
APX3000 / 4000

A NEW GENERATION OF
HIGH PERFORMANCE CUTTERS

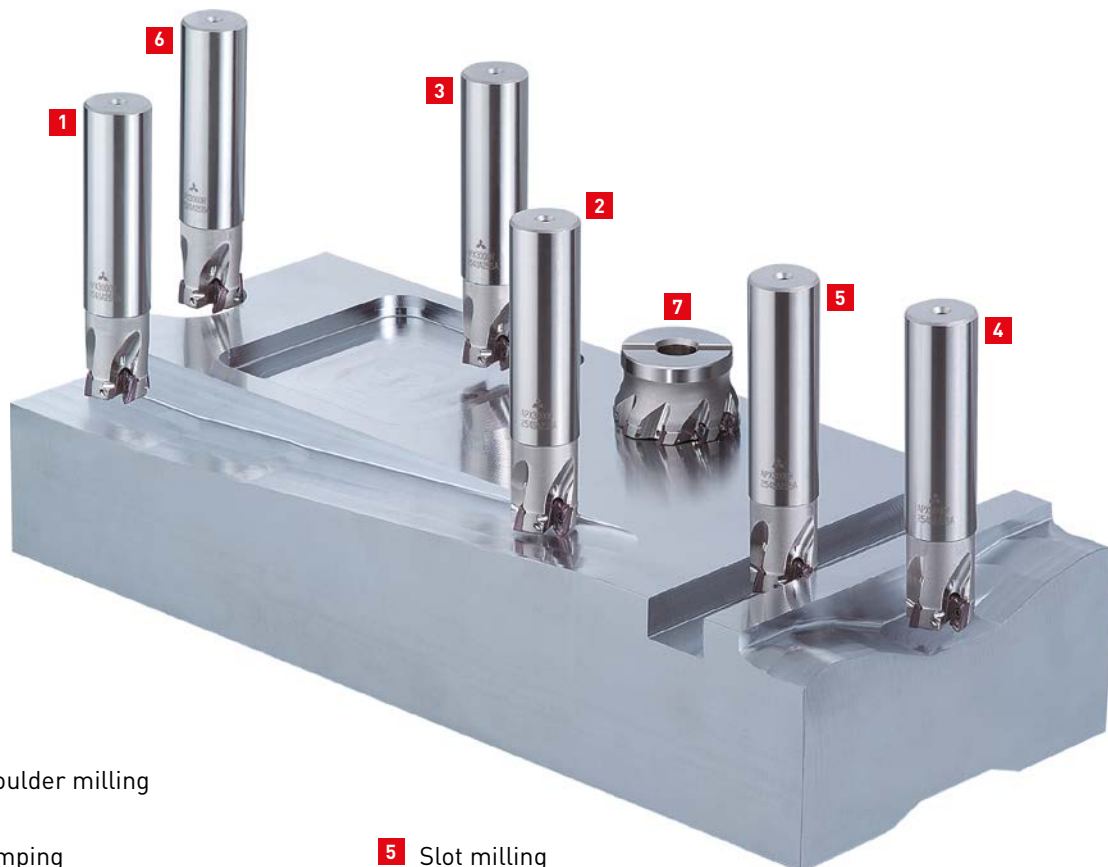


APX3000 / 4000

MULTI-FUNCTIONAL MILLING CUTTER

MULTI-FUNCTIONAL

The APX is highly effective in various 3D machining operations including excellent ramping capabilities.



- 1** Shoulder milling
- 2** Ramping
- 3** Pocket milling
- 4** 3D Profile milling
- 5** Slot milling
- 6** Helical milling
- 7** Face milling

HIGH RIGIDITY CUTTER BODIES

Rigidity has been increased by using a larger amount of backing metal behind the insert. Resistance to corrosion and abrasion on the cutter bodies made possible by using a superior highly heat resistant alloy and a special surface treatment. The cutter bodies are designed with through coolant holes to improve cooling and chip disposal.



EFFECTIVE DEEP HOLE MACHINING

APX3000/4000, an extra long shank type is now available for difficult to reach applications.

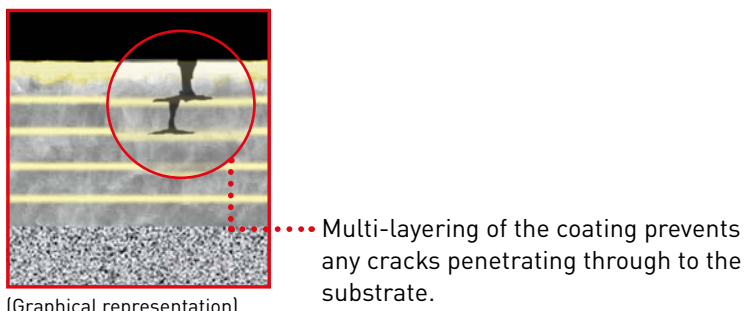
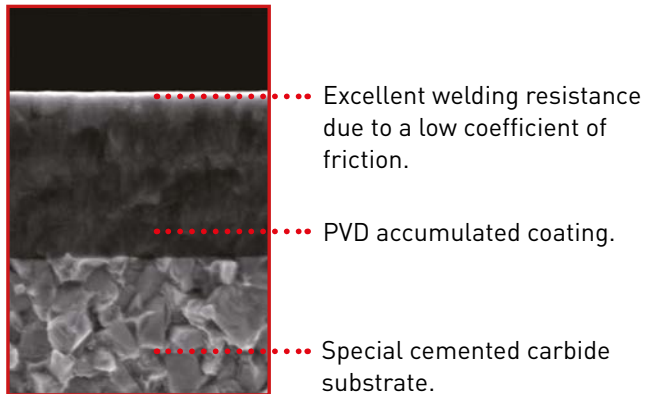
(Long, extra long shank type)



(Standard shank type)

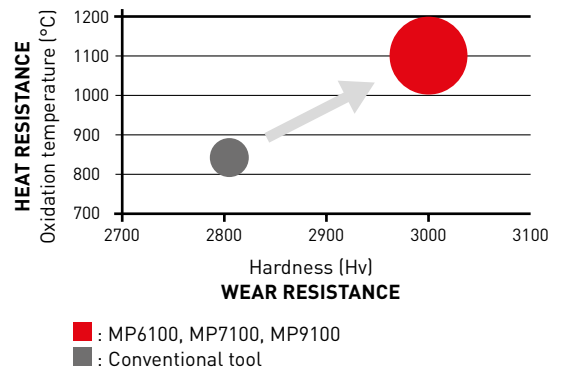
MP6100, MP7100, MP9100 – WITH ACCUMULATED Al-Ti-Cr-N BASED PVD COATING

PVD coatings have properties such as toughness, low coefficient of friction and excellent welding, wear and heat resistance. This results in tough, precision grades such as MP6100, MP7100 and MP9100.



TOUGH-Σ Technology

A fusion of the separate coating technologies; PVD and multi-layering realizes extra toughness.



INSERT GRADES FOR A WIDE RANGE OF MATERIALS

APPLICATION RANGE									
P	M				K	S	N	H	
P10	MP6120	VP15TF	M10	VP15TF	K10	MC5020	S10	N10	H10
P20	MP6130	VP20RT	M20	MP7130	K20	MX3030	S20	N20	H20
P30	MP6130	VP20RT	M30	VP20RT	K30	VP15TF	S30	N30	H30
P40			M40	VP20RT	K40	VP20RT	S40	N40	H40

MP6120
For general milling of steel

MP6130
For interrupted milling of steel

MP7130
For stable milling of stainless steel

MC5020
For general milling of cast iron

MX3030 – CERMET GRADE

MX3030 has higher thermal conductivity than conventional products and has excellent thermal cracking resistance. Therefore, it is possible to suppress wear and maintain the surface finish.

MP9120
For general milling of HRSA and titanium alloy

MP9130
For interrupted general milling of HRSA and titanium alloy

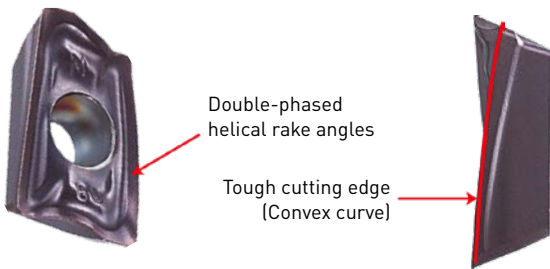
TF15
For general milling of aluminium

VP15TF
Stable machining properties are enabled when the coating is combined with a high wear and fracture resistant carbide substrate

VP20RT
Ideal for heavy interrupted cutting of stainless and general steels because of the excellent fracture resistance properties

LOW CUTTING RESISTANCE INSERTS

Advanced simulation technology has been utilized to develop the inserts. Efficient machining on low rigidity machines and workpieces is now possible and is ideal for thin wall or extended reach applications.



INSERT SIZE

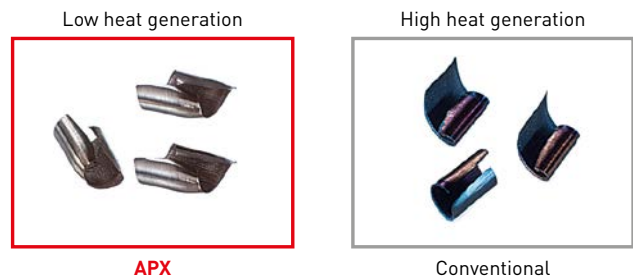
APX4000		APX3000	
15 mm	Max. depth of cut	10 mm	Max. depth of cut

IDEAL HEAT DISPOSAL AND CHIP CONTROL

Heat generated during cutting has been reduced due to the APX's special geometry. Ideal chip shape formed by the insert for easy disposal.

CUTTING CONDITIONS

Material	1.7225
Tool	APX3000R254SA25SA
Insert	AOMT123608PEER-M
Grade	VP15TF
Vc (m/min)	150
fz (mm/t.)	0.15
ap (mm)	6.0
ae (mm)	6.0



INSERT CHIP BREAKER

General use M-Breaker (APX3000, APX4000)	Strong cutting edge type H-Breaker (APX3000, APX4000)	For aluminum alloy (ground & polished) GM-Breaker (APX3000)
Rake angle: 25°	Rake angle: 7°	Rake angle: 25°

Rake angle when the insert is set in the cutter body.

