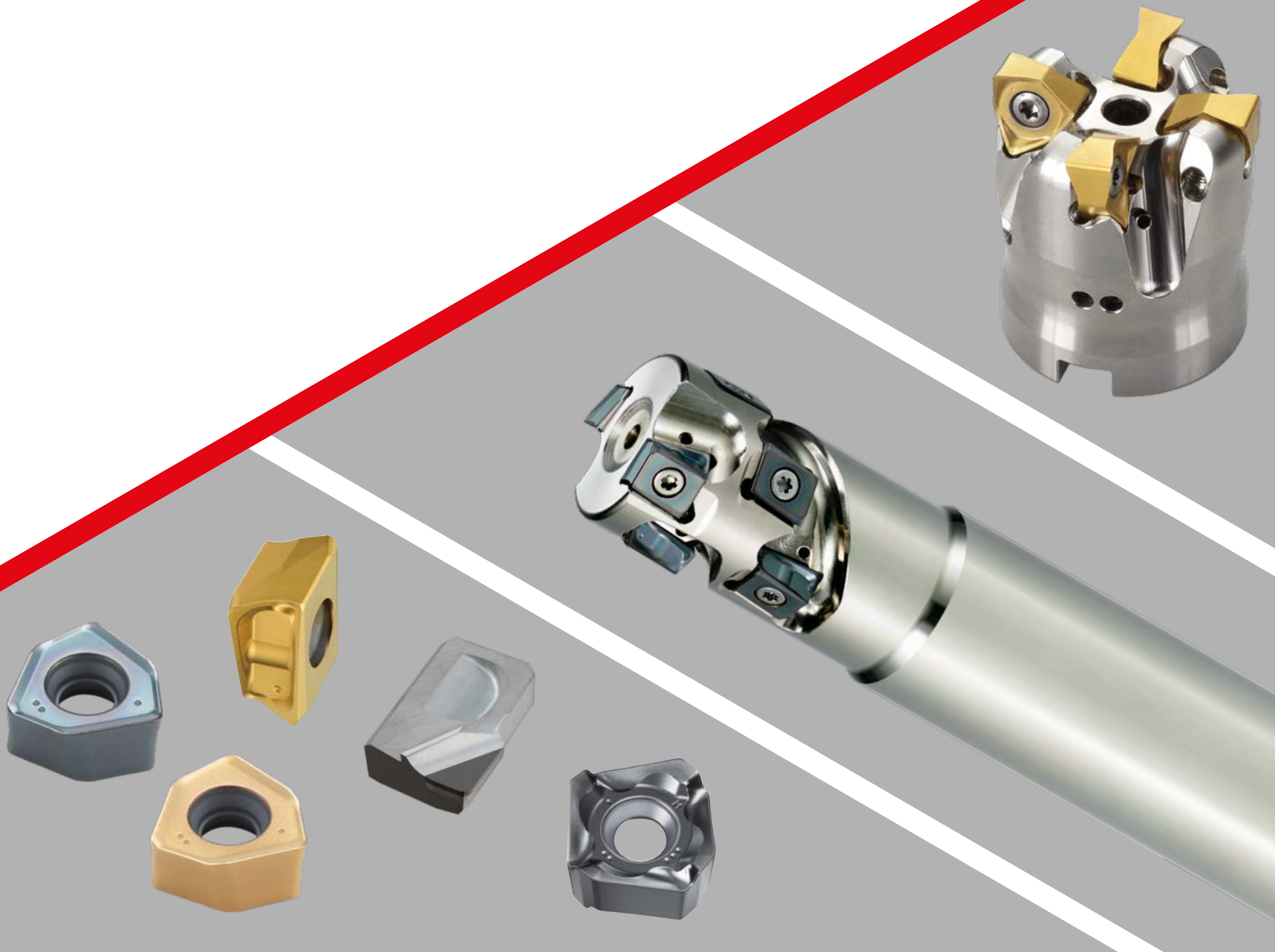
MITSUBISHI MATERIALS

INDEXABLE MILLING TOOLS



INDEXABLE MILLING TOOLS

EFFICIENCY – PASSION FOR PERFECTION

Exceeding customer expectations; that is the motto of Mitsubishi Materials.

Mitsubishi Materials focuses on the ever-growing customer requirements and develops economically sustainable tooling solutions to meet the high demands of the market.

From efficient roughing cutters through to micron-precise indexable insert milling tools, Mitsubishi Materials is committed to the manufacture and supply of the highest quality milling tools.

DIAEDGE

MITSUBISHI MATERIALS

2025 – 2027

INDEX

INDEXABLE MILLING TOOLS

HOW TO READ THE STANDARD OF ROTATING TOOLS

●How this section page is organised

①Organised according to the face milling cutting mode.
(Refer to the index on the next page.)

SCOPE OF MATERIAL COVERED BY THE TOOL
provides a graph depicting the scope of the material suitable for the tool.

CORNER ANGLE ICON

TYPE/
NAME OF
PRODUCT

APPLICATION ICON
represents available machining applications, such as finishing and roughing.

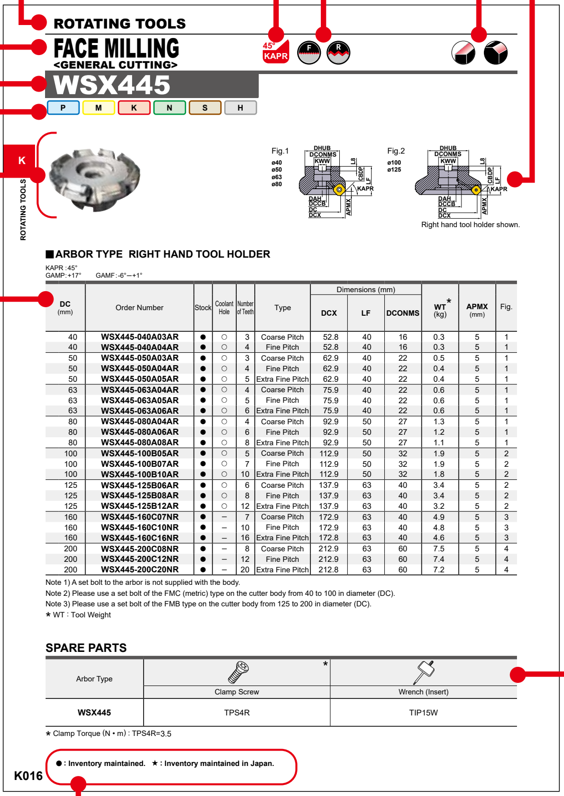
APPLICATION

CUTTING MODE ICON
represents available cutting modes, such as face milling and shoulder milling.

STANDARDS FOR APPLICABLE INSERTS
indicates stock status, dimensions, etc. for applicable inserts.

PRODUCT SECTION

GEOMETRY



ROTATING TOOLS

FACE MILLING
<GENERAL CUTTING>

WSX445

P M K N S H

Right hand tool holder shown.

■**ARBOR TYPE RIGHT HAND TOOL HOLDER**

KAPR : 45°
GAMP : +17° GAMF : -6°—+1°

DC (mm)	Order Number	Stock	Coolant Hole	Number of Teeth	Type	Dimensions (mm) DCX	LF	DCONMS	WT* (kg)	APMX (mm)	Fig.
40	WSX445-040A03AR	●	○	3	Coarse Pitch	52.8	40	16	0.3	5	1
40	WSX445-040A04AR	●	○	4	Fine Pitch	52.8	40	16	0.3	5	1
50	WSX445-050A03AR	●	○	3	Coarse Pitch	62.9	40	22	0.5	5	1
50	WSX445-050A04AR	●	○	4	Fine Pitch	62.9	40	22	0.4	5	1
50	WSX445-050A05AR	●	○	5	Extra Fine Pitch	62.9	40	22	0.4	5	1
63	WSX445-063A04AR	●	○	4	Coarse Pitch	75.9	40	22	0.6	5	1
63	WSX445-063A05AR	●	○	5	Fine Pitch	75.9	40	22	0.6	5	1
63	WSX445-063A06AR	●	○	6	Extra Fine Pitch	75.9	40	22	0.6	5	1
80	WSX445-080A04AR	●	○	4	Coarse Pitch	92.9	50	27	1.3	5	1
80	WSX445-080A06AR	●	○	6	Fine Pitch	92.9	50	27	1.2	5	1
80	WSX445-080A08AR	●	○	8	Extra Fine Pitch	92.9	50	27	1.1	5	1
100	WSX445-100B05AR	●	○	5	Coarse Pitch	112.9	50	32	1.9	5	2
100	WSX445-100B07AR	●	○	7	Fine Pitch	112.9	50	32	1.9	5	2
100	WSX445-100B10AR	●	○	10	Extra Fine Pitch	112.9	50	32	1.8	5	2
125	WSX445-125B06AR	●	○	6	Coarse Pitch	137.9	63	40	3.4	5	2
125	WSX445-125B08AR	●	○	8	Fine Pitch	137.9	63	40	3.4	5	2
125	WSX445-125B12AR	●	○	12	Extra Fine Pitch	137.9	63	40	3.2	5	2
160	WSX445-160C07NR	●	–	7	Coarse Pitch	172.9	63	40	4.9	5	3
160	WSX445-160C10NR	●	–	10	Fine Pitch	172.9	63	40	4.8	5	3
160	WSX445-160C16NR	●	–	16	Extra Fine Pitch	172.8	63	40	4.6	5	3
200	WSX445-200C08NR	●	–	8	Coarse Pitch	212.9	63	60	7.5	5	4
200	WSX445-200C12NR	●	–	12	Fine Pitch	212.9	63	60	7.4	5	4
200	WSX445-200C20NR	●	–	20	Extra Fine Pitch	212.8	63	60	7.2	5	4

Note 1) A set bolt to the arbor is not supplied with the body.
Note 2) Please use a set bolt of the FMC (metric) type on the cutter body from 40 to 100 in diameter (DC).
Note 3) Please use a set bolt of the FMB type on the cutter body from 125 to 200 in diameter (DC).
∗ WT : Tool Weight

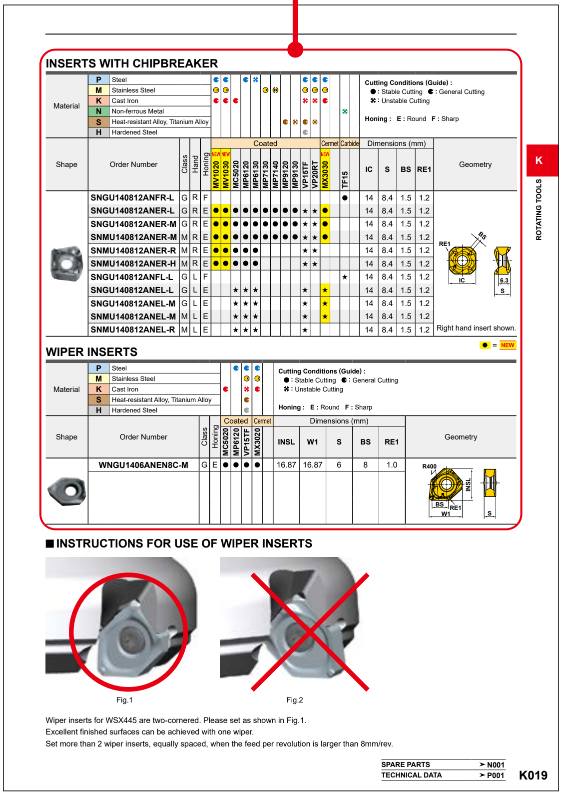
SPARE PARTS

Arbor Type	Clamp Screw *	Wrench (Insert)
WSX445	TPS4R	TIP15W

∗ Clamp Torque (N • m) : TPS4R=3.5

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

K016



INSERTS WITH CHIPBREAKER

Material		MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP20RT	MX3030		TF15	
P	Steel	◐	◐		◐	✤					◐	◐	◐			
M	Stainless Steel	◐	◐				◐	✤			◐	◐	◐			
K	Cast Iron	◐	◐	◐							✤	✤	◐			
N	Non-ferrous Metal														✤	
S	Heat-resistant Alloy, Titanium Alloy								◐	✤	◐	✤				
H	Hardened Steel										◐					

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✤ : Unstable Cutting

Honing : E : Round F : Sharp

Shape	Order Number	Class	Hand	Honing	Coated NEW MV1020	NEW MV1030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP20RT	Cermet NEW MX3030		Carbide TF15		Dimensions (mm) IC	S	BS	RE1	Geometry
	SNGU140812ANFR-L	G	R	F														●		14	8.4	1.5	1.2	
	SNGU140812ANER-L	G	R	E	●	●	●	●	●	●	●	●	●	★	★	●				14	8.4	1.5	1.2	
	SNGU140812ANER-M	G	R	E	●	●	●	●	●	●	●	●	●	★	★	●				14	8.4	1.5	1.2	
	SNMU140812ANER-M	M	R	E	●	●	●	●	●	●	●	●	●	★	★	●				14	8.4	1.5	1.2	
	SNMU140812ANER-R	M	R	E	●	●	●	●	●					★	★					14	8.4	1.5	1.2	
	SNMU140812ANER-H	M	R	E	●	●	●	●	●					★	★					14	8.4	1.5	1.2	
	SNGU140812ANFL-L	G	L	F														★		14	8.4	1.5	1.2	
	SNGU140812ANEL-L	G	L	E			★	★	★					★		★				14	8.4	1.5	1.2	
	SNGU140812ANEL-M	G	L	E			★	★	★					★		★				14	8.4	1.5	1.2	
	SNMU140812ANEL-M	M	L	E			★	★	★					★		★				14	8.4	1.5	1.2	
	SNMU140812ANEL-R	M	L	E			★	★	★					★						14	8.4	1.5	1.2	Right hand insert shown.

● = NEW

WIPER INSERTS

Material		MC5020	MP6120	VP15TF	MX3030	
P	Steel		◐	◐	◐	
M	Stainless Steel			◐	◐	
K	Cast Iron	◐		✤	◐	
S	Heat-resistant Alloy, Titanium Alloy			◐		
H	Hardened Steel			◐		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✤ : Unstable Cutting

Honing : E : Round F : Sharp

Shape	Order Number	Class	Honing	Coated MC5020	MP6120	VP15TF	Cermet MX3020		Dimensions (mm) INSL	W1	S	BS	RE1	Geometry
	WNGU1406ANEN8C-M	G	E	●	●	●	●		16.87	16.87	6	8	1.0	

■**INSTRUCTIONS FOR USE OF WIPER INSERTS**

Fig.1 Fig.2

Wiper inserts for WSX445 are two-cornered. Please set as shown in Fig.1.
Excellent finished surfaces can be achieved with one wiper.
Set more than 2 wiper inserts, equally spaced, when the feed per revolution is larger than 8mm/rev.

SPARE PARTS ➢N001
TECHNICAL DATA ➢P001

K019

LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

SPARE PARTS FOR MIILING TOOLS
indicates the names of the applicable spare parts.

PRODUCT STANDARDS
indicates tool types, order numbers, stock status (per right/left hand), dimensions, etc.

PHOTO OF PRODUCT

●To Order : For title product, please specify ①order number and hand of tool (right/left).
For insert, please specify ①insert number and ②grade.

INDEXABLE MILLING TOOLS

ROTATING TOOLS

STANDARD OF MILLING

*Alphabetical Order Index

SYMBOL DESCRIPTIONS

KAPR (Cutting Edge Angle) List

15° KAPR	15°
30° KAPR	30°
45° KAPR	45°
50° KAPR	50°
60° KAPR	60°
84° KAPR	84°
90° KAPR	90°
R KAPR	R

Application

Face Milling

Chamfer Milling

Shoulder Milling with R

Face Milling Close to a Wall

Shoulder Milling

Side Milling

Slot Milling

Step Milling

Pocket Milling

Slot Milling with Corner R

Copy Milling

T-Slot Milling

Helical Drilling

● : Inventory maintained.
★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only.

Machining Precision

F	**Finish Cutting**
PF	**Medium Cutting**
R	**Rough Cutting**

Material Range

1st Recommendation

P M K N S H

2nd Recommendation

P M K N S H

CLASSIFICATION (ARBOR type)

Product Name · Shape	APMX (mm)	Features	Cutter Dia. (mm)	Material	Page
General Cutting **WSX445**  45° KAPR	5	●Unique design double sided insert. ●Sudden fracture & welding prevention function. ●Highly efficient chip discharge.	Ø40 — Ø200	P M K N S H	K016
General Cutting **ASX445**  45° KAPR	6	●Precision inexpensive moulded type 20° positive insert. ●Screw-on type. ●A wide range of chipbreakers. ●High rigidity due to carbide shim.	Ø50 — Ø315	P M K N S H	K026
General Cutting **AHX440S**  50° KAPR	3	●Heptagonal double sided insert. ●Economical 14 cutting edge inserts. ●Multi insert design for high feed machining.	Ø40 — Ø160	P M K H	K034
High Feed Cutting **AHX475S**  15° KAPR	1.6	●Heptagonal double sided insert. ●Economical 14 cutting edge inserts. ●Multi insert design for high feed machining. ●With through coolant holes.	Ø50 — Ø160	P K H	K038
General Cutting **AHX640S**  50° KAPR	6	●Heptagonal double sided insert. ●Economical 14 cutting edge inserts. ●Multi insert design for high feed machining.	Ø63 — Ø200	P M S H K	K042
High Feed Cutting for Cast Iron **AHX640W**  50° KAPR	6	●Heptagonal double sided insert. ●Economical 14 cutting edge inserts. ●Multi insert design for high feed machining.	Ø80 — Ø315	K	K049
High Efficiency Cutting for Cast Iron NEW **WSF406W**  84° KAPR	7	●Uniquely designed double-sided insert. ●Adjustable cutting edge run-out system. ●Improved surface finish. ●Suppression of edge chipping.	Ø80 — Ø250	K	K052
High Feed Finishing **FMAX**  90° KAPR	2	●Feed Maximum (FMAX) milling cutter for ultra efficient and accurate finishing. ●Light Weight, High Rigidity Body & Economy, Multi-use ●With through coolant holes.	Ø40 — Ø125	K N	K056
Multi Functional Milling **WJX09** 	1.2	●Negative inserts. ●Stable clamp with dovetail structure. ●Suitable for high feed machining. ●Special insert design with 6 cutting edges. ●With through coolant holes.	Ø40 — Ø66	P M K S H	K085

Product Name · Shape	APMX (mm)	Features	Cutter Dia. (mm)	Material	Page
Multi Functional Milling **WJX14** 	2.0	●Negative inserts. ●Stable clamp with dovetail structure. ●Suitable for high feed machining. ●Special insert design with 6 cutting edges. ●With through coolant holes.	Ø50 — Ø160	P M K S H	K092
Multi Functional Cutting **AJX** 	1.2	●15°positive insert. ●High rigidity double clamp structure. ●Suitable for high feed cutting. ●Special insert design with 3 cutting edges. ●With through coolant holes.	Ø50 — Ø160	P M K S H	K194
Multi Functional Milling of Difficult-to-cut Materials **ARP**  R KAPR	5 — 6	●Run-out does not occur easily when changing sections. ●Strong clamping system. ●Standardized stock of extra fine pitch. ●With through coolant holes.	Ø40 — Ø100	M S	K254
Multi Functional Cutting **BRP**  R KAPR	6 — 8	●11°positive insert. ●Round shape insert with a strong cutting edge. ●Wide range of tools available. ●Suitable for mould machining.	Ø40 — Ø100	P M K S H	K206
General Cutting NEW **WWX200**  90° KAPR	5	●High-stability clamping and high-quality machining. ●The optimised “X-type” insert meets the demand for greater strength. ●Economical double-sided 6 corners.	Ø40 — Ø160	P M K N S H	K062
General Cutting **WWX400**  90° KAPR	8.2	●High-stability clamping and high quality machining. ●The optimised “X-type” insert meets the demand for greater strength. ●Economical double sided 6 corners.	Ø50 — Ø250	P M K N S H	K067
Cast Iron **VOX400**  90° KAPR	10	●Tangential inserts with high strength cutting edge. ●Economical 8 cutting edge inserts. ●Screw-on type.	Ø50 — Ø250	K	K077
General Cutting **ASX400**  90° KAPR	10	●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes.	Ø50 — Ø250	P M K N S H	K080
Multi Functional Cutting for High Efficiency Machining **VPX200**  90° KAPR	8	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge with finishing blade. ●With through coolant holes.	Ø32 — Ø63	P M K N S H	K099

CLASSIFICATION (ARBOR type)

Product Name · Shape	APMX (mm)	Features	Cutter Dia. (mm)	Material	Page
Shell Type **VPX200**  90° KAPR	35 – 42	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge. ●With through coolant holes.	Ø32 – Ø50	P M K N S	K129
Multi Functional Cutting for High Efficiency Machining **VPX300**  90° KAPR	11	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge with finishing blade. ●With through coolant holes.	Ø40 – Ø80	P M K N S H	K113
Shell Type **VPX300** 	31 – 63	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge. ●With through coolant holes.	Ø40 – Ø80	P M K N S	K138
Multi Functional Cutting **APX3000**  90° KAPR	10	●Low cutting force insert. ●High accuracy, high quality vertical wall. ●With through air & coolant holes.	Ø32 – Ø100	P M K N S H	K146
Shell Type **APX3000** 	37 46	●High accuracy, high quality vertical wall machining. ●Low cutting force insert. ●With through coolant holes.	Ø40 Ø50	P M K N S	K161
Multi Functional Cutting **APX4000**  90° KAPR	15	●Low cutting force insert. ●High accuracy, high quality vertical wall. ●With through air & coolant holes.	Ø40 – Ø160	P M K S H	K153
Shell Type **APX4000** 	42 56	●High accuracy, high quality vertical wall machining. ●Low cutting force insert. ●With through coolant holes.	Ø50 Ø63	P M K S	K165
Aluminium Alloy to Difficult-to-cut Material Cutting **AXD4000**  90° KAPR	14.8 15.5	●Low resistance chipbreaker. ●Low resistance insert and high rigidity design for excellent performance. ●For high-speed machining. ●Multi-functional machining. ●With through coolant holes.	Ø40 – Ø125	N S	K168
Ultra-high Speed, Efficient Machining of Aluminium Alloys **AXD4000A**  90° KAPR	14.8 15.5	●Low resistance chipbreaker. ●Low resistance insert and high rigidity design for excellent performance. ●For continuous high-speed and ultra-high-speed machining. ●Multi-functional machining.	Ø50	N	K176

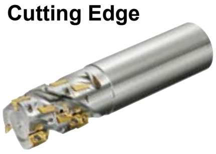
Product Name · Shape	**APMX** (mm)	Features	Cutter Dia. (mm)	Material	Page
Aluminium Alloy to Difficult-to-cut Material Cutting **AXD7000**  90° KAPR	**20.4** **21**	● Low resistance chipbreaker. ● Low resistance insert and high rigidity design for excellent performance. ● For high-speed machining. ● Multi-functional machining. ● With through coolant holes.	**Ø50 — Ø125**	N	**K180**
Shell Type **SPX**  90° KAPR	**58**	● Low cutting resistance due to the use of wavy inserts. ● Suitable for heavy cutting due to holder rigidity.	**Ø63** **Ø80**	P M K S	**K220**
Shell Type **ASPX**  90° KAPR	**54 — 75**	● High performance titanium alloy milling. ● Low cutting resistance due to the use of wavy inserts. ● Suitable for heavy cutting due to holder rigidity.	**Ø50 — Ø80**	S	**K224**
ASPX  90° KAPR	**127**	● High performance titanium alloy milling. ● Low cutting resistance due to the use of wavy inserts. ● Suitable for heavy cutting due to holder rigidity.	**Ø80**	S	**K225**
VFX5  90° KAPR	**26 — 75**	● High performance titanium alloy milling. ● High rigidity design. ● Highly reliable clamping mechanism. ● With through coolant holes.	**Ø40 — Ø80**	S	**K208**
VFX6  90° KAPR	**31 — 90**	● High performance titanium alloy milling. ● High rigidity design. ● Highly reliable clamping mechanism. ● With through coolant holes.	**Ø63 — Ø100**	S	**K212**

CLASSIFICATION (SHANK type)

Product Name · Shape	**APMX** (mm)	Features	Cutter Dia. (mm)	Material	Page
WSX445  45° KAPR	5	●Unique design double sided insert. ●Sudden fracture & welding prevention function. ●Highly efficient chip discharge. ●With through coolant holes.	Ø40 — Ø63	P M K N S H	K016
ASX445  45° KAPR	6	●Precision inexpensive moulded type 20°positive insert. ●Screw-on type. ●A wide range of chipbreakers. ●High rigidity due to carbide shim.	Ø50 Ø63	P M K N S H	K026
WWX200 NEW  90° KAPR	5	●High-stability clamping and high-quality machining. ●The optimised “X-type” insert meets the demand for greater strength. ●Economical double-sided 6 corners.	Ø25 — Ø50	P M K N S H	K062
WWX400  90° KAPR	8.2	●High-stability clamping and high quality machining. ●The optimised “X-type” insert meets the demand for greater strength. ●Economical double sided 6 corners.	Ø50 — Ø80	P M K N S H	K067
ASX400  90° KAPR	10	●High tolerance M-class inserts. ●Economical 4 cutting edge inserts. ●Curved cutting edge and high rigidity holder. ●Screw-on type.	Ø40 — Ø63	P M K N S H	K080
VPX200  90° KAPR	8	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge with finishing blade. ●With through coolant holes.	Ø16 — Ø50	P M K N S H	K099
VPX300  90° KAPR	11	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge with finishing blade. ●With through coolant holes.	Ø25 — Ø50	P M K N S H	K113
APX3000  90° KAPR	10	●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes.	Ø12 — Ø63	P M K N S H	K146
APX4000  90° KAPR	15	●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes.	Ø25 — Ø63	P M K S H	K153

Product Name · Shape	**APMX** (mm)	Features	Cutter Dia. (mm)	Material	Page
AXD4000  90° KAPR	**14.8** **15.5**	●Low resistance chipbreaker. ●Low resistance insert and high rigidity design for excellent performance. ●For high-speed machining. ●Multi-functional machining. ●With through coolant holes.	**Ø20 — Ø40**	N S	**K168**
AXD7000  90° KAPR	**20.4** **21**	●Low resistance chipbreaker. ●Low resistance insert and high rigidity design for excellent performance. ●For high-speed machining. ●Multi-functional machining. ●With through coolant holes.	**Ø32 — Ø50**	N	**K180**
AQX  90° KAPR	**7.4 — 55**	●The centre bottom cutting edge enables drilling without previously formed hole. ●With through coolant holes.	**Ø16 — Ø50**	P M K N S H	**K186**
AJX 	**0.6 — 1.2**	●13° and 15° positive inserts. ●High rigidity double clamp structure. ●Suitable for high feed cutting. ●Special insert design with 3 cutting edges. ●With through coolant holes.	**Ø16 — Ø63**	P M K S H	**K194**
WJX09 	**1.2**	●Multi functional milling. ●Negative inserts. ●Stable clamp with dovetail structure. ●Suitable for high feed machining. ●Special insert design with 6 cutting edges. ●With through coolant holes.	**Ø25 — Ø40**	P M K S H	**K085**
WJX14 	**2.0**	●Multi functional milling. ●Negative inserts. ●Stable clamp with dovetail structure. ●Suitable for high feed machining. ●Special insert design with 6 cutting edges. ●With through coolant holes.	**Ø50**	P M K S H	**K092**
ARP  R KAPR	**5 — 6**	●Accurate insert run out. ●Solid clamping system. ●Standard stock item of extra fine pitch. ●With through coolant holes.	**Ø25 — Ø50**	M S	**K254**
VPX200 **Long Cutting Edge**  90° KAPR	**14 — 42**	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge. ●With through coolant holes.	**Ø20 — Ø40**	P M K N S	**K127**
VPX300 **Long Cutting Edge**  90° KAPR	**21 — 42**	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge. ●With through coolant holes.	**Ø40**	P M K N S	**K137**

CLASSIFICATION (SHANK type)

Product Name · Shape	APMX (mm)	Features	Cutter Dia. (mm)	Material	Page
APX3000 **Long Cutting Edge**  90° KAPR	28 — 55	●High accuracy, high quality vertical wall machining. ●Low cutting force insert.	Ø20 — Ø40	P M K N S	K160
APX4000 **Long Cutting Edge**  90° KAPR	56 84	●High accuracy, high quality vertical wall machining. ●Low cutting force insert. ●With through air & coolant holes.	Ø40 Ø50	P M K S	K164
DCCC  90° KAPR	27 — 83	●Different helical flute angles prevents chattering.	Ø25 — Ø40	P M K	K216
SPX  90° KAPR	110 — 261	●Low cutting resistance due to the use of wavy inserts. ●Suitable for heavy cutting due to holder rigidity.	Ø63	P M K S	K219
SRF/SRB  R KAPR	5 — 17	●S-shaped cutting edge provides sharpness similar to that of solid ball nose end mills. ●Highly accurate corner radius tolerance allows for high precision finishing. ●Carbide shank type available.	Ø10 — Ø32	P K N H	K228
SUF  R KAPR	1.5 — 5.2	●Highly accurate corner radius tolerance allows for high precision finishing. ●Seamless gash.	Ø10 — Ø32	P M K H	K232
SRM2  R KAPR	12 — 44	●Suitable for roughing to semi-finishing of small and medium moulds. ●High rigidity body design. ●Low resistance chipbreaker. ●Through coolant hole.	Ø16 — Ø32	P M K S H	K236
SRM2 Ø40/Ø50  R KAPR	54 63	●Best for roughing of moulds. ●Low resistance chipbreaker. ●Highly rigid body.	Ø40 Ø50	P K	K244
CESP•CFSP•CGSP 30° KAPR 45° KAPR 60° KAPR 	5.9 — 10.2	●Covers 5 cutting modes. ●Excellent sharpness with 11°positive inserts. ●30°, 45° and 60° chamfer series.	Ø8 — Ø32	P K	K246

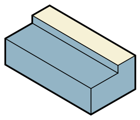
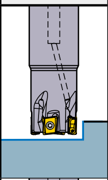
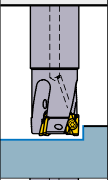
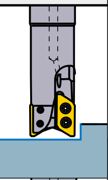
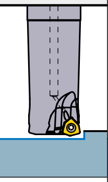
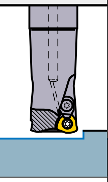
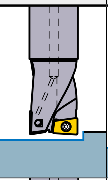
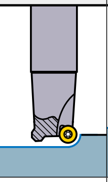
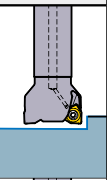
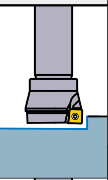
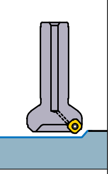
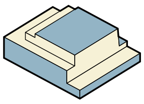
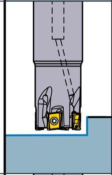
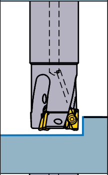
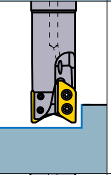
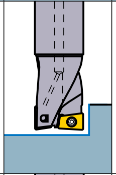
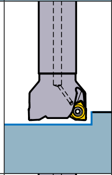
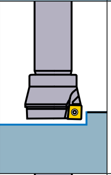
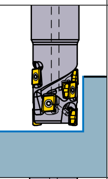
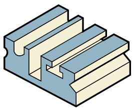
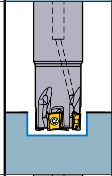
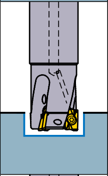
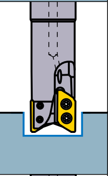
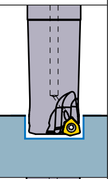
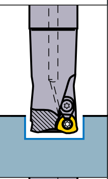
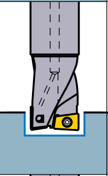
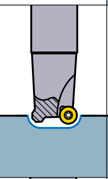
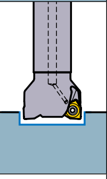
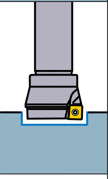
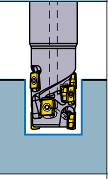
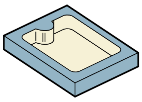
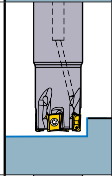
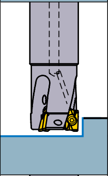
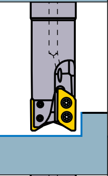
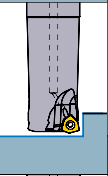
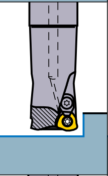
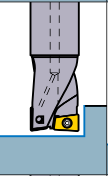
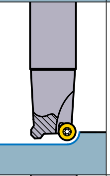
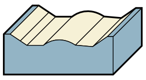
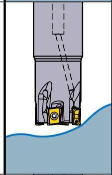
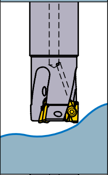
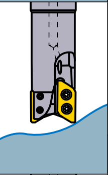
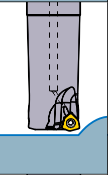
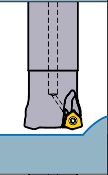
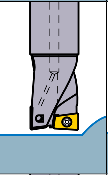
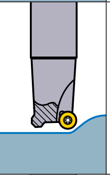
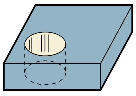
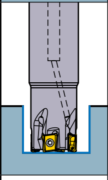
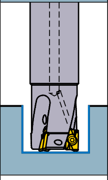
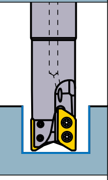
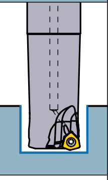
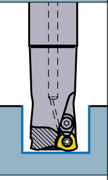
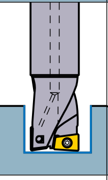
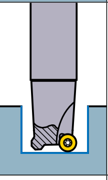
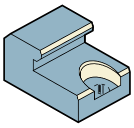
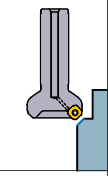
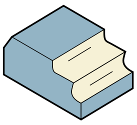
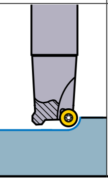
Product Name · Shape	**APMX** (mm)	Features	Cutter Dia. (mm)	Material	Page
TSMP  90° KAPR	**11 — 18**	●T-groove order number 14, 18 and 22 are available. ●86° rhombic shape 11° positive insert. ●Shoulder milling and inversed spot facing are also possible.	**Ø25 — Ø40**	**P** **K**	**K248**
PMF 	**0.1**	●2 directional cutting with large overhang. ●Excellent straightness. ●Excellent wall accuracy.	**Ø50 — Ø80**	**P** **K**	**K250**
PMR 	**11**	●2 directional cutting with large overhang. ●Horizontal feed cutting and oblique cutting are also possible. ●Unique shape of curved edge gives high rigidity and low resistance.	**Ø50 — Ø63**	**P** **K**	**K252**

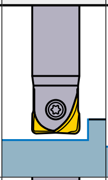
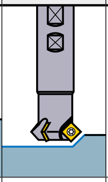
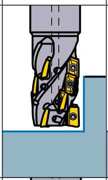
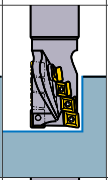
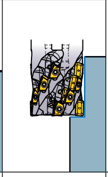
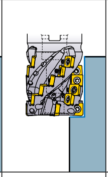
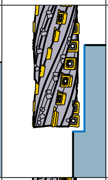
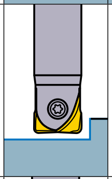
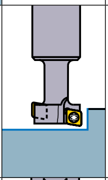
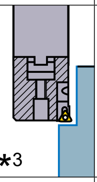
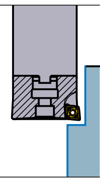
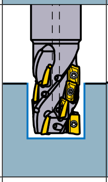
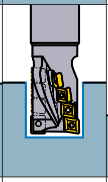
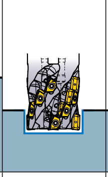
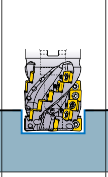
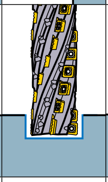
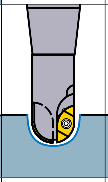
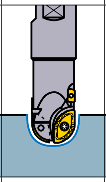
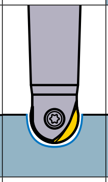
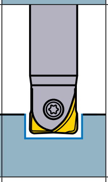
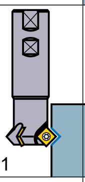
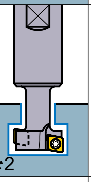
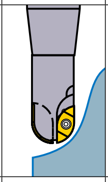
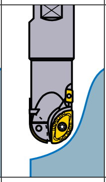
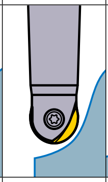
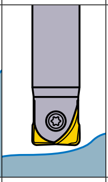
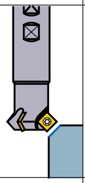
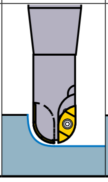
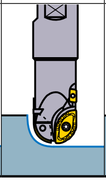
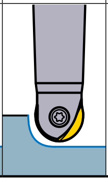
CLASSIFICATION (SCREW-IN type)

Product Name · Shape	APMX (mm)	Features	Cutter Dia. (mm)	Material	Page
ASX400  90° KAPR	10	●High tolerance M-class inserts. ●Economical 4 cutting edge inserts. ●Curved cutting edge and high rigidity holder. ●Screw-on type. ●With through coolant holes.	Ø32 Ø40	P M K N S H	K080
APX3000  90° KAPR	10	●High accuracy, high quality vertical wall machining. ●Low cutting force insert. ●With through air & coolant holes.	Ø16 — Ø40	P M K N S H	K146
APX4000  90° KAPR	15	●High accuracy, high quality vertical wall machining. ●Low cutting force insert. ●With through air & coolant holes.	Ø25 — Ø40	P M K S H	K153
AXD4000 NEW  90° KAPR	14.8 | 15	●Air / coolant through. ●Low resistance insert. ●High balance quality. ●Excellent wall accuracy. ●Multi functional milling.	Ø25 — Ø40	P N S	K168
AQX  90° KAPR	7.4 | 18	●The centre bottom cutting edge enables drilling without previously formed hole. ●With through coolant holes.	Ø16 — Ø40	P M K N S H	K186
VPX200  90° KAPR	8	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge with finishing blade. ●With through coolant holes.	Ø16 — Ø40	P M K N S H	K099
VPX300  90° KAPR	11	●Special insert design with 4 cutting edges. ●High precision, high quality insert cutting edge. ●With through coolant holes.	Ø25 — Ø40	P M K N S H	K113
AJX 	0.6 — 1.2	●13° and 15° positive inserts. ●High rigidity double clamp structure. ●Suitable for high feed cutting. ●Special insert design with 3 cutting edges. ●With through coolant holes.	Ø16 — Ø40	P M K S H	K194
WJX09 	1.2	●Multi functional milling. ●Negative inserts. ●Stable clamp with dovetail structure. ●Suitable for high feed machining. ●Special insert design with 6 cutting edges. ●With through coolant holes.	Ø25 — Ø40	P M K S H	K085

Product Name · Shape	**APMX** (mm)	Features	Cutter Dia. (mm)	Material	Page
ARP  R KAPR	**5 — 6**	●Run-out does not occur easily when changing sections. ●Solid clamping system. ●With through coolant holes.	**Ø25 — Ø40**	M S	**K254**
BRP  R KAPR	**4 — 6**	●11°positive insert. ●Round shape insert with a strong cutting edge. ●Wide range of tools available. ●Suitable for mould machining.	**Ø16 — Ø42**	P M K S H	**K206**
SRF/SRB  R KAPR	**8 — 17**	●S-shaped cutting edge provides sharpness similar to that of solid ball nose end mills. ●Highly accurate corner radius tolerance allows for high precision finishing. ●Carbide shank type available. ●With through coolant holes.	**Ø16 — Ø32**	P K N H	**K228**
SUF  R KAPR	**2.1 — 5.2**	●Highly accurate corner radius tolerance allows for high precision finishing. ●Seamless gash. ●With through coolant holes.	**Ø16 — Ø32**	P M K H	**K232**
SRM2  R KAPR	**12 — 44**	●Suitable for roughing to semi-finishing of small and medium moulds. ●High rigidity body design. ●Low resistance chipbreaker. ●With through coolant holes.	**Ø16 — Ø32**	P M K S H	**K236**

CLASSIFICATION

	Multi Functional Type							General Type			Long Cutting Edge Type
Product Name	**VPX200** **VPX300**	**APX3000** **APX4000**	**AXD4000** **AXD7000**	**WJX09** **WJX14**	**AJX**	**AQX**	**ARP**	**WWX200** **WWX400**	**ASX400**	**ASX445** **WSX445**	**VPX200** **VPX300** Long Cutting Edge Type
Cutting Mode	 ➔ K099 ➔ K113	 ➔ K146 ➔ K153	 ➔ K168 ➔ K180	 ➔ K085 ➔ K092	 ➔ K194	 ➔ K186	 ➔ K254	 ➔ K062 ➔ K067	 ➔ K080	 ➔ K026 ➔ K016	 ➔ K127 ➔ K137
Face Milling 											
Shoulder Milling 											
Slot Milling 											
Pocket Milling 											
Copy Milling 											
Helical Drilling 											
Chamfer Milling 											
Radius Milling 											

	Long Cutting Edge Type					Ball Nose / Radius Type				Special Purpose Type			
	APX3000 **APX4000** Long Cutting Edge Type  ➔ **K160** ➔ **K164**	**DCCC**  ➔ **K216**	**VFX5** **VFX6**  ➔ **K208** ➔ **K212**	**ASPX**  ➔ **K224**	**SPX**  ➔ **K219**	**SRM2**  ➔ **K236**	**SRM2** **Ø40/Ø50**  ➔ **K244**	**SRF/SRB** For Finishing  ➔ **K228**	**SUF** For Finishing  ➔ **K232**	**CESP** **CFSP** **CGSP**  ➔ **K246**	**TSMP**  ➔ **K248**	**PMF**  ➔ **K250**	**PMR**  ➔ **K252**
													
												 ⋆3	
										 ⋆1	 ⋆2		
													
													
													

⋆1 V-Slot Milling ⋆2 T-Slot Milling ⋆3 Plunging

FACE MILLING
<GENERAL CUTTING>

45° KAPR F R

WSX445

P M K N S H

Fig.1
ø40
ø50
ø63
ø80

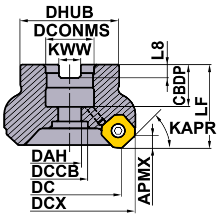
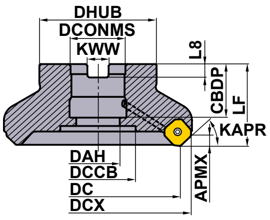


Fig.2
ø100
ø125



Right hand tool holder shown.

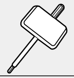
■ARBOR TYPE RIGHT HAND TOOL HOLDER

KAPR :45°
GAMP:+17° GAMF:-6°—+1°

DC (mm)	Order Number	Stock	◑	Number of Teeth	Type	Dimensions (mm)			WT* (kg)	APMX (mm)	Fig.
						DCX	LF	DCONMS			
40	**WSX445-040A03AR**	●	●	3	Coarse Pitch	52.8	40	16	0.3	5	1
40	**WSX445-040A04AR**	●	●	4	Fine Pitch	52.8	40	16	0.3	5	1
50	**WSX445-050A03AR**	●	●	3	Coarse Pitch	62.9	40	22	0.5	5	1
50	**WSX445-050A04AR**	●	●	4	Fine Pitch	62.9	40	22	0.4	5	1
50	**WSX445-050A05AR**	●	●	5	Extra Fine Pitch	62.9	40	22	0.4	5	1
63	**WSX445-063A04AR**	●	●	4	Coarse Pitch	75.9	40	22	0.6	5	1
63	**WSX445-063A05AR**	●	●	5	Fine Pitch	75.9	40	22	0.6	5	1
63	**WSX445-063A06AR**	●	●	6	Extra Fine Pitch	75.9	40	22	0.6	5	1
80	**WSX445-080A04AR**	●	●	4	Coarse Pitch	92.9	50	27	1.3	5	1
80	**WSX445-080A06AR**	●	●	6	Fine Pitch	92.9	50	27	1.2	5	1
80	**WSX445-080A08AR**	●	●	8	Extra Fine Pitch	92.9	50	27	1.1	5	1
100	**WSX445-100B05AR**	●	●	5	Coarse Pitch	112.9	50	32	1.9	5	2
100	**WSX445-100B07AR**	●	●	7	Fine Pitch	112.9	50	32	1.9	5	2
100	**WSX445-100B10AR**	●	●	10	Extra Fine Pitch	112.9	50	32	1.8	5	2
125	**WSX445-125B06AR**	●	●	6	Coarse Pitch	137.9	63	40	3.4	5	2
125	**WSX445-125B08AR**	●	●	8	Fine Pitch	137.9	63	40	3.4	5	2
125	**WSX445-125B12AR**	●	●	12	Extra Fine Pitch	137.9	63	40	3.2	5	2
160	**WSX445-160C07NR**	●	–	7	Coarse Pitch	172.9	63	40	4.9	5	3
160	**WSX445-160C10NR**	●	–	10	Fine Pitch	172.9	63	40	4.8	5	3
160	**WSX445-160C16NR**	●	–	16	Extra Fine Pitch	172.8	63	40	4.6	5	3
200	**WSX445-200C08NR**	●	–	8	Coarse Pitch	212.9	63	60	7.5	5	4
200	**WSX445-200C12NR**	●	–	12	Fine Pitch	212.9	63	60	7.4	5	4
200	**WSX445-200C20NR**	●	–	20	Extra Fine Pitch	212.8	63	60	7.2	5	4

Note 1) A set bolt to the arbor is not supplied with the body.
Note 2) Please use a set bolt of the FMC (metric) type on the cutter body from 40 to 100 in diameter (DC).
Note 3) Please use a set bolt of the FMB type on the cutter body from 125 to 200 in diameter (DC).
* WT : Tool Weight

SPARE PARTS

Arbor Type	 * Clamp Screw	 Wrench (Insert)
WSX445	TPS4R	TIP15W

* Clamp Torque (N • m) : TPS4R=3.5

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

Fig.3

ø160

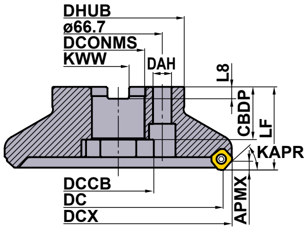
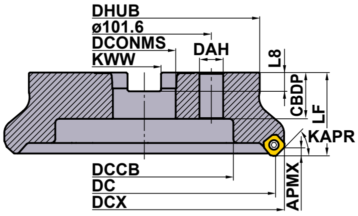


Fig.4

ø200



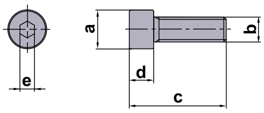
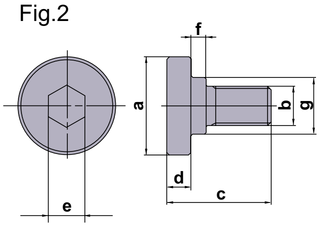
Right hand tool holder shown.

■ARBOR TYPE LEFT HAND TOOL HOLDER

DC (mm)	Order Number	Stock		Number of Teeth	Type	Dimensions (mm)			WT* (kg)	APMX (mm)	Fig.
						DCX	LF	DCONMS			
80	**WSX445-080A04AL**	★	●	4	Coarse Pitch	92.9	50	27	1.3	5	1
100	**WSX445-100B05AL**	★	●	5	Coarse Pitch	112.9	50	32	1.9	5	2
125	**WSX445-125B06AL**	★	●	6	Coarse Pitch	137.9	63	40	3.4	5	2
160	**WSX445-160C07NL**	★	–	7	Coarse Pitch	172.9	63	40	4.9	5	3

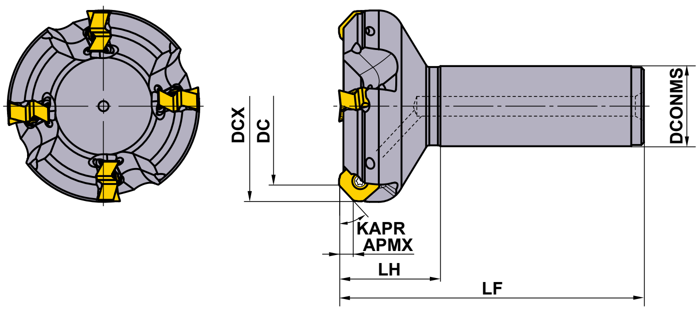
Note 1) A set bolt to the arbor is not supplied with the body.
Note 2) Please use a set bolt of the FMC (metric) type on the cutter body from 80 to 100 in diameter (DC).
Note 3) Please use a set bolt of the FMB type on the cutter body from 125 to 160 in diameter (DC).
* WT : Tool Weight

SET BOLT (SOLD SEPARATELY)

Arbor Type	Set Bolt		Fig.	Reference Dimensions (mm)							Geometry
	With Coolant Hole	Without Coolant Hole									
	Order Number	Order Number		a	b	c	d	e	f	g	
WSX445-040A○○AR	HSC08025H	HSC08040	1	13	M8×1.25	33	8	5	–	–	Fig.1  Fig.2 
WSX445-050A○○AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	–	–	
WSX445-063A○○AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	–	–	
WSX445-080A○○A○	HSC12035H	HSC12035 (HSC12045)	1	18	M12×1.75	47 57	12	10	–	–	
WSX445-100B○○A○	MBA16033H	—	2	40	M16×2	43	10	14	6	23	
WSX445-125B○○A○	MBA20040H	—	2	50	M20×2.5	54	14	17	6	27	
WSX445-160C○○N○	No coolant hole	—	2	50	M20×2.5	54	14	17	6	27	
WSX445-200C○○NR	No coolant hole	—	1	24	M16×2	43	16	14	–	–	

Note 1) Internal coolant is necessary with the set bolt.

MOUNTING DIMENSION ➤K020
SPARE PARTS ➤N001
TECHNICAL DATA ➤P001



Right hand tool holder only.

■SHANK TYPE

DC (mm)	Order Number	Stock		Number of Teeth	Type	Dimensions (mm)				WT* (kg)	APMX (mm)
						DCX	LF	DCONMS	LH		
40	**WSX445R4003SA32M**	★	●	3	Coarse Pitch	52.8	125	32	40	0.8	5
40	**WSX445R4004SA32M**	★	●	4	Fine Pitch	52.8	125	32	40	0.8	5
50	**WSX445R5003SA32M**	★	●	3	Coarse Pitch	62.9	125	32	40	1.0	5
50	**WSX445R5004SA32M**	★	●	4	Fine Pitch	62.9	125	32	40	1.0	5
63	**WSX445R6304SA32M**	★	●	4	Coarse Pitch	75.9	125	32	40	1.2	5
63	**WSX445R6305SA32M**	★	●	5	Fine Pitch	75.9	125	32	40	1.2	5

* WT : Tool Weight

SPARE PARTS

Arbor Type	 *	
	Clamp Screw	Wrench (Insert)
WSX445	TPS4R	TIP15W

* Clamp Torque (N • m) : TPS4R=3.5

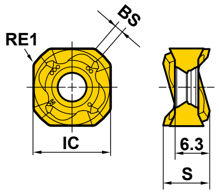
● : Inventory maintained. ★ : Inventory maintained in Japan.
(10 inserts in one case)

INSERTS WITH CHIPBREAKER

Material			MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP20RT	MX3030		TF15	
	P	Steel	◐	◐		◐	✣					◐	◐	◐			
	M	Stainless Steel	◐	◐				◐	✣			◐	◐	◐			
	K	Cast Iron	◐	◐	◐							✣	✣	◐			
	N	Non-ferrous Metal														✣	
	S	Heat-resistant Alloy, Titanium Alloy								◐	✣	◐	✣				
	H	Hardened Steel										◐					

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✣ : Unstable Cutting

Honing : **E :** Round **F :** Sharp

Shape	Order Number	Class	Hand	Honing	Coated											Cermet		Carbide		Dimensions (mm)				Geometry
					NEW MV1020	NEW MV1030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP20RT	NEW MX3030		TF15		IC	S	BS	RE1	
	**SNGU140812ANFR-L**	G	R	F														●		14	8.4	1.5	1.2	
	SNGU140812ANER-L	G	R	E	●	●	●	●	●	●	●	●	●	★	★	●				14	8.4	1.5	1.2	
	SNGU140812ANER-M	G	R	E	●	●	●	●	●	●	●	●	●	★	★	●				14	8.4	1.5	1.2	
	SNMU140812ANER-M	M	R	E	●	●	●	●	●	●	●	●	●	★	★	●				14	8.4	1.5	1.2	
	SNMU140812ANER-R	M	R	E	●	●	●	●	●					★	★					14	8.4	1.5	1.2	
	SNMU140812ANER-H	M	R	E	●	●	●	●	●					★	★					14	8.4	1.5	1.2	
	SNGU140812ANFL-L	G	L	F														★		14	8.4	1.5	1.2	
	SNGU140812ANEL-L	G	L	E			★	★	★					★		★				14	8.4	1.5	1.2	
	SNGU140812ANEL-M	G	L	E			★	★	★					★		★				14	8.4	1.5	1.2	
	SNMU140812ANEL-M	M	L	E			★	★	★					★		★				14	8.4	1.5	1.2	
	SNMU140812ANEL-R	M	L	E			★	★	★					★						14	8.4	1.5	1.2	Right hand insert shown.

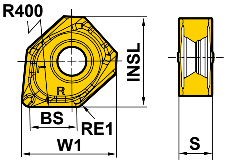
● = NEW

WIPER INSERTS

Material			MC5020	MP6120	VP15TF	MX3020	
	P	Steel		◐	◐	◐	
	M	Stainless Steel			◐	◐	
	K	Cast Iron	◐		✣	◐	
	S	Heat-resistant Alloy, Titanium Alloy			◐		
	H	Hardened Steel			◐		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✣ : Unstable Cutting

Honing : **E :** Round **F :** Sharp

Shape	Order Number	Class	Honing	Coated			Cermet		Dimensions (mm)					Geometry
				MC5020	MP6120	VP15TF	MX3020		INSL	W1	S	BS	RE1	
	**WNGU1406ANEN8C-M**	G	E	●	●	●	●		16.87	16.87	6	8	1.0	

■ INSTRUCTIONS FOR USE OF WIPER INSERTS

Fig.1

Fig.2

Wiper inserts for WSX445 are two-cornered. Please set as shown in Fig.1.
Excellent finished surfaces can be achieved with one wiper.
Set more than 2 wiper inserts, equally spaced, when the feed per revolution is larger than 8mm/rev.

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

ARBOR TYPE MOUNTING DIMENSIONS

Fig.1

ø40
ø50
ø63
ø80

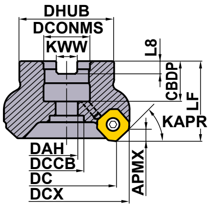


Fig.2

ø100
ø125

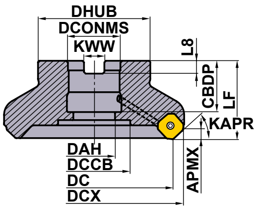
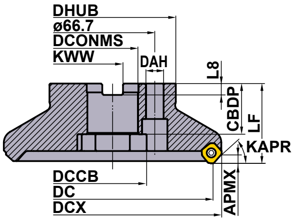


Fig.3

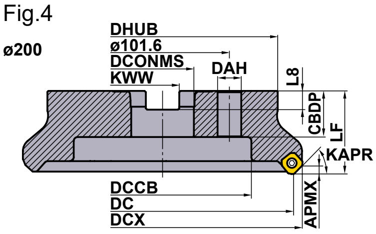
ø160



Right hand tool holder shown.

DC (mm)	Order Number	Dimensions (mm)							Fig.
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	
40	**WSX445-040A03AR**	16	18	9	14	37	8.4	5.6	1
40	**WSX445-040A04AR**	16	18	9	14	37	8.4	5.6	1
50	**WSX445-050A03AR**	22	20	11	17	47	10.4	6.3	1
50	**WSX445-050A04AR**	22	20	11	17	47	10.4	6.3	1
50	**WSX445-050A05AR**	22	20	11	17	47	10.4	6.3	1
63	**WSX445-063A04AR**	22	20	11	17	50	10.4	6.3	1
63	**WSX445-063A05AR**	22	20	11	17	50	10.4	6.3	1
63	**WSX445-063A06AR**	22	20	11	17	50	10.4	6.3	1
80	**WSX445-080A04AR**	27	23	13	20	56	12.4	7	1
80	**WSX445-080A06AR**	27	23	13	20	56	12.4	7	1
80	**WSX445-080A08AR**	27	23	13	20	56	12.4	7	1
80	**WSX445-080A04AL**	27	23	13	20	56	12.4	7	1
100	**WSX445-100B05AR**	32	26	26	45	78	14.4	8	2
100	**WSX445-100B07AR**	32	26	26	45	78	14.4	8	2
100	**WSX445-100B10AR**	32	26	26	45	78	14.4	8	2
100	**WSX445-100B05AL**	32	26	26	45	78	14.4	8	2
125	**WSX445-125B06AR**	40	28	30	56	89	16.4	9	2
125	**WSX445-125B08AR**	40	28	30	56	89	16.4	9	2
125	**WSX445-125B12AR**	40	28	30	56	89	16.4	9	2
125	**WSX445-125B06AL**	40	28	30	56	89	16.4	9	2

Fig.4



Right hand tool holder shown.

DC (mm)	Order Number	Dimensions (mm)							Fig.
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	
160	**WSX445-160C07NR**	40	40	14	56	100	16.4	9	3
160	**WSX445-160C10NR**	40	40	14	56	100	16.4	9	3
160	**WSX445-160C16NR**	40	40	14	56	100	16.4	9	3
160	**WSX445-160C07NL**	40	40	14	56	100	16.4	9	3
200	**WSX445-200C08NR**	60	32	18	135	160	25.7	14.22	4
200	**WSX445-200C12NR**	60	32	18	135	160	25.7	14.22	4
200	**WSX445-200C20NR**	60	32	18	135	160	25.7	14.22	4

■ WSX445 Cutting Speed
Dry and Wet Cutting

(mm)

	Material	Properties	MV1020		MV1030	
			Cutting Speed **Vc** (m/min)		Cutting Speed **Vc** (m/min)	
			Dry Cutting	Wet Cutting	Dry Cutting	Wet Cutting
P	Mild Steel	Hardness ≤180HB	300 (200−400)	220 (120−320)	250 (200−300)	150 (100−200)
	Carbon Steel Alloy Steel	Hardness 180−350HB	260 (170−350)	200 (100−300)	220 (170−270)	120 (80−160)
		Hardness 280−350HB	180 (100−250)	150 (100−200)	180 (100−250)	120 (80−160)
M	Stainless Steel	−	−	−	200 (150−250)	−
K	Ductile Cast Iron	Tensile Strength ≤450MPa	240 (130−350)	200 (130−250)	160 (110−240)	150 (100−200)
		Tensile Strength ≤800MPa	220 (80−350)	180 (80−230)	180 (110−250)	140 (80−200)

RECOMMENDED CUTTING CONDITIONS

■ Dry cutting

	Material	Hardness	1st Recommendation	2nd Recommendation	**Vc** (m/min)	Finish Cutting	
						fz (mm/t.)	**ap**
P						L Chipbreaker	
	Mild Steel	≤ 180HB	MV1020	—	300 (200—400)	0.15 (0.1—0.2)	≤ 1.0
			MV1030	—	250 (200—300)	0.15 (0.1—0.2)	≤ 1.0
			MP6120	VP15TF	250 (200—300)	0.15 (0.1—0.2)	≤ 1.0
			MP6130	VP20RT	240 (190—290)	0.15 (0.1—0.2)	≤ 1.0
			MX3030	—	180 (130—230)	0.15 (0.1—0.2)	≤ 1.0
	Carbon Steel Alloy Steel	180—350HB	MV1020	—	260 (170—350)	0.15 (0.1—0.2)	≤ 1.0
			MV1030	—	220 (170—270)	0.15 (0.1—0.2)	≤ 1.0
			MP6120	VP15TF	220 (170—270)	0.15 (0.1—0.2)	≤ 1.0
			MP6130	VP20RT	200 (150—250)	0.15 (0.1—0.2)	≤ 1.0
			MX3030	—	150 (120—180)	0.15 (0.1—0.2)	≤ 1.0
	Alloy Tool Steel	≤ 350HB (Annealing)	MP6120	VP15TF	220 (170—270)	0.15 (0.1—0.2)	≤ 1.0
			MP6130	VP20RT	200 (150—250)	0.15 (0.1—0.2)	≤ 1.0
			MX3030	—	150 (120—180)	0.15 (0.1—0.2)	≤ 1.0
	Pre-Hardened Steel	35—45HRC	MP6120	VP15TF	140 (100—180)	0.15 (0.1—0.2)	≤ 1.0
			MP6130	VP20RT	120 (90—150)	0.15 (0.1—0.2)	≤ 1.0
M						L Chipbreaker	
	Austenitic Stainless Steel	≤ 200HB	MV1030	—	200 (150—250)	0.15 (0.1—0.2)	≤ 1.0
			MP7130	VP15TF	200 (150—250)	0.15 (0.1—0.2)	≤ 1.0
			MP7140	VP20RT	200 (150—250)	0.15 (0.1—0.2)	≤ 1.0
			MX3030	—	130 (100—180)	0.15 (0.1—0.2)	≤ 1.0
	Austenitic Stainless Steel	>200HB	MP7130	VP15TF	170 (120—220)	0.15 (0.1—0.2)	≤ 1.0
			MP7140	VP20RT	170 (120—220)	0.15 (0.1—0.2)	≤ 1.0
	Two-phase Stainless Steel	≤ 280HB	MP7130	VP15TF	160 (110—210)	0.15 (0.1—0.2)	≤ 1.0
			MP7140	VP20RT	160 (110—210)	0.15 (0.1—0.2)	≤ 1.0
	Precipitation Hardening Stainless Steel	≤ 450HB	MP7130	VP15TF	150 (100—200)	0.15 (0.1—0.2)	≤ 1.0
			MP7140	VP20RT	150 (100—200)	0.15 (0.1—0.2)	≤ 1.0
K						L Chipbreaker	
	Gray Cast Iron	≤ 350MPa	MC5020	—	220 (200—270)	0.15 (0.1—0.2)	≤ 1.0
			VP15TF	—	180 (130—250)	0.15 (0.1—0.2)	≤ 1.0
			VP20RT	—	170 (120—240)	0.15 (0.1—0.2)	≤ 1.0
			MX3030	—	150 (120—180)	0.15 (0.1—0.2)	≤ 1.0
	Ductile Cast Iron	≤ 450MPa	MV1020	—	240 (130—350)	0.15 (0.1—0.2)	≤ 1.0
			MV1030	—	160 (110—240)	0.15 (0.1—0.2)	≤ 1.0
			MC5020	—	200 (180—250)	0.15 (0.1—0.2)	≤ 1.0
			VP15TF	VP20RT	160 (110—240)	0.15 (0.1—0.2)	≤ 1.0
	Ductile Cast Iron	≤ 800MPa	MV1020	—	220 (80—350)	0.15 (0.1—0.2)	≤ 1.0
			MV1030	—	180 (110—250)	0.15 (0.1—0.2)	≤ 1.0
			MC5020	—	200 (180—250)	0.15 (0.1—0.2)	≤ 1.0
			VP15TF	—	160 (110—240)	0.15 (0.1—0.2)	≤ 1.0
			VP20RT	—	150 (100—200)	0.15 (0.1—0.2)	≤ 1.0
H						M Chipbreaker	
	Hardened Steel	40—55HRC	VP15TF	—	50 (30—70)	0.05 (0.05—0.1)	≤ 1.0
	Hardened Steel	55—62HRC	VP15TF	—	40 (20—50)	0.05 (0.05—0.1)	≤ 1.0

Note 1) Refer to the table above and set the cutting conditions to match the application.
Note 2) Wet cutting is recommended when focusing on the surface finish. (Tool life is shorter when compared to dry cutting.)

(mm)

	Light Cutting		Medium Cutting		Rough Cutting		Heavy Cutting	
	fz (mm/t.)	**ap**	**fz** (mm/t.)	**ap**	**fz** (mm/t.)	**ap**	**fz** (mm/t.)	**ap**
	L,M Chipbreaker		M Chipbreaker		M,R Chipbreaker		R,H Chipbreaker	
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	L,M Chipbreaker		M Chipbreaker					
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	—	—	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	L,M Chipbreaker		M Chipbreaker		M,R Chipbreaker		R,H Chipbreaker	
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	—	—	—	—
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	0.15 (0.1—0.2)	≤ 2.0	0.2 (0.15—0.25)	≤ 3.0	0.2 (0.15—0.25)	≤ 4.0	0.25 (0.2—0.3)	≤ 5.0
	M,R Chipbreaker		R,H Chipbreaker					
	0.05 (0.05—0.1)	≤ 1.5	0.1 (0.05—0.15)	≤ 2.0	—	—	—	—
	0.05 (0.05—0.1)	≤ 1.5	0.1 (0.05—0.15)	≤ 2.0	—	—	—	—

RECOMMENDED CUTTING CONDITIONS

■ Wet Cutting

Material	Hardness	1st Recommendation	2nd Recommendation	**Vc** (m/min)	Finish Cutting	
					fz (mm/t.)	**ap**
P					L Chipbreaker	
Mild Steel	≤ 180HB	MV1020	–	220 (120–320)	0.15 (0.1–0.2)	≤ 1.0
		MV1030	–	150 (100–200)	0.15 (0.1–0.2)	≤ 1.0
		MP6120	VP15TF	150 (100–200)	0.15 (0.1–0.2)	≤ 1.0
		MP6130	VP20RT	150 (100–200)	0.15 (0.1–0.2)	≤ 1.0
Carbon Steel Alloy Steel	180–350HB	MV1020	–	200 (100–300)	0.15 (0.1–0.2)	≤ 1.0
		MV1030	–	120 (80–160)	0.15 (0.1–0.2)	≤ 1.0
		MP6120	VP15TF	120 (80–160)	0.15 (0.1–0.2)	≤ 1.0
		MP6130	VP20RT	120 (80–160)	0.15 (0.1–0.2)	≤ 1.0
Alloy Tool Steel	≤ 350HB	MP6120	VP15TF	120 (80–160)	0.15 (0.1–0.2)	≤ 1.0
	(Annealing)	MP6130	VP20RT	120 (80–160)	0.15 (0.1–0.2)	≤ 1.0
Pre-Hardened Steel	35–45HRC	MP6120	VP15TF	100 (80–120)	0.15 (0.1–0.2)	≤ 1.0
		MP6130	VP20RT	100 (80–120)	0.15 (0.1–0.2)	≤ 1.0
M					L Chipbreaker	
Austenitic Stainless Steel	≤ 200HB	MP7130	VP15TF	130 (80–180)	0.15 (0.1–0.2)	≤ 1.0
		MP7140	VP20RT	130 (80–180)	0.15 (0.1–0.2)	≤ 1.0
Austenitic Stainless Steel	> 200HB	MP7130	VP15TF	100 (80–150)	0.15 (0.1–0.2)	≤ 1.0
		MP7140	VP20RT	100 (80–150)	0.15 (0.1–0.2)	≤ 1.0
Two-phase Stainless Steel	≤ 280HB	MP7130	VP15TF	100 (80–150)	0.15 (0.1–0.2)	≤ 1.0
		MP7140	VP20RT	100 (80–150)	0.15 (0.1–0.2)	≤ 1.0
Precipitation Hardening Stainless Steel	≤ 450HB	MP7130	VP15TF	90 (50–140)	0.15 (0.1–0.2)	≤ 1.0
		MP7140	VP20RT	90 (50–140)	0.15 (0.1–0.2)	≤ 1.0
K					L Chipbreaker	
Gray Cast Iron	≤ 350MPa	MC5020	–	180 (160–200)	0.15 (0.1–0.2)	≤ 1.0
		VP15TF	VP20RT	130 (100–160)	0.15 (0.1–0.2)	≤ 1.0
Ductile Cast Iron	≤ 450MPa	MV1020	–	200 (130–250)	0.15 (0.1–0.2)	≤ 1.0
		MV1030	–	150 (100–200)	0.15 (0.1–0.2)	≤ 1.0
		MC5020	–	180 (160–200)	0.15 (0.1–0.2)	≤ 1.0
		VP15TF	VP20RT	130 (100–160)	0.15 (0.1–0.2)	≤ 1.0
Ductile Cast Iron	≤ 800MPa	MV1020	–	180 (80–230)	0.15 (0.1–0.2)	≤ 1.0
		MV1030	–	140 (80–200)	0.15 (0.1–0.2)	≤ 1.0
		MC5020	–	180 (160–200)	0.15 (0.1–0.2)	≤ 1.0
		VP15TF	VP20RT	110 (80–140)	0.15 (0.1–0.2)	≤ 1.0
N					L Chipbreaker	
Aluminium Alloy	–	TF15	–	≥ 300	0.15 (0.1–0.2)	≤ 1.0
S					L Chipbreaker	
Titanium Alloy	–	MP9120	VP15TF	50 (40–60)	0.05 (0.05–0.1)	≤ 1.0
		MP9130	VP20RT	50 (40–60)	0.05 (0.05–0.1)	≤ 1.0
Heat Resistant Alloy	–	MP9120	VP15TF	40 (20–50)	0.05 (0.05–0.1)	≤ 1.0
		MP9130	VP20RT	40 (20–50)	0.05 (0.05–0.1)	≤ 1.0

Note 1) Refer to the table above and set the cutting conditions to match the application.
Note 2) Wet cutting is recommended when focusing on the surface finish. (Tool life is shorter when compared to dry cutting.)

(mm)

	Light Cutting		Medium Cutting		Rough Cutting		Heavy Cutting	
	fz (mm/t.)	**ap**	**fz** (mm/t.)	**ap**	**fz** (mm/t.)	**ap**	**fz** (mm/t.)	**ap**
	L,M Chipbreaker		M Chipbreaker		M,R Chipbreaker		R,H Chipbreaker	
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	L,M Chipbreaker		M Chipbreaker					
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	–	–	–	–
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	–	–	–	–
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	–	–	–	–
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	–	–	–	–
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	–	–	–	–
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	–	–	–	–
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	–	–	–	–
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	–	–	–	–
	L,M Chipbreaker		M Chipbreaker		M,R Chipbreaker		R,H Chipbreaker	
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	0.15 (0.1–0.2)	≤ 2.0	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	L Chipbreaker		L Chipbreaker		L Chipbreaker		L Chipbreaker	
	0.15 (0.1–0.2)	≤ 2.0	0.2 (0.15–0.25)	≤ 3.0	0.2 (0.15–0.25)	≤ 4.0	0.25 (0.2–0.3)	≤ 5.0
	L,M Chipbreaker		M Chipbreaker					
	0.05 (0.05–0.1)	≤ 1.5	0.1 (0.05–0.15)	≤ 2.0	–	–	–	–
	0.05 (0.05–0.1)	≤ 1.5	0.1 (0.05–0.15)	≤ 2.0	–	–	–	–
	0.05 (0.05–0.1)	≤ 1.5	0.1 (0.05–0.15)	≤ 2.0	–	–	–	–
	0.05 (0.05–0.1)	≤ 1.5	0.1 (0.05–0.15)	≤ 2.0	–	–	–	–

FACE MILLING
<GENERAL CUTTING>

ASX445

P | M | K | N | S | H


ø50, ø63


Over ø80

Fig.1
ø50
ø63

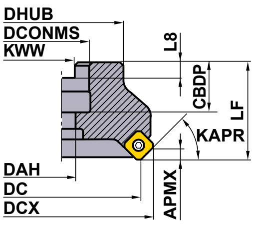


Fig.2
ø80
ø100

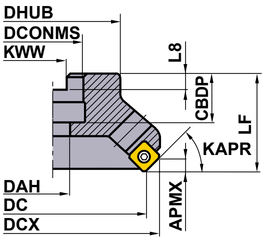


Fig.3
ø125

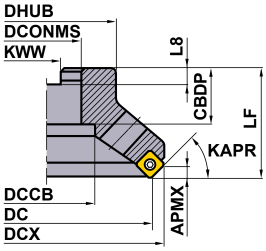


Fig.4
ø160

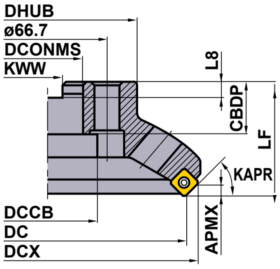
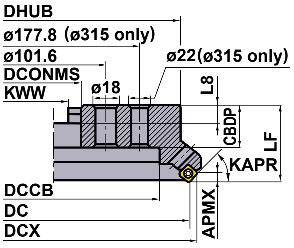


Fig.5
ø200
ø250
ø315



Right hand tool holder shown.

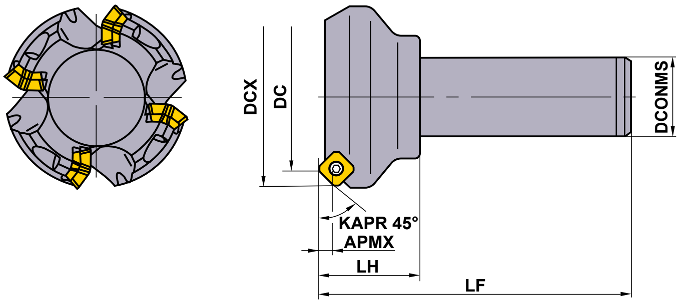
■ARBOR TYPE

KAPR : 45°
GAMP: +20°—+23° GAMF: -13°—-10°

Type	Order Number	Stock			Number of Teeth	Dimensions (mm)										WT * (kg)	APMX (mm)	Fig.
		R	L			DC	DCX	LF	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8			
Coarse Pitch	ASX445-050A03R	●		–	3	50	63.0	40	22	20	11	–	45	10.4	6.3	0.5	6	1
	ASX445-063A04R	●		–	4	63	75.9	40	22	20	11	–	50	10.4	6.3	0.7	6	1
	ASX445-080A04R	●		–	4	80	93.2	50	27	23	13	–	56	12.4	7	1.0	6	2
	ASX445-100A05R	●		–	5	100	113.2	50	32	26	17	–	70	14.4	8	1.6	6	2
	ASX445-125B06R	●		–	6	125	138.0	63	40	32	–	56	80	16.4	9	2.4	6	3
	ASX445-160C07R	●		–	7	160	173.0	63	40	29	–	56	100	16.4	9	3.9	6	4
	ASX445-200C08R	★		–	8	200	212.9	63	60	32	–	135	155	25.7	14.22	6.7	6	5
	ASX445-250C10R	★		–	10	250	262.9	63	60	32	–	174	200	25.7	14.22	10.5	6	5
	ASX445-315C14R	★		–	14	315	327.9	80	60	57	–	256.8	285	25.7	14.22	22.4	6	5
Fine Pitch	ASX445-050A04R	●		–	4	50	63.0	40	22	20	11	–	45	10.4	6.3	0.4	6	1
	ASX445-063A05R	●		–	5	63	75.9	40	22	20	11	–	50	10.4	6.3	0.6	6	1
	ASX445-080A06R/L	●	☐	–	6	80	93.2	50	27	23	13	–	56	12.4	7	0.9	6	2
	ASX445-100A07R/L	●	☐	–	7	100	113.2	50	32	26	17	–	70	14.4	8	1.5	6	2
	ASX445-125B08R/L	●	☐	–	8	125	138.0	63	40	32	–	56	80	16.4	9	2.3	6	3
	ASX445-160C10R	●		–	10	160	173.0	63	40	29	–	56	100	16.4	9	3.6	6	4
	ASX445-200C12R/L	●	☐	–	12	200	212.9	63	60	32	–	135	155	25.7	14.22	5.8	6	5
	ASX445-250C14R/L	★	☐	–	14	250	262.9	63	60	32	–	174	200	25.7	14.22	10.6	6	5
	ASX445-315C18R/L	★	☐	–	18	315	327.9	80	60	57	–	256.8	285	25.7	14.22	22.2	6	5
Extra Fine Pitch	ASX445-050A05R	●		–	5	50	63.0	40	22	20	11	–	45	10.4	6.3	0.4	6	1
	ASX445-063A06R	●		–	6	63	75.9	40	22	20	11	–	50	10.4	6.3	0.6	6	1
	ASX445-080A08R	●		–	8	80	93.2	50	27	23	13	–	56	12.4	7	0.9	6	2
	ASX445-100A10R/L	●	☐	–	10	100	113.2	50	32	26	17	–	70	14.4	8	1.5	6	2
	ASX445-125B12R	●		–	12	125	138.0	63	40	32	–	56	80	16.4	9	2.3	6	3
	ASX445-160C16R	●		–	16	160	173.0	63	40	29	–	56	100	16.4	9	3.6	6	4
	ASX445-200C20R	★		–	20	200	212.9	63	60	32	–	135	155	25.7	14.22	6.5	6	5
	ASX445-250C24R	★		–	24	250	262.9	63	60	32	–	174	200	25.7	14.22	10.3	6	5
	ASX445-315C28R	★		–	28	315	327.9	80	60	57	–	256.8	285	25.7	14.22	21.8	6	5

* WT : Tool Weight

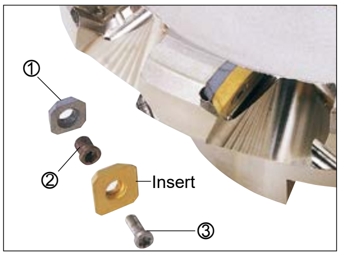
● : Inventory maintained. ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only.



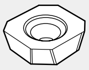
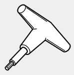
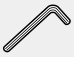
■SHANK TYPE

Right hand tool holder only.

Order Number	Stock		Number of Teeth	Dimensions (mm)					APMX (mm)
	R			DC	DCX	LF	DCONMS	LH	
ASX445R503S32	★	–	3	50	63.0	125	32	40	6
ASX445R634S32	★	–	4	63	75.9	125	32	40	6



SPARE PARTS

Tool Holder Number	① 	② * 	③ * 		
	Shim	Shim Screw	Clamp Screw	Wrench (Insert)	Wrench (Shim)
ASX445	STASX445N	WCS503507H	TPS35	TIP15T	HKY35R

* Clamp Torque (N • m) : WCS503507H=5.0, TPS35=3.5

Wrench	1. Wrench The ASX445 uses a TORXPLUS clamp screw. The attached wrench is for the exclusive use of this screw. To ensure the effectiveness of TORXPLUS only use the attached wrench. 2. Hexagonal wrench The attached hexagonal wrench is for use with the seat and the shim. The wrench size is 3.5mm.
Spare Parts	Only use the original parts that were supplied when purchased. If other parts are used the performance and safety can not be assured.

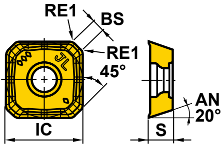
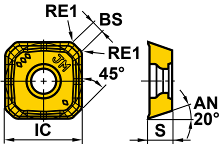
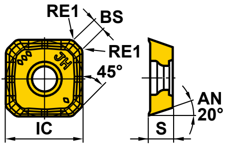
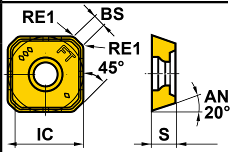
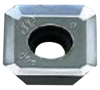
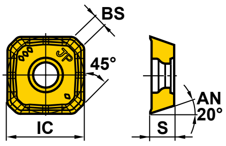
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

Material			MV1020	MV1030	F7030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	VP45N	MX3030	NX4545	HTi10	
Material	P	Steel	◐	◐	◐		◐	✣					◐	✣	◐	◐	◐		
	M	Stainless Steel	◐	◐	◐				◐	✣			◐	✣	◐	◐	◐		
	K	Cast Iron	◐	◐		◐							✣	✣		◐		◐	
	N	Non-ferrous Metal																◐	
	S	Heat-resistant Alloy, Titanium Alloy									◐	✣	◐	✣					
	H	Hardened Steel											◐						

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✣ : Unstable Cutting

Honing :
E : Round **F :** Sharp
S : Chamfer + Hone **T :** Chamfer

Application	Shape	Order Number	Class	Honing	Coated													Cermet		Carbide		Dimensions (mm)				Geometry
					NEW MV1020	NEW MV1030	F7030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	VP45N	NEW MX3030	NX4545	HTi10		IC	S	BS	RE1	
Finish–Light Cutting	JL Chipbreaker 	SEET13T3AGEN-JL	E	E	●	●	●		●	●	●	●	●	●	●	●		●	●			13.4	3.97	1.9	1.5	
Light–Rough Cutting	JM Chipbreaker 	SEMT13T3AGSN-JM	M	S	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			13.4	3.97	1.9	1.5	
Medium–Heavy Cutting	JH Chipbreaker 	SEMT13T3AGSN-JH	M	S	●	●	●	●	●	●	●	●	●	●	●	●						13.4	3.97	1.9	1.5	
Roughing For Cast Iron	FT Chipbreaker 	SEMT13T3AGSN-FT	M	S	●	●		●														13.4	3.97	1.9	1.5	
For Aluminium Alloy	JP Chipbreaker 	SEGT13T3AGFN-JP	G	F																●		13.4	3.97	2.2	–	

● = NEW

■ Instructions for use of the JP Chipbreaker

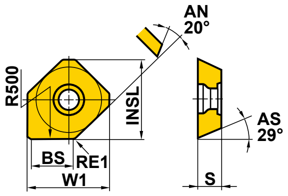
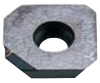
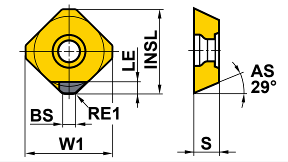
Note 1) The JP Chipbreaker has sharp cutting edges. Wear gloves when handling.

Note 2) When machining aluminium alloy, welding to the cutting edge tends to occur, often leading to insert failure.

Note 3) Wet cutting is recommended.

● : Inventory maintained. (10 inserts in one case)
(CBN and PCD wiper inserts are available in 1 piece in one case)

WIPER INSERTS

Material	**P**	Steel			◐	◐	◐										
	M	Stainless Steel			◐	◐	◐										
	K	Cast Iron		◐	✤	◐	◐	◐	◐								
	N	Non-ferrous Metal						◐		◐							
	S	Heat-resistant Alloy, Titanium Alloy			◐												
	H	Hardened Steel			◐												
Shape	Order Number	Class	Honing	Coated		Cermet	Coated Cermet	Carbide	CBN	PCD	Dimensions (mm)						Geometry
				MC5020	**VP15TF**	**NX2525**	**VP25N**	**HTi05T**	**MB710**	**MD220**	**INSL**	**LE**	**W1**	**S**	**BS**	**RE1**	
	**WEEW13T3AGER8C**	E	E	●	●			●			16.6	—	16.48	3.97	7.5	1.5	
	WEEW13T3AGTR8C	E	T			●	●				16.6	—	16.48	3.97	7.5	1.5	
	**WEEW13T3AGFR3C**	E	F							●	16.6	1.8	16.48	3.97	3.0	1.5	
	WEEW13T3AGTR3C	E	T						●		16.6	1.8	16.48	3.97	3.0	1.5	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Honing :
E : Round **F :** Sharp
S : Chamfer + Hone **T :** Chamfer

Note 1) Wiper inserts are single-cornered.
Note 2) CBN grade MB710 is for cast iron.
Note 3) PCD grade MD220 is for aluminium alloy.

■INSTRUCTIONS FOR USE OF WIPER INSERTS

Fig.1

Fig.2

Note 1) These wiper inserts are single-cornered.
Note 2) Install the insert so that the cutting edge is located as shown in Fig. 1.
Do not install the wiper insert as shown in Fig. 2. (The insert may be damaged by a too heavy cutting load.)
Note 3) Recommended depth of cut is ap=0.2-0.5(mm). (Be aware of the cutting load if the depth of cut is over the recommendation.)
Note 4) The major cutting edge of a wiper insert is set further inside than a standard insert.
This is to prevent heavy loads on the wiper insert. (To prevent fracture set the feed under 0.2 mm/t.)
Note 5) Excellent finished surface can be obtained with one wiper insert.
Note 6) When the feed per revolution is larger than the width of the wiper edge, install 2 or more wiper inserts equally spaced inside the cutting body.

RECOMMENDED CUTTING CONDITIONS WHEN USING A WIPER INSERT

Material	Grade	Recommended Cutting Speed (m/min)
P	**VP25N**	200 (80—250)
	VP15TF	180 (80—250)
M	**VP15TF**	120—270
K	**MC5020**	130—250
	VP15TF	
	MB710	
S	**VP15TF**	20—50
H	**VP15TF**	40—80
N	**MD220**	650 (300—1000)

- Recommended depth of cut (ap) is 0.2mm-0.5mm and feed per tooth (fz) is up to 0.2mm/t.

SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

RECOMMENDED CUTTING CONDITIONS

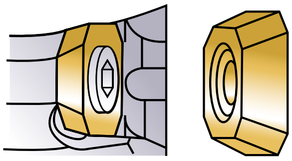
	Material	Hardness	Grade	Cutting Speed (m/min)	Finish—Light Cutting		Light—Rough Cutting		Medium—Heavy Cutting	
					Feed per Tooth (mm/t.)	Chipbreaker	Feed per Tooth (mm/t.)	Chipbreaker	Feed per Tooth (mm/t.)	Chipbreaker
P	Mild Steel	≤180HB	**MV1020**	300 (200—400)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MV1030	275 (200—350)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			F7030	280 (210—350)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP6120 **VP15TF**	250 (200—300)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP6130	240 (190—290)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP30RT	230 (180—280)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MX3030	180 (130—230)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
			NX4545	180 (130—230)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
	Carbon Steel Alloy Steel	180—280HB	**MV1020**	260 (170—350)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MV1030	235 (170—300)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			F7030	250 (200—300)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP6120 **VP15TF**	220 (170—270)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP6130	200 (150—230)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP30RT	150 (120—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MX3030	150 (120—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
			NX4545	150 (120—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
		280—350HB	**MV1020**	180 (100—250)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MV1030	165 (100—230)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			F7030	180 (130—230)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP6120 **VP15TF**	140 (100—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP6130	120 (90—150)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP30RT	100 (80—160)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MX3030	100 (80—160)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
			NX4545	100 (80—160)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
M	Stainless Steel	≤270HB	**MV1030**	220 (170—270)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP7130 **VP15TF**	220 (170—270)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP7140 **VP30RT**	200 (150—250)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MX3030	150 (120—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
			NX4545	150 (120—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
K	Cast Iron Ductile Cast Iron	Tensile Strength ≤450MPa	**MV1020**	240 (130—350)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH** **FT**
			MV1030	190 (130—250)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH** **FT**
			MC5020	200 (150—250)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH** **FT**
			VP15TF	180 (130—250)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
		Tensile Strength ≥450MPa	**MV1020**	220 (80—350)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH** **FT**
			MV1030	110 (80—150)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH** **FT**
			MC5020	110 (80—150)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH** **FT**
N	Aluminium Alloy	—	**HTi10**	650 (300—1000)	0.15 (0.1—0.2)	**JP**	0.2 (0.1—0.3)	**JP**	0.3 (0.2—0.4)	**JP**
S	Titanium Alloy	—	**MP9120** **VP15TF**	50 (40—60)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP9130	45 (30—55)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
	Heat Resistant Alloy (Inconel®718 etc.)	—	**MP9120** **VP15TF**	40 (20—50)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			MP9130	35 (15—45)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
H	Hardened Steel	40—55HRC	**VP15TF**	80 (60—100)	0.1 (0.05—0.15)	**JL**	0.15 (0.1—0.2)	**JM**	0.2 (0.1—0.3)	**JH**

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x DC)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

FEATURES

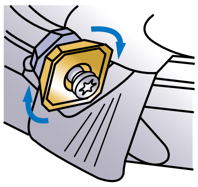
■STABLE, LONG TOOL LIFE, HIGH ACCURACY BODY

A carbide shim with Mitsubishi's proprietary Anti-Fly Insert (AFI) mechanism provides excellent insert location characteristics, permitting stable cutting even under high load conditions.

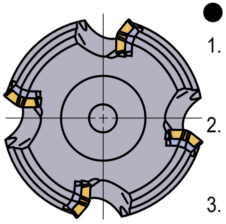


The cutter body is made from a special alloy that provides high strength at high temperature. A special surface treatment improves the corrosion resistance.

The ASX cutter uses screw-on type inserts that allow easy clamping of the inserts with high location precision. Indexing of the inserts can be performed without completely removing the screw.

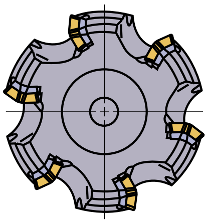


■EFFECTIVE FOR VARIOUS MACHINING APPLICATIONS



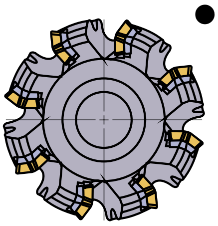
● Coarse Pitch Type

1. 1st recommendation for cutting steels and stainless steels.
2. For deep cutting and high feed rates with large-volume chip discharge.
3. Smooth cutting allows longer overhang applications.



● Fine Pitch Type

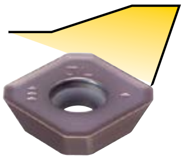
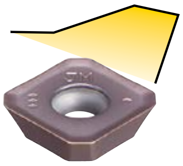
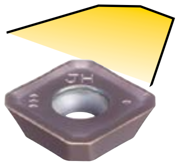
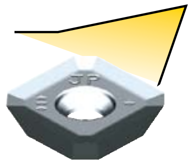
1. 1st recommendation for cast iron, hardened steel and heat-resistant alloys.
2. For shallow cutting with low feed rates and low-volume chip discharge.



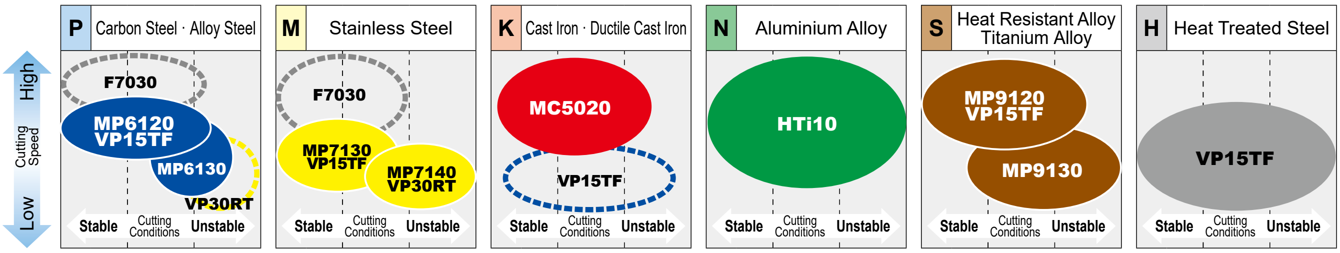
● Extra Fine Pitch Type

1. 1st recommendation for cast iron.
2. For cutting operations where chip discharge volume is small and high table feed is desired.

■CHIPBREAKERS FOR A WIDE RANGE OF APPLICATIONS

JL Finish to Light Cutting Chipbreaker	**JM** Light to Semi-Heavy Cutting Chipbreaker	**JH** Medium to Heavy Cutting Chipbreaker	**JP** Aluminium Alloy Cutting Chipbreaker	**FT** Rough Cutting for Cast Iron Chipbreaker
				
High accuracy insert with ground finished periphery. Large rake angle leading to low cutting resistance.	High accuracy M class insert. For a wide range of workpieces and cutting conditions.	High accuracy M class insert. Strong cutting edge for high fracture resistance.	High accuracy insert with ground finished periphery. Large rake angle and mirror finished rake face for sharp cutting performance and high welding resistance.	High M class inserts. Higher fracture-resistant flat-top inserts.
①Workpiece rigidity is low.	**①General cutting.**	**①Interrupted cutting.** **②Scaling.**	**①General machining of aluminium and non ferrous metal.**	**①For rough accuracy machining of scaled cast iron.**

■INSERT GRADES FOR A WIDE RANGE OF MATERIALS



Note 1) When machining steel or stainless steel where the emphasis is on surface finish, use the cermet grade NX4545.
Stable Cutting: Continuous cutting, Constant depth of cut, Pre-machined securely clamped component cutting.
Unstable Cutting: Heavy interrupted, Irregular depth of cut, Low clamping rigidity cutting.

TECHNICAL DATA ➤P001

FACE MILLING
<GENERAL CUTTING>
AHX440S/475S/640S

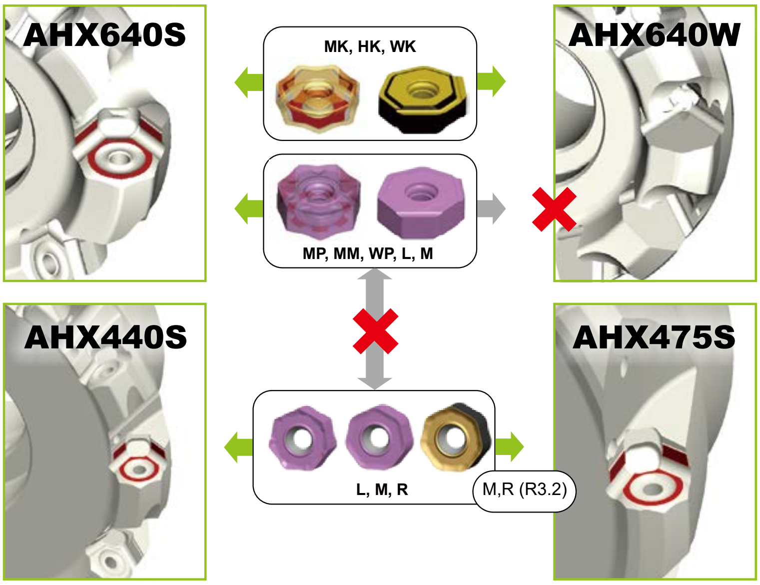
Selection Reference Table (Cutting Edge Count and Cutting Conditions)

DC	Type	Number of Teeth	AHX440S			AHX475S			AHX640S		
			General Cutting			High Feed Machining			General Cutting		
			Stock	**fr** (mm/rev)	**APMX**	Stock	**fr** (mm/rev)	**APMX**	Stock	**fr** (mm/rev)	**APMX**
40	Fine Pitch	3	●	0.6–1.2	3						
	Extra Fine Pitch	4	●	0.8–1.6	3						
50	Fine Pitch	4	●	0.8–1.6	3	●	2.4–4.0	1.6			
	Extra Fine Pitch	5	●	1.0–2.0	3	●	3.0–5.0	1.6			
	Super Extra Fine Pitch	6	●	1.2–2.4	3						
63	Coarse Pitch	4							●	0.8–1.6	6
	Fine Pitch	5	●	1.0–2.0	3	●	3.0–5.0	1.6	●	1.0–2.0	6
	Extra Fine Pitch	6	●	1.2–2.4	3	●	3.6–6.0	1.6			
	Super Extra Fine Pitch	8	●	1.6–3.2	3						
80	Coarse Pitch	4							●	0.8–1.6	6
	Fine Pitch	6	●	1.2–2.4	3	●	3.6–6.0	1.6	●	1.2–2.4	6
	Extra Fine Pitch	8	●	1.6–3.2	3	●	4.8–8.0	1.6			
	Super Extra Fine Pitch	10	●	2.0–4.0	3						
100	Coarse Pitch	5							●	1.0–2.0	6
	Fine Pitch	7	●	1.4–2.8	3	●	4.2–7.0	1.6	●	1.4–2.8	6
	Extra Fine Pitch	9				●	5.4–9.0	1.6			
		10	●	2.0–4.0	3						
	Super Extra Fine Pitch	12	●	2.4–4.8	3						
125	Coarse Pitch	6							●	1.2–2.4	6
	Fine Pitch	8	●	1.6–3.2	3	●	4.8–8.0	1.6	●	1.6–3.2	6
	Extra Fine Pitch	10				●	6.0–10.0	1.6			
		12	●	2.4–4.8	3						
	Super Extra Fine Pitch	14	●	2.8–5.6	3						
160	Coarse Pitch	7							●	1.4–2.8	6
	Fine Pitch	10	●	2.0–4.0	3	●	6.0–10.0	1.6	●	2.0–4.0	6
	Extra Fine Pitch	12				●	7.2–12.0	1.6			
		14	●	2.8–5.6	3						
	Super Extra Fine Pitch	16	●	3.2–6.4	3						
200	Coarse Pitch	8							●	1.6–3.2	6
	Fine Pitch	12							●	2.4–4.8	6

Note 1) fr : Feed rate per revolution (AHX475S : the feed rate per cutter (fz) will be limited by the cutting width ae. Please refer to page K040 for details.)
Note 2) APMX : Maximum depths of cut (AHX440S : the maximum depths of cut will vary depending on the chipbreaker)
Note 3) The depths of cut and feed rate are identical to the recommended conditions for carbon steel and alloy steel.

Compatibility with Inserts for AHX Series

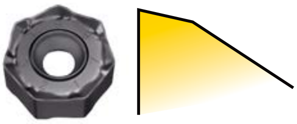
The RE = 3.2 mm insert for use with AHX440S can be mounted on AHX475S.
All inserts for use with AHX640 can be mounted on AHX640S (note, however, that the set height will differ).
The inserts for mounting on AHX640W are the MK, HK, and WK chipbreaker.



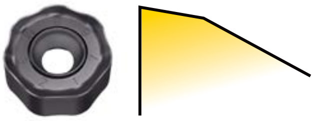
Chipbreaker System

Chipbreaker Series for Varied Cutting Conditions

Focus on Cutting Edge Sharpness ← Stable Cutting (Thin Sheet, Low Rigidity) — Unstable Cutting (Interrupted Cutting, With Scale) → **Focus on Cutting Edge Strength**

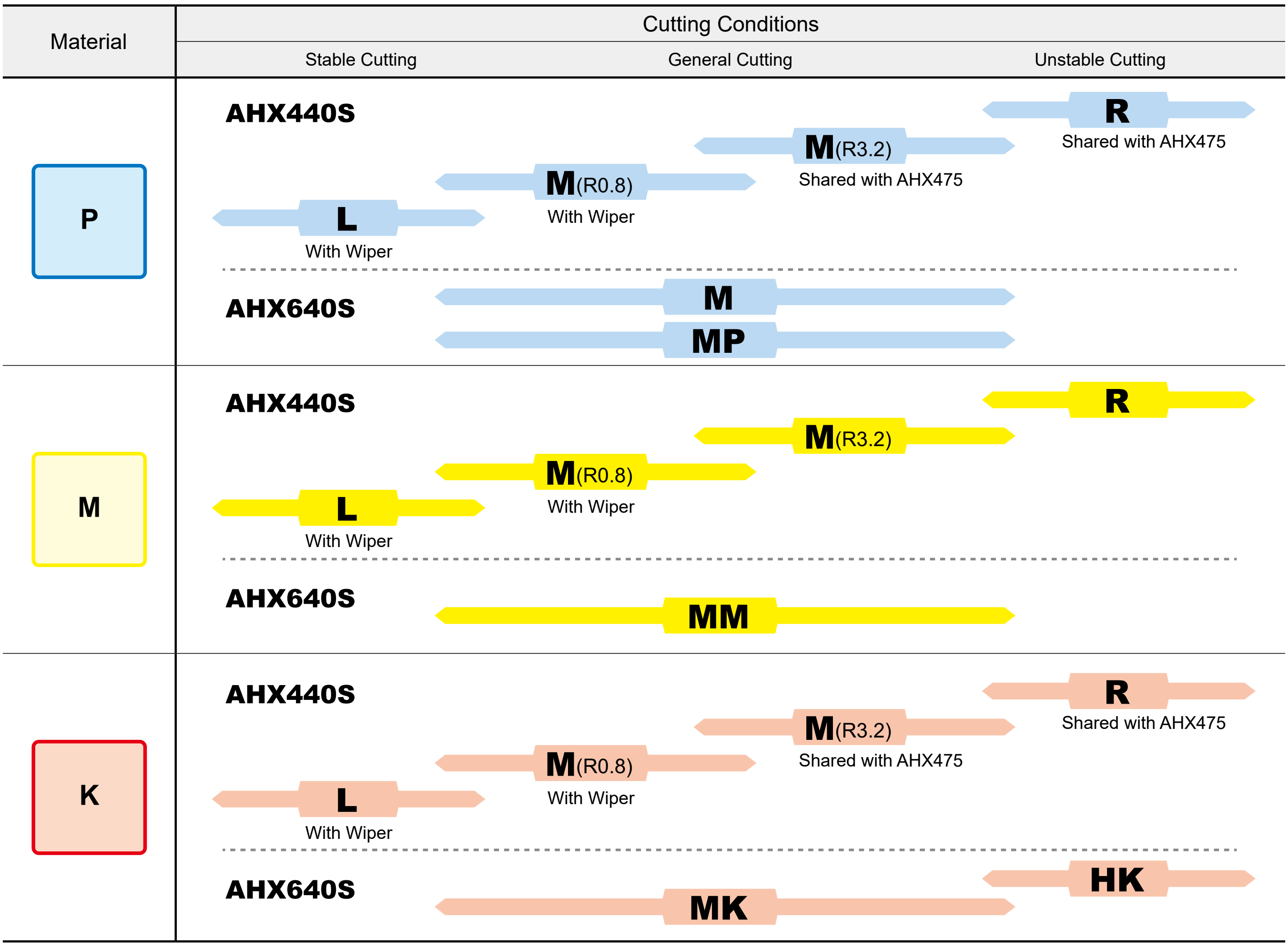


L Chipbreaker
Focus on cutting edge sharpness
Low resistance type



M Chipbreaker
1st Recommendation
All-round

R Chipbreaker
Focused on fracture resistance
Reinforced edge type



Material		Cutting Conditions		
		Stable Cutting	General Cutting	Unstable Cutting
P	**AHX440S**	**L** With Wiper	**M**(R0.8) With Wiper **M**(R3.2) Shared with AHX475	**R** Shared with AHX475
	AHX640S		**M** **MP**	
M	**AHX440S**	**L** With Wiper	**M**(R0.8) With Wiper **M**(R3.2)	**R**
	AHX640S		**MM**	
K	**AHX440S**	**L** With Wiper	**M**(R0.8) With Wiper **M**(R3.2) Shared with AHX475	**R** Shared with AHX475
	AHX640S		**MK**	**HK**

Wiper Insert of AHX640S

Based on the number of inserts and the cutting conditions, use of wiper inserts can improve overall surface finishes.

P **WP** + combination with **MP**
Right-hand 2 corners, left-hand 2 corners.

K **WK** + combination with **MK**
Right-hand 2 corners, left-hand 2 corners.

FACE MILLING

<GENERAL CUTTING>

50° KAPR F R

AHX440S

P M K N S H

KAPR : 50°
GAMP : -6° GAMF : -7°

Fig. 1
ø40
ø50
ø63
ø80

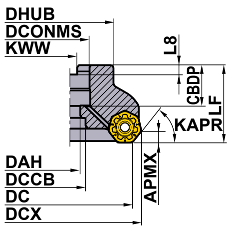
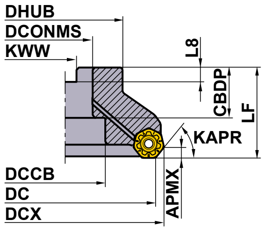
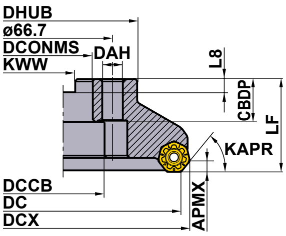


Fig. 2
ø100
ø125



Right hand tool holder only.

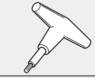
Fig. 3
ø160



DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			Fig.	WT * (kg)	APMX (mm)
					LF	DCX	DCONMS			
40	**AHX440S-040A03AR**	●	●	3	40	48.4	16	1	0.3	3
	AHX440S-040A04AR	●	●	4	40	48.4	16	1	0.2	3
50	**AHX440S-050A04AR**	●	●	4	40	58.4	22	1	0.4	3
	AHX440S-050A05AR	●	●	5	40	58.4	22	1	0.4	3
	AHX440S-050A06AR	●	●	6	40	58.4	22	1	0.4	3
63	**AHX440S-063A05AR**	●	●	5	40	71.4	22	1	0.6	3
	AHX440S-063A06AR	●	●	6	40	71.4	22	1	0.6	3
	AHX440S-063A08AR	●	●	8	40	71.4	22	1	0.5	3
80	**AHX440S-080A06AR**	●	●	6	50	88.4	27	1	1.1	3
	AHX440S-080A08AR	●	●	8	50	88.4	27	1	1.1	3
	AHX440S-080A10AR	●	●	10	50	88.4	27	1	1.1	3
100	**AHX440S-100B07AR**	●	●	7	50	108.4	32	2	1.6	3
	AHX440S-100B10AR	●	●	10	50	108.4	32	2	1.6	3
	AHX440S-100B12AR	●	●	12	50	108.3	32	2	1.6	3
125	**AHX440S-125B08AR**	●	●	8	63	133.4	40	2	3.0	3
	AHX440S-125B12AR	●	●	12	63	133.4	40	2	3.0	3
	AHX440S-125B14AR	●	●	14	63	133.3	40	2	2.9	3
160	**AHX440S-160C10NR**	●	–	10	63	168.4	40	3	4.8	3
	AHX440S-160C14NR	●	–	14	63	168.4	40	3	4.6	3
	AHX440S-160C16NR	●	–	16	63	168.4	40	3	4.7	3

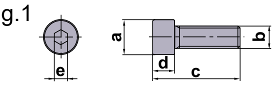
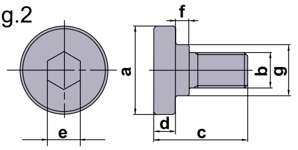
Note 1) The cutter body does not have a set bolt for an arbor. Please order the Set Bolt separately.
Note 2) The above "APMX" will vary depending on the chipbreaker insert.
* WT : Tool Weight

SPARE PARTS

Tool Holder Number	 *	
	Clamp Screw	Wrench (Insert)
AHX440S	TS35R	TKY15T

* Clamp Torque (N • m) : TS35R=3.5

SET BOLT (SOLD SEPARATELY)

Tool Holder Number	Set Bolt		Fig.	Reference Dimensions (mm)							Geometry
	With Coolant Hole	Without Coolant Hole									
	Order Number	Order Number		a	b	c	d	e	f	g	
AHX440S-040A◌◌AR	HSC08025H	HSC08040	1	13	M8×1.25	33	8	5	–	–	Fig.1 
AHX440S-050A◌◌AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	–	–	
AHX440S-063A◌◌AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	–	–	
AHX440S-080A◌◌AR	HSC12035H	HSC12035 (HSC12045)	1	18	M12×1.75	47 57	12	10	–	–	Fig.2 
AHX440S-100B◌◌AR	MBA16033H	–	2	40	M16×2	43	10	14	6	23	
AHX440S-125B◌◌AR	MBA20040H	–	2	50	M20×2.5	54	14	17	6	27	
AHX440S-160C◌◌NR	No coolant hole	–	2	50	M20×2.5	54	14	17	6	27	

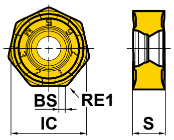
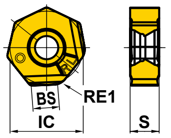
Note 1) Internal coolant is necessary with the set bolt.

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

INSERTS

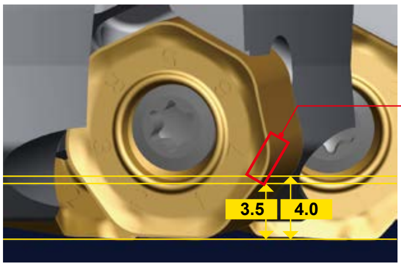
	Material	MV1020	MV1030	MP6120	MP6130	MP7130	MP7140	MC5020	VP15TF
P	Steel	◐	◐	◐	✥				◐
M	Stainless Steel	◐	◐			◐	✥		◐
K	Cast Iron	◐	◐					◐	◐
H	Hardened Steel								◐

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✥ : Unstable Cutting
Honing :
E : Round

Application	Shape	Order Number	Class	Honing	Coated NEW MV1020	 NEW MV1030	 MP6120	 MP6130	 MP7130	 MP7140	 MC5020	 VP15TF	Dimensions (mm) IC	 RE1	 BS	 S	 APMX	Geometry
Stable Cutting		**NNMU130508ZER-L**	M	E	●	●	●	●	●	●	●	★	13.4	0.8	1	5.77	3	
General Cutting		**NNMU130508ZEN-M**	M	E	●	●	●	●	●	●	●	★	13.4	0.8	1	5.57	＊4	
		NNMU130532ZEN-M	M	E	●	●	●	●	●	●	●	★	13.4	3.2	—	5.57	＊4	
Unstable Cutting		**NNMU130532ZEN-R**	M	E	●	●	●	●	●	●	●	★	13.4	3.2	—	5.47	＊4	
Finish Cutting	 Wiper	**WNEU1305ZEN4C-M**	E	E			●				●	★	13.4	2.7	4	5.1	0.5	

＊ When not using the Wiper, APMX = 3.5mm

● = NEW



Corner R on Opposite Side

If using corner R on the opposite side, APMX = 4.0 mm
If not using the opposite corner, APMX = 3.5 mm

■INSTRUCTIONS FOR USE OF WIPER INSERTS

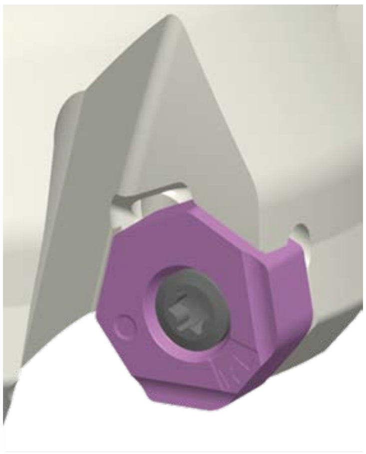


Fig.1

Fig.2

Note 1) These wiper inserts have 2 corners on right hand type and 2 corners for left hand type. Refer to Figure 1.
Note 2) A satisfactory surface finish can be achieved with one wiper insert. However, if the feed rate per revolution will be equal to or greater than the width of the wiper edge, it is recommended to install 2 or more wiper inserts spaced evenly within the cutter body.

MOUNTING DIMENSION ➤K047
SPARE PARTS ➤N001
TECHNICAL DATA ➤P001

RECOMMENDED CUTTING CONDITIONS

■Dry Cutting

	Material	Hardness	Grade	Vc (m/min)	fz (mm/t.)	ap (mm)
P	Mild Steel	≦180HB	**MV1020**	300 (200—400)	0.3 (0.2—0.4)	≦3
			MV1030	245 (190—300)	0.3 (0.2—0.4)	≦3
			MP6120,VP15TF	250 (200—300)	0.3 (0.2—0.4)	≦3
			MP6130	240 (190—290)	0.3 (0.2—0.4)	≦3
	Carbon Steel,Alloy Steel	180—280HB	**MV1020**	260 (170—350)	0.3 (0.2—0.4)	≦3
			MV1030	210 (150—270)	0.3 (0.2—0.4)	≦3
			MP6120,VP15TF	220 (170—270)	0.3 (0.2—0.4)	≦3
			MP6130	200 (150—250)	0.3 (0.2—0.4)	≦3
	Carbon Steel,Alloy Steel	280—350HB	**MV1020**	180 (100—250)	0.3 (0.2—0.4)	≦3
			MV1030	135 (90—180)	0.3 (0.2—0.4)	≦3
			MP6120,VP15TF	140 (100—180)	0.3 (0.2—0.4)	≦3
			MP6130	120 (90—150)	0.3 (0.2—0.4)	≦3
	Alloy Tool Steel	≦350HB (Annealing)	**MP6120,VP15TF**	140 (100—180)	0.15 (0.1—0.2)	≦1
			MP6130	120 (90—150)	0.15 (0.1—0.2)	≦1
	Pre-hardened Steel	35—45HRC	**MP6120,VP15TF**	140 (100—180)	0.15 (0.1—0.2)	≦1
			MP6130	120 (90—150)	0.15 (0.1—0.2)	≦1
M	Austenitic Stainless Steel	≦200HB	**MV1030**	185 (120—250)	0.2 (0.1—0.3)	≦3
			MP7130,VP15TF	200 (150—250)	0.2 (0.1—0.3)	≦3
			MP7140	180 (120—230)	0.2 (0.1—0.3)	≦3
		> 200HB	**MV1030**	140 (80—200)	0.2 (0.1—0.3)	≦3
			MP7130,VP15TF	150 (100—200)	0.2 (0.1—0.3)	≦3
			MP7140	130 (80—180)	0.2 (0.1—0.3)	≦3
	Ferritic and Maltensitic Stainless Steel	≦200HB	**MP7130,VP15TF**	200 (150—250)	0.2 (0.1—0.3)	≦3
			MP7140	180 (120—230)	0.2 (0.1—0.3)	≦3
		> 200HB	**MP7130,VP15TF**	150 (100—200)	0.2 (0.1—0.3)	≦3
			MP7140	130 (80—180)	0.2 (0.1—0.3)	≦3
	Two-phase Stainless Steel	≦280HB	**MP7130,VP15TF**	140 (100—180)	0.15 (0.05—0.25)	≦3
			MP7140	120 (80—160)	0.15 (0.05—0.25)	≦3
	Precipitation Hardening Stainless Steel	< 450HB	**MP7130,VP15TF**	130 (100—160)	0.15 (0.05—0.25)	≦3
			MP7140	110 (80—140)	0.15 (0.05—0.25)	≦3
K	Gray Cast Iron	Tensile Strength ≦350MPa	**MC5020**	220 (150—300)	0.3 (0.2—0.4)	≦3
			VP15TF	180 (130—230)	0.3 (0.2—0.4)	≦3
	Ductile Cast Iron	Tensile Strength ≦450MPa	**MV1020**	240 (130—350)	0.2 (0.1—0.3)	≦3
			MV1030	185 (120—250)	0.2 (0.1—0.3)	≦3
			MC5020	200 (150—250)	0.2 (0.1—0.3)	≦3
			VP15TF	170 (120—220)	0.2 (0.1—0.3)	≦3
	Ductile Cast Iron	Tensile Strength ≦800MPa	**MV1020**	220 (80—350)	0.2 (0.1—0.3)	≦3
			MV1030	150 (100—200)	0.2 (0.1—0.3)	≦3
			MC5020	170 (150—200)	0.2 (0.1—0.3)	≦3
			VP15TF	140 (100—180)	0.2 (0.1—0.3)	≦3
H	Hardened Steel	40—55HRC	**VP15TF**	80 (60—100)	0.15 (0.1—0.2)	≦1

■Wet Cutting

Material		Hardness	Grade	Vc (m/min)	fz (mm/t.)	ap (mm)
M	Austenitic Stainless Steel	≤200HB	**MP7130,VP15TF**	125 (100—150)	0.15 (0.1—0.2)	≤3
			MP7140	100 (80—140)	0.15 (0.1—0.2)	≤3
		> 200HB	**MP7130,VP15TF**	100 (75—125)	0.15 (0.1—0.2)	≤3
			MP7140	80 (55—105)	0.15 (0.1—0.2)	≤3
	Ferritic and Maltensitic Stainless Steel	≤200HB	**MP7130,VP15TF**	125 (100—150)	0.15 (0.1—0.2)	≤3
			MP7140	100 (80—140)	0.15 (0.1—0.2)	≤3
		> 200HB	**MP7130,VP15TF**	100 (75—125)	0.15 (0.1—0.2)	≤3
			MP7140	80 (55—105)	0.15 (0.1—0.2)	≤3
	Two-phase Stainless Steel	≤280HB	**MP7130,VP15TF**	80 (60—100)	0.1 (0.05—0.15)	≤3
			MP7140	60 (40—80)	0.1 (0.05—0.15)	≤3
	Precipitation Hardening Stainless Steel	< 450HB	**MP7130,VP15TF**	70 (50—90)	0.1 (0.05—0.15)	≤3
			MP7140	50 (30—70)	0.1 (0.05—0.15)	≤3

■Cutting Conditions with Wiper Insert

Material		Hardness	Grade	Vc (m/min)	fz (mm/t.)	ap (mm)
P	Mild Steel	≤180HB	**MP6120,VP15TF**	250 (200—300)	0.3 (0.2—0.4)	≤0.5
	Carbon Steel,Alloy Steel	180—280HB	**MP6120,VP15TF**	220 (170—270)	0.3 (0.2—0.4)	≤0.5
		280—350HB	**MP6120,VP15TF**	140 (100—180)	0.3 (0.2—0.4)	≤0.5
	Alloy Tool Steel	≤350HB (Annealing)	**MP6120,VP15TF**	140 (100—180)	0.15 (0.1—0.2)	≤0.5
	Pre-hardened Steel	35—45HRC	**MP6120,VP15TF**	140 (100—180)	0.15 (0.1—0.2)	≤0.5
M	Austenitic Stainless Steel	≤200HB	**VP15TF**	125 (100—150)	0.15 (0.1—0.2)	≤0.5
		> 200HB	**VP15TF**	100 (75—125)	0.15 (0.1—0.2)	≤0.5
	Ferritic and Maltensitic Stainless Steel	≤200HB	**VP15TF**	125 (100—150)	0.15 (0.1—0.2)	≤0.5
		> 200HB	**VP15TF**	100 (75—125)	0.15 (0.1—0.2)	≤0.5
	Two-phase Stainless Steel	≤280HB	**VP15TF**	80 (60—100)	0.1 (0.05—0.15)	≤0.5
	Precipitation Hardening Stainless Steel	< 450HB	**VP15TF**	70 (50—90)	0.1 (0.05—0.15)	≤0.5
K	Gray Cast Iron	Tensile Strength ≤350MPa	**MC5020**	320 (250—400)	0.3 (0.2—0.4)	≤0.5
			VP15TF	220 (150—300)	0.3 (0.2—0.4)	≤0.5
	Ductile Cast Iron	Tensile Strength ≤450MPa	**MC5020**	250 (200—300)	0.2 (0.1—0.3)	≤0.5
			VP15TF	200 (150—250)	0.2 (0.1—0.3)	≤0.5
		Tensile Strength ≤800MPa	**MC5020**	220 (200—250)	0.2 (0.1—0.3)	≤0.5
			VP15TF	170 (150—200)	0.2 (0.1—0.3)	≤0.5
H	Hardened Steel	40—55HRC	**VP15TF**	80 (60—100)	0.15 (0.1—0.2)	≤0.5

Note 1) Refer to the above table and set up cutting conditions according to the applications.
Note 2) When placing emphasis on surface finish quality, wet cutting is recommended. (tool life is lowered compared to dry cutting)
Note 3) The recommended depth of cut differs according to the insert geometry.
Note 4) When clamp rigidity is low and tool overhang is long, we recommend to reduce the cutting speed and the feed rate by 30%.
Note 5) Wet cutting is recommended for good surface finishes when machining stainless steel. (Tool life is short compared to dry cutting.)

FACE MILLING

<GENERAL HIGH FEED CUTTING>

15° KAPR F R

AHX475S

P M **K** N S **H**

Fig.1

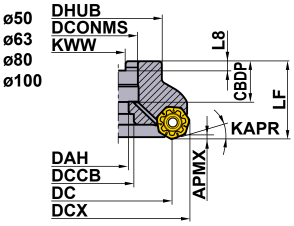
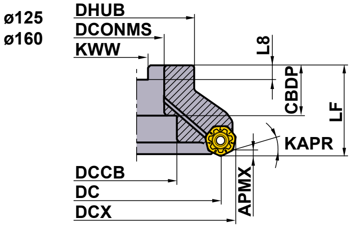


Fig.2



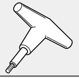
Right hand tool holder only.

KAPR : 15°
GAMP : -6° GAMF : -10°

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			Fig.	WT * (kg)	APMX (mm)
					LF	DCX	DCONMS			
50	**AHX475S-050A04AR**	●	●	4	50	65.7	22	1	0.6	1.6
	AHX475S-050A05AR	●	●	5	50	65.7	22	1	0.6	1.6
63	**AHX475S-063A05AR**	●	●	5	50	78.7	22	1	1.0	1.6
	AHX475S-063A06AR	●	●	6	50	78.7	22	1	1.0	1.6
80	**AHX475S-080A06AR**	●	●	6	50	95.6	27	1	1.6	1.6
	AHX475S-080A08AR	●	●	8	50	95.6	27	1	1.6	1.6
100	**AHX475S-100A07AR**	●	●	7	63	115.6	32	1	3.3	1.6
	AHX475S-100A09AR	●	●	9	63	115.6	32	1	3.3	1.6
125	**AHX475S-125B08AR**	●	●	8	63	140.6	40	2	4.0	1.6
	AHX475S-125B10AR	●	●	10	63	140.6	40	2	4.0	1.6
160	**AHX475S-160B10AR**	●	●	10	63	175.6	40	2	6.0	1.6
	AHX475S-160B12AR	●	●	12	63	175.6	40	2	6.0	1.6

Note 1) The cutter body does not have a set bolt for an arbor.
⁎ WT : Tool Weight

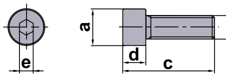
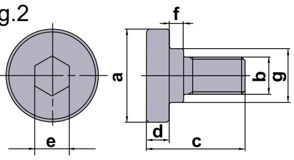
SPARE PARTS

Tool Holder Number	 *	
	Clamp Screw	Wrench (Insert)
AHX475S	TS35R	TKY15T

⁎ Clamp Torque (N • m) : TS35R=3.5

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

SET BOLT (SOLD SEPARATELY)

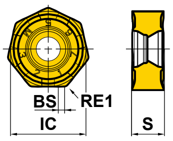
Tool Holder Number	Set Bolt		Fig.	Reference Dimensions (mm)							Geometry
	With Coolant Hole	Without Coolant Hole									
	Order Number	Order Number		a	b	c	d	e	f	g	
AHX475S-050A◌◌AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	–	–	Fig.1 
AHX475S-063A◌◌AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	–	–	
AHX475S-080A◌◌AR	HSC12035H	HSC12035 (HSC12045)	1	18	M12×1.75	47 57	12	10	–	–	Fig.2 
AHX475S-100B◌◌AR	HSC16040H	–	1	24	M16×2	56	16	14	–	–	
AHX475S-125B◌◌AR	MBA20040H	–	2	50	M20×2.5	54	14	17	6	27	
AHX475S-160C◌◌AR	MBA20040H	–	2	50	M20×2.5	54	14	17	6	27	

Note 1) Internal coolant is necessary with the set bolt.

INSERTS

Material			MV1020	MV1030	MP6120	MP6130	MC5020	VP15TF
	P	Steel	◐	◐	◐	✤		◐
	K	Cast Iron	◐	◐			◐	◐
	H	Hardened Steel						◐

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
Honing : E : Round

Application	Shape	Order Number	Class	Honing	Coated						Dimensions (mm)					Geometry
					NEW **MV1020**	NEW **MV1030**	**MP6120**	**MP6130**	**MC5020**	**VP15TF**	**IC**	**RE1**	**BS**	**S**	**APMX**	
General Cutting		**NNMU130532ZEN-M**	M	E	●	●	●	●	●	★	13.4	3.2	–	5.57	1.6	
Unstable Cutting		**NNMU130532ZEN-R**	M	E	●	●	●	●	●	★	13.4	3.2	–	5.47	1.6	

● = NEW

MOUNTING DIMENSION ➤ K047
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

RECOMMENDED CUTTING CONDITIONS

■Dry Cutting

Material		Hardness	Grade	Chipbreaker	Vc (m/min)	fz (mm/t.)	ap (mm)	ae (mm)
P	Mild Steel	≤180HB	**MV1020**	**R**	220(170−270)	0.6	≤1.6	≤0.5DC
			MV1020	**R**	220(170−270)	0.8	≤1.6	0.5−0.8DC
			MV1020	**M**	220(170−270)	1	≤1.6	0.8−1DC
			MV1030	**R**	140(80−200)	0.6	≤1.6	≤0.5DC
			MV1030	**R**	140(80−200)	0.8	≤1.6	0.5−0.8DC
			MV1030	**M**	140(80−200)	1	≤1.6	0.8−1DC
			MP6120	**R**	150(100−200)	0.6	≤1.6	≤0.5DC
			MP6120	**R**	150(100−200)	0.8	≤1.6	0.5−0.8DC
			MP6120	**M**	150(100−200)	1	≤1.6	0.8−1DC
			MP6130	**R**	130(80−180)	0.6	≤1.6	≤0.5DC
			MP6130	**R**	130(80−180)	0.8	≤1.6	0.5−0.8DC
			MP6130	**M**	130(80−180)	1	≤1.6	0.8−1DC
	Carbon Steel,Alloy Steel	180−280HB	**MV1020**	**R**	200(150−250)	0.6	≤1.6	≤0.5DC
			MV1020	**R**	200(150−250)	0.8	≤1.6	0.5−0.8DC
			MV1020	**M**	200(150−250)	1	≤1.6	0.8−1DC
			MV1030	**R**	120(60−180)	0.6	≤1.6	≤0.5DC
			MV1030	**R**	120(60−180)	0.8	≤1.6	0.5−0.8DC
			MV1030	**M**	120(60−180)	1	≤1.6	0.8−1DC
			MP6120	**R**	130(80−180)	0.6	≤1.6	≤0.5DC
			MP6120	**R**	130(80−180)	0.8	≤1.6	0.5−0.8DC
			MP6120	**M**	130(80−180)	1	≤1.6	0.8−1DC
			MP6130	**R**	110(60−160)	0.6	≤1.6	≤0.5DC
			MP6130	**R**	110(60−160)	0.8	≤1.6	0.5−0.8DC
			MP6130	**M**	110(60−160)	1	≤1.6	0.8−1DC
	Carbon Steel,Alloy Steel	280−350HB	**MV1020**	**R**	150(100−200)	0.5	≤1.6	≤0.5DC
			MV1020	**R**	150(100−200)	0.6	≤1.6	0.5−0.8DC
			MV1020	**M**	150(100−200)	0.7	≤1.6	0.8−1DC
			MV1030	**R**	90(30−150)	0.5	≤1.6	≤0.5DC
			MV1030	**R**	90(30−150)	0.6	≤1.6	0.5−0.8DC
			MV1030	**M**	90(30−150)	0.7	≤1.6	0.8−1DC
			MP6120	**R**	100(50−150)	0.5	≤1.6	≤0.5DC
			MP6120	**R**	100(50−150)	0.6	≤1.6	0.5−0.8DC
			MP6120	**R**	100(50−150)	0.7	≤1.6	0.8−1DC
			MP6130	**R**	80(30−130)	0.5	≤1.6	≤0.5DC
			MP6130	**R**	80(30−130)	0.6	≤1.6	0.5−0.8DC
			MP6130	**R**	80(30−130)	0.7	≤1.6	0.8−1DC
	Alloy Tool Steel	≤350HB (Annealing)	**MP6120**	**R**	100(50−150)	0.5	≤1.6	≤0.5DC
			MP6120	**R**	100(50−150)	0.6	≤1.6	0.5−0.8DC
			MP6120	**R**	100(50−150)	0.7	≤1.6	0.8−1DC
			MP6130	**R**	80(30−120)	0.5	≤1.6	≤0.5DC
			MP6130	**R**	80(30−120)	0.6	≤1.6	0.5−0.8DC
			MP6130	**R**	80(30−120)	0.7	≤1.6	0.8−1DC
	Pre-hardened Steel	35−45HRC	**MP6120**	**R**	100(70−130)	0.5	≤1.6	≤0.5DC
			MP6120	**R**	100(70−130)	0.6	≤1.6	0.5−0.8DC
			MP6120	**R**	100(70−130)	0.7	≤1.6	0.8−1DC
			MP6130	**R**	80(50−110)	0.5	≤1.6	≤0.5DC
			MP6130	**R**	80(50−110)	0.6	≤1.6	0.5−0.8DC
			MP6130	**R**	80(50−110)	0.7	≤1.6	0.8−1DC

Note 1) When clamp rigidity is low and tool overhang is long, we recommend to reduce the cutting speed and the feed rate by 30%.

Material		Hardness	Grade	Chipbreaker	Vc (m/min)	fz (mm/t.)	ap (mm)	ae (mm)
K	Gray Cast Iron	Tensile Strength ≦350MPa	**MC5020**	**R**	150(100−200)	0.6	≦1.6	≦0.5DC
			MC5020	**R**	150(100−200)	0.8	≦1.6	0.5−0.8DC
			MC5020	**M**	150(100−200)	1	≦1.6	0.8−1DC
			VP15TF	**M**	120(80−160)	0.6	≦1.6	≦0.5DC
			VP15TF	**M**	120(80−160)	0.8	≦1.6	0.5−0.8DC
			VP15TF	**M**	120(80−160)	1	≦1.6	0.8−1DC
	Ductile Cast Iron	Tensile Strength ≦450MPa	**MV1020**	**R**	200(150−250)	0.6	≦1.6	≦0.5DC
			MV1020	**R**	200(150−250)	0.8	≦1.6	0.5−0.8DC
			MV1020	**M**	200(150−250)	1	≦1.6	0.8−1DC
			MV1030	**R**	140(80−200)	0.6	≦1.6	≦0.5DC
			MV1030	**R**	140(80−200)	0.8	≦1.6	0.5−0.8DC
			MV1030	**M**	140(80−200)	1	≦1.6	0.8−1DC
			MC5020	**R**	150(100−200)	0.6	≦1.6	≦0.5DC
			MC5020	**R**	150(100−200)	0.8	≦1.6	0.5−0.8DC
			MC5020	**M**	150(100−200)	1	≦1.6	0.8−1DC
			VP15TF	**R**	120(80−160)	0.6	≦1.6	≦0.5DC
			VP15TF	**R**	120(80−160)	0.8	≦1.6	0.5−0.8DC
			VP15TF	**M**	120(80−160)	1	≦1.6	0.8−1DC
	Ductile Cast Iron	Tensile Strength ≦800MPa	**MV1020**	**R**	180(130−230)	0.5	≦1.6	≦0.5DC
			MV1020	**R**	180(130−230)	0.6	≦1.6	0.5−0.8DC
			MV1020	**R**	180(130−230)	0.7	≦1.6	0.8−1DC
			MV1030	**R**	140(80−200)	0.5	≦1.6	≦0.5DC
			MV1030	**R**	140(80−200)	0.6	≦1.6	0.5−0.8DC
			MV1030	**R**	140(80−200)	0.7	≦1.6	0.8−1DC
			MC5020	**R**	150(100−200)	0.5	≦1.6	≦0.5DC
			MC5020	**R**	150(100−200)	0.6	≦1.6	0.5−0.8DC
			MC5020	**R**	150(100−200)	0.7	≦1.6	0.8−1DC
			VP15TF	**R**	120(80−160)	0.5	≦1.6	≦0.5DC
			VP15TF	**R**	120(80−160)	0.6	≦1.6	0.5−0.8DC
			VP15TF	**R**	120(80−160)	0.7	≦1.6	0.8−1DC
H	Hardened Steel	40−55HRC	**VP15TF**	**R**	70(50−90)	0.4	≦1.6	≦0.5DC
			VP15TF	**R**	70(50−90)	0.5	≦1.6	0.5−0.8DC
			VP15TF	**R**	70(50−90)	0.6	≦1.6	0.8−1DC

Note 1) When clamp rigidity is low and tool overhang is long, we recommend to reduce the cutting speed and the feed rate by 30%.

FACE MILLING

<GENERAL CUTTING>

50° KAPR F R

AHX640S

P M K N S H

Fig. 1 ø63 ø80

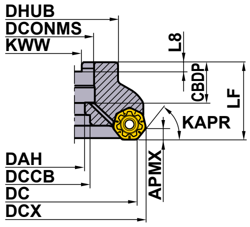


Fig. 2 ø100 ø125

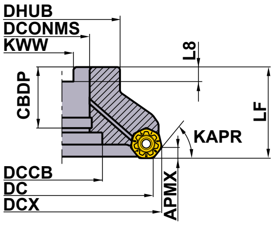


Fig. 3 ø160

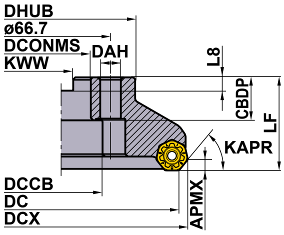
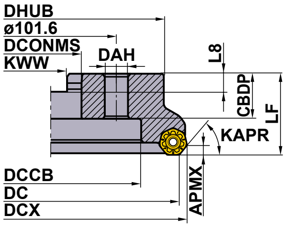
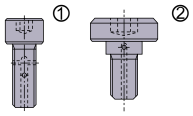


Fig. 4 ø200



Right hand tool holder only.

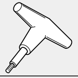
DC	Set Bolt	Geometry	
Ø63	HSC10030H	①	
Ø80	HSC12035H		
Ø100	MBA16033H	②	
Ø125	MBA20040H		
Ø160	—	—	
Ø200	—	—	

KAPR :50°
GAMP:-6° GAMF:-5°

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm) LF	DCX	DCONMS	Fig.	WT * (kg)	APMX (mm)
63	**AHX640S-063A04AR**	●	●	4	50	75.55	22	1	0.7	6
	AHX640S-063A05AR	●	●	5	50	75.55	22	1	0.6	6
80	**AHX640S-080A04AR**	●	●	4	50	92.55	27	1	1.1	6
	AHX640S-080A06AR	●	●	6	50	92.55	27	1	1.0	6
100	**AHX640S-100B05AR**	●	●	5	50	112.55	32	2	1.7	6
	AHX640S-100B07AR	●	●	7	50	112.55	32	2	1.6	6
125	**AHX640S-125B06AR**	●	●	6	63	137.55	40	2	3.1	6
	AHX640S-125B08AR	●	●	8	63	137.55	40	2	3.0	6
160	**AHX640S-160C07NR**	●	–	7	63	172.55	40	3	5.4	6
	AHX640S-160C10NR	●	–	10	63	172.55	40	3	5.2	6
200	**AHX640S-200C08NR**	●	–	8	63	212.55	60	4	7.8	6
	AHX640S-200C12NR	●	–	12	63	212.55	60	4	7.5	6

* WT : Tool Weight

SPARE PARTS

Tool Holder Number	 * Clamp Screw	 Wrench (Insert)
AHX640S	CS5015060T	TKY20T

* Clamp Torque (N • m) : CS5015060T=5.0

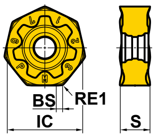
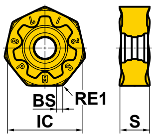
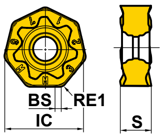
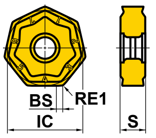
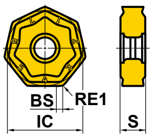
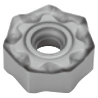
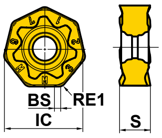
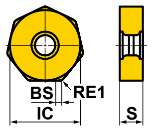
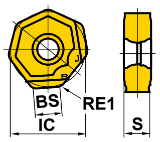
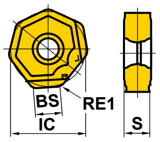
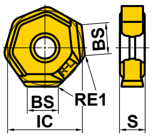
●: Inventory maintained. ★: Inventory maintained in Japan.
(10 inserts in one case)

INSERTS

Material			XC5010	MP6120	MP6130	MP7030	MP9120	MP9130	MC5020	VP15TF	VP20RT
Material	**P**	Steel		◐	✤					◐	◐
	M	Stainless Steel				◐				◐	◐
	K	Cast Iron	●						◐	✤	✤
	N	Non-ferrous Metal									
	S	Heat-resistant Alloy, Titanium Alloy					◐	✤		◐	◐
	H	Hardened Steel								◐	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✤ : Unstable Cutting

Honing :
E : Round

Application	Shape	Order Number	Class	Honing	Coated NEW XC5010	MP6120	MP6130	MP7030	MP9120	MP9130	MC5020	VP15TF	VP20RT	Dimensions (mm) IC	RE1	BS	S	APMX	Geometry
For Steel General Cutting		**NNMU200708ZEN-M**	M	E		●	●							20	0.8	1	8	6	
For Steel General Cutting		**NNMU200708ZEN-MP**	M	E								●		20	0.8	1	8	6	
For Stainless Steel		**NNMU200712ZER-MM**	M	E				●						20	1.2	1	8	6	
For Cast Iron General Cutting		**NNMU200608ZEN-MK**	M	E	●						●	★	★	20	0.8	1	6.55	6	
For Cast Iron Strong Cutting Edge Type		**NNMU200608ZEN-HK**	M	E							●	★	★	20	0.8	1	6.55	6	
For Titanium Alloy and Heat Resistant Alloy		**NNMU200712ZER-L**	M	E					●	●				20	1.2	1	8	6	
For Cast Iron Strong Cutting Edge Type	NEW 	**NNMQ200708ZEN-FT**	M	E	●									20	0.8	1	6.55	6	
For Steel	 Wiper	**WNEU2007ZEN7C-M**	E	E		●								20	0.8	7.2	6.9	0.5	
General Cutting	 Wiper	**WNEU2007ZEN7C-WP**	E	E								●		20	0.8	7.1	6.9	0.5	
For Cast Iron	 Wiper	**WNEU2006ZEN7C-WK**	E	E							●			20	0.8	7.4	6.55	0.5	

Note 1) The height of cutter when setting MK, HK inserts is different from when setting MP, MM inserts.

● = NEW

MOUNTING DIMENSION	➤ **K047**
SPARE PARTS	➤ **N001**
TECHNICAL DATA	➤ **P001**

■INSTRUCTIONS FOR USE OF WIPER INSERTS

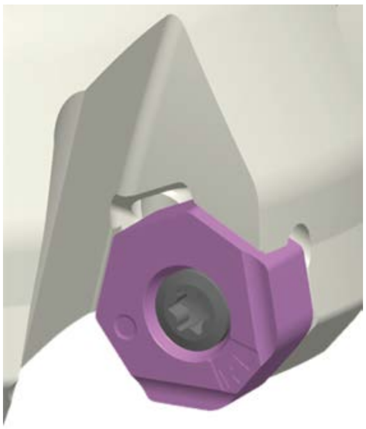


Fig.1

Fig.2

Note 1) These wiper inserts have 2 corners on right hand type and 2 corners for left hand type. Refer to Figure 1.

Note 2) A satisfactory surface finish can be achieved with one wiper insert. However, if the feed rate per revolution will be equal to or greater than the width of the wiper edge, it is recommended to install 2 or more wiper inserts spaced evenly within the cutter body.

TECHNICAL DATA ➢ P001

RECOMMENDED CUTTING CONDITIONS

■Dry Cutting

Material		Hardness	Grade	Chipbreaker	Vc (m/min)	fz (mm/t.)	ap (mm)	ae (mm)
P	Mild Steel	≤180HB	MP6120	M	250 (200−300)	0.3 (0.2−0.4)	≤5	≤0.8DC
			VP15TF	MP	250 (200−300)	0.3 (0.2−0.4)	≤5	≤0.8DC
			MP6130	M	220 (170−270)	0.4 (0.3−0.5)	≤5	≤0.8DC
	Carbon Steel,Alloy Steel	180−280HB	MP6120	M	220 (170−270)	0.3 (0.2−0.4)	≤5	≤0.8DC
			VP15TF	MP	220 (170−270)	0.3 (0.2−0.4)	≤5	≤0.8DC
			MP6130	M	190 (140−240)	0.4 (0.3−0.5)	≤5	≤0.8DC
	Carbon Steel,Alloy Steel	280−350HB	MP6120	M	140 (100−180)	0.3 (0.2−0.4)	≤5	≤0.8DC
			VP15TF	MP	140 (100−180)	0.3 (0.2−0.4)	≤5	≤0.8DC
			MP6130	M	110 (70−150)	0.4 (0.3−0.5)	≤5	≤0.8DC
	Pre-hardened Steel	≤350HB (Annealing)	MP6120	M	140 (100−180)	0.15 (0.1−0.2)	≤3	≤0.8DC
			VP15TF	MP	140 (100−180)	0.15 (0.1−0.2)	≤3	≤0.8DC
			MP6130	M	110 (70−150)	0.25 (0.2−0.3)	≤3	≤0.8DC
	Alloy Tool Steel	35−45HRC	MP6120	M	140 (100−180)	0.15 (0.1−0.2)	≤3	≤0.8DC
			VP15TF	MP	140 (100−180)	0.15 (0.1−0.2)	≤5	≤0.8DC
			MP6130	M	110 (70−150)	0.25 (0.2−0.3)	≤3	≤0.8DC
M	Austenitic Stainless Steel	≤200HB	MP7030	MM	200 (150−250)	0.2 (0.1−0.3)	≤5	≤0.8DC
	Austenitic Stainless Steel	> 200HB	MP7030	MM	150 (100−200)	0.2 (0.1−0.3)	≤5	≤0.8DC
	Duplex Steel	≤280HB	MP7030	MM	140 (100−180)	0.15 (0.05−0.25)	≤5	≤0.8DC
	Ferritic and Maltensitic Stainless Steel	≤200HB	MP7030	MM	200 (150−250)	0.2 (0.1−0.3)	≤5	≤0.8DC
	Ferritic and Maltensitic Stainless Steel	> 200HB	MP7030	MM	150 (100−200)	0.2 (0.1−0.3)	≤5	≤0.8DC
	Precipitation Hardening Stainless Steel	< 450HB	MP7030	MM	130 (100−160)	0.15 (0.05−0.25)	≤5	≤0.8DC
K	Gray Cast Iron	Tensile Strength ≤350MPa	XC5010	MK,FT	800 (500−1000)	0.1 (0.1−0.3)	≤3	≤0.8DC
			MC5020	MK,HK	220 (150−300)	0.3 (0.2−0.4)	≤5	≤0.8DC
			VP15TF,VP20RT	MK,HK	180 (130−230)	0.3 (0.2−0.4)	≤5	≤0.8DC
			VP15TF	MP	180 (130−230)	0.3 (0.2−0.4)	≤5	≤0.8DC
	Ductile Cast Iron	Tensile Strength ≤450MPa	XC5010	MK,FT	800 (500−1000)	0.1 (0.1−0.3)	≤3	≤0.8DC
			MC5020	MK,HK	200 (150−250)	0.2 (0.1−0.3)	≤5	≤0.8DC
			VP15TF,VP20RT	MK,HK	170 (120−220)	0.2 (0.1−0.3)	≤5	≤0.8DC
			VP15TF	MP	170 (120−220)	0.2 (0.1−0.3)	≤5	≤0.8DC
	Ductile Cast Iron	Tensile Strength ≤800MPa	XC5010	MK,FT	800 (500−1000)	0.1 (0.1−0.3)	≤3	≤0.8DC
			MC5020	MK,HK	170 (150−200)	0.2 (0.1−0.3)	≤5	≤0.8DC
			VP15TF,VP20RT	MK,HK	140 (100−180)	0.2 (0.1−0.3)	≤5	≤0.8DC
			VP15TF	MP	140 (100−180)	0.2 (0.1−0.3)	≤5	≤0.8DC
H	Hardened Steel	40−55HRC	VP15TF	MP	80 (60−100)	0.15 (0.1−0.2)	≤3	≤0.8DC

Note 1) Recommended wet cutting for good surface finishing of stainless steel. (Tool life is shorter when compared to dry cutting.)
Note 2) We recommend wet cutting with internal coolant for titanium alloy and heat resistant alloy.
Note 3) When clamp rigidity is low and tool overhang is long, we recommend to reduce the cutting speed and the feed rate by 30%.

RECOMMENDED CUTTING CONDITIONS

■Wet Cutting

	Material	Hardness	Chipbreaker	Grade	Vc (m/min)	fz (mm/t.)	ap (mm)	ae (mm)
M	Austenitic Stainless Steel	≤200HB	**MP7030**	**MM**	125(100—150)	0.15(0.1—0.2)	≤5	≤0.8DC
	Austenitic Stainless Steel	> 200HB	**MP7030**	**MM**	100(75—125)	0.15(0.1—0.2)	≤5	≤0.8DC
	Duplex Steel	≤280HB	**MP7030**	**MM**	80(60—100)	0.1(0.05—0.15)	≤5	≤0.8DC
	Ferritic and Maltensitic Stainless Steel	≤200HB	**MP7030**	**MM**	125(100—150)	0.15(0.1—0.2)	≤5	≤0.8DC
	Ferritic and Maltensitic Stainless Steel	> 200HB	**MP7030**	**MM**	100(75—125)	0.15(0.1—0.2)	≤5	≤0.8DC
	Precipitation Hardening Stainless Steel	< 450HB	**MP7030**	**MM**	70(50—90)	0.1(0.05—0.15)	≤5	≤0.8DC
S	Titanium Alloy	—	**MP7030**	**MM**	40(20—50)	0.15(0.1—0.2)	≤3	≤0.6DC
		—	**MP9120**	**L**	60(50—70)	0.1(0.05—0.15)	≤3	≤0.6DC
		—	**MP9130**	**L**	40(20—50)	0.15(0.1—0.2)	≤3	≤0.6DC
	Heat Resistant Alloy	—	**MP7030**	**MM**	40(20—50)	0.15(0.1—0.2)	≤3	≤0.6DC
		—	**MP9120**	**L**	40(20—50)	0.15(0.1—0.2)	≤3	≤0.6DC
		—	**MP9130**	**L**	40(20—50)	0.15(0.1—0.2)	≤3	≤0.6DC

Note 1) Wet cutting for good surface finishes when machining stainless steel. (Tool life is shorter when compared to dry cutting.)
Note 2) We recommend wet cutting with internal coolant for titanium alloy and heat resistant alloy.
Note 3) When clamp rigidity is low and tool overhang is long, we recommend reducing the cutting speed and the feed rate by 30%.

■Cutting Conditions with Wiper Insert

	Material	Hardness	Main Insert	Grade	Wiper Insert	Grade	Vc (m/min)	fz (mm/t.)	ap (mm)	ae (mm)
P	Mild Steel	≤180HB	**VP15TF**	**MP**	**VP15TF**	**WP**	250(200—300)	0.3(0.2—0.4)	≤0.5	≤0.8DC
			MP6120	**M**	**MP6120**	**M**	250(200—300)	0.3(0.2—0.4)	≤0.5	≤0.8DC
	Carbon Steel,Alloy Steel	180—280HB	**VP15TF**	**MP**	**VP15TF**	**WP**	220(170—270)	0.3(0.2—0.4)	≤0.5	≤0.8DC
			MP6120	**M**	**MP6120**	**M**	220(170—270)	0.3(0.2—0.4)	≤0.5	≤0.8DC
	Carbon Steel,Alloy Steel	280—350HB	**VP15TF**	**MP**	**VP15TF**	**WP**	140(100—180)	0.3(0.2—0.4)	≤0.5	≤0.8DC
			MP6120	**M**	**MP6120**	**M**	140(100—180)	0.3(0.2—0.4)	≤0.5	≤0.8DC
K	Gray Cast Iron	Tensile Strength ≤350MPa	**MC5020**	**MK,HK**	**MC5020**	**WK**	320(250—400)	0.3(0.2—0.4)	≤0.5	≤0.8DC
			VP15TF	**MP**	**VP15TF**	**WP**	220(150—300)	0.3(0.2—0.4)	≤0.5	≤0.8DC
	Ductile Cast Iron	Tensile Strength ≤450MPa	**MC5020**	**MK,HK**	**MC5020**	**WK**	250(200—300)	0.2(0.1—0.3)	≤0.5	≤0.8DC
			VP15TF	**MP**	**VP15TF**	**WP**	200(150—250)	0.2(0.1—0.3)	≤0.5	≤0.8DC
	Ductile Cast Iron	Tensile Strength ≤800MPa	**MC5020**	**MK,HK**	**MC5020**	**WK**	220(200—250)	0.2(0.1—0.3)	≤0.5	≤0.8DC
			VP15TF	**MP**	**VP15TF**	**WP**	170(150—200)	0.2(0.1—0.3)	≤0.5	≤0.8DC
S	Heat Resistant Alloy	—	**VP15TF**	**MP**	**VP15TF**	**WP**	40(20—50)	0.15(0.1—0.2)	≤0.5	≤0.8DC
H	Hardened Steel	40—55HRC	**VP15TF**	**MP**	**VP15TF**	**WP**	80(60—100)	0.15(0.1—0.2)	≤0.5	≤0.8DC

Note 1) When clamp rigidity is low and tool overhang is long, we recommend to reduce the cutting speed and the feed rate by 30%.
Note 2) Please use WP geometry insert in combination with MP or M geometry inserts, and use WK geometry insert in combination with MK or HK geometry inserts

AHX440S, AHX475S, AHX640S MOUNTING DIMENSIONS

Fig. 1

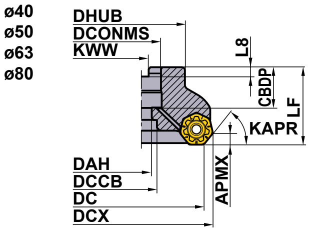


Fig. 2

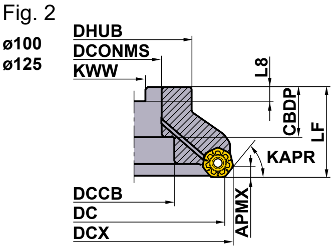
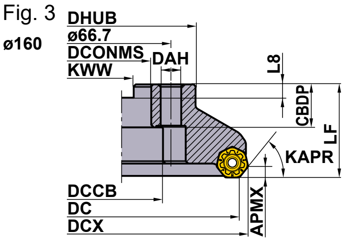


Fig. 3



Right hand tool holder only.

DCONMS (mm)	**DC** (mm)	Order Number	Dimensions(mm)						Fig.
			CBDP	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**	
16	40	**AHX440S-040A03AR**	18	9	14	37	8.4	5.6	1
16	40	**AHX440S-040A04AR**	18	9	14	37	8.4	5.6	1
22	50	**AHX440S-050A04AR**	20	11	17	47	10.4	6.3	1
22	50	**AHX440S-050A05AR**	20	11	17	47	10.4	6.3	1
22	50	**AHX440S-050A06AR**	20	11	17	47	10.4	6.3	1
22	50	**AHX475S-050A04AR**	20	11	17	47	10.4	6.3	5
22	50	**AHX475S-050A05AR**	20	11	17	47	10.4	6.3	5
22	63	**AHX440S-063A05AR**	20	11	17	50	10.4	6.3	1
22	63	**AHX440S-063A06AR**	20	11	17	50	10.4	6.3	1
22	63	**AHX440S-063A08AR**	20	11	17	50	10.4	6.3	1
22	63	**AHX475S-063A05AR**	20	11	17	60	10.4	6.3	5
22	63	**AHX475S-063A06AR**	20	11	17	60	10.4	6.3	5
22	63	**AHX640S-063A04AR**	20	11	17	50	10.4	6.3	1
22	63	**AHX640S-063A05AR**	20	11	17	50	10.4	6.3	1
27	80	**AHX440S-080A06AR**	23	13	20	56	12.4	7	1
27	80	**AHX440S-080A08AR**	23	13	20	56	12.4	7	1
27	80	**AHX440S-080A10AR**	23	13	20	56	12.4	7	1
27	80	**AHX475S-080A06AR**	23	13	20	76	12.4	7	5
27	80	**AHX475S-080A08AR**	23	13	20	76	12.4	7	5
27	80	**AHX640S-080A04AR**	23	13	20	56	12.4	7	1
27	80	**AHX640S-080A06AR**	23	13	20	56	12.4	7	1

Fig. 4

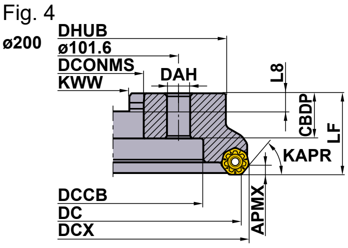
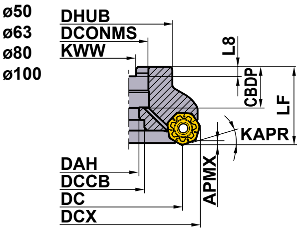
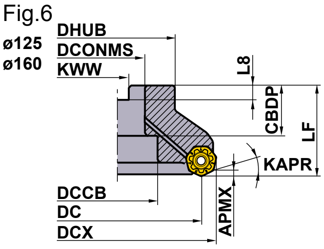


Fig.5



Right hand tool holder only.

Fig.6



DCONMS (mm)	**DC** (mm)	Order Number	Dimensions(mm)						Fig.
			CBDP	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**	
32	100	**AHX440S-100B07AR**	32	–	45	78	14.4	8	2
32	100	**AHX440S-100B10AR**	32	–	45	78	14.4	8	2
32	100	**AHX440S-100B12AR**	32	–	45	78	14.4	8	2
32	100	**AHX475S-100A07AR**	26	17	26	96	14.4	8	5
32	100	**AHX475S-100A09AR**	26	17	26	96	14.4	8	5
32	100	**AHX640S-100B05AR**	32	–	45	78	14.4	8	2
32	100	**AHX640S-100B07AR**	32	–	45	78	14.4	8	2
40	125	**AHX440S-125B08AR**	40	–	56	89	16.4	9	2
40	125	**AHX440S-125B12AR**	40	–	56	89	16.4	9	2
40	125	**AHX440S-125B14AR**	40	–	56	89	16.4	9	2
40	125	**AHX475S-125B08AR**	40	–	56	100	16.4	9	6
40	125	**AHX475S-125B10AR**	40	–	56	100	16.4	9	6
40	125	**AHX640S-125B06AR**	42	–	56	89	16.4	9	2
40	125	**AHX640S-125B08AR**	42	–	56	89	16.4	9	2
40	160	**AHX440S-160C10NR**	40	14	56	100	16.4	9	3
40	160	**AHX440S-160C14NR**	40	14	56	100	16.4	9	3
40	160	**AHX440S-160C16NR**	40	14	56	100	16.4	9	3
40	160	**AHX475S-160B10AR**	40	–	56	100	16.4	9	6
40	160	**AHX475S-160B12AR**	40	–	56	100	16.4	9	6
40	160	**AHX640S-160C07NR**	29	14	56	120	16.4	9	3
40	160	**AHX640S-160C10NR**	29	14	56	120	16.4	9	3
60	200	**AHX640S-200C08NR**	32	18	140	175	25.7	14.22	4
60	200	**AHX640S-200C12NR**	32	18	140	175	25.7	14.22	4

FACE MILLING

<HIGH FEED CUTTING FOR CAST IRON>

50° KAPR F R

AHX640W

P M **K** N S H

Fig.1
ø80

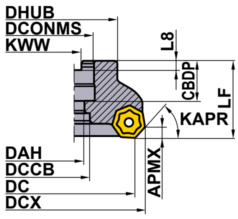


Fig.2
ø100
ø125

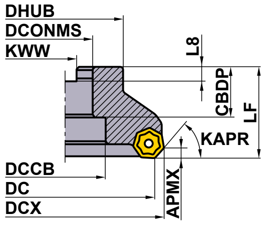


Fig.3
ø160

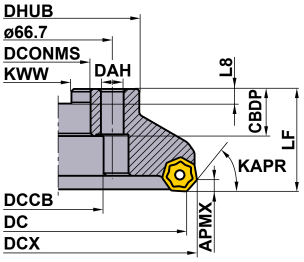


Fig.4
ø200
ø250

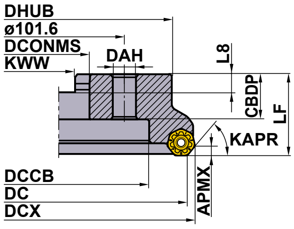
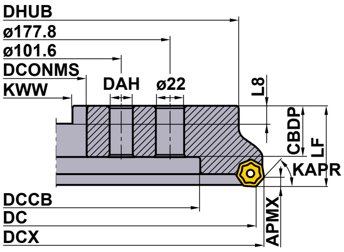


Fig.5
ø315



KAPR : 50°
GAMP: -6° GAMF: -4°

Right hand tool holder shown.

