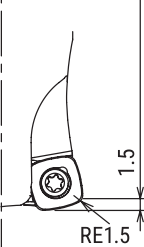
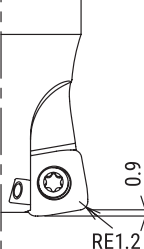
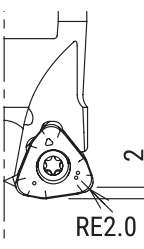
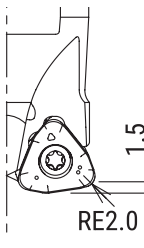
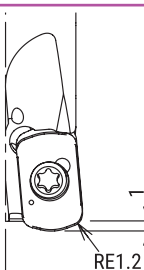
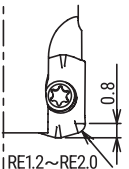
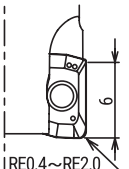
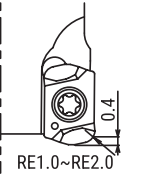
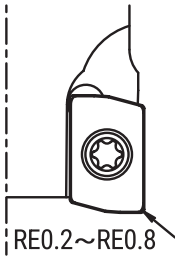
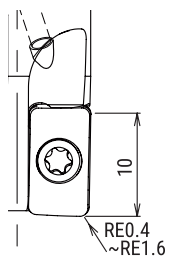
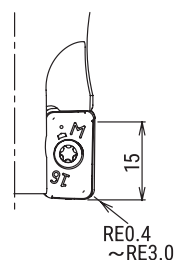
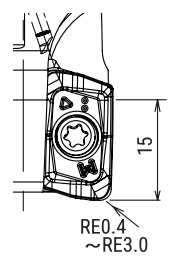
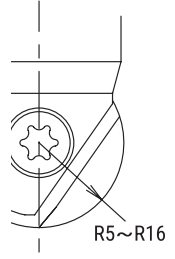


INDEXABLE TOOLS

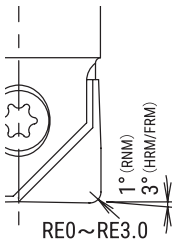
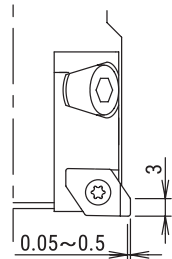
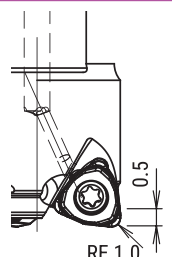
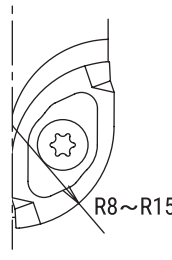
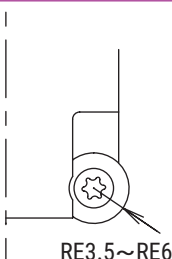


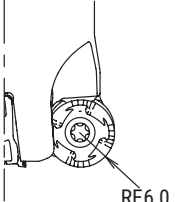
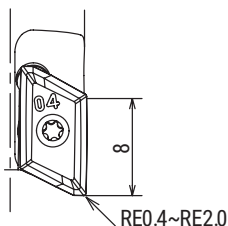
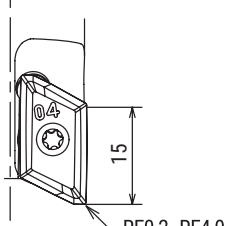
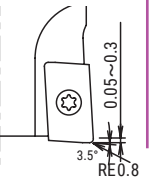
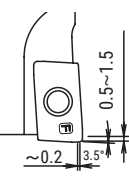
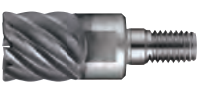
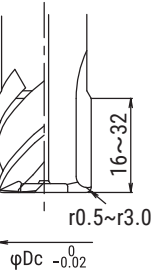
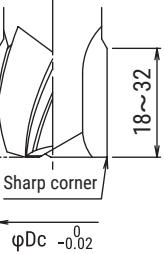
MILLING TOOLS QUICK GUIDE

Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
HIGH FEED COPY MILLING	SKS-GII	O.D. 0 Tolerance -0.1 Insert N.E.M Class  φ25~φ42		     	
	MSG Type				
	A051				
HIGH FEED COPY MILLING	SKS-GII-09	O.D. 0 Tolerance -0.1 Insert E Class  φ20~φ42		     	
	MSG-09 Type				
	A064				
HIGH FEED COPY MILLING	SKS EXTREME	O.D. -0.05 Tolerance -0.15 Insert M Class  φ32~φ42		     	
	MEX-07 Type				
	A072				
HIGH FEED COPY MILLING	SKS EXTREME	O.D. -0.05 Tolerance -0.15 Insert M Class  φ20~φ40		     	
	MEX-05 Type				
	A070				
HIGH FEED COPY MILLING	QM MAX GII	Insert M Class  φ16~φ42		     	
	MXG Type				
	A085				
HIGH FEED COPY MILLING	QM MAX	Insert H.M Class  φ16~φ42	High Feed O.D. Tolerance -0.06 -0.14  Shoulder Milling O.D. Tolerance -0.03 -0.11 	      	
	MQX Type				
	A095				

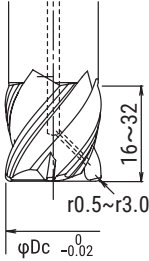
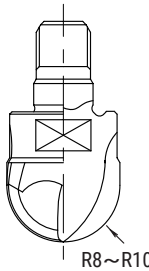
Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
HIGH FEED COPY MILLING	QM MILL	 Insert H, M Class	High Feed O.D. Tolerance -0.05 -0.15 Shoulder Milling O.D. Tolerance -0.02 -0.12  RE1.0~RE2.0  RE0.2~RE0.8	 Face Milling  Pocket Milling  Copy Milling  Helical Interpolation  Slotting  Shoulder Milling  G-Body	
	MPM Type				
	A109	$\phi 10 \sim \phi 32$			
SHOULDER MILLING	HIGH PRECISION QM MILL	 O.D. Tolerance 0 -0.03 Insert H, M Class	 RE0.2~RE0.8	 Face Milling  Shoulder Milling	
	MPT Type				
	A109	$\phi 10 \sim \phi 16$			
SHOULDER MILLING	EXTREME SAP	 O.D. Tolerance -0.04 -0.1 Insert G Class	 RE0.4~RE1.6	 Face Milling  Slotting  Shoulder Milling  Helical Interpolation  Plunge Milling	
	MSX-11 Type				
	A120	$\phi 16 \sim \phi 40$			
SHOULDER MILLING	EXTREME SAP	 O.D. Tolerance -0.05 -0.15 Insert G Class	 RE0.4~RE3.0	 Face Milling  Slotting  Shoulder Milling  Helical Interpolation  Plunge Milling  G-Body	
	MSX-17 Type				
	A124	$\phi 25 \sim \phi 40$			
SHOULDER MILLING	SIC-EVO	 O.D. Tolerance -0.05 -0.15 Insert E, M Class	 RE0.4~RE3.0	 Face Milling  Pocket Milling  Copy Milling  Helical Interpolation  Slotting  Shoulder Milling  G-Body	
	SSV Type				
	A138	$\phi 25 \sim \phi 40$			
FINISHING COPY MILLING	MIRROR BALL	 O.D. Tolerance ± 0.008 Insert F Class	 R5~R16	 Copy Milling  Pocket Milling  Slotting	
	MBX Type				
	A148	$\phi 10 \sim \phi 30$			

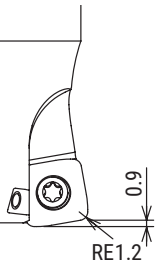
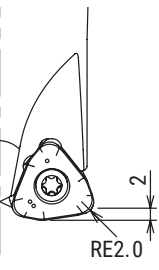
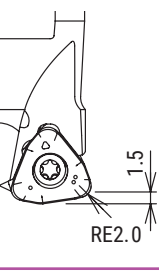
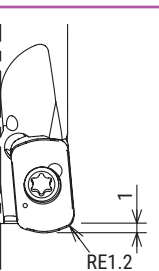
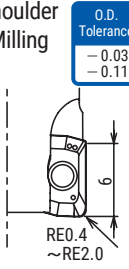
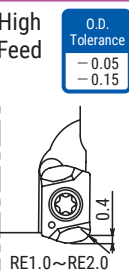
MILLING TOOLS QUICK GUIDE

Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications									
FINISHING COPY MILLING	MIRROR RADIUS	O.D. Tolerance -0.002 -0.018 Insert F Class 		    									
	MRX Type												
	A160	$\phi 10 \sim \phi 32$											
FINISHING UP & DOWN MILLING	BACK & FORTH CUTTER	O.D. Tolerance $+0.1$ -0.3 Insert G Class 		 	WEB CATALOGUE 								
	MPF Type												
	Available only on WEB CATALOGUE	$\phi 30 \sim \phi 40$											
FINISHING COPY MILLING	DIEMASTER 5G	O.D. Tolerance 0.0 -0.05 Insert H Class 		  									
	MXF Type												
	A171	$\phi 16 \sim \phi 42$											
ROUGHING COPY MILLING	SWING BALL	<table><tr><th>Tool dia.</th><th>O.D. Tolerance</th></tr><tr><td>$\phi 16$</td><td>0 -0.1</td></tr><tr><td>$\phi 20, \phi 25$</td><td>-0.01 -0.11</td></tr><tr><td>$\phi 30$</td><td>-0.05 -0.15</td></tr></table>  Insert G Class	Tool dia.	O.D. Tolerance	$\phi 16$	0 -0.1	$\phi 20, \phi 25$	-0.01 -0.11	$\phi 30$	-0.05 -0.15		  	WEB CATALOGUE 
	Tool dia.	O.D. Tolerance											
	$\phi 16$	0 -0.1											
$\phi 20, \phi 25$	-0.01 -0.11												
$\phi 30$	-0.05 -0.15												
MSWX Type													
Available only on WEB CATALOGUE	$\phi 16 \sim \phi 30$												
ROUGHING COPY MILLING	SWING BALL	O.D. Tolerance -0.05 -0.15 Insert G Class 		   	WEB CATALOGUE 								
	MSW Type												
	Available only on WEB CATALOGUE	$\phi 32$											
COPY MILLING	SUPER DIEMASTER	O.D. Tolerance 0 -0.1 Insert G, M Class 		    									
	SDH Type												
	A179	$\phi 15 \sim \phi 42$											

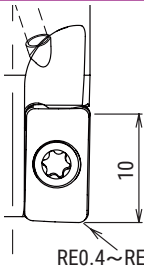
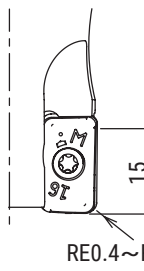
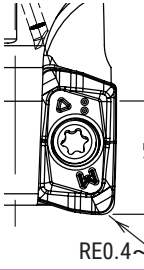
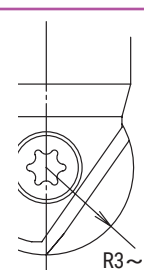
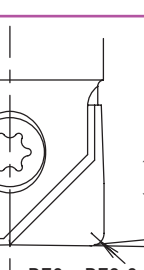
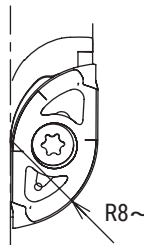
Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
COPY MILLING	EXTREME DIEMASTER	O.D. 0 Tolerance -0.1 Insert M Class  φ32~φ40	 RE6.0	   	WEB CATALOGUE 
	MTX Type	Available only on WEB CATALOGUE			
FOR ALUMINIUM ALLOY	AERO CHIPPER	O.D. 0 Tolerance -0.1 Insert E Class  φ16~φ42	 RE0.4~RE2.0	    	
	MAM Type	A191			
FOR ALUMINIUM ALLOY	AERO CHIPPER	O.D. -0.04 Tolerance -0.1 Insert G Class  φ20~φ40	 RE0.2~RE4.0	     	
	MAL Type	A193			
FINISHING SIDE & BOTTOM FACE	BACK DRAFT CUTTER	O.D. 0 Tolerance -0.1 Insert H Class  φ20~φ40	Bottom Finishing  Side Finishing 	    	WEB CATALOGUE 
	MDB Type	Available only on WEB CATALOGUE			
MULTI-EDGES	S-HEAD	 φ16~φ32		  	
	SMSA Type	A203			
FOR ALUMINIUM ALLOY	S-HEAD	 φ18~φ32		    	
	SMAL Type	A208			

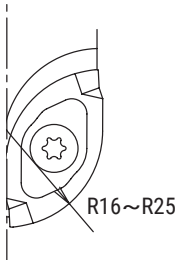
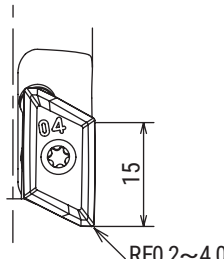
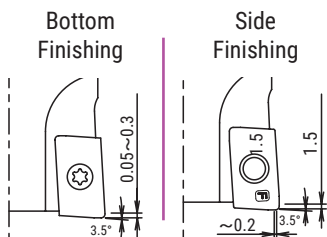
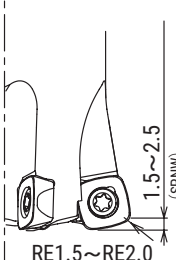
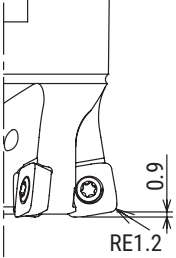
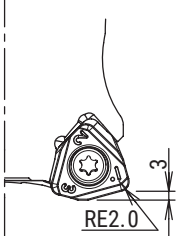
MILLING TOOLS QUICK GUIDE

Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
FOR HEAT RESISTANT ALLOY	S-HEAD	 $\phi 16 \sim \phi 32$	 $\phi D_c \begin{smallmatrix} 0 \\ -0.02 \end{smallmatrix}$	   	
	SMSR Type				
	A210				
FOR HARDENED MATERIALS	S-HEAD	 $\phi 16 \sim \phi 20$	 $R8 \sim R10$	 	
	SMHB Type				
FOR HIGH EFFICIENCY MACHINING	CARBIDE SHANK	 MSN Type $\phi 10 \sim \phi 32$  MSN-S Type $\phi 9.8 \sim \phi 32$			
	MSN Type				
	A214				

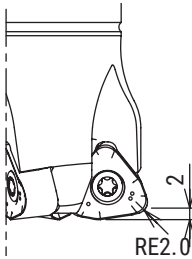
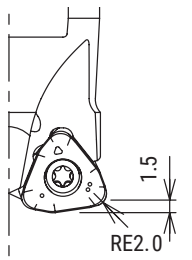
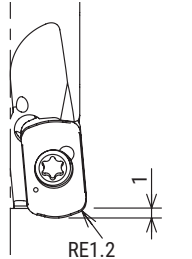
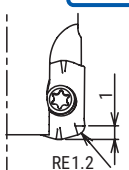
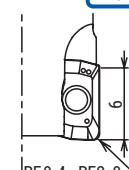
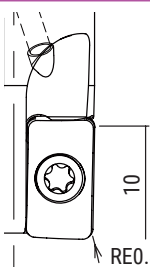
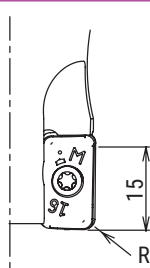
Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
HIGH FEED COPY MILLING	SKS-GII-09	 O.D. $\begin{matrix} 0 \\ -0.1 \end{matrix}$ Tolerance Insert E Class $\phi 25 \sim \phi 35$	 0.9 RE1.2	   	
	SKG-09 Type				
	A063				
HIGH FEED COPY MILLING	SKS EXTREME	 O.D. $\begin{matrix} -0.05 \\ -0.15 \end{matrix}$ Tolerance Insert M Class $\phi 32 \sim \phi 40$	 2 RE2.0	    	
	EXSKS-07 Type				
	A073				
HIGH FEED COPY MILLING	SKS EXTREME	 O.D. $\begin{matrix} -0.05 \\ -0.15 \end{matrix}$ Tolerance Insert M Class $\phi 20 \sim \phi 32$	 1.5 RE2.0	    	
	EXSKS-05 Type				
	A071				
HIGH FEED COPY MILLING	QM MAX GII	 O.D. $\begin{matrix} -0.05 \\ -0.15 \end{matrix}$ Tolerance Insert M Class $\phi 16 \sim \phi 32$	 1 RE1.2	    	
	GMX Type				
	A084				
HIGH FEED COPY MILLING	QM MAX	 Insert H.M Class $\phi 16 \sim \phi 25$	High Feed  O.D. $\begin{matrix} -0.06 \\ -0.14 \end{matrix}$ Tolerance RE1.2 ~ RE2.0 0.8 Shoulder Milling  O.D. $\begin{matrix} -0.03 \\ -0.11 \end{matrix}$ Tolerance RE0.4 ~ RE2.0 6	     	
	QXP Type				
	A094				
HIGH FEED COPY MILLING	QM MILL	 Insert H.M Class $\phi 10 \sim \phi 14$	High Feed  O.D. $\begin{matrix} -0.05 \\ -0.15 \end{matrix}$ Tolerance RE1.0 ~ RE2.0 0.4 Shoulder Milling  O.D. $\begin{matrix} -0.02 \\ -0.12 \end{matrix}$ Tolerance RE0.2 ~ RE0.8 5	     	
	PME Type				
	A108				

MILLING TOOLS QUICK GUIDE

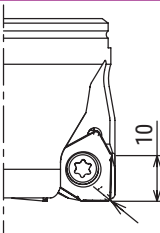
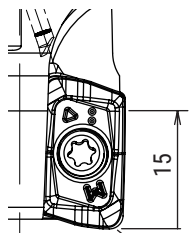
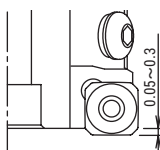
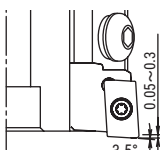
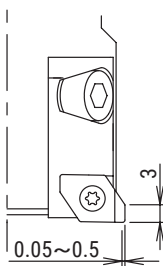
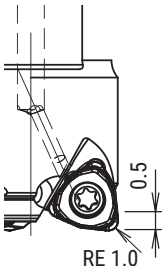
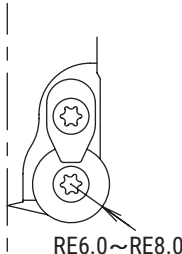
Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications									
SHOULDER MILLING	EXTREME SAP	O.D. — 0.03 Tolerance — 0.11 Insert G Class 		Face Milling Slotting Shoulder Milling Helical Interpolation Plunge Milling									
	EXSAP-11 Type												
	A119	φ16~φ32	RE0.4~RE1.6										
SHOULDER MILLING	EXTREME SAP	O.D. — 0.05 Tolerance — 0.15 Insert G Class 		Face Milling Slotting Shoulder Milling Helical Interpolation Plunge Milling									
	EXSAP-17 Type												
	A123	φ25~φ32	RE0.4~RE3.0										
SHOULDER MILLING	SIC-EVO	O.D. — 0.05 Tolerance — 0.15 Insert E, M Class 		Face Milling Copy Milling Pocket Milling Helical Interpolation Slotting Shoulder Milling									
	SSV Type												
	A139	φ25~φ40	RE0.4~RE3.0										
FINISHING COPY MILLING	MIRROR BALL	O.D. Tolerance ±0.008 Insert F Class 		Copy Milling Pocket Milling Slotting									
	BNM Type												
	A146	φ6~φ30	R3~R16										
FINISHING COPY MILLING	MIRROR RADIUS	O.D. — 0.002 Tolerance — 0.018 Insert F Class 		Face Milling Copy Milling Pocket Milling Helical Interpolation Shoulder Milling									
	RNM Type												
	A158	φ6~φ32	RE0~RE3.0										
ROUGHING COPY MILLING	SWING BALL	<table><tr><th>Tool dia.</th><th>O.D.</th></tr><tr><td>φ16</td><td>0</td></tr><tr><td>φ20, φ25</td><td>-0.01 -0.11</td></tr><tr><td>φ30</td><td>-0.05 -0.15</td></tr></table> Insert G Class 	Tool dia.	O.D.	φ16	0	φ20, φ25	-0.01 -0.11	φ30	-0.05 -0.15		Copy Milling Shoulder Milling Slotting	WEB CATALOGUE 
	Tool dia.	O.D.											
	φ16	0											
φ20, φ25	-0.01 -0.11												
φ30	-0.05 -0.15												
SWBX Type													
Available only on WEB CATALOGUE													

Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
ROUGHING COPY MILLING	SWING BALL	O.D. Tolerance: -0.05 / -0.15 Insert: G Class	 R16~R25	 Copy Milling  Shoulder Milling  Slotting	WEB CATALOGUE 
	SWB Type Available only on WEB CATALOGUE	 $\phi 32 \sim \phi 50$			
FOR ALUMINIUM ALLOY	AERO CHIPPER	O.D. Tolerance: 0 / -0.1 Insert: G Class	 RE0.2~4.0	 Copy Milling  Slotting  Shoulder Milling  Helical Interpolation  Pocket Milling G-Body	
	ALXM Type A194	 $\phi 20 \sim \phi 40$			
FINISHING SIDE & BOTTOM FACE	BACK DRAFT CUTTER	O.D. Tolerance: 0 / -0.1 Insert: H Class	 Bottom Finishing Side Finishing	 Face Milling  Copy Milling  Pocket Milling  Helical Interpolation  Plunge Milling	WEB CATALOGUE 
	DBD Type Available only on WEB CATALOGUE	 $\phi 40$			
HIGH FEED COPY MILLING	SKS-II	O.D. Tolerance: -0.05 / -0.15 Insert: N, E, M Class	 RE1.5~RE2.0	 Face Milling  Copy Milling  Pocket Milling  Helical Interpolation  Plunge Milling G-Body	
	SKG Type A050	 $\phi 50 \sim \phi 160$			
HIGH FEED COPY MILLING	SKS-II-09	O.D. Tolerance: -0.05 / -0.15 Insert: E Class	 RE1.2	 Face Milling  Copy Milling  Pocket Milling  Helical Interpolation  Plunge Milling G-Body	
	SKG-09 Type A062	 $\phi 40 \sim \phi 80$			
HIGH FEED COPY MILLING	SKS EXTREME	O.D. Tolerance: 0 / -0.2 Insert: M Class	 RE2.0	 Face Milling  Copy Milling  Pocket Milling  Helical Interpolation  Plunge Milling G-Body	
	EXSKS-09 Type A074	 $\phi 50 \sim \phi 160$			

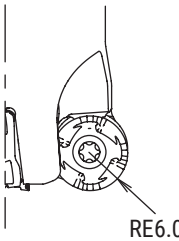
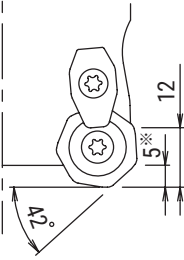
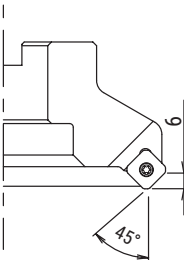
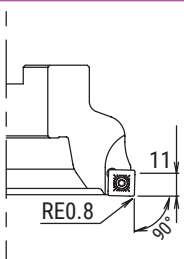
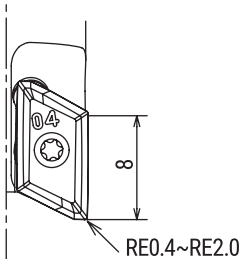
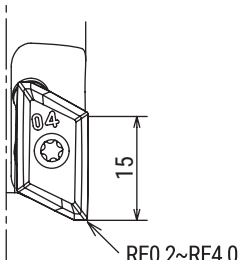
MILLING TOOLS QUICK GUIDE

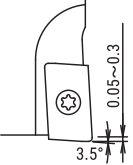
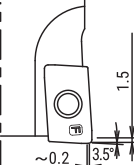
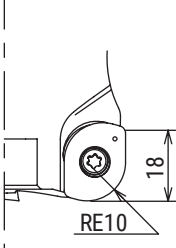
Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
HIGH FEED COPY MILLING	SKS EXTREME	O.D. Tolerance — 0.05 — 0.15 Insert M Class  φ50~φ100	 RE2.0	 Face Milling  Copy Milling  Pocket Milling  Helical Interpolation  Plunge Milling  G-Body	
	EXSKS-07 Type				
	A072				
HIGH FEED COPY MILLING	SKS EXTREME	O.D. Tolerance — 0.05 — 0.15 Insert M Class  φ40~φ63	 RE2.0	 Face Milling  Copy Milling  Pocket Milling  Helical Interpolation  Plunge Milling  G-Body	
	EXSKS-05 Type				
	A070				
HIGH FEED COPY MILLING	QM MAX GII	O.D. Tolerance — 0.05 — 0.15 Insert M Class  φ50~φ66	 RE1.2	 Face Milling  Copy Milling  Pocket Milling  Helical Interpolation  Slotting  G-Body	
	GMX Type				
	A083				
HIGH FEED COPY MILLING	QM MAX	Insert H, M Class  φ40~φ66	High Feed O.D. Tolerance — 0.05 — 0.15  RE1.2 Shoulder Milling O.D. Tolerance — 0.02 — 0.12  RE0.4~RE2.0	 Face Milling  Copy Milling  Pocket Milling  Helical Interpolation  Shoulder Milling  Slotting  G-Body	
	QXP Type				
	A093				
SHOULDER MILLING	EXTREME SAP	Tool dia. O.D. Tolerance ≠ φ63 — 0.03 — 0.11 φ80 — 0.02 — 0.12 Insert G Class  φ40~φ80	 RE0.4~RE1.6	 Face Milling  Slotting  Shoulder Milling  Helical Interpolation  Plunge Milling	
	EXSAP-11 Type				
	A118				
SHOULDER MILLING	EXTREME SAP	Tool dia. O.D. Tolerance ≠ φ80 — 0.05 — 0.15 ≧ φ100 0 — 0.2 Insert G Class  φ50~φ125	 RE0.4~RE3.0	 Face Milling  Slotting  Shoulder Milling  Helical Interpolation  Plunge Milling  G-Body	
	EXSAP-17 Type				
	A122				

φ40~φ80

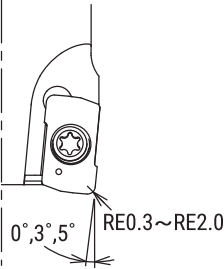
Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications							
SHOULDER MILLING	SHOULDER 6	<table><tr><th>Tool dia.</th><th>O.D. Tolerance</th></tr><tr><td>≤ φ80</td><td>-0.05 -0.15</td></tr><tr><td>≥ φ100</td><td>0 -0.2</td></tr></table>  φ50~φ160	Tool dia.	O.D. Tolerance	≤ φ80	-0.05 -0.15	≥ φ100	0 -0.2	 RE0.8~RE1.6		
	Tool dia.	O.D. Tolerance									
	≤ φ80	-0.05 -0.15									
≥ φ100	0 -0.2										
EXSIX Type											
A133											
SHOULDER MILLING	SIC-EVO	<table><tr><th>Tool dia.</th><th>O.D. Tolerance</th></tr><tr><td>≤ φ80</td><td>-0.05 -0.15</td></tr><tr><td>≥ φ100</td><td>-0.025 -0.175</td></tr></table>  φ40~φ125	Tool dia.	O.D. Tolerance	≤ φ80	-0.05 -0.15	≥ φ100	-0.025 -0.175	 RE0.4~RE3.0		
	Tool dia.	O.D. Tolerance									
	≤ φ80	-0.05 -0.15									
≥ φ100	-0.025 -0.175										
SSV Type											
A137											
SUPER FINISHING FOR FLAT FACE	FINISH JET MILL	<table><tr><th>O.D. Tolerance</th><th>Insert</th></tr><tr><td>±0.2</td><td>H Class</td></tr></table>  φ80~φ250	O.D. Tolerance	Insert	±0.2	H Class	Super Finishing  Corner Finishing  3.5°		WEB CATALOGUE 		
	O.D. Tolerance	Insert									
	±0.2	H Class									
FJM Type											
Available only on WEB CATALOGUE											
FINISHING UP & DOWN MILLING	BACK & FORTH CUTTER	<table><tr><th>O.D. Tolerance</th><th>Insert</th></tr><tr><td>+0.1 -0.3</td><td>G Class</td></tr></table>  φ50~φ80	O.D. Tolerance	Insert	+0.1 -0.3	G Class	 0.05~0.5		WEB CATALOGUE 		
	O.D. Tolerance	Insert									
	+0.1 -0.3	G Class									
PFC Type											
Available only on WEB CATALOGUE											
FINISHING COPY MILLING	DIEMASTER 5G	<table><tr><th>O.D. Tolerance</th><th>Insert</th></tr><tr><td>0.0 -0.5</td><td>H Class</td></tr></table>  φ52~φ66	O.D. Tolerance	Insert	0.0 -0.5	H Class	 RE 1.0				
	O.D. Tolerance	Insert									
	0.0 -0.5	H Class									
XFG Type											
A171											
COPY MILLING	SUPER DIEMASTER	<table><tr><th>O.D. Tolerance</th><th>Insert</th></tr><tr><td>0 -0.2</td><td>G, M Class</td></tr></table>  φ50~φ80	O.D. Tolerance	Insert	0 -0.2	G, M Class	 RE6.0~RE8.0				
	O.D. Tolerance	Insert									
	0 -0.2	G, M Class									
HDM Type											
A177											

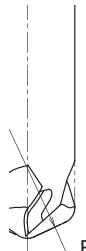
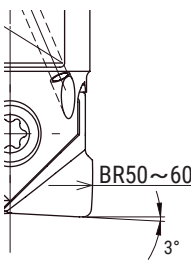
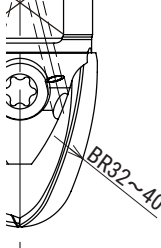
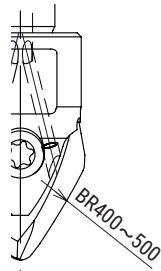
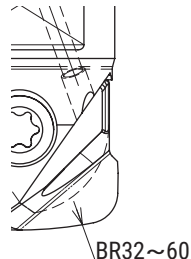
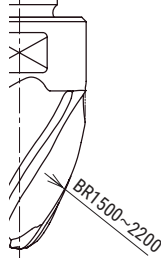
MILLING TOOLS QUICK GUIDE

Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
COPY MILLING	EXTREME DIEMASTER	O.D. Tolerance: 0 / -0.2 Insert: M Class  φ50~φ63	 RE6.0	   	WEB CATALOGUE 
	EXTDM Type Available only on WEB CATALOGUE				
FOR HEAVY MACHINING	HEPTA MILL	O.D. Tolerance: -0.025 / -0.175 Insert: H, M Class  φ50~φ200		     	
	HEP Type A186				
GENERAL FACE MILLING	DIJET MILL 45	Tool dia. O.D. Tolerance: ≤ φ63 ±0.25 / ≥ φ80 ±0.5 Insert: G, M Class  φ50~φ125			WEB CATALOGUE 
	SSE45 Type Available only on WEB CATALOGUE				
GENERAL SHOULDER MILLING	DIJET MILL 90	O.D. Tolerance: ±0.1 Insert: H, M Class  φ50~φ125		 	WEB CATALOGUE 
	SSD90 Type Available only on WEB CATALOGUE				
FOR ALUMINIUM ALLOY	AERO CHIPPER	O.D. Tolerance: 0 / -0.1 Insert: G Class  φ40~φ63	 RE0.4~RE2.0	    	
	AMX Type A191				
FOR ALUMINIUM ALLOY	AERO CHIPPER	O.D. Tolerance: 0 / -0.1 Insert: G Class  φ50~φ63	 RE0.2~RE4.0	     	
	ALX Type A193				

Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
FINISHING SIDE & BOTTOM FACE	BACK DRAFT CUTTER	O.D. 0 Tolerance -0.1 Insert H Class  φ50~φ80	Bottom Finishing  Side Finishing 	Face Milling Copy Milling Pocket Milling Helical Interpolation Plunge Milling	WEB CATALOGUE 
	DBD Type Available only on WEB CATALOGUE				
ROUGHING COPY MILLING	RADIUS MILL	O.D. -0.05 Tolerance -0.15 Insert M Class  φ50~φ63		Face Milling Copy Milling Shoulder Milling Helical Interpolation Pocket Milling	WEB CATALOGUE 
	WDR Type Available only on WEB CATALOGUE				

MILLING TOOLS QUICK GUIDE

Type	Item Code	Shape / Tool dia.	Cutting edge angle / Max.DOC	Applications	
5 - AXIS	HIGH PRECISION QM MAX	O.D. 0 Tolerance -0.03 Insert H, M^{class} 		 	
	MQT Type				
	A031	φ16~φ35			

Type	Item Code	Shape / Tool dia.	Barrel R	Applications	
5 - AXIS	FUJI BARREL	 φ6~φ12	 BR250	  	
	FJVA Type				
	A030				
5 - AXIS	MIRROR BARREL	O.D. — 0.002 Tolerance — 0.018 Insert FClass	 BR50~60 3°	    	
	KRM Type	 φ16~φ30			
	A025				
5 - AXIS	MIRROR BARREL	O.D. ±0.008 Tolerance Insert FClass	 BR32~40	  	
	TNM Type	 φ16~φ20			
	A026				
5 - AXIS	MIRROR BARREL	O.D. ±0.008 Tolerance Insert FClass	 BR400~500	   	
	TPM Type	 φ16~φ20			
	A027				
5 - AXIS	MIRROR BARREL	O.D. ±0.008 Tolerance Insert FClass	 BR32~60	    	
	LRM Type	 φ16~φ30			
	A028				
5 - AXIS	S-HEAD	 φ16~φ25	 BR1500~2200	   	
	STLP Type				
	A029				

DESIGNATION SYSTEM FOR MILLING INSERT



1 Shape

Symbol	Shape	Nose angle	Figure
H	Hexagonal	120°	
O	Octagonal	135°	
P	Pentagonal	108°	
S	Square	90°	
T	Triangular	60°	
C	Rhombic	80°	
D		55°	
E		75°	
M		86°	
V		35°	
L	Rectangular	90°	
A	Parallelogram	85°	
R	Round	—	
W	Special design	others	
X			
Y			
Z			

2 Relief angle

Symbol	Relief angle
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	others

3 Accuracy

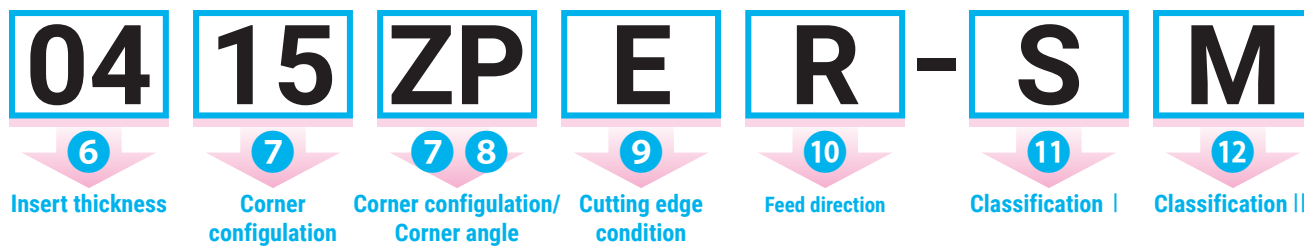
Tolerance (mm)

Symbol	Corner height	Thickness	I.C. dia.
C	±0.013	±0.025	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.13	±0.025
H	±0.013	±0.025	±0.013
K	±0.013	±0.025	±0.05~±0.13
L	±0.025	±0.025	±0.05~±0.13
M	±0.08~±0.18	±0.13	±0.05~±0.13
N	±0.08~±0.18	±0.025	±0.05~±0.13
U	±0.13~±0.38	±0.13	±0.08~±0.25

Inscribed circle	Tolerance on I.C. dia. K, L, M (class)	Tolerance on corner height M (class)
6.35	±0.05	±0.08
9.525		
12.7	±0.08	±0.13
15.875	±0.1	±0.15
19.05		

4 Groove

Symbol	Shape	Symbol	Shape
N		U	
R		B	
F		H	
W		C	
T		J	
Q		X	others



5 Cutting edge length

Symbol	length (ℓ)	Symbol	length (ℓ)
H		C M D V E	
O		L	
S		A	
T		R	

6 Thickness

Symbol	Thickness (mm)
02	2.38
T2	2.78
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35
07	7.94
09	9.52

7 Corner configuration

Symbol	Corner radius (mm)
02	0.2
04	0.4
08	0.8
12	1.2
15	1.5
16	1.6
20	2.0
25	2.5
30	3.0
32	3.2
40	4.0

8 Corner angle

Symbol	Clearance
D	15°
E	20°
F	25°
G	30°
P	11°

9 Symbols of major cutting edge

Symbol	Condition of cutting edge	Shape
F	Sharp edge	
E	Round honing	
T	Angle honing	
S	Combination Honing	

Symbol	Corner angle
A	45°
E	75°
P	90°
Z	others
MO	Round

10 Feed direction

Symbol	Hand
R	Right
L	Left
N	Neutral

11 Classification I

Symbol	Work
P	Steel
M	Stainless Steel
K	Cast iron
N	Non ferrous material
S	Heat resistant alloy
H	Hardened material

12 Classification II

Symbol	Application
L	Light cutting
M	Medium cutting
H	Heavy cutting

HIGH FEED TOOLS LINE-UP

Rigidity

HIGH STRENGTH INSERT WITH
SHARPNESS & STABILITY.
RELIABLE EVEN AT HIGH FEED RATE &
HIGH DEPTH OF CUT.
DEVELOPED FOR HIGH METAL REMOVAL
MACHINING.

$$ap \leq 3\text{mm}$$

SKS SERIES

SKS SERIES

SKS EXTREME EXSKS 09 Type



- 6 cutting edges
- High metal removal
- Max.ap = 3mm
- Machine type: BT50
- Program R : R3.5

SKS EXTREME EXSKS 07 Type



- 6 cutting edges
- Excellent balance of stability & sharpness
- Max.ap = 2mm
- Machine type: BT50
- Program R : R3.0

SKS GII SKG/MSG Type



- 4 cutting edges
- For High feed & High D.O.C. machining
- Max.ap = 1.5-2.5mm
- Machine type: BT40-50
- Program R : R2.0-R4.0

SKS EXTREME EXSKS 05 Type



- 6 cutting edges
- For High feed machining with multi-flutes
- Max.ap = 1.5mm
- Machine type: BT40-50
- Program R : R2.5

ADVANCED 3-D SHAPED CUTTING EDGE
INSERT WITH LOW CUTTING FORCE
GEOMETRY . MULTI-FLUTES
SPEC. HOLDER . DEVELOPED FOR HIGH
SPEED MACHINING EVEN ON SMALL
SIZED MACHINE.

$$a_p \leq 1\text{mm}$$

QM SERIES

Low cutting force

QM SERIES

QM MAX GII GMX/MXG Type



- 4 cutting edges
- Machining wide variety of materials
- Max. a_p = 1.0mm
- Machine type: BT40-50
- Program R : R1.5

QM MAX QXP/MQX Type



- 2 cutting edges
- Multiple insert choices for wide range of applications
- Max. a_p = 1.0mm
- Machine type: BT40-50
- Program R : R1.5

QM MILL MPM/PME Type



- 2 cutting edges
- For roughing to finishing
- low cutting force
- Max. a_p = 0.4mm
- Machine type: BT30-40
- Program R : R1.0

● Range of Tool Dia.

