

WE CREATE YOUR TOMORROW!



Aluminum Series

Sensation of high speed aluminum machining

Pro-X Mill

Features

Multi-dimensional clamping system : strong clamping force in high speed operation

- The buffed mirror face of Pro-X Mill insert demonstrates outstanding chip control and prevents built-up edge.
- Since the multi dimensional clamping face at the bottom of insert prevents the micro vibration of the insert during high speed machining, Pro-X Mill provides safe & reliable machining under high RPM condition.
- Excellent surface finish of Pro-X Mill made by high rake angle insert will meet customer's needs.
- Multi-functional aluminum milling tool.
 : Shouldering, Slotting, Helical ramping and Copying operation are available.

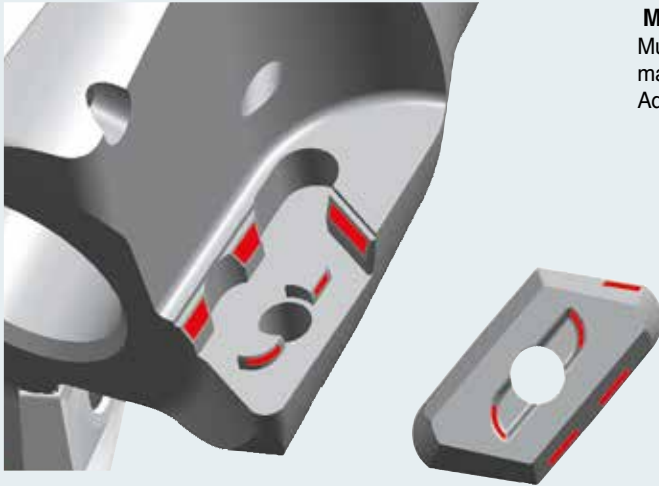




Pro-X Mill

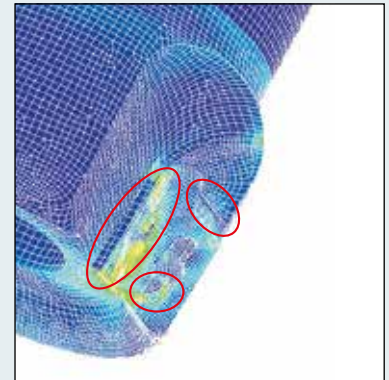
Sensation of high speed aluminum machining

Features of Pro-X Mill



Multi-dimension strong clamping system for high speed
 Multi-dimensional clamping face at the bottom of insert and tip seat
 make strong clamping force
 Adjustment of all factors which cause chattering

**Calculating stress distribution
 by FEM (Finite Element Method)
 on clamping system design**



Coolant system

Better chip scattering at high speed operation
 More reliable machining at high speed
 Coolant oil and air blow action

Strong cutter body

Rigid alloy steel body + nickel coating

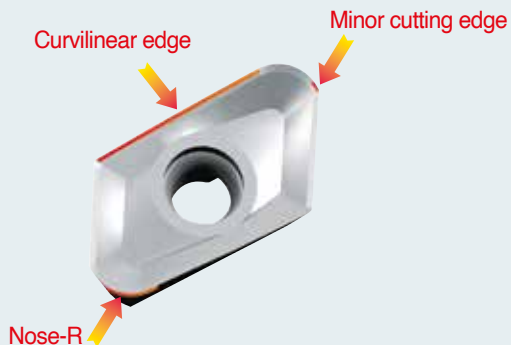
Features of Pro-X Mill insert

3 dimensional chip breaker

Minor cutting edge design for excellent surface roughness
 Optimal chip breaker design for low cutting resistance
 Curvilinear edge for good chip flow
 Edge design for 90° shouldering

Buffed mirror face to prevent built-up edge

High rake angle (19°~25°)