RIGHT HAND TOOL HOLDER

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			Fig.	WT * (kg)	APMX (mm)
					LF	DCX	DCONMS			
80	**AHX640W-080A08R**	●	–	8	50	92.6	27	1	1.5	6
	AHX640W-080A10R	●	–	10	50	92.6	27	1	1.5	6
100	**AHX640W-100B10R**	●	–	10	50	112.6	32	2	2.1	6
	AHX640W-100B14R	●	–	14	50	112.6	32	2	2.1	6
125	**AHX640W-125B12R**	●	–	12	63	137.6	40	2	3.1	6
	AHX640W-125B18R	●	–	18	63	137.6	40	2	3.1	6
160	**AHX640W-160C16R**	●	–	16	63	172.6	40	3	5.6	6
	AHX640W-160C22R	●	–	22	63	172.6	40	3	5.6	6
200	**AHX640W-200C20R**	●	–	20	63	212.6	60	4	8	6
	AHX640W-200C28R	●	–	28	63	212.6	60	4	8	6
250	**AHX640W-250C24R**	●	–	24	63	262.6	60	4	12.6	6
	AHX640W-250C36R	●	–	36	63	262.6	60	4	12.6	6
315	**AHX640W-315C28R**	●	–	28	80	327.6	60	5	31.5	6
	AHX640W-315C44R	●	–	44	80	327.6	60	5	31.5	6

* WT : Tool Weight

LEFT HAND TOOL HOLDER

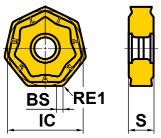
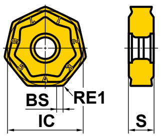
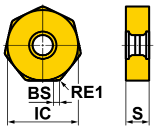
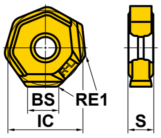
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			Fig.	WT (kg)	APMX (mm)
					LF	DCX	DCONMS			
80	**AHX640W-080A08L**	★	–	8	50	92.6	27	1	1.5	6
	AHX640W-080A10L	★	–	10	50	92.6	27	1	1.5	6
100	**AHX640W-100B10L**	★	–	10	50	112.6	32	2	2.1	6
	AHX640W-100B14L	★	–	14	50	112.6	32	2	2.1	6
125	**AHX640W-125B12L**	★	–	12	63	137.6	40	2	3.1	6
	AHX640W-125B18L	★	–	18	63	137.6	40	2	3.1	6
160	**AHX640W-160C16L**	★	–	16	63	172.6	40	3	5.6	6
	AHX640W-160C22L	★	–	22	63	172.6	40	3	5.6	6
200	**AHX640W-200C20L**	★	–	20	63	212.6	60	4	8.0	6
	AHX640W-200C28L	★	–	28	63	212.6	60	4	8.0	6
250	**AHX640W-250C24L**	★	–	24	63	262.6	60	4	12.6	6
	AHX640W-250C36L	★	–	36	63	262.6	60	4	12.6	6
315	**AHX640W-315C28L**	★	–	28	80	327.6	60	5	31.5	6
	AHX640W-315C44L	★	–	44	80	327.6	60	5	31.5	6

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

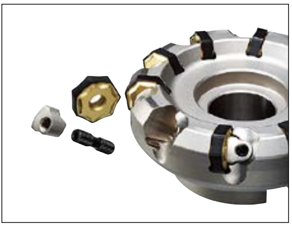
MOUNTING DIMENSION ➤ K051
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

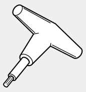
Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
Honing : E : Round

Material	K Cast Iron			●	◐	●	✤						
Shape	Order Number	Class	Honing	Coated				Dimensions(mm)					Geometry
				NEW XC5010	MC5020	VP15TF	VP20RT	IC	RE1	BS	S	APMX	
 General Cutting	**NNMU200608ZEN-MK**	M	E	●	●	★	★	20	0.8	1.0	6.55	6	
 Strong Cutting Edge Type	**NNMU200608ZEN-HK**	M	E		●	★	★	20	0.8	1.0	6.55	6	
NEW  Unstable Cutting	**NNMQ200708ZEN-FT**	M	E	●				20	0.8	1.0	6.55	6	
 Wiper	**WNEU2006ZEN7C-WK**	E	E		●			20	0.8	7.4	6.55	0.5	

● = NEW



SPARE PARTS

Tool Holder Number	 Wedge	 Clamp Screw *	 Wrench
AHX640W	CWAHX640WN	LS0622T	TKY15T

* Clamp Torque (N • m) : LS0622T=6.0

RECOMMENDED CUTTING CONDITIONS

■Dry·Wet Cutting

Material		Tensile Strength	Grade	Vc (m/min)	fz (mm/t.)
K	Gray Cast Iron	≤350MPa	**XC5010**	800 (500–1000)	0.1 (0.1–0.3)
			MC5020	220 (150–300)	0.3 (0.2–0.4)
			VP15TF **VP20RT**	180 (130–250)	0.3 (0.2–0.4)
	Ductile Cast Iron	≤450MPa	**XC5010**	800 (500–1000)	0.1 (0.1–0.3)
			MC5020	200 (150–250)	0.2 (0.1–0.3)
			VP15TF **VP20RT**	170 (120–220)	0.2 (0.1–0.3)
		≤800MPa	**XC5010**	800 (500–1000)	0.1 (0.1–0.3)
			MC5020	170 (150–200)	0.2 (0.1–0.3)
			VP15TF **VP20RT**	140 (100–180)	0.2 (0.1–0.3)

* Please use 2-3 pcs of Wiper inserts in case of 'over 6mm/rev'.

■Finishing (When using wiper insert)

Material		Grade	ap (mm)	Vc (m/min)	fz (mm/t.)
K	Gray Cast Iron	**MC5020**	<0.5	320 (250–400)	0.2 (0.1–0.3)
			0.5–3	270 (200–350)	
	Ductile Cast Iron		<0.5	270 (200–350)	
			0.5–3	220 (200–250)	

Note 1) With reference to the above examples, adjust the cutting conditions according to the use environment.
Note 2) Tool life when wet cutting is short compared to dry cutting.

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

AHX640W MOUNTING DIMENSIONS

Fig.1

ø80

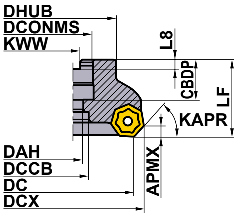


Fig.2

ø100
ø125

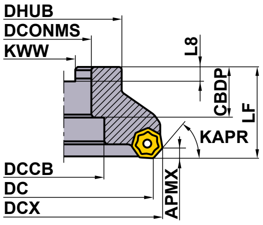


Fig.3

ø160

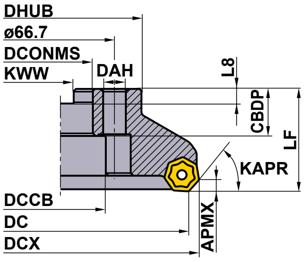


Fig.4

ø200
ø250

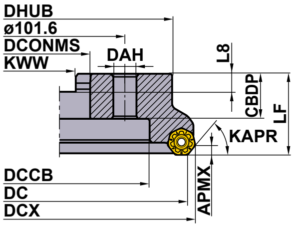
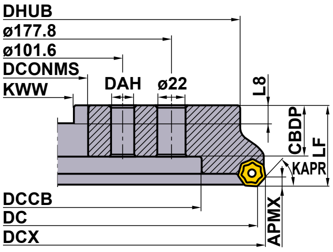


Fig.5

ø315



Right hand tool holder shown.

DCONMS (mm)	**DC** (mm)	Order Number	Dimensions(mm)						Fig.
			CBDP	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**	
27	80	**AHX640W-080A08L**	23	13	20	56	12.4	7	1
27	80	**AHX640W-080A08R**	23	13	20	56	12.4	7	1
27	80	**AHX640W-080A10L**	23	13	20	56	12.4	7	1
27	80	**AHX640W-080A10R**	23	13	20	56	12.4	7	1
32	100	**AHX640W-100B10L**	32	—	45	70	14.4	8	2
32	100	**AHX640W-100B10R**	32	—	45	70	14.4	8	2
32	100	**AHX640W-100B14L**	32	—	45	70	14.4	8	2
32	100	**AHX640W-100B14R**	32	—	45	70	14.4	8	2
40	125	**AHX640W-125B12L**	32	—	56	80	16.4	9	2
40	125	**AHX640W-125B12R**	32	—	56	80	16.4	9	2
40	125	**AHX640W-125B18L**	32	—	56	80	16.4	9	2
40	125	**AHX640W-125B18R**	32	—	56	80	16.4	9	2
40	160	**AHX640W-160C16L**	29	14	56	100	16.4	9	3
40	160	**AHX640W-160C16R**	29	14	56	100	16.4	9	3
40	160	**AHX640W-160C22L**	29	14	56	100	16.4	9	3
40	160	**AHX640W-160C22R**	29	14	56	100	16.4	9	3
60	200	**AHX640W-200C20L**	32	18	135	155	25.7	14.22	4
60	200	**AHX640W-200C20R**	32	18	135	155	25.7	14.22	4
60	200	**AHX640W-200C28L**	32	18	135	155	25.7	14.22	4
60	200	**AHX640W-200C28R**	32	18	135	155	25.7	14.22	4
60	250	**AHX640W-250C24L**	32	18	180	200	25.7	14.22	4
60	250	**AHX640W-250C24R**	32	18	180	200	25.7	14.22	4
60	250	**AHX640W-250C36L**	32	18	180	200	25.7	14.22	4
60	250	**AHX640W-250C36R**	32	18	180	200	25.7	14.22	4
60	315	**AHX640W-315C28L**	57	18	225	285	25.7	14.22	5
60	315	**AHX640W-315C28R**	57	18	225	285	25.7	14.22	5
60	315	**AHX640W-315C44L**	57	18	225	285	25.7	14.22	5
60	315	**AHX640W-315C44R**	57	18	225	285	25.7	14.22	5

FACE MILLING

<HIGH EFFICIENCY CUTTING FOR CAST IRON>

84° KAPR

WSF406W

NEW

P M **K** N S H

Fig.1

ø80

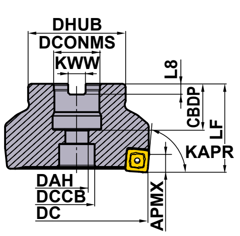


Fig.2

ø100
ø125
ø160

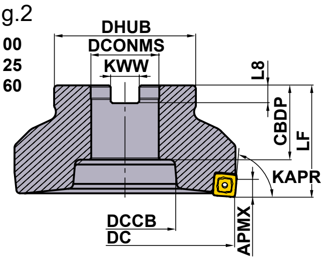
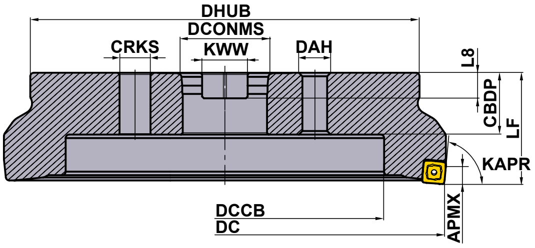


Fig.3

ø200
ø250



Right hand tool holder only.

ARBOR TYPE

KAPR : 84°

DCONMS = inch size

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)		WT* (kg)	APMX (mm)	RPMX (min-1)	Fig.
		R			LF	DCONMS				
80	**WSF406WR08006CN**	★	–	6	50	25.4	1.2	7.0	7,800	1
80	**WSF406WR08009CN**	★	–	9	50	25.4	1.2	7.0	7,800	1
100	**WSF406WR10008DN**	★	–	8	50	31.75	1.7	7.0	7,000	2
100	**WSF406WR10012DN**	★	–	12	50	31.75	1.7	7.0	7,000	2
125	**WSF406WR12510EN**	★	–	10	63	38.1	3.3	7.0	6,250	2
125	**WSF406WR12516EN**	★	–	16	63	38.1	3.2	7.0	6,250	2
160	**WSF406WR16014FN**	★	–	14	63	50.8	5	7.0	5,500	2
160	**WSF406WR16020FN**	★	–	20	63	50.8	4.9	7.0	5,500	2
200	**WSF406WR20016KN**	★	–	16	63	47.625	8.6	7.0	4,900	3
200	**WSF406WR20024KN**	★	–	24	63	47.625	8.5	7.0	4,900	3
250	**WSF406WR25022KN**	★	–	22	63	47.625	14	7.0	4,400	3
250	**WSF406WR25032KN**	★	–	32	63	47.625	13.9	7.0	4,400	3

Note 1) A set bolt for the arbor is not supplied with the body. Please refer to page K053 to find the correct type of set bolt to order.

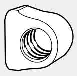
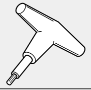
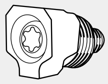
* WT : Tool Weight

MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions (mm)								Fig.
		DCONMS	CBDP	DAH	DCCB	CRKS	DHUB	KWW	L8	
80	**WSF406WR080**	25.4	34	13	20	–	55	9.5	6	1
100	**WSF406WR100**	31.75	32	–	46	–	70	12.7	8	2
125	**WSF406WR125**	38.1	42	–	56	–	80	15.9	10	2
160	**WSF406WR160**	50.8	45	–	80	–	100	19.1	11	2
200	**WSF406WR200**	47.625	35	18	140	M16	175	25.4	14.22	3
250	**WSF406WR250**	47.625	35	18	180	M16	220	25.4	14.22	3

★ : Inventory maintained in Japan.

SPARE PARTS

Tool Holder Type	 Wedge	 * Clamp Screw	 Wrench	 Adjustable Run-Out System
WSF406W	CWSF406N	LS0622T	TKY15T	ADW04

* Clamp Torque (N • m) : LS0622T = 6.0

■ Parts Sold Separately
Set Bolt

Tool Holder Type	Set Bolt	Fig.	Reference Dimensions (mm)							Geometry
	Order Number		a	b	c	d	e	f	g	
WSF406WR080	HSC12035	1	18	M12x1.75	47	12	10	–	–	
WSF406WR100	–	2	40	M16x2	43	10	14	6	23	
WSF406WR125	–	2	50	M20x2.5	54	14	17	6	27	
WSF406WR160	–	2	65	M24x3	59	14	17	10	37	
WSF406WR200	–	1	24	M16x2	61-	16	14	–	–	
WSF406WR250	–	1	24	M16x2	61-	16	14	–	–	

Fig.1

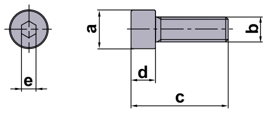
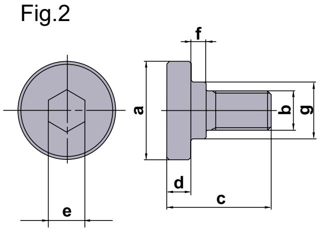


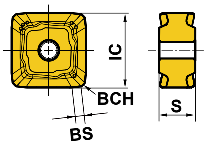
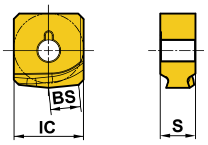
Fig.2



Note 1) Please purchase the appropriate set bolt after confirming the reference dimensions. The items with an order number listed under the Set Bolt columns are also sold by MITSUBISHI MATERIALS.

INSERTS

Material			MV1020	MV1030	MC520	MC5020	
Material	**K**	Cast Irons	◐	◐	◐	◐	**Cutting Conditions (Guide) :** ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting **Honing : E :** Round

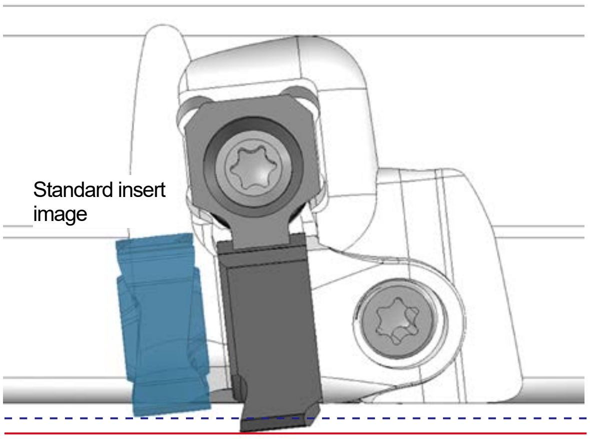
Shape	Order Number	Class	Honing	Coated NEW MV1020	 NEW MV1030	 MC520	 MC5020	Dimensions (mm) IC	 S	 BS	 BCH	Geometry
NEW 	**SNMU1206C05ZNER-M**	M	E	●	●	★	★	12.7	6.2	1.6	0.5	
NEW  Wiper	**WNGU1206ZNER5C-M**	G	E			★		12.3	6.2	5.2	–	

● ★ = NEW

How to Use Wiper Insert for Best Results

- ●The WSF406W can obtain a good surface finish when using a standard insert due to the adjustable run-out system, but by using a wiper insert an excellent surface finish can be achieved without having to set a high accuracy face run out.
  When a wiper insert is mounted, aim to set the standard insert run out accuracy to within 0.04mm.
- ●Just one wiper insert is enough to achieve excellent finished surfaces.
  However, if the feed per revolution is greater than 5.0mm/rev, attach two or more wiper inserts so that they are evenly spaced in the cutter body and set the run out accuracy between multiple wiper inserts to within 0.003mm before use.

By figure image



Please set the wiper insert to protrude by up to 0.07 mm.

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

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

RECOMMENDED CUTTING CONDITIONS

■ Dry cutting

(mm)

	Material	Properties	Cutting Conditions	Depth of Cut **ap**	Insert		Cutting Speed **Vc** (m/min)	Feed per Tooth **fz** (mm/t.)	Width of Cut **ae**
					1st Recommended	2nd Recommended			
K	Gray Cast Irons	Tensile Strength ≤350MPa	●	ap≤0.5mm	MC520	MV1020	300 (250–300)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MC520	MV1020	250 (210–300)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MC520	MV1020	220 (190–260)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MC520	MV1020	200 (180–230)	0.10 (0.08–0.15)	≤0.8DC
			◐	ap≤0.5mm	MC520	MV1020	250 (210–300)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MC520	MV1020	220 (190–260)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MC520	MV1020	200 (180–230)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MC520	MV1020	180 (160–210)	0.10 (0.08–0.15)	≤0.8DC
			✣	ap≤0.5mm	MC520	MV1020	220 (190–260)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MC520	MV1020	200 (180–230)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MC520	MV1020	180 (160–210)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MC520	MV1020	150 (100–180)	0.10 (0.08–0.15)	≤0.8DC
	Ductile Cast Irons	Tensile Strength ≤450MPa	●	ap≤0.5mm	MV1020	MC520	230 (200–250)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MV1020	MC520	200 (170–230)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MV1020	MC520	180 (150–210)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MV1020	MC520	160 (130–190)	0.10 (0.08–0.15)	≤0.8DC
			◐	ap≤0.5mm	MV1020	MC520	200 (170–230)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MV1020	MC520	180 (150–210)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MV1020	MC520	160 (130–190)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MV1020	MC520	140 (110–170)	0.10 (0.08–0.15)	≤0.8DC
			✣	ap≤0.5mm	MV1020	MC520	180 (150–200)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MV1020	MC520	160 (130–190)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MV1020	MC520	140 (110–170)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MV1020	MC520	120 (90–150)	0.10 (0.08–0.15)	≤0.8DC
	Ductile Cast Irons	Tensile Strength ≤800MPa	●	ap≤0.5mm	MV1020	MC520	230 (200–250)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MV1020	MC520	200 (170–230)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MV1020	MC520	180 (150–210)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MV1020	MC520	160 (130–190)	0.10 (0.08–0.15)	≤0.8DC
			◐	ap≤0.5mm	MV1020	MC520	200 (170–230)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MV1020	MC520	180 (150–210)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MV1020	MC520	160 (130–190)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MV1020	MC520	140 (110–170)	0.10 (0.08–0.15)	≤0.8DC
			✣	ap≤0.5mm	MV1020	MC520	180 (150–210)	0.13 (0.08–0.20)	≤0.8DC
				ap≤2.0mm	MV1020	MC520	160 (130–190)	0.15 (0.10–0.25)	≤0.8DC
				2.0mm<ap≤4.0mm	MV1020	MC520	140 (110–170)	0.13 (0.10–0.20)	≤0.8DC
				4.0mm< ap≤7.5mm	MV1020	MC520	120 (90–150)	0.10 (0.08–0.15)	≤0.8DC

Note 1) Refer to the table above for more details on how to set the cutting conditions according the usage.
Note 2) When using a wiper insert, the cutting conditions for finishing are ap≤0.5mm.

FACE MILLING

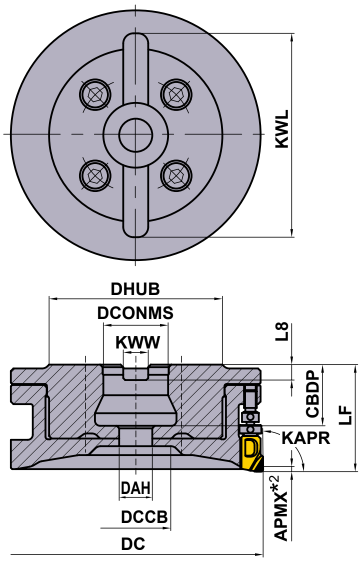
<HIGH FEED FINISHING>

FMAX

P M **K** **N** S H

For Compact and Smaller Machining Centre

Fig.1
ø100
ø125



Right hand tool holder only.

■ARBOR TYPE

KAPR: 90°
GAMP: PCD Grade +5° CBN Grade 0° GAMF: 0°

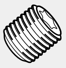
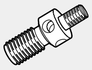
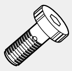
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)		WT*1 (kg)	RPMX (min-1)	Fig.
					LF	DCONMS			
100	**FMAXR10010CLW**	★	●	10	42	25.4	1.06	22000	1
100	**FMAXR10016CLW**	★	●	16	42	25.4	1.11	22000	1
125	**FMAXR12514CLW**	★	●	14	42	25.4	1.44	19600	1
125	**FMAXR12520CLW**	★	●	20	42	25.4	1.48	19600	1

*1 WT : Tool Weight
*2 For the maximum depth of cut (**APMX**), please refer to recommended cutting conditions (**ap**).
Note 1) The maximum depth of cut should be 2mm or less for ultra high efficiency machining with table feed (**Vf** ≥ 20000mm/min).
Note 2) Rake angle axial **GAMP** varies depending on the insert grade.

MOUNTING DIMENSIONS

DCONMS (mm)	DC (mm)	Order Number	Dimensions (mm)							Fig.
			CBDP	DAH	DCCB	DHUB	KWW	L8	KWL	
25.4	100	**FMAXR10010CLW**	24	13	27	68	9.5	6	80	1
25.4	100	**FMAXR10016CLW**	24	13	27	68	9.5	6	80	1
25.4	125	**FMAXR12514CLW**	24	13	52	68	9.5	6	80	1
25.4	125	**FMAXR12520CLW**	24	13	52	68	9.5	6	80	1

SPARE PARTS

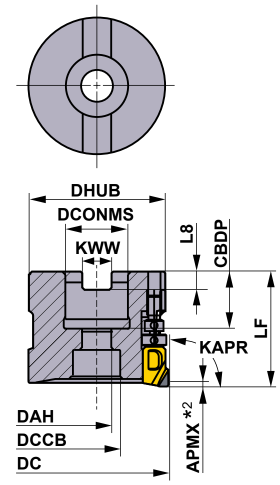
Insert Clamp Screw *	Micro Adjustment Nut	Large Adjustment Screw	Cutter Set Bolt	Wrench T10	Wrench ø2.5
					
TSS04505S	KSN3	KSS2	HSCX12030H	TKY10T	RKY25S

* Clamp Torque (N • m) : TSS04505S = 3.5
Note 1) Please refer to the instruction manual included with the cutter body for how to locate the insert and adjust the run out and the balance.

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

FMAX-40/50/63

Fig.1
ø40
ø50
ø63



Right hand tool holder only.

■ARBOR TYPE

KAPR: 90°
GAMP: PCD Grade +5° CBN Grade 0°   GAMF: -6°— -3°

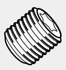
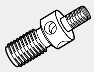
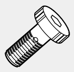
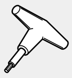
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)		WT *1 (kg)	RPMX (min-1)	Fig.
					LF	DCONMS			
40	**FMAX-040A04R**	★	●	4	40	16	0.24	30000	1
40	**FMAX-040A06R**	★	●	6	40	16	0.23	30000	1
50	**FMAX-050A08R**	★	●	8	40	22	0.37	30000	1
50	**FMAX-050A10R**	●	●	10	40	22	0.35	30000	1
63	**FMAX-063A10R**	★	●	10	40	22	0.67	27000	1
63	**FMAX-063A12R**	●	●	12	40	22	0.66	27000	1

*1 WT : Tool Weight
*2 For the maximum depth of cut (**APMX**), please refer to recommended cutting conditions (**ap**).
Note 1) The maximum depth of cut for should be 2mm or less for ultra high efficiency machining with table feed (**Vf** ≥ 20000mm/min).
Note 2) Rake angle axial **GAMP** varies depending on the insert grade.

MOUNTING DIMENSIONS

DCONMS (mm)	DC (mm)	Order Number	Dimensions (mm)							Fig.
			CBDP	DAH	DCCB	DHUB	KWW	L8	KWL	
16	40	**FMAX-040A04R**	18	9	14	37	8.4	5.6	—	1
16	40	**FMAX-040A06R**	18	9	14	37	8.4	5.6	—	1
22	50	**FMAX-050A08R**	20	11	17	47	10.4	6.3	—	1
22	50	**FMAX-050A10R**	20	11	17	47	10.4	6.3	—	1
22	63	**FMAX-063A10R**	20	11	17	60	10.4	6.3	—	1
22	63	**FMAX-063A12R**	20	11	17	60	10.4	6.3	—	1

SPARE PARTS

DC	Tool Holder Type	Insert Clamp Screw *	Micro Adjustment Nut	Large Adjustment Screw	Cutter Set Bolt	Wrench T10	Wrench ø2.5
							
40	**FMAX-040**	TSS04505S	KSN3	KSS2	HSC08030H	TKY10T	RKY25S
50	**FMAX-050**	TSS04505S	KSN3	KSS2	HSC10030H	TKY10T	RKY25S
63	**FMAX-063**	TSS04505S	KSN3	KSS2	HSC10030H	TKY10T	RKY25S

* Clamp Torque (N • m) : TSS04505S = 3.5
Note 1) Please refer to the instruction manual included in the cutter body for how to locate the insert and adjust the run out and the balance.

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

FMAX

Fig.1
ø80

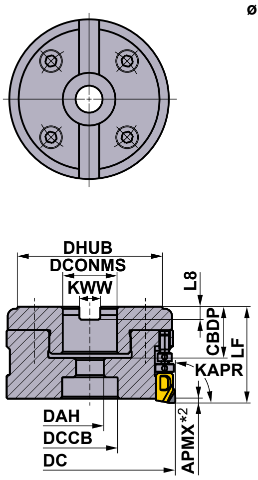
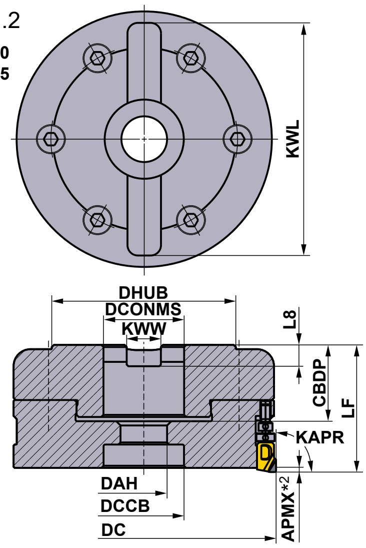


Fig.2
ø100
ø125



Right hand tool holder only.

■ARBOR TYPE

KAPR: 90°
GAMP: PCD Grade +5° CBN Grade 0°   GAMF: 0°

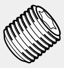
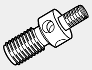
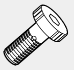
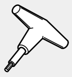
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)		WT*1 (kg)	RPMX (min^{-1})	Fig.
					LF	DCONMS			
80	**FMAX-080B14R**	●	●	14	45	27	1.08	24500	1
100	**FMAX-100B18R**	●	●	18	50	32	1.81	22000	2
125	**FMAX-125B24R**	●	●	24	60	40	3.26	19600	2

*1 WT : Tool Weight
*2 For the maximum depth of cut (**APMX**), please refer to recommended cutting conditions (**ap**).
Note 1) The maximum depth of cut for should be 2 mm or less for ultra high efficiency machining with table feed (**Vf** ≥ 20000 mm/min).
Note 2) Rake angle axial **GAMP** varies depending on the insert grade.

MOUNTING DIMENSIONS

DCONMS (mm)	DC (mm)	Order Number	Dimensions (mm)							Fig.
			CBDP	DAH	DCCB	DHUB	KWW	L8	KWL	
27	80	**FMAX-080B14R**	24	13	26	68	12.4	7	—	1
32	100	**FMAX-100B18R**	32	17	32	79	14.4	8	90	2
40	125	**FMAX-125B24R**	36	22	38	88	16.4	9	112	2

SPARE PARTS

DC	Tool Holder Type	Insert Clamp Screw *	Micro Adjustment Nut	Large Adjustment Screw	Cutter Set Bolt	Wrench T10	Wrench ø2.5
							
80	**FMAX-080**	TSS04505S	KSN3	KSS2	HSCX12030H	TKY10T	RKY25S
100	**FMAX-100**	TSS04505S	KSN3	KSS2	HSCX16035H	TKY10T	RKY25S
125	**FMAX-125**	TSS04505S	KSN3	KSS2	HSCX20035H	TKY10T	RKY25S

* Clamp Torque (N • m) : TSS04505S = 3.5
Note 1) Please refer to the instruction manual included with the cutter body for how to locate the insert and adjust the run out and the balance.

● : Inventory maintained.

FACE MILLING
<FOR LOW RIGIDITY CONDITIONS>

90° KAPR F

FMAX-MB Coarse Pitch Type

NEW

P M **K** **N** S H

Fig.1
ø50
ø63

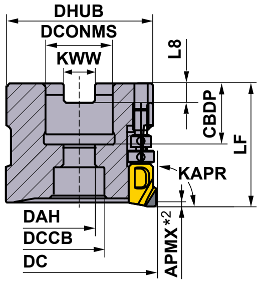
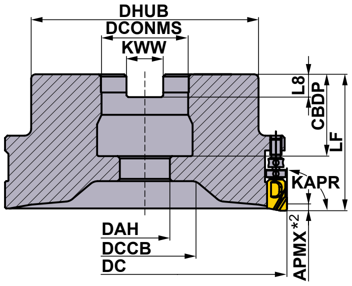


Fig.2
ø80
ø100
ø125



Right hand tool holder only.

■ARBOR TYPE

DCONMS = mm size

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)		WT *1 (kg)	RPMX (min^{-1})	Fig.
					LF	DCONMS			
50	**FMAX-050A04R**	●	●	4	40	22	0.38	30000	1
63	**FMAX-063A04R**	●	●	4	40	22	0.70	30000	1
80	**FMAX-080B04RMB**	●	●	4	45	27	1.12	24500	2
100	**FMAX-100B04RMB**	●	●	4	50	32	2.00	22000	2
125	**FMAX-125B06RMB**	●	●	6	60	40	3.81	19600	2

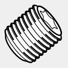
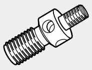
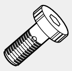
*1 WT : Tool Weight

*2 For the maximum depth of cut (**APMX**), please refer to the recommended cutting conditions (**ap**).

MOUNTING DIMENSIONS

DCONMS (mm)	DC (mm)	Order Number	Dimensions (mm)						Fig.
			CBDP	DAH	DCCB	DHUB	KWW	L8	
22	50	**FMAX-050A04R**	20	11	17	47	10.4	6.3	1
22	63	**FMAX-063A04R**	20	11	17	60	10.4	6.3	1
27	80	**FMAX-080B04RMB**	24	13	30	55	12.4	7	2
32	100	**FMAX-100B04RMB**	32	17	39	75	14.4	8	2
40	125	**FMAX-125B06RMB**	36	22	45	100	16.4	9	2

SPARE PARTS

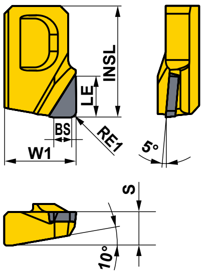
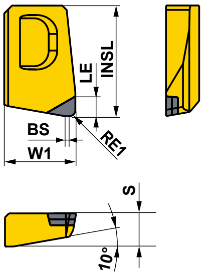
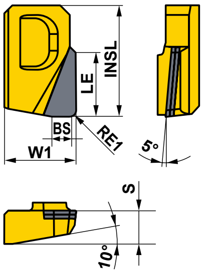
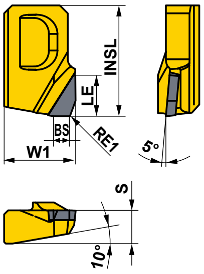
DC	Tool Holder Type	Insert Clamp Screw *	Micro Adjustment Screw	Large Adjustment Screw	Cuter Clamp Bolt	Wrench T10	Wrench 2.5
							
50	**FMAX-050**	TSS04505S	KSN3	KSS2	HSC10030H	TKY10T	RKY25S
63	**FMAX-063**	TSS04505S	KSN3	KSS2	HSC10030H	TKY10T	RKY25S
80	**FMAX-080**	TSS04505S	KSN3	KSS2	HSCX12030H	TKY10T	RKY25S
100	**FMAX-100**	TSS04505S	KSN3	KSS2	HSCX16035H	TKY10T	RKY25S
125	**FMAX-125**	TSS04505S	KSN3	KSS2	HSCX20035H	TKY10T	RKY25S

* Clamp Torque (N • m) : TSS04505S = 3.5

Note 1) Please refer to the instruction manual included with the cutter body for how to locate the insert and adjust the run-out and the balance.

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

Material		MD220	MD2030	MB4120	**Cutting Conditions (Guide) :** ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting						
	K Cast Iron			◐							
	N Non-ferrous Metal	◐	◐								
Shape	Order Number	MD220	MD2030	MB4120	Dimensions (mm)						Geometry
					INSL	LE	W1	S	BS	RE1	
For Aluminium Alloys	**GOER1404PXFR2**	●	●		14.0	5.0	9.0	4.2	2.0	0.4	
 General Purpose	**GOER1408PXFR2**	●	●		14.0	5.0	9.0	4.2	2.0	0.8	
For Gray Cast Irons	**NP-GOEN1404PXSR05**			★	14.0	2.5	9.0	4.2	0.5	0.4	
 General Purpose	**NP-GOEN1408PXSR05**			★	14.0	2.5	9.0	4.2	0.5	0.8	
For Aluminium Alloys  Long Edge	**GOER1408PXFR2-8**	★			14.0	8.0	9.0	4.2	2.0	0.8	
For Aluminium Alloys  Burr Prevention	**GOER1401ZXFR2**	●			14.0	5.0	9.0	4.2	2.0	0.1	

For Aluminium Alloys: Sharp Edge
For Gray Cast Irons: Chamferd and Rounded (0.13mmx15°+R0.01)

Note 1) If general purpose inserts (RE = 0.4mm, 0.8mm), burr prevention inserts and long edge inserts are used together, they will not be able to sufficiently display their full performance. Inserts of the same shape should be used according to the application.
Note 2) The cutting diameter will change depending on the shape. Be particularly careful when cutting near vertical walls, since there is a possibility of interference with the holder.

● : Inventory maintained. ★ : Inventory maintained in Japan.
(CBN and PCD inserts are available in 1 piece in one case)

RECOMMENDED CUTTING CONDITIONS

Material		Properties	Grade	**Vc** (m/min)	**ae** (mm)	**ap** (mm)	**fz** (mm/t.)	Cutting Mode
K	Gray Cast Irons	Tensile Strength ≤350MPa	**MB4120**	1000 (700—1300)	≤ 0.8 DC	≤ 0.5	0.07 (0.05—0.15)	Dry Cutting
N	Aluminium Alloys	Si < 5%	**MD2030** **MD220**	2500 (2000—3000)	≤ 0.2 DC	≤ 3.0 (0.5—3.0)	0.08 (0.05—0.2)	Wet Cutting
					≤ 0.5 DC	≤ 2.5 (0.5—2.5)		
					≤ 0.8 DC	≤ 2.0 (0.5—2.0)		
		5% ≤ Si ≤ 10%	**MD2030** **MD220**	2500 (2000—3000)	≤ 0.2 DC	≤ 3.0 (0.5—3.0)	0.08 (0.05—0.2)	Wet Cutting
					≤ 0.5 DC	≤ 2.5 (0.5—2.5)		
					≤ 0.8 DC	≤ 2.0 (0.5—2.0)		
		10% < Si < 15%	**MD220** **MD2030**	600 (400—800)	≤ 0.2 DC	≤ 3.0 (0.5—3.0)	0.08 (0.05—0.2)	Wet Cutting
					≤ 0.5 DC	≤ 2.5 (0.5—2.5)		
					≤ 0.8 DC	≤ 2.0 (0.5—2.0)		
		Si ≥ 15%	**MD220** **MD2030**	600 (400—800)	≤ 0.2 DC	≤ 3.0 (0.5—3.0)	0.08 (0.05—0.2)	Wet Cutting
					≤ 0.5 DC	≤ 2.5 (0.5—2.5)		
					≤ 0.8 DC	≤ 2.0 (0.5—2.0)		

Note 1) Please adjust the depth of cut depending on the width of cut.
Note 2) When using the long edge insert, please select the conditions depending on depths of cut (ap) excluding the length of the gate.

SHOULDER MILLING

<GENERAL CUTTING>

90° KAPR F R

WWX200

NEW

P M K N S H

Fig.1

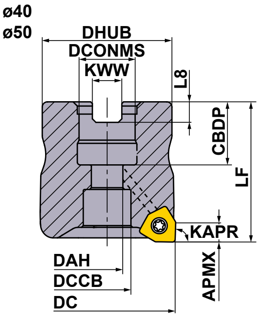
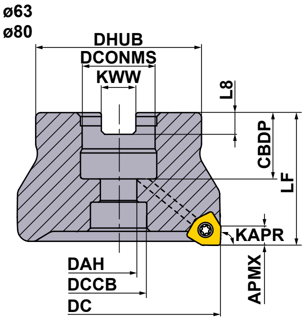


Fig.2



Right hand tool holder only.

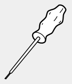
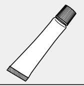
■ARBOR TYPE

DCONMS = mm size

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)		WT* (kg)	APMX (mm)	RPMX (min^{-1})	Fig.
		R			LF	DCONMS				
40	**WWX200-040A03AR**	●	●	3	40	16	0.2	5.0	21600	1
40	**WWX200-040A04AR**	●	●	4	40	16	0.2	5.0	21600	1
50	**WWX200-050A04AR**	●	●	4	40	22	0.4	5.0	18600	1
50	**WWX200-050A05AR**	●	●	5	40	22	0.4	5.0	18600	1
50	**WWX200-050A06AR**	●	●	6	40	22	0.3	5.0	18600	1
63	**WWX200-063A05AR**	●	●	5	40	22	0.5	5.0	16000	2
63	**WWX200-063A06AR**	●	●	6	40	22	0.5	5.0	16000	2
63	**WWX200-063A07AR**	●	●	7	40	22	0.5	5.0	16000	2
80	**WWX200-080A05AR**	●	●	5	50	27	1.1	5.0	13600	2
80	**WWX200-080A07AR**	●	●	7	50	27	1.0	5.0	13600	2
80	**WWX200-080A09AR**	●	●	9	50	27	1.0	5.0	13600	2
100	**WWX200-100B06AR**	●	●	6	50	32	1.7	5.0	11700	3
100	**WWX200-100B08AR**	●	●	8	50	32	1.7	5.0	11700	3
100	**WWX200-100B11AR**	●	●	11	50	32	1.7	5.0	11700	3
125	**WWX200-125B07AR**	●	●	7	63	40	3.1	5.0	10100	3
125	**WWX200-125B11AR**	●	●	11	63	40	3.0	5.0	10100	3
125	**WWX200-125B14AR**	●	●	14	63	40	3.0	5.0	10100	3
160	**WWX200-160C09NR**	●	–	9	63	40	4.6	5.0	8600	4
160	**WWX200-160C12NR**	●	–	12	63	40	4.6	5.0	8600	4
160	**WWX200-160C16NR**	●	–	16	63	40	4.6	5.0	8600	4

Note 1) A set bolt to the arbor is not supplied with the body. Please refer to page K064, when ordering.
Note 2) Please use a set bolt of the FMC type on the cutter body from 40 to 100 in diameter (DC).
Note 3) Please use a set bolt of the FMA type on the cutter body from 125 to 160 in diameter (DC).
∗ WT : Tool Weight

SPARE PARTS

Tool Holder Type	 *		
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX200	TPS3R	TIP10D	MK1KS

∗ Clamp Torque (N • m) : TPS3R = 2.0

● : Inventory maintained.

Fig.3

ø100
ø125
ø160

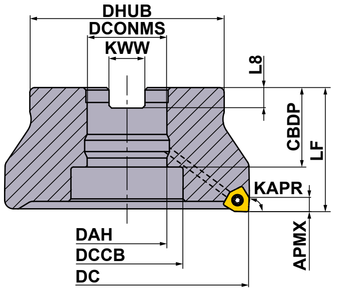
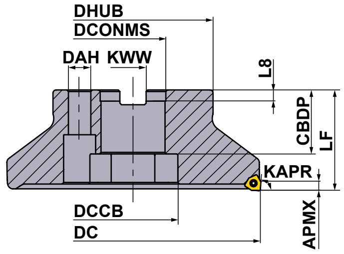


Fig.4

ø160

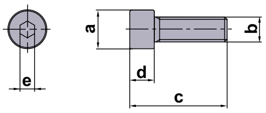
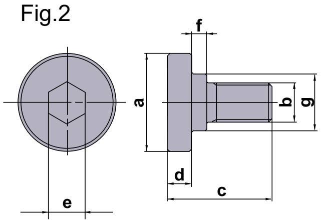


Right hand tool holder only.

MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions (mm)							Fig.
		DCONMS	**CBDP**	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**	
40	**WWX200-040A03AR**	16	18	9	13.6	37	8.4	5.6	1
40	**WWX200-040A04AR**	16	18	9	13.6	37	8.4	5.6	1
50	**WWX200-050A04AR**	22	20	11	17	47	10.4	6.3	1
50	**WWX200-050A05AR**	22	20	11	17	47	10.4	6.3	1
50	**WWX200-050A06AR**	22	20	11	17	47	10.4	6.3	1
63	**WWX200-063A05AR**	22	20	11	17	50	10.4	6.3	2
63	**WWX200-063A06AR**	22	20	11	17	50	10.4	6.3	2
63	**WWX200-063A07AR**	22	20	11	17	50	10.4	6.3	2
80	**WWX200-080A05AR**	27	23	13	20	56	12.4	7	2
80	**WWX200-080A07AR**	27	23	13	20	56	12.4	7	2
80	**WWX200-080A09AR**	27	23	13	20	56	12.4	7	2
100	**WWX200-100B06AR**	32	26	32	45	78	14.4	8	3
100	**WWX200-100B08AR**	32	26	32	45	78	14.4	8	3
100	**WWX200-100B11AR**	32	26	32	45	78	14.4	8	3
125	**WWX200-125B07AR**	40	35	42	56	89	16.4	9	3
125	**WWX200-125B11AR**	40	35	42	56	89	16.4	9	3
125	**WWX200-125B14AR**	40	35	42	56	89	16.4	9	3
160	**WWX200-160C09NR**	40	40	–	56	100	16.4	9	4
160	**WWX200-160C12NR**	40	40	–	56	100	16.4	9	4
160	**WWX200-160C16NR**	40	40	–	56	100	16.4	9	4

Parts Sold Separately
Set Bolt

Tool Holder Type	Set Bolt		Fig.	Reference Dimensions (mm)							Geometry
	With Coolant Hole	Without Coolant Hole									
	Order Number	Order Number		a	b	c	d	e	f	g	
WWX200-040A○○AR	HSC08025H	–	1	13	M8x1.25	33	8	5	–	–	Fig.1  Fig.2 
WWX200-050A○○AR	HSC10030H	HSC10035	1	16	M10x1.5	40(45)	10	6	–	–	
WWX200-063A○○AR	HSC10030H	HSC10035	1	16	M10x1.5	40(45)	10	6	–	–	
WWX200-080A○○AR	HSC12035H	HSC12035	1	18	M12x1.75	47	12	10	–	–	
WWX200-100B○○AR	MBA16033H	–	2	40	M16x2	43	10	14	6	23	
WWX200-125B○○AR	MBA20040H	–	2	50	M20x2.5	54	14	17	6	27	
WWX200-160C○○NR	No Coolant Hole	–	2	50	M20x2.5	54	14	17	6	27	

Note 1) Please purchase the appropriate set bolt after confirming the reference dimensions. The items with an order number listed under the Set Bolt columns are also sold by MITSUBISHI MATERIALS.

Note 2) Internal coolant is necessary with the set bolt.

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

Fig.1

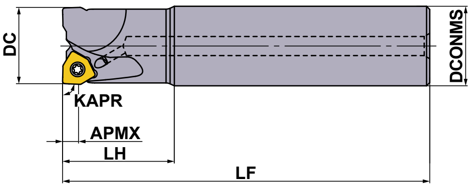
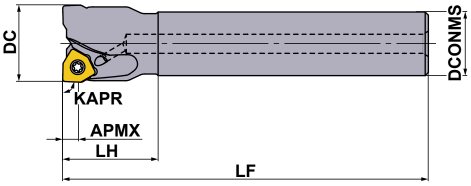


Fig.2



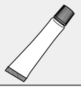
Right hand tool holder only.

■SHANK TYPE

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			WT* (kg)	APMX (mm)	RPMX (min^{-1})	Fig.
		R			LF	DCONMS	LH				
25	**WWX200R2502SA20S**	●	●	2	115	20	30	0.3	5	29600	2
25	**WWX200R2502SA25S**	●	●	2	115	25	35	0.4	5	29600	1
25	**WWX200R2502SA25L**	●	●	2	170	25	70	0.6	5	29600	1
28	**WWX200R2802SA25S**	●	●	2	115	25	35	0.4	5	27400	2
28	**WWX200R2802SA25L**	●	●	2	170	25	35	0.6	5	27400	2
30	**WWX200R3002SA25S**	●	●	2	125	25	35	0.5	5	26200	2
32	**WWX200R3202SA32S**	●	●	2	125	32	45	0.7	5	26200	1
32	**WWX200R3203SA32S**	●	●	3	125	32	45	0.7	5	26200	1
32	**WWX200R3203SA32L**	●	●	3	190	32	90	1.0	5	26200	1
35	**WWX200R3503SA32L**	●	●	3	190	32	45	1.1	5	25100	2
40	**WWX200R4003SA32S**	★	●	3	125	32	45	0.8	5	21600	2
40	**WWX200R4004SA32S**	★	●	4	125	32	45	0.8	5	21600	2
50	**WWX200R5004SA32S**	★	●	4	125	32	45	0.9	5	18600	2
50	**WWX200R5005SA32S**	★	●	5	125	32	45	0.9	5	18600	2
50	**WWX200R5006SA32S**	★	●	6	125	32	45	0.9	5	18600	2

* WT : Tool Weight

SPARE PARTS

Tool Holder Type	 *		
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX200	TPS3R	TIP10D	MK1KS

* Clamp Torque (N • m) : TPS3R = 2.0

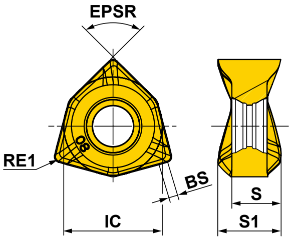
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

Material			MV1020	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15
Material	P	Steel	◐		◐	✤				◐	
	M	Stainless Steel	◐				◐			◐	
	K	Cast Iron	◐	◐						◐	
	N	Non-ferrous Metals									✤
	S	Heat Resistant Alloys, Titanium Alloys						◐	✤		
	H	Hardened Steel								◐	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✤ : Unstable Cutting

Honing :
E : Round **F** : Sharp

Shape	Order Number	Class	Honing	Coated								Carbide	Dimensions (mm)					Geometry
				NEW MV1020	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	IC	S	S1	BS	RE1	
NEW 	6NGU0906040PNFR-L	G	F									●	9.0	5.3	6.1	1.6	0.4	
	6NGU0906080PNFR-L	G	F									●	9.0	5.3	6.1	1.2	0.8	
	6NMU0906040PNER-M	M	E	●	●	●	●	●	●	●	●		9.0	5.3	6.1	1.6	0.4	
	6NMU0906080PNER-M	M	E	●	●	●	●	●	●	●	●		9.0	5.3	6.1	1.2	0.8	
	6NMU0906080PNER-R	M	E	●	●	●	●		●	●	●		9.0	5.3	6.1	1.2	0.8	

● = NEW

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

SHOULDER MILLING
<GENERAL CUTTING>

90° KAPR F R

WWX400

P M K N S H

ø50

Fig.1
ø50

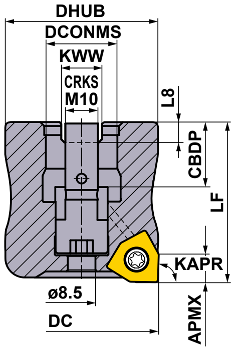
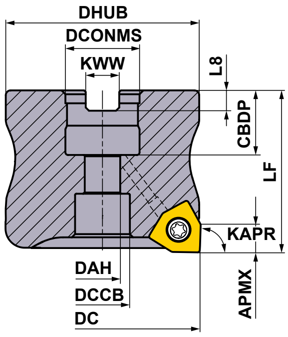


Fig.2
ø63
ø80



Right hand tool holder only.

■ARBOR TYPE

KAPR :90°
GAMP:-6° GAMF :-7.2°–-12.8°

DC (mm)	Order Number	Stock R		Number of Teeth	Dimensions (mm) LF	Dimensions (mm) DCONMS	APMX (mm)	WT* (kg)	RMPX	RPMX (min^{-1})	Fig.
50	**WWX400-050A03AR**	★	●	3	55	22	8.2	0.5	0.4°	5000	1
50	**WWX400-050A04AR**	●	●	4	55	22	8.2	0.5	0.4°	5000	1
63	**WWX400-063A03AR**	★	●	3	40	22	8.2	0.5	0.26°	14100	2
63	**WWX400-063A04AR**	●	●	4	40	22	8.2	0.5	0.26°	14100	2
63	**WWX400-063A05AR**	●	●	5	40	22	8.2	0.5	0.26°	14100	2
80	**WWX400-080A04AR**	★	●	4	50	27	8.2	1.0	0.16°	12200	2
80	**WWX400-080A05AR**	●	●	5	50	27	8.2	1.0	0.16°	12200	2
80	**WWX400-080A07AR**	●	●	7	50	27	8.2	0.9	0.16°	12200	2
100	**WWX400-100B05AR**	★	●	5	50	32	8.2	1.6	–	10700	3
100	**WWX400-100B07AR**	●	●	7	50	32	8.2	1.5	–	10700	3
100	**WWX400-100B09AR**	●	●	9	50	32	8.2	1.5	–	10700	3
125	**WWX400-125B06AR**	★	●	6	63	40	8.2	3.0	–	9500	3
125	**WWX400-125B08AR**	●	●	8	63	40	8.2	3.0	–	9500	3
125	**WWX400-125B12AR**	★	●	12	63	40	8.2	2.9	–	9500	3
160	**WWX400-160C08NR**	★	–	8	63	40	8.2	4.5	–	8300	4
160	**WWX400-160C10NR**	★	–	10	63	40	8.2	4.4	–	8300	4
160	**WWX400-160C14NR**	★	–	14	63	40	8.2	4.4	–	8300	4
200	**WWX400-200C10NR**	★	–	10	63	60	8.2	6.7	–	7300	5
200	**WWX400-200C12NR**	★	–	12	63	60	8.2	6.7	–	7300	5
200	**WWX400-200C16NR**	★	–	16	63	60	8.2	6.6	–	7300	5
250	**WWX400-250C12NR**	★	–	12	63	60	8.2	11.5	–	6400	5
250	**WWX400-250C14NR**	★	–	14	63	60	8.2	11.5	–	6400	5
250	**WWX400-250C18NR**	★	–	18	63	60	8.2	11.4	–	6400	5

Note 1) A set bolt to the arbor is not supplied with the body. Please refer to page K068, when ordering.

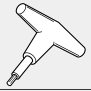
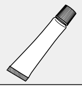
Note 2) The milling cutter with cutting diameter DC=50 mm has a built-in set bolt. The set bolt cannot be replaced. Therefore, absolutely do not disassemble the milling cutter.

Note 3) Please use a set bolt of the FMC type on the cutter body from 63 to 100 in diameter (DC).

Note 4) Please use a set bolt of the FMA type on the cutter body from 125 to 250 in diameter (DC).

⋆ WT : Tool Weight

SPARE PARTS

Tool Holder Type	 * Clamp Screw	 Wrench (Insert)	 Anti-seize Lubricant
WWX400	TS5R	TKY20T	MK1KS

⋆ Clamp Torque (N • m) : TS5R = 5.0

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

Fig.3

ø100
ø125

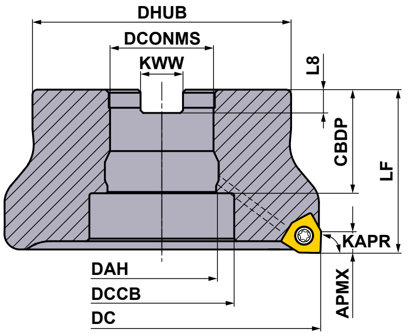
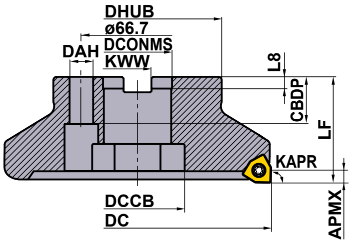


Fig.4

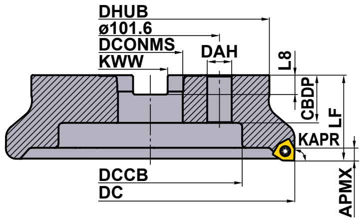
ø160



Right hand tool holder only.

Fig.5

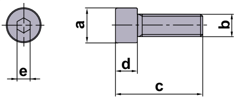
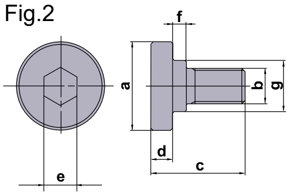
ø200
ø250



MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions (mm)							Fig.
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	
50	**WWX400-050A03AR**	22	20	—	—	47	10.4	6.3	1
50	**WWX400-050A04AR**	22	20	—	—	47	10.4	6.3	1
63	**WWX400-063A03AR**	22	20	11	17	50	10.4	6.3	2
63	**WWX400-063A04AR**	22	20	11	17	50	10.4	6.3	2
63	**WWX400-063A05AR**	22	20	11	17	50	10.4	6.3	2
80	**WWX400-080A04AR**	27	23	13	20	56	12.4	7	2
80	**WWX400-080A05AR**	27	23	13	20	56	12.4	7	2
80	**WWX400-080A07AR**	27	23	13	20	56	12.4	7	2
100	**WWX400-100B05AR**	32	32	32	45	78	14.4	8	3
100	**WWX400-100B07AR**	32	32	32	45	78	14.4	8	3
100	**WWX400-100B09AR**	32	32	32	45	78	14.4	8	3
125	**WWX400-125B06AR**	40	40	40	56	89	16.4	9	3
125	**WWX400-125B08AR**	40	40	40	56	89	16.4	9	3
125	**WWX400-125B12AR**	40	40	40	56	89	16.4	9	3
160	**WWX400-160C08NR**	40	40	14	56	100	16.4	9	4
160	**WWX400-160C10NR**	40	40	14	56	100	16.4	9	4
160	**WWX400-160C14NR**	40	40	14	56	100	16.4	9	4
200	**WWX400-200C10NR**	60	32	18	135	160	25.7	14.22	5
200	**WWX400-200C12NR**	60	32	18	135	160	25.7	14.22	5
200	**WWX400-200C16NR**	60	32	18	135	160	25.7	14.22	5
250	**WWX400-250C12NR**	60	32	18	180	210	25.7	14.22	5
250	**WWX400-250C14NR**	60	32	18	180	210	25.7	14.22	5
250	**WWX400-250C18NR**	60	32	18	180	210	25.7	14.22	5

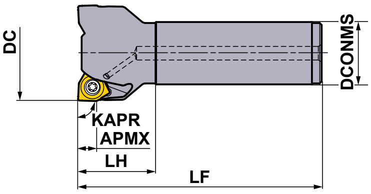
SET BOLT (SOLD SEPARATELY)

Tool Holder Type	Set Bolt		Fig.	Reference Dimensions (mm)							Geometry
	With Coolant Hole	Without Coolant Hole									
	Order Number	Order Number		a	b	c	d	e	f	g	
WWX400-063A○○AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	–	–	Fig.1 
WWX400-080A○○AR	HSC12035H	HSC12035 HSC12045	1	18	M12×1.75	47 57	12	10	–	–	
WWX400-100B○○AR	MBA16033H	–	2	40	M16×2	43	10	14	6	23	Fig.2 
WWX400-125B○○AR	MBA20040H	–	2	50	M20×2.5	54	14	17	6	27	
WWX400-160C○○NR	No Coolant Hole	–	2	50	M20×2.5	54	14	17	6	27	
WWX400-200C○○NR	No Coolant Hole	–	1	24	M16×2	43	16	14	–	–	
WWX400-250C○○NR	No Coolant Hole	–	1	24	M16×2	43	16	14	–	–	

Note 1) Internal coolant is necessary with the set bolt.

Note 2) The milling cutter with cutting diameter DC=50 mm has a built-in set bolt.
Please use a 7 mm Allen wrench to tighten/loosen the set bolt.

★ : Inventory maintained in Japan.



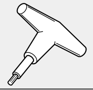
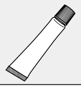
Right hand tool holder only.

■SHANK TYPE

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			APMX	WT *	RMPX	RPMX
		R			LF	DCONMS	LH	(mm)	(kg)		(min^{-1})
50	**WWX400R5003SA32M**	★	●	3	125	32	40	8.2	0.8	0.4°	16000
50	**WWX400R5004SA32M**	★	●	4	125	32	40	8.2	0.8	0.4°	16000
63	**WWX400R6303SA32M**	★	●	3	125	32	40	8.2	1.0	0.26°	14100
63	**WWX400R6304SA32M**	★	●	4	125	32	40	8.2	1.0	0.26°	14100
63	**WWX400R6305SA32M**	★	●	5	125	32	40	8.2	1.0	0.26°	14100
80	**WWX400R8004SA32M**	★	●	4	125	32	40	8.2	1.3	0.16°	12200
80	**WWX400R8005SA32M**	★	●	5	125	32	40	8.2	1.3	0.16°	12200
80	**WWX400R8007SA32M**	★	●	7	125	32	40	8.2	1.2	0.16°	12200

* WT : Tool Weight

SPARE PARTS

Tool Holder Type	 *		
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX400	TS5R	TKY20T	MK1KS

* Clamp Torque (N • m) : TS5R = 5.0

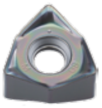
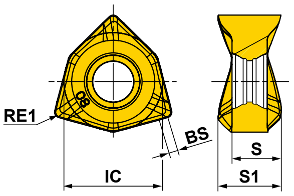
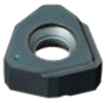
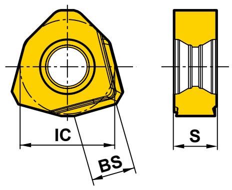
SPARE PARTS ➢ N001
TECHNICAL DATA ➢ P001

INSERTS

Material			MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF		TF15	
Material	P	Steels	◐	◐		●	◐				✤			
	M	Stainless Steels	◐	◐				●			◐			
	K	Cast Irons	◐	◐	◐						✤			
	N	Non-ferrous Metals											◐	
	S	Heat Resistant Alloys, Titanium Alloys							●	◐				
	H	Hardened Steels				◐					●			

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✤ : Unstable Cutting

Honing :
E : Round F : Sharp

Shape	Order Number	Class	Honing	Coated NEW MV1020	Coated NEW MV1030	Coated MC5020	Coated MP6120	Coated MP6130	Coated MP7130	Coated MP9120	Coated MP9130	Coated VP15TF		Carbide TF15		Dimensions (mm) IC	S	S1	BS	RE1	Geometry
	**6NGU1409040PNER-L**	G	E	●	●	★	★	★	●	●	★	★				14	7	9	1.7	0.4	
	6NGU1409080PNER-L	G	E	●	●	★	●	●	●	●	●	●				14	7	9	1.3	0.8	
	6NGU1409040PNFR-L	G	F											●		14	7	9	1.7	0.4	
	6NGU1409080PNFR-L	G	F											●		14	7	9	1.3	0.8	
	6NGU1409040PNER-M	G	E	●	●	★	★	★	●	●	★	★				14	7	9	1.7	0.4	
	6NGU1409080PNER-M	G	E	●	●	★	●	●	●	●	●	●				14	7	9	1.3	0.8	
	6NMU1409040PNER-M	M	E	●	●	●	●	●	●	●	●	●				14	7	9	1.7	0.4	
	6NMU1409080PNER-M	M	E	●	●	●	●	●	●	●	●	●				14	7	9	1.3	0.8	
	6NMU1409160PNER-M	M	E	●	●	●	●	●	●	★	●	●				14	7	9	0.5	1.6	
	6NMU1409200PNER-M	M	E	●	●	●	●	●	●	★	●	●				14	7	9	0.5	2.0	
	6NMU1409080PNER-R	M	E	●	●	●	●	●		●	●	●				14	7	9	1.3	0.8	
	6NMU1409160PNER-R	M	E	●	●	●	●	●		★	★	●				14	7	9	0.5	1.6	
	6NMU1409200PNER-R	M	E	●	●	●	●	●		★	★	●				14	7	9	0.5	2.0	
 Wiper	**2NGU1406ZNER6C-M**	G	E			●	●					●				14	6.3	–	6.5	–	

● = NEW

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

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

WWX200/400

RECOMMENDED CUTTING CONDITIONS

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

■ Dry Cutting

Cutting Speed

(mm)

	Material	Properties	Cutting Conditions	Grade	ae		
					0.5DC≥	0.8DC≥	DC(Slot)
					Vc (m/min)		
P	Mild Steel	Hardness ≤180HB	●	MV1020	300 (250−350)	280 (230−330)	250 (200−300)
			●	MP6120	240 (200−280)	220 (180−260)	200 (160−240)
			●	MV1030	230 (190−270)	210 (170−250)	190 (150−230)
			◐	MV1020	290 (240−340)	260 (210−320)	240 (190−290)
			◐	MV1030,MP6130	230 (190−270)	210 (170−250)	190 (150−230)
			✤	MP6130,VP15TF	210 (170−250)	190 (150−230)	170 (130−210)
	Carbon Steel Alloy Steel	Hardness 180−280HB	●	MV1020	260 (210−310)	240 (190−280)	210 (160−260)
			●	MP6120	210 (170−250)	190 (150−230)	170 (130−210)
			●	MV1030	200 (160−240)	180 (140−220)	160 (120−200)
			◐	MV1020	250 (200−300)	230 (180−270)	200 (150−250)
			◐	MV1030,MP6130	200 (160−240)	180 (140−220)	160 (120−200)
			✤	MP6130,VP15TF	180 (140−220)	160 (120−200)	140 (100−180)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280−350HB ≤350HB (Annealing)	●	MV1020	260 (210−310)	240 (190−280)	210 (160−260)
			●	MP6120	200 (160−240)	180 (140−220)	160 (120−200)
			●	MV1030	200 (160−240)	180 (140−220)	160 (120−200)
			◐	MV1020	250 (200−300)	230 (180−270)	200 (150−250)
			◐	MV1030,MP6130	190 (150−230)	170 (130−210)	150 (110−190)
			✤	MP6130,VP15TF	170 (130−210)	150 (110−190)	130 (90−170)
	Pre-hardened Steel	Hardness 35−45HRC	●	MP6120	140 (120−160)	−	−
			◐	MP6130	120 (100−140)	−	−
			✤	MP6130,VP15TF	110 (90−130)	−	−
M	Austenitic Stainless Steel	Hardness ≤200HB	●	MV1030,MP7130	180 (160−200)	160 (140−180)	−
			◐	MV1030,MP7130,VP15TF	170 (150−190)	150 (130−170)	−
			✤	MP7130,VP15TF	150 (130−170)	130 (110−150)	−
	Austenitic Stainless Steel	Hardness >200HB	●	MV1030,MP7130	170 (150−190)	150 (130−170)	−
			◐	MV1030,MP7130,VP15TF	160 (140−180)	140 (120−160)	−
			✤	MP7130,VP15TF	140 (120−160)	120 (100−140)	−
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	●	MV1030,MP7130	180 (160−200)	160 (140−180)	−
			◐	MV1030,MP7130,VP15TF	170 (150−190)	150 (130−170)	−
			✤	MP7130,VP15TF	150 (130−170)	130 (110−150)	−
	Duplex Stainless Steel	Hardness ≤280HB	●	MP7130	160 (140−180)	140 (120−160)	−
			◐	MP7130,VP15TF	150 (130−170)	130 (110−150)	−
			✤	MP7130,VP15TF	130 (110−150)	110 (90−130)	−
	Precipitation Hardening Stainless Steel	Hardness <450HB	●	MP7130	140 (120−160)	−	−
			◐	MP7130,VP15TF	130 (110−150)	−	−
			✤	MP7130,VP15TF	110 (90−130)	−	−
K	Gray Cast Iron	Tensile Strength ≤350MPa	●	MC5020	250 (210−290)	230 (190−270)	210 (170−250)
			◐	MC5020	240 (200−280)	220 (180−260)	200 (160−240)
			◐	VP15TF	240 (200−280)	220 (180−260)	−
			✤	MC5020,VP15TF	220 (180−260)	200 (160−240)	180 (140−220)
	Ductile Cast Iron	Tensile Strength ≤450MPa	●	MV1020	240 (200−310)	220 (170−280)	200 (150−260)
			●	MC5020	220 (180−260)	200 (160−240)	180 (140−220)
			●	MV1030	210 (170−250)	190 (150−230)	170 (130−210)
			◐	MV1020	230 (190−300)	210 (160−270)	190 (140−250)
			◐	MV1030,MC5020	210 (170−250)	190 (150−230)	170 (130−210)
			◐	VP15TF	210 (170−250)	190 (150−230)	−
			✤	MC5020,VP15TF	190 (150−230)	170 (130−210)	150 (110−190)
	Ductile Cast Iron	Tensile Strength ≤800MPa	●	MV1020	210 (160−280)	190 (140−250)	160 (120−210)
			●	MC5020	180 (140−220)	160 (120−200)	140 (100−180)
			●	MV1030	170 (130−210)	150 (110−190)	130 (90−170)
			◐	MV1020	200 (150−270)	180 (130−240)	150 (110−210)
			◐	MV1030,MC5020	170 (130−210)	150 (110−190)	130 (90−170)
			◐	VP15TF	170 (130−210)	150 (110−190)	−
			✤	MC5020,VP15TF	150 (110−190)	130 (90−170)	110 (70−150)
H	Hardened Steel	Hardness 40−55HRC	● ◐	VP15TF	50 (30−70)	−	−
			◐	MP6120	40 (30−70)	−	−

Note 1) The recommended cutting speed has been calculated for a depth of cut 2mm. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

■ Wet Cutting

Cutting Speed

(mm)

	Material	Properties	Cutting Conditions	Grade	ae		
					0.5DC≥	0.8DC≥	DC(Slot)
					Vc (m/min)		
P	Mild Steel	Hardness ≤180HB	●	MV1020	220(210—230)	190(180—210)	180(160—190)
			●	MP6120	150(140—160)	130(120—140)	120(110—130)
			●	MV1030	140(130—150)	120(110—130)	110(100—120)
			◐	MV1020	210(200—220)	180(170—200)	170(150—180)
			◐	MV1030,MP6130	140(130—150)	120(110—130)	110(100—120)
			✤	MP6130,VP15TF	120(110—130)	100(90—110)	90(80—100)
	Carbon Steel Alloy Steel	Hardness 180—280HB	●	MV1020	200(190—210)	170(160—190)	160(150—170)
			●	MP6120	150(140—160)	130(120—140)	120(110—130)
			●	MV1030	140(130—150)	120(110—130)	110(100—120)
			◐	MV1020	190(180—200)	160(150—180)	150(140—160)
			◐	MV1030,MP6130	140(130—150)	120(110—130)	110(100—120)
			✤	MP6130,VP15TF	120(110—130)	100(90—110)	90(80—100)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	●	MV1020	200(190—210)	170(160—190)	160(150—170)
			●	MP6120, MV1030	140(130—150)	120(110—130)	110(100—120)
			◐	MV1020	190(180—200)	160(150—180)	150(140—160)
			◐	MV1030	140(130—150)	120(110—130)	110(100—120)
			◐	MP6130	130(120—140)	110(100—120)	100(90—110)
			✤	MP6130,VP15TF	110(100—120)	90(80—100)	80(70—90)
	Pre-hardened Steel	Hardness 35—45HRC	●	MP6120	110(100—120)	—	—
			◐	MP6130	100(90—110)	—	—
			✤	MP6130,VP15TF	80(70—90)	—	—
M	Austenitic Stainless Steel	Hardness ≤200HB	●	MP7130	130(120—140)	110(100—120)	—
			◐	MP7130,VP15TF	120(110—130)	100(90—110)	—
			✤	MP7130,VP15TF	100(90—110)	80(70—90)	—
	Austenitic Stainless Steel	Hardness >200HB	●	MP7130	130(120—140)	110(100—120)	—
			◐	MP7130,VP15TF	120(110—130)	100(90—110)	—
			✤	MP7130,VP15TF	100(90—110)	80(70—90)	—
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	●	MP7130	130(120—140)	110(100—120)	—
			◐	MP7130,VP15TF	120(110—130)	100(90—110)	—
			✤	MP7130,VP15TF	100(90—110)	80(70—90)	—
	Duplex Stainless Steel	Hardness ≤280HB	●	MP7130	120(110—130)	100(90—110)	—
			◐	MP7130,VP15TF	110(100—120)	90(80—100)	—
			✤	MP7130,VP15TF	90(80—100)	70(60—80)	—
	Precipitation Hardening Stainless Steel	Hardness <450HB	●	MP7130	120(110—130)	—	—
			◐	MP7130,VP15TF	110(100—120)	—	—
			✤	MP7130,VP15TF	90(80—100)	—	—
K	Gray Cast Iron	Tensile Strength ≤350MPa	●	MC5020	170(150—190)	150(130—170)	130(110—150)
			◐	MC5020	160(140—180)	140(120—160)	120(100—140)
			◐	VP15TF	160(140—180)	140(120—160)	—
			✤	MC5020,VP15TF	140(120—160)	120(100—140)	100(80—120)
	Ductile Cast Iron	Tensile Strength ≤450MPa	●	MV1020	200(180—240)	180(150—220)	150(130—200)
			●	MC5020	170(150—190)	150(130—170)	130(110—150)
			●	MV1030	160(140—180)	140(120—160)	120(100—140)
			◐	MV1020	190(170—230)	170(140—210)	140(120—190)
			◐	MV1030,MC5020	160(140—180)	140(120—160)	120(100—140)
			◐	VP15TF	160(140—180)	140(120—160)	—
			✤	MC5020,VP15TF	140(120—160)	120(100—140)	100(80—120)
	Ductile Cast Iron	Tensile Strength ≤800MPa	●	MV1020	180(170—210)	160(150—190)	140(120—160)
			●	MC5020	160(150—170)	140(130—150)	120(110—130)
			●	MV1030	150(140—160)	130(120—140)	110(100—120)
			◐	MV1020	170(160—200)	150(140—180)	120(110—150)
			◐	MV1030,MC5020	150(140—160)	130(120—140)	110(100—120)
			◐	VP15TF	150(140—160)	130(120—140)	—
			✤	MC5020,VP15TF	130(120—140)	110(100—120)	90(80—100)

Note 1) The recommended cutting speed has been calculated for a depth of cut 2mm. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

(mm)

	Material	Properties	Cutting Conditions	Grade	ae		
					0.5DC≥	0.8DC≥	DC(Slot)
					Vc (m/min)		
N	Aluminium Alloys	Content Si<5%	●	TF15	500(300—900)	500(300—900)	500(300—900)
			◐	TF15	500(300—900)	500(300—900)	500(300—900)
			✤	TF15	400(200—800)	400(200—800)	400(200—800)
S	Titanium Alloys	—	●	MP9120	80(60—100)	—	—
			◐	MP9120	70(50—90)	—	—
			✤	MP9130	60(40—80)	—	—
	Heat Resistant Alloys	—	●	MP9120	60(50—70)	—	—
			◐	MP9120	50(30—60)	—	—
			✤	MP9130	40(20—40)	—	—
H	Hardened Steel	Hardness 40—55HRC	● ◐	VP15TF	50(30—70)	—	—
			◐	MP6120	40(30—70)	—	—

Note 1) The recommended cutting speed has been calculated for a depth of cut 2mm. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

RECOMMENDED CUTTING CONDITIONS

Depth of Cut / Feed per Tooth

Material		Properties	Cutting Conditions	Schnittmodus	Grade	ae		
						0.5DC≥		
						Chipbreaker	ap	fz (mm/t.)
P	Mild Steel	Hardness ≤180HB	●	Dry, Wet	MV1020,MP6120	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet	MV1020,MP6130	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet		M,R	≤3.0	0.16(0.10–0.20)
			✤	Dry, Wet	MP6130,VP15TF	R	≤3.0	0.13(0.10–0.15)
	Carbon Steel Alloy Steel	Hardness 180–280HB	●	Dry, Wet	MV1020,MP6120	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet	MV1020,MP6130	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet		R	≤3.0	0.16(0.10–0.20)
			✤	Dry, Wet	MP6130,VP15TF	R	≤3.0	0.13(0.10–0.15)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280–350HB ≤350HB (Annealing)	●	Dry, Wet	MV1020,MP6120	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet	MV1020,MP6130	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet		R	≤3.0	0.16(0.10–0.20)
			✤	Dry, Wet	MP6130,VP15TF	R	≤3.0	0.13(0.10–0.15)
	Pre-hardened Steel	Hardness 35–45HRC	●	Dry, Wet	MP6120	M	≤2.0	0.13(0.10–0.15)
			◐	Dry, Wet	MP6130	M	≤2.0	0.13(0.10–0.15)
			◐	Dry, Wet		R	≤2.0	0.16(0.10–0.20)
			✤	Dry, Wet	MP6130,VP15TF	R	≤2.0	0.13(0.10–0.15)
M	Austenitic Stainless Steel	Hardness ≤200HB	● ◐	Dry, Wet	MP7130	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet	VP15TF	M	≤3.0	0.16(0.10–0.20)
			✤	Dry, Wet	MP7130,VP15TF	M	≤3.0	0.13(0.10–0.15)
	Austenitic Stainless Steel	Hardness >200HB	●	Dry	MP7130	M	≤2.0	0.13(0.10–0.15)
			●	Wet		M	≤3.0	0.13(0.10–0.15)
			◐	Dry		M	≤2.0	0.13(0.10–0.15)
			◐	Wet		M	≤3.0	0.13(0.10–0.15)
			◐	Dry	VP15TF	M	≤2.0	0.16(0.10–0.20)
			◐	Wet		M	≤3.0	0.16(0.10–0.20)
			✤	Dry	MP7130,VP15TF	M	≤2.0	0.13(0.10–0.15)
			✤	Wet		M	≤3.0	0.13(0.10–0.15)
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	● ◐	Dry, Wet	MP7130	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet	VP15TF	M	≤3.0	0.16(0.10–0.20)
			✤	Dry, Wet	MP7130,VP15TF	M	≤3.0	0.13(0.10–0.15)
	Duplex Stainless Steel	Hardness ≤280HB	● ◐	Dry	MP7130	M	≤2.0	0.13(0.10–0.15)
			● ◐	Wet		M	≤3.0	0.13(0.10–0.15)
			◐	Dry	VP15TF	M	≤2.0	0.16(0.10–0.20)
			◐	Wet		M	≤3.0	0.16(0.10–0.20)
			✤	Dry	MP7130,VP15TF	M	≤2.0	0.13(0.10–0.15)
			✤	Wet		M	≤3.0	0.13(0.10–0.15)
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐	Dry, Wet	MP7130	M	≤2.0	0.13(0.10–0.15)
			◐	Dry, Wet	VP15TF	M	≤2.0	0.16(0.10–0.20)
			✤	Dry, Wet	MP7130,VP15TF	M	≤2.0	0.13(0.10–0.15)
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	Dry, Wet	MC5020	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet	VP15TF	R	≤3.0	0.16(0.10–0.20)
			✤	Dry, Wet	MC5020,VP15TF	R	≤3.0	0.13(0.10–0.15)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	Dry, Wet	MV1020,MC5020	M	≤3.0	0.13(0.10–0.15)
			◐	Dry, Wet	MV1020,VP15TF	R	≤3.0	0.16(0.10–0.20)
			✤	Dry, Wet	MC5020,VP15TF	R	≤3.0	0.13(0.10–0.15)
N	Aluminium Alloys	Content Si<5%	● ◐ ✤	Wet	TF15	L	≤3.0	0.13(0.10–0.15)
S	Titanium Alloys	–	● ◐	Wet	MP9120	M	≤2.0	0.10(0.05–0.13)
			✤	Wet	MP9130	M	≤2.0	0.10(0.05–0.13)
	Heat Resistant Alloys	–	● ◐	Wet	MP9120	M	≤2.0	0.10(0.05–0.13)
			✤	Wet	MP9130	M	≤2.0	0.10(0.05–0.13)
H	Hardened Steel	Hardness 40–55HRC	●	Dry, Wet	VP15TF	M	≤2.0	0.05(0.05–0.10)
			◐	Dry, Wet	VP15TF,MP6120	R	≤2.0	0.05(0.05–0.10)

Note 1) Refer to the above table and apply the cutting conditions according to the application.

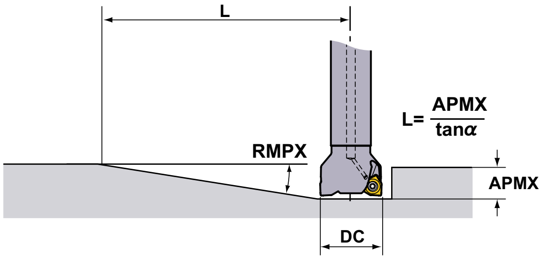
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

(mm)

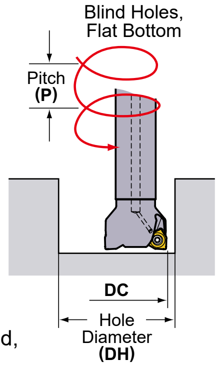
	ae			**ae**		
	0.8DC≥			DC(Slot)		
	Chipbreaker	**ap**	**fz** (mm/t.)	Chipbreaker	**ap**	**fz** (mm/t.)
	M	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	M	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	R	≤3.0	0.16(0.10−0.20)	–	–	–
	R	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	M	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	M	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	R	≤3.0	0.16(0.10−0.20)	–	–	–
	R	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	M	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	M	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	R	≤3.0	0.16(0.10−0.20)	–	–	–
	R	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	–	–	–	–	–	–
	–	–	–	–	–	–
	–	–	–	–	–	–
	–	–	–	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.16(0.10−0.20)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.16(0.10−0.20)	–	–	–
	M	≤3.0	0.16(0.10−0.20)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.16(0.10−0.20)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	M	≤3.0	0.16(0.10−0.20)	–	–	–
	M	≤3.0	0.16(0.10−0.20)	–	–	–
	M	≤3.0	0.16(0.10−0.20)	–	–	–
	M	≤3.0	0.13(0.10−0.15)	–	–	–
	–	–	–	–	–	–
	–	–	–	–	–	–
	–	–	–	–	–	–
	M	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	R	≤3.0	0.16(0.10−0.20)	–	–	–
	R	≤3.0	0.13(0.10−0.15)	R	≤2.0	0.13(0.10−0.15)
	M	≤3.0	0.13(0.10−0.15)	M	≤2.0	0.13(0.10−0.15)
	R	≤3.0	0.16(0.10−0.20)	–	–	–
	R	≤3.0	0.13(0.10−0.15)	R	≤2.0	0.13(0.10−0.15)
	L	≤3.0	0.13(0.10−0.15)	L	≤2.0	0.13(0.10−0.15)
		–	–	–	–	–
	–	–	–	–	–	–
	–	–	–	–	–	–
	–	–	–	–	–	–
	–	–	–	–	–	–
	–	–	–	–	–	–

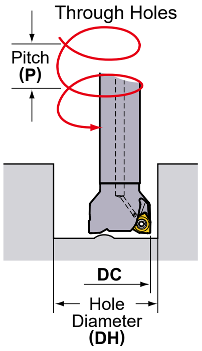
■Ramping / Helical Milling

●Ramping



●Helical Milling





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

(mm)

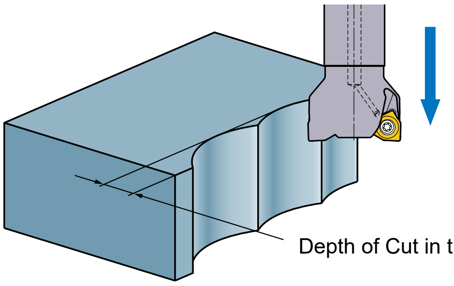
DC	RE	APMX	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
			RMPX	L *	DH max.	P max.	DH min.	P max.	DH min.	P max.
50	0.4	8	0.40°	1175	98.5	1.06	95.2	0.99	82.5	0.7
50	0.8	8	0.40°	1175	97.7	1.05	95.2	0.99	82.5	0.7
63	0.4	8	0.26°	1807	124.5	0.88	121.2	0.83	108.6	0.6
63	0.8	8	0.26°	1807	123.7	0.87	121.2	0.83	108.6	0.6
80	0.4	8	0.16°	2936	158.5	0.69	155.2	0.66	142.6	0.5
80	0.8	8	0.16°	2936	157.7	0.68	155.3	0.66	142.6	0.5

DC = Cutting Diameter
APMX = Depth of Cut Max.
RMPX = Ramping Angle Max.
DH = Desired Hole Diameter
P = Pitch

Note 1) When ramping and helical milling, it is recommended to reduce the feed per tooth.
Note 2) When ramping and helical milling, long continuous chips may be dispersed, take cautionary measures.
Note 3) WWX200 cannot be used for ramping or helical machining.

<Helical Milling>
To obtain a flat bottom surface when helical milling, it is required to remove “the uncut part” in the centre of the workpiece during a final pass.
When helical milling, make sure that the depth of cut per helical pass doesn’t exceed the maximum depth of cut (**APMX**).

●Plunging



Depth of Cut in the Radial Direction : **ae** = WWX200 5mm
WWX400 8mm

SHOULDER MILLING
<STRONG EDGE TYPE FOR CAST IRON>

90° KAPR

VOX400

P M **K** N S H

Fig.1

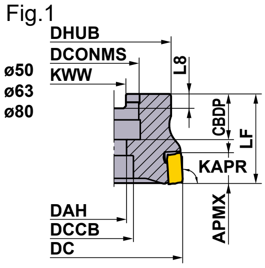
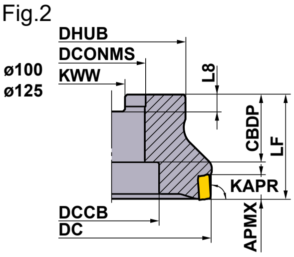
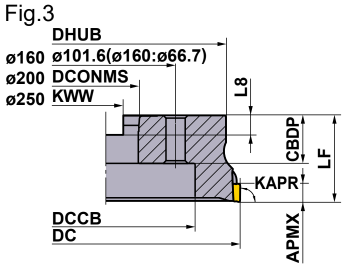


Fig.2



Right hand tool holder only.

Fig.3



■ARBOR TYPE

KAPR : 90°
GAMP : -6° GAMF : -18°

Type	Order Number	Stock		Number of Teeth	Dimensions(mm)									*2 WT (kg)	APMX (mm)	Fig.	*1 Clamp Screw	Wrench
		R			DC	LF	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8					
Coarse Pitch	VOX400-050A03R	●	–	3	50	40	22	20	11	17	41	10.4	6.3	0.3	10	1	CS401160T	TKY15T
	VOX400-063A04R	●	–	4	63	40	22	20	11	17	50	10.4	6.3	0.6	10	1	CS401160T	TKY15T
	VOX400-080A04R	●	–	4	80	50	27	23	13	20	56	12.4	7	1	10	1	CS401160T	TKY15T
	VOX400-100B06R	●	–	6	100	50	32	32	–	45	78	14.4	8	1.7	10	2	CS401160T	TKY15T
	VOX400-125B08R	●	–	8	125	63	40	32	–	56	89	16.4	9	3	10	2	CS401160T	TKY15T
	VOX400-160C10R	●	–	10	160	63	40	29	–	56	120	16.4	9	5.4	10	3	CS401160T	TKY15T
	VOX400-200C12R	●	–	12	200	63	60	32	–	130	175	25.7	14.22	8.1	10	3	CS401160T	TKY15T
	VOX400-250C16R	●	–	16	250	63	60	32	–	180	210	25.7	14.22	11.8	10	3	CS401160T	TKY15T
Fine Pitch	VOX400-050A05R	●	–	5	50	40	22	20	11	17	41	10.4	6.3	0.3	10	1	CS401160T	TKY15T
	VOX400-063A06R	●	–	6	63	40	22	20	11	17	50	10.4	6.3	0.6	10	1	CS401160T	TKY15T
	VOX400-080A08R	●	–	8	80	50	27	23	13	20	56	12.4	7	1	10	1	CS401160T	TKY15T
	VOX400-100B10R	●	–	10	100	50	32	32	–	45	78	14.4	8	1.7	10	2	CS401160T	TKY15T
	VOX400-125B12R	●	–	12	125	63	40	32	–	56	89	16.4	9	3	10	2	CS401160T	TKY15T
	VOX400-160C16R	●	–	16	160	63	40	29	–	56	120	16.4	9	5.4	10	3	CS401160T	TKY15T
	VOX400-200C20R	●	–	20	200	63	60	32	–	130	175	25.7	14.22	8.1	10	3	CS401160T	TKY15T
	VOX400-250C24R	●	–	24	250	63	60	32	–	180	210	25.7	14.22	11.8	10	3	CS401160T	TKY15T
Extra Fine Pitch	VOX400-063A08R	●	–	8	63	40	22	20	11	17	50	10.4	6.3	0.5	10	1	CS401160T	TKY15T
	VOX400-080A10R	●	–	10	80	50	27	23	13	20	56	12.4	7	1.0	10	1	CS401160T	TKY15T
	VOX400-100B12R	●	–	12	100	50	32	32	–	45	78	14.4	8	1.6	10	2	CS401160T	TKY15T
	VOX400-125B16R	●	–	16	125	63	40	32	–	56	89	16.4	9	2.8	10	2	CS401160T	TKY15T
	VOX400-160C20R	●	–	20	160	63	40	29	–	56	120	16.4	9	5.2	10	3	CS401160T	TKY15T
	VOX400-200C26R	★	–	26	200	63	60	32	–	130	175	25.7	14.22	7.9	10	3	CS401160T	TKY15T
	VOX400-250C34R	★	–	34	250	63	60	32	–	180	210	25.7	14.22	11.5	10	3	CS401160T	TKY15T

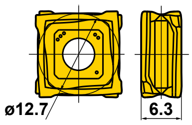
*1 Clamp Torque (N • m) : CS401160T=3.5
*2 WT : Tool Weight

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

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

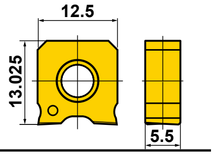
Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting
✽: Unstable Cutting

Material	K	Cast Iron			◐	✽	
Shape	Order Number		Class	Honing	Coated MC5020	 VP15TF	Geometry
	**SONX1206PER**		N	E	●	●	
	SONX1206PEL		N	E		★	ø12.7 6.3 Right hand tool holder shown.

⁎ Left hand insert use for the side cutter (special products).

WIPER INSERTS

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting
✽: Unstable Cutting

Material	K	Cast Iron			◐	
Shape	Order Number		Class	Honing	Coated VP15TF	Geometry
	**WOEX1206PER5C**		E	E	●	

RECOMMENDED CUTTING CONDITIONS

■VOX400 (Standard Pitch)

	Material	Tensile Strength	Insert Grade	Cutting Speed (m/min)	Ø50−Ø250		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)
K	Gray Cast Iron	≤200MPa	MC5020	300(250−350)	≤DC	≤10	0.4(0.3−0.5)
			VP15TF	250(200−300)	≤DC	≤10	0.4(0.3−0.5)
		≤350MPa	MC5020	220(150−300)	≤DC	≤10	0.3(0.2−0.4)
			VP15TF	200(150−300)	≤DC	≤10	0.3(0.2−0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150−250)	≤DC	≤10	0.3(0.2−0.4)
			VP15TF	170(150−200)	≤DC	≤10	0.3(0.2−0.4)
		≤800MPa	MC5020	170(150−200)	≤DC	≤10	0.2(0.1−0.3)
			VP15TF	150(100−200)	≤DC	≤10	0.2(0.1−0.3)

■VOX400 (Fine Pitch)

	Material	Tensile Strength	Insert Grade	Cutting Speed (m/min)	Ø50,Ø63			Ø80		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)
K	Gray Cast Iron	≤200MPa	MC5020	300(250−350)	≤DC	≤10	0.4(0.3−0.5)	≤DC	≤10	0.4(0.3−0.5)
			VP15TF	250(200−300)	≤DC	≤10	0.4(0.3−0.5)	≤DC	≤10	0.4(0.3−0.5)
		≤350MPa	MC5020	220(150−300)	≤DC	≤10	0.3(0.2−0.4)	≤DC	≤10	0.3(0.2−0.4)
			VP15TF	200(150−300)	≤DC	≤10	0.3(0.2−0.4)	≤DC	≤10	0.3(0.2−0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150−250)	≤0.8DC	≤10	0.3(0.2−0.4)	≤0.6DC	≤10	0.3(0.2−0.4)
			VP15TF	170(150−200)	≤0.8DC	≤10	0.3(0.2−0.4)	≤0.6DC	≤10	0.3(0.2−0.4)
		≤800MPa	MC5020	170(150−200)	≤0.8DC	≤10	0.2(0.1−0.3)	≤0.6DC	≤10	0.2(0.1−0.3)
			VP15TF	150(100−200)	≤0.8DC	≤10	0.2(0.1−0.3)	≤0.6DC	≤10	0.2(0.1−0.3)

	Material	Tensile Strength	Insert Grade	Cutting Speed (m/min)	Ø100			Ø125		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)
K	Gray Cast Iron	≤200MPa	MC5020	300(250−350)	<DC	<10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
			VP15TF	250(200−300)	<DC	<10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
		≤350MPa	MC5020	220(150−300)	<DC	<10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
			VP15TF	200(150−300)	<DC	<10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150−250)	<0.5DC	<10	0.3(0.2−0.4)	<0.4DC	<10	0.3(0.2−0.4)
			VP15TF	170(150−200)	<0.5DC	<10	0.3(0.2−0.4)	<0.4DC	<10	0.3(0.2−0.4)
		≤800MPa	MC5020	170(150−200)	<0.5DC	<10	0.2(0.1−0.3)	<0.4DC	<10	0.2(0.1−0.3)
			VP15TF	150(100−200)	<0.5DC	<10	0.2(0.1−0.3)	<0.4DC	<10	0.2(0.1−0.3)

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

	Material	Tensile Strength	Insert Grade	Cutting Speed (m/min)	Ø160			Ø200−Ø250		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)
K	Gray Cast Iron	≤200MPa	MC5020	300(250−350)	<DC	<10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
			VP15TF	250(200−300)	<DC	<10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
		≤350MPa	MC5020	220(150−300)	<DC	<10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
			VP15TF	200(150−300)	<DC	<10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150−250)	<0.3DC	<10	0.3(0.2−0.4)	<0.2DC	<10	0.3(0.2−0.4)
			VP15TF	170(150−200)	<0.3DC	<10	0.3(0.2−0.4)	<0.2DC	<10	0.3(0.2−0.4)
		≤800MPa	MC5020	170(150−200)	<0.3DC	<10	0.2(0.1−0.3)	<0.2DC	<10	0.2(0.1−0.3)
			VP15TF	150(100−200)	<0.3DC	<10	0.2(0.1−0.3)	<0.2DC	<10	0.2(0.1−0.3)

Note 1) DC is cutter diameter.

Note 2) When using wiper inserts, please reduce the feed per tooth to half the normal rate.

■VOX400 (Extra Fine Pitch)

	Material	Tensile Strength	Insert Grade	Cutting Speed (m/min)	Ø63			Ø80		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)
K	Gray Cast Iron	≤200MPa	MC5020	300(250−350)	≤DC	≤10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
			VP15TF	250(200−300)	≤DC	≤10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
		≤350MPa	MC5020	220(150−300)	≤DC	≤10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
			VP15TF	200(150−300)	≤DC	≤10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150−250)	≤0.6DC	≤10	0.3(0.2−0.4)	<0.5DC	<10	0.3(0.2−0.4)
			VP15TF	170(150−200)	≤0.6DC	≤10	0.3(0.2−0.4)	<0.5DC	<10	0.3(0.2−0.4)
		≤800MPa	MC5020	170(150−200)	≤0.6DC	≤10	0.2(0.1−0.3)	<0.5DC	<10	0.2(0.1−0.3)
			VP15TF	150(100−200)	≤0.6DC	≤10	0.2(0.1−0.3)	<0.5DC	<10	0.2(0.1−0.3)

	Material	Tensile Strength	Insert Grade	Cutting Speed (m/min)	Ø100			Ø125		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)
K	Gray Cast Iron	≤200MPa	MC5020	300(250−350)	<DC	<10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
			VP15TF	250(200−300)	<DC	<10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
		≤350MPa	MC5020	220(150−300)	<DC	<10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
			VP15TF	200(150−300)	<DC	<10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150−250)	<0.4DC	<10	0.3(0.2−0.4)	<0.3DC	<10	0.3(0.2−0.4)
			VP15TF	170(150−200)	<0.4DC	<10	0.3(0.2−0.4)	<0.3DC	<10	0.3(0.2−0.4)
		≤800MPa	MC5020	170(150−200)	<0.4DC	<10	0.2(0.1−0.3)	<0.3DC	<10	0.2(0.1−0.3)
			VP15TF	150(100−200)	<0.4DC	<10	0.2(0.1−0.3)	<0.3DC	<10	0.2(0.1−0.3)

	Material	Tensile Strength	Insert Grade	Cutting Speed (m/min)	Ø160			Ø200−Ø250		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/t.)
K	Gray Cast Iron	≤200MPa	MC5020	300(250−350)	<DC	<10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
			VP15TF	250(200−300)	<DC	<10	0.4(0.3−0.5)	<DC	<10	0.4(0.3−0.5)
		≤350MPa	MC5020	220(150−300)	<DC	<10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
			VP15TF	200(150−300)	<DC	<10	0.3(0.2−0.4)	<DC	<10	0.3(0.2−0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150−250)	<0.25DC	<10	0.3(0.2−0.4)	<0.15DC	<10	0.3(0.2−0.4)
			VP15TF	170(150−200)	<0.25DC	<10	0.3(0.2−0.4)	<0.15DC	<10	0.3(0.2−0.4)
		≤800MPa	MC5020	170(150−200)	<0.25DC	<10	0.2(0.1−0.3)	<0.15DC	<10	0.2(0.1−0.3)
			VP15TF	150(100−200)	<0.25DC	<10	0.2(0.1−0.3)	<0.15DC	<10	0.2(0.1−0.3)

Note 1) DC is cutter diameter.

Note 2) When using wiper insert, please reduce the feed per tooth to half the normal rate.

SHOULDER MILLING
<GENERAL CUTTING>

ASX400

P M K N S H

ARBOR TYPE

KAPR :90°
GAMP:+11° GAMF:-9°–-11°

Fig.1
ø50
ø63

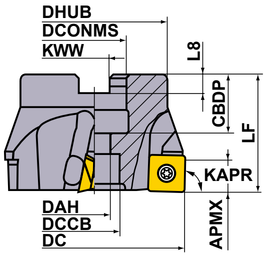


Fig.2
ø80
ø100
ø125

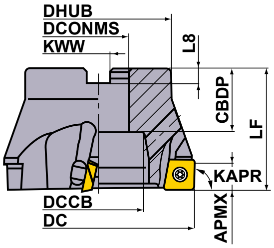


Fig.3
ø160

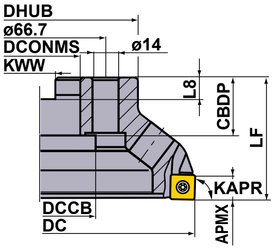
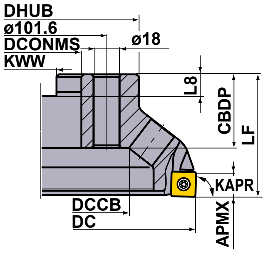


Fig.4
ø200
ø250

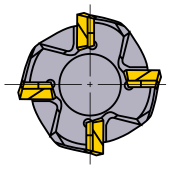


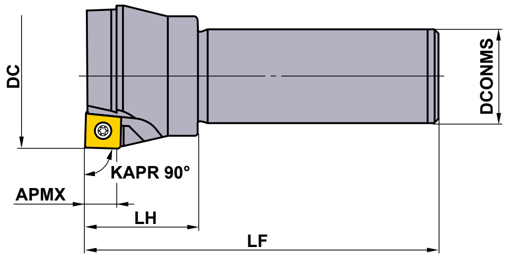
Right hand tool holder only.

Type	Order Number	Stock		Number of Teeth	Dimensions(mm)									WT* (kg)	APMX (mm)	Fig.
		R			DC	LF	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8			
Coarse Pitch	**ASX400-050A03R**	●	–	3	50	40	22	20	11	17	41	10.4	6.3	0.3	10	1
	ASX400-063A04R	●	–	4	63	40	22	20	11	17	50	10.4	6.3	0.5	10	1
	ASX400-080B04R	●	–	4	80	50	27	29	–	38	60	12.4	7	0.9	10	2
	ASX400-100B05R	●	–	5	100	50	32	32	–	45	70	14.4	8	1.4	10	2
	ASX400-125B06R	●	–	6	125	63	40	32	–	60	80	16.4	9	2.3	10	2
	ASX400-160C08R	●	–	8	160	63	40	29	–	56	100	16.4	9	3.6	10	3
	ASX400-200C10R	●	–	10	200	63	60	32	–	135	160	25.7	14.22	6.3	10	4
	ASX400-250C12R	●	–	12	250	63	60	32	–	180	210	25.7	14.22	10.8	10	4
Fine Pitch	**ASX400-050A04R**	●	–	4	50	40	22	20	11	17	41	10.4	6.3	0.3	10	1
	ASX400-063A05R	●	–	5	63	40	22	20	11	17	50	10.4	6.3	0.5	10	1
	ASX400-080B06R	●	–	6	80	50	27	29	–	38	60	12.4	7	0.9	10	2
	ASX400-100B07R	●	–	7	100	50	32	32	–	45	70	14.4	8	1.4	10	2
	ASX400-125B08R	●	–	8	125	63	40	32	–	60	80	16.4	9	2.2	10	2
	ASX400-160C12R	●	–	12	160	63	40	29	–	56	100	16.4	9	3.5	10	3
	ASX400-200C16R	●	–	16	200	63	60	32	–	135	160	25.7	14.22	6.2	10	4
	ASX400-250C18R	●	–	18	250	63	60	32	–	180	210	25.7	14.22	10.7	10	4
Extra Fine Pitch	**ASX400-050A05R**	●	–	5	50	40	22	20	11	17	41	10.4	6.3	0.3	10	1
	ASX400-063A06R	●	–	6	63	40	22	20	11	17	50	10.4	6.3	0.5	10	1
	ASX400-080B08R	●	–	8	80	50	27	29	–	38	60	12.4	7	0.9	10	2
	ASX400-100B10R	●	–	10	100	50	32	32	–	45	70	14.4	8	1.4	10	2
	ASX400-125B12R	●	–	12	125	63	40	32	–	60	80	16.4	9	2.1	10	2
	ASX400-160C15R	●	–	15	160	63	40	29	–	56	100	16.4	9	3.4	10	3
	ASX400-200C19R	★	–	19	200	63	60	32	–	135	160	25.7	14.22	6.2	10	4
	ASX400-250C22R	★	–	22	250	63	60	32	–	180	210	25.7	14.22	10.5	10	4

* WT : Tool Weight

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



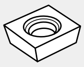
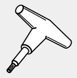
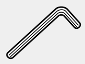


SHANK TYPE

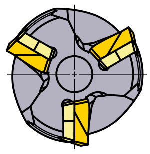
Right hand tool holder only.

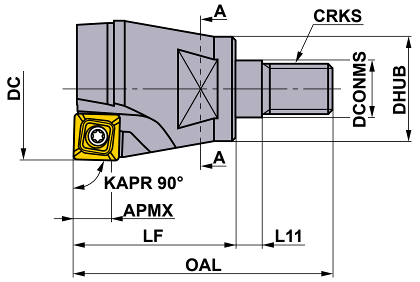
Type	Order Number	Stock	Number of Teeth	Dimensions(mm)				
		R		DC	LF	DCONMS	LH	APMX
Coarse Pitch	**ASX400R403S32**	★	3	40	125	32	40	10
Fine Pitch	**ASX400R504S32**	★	4	50	125	32	40	10
	ASX400R635S32	★	5	63	125	32	40	10

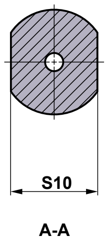
SPARE PARTS

Tool Holder Number		 *	 *		
	Shim	Shim Screw	Clamp Screw	Wrench (Insert)	Wrench (Shim)
ASX400	STASX400N	WCS503507H	TPS35	TIP15T	HKY35R

* Clamp Torque (N • m) : WCS503507H=5.0, TPS35=3.5

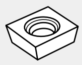
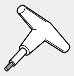
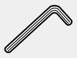






SCREW-IN TYPE

Right hand tool holder only.

Order Number	Stock	Teeth	Dimensions (mm)									*2 WT (kg)		 *1	 *1		
	R		DC	DCONMS	DHUB	OAL	LF	L11	S10	CRKS	APMX		Shim	Shim Screw	Clamp Screw	Wrench (Insert)	Wrench (Shim)
ASX400R322M16	●	2	32	17	29	65	42	6	22	M16	10	0.3	–	WCS503507H	TPS35	TIP15T	HKY35R
ASX400R403M16	●	3	40	17	29	70	47	6	22	M16	10	0.3	STASX400N	WCS503507H	TPS35	TIP15T	HKY35R

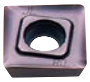
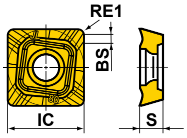
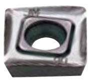
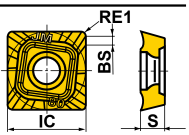
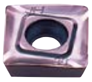
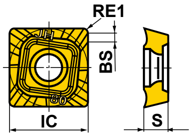
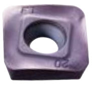
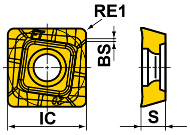
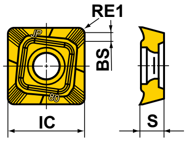
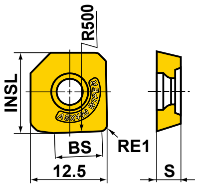
*1 Clamp Torque (N • m) : WCS503507H=5.0, TPS35=3.5
*2 WT : Tool Weight
Note 1) For screw-in type arbors, refer to page K260.

INSERTS

Material			MV1020	MV1030	F7030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	MX3030	NX4545	NX2525	HTi10	HTi05T
	P	Steel	◐	◐	◐		◐	✣					◐	✣	◐	◐	●		
	M	Stainless Steel	◐	◐	◐				◐	✣			◐	✣	◐	◐	●		
	K	Cast Iron	◐	◐		◐							✣	✣	◐		●	◐	◐
	N	Non-ferrous Metal																◐	◐
	S	Heat-resistant Alloy, Titanium Alloy									◐	✣	◐	✣					
	H	Hardened Steel											◐						

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✣ : Unstable Cutting

Honing :
E : Round F : Sharp T : Chamfer

Application	Shape	Order Number	Class	Honing	Coated												Cermet			Carbide		Dimensions (mm)					Geometry
					NEW MV1020	NEW MV1030	F7030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	NEW MX3030	NX4545	NX2525	HTi10	HTi05T	INSL	IC	S	BS	RE1	
Finish–Light Cutting	JL Chipbreaker 	SOET12T308PEER-JL	E	E	●	●	●		●	●	●	●	●	●	●	●	●	●				–	12.7	3.97	1.4	0.8	
Light–Rough Cutting	JM Chipbreaker 	SOMT12T308PEER-JM	M	E	●	●	●	●	●	●	●	●	●	●	●	●	●	●				–	12.7	3.97	1.4	0.8	 Right hand tool holder shown.
		SOMT12T308PEEL-JM	M	E											●							–	12.7	3.97	1.4	0.8	
Medium–Heavy Cutting	JH Chipbreaker 	SOMT12T308PEER-JH	M	E	●	●	●	●	●	●	●	●	●	●	●	●						–	12.7	3.97	1.4	0.8	
Heavy Interrupted Cutting	FT Chipbreaker 	SOMT12T320PEER-FT	M	E	●	●		●	●				★	★	●							–	12.7	3.97	0.5	2.0	
For Aluminium Alloy	JP Chipbreaker 	SOGT12T308PEFR-JP	G	F																●		–	12.7	3.97	1.4	0.8	
Wiper		WOEW12T308PEER8C	E	E																	●	13.2	–	3.97	8	0.8	
		WOEW12T308PETR8C	E	T															●			13.2	–	3.97	8	0.8	

● = NEW

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

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	Grade	Cutting Speed (m/min)	Finish–Light Cutting		Light–Rough Cutting		Medium–Heavy Cutting	
					Feed per Tooth (mm/t.)	Chipbreaker	Feed per Tooth (mm/t.)	Chipbreaker	Feed per Tooth (mm/t.)	Chipbreaker
P	Mild Steel	≤180HB	**MV1020**	300 (200–400)	0.18 (0.08–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH**
			MV1030	275 (200–350)	0.18 (0.08–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH**
			F7030	280 (210–350)	0.18 (0.08–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH**
			MP6120 **VP15TF**	250 (200–300)	0.18 (0.08–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH** **FT**
			MP6130	240 (190–290)	0.18 (0.08–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH**
			VP30RT	230 (180–280)	0.18 (0.08–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH**
			MX3030	180 (130–250)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	–	–
			NX4545	180 (130–230)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	–	–
	Carbon Steel Alloy Steel	180–280HB	**MV1020**	260 (170–350)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH**
			MV1030	235 (170–300)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH**
			F7030	250 (200–300)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH**
			MP6120 **VP15TF**	220 (170–270)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH** **FT**
			MP6130	180 (150–230)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH**
			VP30RT	150 (120–180)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH**
			MX3030	150 (120–180)	0.13 (0.06–0.20)	**JL**	0.15 (0.10–0.25)	**JM**	–	–
			NX4545	150 (120–180)	0.13 (0.06–0.20)	**JL**	0.15 (0.10–0.25)	**JM**	–	–
		280–350HB	**MV1020**	180 (100–250)	0.13 (0.06–0.20)	**JL**	0.15 (0.10–0.25)	**JM**	0.18 (0.10–0.28)	**JH**
			MV1030	165 (100–230)	0.13 (0.06–0.20)	**JL**	0.15 (0.10–0.25)	**JM**	0.18 (0.10–0.28)	**JH**
			F7030	180 (130–230)	0.13 (0.06–0.20)	**JL**	0.15 (0.10–0.25)	**JM**	0.18 (0.10–0.28)	**JH**
			MP6120 **VP15TF**	140 (100–180)	0.13 (0.06–0.20)	**JL**	0.15 (0.10–0.25)	**JM**	0.18 (0.10–0.28)	**JH** **FT**
			MP6130	120 (90–150)	0.13 (0.06–0.20)	**JL**	0.15 (0.10–0.25)	**JM**	0.18 (0.10–0.28)	**JH**
			VP30RT	100 (80–160)	0.13 (0.06–0.20)	**JL**	0.15 (0.10–0.25)	**JM**	0.18 (0.10–0.28)	**JH**
			NX4545	100 (80–160)	0.10 (0.05–0.15)	**JL**	0.13 (0.10–0.20)	**JM**	–	–
M	Stainless Steel	≤270HB	**MV1030**	220 (170–270)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH** **FT**
			MP7130 **VP15TF**	220 (170–270)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH** **FT**
			MP7140 **VP30RT**	200 (150–250)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	0.20 (0.10–0.30)	**JH**
			MX3030	100 (80–160)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	–	–
			NX4545	150 (120–180)	0.15 (0.07–0.23)	**JL**	0.18 (0.10–0.28)	**JM**	–	–
K	Cast Iron Ductile Cast Iron	Tensile Strength ≤450MPa	**MV1020**	240 (130–350)	0.18 (0.10–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH** **FT**
			MV1030	190 (130–250)	0.18 (0.10–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH** **FT**
			MC5020	200 (150–250)	–	–	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH** **FT**
			VP15TF	180 (130–230)	0.18 (0.10–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH** **FT**
		Tensile Strength >450MPa	**MV1020**	220 (80–350)	0.18 (0.10–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH** **FT**
			MV1030	110 (80–150)	0.18 (0.10–0.28)	**JL**	0.20 (0.10–0.30)	**JM**	0.25 (0.10–0.35)	**JH** **FT**

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x DC)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

TECHNICAL DATA ➤P001

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	Grade	Cutting Speed (m/min)	Finish—Light Cutting		Light—Rough Cutting		Medium—Heavy Cutting	
					Feed per Tooth (mm/t.)	Chipbreaker	Feed per Tooth (mm/t.)	Chipbreaker	Feed per Tooth (mm/t.)	Chipbreaker
N	Aluminium Alloy	—	**HTi10**	650 (300—1000)	0.15 (0.10—0.20)	**JP**	0.20 (0.10—0.30)	**JP**	0.30 (0.20—0.40)	**JP**
S	Titanium Alloy	—	**MP9120** **VP15TF**	50 (40—60)	0.12 (0.05—0.20)	**JL**	0.15 (0.05—0.20)	**JM**	0.18 (0.10—0.28)	**JH** **FT**
			MP9130	45 (30—55)	0.10 (0.05—0.20)	**JL**	0.15 (0.05—0.20)	**JM**	0.18 (0.10—0.28)	**JH** **FT**
	Heat Resistant Alloy (Inconel etc.)	—	**MP9120** **VP15TF**	40 (20—50)	0.12 (0.05—0.20)	**JL**	0.15 (0.05—0.20)	**JM**	0.18 (0.10—0.28)	**JH** **FT**
			MP9130	35 (15—45)	0.10 (0.05—0.20)	**JL**	0.15 (0.05—0.20)	**JM**	0.18 (0.10—0.28)	**JH** **FT**
H	Hardened Steel	40—55HRC	**VP15TF**	80 (60—100)	0.08 (0.04—0.13)	**JL**	0.10 (0.05—0.15)	**JM**	0.12 (0.07—0.17)	**JH** **FT**

- ● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x DC)
- ● Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

INSTRUCTIONS FOR USING INSERTS

■ Instructions for use of the JP chipbreaker

- ● The JP chipbreaker has sharp cutting edges. Wear gloves when handling.
- ● When machining aluminium alloy, welding to the cutting edge tends to occur, often leading to insert failure. To prevent this, wet cutting is recommended.

■ Instructions for use of wiper inserts

- ● Wiper inserts for the ASX400 are single-cornered.
- ● When installing the wiper insert, place the insert so that the small chamfer is located as shown.
- ● The peripheral cutting edge of the wiper insert is located further back than general inserts. Beware of wear of the insert just behind the wiper insert.
- ● When using the wiper, set the following standard conditions. Depth of Cut (ap) ≤0.5 mm, Feed per Tooth (fz)≤0.2 mm/t.

WJX09

P M K N S H

Fig.1
ø40

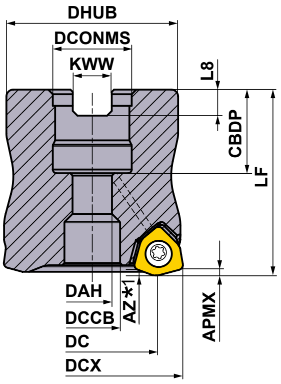
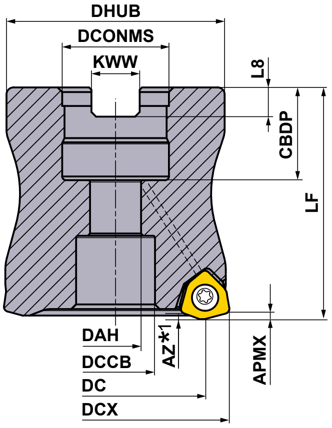
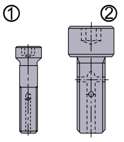


Fig.2
ø50
ø52
ø63
ø66



Right hand tool holder only.

DCONMS (mm)	Set Bolt	Geometry	
Ø16	HFF08033H	①	 ① ②
Ø22	HSC10030H	②	
Ø27	HSC12035H		

ARBOR TYPE

GAMP:-6° GAMF :-11°—-10°

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			**WT***2 (kg)	**APMX** (mm)	**RPMX** (min^{-1})	Fig.	Insert Type
		R			**DC**	**LF**	**DCONMS**					
40	**WJX09-040A04AR**	●	●	4	28.8	40	16	0.2	1.2	23200	1	JOMU0905
40	**WJX09-040A05AR**	●	●	5	28.8	40	16	0.2	1.2	23200	1	JOMU0905
50	**WJX09-050A04AR**	●	●	4	38.8	50	22	0.4	1.2	20000	2	JOMU0905
50	**WJX09-050A06AR**	●	●	6	38.8	50	22	0.4	1.2	20000	2	JOMU0905
52	**WJX09-052A06AR**	●	●	6	40.8	50	22	0.5	1.2	19500	2	JOMU0905
63	**WJX09-063A05AR**	●	●	5	51.8	50	22	0.8	1.2	17300	2	JOMU0905
63	**WJX09-063A07AR**	●	●	7	51.8	50	22	0.8	1.2	17300	2	JOMU0905
63	**WJX09-063X07AR**	●	●	7	51.8	50	27	0.7	1.2	17300	2	JOMU0905
66	**WJX09-066X07AR**	●	●	7	54.8	50	27	0.8	1.2	16800	2	JOMU0905

*1 Refer to page K090, for the maximum drilling depth (**AZ**).
*2 WT : Tool Weight
Note 1) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 2) When using at high spindle speeds, ensure that the tool and arbor are correctly balanced.

MOUNTING DIMENSIONS

DCX (mm)	Order Number	Dimensions (mm)							Fig.
		DCONMS	**CBDP**	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**	
40	**WJX09-040A04AR**	16	18	8.5	12	37	8.4	5.6	1
40	**WJX09-040A05AR**	16	18	8.5	12	37	8.4	5.6	1
50	**WJX09-050A04AR**	22	20	11	17	47	10.4	6.3	2
50	**WJX09-050A06AR**	22	20	11	17	47	10.4	6.3	2
52	**WJX09-052A06AR**	22	20	11	17	47	10.4	6.3	2
63	**WJX09-063A05AR**	22	20	11	17	60	10.4	6.3	2
63	**WJX09-063A07AR**	22	20	11	17	60	10.4	6.3	2
63	**WJX09-063X07AR**	27	23	13	20	60	12.4	7	2
66	**WJX09-066X07AR**	27	23	13	20	60	12.4	7	2

● : Inventory maintained.

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

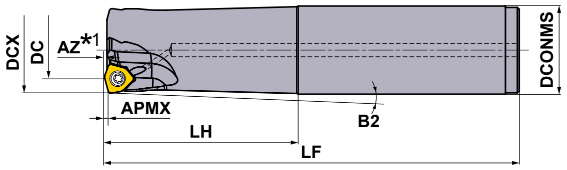


Fig.1

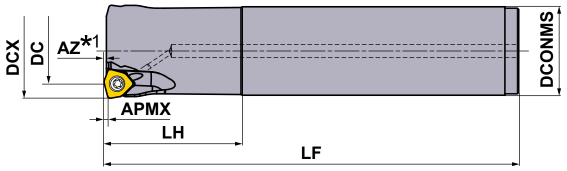


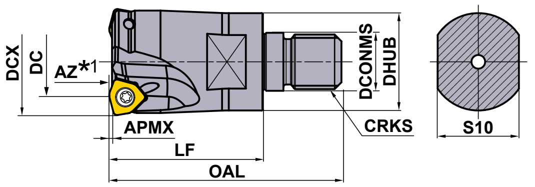
Fig.2

SHANK TYPE

Right hand tool holder only.

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)					APMX	RPMX	Fig.	Insert Type
		R			DC	LF	LH	DCONMS	B2	(mm)	(min^{-1})		
25	WJX09R2502SA25S	●	●	2	14	140	60	25	1.09°	1.2	33500	1	JOMU0905
25	WJX09R2503SA25S	●	●	3	14	140	60	25	1.09°	1.2	33500	1	JOMU0905
25	WJX09R2502SA25L	●	●	2	14	200	120	25	0.54°	1.2	33500	1	JOMU0905
25	WJX09R2503SA25L	★	●	3	14	200	120	25	0.54°	1.2	33500	1	JOMU0905
25	WJX09R2502SA25EL	★	●	2	14	300	180	25	0.35°	1.2	33500	1	JOMU0905
28	WJX09R2802SA25S	★	●	2	16.9	140	40	25	—	1.2	30300	2	JOMU0905
28	WJX09R2803SA25S	●	●	3	16.9	140	40	25	—	1.2	30300	2	JOMU0905
28	WJX09R2802SA25L	●	●	2	16.9	200	40	25	—	1.2	30300	2	JOMU0905
28	WJX09R2803SA25L	★	●	3	16.9	200	40	25	—	1.2	30300	2	JOMU0905
28	WJX09R2802SA25EL	★	●	2	16.9	300	40	25	—	1.2	30300	2	JOMU0905
32	WJX09R3202SA32S	★	●	2	20.9	150	70	32	0.93°	1.2	27300	1	JOMU0905
32	WJX09R3203SA32S	●	●	3	20.9	150	70	32	0.93°	1.2	27300	1	JOMU0905
32	WJX09R3202SA32L	★	●	2	20.9	200	120	32	0.54°	1.2	27300	1	JOMU0905
32	WJX09R3203SA32L	●	●	3	20.9	200	120	32	0.54°	1.2	27300	1	JOMU0905
32	WJX09R3202SA32EL	★	●	2	20.9	300	180	32	0.35°	1.2	27300	1	JOMU0905
35	WJX09R3503SA32S	★	●	3	23.8	150	50	32	—	1.2	25500	2	JOMU0905
35	WJX09R3504SA32S	★	●	4	23.8	150	50	32	—	1.2	25500	2	JOMU0905
35	WJX09R3503SA32L	★	●	3	23.8	200	50	32	—	1.2	25500	2	JOMU0905
35	WJX09R3504SA32L	★	●	4	23.8	200	50	32	—	1.2	25500	2	JOMU0905
35	WJX09R3502SA32EL	★	●	2	23.8	300	50	32	—	1.2	25500	2	JOMU0905
40	WJX09R4003SA32S	★	●	3	28.8	150	50	32	—	1.2	23200	2	JOMU0905
40	WJX09R4004SA32S	●	●	4	28.8	150	50	32	—	1.2	23200	2	JOMU0905
40	WJX09R4003SA32L	★	●	3	28.8	250	50	32	—	1.2	23200	2	JOMU0905
40	WJX09R4004SA32L	★	●	4	28.8	250	50	32	—	1.2	23200	2	JOMU0905
40	WJX09R4003SA32EL	★	●	3	28.8	300	50	32	—	1.2	23200	2	JOMU0905

*1 Refer to page K090, for the maximum drilling depth (**AZ**).



SCREW-IN TYPE

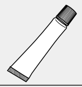
Right hand tool holder only.

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)							*2 WT (kg)	APMX	RPMX	Insert Type
		R			DC	LF	OAL	DCONMS	DHUB	S10	CRKS		(mm)	(min^{-1})	
25	WJX09R2502AM1235	●	●	2	14	35	57	12.5	23.5	19	M12	0.1	1.2	33500	JOMU0905
25	WJX09R2503AM1235	●	●	3	14	35	57	12.5	23.5	19	M12	0.1	1.2	33500	JOMU0905
28	WJX09R2802AM1235	●	●	2	16.9	35	57	12.5	23.5	19	M12	0.1	1.2	30300	JOMU0905
28	WJX09R2803AM1235	●	●	3	16.9	35	57	12.5	23.5	19	M12	0.1	1.2	30300	JOMU0905
32	WJX09R3202AM1645	●	●	2	20.9	45	68	17.0	28.5	24	M16	0.2	1.2	27300	JOMU0905
32	WJX09R3203AM1645	●	●	3	20.9	45	68	17.0	28.5	24	M16	0.2	1.2	27300	JOMU0905
35	WJX09R3502AM1645	●	●	2	23.8	45	68	17.0	28.5	24	M16	0.3	1.2	25500	JOMU0905
35	WJX09R3503AM1645	●	●	3	23.8	45	68	17.0	28.5	24	M16	0.2	1.2	25500	JOMU0905
35	WJX09R3504AM1645	●	●	4	23.8	35	68	17.0	28.5	24	M16	0.2	1.2	25500	JOMU0905
40	WJX09R4003AM1645	●	●	3	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905
40	WJX09R4004AM1645	●	●	4	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905
40	WJX09R4005AM1645	●	●	5	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905

*1 Refer to page K090, for the maximum drilling depth (**AZ**).
*2 WT : Tool Weight
Note 1) For screw-in type arbors, refer to page K260.

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

SPARE PARTS

Tool Holder Type	 * Clamp Screw	 Wrench (Insert)	 Anti-seize Lubricant
WJX09	TPS3R	TIP10D	MK1KS

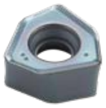
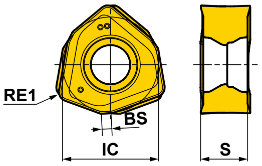
* Clamp Torque (N • m) : TPS3R = 2.0

INSERTS

Material													
	P	Steels	◐	◐	◐	◐	✜					◐	✜
	M	Stainless Steels	◐	◐	◐			◐	✜			◐	✜
	K	Cast Irons	◐	◐								✜	
	S	Heat Resistant Alloys, Titanium Alloys								◐	✜	◐	
	H	Hardened Steels										◐	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✜ : Unstable Cutting

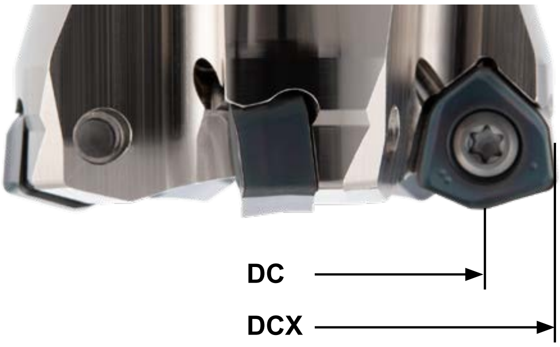
Honing :
E : Round

Shape	Order Number	Class	Honing	Coated NEW MV1020	NEW MV1030	MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	Dimensions (mm) IC	S	BS	RE1	Geometry
	**JOMU090512ZZER-L**	M	E	●	●	●	●	●	●	●	●	●	●	●	9.525	4.73	0.88	1.2	
	JOMU090512ZZER-M	M	E	●	●	●	●	●	●	●	●	●	●	●	9.525	4.75	0.88	1.2	
	JOMU090512ZZER-R	M	E	●	●	●	●	●					●	●	9.525	4.83	0.88	1.2	Right hand insert only.

● = NEW

■Cutter Diameter and Flat Surface Milling

The maximum cutting diameter (DCX) shown in the WJX items table is not the same as the possible dimensions for flat face milling.
The possible dimensions for flat face milling are given as the cutting axis DC value. Please note that this is smaller than the DCX value.



ARBORS ➤ K260
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

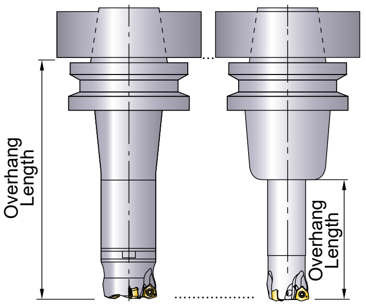
RECOMMENDED CUTTING CONDITIONS

Correction Value According to Overhang Length

Multiply the recommended cutting conditions by the correction factor x overhang length.

(mm)

Type	Cutting Dia. Max. **DCX**	Overhang Length	Correction Value According		
			Cutting Speed **Vc** (m/min)	Depth of Cut **ap**	Feed **fz**(mm/t.)
Shank Type Screw-in Type	25–40	< 2.5×DCONMS	100%	100%	100%
		3.0×DCONMS	90%	100%	90%
		4.0×DCONMS	85%	90%	85%
		5.0×DCONMS	80%	85%	80%
		7.5×DCONMS	70%	75%	75%
Arbor Type	40–66	< 2.5×DCX	100%	100%	100%
		3.0×DCX	85%	100%	90%
		4.0×DCX	80%	80%	80%
		5.0×DCX	75%	75%	60%
		6.0×DCX	70%	70%	40%



DCONMS=Connection Dia.

Cutting Speed (Dry Cutting)

(mm)

Material	Properties	Cutting Speed **Vc** (m/min)						
P		**MV1020**	**MV1030**	**MP6130**	**MP6120**	**VP15TF**	**MC7020**	**VP30RT**
Mild Steel	≦180HB	230 (180–280)	160 (100–220)	160 (110–200)	170 (120–220)	170 (120–220)	230 (180–280)	140 (100–180)
Carbon Steel Alloy Steel	180–280HB	220 (170–270)	150 (80–220)	140 (90–200)	160 (100–220)	160 (100–220)	220 (170–270)	120 (80–170)
Carbon Steel Alloy Steel	280–350HB	220 (170–270)	150 (80–220)	140 (90–200)	160 (100–220)	160 (100–220)	220 (170–270)	120 (80–170)
Alloy Tool Steel	≦350HB (Annealing)	220 (170–270)	150 (80–220)	140 (90–200)	160 (100–220)	160 (100–220)	220 (170–270)	120 (80–170)
Pre-hardened Steel	35–45HRC	150 (120–190)	110 (60–150)	100 (60–140)	120 (80–160)	120 (80–160)	–	90 (50–130)
M		**MV1030**	**MP7130**	**MP7140**	**MC7020**	**VP30RT**		
Austenitic Stainless Steel	≦200HB	160 (130–200)	160 (130–200)	150 (120–180)	220 (170–270)	150 (120–180)		
Austenitic Stainless Steel	>200HB	140 (80–200)	140 (100–200)	130 (80–180)	190 (140–240)	130 (80–180)		
Ferritic and Martensitic Stainless Steel	≦200HB	150 (80–200)	150 (100–200)	130 (80–180)	220 (170–270)	130 (80–180)		
Duplex Stainless Steel	≦280HB	130 (80–180)	130 (80–180)	110 (60–160)	180 (130–230)	110 (60–160)		
Precipitation Hardening Stainless Steel	<450HB	110 (60–160)	110 (60–160)	90 (50–130)	170 (120–220)	90 (50–130)		
K		**MV1020**	**MV1030**	**VP15TF**				
Gray Cast Iron	≦350MPa	230 (180–280)	180 (140–220)	180 (140–220)				
Ductile Cast Iron	≦450MPa	210 (160–260)	160 (120–210)	160 (120–210)				
Ductile Cast Iron	≦800MPa	190 (140–240)	130 (90–170)	130 (90–170)				
S		**MP9130**	**MP9120**	**VP15TF**				
Titanium Alloy	–	40 (30–60)	50 (30–65)	50 (30–65)				
Heat Resistant Alloy	–	30 (20–40)	40 (20–50)	40 (20–50)				
H		**VP15TF**						
Hardened Steel	40–55HRC	70 (40–100)						

Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
Note 2) When wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25%.
Note 3) When large vibration occurs, reduce the cutting conditions.
Note 4) For interrupted cutting, reduce the cutting speed and feed rate by 20%.

Depth of Cut / Feed per Tooth

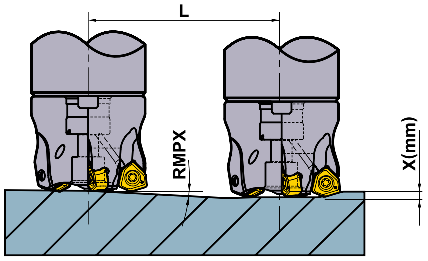
(mm)

	Material	Properties	Depth of Cut ap	Chipbreaker	Cutting Dia. Max. DCX=25,28(Z=2)	Cutting Dia. Max. DCX=25,28(Z=3)	Cutting Dia. Max. DCX=32–	Cutting Mode
					Feed **fz**(mm/t.)	Feed **fz**(mm/t.)	Feed **fz**(mm/t.)	
P	Mild Steel	Hardness ≤180HB	≤0.5	M,R	1.3(0.4–2.0)	1.3(0.4–2.0)	1.5(0.5–2.0)	Dry
				L	1.2(0.4–1.6)	1.2(0.4–1.6)	1.2(0.4–1.6)	
			≤1.0	M,R	1.0(0.3–1.3)	0.8(0.3–1.0)	1.2(0.4–1.5)	
				L	0.8(0.3–1.2)	0.8(0.3–1.0)	0.8(0.3–1.2)	
			≤1.5	M,R	0.6(0.3–1.0)	–	0.8(0.4–1.2)	
	Carbon Steel Alloy Steel	Hardness 180–280HB	≤0.5	M,R	1.3(0.4–1.7)	1.3(0.4–1.7)	1.5(0.4–2.0)	Dry
				L	1.2(0.3–1.5)	1.2(0.3–1.5)	1.2(0.3–1.5)	
			≤1.0	M,R	0.8(0.3–1.0)	0.7(0.3–0.9)	1.0(0.3–1.3)	
				L	0.7(0.2–1.0)	0.7(0.2–0.9)	0.7(0.2–1.0)	
			≤1.5	M,R	0.5(0.3–0.7)	–	0.7(0.3–1.0)	
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280–350HB ≤350HB (Annealing)	≤0.5	M,R	1.3(0.4–1.7)	1.3(0.4–1.7)	1.5(0.4–2.0)	Dry
				L	1.2(0.3–1.5)	1.2(0.3–1.5)	1.2(0.3–1.5)	
			≤1.0	M,R	0.8(0.3–1.0)	0.7(0.3–0.9)	1.0(0.3–1.3)	
				L	0.7(0.2–1.0)	0.7(0.2–0.9)	0.7(0.2–1.0)	
			≤1.5	M,R	0.5(0.3–0.7)	–	0.7(0.3–1.0)	
	Pre-hardened Steel	Hardness 35–45HRC	≤0.5	M,R	1.0(0.3–1.3)	1.0(0.3–1.3)	1.2(0.3–1.5)	Dry
				L	0.8(0.3–1.2)	0.8(0.3–1.2)	0.8(0.3–1.2)	
			≤1.0	M,R	0.6(0.2–0.8)	0.6(0.2–0.8)	0.8(0.2–1.0)	
				L	0.5(0.2–0.8)	0.5(0.2–0.8)	0.5(0.2–0.8)	
M	Austenitic Stainless Steel	–	≤0.5	L	0.8(0.3–1.0)	0.8(0.3–1.0)	0.8(0.3–1.0)	Dry
				M	1.0(0.4–1.2)	1.0(0.4–1.2)	1.0(0.4–1.2)	
			≤1.0	L	0.6(0.2–0.8)	0.6(0.2–0.8)	0.6(0.2–0.8)	
				M	0.8(0.3–1.0)	0.8(0.3–1.0)	0.8(0.3–1.0)	
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	≤0.5	L	0.8(0.3–1.0)	0.8(0.3–1.0)	0.8(0.3–1.0)	Dry
				M	1.0(0.4–1.2)	1.0(0.4–1.2)	1.0(0.4–1.2)	
			≤1.0	L	0.6(0.2–0.8)	0.6(0.2–0.8)	0.6(0.2–0.8)	
				M	0.8(0.3–1.0)	0.8(0.3–1.0)	0.8(0.3–1.0)	
	Duplex Stainless Steel	Hardness ≤280HB	≤0.5	L	0.6(0.3–0.8)	0.6(0.3–0.8)	0.6(0.3–0.8)	Dry
				M	0.7(0.3–1.0)	0.7(0.3–1.0)	0.7(0.3–1.0)	
			≤1.0	L	0.5(0.2–0.7)	0.5(0.2–0.7)	0.5(0.2–0.7)	
				M	0.6(0.3–0.7)	0.6(0.3–0.7)	0.6(0.3–0.7)	
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤0.5	L	0.6(0.3–0.8)	0.6(0.3–0.8)	0.6(0.3–0.8)	Dry
				M	0.7(0.3–1.0)	0.7(0.3–1.0)	0.7(0.3–1.0)	
			≤1.0	L	0.5(0.2–0.7)	0.5(0.2–0.7)	0.5(0.2–0.7)	
				M	0.6(0.3–0.7)	0.6(0.3–0.7)	0.6(0.3–0.7)	
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.5	M,R	1.3(0.4–2.0)	1.3(0.4–2.0)	1.5(0.5–2.0)	Dry
				L	1.2(0.4–1.6)	1.2(0.4–1.6)	1.2(0.4–1.6)	
			≤1.0	M,R	1.0(0.3–1.3)	0.8(0.3–1.0)	1.2(0.4–1.5)	
				L	1.0(0.3–1.3)	0.8(0.3–1.0)	1.0(0.3–1.3)	
			≤1.5	M,R	0.6(0.3–1.0)	–	0.8(0.4–1.2)	
	Ductile Cast Iron	Tensile Strength ≤450MPa	≤0.5	M,R	1.3(0.4–1.7)	1.3(0.4–1.7)	1.5(0.4–2.0)	Dry
				L	1.0(0.3–1.3)	1.0(0.3–1.3)	1.0(0.3–1.3)	
			≤1.0	M,R	0.8(0.3–1.0)	0.7(0.3–0.9)	1.0(0.3–1.3)	
				L	0.8(0.2–1.0)	0.7(0.2–0.9)	0.8(0.2–1.2)	
			≤1.5	M,R	0.5(0.3–0.7)	–	0.7(0.3–1.0)	
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.5	M,R	1.0(0.2–1.5)	1.0(0.2–1.5)	1.3(0.3–1.7)	Dry
				L	0.8(0.3–1.2)	0.8(0.3–1.2)	0.8(0.3–1.2)	
			≤1.0	M,R	0.8(0.2–1.0)	0.6(0.2–0.8)	1.0(0.3–1.2)	
				L	0.5(0.2–0.8)	0.5(0.2–0.8)	0.5(0.2–0.8)	
S	Titanium Alloy	–	≤0.5	L	0.3(0.2–0.6)	0.3(0.2–0.6)	0.3(0.2–0.6)	Wet
			≤1.0	L	0.3(0.2–0.4)	0.3(0.2–0.4)	0.3(0.2–0.4)	
	Heat Resistant Alloy	–	≤0.5	L,M,R	0.8(0.3–1.2)	0.8(0.3–1.2)	0.8(0.3–1.2)	Wet
			≤1.0	L,M,R	0.7(0.3–1.0)	0.7(0.3–1.0)	0.7(0.3–1.0)	
H	Hardened Steel	Hardness 40–55HRC	≤0.5	R,M	0.6(0.3–1.0)	0.6(0.3–1.0)	0.6(0.3–1.0)	Dry
			≤1.0	R,M	0.5(0.3–0.8)	0.4(0.3–0.6)	0.5(0.3–0.8)	

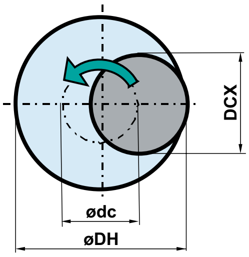
Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
Note 2) When large vibration occurs, reduce the cutting conditions.
Note 3) For interrupted cutting, reduce the cutting speed and feed rate by 20%.
Note 4) If ap is set at 2mm or more, avoid machining on the walls or ramping.

MAXIMUM CAPACITIES BY MODE

■Ramping



■Helical Milling



● How to derive a locus of the centre of the tool.

ødc = øDH - DCX

Locus of the Centre of the Tool
Desired Hole Diameter
Cutting Diameter Maximum

Tool Holder Type	DCX (mm)	DC (mm)	APMX (mm)	Ramping		Helical Milling (Blind Hole, Flat Bottom)		Helical Milling (Through Hole)		AZ (mm)
				RMPX	L (mm) Required Distance for X mm Depth	**DH** (mm)		**DH** (mm)	**P max.** (mm)	
					x = 1 (mm)	Min.	Max.	Min.		
WJX09R25	25	14.0	1.2	4.7°	12.2	38	47	34	1.2	0.8
WJX09R28	28	16.9	1.2	5.6°	10.2	44	53	38	1.2	1.2
WJX09R32	32	20.9	1.2	4.2°	13.7	52	61	46	1.2	1.2
WJX09R35	35	23.8	1.2	3.6°	15.9	58	67	52	1.2	1.2
WJX09R40	40	28.8	1.2	2.9°	19.8	68	77	61	1.2	1.2
WJX09-040	40	28.8	1.2	2.9°	19.8	68	77	61	1.2	1.2
WJX09-050	50	38.8	1.2	2.0°	28.7	88	97	81	1.2	1.2
WJX09-052	52	40.8	1.2	1.9°	30.2	92	101	85	1.2	1.2
WJX09-063	63	51.8	1.2	1.4°	41.0	114	123	107	1.2	1.2
WJX09-066	66	54.8	1.2	1.4°	41.0	120	129	113	1.2	1.2

DCX = Cutting Dia. Max.
APMX = Depth of Cut Max.
DC = Cutting Dia.
RMPX = Ramping Angle Max.
DH = Desired Hole Dia.
AZ = Plunge Depth Max.

Note 1) When ramping and helical milling, it is recommended to reduce the feed per tooth.
Note 2) When ramping, helical milling and drilling, long continuous chips may be dispersed.

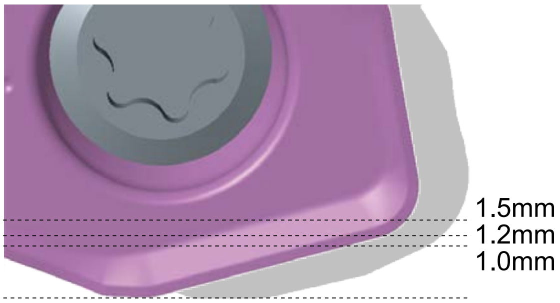
<Helical Milling>
To obtain a flat bottom surface when helical milling, it requires to remove "the uncut part" in the centre of the workpiece at a final pass.
When helical milling, make sure that the depth of cut per helical pass doesn't exceed the maximum depth of cut (APMX).
<Drilling>
When drilling, set the axial feed per revolution at 0.2 mm/rev or less.

OPERATIONAL GUIDANCE

Depth of Cut

Refer to the following table for the maximum depth of cut of the WJX. The straight cutting edge extending to the maximum depth of cut (APMX) allows for stable machining even at high depths of cut. For face milling, lowering the feed rate will allow the APMX value to be exceeded, up to depths of cut shown in the following table (when using the corner R). For details on the feed rate, refer to the recommended cutting conditions on page K089.

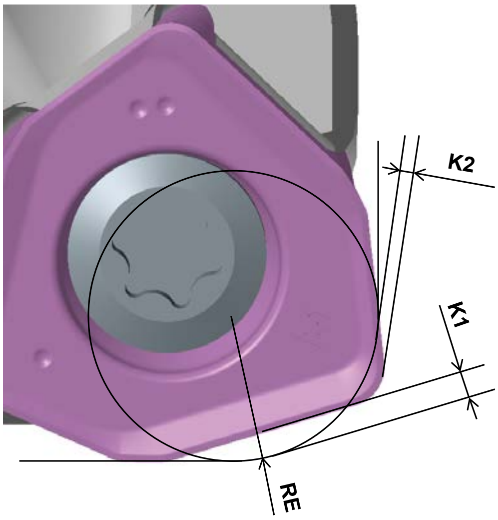
	WJX09
High feed and multi-function machining (APMX)	ap=1.2mm
Low feed and Face machining	ap=1.5mm



WJX09 Conventional Size 09

Remaining Stock

For CAM, use CAD data (from online catalogs), or define it as a radius milling cutter with reference to the following table.
The approximate radius RE, remaining stock K1, and over cutting amount K2 are as shown in the following table.



WJX09

RE (mm)	Remaining Stock **K1**	Cutting Amount **K2**
R2.0 (Recommendation)	0.93	0.00
R2.3	0.86	0.00
R3.0	0.70	0.13

Depth of Cut **ap** (mm)	Remaining Stock **H**
0.5	0.02
1.0	0.07
1.5	–

MULTI-FUNCTIONAL MILLING

WJX14

P **M** **K** N **S** **H**

Fig.1
ø50
ø52

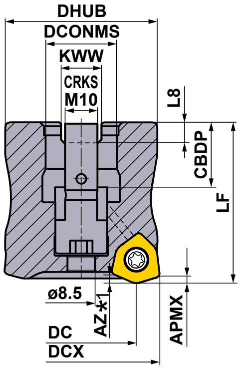


Fig.2
ø63
ø66
ø80
ø100

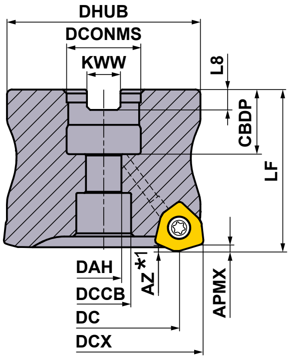
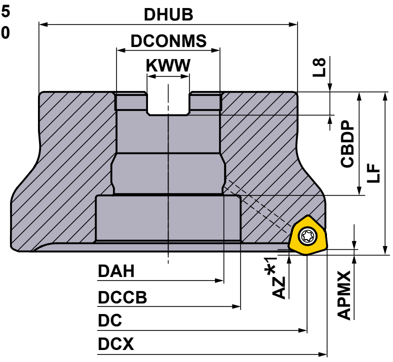
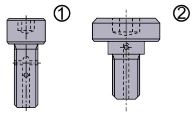


Fig.3
ø125
ø160



Right hand tool holder only.

DCONMS (mm)	Set Bolt	Geometry	
Ø22	HSC10030H	①	 ① ②
Ø27	HSC12035H		
Ø32	HSC16040H		
Ø40	MBA20040H	②	
	MBA24045H		

Note 1) The tools with cutting diameter maximum DCX = 50mm and 52mm has a built in set bolt. Please use 7mm Allen wrench to tighten / loosen the set bolt.

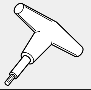
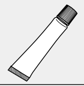
■ARBOR TYPE

GAMP : -7°, -10° GAMF : -10°

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			WT*2 (kg)	APMX (mm)	RPMX (min^{-1})	Fig.	Insert Type
		R			DC	LF	DCONMS					
50	**WJX14-050A03AR**	★	●	3	34.5	50	22	0.4	2	5000	1	JOMU1407
50	**WJX14-050A04AR**	●	●	4	34.5	50	22	0.4	2	5000	1	JOMU1407
52	**WJX14-052A04AR**	●	●	4	36.5	50	22	0.4	2	5000	1	JOMU1407
63	**WJX14-063A04AR**	●	●	4	47.5	50	22	0.7	2	18200	2	JOMU1407
63	**WJX14-063A05AR**	★	●	5	47.5	50	22	0.7	2	18200	2	JOMU1407
63	**WJX14-063X05AR**	●	●	5	47.5	50	27	0.6	2	18200	2	JOMU1407
66	**WJX14-066X05AR**	●	●	5	50.4	50	27	0.7	2	17700	2	JOMU1407
80	**WJX14-080A05AR**	●	●	5	64.4	50	27	1.2	2	15600	2	JOMU1407
80	**WJX14-080A06AR**	●	●	6	64.4	50	27	1.2	2	15600	2	JOMU1407
100	**WJX14-100A06AR**	★	●	6	84.4	63	32	2.5	2	13500	2	JOMU1407
100	**WJX14-100A07AR**	★	●	7	84.4	63	32	2.5	2	13500	2	JOMU1407
125	**WJX14-125B07AR**	★	●	7	109.4	63	40	3.2	2	11600	3	JOMU1407
125	**WJX14-125B09AR**	★	●	9	109.4	63	40	3.1	2	11600	3	JOMU1407
160	**WJX14-160B09AR**	★	●	9	144.4	63	40	4.9	2	9900	3	JOMU1407

*1 Refer to page K097, for the maximum drilling depth (**AZ**).
*2 WT : Tool Weight
Note 1) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 2) Tools with cutting diameter DCX = 50 mm and 52 mm have a built-in set bolt that cannot be replaced. Therefore, do not disassemble the milling cutter.
Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

SPARE PARTS

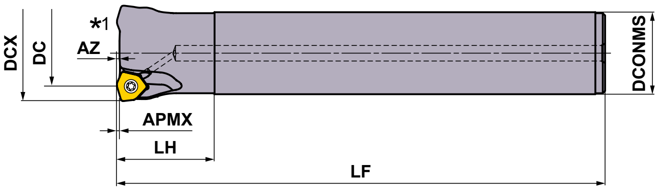
Tool Holder Type	 * Clamp Screw	 Wrench (Insert)	 Anti-seize Lubricant
WJX14	TS5R	TKY20T	MK1KS

* Clamp Torque (N • m) : TS5R = 5.0

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

MOUNTING DIMENSIONS

DCX (mm)	Order Number	Dimensions (mm)							Fig.
		DCONMS	**CBDP**	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**	
50	**WJX14-050A03AR**	22	20	—	—	47	10.4	6.3	1
50	**WJX14-050A04AR**	22	20	—	—	47	10.4	6.3	1
52	**WJX14-052A04AR**	22	20	—	—	47	10.4	6.3	1
63	**WJX14-063A04AR**	22	20	11	17	60	10.4	6.3	2
63	**WJX14-063A05AR**	22	20	11	17	60	10.4	6.3	2
63	**WJX14-063X05AR**	27	23	13	20	60	12.4	7	2
66	**WJX14-066X05AR**	27	23	13	20	60	12.4	7	2
80	**WJX14-080A05AR**	27	23	13	20	76	12.4	7	2
80	**WJX14-080A06AR**	27	23	13	20	76	12.4	7	2
100	**WJX14-100A06AR**	32	26	17	26	96	14.4	8	2
100	**WJX14-100A07AR**	32	26	17	26	96	14.4	8	2
125	**WJX14-125B07AR**	40	40	42	56	100	16.4	9	3
125	**WJX14-125B09AR**	40	40	42	56	100	16.4	9	3
160	**WJX14-160B09AR**	40	40	42	56	100	16.4	9	3



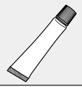
Right hand tool holder only.

■SHANK TYPE

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)				**APMX**	**RPMX**	Insert Type
		R			**DC**	**LF**	**LH**	**DCONMS**	(mm)	(min^{-1})	
50	**WJX14R5003SA42S**	★	●	3	34.5	150	50	42	2	21200	JOMU1407
50	**WJX14R5003SA42L**	★	●	3	34.5	250	50	42	2	21200	JOMU1407

*1 Refer to page K097, for the maximum drilling depth (**AZ**).
Note 1) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

SPARE PARTS

Tool Holder Type	 *		
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WJX14	TS5R	TKY20D	MK1KS

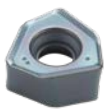
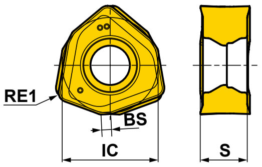
* Clamp Torque (N • m) : TS5R = 5.0

INSERTS

Material			MV1020	MV1030	MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT
Material	P	Steels	◐	◐	◐	◐	✤					◐	✤
	M	Stainless Steels	◐	◐	◐			◐	✤			◐	✤
	K	Cast Irons	◐	◐								✤	
	S	Heat Resistant Alloys, Titanium Alloys								◐	✤	◐	
	H	Hardened Steels										◐	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Honing :
E : Round

Shape	Order Number	Class	Honing	Coated											Dimensions (mm)				Geometry
				NEW MV1020	NEW MV1030	MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	IC	S	BS	RE1	
	**JOMU140715ZZER-L**	M	E	●	●	●	●	●	●	●	●	●	★	★	14	6.58	1.3	1.5	
	JOMU140715ZZER-M	M	E	●	●	●	●	●	●	●	●	●	★	★	14	6.63	1.3	1.5	
	JOMU140715ZZER-R	M	E	●	●	●	●	●					●	●	14	6.75	1.3	1.5	Right hand insert only.

● = NEW

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

RECOMMENDED CUTTING CONDITIONS

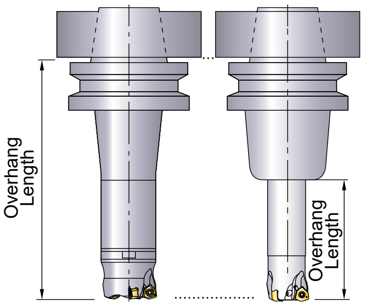
Correction Value According to Overhang Length

Multiply the recommended cutting conditions by the correction factor x overhang length.

(mm)

Type	Cutting Dia. Max. **DCX**	Overhang Length	Correction Value According		
			Cutting Speed **Vc** (m/min)	Depth of Cut **ap**	Feed **fz**(mm/t.)
Shank Type	50	< 2.5 × DCONMS	100%	100%	100%
		3.0 × DCONMS	90%	100%	90%
		4.0 × DCONMS	80%	80%	90%
Arbor Type	50–80	< 2.5 × DCX	100%	100%	100%
		3.0 × DCX	85%	100%	90%
		4.0 × DCX	80%	80%	80%
		5.0 × DCX	75%	75%	60%
		6.0 × DCX	70%	70%	40%
	≥ 100	200	100%	100%	100%
		300	85%	100%	90%
		400	80%	80%	80%

DCONMS=Connection Dia.



Cutting Speed (Dry Cutting)

(mm)

Material	Properties	Cutting Speed **Vc** (m/min)						
P		**MV1020**	**MV1030**	**MP6130**	**MP6120**	**MC7020**	**VP15TF**	**VP30RT**
Mild Steel	≤180HB	220 (170–270)	130 (80–180)	140 (90–180)	150 (100–200)	220 (170–270)	150 (100–200)	120 (80–160)
Carbon Steel Alloy Steel	180–280HB	200 (150–250)	120 (60–180)	120 (70–180)	140 (80–200)	200 (150–250)	140 (80–200)	100 (60–150)
Carbon Steel Alloy Steel	280–350HB	200 (150–250)	120 (60–180)	120 (70–180)	140 (80–200)	200 (150–250)	140 (80–200)	100 (60–150)
Alloy Tool Steel	≤350HB (Annealing)	200 (150–250)	120 (60–180)	120 (70–180)	140 (80–200)	200 (150–250)	140 (80–200)	100 (60–150)
Pre-hardened Steel	35–45HRC	140 (100–180)	90 (50–130)	90 (50–130)	110 (70–150)	–	110 (70–150)	80 (40–120)
M		**MV1030**	**MP7130**	**MP7140**	**MC7020**	**VP30RT**		
Austenitic Stainless Steel	≤200HB	160 (130–200)	160 (130–200)	150 (120–180)	220 (170–270)	150 (120–180)		
Austenitic Stainless Steel	> 200HB	140 (100–200)	140 (100–200)	130 (80–180)	190 (140–240)	130 (80–180)		
Ferritic and Martensitic Stainless Steel	≤200HB	150 (100–200)	150 (100–200)	130 (80–180)	220 (170–270)	130 (80–180)		
Duplex Stainless Steel	≤280HB	130 (80–180)	130 (80–180)	110 (60–160)	180 (130–230)	110 (60–160)		
Precipitation Hardening Stainless Steel	< 450HB	110 (60–160)	110 (60–160)	90 (50–130)	170 (120–220)	90 (50–130)		
K		**MV1020**	**MV1030**	**VP15TF**				
Gray Cast Iron	≤350MPa	210 (160–260)	160 (120–200)	160 (120–200)				
Ductile Cast Iron	≤450MPa	200 (150–250)	150 (100–200)	150 (100–200)				
Ductile Cast Iron	≤800MPa	180 (130–230)	120 (80–160)	120 (80–160)				
S		**MP9130**	**MP9120**	**VP15TF**				
Titanium Alloy	–	40 (30–60)	50 (30–65)	50 (30–65)				
Heat Resistant Alloy	–	30 (20–40)	40 (20–50)	40 (20–50)				
H		**VP15TF**						
Hardened Steel	40–55HRC	70 (40–100)						

Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
Note 2) When wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25%.
Note 3) When large vibration occurs, reduce the cutting conditions.
Note 4) For interrupted cutting, reduce the cutting speed and feed rate by 20%.

SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

Depth of Cut / Feed per Tooth

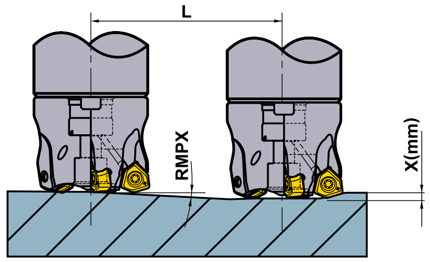
(mm)

	Material	Properties	Depth of Cut **ap**	Chipbreaker	Cutting Dia. Max. DCX=50, 52	Cutting Dia. Max. DCX≧63	Cutting Mode
					Feed **fz**(mm/t.)	Feed **fz**(mm/t.)	
P	Mild Steel	Hardness ≦180HB	≦1.0	M,R	1.5(0.6−2.5)	1.7(0.6−2.8)	Dry
				L	1.2(0.4−2.0)	1.2(0.4−2.0)	
			≦1.5	M,R	1.3(0.6−2.0)	1.5(0.6−2.5)	
				L	1.0(0.4−1.8)	1.0(0.4−1.8)	
			≦2.0	M,R	1.2(0.6−2.0)	1.3(0.6−2.5)	
				L	0.8(0.4−1.7)	0.8(0.4−1.7)	
			≦2.5	M,R	0.8(0.3−1.5)	1.0(0.3−1.6)	
			≦3.0	M,R	0.4(0.2−1.0)	0.5(0.2−1.2)	
	Carbon Steel Alloy Steel	Hardness 180−280HB	≦1.0	M,R	1.5(0.5−2.0)	1.7(0.5−2.5)	Dry
				L	1.0(0.3−1.7)	1.0(0.3−1.7)	
			≦1.5	M,R	1.2(0.5−1.7)	1.3(0.5−2.5)	
				L	0.8(0.3−1.5)	0.8(0.3−1.5)	
			≦2.0	M,R	1.0(0.5−1.5)	1.2(0.5−2.0)	
				L	0.7(0.3−1.2)	0.7(0.3−1.2)	
			≦2.5	M,R	0.7(0.3−1.2)	0.9(0.3−1.5)	
			≦3.0	M,R	0.3(0.2−0.8)	0.4(0.2−1.0)	
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280−350HB ≦350HB (Annealing)	≦1.0	M,R	1.5(0.5−2.0)	1.7(0.5−2.5)	Dry
				L	1.0(0.3−1.7)	1.0(0.3−1.7)	
			≦1.5	M,R	1.2(0.5−1.7)	1.3(0.5−2.2)	
				L	0.8(0.3−1.5)	0.8(0.3−1.5)	
			≦2.0	M,R	1.0(0.5−1.5)	1.2(0.5−2.0)	
				L	0.7(0.3−1.2)	0.7(0.3−1.2)	
			≦2.5	M,R	0.7(0.3−1.2)	0.9(0.3−1.5)	
			≦3.0	M,R	0.3(0.2−0.8)	0.4(0.2−1.0)	
	Pre-hardened Steel	Hardness 35−45HRC	≦1.0	M,R	1.3(0.4−1.7)	1.5(0.4−2.0)	Dry
				L	0.7(0.3−1.2)	0.7(0.3−1.2)	
			≦1.5	M,R	1.0(0.4−1.5)	1.2(0.4−1.5)	
				L	0.6(0.3−1.0)	0.6(0.3−1.0)	
			≦2.0	M,R	0.8(0.4−1.2)	1.0(0.4−1.3)	
				L	0.5(0.3−0.8)	0.5(0.3−0.8)	
M	Austenitic Stainless Steel	−	≦1.0	L	0.8(0.3−1.2)	0.8(0.3−1.2)	Dry
				M	1.0(0.5−1.2)	1.0(0.5−1.2)	
			≦1.5	L	0.8(0.3−1.0)	0.8(0.3−1.0)	
				M	1.0(0.5−1.0)	1.0(0.5−1.0)	
	Ferritic and Martensitic Stainless Steel	Hardness ≦200HB	≦1.0	L	0.8(0.3−1.2)	0.8(0.3−1.2)	Dry
				M	1.0(0.5−1.2)	1.0(0.5−1.2)	
			≦1.5	L	0.8(0.3−1.0)	0.8(0.3−1.0)	
				M	1.0(0.5−1.0)	1.0(0.5−1.0)	
	Duplex Stainless Steel	Hardness ≦280HB	≦1.0	L	0.6(0.3−1.0)	0.6(0.3−1.0)	Dry
				M	0.8(0.4−1.0)	0.8(0.4−1.0)	
			≦1.5	L	0.6(0.3−0.8)	0.6(0.3−0.8)	
				M	0.8(0.4−0.8)	0.8(0.4−0.8)	
	Precipitation Hardening Stainless Steel	Hardness <450HB	≦1	L	0.6(0.3−1.0)	0.6(0.3−1.0)	Dry
				M	0.8(0.4−1.0)	0.8(0.4−1.0)	
			≦1.5	L	0.6(0.3−0.8)	0.6(0.3−0.8)	
				M	0.8(0.4−0.8)	0.8(0.4−0.8)	
K	Gray Cast Iron	Tensile Strength ≦350MPa	≦1	M,R	1.7(0.6−2.5)	1.8(0.6−2.8)	Dry
				L	1.3(0.4−2.0)	1.3(0.4−2.0)	
			≦1.5	M,R	1.5(0.6−2.0)	1.7(0.6−2.5)	
				L	1.2(0.4−1.8)	1.2(0.4−1.8)	
			≦2	M,R	1.3(0.6−2.0)	1.5(0.6−2.5)	
				L	1.0(0.4−1.5)	1.0(0.4−1.5)	
			≦2.5	M,R	0.8(0.3−1.5)	1.0(0.3−1.6)	
			≦3	M,R	0.4(0.2−1.0)	0.5(0.2−1.2)	
	Ductile Cast Iron	Tensile Strength ≦450MPa	≦1	M,R	1.5(0.5−2.0)	1.7(0.5−2.5)	Dry
				L	1.2(0.3−2.0)	1.2(0.3−2.0)	
			≦1.5	M,R	1.3(0.5−1.8)	1.5(0.5−2.0)	
				L	1.0(0.3−1.7)	1.0(0.3−1.7)	
			≦2	M,R	1.2(0.5−1.8)	1.3(0.5−2.0)	
				L	0.8(0.3−1.5)	0.8(0.3−1.5)	
			≦2.5	M,R	0.7(0.3−1.2)	0.9(0.3−1.5)	
			≦3	M,R	0.3(0.2−0.8)	0.4(0.2−1.0)	
	Ductile Cast Iron	Tensile Strength ≦800MPa	≦1	M,R	1.3(0.4−1.8)	1.5(0.4−2.0)	Dry
				L	1.0(0.3−1.7)	1.0(0.3−1.7)	
			≦1.5	M,R	1.2(0.4−1.5)	1.3(0.4−1.8)	
				L	0.8(0.3−1.5)	0.8(0.3−1.5)	
			≦2	M,R	1.0(0.4−1.5)	1.2(0.4−1.8)	
				L	0.7(0.3−1.2)	0.7(0.3−1.2)	
S	Titanium Alloy	−	≦1	L	0.3(0.2−0.6)	0.3(0.2−0.6)	Wet
			≦1.5	L	0.3(0.2−0.5)	0.3(0.2−0.5)	
			≦2	L	0.3(0.2−0.4)	0.3(0.2−0.4)	
	Heat Resistant Alloy	−	≦1	L,M,R	1.0(0.3−1.3)	1.0(0.3−1.3)	Wet
			≦1.5	L,M,R	0.8(0.3−1.2)	0.8(0.3−1.2)	
			≦2	L,M,R	0.7(0.3−1.2)	0.7(0.3−1.2)	
H	Hardened Steel	Hardness 40−55HRC	≦1	R,M	0.8(0.3−1.2)	0.8(0.3−1.2)	Dry
			≦1.5	R,M	0.6(0.3−1.0)	0.6(0.3−1.0)	
			≦2	R,M	0.5(0.3−0.8)	0.5(0.3−0.8)	

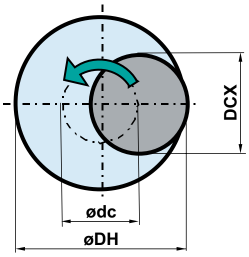
Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
Note 2) When large vibration occurs, reduce the cutting conditions.
Note 3) For interrupted cutting, reduce the cutting speed and feed rate by 20%.
Note 4) If ap is set at 2mm or more, avoid machining on the walls or ramping.

