DIA EDGE
TOOL NEWS
2022.7 Update
B116G

For Machining of Aluminium and Titanium Alloys

AXD Series

Series Expansion

Multi-Functional Milling Cutter with Unique Technology for High-Speed and High Efficiency Machining

MITSUBISHI MATERIALS CORPORATION

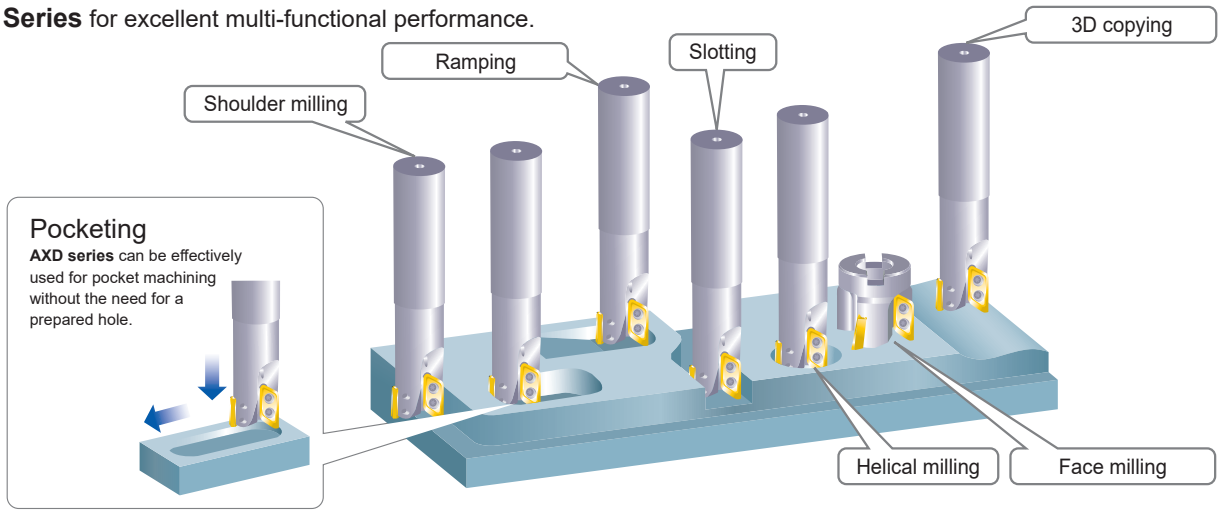
For Machining of Aluminium and Titanium Alloys

AXD Series

Features

Multi-Functional Milling

AXD Series for excellent multi-functional performance.



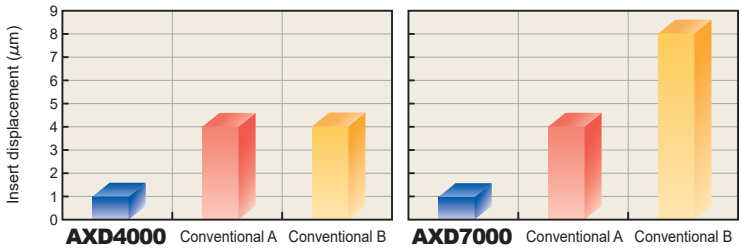
Designed for high-speed, efficiency and safety

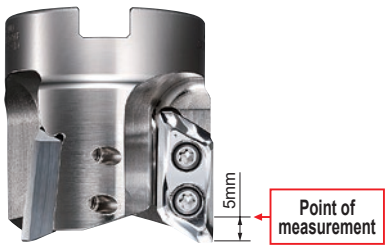
At high spindle speeds the double clamping screws prevent insert displacement caused by centrifugal force. The double clamping offers both reliability and safety.

<Cutting conditions>
Tool : AXD4000-050A04RA
AXD7000-050A03RA
Insert : XDGX175008PDFR-GL
XDGX227008PDFR-GL
Spindle speed : 20000min^{-1}
(for air cutting)

Insert Displacement due to Centrifugal Force

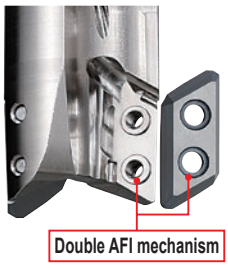
Insert displacement after air cutting





High Spindle Speeds Possible

Safe and reliable high spindle speed milling can be achieved due to the use of double screw clamping and MITSUBISHI MATERIALS' proprietary “Anti Fly Insert” mechanism (Double AFI).



High Balance Quality

To prevent vibration under high spindle speeds the holder is balanced to G6.3 or better at 10000min^{-1}, according to the ISO1940 standard. (The holder is balanced without the inserts and the screws in place.)

AXD Insert Grades

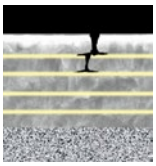
Al-Ti-Cr-N Accumulated Coating Series

MP6100/MP9100

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

Base Layer
High Al-(Al, Ti)N

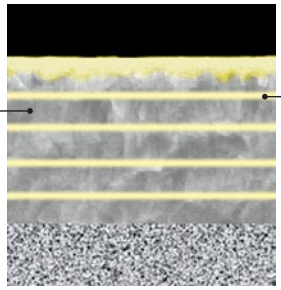
The new technology Al-(Al, Ti)N coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



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

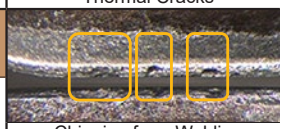
*Graphical Representation.

Al-Ti-Cr-N Based PVD Coating



*Graphical Representation.

Ideal Layers for Different Workpiece Materials

P	(Al,Cr)N Tough! Against Thermal Cracks	 Thermal Cracks
S	CrN Tough! Resistant to Chipping	 Chipping from Welding

DLC Coated

LC15TF

DLC coating prevents the chips from welding to the rake face that provides improved surface finishes and high efficiency machining. LC15TF can be used for both wet and dry machining.

Micro-Grain Cemented Carbide

TF15

Micro-grain cemented carbide with superior resistance to wear and fracturing. TF15 ensures stable cutting and efficient machining of aluminium alloys. The special mirror treatment on the rake face prevents chip welding for reliability and longer tool life.

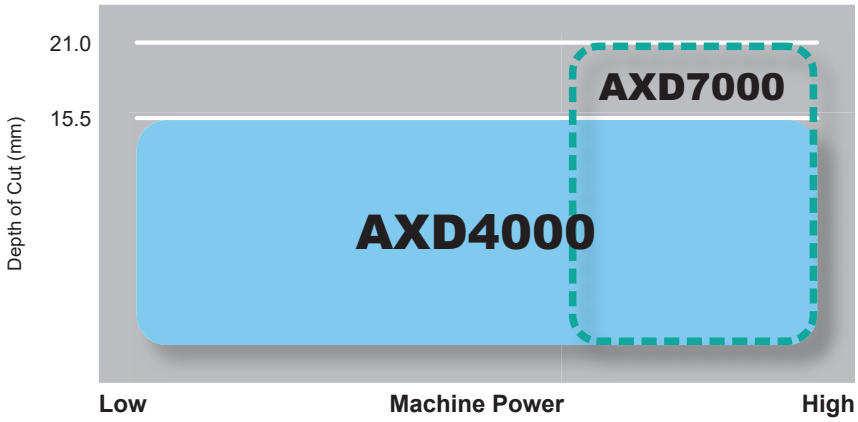
GM breaker — AXD4000

Improved fracture resistance compared to the GL breaker

GL, GLA breaker — AXD4000 AXD7000

Low cutting resistance breaker emphasises good sharpness

Correct Use of the AXD4000 and AXD7000



MULTI FUNCTIONAL MILLING

<ALUMINIUM ALLOY TO DIFFICULT-TO-CUT MATERIAL CUTTING>

AXD4000

P	M	K	N	S	H
Steel			Non-ferrous Metal	Heat Resistant Alloy	

Fig.1

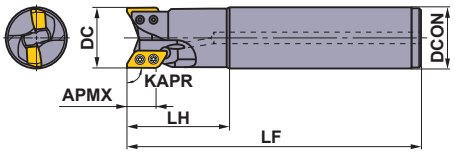
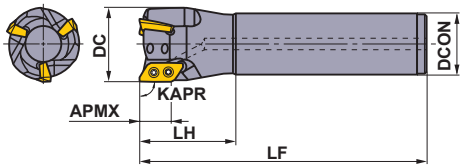


Fig.2



Right hand tool holder only.

■Shank Type

With Coolant Hole

(mm)

DC	Type	Insert Corner Radius RE	Order Number	Stock R	∗1 No.T	LF	LH	DCON	WT (kg)	APMX	Max. Allowable Revolution (min^{-1})	Fig.	Insert Type
20	A Type	0.4-3.2	**AXD4000R201SA20SA**	●	1	110	35	20	0.22	15.5	15000	1	XDGX1750
20	B Type	4.0-5.0	**AXD4000R201SA20SB**	●	1	110	35	20	0.22	14.8	15000	1	XDGX1750
25	A Type	0.4-3.2	**AXD4000R252SA25SA**	●	2	125	50	25	0.38	15.5	49000	1	XDGX1750
25	B Type	4.0-5.0	**AXD4000R252SA25SB**	●	2	125	50	25	0.38	14.8	49000	1	XDGX1750
25	A Type	0.4-3.2	**AXD4000R252SA25LA**	●	2	170	80	25	0.53	15.5	49000	1	XDGX1750
25	B Type	4.0-5.0	**AXD4000R252SA25LB**	●	2	170	80	25	0.53	14.8	49000	1	XDGX1750
28	A Type	0.4-3.2	**AXD4000R282SA25SA**	●	2	125	50	25	0.41	15.5	48500	2	XDGX1750
28	B Type	4.0-5.0	**AXD4000R282SA25SB**	●	2	125	50	25	0.41	14.8	48500	2	XDGX1750
28	A Type	0.4-3.2	**AXD4000R282SA25ELA**	●	2	220	50	25	0.76	15.5	48500	2	XDGX1750
28	B Type	4.0-5.0	**AXD4000R282SA25ELB**	●	2	220	50	25	0.76	14.8	48500	2	XDGX1750
32	A Type	0.4-3.2	**AXD4000R322SA32SA**	●	2	150	50	32	0.80	15.5	48000	1	XDGX1750
32	B Type	4.0-5.0	**AXD4000R322SA32SB**	●	2	150	50	32	0.80	14.8	48000	1	XDGX1750
32	A Type	0.4-3.2	**AXD4000R322SA32LA**	●	2	200	80	32	1.09	15.5	48000	1	XDGX1750
32	B Type	4.0-5.0	**AXD4000R322SA32LB**	●	2	200	80	32	1.09	14.8	48000	1	XDGX1750
35	A Type	0.4-3.2	**AXD4000R352SA32SA**	●	2	150	50	32	0.84	15.5	45000	2	XDGX1750
35	B Type	4.0-5.0	**AXD4000R352SA32SB**	●	2	150	50	32	0.84	14.8	45000	2	XDGX1750
35	A Type	0.4-3.2	**AXD4000R352SA32ELA**	●	2	250	50	32	1.45	15.5	45000	2	XDGX1750
35	B Type	4.0-5.0	**AXD4000R352SA32ELB**	●	2	250	50	32	1.45	14.8	45000	2	XDGX1750
40	A Type	0.4-3.2	**AXD4000R403SA32SA**	●	3	150	50	32	0.87	15.5	41000	2	XDGX1750
40	B Type	4.0-5.0	**AXD4000R403SA32SB**	●	3	150	50	32	0.87	14.8	41000	2	XDGX1750
40	A Type	0.4-3.2	**AXD4000R403SA42SA**	●	3	170	80	42	1.53	15.5	41000	1	XDGX1750
40	B Type	4.0-5.0	**AXD4000R403SA42SB**	●	3	170	80	42	1.53	14.8	41000	1	XDGX1750
40	A Type	0.4-3.2	**AXD4000R403SA32ELA**	●	3	250	50	32	1.48	15.5	41000	2	XDGX1750
40	B Type	4.0-5.0	**AXD4000R403SA32ELB**	●	3	250	50	32	1.48	14.8	41000	2	XDGX1750

∗1 Number of Teeth

Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on page 24.

