

APX3000 / 4000

A NEW GENERATION OF HIGH PERFORMANCE CUTTERS

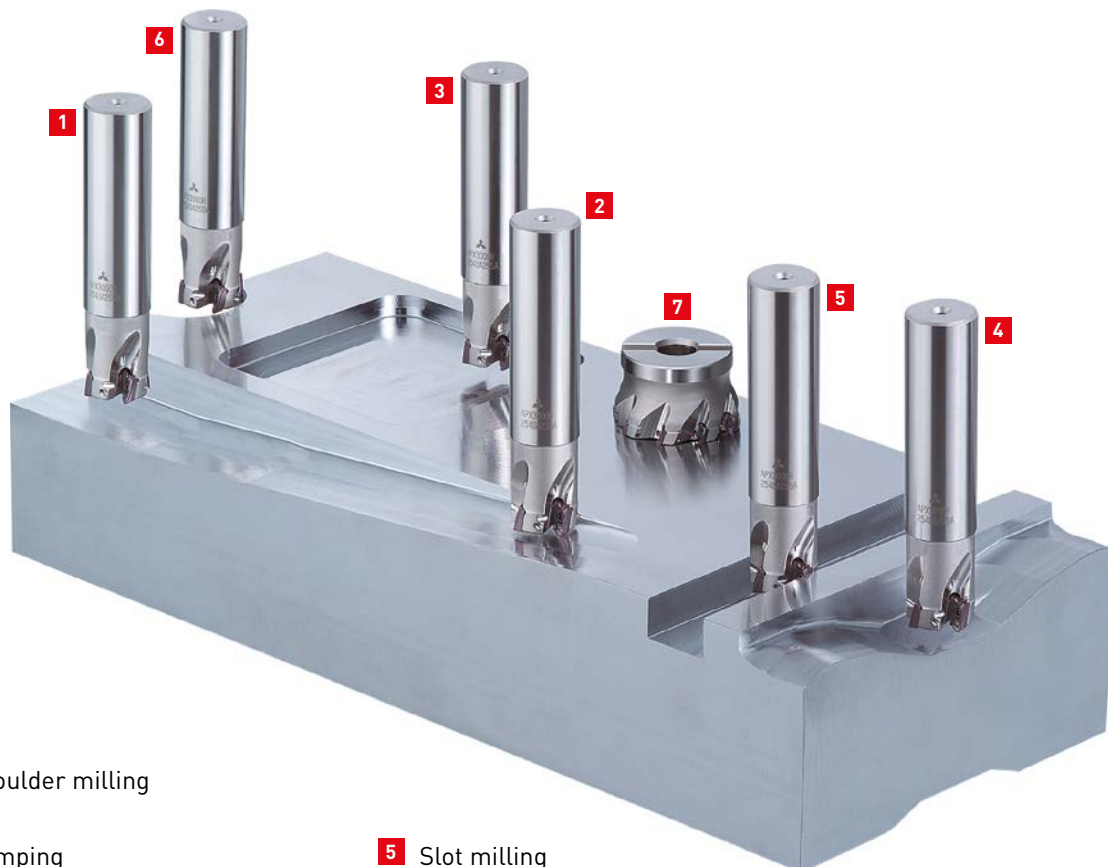


APX3000 / 4000

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

5 Slot milling

3 Pocket milling

6 Helical milling

4 3D Profile 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)

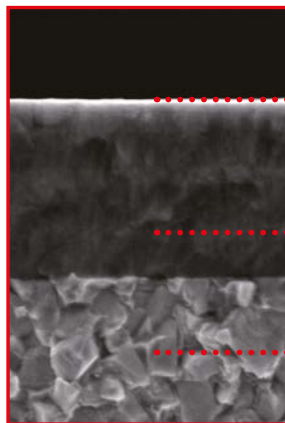


(Standard shank type)

MP6100, MP7100, MP9100

WITH ACCUMULATED AL-Ti-Cr-N BASED PVD COATING

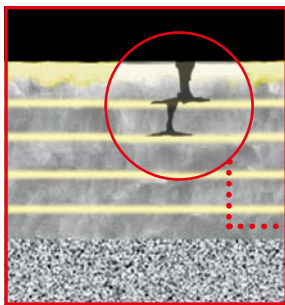
PVD coatings have properties such as toughness, low coefficient of friction and excellent welding, wear and heat resistance. This results in tough, precision grades such as MP6100, MP7100 and MP9100.



Excellent welding resistance due to a low coefficient of friction.

PVD accumulated coating.

Special cemented carbide substrate.

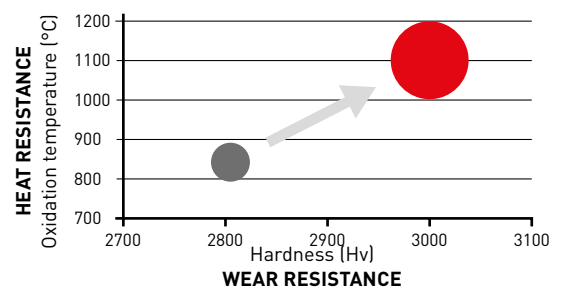


(Graphical representation)

Multi-layering of the coating prevents any cracks penetrating through to the substrate.

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	MP9120	N10		H10
P20	MP6130, VP20RT	M20	MP7130, VP15TF	K20	MX3030, VP15TF	S20	MP9130, VP20RT	N20	TF15	H20, VP15TF
P30		M30	VP20RT	K30		S30		N30		H30
P40		M40		K40		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

MP9120

For general milling of HRSA and titanium alloy

MP9130

For interrupted general milling of HRSA and titanium alloy

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.