MAXIMUM CAPACITIES BY MODE

■Ramping



■Helical Milling



● How to derive a locus of the centre of the tool.

ødc = øDH - DCX

Locus of the Centre of the Tool
Desired Hole Diameter
Cutting Diameter Maximum

(mm)

Tool Holder Type	DCX	DC	APMX	Ramping			Helical Milling (Blind Hole, Flat Bottom)		Helical Milling (Through Hole)	AZ
				RMPX	L (mm) Required Distance for X mm Depth		DH		DH	
					x = 1	x = 2	Min.	Max.	Min.	
WJX14R50	50	34.5	2	4.4°	13.0	26.0	82	97	73	2.1
WJX14-050	50	34.5	2	4.4°	13.0	26.0	82	97	73	2.1
WJX14-052	52	36.5	2	4.1°	14.0	28.0	86	101	77	2.1
WJX14-063	63	47.5	2	3.0°	19.1	38.2	108	123	99	2.1
WJX14-066	66	50.4	2	2.8°	20.5	40.9	114	129	105	2.1
WJX14-080	80	64.4	2	2.1°	27.3	54.6	142	157	133	2.1
WJX14-100	100	84.4	2	1.5°	38.2	76.4	182	197	173	2.1
WJX14-125	125	109.4	2	1.2°	47.8	95.5	232	247	223	2.1
WJX14-160	160	144.4	2	0.8°	71.7	143.3	302	317	293	2.1

DCX = Cutting Dia. Max.
APMX = Depth of Cut Max.
DC = Cutting Dia.
RMPX = Ramping Angle Max.
DH = Desired Hole Dia.
AZ = Plunge Depth Max.

Note 1) When ramping and helical milling, it is recommended to reduce the feed per tooth.
Note 2) When ramping, helical milling and drilling, long continuous chips may be scattered so please be careful.

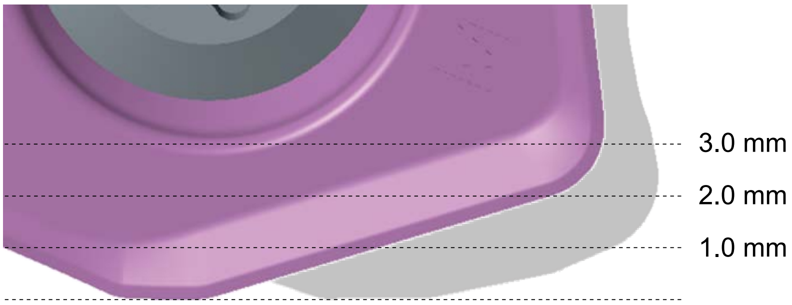
<Helical Milling>
To obtain a flat bottom surface when helical milling, it requires to remove “the uncut part” in the centre of the workpiece with a final pass.
When helical milling, make sure that the depth of cut per helical pass doesn’t exceed the maximum depth of cut (APMX).
<Drilling>
When drilling, set the axial feed per revolution at 0.2 mm/rev or less.

OPERATIONAL GUIDANCE

■Depth of Cut

Refer to the following table for the maximum depth of cut of the WJX. The straight cutting edge extending to the maximum depth of cut (APMX) allows for stable machining even at high depths of cut. For face milling, lowering the feed rate will allow the APMX value to be exceeded, up to depths of cut shown in the following table (when using the corner R). For details on the feed rate, refer to the recommended cutting conditions on page K096.

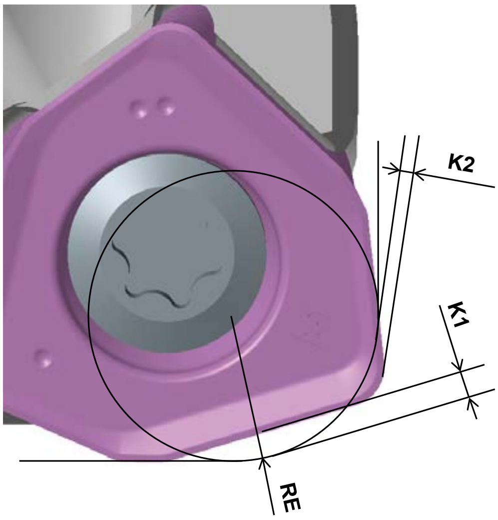
	WJX14
High feed and multi-function machining (APMX)	ap=2.0 mm
Low feed and Face machining	ap=3.0 mm



WJX14 Conventional Size 14

■Remaining Stock

For CAM, use CAD data (from online catalogues), or define it as a radius milling cutter with reference to the following table.
The approximate radius RE, remaining stock K1, and over cut amount K2 are as shown in the following table.



WJX14

RE (mm)	Remaining Stock **K1** (mm)	Cutting Amount **K2** (mm)
R3.0 (Recommendation)	1.41	0.00
R3.2	1.37	0.00
R4.0	1.17	0.10
R5.0	0.92	0.39

Depth of Cut **ap** (mm)	Remaining Stock **H** (mm)
1.0	0.05
1.5	0.08
2.0	0.12

MULTI-FUNCTIONAL MILLING

90° KAPR

VPX200

P M K N S H

Fig.1

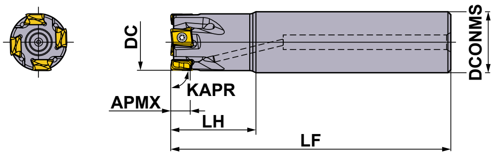
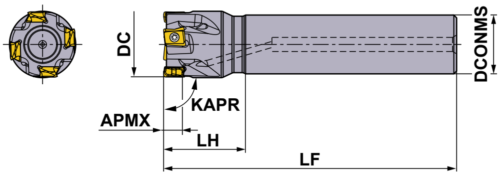


Fig.2



Right hand tool holder only.

■CYLINDRICAL SHANK

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			APMX (mm)	RMPX	RPMX (min^{-1})	WT* (kg)	Fig.	Insert Type
		R			DCONMS	LF	LH						
16	**VPX200R1602SA16S**	●	●	2	16	85	25	8	1.85°	37900	0.11	1	LOGU09
18	**VPX200R1802SA16S**	★	●	2	16	85	25	8	1.56°	35300	0.12	2	LOGU09
18	**VPX200R1802SA16L**	●	●	2	16	120	25	8	1.56°	35300	0.17	2	LOGU09
20	**VPX200R2002SA16S**	★	●	2	16	100	25	8	1.35°	33200	0.14	2	LOGU09
20	**VPX200R2003SA16S**	●	●	3	16	100	25	8	1.35°	33200	0.14	2	LOGU09
20	**VPX200R2002SA20S**	●	●	2	20	100	30	8	1.35°	33200	0.21	1	LOGU09
20	**VPX200R2003SA20S**	●	●	3	20	100	30	8	1.35°	33200	0.21	1	LOGU09
20	**VPX200R2002SA20L**	●	●	2	20	150	60	8	1.35°	33200	0.32	1	LOGU09
22	**VPX200R2202SA20S**	★	●	2	20	115	30	8	1.16°	31400	0.26	2	LOGU09
22	**VPX200R2203SA20S**	●	●	3	20	115	30	8	1.16°	31400	0.25	2	LOGU09
22	**VPX200R2202SA20L**	★	●	2	20	150	30	8	1.16°	31400	0.34	2	LOGU09
25	**VPX200R2503SA20S**	●	●	3	20	115	30	8	0.97°	29000	0.26	2	LOGU09
25	**VPX200R2504SA20S**	●	●	4	20	115	30	8	0.97°	29000	0.26	2	LOGU09
25	**VPX200R2503SA25S**	●	●	3	25	115	35	8	0.97°	29000	0.39	1	LOGU09
25	**VPX200R2504SA25S**	●	●	4	25	115	35	8	0.97°	29000	0.39	1	LOGU09
25	**VPX200R2503SA25L**	●	●	3	25	170	70	8	0.97°	29000	0.57	1	LOGU09
28	**VPX200R2803SA25S**	★	●	3	25	115	35	8	0.84°	27200	0.41	2	LOGU09
28	**VPX200R2804SA25S**	★	●	4	25	115	35	8	0.84°	27200	0.41	2	LOGU09
28	**VPX200R2803SA25L**	★	●	3	25	170	35	8	0.84°	27200	0.61	2	LOGU09
30	**VPX200R3003SA25S**	★	●	3	25	125	35	8	0.77°	26000	0.46	2	LOGU09
30	**VPX200R3004SA25S**	★	●	4	25	125	35	8	0.77°	26000	0.46	2	LOGU09
32	**VPX200R3203SA32S**	★	●	3	32	125	45	8	0.71°	25100	0.70	1	LOGU09
32	**VPX200R3204SA32S**	●	●	4	32	125	45	8	0.71°	25100	0.70	1	LOGU09
32	**VPX200R3205SA32S**	●	●	5	32	125	45	8	0.71°	25100	0.70	1	LOGU09
32	**VPX200R3203SA32L**	●	●	3	32	190	90	8	0.71°	25100	1.06	1	LOGU09
35	**VPX200R3503SA32L**	★	●	3	32	190	45	8	0.63°	23800	1.14	2	LOGU09
40	**VPX200R4004SA32S**	★	●	4	32	125	45	8	0.54°	22000	0.81	2	LOGU09
40	**VPX200R4006SA32S**	★	●	6	32	125	45	8	0.54°	22000	0.80	2	LOGU09
50	**VPX200R5005SA32S**	★	●	5	32	125	45	8	0.42°	19200	0.91	2	LOGU09
50	**VPX200R5007SA32S**	★	●	7	32	125	45	8	0.42°	19200	0.91	2	LOGU09

Note 1) The maximum spindle speeds are set to ensure tool and insert stability.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

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

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

Fig.1

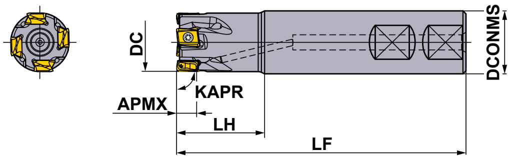
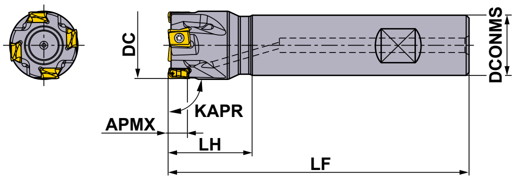


Fig.2



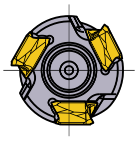
■ WELDON SHANK TYPE

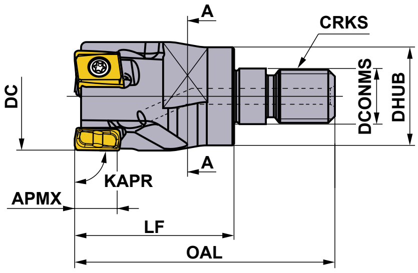
Right hand tool holder only.

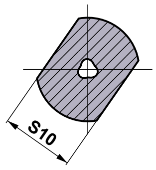
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			APMX (mm)	RMPX	RPMX (min^{-1})	WT* (kg)	Fig.	Insert Type
		R			DCONMS	LF	LH						
16	**VPX200R1602WA16S**	●	●	2	16	73	25	8	1.85°	37900	0.09	2	LOGU09
16	**VPX200R1602WA16M**	●	●	2	16	85	37	8	1.85°	37900	0.11	1	LOGU09
20	**VPX200R2002WA20S**	●	●	2	20	80	30	8	1.35°	33200	0.17	2	LOGU09
20	**VPX200R2003WA20S**	●	●	3	20	80	30	8	1.35°	33200	0.16	2	LOGU09
20	**VPX200R2002WA20M**	●	●	2	20	100	50	8	1.35°	33200	0.2	1	LOGU09
20	**VPX200R2003WA20M**	●	●	3	20	100	50	8	1.35°	33200	0.2	1	LOGU09
25	**VPX200R2503WA25S**	●	●	3	25	91	35	8	0.97°	29000	0.29	1	LOGU09
25	**VPX200R2504WA25S**	●	●	4	25	91	35	8	0.97°	29000	0.29	1	LOGU09
25	**VPX200R2503WA25M**	●	●	3	25	115	59	8	0.97°	29000	0.37	1	LOGU09
25	**VPX200R2504WA25M**	●	●	4	25	115	59	8	0.97°	29000	0.37	1	LOGU09
32	**VPX200R3203WA32S**	●	●	3	32	105	45	8	0.71°	25100	0.58	1	LOGU09
32	**VPX200R3204WA32S**	●	●	4	32	105	45	8	0.71°	25100	0.57	1	LOGU09
32	**VPX200R3205WA32S**	●	●	5	32	105	45	8	0.71°	25100	0.57	1	LOGU09
32	**VPX200R3203WA32M**	●	●	3	32	125	65	8	0.71°	25100	0.68	1	LOGU09
32	**VPX200R3204WA32M**	●	●	4	32	125	65	8	0.71°	25100	0.68	1	LOGU09
32	**VPX200R3205WA32M**	●	●	5	32	125	65	8	0.71°	25100	0.68	1	LOGU09

Note 1) The maximum spindle speeds are set to ensure tool and insert stability.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

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







A-A Section

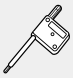
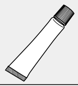
Right hand tool holder only.

SCREW-IN TYPE

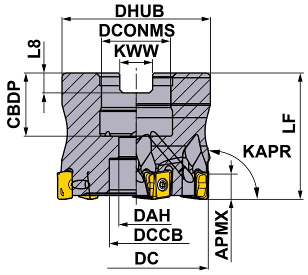
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)						WT* (kg)	APMX (mm)	RMPX	Insert Type
		R			DCONMS	DHUB	OAL	LF	S10	CRKS				
16	**VPX200R1602AM0830**	●	●	2	8.5	14.5	48	30	10	M08	0.03	8	1.85°	LOGU09
18	**VPX200R1802AM0830**	★	●	2	8.5	14.5	48	30	10	M08	0.04	8	1.56°	LOGU09
20	**VPX200R2002AM1030**	●	●	2	10.5	18.5	49	30	14	M10	0.06	8	1.35°	LOGU09
20	**VPX200R2003AM1030**	●	●	3	10.5	18.5	49	30	14	M10	0.06	8	1.35°	LOGU09
22	**VPX200R2202AM1030**	★	●	2	10.5	18.5	49	30	14	M10	0.06	8	1.16°	LOGU09
22	**VPX200R2203AM1030**	★	●	3	10.5	18.5	49	30	14	M10	0.06	8	1.16°	LOGU09
25	**VPX200R2503AM1235**	●	●	3	12.5	23.5	57	35	19	M12	0.11	8	0.97°	LOGU09
25	**VPX200R2504AM1235**	●	●	4	12.5	23.5	57	35	19	M12	0.11	8	0.97°	LOGU09
32	**VPX200R3203AM1640**	●	●	3	17.0	28.5	63	40	24	M16	0.21	8	0.71°	LOGU09
32	**VPX200R3204AM1640**	●	●	4	17.0	28.5	63	40	24	M16	0.21	8	0.71°	LOGU09
32	**VPX200R3205AM1640**	●	●	5	17.0	28.5	63	40	24	M16	0.21	8	0.71°	LOGU09
35	**VPX200R3503AM1640**	★	●	3	17.0	28.5	63	40	24	M16	0.24	8	0.63°	LOGU09
35	**VPX200R3505AM1640**	★	●	5	17.0	28.5	63	40	24	M16	0.23	8	0.63°	LOGU09
40	**VPX200R4004AM1640**	●	●	4	17.0	28.5	63	40	24	M16	0.26	8	0.54°	LOGU09
40	**VPX200R4006AM1640**	●	●	6	17.0	28.5	63	40	24	M16	0.26	8	0.54°	LOGU09

Note 1) For screw-in type arbors, refer to K260.
* WT : Tool Weight

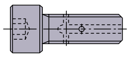
SPARE PARTS

DC (mm)	Tool Holder Type	 *		
		Clamp Screw	Wrench	Anti-seize Lubricant
16	**VPX200R16**	TPS27F1	TIP07F	MK1KS
18	**VPX200R18**	TPS27F1	TIP07F	MK1KS
20	**VPX200R20**	TPS27F1	TIP07F	MK1KS
22	**VPX200R22**	TPS27F2	TIP07F	MK1KS
25	**VPX200R25**	TPS27F2	TIP07F	MK1KS
28	**VPX200R28**	TPS27F2	TIP07F	MK1KS
30	**VPX200R30**	TPS27F2	TIP07F	MK1KS
32	**VPX200R32**	TPS27F2	TIP07F	MK1KS
35	**VPX200R35**	TPS27F2	TIP07F	MK1KS
40	**VPX200R40**	TPS27F2	TIP07F	MK1KS
50	**VPX200R50**	TPS27F2	TIP07F	MK1KS

* Clamp Torque (N • m) : TPS27F1=1.0,TPS27F2=1.0



Right hand tool holder only.

DC	Set Bolt	Geometry
Ø32, Ø40	HSC08025H	
Ø50, Ø63	HSC10030H	

■ARBOR TYPE

KAPR: 90°
GAMP: -6° GAMF : -25°

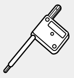
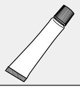
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)		WT* (kg)	APMX (mm)	RMPX	RPMX (min^{-1})	Insert Type
		R			LF	DCONMS					
32	**VPX200-032A03AR**	●	●	3	35	16	0.11	8	0.71°	25100	LOGU09
32	**VPX200-032A05AR**	●	●	5	35	16	0.11	8	0.71°	25100	LOGU09
40	**VPX200-040A04AR**	●	●	4	40	16	0.23	8	0.54°	22000	LOGU09
40	**VPX200-040A06AR**	●	●	6	40	16	0.22	8	0.54°	22000	LOGU09
50	**VPX200-050A05AR**	●	●	5	40	22	0.36	8	0.42°	19200	LOGU09
50	**VPX200-050A07AR**	●	●	7	40	22	0.36	8	0.42°	19200	LOGU09
63	**VPX200-063A06AR**	●	●	6	40	22	0.66	8	0.32°	16700	LOGU09
63	**VPX200-063A09AR**	●	●	9	40	22	0.66	8	0.32°	16700	LOGU09

Note 1) The maximum spindle speeds are set to ensure tool and insert stability.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions (mm)						
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
32	**VPX200-032A03AR**	16	18	9	14	30	8.4	5.6
32	**VPX200-032A05AR**	16	18	9	14	30	8.4	5.6
40	**VPX200-040A04AR**	16	18	9	14	37	8.4	5.6
40	**VPX200-040A06AR**	16	18	9	14	37	8.4	5.6
50	**VPX200-050A05AR**	22	20	11	17	47	10.4	6.3
50	**VPX200-050A07AR**	22	20	11	17	47	10.4	6.3
63	**VPX200-063A06AR**	22	20	11	17	60	10.4	6.3
63	**VPX200-063A09AR**	22	20	11	17	60	10.4	6.3

SPARE PARTS

Tool Holder Type	 *		
	Clamp Screw	Wrench	Anti-seize Lubricant
VPX200	TPS27F2	TIP07F	MK1KS

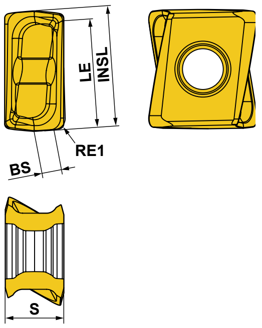
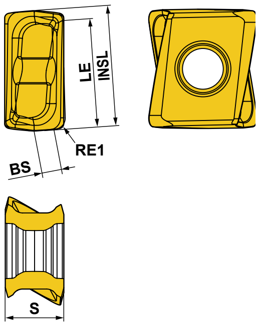
* Clamp Torque (N • m) : TPS27F2=1.0

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

INSERTS

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✤ : Unstable Cutting

Honing :
E : Round F : Sharp

Material	**P**	Steels		◐	◐		◐	✤				◐								
	M	Stainless Steels		◐	◐				◐			◐								
	K	Cast Irons		◐	◐	◐						✤								
	N	Non-ferrous Metals											◐							
	S	Heat Resistant Alloys, Titanium Alloys								◐	✤	◐								
	H	Hardened Steels										◐								
Shape	Order Number	Class	Honing	Coated									Carbide		Dimensions (mm)					Geometry
				NEW **MV1020**	NEW **MV1030**	**MC5020**	**MP6120**	**MP6130**	**MP7130**	**MP9120**	**MP9130**	**VP15TF**	**TF15**		**INSL**	**RE1**	**LE**	**S**	**BS**	
Low Cutting Resistance **L** Chipbreaker 	**LOGU0904020PNER-L**	G	E	●	●	★	★	★	★	★	★	★			8.7	0.2	7.6	4.3	1.7	 Right hand insert only.
	LOGU0904040PNER-L	G	E	●	●	●	●	●	●	●	●	★			8.7	0.4	7.6	4.3	1.5	
	LOGU0904080PNER-L	G	E	●	●	●	●	●	●	●	●	★			8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNER-L	G	E	●	●	★	★	★	★	★	★	★			8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNER-L	G	E	●	●	★	★	★	★	★	★	★			8.7	1.2	7.6	4.3	0.8	
	LOGU0904160PNER-L	G	E	●	●	●	●	●	●	●	●	★			8.7	1.6	7.6	4.3	0.5	
	LOGU0904020PNFR-L	G	F										●		8.7	0.2	7.6	4.3	1.7	
	LOGU0904040PNFR-L	G	F										●		8.7	0.4	7.6	4.3	1.5	
	LOGU0904080PNFR-L	G	F										●		8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNFR-L	G	F										★		8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNFR-L	G	F										★		8.7	1.2	7.6	4.3	0.8	
	LOGU0904160PNFR-L	G	F										★		8.7	1.6	7.6	4.3	0.5	
General Use **M** Chipbreaker 	**LOGU0904020PNER-M**	G	E	●	●	★	★	★	★	★	★	★			8.7	0.2	7.6	4.3	1.7	 Right hand insert only.
	LOGU0904040PNER-M	G	E	●	●	●	●	●	●	●	●	★			8.7	0.4	7.6	4.3	1.6	
	LOGU0904080PNER-M	G	E	●	●	●	●	●	●	●	●	★			8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNER-M	G	E	●	●	★	★	★	★	★	★	★			8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNER-M	G	E	●	●	★	★	★	★	★	★	★			8.7	1.2	7.6	4.3	0.9	
	LOGU0904160PNER-M	G	E	●	●	●	●	●	●	●	●	★			8.7	1.6	7.6	4.3	0.5	
	LOGU0904020PNFR-M	G	F										●		8.7	0.2	7.6	4.3	1.7	
	LOGU0904040PNFR-M	G	F										●		8.7	0.4	7.6	4.3	1.6	
	LOGU0904080PNFR-M	G	F										●		8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNFR-M	G	F										★		8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNFR-M	G	F										★		8.7	1.2	7.6	4.3	0.9	
	LOGU0904160PNFR-M	G	F										★		8.7	1.6	7.6	4.3	0.5	

● = NEW

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

CHIPBREAKER RECOMMENDATION

■ Chipbreaker Selection Table

	Material	Properties	Cutting Conditions	Chipbreaker		Grade	
				1st Recommendation	2nd Recommendation	1st Recommendation	2nd Recommendation
P	Mild Steel	Hardness ≤180HB	● ◐	L	M	MV1020	—
			● ◐	L	M	MV1030	—
			● ◐	L	M	MP6120	VP15TF
			✤	M	L	MP6130	—
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180-350HB ≤350HB (Annealing)	● ◐	L	M	MV1020	—
			● ◐	L	M	MV1030	—
			●	L	M	MP6120	VP15TF
			◐	M	L	MP6120	VP15TF
			✤	M	L	MP6130	—
	Pre-hardened Steel	Hardness 35—45HRC	● ◐	M	L	MP6120	VP15TF
			✤	M	L	MP6130	—
M	Austenitic Stainless Steel	Hardness ≤280HB	● ◐	L	M	MV1030	—
			● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
		Hardness >200HB	● ◐	L	M	MV1030	—
			● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
	Duplex Stainless Steel	Hardness ≤280HB	● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
	Ferritic and Martensitic Stainless Steel	—	● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	M	L	MC5020	VP15TF
			✤	M	L	VP15TF	—
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	M	L	MV1020	—
			● ◐	M	L	MV1030	—
			● ◐	M	L	MC5020	VP15TF
			✤	M	L	VP15TF	—
N	Aluminium Alloy	Content Si<5%	● ◐	L	M	TF15	—
			✤	M	L	TF15	—
S	Titanium Alloy (Ti-6Al-4V,etc.)	—	● ◐	L	M	MP9120	VP15TF
			✤	M	L	MP9130	—
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	—	● ◐	L	M	MP9120	VP15TF
			✤	M	L	MP9130	—
	Heat Resistant Alloy	—	● ◐	M	L	MP9120	VP15TF
			✤	M	L	MP9130	—
H	Hardened Steel	Hardness 40—55HRC	● ◐ ✤	M	—	VP15TF	—

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

RECOMMENDED CUTTING CONDITIONS

■ Dry Cutting

Cutting Speed

	Material	Properties	Cutting Conditions	Grade	**ae** (mm)			
					≤0.25DC	0.25—0.5DC	0.5—0.75DC	DC(Slot)
					Vc (m/min)			
P	Mild Steel	Hardness ≤180HB	● ◐	MV1020	280 (220—330)	270 (210—320)	220 (170—260)	220 (170—260)
			● ◐	MV1030	230 (180—270)	220 (170—260)	180 (140—210)	180 (140—210)
			● ◐	MP6120,VP15TF	230 (180—270)	220 (170—260)	180 (140—210)	180 (140—210)
			✤	MP6130	200 (150—240)	190 (140—230)	150 (110—180)	150 (110—180)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180—350HB ≤350HB (Annealing)	● ◐	MV1020	220 (170—260)	210 (160—240)	170 (130—200)	170 (130—200)
			● ◐	MV1030	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
			● ◐	MP6120,VP15TF	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
			✤	MP6130	150 (110—180)	140 (100—170)	110 (80—130)	110 (80—130)
	Pre-hardened Steel	Hardness 35—45HRC	● ◐	MP6120,VP15TF	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)
			✤	MP6130	100 (80—120)	90 (70—110)	80 (60—100)	80 (60—100)
M	Austenitic Stainless Steel	Hardness ≤200HB	● ◐	MV1030	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
			● ◐ ✤	MP7130,VP15TF	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
		Hardness >200HB	● ◐	MV1030	150 (110—180)	140 (100—160)	110 (80—130)	110 (80—130)
			● ◐ ✤	MP7130,VP15TF	150 (110—180)	140 (100—160)	110 (80—130)	110 (80—130)
	Duplex Stainless Steel	Hardness ≤280HB	● ◐ ✤	MP7130,VP15TF	140 (110—170)	130 (90—150)	100 (70—120)	100 (70—120)
	Ferritic and Martensitic Stainless Steel	—	● ◐ ✤	MP7130,VP15TF	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐ ✤	MP7130,VP15TF	130 (100—160)	120 (80—140)	90 (60—110)	90 (60—110)
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	MC5020	250 (200—300)	240 (190—290)	210 (160—260)	210 (160—260)
			● ◐ ✤	VP15TF	200 (150—250)	190 (140—240)	160 (110—210)	160 (110—210)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	MV1020	180 (140—250)	170 (130—240)	150 (120—210)	150 (120—210)
			● ◐	MV1030	150 (100—200)	140 (90—190)	125 (80—170)	125 (80—170)
			● ◐	MC5020	180 (150—200)	170 (140—190)	150 (120—170)	150 (120—170)
			● ◐ ✤	VP15TF	130 (100—150)	120 (90—140)	100 (80—120)	100 (80—120)
N	Aluminium Alloy	Content Si<5%	● ◐ ✤	TF15	600 (400—1000)	600 (400—1000)	600 (400—1000)	600 (400—1000)
H	Hardened Steel	Hardness 40—55HRC	● ◐ ✤	VP15TF	90 (70—100)	85 (60—100)	70 (50—80)	70 (50—80)

Note 1) These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.

Note 2) Chattering and vibrations are more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
- When tool overhang is long (using a long shank, screw-in type, etc.)
- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change out the clamp screw periodically.

Depth of Cut / Feed per Tooth

	Material	Properties	**ae**	Cutting Conditions	**DC** (mm)					
					ø16—ø18		**ø20—ø25**		**ø28—ø63**	
					ap	**fz** (mm/t.)	**ap**	**fz** (mm/t.)	**ap**	**fz** (mm/t.)
P	Mild Steel	Hardness ≤180HB	≤0.25DC	● ◐ ✤	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.25
			0.25—0.5DC	● ◐ ✤	≤5	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.20
			0.5—0.75DC	● ◐ ✤	≤4	0.08—0.12	≤6	0.08—0.12	≤6	0.10—0.15
			DC(Slot)	● ◐ ✤	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.08—0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180—280HB	≤0.25DC	● ◐ ✤	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.25
			0.25—0.5DC	● ◐ ✤	≤5	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.20
			0.5—0.75DC	● ◐ ✤	≤4	0.08—0.12	≤6	0.08—0.12	≤6	0.10—0.15
			DC(Slot)	● ◐ ✤	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.08—0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	≤0.25DC	● ◐ ✤	≤6	0.10—0.15	≤8	0.10—0.15	≤8	0.10—0.20
			0.25—0.5DC	● ◐ ✤	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.10—0.15
			0.5—0.75DC	● ◐ ✤	≤4	0.08—0.12	≤6	0.06—0.10	≤6	0.08—0.12
			DC(Slot)	● ◐ ✤	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.05—0.10
	Pre-hardened Steel	Hardness 35—45HRC	≤0.25DC	● ◐ ✤	≤6	0.10—0.15	≤8	0.10—0.15	≤8	0.10—0.20
			0.25—0.5DC	● ◐ ✤	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.10—0.15
			0.5—0.75DC	● ◐ ✤	≤4	0.08—0.12	≤6	0.06—0.10	≤6	0.08—0.12
			DC(Slot)	● ◐ ✤	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10

RECOMMENDED CUTTING CONDITIONS

■ Dry Cutting

Depth of Cut / Feed per Tooth

	Material	Properties	ae	Cutting Conditions	DC (mm)					
					ø16—ø18		ø20—ø25		ø28—ø63	
					ap	fz (mm/t.)	ap	fz (mm/t.)	ap	fz (mm/t.)
M	Austenitic Stainless Steel	–	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✤	≤6	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
				✤	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.06—0.10	≤6	0.08—0.12	≤6	0.08—0.12
				✤	≤4	0.06—0.08	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
				✤	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.08
	Duplex Stainless Steel	Hardness ≤280HB	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✤	≤6	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
				✤	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.06—0.10	≤6	0.08—0.12	≤6	0.08—0.12
				✤	≤4	0.06—0.08	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
				✤	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.08
	Ferritic and Martensitic Stainless Steel	–	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✤	≤6	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
				✤	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.06—0.10	≤6	0.08—0.12	≤6	0.08—0.12
				✤	≤4	0.06—0.08	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
				✤	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.08
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.15	≤8	0.10—0.15
				✤	≤6	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
				✤	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.06—0.10	≤6	0.06—0.10	≤6	0.06—0.10
				✤	≤4	0.06—0.08	≤6	0.06—0.08	≤6	0.06—0.08
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
				✤	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.08
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.25
				✤	≤6	0.08—0.12	≤8	0.08—0.15	≤8	0.10—0.20
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.15	≤8	0.10—0.20
				✤	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.10—0.15
			0.5—0.75DC	● ◐	≤4	0.08—0.12	≤6	0.08—0.12	≤6	0.10—0.15
				✤	≤4	0.08—0.12	≤6	0.06—0.10	≤6	0.08—0.12
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.08—0.15
				✤	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.08—0.10
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✤	≤6	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.15
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.15
				✤	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.08—0.12	≤6	0.08—0.12	≤6	0.08—0.12
				✤	≤4	0.08—0.12	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
				✤	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.08
N	Aluminium Alloy	Content Si<5%	≤0.25DC	● ◐	≤6	0.10—0.20	≤8	0.10—0.25	≤8	0.10—0.25
				✤	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
			0.25—0.5DC	● ◐	≤5	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✤	≤5	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.15
			0.5—0.75DC	● ◐	≤4	0.08—0.12	≤6	0.06—0.15	≤6	0.08—0.15
				✤	≤4	0.06—0.10	≤6	0.06—0.15	≤6	0.08—0.15
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.15	≤4	0.08—0.15
				✤	≤2	0.06—0.08	≤4	0.06—0.12	≤4	0.08—0.12
H	Hardened Steel	Hardness 40—55HRC	≤0.25DC	● ◐	≤4	0.08—0.15	≤4	0.08—0.15	≤4	0.08—0.15
				✤	≤4	0.08—0.12	≤4	0.08—0.12	≤4	0.08—0.12
			0.25—0.5DC	● ◐	≤3	0.08—0.12	≤3	0.08—0.12	≤3	0.08—0.12
				✤	≤3	0.06—0.10	≤3	0.08—0.10	≤3	0.06—0.10
			0.5—0.75DC	● ◐	≤2	0.06—0.10	≤2	0.08—0.10	≤2	0.06—0.10
				✤	≤2	0.06—0.08	≤2	0.06—0.08	≤2	0.06—0.08
			DC(Slot)	● ◐	≤1	0.06—0.10	≤1	0.06—0.10	≤1	0.06—0.10
				✤	≤1	0.06—0.08	≤1	0.06—0.08	≤1	0.06—0.08

Note 1) These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.

Note 2) Chattering and vibrations are more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
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- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change out the clamp screw periodically.

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

■ Wet Cutting
Cutting Speed

	Material	Properties	Cutting Conditions	Grade	**ae** (mm)			
					≤0.25DC	0.25—0.5DC	0.5—0.75DC	DC(Slot)
					Vc (m/min)			
P	Mild Steel	Hardness ≤180HB	● ◐	MV1020	210 (150—290)	200 (140—270)	150 (110—180)	150 (110—180)
			● ◐	MV1030	140 (100—190)	130 (90—180)	100 (70—120)	100 (70—120)
			● ◐ ✤	MP6120 MP6130 VP15TF	140 (100—190)	130 (90—180)	100 (70—120)	100 (70—120)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180—350HB ≤350HB (Annealing)	● ◐	MV1020	180 (140—210)	170 (120—200)	150 (110—180)	150 (110—180)
			● ◐	MV1030	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)
			● ◐ ✤	MP6120 MP6130 VP15TF	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)
	Pre-hardened Steel	Hardness 35—45HRC	● ◐ ✤	MP6120 MP6130 VP15TF	100 (80—120)	90 (70—110)	80 (60—100)	80 (60—100)
M	Austenitic Stainless Steel	Hardness ≤200HB	● ◐ ✤	MP7130 VP15TF	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)
		Hardness >200HB	● ◐ ✤	MP7130 VP15TF	100 (80—130)	90 (70—110)	70 (50—100)	70 (50—100)
	Duplex Stainless Steel	Hardness ≤280HB	● ◐ ✤	MP7130 VP15TF	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)
	Ferritic and Martensitic Stainless Steel	—	● ◐ ✤	MP7130 VP15TF	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐ ✤	MP7130 VP15TF	90 (70—120)	80 (60—110)	60 (40—90)	60 (40—90)
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	MC5020	180 (160—220)	170 (150—210)	150 (130—190)	150 (130—190)
			● ◐ ✤	VP15TF	130 (100—150)	120 (90—140)	100 (80—120)	100 (80—120)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	MV1020	160 (130—210)	150 (120—200)	130 (110—170)	130 (110—170)
			● ◐	MV1030	130 (80—180)	120 (70—170)	105 (60—150)	105 (60—150)
			● ◐	MC5020	160 (140—180)	150 (130—170)	130 (110—150)	130 (110—150)
			● ◐ ✤	VP15TF	110 (80—140)	100 (70—130)	80 (60—120)	80 (60—120)
N	Aluminium Alloy	Content Si<5%	● ◐ ✤	TF15	600 (400—1000)	600 (400—1000)	600 (400—1000)	600 (400—1000)
S	Titanium Alloy (Ti-6Al-4V,etc.)	—	● ◐	MP9120,VP15TF	50 (40—70)	50 (40—70)	50 (40—70)	50 (40—70)
			✤	MP9130	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	—	● ◐ ✤	MP9120 MP9130 VP15TF	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)
	Heat Resistant Alloy	—	● ◐	MP9120,VP15TF	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)
			✤	MP9130	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)
H	Hardened Steel	Hardness 40—55HRC	● ◐ ✤	VP15TF	90 (70—100)	85 (60—100)	70 (50—80)	70 (50—80)

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- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change out the clamp screw periodically.

RECOMMENDED CUTTING CONDITIONS

■ Wet Cutting

Depth of Cut / Feed per Tooth

	Material	Properties	ae	Cutting Conditions	DC (mm)					
					ø16—ø18		ø20—ø25		ø28—ø63	
					ap	fz (mm/t.)	ap	fz (mm/t.)	ap	fz (mm/t.)
P	Mild Steel	Hardness ≤180HB	≤0.25DC	● ◐ ✱	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.25
			0.25—0.5DC	● ◐ ✱	≤5	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.20
			0.5—0.75DC	● ◐ ✱	≤4	0.08—0.12	≤6	0.08—0.12	≤6	0.10—0.15
			DC(Slot)	● ◐ ✱	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.08—0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180—280HB	≤0.25DC	● ◐ ✱	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.25
			0.25—0.5DC	● ◐ ✱	≤5	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.20
			0.5—0.75DC	● ◐ ✱	≤4	0.08—0.12	≤6	0.08—0.12	≤6	0.10—0.15
			DC(Slot)	● ◐ ✱	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.08—0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	≤0.25DC	● ◐ ✱	≤6	0.10—0.15	≤8	0.10—0.15	≤8	0.10—0.20
			0.25—0.5DC	● ◐ ✱	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.10—0.15
			0.5—0.75DC	● ◐ ✱	≤4	0.08—0.12	≤6	0.06—0.10	≤6	0.08—0.12
			DC(Slot)	● ◐ ✱	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
	Pre-hardened Steel	Hardness 35—45HRC	≤0.25DC	● ◐ ✱	≤6	0.10—0.15	≤8	0.10—0.15	≤8	0.10—0.20
			0.25—0.5DC	● ◐ ✱	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.10—0.15
			0.5—0.75DC	● ◐ ✱	≤4	0.08—0.12	≤6	0.06—0.10	≤6	0.08—0.12
			DC(Slot)	● ◐ ✱	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
M	Austenitic Stainless Steel	–	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✱	≤6	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
				✱	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.06—0.10	≤6	0.08—0.12	≤6	0.08—0.12
				✱	≤4	0.06—0.08	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
				✱	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.08
	Duplex Stainless Steel	Hardness ≤280HB	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✱	≤6	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.12
				✱	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.06—0.10	≤6	0.08—0.12	≤6	0.08—0.12
				✱	≤4	0.06—0.08	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
				✱	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.08
	Ferritic and Martensitic Stainless Steel	–	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✱	≤6	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.15	≤8	0.08—0.15
				✱	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.06—0.10	≤6	0.08—0.12	≤6	0.08—0.12
				✱	≤4	0.06—0.08	≤6	0.06—0.10	≤6	0.05—0.10
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.05—0.10
				✱	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.05—0.08
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.15	≤8	0.10—0.15
				✱	≤6	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
				✱	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.06—0.10	≤6	0.06—0.10	≤6	0.05—0.10
				✱	≤4	0.06—0.08	≤6	0.06—0.08	≤6	0.05—0.08
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.05—0.10
				✱	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.05—0.08
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.25
				✱	≤6	0.08—0.12	≤8	0.08—0.15	≤8	0.10—0.20
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.08—0.15	≤8	0.10—0.20
				✱	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.10—0.15
			0.5—0.75DC	● ◐	≤4	0.08—0.12	≤6	0.06—0.10	≤6	0.10—0.15
				✱	≤4	0.08—0.12	≤6	0.06—0.10	≤6	0.08—0.12
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.08—0.15
				✱	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.10
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.25DC	● ◐	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✱	≤6	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.15
			0.25—0.5DC	● ◐	≤5	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.15
				✱	≤5	0.06—0.10	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐	≤4	0.08—0.12	≤6	0.08—0.12	≤6	0.08—0.12
				✱	≤4	0.08—0.12	≤6	0.08—0.12	≤6	0.06—0.10
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
				✱	≤2	0.06—0.08	≤4	0.06—0.08	≤4	0.06—0.08

Note 1) These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.

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- When tool overhang is long (using a long shank, screw-in type, etc.)
- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change out the clamp screw periodically.

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

	Material	Properties	ae	Cutting Conditions	DC (mm)					
					ø16—ø18		**ø20—ø25**		**ø28—ø63**	
					ap	**fz** (mm/t.)	**ap**	**fz** (mm/t.)	**ap**	**fz** (mm/t.)
N	Aluminium Alloy	Content Si＜5%	≤0.25DC	● ◐	≤6	0.10—0.20	≤8	0.10—0.25	≤8	0.10—0.25
				✣	≤6	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
			0.25—0.5DC	● ◐	≤5	0.10—0.15	≤8	0.10—0.20	≤8	0.10—0.20
				✣	≤5	0.08—0.12	≤8	0.10—0.15	≤8	0.10—0.15
			0.5—0.75DC	● ◐	≤4	0.08—0.12	≤6	0.06—0.15	≤6	0.08—0.15
				✣	≤4	0.06—0.10	≤6	0.06—0.15	≤6	0.08—0.15
			DC(Slot)	● ◐	≤2	0.06—0.10	≤4	0.06—0.15	≤4	0.08—0.15
				✣	≤2	0.06—0.08	≤4	0.06—0.12	≤4	0.08—0.12
S	Titanium Alloy (Ti-6Al-4V,etc.)	–	≤0.25DC	● ◐ ✣	≤6	0.08—0.15	≤8	0.08—0.15	≤8	0.08—0.15
			0.25—0.5DC	● ◐ ✣	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐ ✣	≤4	0.06—0.10	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐ ✣	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	–	≤0.25DC	● ◐ ✣	≤6	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
			0.25—0.5DC	● ◐ ✣	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐ ✣	≤4	0.06—0.10	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐ ✣	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
	Heat Resistant Alloy	–	≤0.25DC	● ◐ ✣	≤6	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
			0.25—0.5DC	● ◐ ✣	≤5	0.08—0.12	≤8	0.08—0.12	≤8	0.08—0.12
			0.5—0.75DC	● ◐ ✣	≤4	0.06—0.10	≤6	0.06—0.10	≤6	0.06—0.10
			DC(Slot)	● ◐ ✣	≤2	0.06—0.10	≤4	0.06—0.10	≤4	0.06—0.10
H	Hardened Steel	Hardness 40—55HRC	≤0.25DC	● ◐	≤4	0.08—0.15	≤4	0.08—0.15	≤4	0.08—0.15
				✣	≤4	0.08—0.12	≤4	0.08—0.12	≤4	0.08—0.12
			0.25—0.5DC	● ◐	≤3	0.08—0.12	≤3	0.08—0.12	≤3	0.08—0.12
				✣	≤3	0.06—0.10	≤3	0.06—0.10	≤3	0.06—0.10
			0.5—0.75DC	● ◐	≤2	0.06—0.10	≤2	0.06—0.10	≤2	0.06—0.10
				✣	≤2	0.06—0.10	≤2	0.06—0.10	≤2	0.06—0.10
			DC(Slot)	● ◐	≤1	0.06—0.10	≤1	0.06—0.10	≤1	0.06—0.10
				✣	≤1	0.06—0.10	≤1	0.06—0.10	≤1	0.06—0.10

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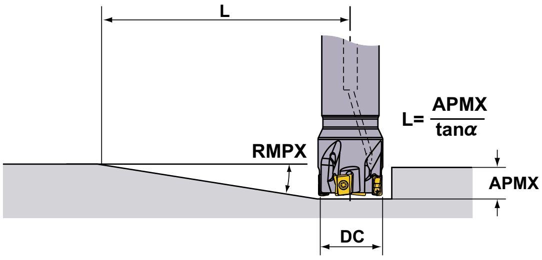
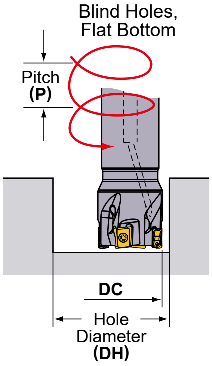
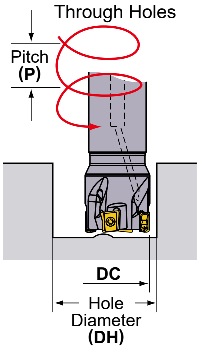
■Ramping / Helical Cutting

●Ramping



●Helical Cutting





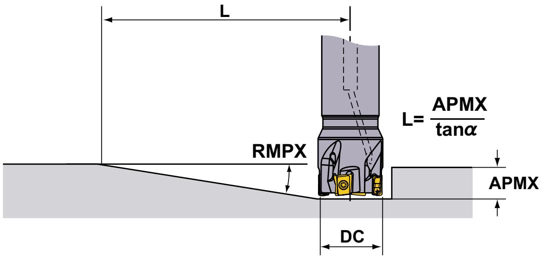
Refer to the table below for cutting conditions. For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

DC (mm)	RE (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
		RMPX	**L** (mm) *	**DH max.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)
16	0.2	1.85°	248	31.0	1.5	27.5	1.2	24.2	0.8
	0.4	1.85°	248	30.6	1.5	27.5	1.2	24.2	0.8
	0.8	1.85°	248	29.8	1.4	27.5	1.2	24.2	0.8
	1.0	1.85°	248	29.4	1.4	27.5	1.2	24.2	0.8
	1.2	1.85°	248	29.0	1.3	27.5	1.2	24.2	0.8
	1.6	1.85°	248	28.2	1.2	27.5	1.2	24.2	0.8
18	0.2	1.56°	294	35.0	1.5	31.5	1.2	28.1	0.9
	0.4	1.56°	294	34.6	1.4	31.5	1.2	28.1	0.9
	0.8	1.56°	294	33.8	1.4	31.5	1.2	28.1	0.9
	1.0	1.56°	294	33.4	1.3	31.5	1.2	28.1	0.9
	1.2	1.56°	294	33.0	1.3	31.5	1.2	28.1	0.9
	1.6	1.56°	294	32.2	1.2	31.5	1.2	28.1	0.9
20	0.2	1.35°	340	39.0	1.4	35.5	1.1	32.0	0.9
	0.4	1.35°	340	38.6	1.4	35.5	1.1	32.0	0.9
	0.8	1.35°	340	37.8	1.3	35.5	1.1	32.0	0.9
	1.0	1.35°	340	37.4	1.3	35.5	1.1	32.0	0.9
	1.2	1.35°	340	37.0	1.3	35.5	1.1	32.0	0.9
	1.6	1.35°	340	36.2	1.2	35.5	1.1	32.0	0.9
22	0.2	1.16°	396	43.0	1.3	39.5	1.1	36.0	0.9
	0.4	1.16°	396	42.6	1.3	39.5	1.1	36.0	0.9
	0.8	1.16°	396	41.8	1.3	39.5	1.1	36.0	0.9
	1.0	1.16°	396	41.4	1.2	39.5	1.1	36.0	0.9
	1.2	1.16°	396	41.0	1.2	39.5	1.1	36.0	0.9
	1.6	1.16°	396	40.2	1.2	39.5	1.1	36.0	0.9
25	0.2	0.97°	473	49.0	1.3	45.5	1.1	42.0	0.9
	0.4	0.97°	473	48.6	1.3	45.5	1.1	42.0	0.9
	0.8	0.97°	473	47.8	1.2	45.5	1.1	42.0	0.9
	1.0	0.97°	473	47.4	1.2	45.5	1.1	42.0	0.9
	1.2	0.97°	473	47.0	1.2	45.5	1.1	42.0	0.9
	1.6	0.97°	473	46.2	1.1	45.5	1.1	42.0	0.9
28	0.2	0.84°	546	55.0	1.2	51.5	1.1	48.0	0.9
	0.4	0.84°	546	54.6	1.2	51.5	1.1	48.0	0.9
	0.8	0.84°	546	53.8	1.2	51.5	1.1	48.0	0.9
	1.0	0.84°	546	53.4	1.2	51.5	1.1	48.0	0.9
	1.2	0.84°	546	53.0	1.2	51.5	1.1	48.0	0.9
	1.6	0.84°	546	52.2	1.1	51.5	1.1	48.0	0.9
30	0.2	0.77°	596	59.0	1.2	55.5	1.1	52.0	0.9
	0.4	0.77°	596	58.6	1.2	55.5	1.1	52.0	0.9
	0.8	0.77°	596	57.8	1.2	55.5	1.1	52.0	0.9
	1.0	0.77°	596	57.4	1.2	55.5	1.1	52.0	0.9
	1.2	0.77°	596	57.0	1.1	55.5	1.1	52.0	0.9
	1.6	0.77°	596	56.2	1.1	55.5	1.1	52.0	0.9
32	0.2	0.71°	646	62.8	1.2	59.4	1.1	56.0	0.9
	0.4	0.71°	646	62.4	1.2	59.4	1.1	56.0	0.9
	0.8	0.71°	646	61.6	1.2	59.4	1.1	56.0	0.9
	1.0	0.71°	646	61.2	1.1	59.4	1.1	56.0	0.9
	1.2	0.71°	646	60.8	1.1	59.4	1.1	56.0	0.9
	1.6	0.71°	646	60.0	1.1	59.4	1.1	56.0	0.9

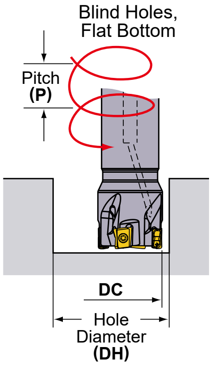
Note 1) When machining a highly ductile workpiece with the ramping angles in the table above, chips may be elongated.
* Shows the distance until a maximum depth of cut of 8 mm is achieved at the maximum ramping angle L (= 8/tan α).

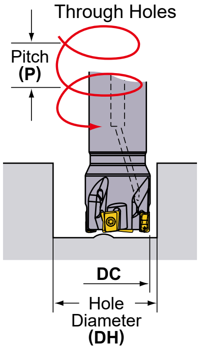
■Ramping / Helical Cutting

●Ramping



●Helical Cutting





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

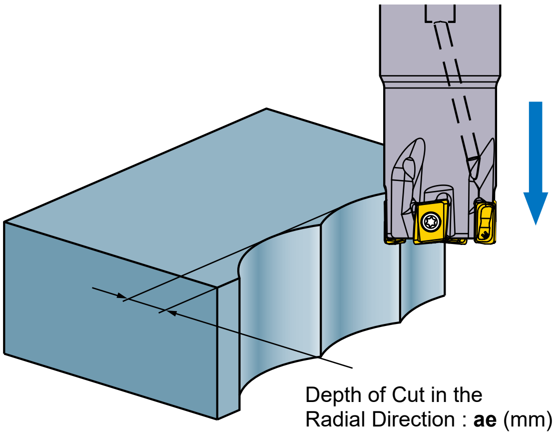
DC (mm)	**RE** (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
		RMPX	**L** (mm) *	**DH max.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)
35	0.2	0.63°	728	69.0	1.2	65.5	1.1	62.0	0.9
	0.4	0.63°	728	68.6	1.2	65.5	1.1	62.0	0.9
	0.8	0.63°	728	67.8	1.1	65.5	1.1	62.0	0.9
	1.0	0.63°	728	67.4	1.1	65.5	1.1	62.0	0.9
	1.2	0.63°	728	67.0	1.1	65.5	1.1	62.0	0.9
	1.6	0.63°	728	66.2	1.1	65.5	1.1	62.0	0.9
40	0.2	0.54°	849	78.8	1.2	75.4	1.0	72.0	0.9
	0.4	0.54°	849	78.4	1.1	75.4	1.0	72.0	0.9
	0.8	0.54°	849	77.6	1.1	75.4	1.0	72.0	0.9
	1.0	0.54°	849	77.2	1.1	75.4	1.0	72.0	0.9
	1.2	0.54°	849	76.8	1.1	75.4	1.0	72.0	0.9
	1.6	0.54°	849	76.0	1.1	75.4	1.0	72.0	0.9
50	0.2	0.42°	1092	98.8	1.1	95.4	1.0	92.0	1.0
	0.4	0.42°	1092	98.4	1.1	95.4	1.0	92.0	1.0
	0.8	0.42°	1092	97.6	1.1	95.4	1.0	92.0	1.0
	1.0	0.42°	1092	97.2	1.1	95.4	1.0	92.0	1.0
	1.2	0.42°	1092	96.8	1.1	95.4	1.0	92.0	1.0
	1.6	0.42°	1092	96.0	1.1	95.4	1.0	92.0	1.0
63	0.2	0.32°	1433	124.8	1.1	121.4	1.0	118.0	1.0
	0.4	0.32°	1433	124.4	1.1	121.4	1.0	118.0	1.0
	0.8	0.32°	1433	123.6	1.1	121.4	1.0	118.0	1.0
	1.0	0.32°	1433	123.2	1.1	121.4	1.0	118.0	1.0
	1.2	0.32°	1433	122.8	1.1	121.4	1.0	118.0	1.0
	1.6	0.32°	1433	122.0	1.0	121.4	1.0	118.0	1.0

Note 1) When machining a highly ductile workpiece with the ramping angles in the table above, chips may be elongated.
* Shows the distance until a maximum depth of cut of 8 mm is achieved at the maximum ramping angle L (= 8/tan α).

For Plunging and Drilling

See the tables to the right for cutting conditions. Follow the cutting conditions for slot milling regarding feed per tooth and cutting speed.

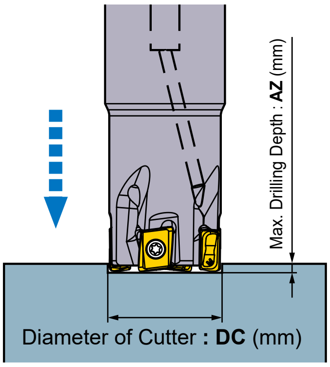
Plunging



DC (mm)	ae max. (mm)
16	3.9
18	3.9
20	3.9
22	4.0
25	4.0
28	4.0
30	4.0
32	4.0
35	4.0
40	4.0
50	4.0
63	4.0

Note 1) No step feed necessary.

Drilling



DC (mm)	AZ max. (mm)
16	0.3
18	0.3
20	0.3
22	0.3
25	0.3
28	0.3
30	0.3
32	0.3
35	0.3
40	0.3
50	0.3
63	0.3

Note 1) Exercise due caution as chips scatter easily.
Note 2) Use compressed air to eliminate chips (or coolant for when machining aluminium alloy).

MULTI-FUNCTIONAL MILLING

90° KAPR

VPX300

P M K N S H

Fig.1

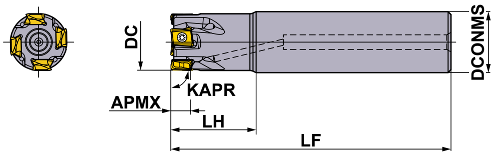
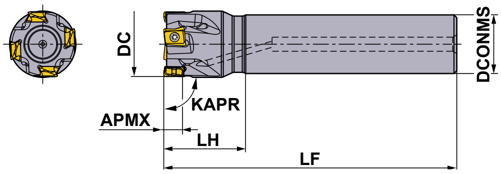


Fig.2



Right hand tool holder only.

■CYLINDRICAL SHANK

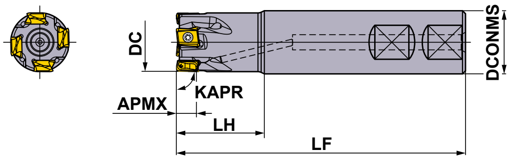
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			APMX (mm)	RMPX	RPMX (min^{-1})	WT* (kg)	Fig.	Insert Type
		R			DCONMS	LF	LH						
25	**VPX300R2502SA25S**	●	●	2	25	115	35	11	2.13°	24100	0.38	1	LOGU12
25	**VPX300R2502SA25L**	●	●	2	25	170	70	11	2.13°	24100	0.56	1	LOGU12
28	**VPX300R2802SA25S**	★	●	2	25	115	35	11	1.77°	22500	0.40	2	LOGU12
28	**VPX300R2802SA25L**	★	●	2	25	170	35	11	1.77°	22500	0.60	2	LOGU12
30	**VPX300R3002SA25S**	★	●	2	25	125	35	11	1.61°	21500	0.45	2	LOGU12
30	**VPX300R3003SA25S**	★	●	3	25	125	35	11	1.61°	21500	0.44	2	LOGU12
32	**VPX300R3202SA32S**	●	●	2	32	125	45	11	1.47°	20600	0.69	1	LOGU12
32	**VPX300R3203SA32S**	●	●	3	32	125	45	11	1.47°	20600	0.68	1	LOGU12
32	**VPX300R3203SA32L**	●	●	3	32	190	90	11	1.47°	20600	1.04	1	LOGU12
35	**VPX300R3503SA32L**	★	●	3	32	190	45	11	1.28°	19500	1.10	2	LOGU12
40	**VPX300R4003SA32S**	●	●	3	32	125	45	11	1.06°	17900	0.76	2	LOGU12
40	**VPX300R4004SA32S**	●	●	4	32	125	45	11	1.06°	17900	0.76	2	LOGU12
50	**VPX300R5004SA32S**	★	●	4	32	125	45	11	0.79°	15500	0.89	2	LOGU12
50	**VPX300R5006SA32S**	★	●	6	32	125	45	11	0.79°	15500	0.88	2	LOGU12

Note 1) The maximum spindle speeds are set to ensure tool and insert stability.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

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

SPARE PARTS ➢ N001
TECHNICAL DATA ➢ P001

Fig.1



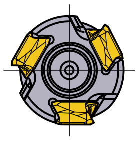
Right hand tool holder only.

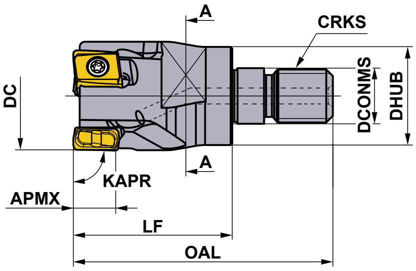
■WELDON SHANK TYPE

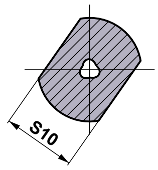
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			APMX (mm)	RMPX	RPMX (min^{-1})	WT* (kg)	Fig.	Insert Type
		R			DCONMS	LF	LH						
25	**VPX300R2502WA25S**	●	●	2	25	91	35	11	2.13°	24100	0.29	1	LOGU12
32	**VPX300R3202WA32S**	●	●	2	32	105	45	11	1.47°	20600	0.56	1	LOGU12
32	**VPX300R3203WA32S**	●	●	3	32	105	45	11	1.47°	20600	0.55	1	LOGU12

Note 1) The maximum spindle speeds are set to ensure tool and insert stability.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

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







A-A Section

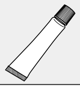
Right hand tool holder only.

SCREW-IN TYPE

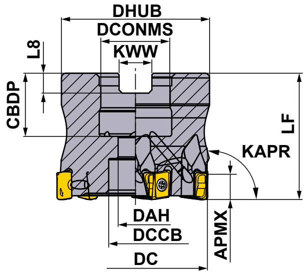
DC (mm)	Order Number	Stock	🌐	Number of Teeth	Dimensions (mm)						WT* (kg)	APMX (mm)	RMPX	Insert Type
		R			DCONMS	DHUB	OAL	LF	S10	CRKS				
25	**VPX300R2502AM1235**	●	●	2	12.5	23.5	57	35	19	M12	0.10	11	2.13°	LOGU12
28	**VPX300R2802AM1235**	★	●	2	12.5	23.5	57	35	19	M12	0.12	11	1.77°	LOGU12
32	**VPX300R3202AM1640**	●	●	2	17.0	28.5	63	40	24	M16	0.20	11	1.47°	LOGU12
32	**VPX300R3203AM1640**	●	●	3	17.0	28.5	63	40	24	M16	0.19	11	1.47°	LOGU12
35	**VPX300R3502AM1640**	★	●	2	17.0	28.5	63	40	24	M16	0.22	11	1.28°	LOGU12
35	**VPX300R3503AM1640**	★	●	3	17.0	28.5	63	40	24	M16	0.22	11	1.28°	LOGU12
40	**VPX300R4003AM1640**	●	●	3	17.0	28.5	63	40	24	M16	0.26	11	1.06°	LOGU12
40	**VPX300R4004AM1640**	●	●	4	17.0	28.5	63	40	24	M16	0.26	11	1.06°	LOGU12

Note 1) For screw-in type arbors, refer to K260.
* WT : Tool Weight

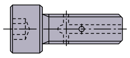
SPARE PARTS

DC (mm)	Tool Holder Type	 *		
		Clamp Screw	Wrench	Anti-seize Lubricant
25	**VPX300R25**	TPS40F1	TIP15W	MK1KS
28	**VPX300R28**	TPS40F1	TIP15W	MK1KS
30	**VPX300R30**	TPS40F1	TIP15W	MK1KS
32	**VPX300R32**	TPS40F1	TIP15W	MK1KS
35	**VPX300R35**	TPS40F1	TIP15W	MK1KS
40	**VPX300R40**	TPS40F1	TIP15W	MK1KS
50	**VPX300R50**	TPS40F1	TIP15W	MK1KS

* Clamp Torque (N • m) : TPS40F1=3.0



Right hand tool holder only.

DC (mm)	Set Bolt	Geometry
Ø40	HSC08025H	
Ø50, Ø63	HSC10030H	
Ø80	HSC12035H	

■ARBOR TYPE

KAPR: 90°
GAMP : -6°   GAMF : -22.5°

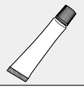
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)		WT* (kg)	APMX (mm)	RMPX	RPMX (min^{-1})	Insert Type
		R			LF	DCONMS					
40	**VPX300-040A03AR**	●	●	3	40	16	0.21	11	1.06°	17900	LOGU12
40	**VPX300-040A04AR**	●	●	4	40	16	0.21	11	1.06°	17900	LOGU12
50	**VPX300-050A04AR**	●	●	4	40	22	0.34	11	0.79°	15500	LOGU12
50	**VPX300-050A06AR**	●	●	6	40	22	0.33	11	0.79°	15500	LOGU12
63	**VPX300-063A06AR**	●	●	6	40	22	0.61	11	0.60°	13400	LOGU12
63	**VPX300-063A08AR**	●	●	8	40	22	0.62	11	0.60°	13400	LOGU12
80	**VPX300-080A07AR**	●	●	7	50	27	0.99	11	0.45°	11500	LOGU12
80	**VPX300-080A10AR**	●	●	10	50	27	0.99	11	0.45°	11500	LOGU12

Note 1) The maximum spindle speeds are set to ensure tool and insert stability.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions (mm)						
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
40	**VPX300-040A03AR**	16	18	9	14	37	8.4	5.6
40	**VPX300-040A04AR**	16	18	9	14	37	8.4	5.6
50	**VPX300-050A04AR**	22	20	11	17	47	10.4	6.3
50	**VPX300-050A06AR**	22	20	11	17	47	10.4	6.3
63	**VPX300-063A06AR**	22	20	11	17	60	10.4	6.3
63	**VPX300-063A08AR**	22	20	11	17	60	10.4	6.3
80	**VPX300-080A07AR**	27	23	13	20	56	12.4	7.0
80	**VPX300-080A10AR**	27	23	13	20	56	12.4	7.0

SPARE PARTS

Tool Holder Type	 *		
	Clamp Screw	Wrench	Anti-seize Lubricant
VPX300	TPS40F1	TIP15W	MK1KS

* Clamp Torque (N • m) : TPS40F1 = 3.0

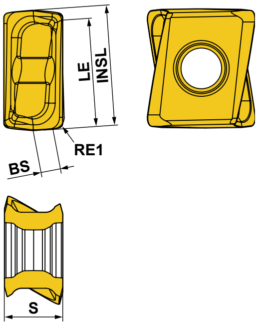
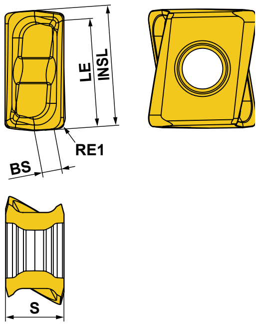
● : Inventory maintained.   ★ : Inventory maintained in Japan.
(10 inserts in one case)

INSERTS

Material			MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	
Material	**P**	Steels	◐	◐		◐	✤				◐		
	M	Stainless Steels	◐	◐				◐			◐		
	K	Cast Irons	◐	◐	◐						✤		
	N	Non-ferrous Metals										◐	
	S	Heat Resistant Alloys, Titanium Alloys							◐	✤	◐		
	H	Hardened Steels									◐		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Honing :
E : Round F : Sharp

Shape	Order Number	Class	Honing	Coated NEW MV1020	NEW MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	Carbide TF15		Dimensions (mm) INSL	RE1	LE	S	BS	Geometry
Low Cutting Resistance **L** Chipbreaker 	**LOGU1207020PNER-L**	G	E	●	●	★	★	★	★	★	★	★			12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	0.8	11.3	7.0	2.6	
	LOGU1207100PNER-L	G	E	●	●	★	★	★	★	★	★	★			12.4	1.0	11.3	7.0	2.5	
	LOGU1207120PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	1.2	11.3	7.0	2.4	
	LOGU1207160PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	1.6	11.3	7.0	1.8	
	LOGU1207200PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	2.4	11.3	7.0	1.2	
	LOGU1207300PNER-L	G	E	●	●	★	★	★	★	★	★	★			12.4	3.0	11.3	7.0	0.6	
	LOGU1207320PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	3.2	11.3	7.0	0.4	
	LOGU1207020PNFR-L	G	F										★		12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNFR-L	G	F										●		12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNFR-L	G	F										●		12.4	0.8	11.3	7.0	2.6	
	LOGU1207100PNFR-L	G	F										★		12.4	1.0	11.3	7.0	2.5	
	LOGU1207120PNFR-L	G	F										●		12.4	1.2	11.3	7.0	2.4	
	LOGU1207160PNFR-L	G	F										●		12.4	1.6	11.3	7.0	1.8	
	LOGU1207200PNFR-L	G	F										●		12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNFR-L	G	F										●		12.4	2.4	11.3	7.0	1.2	
	LOGU1207300PNFR-L	G	F										★		12.4	3.0	11.3	7.0	0.6	
	LOGU1207320PNFR-L	G	F										●		12.4	3.2	11.3	7.0	0.4	Right hand insert only.
General Use **M** Chipbreaker 	**LOGU1207020PNER-M**	G	E	●	●	★	★	★	★	★	★	★			12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	0.8	11.3	7.0	2.4	
	LOGU1207100PNER-M	G	E	●	●	★	★	★	★	★	★	★			12.4	1.0	11.3	7.0	2.3	
	LOGU1207120PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	1.2	11.3	7.0	2.1	
	LOGU1207160PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	1.6	11.3	7.0	1.7	
	LOGU1207200PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	2.4	11.3	7.0	1.0	
	LOGU1207300PNER-M	G	E	●	●	★	★	★	★	★	★	★			12.4	3.0	11.3	7.0	0.5	
	LOGU1207320PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	3.2	11.3	7.0	0.3	
	LOGU1207020PNFR-M	G	F										★		12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNFR-M	G	F										●		12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNFR-M	G	F										●		12.4	0.8	11.3	7.0	2.4	
	LOGU1207100PNFR-M	G	F										★		12.4	1.0	11.3	7.0	2.3	
	LOGU1207120PNFR-M	G	F										●		12.4	1.2	11.3	7.0	2.1	
	LOGU1207160PNFR-M	G	F										●		12.4	1.6	11.3	7.0	1.7	
	LOGU1207200PNFR-M	G	F										●		12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNFR-M	G	F										●		12.4	2.4	11.3	7.0	1.0	
	LOGU1207300PNFR-M	G	F										★		12.4	3.0	11.3	7.0	0.5	
	LOGU1207320PNFR-M	G	F										●		12.4	3.2	11.3	7.0	0.3	Right hand insert only.

● = NEW

SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

CHIPBREAKER RECOMMENDATION

■ Chipbreaker Selection Table

Material		Properties	Cutting Conditions	Chipbreaker		Grade	
				1st Recommendation	2nd Recommendation	1st Recommendation	2nd Recommendation
P	Mild Steel	Hardness ≤180HB	● ◐	L	M	MV1020	–
			● ◐	L	M	MV1030	–
			● ◐	L	M	MP6120	VP15TF
			✽	M	L	MP6130	–
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180-350HB ≤350HB (Annealing)	● ◐	L	M	MV1020	–
			● ◐	L	M	MV1030	–
			●	L	M	MP6120	VP15TF
			◐	M	L	MP6120	VP15TF
			✽	M	L	MP6130	–
	Pre-hardened Steel	Hardness 35–45HRC	● ◐	M	L	MP6120	VP15TF
			✽	M	L	MP6130	–
M	Austenitic Stainless Steel	Hardness ≤280HB	● ◐	L	M	MV1030	–
			● ◐	L	M	MP7130	VP15TF
			✽	M	L	MP7130	–
		Hardness >200HB	● ◐	L	M	MV1030	–
			● ◐	L	M	MP7130	VP15TF
			✽	M	L	MP7130	–
	Duplex Stainless Steel	Hardness ≤280HB	● ◐	L	M	MP7130	VP15TF
			✽	M	L	MP7130	–
	Ferritic and Martensitic Stainless Steel	–	● ◐	L	M	MP7130	VP15TF
			✽	M	L	MP7130	–
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐	L	M	MP7130	VP15TF
			✽	M	L	MP7130	–
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	M	L	MC5020	VP15TF
			✽	M	L	VP15TF	–
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	M	L	MV1020	–
			● ◐	M	L	MV1030	–
			● ◐	M	L	MC5020	VP15TF
			✽	M	L	VP15TF	–
N	Aluminium Alloy	Content Si<5%	● ◐	L	M	TF15	–
			✽	M	L	TF15	–
S	Titanium Alloy (Ti-6Al-4V,etc.)	–	● ◐	L	M	MP9120	VP15TF
			✽	M	L	MP9130	–
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	–	● ◐	L	M	MP9120	VP15TF
			✽	M	L	MP9130	–
	Heat Resistant Alloy	–	● ◐	M	L	MP9120	VP15TF
			✽	M	L	MP9130	–
H	Hardened Steel	Hardness 40–55HRC	● ◐ ✽	M	–	VP15TF	–

RECOMMENDED CUTTING CONDITIONS

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

■ Dry Cutting

Cutting Speed

	Material	Properties	Cutting Conditions	Insert Grade	ae (mm) ≤0.25DC Vc (m/min)	ae (mm) 0.25—0.5DC Vc (m/min)	ae (mm) 0.5—0.75DC Vc (m/min)	ae (mm) DC(Slot) Vc (m/min)
P	Mild Steel	Hardness ≤180HB	● ◐	MV1020	280 (220—330)	270 (210—320)	220 (170—260)	220 (170—260)
			● ◐	MV1030	230 (180—270)	220 (170—260)	180 (140—210)	180 (140—210)
			● ◐	MP6120, VP15TF	230 (180—270)	220 (170—260)	180 (140—210)	180 (140—210)
			✣	MP6130	200 (150—240)	190 (170—260)	150 (110—180)	150 (110—180)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180—350HB ≤350HB (Annealing)	● ◐	MV1020	220 (170—260)	210 (160—240)	170 (130—200)	170 (130—200)
			● ◐	MV1030	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
			● ◐	MP6120, VP15TF	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—180)
			✣	MP6130	150 (110—180)	140 (100—170)	110 (80—130)	110 (80—130)
	Pre-hardened Steel	Hardness 35—45HRC	● ◐	MP6120, VP15TF	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)
			✣	MP6130	100 (80—120)	90 (70—110)	80 (60—100)	80 (60—100)
M	Austenitic Stainless Steel	Hardness ≤200HB	● ◐	MV1030	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
			● ◐ ✣	MP7130, VP15TF	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
		Hardness >200HB	● ◐	MV1030	150 (110—180)	140 (100—160)	110 (80—130)	110 (80—130)
			● ◐ ✣	MP7130, VP15TF	150 (110—180)	140 (100—160)	110 (80—130)	110 (80—130)
	Duplex Stainless Steel	Hardness ≤280HB	● ◐ ✣	MP7130, VP15TF	140 (110—170)	130 (90—150)	100 (70—120)	100 (70—120)
	Ferritic and Martensitic Stainless Steel	—	● ◐ ✣	MP7130, VP15TF	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐ ✣	MP7130, VP15TF	130 (100—160)	120 (80—140)	90 (60—110)	90 (60—110)
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	MC5020	250 (200—300)	240 (190—290)	210 (160—260)	210 (160—260)
			● ◐ ✣	VP15TF	200 (150—250)	190 (140—240)	160 (110—210)	160 (110—210)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	MV1020	180 (140—250)	170 (130—240)	150 (120—210)	150 (120—210)
			● ◐	MV1030	150 (100—200)	140 (90—190)	125 (80—170)	150 (120—210)
			● ◐	MC5020	180 (150—200)	170 (140—190)	150 (120—170)	150 (120—170)
			● ◐ ✣	VP15TF	130 (100—150)	120 (90—140)	100 (80—120)	100 (80—120)
N	Aluminium Alloy	Content Si<5%	● ◐ ✣	TF15	600 (400—1000)	600 (400—1000)	600 (400—1000)	600 (400—1000)
H	Hardened Steel	Hardness 40—55HRC	● ◐ ✣	VP15TF	90 (70—100)	85 (60—100)	70 (50—80)	70 (50—80)

Note 1) These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.

Note 2) Chattering and vibrations are more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
- When tool overhang is long (using a long shank, screw-in type, etc.)
- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change the clamp screw periodically.

Depth of Cut / Feed per Tooth

	Material	Properties	ae (mm)	Cutting Conditions	DC (mm) ø25 ap (mm)	DC (mm) ø25 fz (mm/t.)	DC (mm) ø28—ø80 ap (mm)	DC (mm) ø28—ø80 fz (mm/t.)
P	Mild Steel	Hardness ≤180HB	≤0.25DC	● ◐ ✣	≤11	0.10—0.20	≤11	0.10—0.30
			0.25—0.5DC	● ◐ ✣	≤11	0.10—0.15	≤11	0.10—0.25
			0.5—0.75DC	● ◐ ✣	≤8	0.08—0.12	≤8	0.10—0.20
			DC(Slot)	● ◐ ✣	≤5	0.06—0.10	≤5	0.08—0.15
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180—280HB	≤0.25DC	● ◐ ✣	≤11	0.10—0.20	≤11	0.10—0.30
			0.25—0.5DC	● ◐ ✣	≤11	0.10—0.15	≤11	0.10—0.25
			0.5—0.75DC	● ◐ ✣	≤8	0.08—0.12	≤8	0.10—0.20
			DC(Slot)	● ◐ ✣	≤5	0.06—0.10	≤5	0.08—0.15
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	≤0.25DC	● ◐ ✣	≤11	0.10—0.15	≤11	0.10—0.25
			0.25—0.5DC	● ◐ ✣	≤11	0.08—0.12	≤11	0.10—0.20
			0.5—0.75DC	● ◐ ✣	≤8	0.06—0.10	≤8	0.10—0.15
			DC(Slot)	● ◐ ✣	≤5	0.06—0.10	≤5	0.08—0.12
	Pre-hardened Steel	Hardness 35—45HRC	≤0.25DC	● ◐ ✣	≤11	0.10—0.15	≤11	0.10—0.25
			0.25—0.5DC	● ◐ ✣	≤11	0.08—0.12	≤11	0.10—0.20
			0.5—0.75DC	● ◐ ✣	≤8	0.06—0.10	≤8	0.10—0.15
			DC(Slot)	● ◐ ✣	≤5	0.06—0.10	≤5	0.08—0.12

RECOMMENDED CUTTING CONDITIONS

■ Dry Cutting

Depth of Cut / Feed per Tooth

	Material	Properties	ae (mm)	Cutting Conditions	DC (mm)			
					ø25		ø28–ø80	
					ap (mm)	fz (mm/t.)	ap (mm)	fz (mm/t.)
M	Austenitic Stainless Steel	–	≤0.25DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.20
				✤	≤11	0.08–0.15	≤11	0.08–0.15
			0.25–0.5DC	● ◐	≤11	0.08–0.15	≤11	0.08–0.15
				✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.5–0.75DC	● ◐	≤8	0.08–0.12	≤8	0.08–0.12
				✤	≤8	0.06–0.10	≤8	0.06–0.10
			DC(Slot)	● ◐	≤5	0.06–0.10	≤5	0.06–0.10
				✤	≤5	0.06–0.08	≤5	0.06–0.08
	Duplex Stainless Steel	Hardness ≤280HB	≤0.25DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.20
				✤	≤11	0.08–0.15	≤11	0.08–0.15
			0.25–0.5DC	● ◐	≤11	0.08–0.15	≤11	0.08–0.15
				✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.5–0.75DC	● ◐	≤8	0.08–0.12	≤8	0.08–0.12
				✤	≤8	0.06–0.10	≤8	0.06–0.10
			DC(Slot)	● ◐	≤5	0.06–0.10	≤5	0.06–0.10
				✤	≤5	0.06–0.08	≤5	0.06–0.08
	Ferritic and Martensitic Stainless Steel	–	≤0.25DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.20
				✤	≤11	0.08–0.15	≤11	0.08–0.15
			0.25–0.5DC	● ◐	≤11	0.08–0.15	≤11	0.08–0.15
				✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.5–0.75DC	● ◐	≤8	0.08–0.12	≤8	0.08–0.12
				✤	≤8	0.06–0.10	≤8	0.06–0.10
			DC(Slot)	● ◐	≤5	0.06–0.10	≤5	0.06–0.10
				✤	≤5	0.06–0.08	≤5	0.06–0.08
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤0.25DC	● ◐	≤11	0.10–0.15	≤11	0.10–0.15
				✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.25–0.5DC	● ◐	≤11	0.08–0.12	≤11	0.08–0.12
				✤	≤11	0.08–0.12	≤11	0.06–0.10
			0.5–0.75DC	● ◐	≤8	0.06–0.10	≤8	0.06–0.10
				✤	≤8	0.06–0.08	≤8	0.06–0.08
			DC(Slot)	● ◐	≤5	0.06–0.10	≤5	0.06–0.10
				✤	≤5	0.06–0.08	≤5	0.06–0.08
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.25DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.30
				✤	≤11	0.08–0.15	≤11	0.10–0.25
			0.25–0.5DC	● ◐	≤11	0.08–0.15	≤11	0.10–0.25
				✤	≤11	0.08–0.12	≤11	0.10–0.20
			0.5–0.75DC	● ◐	≤8	0.08–0.12	≤8	0.10–0.20
				✤	≤8	0.06–0.10	≤8	0.08–0.15
			DC(Slot)	● ◐	≤5	0.06–0.10	≤5	0.08–0.15
				✤	≤5	0.06–0.08	≤5	0.08–0.12
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.25DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.25
				✤	≤11	0.10–0.15	≤11	0.10–0.20
			0.25–0.5DC	● ◐	≤11	0.10–0.15	≤11	0.10–0.20
				✤	≤11	0.08–0.12	≤11	0.10–0.15
			0.5–0.75DC	● ◐	≤8	0.08–0.12	≤8	0.10–0.15
				✤	≤8	0.08–0.12	≤8	0.08–0.12
			DC(Slot)	● ◐	≤5	0.06–0.10	≤5	0.08–0.12
				✤	≤5	0.06–0.08	≤5	0.06–0.10
N	Aluminium Alloy	Content Si<5%	≤0.25DC	● ◐	≤11	0.10–0.25	≤11	0.10–0.25
				✤	≤11	0.10–0.20	≤11	0.10–0.20
			0.25–0.5DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.20
				✤	≤11	0.10–0.15	≤11	0.10–0.15
			0.5–0.75DC	● ◐	≤8	0.06–0.15	≤8	0.08–0.15
				✤	≤8	0.06–0.15	≤8	0.08–0.15
			DC(Slot)	● ◐	≤5	0.06–0.15	≤5	0.08–0.15
				✤	≤5	0.06–0.15	≤5	0.08–0.12
H	Hardened Steel	Hardness 40–55HRC	≤0.25DC	● ◐	≤5	0.08–0.15	≤5	0.08–0.15
				✤	≤5	0.08–0.12	≤5	0.08–0.12
			0.25–0.5DC	● ◐	≤4	0.08–0.12	≤4	0.08–0.12
				✤	≤4	0.06–0.10	≤4	0.06–0.10
			0.5–0.75DC	● ◐	≤3	0.06–0.10	≤3	0.06–0.10
				✤	≤3	0.06–0.08	≤3	0.06–0.08
			DC(Slot)	● ◐	≤2	0.06–0.10	≤2	0.06–0.10
				✤	≤2	0.06–0.08	≤2	0.06–0.08

Note 1) These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.

Note 2) Chattering and vibrations are more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
- When tool overhang is long (using a long shank, screw-in type, etc.)
- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change the clamp screw periodically.

■ Wet Cutting
Cutting Speed

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

	Material	Properties	Cutting Conditions	Insert Grade	ae (mm)			
					≤0.25DC	0.25—0.5DC	0.5—0.75DC	DC(Slot)
					Vc (m/min)			
P	Mild Steel	Hardness ≤180HB	● ◐	MV1020	210 (150—290)	200 (140—270)	150 (110—180)	150 (110—180)
			● ◐	MV1030	140 (100—190)	130 (90—180)	100 (70—120)	100 (70—120)
			● ◐ ✤	MP6120 MP6130 VP15TF	140 (100—190)	130 (90—180)	100 (70—120)	100 (70—120)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180—350HB ≤350HB (Annealing)	● ◐	MV1020	180 (140—210)	170 (120—200)	150 (110—180)	150 (110—180)
			● ◐	MV1030	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)
			● ◐ ✤	MP6120 MP6130 VP15TF	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)
	Pre-hardened Steel	Hardness 35—45HRC	● ◐ ✤	MP6120 MP6130 VP15TF	100 (80—120)	90 (70—110)	80 (60—100)	80 (60—100)
M	Austenitic Stainless Steel	Hardness ≤200HB	● ◐ ✤	MP7130, VP15TF	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)
		Hardness >200HB	● ◐ ✤	MP7130, VP15TF	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)
	Duplex Stainless Steel	Hardness ≤280HB	● ◐ ✤	MP7130, VP15TF	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)
	Ferritic and Martensitic Stainless Steel	—	● ◐ ✤	MP7130, VP15TF	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐ ✤	MP7130, VP15TF	90 (70—120)	80 (60—110)	60 (40—90)	60 (40—90)
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	MC5020	180 (160—220)	170 (150—210)	150 (130—190)	150 (130—190)
			● ◐ ✤	VP15TF	130 (100—150)	120 (90—140)	100 (80—120)	100 (80—120)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	MV1020	160 (130—210)	150 (120—200)	130 (110—170)	130 (110—170)
			● ◐	MV1030	130 (80—180)	120 (70—170)	105 (60—150)	105 (60—150)
			● ◐	MC5020	160 (140—180)	150 (130—170)	130 (110—150)	130 (110—150)
			● ◐ ✤	VP15TF	110 (80—140)	100 (70—130)	80 (60—120)	80 (60—120)
N	Aluminium Alloy	Content Si<5%	● ◐ ✤	TF15	600 (400—1000)	600 (400—1000)	600 (400—1000)	600 (400—1000)
S	Titanium Alloy (Ti-6Al-4V,etc.)	—	● ◐	MP9120, VP15TF	50 (40—70)	50 (40—70)	50 (40—70)	50 (40—70)
			✤	MP9130	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	—	● ◐	MP9120, VP15TF	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)
			✤	MP9130	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)
	Heat Resistant Alloy	—	● ◐	MP9120, VP15TF	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)
			✤	MP9130	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)
H	Hardened Steel	Hardness 40—55HRC	● ◐ ✤	VP15TF	90 (70—100)	85 (60—100)	70 (50—80)	70 (50—80)

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- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change the clamp screw periodically.

RECOMMENDED CUTTING CONDITIONS

■ Wet Cutting

Depth of Cut / Feed per Tooth

	Material	Properties	**ae** (mm)	Cutting Conditions	**DC** (mm)			
					ø25		ø28—ø80	
					ap (mm)	**fz** (mm/t.)	**ap** (mm)	**fz** (mm/t.)
P	Mild Steel	Hardness ≤180HB	≤0.25DC	● ◔ ✤	≤11	0.10—0.20	≤11	0.10—0.30
			0.25—0.5DC	● ◔ ✤	≤11	0.10—0.15	≤11	0.10—0.25
			0.5—0.75DC	● ◔ ✤	≤8	0.08—0.12	≤8	0.10—0.20
			DC(Slot)	● ◔ ✤	≤5	0.06—0.10	≤5	0.08—0.15
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180—280HB	≤0.25DC	● ◔ ✤	≤11	0.10—0.20	≤11	0.10—0.30
			0.25—0.5DC	● ◔ ✤	≤11	0.10—0.15	≤11	0.10—0.25
			0.5—0.75DC	● ◔ ✤	≤8	0.08—0.12	≤8	0.10—0.20
			DC(Slot)	● ◔ ✤	≤5	0.06—0.10	≤5	0.08—0.15
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	≤0.25DC	● ◔ ✤	≤11	0.10—0.15	≤11	0.10—0.25
			0.25—0.5DC	● ◔ ✤	≤11	0.08—0.12	≤11	0.10—0.20
			0.5—0.75DC	● ◔ ✤	≤8	0.06—0.10	≤8	0.10—0.15
			DC(Slot)	● ◔ ✤	≤5	0.06—0.10	≤5	0.08—0.12
	Pre-hardened Steel	Hardness 35—45HRC	≤0.25DC	● ◔ ✤	≤11	0.10—0.15	≤11	0.10—0.25
			0.25—0.5DC	● ◔ ✤	≤11	0.08—0.12	≤11	0.10—0.20
			0.5—0.75DC	● ◔ ✤	≤8	0.06—0.10	≤8	0.10—0.15
			DC(Slot)	● ◔ ✤	≤5	0.06—0.10	≤5	0.08—0.12
M	Austenitic Stainless Steel	–	≤0.25DC	● ◔	≤11	0.10—0.20	≤11	0.10—0.20
				✤	≤11	0.08—0.15	≤11	0.08—0.15
			0.25—0.5DC	● ◔	≤11	0.08—0.12	≤11	0.08—0.15
				✤	≤11	0.06—0.10	≤11	0.08—0.12
			0.5—0.75DC	● ◔	≤8	0.06—0.10	≤8	0.08—0.12
				✤	≤8	0.06—0.10	≤8	0.06—0.10
			DC(Slot)	● ◔	≤5	0.06—0.10	≤5	0.06—0.10
				✤	≤5	0.06—0.08	≤5	0.06—0.08
	Duplex Stainless Steel	Hardness ≤280HB	≤0.25DC	● ◔	≤11	0.10—0.20	≤11	0.10—0.20
				✤	≤11	0.08—0.15	≤11	0.08—0.15
			0.25—0.5DC	● ◔	≤11	0.08—0.15	≤11	0.08—0.15
				✤	≤11	0.08—0.12	≤11	0.08—0.12
			0.5—0.75DC	● ◔	≤8	0.08—0.12	≤8	0.08—0.12
				✤	≤8	0.06—0.10	≤8	0.06—0.10
			DC(Slot)	● ◔	≤5	0.06—0.10	≤5	0.06—0.10
				✤	≤5	0.06—0.08	≤5	0.06—0.08
	Ferritic and Martensitic Stainless Steel	–	≤0.25DC	● ◔	≤11	0.10—0.20	≤11	0.10—0.20
				✤	≤11	0.08—0.15	≤11	0.08—0.15
			0.25—0.5DC	● ◔	≤11	0.08—0.15	≤11	0.08—0.15
				✤	≤11	0.08—0.12	≤11	0.08—0.12
			0.5—0.75DC	● ◔	≤8	0.08—0.12	≤8	0.08—0.12
				✤	≤8	0.06—0.10	≤8	0.06—0.10
			DC(Slot)	● ◔	≤5	0.06—0.10	≤5	0.06—0.10
				✤	≤5	0.06—0.08	≤5	0.06—0.08
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤0.25DC	● ◔	≤11	0.10—0.15	≤11	0.10—0.15
				✤	≤11	0.08—0.12	≤11	0.08—0.12
			0.25—0.5DC	● ◔	≤11	0.08—0.12	≤11	0.08—0.12
				✤	≤11	0.08—0.12	≤11	0.08—0.12
			0.5—0.75DC	● ◔	≤8	0.06—0.10	≤8	0.06—0.10
				✤	≤8	0.06—0.08	≤8	0.06—0.08
			DC(Slot)	● ◔	≤5	0.06—0.10	≤5	0.06—0.10
				✤	≤5	0.06—0.08	≤5	0.06—0.08

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Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change the clamp screw periodically.

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

	Material	Properties	**ae** (mm)	Cutting Conditions	**DC** (mm)			
					ø25		ø28–ø80	
					ap (mm)	**fz** (mm/t.)	**ap** (mm)	**fz** (mm/t.)
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.25DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.30
				✤	≤11	0.08–0.15	≤11	0.10–0.25
			0.25–0.5DC	● ◐	≤11	0.08–0.15	≤11	0.10–0.25
				✤	≤11	0.08–0.12	≤11	0.10–0.20
			0.5–0.75DC	● ◐	≤8	0.08–0.12	≤8	0.10–0.20
				✤	≤8	0.06–0.10	≤8	0.08–0.15
			DC(Slot)	● ◐	≤5	0.06–0.10	≤5	0.08–0.15
				✤	≤5	0.06–0.08	≤5	0.08–0.12
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.25DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.25
				✤	≤11	0.10–0.15	≤11	0.10–0.20
			0.25–0.5DC	● ◐	≤11	0.10–0.15	≤11	0.10–0.20
				✤	≤11	0.08–0.12	≤11	0.10–0.15
			0.5–0.75DC	● ◐	≤8	0.08–0.12	≤8	0.10–0.15
				✤	≤8	0.06–0.10	≤8	0.08–0.12
			DC(Slot)	● ◐	≤5	0.06–0.10	≤5	0.08–0.12
				✤	≤5	0.06–0.08	≤5	0.06–0.10
N	Aluminium Alloy	Content Si<5%	≤0.25DC	● ◐	≤11	0.10–0.25	≤11	0.10–0.25
				✤	≤11	0.10–0.20	≤11	0.10–0.20
			0.25–0.5DC	● ◐	≤11	0.10–0.20	≤11	0.10–0.20
				✤	≤11	0.10–0.15	≤11	0.10–0.15
			0.5–0.75DC	● ◐	≤8	0.06–0.15	≤8	0.08–0.15
				✤	≤8	0.06–0.15	≤8	0.08–0.15
			DC(Slot)	● ◐	≤5	0.06–0.15	≤5	0.08–0.15
				✤	≤5	0.06–0.15	≤5	0.08–0.12
S	Titanium Alloy (Ti-6Al-4V,etc.)	–	≤0.25DC	● ◐ ✤	≤11	0.08–0.15	≤11	0.08–0.15
			0.25–0.5DC	● ◐ ✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.5–0.75DC	● ◐ ✤	≤8	0.06–0.10	≤8	0.06–0.10
			DC(Slot)	● ◐ ✤	≤5	0.06–0.10	≤5	0.06–0.10
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	–	≤0.25DC	● ◐ ✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.25–0.5DC	● ◐ ✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.5–0.75DC	● ◐ ✤	≤8	0.06–0.10	≤8	0.06–0.10
			DC(Slot)	● ◐ ✤	≤5	0.06–0.10	≤5	0.06–0.10
	Heat Resistant Alloy	–	≤0.25DC	● ◐ ✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.25–0.5DC	● ◐ ✤	≤11	0.08–0.12	≤11	0.08–0.12
			0.5–0.75DC	● ◐ ✤	≤8	0.06–0.10	≤8	0.06–0.10
			DC(Slot)	● ◐ ✤	≤5	0.06–0.10	≤5	0.06–0.10
H	Hardened Steel	Hardness 40–55HRC	≤0.25DC	● ◐	≤5	0.08–0.15	≤5	0.08–0.15
				✤	≤5	0.08–0.12	≤5	0.08–0.12
			0.25–0.5DC	● ◐	≤4	0.08–0.12	≤4	0.08–0.12
				✤	≤4	0.06–0.10	≤4	0.06–0.10
			0.5–0.75DC	● ◐	≤3	0.06–0.10	≤3	0.06–0.10
				✤	≤3	0.06–0.10	≤3	0.06–0.08
			DC(Slot)	● ◐	≤2	0.06–0.10	≤2	0.06–0.10
				✤	≤2	0.06–0.10	≤2	0.06–0.08

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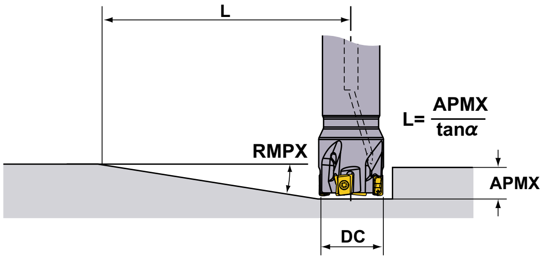
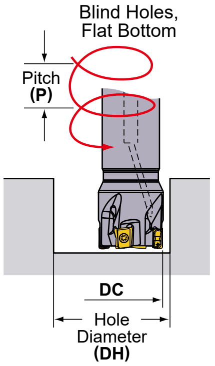
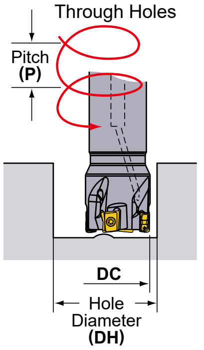
■ Ramping / Helical Cutting

● Ramping



● Helical Cutting





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

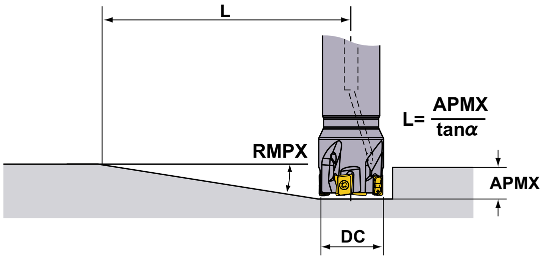
DC (mm)	RE (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
		RMPX	**L** (mm) *	**DH max.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)
25	0.2	2.13°	296	49.0	2.8	42.7	2.1	36.9	1.4
	0.4	2.13°	296	48.6	2.8	42.7	2.1	36.9	1.4
	0.8	2.13°	296	47.8	2.7	42.7	2.1	36.9	1.4
	1.0	2.13°	296	47.4	2.6	42.7	2.1	36.9	1.4
	1.2	2.13°	296	47.0	2.6	42.7	2.1	36.9	1.4
	1.6	2.13°	296	46.2	2.5	42.7	2.1	36.9	1.4
	2.0	2.13°	296	45.4	2.4	42.7	2.1	36.9	1.4
	2.4	2.13°	296	44.6	2.3	42.7	2.1	36.9	1.4
	3.0	2.13°	296	43.4	2.2	42.7	2.1	36.9	1.4
	3.2	2.13°	296	43.0	2.1	42.7	2.1	36.9	1.4
28	0.2	1.77°	356	55.0	2.6	48.7	2.0	42.7	1.4
	0.4	1.77°	356	54.6	2.6	48.7	2.0	42.7	1.4
	0.8	1.77°	356	53.8	2.5	48.7	2.0	42.7	1.4
	1.0	1.77°	356	53.4	2.5	48.7	2.0	42.7	1.4
	1.2	1.77°	356	53.0	2.4	48.7	2.0	42.7	1.4
	1.6	1.77°	356	52.2	2.4	48.7	2.0	42.7	1.4
	2.0	1.77°	356	51.4	2.3	48.7	2.0	42.7	1.4
	2.4	1.77°	356	50.6	2.2	48.7	2.0	42.7	1.4
	3.0	1.77°	356	49.4	2.1	48.7	2.0	42.7	1.4
	3.2	1.77°	356	49.0	2.0	48.7	2.0	42.7	1.4
30	0.2	1.61°	392	59.0	2.6	52.7	2.0	46.6	1.5
	0.4	1.61°	392	58.6	2.5	52.7	2.0	46.6	1.5
	0.8	1.61°	392	57.8	2.5	52.7	2.0	46.6	1.5
	1.0	1.61°	392	57.4	2.4	52.7	2.0	46.6	1.5
	1.2	1.61°	392	57.0	2.4	52.7	2.0	46.6	1.5
	1.6	1.61°	392	56.2	2.3	52.7	2.0	46.6	1.5
	2.0	1.61°	392	55.4	2.2	52.7	2.0	46.6	1.5
	2.4	1.61°	392	54.6	2.2	52.7	2.0	46.6	1.5
	3.0	1.61°	392	53.4	2.1	52.7	2.0	46.6	1.5
	3.2	1.61°	392	53.0	2.0	52.7	2.0	46.6	1.5
32	0.2	1.47°	429	63.0	2.5	56.7	2.0	50.6	1.5
	0.4	1.47°	429	62.6	2.5	56.7	2.0	50.6	1.5
	0.8	1.47°	429	61.8	2.4	56.7	2.0	50.6	1.5
	1.0	1.47°	429	61.4	2.4	56.7	2.0	50.6	1.5
	1.2	1.47°	429	61.0	2.3	56.7	2.0	50.6	1.5
	1.6	1.47°	429	60.2	2.3	56.7	2.0	50.6	1.5
	2.0	1.47°	429	59.4	2.2	56.7	2.0	50.6	1.5
	2.4	1.47°	429	58.6	2.1	56.7	2.0	50.6	1.5
	3.0	1.47°	429	57.4	2.1	56.7	2.0	50.6	1.5
	3.2	1.47°	429	57.0	2.0	56.7	2.0	50.6	1.5
35	0.2	1.28°	493	69.0	2.4	62.8	1.9	56.6	1.5
	0.4	1.28°	493	68.6	2.4	62.8	1.9	56.6	1.5
	0.8	1.28°	493	67.8	2.3	62.8	1.9	56.6	1.5
	1.0	1.28°	493	67.4	2.3	62.8	1.9	56.6	1.5
	1.2	1.28°	493	67.0	2.2	62.8	1.9	56.6	1.5
	1.6	1.28°	493	66.2	2.2	62.8	1.9	56.6	1.5
	2.0	1.28°	493	65.4	2.1	62.8	1.9	56.6	1.5
	2.4	1.28°	493	64.6	2.1	62.8	1.9	56.6	1.5
	3.0	1.28°	493	63.4	2.0	62.8	1.9	56.6	1.5
	3.2	1.28°	493	63.0	2.0	62.8	1.9	56.6	1.5

Note 1) When machining a highly ductile workpiece with the ramping angles in the table above, chips may be elongated.

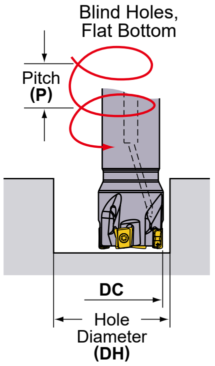
∗ Shows the distance until a maximum depth of cut of 11 mm is achieved at the maximum ramping angle L (= 11/tan α).

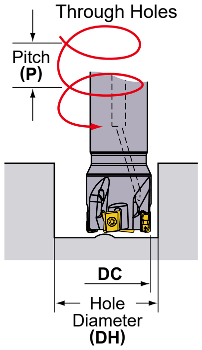
■ Ramping / Helical Cutting

● Ramping



● Helical Cutting





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

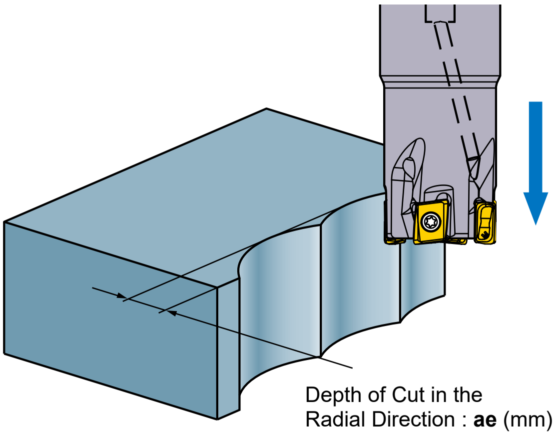
DC (mm)	RE (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
		RMPX	**L** (mm) *	**DH max.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)
40	0.2	1.06°	595	78.8	2.3	72.7	1.9	66.5	1.5
	0.4	1.06°	595	78.4	2.2	72.7	1.9	66.5	1.5
	0.8	1.06°	595	77.6	2.2	72.7	1.9	66.5	1.5
	1.0	1.06°	595	77.2	2.2	72.7	1.9	66.5	1.5
	1.2	1.06°	595	76.8	2.1	72.7	1.9	66.5	1.5
	1.6	1.06°	595	76.0	2.1	72.7	1.9	66.5	1.5
	2.0	1.06°	595	75.2	2.0	72.7	1.9	66.5	1.5
	2.4	1.06°	595	74.4	2.0	72.7	1.9	66.5	1.5
	3.0	1.06°	595	73.2	1.9	72.7	1.9	66.5	1.5
	3.2	1.06°	595	72.8	1.9	72.7	1.9	66.5	1.5
50	0.2	0.79°	798	98.8	2.1	92.7	1.8	86.5	1.6
	0.4	0.79°	798	98.4	2.1	92.7	1.8	86.5	1.6
	0.8	0.79°	798	97.6	2.1	92.7	1.8	86.5	1.6
	1.0	0.79°	798	97.2	2.0	92.7	1.8	86.5	1.6
	1.2	0.79°	798	96.8	2.0	92.7	1.8	86.5	1.6
	1.6	0.79°	798	96.0	2.0	92.7	1.8	86.5	1.6
	2.0	0.79°	798	95.2	2.0	92.7	1.8	86.5	1.6
	2.4	0.79°	798	94.4	1.9	92.7	1.8	86.5	1.6
	3.0	0.79°	798	93.2	1.9	92.7	1.8	86.5	1.6
	3.2	0.79°	798	92.8	1.9	92.7	1.8	86.5	1.6
63	0.2	0.6°	1051	124.8	2.0	118.7	1.8	112.5	1.6
	0.4	0.6°	1051	124.4	2.0	118.7	1.8	112.5	1.6
	0.8	0.6°	1051	123.6	2.0	118.7	1.8	112.5	1.6
	1.0	0.6°	1051	123.2	2.0	118.7	1.8	112.5	1.6
	1.2	0.6°	1051	122.8	2.0	118.7	1.8	112.5	1.6
	1.6	0.6°	1051	122.0	1.9	118.7	1.8	112.5	1.6
	2.0	0.6°	1051	121.2	1.9	118.7	1.8	112.5	1.6
	2.4	0.6°	1051	120.4	1.9	118.7	1.8	112.5	1.6
	3.0	0.6°	1051	119.2	1.9	118.7	1.8	112.5	1.6
	3.2	0.6°	1051	118.8	1.8	118.7	1.8	112.5	1.6
80	0.2	0.45°	1401	158.8	1.9	152.6	1.8	146.5	1.6
	0.4	0.45°	1401	158.4	1.9	152.7	1.8	146.5	1.6
	0.8	0.45°	1401	157.6	1.9	152.7	1.8	146.5	1.6
	1.0	0.45°	1401	157.2	1.9	152.7	1.8	146.5	1.6
	1.2	0.45°	1401	156.8	1.9	152.7	1.8	146.5	1.6
	1.6	0.45°	1401	156.0	1.9	152.7	1.8	146.5	1.6
	2.0	0.45°	1401	155.2	1.9	152.7	1.8	146.5	1.6
	2.4	0.45°	1401	154.4	1.8	152.7	1.8	146.5	1.6
	3.0	0.45°	1401	153.2	1.8	152.7	1.8	146.5	1.6
	3.2	0.45°	1401	152.8	1.8	152.7	1.8	146.5	1.6

Note 1) When machining a highly ductile workpiece with the ramping angles in the table above, chips may be elongated.
* Shows the distance until a maximum depth of cut of 11 mm is achieved at the maximum ramping angle L (= 11/tan α).

For Plunging and Drilling

See the tables to the right for cutting conditions. Follow the cutting conditions for slot milling regarding feed per tooth and cutting speed.

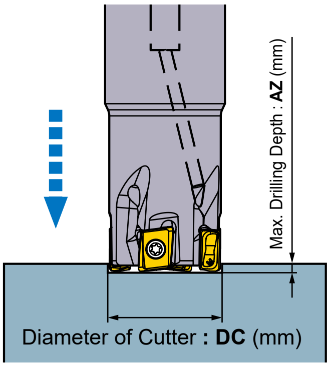
Plunging



DC (mm)	**ae max.** (mm)
25	6.5
28	6.6
30	6.6
32	6.6
35	6.7
40	6.7
50	6.7
63	6.7
80	6.7

Note 1) No step feed necessary.

Drilling



DC (mm)	**AZ max.** (mm)
25	0.55
28	0.55
30	0.55
32	0.55
35	0.55
40	0.55
50	0.55
63	0.55
80	0.55

Note 1) Exercise due caution as chips scatter easily.
Note 2) Use compressed air to eliminate chips (or coolant for when machining aluminium alloy).

DEEP SHOULDER MILLING

90° KAPR

VPX200

P M K N S H

LONG CUTTING EDGE

Fig.1

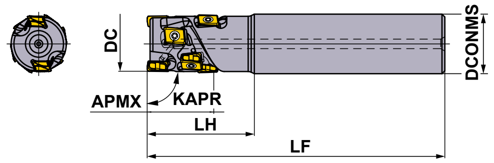
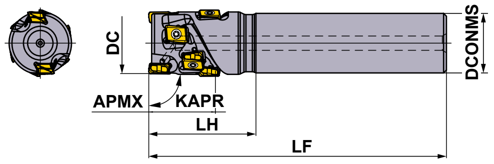


Fig.2



Right hand tool holder only.

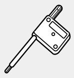
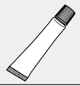
■CYLINDRICAL SHANK

DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions (mm)			APMX (mm)	RMPX	WT*2 (kg)	Fig.	*1 Insert Type
		R				DCONMS	LF	LH					
20	**VPX200R202SA20S01404**	●	●	2	4	20	100	30	14	1.35°	0.21	1	LOGU09
22	**VPX200R222SA20S01404**	●	●	2	4	20	115	30	14	1.16°	0.26	2	LOGU09
25	**VPX200R252SA25S02106**	●	●	2	6	25	115	35	21	0.97°	0.39	1	LOGU09
25	**VPX200R252SA25S02808**	●	●	2	8	25	125	45	28	0.97°	0.41	1	LOGU09
28	**VPX200R282SA25S02106**	★	●	2	6	25	115	35	21	0.84°	0.40	2	LOGU09
28	**VPX200R282SA25S02808**	★	●	2	8	25	125	45	28	0.84°	0.43	2	LOGU09
32	**VPX200R322SA32S02808**	★	●	2	8	32	125	45	28	0.71°	0.68	1	LOGU09
32	**VPX200R323SA32S02812**	●	●	3	12	32	125	45	28	0.71°	0.67	1	LOGU09
32	**VPX200R322SA32S03510**	★	●	2	10	32	130	50	35	0.71°	0.70	1	LOGU09
32	**VPX200R323SA32S03515**	●	●	3	15	32	130	50	35	0.71°	0.68	1	LOGU09
35	**VPX200R352SA32S02808**	★	●	2	8	32	125	45	28	0.63°	0.72	2	LOGU09
35	**VPX200R353SA32S02812**	★	●	3	12	32	125	45	28	0.63°	0.71	2	LOGU09
35	**VPX200R352SA32S03510**	★	●	2	10	32	130	50	35	0.63°	0.74	2	LOGU09
35	**VPX200R353SA32S03515**	★	●	3	15	32	130	50	35	0.63°	0.73	2	LOGU09
40	**VPX200R403SA32S03515**	★	●	3	15	32	130	50	35	0.54°	0.81	2	LOGU09
40	**VPX200R404SA32S03520**	●	●	4	20	32	130	50	35	0.54°	0.80	2	LOGU09
40	**VPX200R403SA32S04218**	★	●	3	18	32	140	60	42	0.54°	0.88	2	LOGU09
40	**VPX200R404SA32S04224**	★	●	4	24	32	140	60	42	0.54°	0.86	2	LOGU09

*1 Corner radius RE 0.8mm is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting). Insert RE 0.2mm and 0.4 mm can also be used for the peripheral cutting edges.

*2 WT : Tool Weight

SPARE PARTS

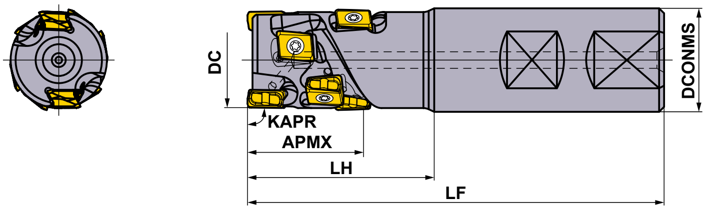
DC (mm)	Tool Holder Type	 *		
		Clamp Screw	Wrench	Anti-seize Lubricant
20	**VPX200R20**	TPS27F1	TIP07F	MK1KS
22	**VPX200R22**	TPS27F2	TIP07F	MK1KS
25	**VPX200R25**	TPS27F2	TIP07F	MK1KS
28	**VPX200R28**	TPS27F2	TIP07F	MK1KS
32	**VPX200R32**	TPS27F2	TIP07F	MK1KS
35	**VPX200R35**	TPS27F2	TIP07F	MK1KS
40	**VPX200R40**	TPS27F2	TIP07F	MK1KS

* Clamp Torque (N • m) : TPS27F1 = 1.0,TPS27F2 = 1.0

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

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

Fig.1



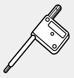
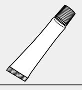
Right hand tool holder only.

WELDON SHANK TYPE

DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions (mm)			APMX (mm)	RMPX	WT *2 (kg)	Fig.	*1 Insert Type
		R				DCONMS	LF	LH					
20	**VPX200R202WA20S01404**	●	●	2	4	20	80	30	14	1.35°	0.16	1	LOGU09
25	**VPX200R252WA25S02106**	●	●	2	6	25	91	35	21	0.97°	0.29	1	LOGU09
25	**VPX200R252WA25S02808**	●	●	2	8	25	101	45	28	0.97°	0.32	1	LOGU09
32	**VPX200R322WA32S02808**	●	●	2	8	32	105	45	28	0.71°	0.55	1	LOGU09
32	**VPX200R323WA32S02812**	●	●	3	12	32	105	45	28	0.71°	0.54	1	LOGU09
32	**VPX200R322WA32S03510**	●	●	2	10	32	110	50	35	0.71°	0.57	1	LOGU09
32	**VPX200R323WA32S03515**	●	●	3	15	32	110	50	35	0.71°	0.55	1	LOGU09

*1 Corner radius RE 0.8mm is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting).
Insert RE 0.2 mm and 0.4 mm can also be used for the peripheral cutting edges.
*2 WT : Tool Weight

SPARE PARTS

DC (mm)	Tool Holder Type	 *		
		Clamp Screw	Wrench	Anti-seize Lubricant
20	**VPX200R20**	TPS27F1	TIP07F	MK1KS
25	**VPX200R25**	TPS27F2	TIP07F	MK1KS
32	**VPX200R32**	TPS27F2	TIP07F	MK1KS

* Clamp Torque (N • m) : TPS27F1 = 1.0,TPS27F2 = 1.0

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

Fig.1

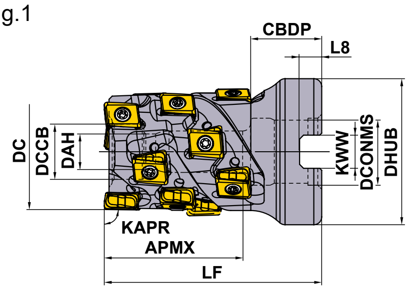
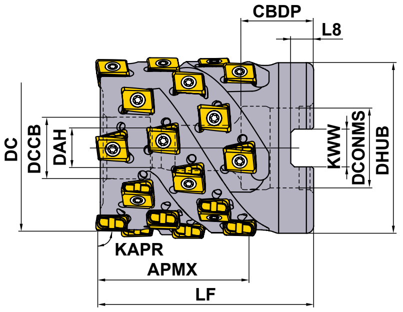
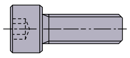


Fig.2



Right hand tool holder only.

DC (mm)	APMX	Set Bolt	Geometry
Ø32	35	HSC08045	
Ø40	42	HSC08050	
Ø50	42	HSC10045	

■SHELL TYPE

KAPR: 90°
GAMP: -6° GAMF : -25°

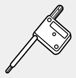
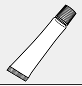
DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions (mm)		WT*2 (kg)	APMX (mm)	RMPX	Fig.	*1 Insert Type
		R				LF	DCONMS					
32	**VPX200-032A02A035R10**	★	●	2	10	55	16	0.22	35	0.71°	1	LOGU09
32	**VPX200-032A03A035R15**	●	●	3	15	55	16	0.20	35	0.71°	1	LOGU09
40	**VPX200-040A03A042R18**	★	●	3	18	60	16	0.34	42	0.54°	2	LOGU09
40	**VPX200-040A04A042R24**	●	●	4	24	60	16	0.33	42	0.54°	2	LOGU09
50	**VPX200-050A04A042R24**	★	●	4	24	60	22	0.55	42	0.42°	2	LOGU09
50	**VPX200-050A05A042R30**	★	●	5	30	60	22	0.54	42	0.42°	2	LOGU09

*1 Corner radius RE 0.8 mm is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting).
Insert RE 0.2 mm and 0.4 mm can also be used for the peripheral cutting edges.
*2 WT : Tool Weight

MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions (mm)						
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
32	**VPX200-032A02A035R10**	16	18	9	14	37	8.4	5.6
32	**VPX200-032A03A035R15**	16	18	9	14	37	8.4	5.6
40	**VPX200-040A03A042R18**	16	18	9	14	37	8.4	5.6
40	**VPX200-040A04A042R24**	16	18	9	14	37	8.4	5.6
50	**VPX200-050A04A042R24**	22	20	11	17	47	10.4	6.3
50	**VPX200-050A05A042R30**	22	20	11	17	47	10.4	6.3

SPARE PARTS

Tool Holder Type	 *		
	Clamp Screw	Wrench	Anti-seize Lubricant
VPX200	TPS27F2	TIP07F	MK1KS

* Clamp Torque (N • m) : TPS27F2 = 1.0

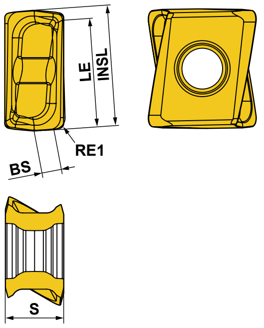
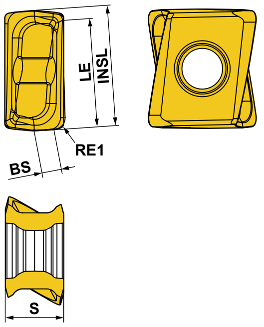
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

Material			MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15
	P	Steels	◖	◖		◖	✤				◖	
	M	Stainless Steels	◖	◖				◖			◖	
	K	Cast Irons	◖	◖	◖						✤	
	N	Non-ferrous Metals										◖
	S	Heat Resistant Alloys, Titanium Alloys							◖	✤	◖	
	H	Hardened Steels									◖	

Cutting Conditions (Guide) :
● : Stable Cutting ◖ : General Cutting ✤ : Unstable Cutting

Honing :
E : Round F : Sharp

Shape	Order Number	Class	Honing	Coated NEW **MV1020**	 NEW **MV1030**	 **MC5020**	 **MP6120**	 **MP6130**	 **MP7130**	 **MP9120**	 **MP9130**	 **VP15TF**	Carbide **TF15**	Dimensions (mm) **INSL**	 **RE1**	 **LE**	 **S**	 **BS**	Geometry
Low Cutting Resistance **L** Chipbreaker 	**LOGU0904020PNER-L**	G	E	●	●	★	★	★	★	★	★	★		8.7	0.2	7.6	4.3	1.7	 Right hand insert only.
	LOGU0904040PNER-L	G	E	●	●	●	●	●	●	●	●	★		8.7	0.4	7.6	4.3	1.5	
	LOGU0904080PNER-L	G	E	●	●	●	●	●	●	●	●	★		8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNER-L	G	E	●	●	★	★	★	★	★	★	★		8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNER-L	G	E	●	●	★	★	★	★	★	★	★		8.7	1.2	7.6	4.3	0.8	
	LOGU0904160PNER-L	G	E	●	●	●	●	●	●	●	●	★		8.7	1.6	7.6	4.3	0.5	
	LOGU0904020PNFR-L	G	F										●	8.7	0.2	7.6	4.3	1.7	
	LOGU0904040PNFR-L	G	F										●	8.7	0.4	7.6	4.3	1.5	
	LOGU0904080PNFR-L	G	F										●	8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNFR-L	G	F										★	8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNFR-L	G	F										★	8.7	1.2	7.6	4.3	0.8	
	LOGU0904160PNFR-L	G	F										★	8.7	1.6	7.6	4.3	0.5	
General Use **M** Chipbreaker 	**LOGU0904020PNER-M**	G	E	●	●	★	★	★	★	★	★	★		8.7	0.2	7.6	4.3	1.7	 Right hand insert only.
	LOGU0904040PNER-M	G	E	●	●	●	●	●	●	●	●	★		8.7	0.4	7.6	4.3	1.6	
	LOGU0904080PNER-M	G	E	●	●	●	●	●	●	●	●	★		8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNER-M	G	E	●	●	★	★	★	★	★	★	★		8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNER-M	G	E	●	●	★	★	★	★	★	★	★		8.7	1.2	7.6	4.3	0.9	
	LOGU0904160PNER-M	G	E	●	●	●	●	●	●	●	●	★		8.7	1.6	7.6	4.3	0.5	
	LOGU0904020PNFR-M	G	F										●	8.7	0.2	7.6	4.3	1.7	
	LOGU0904040PNFR-M	G	F										●	8.7	0.4	7.6	4.3	1.6	
	LOGU0904080PNFR-M	G	F										●	8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNFR-M	G	F										★	8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNFR-M	G	F										★	8.7	1.2	7.6	4.3	0.9	
	LOGU0904160PNFR-M	G	F										★	8.7	1.6	7.6	4.3	0.5	

● = NEW

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

CHIPBREAKER RECOMMENDATION

■ Chipbreaker Selection Table

Material		Properties	Cutting Conditions	Chipbreaker		Grade	
				1st Recommendation	2nd Recommendation	1st Recommendation	2nd Recommendation
P	Mild Steel	Hardness ≤180HB	● ◐	L	M	MV1020	—
			● ◐	L	M	MV1030	—
			● ◐	L	M	MP6120	VP15TF
			✤	M	L	MP6130	—
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180-350HB ≤350HB (Annealing)	● ◐	L	M	MV1020	—
			● ◐	L	M	MV1030	—
			●	L	M	MP6120	VP15TF
			◐	M	L	MP6120	VP15TF
			✤	M	L	MP6130	—
	Pre-hardened Steel	Hardness 35—45HRC	● ◐	M	L	MP6120	VP15TF
			✤	M	L	MP6130	—
M	Austenitic Stainless Steel	Hardness ≤280HB	● ◐	L	M	MV1030	—
			● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
		Hardness ＞200HB	● ◐	L	M	MV1030	—
			● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
	Duplex Stainless Steel	Hardness ≤280HB	● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
	Ferritic and Martensitic Stainless Steel	—	● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
	Precipitation Hardening Stainless Steel	Hardness ＜450HB	● ◐	L	M	MP7130	VP15TF
			✤	M	L	MP7130	—
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	M	L	MC5020	VP15TF
			✤	M	L	VP15TF	—
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	M	L	MV1020	—
			● ◐	M	L	MV1030	—
			● ◐	M	L	MC5020	VP15TF
			✤	M	L	VP15TF	—
N	Aluminium Alloy	Content Si＜5%	● ◐	L	M	TF15	—
			✤	M	L	TF15	—
S	Titanium Alloy (Ti-6Al-4V,etc.)	—	● ◐	L	M	MP9120	VP15TF
			✤	M	L	MP9130	—
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	—	● ◐	L	M	MP9120	VP15TF
			✤	M	L	MP9130	—
	Heat Resistant Alloy	—	● ◐	M	L	MP9120	VP15TF
			✤	M	L	MP9130	—
H	Hardened Steel	Hardness 40—55HRC	● ◐ ✤	M	—	VP15TF	—

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

RECOMMENDED CUTTING CONDITIONS

■ Cutting Speed

(mm)

	Material	Properties	Cutting Conditions	Grade	ae				Cutting Mode
					≤0.25DC	0.25—0.5DC	0.5—0.75DC	DC(Slot)	
					Vc (m/min)				
P	Mild Steel	Hardness ≤180HB	● ◐	MV1020	280 (220—330)	270 (210—320)	220 (170—260)	220 (170—260)	Dry, Wet
			● ◐	MV1030	230 (180—270)	220 (170—260)	180 (140—210)	180 (140—210)	Dry, Wet
			● ◐	MP6120,VP15TF	140 (100—190)	130 (90—180)	100 (70—120)	100 (70—120)	Dry, Wet
			✤	MP6130	140 (100—190)	130 (90—180)	100 (70—120)	100 (70—120)	Dry, Wet
	Carbon Steel Alloy Steel	Hardness 180—350HB	● ◐	MV1020	220 (170—260)	210 (160—240)	170 (130—200)	170 (130—200)	Dry, Wet
			● ◐	MV1030	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)	Dry, Wet
			● ◐	MP6120,VP15TF	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)	Dry, Wet
			✤	MP6130	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)	Dry, Wet
	Pre-hardened Steel	Hardness 180—350HB	● ◐	MP6120,VP15TF	100 (80—120)	90 (70—110)	80 (60—100)	80 (60—100)	Dry, Wet
			✤	MP6130	100 (80—120)	90 (70—110)	80 (60—100)	80 (60—100)	Dry, Wet
M	Austenitic Stainless Steel	Hardness ≤200HB	● ◐	MV1030	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)	Dry
			● ◐	MP7130,VP15TF	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)	Dry, Wet
			✤	MP7130	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)	Dry, Wet
		Hardness >200HB	● ◐	MV1030	150 (110—180)	140 (100—160)	110 (80—130)	110 (80—130)	Dry
			● ◐	MP7130,VP15TF	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)	Dry, Wet
			✤	MP7130	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)	Dry, Wet
	Ferritic and Martensitic Stainless Steel	—	● ◐	MP7130,VP15TF	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)	Dry, Wet
			✤	MP7130	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)	Dry, Wet
	Duplex Stainless Steel	Hardness ≤280HB	● ◐	MP7130,VP15TF	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)	Dry, Wet
			✤	MP7130	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)	Dry, Wet
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐	MP7130,VP15TF	90 (70—120)	80 (60—110)	60 (40—90)	60 (40—90)	Dry, Wet
			✤	MP7130	90 (70—120)	80 (60—110)	60 (40—90)	60 (40—90)	Dry, Wet
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	MC5020	180 (160—220)	170 (150—210)	150 (130—190)	150 (130—190)	Dry, Wet
			◐ ✤	VP15TF	130 (100—150)	120 (90—140)	100 (80—120)	100 (80—120)	Dry, Wet
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	MV1020	180 (140—250)	170 (130—240)	150 (120—210)	150 (120—210)	Dry, Wet
			● ◐	MV1030	150 (100—200)	140 (90—190)	125 (80—170)	150 (120—210)	Dry, Wet
			● ◐	MC5020	160 (140—180)	150 (130—170)	130 (110—150)	130 (110—150)	Dry, Wet
			◐ ✤	VP15TF	110 (80—140)	100 (70—130)	80 (60—120)	80 (60—120)	Dry, Wet
N	Aluminium Alloy	Content Si<5%	● ◐ ✤	TF15	600 (400—1000)	600 (400—1000)	600 (400—1000)	600 (400—1000)	Dry, Wet
S	Titanium Alloy (Ti-6Al-4V etc.)	—	● ◐	MP9120	50 (40—70)	50 (40—70)	50 (40—70)	50 (40—70)	Wet
			●	VP15TF	50 (40—70)	50 (40—70)	50 (40—70)	50 (40—70)	Wet
			◐ ✤	MP9130	50 (40—70)	50 (40—70)	50 (40—70)	50 (40—70)	Wet
	Titanium Alloy (Ti-6Al-5V-5Mo-3Cr etc.)	—	● ◐	MP9120	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)	Wet
			●	VP15TF	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)	Wet
			◐ ✤	MP9130	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)	Wet
	Heat Resistant Alloy	—	● ◐	MP9120	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)	Wet
			●	VP15TF	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)	Wet
			◐ ✤	MP9130	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)	Wet

Note 1) If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.

Note 2) Chattering and vibrations are more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.

- When tool overhang is long
- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change the clamp screw periodically.

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

■ Depth of Cut / Feed per Tooth

(mm)

	Material	Properties	ae	Cutting Conditions	DC			
					ø20—ø28		ø32—ø50	
					ap	fz (mm/t.)	ap	fz (mm/t.)
P	Mild Steel	Hardness ≤180HB	≤0.25DC	● ◐ ✤	≤14	0.13 (0.10—0.15)	≤APMX	0.15 (0.10—0.20)
			0.25—0.5DC	● ◐ ✤	≤8	0.10 (0.08—0.12)	≤28	0.13 (0.10—0.15)
			0.5—0.75DC	● ◐ ✤	≤6	0.10 (0.08—0.12)	≤14	0.10 (0.08—0.12)
			DC(Slot)	● ◐ ✤	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
	Carbon Steel Alloy Steel	Hardness 180—280HB	≤0.25DC	● ◐ ✤	≤14	0.13 (0.10—0.15)	≤APMX	0.15 (0.10—0.20)
			0.25—0.5DC	● ◐ ✤	≤8	0.10 (0.08—0.12)	≤28	0.13 (0.10—0.15)
			0.5—0.75DC	● ◐ ✤	≤6	0.10 (0.08—0.12)	≤14	0.10 (0.08—0.12)
			DC(Slot)	● ◐ ✤	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
	Carbon Steel Alloy Steel	Hardness 280—350HB	≤0.25DC	● ◐ ✤	≤14	0.13 (0.10—0.15)	≤APMX	0.13 (0.10—0.15)
			0.25—0.5DC	● ◐ ✤	≤8	0.10 (0.08—0.12)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐ ✤	≤6	0.10 (0.08—0.12)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐ ✤	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
	Pre-hardened Steel	Hardness 35—45HRC	≤0.25DC	● ◐ ✤	≤14	0.13 (0.10—0.15)	≤APMX	0.13 (0.10—0.15)
			0.25—0.5DC	● ◐ ✤	≤8	0.10 (0.08—0.12)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐ ✤	≤6	0.10 (0.08—0.12)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐ ✤	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
M	Austenitic Stainless Steel	–	≤0.25DC	● ◐	≤14	0.13 (0.10—0.15)	≤APMX	0.15 (0.10—0.20)
				✤	≤14	0.10 (0.08—0.12)	≤APMX	0.12 (0.08—0.15)
			0.25—0.5DC	● ◐	≤8	0.10 (0.08—0.12)	≤28	0.12 (0.08—0.15)
				✤	≤8	0.08 (0.06—0.10)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐	≤6	0.08 (0.06—0.10)	≤14	0.10 (0.08—0.12)
				✤	≤6	0.07 (0.06—0.08)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
				✤	≤4	0.07 (0.06—0.08)	≤4	0.07 (0.06—0.08)
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	≤0.25DC	● ◐	≤14	0.13 (0.10—0.15)	≤APMX	0.15 (0.10—0.20)
				✤	≤14	0.10 (0.08—0.12)	≤APMX	0.12 (0.08—0.15)
			0.25—0.5DC	● ◐	≤8	0.10 (0.08—0.12)	≤28	0.12 (0.08—0.15)
				✤	≤8	0.08 (0.06—0.10)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐	≤6	0.08 (0.06—0.10)	≤14	0.10 (0.08—0.12)
				✤	≤6	0.07 (0.06—0.08)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
				✤	≤4	0.07 (0.06—0.08)	≤4	0.07 (0.06—0.08)
	Duplex Stainless Steel	Hardness ≤280HB	≤0.25DC	● ◐	≤14	0.13 (0.10—0.15)	≤APMX	0.15 (0.10—0.20)
				✤	≤14	0.10 (0.08—0.12)	≤APMX	0.12 (0.08—0.15)
			0.25—0.5DC	● ◐	≤8	0.10 (0.08—0.12)	≤28	0.12 (0.08—0.15)
				✤	≤8	0.08 (0.06—0.10)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐	≤6	0.08 (0.06—0.10)	≤14	0.10 (0.08—0.12)
				✤	≤6	0.07 (0.06—0.08)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
				✤	≤4	0.07 (0.06—0.08)	≤4	0.07 (0.06—0.08)
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤0.25DC	● ◐	≤14	0.13 (0.10—0.15)	≤APMX	0.13 (0.10—0.15)
				✤	≤14	0.10 (0.08—0.12)	≤APMX	0.10 (0.08—0.12)
			0.25—0.5DC	● ◐	≤8	0.10 (0.08—0.12)	≤28	0.10 (0.08—0.12)
				✤	≤8	0.08 (0.06—0.10)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐	≤6	0.08 (0.06—0.10)	≤14	0.08 (0.06—0.10)
				✤	≤6	0.07 (0.06—0.08)	≤14	0.07 (0.06—0.08)
			DC(Slot)	● ◐	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
				✤	≤4	0.07 (0.06—0.08)	≤4	0.07 (0.06—0.08)

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

RECOMMENDED CUTTING CONDITIONS

■ Depth of Cut / Feed per Tooth

(mm)

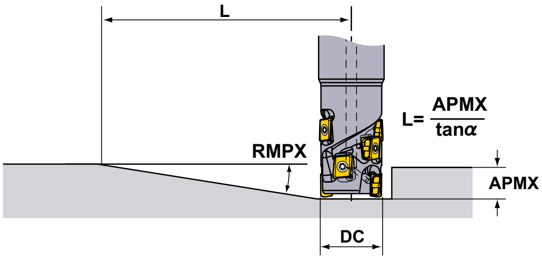
	Material	Properties	ae	Cutting Conditions	DC			
					ø20—ø28		ø32—ø50	
					ap	fz (mm/t.)	ap	fz (mm/t.)
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.25DC	● ◐	≤14	0.13 (0.10—0.15)	≤APMX	0.15 (0.10—0.20)
				✤	≤14	0.10 (0.08—0.12)	≤APMX	0.12 (0.08—0.15)
			0.25—0.5DC	● ◐	≤8	0.10 (0.08—0.12)	≤28	0.12 (0.08—0.15)
				✤	≤8	0.08 (0.06—0.10)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐	≤6	0.10 (0.08—0.12)	≤14	0.10 (0.08—0.12)
				✤	≤6	0.08 (0.06—0.10)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
				✤	≤4	0.07 (0.06—0.08)	≤4	0.07 (0.06—0.08)
	Ductile Cast Iron	—	≤0.25DC	● ◐	≤14	0.13 (0.10—0.15)	≤APMX	0.15 (0.10—0.20)
				✤	≤14	0.10 (0.08—0.12)	≤APMX	0.13 (0.10—0.15)
			0.25—0.5DC	● ◐	≤8	0.10 (0.08—0.12)	≤28	0.13 (0.10—0.15)
				✤	≤8	0.08 (0.06—0.10)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐	≤6	0.10 (0.08—0.12)	≤14	0.10 (0.08—0.12)
				✤	≤6	0.08 (0.06—0.10)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
				✤	≤4	0.07 (0.06—0.08)	≤4	0.07 (0.06—0.08)
N	Aluminium Alloy	Content Si<5%	≤0.25DC	● ◐	≤14	0.15 (0.10—0.20)	≤APMX	0.18 (0.10—0.25)
				✤	≤14	0.13 (0.10—0.15)	≤APMX	0.15 (0.10—0.20)
			0.25—0.5DC	● ◐	≤8	0.13 (0.10—0.15)	≤28	0.15 (0.10—0.20)
				✤	≤8	0.10 (0.08—0.12)	≤28	0.13 (0.10—0.15)
			0.5—0.75DC	● ◐	≤6	0.10 (0.08—0.12)	≤14	0.11 (0.06—0.15)
				✤	≤6	0.08 (0.06—0.10)	≤14	0.11 (0.06—0.15)
			DC(Slot)	● ◐	≤4	0.08 (0.06—0.10)	≤4	0.11 (0.06—0.15)
				✤	≤4	0.07 (0.06—0.08)	≤4	0.09 (0.06—0.12)
S	Titanium Alloy (Ti-6Al-4V etc.)	—	≤0.25DC	● ◐ ✤	≤14	0.12 (0.08—0.15)	≤APMX	0.12 (0.08—0.15)
			0.25—0.5DC	● ◐ ✤	≤8	0.10 (0.08—0.12)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐ ✤	≤6	0.08 (0.06—0.10)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐ ✤	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr etc.)	—	≤0.25DC	● ◐ ✤	≤14	0.10 (0.08—0.12)	≤APMX	0.10 (0.08—0.12)
			0.25—0.5DC	● ◐ ✤	≤8	0.10 (0.08—0.12)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐ ✤	≤6	0.08 (0.06—0.10)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐ ✤	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)
	Heat Resistant Alloy	—	≤0.25DC	● ◐ ✤	≤14	0.10 (0.08—0.12)	≤APMX	0.10 (0.08—0.12)
			0.25—0.5DC	● ◐ ✤	≤8	0.10 (0.08—0.12)	≤28	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐ ✤	≤6	0.08 (0.06—0.10)	≤14	0.08 (0.06—0.10)
			DC(Slot)	● ◐ ✤	≤4	0.08 (0.06—0.10)	≤4	0.08 (0.06—0.10)

Note 1) If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.
Note 2) Chattering and vibrations are more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
- When tool overhang is long
- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

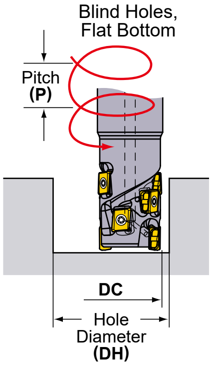
Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.
Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)
Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change the clamp screw periodically.

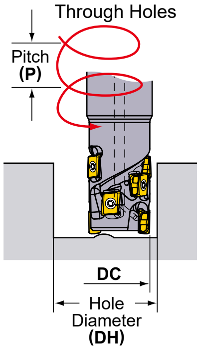
■Ramping / Helical Cutting

●Ramping



●Helical Cutting





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

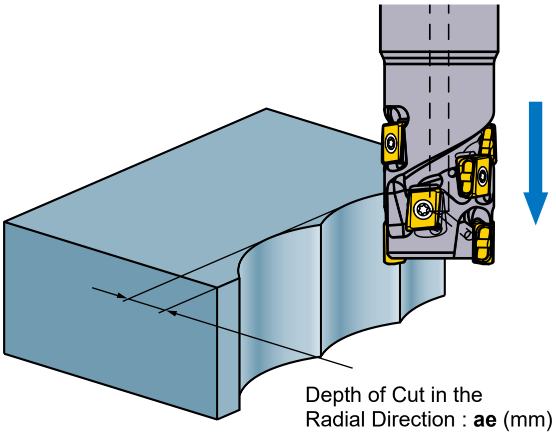
DC (mm)	RE (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
		RMPX	L * (mm)	DH max. (mm)	P max. (mm)	DH min. (mm)	P max. (mm)	DH min. (mm)	P max. (mm)
20	0.2	1.35°	340	39.0	1.4	35.5	1.1	32.0	0.9
	0.4	1.35°	340	38.6	1.4	35.5	1.1	32.0	0.9
	0.8	1.35°	340	37.8	1.3	35.5	1.1	32.0	0.9
	1.0	1.35°	340	37.4	1.3	35.5	1.1	32.0	0.9
	1.2	1.35°	340	37.0	1.3	35.5	1.1	32.0	0.9
	1.6	1.35°	340	36.2	1.2	35.5	1.1	32.0	0.9
22	0.2	1.16°	396	43.0	1.3	39.5	1.1	36.0	0.9
	0.4	1.16°	396	42.6	1.3	39.5	1.1	36.0	0.9
	0.8	1.16°	396	41.8	1.3	39.5	1.1	36.0	0.9
	1.0	1.16°	396	41.4	1.2	39.5	1.1	36.0	0.9
	1.2	1.16°	396	41.0	1.2	39.5	1.1	36.0	0.9
	1.6	1.16°	396	40.2	1.2	39.5	1.1	36.0	0.9
25	0.2	0.97°	473	49.0	1.3	45.5	1.1	42.0	0.9
	0.4	0.97°	473	48.6	1.3	45.5	1.1	42.0	0.9
	0.8	0.97°	473	47.8	1.2	45.5	1.1	42.0	0.9
	1.0	0.97°	473	47.4	1.2	45.5	1.1	42.0	0.9
	1.2	0.97°	473	47.0	1.2	45.5	1.1	42.0	0.9
	1.6	0.97°	473	46.2	1.1	45.5	1.1	42.0	0.9
28	0.2	0.84°	546	55.0	1.2	51.5	1.1	48.0	0.9
	0.4	0.84°	546	54.6	1.2	51.5	1.1	48.0	0.9
	0.8	0.84°	546	53.8	1.2	51.5	1.1	48.0	0.9
	1.0	0.84°	546	53.4	1.2	51.5	1.1	48.0	0.9
	1.2	0.84°	546	53.0	1.2	51.5	1.1	48.0	0.9
	1.6	0.84°	546	52.2	1.1	51.5	1.1	48.0	0.9
32	0.2	0.71°	646	62.8	1.2	59.4	1.1	56.0	0.9
	0.4	0.71°	646	62.4	1.2	59.4	1.1	56.0	0.9
	0.8	0.71°	646	61.6	1.2	59.4	1.1	56.0	0.9
	1.0	0.71°	646	61.2	1.1	59.4	1.1	56.0	0.9
	1.2	0.71°	646	60.8	1.1	59.4	1.1	56.0	0.9
	1.6	0.71°	646	60.0	1.1	59.4	1.1	56.0	0.9
35	0.2	0.63°	728	69.0	1.2	65.5	1.1	62.0	0.9
	0.4	0.63°	728	68.6	1.2	65.5	1.1	62.0	0.9
	0.8	0.63°	728	67.8	1.1	65.5	1.1	62.0	0.9
	1.0	0.63°	728	67.4	1.1	65.5	1.1	62.0	0.9
	1.2	0.63°	728	67.0	1.1	65.5	1.1	62.0	0.9
	1.6	0.63°	728	66.2	1.1	65.5	1.1	62.0	0.9
40	0.2	0.54°	849	78.8	1.2	75.4	1.0	72.0	0.9
	0.4	0.54°	849	78.4	1.1	75.4	1.0	72.0	0.9
	0.8	0.54°	849	77.6	1.1	75.4	1.0	72.0	0.9
	1.0	0.54°	849	77.2	1.1	75.4	1.0	72.0	0.9
	1.2	0.54°	849	76.8	1.1	75.4	1.0	72.0	0.9
	1.6	0.54°	849	76.0	1.1	75.4	1.0	72.0	0.9
50	0.2	0.42°	1092	98.8	1.1	95.4	1.0	92.0	1.0
	0.4	0.42°	1092	98.4	1.1	95.4	1.0	92.0	1.0
	0.8	0.42°	1092	97.6	1.1	95.4	1.0	92.0	1.0
	1.0	0.42°	1092	97.2	1.1	95.4	1.0	92.0	1.0
	1.2	0.42°	1092	96.8	1.1	95.4	1.0	92.0	1.0
	1.6	0.42°	1092	96.0	1.1	95.4	1.0	92.0	1.0

Note 1) When machining a highly ductile workpiece with the ramping angles in the table above, chips may be elongated.
* Shows the distance until a maximum depth of cut of 8 mm is achieved at the maximum ramping angle L (= 8/tan α).

For Plunging and Drilling

See the tables to the right for cutting conditions. Follow the cutting conditions for slot milling regarding feed per tooth and cutting speed.

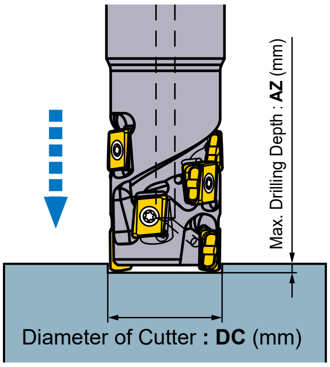
● Plunging



DC (mm)	**ae max.** (mm)
20	3.9
22	4.0
25	4.0
28	4.0
32	4.0
35	4.0
40	4.0
50	4.0

Note 1) No step feed necessary.

● Drilling



DC (mm)	**AZ max.** (mm)
20	0.3
22	0.3
25	0.3
28	0.3
32	0.3
35	0.3
40	0.3
50	0.3

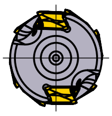
Note 1) Exercise due caution as chips scatter easily.
Note 2) Use compressed air to eliminate chips (or coolant for when machining aluminium alloy).

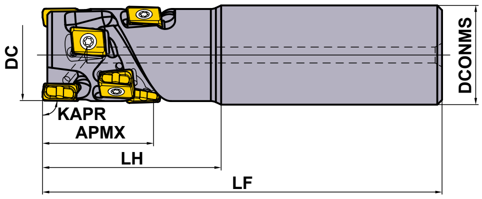
DEEP SHOULDER MILLING

VPX300

LONG CUTTING EDGE

P **M** **K** **N** **S** H





Right hand tool holder only.

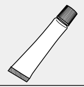
CYLINDRICAL SHANK

DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions (mm)			**APMX** (mm)	**RMPX**	**WT** *2 (kg)	*1 Insert Type
		R				**DCONMS**	**LF**	**LH**				
40	**VPX300R402SA32S02104**	●	●	2	4	32	125	45	21	1.06°	0.78	LOGU12
40	**VPX300R402SA32S03106**	●	●	2	6	32	130	50	31	1.06°	0.79	LOGU12
40	**VPX300R402SA32S04208**	●	●	2	8	32	140	60	42	1.06°	0.84	LOGU12

*1 Corner radius RE 0.8 mm is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting).
Insert RE 0.2 mm and 0.4 mm can also be used for the peripheral cutting edges.

*2 WT : Tool Weight

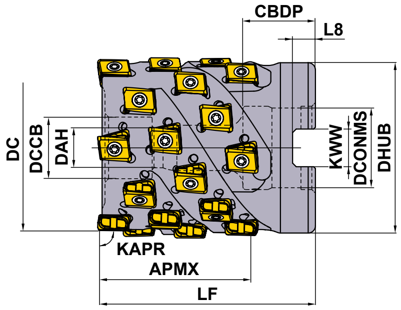
SPARE PARTS

DC (mm)	Tool Holder Type	 *		
		Clamp Screw	Wrench	Anti-seize Lubricant
40	**VPX300R40**	TPS40F1	TIP15W	MK1KS

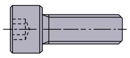
* Clamp Torque (N • m) : TPS40F1 = 3.5

● : Inventory maintained.

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001



Right hand tool holder only.

Order Number	APMX	Set Bolt	Geometry
VPX300-040A02A031	31	HSC08040	
VPX300-040A02A042	42	HSC08050	
VPX300-050A03A031	31	HSC10040	
VPX300-050A03A042	42	HSC10050	
VPX300-050A03A052	52	HSC10060	
VPX300-063A04A042	42	HSC12050	
VPX300-063A04A052	52	HSC12060	
VPX300-080A05A052	52	HSC12060	
VPX300-080A05A063	63	HSC12070	
VPX300R08005CA052	52	HSC16055	
VPX300R08005CA063	63	HSC16065	

■SHELL TYPE

KAPR: 90°
GAMP: -6° GAMF : -22.5°

DCONMS = mm size

DC (mm)	Order Number	Stock	◑	Number of Flutes	Total	Dimensions (mm)		**WT** *2 (kg)	**APMX** (mm)	**RMPX**	*1 Insert Type
		R				**LF**	**DCONMS**				
40	**VPX300-040A02A031R06**	●	●	2	6	50	16	0.26	31	1.06°	LOGU12
40	**VPX300-040A02A042R08**	●	●	2	8	60	16	0.31	42	1.06°	LOGU12
50	**VPX300-050A03A031R09**	●	●	3	9	55	22	0.47	31	0.79°	LOGU12
50	**VPX300-050A03A042R12**	●	●	3	12	65	22	0.55	42	0.79°	LOGU12
50	**VPX300-050A03A052R15**	●	●	3	15	75	22	0.63	52	0.79°	LOGU12
63	**VPX300-063A04A042R16**	★	●	4	16	65	27	0.92	42	0.6°	LOGU12
63	**VPX300-063A04A052R20**	★	●	4	20	75	27	1.06	52	0.6°	LOGU12
80	**VPX300-080A05A052R25**	★	●	5	25	75	27	1.94	52	0.45°	LOGU12
80	**VPX300-080A05A063R30**	★	●	5	30	85	27	2.20	63	0.45°	LOGU12

DCONMS = inch size

DC (mm)	Order Number	Stock	Number of Flutes	Total	Dimensions (mm)		**WT** (kg)	**APMX** (mm)	**RMPX**	Insert Type
		R			**LF**	**DCONMS**				
80	**VPX300R08005CA05225**	★	5	25	75	31.75	1.81	52	0.45°	LOGU12
80	**VPX300R08005CA06330**	★	5	30	85	31.75	2.06	63	0.45°	LOGU12

*1 Corner radius RE 0.8mm is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting).
Insert RE 0.2mm and 0.4 mm can also be used for the peripheral cutting edges.
*2 WT : Tool Weight

MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions (mm)						
		DCONMS	**CBDP**	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**
40	**VPX300-040A02A031R06**	16	18	9	14	37	8.4	5.6
40	**VPX300-040A02A042R08**	16	18	9	14	37	8.4	5.6
50	**VPX300-050A03A031R09**	22	20	11	17	47	10.4	6.3
50	**VPX300-050A03A042R12**	22	20	11	17	47	10.4	6.3
50	**VPX300-050A03A052R15**	22	20	11	17	47	10.4	6.3
63	**VPX300-063A04A042R16**	27	23	13	20	76	12.4	7.0
63	**VPX300-063A04A052R20**	27	23	13	20	76	12.4	7.0
80	**VPX300-080A05A052R25**	27	23	13	20	76	12.4	7.0
80	**VPX300-080A05A063R30**	27	23	13	20	76	12.4	7.0
80	**VPX300R08005CA05225**	31.75	32	17	26	76	12.7	8.0
80	**VPX300R08005CA06330**	31.75	32	17	26	76	12.7	8.0

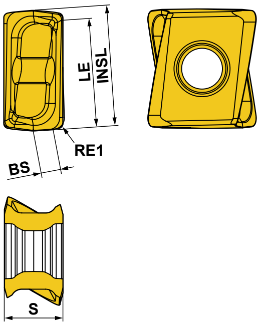
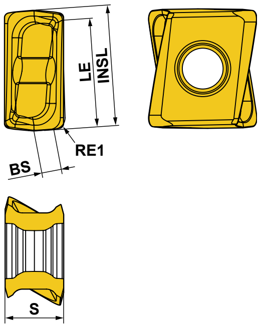
● : Inventory maintained. ★ : Inventory maintained in Japan.
(10 inserts in one case)

INSERTS

Material			MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	
Material	P	Steels	◐	◐		◐	✣				◐		
	M	Stainless Steels	◐	◐				◐			◐		
	K	Cast Irons	◐	◐	◐						✣		
	N	Non-ferrous Metals										◐	
	S	Heat Resistant Alloys, Titanium Alloys							◐	✣	◐		
	H	Hardened Steels									◐		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round F : Sharp

Shape	Order Number	Class	Honing	Coated									Carbide		Dimensions (mm)					Geometry
				NEW MV1020	NEW MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15		INSL	RE1	LE	S	BS	
Low Cutting Resistance L Chipbreaker	**LOGU1207020PNER-L**	G	E	●	●	★	★	★	★	★	★	★			12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	0.8	11.3	7.0	2.6	
	LOGU1207100PNER-L	G	E	●	●	★	★	★	★	★	★	★			12.4	1.0	11.3	7.0	2.5	
	LOGU1207120PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	1.2	11.3	7.0	2.4	
	LOGU1207160PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	1.6	11.3	7.0	1.8	
	LOGU1207200PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	2.4	11.3	7.0	1.2	
	**LOGU1207300PNER-L**	G	E	●	●	★	★	★	★	★	★	★			12.4	3.0	11.3	7.0	0.6	
	LOGU1207320PNER-L	G	E	●	●	●	●	●	●	●	●	★			12.4	3.2	11.3	7.0	0.4	
	LOGU1207020PNFR-L	G	F										★		12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNFR-L	G	F										●		12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNFR-L	G	F										●		12.4	0.8	11.3	7.0	2.6	
	LOGU1207100PNFR-L	G	F										★		12.4	1.0	11.3	7.0	2.5	
	LOGU1207120PNFR-L	G	F										●		12.4	1.2	11.3	7.0	2.4	
	LOGU1207160PNFR-L	G	F										●		12.4	1.6	11.3	7.0	1.8	
	LOGU1207200PNFR-L	G	F										●		12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNFR-L	G	F										●		12.4	2.4	11.3	7.0	1.2	
	LOGU1207300PNFR-L	G	F										★		12.4	3.0	11.3	7.0	0.6	
	LOGU1207320PNFR-L	G	F										●		12.4	3.2	11.3	7.0	0.4	Right hand insert only.
General Use M Chipbreaker	**LOGU1207020PNER-M**	G	E	●	●	★	★	★	★	★	★	★			12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	0.8	11.3	7.0	2.4	
	LOGU1207100PNER-M	G	E	●	●	★	★	★	★	★	★	★			12.4	1.0	11.3	7.0	2.3	
	LOGU1207120PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	1.2	11.3	7.0	2.1	
	LOGU1207160PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	1.6	11.3	7.0	1.7	
	LOGU1207200PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	2.4	11.3	7.0	1.0	
	**LOGU1207300PNER-M**	G	E	●	●	★	★	★	★	★	★	★			12.4	3.0	11.3	7.0	0.5	
	LOGU1207320PNER-M	G	E	●	●	●	●	●	●	●	●	★			12.4	3.2	11.3	7.0	0.3	
	LOGU1207020PNFR-M	G	F										★		12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNFR-M	G	F										●		12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNFR-M	G	F										●		12.4	0.8	11.3	7.0	2.4	
	LOGU1207100PNFR-M	G	F										★		12.4	1.0	11.3	7.0	2.3	
	LOGU1207120PNFR-M	G	F										●		12.4	1.2	11.3	7.0	2.1	
	LOGU1207160PNFR-M	G	F										●		12.4	1.6	11.3	7.0	1.7	
	LOGU1207200PNFR-M	G	F										●		12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNFR-M	G	F										●		12.4	2.4	11.3	7.0	1.0	
	LOGU1207300PNFR-M	G	F										★		12.4	3.0	11.3	7.0	0.5	
	LOGU1207320PNFR-M	G	F										●		12.4	3.2	11.3	7.0	0.3	Right hand insert only.

● = NEW

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

CHIPBREAKER RECOMMENDATION

■ Chipbreaker Selection Table

Material		Properties	Cutting Conditions	Chipbreaker		Grade	
				1st Recommendation	2nd Recommendation	1st Recommendation	2nd Recommendation
P	Mild Steel	Hardness ≤180HB	● ◐	L	M	MV1020	–
			● ◐	L	M	MV1030	–
			● ◐	L	M	MP6120	VP15TF
			✣	M	L	MP6130	–
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 180-350HB ≤350HB (Annealing)	● ◐	L	M	MV1020	–
			● ◐	L	M	MV1030	–
			●	L	M	MP6120	VP15TF
			◐	M	L	MP6120	VP15TF
			✣	M	L	MP6130	–
	Pre-hardened Steel	Hardness 35–45HRC	● ◐	M	L	MP6120	VP15TF
			✣	M	L	MP6130	–
M	Austenitic Stainless Steel	Hardness ≤200HB	● ◐	L	M	MV1030	–
			● ◐	L	M	MP7130	VP15TF
			✣	M	L	MP7130	–
		Hardness >200HB	● ◐	L	M	MV1030	–
			● ◐	L	M	MP7130	VP15TF
			✣	M	L	MP7130	–
	Duplex Stainless Steel	Hardness ≤280HB	● ◐	L	M	MP7130	VP15TF
			✣	M	L	MP7130	–
	Ferritic and Martensitic Stainless Steel	–	● ◐	L	M	MP7130	VP15TF
			✣	M	L	MP7130	–
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐	L	M	MP7130	VP15TF
			✣	M	L	MP7130	–
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	M	L	MC5020	VP15TF
			✣	M	L	VP15TF	–
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	M	L	MV1020	–
			● ◐	M	L	MV1030	–
			● ◐	M	L	MC5020	VP15TF
			✣	M	L	VP15TF	–
N	Aluminium Alloy	Content Si<5%	● ◐	L	M	TF15	–
			✣	M	L	TF15	–
S	Titanium Alloy (Ti-6Al-4V,etc.)	–	● ◐	L	M	MP9120	VP15TF
			✣	M	L	MP9130	–
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	–	● ◐	L	M	MP9120	VP15TF
			✣	M	L	MP9130	–
	Heat Resistant Alloy	–	● ◐	M	L	MP9120	VP15TF
			✣	M	L	MP9130	–
H	Hardened Steel	Hardness 40–55HRC	● ◐ ✣	M	–	VP15TF	–

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

RECOMMENDED CUTTING CONDITIONS

■ Cutting Speed

(mm)

	Material	Properties	Cutting Conditions	Grade	ae				Cutting Mode
					≤0.25DC	0.25—0.5DC	0.5—0.75DC	DC(Slot)	
					Vc (m/min)				
P	Mild Steel	Hardness ≤180HB	● ◐	MV1020	280 (220—330)	270 (210—320)	220 (170—260)	220 (170—260)	Dry, Wet
			● ◐	MV1030	230 (180—270)	220 (170—260)	180 (140—210)	180 (140—210)	Dry, Wet
			● ◐	MP6120,VP15TF	140 (100—190)	130 (90—180)	100 (70—120)	100 (70—120)	Dry, Wet
			✤	MP6130	140 (100—190)	130 (90—180)	100 (70—120)	100 (70—120)	Dry, Wet
	Carbon Steel Alloy Steel	Hardness 180—350HB	● ◐	MV1020	220 (170—260)	210 (160—240)	170 (130—200)	170 (130—200)	Dry, Wet
			● ◐	MV1030	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)	Dry, Wet
			● ◐	MP6120,VP15TF	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)	Dry, Wet
			✤	MP6130	120 (90—140)	110 (80—130)	100 (70—120)	100 (70—120)	Dry, Wet
	Pre-hardened Steel	Hardness 35–45HRC	● ◐	MP6120,VP15TF	100 (80—120)	90 (70—110)	80 (60—100)	80 (60—100)	Dry, Wet
			✤	MP6130	100 (80—120)	90 (70—110)	80 (60—100)	80 (60—100)	Dry, Wet
M	Austenitic Stainless Steel	Hardness ≤200HB	● ◐	MV1030	180 (140—210)	170 (130—200)	140 (110—160)	140 (110—160)	Dry
			● ◐	MP7130,VP15TF	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)	Dry, Wet
			✤	MP7130	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)	Dry, Wet
		Hardness >200HB	● ◐	MV1030	150 (110—180)	140 (100—160)	110 (80—130)	110 (80—130)	Dry
			● ◐	MP7130,VP15TF	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)	Dry, Wet
			✤	MP7130	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)	Dry, Wet
	Ferritic and Martensitic Stainless Steel	—	● ◐	MP7130,VP15TF	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)	Dry, Wet
			✤	MP7130	120 (100—150)	110 (90—140)	90 (70—120)	90 (70—120)	Dry, Wet
	Duplex Stainless Steel	Hardness ≤280HB	● ◐	MP7130,VP15TF	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)	Dry, Wet
			✤	MP7130	100 (80—130)	90 (70—120)	70 (50—100)	70 (50—100)	Dry, Wet
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ◐	MP7130,VP15TF	90 (70—120)	80 (60—110)	60 (40—90)	60 (40—90)	Dry, Wet
			✤	MP7130	90 (70—120)	80 (60—110)	60 (40—90)	60 (40—90)	Dry, Wet
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ◐	MC5020	180 (160—220)	170 (150—210)	150 (130—190)	150 (130—190)	Dry, Wet
			◐ ✤	VP15TF	130 (100—150)	120 (90—140)	100 (80—120)	100 (80—120)	Dry, Wet
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	MV1020	200 (150—280)	170 (130—240)	150 (120—210)	150 (120—210)	Dry, Wet
			● ◐	MV1030	150 (100—200)	140 (90—190)	125 (80—170)	125 (80—170)	Dry, Wet
			● ◐	MC5020	160 (140—180)	150 (130—170)	130 (110—150)	130 (110—150)	Dry, Wet
			◐ ✤	VP15TF	110 (80—140)	100 (70—130)	80 (60—120)	80 (60—120)	Dry, Wet
N	Aluminium Alloy	Content Si<5%	● ◐ ✤	TF15	600 (400—1000)	600 (400—1000)	600 (400—1000)	600 (400—1000)	Dry, Wet
S	Titanium Alloy (Ti-6Al-4V etc.)	—	● ◐	MP9120	50 (40—70)	50 (40—70)	50 (40—70)	50 (40—70)	Wet
			●	VP15TF	50 (40—70)	50 (40—70)	50 (40—70)	50 (40—70)	Wet
			◐ ✤	MP9130	50 (40—70)	50 (40—70)	50 (40—70)	50 (40—70)	Wet
	Titanium Alloy (Ti-6Al-5V-5Mo-3Cr etc.)	—	● ◐	MP9120	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)	Wet
			●	VP15TF	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)	Wet
			◐ ✤	MP9130	30 (20—40)	30 (20—40)	30 (20—40)	30 (20—40)	Wet
	Heat Resistant Alloy	—	● ◐	MP9120	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)	Wet
			●	VP15TF	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)	Wet
			◐ ✤	MP9130	40 (30—60)	40 (30—60)	40 (30—60)	40 (30—60)	Wet

Note 1) If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.
Note 2) Chattering and vibrations are more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
- When tool overhang is long
- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.
Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)
Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change the clamp screw periodically.