Note 2) When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.

Note 3) Note for inserts with a corner radius of 1.6 and above, as corner radius increases the LF and LH dimensions decrease.

Spare Parts

(mm)

DC	 ∗		
	Clamp Screw	Wrench	Anti-seize Lubricant
20	TS3SBS	TKY08D	MK1KS
>20	TS3SB	TKY08D	MK1KS

∗ Clamp Torque (N • m) : TS3SBS=1.5, TS3SB=1.5

● : **Inventory maintained in Japan.**

Fig. 1
ø40

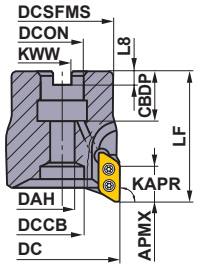


Fig. 2
ø50
ø63
ø80
ø100

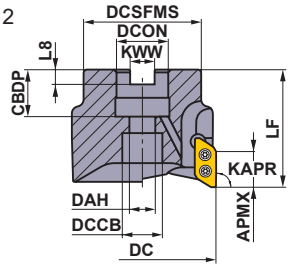
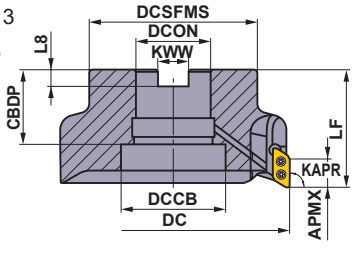


Fig. 3
ø125



Right hand tool holder only.

Cutter Diameter **DC**		Set Bolt	Geometry	
mm	inch			
ϕ40		HFF08043H	①	① ② ③
ϕ50, ϕ63		HSC10030H		
ϕ80	ϕ80	HSC12035H	②	
ϕ100	ϕ100	HSC16040H		
ϕ125	ϕ125	MBA20040H	③	With Coolant Hole

■ Arbor Type

DCON = inch size, With Coolant Hole

(mm)

DC	Type	Insert Corner Radius **RE**	Order Number	Stock **R**	∗1 No.T	**LF**	**DCON**	**WT** (kg)	**APMX**	Max. Allowable Revolution (min^{-1})	Fig.	Insert Type
80	A Type	0.4-3.2	**AXD4000R08005CA**	●	5	50	25.4	1.0	15.5	27000	2	XDGX1750
80	B Type	4.0-5.0	**AXD4000R08005CB**	●	5	50	25.4	1.0	14.8	27000	2	XDGX1750
100	A Type	0.4-3.2	**AXD4000R10006DA**	●	6	63	31.75	2.0	15.5	23000	2	XDGX1750
100	B Type	4.0-5.0	**AXD4000R10006DB**	●	6	63	31.75	2.0	14.8	23000	2	XDGX1750
125	A Type	0.4-3.2	**AXD4000R12507EA**	●	7	63	38.1	2.8	15.5	20000	3	XDGX1750
125	B Type	4.0-5.0	**AXD4000R12507EB**	●	7	63	38.1	2.8	14.8	20000	3	XDGX1750

DCON = mm size, With Coolant Hole

(mm)

DC	Type	Insert Corner Radius **RE**	Order Number	Stock **R**	∗1 No.T	**LF**	**DCON**	**WT** (kg)	**APMX**	Max. Allowable Revolution (min^{-1})	Fig.	Insert Type
40	A Type	0.4-3.2	**AXD4000-040A02RA**	●	2	50	16	0.3	15.5	41000	1	XDGX1750
40	B Type	4.0-5.0	**AXD4000-040A02RB**	●	2	50	16	0.3	14.8	41000	1	XDGX1750
40	A Type	0.4-3.2	**AXD4000-040A03RA**	●	3	50	16	0.3	15.5	41000	1	XDGX1750
40	B Type	4.0-5.0	**AXD4000-040A03RB**	●	3	50	16	0.3	14.8	41000	1	XDGX1750
50	A Type	0.4-3.2	**AXD4000-050A02RA**	●	2	50	22	0.4	15.5	35000	2	XDGX1750
50	B Type	4.0-5.0	**AXD4000-050A02RB**	●	2	50	22	0.4	14.8	35000	2	XDGX1750
50	A Type	0.4-3.2	**AXD4000-050A04RA**	●	4	50	22	0.4	15.5	35000	2	XDGX1750
50	B Type	4.0-5.0	**AXD4000-050A04RB**	●	4	50	22	0.4	14.8	35000	2	XDGX1750
63	A Type	0.4-3.2	**AXD4000-063A05RA**	●	5	50	22	0.6	15.5	30000	2	XDGX1750
63	B Type	4.0-5.0	**AXD4000-063A05RB**	●	5	50	22	0.6	14.8	30000	2	XDGX1750
80	A Type	0.4-3.2	**AXD4000-080A05RA**	●	5	50	27	1.0	15.5	27000	2	XDGX1750
80	B Type	4.0-5.0	**AXD4000-080A05RB**	●	5	50	27	1.0	14.8	27000	2	XDGX1750
100	A Type	0.4-3.2	**AXD4000-100A06RA**	●	6	63	32	2.0	15.5	23000	2	XDGX1750
100	B Type	4.0-5.0	**AXD4000-100A06RB**	●	6	63	32	2.0	14.8	23000	2	XDGX1750
125	A Type	0.4-3.2	**AXD4000-125B07RA**	●	7	63	40	2.8	15.5	20000	3	XDGX1750
125	B Type	4.0-5.0	**AXD4000-125B07RB**	●	7	63	40	2.8	14.8	20000	3	XDGX1750

∗1 Number of Teeth
Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on page 24.
Note 2) When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.
Note 3) Note for inserts with a corner radius of 1.6 and above, as corner radius increases the LF and LH dimensions decrease.

● : **Inventory maintained in Japan.**

Mounting Dimensions

(mm)

DC	Cutter Body Type	DCON	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
40	**AXD4000-040A**	16	18	8.5	12	10.40	34	8.4	5.6	1
50	**AXD4000-050A**	22	20	11.0	17	15.99	45	10.4	6.3	2
63	**AXD4000-063A**	22	20	11.0	17	19.99	50	10.4	6.3	2
80	**AXD4000R080**	25.4	26	13.0	20	14.49	60	9.5	6.0	2
80	**AXD4000-080A**	27	23	13.0	20	14.49	60	12.4	7.0	2
100	**AXD4000R100**	31.75	32	17.0	26	18.99	70	12.7	8.0	2
100	**AXD4000-100A**	32	26	17.0	26	24.99	78	14.4	8.0	2
125	**AXD4000R125**	38.1	40	—	56	20.99	90	15.9	10.0	3
125	**AXD4000-125B**	40	40	—	56	20.99	90	16.4	9.0	3

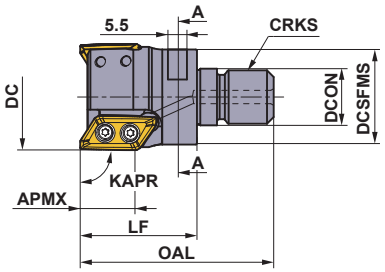
Spare Parts

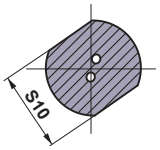
(mm)

* 		
Clamp Screw	Wrench	Anti-seize Lubricant
TS3SB	TKY08D	MK1KS

* Clamp Torque (N • m) : TS3SB=1.5

Fig





A-A Section

Right hand tool holder only.

NEW

■ Screw-in Type

With Coolant Hole

(mm)

DC	Type	Insert Corner Radius RE	Order Number	Stock R	∗1 No.T	DCON	DCSFMS	OAL	LF	S10	CRKS	WT (kg)	APMX	Max. Allowable Revolution (min^{-1})	Insert Type
25	A Type	0.4-3.2	**AXD4000R252AM1228A**	●	2	12.5	23.5	50	28	19	M12	0.06	15.0	49000	XDGX1750
25	B Type	4.0-5.0	**AXD4000R252AM1228B**	●	2	12.5	23.5	50	28	19	M12	0.06	14.8	49000	XDGX1750
28	A Type	0.4-3.2	**AXD4000R282AM1228A**	●	2	12.5	23.5	50	28	19	M12	0.07	15.0	48500	XDGX1750
28	B Type	4.0-5.0	**AXD4000R282AM1228B**	●	2	12.5	23.5	50	28	19	M12	0.07	14.8	48500	XDGX1750
32	A Type	0.4-3.2	**AXD4000R322AM1635A**	●	2	17.0	28.5	58	35	24	M16	0.15	15.0	48000	XDGX1750
32	B Type	4.0-5.0	**AXD4000R322AM1635B**	●	2	17.0	28.5	58	35	24	M16	0.15	14.8	48000	XDGX1750
35	A Type	0.4-3.2	**AXD4000R353AM1635A**	●	3	17.0	28.5	58	35	24	M16	0.15	15.0	41000	XDGX1750
35	B Type	4.0-5.0	**AXD4000R353AM1635B**	●	3	17.0	28.5	58	35	24	M16	0.15	14.8	41000	XDGX1750
40	A Type	0.4-3.2	**AXD4000R403AM1635A**	●	3	17.0	28.5	58	35	24	M16	0.18	15.0	38000	XDGX1750
40	B Type	4.0-5.0	**AXD4000R403AM1635B**	●	3	17.0	28.5	58	35	24	M16	0.18	14.8	38000	XDGX1750

∗1 Number of Teeth

Note 1) For screw-in type arbors, refer to pages 22 and 23.

Note 2) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on page 24.

Spare Parts

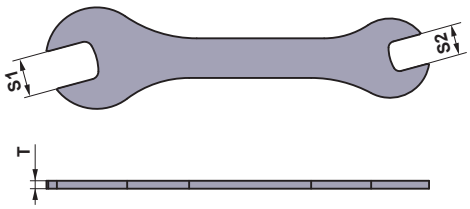
(mm)

 ∗		
Clamp Screw	Wrench	Anti-seize Lubricant
TS3SB	TKY08D	MK1KS

∗ Clamp Torque (N • m) : TS3SB=1.5

Parts Sold Separately

Arbor Mounting Spanner



(mm)

Order Number	Dimensions		
	S1 ∗	S2 ∗	T
AKY1924050A	24	19	5

∗ Clamp Torque (N • m) : 19 = 80, 24 = 90

Note 1) Due to the structure of the head, it may not be possible to use a commercially available spanner to attach the arbor. It is recommended to use the dedicated spanner.