Product	No.of corners	Insert spec.	MAX. ap (mm)	Tool Dia. (mm)													
				10	16	20	25	32	40	50	52	63	66	80	100	125	160
QM MILL	2	Single sided	0.4	←→													
QM MAX	2	Single sided	1		←→												
QM MAX GII	4	Double sided	1		←→												
EXSKS-05	6	Double sided	1.5			←→											
SKSGII	4	Single sided	1.5 - 2.5			←→											
EXSKS-07	6	Double sided	2				←→										
EXSKS-09	6	Double sided	3					←→									

SHOULDER MILLING TOOLS LINE-UP

■ Shoulder Milling Series

SIC-EVO (ZOMT16)
QM MAX (ZPMT10)
QM MILL (ZOMT06)



- Single-sided 2 cutting edge insert
- Excellent chips control design
- Reliable even for long overhang machining

SHOULDER EXTREME
EXSAP-11 type
EXSAP-17 type



- Double-sided 4 cutting edge insert
- G class ground insert gives good surface finish on bottom & side wall

SHOULDER 6
EXSIX type



- Double-sided 6 cutting edge insert
- High cutting edge strength
- For heavy roughing process

Range of Tool Dia.

Product	No. of corners	Insert spec.	MAX. ap (mm)	Tool Dia. (mm)													
				10	16	20	25	32	40	50	52	63	66	80	100	125	160
QM MILL	2	Single sided	5	← $\phi 10 \sim \phi 32$ →													
QM MAX	2	Single sided	9		← $\phi 16 \sim \phi 66$ →												
SIC-EVO	2	Single sided	15			← $\phi 25 \sim \phi 125$ →											
EXSAP-11	4	Double sided	10		← $\phi 16 \sim \phi 80$ →												
EXSAP-17	4	Double sided	15			← $\phi 25 \sim \phi 125$ →											
EXSIX	6	Double sided	10							← $\phi 50 \sim \phi 160$ →							

Selection Guide

Product	Cutting Force	Chip Control	Surface Finish	Wall Accuracy	Cutting Edge Strength	No. of Cutting Edges
SIC-EVO (ZOMT16) QM MAX (ZPMT10) QM MILL (ZOMT06)	★★★	★★★	★★	★★	★	★
EXSAP11 EXSAP17	★★	★★	★★★★	★★★★	★★	★★
EXSIX	★★	★★	★	★★	★★★★	★★★★

Modular Head Series

■ PROPER MOUNTING OF MODULAR HEADS

1 Cleaning



Remove dirt and chips with air from the connecting thread and face of modular head and MSN/MGN shank holder.

2 Initial Tightening



Tighten by hand until the head and the shank holder faces touch.

3 Final Tightening



Tighten slowly with torque control spanner wrench or DIJET DS type spanner wrench and confirm that there is no gap.

- Attention)
1. Final tightening without initial tightening cause connecting thread damage.
 2. Only use DS type spanner wrench when use Solid modular head (SMSA/SMSR/SMAL type)

Attention

1. Only use torque control spanner wrench or DIJET DS type spanner wrench.
In case of choosing torque control spanner wrench, confirm that the wrench size is matched to the dimensions W & C of each modular head.



Torque control spanner



Spanner wrench (DS type)

2. Only apply gentle pressure on wrench.
3. Confirm there is no gap between MSN/MGN shank holder and modular head

■ Steel modular heads

Thread	Tightening torque	Spanner size(W)
M6	8.0N·m	8 [☆] 10
M8	16N·m	12 [☆]
M10	16N·m	14, 15
M12	20N·m	17, 19
M16	25N·m	22, 26

■ Solid modular heads(SMSA/SMSR/SMAL)

Thread	Tightening torque	Spanner size(W)	Cat.No. 
M8	10~11N·m	14	DS-14
M10	10~11N·m	14	DS-14
M10	10~16N·m	17	DS-17
M12	15~20N·m	19, 22	DS-19, DS-22
M16	20~25N·m	27	DS-27

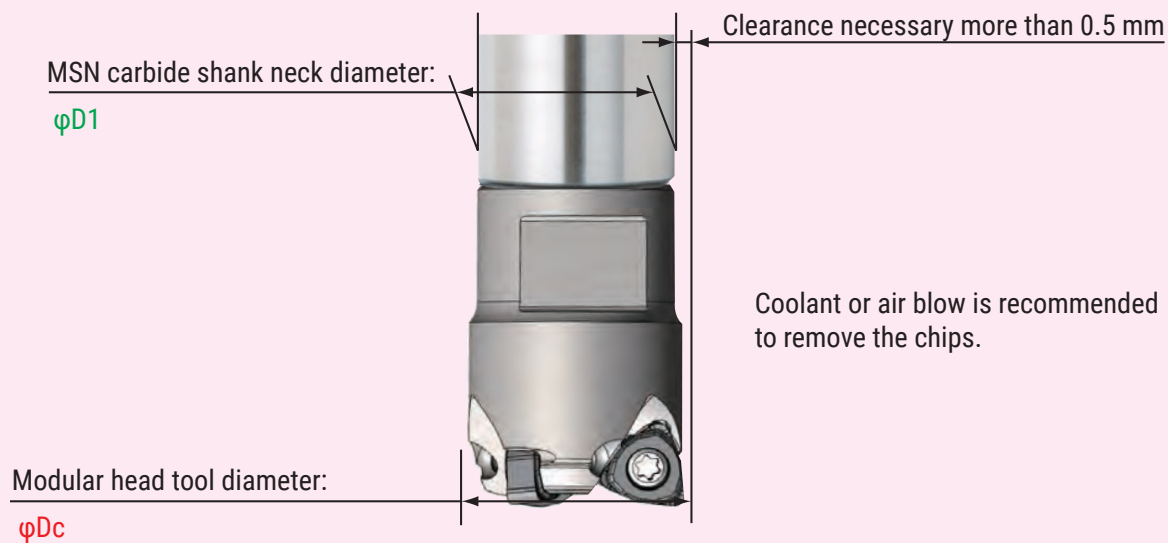
Note) Modular heads are supplied without spanner wrench

Modular Head Series

SELECTION OF MSN CARBIDE SHANK HOLDER

When using modular head over $\varnothing 16\text{mm}$, please select MSN carbide shank which the diameter ($\varnothing D1$) is 1 mm or smaller than modular head ($\varnothing Dc$).

Wrong selection can cause damage to the carbide shank.



Caution for mounting in shrink fit holder.

When you use a carbide shank and a modular head on a shrink fit holder, please shrink fit only the carbide shank without mounting the modular head. Mount the modular head on the shank after shrink fit operation is complete.

In case of shrink fit MSN shank + modular head together, it will be difficult to loosen due to heat

5-AXIS Series

TECHNOLOGY

Designs that allow you to machine freely & quickly

Advanced machining technology that enables high-precision and high efficiency

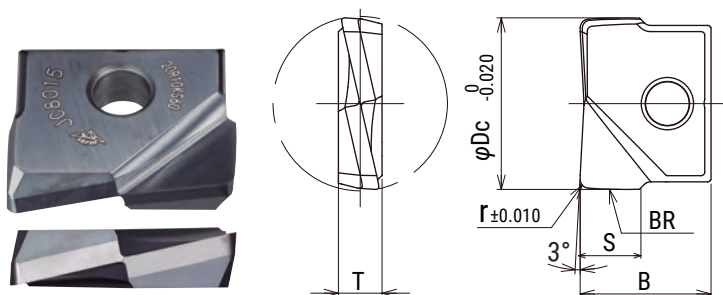
A line-up that supports machining of complex shapes found in the Die&Mould and Aerospace industries.

5-AXIS Series

5
axis

KRM
TYPE

Insert for "MIRROR BARREL"


 Radius form accuracy
on the outer periphery
 $\pm 0.010\text{mm}$

 Corner radius accuracy
of inserts within
 $\pm 0.010\text{mm}$

Cat.No.	Grade		Dimensions (mm)					
	JC8015	DH102	ϕDc	r	BR	S	B	T
KRM-160-R10-BR50	●	●	16	1	50	5.7	12	4
KRM-200-R10-BR60	●	●	20	1	60	6.8	15	5
KRM-250-R10-BR60	●	●	25	1	60	7.3	18.5	6
KRM-300-R10-BR60	●	●	30	1	60	9.1	22.5	7

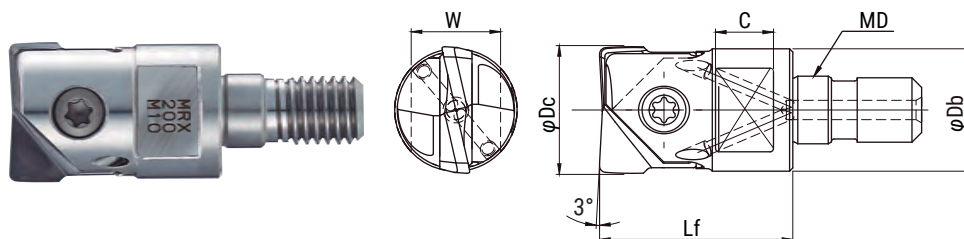
 Through
coolant
hole

5
axis

MRX
TYPE

Modular Type

 Accuracy of MRX after combined O.D. run out: below $15\mu\text{m}$ (Target below $10\mu\text{m}$).

 When using KRM type insert/Corner radius accuracy: within $\pm 0.010\text{mm}$. Radius form accuracy on the outer periphery: within $\pm 0.010\text{mm}$.


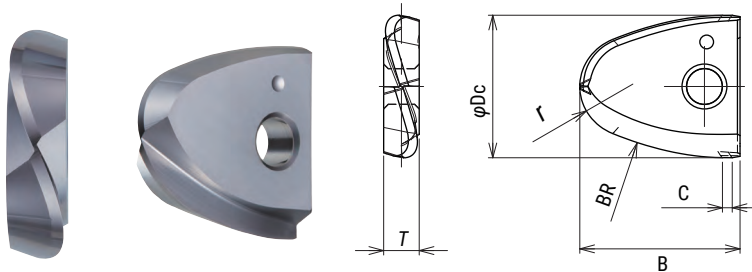
Cat.No.	Stock	Dimensions (mm)						Parts	
		ϕDc	Lf	ϕDb	MD	C	W	Screw	Wrench
MRX-160-M8	●	16	23	15	M8	8	12		
MRX-200-M10	●	20	30	19	M10	8	14	FSW-4013H	A-15
MRX-250-M12	●	25	35	24	M12	10	17	FSW-5016H	A-20W
MRX-300-M16	●	30	43	29	M16	12.5	22	FSW-6020	A-30

Clamp screw	Torque(N·m)
FSW-4013H	3.0
FSW-5016H	4.0
FSW-6020	5.0
FSW-8025S	6.0

5-AXIS Series

5
axis

TNM
TYPE

Insert for "MIRROR BARREL"

 Corner radius accuracy
of inserts within
 $\pm 0.010\text{mm}$

Cat.No.	Grade		Dimensions (mm)					
	JC8015	FZ15	ϕDc	r	BR	B	T	C
TNM-160-NR6BR32	●	●	16	6	32	18	4	1
TNM-200-NR8BR40	●	●	20	8	40	21	5	1

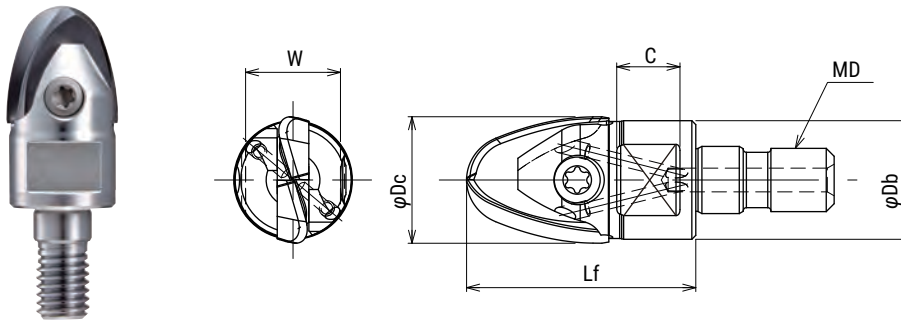
 Through
coolant
hole

5
axis

MTP
TYPE

MIRROR BARREL Modular Type

Accuracy of MTP after combined O.D. run out: below $15\text{ }\mu\text{m}$ (Target below $10\text{ }\mu\text{m}$).
When using TNM type insert / Radius form accuracy on the outer periphery: within $\pm 0.010\text{mm}$.



Clamp screw	Torque(N·m)
FSW-4013H	3.0
FSW-5016H	4.0

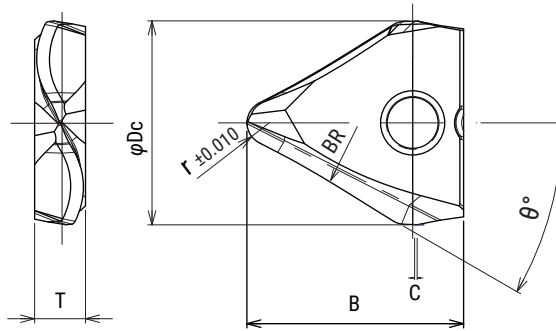
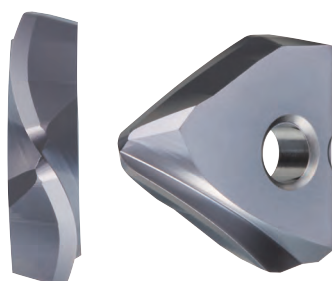
Cat.No.	Stock	Dimensions (mm)						Insert	Parts	
									Screw	Wrench
		φDc	Lf	φDb	MD	C	W			
MTP-160-M8	●	16	29	15	M8	8	12	TPM-160... TNM-160...	FSW-4013H	A-15
MTP-200-M10	●	20	36	19	M10	9	14	TPM-200... TNM-200...	FSW-5016H	A-20W

5-AXIS Series

5
axis

TPM
TYPE

Insert for "MIRROR BARREL"


 Radius form accuracy
on the outer periphery
±0.010mm

 Radius accuracy
of inserts within
±0.010mm

Cat.No.	Grade		Dimensions (mm)						
	JC8015	DH102	ϕDc	r	BR	B	T	C	θ°
TPM-160-NR2T30BR400	●	●	16	2	400	17	4	1	30°
TPM-200-NR2T30BR500	●	●	20	2	500	20	5	1	30°

 Through
coolant
hole

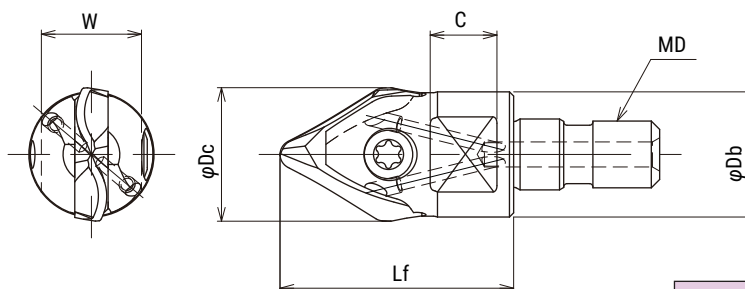
5
axis

MTP
TYPE

MIRROR BARREL Modular Type

 Accuracy of MTP after combined O.D. run out: below 15 μm (Target below 10 μm).

When using TPM type insert / Corner Radius accuracy: within ±0.010mm. Radius form accuracy on the outer periphery: within ±0.010mm.



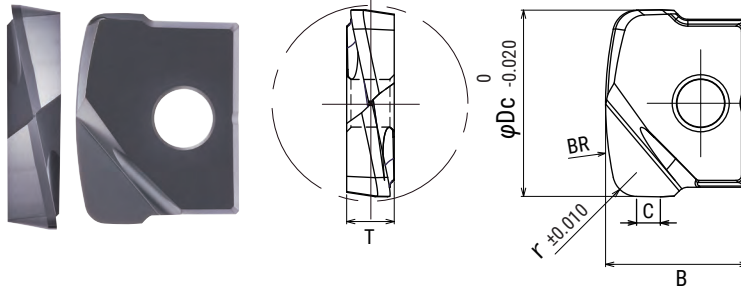
Clamp screw	Torque(N·m)
FSW-4013H	3.0
FSW-5016H	4.0

Cat.No.	Stock	Dimensions (mm)						Inserts	Parts	
		ϕDc	Lf	ϕDb	MD	C	W		Screw	Wrench
MTP-160-M8	●	16	28	15	M8	8	12	TPM-160... TNM-160...	FSW-4013H	A-15
MTP-200-M10	●	20	35	19	M10	9	14	TPM-200... TNM-200...	FSW-5016H	A-20W

5-AXIS Series

5
axis

LRM
TYPE

Insert for "MIRROR BARREL"

 Radius form accuracy
on the bottom
 $\pm 0.010\text{mm}$

 Corner radius accuracy
of inserts within
 $\pm 0.010\text{mm}$

Cat.No.	Grade		Dimensions (mm)					
	JC8015	DH102	ϕDc	r	BR	B	T	C
LRM-160-R20-BR32	●	●	16	2	32	12	4	2
LRM-200-R30-BR40	●	●	20	3	40	15	5	2
LRM-250-R30-BR50	●	●	25	3	50	18.5	6	2.5
LRM-300-R30-BR60	●	●	30	3	60	22.5	7	3

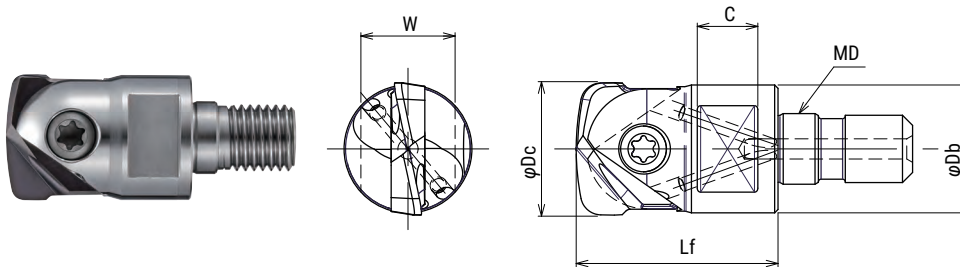
 Through
coolant
hole

5
axis

MBX
TYPE

Modular Type

 Accuracy of MBX after combined O.D. run out: below $15\mu\text{m}$ (Target below $10\mu\text{m}$).