RECOMMENDED CUTTING CONDITIONS

■ Depth of Cut / Feed per Tooth

(mm)

	Material	Properties	ae	Cutting Conditions	DC			
					ø40		ø50–ø80	
					ap	fz (mm/t.)	ap	fz (mm/t.)
P	Mild Steel	Hardness ≤180HB	≤0.25DC	● ◐ ❋	≤APMX	0.15 (0.10–0.20)	≤APMX	0.18 (0.10–0.25)
			0.25–0.5DC	● ◐ ❋	≤APMX	0.13 (0.10–0.15)	≤31	0.15 (0.10–0.20)
			0.5–0.75DC	● ◐ ❋	≤21	0.10 (0.08–0.12)	≤21	0.13 (0.10–0.15)
			DC(Slot)	● ◐ ❋	≤5	0.08 (0.06–0.10)	≤5	0.10 (0.08–0.12)
	Carbon Steel Alloy Steel	Hardness 180–280HB	≤0.25DC	● ◐ ❋	≤APMX	0.15 (0.10–0.20)	≤APMX	0.18 (0.10–0.25)
			0.25–0.5DC	● ◐ ❋	≤APMX	0.13 (0.10–0.15)	≤31	0.15 (0.10–0.20)
			0.5–0.75DC	● ◐ ❋	≤21	0.10 (0.08–0.12)	≤21	0.13 (0.10–0.15)
			DC(Slot)	● ◐ ❋	≤5	0.08 (0.06–0.10)	≤5	0.10 (0.08–0.12)
	Carbon Steel Alloy Steel	Hardness 280–350HB	≤0.25DC	● ◐ ❋	≤APMX	0.13 (0.10–0.15)	≤APMX	0.15 (0.10–0.20)
			0.25–0.5DC	● ◐ ❋	≤APMX	0.10 (0.08–0.12)	≤31	0.13 (0.10–0.15)
			0.5–0.75DC	● ◐ ❋	≤21	0.08 (0.06–0.10)	≤21	0.10 (0.08–0.12)
			DC(Slot)	● ◐ ❋	≤5	0.08 (0.06–0.10)	≤5	0.08 (0.06–0.10)
	Pre-hardened Steel	Hardness 35–45HRC	≤0.25DC	● ◐ ❋	≤APMX	0.13 (0.10–0.15)	≤APMX	0.15 (0.10–0.20)
			0.25–0.5DC	● ◐ ❋	≤APMX	0.10 (0.08–0.12)	≤31	0.13 (0.10–0.15)
			0.5–0.75DC	● ◐ ❋	≤21	0.08 (0.06–0.10)	≤21	0.10 (0.08–0.12)
			DC(Slot)	● ◐ ❋	≤5	0.08 (0.06–0.10)	≤5	0.08 (0.06–0.10)
M	Austenitic Stainless Steel	–	≤0.25DC	● ◐	≤APMX	0.15 (0.10–0.20)	≤APMX	0.15 (0.10–0.20)
				❋	≤APMX	0.12 (0.08–0.15)	≤APMX	0.12 (0.08–0.15)
			0.25–0.5DC	● ◐	≤APMX	0.12 (0.08–0.15)	≤31	0.12 (0.08–0.15)
				❋	≤APMX	0.10 (0.08–0.12)	≤31	0.10 (0.08–0.12)
			0.5–0.75DC	● ◐	≤21	0.10 (0.08–0.12)	≤21	0.10 (0.08–0.12)
				❋	≤21	0.08 (0.06–0.10)	≤21	0.08 (0.06–0.10)
			DC(Slot)	● ◐	≤5	0.08 (0.06–0.10)	≤5	0.08 (0.06–0.10)
				❋	≤5	0.07 (0.06–0.08)	≤5	0.07 (0.06–0.08)
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	≤0.25DC	● ◐	≤APMX	0.15 (0.10–0.20)	≤APMX	0.15 (0.10–0.20)
				❋	≤APMX	0.12 (0.08–0.15)	≤APMX	0.12 (0.08–0.15)
			0.25–0.5DC	● ◐	≤APMX	0.12 (0.08–0.15)	≤31	0.12 (0.08–0.15)
				❋	≤APMX	0.10 (0.08–0.12)	≤31	0.10 (0.08–0.12)
			0.5–0.75DC	● ◐	≤21	0.10 (0.08–0.12)	≤21	0.10 (0.08–0.12)
				❋	≤21	0.08 (0.06–0.10)	≤21	0.08 (0.05–0.10)
			DC(Slot)	● ◐	≤5	0.08 (0.06–0.10)	≤5	0.08 (0.05–0.10)
				❋	≤5	0.07 (0.06–0.08)	≤5	0.07 (0.05–0.08)
	Duplex Stainless Steel	Hardness ≤280HB	≤0.25DC	● ◐	≤APMX	0.15 (0.10–0.20)	≤APMX	0.15 (0.10–0.20)
				❋	≤APMX	0.12 (0.08–0.15)	≤APMX	0.12 (0.08–0.15)
			0.25–0.5DC	● ◐	≤APMX	0.12 (0.08–0.15)	≤31	0.12 (0.08–0.15)
				❋	≤APMX	0.10 (0.08–0.12)	≤31	0.10 (0.08–0.12)
			0.5–0.75DC	● ◐	≤21	0.10 (0.08–0.12)	≤21	0.10 (0.08–0.12)
				❋	≤21	0.08 (0.06–0.10)	≤21	0.08 (0.06–0.10)
			DC(Slot)	● ◐	≤5	0.08 (0.06–0.10)	≤5	0.08 (0.06–0.10)
				❋	≤5	0.07 (0.06–0.08)	≤5	0.07 (0.06–0.08)
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤0.25DC	● ◐	≤APMX	0.13 (0.10–0.15)	≤APMX	0.13 (0.10–0.15)
				❋	≤APMX	0.10 (0.08–0.12)	≤APMX	0.10 (0.08–0.12)
			0.25–0.5DC	● ◐	≤APMX	0.10 (0.08–0.12)	≤31	0.10 (0.08–0.12)
				❋	≤APMX	0.10 (0.08–0.12)	≤31	0.10 (0.08–0.12)
			0.5–0.75DC	● ◐	≤21	0.08 (0.06–0.10)	≤21	0.08 (0.05–0.10)
				❋	≤21	0.07 (0.06–0.08)	≤21	0.07 (0.05–0.08)
			DC(Slot)	● ◐	≤5	0.08 (0.06–0.10)	≤5	0.08 (0.05–0.10)
				❋	≤5	0.07 (0.06–0.08)	≤5	0.07 (0.06–0.08)

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

(mm)

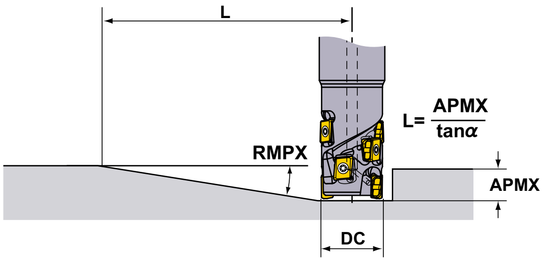
	Material	Properties	ae	Cutting Conditions	DC			
					ø40		ø50—ø80	
					ap	fz (mm/t.)	ap	fz (mm/t.)
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.25DC	● ◐	≤APMX	0.15 (0.10—0.20)	≤APMX	0.18 (0.10—0.25)
				✤	≤APMX	0.12 (0.08—0.15)	≤APMX	0.15 (0.10—0.20)
			0.25—0.5DC	● ◐	≤APMX	0.12 (0.08—0.15)	≤31	0.15 (0.10—0.20)
				✤	≤APMX	0.10 (0.08—0.12)	≤31	0.13 (0.10—0.15)
			0.5—0.75DC	● ◐	≤21	0.10 (0.08—0.12)	≤21	0.13 (0.10—0.15)
				✤	≤21	0.08 (0.06—0.10)	≤21	0.10 (0.08—0.12)
			DC(Slot)	● ◐	≤5	0.08 (0.06—0.10)	≤5	0.12 (0.08—0.15)
				✤	≤5	0.07 (0.06—0.08)	≤5	0.08 (0.06—0.10)
	Ductile Cast Iron	—	≤0.25DC	● ◐	≤APMX	0.15 (0.10—0.20)	≤APMX	0.15 (0.10—0.20)
				✤	≤APMX	0.13 (0.10—0.15)	≤APMX	0.13 (0.10—0.15)
			0.25—0.5DC	● ◐	≤APMX	0.13 (0.10—0.15)	≤31	0.13 (0.10—0.15)
				✤	≤APMX	0.10 (0.08—0.12)	≤31	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐	≤21	0.10 (0.08—0.12)	≤21	0.10 (0.08—0.12)
				✤	≤21	0.08 (0.06—0.10)	≤21	0.08 (0.06—0.10)
			DC(Slot)	● ◐	≤5	0.08 (0.06—0.10)	≤5	0.08 (0.06—0.10)
				✤	≤5	0.07 (0.06—0.08)	≤5	0.07 (0.06—0.08)
N	Aluminium Alloy	Content Si＜5%	≤0.25DC	● ◐	≤APMX	0.18 (0.10—0.25)	≤APMX	0.18 (0.10—0.25)
				✤	≤APMX	0.15 (0.10—0.20)	≤APMX	0.15 (0.10—0.20)
			0.25—0.5DC	● ◐	≤APMX	0.15 (0.10—0.20)	≤31	0.15 (0.10—0.20)
				✤	≤APMX	0.13 (0.10—0.15)	≤31	0.13 (0.10—0.15)
			0.5—0.75DC	● ◐	≤21	0.11 (0.06—0.15)	≤21	0.12 (0.08—0.15)
				✤	≤21	0.11 (0.06—0.15)	≤21	0.12 (0.08—0.15)
			DC(Slot)	● ◐	≤5	0.11 (0.06—0.15)	≤5	0.12 (0.08—0.15)
				✤	≤5	0.09 (0.06—0.12)	≤5	0.10 (0.08—0.12)
S	Titanium Alloy (Ti-6Al-4V etc.)	—	≤0.25DC	● ◐ ✤	≤APMX	0.12 (0.08—0.15)	≤APMX	0.12 (0.08—0.15)
			0.25—0.5DC	● ◐ ✤	≤APMX	0.10 (0.08—0.12)	≤31	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐ ✤	≤21	0.08 (0.06—0.10)	≤21	0.08 (0.06—0.10)
			DC(Slot)	● ◐ ✤	≤5	0.08 (0.06—0.10)	≤5	0.08 (0.06—0.10)
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr etc.)	—	≤0.25DC	● ◐ ✤	≤APMX	0.10 (0.08—0.12)	≤APMX	0.10 (0.08—0.12)
			0.25—0.5DC	● ◐ ✤	≤APMX	0.10 (0.08—0.12)	≤31	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐ ✤	≤21	0.08 (0.06—0.10)	≤21	0.08 (0.06—0.10)
			DC(Slot)	● ◐ ✤	≤5	0.08 (0.06—0.10)	≤5	0.08 (0.06—0.10)
	Heat Resistant Alloy	—	≤0.25DC	● ◐ ✤	≤APMX	0.10 (0.08—0.12)	≤APMX	0.10 (0.08—0.12)
			0.25—0.5DC	● ◐ ✤	≤APMX	0.10 (0.08—0.12)	≤31	0.10 (0.08—0.12)
			0.5—0.75DC	● ◐ ✤	≤21	0.08 (0.06—0.10)	≤21	0.08 (0.06—0.10)
			DC(Slot)	● ◐ ✤	≤5	0.08 (0.06—0.10)	≤5	0.08 (0.06—0.10)

Note 1) If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.
Note 2) Chattering and vibrations are more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
- When tool overhang is long
- Rigidity of machine, workpiece or attachment of workpiece is low
- At a corner radius during pocket milling

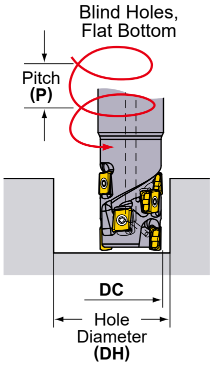
Note 3) A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.
Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)
Note 5) When using higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change the clamp screw periodically.

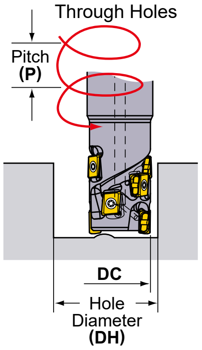
■ Ramping / Helical Cutting

● Ramping



● Helical Cutting





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

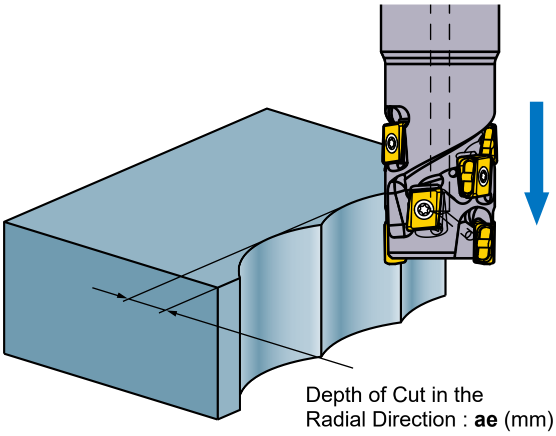
DC (mm)	**RE** (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
		RMPX	**L** (mm) *	**DH max.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)
40	0.2	1.06°	595	78.8	2.3	72.7	1.9	66.5	1.5
	0.4	1.06°	595	78.4	2.2	72.7	1.9	66.5	1.5
	0.8	1.06°	595	77.6	2.2	72.7	1.9	66.5	1.5
	1.0	1.06°	595	77.2	2.2	72.7	1.9	66.5	1.5
	1.2	1.06°	595	76.8	2.1	72.7	1.9	66.5	1.5
	1.6	1.06°	595	76.0	2.1	72.7	1.9	66.5	1.5
	2.0	1.06°	595	75.2	2.0	72.7	1.9	66.5	1.5
	2.4	1.06°	595	74.4	2.0	72.7	1.9	66.5	1.5
	3.0	1.06°	595	73.2	1.9	72.7	1.9	66.5	1.5
	3.2	1.06°	595	72.8	1.9	72.7	1.9	66.5	1.5
50	0.2	0.79°	798	98.8	2.1	92.7	1.8	86.5	1.6
	0.4	0.79°	798	98.4	2.1	92.7	1.8	86.5	1.6
	0.8	0.79°	798	97.6	2.1	92.7	1.8	86.5	1.6
	1.0	0.79°	798	97.2	2.0	92.7	1.8	86.5	1.6
	1.2	0.79°	798	96.8	2.0	92.7	1.8	86.5	1.6
	1.6	0.79°	798	96.0	2.0	92.7	1.8	86.5	1.6
	2.0	0.79°	798	95.2	2.0	92.7	1.8	86.5	1.6
	2.4	0.79°	798	94.4	1.9	92.7	1.8	86.5	1.6
	3.0	0.79°	798	93.2	1.9	92.7	1.8	86.5	1.6
	3.2	0.79°	798	92.8	1.9	92.7	1.8	86.5	1.6
63	0.2	0.6°	1051	124.8	2.0	118.7	1.8	112.5	1.6
	0.4	0.6°	1051	124.4	2.0	118.7	1.8	112.5	1.6
	0.8	0.6°	1051	123.6	2.0	118.7	1.8	112.5	1.6
	1.0	0.6°	1051	123.2	2.0	118.7	1.8	112.5	1.6
	1.2	0.6°	1051	122.8	2.0	118.7	1.8	112.5	1.6
	1.6	0.6°	1051	122.0	1.9	118.7	1.8	112.5	1.6
	2.0	0.6°	1051	121.2	1.9	118.7	1.8	112.5	1.6
	2.4	0.6°	1051	120.4	1.9	118.7	1.8	112.5	1.6
	3.0	0.6°	1051	119.2	1.9	118.7	1.8	112.5	1.6
	3.2	0.6°	1051	118.8	1.8	118.7	1.8	112.5	1.6
80	0.2	0.45°	1401	158.8	1.9	152.6	1.8	146.5	1.6
	0.4	0.45°	1401	158.4	1.9	152.7	1.8	146.5	1.6
	0.8	0.45°	1401	157.6	1.9	152.7	1.8	146.5	1.6
	1.0	0.45°	1401	157.2	1.9	152.7	1.8	146.5	1.6
	1.2	0.45°	1401	156.8	1.9	152.7	1.8	146.5	1.6
	1.6	0.45°	1401	156.0	1.9	152.7	1.8	146.5	1.6
	2.0	0.45°	1401	155.2	1.9	152.7	1.8	146.5	1.6
	2.4	0.45	1401	154.4	1.8	152.7	1.8	146.5	1.6
	3.0	0.45	1401	153.2	1.8	152.7	1.8	146.5	1.6
	3.2	0.45	1401	152.8	1.8	152.7	1.8	146.5	1.6

Note 1) When machining a highly ductile workpiece with the ramping angles in the table above, chips may be elongated.
* Shows the distance until a maximum depth of cut of 11 mm is achieved at the maximum ramping angle L (= 11/tan α).

For Plunging and Drilling

See the tables to the right for cutting conditions. Follow the cutting conditions for slot milling regarding feed per tooth and cutting speed.

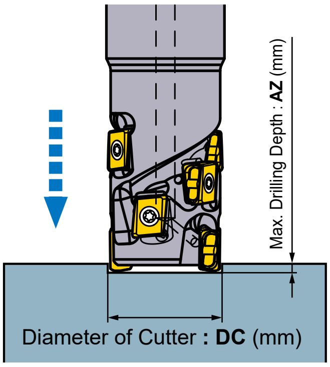
● Plunging



DC (mm)	**ae max.** (mm)
40	6.7
50	6.7
63	6.7
80	6.7

Note 1) No step feed necessary.

● Drilling



DC (mm)	**AZ max.** (mm)
40	0.55
50	0.55
63	0.55
80	0.55

Note 1) Exercise due caution as chips scatter easily.
Note 2) Use compressed air to eliminate chips (or coolant for when machining aluminium alloy).

MULTI FUNCTIONAL MILLING

APX3000

P M K N S H

Fig.1

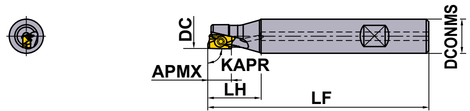


Fig.2

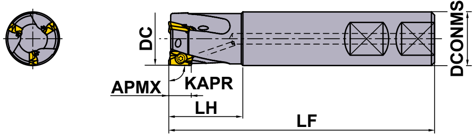
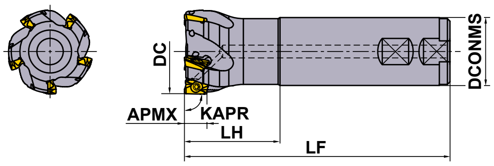


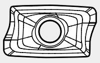
Fig.3



WELDON SHANK TYPE

KAPR :90°

Right hand tool holder only.

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

Note 1) When using inserts with corner radius RE≥2.4mm, machining of the holder is required as shown on page K150.
Note 2) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
＊WT : Tool Weight

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

Fig.1

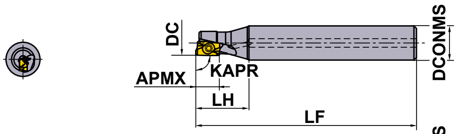


Fig.2

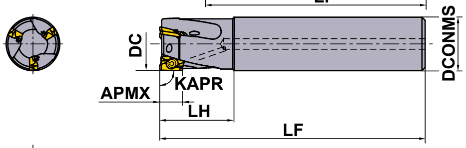
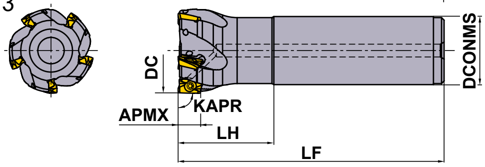


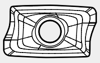
Fig.3



Right hand tool holder only.

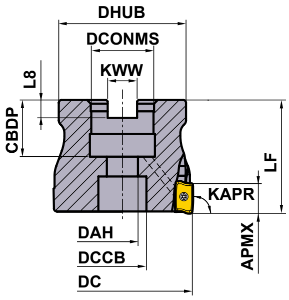
■STRAIGHT SHANK TYPE

KAPR :90°

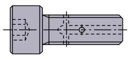
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions(mm)			WT* (kg)	APMX (mm)	RMPX	RPMX (min-1)	Fig.	
		R			DCONMS	LF	LH						Insert Type
12	**APX3000R121SA16SA**	★	●	1	16	85	25	0.10	10	6.0°	10500	1	AO◌T12
14	**APX3000R141SA16SA**	★	●	1	16	85	25	0.11	10	6.0°	9000	1	AO◌T12
16	**APX3000R162SA16SA**	●	●	2	16	85	25	0.11	10	11.3°	20900	2	AO◌T12
18	**APX3000R182SA16SA**	★	●	2	16	85	25	0.11	10	8.6°	19600	3	AO◌T12
18	**APX3000R182SA16LA**	●	●	2	16	120	25	0.16	10	8.6°	19600	3	AO◌T12
18	**APX3000R182SA16ELA**	●	●	2	16	180	25	0.25	10	8.6°	19600	3	AO◌T12
20	**APX3000R202SA20SA**	★	●	2	20	100	30	0.21	10	6.9°	18500	2	AO◌T12
20	**APX3000R203SA20SA**	●	●	3	20	100	30	0.21	10	6.9°	18500	2	AO◌T12
20	**APX3000R202SA20LA**	●	●	2	20	150	60	0.32	10	6.9°	18500	2	AO◌T12
20	**APX3000R202SA20ELA**	★	●	2	20	200	70	0.42	10	6.9°	18500	2	AO◌T12
22	**APX3000R223SA20SA**	●	●	3	20	115	30	0.25	10	5.7°	17600	3	AO◌T12
22	**APX3000R222SA20LA**	●	●	2	20	150	30	0.34	10	5.7°	17600	3	AO◌T12
22	**APX3000R222SA20ELA**	★	●	2	20	200	30	0.45	10	5.7°	17600	3	AO◌T12
25	**APX3000R252SA25SA**	★	●	2	25	115	35	0.38	10	4.6°	16400	2	AO◌T12
25	**APX3000R253SA25SA**	★	●	3	25	115	35	0.38	10	4.6°	16400	2	AO◌T12
25	**APX3000R254SA25SA**	●	●	4	25	115	35	0.38	10	4.6°	16400	2	AO◌T12
25	**APX3000R252SA25LA**	★	●	2	25	170	70	0.51	10	4.6°	16400	2	AO◌T12
25	**APX3000R253SA25LA**	★	●	3	25	170	70	0.51	10	4.6°	16400	2	AO◌T12
25	**APX3000R252SA25ELA**	★	●	2	25	220	80	0.75	10	4.6°	16400	2	AO◌T12
25	**APX3000R253SA25ELA**	★	●	3	25	220	80	0.75	10	4.6°	16400	2	AO◌T12
28	**APX3000R284SA25SA**	★	●	4	25	115	35	0.40	10	3.8°	15500	3	AO◌T12
28	**APX3000R282SA25LA**	★	●	2	25	170	35	0.61	10	3.8°	15500	3	AO◌T12
28	**APX3000R283SA25LA**	★	●	3	25	170	35	0.61	10	3.8°	15500	3	AO◌T12
28	**APX3000R282SA25ELA**	★	●	2	25	220	35	0.80	10	3.8°	15500	3	AO◌T12
28	**APX3000R283SA25ELA**	★	●	3	25	220	35	0.79	10	3.8°	15500	3	AO◌T12
30	**APX3000R304SA32SA**	★	●	4	32	125	45	0.64	10	3.4°	14900	2	AO◌T12
32	**APX3000R323SA32SA**	★	●	3	32	125	45	0.68	10	3.1°	14400	2	AO◌T12
32	**APX3000R324SA32SA**	★	●	4	32	125	45	0.67	10	3.1°	14400	2	AO◌T12
32	**APX3000R325SA32SA**	★	●	5	32	125	45	0.68	10	3.1°	14400	2	AO◌T12
32	**APX3000R322SA32LA**	★	●	2	32	190	90	1.07	10	3.1°	14400	2	AO◌T12
32	**APX3000R323SA32LA**	★	●	3	32	190	90	1.05	10	3.1°	14400	2	AO◌T12
32	**APX3000R322SA32ELA**	★	●	2	32	260	100	1.47	10	3.1°	14400	2	AO◌T12
32	**APX3000R323SA32ELA**	★	●	3	32	260	100	1.45	10	3.1°	14400	2	AO◌T12
35	**APX3000R352SA32LA**	★	●	2	32	190	45	1.12	10	2.7°	13700	3	AO◌T12
35	**APX3000R353SA32LA**	★	●	3	32	190	45	1.11	10	2.7°	13700	3	AO◌T12
35	**APX3000R352SA32ELA**	★	●	2	32	260	45	1.53	10	2.7°	13700	3	AO◌T12
35	**APX3000R353SA32ELA**	★	●	3	32	260	45	1.52	10	2.7°	13700	3	AO◌T12
40	**APX3000R403SA32SA**	★	●	3	32	125	45	0.75	10	2.2°	12800	3	AO◌T12
40	**APX3000R405SA32SA**	★	●	5	32	125	45	0.75	10	2.2°	12800	3	AO◌T12
40	**APX3000R406SA32SA**	★	●	6	32	125	45	0.76	10	2.2°	12800	3	AO◌T12
50	**APX3000R507SA32SA**	★	●	7	32	125	45	0.90	10	1.7°	11300	3	AO◌T12
63	**APX3000R638SA32SA**	★	●	8	32	125	45	1.04	10	1.3°	10000	3	AO◌T12

Note 1) When using inserts with corner radius RE≧2.4mm, machining of the holder is required as shown on page K150.
Note 2) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
∗ WT : Tool Weight

SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

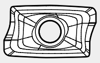


Right hand tool holder only.

DC (mm)	Set Bolt	Geometry
32, 40	HSC08030H	
50, 63	HSC10030H	
80	HSC12035H	
100	HSC16040H	

■ARBOR TYPE

KAPR :90°
GAMP:+7°—+21° GAMF:+15°—+27°

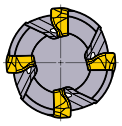
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions(mm)		WT * (kg)	APMX (mm)	RMPX	RPMX (min^{-1})	
		R			LF	DCONMS					Insert Type
32	**APX3000-032A05RA**	●	●	5	40	16	0.2	10	3.1°	14400	AO◌T12
40	**APX3000-040A06RA**	●	●	6	40	16	0.3	10	2.2°	12800	AO◌T12
50	**APX3000-050A07RA**	●	●	7	40	22	0.4	10	1.7°	11300	AO◌T12
63	**APX3000-063A08RA**	●	●	8	40	22	0.7	10	1.3°	10000	AO◌T12
80	**APX3000-080A09RA**	●	●	9	50	27	1.3	10	1.0°	8800	AO◌T12
100	**APX3000-100A11RA**	●	●	11	63	32	2.2	10	0.8°	7800	AO◌T12

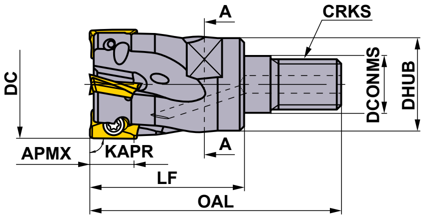
Note 1) When using inserts with corner radius RE≥2.4mm, machining of the holder is required as shown on page K150.
Note 2) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

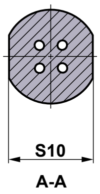
MOUNTING DIMENSIONS

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

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







■SCREW-IN TYPE

Right hand tool holder only.

KAPR : 90°

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions(mm)						WT* (kg)	APMX (mm)	RMPX	Insert Type
		R			DCONMS	DHUB	OAL	LF	S10	CRKS				
16	**APX3000R162M08A**	●	●	2	8.5	13	48	30	10	M8	0.1	10	11.3°	AO◌T12
18	**APX3000R182M08A30**	★	●	2	8.5	13	48	30	10	M8	0.1	10	8.6°	AO◌T12
20	**APX3000R203M10A**	●	●	3	10.5	18	49	30	14	M10	0.1	10	6.9°	AO◌T12
22	**APX3000R223M10A30**	★	●	3	10.5	18	49	30	14	M10	0.1	10	5.7°	AO◌T12
25	**APX3000R254M12A**	●	●	4	12.5	21	57	35	19	M12	0.2	10	4.6°	AO◌T12
28	**APX3000R284M12A35**	★	●	4	12.5	21	57	35	19	M12	0.2	10	3.8°	AO◌T12
30	**APX3000R304M16A40**	★	●	4	17	29	63	40	24	M16	0.3	10	3.4°	AO◌T12
32	**APX3000R325M16A**	●	●	5	17	29	63	40	24	M16	0.3	10	3.1°	AO◌T12
35	**APX3000R355M16A40**	★	●	5	17	29	63	40	24	M16	0.3	10	2.7°	AO◌T12
40	**APX3000R406M16A**	●	●	6	17	29	63	40	24	M16	0.3	10	2.2°	AO◌T12

Note 1) When using inserts with corner radius RE≥2.4mm, machining of the holder is required as shown on page K150.
Note 2) For screw-in type arbors, refer to page K260.
* WT : Tool Weight

SPARE PARTS

DC (mm)	Tool Holder Type	DC (mm)	Tool Holder Type	Clamp Screw *	Wrench	Anti-seize Lubricant
12	**APX3000R12**	14	**APX3000R14**	TPS25	TIP07F	MK1KS
16	**APX3000R16**	18	**APX3000R18**	TPS25	TIP07F	MK1KS
20	**APX3000R20**			TPS25	TIP07F	MK1KS
22	**APX3000R22**	25	**APX3000R25**	TPS25-1	TIP07F	MK1KS
28	**APX3000R28**	30	**APX3000R30**	TPS25-1	TIP07F	MK1KS
32	**APX3000R32**	32	**APX3000-032**	TPS25-1	TIP07F	MK1KS
35	**APX3000R35**			TPS25-1	TIP07F	MK1KS
40	**APX3000R40**	40	**APX3000-040**	TPS25-1	TIP07F	MK1KS
50	**APX3000R50**	50	**APX3000-050**	TPS25-1	TIP07F	MK1KS
63	**APX3000R63**	63	**APX3000-063**	TPS25-1	TIP07F	MK1KS
80	**APX3000-080**			TPS25-1	TIP07F	MK1KS
100	**APX3000-100**			TPS25-1	TIP07F	MK1KS

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

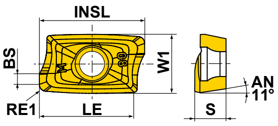
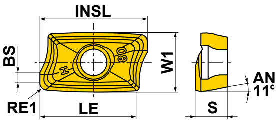
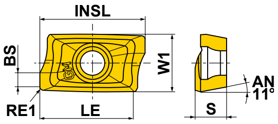
ARBORS ➤ K260
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

Material			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	TF15	
Material	P	Steels		◐	✤				◐	◐		
	M	Stainless Steels				◐			◐	◐		
	K	Cast Irons	◐						✤	✤		
	N	Non-ferrous Metals									◐	
	S	Heat Resistant Alloys, Titanium Alloys					◐	✤	◐			
	H	Hardened Steels							◐			

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

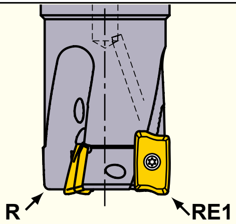
Honing :
E : Round **F** : Sharp

Shape	Order Number	Class	Honing	Coated								Carbide		Dimensions (mm)						Geometry
				MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	TF15		INSL	LE	W1	S	BS	* RE1	
General **M** Chipbreaker 	**AOMT123602PEER-M**	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	1.8	0.2	
	AOMT123604PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	1.6	0.4	
	AOMT123608PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	1.2	0.8	
	AOMT123610PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	1.0	1.0	
	AOMT123612PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.8	1.2	
	AOMT123616PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	1.6	
	AOMT123620PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	2.0	
	AOMT123624PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	2.4	
	AOMT123630PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	3.0	
	AOMT123632PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	3.2	
Strong Cutting Edge Type **H** Chipbreaker 	**AOMT123604PEER-H**	M	E	●	●	●	●	●	●	●	●			12	10	6.6	3.6	1.6	0.4	
	AOMT123608PEER-H	M	E	●	●	●	●	●	●	●	●			12	10	6.6	3.6	1.2	0.8	
	AOMT123616PEER-H	M	E	●	●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	1.6	
For Machining of Aluminium Alloys **GM** Chipbreaker 	**AOGT123602PEFR-GM**	G	F									●		12	10	6.6	3.6	1.8	0.2	
	AOGT123604PEFR-GM	G	F									●		12	10	6.6	3.6	1.6	0.4	
	AOGT123608PEFR-GM	G	F									●		12	10	6.6	3.6	1.2	0.8	

* Corner radius RE1 is different from the workpiece of R shape depending on the axial rake angle of the body.

Note on Use of Inserts with Large Corner Radii

When using inserts with corner radius RE 1≧R2.4mm, please machine the holder with a radius form as shown in the table.



RE1 (mm)	**R** (mm)
2.4	1.9
3.0	2.5
3.2	2.7

R : Holder End Radius
RE1 : Insert Corner Radius

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

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

	Material	Hardness	Insert				**ae** (mm)			
			Grade Priority		Chipbreaker		≤0.25DC	0.25–0.5DC	0.5–0.75DC	DC (Slot)
			1st	2nd			**Vc** (m/min)			
P	Mild Steel	≤180HB	MP6120	VP15TF	M	H	230(180–270)	220(170–260)	180(140–210)	180(140–210)
			MP6130	VP20RT	M	H	200(150–240)	190(140–230)	150(110–180)	150(110–180)
	Carbon Steel Alloy Steel	180–350HB	MP6120	VP15TF	M	H	180(140–210)	170(130–200)	140(110–160)	140(110–160)
			MP6130	VP20RT	M	H	150(110–180)	140(100–170)	110(80–130)	110(80–130)
M	Stainless Steel	≤270HB	MP7130	VP20RT	M	H	180(140–210)	170(130–200)	140(110–160)	140(110–160)
K	Gray Cast Iron	≤350MPa	MC5020	VP15TF	H	–	250(200–300)	240(190–290)	210(160–260)	140(110–160)
	Ductile Cast Iron	≤800MPa	MC5020	VP15TF	H	–	130(100–150)	120(90–140)	100(80–120)	100(80–120)
N	Aluminium Alloy	–	TF15	–	GM	–	500(200–1000)	500(200–1000)	500(200–1000)	500(200–1000)
S	Titanium Alloy	≤350HB	MP9120	VP15TF	M	H	50(40–70)	–	–	50(40–70)
			MP9130	VP20RT	M	H	40(30–60)	–	–	40(30–60)
	Heat-resistant Alloy	–	MP9120	VP15TF	M	H	40(30–60)	–	–	40(30–60)
			MP9130	VP20RT	M	H	30(20–40)	–	–	30(20–40)
H	Hardened Steel	40–55HRC	VP15TF	–	H	–	90(70–100)	85(60–100)	70(50–80)	70(50–80)

DEPTH OF CUT AND FEED PER TOOTH

	Material	Hardness	**ae** (mm)	**DC** (mm)					
				ø12–ø16		**ø18–ø25**		**ø28–ø100**	
				Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.)
P	Mild Steel Carbon Steel Alloy Steel	≤180HB 180–350HB	≤0.25DC	≤4	0.15	≤5	0.25	≤5	0.20
				4–7	0.10	5–7	0.20	5–7	0.15
				–	–	7–8.5	0.15	7–8.5	0.10
				–	–	8.5–10	0.10	8.5–10	0.07
			0.25–0.5DC	≤2	0.15	≤3	0.25	≤3	0.20
				2–5	0.10	3–5.5	0.20	3–5.5	0.15
				–	–	5.5–8	0.15	5.5–8	0.10
				–	–	8–10	0.10	8–10	0.07
			0.5–0.75DC	≤4	0.10	≤4	0.15	≤3	0.10
				–	–	4–10	0.10	3–7	0.07
			DC (Slot)	≤3	0.10	≤4	0.10	≤3	0.10
						4–7	0.07	3–5	0.07
M	Stainless Steel	≤270HB	≤0.25DC	≤4	0.15	≤5	0.20	≤5	0.20
				4–7	0.10	5–7	0.15	5–7	0.15
				–	–	7–8.5	0.10	7–8.5	0.10
				–	–	8.5–10	0.07	8.5–10	0.07
			0.25–0.5DC	≤2	0.15	≤3	0.20	≤3	0.20
				2–5	0.10	3–5.5	0.15	3–5.5	0.15
				–	–	5.5–8	0.10	5.5–8	0.10
				–	–	8–10	0.07	8–10	0.07
			0.5–0.75DC	≤4	0.10	≤4	0.10	≤3	0.10
				–	–	4–10	0.07	3–7	0.07
			DC (Slot)	≤3	0.10	≤4	0.10	≤3	0.10
						4–7	0.07	3–5	0.07
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.25DC	≤4	0.15	≤5	0.25	≤5	0.20
				4–7	0.10	5–7	0.20	5–7	0.15
				–	–	7–8.5	0.15	7–8.5	0.10
				–	–	8.5–10	0.10	8.5–10	0.07
			0.25–0.5DC	≤2	0.15	≤3	0.25	≤3	0.20
				2–5	0.10	3–5.5	0.20	3–5.5	0.15
				–	–	5.5–8	0.15	5.5–8	0.10
				–	–	8–10	0.10	8–10	0.07
			0.5–0.75DC	≤4	0.10	≤4	0.15	≤3	0.10
				–	–	4–10	0.10	3–7	0.07
			DC (Slot)	≤3	0.10	≤4	0.10	≤3	0.10
						4–7	0.07	3–5	0.07
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.25DC	≤4	0.10	≤5	0.20	≤5	0.20
				4–7	0.07	5–7	0.15	5–7	0.15
				–	–	7–8.5	0.10	7–8.5	0.10
				–	–	8.5–10	0.07	8.5–10	0.07
			0.25–0.5DC	≤2	0.10	≤3	0.20	≤3	0.20
				2–5	0.07	3–5.5	0.15	3–5.5	0.15
				–	–	5.5–8	0.10	5.5–8	0.10
				–	–	8–10	0.07	8–10	0.07
			0.5–0.75DC	≤4	0.07	≤4	0.10	≤3	0.10
				–	–	4–10	0.07	3–7	0.07
			DC (Slot)	≤3	0.07	≤4	0.10	≤3	0.10
						4–7	0.07	3–5	0.07

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

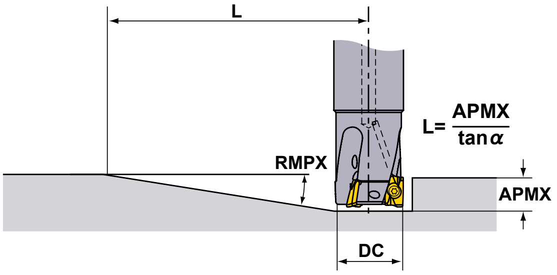
Material		Hardness	**ae** (mm)	**DC** (mm)					
				ø12—ø16		**ø18—ø25**		**ø28—ø100**	
				Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.)
N	Aluminium Alloy	—	≤0.25DC	≤4	0.15	≤4	0.25	≤4	0.20
				4—7	0.10	4—7	0.15	4—7	0.10
			0.25—0.5DC	≤4	0.15	≤4	0.20	≤4	0.20
				4—7	0.10	4—7	0.10	4—7	0.10
			0.5—0.75DC	≤5	0.10	≤5	0.15	≤5	0.10
			DC (Slot)	≤5	0.10	≤5	0.20	≤5	0.15
S	Titanium Alloy	≤350HB	≤0.25DC	≤4	0.15	≤4	0.15	≤4	0.10
				4—7	0.10	4—7	0.10	4—7	0.07
			0.25—0.5DC	≤3	0.05	≤3	0.05	≤3	0.05
	Heat-resistant Alloy	—	0.5—0.75DC	≤2	0.10	≤2	0.05	≤2	0.05
			DC (Slot)	≤1	0.05	≤1	0.05	≤1	0.05
H	Hardened Steel	40—55HRC	≤0.25DC	≤4	0.10	≤5	0.15	≤5	0.15
				4—7	0.07	5—7	0.10	5—7	0.10
				—	—	7—8.5	0.07	—	—
			0.25—0.5DC	≤2	0.10	≤3	0.15	≤3	0.15
				2—5	0.07	3—5.5	0.10	—	—
			0.5—0.75DC	≤4	0.07	≤4	0.07	≤3	0.07
			DC (Slot)	≤3	0.07	≤4	0.07	≤3	0.07

Note 1) These cutting conditions are a guide to the standard shank type and the arbor type. Please make adjustments according to the machining conditions.
Note 2) Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
- When using the long shank type and extra long shank type.
- When using long tool overhang with the standard or arbor type.
- When the application has poor clamping rigidity or when using a low rigidity machine.

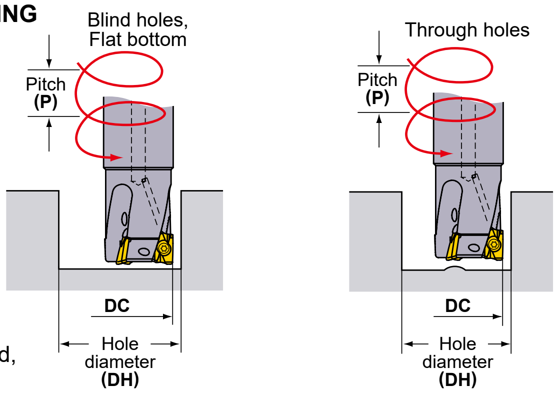
Note 3) In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
Note 4) For heavy interrupted and unstable cutting, the H chipbreaker is first recommendation.

■RAMPING/HELICAL CUTTING

●RAMPING



●HELICAL CUTTING



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

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

Note 1) When machining highly ductile workpiece with ramping angles above, chips could be continuous. In this case, decrease the ramping angle or feed per tooth.
∗1 L (=10 / tan α). Cutters' moving distance until depth of cut reaches 10mm at a maximum ramping angle.
∗2 In case corner radius of 0.8mm. Other than that, find with the formula below.
{(cutting edge diameter DC)—(corner radius)—0.2)}×2

MULTI FUNCTIONAL MILLING

APX4000

P **M** **K** N **S** **H**

WELDON SHANK TYPE

KAPR :90°

Fig.1

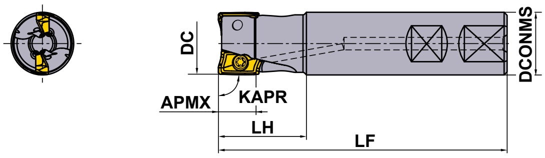
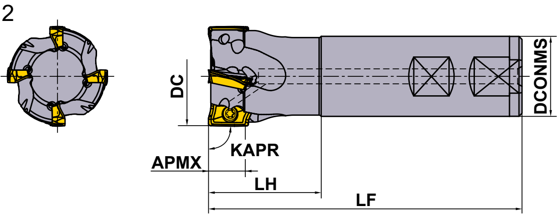
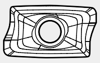


Fig.2



Right hand tool holder only.

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions(mm)			WT* (kg)	APMX (mm)	RMPX	RPMX (min^{-1})	Fig.	
		R			DCONMS	LF	LH						Insert Type
25	**APX4000R252WA25SA**	●	●	2	25	115	35	0.40	15	11°	18900	1	AO◌T18
25	**APX4000R252WA25LA**	●	●	2	25	170	35	0.61	15	11°	18900	1	AO◌T18
25	**APX4000R252WA25ELA**	●	●	2	25	220	80	0.76	15	11°	18900	1	AO◌T18
28	**APX4000R282WA25LA**	●	●	2	25	170	35	0.63	15	9°	17700	2	AO◌T18
28	**APX4000R282WA25ELA**	●	●	2	25	220	35	0.81	15	9°	17700	2	AO◌T18
32	**APX4000R323WA32SA**	●	●	3	32	125	45	0.71	15	7°	16300	1	AO◌T18
32	**APX4000R323WA32LA**	●	●	3	32	190	45	1.11	15	7°	16300	1	AO◌T18
32	**APX4000R323WA32ELA**	●	●	3	32	260	100	1.49	15	7°	16300	1	AO◌T18
35	**APX4000R353WA32LA**	●	●	3	32	190	45	1.14	15	6°	15400	2	AO◌T18
40	**APX4000R403WA32SA**	●	●	3	32	125	45	0.80	15	6°	14200	2	AO◌T18
40	**APX4000R404WA32SA**	●	●	4	32	125	45	0.80	15	6°	14200	2	AO◌T18
40	**APX4000R404WA32LA**	●	●	4	32	190	45	1.19	15	6°	14200	2	AO◌T18

Note 1) When using inserts with corner radius RE≥3.2mm, machining of the holder is required as shown on page K157.
Note 2) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

● : Inventory maintained.

SPARE PARTS ➢ N001
TECHNICAL DATA ➢ P001

Fig.1

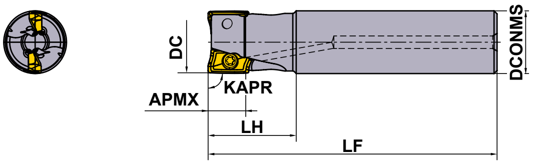
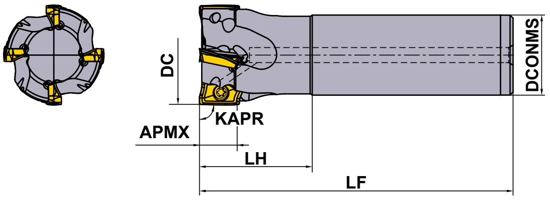


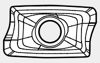
Fig.2



■STRAIGHT SHANK TYPE

KAPR :90°

Right hand tool holder only.

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

Note 1) When using inserts with corner radius RE≥3.2mm, machining of the holder is required as shown on page K157.
Note 2) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

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

Fig.1

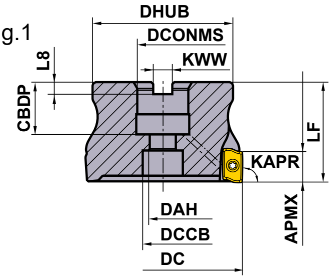
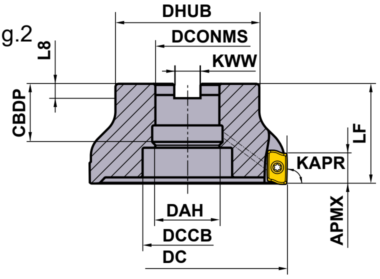
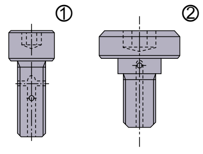


Fig.2

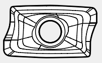


Right hand tool holder only.

DC (mm)	Set Bolt	Geometry	
40	HSC08030H	①	
50, 63	HSC10030H		
80	HSC12035H		
100	HSC16040H		
125	MBA20040H	②	
160	MBA24045H		

■ARBOR TYPE

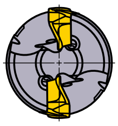
KAPR :90°
GAMP:+15°—+22° GAMF:+21°—+28°

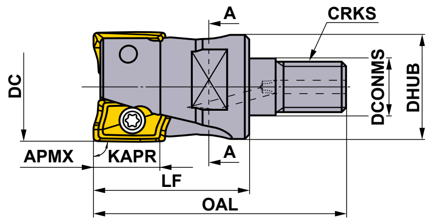
DC (mm)	Order Number	Stock		Number of Teeth	Dimensions(mm)		WT* (kg)	APMX (mm)	RMPX	RPMX (min^{-1})	Fig.	
		R			LF	DCONMS						Insert Type
40	**APX4000-040A04RA**	●	●	4	40	16	0.2	15	6.0°	14200	1	AO◌T18
50	**APX4000-050A05RA**	●	●	5	40	22	0.3	15	4.0°	12400	1	AO◌T18
63	**APX4000-063A06RA**	●	●	6	40	22	0.5	15	3.0°	10800	1	AO◌T18
80	**APX4000-080A07RA**	●	●	7	50	27	1.2	15	2.0°	9300	1	AO◌T18
100	**APX4000-100A08RA**	●	●	8	50	32	2.1	15	1.5°	8100	1	AO◌T18
125	**APX4000-125A09RA**	●	●	9	63	40	3.3	15	1.0°	7100	2	AO◌T18
160	**APX4000-160A10RA**	●	●	10	63	40	4.8	15	1.0°	6100	2	AO◌T18

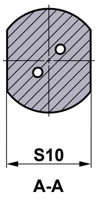
Note 1) When using inserts with corner radius RE≥3.2mm, machining of the holder is required as shown on page K157.
Note 2) The maximum allowable spindle speeds (**RPMX**) are set to ensure tool and insert stability.
Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* WT : Tool Weight

MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions(mm)						
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
40	**APX4000-040A04RA**	16	18	9	14	34	8.4	5.6
50	**APX4000-050A05RA**	22	20	11	17	45	10.4	6.3
63	**APX4000-063A06RA**	22	20	11	17	50	10.4	6.3
80	**APX4000-080A07RA**	27	23	13	20	60	12.4	7
100	**APX4000-100A08RA**	32	26	17	27	70	14.4	8
125	**APX4000-125A09RA**	40	40	42	56	90	16.4	9
160	**APX4000-160A10RA**	40	40	42	72	100	16.4	9







Right hand tool holder only.

■SCREW-IN TYPE

DC (mm)	Order Number	Stock		Number of Teeth	Dimensions(mm)						WT* (kg)	APMX (mm)	RMPX	Insert Type
		R			DCONMS	DHUB	OAL	LF	S10	CRKS				
25	**APX4000R252M12A35**	●	●	2	12.5	23.5	57	35	19	M12	0.2	15	11.0°	AO□T18
28	**APX4000R282M12A35**	●	●	2	12.5	23.5	57	35	19	M12	0.2	15	9.0°	AO□T18
32	**APX4000R322M16A40**	★	●	2	17	28.5	63	40	24	M16	0.3	15	7.0°	AO□T18
32	**APX4000R323M16A40**	●	●	3	17	28.5	63	40	24	M16	0.3	15	7.0°	AO□T18
35	**APX4000R352M16A40**	★	●	2	17	28.5	63	40	24	M16	0.3	15	6.0°	AO□T18
35	**APX4000R353M16A40**	★	●	3	17	28.5	63	40	24	M16	0.3	15	6.0°	AO□T18
40	**APX4000R403M16A40**	★	●	3	17	28.5	63	40	24	M16	0.3	15	6.0°	AO□T18
40	**APX4000R404M16A40**	●	●	4	17	28.5	63	40	24	M16	0.3	15	6.0°	AO□T18

Note 1) When using inserts with corner radius RE≥3.2mm, machining of the holder is required as shown on page K157.
Note 2) For screw-in type arbors, refer to page K260.
⁎ WT : Tool Weight

SPARE PARTS

DC (mm)	Tool Holder Type	DC (mm)	Tool Holder Type	Clamp Screw *	Wrench	Anti-seize Lubricant
25	**APX4000R25**	28	**APX4000R28**	TPS4	TIP15W	MK1KS
32	**APX4000R32**	35	**APX4000R35**	TPS4	TIP15W	MK1KS
40	**APX4000R40**	40	**APX4000-040**	TPS43	TIP15W	MK1KS
50	**APX4000R50**	50	**APX4000-050**	TPS43	TIP15W	MK1KS
63	**APX4000R63**	63	**APX4000-063**	TPS43	TIP15W	MK1KS
		80	**APX4000-080**	TPS43	TIP15W	MK1KS
		100	**APX4000-100**	TPS43	TIP15W	MK1KS
		125	**APX4000-125**	TPS43	TIP15W	MK1KS
		160	**APX4000-160**	TPS43	TIP15W	MK1KS

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

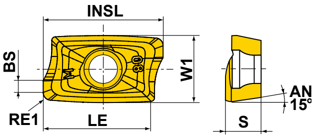
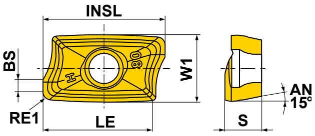
● : Inventory maintained. ★ : Inventory maintained in Japan.
(10 inserts in one case)

INSERTS

Material			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT
	P	Steels		◐	✤				◐	◐
	M	Stainless Steels				◐			◐	◐
	K	Cast Irons	◐						✤	✤
	S	Heat Resistant Alloys, Titanium Alloys					◐	✤	◐	✤
	H	Hardened Steels							◐	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

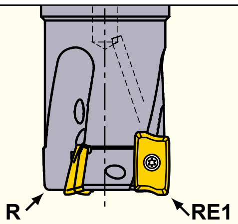
Honing :
E : Round

Shape	Order Number	Class	Honing	Coated								Dimensions (mm)						Geometry
				MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	INSL	LE	W1	S	BS	RE1 *	
General **M** Chipbreaker 	**AOMT184804PEER-M**	M	E		●	●	●	●	●	●	●	18	15	9	4.8	1.8	0.4	
	AOMT184808PEER-M	M	E		●	●	●	●	●	●	●	18	15	9	4.8	1.4	0.8	
	AOMT184810PEER-M	M	E		●			●	●	●		18	15	9	4.8	1.0	1.0	
	AOMT184812PEER-M	M	E		●			●	●	●		18	15	9	4.8	0.8	1.2	
	AOMT184816PEER-M	M	E		●	●	●	●	●	●	●	18	15	9	4.8	0.4	1.6	
	AOMT184820PEER-M	M	E		●			●	●	●		18	15	9	4.8	0.4	2.0	
Strong Cutting Edge Type **H** Chipbreaker 	**AOMT184804PEER-H**	M	E	●	●	●	●	●	●	●	●	18	15	9	4.8	1.8	0.4	
	AOMT184808PEER-H	M	E	●	●	●	●	●	●	●	●	18	15	9	4.8	1.4	0.8	
	AOMT184816PEER-H	M	E	●	●	●	●	●	●	●	●	18	15	9	4.8	0.4	1.6	
	AOMT184832PEER-H	M	E			●	●				●	18	15	9	4.8	0.4	3.2	
	AOMT184840PEER-H	M	E			●	●				●	18	15	9	4.8	0.4	4.0	
	AOMT184850PEER-H	M	E			●	●				●	18	15	9	4.8	–	5.0	
	AOMT184864PEER-H	M	E			●	●				●	18	15	9	4.8	–	6.35	

* Corner radius RE1 is different from the workpiece of R shape depending on the axial rake angle of the body.

Note on Use of Inserts with Large Corner Radii

When using inserts with corner radius RE 1≥R3.2mm, please machine the holder with a radius form as shown in the table.



RE1 (mm)	**R** (mm)
3.2	2.0
4.0	2.5
5.0	3.5
6.35	5.0

R : Holder End Radius
RE1 : Insert Corner Radius

ARBORS ➤ K260
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

	Material	Hardness	Insert				**ae** (mm)			
			Grade Priority		Chipbreaker		≤0.25DC	0.25—0.5DC	0.5—0.75DC	DC (Slot)
			1st	2nd			Cutting Speed **Vc** (m/min)			
P	Mild Steel	≤180HB	MP6120	VP15TF	M	H	230(180—270)	220(170—260)	180(140—210)	180(140—210)
			MP6130	VP20RT	M	H	200(150—240)	190(140—230)	150(110—180)	150(110—180)
	Carbon Steel Alloy Steel	180—350HB	MP6120	VP15TF	M	H	180(140—210)	170(130—200)	140(110—160)	140(110—160)
			MP6130	VP20RT	M	H	150(110—180)	140(100—170)	110(80—130)	110(80—130)
M	Stainless Steel	≤270HB	MP7130	VP20RT	M	H	180(140—210)	170(130—200)	140(110—160)	140(110—160)
K	Gray Cast Iron	≤350MPa	MC5020	VP15TF	H	—	250(200—300)	240(190—290)	210(160—260)	140(110—160)
	Ductile Cast Iron	≤800MPa	MC5020	VP15TF	H	—	130(100—150)	120(90—140)	100(80—120)	100(80—120)
S	Titanium Alloy	≤350HB	MP9120	VP15TF	H	M	50(40—70)	—	—	50(40—70)
			MP9130	VP20RT	H	M	40(30—60)	—	—	40(30—60)
	Heat-resistant Alloy	—	MP9120	VP15TF	H	M	40(30—60)	—	—	40(30—60)
			MP9130	VP20RT	H	M	30(20—40)	—	—	30(20—40)
H	Hardened Steel	40—55HRC	VP15TF	—	H	—	90(70—100)	85(60—100)	70(50—80)	70(50—80)

DEPTH OF CUT AND FEED PER TOOTH

	Material	Hardness	**ae** (mm)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.)		
					Cutter Diameter **DC** (mm)		
					ø25—ø40	**ø50—ø80**	**ø100—ø160**
P	Mild Steel Carbon Steel Alloy Steel	≤180HB 180—350HB	≤0.5DC	≤5	0.30	0.30	0.25
				5—7.5	0.25	0.25	0.20
				7.5—10	0.20	0.20	0.15
				10—12.5	0.15	0.15	0.10
				12.5—15	0.10	0.10	0.07
			0.5—0.75DC	≤5	0.20	0.20	0.15
				5—10	0.15	0.15	0.10
				10—15	0.10	0.10	0.07
			DC (Slot)	≤5	0.15	0.15	0.15
				5—7.5	0.10	0.10	0.10
				7.5—10	0.07	0.07	0.07
M	Stainless Steel	≤270HB	≤0.5DC	≤5	0.30	0.25	0.25
				5—7.5	0.25	0.20	0.20
				7.5—10	0.20	0.15	0.15
				10—12.5	0.15	0.10	0.10
				12.5—15	0.10	0.07	0.07
			0.5—0.75DC	≤5	0.20	0.15	0.15
				5—10	0.15	0.10	0.10
				10—15	0.10	0.07	0.07
			DC (Slot)	≤5	0.15	0.15	0.15
				5—7.5	0.10	0.10	0.10
				7.5—10	0.07	0.07	0.07
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.5DC	≤5	0.30	0.30	0.25
				5—7.5	0.25	0.25	0.20
				7.5—10	0.20	0.20	0.15
				10—12.5	0.15	0.15	0.10
				12.5—15	0.10	0.10	0.07
			0.5—0.75DC	≤5	0.20	0.20	0.15
				5—10	0.15	0.15	0.10
				10—15	0.10	0.10	0.07
			DC (Slot)	≤5	0.15	0.15	0.15
				5—7.5	0.10	0.10	0.10
				7.5—10	0.07	0.07	0.07
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.5DC	≤5	0.25	0.25	0.25
				5—7.5	0.20	0.20	0.20
				7.5—10	0.15	0.15	0.15
				10—12.5	0.10	0.10	0.10
				12.5—15	0.07	0.07	0.07
			0.5—0.75DC	≤5	0.20	0.20	0.15
				5—10	0.15	0.15	0.10
				10—15	0.10	0.10	0.07
			DC (Slot)	≤5	0.15	0.15	0.15
				5—7.5	0.10	0.10	0.10
				7.5—10	0.07	0.07	0.07

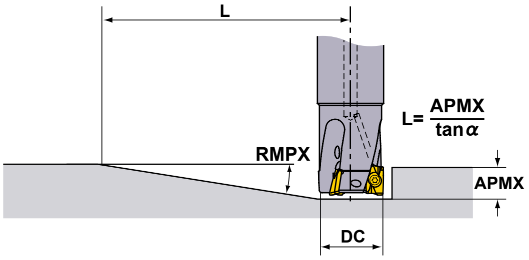
	Material	Hardness	**ae** (mm)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.) Cutter Diameter **DC** (mm) **ø25—ø40**	**ø50—ø80**	**ø100—ø160**
S	Titanium Alloy	≤350HB	≤0.25DC	≤5	0.15	0.10	0.10
				5—7.5	0.10	0.05	0.05
				7.5—10	0.05	—	—
			DC (Slot)	≤5	0.05	0.05	0.05
	Heat-resistant Alloy	—	≤0.25DC	≤2	0.10	0.05	0.05
			DC (Slot)	≤1	0.05	0.05	0.05
H	Hardened Steel	40—55HRC	≤0.25DC	≤5	0.15	0.15	0.15
				5—7.5	0.10	0.10	0.10
				7.5—10	0.07	0.07	0.07
			0.25—0.5DC	≤5	0.10	0.10	0.10
				5—7.5	0.07	0.07	0.07
			0.5—0.75DC	≤5	0.07	0.07	0.07
			DC (Slot)	≤5	0.07	0.07	0.07

Note 1) These cutting conditions are a guide to the standard shank type and the arbor type.
Please make adjustments according to the machining conditions.
Note 2) Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
- When using the long shank type and extra long shank type.
- When using long tool overhang with the standard or arbor type.
- When the application has poor clamping rigidity or when using a low rigidity machine.

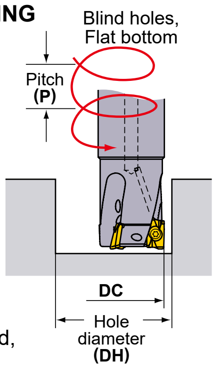
Note 3) In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
Note 4) For heavy interrupted and unstable cutting, the H chipbreaker is first recommendation.

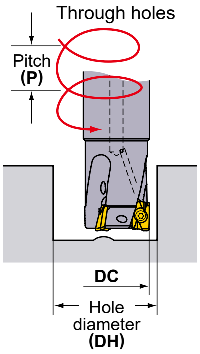
■RAMPING/HELICAL CUTTING

●RAMPING



●HELICAL CUTTING





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

Cutting Edge Diameter **DC** (mm)	Ramping Maximum Ramping Angle **RMPX**	Minimum Distance ∗1 **L** (mm)	Helical Cutting (Blind Hole, Flat Bottom) Maximum Hole Diameter ∗2 **DH max.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)	Helical Cutting (Through Hole) Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)
25	11°	85	48	14	45	12	32	4
28	9°	105	54	12	51	11	38	4
32	7°	135	62	11	59	10	46	5
35	6°	158	68	10	65	9	52	5
40	6°	158	78	12	75	11	62	7
50	4°	238	98	10	95	9	82	7
63	3°	318	124	10	121	9	108	7
80	2°	477	158	8	155	8	142	6
100	1.5°	636	198	8	195	7	182	6
125	1°	954	248	6	245	6	232	5
160	1°	954	318	8	315	8	302	7

Note 1) When machining highly ductile workpiece with ramping angles above, chips could be continuous.
In this case, decrease the ramping angle or feed per tooth.
∗1 L (=15 / tan α). Cutters' moving distance until depth of cut reaches 15mm at a maximum ramping angle.
∗2 In case corner radius of 0.8mm. Other than that, calculate using the fromula below.
{(cutting edge diameter DC)—(corner radius)—0.2)}×2

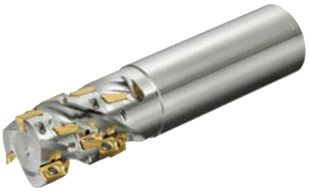
DEEP SHOULDER MILLING

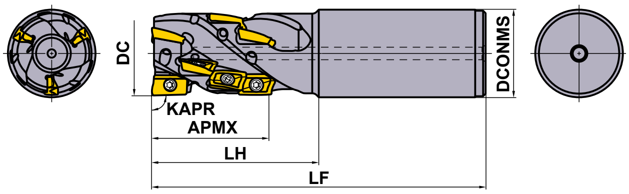
90° KAPR

APX3000

LONG CUTTING EDGE

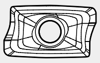
P M K N S H





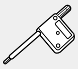
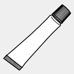
Right hand tool holder only.

■SHANK TYPE

DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions(mm)			WT* (kg)	APMX (mm)	
		R				DCONMS	LF	LH			Insert Type
20	**APX3KR2004SN20S028A**	★	–	1	4	20	125	45	0.27	28	AO◌T12
25	**APX3KR2506SA25S028A**	●	●	2	6	25	125	45	0.40	28	AO◌T12
25	**APX3KR2508SA25M037A**	●	●	2	8	25	130	50	0.41	37	AO◌T12
32	**APX3KR3208SA32S037A**	★	●	2	8	32	130	50	0.70	37	AO◌T12
32	**APX3KR3210SA32M046A**	★	●	2	10	32	140	60	0.74	46	AO◌T12
32	**APX3KR3212SA32S037A**	★	●	3	12	32	130	50	0.67	37	AO◌T12
32	**APX3KR3215SA32M046A**	★	●	3	15	32	140	60	0.71	46	AO◌T12
40	**APX3KR4015SA42S046A**	★	●	3	15	42	140	60	1.24	46	AO◌T12
40	**APX3KR4018SA42M055A**	★	●	3	18	42	150	70	1.31	55	AO◌T12

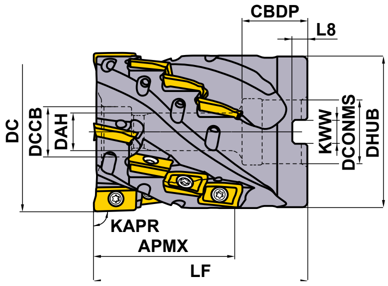
Note 1) When using inserts with corner radius RE≥2.4mm, machining of the holder is required as shown on page K162.
Note 2) Corner radius RE 0.8 mm is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting).
Inserts RE 0.2 mm and 0.4 mm can also be used.
* WT : Tool Weight

SPARE PARTS

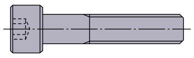
DC (mm)	Tool Holder Type	 *		
		Clamp Screw	Wrench	Anti-seize Lubricant
20	**APX3KR20**	TPS25	TIP07F	MK1KS
25	**APX3KR25**	TPS25-1	TIP07F	MK1KS
32	**APX3KR32**	TPS25-1	TIP07F	MK1KS
40	**APX3KR40**	TPS25-1	TIP07F	MK1KS
40	**APX3K-040**	TPS25-1	TIP07F	MK1KS
50	**APX3K-050**	TPS25-1	TIP07F	MK1KS

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

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

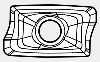


Right hand tool holder only.

DC (mm)	Set Bolt	Geometry
40	HSC08040	
50	HSC10045	

■SHELL TYPE

KAPR：90°
GAMP：+12°　GAMF：+6°

DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions(mm)		WT* (kg)	APMX (mm)	
		R				LF	DCONMS			Insert Type
40	**APX3K-040A16A037RA**	★	●	4	16	50	16	0.25	37	AO◌T12
50	**APX3K-050A20A046RA**	★	●	4	20	60	22	0.54	46	AO◌T12

Note 1) When using inserts with corner radius RE≥2.4mm, machining of the holder is required as shown on page K162.
Note 2) Corner radius RE 0.8 mm is recommended for the peripheral cutting edges except the bottom cutting edge (end cutting).
Inserts RE 0.2 mm and 0.4 mm can also be used.
Note 3) Coolant can be supplied from the end face of the central location bore in the arbor. However, it cannot be supplied from the set bolt.
* WT : Tool Weight

MOUNTING DIMENSIONS

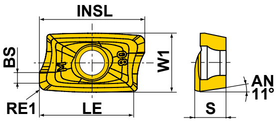
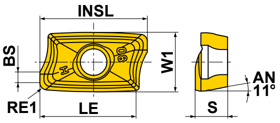
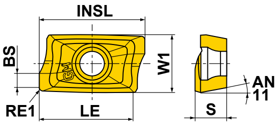
DC (mm)	Order Number	Dimensions(mm)						
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
40	**APX3K-040A16A037RA**	16	18	9	14	38.5	8.4	5.6
50	**APX3K-050A20A046RA**	22	20	11	17	48.4	10.4	6.3

INSERTS

Material			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	TF15	
Material	P	Steels		◐	✣				◐	◐		
	M	Stainless Steels				◐			◐	◐		
	K	Cast Irons	◐						✣	✣		
	N	Non-ferrous Metals									◐	
	S	Heat Resistant Alloys, Titanium Alloys					◐	✣	◐			
	H	Hardened Steels							◐			

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

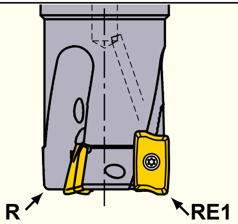
Honing :
E : Round **F** : Sharp

Shape	Order Number	Class	Honing	Coated								Carbide		Dimensions (mm)						Geometry
				MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	TF15		INSL	LE	W1	S	BS	* RE1	
General **M** Chipbreaker 	AOMT123602PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	1.8	0.2	
	AOMT123604PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	1.6	0.4	
	AOMT123608PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	1.2	0.8	
	AOMT123610PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	1.0	1.0	
	AOMT123612PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.8	1.2	
	AOMT123616PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	1.6	
	AOMT123620PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	2.0	
	AOMT123624PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	2.4	
	AOMT123630PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	3.0	
	AOMT123632PEER-M	M	E		●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	3.2	
Strong Cutting Edge Type **H** Chipbreaker 	AOMT123604PEER-H	M	E	●	●	●	●	●	●	●	●			12	10	6.6	3.6	1.6	0.4	
	AOMT123608PEER-H	M	E	●	●	●	●	●	●	●	●			12	10	6.6	3.6	1.2	0.8	
	AOMT123616PEER-H	M	E	●	●	●	●	●	●	●	●			12	10	6.6	3.6	0.4	1.6	
For Machining of Aluminium Alloys **GM** Chipbreaker 	AOGT123602PEFR-GM	G	F									●		12	10	6.6	3.6	1.8	0.2	
	AOGT123604PEFR-GM	G	F									●		12	10	6.6	3.6	1.6	0.4	
	AOGT123608PEFR-GM	G	F									●		12	10	6.6	3.6	1.2	0.8	

* Corner radius RE1 is different from the workpiece of R shape depending on the axial rake angle of the body.

Note on Use of Inserts with Large Corner Radii

When using inserts with corner radius RE 1≥R2.4mm, please machine the holder with a radius form as shown in the table.



RE1 (mm)	**R** (mm)
2.4	1.9
3.0	2.5
3.2	2.7

R : Holder End Radius
RE1 : Insert Corner Radius

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

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

RECOMMENDED CUTTING CONDITIONS

■CUTTING SPEED

	Material	Insert				ae (mm)		
		Grade Priority		Chipbreaker		≤0.25DC	0.25—0.75DC	DC (Slot)
		1st	2nd			Vc (m/min)		
P	Mild Steel	MP6120	VP15TF	M	H	180(140—220)	150(110—180)	120(100—140)
		MP6130	VP20RT	M	H	160(120—200)	130(100—160)	100(80—120)
	Carbon Steel Alloy Steel, Alloy Tool Steel	MP6120	VP15TF	M	H	150(100—200)	120(90—150)	100(80—120)
		MP6130	VP20RT	M	H	130(90—170)	90(70—110)	80(60—100)
	Pre-hardened Steel	MP6120	VP15TF	M	H	120(80—160)	100(70—130)	90(50—120)
		MP6130	VP20RT	M	H	100(70—130)	90(60—120)	70(50—100)
M	Stainless Steel	MP7130	—	M	—	150(120—180)	120(100—140)	100(80—120)
K	Gray Cast Iron	MC5020	—	H	—	200(150—250)	180(150—210)	—
		VP15TF	—	M	H	180(120—240)	150(100—200)	100(60—140)
	Ductile Cast Iron	VP15TF	—	M	H	160(120—200)	140(100—180)	80(60—100)
N	Aluminium Alloy	TF15	MP9120	GM	M	400(200—800)	400(200—800)	400(200—800)
S	Titanium Alloy	MP9130	—	M	—	40(30—60)	—	40(30—60)
		MP9120	—	M	—	50(40—70)	—	50(40—70)
	Heat Resistant Alloy	MP9120	VP15TF	M	H	40(30—60)	—	40(30—60)
		MP9130	VP20RT	M	H	30(20—40)	—	30(20—40)

■DEPTH OF CUT / FEED PER TOOTH

	Material	Characteristics	ae	DC (mm)					
				ø20		ø25		ø32—ø50	
				ap	fz (mm/t.)	ap	fz (mm/t.)	ap	fz (mm/t.)
P	Mild Steel	≤180HB	≤0.25DC	≤28	0.15	≤37	0.17	≤55	0.2
			0.25-0.75DC	≤28	0.12	≤37	0.15	≤55	0.17
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Carbon Steel Alloy Steel	180—280HB	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25-0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Tool Alloy Steel	≤350HB (Annealing)	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25-0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Pre-hardened Steel	35—45HRC	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25-0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
M	Ferritic and Martensitic Stainless Steel	—	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25-0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Duplex Stainless Steel	≤280HB	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25-0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
	Precipitation Hardening Stainless Steel	<450HB	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25-0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.25DC	≤28	0.15	≤37	0.17	≤55	0.2
			0.25-0.75DC	≤28	0.12	≤37	0.15	≤55	0.17
			DC (Slot)	≤18	0.1	≤18	0.1	≤18	0.1
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.25DC	≤28	0.12	≤37	0.15	≤55	0.17
			0.25-0.75DC	≤28	0.1	≤37	0.12	≤55	0.15
			DC (Slot)	≤18	0.08	≤18	0.08	≤18	0.08
N	Aluminium Alloy	—	≤0.25DC	≤28	0.15	≤37	0.17	≤55	0.2
			0.25-0.75DC	—	—	≤9	0.17	≤9	0.2
			DC (Slot)	—	—	≤9	0.17	≤9	0.2
S	Titanium Alloy	≤350HB	≤0.25DC	≤28	0.1	≤37	0.1	≤55	0.1
			0.25-0.75DC	—	—	—	—	—	—
			DC (Slot)	≤18	0.06	≤18	0.06	≤18	0.06
	Heat Resistant Alloy	—	≤0.25DC	≤28	0.08	≤37	0.08	≤55	0.08
			0.25-0.75DC	—	—	—	—	—	—
			DC (Slot)	≤18	0.05	≤18	0.05	≤18	0.05

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

DEEP SHOULDER MILLING

APX4000

LONG CUTTING EDGE

P **M** **K** N **S** H

Fig.1

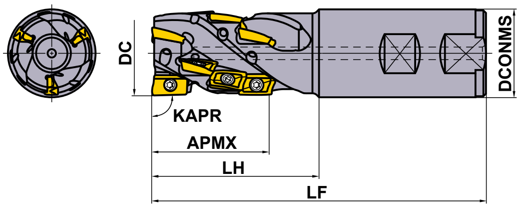
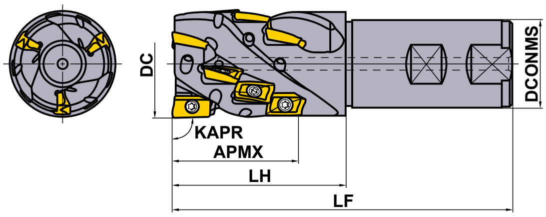


Fig.2



■SHANK TYPE

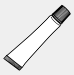
KAPR :90°

Right hand tool holder only.

DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions(mm)			WT* (kg)	APMX (mm)	Fig.	
		R				DCONMS	LF	LH				Insert Type
40	**APX4KR4008WA40S056A**	●	●	2	8	40	150	80	1.54	56	1	AO◌T18
40	**APX4KR4012WA40S056A**	●	●	3	12	40	150	80	1.54	56	1	AO◌T18
50	**APX4KR5012WA40S056A**	●	●	3	12	40	150	80	1.76	56	2	AO◌T18
50	**APX4KR5018WA40M084A**	●	●	3	18	40	180	110	2.18	84	2	AO◌T18

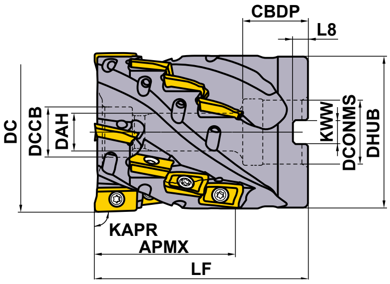
Note 1) When using inserts with corner radius RE≥3.2 mm, machining of the holder is required as shown on page K166.
Note 2) Only corner radius RE 0.4 mm and 0.8 mm can be used for the peripheral cutting edges expect the bottom cutting edge (the end cuttting edge).
∗ WT : Tool Weight

SPARE PARTS

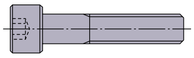
 *		
Clamp Screw	Wrench	Anti-seize Lubricant
TPS43	TIP15W	MK1KS

∗ Clamp Torque (N • m) : TPS43 = 4.0

● : Inventory maintained.

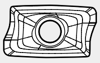


Right hand tool holder only.

DC (mm)	Set Bolt	Geometry
50	HSC10050	
63	HSC12070	

SHELL TYPE

KAPR :90°
GAMP:+12° GAMF :+6°

DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions(mm)		**WT*** (kg)	**APMX** (mm)	
		R				**LF**	**DCONMS**			Insert Type
50	**APX4K-050A09A042RA**	●	●	3	9	65	22	0.75	42	AO◌T18
63	**APX4K-063A16A056RA**	●	●	4	16	85	27	1.63	56	AO◌T18

Note 1) When using inserts with corner radius RE≥3.2 mm, machining of the holder is required as shown on page K166.
Note 2) Only corner radius RE 0.4 mm and 0.8 mm can be used for the peripheral cutting edges except the bottom cutting edge (the end cuttting edge).
Note 3) Coolant can be supplied from the end face of the central location bore in the arbor. However, it cannot be supplied from the set bolt.
* WT : Tool Weight

MOUNTING DIMENSIONS

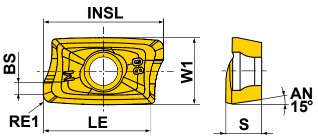
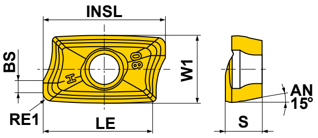
DC (mm)	Order Number	Dimensions(mm)						
		DCONMS	**CBDP**	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**
50	**APX4K-050A09A042RA**	22	22	11	17	48	10.4	6.3
63	**APX4K-063A16A056RA**	27	28	13	20	60.7	12.4	7

INSERTS

Material			MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT
	P	Steels		◐	✤				◐	◐
	M	Stainless Steels				◐			◐	◐
	K	Cast Irons	◐						✤	✤
	S	Heat Resistant Alloys, Titanium Alloys					◐	✤	◐	✤
	H	Hardened Steels							◐	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

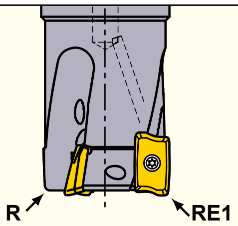
Honing :
E : Round

Shape	Order Number	Class	Honing	Coated								Dimensions (mm)						Geometry
				MC5020	**MP6120**	**MP6130**	**MP7130**	**MP9120**	**MP9130**	**VP15TF**	**VP20RT**	**INSL**	**LE**	**W1**	**S**	**BS**	**RE1** *	
General **M** Chipbreaker 	**AOMT184804PEER-M**	M	E		●	●	●	●	●	●	●	18	15	9	4.8	1.8	0.4	
	AOMT184808PEER-M	M	E		●	●	●	●	●	●	●	18	15	9	4.8	1.4	0.8	
	AOMT184810PEER-M	M	E		●			●	●	●		18	15	9	4.8	1.0	1.0	
	AOMT184812PEER-M	M	E		●			●	●	●		18	15	9	4.8	0.8	1.2	
	AOMT184816PEER-M	M	E		●	●	●	●	●	●	●	18	15	9	4.8	0.4	1.6	
	AOMT184820PEER-M	M	E		●			●	●	●		18	15	9	4.8	0.4	2.0	
Strong Cutting **Edge Type** **H** Chipbreaker 	**AOMT184804PEER-H**	M	E	●	●	●	●	●	●	●	●	18	15	9	4.8	1.8	0.4	
	AOMT184808PEER-H	M	E	●	●	●	●	●	●	●	●	18	15	9	4.8	1.4	0.8	
	AOMT184816PEER-H	M	E	●	●	●	●	●	●	●	●	18	15	9	4.8	0.4	1.6	
	AOMT184832PEER-H	M	E			●	●				●	18	15	9	4.8	0.4	3.2	
	AOMT184840PEER-H	M	E			●	●				●	18	15	9	4.8	0.4	4.0	
	AOMT184850PEER-H	M	E			●	●				●	18	15	9	4.8	–	5.0	
	AOMT184864PEER-H	M	E			●	●				●	18	15	9	4.8	–	6.35	

* Corner radius RE1 is different from the workpiece of R shape depending on the axial rake angle of the body.

Note on Use of Inserts with Large Corner Radii

When using inserts with corner radius RE 1≧R3.2mm, please machine the holder with a radius form as shown in the table.



RE1 (mm)	**R** (mm)
3.2	2.0
4.0	2.5
5.0	3.5
6.35	5.0

R : Holder End Radius
RE1 : Insert Corner Radius

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

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

	Material	Hardness	Insert				Cutting Width **ae** (mm)		
			Grade		Chipbreaker		≤0.15DC	0.15–0.3DC	DC (Slot)
			1st Recommendation	2nd Recommendation			Cutting Speed **Vc** (m/min)		
P	Mild Steel	≤180HB	MP6120	VP15TF	M	H	200(160–250)	160(120–200)	140(120–160)
			MP6130	VP20RT	M	H	170(130–220)	130(90–170)	110(90–130)
	Carbon Steel Alloy Steel	180–350HB	MP6120	VP15TF	M	H	160(120–200)	120(100–140)	100(80–120)
			MP6130	VP20RT	M	H	130(90–170)	90(70–110)	70(50–90)
M	Stainless Steel	≤270HB	MP7130	VP15TF	M	H	160(120–200)	120(100–140)	100(80–120)
K	Gray Cast Iron	≤350MPa	MC5020	VP15TF	H	–	230(180–280)	190(140–240)	190(140–240)
	Ductile Cast Iron	≤800MPa	MC5020	VP15TF	H	–	190(140–220)	170(120–220)	170(120–220)
S	Titanium Alloy	≤350HB	MP9120	VP15TF	H	M	50(40–70)	–	50(40–70)
			MP9130	VP20RT	H	M	40(30–60)	–	40(30–60)
	Heat-resistant Alloy	–	MP9120	VP15TF	H	M	40(30–60)	–	40(30–60)
			MP9130	VP20RT	H	M	30(20–40)	–	30(20–40)

DEPTH OF CUT AND FEED PER TOOTH

	Material	Characteristics	Cutting Width **ae** (mm)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/t.)		
					Cutter Diameter **DC** (mm)		
					ø40 Length of cut 56mm ø50 Length of cut 42mm	**ø50 Length of cut 56mm ø63 Length of cut 56mm**	**ø50 Length of cut 84mm**
P	Mild Steel	≤180HB	≤0.3DC	≤20	0.25	0.25	0.20
				20–50	0.20	0.20	0.15
				50–80	–	–	0.10
			DC (Slot)	≤20	0.20	0.20	0.15
				20–50	0.15	0.15	–
	Carbon Steel Alloy Steel	180–350HB	≤0.3DC	≤20	0.25	0.25	0.20
				20–50	0.20	0.20	0.15
				50–80	–	–	0.10
			DC (Slot)	≤20	0.15	0.15	0.10
				20–50	0.10	0.10	–
M	Stainless Steel	≤270HB	≤0.3DC	≤20	0.25	0.25	0.20
				20–50	0.20	0.20	0.15
				50–80	–	–	0.10
			DC (Slot)	≤10	0.10	0.10	0.07
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤0.15DC	≤10	0.30	0.30	0.25
				10–50	0.25	0.25	0.20
				50–80	–	–	0.15
			0.15–0.3DC	≤10	0.25	0.25	0.20
				10–50	0.20	0.20	0.15
				50–80	–	–	0.10
			DC (Slot)	≤10	0.25	0.25	0.20
				10–50	0.20	0.20	0.15
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.15DC	≤20	0.25	0.25	0.20
				20–50	0.20	0.20	0.15
				50–80	–	–	0.10
			0.15–0.3DC	≤20	0.20	0.20	0.15
				20–50	0.15	0.15	0.10
				50–80	–	–	0.07
			DC (Slot)	≤10	0.15	0.15	0.10
				10–50	0.10	0.10	–
S	Titanium Alloy	≤350HB	≤0.15DC	≤20	0.10	0.10	–
				20–50	0.10	0.10	–
			DC (Slot)	≤50	0.08	0.08	–
	Heat-resistant Alloy	–	≤0.15DC	≤10	0.07	0.07	–
			DC (Slot)	≤20	0.05	0.05	–

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

MULTI FUNCTIONAL MILLING

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

90° KAPR

AXD4000

P M K **N** **S** H

Fig. 1

ø40

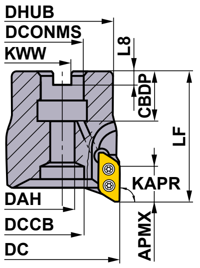


Fig. 2

ø50
ø63
ø80
ø100

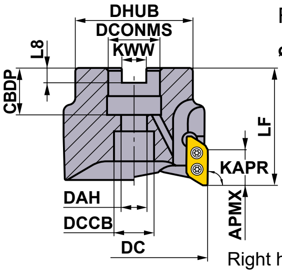
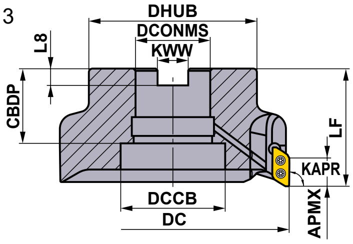
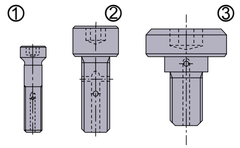


Fig. 3

ø125



Right hand tool holder only.

Cutter Diameter DC (mm)	Set Bolt	Geometry	
Ø40	HFF08043H	①	
Ø50, Ø63	HSC10030H	②	
Ø80	HSC12035H		
Ø100	HSC16040H		
Ø125	MBA20040H	③	

■ARBOR TYPE

KAPR :90°
GAMP:+14°−15° GAMF:+21°−+26°

Type	Insert Corner Radius RE	Order Number	Stock R		Number of Teeth	Dimensions(mm) DC	LF	DCONMS	CBDP	DAH	DHUB	KWW	L8	DCCB	WT *2 (kg)	APMX (mm)	Max. Allowable Revolution (min⁻¹)	Fig.	Clamp Screw *1	Wrench	Anti-seize Lubricant	Insert
A Type	0.4–3.2	**AXD4000-040A02RA**	★	–	2	40	50	16	18	8.5	34	8.4	5.6	12	0.3	15.5	41000	1	TS3SB	TKY08D	MK1KS	XDGX1750○○
		AXD4000-040A03RA	●	–	3	40	50	16	18	8.5	34	8.4	5.6	12	0.3	15.5	41000	1	TS3SB	TKY08D	MK1KS	
		AXD4000-050A02RA	★	–	2	50	50	22	20	11	45	10.4	6.3	17	0.4	15.5	35000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-050A04RA	●	–	4	50	50	22	20	11	45	10.4	6.3	17	0.4	15.5	35000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-063A05RA	●	–	5	63	50	22	20	11	50	10.4	6.3	17	0.6	15.5	30000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-080A05RA	●	–	5	80	50	27	23	13	60	12.4	7	20	1	15.5	27000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-100A06RA	●	–	6	100	63	32	26	17	78	14.4	8	26	2	15.5	23000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-125B07RA	●	–	7	125	63	40	40	—	90	16.4	9	56	2.8	15.5	20000	3	TS3SB	TKY08D	MK1KS	
B Type	4.0–5.0	**AXD4000-040A02RB**	★	–	2	40	50	16	18	8.5	34	8.4	5.6	12	0.3	14.8	41000	1	TS3SB	TKY08D	MK1KS	
		AXD4000-040A03RB	●	–	3	40	50	16	18	8.5	34	8.4	5.6	12	0.3	14.8	41000	1	TS3SB	TKY08D	MK1KS	
		AXD4000-050A02RB	★	–	2	50	50	22	20	11	45	10.4	6.3	17	0.4	14.8	35000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-050A04RB	●	–	4	50	50	22	20	11	45	10.4	6.3	17	0.4	14.8	35000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-063A05RB	●	–	5	63	50	22	20	11	50	10.4	6.3	17	0.6	14.8	30000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-080A05RB	●	–	5	80	50	27	23	13	60	12.4	7	20	1	14.8	27000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-100A06RB	●	–	6	100	63	32	26	17	78	14.4	8	26	2	14.8	23000	2	TS3SB	TKY08D	MK1KS	
		AXD4000-125B07RB	●	–	7	125	63	40	40	—	90	16.4	9	56	2.8	14.8	20000	3	TS3SB	TKY08D	MK1KS	

Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on page K182.

Note 2) When using the tool at high spindle speeds, ensure that the tool and milling 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.

*1 Clamp Torque (N • m) : TS3SB=1.5
Use the clamp screw by setting the bundled screw.

*2 WT : Tool Weight

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

Fig.1

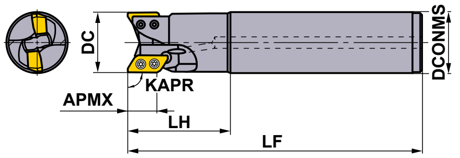
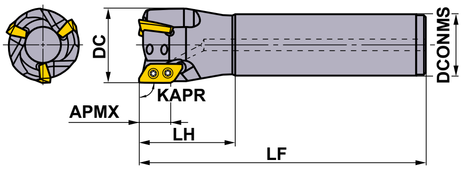


Fig.2



■SHANK TYPE

KAPR :90°

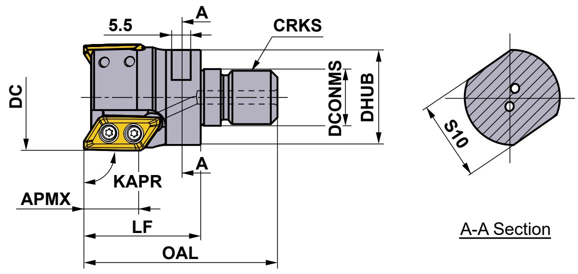
Right hand tool holder only.

Type	Insert Corner Radius	Order Number	Stock		Number of Teeth	Dimensions(mm)				APMX (mm)	Max. Allowable Revolution (min^{-1})	Fig.	*			
	RE		R			DC	LF	LH	DCONMS				Clamp Screw	Wrench	Anti-seize Lubricant	Insert
A Type	0.4 — 3.2	AXD4000R201SA20SA	●	–	1	20	110	35	20	15.5	15000	1	TS3SBS	TKY08D	MK1KS	XDGX1750◌◌
		AXD4000R252SA25SA	●	–	2	25	125	50	25	15.5	49000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R252SA25LA	●	–	2	25	170	80	25	15.5	49000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R282SA25SA	●	–	2	28	125	50	25	15.5	48500	2	TS3SB	TKY08D	MK1KS	
		AXD4000R282SA25ELA	●	–	2	28	220	50	25	15.5	48500	2	TS3SB	TKY08D	MK1KS	
		AXD4000R322SA32SA	●	–	2	32	150	50	32	15.5	48000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R322SA32LA	●	–	2	32	200	80	32	15.5	48000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R352SA32SA	●	–	2	35	150	50	32	15.5	45000	2	TS3SB	TKY08D	MK1KS	
		AXD4000R352SA32ELA	★	–	2	35	250	50	32	15.5	45000	2	TS3SB	TKY08D	MK1KS	
		AXD4000R403SA32SA	●	–	3	40	150	50	32	15.5	41000	2	TS3SB	TKY08D	MK1KS	
		AXD4000R403SA42SA	★	–	3	40	170	80	42	15.5	41000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R403SA32ELA	★	–	3	40	250	50	32	15.5	41000	2	TS3SB	TKY08D	MK1KS	
B Type	4.0 — 5.0	AXD4000R201SA20SB	●	–	1	20	110	35	20	14.8	15000	1	TS3SBS	TKY08D	MK1KS	
		AXD4000R252SA25SB	●	–	2	25	125	50	25	14.8	49000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R252SA25LB	●	–	2	25	170	80	25	14.8	49000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R282SA25SB	★	–	2	28	125	50	25	14.8	48500	2	TS3SB	TKY08D	MK1KS	
		AXD4000R282SA25ELB	●	–	2	28	220	50	25	14.8	48500	2	TS3SB	TKY08D	MK1KS	
		AXD4000R322SA32SB	●	–	2	32	150	50	32	14.8	48000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R322SA32LB	●	–	2	32	200	80	32	14.8	48000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R352SA32SB	★	–	2	35	150	50	32	14.8	45000	2	TS3SB	TKY08D	MK1KS	
		AXD4000R352SA32ELB	●	–	2	35	250	50	32	14.8	45000	2	TS3SB	TKY08D	MK1KS	
		AXD4000R403SA32SB	●	–	3	40	150	50	32	14.8	41000	2	TS3SB	TKY08D	MK1KS	
		AXD4000R403SA42SB	★	–	3	40	170	80	42	14.8	41000	1	TS3SB	TKY08D	MK1KS	
		AXD4000R403SA32ELB	★	–	3	40	250	50	32	14.8	41000	2	TS3SB	TKY08D	MK1KS	

Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on page K182.
Note 2) When using the tool at high spindle speeds, ensure that the tool and milling 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.
* Clamp Torque (N • m) : TS3SBS=1.5, TS3SB=1.5

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

Fig.1



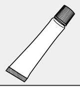
Right hand tool holder only.

SCREW-IN TYPE

DC (mm)	Type	Insert Corner Radius RE	Order Number	Stock R		Number of Teeth	Dimensions (mm) DCONMS	DHUB	OAL	LF	S10	CRKS	WT* (kg)	APMX (mm)	Max. Allowable Revolution (min^{-1})	Insert Type
25	A Type	0.4-3.2	NEW **AXD4000R252AM1228A**	●	●	2	12.5	23.5	50	28	19	M12	0.06	15.0	49000	XDGX1750
25	B Type	4.0-5.0	NEW **AXD4000R252AM1228B**	●	●	2	12.5	23.5	50	28	19	M12	0.06	14.8	49000	XDGX1750
28	A Type	0.4-3.2	NEW **AXD4000R282AM1228A**	●	●	2	12.5	23.5	50	28	19	M12	0.07	15.0	48500	XDGX1750
28	B Type	4.0-5.0	NEW **AXD4000R282AM1228B**	●	●	2	12.5	23.5	50	28	19	M12	0.07	14.8	48500	XDGX1750
32	A Type	0.4-3.2	NEW **AXD4000R322AM1635A**	●	●	2	17.0	28.5	58	35	24	M16	0.15	15.0	48000	XDGX1750
32	B Type	4.0-5.0	NEW **AXD4000R322AM1635B**	●	●	2	17.0	28.5	58	35	24	M16	0.15	14.8	48000	XDGX1750
35	A Type	0.4-3.2	NEW **AXD4000R353AM1635A**	●	●	3	17.0	28.5	58	35	24	M16	0.15	15.0	41000	XDGX1750
35	B Type	4.0-5.0	NEW **AXD4000R353AM1635B**	●	●	3	17.0	28.5	58	35	24	M16	0.15	14.8	41000	XDGX1750
40	A Type	0.4-3.2	NEW **AXD4000R403AM1635A**	●	●	3	17.0	28.5	58	35	24	M16	0.18	15.0	38000	XDGX1750
40	B Type	4.0-5.0	NEW **AXD4000R403AM1635B**	●	●	3	17.0	28.5	58	35	24	M16	0.18	14.8	38000	XDGX1750

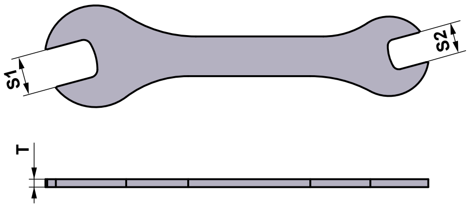
Note 1) For screw-in type arbors, refer to page K260.
Note 2) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on page K182.
* WT : Tool Weight

SPARE PARTS

 *		
Clamp Screw	Wrench	Anti-seize Lubricant
TS3SB	TKY08D	MK1KS

* Clamp Torque (N • m) : TS3SB=1.5

Parts Sold Separately
Arbor Mounting Spanner



Order Number	Dimensions (mm)		
	S1 *	S2 *	T
AKY1924050A	24	19	5

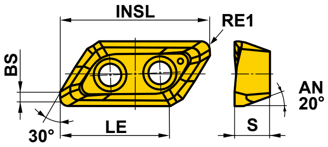
* Clamp Torque (N • m) : 19 = 80, 24 = 90
Note 1) Due to the structure of the head, it may not be possible to use a commercially available spanner to attach the arbor. It is recommended to use the dedicated spanner.

INSERTS

Material			LC15TF	MP9120		TF15	MT2010
	N	Aluminium Alloy	◐	✤		✤	
	S	Titanium Alloy		◐			

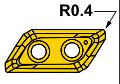
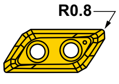
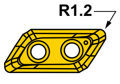
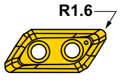
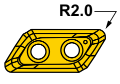
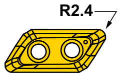
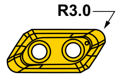
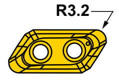
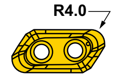
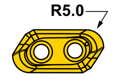
Cutting Conditions (Guide):
● :Stable Cutting ◐ :General Cutting ✤ :Unstable Cutting
Honing : F :Sharp **E** :Round

Shape	Order Number	Class	Honing	Stock					Dimensions (mm)					Geometry
				Coated			Carbide							
				LC15TF	MP9120		TF15	MT2010	INSL	LE	S	BS	RE1*	
GL Chipbreaker 	**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 Chipbreaker 	**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 Chipbreaker 	**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 careful because corner R(RE1) has a different shape than machined workpiece R.
When a GM chipbreaker is recommended, take note of the dimensional precision of the workpiece shape.

HOLDER AND INSERT CORNER RADIUS COMBINATION

Holder	**A** Type Holder								**B** Type Holder	
	AXD4000–◌◌◌◌◌◌◌◌A AXD4000R◌◌◌◌◌◌◌◌◌A								AXD4000–◌◌◌◌◌◌◌◌B AXD4000R◌◌◌◌◌◌◌◌◌B	
Applicable Insert Corner R (**RE1**)										
	XDGX 175004PD◌R-◌◌	XDGX 175008PD◌R-◌◌	XDGX 175012PD◌R-◌◌	XDGX 175016PD◌R-◌◌	XDGX 175020PD◌R-◌◌	XDGX 175024PD◌R-◌◌	XDGX 175030PD◌R-◌◌	XDGX 175032PD◌R-◌◌	XDGX 175040PD◌R-◌◌	XDGX 175050PD◌R-◌◌

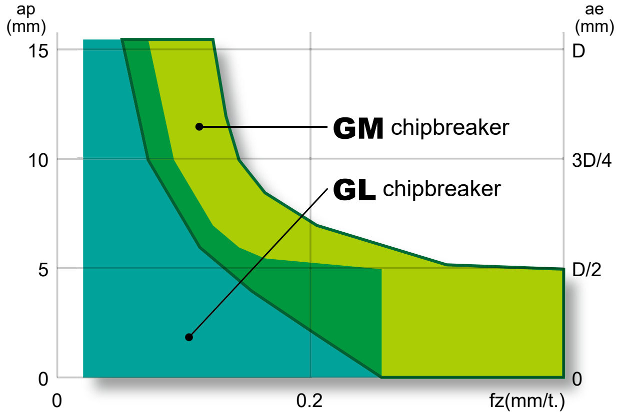
Please note that there is no compatibility between an insert for A type holder and for B type holder.

ARBORS ➤ K260
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

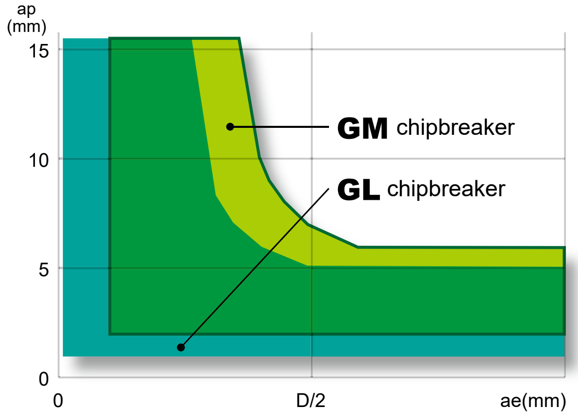
AXD4000 Selection of insert

It is necessary to choose the best insert according to the cutting conditions. Please select an insert from the tables below.
1st recommendation for stable cutting condition is the GL chipbreaker with a strong cutting edge.

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



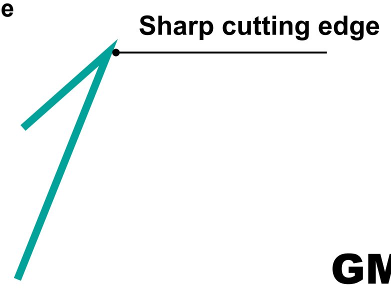
Selection of insert according to the width of cut and the required cutting depth



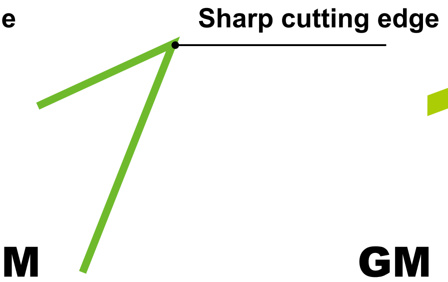
1st recommendation for machining aluminium alloys is GL chipbreaker.
Under high-load conditions such as deep or high feed cutting, it is advisable to use the GM chipbreaker.

Selection of insert according to cutting edge

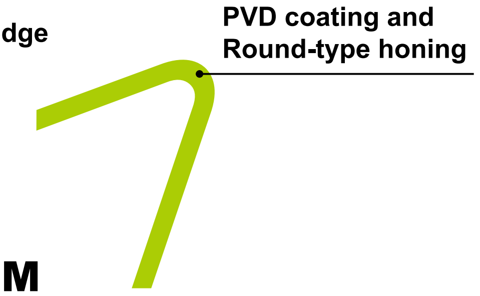
Insert type



GL
TF15/LC15TF
Low cutting resistance

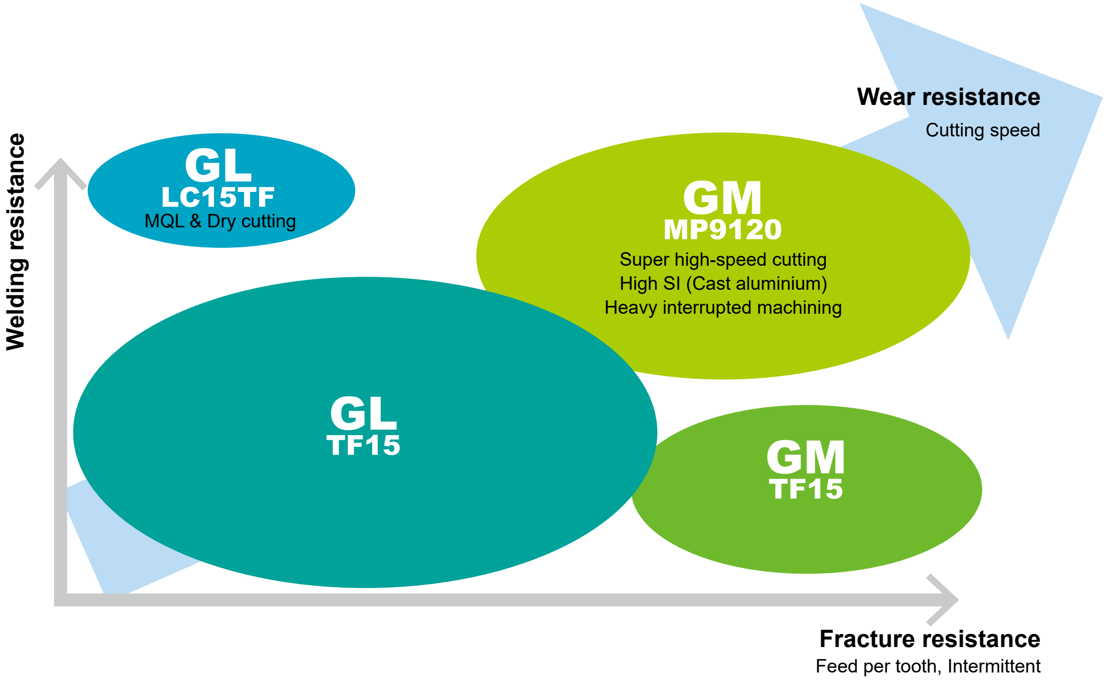


GM
TF15
Tougher cutting edge



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

Selection of insert according to wear resistance



RECOMMENDED CUTTING CONDITIONS

■Cutting Speed

	Material		Grade	Chipbreaker	Cutting Speed **Vc** (mm/min)
N	Aluminium Alloy (AlMg1SiCu, AlZn6MgCu etc)	**Si<5%**	**TF15** **LC15TF**	**GL**	1000 (200–3000)
			TF15 **MT2010** **MP9120**	**GM**	1000 (200–3000)
	Aluminium Alloy (AlSi9Cu3, AlSi11Cu2, AlSi17Cu4Mg 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

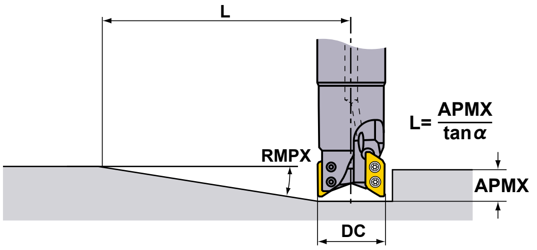
	Material		Chipbreaker	Cutting Width **ae** (mm)	Depth of Cut **ap** (mm)	Feed per Tooth (mm/t.) Cutting Edge Diameter **DC** (mm)					
						20	**25, 28**	**32, 35**	**40**	**50, 63, 80**	**100, 125**
N	Aluminium Alloy (AlMg1SiCu, AlZn6MgCu etc)	**Si<5%**	**GL**	≤0.25 DC	≤ 5	≤ 0.05	≤ 0.25	≤ 0.25	≤ 0.25	≤ 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 (AlMg1SiCu, AlZn6MgCu etc)	**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 (AlSi9Cu3 etc) Aluminium Alloy (AlSi11Cu2, AlSi17Cu4Mg etc)	**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 vibration occurred. If vibrations occur make adjustments according to the machining conditions.

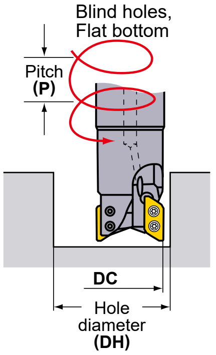
Note 2) Vibrations may occur in the following conditions:
When using long tool overhang.
When pocket machining corner radii.
When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width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

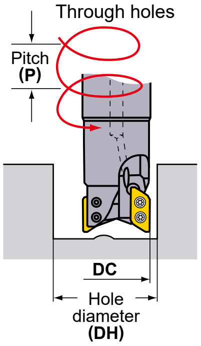
■RAMPING/HELICAL MILLING

●RAMPING



●HELICAL MILLING





RAMPING/HELICAL MILLING (Aluminium Alloy)

Holder Type	Cutting Edge Diameter **DC** (mm)	Insert Corner R **RE** (mm)	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling	
			Maximum Ramping Angle **RMPX**	Minimum Distance **L** *1 (mm)	Maximum Hole Diameter **DH max.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)
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

Note 1) Ramping, helical cutting, and drilling are not recommended for machining of steel and titanium alloys.

*1 Using the maximum ramping angle, the distance to reach the maximum depth of cut is as follows:
L= (maximum depth of cut ap/tan α). 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

Holder Type	Cutting Edge Diameter **DC** (mm)	Insert Corner R **RE** (mm)	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling	
			Maximum Ramping Angle **RMPX**	Minimum Distance **L** *1 (mm)	Maximum Hole Diameter **DH max.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)
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

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

*1 Using the maximum ramping angle, the distance to reach the maximum depth of cut is as follows:
L= (maximum depth of cut ap/tan α). 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

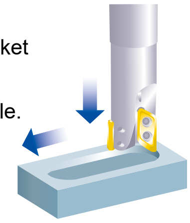
*3 Corner radius of 2.4mm. For other corner radii, use the following formula. {(cutting edge diameter DC)−(corner radius RE)−0.25}×2

*4 Corner radius of 3.2mm. For other corner radii, use the following formula. {(cutting edge diameter DC)−(corner radius RE)−0.25}×2

■ Max.Drilling Depth (Aluminium Alloy)

Type	Insert Corner R **RE** (mm)	Max.Drilling Depth (mm)					
		Cutting Edge Diameter **DC** (mm)					
		Ø20	**Ø25**	**Ø28**	**Ø32**	**Ø35**	**Ø40−Ø125**
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.

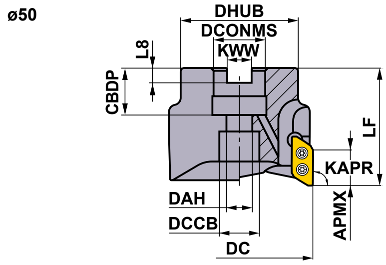


MULTI FUNCTIONAL MILLING <FOR ALUMINIUM ALLOY CUTTING>

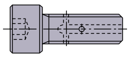
90° KAPR

AXD4000A

P M K **N** S H

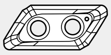


Right hand tool holder only.

Cutter Diameter **DC** (mm)	Set Bolt	Geometry
Ø50	HSC10030H	

ARBOR TYPE

KAPR :90°
GAMP : +10° GAMF : +21°

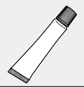
DC	Type	Insert Corner Radius **RE**	Order Number	Stock		Number of Teeth	Dimensions (mm)		**WT** (kg)	**APMX** (mm)	**RPMX** (min^{-1})	
				R			**LF**	**DCONMS**				Insert Type
50	D	0.4–3.2	**AXD4000A-050A04RD**	●	●	4	50	22	0.4	15.5	34000	XDGX1750
50	E	4.0–5.0	**AXD4000A-050A04RE**	●	●	4	50	22	0.4	14.8	34000	XDGX1750

Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
RPMX (max. rev/min) for holders must also be considered.
Note 2) Tool should be set with balancing quality of G6.3 (ISO1940) or ISO16084, in situations over 6000 min^{-1} spindle rotation.
Note 3) When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.
Note 4) Note for inserts with a corner radius of 1.6 and above, as corner radius increases the LF dimensions decrease.

MOUNTING DIMENSIONS

DC	Order Number	Dimensions (mm)						
		DCONMS	**CBDP**	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**
50	**AXD4000A-050A04RD**	22	20	11	17	45	10.4	6.3
50	**AXD4000A-050A04RE**	22	20	11	17	45	10.4	6.3

SPARE PARTS

 *		
Clamp Screw	Wrench	Anti-seize Lubricant
TPS3SB	TIP10D	MK1KS

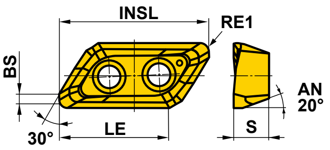
⁎ Clamp Torque (N • m) : TPS3SB = 3.0

Note 1) Clamp screw and wrench of AXD4000A are different from AXD4000.

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

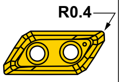
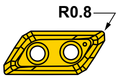
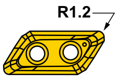
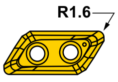
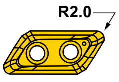
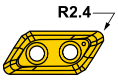
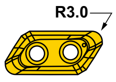
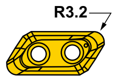
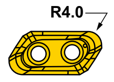
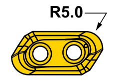
INSERTS

Cutting Conditions (Guide):
● :Stable Cutting ◐ :General Cutting ✤ :Unstable Cutting
Honing:
F :Sharp **E** :Round

Shape	Order Number	Class	Honing	Stock						Dimensions (mm)					Geometry
				Coated				Carbide							
				LC15TF	MP9120			MT2010	TF15	INSL	LE	S	BS	RE1*	
Material	**N** Aluminium Alloys			◐	✤			◐	✤						
Strong Cutting Edge Type **GM** Chipbreaker 	**XDGX175004PDFR-GM**	G	F					●	●	23.0	17.0	5	1.7	0.4	
	XDGX175008PDFR-GM	G	F					●	●	23.0	17.0	5	1.2	0.8	
	XDGX175012PDFR-GM	G	F					★	●	23.0	17.0	5	0.9	1.2	
	XDGX175016PDFR-GM	G	F					●	●	22.0	15.9	5	1.3	1.6	
	XDGX175020PDFR-GM	G	F					●	●	22.0	15.9	5	0.8	2.0	
	XDGX175024PDFR-GM	G	F					★	●	22.0	15.9	5	0.4	2.4	
	XDGX175030PDFR-GM	G	F					●	●	21.1	16.0	5	0.6	3.0	
	XDGX175032PDFR-GM	G	F					●	●	21.1	16.0	5	0.4	3.2	
	XDGX175040PDFR-GM	G	F					●	●	20.0	14.8	5	0.5	4.0	
	XDGX175050PDFR-GM	G	F					★	●	19.4	15.0	5	0.3	5.0	
Strong Cutting Edge Fracture Resistance Type **GM** Chipbreaker 	**XDGX175004PDER-GM**	G	E		●					23.0	17.0	5	1.7	0.4	
	XDGX175008PDER-GM	G	E		●					23.0	17.0	5	1.2	0.8	
	XDGX175012PDER-GM	G	E		●					23.0	17.0	5	0.9	1.2	
	XDGX175016PDER-GM	G	E		●					22.0	15.9	5	1.3	1.6	
	XDGX175020PDER-GM	G	E		●					22.0	15.9	5	0.8	2.0	
	XDGX175024PDER-GM	G	E		●					22.0	15.9	5	0.4	2.4	
	XDGX175030PDER-GM	G	E		●					21.1	16.0	5	0.6	3.0	
	XDGX175032PDER-GM	G	E		●					21.1	16.0	5	0.4	3.2	
	XDGX175040PDER-GM	G	E		●					20.0	14.8	5	0.5	4.0	
	XDGX175050PDER-GM	G	E		●					19.4	15.0	5	0.3	5.0	
Low Cutting Resistance **GL** Chipbreaker 	**XDGX175004PDFR-GL**	G	F	★					●	23.0	16.9	5	1.7	0.4	
	XDGX175008PDFR-GL	G	F	★					●	23.0	17.0	5	1.3	0.8	
	XDGX175012PDFR-GL	G	F	★					●	23.0	17.0	5	0.9	1.2	
	XDGX175016PDFR-GL	G	F	★					●	22.0	16.4	5	1.4	1.6	
	XDGX175020PDFR-GL	G	F	★					●	22.0	16.4	5	1.0	2.0	
	XDGX175024PDFR-GL	G	F	★					●	22.0	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	★					●	20.0	15.6	5	0.8	4.0	
	XDGX175050PDFR-GL	G	F	★					●	19.4	15.3	5	0.4	5.0	

* The insert nose R differs from radius from the radius formed on the workpiece after machining due to the effects of the axial rake angle at the time of setting. GM chipbreaker is recommended if the priority is on the dimensional precision of the workpiece corner radius.

HOLDER AND INSERT CORNER RADIUS COMBINATION

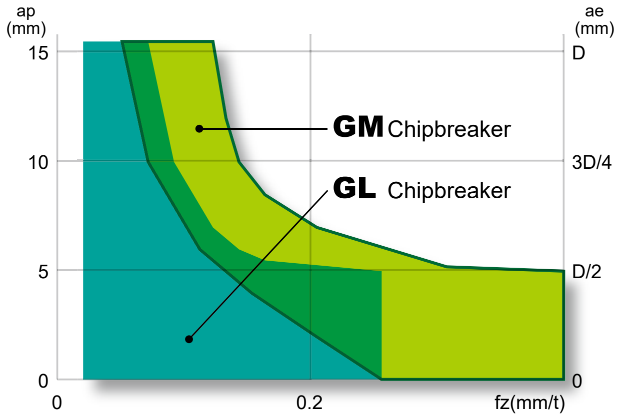
Holder	**D** Type Holder								**E** Type Holder	
	AXD4000A–050A04RD								**AXD4000A–050A04RE**	
Applicable Insert Corner R (**RE1**)										
	XDGX **175004PD◌R-◌◌**	**XDGX** **175008PD◌R-◌◌**	**XDGX** **175012PD◌R-◌◌**	**XDGX** **175016PD◌R-◌◌**	**XDGX** **175020PD◌R-◌◌**	**XDGX** **175024PD◌R-◌◌**	**XDGX** **175030PD◌R-◌◌**	**XDGX** **175032PD◌R-◌◌**	**XDGX** **175040PD◌R-◌◌**	**XDGX** **175050PD◌R-◌◌**

Note 1) Other combinations of holder and insert corner R are not acceptable.

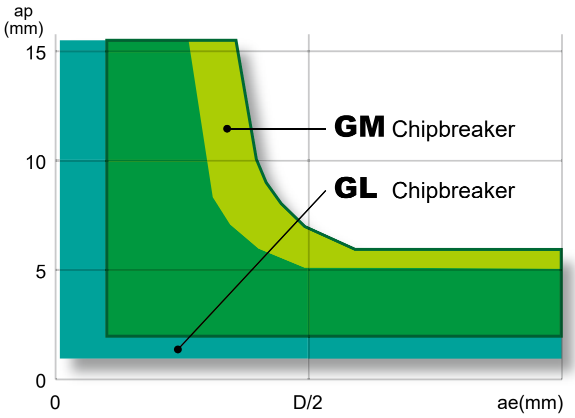
AXD4000A Selection of Insert

It is necessary to choose the best insert according to the cutting conditions. Please select an insert from the tables below. 1st recommendation for efficient, high load machining with a high speed spindle is the GM chipbreaker with a strong cutting edge.

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

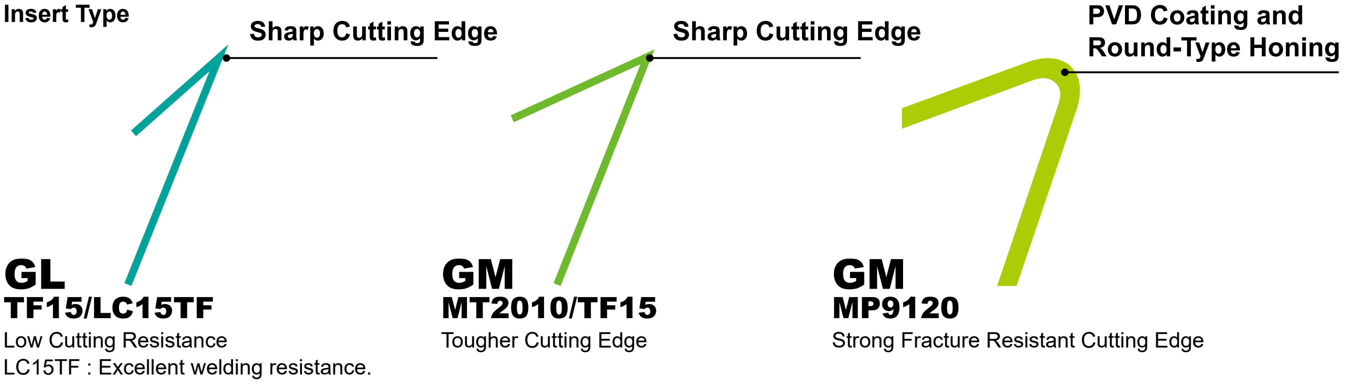


Selection of insert according to the width of cut and the required cutting depth



1st recommendation for machining aluminium alloys is GL chipbreaker.
Under high-load conditions such as deep or high feed cutting, it is advisable to use the GM chipbreaker.

Selection of Insert According to Cutting Edge

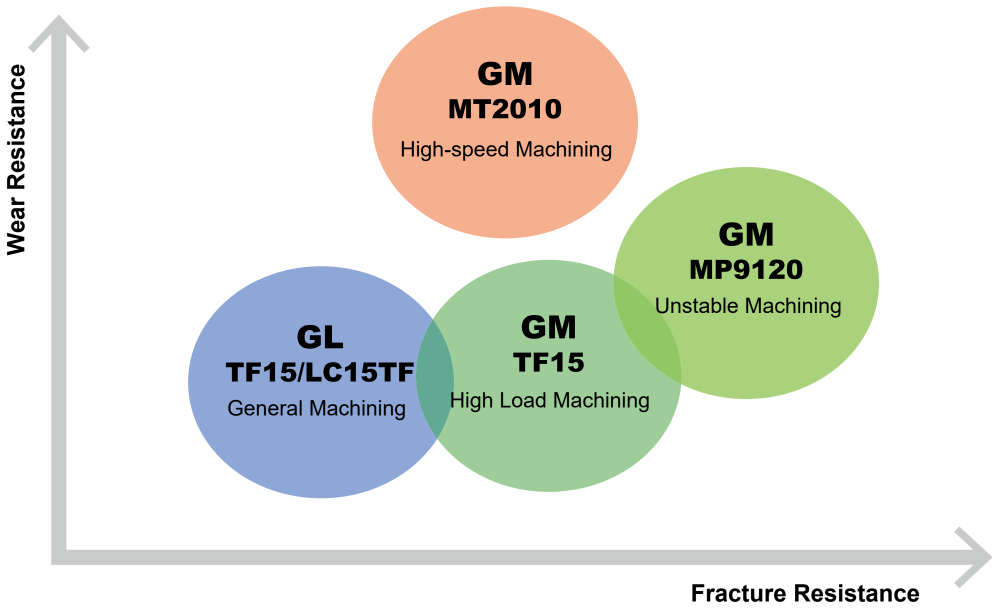


GL
TF15/LC15TF
Low Cutting Resistance
LC15TF : Excellent welding resistance.

GM
MT2010/TF15
Tougher Cutting Edge

GM
MP9120
Strong Fracture Resistant Cutting Edge

Selection of insert according to wear resistance



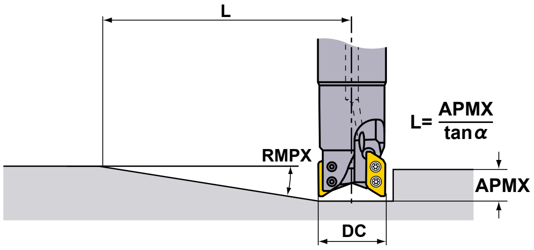
RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Grade	Chipbreaker	Cutting Speed **Vc** (mm/min)	Cutting Width **ae** (mm)	Depth of Cut **ap** (mm)	Feed per Tooth (mm/t.)
N	Aluminium Alloys (AlZn6MgZr, AlZn6MgCu, AlCuMg1, AlMg1SiCu etc) Aluminium-lithium Alloy	Content Si<5%	MT2010 TF15 MP9120	**GM**	4000(2000—5000)	≤0.5 DC	≤ 5	≤ 0.35
							≤ 10	≤ 0.30
							≤ 14.5	≤ 0.25
						≤0.75 DC	≤ 5	≤ 0.30
							≤ 10	≤ 0.25
							≤ 14.5	≤ 0.20
						DC (Slot)	≤ 5	≤ 0.30
			TF15 LC15TF	**GL**	4000(2000—5000)	≤0.75 DC	≤ 5	≤ 0.20
							≤ 10	≤ 0.15
							≤ 14.5	≤ 0.10
						DC (Slot)	≤ 5	≤ 0.20

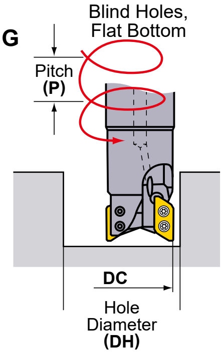
Note 1) The above cutting conditions are determined based on high workpieces and machine rigidity, where no vibration occurred.
If vibrations occur make adjustments according to the machining conditions.
Note 2) Vibrations may occur in the following conditions:
- When using a long tool overhang.
- When pocket machining corner radii.
- When the workpieces 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.

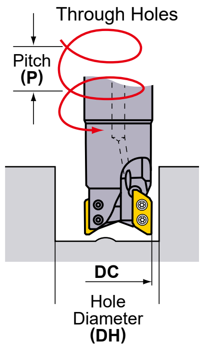
■ RAMPING / HELICAL MILLING / DRILLING

● RAMPING



● HELICAL MILLING





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

DC (mm)	Type	Insert Corner R **RE** (mm)	Ramping		Helical Milling (Blind Hole, Flat Bottom)			Helical Milling (Through Hole)		Drilling
			RMPX	**L** (mm) *1	**DH max.** (mm)	**DH min.** (mm)	**P max.** (mm)	**DH min.** (mm)	**P max.** (mm)	
50	D	0.4—1.2	8.2°	108	96.8 *2	95.4	14	81.2	14	5.5
		1.6—2.4	7.6°	117	94.4 *3	93.6	13	81.2	13	5.0
		3.0—3.2	6.9°	129	92.8 *4	92.0	12	81.2	12	4.5
	E	4.0	6.3°	135	91.2	90.0	10	81.2	10	3.9
		5.0	5.8°	146	89.2	88.8	9	81.2	9	3.6

*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 α). Maximum depth of cut D type is 15.5mm, E 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)—0.3}×2
*3 Corner radius of 2.4mm. For other corner radii, use the following formula. {(cutting edge diameter DC)—(corner radius RE)—0.3}×2
*4 Corner radius of 3.2mm. For other corner radii, use the following formula. {(cutting edge diameter DC)—(corner radius RE)—0.3}×2
Note 1) The recommended ramping feed is 0.05mm/t. or under.

MULTI FUNCTIONAL MILLING
<FOR ALUMINIUM ALLOY CUTTING>

90° KAPR

AXD7000

P M K **N** S H

Fig.1

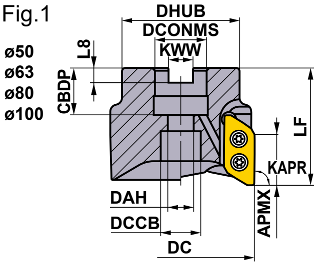
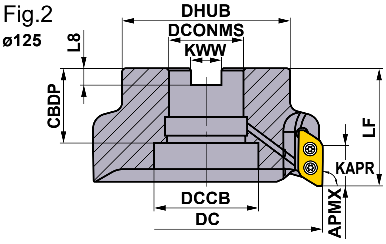
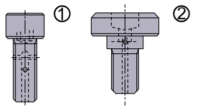


Fig.2



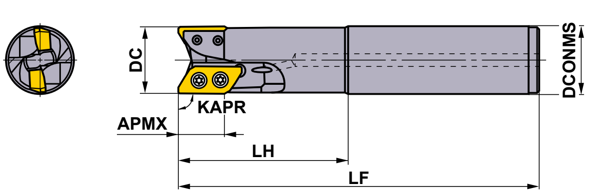
Right hand tool holder only.

Cutter Diameter DC (mm)	Set Bolt	Geometry	
Ø50, Ø63	HSC10030H	①	 ① ②
Ø80	HSC12035H		
Ø100	HSC16040H		
Ø125	MBA20040H	②	

■ARBOR TYPE

KAPR :90°
GAMP:+11° GAMF:+26°−+29°

Type	Insert Corner Radius	Order Number	Stock		Number of Teeth	Dimensions (mm)									*2 WT (kg)	APMX	Max. Allowable Revolution (min⁻¹)	Fig.	*1			
	RE		R			DC	LF	DCONMS	CBDP	DAH	DHUB	KWW	L8	DCCB		(mm)			Clamp Screw	Wrench	Anti-seize Lubricant	Insert
A Type	0.8 – 3.2	AXD7000-050A03RA	●	–	3	50	50	22	20	11	45	10.4	6.3	17	0.4	21	30000	1	TS4SBL	TKY15D	MK1KS	XDGX2270○○
		AXD7000-063A03RA	●	–	3	63	50	22	20	11	50	10.4	6.3	17	0.5	21	25000	1	TS4SBL	TKY15D	MK1KS	
		AXD7000-080A04RA	●	–	4	80	63	27	23	13	63	12.4	7	20	1.2	21	23000	1	TS4SBL	TKY15D	MK1KS	
		AXD7000-100A05RA	●	–	5	100	63	32	26	17	70	14.4	8	26	1.8	21	19000	1	TS4SBL	TKY15D	MK1KS	
		AXD7000-125B06RA	●	–	6	125	63	40	40	–	90	16.4	9	56	2.7	21	16000	2	TS4SBL	TKY15D	MK1KS	
B Type	4.0 – 5.0	AXD7000-050A03RB	●	–	3	50	50	22	20	11	45	10.4	6.3	17	0.4	20.4	30000	1	TS4SBL	TKY15D	MK1KS	
		AXD7000-063A03RB	●	–	3	63	50	22	20	11	50	10.4	6.3	17	0.5	20.4	25000	1	TS4SBL	TKY15D	MK1KS	
		AXD7000-080A04RB	●	–	4	80	63	27	23	13	63	12.4	7	20	1.2	20.4	23000	1	TS4SBL	TKY15D	MK1KS	
		AXD7000-100A05RB	●	–	5	100	63	32	26	17	70	14.4	8	26	1.8	20.4	19000	1	TS4SBL	TKY15D	MK1KS	
		AXD7000-125B06RB	●	–	6	125	63	40	40	–	90	16.4	9	56	2.7	20.4	16000	2	TS4SBL	TKY15D	MK1KS	



■SHANK TYPE

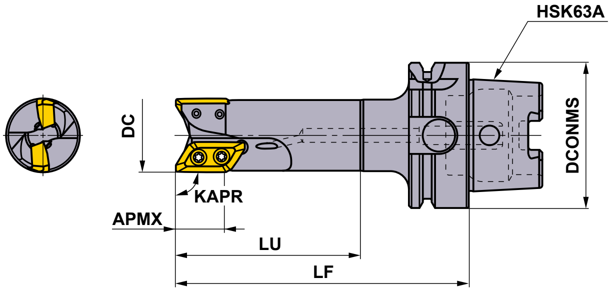
KAPR:90°

Right hand tool holder only.

Type	Insert Corner Radius	Order Number	Stock		Number of Teeth	Dimensions (mm)				APMX	Max. Allowable Revolution (min⁻¹)	*1			
	RE		R			DC	LF	LH	DCONMS	(mm)		Clamp Screw	Wrench	Anti-seize Lubricant	Insert
A Type	0.8 | 3.2	AXD7000R322SA32SA	●	–	2	32	170	80	32	21	41000	TS4SB	TKY15D	MK1KS	XDGX2270○○
		AXD7000R402SA40SA	●	–	2	40	170	80	40	21	36000	TS4SBL	TKY15D	MK1KS	
B Type	4.0 | 5.0	AXD7000R322SA32SB	●	–	2	32	170	80	32	20.4	41000	TS4SB	TKY15D	MK1KS	
		AXD7000R402SA40SB	●	–	2	40	170	80	40	20.4	36000	TS4SBL	TKY15D	MK1KS	

Note 1) The maximum allowable spindle speeds are set to ensure tool and insert stability.
Before use read the operational guidance on page K182.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor 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.
*1 Clamp Torque (N • m) : TS4SB=3.5, TS4SBL=3.5
Use the clamp screw by setting the bundled screw.
*2 WT : Tool Weight

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



HSK63A MONOBLOCK

KAPR :90°

Right hand tool holder only.

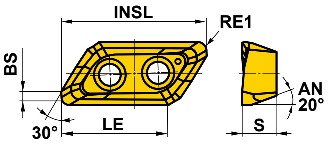
Type	Insert Corner RE	Order Number	Stock R		Number of Teeth	Dimensions (mm) DC	LF	LU	DCONMS	APMX (mm)	RMPX *2	Max. Allowable Revolution (min⁻¹)	Clamp Screw *1	Wrench	Anti-seize Lubricant	Insert
A type	0.8 – 3.2	**AXD7000R03202A-H63A**	●	–	2	32	127	80	63	21	19°	41000	TS4SB	TKY15D	MK1KS	XDGX2270◌◌ PDFR-GL
		AXD7000R04002A-H63A	●	–	2	40	132	85	63	21	13°	36000	TS4SBL	TKY15D	MK1KS	
		AXD7000R05003A-H63A	●	–	3	50	137	90	63	21	9°	30000	TS4SBL	TKY15D	MK1KS	

Note 1) The maximum allowable spindle speeds are set to ensure tool and insert stability.
Before use read the operational guidance on page K182.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the LF and LU dimensions decrease.
Note 4) There is no hole for a data chip
Note 5) The HSK63A shank type has a built-in coolant pipe for installation.
*1 Clamp Torque (N • m) : TS4SB=3.5, TS4SBL=3.5
*2 RMPX : Max. Ramping Angle

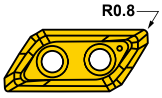
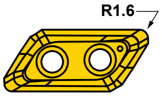
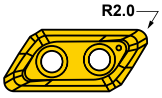
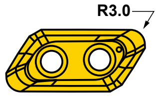
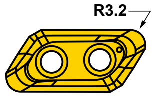
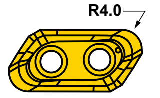
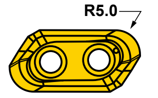
INSERTS

Cutting Conditions (Guide): ●: Stable Cutting ◐: General Cutting ✤: Unstable Cutting

Honing: F: Sharp

Shape	Order Number	Class	Honing	Stock Coated LC15TF				Carbide TF15		Dimensions (mm) INSL	LE	S	BS	RE1	Geometry
Material	N Aluminium Alloy			◐				◐							
	**XDGX227008PDFR-GL**	G	F	★				●		30	21.6	7	2.0	0.8	 INSL RE1 BS 30° LE S AN 20°
	XDGX227016PDFR-GL	G	F	★				●		30	21.7	7	1.2	1.6	
	XDGX227020PDFR-GL	G	F	★				●		30	21.7	7	0.8	2.0	
	XDGX227030PDFR-GL	G	F	★				●		28.8	21.2	7	0.8	3.0	
	XDGX227032PDFR-GL	G	F	★				●		28.8	21.2	7	0.6	3.2	
	XDGX227040PDFR-GL	G	F	★				●		27.5	20.6	7	0.9	4.0	
	XDGX227050PDFR-GL	G	F	★				●		27	20.3	7	0.4	5.0	

HOLDER AND INSERT CORNER RADIUS COMBINATION

Holder	**A** Type Holder					**B** Type Holder	
	AXD7000–◌◌◌◌◌◌◌◌A **AXD7000R◌◌◌◌◌◌◌◌◌A** **AXD7000R◌◌◌◌◌A-H63A**					**AXD7000–◌◌◌◌◌◌◌◌B** **AXD7000R◌◌◌◌◌◌◌◌◌B**	
Applicable Insert Corner R **(RE1)**	R0.8 	R1.6 	R2.0 	R3.0 	R3.2 	R4.0 	R5.0 
	XDGX 227008PDFR-GL	**XDGX 227016PDFR-GL**	**XDGX 227020PDFR-GL**	**XDGX 227030PDFR-GL**	**XDGX 227032PDFR-GL**	**XDGX 227040PDFR-GL**	**XDGX 227050PDFR-GL**

Please note that there is no compatibility between an insert for A type holder and that of for B type holder.

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

■CAUTION FOR USE

Procedure for attaching inserts

1) Clean the seat by air blowing or with a brush before installing the insert.
2) Tighten the clamp screw using the accessory wrench while pressing the insert against the seat.
3) Tighten the clamp screw as shown in Figure 1.
4) Coat the clamp screw with anti-seize compound and tighten it to the specified tightening torque.
The tightening torque is shown below.
AXD7000 3.5N•m(2.58ft•lb)
AXD4000 1.5N•m(1.11ft•lb)
5) The clamp screw is an important part in ensuring safety. Purchase an official product from Mitsubishi Materials. When using above the revolutions shown in Table 2, replacing the clamp screw simultaneously with insert replacement is recommended.
6) Check that there is no clearance at the insert seat surface.

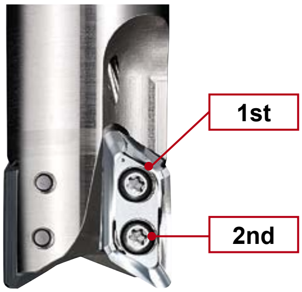
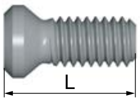


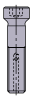
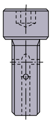
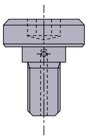
Fig.1

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

Installation of arbor type

1) Clean the inside and face of the hole and the arbor face before installing the body to the arbor.
2) Set the body to the arbor and tighten it. 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.

AXD4000

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

AXD7000

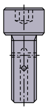
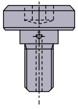
Geometry	Set Bolt	Clamp Torque (N•m)	Cutting Edge Diameter **DC**(mm)	Fig
Fig.1  Fig.2 	HSC10030H	40	ø50, ø63	1
	HSC12035H	80	ø80	1
	HSC16040H	150	ø100	1
	MBA20040H	320	ø120	2

Table 1 Max. Allowable Revolution

AXD4000

Cutting Edge Diameter **DC**(mm)	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Allowable Revolution (min^{-1})	49000	48000	41000	35000	30000	27000	23000	20000

AXD7000

Cutting Edge Diameter **DC**(mm)	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Allowable Revolution (min^{-1})	41000	36000	30000	25000	23000	19000	16000

● Even when operating under the maximum allowable spindle speed, if the spindle speed is equal to or higher than the values shown in table 2, it is recommended that the balance quality (with the arbor or milling chuck) conforms to G6.3 or better based on ISO1940. It is also recommended to replace the clamp screws with new ones when changing inserts. Furthermore, ensure to use machines with safety measures in case of cutter breakage.

Note 1) The balance quality of the holder (without inserts and clamp screws) is G6.3 or better at 10,000min^{-1}.

Table 2 Maximum spindle speed when balancing with the arbor or milling chuck has not been achieved

AXD4000

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

● When setting the spindle speed, take into consideration the maximum allowable spindle speed of the arbor or milling chuck.
● Use the specified set bolt when using the arbor type with through coolant.
● The inserts have sharp cutting edges and handling them with bare hands may cause injuries.
Always wear safety gloves when handling the inserts.

RECOMMENDED CUTTING CONDITIONS

■Cutting Speed

Material			Grade	Chipbreaker	Cutting Speed **Vc** (mm/min)
N	Aluminium Alloy	**Si<5%**	**LC15TF**	**GL**	1000 (200–3000)
			TF15	**GL**	1000 (200–3000)
		5%≤Si≤10% **Si>10%**	**LC15TF**	**GL**	1000 (200–3000)

■Depth of Cut / Feed per Tooth

Material			Chipbreaker	Cutting Width **ae** (mm)	Depth of Cut **ap** (mm)	Feed per Tooth (mm/t.)			
						Cutting Edge Diameter **DC** (mm)			
						32	**40**	**50, 63, 80**	**100, 125**
N	Aluminium Alloy	**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
		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

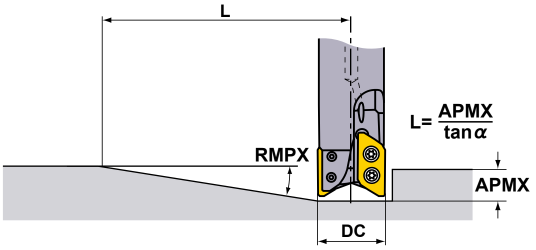
Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibration occurred. If vibrations occur make adjustments according to the machining conditions.

Note 2) Vibrations may occur in the following conditions:

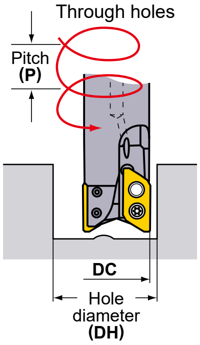
- When using long tool overhang.
- When pocket machining corner radii.
- When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

■RAMPING/HELICAL MILLING

●RAMPING



●HELICAL MILLING



RAMPING/HELICAL MILLING (ALUMINIUM ALLOY)

Type	DC (mm)	RE (mm)	Ramping	
			RMPX	L (mm) *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

Type	DC (mm)	RE (mm)	Helical Milling	
			DH min. (mm)	P max. (mm)
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

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

*1 L (Max. Depth of Cut =15 / tan α). 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 20.4 mm.

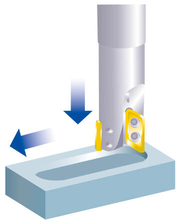
*2 The maximum diameter when machining a blind hole with a flat face using a corner radius of 0.8 mm for A type and 4 mm for B type.
For other corner radii, use the formula below.
{(cutting edge diameter DC)—(corner radius)—0.3}×2

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

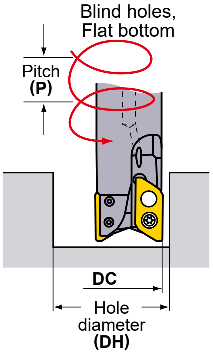
■Max. Drilling Depth (Aluminium Alloy)

Type	Insert corner radius RE (mm)	Max. Drilling Depth (mm)
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 for a prepared hole.



● **HELICAL MILLING**



RAMPING/HELICAL MILLING (ALUMINIUM ALLOY)

Type	DC (mm)	RE (mm)	BS (mm)	Helical Milling (Blind Hole, Flat Bottom)			
				DH max. *2 (mm)	P max. (mm)	DH min. *3 (mm)	P max. (mm)
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

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

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

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

MULTI FUNCTIONAL MILLING

90° KAPR

AQX

P M K N S H

Fig.1

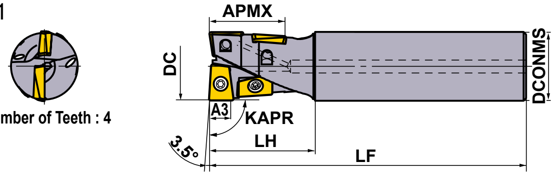
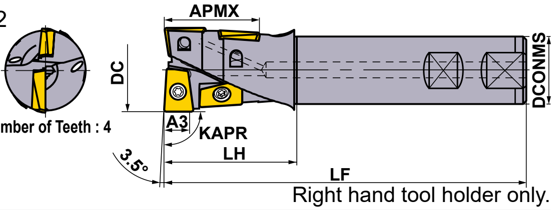


Fig.2



STANDARD EDGE TYPE

KAPR :90°

Right hand tool holder only.

Type	Order Number	Stock R		DC	LF	DCONMS	LH	A3 *1	APMX *2	Type (Fig.)	Clamp Screw *3	Wrench ① ② ③	Insert
Standard	AQXR164SA16S	●	●	16	120	16	30	4.5	17.6	1	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	AQXR164SN16S	★	–	16	120	16	30	4.5	17.6	1	TS2A	①TKY06F	
	AQXR174SA16S	●	●	17	120	16	30	4.5	17.6	1	TS2A	①TKY06F	
	AQXR174SN16S	★	–	17	120	16	30	4.5	17.6	1	TS2A	①TKY06F	
	AQXR204SA20S	●	●	20	130	20	35	6	22	1	TS25	①TKY08F	QOG/MT1035R-G1/M2
	AQXR204SN20S	★	–	20	130	20	35	6	22	1	TS25	①TKY08F	
	AQXR214SA20S	●	●	21	130	20	35	6	22	1	TS25	①TKY08F	
	AQXR214SN20S	★	–	21	130	20	35	6	22	1	TS25	①TKY08F	
	AQXR254SA25S	●	●	25	140	25	40	7.5	27.5	1	TS33	②TKY08D	QOG/MT1342R-G1/M2
	AQXR254SN25S	★	–	25	140	25	40	7.5	27.5	1	TS33	②TKY08D	
	AQXR264SA25S	●	●	26	140	25	40	7.5	27.5	1	TS33	②TKY08D	
	AQXR264SN25S	★	–	26	140	25	40	7.5	27.5	1	TS33	②TKY08D	
	AQXR324SA32S	●	●	32	150	32	50	9.5	35.2	1	TS407	②TKY15D	QOG/MT1651R-G1/M2
	AQXR324SN32S	★	–	32	150	32	50	9.5	35.2	1	TS407	②TKY15D	
	AQXR334SA32S	●	●	33	150	32	50	9.5	35.2	1	TS407	②TKY15D	
	AQXR334SN32S	★	–	33	150	32	50	9.5	35.2	1	TS407	②TKY15D	
	AQXR354SA32S	●	●	35	150	32	50	11	40	1	TS407	②TKY15D	QOG/MT1856R-G1/M2
	AQXR354SN32S	★	–	35	150	32	50	11	40	1	TS407	②TKY15D	
	AQXR404SA32S	●	●	40	160	32	60	12	44	1	TS55	②TKY25D	QOG/MT2062R-G1/M2
	AQXR404SN32S	★	–	40	160	32	60	12	44	1	TS55	②TKY25D	
	AQXR504WA40S	●	●	50	170	40	70	15	55	2	TS6S	③TKY30T	QOG/MT2576R-G1/M2
	AQXR504SA42S	★	●	50	170	42	70	15	55	1	TS6S	③TKY30T	
	AQXR504SN42S	★	–	50	170	42	70	15	55	1	TS6S	③TKY30T	
Long	AQXR164SA16L	●	●	16	175	16	50	4.5	17.6	1	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	AQXR164SN16L	★	–	16	175	16	50	4.5	17.6	1	TS2A	①TKY06F	
	AQXR174SA16L	●	●	17	175	16	30	4.5	17.6	1	TS2A	①TKY06F	
	AQXR174SN16L	★	–	17	175	16	30	4.5	17.6	1	TS2A	①TKY06F	
	AQXR204SA20L	●	●	20	185	20	60	6	22	1	TS25	①TKY08F	QOG/MT1035R-G1/M2
	AQXR204SN20L	★	–	20	185	20	60	6	22	1	TS25	①TKY08F	
	AQXR214SA20L	●	●	21	185	20	35	6	22	1	TS25	①TKY08F	
	AQXR214SN20L	★	–	21	185	20	35	6	22	1	TS25	①TKY08F	
	AQXR254SA25L	●	●	25	220	25	75	7.5	27.5	1	TS33	②TKY08D	QOG/MT1342R-G1/M2
	AQXR254SN25L	★	–	25	220	25	75	7.5	27.5	1	TS33	②TKY08D	
	AQXR264SA25L	●	●	26	220	25	40	7.5	27.5	1	TS33	②TKY08D	
	AQXR264SN25L	★	–	26	220	25	40	7.5	27.5	1	TS33	②TKY08D	
	AQXR324SA32L	●	●	32	230	32	90	9.5	35.2	1	TS407	②TKY15D	QOG/MT1651R-G1/M2
	AQXR324SN32L	★	–	32	230	32	90	9.5	35.2	1	TS407	②TKY15D	
	AQXR334SA32L	●	●	33	230	32	50	9.5	35.2	1	TS407	②TKY15D	
	AQXR334SN32L	★	–	33	230	32	50	9.5	35.2	1	TS407	②TKY15D	
	AQXR354SA32L	●	●	35	230	32	50	11	40	1	TS407	②TKY15D	QOG/MT1856R-G1/M2
	AQXR354SN32L	★	–	35	230	32	50	11	40	1	TS407	②TKY15D	
	AQXR404SA32L	●	●	40	240	32	60	12	44	1	TS55	②TKY25D	QOG/MT2062R-G1/M2
	AQXR404SN32L	★	–	40	240	32	60	12	44	1	TS55	②TKY25D	
	AQXR504WA40L	●	●	50	250	40	70	15	55	2	TS6S	③TKY30T	QOG/MT2576R-G1/M2
	AQXR504SA42L	★	●	50	250	42	70	15	55	1	TS6S	③TKY30T	
	AQXR504SN42L	★	–	50	250	42	70	15	55	1	TS6S	③TKY30T	

*1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts.
*2 APMX: Maximum depth of cut.
*3 Clamp Torque (N • m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5, TS6S=10.0

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

Fig.1

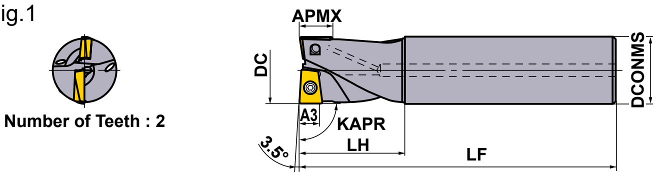
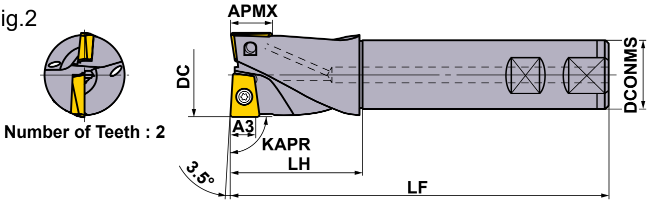


Fig.2



SHORT EDGE TYPE

KAPR :90°

Right hand tool holder only.

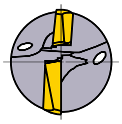
Type	Order Number	Stock		Dimensions (mm)						Type (Fig.)	Clamp Screw *3	① ② ③ Wrench	Insert
		R		DC	LF	DCONMS	LH	A3 *1	APMX *2				
Standard	**AQXR162SA16S**	●	●	16	120	16	30	4.5	7.4	1	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	AQXR162SN16S	★	–	16	120	16	30	4.5	7.4	1	TS2A	①TKY06F	
	AQXR172SA16S	●	●	17	120	16	30	4.5	7.4	1	TS2A	①TKY06F	
	AQXR172SN16S	★	–	17	120	16	30	4.5	7.4	1	TS2A	①TKY06F	
	AQXR202SA20S	●	●	20	130	20	35	6	9.2	1	TS25	①TKY08F	QOG/MT1035R-G1/M2
	AQXR202SN20S	★	–	20	130	20	35	6	9.2	1	TS25	①TKY08F	
	AQXR212SA20S	●	●	21	130	20	35	6	9.2	1	TS25	①TKY08F	
	AQXR212SN20S	★	–	21	130	20	35	6	9.2	1	TS25	①TKY08F	
	AQXR252SA25S	●	●	25	140	25	40	7.5	11.5	1	TS33	②TKY08D	QOG/MT1342R-G1/M2
	AQXR252SN25S	★	–	25	140	25	40	7.5	11.5	1	TS33	②TKY08D	
	AQXR262SA25S	●	●	26	140	25	40	7.5	11.5	1	TS33	②TKY08D	
	AQXR262SN25S	★	–	26	140	25	40	7.5	11.5	1	TS33	②TKY08D	
	AQXR322SA32S	●	●	32	150	32	50	9.5	14.5	1	TS407	②TKY15D	QOG/MT1651R-G1/M2
	AQXR322SN32S	★	–	32	150	32	50	9.5	14.5	1	TS407	②TKY15D	
	AQXR332SA32S	●	●	33	150	32	50	9.5	14.5	1	TS407	②TKY15D	
	AQXR332SN32S	★	–	33	150	32	50	9.5	14.5	1	TS407	②TKY15D	
	AQXR352SA32S	●	●	35	150	32	50	11	16	1	TS407	②TKY15D	QOG/MT1856R-G1/M2
	AQXR352SN32S	★	–	35	150	32	50	11	16	1	TS407	②TKY15D	
	AQXR402SA32S	●	●	40	160	32	60	12	18	1	TS55	②TKY25D	QOG/MT2062R-G1/M2
	AQXR402SN32S	★	–	40	160	32	60	12	18	1	TS55	②TKY25D	
	AQXR502WA40S	●	●	50	170	40	70	15	23	2	TS6S	③TKY30T	QOG/MT2576R-G1/M2
	AQXR502SA42S	★	●	50	170	42	70	15	23	1	TS6S	③TKY30T	
	AQXR502SN42S	★	–	50	170	42	70	15	23	1	TS6S	③TKY30T	
Long	**AQXR162SA16L**	●	●	16	175	16	50	4.5	7.4	1	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	AQXR162SN16L	★	–	16	175	16	50	4.5	7.4	1	TS2A	①TKY06F	
	AQXR172SA16L	●	●	17	175	16	30	4.5	7.4	1	TS2A	①TKY06F	
	AQXR172SN16L	★	–	17	175	16	30	4.5	7.4	1	TS2A	①TKY06F	
	AQXR202SA20L	●	●	20	185	20	60	6	9.2	1	TS25	①TKY08F	QOG/MT1035R-G1/M2
	AQXR202SN20L	★	–	20	185	20	60	6	9.2	1	TS25	①TKY08F	
	AQXR212SA20L	●	●	21	185	20	35	6	9.2	1	TS25	①TKY08F	
	AQXR212SN20L	★	–	21	185	20	35	6	9.2	1	TS25	①TKY08F	
	AQXR252SA25L	●	●	25	220	25	75	7.5	11.5	1	TS33	②TKY08D	QOG/MT1342R-G1/M2
	AQXR252SN25L	★	–	25	220	25	75	7.5	11.5	1	TS33	②TKY08D	
	AQXR262SA25L	●	●	26	220	25	40	7.5	11.5	1	TS33	②TKY08D	
	AQXR262SN25L	★	–	26	220	25	40	7.5	11.5	1	TS33	②TKY08D	
	AQXR322SA32L	●	●	32	230	32	90	9.5	14.5	1	TS407	②TKY15D	QOG/MT1651R-G1/M2
	AQXR322SN32L	★	–	32	230	32	90	9.5	14.5	1	TS407	②TKY15D	
	AQXR332SA32L	●	●	33	230	32	50	9.5	14.5	1	TS407	②TKY15D	
	AQXR332SN32L	★	–	33	230	32	50	9.5	14.5	1	TS407	②TKY15D	
	AQXR352SA32L	●	●	35	230	32	50	11	16	1	TS407	②TKY15D	QOG/MT1856R-G1/M2
	AQXR352SN32L	★	–	35	230	32	50	11	16	1	TS407	②TKY15D	
	AQXR402SA32L	●	●	40	240	32	60	12	18	1	TS55	②TKY25D	QOG/MT2062R-G1/M2
	AQXR402SN32L	★	–	40	240	32	60	12	18	1	TS55	②TKY25D	
	AQXR502WA40L	●	●	50	250	40	70	15	23	2	TS6S	③TKY30T	QOG/MT2576R-G1/M2
	AQXR502SA42L	★	●	50	250	42	70	15	23	1	TS6S	③TKY30T	
	AQXR502SN42L	★	–	50	250	42	70	15	23	1	TS6S	③TKY30T	

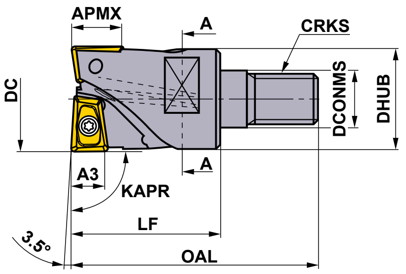
*1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts.

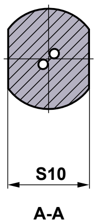
*2 APMX: Maximum depth of cut.

*3 Clamp Torque (N • m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5, TS6S=10.0

SPARE PARTS ➤**N001**
TECHNICAL DATA ➤**P001**







SCREW-IN TYPE

KAPR :90°

Right hand tool holder only.