Various nose-R size

Nose-R (ISO code)	04	08	12	16	18	20	30	32	40	50
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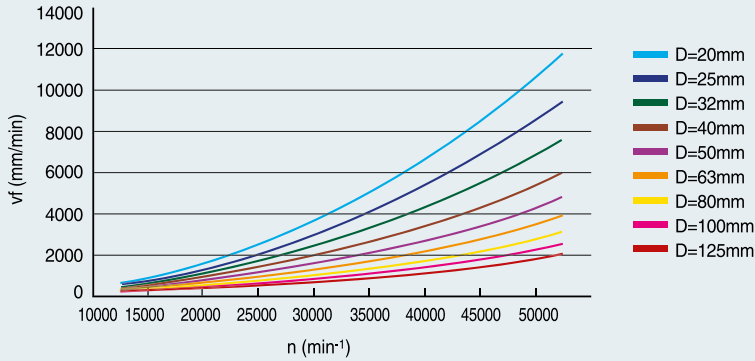


Pro-X Mill

Sensation of high speed aluminum machining

Maximum RPM as per diameter

Centrifugal force by RPM



The torque of screw clamp : 4N.m
The weight of insert : 6.8g

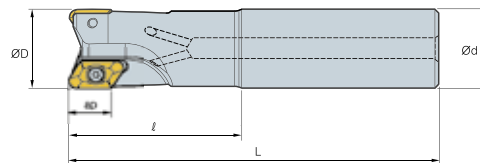


Laser marked information
Designation
Max. RPM

Diameter (mm)	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. vc (m/min)	2,292	2,559	2,893	3,240	3,611	4,055	4,571	5,118	5,730
Max. RPM	15,000	32,600	28,800	25,800	23,000	20,500	18,200	16,300	14,600

This data is based on the separation of insert from cutter under high R.P.M.(without machining)
Safe counterplan will be required for big volume of scattering chips or unexpected breakage of tool.

PAXS



Designation	Stock		Dimensions(mm)						□ (max)
	A	B	øD	ød	□	L	ap	⊙	
PAXS 5020HR-A, B			20	20	60	130	17	1	8.30°
5025HR-A, B			25	25	60	140	17	2	17.95°
5032HR-A, B			32	32	70	150	17	2	12.6°
5040HR-A, B-S32			40	32	70	160	17	3	9.91°
5040HR-A, B-S40			40	40	70	160	17	3	9.91°
5040HR-A, B-S42			40	42	70	160	17	3	9.91°
PAXS 6025HR-A, B			25	25	60	140	23	1	9.0°
6032HR-A, B			32	32	70	150	23	1	7.0°
6040HR-A, B-S32			40	32	70	160	23	2	17.0°
6040HR-A, B-S40			40	40	70	160	23	2	17.0°
6040HR-A, B-S42			40	42	70	160	23	2	17.0°

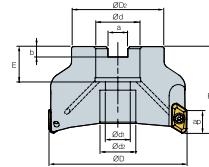
Stock item, Under preparing for stock



Pro-X Mill

Sensation of high speed aluminum machining

PAXCM

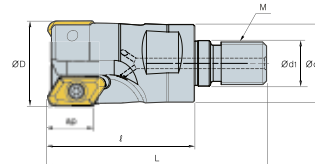


Designation	Stock		Dimensions(mm)											(max)
	A	B	øD	øD2	ød	ød ₁	ød ₂	a	b	F	E	ap	⊙	
PAXCM 5040HR-A, B			40	34	16	9	14	8.4	5.6	40	19	17	3	11.31°
5050HR-A, B			50	42	22	11	18	10.4	6.3	50	21	17	4	7.24°
5063HR-A, B			63	49	22	11	18	10.4	6.3	50	21	17	4	5.10°
5080HR-A, B			80	57	27	14	20	12.4	7	50	23	17	5	3.86°
5100HR-A, B			100	67	32	18	26	14.4	8	63	26	17	6	3.94°
5125HR-A, B			125	87	40	22	32	16.4	9	63	29	17	7	9.5°
PAXCM 6050HR-A, B			50	42	22	11	18	10.4	6.3	50	18	23	2	9.5°
6063HR-A, B			63	49	22	11	18	10.4	6.3	50	21	23	3	7.0°
6080HR-A, B			80	57	27	14	20	12.4	7	50	23	23	4	5.0°
6100HR-A, B			100	67	32	18	26	14.4	8	63	26	23	5	4.0°
6125HR-A, B			125	87	40	22	32	16.4	9	63	29	23	6	3.0°