 When using LRM type insert/Corner radius accuracy: within $\pm 0.010\text{mm}$. Radius form accuracy on the front edge: within $\pm 0.010\text{mm}$.


Clamp screw	Torque(N.m)
FSW-4013H	3.0
FSW-5016H	4.0
FSW-6020	5.0
FSW-8025S	6.0

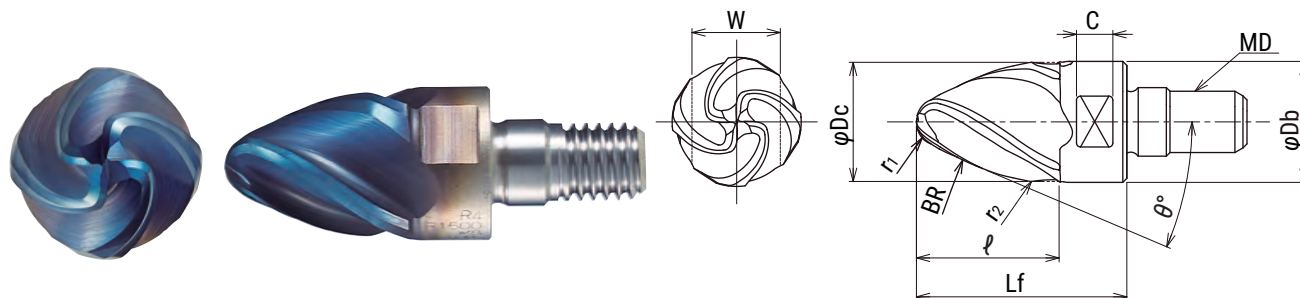
Cat.No.	Stock	Dimensions (mm)						Insert		Parts	
										Screw	Wrench
		φDc	L f	φDb	MD	C	W				
MBX-160-M8	●	16	23	15	M8	8	12	BNM-160...	LRM-160...	FSW-4013H	A-15
MBX-200-M10	●	20	30	19	M10	8	14	BNM-200...	LRM-200...	FSW-5016H	A-20W
MBX-250-M12	●	25	35	24	M12	10	17	BNM-250...	LRM-250...	FSW-6020	A-30
MBX-300-M16	●	30	43	29	M16	12.5	22	BNM-300...	LRM-300...	FSW-8025S	A-30

5-AXIS Series

STLP
TYPE

Solid Modular Type


- 4flutes Helix angle 30°



Cat.No.	Stock	Grade	No. of Flutes	Dimensions (mm)										
				ϕDc	ℓ	Lf	BR	r_1	r_2	θ°	ϕDb	MD	C	W
STLP-4160T20R4-M8	●	DH115	4	16	17.7	26	1500	4	4	20°	15	M8	5.5	14
STLP-4200T15R4-M10	●			20	30	38	1500	4	5	15°	19	M10	5.5	17
STLP-4200T20R5-M10	●			20	22	30	1500	5	5	20°	19	M10	5.5	17
STLP-4250T20R5-M12	●			25	28	38	2,200	5	5	20°	24	M12	5.5	22

ϕDc (mm)	Torque	Width across flats W (mm)	DIJET DS type spanner
$\phi 16$	10~11 N·m	14	DS-14
$\phi 20$	10~16 N·m	17	DS-17
$\phi 25$	15~20 N·m	22	DS-22

5-AXIS Series

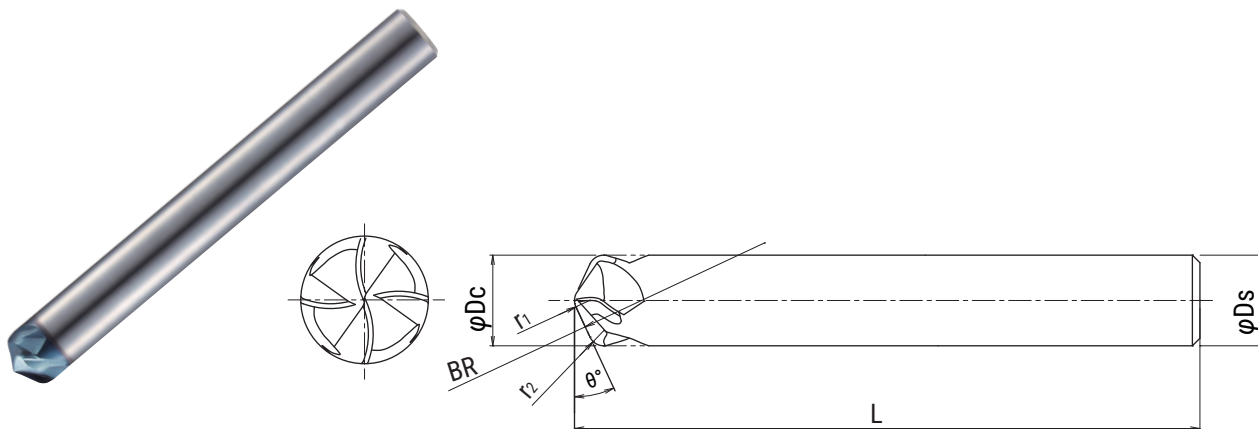


FJVA
TYPE

"FUJI BARRELL"

- 4flutes
- For shrink fit holder

Radius form accuracy
on the outer periphery
 $\pm 0.010\text{mm}$



Cat.No.	Stock	Grade	No.of Flutes	Dimensions (mm)						
				ϕDc	BR	r_1	r_2	θ°	L	ϕDs
FJVA4060S06-R250	●	DH115	4	6	250	1	1	25°	60	6
FJVA4080S08-R250	●			8	250	1	1.2	25°	75	8
FJVA4100S10-R250	●			10	250	1	1.75	25°	80	10
FJVA4120S12-R250	●			12	250	1	1.75	25°	100	12

5-AXIS Series

MQT
TYPE

High precision "QM MAX"

 Through
coolant
hole

Face Milling

Shoulder Milling

- 3 different angled bodies (0°, 3°, and 5°) that cover a range of tapered walls from 0° ~ 8°
- Possible to use even on 3 axis machine with 3° or 5° angled body ; A03 type or A05 type
- High tolerance insert-pocket for the ground inserts
- High efficiency with multi flutes



Fig 1

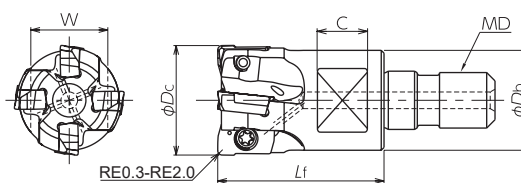
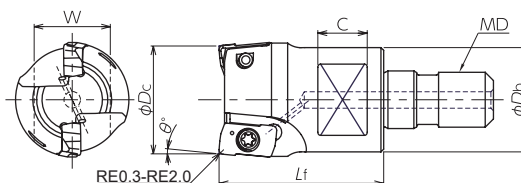


Fig 2



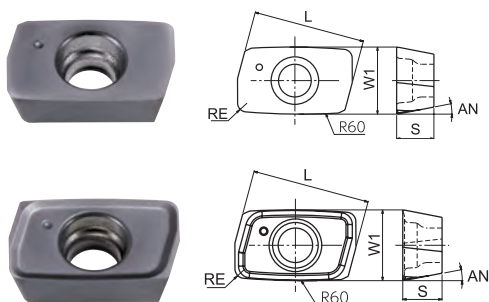
Inclination angle θ°	Cat.No.	Stock	No. of inserts	Dimensions (mm)						Parts		Insert	Fig.
				φD _C	L _f	φD _b	MD	C	W	Screws	Wrench		
0°	MQT-2016A00-M8	●	2	16	23	14	M8	8	12	TSW-2556H	A-08	XP**100308ZER-R YPHW1003**Z*R** ZPMT1003**ZER-PL	1
	MQT-4020A00-M10	●	4	20	30	18	M10	9	14				
	MQT-5025A00-M12	●	5	25	35	22.5	M12	10	17	DSW-2563H			
	MQT-6032A00-M16	●	6	32	43	29	M16	12	22				
	MQT-6035A00-M16	●		35			M16						
3°	MQT-2016A03-M8	●	2	16	23	14	M8	8	12	TSW-2556H			2
	MQT-2020A03-M10	●		20	30	18	M10	9	14				
5°	MQT-2016A05-M8	●		16	23	14	M8	8	12				
	MQT-2020A05-M10	●		20	30	18	M10	9	14				

Clamp screw	Torque(N.m)
TSW-2556H	1.1
DSW-2563H	

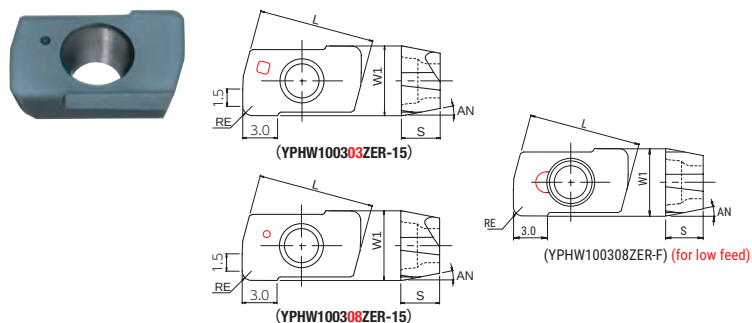
5-AXIS Series

Insert

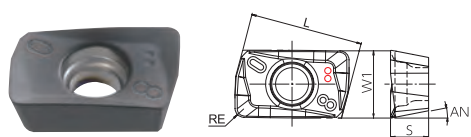
For tapered wall finishing
(XPHW100308ZER-R)
(XPHT100308RZER-R)



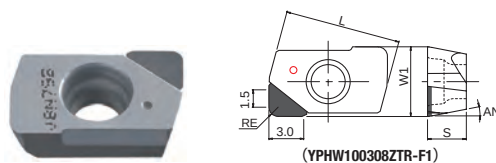
For finishing side face
(YPHW1003**ZER-15)
(YPHW100308ZER-F)
(YPHW100308ZTR-F1)



Shoulder milling insert
(for semi-finishing to finishing)
ZPMT1003**ZER-PL*



CBN Insert



Type	Cat.No.	Tolerance	PVD Coating				Cermet	CBN	Dimensions (mm)					
			DH102	JC8015	JC8050	JC8118	CX75	JBN795	RE	L	W1	S	AN	
For Tapered wall finishing	XPHW100308ZER-R	H	●	●					0.8	10.06	6	3.35	11°	
	XPHT100308ZER-R			●			●							
							●							
							●							
For Finishing side face	YPHW100303ZER-15		●	●					0.3					
	YPHW100308ZER-15		●				●							
			YPHW100308ZER-F					●						0.8
				YPHW100308ZER-F		●								
	YPHW100308ZTR-F1							●						
	Shoulder milling insert (for semi-finishing to finishing)	ZPMT100304ZER-PL	M	●		●	●			0.4	10.08	3.4		
ZPMT100308ZER-PL		●			●	●		●						
		ZPMT100320ZER-PL		●		●	●			2				
								●						

5-AXIS Series

■ Recommended cutting conditions

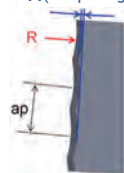
● KRM Type Side finishing



Material	Grade	Tool dia.(mm)							
		16				20			
		a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015	0.8	0.15	5,970	2,390	1	0.15	4,770	1,910
Cast steel (GM190, ICD5) below 285HB	JC8015	0.8	0.15	5,970	2,390	1	0.15	4,770	1,910
Tool & die steel (SKD61, SKD11) below 255HB	JC8015	0.8	0.15	5,970	2,390	1	0.15	4,770	1,910
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015	0.8	0.12	5,970	2,390	1	0.12	4,770	1,910
Mold steel (NAK80, HPM1, P21) 38-43HRC	JC8015	0.8	0.12	5,570	1,670	1	0.12	4,460	1,340
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	DH102	0.6	0.1	4,970	750	0.7	0.1	3,980	600
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	DH102	0.5	0.1	3,980	600	0.7	0.1	3,180	480
Grey cast iron (FC250) 160-260HB	DH102	0.8	0.2	6,960	3,480	1	0.2	5,570	3,340
Nodular cast iron (FCD700) 170-300HB	DH102	0.8	0.2	6,960	3,480	1	0.2	5,570	3,340
Austenitic stainless steel (SUS304, 316, 317) 17Cr	JC8015	0.8	0.12	5,570	2,230	1	0.12	4,460	1,780
Ferritic & martensitic stainless steel (SUS403, 420J2, 430) 13Cr	JC8015	0.8	0.12	5,570	2,230	1	0.12	4,460	1,780
Titanium alloy (Ti-6Al-4V) 35-43HRC	JC8015	0.5	0.1	1,990	480	0.6	0.1	1,590	380
Heat resistant alloy (INCO718) 35-43HRC	JC8015	0.5	0.1	1,590	380	0.6	0.1	1,270	300

Please refer to chart and formula below to calculate a_p .

H(Cusp Height)



$$a_p = 2 \sqrt{(R^2 - (R - H)^2)}$$

a_p (mm)		Cusp height (mm)									
Cat.No.	R	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
KRM-160-R10-BR50	50	0.63	0.89	1.10	1.26	1.41	1.55	1.67	1.79	1.90	2.00
KRM-200-R10-BR60	60	0.69	0.98	1.20	1.39	1.55	1.70	1.83	1.96	2.08	2.19

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. These parameters are for overhang length 3Dc. See right table for longer application.
3. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
4. Use air blow.

Overhang (l/D_c)	n (min ⁻¹)	V_f (mm/min)
~ 3Dc	100%	100%
3Dc ~ 5Dc	70%	70%
5Dc ~ 10Dc	50%	50%

5-AXIS Series

■ Recommended cutting conditions

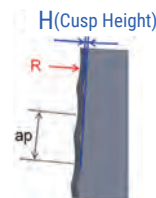
● KRM Type Side finishing



Material	Grade	Tool dia.(mm)							
		25				30			
		a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015	1.2	0.15	3,820	1,530	1.2	0.15	3,180	1,270
Cast steel (GM190, ICD5) below 285HB	JC8015	1.2	0.15	3,820	1,530	1.2	0.15	3,180	1,270
Tool & die steel (SKD61, SKD11) below 255HB	JC8015	1.2	0.15	3,820	1,530	1.2	0.15	3,180	1,270
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015	1.2	0.12	3,820	1,530	1.2	0.12	3,180	1,270
Mold steel (NAK80, HPM1, P21) 38-43HRC	JC8015	1	0.12	3,570	1,070	1	0.12	2,970	890
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	DH102	0.8	0.1	3,180	480	0.8	0.1	2,650	400
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	DH102	0.7	0.1	2,550	380	0.7	0.1	2,120	320
Grey cast iron (FC250) 160-260HB	DH102	1.2	0.2	4,460	2,680	1.2	0.2	3,710	2,230
Nodular cast iron (FCD700) 170-300HB	DH102	1.2	0.2	4,460	2,680	1.2	0.2	3,710	2,230
Austenitic stainless steel (SUS304, 316, 317) 17Cr	JC8015	1.2	0.12	3,570	1,430	1.2	0.12	2,970	1,190
Ferritic & martensitic stainless steel (SUS403, 420J2, 430) 13Cr	JC8015	1.2	0.12	3,570	1,430	1.2	0.12	2,970	1,190
Titanium alloy (Ti-6Al-4V) 35-43HRC	JC8015	0.7	0.1	1,270	320	0.7	0.1	1,060	270
Heat resistant alloy (INCO718) 35-43HRC	JC8015	0.7	0.1	1,020	260	0.7	0.1	850	210

Please refer to chart and formula below to calculate a_p .

$$a_p = 2 \sqrt{(R^2 - (R - H)^2)}$$



a_p (mm)		Cusp height (mm)									
Cat.No.	R	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
KRM-250-R10-BR60	60	0.69	0.98	1.20	1.39	1.55	1.70	1.83	1.96	2.08	2.19
KRM-300-R10-BR60											

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. These parameters are for overhang length 3Dc. See right table for longer application.
3. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
4. Use air blow.

Overhang (l/D_c)	n (min ⁻¹)	V_f (mm/min)
~ 3Dc	100%	100%
3Dc ~ 5Dc	70%	70%
5Dc ~ 10Dc	50%	50%

5-AXIS Series

Recommended cutting conditions

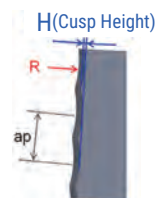


TNM Type Side finishing with Barrel R

Material	Grade	Tool dia.(mm)							
		16				20			
		a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015	~1	0.2	6,960	2,780	~1	0.2	5,570	2,230
Cast steel (GM190, ICD5) below 285HB	JC8015	~1	0.2	6,960	2,780	~1	0.2	5,570	2,230
Tool & die steel (SKD61, SKD11) below 255HB	JC8015	~1	0.2	6,960	2,780	~1	0.2	5,570	2,230
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015	~1	0.2	6,960	2,780	~1	0.2	5,570	2,230
Mold steel (NAK80, HPM1, P21) 38-43HRC	JC8015	~1	0.2	5,970	2,390	~1	0.2	4,770	1,910
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	JC8015	~1	0.1	4,970	1,490	~1	0.1	3,980	1,190
Grey cast iron (FC250) 160-260HB	JC8015	~1	0.2	6,960	2,780	~1	0.2	5,570	2,230
Nodular cast iron (FCD700) 170-300HB	JC8015	~1	0.2	6,960	2,780	~1	0.2	5,570	2,230
Austenitic stainless steel (SUS304, 316, 317) 17Cr	JC8015	~1	0.2	6,960	2,090	~1	0.2	5,570	1,670
Ferritic & martensitic stainless steel (SUS403, 420J2, 430) 13Cr	JC8015	~1	0.2	6,960	2,090	~1	0.2	5,570	1,670
Titanium alloy (Ti-6Al-4V) 35-43HRC	JC8015	~0.4	0.15	4,970	1,490	~0.4	0.15	3,980	1,190
Heat resistant alloy (INCO718) 35-43HRC	JC8015	~0.4	0.1	3,980	800	~0.4	0.1	3,180	640
Aluminium alloy	FZ15	~1.5	0.25	9,950	4,980	~1.5	0.25	7,960	4,780

Please refer to chart and formula below to calculate a_p .

$$a_p = 2 \sqrt{(R^2 - (R - H)^2)}$$



a_p (mm)		Cusp height (mm)									
Cat.No.	R	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
TNM-160-NR6BR32	32	0.51	0.72	0.88	1.01	1.13	1.24	1.34	1.43	1.52	1.60
TNM-200-NR8BR40	40	0.57	0.80	0.98	1.13	1.26	1.39	1.50	1.60	1.70	1.79

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. These parameters are for overhang length 3Dc. See right table for longer application.
3. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
4. Use air blow.