Order Number	Stock		Dimensions (mm)									*4 WT (kg)	*3	① ②	
	R		DC	DCONMS	DHUB	OAL	LF	S10	CRKS	A3*1	APMX*2		Clamp Screw	Wrench	Insert
AQXR162M08A30	●	●	16	8.5	14.7	48	30	10	M8	4.5	7.4	0.1	TS2A	①TKY06F	QO◌T0830R-◌◌
AQXR172M08A30	●	●	17	8.5	14.5	48	30	10	M8	4.5	7.4	0.1	TS2A	①TKY06F	
AQXR202M10A30	●	●	20	10.5	18.6	49	30	14	M10	6	9.2	0.2	TS25	①TKY08F	QO◌T1035R-◌◌
AQXR212M10A30	●	●	21	10.5	18.5	49	30	14	M10	6	9.2	0.2	TS25	①TKY08F	
AQXR252M12A35	●	●	25	12.5	23.5	57	35	19	M12	7.5	11.5	0.2	TS33	②TKY08D	QO◌T1342R-◌◌
AQXR262M12A35	●	●	26	12.5	23.5	57	35	19	M12	7.5	11.5	0.2	TS33	②TKY08D	
AQXR322M16A40	●	●	32	17	28.5	63	40	24	M16	9.5	14.5	0.3	TS407	②TKY15D	QO◌T1651R-◌◌
AQXR332M16A40	●	●	33	17	28.5	63	40	24	M16	9.5	14.5	0.3	TS407	②TKY15D	
AQXR352M16A40	●	●	35	17	28.5	63	40	24	M16	11	16	0.3	TS407	②TKY15D	QO◌T1856R-◌◌
AQXR402M16A45	●	●	40	17	28.5	68	45	24	M16	12	18	0.3	TS55	②TKY25D	QO◌T2062R-◌◌

Note 1) For screw-in type arbors, refer to page K260.
*1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts.
*2 APMX: Maximum depth of cut.
*3 Clamp Torque (N • m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5
*4 WT : Tool Weight

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

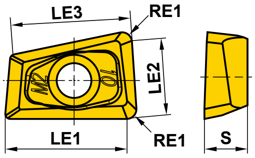
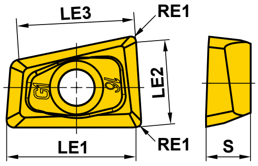
ARBORS ➤ K260

INSERTS

Material			MP6120	MP6130	MP7130	MP7140	MP9120	VP15TF	VP30RT	HTi10		
Material	P	Steel	●	◐				◐	✤			
	M	Stainless Steel			◐	✤		◐	✤			
	K	Cast Iron						✤	✤	◐		
	N	Non-ferrous Metal								◐		
	S	Heat-resistant Alloy, Titanium Alloy					◐	◐	✤			
	H	Hardened Materials						◐				

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✤: Unstable Cutting

Honing :
E : Round F : Sharp

Shape	Order Number	DC	Class	Honing	Coated							Carbide			Dimensions (mm)					Geometry
					MP6120	MP6130	MP7130	MP7140	MP9120	VP15TF	VP30RT	HTi10			LE1	LE2	LE3	S	RE1	
	QOMT0830R-M2	Ø16,17	M	E	●	●	●	●	●	●	●				7.3	4.4	7.3	3	0.8	
	QOMT1035R-M2	Ø20,21	M	E	●	●	●	●	●	●	●				9.5	5.9	9.3	3.5	0.8	
	QOMT1342R-M2	Ø25,26	M	E	●	●	●	●	●	●	●				12	7.6	11.6	4.2	0.8	
	QOMT1651R-M2	Ø32,33	M	E	●	●	●	●	●	●	●				15.4	9.9	14.6	5.1	0.8	
	QOMT1856R-M2	Ø35	M	E	●	●	●	●	●	●	●				16.9	10.9	16	5.6	0.8	
	QOMT2062R-M2	Ø40	M	E	●	●	●	●	●	●	●				19.4	12.6	18.1	6.2	0.8	
	QOMT2576R-M2	Ø50	M	E	●	●	●	●	●	●	●				24.8	16.1	23.1	7.6	0.8	
	QOGT0830R-G1	Ø16,17	G	E*	★				★	●		●			7.7	4.9	7.3	3	0.4	
	QOGT1035R-G1	Ø20,21	G	E*	★				★	●		●			9.9	6.4	9.3	3.5	0.4	
	QOGT1342R-G1	Ø25,26	G	E*	★				★	●		●			12.4	8.1	11.6	4.2	0.4	
	QOGT1651R-G1	Ø32,33	G	E*	★				★	●		●			15.8	10.4	14.6	5.1	0.4	
	QOGT1856R-G1	Ø35	G	E*	★				★	●		●			17.3	11.4	16	5.6	0.4	
	QOGT2062R-G1	Ø40	G	E*	★				★	●		●			19.8	13.1	18.1	6.2	0.4	
	QOGT2576R-G1	Ø50	G	E*	★				★	●		●			25.2	16.6	23.1	7.6	0.4	

* HTi10 insert honing is "F" type.

RECOMMENDED CUTTING CONDITIONS

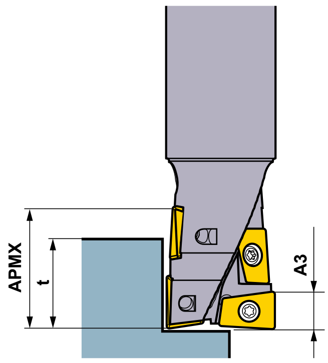
CUTTING SPEED

Material	No.	Hardness	Chipbreaker	Cutting Speed for Different Grades **Vc** (m/min)		
P				**MP6120**	**VP15TF**	**MP6130**
Mild Steel	1	≤180HB	**M2/G1**	200 (170—240)	180 (150—220)	160 (130—200)
Carbon Steel, Alloy Steel	2	180—350HB	**M2**	180 (140—220)	160 (120—200)	140 (100—180)
M				**MP7130**	**MP7140**	**VP30RT(VP15TF)**
Austenitic Stainless Steel	1	≤200HB	**M2/G1**	170 (120—200)	160 (100—180)	150 (120—180)
Austenitic Stainless Steel	2	>200HB	**M2**			
Ferritic and Martensitic Stainless Steel	3	≤200HB	**M2**			
Ferritic and Martensitic Stainless Steel	4	>200HB	**M2**			
K				**VP15TF**		
Gray Cast Iron	1	≤350MPa	**M2**	180 (150—220)	—	—
Ductile Cast Iron	2	≤450MPa	**M2**	180 (150—220)	—	—
N				**HTi10**		
Aluminium Alloy	1	Si<5%	**G1**	500 (200—800)	—	—
Aluminium Alloy	2	5%≤Si≤10%	**G1**	100 (50—300)	—	—
Aluminium Alloy	3	Si>5%	**G1**	100 (50—300)	—	—
S				**MP9120**		
Titanium Alloy*	1	—	**M2**	50 (30—70)	—	—
H				**VP15TF**		
Hardened Steel	1	40—55HRC	**M2**	80 (50—120)	—	—

* Wet cutting is recommended for Titanium alloy.

SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

RECOMMENDED CUTTING CONDITIONS

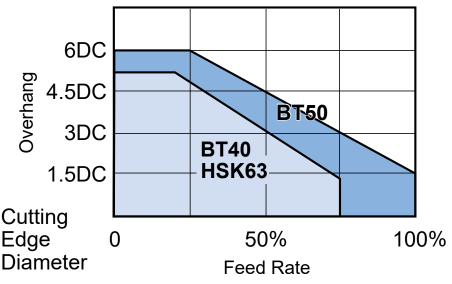


- A3 is the depth of cut for the full dual insert portion at the end of the cutting edge.
- Beyond the range of A3 where overlapping occurs, there is an area where the cutting edge becomes a single insert, not forming full dual insert configuration. Therefore, please pay special attention to the relationship between depth of cut and feed.
- In general, the edge at the border of cut tends to suffer from damage. At large depths of cut, applying the following depth of cut (**t**), at which the edge is full dual insert at the border of cut is recommended to prevent damage to the cutting edge.

(mm)

Tool diameter	Recommended depth of cut t (mm)
Ø16,17	12 — 14
Ø20,21	14 — 17
Ø25,26	17 — 22
Ø32,33	22 — 28
Ø35	25 — 32
Ø40	28 — 35
Ø50	35 — 45

* Figures for A3 and APMX are shown in the standard holder tables on the previous pages.



* **DC**=Cutting Edge Diameter

- Chatter vibration and other problems tend to occur at operations where overhang length is large and/or machine rigidity is low, resulting in unstable machining.
- Please reduce feed accordingly, using the above chart as a guideline.

■ CUTTING CONDITIONS FOR SHOULDER MILLING

	Material	No.	Hardness	Ø16, 17			Ø20, 21			Ø25, 26		
				ap (mm)	ae (mm)	fr (mm/rev)	ap (mm)	ae (mm)	fr (mm/rev)	ap (mm)	ae (mm)	fr (mm/rev)
P	Mild Steel	1	≤180HB	≤4.5	≤8	0.25	≤6	≤10	0.3	≤7.5	≤12.5	0.35
				4.5—12	≤5	0.16	6—14	≤7	0.25	7.5—17	≤8	0.28
				12—17	≤3	0.1	14—22	≤4	0.18	17—27	≤5	0.2
	Carbon Steel Alloy Steel	2	180—350HB	≤4.5	≤8	0.2	≤6	≤10	0.25	≤7.5	≤12.5	0.3
				4.5—12	≤4	0.14	6—14	≤6	0.2	7.5—17	≤7	0.25
				12—17	≤2	0.08	14—22	≤3	0.16	17—27	≤4	0.18
M	Stainless Steel	1,2,3,4	—	≤4.5	≤8	0.2	≤6	≤10	0.25	≤7.5	≤12.5	0.3
				4.5—12	≤4	0.14	6—14	≤6	0.2	7.5—17	≤7	0.25
				12—17	≤2	0.08	14—22	≤3	0.16	17—27	≤4	0.18
K	Cast Iron	1,2	—	≤4.5	≤8	0.25	≤6	≤10	0.3	≤7.5	≤12.5	0.35
				4.5—12	≤5	0.16	6—14	≤7	0.25	7.5—17	≤8	0.28
				12—17	≤3	0.1	14—22	≤4	0.18	17—27	≤5	0.2
N	Aluminium Alloy	1,2,3	—	≤4.5	≤11	0.3	≤6	≤14	0.35	≤7.5	≤12.5	0.4
				4.5—12	≤8	0.21	6—14	≤10	0.3	7.5—17	≤7	0.33
				12—17	≤5	0.15	14—22	≤6	0.23	17—27	≤4	0.25
S	Titanium Alloy	1	—	≤4.5	≤8	0.14	≤6	≤10	0.18	≤7.5	≤17.5	0.21
				4.5—12	≤4	0.1	6—14	≤6	0.14	7.5—17	≤12.5	0.18
				12—17	≤2	0.06	14—22	≤3	0.11	17—27	≤7.5	0.13
H	Hardened Steel	1	40—55HRC	≤4.5	≤5	0.16	≤6	≤6	0.2	≤7.5	≤7	0.22
				4.5—12	≤3	0.1	6—14	≤4	0.16	7.5—17	≤4	0.18
				12—17	≤1	0.06	14—22	≤2	0.12	17—27	≤2	0.14

	Material	No.	Hardness	Ø32, 33			Ø35			Ø40			Ø50		
				ap (mm)	ae (mm)	fr (mm/rev)	ap (mm)	ae (mm)	fr (mm/rev)	ap (mm)	ae (mm)	fr (mm/rev)	ap (mm)	ae (mm)	fr (mm/rev)
P	Mild Steel	1	≤180HB	≤9.5	≤16	0.4	≤11	≤17.5	0.45	≤12	≤20	0.5	≤15	≤25	0.6
				9.5—22	≤11	0.32	11—25	≤12	0.35	12—28	≤13	0.4	15—35	≤16	0.5
				22—35	≤6	0.25	25—40	≤6.5	0.28	28—44	≤7	0.3	35—55	≤10	0.35
	Carbon Steel Alloy Steel	2	180—350HB	≤9.5	≤16	0.35	≤11	≤17.5	0.37	≤12	≤20	0.4	≤15	≤25	0.5
				9.5—22	≤10	0.28	11—25	≤11	0.3	12—28	≤12	0.32	15—35	≤14	0.4
				22—35	≤5	0.2	25—40	≤5.5	0.22	28—44	≤6	0.25	35—55	≤8	0.3
M	Stainless Steel	1,2,3,4	—	≤9.5	≤16	0.35	≤11	≤17.5	0.37	≤12	≤20	0.4	≤15	≤25	0.5
				9.5—22	≤10	0.28	11—25	≤12	0.3	12—28	≤12	0.32	15—35	≤14	0.4
				22—35	≤5	0.2	25—40	≤6.5	0.22	28—44	≤6	0.25	35—55	≤8	0.3
K	Cast Iron	1,2	—	≤9.5	≤16	0.4	≤11	≤17.5	0.45	≤12	≤20	0.5	≤15	≤25	0.6
				9.5—22	≤11	0.32	11—25	≤12	0.35	12—28	≤13	0.4	15—35	≤16	0.5
				22—35	≤6	0.25	25—40	≤6.5	0.28	28—44	≤7	0.3	35—55	≤10	0.35
N	Aluminium Alloy	1,2,3	—	≤9.5	≤16	0.45	≤11	≤17.5	0.5	≤12	≤20	0.55	≤15	≤25	0.65
				9.5—22	≤10	0.37	11—25	≤12	0.4	12—28	≤12	0.45	15—35	≤14	0.55
				22—35	≤5	0.3	25—40	≤6.5	0.32	28—44	≤6	0.35	35—55	≤8	0.4
S	Titanium Alloy	1	—	≤9.5	≤23	0.25	≤11	≤24.5	0.26	≤12	≤28	0.28	≤15	≤35	0.35
				9.5—22	≤16	0.2	11—25	≤17.5	0.21	12—28	≤20	0.22	15—35	≤25	0.28
				22—35	≤10	0.14	25—40	≤10.5	0.15	28—44	≤12	0.18	35—55	≤15	0.21
H	Hardened Steel	1	40—55HRC	≤9.5	≤8	0.25	≤11	≤9	0.28	≤12	≤10	0.3	≤15	≤14	0.35
				9.5—22	≤5	0.2	11—25	≤5.5	0.22	12—28	≤6	0.24	15—35	≤8	0.3
				22—35	≤2	0.16	25—40	≤2	0.17	28—44	≤2	0.18	35—55	≤4	0.22

Note 1) Please pay special attention on the depth of cut when using the short edge type.
Note 2) When using the G1 chipbreaker (VP15TF), please reduce the feed rate by 20%.
Note 3) For the details of the material number, please refer to the cutting speed on page K189.

■ CUTTING CONDITIONS FOR SLOT MILLING

Material		No.	Hardness	Ø16, 17		Ø20, 21		Ø25, 26	
				ap (mm)	**fr** (mm/rev)	**ap** (mm)	**fr** (mm/rev)	**ap** (mm)	**fr** (mm/rev)
P	Mild Steel	1	≤180HB	≤4.5	0.16	≤6	0.18	≤7.5	0.2
				4.5–12	0.1	6–14	0.14	7.5–17	0.16
				12–17	0.07	14–22	0.1	17–27	0.12
	Carbon Steel Alloy Steel	2	180–350HB	≤4.5	0.14	≤6	0.16	≤7.5	0.18
				4.5–12	0.09	6–14	0.12	7.5–17	0.14
				12–17	0.05	14–22	0.1	17–27	0.1
M	Stainless Steel	1,2,3,4	–	≤4.5	0.14	≤6	0.16	≤7.5	0.18
				4.5–12	0.09	6–14	0.12	7.5–17	0.14
				12–17	0.05	14–22	0.1	17–27	0.1
K	Gray Cast Iron	1	≤350MPa	≤4.5	0.16	≤6	0.18	≤7.5	0.2
				4.5–12	0.1	6–14	0.14	7.5–17	0.16
				12–17	0.07	14–22	0.1	17–27	0.12
N	Aluminium Alloy	1,2,3	–	≤4.5	0.18	≤6	0.2	≤7.5	0.22
				4.5–12	0.12	6–14	0.16	7.5–17	0.18
				12–17	0.09	14–22	0.12	17–27	0.14
S	Titanium Alloy	1	–	≤4.5	0.1	≤6	0.12	≤7.5	0.15
				4.5–12	0.05	6–14	0.08	7.5–17	0.1
				12–17	0.03	14–22	0.05	17–27	0.08
H	Hardened Steel	1	40–55HRC	≤4.5	0.1	≤6	0.12	≤7.5	0.14
				4.5–12	0.07	6–14	0.1	7.5–17	0.12
				–	–	–	–	–	–

Material		No.	Hardness	Ø32, 33		Ø35		Ø40		Ø50	
				ap (mm)	**fr** (mm/rev)	**ap** (mm)	**fr** (mm/rev)	**ap** (mm)	**fr** (mm/rev)	**ap** (mm)	**fr** (mm/rev)
P	Mild Steel	1	≤180HB	≤9.5	0.25	≤11	0.27	≤12	0.3	≤15	0.35
				9.5–22	0.2	11–25	0.22	12–28	0.25	15–35	0.3
				22–35	0.14	25–40	0.16	28–44	0.18	35–55	0.22
	Carbon Steel Alloy Steel	2	180–350HB	≤9.5	0.2	≤11	0.22	≤12	0.25	≤15	0.3
				9.5–22	0.16	11–25	0.18	12–28	0.2	15–35	0.25
				22–35	0.12	25–40	0.13	28–44	0.14	35–55	0.16
M	Stainless Steel	1,2,3,4	–	≤9.5	0.2	≤11	0.22	≤12	0.25	≤15	0.3
				9.5–22	0.16	11–25	0.18	12–28	0.2	15–35	0.25
				22–35	0.12	25–40	0.13	28–44	0.14	35–55	0.16
K	Gray Cast Iron	1	≤350MPa	≤9.5	0.25	≤11	0.27	≤12	0.3	≤15	0.35
				9.5–22	0.2	11–25	0.22	12–28	0.25	15–35	0.3
				22–35	0.14	25–40	0.16	28–44	0.18	35–55	0.22
N	Aluminium Alloy	1,2,3	–	≤9.5	0.27	≤11	0.3	≤12	0.32	≤15	0.37
				9.5–22	0.22	11–25	0.25	12–28	0.27	15–35	0.32
				22–35	0.16	25–40	0.18	28–44	0.2	35–55	0.25
S	Titanium Alloy	1	–	≤9.5	0.18	≤11	0.2	≤12	0.23	≤15	0.25
				9.5–22	0.12	11–25	0.15	12–28	0.2	15–35	0.23
				22–35	0.1	25–40	0.12	28–44	0.15	35–55	0.18
H	Hardened Steel	1	40–55HRC	≤9.5	0.16	≤11	0.17	≤12	0.18	≤15	0.22
				9.5–22	0.12	11–25	0.13	12–28	0.14	15–35	0.16
				–	–	–	–	–	–	–	–

Note 1) Please pay special attention on the depth of cut when using the short edge type.
Note 2) When using the G1 chipbreaker (VP15TF), please reduce the feed rate by 20%.
Note 3) For the details of the material number please refer to the cutting speed on page K189.

RECOMMENDED CUTTING CONDITIONS

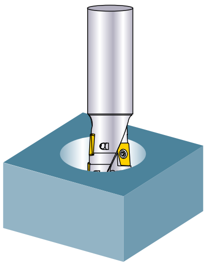
■ FOR HELICAL CUTTING

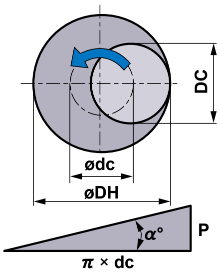
Ø dc = Ø DH - DC

Locus of the centre of the tool · Desired hole diameter · Cutting edge diameter

P = π × dc × tan α°

(Note) α°≤ 3°





- ●How to derive a locus of the centre of the tool.
- ●Depth of cut per pass.
- ●Min. machined hole diameter for helical cutting : 1.2DC
  Max. machined hole diameter for helical cutting : 1.8DC
- ●For chip discharge, please always apply air blow.
  (When machining aluminium, please use coolant.)
- ●When using G1 chipbreaker (VP15TF), please reduce the feed rate by 20%.

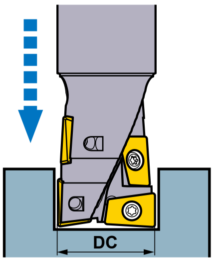
	Material	No.	Hardness	Ø16, 17				Ø20, 21				Ø25, 26			
				DH (mm)	APMX (mm)	fr (mm/rev)	P (mm/pass)	DH (mm)	APMX (mm)	fr (mm/rev)	P (mm/pass)	DH (mm)	APMX (mm)	fr (mm/rev)	P (mm/pass)
P	Mild Steel	1	≤180HB	20	8	0.16	0.44	24	10	0.18	0.44	30	12.5	0.2	0.55
				25	12	0.14	0.99	30	15	0.16	1.1	38	19	0.18	1.43
				29	16	0.12	1.43	36	20	0.14	1.76	45	25	0.16	2.2
	Carbon Steel Alloy Steel	2	180−350HB	20	8	0.14	0.33	24	10	0.16	0.33	30	12.5	0.18	0.41
				25	12	0.12	0.74	30	15	0.14	0.82	38	19	0.16	1.07
				29	16	0.1	1.07	36	20	0.12	1.32	45	25	0.14	1.65
M	Stainless Steel	1,2,3,4	–	20	3	0.14	0.22	24	4	0.16	0.22	30	5	0.18	0.27
				25	5	0.12	0.49	30	7	0.14	0.55	38	9	0.16	0.71
				29	8	0.1	0.71	36	10	0.12	0.88	45	12.5	0.14	1.1
K	Gray Cast Iron	1	≤350MPa	20	10	0.16	0.55	24	14	0.18	0.55	30	18	0.2	0.69
				25	13	0.14	1.23	30	17	0.16	1.37	38	21	0.18	1.78
				29	16	0.12	1.78	36	20	0.14	2.19	45	25	0.16	2.74
N	Aluminium Alloy	1,2,3	–	20	10	0.18	0.44	24	14	0.2	0.44	30	18	0.22	0.55
				25	13	0.16	0.99	30	17	0.18	1.1	38	21	0.2	1.43
				29	16	0.14	1.43	36	20	0.16	1.76	45	25	0.18	2.2
S	Titanium Alloy	1	–	20	3	0.1	0.22	24	4	0.11	0.22	30	5	0.13	0.27
				25	5	0.08	0.49	30	7	0.1	0.55	38	9	0.11	0.71
				29	8	0.07	0.71	36	10	0.08	0.88	45	12.5	0.1	1.1
H	Hardened Steel	1	40−55HRC	20	3	0.1	0.22	24	4	0.12	0.22	30	5	0.14	0.27
				25	5	0.08	0.49	30	7	0.1	0.55	38	9	0.12	0.71
				29	8	0.06	0.71	36	10	0.08	0.88	45	12.5	0.1	1.1

	Material	No.	Hardness	Ø32, 33				Ø35				Ø40				Ø50			
				DH (mm)	APMX (mm)	fr (mm/rev)	P (mm/pass)	DH (mm)	APMX (mm)	fr (mm/rev)	P (mm/pass)	DH (mm)	APMX (mm)	fr (mm/rev)	P (mm/pass)	DH (mm)	APMX (mm)	fr (mm/rev)	P (mm/pass)
P	Mild Steel	1	≤180HB	38	16	0.25	0.66	42	18	0.28	0.77	48	20	0.3	0.88	60	25	0.35	1.1
				48	24	0.22	1.76	53	27	0.24	1.97	60	30	0.26	2.19	75	38	0.3	2.74
				58	32	0.2	2.85	63	35	0.21	3.07	72	40	0.22	3.51	90	50	0.26	4.39
	Carbon Steel Alloy Steel	2	180−350HB	38	16	0.2	0.49	42	18	0.22	0.58	48	20	0.25	0.66	60	25	0.28	0.82
				48	24	0.18	1.32	53	27	0.2	1.48	60	30	0.22	1.65	75	38	0.26	2.06
				58	32	0.16	2.14	63	35	0.18	2.3	72	40	0.2	2.63	90	50	0.24	3.29
M	Stainless Steel	1,2,3,4	–	38	6	0.2	0.33	42	7	0.22	0.38	48	8	0.25	0.44	60	10	0.28	0.55
				48	11	0.18	0.88	53	13	0.2	0.99	60	14	0.22	1.1	75	18	0.26	1.37
				58	16	0.16	1.43	63	18	0.18	1.53	72	20	0.2	1.75	90	25	0.27	2.19
K	Gray Cast Iron	1	≤350MPa	38	22	0.25	0.82	42	25	0.28	0.95	48	28	0.3	1.1	60	35	0.35	1.37
				48	27	0.22	2.19	53	30	0.24	2.47	60	34	0.26	2.74	75	43	0.3	3.43
				58	32	0.2	3.57	63	35	0.21	3.84	72	40	0.22	4.39	90	50	0.26	5.49
N	Aluminium Alloy	1,2,3	–	38	22	0.27	0.66	42	25	0.3	0.77	48	28	0.32	0.88	60	35	0.37	1.1
				48	27	0.24	1.76	53	30	0.26	1.97	60	34	0.28	2.19	75	43	0.32	2.74
				58	32	0.22	2.85	63	35	0.21	3.07	72	40	0.24	3.51	90	50	0.27	4.39
S	Titanium Alloy	1	–	38	6	0.14	0.33	42	7	0.15	0.38	48	8	0.18	0.44	60	10	0.2	0.55
				48	11	0.13	0.88	53	13	0.14	0.99	60	14	0.15	1.1	75	18	0.18	1.37
				58	16	0.11	1.43	63	18	0.13	1.53	72	20	0.14	1.75	90	25	0.17	2.19
H	Hardened Steel	1	40−55HRC	38	6	0.16	0.33	42	7	0.17	0.38	48	8	0.18	0.44	60	10	0.2	0.55
				48	11	0.14	0.88	53	13	0.15	0.99	60	14	0.16	1.1	75	18	0.18	1.37
				58	16	0.12	1.43	63	18	0.13	1.53	72	20	0.14	1.75	90	25	0.16	2.19

Note 1) Helical grooving is strongly recommended for machining tempered steel.
Note 2) When using G1 chipbreaker (VP15TF), please reduce the feed rate by 20%.
Note 3) For the details the material number please refer to the cutting speed on page K189.

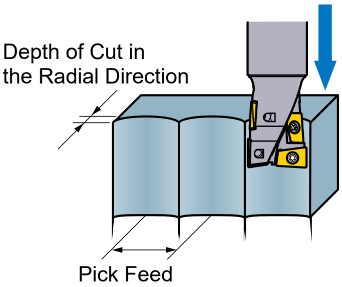
FOR DRILLING AND PLUNGING

● Drilling



- The recommended drilling depth is less than 0.5DC.
- Use step feed when drilling (0.25–0.5mm) to ensure that the chips are effectively broken.
- Use internal or external coolant to ensure efficient chip disposal.
- The chips generated can dispel in any direction, ensure that adequate safety precautions are taken.

● Plunging



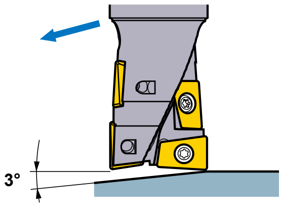
- The feed for plunging is the same as the feed for drilling.
- No step feed necessary.
- Please refer to the following table for the depth of cut for plunging operations.

Depth of Cut in the Radial Direction	≤ 0.4DC
Pick Feed	≤ 0.5DC

Material		No.	Hardness	Ø16, 17		Ø20, 21		Ø25, 26		Ø32, 33, 35		Ø40		Ø50	
				fr (mm/rev)	Step (mm)	**fr** (mm/rev)	Step (mm)	**fr** (mm/rev)	Step (mm)	**fr** (mm/rev)	Step (mm)	**fr** (mm/rev)	Step (mm)	**fr** (mm/rev)	Step (mm)
P	Mild Steel	1	≤180HB	0.035	0.2	0.045	0.3	0.05	0.3	0.055	0.3	0.06	0.3	0.065	0.3
	Carbon Steel Alloy Steel	2	180−350HB	0.03	0.2	0.04	0.3	0.045	0.3	0.05	0.3	0.055	0.3	0.06	0.3
M	Stainless Steel	1,2,3,4	−	0.03	0.15	0.04	0.25	0.045	0.25	0.05	0.25	0.055	0.25	0.06	0.25
K	Gray Cast Iron	1	≤350MPa	0.04	0.4	0.05	0.5	0.06	0.5	0.065	0.5	0.07	0.5	0.075	0.5
N	Aluminium Alloy	1,2,3	−	0.04	0.2	0.05	0.3	0.06	0.3	0.065	0.3	0.07	0.3	0.075	0.3
H	Hardened Steel	1	40−55HRC	0.02	0.15	0.03	0.25	0.035	0.25	0.04	0.25	0.045	0.25	0.05	0.25

Note 1) Helical grooving is strongly recommended for machining tempered steel.
Note 2) When using G1 chipbreaker (VP15TF), please reduce the feed rate by 20%.
Note 3) For the details the material number please refer to the cutting speed on page K189.

FOR RAMPING



- When machining steel the recommended ramping angle is 3°. If a ramping angle larger than 3° is used, then the chips may not be broken effectively resulting in chips wrapping around the tool.
- During ramping, it is recommended to reduce the feed rate by 40% from the cutting conditions.

MULTI FUNCTIONAL MILLING

AJX

P M K N S H

Fig.1

ø50
ø63
ø80
ø100

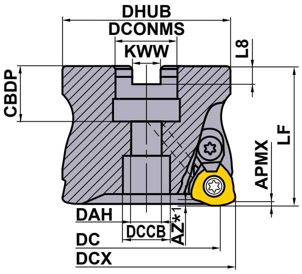
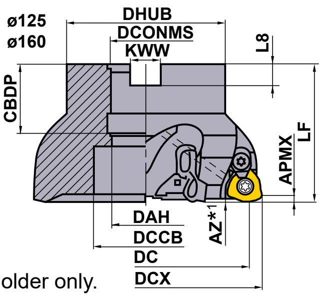


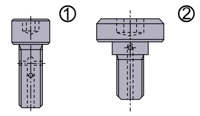
Fig.2

ø125
ø160



Right hand tool holder only.

(mm)

DCX DCONMS mm size	Set Bolt	Geometry	
Ø50, Ø52, Ø63, Ø66	HSC10030H	①	 ① ②
Ø80	HSC12035H		
Ø100	HSC16040H		
Ø125, Ø160	MBA20040H	②	

■ARBOR TYPE

AJX09
GAMP :+8°
GAMF :-6°

AJX12
GAMP :+8°
GAMF :-5°—-4°

AJX14
GAMP :+8°
GAMF :-5°—-3°

DCX (mm)	Order Number	Stock R		Number of Teeth	Dimensions (mm) DC	LF	DCONMS	WT*2 (kg)	APMX (mm)	RMPX	Fig.	Insert Type
50	**AJX12-050A03R**	●	●	3	38.3	50	22	0.4	1.2	2°	1	JDM◌1204
50	**AJX12-050A04R**	●	●	4	38.3	50	22	0.4	1.2	2°	1	JDM◌1204
50	**AJX09-050A05R**	●	●	5	40	50	22	0.5	1.2	1.1°	1	JDM◌09T3
52	**AJX12-052A03R**	□	●	3	40.3	50	22	0.4	1.2	1.8°	1	JDM◌1204
52	**AJX12-052A04R**	●	●	4	40.3	50	22	0.4	1.2	1.8°	1	JDM◌1204
52	**AJX09-052A05R**	●	●	5	42	50	22	0.4	1.2	1.1°	1	JDM◌09T3
63	**AJX14-063A03R**	★	●	3	51.1	50	22	0.7	1.2	2.8°	1	JDM◌1405
63	**AJX14-063A04R**	●	●	4	51.1	50	22	0.7	1.2	2.8°	1	JDM◌1405
63	**AJX12-063A05R**	●	●	5	51.3	50	22	0.9	1.2	1.5°	1	JDM◌1204
NEW 63	**AJX14-063X03R**	★	●	3	51.1	50	27	0.6	1.2	2.8°	1	JDM◌1405
NEW 63	**AJX14-063X04R**	★	●	4	51.1	50	27	0.6	1.2	2.8°	1	JDM◌1405
NEW 63	**AJX12-063X05R**	★	●	5	51.3	50	27	0.6	1.2	1.5°	1	JDM◌1204
NEW 66	**AJX14-066X03R**	★	●	3	54.1	50	27	0.6	1.2	2.6°	1	JDM◌1405
NEW 66	**AJX14-066X04R**	★	●	4	54.1	50	27	0.6	1.2	2.6°	1	JDM◌1405
NEW 66	**AJX12-066X05R**	★	●	5	54.3	50	27	0.7	1.2	1.4°	1	JDM◌1204
66	**AJX14-066A03R**	□	●	3	54.1	50	22	0.7	1.2	2.5°	1	JDM◌1405
66	**AJX14-066A04R**	●	●	4	54.1	50	22	0.7	1.2	2.5°	1	JDM◌1405
66	**AJX12-066A05R**	●	●	5	54.3	50	22	0.8	1.2	2.5°	1	JDM◌1204
80	**AJX14-080A04R**	★	●	4	68.1	50	27	1.2	1.2	1.8°	1	JDM◌1405
80	**AJX14-080A05R**	●	●	5	68.1	50	27	1.2	1.2	1.8°	1	JDM◌1405
80	**AJX12-080A06R**	●	●	6	68.3	50	27	1.2	1.2	1.1°	1	JDM◌1204
100	**AJX14-100A05R**	●	●	5	88.1	63	32	2.4	1.2	1.2°	1	JDM◌1405
100	**AJX14-100A06R**	●	●	6	88.1	63	32	2.4	1.2	1.2°	1	JDM◌1405
100	**AJX12-100A07R**	●	●	7	88.3	63	32	2.6	1.2	0.8°	1	JDM◌1204
125	**AJX14-125B05R**	★	●	5	113.2	63	40	3.3	1.2	0.8°	2	JDM◌1405
125	**AJX14-125B07R**	●	●	7	113.2	63	40	3.3	1.2	0.8°	2	JDM◌1405
160	**AJX14-160B06R**	★	●	6	148.2	63	40	5	1.2	0.5°	2	JDM◌1405
160	**AJX14-160B08R**	★	●	8	148.2	63	40	5	1.2	0.5°	2	JDM◌1405

*1 Refer to page K203, for the max. drilling depth (**AZ**).

*2 WT : Tool Weight

Note 1) Refer to page K203, for the max. depth of cut (**APMX**) and max. drilling depth (**AZ**).

●: Inventory maintained. ★: Inventory maintained in Japan.
□: Non stock, produced to order only.

Fig.3

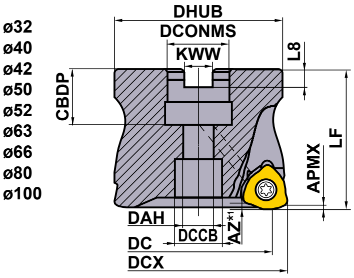
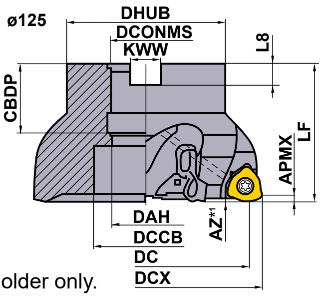
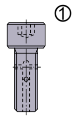
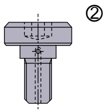


Fig.4



Right hand tool holder only.

(mm)

DCX	Set Bolt	Geometry	
Ø32, Ø40, Ø42	HSC08025H	①	①  ② 
Ø50, Ø52, Ø63 Ø66 (DCONMS=22)	HSC10030H		
Ø63 Ø66 (DCONMS=27), Ø80	HSC12035H		
Ø100	HSC16040H		
Ø125	MBA20040H	②	

■ARBOR TYPE – ULTRA FINE PITCH

DCX = mm size, DCONMS = mm size

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)			WT *2 (kg)	APMX (mm)	RMPX	Fig.	Insert Type
		R			DC	LF	DCONMS					
NEW 32	**AJX06-032A05R**	●	●	5	24.9	40	16	0.1	0.6	0.5°	3	JOM◌06T2
NEW 32	**AJX06-032A06R**	●	●	6	24.9	40	16	0.1	0.6	0.5°	3	JOM◌06T2
NEW 40	**AJX08-040A06R**	●	●	6	31.4	40	16	0.2	0.9	1°	3	JOM◌0803
NEW 42	**AJX08-042A06R**	●	●	6	33.4	40	16	0.2	0.9	0.9°	3	JOM◌0803
NEW 50	**AJX09-050A06R**	●	●	6	39.3	50	22	0.4	1.2	1.1°	3	JDM◌09T3
NEW 50	**AJX08-050A07R**	●	●	7	41.4	50	22	0.4	0.9	0.7°	3	JOM◌0803
NEW 52	**AJX09-052A06R**	●	●	6	41.9	50	22	0.4	1.2	1°	3	JDM◌09T3
NEW 52	**AJX08-052A07R**	●	●	7	43.4	50	22	0.5	0.9	0.7°	3	JOM◌0803
NEW 63	**AJX12-063A06R**	●	●	6	51.3	50	22	0.7	1.2	1.5°	3	JDM◌1204
NEW 63	**AJX09-063A07R**	●	●	7	52.9	50	22	0.7	1.2	0.8°	3	JDM◌09T3
NEW 63	**AJX12-063X06R**	●	●	6	51.3	50	27	0.6	1.2	1.5°	3	JDM◌1204
NEW 63	**AJX09-063X07R**	●	●	7	52.9	50	27	0.7	1.2	0.8°	3	JDM◌09T3
NEW 66	**AJX12-066A06R**	●	●	6	54.3	50	22	0.7	1.2	1.4°	3	JDM◌1204
NEW 66	**AJX09-066A07R**	●	●	7	55.9	50	22	0.8	1.2	0.8°	3	JDM◌09T3
NEW 66	**AJX12-066X06R**	●	●	6	54.3	50	27	0.7	1.2	1.4°	3	JDM◌1204
NEW 66	**AJX09-066X07R**	●	●	7	55.9	50	27	0.8	1.2	0.8°	3	JDM◌09T3
NEW 80	**AJX12-080A08R**	●	●	8	68.3	50	27	1.1	1.2	1.1°	3	JDM◌1204
NEW 100	**AJX12-100A09R**	●	●	9	88.3	63	32	2.5	1.2	0.8°	3	JDM◌1204
NEW 125	**AJX14-125B09R**	●	●	9	113.2	63	40	3.0	1.2	0.8°	4	JDM◌1405

*1 Refer to page K203, for the max. drilling depth (**AZ**).

*2 WT : Tool Weight

Note 1) Refer to page K203, for the max. depth of cut (**APMX**) and max. drilling depth (**AZ**).

MOUNTING DIMENSIONS

Fig.1

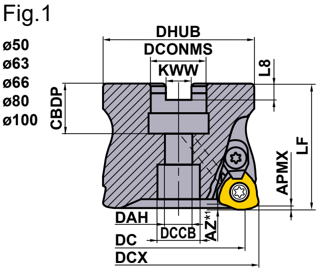


Fig.2

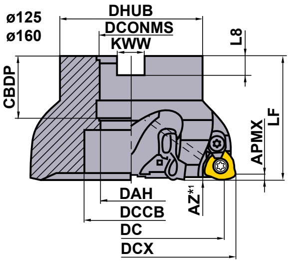


Fig.3

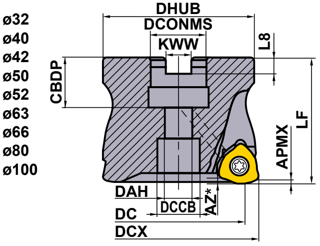
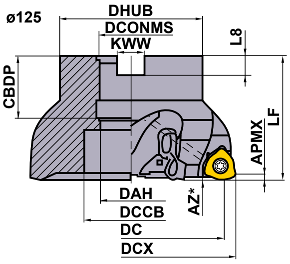


Fig.4



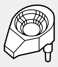
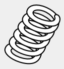
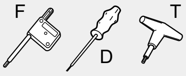
DCX = mm size, DCONMS = inch size

DCX (mm)	Order Number	Dimensions (mm)							Fig.
		DCONMS	**CBDP**	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**	
50	**AJX12R050**	22.225	19	11	17	47	8.4	5	1
50	**AJX09R050**	22.225	19	11	17	47	8.4	5	1
63	**AJX14R063**	22.225	19	11	17	60	8.4	5	1
63	**AJX12R063**	22.225	19	11	17	60	8.4	5	1
80	**AJX14R080**	31.75	32	17	26	76	12.7	8	1
80	**AJX12R080**	31.75	32	17	26	76	12.7	8	1
100	**AJX14R100**	31.75	32	17	26	96	12.7	8	1
100	**AJX12R100**	31.75	32	17	26	96	12.7	8	1
125	**AJX14R125**	38.1	40	40	56	100	15.9	10	2
160	**AJX14R160**	50.8	43	53	72	100	19.1	11	2

DCX = mm size, DCONMS = mm size

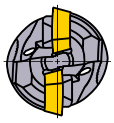
DCX (mm)	Order Number	Dimensions (mm)							Fig.
		DCONMS	**CBDP**	**DAH**	**DCCB**	**DHUB**	**KWW**	**L8**	
32	**AJX06-032A**	16	18	9	14	30	8.4	5.6	3
40	**AJX08-040A**	16	18	9	14	37	8.4	5.6	3
42	**AJX08-042A**	16	18	9	14	37	8.4	5.6	3
50	**AJX12-050A**	22	20	11	17	47	10.4	6.3	1
50	**AJX09-050A**	22	20	11	17	47	10.4	6.3	1, 3
50	**AJX08-050A**	22	20	11	17	47	10.4	6.3	3
52	**AJX09-052A**	22	20	11	17	47	10.4	6.3	3
52	**AJX08-052A**	22	20	11	17	47	10.4	6.3	3
63	**AJX14-063A**	22	20	11	17	60	10.4	6.3	1
63	**AJX12-063A**	22	20	11	17	60	10.4	6.3	1, 3
63	**AJX09-063A**	22	20	11	17	60	10.4	6.3	3
63	**AJX14-063X**	27	23	13	20	60	12.4	7.0	1
63	**AJX12-063X**	27	23	13	20	60	12.4	7.0	3
63	**AJX09-063X**	27	23	13	20	60	12.4	7.0	3
66	**AJX12-066A**	22	20	11	17	60	10.4	6.3	3
66	**AJX09-066A**	22	20	11	17	60	10.4	6.3	3
66	**AJX14-066X**	27	23	13	20	60	12.4	7.0	1
66	**AJX12-066X**	27	23	13	20	60	12.4	7.0	1, 3
66	**AJX09-066X**	27	23	13	20	60	12.4	7.0	3
80	**AJX14-080A**	27	23	13	19	76	12.4	7.0	1
80	**AJX12-080A**	27	23	13	19	76	12.4	7.0	1, 3
100	**AJX14-100A**	32	26	17	26	96	14.4	8.0	1
100	**AJX12-100A**	32	26	17	26	96	14.4	8.0	1, 3
125	**AJX14-125B**	40	40	42	56	100	16.4	9.0	2, 4
160	**AJX14-160B**	40	40	42	56	100	16.4	9.0	2

SPARE PARTS

Tool Holder Type	 *		 *		 F D T
	Clamp Screw	Clamp Bridge	Clamp Bridge Screw	Spring	Wrench
AJX06 Super Extra Fine Pitch	TS25	–	–	–	TKY08F
AJX08 Super Extra Fine Pitch	TS33	–	–	–	TKY08D
AJX09	TS351	AMS3	AJS3010T10	ASS2	TKY10D
AJX09 Super Extra Fine Pitch	TS351	-	–	–	TKY10D
AJX12	TS43	AMS4	AJS4012T15	ASS2	TKY15T
AJX12 Super Extra Fine Pitch	TS43	–	–	–	TKY15T
AJX14	TS54	AMS5	AJS5014T25	ASS3	TKY25T
AJX14 Super Extra Fine Pitch	TS54	–	–	–	TKY25T

* Clamp Torque (N • m) : TS25=1.0, TS33=1.5, TS351=2.5, TS43=3.5, TS54=7.5, AJS3010T10=2.5, AJS4012T15=3.5, AJS5014T25=7.5

● : Inventory maintained.



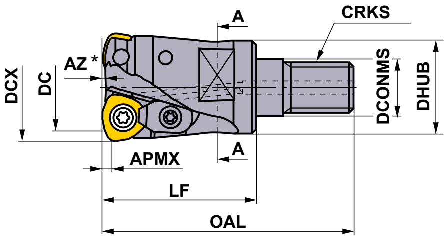


Fig.1

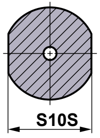


Fig.2

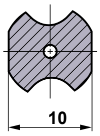
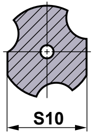


Fig.3



A-A section

■SCREW-IN TYPE

Right hand tool holder only.

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)							∗2 WT (kg)	APMX (mm)	RMPX	Fig.	Shank Type	Insert Type
		R			DC	LF	OAL	DCONMS	DHUB	S10	CRKS						
16	**AJX06R162AM08**	●	●	2	8.9	25	43	8.5	13	10	M8	0.1	0.6	3°	2	SC16M08	JOM○06T2
17	**AJX06R172AM08**	●	●	2	9.9	25	43	8.5	13	10	M8	0.1	0.6	2.5°	2	SC16M08	JOM○06T2
20	**AJX08R202AM10**	●	●	2	11.4	28	47	10.5	18	15	M10	0.1	0.9	3.5°	2	SC20M10	JOM○0803
20	**AJX06R203AM10**	●	●	3	12.9	28	47	10.5	18	15	M10	0.1	0.6	1.5°	3	SC20M10	JOM○06T2
22	**AJX08R222AM10**	●	●	2	13.4	28	47	10.5	18	15	M10	0.1	0.9	3°	2	SC20M10	JOM○0803
22	**AJX06R223AM10**	●	●	3	14.9	28	47	10.5	18	15	M10	0.1	0.6	1°	3	SC20M10	JOM○06T2
25	**AJX09R252AM12**	●	●	2	14.9	36	58	12.5	21	17	M12	0.2	1.2	4°	2	SC25M12	JDM○09T3
25	**AJX08R253AM12**	●	●	3	16.4	36	58	12.5	21	17	M12	0.1	0.9	2°	1	SC25M12	JOM○0803
NEW 25	**AJX06R254AM1235**	●	●	4	17.9	35	57	12.5	23.5	19	M12	0.1	0.6	0.8°	1	SC25M12	JOM○06T2
28	**AJX09R282AM12**	●	●	2	17.9	36	58	12.5	21	17	M12	0.2	1.2	3°	2	SC25M12	JDM○09T3
28	**AJX08R283AM12**	●	●	3	19.4	36	58	12.5	21	17	M12	0.1	0.9	1.7°	1	SC25M12	JOM○0803
NEW 28	**AJX06R284AM1235**	●	●	4	20.9	35	57	12.5	23.5	19	M12	0.1	0.6	0.7°	1	SC25M12	JOM○06T2
30	**AJX12R302AM16**	●	●	2	18.3	47	70	17	29	22	M16	0.3	1.2	4.5°	2	SC32M16	JDM○1204
30	**AJX09R303AM16**	●	●	3	20	47	70	17	29	22	M16	0.2	1.2	2.7°	1	SC32M16	JDM○09T3
32	**AJX12R322AM16**	●	●	2	20.3	47	70	17	29	22	M16	0.3	1.2	4°	2	SC32M16	JDM○1204
32	**AJX09R323AM16**	●	●	3	21.9	47	70	17	29	22	M16	0.2	1.2	2.5°	1	SC32M16	JDM○09T3
NEW 32	**AJX08R324AM1645**	●	●	4	23.4	45	68	17	29	24	M16	0.2	0.9	1.4°	1	SC32M16	JOM○0803
35	**AJX12R352AM16**	●	●	2	23.3	47	70	17	29	22	M16	0.3	1.2	3.5°	2	SC32M16	JDM○1204
35	**AJX09R353AM16**	●	●	3	24.9	47	70	17	29	22	M16	0.2	1.2	2°	1	SC32M16	JDM○09T3
NEW 35	**AJX08R354AM1645**	●	●	4	26.4	45	68	17	29	24	M16	0.2	0.9	1.2°	1	SC32M16	JOM○0803
40	**AJX12R403AM16**	●	●	3	28.3	60	83	17	29	22	M16	0.3	1.2	3°	2	SC32M16	JDM○1204
40	**AJX09R404AM16**	●	●	4	29.9	60	83	17	29	22	M16	0.2	1.2	1.5°	1	SC32M16	JDM○09T3
NEW 40	**AJX08R406AM1645**	●	●	6	31.4	45	68	17	29	24	M16	0.3	0.9	1°	1	SC32M16	JOM○0803

∗1 Refer to page K203, for the max. drilling depth (**AZ**).

∗2 WT : Tool Weight

Note 1) Refer to page K203, for the max. depth of cut (**APMX**) and max. drilling depth (**AZ**).

Note 2) For screw-in type arbors, refer to page K260.

Fig.1

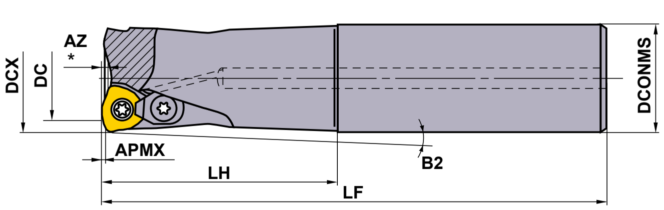
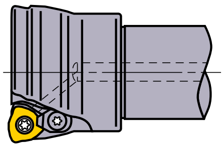


Fig.2



Right hand tool holder only.

STRAIGHT SHANK TYPE

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)				B2	APMX (mm)	RMPX	Fig.	Insert Type
		R			LF	DC	LH	DCONMS					
16	AJX06R162SA16ES	●	●	2	70	8.9	20	16	3.5°	0.6	3°	1	JOM◌06T2
16	AJX06R162SA16S	●	●	2	110	8.9	30	16	2.25°	0.6	3°	1	JOM◌06T2
16	AJX06R162SA16L	●	●	2	150	8.9	70	16	0.93°	0.6	3°	1	JOM◌06T2
16	AJX06R162SA16EL	★	●	2	200	8.9	100	16	0.64°	0.6	3°	1	JOM◌06T2
17	AJX06R172SA16ES	●	●	2	70	9.9	20	16	–	0.6	2.5°	1	JOM◌06T2
17	AJX06R172SA16S	●	●	2	110	9.9	20	16	–	0.6	2.5°	1	JOM◌06T2
17	AJX06R172SA16L	●	●	2	150	9.9	20	16	–	0.6	2.5°	1	JOM◌06T2
17	AJX06R172SA16EL	★	●	2	200	9.9	20	16	–	0.6	2.5°	1	JOM◌06T2
20	AJX08R202SA20S	●	●	2	130	11.4	50	20	1.34°	0.9	3.5°	1	JOM◌0803
20	AJX06R203SA20S	●	●	3	130	12.9	50	20	1.31°	0.6	1.5°	1	JOM◌06T2
20	AJX08R202SA20L	●	●	2	180	11.4	100	20	0.65°	0.9	3.5°	1	JOM◌0803
20	AJX06R203SA20L	●	●	3	180	12.9	100	20	0.64°	0.6	1.5°	1	JOM◌06T2
20	AJX08R202SA20EL	★	●	2	250	11.4	130	20	0.5°	0.9	3.5°	1	JOM◌0803
22	AJX08R222SA20S	●	●	2	130	13.4	30	20	–	0.9	3°	1	JOM◌0803
22	AJX06R223SA20S	●	●	3	130	14.9	30	20	–	0.6	1°	1	JOM◌06T2
22	AJX08R222SA20L	●	●	2	180	13.4	30	20	–	0.9	3°	1	JOM◌0803
22	AJX06R223SA20L	●	●	3	180	14.9	30	20	–	0.6	1°	1	JOM◌06T2
22	AJX08R222SA20EL	★	●	2	250	13.4	30	20	–	0.9	3°	1	JOM◌0803
25	AJX09R252SA25S	●	●	2	140	14.9	60	25	1.1°	1.2	4°	1	JDM◌09T3
25	AJX08R253SA25S	●	●	3	140	16.4	60	25	1.1°	0.9	2°	1	JOM◌0803
NEW 25	AJX06R254SA25S	●	●	4	140	17.9	60	25	1.11°	0.6	0.8°	1	JOM◌06T2
25	AJX09R252SA25L	●	●	2	200	14.9	120	25	0.54°	1.2	4°	1	JDM◌09T3
25	AJX08R253SA25L	●	●	3	200	16.4	120	25	0.54°	0.9	2°	1	JOM◌0803
NEW 25	AJX06R254SA25L	●	●	4	200	17.9	120	25	0.54°	0.6	0.8°	1	JOM◌06T2
25	AJX09R252SA25EL	★	●	2	300	14.9	180	25	0.36°	1.2	4°	1	JDM◌09T3
28	AJX09R282SA25S	●	●	2	140	17.9	40	25	–	1.2	3°	1	JDM◌09T3
28	AJX08R283SA25S	●	●	3	140	19.4	40	25	–	0.9	1.7°	1	JOM◌0803
NEW 28	AJX06R284SA25S	●	●	4	140	20.9	40	25	–	0.6	0.7°	1	JOM◌06T2
28	AJX09R282SA25L	●	●	2	200	17.9	40	25	–	1.2	3°	1	JDM◌09T3
28	AJX08R283SA25L	●	●	3	200	19.4	40	25	–	0.9	1.7°	1	JOM◌0803
NEW 28	AJX06R284SA25L	●	●	4	200	20.9	40	25	–	0.6	0.7°	1	JOM◌06T2
28	AJX09R282SA25EL	★	●	2	300	17.9	40	25	–	1.2	3°	1	JDM◌09T3
30	AJX12R302SA32S	●	●	2	150	18.3	70	32	1.82°	1.2	4.5°	1	JDM◌1204
30	AJX09R303SA32S	●	●	3	150	20	70	32	1.79°	1.2	2.7°	1	JDM◌09T3
30	AJX12R302SA32L	●	●	2	200	18.3	120	32	1.04°	1.2	4.5°	1	JDM◌1204
30	AJX09R303SA32L	●	●	3	200	20	120	32	1.03°	1.2	2.7°	1	JDM◌09T3
30	AJX12R302SA32EL	★	●	2	300	18.3	180	32	0.69°	1.2	4.5°	1	JDM◌1204
32	AJX12R322SA32S	●	●	2	150	20.3	70	32	0.96°	1.2	4°	1	JDM◌1204
32	AJX09R323SA32S	●	●	3	150	21.9	70	32	0.94°	1.2	2.5°	1	JDM◌09T3
NEW 32	AJX08R324SA32S	●	●	4	150	23.4	70	32	0.95°	0.9	1.4°	1	JOM◌0803
NEW 32	AJX06R325SA32S	●	●	5	150	24.9	70	32	0.94°	0.6	0.5°	1	JOM◌06T2
NEW 32	AJX06R326SA32S	●	●	6	150	24.9	70	32	0.94°	0.6	0.5°	1	JOM◌06T2
32	AJX12R322SA32L	●	●	2	200	20.3	120	32	0.55°	1.2	4°	1	JDM◌1204
32	AJX09R323SA32L	●	●	3	200	21.9	120	32	0.54°	1.2	2.5°	1	JDM◌09T3
NEW 32	AJX08R324SA32L	●	●	4	200	23.4	120	32	0.55°	0.9	1.4°	1	JOM◌0803
NEW 32	AJX06R325SA32L	●	●	5	200	24.9	120	32	0.54°	0.6	0.5°	1	JOM◌06T2
32	AJX12R322SA32EL	★	●	2	300	20.3	180	32	0.36°	1.2	4°	1	JDM◌1204

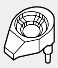
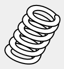
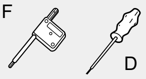
* Refer to page K203, for the max. drilling depth (**AZ**).
Note 1) Refer to page K203, for the max. depth of cut (**APMX**) and max. drilling depth (**AZ**).

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

DCX (mm)	Order Number	Stock		Number of Teeth	Dimensions (mm)				B2	APMX (mm)	RMPX	Fig.	Insert Type
		R			LF	DC	LH	DCONMS					
35	**AJX12R352SA32S**	●	●	2	150	23.3	50	32	—	1.2	3.5°	1	JDM◌1204
35	**AJX09R353SA32S**	●	●	3	150	24.9	50	32	—	1.2	2°	1	JDM◌09T3
35	**AJX12R352SA32L**	●	●	2	200	23.3	50	32	—	1.2	3.5°	1	JDM◌1204
35	**AJX09R353SA32L**	●	●	3	200	24.9	50	32	—	1.2	2°	1	JDM◌09T3
35	**AJX12R352SA32EL**	★	●	2	300	23.3	50	32	—	1.2	3.5°	1	JDM◌1204
40	**AJX12R403SA32S**	●	●	3	150	28.3	50	32	—	1.2	3°	1	JDM◌1204
40	**AJX09R404SA32S**	●	●	4	150	29.9	50	32	—	1.2	1.5°	1	JDM◌09T3
NEW 40	**AJX08R406SA32S**	●	●	6	150	31.4	50	32	—	0.9	1°	1	JOM◌0803
40	**AJX12R403SA32L**	●	●	3	250	28.3	50	32	—	1.2	3°	1	JDM◌1204
40	**AJX09R404SA32L**	●	●	4	250	29.9	50	32	—	1.2	1.5°	1	JDM◌09T3
NEW 40	**AJX08R406SA32L**	●	●	6	250	31.4	50	32	—	0.9	1°	1	JOM◌0803
40	**AJX12R402SA32EL**	★	●	2	350	28.3	50	32	—	1.2	3°	1	JDM◌1204
40	**AJX12R403SA40S**	●	●	3	150	28.3	70	40	0.35°	1.2	0.95°	1	JDM◌1204
40	**AJX09R404SA40S**	●	●	4	150	29.9	70	40	1.8°	1.2	1.8°	1	JDM◌09T3
40	**AJX12R403SA40L**	☐	●	3	250	28.3	70	40	0.35°	1.2	0.95°	1	JDM◌1204
40	**AJX09R404SA40L**	☐	●	4	250	29.9	70	40	0.43°	1.2	0.92°	1	JDM◌09T3
40	**AJX12R402SA40EL**	☐	●	2	350	28.3	70	40	0.35°	1.2	0.95°	1	JDM◌1204
40	**AJX12R403SA42S**	★	●	3	150	28.3	70	42	1.79°	1.2	3°	1	JDM◌1204
40	**AJX12R403SA42L**	★	●	3	250	28.3	70	42	1.79°	1.2	3°	1	JDM◌1204
40	**AJX12R402SA42EL**	★	●	2	350	28.3	70	42	1.79°	1.2	3°	1	JDM◌1204
50	**AJX14R503SA40S**	●	●	3	150	38.2	50	40	—	1.2		1	JDM◌1405
50	**AJX14R503SA40L**	☐	●	3	250	38.2	50	40	—	1.2		1	JDM◌1405
50	**AJX14R503SA42S**	★	●	3	150	38.2	50	42	—	1.2	4.2°	1	JDM◌1405
50	**AJX14R503SA42L**	★	●	3	250	38.1	50	42	—	1.2	4.2°	1	JDM◌1405
63	**AJX14R634SA40S**	☐	●	4	150	51.1	50	40	—	1.2		2	JDM◌1405
63	**AJX14R634SA40L**	☐	●	4	250	51.1	50	40	—	1.2		2	JDM◌1405
63	**AJX14R634SA42S**	★	●	4	150	51.1	50	42	—	1.2	2.8°	2	JDM◌1405
63	**AJX14R634SA42L**	★	●	4	250	51.1	50	42	—	1.2	2.8°	2	JDM◌1405

Note 1) Refer to page K203, for the max. drilling depth (**AZ**).
Note 2) Refer to page K203, for the max. depth of cut (**APMX**) and max. drilling depth (**AZ**).

SPARE PARTS

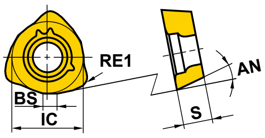
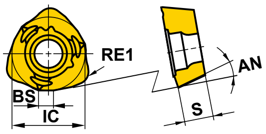
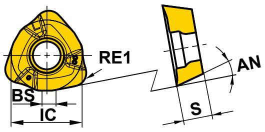
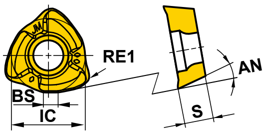
Tool Holder Type	 *		 *		F  D
	Clamp Screw	Clamp Bridge	Clamp Bridge Screw	Spring	Wrench
AJX06R162	TS25	—	—	—	TKY08F
AJX06R172	TS25	—	—	—	TKY08F
AJX06R203	TS25	—	—	—	TKY08F
AJX06R223	TS25	—	—	—	TKY08F
AJX08R202	TS33	—	—	—	TKY08D
AJX08R222	TS33	—	—	—	TKY08D
AJX08R253	TS33	—	—	—	TKY08D
AJX08R283	TS33	—	—	—	TKY08D
AJX09R252	TS351	AMS3	AJS3010T10	ASS2	TKY10D
AJX09R282	TS351	AMS3	AJS3010T10	ASS2	TKY10D
AJX09R303	TS351	AMS3	AJS3010T10	ASS2	TKY10D
AJX09R323	TS351	AMS3	AJS3010T10	ASS2	TKY10D
AJX09R353	TS351	AMS3	AJS3010T10	ASS2	TKY10D
AJX09R404	TS351	AMS3	AJS3010T10	ASS2	TKY10D
AJX12R302	TS407	AMS4	AJS4012T15	ASS2	TKY15D
AJX12R322	TS43	AMS4	AJS4012T15	ASS2	TKY15D
AJX12R352	TS43	AMS4	AJS4012T15	ASS2	TKY15D
AJX12R402	TS43	AMS4	AJS4012T15	ASS2	TKY15D
AJX12R403	TS43	AMS4	AJS4012T15	ASS2	TKY15D
AJX14R503	TS54	AMS5	AJS5014T25	ASS3	TKY25D
AJX14R634	TS54	AMS5	AJS5014T25	ASS3	TKY25D

* Clamp Torque (N • m) : TS25=1.0, TS33=1.0, TS351=2.5, TS407=3.5, TS43=3.5, TS54=7.5, AJS3010T10=2.5, AJS4012T15=3.5, AJS5014T25=7.5

INSERTS

Material			FH7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP30RT
Material	P	Steel	◐	◐	✤						◐	✤
	M	Stainless Steel				◐	✤				◐	✤
	K	Cast Iron	◐								✤	✤
	S	Heat-resistant Alloy, Titanium Alloy						◐	✤	✤	◐	✤
	H	Hardened Materials									◐	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Shape	Order Number	Class	Coated										Dimensions (mm)				AN	Geometry
			FH7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP30RT	IC	S	BS	RE1		
Partial Profile **FT** Chipbreaker 	JOMW06T215ZZSR-FT	M	●	●	●	●	●	●	●		●	●	6.35	2.78	1.2	1.5	13°	
	JOMW080320ZZSR-FT	M	●	●	●	●	●	●	●		●	●	8	3.18	1.4	2	13°	
	JDMW09T320ZDSR-FT	M	●	●	●	●	●	●	●		●	●	9.525	3.97	1.8	2	15°	
	JDMW120420ZDSR-FT	M	●	●	●	●	●	●	●		●	●	12	4.76	2.5	2	15°	
	JDMW140520ZDSR-FT	M	●	●	●	●	●	●	●		●	●	14	5.56	2.8	2	15°	
Strong Cutting Edge Type **ST** Chipbreaker 	JDMT120420ZDSR-ST	M	●	●	●	●	●				●	●	12	4.76	2.5	2	15°	
	JDMT140520ZDSR-ST	M	●	●	●	●	●				●	●	14	5.56	2.8	2	15°	
Focus on cutting edge sharpness (For Difficult-to-cut Materials) **JL** Chipbreaker 	JOMT06T216ZZER-JL	M				●	●	●	●	●			6.35	2.78	1.2	1.6	13°	
	JOMT080322ZZER-JL	M				●	●	●	●	●			8	3.18	1.4	2.2	13°	
	JDMT09T323ZDER-JL	M				●	●	●	●	●			9.525	3.97	1.8	2.3	15°	
	JDMT120423ZDER-JL	M				●	●	●	●	●			12	4.76	2.5	2.3	15°	
	JDMT140523ZDER-JL	M				●	●	●	●	●			14	5.56	2.8	2.3	15°	
Focus on cutting edge sharpness (For General Cutting) **JM** Chipbreaker 	JOMT06T215ZZSR-JM	M	●	●	●	●	●	●	●		●	●	6.35	2.78	1.2	1.5	13°	
	JOMT080320ZZSR-JM	M	●	●	●	●	●	●	●		●	●	8	3.18	1.4	2	13°	
	JDMT09T320ZDSR-JM	M	●	●	●	●	●	●	●		●	●	9.525	3.97	1.8	2	15°	
	JDMT120420ZDSR-JM	M	●	●	●	●	●	●	●		●	●	12	4.76	2.5	2	15°	
	JDMT140520ZDSR-JM	M	●	●	●	●	●	●	●		●	●	14	5.56	2.8	2	15°	

Note 1) Setting height for ST chipbreaker is slightly different from that of other chipbreakers.
If you use ST chipbreaker, check the setting height.

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

SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

Memo

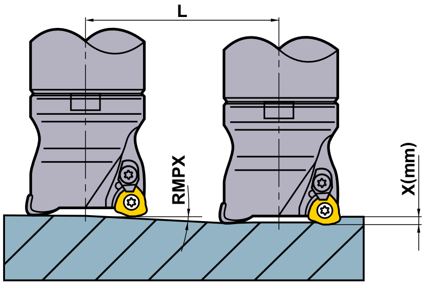
RECOMMENDED CUTTING CONDITIONS

■CUTTING SPEED

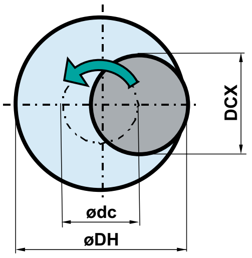
	Material	Characteristics	Cutting Speed (m/min) for Different Grades			
P			**FH7020**	**MP6120**	**MP6130**	**VP30RT**
	Mild Steel	Hardness ≤180HB	170 (120—220)	150 (100—200)	130 (80—180)	110 (60—160)
	Carbon Steel Alloy Steel	Hardness 180—280HB	150 (100—200)	130 (80—180)	110 (60—160)	90 (40—140)
	Carbon Steel Alloy Steel	Hardness 280—350HB	130 (80—180)	100 (50—150)	80 (30—130)	60 (20—110)
	Alloy Tool Steel	Hardness ≤350HB (Annealing)	130 (80—180)	100 (50—150)	80 (30—120)	60 (20—90)
	Pre-hardened Steel	Hardness 35—45HRC	—	100 (70—130)	80 (50—110)	80 (30—90)
M			**MP7130**	**MP7140**	—	—
	Stainless Steel	Hardness ≤270HB	140 (100—180)	120 (80—160)		
K			**FH7020**	**VP15TF**	—	—
	Gray Cast Iron	Tensile Strength ≤350MPa	150 (100—200)	—		
	Ductile Cast Iron	Tensile Strength ≤800MPa	—	120 (80—160)	—	—
S			**MP9120**	**MP9130**	**MP9140**	—
	Heat Resistant Alloy	Hardness ≤350HB	30 (20—40)	25 (20—35)	20 (15—30)	
	Titanium Alloy	—	50 (40—60)	45 (30—55)	40 (30—50)	
H			**VP15TF**	—	—	—
	Hardened Steel	Hardness 40—55HRC	70 (50—90)			

MAXIMUM CAPACITIES BY MODE

■RAMPING



■HELICAL DRILLING



- How to derive a locus of the centre of the tool.

ødc = øDH - DCX

ødc	øDH	DCX
Locus of the centre of the tool	Desired hole diameter	Cutting Diameter Maximum

- For the depth of cut per pass, refer to the cutting conditions above for helical drilling.
- Set the machine spindle revolution so that the tool is rotating and cutting in a down cut direction.

- When ramping and helical cutting, please apply a lower feed (60% of the calculated feed rate or less).
- When drilling, please set the feed in the axial direction at 0.2 mm/rev or less.
- The long chips generated can disperse, ensure that adequate safety precautions are taken.

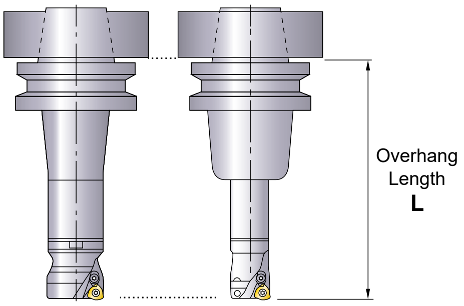
Tool Holder Type		**DCX** (mm)	**DC** (mm)	**APMX** (mm)		Ramping					Helical Drilling		**AZ** (mm)
				FT/JM/ST Chipbreaker	**JL** Chipbreaker	**RMPX**	L Required distance for X mm depth (mm)				**DH** (mm)		
							X=1	**X=1.2**	**X=1.5**	**X=2**	Min	Max	
Shank type/Screw-in type	**AJX06**	16	8.9	1	0.6	3°	19.1	–	–	–	23	29	0.3
	AJX06	17	9.9	1	0.6	2.5°	22.9	–	–	–	25	31	0.3
	AJX06	20	12.9	1	0.6	1.5°	38.2	–	–	–	31	37	0.3
	AJX06	22	14.9	1	0.6	1°	57.3	–	–	–	35	41	0.3
	AJX08	20	11.4	1.5	0.9	3.5°	16.3	19.6	24.5	–	27	36	0.5
	AJX08	22	13.4	1.5	0.9	3°	19.1	22.9	28.6	–	31	40	0.5
	AJX08	25	16.4	1.5	0.9	2°	28.6	34.4	43	–	37	46	0.5
	AJX08	28	19.4	1.5	0.9	1.7°	33.7	40.4	50.5	–	43	52	0.5
	AJX09	25	14.9	2	1.2	4°	14.3	17.2	21.5	28.6	33	46	1
	AJX09	28	17.9	2	1.2	3°	19.1	22.9	28.6	38.1	39	52	1
	AJX09	30	20	2	1.2	2.7°	21.2	25.4	31.8	42.4	43	56	1
	AJX09	32	21.9	2	1.2	2.5°	22.9	27.5	34.4	45.8	47	60	1
	AJX09	35	24.9	2	1.2	2°	28.6	34.4	43	57.3	53	66	1
	AJX09	40	29.9	2	1.2	1.5°	38.2	45.8	57.3	76.4	63	76	1
	AJX12	30	18.3	2	1.2	4.5°	12.7	15.2	19	25.4	39	56	1.5
	AJX12	32	20.3	2	1.2	4°	14.3	17.2	21.4	28.6	41	60	1.5
	AJX12	35	23.3	2	1.2	3.5°	16.3	19.6	24.5	32.7	47	66	1.5
	AJX12	40	28.3	2	1.2	3°	19.1	22.9	28.6	38.2	57	76	1.5
	AJX14	50	38.2	2	1.2	4.2°	13.6	16.3	20.4	27.2	72	96	2
	AJX14	63	51.1	2	1.2	2.8°	20.4	24.5	30.7	40.9	98	122	2
Arbor type	**AJX09**	50	40	2	1.2	1.1°	52.1	62.5	78.1	104.2	83	96	1
	AJX12	50	38.3	2	1.2	2°	28.6	34.4	43	57.3	77	96	1.5
	AJX12	63	51.3	2	1.2	1.5°	38.2	45.8	57.3	76.4	103	122	1.5
	AJX12	80	68.3	2	1.2	1.1°	52.1	62.5	78.1	104.2	137	156	1.5
	AJX12	100	88.3	2	1.2	0.8°	71.6	85.9	107.4	143.2	177	196	1.5
	AJX14	63	51.1	2	1.2	2.8°	20.4	24.5	30.7	40.9	98	122	2
	AJX14	80	68.1	2	1.2	1.8°	31.8	38.2	47.7	63.6	132	156	2
	AJX14	100	88.1	2	1.2	1.2°	47.7	57.3	71.6	95.5	172	196	2
	AJX14	125	113.2	2	1.2	0.8°	71.6	85.9	107.4	143.2	222	246	2
	AJX14	160	148.2	2	1.2	0.5°	114.6	137.5	171.9	229.2	292	316	2

RECOMMENDED CUTTING CONDITIONS

■DEPTH OF CUT / FEED

	Material	Characteristics	Shank Type / Screw-in Type								
			DCX=ø16, ø17			DCX=ø20, ø22			DCX=ø25, ø28		
			L	ap	fz (mm/t.)	L	ap	fz (mm/t.)	L	ap	fz (mm/t.)
P	Mild Steel	Hardness ≤180HB	140	0.8	0.8	160	1.0	1.0	170	1.0	1.2
			180	0.6	0.6	210	0.8	0.8	230	0.8	1.0
			210	0.4	0.4	240	0.6	0.6	290	0.6	0.8
	Carbon Steel Alloy Steel	Hardness 180—280HB	140	0.8	0.8	160	1.0	1.0	170	1.0	1.2
			180	0.6	0.6	210	0.8	0.8	230	0.8	1.0
			210	0.4	0.4	240	0.6	0.6	290	0.6	0.8
	Carbon Steel Alloy Steel	Hardness 280—350HB	140	0.7	0.8	160	0.8	1.0	170	0.8	1.2
			180	0.5	0.6	210	0.6	0.8	230	0.6	1.0
			210	0.3	0.4	240	0.4	0.6	290	0.4	0.8
	Alloy Tool Steel	Hardness ≤350HB	140	0.7	0.8	160	0.8	1.0	170	0.8	1.2
			180	0.5	0.6	210	0.6	0.8	230	0.6	1.0
			210	0.3	0.4	240	0.4	0.6	290	0.4	0.8
	Pre-hardened Steel	Hardness 35—45HRC	140	0.7	0.7	160	0.8	0.8	170	0.8	1.0
			180	0.5	0.5	210	0.6	0.6	230	0.6	0.8
			210	0.3	0.3	240	0.4	0.4	290	0.4	0.6
M	Stainless Steel	Hardness ≤270HB	140	0.8	0.7	160	1.0	0.8	170	1.0	1.0
			180	0.6	0.5	210	0.8	0.6	230	0.8	0.8
			210	0.4	0.3	240	0.6	0.4	290	0.6	0.6
K	Gray Cast Iron	Tensile Strength ≤350MPa	140	0.8	1.0	160	1.0	1.2	170	1.0	1.4
			180	0.6	0.8	210	0.8	1.0	230	0.8	1.2
			210	0.4	0.6	240	0.6	0.8	290	0.6	1.0
	Ductile Cast Iron	Tensile Strength ≤800MPa	140	0.7	0.8	160	0.8	1.0	170	0.8	1.2
			180	0.5	0.6	210	0.6	0.8	230	0.6	1.0
			210	0.3	0.4	240	0.4	0.6	290	0.4	0.8
S	Heat Resistant Alloy	Hardness ≤350HB	140	0.6	0.6	160	0.8	0.6	170	1.0	0.6
			180	0.4	0.4	210	0.6	0.4	230	0.8	0.4
	Titanium Alloy	—	210	0.3	0.3	240	0.4	0.3	290	0.6	0.3
H	Hardened Steel	Hardness 40—55HRC	140	0.5	0.5	160	0.5	0.6	170	0.5	0.8
			180	0.4	0.3	210	0.4	0.4	230	0.4	0.6
			210	0.3	0.2	240	0.3	0.2	290	0.3	0.4

① Overhang Length **L**



② Main Spindle Revolution
n(min^{-1})=(Recommended Cutting Speed x 1000)÷
(DCX x 3.14)

③ Table Feed Rate
Vf(mm/min)=n x Feed per Tooth x Number of Teeth

④ Recommended width of cut (ae) is more than 60% of the cutting edge diameter (DCX).

⑤ The above cutting conditions are guides to cutting on a #50 BT machine. In case of #40 BT and #63 HSK machines, a cutting edge diameter of under 35mm is recommended. In this case, reduce the depth of cut and table feed rate.

⑥ Use of ST chipbreaker with tougher cutting edges is recommended for machining parts that require interrupted cutting. First recommended insert grade for non-standard 06/08/09 ST chipbreakers is VP30RT irrespective of the workpiece.

⑦ A cutter body with coarse pitch is recommended for unstable cutting caused by a long tool overhang.

⑧ Use the "sharp" JM chipbreaker to lower cutting forces or when long tool overhangs are used.

⑨ Heavy chips are generated when machining with the AJX. To avoid chip jamming-related problems, use air blow while machining to discharging chips effectively.

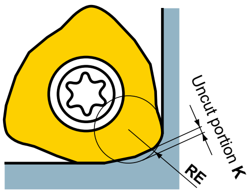
⑩ The maximum depth of cut of JL chipbreaker is different in the insert size. 06 size is up to 0.6 mm, 08 size is up to 0.9 mm, and 09,12,14 size is up to 1.2 mm.

(mm)

Shank Type / Screw-in Type												Arbor Type					
DCX=ø30, ø32, ø35			**DCX=ø40** (**ø32** Shank)			**DCX=ø40** (**ø42** Shank)			**DCX=ø50, ø63**			**DCX=ø50, ø63**			**DCX=ø80, ø100, ø125, ø160**		
L	**ap**	**fz** (mm/t.)	**L**	**ap**	**fz** (mm/t.)	**L**	**ap**	**fz** (mm/t.)	**L**	**ap**	**fz** (mm/t.)	**L**	**ap**	**fz** (mm/t.)	**L**	**ap**	**fz** (mm/t.)
180	1.2	1.4	180	1.2	1.4	180	1.2	1.5	180	1.4	1.5	150	1.5	1.5	170	1.5	1.5
230	1.0	1.2	240	1.0	1.2	240	1.0	1.3	240	1.2	1.3	250	1.3	1.3	300	1.3	1.3
290	0.8	1.0	300	0.8	1.0	300	0.8	1.1	—	—	—	350	1.1	1.1	450	1.0	1.0
180	1.2	1.4	180	1.2	1.4	180	1.2	1.5	180	1.4	1.5	150	1.5	1.5	170	1.5	1.5
230	1.0	1.2	240	1.0	1.2	240	1.0	1.3	240	1.2	1.3	250	1.3	1.3	300	1.3	1.3
290	0.8	1.0	300	0.8	1.0	300	0.8	1.1	—	—	—	350	1.1	1.1	450	1.0	1.0
180	1.0	1.4	180	1.0	1.4	180	1.0	1.5	180	1.2	1.5	150	1.3	1.5	170	1.3	1.5
230	0.8	1.2	240	0.8	1.2	240	0.8	1.3	240	1.0	1.3	250	1.1	1.3	300	1.1	1.3
290	0.6	1.0	300	0.6	1.0	300	0.6	1.1	—	—	—	350	0.9	1.1	450	0.8	1.0
180	1.0	1.4	180	1.0	1.4	180	1.0	1.5	180	1.2	1.5	150	1.3	1.5	170	1.3	1.5
230	0.8	1.2	240	0.8	1.2	240	0.8	1.3	240	1.0	1.3	250	1.1	1.3	300	1.1	1.3
290	0.6	1.0	300	0.6	1.0	300	0.6	1.1	—	—	—	350	0.9	1.1	450	0.8	1.0
180	1.0	1.2	180	1.0	1.2	180	1.0	1.3	180	1.2	1.3	150	1.3	1.3	170	1.3	1.3
230	0.8	1.0	240	0.8	1.0	240	0.8	1.1	240	1.0	1.1	250	1.1	1.1	300	1.1	1.1
290	0.6	0.8	300	0.6	0.8	300	0.6	0.9	—	—	—	350	0.9	0.9	450	0.8	0.8
180	1.2	1.2	180	1.2	1.2	180	1.2	1.3	180	*1.4	1.3	150	*1.5	1.3	170	*1.5	1.3
230	1.0	1.0	240	1.0	1.0	240	1.0	1.1	240	1.2	1.1	250	*1.3	1.1	300	*1.3	1.1
290	0.8	0.8	300	0.8	0.8	300	0.8	0.9	—	—	—	350	1.1	0.9	450	1.0	0.8
180	1.2	1.6	180	1.2	1.6	180	1.2	1.7	180	1.4	1.7	150	1.5	1.7	170	1.5	1.7
230	1.0	1.4	240	1.0	1.4	240	1.0	1.5	240	1.2	1.5	250	1.3	1.5	300	1.3	1.5
290	0.8	1.2	300	0.8	1.2	300	0.8	1.3	—	—	—	350	1.1	1.3	450	1.0	1.2
180	1.0	1.4	180	1.0	1.4	180	1.0	1.5	180	1.2	1.5	150	1.3	1.5	170	1.3	1.5
230	0.8	1.2	240	0.8	1.2	240	0.8	1.3	240	1.0	1.3	250	1.1	1.3	300	1.1	1.3
290	0.6	1.0	300	0.6	1.0	300	0.6	1.1	—	—	—	350	0.9	1.1	450	0.8	1.0
180	1.2	0.6	180	1.2	0.6	180	1.2	0.6	180	1.2	0.6	150	1.2	0.6	170	1.2	0.6
230	1.0	0.4	240	1.0	0.4	240	1.0	0.4	240	1.0	0.4	250	1.0	0.4	300	1.0	0.4
290	0.8	0.3	300	0.8	0.3	300	0.8	0.3	—	—	—	350	0.8	0.3	450	0.8	0.3
180	0.6	1.0	180	0.6	1.0	180	0.6	1.1	180	0.8	1.1	150	0.9	1.1	170	0.9	1.1
230	0.5	0.8	240	0.5	0.8	240	0.5	0.9	240	0.6	0.9	250	0.7	0.9	300	0.7	0.9
290	0.4	0.6	300	0.4	0.6	300	0.4	0.7	—	—	—	—	—	—	—	—	—

* Depth of cut of JL chipbreaker is up to 1.2 mm.

NOTE FOR PROGRAMMING



When using the AJX, please programme as an RE radius cutter. The approximate uncut portions for the programme are as follows.

(mm)

Insert Size	Chipbreaker	Approx. **RE**	Uncut Portion **K**
06	**FT / JM**	2.0	0.33
	JL	2.5	0.32
08	**FT / JM**	2.5	0.46
	JL	2.0	0.40
09	**FT / JM**	3.0	0.47
	JL	3.0	0.46
12	**FT / JM / ST**	3.0	0.63
	JL	3.0	0.53
14	**FT / JM / ST**	3.0	0.64
	JL	3.0	0.55

Note 1) The uncut portion may change slightly depending on cutting conditions.

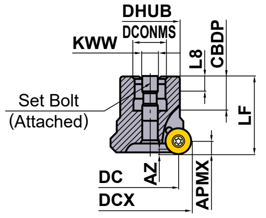
MULTI FUNCTIONAL MILLING

BRP

P M K N S H

Fig.1

ø40
ø42



Set an attached bolt.

Fig.2

ø50
ø52
ø63
ø66
ø80

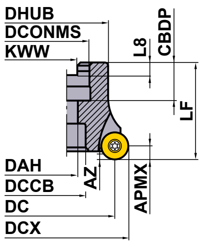
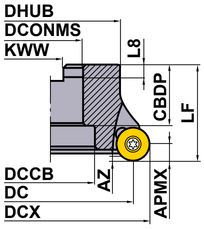


Fig.3

ø100



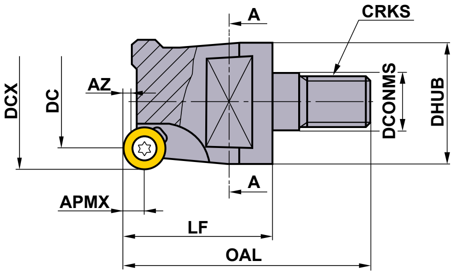
ARBOR TYPE

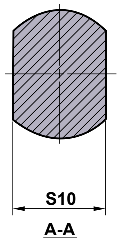
GAMP:+5°
GAMF:-4°–0°

Right hand tool holder only.

Cutting Edge R (APMX)	Order Number	Stock R		Number of Teeth	Dimensions (mm) DCX	DC	DHUB	LF	DCONMS	CBDP	DAH	KWW	L8	DCCB	*2 WT (kg)	Max. Depth of Cut (mm) APMX	AZ	*1 Clamp Screw	Wrench	Set Bolt	Type (Fig.)
6	**BRP6P-040A03R**	★	—	3	40	27.9	30	40	16	18	—	8.4	5.6	—	0.4	6	4	TS43	TKY15D	HDS08030	1
	BRP6P-050A04R	★	—	4	50	37.8	41	50	22	20	11	10.4	6.3	—	0.5	6	4	TS43	TKY15D	—	2
	BRP6P-063A05R	★	—	5	63	50.8	42	50	22	20	11	10.4	6.3	—	0.7	6	4	TS43	TKY15D	—	2
	BRP6N-042A04R	●	—	4	42	29.8	30	40	16	18	—	8.4	5.6	—	0.4	6	4	TS43	TKY15D	HDS08030	1
	BRP6N-050A04R	●	—	4	50	37.8	41	50	22	20	11	10.4	6.3	—	0.5	6	4	TS43	TKY15D	—	2
	BRP6N-052A05R	●	—	5	52	39.8	41	63	22	20	11	10.4	6.3	—	0.5	6	4	TS43	TKY15D	—	2
	BRP6N-063A05R	●	—	5	63	50.8	42	50	22	20	11	10.4	6.3	—	0.7	6	4	TS43	TKY15D	—	2
	BRP6N-066A06R	●	—	6	66	53.8	42	63	22	20	11	10.4	6.3	—	0.7	6	4	TS43	TKY15D	—	2
	BRP6N-080A06R	●	—	6	80	67.8	60	50	27	22	13	12.4	8	—	1.2	6	4	TS43	TKY15D	—	2
8	**BRP8P-063A04R**	★	—	4	63	46.8	42	50	22	20	11	10.4	6.3	—	0.7	8	5.5	TS54	TKY25D	—	2
	BRP8N-063A04R	●	—	4	63	46.8	42	50	22	20	11	10.4	6.3	—	0.7	8	5.5	TS54	TKY25D	—	2
	BRP8N-080A06R	●	—	6	80	63.8	60	50	27	22	13	12.4	8	—	1.2	8	5.5	TS54	TKY25D	—	2
	BRP8N-100B07R	●	—	7	100	83.8	70	50	32	32	—	14.4	8	45	1.6	8	5.5	TS54	TKY25D	—	3

*1 Clamp Torque (N • m) : TS43=3.5, TS54=7.5
*2 WT : Tool Weight





A-A

SCREW-IN TYPE

Right hand tool holder only.

Type	Order Number	Stock R		Number of Teeth	Dimensions (mm) DCX	DC	OAL	LF	DCONMS	DHUB	S10	CRKS	APMX	AZ	* Clamp Screw	Wrench	Insert
BRP4	**BRP4NR161M08**	●	—	1	16	7.8	46	28	8.5	13	10	M8	4	1	CS250560T	TKY08F	①RPMW08T2M0E/T ②RPMT08T2M0E-JS
	BRP4NR202M10	●	—	2	20	11.8	47	28	10.5	18	15	M10	4	2			
	BRP4NR253M12	●	—	3	25	16.8	54	32	12.5	21	17	M12	4	2			
	BRP4NR323M16	●	—	3	32	23.8	59	36	17	29	22	M16	4	2			
BRP5	**BRP5NR201M10**	●	—	1	20	9.8	51	32	10.5	18	15	M10	5	1.2	CS350760T	TKY15F	①RPMW10T3M0E/T ②RPMT10T3M0E-JS
	BRP5NR252M12	●	—	2	25	14.8	54	32	12.5	21	17	M12	5	2.5	CS350860T		
	BRP5NR323M12	●	—	3	32	21.8	58	36	12.5	21	17	M12	5	2.5			
	BRP5NR323M16	●	—	3	32	21.8	59	36	17	29	22	M16	5	2.5			
BRP6	**BRP6NR322M16**	●	—	2	32	19.8	58	35	17	29	22	M16	6	4	TS43	TKY15F	①RPMW1204M0E/T ②RPMW1204M0E-JS
	BRP6NR403M16	●	—	3	40	27.8	66	43	17	29	22	M16	6	4			
	BRP6NR424M16	●	—	4	42	29.8	66	43	17	29	22	M16	6	4			

Note 1) For screw-in type arbors, refer to page K260.
* Clamp Torque (N • m) : CS250560T=1.0, CS350760T=3.5, CS350860T=3.5, TS43=3.5

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

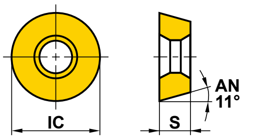
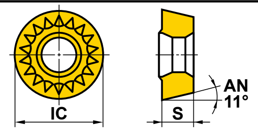
□ : Non stock, produced to order only. (10 inserts in one case)

INSERTS

Material			F7010	F7030	VP15TF	AP20M	NX2525	MX3030	NX4545	UTi20T
Material	P	Steel	●	◐	◐	◐	●	◐	◐	◐
	M	Stainless Steel	◐	◐	◐	◐	●	◐	◐	◐
	K	Cast Iron			✣		●	◐		✣
	S	Heat-resistant Alloy, Titanium Alloy			◐					
	H	Hardened Materials			◐					

Cutting Conditions (Guide):
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing:
E: Round T: Chamfer

Shape	Order Number	Class	Honing	Coated F7010	Coated F7030	Coated VP15TF	Coated AP20M	Cermet NX2525	Cermet NEW MX3030	Cermet NX4545	Carbide UTi20T	Dimensions (mm) IC	Dimensions (mm) S	Geometry
	**RPMW08T2M0E**	M	E								●	8	2.78	
	RPMW08T2M0T	M	T			●						8	2.78	
	RPMW10T3M0E	M	E		★				★	★	☐	10	3.97	
	RPMW10T3M0T	M	T			●						10	3.97	
	RPMW1204M0E	M	E		●		●	☐	★	●	●	12	4.76	
	RPMW1204M0T	M	T			●		●				12	4.76	
	RPMW1606M0E	M	E		●		●	☐			●	16	6.35	
	RPMW1606M0T	M	T			●						16	6.35	
	**RPMT08T2M0E-JS**	M	E		●	●					●	8	2.78	
	RPMT10T3M0E-JS	M	E		●	●					●	10	3.97	
	RPMT1204M0E-JS	M	E	●	●	●	●				●	12	4.76	
	RPMT1606M0E-JS	M	E		●	●	●					16	6.35	

RECOMMENDED CUTTING CONDITIONS

■ CUTTING SPEED (m/min)

	Material	Hardness	Coated F7030	Coated VP15TF	Carbide UTi20T
P	Mild Steel	≤180HB	**250 (200—300)**	250 (200—300)	150 (100—200)
	Carbon Steel Alloy Steel	180—280HB	**180 (130—220)**	180 (130—220)	140 (100—170)
		280—380HB	**160 (110—190)**	160 (110—190)	100 (70—120)
	Pre-Hardened Steel	35—45HRC	**120 (80—140)**	120 (80—140)	90 (60—100)
	High Alloy Steel	300HB	**130 (90—160)**	130 (90—160)	100 (70—120)
M	Stainless Steel	≤260HB	**180 (130—220)**	180 (130—220)	140 (100—170)
K	Cast Iron	Tensile Strength ≤350MPa	—	**170 (130—220)**	140 (100—170)
	Ductile Cast Iron	Tensile Strength 360—500MPa	—	**140 (100—180)**	120 (80—140)
		Tensile Strength 500—800MPa	—	**110 (80—140)**	90 (70—110)
H	Hardened Steel	45—60HRC	—	**60 (50—100)**	60 (40—70)

Note 1) Cutting speeds shown in bold type are for the recommended first choice grades.

■ FEED PER TOOTH (mm/t.)

Type	Depth of Cut (mm) 1	2	3	4	5	6	7	8
BRP4	0.40	0.30	0.20	0.10	—	—	—	—
BRP5	0.40	0.35	0.30	0.20	0.10	—	—	—
BRP6	0.50	0.40	0.30	0.25	0.23	0.20	—	—
BRP8	0.60	0.50	0.45	0.40	0.33	0.30	0.25	0.20

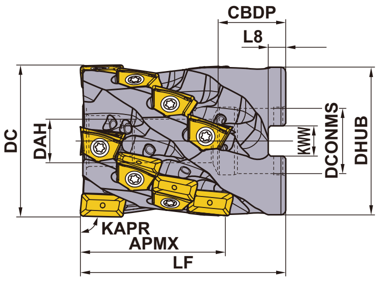
ARBORS ➤ K260
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

DEEP SHOULDER MILLING

<MILLING FOR TITANIUM ALLOY>

VFX5

P M K N **S** H



Right hand tool holder only.

■SHELL TYPE

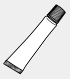
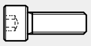
KAPR :90°

Order Number	Stock		Number of Flutes	Total	Dimensions (mm)								APMX (mm)	WT* (kg)
	R				DC	LF	DCONMS	CBDP	DAH	DHUB	KWW	L8		
VFX5-040A03A026R	●	—	3	6	40	50	16	21	8.5	38.2	8.4	5.6	26	0.3
VFX5-040A03A038R	●	—	3	9	40	60	16	21	8.5	38.2	8.4	5.6	38	0.4
VFX5-050X03A026R	●	—	3	6	50	50	27	23	12.5	48.2	12.4	7.0	26	0.4
VFX5-050X03A038R	●	—	3	9	50	60	27	23	12.5	48.2	12.4	7.0	38	0.5
VFX5-050A04A026R	●	—	4	8	50	50	22	21	10.5	48.2	10.4	6.3	26	0.5
VFX5-050A04A038R	●	—	4	12	50	60	22	21	10.5	48.2	10.4	6.3	38	0.6
VFX5-050X04A038R	●	—	4	12	50	60	27	23	12.5	48.2	12.4	7.0	38	0.5
VFX5-050A04A050R	●	—	4	16	50	70	22	21	10.5	48.2	10.4	6.3	50	0.7
VFX5-063A05A026R	●	—	5	10	63	60	27	28	12.5	61	12.4	7.0	26	1.0
VFX5-063A05A063R	●	—	5	25	63	85	27	28	12.5	61	12.4	7.0	63	1.4
VFX5-080A06A075R	●	—	6	36	80	100	32	28	16.5	77.3	14.4	8.0	75	2.8

* WT : Tool Weight

● : Inventory maintained.

SPARE PARTS

Order Number	 *2				 *3				Number of Insert	
									End Cutting Edge	Peripheral *1 Cutting Edge
	Clamp Screw	Number	Seal Washer	Wrench	Coolant Nozzle	Number	Anti-seize Lubricant	Set Bolt	**XNMU1607 ○○R-○○**	**XNMU1607 08R-○○**
VFX5-040A03A026R	TS352	6	W8-S1	TKY10D	HSD04004H08	9	MK1KS	HSC08040	3	3
VFX5-040A03A038R	TS352	9	W8-S1	TKY10D	HSD04004H08	12	MK1KS	HSC08050	3	6
VFX5-050X03A026R	TS352	6	W12-S1	TKY10D	HSD04004H08	9	MK1KS	HSC12035	3	3
VFX5-050X03A038R	TS352	9	W12-S1	TKY10D	HSD04004H08	12	MK1KS	HSC12045	3	6
VFX5-050A04A026R	TS352	8	W10-S1	TKY10D	HSD04004H08	12	MK1KS	HSC10035	4	4
VFX5-050A04A038R	TS352	12	W10-S1	TKY10D	HSD04004H08	16	MK1KS	HSC10045	4	8
VFX5-050X04A038R	TS352	12	W12-S1	TKY10D	HSD04004H08	16	MK1KS	HSC12045	4	8
VFX5-050A04A050R	TS352	16	W10-S1	TKY10D	HSD04004H08	20	MK1KS	HSC10055	4	12
VFX5-063A05A026R	TS352	10	W12-S1	TKY10D	HSD04004H08	15	MK1KS	HSC12045	5	5
VFX5-063A05A063R	TS352	25	W12-S1	TKY10D	HSD04004H08	30	MK1KS	HSC12070	5	20
VFX5-080A06A075R	TS352	36	W16-S1	TKY10D	HSD04004H08	42	MK1KS	HSC16080	6	30

*1 Only corner radius R0.8 can be used for the peripheral cutting edges except the end cutting edge.
*2 Clamp Torque (N • m) : TS352=2.5
*3 Coolant nozzles are available with varying diameters for adjusting coolant pressure. Select nozzles as required by the specification.

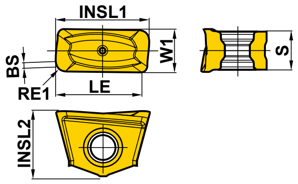
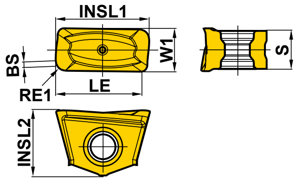
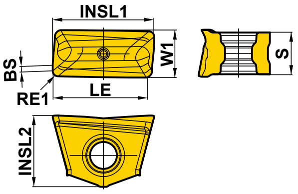
	≦1Mpa (≦20 l/min.)	←Standard→	**≧5Mpa (≧30 l/min.)**	**≧7Mpa (≧50 l/min.)**
Nozzle Dia.	ø0.6mm	ø0.8mm	ø1.2mm	ø1.6mm
Order Number	**HSD04004H06**	**HSD04004H08**	**HSD04004H12**	**HSD04004H16**

* Clamp Torque (N • m) : HSD0400H○○=1.5

*4 The part number for a blank screw without a through nozzle is HSS04004.
*5 Note for insert with a corner radius of 3.2 and above, as corner radius increases the LF dimension increases.
Corner radius 3.2: LF+0.7mm　Corner radius 4.0: LF+1.5mm

SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

Material	S Heat-resistant Alloy, Titanium Alloy	✤				Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting							
Shape	Order Number	Stock				Dimensions (mm)							Geometry
		Coated											
		MP9130				INSL1	LE	W1	INSL2	S	BS	RE1	
General Purpose 	XNMU160708R-MS	●				16.0	13.4	7.0	11.1	6.5	1.0	0.8	
	XNMU160712R-MS	●				16.0	13.8	7.0	11.1	6.5	1.0	1.2	
	XNMU160716R-MS	●				16.0	13.8	7.0	11.1	6.5	1.0	1.6	
	XNMU160724R-MS	●				16.0	13.8	7.0	11.1	6.5	1.0	2.4	
	*1 XNMU160732R-MS	●				17.3	14.4	7.0	11.1	6.5	—	3.2	
	*1 XNMU160740R-MS	●				18.9	15.2	7.0	11.1	6.5	—	4.0	
Cutting Edge Enhancement Type 	XNMU160708R-HS	●				16.0	13.4	7.0	11.1	6.5	1.0	0.8	
Chip Processing Type 	XNMU160708R-LS	●				16.0	13.4	7.0	11.1	6.5	1.0	0.8	

*1 Note for insert with a corner radius of 3.2 and above, as corner radius increases the LF dimension increases.
Corner radius 3.2: LF+0.7mm　Corner radius 4.0: LF+1.5mm

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

RECOMMENDED CUTTING CONDITIONS

■VFX5

Material		Cutting Edge Diameter (mm)	Number of Flutes	Recommended Insert	Cutting Speed **Vc** (m/min)	Revolution **n** (min^{-1})	Depth of Cut **APMX** (mm)	Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/t.)	Table Feed **Vf** (mm/min)	Chip Removal Rate **Q** (cm^3/min)	Estimated Cutting Power (kW)	Expected Torque (Nm)	Tool Life Ratio (%)
S	Titanium Alloy (Ti-6Al-4V)	**Ø40**	3	LS	40	318	38	40	0.10	95	145	6.5	194	40
			3	MS	50	398	38	24	0.10	119	109	4.5	109	60
			3	MS	60	477	38	16	0.10	143	87	3.5	69	80
			3	HS	60	477	38	8	0.12	172	52	2.3	45	100
		Ø50	3	LS	40	255	38	50	0.10	76	145	6.5	242	40
			4	MS	50	318	50	30	0.10	127	191	7.9	237	60
			4	MS	60	382	50	20	0.10	153	153	6.0	151	80
			4	HS	60	382	50	10	0.12	183	92	3.9	98	100
		Ø63	5	LS	40	202	60	63	0.10	101	382	16.8	793	40
			5	MS	50	253	60	38	0.10	126	286	11.8	447	60
			5	MS	60	303	60	25	0.10	152	229	9.0	285	80
			5	HS	60	303	60	13	0.12	182	138	5.9	185	100
		Ø80	6	LS	40	159	75	80	0.10	95	573	25.0	1500	40
			6	MS	50	199	75	48	0.10	119	430	17.6	846	60
			6	MS	60	239	75	32	0.10	143	344	13.5	539	80
			6	HS	60	239	75	16	0.12	172	206	8.7	350	100
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr)	**Ø40**	3	LS	25	199	38	40	0.08	48	73	3.4	161	30
			3	MS	25	199	38	24	0.08	48	44	1.9	92	50
			3	MS	30	239	38	16	0.10	72	44	1.8	74	70
			3	HS	30	239	38	8	0.10	72	22	1.0	41	90
		Ø50	4	LS	25	159	50	50	0.08	51	127	5.8	350	30
			4	MS	25	159	50	30	0.08	51	76	3.4	201	50
			4	MS	30	191	50	20	0.10	76	76	3.2	160	70
			4	HS	30	191	50	10	0.10	76	38	1.8	89	90
		Ø63	5	LS	25	126	60	63	0.08	51	191	8.7	658	30
			5	MS	25	126	60	38	0.08	51	115	5.0	378	50
			5	MS	30	152	60	25	0.10	76	115	4.8	301	70
			5	HS	30	152	60	13	0.10	76	57	2.6	167	90
		Ø80	6	LS	25	99	75	80	0.08	48	286	13.0	1246	30
			6	MS	25	99	75	48	0.08	48	172	7.5	716	50
			6	MS	30	119	75	32	0.10	72	172	7.1	570	70
			6	HS	30	119	75	16	0.10	72	86	3.9	316	90

Note 1) Please note that machining performance varies depending to the conditions such as machine rigidity, work clamping rigidity, coolant supply system, pressure and flow volume etc.

Note 2) Internal coolant is recommended. Please use an FMH type arbor for through coolant. Using external coolant in combination with through coolant is even more effective.

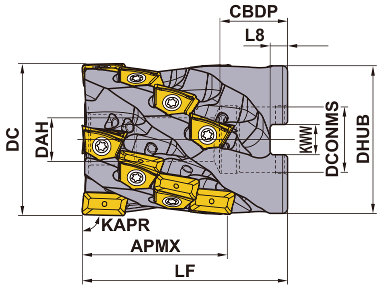
Note 3) The maximum depth of cut (apmx) varies according to the machine rigidity and power.

DEEP SHOULDER MILLING
<MILLING FOR TITANIUM ALLOY>

90° KAPR R

VFX6

P M K N **S** H



Right hand tool holder only.

SHELL TYPE

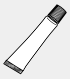
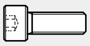
KAPR :90°

Order Number	Stock		Number of Flutes	Total	Dimensions (mm)								APMX (mm)	WT* (kg)
	R				DC	LF	DCONMS	CBDP	DAH	DHUB	KWW	L8		
VFX6-063A04A031R	●	—	4	8	63	60	27	28	12.5	61	12.4	7	31	0.9
VFX6-063A04A060R	●	—	4	16	63	85	27	28	12.5	61	12.4	7	60	1.3
VFX6-080A05A031R	●	—	5	10	80	60	32	28	16.5	77.3	14.4	8	31	1.5
VFX6-080A05A075R	●	—	5	25	80	100	32	28	16.5	77.3	14.4	8	75	2.6
VFX6-100A06A031R	●	—	6	12	100	65	40	30	20.5	96.6	16.4	9	31	2.7
VFX6-100A06A090R	●	—	6	36	100	115	40	30	20.5	96.6	16.4	9	90	4.8

* WT : Tool Weight

● : Inventory maintained.

SPARE PARTS

Order Number		*2				*3			Number of Insert	
									End Cutting Edge	Peripheral *1 Cutting Edge
	Clamp Screw	Number	Seal Washer	Wrench	Coolant Nozzle	Number	Anti-seize Lubricant	Set Bolt	XNMU1909 ○○R-○○	XNMU1909 12R-○○
VFX6-063A04A031R	TS450	8	W12-S1	TKY20T	HSD04004H08	12	MK1KS	HSC12045	4	4
VFX6-063A04A060R	TS450	16	W12-S1	TKY20T	HSD04004H08	20	MK1KS	HSC12070	4	12
VFX6-080A05A031R	TS450	10	W16-S1	TKY20T	HSD04004H08	15	MK1KS	HSC16040	5	5
VFX6-080A05A075R	TS450	25	W16-S1	TKY20T	HSD04004H08	30	MK1KS	HSC16080	5	20
VFX6-100A06A031R	TS450	12	W20-S1	TKY20T	HSD04004H08	18	MK1KS	HSC20040	6	6
VFX6-100A06A090R	TS450	36	W20-S1	TKY20T	HSD04004H08	42	MK1KS	HSC20090	6	30

*1 Only corner radius R1.2 can be used for the peripheral cutting edges except the end cutting edge.

*2 Clamp Torque (N • m) : TS450=5.0

*3 Coolant nozzles are available with varying diameters for adjusting coolant pressure. Select nozzles as required by the specification.

	≤1Mpa (≤20 l/min.)	←Standard→	**≥5Mpa (≥30 l/min.)**	**≥7Mpa (≥50 l/min.)**
Nozzle Dia.	ø0.6mm	ø0.8mm	ø1.2mm	ø1.6mm
Order Number	**HSD04004H06**	**HSD04004H08**	**HSD04004H12**	**HSD04004H16**

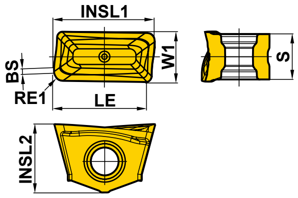
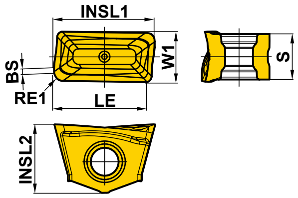
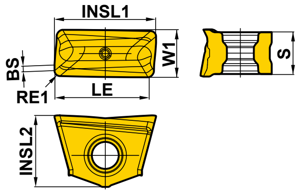
* Clamp Torque (N • m) : HSD0400H○○=1.5

*4 The part number for a blank screw without a through nozzle is HSS04004.

*5 Note for insert with a corner radius of 3.2 and above, as corner radius increases the LF dimension increases.
Corner radius 3.2: LF+0.7mm Corner radius 4.0: LF+1.5mm Corner radius 5.0: LF+1.5mm

INSERTS

Material	S	Heat-resistant Alloy, Titanium Alloy	✤			**Cutting Conditions (Guide) :** ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Shape	Order Number	Stock Coated			Dimensions (mm)							Geometry
		MP9130			INSL1	LE	W1	INSL2	S	BS	RE1	
General Purpose 	**XNMU190912R-MS**	●			19.1	16.5	9.5	12.7	8.5	1.0	1.2	
	XNMU190916R-MS	●			19.1	16.5	9.5	12.7	8.5	1.0	1.6	
	XNMU190924R-MS	●			19.1	16.6	9.5	12.7	8.5	1.0	2.4	
	⁎1 **XNMU190932R-MS**	●			20.2	17.1	9.5	12.7	8.5	—	3.2	
	⁎1 **XNMU190940R-MS**	●			21.8	17.8	9.5	12.7	8.5	—	4.0	
	⁎1 **XNMU190950R-MS**	●			21.8	17.8	9.5	12.7	8.5	—	5.0	
Cutting Edge Enhancement Type 	**XNMU190912R-HS**	●			19.1	16.5	9.5	12.7	8.5	1.0	1.2	
Chip Processing Type 	**XNMU190912R-LS**	●			19.1	16.5	9.5	12.7	8.5	1.0	1.2	

⁎1 Note for insert with a corner radius of 3.2 and above, as corner radius increases the LF dimension increases.
Corner radius 3.2: LF+0.7mm Corner radius 4.0: LF+1.5mm Corner radius 5.0: LF+1.5mm

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

RECOMMENDED CUTTING CONDITIONS

■VFX6

Material		Cutting Edge Diameter (mm)	Number of Flutes	Recommended Insert	Cutting Speed **Vc** (m/min)	Revolution **n** (min^{-1})	Depth of Cut **APMX** (mm)	Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/t.)	Table Feed **Vf** (mm/min)	Chip Removal Rate **Q** (cm^3/min)	Estimated Cutting Power (kW)	Expected Torque (Nm)	Tool Life Ratio (%)
S	Titanium Alloy (Ti-6Al-4V)	**Ø63**	4	LS	40	202	60	63	0.10	81	306	13.4	634	40
			4	MS	50	253	60	38	0.10	101	229	9.5	357	60
			4	MS	60	303	60	25	0.10	121	183	7.2	228	80
			4	HS	60	303	60	13	0.12	146	110	4.7	148	100
		Ø80	5	LS	40	159	75	80	0.10	80	477	20.8	1250	40
			5	MS	50	199	75	48	0.10	99	358	14.7	705	60
			5	MS	60	239	75	32	0.10	119	286	11.2	449	80
			5	HS	60	239	75	16	0.12	143	172	7.3	291	100
		Ø100	6	LS	40	127	90	100	0.10	76	688	29.6	2218	40
			6	MS	50	159	90	60	0.10	95	516	20.9	1252	60
			6	MS	60	191	90	40	0.10	115	413	16.0	798	80
			6	HS	60	191	90	20	0.12	138	248	10.3	517	100
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr)	**Ø63**	4	LS	25	126	60	63	0.08	40	153	7.0	527	30
			4	MS	25	126	60	38	0.08	40	92	4.0	303	50
			4	MS	30	152	60	25	0.10	61	92	3.8	241	70
			4	HS	30	152	60	13	0.10	61	46	2.1	133	80
		Ø80	5	LS	25	99	75	80	0.08	40	239	10.8	1038	30
			5	MS	25	99	75	48	0.08	40	143	6.2	597	50
			5	MS	30	119	75	32	0.10	60	143	5.9	475	70
			5	HS	30	119	75	16	0.10	60	72	3.3	263	80
		Ø100	6	LS	25	80	90	100	0.08	38	344	15.3	1841	30
			6	MS	25	80	90	60	0.08	38	206	8.8	1059	50
			6	MS	30	95	90	40	0.10	57	206	8.4	844	70
			6	HS	30	95	90	20	0.10	57	103	4.7	466	80

Note 1) Please note that machining performance varies depending on the conditions such as machine rigidity, work clamping rigidity, coolant supply system, pressure and flow volume etc.

Note 2) Internal coolant is recommended. Please use an FMH type arbor for through coolant. Using external coolant in combination with through coolant is even more effective.

Note 3) The maximum depth of cut (apmx) varies according to the machine rigidity and power.

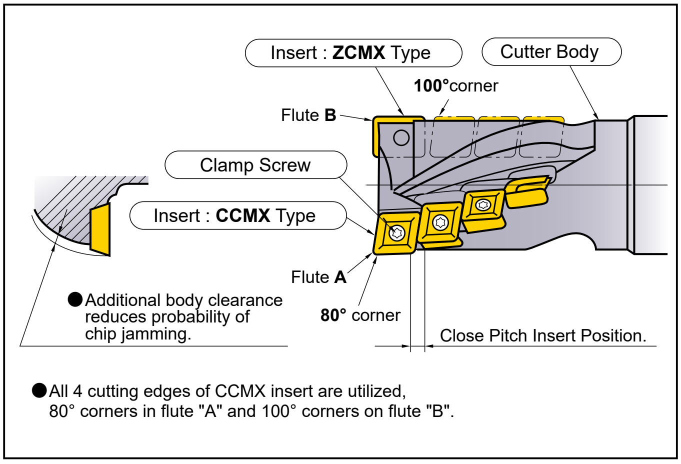
DEEP SHOULDER MILLING

90° KAPR

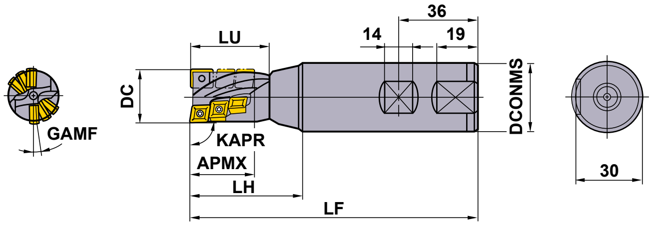
DCCC

P M K N S H

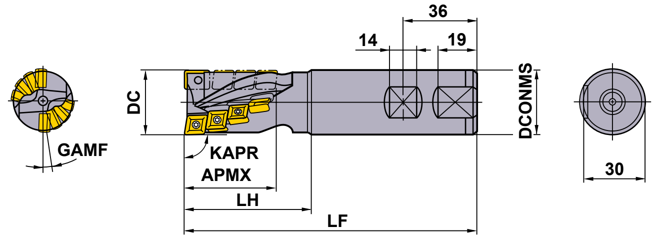
■DESIGN FEATURES OF DCCC TYPE END MILL



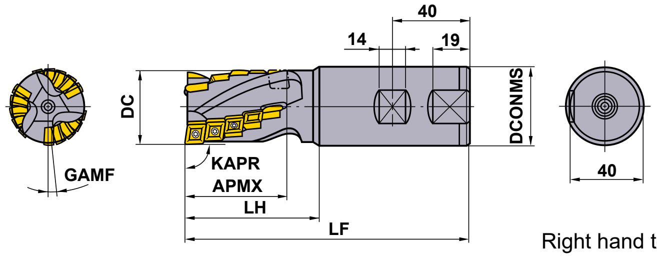
● **Ø25 2 flutes**



● **Ø32 2 flutes**



● **Ø40 3 flutes**



Right hand tool holder only.

■WELDON SHANK TYPE

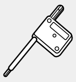
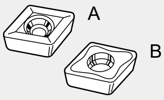
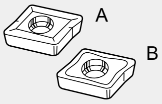
KAPR : 90°

DC (mm)	Order Number	Stock		Dimensions (mm)					GAMF	WT* (kg)	Number of Teeth		Peripheral and Bottom		Bottom insert only	
				LF	DCONMS	LH	LU	APMX			Bottom	Total	Type	Number of Teeth	Type	Number of Teeth
25	**DCCCR2506S32**	●	—	130	32	50	36	27	8°	0.6	2	6	CCMX08	5	ZCMX08	1
25	**DCCCR2510S32**	●	—	150	32	70	56	44	8°	0.7	2	10	CCMX08	9	ZCMX08	1
32	**DCCCR3208S32**	●	—	140	32	60	—	43	8°36′	0.8	2	8	CCMX09	7	ZCMX09	1
32	**DCCCR3212S32**	●	—	160	32	80	—	63	8°36′	0.8	2	12	CCMX09	11	ZCMX09	1
40	**DCCCR4015S40**	●	—	150	40	70	—	53	5°31′	1.3	3	15	CCMX09	14	ZCMX09	1
40	**DCCCR4015S42**	★	—	150	42	70	—	53	5°31′	1.3	3	15	CCMX09	14	ZCMX09	1
40	**DCCCR4024S40**	●	—	180	40	100	—	83	5°31′	1.4	3	24	CCMX09	23	ZCMX09	1
40	**DCCCR4024S42**	★	—	180	42	100	—	83	5°31′	1.4	3	24	CCMX09	23	ZCMX09	1

* WT : Tool Weight

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

SPARE PARTS

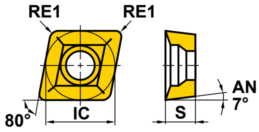
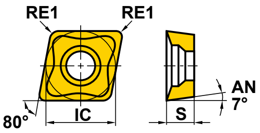
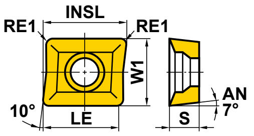
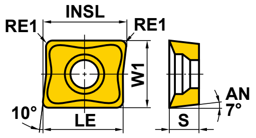
Tool Holder Number	 * Clamp Screw	 Wrench	 Wrench	 Insert Peripheral and Bottom Insert	 Insert Bottom Insert (One Pocket Only)
DCCCR25	CS300890T	TKY08F	TKY08DS	CCMX083508EN-A	ZCMX083508ER-A
DCCCR32	CS350990T	TKY10F	TKY10DS	CCMX09T308EN-A ou B	ZCMX09T308ER-A or B
DCCCR40					

* Clamp Torque (N • m) : CS300890T=1.0, CS350990T=2.5

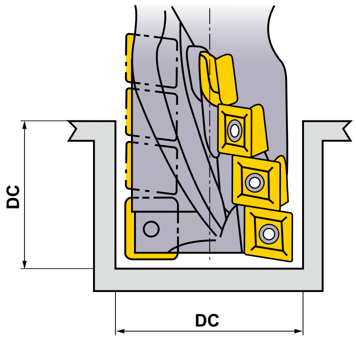
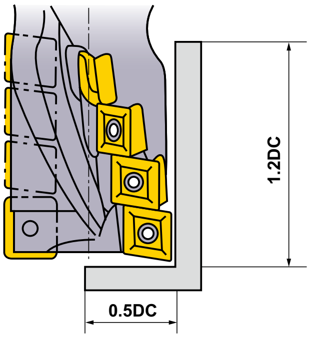
INSERTS

Material	**P**	Steel	◐	◐	◐		◐	
	M	Stainless Steel	◐	◐	◐		◐	
	K	Cast Iron		✤			✤	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
Honing : E : Round

Shape	Order Number	Class	Honing	Coated				Carbide		Dimensions (mm)						Geometry
				F7030	**VP15TF**	**UP20M**		**UTi20T**		**INSL**	**LE**	**W1**	**IC**	**S**	**RE1**	
	**CCMX083508EN-A**	M	E	●		★		★		–	–	–	7.94	3.5	0.8	
	CCMX09T308EN-A	M	E	●	●	★		★		–	–	–	9.525	3.97	0.8	
Strong Cutting Edge Type 	**CCMX09T308EN-B**	M	E	●				★		–	–	–	9.525	3.97	0.8	
	**ZCMX083508ER-A**	M	E	●				★		11.0	8.5	7.94	–	3.5	0.8	
	ZCMX09T308ER-A	M	E	●	●	●		★		12.7	11.0	9.525	–	3.97	0.8	
Strong Cutting Edge Type 	**ZCMX09T308ER-B**	M	E	●		★				12.7	11.0	9.525	–	3.97	0.8	

RECOMMENDED CUTTING CONDITIONS

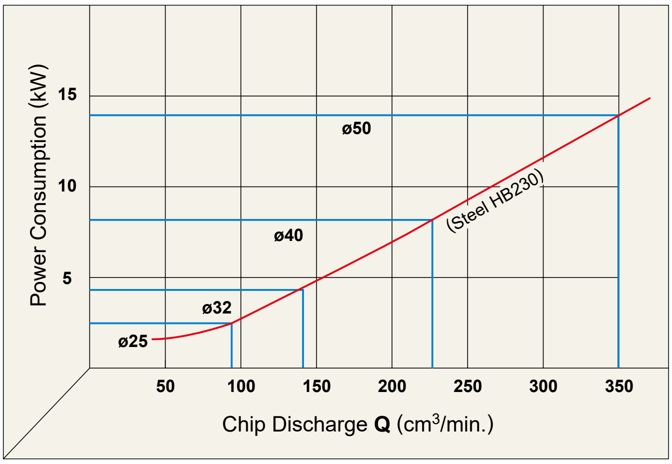
	A : Slot Milling (APMX Short Type)	B : Shoulder Milling (APMX Short Type)
Cutting Mode		

	Material	Hardness	Grade	Cutting Mode	Cutting Speed (m/min)	Table Feed (mm/min)		
						Ø25	Ø32	Ø40
P	Mild Steel	≤180HB	**F7030**	A	200 (160—240)	120 (100—140)	120 (100—140)	120 (100—140)
			F7030	B	200 (160—240)	200 (180—220)	200 (180—220)	230 (200—250)
	Carbon Steel Alloy Steel	180—280HB	**F7030**	A	160 (130—180)	120 (100—140)	120 (100—140)	140 (120—150)
			F7030	B	160 (130—180)	150 (120—180)	150 (120—180)	180 (150—200)
		280—350HB	**F7030**	A	160 (130—180)	100 (80—120)	100 (80—120)	130 (100—150)
			F7030	B	160 (130—180)	120 (100—140)	120 (100—140)	150 (120—180)
M	Stainless Steel	≤200HB	**F7030**	A	80 (60—100)	70 (50—90)	70 (50—90)	70 (50—90)
			F7030	B	130 (100—160)	100 (80—120)	100 (80—120)	120 (100—140)
K	Cast Iron	Tensile Strength ≤450MPa	**UTI20T**	A	120 (100—140)	200 (180—220)	200 (180—220)	230 (200—250)
			UTI20T	B	120 (100—140)	230 (200—250)	230 (200—250)	260 (240—280)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x DC)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

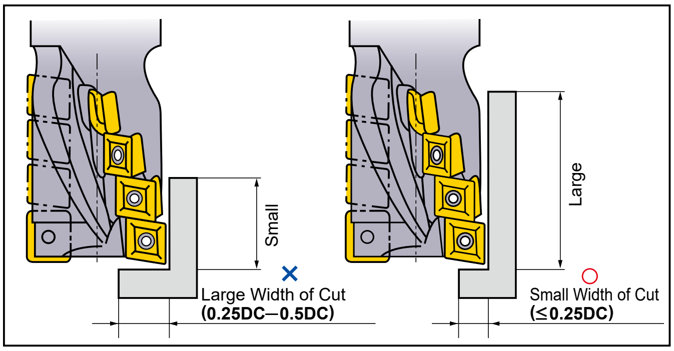
■POWER CONSUMPTION

- Please use the chart below for reference, please select the conditions that suits the machines power.
- Chip Discharge Q (cm^3/min.)=Table Feed x Depth of Cut x Cutting Width÷1000



■FOR USE OF APMX LONG TYPE

- When the overhang from the milling chuck is long, a large width of cut will cause chattering and tool breakage.
- Keep the width of cut small and the depth of cut in axial direction large. (See the following illustration.)
- For slot milling, keep the table feed at not more than half the value listed in the above table. (Use the APMX Short type as much as possible.)



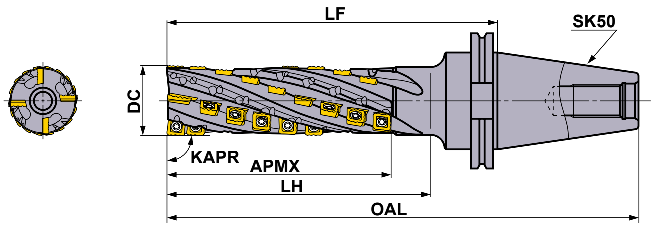
DEEP SHOULDER MILLING

90° KAPR

SPX

P | M | K | N | S | H

●SK50 shank type

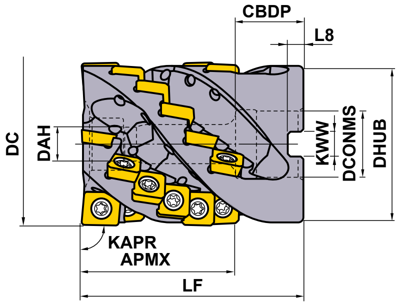


KAPR :90°

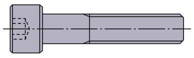
Order Number	Stock		Number of Teeth			Dimensions (mm)					Number of Insert		
			Flutes	Total	Bottom	DC	OAL	LH	LF	APMX	Bottom On-edge A JPMX 190412-○○	Bottom On-edge B MPMX 120412-○○	Peripheral SPMX 120408-○○
SPX4R06324SK50NS	☐	—	2	24	4	63	289.6	140	188	110	2	2	20
SPX4R06334SK50NM	☐	—	2	34	4	63	339.6	190	238	157	2	2	30
SPX4R06344SK50NL	☐	—	2	44	4	63	389.6	240	288	205	2	2	40
SPX4R06356SK50NX	☐	—	2	56	4	63	439.6	290	338	261	2	2	52

☐ : Non stock, produced to order only.

SPARE PARTS ➢ N001
TECHNICAL DATA ➢ P001



Right hand tool holder only.

Cutter Diameter **DC** (mm)	Set Bolt	Geometry
Ø63	HSC12070	
Ø80	HSC16065	

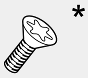
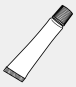
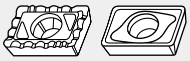
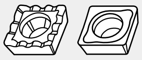
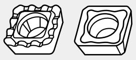
■SHELL TYPE

KAPR :90°

Order Number	Stock		Number of Teeth		Dimensions (mm)									Number of Insert		
														Bottom On-edge **A**	Bottom On-edge **B**	Peripheral
	R		Flutes	Total	DC	LF	DCONMS	CBDP	DAH	DHUB	KWW	L8	APMX	JPMX 140412-○○	MPMX 120412-○○	SPMX 120408-○○
SPX4-063A24A058RA	●	—	4	24	63	85	27	28	13	60	12.4	7	58	2	2	20
SPX4-080A24A058RA	★	—	4	24	80	85	32	40	17	76.8	14.4	8	58	2	2	20

Note 1) In case of internal coolant supply, please use a face mill arbor with through coolant channels. Regular centre-thru or side-thru arbors can't be used.

SPARE PARTS

Tool Holder Number	 *					
	Clamp Screw	Wrench	Anti-seize Lubricant	Insert		
				Bottom On-edge **A**	Bottom On-edge **B**	Peripheral
SPX	TS55	TKY25D	MK1KS	JPMX140412-WH	MPMX120412-WH	SPMX120408-WH
				JPMX140412-JM	MPMX120412-JM	SPMX120408-JM

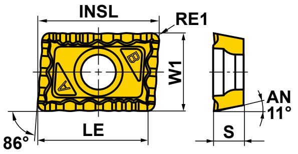
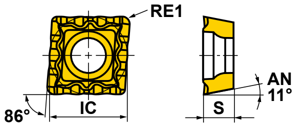
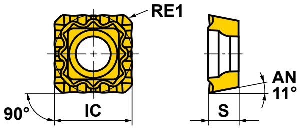
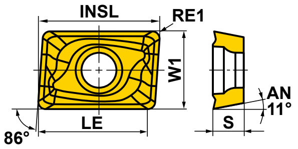
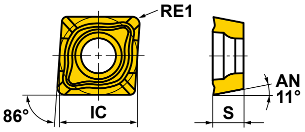
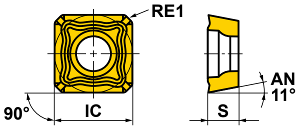
* Clamp Torque (N • m) : TS55=7.5

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

INSERTS

Material			VP15TF	VP20RT		
	P	Steel	◐	◐		
	M	Stainless Steel	◐	◐		
	K	Cast Iron	✤	✤		
	S	Heat-resistant Alloy, Titanium Alloy	◐	✤		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Type		Shape	Order Number	Class	Coated				Dimensions (mm)						Geometry
					VP15TF	VP20RT			INSL	LE	W1	IC	S	RE1	
Wavy cutting edge type (**WH** Chipbreaker)	Bottom On-edge **A**		**JPMX190412-WH**	M	●	●			19.81	17.6	12.7	—	4.76	1.2	
			⋆ **JPMX140412-WH**	M	●	●			15.04	12.9	12.7	—	4.76	1.2	
	Bottom On-edge **B**		**MPMX120412-WH**	M	●	●			—	—	—	12.7	4.76	1.2	
	Peripheral		**SPMX120408-WH**	M	●	●			—	—	—	12.7	4.76	0.8	
Straight cutting edge type (**JM** Chipbreaker)	Bottom On-edge **A**		**JPMX190412-JM**	M	●	●			19.81	17.6	12.7	—	4.83	1.2	
			⋆ **JPMX140412-JM**	M	●	●			15.04	12.9	12.7	—	4.79	1.2	
	Bottom On-edge **B**		**MPMX120412-JM**	M	●	●			—	—	—	12.7	4.79	1.2	
	Peripheral		**SPMX120408-JM**	M	●	●			—	—	—	12.7	4.80	0.8	

⋆ Only for use with a shell type holder.

RECOMMENDED CUTTING CONDITIONS (SHANK TYPE)

CUTTING CONDITIONS FOR SHOULDER MILLING

	Material	Hardness	Grade Chipbreaker		Cutting Speed **Vc** (m/min)	Cutting Width : **ae** (mm) Feed per Tooth : **fz** (mm/t.)						
						Ø50 (the last letter of order number for cutter body)			Ø63 (the last letter of order number for cutter body)			
						S (APMX≤110)	**M** (APMX=157)	**L** (APMX=205)	**S** (APMX=110)	**M** (APMX=157)	**L** (APMX=205)	**X** (APMX=261)
P	Mild Steel	≤180HB	**VP15TF**	**WH**	120 (100−140)	≤10.0 0.15−0.25	≤5.0 0.15−0.25	≤2.5 0.10−0.20	≤12.5 0.15−0.25	≤10.0 0.15−0.25	≤5.0 0.15−0.25	≤2.5 0.10−0.20
				JM	120 (100−140)	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.05−0.15	≤10.0 0.10−0.20	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.05−0.15
	Carbon Steel Alloy Steel	180−350HB		**WH**	80 (70−120)	≤10.0 0.15−0.25	≤5.0 0.15−0.25	≤2.5 0.10−0.20	≤12.5 0.15−0.25	≤10.0 0.15−0.25	≤5.0 0.15−0.25	≤2.5 0.10−0.20
				JM	80 (70−120)	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.05−0.15	≤10.0 0.10−0.20	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.05−0.15
	Alloy Tool Steel	≤300HB		**WH**	80 (60−100)	≤10.0 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.05−0.15	≤12.5 0.10−0.20	≤10.0 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.05−0.15
				JM	80 (60−100)	≤7.5 0.10−0.15	≤5.0 0.10−0.15	≤2.5 0.05−0.10	≤10.0 0.10−0.15	≤7.5 0.10−0.15	≤5.0 0.10−0.15	≤2.5 0.05−0.10
M	Stainless Steel	≤200HB	**VP20RT**	**WH**	80 (60−100)	≤7.5 0.08−0.15	≤5.0 0.08−0.15	≤2.5 0.05−0.10	≤10.0 0.08−0.15	≤7.5 0.08−0.15	≤5.0 0.08−0.15	≤2.5 0.05−0.10
				JM	80 (60−100)	≤5.0 0.08−0.15	≤3.5 0.08−0.15	≤2.0 0.05−0.10	≤7.5 0.08−0.15	≤5.0 0.08−0.15	≤3.5 0.08−0.15	≤2.0 0.05−0.10
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP15TF**	**WH**	100 (80−120)	≤10.0 0.15−0.40	≤5.0 0.15−0.35	≤2.5 0.10−0.30	≤12.5 0.15−0.40	≤10.0 0.15−0.40	≤5.0 0.15−0.35	≤2.5 0.10−0.30
				JM	100 (80−120)	≤7.5 0.10−0.25	≤5.0 0.10−0.25	≤2.5 0.05−0.20	≤10.0 0.10−0.25	≤7.5 0.10−0.25	≤5.0 0.10−0.25	≤2.5 0.05−0.20
	Ductile Cast Iron	Tensile Strength ≤800MPa		**WH**	80 (60−100)	≤10.0 0.15−0.35	≤5.0 0.15−0.30	≤2.5 0.10−0.25	≤12.5 0.15−0.35	≤10.0 0.15−0.35	≤5.0 0.15−0.30	≤2.5 0.10−0.25
				JM	80 (60−100)	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.05−0.15	≤10.0 0.10−0.20	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.05−0.15
S	Ti Alloy	≤350HB	**VP20RT**	**WH**	40 (35−50)	≤5.0 0.05−0.10	≤3.5 0.05−0.10	≤2.0 0.05−0.10	≤7.5 0.05−0.10	≤5.0 0.05−0.10	≤3.5 0.05−0.10	≤2.0 0.05−0.10
				JM	40 (35−50)	≤3.5 0.05−0.10	≤2.5 0.05−0.10	≤1.5 0.05−0.10	≤5.0 0.05−0.10	≤3.5 0.05−0.10	≤2.5 0.05−0.10	≤1.5 0.05−0.10

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

Note 2) If the cutting angle between the tool and workpiece exceeds 90º when machining corners. Reduce the cutting speed and table feed by 10-20% and ae by 50%. Also if possible, set a radius cutting path for corners.

CUTTING CONDITIONS FOR SLOT MILLING

	Material	Hardness	Grade Chipbreaker		Cutting Speed **Vc** (m/min)	Depth of Cut : **ap** : (mm) Feed per Tooth : **fz** (mm/t.)						
						Ø50 (the last letter of order number for cutter body)			Ø63 (the last letter of order number for cutter body)			
						S (APMX≤110)	**M** (APMX=157)	**L** (APMX=205)	**S** (APMX=110)	**M** (APMX=157)	**L** (APMX=205)	**X** (APMX=261)
P	Mild Steel	≤180HB	**VP15TF**	**WH**	60 (50−120)	≤10.0 0.10−0.25	≤5.0 0.10−0.20	≤2.5 0.10−0.15	≤12.5 0.10−0.25	≤10.0 0.10−0.25	≤5.0 0.10−0.20	≤2.5 0.10−0.15
				JM	60 (50−120)	≤7.5 0.10−0.15	≤5.0 0.10−0.15	≤2.5 0.10−0.15	≤10.0 0.10−0.15	≤7.5 0.10−0.15	≤5.0 0.10−0.15	≤2.5 0.10−0.15
	Carbon Steel Alloy Steel	180−350HB		**WH**	60 (50−100)	≤10.0 0.10−0.25	≤5.0 0.10−0.20	≤2.5 0.10−0.15	≤12.5 0.10−0.25	≤10.0 0.10−0.25	≤5.0 0.10−0.20	≤2.5 0.10−0.15
				JM	60 (50−100)	≤7.5 0.10−0.15	≤5.0 0.10−0.15	≤2.5 0.10−0.15	≤10.0 0.10−0.15	≤7.5 0.10−0.15	≤5.0 0.10−0.15	≤2.5 0.10−0.15
	Alloy Tool Steel	≤300HB		**WH**	50 (40−80)	≤10.0 0.10−0.25	≤5.0 0.10−0.20	≤2.5 0.10−0.15	≤12.5 0.10−0.25	≤10.0 0.10−0.25	≤5.0 0.10−0.20	≤2.5 0.10−0.15
				JM	50 (40−80)	≤7.5 0.10−0.15	≤5.0 0.10−0.15	≤2.5 0.10−0.15	≤10.0 0.10−0.15	≤7.5 0.10−0.15	≤5.0 0.10−0.15	≤2.5 0.10−0.15
M	Stainless Steel	≤200HB	**VP20RT**	**WH**	40 (35−80)	≤10.0 0.08−0.15	≤5.0 0.08−0.15	≤2.5 0.05−0.10	≤12.5 0.08−0.15	≤10.0 0.08−0.15	≤5.0 0.08−0.15	≤2.5 0.05−0.10
				JM	40 (35−80)	≤7.5 0.08−0.15	≤5.0 0.08−0.15	≤2.5 0.05−0.10	≤10.0 0.08−0.15	≤7.5 0.08−0.15	≤5.0 0.08−0.15	≤2.5 0.05−0.10
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP15TF**	**WH**	50 (40−80)	≤10.0 0.15−0.25	≤5.0 0.10−0.25	≤2.5 0.10−0.20	≤12.5 0.15−0.25	≤10.0 0.15−0.25	≤5.0 0.10−0.25	≤2.5 0.10−0.20
				JM	50 (40−80)	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.10−0.20	≤10.0 0.10−0.20	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.10−0.20
	Ductile Cast Iron	Tensile Strength ≤800MPa		**WH**	40 (35−80)	≤10.0 0.15−0.25	≤5.0 0.10−0.25	≤2.5 0.10−0.20	≤12.5 0.15−0.25	≤10.0 0.15−0.25	≤5.0 0.10−0.25	≤2.5 0.10−0.20
				JM	40 (35−80)	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.10−0.20	≤10.0 0.10−0.20	≤7.5 0.10−0.20	≤5.0 0.10−0.20	≤2.5 0.10−0.20
S	Ti Alloy	≤350HB	**VP20RT**	**WH**	35 (30−50)	≤5.0 0.05−0.10	≤3.5 0.05−0.10	≤2.0 0.05−0.10	≤7.5 0.05−0.10	≤5.0 0.05−0.10	≤3.5 0.05−0.10	≤2.0 0.05−0.10
				JM	35 (30−50)	≤5.0 0.05−0.10	≤3.5 0.05−0.10	≤2.0 0.05−0.10	≤7.5 0.05−0.10	≤5.0 0.05−0.10	≤3.5 0.05−0.10	≤2.0 0.05−0.10

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

Note 2) For slotting, please use high rigidity tools such as SPX4R05016WNES/BT50NES.

RECOMMENDED CUTTING CONDITIONS (SHELL TYPE)

■CUTTING CONDITIONS FOR SHOULDER MILLING

	Material	Hardness	Grade Chipbreaker	Cutting Speed **Vc** (m/min)	Depth of Cut **ap** (mm)	Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/t.)
P	Mild Steel	≦180HB	**VP15TF JM**	120 (100—140)	—0.5DC	—10	0.15—0.30
				120 (100—140)	0.5DC—	—10	0.15—0.25
	Carbon Steel Alloy Steel	180—350HB	**VP15TF JM**	120 (80—130)	—0.5DC	—10	0.15—0.30
				100 (80—120)	0.5DC—	—10	0.15—0.25
	Alloy Tool Steel	≦300HB	**VP15TF JM**	100 (60—110)	—0.5DC	—10	0.10—0.20
				80 (60—100)	0.5DC—	—10	0.10—0.15
M	Stainless Steel	≦200HB	**VP20RT JM**	140 (100—150)	—0.5DC	—10	0.10—0.25
				120 (100—140)	0.5DC—	—10	0.10—0.20
K	Gray Cast Iron	Tensile Strength ≦350MPa	**VP15TF WH**	120 (80—130)	—0.5DC	—10	0.25—0.40
				100 (80—120)	0.5DC—	—10	0.25—0.40
			VP15TF JM	120 (80—130)	—0.5DC	—10	0.15—0.30
				100 (80—120)	0.5DC—	—10	0.15—0.25
	Ductile Cast Iron	Tensile Strength ≦800MPa	**VP15TF WH**	100 (60—110)	—0.5DC	—10	0.20—0.35
				80 (60—110)	0.5DC—	—10	0.20—0.35
			VP15TF JM	100 (60—120)	—0.5DC	—10	0.15—0.30
				80 (60—120)	0.5DC—	—10	0.15—0.30
S	Ti Alloy	≦350HB	**VP20RT JM**	45 (35—50)	—0.5DC	—10	0.08—0.10
				40 (35—50)	0.5DC—	—10	0.08—0.10

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

■CUTTING CONDITIONS FOR SLOT MILLING

	Material	Hardness	Grade Chipbreaker	Cutting Speed **Vc** (m/min)	Depth of Cut **ap** (mm)	Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/t.)
P	Mild Steel	≦180HB	**VP15TF JM**	120 (100—140)	—10	DC	0.15—0.25
	Carbon Steel Alloy Steel	180—350HB	**VP15TF JM**	100 (80—120)	—0.25DC	DC	0.15—0.25
	Alloy Tool Steel	≦300HB	**VP15TF JM**	80 (60—100)	—10	DC	0.10—0.20
M	Stainless Steel	≦200HB	**VP20RT JM**	100 (80—140)	—10	DC	0.10—0.15
K	Gray Cast Iron	Tensile Strength ≦350MPa	**VP15TF WH**	80 (60—100)	—0.25DC	DC	0.10—0.25
				60 (50—100)	—0.6DC	DC	0.10—0.20
			VP15TF JM	80 (60—100)	—0.25DC	DC	0.10—0.20
				60 (50—100)	—0.6DC	DC	0.10—0.15
	Ductile Cast Iron	Tensile Strength ≦800MPa	**VP15TF WH**	80 (60—100)	—0.25DC	DC	0.10—0.25
				60 (50—100)	—0.5DC	DC	0.10—0.20
			VP15TF JM	80 (60—100)	—0.25DC	DC	0.10—0.20
				60 (50—100)	—0.5DC	DC	0.10—0.15
S	Ti Alloy	≦350HB	**VP20RT JM**	40 (35—50)	—0.25DC	DC	0.06—0.10

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

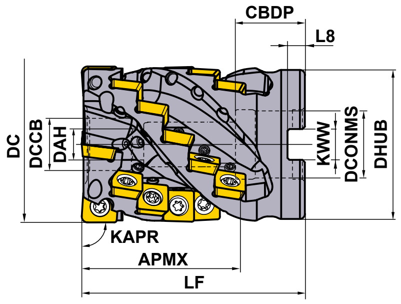
DEEP SHOULDER MILLING

<CUTTING FOR TITANIUM ALLOY>

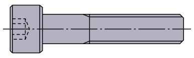
90° KAPR

ASPX

P M K N **S** H



Right hand tool holder only.

Cutter Diameter **DC** (mm)	Set Bolt	Geometry
Ø50	HSC10070	
Ø63	HSC12070	
Ø80	HSC16080	

SHELL TYPE

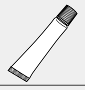
KAPR: 90°
With Coolant Hole : Shell type should be combined with a through coolant arbor.

DC (mm)	Order Number	Stock		Number of Flutes	Total	Dimensions (mm)		WT (kg)	APMX (mm)
		R				LF	DCONMS		
50	**ASPX4-050A03A054RA15**	●	—	3	15	85	22	0.6	54
63	**ASPX4-063A04A064RA24**	●	—	4	24	90	27	1.0	64
80	**ASPX4-080A05A075RA35**	●	—	5	35	100	32	2.0	75

MOUNTING DIMENSIONS

DC (mm)	Order Number	Dimensions (mm)						
		DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8
50	**ASPX4-050A03A054RA15**	22	21	10.5	17	47	10.4	6.3
63	**ASPX4-063A04A064RA24**	27	28	12.5	21	60	12.4	7
80	**ASPX4-080A05A075RA35**	32	28	16.5	27	76	14.4	8

SPARE PARTS

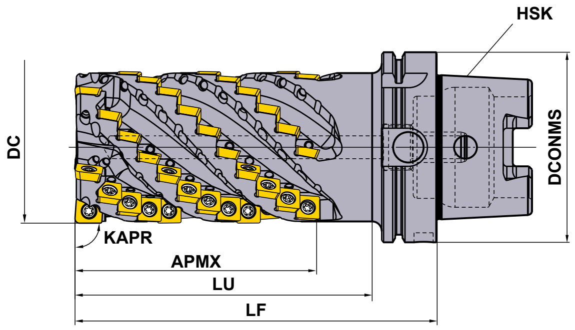
Tool Holder Type	 *						Number of Insert	
	Clamp Screw	Seal Washer	Wrench	Coolant Nozzle	Number	Anti-seize Lubricant	JPGX	SPGX
ASPX4-050A	TS55	W10-S1	TKY25D	HSD04004H08	18	MK1KS	3	12
ASPX4-063A	TS55	W12-S1	TKY25D	HSD04004H08	28	MK1KS	4	20
ASPX4-080A	TS55	W16-S1	TKY25D	HSD04004H08	40	MK1KS	5	30

⋆ Clamp Torque (N • m) : TS55 = 5.0

	≤1Mpa (≤20 l/min.)	←Standard→	**≥5Mpa (≥30 l/min.)**	**≥7Mpa (≥50 l/min.)**	To Plug a Coolant Hole
Nozzle Dia.	ø0.6mm	ø0.8mm	ø1.2mm	ø1.6mm	—
Order Number	**HSD04004H06**	**HSD04004H08**	**HSD04004H12**	**HSD04004H16**	**HSS04004**

Note 1) Coolant nozzles are available with varying diameters for adjusting coolant pressure.
Select the correct nozzle according to the specification.
Note 2) Use HSS04004 (JIS B 1177 flat point M4x4, clamp torque 1.5 Nm) to plug the coolant hole.

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



The standard type is right-handed (R) only.
The HSK shank type has a built-in movable coolant pipe for installation.

■HSK SHANK TYPE

KAPR: 90°

DC	Order Number	Stock		Number of Flutes	Total	Dimensions (mm)			HSK	APMX
		R				LF	LU	DCONMS		(mm)
80	**ASPX4R0805H100A127SA**	★	●	5	60	190	156	100	HSK-A100	127
80	**ASPX4R0805H125A127SA**	★	●	5	60	190	156	125	HSK-A125	127

SPARE PARTS

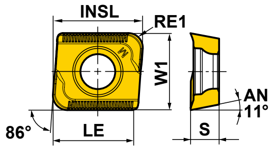
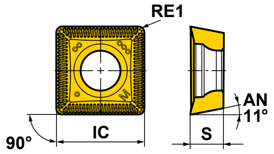
Tool Holder Type	*					Number of Insert	
	Clamp Screw	Wrench	Coolant Nozzle	Number	Anti-seize Lubricant	JPGX	SPGX
ASPX4R0805H100A	TS55	TKY25D	HSD04004H08	65	MK1KS	5	55
ASPX4R0805H125A	TS55	TKY25D	HSD04004H08	65	MK1KS	5	55

* Clamp Torque (N • m) : TS55 = 5.0

INSERTS

Material			
	S	Heat-resistant Alloy, Titanium Alloy	◐

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting
Honing :
E : Round

Shape		Order Number	Class	Honing	Coated				Dimensions (mm)						Geometry
					MP9140				**INSL**	**LE**	**W1**	**IC**	**S**	**RE1**	
Bottom	 2 Corner	**JPGX1404080PPER-JM**	G	E	●				15.12	13.4	12.7	—	4.8	0.8	
		JPGX1404120PPER-JM	G	E	●				15.06	13.3	12.7	—	4.8	1.2	
		JPGX1404160PPER-JM	G	E	●				15.00	13.3	12.7	—	4.8	1.6	
		JPGX1404240PPER-JM	G	E	●				14.88	13.2	12.7	—	4.8	2.4	
		JPGX1404320PPER-JM	G	E	●				14.72	13.1	12.7	—	4.8	3.2	
		JPGX1404400PPER-JM	G	E	●				14.64	13.0	12.7	—	4.8	4.0	
		JPGX1404500PPER-JM	G	E	●				14.49	13.0	12.7	—	4.8	5.0	
		JPGX1404635PPER-JM	G	E	●				14.29	12.9	12.7	—	4.8	6.35	
Peripheral	 4 Corner	**SPGX1204100PPER-JM**	G	E	●				—	—	—	12.7	4.8	1.0	

RECOMMENDED CUTTING CONDITIONS

	Material	Cutting Width **ae** (mm)	Cutting Speed **Vc** (m/min)	Feed per Tooth **fz** (mm/t.)
S	Ti Alloys Ti-6Al-4V,Ti-6Al-4V-ELI Ti-10V-2Fe-3Al Ti-5Al-5V-5Mo-3Cr etc.	ae≤0.5DC	60(50—80)	0.12(0.10—0.14)
		0.5DC<ae<0.8DC	50(40—60)	0.10(0.08—0.12)
		ae≥0.8DC	40(50—60)	0.08(0.06—0.10)

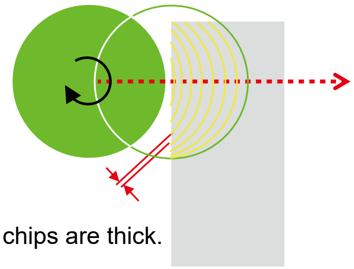
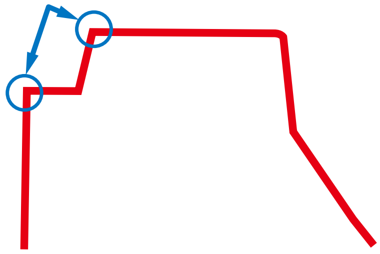
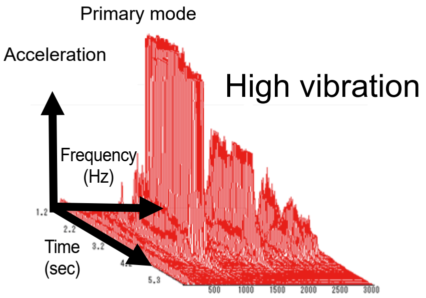
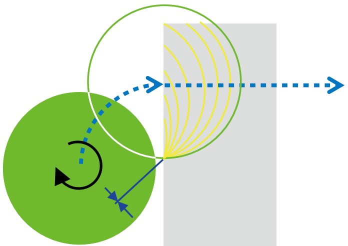
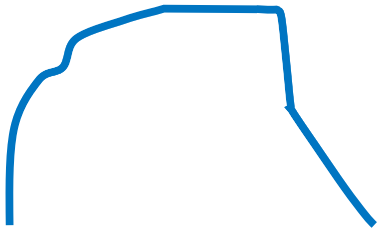
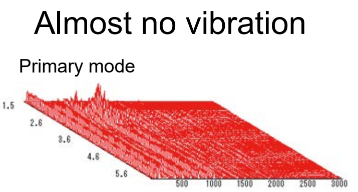
Note 1) The cutting performance depends on machine and clamping rigidity, as well as the supply and pressure of the coolant. Adjust as necessary.
Note 2) Use a machine and spindle size suitable for heavy machining of titanium alloys. (7/24 taper #50 or #60, or high rigidity HSK-A100 or A125, with an output of 15kW or higher and torque of 500 Nm or higher for a rotation speed of 500min-1 or less).
Caution, at high load cutting conditions the output power of the machine spindle may be exceeded.
Note 3) If chatter and vibration or machine overloading occur, it is recommended to reduce the depth of cut ap.
Note 4) The coolant system combines internal and external lubrication, it is recommended to supply coolant in ample quantities.
Note 5) A gradual roll feed into the workpiece and use of down cutting (climb milling) is recommended. (refer to page K227)

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

How to Use

Positive Effects of a Roll Into Cutting Approach

The roll into cutting approach can control sharp increases in cutting loads and prevent sudden chipping of inserts which is likely to occur at the start of machining.

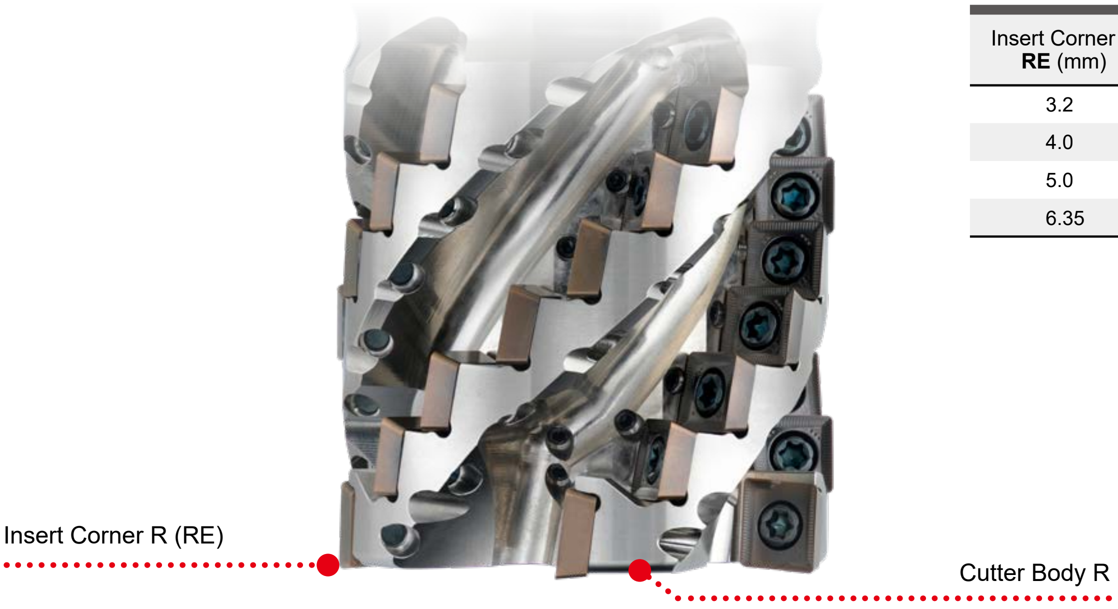
Approach Method	Cutting Load Simulation	Cutting Vibration Frequency
Direct Approach  Exit chips are thick.	Cutting load increases suddenly. High risk of chipping. 	
Roll Into Cutting Approach  Exit chips have zero thickness.	Cutting load increases smoothly. 	

Down cutting (climb milling) is recommended.

Notes on Use of Inserts with Large Corner Radii

When using inserts with corner radius RE≥R3.2mm, please machine the cutter body with a radius form as shown on the table below.

Insert Corner R **RE** (mm)	Cutter Body Radius **R** (mm)
3.2	3.0
4.0	4.0
5.0	5.0
6.35	6.2



SPARE PARTS ➤N001
TECHNICAL DATA ➤P001

BALL NOSE END MILL

SRF/SRB

P M K N S H

Fig.1

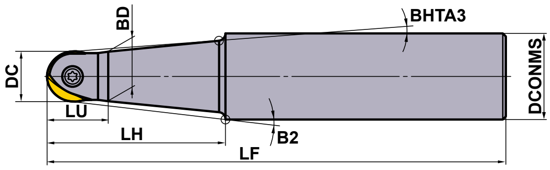


Fig.2

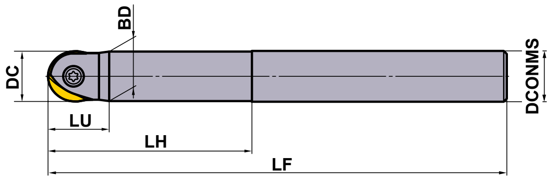
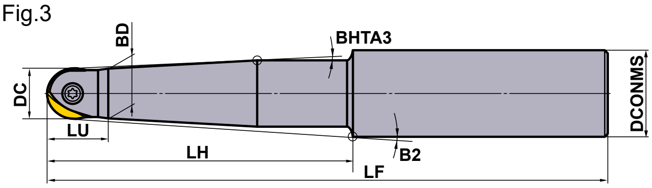


Fig.3



Right hand tool holder only.

STEEL SHANK TYPE

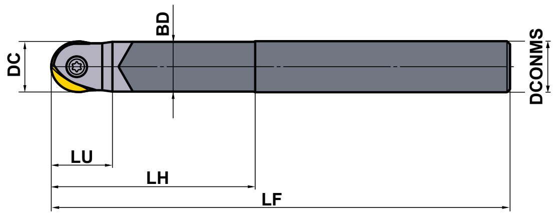
Type	Order Number	Stock		Number of Teeth	Dimensions (mm)									Fig.	Clamp Screw *1	Wrench ① ②	Insert
		R			RE*2	DC	DCONMS	LF	BD	LH	LU	B2	BHTA3				
Standard	**SRFH10S12M**	●	—	1	5	10	12	110	9.5	40	13	1.63°	1.5°	1	RS3008T	①TKY08D	SRFT10 SRBT10
	SRFH12S16M	●	—	1	6	12	16	120	11.5	50	15	2.6°	1.5°	1	RS3510T	①TKY10D	SRFT12 SRBT12
	SRFH16S20M	●	—	1	8	16	20	130	15.5	50	20	2.73	1.5°	1	RS4015T	②TKY15T	SRFT16 SRBT16
	SRFH20S25M	●	—	1	10	20	25	150	19.5	70	24	2.38°	1.5°	1	RS5020T	②TKY20T	SRFT20 SRBT20
	SRFH25S32M	●	—	1	12.5	25	32	180	24.5	80	30	2.97°	1.5°	1	RS6025T	②TKY25T	SRFT25 SRBT25
	SRFH30S32M	●	—	1	15	30	32	200	29.5	100	35	—	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
	SRFH32S32M	●	—	1	16	32	32	200	31.5	100	35	—	—	2	RS8030T	②TKY30T	SRFT32 SRBT32
Semi-long	**SRFH10S12L**	●	—	1	5	10	12	150	9.5	60	13	1.5°	1.5°	1	RS3008T	①TKY08D	SRFT10 SRBT10
	SRFH12S16L	●	—	1	6	12	16	160	11.5	70	15	1.78°	1.5°	1	RS3510T	①TKY10D	SRFT12 SRBT12
	SRFH16S20L	●	—	1	8	16	20	160	15.5	70	20	1.85°	1.5°	1	RS4015T	②TKY15T	SRFT16 SRBT16
	SRFH20S25L	●	—	1	10	20	25	180	19.5	80	24	2.05°	1.5°	1	RS5020T	②TKY20T	SRFT20 SRBT20
	SRFH20S20L80	●	—	1	10	20	20	180	19.5	80	24	—	—	2	RS5020T	②TKY20T	SRFT20 SRBT20
	SRFH25S32L	★	—	1	12.5	25	32	200	24.5	100	30	2.28°	1.5°	1	RS6025T	②TKY25T	SRFT25 SRBT25
	SRFH25S25L100	●	—	1	12.5	25	25	200	24.5	100	30	—	—	2	RS6025T	②TKY25T	SRFT25 SRBT25
	SRFH30S32L	★	—	1	15	30	32	230	29.5	130	35	—	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
Long	**SRFH20S25E**	●	—	1	10	20	25	220	19.5	120	24	1.5°	1.5°	3	RS5020T	②TKY20T	SRFT20 SRBT20
	SRFH20S20E120	●	—	1	10	20	20	220	19.5	120	24	—	—	2	RS5020T	②TKY20T	SRFT20 SRBT20
	SRFH25S32E	●	—	1	12.5	25	32	250	24.5	150	30	1.5°	1.5°	3	RS6025T	②TKY25T	SRFT25 SRBT25
	SRFH25S25E150	●	—	1	12.5	25	25	250	24.5	150	30	—	—	2	RS6025T	②TKY25T	SRFT25 SRBT25
	SRFH30S32E	●	—	1	15	30	32	300	29.5	200	35	—	—	2	RS8030T	②TKY30T	SRFT30 SRBT30

*1 Clamp Torque (N • m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

*2 RE is shown for insert corner R.

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

Fig.1



Right hand tool holder only.

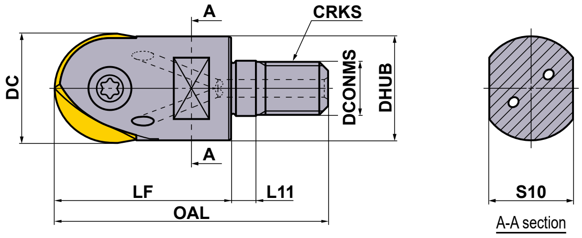
CARBIDE SHANK TYPE

Type	Order Number	Stock		Number of Teeth	Dimensions (mm)							Fig.	*1	① ②	
		R			RE*2	DC	DCONMS	LF	BD	LH	LU		Clamp Screw	Wrench	Insert
Standard	**SRFH10S10MW**	●	—	1	5	10	10	110	9.5	40	13	1	RS3008T	①TKY08D	SRFT10 SRBT10
	SRFH12S12MW	●	—	1	6	12	12	120	11.5	50	15	1	RS3510T	①TKY10D	SRFT12 SRBT12
	SRFH16S16MW	●	—	1	8	16	16	130	15.5	50	20	1	RS4015T	②TKY15T	SRFT16 SRBT16
	SRFH20S20MW	●	—	1	10	20	20	180	19.5	80	24	1	RS5020T	②TKY20T	SRFT20 SRBT20
	SRFH25S25MW	●	—	1	12.5	25	25	200	24.5	100	30	1	RS6025T	②TKY25T	SRFT25 SRBT25
	SRFH30S32MW	★	—	1	15	30	32	230	29.5	130	35	1	RS8030T	②TKY30T	SRFT30 SRBT30
					16	32	32	231	29.5	131	36				SRFT32 SRBT32
Long	**SRFH10S10LW**	●	—	1	5	10	10	150	9.5	60	13	1	RS3008T	①TKY08D	SRFT10 SRBT10
	SRFH12S12LW	●	—	1	6	12	12	160	11.5	70	15	1	RS3510T	①TKY10D	SRFT12 SRBT12
	SRFH16S16LW	●	—	1	8	16	16	160	15.5	70	20	1	RS4015T	②TKY15T	SRFT16 SRBT16
	SRFH16S16EW	●	—	1	8	16	16	200	15.5	110	20	1	RS4015T	②TKY15T	SRFT16 SRBT16
	SRFH20S20LW	●	—	1	10	20	20	250	19.5	150	24	1	RS5020T	②TKY20T	SRFT20 SRBT20
	SRFH25S25LW	★	—	1	12.5	25	25	300	24.5	200	30	1	RS6025T	②TKY25T	SRFT25 SRBT25
	SRFH30S32LW	★	—	1	15	30	32	350	29.5	250	35	1	RS8030T	②TKY30T	SRFT30 SRBT30
					16	32	32	351	29.5	251	36				SRFT32 SRBT32

Note 1) SRFH30S32MW and SRFH30S32LW tool body can use both inserts SRFT30 and SRFT32. However, the overall length size LF is different respectively.

