



## 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.

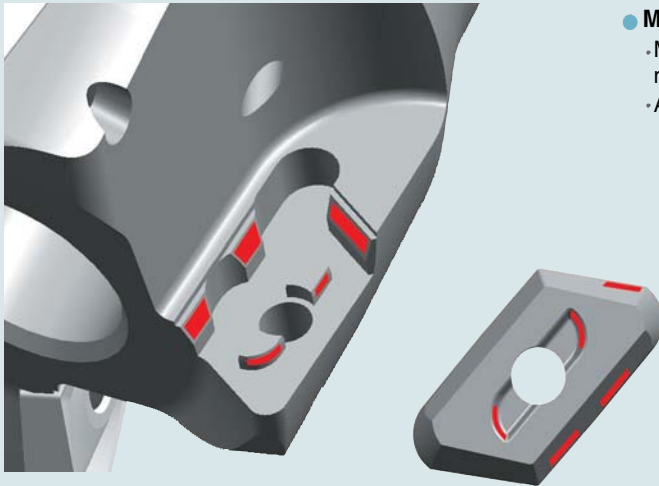




# Pro-X Mill

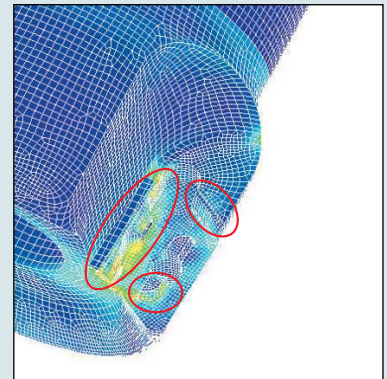
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## Features of Pro-X Mill



- **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

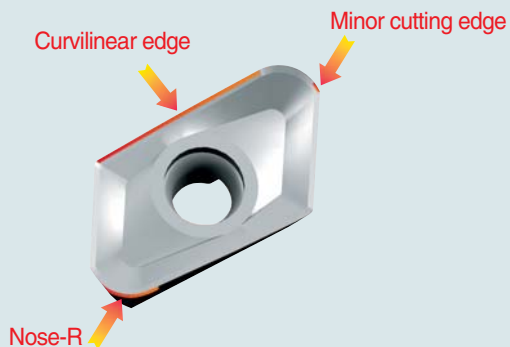
## Features of Pro-X Mill insert

- **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

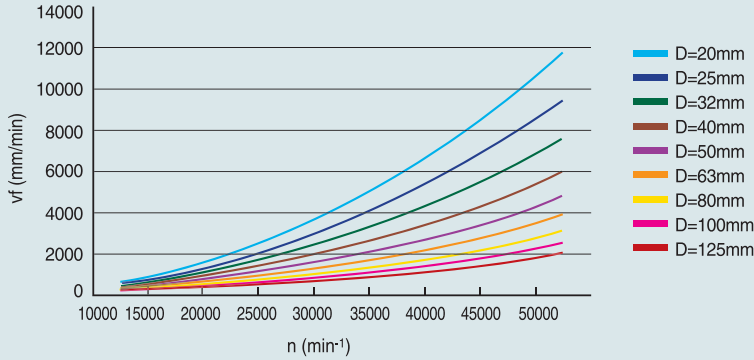


# Pro-X Mill

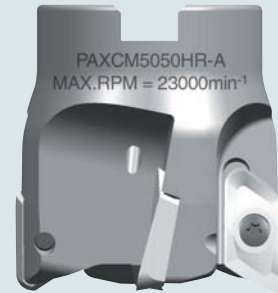
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## Maximum RPM as per diameter