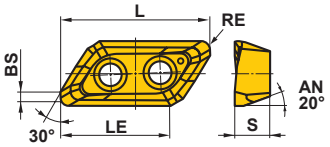
● : **Inventory maintained in Japan. (10 inserts per one case)**

Inserts

(mm)

Workpiece Material			LC15TF	MP6120	MP9120	TF15
	P	Steel		◆		
	N	Aluminium Alloys	◆		◆	◆
	S	Titanium Alloys			◆	

This is the selection guideline for AXD4000.
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

Shape	Order Number	Class	Honing	Stock: Coated LC15TF	Stock: Coated MP6120	Stock: Coated MP9120	Stock: Carbide TF15	L	LE	S	BS	RE*	Geometry
GL Breaker 	**XDGX175004PDFR-GL**	G	F	●			●	23	16.9	5	1.7	0.4	
	XDGX175008PDFR-GL	G	F	●			●	23	17	5	1.3	0.8	
	XDGX175012PDFR-GL	G	F	●			●	23	17	5	0.9	1.2	
	XDGX175016PDFR-GL	G	F	●			●	22	16.4	5	1.4	1.6	
	XDGX175020PDFR-GL	G	F	●			●	22	16.4	5	1.0	2.0	
	XDGX175024PDFR-GL	G	F	●			●	22	16.4	5	0.6	2.4	
	XDGX175030PDFR-GL	G	F	●			●	21.1	16.1	5	0.8	3.0	
	XDGX175032PDFR-GL	G	F	●			●	21.1	16.1	5	0.6	3.2	
	XDGX175040PDFR-GL	G	F	●			●	20	15.6	5	0.8	4.0	
	XDGX175050PDFR-GL	G	F	●			●	19.4	15.3	5	0.4	5.0	
GM Breaker 	**XDGX175004PDER-GM**	G	E		●	●		23	17	5	1.7	0.4	
	XDGX175008PDER-GM	G	E		●	●		23	17	5	1.2	0.8	
	XDGX175012PDER-GM	G	E		●	●		23	17	5	0.9	1.2	
	XDGX175016PDER-GM	G	E		●	●		22	15.9	5	1.3	1.6	
	XDGX175020PDER-GM	G	E		●	●		22	15.9	5	0.8	2.0	
	XDGX175024PDER-GM	G	E		●	●		22	15.9	5	0.4	2.4	
	XDGX175030PDER-GM	G	E		●	●		21.1	16	5	0.6	3.0	
	XDGX175032PDER-GM	G	E		●	●		21.1	16	5	0.4	3.2	
	XDGX175040PDER-GM	G	E		●	●		20	14.8	5	0.5	4.0	
	XDGX175050PDER-GM	G	E		●	●		19.4	15	5	0.3	5.0	
GM Breaker 	**XDGX175004PDFR-GM**	G	F				●	23	17	5	1.7	0.4	
	XDGX175008PDFR-GM	G	F				●	23	17	5	1.2	0.8	
	XDGX175012PDFR-GM	G	F				●	23	17	5	0.9	1.2	
	XDGX175016PDFR-GM	G	F				●	22	15.9	5	1.3	1.6	
	XDGX175020PDFR-GM	G	F				●	22	15.9	5	0.8	2.0	
	XDGX175024PDFR-GM	G	F				●	22	15.9	5	0.4	2.4	
	XDGX175030PDFR-GM	G	F				●	21.1	16	5	0.6	3.0	
	XDGX175032PDFR-GM	G	F				●	21.1	16	5	0.4	3.2	
	XDGX175040PDFR-GM	G	F				●	20	14.8	5	0.5	4.0	
	XDGX175050PDFR-GM	G	F				●	19.4	15	5	0.3	5.0	

* Be aware that the corner R(RE) has a different shape than the machined workpiece R.
When a GM breaker is recommended, stress the dimensional precision of the workpiece shape.

■ Holder And Insert Corner Radius Combination

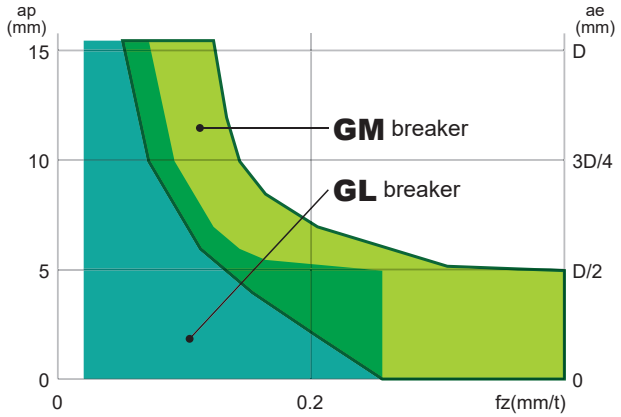
Holder	**A** Type	**B** Type
	AXD4000–□□□□□□A **AXD4000R□□□□□□A**	**AXD4000–□□□□□□B** **AXD4000R□□□□□□B**
Applicable Insert Corner R (**RE**)	RE0.4  **XDGX 175004PD□R-□□**	RE0.8  **XDGX 175008PD□R-□□**
	RE1.2  **XDGX 175012PD□R-□□**	RE1.6  **XDGX 175016PD□R-□□**
	RE2.0  **XDGX 175020PD□R-□□**	RE2.4  **XDGX 175024PD□R-□□**
	RE3.0  **XDGX 175030PD□R-□□**	RE3.2  **XDGX 175032PD□R-□□**
	RE4.0  **XDGX 175040PD□R-□□**	RE5.0  **XDGX 175050PD□R-□□**

Not interchangeable with the corresponding inserts of A type and B type holders.

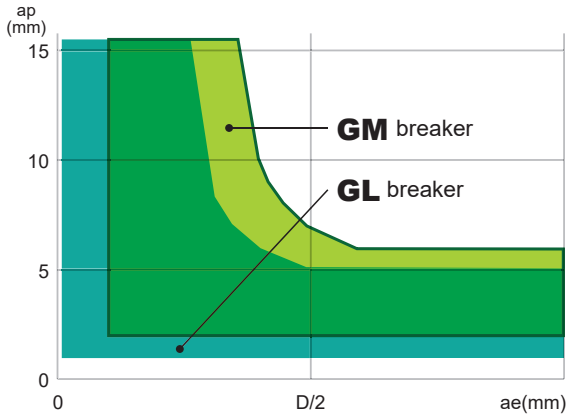
Selection of Insert

It is necessary to choose the best insert according to the cutting conditions. Please select an insert from the tables below.
The first recommendation for stable cutting conditions is the GL breaker with a strong cutting edge.

Selection of insert according to the feed per tooth and the required cutting depth



Selection of insert according to the width of cut and the required cutting depth



First recommendation for machining aluminium alloys is the GL breaker.
Under high-load conditions such as deep or high feed cutting, it is advisable to use the GM breaker.

Selection of insert according to cutting edge

Insert type

Sharp cutting edge

GL
TF15/LC15TF
Low cutting resistance

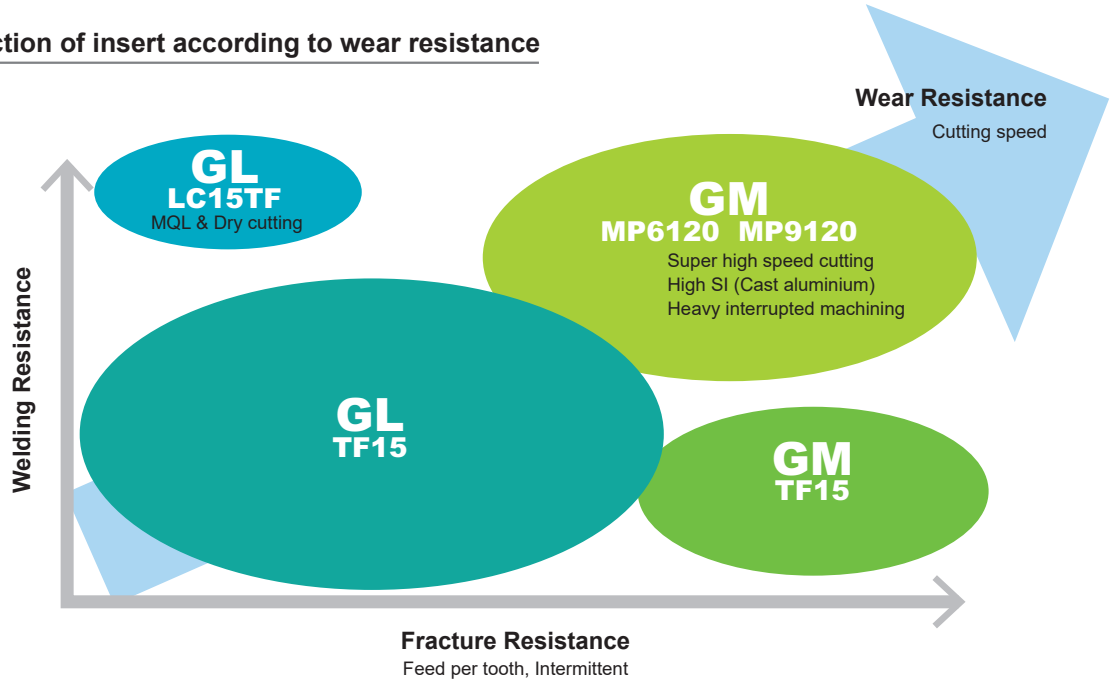
Sharp cutting edge

GM
TF15
Tougher cutting edge

PVD coating and Round-type honing

GM
MP9120
Tougher cutting edge & wear resistance.
Machining of difficult-to-cut materials and aluminium alloys

Selection of insert according to wear resistance



Recommended Cutting Conditions

■Cutting Speed

(mm)

	Workpiece Material	Properties	Greade	Breaker	Cutting Speed **vc** (m/min)
P	Mild Steel (ASTM A36,AISI 1010)	Hardness **≤180HB**	**MP6120**	**GM**	200 (150—220)
P	Carbon Steel, Alloy Steel (AISI 1045,AISI 4140)	Hardness **180—280HB**	**MP6120**	**GM**	200 (150—220)
N	Aluminium Alloy (A6061, A7075 etc)	Content **Si<5%**	**TF15 LC15TF**	**GL**	1000 (200—3000)
N			**TF15 MP9120**	**GM**	1000 (200—3000)
N	Aluminium Alloy (AC4B, ADC12, A390 etc)	**5%≤Si≤10% Si>10%**	**MP9120**	**GM**	1000 (200—3000)
S	Titanium Alloy (Ti-6Al-4V etc)	—	**MP9120**	**GM**	40 (30—60)

■Depth of Cut / Feed per Tooth

(mm)

	Workpiece Material	Properties	Breaker	Cutting Width **ae**	Depth of Cut **ap**	Feed per Tooth (mm/t) Cutting Edge Diameter **DC** 20	25, 28	32, 35	40	50, 63, 80	100, 125
P	Mild Steel (ASTM A36,AISI 1010)	Hardness **≤180HB**	**GM**	≤0.25 DC	≤ 5	≤ 0.05	≤ 0.15	≤ 0.15	≤ 0.18	≤ 0.18	≤ 0.18
					≤ 10	≤ 0.05	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.15
					≤ 14.5	≤ 0.05	≤ 0.10	≤ 0.10	≤ 0.12	≤ 0.12	—
				≤0.5 DC	≤ 5	≤ 0.05	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.18	≤ 0.18
					≤ 10	—	≤ 0.10	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15
					≤ 14.5	—	≤ 0.08	≤ 0.10	≤ 0.10	≤ 0.12	—
				≤0.75 DC	≤ 5	≤ 0.05	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.15
					≤ 10	—	≤ 0.10	≤ 0.10	≤ 0.12	≤ 0.12	≤ 0.12
				DC (Slot)	≤ 5	≤ 0.05	≤ 0.10	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15
	Carbon Steel, Alloy Steel (AISI 1045,AISI 4140)	Hardness **180—280HB**	**GM**	≤0.25 DC	≤ 5	≤ 0.05	≤ 0.15	≤ 0.15	≤ 0.18	≤ 0.18	≤ 0.18
					≤ 10	≤ 0.05	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.15
					≤ 14.5	≤ 0.05	≤ 0.10	≤ 0.10	≤ 0.12	≤ 0.12	—
				≤0.5 DC	≤ 5	≤ 0.05	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.18	≤ 0.18
					≤ 10	—	≤ 0.10	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15
					≤ 14.5	—	≤ 0.08	≤ 0.10	≤ 0.10	≤ 0.12	—
				≤0.75 DC	≤ 5	≤ 0.05	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.15
					≤ 10	—	≤ 0.10	≤ 0.10	≤ 0.12	≤ 0.12	≤ 0.12
				DC (Slot)	≤ 5	≤ 0.05	≤ 0.10	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15

Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibrations occurred.
If vibrations occur make adjustments according to the machining conditions.