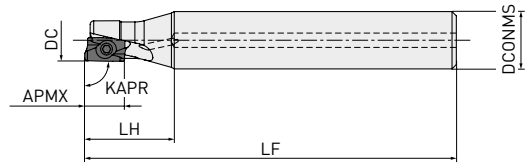
APX3000



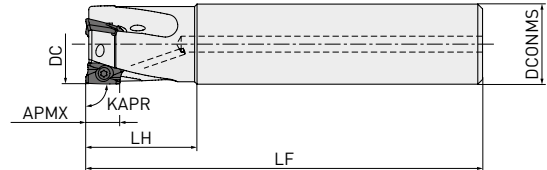
MULTI-FUNCTIONAL MILLING



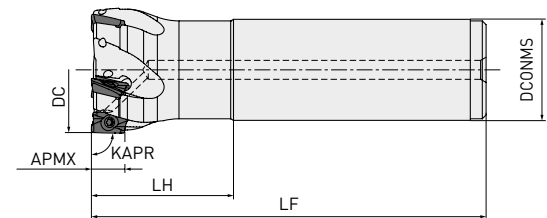
1



2



3



Right hand tool holder only

SHANK TYPE



Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	RMPX	RPMX	ZEFP	Type		
APX3000R121SA16SA	●	12	16	85	25	0.10	10	6.0°	10500	1	1	●	AO-T12
APX3000R141SA16SA	●	14	16	85	25	0.11	10	6.0°	9000	1	1	●	AO-T12
APX3000R162SA16SA	●	16	16	85	25	0.11	10	11.3°	20900	2	2	●	AO-T12
APX3000R182SA16SA	●	18	16	85	25	0.11	10	8.6°	19600	2	3	●	AO-T12
APX3000R182SA16LA	●	18	16	120	25	0.16	10	8.6°	19600	2	3	●	AO-T12
APX3000R182SA16ELA	●	18	16	180	25	0.25	10	8.6°	19600	2	3	●	AO-T12
APX3000R202SA20SA	●	20	20	100	30	0.21	10	6.9°	18500	2	2	●	AO-T12
APX3000R203SA20SA	●	20	20	100	30	0.21	10	6.9°	18500	3	2	●	AO-T12
APX3000R202SA20LA	●	20	20	150	60	0.32	10	6.9°	18500	2	2	●	AO-T12
APX3000R202SA20ELA	●	20	20	200	70	0.42	10	6.9°	18500	2	2	●	AO-T12
APX3000R223SA20SA	●	22	20	115	30	0.25	10	5.7°	17600	3	3	●	AO-T12
APX3000R222SA20LA	●	22	20	150	30	0.34	10	5.7°	17600	2	3	●	AO-T12
APX3000R222SA20ELA	●	22	20	200	30	0.45	10	5.7°	17600	2	3	●	AO-T12
APX3000R252SA25SA	●	25	25	115	35	0.38	10	4.6°	16400	2	2	●	AO-T12
APX3000R253SA25SA	●	25	25	115	35	0.38	10	4.6°	16400	3	2	●	AO-T12
APX3000R254SA25SA	●	25	25	115	35	0.38	10	4.6°	16400	4	2	●	AO-T12
APX3000R252SA25LA	●	25	25	170	70	0.51	10	4.6°	16400	2	2	●	AO-T12
APX3000R253SA25LA	●	25	25	170	70	0.51	10	4.6°	16400	3	2	●	AO-T12
APX3000R252SA25ELA	●	25	25	220	80	0.75	10	4.6°	16400	2	2	●	AO-T12
APX3000R253SA25ELA	●	25	25	220	80	0.75	10	4.6°	16400	3	2	●	AO-T12

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1. When using inserts with corner radius RE>2.4, machining of the holder is required as shown on page 10.
2. The maximum allowable spindle speeds are set to ensure tool and insert stability.
3. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.



APX3000 – MULTI-FUNCTIONAL MILLING – SHANK TYPE

Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	RMPX	RPMX	ZEFP	Type		
APX3000R284SA25SA	●	28	25	115	35	0.40	10	3.8°	15500	4	3	●	AO-T12
APX3000R282SA25LA	●	28	25	170	35	0.61	10	3.8°	15500	2	3	●	AO-T12
APX3000R283SA25LA	●	28	25	170	35	0.61	10	3.8°	15500	3	3	●	AO-T12
APX3000R282SA25ELA	●	28	25	220	35	0.80	10	3.8°	15500	2	3	●	AO-T12
APX3000R283SA25ELA	●	28	25	220	35	0.79	10	3.8°	15500	3	3	●	AO-T12
APX3000R304SA32SA	●	30	32	125	45	0.64	10	3.4°	14900	4	2	●	AO-T12
APX3000R323SA32SA	●	32	32	125	45	0.68	10	3.1°	14400	3	2	●	AO-T12
APX3000R324SA32SA	●	32	32	125	45	0.67	10	3.1°	14400	4	2	●	AO-T12
APX3000R325SA32SA	●	32	32	125	45	0.68	10	3.1°	14400	5	2	●	AO-T12
APX3000R322SA32LA	●	32	32	190	90	1.07	10	3.1°	14400	2	2	●	AO-T12
APX3000R323SA32LA	●	32	32	190	90	1.05	10	3.1°	14400	3	2	●	AO-T12
APX3000R322SA32ELA	●	32	32	260	100	1.47	10	3.1°	14400	2	2	●	AO-T12
APX3000R323SA32ELA	●	32	32	260	100	1.45	10	3.1°	14400	3	2	●	AO-T12
APX3000R352SA32LA	●	35	32	190	45	1.12	10	2.7°	13700	2	3	●	AO-T12
APX3000R353SA32LA	●	35	32	190	45	1.11	10	2.7°	13700	3	3	●	AO-T12
APX3000R352SA32ELA	●	35	32	260	45	1.53	10	2.7°	13700	2	3	●	AO-T12
APX3000R353SA32ELA	●	35	32	260	45	1.52	10	2.7°	13700	3	3	●	AO-T12
APX3000R403SA32SA	●	40	32	125	45	0.75	10	2.2°	12800	3	3	●	AO-T12
APX3000R405SA32SA	●	40	32	125	45	0.75	10	2.2°	12800	5	3	●	AO-T12
APX3000R406SA32SA	●	40	32	125	45	0.76	10	2.2°	12800	6	3	●	AO-T12
APX3000R507SA32SA	●	50	32	125	45	0.90	10	1.7°	11300	7	3	●	AO-T12
APX3000R638SA32SA	●	63	32	125	45	1.04	10	1.3°	10000	8	3	●	AO-T12

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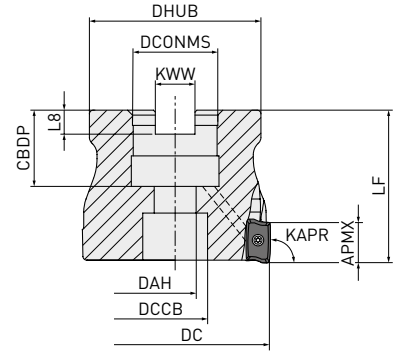
1. When using inserts with corner radius $RE > 2.4$, machining of the holder is required as shown on page 10.
2. The maximum allowable spindle speeds are set to ensure tool and insert stability.
3. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.



APX3000



MULTI-FUNCTIONAL MILLING



Right hand tool holder only

DC	Set bolt	Geometry
Ø32, Ø40	HSC08030H	
Ø50, Ø63	HSC10030H	
Ø80	HSC12035H	
Ø100	HSC16040H	

ARBOR TYPE

Order number	Stock	DC	DCONMS	LF	WT	APMX	RMPX	RPMX	ZEFP		
APX3000-032A05RA	●	32	16	40	0.2	10	3.1°	14400	5	●	AO-T12
APX3000-040A06RA	●	40	16	40	0.3	10	2.2°	12800	6	●	AO-T12
APX3000-050A07RA	●	50	22	40	0.4	10	1.7°	11300	7	●	AO-T12
APX3000-063A08RA	●	63	22	40	0.7	10	1.3°	10000	8	●	AO-T12
APX3000R08009CA	●	80	25.4	50	1.3	10	1.0°	8800	9	●	AO-T12
APX3000-080A09RA	●	80	27	50	1.3	10	1.0°	8800	9	●	AO-T12
APX3000R10011DA	●	100	31.75	63	2.2	10	0.8°	7800	11	●	AO-T12
APX3000-100A11RA	●	100	32	63	2.2	10	0.8°	7800	11	●	AO-T12

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1. When using inserts with corner radius RE>2.4, machining of the holder is required as shown on page 10.
2. The maximum allowable spindle speeds are set to ensure tool and insert stability.
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APX3000 – MULTI-FUNCTIONAL MILLING – SHANK TYPE / ARBOR TYPE

MOUNTING DIMENSIONS

Order number	DC	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
APX3000-032A05RA	32	16	18	9	14	30	8.4	5.6
APX3000-040A06RA	40	16	18	9	14	34	8.4	5.6
APX3000-050A07RA	50	22	20	11	17	45	10.4	6.3
APX3000-063A08RA	63	22	20	11	17	55	10.4	6.3
APX3000R08009CA	80	25.4	26	13	20	70	9.5	6
APX3000-080A09RA	80	27	23	13	20	70	12.4	7
APX3000R10011DA	100	31.75	32	17	26	80	12.7	8
APX3000-100A11RA	100	32	26	17	26	80	14.4	8

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SPARE PARTS

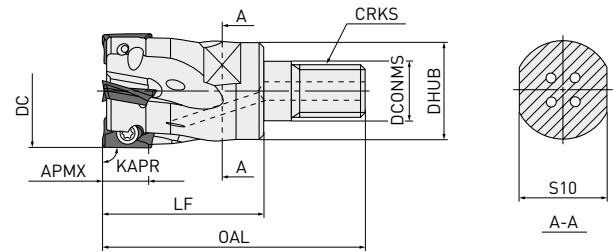
DC	Tool holder type	DC	Tool holder type	 Clamp screw *	 Wrench	 Anti-seize-lubricant
12	APX3000R12	14	APX3000R14	TPS25	TIP07F	MK1KS
16	APX3000R16	18	APX3000R18	TPS25	TIP07F	MK1KS
20	APX3000R20	—	—	TPS25	TIP07F	MK1KS
22	APX3000R22	25	APX3000R25	TPS25-1	TIP07F	MK1KS
28	APX3000R28	30	APX3000R30	TPS25-1	TIP07F	MK1KS
32	APX3000R32	32	APX3000-032	TPS25-1	TIP07F	MK1KS
35	APX3000R35	—	—	TPS25-1	TIP07F	MK1KS
40	APX3000R40	40	APX3000-040	TPS25-1	TIP07F	MK1KS
50	APX3000R50	50	APX3000-050	TPS25-1	TIP07F	MK1KS
63	APX3000R63	63	APX3000-063	TPS25-1	TIP07F	MK1KS
80	APX3000R080	80	APX3000-080	TPS25-1	TIP07F	MK1KS
100	APX3000R100	100	APX3000-100	TPS25-1	TIP07F	MK1KS

* Clamp Torque (N • m): TPS25 = 1.0, TPS25 - 1 = 1.0

APX3000 90° KAPR


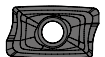
MULTI-FUNCTIONAL MILLING

P M N S K H



Right hand tool holder only

SCREW-IN TYPE




Order number	Stock	DC	DCONMS	DHUB	OAL	LF	S10	CRKS	WT	APMX	RMPX	ZEPF		
APX3000R162M08A30	●	16	8.5	13	48	30	10	M8	0.1	10	11.3°	2	●	AO-T12
APX3000R182M08A30	●	18	8.5	13	48	30	10	M8	0.1	10	8.6°	2	●	AO-T12
APX3000R203M10A30	●	20	10.5	18	49	30	14	M10	0.1	10	6.9°	3	●	AO-T12
APX3000R223M10A30	●	22	10.5	18	49	30	14	M10	0.1	10	5.7°	3	●	AO-T12
APX3000R254M12A35	●	25	12.5	21	57	35	19	M12	0.2	10	4.6°	4	●	AO-T12
APX3000R284M12A35	●	28	12.5	21	57	35	19	M12	0.2	10	3.8°	4	●	AO-T12
APX3000R304M16A40	●	30	17	29	63	40	24	M16	0.3	10	3.4°	4	●	AO-T12
APX3000R325M16A40	●	32	17	29	63	40	24	M16	0.3	10	3.1°	5	●	AO-T12
APX3000R355M16A40	●	35	17	29	63	40	24	M16	0.3	10	2.7°	5	●	AO-T12
APX3000R406M16A40	●	40	17	29	63	40	24	M16	0.3	10	2.2°	6	●	AO-T12

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1. When using inserts with corner radius RE>2.4, machining of the holder is required as shown on page 10.
2. For screw-in type arbors, refer to page 31.