UA type : Nose-R 0.4 ~ 3.2 UB type : Nose-R 4.0 ~ 5.0

Stock item, Under preparing for stock

PAXM

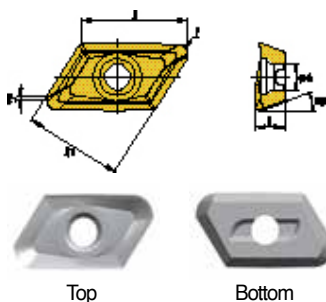


Designation	Stock		Dimensions(mm)							
	A	B	øD	ød	ød ₁	L	□	M	ap	⊙
PAXM 5025HR-A,B-M12			25	23	12.5	76	55	M12	23	2
5032HR-A,B-M16			32	29	17.0	79	55	M16	23	2
5040HR-A,B-M16			40	29	17.0	82	55	M16	23	3

UA type : Nose-R 0.4 ~ 3.2 UB type : Nose-R 4.0 ~ 5.0

Stock item, Under preparing for stock

Insert



Designation	Grade		Dimension(mm)					
	H01	PD2000	□	□	□	t	r	ød ₁
XEKT 19M504FR-MA			18	16.4	1.4	5	0.4	4.4
19M508FR-MA			18	16.4	1.0	5	0.8	4.4
19M512FR-MA			18	16.4	0.6	5	1.2	4.4
19M516FR-MA			17.5	16.4	0.5	5	1.6	4.4
19M518FR-MA			17.5	16.4	0.5	5	1.8	4.4
19M520FR-MA			17.5	16.4	0.5	5	2.0	4.4
19M530FR-MA			17	16.4	0.7	5	3.0	4.4
19M532FR-MA			17	16.4	0.5	5	3.2	4.4
19M540FR-MA			16.5	16.4	0.5	5	4.0	4.4
19M550FR-MA			16	16.4	0.4	5	5.0	4.4
XEKT 250608FR-MA			24	21.9	1.2	6.35	0.8	6.0
250640FR-MA			22	21.9	1.2	6.35	4.0	6.0

Stock item, Under preparing for stock



Pro-X Mill

Sensation of high speed aluminum machining

Modular adaptor

Steel

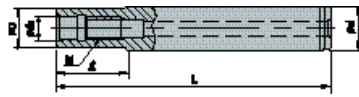


Fig 1. Straight Neck adaptor

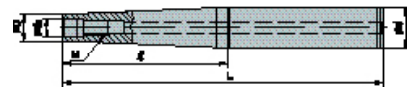


Fig 2. Taper Neck adaptor

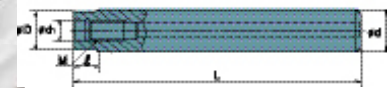
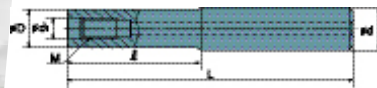
Designation	Stock	Fig.	Dimensions(mm)					
			M	øD	ød	ød ₁		L
MAT-M06-020-S10S		1	M06	9.5	10	6.5	20	70
MAT-M06-040-S12T		2	M06	9.5	12	6.5	40	96
MAT-M06-065-S16T		2	M06	9.5	16	6.5	65	125
MAT-M6B-020-S12S		1	M06	11	12	6.5	20	76
MAT-M6B-040-S12S		1	M06	11	12	6.5	40	96
MAT-M6B-065-S16T		2	M06	11	16	6.5	65	125
MAT-M6B-080-S16T		2	M06	11	16	6.5	80	140
MAT-M08-020-S16S		1	M08	14.5	16	8.5	20	80
MAT-M08-040-S16T		2	M08	14.5	16	8.5	40	100
MAT-M08-065-S16T		2	M08	14.5	16	8.5	65	125
MAT-M08-080-S20T		2	M08	14.5	20	8.5	80	150
MAT-M08-110-S25T		2	M08	14.5	25	8.5	110	190
MAT-M10-030-S20S		1	M10	18	20	10.5	30	100
MAT-M10-050-S20T		2	M10	18	20	10.5	50	120
MAT-M10-070-S20T		2	M10	18	20	10.5	70	140
MAT-M10-090-S25T		2	M10	18	25	10.5	90	170
MAT-M10-110-S25T		2	M10	18	25	10.5	110	190
MAT-M10-130-S32T		2	M10	18	32	10.5	130	220
MAT-M12-030-S25S		1	M12	22.5	25	12.5	30	110
MAT-M12-050-S25T		2	M12	22.5	25	12.5	50	130
MAT-M12-070-S25T		2	M12	22.5	25	12.5	70	150
MAT-M12-090-S25T		2	M12	22.5	25	12.5	90	170
MAT-M12-110-S32T		2	M12	22.5	32	12.5	110	200
MAT-M12-175-S40T		2	M12	22.5	40	12.5	175	300
MAT-M16-035-S32S		1	M16	28.5	32	17	35	125
MAT-M16-055-S32T		2	M16	28.5	32	17	55	145
MAT-M16-080-S32T		2	M16	28.5	32	17	80	170
MAT-M16-120-S32T		2	M16	28.5	32	17	120	210
MAT-M16-175-S40T		2	M16	28.5	40	17	175	300