### Centrifugal force by RPM



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

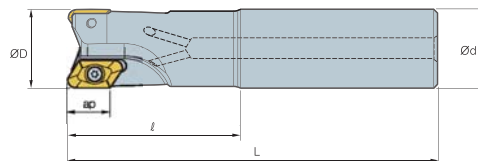


- Laser marked information
  - Designation
  - Max. RPM

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)						$\alpha^\circ$ (max)
	A	B	øD	ød	ℓ	L	ap		
<b>PAXS 5020HR-A, B</b>	●	●	20	20	60	130	17	1	8.30°
<b>5025HR-A, B</b>	●	●	25	25	60	140	17	2	17.95°
<b>5032HR-A, B</b>	●	●	32	32	70	150	17	2	12.6°
<b>5040HR-A, B-S32</b>	○	○	40	32	70	160	17	3	9.91°
<b>5040HR-A, B-S40</b>	○	○	40	40	70	160	17	3	9.91°
<b>5040HR-A, B-S42</b>	○	○	40	42	70	160	17	3	9.91°
<b>PAXS 6025HR-A, B</b>	○	○	25	25	60	140	23	1	9.0°
<b>6032HR-A, B</b>	○	○	32	32	70	150	23	1	7.0°
<b>6040HR-A, B-S32</b>	○	○	40	32	70	160	23	2	17.0°
<b>6040HR-A, B-S40</b>	○	○	40	40	70	160	23	2	17.0°
<b>6040HR-A, B-S42</b>	○	○	40	42	70	160	23	2	17.0°

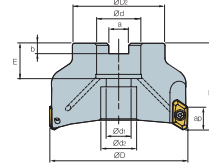
● Stock item, ○ Under preparing for stock

# Pro-X Mill

Sensation of high speed aluminum machining



## PAXCM

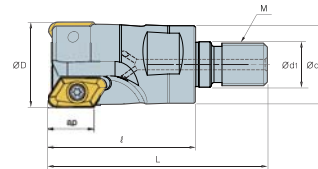


Designation	Stock		Dimensions(mm)										$\alpha^\circ$ (max)	
	A	B	$\phi D$	$\phi D_2$	$\phi d$	$\phi d_1$	$\phi d_2$	a	b	F	E	ap		
<b>PAXCM 5040HR-A, B</b>	●	●	40	34	16	9	14	8.4	5.6	40	19	17	3	11.31°
<b>5050HR-A, B</b>	●	●	50	42	22	11	18	10.4	6.3	50	21	17	4	7.24°
<b>5063HR-A, B</b>	●	●	63	49	22	11	18	10.4	6.3	50	21	17	4	5.10°
<b>5080HR-A, B</b>	●	●	80	57	27	14	20	12.4	7	50	23	17	5	3.86°
<b>5100HR-A, B</b>	●	●	100	67	32	18	26	14.4	8	63	26	17	6	3.94°
<b>5125HR-A, B</b>	●	●	125	87	40	22	32	16.4	9	63	29	17	7	9.5°
<b>PAXCM 6050HR-A, B</b>	○	○	50	42	22	11	18	10.4	6.3	50	18	23	2	9.5°
<b>6063HR-A, B</b>	○	○	63	49	22	11	18	10.4	6.3	50	21	23	3	7.0°
<b>6080HR-A, B</b>	○	○	80	57	27	14	20	12.4	7	50	23	23	4	5.0°
<b>6100HR-A, B</b>	○	○	100	67	32	18	26	14.4	8	63	26	23	5	4.0°
<b>6125HR-A, B</b>	○	○	125	87	40	22	32	16.4	9	63	29	23	6	3.0°

• A type : Nose-R 0.4 ~ 3.2 • B type : Nose-R 4.0 ~ 5.0

● Stock item, ○ Under preparing for stock

## PAXM

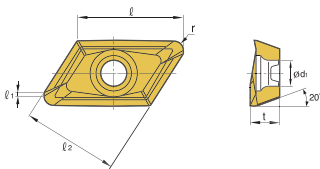


Designation	Stock		Dimensions(mm)							
	A	B	$\phi D$	$\phi d$	$\phi d_1$	L	l	M	ap	
<b>PAXM 5025HR-A,B-M12</b>	○	○	25	23	12.5	76	55	M12	23	2
<b>5032HR-A,B-M16</b>	○	○	32	29	17.0	79	55	M16	23	2
<b>5040HR-A,B-M16</b>	○	○	40	29	17.0	82	55	M16	23	3