TF15

For general milling of aluminium

VP15TF

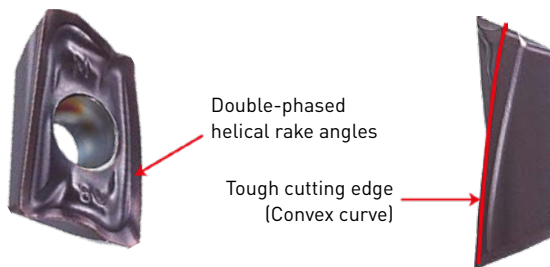
Stable machining properties are enabled when the coating is combined with a high wear and fracture resistant carbide substrate

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

Low heat generation



APX

High heat generation



Conventional

INSERT CHIP BREAKER

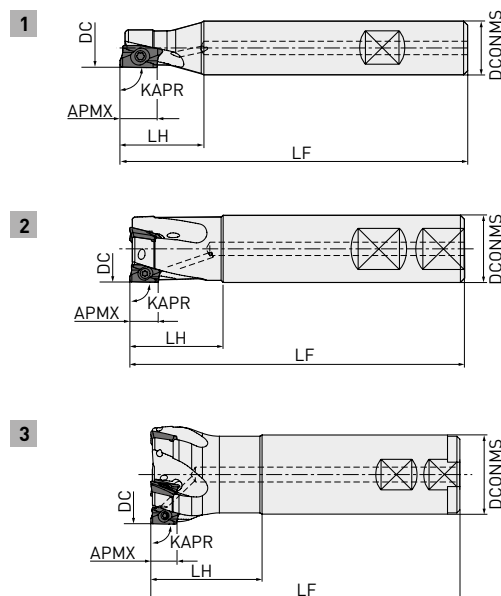
General use M-Breaker (APX3000, APX4000)	Strong cutting edge type H-Breaker (APX3000, APX4000)	For aluminum alloy (ground & polished) GM-Breaker (APX3000)
Rake angle: 25°	Rake angle: 7°	Rake angle: 25°
		

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

APX3000



MULTI-FUNCTIONAL MILLING



WELDON SHANK TYPE

Right hand tool holder only

Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	RMPX	RPMX	ZEFP	Type		
APX3000R121WA16SA	●	12	16	85	25	0.10	10	6.0°	10500	1	1	●	AO-T12
APX3000R141WA16SA	●	14	16	85	25	0.11	10	6.0°	9000	1	1	●	AO-T12
APX3000R162WA16SA	●	16	16	85	25	0.11	10	11.3°	20900	2	2	●	AO-T12
APX3000R182WA16SA	●	18	16	85	25	0.11	10	8.6°	19600	2	3	●	AO-T12
APX3000R182WA16LA	●	18	16	120	25	0.16	10	8.6°	19600	2	3	●	AO-T12
APX3000R202WA20SA	●	20	20	100	30	0.21	10	6.9°	18500	2	2	●	AO-T12
APX3000R203WA20SA	●	20	20	100	30	0.21	10	6.9°	18500	3	2	●	AO-T12
APX3000R202WA20LA	●	20	20	150	60	0.32	10	6.9°	18500	2	2	●	AO-T12
APX3000R223WA20SA	●	22	20	115	30	0.25	10	5.7°	17600	3	3	●	AO-T12
APX3000R222WA20LA	●	22	20	150	30	0.34	10	5.7°	17600	2	3	●	AO-T12
APX3000R252WA25SA	●	25	25	115	35	0.38	10	4.6°	16400	2	2	●	AO-T12
APX3000R253WA25SA	●	25	25	115	35	0.38	10	4.6°	16400	3	2	●	AO-T12
APX3000R254WA25SA	●	25	25	115	35	0.38	10	4.6°	16400	4	2	●	AO-T12
APX3000R253WA25LA	●	25	25	170	70	0.51	10	4.6°	16400	3	2	●	AO-T12
APX3000R284WA25SA	●	28	25	115	35	0.40	10	3.8°	15500	4	3	●	AO-T12
APX3000R283WA25LA	●	28	25	170	35	0.61	10	3.8°	15500	3	3	●	AO-T12
APX3000R304WA32SA	●	30	32	125	45	0.64	10	3.4°	14900	4	1	●	AO-T12
APX3000R323WA32SA	●	32	32	125	45	0.68	10	3.1°	14400	3	2	●	AO-T12
APX3000R324WA32SA	●	32	32	125	45	0.67	10	3.1°	14400	4	2	●	AO-T12
APX3000R325WA32SA	●	32	32	125	45	0.68	10	3.1°	14400	5	2	●	AO-T12
APX3000R353WA32LA	●	35	32	190	45	1.11	10	2.7°	13700	3	3	●	AO-T12
APX3000R403WA32SA	□	40	32	125	45	0.75	10	2.2°	12800	3	3	●	AO-T12
APX3000R405WA32SA	●	40	32	125	45	0.75	10	2.2°	12800	5	3	●	AO-T12
APX3000R406WA32SA	●	40	32	125	45	0.76	10	2.2°	12800	6	3	●	AO-T12

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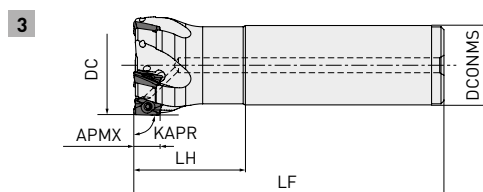
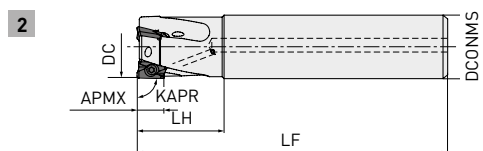
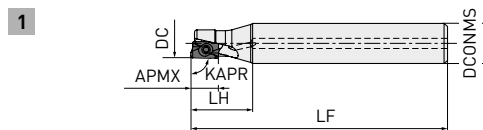
1. When using inserts with corner radius $RE \geq 2.4$, machining of the holder is required as shown on page 10.
2. The maximum allowable spindle speeds (RPMX) are set to ensure tool and insert stability.
3. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

● : Inventory maintained. ★ : Inventory maintained in Japan. □ : Produced to order only

APX3000



MULTI-FUNCTIONAL MILLING



STRAIGHT SHANK TYPE

Right hand tool holder only

Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	RMPX	RPMX	ZEFP	Type		
APX3000R121SA16SA	★	12	12	85	25	0.10	10	6.0°	10500	1	1	●	AO-T12
APX3000R141SA16SA	★	14	14	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	18	85	25	0.11	10	8.6°	19600	2	3	●	AO-T12
APX3000R182SA16LA	●	18	18	120	25	0.16	10	8.6°	19600	2	3	●	AO-T12
APX3000R182SA16ELA	●	18	18	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	22	115	30	0.25	10	5.7°	17600	3	3	●	AO-T12
APX3000R222SA20LA	●	22	22	150	30	0.34	10	5.7°	17600	2	3	●	AO-T12
APX3000R222SA20ELA	★	22	22	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 $RE \geq 2.4$, machining of the holder is required as shown on page 10.
2. The maximum allowable 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.