SPARE PARTS

Tool holder type	DC			
		Clamp screw *	Wrench	Anti-seize-lubricant
APX3000R16	16	TPS25	TIP07F	MK1KS
APX3000R18	18	TPS25	TIP07F	MK1KS
APX3000R20	20	TPS25	TIP07F	MK1KS
APX3000R22	22	TPS25-1	TIP07F	MK1KS
APX3000R25	25	TPS25-1	TIP07F	MK1KS
APX3000R28	28	TPS25-1	TIP07F	MK1KS
APX3000R30	30	TPS25-1	TIP07F	MK1KS
APX3000R32	32	TPS25-1	TIP07F	MK1KS
APX3000R35	35	TPS25-1	TIP07F	MK1KS
APX3000R40	40	TPS25-1	TIP07F	MK1KS

* Clamp Torque (N • m): TPS25 = 1.0, TPS25 - 1 = 1.0

APX3000

INSERTS

Order number	Class	Edge preparation	Coated							*1	*2	L	LE	W1	S	BS	RE	Geometry
			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF									
P	Steel		◆	◆				◆	◆	◆								
M	Stainless steel				◆			◆	◆	◆								
K	Cast iron		◆					◆	◆	◆								
N	Non-ferrous material					◆												
S	Heat-resistant alloy, Titanium alloy					◆	◆	◆										
H	Hardened steel							◆										

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.																		
Edge preparation: E: Round F: Sharp																		
Coated																		
Order number	Class	Edge preparation	Coated							*1	*2	L	LE	W1	S	BS	RE	Geometry
			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF									
AOMT123602PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	1.8	0.2	General M
AOMT123604PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	1.6	0.4	
AOMT123608PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	1.2	0.8	
AOMT123610PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	1.0	1.0	
AOMT123612PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	0.8	1.2	
AOMT123616PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	1.6	
AOMT123620PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	2.0	
AOMT123624PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	2.4	
AOMT123630PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	3.0	
AOMT123632PEER-M	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	3.2	
AOMT123604PEER-H	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	1.6	0.4	Strong Cutting Edge Type H
AOMT123608PEER-H	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	1.2	0.8	
AOMT123616PEER-H	M	E	●	●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	1.6	
AOGT123602PEFR-GM	G	F									●	12	10	6.6	3.6	1.8	0.2	For Machining of Aluminium Alloys GM
AOGT123604PEFR-GM	G	F									●	12	10	6.6	3.6	1.6	0.4	
AOGT123608PEFR-GM	G	F									●	12	10	6.6	3.6	1.2	0.8	

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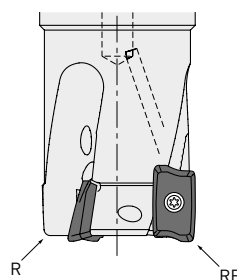
*1: Cermet

*2: Carbide

1. Please note that the corner radius RE is different from the workpiece material of R shape depending on the axial rake angle of the body. For more information, please contact our sales offices.

NOTE ON USE OF INSERTS WITH LARGE CORNER RADII

When using inserts with corner radius RE > R2.4, please machine the holder with a radius form as shown on the right.



RE (mm)	R
2.4	1.9
3.0	2.5
3.2	2.7

R: Holder end radius
RE: Insert corner radius

APX3000

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

Material	Properties	Insert		M	H	ae			
		Grade				≤0.25DC	0.25 – 0.5DC	0.5 – 0.75DC	DC (Slot)
		1st	2nd						
P	Mild steel ≤180HB	MP6120	VP15TF	M	H	230 (180 – 270)	220 (170 – 260)	180 (140 – 210)	180 (140 – 210)
		MP6130	VP20RT	M	H	200 (150 – 240)	190 (140 – 230)	150 (110 – 180)	150 (110 – 180)
		MX3030	—	M	—	160 (120 – 200)	150 (110 – 190)	120 (100 – 150)	—
P	Carbon steel Alloy steel 180 – 350HB	MP6120	VP15TF	M	H	180 (140 – 210)	170 (130 – 200)	140 (110 – 160)	140 (110 – 160)
		MP6130	VP20RT	M	H	150 (110 – 180)	140 (100 – 170)	110 (80 – 130)	110 (80 – 130)
		MX3030	—	M	—	140 (100 – 180)	130 (90 – 170)	100 (80 – 150)	—
M	Stainless steel ≤270HB	MP7130	VP20RT	M	H	180 (140 – 210)	170 (130 – 200)	140 (110 – 160)	140 (110 – 160)
		MX3030	—	M	—	120 (80 – 140)	110 (80 – 130)	100 (80 – 120)	—
K	Gray cast iron ≤350MPa	MC5020	VP15TF	H	—	250 (200 – 300)	240 (190 – 290)	210 (160 – 260)	140 (110 – 160)
		MX3030	—	M	—	120 (80 – 140)	110 (80 – 130)	100 (80 – 120)	—
	Ductile cast iron ≤800MPa	MC5020	VP15TF	H	—	130 (100 – 150)	120 (90 – 140)	100 (80 – 120)	100 (80 – 120)
		MX3030	—	M	—	120 (80 – 140)	110 (80 – 130)	100 (80 – 120)	—
N	Aluminum alloy —	TF15	MP9120	GM	M	500 (200 – 1000)	500 (200 – 1000)	500 (200 – 1000)	500 (200 – 1000)
S	Titanium alloy ≤350HB	MP9120	VP15TF	M	H	50 (40 – 70)	—	—	50 (40 – 70)
		MP9130	VP20RT	M	H	40 (30 – 60)	—	—	40 (30 – 60)
	Heat resistant alloy —	MP9120	VP15TF	M	H	40 (30 – 60)	—	—	40 (30 – 60)
		MP9130	VP20RT	M	H	30 (20 – 40)	—	—	30 (20 – 40)
H	Hardened steel 40 – 55HRC	VP15TF	—	H	—	90 (70 – 100)	85 (60 – 100)	70 (50 – 80)	70 (50 – 80)

APX3000

RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT/FEED PER TOOTH

Material	Properties	ae	DC					
			Ø 12 - Ø 16		Ø 18 - Ø 25		Ø 28 - Ø 100	
			ap	fz	ap	fz	ap	fz
P Mild steel Carbon steel Alloy steel	≤180HB	≤0.25DC	≤4	0.15	≤5	0.25	≤5	0.20
			4 - 7	0.10	5 - 7	0.20	5 - 7	0.15
			—	—	7 - 8.5	0.15	7 - 8.5	0.10
		—	—	8.5 - 10	0.10	8.5 - 10	0.07	
		≤2	0.15	≤3	0.25	≤3	0.20	
		2 - 5	0.10	3 - 5.5	0.20	3 - 5.5	0.15	
	180 - 350HB	0.25 - 0.5DC	—	—	5.5 - 8	0.15	5.5 - 8	0.10
			—	—	8 - 10	0.10	8 - 10	0.07
			≤4	0.10	≤4	0.15	≤3	0.10
	0.5 - 0.75DC	—	—	4 - 10	0.10	3 - 7	0.07	
		≤3	0.10	≤4	0.10	≤3	0.10	
		—	—	4 - 7	0.07	3 - 5	0.07	
M Stainless steel	≤270HB	≤0.25DC	≤4	0.15	≤5	0.20	≤5	0.20
			4 - 7	0.10	5 - 7	0.15	5 - 7	0.15
			—	—	7 - 8.5	0.10	7 - 8.5	0.10
		—	—	8.5 - 10	0.07	8.5 - 10	0.07	
		≤2	0.15	≤3	0.20	≤3	0.20	
		2 - 5	0.10	3 - 5.5	0.15	3 - 5.5	0.15	
	0.25 - 0.5DC	—	—	5.5 - 8	0.10	5.5 - 8	0.10	
		—	—	8 - 10	0.07	8 - 10	0.07	
		≤4	0.10	≤4	0.10	≤3	0.10	
	0.5 - 0.75DC	—	—	4 - 10	0.07	3 - 7	0.07	
		≤3	0.10	≤4	0.10	≤3	0.10	
		—	—	4 - 7	0.07	3 - 5	0.07	
K Gray cast iron	Tensile Strength ≤350MPa	≤0.25DC	≤4	0.15	≤5	0.25	≤5	0.20
			4 - 7	0.10	5 - 7	0.20	5 - 7	0.15
			—	—	7 - 8.5	0.15	7 - 8.5	0.10
		—	—	8.5 - 10	0.10	8.5 - 10	0.07	
		≤2	0.15	≤3	0.25	≤3	0.20	
		2 - 5	0.10	3 - 5.5	0.20	3 - 5.5	0.15	
	0.25 - 0.5DC	—	—	5.5 - 8	0.15	5.5 - 8	0.10	
		—	—	8 - 10	0.10	8 - 10	0.07	
		≤4	0.10	≤4	0.15	≤3	0.10	
	0.5 - 0.75DC	—	—	4 - 10	0.10	3 - 7	0.07	
		≤3	0.10	≤4	0.10	≤3	0.10	
		—	—	4 - 7	0.07	3 - 5	0.07	

1/2

- These cutting conditions are a guide to the standard shank type and the arbor type. Please make adjustments according to the machining conditions.
- Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
 - When using the long shank type and extra long shank type.
 - When using long tool overhang with the standard or arbor type.
 - When the application has poor clamping rigidity or when using a low rigidity machine.
- In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
- For heavy interrupted and unstable cutting, the H breaker is first recommendation.