• A type : Nose-R 0.4 ~ 3.2 • B type : Nose-R 4.0 ~ 5.0

● Stock item, ○ Under preparing for stock

## Insert



Top



Bottom

Designation	Grade		Dimension(mm)					
	H01	PD2000	l	l <sub>2</sub>	l <sub>1</sub>	t	r	$\phi d_1$
<b>XEKT 19M504FR-MA</b>	●	●	18	16.4	1.4	5	0.4	4.4
<b>19M508FR-MA</b>	●	●	18	16.4	1.0	5	0.8	4.4
<b>19M512FR-MA</b>	●	●	18	16.4	0.6	5	1.2	4.4
<b>19M516FR-MA</b>	●	●	17.5	16.4	0.5	5	1.6	4.4
<b>19M518FR-MA</b>	●	●	17.5	16.4	0.5	5	1.8	4.4
<b>19M520FR-MA</b>	●	●	17.5	16.4	0.5	5	2.0	4.4
<b>19M530FR-MA</b>	●	●	17	16.4	0.7	5	3.0	4.4
<b>19M532FR-MA</b>	●	●	17	16.4	0.5	5	3.2	4.4
<b>19M540FR-MA</b>	●	●	16.5	16.4	0.5	5	4.0	4.4
<b>19M550FR-MA</b>	●	●	16	16.4	0.4	5	5.0	4.4
<b>XEKT 250608FR-MA</b>	○	○	24	21.9	1.2	6.35	0.8	6.0
<b>250640FR-MA</b>	○	○	22	21.9	1.2	6.35	4.0	6.0

● Stock item, ○ Under preparing for stock



# Pro-X Mill

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## Modular adaptor

### Steel

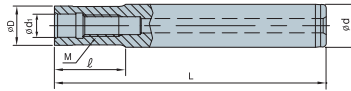


Fig 1. Straight Neck adaptor

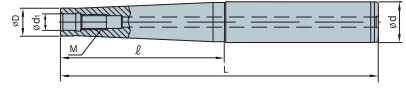


Fig 2. Taper Neck adaptor

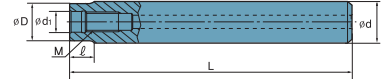
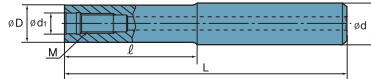
Designation	Stock	Fig.	Dimensions(mm)					
			M	øD	ød	ød <sub>1</sub>	ℓ	L
MAT-M06-020-S10S	●	1	M06	9.5	10	6.5	20	70
MAT-M06-040-S12T	●	2	M06	9.5	12	6.5	40	96
MAT-M06-065-S16T	●	2	M06	9.5	16	6.5	65	125
MAT-M6B-020-S12S	●	1	M06	11	12	6.5	20	76
MAT-M6B-040-S12S	●	1	M06	11	12	6.5	40	96
MAT-M6B-065-S16T	●	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

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

•S : Straight type •T : Taper type

●Stock item, ○Under preparing for stock

### Carbide



Designation	Stock	Dimensions(mm)					
		M	øD	ød	ød <sub>1</sub>	ℓ	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

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

●Stock item, ○Under preparing for stock

# Pro-X Mill

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## Chip removal rate (cm<sup>3</sup>/min)

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

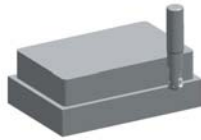


# Pro-X Mill

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## 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

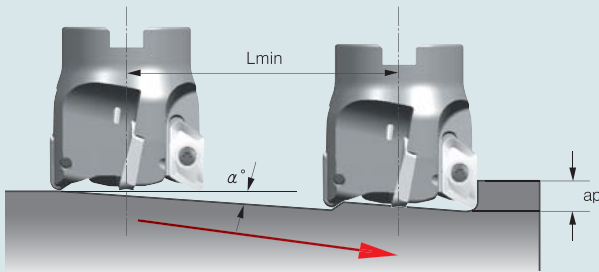


Workpiece : A6061  
Cutting condition

	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
- $\alpha^{\circ}$  : Max. ramping angle
- ap : depth of cut