APX3000 – MULTI-FUNCTIONAL MILLING – STRAIGHT SHANK TYPE

Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	RMPX	RPMX	ZEFP	Type		
APX3000R284SA25SA	★	28	28	115	35	0.40	10	3.8°	15500	4	3	●	AO-T12
APX3000R282SA25LA	★	28	28	170	35	0.61	10	3.8°	15500	2	3	●	AO-T12
APX3000R283SA25LA	★	28	28	170	35	0.61	10	3.8°	15500	3	3	●	AO-T12
APX3000R282SA25ELA	★	28	28	220	35	0.80	10	3.8°	15500	2	3	●	AO-T12
APX3000R283SA25ELA	★	28	28	220	35	0.79	10	3.8°	15500	3	3	●	AO-T12
APX3000R304SA32SA	★	30	30	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	35	190	45	1.12	10	2.7°	13700	2	3	●	AO-T12
APX3000R353SA32LA	★	35	35	190	45	1.11	10	2.7°	13700	3	3	●	AO-T12
APX3000R352SA32ELA	★	35	35	260	45	1.53	10	2.7°	13700	2	3	●	AO-T12
APX3000R353SA32ELA	★	35	35	260	45	1.52	10	2.7°	13700	3	3	●	AO-T12
APX3000R403SA32SA	★	40	40	125	45	0.75	10	2.2°	12800	3	3	●	AO-T12
APX3000R405SA32SA	★	40	40	125	45	0.75	10	2.2°	12800	5	3	●	AO-T12
APX3000R406SA32SA	★	40	40	125	45	0.76	10	2.2°	12800	6	3	●	AO-T12
APX3000R507SA32SA	★	50	50	125	45	0.90	10	1.7°	11300	7	3	●	AO-T12
APX3000R638SA32SA	★	63	63	125	45	1.04	10	1.3°	10000	8	3	●	AO-T12
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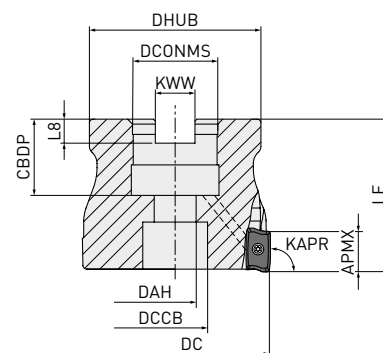
1. When using inserts with corner radius $RE \geq 2.4$, machining of the holder is required as shown on page 10.
2. The maximum allowable spindle speeds (RPMX) are set to ensure tool and insert stability.
3. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.



APX3000



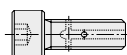
MULTI-FUNCTIONAL MILLING



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
APX3000-080A09RA	●	80	27	50	1.3	10	1.0°	8800	9	●	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 $RE \geq 2.4$, machining of the holder is required as shown on page 10.
2. The maximum allowable 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.



MOUNTING DIMENSIONS

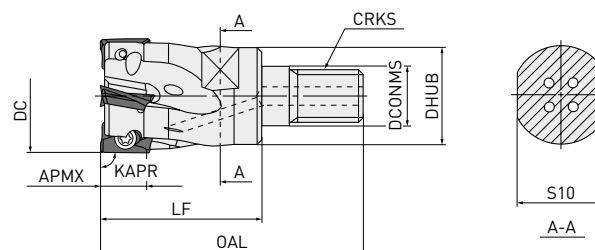
Order number	DC	DCONMS	CDDP	DAH	DCCB	DHUB	KWW	L8
APX3000-032A05RA	32	16	18	9	14	30	8.4	5.6
APX3000-040A06RA	40	16	18	9	14	34	8.4	5.6
APX3000-050A07RA	50	22	20	11	17	45	10.4	6.3
APX3000-063A08RA	63	22	20	11	17	55	10.4	6.3
APX3000-080A09RA	80	27	23	13	20	70	12.4	7
APX3000-100A11RA	100	32	26	17	26	80	14.4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

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APX3000



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		
APX3000R162M08A	●	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
APX3000R203M10A	●	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
APX3000R254M12A	●	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
APX3000R325M16A	●	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
APX3000R406M16A	●	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 $RE \geq 2.4$, machining of the holder is required as shown on page 10.
2. For screw-in type arbors, refer to page 32.



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	APX3000-080			TPS25-1	TIP07F	MK1KS
100	APX3000-100			TPS25-1	TIP07F	MK1KS

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

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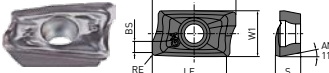
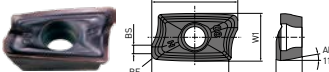
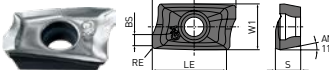
APX3000

INSERTS

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

Order number	Class	Edge preparation	Coated										*1	*2	Geometry							
			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	MX3030	TF15	MV1020	MV1030								
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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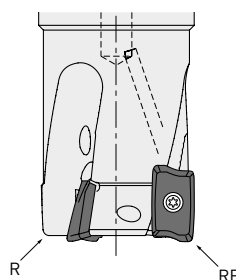
*1: Cermet

*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 $RE \geq R$ 2.4, please machine the holder with a radius form as shown on the right.



RE (mm) R (mm)

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 Grade				ae			
			1st	2nd			≤0.25DC	0.25 – 0.5DC	0.5 – 0.75DC	DC (Slot)
							Vc			
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)
	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)
N	Aluminum alloy	—	TF15	—	GM	—	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)
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MV1000 INSERTS

CUTTING SPEED (DRY CUTTING)

Material	Properties		Conditions	Recommendation	ae							
					≤0.25 DC		0.25 – 0.5 DC		0.5 – 0.75 DC		DC (Slot)	
					MV1020	MV1030	MV1020	MV1030	MV1020	MV1030	MV1020	MV1030
P	Mild steel	≤180HB		L M	280 (220–330)	230 (180–270)	270 (210–320)	220 (170–260)	220 (170–260)	180 (140–210)	220 (170–260)	180 (140–210)
	Carbon steel, Alloy steel	180 – 280HB		L M	220 (170–260)	180 (140–210)	210 (160–240)	170 (130–200)	170 (130–200)	140 (110–160)	170 (130–200)	170 (130–200)
		280 – 350HB		L M	180 (140–210)	180 (140–210)	170 (130–200)	170 (130–200)	140 (110–160)	140 (110–160)	140 (110–160)	140 (110–160)
M	Austenitic stainless steel	≤200HB		L M	—	180 (140–210)	—	170 (130–200)	—	140 (110–160)	—	140 (110–160)
		>200HB		L M	—	150 (110–180)	—	140 (100–160)	—	110 (80–130)	—	110 (80–130)
	PH stainless steel	<450HB		L M	—	140 (110–170)	—	140 (110–170)	—	140 (110–170)	—	140 (110–170)
K	Gray cast iron	≤450HB		M L	200 (150–280)	150 (100–200)	190 (140–270)	140 (90–190)	170 (130–240)	125 (80–170)	170 (130–240)	100 (80–120)
	Ductile cast iron	≤800MPa		M L	180 (140–250)	150 (100–200)	170 (130–240)	140 (90–190)	150 (120–210)	125 (80–170)	150 (120–210)	150 (120–210)