*1 Clamp Torque (N • m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

*2 RE is shown for insert corner R.



SCREW-IN TYPE

Right hand tool holder only.

Order Number	Stock		Number of Teeth	Dimensions (mm)									*3 WT (kg)	*1		
	R			RE*2	DC	DCONMS	DHUB	OAL	LF	L11	S10	CRKS		Clamp Screw	Wrench	Insert
SRFH16AM0830	●	●	1	8	16	8.5	14.9	48	30	6	10	8	0.1	RS4015T	TKY15T	SRFT16 SRBT16
SRFH20AM1035	●	●	1	10	20	10.5	18.4	54	35	6	14	10	0.1	RS5020T	TKY20T	SRFT20 SRBT20
SRFH25AM1240	●	●	1	12.5	25	12.5	23.5	62	40	6	19	12	0.1	RS6025T	TKY25T	SRFT25 SRBT25
SRFH30AM1645	●	●	1	15	30	17	28.1	68	45	6	24	16	0.2	RS8030T	TKY30T	SRFT30 SRBT30
				16	32	17	28.1	69	46	6	24	16	0.2			SRFT32 SRBT32

Note 1) SRFH30AM1645 tool body can use both inserts SRFT30 and SRFT32. However, the overall length size OAL is different respectively.

Note 2) For screw-in type arbors, refer to page K260.

*1 Clamp Torque (N • m) : RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

*2 RE is shown for insert corner R.

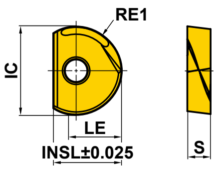
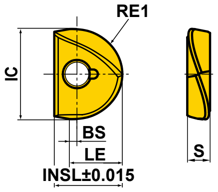
*3 WT : Tool Weight

ARBORS ➤ K260
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

Material			EP6120	VP15TF	MP8010	
Material	P	Steel	◐	◐		
	M	Stainless Steel		◐		
	K	Cast Iron		✤	●	
	N	Non-ferrous Metal	◐			
	H	Hardened Steel	◐	◐	●	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Shape	Order Number	Coated				Dimensions (mm)							Geometry
							RE1						
		EP6120	VP15TF	MP8010		IC	Corner R	Tolerance	INSL	LE	BS	S	
	**SRBT10**		●			10	5	±0.02	8.5	5	—	2.6	
	SRBT12		●			12	6	±0.02	10	6	—	3	
	SRBT16		●			16	8	±0.025	12	8	—	4	
	SRBT20		●			20	10	±0.025	15	10	—	5	
	SRBT25		●			25	12.5	±0.035	18.5	12.5	—	6	
	SRBT30		●			30	15	±0.035	22.5	15	—	7	
	SRBT32		●			32	16	±0.035	23.5	16	—	7	
	**SRFT10**	●	●	●		10	5	±0.006	8.5	5.5	0.5	2.6	
	SRFT12	●	●	●		12	6	±0.006	10	6.5	0.5	3	
	SRFT16	●	●	●		16	8	±0.006	12	9	1	4	
	SRFT20	●	●	●		20	10	±0.006	15	11	1	5	
	SRFT25	●	●	●		25	12.5	±0.006	18.5	13.5	1	6	
	SRFT30	●	●	●		30	15	±0.006	22.5	16	1	7	
	SRFT32	●	●	●		32	16	±0.006	23.5	17	1	7	

FITTING INSERTS ON HOLDERS

1. Clean the insert seat

Clean the insert seat in the holder body by blowing air or using a brush.

2. Fit the insert

Place the concave mark of the insert into the clamp-screw-fastening part of the holder(only SRF type inserts). Fasten the clamp screw while firmly pressing the insert against the insert seat wall. It is recommended to use the special lubricant to prevent the screw seizing, MK1KS, and to fasten to the recommended torque.

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

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	Grade	Cutting Speed **Vc** (m/min)	Feed per Tooth **fz** (mm/t.)	Depth of Cut **ap** (mm)
P	Mild Steel	≤180HB	**EP6120**	200 (80—300)	0.2 (0.1—0.3)	≤0.05DC
	Carbon Steel, Alloy Steel	180—280HB	**EP6120**	200 (80—300)	0.2 (0.1—0.3)	≤0.05DC
			VP15TF	200 (80—300)	0.2 (0.1—0.3)	≤0.05DC
	Carbon Steel, Alloy Steel	280—350HB	**EP6120**	200 (80—300)	0.2 (0.1—0.3)	≤0.05DC
	Pre-Hardened Steel	35—45HRC	**EP6120**	150 (80—200)	0.2 (0.1—0.3)	≤0.05DC
			VP15TF	150 (80—200)	0.2 (0.1—0.3)	≤0.05DC
	Alloy Tool Steel	≤350HB	**EP6120**	150 (80—200)	0.2 (0.1—0.3)	≤0.05DC
			VP15TF	150 (80—200)	0.2 (0.1—0.3)	≤0.05DC
K	Gray Cast Iron	Tensile Strength ≤350MPa	**MP8010**	250 (80—450)	0.2 (0.1—0.3)	≤0.05DC
	Ductile Cast Iron	Tensile Strength ≤450MPa	**MP8010**	200 (80—300)	0.2 (0.1—0.3)	≤0.05DC
	Ductile Cast Iron	Tensile Strength ≤800MPa	**MP8010**	200 (80—300)	0.2 (0.1—0.3)	≤0.05DC
N	Copper, Copper alloys	—	**EP6120**	200 (80—300)	0.2 (0.1—0.3)	≤0.05DC
H	Hardened Steel	45—55HRC	**MP8010**	100 (60—120)	0.2 (0.1—0.3)	≤0.05DC
	Hardened Steel	55—65HRC	**MP8010**	80 (60—120)	0.2 (0.1—0.3)	≤0.01DC

Note 1) The above values are average condition values at actual cutting speeds. The values change slightly according to the state of a machine to be used and method of workholding. Adjust the values depending on actual machine condition, referring to the above values.

Note 2) For end mills with a carbide shank, it is possible to set about 20% higher cutting conditions.

Note 3) Please note the following when machining hardened steel with MP8010.

- Shorten the overhang length as much as possible.
- Carbide shank type is recommended.
- Please note especially the setting of the depth of cut to prevent fracturing.

CUTTING SPEED FORMULAE

1. Employing $\theta°$ ➡ Calculate cutting speed at point P.
(Cutting speed at the cutting depth border for oblique machining)

Formula : Cutting Speed $= \dfrac{\pi \cdot DC \cdot \sin\theta \cdot n}{1000}$ (m/min)

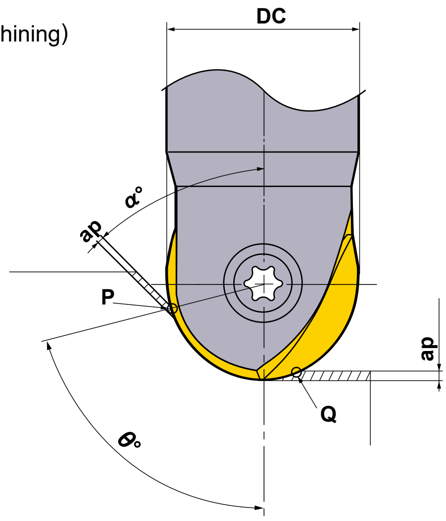
$$\theta° = \cos^{-1}\left(\frac{DC-2ap}{DC}\right)+90-\alpha$$

n : Spindle Speed (min^{-1})

2. Employing ap ➡ Calculate cutting speed at point Q.
(Cutting speed at the cutting depth border)

Formula : Cutting Speed $= \dfrac{2\pi n\sqrt{ap\,(DC-ap)}}{1000}$ (m/min)

n : Spindle Speed (min^{-1})
DC : Cutting Edge Diameter (mm)
ap : Depth of Cut (mm)



RADIUS END MILL

SUF

P M K N S H

Fig.1

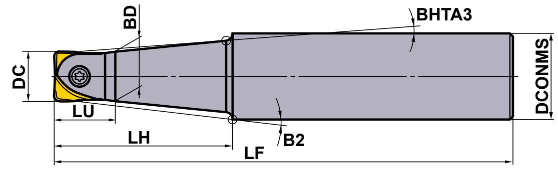


Fig.2

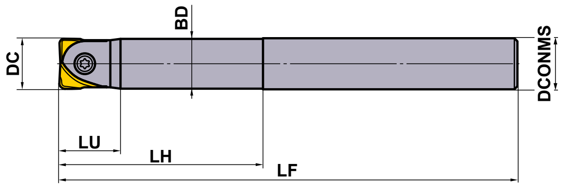
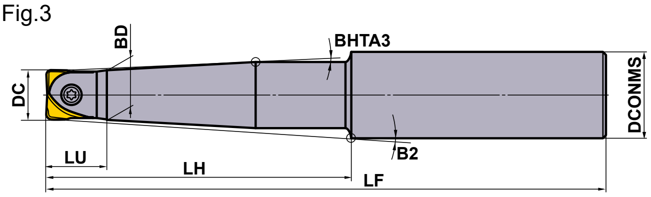


Fig.3



■STEEL SHANK TYPE

Right hand tool holder only.

Type	Order Number	Stock		Number of Teeth	Dimensions (mm)								Fig.	*	① ②	
		R			DC	DCONMS	LF	BD	LH	LU	B2	BHTA3		Clamp Screw	Wrench	Insert
Standard	**SRFH10S12M**	●	–	1	10	12	110	9.5	40	13	1.63°	–	1	RS3008T	①TKY08D	SUFT10R◌◌
	SRFH12S16M	●	–	1	12	16	120	11.5	50	15	2.60°	–	1	RS3510T	①TKY10D	SUFT12R◌◌
	SRFH16S20M	●	–	1	16	20	130	15.5	50	20	2.73°	–	1	RS4015T	②TKY15T	SUFT16R◌◌
	SRFH20S25M	●	–	1	20	25	150	19.5	70	24	2.38°	1.5°	1	RS5020T	②TKY20T	SUFT20R◌◌
	SRFH25S32M	●	–	1	25	32	180	24.5	80	30	2.97°	1.5°	1	RS6025T	②TKY25T	SUFT25R◌◌
	SRFH30S32M	●	–	1	30	32	200	29.5	100	35	–	–	2	RS8030T	②TKY30T	SUFT30R◌◌
	SRFH32S32M	●	–	1	32	32	200	31.5	100	35	–	–	2	RS8030T	②TKY30T	SUFT32R◌◌
Semi-long	**SRFH10S12L**	●	–	1	10	12	150	9.5	60	13	1.5°	–	1	RS3008T	①TKY08D	SUFT10R◌◌
	SRFH12S16L	●	–	1	12	16	160	11.5	70	15	1.78°	–	1	RS3510T	①TKY10D	SUFT12R◌◌
	SRFH16S20L	●	–	1	16	20	160	15.5	70	20	1.85°	–	1	RS4015T	②TKY15T	SUFT16R◌◌
	SRFH20S25L	●	–	1	20	25	180	19.5	80	24	2.05°	1.5°	1	RS5020T	②TKY20T	SUFT20R◌◌
	SRFH20S20L80	●	–	1	20	20	180	19.5	80	24	–	–	2	RS5020T	②TKY20T	SUFT20R◌◌
	SRFH25S32L	★	–	1	25	32	200	24.5	100	30	2.28°	1.5°	1	RS6025T	②TKY25T	SUFT25R◌◌
	SRFH25S25L100	●	–	1	25	25	200	24.5	100	30	–	–	2	RS6025T	②TKY25T	SUFT25R◌◌
	SRFH30S32L	★	–	1	30	32	230	29.5	130	35	–	–	2	RS8030T	②TKY30T	SUFT30R◌◌
Long	**SRFH20S25E**	●	–	1	20	25	220	19.5	120	24	1.5°	1.5°	3	RS5020T	②TKY20T	SUFT20R◌◌
	SRFH20S20E120	●	–	1	20	20	220	19.5	120	24	–	–	2	RS5020T	②TKY20T	SUFT20R◌◌
	SRFH25S32E	●	–	1	25	32	250	24.5	150	30	1.5°	1.5°	3	RS6025T	②TKY25T	SUFT25R◌◌
	SRFH25S25E150	●	–	1	25	25	250	24.5	150	30	–	–	2	RS6025T	②TKY25T	SUFT25R◌◌
	SRFH30S32E	●	–	1	30	32	300	29.5	200	35	–	–	2	RS8030T	②TKY30T	SUFT30R◌◌

* Clamp Torque (N • m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

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

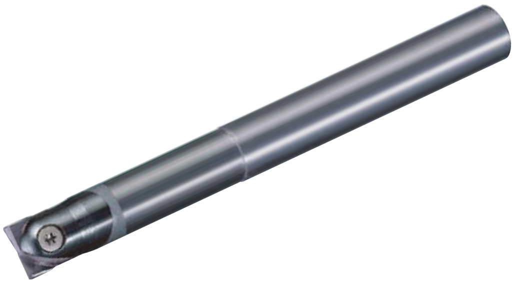
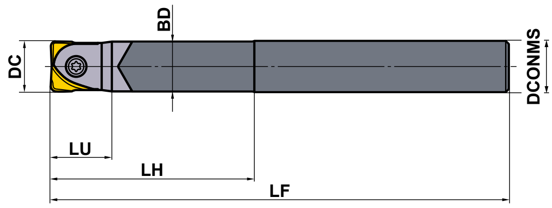


Fig.1



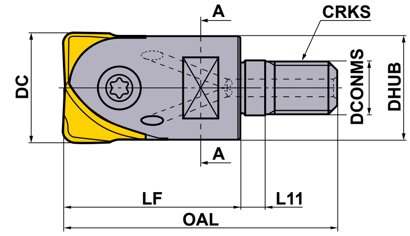
■CARBIDE SHANK TYPE

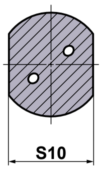
Right hand tool holder only.

Type	Order Number	Stock		Number of Teeth	Dimensions (mm)						Fig.	*	① ②	
		R			DC	DCONMS	LF	BD	LH	LU		Clamp Screw	Wrench	Insert
Standard	**SRFH10S10MW**	●	—	1	10	10	110	9.5	40	13	1	RS3008T	①TKY08D	SUFT10R◌◌
	SRFH12S12MW	●	—	1	12	12	120	11.5	50	15	1	RS3510T	①TKY10D	SUFT12R◌◌
	SRFH16S16MW	●	—	1	16	16	130	15.5	50	20	1	RS4015T	②TKY15T	SUFT16R◌◌
	SRFH20S20MW	●	—	1	20	20	180	19.5	80	24	1	RS5020T	②TKY20T	SUFT20R◌◌
	SRFH25S25MW	●	—	1	25	25	200	24.5	100	30	1	RS6025T	②TKY25T	SUFT25R◌◌
	SRFH30S32MW	★	—	1	30	32	230	29.5	130	35	1	RS8030T	②TKY30T	SUFT30R◌◌
					32	32	231	29.5	131	36				SUFT32R◌◌
Long	**SRFH10S10LW**	●	—	1	10	10	150	9.5	60	13	1	RS3008T	①TKY08D	SUFT10R◌◌
	SRFH12S12LW	●	—	1	12	12	160	11.5	70	15	1	RS3510T	①TKY10D	SUFT12R◌◌
	SRFH16S16LW	●	—	1	16	16	160	15.5	70	20	1	RS4015T	②TKY15T	SUFT16R◌◌
	SRFH20S20LW	●	—	1	20	20	250	19.5	150	24	1	RS5020T	②TKY20T	SUFT20R◌◌
	SRFH25S25LW	★	—	1	25	25	300	24.5	200	30	1	RS6025T	②TKY25T	SUFT25R◌◌
	SRFH30S32LW	★	—	1	30	32	350	29.5	250	35	1	RS8030T	②TKY30T	SUFT30R◌◌
					32	32	351	29.5	251	36				SUFT32R◌◌

Note 1) SRFH30S32MW and SRFH30S32LW tool body can use both inserts SUFT30R◌◌ and SUFT32R◌◌.
However, the overall length size LF is different respectively.

* Clamp Torque (N • m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0





A-A section

■SCREW-IN TYPE

Right hand tool holder only.

Order Number	Stock		Number of Teeth	Dimensions (mm)								*2 WT (kg)	*1		
	R			DC	DCONMS	DHUB	OAL	LF	L11	S10	CRKS		Clamp Screw	Wrench	Insert
SRFH16AM0830	●	●	1	16	8.5	14.9	48	30	6	10	8	0.1	RS4015T	TKY15T	SUFT16R◌◌
SRFH20AM1035	●	●	1	20	10.5	18.4	54	35	6	14	10	0.1	RS5020T	TKY20T	SUFT20R◌◌
SRFH25AM1240	●	●	1	25	12.5	23.5	62	40	6	19	12	0.1	RS6025T	TKY25T	SUFT25R◌◌
SRFH30AM1645	●	●	1	30	17	28.1	68	45	6	24	16	0.2	RS8030T	TKY30T	SUFT30R◌◌
				32	17	28.1	69	46	6	24	16				SUFT32R◌◌

Note 1) SRFH30AM1645 tool body can use both inserts SUFT30R◌◌ and SUFT32R◌◌.
However, the overall length size OAL is different respectively.

Note 2) For screw-in type arbors, refer to page K260.

*1 Clamp Torque (N • m) : RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

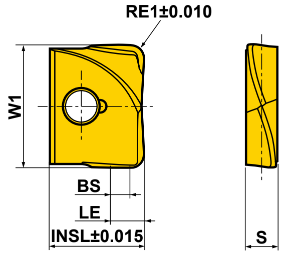
*2 WT : Tool Weight

ARBORS ➤ K260
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

INSERTS

Material			MP8010	VP15TF
	P	Steel		◐
	M	Stainless Steel		◐
	K	Cast Iron	●	✤
	H	Hardened Steel	●	◐

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Shape	Order Number	Coated		Dimensions (mm)						Geometry
		MP8010	VP15TF	W1	RE1	BS	LE	INSL	S	
	**SUFT10R05**	●	●	10	0.5	1	1.5	8.5	2.6	
	SUFT10R10	●	●	10	1	1	2	8.5	2.6	
	SUFT10R20	●	★	10	2	1	3	8.5	2.6	
	SUFT12R05	●	●	12	0.5	1.2	1.7	10	3	
	SUFT12R10	●	●	12	1	1.2	2.2	10	3	
	SUFT12R20	●	●	12	2	1.2	3.2	10	3	
	SUFT12R30	★	●	12	3	1.2	4.2	10	3	
	SUFT16R05	●	●	16	0.5	1.6	2.1	12	4	
	SUFT16R10	●	●	16	1	1.6	2.6	12	4	
	SUFT16R15	★	●	16	1.5	1.6	3.1	12	4	
	SUFT16R20	●	●	16	2	1.6	3.6	12	4	
	SUFT16R30	★	●	16	3	1.6	4.6	12	4	
	SUFT20R05	●	●	20	0.5	2	2.5	15	5	
	SUFT20R10	●	●	20	1	2	3	15	5	
	SUFT20R15	★	●	20	1.5	2	3.5	15	5	
	SUFT20R20	●	●	20	2	2	4	15	5	
	SUFT20R30	●	●	20	3	2	5	15	5	
	SUFT25R05	★	●	25	0.5	2.5	3	18.5	6	
	SUFT25R10	●	★	25	1	2.5	3.5	18.5	6	
	SUFT25R20	★	●	25	2	2.5	4.5	18.5	6	
	SUFT25R30	★	●	25	3	2.5	5.5	18.5	6	
	SUFT30R05	★	★	30	0.5	3	3.5	22.5	7	
	SUFT30R10	★	★	30	1	3	4	22.5	7	
	SUFT30R20	★	★	30	2	3	5	22.5	7	
	SUFT30R30	★	★	30	3	3	6	22.5	7	
	SUFT32R05	★	★	32	0.5	3.2	3.7	23.5	7	
	SUFT32R10	★	★	32	1	3.2	4.2	23.5	7	
	SUFT32R20	★	★	32	2	3.2	5.2	23.5	7	

FITTING INSERTS ON HOLDERS

1. Clean the insert seat

Clean the insert seat in the holder body by blowing air or using a brush.

2. Fit the insert

Place the concave mark of the insert into the clamp-screw-fastening part of the holder (only SRF type inserts). Fasten the clamp screw while firmly pressing the insert against the insert seat wall. It is recommended to use the special lubricant MK1KS to preventing the screw seizing and to tighten to the recommended torque.

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

RECOMMENDED CUTTING CONDITIONS

■SHOULDER MILLING (When small width of cut.*)

Material		Hardness	Grade	Cutting Speed **Vc** (m/min)	Depth of Cut **ap** (mm)	Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/t.)
P	Carbon Steel Alloy Steel	180—280HB	**VP15TF**	200 (80—300)	≤0.05DC	≤0.05DC	0.2 (≤0.4)
	Pre-Hardened Steel	≤45HRC	**VP15TF**	150 (80—200)	≤0.05DC	≤0.05DC	0.15 (≤0.3)
	Alloy Tool Steel	180—380HB	**VP15TF**	150 (80—200)	≤0.05DC	≤0.05DC	0.15 (≤0.3)
M	Stainless Steel	≤270HB	**VP15TF**	150 (100—200)	≤0.05DC	≤0.05DC	0.2 (≤0.4)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**MP8010**	250 (180—450)	≤0.05DC	≤0.1DC	0.3 (≤0.4)
	Ductile Cast Iron	Tensile Strength ≤800MPa	**MP8010**	200 (80—300)	≤0.05DC	≤0.1DC	0.3 (≤0.4)
H	Hardened Steel	45—55HRC	**MP8010**	100 (80—120)	≤0.05DC	≤0.02DC	0.1 (≤0.2)
	Hardened Steel	55—65HRC	**MP8010**	80 (60—100)	≤0.05DC	≤0.02DC	0.1 (≤0.2)

* When the pick feed direction is along the axis of the tool such as finish machining at the wall part.

■SLOTTING•SHOULDER MILLING (When large width of cut.*)

Material		Hardness	Grade	Cutting Speed **Vc** (m/min)	Depth of Cut **ap** (mm)	Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/t.)
P	Carbon Steel Alloy Steel	180—280HB	**VP15TF**	200 (80—300)	≤0.02DC	≤DC	0.2 (≤0.4)
	Pre-Hardened Steel	≤45HRC	**VP15TF**	150 (80—200)	≤0.02DC	≤DC	0.15 (≤0.3)
	Alloy Tool Steel	180—380HB	**VP15TF**	150 (80—200)	≤0.02DC	≤DC	0.15 (≤0.3)
M	Stainless Steel	≤270HB	**VP15TF**	150 (100—200)	≤0.02DC	≤DC	0.2 (≤0.4)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**MP8010**	250 (180—450)	≤0.03DC	≤DC	0.3 (≤0.4)
	Ductile Cast Iron	Tensile Strength ≤800MPa	**MP8010**	200 (80—300)	≤0.03DC	≤DC	0.3 (≤0.4)
H	Hardened Steel	45—55HRC	**MP8010**	100 (80—120)	≤0.01DC	≤DC	0.1 (≤0.2)
	Hardened Steel	55—65HRC	**MP8010**	70 (60—80)	≤0.01DC	≤DC	0.1 (≤0.2)

* When the pick feed direction is along the axis of the tool such as finish machining at the wall part.

Note 1) This cutting condition is the standard condition when using the steel standard shank type. If vibration or chipping of the insert occurs on the cutting edge, please decrease the cutting condition as width of cut, depth of cut and feed per tooth depending on the situation.

Note 2) Cutting speed is calculated at the peripheral edge of the tool. Calculate spindle speed in the following way.

Spindle speed of cutting tool $n(\text{min}^{-1})=1000\times$Cutting speed Vc ÷Diameter of cutting tool DC÷3.14

Note 3) Please note the following when machining hardened steel with MP8010.

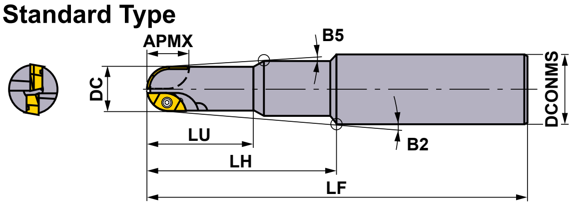
- Shorten the overhang length as much as possible.
- Use with carbide shank recommended.
- Correct setting of the depth of cut is especially important to prevent fracturing.

BALL NOSE END MILL

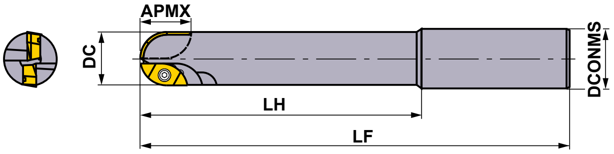
SRM2

P | M | K | N | S | H

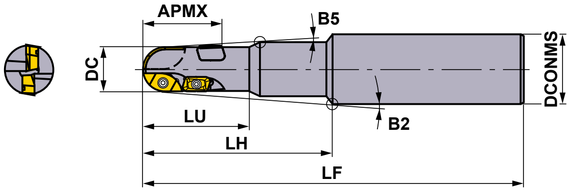
● Standard Type



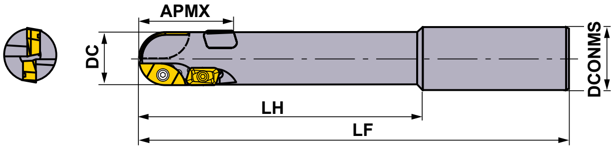
● Long Neck Type



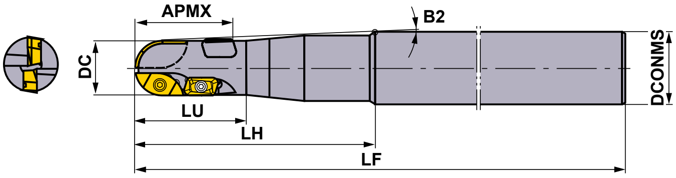
● Long Cutting Edge Type



● Long Neck Cutting Edge Type



● Extra Long Cutting Edge Type



Right hand tool holder only.

Type	Order Number	Stock		Number of Teeth	Dimensions (mm)									*1	*1	① ② ③				
		R			*2 RE	DC	DCONMS	LF	LH	LU	APMX	B2	B5	Inner, Outer	Peripheral	Inner, Outer	Peripheral	Inner	Outer	Peripheral
														Clamp Screw		Wrench		Insert		
Standard	SRM2160SNM	★	–	2	8	16	20	130	50	25	12	2.8°	1.5°	TS25H	–	①TKY08D	–	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	SRM2160SAM	●	●	2	8	16	20	130	50	25	12	2.8°	1.5°	TS25H	–	①TKY08D	–	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	SRM2200SNM	★	–	2	10	20	25	150	70	35	14	2.45°	1.5°	TS32	–	①TKY08D	–	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	SRM2200SAM	●	●	2	10	20	25	150	70	35	14	2.45°	1.5°	TS32	–	①TKY08D	–	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	SRM2250SNM	★	–	2	12.5	25	32	180	80	40	19	3.22°	1.5°	TS43	–	②TKY15T	–	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	SRM2250SAM	●	●	2	12.5	25	32	180	80	40	19	3.22°	1.5°	TS43	–	②TKY15T	–	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	SRM2300SNM	★	–	2	15	30	32	200	100	50	24	0.73°	0.5°	TS55	–	②TKY25T	–	SRG30C SRM30C-M	SRG30E SRM30E-M	–
	SRM2300SAM	●	●	2	15	30	32	200	100	50	24	0.73°	0.5°	TS55	–	②TKY25T	–	SRG30C SRM30C-M	SRG30E SRM30E-M	–
	SRM2320SAM	●	–	2	16	32	32	200	100	45	28	0.5°	0.5°	TS55	–	②TKY25T	–	SRG32C SRM32C-M	SRG32E SRM32E-M	–

*1 Clamp Torque (N • m) : TS25H=1.7, TS25=1.0, TS32=2.0, TS43=3.5, TS55=7.5

*2 RE is shown for insert corner R.

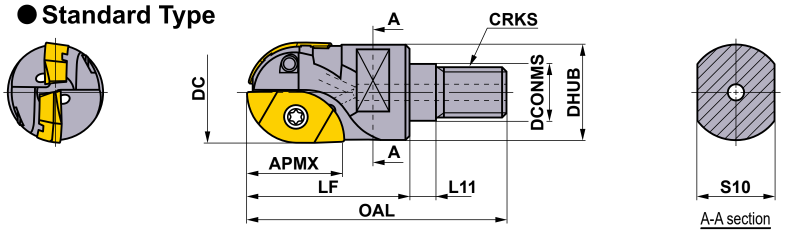
● : Inventory maintained. ★ : Inventory maintained in Japan.

Type	Order Number	Stock		Number of Teeth	Dimensions (mm)									Clamp Screw		Wrench		Insert		
		R			*2 RE	DC	DCONMS	LF	LH	LU	APMX	B2	B5	*1 Inner, Outer	*1 Peripheral	① Inner, Outer	② ③ Peripheral	Inner	Outer	Peripheral
Long Cutting Edge	**SRM2200SNL**	★	–	4	10	20	25	150	70	35	30	2.45°	1.5°	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	SRM2200SAL	●	●	4	10	20	25	150	70	35	30	2.45°	1.5°	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	SRM2250SNL	★	–	4	12.5	25	32	180	80	40	37	3.22°	1.5°	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	SRM2250SAL	●	●	4	12.5	25	32	180	80	40	37	3.22°	1.5°	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	SRM2300SNL	★	–	4	15	30	32	200	100	50	44	0.73°	0.5°	TS55	TS43	②TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
	SRM2300SAL	★	●	4	15	30	32	200	100	50	44	0.73°	0.5°	TS55	TS43	②TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
	SRM2320SAL	●	–	4	16	32	32	200	100	60	44	0.5°	0.5°	TS55	TS43	②TKY25T	③TKY15F	SRG32C SRM32C-M	SRG32E SRM32E-M	APMT1604 PDER-◌2
Long Neck	**SRM2160SNF**	★	–	2	8	16	16	150	70	–	12	–	–	TS25H	–	①TKY08D	–	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	SRM2160SAF	★	●	2	8	16	16	150	70	–	12	–	–	TS25H	–	①TKY08D	–	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	SRM2200SNF	★	–	2	10	20	20	180	100	–	14	–	–	TS32	–	①TKY08D	–	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	SRM2200SAF	★	●	2	10	20	20	180	100	–	14	–	–	TS32	–	①TKY08D	–	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	SRM2250SNF	★	–	2	12.5	25	25	200	120	–	19	–	–	TS43	–	②TKY15T	–	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	SRM2250SAF	★	●	2	12.5	25	25	200	120	–	19	–	–	TS43	–	②TKY15T	–	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	SRM2300SNF	★	–	2	15	30	32	230	150	–	24	–	–	TS55	–	②TKY25T	–	SRG30C SRM30C-M	SRG30E SRM30E-M	–
	SRM2300SAF	★	●	2	15	30	32	230	150	–	24	–	–	TS55	–	②TKY25T	–	SRG30C SRM30C-M	SRG30E SRM30E-M	–
Long Neck Cutting Edge	**SRM2200SNLF**	★	–	4	10	20	20	180	100	–	30	–	–	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	SRM2200SALF	★	●	4	10	20	20	180	100	–	30	–	–	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	SRM2250SNLF	★	–	4	12.5	25	25	200	120	–	37	–	–	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	SRM2250SALF	★	●	4	12.5	25	25	200	120	–	37	–	–	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	SRM2300SNLF	★	–	4	15	30	32	230	150	–	44	–	–	TS55	TS43	②TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
	SRM2300SALF	★	●	4	15	30	32	230	150	–	44	–	–	TS55	TS43	②TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
Extra Long Cutting Edge	**SRM2200SNLL**	★	–	4	10	20	25	250	120	35	30	1.5°	–	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	SRM2200SALL	★	●	4	10	20	25	250	120	35	30	1.5°	–	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	SRM2250SNLL	★	–	4	12.5	25	32	300	170	37	37	1.5°	–	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	SRM2250SALL	★	●	4	12.5	25	32	300	170	37	37	1.5°	–	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	SRM2300SNLL	★	–	4	15	30	32	350	100	50	44	1.5°	–	TS55	TS43	③TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
	SRM2300SALL	★	●	4	15	30	32	350	100	50	44	1.5°	–	TS55	TS43	③TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2

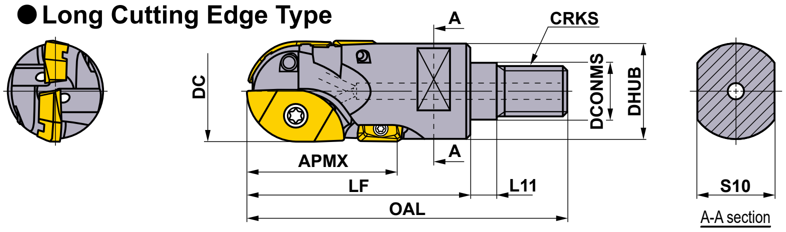
*1 Clamp Torque (N • m) : TS25H=1.7, TS25=1.0, TS32=2.0, TS43=3.5, TS55=7.5

*2 RE is shown for insert corner R.

● Standard Type



● Long Cutting Edge Type



■SCREW-IN TYPE

Right hand tool holder only.

Type	Order Number	Stock		Dimensions (mm)										*3 WT (kg)	Clamp Screw *1		①②③ Wrench	Insert		
		R		*2 RE	DC	DCONMS	DHUB	OAL	LF	L11	S10	CRKS	APMX		Inner, Outer	Peripheral		Inner	Outer	Peripheral
Standard	**SRM2160AM08S30**	●	●	8	16	8.5	14.6	48	30	6	10	M8	12	0.1	TS25H	–	①TKY08D	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	SRM2200AM10S35	●	●	10	20	10.5	18.6	54	35	6	14	M10	14	0.1	TS32	–	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	SRM2250AM12S40	●	●	12.5	25	12.5	23.5	62	40	6	19	M12	19	0.2	TS43	–	②TKY15T	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	SRM2300AM16S45	★	●	15	30	17	28.3	68	45	6	24	M16	24	0.2	TS55	–	②TKY25T	SRG30C SRM30C-M	SRG30E SRM30E-M	–
	SRM2320AM16S45	●	●	16	32	17	30.0	68	45	6	24	M16	28	0.2	TS55	–	②TKY25T	SRG32C SRM32C-M	SRG32E SRM32E-M	–
Long Cutting Edge	**SRM2200AM10L45**	★	●	10	20	10.5	18.6	64	45	6	14	M10	30	0.2	TS32	TS25	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	SRM2200M10L	☐	–	10	20	10.5	18.6	66	47	6	15	M10	30	0.2	TS32	TS25	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	SRM2250AM12L55	★	●	12.5	25	12.5	23.5	77	55	6	19	M12	37	0.3	TS43	TS25	②TKY15T ③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	SRM2250M12L	☐	–	12.5	25	12.5	23.5	77	55	6	17	M12	37	0.3	TS43	TS25	②TKY15T ③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	SRM2300AM16L60	★	●	15	30	17	28.3	83	60	6	24	M16	44	0.3	TS55	TS43	②TKY25T ③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
	SRM2300M16L	☐	–	15	30	17	28.3	86	63	6	22	M16	44	0.3	TS55	TS43	②TKY15T ③TKY08F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
	SRM2320AM16L60	★	●	16	32	17	29.0	83	60	6	24	M16	44	0.3	TS55	TS43	②TKY25T ③TKY15F	SRG32C SRM32C-M	SRG32E SRM32E-M	APMT1604 PDER-◌2
	SRM2320M16L	☐	–	16	32	17	29.0	86	63	6	22	M16	44	0.3	TS55	TS43	②TKY15T ③TKY08F	SRG32C SRM32C-M	SRG32E SRM32E-M	APMT1604 PDER-◌2

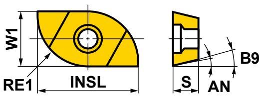
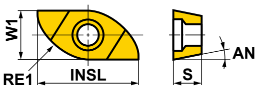
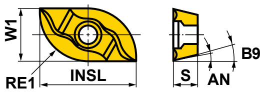
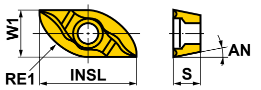
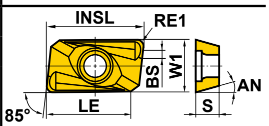
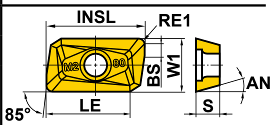
Note 1) For screw-in type arbors, refer to page K260.
*1 Clamp Torque (N • m) : TS25H=1.7, TS25=1.0, TS32=2.0, TS43=3.5, TS55=7.5
*2 RE is shown for insert corner R.
*3 WT : Tool Weight

● : Inventory maintained. ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only. (10 inserts in one case)

INSERTS

Material			F7030	MP6120	MP9120	VP15TF
Material	P	Steel	◐	◐		◐
	M	Stainless Steel	◐			◐
	K	Cast Iron				✤
	S	Heat-resistant Alloy, Titanium Alloy			◐	◐
	H	Hardened Steel				◐

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Type	Shape	Order Number	Class	Coated				Dimensions (mm)								Geometry
				F7030	MP6120	MP9120	VP15TF	RE1	INSL	LE	W1	S	BS	AN	B9	
Inner	Strong Cutting Edge Type 	**SRG16C**	G		●	★	●	8	16	—	8.2	3.5	—	11°	—	
		SRG20C	G		●	★	●	10	19	—	10.2	4.6	—	10°	18°	
		SRG25C	G		●	★	●	12.5	24	—	12.8	5.5	—	10°	18°	
		SRG30C	G		●	★	●	15	28	—	15.3	7	—	10°	18°	
		SRG32C	G		●	★	●	16	28	—	16.3	7	—	10°	18°	
Outer	Strong Cutting Edge Type 	**SRG16E**	G		●	★	●	8	13.5	—	6.7	3.5	—	11°	—	
		SRG20E	G		●	★	●	10	15.5	—	8.5	4.6	—	9°	—	
		SRG25E	G		●	★	●	12.5	20.5	—	10.2	5.5	—	9°	—	
		SRG30E	G		●	★	●	15	25.2	—	12.2	7	—	9°	—	
		SRG32E	G		●	★	●	16	26.1	—	13.1	7	—	9°	—	
Inner	Low Resistance Type 	**SRM16C-M**	M		●	★	●	8	16	—	8.2	3.5	—	11°	—	
		SRM20C-M	M		●	★	●	10	19	—	10.2	4.6	—	10°	18°	
		SRM25C-M	M		●	★	●	12.5	24	—	12.8	5.5	—	10°	18°	
		SRM30C-M	M		●	★	●	15	28	—	15.3	7	—	10°	18°	
		SRM32C-M	M		●	★	●	16	28	—	16.3	7	—	10°	18°	
Outer	Low Resistance Type 	**SRM16E-M**	M		●	★	●	8	13.5	—	6.7	3.5	—	11°	—	
		SRM20E-M	M		●	★	●	10	15.5	—	8.5	4.6	—	9°	—	
		SRM25E-M	M		●	★	●	12.5	20.5	—	10.2	5.5	—	9°	—	
		SRM30E-M	M		●	★	●	15	25.2	—	12.2	7	—	9°	—	
		SRM32E-M	M		●	★	●	16	26.1	—	13.1	7	—	9°	—	
Peripheral *1	Strong Cutting Edge Type 	**APMT1135PDER-H2**	M	●			●	0.8	11.25	9	6.35	3.5	1.2	11°	—	
		APMT1604PDER-H2	M	●			●	0.8	17.11	14	9.525	4.76	1.4	11°	—	
	Low Resistance Type 	**APMT1135PDER-M2**	M	●			●	0.8	11.18	9	6.35	3.5	1.2	11°	—	
		APMT1604PDER-M2	M	●			●	0.8	17.10	14	9.525	4.76	1.4	11°	—	

(Low-resistance inner or outer inserts are precision M class type.)

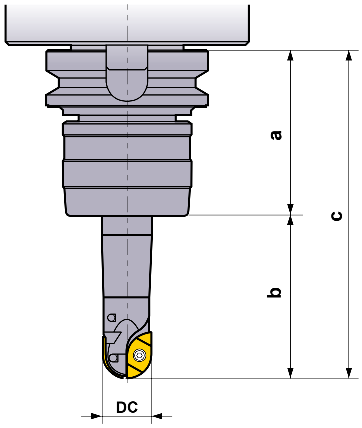
*1 Selection guide for peripheral cutting edges : The first recommendation is the super sharp M chipbreaker (APMT....PDER-M2).
When cutting edge strength is particularly important, use the H chipbreaker (APMT....PDER-H2).

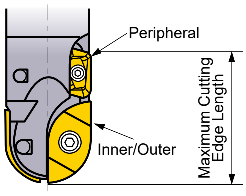
ARBORS ➤K260
SPARE PARTS ➤N001
TECHNICAL DATA ➤P001

RECOMMENDED CUTTING CONDITIONS

SRM2

Ø16–Ø32





(Long Cutting Edge)

Tool Overhang

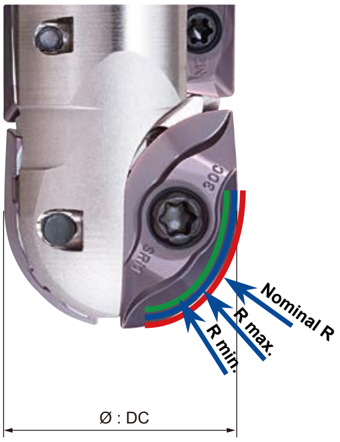
The recommended cutting conditions are chosen based on deflection, vibration and surface finish when using a BT50 arbor under the conditions below -**"a"**, a length from the gauge line to the arbor end face and **"b"**, neck length (tool overhang from the arbor).

Cutting Edge Diameter:DC	Type	a	b	c
16	Standard	**105**	**50**	**155**
	Long Neck		**70**	**175**
	Extra Long		–	–
20	Standard		**70**	**175**
	Long Neck		**100**	**205**
	Extra Long		**150**	**255**
25	Standard		**80**	**185**
	Long Neck		**120**	**225**
	Extra Long		**200**	**305**
30	Standard		**100**	**205**
	Long Neck		**150**	**255**
	Extra Long		**250**	**355**

Recommended Depth of Cut for Long Cutting Edge Type

The maximum cutting edge length of the long cutting edge type with a peripheral insert is 1.4-1.5DC. The peripheral insert's main purpose is to remove the small un-machined portions of the pre-machined surface above the main cutting edge. Please refer to recommended cutting conditions for recommended depth of cut **ap**.

■ Radius tolerance and other dimensions with an insert mounted in the body



Radial tolerance

Cutting Edge Diameter DC	Nominal R	Tolerance	R min.	R max.
16	8	G	7.925	7.975
		M	7.910	7.970
20	10	G	9.925	9.975
		M	9.910	9.970
25	12.5	G	12.425	12.475
		M	12.410	12.470
30	15	G	14.925	14.975
		M	14.910	14.970

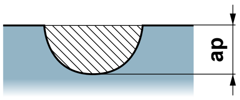
Dimensions with an insert mounted in the body

Cutting Edge Diameter DC	Tolerance	DC min.	DC max.
16	G	15.800	16.000
	M	15.770	15.990
20	G	19.800	20.000
	M	19.770	19.990
25	G	24.800	25.000
	M	24.770	24.990
30	G	29.800	30.000
	M	29.770	29.990

*M : Precision M class

■SLOT MILLING

Cutting Mode



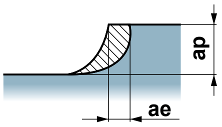
N : Revolution (min^{-1})
F : Table Feed (mm/min)

	Material	Hardness	Cutting Speed (m/min)	Insert Grade, Type	Holder Type	Ø16			Ø20			Ø25			Ø30		
						N	F	ap	N	F	ap	N	F	ap	N	F	ap
P	Carbon Steel Alloy Steel	180−280HB	160 (120−200)	**MP6120** **VP15TF** Low Resistance Type	Standard	3183	382	6	2546	306	8	2037	489	12.5	1698	407	15
					Long Neck	3183	382	4	2546	306	4	2037	489	6	1698	407	7.5
					Extra Long	−	−	−	2546	306	2	2037	489	4	1698	407	3
		280−350HB	140 (120−160)	**MP6120** **VP15TF** Low Resistance Type	Standard	2785	334	6	2228	267	8	1783	428	12.5	1485	357	15
					Long Neck	2785	334	4	2228	267	4	1783	428	6	1485	357	7.5
					Extra Long	−	−	−	2228	267	2	1783	428	4	1485	357	3
	Pre-Hardened Steel	35−45HRC	120 (100−160)	**MP6120** **VP15TF** Low Resistance Type	Standard	2387	286	6	1910	229	8	1528	367	12.5	1273	306	15
					Long Neck	2387	286	4	1910	229	4	1528	367	6	1273	306	7.5
					Extra Long	−	−	−	1910	229	2	1528	367	4	1273	306	3
	Alloy Tool Steel	≤350HB	140 (120−160)	**MP6120** **VP15TF** Low Resistance Type	Standard	2785	334	6	2228	267	8	1783	535	10	1485	594	12
					Long Neck	2785	334	4	2228	267	4	1783	535	5	1485	594	4.5
					Extra Long	−	−	−	2228	267	2	1783	535	2.5	1485	594	1.5
M	Stainless Steel	≤270HB	200 (100−250)	**VP15TF** Low Resistance Type	Standard	3979	477	4	3183	382	5	2546	764	6	2122	849	7.5
					Long Neck	3979	477	3	3183	382	3	2546	611	4	2122	637	4.5
					Extra Long	−	−	−	3183	382	1.5	2546	509	1.5	2122	509	1.5
K	Gray Cast Iron	≤350MPa	200 (150−300)	**VP15TF** Low Resistance Type	Standard	3979	796	6	3183	637	8	2546	1019	12.5	2122	849	15
					Long Neck	3979	796	4	3183	637	4	2546	1019	7.5	2122	849	4.5
					Extra Long	−	−	−	3183	637	2	2546	1019	4	2122	849	3
	Ductile Cast Iron	≤500MPa	180 (150−240)	**VP15TF** Low Resistance Type	Standard	3581	716	6	2865	573	8	2292	917	12.5	1910	764	15
					Long Neck	3581	716	4	2865	573	4	2292	917	7.5	1910	764	4.5
					Extra Long	−	−	−	2865	573	2	2292	917	4	1910	764	1.5
	Ductile Cast Iron	≤800MPa	160 (150−250)	**VP15TF** Low Resistance Type	Standard	3183	637	6	2546	509	8	2037	815	12.5	1698	679	15
					Long Neck	3183	637	4	2546	509	4	2037	815	7.5	1698	679	4.5
					Extra Long	−	−	−	2546	509	2	2037	815	4	1698	679	1.5
H	Hardened Steel	45−50HRC	100 (60−120)	**VP15TF** Strong Cutting Edge Type	Standard	1989	239	4	1591	191	4	1273	255	6	1061	212	7.5
					Long Neck	1989	239	2	1591	191	2	1273	255	4	1061	212	3
					Extra Long	−	−	−	1591	191	1	1273	255	2.5	1061	212	1.5
	Hardened Steel	50−60HRC	60 (40−100)	**VP15TF** Strong Cutting Edge Type	Standard	1194	143	4	955	115	4	764	153	6	637	127	7.5
					Long Neck	1194	143	2	955	115	2	764	153	4	637	127	3
					Extra Long	−	−	−	955	115	1	764	153	2.5	637	127	1.5
S	Titanium Alloy	≤350HB	50 (30-60)	**MP9120**	Standard	995	100	4	796	80	4	637	64	6	531	53	7.5
					Long Neck	995	100	2	796	80	2	637	64	4	531	53	3
					Extra Long	−	−	−	796	80	1	637	64	2.5	531	53	1.5
	Heat Resistant Alloy	−	40 (30-60)	**MP9120**	Standard	796	80	4	637	64	4	510	51	6	425	43	7.5
					Long Neck	796	80	2	637	64	2	510	51	4	425	43	3
					Extra Long	−	−	−	637	64	1	510	51	2.5	425	43	1.5

RECOMMENDED CUTTING CONDITIONS

■SHOULDER MILLING (Cutting Depth : Small)

Cutting Mode

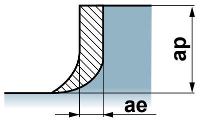


N : Revolution (min^{-1})
F : Table Feed (mm/min)

	Material	Hardness	Cutting Speed (m/min)	Insert Grade, Type	Holder Type	Ø16				Ø20				Ø25				Ø30			
						N	F	ap	ae	N	F	ap	ae	N	F	ap	ae	N	F	ap	ae
P	Carbon Steel Alloy Steel	180−280HB	200 (160−250)	**MP6120** **VP15TF** Low Resistance Type	Standard	3979	796	4	6	3183	955	5	8	2546	1273	6	10	2122	1273	7.5	10
					Long Neck	3979	637	4	4	3183	637	5	6	2546	1273	6	7.5	2122	1273	7.5	7.5
					Extra Long	−	−	−	−	3183	382	5	4	2546	1019	6	5	2122	637	7.5	3
		280−350HB	160 (120−200)	**MP6120** **VP15TF** Low Resistance Type	Standard	3183	509	4	6	2546	509	5	8	2037	815	6	10	1698	849	7.5	10
					Long Neck	3183	382	4	4	2546	407	5	6	2037	611	6	7.5	1698	509	7.5	7.5
					Extra Long	−	−	−	−	2546	306	5	4	2037	489	6	5	1698	407	7.5	3
	Pre-Hardened Steel	35−45HRC	160 (120−200)	**MP6120** **VP15TF** Low Resistance Type	Standard	3183	509	4	6	2546	509	5	8	2037	815	6	10	1698	849	7.5	10
					Long Neck	3183	382	4	4	2546	407	5	6	2037	611	6	7.5	1698	679	7.5	7.5
					Extra Long	−	−	−	−	2546	306	5	4	2037	489	6	5	1698	509	7.5	3
	Alloy Tool Steel	≦350HB	160 (120−200)	**MP6120** **VP15TF** Low Resistance Type	Standard	3183	509	4	6	2546	509	5	8	2037	815	6	10	1698	849	7.5	10
					Long Neck	3183	382	4	4	2546	407	5	6	2037	611	6	7.5	1698	509	7.5	7.5
					Extra Long	−	−	−	−	2546	306	5	4	2037	489	6	2.5	1698	407	7.5	1.5
M	Stainless Steel	≦270HB	200 (100−250)	**VP15TF** Low Resistance Type	Standard	3979	477	4	6	3183	509	5	8	2546	764	6	10	2122	849	7.5	10
					Long Neck	3979	477	4	4	3183	382	5	6	2546	611	6	7.5	2122	849	7.5	7.5
					Extra Long	−	−	−	−	3183	382	5	4	2546	509	6	5	2122	424	7.5	1.5
K	Gray Cast Iron	≦350MPa	200 (150−300)	**VP15TF** Low Resistance Type	Standard	3979	1592	4	8	3183	1592	5	10	2546	1528	6	10	2122	1485	7.5	10
					Long Neck	3979	1194	4	6	3183	1273	5	8	2546	1528	6	10	2122	1485	7.5	6
					Extra Long	−	−	−	−	3183	955	5	6	2546	1273	6	7.5	2122	1061	7.5	3
	Ductile Cast Iron	≦500MPa	200 (150−280)	**VP15TF** Low Resistance Type	Standard	3979	1592	4	8	3183	1592	5	10	2546	1528	6	10	2122	1273	7.5	10
					Long Neck	3979	1194	4	6	3183	1273	5	8	2546	1528	6	10	2122	1273	7.5	6
					Extra Long	−	−	−	−	3183	955	5	6	2546	1273	6	7.5	2122	1061	7.5	3
	Ductile Cast Iron	≦800MPa	180 (150−250)	**VP15TF** Low Resistance Type	Standard	3581	1432	4	8	2865	1433	5	10	2292	1375	6	10	1910	1146	7.5	10
					Long Neck	3581	1074	4	6	2865	1146	5	8	2292	1375	6	10	1910	1146	7.5	6
					Extra Long	−	−	−	−	2865	860	5	6	2292	1146	6	7.5	1910	955	7.5	3
H	Hardened Steel	45−50HRC	100 (60−120)	**VP15TF** Strong Cutting Edge Type	Standard	1989	239	4	4	1591	191	5	5	1273	255	6	7.5	1061	212	7.5	3
					Long Neck	1989	239	4	2	1591	191	5	3	1273	255	6	4	1061	212	7.5	1.5
					Extra Long	−	−	−	−	1591	191	5	2	1273	204	6	1.5	1061	170	7.5	1
	Hardened Steel	50−60HRC	60 (40−100)	**VP15TF** Strong Cutting Edge Type	Standard	1194	143	4	4	955	115	5	5	764	153	6	7.5	637	127	7.5	3
					Long Neck	1194	143	4	2	955	115	5	3	764	153	6	4	637	127	7.5	1.5
					Extra Long	−	−	−	−	955	115	5	2	764	122	6	1.5	637	102	7.5	1
S	Titanium Alloy	≦350HB	50 (30-60)	**MP9120**	Standard	995	299	4	4	796	239	4	5	637	191	6	7.5	531	159	7.5	3
					Long Neck	995	299	2	2	796	239	2	3	637	191	4	4	531	159	3	1.5
					Extra Long	−	−	−	−	796	239	1	2	637	191	2.5	1.5	531	159	1.5	1
	Heat Resistant Alloy	−	40 (30-60)	**MP9120**	Standard	796	239	4	4	637	191	4	5	510	153	6	7.5	425	128	7.5	3
					Long Neck	796	239	2	2	637	191	2	3	510	153	4	4	425	128	3	1.5
					Extra Long	−	−	−	−	637	191	1	2	510	153	2.5	1.5	425	128	1.5	1

■SHOULDER MILLING (Cutting Depth : Large)

Cutting Mode



N : Revolution (min^{-1})
F : Table Feed (mm/min)

Note: Machining Stainless Steels

When up-cut milling stainless steels at large depths and widths of cut, the machined surface is liable to burrs and welding due to chip jamming. For stainless steels, down-cutting (climb milling) is recommended.

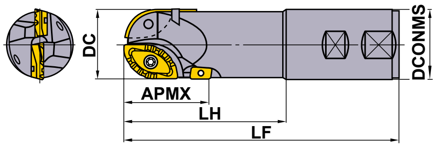
	Material	Hardness	Cutting Speed (m/min)	Insert Grade, Type	Holder Type	Ø16				Ø20				Ø25				Ø30			
						N	F	ap	ae	N	F	ap	ae	N	F	ap	ae	N	F	ap	ae
P	Carbon Steel Alloy Steel	180–280HB	200 (160–250)	**MP6120** **VP15TF** Low Resistance Type	Standard	3979	637	8	4	3183	764	10	4	2546	1273	12.5	5	2122	1273	15	4.5
					Long Neck	3979	477	8	3	3183	509	10	3	2546	1019	12.5	4	2122	849	15	3
					Extra Long	—	—	—	—	3183	382	10	2	2546	764	12.5	2.5	2122	849	15	1.5
		280–350HB	160 (120–200)	**MP6120** **VP15TF** Low Resistance Type	Standard	3183	382	8	4	2546	509	10	4	2037	815	12.5	5	1698	849	15	4.5
					Long Neck	3183	382	8	3	2546	306	10	3	2037	611	12.5	4	1698	509	15	3
					Extra Long	—	—	—	—	2546	306	10	2	2037	489	12.5	2.5	1698	407	15	1.5
	Pre-Hardened Steel	35–45HRC	160 (120–200)	**MP6120** **VP15TF** Low Resistance Type	Standard	3183	382	8	4	2546	509	10	4	2037	815	12.5	5	1698	849	15	4.5
					Long Neck	3183	382	8	3	2546	306	10	3	2037	611	12.5	4	1698	509	15	3
					Extra Long	—	—	—	—	2546	306	10	2	2037	489	12.5	2.5	1698	407	15	1.5
	Alloy Tool Steel	≤350HB	160 (120–200)	**MP6120** **VP15TF** Low Resistance Type	Standard	3183	382	8	4	2546	509	10	4	2037	815	12.5	5	1698	849	15	4.5
					Long Neck	3183	382	8	3	2546	306	10	3	2037	611	12.5	2.5	1698	509	15	3
					Extra Long	—	—	—	—	2546	306	10	2	2037	489	12.5	1.5	1698	407	15	1.5
M	Stainless Steel	≤270HB	200 (100–250)	**VP15TF** Low Resistance Type	Standard	3979	477	8	4	3183	509	10	4	2546	764	12.5	10	2122	849	15	10
					Long Neck	3979	477	8	3	3183	382	10	3	2546	611	12.5	4	2122	509	15	4.5
					Extra Long	—	—	—	—	3183	382	10	2	2546	489	12.5	1.5	2122	340	15	1.5
K	Gray Cast Iron	≤350MPa	200 (150–300)	**VP15TF** Low Resistance Type	Standard	3979	1194	8	8	3183	1273	10	8	2546	1273	12.5	10	2122	1485	15	10
					Long Neck	3979	955	8	5	3183	955	10	4	2546	1273	12.5	7.5	2122	1061	15	4.5
					Extra Long	—	—	—	—	3183	764	10	2	2546	1019	12.5	1.5	2122	849	15	3
	Ductile Cast Iron	≤500MPa	200 (150–280)	**VP15TF** Low Resistance Type	Standard	3979	1194	8	8	3183	1273	10	8	2546	1273	12.5	10	2122	1273	15	10
					Long Neck	3979	955	8	5	3183	955	10	4	2546	1273	12.5	7.5	2122	849	15	4.5
					Extra Long	—	—	—	—	3183	764	10	2	2546	1019	12.5	5	2122	849	15	1.5
	Ductile Cast Iron	≤800MPa	180 (150–250)	**VP15TF** Low Resistance Type	Standard	3581	1074	8	8	2865	1146	10	8	2292	1146	12.5	10	1910	1146	15	10
					Long Neck	3581	859	8	5	2865	860	10	4	2292	1146	12.5	7.5	1910	764	15	4.5
					Extra Long	—	—	—	—	2865	688	10	2	2292	917	12.5	5	1910	764	15	1.5
H	Hardened Steel	45–50HRC	100 (60–120)	**VP15TF** Strong Cutting Edge Type	Standard	1989	239	8	2	1591	191	10	3	1273	255	12.5	4	1061	212	15	3
					Long Neck	1989	239	8	1	1591	191	10	2	1273	204	12.5	1.5	1061	106	15	1.5
					Extra Long	—	—	—	—	1591	191	10	1	—	—	—	—	—	—	—	—
	Hardened Steel	50–60HRC	60 (40–100)	**VP15TF** Strong Cutting Edge Type	Standard	1194	143	8	2	955	115	10	3	764	153	12.5	4	637	127	15	3
					Long Neck	1194	143	8	1	955	115	10	2	764	122	12.5	1.5	637	64	15	1.5
					Extra Long	—	—	—	—	955	115	10	1	—	—	—	—	—	—	—	—
S	Titanium Alloy	≤350HB	50 (30-60)	**MP9120**	Standard	995	199	4	2	796	159	4	3	637	127	6	4	531	106	7.5	3
					Long Neck	995	199	2	1	796	159	2	2	637	127	4	1.5	531	106	3	1.5
					Extra Long	—	—	—	—	796	159	1	1	637	127	2.5	—	531	106	1.5	—
	Heat Resistant Alloy	—	40 (30-60)	**MP9120**	Standard	796	159	4	2	637	127	4	3	510	102	6	4	425	85	7.5	3
					Long Neck	796	159	2	1	637	127	2	2	510	102	4	1.5	425	85	3	1.5
					Extra Long	—	—	—	—	637	127	1	1	510	102	2.5	—	425	85	1.5	—

BALL NOSE END MILL

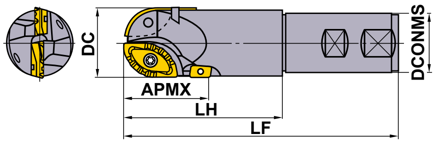
SRM2 ø40 ø50

P M K N S H

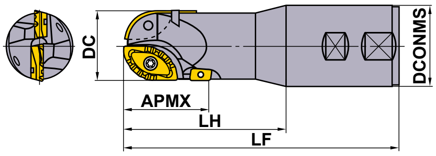
● Weldon Type (Fig.1)



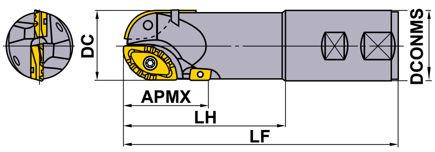
● Weldon Type (Fig.2)



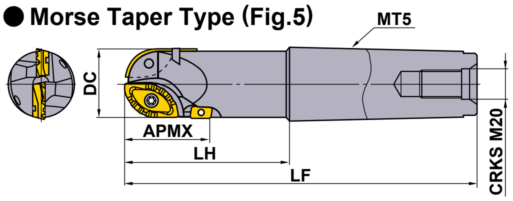
● Weldon Type (Fig.3)



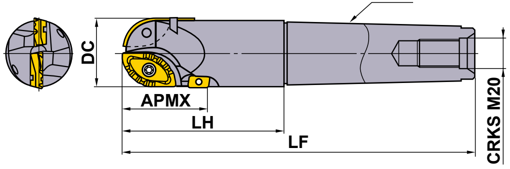
● Weldon Type (Fig.4)



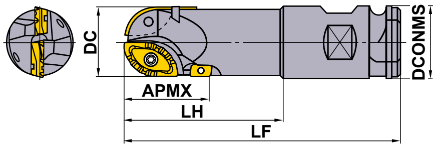
● Morse Taper Type (Fig.5)



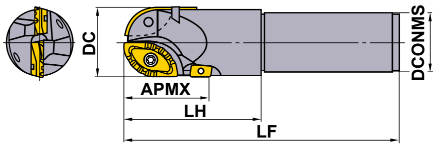
● Morse Taper Type (Fig.6)



● Combination Type (Fig.7)



● Straight Type (Fig.8)



Right hand tool holder only.

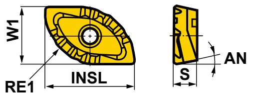
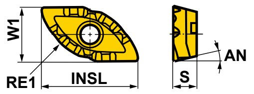
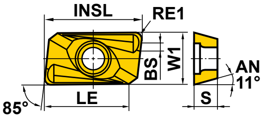
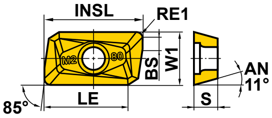
Type		Order Number	Stock		Number of Teeth	Dimensions (mm)						Type (Fig.)	Clamp Screw		Wrench		Insert		
			R			*2 RE	DC	DCONMS	LF	LH	APMX		Inner/Outer *1	Peripheral *1	Inner/Outer	Peripheral	Inner	Outer	Peripheral
Weldon Type	Short	SRM2400I40NLS	●	—	2	20	40	40	190	120	54	1	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2400I50NLS	□	—	2	20	40	50	200	120	54	3	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2500I40NLS	●	—	2	25	50	40	190	120	63	2	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
		SRM2500I50NLS	□	—	2	25	50	50	200	120	63	4	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
	Medium	SRM2400I40NLM	□	—	2	20	40	40	220	150	54	1	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2400I50NLM	□	—	2	20	40	50	230	150	54	3	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2500I40NLM	□	—	2	25	50	40	220	150	63	2	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
		SRM2500I50NLM	□	—	2	25	50	50	230	150	63	4	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
Morse Taper Type	Short	SRM2400MNLS	□	—	2	20	40	—	256	120	54	5	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2500MNLS	★	—	2	25	50	—	256	120	63	6	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
	Medium	SRM2400MNLM	●	—	2	20	40	—	286	150	54	5	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2500MNLM	★	—	2	25	50	—	286	150	63	6	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
Combination Type	Short	SRM2400WNLS	★	—	2	20	40	50.8	200	120	54	7	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2500WNLS	★	—	2	25	50	50.8	200	120	63	7	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
	Medium	SRM2400WNLM	★	—	2	20	40	50.8	250	170	54	7	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2500WNLM	★	—	2	25	50	50.8	250	170	63	7	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
	Long	SRM2500WNLL	★	—	2	25	50	50.8	300	220	63	7	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
		SRM2500WNLX	★	—	2	25	50	50.8	350	270	63	7	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
Straight Type	Short	SRM2400SNLS	★	—	2	20	40	42	200	100	54	8	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2500SNLS	★	—	2	25	50	42	200	100	63	8	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2
	Medium	SRM2400SNLM	★	—	2	20	40	42	250	150	54	8	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-◌2
		SRM2500SNLM	★	—	2	25	50	42	250	100	63	8	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-◌2

*1 Clamp Torque (N • m) : TS43=6.0, TS6=10.0, TS6S=10.0 *2 RE is shown for insert corner R.

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

□ : Non stock, produced to order only. (10 inserts in one case) (Inserts with asterisk (*2) are available in 2 piece in one case)

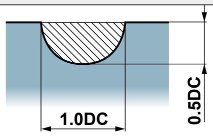
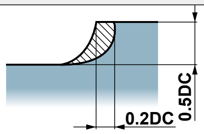
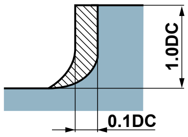
INSERTS

Material		P	Steel	◐	◐	◐	✤	**Cutting Conditions (Guide) :**	● : Stable Cutting	◐ : General Cutting	✤ : Unstable Cutting				
		K	Cast Iron		✤	✤	✤								
Type	Shape	Order Number	Class	Coated				Dimensions (mm)							Geometry
				F7030	**VP15TF**	**VP20RT**	**VP30RT**	**RE1**	**INSL**	**LE**	**W1**	**S**	**BS**	**AN**	
Inner		*2 **SRG40C**	G		●	●	●	20	36	—	20.5	8.0	—	11°	
		*2 **SRG50C**	G		●	●	●	25	40	—	26	8.5	—	11°	
Outer		*2 **SRG40E**	G		●	●	●	20	32	—	16.6	8.0	—	11°	
		*2 **SRG50E**	G		●	●	●	25	35.8	—	20	8.5	—	11°	
*1 Peripheral	**Strong Cutting Edge Type** 	**APMT1604PDER-H2**	M	●	●			0.8	11.71	14	9.525	4.76	1.4	11°	
	Low Resistance Type 	**APMT1604PDER-M2**	M	●	●			0.8	17.10	14	9.525	4.76	1.4	11°	

(Low-resistance inner or outer inserts are precision M class type.)

*1 Selection guide for peripheral cutting edges : The first recommendation is the super sharp M chipbreaker (APMT....PDER-M2).
When cutting edge strength is particularly important, use the H chipbreaker (APMT....PDER-H2).

RECOMMENDED CUTTING CONDITIONS

Cutting Mode	A : Slot Milling	B : Shoulder Milling (Standard Type)	C : Shoulder Milling (Long Cutting Edge Type)
			

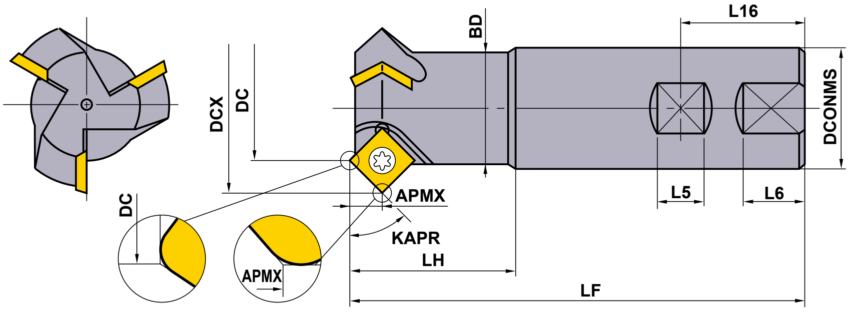
	Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/t.)	Cutting Mode
P	Alloy Tool Steel	≤250HB	**VP20RT** **VP30RT**	160 (120—200)	0.12 (0.08—0.2)	A
					0.2 (0.1—0.4)	B
					0.15 (0.1—0.3)	C
	Alloy Tool Steel	≤250HB	**VP20RT** **VP30RT**	200 (160—250)	0.2 (0.1—0.3)	A
					0.3 (0.1—0.4)	B
					0.2 (0.1—0.4)	C
	Cast Tool Steel	≤235HB	**VP20RT**	200 (160—250)	0.2 (0.1—0.3)	A
					0.3 (0.1—0.4)	B
					0.2 (0.1—0.4)	C
	Cast Tool Steel	≤230HB	**VP15TF** **VP20RT**	200 (160—300)	0.2 (0.1—0.3)	A
					0.3 (0.1—0.45)	B
					0.2 (0.1—0.4)	C
K	Ductile Cast Iron	Tensile Strength ≤540MPa	**VP15TF** **VP20RT**	200 (160—300)	0.25 (0.1—0.4)	A
					0.35 (0.1—0.45)	B
					0.25 (0.1—0.45)	C
	Gray Cast Iron	Tensile Strength ≤350MPa	**VP15TF** **VP20RT**	200 (160—300)	0.25 (0.1—0.4)	A
					0.35 (0.1—0.45)	B
					0.25 (0.1—0.4)	C

CHAMFER MILLING

60° KAPR 45° KAPR 30° KAPR R

CESP/CFSP/CGSP

P M K N S H



Right hand tool holder only.

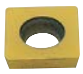
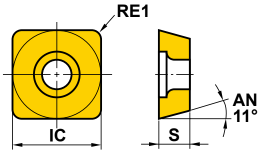
Order Number	Stock	◔	Number of Teeth	Dimensions (mm)											Clamp Screw *	① ②	
	R			KAPR	DC	DCX	LF	DCONMS	BD	LH	L16	L5	L6	APMX	Clamp Screw	Wrench	Insert
CESPR081S20	●	—	1	60°	8	19.6	110	20	19.5	40	25	11	—	10.2	TS52	①TKY25R	SPMW1203○○
CESPR161S20	●	—	1	60°	16	27.8	110	20	19.5	40	25	11	—	10.2	TS5	①TKY25R	SPMW1203○○
CESPR323S32	●	—	3	60°	32	43.8	125	32	31.5	45	36	14	19	10.2	TS5	①TKY25R	SPMW1203○○
CFSPR041S16S	●	—	1	45°	4	15.7	85	16	14.4	25	24	10	—	5.9	TS4	②TKY15F	SPMW0903○○
CFSPR041S16L	●	—	1	45°	4	15.7	110	16	14.4	50	24	10	—	5.9	TS4	②TKY15F	SPMW0903○○
CFSPR081S20	●	—	1	45°	8	24.6	110	20	19.5	40	25	11	—	8.3	TS5	①TKY25R	SPMW1203○○
CFSPR161S20	●	—	1	45°	16	32.6	110	20	19.5	40	25	11	—	8.3	TS5	①TKY25R	SPMW1203○○
CFSPR323S32	●	—	3	45°	32	48.6	125	32	31.5	45	36	14	19	8.3	TS5	①TKY25R	SPMW1203○○
CGSPR081S20	●	—	1	30°	8	28.4	110	20	19.5	40	25	11	—	5.9	TS5	①TKY25R	SPMW1203○○
CGSPR161S20	●	—	1	30°	16	36.4	110	20	19.5	40	25	11	—	5.9	TS5	①TKY25R	SPMW1203○○
CGSPR323S32	●	—	3	30°	32	52.4	125	32	31.5	45	36	14	19	5.9	TS5	①TKY25R	SPMW1203○○

⁎ Clamp Torque (N • m) : TS4=3.5, TS5=7.5, TS52=7.5

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

INSERTS

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Shape	Order Number	Class	Honing	Coated			Cermet			Carbide		Dimensions (mm)			Geometry
				VP15TF	**UP20M**		**NX2525**	NEW **MX3030**	**NX4545**	**UTi20T**	**HTi10**	**IC**	**S**	**RE1**	
Material	**P** Steel			◐	◐		●	◐	◐	◐					
	K Cast Iron			✤			●	◐		✤	◐				
	**SPMW090304**	M	E*	★	●		●	●	●	●	●	9.525	3.18	0.4	
	SPMW090308	M	E*	★	●		★	●	★	●	●	9.525	3.18	0.8	
	SPMW120304	M	E*	★	●		●	●	●	●	●	12.7	3.18	0.4	
	SPMW120308	M	E*	★	●		●	●	●	●	●	12.7	3.18	0.8	

* NX2525 and NX4545 insert honing is "T" type.

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/t.)	
					Chamfer Milling	Face Milling
P	Carbon Steel Alloy Steel	180−280HB	**UTi20T**	80 (60−100)	0.4	0.15
			UP20M	130 (100−160)	0.4	0.2
			NX4545	130 (100−160)	0.4	0.2
		280−350HB	**UTi20T**	80 (60−100)	0.3	0.15
K	Cast Iron	Tensile Strength ≤450MPa	**UTi20T**	100 (85−120)	0.5	0.25
			HTi10	100 (85−120)	0.5	0.25

● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x DC)
● Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

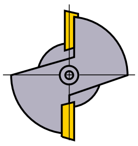
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

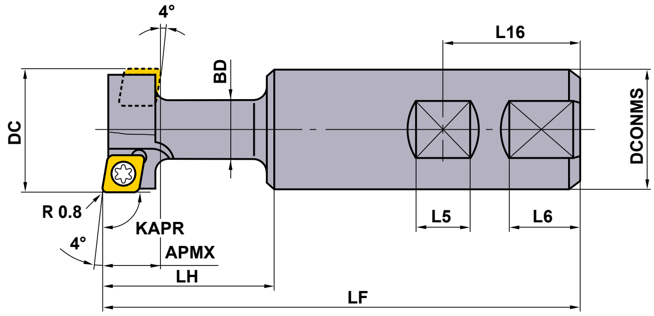
T-SLOT MILLING

90° KAPR

TSMP

P M K N S H





KAPR :90°

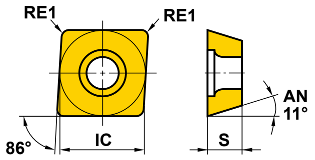
Right hand tool holder only.

Order Number	T Slot Nomenclature	Stock		Number of Teeth	Dimensions (mm)									*	① ②	
		R			DC	LF	DCONMS	BD	LH	L16	L5	L6	APMX	Clamp Screw	Wrench	Insert
TSMPR252S25	14	●	—	2	25	112	25	12.5	33.2	32	12	17	11	TS3	①TKY08D	MPMW070308
TSMPR322S32	18	●	—	2	32	120	32	16	41.2	36	14	19	14	TS4	②TKY15R	MPMW090308
TSMPR402S32	22	●	—	2	40	130	32	20	51.2	36	14	19	18	TS5	②TKY25R	MPMW120408

⁎ Clamp Torque (N • m) : TS3=1.0, TS4=3.5, TS5=7.5

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

INSERTS

Material	**P**	Steel		◐	**Cutting Conditions (Guide) :**			
	K	Cast Iron		✤	● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting			
Shape	Order Number		Class	Carbide	Dimensions (mm)			Geometry
				UTi20T	**IC**	**S**	**RE1**	
	**MPMW070308**		M	●	7.94	3.18	0.8	
	MPMW090308		M	●	9.525	3.18	0.8	
	MPMW120408		M	●	12.7	4.76	0.8	

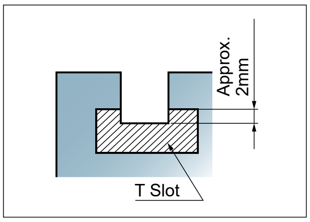
RECOMMENDED CUTTING CONDITIONS

Material		Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel Alloy Steel	180−280HB	**UTi20T**	130 (100−160)	0.15 (0.1−0.2)
		280−350HB	**UTi20T**	80 (60−100)	0.1 (0.05−0.15)
K	Cast Iron	Tensile Strength ≤450MPa	**UTi20T**	100 (80−120)	0.15 (0.1−0.2)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x DC)

■ CAUTION FOR USE

- When T slot machining steel, the workpiece must be pre-machined as shown in the drawing, so as to ensure smooth chip evacuation.
- Slots to be machined must be free from chips for smooth machining.

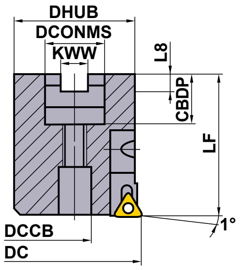


VERTICAL FEED MILLING

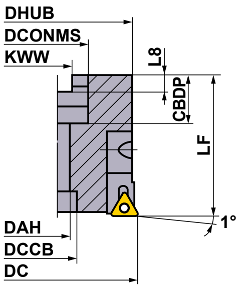
PMF

P	M	K	N	S	H

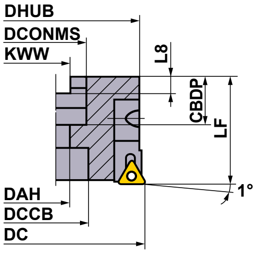
ø50



ø63



ø80

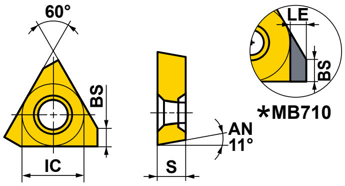


Right hand tool holder only.

Order Number	Stock		Number of Teeth	Dimensions (mm)									Cartridge	Clamp Screw *	Radial Screw	Set Bolt (Cartridge) *	Wrench	Wrench	Set Bolt	Insert
	R			DC	LF	DCONMS	CBDP	DAH	DCCB	KWW	L8	DHUB								
PMF05004A22R	★	—	4	50	63	22	20	—	12	10.4	6.3	48	PMFA13R	TS254	TSS04005	HBH06012	TKY08F	HKY40R HKY50R	①HDS10031	TPEW 1303 ZP◌R2
PMF06306A22R	★	—	6	63	63	22	20	11	18	10.4	6.3	60	PMFA13R	TS254	TSS04005	HBH06012	TKY08F	HKY40R	②HSC10050	
PMF08008A27R	●	—	8	80	50	27	23	13.5	30	12.4	7	75	PMFA13R	TS254	TSS04005	HBH06012	TKY08F	HKY40R	②HSC12035	

* Clamp Torque (N • m) : TS254=1.0, HBH06012=8.5

INSERTS

Material	P	Steel		◐	◐					Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting				
	K	Cast Iron		✣	◐			◐						
Shape	Order Number		Class	Coated				CBN		Dimensions (mm)				Geometry
				VP15TF	AP10H			MB710		IC	LE	S	BS	
	**TPEW1303ZPER2**		E	●	●					7.94	—	3.18	2	
 *	* **TPEW1303ZPTR2**		E					●		7.94	1.5	3.18	2	

● : Inventory maintained. ★ : Inventory maintained in Japan.
(10 inserts in one case) (CBN inserts are available in 1 piece in one case.)

RECOMMENDED CUTTING CONDITIONS

Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/t.)
P	Carbon Steel Alloy Steel	180—280HB	**VP15TF**	250 (150—350)	0.1 (0.05—0.15)
		280—380HB	**VP15TF**	200 (100—300)	
K	Gray Cast Iron	Tensile Strength ≤350MPa	**AP10H**	350 (200—500)	0.1 (0.05—0.15)
			MB710	1500 (1000—2000)	

Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/t.)
K	Ductile Cast Iron	Tensile Strength 360—500MPa	**AP10H**	250 (150—350)	0.1 (0.05—0.15)
			MB710	1000 (800—1200)	
	Ductile Cast Iron	Tensile Strength 500—800MPa	**AP10H**	200 (100—300)	0.1 (0.05—0.15)
			MB710	1000 (800—1200)	

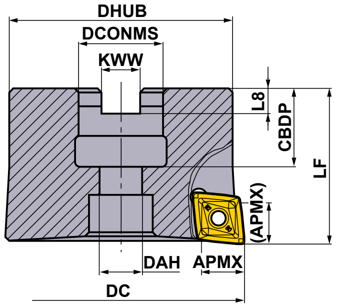
- ●Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x DC)
- ●Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

Note 1) Recommended radial depth of cut is 0.1 mm.
Note 2) 2 directional vertical cutting is recommended for efficiency.
Note 3) For crossfeed cutting, the feed per tooth should be reduced to less than 0.05(mm/t.).

VERTICAL FEED MILLING

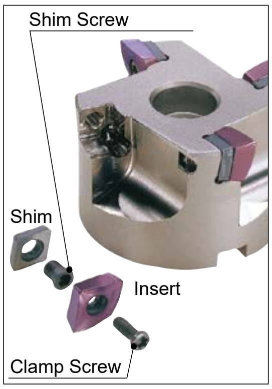
PMR

P M K N S H



Right hand tool holder only.

Type	Order Number	Stock		Number of Teeth	Dimensions (mm)									Insert
		R			DC	LF	DCONMS	CBDP	DAH	DHUB	KWW	L8	APMX	
Metric	**PMR405003A22R**	★	—	3	50	40	22	20	11	45	10.4	6.3	11	CPMT1205ZPEN-M2/3
	PMR405203A22R	☐	—	3	52	40	22	20	11	47	10.4	6.3	11	CPMT1205ZPEN-M2/3
	PMR406304A22R	★	—	4	63	40	22	20	11	57	10.4	6.3	11	CPMT1205ZPEN-M2/3
	PMR406604A27R	☐	—	4	66	50	27	23	13	60	12.4	7	11	CPMT1205ZPEN-M2/3
Inch	**PMR405003BR**	★	—	3	50	40	22.225	19	11	45	8.4	5	11	CPMT1205ZPEN-M2/3
	PMR406304BR	★	—	4	63	40	22.225	19	11	57	8.4	5	11	CPMT1205ZPEN-M2/3



SPARE PARTS

Tool Holder Number	Shim	Shim Screw *	Clamp Screw ① ② *	Wrench (Insert) ① ②	Wrench (Shim)	Set Bolt
PMR405003A22R	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
PMR405203A22R	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
PMR406304A22R	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
PMR406604A22R	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
PMR405003BR	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
PMR406304BR	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035

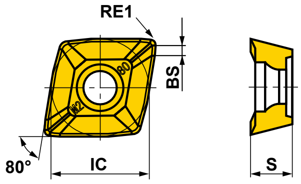
* Clamp Torque (N • m) : TPS35=3.5, CSF401260T=5.0, WCS503507H=5.0, WCS604010H=7.0

● : Inventory maintained.   ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only. (10 inserts in one case)

INSERTS

Material						
Material	P	Steel	◐			
	K	Cast Iron	✤			

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Shape	Order Number	Class	Coated				Dimensions (mm)				Geometry
			VP15TF				**IC**	**S**	**BS**	**RE1**	
	**CPMT1205ZPEN-M2**	M	●				12.7	5.56	1.4	0.8	
	CPMT1205ZPEN-M3	M	★				12.7	5.56	1.4	1.2	

RECOMMENDED CUTTING CONDITIONS

Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/t.)	pf (mm)
P	Carbon Steel Alloy Steel	180—280HB	**VP15TF**	180 (150—200)	0.2 (0.1—0.3)	≤0.5DC
		280—380HB				
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP15TF**	180 (150—200)	0.2 (0.1—0.3)	≤0.5DC
	Ductile Cast Iron	Tensile Strength 360—500MPa	**VP15TF**	150 (120—170)	0.2 (0.1—0.3)	≤0.5DC
		Tensile Strength 500—800MPa	**VP15TF**	120 (100—150)	0.2 (0.1—0.3)	≤0.5DC

●Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x DC)
●Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution
Note 1) The above conditions are suitable for general machining purposes, it is possible to use conditions that are different from the above.
Note 2) For horizontal feed machining, please reduce the feed rate by 20—40%.
Note 3) If vibration occurs when machining, please reduce the depth of cut and reduce the cutting speed by 20—50%.

MULTI FUNCTIONAL MILLING

ARP

P **M** K N **S** H

Fig.1

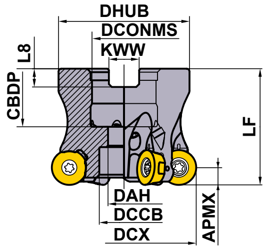
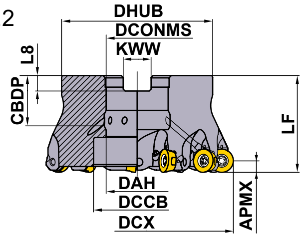
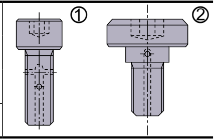


Fig.2



Right hand (R) only for the standard.

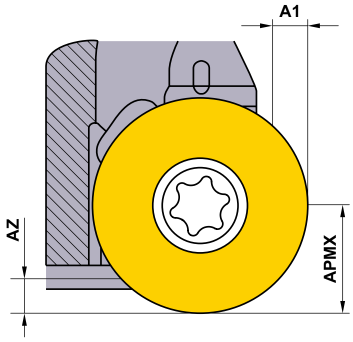
Cutter Diameter **DCX** (mm)	Set Bolt	Geometry	
Ø40	HSC08025H		
Ø50, Ø63	HSC10030H	①	
Ø80	HSC12035H		
Ø100	MBA16033H	②	

ARBOR TYPE

GAMP:+4° GAMF:-6°

Type	Cutting Edge R (APMX)	Order Number	Stock		Number of Teeth	Dimensions (mm)									WT* (kg)	Max. Depth of Cut (mm)			RMPX	Fig.
			R			DCX	DHUB	LF	DCONMS	CBDP	DAH	DCCB	KWW	L8		APMX	A1	AZ		
Fine Pitch	5	**ARP5P-040A05AR**	●	●	5	40	34	40	16	18	9	14	8.4	5.6	0.15	5.0	2.0	1.30	2.8°	1
		ARP5P-042A05AR	●	●	5	42	34	40	16	18	9	14	8.4	5.6	0.16	5.0	2.5	1.4	2.8°	1
		ARP5P-050A06AR	●	●	6	50	45	40	22	20	11	17	10.4	6.3	0.27	5.0	2.0	1.85	2.9°	1
		ARP5P-052A06AR	●	●	6	52	45	40	22	20	11	17	10.4	6.3	0.29	5.0	2.5	2	3.0°	1
		ARP5P-063A07AR	●	●	7	63	50	40	22	20	11	17	10.4	6.3	0.46	5.0	2.5	2.50	3.0°	1
Extra Fine Pitch	5	**ARP5P-042A06AR**	●	●	6	42	34	40	16	18	9	14	8.4	5.6	1.6	5.0	2.5	1.4	2.8°	1
		ARP5P-050A07AR	●	●	7	50	45	40	22	20	11	17	10.4	6.3	0.27	5.0	2.0	1.85	2.9°	1
		ARP5P-052A07AR	●	●	7	52	45	40	22	20	11	17	10.4	6.3	0.29	5.0	2.5	2	3.0°	1
		ARP5P-063A08AR	●	●	8	63	50	40	22	20	11	17	10.4	6.3	0.46	5.0	2.5	2.50	3.0°	1
Fine Pitch	6	**ARP6P-040A04AR**	●	●	4	40	34	40	16	18	9	13.4	8.4	5.6	0.15	6.0	2.0	1.15	2.7°	1
		ARP6P-050A05AR	●	●	5	50	45	40	22	20	11	17	10.4	6.3	0.26	6.0	2.0	1.70	2.9°	1
		ARP6P-052A05AR	●	●	5	52	45	40	22	20	11	17	10.4	6.3	0.28	6.0	2.5	1.8	2.9°	1
		ARP6P-063A06AR	●	●	6	63	50	40	22	20	11	17	10.4	6.3	0.44	6.0	2.5	2.50	3.1°	1
		ARP6P-066X06AR	●	●	6	66	56	50	27	23	13	20	12.4	7	0.64	6.0	2.5	2.5	2.9°	1
		ARP6P-080A08AR	●	●	8	80	56	50	27	23	13	20	12.4	7	0.88	6.0	2.5	2.50	2.3°	1
		ARP6P-100B09AR	●	●	9	100	78	50	32	26	32	45	14.4	8	1.47	6.0	2.5	2.50	1.7°	2
Extra Fine Pitch	6	**ARP6P-050A06AR**	●	●	6	50	45	40	22	20	11	17	10.4	6.3	0.25	6.0	2.0	1.70	2.9°	1
		ARP6P-052A06AR	●	●	6	52	45	40	22	20	11	17	10.4	6.3	0.27	6.0	2.5	1.8	2.9°	1
		ARP6P-063A07AR	●	●	7	63	50	40	22	20	11	17	10.4	6.3	0.44	6.0	2.5	2.50	3.1°	1
		ARP6P-066X07AR	●	●	7	66	56	50	27	23	13	20	12.4	7	0.64	6.0	2.5	2.5	2.9°	1
		ARP6P-080A09AR	●	●	9	80	56	50	27	23	13	20	12.4	7	0.88	6.0	2.5	2.50	2.3°	1
		ARP6P-100B11AR	●	●	11	100	78	50	32	26	32	45	14.4	8	1.45	6.0	2.5	2.50	1.7°	2

* WT : Tool Weight



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

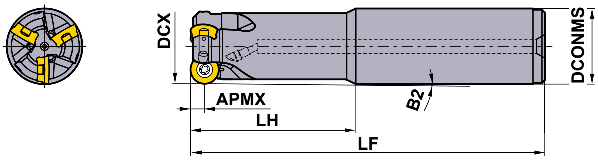


Fig.1

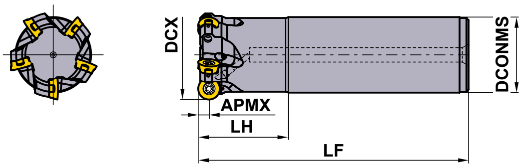


Fig.2

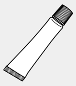
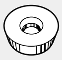
SHANK TYPE

GAMP:+4° GAMF:-6°—-7°

Type	Cutting Edge R (APMX)	Order Number	Stock		Number of Teeth	Dimensions (mm)					* WT (kg)	Max. Depth of Cut (mm)			RMPX	Fig.
			R			DCX	DCONMS	LF	LH	B2		APMX	A1	AZ		
Standard	5	**ARP5PR2503SA25M**	★	●	3	25	25	140	60	1.10°	0.42	5.0	1.0	0.40	1.8°	1
		ARP5PR3204SA32M	★	●	4	32	32	150	70	0.92°	0.77	5.0	1.0	0.65	1.9°	1
Long	5	**ARP5PR2502SA25L**	★	●	2	25	25	180	80	0.80°	0.56	5.0	1.0	0.40	1.8°	1
		ARP5PR3203SA32L	★	●	3	32	32	200	120	0.51°	1.01	5.0	1.0	0.65	1.9°	1
Standard	6	**ARP6PR3203SA32M**	★	●	3	32	32	150	70	0.94°	0.76	6.0	1.0	0.60	2.0°	1
		ARP6PR4004SA32M	★	●	4	40	32	150	50	–	0.85	6.0	2.5	1.15	2.7°	2
		ARP6PR5005SA42M	★	●	5	50	42	150	50	–	1.47	6.0	2.5	1.70	2.9°	2
Long	6	**ARP6PR3202SA32L**	★	●	2	32	32	200	120	0.52°	1.00	6.0	1.0	0.60	2.0°	1
		ARP6PR4003SA32L	★	●	3	40	32	250	50	–	1.48	6.0	2.5	1.15	2.7°	2
		ARP6PR5004SA42L	★	●	4	50	42	250	50	–	2.53	6.0	2.5	1.70	2.9°	2

∗ WT : Tool Weight

SPARE PARTS

Tool Holder Number	 ∗1			
	Insert Screw	Wrench	Anti-seize Lubricant	Insert
ARP5	TPS351B	TIP10D	MK1KS	RP◌T1040M0E4-◌
ARP6	TPS4	TIP15D	MK1KS	RP◌T1248M0E4-◌

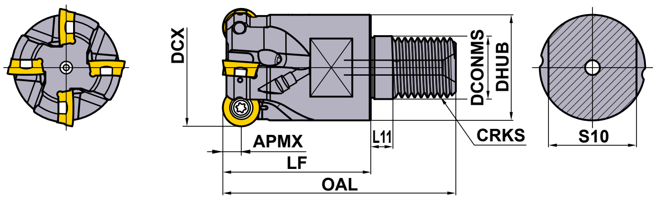
∗1 Clamp Torque (N • m) : TPS351B=2.5,TPS4=3.5

∗2 Coolant nozzles are available with varying diameters for adjusting coolant pressure. Select nozzles as required by the specification.

	≤1Mpa (≤20 l/min.)	←Standard→	**≥5Mpa (≥30 l/min.)**	**≥7Mpa (≥50 l/min.)**
Nozzle Dia.	ø0.6mm	ø0.8mm	ø1.2mm	ø1.6mm
Order Number	**HSD04004H06**	**HSD04004H08**	**HSD04004H12**	**HSD04004H16**

∗ Clamp Torque (N • m) : HSD0400H◌◌=1.5

∗3 The part number for a blank screw without a through nozzle is HSS04004.



■SCREW-IN TYPE

GAMP:+4° GAMF:-6°—-7°

Type	Cutting Edge R (APMX)	Order Number	Stock		Number of Teeth	Dimensions (mm)								* WT (kg)	Max. Depth of Cut (mm)			RMPX
			R			DCX	DCONMS	DHUB	OAL	LF	L11	S10	CRKS		APMX	A1	AZ	
Standard	5	**ARP5PR2502AM1235**	●	●	2	25	12.5	23.5	57	35	6	19	M12	0.10	5.0	–	0.40	1.8°
		ARP5PR3203AM1640	●	●	3	32	17.0	28.5	63	40	6	24	M16	0.16	5.0	1.0	0.65	1.9°
Fine Pitch	5	**ARP5PR2503AM1235**	●	●	3	25	12.5	23.5	57	35	6	19	M12	0.09	5.0	–	0.40	1.8°
		ARP5PR3204AM1640	●	●	4	32	17.0	28.5	63	40	6	24	M16	0.15	5.0	1.0	0.65	1.9°
Standard	6	**ARP6PR3202AM1640**	●	●	2	32	17.0	28.5	63	40	6	24	M16	0.18	6.0	1.0	0.60	2.0°
		ARP6PR4003AM1640	●	●	3	40	17.0	28.5	63	40	6	24	M16	0.20	6.0	2.5	1.15	2.7°
Fine Pitch	6	**ARP6PR3203AM1640**	●	●	3	32	17.0	28.5	63	40	6	24	M16	0.17	6.0	1.0	0.60	2.0°
		ARP6PR4004AM1640	●	●	4	40	17.0	28.5	63	40	6	24	M16	0.20	6.0	2.5	1.15	2.7°

* WT : Tool Weight

Note 1) For screw-in type arbors, refer to page K260.

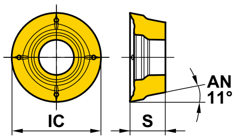
● : Inventory maintained.
(10 inserts in one case)

INSERTS

Material			MC7020	MP7130	MP9130	MP9140
Material	M	Stainless Steels	◐	◐		
	S	Heat-resistant Alloys, Titanium Alloys			◐	◐

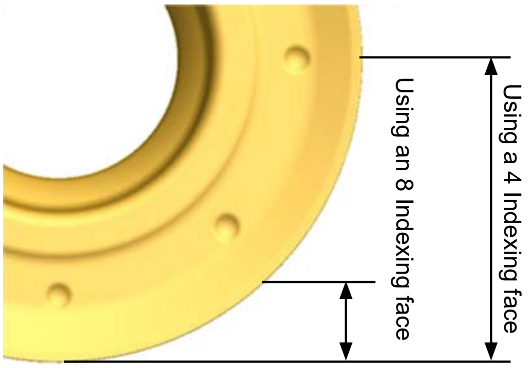
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting
✣ : Unstable Cutting

Honing :
E : Round

Shape	Holder	Order Number	Type	Class	Honing	Coated				Dimensions (mm)		APMX (mm)		Geometry
						MC7020	MP7130	MP9130	MP9140	IC	S	4 Seats	8 Seats	
	ARP5	**RPHT1040M0E4-L**	Low Resistance, High Precision	H	E	●	●	●		10	3.97	5.0	−	
		RPMT1040M0E4-L	Low Resistance	M	E	●	●	●		10	3.97	5.0	−	
		RPMT1040M0E8-L1	Low Resistance, 8 Seats	M	E	●	●	●	●	10	3.97	5.0	1.4	
		RPMT1040M0E4-L2	Low Resistance, High Rigidity	M	E				●	10	3.97	5.0	−	
		RPHT1040M0E4-M	General, High Precision	H	E	●	●	●		10	3.97	5.0	−	
		RPMT1040M0E4-M	General Purpose	M	E	●	●	●		10	3.97	5.0	−	
		RPMT1040M0E8-M1	General, 8 Seats	M	E	●	●	●	●	10	3.97	5.0	1.4	
		RPMT1040M0E4-M2	General, High Rigidity	M	E				●	10	3.97	5.0	−	
		RPHT1040M0E4-R	Reinforced Edge, High Precision	H	E	●	●	●		10	3.97	5.0	−	
		RPMT1040M0E4-R	Reinforced Edge	M	E	●	●	●		10	3.97	5.0	−	
		RPMT1040M0E8-R1	Reinforced Edge, 8 Seats	M	E	●	●	●		10	3.97	5.0	1.4	
	ARP6	**RPHT1248M0E4-L**	Low Resistance, High Precision	H	E	●	●	●		12	4.76	6.0	−	
		RPMT1248M0E4-L	Low Resistance	M	E	●	●	●		12	4.76	6.0	−	
		RPMT1248M0E8-L1	Low Resistance, 8 Seats	M	E	●	●	●	●	12	4.76	6.0	1.7	
		RPMT1248M0E4-L2	Low Resistance, High Rigidity	M	E				●	12	4.76	6.0	−	
		RPHT1248M0E4-M	General, High Precision	H	E	●	●	●		12	4.76	6.0	−	
		RPMT1248M0E4-M	General Purpose	M	E	●	●	●		12	4.76	6.0	−	
		RPMT1248M0E8-M1	General, 8 Seats	M	E	●	●	●	●	12	4.76	6.0	1.7	
		RPMT1248M0E4-M2	General, High Rigidity	M	E				●	12	4.76	6.0	−	
		RPHT1248M0E4-R	Reinforced Edge, High Precision	H	E	●	●	●		12	4.76	6.0	−	
		RPMT1248M0E4-R	Reinforced Edge	M	E	●	●	●		12	4.76	6.0	−	
		RPMT1248M0E8-R1	Reinforced Edge, 8 Seats	M	E	●	●	●		12	4.76	6.0	1.7	

Depth of cut (ap) for 8 indexing face insert

8 indexing face type inserts can also be used at the same depth of cut as the 4 face type insert.



ARBORS ➢ K260
SPARE PARTS ➢ N001
TECHNICAL DATA ➢ P001

RECOMMENDED CUTTING CONDITIONS

■ Dry cutting

	Material	Hardness	Grade	**Vc** (m/min)	**fz** (mm/t.)
M	Austenitic Stainless Steel	≤200HB	**MC7020**	220 (170–270)	0.2 (0.1–0.35)
			MP7130	200 (150–250)	0.2 (0.1–0.35)
	Austenitic Stainless Steel	>200HB	**MC7020**	190 (140–240)	0.2 (0.1–0.35)
			MP7130	170 (120–220)	0.2 (0.1–0.35)
	Two-phase Stainless Steel	≤280HB	**MC7020**	180 (130–230)	0.2 (0.1–0.35)
			MP7130	160 (110–210)	0.2 (0.1–0.35)
	Ferritic and Martensitic Stainless Steel	≤200MPa	**MC7020**	240 (190–290)	0.2 (0.1–0.35)
			MP7130	200 (150–250)	0.2 (0.1–0.35)
	Ferritic and Martensitic Stainless Steel	>200HB	**MC7020**	240 (190–290)	0.2 (0.1–0.35)
			MP7130	200 (150–250)	0.2 (0.1–0.35)
	Hardened Stainless Steel	<450HB	**MC7020**	170 (120–220)	0.2 (0.1–0.35)
			MP7130	150 (100–200)	0.2 (0.1–0.35)

■ Wet cutting

	Material	Hardness	Grade	**Vc** (m/min)	**fz** (mm/t.)
M	Austenitic Stainless Steel	≤200HB	**MC7020**	150 (100–200)	0.2 (0.1–0.35)
			MP7130	130 (80–180)	0.2 (0.1–0.35)
	Austenitic Stainless Steel	>200HB	**MC7020**	120 (70–170)	0.2 (0.1–0.35)
			MP7130	100 (80–150)	0.2 (0.1–0.35)
	Two-phase Stainless Steel	≤280HB	**MC7020**	120 (70–170)	0.2 (0.1–0.35)
			MP7130	100 (80–150)	0.2 (0.1–0.35)
	Ferritic and Martensitic Stainless Steel	≤200MPa	**MC7020**	170 (120–220)	0.2 (0.1–0.35)
			MP7130	130 (80–180)	0.2 (0.1–0.35)
	Ferritic and Martensitic Stainless Steel	>200HB	**MC7020**	170 (120–220)	0.2 (0.1–0.35)
			MP7130	130 (80–180)	0.2 (0.1–0.35)
	Hardened Stainless Steel	<450HB	**MC7020**	110 (60–160)	0.2 (0.1–0.35)
			MP7130	90 (50–140)	0.2 (0.1–0.35)
S	Titanium Alloy	–	**MP9130**	45 (30–55)	0.1 (0.05–0.15)
	Heat Resistant Alloy	–	**MP9130**	35 (15–45)	0.1 (0.05–0.15)

Note 1) Actual cutting conditions are estimated to avoid chatter vibration with high rigidity of a machine or workpiece.
Make appropriate adjustments when chatter and/or insert chipping occurs during cutting.
Use with lowered conditions when there is a big overhang and/or when pocket-cutting.

Note 2) The depth of cut is ap = 2.5mm with ARP5 axial cutting. With ARP6, use ap = 3mm.
Use while matching the ap fluctuation and correction value F of the respective table.
Example: The feed for when using ARP5,SUS304, MP7130,ap=1: 0.2 mm/t.×1.5 (correction value F)=0.3 mm/t.

Note 3) For grooving, use feed at the recommended 70% level. For ramping, drilling, and plunging, use 50% level.

Note 4) Internal coolant is recommended in titanium alloy and heat resistant alloy cutting.
When the separately available coolant nozzle is used, it is more effective.

MAXIMUM CAPACITIES BY EACH CUTTING

Cutting Edge	Maximum hole diameter	Order Number	Install	Type	Recommendation (mm)		Ramping	Helical Drilling		Drilling Depth	Plunging
APMX (mm)	**DCX** (mm)				**ap**	**ae**	**RMPX**(deg)	Smallest hole **DH min.**(mm)	Largest hole **DH max.**(mm)	Maximum **AZ**(mm)	**AE1**(mm)
5	25	**ARP5PR2502AM1235**	Screw-in	Standard	≦2.5	≦1.00DCX	1.8°	40	48	0.40	—
		ARP5PR2503AM1235	Screw-in	Fine Pitch	≦1.5	≦1.00DCX	1.8°	40	48	0.40	—
		ARP5PR2503SA25M	Shank	Standard	≦1.5	≦1.00DCX	1.8°	40	48	0.40	1.0
		ARP5PR2502SA25L	Shank	Long	≦1.5	≦1.00DCX	1.8°	40	48	0.40	1.0
	32	**ARP5PR3203AM1640**	Screw-in	Standard	≦2.5	≦1.00DCX	1.9°	54	62	0.65	1.0
		ARP5PR3204AM1640	Screw-in	Fine Pitch	≦2.5	≦1.00DCX	1.9°	54	62	0.65	1.0
		ARP5PR3204SA32M	Shank	Standard	≦2.5	≦1.00DCX	1.9°	54	62	0.65	1.0
		ARP5PR3203SA32L	Shank	Long	≦2.5	≦1.00DCX	1.9°	54	62	0.65	1.0
	40	**ARP5P-040A05AR**	Arbor	Fine Pitch	≦2.5	≦1.00DCX	2.8°	70	78	1.30	2.0
	50	**ARP5P-050A06AR**	Arbor	Fine Pitch	≦2.5	≦1.00DCX	2.9°	90	98	1.85	2.0
		ARP5P-050A07AR	Arbor	Extra Fine Pitch	≦1.5	≦1.00DCX	2.9°	90	98	1.85	2.0
	63	**ARP5P-063A07AR**	Arbor	Fine Pitch	≦2.5	≦0.75DCX	3.0°	116	124	2.50	2.5
		ARP5P-063A08AR	Arbor	Extra Fine Pitch	≦1.5	≦0.75DCX	3.0°	116	124	2.50	2.5
6	32	**ARP6PR3202AM1640**	Screw-in	Standard	≦3.5	≦1.00DCX	2.0°	52	62	0.60	1.0
		ARP6PR3203AM1640	Screw-in	Fine Pitch	≦3.5	≦1.00DCX	2.0°	52	62	0.60	1.0
		ARP6PR3203SA32M	Shank	Standard	≦3.5	≦1.00DCX	2.0°	52	62	0.60	1.0
		ARP6PR3202SA32L	Shank	Long	≦3.5	≦1.00DCX	2.0°	52	62	0.60	1.0
	40	**ARP6PR4003AM1640**	Screw-in	Standard	≦3.5	≦1.00DCX	2.7°	68	78	1.15	2.5
		ARP6PR4004AM1640	Screw-in	Fine Pitch	≦3.5	≦1.00DCX	2.7°	68	78	1.15	2.5
		ARP6PR4004SA32M	Shank	Standard	≦3.5	≦1.00DCX	2.7°	68	78	1.15	2.5
		ARP6PR4003SA32L	Shank	Long	≦3.5	≦1.00DCX	2.7°	68	78	1.15	2.5
		ARP6P-040A04AR	Arbor	Fine Pitch	≦3.5	≦1.00DCX	2.7°	68	78	1.15	2.0
	50	**ARP6PR5005SA42M**	Shank	Standard	≦3.5	≦1.00DCX	2.9°	88	98	1.70	2.5
		ARP6PR5004SA42L	Shank	Long	≦3.5	≦1.00DCX	2.9°	88	98	1.70	2.5
		ARP6P-050A05AR	Arbor	Fine Pitch	≦3.5	≦1.00DCX	2.9°	88	98	1.70	2.0
		ARP6P-050A06AR	Arbor	Extra Fine Pitch	≦2.5	≦1.00DCX	2.9°	88	98	1.70	2.0
	63	**ARP6P-063A06AR**	Arbor	Fine Pitch	≦3.5	≦0.75DCX	3.1°	114	124	2.50	2.5
		ARP6P-063A07AR	Arbor	Extra Fine Pitch	≦2.5	≦0.75DCX	3.1°	114	124	2.50	2.5
	80	**ARP6PR08008CA**	Arbor	Fine Pitch	≦3.5	≦0.60DCX	2.3°	148	158	2.50	2.5
		ARP6PR08009CA	Arbor	Extra Fine Pitch	≦2.5	≦0.60DCX	2.3°	148	158	2.50	2.5
	100	**ARP6PR10009DA**	Arbor	Fine Pitch	≦3.5	≦0.50DCX	1.7°	188	198	2.50	2.5
		ARP6PR10011DA	Arbor	Extra Fine Pitch	≦2.5	≦0.50DCX	1.7°	188	198	2.50	2.5

Note 1) Tool body durability may weaken when the amount of axial cutting exceeds ARP5 = 5 mm and ARP6 = 6 mm.

Note 2) When drilling, be careful of long scattered cutting chips.

Note 3) When cutting helical holes, do not exceed the largest APMX cutting depth per one rotation.

Note 4) Calculate using the following formula for centre tool tracks and Ødc when cutting helical holes : Centre tool tracks Ødc=desired hole diameter ØDH tool diameter ØDCX

Note 5) For preventing trouble with cutting chip biting, especially when grooving, ramping, helical cutting, and drilling, thoroughly eliminate cutting chips with an air blower or the like.

Note 6) Chip pockets are small for on small diameter cutters. Use with caution the ae and ap feed due to the possibility of cutting blockage.

Note 7) When cutting large ae with large diameter cutter, blockage from long chips is possible. Regulate ap and feed.

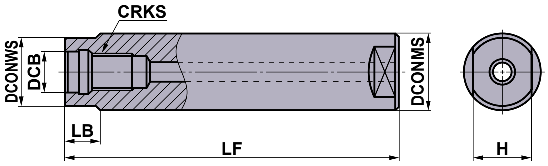
■ CORRECTION LEVEL F FEED AMOUNT FOR 1 BLADE, BASED ON AXIAL CUTTING AP FLUCTUATION

Holder	ap=0.5mm	ap=1mm	ap=1.5mm	ap=2mm	ap=2.5mm	ap=3mm	ap=3.5mm	ap=4mm	ap=5mm	ap=6mm
ARP5	2.3	1.5	1.2	1.1	1.0	0.9	0.8	0.8	0.8	–
ARP6	2.5	1.7	1.3	1.1	1.0	1.0	0.9	0.9	0.8	0.8

Note 1) Tool body durability may weaken, when the amount of axial cutting exceeds ARP5=5mm and ARP6=6mm.

ARBORS

■STRAIGHT SHANK ARBOR



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

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.

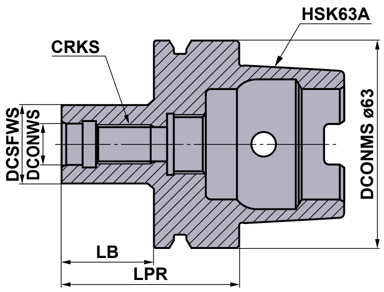
②Tighten the head at the recommended torque and ensure that there is no gap between the head and arbor.

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

●Cutting tools become extremely hot during cutting. Never touch them with bare hands after operation as this may produce risk of injuries or burns.
●Do not handle the cutting tools with bare hands as this may cause injuries.

★ : Inventory maintained in Japan.

■ HSK63A SHANK ARBOR



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

Note 1) The HSK63A shank type has a built-in coolant pipe for installation.

MAXIMUM ALLOWABLE REVOLUTION FOR EACH CUTTER

Diameter (mm)	WSX445		ASX445		WWX400		ASX400		FMAX	
	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)
40	19000	3.5	—	—	—	—	—	—	30000	3.5
50	17000	3.5	18000	3.5	5000	5.0	18000	3.5	30000	3.5
63	15000	3.5	16000	3.5	14100	5.0	16000	3.5	27000	3.5
80	14000	3.5	14000	3.5	12200	5.0	14000	3.5	24500	3.5
100	12000	3.5	13000	3.5	10700	5.0	13000	3.5	22000	3.5
125	11000	3.5	12000	3.5	9500	5.0	12000	3.5	19600	3.5
160	9500	3.5	10000	3.5	8300	5.0	10000	3.5	—	—
200	8500	3.5	9000	3.5	7300	5.0	9000	3.5	—	—
250	—	—	8000	3.5	6400	5.0	8000	3.5	—	—
315	—	—	6500	3.5	—	—	—	—	—	—

Diameter (mm)	AHX440S		AHX475S		AHX640S		AHX640W		WJX14	
	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)
40	21000	3.5	—	—	—	—	—	—	—	—
50	19800	3.5	18300	3.5	—	—	—	—	5000	5.0
52	—	—	—	—	—	—	—	—	5000	5.0
63	18300	3.5	17200	3.5	12000	5	—	—	18200	5.0
66	—	—	—	—	—	—	—	—	17700	5.0
80	16500	3.5	15700	3.5	10000	5	8900	6	15600	5.0
100	14600	3.5	14000	3.5	8700	5	7800	6	13500	5.0
125	12600	3.5	12200	3.5	7500	5	6600	6	11600	5.0
160	10200	3.5	9900	3.5	6100	5	5300	6	9900	5.0
200	—	—	—	—	5100	5	4100	6	—	—
250	—	—	—	—	—	—	2900	6	—	—
315	—	—	—	—	—	—	1700	6	—	—

Diameter (mm)	AXD4000		AXD7000		VPX200		VPX300		WJX09	
	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)
16	—	—	—	—	37900	1.0	—	—	—	—
18	—	—	—	—	35300	1.0	—	—	—	—
20	15000	1.5	—	—	33200	1.0	—	—	—	—
22	—	—	—	—	31400	1.0	—	—	—	—
25	49000	1.5	—	—	29000	1.0	24100	3.0	33500	2.0
28	48500	1.5	—	—	27200	1.0	22500	3.0	30300	2.0
30	—	—	—	—	26000	1.0	21500	3.0	—	—
32	48000	1.5	41000	3.5	25100	1.0	20600	3.0	27300	2.0
35	45000	1.5	—	—	23800	1.0	19500	3.0	25500	2.0
40	41000	1.5	36000	3.5	22000	1.0	17900	3.0	23200	2.0
50	35000	1.5	30000	3.5	19200	1.0	15500	3.0	20000	2.0
52	—	—	—	—	—	—	—	—	19500	2.0
63	30000	1.5	25000	3.5	16700	1.0	13400	3.0	17300	2.0
66	—	—	—	—	—	—	—	—	16800	2.0
80	27000	1.5	23000	3.5	—	—	11500	3.0	—	—
100	23000	1.5	19000	3.5	—	—	—	—	—	—
125	20000	1.5	16000	3.5	—	—	—	—	—	—
160	—	—	—	—	—	—	—	—	—	—

Note 1) All values shown on this chart are based on the insert being properly seated in pocket and torqued to the recommended values.

LIST OF CUTTING EDGE DIAMETER TOLERANCES

Cutter Type	Cutting Edge Diameter Tolerance (mm)
AJX	−0.1 −0.4
APX3000 **Arbor Type**	−0.1 −0.4
APX3000 **Shank Type**	−0.1 −0.2
APX3000 **Long Cutting Edge Type**	−0.1 −0.3
APX4000 **Arbor Type**	−0.1 −0.4
APX4000 **Shank Type**	−0.1 −0.2
APX4000 **Long Cutting Edge Type**	−0.1 −0.3
AQX	−0.1 −0.3
ARP **Arbor Type**	−0.1 −0.3
ARP **Shank Type**	−0.1 −0.2
ASX400	0 −0.3
AXD4000 **Arbor Type**	−0.1 −0.4
AXD4000 **Shank Type**	−0.1 −0.2
AXD7000 **Arbor Type**	−0.1 −0.4
AXD7000 **Shank Type**	−0.1 −0.2
BRP	−0.1 −0.3
CBJP	0 −0.3

Cutter Type	Cutting Edge Diameter Tolerance (mm)
CBMP	0 −0.3
PMF	0 −0.3
PMR	0 −0.3
SPX	−0.1 −0.3
SRF	0 −0.027
SRM	−0.05 −0.15
SUF	0 −0.02
TSMP	−0.1 −0.3
VFX5, VFX6 **Shell Type**	−0.1 −0.3
VOX400 **Arbor Type**	−0.1 −0.4
VPX **Arbor Type**	−0.1 −0.3
VPX **Shank Type**	−0.1 −0.2
VPX **Long Cutting Edge Type**	−0.1 −0.3
WJX **Arbor Type**	−0.1 −0.3
WJX **Shank Type**	−0.1 −0.3
WWX400 **Arbor Type**	−0.1 −0.3
WWX400 **Shank Type**	−0.1 −0.3

Note 1) Cutting edge diameter tolerance when the gauge insert is set.
Note 2) When setting the insert available, the insert tolerance is added to the above tolerance.
(Tolerance when setting the insert for SRF.)

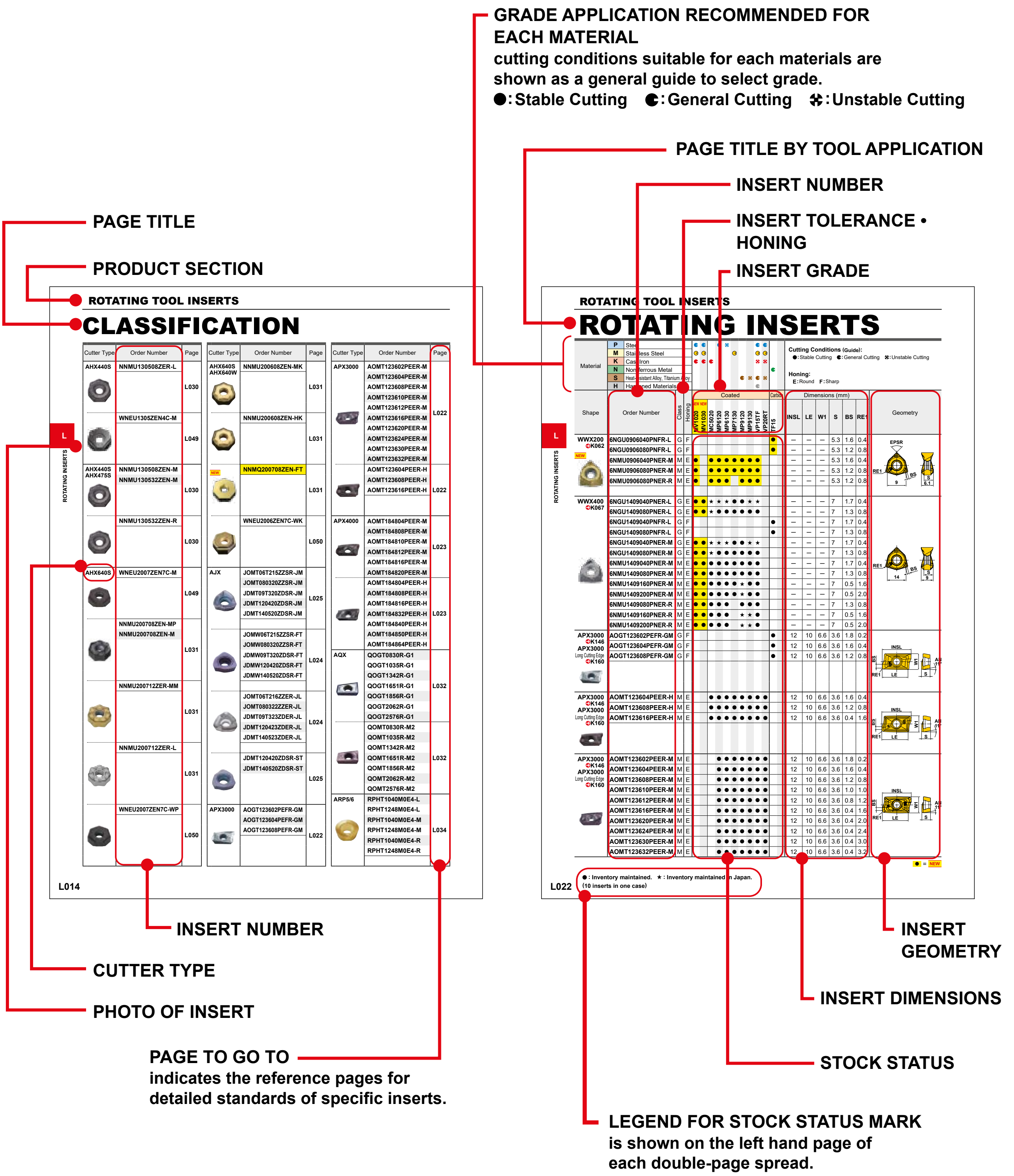
HOW TO READ THE STANDARD OF ROTATING TOOL INSERTS

●How the section of milling inserts is organised

①Organised according to cutter type.
②Cutters are arranged in alphabetical order.

●How the standards for milling inserts are organised

①Classified into milling inserts, wiper inserts and drilling inserts.
②Arranged alphabetically by order number.



GRADE APPLICATION RECOMMENDED FOR EACH MATERIAL
cutting conditions suitable for each materials are shown as a general guide to select grade.
●:Stable Cutting ◐:General Cutting ✱:Unstable Cutting

PAGE TITLE BY TOOL APPLICATION

INSERT NUMBER

INSERT TOLERANCE • HONING

INSERT GRADE

PAGE TITLE

PRODUCT SECTION

INSERT NUMBER

CUTTER TYPE

PHOTO OF INSERT

PAGE TO GO TO
indicates the reference pages for detailed standards of specific inserts.

INSERT GEOMETRY

INSERT DIMENSIONS

STOCK STATUS

LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

●To Order : Please specify
①insert number and grade.

INDEXABLE MILLING TOOLS

INSERT STANDARDS
CBN & PCD INSERT STANDARDS
INSERT GRADES

IDENTIFICATION

Symbol	Insert Shape	
6	Special Design	—
N	Heptagonal	⬢
O	Octagonal	⯃
S	Square	■
T	Triangular	▲
C	Rhombic 80°	▰
M	Rhombic 86°	▰
A	Parallelogram 85°	▰
R	Round	●
L	Rectangular	▬
J	Special Design	—
X	Special Design	—
W	Wiper	—

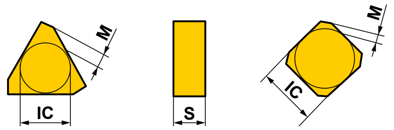
①Insert Shape

Symbol	Normal Clearance AN
C	**7°**
D	**15°**
E	**20°**
F	**25°**
G	**30°**
N	**0°**
P	**11°**
O	Other
X	Other

②Normal Clearance

① **S** ② **E** **E** ③ **R** ④

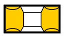
③Tolerance Class



Symbol	Tolerance of Nose Height **M** (mm)	Tolerance of Inscribed Circle **IC** (mm)	Tolerance of Thickness **S** (mm)
A	±0.005	±0.025	±0.025
C	±0.013	±0.025	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
K*	±0.013	±0.05—±0.15	±0.025
M*	±0.08—±0.18	±0.05—±0.15	±0.13
N*	±0.08—±0.18	±0.05—±0.15	±0.025

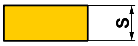
The surface of insert with * mark is sintered.

④Fixing and / or for Chipbreaker

Symbol	Hole	Hole Configuration	Chipbreaker	Figure
W	With Hole	Cylindrical Hole + One Countersink (40°—60°)	No	
T	With Hole		Single Sided	
U	With Hole	Cylindrical Hole + Countersink (40°—60°)	Double Sided	
B	With Hole	Cylindrical Hole + One Countersink (70°—90°)	No	
N	Without Hole	—	No	
R	Without Hole	—	Single Sided	
X	—	—	—	Special Design

Symbol				Diameter of Inscribed Circle (mm)
R	C	S	T	
	06	**06**	**11**	6.35
	08	**07**	**13**	7.94
	09	**09**	**16**	9.525
10				10.00
12				12.00
	12	**12**	**22**	12.70
	16	**15**	**27**	15.875
20				20.00

⑤Insert Size



Symbol	Insert Thickness (mm)
03	3.18
T3	3.97
04	4.76

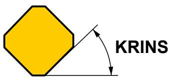
⑥Insert Thickness

Symbol	Honing
F	 Sharp
E	 Round
T	 Chamfer
S	 Chamfer+Hone
X	 Round (small)
Z	 Chamfer (Strong Cutting Edge Type)

⑨Cutting Edge Condition

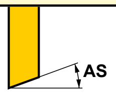
12 ⑤ **03** ⑥ **A** ⑦ **F** ⑧ **E** ⑨ **R** ⑩ **1** ⑪ **-** **JS** ⑫

⑦Cutting Edge Angle



Symbol	Cutting Edge Angle
A	45°
E	75°
P	90°
Z	Other Angle

⑧Clearance of Wiper Insert

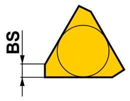


Symbol	Clearance Angle
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

⑩Cutting Direction

L	Left
N	Neutral
R	Right

⑪Width of Wiper Edge



(mm)

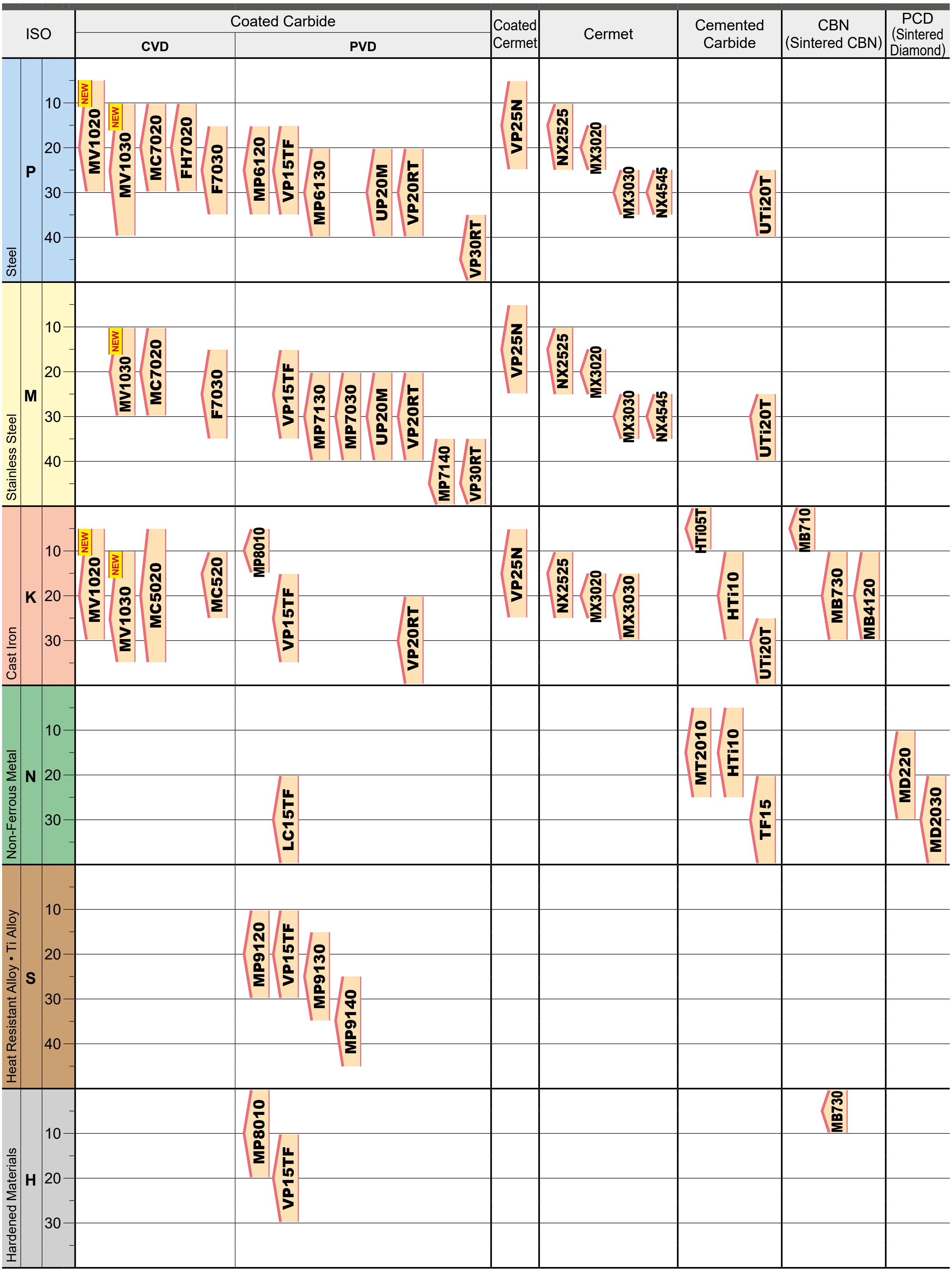
Symbol	BS
1	1.4 (1.94 only for TEKN)
2	2.4

⑫Chipbreaker

Symbol	Name
FT	FT Chipbreaker
HS	HS Chipbreaker
JH	JH Chipbreaker
JM	JM Chipbreaker
JS	JS Chipbreaker
JL	JL Chipbreaker
JP	JP Chipbreaker
LS	LS Chipbreaker
MM	MM Chipbreaker
MS	MS Chipbreaker
L	L Chipbreaker
M	M Chipbreaker
R	R Chipbreaker

GRADES FOR MILLING

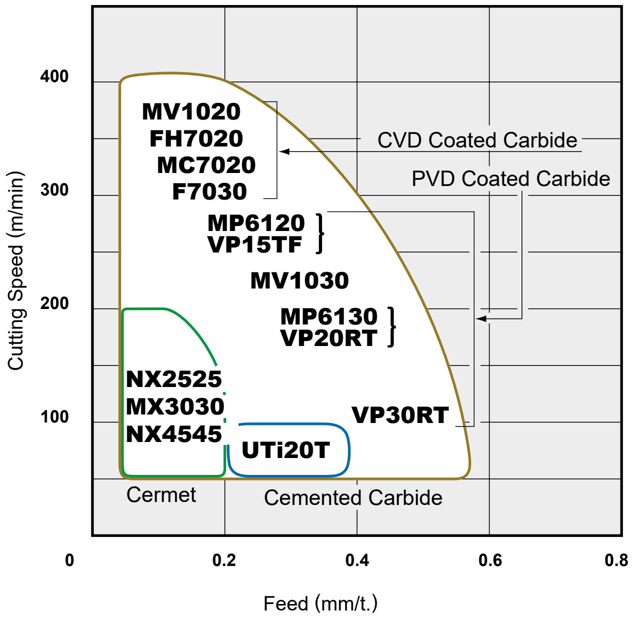
●INDEXABLE INSERT GRADES FOR MILLING



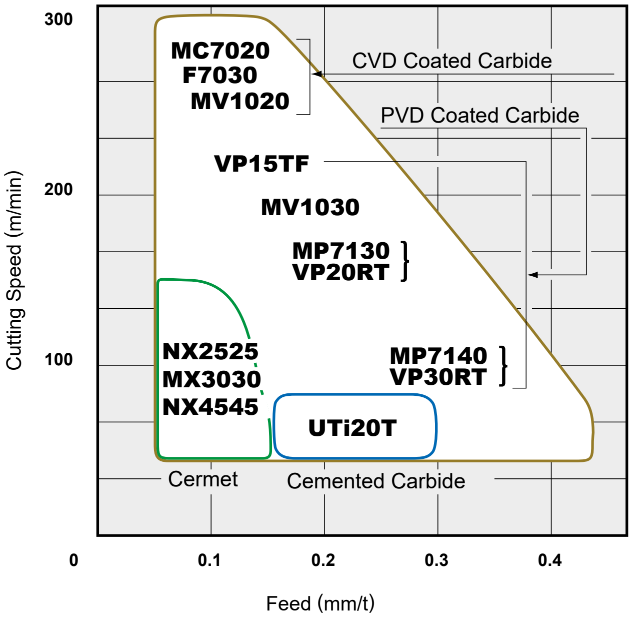
ISO		Coated Carbide		Coated Cermet	Cermet	Cemented Carbide	CBN (Sintered CBN)	PCD (Sintered Diamond)
		CVD	PVD					
Steel	P	MV1020 NEW MV1030 NEW MC7020 FH7020 F7030	MP6120 VP15TF MP6130 UP20M VP20RT VP30RT	VP25N	NX2525 MX3020 MX3030 NX4545	UTi20T		
Stainless Steel	M	MV1030 NEW MC7020 F7030	VP15TF MP7130 MP7030 UP20M VP20RT MP7140 VP30RT	VP25N	NX2525 MX3020 MX3030 NX4545	UTi20T		
Cast Iron	K	MV1020 NEW MV1030 NEW MC5020 MC520	MP8010 VP15TF VP20RT	VP25N	NX2525 MX3020 MX3030	HTi05T HTi10 UTi20T	MB710 MB730 MB4120	
Non-Ferrous Metal	N		LC15TF			MT2010 HTi10 TF15		MD220 MD2030
Heat Resistant Alloy • Ti Alloy	S		MP9120 VP15TF MP9130 MP9140					
Hardened Materials	H		MP8010 VP15TF				MB730	

MILLING APPLICATION RANGE

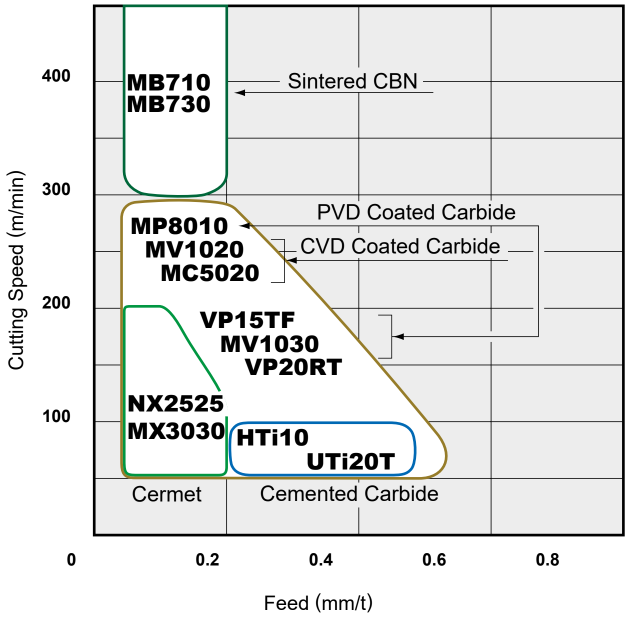
P STEEL



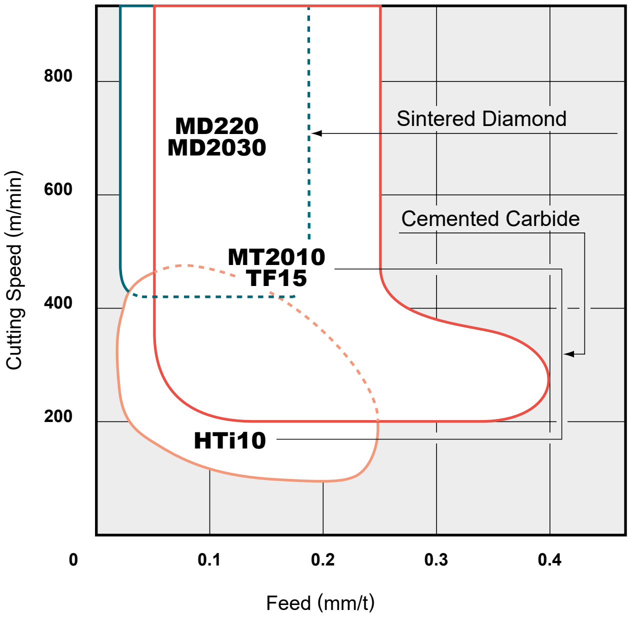
M STAINLESS STEEL



K CAST IRON



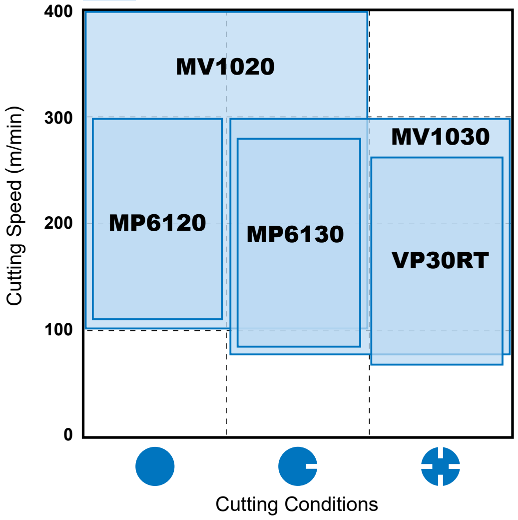
N NON-FERROUS METAL



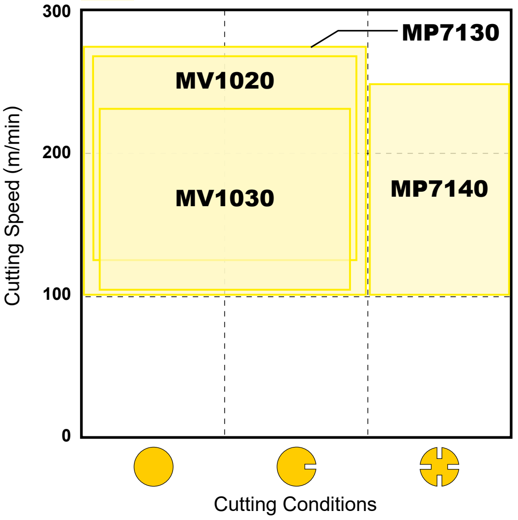
MILLING APPLICATION RANGE

● Recommendation of the insert grade based on cutting speed and conditions for each material.

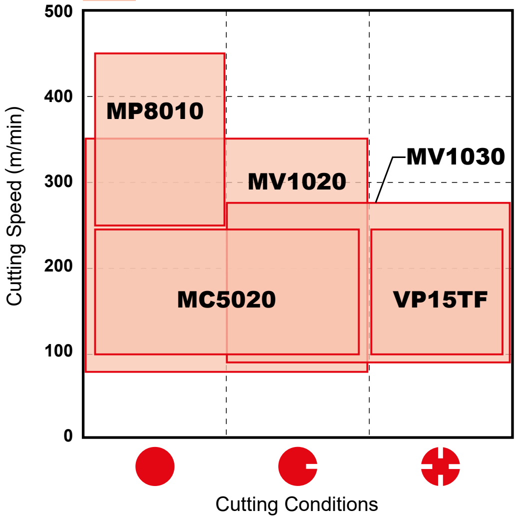
P STEEL (Medium-Rough Cutting)



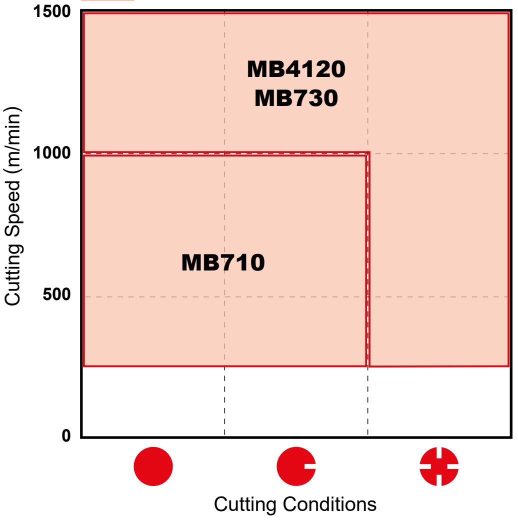
M STAINLESS STEEL



K CAST IRON



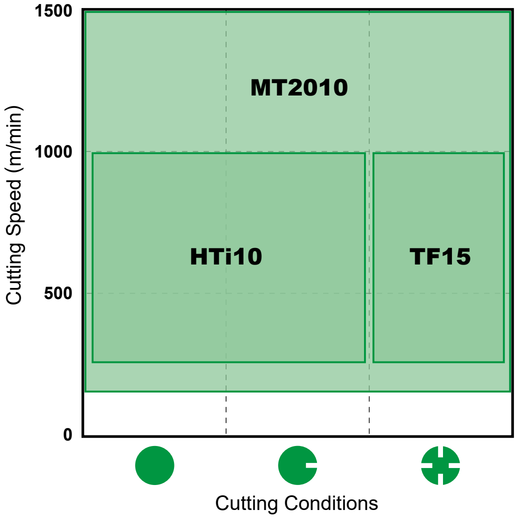
K CAST IRON (CBN)



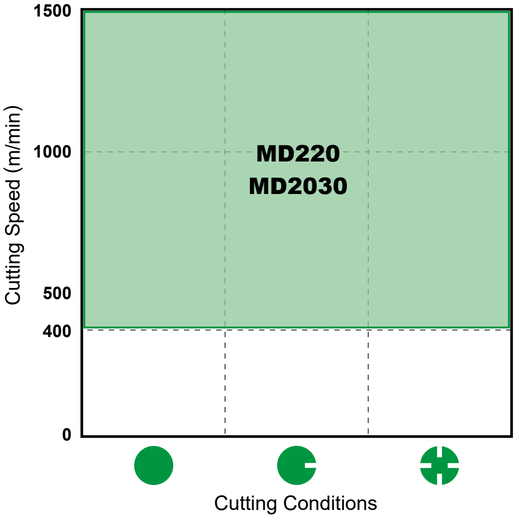
■CUTTING CONDITIONS

●	Stable Cutting	Plane Cutting Constant Depth of Cut Pre-Machined Securely Clamped Component Cutting
◐	General Cutting	
✚	Unstable Cutting	Heavy Interrupted Cutting Irregular Depth of Cut Low Clamping Rigidity Cutting

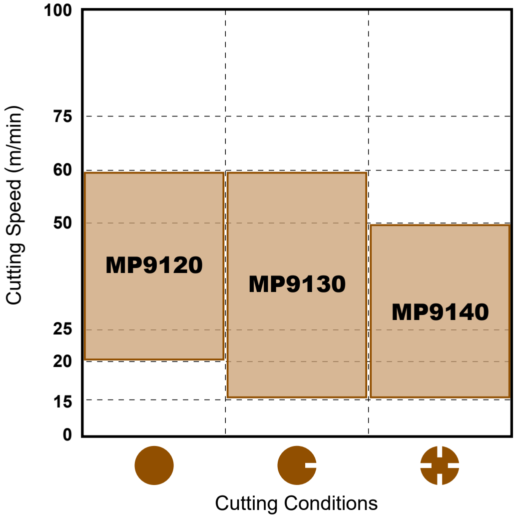
N NON-FERROUS METAL



N NON-FERROUS METAL (PCD)



S HEAT RESISTANT ALLOY, TITANIUM ALLOY



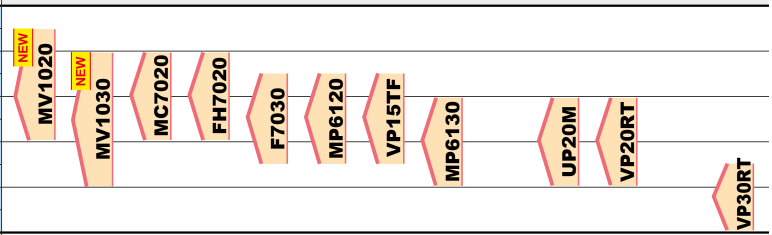
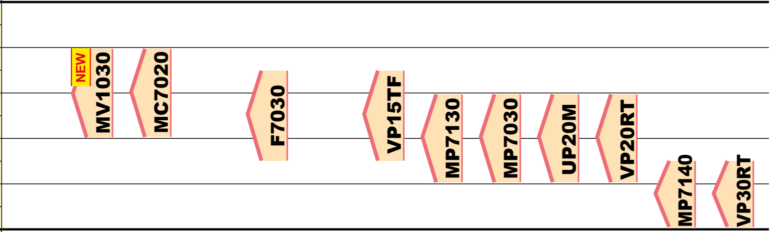
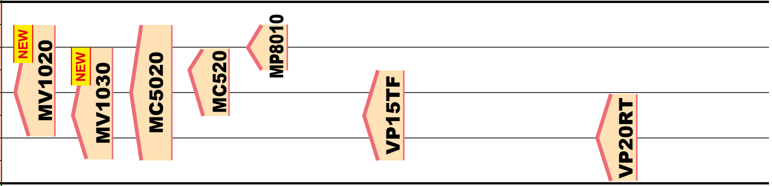
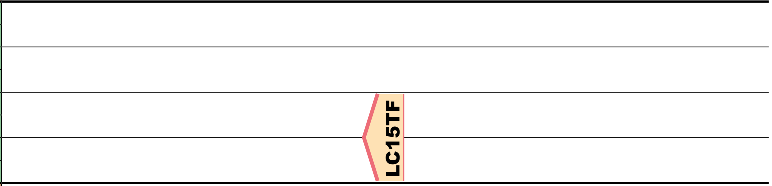
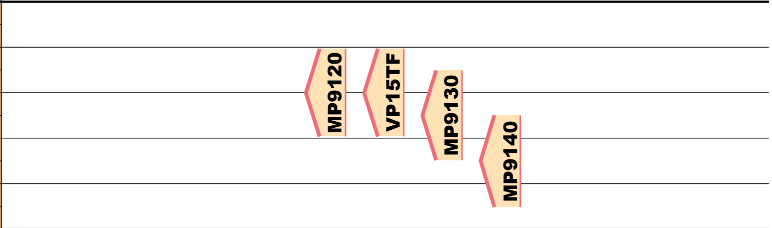
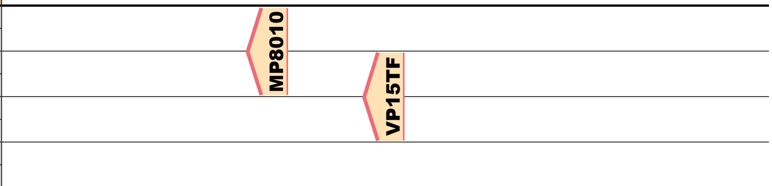
COATED CARBIDE (CVD&PVD)

<CVD>
- Special tough fibrous structure improves wear and fracture resistance.
- It covers a wide application range and reduces the number of tools required.

<PVD>
- PVD coating prolongs tool life when compared to cemented carbide under the same cutting conditions.
- Coating of tools with sharp edges is possible without softening or changing the quality of the substrate.

■SELECTION STANDARD

MILLING

	Material	Recommended Grade	ISO	Application Range
P	Steel	NEW MV1020 NEW MV1030 F7030 MC7020 MP6120 MP6130 VP15TF	P 10 20 30 40	
M	Stainless Steel	NEW MV1030 F7030 MC7020 MP7030 MP7130 MP7140 VP15TF	M 10 20 30 40	
K	Cast Iron	NEW MV1020 NEW MV1030 MC5020 MC520 VP15TF	K 10 20 30	
N	Aluminium Alloy	LC15TF	N 10 20 30	
S	Heat Resistant Alloy Ti Alloy	MP9120 VP15TF MP9130 MP9140	S 10 20 30 40	
H	Hardened Materials	MP8010 VP15TF	H 10 20 30	

■GRADE CHARACTERISTICS

Grade	Substrate	Coating Layer	
	Hardness (HRA)	Composition	Thickness
NEW **MV1020**	89.0	(Al,Ti)N	Thin
NEW **MV1030**	89.0	(Al,Ti)N	Thin
MC5020	91.0	TiCN-Al2O3-Ti Compound	Thick
MC520	91.0	TiCN-Al2O3-Ti Compound	Thick
MC7020	88.8	TiCN-Al2O3-Ti Compound	Thick
FH7020	89.0	TiCN-Al2O3-Ti Compound	Thick
F7030	88.8	TiCN-Al2O3-TiN	Thin
MP6120	91.5	(Al,Ti,Cr)N	Thin
MP6130	90.5	(Al,Ti,Cr)N	Thin
MP7030	90.5	(Al,Ti)N-Ti Compound	Thin

Grade	Substrate	Coating Layer	
	Hardness (HRA)	Composition	Thickness
MP7130	90.5	(Al,Ti)N-Ti Compound	Thin
MP7140	88.8	(Al,Ti)N-Ti Compound	Thin
MP8010	93.5	(Al,Ti,Si)N	Thin
MP9120	91.5	(Al,Ti,Cr)N	Thin
MP9130	90.5	(Al,Ti,Cr)N	Thin
MP9140	89.0	(Al,Ti)N	Thin
VP15TF	91.5	(Al,Ti)N	Thin
VP20RT	90.5	(Al,Ti)N	Thin
VP30RT	88.8	(Al,Ti)N	Thin
UP20M	90.5	TiN-TiCN-TiN	Thin

Note 1) Internal hardness represent typical values shown as hardness.

For machining of steels and stainless steels

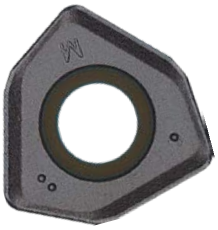
NEW

MV1000 Series

Advanced Wear Resistance

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays a very high hardness. This greatly improves oxidation and wear resistance.

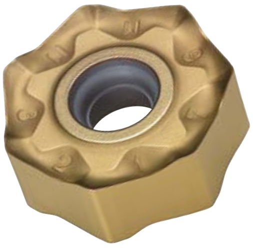
MC7020



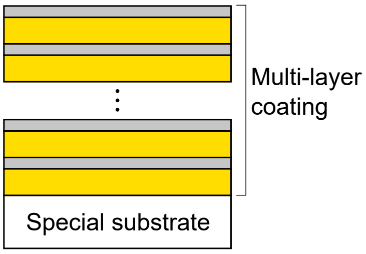
The micro-grain wear resistant Al$_2$O$_3$ and fibrous TiCN layers deliver excellent wear resistance during high speed cutting. Use of a specially developed cemented carbide that provides superior resistance to fracture and thermal cracking prevents the cutting edge from sudden breakage..

For machining of stainless steel

MP7030



MP7030 has a multi-layer coating based on a newly developed Ti-compound. It provides superior wear and fracture resistance during stainless steel machining. A special tough cemented carbide substrate gives excellent performance when machining difficult-to-cut materials such as stainless steel.



For Heat-resistant and Titanium Alloys

MP9130

An enhanced super fine cemented carbide substrate has increased toughness while maintaining hardness. The Al-Ti-Cr-N accumulating coating ensures optimum heat and wear resistance. The combination of these properties gives excellent fracture and welding resistance because of a low coefficient of friction when machining titanium alloy.

MP9140

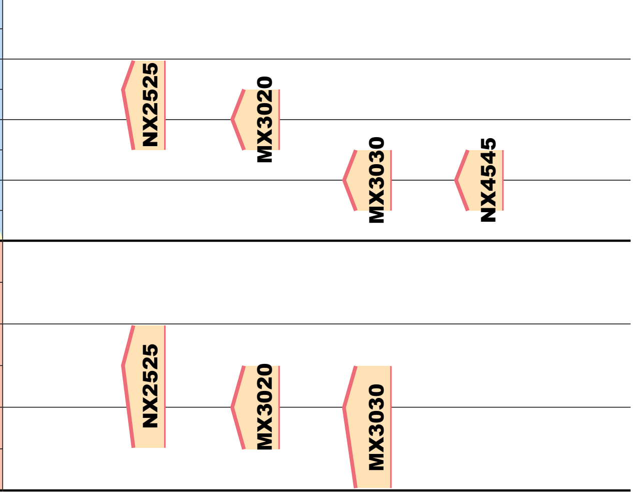
The new technology Al-(Al, Ti)N coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

CERMET

- ●NX2525 for high speed milling.
- ●NX4545, MX3030 for general milling.

■SELECTION STANDARD

MILLING

Material	Recommended Grade	ISO	Application Range
P M Steel Stainless Steel	**NX2525**	P 10 20 30 M	
	MX3020		
	MX3030 **NX4545**		
K Cast Iron	**NX2525**	K 10 20	
	MX3020		
	MX3030		

Note 1) In case of wet cutting, please use coated carbide VP15TF for steel cutting and coated carbide MC5020 for cast iron cutting.

■GRADE CHARACTERISTICS

Grade	Hardness (HRA)
NX2525	92.2
MX3030	90.0
NX4545	90.0

Note 1) Internal hardness represent typical values shown as hardness.

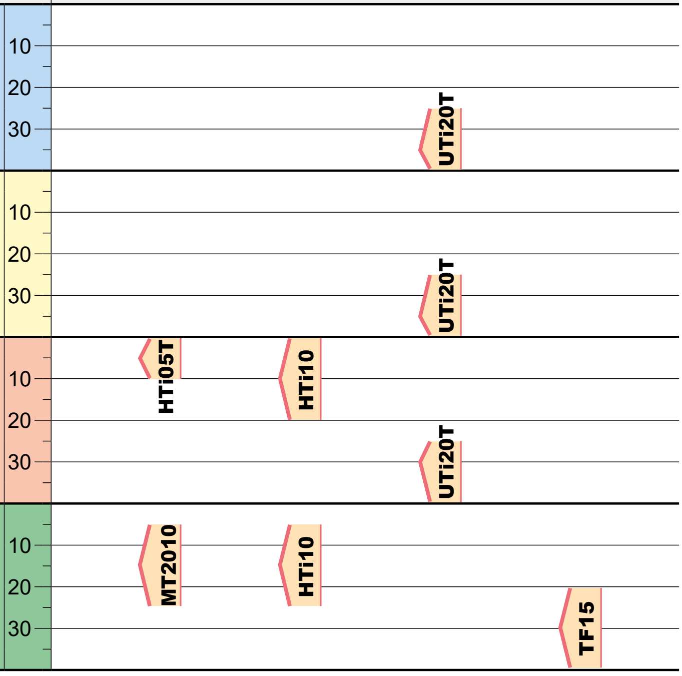
CEMENTED CARBIDE

- The grades available are UTi20T for steel and cast iron, and HTi10 for cast iron, non-ferrous metal and non-metal.

■SELECTION STANDARD

MILLING

	Material	Recommended Grade	ISO	Application Range
P	Steel	**UTi20T**	**P**	
M	Stainless Steel	**UTi20T**	**M**	
K	Cast Iron	**HTi05T**	**K**	
		HTi10		
		UTi20T		
N	Non-Ferrous Metal	**HTi10**	**N**	
		MT2010		
		TF15		



■MAIN COMPONENT AND APPLICATION

ISO	Main Component	Characteristics	Material
M P	WC-TiC-TaC-Co	Heat / Deformation resistance.	Carbon steel, Alloy steel, Stainless steel and Cast iron
N K	WC-Co	High rigidity and wear resistance.	Cast iron, Non-Ferrous metals and Non-metal

■GRADE CHARACTERISTICS

ISO	Grade	Hardness (HRA)
M P	**UTi20T**	90.5
N K	**HTi05T**	92.5
	HTi10	92.0
N	**MT2010**	91.8
	TF15	91.5

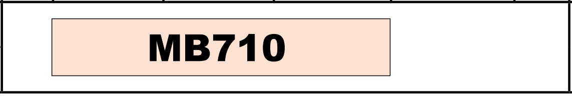
Note 1) Internal hardness represent typical values shown as hardness.

CBN (SINTERED CBN)

- **MB710 and MB730 for cast iron finishing.**

■SELECTION STANDARD / RECOMMENDED CUTTING CONDITIONS

FINISHING

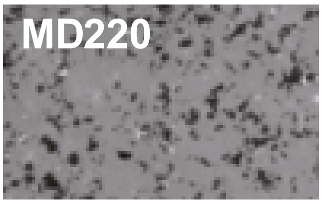
Material		Structure	Cutting Speed (m/min)	Feed (mm/t)	Depth of Cut (mm)	Coolant
			250 500 750 1000 1250			
Grey Cast Iron	DIN GG25	Ferritic + Pearilitic	 MB710	−0.3	−0.5	Dry
	DIN GG30	Pearilitic				

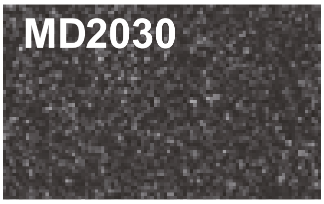
■FEATURES AND BASE

Grade	Application	Features	Main Component	Coating Layer
MB710	For General Cutting	General purpose grade with well balanced wear and fracture resistance.	CBN TiC Al_2O_3	–

PCD (SINTERED DIAMOND)

- Suitable for cutting non-ferrous metals such as aluminium alloy.
- Suitable for extremely high speed finishing.





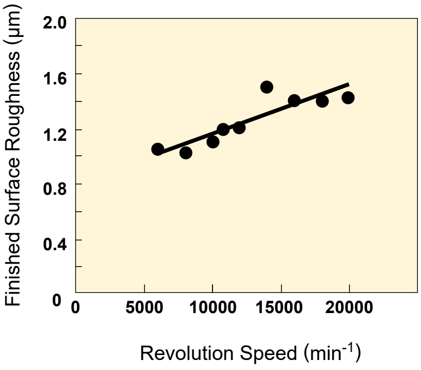
■GRADE FEATURES

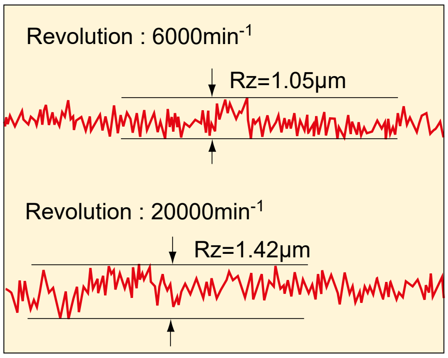
Grade	Features
MD220	Excellent in the balance between wear resistance and fracture resistance. For a wide range of tooling applications.
MD2030	Improved fracture resistance when used in unstable applications. The stability of the cutting edge can meet a wide variety of material and cutting conditions.