U: Available to use (FMRM, LBE, PAM, AMM, RM4PM, HRMM, PAXM)

US : Straight type UT : Taper type

Stock item, Under preparing for stock

Carbide



Designation	Stock	Dimensions(mm)					
		M	øD	ød	ød ₁		L
MAT-M08-080-S16S-C		M08	14.5	16	8.5	80	150
MAT-M08-110-S16S-C		M08	14.5	16	8.5	110	180
MAT-M08-150-S16S-C		M08	14.5	16	8.5	150	250
MAT-M10-090-S20S-C		M10	18	20	10.5	90	170
MAT-M10-110-S20S-C		M10	18	20	10.5	110	200
MAT-M10-175-S20S-C		M10	18	20	10.5	175	300
MAT-M12-090-S25S-C		M12	22.5	25	12.5	90	170
MAT-M12-110-S25S-C		M12	22.5	25	12.5	110	200
MAT-M12-175-S25S-C		M12	22.5	25	12.5	175	300
MAT-M16-090-S32S-C		M16	28.5	32	17	90	180
MAT-M16-120-S32S-C		M16	28.5	32	17	120	210
MAT-M16-175-S32S-C		M16	28.5	32	17	175	300
MAT-M08-010-S16S-C-150		M08	14.5	8.5	16	10	150
MAT-M08-010-S16S-C-180		M08	14.5	8.5	16	10	180
MAT-M08-010-S16S-C-250		M08	14.5	8.5	16	10	250
MAT-M10-010-S20S-C-170		M10	18	10.5	20	10	170
MAT-M10-010-S20S-C-200		M10	18	10.5	20	10	200
MAT-M10-010-S20S-C-300		M10	18	10.5	20	10	300
MAT-M12-015-S25S-C-170		M12	22.5	12.5	25	15	170
MAT-M12-015-S25S-C-200		M12	22.5	12.5	25	15	200
MAT-M12-015-S25S-C-300		M12	22.5	12.5	25	15	300
MAT-M16-020-S32S-C-180		M16	28.5	17	32	20	180
MAT-M16-020-S32S-C-210		M16	28.5	17	32	20	210
MAT-M16-020-S32S-C-300		M16	28.5	17	32	20	300

U: Available to use (FMRM, LBE, PAM, AMM, RM4PM, HRMM, PAXM)

Stock item, Under preparing for stock



Pro-X Mill

Sensation of high speed aluminum machining

Chip removal rate (cm³/min)