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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	≤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
		0.25 – 0.5DC	≤2	0.15	≤3	0.25	≤3	0.20
			2 – 5	0.10	3 – 5.5	0.20	3 – 5.5	0.15
			—	—	5.5 – 8	0.15	5.5 – 8	0.10
			—	—	8 – 10	0.10	8 – 10	0.07
		0.5 – 0.75DC	≤4	0.10	≤4	0.15	≤3	0.10
			—	—	4 – 10	0.10	3 – 7	0.07
		DC (Slot)	≤3	0.10	≤4	0.10	≤3	0.10
					4 – 7	0.07	3 – 5	0.07
M	Stainless steel	≤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
		0.25 – 0.5DC	≤2	0.15	≤3	0.20	≤3	0.20
			2 – 5	0.10	3 – 5.5	0.15	3 – 5.5	0.15
			—	—	5.5 – 8	0.10	5.5 – 8	0.10
			—	—	8 – 10	0.07	8 – 10	0.07
		0.5 – 0.75DC	≤4	0.10	≤4	0.10	≤3	0.10
			—	—	4 – 10	0.07	3 – 7	0.07
		DC (Slot)	≤3	0.10	≤4	0.10	≤3	0.10
					4 – 7	0.07	3 – 5	0.07
K	Gray cast iron	≤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
		0.25 – 0.5DC	≤2	0.15	≤3	0.25	≤3	0.20
			2 – 5	0.10	3 – 5.5	0.20	3 – 5.5	0.15
			—	—	5.5 – 8	0.15	5.5 – 8	0.10
			—	—	8 – 10	0.10	8 – 10	0.07
		0.5 – 0.75DC	≤4	0.10	≤4	0.15	≤3	0.10
			—	—	4 – 10	0.10	3 – 7	0.07
		DC (Slot)	≤3	0.10	≤4	0.10	≤3	0.10
					4 – 7	0.07	3 – 5	0.07

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1. These cutting conditions are a guide to the standard shank type and the arbor type. Please make adjustments according to the machining conditions.
2. 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.
3. In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
4. For heavy interrupted and unstable cutting, the H chipbreaker 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
				—	—	8.5 – 10	0.07	8.5 – 10	0.07
			0.25 – 0.5DC	≤2	0.10	≤3	0.20	≤3	0.20
				2 – 5	0.07	3 – 5.5	0.15	3 – 5.5	0.15
				—	—	5.5 – 8	0.10	5.5 – 8	0.10
				—	—	8 – 10	0.07	8 – 10	0.07
			0.5 – 0.75DC	≤4	0.07	≤4	0.10	≤3	0.10
				—	—	4 – 10	0.07	3 – 7	0.07
			DC (Slot)	<3	0.07	≤4	0.10	≤3	0.10
						4 – 7	0.07	3 – 5	0.07
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
				—	—	7 – 8.5	0.07	—	—
			0.25 – 0.5DC	≤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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2/2

1. These cutting conditions are a guide to the standard shank type and the arbor type. Please make adjustments according to the machining conditions.
2. 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.
3. In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
4. For heavy interrupted and unstable cutting, the H chipbreaker is first recommendation.

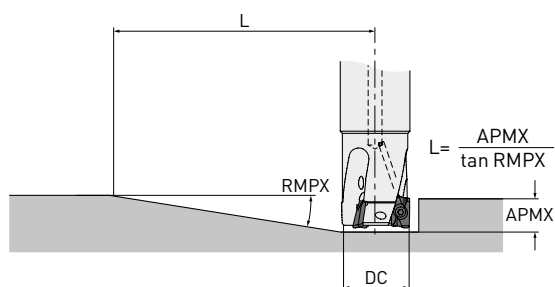
APX3000

RAMPING/HELICAL CUTTING

1 Ramping

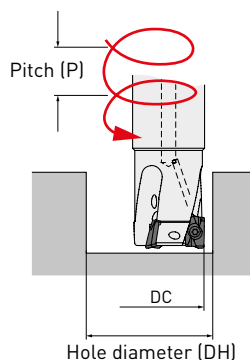
Refer to the table below for cutting conditions.

For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

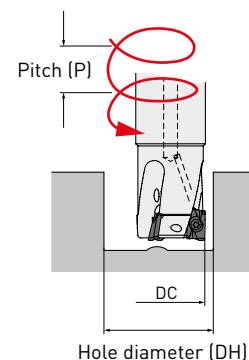


2 Helical cutting

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

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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 $L (=10 / \tan \alpha)$. 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.

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

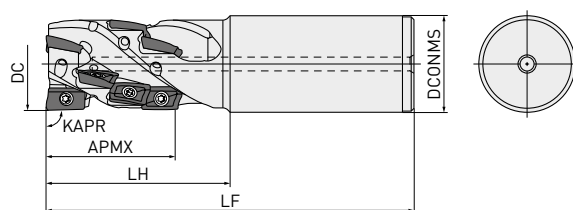
APX3000



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 $RE \geq 2.4$, machining of the holder is required as shown on page 10.
- Corner radius $RE 0.8$ is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting).
Inserts $RE 0.2$ and 0.4 can also be used.



SPARE PARTS

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

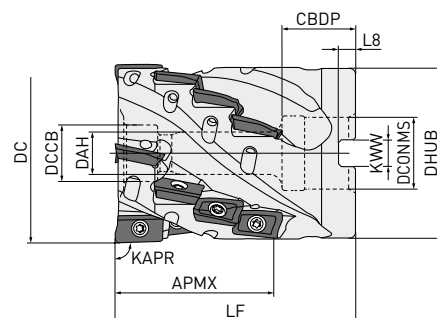
APX3000



DEEP SHOULDER MILLING



LONG CUTTING EDGE



Right hand tool holder only

DC Set Bolt Geometry

Ø40	HSC08040	
Ø50	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 $RE \geq 2.4$, machining of the holder is required as shown on page 10.
- Corner radius $RE 0.8$ is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting).
Inserts $RE 0.2$ and 0.4 can also be used.
- Coolant can be supplied from the end face of the central location bore in the arbor.
However, it cannot be supplied from the set bolt.