APX3000 – DEPTH OF CUT/FEED PER TOOTH

Material	Properties	ae	DC									
			Ø 12 – Ø 16		Ø 18 – Ø 25		Ø 28 – Ø 100					
			ap	fz	ap	fz	ap	fz				
K	Ductile cast iron	Tensile Strength <800MPa	≤0.25DC	≤4	0.10	≤5	0.20	≤5	0.20			
				4 – 7	0.07	5 – 7	0.15	5 – 7	0.15			
				—	—	7 – 8.5	0.10	7 – 8.5	0.10			
			0.25 – 0.5DC	—	—	8.5 – 10	0.07	8.5 – 10	0.07			
				≤2	0.10	≤3	0.20	≤3	0.20			
				2 – 5	0.07	3 – 5.5	0.15	3 – 5.5	0.15			
			0.5 – 0.75DC	—	—	5.5 – 8	0.10	5.5 – 8	0.10			
				—	—	8 – 10	0.07	8 – 10	0.07			
				≤4	0.07	≤4	0.10	≤3	0.10			
			DC (Slot)	—	—	4 – 10	0.07	3 – 7	0.07			
<3	0.07	≤4		0.10	≤3	0.10						
N	Aluminum alloy	—	≤0.25DC	≤4	0.15	≤4	0.25	<4	0.20			
				4 – 7	0.10	4 – 7	0.15	4 – 7	0.10			
			0.25 – 0.5DC	≤4	0.15	≤4	0.20	<4	0.20			
				4 – 7	0.10	4 – 7	0.10	4 – 7	0.10			
			0.5 – 0.75DC	≤5	0.10	≤5	0.15	<5	0.10			
			DC (Slot)	≤5	0.10	≤5	0.20	<5	0.15			
			S	Titanium alloy	<350HB	≤0.25DC	≤4	0.15	≤4	0.15	≤4	0.10
							4 – 7	0.10	4 – 7	0.10	4 – 7	0.07
						0.25 – 0.5DC	≤3	0.05	≤3	0.05	≤3	0.05
				Heat resistant alloy	—	0.5 – 0.75DC	≤2	0.10	≤2	0.05	≤2	0.05
DC (Slot)	≤1	0.05				≤1	0.05	≤1	0.05			
H	Hardened steel	40 – 55HRC				≤0.25DC	≤4	0.10	≤5	0.15	≤5	0.15
			4 – 7	0.07	5 – 7		0.10	5 – 7	0.10			
			0.25 – 0.5DC	—	—	7 – 8.5	0.07	—	—			
				≤2	0.10	≤3	0.15	≤3	0.15			
				2 – 5	0.07	3 – 5.5	0.10	—	—			
0.5 – 0.75DC	≤4	0.07	≤4	0.07	≤3	0.07						
DC (Slot)	≤3	0.07	≤4	0.07	≤3	0.07						

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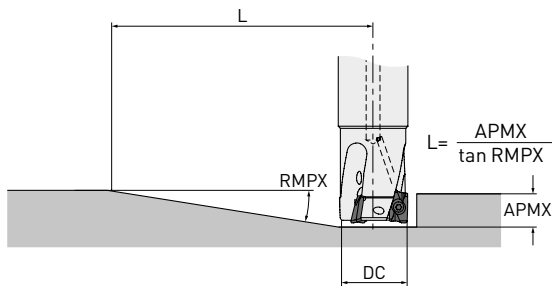
- These cutting conditions are a guide to the standard shank type and the arbor type.
Please make adjustments according to the machining conditions.
- Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
When using the long shank type and extra long shank type.
When using long tool overhang with the standard or arbor type.
When the application has poor clamping rigidity or when using a low rigidity machine.
- In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
- For heavy interrupted and unstable cutting, the H breaker is first recommendation.

APX3000

RAMPING/HELICAL CUTTING

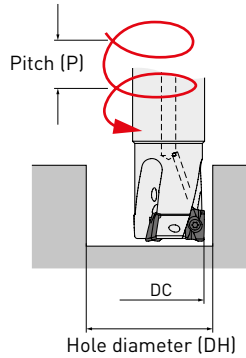
1 Ramping

Refer to the table below for cutting conditions.
For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

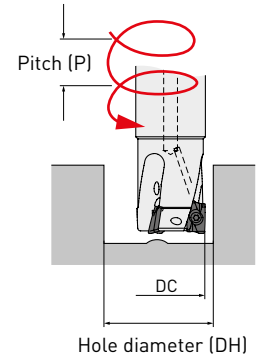


2 Helical cutting

2.1 Blind holes, flat bottom



2.2 Through holes



DC	1		2.1				2.2	
	RMPX	L*1	DH max.*2	P max.	DH min	P max.	DH min	P max.
12	6.0°	95	22	2.5	20.5	2	14	0.5
14	6.0°	95	26	2.5	24.5	2	18	1
16	11.3°	50	30	9	28	7	21	2
18	8.6°	66	34	5	32	4.5	25	2
20	6.9°	83	38	5	36	4.5	29	2
22	5.7°	100	42	5	40	4.5	33	2
25	4.6°	124	48	6	46	5	39	3
28	3.8°	151	54	4.5	52	4	45	2
30	3.4°	168	58	4.5	56	4	49	2
32	3.1°	185	62	4.5	60	4	53	2
35	2.7°	212	68	4	66	3.5	59	2
40	2.2°	260	78	4	76	3.5	69	2
50	1.7°	337	98	2	96	2	89	2
63	1.3°	441	124	2	122	2	115	2
80	1.0°	573	158	2	156	2	149	2
100	0.8°	716	198	1	196	1	189	1

1. When machining highly ductile materials with ramping angles above, chips could be continuous.
In this case, decrease the ramping angle or feed per tooth.

*1 L (=10 / tan α). Cutters' moving distance until depth of cut reaches 10 mm at a maximum ramping angle.

*2 In case corner radius of 0.8 mm. Other than that, find with the below formula.
{(cutting edge diameter DC) - (corner radius) - 0.2} × 2

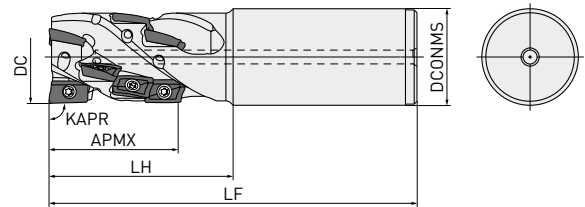
APX3000



DEEP SHOULDER MILLING

P M N S K

LONG CUTTING EDGE



Right hand tool holder only

SHANK TYPE

Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	ZNF	ZNP		
APX3KR2004SN20S028A	●	20	20	125	45	0.27	28	1	4	—	AO-T12
APX3KR2506SA25S028A	●	25	25	125	45	0.40	28	2	6	●	AO-T12
APX3KR2508SA25M037A	●	25	25	130	50	0.41	37	2	8	●	AO-T12
APX3KR3208SA32S037A	●	32	32	130	50	0.70	37	2	8	●	AO-T12
APX3KR3210SA32M046A	●	32	32	140	60	0.74	46	2	10	●	AO-T12
APX3KR3212SA32S037A	●	32	32	130	50	0.67	37	3	12	●	AO-T12
APX3KR3215SA32M046A	●	32	32	140	60	0.71	46	3	15	●	AO-T12
APX3KR4015SA42S046A	●	40	42	140	60	1.24	46	3	15	●	AO-T12
APX3KR4018SA42M055A	●	40	42	150	70	1.31	55	3	18	●	AO-T12

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- When using inserts with corner radius $RE > 2.4$, machining of the holder is required as shown on page 10.
- Only corner radius RE 0.4 and 0.8 can be used for the peripheral cutting edges except the bottom cutting edge (the end cutting edge).

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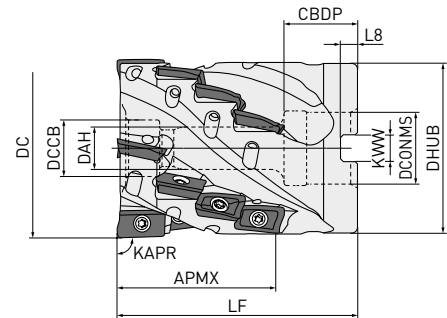
APX3000



DEEP SHOULDER MILLING

P M N S K

LONG CUTTING EDGE



Right hand tool holder only

DC Set Bolt Geometry

∅40	HSC08040	
∅50	HSC10045	

SHELL TYPE

Order number	Stock	DC	DCONMS	LF	WT	APMX	ZNF	ZNP		
APX3K-040A16A037RA	●	40	16	50	0.25	37	4	16	●	AO-T12
APX3K-050A20A046RA	●	50	22	60	0.54	46	4	20	●	AO-T12

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- When using inserts with corner radius $RE > 2.4$, machining of the holder is required as shown on page 10.
- Only corner radius $RE 0.4$ and 0.8 can be used for the peripheral cutting edges except the bottom cutting edge (the end cutting edge).
- When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
- In case of internal coolant supply, please use a face mill arbor with through coolant channels.
Regular center-thru or side-thru arbors can't be used.

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LONG CUTTING EDGE - SHELL TYPE

MOUNTING DIMENSIONS




Order number	DC	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
APX3K-040A16A037RA	40	16	18	9	14	38.5	8.4	5.6
APX3K-050A20A046RA	50	22	20	11	17	48.4	10.4	6.3

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APX3000

SPARE PARTS


LONG CUTTING EDGE – SHANK TYPE / SHELL TYPE

Tool holder type	DC			
		Clamp screw *	Wrench	Anti-seize-lubricant
APX3KR20	20	TPS25	TIP07F	MK1KS
APX3KR25	25	TPS25-1	TIP07F	MK1KS
APX3KR32	32	TPS25-1	TIP07F	MK1KS
APX3KR40	40	TPS25-1	TIP07F	MK1KS
APX3K-040	40	TPS25-1	TIP07F	MK1KS
APX3K-050	50	TPS25-1	TIP07F	MK1KS

* Clamp Torque (N • m): TPS25 = 1.0, TPS25 - 1 = 1.0

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

Material	Insert Grade		ae				
	1st	2nd		≤0.25DC	0.25 – 0.75DC	DC (Slot)	
				Vc			
P Mild steel	MP6120	VP15TF	M H	180 (140 – 220)	150 (110 – 180)	120 (100 – 140)	
	MP6130	VP20RT	M H	160 (120 – 200)	130 (100 – 160)	100 (80 – 120)	
P Carbon steel, Alloy steel, Alloy tool steel	MP6120	VP15TF	M H	150 (100 – 200)	120 (90 – 150)	100 (80 – 120)	
	MP6130	VP20RT	M H	130 (90 – 170)	90 (70 – 110)	80 (60 – 100)	
Pre-hardened steel	MP6120	VP15TF	M H	120 (80 – 160)	100 (70 – 130)	90 (50 – 120)	
	MP6130	VP20RT	M H	100 (70 – 130)	90 (60 – 120)	70 (50 – 100)	
M Stainless steel	MP7130	—	M —	150 (120 – 180)	120 (100 – 140)	100 (80 – 120)	
K Gray cast iron	MC5020	—	H —	200 (150 – 250)	180 (150 – 210)	—	
	VP15TF	—	M H	180 (120 – 240)	150 (100 – 200)	100 (60 – 140)	
Ductile cast iron	VP15TF	—	M H	160 (120 – 200)	140 (100 – 180)	80 (60 – 100)	
N Aluminum alloy	TF15	MP9120	GM M	400 (200 – 800)	400 (200 – 800)	400 (200 – 800)	
S Titanium alloy	MP9130	—	M —	40 (30 – 60)	—	40 (30 – 60)	
	MP9120	—	M —	50 (40 – 70)	—	50 (40 – 70)	
	MP9120	VP15TF	M H	40 (30 – 60)	—	40 (30 – 60)	
Heat resistant alloy	MP9130	VP20RT	M H	30 (20 – 40)	—	30 (20 – 40)	

