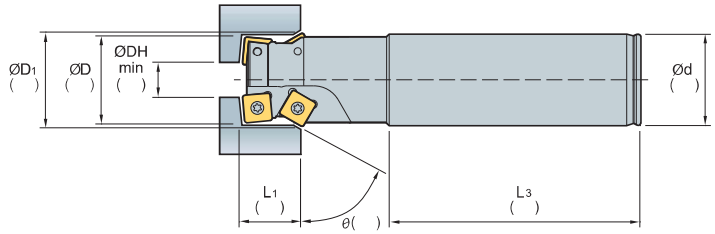
● Stock item

Special Boring holder for multi-purpose

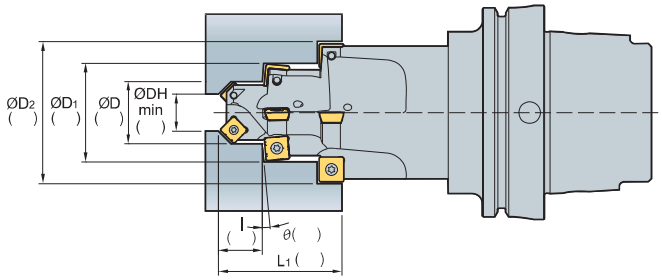
Boring & Counter Boring



Boring & Chamfering



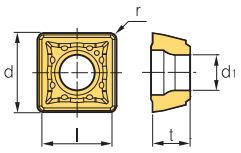
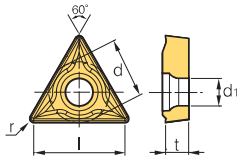
Boring & Chamfering & Counter Boring



※ Order-made items available outer above configulations

Available inserts

(mm)

Picture	Designation		Coated		Dimensions					Available screw	Configuration
			PC5300	PC3600	l	d	t	r	d_1		
	SPMT	050204-BC	●		4.2	5	2.48	0.4	2.25	FTNA0204	
		060204-BC	●		5.2	6	2.48	0.4	2.61	FTNA02205	
		07T308-BC	●		6.34	7.94	3.97	0.8	2.85	FTKA02565	
		090408-BC	●		7.9	9.525	4.3	0.8	4.05	FTNA03508	
		110408-BC	●		9.9	11.5	5	0.8	4.45	FTKA0408	
		120408-BC	●		11.1	12.7	5	0.8	4.45	FTKA0408	
		140512-BC	●		11.9	14.3	5.4	1.2	5.75	FTNA0510	
	TCMT	090204-MP			8.6	5.56	2.38	0.4	2.50	FTKA02206	
		090208-MP			7.6	5.56	2.38	0.8	2.50	FTKA02206	
		110202-MP			10.5	6.35	2.38	0.2	2.80	FTKA2565	
		110204-MP			10.0	6.35	2.38	0.4	2.80	FTKA2565	
		110208-MP	●		9.0	6.35	2.38	0.8	2.80	FTKA2565	
		16T304-MP	●		15.5	9.525	3.97	0.4	4.40	FTGA3512	
		16T308-MP	●		14.5	9.525	3.97	0.8	4.40	FTGA3512	

● Stock item