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

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

Material	Insert Grade				ae		
					≤0.25DC	0.25 – 0.75DC	DC (Slot)
	1st	2nd			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)
	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)
M	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)
K	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)
N	Ductile cast iron	VP15TF —	M	H	160 (120 – 200)	140 (100 – 180)	80 (60 – 100)
		TF15 MP9120	GM	M	400 (200 – 800)	400 (200 – 800)	400 (200 – 800)
S	Aluminum alloy	MP9130 —	M	—	40 (30 – 60)	—	40 (30 – 60)
		MP9120 —	M	—	50 (40 – 70)	—	50 (40 – 70)
	Titanium alloy	MP9120 VP15TF	M	H	40 (30 – 60)	—	40 (30 – 60)
		MP9130 VP20RT	M	H	30 (20 – 40)	—	30 (20 – 40)
S	Heat resistant alloy	MP9120 VP15TF	M	H	40 (30 – 60)	—	40 (30 – 60)
		MP9130 VP20RT	M	H	30 (20 – 40)	—	30 (20 – 40)

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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

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

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
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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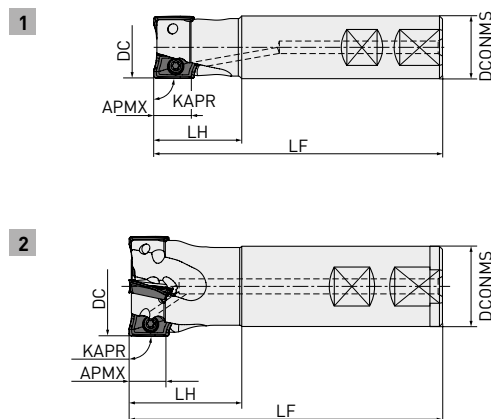
2/2

1. The above cutting conditons 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



WELDON SHANK TYPE

Right hand tool holder only

Order number	Stock	DC	DCONMS	LF	LH	WT	APMX	RMPX	RPMX	ZEFP	Type		
APX4000R252WA25SA	●	25	25	115	35	0.40	15	11°	18900	2	1	●	AO-T18
APX4000R252WA25LA	●	25	25	170	35	0.61	15	11°	18900	2	1	●	AO-T18
APX4000R252WA25ELA	●	25	25	220	80	0.76	15	11°	18900	2	1	●	AO-T18
APX4000R282WA25LA	●	28	25	170	35	0.63	15	9°	17700	2	2	●	AO-T18
APX4000R282WA25ELA	●	28	25	220	35	0.81	15	9°	17700	2	2	●	AO-T18
APX4000R323WA32SA	●	32	32	125	45	0.71	15	7°	16300	3	1	●	AO-T18
APX4000R323WA32LA	●	32	32	190	45	1.11	15	7°	16300	3	1	●	AO-T18
APX4000R323WA32ELA	●	32	32	260	100	1.49	15	7°	16300	3	1	●	AO-T18
APX4000R353WA32LA	●	35	32	190	45	1.14	15	6°	15400	3	2	●	AO-T18
APX4000R403WA32SA	●	40	32	125	45	0.80	15	6°	14200	3	2	●	AO-T18
APX4000R404WA32SA	●	40	32	125	45	0.80	15	6°	14200	4	2	●	AO-T18
APX4000R404WA32LA	●	40	32	190	45	1.19	15	6°	14200	4	2	●	AO-T18

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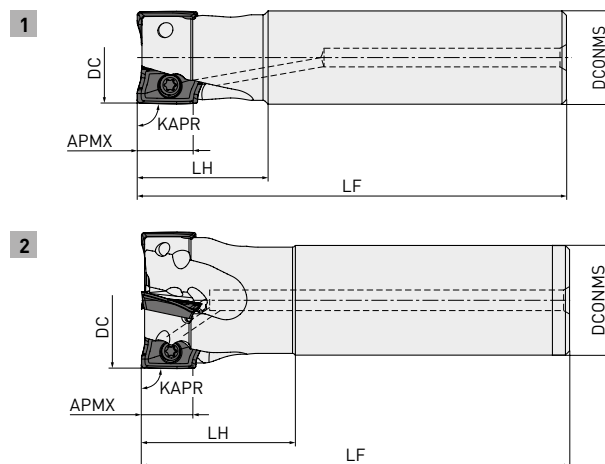
1. When using inserts with corner radius $RE \geq 3.2$, machining of the holder is required as shown on page 24.
2. The maximum allowable spindle speeds (RPMX) are set to ensure tool and insert stability.
3. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.



APX4000



MULTI-FUNCTIONAL MILLING



STRAIGHT SHANK TYPE

Right hand tool holder only

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

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1. When using inserts with corner radius $RE \geq 3.2$, machining of the holder is required as shown on page 24.
2. The maximum allowable 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.



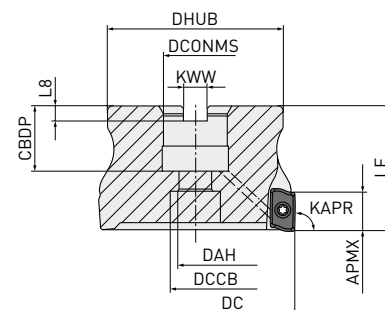
APX4000



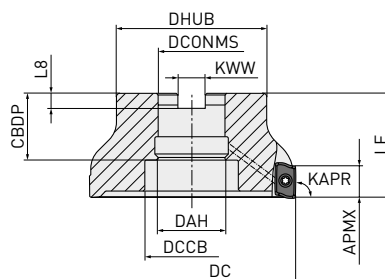
MULTI-FUNCTIONAL MILLING



1



2



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
APX4000-080A07RA	●	80	27	50	1.2	15	2.0°	9300	7	1	●	AO-T18
APX4000-100A08RA	●	100	32	50	2.1	15	1.5°	8100	8	1	●	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

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1. When using inserts with corner radius $RE \geq 3.2$, machining of the holder is required as shown on page 24.
2. The maximum allowable 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.