■ PAXCM5000

Diameter( $\phi$ )	$\alpha^{\circ}$ (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( $\phi$ )	$\alpha^{\circ}$ (max)	L min(mm)
20	8.30°	68
25	17.95°	31
32	12.6°	45
40	9.91°	57

•ap=10mm

■ PAXCM6000

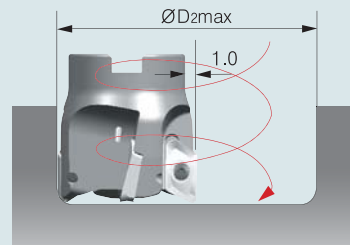
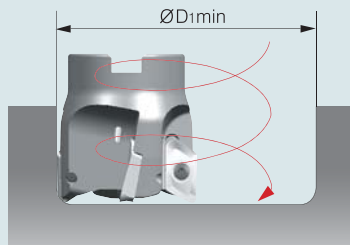
Diameter( $\phi$ )	$\alpha^{\circ}$ (max)	L min(mm)
40	17°	32
50	9.5°	60
63	7°	81
80	5°	114
100	4°	143
125	3°	190

■ PAXS6000

Diameter( $\phi$ )	$\alpha^{\circ}$ (max)	L min(mm)
20	-	-
25	9°	63
32	7°	81
40	17°	32

•ap=10mm

## Helical cutting technical data



Unit : mm

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

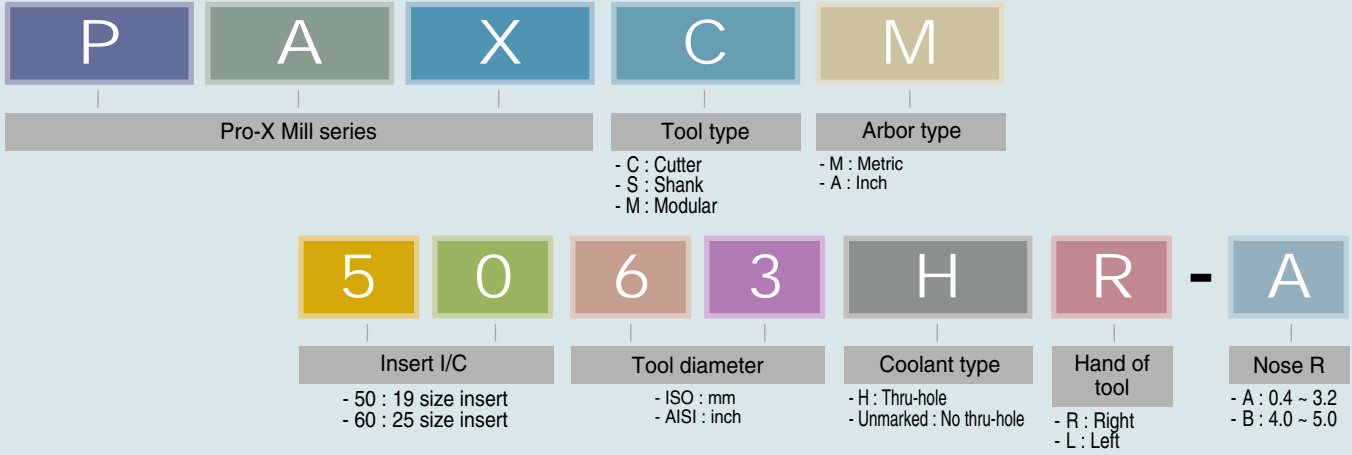
$\phi D$	$\phi D_{1 \min}$	$\phi D_{2 \max}$
63	105	119
80	139	153
100	179	193
125	229	243





# 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.