■RECOMMENDED CUTTING CONDITIONS

Material	Cutting Speed (m/min)	Grade	Feed per Tooth (mm/t)	Depth of Cut (mm)
Aluminium Alloy (Si ≤12%)	2000−3000	**MD2030** **MD220**	<0,2	<3,0
Aluminium Alloy (Si ≥13%)	400−800			

■CUTTING PERFORMANCE

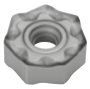


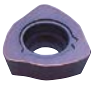


<Cutting Conditions>

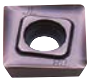
Material : Aluminium Alloy
Insert : NP-GDCW1240PDFR2
Grade : MD220
Tool : V10000R0406D
Feed : 0.2mm/t
Depth of Cut : 0.5mm
Width of Cut : 80mm
Dry Cutting

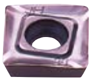
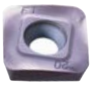
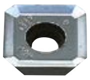
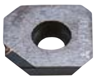
CLASSIFICATION

Cutter Type	Order Number	Page
AHX440S 	NNMU130508ZER-L	L030
	WNEU1305ZEN4C-M	L049
AHX440S AHX475S 	NNMU130508ZEN-M NNMU130532ZEN-M	L030
	NNMU130532ZEN-R	L030
AHX640S 	WNEU2007ZEN7C-M	L049
	NNMU200708ZEN-MP NNMU200708ZEN-M	L031
	NNMU200712ZER-MM	L031
	NNMU200712ZER-L	L031
	WNEU2007ZEN7C-WP	L050

Cutter Type	Order Number	Page
AHX640S AHX640W 	NNMU200608ZEN-MK	L031
	NNMU200608ZEN-HK	L031
NEW 	NNMQ200708ZEN-FT	L031
	WNEU2006ZEN7C-WK	L050
AJX 	JOMT06T215ZZSR-JM JOMT080320ZZSR-JM JDMT09T320ZDSR-JM JDMT120420ZDSR-JM JDMT140520ZDSR-JM	L025
	JOMW06T215ZZSR-FT JOMW080320ZZSR-FT JDMW09T320ZDSR-FT JDMW120420ZDSR-FT JDMW140520ZDSR-FT	L024
	JOMT06T216ZZER-JL JOMT080322ZZER-JL JDMT09T323ZDER-JL JDMT120423ZDER-JL JDMT140523ZDER-JL	L024
	JDMT120420ZDSR-ST JDMT140520ZDSR-ST	L025
APX3000 	AOGT123602PEFR-GM AOGT123604PEFR-GM AOGT123608PEFR-GM	L022

Cutter Type	Order Number	Page
APX3000 	AOMT123602PEER-M AOMT123604PEER-M AOMT123608PEER-M AOMT123610PEER-M AOMT123612PEER-M AOMT123616PEER-M AOMT123620PEER-M AOMT123624PEER-M AOMT123630PEER-M AOMT123632PEER-M	L022
	AOMT123604PEER-H AOMT123608PEER-H AOMT123616PEER-H	L022
APX4000 	AOMT184804PEER-M AOMT184808PEER-M AOMT184810PEER-M AOMT184812PEER-M AOMT184816PEER-M AOMT184820PEER-M	L023
	AOMT184804PEER-H AOMT184808PEER-H AOMT184816PEER-H AOMT184832PEER-H AOMT184840PEER-H AOMT184850PEER-H AOMT184864PEER-H	L023
AQX 	QOGT0830R-G1 QOGT1035R-G1 QOGT1342R-G1 QOGT1651R-G1 QOGT1856R-G1 QOGT2062R-G1 QOGT2576R-G1	L032
	QOMT0830R-M2 QOMT1035R-M2 QOMT1342R-M2 QOMT1651R-M2 QOMT1856R-M2 QOMT2062R-M2 QOMT2576R-M2	L032
ARP5/6 	RPHT1040M0E4-L RPHT1248M0E4-L RPHT1040M0E4-M RPHT1248M0E4-M RPHT1040M0E4-R RPHT1248M0E4-R	L034

Cutter Type	Order Number	Page
ARP5/6 	RPMT1040M0E4-L	L034
	RPMT1040M0E8-L1	
	RPMT1040M0E4-L2	
	RPMT1248M0E4-L	
	RPMT1248M0E8-L1	
	RPMT1248M0E4-L2	
	RPMT1040M0E4-M	
	RPMT1040M0E8-M1	
	RPMT1040M0E4-M2	
	RPMT1248M0E4-M	
	RPMT1248M0E8-M1	
	RPMT1248M0E4-M2	
	RPMT1040M0E4-R	
	RPMT1040M0E8-R1	
	RPMT1248M0E4-R	
	RPMT1248M0E8-R1	
ASPX 	JPGX1404080PPER-JM	L025
	JPGX1404120PPER-JM	
	JPGX1404160PPER-JM	
	JPGX1404240PPER-JM	
	JPGX1404320PPER-JM	
	JPGX1404400PPER-JM	
	JPGX1404500PPER-JM	
	JPGX1404635PPER-JM	
	SPGX1204100PPER-JM	L040
ASX400 	SOGT12T308PEFR-JP	L038
	SOET12T308PEER-JL	L038
	SOMT12T308PEER-JM	L038
	SOMT12T308PEEL-JM	

Cutter Type	Order Number	Page
ASX400 	SOMT12T308PEER-JH	L038
	SOMT12T320PEER-FT	L039
	WOEW12T308PEER8C	L050
	WOEW12T308PETR8C	
ASX445 	SEGT13T3AGFN-JP	L036
	SEET13T3AGEN-JL	L036
	SEMT13T3AGSN-JM	L037
	SEMT13T3AGSN-JH	L037
	SEMT13T3AGSN-FT	L037
	WEEW13T3AGFR3C	L052
	WEEW13T3AGTR3C	
	WEEW13T3AGER8C	L049
	WEEW13T3AGTR8C	

Cutter Type	Order Number	Page
AXD4000 	XDGX175004PDFR-GL	L046
	XDGX175008PDFR-GL	
	XDGX175012PDFR-GL	
	XDGX175016PDFR-GL	
	XDGX175020PDFR-GL	
	XDGX175024PDFR-GL	
	XDGX175030PDFR-GL	
	XDGX175032PDFR-GL	
	XDGX175040PDFR-GL	
	XDGX175050PDFR-GL	
	XDGX175004PDER-GM	L046
	XDGX175008PDER-GM	
	XDGX175012PDER-GM	
	XDGX175016PDER-GM	
	XDGX175020PDER-GM	
	XDGX175024PDER-GM	
	XDGX175030PDER-GM	
	XDGX175032PDER-GM	
	XDGX175040PDER-GM	
	XDGX175050PDER-GM	
	XDGX175004PDFR-GM	L046
	XDGX175008PDFR-GM	
	XDGX175012PDFR-GM	
	XDGX175016PDFR-GM	
	XDGX175020PDFR-GM	
	XDGX175024PDFR-GM	
	XDGX175030PDFR-GM	
	XDGX175032PDFR-GM	
	XDGX175040PDFR-GM	
	XDGX175050PDFR-GM	
AXD7000 	XDGX227008PDFR-GL	L046
	XDGX227016PDFR-GL	
	XDGX227020PDFR-GL	
	XDGX227030PDFR-GL	
	XDGX227032PDFR-GL	
	XDGX227040PDFR-GL	
	XDGX227050PDFR-GL	
BAE 	AEMW150304ER	L023
	AEMW150308ER	
	AEMW19T304ER	
	AEMW19T308ER	
BAP300 	APGT1135PDFR-G2	L023

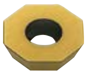
CLASSIFICATION

Cutter Type	Order Number	Page
BAP300 SRM2 	APMT1135PDER-M0 APMT1135PDER-M1 APMT1135PDER-M2	L024
	APMT1135PDER-H1 APMT1135PDER-H2 APMT1135PDER-H3 APMT1135PDER-H4 APMT1135PDER-H6	L023
BAP400 	APGT1604PDFR-G2	L023
BAP400 SRM2 	APMT1604PDER-M2	L024
	APMT1604PDER-H1 APMT1604PDER-H2 APMT1604PDER-H4 APMT1604PDER-H6 APMT1604PDER-H8	L023
BF407 	SFAN1203ZFFR2 SFAN1203ZFFL2 SFCN1203ZFFR2	L037
BN425 DN 	SNC43B2S	L037

Cutter Type	Order Number	Page
BN425 DN 	SNMF43B2G	L038
BRP 	RPMT08T2M0E-JS RPMT10T3M0E-JS RPMT1204M0E-JS RPMT1606M0E-JS	L034
	RPMW08T2M0E RPMW08T2M0T RPMW10T3M0E RPMW10T3M0T RPMW1204M0E RPMW1204M0T RPMW1606M0E RPMW1606M0T	L034
BSP 	SPMB1204APT	L040
CBJP TAB 	JPMT060204-E	L025
CBMP ECMP TAB 	MPMT070308 MPMT090308 MPMT120408	L030
CESP CFSP CGSP 	SPMW090304 SPMW090308 SPMW120304 SPMW120308	L040

Cutter Type	Order Number	Page
DCCC 	CCMX083508EN-A CCMX09T308EN-A	L024
	CCMX09T308EN-B	L024
	ZCMX083508ER-A ZCMX09T308ER-A	L048
	ZCMX09T308ER-B	L048
FBP415 	SPEN1203EEER1 SPEN1203EEEL1 SPNN1203EEER1 SPNN1203EEEL1	L039
	SPER1203EEER-JS	L039
	SPEN1203EETR1	L051
	WPC42EEER10C	L050

Cutter Type	Order Number	Page
FMAX 	**GOER1404PXFR2** **GOER1408PXFR2**	**L051**
	**GOER1408PXFR2-8**	**L051**
	**GOER1401ZXFR2**	**L051**
	**NP-GOEN1404PXSR05** **NP-GOEN1408PXSR05**	**L051**
FP490 	**SPEN424A**	**L039**
LSE445 **SE445**  Mplus...	**SEEN1203AFEN1** **SEEN1203AFTN1** **SEEN1203AFTN3**	**L035**
	**SEER1203AFEN-JS**	**L035**
NSE300 **SE300**  Mplus...	**TECN1603PEFR1W** **TECN1603PEER1W** **TECN1603PETR1W**	**L044**

Cutter Type	Order Number	Page
NSE300 **SE300**  Mplus...	**TECN1603PEFR1**	**L051**
	**TEEN1603PEFR1** **TEEN1603PEER1** **TEEN1603PETR1** **TEEN1603PESR1** **TEEN1603PEZR1**	**L044**
NSE300  Mplus...	**TEER1603PEER-JS**	**L044**
NSE400  Mplus...	**TEER2204PEER-JS**	**L044**
NSE400 **SE400**  Mplus...	**TECN2204PEFR1** **TECN2204PEER1** **TECN2204PETR1** **TEEN2204PEFR1** **TEEN2204PEER1** **TEEN2204PETR1** **TEEN2204PESR1**	**L044**
OCTACUT 	**OEMX12T3ETR1** **OEMX12T3ESR1** **OEMX1705ETR1** **OEMX1705ESR1**	**L031**
	**OEMX12T3EER1-JS** **OEMX1705EER1-JS** **OEMX1705ETR1-JS**	**L032**
	**REMX1705SN**	**L033**

Cutter Type	Order Number	Page
OCTACUT 	**REMX12T3EN-JS** **REMX1705EN-JS**	**L033**
PMF 	**TPEW1303ZPER2**	**L045**
	**TPEW1303ZPTR2**	**L052**
RRD  Mplus...	**RDHX0501M0E** **RDHX0501M0S** **RDHX07T1M0E** **RDHX07T1M0S** **RDHX0702M0E** **RDHX0702M0S** **RDHX1003M0E** **RDHX1003M0S**	**L032**
 Mplus...	**RDHX12T3M0E** **RDHX12T3M0S** **RDHX1604M0E** **RDHX1604M0S**	**L032**
 Mplus...	**RDMX07T1M0E** **RDMX07T1M0T** **RDMX0702M0E** **RDMX0702M0T** **RDMX1003M0E** **RDMX1003M0S** **RDMX1003M0T** **RDMX12T3M0E** **RDMX12T3M0S** **RDMX12T3M0T** **RDMX1604M0E** **RDMX1604M0S** **RDMX1604M0T**	**L033**

Mplus...

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CLASSIFICATION

Cutter Type	Order Number	Page
RRD 	**RDZX0501M0E**	**L033**
	RDZX07T1M0E	
	RDZX0702M0E	
	RDZX1003M0E	
	RDZX1003M0S	
	RDZX12T3M0E	
	RDZX12T3M0S	
	RDZX1604M0E	
	RDZX1604M0S	
PMR 	**CPMT1205ZPEN-M2**	**L024**
	CPMT1205ZPEN-M3	
	CPMT1906ZPEN-M2	
	CPMT1906ZPEN-M3	
SE415 	**SEEN1203EFFR1**	**L036**
	SEEN1203EFER1	
	SEEN1203EFTR1	
	SEEN1203EFTR3	
	SEEN1203EFSR1	
	**SEER1203EFER-JS**	**L036**
	**SECN1203EFFR1**	**L051**
	**WEC42EFTR5C**	**L049**
SE515 	**SECN1504EFTR1**	**L036**
	SEEN1504EFER1	
	SEEN1504EFTR1	
	SEEN1504EFSR1	
	**WEC53EFTR5C**	**L049**

Cutter Type	Order Number	Page
SE545 	**SEEN1504AFEN1**	**L035**
	SEEN1504AFTN1	
	SEEN1504AFTN3	
	SEEN1504AFSN1	
	**SEER1504AFEN-JS**	**L035**
	**WEC53AFTR5C**	**L049**
SG20 	**RGEN2004M0EN**	**L033**
	RGEN2004M0SN	
SPX 	**JPMX140412-JM**	**L025**
	JPMX190412-JM	
	**JPMX140412-WH**	**L025**
	JPMX190412-WH	
	**MPMX120412-JM**	**L030**
	**MPMX120412-WH**	**L030**
	**SPMX120408-JM**	**L041**
	**SPMX120408-WH**	**L041**

Cutter Type	Order Number	Page
SRB 	**SRBT10**	**L042**
	SRBT12	
	SRBT16	
	SRBT20	
	SRBT25	
	SRBT30	
	SRBT32	
SRF 	**SRFT10**	**L042**
	SRFT12	
	SRFT16	
	SRFT20	
	SRFT25	
	SRFT30	
	SRFT32	
SRM2 	**SRG16C**	**L042**
	SRG20C	
	SRG25C	
	SRG30C	
	SRG32C	
	**SRG16E**	**L042**
	SRG20E	
	SRG25E	
	SRG30E	
	SRG32E	
	**SRM16C-M**	**L043**
	SRM20C-M	
	SRM25C-M	
	SRM30C-M	
	SRM32C-M	
	**SRM16E-M**	**L043**
	SRM20E-M	
	SRM25E-M	
	SRM30E-M	
	SRM32E-M	
SRM2 Ø40 Ø50 	**SRG40C**	**L042**
	SRG50C	
	**SRG40E**	**L042**
	SRG50E	
	**APMT1135PDER-M2**	**L024**
	APMT1604PDER-M2	

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Cutter Type	Order Number	Page
SRM2 Ø40 Ø50 	APMT1135PDER-H2	L023
	APMT1604PDER-H2	
SUF 	SUFT10R05	L043
	SUFT10R10	
	SUFT10R20	
	SUFT12R05	
	SUFT12R10	
	SUFT12R20	
	SUFT12R30	
	SUFT16R05	
	SUFT16R10	
	SUFT16R15	
	SUFT16R20	
	SUFT16R30	
	SUFT20R05	
	SUFT20R10	
	SUFT20R15	
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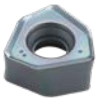
	SUFT25R05	
	SUFT25R10	
	SUFT25R20	
	SUFT25R30	
	SUFT30R05	
	SUFT30R10	
	SUFT30R20	
	SUFT30R30	
	SUFT32R05	
	SUFT32R10	
	SUFT32R20	
TBE1 	SPMT120408-A	L040
TSMP 	MPMW070308	L030
	MPMW090308	
	MPMW120408	

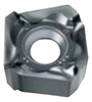
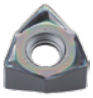
Cutter Type	Order Number	Page
DCV3 Side Cutter 	LNGU090604PNER-M	L026
	LNGU090604PNEL-M	
	LNGU090608PNER-M	
	LNGU090608PNEL-M	
	LNGU090612PNER-M	
	LNGU090612PNEL-M	
	LNGU090616PNER-M	
	LNGU090616PNEL-M	
	LNGU090620PNER-M	
	LNGU090620PNEL-M	
	LNGU090624PNER-M	
	LNGU090624PNEL-M	
	LNGU090630PNER-M	
	LNGU090630PNEL-M	
	LNGU090640PNER-M	
	LNGU090640PNEL-M	
DCV4 Side Cutter 	LNGU130804PNER-M	L026
	LNGU130804PNEL-M	
	LNGU130808PNER-M	
	LNGU130808PNEL-M	
	LNGU130820PNER-M	
	LNGU130820PNEL-M	
	LNGU130830PNER-M	
	LNGU130830PNEL-M	
	LNGU130840PNER-M	
	LNGU130840PNEL-M	
	LNGU130850PNER-M	
	LNGU130850PNEL-M	
	LNGU130804PNER-R	L026
	LNGU130804PNEL-R	
	LNGU130808PNER-R	
	LNGU130808PNEL-R	
	LNGU130812PNER-R	
	LNGU130812PNEL-R	
	LNGU130816PNER-R	
	LNGU130816PNEL-R	
	LNGU130820PNER-R	
	LNGU130820PNEL-R	
	LNGU130824PNER-R	
	LNGU130824PNEL-R	
	LNGU130830PNER-R	
	LNGU130830PNEL-R	
	LNGU130840PNER-R	
	LNGU130840PNEL-R	
	LNGU130850PNER-R	
	LNGU130850PNEL-R	

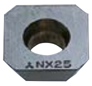
Cutter Type	Order Number	Page
DCV4 Side Cutter 	LNGU171004PNER-R	L027
	LNGU171004PNEL-R	
	LNGU171008PNER-R	
	LNGU171008PNEL-R	
	LNGU171012PNER-R	
	LNGU171012PNEL-R	
	LNGU171016PNER-R	
	LNGU171016PNEL-R	
	LNGU171020PNER-R	
	LNGU171020PNEL-R	
	LNGU171024PNER-R	
	LNGU171024PNEL-R	
	LNGU171030PNER-R	
	LNGU171030PNEL-R	
	LNGU171040PNER-R	
	LNGU171040PNEL-R	
	LNGU171050PNER-R	
	LNGU171050PNEL-R	
	LNGU171060PNER-R	
	LNGU171060PNEL-R	
	LNGU171070PNER-R	
	LNGU171070PNEL-R	
VPX200 	LOGU0904020PNER-L	L028
	LOGU0904040PNER-L	
	LOGU0904080PNER-L	
	LOGU0904100PNER-L	
	LOGU0904120PNER-L	
	LOGU0904160PNER-L	
	LOGU0904020PNFR-L	
	LOGU0904040PNFR-L	
	LOGU0904080PNFR-L	
	LOGU0904100PNFR-L	
	LOGU0904120PNFR-L	
	LOGU0904160PNFR-L	
	LOGU0904020PNER-M	L028
	LOGU0904040PNER-M	
	LOGU0904080PNER-M	
	LOGU0904100PNER-M	
	LOGU0904120PNER-M	
	LOGU0904160PNER-M	
	LOGU0904020PNFR-M	
	LOGU0904040PNFR-M	
	LOGU0904080PNFR-M	
	LOGU0904100PNFR-M	
	LOGU0904120PNFR-M	
	LOGU0904160PNFR-M	

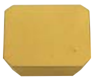
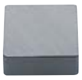
CLASSIFICATION

Cutter Type	Order Number	Page
VPX300 	LOGU1207020PNER-L	L029
	LOGU1207040PNER-L	
	LOGU1207080PNER-L	
	LOGU1207100PNER-L	
	LOGU1207120PNER-L	
	LOGU1207160PNER-L	
	LOGU1207200PNER-L	
	LOGU1207240PNER-L	
	LOGU1207300PNER-L	
	LOGU1207320PNER-L	
	LOGU1207020PNFR-L	
	LOGU1207040PNFR-L	
	LOGU1207080PNFR-L	
	LOGU1207100PNFR-L	
	LOGU1207120PNFR-L	
	LOGU1207160PNFR-L	
	LOGU1207200PNFR-L	
	LOGU1207240PNFR-L	
	LOGU1207300PNFR-L	
	LOGU1207320PNFR-L	
	LOGU1207020PNER-M	L029
	LOGU1207040PNER-M	
	LOGU1207080PNER-M	
	LOGU1207100PNER-M	
	LOGU1207120PNER-M	
	LOGU1207160PNER-M	
	LOGU1207200PNER-M	
	LOGU1207240PNER-M	
	LOGU1207300PNER-M	
	LOGU1207320PNER-M	
	LOGU1207020PNFR-M	
	LOGU1207040PNFR-M	
	LOGU1207080PNFR-M	
	LOGU1207100PNFR-M	
	LOGU1207120PNFR-M	
	LOGU1207160PNFR-M	
	LOGU1207200PNFR-M	
	LOGU1207240PNFR-M	
	LOGU1207300PNFR-M	
	LOGU1207320PNFR-M	
VFX5 	XNMU160708R-MS	L047
	XNMU160712R-MS	
	XNMU160716R-MS	
	XNMU160724R-MS	
	XNMU160732R-MS	
	XNMU160740R-MS	

Cutter Type	Order Number	Page
VFX5 	XNMU160708R-HS	L047
	XNMU160708R-LS	L047
VFX6 	XNMU190912R-MS	L047
	XNMU190916R-MS	
	XNMU190924R-MS	
	XNMU190932R-MS	
	XNMU190940R-MS	
	XNMU190950R-MS	
	XNMU190912R-HS	L047
	XNMU190912R-LS	L047
VOX400 	SONX1206PER	L039
	SONX1206PEL	
	WOEX1206PER5C	L050
WJX09 **WJX14** 	JOMU090512ZZER-L	L025
	JOMU140715ZZER-L	
	JOMU090512ZZER-M	
	JOMU140715ZZER-M	
	JOMU090512ZZER-R	
	JOMU140715ZZER-R	

Cutter Type	Order Number	Page
WSF406W NEW 	SNMU1206C05ZNER-M	L038
WSX445 	SNGU140812ANFR-L	L037
	SNGU140812ANFL-L	
	SNGU140812ANER-L	
	SNGU140812ANEL-L	
	SNGU140812ANER-M	
	SNGU140812ANEL-M	
	SNMU140812ANER-M	
	SNMU140812ANEL-M	
	SNMU140812ANER-R	
	SNMU140812ANEL-R	
	SNMU140812ANER-H	
	WNGU1406ANEN8C-M	L050
WWX200 NEW 	6NGU0906040PNFR-L	L022
	6NGU0906080PNFR-L	
	6NMU0906040PNER-M	
	6NMU0906080PNER-M	
	6NMU0906080PNER-R	
WWX400 	6NGU1409040PNER-L	L022
	6NGU1409080PNER-L	
	6NGU1409040PNFR-L	
	6NGU1409080PNFR-L	
	6NGU1409040PNER-M	
	6NGU1409080PNER-M	
	6NMU1409040PNER-M	
	6NMU1409080PNER-M	
	6NMU1409160PNER-M	
	6NMU1409200PNER-M	
	6NMU1409080PNER-R	
	6NMU1409160PNER-R	
	6NMU1409200PNER-R	
	2NGU1406ZNER6C-M	L049

Cutter Type	Order Number	Page
415SD NEW  Mplus...	**SDMT125530ZEN-L**	**L035**
NEW  Mplus...	**SDMT125530ZEN-M**	**L035**
NEW  Mplus...	**SDMT125530ZEN-R**	**L035**
Corner Angle 0° **11° Positive** 	**TPEN1603PPR**	**L045**
	TPEN1603PPN	
	TPEN2204PDR	
	TPEN2204PDL	
	**TPNN2204PDR**	**L045**
Corner Angle 15° **11° Positive** 	**SPEN1203EDR**	**L039**
	SPEN1203EDL	
	SPEN1504EDR	
	SPEN1504EDL	
	**SPNN1203EDR**	**L041**
Corner Angle 45° **15° Positive** 	**SDEN1203AEN**	**L035**
Corner Angle 45° **20° Positive** 	**SEER1204AFEN-JS**	**L035**
	**SEEW1204AFTN**	**L036**

Cutter Type	Order Number	Page
Corner Angle 45° **20° Positive** 	**SEMN1204AZTN**	**L036**
Negative 	**SNEN1204EN**	**L037**
	SNEN1504EN	
	**SNMN120408**	**L038**
	SNMN120412	
11° Positive 	**SPGN120304**	**L040**
	SPGN120308	
	SPGN120312	
	SPGN150404	
	SPGN150408	
	SPMN120304	
	SPMN120304T	
	SPMN120308	
	SPMN120312	
	SPMN120408	
	SPMN120412	
	SPMN150408	
	SPMN150412	
	**TPMN160304**	**L045**
	TPMN160308	
	TPMN160312	
	TPMN220404	
	TPMN220408	
	TPMN220408T	
	TPMN220412	

Mplus...

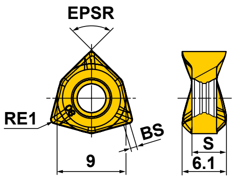
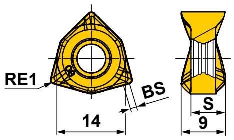
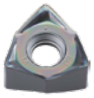
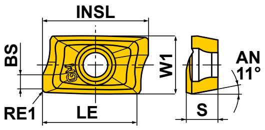
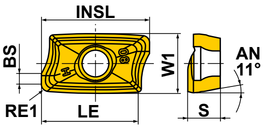
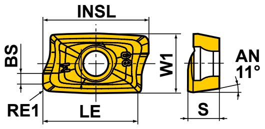
MPlus is a product manufactured by our contracted suppliers.

ROTATING INSERTS

Material			MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	TF15
	P	Steel	◐	◐		◐	✤				◐	◐	
	M	Stainless Steel	◐	◐				◐			◐	◐	
	K	Cast Iron	◐	◐	◐						✤	✤	
	N	Non-ferrous Metal											◐
	S	Heat-resistant Alloy, Titanium Alloy							◐	✤	◐	✤	
	H	Hardened Materials									◐		

Cutting Conditions (Guide):
●: Stable Cutting ◐: General Cutting ✤: Unstable Cutting

Honing:
E: Round F: Sharp

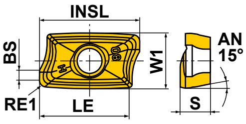
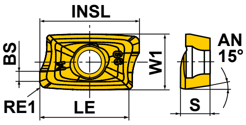
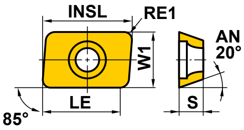
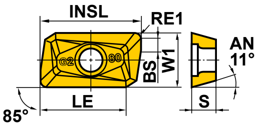
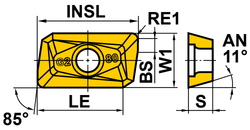
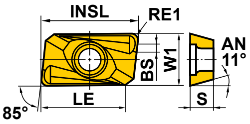
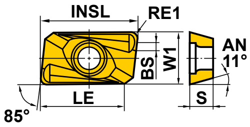
Shape	Order Number	Class	Honing	Coated										Carbide	Dimensions (mm)						Geometry
				NEW MV1020	NEW MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	TF15	INSL	LE	W1	S	BS	RE1	
WWX200 ➲K062	6NGU0906040PNFR-L	G	F											●	—	—	—	5.3	1.6	0.4	
	6NGU0906080PNFR-L	G	F											●	—	—	—	5.3	1.2	0.8	
NEW	6NMU0906040PNER-M	M	E	●		●	●	●	●	●	●	●			—	—	—	5.3	1.6	0.4	
	6NMU0906080PNER-M	M	E	●		●	●	●	●	●	●	●			—	—	—	5.3	1.2	0.8	
	6NMU0906080PNER-R	M	E	●		●	●	●		●	●	●			—	—	—	5.3	1.2	0.8	
WWX400 ➲K067	6NGU1409040PNER-L	G	E	●	●	★	★	★	●	●	★	★			—	—	—	7	1.7	0.4	
	6NGU1409080PNER-L	G	E	●	●	★	●	●	●	●	●	●			—	—	—	7	1.3	0.8	
	6NGU1409040PNFR-L	G	F											●	—	—	—	7	1.7	0.4	
	6NGU1409080PNFR-L	G	F											●	—	—	—	7	1.3	0.8	
	6NGU1409040PNER-M	G	E	●	●	★	★	★	●	●	★	★			—	—	—	7	1.7	0.4	
	6NGU1409080PNER-M	G	E	●	●	★	●	●	●	●	●	●			—	—	—	7	1.3	0.8	
	6NMU1409040PNER-M	M	E	●	●	●	●	●	●	●	●	●			—	—	—	7	1.7	0.4	
	6NMU1409080PNER-M	M	E	●	●	●	●	●	●	●	●	●			—	—	—	7	1.3	0.8	
	6NMU1409160PNER-M	M	E	●	●	●	●	●	●	★	●	●			—	—	—	7	0.5	1.6	
	6NMU1409200PNER-M	M	E	●	●	●	●	●	●	★	●	●			—	—	—	7	0.5	2.0	
	6NMU1409080PNER-R	M	E	●	●	●	●	●		●	●	●			—	—	—	7	1.3	0.8	
	6NMU1409160PNER-R	M	E	●	●	●	●	●		★	★	●			—	—	—	7	0.5	1.6	
	6NMU1409200PNER-R	M	E	●	●	●	●	●		★	★	●			—	—	—	7	0.5	2.0	
APX3000 ➲K146 APX3000 Long Cutting Edge ➲K160	AOGT123602PEFR-GM	G	F											●	12	10	6.6	3.6	1.8	0.2	
	AOGT123604PEFR-GM	G	F											●	12	10	6.6	3.6	1.6	0.4	
	AOGT123608PEFR-GM	G	F											●	12	10	6.6	3.6	1.2	0.8	
																					
APX3000 ➲K146 APX3000 Long Cutting Edge ➲K160	AOMT123604PEER-H	M	E			●	●	●	●	●	●	●	●		12	10	6.6	3.6	1.6	0.4	
	AOMT123608PEER-H	M	E			●	●	●	●	●	●	●	●		12	10	6.6	3.6	1.2	0.8	
	AOMT123616PEER-H	M	E			●	●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	1.6	
																					
APX3000 ➲K146 APX3000 Long Cutting Edge ➲K160	AOMT123602PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	1.8	0.2	
	AOMT123604PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	1.6	0.4	
	AOMT123608PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	1.2	0.8	
	AOMT123610PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	1.0	1.0	
	AOMT123612PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	0.8	1.2	
	AOMT123616PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	1.6	
	AOMT123620PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	2.0	
	AOMT123624PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	2.4	
	AOMT123630PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	3.0	
	AOMT123632PEER-M	M	E				●	●	●	●	●	●	●		12	10	6.6	3.6	0.4	3.2	

● = NEW

Material			F7030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	UP20M	NX2525	MX3030	NX4545	UTi20T	HTi10
Material	P	Steel	◐		◐	✤				◐	◐	◐	●	◐	◐	◐	
	M	Stainless Steel	◐				◐			◐	◐	◐	●	◐	◐	◐	
	K	Cast Iron		◐						✤	✤		●	◐		✤	◐
	N	Non-ferrous Metal															◐
	S	Heat-resistant Alloy, Titanium Alloy						◐	✤	◐	✤						
	H	Hardened Materials								◐							

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round F:Sharp

Shape	Order Number	Class	Honing	Coated										Cermet			Carbide		Dimensions (mm)						Geometry
				F7030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	VP20RT	UP20M	NX2525	NEW MX3030	NX4545	UTi20T	HTi10	INSL	LE	W1	S	BS	RE1	
APX4000 ➲K153 **APX4000** Long Cutting Edge ➲K164 	**AOMT184804PEER-H**	M	E		●	●	●	●	●	●	●	●							18	15	9	4.8	1.8	0.4	
	AOMT184808PEER-H	M	E		●	●	●	●	●	●	●	●							18	15	9	4.8	1.4	0.8	
	AOMT184816PEER-H	M	E		●	●	●	●	●	●	●	●							18	15	9	4.8	0.4	1.6	
	AOMT184832PEER-H	M	E				●	●				●							18	15	9	4.8	0.4	3.2	
	AOMT184840PEER-H	M	E				●	●				●							18	15	9	4.8	0.4	4.0	
	AOMT184850PEER-H	M	E				●	●				●							18	15	9	4.8	–	5.0	
	AOMT184864PEER-H	M	E				●	●				●							18	15	9	4.8	–	6.35	
APX4000 ➲K153 **APX4000** Long Cutting Edge ➲K164 	**AOMT184804PEER-M**	M	E			●	●	●	●	●	●	●							18	15	9	4.8	1.8	0.4	
	AOMT184808PEER-M	M	E			●	●	●	●	●	●	●							18	15	9	4.8	1.4	0.8	
	AOMT184810PEER-M	M	E			●			●	●	●								18	15	9	4.8	1.0	1.0	
	AOMT184812PEER-M	M	E			●			●	●	●								18	15	9	4.8	0.8	1.2	
	AOMT184816PEER-M	M	E			●	●	●	●	●	●	●							18	15	9	4.8	0.4	1.6	
	AOMT184820PEER-M	M	E			●			●	●	●								18	15	9	4.8	0.4	2.0	
BAE 	**AEMW150304ER**	M	E										★	●			●		16.696	15.2	9.525	3.18	–	0.4	
	AEMW150308ER	M	E										★	★			●		16.623	14.8	9.525	3.18	–	0.8	
	AEMW19T304ER	M	E										★	●					20.161	18.4	12.7	3.97	–	0.4	
	AEMW19T308ER	M	E										★	★					20.088	18.0	12.7	3.97	–	0.8	
BAP300 	**APGT1135PDFR-G2**	G	F															●	11.3	9.7	6.35	3.5	1.2	0.8	
BAP400 	**APGT1604PDFR-G2**	G	F															●	17.02	14	9.525	4.76	1.4	0.8	
BAP300 **SRM2** ➲K236 	**APMT1135PDER-H1**	M	E	●							●			●	●	★		●	11.25	9	6.35	3.5	1.5	0.4	
	APMT1135PDER-H2	M	E	●							●			●	●	●		●	11.25	9	6.35	3.5	1.2	0.8	
	APMT1135PDER-H3	M	E	●															11.26	9	6.35	3.5	0.8	1.2	
	APMT1135PDER-H4	M	E	●															11.24	9	6.35	3.5	0.4	1.6	
	APMT1135PDER-H6	M	E	●															11.10	9	6.35	3.5	0.4	2.4	
BAP400 **SRM2** ➲K236 **SRM2Ø40** **Ø50** ➲K244 	**APMT1604PDER-H1**	M	E	●										●					17.02	14	9.525	4.76	1.7	0.4	
	APMT1604PDER-H2	M	E	●							●			●	●	●		●	17.11	14	9.525	4.76	1.4	0.8	
	APMT1604PDER-H4	M	E	●															17.06	14	9.525	4.76	0.4	1.6	
	APMT1604PDER-H6	M	E	●															16.93	14	9.525	4.76	0.4	2.4	
	APMT1604PDER-H8	M	E	●															16.79	14	9.525	4.76	0.4	3.2	

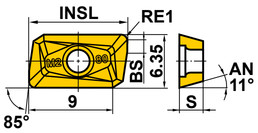
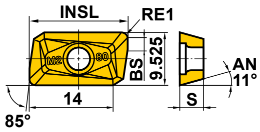
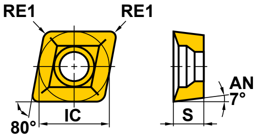
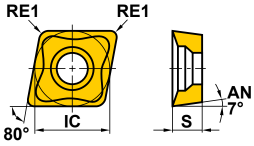
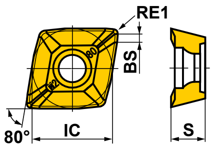
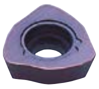
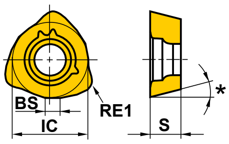
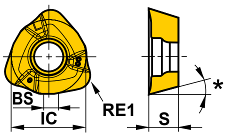
● = NEW

ROTATING INSERTS

Material			F7030	FH7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP30RT	UP20M	MX3030	NX4545	UTi20T
Material	P	Steel	◐	◐	◐	✤						◐	✤	◐	◐	◐	◐
	M	Stainless Steel	◐				◐	✤				◐	✤	◐	◐	◐	◐
	K	Cast Iron		◐								✤	✤		◐		✤
	N	Non-ferrous Metal															
	S	Heat-resistant Alloy, Titanium Alloy							◐	✤	✤	◐					
	H	Hardened Materials										◐					

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round S:Chamfer + Hone

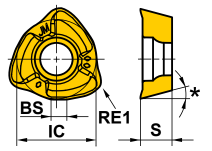
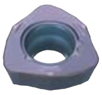
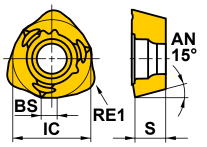
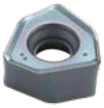
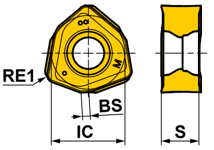
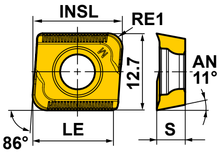
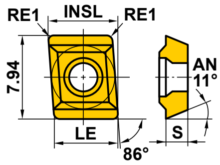
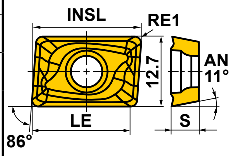
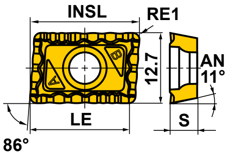
Shape	Order Number	Class	Honing	Coated												Cermet		Carbide	Dimensions (mm)					Geometry
				F7030	FH7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP30RT	UP20M	NEW MX3030	NX4545	UTi20T	INSL	IC	S	BS	RE1	
BAP300 **SRM2** **➲K236** 	**APMT1135PDER-M0**	M	E	★															11.25	–	3.5	1.8	0.2	
	APMT1135PDER-M1	M	E	★															11.25	–	3.5	1.5	0.4	
	APMT1135PDER-M2	M	E	●									●			●	●		11.18	–	3.5	1.2	0.8	
BAP400 **SRM2** **➲K236** **SRM2Ø40** **Ø50** **➲K244** 	**APMT1604PDER-M2**	M	E	●									●			●	●		17.10	–	4.76	1.4	0.8	
DCCC **➲K216** 	**CCMX083508EN-A**	M	E	●											★			★	–	7.94	3.5	–	0.8	
	CCMX09T308EN-A	M	E	●									●		★			★	–	9.525	3.97	–	0.8	
DCCC **➲K216** 	**CCMX09T308EN-B**	M	E	●														★	–	9.525	3.97	–	0.8	
PMR **➲K252** 	**CPMT1205ZPEN-M2**	M	E										●						–	12.7	5.56	1.4	0.8	
	CPMT1205ZPEN-M3	M	E										★						–	12.7	5.56	1.4	1.2	
	CPMT1906ZPEN-M2	M	E										●						–	19.05	6.35	1.4	0.8	
	CPMT1906ZPEN-M3	M	E										★						–	19.05	6.35	1.4	1.2	
AJX **➲K194** 	**JOMW06T215ZZSR-FT**	M	S		●	●	●	●	●	●	●		●	●					–	6.35	2.78	1.2	1.5	
	JOMW080320ZZSR-FT	M	S		●	●	●	●	●	●	●		●	●					–	8	3.18	1.4	2	
	JDMW09T320ZDSR-FT	M	S		●	●	●	●	●	●	●		●	●					–	9.525	3.97	1.8	2	
	JDMW120420ZDSR-FT	M	S		●	●	●	●	●	●	●		●	●					–	12	4.76	2.5	2	
	JDMW140520ZDSR-FT	M	S		●	●	●	●	●	●	●		●	●					–	14	5.56	2.8	2	
																								*JOMW... : 13°, JDMW... : 15°
AJX **➲K194** 	**JOMT06T216ZZER-JL**	M	E					●	●	●	●	●							–	6.35	2.78	1.2	1.6	
	JOMT080322ZZER-JL	M	E					●	●	●	●	●							–	8	3.18	1.4	2.2	
	JDMT09T323ZDER-JL	M	E					●	●	●	●	●							–	9.525	3.97	1.8	2.3	
	JDMT120423ZDER-JL	M	E					●	●	●	●	●							–	12	4.76	2.5	2.3	
	JDMT140523ZDER-JL	M	E					●	●	●	●	●							–	14	5.56	2.8	2.3	
																								*JOMT... : 13°, JDMT... : 15°

● = NEW

Material			MV1020	MV1030	FH7020	MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP20RT	VP30RT	UP20M	UTi20T
Material	P	Steel	◐	◐	◐	◐	◐	✤						◐	◐	✤	◐	◐
	M	Stainless Steel	◐	◐	◐	◐			◐	✤				◐	◐	✤	◐	◐
	K	Cast Iron	◐	◐										✤	✤			✤
	N	Non-ferrous Metal																
	S	Heat-resistant Alloy, Titanium Alloy									◐	✤	✤	◐	✤	✤		
	H	Hardened Materials												◐				

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round S:Chamfer + Hone

Shape	Order Number	Class	Honing	Coated															Carbide	Dimensions (mm)						Geometry
				NEW MV1020	NEW MV1030	FH7020	MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	MP9140	VP15TF	VP20RT	VP30RT	UP20M	UTi20T	INSL	LE	IC	S	BS	RE1	
AJX ➲K194 	JOMT06T215ZZSR-JM	M	S			●		●	●	●	●	●	●		●		●			–	–	6.35	2.78	1.2	1.5	 *JOMT... : 13°, JDMT... : 15°
	JOMT080320ZZSR-JM	M	S			●		●	●	●	●	●	●		●		●			–	–	8	3.18	1.4	2	
	JDMT09T320ZDSR-JM	M	S			●		●	●	●	●	●	●		●		●			–	–	9.525	3.97	1.8	2	
	JDMT120420ZDSR-JM	M	S			●		●	●	●	●	●	●		●		●			–	–	12	4.76	2.5	2	
	JDMT140520ZDSR-JM	M	S			●		●	●	●	●	●	●		●		●			–	–	14	5.56	2.8	2	
AJX ➲K194 	JDMT120420ZDSR-ST	M	S			●		●	●	●	●				●		●			–	–	12	4.76	2.5	2	
	JDMT140520ZDSR-ST	M	S			●		●	●	●	●				●		●			–	–	14	5.56	2.8	2	
WJX09 ➲K085 **WJX14** ➲K092 	JOMU090512ZZER-L	M	E	●	●		●	●	●	●	●	●	●		●		●			–	–	9.525	4.73	0.88	1.2	 Right hand insert only.
	JOMU140715ZZER-L	M	E	●	●		●	●	●	●	●	●	●		★		★			–	–	14	6.58	1.3	1.5	
	JOMU090512ZZER-M	M	E	●	●		●	●	●	●	●	●	●		●		●			–	–	9.525	4.75	0.88	1.2	
	JOMU140715ZZER-M	M	E	●	●		●	●	●	●	●	●	●		★		★			–	–	14	6.63	1.3	1.5	
	JOMU090512ZZER-R	M	E	●	●		●	●	●						●		●			–	–	9.525	4.83	0.88	1.2	
	JOMU140715ZZER-R	M	E	●	●		●	●	●						●		●			–	–	14	6.75	1.3	1.5	
ASPX ➲K224 	JPGX1404080PPER-JM	G	E											●						15.12	13.4	–	4.8	–	0.8	
	JPGX1404120PPER-JM	G	E											●						15.06	13.3	–	4.8	–	1.2	
	JPGX1404160PPER-JM	G	E											●						15.00	13.3	–	4.8	–	1.6	
	JPGX1404240PPER-JM	G	E											●						14.88	13.2	–	4.8	–	2.4	
	JPGX1404320PPER-JM	G	E											●						14.72	13.1	–	4.8	–	3.2	
	JPGX1404400PPER-JM	G	E											●						14.64	13.0	–	4.8	–	4.0	
	JPGX1404500PPER-JM	G	E											●						14.49	13.0	–	4.8	–	5.0	
	JPGX1404635PPER-JM	G	E											●						14.29	12.9	–	4.8	–	6.35	
TAB 	JPMT060204-E	M	E												★			●	●	7.0	6.0	–	2.38	–	0.4	 Inner insert (E) shown.
SPX ➲K219 	JPMX140412-JM	M	E												●	●				15.04	12.9	–	4.79	–	1.2	
	JPMX190412-JM	M	E												●	●				19.81	17.6	–	4.83	–	1.2	
SPX ➲K219 	JPMX140412-WH	M	E												●	●				15.04	12.9	–	4.76	–	1.2	
	JPMX190412-WH	M	E												●	●				19.81	17.6	–	4.76	–	1.2	

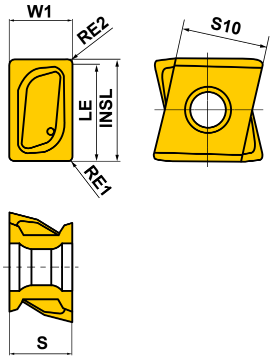
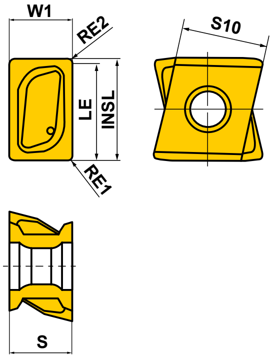
● = NEW

ROTATING INSERTS

			MP6120	VP15TF
Material	P	Steel	◐	◐
	M	Stainless Steel		
	K	Cast Iron		✤
	N	Non-ferrous Metal		
	S	Heat-resistant Alloy, Titanium Alloy		◐
	H	Hardened Steel		

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

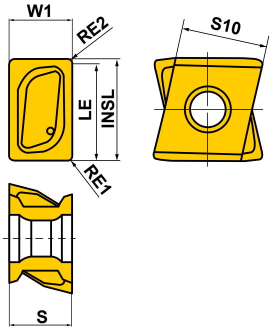
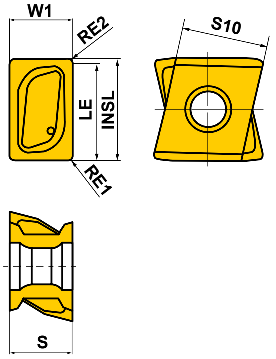
Honing:
E:Round

Shape	Order Number	Hand	Class	Honing	Coated		Dimensions (mm)							Geometry
					MP6120	VP15TF	INSL	LE	S	S10	RE1	RE2	W1	
DCV3 Side Cutter 	**LNGU090604PNER-M**	R	G	E		●	9.0	8.6	6.0	8.5	0.4	0.4	6.0	
	LNGU090604PNEL-M	L	G	E		●	9.0	8.6	6.0	8.5	0.4	0.4	6.0	
	LNGU090608PNER-M	R	G	E		●	9.0	8.6	6.0	8.5	0.8	0.4	6.0	
	LNGU090608PNEL-M	L	G	E		●	9.0	8.6	6.0	8.5	0.8	0.4	6.0	
	LNGU090612PNER-M	R	G	E		●	9.0	8.6	6.0	8.5	1.2	0.4	6.0	
	LNGU090612PNEL-M	L	G	E		●	9.0	8.6	6.0	8.5	1.2	0.4	6.0	
	LNGU090616PNER-M	R	G	E		●	9.0	8.6	6.0	8.5	1.6	0.4	6.0	
	LNGU090616PNEL-M	L	G	E		●	9.0	8.6	6.0	8.5	1.6	0.4	6.0	
	LNGU090620PNER-M	R	G	E		●	9.0	8.6	6.0	8.5	2.0	0.4	6.0	
	LNGU090620PNEL-M	L	G	E		●	9.0	8.6	6.0	8.5	2.0	0.4	6.0	
	LNGU090624PNER-M	R	G	E		●	9.0	8.6	6.0	8.5	2.4	0.4	6.0	
	LNGU090624PNEL-M	L	G	E		●	9.0	8.6	6.0	8.5	2.4	0.4	6.0	
	LNGU090630PNER-M	R	G	E		●	9.0	8.6	6.0	8.5	3.0	0.4	6.0	
	LNGU090630PNEL-M	L	G	E		●	9.0	8.6	6.0	8.5	3.0	0.4	6.0	
	LNGU090640PNER-M	R	G	E		●	9.0	8.6	6.0	8.5	4.0	0.4	6.0	
	LNGU090640PNEL-M	L	G	E		●	9.0	8.6	6.0	8.5	4.0	0.4	6.0	Right hand insert shown.
DCV4 Side Cutter 	**LNGU130804PNER-M**	R	G	E		●	13.0	12.2	8.0	11.0	0.4	0.8	8.0	
	LNGU130804PNEL-M	L	G	E		●	13.0	12.2	8.0	11.0	0.4	0.8	8.0	
	LNGU130808PNER-M	R	G	E		●	13.0	12.2	8.0	11.0	0.8	0.8	8.0	
	LNGU130808PNEL-M	L	G	E		●	13.0	12.2	8.0	11.0	0.8	0.8	8.0	
	LNGU130820PNER-M	R	G	E		●	13.0	12.2	8.0	11.0	2.0	0.8	8.0	
	LNGU130820PNEL-M	L	G	E		●	13.0	12.2	8.0	11.0	2.0	0.8	8.0	
	LNGU130830PNER-M	R	G	E		●	13.0	11.4	8.0	11.0	3.0	1.6	8.0	
	LNGU130830PNEL-M	L	G	E		●	13.0	11.4	8.0	11.0	3.0	1.6	8.0	
	LNGU130840PNER-M	R	G	E		●	13.0	11.4	8.0	11.0	4.0	1.6	8.0	
	LNGU130840PNEL-M	L	G	E		●	13.0	11.4	8.0	11.0	4.0	1.6	8.0	
	LNGU130850PNER-M	R	G	E		●	13.0	11.4	8.0	11.0	5.0	1.6	8.0	
	LNGU130850PNEL-M	L	G	E		●	13.0	11.4	8.0	11.0	5.0	1.6	8.0	
	LNGU130804PNER-R	R	G	E	●	●	13.0	12.2	8.0	11.0	0.4	0.8	8.0	
	LNGU130804PNEL-R	L	G	E	●	●	13.0	12.2	8.0	11.0	0.4	0.8	8.0	
	LNGU130808PNER-R	R	G	E	●	●	13.0	12.2	8.0	11.0	0.8	0.8	8.0	
	LNGU130808PNEL-R	L	G	E	●	●	13.0	12.2	8.0	11.0	0.8	0.8	8.0	
	LNGU130812PNER-R	R	G	E	●	●	13.0	12.2	8.0	11.0	1.2	0.8	8.0	
	LNGU130812PNEL-R	L	G	E	●	●	13.0	12.2	8.0	11.0	1.2	0.8	8.0	
	LNGU130816PNER-R	R	G	E	●	●	13.0	12.2	8.0	11.0	1.6	0.8	8.0	
	LNGU130816PNEL-R	L	G	E	●	●	13.0	12.2	8.0	11.0	1.6	0.8	8.0	
	LNGU130820PNER-R	R	G	E	●	●	13.0	12.2	8.0	11.0	2.0	0.8	8.0	
	LNGU130820PNEL-R	L	G	E	●	●	13.0	12.2	8.0	11.0	2.0	0.8	8.0	Right hand insert shown.

Material			MP6120	VP15TF
Material	**P**	Steel	◐	◐
	M	Stainless Steel		
	K	Cast Iron		✤
	N	Non-ferrous Metal		
	S	Heat-resistant Alloy, Titanium Alloy		◐
	H	Hardened Steel		

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

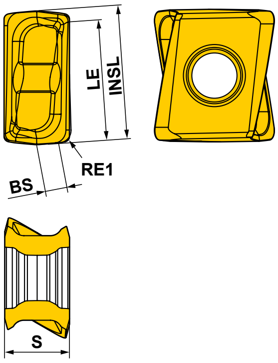
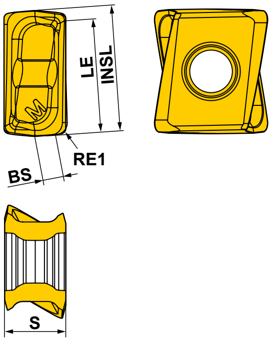
Honing:
E:Round

Shape	Order Number	Hand	Class	Honing	Coated		Dimensions (mm)							Geometry
					MP6120	**VP15TF**	**INSL**	**LE**	**S**	**S10**	**RE1**	**RE2**	**W1**	
DCV4 Side Cutter 	**LNGU130824PNER-R**	R	G	E	●	●	13.0	12.2	8.0	11.0	2.4	0.8	8.0	
	LNGU130824PNEL-R	L	G	E	●	●	13.0	12.2	8.0	11.0	2.4	0.8	8.0	
	LNGU130830PNER-R	R	G	E	●	●	13.0	11.4	8.0	11.0	3.0	1.6	8.0	
	LNGU130830PNEL-R	L	G	E	●	●	13.0	11.4	8.0	11.0	3.0	1.6	8.0	
	LNGU130840PNER-R	R	G	E	●	●	13.0	11.4	8.0	11.0	4.0	1.6	8.0	
	LNGU130840PNEL-R	L	G	E	●	●	13.0	11.4	8.0	11.0	4.0	1.6	8.0	
	LNGU130850PNER-R	R	G	E	●	●	13.0	11.4	8.0	11.0	5.0	1.6	8.0	
	LNGU130850PNEL-R	L	G	E	●	●	13.0	11.4	8.0	11.0	5.0	1.6	8.0	
														Right hand insert shown.
DCV5 Side Cutter 	**LNGU171004PNER-R**	R	G	E	●	●	17.0	16.2	10.0	13.0	0.4	0.8	10.0	
	LNGU171004PNEL-R	L	G	E	●	●	17.0	16.2	10.0	13.0	0.4	0.8	10.0	
	LNGU171008PNER-R	R	G	E	●	●	17.0	16.2	10.0	13.0	0.8	0.8	10.0	
	LNGU171008PNEL-R	L	G	E	●	●	17.0	16.2	10.0	13.0	0.8	0.8	10.0	
	LNGU171012PNER-R	R	G	E	●	●	17.0	16.2	10.0	13.0	1.2	0.8	10.0	
	LNGU171012PNEL-R	L	G	E	●	●	17.0	16.2	10.0	13.0	1.2	0.8	10.0	
	LNGU171016PNER-R	R	G	E	●	●	17.0	16.2	10.0	13.0	1.6	0.8	10.0	
	LNGU171016PNEL-R	L	G	E	●	●	17.0	16.2	10.0	13.0	1.6	0.8	10.0	
	LNGU171020PNER-R	R	G	E	●	●	17.0	16.2	10.0	13.0	2.0	0.8	10.0	
	LNGU171020PNEL-R	L	G	E	●	●	17.0	16.2	10.0	13.0	2.0	0.8	10.0	
	LNGU171024PNER-R	R	G	E	●	●	17.0	16.2	10.0	13.0	2.4	0.8	10.0	
	LNGU171024PNEL-R	L	G	E	●	●	17.0	16.2	10.0	13.0	2.4	0.8	10.0	
	LNGU171030PNER-R	R	G	E	●	●	17.0	15.4	10.0	13.0	3.0	1.6	10.0	
	LNGU171030PNEL-R	L	G	E	●	●	17.0	15.4	10.0	13.0	3.0	1.6	10.0	
	LNGU171040PNER-R	R	G	E	●	●	17.0	15.4	10.0	13.0	4.0	1.6	10.0	
	LNGU171040PNEL-R	L	G	E	●	●	17.0	15.4	10.0	13.0	4.0	1.6	10.0	
	LNGU171050PNER-R	R	G	E	●	●	17.0	15.4	10.0	13.0	5.0	1.6	10.0	
	LNGU171050PNEL-R	L	G	E	●	●	17.0	15.4	10.0	13.0	5.0	1.6	10.0	
	LNGU171060PNER-R	R	G	E	●	●	17.0	15.4	10.0	13.0	6.0	1.6	10.0	
	LNGU171060PNEL-R	L	G	E	●	●	17.0	15.4	10.0	13.0	6.0	1.6	10.0	
	LNGU171070PNER-R	R	G	E	●	●	17.0	15.4	10.0	13.0	7.0	1.6	10.0	
	LNGU171070PNEL-R	L	G	E	●	●	17.0	15.4	10.0	13.0	7.0	1.6	10.0	Right hand insert shown.

ROTATING INSERTS

Cutting Conditions (Guide):
●: Stable Cutting ◐: General Cutting ✤: Unstable Cutting

Honing:
E: Round F: Sharp

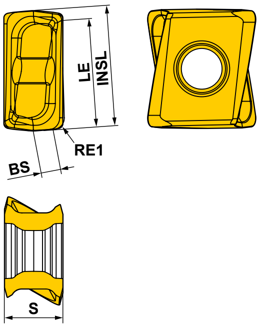
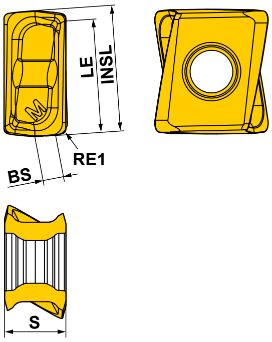
Material	**P** Steel			◐	◐		◐	✤				◐							
	M Stainless Steel			◐	◐				◐			◐							
	K Cast Iron			◐	◐	◐						✤							
	N Non-ferrous Metal												◐						
	S Heat-resistant Alloy, Titanium Alloy									◐	✤	◐							
	H Hardened Steel											◐							
Shape	Order Number	Class	Honing	Coated									Carbide	Dimensions (mm)					Geometry
				NEW **MV1020**	NEW **MV1030**	**MC5020**	**MP6120**	**MP6130**	**MP7130**	**MP9120**	**MP9130**	**VP15TF**	**TF15**	**INSL**	**RE1**	**LE**	**S**	**BS**	
VPX200 ➲**K099** **VPX200** Long Cutting Edge ➲**K127** 	**LOGU0904020PNER-L**	G	E	●	●	★	★	★	★	★	★	★		8.7	0.2	7.6	4.3	1.7	 Right hand insert only.
	LOGU0904040PNER-L	G	E	●	●	●	●	●	●	●	●	★		8.7	0.4	7.6	4.3	1.5	
	LOGU0904080PNER-L	G	E	●	●	●	●	●	●	●	●	★		8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNER-L	G	E	●	●	★	★	★	★	★	★	★		8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNER-L	G	E	●	●	★	★	★	★	★	★	★		8.7	1.2	7.6	4.3	0.8	
	LOGU0904160PNER-L	G	E	●	●	●	●	●	●	●	●	★		8.7	1.6	7.6	4.3	0.5	
	LOGU0904020PNFR-L	G	F										●	8.7	0.2	7.6	4.3	1.7	
	LOGU0904040PNFR-L	G	F										●	8.7	0.4	7.6	4.3	1.5	
	LOGU0904080PNFR-L	G	F										●	8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNFR-L	G	F										★	8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNFR-L	G	F										★	8.7	1.2	7.6	4.3	0.8	
	LOGU0904160PNFR-L	G	F										★	8.7	1.6	7.6	4.3	0.5	
VPX200 ➲**K099** **VPX200** Long Cutting Edge ➲**K127** 	**LOGU0904020PNER-M**	G	E	●	●	★	★	★	★	★	★	★		8.7	0.2	7.6	4.3	1.7	 Right hand insert only.
	LOGU0904040PNER-M	G	E	●	●	●	●	●	●	●	●	★		8.7	0.4	7.6	4.3	1.6	
	LOGU0904080PNER-M	G	E	●	●	●	●	●	●	●	●	★		8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNER-M	G	E	●	●	★	★	★	★	★	★	★		8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNER-M	G	E	●	●	★	★	★	★	★	★	★		8.7	1.2	7.6	4.3	0.9	
	LOGU0904160PNER-M	G	E	●	●	●	●	●	●	●	●	★		8.7	1.6	7.6	4.3	0.5	
	LOGU0904020PNFR-M	G	F										●	8.7	0.2	7.6	4.3	1.7	
	LOGU0904040PNFR-M	G	F										●	8.7	0.4	7.6	4.3	1.6	
	LOGU0904080PNFR-M	G	F										●	8.7	0.8	7.6	4.3	1.2	
	LOGU0904100PNFR-M	G	F										★	8.7	1.0	7.6	4.3	1.0	
	LOGU0904120PNFR-M	G	F										★	8.7	1.2	7.6	4.3	0.9	
	LOGU0904160PNFR-M	G	F										★	8.7	1.6	7.6	4.3	0.5	

● = NEW

Material			MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15
	P	Steel	◐	◐		◐	✤				◐	
	M	Stainless Steel	◐	◐				◐			◐	
	K	Cast Iron	◐	◐	◐						✤	
	N	Non-ferrous Metal										◐
	S	Heat-resistant Alloy, Titanium Alloy							◐	✤	◐	
	H	Hardened Steel									◐	

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round F:Sharp

Shape	Order Number	Class	Honing	Coated									Carbide	Dimensions (mm)					Geometry
				NEW	NEW														
				MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	INSL	RE1	LE	S	BS	
VPX300 **➲K113** **VPX300** Long Cutting Edge **➲K137**	LOGU1207020PNER-L	G	E	●	●	★	★	★	★	★	★	★		12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNER-L	G	E	●	●	●	●	●	●	●	●	★		12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNER-L	G	E	●	●	●	●	●	●	●	●	★		12.4	0.8	11.3	7.0	2.6	
	LOGU1207100PNER-L	G	E	●	●	★	★	★	★	★	★	★		12.4	1.0	11.3	7.0	2.5	
	LOGU1207120PNER-L	G	E	●	●	●	●	●	●	●	●	★		12.4	1.2	11.3	7.0	2.4	
	LOGU1207160PNER-L	G	E	●	●	●	●	●	●	●	●	★		12.4	1.6	11.3	7.0	1.8	
	LOGU1207200PNER-L	G	E	●	●	●	●	●	●	●	●	★		12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNER-L	G	E	●	●	●	●	●	●	●	●	★		12.4	2.4	11.3	7.0	1.2	
	LOGU1207300PNER-L	G	E	●	●	★	★	★	★	★	★	★		12.4	3.0	11.3	7.0	0.6	
	LOGU1207320PNER-L	G	E	●	●	●	●	●	●	●	●	★		12.4	3.2	11.3	7.0	0.4	
	LOGU1207020PNFR-L	G	F										★	12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNFR-L	G	F										●	12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNFR-L	G	F										●	12.4	0.8	11.3	7.0	2.6	
	LOGU1207100PNFR-L	G	F										★	12.4	1.0	11.3	7.0	2.5	
	LOGU1207120PNFR-L	G	F										●	12.4	1.2	11.3	7.0	2.4	
	LOGU1207160PNFR-L	G	F										●	12.4	1.6	11.3	7.0	1.8	
	LOGU1207200PNFR-L	G	F										●	12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNFR-L	G	F										●	12.4	2.4	11.3	7.0	1.2	
	LOGU1207300PNFR-L	G	F										★	12.4	3.0	11.3	7.0	0.6	
	LOGU1207320PNFR-L	G	F										●	12.4	3.2	11.3	7.0	0.4	Right hand insert only.
VPX300 **➲K113** **VPX300** Long Cutting Edge **➲K137**	LOGU1207020PNER-M	G	E	●	●	★	★	★	★	★	★	★		12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNER-M	G	E	●	●	●	●	●	●	●	●	★		12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNER-M	G	E	●	●	●	●	●	●	●	●	★		12.4	0.8	11.3	7.0	2.4	
	LOGU1207100PNER-M	G	E	●	●	★	★	★	★	★	★	★		12.4	1.0	11.3	7.0	2.3	
	LOGU1207120PNER-M	G	E	●	●	●	●	●	●	●	●	★		12.4	1.2	11.3	7.0	2.1	
	LOGU1207160PNER-M	G	E	●	●	●	●	●	●	●	●	★		12.4	1.6	11.3	7.0	1.7	
	LOGU1207200PNER-M	G	E	●	●	●	●	●	●	●	●	★		12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNER-M	G	E	●	●	●	●	●	●	●	●	★		12.4	2.4	11.3	7.0	1.0	
	LOGU1207300PNER-M	G	E	●	●	★	★	★	★	★	★	★		12.4	3.0	11.3	7.0	0.5	
	LOGU1207320PNER-M	G	E	●	●	●	●	●	●	●	●	★		12.4	3.2	11.3	7.0	0.3	
	LOGU1207020PNFR-M	G	F										★	12.4	0.2	11.3	7.0	3.0	
	LOGU1207040PNFR-M	G	F										●	12.4	0.4	11.3	7.0	2.8	
	LOGU1207080PNFR-M	G	F										●	12.4	0.8	11.3	7.0	2.4	
	LOGU1207100PNFR-M	G	F										★	12.4	1.0	11.3	7.0	2.3	
	LOGU1207120PNFR-M	G	F										●	12.4	1.2	11.3	7.0	2.1	
	LOGU1207160PNFR-M	G	F										●	12.4	1.6	11.3	7.0	1.7	
	LOGU1207200PNFR-M	G	F										●	12.4	2.0	11.3	7.0	1.4	
	LOGU1207240PNFR-M	G	F										●	12.4	2.4	11.3	7.0	1.0	
	LOGU1207300PNFR-M	G	F										★	12.4	3.0	11.3	7.0	0.5	
	LOGU1207320PNFR-M	G	F										●	12.4	3.2	11.3	7.0	0.3	Right hand insert only.

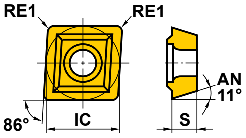
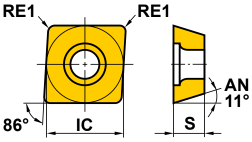
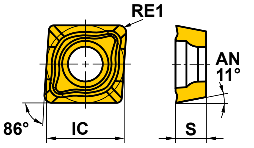
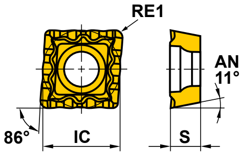
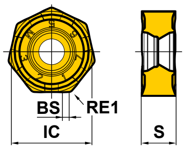
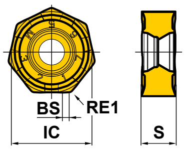
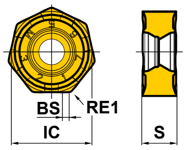
● = NEW

ROTATING INSERTS

Material			MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP7140	VP15TF	VP20RT	UP20M	UTi20T
Material	P	Steel	◐	◐		◐	✤			◐	◐	◐	◐
	M	Stainless Steel	◐	◐				◐	✤	◐	◐	◐	◐
	K	Cast Iron	◐	◐	◐					✤	✤		✤
	N	Non-ferrous Metal											
	S	Heat-resistant Alloy, Titanium Alloy								◐	✤		
	H	Hardened Materials								◐			

Cutting Conditions (Guide):
●: Stable Cutting ◐: General Cutting ✤: Unstable Cutting

Honing:
E: Round

Shape	Order Number	Class	Honing	Coated									Carbide	Dimensions (mm)				Geometry
				NEW MV1020	NEW MV1030	MC5020	MP6120	MP6130	MP7130	MP7140	VP15TF	VP20RT	UP20M	UTi20T	IC	S	BS	RE1	
CBMP ECMP TAB 	**MPMT070308**	M	E										★	●	7.94	3.18	–	0.8	
	MPMT090308	M	E								★		★	●	9.525	3.18	–	0.8	
	MPMT120408	M	E										★	●	12.7	4.76	–	0.8	
TSMP ➲K248 	**MPMW070308**	M	E											●	7.94	3.18	–	0.8	
	MPMW090308	M	E											●	9.525	3.18	–	0.8	
	MPMW120408	M	E											●	12.7	4.76	–	0.8	
SPX ➲K219 	**MPMX120412-JM**	M	E								●	●			12.7	4.79	–	1.2	
SPX ➲K219 	**MPMX120412-WH**	M	E								●	●			12.7	4.76	–	1.2	
AHX440S ➲K034 	**NNMU130508ZER-L**	M	E	●	●	●	●	●	●	●	★				13.4	5.77	1	0.8	
AHX440S ➲K034 **AHX475S** ➲K038 	**NNMU130508ZEN-M**	M	E	●	●	●	●	●	●	●	★				13.4	5.57	1	0.8	
	NNMU130532ZEN-M	M	E	●	●	●	●	●	●	●	★				13.4	5.57	–	3.2	
AHX440S ➲K034 **AHX475S** ➲K038 	**NNMU130532ZEN-R**	M	E	●	●	●	●	●	●	●	★				13.4	5.47	–	3.2	

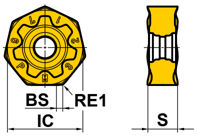
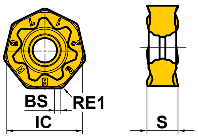
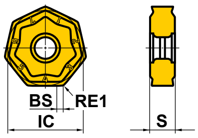
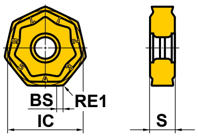
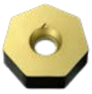
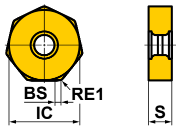
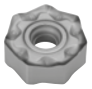
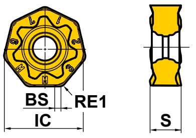
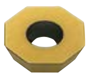
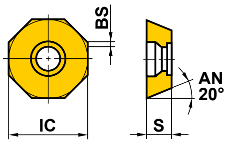
●: Inventory maintained. ★: Inventory maintained in Japan.
(10 inserts in one case)

● = NEW

Material			MP6120	MP6130	MP9120	MP9130	F7010	F7030	XC5010	MC5020	MP7030	VP15TF	VP20RT	MX3030	NX4545
Material	P	Steel	◐	✤			●	◐				◐	◐	◐	◐
	M	Stainless Steel					◐	◐			◐	◐	◐	◐	◐
	K	Cast Iron							●	◐		✤	✤	◐	
	N	Non-ferrous Metal													
	S	Heat-resistant Alloy, Titanium Alloy			◐	✤						◐			
	H	Hardened Materials										◐			

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round S:Chamfer + Hone T:Chamfer

Shape	Order Number	Class	Honing	Coated											Cermet		Dimensions (mm)				Geometry
				MP6120	MP6130	MP9120	MP9130	F7010	F7030	NEW XC5010	MC5020	MP7030	VP15TF	VP20RT	NEW MX3030	NX4545	IC	S	BS	RE1	
AHX640S **➲K042** 	**NNMU200708ZEN-M**	M	E	●	●												20	8	1	0.8	
	NNMU200708ZEN-MP	M	E										●				20	8	1	0.8	
AHX640S **➲K042** 	**NNMU200712ZER-MM**	M	E									●					20	8	1	1.2	
AHX640W **➲K049** **AHX640S** **➲K042** 	**NNMU200608ZEN-MK**	M	E							●	●		★	★			20	6.55	1	0.8	
AHX640W **➲K049** **AHX640S** **➲K042** 	**NNMU200608ZEN-HK**	M	E								●		★	★			20	6.55	1	0.8	
AHX640S **➲K042** NEW 	**NNMQ200708ZEN-FT**	M	E							●							20	6.55	1	0.8	
AHX640S **➲K042** 	**NNMU200712ZER-L**	M	E			●	●										20	8	1	1.2	
OCTACUT 	**OEMX12T3ETR1**	M	T					●							●	★	12.7	3.97	1	—	
	OEMX12T3ESR1	M	S						●								12.7	3.97	1	—	
	OEMX1705ETR1	M	T					●					★		●	●	17	5	1.4	—	
	OEMX1705ESR1	M	S						●								17	5	1.4	—	

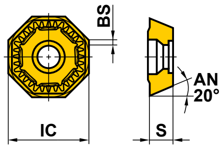
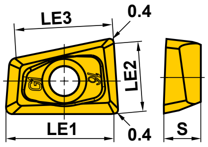
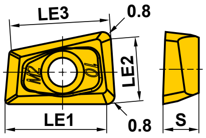
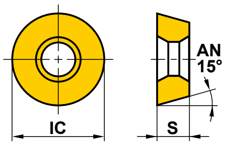
● = NEW

ROTATING INSERTS

Material			F7030	MP6120	MP6130	MP7130	MP7140	MP9120	VP15TF	VP30RT	VP10H	VP05HT	HTi10
Material	P	Steel	◐	◐	✤				◐	✤	●	●	
	M	Stainless Steel	◐			◐	✤		◐	✤			
	K	Cast Iron							✤	✤	◐	●	◐
	N	Non-ferrous Metal											◐
	S	Heat-resistant Alloy, Titanium Alloy						◐	◐	✤	●		
	H	Hardened Materials							◐		●	●	

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round F:Sharp S:Chamfer + Hone T:Chamfer

Shape	Order Number	Class	Honing	Coated										Carbide	Dimensions (mm)						Geometry
				F7030	MP6120	MP6130	MP7130	MP7140	MP9120	VP15TF	VP30RT	VP10H	VP05HT	HTi10	LE1	LE2	LE3	IC	S	BS	
OCTACUT 	**OEMX12T3EER1-JS**	M	E	●											—	—	—	12.7	3.97	1	
	OEMX1705EER1-JS	M	E	●											—	—	—	17	5	1.4	
	OEMX1705ETR1-JS	M	T							★					—	—	—	17	5	1.4	
AQX ➲K186 	**QOGT0830R-G1**	G	E *1		★				★	●				●	7.7	4.9	7.3	—	3	—	
	QOGT1035R-G1	G	E *1		★				★	●				●	9.9	6.4	9.3	—	3.5	—	
	QOGT1342R-G1	G	E *1		★				★	●				●	12.4	8.1	11.6	—	4.2	—	
	QOGT1651R-G1	G	E *1		★				★	●				●	15.8	10.4	14.6	—	5.1	—	
	QOGT1856R-G1	G	E *1		★				★	●				●	17.3	11.4	16	—	5.6	—	
	QOGT2062R-G1	G	E *1		★				★	●				●	19.8	13.1	18.1	—	6.2	—	
	QOGT2576R-G1	G	E *1		★				★	●				●	25.2	16.6	23.1	—	7.6	—	
AQX ➲K186 	**QOMT0830R-M2**	M	E		●	●	●	●	●	●	●				7.3	4.4	7.3	—	3	—	
	QOMT1035R-M2	M	E		●	●	●	●	●	●	●				9.5	5.9	9.3	—	3.5	—	
	QOMT1342R-M2	M	E		●	●	●	●	●	●	●				12	7.6	11.6	—	4.2	—	
	QOMT1651R-M2	M	E		●	●	●	●	●	●	●				15.4	9.9	14.6	—	5.1	—	
	QOMT1856R-M2	M	E		●	●	●	●	●	●	●				16.9	10.9	16	—	5.6	—	
	QOMT2062R-M2	M	E		●	●	●	●	●	●	●				19.4	12.6	18.1	—	6.2	—	
	QOMT2576R-M2	M	E		●	●	●	●	●	●	●				24.8	16.1	23.1	—	7.6	—	
RRD 	**RDHX0501M0E**	H	E	●						●		●	●		—	—	—	5	1.5	—	
	RDHX0501M0S	H	S	●						●		●			—	—	—	5	1.5	—	
	RDHX07T1M0E	H	E	●						●		●	●		—	—	—	7	1.98	—	
	RDHX07T1M0S	H	S	●						●		●	●		—	—	—	7	1.98	—	
	RDHX0702M0E	H	E	●						●		●	●		—	—	—	7	2.38	—	
	RDHX0702M0S	H	S	●						●		●			—	—	—	7	2.38	—	
	RDHX1003M0E	H	E	●						●		●	●		—	—	—	10	3.18	—	
	RDHX1003M0S	H	S	●						●		●	●		—	—	—	10	3.18	—	
	RDHX12T3M0E	H	E	●						●		●	●		—	—	—	12	3.97	—	
	RDHX12T3M0S	H	S	●						●		●			—	—	—	12	3.97	—	
	RDHX1604M0E	H	E	●						●		●	●		—	—	—	16	4.76	—	
	RDHX1604M0S	H	S	●						●		●			—	—	—	16	4.76	—	

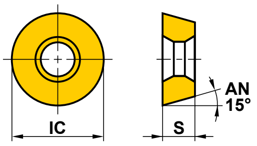
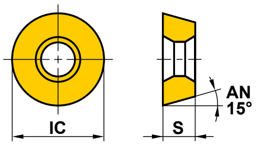
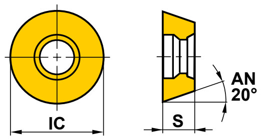
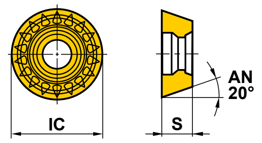
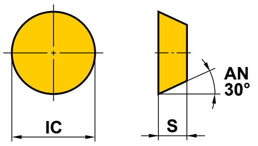
*1 Grade HTi10 is "F".

●: Inventory maintained. ★: Inventory maintained in Japan.
☐: Non stock, produced to order only. (10 inserts in one case)

Material			F7030	VP15TF	VP20M	VP10H	VP05HT	UP20M	NX4545		UTi20T	HTi10
Material	P	Steel	◐	◐	◐	●	●	◐	◐		◐	
	M	Stainless Steel	◐	◐	◐			◐	◐		◐	
	K	Cast Iron		✜		◐	●				✜	◐
	N	Non-ferrous Metal										◐
	S	Heat-resistant Alloy, Titanium Alloy		◐		●						
	H	Hardened Materials		◐		●	●					

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✜:Unstable Cutting

Honing:
E:Round **S**:Chamfer + Hone **T**:Chamfer

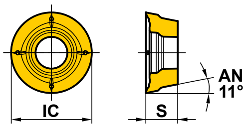
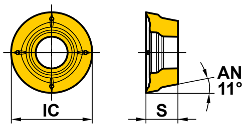
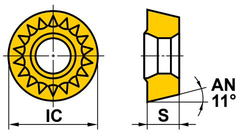
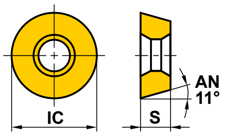
Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)		Geometry
				F7030	VP15TF	VP20M	VP10H	VP05HT	UP20M	NX4545		UTi20T	HTi10	IC	S	
RRD 	**RDMX07T1M0E**	M	E					●						7	1.98	
	RDMX07T1M0T	M	T	☐		●	●							7	1.98	
	RDMX0702M0E	M	E					☐						7	2.38	
	RDMX0702M0T	M	T	●		●	●							7	2.38	
	RDMX1003M0E	M	E					●						10	3.18	
	RDMX1003M0S	M	S		●		●							10	3.18	
	RDMX1003M0T	M	T	●		●	●			●		☐		10	3.18	
	RDMX12T3M0E	M	E					●						12	3.97	
	RDMX12T3M0S	M	S		●		●							12	3.97	
	RDMX12T3M0T	M	T	●		●	●			☐		☐		12	3.97	
	RDMX1604M0E	M	E					●						16	4.76	
	RDMX1604M0S	M	S		●		●							16	4.76	
	RDMX1604M0T	M	T	●		●	●			☐		☐		16	4.76	
RRD 	**RDZX0501M0E**	Z	E		●									5	1.50	
	RDZX07T1M0E	Z	E		●									7	1.98	
	RDZX0702M0E	Z	E		●									7	2.38	
	RDZX1003M0E	Z	E		●									10	3.18	
	RDZX1003M0S	Z	S	●	●									10	3.18	
	RDZX12T3M0E	Z	E		●									12	3.97	
	RDZX12T3M0S	Z	S	●	●									12	3.97	
	RDZX1604M0E	Z	E		●									16	4.76	
	RDZX1604M0S	Z	S	●	●									16	4.76	
OCTACUT 	**REMX1705SN**	M	S	★										17.25	5.2	
OCTACUT 	**REMX12T3EN-JS**	M	E	★										12.95	4.17	
	REMX1705EN-JS	M	E	★										17.25	5.2	
SG20 	**RGEN2004M0EN**	E	E		★									20	4.76	
	RGEN2004M0SN	E	S	●					●			●	●	20	4.76	

MPlus is a product manufactured by our contracted suppliers.

ROTATING INSERTS

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting
✤:Unstable Cutting

Honing:
E:Round T:Chamfer

Material	**P** Steel			●	◐					◐	◐	●	◐	◐	◐				
	M Stainless Steel			◐	◐	◐	◐			◐	◐	●	◐	◐	◐				
	K Cast Iron									✤		●	◐		✤				
	N Non-ferrous Metal																		
	S Heat-resistant Alloy, Titanium Alloy							✤	✤	◐									
	H Hardened Materials									◐									
Shape	Order Number	Class	Honing	Coated								Cermet			Carbide	Dimensions (mm)			Geometry
				F7010	F7030	MC7020	MP7130	MP9130	MP9140	VP15TF	AP20M	NX2525	NEW MX3030	NX4545	UTi20T	IC	S	BS	
ARP5/6 ➲**K254** 	**RPHT1040M0E4-L**	H	E			●	●	●								10	3.97	–	
	RPHT1248M0E4-L	H	E			●	●	●								12	4.76	–	
	RPHT1040M0E4-M	H	E			●	●	●								10	3.97	–	
	RPHT1248M0E4-M	H	E			●	●	●								12	4.76	–	
	RPHT1040M0E4-R	H	E			●	●	●								10	3.97	–	
	RPHT1248M0E4-R	H	E			●	●	●								12	4.76	–	
ARP5/6 ➲**K254** 	**RPMT1040M0E4-L**	M	E			●	●	●								10	3.97	–	
	RPMT1040M0E8-L1	M	E			●	●	●	●							10	3.97	–	
	RPMT1040M0E4-L2	M	E						●							10	3.97	–	
	RPMT1248M0E4-L	M	E			●	●	●								12	4.76	–	
	RPMT1248M0E8-L1	M	E			●	●	●	●							12	4.76	–	
	RPMT1248M0E4-L2	M	E						●							12	4.76	–	
	RPMT1040M0E4-M	M	E			●	●	●								10	3.97	–	
	RPMT1040M0E8-M1	M	E			●	●	●	●							10	3.97	–	
	RPMT1040M0E4-M2	M	E						●							10	3.97	–	
	RPMT1248M0E4-M	M	E			●	●	●								12	4.76	–	
	RPMT1248M0E8-M1	M	E			●	●	●	●							12	4.76	–	
	RPMT1248M0E4-M2	M	E						●							12	4.76	–	
	RPMT1040M0E4-R	M	E			●	●	●								10	3.97	–	
	RPMT1040M0E8-R1	M	E			●	●	●								10	3.97	–	
	RPMT1248M0E4-R	M	E			●	●	●								12	4.76	–	
	RPMT1248M0E8-R1	M	E			●	●	●								12	4.76	–	
BRP ➲**K206** 	**RPMT08T2M0E-JS**	M	E		●					●					●	8	2.78	–	
	RPMT10T3M0E-JS	M	E		●					●					●	10	3.97	–	
	RPMT1204M0E-JS	M	E	●	●					●	●				●	12	4.76	–	
	RPMT1606M0E-JS	M	E		●					●	●					16	6.35	–	
BRP ➲**K206** 	**RPMW08T2M0E**	M	E												●	8	2.78	–	
	RPMW08T2M0T	M	T							●						8	2.78	–	
	RPMW10T3M0E	M	E		★								●	★	☐	10	3.97	–	
	RPMW10T3M0T	M	T							●						10	3.97	–	
	RPMW1204M0E	M	E		●						●	☐	●	●	●	12	4.76	–	
	RPMW1204M0T	M	T							●		●				12	4.76	–	
	RPMW1606M0E	M	E		●						●	☐			●	16	6.35	–	
	RPMW1606M0T	M	T							●						16	6.35	–	

● = NEW

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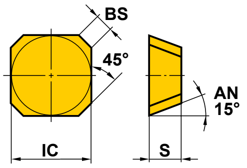
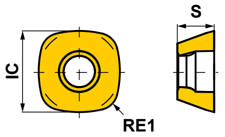
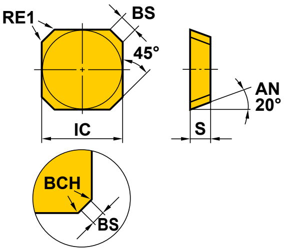
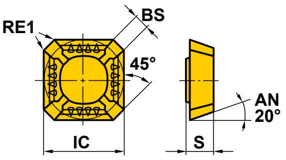
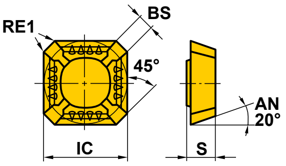
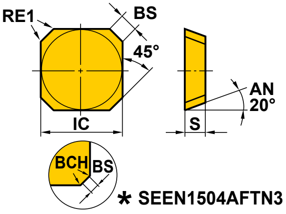
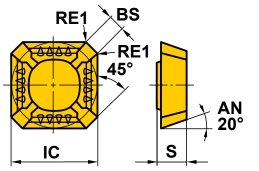
☐: Non stock, produced to order only. (10 inserts in one case)

Material			F7010	F7030	MC5020	MP9130	VP15TF	UP20M	NX2525	NX4545	UTi20T	HTi10
Material	P	Steel	●	◐			◐	◐	●	◐	◐	
	M	Stainless Steel	◐	◐			◐	◐	●	◐	◐	
	K	Cast Iron			◐		✱		●		✱	◐
	N	Non-ferrous Metal										◐
	S	Heat-resistant Alloy, Titanium Alloy				◐	◐					
	H	Hardened Materials					◐					

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✱:Unstable Cutting

Honing:
E:Round F:Sharp S:Chamfer + Hone
T:Chamfer

Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)					Geometry
				F7010	F7030	MC5020	MP9130	VP15TF	UP20M	NX2525	NX4545	UTi20T	HTi10	IC	S	BS	BCH	RE1	
Corner Angle 45° 	**SDEN1203AEN**	E	T								●			12.7	3.18	1.2	—	—	
Mplus 415SD NEW 	**SDMT125530ZEN-L**	L	—				●							12.25	5.56	—	—	3.0	
	SDMT125530ZEN-M	M	—				●							12.25	5.56	—	—	3.0	
	SDMT125530ZEN-R	R	—				●							12.25	5.56	—	—	3.0	
Mplus LSE445 (Mplus) SE445 	**SEEN1203AFEN1**	E	E										●	12.7	3.18	1.4	—	1.0	 ✱ SEEN1203AFTN3
	SEEN1203AFTN1	E	T						●					12.7	3.18	1.4	—	1.0	
	✱ SEEN1203AFTN3	E	T							●				12.7	3.18	1.4	0.77	—	
Mplus LSE445 (Mplus) SE445 	**SEER1203AFEN-JS**	E	E	●	●	●		●						12.7	3.18	1.4	—	1.0	
Corner Angle 45° 	**SEER1204AFEN-JS**	E	E	●										12.7	4.76	1.4	—	1.0	
SE545 	**SEEN1504AFEN1**	E	E					★						15.875	4.76	1.4	—	1.0	 ✱ SEEN1504AFTN3
	SEEN1504AFTN1	E	T	□					●	★	●	●		15.875	4.76	1.4	—	1.0	
	✱ SEEN1504AFTN3	E	T	●										15.875	4.76	1.4	0.77	—	
	SEEN1504AFSN1	E	S		●	●								15.875	4.76	1.4	—	1.0	
SE545 	**SEER1504AFEN-JS**	E	E	●	●	★								15.875	4.76	1.4	—	1.0	

● = NEW

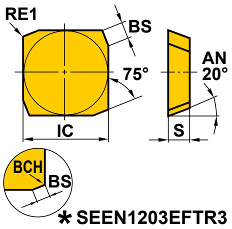
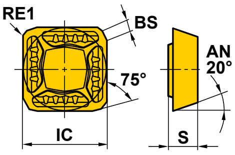
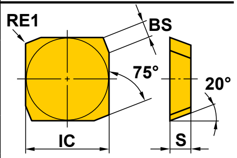
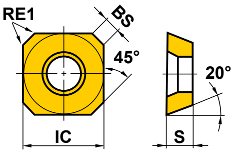
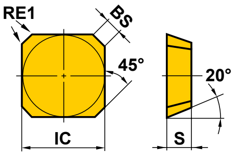
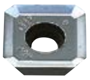
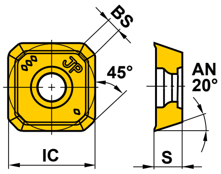
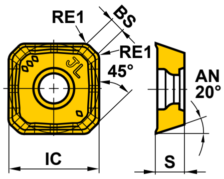
Mplus...
MPlus is a product manufactured by our contracted suppliers.

ROTATING INSERTS

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✣:Unstable Cutting

Honing:
E:Round F:Sharp S:Chamfer + Hone
T:Chamfer

Material		MV1020	MV1030	F7030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	UP20M	NX2525	MX3030	NX4545	UTi20T	HTi10
P	Steel	◐	◐	◐		◐	✣					◐	✣	◐	◐	◐	◐	◐	
M	Stainless Steel	◐	◐	◐				◐	✣			◐	✣	◐	◐	◐	◐	◐	
K	Cast Iron	◐	◐		◐							✣	✣		●	◐		✣	◐
N	Non-ferrous Metal																		◐
S	Heat-resistant Alloy, Titanium Alloy									◐	✣	◐	✣						
H	Hardened Materials											◐							

Shape	Order Number	Class	Honing	Coated													Cermet			Carbide		Dimensions (mm)				Geometry
				NEW MV1020	NEW MV1030	F7030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	UP20M	NX2525	NEW MX3030	NX4545	UTi20T	HTi10	IC	S	BS	RE1	
SE415 	**SEEN1203EFFR1**	E	F																		●	12.7	3.18	1.4	1.0	 ★SEEN1203EFTR3 Right hand insert shown.
	SEEN1203EFER1	E	E													★						12.7	3.18	1.4	1.0	
	SEEN1203EFTR1	E	T														★		●			12.7	3.18	1.4	1.0	
	★ SEEN1203EFTR3	E	T														●					12.7	3.18	1.4	—	
	SEEN1203EFSR1	E	S			●	●															12.7	3.18	1.4	1.0	
SE415 	**SEER1203EFER-JS**	E	E			●	★															12.7	3.18	1.4	1.0	
SE515 	**SECN1504EFTR1**	C	T																★			15.875	4.76	1.4	1.0	 Right hand insert shown.
	SEEN1504EFER1	E	E													★						15.875	4.76	1.4	1.0	
	SEEN1504EFTR1	E	T																	●		15.875	4.76	1.4	1.0	
	SEEN1504EFSR1	E	S			●																15.875	4.76	1.4	1.0	
Corner Angle 45° 	**SEEW1204AFTN**	E	T														●		●	●		12.7	4.76	2.6	1.0	
Corner Angle 45° 	**SEMN1204AZTN**	M	T															●		●		12.7	4.76	2.0	0.2	
ASX445 ➲K026 	**SEGT13T3AGFN-JP**	G	F																		●	13.4	3.97	2.2	—	
ASX445 ➲K026 	**SEET13T3AGEN-JL**	E	E	●	●	●		●	●	●	●	●	●	●	●			●	●			13.4	3.97	1.9	1.5	

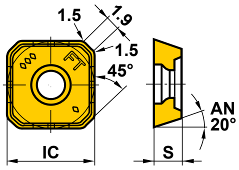
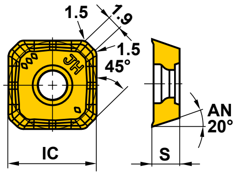
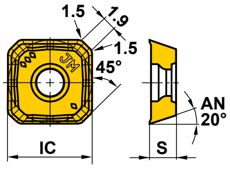
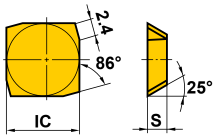
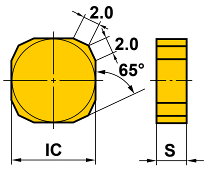
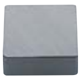
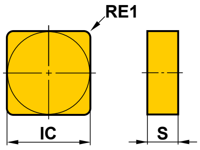
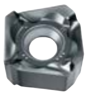
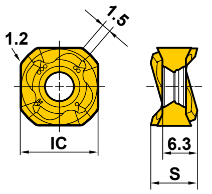
● = NEW

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

Material			MV1020	MV1030	F7030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP20RT	VP30RT	UP20M	MX3030	NX4545	VP45N	UTi20T	HTi10	TF15
Material	P	Steel	◐	◐	◐		◐	✤					◐	◐	✤	◐	◐	◐	◐	◐		
	M	Stainless Steel	◐	◐	◐				◐	✤			◐	◐	✤	◐	◐	◐	◐	◐		
	K	Cast Iron	◐	◐		◐							✤	✤	✤	✤	◐			✤	◐	
	N	Non-ferrous Metal																			◐	✤
	S	Heat-resistant Alloy, Titanium Alloy									◐	✤	◐	✤	✤							
	H	Hardened Materials											◐									

Cutting Conditions (Guide)**:**
●:Stable Cutting ◐:General Cutting
✤:Unstable Cutting

Honing:
E:Round **F**:Sharp
S:Chamfer + Hone **T**:Chamfer

Shape	Order Number	Class	Honing	Coated														Cermet			Carbide			Dimensions (mm)		Geometry
				NEW	NEW													NEW								
				MV1020	MV1030	F7030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP20RT	VP30RT	UP20M	MX3030	NX4545	VP45N	UTi20T	HTi10	TF15	IC	S	
ASX445 **➔K026** 	**SEMT13T3AGSN-FT**	M	S	●	●		●																	13.4	3.97	
ASX445 **➔K026** 	**SEMT13T3AGSN-JH**	M	S	●	●	●	●	●	●	●	●	●	●	●		●								13.4	3.97	
ASX445 **➔K026** 	**SEMT13T3AGSN-JM**	M	S	●	●	●	●	●	●	●	●	●	●	●		●		●	●	●				13.4	3.97	
BF407 	**SFAN1203ZFFR2**	A	F																			●		12.7	3.175	 Right hand insert shown.
	SFAN1203ZFFL2	A	F																			★		12.7	3.175	
	SFCN1203ZFFR2	C	F																			●		12.7	3.175	
BN425 **DN** 	**SNC43B2S**	C	T														★							12.7	4.8	
	**SNEN1204EN**	E	E												●				●			12.7	4.76	
	SNEN1504EN	E	E																★			15.88	4.76	
WSX445 **➔K016** 	**SNGU140812ANFR-L**	G	F																		●	14	8.4	 Right hand insert shown.
	SNGU140812ANFL-L	G	F																		★	14	8.4	
	SNGU140812ANER-L	G	E	●	●		●	●	●	●	●	●	●	★	★			●						14	8.4	
	SNGU140812ANEL-L	G	E				★	★	★					★				★						14	8.4	
	SNGU140812ANER-M	G	E	●	●		●	●	●	●	●	●	●	★	★			●						14	8.4	
	SNGU140812ANEL-M	G	E				★	★	★					★				★						14	8.4	
	SNMU140812ANER-M	M	E	●	●		●	●	●	●	●	●	●	★	★			●						14	8.4	
	SNMU140812ANEL-M	M	E				★	★	★					★				★						14	8.4	
	SNMU140812ANER-R	M	E	●	●		●	●	●					★	★									14	8.4	
	SNMU140812ANEL-R	M	E				★	★	★					★										14	8.4	
	SNMU140812ANER-H	M	E	●	●		●	●	●					★	★									14	8.4	

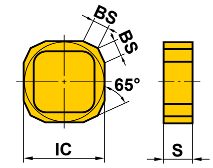
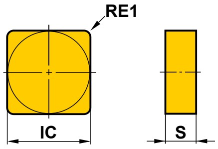
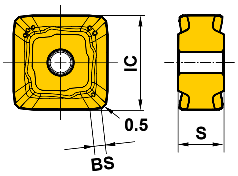
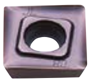
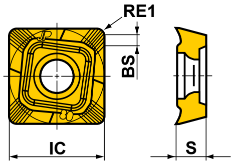
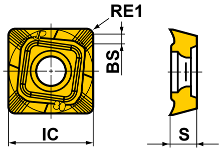
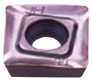
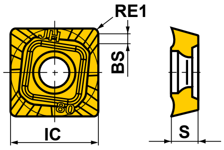
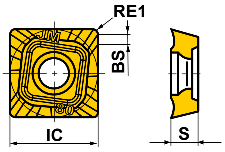
● = NEW

ROTATING INSERTS

Material			MV1020	MV1030	F7030	MC520	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	NX2525	MX3030	NX4545	UTi20T	HTi10
	P	Steel	◐	◐	◐			◐	✤					◐	✤	◐	◐	◐	◐	
	M	Stainless Steel	◐	◐	◐					◐	✤			◐	✤	◐	◐	◐	◐	
	K	Cast Iron	◐	◐		●	◐							✤	✤	●	◐		✤	◐
	N	Non-ferrous Metal																		◐
	S	Heat-resistant Alloy, Titanium Alloy										◐	✤	◐	✤					
	H	Hardened Materials												◐						

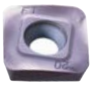
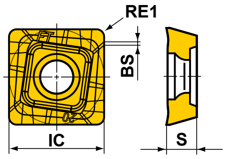
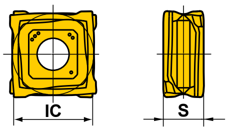
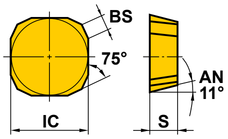
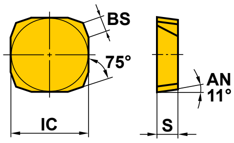
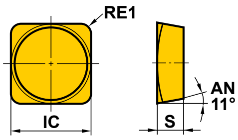
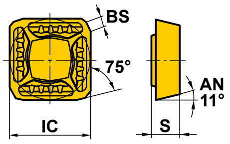
Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting
✤:Unstable Cutting

Honing:
E:Round F:Sharp

Shape	Order Number	Class	Honing	Coated													Cermet			Carbide		Dimensions (mm)				Geometry
				NEW MV1020	NEW MV1030	F7030	MC520	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	NX2525	NEW MX3030	NX4545	UTi20T	HTi10	IC	S	BS	RE1	
BN425 DN 	**SNMF43B2G**	M	E					★														12.7	4.8	2.0	—	
	**SNMN120408**	M	E					★									★			●	★	12.7	4.76	—	0.8	
	SNMN120412	M	E					●									★			●		12.7	4.76	—	1.2	
WSF406W NEW 	**SNMU1206C05ZNER-M**	M	E	●	●		★	★														12.7	6.2	1.6	—	
ASX400 **➲K080** 	**SOET12T308PEER-JL**	E	E	●	●	●			●	●	●	●	●	●	●	●		●	●			12.7	3.97	1.4	0.8	
ASX400 **➲K080** 	**SOGT12T308PEFR-JP**	G	F																		●	12.7	3.97	1.4	0.8	
ASX400 **➲K080** 	**SOMT12T308PEER-JH**	M	E	●	●	●		●	●	●	●	●	●	●	●	●						12.7	3.97	1.4	0.8	
ASX400 **➲K080**	**SOMT12T308PEER-JM**	M	E	●	●	●		●	●	●	●	●	●	●	●	●		●	●			12.7	3.97	1.4	0.8	 Right hand insert shown.
ASX400 Side Cutter 	**SOMT12T308PEEL-JM**	M	E												●							12.7	3.97	1.4	0.8	

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only. (10 inserts in one case)

Material	P	Steel		◐	◐	◐		◐			◐	◐	●	◐	◐						
	M	Stainless Steel		◐	◐	◐					◐	◐	●	◐	◐						
	K	Cast Iron		◐	◐		◐				✤		●		✤	◐					
	N	Non-ferrous Metal														◐					
	S	Heat-resistant Alloy, Titanium Alloy							◐	✤	◐										
	H	Hardened Materials									◐										
Shape	Order Number	Class	Honing	Coated									Cermet		Carbide		Dimensions (mm)				Geometry
				NEW MV1020	NEW MV1030	F7030	MC5020	MP6120	MP9120	MP9130	VP15TF	UP20M	NX2525	NX4545	UTi20T	HTi10	IC	S	BS	RE1	
ASX400 ➲K080 	**SOMT12T320PEER-FT**	M	E	●	●		●	●	★	★	●						12.7	3.97	0.5	2.0	
VOX400 ➲K077 	**SONX1206PER**	N	E				●				●						12.7	6.3	—	—	 Right hand insert shown.
	SONX1206PEL	N	E								★						12.7	6.3	—	—	
Corner Angle 15° 	**SPEN1203EDR**	E	T			●							●	●			12.7	3.18	1.4	—	 Right hand insert shown.
	SPEN1203EDL	E	T *1										☐		★	☐	12.7	3.18	1.4	—	
	SPEN1504EDR	E	T *1									●	☐	●		☐	15.875	4.76	1.4	—	
	SPEN1504EDL	E	T												●		15.875	4.76	1.4	—	
FBP415 	**SPEN1203EEER1**	E	E				●									★	12.7	3.175	1.4	—	 Right hand insert shown.
	SPEN1203EEEL1	E	E				★									★	12.7	3.175	1.4	—	
	SPNN1203EEER1	N	E				★									★	12.7	3.18	1.3	—	
	SPNN1203EEEL1	N	E													★	12.7	3.18	1.3	—	
FP490 	**SPEN424A**	E	F													★	12.7	3.18	—	1.6	
FBP415 	**SPER1203EEER-JS**	E	E				●										12.7	3.18	1.4	—	

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round F:Sharp T:Chamfer

*1 Grade HTi10 is "F".

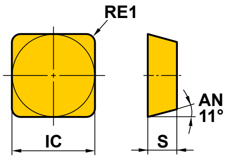
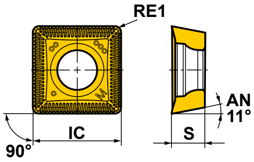
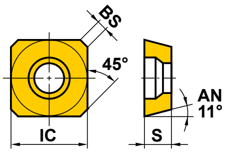
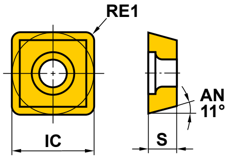
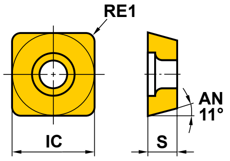
● = NEW

ROTATING INSERTS

Material			F7030	MC5020	MP9140	VP15TF	UP20M	NX2525	MX3030	NX4545	UTi20T	HTi10
Material	P	Steel	◐			◐	◐	●	◐	◐	◐	
	M	Stainless Steel	◐			◐	◐	●	◐	◐	◐	
	K	Cast Iron		◐		✤		●	◐		✤	◐
	N	Non-ferrous Metal										◐
	S	Heat-resistant Alloy, Titanium Alloy			✤	◐						
	H	Hardened Materials				◐						

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round F:Sharp T:Chamfer

Shape	Order Number	Class	Honing	Coated F7030	Coated MC5020	Coated MP9140	Coated VP15TF	Coated UP20M	Cermet NX2525	Cermet MX3030 NEW	Cermet NX4545	Carbide UTi20T	Carbide HTi10	Dimensions (mm) IC	Dimensions (mm) S	Dimensions (mm) BS	Dimensions (mm) RE1	Geometry
11° Positive 	SPGN120304	G	E *1						★			★	●	12.7	3.18	–	0.4	
	SPGN120308	G	E *1					★	★			★	●	12.7	3.18	–	0.8	
	SPGN120312	G	F										★	12.7	3.18	–	1.2	
	SPGN150404	G	E									★		15.875	4.76	–	0.4	
	SPGN150408	G	E *1										★	15.875	4.76	–	0.8	
	SPMN120304	M	E *1				★					●	●	12.7	3.18	–	0.4	
	SPMN120304T	M	T						●					12.7	3.18	–	0.4	
	SPMN120308	M	E *1	★			★	★				●	●	12.7	3.18	–	0.8	
	SPMN120312	M	E *1	★			★					●	●	12.7	3.18	–	1.2	
	SPMN120408	M	E *1		★							●	★	12.7	4.76	–	0.8	
	SPMN120412	M	E		★							★		12.7	4.76	–	1.2	
	SPMN150408	M	E									●		15.875	4.76	–	0.8	
	SPMN150412	M	E									●		15.875	4.76	–	1.2	
ASPX ➲K224 	SPGX1204100PPER-JM	G	E			●								12.7	4.8	–	1.0	
BSP 	SPMB1204APT	M	T					●				●		12.7	4.76	1.4	–	
TBE1 	SPMT120408-A	M	E					●				●		12.7	4.76	–	0.8	
CESP CFSP CGSP ➲K246 	SPMW090304	M	E *2				★	●	●	●	●	●	●	9.525	3.18	–	0.4	
	SPMW090308	M	E *2				★	●	★	●	★	●	●	9.525	3.18	–	0.8	
	SPMW120304	M	E *2				★	●	●	●	●	●	●	12.7	3.18	–	0.4	
	SPMW120308	M	E *2				★	●	●	●	●	●	●	12.7	3.18	–	0.8	

*1 Grade HTi10 is "F".
*2 Grade HTi10 is "T".

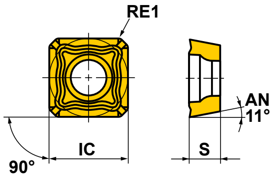
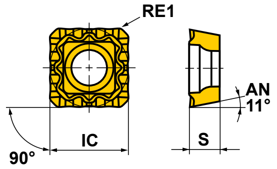
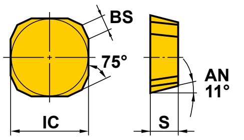
● = NEW

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

Material			VP15TF	VP20RT	UTi20T
	P	Steel	◐	◐	◐
	M	Stainless Steel	◐	◐	◐
	K	Cast Iron	✤	✤	✤
	N	Non-ferrous Metal			
	S	Heat-resistant Alloy, Titanium Alloy	◐	✤	
	H	Hardened Materials	◐		

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round

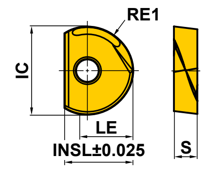
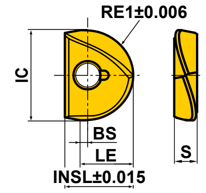
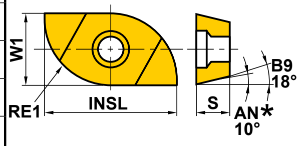
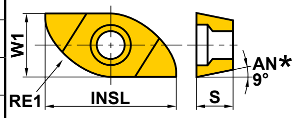
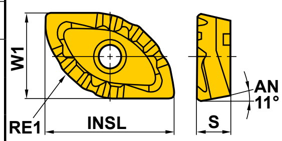
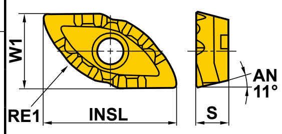
Shape	Order Number	Class	Honing	Coated		Carbide	Dimensions (mm)				Geometry
				VP15TF	**VP20RT**	**UTi20T**	**IC**	**S**	**BS**	**RE1**	
SPX ➲K219 	**SPMX120408-JM**	M	E	●	●		12.7	4.80	—	0.8	
SPX ➲K219 	**SPMX120408-WH**	M	E	●	●		12.7	4.76	—	0.8	
Corner Angle 15° 	**SPNN1203EDR**	N	E			●	12.7	3.18	1.4	—	 Right hand insert shown.

ROTATING INSERTS

Material			EP6120	MP6120	MP9120	VP15TF	VP20RT	VP30RT	MP8010
	P	Steel	◐	◐		◐	◐	✤	
	M	Stainless Steel				◐	◐	✤	
	K	Cast Iron				✤	✤	✤	
	N	Non-ferrous Metal	◐						
	S	Heat-resistant Alloy, Titanium Alloy			◐	◐	✤	✤	
	H	Hardened Materials	◐			◐			●

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round **F**:Sharp

Shape		Order Number	Class	Honing	Coated							Dimensions (mm)							Geometry
					EP6120	MP6120	MP9120	VP15TF	VP20RT	VP30RT	MP8010	RE1	INSL	LE	W1	IC	S	BS	
SRB **➲K228** 	✱	**SRBT10**	–	F				●				5	8.5	5	–	10	2.6	–	
	✱	**SRBT12**	–	F				●				6	10	6	–	12	3	–	
	✱	**SRBT16**	–	F				●				8	12	8	–	16	4	–	
	✱	**SRBT20**	–	F				●				10	15	10	–	20	5	–	
	✱	**SRBT25**	–	F				●				12.5	18.5	12.5	–	25	6	–	
	✱	**SRBT30**	–	F				●				15	22.5	15	–	30	7	–	
	✱	**SRBT32**	–	F				●				16	23.5	16	–	32	7	–	
SRF **➲K228** 	✱	**SRFT10**	–	F	●			●			●	5	8.5	5.5	–	10	2.6	0.5	
	✱	**SRFT12**	–	F	●			●			●	6	10	6.5	–	12	3	0.5	
	✱	**SRFT16**	–	F	●			●			●	8	12	9	–	16	4	1	
	✱	**SRFT20**	–	F	●			●			●	10	15	11	–	20	5	1	
	✱	**SRFT25**	–	F	●			●			●	12.5	18.5	13.5	–	25	6	1	
	✱	**SRFT30**	–	F	●			●			●	15	22.5	16	–	30	7	1	
	✱	**SRFT32**	–	F	●			●			●	16	23.5	17	–	32	7	1	
SRM2 **➲K236** 		**SRG16C**	G	E		●	★	●				8	16	–	8.2	–	3.5	–	 **✱ SRG16C : 11°**
		SRG20C	G	E		●	★	●				10	19	–	10.2	–	4.6	–	
		SRG25C	G	E		●	★	●				12.5	24	–	12.8	–	5.5	–	
		SRG30C	G	E		●	★	●				15	28	–	15.3	–	7	–	
		SRG32C	G	E		●	★	●				16	28	–	16.3	–	7	–	
SRM2 **➲K236** 		**SRG16E**	G	E		●	★	●				8	13.5	–	6.7	–	3.5	–	 **✱ SRG16E : 11°**
		SRG20E	G	E		●	★	●				10	15.5	–	8.5	–	4.6	–	
		SRG25E	G	E		●	★	●				12.5	20.5	–	10.2	–	5.5	–	
		SRG30E	G	E		●	★	●				15	25.2	–	12.2	–	7	–	
		SRG32E	G	E		●	★	●				16	26.1	–	13.1	–	7	–	
SRM2Ø40 **Ø50** **➲K244** 	✱	**SRG40C**	G	E				●	●	●		20	36	–	20.5	–	8	–	
	✱	**SRG50C**	G	E				●	●	●		25	40	–	26	–	8.5	–	
SRM2Ø40 **Ø50** **➲K244** 	✱	**SRG40E**	G	E				●	●	●		20	32	–	16.6	–	8	–	
	✱	**SRG50E**	G	E				●	●	●		25	35.8	–	20	–	8.5	–	

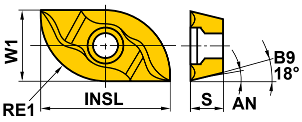
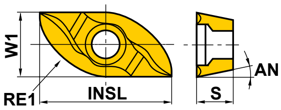
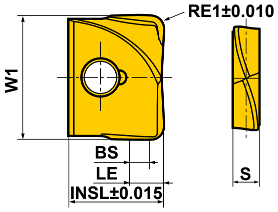
✱2 inserts in one case.

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

Material			MP6120	MP9120	VP15TF	MP8010
Material	P	Steel	◐		◐	
	M	Stainless Steel			◐	
	K	Cast Iron			✤	●
	N	Non-ferrous Metal				
	S	Heat-resistant Alloy, Titanium Alloy		◐	◐	
	H	Hardened Materials			◐	●

Cutting Conditions (Guide)**:**
●: Stable Cutting ◐: General Cutting ✤: Unstable Cutting

Honing:
E: Round F: Sharp

Shape	Order Number	Class	Honing	Coated				Dimensions (mm)							Geometry
				MP6120	MP9120	VP15TF	MP8010	RE1	INSL	LE	W1	S	BS	AN	
SRM2 ➲K236 	**SRM16C-M**	M	E	●	★	●		8	16	–	8.2	3.5	–	11°	
	SRM20C-M	M	E	●	★	●		10	19	–	10.2	4.6	–	10°	
	SRM25C-M	M	E	●	★	●		12.5	24	–	12.8	5.5	–	10°	
	SRM30C-M	M	E	●	★	●		15	28	–	15.3	7	–	10°	
	SRM32C-M	M	E	●	★	●		16	28	–	16.3	7	–	10°	
SRM2 ➲K236 	**SRM16E-M**	M	E	●	★	●		8	13.5	–	6.7	3.5	–	11°	
	SRM20E-M	M	E	●	★	●		10	15.5	–	8.5	4.6	–	9°	
	SRM25E-M	M	E	●	★	●		12.5	20.5	–	10.2	5.5	–	9°	
	SRM30E-M	M	E	●	★	●		15	25.2	–	12.2	7	–	9°	
	SRM32E-M	M	E	●	★	●		16	26.1	–	13.1	7	–	9°	
SUF ➲K232 	* **SUFT10R05**	–	F			●	●	0.5	8.5	1.5	10	2.6	1	–	
	* **SUFT10R10**	–	F			●	●	1	8.5	2	10	2.6	1	–	
	* **SUFT10R20**	–	F			★	●	2	8.5	3	10	2.6	1	–	
	* **SUFT12R05**	–	F			●	●	0.5	10	1.7	12	3	1.2	–	
	* **SUFT12R10**	–	F			●	●	1	10	2.2	12	3	1.2	–	
	* **SUFT12R20**	–	F			●	●	2	10	3.2	12	3	1.2	–	
	* **SUFT12R30**	–	F			●	★	3	10	4.2	12	3	1.2	–	
	* **SUFT16R05**	–	F			●	●	0.5	12	2.1	16	4	1.6	–	
	* **SUFT16R10**	–	F			●	●	1	12	2.6	16	4	1.6	–	
	* **SUFT16R15**	–	F			●	★	1.5	12	3.1	16	4	1.6	–	
	* **SUFT16R20**	–	F			●	●	2	12	3.6	16	4	1.6	–	
	* **SUFT16R30**	–	F			●	★	3	12	4.6	16	4	1.6	–	
	* **SUFT20R05**	–	F			●	●	0.5	15	2.5	20	5	2	–	
	* **SUFT20R10**	–	F			●	●	1	15	3	20	5	2	–	
	* **SUFT20R15**	–	F			●	★	1.5	15	3.5	20	5	2	–	
	* **SUFT20R20**	–	F			●	●	2	15	4	20	5	2	–	
	* **SUFT20R30**	–	F			●	●	3	15	5	20	5	2	–	
	* **SUFT25R05**	–	F			●	★	0.5	18.5	3	25	6	2.5	–	
	* **SUFT25R10**	–	F			★	●	1	18.5	3.5	25	6	2.5	–	
	* **SUFT25R20**	–	F			●	★	2	18.5	4.5	25	6	2.5	–	
	* **SUFT25R30**	–	F			●	★	3	18.5	5.5	25	6	2.5	–	
	* **SUFT30R05**	–	F			★	★	0.5	22.5	3.5	30	7	3	–	
	* **SUFT30R10**	–	F			★	★	1	22.5	4	30	7	3	–	
	* **SUFT30R20**	–	F			★	★	2	22.5	5	30	7	3	–	
	* **SUFT30R30**	–	F			★	★	3	22.5	6	30	7	3	–	
	* **SUFT32R05**	–	F			★	★	0.5	23.5	3.7	32	7	3.2	–	
	* **SUFT32R10**	–	F			★	★	1	23.5	4.2	32	7	3.2	–	
	* **SUFT32R20**	–	F			★	★	2	23.5	5.2	32	7	3.2	–	

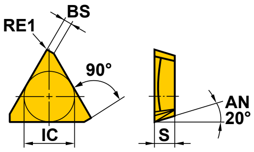
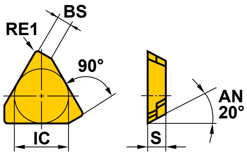
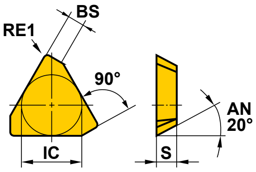
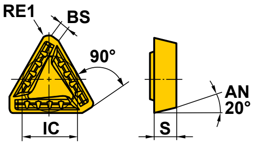
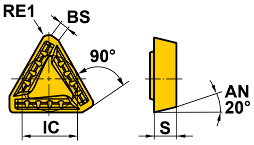
*2 inserts in one case.

ROTATING INSERTS

Material			F7030	MC5020	VP15TF	UP20M	NX2525	NX4545	UTi20T	HTi10
Material	P	Steel	◐		◐	◐	●	◐	◐	
	M	Stainless Steel	◐		◐	◐	●	◐	◐	
	K	Cast Iron		◐	✤		●		✤	◐
	N	Non-ferrous Metal								◐
	S	Heat-resistant Alloy, Titanium Alloy			◐					
	H	Hardened Materials			◐					

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round F:Sharp S:Chamfer + Hone
T:Chamfer Z:Strong

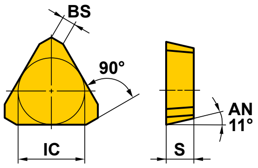
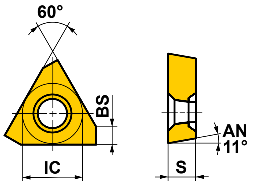
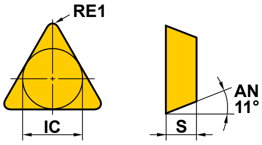
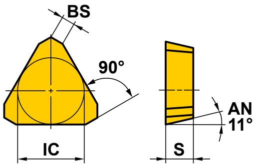
Shape	Order Number	Class	Honing	Coated				Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	MC5020	VP15TF	UP20M	NX2525	NX4545	UTi20T	HTi10	IC	S	BS	RE1	
NSE300 **SE300** 	**TECN1603PEFR1W**	C	F								★	9.525	3.175	1.4	0.4	Wall face finishing. 
	TECN1603PEER1W	C	E								★	9.525	3.175	1.4	0.4	
	TECN1603PETR1W	C	T					★	★	★		9.525	3.175	1.4	0.4	
NSE300 **SE300** 	**TEEN1603PEFR1**	E	F								●	9.525	3.175	1.4	0.4	
	TEEN1603PEER1	E	E			★					●	9.525	3.175	1.4	0.4	
	TEEN1603PETR1	E	T				●	●	●	●		9.525	3.175	1.4	0.4	
	TEEN1603PESR1	E	S	●	●							9.525	3.175	1.4	0.4	
	TEEN1603PEZR1	E	Z					●				9.525	3.175	1.4	0.4	
NSE400 **SE400** 	**TECN2204PEFR1**	C	F								★	12.7	4.76	1.4	1.0	
	TECN2204PEER1	C	E								★	12.7	4.76	1.4	1.0	
	TECN2204PETR1	C	T					★	★	★		12.7	4.76	1.4	1.0	
	TEEN2204PEFR1	E	F								●	12.7	4.76	1.4	1.0	
	TEEN2204PEER1	E	E			★					●	12.7	4.76	1.4	1.0	
	TEEN2204PETR1	E	T				●		●	●		12.7	4.76	1.4	1.0	
	TEEN2204PESR1	E	S	●	●							12.7	4.76	1.4	1.0	Right hand insert shown.
NSE300 	**TEER1603PEER-JS**	E	E	●						●		9.525	3.175	1.4	0.4	
NSE400 	**TEER2204PEER-JS**	E	E	●						★		12.7	4.76	1.4	1.0	

●: Inventory maintained. ★: Inventory maintained in Japan.
☐: Non stock, produced to order only. (10 inserts in one case)

Material			F7030	VP15TF	UP20M	AP10H	NX2525	NX4545	UTi20T	HTi10
	P	Steel	◐	◐	◐		●	◐	◐	
	M	Stainless Steel	◐	◐	◐		●	◐	◐	
	K	Cast Iron		✱		◐	●		✱	◐
	N	Non-ferrous Metal								◐
	S	Heat-resistant Alloy, Titanium Alloy		◐						
	H	Hardened Materials		◐						

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✱:Unstable Cutting

Honing:
E:Round **T**:Chamfer

Shape	Order Number	Class	Honing	Coated				Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	VP15TF	UP20M	AP10H	NX2525	NX4545	UTi20T	HTi10	IC	S	BS	RE1	
Corner Angle 0° 	**TPEN1603PPR**	E	T	●				●				9.525	3.18	1.2	−	
	TPEN1603PPN	E	T *1							●		9.525	3.18	1.2	−	
	TPEN2204PDR	E	T *1	●				●	●		●	12.7	4.76	1.4	−	
	TPEN2204PDL	E	T *1							☐		12.7	4.76	1.4	−	
PMF ➲**K250** 	**TPEW1303ZPER2**	E	E		●		●					7.94	3.18	2	−	
11° Positive 	**TPMN160304**	M	E *1	●	★	★		●		●	●	9.525	3.18	−	0.4	
	TPMN160308	M	E *2	●	★	●		●		●	●	9.525	3.18	−	0.8	
	TPMN160312	M	E *1			●					★	9.525	3.18	−	1.2	
	TPMN220404	M	E							●		12.7	4.76	−	0.4	
	TPMN220408	M	E *1	●	★	●				●	●	12.7	4.76	−	0.8	
	TPMN220408T	M	T					●				12.7	4.76	−	0.8	
	TPMN220412	M	E *1	★	★					●	●	12.7	4.76	−	1.2	
Corner Angle 0° 	**TPNN2204PDR**	N	E							●		12.7	4.76	1.4	−	

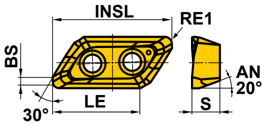
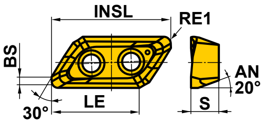
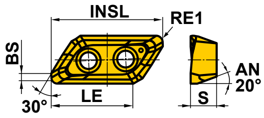
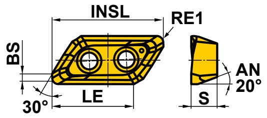
*1 Grade HTi10 is "F".
*2 Grade HTi10 is "F", Grade NX2525 is "T".

ROTATING INSERTS

Material		MP9120	LC15TF	MT2010	TF15
P	Steel				
M	Stainless Steel				
K	Cast Iron				
N	Non-ferrous Metal	✤	✤	◐	◐
S	Heat-resistant Alloy, Titanium Alloy	◐			
H	Hardened Materials				

Cutting Conditions **(Guide):**
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round F:Sharp

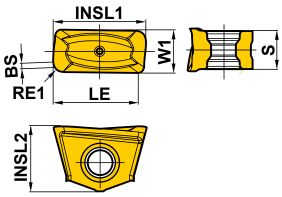
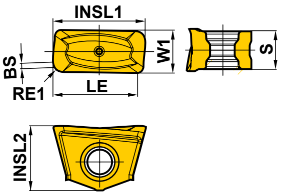
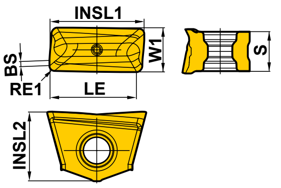
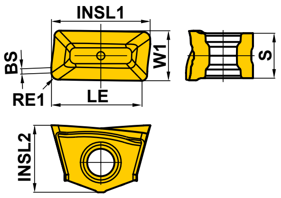
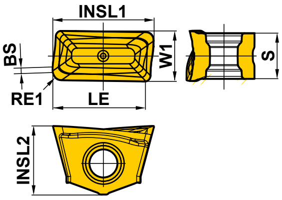
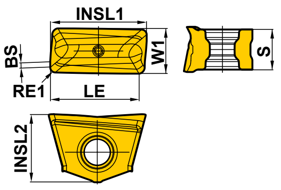
Shape	Order Number	Class	Honing	Coated		Carbide		Dimensions (mm)					Geometry
				MP9120	LC15TF	MT2010	TF15	INSL	LE	S	BS	RE1	
AXD4000 **➲K168** **AXD4000A** **➲K176** 	**XDGX175004PDFR-GL**	G	F		★		●	23.0	16.9	5	1.7	0.4	
	XDGX175008PDFR-GL	G	F		★		●	23.0	17.0	5	1.3	0.8	
	XDGX175012PDFR-GL	G	F		★		●	23.0	17.0	5	0.9	1.2	
	XDGX175016PDFR-GL	G	F		★		●	22.0	16.4	5	1.4	1.6	
	XDGX175020PDFR-GL	G	F		★		●	22.0	16.4	5	1.0	2.0	
	XDGX175024PDFR-GL	G	F		★		●	22.0	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		★		●	20.0	15.6	5	0.8	4.0	
	XDGX175050PDFR-GL	G	F		★		●	19.4	15.3	5	0.4	5.0	
AXD4000 **➲K168** **AXD4000A** **➲K176** 	**XDGX175004PDER-GM**	G	E	●				23.0	17.0	5	1.7	0.4	
	XDGX175008PDER-GM	G	E	●				23.0	17.0	5	1.2	0.8	
	XDGX175012PDER-GM	G	E	●				23.0	17.0	5	0.9	1.2	
	XDGX175016PDER-GM	G	E	●				22.0	15.9	5	1.3	1.6	
	XDGX175020PDER-GM	G	E	●				22.0	15.9	5	0.8	2.0	
	XDGX175024PDER-GM	G	E	●				22.0	15.9	5	0.4	2.4	
	XDGX175030PDER-GM	G	E	●				21.1	16.0	5	0.6	3.0	
	XDGX175032PDER-GM	G	E	●				21.1	16.0	5	0.4	3.2	
	XDGX175040PDER-GM	G	E	●				20.0	14.8	5	0.5	4.0	
	XDGX175050PDER-GM	G	E	●				19.4	15.0	5	0.3	5.0	
AXD4000 **➲K168** **AXD4000A** **➲K176** 	**XDGX175004PDFR-GM**	G	F			●	●	23.0	17.0	5	1.7	0.4	
	XDGX175008PDFR-GM	G	F			●	●	23.0	17.0	5	1.2	0.8	
	XDGX175012PDFR-GM	G	F			★	●	23.0	17.0	5	0.9	1.2	
	XDGX175016PDFR-GM	G	F			●	●	22.0	15.9	5	1.3	1.6	
	XDGX175020PDFR-GM	G	F			●	●	22.0	15.9	5	0.8	2.0	
	XDGX175024PDFR-GM	G	F			★	●	22.0	15.9	5	0.4	2.4	
	XDGX175030PDFR-GM	G	F			●	●	21.1	16.0	5	0.6	3.0	
	XDGX175032PDFR-GM	G	F			●	●	21.1	16.0	5	0.4	3.2	
	XDGX175040PDFR-GM	G	F			●	●	20.0	14.8	5	0.5	4.0	
	XDGX175050PDFR-GM	G	F			★	●	19.4	15.0	5	0.3	5.0	
AXD7000 **➲K180** 	**XDGX227008PDFR-GL**	G	F		★		●	30.0	21.6	7	2.0	0.8	
	XDGX227016PDFR-GL	G	F		★		●	30.0	21.7	7	1.2	1.6	
	XDGX227020PDFR-GL	G	F		★		●	30.0	21.7	7	0.8	2.0	
	XDGX227030PDFR-GL	G	F		★		●	28.8	21.2	7	0.8	3.0	
	XDGX227032PDFR-GL	G	F		★		●	28.8	21.2	7	0.6	3.2	
	XDGX227040PDFR-GL	G	F		★		●	27.5	20.6	7	0.9	4.0	
	XDGX227050PDFR-GL	G	F		★		●	27.0	20.3	7	0.4	5.0	

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

Material	P	Steel	
	M	Stainless Steel	
	K	Cast Iron	
	N	Non-ferrous Metal	
	S	Heat-resistant Alloy, Titanium Alloy	✤
	H	Hardened Materials	

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round

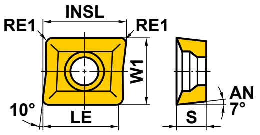
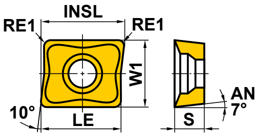
Shape	Order Number	Class	Honing	Coated	Dimensions (mm)							Geometry
				MP9130	INSL1	LE	W1	INSL2	S	BS	RE1	
VFX5 **➲K208** 	**XNMU160708R-MS**	M	E	●	16.0	13.4	7.0	11.1	6.5	1.0	0.8	
	XNMU160712R-MS	M	E	●	16.0	13.8	7.0	11.1	6.5	1.0	1.2	
	XNMU160716R-MS	M	E	●	16.0	13.8	7.0	11.1	6.5	1.0	1.6	
	XNMU160724R-MS	M	E	●	16.0	13.8	7.0	11.1	6.5	1.0	2.4	
	XNMU160732R-MS	M	E	●	17.3	14.4	7.0	11.1	6.5	–	3.2	
	XNMU160740R-MS	M	E	●	18.9	15.2	7.0	11.1	6.5	–	4.0	
VFX5 **➲K208** 	**XNMU160708R-HS**	M	E	●	16.0	13.4	7.0	11.1	6.5	1.0	0.8	
VFX5 **➲K208** 	**XNMU160708R-LS**	M	E	●	16.0	13.4	7.0	11.1	6.5	1.0	0.8	
VFX6 **➲K212** 	**XNMU190912R-MS**	M	E	●	19.1	16.5	9.5	12.7	8.5	1.0	1.2	
	XNMU190916R-MS	M	E	●	19.1	16.5	9.5	12.7	8.5	1.0	1.6	
	XNMU190924R-MS	M	E	●	19.1	16.6	9.5	12.7	8.5	1.0	2.4	
	XNMU190932R-MS	M	E	●	20.2	17.1	9.5	12.7	8.5	–	3.2	
	XNMU190940R-MS	M	E	●	21.8	17.8	9.5	12.7	8.5	–	4.0	
	XNMU190950R-MS	M	E	●	21.8	17.8	9.5	12.7	8.5	–	5.0	
VFX6 **➲K212** 	**XNMU190912R-HS**	M	E	●	19.1	16.5	9.5	12.7	8.5	1.0	1.2	
VFX6 **➲K212** 	**XNMU190912R-LS**	M	E	●	19.1	16.5	9.5	12.7	8.5	1.0	1.2	

ROTATING INSERTS

Material			F7030	VP15TF	UP20M	UTi20T
Material	P	Steel	◐	◐	◐	◐
	M	Stainless Steel	◐	◐	◐	◐
	K	Cast Iron		✤		✤
	N	Non-ferrous Metal				
	S	Heat-resistant Alloy, Titanium Alloy		◐		
	H	Hardened Materials		◐		

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round

Shape	Order Number	Class	Honing	Coated			Carbide	Dimensions (mm)					Geometry
				F7030	VP15TF	UP20M	UTi20T	INSL	LE	W1	S	RE1	
DCCC ➲K216 	ZCMX083508ER-A	M	E	●			★	11	8.5	7.94	3.5	0.8	
	ZCMX09T308ER-A	M	E	●	●	●	★	12.7	11	9.525	3.97	0.8	
DCCC ➲K216 	ZCMX09T308ER-B	M	E	●		★		12.7	11	9.525	3.97	0.8	

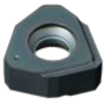
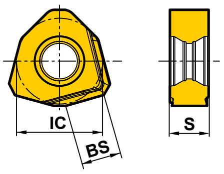
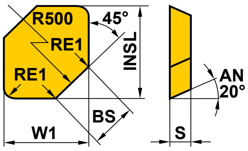
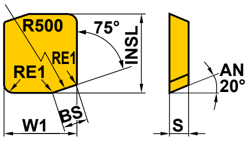
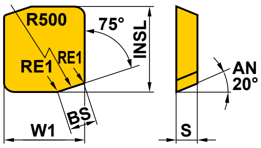
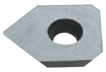
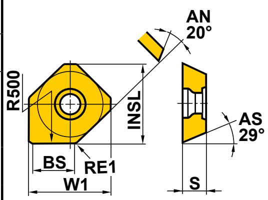
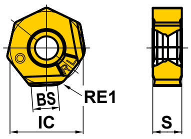
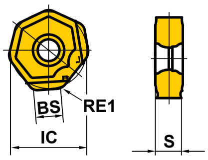
● : Inventory maintained. ★ : Inventory maintained in Japan.
(10 inserts in one case)

WIPER INSERTS

Material			MP6120	MC5020	VP15TF	NX2525		VP25N		HTi05T	
	P	Steel	◐		◐	●		◐			
	M	Stainless Steel			◐	●		◐			
	K	Cast Iron		◐	✤	●		◐		◐	
	N	Non-ferrous Metal								◐	
	S	Heat-resistant Alloy, Titanium Alloy			◐						
	H	Hardened Materials			◐						

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting

Honing:
E:Round T:Chamfer

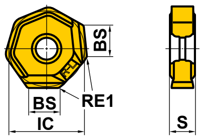
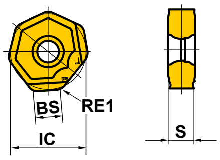
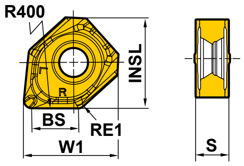
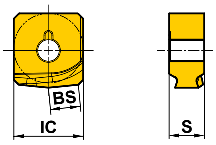
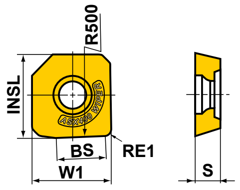
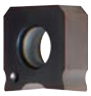
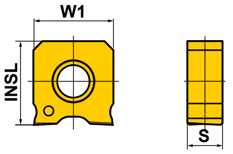
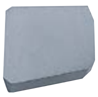
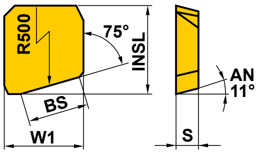
Shape	Order Number	Class	Honing	Coated			Cermet		Coated Cermet		Carbide		Dimensions (mm)						Geometry
				MP6120	MC5020	VP15TF	NX2525		VP25N		HTi05T		INSL	W1	IC	S	BS	RE1	
WWX400 ➲K067 	**2NGU1406ZNER6C-M**	G	E	●	●	●							—	—	14	6.3	6.5	—	
SE545 	**WEC53AFTR5C**	C	T				★						18.505	15.875	—	4.76	5	1.0	
SE415 	**WEC42EFTR5C**	C	T				★						13.728	12.7	—	3.18	5	1.0	
SE515 	**WEC53EFTR5C**	C	T				★						16.903	15.875	—	4.76	5	1.0	
ASX445 ➲K026 	**WEEW13T3AGER8C**	E	E		●	●					●		16.6	16.48	—	3.97	7.5	1.5	
	WEEW13T3AGTR8C	E	T				●		●				16.6	16.48	—	3.97	7.5	1.5	
AHX440S ➲K034 	**WNEU1305ZEN4C-M**	E	E	●	●	★							—	—	13.4	5.1	4	2.7	
AHX640S ➲K042 	**WNEU2007ZEN7C-M**	E	E	●									—	—	20	6.9	7.2	0.8	

WIPER INSERTS

Material			MC520	MC5020	MP6120	VP15TF	NX2525	MX3020	HTi05T
	P	Steel			◐	◐	●	◐	
	M	Stainless Steel				◐	●	◐	
	K	Cast Iron	●	◐		✣	●	◐	●
	N	Non-ferrous Metal							●
	S	Heat-resistant Alloy, Titanium Alloy				◐			
	H	Hardened Materials				◐			

Cutting Conditions (Guide):
●:Stable Cutting ◐:General Cutting ✣:Unstable Cutting

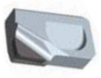
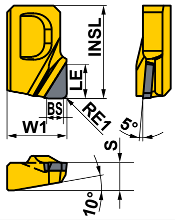
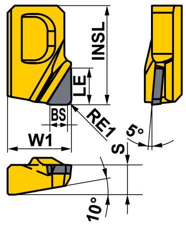
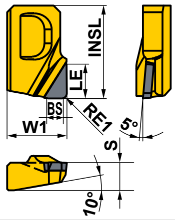
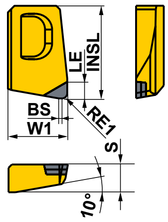
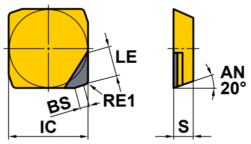
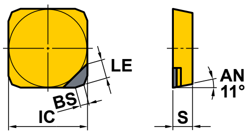
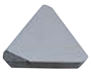
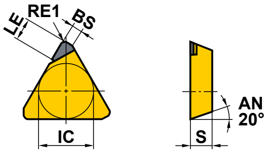
Honing:
E:Round T:Chamfer

Shape	Order Number	Class	Honing	Coated				Cermet		Carbide	Dimensions (mm)						Geometry
				MC520	MC5020	MP6120	VP15TF	NX2525	MX3020	HTi05T	INSL	W1	IC	S	BS	RE1	
AHX640S ➲K042 **AHX640W** ➲K049 	WNEU2006ZEN7C-WK	E	E		●						–	–	20	6.55	7.4	0.8	
AHX640S ➲K042 	WNEU2007ZEN7C-WP	E	E				●				–	–	20	6.9	7.1	0.8	
WSX445 ➲K016 	WNGU1406ANEN8C-M	G	E		●	●	●		●		16.87	16.87	–	6	8	1.0	
WSF406W ➲K052 NEW 	WNGU1206ZNER5C-M	G	E	★							–	–	12.3	6.2	5.2	–	
ASX400 ➲K080 	WOEW12T308PEER8C	E	E							●	13.2	12.5	–	3.97	8	0.8	
	WOEW12T308PETR8C	E	T					●			13.2	12.5	–	3.97	8	0.8	
VOX400 ➲K077 	WOEX1206PER5C	E	E				●				13.025	12.5	–	5.5	–	–	
FBP415 	WPC42EEER10C	C	E							●	15.163	12.5	–	3.175	10	–	 Right hand insert shown.