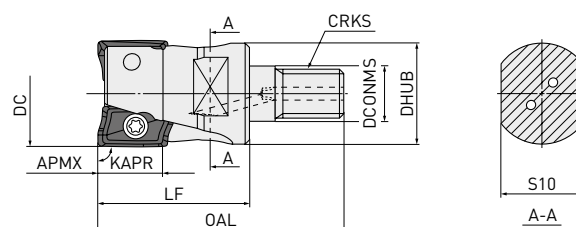
APX4000 – MULTI-FUNCTIONAL MILLING – ARBOR TYPE**MOUNTING DIMENSIONS**

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
APX4000-080A07RA	80	27	23	13	20	60	12.4	7
APX4000-100A08RA	100	32	26	17	27	70	14.4	8
APX4000-125A09RA	125	40	40	42	56	90	16.4	9
APX4000-160A10RA	160	40	40	42	72	100	16.4	9
								1/1

APX4000



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

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- When using inserts with corner radius $RE \geq 3.2$, machining of the holder is required as shown on page 24.
- For screw-in type arbors, refer to page 32.



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	APX4000-080	TPS43	TIP15W	MK1KS
		100	APX4000-100	TPS43	TIP15W	MK1KS
		125	APX4000-125	TPS43	TIP15W	MK1KS
		160	APX4000-160	TPS43	TIP15W	MK1KS

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

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

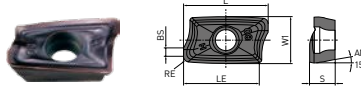
APX4000

INSERTS

P	Steel		◆	◆			◆	◆	◆	◆
M	Stainless steel			◆			◆	◆	◆	◆
K	Cast iron	◆					◆	◆	◆	◆
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

Order number	Class	Edge preparation	Coated										Geometry						
			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	MV1020	MV1030	L	LE	W1	S	BS	RE	General M
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	Strong cutting Edge type H	
AOMT184804PEER-H	M	E	●	●	●	●	●	●	●	●	●	18	15	9	4.8	1.8	0.4		
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		

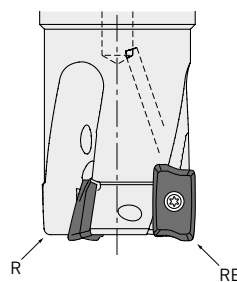
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1. Please note that the corner radius RE is different from the workpiece material of R shape depending on the axial rake angle of the body. For more information, please contact our sales offices.

NOTE ON USE OF INSERTS WITH LARGE CORNER RADII

When using inserts with corner radius $RE \geq R$ 3.2, please machine the holder with a radius form as shown on the right.



RE (mm)	R (mm)
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 Grade				ae			
												≤0.25DC	0.25 – 0.5DC	0.5 – 0.75DC	DC (Slot)
												1st	2nd	Vc	
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)					
	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															

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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, Carbon steel, Alloy 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
		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	7.5 – 10	0.07	0.07	0.07
				≤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
			0.5 – 0.75DC	12.5 – 15	0.10	0.07	0.07
				≤5	0.20	0.15	0.15
				5 – 10	0.15	0.10	0.10
				10 – 15	0.10	0.07	0.07
				DC (Slot)	≤5	0.15	0.15
5 – 7.5	0.10	0.10	0.10				
7.5 – 10	0.07	0.07	0.07				

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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 chipbreaker 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	
			≤5	0.15	0.15	0.15	
		DC (Slot)	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
	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
	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	
		7.5 – 10	0.07	0.07	0.07		
S	Titanium alloy	≤350HB	≤0.25DC	≤5	0.15	0.10	0.10
				5 – 7.5	0.10	0.05	0.05
			DC (Slot)	7.5 – 10	0.05	—	—
				≤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
			0.25 – 0.5DC	≤5	0.10	0.10	0.10
				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/

2/2

1. These cutting conditions are a guide to the standard shank type and the arbor type.
Please make adjustments according to the machining conditions.
2. 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.
3. In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
4. For heavy interrupted and unstable cutting, the H chipbreaker is first recommendation.

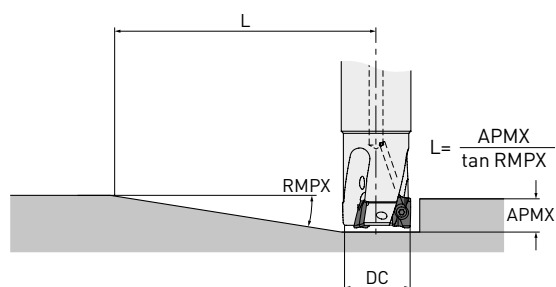
APX4000

RAMPING/HELICAL CUTTING

1 Ramping

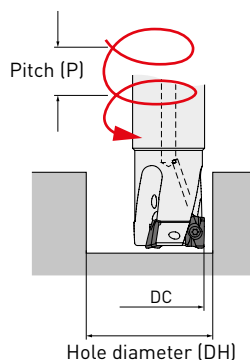
Refer to the table below for cutting conditions.

For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

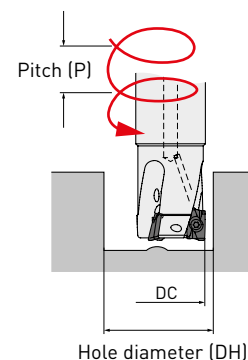


2 Helical cutting

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 α). 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.

{(cutting edge diameter DC) – (corner radius) – 0.2} x 2

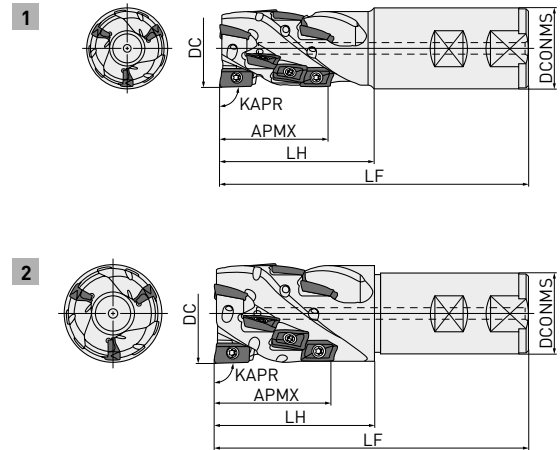
APX4000



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		
APX4KR4008WA40S056A	●	40	40	150	80	1.54	56	2	8	1	●	AO-T18
APX4KR4012WA40S056A	●	40	40	150	80	1.54	56	3	12	1	●	AO-T18
APX4KR5012WA40S056A	●	50	40	150	80	1.76	56	3	12	2	●	AO-T18
APX4KR5018WA40M084A	●	50	40	180	110	2.18	84	3	18	2	●	AO-T18

1/1

1. When using inserts with corner radius $RE \geq 3.2$, machining of the holder is required as shown on page 24.
2. 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).