Workpiece	Diameter	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125	Cutting condition			
											vc	fz	ap	ae
Aluminum alloys	Rm < 280 N/mm ²	687	1375	1375	2063	2750	3437	3437	4125	4812	1200	0.3	12	0.5D
Copper	mm ²	101	203	203	305	407	509	509	611	713	400	0.2	8	0.5D
	Long Chip	50	100	100	150	200	250	250	300	350	350	0.1	6	0.5D
	-	397	795	795	1193	1591	1989	1989	2387	2785	1000	0.25	10	0.5D
	Si < 12%	127	254	254	381	509	636	636	763	891	500	0.2	8	0.5D
	Short Chip	85	171	171	257	343	429	429	515	601	450	0.2	6	0.5D
	-	23	47	47	71	95	119	119	143	167	200	0.15	5	0.5D

Power of machine required (Hp)

$$P_{kw} = 0.75 \times P_{Hp}$$

Workpiece	Diameter	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125	Cutting condition			
											vc	fz	ap	ae
Aluminum alloys	Rm < 280 N/mm ²	6.6	13.3	13.3	19.9	26.6	33.2	33.2	39.9	52.4	1200	0.3	12	0.5D
Copper alloys	mm ²	1.2	2.4	2.4	3.7	4.9	6.2	6.2	4.7	8.7	400	0.2	8	0.5D
Thermoplastics	Long Chip	0.6	1.2	1.2	1.8	2.4	3.0	3.0	3.6	4.3	350	0.1	6	0.5D
Aluminum alloys	-	4.8	9.7	9.7	14.6	19.5	24.3	24.3	29.2	34.1	1000	0.25	10	0.5D
Copper alloys	Si < 12%	1.5	3.1	3.1	4.6	6.2	7.8	7.8	9.3	10.9	500	0.2	8	0.5D
Magnesium alloys	Short Chip	1.0	2.1	2.1	3.1	4.2	5.2	5.2	6.3	7.3	450	0.2	6	0.5D
Duro plastics	-	0.3	0.6	0.6	0.8	1.1	1.5	1.5	1.7	2.0	200	0.15	5	0.5D

Recommended Cutting Condition

Workpiece		vc (m/min)	fz (mm/t)
Aluminum alloys	Rm < 280 N/mm ²	1200	0.3
	Rm > 280 N/mm ²	1000	0.25
Copper alloys	Long chip	400	0.2
Thermo plastics	-	350	0.15
Aluminum alloys	Si < 12%	1000	0.25
	Si ≥ 12%	-	-
Copper alloys	Short chip	500	0.2
Magnesium alloys	-	450	0.2
Duroplastics	-	200	0.15

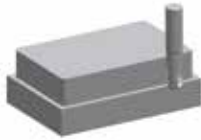


Pro-X Mill

Sensation of high speed aluminum machining

Application Examples

PAXS5032R-A



Workpiece : A6061
Cutting condition

	vc (m/min)	fz (mm/t)	ap (mm)	ae (mm)
Metric	1300	0.2	8	16

Chip evacuation and good surface roughness

PAXCM5050R-A

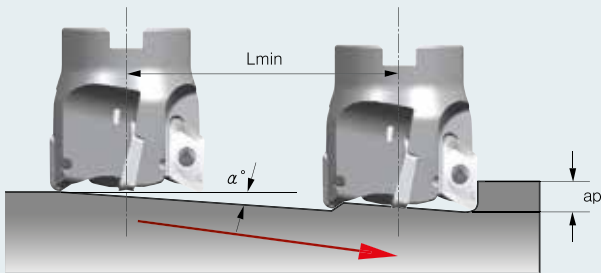


Workpiece : A6061
Cutting condition

	vc (m/min)	fz (mm/t)	ap (mm)	ae (mm)
Metric	1300	0.25	10	25

Long tool life and no built-up edge & chipping

Ramping cutting technical data



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

L min : minimum inclination cutting length

α : Max. ramping angle
ap : depth of cut

PAXCM5000

Diameter(ϕ)	α (max)	L min(mm)
40	11.31°	50
50	7.24°	78
63	5.10°	112
80	3.86°	148
100	3.94°	145
125	2.14°	267