Overhang (l/D_c)	n (min ⁻¹)	V_f (mm/min)
~ 3Dc	100%	100%
3Dc ~ 5Dc	70%	70%
5Dc ~ 10Dc	50%	50%

5-AXIS Series

■ Recommended cutting conditions



● TNM Type - with Tip R

Material	Grade	Tool dia.(mm)							
		16				20			
		a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015	0.15	0.2	10,940	4,380	0.15	0.25	8,750	5,250
Cast steel (GM190, ICD5) below 285HB	JC8015	0.15	0.2	10,940	4,380	0.15	0.25	8,750	5,250
Tool & die steel (SKD61, SKD11) below 255HB	JC8015	0.15	0.2	10,940	4,380	0.15	0.25	8,750	5,250
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015	0.15	0.2	9,950	3,980	0.15	0.25	7,960	4,780
Mold steel (NAK80, HPM1, P21) 38-43HRC	JC8015	0.1	0.2	7,960	2,390	0.1	0.25	6,370	3,190
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	JC8015	0.1	0.2	5,970	1,790	0.1	0.25	4,770	2,390
Grey cast iron (FC250) 160-260HB	JC8015	0.15	0.2	10,940	5,470	0.15	0.25	8,750	6,130
Nodular cast iron (FCD700) 170-300HB	JC8015	0.15	0.2	10,940	5,470	0.15	0.25	8,750	6,130
Austenitic stainless steel (SUS304, 316, 317) 17Cr	JC8015	0.15	0.2	10,940	4,380	0.15	0.25	8,750	5,250
Ferritic & martensitic stainless steel (SUS403, 420J2, 430) 13Cr	JC8015	0.15	0.2	10,940	4,380	0.15	0.25	8,750	5,250
Titanium alloy (Ti-6Al-4V) 35-43HRC	JC8015	0.1	0.2	7,960	3,180	0.1	0.25	6,370	3,190
Heat resistant alloy (INCO718) 35-43HRC	JC8015	0.1	0.1	5,970	1,790	0.1	0.1	4,770	1,910
Aluminium alloy	FZ15	0.25	0.2	13,330	6,670	0.25	0.2	10,660	6,400

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. These parameters are for overhang length 3Dc. See right table for longer application.
3. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
4. Use air blow.

Overhang (ℓ / Dc)	n (min ⁻¹)	V_f (mm/min)
$\sim 3Dc$	100%	100%
$3Dc \sim 5Dc$	70%	70%
$5Dc \sim 10Dc$	50%	50%

5-AXIS Series

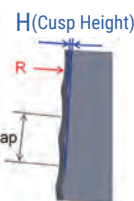
Recommended cutting conditions



TPM Type - with Barrel R

Material	Grade	Tool dia.(mm)							
		16				20			
		a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015	~4	0.15	13,930	4,180	~5	0.2	11,140	3,340
Cast steel (GM190, ICD5) below 285HB	JC8015	~4	0.15	13,930	4,180	~5	0.2	11,140	3,340
Tool & die steel (SKD61, SKD11) below 255HB	JC8015	~4	0.15	13,930	4,180	~5	0.2	11,140	3,340
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015	~3.5	0.12	11,940	3,580	~4.5	0.1	9,550	2,870
Mold steel (NAK80, HPM1, P21) 38-43HRC	JC8015	~3	0.12	9,950	2,990	~4	0.1	7,960	2,390
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	DH102	~2.5	0.1	6,960	1,390	~3	0.1	5,570	1,110
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	DH102	~2	0.1	5,970	1,190	~2.5	0.1	4,770	950
Grey cast iron (FC250) 160-260HB	DH102	~4	0.15	13,930	5,570	~5	0.2	11,140	4,460
Nodular cast iron (FCD700) 170-300HB	DH102	~4	0.15	13,930	4,180	~5	0.2	11,140	3,340
Austenitic stainless steel (SUS304, 316, 317) 17Cr	JC8015	~3	0.12	11,940	3,580	~4	0.1	9,550	2,870
Ferritic & martensitic stainless steel (SUS403, 420J2, 430) 13Cr	JC8015	~3	0.12	11,940	3,580	~4	0.1	9,550	2,870
Titanium alloy (Ti-6Al-4V) 35-43HRC	JC8015	~2.5	0.1	5,970	1,190	~3	0.1	4,770	950
Heat resistant alloy (INCO718) 35-43HRC	JC8015	~2.5	0.1	3,980	800	~3	0.1	3,180	640

Please refer to chart and formula below to calculate a_p .



$$a_p = 2 \sqrt{R^2 - (R - H)^2}$$

Pick amount a_p (mm)		Cusp height (mm)									
Cat.No.	R	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
TPM-160-NR2T30BR400	400	1.79	2.53	3.10	3.58	4.00	4.38	4.73	5.06	5.73	5.66
TPM-200-NR2T30BR500	500	2.00	2.83	3.46	4.00	4.47	1.39	4.90	5.66	6.00	6.32

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. These parameters are for overhang length 3Dc. See right table for longer application.
3. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
4. Use air blow.

Overhang (l/D_c)	n (min ⁻¹)	V_f (mm/min)
~ 3Dc	100%	100%
3Dc ~ 5Dc	70%	70%
5Dc ~ 10Dc	50%	50%

5-AXIS Series

■ Recommended cutting conditions



● TPM Type - with Tip R

Material	Grade	Tool dia.(mm)							
		16				20			
		a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015	0.1	0.2	15,920	1,590	0.1	0.2	12,730	1,530
Cast steel (GM190, ICD5) below 285HB	JC8015	0.1	0.2	15,920	1,590	0.1	0.2	12,730	1,530
Tool & die steel (SKD61, SKD11) below 255HB	JC8015	0.1	0.2	15,920	1,590	0.1	0.2	12,730	1,530
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015	0.1	0.2	14,920	1,490	0.1	0.2	11,940	1,430
Mold steel (NAK80, HPM1, P21) 38-43HRC	JC8015	0.1	0.2	13,930	1,390	0.1	0.2	11,140	1,110
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	DH102	0.08	0.2	9,950	1,000	0.08	0.2	7,960	960
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	DH102	0.08	0.2	8,950	900	0.08	0.2	7,160	860
Grey cast iron (FC250) 160-260HB	DH102	0.12	0.2	16,910	1,690	0.12	0.2	13,530	1,620
Nodular cast iron (FCD700) 170-300HB	DH102	0.12	0.2	15,920	1,590	0.12	0.2	12,730	1,530
Austenitic stainless steel (SUS304, 316, 317) 17Cr	JC8015	0.1	0.2	14,920	1,490	0.1	0.2	11,940	1,430
Ferritic & martensitic stainless steel (SUS403, 420J2, 430) 13Cr	JC8015	0.1	0.2	14,920	1,490	0.1	0.2	11,940	1,430
Titanium alloy (Ti-6Al-4V) 35-43HRC	JC8015	0.06	0.2	5,970	600	0.06	0.2	4,770	570
Heat resistant alloy (INCO718) 35-43HRC	JC8015	0.05	0.2	3,980	400	0.05	0.2	3,180	380

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. These parameters are for overhang length 3Dc. See right table for longer application.
3. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
4. Use air blow.

Overhang (ℓ /Dc)	n (min ⁻¹)	V_f (mm/min)
~ 3Dc	100%	100%
3Dc ~ 5Dc	70%	70%
5Dc ~ 10Dc	50%	50%

5-AXIS Series

Recommended cutting conditions

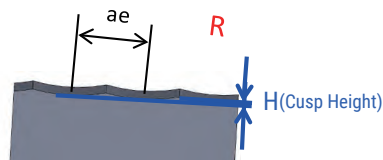
LRM Type



Material	Grade	Tool dia.(mm)							
		16				20			
		a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015	0.15	~0.6	7,960	4,780	0.15	~0.7	6,370	4,460
Cast steel (GM190, ICD5) below 285HB	JC8015	0.15	~0.6	7,960	4,780	0.15	~0.7	6,370	4,460
Tool & die steel (SKD61, SKD11) below 255HB	JC8015	0.15	~0.6	7,960	4,780	0.15	~0.7	6,370	4,460
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015	0.1	~0.6	7,960	3,980	0.1	~0.7	6,370	3,820
Mold steel (NAK80, HPM1, P21) 38-43HRC	JC8015	0.1	~0.6	6,960	3,480	0.1	~0.7	5,570	3,340
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	DH102	0.1	~0.5	5,970	2,390	0.1	~0.6	4,770	2,390
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	DH102	0.1	~0.5	4,970	1,990	0.1	~0.6	3,980	1,590
Hardened die steel (SKH, HAP) 55-62HRC	DH102	0.05	~0.25	3,980	1,190	0.05	~0.25	3,180	950
Grey cast iron (FC250) 160-260HB	DH102	0.15	~0.6	7,960	4,780	0.15	~0.7	6,370	4,460
Nodular cast iron (FCD700) 170-300HB	DH102	0.15	~0.6	6,960	4,180	0.15	~0.7	5,570	3,900
Austenitic stainless steel (SUS304, 316, 317) 17Cr	JC8015	0.15	~0.6	7,960	3,980	0.15	~0.7	6,370	3,820
Ferritic & martensitic stainless steel (SUS403, 420J2, 430) 13Cr	JC8015	0.15	~0.6	7,960	3,980	0.15	~0.7	6,370	3,820
Titanium alloy (Ti-6Al-4V) 35-43HRC	JC8015	0.1	~0.6	4,970	1,990	0.1	~0.7	3,980	1,990
Heat resistant alloy (INCO718) 35-43HRC	JC8015	0.1	~0.25	3,980	1,190	0.1	~0.3	3,180	1,270

Please refer to chart and formula below to calculate a_p .

$$a_e = 2 \sqrt{(R^2 - (R - H)^2)}$$



Pick amount a_p (mm)		Cusp height (mm)									
Cat.No.	R	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
LRM-160-R20-BR32	32	0.51	0.72	0.88	1.01	1.13	1.24	1.34	1.43	1.52	1.60
LRM-200-R30-BR40	40	0.57	0.80	0.98	1.13	1.26	1.39	1.50	1.60	1.70	1.79

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. These parameters are for overhang length 3Dc. See right table for longer application.
3. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
4. Use air blow.

Overhang (l/Dc)	n (min ⁻¹)	V_f (mm/min)
~ 3Dc	100%	100%
5Dc ~ 10Dc	70%	70%
3Dc ~ 5Dc	50%	50%

5-AXIS Series

Recommended cutting conditions

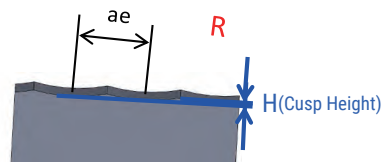


● LRM Type

Material	Grade	Tool dia.(mm)							
		25				30			
		a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015	0.15	~0.8	5,730	4,010	0.15	~0.8	4,770	3,340
Cast steel (GM190, ICD5) below 285HB	JC8015	0.15	~0.8	5,730	4,010	0.15	~0.8	4,770	3,340
Tool & die steel (SKD61, SKD11) below 255HB	JC8015	0.15	~0.8	5,730	4,010	0.15	~0.8	4,770	3,340
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015	0.1	~0.8	5,730	3,440	0.1	~0.8	4,770	2,860
Mold steel (NAK80, HPM1, P21) 38-43HRC	JC8015	0.1	~0.8	5,090	3,050	0.1	~0.8	4,240	2,540
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	DH102	0.1	~0.7	4,460	2,230	0.1	~0.7	3,710	1,860
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	DH102	0.1	~0.7	3,820	1,530	0.1	~0.7	3,180	1,270
Hardened die steel (SKH, HAP) 55-62HRC	DH102	0.05	~0.25	2,550	770	0.05	~0.25	2,120	640
Grey cast iron (FC250) 160-260HB	DH102	0.15	~0.8	5,730	4,010	0.15	~0.8	4,770	3,340
Nodular cast iron (FCD700) 170-300HB	DH102	0.15	~0.8	5,730	4,010	0.15	~0.8	4,770	3,340
Austenitic stainless steel (SUS304, 316, 317) 17Cr	JC8015	0.15	~0.8	5,730	3,440	0.15	~0.8	4,770	2,860
Ferritic & martensitic stainless steel (SUS403, 420J2, 430) 13Cr	JC8015	0.15	~0.8	5,730	3,440	0.15	~0.8	4,770	2,860
Titanium alloy (Ti-6Al-4V) 35-43HRC	JC8015	0.1	~0.8	3,180	1,590	0.1	~0.8	2,650	1,330
Heat resistant alloy (INCO718) 35-43HRC	JC8015	0.1	~0.3	2,550	1,020	0.1	~0.3	2,120	850

Please refer to chart and formula below to calculate a_p .

$$a_e = 2 \sqrt{(R^2 - (R - H)^2)}$$



Pick amount a_p (mm)		Cusp height (mm)									
Cat.No.	R	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
LRM-250-R30-BR50	50	0.63	0.89	1.10	1.26	1.41	1.55	1.67	1.79	1.90	2.00
LRM-300-R30-BR60	60	0.69	0.98	1.20	1.39	1.55	1.70	1.83	1.96	2.08	2.19

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. These parameters are for overhang length 3Dc. See right table for longer application.
3. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
4. Use air blow.

Overhang (ℓ/Dc)	n (min ⁻¹)	V_f (mm/min)
~ 3Dc	100%	100%
5Dc ~ 10Dc	70%	70%
3Dc ~ 5Dc	50%	50%

5-AXIS Series

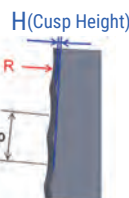
Recommended cutting conditions



STLP Type - with Barrel R

Material		Tool dia.(mm)								
		16			20			25		
		ℓ (mm)	n (min ⁻¹)	V _f (mm/min)	ℓ (mm)	n (min ⁻¹)	V _f (mm/min)	ℓ (mm)	n (min ⁻¹)	V _f (mm/min)
Carbon steel (S50C, S55C) below 250HB		70	10,000	3,200~4,000	70	8,000	2,600~3,200	70	6,400	2,000~2,600
		110	8,800	2,500~3,200	125	7,200	2,000~2,600	140	5,700	2,000~2,600
		150	7,800	1,900~2,500	175	6,400	1,600~2,100	200	5,100	1,200~1,600
Alloy steel, Tool & die steel, Mold steel (SKD, SKH, NAK) below 42HRC		70	10,000	2,400~3,200	70	8,000	2,000~2,600	70	6,400	1,500~2,000
		110	8,800	1,800~2,500	125	7,200	1,500~2,100	140	5,700	1,100~1,600
		150	7,800	1,300~1,900	175	6,400	1,300~1,600	200	5,100	800~1,200
Hardened die steel (SKD61, DAC, DHA) 42-52HRC		70	10,000	2,000~2,800	70	8,000	1,600~2,300	70	5,100	600~1,000
		110	8,800	1,400~2,100	125	7,200	1,200~1,800	140	4,500	500~700
		150	7,800	1,000~1,600	175	6,400	800~1,300	200	3,800	300~600
Austenitic stainless steel (SUS304, 316, 317) 17Cr		70	10,000	2,000~2,800	70	8,000	1,600~2,300	70	6,400	1,300~1,800
		110	8,800	1,400~2,100	125	7,200	1,200~1,800	140	5,700	900~1,400
		150	7,800	1,000~1,600	175	6,400	800~1,300	200	5,100	600~1,000
Titanium alloy (Ti-6Al-4V) 35-43HRC		70	8,000	1,000~1,600	70	6,400	800~1,200	70	5,100	800~1,200
		110	7,000	800~1,400	125	5,600	700~900	140	4,500	700~900
		150	6,000	500~1,000	175	4,800	400~800	200	3,800	400~800
Heat resistant alloy (INCO718) 35-43HRC		70	4,000	320~480	70	3,200	260~380	70	2,500	200~300
		110	3,500	280~420	125	2,800	220~340	140	2,200	180~260
		150	3,000	240~360	175	2,400	190~290	200	1,900	150~230

Please refer to chart and formula below to calculate a_p .



$$a_p = 2 \sqrt{(R^2 - (R - H)^2)}$$

Pick amount a_p (mm)		Cusp height (mm)									
Cat.No.	R	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
STLP-4160T20R4-M8	1500										
STLP-4200T15R4-M10		3.46	4.90	6.00	6.93	7.75	8.49	9.17	9.80	10.39	10.95
STLP-4200T20R5-M10											
STLP-4250T20R5-M12	2200	4.20	5.93	7.27	8.39	9.38	10.28	11.10	11.87	12.59	13.27

Note

1. Please apply coolant according to work material.
2. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
3. In case of machine rpm not enough, reduce V_f at same rate.

5-AXIS Series

■ Recommended cutting conditions



● STLP Type - with Tip R

Material			Tool dia.(mm)								
			16			20			25		
	a_p (mm)	a_e (mm)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	 $a_p \leq 0.4$ $a_e \leq 0.25$	70	7,800	1,090~1,400	70	6,300	880~1,100	70	5,100	710~920	
		110	7,100	850~1,100	125	5,700	680~910	140	4,600	550~740	
		150	6,300	630~880	175	5,000	500~700	200	4,100	410~570	
Alloy steel, Tool & die steel, Mold steel (SKD, SKH, NAK) below 42HRC	 $a_p \leq 0.4$ $a_e \leq 0.25$	70	7,800	780~1,090	70	6,300	630~880	70	5,100	510~710	
		110	7,100	560~850	125	5,700	450~680	140	4,600	370~550	
		150	6,300	440~690	175	5,000	350~550	200	4,100	290~450	
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	 $a_p \leq 0.3$ $a_e \leq 0.2$	70	6,300	310~560	70	5,000	250~400	70	4,100	210~370	
		110	5,500	270~380	125	4,400	220~290	140	3,600	180~250	
		150	4,700	180~320	175	3,800	140~260	200	3,100	120~220	
Austenitic stainless steel (SUS304, 316, 317) 17Cr	 $a_p \leq 0.3$ $a_e \leq 0.2$	70	7,800	700~930	70	6,300	560~750	70	5,100	460~610	
		110	7,100	490~780	125	5,700	390~620	140	4,600	320~510	
		150	6,300	310~560	175	5,000	250~450	200	4,100	210~370	
Titanium alloy (Ti-6Al-4V) 35-43HRC	 $a_p \leq 0.3$ $a_e \leq 0.2$	70	5,900	230~470	70	4,700	180~370	70	3,800	150~300	
		110	5,100	200~350	125	4,100	160~280	140	3,300	130~230	
		150	4,300	170~300	175	3,500	140~240	200	2,800	110~200	
Heat resistant alloy (INCO718) 35-43HRC	 $a_p \leq 0.2$ $a_e \leq 0.15$	70	4,000	320~480	70	3,200	260~380	70	2,500	100~130	
		110	3,500	280~420	125	2,800	220~340	140	2,200	90~110	
		150	3,000	240~360	175	2,400	190~290	200	1,900	80~100	

Note

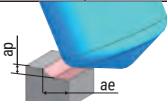
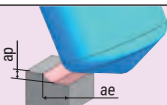
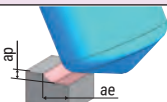
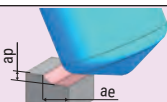
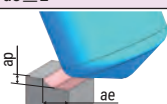
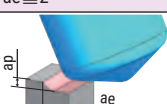
1. Please apply coolant according to work material.
2. In case of chatter occurring, recommended to reduce a_p or rpm and keep feed per tooth.
3. In case of machine rpm not enough, reduce V_f at same rate.