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APX3000

RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT/FEED PER TOOTH

Material	Properties	ae	DC						
			Ø 20		Ø 25		Ø 32 - Ø 50		
			ap	fz	ap	fz	ap	fz	
P	Mild steel	≤180HB	≤0.25DC	≤28	0.15	≤37	0.17	≤55	0.2
			0.25 - 0.75DC	≤28	0.12	≤37	0.15	≤55	0.17
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Carbon steel Alloy steel	180 - 280HB	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25 - 0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Alloy tool steel	≤350HB (Annealing)	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25 - 0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
Pre-hardened steel	35 - 45HRC	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17	
		0.25 - 0.75DC	≤28	0.1	≤37	0.12	≤55	0.15	
		DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08	
M	Ferritic and martensitic stainless steel	—	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25-0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Duplex stainless steel	≤280HB	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25 - 0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Precipitation hardening stainless steel	≤450HB	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25 - 0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
K	Gray cast iron	Tensile Strength ≤350MPa	≤0.25DC	≤28	0.15	≤37	0.17	≤55	0.2
			0.25 - 0.75DC	≤28	0.12	≤37	0.15	≤55	0.17
			DC (Slot)	≤18	0.1	≤18	0.1	≤18	0.1
	Ductile cast iron	Tensile Strength ≤800MPa	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25 - 0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
N	Aluminum alloy	—	≤0.25DC	≤28	0.15	≤37	0.17	≤55	0.2
			0.25 - 0.75DC	—	—	≤9	0.17	≤9	0.2
			DC (Slot)	—	—	≤9	0.17	≤9	0.2
S	Titanium alloy	≤350HB	≤0.25DC	≤28	0.1	≤37	0.1	≤55	0.1
			0.25 - 0.75DC	—	—	—	—	—	—
			DC (Slot)	≤18	0.06	≤18	0.06	≤18	0.06
	Heat resistant alloy	—	≤0.25DC	≤28	0.08	≤37	0.08	≤55	0.08
			0.25 - 0.75DC	—	—	—	—	—	—
			DC (Slot)	≤18	0.05	≤18	0.05	≤18	0.05

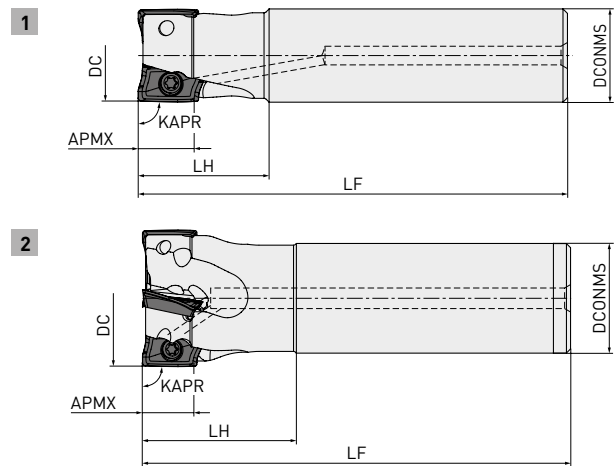
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1. The above cutting conditions are determined based on high rigidity machine and work materials, where no vibration occurred. Please adjust processing conditions if the vibration is generated.

APX4000



MULTI-FUNCTIONAL MILLING



Right hand tool holder only

SHANK TYPE

Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	RMPX	RPMX	ZEFP	Type		
APX4000R252SA25SA	●	25	25	115	35	0.40	15	11.0°	18900	2	1	●	AO-T18
APX4000R252SA25LA	●	25	25	170	35	0.61	15	11.0°	18900	2	1	●	AO-T18
APX4000R252SA25ELA	●	25	25	220	80	0.76	15	11.0°	18900	2	1	●	AO-T18
APX4000R282SA25LA	●	28	25	170	35	0.63	15	9.0°	17700	2	2	●	AO-T18
APX4000R282SA25ELA	●	28	25	220	35	0.81	15	9.0°	17700	2	2	●	AO-T18
APX4000R322SA32SA	●	32	32	125	45	0.71	15	7.0°	16300	2	1	●	AO-T18
APX4000R323SA32SA	●	32	32	125	45	0.71	15	7.0°	16300	3	1	●	AO-T18
APX4000R322SA32LA	●	32	32	190	45	1.11	15	7.0°	16300	2	1	●	AO-T18
APX4000R323SA32LA	●	32	32	190	45	1.11	15	7.0°	16300	3	1	●	AO-T18
APX4000R322SA32ELA	●	32	32	260	100	1.49	15	7.0°	16300	2	1	●	AO-T18
APX4000R323SA32ELA	●	32	32	260	100	1.49	15	7.0°	16300	3	1	●	AO-T18
APX4000R352SA32LA	●	35	32	190	45	1.14	15	6.0°	15400	2	2	●	AO-T18
APX4000R353SA32LA	●	35	32	190	45	1.14	15	6.0°	15400	3	2	●	AO-T18
APX4000R352SA32ELA	●	35	32	260	45	1.57	15	6.0°	15400	2	2	●	AO-T18
APX4000R353SA32ELA	●	35	32	260	45	1.57	15	6.0°	15400	3	2	●	AO-T18
APX4000R403SA32SA	●	40	32	125	45	0.80	15	6.0°	14200	3	2	●	AO-T18
APX4000R404SA32SA	●	40	32	125	45	0.80	15	6.0°	14200	4	2	●	AO-T18
APX4000R402SA32LA	●	40	32	190	45	1.19	15	6.0°	14200	2	2	●	AO-T18
APX4000R403SA32LA	●	40	32	190	45	1.19	15	6.0°	14200	3	2	●	AO-T18
APX4000R404SA32LA	●	40	32	190	45	1.19	15	6.0°	14200	4	2	●	AO-T18
APX4000R402SA32ELA	●	40	32	260	45	1.62	15	6.0°	14200	2	2	●	AO-T18
APX4000R403SA32ELA	●	40	32	260	45	1.62	15	6.0°	14200	3	2	●	AO-T18
APX4000R404SA32ELA	●	40	32	260	45	1.62	15	6.0°	14200	4	2	●	AO-T18
APX4000R504SA32SA	●	50	32	125	45	0.93	15	4.0°	12400	4	2	●	AO-T18
APX4000R505SA32SA	●	50	32	125	45	0.93	15	4.0°	12400	5	2	●	AO-T18
APX4000R634SA32SA	●	63	32	125	45	1.15	15	3.0°	10800	4	2	●	AO-T18
APX4000R636SA32SA	●	63	32	125	45	1.15	15	3.0°	10800	6	2	●	AO-T18

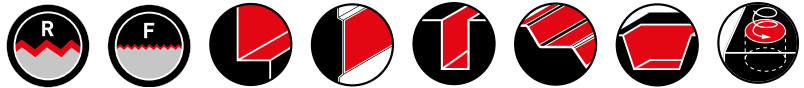
1/1

- When using inserts with corner radius $RE > 3.2$, machining of the holder is required as shown on page 23.
- The maximum spindle speeds $RPMX$ are set to ensure tool and insert stability.
- When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

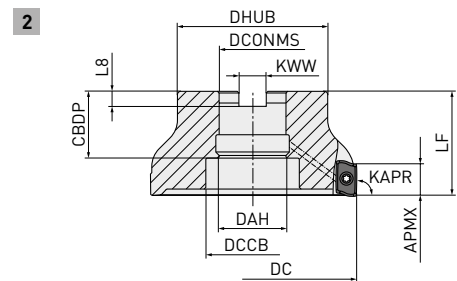
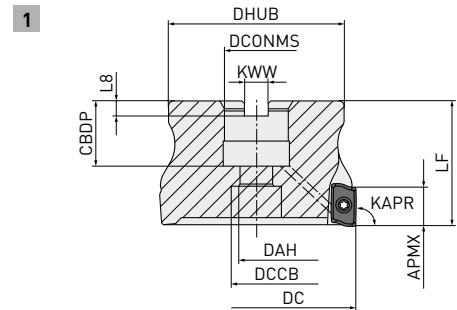


● : Inventory maintained. ★ : Inventory maintained in Japan.

APX4000 ^{90°} KAPR



MULTI-FUNCTIONAL MILLING



Right hand tool holder only

DC	Set Bolt	Geometry
Ø40	HSC08030H	
Ø50, Ø63	HSC10030H	
Ø80	HSC12035H	
Ø100	HSC16040H	
Ø125	MBA20040H	
Ø160	MBA24045H	

ARBOR TYPE

Order number	Stock	DC	DCONMS	LF	WT	APMX	RMPX	RPMX	ZEFP	Type		
APX4000-040A04RA	●	40	16	40	0.2	15	6.0°	14200	4	1	●	AO-T18
APX4000-050A05RA	●	50	22	40	0.3	15	4.0°	12400	5	1	●	AO-T18
APX4000-063A06RA	●	63	22	40	0.5	15	3.0°	10800	6	1	●	AO-T18
APX4000R08007CA	●	80	25.4	50	1.2	15	2.0°	9300	7	1	●	AO-T18
APX4000-080A07RA	●	80	27	50	1.2	15	2.0°	9300	7	1	●	AO-T18
APX4000R10008DA	●	100	31.75	63	2.1	15	1.5°	8100	8	1	●	AO-T18
APX4000-100A08RA	●	100	32	50	2.1	15	1.5°	8100	8	1	●	AO-T18
APX4000R12509EA	●	125	38.1	63	3.3	15	1.0°	7100	9	2	●	AO-T18
APX4000-125A09RA	●	125	40	63	3.3	15	1.0°	7100	9	2	●	AO-T18
APX4000-160A10RA	●	160	40	63	4.8	15	1.0°	6100	10	2	●	AO-T18
APX4000R16010FA	●	160	50.8	63	4.8	15	1.0°	6100	10	2	●	AO-T18

1/1

1. When using inserts with corner radius RE>3.2, machining of the holder is required as shown on page 23.
2. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
3. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.