PAXS5000

Diameter(ϕ)	α (max)	L min(mm)
20	8.30°	68
25	17.95°	31
32	12.6°	45
40	9.91°	57

Uap=10mm

PAXCM6000

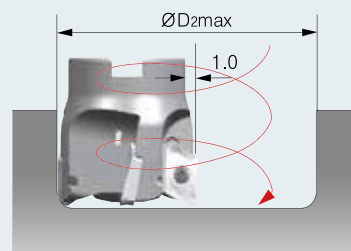
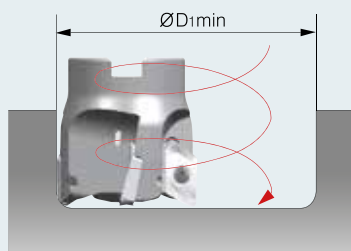
Diameter(ϕ)	α (max)	L min(mm)
40	17°	32
50	9.5°	60
63	7°	81
80	5°	114
100	4°	143
125	3°	190

PAXS6000

Diameter(ϕ)	α (max)	L min(mm)
20	-	-
25	9°	63
32	7°	81
40	17°	32

Uap=10mm

Helical cutting technical data



Unit : mm

ϕD	$\phi D_{1 \min}$	$\phi D_{2 \max}$
20	22	33
25	29	43
32	43	57
40	59	73
50	79	93

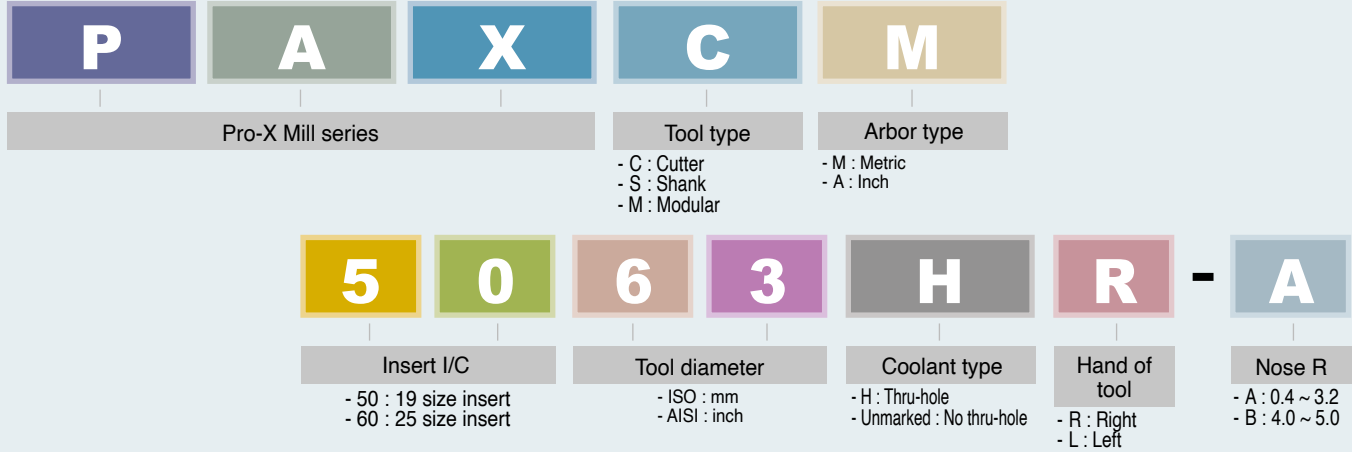
ϕD	$\phi D_{1 \min}$	$\phi D_{2 \max}$
63	105	119
80	139	153
100	179	193
125	229	243





Pro-X Mill

Sensation of high speed aluminum machining

Pro-A Mill code system



Part

Screw		Wrench	
PTKA0407 / PTKA0408		TW15S	



Safety instruction

- Use glasses safely and face cover with protective equipment. If cutting condition and use method are inaccurate, you may be injured by broken tools or scattered chips.
- Excessive cutting load may influence badly on both tool and machine. Make suitable tool replacement for preventing failure of machining.
- After machine stopped, clean remained chips from machine with special cleaning equipment.
- Keep safety distance from acute and hot chip during machining.
- Make precaution for prevention of fire in advance when you use insoluble cutting oil.
- Assembled parts may be scattered at high speed cutting. Please use protective equipment.