Note 2) Note, vibrations may occur in the following conditions.
- When using long tool overhang.
- When pocket machining corner radii.
- When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

For Machining of Aluminium and Titanium Alloys

(mm)

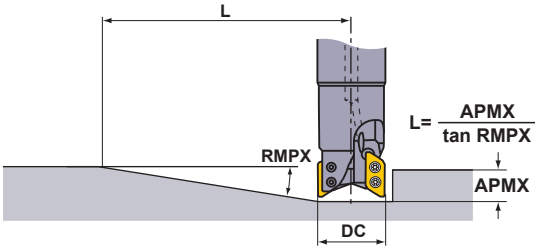
	Workpiece Material	Properties	Breaker	Cutting Width **ae**	Depth of Cut **ap**	Feed per Tooth (mm/t) Cutting Edge Diameter **DC**					
						20	**25, 28**	**32, 35**	**40**	**50, 63, 80**	**100, 125**
N	Aluminium Alloy (A6061, A7075 etc)	Content **Si<5%**	GL	≤0.25 DC	≤ 5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25
					≤ 10	≤ 0.05	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2
					≤ 14.5	≤ 0.05	≤ 0.15	≤ 0.15	≤ 0.15	≤ 0.15	≤ 0.15
				≤0.5 DC	≤ 5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25
					≤ 10	—	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2
					≤ 14.5	—	≤ 0.15	≤ 0.15	≤ 0.15	≤ 0.15	≤ 0.15
				≤0.75 DC	≤ 5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25
					≤ 10	—	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2
					≤ 14.5	—	≤ 0.15	≤ 0.15	≤ 0.15	≤ 0.15	≤ 0.15
				DC (Slot)	≤ 5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25
	Aluminium Alloy (A6061, A7075 etc)	Content **Si<5%**	GM	≤0.25 DC	≤ 5	≤ 0.05	≤ 0.35	≤ 0.35	≤ 0.4	≤ 0.4	≤ 0.4
					≤ 10	≤ 0.05	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35	≤ 0.35
					≤ 14.5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3	≤ 0.3
				≤0.5 DC	≤ 5	≤ 0.05	≤ 0.35	≤ 0.35	≤ 0.35	≤ 0.4	≤ 0.4
					≤ 10	—	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 14.5	—	≤ 0.2	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3
				≤0.75 DC	≤ 5	≤ 0.05	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 10	—	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3
					≤ 14.5	—	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.25	≤ 0.25
				DC (Slot)	≤ 5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.35	≤ 0.35
	Aluminium Alloy (AC4B etc) Aluminium Alloy (ADC12, A390 etc)	Content **5%≤Si≤10%** **Si>10%**	GM	≤0.25 DC	≤ 5	≤ 0.05	≤ 0.35	≤ 0.35	≤ 0.4	≤ 0.4	≤ 0.4
					≤ 10	≤ 0.05	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35	≤ 0.35
					≤ 14.5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3	≤ 0.3
				≤0.5 DC	≤ 5	≤ 0.05	≤ 0.35	≤ 0.35	≤ 0.35	≤ 0.4	≤ 0.4
					≤ 10	—	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 14.5	—	≤ 0.2	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3
				≤0.75 DC	≤ 5	≤ 0.05	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 10	—	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3
					≤ 14.5	—	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.25	≤ 0.25
				DC (Slot)	≤ 5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.35	≤ 0.35
S	Titanium Alloy (Ti-6Al-4V etc)	—	GM	≤0.25 DC	≤ 5	≤ 0.05	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1
					≤ 10	≤ 0.05	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1
					≤ 14.5	≤ 0.05	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1
				≤0.5 DC	≤ 5	≤ 0.05	≤ 0.08	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1
					≤ 10	—	≤ 0.08	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1
					≤ 14.5	—	≤ 0.08	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1
				≤0.75 DC	≤ 5	≤ 0.05	≤ 0.05	≤ 0.08	≤ 0.1	≤ 0.1	≤ 0.1
					≤ 10	—	≤ 0.05	≤ 0.08	≤ 0.1	≤ 0.1	≤ 0.1
					≤ 14.5	—	≤ 0.05	≤ 0.08	≤ 0.1	≤ 0.1	≤ 0.1
				DC (Slot)	≤ 5	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05

Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibrations occurred.
If vibrations occur make adjustments according to the machining conditions.

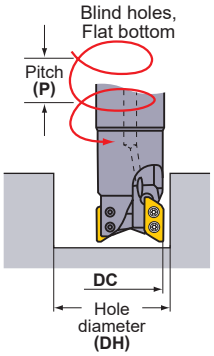
Note 2) Note, vibrations may occur in the following conditions.
- When using long tool overhang.
- When pocket machining corner radii.
- When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

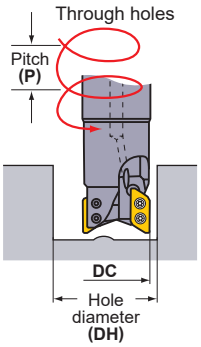
■RAMPING/HELICAL CUTTING

● **RAMPING**



● **HELICAL CUTTING**





Ramping/Helical Cutting (Aluminium Alloys)

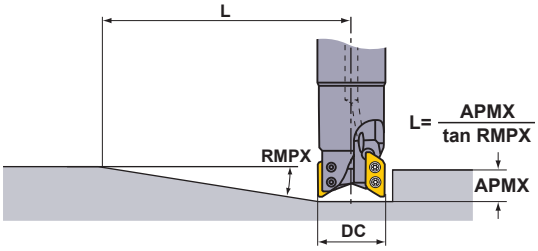
(mm)

Type	Cutting Edge Diameter **DC**	Insert Corner R **RE**	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling	
			Maximum Ramping Angle **RMPX**	Minimum Distance **L** ✶1	Maximum Hole Diameter **DH max.**	Maximum Pitch **P max.**	Minimum Hole Diameter **DH min.**	Maximum Pitch **P max.**	Minimum Hole Diameter **DH min.**	Maximum Pitch **P max.**
A type	20	0.4—1.2	20.7°	42	37.1 ✶2	14	36.1	14	22	2
		1.6—2.4	19.9°	43	34.7 ✶3	13	34.6	13	22	2
		3.0—3.2	18.9°	46	33.1 ✶4	12	33.3	12	22	1
	25	0.4—1.2	23.1°	37	47.1 ✶2	14	46	14	31.6	8
		1.6—2.4	22.0°	39	44.7 ✶3	13	44.4	13	31.6	8
		3.0—3.2	18.7°	46	43.1 ✶4	12	43	12	31.6	7
	28	0.4—1.2	19.2°	45	53.1 ✶2	14	52	14	36	8
		1.6—2.4	18.5°	47	50.7 ✶3	13	50.4	13	36	8
		3.0—3.2	16.7°	52	49.1 ✶4	12	48.9	12	36	7
	32	0.4—1.2	15.4°	57	61.1 ✶2	14	59.9	14	45.5	11
		1.6—2.4	14.7°	60	58.7 ✶3	13	58.3	13	45.5	11
		3.0—3.2	13.8°	64	57.1 ✶4	12	56.8	12	45.5	10
	35	0.4—1.2	13.4°	66	67.1 ✶2	14	65.8	14	50	11
		1.6—2.4	12.7°	69	64.7 ✶3	13	64.3	13	50	10
		3.0—3.2	11.8°	75	63.1 ✶4	12	62.8	12	50	9
	40	0.4—1.2	11.1°	80	76.7 ✶2	14	75.9	14	61.5	13
		1.6—2.4	10.4°	85	74.3 ✶3	13	74.2	13	61.5	12
		3.0—3.2	9.7°	91	72.7 ✶4	12	72.7	12	61.5	11
	50	0.4—1.2	8.2°	108	96.7 ✶2	14	95.6	14	81.4	14
		1.6—2.4	7.6°	117	94.3 ✶3	13	94	13	81.4	13
		3.0—3.2	6.9°	129	92.7 ✶4	12	92.4	12	81.4	11
	63	0.4—1.2	6.1°	146	122.7 ✶2	14	121.6	14	107.4	14
		1.6—2.4	5.6°	159	120.3 ✶3	13	119.9	13	107.4	13
		3.0—3.2	5.2°	171	118.7 ✶4	12	118.4	12	107.4	12
	80	0.4—1.2	4.6°	193	156.7 ✶2	14	155.6	14	141.4	14
		1.6—2.4	4.2°	212	154.3 ✶3	13	153.9	13	141.4	13
		3.0—3.2	3.8°	234	152.7 ✶4	12	152.4	12	141.4	12
	100	0.4—1.2	3.5°	254	196.7 ✶2	14	195.5	14	181.5	14
		1.6—2.4	3.2°	278	194.3 ✶3	13	193.9	13	181.5	13
		3.0—3.2	2.9°	306	192.7 ✶4	12	192.3	12	181.5	12
	125	0.4—1.2	2.7°	329	246.7 ✶2	14	245.5	14	231.5	14
		1.6—2.4	2.5°	356	244.3 ✶3	13	243.8	13	231.5	13
		3.0—3.2	2.3°	386	242.7 ✶4	12	242.3	12	231.5	12

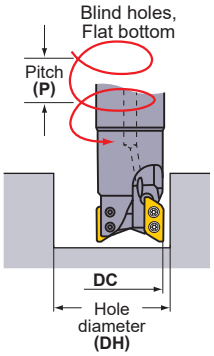
✶1 Using the maximum ramping angle, the distance to reach the maximum depth of cut is as follows:
L= (maximum depth of cut APMX/tan RMPX). Maximum depth of cut A type is 15.5mm, B type is 14.8mm.
✶2 Corner radius of 1.2mm. For other corner radii, use the following formula. {(cutting edge diameter DC)—(corner radius RE)–0.25}×2
✶3 Corner radius of 2.4mm. For other corner radii, use the following formula. {(cutting edge diameter DC)—(corner radius RE)–0.25}×2
✶4 Corner radius of 3.2mm. For other corner radii, use the following formula. {(cutting edge diameter DC)—(corner radius RE)–0.25}×2
Note 1) Ramping, helical, and drilling are not recommended for machining of steel and titanium alloys.

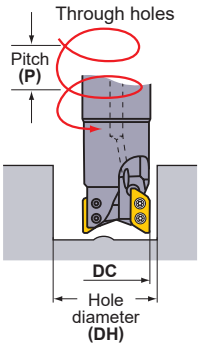
■RAMPING/HELICAL CUTTING

●RAMPING



●HELICAL CUTTING





Ramping/Helical Cutting (Aluminium Alloys)

(mm)

Type	Cutting Edge Diameter DC	Insert Corner R RE	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling	
			Maximum Ramping Angle RMPX	Minimum Distance L *1	Maximum Hole Diameter DH max.	Maximum Pitch P max.	Minimum Hole Diameter DH min.	Maximum Pitch P max.	Minimum Hole Diameter DH min.	Maximum Pitch P max.
B type	20	4	17.5°	47	31.5	10	31.8	10	22	1
		5	16.6°	71	29.5	6	31.1	7	22	1
	25	4	15.1°	55	41.5	10	41.4	10	31.7	5
		5	13.7°	61	39.5	9	40.6	9	31.7	5
	28	4	14.1°	59	47.5	10	47.2	10	36	6
		5	13°	65	45.5	9	46.4	9	36	5
	32	4	12.7°	66	55.5	10	55.1	10	45.5	9
		5	12°	70	53.5	9	54.3	9	45.5	8
	35	4	10.8°	78	61.5	10	61	10	50	8
		5	10.2°	83	59.5	9	60.2	9	50	8
	40	4	8.8°	96	71.1	10	70.9	10	61.5	10
		5	8.2°	103	69.1	9	70.1	9	61.5	9
	50	4	6.3°	135	91.1	10	90.6	10	81.3	10
		5	5.8°	146	89.1	9	89.8	9	81.3	9
	63	4	4.6°	184	117.1	10	116.6	10	107.4	10
		5	4.2°	202	115.1	9	115.7	9	107.3	9
	80	4	3.4°	250	151.1	10	150.5	10	141.4	10
		5	3.1°	274	149.1	9	149.6	9	141.4	9
	100	4	2.6°	326	191.1	10	190.5	10	181.4	10
		5	2.4°	354	189.1	9	189.6	9	181.4	9
	125	4	2°	424	241.1	10	240.5	10	231.4	10
		5	1.8°	471	239.1	9	239.6	9	229.9	9

*1 Using the maximum ramping angle, the distance to reach the maximum depth of cut is as follows:
L= (maximum depth of cut APMX/tan RMPX). Maximum depth of cut A type is 15.5mm, B type is 14.8mm.

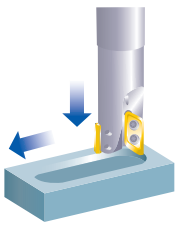
Note 1) The recommended ramping feed is 0.05mm/t or under.