APX4000 – MULTI-FUNCTIONAL MILLING – SHANK TYPE / ARBOR TYPE

MOUNTING DIMENSIONS

Order number	DC	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
APX4000-040A04RA	40	16	18	9	14	34	8.4	5.6
APX4000-050A05RA	50	22	20	11	17	45	10.4	6.3
APX4000-063A06RA	63	22	20	11	17	50	10.4	6.3
APX4000R08007CA	80	25.4	26	13	20	70	9.5	6
APX4000-080A07RA	80	27	23	13	20	60	12.4	7
APX4000R10008DA	100	31.75	32	17	26	80	12.7	8
APX4000-100A08RA	100	32	26	17	27	70	14.4	8
APX4000R12509EA	125	38.1	40	40	56	100	15.9	10
APX4000-125A09RA	125	40	40	42	56	90	16.4	9
APX4000-160A10RA	160	40	40	42	72	100	16.4	9
APX4000R16010FA	160	50.8	40	53	72	100	19.1	11

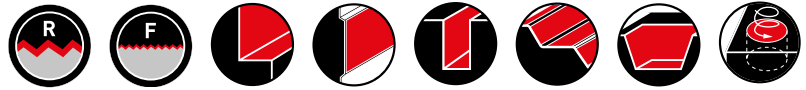
1/1

SPARE PARTS

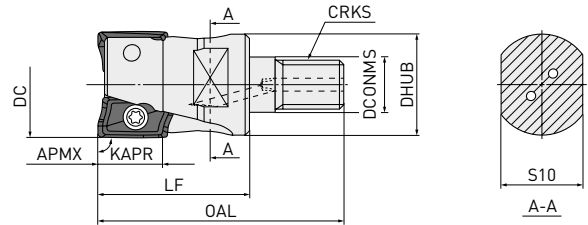
DC	Tool holder type	DC	Tool holder type			
				Clamp screw *	Wrench	Anti-seize-lubricant
25	APX4000R25	28	APX4000R28	TPS4	TIP15W	MK1KS
32	APX4000R32	35	APX4000R35	TPS4	TIP15W	MK1KS
40	APX4000R40	40	APX4000-040	TPS43	TIP15W	MK1KS
50	APX4000R50	50	APX4000-050	TPS43	TIP15W	MK1KS
63	APX4000R63	63	APX4000-063	TPS43	TIP15W	MK1KS
80	APX4000R080	80	APX4000-080	TPS43	TIP15W	MK1KS
100	APX4000R100	100	APX4000-100	TPS43	TIP15W	MK1KS
125	APX4000R125	125	APX4000-125	TPS43	TIP15W	MK1KS
160	APX4000R160	160	APX4000-160	TPS43	TIP15W	MK1KS

* Clamp Torque (N • m): TPS25 = 1.0, TPS25 - 1 = 1.0

APX4000 ^{90°}KAPR



MULTI-FUNCTIONAL MILLING



Right hand tool holder only

SCREW-IN TYPE

Order number	Stock	DC	DCONMS	DHUB	OAL	LF	S10	CRKS	WT	APMX	RMPX	ZEFP		
APX4000R252M12A35	●	25	12.5	23.5	57	35	19	M12	0.2	15	11.0°	2	●	AO-T18
APX4000R282M12A35	●	28	12.5	23.5	57	35	19	M12	0.2	15	9.0°	2	●	AO-T18
APX4000R322M16A40	●	32	17	28.5	63	40	24	M16	0.3	15	7.0°	2	●	AO-T18
APX4000R323M16A40	●	32	17	28.5	63	40	24	M16	0.3	15	7.0°	3	●	AO-T18
APX4000R352M16A40	●	35	17	28.5	63	40	24	M16	0.3	15	6.0°	2	●	AO-T18
APX4000R353M16A40	●	35	17	28.5	63	40	24	M16	0.3	15	6.0°	3	●	AO-T18
APX4000R403M16A40	●	40	17	28.5	63	40	24	M16	0.3	15	6.0°	3	●	AO-T18
APX4000R404M16A40	●	40	17	28.5	63	40	24	M16	0.3	15	6.0°	4	●	AO-T18

1/1

1. When using inserts with corner radius RE>3.2, machining of the holder is required as shown on page 23.
2. For screw-in type arbors, refer to page 31.



SPARE PARTS

Tool holder type	DC			
		Clamp screw *	Wrench	Anti-seize-lubricant
APX4000R25	25	TPS4	TIP15W	MK1KS
APX4000R28	28	TPS4	TIP15W	MK1KS
APX4000R32	32	TPS4	TIP15W	MK1KS
APX4000R35	35	TPS4	TIP15W	MK1KS
APX4000R40	40	TPS43	TIP15W	MK1KS

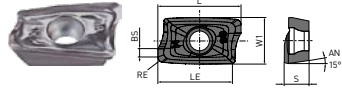
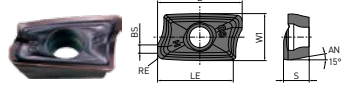
* Clamp Torque (N • m): TPS4 = 4.0, TPS43 - 1 = 4.0

APX4000

INSERTS

P	Steel		◆	◆				◆	◆	Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.
M	Stainless steel				◆			◆	◆	
K	Cast iron	◆						◆	◆	
S	Heat-resistant alloy, Titanium alloy					◆	◆	◆	◆	
H	Hardened steel							◆	◆	

Edge preparation: E: Round

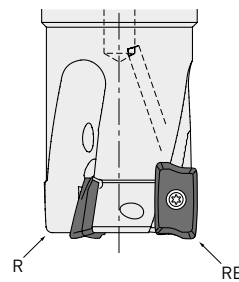
Order number	Class	Edge preparation	Coated								L	LE	W1	S	BS	RE	Geometry
			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT							
AOMT184804PEER-M	M	E	●	●	●	●	●	●	●	18	15	9	4.8	1.8	0.4	General M 	
AOMT184808PEER-M	M	E	●	●	●	●	●	●	●	18	15	9	4.8	1.4	0.8		
AOMT184810PEER-M	M	E	●				●	●	●	18	15	9	4.8	1.0	1.0		
AOMT184812PEER-M	M	E	●				●	●	●	18	15	9	4.8	0.8	1.2		
AOMT184816PEER-M	M	E	●	●	●	●	●	●	●	18	15	9	4.8	0.4	1.6		
AOMT184820PEER-M	M	E	●				●	●	●	18	15	9	4.8	0.4	2.0		
AOMT184804PEER-H	M	E	●	●	●	●	●	●	●	18	15	9	4.8	1.8	0.4	Strong cutting Edge type H 	
AOMT184808PEER-H	M	E	●	●	●	●	●	●	●	18	15	9	4.8	1.4	0.8		
AOMT184816PEER-H	M	E	●	●	●	●	●	●	●	18	15	9	4.8	0.4	1.6		
AOMT184832PEER-H	M	E			●	●			●	18	15	9	4.8	0.4	3.2		
AOMT184840PEER-H	M	E			●	●			●	18	15	9	4.8	0.4	4.0		
AOMT184850PEER-H	M	E			●	●			●	18	15	9	4.8	-	5.0		
AOMT184864PEER-H	M	E			●	●			●	18	15	9	4.8	-	6.35		

1/1

1. Please note that the corner radius RE is different from the workpiece material of R shape depending on the axial rake angle of the body. For more information, please contact our sales offices.

NOTE ON USE OF INSERTS WITH LARGE CORNER RADII

When using inserts with corner radius RE>R3.2, please machine the holder with a radius form as shown on the right.



RE (mm)	R
3.2	2.0
4.0	2.5
5.0	3.5
6.35	5.0

R: Holder end radius
RE: Insert corner radius

APX4000

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

Material	Properties	Insert				ae			
		Grade		M	H	≤0.25DC	0.25 – 0.5DC	0.5 – 0.75DC	DC (Slot)
		1st	2nd						
P	Mild steel ≤180HB	MP6120	VP15TF	M	H	230 (180 – 270)	220 (170 – 260)	180 (140 – 210)	180 (140 – 210)
		MP6130	VP20RT	M	H	200 (150 – 240)	190 (140 – 230)	150 (110 – 180)	150 (110 – 180)
P	Carbon steel Alloy steel 180 – 350HB	MP6120	VP15TF	M	H	180 (140 – 210)	170 (130 – 200)	140 (110 – 160)	140 (110 – 160)
		MP6130	VP20RT	M	H	150 (110 – 180)	140 (100 – 170)	110 (80 – 130)	110 (80 – 130)
M	Stainless steel ≤270HB	MP7130	VP20RT	M	H	180 (140 – 210)	170 (130 – 200)	140 (110 – 160)	140 (110 – 160)
K	Gray cast iron ≤350MPa	MC5020	VP15TF	H	—	250 (200 – 300)	240 (190 – 290)	210 (160 – 260)	140 (110 – 160)
	Ductile cast iron ≤800MPa	MC5020	VP15TF	H	—	130 (100 – 150)	120 (90 – 140)	100 (80 – 120)	100 (80 – 120)
S	Titanium alloy ≤350HB	MP9120	VP15TF	H	M	50 (40 – 70)	—	—	50 (40 – 70)
		MP9130	VP20RT	H	M	40 (30 – 60)	—	—	40 (30 – 60)
	Heat resistant alloy —	MP9120	VP15TF	H	M	40 (30 – 60)	—	—	40 (30 – 60)
		MP9130	VP20RT	H	M	30 (20 – 40)	—	—	30 (20 – 40)
H	Hardened steel 40 – 55HRC	VP15TF	—	H	—	90 (70 – 100)	85 (60 – 100)	70 (50 – 80)	70 (50 – 80)

1/1

DEPTH OF CUT/FEED PER TOOTH

Material	Properties	ae	ap	DC			
				fz			
				Ø 25 – Ø 40	Ø 50 – Ø 80	Ø 100 – Ø 160	
P	Mild steel ≤180HB	≤0.5DC	≤5	0.30	0.30	0.25	
			5 – 7.5	0.25	0.25	0.20	
			7.5 – 10	0.20	0.20	0.15	
			10 – 12.5	0.15	0.15	0.10	
			12.5 – 15	0.10	0.10	0.07	
	Carbon steel Alloy steel 180 – 350HB	0.5 – 0.75DC	≤5	0.20	0.20	0.15	
			5 – 10	0.15	0.15	0.10	
			10 – 15	0.10	0.10	0.07	
			DC (Slot)	≤5	0.15	0.15	0.15
			5 – 7.5	0.10	0.10	0.10	
M	Stainless steel ≤270HB	≤0.5DC	≤5	0.30	0.25	0.25	
			5 – 7.5	0.25	0.20	0.20	
			7.5 – 10	0.20	0.15	0.15	
			10 – 12.5	0.15	0.10	0.10	
			12.5 – 15	0.10	0.07	0.07	
	DC (Slot)	0.5 – 0.75DC	≤5	0.20	0.15	0.15	
			5 – 10	0.15	0.10	0.10	
			10 – 15	0.10	0.07	0.07	
			≤5	0.15	0.15	0.15	
			5 – 7.5	0.10	0.10	0.10	
7.5 – 10	0.07	0.07	0.07				

1/2

- These cutting conditions are a guide to the standard shank type and the arbor type. Please make adjustments according to the machining conditions.
- Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
 - When using the long shank type and extra long shank type.
 - When using long tool overhang with the standard or arbor type.
 - When the application has poor clamping rigidity or when using a low rigidity machine.
- In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
- For heavy interrupted and unstable cutting, the H breaker is first recommendation.