SPARE PARTS



Clamp screw*

TPS43



Wrench

TIP15W



Anti-seize-lubricant

MK1KS

* Clamp Torque (N • m): TPS43 = 4.0

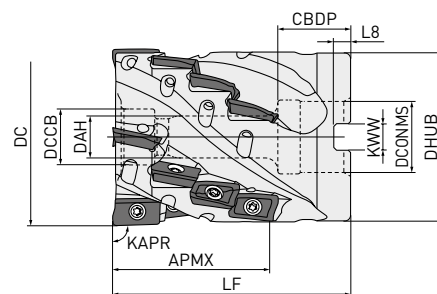
APX4000



DEEP SHOULDER MILLING

P M S K

LONG CUTTING EDGE



Right hand tool holder only

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	●	A0T18
APX4K-063A16A056RA	●	63	27	85	1.63	56	4	16	●	A0T18

1/1

- When using inserts with corner radius $RE \geq 3.2$, machining of the holder is required as shown on page 24.
- 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).
- Coolant can be supplied from the end face of the central location bore in the arbor.
However, it cannot be supplied from the set bolt.



MOUNTING DIMENSIONS

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

1/1

APX4000

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

						ae			
Material	Hardness	Insert Grade				Vc			
		1st	2nd			≤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)
	Ductile cast iron	≤800MPa	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)
	Heat resistant alloy	—	MP9120	VP15TF	H	M	40 (30 – 60)	—	40 (30 – 60)
			MP9130	VP20RT	H	M	30 (20 – 40)	—	30 (20 – 40)

1/1

1/1

APX4000 – DEPTH OF CUT / FEED PER TOOTH

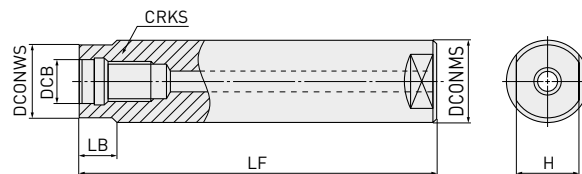
Material	Properties	ae	ap	DC		
				fz		
				Ø 40 APMX 56 mm Ø 50 APMX 42 mm	Ø 50 APMX 56 mm Ø 63 APMX 56 mm	Ø 50 APMX 84 mm
P	Mild steel	≤180HB	≤20	0.25	0.25	0.20
			20 – 50	0.20	0.20	0.15
			50 – 80	—	—	0.10
		DC (Slot)	≤20	0.20	0.20	0.15
			20 – 50	0.15	0.15	—
	Carbon steel, Alloy steel	180 – 350HB	≤20	0.25	0.25	0.20
			20 – 50	0.20	0.20	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
		DC (Slot)	≤10	0.10	0.10	0.07
	Gray cast iron	Tensile Strength ≤350MPa	≤10	0.30	0.30	0.25
			10 – 50	0.25	0.25	0.20
			50 – 80	—	—	0.15
		0.15 – 0.3DC	≤10	0.25	0.25	0.20
			10 – 50	0.20	0.20	0.15
			50 – 80	—	—	0.10
		DC (Slot)	≤10	0.25	0.25	0.20
			10 – 50	0.20	0.20	0.15
K	Ductile cast iron	Tensile Strength ≤800MPa	≤20	0.25	0.25	0.20
			20 – 50	0.20	0.20	0.15
			50 – 80	—	—	0.10
		0.15 – 0.3DC	≤20	0.20	0.20	0.15
			20 – 50	0.15	0.15	0.10
			50 – 80	—	—	0.07
		DC (Slot)	≤10	0.15	0.15	0.10
			10 – 50	0.10	0.10	—
S	Titanium alloy	≤350HB	≤20	0.10	0.10	—
			20 – 50	0.10	0.10	—
		DC (Slot)	≤50	0.08	0.08	—
	Heat resistant alloy	—	≤10	0.07	0.07	—
			≤20	0.05	0.05	—

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

1/1

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

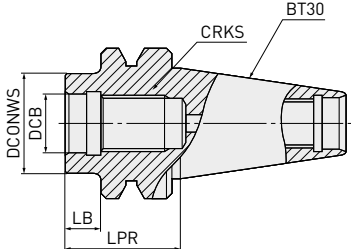


Cutting tools become extremely hot during cutting. Do not handle the cutting tools with bare hands as this may cause injuries.

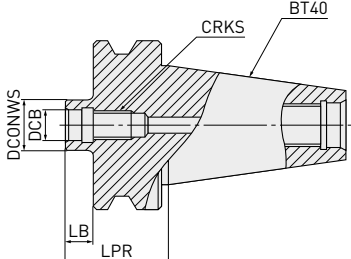
ARBORS

ARBORS FOR SCREW-IN TOOLS

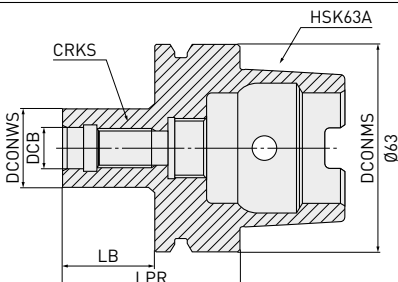
BT30 SHANK ARBOR

Order number	Stock	DCB	DCONWS	LPR	LB	CRKS	Shape	Geometry
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	Shape	Geometry
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	Shape	Geometry
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		

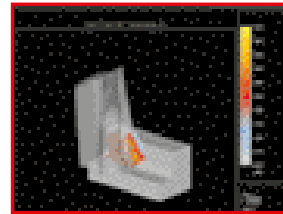
APX3000 / 4000

CUTTING PERFORMANCE

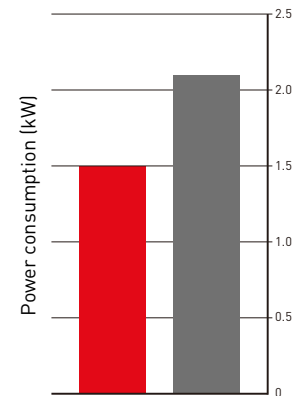
POWER CONSUMPTION COMPARISON

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

Cutting simulation

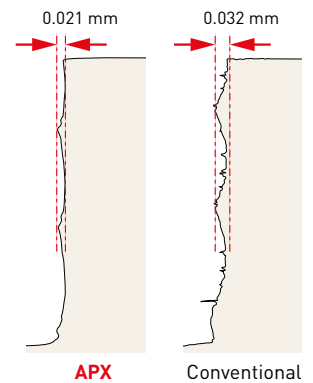


Down 30 %!