■Max.Drilling Depth (Aluminium Alloys)

(mm)

Type	Insert Corner R RE	Max.Drilling Depth					
		Cutting Edge Diameter DC					
		ϕ20	ϕ25	ϕ28	ϕ32	ϕ35	ϕ40—ϕ125
A type	0.4	5.3	5.2	5.2	5.2	5.3	5.3
	0.8	5.3	5.2	5.2	5.2	5.3	5.3
	1.2	5.3	5.2	5.2	5.2	5.3	5.3
	1.6	4.8	4.6	4.7	4.7	4.9	4.8
	2.0	4.8	4.6	4.7	4.7	4.9	4.8
	2.4	4.8	4.6	4.7	4.7	4.9	4.8
	3.0	4.3	3.7	4.2	4.2	4.4	4.4
	3.2	4.3	3.7	4.2	4.2	4.4	4.4
B type	4.0	3.7	2.7	3.7	3.6	3.8	3.8
	5.0	3.4	2.3	3.3	3.3	3.5	3.5

AXD4000 can be effectively used for pocket machining without the need for a prepared hole.



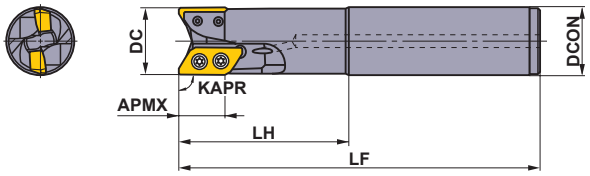
MULTI FUNCTIONAL MILLING

<ALUMINIUM ALLOY TO DIFFICULT-TO-CUT MATERIAL CUTTING>

AXD7000

P	M	K	N	S	H
Steel			Non-ferrous Metal	Heat Resistant Alloy	

Fig.1



Right hand tool holder only.

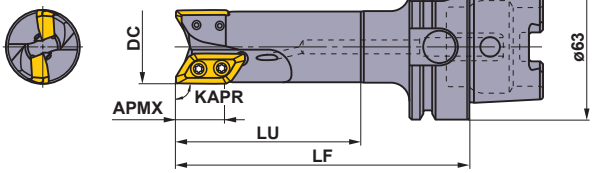
■Shank Type

With Coolant Hole

(mm)

DC	Type	Insert Corner Radius RE	Order Number	Stock R	*1 No.T	LF	LH	DCON	WT (kg)	APMX	Max. Allowable Revolution (min^{-1})	Fig.	Insert Type
32	A Type	0.8-3.2	**AXD7000R322SA32SA**	●	2	170	80	32	0.85	21.0	41000	1	XDGX2270
32	B Type	4.0-5.0	**AXD7000R322SA32SB**	●	2	170	80	32	0.85	20.4	41000	1	XDGX2270
40	A Type	0.8-3.2	**AXD7000R402SA42SA**	●	2	170	80	42	1.44	21.0	36000	1	XDGX2270
40	B Type	4.0-5.0	**AXD7000R402SA42SB**	●	2	170	80	42	1.44	20.4	36000	1	XDGX2270

Fig.1



■HSK63A Shank Type

Right hand tool holder only.

With Coolant Hole

(mm)

DC	Type	Insert Corner Radius RE	Order Number	Stock R	*1 No.T	LF	LH	WT (kg)	APMX	Max. Allowable Revolution (min^{-1})	Fig.	Insert Type
32	A Type	0.8-3.2	**AXD7000R03202A-H63A**	●	2	127	80	1.06	21.0	41000	1	XDGX2270
40	A Type	0.8-3.2	**AXD7000R04002A-H63A**	●	2	132	85	1.34	21.0	36000	1	XDGX2270
50	A Type	0.8-3.2	**AXD7000R05003A-H63A**	●	3	137	90	2.40	21.0	30000	1	XDGX2270

*1 Number of Teeth

Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on page 24.

Note 2) When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.

Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the LF and LH dimensions decrease.

Note 4) No hole for data carrier.

Spare Parts

(mm)

DC	* 		
	Clamp Screw	Wrench	Anti-seize Lubricant
32	TS4SB	TKY15D	MK1KS
40, 50	TS4SBL	TKY15D	MK1KS

* Clamp Torque (N • m) : TS4SB=3.5, TS4SBL=3.5

● : **Inventory maintained in Japan.**

Fig.1

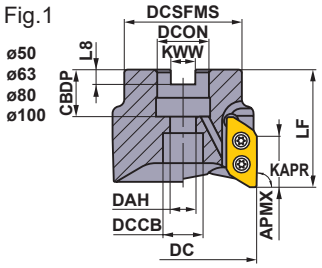
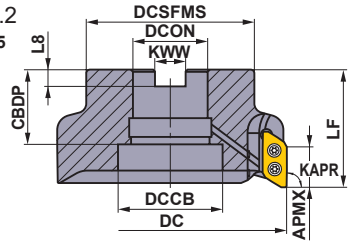
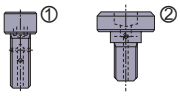


Fig.2



Right hand tool holder only.

Cutter Diameter **DC**		Set Bolt	Geometry	
mm	inch			
ϕ50, ϕ63		HSC10030H	①	 With Coolant Hole
ϕ80	ϕ80	HSC12035H		
ϕ100	ϕ100	HSC16040H		
ϕ125	ϕ125	MBA20040H	②	

■ Arbor Type

DCON = inch size, With Coolant Hole

(mm)

DC	Type	Insert Corner Radius **RE**	Order Number	Stock **R**	∗1 No.T	**LF**	**DCON**	**WT** (kg)	**APMX**	Max. Allowable Revolution (min^{-1})	Fig.	Insert Type
80	A Type	0.8-3.2	**AXD7000R08004CA**	●	4	63	25.4	1.2	21.0	23000	1	XDGX2270
80	B Type	4.0-5.0	**AXD7000R08004CB**	●	4	63	25.4	1.2	20.4	23000	1	XDGX2270
100	A Type	0.8-3.2	**AXD7000R10005DA**	●	5	63	31.75	1.8	21.0	19000	1	XDGX2270
100	B Type	4.0-5.0	**AXD7000R10005DB**	●	5	63	31.75	1.8	20.4	19000	1	XDGX2270
125	A Type	0.8-3.2	**AXD7000R12506EA**	●	6	63	38.1	2.7	21.0	16000	2	XDGX2270
125	B Type	4.0-5.0	**AXD7000R12506EB**	●	6	63	38.1	2.7	20.4	16000	2	XDGX2270

DCON = mm size, With Coolant Hole

(mm)

DC	Type	Insert Corner Radius **RE**	Order Number	Stock **R**	∗1 No.T	**LF**	**DCON**	**WT** (kg)	**APMX**	Max. Allowable Revolution (min^{-1})	Fig.	Insert Type
50	A Type	0.8-3.2	**AXD7000-050A03RA**	●	3	50	22	0.4	21.0	30000	1	XDGX2270
50	B Type	4.0-5.0	**AXD7000-050A03RB**	●	3	50	22	0.4	20.4	30000	1	XDGX2270
63	A Type	0.8-3.2	**AXD7000-063A03RA**	●	3	50	22	0.5	21.0	25000	1	XDGX2270
63	B Type	4.0-5.0	**AXD7000-063A03RB**	●	3	50	22	0.5	20.4	25000	1	XDGX2270
80	A Type	0.8-3.2	**AXD7000-080A04RA**	●	4	63	27	1.2	21.0	23000	1	XDGX2270
80	B Type	4.0-5.0	**AXD7000-080A04RB**	●	4	63	27	1.2	20.4	23000	1	XDGX2270
100	A Type	0.8-3.2	**AXD7000-100A05RA**	●	5	63	32	1.8	21.0	19000	1	XDGX2270
100	B Type	4.0-5.0	**AXD7000-100A05RB**	●	5	63	32	1.8	20.4	19000	1	XDGX2270
125	A Type	0.8-3.2	**AXD7000-125B06RA**	●	6	63	40	2.7	21.0	16000	2	XDGX2270
125	B Type	4.0-5.0	**AXD7000-125B06RB**	●	6	63	40	2.7	20.4	16000	2	XDGX2270

∗1 Number of Teeth

Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on page 24.

Note 2) When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.

Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the LF and LH dimensions decrease.

● : **Inventory maintained in Japan.**

Mounting Dimensions

(mm)

DC	Cutter Body Type	DCON	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
50	**AXD7000-050A**	22	20	11.0	17	20.72	45	10.4	6.3	1
63	**AXD7000-063A**	22	20	11.0	17	20.72	50	10.4	6.3	1
80	**AXD7000R080**	25.4	26	13.0	20	26.72	63	9.5	6.0	1
80	**AXD7000-080A**	27	23	13.0	20	26.72	63	12.4	7.0	1
100	**AXD7000R100**	31.75	32	17.0	26	18.72	70	12.7	8.0	1
100	**AXD7000-100A**	32	26	17.0	26	24.72	70	14.4	8.0	1
125	**AXD7000R125**	38.1	40	—	56	20.72	90	15.9	10.0	2
125	**AXD7000-125B**	40	40	—	56	20.72	90	16.4	9.0	2

Spare Parts

(mm)

* 		
Clamp Screw	Wrench	Anti-seize Lubricant
TS4SBL	TKY15D	MK1KS

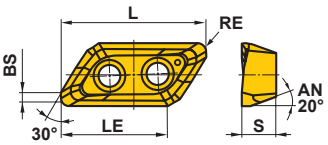
* Clamp Torque (N • m) : TS4SBL=3.5

Inserts

(mm)

Workpiece Material			LC15TF	MP6120	MP9120	TF15
	P	Steel		◆		
	N	Aluminium Alloys	◆		◆	◆
	S	Titanium Alloys			◆	

This is the selection guideline for AXD7000.
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

Shape	Order Number	Class	Honing	Stock: Coated LC15TF	Stock: Coated MP6120	Stock: Coated MP9120	Stock: Carbide TF15	L	LE	S	BS	RE *	Geometry
	**XDGX227008PDFR-GL**	G	F	●			●	30	21.6	7	2.0	0.8	
	XDGX227016PDFR-GL	G	F	●			●	30	21.7	7	1.2	1.6	
	XDGX227020PDFR-GL	G	F	●			●	30	21.7	7	0.8	2	
	XDGX227030PDFR-GL	G	F	●			●	28.8	21.2	7	0.8	3	
	XDGX227032PDFR-GL	G	F	●			●	28.8	21.2	7	0.6	3.2	
	XDGX227040PDFR-GL	G	F	●			●	27.5	20.6	7	0.9	4	
	XDGX227050PDFR-GL	G	F	●			●	27	20.3	7	0.4	5	
	XDGX227008PDER-GLA	G	E		●	●		30	21.7	7	1.9	0.8	
	XDGX227016PDER-GLA	G	E		●	●		30	21.7	7	1.1	1.6	
	XDGX227020PDER-GLA	G	E		●	●		30	21.7	7	0.7	2	
	XDGX227024PDER-GLA	G	E		●	●		30	21.7	7	0.3	2.4	
	XDGX227030PDER-GLA	G	E		●	●		28.8	21.1	7	0.7	3	
	XDGX227032PDER-GLA	G	E		●	●		28.8	21.1	7	0.5	3.2	
	XDGX227040PDER-GLA	G	E		●	●		27.5	20.4	7	0.8	4	
	XDGX227050PDER-GLA	G	E		●	●		27	20.2	7	0.2	5	

* GLA breaker corner R (RE) is designed with almost the same corner R as the machined corner R of a workpiece.
* Be aware that the corner R(RE) has a different shape than the machined workpiece R.

■Holder and Insert Corner Radius Combination

Holder	**A** Holder					**B** Holder	
	AXD7000–○○○○○○A **AXD7000R○○○○○○A** **AXD7000R○○○○A-H63A**					**AXD7000–○○○○○○B** **AXD7000R○○○○○○B**	
Insert Corner Radius (**RE**)	RE0.8	RE1.6	RE2.0	RE3.0	RE3.2	RE4.0	RE5.0
							
	XDGX 227008PDFR-G○	**XDGX 227016PDFR-G○**	**XDGX 227020PDFR-G○**	**XDGX 227030PDFR-G○**	**XDGX 227032PDFR-G○**	**XDGX 227040PDFR-G○**	**XDGX 227050PDFR-G○**

Not interchangeable with the corresponding inserts of the A type and B type holders.