APX4000 – DEPTH OF CUT/FEED PER TOOTH

Material	Properties	ae	ap	DC				
				fz				
				Ø 25 – Ø 40	Ø 50 – Ø 80	Ø 100 – Ø 160		
K Gray cast iron	Tensile Strength ≤350MPa	≤0.5DC	≤5	0.30	0.30	0.25		
			5 – 7.5	0.25	0.25	0.20		
			7.5 – 10	0.20	0.20	0.15		
			10 – 12.5	0.15	0.15	0.10		
			12.5 – 15	0.10	0.10	0.07		
			≤5	0.20	0.20	0.15		
		0.5 – 0.75DC	5 – 10	0.15	0.15	0.10		
			10 – 15	0.10	0.10	0.07		
			DC (Slot)	≤5	0.15	0.15	0.15	
				5 – 7.5	0.10	0.10	0.10	
				7.5 – 10	0.07	0.07	0.07	
			Ductile cast iron	Tensile Strength ≤800MPa	≤0.5DC	≤5	0.25	0.25
5 – 7.5	0.20	0.20				0.20		
7.5 – 10	0.15	0.15				0.15		
10 – 12.5	0.10	0.10				0.10		
12.5 – 15	0.07	0.07				0.07		
≤5	0.20	0.20				0.15		
0.5 – 0.75DC	5 – 10	0.15			0.15	0.10		
	10 – 15	0.10			0.10	0.07		
	DC (Slot)	≤5			0.15	0.15	0.15	
		5 – 7.5			0.10	0.10	0.10	
		7.5 – 10			0.07	0.07	0.07	
	S Titanium alloy	≤350HB			≤0.25DC	≤5	0.15	0.10
5 – 7.5			0.10	0.05		0.05		
7.5 – 10			0.05	—		—		
DC (Slot)			≤5	0.05	0.05	0.05		
			Heat resistant alloy	≤0.25DC	≤2	0.10	0.05	0.05
				DC (Slot)	≤1	0.05	0.05	0.05
H Hardened steel	40 – 55HRC	≤0.25DC	≤5	0.15	0.15	0.15		
			5 – 7.5	0.10	0.10	0.10		
			7.5 – 10	0.07	0.07	0.07		
			≤5	0.10	0.10	0.10		
		0.25 – 0.5DC	5 – 7.5	0.07	0.07	0.07		
			0.5 – 0.75DC	≤5	0.07	0.07	0.07	
				DC (Slot)	≤5	0.07	0.07	0.07

2/2

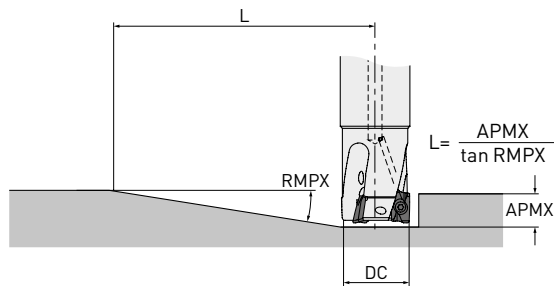
- These cutting conditions are a guide to the standard shank type and the arbor type.
Please make adjustments according to the machining conditions.
- Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
When using the long shank type and extra long shank type.
When using long tool overhang with the standard or arbor type.
When the application has poor clamping rigidity or when using a low rigidity machine.
- In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
- For heavy interrupted and unstable cutting, the H breaker is first recommendation.

APX4000

RAMPING/HELICAL CUTTING

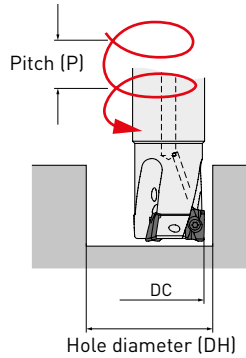
1 Ramping

Refer to the table below for cutting conditions.
For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

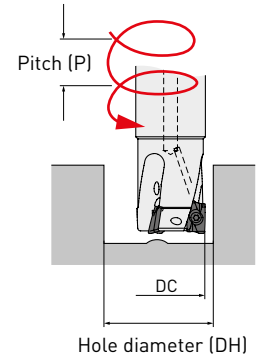


2 Helical cutting

2.1 Blind holes, flat bottom



2.2 Through holes



DC	1		2.1				2.2	
	RMPX	L*1	DH max.*2	P max.	DH min	P max.	DH min	P max.
25	11°	85	48	14	45	12	32	4
28	9°	105	54	12	51	11	38	4
32	7°	135	62	11	59	10	46	5
35	6°	158	68	10	65	9	52	5
40	6°	158	78	12	75	11	62	7
50	4°	238	98	10	95	9	82	7
63	3°	318	124	10	121	9	108	7
80	2°	477	158	8	155	8	142	6
100	1.5°	636	198	8	195	7	182	6
125	1°	954	248	6	245	6	232	5
160	1°	954	318	8	315	8	302	7

1/1

1. When machining highly ductile materials with ramping angles above, chips could be continuous.
In this case, decrease the ramping angle or feed per tooth.

*1 $L = 15 / \tan \alpha$. Cutters' moving distance until depth of cut reaches 15 mm at a maximum ramping angle.

*2 In case corner radius of 0.8 mm. Other than that, find with the below formula.

$$\{(\text{cutting edge diameter DC}) - (\text{corner radius}) - 0.2\} \times 2$$

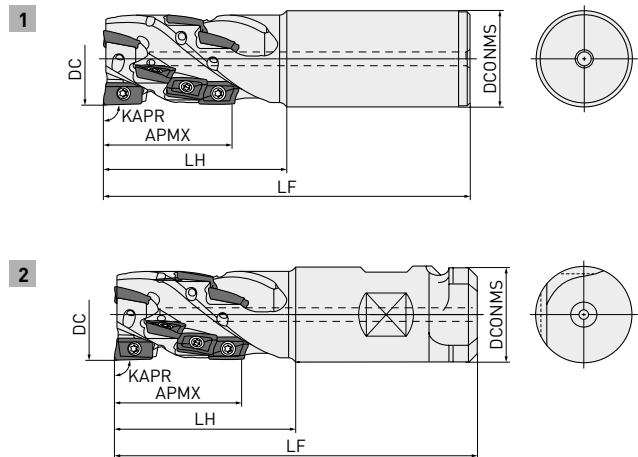
APX4000



DEEP SHOULDER MILLING



LONG CUTTING EDGE



Right hand tool holder only

SHANK TYPE

Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	ZNF	ZNP	Type		
APX4KR4008SA42S056A	●	40	42	160	80	1.54	56	2	8	1	●	AO-T18
APX4KR4012SA42S056A	●	40	42	160	80	1.54	56	3	12	1	●	AO-T18
APX4KR5012WA508S056A	●	50	50.8	160	80	1.76	56	3	12	2	●	AO-T18
APX4KR5018WA508M084A	●	50	50.8	190	110	2.18	84	3	18	2	●	AO-T18

1/1

- When using inserts with corner radius $RE > 3.2$, machining of the holder is required as shown on page 23.
- Only corner radius RE 0.4 and 0.8 can be used for the peripheral cutting edges except the bottom cutting edge (the end cutting edge).



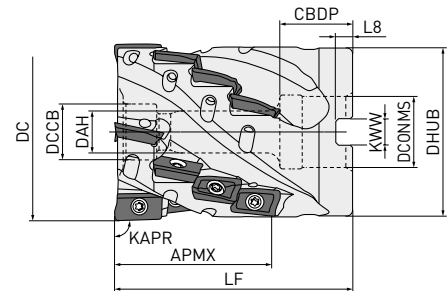
APX4000



DEEP SHOULDER MILLING



LONG CUTTING EDGE



Right hand tool holder only

DC Set Bolt Geometry

DC	Set Bolt	Geometry
Ø50	HSC10050	
Ø63	HSC12070	

SHELL TYPE

Order number	Stock	DC	DCONMS	LF	WT	APMX	ZNF	ZNP		
APX4K-050A09A042RA	●	50	22	65	0.75	42	3	9	●	AO-T18
APX4KR06316CA056A	●	63	25.4	85	1.66	56	4	16	●	AO-T18
APX4K-063A16A056RA	●	63	27	85	1.63	56	4	16	●	AO-T18

1/1

- When using inserts with corner radius $RE > 3.2$, machining of the holder is required as shown on page 23.
- Only corner radius RE 0.4 and 0.8 can be used for the peripheral cutting edges expect the bottom cutting edge (the end cutting edge).
- When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.



APX4000 – LONG CUTTING EDGE – SHANK TYPE / SHELL TYPE




MOUNTING DIMENSIONS

Order number	DC	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
APX4K-050A09A042RA	50	22	22	11	17	48	10.4	6.3
APX4KR06316CA056A	63	25.4	26	13	20	60.7	9.5	6
APX4K-063A16A056RA	63	27	28	13	20	60.7	12.4	7

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SPARE PARTS


LONG CUTTING EDGE – SHANK TYPE / SHELL TYPE

		
Clamp screw*	Wrench	Anti-seize-lubricant
TPS43	TIP15W	MK1KS

* Clamp Torque (N • m): TPS43 = 4.0

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

Material	Hardness	Insert Grade				ae		
		1st	2nd			vc		
						≤0.15DC	0.15 – 0.3DC	DC (Slot)
P Mild steel	≤180HB	MP6120	VP15TF	M	H	200 (160 – 250)	160 (120 – 200)	140 (120 – 160)
		MP6130	VP20RT	M	H	170 (130 – 220)	130 (90 – 170)	110 (90 – 130)
Carbon steel Alloy steel	180 – 350HB	MP6120	VP15TF	M	H	160 (120 – 200)	120 (100 – 140)	100 (80 – 120)
		MP6130	VP20RT	M	H	130 (90 – 170)	90 (70 – 110)	70 (50 – 90)
M Stainless steel	≤270HB	MP7130	VP15TF	M	H	160 (120 – 200)	120 (100 – 140)	100 (80 – 120)
K Gray cast iron	≤350MPa	MC5020	VP15TF	H	—	230 (180 – 280)	190 (140 – 240)	190 (140 – 240)
		MC5020	VP15TF	H	—	190 (140 – 220)	170 (120 – 220)	170 (120 – 220)
S Titanium alloy	≤350HB	MP9120	VP15TF	H	M	50 (40 – 70)	—	50 (40 – 70)
		MP9130	VP20RT	H	M	40 (30 – 60)	—	40 (30 – 60)
		MP9120	VP15TF	H	M	40 (30 – 60)	—	40 (30 – 60)
		MP9130	VP20RT	H	M	30 (20 – 40)	—	30 (20 – 40)
Heat resistant alloy	—							

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APX4000 – DEPTH OF CUT / FEED PER TOOTH

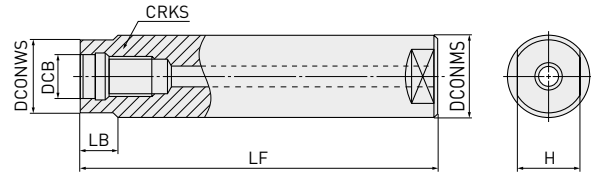
Material	Properties	ae	ap	DC		
				fz		
				Ø 40 APMX 56 mm Ø 50 APMX 42 mm	Ø 50 APMX 56 mm Ø 63 APMX 56 mm	Ø 50 APMX 84 mm
P	Mild steel	≤180HB	≤20	0.25	0.25	0.20
			20 – 50	0.20	0.20	0.15
			50 – 80	—	—	0.10
	Carbon steel Alloy steel	180 – 350HB	≤20	0.20	0.20	0.15
			20 – 50	0.15	0.15	—
			50 – 80	—	—	0.10
M	Stainless steel	≤270HB	≤20	0.25	0.25	0.20
			20 – 50	0.20	0.20	0.15
			50 – 80	—	—	0.10
	Gray cast iron	Tensile Strength ≤350MPa	≤10	0.10	0.10	0.07
			10 – 50	0.30	0.30	0.25
			50 – 80	—	—	0.15
K	Ductile cast iron	Tensile Strength ≤800MPa	≤10	0.25	0.25	0.20
			10 – 50	0.20	0.20	0.15
			50 – 80	—	—	0.10
	Titanium alloy	≤350HB	≤20	0.20	0.20	0.15
			20 – 50	0.15	0.15	0.10
			50 – 80	—	—	0.07
Heat resistant alloy	—	≤10	0.15	0.15	0.10	
		10 – 50	0.10	0.10	—	
		50 – 80	—	—	0.07	
S	—	≤20	0.10	0.10	—	
		20 – 50	0.10	0.10	—	
		50 – 80	—	—	0.07	

1/1

1. The above cutting conditions are determined based on high rigidity machine and workpiece, where no vibration occurred. Please adjust processing conditions if the vibration is generated.