5-AXIS Series

Recommended cutting conditions

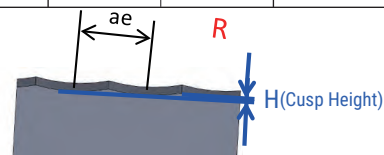
FJVA Type - with Barrel R



Material			Tool dia.(mm)							
			6		8		10		12	
	ap (mm)	ae (mm)	n (min ⁻¹)	V _f (mm/min)	n (min ⁻¹)	V _f (mm/min)	n (min ⁻¹)	V _f (mm/min)	n (min ⁻¹)	V _f (mm/min)
Carbon steel (S50C, S55C) below 250HB	 ap≤0.3 ae≤3		15,920	2,550	13,930	2,510	12,730	2,550	10,610	2,120
Alloy steel, Tool & die steel, Mold steel (SKD, SKH, NAK) below 42HRC	 ap≤0.3 ae≤3		10,610	1,270	9,950	1,390	9,550	1,530	7,960	1,270
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	 ap≤0.02Dc ae≤2.5		8,490	850	7,960	960	7,640	1,070	6,370	890
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	 ap≤0.01Dc ae≤2		6,900	550	6,370	640	6,050	730	5,040	600
Austenitic stainless steel (SUS304, 316, 317) 17Cr	 ap≤0.02Dc ae≤2		10,610	1,060	9,950	1,190	9,550	1,340	7,960	1,110
Titanium alloy (Ti-6Al-4V)	 ap≤0.02Dc ae≤2		5,310	420	4,770	480	4,140	500	3,450	410
Heat resistant alloy (INCO718) 35-43HRC	 ap≤0.01Dc ae≤1		3,180	250	2,790	220	2,550	200	2,120	170

Please refer to chart and formula below to calculate ap.

$$ae = 2 \sqrt{(R^2 - (R - H)^2)}$$



Pick amount ap(mm)		Cusp height (mm)									
Cat.No.	R	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
FJVA4060S06-R250	250										
FJVA4080S08-R250											
FJVA4100S10-R250		1.41	2.00	2.45	2.83	3.16	3.46	3.74	4.00	4.24	4.47
FJVA4120S12-R250											

Note

1. Please apply coolant according to work material.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. In case of machine rpm not enough, reduce Vf at same rate.

5-AXIS Series

■ Definition of edge shape for programming

● When using taper holder (MQT-***A03/05 type)

Fig.1 XPHW/T

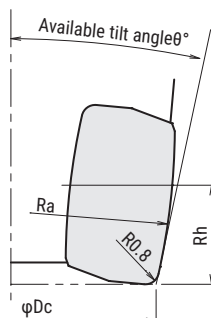
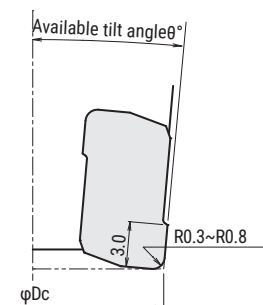


Fig.2 YPHW



● Dimensions when using XPHW / T insert

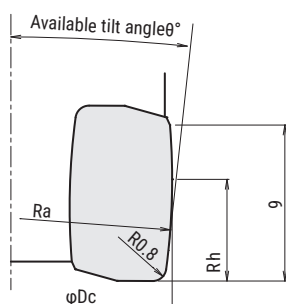
available tilt angle	Cat.No	Dimensions (mm)			Fig
		ϕD_c	R_a	R_h	
$1^\circ \sim 6^\circ$	MQT-2016A03-M8	15.5	R64.19	8.76	1
$3^\circ \sim 8^\circ$	MQT-2016A05-M8	15.5	R64.34	10.98	1
$1^\circ \sim 6^\circ$	MQT-2020A03-M10	19.5	R63.34	8.67	1
$3^\circ \sim 8^\circ$	MQT-2020A05-M10	19.5	R63.46	10.85	1

● Dimensions when using YPHW insert

available tilt angle	Cat.No	Dimensions (mm)	Fig
		ϕD_c	
3°	MQT-2016A03-M8	16	2
5°	MQT-2016A05-M8	16	2
3°	MQT-2020A03-M10	20	2
5°	MQT-2020A05-M10	20	2

● When using straight holder (MQT-***A00 type)

Fig.3 XPHW/T



● Dimensions when using XPHW/T insert

available tilt angle	Cat.No	Dimensions (mm)			Fig
		ϕD_c	R_a	R_h	
$0^\circ \sim 3^\circ$	MQT-2016A00-M8	16	R63.27	5.48	3
$0^\circ \sim 3^\circ$	MQT-4020A00-M10	20	R64.29	5.48	3
$0^\circ \sim 3^\circ$	MQT-5025A00-M12	25	R63.26	5.48	3
$0^\circ \sim 3^\circ$	MQT-6032A00-M16	32	R62.41	5.48	3
$0^\circ \sim 3^\circ$	MQT-6035A00-M16	35	R62.16	5.48	3

● Dimensions when using YPHW insert

available tilt angle	Cat.No	Dimensions (mm)	Fig
		ϕD_c	
0°	MQT-2016A00-M8	16	-
0°	MQT-4020A00-M10	20	-
0°	MQT-5025A00-M12	25	-
0°	MQT-6032A00-M16	32	-
0°	MQT-6035A00-M16	35	-

5-AXIS Series

■ Recommended cutting conditions

MQT type with XPHT/XPHW insert for finishing side wall + MSN shank

Material	Grade	Tool dia.(mm)														
		16					20					20				
		2N					2N					4N				
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015 XPHT (XPHW)	~55	≤1.5	<0.12	12,000	4,800	~70	≤1.5	<0.12	9,600	3,840	~70	≤1.5	<0.12	9,600	7,680
		55~80	≤1.2	<0.10	9,000	3,600	70~100	≤1.2	<0.10	7,200	2,880	70~100	≤1.2	<0.10	7,200	5,760
		80~105	≤1.0	<0.10	7,200	2,880	100~130	≤1.0	<0.10	5,760	2,300	100~130	≤1.0	<0.10	5,760	4,600
	(CX75)	105~160	≤1.0	<0.10	6,000	2,400	130~200	≤1.0	<0.10	4,800	1,920	130~200	≤1.0	<0.10	4,800	3,840
Tool & die steel (SKD61, SKD11) below 255HB	JC8015 XPHT (XPHW)	~55	≤1.5	<0.12	10,000	4,000	~70	≤1.5	<0.12	8,000	3,200	~70	≤1.5	<0.12	8,000	6,400
		55~80	≤1.2	<0.10	7,500	3,000	70~100	≤1.2	<0.10	6,000	2,400	70~100	≤1.2	<0.10	6,000	4,800
		80~105	≤1.0	<0.10	6,000	2,400	100~130	≤1.0	<0.10	4,800	1,920	100~130	≤1.0	<0.10	4,800	3,840
	(CX75)	105~160	≤1.0	<0.10	5,000	2,000	130~200	≤1.0	<0.10	4,000	1,600	130~200	≤1.0	<0.10	4,000	3,200
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015 XPHT (XPHW)	~55	≤1.2	<0.12	9,000	3,600	~70	≤1.2	<0.12	7,200	2,880	~70	≤1.2	<0.12	7,200	5,760
		55~80	≤1.0	<0.10	6,800	2,720	70~100	≤1.0	<0.10	5,400	2,160	70~100	≤1.0	<0.10	5,400	4,320
		80~105	≤0.8	<0.10	5,400	2,160	100~130	≤0.8	<0.10	4,320	1,730	100~130	≤0.8	<0.10	4,320	3,460
	(DH102)	105~160	≤0.8	<0.10	4,500	1,800	130~200	≤0.8	<0.10	3,600	1,440	130~200	≤0.8	<0.10	3,600	2,880
Mold steel (NAK80, HPM1, P21) 38-43HRC	DH102 XPHW	~55	≤1.0	<0.12	8,000	3,200	~70	≤1.0	<0.12	6,400	2,560	~70	≤1.0	<0.12	6,400	5,120
		55~80	≤0.8	<0.10	6,000	2,400	70~100	≤0.8	<0.10	4,800	1,920	70~100	≤0.8	<0.10	4,800	3,840
		80~105	≤0.6	<0.10	4,800	1,920	100~130	≤0.6	<0.10	3,840	1,540	100~130	≤0.6	<0.10	3,840	3,080
	(JC8015)	105~160	≤0.6	<0.10	4,000	1,600	130~200	≤0.6	<0.10	3,200	1,280	130~200	≤0.6	<0.10	3,200	2,560
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	DH102 XPHW	~55	≤1.0	<0.10	5,000	1,500	~70	≤1.0	<0.10	4,000	1,200	~70	≤1.0	<0.10	4,000	2,400
		55~80	≤0.8	<0.08	3,750	1,130	70~100	≤0.8	<0.08	3,000	900	70~100	≤0.8	<0.08	3,000	1,800
		80~105	≤0.6	<0.08	3,000	900	100~130	≤0.6	<0.08	2,400	720	100~130	≤0.6	<0.08	2,400	1,440
	(JC8015)	105~160	≤0.6	<0.08	2,500	750	130~200	≤0.6	<0.08	2,000	600	130~200	≤0.6	<0.08	2,000	1,200
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	DH102 XPHW	~55	≤1.0	<0.10	3,600	720	~70	≤1.0	<0.10	2,860	570	~70	≤1.0	<0.10	2,860	1,140
		55~80	≤0.8	<0.08	2,700	540	70~100	≤0.8	<0.08	2,140	430	70~100	≤0.8	<0.08	2,140	860
		80~105	≤0.6	<0.08	2,160	430	100~130	≤0.6	<0.08	1,720	340	100~130	≤0.6	<0.08	1,720	680
		105~160	≤0.6	<0.08	1,800	360	130~200	≤0.6	<0.08	1,430	290	130~200	≤0.6	<0.08	1,430	580
Grey & Nodular cast iron (FC, FCD) below 300HB	JC8015 XPHW (XPHT)	~55	≤1.5	<0.12	12,000	6,000	~70	≤1.5	<0.12	9,600	4,800	~70	≤1.5	<0.12	9,600	9,600
		55~80	≤1.2	<0.10	9,000	4,500	70~100	≤1.2	<0.10	7,200	3,600	70~100	≤1.2	<0.10	7,200	7,200
		80~105	≤1.0	<0.10	7,200	3,600	100~130	≤1.0	<0.10	5,760	2,880	100~130	≤1.0	<0.10	5,760	5,760
	(DH102)	105~160	≤1.0	<0.10	6,000	3,000	130~200	≤1.0	<0.10	4,800	2,400	130~200	≤1.0	<0.10	4,800	4,800
Stainless steel (SUS304) below 250HB	JC8015 XPHT (XPHW)	~55	≤1.2	<0.12	10,000	4,000	~70	≤1.2	<0.12	8,000	3,200	~70	≤1.2	<0.12	8,000	6,400
		55~80	≤1.0	<0.10	7,500	3,000	70~100	≤1.0	<0.10	6,000	2,400	70~100	≤1.0	<0.10	6,000	4,800
		80~105	≤0.8	<0.10	6,000	2,400	100~130	≤0.8	<0.10	4,800	1,920	100~130	≤0.8	<0.10	4,800	3,840
		105~160	≤0.8	<0.10	5,000	2,000	130~200	≤0.8	<0.10	4,000	1,600	130~200	≤0.8	<0.10	4,000	3,200

Cusp height: XPHT/W

Cusp Height (μm)	a_p (mm)	Cusp Height (μm)	a_p (mm)
0.50	0.5	3.35	1.3
0.71	0.6	3.89	1.4
0.97	0.7	4.46	1.5
1.27	0.8	5.08	1.6
1.61	0.9	5.73	1.7
1.98	1.0	6.43	1.8
2.40	1.1	7.16	1.9
2.86	1.2	7.94	2.0

Note

- Figures to be adjusted according to machine rigidity or work rigidity.
- If chattering occurs, recommended to reduce a_p and a_e .
- Use air blow.

5-AXIS Series

■ Recommended cutting conditions

MQT type with XPHT/XPHW insert for finishing side wall + MSN shank

Material	Grade	Tool dia.(mm)									
		25					32/35				
		5N					6N				
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	JC8015 XPHT (XPHW) (CX75)	~90	≤1.5	<0.12	7,640	7,640	~120	≤1.5	<0.12	5,460	6,550
		90~125	≤1.2	<0.10	5,730	5,730	120~175	≤1.2	<0.10	4,100	4,920
		125~160	≤1.0	<0.10	4,580	4,580	175~225	≤1.0	<0.10	3,280	3,940
		160~250	≤1.0	<0.10	3,820	3,820	225~320	≤1.0	<0.10	2,730	3,280
Tool & die steel (SKD61, SKD11) below 255HB	JC8015 XPHT (XPHW) (CX75)	~90	≤1.5	<0.12	6,400	6,400	~120	≤1.5	<0.12	4,550	5,460
		90~125	≤1.2	<0.10	4,800	4,800	120~175	≤1.2	<0.10	3,410	4,090
		125~160	≤1.0	<0.10	3,840	3,840	175~225	≤1.0	<0.10	2,730	3,280
		160~250	≤1.0	<0.10	3,200	3,200	225~320	≤1.0	<0.10	2,280	2,740
Mold steel (HPM7, PX5, P20) 30-36 HRC	JC8015 XPHT (XPHW) (DH102)	~90	≤1.2	<0.12	5,730	5,730	~120	≤1.2	<0.12	4,090	4,910
		90~125	≤1.0	<0.10	4,300	4,300	120~175	≤1.0	<0.10	3,070	3,680
		125~160	≤0.8	<0.10	3,440	3,440	175~225	≤0.8	<0.10	2,450	2,940
		160~250	≤0.8	<0.10	2,870	2,870	225~320	≤0.8	<0.10	2,050	2,460
Mold steel (NAK80, HPM1, P21) 38-43HRC	DH102 XPHW (JC8015)	~90	≤1.0	<0.12	5,100	5,100	~120	≤1.0	<0.12	3,640	4,370
		90~125	≤0.8	<0.10	3,830	3,830	120~175	≤0.8	<0.10	2,730	3,280
		125~160	≤0.6	<0.10	3,060	3,060	175~225	≤0.6	<0.10	2,180	2,620
		160~250	≤0.6	<0.10	2,550	2,550	225~320	≤0.6	<0.10	1,820	2,180
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	DH102 XPHW (JC8015)	~90	≤1.0	<0.10	3,180	2,380	~120	≤1.0	<0.10	2,280	2,050
		90~125	≤0.8	<0.08	2,380	1,780	120~175	≤0.8	<0.08	1,710	1,540
		125~160	≤0.6	<0.08	1,910	1,430	175~225	≤0.6	<0.08	1,370	1,230
		160~250	≤0.6	<0.08	1,590	1,190	225~320	≤0.6	<0.08	1,140	1,030
Hardened die steel (SKD11, SLD, DC11) 55-62HRC	DH102 XPHW	~90	≤1.0	<0.10	2,300	1,150	~120	≤1.0	<0.10	1,640	980
		90~125	≤0.8	<0.08	1,720	860	120~175	≤0.8	<0.08	1,230	740
		125~160	≤0.6	<0.08	1,380	690	175~225	≤0.6	<0.08	980	590
		160~250	≤0.6	<0.08	1,150	580	225~320	≤0.6	<0.08	820	490
Grey & Nodular cast iron (FC, FCD) below 300HB	JC8015 XPHW (XPHT) (DH102)	~90	≤1.5	<0.12	7,640	9,550	~120	≤1.5	<0.12	5,460	8,190
		90~125	≤1.2	<0.10	5,730	7,160	120~175	≤1.2	<0.10	4,100	6,150
		125~160	≤1.0	<0.10	4,580	5,720	175~225	≤1.0	<0.10	3,280	4,920
		160~250	≤1.0	<0.10	3,820	4,780	225~320	≤1.0	<0.10	2,730	4,100
Stainless steel (SUS304) below 250HB	JC8015 XPHT (XPHW)	~90	≤1.2	<0.12	6,400	6,400	~120	≤1.2	<0.12	4,550	5,460
		90~125	≤1.0	<0.10	4,800	4,800	120~175	≤1.0	<0.10	3,410	4,090
		125~160	≤0.8	<0.10	3,840	3,840	175~225	≤0.8	<0.10	2,730	3,280
		160~250	≤0.8	<0.10	3,200	3,200	225~320	≤0.8	<0.10	2,280	2,740

Cusp height: XPHT/W

Cusp Height (μm)	a_p (mm)	Cusp Height (μm)	a_p (mm)
0.50	0.5	3.35	1.3
0.71	0.6	3.89	1.4
0.97	0.7	4.46	1.5
1.27	0.8	5.08	1.6
1.61	0.9	5.73	1.7
1.98	1.0	6.43	1.8
2.40	1.1	7.16	1.9
2.86	1.2	7.94	2.0

Note

- Figures to be adjusted according to machine rigidity or work rigidity.
- If chattering occurs, recommended to reduce a_p and a_e .
- Use air blow.

SKS-GII

SKG/MSG Type



High metal removal rate

Feature 1

Provides stability even milling of deep cavities.

Feature 2

4 corner positive insert with low cutting forces.



SKS-GII

SKG/MSG Type

Feature 3 **Flat top insert**

SKG-10 type insert : Max ap=1.5mm

SKG-14 type insert : Max ap=2.5mm

Feature 4 **Chip breaker insert**

Optimized cutting edge for machining of difficult to cut materials like titanium alloy.

Effective for machining that requires reduced cutting loads or long overhang application.