● : Inventory maintained in Japan. (10 inserts in one case)

Recommended Cutting Conditions

■Cutting Speed

(mm)

	Workpiece Material	Properties	Greade	Breaker	Cutting Speed **vc** (m/min)
P	Mild Steel (SS400, S10C etc)	Hardness **≤180HB**	**MP6120**	**GLA**	200 (150—220)
	Carbon Steel Alloy Steel (S45C, SCM440 etc)	Hardness **180—280HB**	**MP6120**	**GLA**	200 (150—220)
N	Aluminium Alloy (A6061, A7075 etc)	Content **Si<5%**	**LC15TF**	**GL**	1000 (200—3000)
			TF15	**GL**	1000 (200—3000)
	Aluminium Alloy (AC4B, ADC12, A390 etc)	**5%≤Si≤10%** **Si>10%**	**LC15TF**	**GL**	1000 (200—3000)
S	Titanium Alloy (Ti-6Al-4V etc)	—	**MP9120**	**GLA**	40 (30—60)

■Depth of Cut / Feed per Tooth

(mm)

	Workpiece Material	Properties	Breaker	Cutting Width **ae**	Depth of Cut **ap**	Feed per Tooth (mm/t) Cutting Edge Diameter **DC** 32	40	50, 63, 80	100, 125
P	Mild Steel (SS400, S10C etc)	Hardness **≤180HB**	**GLA**	≤0.25 DC	≤ 5	≤ 0.18	≤ 0.2	≤ 0.2	≤ 0.2
					≤ 10	≤ 0.15	≤ 0.18	≤ 0.18	≤ 0.18
					≤ 15	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.15
					≤ 20	≤ 0.1	≤ 0.12	≤ 0.12	—
				≤0.5 DC	≤ 5	≤ 0.18	≤ 0.2	≤ 0.2	≤ 0.2
					≤ 10	≤ 0.15	≤ 0.18	≤ 0.18	≤ 0.18
					≤ 15	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.15
					≤ 20	≤ 0.1	≤ 0.12	≤ 0.12	—
				≤0.75 DC	≤ 5	≤ 0.15	≤ 0.15	≤ 0.18	≤ 0.18
					≤ 10	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15
					≤ 15	≤ 0.1	≤ 0.1	≤ 0.12	≤ 0.12
				DC (Slot)	≤ 5	≤ 0.12	≤ 0.15	≤ 0.18	≤ 0.18
					≤ 10	≤ 0.1	≤ 0.12	≤ 0.15	≤ 0.15
	Carbon Steel Alloy Steel (S45C, SCM440 etc)	Hardness **180—280HB**	**GLA**	≤0.25 DC	≤ 5	≤ 0.18	≤ 0.2	≤ 0.2	≤ 0.2
					≤ 10	≤ 0.15	≤ 0.18	≤ 0.18	≤ 0.18
					≤ 15	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.15
					≤ 20	≤ 0.1	≤ 0.12	≤ 0.12	—
				≤0.5 DC	≤ 5	≤ 0.18	≤ 0.2	≤ 0.2	≤ 0.2
					≤ 10	≤ 0.15	≤ 0.18	≤ 0.18	≤ 0.18
					≤ 15	≤ 0.12	≤ 0.15	≤ 0.15	≤ 0.15
					≤ 20	≤ 0.1	≤ 0.12	≤ 0.12	—
				≤0.75 DC	≤ 5	≤ 0.15	≤ 0.15	≤ 0.18	≤ 0.18
					≤ 10	≤ 0.12	≤ 0.12	≤ 0.15	≤ 0.15
					≤ 15	≤ 0.1	≤ 0.1	≤ 0.12	≤ 0.12
				DC (Slot)	≤ 5	≤ 0.12	≤ 0.15	≤ 0.18	≤ 0.18
					≤ 10	≤ 0.1	≤ 0.12	≤ 0.15	≤ 0.15

Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibrations occurred. If vibrations occur make adjustments according to the machining conditions.

Note 2) Note, vibrations may occur in the following conditions.

- When using long tool overhang.
- When pocket machining corner radii.
- When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

Recommended Cutting Conditions

■ Depth of Cut / Feed per Tooth

(mm)

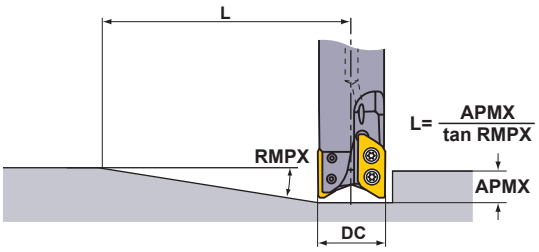
	Workpiece Material	Properties	Breaker	Cutting Width **ae**	Depth of Cut **ap**	Feed per Tooth (mm/t) Cutting Edge Diameter **DC**			
						32	**40**	**50, 63, 80**	**100, 125**
N	Aluminium Alloy (A6061, A7075 etc)	Content **Si<5%**	**GL**	≤0.25 DC	≤ 5	≤ 0.35	≤ 0.4	≤ 0.4	≤ 0.4
					≤ 10	≤ 0.3	≤ 0.35	≤ 0.35	≤ 0.35
					≤ 15	≤ 0.25	≤ 0.3	≤ 0.3	≤ 0.3
					≤ 20	≤ 0.2	≤ 0.25	≤ 0.25	≤ 0.25
				≤0.5 DC	≤ 5	≤ 0.35	≤ 0.35	≤ 0.4	≤ 0.4
					≤ 10	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 15	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3
					≤ 20	≤ 0.2	≤ 0.2	≤ 0.25	≤ 0.25
				≤0.75 DC	≤ 5	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 10	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3
					≤ 15	≤ 0.2	≤ 0.2	≤ 0.25	≤ 0.25
					≤ 20	≤ 0.15	≤ 0.15	≤ 0.2	≤ 0.2
				DC (Slot)	≤ 5	≤ 0.25	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 10	≤ 0.2	≤ 0.25	≤ 0.3	≤ 0.3
					≤ 15	≤ 0.15	≤ 0.2	≤ 0.25	≤ 0.25
					≤ 20	≤ 0.1	≤ 0.15	≤ 0.2	≤ 0.2
	Aluminium Alloy (AC4B etc) Aluminium Alloy (ADC12, A390 etc)	Content **5%≤Si≤10% Si>10%**	**GL**	≤0.25 DC	≤ 5	≤ 0.35	≤ 0.4	≤ 0.4	≤ 0.4
					≤ 10	≤ 0.3	≤ 0.35	≤ 0.35	≤ 0.35
					≤ 15	≤ 0.25	≤ 0.3	≤ 0.3	≤ 0.3
					≤ 20	≤ 0.2	≤ 0.25	≤ 0.25	≤ 0.25
				≤0.5 DC	≤ 5	≤ 0.35	≤ 0.35	≤ 0.4	≤ 0.4
					≤ 10	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 15	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3
					≤ 20	≤ 0.2	≤ 0.2	≤ 0.25	≤ 0.25
				≤0.75 DC	≤ 5	≤ 0.3	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 10	≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3
					≤ 15	≤ 0.2	≤ 0.2	≤ 0.25	≤ 0.25
					≤ 20	≤ 0.15	≤ 0.15	≤ 0.2	≤ 0.2
				DC (Slot)	≤ 5	≤ 0.25	≤ 0.3	≤ 0.35	≤ 0.35
					≤ 10	≤ 0.2	≤ 0.25	≤ 0.3	≤ 0.3
					≤ 15	≤ 0.15	≤ 0.2	≤ 0.25	≤ 0.25
					≤ 20	≤ 0.1	≤ 0.15	≤ 0.2	≤ 0.2
S	Titanium Alloy (Ti-6Al-4V etc)	—	**GLA**	≤0.25 DC	≤ 5	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 10	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 15	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 20	≤ 0.1	≤ 0.12	≤ 0.12	—
				≤0.5 DC	≤ 5	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 10	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 15	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 20	—	≤ 0.1	≤ 0.1	—
				≤0.75 DC	≤ 5	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 10	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 15	≤ 0.1	≤ 0.12	≤ 0.12	—
					≤ 20	—	≤ 0.1	≤ 0.1	—
				DC (Slot)	≤ 5	≤ 0.08	≤ 0.08	≤ 0.08	—
					≤ 10	≤ 0.05	≤ 0.08	≤ 0.08	—

Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibrations occurred. If vibrations occur make adjustments according to the machining conditions.

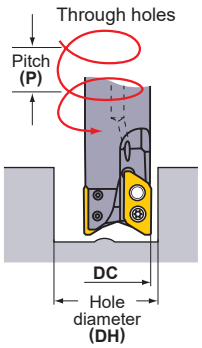
Note 2) Note, vibrations may occur in the following conditions.
- When using long tool overhang.
- When pocket machining corner radii.
- When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

■RAMPING/HELICAL CUTTING

● **RAMPING**



● **HELICAL CUTTING**



Ramping / Helical Cutting (Aluminium Alloys)

(mm)

Type	DC	RE	Ramping	
			RMPX	L ∗1
A type	32	0.8 - 2.4	19°	61
		3,3.2	18°	65
	40	0.8 - 2.4	14°	85
		3, 3.2	13°	91
	50	0.8 - 2.4	10°	120
		3, 3.2	9°	133
	63	0.8 - 2.4	8°	150
		3, 3.2	7°	172
	80	0.8 - 2.4	6°	200
		3, 3.2	5°	241
	100	0.8 - 2.4	4°	301
		3, 3.2	4°	301
	125	0.8 - 2.4	3°	401
		3, 3.2	3°	401
B type	32	4, 5	18°	63
	40	4, 5	11°	105
	50	4, 5	8°	146
	63	4, 5	6°	195
	80	4, 5	4°	292
	100	4, 5	3°	390
	125	4, 5	2°	585

(mm)

Type	DC	RE	Helical Milling	
			DH min.	P max.
A type	32	0.8 - 2.4	41	8
		3, 3.2	41	7
	40	0.8 - 2.4	57	10
		3, 3.2	57	9
	50	0.8 - 2.4	77	12
		3, 3.2	77	11
	63	0.8 - 2.4	103	13
		3, 3.2	103	12
	80	0.8 - 2.4	137	14
		3, 3.2	137	12
	100	0.8 - 2.4	177	14
		3, 3.2	177	13
	125	0.8 - 2.4	227	15
		3, 3.2	227	13
B type	32	4	41	7
		5	41	6
	40	4	57	9
		5	57	8
	50	4	77	10
		5	77	9
	63	4	103	10
		5	103	10
	80	4	137	11
		5	137	10
	100	4	177	11
		5	177	10
	125	4	227	11
		5	227	11

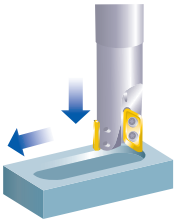
∗1 L (Max. Depth of Cut =15 / tan RMPX). Cutters' moving distance until depth of cut reaches APMX at a maximum ramping angle.
Maximum depth of cut A type is 21mm, B type is 20.4mm.

Note 1) The recommended ramping feed is 0.05mm/t or Lower. Ramping, helical, and drilling are not recommended for machining of steel and titanium alloys.

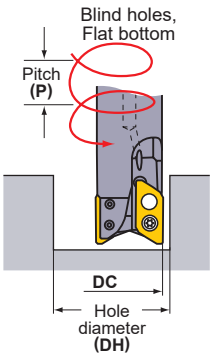
■Max. Drilling Depth (Aluminium Alloys) (mm)

Type	Insert corner radius **RE**	Max. Drilling Depth
Type A	0.8—2.4	5
	3, 3.2	4.5
Type B	4	4
	5	3.5

AXD7000 can be effectively used for pocket machining without the need of a prepared hole.