ARBORS

STRAIGHT SHANK ARBOR (EXTENSION)



Order number	Stock	DCB	DCONMS	DCONWS	LF	LB	H	CRKS
STEEL SHANK TYPE								
SC16M08S100S	★	8.5	16	14.5	100	10	10	M8
SC16M08S200L	★	8.5	16	14.5	200	10	10	M8
SC20M10S120S	★	10.5	20	18.5	120	10	14	M10
SC20M10S220L	★	10.5	20	18.5	220	10	14	M10
SC25M12S125S	★	12.5	25	23.5	125	10	19	M12
SC25M12S245L	★	12.5	25	23.5	245	10	19	M12
SC32M16S140S	★	17	32	28.5	140	15	24	M16
SC32M16S280L	★	17	32	28.5	280	15	24	M16
CARBIDE SHANK TYPE								
SC16M08S100SW	★	8.5	16	14.5	100	10	10	M8
SC16M08S200LW	★	8.5	16	14.5	200	10	10	M8
SC20M10S120SW	★	10.5	20	18.5	120	10	14	M10
SC20M10S220LW	★	10.5	20	18.5	220	10	14	M10
SC25M12S125SW	★	12.5	25	23.5	125	10	19	M12
SC25M12S245LW	★	12.5	25	23.5	245	10	19	M12
SC32M16S140SW	★	17	32	28.5	140	15	24	M16
SC32M16S280LW	★	17	32	28.5	280	15	24	M16

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HOW TO INSTALL THE SCREW-IN HEAD

1. Thoroughly clean the clamping section of the head and the arbor with an air blower or brush before installation.
2. Tighten the head to the recommended torque and ensure there is no gap between the head and arbor.

Screw size	Recommended torque (N • m)	Wrench size (mm)
M8	23	10
M10	46	14
M12	80	19
M16	90	24



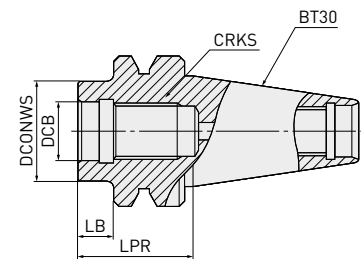
Cutting tools become extremely hot during cutting. Do not handle the cutting tools with bare hands as this may cause injuries.

ARBORS

ARBORS FOR SCREW-IN TOOLS

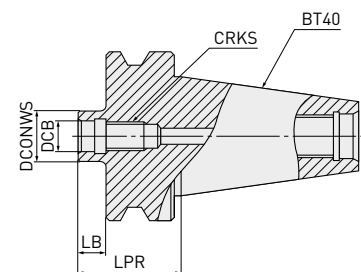
BT30 SHANK ARBOR

Order number	Stock	DCB	DCONWS	LPR	LB	CRKS
SC16M08S10-BT30	★	8.5	14.5	32	10	M8
SC20M10S10-BT30	★	10.5	18.5	32	10	M10
SC25M12S10-BT30	★	12.5	23.5	32	10	M12
SC32M16S10-BT30	★	17.0	28.5	32	10	M16



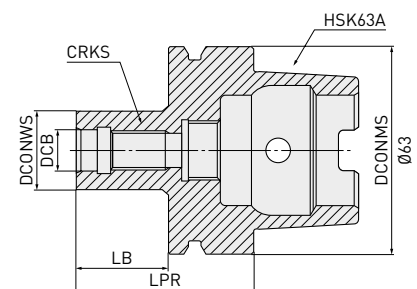
BT40 SHANK ARBOR

Order number	Stock	DCB	DCONWS	LPR	LB	CRKS
SC16M08S10-BT40	★	8.5	14.5	37	10	M8
SC20M10S10-BT40	★	10.5	18.5	37	10	M10
SC25M12S10-BT40	★	12.5	23.5	37	10	M12
SC32M16S10-BT40	★	17.0	28.5	37	10	M16



HSK63A SHANK ARBOR

Order number	Stock	DCB	DCONWS	LPR	LB	CRKS
SC16M08S22-HSK63A	★	8.5	14.5	48	22	M8
SC20M10S24-HSK63A	★	10.5	18.5	50	24	M10
SC25M12S27-HSK63A	★	12.5	23.5	53	27	M12
SC32M16S28-HSK63A	★	17.0	28.5	54	28	M16

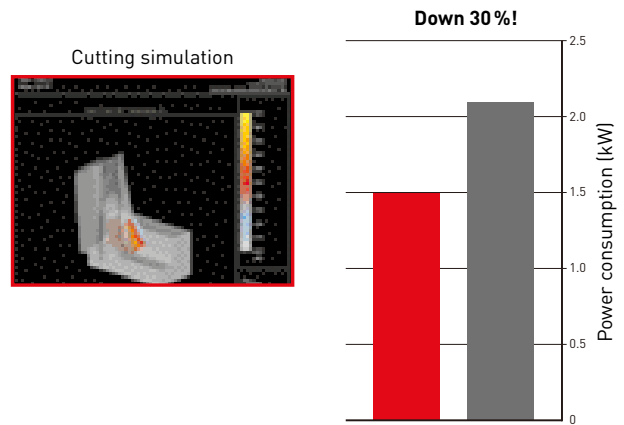


APX3000 / 4000

CUTTING PERFORMANCE

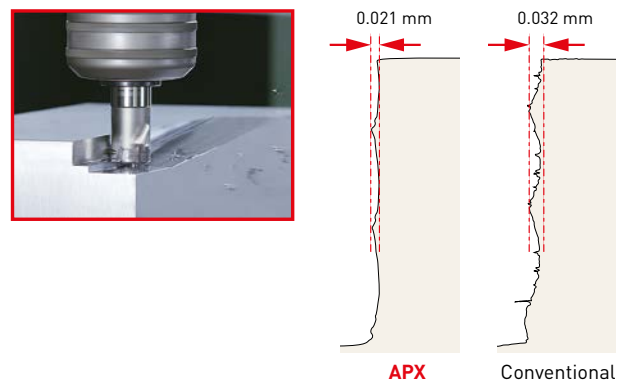
POWER CONSUMPTION COMPARISON

Material	1.7225
Tool	APX3000R254SA25SA
Insert	AOMT123608PEER-M
Grade	VP15TF
Vc (m/min)	160
fz (mm/t)	0.2
ap (mm)	9
ae (mm)	6
Cutting mode	Single insert



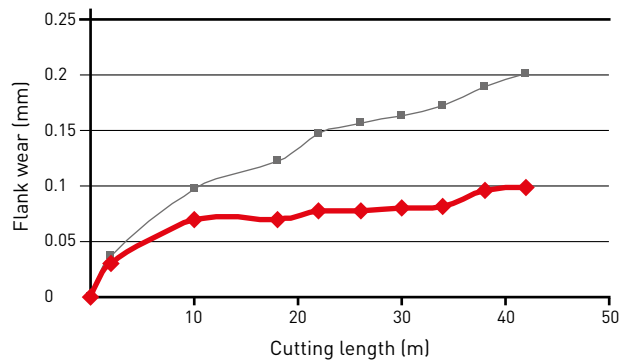
WALL SURFACE ACCURACY

Material	1.7225
Tool	APX3000R253SA25SA
Insert	AOMT123608PEER-M
Grade	VP15TF
Vc (m/min)	160
fz (mm/t)	0.15
ap (mm)	6
ae (mm)	2



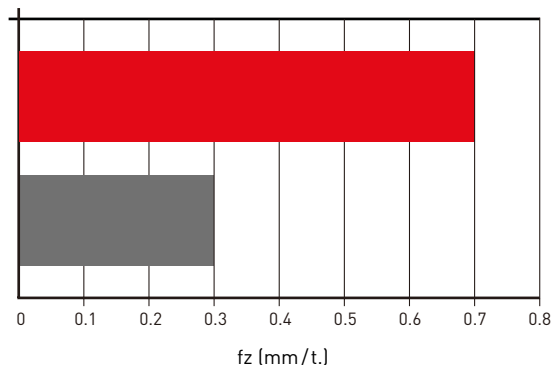
WEAR RESISTANCE

Material	1.7225
Tool	APX3000R253SA25SA
Insert	AOMT123608PEER-M
Grade	VP15TF
Vc (m/min)	200
fz (mm/t)	0.2
ap (mm)	5
ae (mm)	3
Cutting mode	Air blow



FRACTURE RESISTANCE

Material	1.1206
Tool	APX3000R253SA25SA
Insert	AOMT123608PEER-M
Grade	VP15TF
Vc (m/min)	160
ap (mm)	5
ae (mm)	5
Cutting mode	Air blow



■ : APX ■ : Conventional tool

APX3000 / 4000

CUTTING PERFORMANCE

APPLICATION EXAMPLES IN Ti-6Al-4V

Achieved a longer and more stable tool life due to excellent resistance to chipping.

Material	Ti-6Al-4V
Tool	APX3000R323SA32SA
Insert	AOMT123608PEER-M
Grade	MP9130
Vc (m/min)	60
fz (mm/t)	0.1
ap (mm)	8
ae (mm)	8
Cutting mode	Wet cutting

Cutting length 1.2 m



MP9130

Cutting length 0.75 m



Conventional

APPLICATION EXAMPLES IN Inconel®718

Superior wear and chipping resistance.

Material	Inconel®718
Tool	APX3000R324SA32SA
Insert	AOMT123608PEER-M
Grade	MP9130
Vc (m/min)	30
fz (mm/t)	0.15
ap (mm)	5
ae (mm)	8
Cutting mode	Wet cutting

Cutting length 1.5 m



MP9130

Cutting length 1.2 m



Conventional

APPLICATION EXAMPLES IN 1.1206

Excellent wear resistance!

Material	1.1206
Tool	APX3000R324SA32SA
Insert	AOMT123608PEER-M
Grade	MP6120
Vc (m/min)	200
fz (mm/t)	0.1
ap (mm)	2
ae (mm)	2
Cutting mode	Dry cutting

Cutting length 28 m
can continue machining up to
46 m



MP9130

Cutting length 28 m



Conventional A

Cutting length 15 m



Conventional B

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