SM breaker for difficult to cut materials



PM breaker for mold steel

Feature 5

Insert grades for a wide range of materials

<JC8118> <JC8050> <JC7550> <DS150>



mold steel, hardened steel from 38HRC upto 50HRC
JC8118



mold steel, general steel below 36HRC
JC8050



Titanium alloy, stainless steel
JC7550, DS150

ISO	P					M					K				S				H		
	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30	S01	S10	S20	S30	H01	H10	H20
Range			JC8118								JC8118								JC8118		
			JC8050														DS150				
								JC7550									JC7550				

Feature 6

Excellent chip evacuation

SKS-GII

SKG/MSG Type

SKG10
TYPE

Bore Type

Through
coolant
holeG-
Body

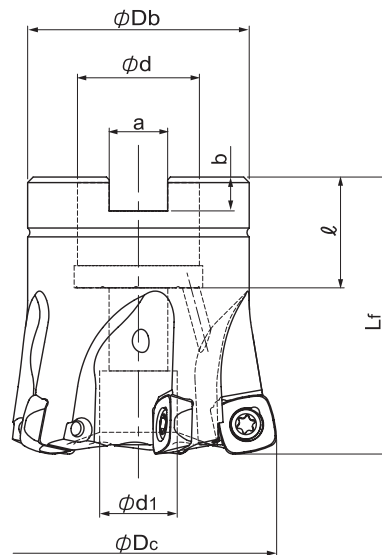
Face Milling

Copy Milling

Pocket Milling

Helical Interpolation

Plunge Milling



Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Inserts
			φDc	Lf	φDb	φd	φd1	a	b	ℓ			
SKG-4050R-10-22	●	4	50	50	40	22	14	10.4	6.3	20	M10X1.5X35★	0.3	SPNW10 SPET10 SPMT10
SKG-5050R-10-22	●	5									52	16.6	
SKG-5052R-10-22	●		M10				0.3						
SKG-5063R-10-22	○		63		48	17	M10	0.5					
SKG-5063R-10-27	○	27				20	12.4	7	22	M12X1.75X30★	0.5		
SKG-6063R-10-22	●	22				17	10.4	6.3	20	M10	0.5		
SKG-6063R-10-27	●	6	66		50	27	20	12.4	7	22	M12X1.75X30★	0.5	
SKG-6063R-10-27	●										M12X1.75X30★	0.6	
SKG-6066R-10-27	●										M12X1.75X30★	0.9	
SKG-6080R-10-27	●		80	60									

Screw	Torque(N.m)	Wrench
TSW-3509H	3.0	A-15T

SKS-GII

SKG/MSG Type

MSG10
TYPE

Modular Type

Through
coolant
holeG-
Body

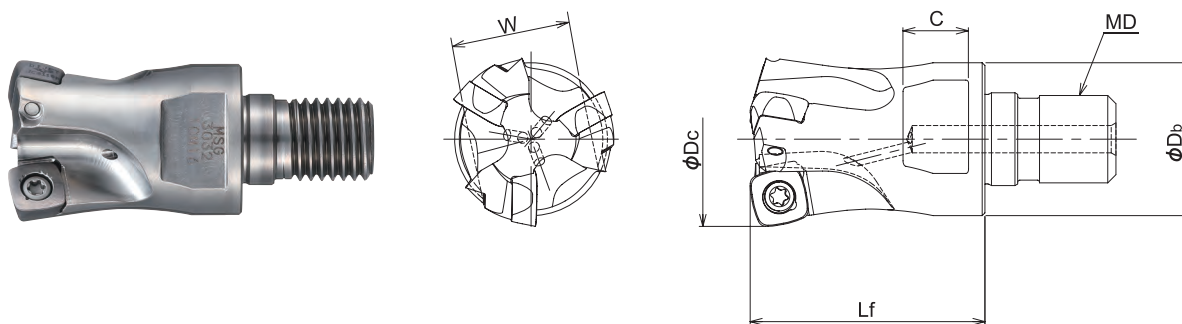
Face Milling

Copy Milling

Pocket Milling

Helical Interpolation

Plunge Milling



Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert					
			φDc	Lf	φDb	MD	C	W						
MSG-2025-10-M12	●	2	25	35	23	M12	11	19	SPNW10 SPET10 SPMT10					
MSG-3032-10-M16	●	3	32	43	28	M16	12	22						
MSG-3035-10-M16	○		35		30		14	26						
MSG-4040-10-M16	●	4	40		32									
MSG-4042-10-M16	●		42											

Screw	Torque(N.m)	Wrench
TSW-3509H	3.0	A-15

SKS-GII

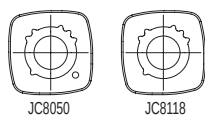
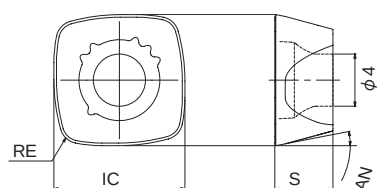
SKG/MSG Type

SKG/MSG10
TYPE

Insert



Fig. 1



JC8050

JC8118



Fig. 2

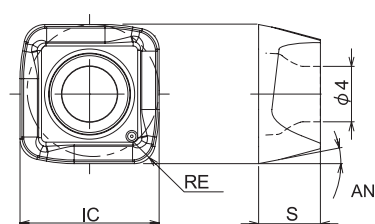


Fig. 3

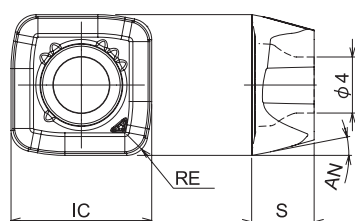
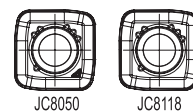
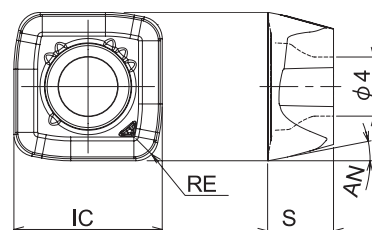


Fig. 4



JC8050

JC8118

Cat.No.	Tolerance	PVD Coating				Dimensions (mm)				Fig.
		DS150	JC7550	JC8050	JC8118	RE	IC	S	AN	
SPNW100415ZTR	N			●	●	1.5	10	4.46	11°	1
SPET100415ZPER-SM	E	●	●							2
SPMT100415ZPER-SM	M	●	●							3
SPMT100415ZPTR-PM				●	●					4

SKS-GII**SKG/MSG Type****SKG14**
TYPE**Bore Type**Through
coolant
hole**G-
Body**

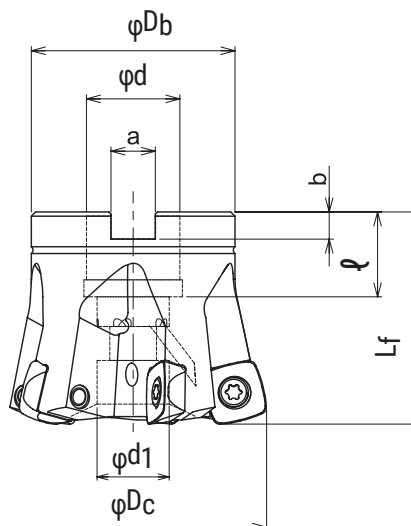
Face Milling

Copy Milling

Pocket Milling

Helical Interpolation

Plunge Milling



Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Insert
			φD _C	L _f	φD _B	φ _d	φd ₁	a	b	ℓ			
SKG-4050R-14-22	●	4	50	50	40	22	14	10.4	6.3	19.05	M10X1.5X35★	0.3	SPNW14 SPMT14
SKG-4052R-14-22	●		52		42		17				M10X1.5X35★	0.3	
SKG-4063R-14-22	●		63		48						20	M10	
SKG-4063R-14-27	●				27	20	12.4	7	22	M12X1.75X35★	0.5		
SKG-5066R-14-27	●	5	66							50	M12X1.75X35★	0.5	
SKG-5080R-14-27	●		80			60				37	M12X1.75X35★	0.8	
SKG-6100R-14-32	●	6	100	63	70	32	45	14.4	8	25	M16	1.6	

Screw	Torque(N.m)	Wrench
CSW-513H	5.5	A-20

SKS-GII

SKG/MSG Type

SKG14
TYPE

Insert

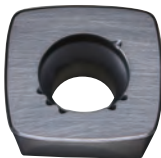


Fig. 1

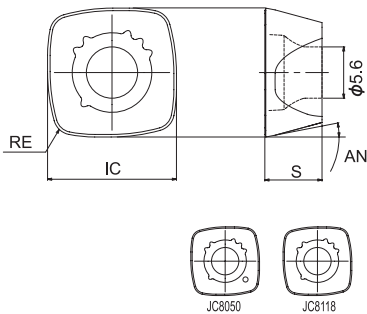


Fig. 2

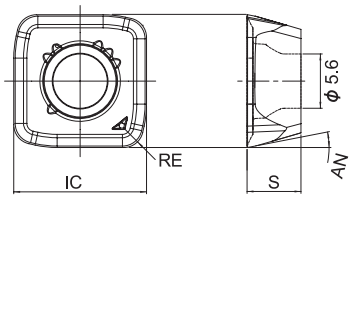
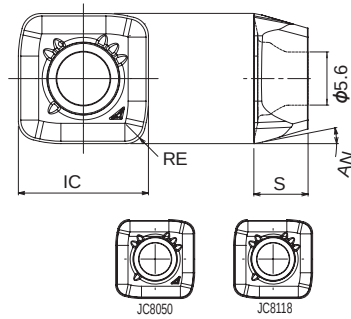


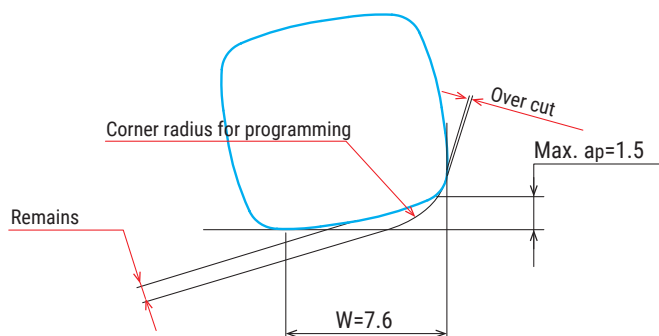
Fig. 3



Cat.No.	Tolerance	PVD Coating				Dimensions (mm)				Fig.		
		DS150	JC7550	JC8050	JC8118	RE	IC	S	AN			
SPNW140515ZTR	N			●	●	1.5	13.7	5.56	11°	1		
SPMT140520ZPER-SM	M	●	●			2						2
SPMT140520ZPTR-PM				●	●							3

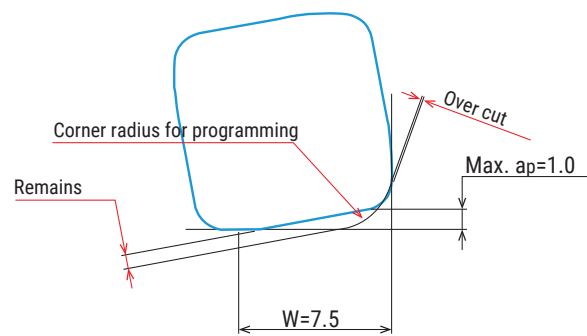
Definition of corner shape for programming

● SPNW100415ZTR



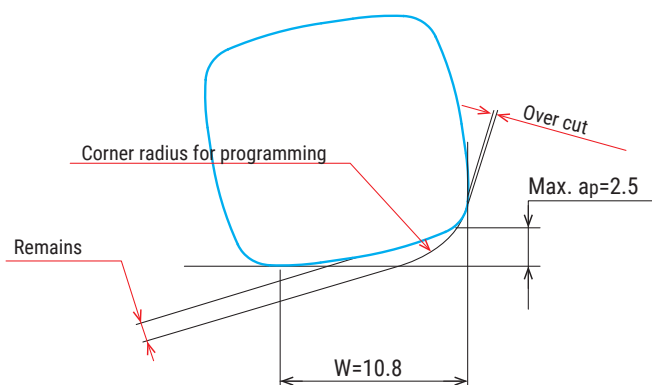
Corner radius for programming	Over cut	Remains
R2.5	0	0.99
R3.0 (Standard)	0	0.84
R3.5	0.09	0.71
R4.0	0.23	0.59

● SPE(M)T100415ZPER-SM SPMT100415ZPTR-PM



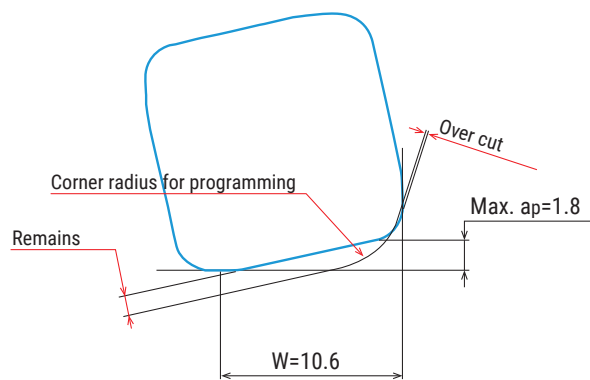
Corner radius for programming	Over cut	Remains
R2.5 (Standard)	0	0.77
R3.0	0.09	0.68
R3.5	0.25	0.60
R4.0	0.43	0.52

● SPNW140515ZTR



Corner radius for programming	Over cut	Remains
R3.5	0	1.60
R4.0 (Standard)	0	1.46
R4.5	0.06	1.32
R5.0	0.17	1.19

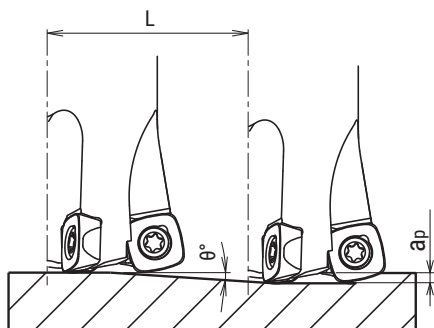
● SPMT140520ZPER-SM SPMT140520ZPTR-PM



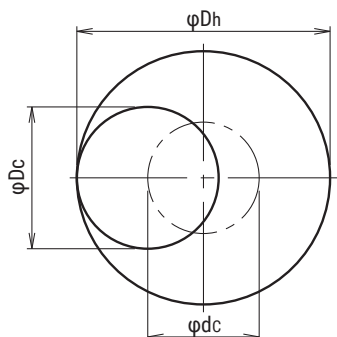
Corner radius for programming	Over cut	Remains
R3.5 (Standard)	0	1.35
R4.0	0.02	1.25
R4.5	0.14	1.12
R5.0	0.29	1.05

Recommended Data for Profile Milling

Ramping



Helical interpolation



- Calculation of tool pass dia.

$$\varphi Dc = \varphi Dh - \varphi Dc$$

Tool pass dia. Bore dia. Tool Dia.

- Depth of cut per one circuit should not exceed max. depth of cut Ap
- Down cutting is recommended, tool pass rotation should be counterclockwise

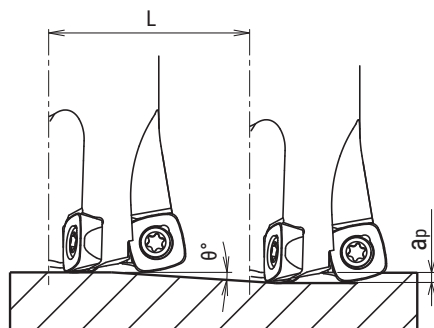
- In case of ramping and helical interpolation, apply 70% or less feed (Vf) from standard cutting condition table.

● SPNW100415ZTR / SPNW140515ZTR

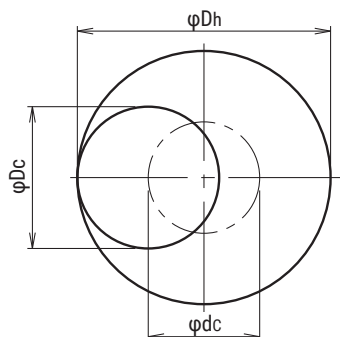
Cat.No.	Tool dia. (mm)	Effective Cutting dia. (mm)	Max. depth of cut: ap (mm)	Ramping		Helical interpolation	
				Max. ramping angle θ	Total cutting length at Max. (ap) : L (mm)	Min. Bore dia. Dh min. (mm)	Max. Bore dia. Dh max. (mm)
MSG-2025-10	25	9.8	1.5	1°	85.9	36	48
MSG-3032-10	32	16.8	1.5	1°	85.9	50	62
MSG-3035-10	35	19.8	1.5	1°	85.9	56	70
MSG-4040-10	40	24.8	1.5	1°	85.9	66	78
MSG-4042-10	42	26.8	1.5	1°	85.9	70	82
SKG-*050R-10	50	34.8	1.5	1°	85.9	86	98
SKG-5052R-10	52	36.8	1.5	1°	85.9	90	102
SKG-*063R-10	63	47.8	1.5	0°45'	114.6	112	124
SKG-6066R-10	66	50.8	1.5	0°45'	114.6	118	130
SKG-6080R-10	80	64.8	1.5	0°30'	171.9	146	158
SKG-4050R-14	50	28.4	2.5	1°	143.2	80	98
SKG-4052R-14	52	30.4	2.5	1°	143.2	84	102
SKG-*063R-14	63	41.4	2.5	0°45'	191	106	124
SKG-5066R-14	66	44.4	2.5	0°45'	191	112	130
SKG-5080R-14	80	58.4	2.5	0°30'	286.5	140	158
SKG-6100R-14	100	78.4	2.5	0°20'	430	180	198
SKG-6125R-14	125	103.4	2.5	0°20'	430	230	248
SKG-7160R-14	160	138.4	2.5	0°15'	573	300	318

Recommended Data for Profile Milling

Ramping



Helical interpolation



- Calculation of tool pass dia.

$$\phi D_c = \phi D_h - \phi D_c$$

Tool pass dia. Bore dia. Tool Dia.

- Depth of cut per one circuit should not exceed max. depth of cut A_p
- Down cutting is recommended, tool pass rotation should be counterclockwise

- In case of ramping and helical interpolation, apply 70% or less feed (V_f) from standard cutting condition table.

- SPE (M) T100415ZPER-SM, SPMT100415ZPTR-PM

- SPMT140520ZPER-SM, SPMT140520ZPTR-PM

Cat.No.	Tool dia. (mm)	Effective Cutting dia. (mm)	Max. depth of cut : a_p (mm)	Ramping		Helical interpolation	
				Max. ramping angle θ	Total cutting length at Max. (a_p) : L (mm)	Min. Bore dia. D_h min. (mm)	Max. Bore dia. D_h max. (mm)
MSG-2025-10	25	10	1.0	1°	57.3	36	48
MSG-3032-10	32	17	1.0	1°	57.3	50	62
MSG-3035-10	35	20	1.0	1°	57.3	56	70
MSG-4040-10	40	25	1.0	1°	57.3	66	78
MSG-4042-10	42	27	1.0	1°	57.3	70	82
SKG-*050R-10	50	35	1.0	1°	57.3	86	98
SKG-5052R-10	52	37	1.0	1°	57.3	90	102
SKG-*063R-10	63	48	1.0	0°45'	76.4	112	124
SKG-6066R-10	66	51	1.0	0°45'	76.4	118	130
SKG-6080R-10	80	65	1.0	0°30'	114.6	146	158
SKG-4050R-14	50	28.8	1.8	1°	103.1	80	98
SKG-4052R-14	52	30.8	1.8	1°	103.1	84	102
SKG-*063R-14	63	41.8	1.8	0°45'	137.5	106	124
SKG-5066R-14	66	44.8	1.8	0°45'	137.5	112	130
SKG-5080R-14	80	58.8	1.8	0°30'	206.3	140	158
SKG-6100R-14	100	78.8	1.8	0°20'	206.3	180	198
SKG-6125R-14	125	123.8	1.8	0°20'	206.3	230	248
SKG-7160R-14	160	138.8	1.8	0°15'	412.5	300	318

SKS-GII

SKG/MSG Type

■ Recommended Cutting Conditions - SKSG2-10 type -

Material	Insert	Grade	Vc	fz	ap	ae
Carbon Steel below 250HB	SPNW SPMT-PM	JC8050 (JC8118)	130 - 160 - 180	1.4 - 1.5 - 1.8	0.5 - 1.0 - 1.5	0.7 Dc
Tool & Die Steel below 255HB	SPNW SPMT-PM	JC8050 (JC8118)	130 - 160 - 180	1.4 - 1.5 - 1.8	0.5 - 1.0 - 1.5	0.7 Dc
Mold Steel 30-36HRC	SPNW SPMT-PM	JC8050 (JC8118)	130 - 160 - 180	1.4 - 1.5 - 1.8	0.5 - 1.0 - 1.5	0.7 Dc
Mold Steel 38-43HRC	SPNW SPMT-PM	JC8118 (JC8050)	80 - 110	1.2 - 1.3 - 1.5	0.5 - 1.0 - 1.2	0.6 Dc
Hardened Die Steel 42-52HRC	SPNW	JC8118	100	1.0 - 1.2 - 1.4	0.3 - 0.6 - 1.0	0.5 Dc
Grey & Nodular Cast Iron	SPNW SPMT-PM	JC8118	160 - 180	1.5 - 1.8	0.5 - 1.2 - 1.5	0.7 Dc
Stainless Steel	SPMT-SM SPET-SM	JC7550	100 - 130 - 150	0.9 - 1.0 - 1.4	0.5 - 1.0	0.6 Dc
Titanium Alloy	SPMT-SM SPET-SM	DS150	60	0.4 - 0.6	0.4 - 1.0	0.6 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity. (the above table is guide for cutting on a BT50 machine.)
 2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
 3. ap should be reduced when using on low rigidity machine.
 4. Use air blow.
- ★ap ≤1.0 when using SPMT/SPET insert.