● **HELICAL CUTTING**



Helical Cutting of Aluminium Alloys (Blind Hole, Flat Bottom)

(mm)

Type	DC	RE	BS	Helical Cutting (Blind Hole, Flat Bottom)			
				DH max. *2	P max.	DH min. *3	P max.
A type	32	0.8	2	61.9	20	58.3	20
		1.6	1.2	60.3	19	58.3	19
		2	0.8	59.5	18	58.3	18
		2.4	0.4	58.7	18	58.3	18
		3	0.8	57.5	17	56.2	17
		3.2	0.6	57.1	17	56.2	17
	40	0.8	2	77.9	20	74.3	20
		1.6	1.2	76.3	19	74.3	19
		2	0.8	75.5	18	74.3	18
		2.4	0.4	74.7	18	74.3	18
		3	0.8	73.5	17	72.2	17
		3.2	0.6	73.1	17	72.2	17
	50	0.8	2	97.5	20	94.1	20
		1.6	1.2	95.9	19	94.1	19
		2	0.8	95.1	18	94.1	18
		2.4	0.4	94.3	18	94.1	18
		3	0.8	93.1	17	92.1	17
		3.2	0.6	92.7	17	92.1	17
	63	0.8	2	123.5	20	120.1	19
		1.6	1.2	121.9	19	120.1	19
		2	0.8	121.1	18	120.1	18
		2.4	0.4	120.3	18	120.1	18
		3	0.8	119.1	17	118	16
		3.2	0.6	118.7	17	118	16
	80	0.8	2	157.5	19	154.1	18
		1.6	1.2	155.9	19	154.1	18
		2	0.8	155.1	18	154.1	18
		2.4	0.4	154.3	18	154.1	18
		3	0.8	153.1	16	152	16
		3.2	0.6	152.7	16	152	16
	100	0.8	2	197.5	18	194.1	18
		1.6	1.2	195.9	18	194.1	18
		2	0.8	195.1	18	194.1	18
		2.4	0.4	194.3	18	194.1	18
		3	0.8	193.1	15	192	15
		3.2	0.6	192.7	15	192	15
	125	0.8	2	247.5	18	244.1	17
		1.6	1.2	245.9	17	244.1	17
		2	0.8	245.1	17	244.1	17
		2.4	0.4	244.3	17	244.1	17
		3	0.8	243.1	15	242	15
		3.2	0.6	242.7	15	242	15
B type	32	4	0.9	55.5	16	54	16
		5	0.4	53.5	15	53.1	15
	40	4	0.9	71.5	16	70	16
		5	0.4	69.5	15	69	14
	50	4	0.9	91.1	15	89.8	15
		5	0.4	89.1	14	88.9	14
	63	4	0.9	117.1	14	115.8	14
		5	0.4	115.1	13	114.9	13
	80	4	0.9	151.1	14	149.8	13
		5	0.4	149.1	12	148.9	12
	100	4	0.9	191.1	13	189.8	13
		5	0.4	189.1	12	188.8	12
	125	4	0.9	241.1	13	239.8	13
		5	0.4	239.1	12	238.8	12

*2 The maximum diameter when machining a blind hole with a flat face using a corner radius of 0.8mm for A type and 4mm for B type.Other than that, find with the formula below.
{(cutting edge diameter DC)−(corner radius)−0.3}×2

*3 The minimum diameter when machining a blind hole with a flat face using a corner radius of 0.8mm for A type and 4mm for B type.Other than that, find with the formula below.
{(cutting edge diameter DC)−(corner radius)−(Width of wiper edge BS)−0.1}×2

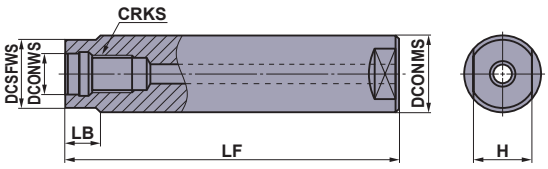
Note 1) The recommended ramping feed is 0.05mm/t or under.

ARBORS

Arbors for Screw-in Tools

■ Straight Shank Arbor

(mm)



Type	Order Number	Stock	DCONWS	DCONMS	DCSFWS	LF	LB	H	CRKS
Steel Shank Type	**SC25M12S125S**	●	12.5	25	23.5	125	10	19	M12
	SC25M12S245L	●	12.5	25	23.5	245	10	19	M12
	SC32M16S140S	●	17.0	32	28.5	140	15	24	M16
	SC32M16S280L	●	17.0	32	28.5	280	15	24	M16
Carbide Shank Type	**SC25M12S125SW**	●	12.5	25	23.5	125	10	19	M12
	SC25M12S245LW	●	12.5	25	23.5	245	10	19	M12
	SC32M16S140SW	●	17.0	32	28.5	140	15	24	M16
	SC32M16S280LW	●	17.0	32	28.5	280	15	24	M16

How to Install the Screw-in Head

①Thoroughly clean the clamp section of the head and the arbor with an air blower or brush before installation.

②Tighten the head at the recommended torque and ensure that there is no gap between the head and arbor.

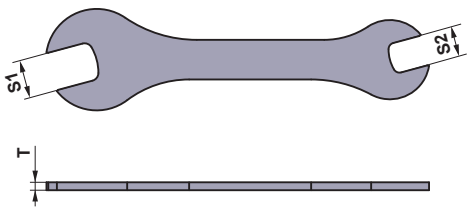
(mm)

Screw Size	Recommended Torque (N • m)	Wrench Size
M12	80	19
M16	90	24

- Due to the structure of the screw-in head of the AXD, it may not be possible to use a commercially available spanner to attach the arbor. It is recommended to use the dedicated spanner.
- Cutting tools become extremely hot during cutting. Never touch them with bare hands after operation as this may produce a risk of injuries or burns.

Parts Sold Separately

Arbor Mounting Spanner



(mm)

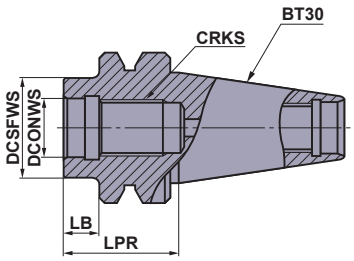
Order Number	Dimensions		
	S1 *	S2 *	T
AKY1924050A	24	19	5

* Clamp Torque (N • m) : 19 = 80, 24 = 90

● : **Inventory maintained in Japan.**

■ BT30 Shank Arbor

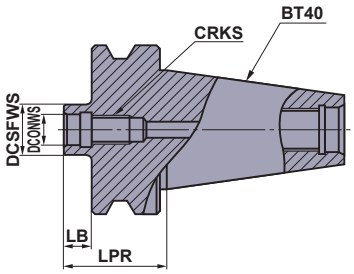
(mm)



Order Number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS
SC25M12S10-BT30	●	12.5	23.5	32	10	M12
SC32M16S10-BT30	●	17.0	28.5	32	10	M16

■ BT40 Shank Arbor

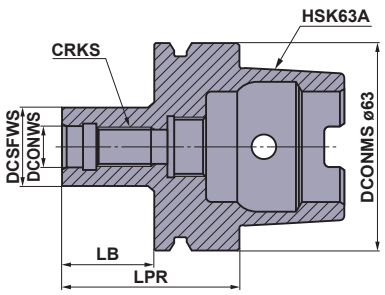
(mm)



Order Number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS
SC25M12S10-BT40	●	12.5	23.5	37	10	M12
SC32M16S10-BT40	●	17.0	28.5	37	10	M16

■ HSK63A Shank Arbor

(mm)



The coolant tube has been already set.

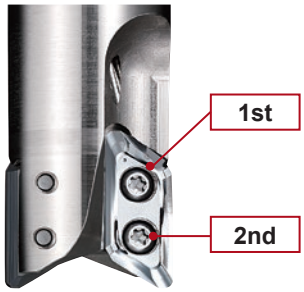
Order Number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS
SC25M12S27-HSK63A	●	12.5	23.5	53	27	M12
SC32M16S28-HSK63A	●	17.0	28.5	54	28	M16

● : Inventory maintained in Japan.

■Installation Procedures

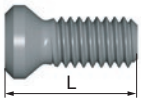
Procedure for attaching inserts

1) Clean the seat by air blowing or with a brush before installing the insert.
2) The inserts have sharp cutting edges and handling them with bare hands may cause injuries. Always wear gloves when handling.
3) Tighten the clamp screw using the accessory wrench while pressing the insert against the seat.
4) Tighten the clamp screw as shown in the figure to the right.
5) Coat the clamp screw with anti-seize compound and tighten it to the specified tightening torque. The tightening torque is shown below.
   AXD4000 : 1.5N•m (1.11ft•lb), AXD7000 : 3.5 N•m (2.58ft•lb)
6) The clamp screw is an important part in ensuring safety.
   Purchase an official product from MITSUBISHI MATERIALS.
   When using over the revolution shown in Table 2, replacing the clamp screw simultaneously with insert replacement is recommended.
7) Check that there is no clearance at the insert seat surface.



(mm)

Type	AXD4000		AXD7000	
Cutting Edge Diameter **DC**	ø20	ø25−ø125	ø32	ø40−ø125
Clamp Screw Number	TS3SBS	TS3SB	TS4SB	TS4SBL
Overall Length **L**	6.5	8	9	10.5

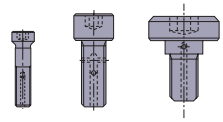


Installation of arbor type

1) Clean carefully the inside and face of the hole and the arbor face before installing the body to the arbor.
2) Set the body at the arbor and tighten it with the accessory. Refer to the table shown below for the tightening torque.
3) The set bolt supplied with the AXD is a special coolant through compatible nozzle. Be careful not to lose it.

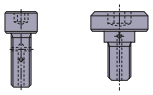
AXD4000

(mm)

Geometry	Set Bolt	Clamp Torque (N • m)	Cutting Edge Diameter **DC**	Fig
Fig.1 Fig.2 Fig.3  With Coolant Hole	HFF08043H	11	ø40	1
	HSC10030H	40	ø50, ø63	2
	HSC12035H	80	ø80	2
	HSC16040H	150	ø100	2
	MBA20040H	320	ø120	3

AXD7000

(mm)

Geometry	Set Bolt	Clamp Torque (N•m)	Cutting Edge Diameter **DC**	Fig
Fig.1 Fig.2  With Coolant Hole	HSC10030H	40	ø50, ø63	1
	HSC12035H	80	ø80	1
	HSC16040H	150	ø100	1
	MBA20040H	320	ø120	2

■Maximum Allowable Spindle Speed (min-1)

- The maximum allowable Spindle Speed listed in each table is set at the maximum balance (balance: ISO1940) accuracy of G6.3 or higher under the condition that the insert does not fly off or the body gets damaged due to centrifugal force.
- Even if the insert is used within the maximum allowable spindle speed, if the spindle speed exceeds the values listed in the table below, set the balance accuracy along with an arbor or milling chuck to G6.3 or better. It is also recommended to replace the clamp screw with a new one each time the insert is replaced.
- The balance accuracy of the AXD series is G6.3 at 10000 min^{-1} with just the holder alone (with no insert or clamp screw attached).
- Use a machining tool that has safety measures in place in case there is damage to the cutter body.

Maximum Allowable Spindle Speed (min-1) When Balancing With an Arbor or Milling Chuck Has Not Occurred

AXD4000

(mm)

Cutting Edge Diameter **DC**	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Allowable Revolution (min-1)	12000	9500	7600	6000	4800	3800	3000	2400

AXD7000

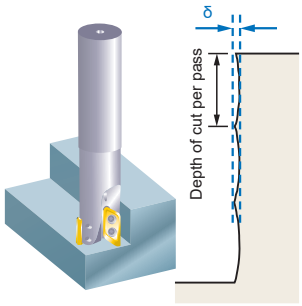
Cutting Edge Diameter **DC**	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Allowable Revolution (min-1)	9500	7600	6000	4800	3800	3000	2400

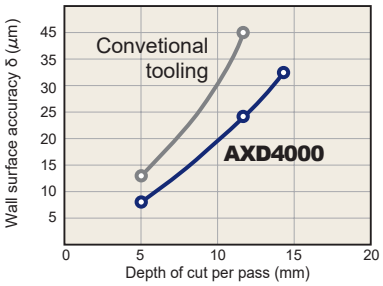
Note 1) For the operating speed, please check, and take into consideration, the maximum allowable speed of the machining tool, arbor, milling chuck, etc.