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

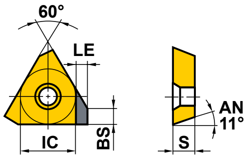
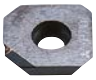
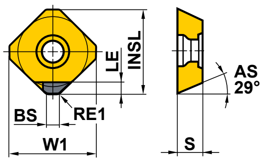
● = NEW

CBN AND PCD

Material	K	Cast Iron		◐	◐			**Cutting Conditions (Guide):**							
	N	Non-ferrous Metal				◐	◐	●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting							
Shape	Order Number		Class	CBN		PCD		Dimensions (mm)							Geometry
				MB4120	MB710	MD2030	MD220	INSL	LE	W1	IC	S	BS	RE1	
FMAX **➲K056** 	**GOER1404PXFR2**		E			●	●	14.0	5.0	9.0	–	4.2	2.0	0.4	
	GOER1408PXFR2		E			●	●	14.0	5.0	9.0	–	4.2	2.0	0.8	
FMAX **➲K056** 	**GOER1408PXFR2-8**		E				★	14.0	8.0	9.0	–	4.2	2.0	0.8	
FMAX **➲K056** 	**GOER1401ZXFR2**		E				●	14.0	5.0	9.0	–	4.2	2.0	0.1	
FMAX **➲K056** 	**NP-GOEN1404PXSR05**		E	●				14.0	2.5	9.0	–	4.2	0.5	0.4	
	NP-GOEN1408PXSR05		E	●				14.0	2.5	9.0	–	4.2	0.5	0.8	
SE415 	**SECN1203EFFR1**		C				★	–	5.0	–	12.7	3.18	1.4	1.0	
FBP415 	**SPEN1203EETR1**		E		★			–	3.0	–	12.7	3.175	1.4	–	
SE300 **NSE300** 	**TECN1603PEFR1**		C				★	–	5.0	–	9.525	3.175	1.4	0.4	

●: Inventory maintained. ★: Inventory maintained in Japan.
(1 insert in one case)

CBN AND PCD WITH WIPER

Material	K Cast Iron		◐		Cutting Conditions (Guide): ●:Stable Cutting ◐:General Cutting ✤:Unstable Cutting							
	N Non-ferrous Metal			◐								
Shape	Order Number	Class	CBN	PCD	Dimensions (mm)							Geometry
			MB710	MD220	INSL	LE	W1	IC	S	BS	RE1	
PMF ➲**K250** 	**TPEW1303ZPTR2**	E	●		—	1.5	—	7.94	3.18	2	—	
ASX445 ➲**K026** 	**WEEW13T3AGFR3C**	E		●	16.6	1.8	16.48	—	3.97	3.0	1.5	
	WEEW13T3AGTR3C	E	●		16.6	1.8	16.48	—	3.97	3.0	1.5	

●: Inventory maintained. ★: Inventory maintained in Japan.
(1 insert in one case)

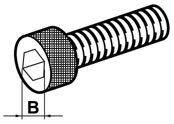
Memo

Memo

SPARE PARTS

IDENTIFICATION

IDENTIFICATION OF CLAMP SCREW (Metric coarse right hand screw thread)



H SC 060 05

- 05: Length
- 060: Screw Diameter
- SC: Screw Head
- H: Hexagonal Hole Dimensions / With Slot / With Cross Hole

Length

Example	
Symbol	L
05	5
10	10
20	20
30	30

Screw Diameter

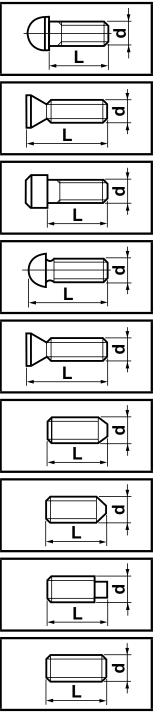
Example	
Symbol	d
050	M5
060	M6

● Hexagonal Hole Dimensions

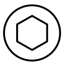
Diameter	Pitch	B Dimensions			
		HBH	HFC	HSC	HS◌
M2	0.4	—	—	1.5	0.9
M2.5	0.45	—	—	2	1.3
M3	0.5	2	2	2.5	1.5
M4	0.7	2.5	2.5	3	2
M5	0.8	3	3	4	2.5
M6	1	4	4	5	3
M8	1.25	5	5	6	4
M10	1.5	6	6	8	5

Screw Head

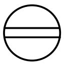
BH	CHUUBURASHI CO.	Button Head
BHA	UNBRAKO CO.	Button Head
FC	CHUUBURASHI CO.	Flat Head
SC	JIS Standard	Socket Head
PM	JIS Standard	Pan Head
FM	JIS Standard	Flat Head
SD	JIS Standard	Set Screw (Cut Point)
SP	JIS Standard	Set Screw (Cone Point)
SR	JIS Standard	Set Screw (Dog Point)
SS	JIS Standard	Set Screw (Flat Point)



Hexagonal Hole Dimensions

Symbol	Geometry
H	

With Slot

Symbol	Geometry
S	

With Cross Hole

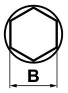
Symbol	Geometry
C	

IDENTIFICATION OF WRENCH

HKY 15 R

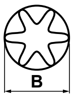
Symbol	Wrench
HKY	Hexagonal Wrench
TKY	Torx Wrench
RKY	R Wrench
TIP	Torx plus Wrench

Hexagonal Wrench



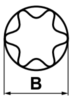
Symbol	B
15	1.5
20	2
25	2.5
30	3
35	3.5
40	4
50	5
60	6

Torx Wrench

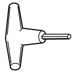
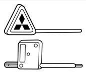
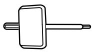
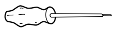
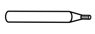


Symbol	B	Size
06	1.7	T6
08	2.3	T8
10	2.7	T10
15	3.3	T15
20	3.8	T20
25	4.4	T25
27	5.0	T27
30	5.5	T30

Torx plus Wrench



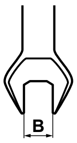
Symbol	B	Size
06	1.8	6IP
07	2.1	7IP
08	2.4	8IP
10	2.8	10IP
15	3.4	15IP

R	Standard L Wrench	
L	Long L Wrench	
T	T Wrench	
F FS	Flag Wrench	
W	Flag Wrench	
D DS	Driver	
S	Wrench	

IMX 10 - WR

Symbol	Wrench
iMX	Wrench for iMX Series

Hexagonal Wrench

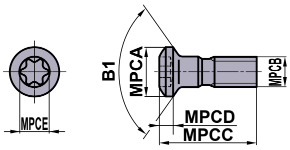
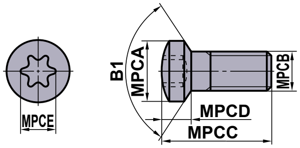
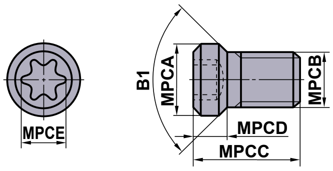
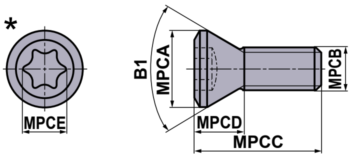
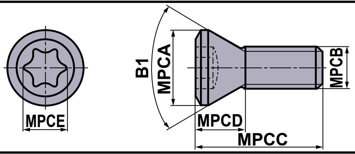
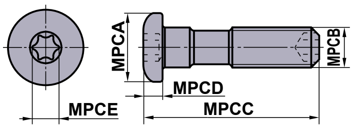
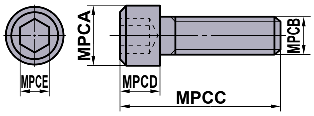
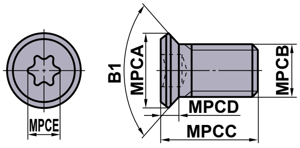
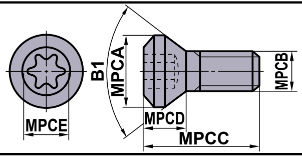
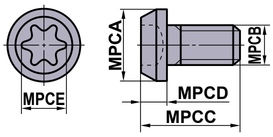
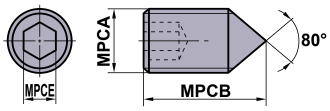


Symbol	B
10	8
12	10
16	13
20	16
25	20

WR

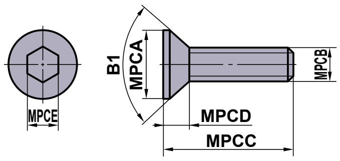
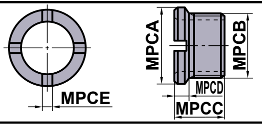
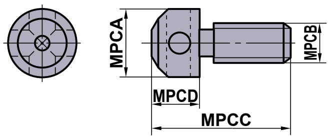
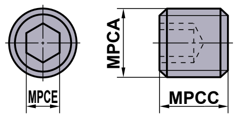
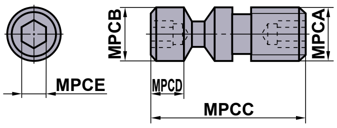
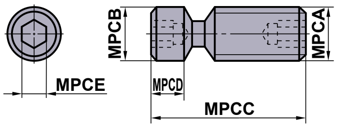
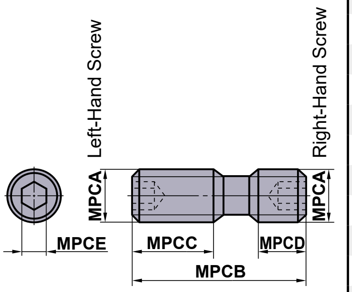
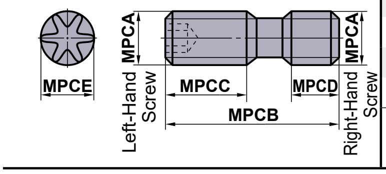
SPARE PARTS

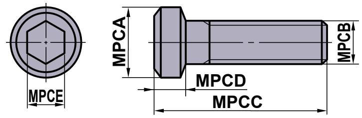
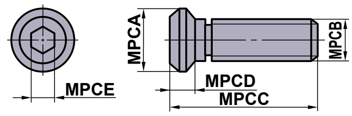
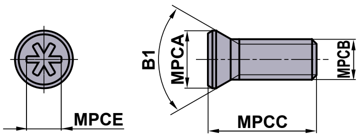
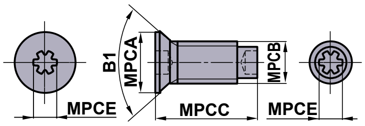
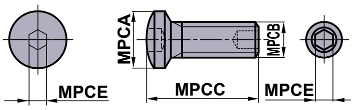
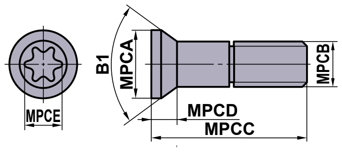
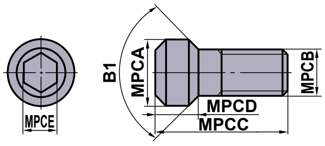
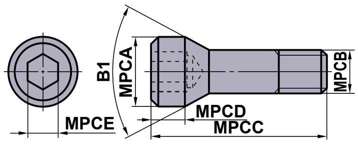
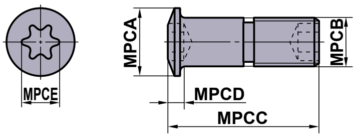
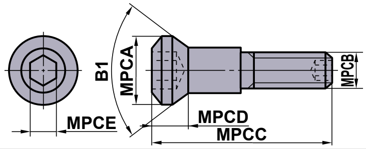
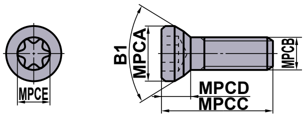
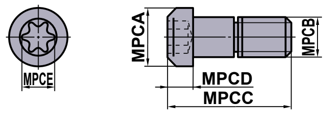
CLAMP SCREW

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**AJS3010T10**	5	M3×0.5	10	1.5	2.8	120°	T10	2.5	**Profile** Holder (➲C032) **AJX** (➲K194)
	AJS4012T15	7	M4×0.7	12	2.2	3.4	120°	T15	3.5	**AJX** (➲K194)
	AJS5014T25	8	M5×0.8	14	2.7	4.5	120°	T25	7.5	
	**BRS103**	5	M3×0.5	9.9	2.9	3.4	120°	T15	3.5	
	BRS105	8	M5×0.8	13.8	3.8	4.5	120°	T25	7.5	
	**CS200T**	3.2	M2×0.4	5	1.6	1.8	90°	T6	0.6	**F** Type Boring Bar (➲E028)
	CS250T	3.7	M2.5×0.45	6	1.8	2.4	90°	T8	1.0	**Milling Tools** Series (➲K001)
	* **CS250560T**	3.9	M2.5×0.45	5.2	2.5	2.4	60°	T8	1.0	**BRP** (➲K206)
	CS300590T	4.1	M3×0.5	5.5	2.1	2.4	90°	T8	1.0	
	CS300890T	4.1	M3×0.5	8	2.1	2.4	90°	T8	1.0	**DCCC** (➲K216)
	* **CS350860T**	5.5	M3.5×0.6	8.4	4.0	3.4	60°	T15	3.5	**MMTI** Type Boring Bar (➲G026) **BRP** (➲K206)
* 	**CS350990T**	4.8	M3.5×0.6	9	2.4	2.8	90°	T10	2.5	**DCCC** (➲K216)
	CS401160T	5.7	M4×0.7	11	4.5	3.4	60°	T15	3.5	
	CS401990T	6.0	M4×0.7	19	3.0	3.9	90°	T20	3.5	
	CS451190T	6.3	M4.5×0.75	11	2.9	3.9	90°	T20	5.0	**AL** Type Holder (➲C034)
	* **CS5015060T**	7.2	M5×0.8	15	2.4	3.9	60°	T20	5.0	**AHX640S** (➲K042)
	CS502190T	8.5	M5×0.8	21	4.0	5.1	90°	T27	7.5	
	**CSF401260T**	7.2	M4×0.5	12	5.2	3.9	60°	T20	5.0	**PMR** (➲K252)
	**DC0520T**	8.5	M5×0.8	22.5	2.5	3.4	—	T15	3.5	**DOUBLE CLAMP** Holder (➲C008)
	DC0621T	10.5	M6×1.0	25	4	3.9	—	T20	5.0	**DOUBLE CLAMP DIMPLE BAR** (➲E015) **HSK** Tool Holder (➲H001)
	**DKS4**	5.6	M4×0.7	18	3.5	3	—	—	3.3	
	**FC400890T**	5.6	M4×0.7	7.5	1.3	2.8	90°	T10	2.5	**AL** Type Holder (➲C035) **AL** Type Boring Bar (➲E043)
	**GY05016S**	8.7	M5×0.8	16	3.5	3.9	90°	T20	5.0	**GY** Series (➲F004)
	**GY06013M**	12	M6×1	18	5	5.6	—	T30	6.0	**GY** Series (➲F004)
	**HSP05008C**	M5×0.8	8	—	—	2.5	—	—	2.5	**MP** Type Holder (➲C019)

SPARE PARTS

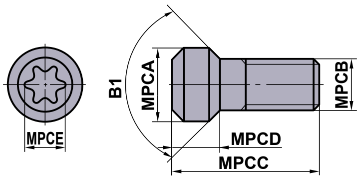
CLAMP SCREW

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**HY-A1**	4.4	M3×0.5	7	2.1	2	82°	—	1.5	
	HY-V1	5.5	M3×0.5	7	2.5	2	82°	—	1.5	
	HY2	5.5	M3×0.5	10	2.5	2	82°	—	1.5	
	HY3	7	M3.5×0.6	12	2.9	2	82°	—	1.5	
	HY4	9.3	M5×0.8	16	3.6	3	82°	—	3.3	
	**JSS6**	6.9	M6×0.75	4.5	1.5	0.8	—	—	—	
	JSS7	8	M7×0.75	4.4	1.5	1	—	—	—	
	**KS1**	7	M4×0.7	14	5	—	—	—	—	
	KS2	10	M6×1	18	7	—	—	—	—	
	KS2S	10	M6×1	18	7	—	—	—	—	
	**LLR1**	M5×0.8	—	3.5	—	2.5	—	—	—	
	LLR2	M6×1	—	5	—	3	—	—	—	
  **LLCS103, LLCS105** **LLCS112, LLCS125** **LLCS205** The products with "*" do not have a hexagonal hole at the end marked **MPCB**. The products with "☆" do not have a hexagonal hole at the end marked **MPCA**.	☆**LLCS103**	M3×0.5	4	11	4.6	2	—	—	1.5	
	* **LLCS105**	M5×0.8	M5×0.8	10	1.5	2	—	—	1.5	**P** Type Boring Bar (➲E038)
	LLCS106	M6×1	6	16.5	3.5	2.5	—	—	2.2	**HSK** Tool Holder (➲H001)
	* **LLCS106S**	M6×1	6	13.4	0.7	2.5	—	—	2.2	
	LLCS108	M8×1.25	8	21	6.5	3	—	—	3.3	
	* **LLCS108S**	M8×1.25	8	16.5	2	3	—	—	3.3	
	LLCS110	M10×1.5	10	29	8	4	—	—	7.0	
	LLCS112	M12×1	11.9	36.2	9	5	—	—	8.0	
	LLCS125	M5×0.8	M5×0.8	12	2	2	—	—	1.5	
	LLCS205	M5×0.8	M5×0.8	16	4	2	—	—	1.5	
	LLCS206	M6×1	6	26	13	2.5	—	—	2.2	
	LLCS208	M8×1.25	8	24	6.5	3	—	—	3.3	
	LLCS306	M6×1	6	21	4	2.5	—	—	2.2	
	LLCS310	M10×1	10	29	8	4	—	—	7.0	
	LLCS410	M10×1	10	30	6.6	4	—	—	7.0	
	LLCS508	M8×1	8	24	6.5	3	—	—	3.3	
	* **LLCS508S**	M8×1	8	20.5	3	3	—	—	3.3	
 *Without Hexagonal Hole on Right-Hand Screw	**LS1**	M6×1	22	8	8	3	—	—	5.0	
	LS2	M8×1	29	13	10	4	—	—	8.2	
	* **LS4**	M6×1	15	8	4	3	—	—	5.0	**Milling Tools** Series (➲K001)
	* **LS5**	M6×1	18	8	5	3	—	—	5.0	
	* **LS6**	M8×1	24	13	5	4	—	—	8.2	
	* **LS7**	M8×1	27	13	8	4	—	—	8.2	
	* **LS8**	M6×0.75	18	7	7	3	—	—	5.0	
	* **LS9**	M6×0.75	22	8	8	3	—	—	5.0	
	* **LS10**	M7×0.75	16	6	6	4	—	—	8.2	
	* **LS11**	M8×1	16	6	6	4	—	—	7.8	
	* **LS12**	M8×1	24	7	7	4	—	—	7.8	
	* **LS16**	M7×0.75	23	11	8	4	—	—	7.8	
	* **LS20**	M10×1.5	26	9	9	5	—	—	9.0	
	* **LS21**	M10×1.5	32	12	12	5	—	—	9.0	
	LS24	M8×1.25	24	8.5	8.5	4	—	—	7.8	
	LS25	M8×1	28.5	12.0	10.5	4	—	—	8.2	**DOUBLE CLAMP** Holder (➲C009)
	**LS14T**	M7×0.75	24	10	10	4.5	—	T25	8.0	
	LS15T	M7×0.75	18	7	7	4.5	—	T25	8.0	
	LS10TS	M7×0.75	13	6	4	4.5	—	T25	8.5	
	LS0622T	M6×0.75	22	8	8	3.4	—	T15	6.0	**AHX640W** (➲K049)

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**MGS6**	10	M6×1	26	4	5	—	—	9.0	**APX3000** (➲K146)
	**MHT1**	11	M8×1	18.5	3.5	4	—	—	8.7	
	**NS251**	3.6	M2.5×0.45	7	—	2.2	60°	—	0.7	**BTVH** (➲D016)
	NS401	5.8	M4×0.7	6	—	3.6	60°	—	3.5	**CTAH-S** (➲D020)
	**NS402W**	5.85	M4×0.7	10	—	2.2	60°	—	0.7	**CTAH** (➲D020) **CTBH** (➲D022)
	NS403W	5.85	M4×0.7	12	—	2.2	60°	—	0.7	
	NS404W	5.8	M4×0.7	10	—	2.2	90°	—	0.7	
	**NS501W**	8	M5×0.8	16	—	2.5	120°	—	2.2	**SMALL TOOLS** (➲D001)
	NS502W	8	M5×0.8	20	—	2.5	120°	—	2.2	
	**RS3008T**	4.3	M3×0.35	8.6	2	2.4	61°	T8	1.5	**SRF** (➲K228) **SUF** (➲K232)
	RS3510T	5	M3.5×0.35	10	2.3	2.8	61°	T10	2.5	
	RS4015T	6	M4×0.5	14	2.7	3.4	61°	T15	3.3	
	RS5020T	8.1	M5×0.5	16.4	3.6	3.9	61°	T20	5.0	
	RS6025T	9.5	M6×0.75	21.5	4.2	4.5	61°	T25	7.5	
	RS8030T	12	M8×0.75	25	5	5.6	61°	T30	10.0	
	**S1**	3.5	M2×0.4	5.5	2.2	1.5	92°	—	0.6	
	S3	4.5	M3×0.5	7.7	2.4	2	92°	—	1.5	
	S4	5.3	M4×0.7	8	1.8	2.5	62°	—	2.2	
	S5	6.8	M5×0.8	9	2.4	3	62°	—	3.3	
	**SD32**	12	M8×1.25	28	7.2	6	50°	—	9.5	
	SD40	12	M8×1.25	36	7.2	6	50°	—	9.5	
	SD50	16	M10×1.5	46	8.2	8	50°	—	1.0	
	SD63	16	M10×1.5	61	8.2	8	50°	—	1.0	
	**SETS51**	6.8	M5×0.8	14.8	1.5	3.4	—	T15	3.5	**MMTE** Type Holder (➲G019)
	SETS61	8	M6×1	20	1.8	3.9	—	T20	5.0	**MMTI** Type Boring Bar (➲G026)
										HSK Tool Holder (➲H001)
	**SLCS105**	10	M5×0.8	25	6.3	4	90°	—	7.0	**WP** Type Holder (➲C017)
	SLCS106	12	M6×1	32	6.2	4	90°	—	7.0	
	**SPS1**	8.5	M5×0.8	16	4	4.5	70°	T25	5.0	
	**SRS5**	6.7	M5×0.8	16	3.5	3.9	—	T20	5.0	

SPARE PARTS

CLAMP SCREW



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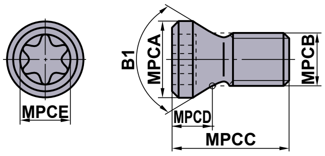

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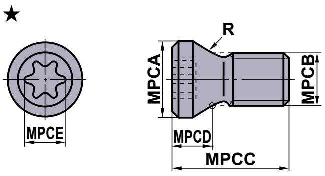

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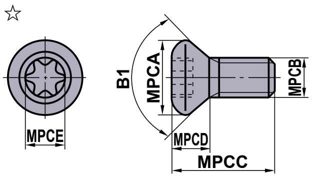
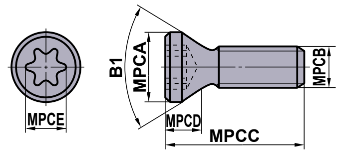
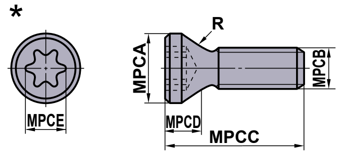
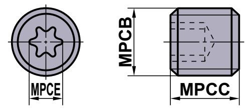
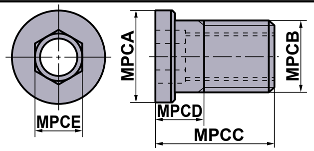
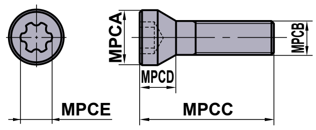
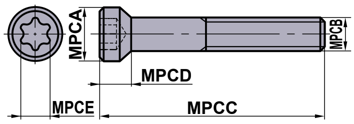
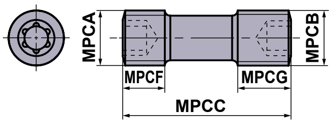


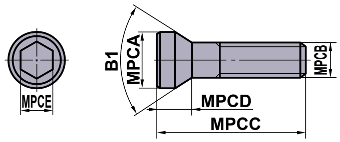
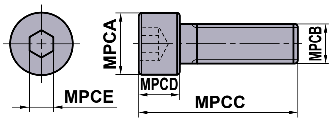
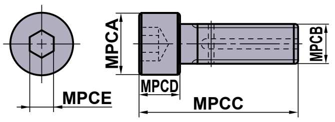
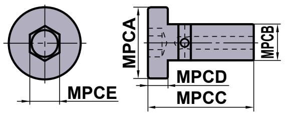
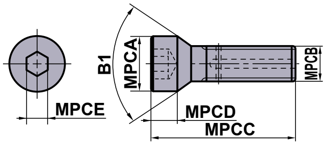
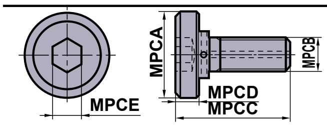
Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	* **TS16**	2.5	M1.6×0.35	3.2	1.6	1.8	60°	T6	0.6	**MICRO-DEX** (➲E018)
	TS2	2.7	M2×0.4	4.6	1.4	1.8	60°	T6	0.6	
	* **TS2A**	2.7	M2×0.4	4.5	1.2	1.8	60°	T6	0.6	**AQX** (➲K186)
	TS2C	2.7	M2×0.4	3.8	1.4	1.8	60°	T6	0.6	
	☆ **TS2D**	3.8	M2×0.4	5.3	1.9	1.8	82°	T6	0.6	**DIMPLE BAR** (➲E007)
	TS21	2.7	M2×0.4	3.4	1.4	1.8	60°	T6	0.6	**F** Type Boring Bar (➲E030)
	* **TS22**	3.0	M2.2×0.45	5	1.2	1.8	60°	T6	0.6	**S** Type Boring Bar (➲E031)
	* **TS25**	3.3	M2.5×0.45	5.5	1.7	2.4	60°	T8	1.0	**AQX** (➲K186) **AJX** (➲K194)
	☆ **TS25D**	4.4	M2.5×0.45	6.2	2.2	2.4	82°	T8	1.0	**MMTI** Type Boring Bar (➲G026)
	* **TS25H**	3.6	M2.5×0.45	5.5	2	2.4	60°	T8	1.0	**SRM2** (➲K236)
	TS202	2.7	M2×0.4	5.5	1.8	1.8	60°	T6	0.6	
	TS253	3.3	M2.5×0.45	4.5	1.7	2.4	60°	T8	1.0	**Milling Tools** Series (➲K001)
	TS254	3.3	M2.5×0.45	7	1.7	2.4	60°	T8	1.0	**SMALL TOOLS** (➲D001) **PMF** (➲K250)
	* **TS255**	3.5	M2.5×0.45	7.5	1.6	2.4	60°	T8	1.0	**Profile Holder** (➲C032)
	TS3	3.9	M3×0.5	6	2	2.4	60°	T8	1.0	**TSMP** (➲K248)
	TS3D	5.0	M3×0.5	6	2.3	2.8	82°	T10	2.5	**DIMPLE BAR** (➲E007)
	* **TS3SB**	4.4	M3×0.5	8	2	2.4	80°	T8	1.5	**AXD4000** (➲K168)
	TS3SBS	4.4	M3×0.5	6.5	2	2.4	80°	T8	1.5	**AXD4000** (➲K168)
	☆ **TS31D**	4.8	M3×0.5	7.2	2.2	2.8	82°	T10	2.5	**DIMPLE BAR** (➲E007)
	* **TS32**	3.9	M3×0.5	7.5	2	2.4	60°	T8	2.0	**SRM2** (➲K236)
	* **TS33**	3.9	M3×0.5	6.7	2	2.4	60°	T8	1.5	**AQX** (➲K186) **AJX** (➲K194)
	TS35	4.8	M3.5×0.6	6.5	2.4	2.8	60°	T10	2.5	
	* **TS35D**	5.3	M3.5×0.6	12	2.8	3.4	60°	T15	3.5	**HSK** Tool Holder (➲H001)
	★ **TS35R**	5.7	M3.5×0.6	10	2.1	3.4	–	T15	3.5	**AHX440S** (➲K034) **AHX475S** (➲K038)
	TS351	4.8	M3.5×0.6	7.2	2.4	2.8	60°	T10	2.5	**AJX** (➲K194) **SRM2** (➲K236)
	TS352	4.8	M3.5×0.6	10	3	2.8	60°	T10	2.5	**VFX5** (➲K208)
	* **TS4SB**	5.8	M4×0.7	9	2.7	3.4	80°	T15	3.5	**AXD7000** (➲K180)
	* **TS4SBL**	5.8	M4×0.7	10.5	2.7	3.4	80°	T15	3.5	**GY** SERIES (➲F004) **AXD7000** (➲K180)
	TS4	5.4	M4×0.7	8	2.6	3.4	60°	T15	3.5	**CE/CF/CGSP** (➲K246) **TSMP** (➲K248)
	TS4D	5.6	M4×0.7	7.7	2.5	3.4	82°	T15	3.5	**DIMPLE BAR** (➲E007)
	TS42	5.4	M4×0.7	6	2.6	3.4	60°	T15	3.5	
	TS43	5.4	M4×0.7	10	2.6	3.4	60°	T15	3.5	**AJX** (➲K194) **BRP** (➲K206) **SRM2** (➲K236)
	TS44	5.4	M4×0.7	12	2.6	3.4	60°	T15	3.5	
	TS406	5.4	M4×0.7	15.5	2.6	3.4	60°	T15	3.5	
	TS407	5.4	M4×0.7	9	2.6	3.4	60°	T15	3.5	**AQX** (➲K186) **AJX** (➲K194)
	TS450	5.9	M4.5×0.75	13	3.6	3.9	60°	T20	5.0	**VFX6** (➲K212)
	TS5S	6.8	M5×0.8	9	2.9	4.5	80°	T25	7.5	
	TS5	6.8	M5×0.8	9	3.2	4.5	60°	T25	7.5	**SP** Holder (➲C024) **CE/CF/CGSP** (➲K246) **TSMP** (➲K248)
	TS5L	6.8	M5×0.8	15	2.9	4.5	80°	T25	7.5	
	★ **TS5R**	6.9	M5×0.8	12	3.5	3.9	–	T20	5.0	**WWX400** (➲K067) **WJX** (➲K085)
	TS52	6.8	M5×0.8	8	3.2	4.5	60°	T25	7.5	**CE/CF/CGSP** (➲K246)
	TS53	6.8	M5×0.8	16	3.2	4.5	60°	T25	7.5	
	TS54	6.8	M5×0.8	12	3.2	4.5	60°	T25	7.5	**AJX** (➲K194)
	TS55	6.8	M5×0.8	10.5	3.2	4.5	60°	T25	7.5	GY SERIES (➲F004) **AQX** (➲K186) **SPX** (➲K219) **SRM2** (➲K236)
	* **TS6S**	8.5	M6×1.0	13	4.4	5.6	60°	T30	10.0	**AQX** (➲K186) **SRM2** (➲K236)
	* **TS6**	8.5	M6×1.0	16	4.4	5.6	60°	T30	10.0	**SRM2** (➲K236)

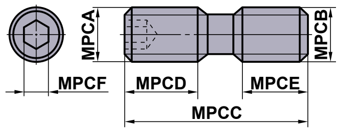
Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**TPS20-1**	2.65	M2×0.4	4.7	2.4	1.8	60°	6IP	0.6	**MVX** (➔M158)
	TPS25	3.3	M2.5×0.45	5.5	1.7	2.1	60°	7IP	1.0	**APX3000** (➔K146) **MVX** (➔M158)
	TPS25-1	3.3	M2.5×0.45	6.5	1.7	2.1	60°	7IP	1.0	**APX3000** (➔K146)
	TPS27F1	3.7	M2.7×0.35	6.5	1.8	2.1	60°	7IP	1.0	**VPX200** (➔K099)
	TPS27F2	3.7	M2.7×0.35	8.0	1.8	2.1	60°	7IP	1.0	**VPX300** (➔K113)
	TPS3	3.9	M3×0.5	6.7	1.4	2.82	60°	10IP	1.0	**MVX** (➔M158)
	* **TPS3R**	4.6	M3×0.5	8.5	1.4	2.82	—	10IP	2.0	**WJX09** (➔K085)
	TPS3SB	4.4	M3×0.5	8	2.0	2.82	80°	10IP	3.0	**AXD4000A** (➔K176)
	TPS35	5.3	M3.5×0.6	11.5	2.8	3.4	60°	15IP	3.5	**ASX445** (➔K026) **ASX400** (➔K080) **PMR** (➔K252)
* 	**TPS351**	4.8	M3.5×0.6	7.2	1.4	2.82	60°	10IP	2.5	**MVX** (➔M158)
	TPS351B	5.1	M3.5×0.6	7.2	1.4	2.82	60°	10IP	2.5	**ARP** (➔K254)
	TPS4	5.3	M4×0.7	8	2.6	3.4	60°	15IP	3.5	**APX4000** (➔K153) **ARP** (➔K254) **MVX** (➔M158)
	TPS40F1	5.3	M4×0.5	10.5	2.8	3.4	60°	15IP	3.0	**VPX300** (➔K113)
	TPS43	5.3	M4×0.7	10	2.6	3.4	60°	15IP	4.0	**APX4000** (➔K153) **MVX** (➔M158)
	* **TPS4R**	6.4	M4×0.7	10.6	2.9	3.4	—	15IP	3.5	**WSX445** (➔K016)
	TPS54	6.8	M5×0.8	12	3.2	4.5	60°	25IP	7.5	**MVX** (➔M158)
	**TSS04005**	—	M4×0.7	5	—	2.4	—	T8	—	**PMF** (➔K250)
	TSS04505S	—	M4.5×0.7	5	—	3.5	—	T10	3.5	**FMAX** (➔K056)
	TSS05006	—	M5×0.8	6	—	2.8	—	T10	—	
	TSS06010	—	M6×1	10	—	3.9	—	T20	—	
	**WCS503507H**	6.3	M5×0.5	7	3.3	3.5	—	—	5.0	**ASX445** (➔K026) **ASX400** (➔K080) **PMR** (➔K252)
	WCS604010H	7.8	M6×0.75	10	4.1	4.0	—	—	7.0	**PMR** (➔K252)
	**WS203107TPS**	3.1	M2×0.25	7.3	1.7	1.8	60°	6IP	1.0	**STAW** (➔M139)
	WS203108TPS	3.1	M2×0.25	8.3	1.9	1.8	60°	6IP	1.0	
	WS253909TPS	3.9	M2.5×0.35	9.5	2.4	2.4	60°	8IP	2.0	
	WS304912TPS	4.9	M3×0.35	12	3.25	2.82	60°	10IP	2.5	
	WS254012T	4	M2.5×0.45	11.5	2.2	2.4	80°	T8	2.0	**TAW** (➔M148)
	WS254013T	4	M2.5×0.45	12.5	2.2	2.4	80°	T8	2.0	
	WS254014T	4	M2.5×0.45	13.5	2.2	2.4	80°	T8	2.0	
	WS254015T	4	M2.5×0.45	14.5	2.2	2.4	80°	T8	2.0	
	WS254016T	4	M2.5×0.45	15.5	2.2	2.4	80°	T8	2.0	
	**WS304517T**	4.5	M3×0.5	16.5	3.4	2.8	60°	T10	3.5	
	WS304518T	4.5	M3×0.5	17.5	3.4	2.8	60°	T10	3.5	
	WS355520T	5.5	M3.5×0.6	19.5	3.9	3.4	60°	T15	5.5	
	WS355521T	5.5	M3.5×0.6	20.5	3.9	3.4	60°	T15	5.5	
	WS406023T	6	M4×0.7	22.0	4.4	4.5	60°	T25	8.5	
	WS406024T	6	M4×0.7	23.0	4.4	4.5	60°	T25	8.5	
	WS508026T	8	M5×0.8	25.0	5.2	5.1	60°	T27	12.0	
	WS508027T	8	M5×0.8	26.0	5.2	5.1	60°	T27	12.0	

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCF	MPCG	B1			
	**RX1ST8TP1**	M4×0.7	M4×0.5	16.5	7.0	7.0	—	TX8	2.0	**RX1S** (➔M197)
	RX1ST10TP23	M5×0.8	M5×0.5	17.0	7.5	7.0	—	TX10	3.0	
	RX1ST15TP45	M6×1.0	M6×0.75	18.0	6.5	8.5	—	TX15	6.5	
	RX1ST25TP6	M10×1.5	M10×1.25	30.0	7.5	9.5	—	TX25	15.0	

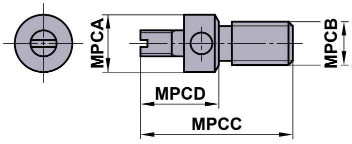
SPARE PARTS

SET BOLT

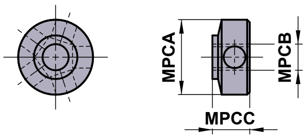
Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**BOES101**	15	M10×1.5	45	10	8	60°	—	10.0	
 	* **HSC08025H**	13	M8×1.25	33	8	5	—	—	24	**VPX200/300** (➲K099,K113) **ARP** (➲K254)
	HSC05030	8.5	M5×0.8	35	5	4	—	—	10	**APX3000/4000** (➲K146,K153)
	* **HSC08030H**	13	M8×1.25	38	8	5	—	—	24	**WSX445** (➲K016)
	HSC08045	13	M8×1.25	53	8	5	—	—	24	**VPX200/300** (➲K099,K113)
	HSC08040	13	M8×1.25	48	8	5	—	—	24	**WSX445** (➲K016)
	HSC08050	13	M8×1.25	58	8	5	—	—	24	**VPX200/300** (➲K099,K113)
	* **HSC10030H**	16	M10×1.5	40	10	6	—	—	40	**APX3000/4000** (➲K146,K153) **AJX** (➲K194) **WSX445** (➲K016)
	HSC10035	16	M10×1.5	45	10	6	—	—	44	**VFX5** (➲K208) **VFX6** (➲K212)
	HSC10050	16	M10×1.5	60	10	8	—	—	44	**APX3000/4000** (➲K146,K153) **VPX200/300** (➲K099,K113)
	HSC10055	16	M10×1.5	65	10	8	—	—	44	**VFX5** (➲K208)
	HSC10060	16	M10×1.5	70	10	8	—	—	44	**VPX200/300** (➲K099,K113)
	HSC10070	16	M10×1.5	80	10	8	—	—	44	**VPX200/300** (➲K099,K113) **ASPX** (➲K224)
	HSC12035	18	M12×1.75	47	12	10	—	—	80	**WSX445** (➲K016)
	* **HSC12035H**	18	M12×1.75	47	12	10	—	—	80	**APX3000/4000** (➲K146,K153) **AJX** (➲K194)
	HSC12040	18	M12×1.75	52	12	10	—	—	80	
	HSC12045	18	M12×1.75	57	12	10	—	—	80	**WSX445** (➲K016)
	HSC12060	18	M12×1.75	72	12	10	—	—	80	**VPX200/300** (➲K099,K113)
	HSC12070	18	M12×1.75	82	12	10	—	—	80	**APX3000/4000** (➲K146,K153) **AJX** (➲K194) **WSX445** (➲K016)
	HSC16040	24	M16×2	56	16	14	—	—	150	**WSX445** (➲K016)
	* **HSC16040H**	24	M16×2	56	16	14	—	—	150	**APX3000/4000** (➲K146,K153) **AJX** (➲K194)
	HSC16055	24	M16×2	71	16	14	—	—	150	**VPX200/300** (➲K099,K113)
	HSC16065	24	M16×2	81	16	14	—	—	150	**VPX200/300** (➲K099,K113)
	HSC16080	24	M16×2	96	16	14	—	—	150	
* With coolant hole.	**HSC20040**	30	M20×2.5	60	20	17	—	—	320	
	HSC20090	30	M20×2.5	110	20	17	—	—	320	
	**HSCX12030H**	24	M12×1.75	37	7	8	—	—	40	**FMAX** (➲K056)
	HSCX16035H	30	M16×2	44	9	12	—	—	100	
	HSCX20035H	36	M20×2.5	46	11	14	—	—	180	
	**HFF08033H**	11	M8×1.25	33	5	5	90°	—	8.2	**WJX09** (➲K085)
	HFF08043H	11	M8×1.25	43	5	5	90°	—	8.2	**AXD4000** (➲K168)
	**MBA16033H**	40	M16×2	43	10	14	—	—	150	**AHX640** (For ϕ100) (➲K042) **WSX445** (➲K016) **APX4000** (➲K153) **AHX475S** (➲K038) **AHX640S** (➲K042) **AXD4000** (➲K168) **AXD7000** (➲K180) **AJX** (➲K194)
	MBA20040H	50	M20×2.5	54	14	17	—	—	320	

Geometry	Order Number	Dimensions (mm)						TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF		
	**HDS08030**	M8×0.75	M8×1.25	30	13.5	11.5	4	8.2	**BRP** (➲K206)
	HDS10031	M10×1.0	M10×1.5	31	14	12	5	9.0	**PMF** (➲K250)

LARGE ADJUSTMENT SCREW

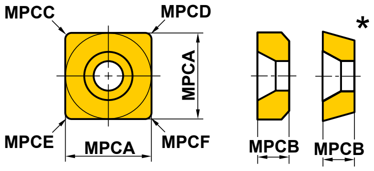
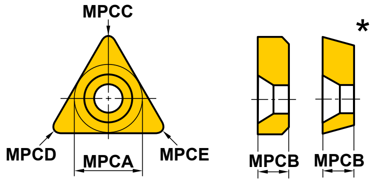
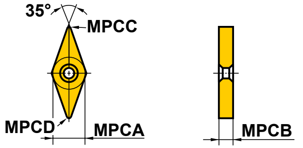
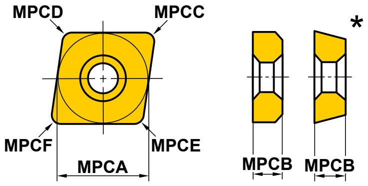
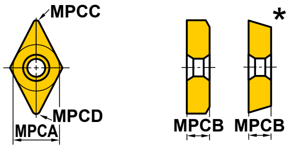
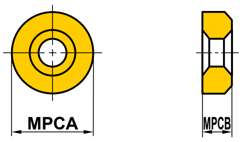
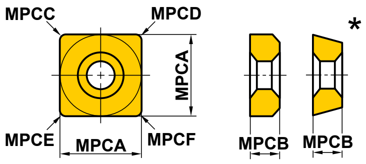
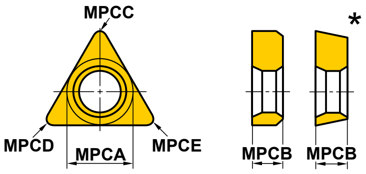
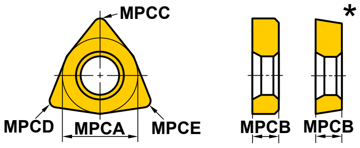
Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**KSS2**	6.6	M5×0.8	17.5	9	—	—	—	—	**FMAX** (➔K056)

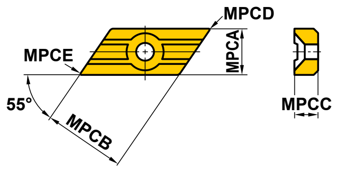
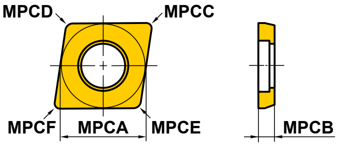
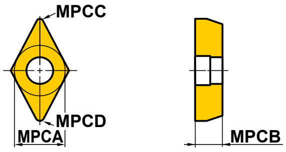
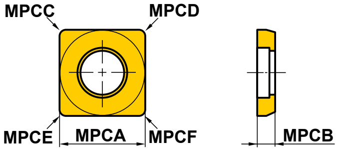
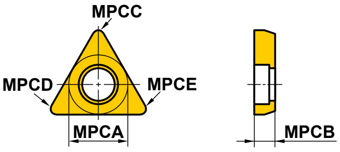
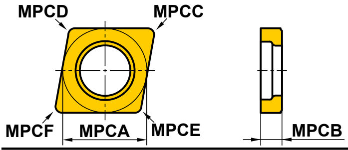
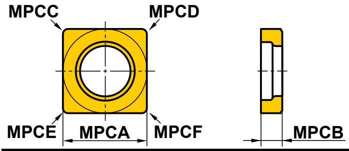
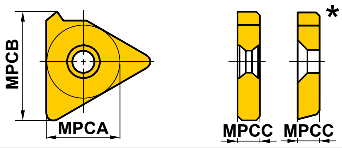
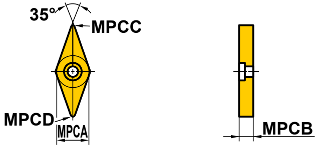
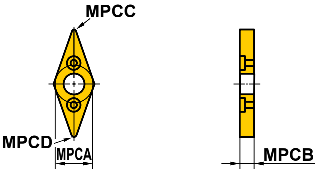
MICRO ADJUSTMENT NUT

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**KSN3**	8.6	M3×0.35	4.3	—	—	—	—	—	**FMAX** (➔K056)

SPARE PARTS

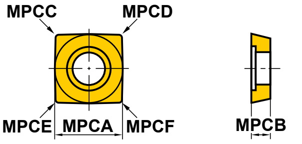
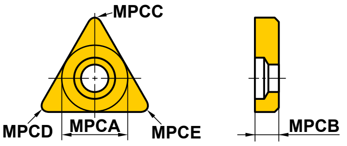
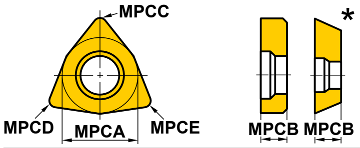
SHIM

Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	*PS42	11.46	3.18	0.2	0.2	0.6	1.0	
	*PT21	5.11	2.38	0.2	0.2	0.6	—	
	*PT32	8.28	3.18	0.2	0.2	0.6	—	F Type Boring Bar (➲E029)
	*PT42	10.85	3.18	0.3	0.3	0.7	—	
	DCSVN32	9.52	3.18	0.8	1.2	—	—	DOUBLE CLAMP Holder (➲C019) DOUBLE CLAMP DIMPLE BAR (➲E017)
	LLSCN3T3	9.52	3.97	0.4	0.4	0.8	0.8	LL Type Holder (➲C008)
	LLSCN33	9.52	4.76	0.4	0.4	0.8	0.8	LL Type Holder (➲C008)
	LLSCN42	12.70	3.18	0.8	0.8	1.2	1.2	DOUBLE CLAMP DIMPLE BAR (➲E015)
	LLSCN53	15.87	4.76	1.2	1.2	1.6	1.6	P Type Boring Bar (➲E039)
	LLSCN63	19.05	4.76	1.2	1.2	1.6	1.6	HSK Tool Holder (➲H001)
	*LLSCP42	12.70	3.18	0.8	0.8	1.2	1.2	DOUBLE CLAMP DIMPLE BAR (➲E015)
	*LLSCP63	19.05	4.76	1.2	1.2	1.6	1.6	P Type Boring Bar (➲E039)
								HSK Tool Holder (➲H001)
	LLSDN32	9.52	3.18	0.8	1.2	—	—	DOUBLE CLAMP Holder (➲C010) LL Type Holder (➲C010) DOUBLE CLAMP DIMPLE BAR (➲E015) P Type Boring Bar (➲E039) HSK Tool Holder (➲H001)
	LLSDN42	12.70	3.18	0.8	1.2	—	—	
	LLSDN43	12.70	4.76	0.8	1.2	—	—	
	LLSDN53	15.87	4.76	1.2	1.6	—	—	
	*LLSDP42	12.70	3.18	0.8	1.2	—	—	DOUBLE CLAMP DIMPLE BAR (➲E015)
	LLSRN103	8.3	3.18	—	—	—	—	LL Type Holder (➲C026)
	LLSRN123	9.8	3.18	—	—	—	—	HSK Tool Holder (➲H001)
	LLSRN164	13.6	4.76	—	—	—	—	
	LLSRN204	17.3	4.76	—	—	—	—	
	LLSRN326	28.0	6.35	—	—	—	—	
	LLSSN33	9.52	4.76	0.8	0.8	1.2	1.2	DOUBLE CLAMP DIMPLE BAR (➲C014)
	LLSSN42	12.70	3.18	0.8	0.8	1.2	1.6	P Type Boring Bar (➲E038)
	LLSSN53	15.87	4.76	1.2	1.2	1.6	1.6	
	LLSSN63	19.05	4.76	1.2	1.2	1.6	2.0	
	LLSSN84	25.40	6.35	1.6	1.6	2.4	2.4	
	*LLSSP42	12.70	3.18	0.8	0.8	1.2	1.6	DOUBLE CLAMP DIMPLE BAR (➲E016)
	LLSTE32	7.6	3.18	0.4	0.4	0.4	—	
	LLSTN32	9.52	3.18	0.4	0.8	1.2	—	LL Type Holder (➲C016)
	LLSTN33	9.52	4.76	0.4	0.8	1.2	—	DOUBLE CLAMP DIMPLE BAR (➲E016)
	LLSTN42	12.70	3.18	0.4	0.8	1.2	—	P Type Boring Bar (➲E038)
	LLSTN53	15.87	4.76	0.8	1.2	1.6	—	
	*LLSTP32	9.52	3.18	0.4	0.8	1.2	—	
	LLSWN32	9.52	3.18	0.4	0.8	1.2	—	LL Type Holder (➲C022)
	LLSWN3T3	9.52	3.97	0.4	0.8	1.2	—	DOUBLE CLAMP Holder (➲C022)
	LLSWN42	12.70	3.18	0.4	0.8	1.2	—	DOUBLE CLAMP DIMPLE BAR (➲E017)
	*LLSWP32	9.52	3.18	0.4	0.8	1.2	—	
	*LLSWP42	12.70	3.18	0.4	0.8	1.2	—	

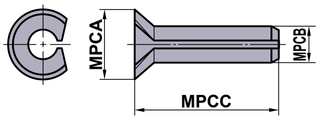
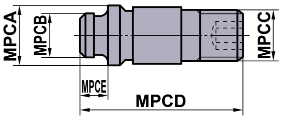
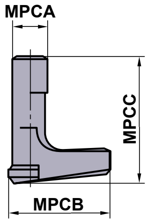
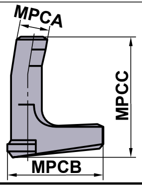
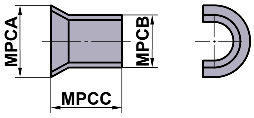
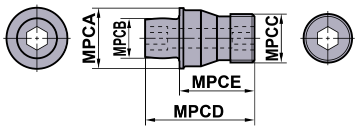
Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**MHS532R**	9.4	15.7	4.5	0.8	0.8	—	
 Hole position of this item is offset from centre.	**MLCP42**	12.58	3.18	1.2	1.2	1.2	1.2	**P** Type Boring Bar (➲E039)
 Hole position of this item is offset from centre.	**MLDP42**	12.56	3.18	1.2	1.2	—	—	**P** Type Boring Bar (➲E039)
 Hole position of this item is offset from centre.	**MLSP42**	12.63	3.18	1.2	1.2	1.2	1.2	**P** Type Boring Bar (➲E038)
 Hole position of this item is offset from centre.	**MLTP32**	9.50	3.18	1.2	1.2	1.2	—	**P** Type Boring Bar (➲E038)
	**MSCN63**	18.8	4.76	1.6	1.6	1.6	1.6	**DOUBLE CLAMP** Holder (➲C009) (For Heavy Cutting)
	**MSSN63**	18.8	4.76	1.6	1.6	1.6	1.6	**DOUBLE CLAMP** Holder (➲C012) (For Heavy Cutting)
	* **PT32T1R**	8.28	13.34	3.18	—	—	—	
	* **PT32T2R**	8.28	13.19	3.18	—	—	—	
	**PV321**	9.52	3.18	0.4	0.4	—	—	**MP** Type Holder (➲C019)
	PV322	9.52	3.18	0.8	0.8	—	—	
	PV323	9.52	3.18	1.2	1.2	—	—	
	**SPSVN32**	8.06	3.18	0.3	0.3	—	—	**SP** Type Holder (➲C030) **HSK** Tool Holder (➲H001)

SPARE PARTS

SHIM

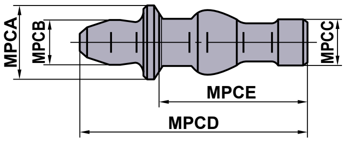
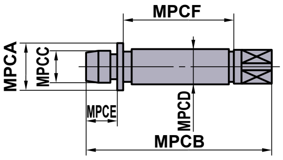
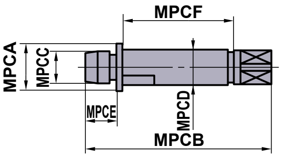
Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**STASX400N**	11.00	3.00	0.4	0.4	0.4	0.4	**ASX400** (➲K080)
	**STASX445N**	10.76	3.00	–	–	–	–	**ASX445** (➲K026)
	**WPSTN33**	9.3	4.76	0.8	0.4	1.2	–	**WP** Type Holder (➲C017)
	WPSTN43	12.50	4.76	0.8	0.4	1.2	–	
	* **WPSWC43**	12.50	4.76	0.4	0.8	1.2	–	
	WPSWN43	12.50	4.76	0.4	0.8	1.2	–	**WP** Type Holder (➲C023)

SHIM PIN AND CLAMP LEVER

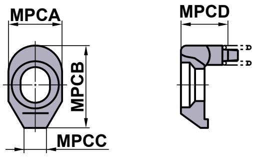
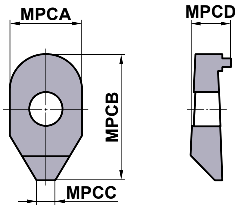
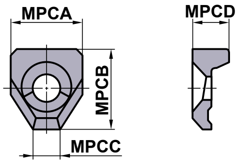
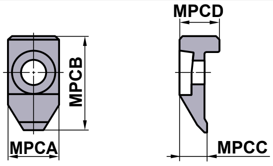
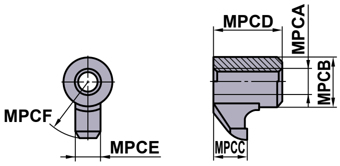
Geometry	Order Number	Dimensions (mm)					Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	
	**BCP141**	3.0	1.4	5.6	–	–	**SP** Type Holder (➲C030)
	BCP201	4.3	2	7.4	–	–	**F** Type Boring Bar (➲E029)
	BCP202	4.3	2	6.4	–	–	**HSK** Tool Holder (➲H013)
	**CCP33**	6.5	3.66	M5×0.8	18.5	3	**WP** Holder (➲C017)
	CCP34	7.5	5.0	M6×1.0	18.5	3	
	CCP44	7.5	5.0	M5×0.8	14.2	3	
	**LLCL12S**	2.1	9.3	5.6	–	–	**LL** Type Holder (➲C016)
	LLCL13	3.6	10	12.5	–	–	**P** Type Boring Bar (➲E039)
	LLCL13S	3.6	10	7.8	–	–	**HSK** Tool Holder (➲H001)
	LLCL14	4.7	13.4	13.2	–	–	
	LLCL14S	4.7	13.6	12.2	–	–	
	LLCL15	6.0	19	17	–	–	
	LLCL16	7.5	20.8	21	–	–	
	LLCL18	8.6	25.4	25.2	–	–	
	LLCL23	3.6	12.0	11.5	–	–	
	LLCL23S	3.6	11.6	9.5	–	–	
	LLCL24	4.7	16.2	14.8	–	–	
	LLCL25	6.0	17.1	17	–	–	
	**LLCL110**	3.0	10.7	11.6	–	–	
	LLCL112	3.5	13	13.5	–	–	
	LLCL116	4.5	18.5	18	–	–	
	LLCL120	5.6	20.3	19	–	–	
	LLCL125	6	24	24	–	–	
	LLCL132	8	30	27	–	–	
	**LLP13**	5.55	4.85	5.3	–	–	**LL** Type Holder (➲C008)
	LLP14	7.25	6.55	5.8	–	–	**DOUBLE CLAMP** Holder (➲C008)
	LLP15	8.8	8.05	8.6	–	–	**DOUBLE CLAMP DIMPLE BAR** (➲E015)
	LLP16	10.85	9.85	11.1	–	–	**P** Type Boring Bar (➲E038)
	LLP18	15.35	13.05	12.0	–	–	**HSK** Tool Holder (➲H001)
	LLP23	5.55	4.85	6.8	–	–	
	LLP24	7.25	6.55	9.1	–	–	
	**MP6**	11.9	7.8	M10×1	22.1	15	**DOUBLE CLAMP** Holder (➲C009) (For Heavy Cutting)

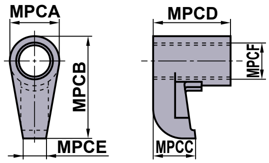
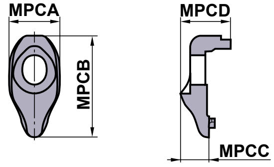
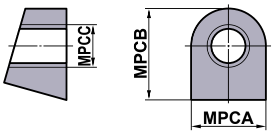
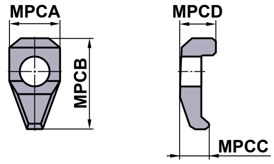
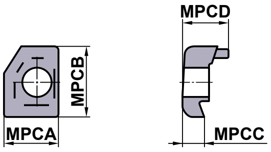
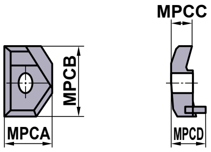
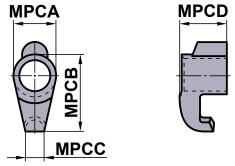
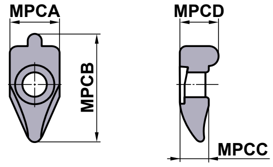
SPARE PARTS

LOCK PIN

Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**P11S**	6	3.7	4	17	11.1	–	**MP** Type Holder (➲C019)
	P21S	7.5	4.9	4.5	17.2	11.5	–	
	**P221US**	4	18	2.11	3.5	3.3	7.7	
	**P333WS**	5.75	24	3.64	5.0	4.9	11.3	
	P434W	7.75	30	5.03	7.0	4.9	16.8	

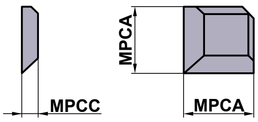
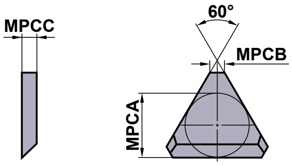
CLAMP BRIDGE

Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**AMS3**	7	12	3	3.3	–	–	**Profile** Holder (➲C032) **AJX** (➲K196)
	AMS4	9	13.5	3	3.8	–	–	
	AMS5	10	15	3.5	5	–	–	
	**CA161**	13	20	6	8	–	–	
	**CCK13**	15	18.5	6	9	–	–	**WP** Type Holder (➲C017)
	CCK14	19	22	8	9.5	–	–	
	**CCTC1**	13	25	7	10.2	–	–	
	**CK231**	M6×1	8	4	7.5	4.5	9.5	
	CK232	M6×1	8	4.5	8	4.5	11.5	
	CK341	M8×1	11	5.5	13.5	6	13.5	
	CK342	M8×1	11	6	14	6	16.5	

Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	**MPCB**	**MPCC**	**MPCD**	**MPCE**	**MPCF**	
	**CKW6**	10.9	22.5	9.2	16.8	5	M8×1	**DOUBLE CLAMP** Holder (➲C009) (For Heavy Cutting)
	**DCK2211**	11	22	6.57	11.1	–	–	**DOUBLE CLAMP** Holder (➲C008) **DOUBLE CLAMP DIMPLE BAR** (➲E015) **HSK** Tool Holder (➲H001)
	DCK2613	13	26.5	7.35	12.9	–	–	
	DCK3113	13	31	9	14.5	–	–	
	**KGC1**	12.0	15.0	M7×0.75	–	–	–	
	**LK1**	8	14.3	4.5	5.9	–	–	
	**MTK1R/L**	13	17.5	5	12	–	–	**MG** Type Holder (➲F132) **MT** Type Holder (➲G024) **HSK** Tool Holder (➲H001)
	**MTK2R/L**	18	28	7	14	–	–	
	**SETK51**	6.8	14.5	2.9	8	–	–	**MMTE** Type Holder (➲G019) **MMTI** Type Holder (➲G026) **HSK** Tool Holder (➲H001)
	SETK61	8.9	18.1	4.1	8.6	–	–	
	**SRK1R**	9.4	21	5.5	7.5	–	–	

SPARE PARTS

BREAKER PIECE

Geometry	Order Number	Dimensions (mm)					Tool Holder
		MPCA	MPCB	MPCC	IC	LBB	
	**CBS3D**	8.0	–	1.5	9.525	1.5	
	CBS4D	10.2	–	2.5	12.70	2.5	
	**CBT2N**	5.67	1.4	1.5	6.35	1.0	**F** Type Boring Bar (➲E029) *For positive inserts, the breaker width is 0.5mm larger than the figures in the list.
	CBT3F	8.53	1.4	2.5	9.525	1.5	
	CBT4N	11.07	1.4	2.5	12.70	2.5	

ANTI SEIZE LUBRICANT

ANTI SEIZE LUBRICANT

Shape	Order Number	Stock	Volume (g)
	**MK1K**	★	20
	**MK1KS**	★	3

★ : Inventory maintained in Japan.

Memo

TECHNICAL DATA

ISO13399 COMPLIANCE

List of Property Symbols Complying with ISO13399

Alphabetical

Source: ISO13399 standard
URL : https://www.iso.org/search/x/query/13399

ISO13399 Property Symbols	Content
ADJLX	Adjustment limit maximum
ADJRG	Adjustment range
ALF	Clearance angle radial
ALP	Clearance angle axial
AN	Clearance angle major
ANN	Clearance angle minor
APMX	Depth of cut maximum
AS	Clearance angle wiper edge
ASP	Adjusting screw protrusion
AZ	Plunge depth maximum
B	Shank width
BBD	Balanced by design
BCH	Corner chamfer length
BD	Body diameter
BDX	Body diameter maximum
BHCC	Bolt hole circle count
BHTA	Body half taper angle
BMC	Body material code
BS	Wiper edge length
BSR	Wiper edge radius
CASC	Cartridge size code
CB	Chipbreaker face count
CBDP	Connection bore depth
CBMD	Chipbreaker manufacturers designation
CBP	Chipbreaker property
CCMS	Connection code machine side
CCWS	Connection code workpiece side
CCP	Chamfer corner property
CDI	Insert cutting diameter
CDX	Cutting depth maximum
CEATC	Tool cutting edge angle type code
CECC	Cutting edge condition code
CEDC	Cutting edge count
CF	Spot chamfer
CHW	Corner chamfer width
CICT	Cutting item count
CNC	Corner count
CND	Coolant entry diameter
CNSC	Coolant entry style code
CNT	Coolant entry thread size
CP	Coolant pressure
CRE	Spot radius
CRKS	Connection retention knob thread size
CSP	Coolant supply property
CTP	Coating property
CTX	Cutting point translation X-direction
CTY	Cutting point translation Y-direction
CUTDIA	Work piece parting diameter maximum
CUB	Connection unit basis
CW	Cutting width
CWX	Cutting width maximum
CXD	Coolant exit diameter

ISO13399 Property Symbols	Content
CXSC	Coolant exit style code
CZC	Connection size code
D1	Fixing hole diameter
DAH	Diameter access hole
DAXN	Axial groove outside diameter minimum
DAXX	Axial groove outside diameter maximum
DBC	Diameter bolt circle
DC	Cutting diameter
DCB	Connection bore diameter
DCBN	Connection bore diameter minimum
DCBX	Connection bore diameter maximum
DCC	Design configuration style code
DCCB	Counterbore diameter connection bore
DCIN	Cutting diameter internal
DCINN	Cutting diameter internal minimum
DCINX	Cutting diameter internal maximum
DCN	Cutting diameter minimum
DCON	Connection diameter
DCONMS	Connection diameter machine side
DCONWS	Connection diameter workpiece side
DCSC	Cutting diameter size code
DCSFMS	Contact surface diameter machine side
DCX	Cutting diameter maximum
DF	Flange diameter
DHUB	Hub diameter
DMIN	Minimum bore diameter
DMM	Shank diameter
DN	Neck diameter
DRVA	Drive angle
EPSR	Insert included angle
FHA	Flute helix angle
FHCSA	Fixing hole countersunk angle
FHCSD	Fixing hole countersunk diameter
FLGT	Flange thickness
FMT	Form type
FXHLP	Fixing hole property
GAMF	Rake angle radial
GAMN	Rake angle normal
GAMO	Rake angle orthogonal
GAMP	Rake angle axial
GAN	Insert rake angle
H	Shank height
HA	Thread height theoretical
HAND	Hand
HBH	Head bottom offset height
HBKL	Head back offset length
HBKW	Head back offset width
HBL	Head bottom offset length
HC	Thread height actual
HF	Functional height
HHUB	Hub height
HTB	Body height
IC	Inscribed circle diameter
IFS	Insert mounting style code
IIC	Insert interface code
INSL	Insert length
KAPR	Tool cutting edge angle
KCH	Corner chamfer angle

ISO13399 Property Symbols	Content
KRINS	Cutting edge angle major
KWW	Keyway width
KYP	Keyway property
L	Cutting edge length
LAMS	Inclination angle
LB	Body length
LBB	Chipbreaker width
LBX	Body length maximum
LCCB	Counterbore depth connection bore
LCF	Length chip flute
LDRED	Reduced body diameter length
LE	Cutting edge effective length
LF	Functional length
LFA	a dimension on lf
LH	Head length
LPR	Protruding length
LS	Shank length
LSC	Clamping length
LSCN	Clamping length minimum
LSCX	Clamping length maximum
LTA	LTA length (length from MCS to CRP)
LU	Usable length
LUX	Usable length maximum
M	m-dimension
M2	Distance between the nominal inscribed circle and the corner of an insert that has the secondary included angle
MHA	Mounting hole angle
MHD	Mounting hole distance
MHH	Mounting hole height
MIID	Master insert identification
MTP	Clamping type code
NCE	Cutting end count
NOF	Flute count
NOI	Insert index count
NT	Tooth count
OAH	Overall height
OAL	Overall length
OAW	Overall width
PDPT	Profile depth insert
PDX	Profile distance ex
PDY	Profile distance ey
PFS	Profile style code
PL	Point length
PNA	Profile included angle
PRFRAD	Profile radius
PSIR	Tool lead angle
PSIRL	Cutting edge angle major left hand
PSIRR	Cutting edge angle major right hand
RAL	Relief angle left hand
RAR	Relief angle right hand
RCP	Rounded corner property
RE	Corner radius
REL	Corner radius left hand
RER	Corner radius right hand
RMPX	Ramping angle maximum
RPMX	Rotational speed maximum
S	Insert thickness
S1	Insert thickness total
SC	Insert shape code
SDL	Step diameter length
SIG	Point angle

ISO13399 Property Symbols	Content
SSC	Insert seat size code
SX	Shank cross section shape code
TC	Tolerance class insert
TCE	Tipped cutting edge code
TCTR	Thread tolerance class
TD	Thread diameter
THFT	Thread form type
THL	Threading length
THLGTH	Thread length
THSC	Tool holder shape code
THUB	Hub thickness
TP	Thread pitch
TPI	Threads per inch
TPIN	Threads per inch minimum
TPIX	Threads per inch maximum
TPN	Thread pitch minimum
TPT	Thread profile type
TPX	Thread pitch maximum
TQ	Torque
TSYC	Tool style code
TTP	Thread type
ULDR	Usable length diameter ratio
UST	Unit system
W1	Insert width
WEP	Wiper edge property
WF	Functional width
WF2	Distance between the cutting reference point and the front seating surface of a turning tool
WFS	Functional width secondary
WT	Weight of item
ZEFF	Face effective cutting edge count
ZEFP	Peripheral effective cutting edge count
ZNC	Cutting edge centre count
ZNF	Face mounted insert count
ZNP	Peripheral mounted insert count

List of Reference Symbols Complying with ISO13399

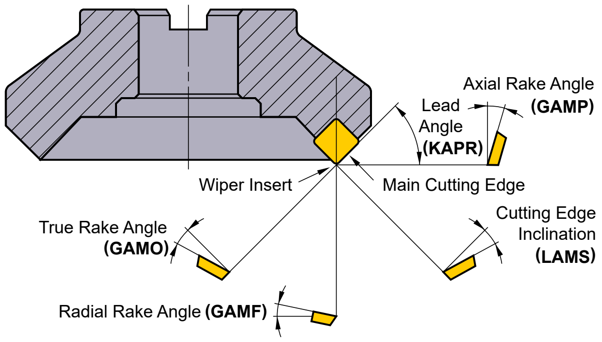
ISO13399 Reference Symbols	Content
CIP	Coordinate system In Process
CRP	Cutting Reference Point
CSW	Coordinate System Workpiece side
MCS	Mounting Coordinate System
PCS	Primary Coordinate System

TROUBLE SHOOTING FOR FACE MILLING

Trouble		Factors \ Solution	Insert Grade Selection				Cutting Conditions						Style and Design of the Tool									Machine, Installation of Tool		
			Select a harder grade	Select a tougher grade	Select a grade with better thermal shock resistance	Select a grade with better adhesion resistance	Cutting speed	Feed	Depth of cut	Engage angle	Coolant: Do not use water-soluble cutting fluid	Coolant: Determine dry or wet cutting	Rake	Corner angle	Honing strengthens the cutting edge	Cutter diameter	Number of teeth	Wider chip pocket	Use of a wiper insert	Improve run-out accuracy	Cutter rigidity	Increase clamping rigidity of the tool and workpiece	Decrease overhang	Decrease power and machine backlash
							Up ↗ Down ↘			↗ Up			Up ↗ Down ↘				Larger ↗ Smaller ↘							
Deterioration of Tool Life	Insert wear quickly generated	Improper tool grade	●																					
		Improper cutting edge geometry											●↗	●↗	●↘					●				
		Improper cutting speed					●↘					● Wet												
	Chipping or fracturing of cutting edge	Improper tool grade		●																				
		Improper cutting conditions						●↘	●↘															
		Lack of cutting edge strength.													●↗									
		Thermal crack occurs			●		●↘	●↘	●↘		●	● Dry												
		Build-up edge occurs				●	●↗	●↗			●	● Wet												
		Lack of rigidity																			●	●	●	●
Deterioration of Surface Finish	Poor finished surface	Improper cutting conditions	●				●↘	●↘	●↘															
		Welding occurs				●	●↗				●	● Wet	●↗		●↘									
		Poor run-out accuracy																	●	●				
		Chattering					●↘	●↘	●↘	●↗			●↗		●↘		●↘				●	●	●	●
	Not parallel or irregular surface	Workpiece bending						●↘	●↘				●↗	●↘	●↘		●↘					●		
		Tool clearance																			●	●	●	●
		Large back force											●↗	●↘	●↘		●↘							
Burr, Workpiece Chipping	Burrs, chipping	Chip thickness is too large					●↗	●↘	●↘															
		Cutter diameter is too large								●↗						●↘								
		Low sharpness											●↗		●↘									
		A large corner angle												●↘										
	Workpiece edge chipping	Improper cutting conditions						●↘	●↘															
		Low sharpness											●↗		●↘									
		A small corner angle												●↗										
		Chattering					●↘	●↘	●↘	●↗			●↗		●↘		●↘				●	●	●	●
Chip Control	Poor chip dispersal, chip jamming and chip packing	Welding occurs					●↗																	
		Chip thickness is too thin					●↗	●↗																
		Cutter diameter is too small														●↘								
		Poor chip disposal									●	● Wet					●↘	●						

FUNCTION OF TOOL FEATURES FOR FACE MILLING

■FUNCTION OF EACH CUTTING EDGE ANGLE IN FACE MILLING

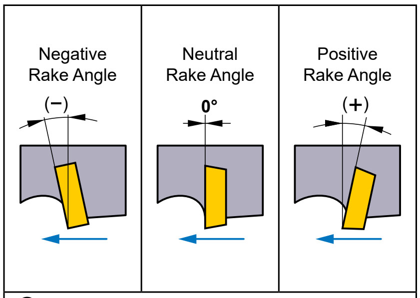


Each Cutting Edge Angle in Face Milling

Type of Angle	Symbol	Function	Effect
Axial Rake Angle	GAMP	Determines chip disposal direction.	**Positive** : Excellent machinability.
Radial Rake Angle	GAMF	Determines sharpness.	**Negative** : Excellent chip disposal.
Lead Angle	KAPR	Determines chip thickness.	**Small** : Thin chips and small cutting impact. Large back force.
True Rake Angle	GAMO	Determines actual sharpness.	**Positive (large)** : Excellent machinability. Minimal welding. **Negative (large)** : Poor machinability. Strong cutting edge.
Cutting Edge Inclination	LAMS	Determines chip disposal direction.	**Positive (large)** : Excellent chip disposal. Low cutting edge strength.

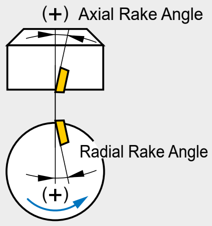
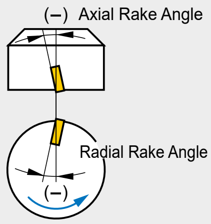
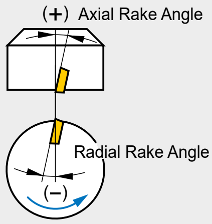
■STANDARD INSERTS

● Positive and Negative Rake Angle

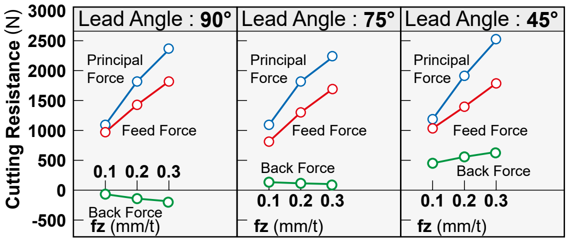


- ● Insert shape whose cutting edge precedes is a positive rake angle.
- ● Insert shape whose cutting edge follows is a negative rake angle.

● Standard Cutting Edge Shape

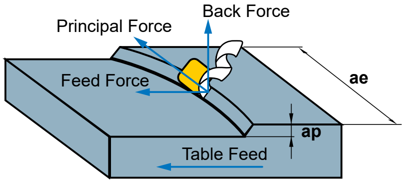
Standard Cutting Edge Combinations		 Double Positive (DP Edge Type)	 Double Negative (DN Edge Type)	 Negative/Positive (NP Edge Type)
Axial Rake Angle (GAMP)		Positive (+)	Negative (−)	Positive (+)
Radial Rake Angle (GAMF)		Positive (+)	Negative (−)	Negative (−)
Insert Used		Positive Insert (One Sided Use)	Negative Insert (Double Sided Use)	Positive Insert (One Sided Use)
Material	**Steel**	●	−	●
	Cast Iron	−	●	●
	Aluminium Alloy	●	−	−
	Difficult-to-Cut Material	●	−	●

■LEAD ANGLE (KAPR) AND CUTTING CHARACTERISTICS



Workpiece : **DIN 41CrMo4 (281HB)**
Tool : **ø125mm** Single Insert
Cutting Conditions : **Vc=125.6 m/min ap=4 mm ae=110mm**

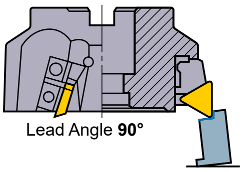
Cutting Resistance Comparison between Different Insert Shapes



Three Cutting Resistance Forces in Milling

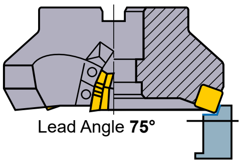
Lead Angle
90°

Back force is in the minus direction. Lifts the workpiece when workpiece clamp rigidity is low.



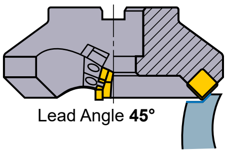
Lead Angle
75°

Lead angle 75° is recommended for face milling of workpieces with low rigidity such as thin workpieces.



Lead Angle
45°

The largest back force.
Bends thin workpieces and lowers cutting accuracy.
*Prevents workpiece edge chipping when cast iron cutting.



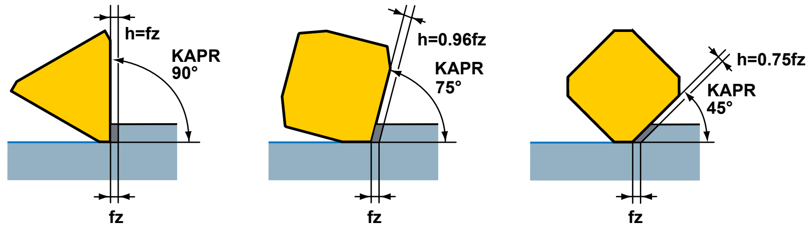
* Principal force : Force is in the opposite direction of face milling rotation.
* Back force : Force that pushes in the axial direction.
* Feed force : Force is in the feed direction and is caused by table feed.

FUNCTION OF TOOL FEATURES FOR FACE MILLING

■LEAD ANGLE AND TOOL LIFE

●Lead angle and chip thickness

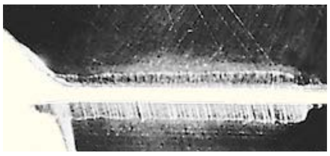
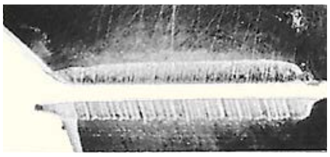
When the depth of cut and feed per tooth, fz, are fixed, the smaller the lead angle (KAPR) is, then the thinner the chip thickness (h) becomes (for a 45° KAPR, it is approx. 75% that of a 90° KAPR). Therefore as the KAPR increases, the cutting resistance decreases resulting in longer tool life. Note however, if the chip thickness is too large then the cutting resistance can increase leading to vibrations and shortened tool life.



Effects on chip thickness due to the variation of lead angles

●Lead angle and crater wear

The table below shows wear patterns for different lead angles. When comparing crater wear for 90° and 45° lead angles, it can be clearly seen that the crater wear for 90° lead angle is larger. This is because if the chip thickness is relatively large, the cutting resistance increases and so promotes crater wear. As the crater develops then cutting edge strength will reduce and lead to fracturing.

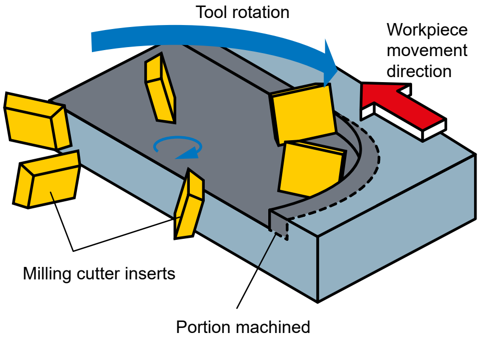
	Lead Angle **90°**	Lead Angle **75°**	Lead Angle **45°**
Vc=100m/min **Tc=69min**			
Vc=125m/min **Tc=55min**			
Vc=160m/min **Tc=31min**			

Workpiece : **Alloy steel (287HB)**
Tools : **DC=125 mm**
Insert : **M20**Cemented Carbide
Cutting Conditions : **ap=3.0 mm**
ae=110 m
fz=0.2 mm/t
Dry Cutting

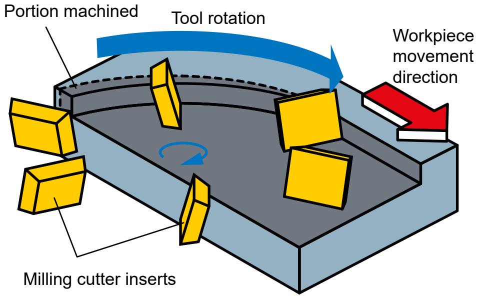
■UP AND DOWN CUT (CLIMB) MILLING

When choosing a method to machine, up cutting or down cut milling (climb milling) is decided by the conditions of the machine tool, the milling cutter and the application. However, it is said that in terms of tool life, down cut (climb) milling is more advantageous.

Up Cut

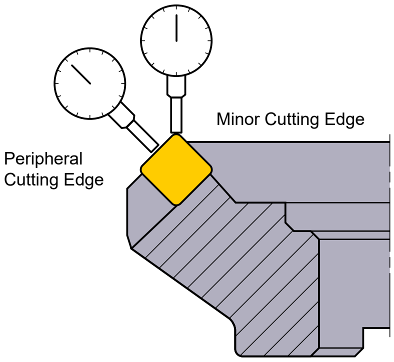


Down Cut



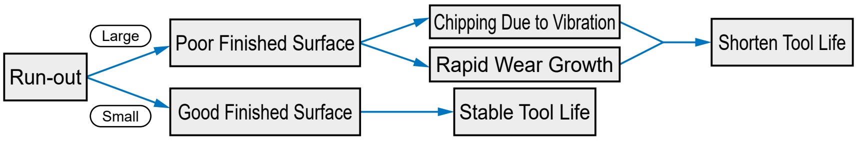
■FINISHED SURFACE

● Cutting Edge Run-out Accuracy

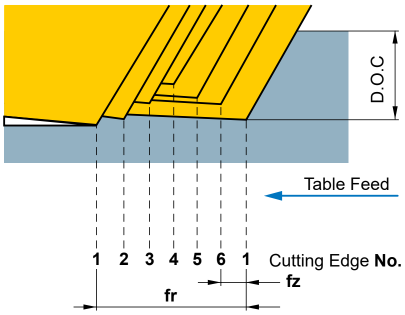


Cutting Edge Run-out and Accuracy in Face Milling

Cutting edge run-out accuracy of indexable inserts on the cutter body greatly affects the surface finish and tool life.



● Improve Finished Surface Roughness



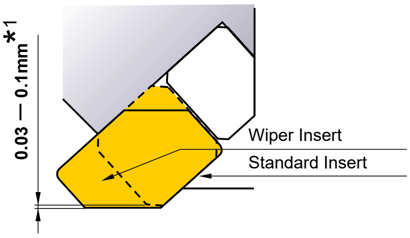
fz : Feed per Tooth
fr : Feed per Revolution

Sub Cutting Edge Run-out and Finished Surface

Since Mitsubishi Materials' normal sub cutting edge width is 1.4 mm, and the sub cutting edges are set parallel to the face of a milling cutter, theoretically the finished surface accuracy should be maintained even if run-out accuracy is low.

Actual Problems	Countermeasure
· Cutting edge run-out. · Sub cutting edge inclination. · Milling cutter body accuracy. · Spare parts accuracy. · Welding, vibration, chattering.	Wiper Insert

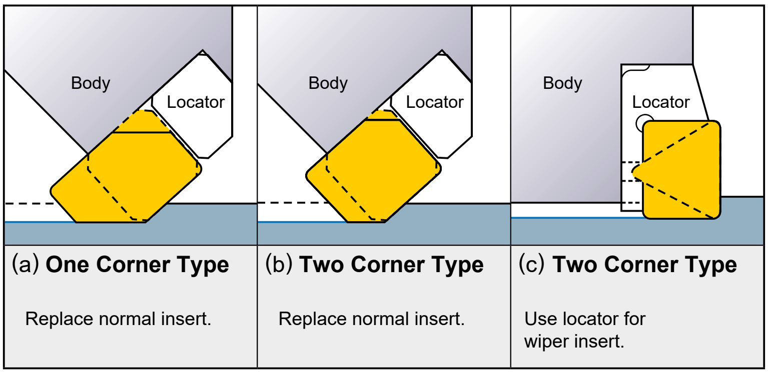
* Machine a surface that has already been machined with normal inserts in order to produce a smooth finished surface.



- Replace one or two normal inserts with wiper inserts.
- Wiper inserts are set to protrude by 0.03−0.1 mm from the standard inserts.

*1.Value depends on the cutting edge and insert combination.

● How to Set a Wiper Insert



(a) **One Corner Type**
Replace normal insert.

(b) **Two Corner Type**
Replace normal insert.

(c) **Two Corner Type**
Use locator for wiper insert.

- ● Sub cutting edge length has to be longer than the feed per revolution.
- * A sub cutting edge that is too long causes chatter.
- ● When the cutter diameter is large and feed per revolution is longer than the sub cutting edge of the wiper insert, use two or three wiper inserts.
- ● When using more than 1 wiper insert, run-out needs to be eliminated.
- ● Use a high hardness grade (high wear resistance) for wiper inserts.

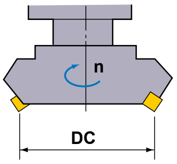
FORMULAE FOR FACE MILLING

■CUTTING SPEED (Vc)

$$Vc = \frac{\pi \cdot DC \cdot n}{1000}\ (m/min)$$

Vc (m/min) : Cutting Speed
π (3.14) : Pi
DC(mm) : Cutter Diameter
n (min^{-1}) : Main Axis Spindle Speed

*Divide by 1000 to change to m from mm.



(Example) What is the cutting speed when the main axis spindle speed is 350min^{-1} and the cutter diameter is ϕ125 ?

(Answer) Substitute π=3.14, DC=125, n=350 into the formula.

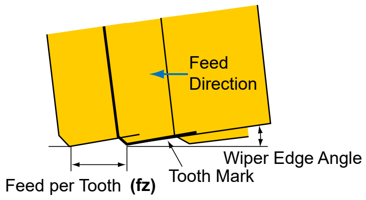
$$Vc = \frac{\pi \cdot DC \cdot n}{1000} = \frac{3.14 \times 125 \times 350}{1000} = 137.4\ m/min$$

The cutting speed is 137.4 m/min.

■FEED PER TOOTH (fz)

$$fz = \frac{Vf}{z \cdot n}\ (mm/t.)$$

fz (mm/t.) : Feed per Tooth
Vf (mm/min) : Table Feed per Min.
n (min^{-1}) : Main Axis Spindle Speed (Feed per Revolution **f = z** x **fz**)
z : Insert Number



(Example) What is the feed per tooth when the main axis spindle speed is 500min^{-1}, insert number is 10, and the table feed is 500mm/min ?

(Answer) Substitute the above figures into the formula.

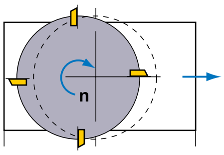
$$fz = \frac{Vf}{z \times n} = \frac{500}{10 \times 500} = 0.1\ mm/t.$$

The answer is 0.1mm/t.

■TABLE FEED (Vf)

$$Vf = fz \cdot z \cdot n\ (mm/min)$$

Vf (mm/min) : Table Feed per Min.
fz (mm/t.) : Feed per Tooth
n (min^{-1}) : Main Axis Spindle Speed
z : Insert Number



(Example) What is the table feed when feed per tooth is 0.1 mm/t., insert number is 10, and the main axis spindle speed is 500 min^{-1}?

(Answer) Substitute the above figures into the formula.

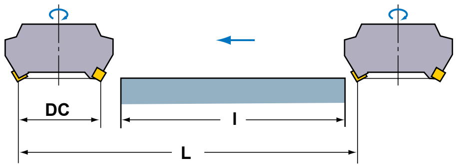
$$Vf = fz \times z \times n = 0.1 \times 10 \times 500 = 500\ mm/min$$

The table feed is 500 mm/min.

■CUTTING TIME (Tc)

$$Tc = \frac{L}{Vf}\ (min)$$

Tc (min) : Cutting Time
Vf (mm/min) : Table Feed per Min.
L (mm) : Total Table Feed Length (Workpiece Length: **l**+Cutter Diameter : **DC**)



(Example) What is the cutting time required for finishing 100mm width and 300mm length surface of a cast iron (GG20) block when the cutter diameter is ϕ200, the number of inserts is 16, the cutting speed is 125 m/min, and feed per tooth is 0.25 mm/t.. (spindle speed is 200 min^{-1})

(Answer) Calculate table feed per min Vf=0.25×16×200=800 mm/min
Calculate total table feed length. L=300+200=500 mm
Substitute the above answers into the formula.

$$Tc = \frac{500}{800} = 0.625\ (min)$$

0.625×60=37.5 (sec). The answer is 37.5 sec.

■CUTTING POWER (Pc)

$$Pc = \frac{ap \cdot ae \cdot Vf \cdot Kc}{60 \times 10^6 \times \eta}$$

Pc (kW) : Actual Cutting Power
ae (mm) : Cutting Width
Kc (MPa) : Specific Cutting Force
ap (mm) : Depth of Cut
Vf (mm/min) : Table Feed per Min.
η : (Machine Coefficient)

(Example) What is the cutting power required for milling tool steel at a cutting speed of 80m/min. With depth of cut 2mm, cutting width 80mm, and table feed 280mm/min by ϕ250 cutter with 12 inserts. Machine coefficient 80%.

(Answer) First, calculate the spindle speed in order to obtain the feed per tooth.

$$n = \frac{1000Vc}{\pi DC} = \frac{1000 \times 80}{3.14 \times 250} = 101.91 \text{ min}^{-1}$$

Feed per Tooth $fz = \frac{Vf}{z \times n} = \frac{280}{12 \times 101.9} = 0.228$ mm/t

Substitute the specific cutting force into the formula.

$$Pc = \frac{2 \times 80 \times 280 \times 1800}{60 \times 10^6 \times 0.8} = 1.68 \text{ kW}$$

●Kc

Material	Tensile Strength (MPa) and Hardness	Specific Cutting Force Kc (MPa)				
		0.1mm/t	0.2mm/t	0.3mm/t	0.4mm/t	0.6mm/t
Mild Steel	**520**	2200	1950	1820	1700	1580
Medium Steel	**620**	1980	1800	1730	1600	1570
Hard Steel	**720**	2520	2200	2040	1850	1740
Tool Steel	**670**	1980	1800	1730	1700	1600
Tool Steel	**770**	2030	1800	1750	1700	1580
Chrome Manganese Steel	**770**	2300	2000	1880	1750	1660
Chrome Manganese Steel	**630**	2750	2300	2060	1800	1780
Chrome Molybdenum Steel	**730**	2540	2250	2140	2000	1800
Chrome Molybdenum Steel	**600**	2180	2000	1860	1800	1670
Nickel Chrome Molybdenum Steel	**940**	2000	1800	1680	1600	1500
Nickel Chrome Molybdenum Steel	**352HB**	2100	1900	1760	1700	1530
Austenitic Stainless Steel	**155HB**	2030	1970	1900	1770	1710
Cast Iron	**520**	2800	2500	2320	2200	2040
Hard Cast Iron	**46HRC**	3000	2700	2500	2400	2200
Meehanite Cast Iron	**360**	2180	2000	1750	1600	1470
Grey Cast Iron	**200HB**	1750	1400	1240	1050	970
Brass	**500**	1150	950	800	700	630
Light Alloy (Al-Mg)	**160**	580	480	400	350	320
Light Alloy (Al-Si)	**200**	700	600	490	450	390
Light Alloy (Al-Zn-Mg-Cu)	**570**	880	840	840	810	720

TROUBLE SHOOTING FOR END MILLING

Trouble		Factors \ Solution	Insert Grade Selection	Cutting Conditions									Style and Design of the Tool						Machine, Installation of Tool					
										Coolant														
			Coated tool	Cutting speed	Feed	Depth of cut	Pick feed	Down cut	Use air blow	Increase coolant quantity	Do not use water-soluble cutting fluid	Determine dry or wet cutting	Helix angle	Insert number	Concavity angle of end cutting edge	Tool diameter	Cutter rigidity	Wider chip pocket	Shorten tool overhang	Increase tool installation accuracy	Increase spindle collet run-out accuracy	Collet inspection and exchange	Increase chuck clamping power	Increase work clamping rigidity
				Up ↗ Down ↘			↘ Down						Up ↗ Larger Down ↘ Smaller											
Deterioration of Tool Life	Large peripheral cutting edge wear	Non-coated end mill is used	●																					
		A small number of cutting edges												↗●										
		Improper cutting conditions		●↘							●													
		Up cut milling is used						Down Cut																
	Severe chipping	Improper cutting conditions																						
		Fragile cutting edge															●							
		Insufficient clamping force																				●	●	
		Low clamping rigidity																	●	●	●	●	●	●
	Breakage during cutting	Improper cutting conditions				●↘																		
		Low end mill rigidity														↗●	●							
		Overhang longer than necessary				●↘													●					
		Chip jamming								●								●						
Deterioration of Surface Finish	Vibration during cutting	Improper cutting conditions		●↘	●↘																			
		Low end mill rigidity											↗●	↗●		↗●	●							
		Low clamping rigidity																	●	●	●	●	●	●
	Poor surface finish on walls	Large cutting edge wear	●																					
		Improper cutting conditions		●↘		●↘																		
		Chip packing							●	●		● Wet												
	Poor surface finish on faces	The end cutting edge does not have a concave angle			●↘	●↘									↗●									
		Large pick feed					●↘																	
	Out of vertical	Large cutting edge wear	●																					
		Improper cutting conditions			●↘	●↘																		
		Lack of end mill rigidty											↗●	↗●		↗●	●							
	Poor dimensional accuracy	Improper cutting conditions		●↘	●↘	●↘																		
		Low clamping rigidity																	●	●	●	●	●	●
Burrs, Chipping, etc.	Burr or chipping occurs	Improper cutting conditions			●↘	●↘																		
		Large helix angle											●↘											
	Quick bur formation	Notch wear	●																					
		Improper cutting conditions		●↘	↗●																			
Poor Chip Dispersal	Chip packing	Metal removal too large			●↘	●↘																		
		Lack of chip pocket												●↘				●						

Memo

METALLIC MATERIALS CROSS REFERENCE LIST

■CARBON STEEL

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.0038	RSt.37-2	4360 40 C	–	E 24-2 Ne	–	–	1311	STKM 12A STKM 12C	A570.36	15
1.0401	C15	080M15	–	CC12	C15, C16	F.111	1350	–	1015	15
1.0402	C22	050A20	2C	CC20	C20, C21	F.112	1450	–	1020	20
1.0715	9SMn28	230M07	1A	S250	CF9SMn28	F.2111 11SMn28	1912	SUM22	1213	Y15
1.0718	9SMnPb28	–	–	S250Pb	CF9SMnPb28	11SMnPb28	1914	SUM22L	12L13	–
1.0722	10SPb20	–	–	10PbF2	CF10Pb20	10SPb20	–	–	–	–
1.0736	9SMn36	240M07	1B	S300	CF9SMn36	12SMn35	–	–	1215	Y13
1.0737	9SMnPb36	–	–	S300Pb	CF9SMnPb36	12SMnP35	1926	–	12L14	–
1.1141	Ck15	080M15	32C	XC12	C16	C15K	1370	S15C	1015	15
1.1158	Ck25	–	–	–	–	–	–	S25C	1025	25
1.8900	StE380	4360 55 E	–	–	FeE390KG	–	2145	–	A572-60	–
1.0501	C35	060A35	–	CC35	C35	F.113	1550	–	1035	35
1.0503	C45	080M46	–	CC45	C45	F.114	1650	–	1045	45
1.0726	35S20	212M36	8M	35MF4	–	F210G	1957	–	1140	–
1.1157	40Mn4	150M36	15	35M5	–	–	–	–	1039	40Mn
1.1167	36Mn5	–	–	40M5	–	36Mn5	2120	SMn438(H)	1335	35Mn2
1.1170	28Mn6	150M28	14A	20M5	C28Mn	–	–	SCMn1	1330	30Mn
1.1183	Cf35	060A35	–	XC38TS	C36	–	1572	S35C	1035	35Mn
1.1191	Ck45	080M46	–	XC42	C45	C45K	1672	S45C	1045	Ck45
1.1213	C50	060A52	–	XC48TS	C53	–	1674	S50C	1050	50
1.0535	C55	070M55	9	–	C55	–	1655	–	1055	55
1.0601	C60	080A62	43D	CC55	C60	–	–	–	1060	60
1.1203	Ck55	070M55	–	XC55	C50	C55K	–	S55C	1055	55
1.1221	Ck60	080A62	43D	XC60	C60	–	1678	S58C	1060	60Mn
1.1274	Ck101	060A96	–	XC100	–	F.5117	1870	–	1095	–
1.1545	C105W1	BW1A	–	Y105	C36KU	F.5118	1880	SK3	W1	–
1.1545	C105W1	BW2	–	Y120	C120KU	F.515	2900	SUP4	W210	–

■ALLOY STEEL

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.0144	St.44.2	4360 43 C	–	E28-3	–	–	1412	SM400A, SM400B SM400C	A573-81	–
1.0570	St52-3	4360 50 B	–	E36-3	Fe52BFN Fe52CFN	–	2132	SM490A, SM490B SM490C	–	–
1.0841	St52-3	150M19	–	20MC5	Fe52	F.431	2172	–	5120	–
1.0904	55Si7	250A53	45	55S7	55Si8	56Si7	2085	–	9255	55Si2Mn
1.0961	60SiCr7	–	–	60SC7	60SiCr8	60SiCr8	–	–	9262	–
1.3505	100Cr6	534A99	31	100C6	100Cr6	F.131	2258	SUJ2	ASTM 52100	Gr15, 45G
1.5415	15Mo3	1501-240	–	15D3	16Mo3KW	16Mo3	2912	–	ASTM A204Gr.A	–
1.5423	16Mo5	1503-245-420	–	–	16Mo5	16Mo5	–	–	4520	–
1.5622	14Ni6	–	–	16N6	14Ni6	15Ni6	–	–	ASTM A350LF5	–
1.5662	X8Ni9	1501-509-510	–	–	X10Ni9	XBNi09	–	–	ASTM A353	–
1.5710	36NiCr6	640A35	111A	35NC6	–	–	–	SNC236	3135	–
1.5732	14NiCr10	–	–	14NC11	16NiCr11	15NiCr11	–	SNC415(H)	3415	–
1.5752	14NiCr14	655M13	36A	12NC15	–	–	–	SNC815(H)	3415, 3310	–
1.6523	21NiCrMo2	805M20	362	20NCD2	20NiCrMo2	20NiCrMo2	2506	SNCM220(H)	8620	–
1.6546	40NiCrMo22	311-Type 7	–	–	40NiCrMo2(KB)	40NiCrMo2	–	SNCM240	8740	–
1.6587	17CrNiMo6	820A16	–	18NCD6	–	14NiCrMo13	–	–	–	–
1.7015	15Cr3	523M15	–	12C3	–	–	–	SCr415(H)	5015	15Cr

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.7045	42Cr4	–	–	–	–	42Cr4	2245	SCr440	5140	40Cr
1.7176	55Cr3	527A60	48	55C3	–	–	–	SUP9(A)	5155	20CrMn
1.7262	15CrMo5	–	–	12CD4	–	12CrMo4	2216	SCM415(H)	–	–
1.7335	13CrMo4 4	1501-620Gr27	–	15CD3.5 15CD4.5	14CrMo45	14CrMo45	–	–	ASTM A182 F11, F12	–
1.7380	10CrMo910	1501-622 Gr31, 45	–	12CD9 12CD10	12CrMo9 12CrMo10	TU.H	2218	–	ASTM A182 F.22	–
1.7715	14MoV63	1503-660-440	–	–	–	13MoCrV6	–	–	–	–
1.8523	39CrMoV13 9	897M39	40C	–	36CrMoV12	–	–	–	–	–
1.6511	36CrNiMo4	816M40	110	40NCD3	38NiCrMo4(KB)	35NiCrMo4	–	–	9840	–
1.6582	34CrNiMo6	817M40	24	35NCD6	35NiCrMo6(KB)	–	2541	–	4340	40CrNiMoA
1.7033	34Cr4	530A32	18B	32C4	34Cr4(KB)	35Cr4	–	SCr430(H)	5132	35Cr
1.7035	41Cr4	530M40	18	42C4	41Cr4	42Cr4	–	SCr440(H)	5140	40Cr
1.7131	16MnCr5	(527M20)	–	16MC5	16MnCr5	16MnCr5	2511	–	5115	18CrMn
1.7218	25CrMo4	1717CDS110 708M20	–	25CD4	25CrMo4(KB)	55Cr3	2225	SCM420 SCM430	4130	30CrMn
1.7220	34CrMo4	708A37	19B	35CD4	35CrMo4	34CrMo4	2234	SCM432 SCCRM3	4137 4135	35CrMo
1.7223	41CrMo4	708M40	19A	42CD4TS	41CrMo4	42CrMo4	2244	SCM 440	4140 4142	40CrMoA
1.7225	42CrMo4	708M40	19A	42CD4	42CrMo4	42CrMo4	2244	SCM440(H)	4140	42CrMo 42CrMnMo
1.7361	32CrMo12	722M24	40B	30CD12	32CrMo12	F.124.A	2240	–	–	–
1.8159	50CrV4	735A50	47	50CV4	50CrV4	51CrV4	2230	SUP10	6150	50CrVA
1.8509	41CrAlMo7	905M39	41B	40CAD6 40CAD2	41CrAlMo7	41CrAlMo7	2940	–	–	–
1.2067	100Cr6	BL3	–	Y100C6	–	100Cr6	–	–	L3	CrV, 9SiCr
1.2419	105WCr6	–	–	105WC13	100WCr6 107WCr5KU	105WCr5	2140	SKS31 SKS2, SKS3	–	CrWMo
1.2713	55NiCrMoV6	BH224/5	–	55NCDV7	–	F.520.S	–	SKT4	L6	5CrNiMo
1.5662	X8Ni9	1501-509	–	–	X10Ni9	XBNi09	–	–	ASTM A353	–
1.5680	12Ni19	–	–	Z18N5	–	–	–	–	2515	–
1.6657	14NiCrMo134	832M13	36C	–	15NiCrMo13	14NiCrMo131	–	–	–	–
1.2080	X210Cr12	BD3	–	Z200C12	X210Cr13KU X250Cr12KU	X210Cr12	–	SKD1	D3 ASTM D3	Cr12
1.2601	X153CrMoV12	BD2	–	–	X160CrMoV12	–	–	SKD11	D2	Cr12MoV
1.2363	X100CrMoV5	BA2	–	Z100CDV5	X100CrMoV5	F.5227	2260	SKD12	A2	Cr5Mo1V
1.2344	X40CrMoV51 X40CrMoV51	BH13	–	Z40CDV5	X35CrMoV05KU X40CrMoV51KU	X40CrMoV5	2242	SKD61	H13 ASTM H13	40CrMoV5
1.2436	X210CrW12	–	–	–	X215CrW121KU	X210CrW12	2312	SKD2	–	–
1.2542	45WCrV7	BS1	–	–	45WCrV8KU	45WCrSi8	2710	–	S1	–
1.2581	X30WCrV93	BH21	–	Z30WCV9	X28W09KU	X30WCrV9	–	SKD5	H21	30WCrV9
1.2601	X165CrMoV12	–	–	–	X165CrMoW12KU	X160CrMoV12	2310	–	–	–
1.2833	100V1	BW2	–	Y1105V	–	–	–	SKS43	W210	V
1.3255	S 18-1-2-5	BT4	–	Z80WKCV	X78WCo1805KU	HS18-1-1-5	–	SKH3	T4	W18Cr4VCo5
1.3355	S 18-0-1	BT1	–	Z80WCV	X75W18KU	HS18-0-1	–	SKH2	T1	–
1.3401	G-X120Mn12	Z120M12	–	Z120M12	XG120Mn12	X120MN12	–	SCMnH/1	–	–
1.4718	X45CrSi93	401S45	52	Z45CS9	X45CrSi8	F.322	–	SUH1	HW3	X45CrSi93
1.3343	S6-5-2	4959BA2	–	Z40CSD10	15NiCrMo13	–	2715	SUH3	D3	–
1.3343	S6/5/2	BM2	–	Z85WDCV	HS6-5-2-2	F.5603	2722	SKH9, SKH51	M2	–
1.3348	S 2-9-2	–	–	–	HS2-9-2	HS2-9-2	2782	–	M7	–
1.3243	S6/5/2/5	BM35	–	6-5-2-5	HS6-5-2-5	F.5613	2723	SKH55	M35	–

METALLIC MATERIALS CROSS REFERENCE LIST

STAINLESS STEEL (FERRITIC,MARTENSITIC)

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.4000	X7Cr13	403S17	–	Z6C13	X6Cr13	F.3110	2301	SUS403	403	OCr13 1Cr12
1.4001	X7Cr14	–	–	–	–	F.8401	–	–	–	–
1.4005	X12CrS13	416S21	–	Z11CF13	X12CrS13	F.3411	2380	SUS416	416	–
1.4006	X10Cr13	410S21	56A	Z10C14	X12Cr13	F.3401	2302	SUS410	410	1Cr13
1.4016	X8Cr17	430S15	60	Z8C17	X8Cr17	F.3113	2320	SUS430	430	1Cr17
1.4027	G-X20Cr14	420C29	56B	Z20C13M	–	–	–	SCS2	–	–
1.4034	X46Cr13	420S45	56D	Z40CM Z38C13M	X40Cr14	F.3405	2304	SUS420J2	–	4Cr13
1.4003	–	405S17	–	Z8CA12	X6CrAl13	–	–	–	405	–
1.4021	–	420S37	–	Z8CA12	X20Cr13	–	2303	–	420	–
1.4057	X22CrNi17	431S29	57	Z15CNi6.02	X16CrNi16	F.3427	2321	SUS431	431	1Cr17Ni2
1.4104	X12CrMoS17	–	–	Z10CF17	X10CrS17	F.3117	2383	SUS430F	430F	Y1Cr17
1.4113	X6CrMo17	434S17	–	Z8CD17.01	X8CrMo17	–	2325	SUS434	434	1Cr17Mo
1.4313	X5CrNi134	425C11	–	Z4CND13.4M	(G)X6CrNi304	–	2385	SCS5	CA6-NM	–
1.4724	X10CrA113	403S17	–	Z10C13	X10CrA112	F.311	–	SUS405	405	OCr13Al
1.4742	X10CrA118	430S15	60	Z10CAS18	X8Cr17	F.3113	–	SUS430	430	Cr17
1.4747	X80CrNiSi20	443S65	59	Z80CSN20.02	X80CrSiNi20	F.320B	–	SUH4	HNV6	–
1.4762	X10CrA124	–	–	Z10CAS24	X16Cr26	–	2322	SUH446	446	2Cr25N
1.4871	X53CrMnNiN219	349S54	–	Z52CMN21.09	X53CrMnNiN219	–	–	SUH35	EV8	5Cr2Mn9Ni4N
1.4521	X1CrMoTi182	–	–	–	–	–	2326	–	S44400	–
1.4922	X20CrMoV12-1	–	–	–	X20CrMoNi1201	–	2317	–	–	–
1.4542	–	–	–	Z7CNU17-04	–	–	–	–	630	–

STAINLESS STEEL (AUSTENITIC)

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.4306	X2CrNi1911	304S11	–	Z2CN18.10	X2CrNi18.11	–	2352	SUS304L	304L	OCr19Ni10
1.4350	X5CrNi189	304S11	58E	Z6CN18.09	X5CrNi1810	F.3551 F.3541 F.3504	2332	SUS304	304	OCr18Ni9
1.4305	X12CrNiS188	303S21	58M	Z10CNF18.09	X10CrNiS18.09	F.3508	2346	SUS303	303	1Cr18Ni9MoZr
–	–	304C12	–	Z3CN19.10	–	–	2333	SUS304L	–	–
1.4306	X2CrNi189	304S12	–	Z2CrNi1810	X2CrNi18.11	F.3503	2352	SCS19	304L	–
1.4310	X12CrNi177	–	–	Z12CN17.07	X12CrNi1707	F.3517	2331	SUS301	301	Cr17Ni7
1.4311	X2CrNiN1810	304S62	–	Z2CN18.10	–	–	2371	SUS304LN	304LN	–
1.4401	X5CrNiMo1810	316S16	58J	Z6CND17.11	X5CrNiMo1712	F.3543	2347	SUS316	316	0Cr17Ni11Mo2
1.4308	G-X6CrNi189	304C15	–	Z6CN18.10M	–	–	–	SCS13	–	–
1.4408	G-X6CrNiMo1810	316C16	–	–	–	F.8414	–	SCS14	–	–
1.4581	G-X5CrNiMoNb1810	318C17	–	Z4CNDNb1812M	XG8CrNiMo1811	–	–	SCS22	–	–
1.4429	X2CrNiMoN1813	–	–	Z2CND17.13	–	–	2375	SUS316LN	316LN	OCr17Ni13Mo
1.4404	–	316S13	–	Z2CND17.12	X2CrNiMo1712	–	2348	–	316L	–
1.4435	X2CrNiMo1812	316S13	–	Z2CND17.12	X2CrNiMo1712	–	2353	SCS16 SUS316L	316L	OCr27Ni12Mo3
1.4436	–	316S13	–	Z6CND18-12-03	X8CrNiMo1713	–	2343, 2347	–	316	–
1.4438	X2CrNiMo1816	317S12	–	Z2CND19.15	X2CrNiMo1816	–	2367	SUS317L	317L	OOCr19Ni13Mo
1.4539	X1NiCrMo	–	–	Z6CNT18.10	–	–	2562	–	UNS V 0890A	–
1.4541	X10CrNiTi189	321S12	58B	Z6CNT18.10	X6CrNiTi1811	F.3553 F.3523	2337	SUS321	321	1Cr18NI9Ti
1.4550	X10CrNiNb189	347S17	58F	Z6CNNb18.10	X6CrNiNb1811	F.3552 F.3524	2338	SUS347	347	1Cr18Ni11Nb
1.4571	X10CrNiMoTi1810	320S17	58J	Z6CNDT17.12	X6CrNiMoTi1712	F.3535	2350	–	316Ti	Cr18Ni12Mo2T
1.4583	X10CrNiMoNb1812	–	–	Z6CNDNb1713B	X6CrNiMoNb1713	–	–	–	318	Cr17Ni12Mo3Mb

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.4828	X15CrNiSi2012	309S24	–	Z15CNS20.12	X6CrNi2520	–	–	SUH309	309	1Cr23Ni13
1.4845	X12CrNi2521	310S24	–	Z12CN2520	X6CrNi2520	F.331	2361	SUH310	310S	OCr25Ni20
1.4406	X10CrNi18.08	–	58C	Z1NCDU25.20	–	F.8414	2370	SCS17	308	–
1.4418	X4CrNiMo165	–	–	Z6CND16-04-01	–	–	–	–	–	–
1.4568 1.4504	–	316S111	–	Z8CNA17-07	X2CrNiMo1712	–	–	–	17-7PH	–
1.4563	–	–	–	Z1NCDU31-27-03 Z1CNDU20-18-06AZ	–	–	2584 2378	–	NO8028 S31254	–
1.4878	X12CrNiTi189	321S32	58B, 58C	Z6CNT18.12B	X6CrNiTi18 11	F.3523	–	SUS321	321	1Cr18Ni9Ti

HEAT RESISTANT STEELS

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.4864	X12NiCrSi3616	–	–	Z12NCS35.16	–	–	–	SUH330	330	–
1.4865	G-X40NiCrSi3818	330C11	–	–	XG50NiCr3919	–	–	SCH15	HT, HT 50	–

GRAY CAST IRON

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
–	–	–	–	–	–	–	0100	–	–	–
–	GG 10	–	–	Ft 10 D	–	–	0110	FC100	No 20 B	–
0.6015	GG 15	Grade 150	–	Ft 15 D	G15	FG15	0115	FC150	No 25 B	HT150
0.6020	GG 20	Grade 220	–	Ft 20 D	G20	–	0120	FC200	No 30 B	HT200
0.6025	GG 25	Grade 260	–	Ft 25 D	G25	FG25	0125	FC250	No 35 B	HT250
–	–	–	–	–	–	–	–	–	No 40 B	–
0.6030	GG 30	Grade 300	–	Ft 30 D	G30	FG30	0130	FC300	No 45 B	HT300
0.6035	GG 35	Grade 350	–	Ft 35 D	G35	FG35	0135	FC350	No 50 B	HT350
0.6040	GG 40	Grade 400	–	Ft 40 D	–	–	0140	–	No 55 B	HT400
0.6660	GGL NiCr202	L-NiCuCr202	–	L-NC 202	–	–	0523	–	A436 Type 2	–

DUCTILE CAST IRON

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
0.7040	GGG 40	SNG 420/12	–	FCS 400-12	GS 370-17	FGE 38-17	07 17-02	FCD400	60-40-18	QT400-18
–	GGG 40.3	SNG 370/17	–	FGS 370-17	–	–	07 17-12	–	–	–
0.7033	GGG 35.3	–	–	–	–	–	07 17-15	–	–	–
0.7050	GGG 50	SNG 500/7	–	FGS 500-7	GS 500	FGE 50-7	07 27-02	FCD500	80-55-06	QT500-7
0.7660	GGG NiCr202	Grade S6	–	S-NC202	–	–	07 76	–	A43D2	–
–	GGG NiMn137	L-NiMn 137	–	L-MN 137	–	–	07 72	–	–	–
–	GGG 60	SNG 600/3	–	FGS 600-3	–	–	07 32-03	FCD600	–	QT600-3
0.7070	GGG 70	SNG 700/2	–	FGS 700-2	GS 700-2	FGS 70-2	07 37-01	FCD700	100-70-03	QT700-18

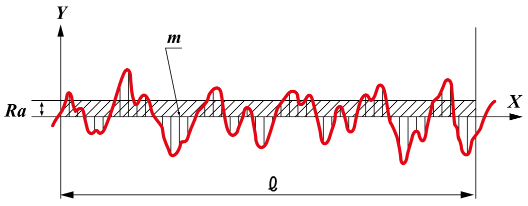
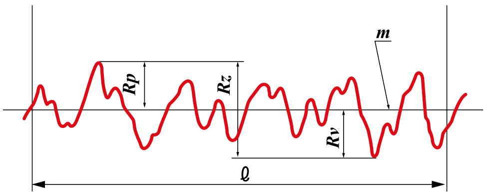
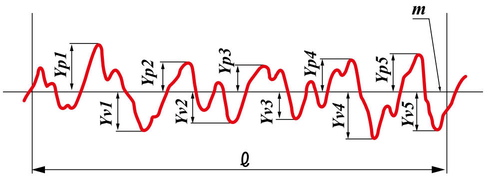
MALLEABLE CAST IRON

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
–	–	8 290/6	–	MN 32-8	–	–	08 14	FCMB310	–	–
–	GTS-35	B 340/12	–	MN 35-10	–	–	08 15	FCMW330	32510	–
0.8145	GTS-45	P 440/7	–	Mn 450	GMN45	–	08 52	FCMW370	40010	–
0.8155	GTS-55	P 510/4	–	MP 50-5	GMN55	–	08 54	FCMP490	50005	–
–	GTS-65	P 570/3	–	MP 60-3	–	–	08 58	FCMP540	70003	–
0.8165	GTS-65-02	P 570/3	–	Mn 650-3	GMN 65	–	08 56	FCMP590	A220-70003	–
–	GTS-70-02	P 690/2	–	Mn 700-2	GMN 70	–	08 62	FCMP690	A220-80002	–

SURFACE ROUGHNESS

SURFACE ROUGHNESS

(From JIS B 0601-1994)

Type	Code	Determination	Determination Example (Figure)
Arithmetical Mean Roughness	Ra	**Ra means the value obtained by the following formula and expressed in micrometer (µm) when sampling only the reference length from the roughness curve in the direction of the mean line, taking X-axis in the direction of mean line and Y-axis in the direction of longitudinal magnification of this sampled part and the roughness curve is expressed by y=f(x):** $Ra=\frac{1}{\ell}\int_{0}^{\ell}\lvert f(x)\rvert dx$	
Maximum Height	Rz	**Rz shall be that only when the reference length is sampled from the roughness curve in the direction of the mean line, the distance between the top profile peak line and the bottom profile valley line on this sampled portion is measured in the longitudinal magnification direction of roughness curve and the obtained value is expressed in micrometer (µm).** **Note) When finding Rz, a portion without an exceptionally high peak or low valley, which may be regarded as a flaw, is selected as the sampling length.** $Rz=R_p+Rv$	
Ten-Point Mean Roughness	RzJIS	**RzJIS shall be that only when the reference length is sampled from the roughness curve in the direction of its mean line, the sum of the average value of absolute values of the heights of five highest profile peaks (Yp) and the depths of five deepest profile valleys (Yv) measured in the vertical magnification direction from the mean line of this sampled portion and this sum is expressed in micrometer (µm).** $Rz_{JIS}=\frac{(Yp1+Yp2+Yp3+Yp4+Yp5)+(Yv1+Yv2+Yv3+Yv4+Yv5)}{5}$	 *Yp1,Yp2,Yp3,Yp4,Yp5* :altitudes of the five highest profile peaks of the sampled portion corresponding to the reference length l. *Yv1,Yv2,Yv3,Yv4,Yv5* :altitudes of the five deepest profile valleys of the sampled portion corresponding to the reference length l.

RELATIONSHIP BETWEEN ARITHMETICAL MEAN (Ra) AND CONVENTIONAL DESIGNATION (REFERENCE DATA)

Arithmetical Mean Roughness Ra		Max. Height Rz	Ten-Point Mean Roughness RzJIS	Sampling Length for Rz • RzJIS l (mm)	Conventional Finish Mark
Standard Series	Cutoff Value λc (mm)	Standard Series			
0.012 a	0.08	0.05s	0.05z	0.08	▽▽▽▽
0.025 a	0.25	0.1 s	0.1 z		
0.05 a		0.2 s	0.2 z	0.25	
0.1 a	0.8	0.4 s	0.4 z		
0.2 a		0.8 s	0.8 z	0.8	
0.4 a		1.6 s	1.6 z		▽▽▽
0.8 a		3.2 s	3.2 z		
1.6 a		6.3 s	6.3 z		
3.2 a	2.5	12.5 s	12.5 z	2.5	▽▽
6.3 a		25 s	25 z		
12.5 a	8	50 s	50 z		▽
25 a		100 s	100 z	8	
50 a		200 s	200 z		–
100 a	—	400 s	400 z	—	

*The correlation among the three is shown for convenience and is not exact.

*Ra: The evaluation length of Rz and RzJIS is the cutoff value and sampling length multiplied by 5, respectively.

HARDNESS COMPARISON TABLE

HARDNESS CONVERSION NUMBERS OF STEEL

Brinell Hardness (HB), 10mm Ball, Load: 3000kgf		Vickers Hardness	Rockwell Hardness				Shore Hardness	Tensile Strength (Approx.)
Standard Ball	Tungsten Carbide Ball		A Scale, Load: 60kgf, Diamond Point	B Scale, Load: 100kgf, 1/16" Ball	C Scale, Load: 150kgf, Diamond Point	D Scale, Load: 100kgf, Diamond Point		MPa
		(HV)	(HRA)	(HRB)	(HRC)	(HRD)	(HS)	
—	—	940	85.6	—	68.0	76.9	97	—
—	—	920	85.3	—	67.5	76.5	96	—
—	—	900	85.0	—	67.0	76.1	95	—
—	(767)	880	84.7	—	66.4	75.7	93	—
—	(757)	860	84.4	—	65.9	75.3	92	—
—	(745)	840	84.1	—	65.3	74.8	91	—
—	(733)	820	83.8	—	64.7	74.3	90	—
—	(722)	800	83.4	—	64.0	73.8	88	—
—	(712)	—	—	—	—	—	—	—
—	(710)	780	83.0	—	63.3	73.3	87	—
—	(698)	760	82.6	—	62.5	72.6	86	—
—	(684)	740	82.2	—	61.8	72.1	—	—
—	(682)	737	82.2	—	61.7	72.0	84	—
—	(670)	720	81.8	—	61.0	71.5	83	—
—	(656)	700	81.3	—	60.1	70.8	—	—
—	(653)	697	81.2	—	60.0	70.7	81	—
—	(647)	690	81.1	—	59.7	70.5	—	—
—	(638)	680	80.8	—	59.2	70.1	80	—
—	630	670	80.6	—	58.8	69.8	—	—
—	627	667	80.5	—	58.7	69.7	79	—
—	—	677	80.7	—	59.1	70.0	—	—
—	601	640	79.8	—	57.3	68.7	77	—
—	—	640	79.8	—	57.3	68.7	—	—
—	578	615	79.1	—	56.0	67.7	75	—
—	—	607	78.8	—	55.6	67.4	—	—
—	555	591	78.4	—	54.7	66.7	73	2055
—	—	579	78.0	—	54.0	66.1	—	2015
—	534	569	77.8	—	53.5	65.8	71	1985
—	—	533	77.1	—	52.5	65.0	—	1915
—	514	547	76.9	—	52.1	64.7	70	1890
(495)	—	539	76.7	—	51.6	64.3	—	1855
—	—	530	76.4	—	51.1	63.9	—	1825
	495	528	76.3	—	51.0	63.8	68	1820
(477)	—	516	75.9	—	50.3	63.2	—	1780
—	—	508	75.6	—	49.6	62.7	—	1740
	477	508	75.6	—	49.6	62.7	66	1740
(461)	—	495	75.1	—	48.8	61.9	—	1680
—	—	491	74.9	—	48.5	61.7	—	1670
	461	491	74.9	—	48.5	61.7	65	1670
444	—	474	74.3	—	47.2	61.0	—	1595
—	—	472	74.2	—	47.1	60.8	—	1585
—	444	472	74.2	—	47.1	60.8	63	1585
429	429	455	73.4	—	45.7	59.7	61	1510
415	415	440	72.8	—	44.5	58.8	59	1460
401	401	425	72.0	—	43.1	57.8	58	1390
388	388	410	71.4	—	41.8	56.8	56	1330
375	375	396	70.6	—	40.4	55.7	54	1270
363	363	383	70.0	—	39.1	54.6	52	1220
352	352	372	69.3	(110.0)	37.9	53.8	51	1180
341	341	360	68.7	(109.0)	36.6	52.8	50	1130
331	331	350	68.1	(108.5)	35.5	51.9	48	1095
321	321	339	67.5	(108.0)	34.3	51.0	47	1060
311	311	328	66.9	(107.5)	33.1	50.0	46	1025
302	302	319	66.3	(107.0)	32.1	49.3	45	1005
293	293	309	65.7	(106.0)	30.9	48.3	43	970
285	285	301	65.3	(105.5)	29.9	47.6	—	950
277	277	292	64.6	(104.5)	28.8	46.7	41	925
269	269	284	64.1	(104.0)	27.6	45.9	40	895
262	262	276	63.6	(103.0)	26.6	45.0	39	875
255	255	269	63.0	(102.0)	25.4	44.2	38	850
248	248	261	62.5	(101.0)	24.2	43.2	37	825
241	241	253	61.8	100	22.8	42.0	36	800
235	235	247	61.4	99.0	21.7	41.4	35	785
229	229	241	60.8	98.2	20.5	40.5	34	765
223	223	234	—	97.3	(18.8)	—	—	—
217	217	228	—	96.4	(17.5)	—	33	725
212	212	222	—	95.5	(16.0)	—	—	705
207	207	218	—	94.6	(15.2)	—	32	690
201	201	212	—	93.8	(13.8)	—	31	675
197	197	207	—	92.8	(12.7)	—	30	655
192	192	202	—	91.9	(11.5)	—	29	640
187	187	196	—	90.7	(10.0)	—	—	620
183	183	192	—	90.0	(9.0)	—	28	615
179	179	188	—	89.0	(8.0)	—	27	600
174	174	182	—	87.8	(6.4)	—	—	585
170	170	178	—	86.8	(5.4)	—	26	570
167	167	175	—	86.0	(4.4)	—	—	560
163	163	171	—	85.0	(3.3)	—	25	545
156	156	163	—	82.9	(0.9)	—	—	525
149	149	156	—	80.8	—	—	23	505
143	143	150	—	78.7	—	—	22	490
137	137	143	—	76.4	—	—	21	460
131	131	137	—	74.0	—	—	—	450
126	126	132	—	72.0	—	—	20	435
121	121	127	—	69.8	—	—	19	415
116	116	122	—	67.6	—	—	18	400
111	111	117	—	65.7	—	—	15	385

Note 1) The above list is the same as that of AMS Metals Hand book with tensile strength in approximate metric value and Brinell hardness over a recommended range.

Note 2) 1MPa=1N/mm^2

Note 3) Figures in ( ) are rarely used and are included for reference. This list has been taken from JIS Handbook Steel I.

FIT TOLERANCE TABLE(HOLE)

Classification of Standard Dimensions (mm)		Class of Geometrical Tolerance Zone of Holes															
>	≤	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7
–	3	+180 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0
3	6	+188 +140	+100 +70	+118 +70	+48 +30	+60 +30	+78 +30	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0
6	10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0
10	14	+220 +150	+138 +95	+165 +95	+77 +50	+93 +50	+120 +50	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+11 0	+18 0
14	18																
18	24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+13 0	+21 0
24	30																
30	40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+16 0	+25 0
40	50	+280 +180	+192 +130	+230 +130													
50	65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+220 +100	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+19 0	+30 0
65	80	+320 +200	+224 +150	+270 +150													
80	100	+360 +220	+257 +170	+310 +170	+174 +120	+207 +120	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+22 0	+35 0
100	120	+380 +240	+267 +180	+320 +180													
120	140	+420 +260	+300 +200	+360 +200	+208 +145	+245 +145	+305 +145	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0
140	160	+440 +280	+310 +210	+370 +210													
160	180	+470 +310	+330 +230	+390 +230													
180	200	+525 +340	+355 +240	+425 +240	+242 +170	+285 +170	+355 +170	+146 +100	+172 +100	+215 +100	+79 +50	+96 +50	+122 +50	+44 +15	+61 +15	+29 0	+46 0
200	225	+565 +380	+375 +260	+445 +260													
225	250	+605 +420	+395 +280	+465 +280													
250	280	+690 +480	+430 +300	+510 +300	+271 +190	+320 +190	+400 +190	+162 +110	+191 +110	+240 +110	+88 +56	+108 +56	+137 +56	+49 +17	+69 +17	+32 0	+52 0
280	315	+750 +540	+460 +330	+540 +330													
315	355	+830 +600	+500 +360	+590 +360	+299 +210	+350 +210	+440 +210	+182 +125	+214 +125	+265 +125	+98 +62	+119 +62	+151 +62	+54 +18	+75 +18	+36 0	+57 0
355	400	+910 +680	+540 +400	+630 +400													
400	450	+1010 +760	+595 +440	+690 +440	+327 +230	+385 +230	+480 +230	+198 +135	+232 +135	+290 +135	+108 +68	+131 +68	+165 +68	+60 +20	+83 +20	+40 0	+63 0
450	500	+1090 +840	+635 +480	+730 +480													

Note 1) Values shown in the upper portion of the respective boxes are the upper dimensional tolerance, while values shown in the lower portion are the lower dimensional tolerance.

Units : μm

Class of Geometrical Tolerance Zone of Holes																	
H8	**H9**	**H10**	**JS6**	**JS7**	**K6**	**K7**	**M6**	**M7**	**N6**	**N7**	**P6**	**P7**	**R7**	**S7**	**T7**	**U7**	**X7**
+14 0	+25 0	+40 0	±3	±5	0 −6	0 −10	−2 −8	−2 −12	−4 −10	−4 −14	−6 −12	−6 −16	−10 −20	−14 −24	–	−18 −28	−20 −30
+18 0	+30 0	+48 0	±4	±6	+2 −6	+3 −9	−1 −9	0 −12	−5 −13	−4 −16	−9 −17	−8 −20	−11 −23	−15 −27	–	−19 −31	−24 −36
+22 0	+36 0	+58 0	±4.5	±7	+2 −7	+5 −10	−3 −12	0 −15	−7 −16	−4 −19	−12 −21	−9 −24	−13 −28	−17 −32	–	−22 −37	−28 −43
+27 0	+43 0	+70 0	±5.5	±9	+2 −9	+6 −12	−4 −15	0 −18	−9 −20	−5 −23	−15 −26	−11 −29	−16 −34	−21 −39	–	−26 −44	−33 −51
															–		−38 −56
+33 0	+52 0	+84 0	±6.5	±10	+2 −11	+6 −15	−4 −17	0 −21	−11 −24	−7 −28	−18 −31	−14 −35	−20 −41	−27 −48	–	−33 −54	−46 −67
															−33 −54	−40 −61	−56 −77
+39 0	+62 0	+100 0	±8	±12	+3 −13	+7 −18	−4 −20	0 −25	−12 −28	−8 −33	−21 −37	−17 −42	−25 −50	−34 −59	−39 −64	−51 −76	–
															−45 −70	−61 −86	
+46 0	+74 0	+120 0	±9.5	±15	+4 −15	+9 −21	−5 −24	0 −30	−14 −33	−9 −39	−26 −45	−21 −51	−30 −60	−42 −72	−55 −85	−76 −106	–
													−32 −62	−48 −78	−64 −94	−91 −121	
+54 0	+87 0	+140 0	±11	±17	+4 −18	+10 −25	−6 −28	0 −35	−16 −38	−10 −45	−30 −52	−24 −59	−38 −73	−58 −93	−78 −113	−111 −146	–
													−41 −76	−66 −101	−91 −126	−131 −166	
+63 0	+100 0	+160 0	±12.5	±20	+4 −21	+12 −28	−8 −33	0 −40	−20 −45	−12 −52	−36 −61	−28 −68	−48 −88	−77 −117	−107 −147	–	–
													−50 −90	−85 −125	−119 −159		
													−53 −93	−93 −133	−131 −171		
+72 0	+115 0	+185 0	±14.5	±23	+5 −24	+13 −33	−8 −37	0 −46	−22 −51	−14 −60	−41 −70	−33 −79	−60 −106	−105 −151	–	–	–
													−63 −109	−113 −159			
													−67 −113	−123 −169			
+81 0	+130 0	+210 0	±16	±26	+5 −27	+16 −36	−9 −41	0 −52	−25 −57	−14 −66	−47 −79	−36 −88	−74 −126	–	–	–	–
													−78 −130				
+89 0	+140 0	+230 0	±18	±28	+7 −29	+17 −40	−10 −46	0 −57	−26 −62	−16 −73	−51 −87	−41 −98	−87 −144	–	–	–	–
													−93 −150				
+97 0	+155 0	+250 0	±20	±31	+8 −32	+18 −45	−10 −50	0 −63	−27 −67	−17 −80	−55 −95	−45 −108	−103 −166	–	–	–	–
													−109 −172				

FIT TOLERANCE TABLE(SHAFT)

Classification of Standard Dimensions (mm)		Class of Geometrical Tolerance Zone of Shafts														
>	≤	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7
—	3	−140 −165	−60 −85	−20 −34	−20 −45	−14 −24	−14 −28	−14 −39	−6 −12	−6 −16	−6 −20	−2 −6	−2 −8	0 −4	0 −6	0 −10
3	6	−140 −170	−70 −100	−30 −48	−30 −60	−20 −32	−20 −38	−20 −50	−10 −18	−10 −22	−10 −28	−4 −9	−4 −12	0 −5	0 −8	0 −12
6	10	−150 −186	−80 −116	−40 −62	−40 −76	−25 −40	−25 −47	−25 −61	−13 −22	−13 −28	−13 −35	−5 −11	−5 −14	0 −6	0 −9	0 −15
10	14	−150 −193	−95 −138	−50 −77	−50 −93	−32 −50	−32 −59	−32 −75	−16 −27	−16 −34	−16 −43	−6 −14	−6 −17	0 −8	0 −11	0 −18
14	18															
18	24	−160 −212	−110 −162	−65 −98	−65 −117	−40 −61	−40 −73	−40 −92	−20 −33	−20 −41	−20 −53	−7 −16	−7 −20	0 −9	0 −13	0 −21
24	30															
30	40	−170 −232	−120 −182	−80 −119	−80 −142	−50 −75	−50 −89	−50 −112	−25 −41	−25 −50	−25 −64	−9 −20	−9 −25	0 −11	0 −16	0 −25
40	50	−180 −242	−130 −192													
50	65	−190 −264	−140 −214	−100 −146	−100 −174	−60 −90	−60 −106	−60 −134	−30 −49	−30 −60	−30 −76	−10 −23	−10 −29	0 −13	0 −19	0 −30
65	80	−200 −274	−150 −224													
80	100	−220 −307	−170 −257	−120 −174	−120 −207	−72 −107	−72 −126	−72 −159	−36 −58	−36 −71	−36 −90	−12 −27	−12 −34	0 −15	0 −22	0 −35
100	120	−240 −327	−180 −267													
120	140	−260 −360	−200 −300	−145 −208	−145 −245	−85 −125	−85 −148	−85 −185	−43 −68	−43 −83	−43 −106	−14 −32	−14 −39	0 −18	0 −25	0 −40
140	160	−280 −380	−210 −310													
160	180	−310 −410	−230 −330													
180	200	−340 −455	−240 −355	−170 −242	−170 −285	−100 −146	−100 −172	−100 −215	−50 −79	−50 −96	−50 −122	−15 −35	−15 −44	0 −20	0 −29	0 −46
200	225	−380 −495	−260 −375													
225	250	−420 −535	−280 −395													
250	280	−480 −610	−300 −430	−190 −271	−190 −320	−110 −162	−110 −191	−110 −240	−56 −88	−56 −108	−56 −137	−17 −40	−17 −49	0 −23	0 −32	0 −52
280	315	−540 −670	−330 −460													
315	355	−600 −740	−360 −500	−210 −299	−210 −350	−125 −182	−125 −214	−125 −265	−62 −98	−62 −119	−62 −151	−18 −43	−18 −54	0 −25	0 −36	0 −57
355	400	−680 −820	−400 −540													
400	450	−760 −915	−440 −595	−230 −327	−230 −385	−135 −198	−135 −232	−135 −290	−68 −108	−68 −131	−68 −165	−20 −47	−20 −60	0 −27	0 −40	0 −63
450	500	−840 −995	−480 −635													

Note 1) Values shown in the upper portion of the respective boxes are the upper dimensional tolerance, while values shown in the lower portion are the lower dimensional tolerance.

Units : μm

Class of Geometrical Tolerance Zone of Shafts															
h8	**h9**	**js5**	**js6**	**js7**	**k5**	**k6**	**m5**	**m6**	**n6**	**p6**	**r6**	**s6**	**t6**	**u6**	**x6**
0 — 14	0 — 25	±2	±3	±5	+4 0	+6 0	+6 +2	+8 +2	+10 +4	+12 +6	+16 +10	+20 +14	—	+24 +18	+26 +20
0 — 18	0 — 30	±2.5	±4	±6	+6 +1	+9 +1	+9 +4	+12 +4	+16 +8	+20 +12	+23 +15	+27 +19	—	+31 +23	+36 +28
0 — 22	0 — 36	±3	±4.5	±7	+7 +1	+10 +1	+12 +6	+15 +6	+19 +10	+24 +15	+28 +19	+32 +23	—	+37 +28	+43 +34
0 — 27	0 — 43	±4	±5.5	±9	+9 +1	+12 +1	+15 +7	+18 +7	+23 +12	+29 +18	+34 +23	+39 +28	—	+44 +33	+51 +40
															+56 +45
0 — 33	0 — 52	±4.5	±6.5	±10	+11 +2	+15 +2	+17 +8	+21 +8	+28 +15	+35 +22	+41 +28	+48 +35	—	+54 +41	+67 +54
													+54 +41	+61 +48	+77 +64
0 — 39	0 — 62	±5.5	±8	±12	+13 +2	+18 +2	+20 +9	+25 +9	+33 +17	+42 +26	+50 +34	+59 +43	+64 +48	+76 +60	—
													+70 +54	+86 +70	
0 — 46	0 — 74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+39 +20	+51 +32	+60 +41	+72 +53	+85 +66	+106 +87	—
											+62 +43	+78 +59	+94 +75	+121 +102	
0 — 54	0 — 87	±7.5	±11	±17	+18 +3	+25 +3	+28 +13	+35 +13	+45 +23	+59 +37	+73 +51	+93 +71	+113 +91	+146 +124	—
											+76 +54	+101 +79	+126 +104	+166 +144	
0 — 63	0 — 100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27	+68 +43	+88 +63	+117 +92	+147 +122	—	—
											+90 +65	+125 +100	+159 +134		
											+93 +68	+133 +108	+171 +146		
0 — 72	0 — 115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	+60 +31	+79 +50	+106 +77	+151 +122	—	—	—
											+109 +80	+159 +130			
											+113 +84	+169 +140			
0 — 81	0 — 130	±11.5	±16	±26	+27 +4	+36 +4	+43 +20	+52 +20	+66 +34	+88 +56	+126 +94	—	—	—	—
											+130 +98				
0 — 89	0 — 140	±12.5	±18	±28	+29 +4	+40 +4	+46 +21	+57 +21	+73 +37	+98 +62	+144 +108	—	—	—	—
											+150 +114				
0 — 97	0 — 155	±13.5	±20	±31	+32 +5	+45 +5	+50 +23	+63 +23	+80 +40	+108 +68	+166 +126	—	—	—	—
											+172 +132				

INTERNATIONAL SYSTEM OF UNITS

■UNIT CONVERSION TABLE for EASIER CHANGE into SI UNITS (Bold type Indicates SI unit)

●Pressure

Pa	**kPa**	**MPa**	bar	kgf/cm^2	atm	mmH2O	mmHg or Torr
1	1×10^{-3}	1×10^{-6}	1×10^{-5}	1.01972×10^{-5}	9.86923×10^{-6}	1.01972×10^{-1}	7.50062×10^{-3}
1×10^{3}	1	1×10^{-3}	1×10^{-2}	1.01972×10^{-2}	9.86923×10^{-3}	1.01972×10^{2}	7.50062
1×10^{6}	1×10^{3}	1	1×10	1.01972×10	9.86923	1.01972×10^{5}	7.50062×10^{3}
1×10^{5}	1×10^{2}	1×10^{-1}	1	1.01972	9.86923×10^{-1}	1.01972×10^{4}	7.50062×10^{2}
9.80665×10^{4}	9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1	9.67841×10^{-1}	1×10^{4}	7.35559×10^{2}
1.01325×10^{5}	1.01325×10^{2}	1.01325×10^{-1}	1.01325	1.03323	1	1.03323×10^{4}	7.60000×10^{2}
9.80665	9.80665×10^{-3}	9.80665×10^{-6}	9.80665×10^{-5}	1×10^{-4}	9.67841×10^{-5}	1	7.35559×10^{-2}
1.33322×10^{2}	1.33322×10^{-1}	1.33322×10^{-4}	1.33322×10^{-3}	1.35951×10^{-3}	1.31579×10^{-3}	1.35951×10	1

Note 1) 1Pa=1N/m^2

●Force

N	dyn	kgf
1	1×10^{5}	1.01972×10^{-1}
1×10^{-5}	1	1.01972×10^{-6}
9.80665	9.80665×10^{5}	1

●Stress

Pa	**MPa** or **N/mm^2**	kgf/mm^2	kgf/cm^2
1	1×10^{-6}	1.01972×10^{-7}	1.01972×10^{-5}
1×10^{6}	1	1.01972×10^{-1}	1.01972×10
9.80665×10^{6}	9.80665	1	1×10^{2}
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1

Note 1) 1Pa=1N/m^2

●Work / Energy / Quantity of Heat

J	kW•h	kgf•m	kcal
1	2.77778×10^{-7}	1.01972×10^{-1}	2.38889×10^{-4}
$3.600\ \ \times10^{6}$	1	3.67098×10^{5}	$8.6000\ \ \times10^{2}$
9.80665	2.72407×10^{-6}	1	2.34270×10^{-3}
4.18605×10^{3}	1.16279×10^{-3}	4.26858×10^{2}	1

Note 1) 1J=1W•s, 1J=1N•m
1cal=4.18605J
(By the law of weights and measures)

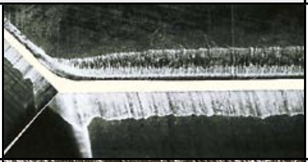
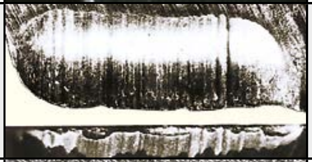
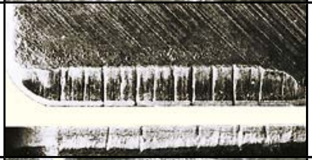
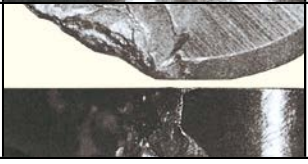
●Power (Rate of Production / Motive Power) /Heat Flow Rate

W	kgf•m/s	PS	kcal/h
1	1.01972×10^{-1}	1.35962×10^{-3}	$8.6000\ \ \times10^{-1}$
9.80665	1	1.33333×10^{-2}	8.43371
$7.355\ \ \times10^{2}$	$7.5\ \ \ \ \times10$	1	6.32529×10^{2}
1.16279	1.18572×10^{-1}	1.58095×10^{-3}	1

Note 1) 1W=1J/s, PS:French horse power
1PS=0.7355kW
1cal=4.18605J
(By the law of weights and measures)

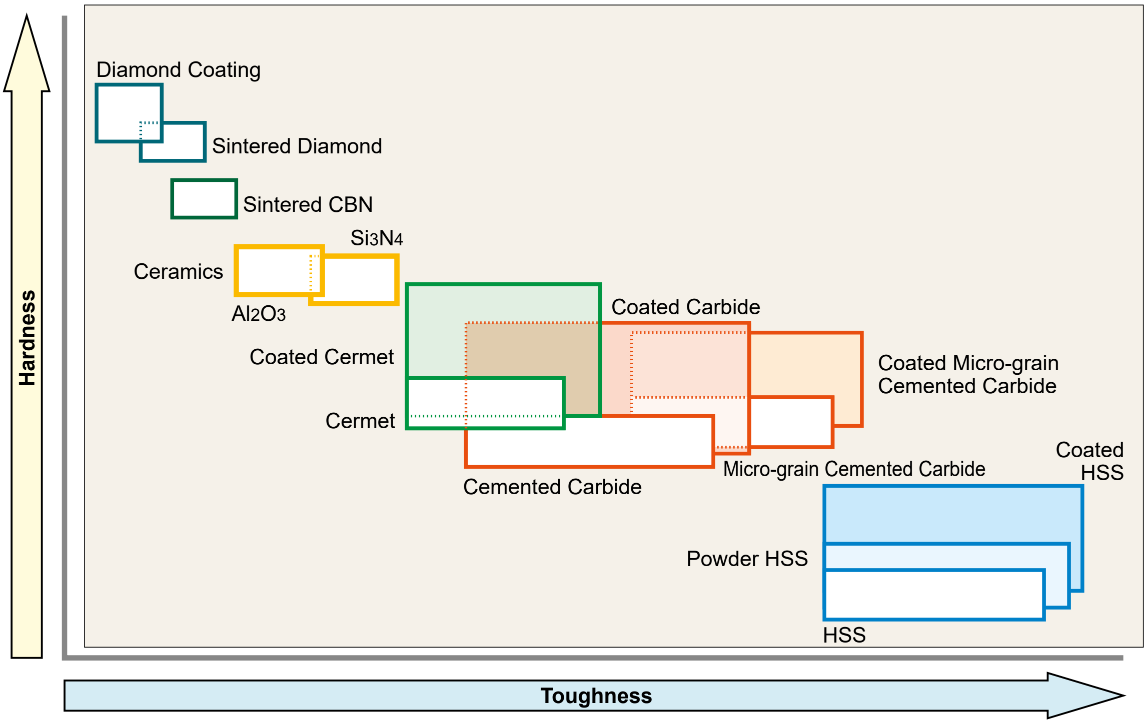
TOOL WEAR AND DAMAGE

CAUSES AND COUNTERMEASURES

Tool Damage Form		Cause	Countermeasure
Flank Wear		• Tool grade is too soft. • Cutting speed is too high. • Flank angle is too small. • Feed rate is extremely low.	• Tool grade with high wear resistance. • Lower cutting speed. • Increase flank angle. • Increase feed rate.
Crater Wear		• Tool grade is too soft. • Cutting speed is too high. • Feed rate is too high.	• Tool grade with high wear resistance. • Lower cutting speed. • Lower feed rate.
Chipping		• Tool grade is too hard. • Feed rate is too high. • Lack of cutting edge strength. • Lack of shank or holder rigidity.	• Tool grade with high toughness. • Lower feed rate. • Increase honing. (Round honing is to be changed to chamfer honing.) • Use large shank size.
Fracture		• Tool grade is too hard. • Feed rate is too high. • Lack of cutting edge strength. • Lack of shank or holder rigidity.	• Tool grade with high toughness. • Lower feed rate. • Increase honing. (Round honing is to be changed to chamfer honing.) • Use large shank size.
Plastic Deformation		• Tool grade is too soft. • Cutting speed is too high. • Depth of cut and feed rate are too large. • Cutting temperature is high.	• Tool grade with high wear resistance. • Lower cutting speed. • Decrease depth of cut and feed rate. • Tool grade with high thermal conductivity.
Welding		• Cutting speed is low. • Poor sharpness. • Unsuitable grade.	• Increase cutting speed. (For DIN Ck45, cutting speed 80m/min.) • Increase rake angle. • Tool grade with low affinity. (Coated grade, cermet grade)
Thermal Cracks		• Expansion or shrinkage due to cutting heat. • Tool grade is too hard. *Especially in milling.	• Dry cutting. (For wet cutting, flood workpiece with cutting fluid) • Tool grade with high toughness.
Notching		• Hard surfaces such as uncut surfaces, chilled parts and machining hardened layers. • Friction caused by jagged shape chips. (Caused by small vibration)	• Tool grade with high wear resistance. • Increase rake angle to improve sharpness.
Flaking		• Cutting edge welding and adhesion. • Poor chip disposal.	• Increase rake angle to improve sharpness. • Enlarge chip pocket.
Flank Wear Fracture *Damage for polycrystallines		• Damage due to the lack of strength of a curved cutting edge.	• Increase honing. • Tool grade with high toughness.
Crater Wear Fracture *Damage for polycrystallines		• Tool grade is too soft. • Cutting resistance is too high and causes high cutting heat.	• Decrease honing. • Tool grade with high wear resistance.

CUTTING TOOL MATERIALS

Cemented carbide (WC-Co) was developed in 1923 and was later improved by adding TiC and TaC. In 1969, CVD coating technology was developed, and coated carbide has since been used widely. TiC-TiN based cermet was developed in 1974. Today, "Coated Carbide grades for roughing and cermet for finishing" is a well established trend.



GRADE CHARACTERISTICS

Hard Materials	Hardness (HV)	Energy Formation (kcal/g·atom)	Solubility in Iron (%.1250℃)	Thermal Conductivity (W/m·k)	Thermal * Expansion (x 10^{-6}/k)	Tool Material
Diamond	>9000	–	Highly Soluble	2100	3.1	Sintered Diamond
CBN	>4500	–	–	1300	4.7	Sintered CBN
Si_3N_4	1600	–	–	100	3.4	Ceramics
Al_2O_3	2100	-100	≒0	29	7.8	Ceramics Cemented Carbide
TiC	3200	-35	< 0.5	21	7.4	Cermet Coated Carbide
TiN	2500	-50	–	29	9.4	Cermet Coated Carbide
TaC	1800	-40	0.5	21	6.3	Cemented Carbide
WC	2100	-10	7	121	5.2	Cemented Carbide

*1W/m•K=2.39×10^{-3}cal/cm•sec•℃

GRADE CHAIN

For Cutting Tools

Cemented Carbide	P	Steel	UTi20T								
	M	Stainless Steel General	UTi20T								
	K	Cast Iron	HTi05T	HTi10	UTi20T						
	N	Non-Ferrous	HTi10								
	S	Heat Resistant Alloy Ti Alloy	MT9005	RT9010	MT9015	TF15					
Coated Carbide	P	Steel	MC6115	MS6015 (PVD)	NEW MV1020	MP6120 (PVD)	MC6125	MC6135	MC6035	UH6400	
			VP15TF (PVD)	NEW MV1030	MP6130 (PVD)	VP10RT (PVD)	VP20RT (PVD)	VP30RT (PVD)	VP20MF (PVD)		
	M	Stainless Steel General	MC7015	US7020	MC7020	MC7025	MS7025 (PVD)	MS9025 (PVD)	F7030	VP15TF (PVD)	VP20RT (PVD)
			MP7030 (PVD)	MP7130 (PVD)	MP7035 (PVD)	US735	MP7140 (PVD)	VP10RT (PVD)	VP30RT (PVD)	VP20MF (PVD)	
	K	Cast Iron	MH515	MC5105	MC5115	MC5125	MY5015	MC5020			
			NEW MV1020	VP15TF (PVD)	VP10RT (PVD)	VP20RT (PVD)	NEW MV1030				
	N	Non-Ferrous	LC15TF								
	S	Heat Resistant Alloy Ti Alloy	US905	MP9005 (PVD)	MV9005	VP05RT (PVD)	VP10RT (PVD)	VP20RT (PVD)	MP9015 (PVD)		
			VP15TF (PVD)	MP9120 (PVD)	MP9025 (PVD)	MS9025 (PVD)	MP9030 (PVD)	MP9130 (PVD)	MP9140 (PVD)		
	H	Hardened Materials	MP8010 (PVD)	VP15TF (PVD)							
Cermet	P	Steel	NX2525	NX3035	MX3020	MX3030	NX4545				
	M	Stainless Steel General	NX2525	MX3020	MX3030	NX4545					
	K	Cast Iron	NX2525	MX3020	MX3030						
Coated Cermet	P	Steel	AP25N (PVD)	VP25N (PVD)	MP3025 (PVD)	VP45N (PVD)					
	M	Stainless Steel General	AP25N (PVD)	VP25N (PVD)							
	K	Cast Iron	AP25N (PVD)								
Polycrystallines	N	Non-Ferrous Non-Metal (Sintered Diamond)	MD205 (Produced to order)	MD220	MD230 (Produced to order)	MD2030					
		Sintered Alloy	MB4120								
	K	Cast Iron (Sintered PCBN)	BC5110 (PVD)	MB4120	MBS140	BC5030					
	H	Hardened Materials (Sintered PCBN)	BC8105 (Coated)	MB8110	BC8110 (Coated)	BC8210 (Coated)	MB8120	BC8120 (Coated)	BC8220 (Coated)	MB8130	BC8130 (Coated)
Micro-grain Cemented Carbide		Steel Cast Iron	SF10	MF07	MF10	TF15	MF20	MF30			

GRADES COMPARISON TABLE

CEMENTED CARBIDE

	ISO		Mitsubishi Materials	Sandvik	Kennametal	Seco Tools	Iscar	Sumitomo Electric	Tungaloy	Kyocera	Dijet	MOLDINO
	Classification	Symbol										
Turning	P	P01										
		P10					IC70	ST10P	TH10			WS10
		P20	UTi20T				IC70 IC50M	ST20E	KS20			EX35
		P30	UTi20T				IC50M IC54	A30 A30N	UX30 KS15F			EX35
		P40					IC54	ST40E	TX40			EX35
	M	M10			KU10 K313 K68	890	IC07	EH510	TH10			WA10B
		M20	UTi20T		KU10 K313 K68	HX 883	IC07 IC08 IC20	EH520	KS20			EX35
		M30	UTi20T				IC08 IC20 IC28	A30 A30N	UX30			EX35
		M40					IC28		TU40			
	K	K01	HTi05T		KU10 K313 K68			H1 H2	KS05F			WH01 WH05
		K10	HTi10		KU10 K313 K68	890	IC20	EH510	TH10	KW10 GW15	KT9	WH10
		K20	UTi20T	H13A	KU10 K313 K68	HX	IC20	G10E H10E EH520	KS15F KS20	GW25	KT9	WH20
		K30	UTi20T			883		G10E H10E				
	N	N01		H10				H1 H2	KS05F	GW05 KW10		
		N10	HTi10	H10 HBA	KU10 K313 K68	890	IC08 IC20	EH510	TH10	KW10 GW15	KT9	WH10
		N20		H10 HBA	KU10 K313 K68	HX KX	IC08 IC20	G10E EH520	KS15F		KT9	WH20
		N30				883						
	S	S01	MT9005							SW05		
		S10	MT9005 RT9010 MT9015	H10A H10F H13A	KU10 K313 K68	HX 883	IC07 IC08	EH510	KS05F TH10	SW10		WH13S
		S20	RT9010 TF15		KU10 K313 K68	883	IC07 IC08	EH520	KS15F KS20	SW25		
		S30	TF15									
Milling	P	P10										
		P20	UTi20T		K125M		IC50M IC28	A30N				EX35
		P30	UTi20T	SM30	GX		IC50M IC28	A30N	UX30			EX35
		P40					IC28					EX35
	M	M10										
		M20	UTi20T				IC08 IC20	A30N				EX35
		M30	UTi20T	SM30			IC08 IC28	A30N				EX35
		M40					IC28					
	K	K01	HTi05T		K115M,K313							
		K10	HTi10		K115M K313		IC20	G10E	TH10	KW10 GW25	KT9	WH10
		K20	UTi20T	H13A		HX	IC20	G10E		GW25	FZ15	WH20
		K30	UTi20T									

Note 1) The tables above are based on published data and not authorized by each manufacturer.

MICRO GRAIN

	ISO Classifi-cation	ISO Symbol	Mitsubishi Materials	Sandvik	Kennametal	Seco Tools	Sumitomo Electric	Tungaloy	Kyocera	Dijet	MOLDINO
Cutting Tools	Z	Z01	**SF10** **MF07** **MF10**	PN90 6UF,H3F 8UF,H6F			F0	F MD05F MD1508		FZ05 FB05 FB10	NM08
		Z10	**HTi10** **MF20**	H10F		890	XF1 F1 AFU	MD10 MD0508 MD07F	FW30	FZ10 FZ15 FB15	NM10 NM12 NM15
		Z20	**TF15** **MF30**	H15F		890 883	AF0 SF2 AF1	EM10 MD20 G1F		FZ15 FB15 FB20	BRM20 EF20N
		Z30				883	A1 CC			FZ20 FB20	NM25 NM40

CERMET

	ISO Classifi-cation	ISO Symbol	Mitsubishi Materials	Sandvik	Kennametal	Seco Tools	Iscar	Sumitomo Electric	Tungaloy	Kyocera	Dijet	MOLDINO
Turning	P	P01	**AP25N*** **VP25N***				IC20N IC520N*	T1000A	NS520 GT720*	CCX* TN610 PV710* PV30*	LN10	
		P10	**NX2525** **AP25N*** **VP25N***	CT5015	KT315 KTP10* KT125	TP1020 TP1030* CM CMP*	IC20N IC520N* IC530N*	T1500A T1500Z*	NS520 NS9530 GT9530* AT9530*	CCX* TN60 TN610 PV710* TN620 PV720*	CX75 PX75*	CZ25*
		P20	**NX2525** **AP25N*** **VP25N*** **NX3035** **MP3025***	GC1525*	KT325 KTP10* KT1120 KT5020*	TP1020 TP1030*	IC20N IC520N* IC30N IC530N* IC75T	T1500A T1500Z* T2500A T2500Z* T3000Z*	NS9530 GT9530* AT9530*	TN60 TN620 PV720* TN6020	CX75 PX75* CX90 PX90*	CH550 CZ25*
		P30	**MP3025*** **VP45N***				IC75T	T3000Z*		PV730* PV90*	CX90 PX90*	
	M	M10	**NX2525** **AP25N*** **VP25N***	GC1525*	KT315 KTP10*	TP1020 TP1030* CM CMP*		T1000A T1500Z*		TN60 TN620 PV720* TN6020	LN10	CZ25*
		M20	**NX2525** **AP25N*** **VP25N***					T1500A T1500Z*		TN90 TN6020 TN620 PV720* PV90*	CX75 PX75 CX90	CH550 CZ25*
		M30								PV730*		
	K	K01	**NX2525** **AP25N***					T1000A	NS520 GT720*	CCX* PV7005*	LN10	
		K10	**NX2525** **AP25N***	CT5015	KT315 KTP10*				NS520 NS9530 GT9530*	CCX* PV7005* TN60		CZ25*
		K20	**NX2525** **AP25N***									CH550
Milling	P	P10	**NX2525**			C15M	IC30N			TN100M TN60	CX75	MZ1000*
		P20	**MX3020** **NX2525**	CT530	KT530M HT7 KT605M	C15M MP1020	IC30N	T250A T2500A		TN100M TN620M TN60	CX75 CX90	CH550 CH7030 MZ1000*
		P30	**MX3030** **NX4545**				IC30N	T4500A	NS740		CX90	CH7035
	M	M10	**NX2525**				IC30N			TN60		
		M20	**MX3020** **NX2525**	CT530	KT530M HT7 KT605M	C15M	IC30N	T250A T2500A		TN100M	CX75	
		M30	**MX3030** **NX4545**					T4500A				
	K	K01										
		K10	**NX2525**							TN60	CX75	
		K20	**NX2525**		KT530M HT7						CX75	

*Coated Cermet

Note 1) The tables above are based on published data and not authorized by each manufacturer.

GRADES COMPARISON TABLE

CVD COATED GRADE

	ISO		Mitsubishi Materials	Sandvik	Kennametal	Seco Tools	Iscar	Sumitomo Electric	Tungaloy	Kyocera	Dijet	MOLDINO
	Classification	Symbol										
Turning	P	P01	**MC6115**	GC4305 GC4405 GC4415	KCP05B KCP05	TP0501 TP1501	IC9150 IC8150 IC428	AC810P AC8015P	T9105 T9205	CA510 CA115P CA5505	JC110V	HG8010
		P10	**MC6115** **MY5015** **MC6125**	GC4315 GC4325 GC4415	KCP10B KCP10 KCP25	TP1501 TP2501	IC9150 IC8150 IC8250	AC810P AC8020P	T9205 T9105 T9115 T9215	CA510 CA115P CA5505 CA515 CA5515	JC110V JC215V	HG8010 HG8025 GM8020
		P20	**MC6115** **MC6125** **MC6135** **MY5015**	GC4315 GC4325 GC4425	KCP25B KCP30B KCP25 KCP25C	TP2501	IC8250 IC9250 IC8350	AC8020P AC820P AC2000 AC8025P	T9115 T9125 T9215 T9225	CA025P CA125P CA515 CA5515 CA525 CA5525 CR9025	JC110V JC215V	HG8025 GM8020 GM25
		P30	**MC6125** **MC6135** **UH6400**	GC4325 GC4335 GC4425	KCP30B KCP30	TP3501	IC8350 IC9250 IC9350	AC6030M AC8035P AC830P AC630M	T9125 T9135 T9225 T9235	CA025P CA125P CA525 CA5525 CA530 CA5535 CR9025	JC215V JC325V	GM25 GM8035
		P40	**MC6035** **UH6400**	GC4335	KCP40 KCP40B	TP3501 TP40	IC9350	AC6030M AC8035P AC630M AC830P	T9135 T9235	CA530 CA5535	JC325V	GM8035 GX30
	M	M10	**MC7015** **US7020**	GC2015 GC2220	KCM15B KCM15	TM1501 TM2000	IC6015 IC8250	AC610M AC6020M	T6120 T6215	CA6515		
		M20	**MC7015** **US7020** **MC7025**	GC2015 GC2220	KCM15 KCM25B KCP40B	TM2000 TM2501	IC8150 IC6015	AC6020M AC610M AC6030M AC630M	T6120 T6215	CA6515 CA6525		HG8025 GM25
		M30	**MC7025** **US735**	GC2025	KCM35B KCP40	TM4000 TM3501	IC8250 IC6025	AC6030M AC630M	T6130	CA6525		GM8035 GX30
		M40	**US735**	GC2025	KCM35B	TM4000 TM3501	IC6025	AC6030M AC630M				GX30
	K	K01	**MC5105**	GC3205 GC3210	KCK05B KCK05	TK0501 TH1500	IC5005	AC405K AC4010K	T505 T5105	CA4505 CA310		HX3505
		K10	**MC5115** **MH515** **MY5015**	GC3205 GC3210	KCK15B KCK15 KCK20 KCK20B	TK0501 TK1501	IC5005 IC5010 IC428	AC405K AC4010K AC410K AC4015K AC415K	T515 T5115	CA315 CA4515		HX3515 HG8010
		K20	**MC5125** **MH515** **MY5015**	GC3225	KCK20B KCK20	TK1501	IC5010 IC8150	AC4015K AC415K AC420K AC4125K	T5115 T5125	CA320 CA4515		HG8025 GM8020
		K30	**MC6115**	GC3225	KCPK05			AC8025P AC4125K	T5125			HG8025 GM8020
	S	S01	**MV9005** **US905**	S05F S205						CA6515 CA6525		HS9105 HS9115
Milling	P	P10	**MV1020** **MV1030**			MP1501	IC5400 IC5600	ACP2000 XCU2500 ACP100				
		P20	**MV1020** **MV1030** **MC7020** **F7030**	GC4220	KCPM20	MP1501 MP2501 MP3501 T25M	IC5400 IC5500	ACP2000 XCU2500 ACP100	T3130 T3225			GX2140 GF30
		P30	**MV1020** **MV1030** **MC7020** **F7030**	GC4330	KCPK30	MP1501 MP2501 MP3501 MS2500 T25M	IC5500	XCU2500 ACP100	T3130 T3225			GX2140 GX2160 GF30
		P40		GC4340	KC935M KC530M	MP2501 MP3501 MS2500 MM4500						GX2030 GX2160
	M	M10	**MV1030**			MP2501		XCU2500 XCS2000				
		M20	**MV1030** **MC7020** **F7030**		KC925M	MP2501 MP3501 MS2500 T25M MM4500		ACP100 ACM200 XCU2500 XCS2000	T3130 T3225	CA6535		AX2040 GX2140
		M30	**MV1030** **MC7020** **F7030**	GC2040	KC930M	MP2501 MP3501 MS2500 T25M MM4500	IC5820	ACP100 XCU2500 ACM200 XCS2000	T3130 T3225	CA6535		AX2040 GX2140 GX2160 GX30
		M40			KC930M KC935M	MP3501 MM4500						GX2160
	K	K10	**MV1020 MV1030** **MC520 MC5020**		KCK15	MK1500		XCK2000 ACK2000	T1215 T1115	CA420M	JC605W	GX2120
		K20	**MV1020 MV1030** **MC520 MC5020**	GC3330 K20W	KC915M	MK1500 MP1501	IC5100	ACK2000 XCU2500 XCK2000 ACK200	T1115		JC605W	GX2120
		K30	**MV1030**	GC3330 GC3040	KC920M KC925M KCPK30 KC930M KC935M	MK1500 MP1501 MP2501 MP3501	IC5100 DT7150					
		K40				MP3501						
	S	Ni				MS2500 MP3501		XCS2000		CA6535		
		Ti		S40T		MP3501						

Note 1) The tables above are based on published data and not authorized by each manufacturer.

PVD COATED GRADE

	ISO		Mitsubishi Materials	Sandvik	Kennametal	Seco Tools	Iscar	Sumitomo Electric	Tungaloy	Kyocera	Dijet	MOLDINO
	Classifi-cation	Symbol										
Turning	P	**P10**	**VP10MF** **MS6015**	GC1125	KCU10 KCU10B KC5010 KC5510	CP200 TS2000	IC250 IC807 IC907 IC908		AH710	PR1705 PR930 PR1025 PR1115 PR1225 PR1725 PR2025		
		P20	**VP10RT** **VP20RT** **VP15TF** **VP20MF** **MS6015**	GC1125	KCS10 KCU10 KCU10B KC5025 KC5525	TS2500	IC1007 IC250 IC308 IC807 IC808 IC907 IC908 IC1008 IC1028 IC3028		AH725 AH120 J740 SH730 SH725 SH7025	PR930 PR1025 PR1725 PR1115 PR1225 PR1425 PR1535 PR2025		IP2000
		P30	**VP10RT** **VP20RT** **VP15TF** **VP20MF** **MS7025**	GC1125	KCU25 KC5525	CP500	IC228 IC250 IC328 IC330 IC354 IC528 IC1008 IC1028	AC1030U AC530U	AH725 AH120 SH730 GH730 GH130 AH740 J740 SH725 AH7025 SH7025	PR1025 PR1725 PR1225 PR1425 PR1535 PR1625 PR2025		IP3000
		P40				CP500 CP600	IC228 IC328 IC528 IC928 IC1008 IC1028		AH740	PR1535		
	M	**M01**				CP200 TS2000				PR1725	JC5003	
		M10	**VP10MF**	GC1115 GC1125 GC1105	KCS10 KCU10 KCU10B KC5010	CP200 TS2000 TS2500	IC354 IC807 IC907 IC1007		AC8005 AH630 AH6225	PR1025 PR1225 PR930 PR1725 PR120S	JC5003 JC8015 JC5015	IP050S
		M20	**VP10RT** **VP20RT** **VP15TF** **VP20MF** **MS7025** **MS9025**	GC1115 GC1125	KCU25 KC5025 KCU10 KCU10B KC5010 KCS10	TS2500 CP500 CP600	IC354 IC808 IC908 IC1008 IC1028	AC1030U AC530U AC6040M	AH725 AH120 SH730 AH630 SH725 AH8015 AH7025 AH6225 SH7025	PR1025 PR1225 PR930 PR1535 PR1725 PR120S	JC5015 JC8015 JC5118	IP100S
		M30	**VP10RT** **VP20RT** **VP15TF** **VP20M** **VP20MF** **MS7025** **MP7035**	GC1125 GC2035	KC5025 KCU25	CP500 CP600	IC228 IC250 IC328 IC1008 IC1028	AC530U AC1030U AC6040M	AH725 AH120 SH730 J740 AH645 SH725 AH6235 SH7025	PR1025 PR1725 PR1535 PR1225 PR120S PR2035	JC5118	
		M40	**MP7035**	GC2035		CP600	IC328 IC928 IC1008 IC1028	AC530U AC6040M AC1030U	AH645 AH6235	PR1535 PR1225		
	K	**K10**		GC15	KCU10 KCS10 KC5010 KC5510	CP200 TS2000	IC350 IC1008		GH110 AH110			
		K20	**VP10RT** **VP20RT** **VP15TF**		KCU15 KCU25	CP200 TS2000 TS2500	IC228 IC808 IC830 IC908 IC1007 IC1008	AC1030U AC530U	AH7025 AH120			
		K30	**VP10RT** **VP20RT** **VP15TF**		KCU25 KC5525	CP500	IC228 IC350 IC808 IC830 IC908 IC928 IC1007 IC1008		AH120 GH130			
	S	**S01**	**MP9005** **VP05RT**	GC1105 GC1205		TH1000	IC804 IC807 IC907	AC510U AC5005S AC5015S AC5005S	AH8005	PR005S PR015S	JC5003 JC8015 JC5015	JP9105
		S10	**MP9005** **MP9015** **VP10RT**	GC1105 GC1205 GC1115 GC1210	KCU10 KCU10B KC5010 KCS10 KCS10B	CP200 TS2000 TS2050 TS2500 TH1000	IC806 IC807	AC510U AC520U AC5015S AC5025S	AH8005 AH8015	PR005S PR015S PR115S	JC5003 JC5015 JC8015	JP9115
		S20	**MP9015** **MT9015**	GC1115 GC1125	KCU10 KCU10B KCU25 KC5025 KCS10 KC5010 KCS10B	TS2000 TS2500 CP200	IC228 IC328 IC808 IC908 IC928 IC806	AC520U AC5015S AC5025S	AH7025 AH8015	PR015S PR1535 PR115S	JC5015 JC5118	
		S30	**MP9025** **VP15TF** **VP20RT**	GC1125	KCU25 KC5025	CP600	IC928 IC830	AC1030U	AH630 AH7025	PR1535 PR120S	JC5118	
Milling	P	**P01**							AH710 AH110		JC8003	ATH80D JP4105
		P10		GC1010 GC1130	KC505M KC715M KC510M KC515M		IC250 IC350 IC808 IC810 IC910 IC950	ACU2500 ACP200	AH120 AH725	PR830 PR1225 PR1825	JC8003 JC8015 JC5015 JC5118	PN15M PN215 PCA12M JP4115
		P20	**MP6120** **VP15TF**	GC1010 GC1030 GC1130 GC2030	KC522M KC525M KC527M KC610M KC620M KC635M KC715M KC730M KTPK20	F25M MP3000	IC250 IC328 IC330 IC350 IC808 IC810 IC830 IC910 IC928 IC950	ACU2500 ACP200	AH3135 AH3225 AH725 AH120 AH9130 AH6030 AH9030	PR830 PR1225 PR1230 PR1525 PR1825	JC5015 JC8015 JC5118	CY9020 JP4120 CY150

Note 1) The tables above are based on published data and not authorized by each manufacturer.

GRADES COMPARISON TABLE

PVD COATED GRADE

	ISO		Mitsubishi Materials	Sandvik	Kennametal	Seco Tools	Iscar	Sumitomo Electric	Tungaloy	Kyocera	Dijet	MOLDINO
	Classifi-cation	Symbol										
Milling	P	P30	**MP6120 VP15TF MP6130 VP30RT**	GC1010 GC1030 GC2030 GC1130	KC735M KC725M KC530M KCPM40	F25M MP3000 F30M MP2050	IC250 IC300 IC330 IC350 IC830 IC845 IC928 IC950	ACU2500 ACP200 ACP300	AH725 AH130 AH140 AH3035 AH6030 AH3225 AH9130	PR1230 PR1525 PR1825	JC8050 JC5040 JC5118	JS4045 CY250 CY250V CY25 HC844
		P40	**VP30RT**	GC2030 GC1030 GC1130	KC735M KCPM40	F40M T60M	IC328 IC330 IC830 IC928	ACP300	AH140 AH3035	PR1525	JC8050 JC5040	JS4060 PTH30E PTH40H JS4060
	M	M01					IC907					PN08M PN208
		M10		GC1025 GC1030 GC1010 GC1130	KC715M KC515M		IC903	ACU2500 ACM100	AH725	PR1225		PN15M PN215
		M20	**VP15TF MP7130 MP7030 VP20RT**	GC1025 GC1030 GC1040 GC2030 S30T	KC610M KC635M KC730M KC522M KC525M KCPM40 KTPK20	F25M MP3000	IC250 IC808 IC830 IC928	ACU2500 ACP200	AH725 AH6030 AH130 AH330 AH9130	PR1025 PR1225	JC5015 JC5118 JC8015	JP4120
		M30	**VP15TF MP7130 MP7030 VP20RT VP30RT MP7140**	S30T GC1040 GC2030	KC725M KC735M KCPM40 KC530M	F30M F40M MP3000 MP2050	IC250 IC328 IC330 IC380 IC830 IC882 IC928	ACP300 ACM300 ACK300	AH130 AH140 AH730 AH3135 AH4035 AH9130	PR830 PR1225 PR1525 PR1535 PR1835	JC5015 JC8015 JC8050 JC5118	JS4045 CY250
		M40	**MP7140 VP30RT**			F40M MP2050	IC250 IC328 IC330 IC882	ACP300 ACM300	AH140 AH3135 AH4035	PR1535 PR1835	JC8050	PTH30E PTH40H JM4160
	K	K01	**MP8010**						AH110 AH330		JC8003	ATH80D ATH08M TH308
		K10	**MP8010**	GC1010	KCKP10 KC514M KC515M KC527M KC635M KCK20B	MK2050	IC350 IC810 IC830 IC900 IC910 IC928 IC950 IC380	ACU2500 ACK3000	AH110 AH725 AH120 AH330	PR1210 PR1510 PR1810	JC8015	ATH10E TH315 CY100H
		K20	**VP15TF VP20RT**	GC1010 GC1020	KTPK20 KC514M KC610M KC520M KC620M KC524M KCK20B	MK2000 MK2050	IC350 IC808 IC810 IC830 IC910 IC928 IC950	ACU2500 ACK300 ACK3000	AH120 AH9130 AH9030	PR1210 PR1510 PR1810	JC5015 JC8015	CY150 JP4120 CY9020 PTH13S
		K30	**VP15TF VP20RT**	GC1020	KC522M KC725M KC524M KC735M	MK2050	IC350 IC808 IC830 IC928 IC950	ACK300 ACK3000	AH120		JC5080 JC5015 JC8015	CY250 JS4045
	S	S01					IC907 IC808		AH110 AH710	PR1210	JC8003 JC8015 JC5118	PN08M PN208
		S10	**MP9120 VP15TF**	GC1130 GC1010 GC1030 GC2030	KC505M KC510M	MS2050	IC907 IC840 IC910 IC808	EH520Z EH20Z ACM100	AH120 AH725	PR1210	JC8003 JC5015 JC8015 JC5118 DS118	JS1025 JP4120
		S20	**MP9120 VP15TF MP9130 MP9030**	S30T GC2030 GC1030 GC1130	KC522M KC525M KCSM30 KCPM40	MS2050 MP2050	IC808 IC830 IC928 IC328 IC330 IC840 IC882 IC380	EH520Z EH20Z ACK300 ACP300	AH725 AH6030 AH130	PR1535	JC8015 JC5015 JC8050 JC5118 DS150	PTH30H
		S30	**MP9140**	GC2030 GC1040	KC725M KCPM40	MS2050 F40M KCSM40	IC830 IC882 IC928	ACP300 ACM300	AH130 AH3135	PR1535	JC8050 JC5118	JM4160
	H	H01	**MP8010 VP05HT**						AH110 AH710		JC8003	
		H10	**VP15TF VP10H**	GC1130 GC1010 GC1030	KC505M KC510M	MH1000 F15M	IC808 IC907		AH110 AH120 AH710		JC6102 JC8008	JP4105 TH303 TH308 PTH08M ATH08M ATH80D
		H20	**VP15TF**	GC1030 GC1130		F15M	IC808 IC380		AH120 AH3135 AH725 AH9030		JC8015 JC5118	JP4115 TH315
		H30				MP3000 F30M	IC380		AH3135			JP4120

Note 1) The tables above are based on published data and not authorized by each manufacturer.

PCBN

	ISO		Mitsubishi Materials	Sandvik	Seco Tools	Iscar	Sumitomo Electric	Tungaloy	Kyocera
	Classification	Symbol							
Turning	H	H01	**BC8105 BC8210 BC8110 MB8110**	CB7105 CB7015	CBN010 CBN060K CH0550	IB50 IB10H IB10HC	BNC2105 BNC2115 BNC2010 BN1000	BXA10 BXM10 BX310	KBN05M KBN010 KBN510
		H10	**BC8110 BC8210 BC8120 BC8220 MB8110 MB8120**	CB7115 CB7125 CB7025 CB20	CBN010 CBN060K CBN150 CH2540 CH1050	IB50 IB10H IB10HC IB55 IB20H IB25HA	BNC2115 BNC2125 BNC2010 BNC2020 BN2000	BXA10 BXA20 BXM10 BX330 BX530	KBN010 KBN020 KBN05M KBN25M KBN525
		H20	**BC8220 BC8120 MB8120**	CB7125 CB7025 CB50	CBN150 CBN160C CH2540 CH2581	IB20H IB25HA IB90 IB25HC	BNC2020 BNC2125 BN2000	BXM20 BXA20 BX360	KBN020 KBN25M
		H30	**BC8130 MB8130**	CB7135 CB7525	CBN160C CH3515	IB90 IB25HC	BNC300 BN350	BXC50 BX380 BR35F	KBN35M
	S	S01	**MB4120**		CBN170	IB05S	BN7125 BN7000 NBC100	BX815	
		S10				IB05S IB10S	BNS8125		
		S20				IB10S	BNS8125		
		S30							
	K	K01	**BC5110 MB5015**	CB50	CBN400C	IB50 IB55 IB85	BN7125 BNC500 BN500	BX910 BX930	KBN475 KBN60M
		K10	**MB4120**	CB7525	CBN300 CBN300 P CBN200	IB50 IB55 IB85	BN7125 BN500	BX480	KBN475 KBN60M
		K20	**MB4120**		CBN200		BN7125 BNC8115 BNS8125	BX480	KBN60M
		K30	**BC5030 MBS140**	CB7925	CBN500		BNS800 BNC8115 BNC8125	BXC90 BX90S	KBN900
	Sintered Alloy		**MB4120**		CBN200	IB05S IB10S	BN7115 BN7125	BX470 BX480	KBN570 KBN70M

PCD

	ISO		Mitsubishi Materials	Sandvik	Seco Tools	Iscar	Sumitomo Electric	Tungaloy	Kyocera
	Classification	Symbol							
Turning	N	N01	**MD205*****	CD05	PCD30 PCD30M	ID5	DA90	DX180 DX160	KPD230
		N10	**MD220**	CD10 CD1810	PCD10	ID5	DA150	DX160 DX140	KPD010 KPD230
		N20	**MD220**		PCD20		DA2200 DA1000	DX140 DX110	KPD010
		N30	**MD230***** **MD2030**		PCD05		DA2200 DA1000	DX120 DX110	KPD001

*Non stock, produced to order only.
Note 1) The tables above are based on published data and not authorized by each manufacturer.

Memo

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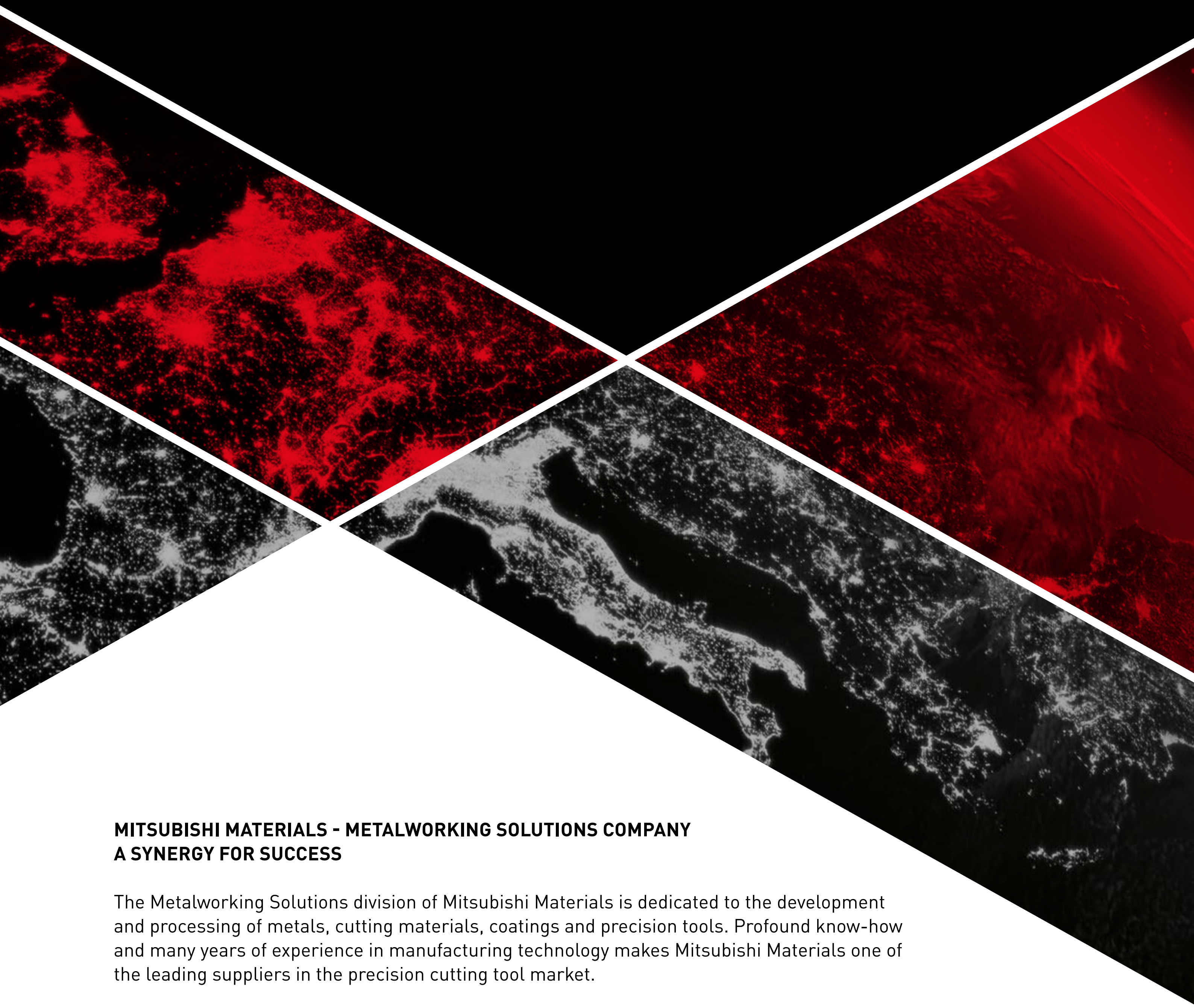

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