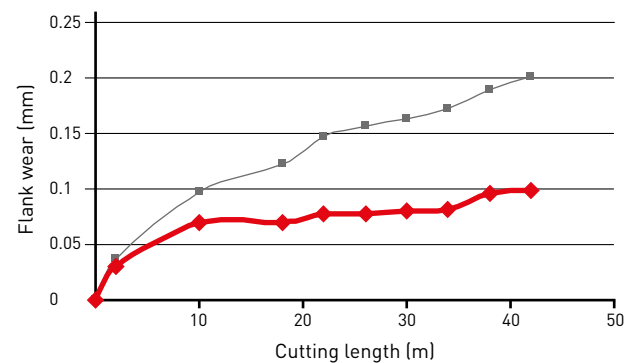
WALL SURFACE ACCURACY

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



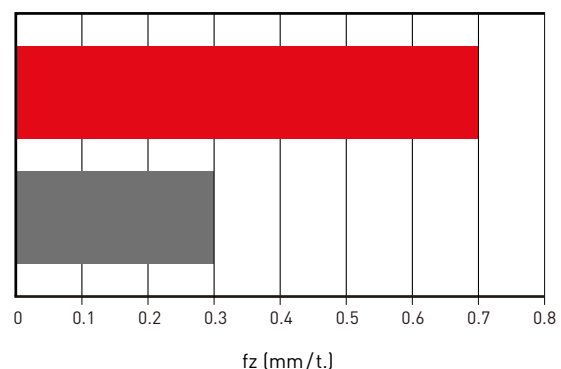
WEAR RESISTANCE

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



APX3000 / 4000

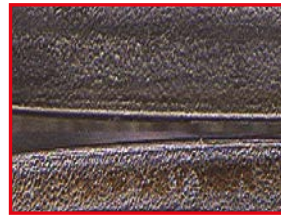
CUTTING PERFORMANCE

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



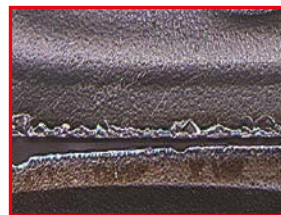
Conventional

APPLICATION EXAMPLES IN Inconel®718

Superior wear and chipping resistance.

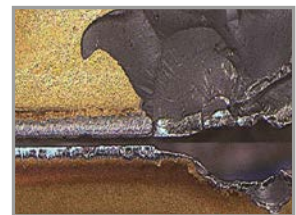
Material	Inconel®718
Tool	APX3000R324SA32SA
Insert	AOMT123608PEER-M
Grade	MP9130
Vc (m/min)	30
fz (mm/t)	0.15
ap (mm)	5
ae (mm)	8
Cutting mode	Wet cutting

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



MP6120

Cutting length 28 m



Conventional A

Cutting length 15 m



Conventional B

SYMBOLS

 Recommended cutting conditions	MACHINING TYPE
NEW Completely new products or expansions released in the current Spring or Autumn product launch and are not included in the latest version of the General Catalogue.	 Roughing
NEW Products or expansions that have already been introduced in one of the previous Spring or Autumn product launches but are not included in the latest General Catalogue.	 Medium cutting
APPLICATION	 Light cutting
 Face milling	 Pre-finishing
 Chamfer milling	 Finishing
 Shoulder milling with R	 Fine-finishing
 Face milling close to a wall	TOOL MATERIAL
 Shoulder milling	 Ultra micro grain carbide Ultra micro grain carbide substrate material.
 Side milling	 Cubic boron nitride Mitsubishi Materials' original CBN material.
 Slot milling	 Ceramic For high speed efficient machining of super alloys due to the excellent high temperature strength property.
 Ramping	 High hardness powder metallurgy HSS High hardness powder metallurgy HSS substrate material.
 Pocket milling	 High grade high alloy HSS High grade high alloy HSS substrate material.
 Slot milling with R	 Cobalt high speed steel Cobalt high speed steel substrate material.
 Copy milling	 High speed steel High speed steel substrate material.
 T-Slot milling	

SYMBOLS

COATING



SMART MIRACLE coating

New smooth and dense coating technology for high efficiency milling of difficult to cut materials.



CRN coating

Newly developed CrN coating for Copper Electrodes machining.



Violet coating

Increased tool life of 2-3 times more than TiN coated products.



DP coating

New generation coating suitable for a wide range of materials.



MIRACLE coating

The original Miracle (Al,Ti)N coating. Also suitable for dry cutting.



[Al, Ti]N coating

[Al,Ti]N highly versatile application range.



[Al,Ti,Cr]N multi-layer coating

For carbon, alloy and hardened steels.



IMPACT MIRACLE coating

Single phase nano crystal coating technology has higher film hardness and heat resistance.



MIRACLE coating

The original MIRACLE (Al,Ti)N coating. Also suitable for dry cutting.



VFR coating

The [AlCrSi]N/[AlTiSi]N PVD multilayer coating is ideal for machining of extremely hard materials up to 70 HRC.



DLC coating

Hardness similar to CVD diamond coating achieved with high adhesion strength.



Diamond coating

Suitable for CFRP and CFRP-aluminium materials.



Diamond coating

Suitable for graphite machining.



Diamond coating

The original CVD diamond coating.



CVD Diamond coating

Unique multi-layer micro-grain diamond crystal control technology drastically improves wear resistance and smoothness.

CUTTING EDGE PROPERTIES



Sharp corner edge

Indicates the end mill has a sharp corner edge.



Gash land

Indicates the end mill cutting edge has a protective chamfer.



Rake angle



Helix angle

Indicates the helix angle of the end mill.



Point angle

Indicates the drill point angle.



Roughing flute geometry



Variable helix



Rounded gash



Corner angle

WEB THINNING



X type point geometry

X web thinning used at the drill point.



XR type point geometry

XR web thinning used at the drill point.



S type point geometry

Easy cutting geometry.



N type point geometry

Effective when the point web is thick.



Chipbreaker

SYMBOLS

TOLERANCES



Tolerance of taper angle
Indicates the tolerance of the taper angle.



R tolerance
Indicates the radial tolerance of a ball nose end mill.



R tolerance
Indicates the radial tolerance of the corner radius.



R tolerance
Indicates the radial tolerance of a cutter with a corner radius.



Outside diameter tolerance
Indicates the diameter tolerance of the end mill.



Peak tolerance
Indicates the tolerance for the end diameter.



Shank diameter tolerance



Shank diameter tolerance



Drill tolerance / diameter

COOLANT HOLES



External coolant



Internal coolant



Internal coolant



Centered, internal coolant hole



Radial, internal coolant holes



Internal coolant holes



Internal coolant holes

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