Technical Data

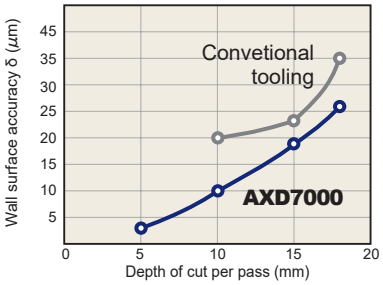
Excellent Wall Accuracy

Specially designed G-class inserts with a helical cutting edge for excellent wall accuracy.





<Cutting Conditions>
Workpiece Material : JIS A7075
Tool : AXD4000R403SA42SA
Insert : RE=0.8R, GL Breaker TF15
Cutting Speed : vc=1000m/min
Feed per Tooth : 0.2mm/t.
Width of Cut : ae=3mm
Cutting Mode : Wet Cutting



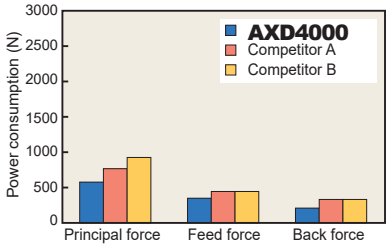
<Cutting Conditions>
Workpiece Material : JIS A7075
Tool : AXD7000R402SA42SA
Insert : RE=0.8R, GL Breaker TF15
Cutting Speed : vc=2500m/min
Feed per Tooth : 0.2mm/t.
Width of Cut : ae=3mm
Cutting Mode : Wet Cutting

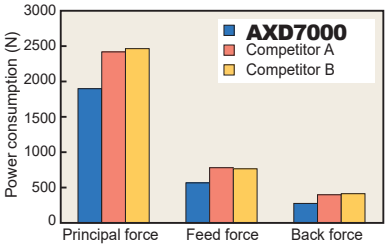
Low Resistance Inserts

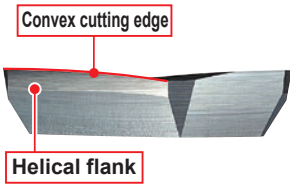
An optimised helical flank and a flank angle offer cutting edge strength and provide a large rake angle to reduce cutting resistance. Additionally a convex cutting edge is incorporated to ensure effective chip flow.

<Cutting Conditions>
Workpiece Material : JIS A7075
Tool : DC=Ø50mm
Insert : RE=0.8R, GL Breaker TF15
Cutting Speed : vc=1000m/min
Feed per Tooth : 0.2mm/t.
Depth of Cut : ap=10mm
Width of Cut : ae=25mm
Cutting Mode : Wet Cutting, Single tooth

Cutting resistance







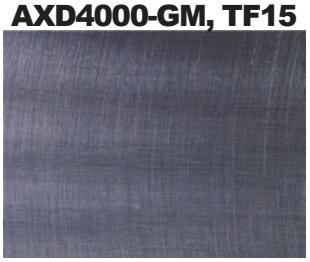
Comparison of surface finishes

Improved surface finishes by reducing feed marks

Conventional

Ra 0.675μm Rz 3.725μm

AXD4000-GM, TF15



Ra 0.120μm Rz 1.132μm

<Cutting Conditions>
Workpiece Material : A7075
Tool : AXD4000-050A04RA
Insert : GM Breaker (TF15)
Cutting Speed : vc=1000m/min
Feed per Tooth : 0.15mm/t.
Depth of Cut : ap=0.5mm
Width of Cut : ae=30mm
Cutting Mode : Wet Cutting, Single Tooth, BT40

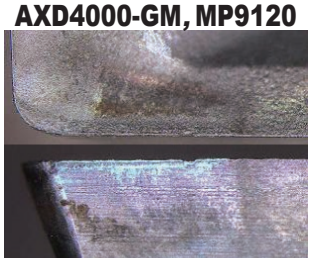
Cutting performance on Ti-6AL-4V

Stable tool life under high-load conditions

Conventional

After 0.4m of machining

AXD4000-GM, MP9120



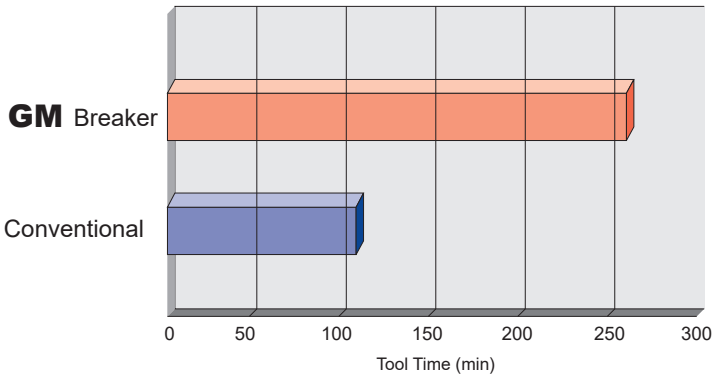
After 0.8m of machining

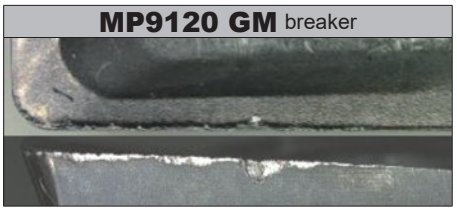
<Cutting Conditions>
Workpiece Material : Ti-6Al-4V
Tool : AXD4000-050A04RA
Insert : RE=0.4R, GM Breaker, MP9120
Cutting Speed : vc=30m/min
Feed per Tooth : 0.1mm/t.
Depth of Cut : ap=2.0mm
Width of Cut : ae=40mm
Cutting Mode : Wet Cutting, Single tooth

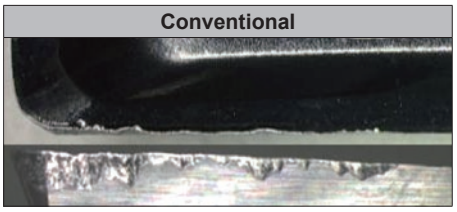
Cutting Performance

Cutting of cast aluminium alloy : Si content 9%

2.3 times longer tool life due to a tougher cutting edge & PVD coating



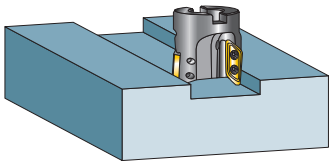
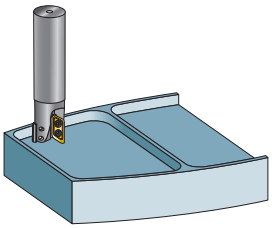


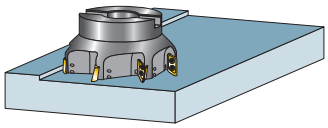
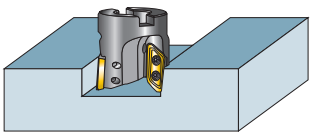


<Cutting Conditions>

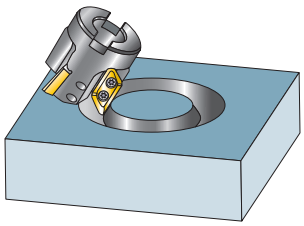
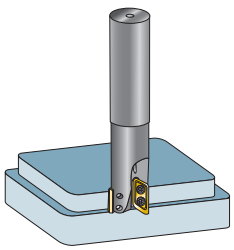
Workpiece Material	: Aluminium Alloy Cast Iron : Si Content 9%
Tool	: AXD4000-040A02RA
Insert	: RE=0.8R, GM Breaker, MP9120
Cutting Speed	: vc=950m/min
Feed per Tooth	: 0.10mm/t.
Depth of Cut	: ap=6.0mm
Width of Cut	: ae=33mm
Cutting Mode	: Wet Cutting

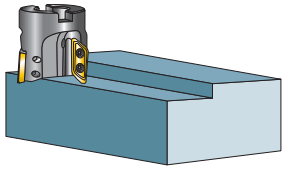
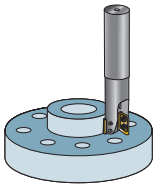
APPLICATION EXAMPLES

Tool		**AXD4000-050A02RA**	**AXD4000R322SA32SA**
Insert (Grade)		**XDGX175030PDFR-GL(TF15)**	**XDGX175030PDFR-GL(TF15)**
Workpiece		JIS A7075 	JIS A7050 
Cutting Conditions	Spindle speed (min^{-1})	27000	13000
	Cutting Speed (m/min)	4240	1300
	Feed per Tooth (mm/tooth)	0.285	0.2
	Depth of Cut (mm)	6	12
	Width of Cut (mm)	50	20
	Metal Removal Rate (cm^3/min)	4620	1250
Cutting mode		Wet	Wet
Machine Spindle Type		M/C-HSK80F	M/C-BT50
Result		Although tool overhang was significant, the low cutting resistance compared with conventional products enabled stable machining conditions.	Compared with conventional products, tool rigidity is high, thereby enabling excellent surface finishes.

Tool		**AXD4000R12507EA**	**AXD7000-050A03RB**
Insert (Grade)		**XDGX175008PDFR-GL(TF15)**	**XDGX227040PDFR-GL(TF15)**
Workpiece		JIS A5052 	JIS A7075 
Cutting Conditions	Spindle speed (min^{-1})	5000	18000
	Cutting Speed (m/min)	1960	2830
	Feed per Tooth (mm/tooth)	0.3	0.2
	Depth of Cut (mm)	5	18
	Width of Cut (mm)	80	50
	Metal Removal Rate (cm^3/min)	4200	9720
Cutting mode		Wet	MQL
Machine Spindle Type		M/C-BT50	M/C-HSK63/80A
Result		Compared with conventional products, cutting resistance is low, and feed rate per tooth was improved by 20%.	AXD displayed lower cutting resistance and achieved a high metal removal rate of up to 9720cm^3/min.

Please note that the machining performed in the application examples is dependent on the rigidity of the machine used and the rigidity of the workpiece and clamping.

Tool		AXD7000-050A03RA	AXD7000R402SA42SA
Insert (Grade)		XDGX227008PDFR-GL(TF15)	XDGX227008PDFR-GL(TF15)
Workpiece		JIS A7075 	JIS A7075 
Cutting Conditions	Spindle speed (min^{-1})	12500	7950
	Cutting Speed (m/min)	1960	1000
	Feed per Tooth (mm/tooth)	0.27	0.2
	Depth of Cut (mm)	10	10
	Width of Cut (mm)	20	5
	Metal Removal Rate (cm^3/min)	1010	160
Cutting mode		Wet	Wet
Machine Spindle Type		M/C-BT50	M/C-HSK63A
Result		Clamping rigidity of the inserts was higher than conventional products thus allowing stable 5-axis machining.	AXD achieved excellent results with a vertical wall accuracy of under 0.007mm.

Tool		AXD4000-050A04RA	AXD4000R252SA25SA
Insert (Grade)		XDGX175008PDER-GM(MP9120)	XDGX175008PDER-GM(MP9120)
Workpiece		Ti-6Al-4V 	JIS-AC4A: Si content 8-10% 
Cutting Conditions	Spindle speed (min^{-1})	190	8790
	Cutting Speed (m/min)	30	690
	Feed per Tooth (mm/tooth)	0.1	0.46
	Depth of Cut (mm)	2	2.5
	Width of Cut (mm)	40	25
Cutting mode		Wet	External coolant
Machine Type		Vertical 3 axis	Vertical
Result		AXD achieved double tool life compared to conventional products.	Aluminium alloys containing silicone tend to cause tool damage, but the MP9120 inserts gave double the tool life compared to conventional grades.

Memo

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For Machining of Aluminium and Titanium Alloys

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For Ultra-high Speed, Super Efficient Machining of Aluminium Alloys

AXD4000A

Up to 5000 m/min cutting speed.
10000cm³/min metal removal rate is possible.

(300 km/h = 33000 min^{-1} x ø50 mm)

For Your Safety
●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When attaching inserts or spare parts, please use only the correct wrench or driver. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

MITSUBISHI MATERIALS CORPORATION

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Overseas Sales Dept, Asian Region
Marunouchi Nijubashi Building 22F, 3-2-3, Marunouchi, Chiyoda-ku, Tokyo 100-8117, Japan
Overseas Sales Dept, European & American Region
Marunouchi Nijubashi Building 22F, 3-2-3, Marunouchi, Chiyoda-ku, Tokyo 100-8117, Japan

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