SKS-GII**SKG/MSG Type****■ Recommended Cutting Conditions - SKSG2-14 type -**

Material	Insert	Grade	Vc	fz	ap	ae
Carbon Steel below 250HB	SPNW SPMT-PM	JC8050 (JC8118)	100 - 150	1.4 - 1.8	0.6 - 2.0	0.7 Dc
Tool & Die Steel below 255HB	SPNW SPMT-PM	JC8050 (JC8118)	100 - 150	1.4 - 1.8	0.6 - 2.0	0.7 Dc
Mold Steel 30-36HRC	SPNW SPMT-PM	JC8050 (JC8118)	100 - 150	1.4 - 1.8	0.6 - 2.0	0.7 Dc
Mold Steel 38-43HRC	SPNW SPMT-PM	JC8118 (JC8050)	80 - 100	1.4 - 1.5	0.7 - 1.6	0.6 Dc
Hardened Die Steel 42-52HRC	SPNW	JC8118	70 - 90	0.7 - 1.2	0.5 - 1.0	0.5 Dc
Grey & Nodular Cast Iron	SPNW SPMT-PM	JC8118	160 - 180	1.4 - 1.8	0.6 - 2.0	0.7 Dc
Stainless Steel	SPMT-SM	JC7550	100 - 150	1.0 - 1.3	0.7 - 1.5	0.6 Dc
Titanium Alloy	SPMT-SM	DS150	60	0.4 - 0.6	0.7 - 1.3	0.6 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity. (the above table is guide for cutting on a BT50 machine.)
 2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
 3. ap should be reduced when using on low rigidity machine.
 4. Use air blow.
- ★ap ≤1.8 when using SPMT insert.

SKS-GII 09

SKG09/MSG09 Type



SKS-GII

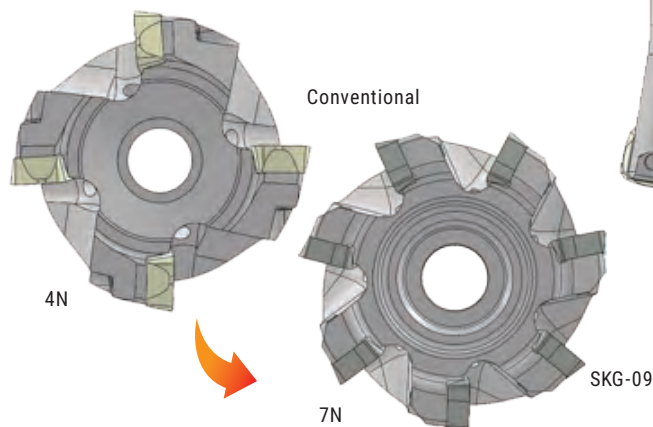
Type 09

Specifically designed for high efficiency machining of difficult to cut materials

Feature 1

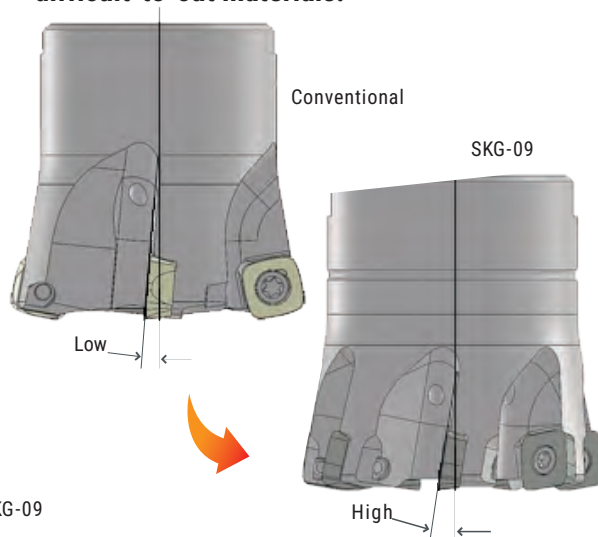
Multi-edge design enables high efficiency machining. Achieved Max $a_p=0.9$ mm even if difficult-to-cut materials such as titanium alloy, stainless steel & heat-resistant alloy

● Tool dia. $\phi 50$



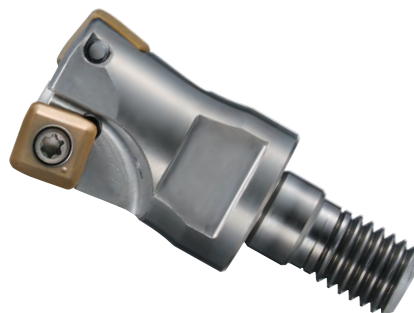
Feature 2

The optimised cutting edge design provides the sharpness and low cutting resistance that is ideal for difficult-to-cut materials.



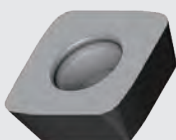
SKS-GII 09**SKG09/MSG09 Type****Feature 3**

Economical 4 cutting edges
Precise ground insert provides run out accuracy and longer tool life.

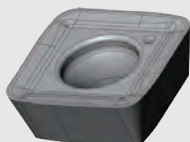
**● Line up**

Wear resistance

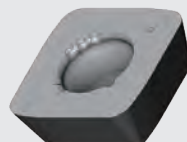
Fracture resistance



SDEW090312ZER (JC7518/DS118)



SDET090312ZDER-SM (DS118)



SDEW090312ZER (JC7550/DS150)



SDET090312ZDER-SM (JC7550/DS150)

Insert	Titanium alloy	Inconel	SUS630	SUS316
SDEW090312ZER (JC7518)		■	◎	
SDEW090312ZER (JC7550)			●	◎
SDEW090312ZER (DS118)	◎			
SDEW090312ZER (DS150)	●			
SDET090312ZDER-SM (JC7550)		●	●	●
SDET090312ZDER-SM (DS150)	●			
SDET090312ZDER-SM (DS118)	●			

◎: stable machining ●: unstable machining ■: light load machining

SKS-GII 09

SKG09/MSG09 Type

SKG09
TYPE

Bore Type

Through
coolant
holeG-
Body

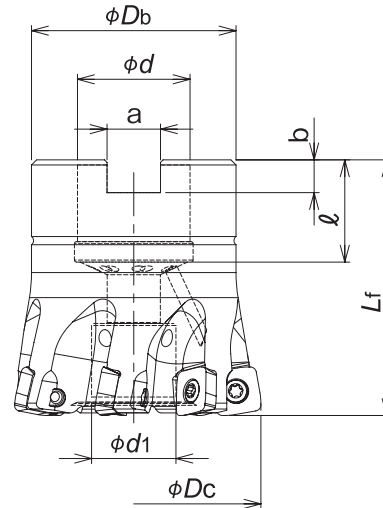
Face Milling

Copy Milling

Pocket Milling

Helical Interpolation

Plunge Milling



Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Insert
			φDc	Lf	φDb	φd	φd1	a	b	ℓ			
SKG-5040R-09-16	●	5	40	40	37	16	13.5	8.4	5.6	18	M8	0.21	SDEW090312ZER SDET090312ZDER-SM
SKG-7050R-09-22	●	7	50	50	40	22	16.5	10.4	6.3	20	M10	0.35	
SKG-7052R-09-22	●		52									M10	
SKG-8063R-09-22	●	8	63		48	17				M10	0.58		
SKG-8066R-09-27	●		66		50			M12X1.75X30★	0.60				
SKG-9080R-09-27	●	9	80		60	27	20	12.4	7	22	M12X1.75X30★	0.97	

Screw	Torque(N.m)	Wrench
DSW-307H	2.1	A-10

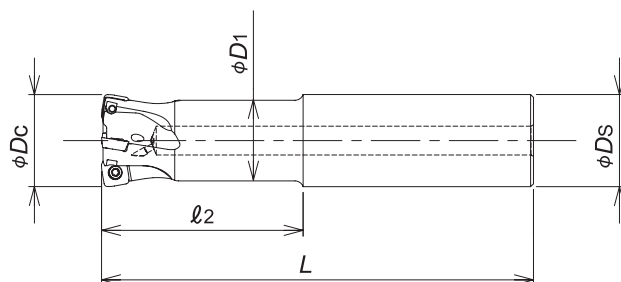
SKS-GII 09**SKG09/MSG09 Type****SKG09**
TYPE**Shank Type**Through
coolant
hole

Face Milling

Copy Milling

Pocket Milling

Helical Interpolation



Cat.No.	Stock	No. of inserts	Dimensions (mm)					Insert
			φDc	ℓ2	L	φD1	φDs	
SKG-3025-60-09-S25	○	3	25	60	140	23	25	SDEW090312ZER SDET090312ZDER-SM
SKG-3025-100-09-S25	○			100	180			
SKG-4032-70-09-S32	○	4	32	70	150	28	32	
SKG-4032-120-09-S32	○			120	200			
SKG-5035-70-09-S32	○	5	35	70	150	31		
SKG-5035-120-09-S32	○			120	200			

Screw	Torque(N.m)	Wrench
DSW-307H	2.1	A-10

SKS-GII 09

SKG09/MSG09 Type

MSG09
TYPE

Modular Type

Through
coolant
holeG-
Body

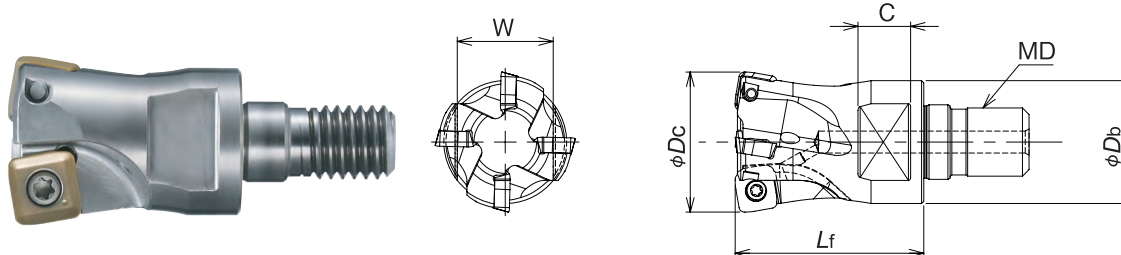
Face Milling

Copy Milling

Pocket Milling

Helical Interpolation

Plunge Milling



Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert	Parts
			φDc	Lf	φDb	MD	C	W		
MSG-2020-09-M10	●	2	20	30	19	M10	9	14	SDEW090312ZER SDET090312ZDER-SM	DSW-306H
MSG-2022-09-M10	○		22			M10				DSW-307H
MSG-3025-09-M12	●	3	25	35	23	M12	11	19		
MSG-4028-09-M12	○	4	28		23.6	M12				
MSG-4032-09-M16	●		32	43	28	M16	12	22		
MSG-5035-09-M16	●	5	35		29	M16				
MSG-5040-09-M16	●		40		32	M16	14	26		
MSG-5042-09-M16	●		42			M16				

Screw	Torque(N.m)	Wrench
DSW-306H	1.8	A-10
DSW-307H	2.1	A-10

SKS-GII 09

SKG09/MSG09 Type

SKG/MSG09
TYPE

Insert

Fig. 1



Fig. 1

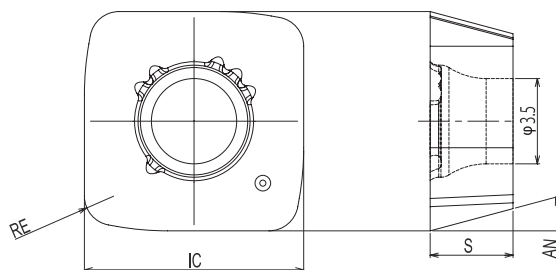
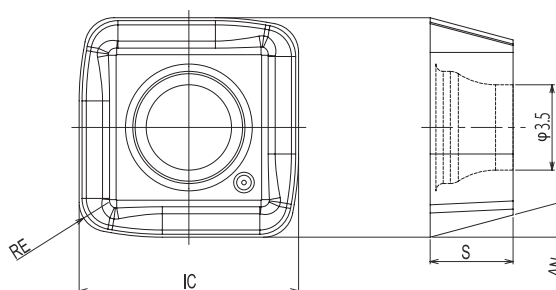


Fig. 2

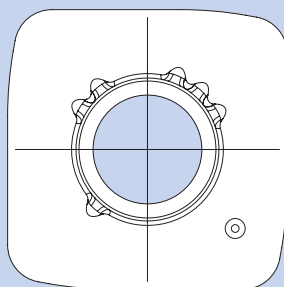


Fig. 2

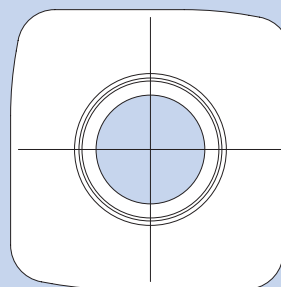


Cat.No.	Tolerance	PVD Coating				Dimensions (mm)				Fig.
		DS118	DS150	JC7518	JC7550	RE	IC	S	AN	
SDEW090312ZER	E	●	●	●	●	1.2	9	3.4	15°	1
SDET090312ZDER-SM		●	●		●					2

GRADE MARKING



JC7550/DS150



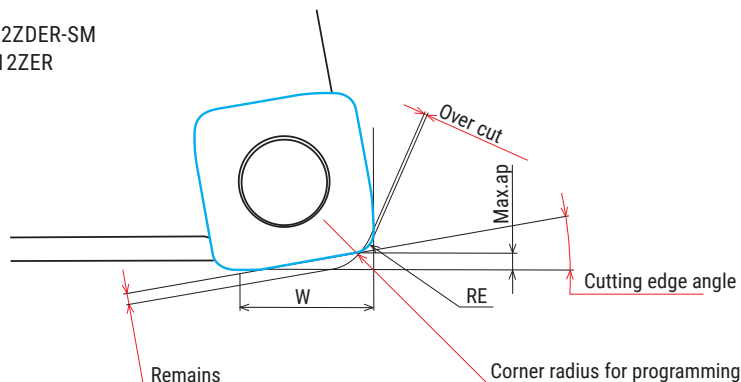
JC7518/DS118

SKS-GII 09

SKG09/MSG09 Type

■ Definition of corner shape for programming

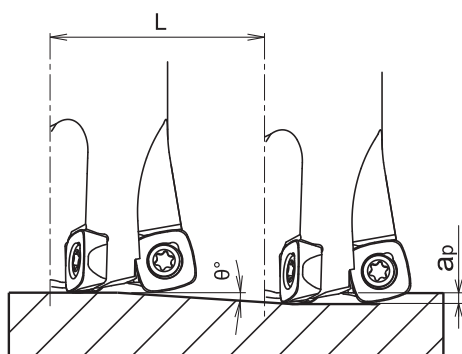
■ SDET090312ZDER-SM
SDEW090312ZER



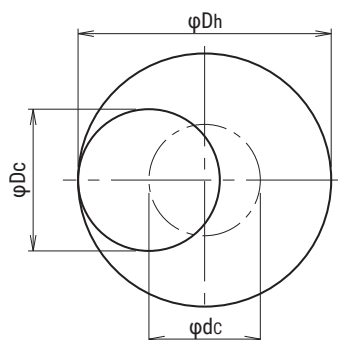
Corner radius for programming	Remains	Over cut	Max.ap	W	Cutting edge angle
1.5	0.81	0	0.9	7.1	10°
2 (Standard)	0.73	0			
2.5	0.65	0.08			

■ Recommended Data for Profile Milling

Ramping



Helical interpolation



● Calculation of tool pass dia.

$$\varphi_{dc} = \varphi_{Dh} - \varphi_{Dc}$$

Tool pass dia. Bore dia. Tool dia.

● Depth of cut per one circuit should not exceed max. depth of cut Ap

● Down cutting is recommended, tool pass rotation should be counterclockwise

● In case of ramping and helical interpolation, apply 70% or less feed (Vf) from standard cutting condition table

Cat.No.	Tool dia.	Effective cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation	
				Max.ramping angle θ	Total cutting length at Max.ap : L(mm)	Min.Bore dia. (mm)	Max.Bore dia. (mm)
MSG-2020-09-M10	20	5.6	0.9	1°	51.6	27	38
MSG-2022-09-M10	22	7.7	0.9	1°	51.6	31	42
MSG-3025-09-M12	25	10.7	0.9	1°	51.6	37	48
MSG-4028-09-M12	28	13.7	0.9	1°	51.6	43	54
MSG-4032-09-M16	32	17.6	0.9	1°	51.6	51	62
MSG-5035-09-M16	35	20.6	0.9	1°	51.6	57	68
MSG-5040-09-M16	40	25.7	0.9	1°	51.6	67	78
MSG-5042-09-M16	42	27.7	0.9	1°	51.6	71	82
SKG-3025-60-09-S25	25	10.7	0.9	1°	51.6	37	48
SKG-3025-100-09-S25	25	10.7	0.9	1°	51.6	37	48
SKG-4032-70-09-S32	32	17.6	0.9	1°	51.6	51	62
SKG-4032-120-09-S32	32	17.6	0.9	1°	51.6	51	62
SKG-5035-70-09-S32	35	20.6	0.9	1°	51.6	57	68
SKG-5035-120-09-S32	35	20.6	0.9	1°	51.6	57	68
SKG-5040R-09-16	40	25.7	0.9	1°	51.6	67	78
SKG-7050R-09-22	50	35.6	0.9	1°	51.6	87	98
SKG-7052R-09-22	52	37.6	0.9	1°	51.6	91	102
SKG-8063R-09-22	63	48.7	0.9	0°45'	68.8	113	124
SKG-8066R-09-27	66	51.7	0.9	0°45'	68.8	119	130
SKG-9080R-09-27	80	65.7	0.9	0°30'	103.1	147	158

SKS-GII 09**SKG09/MSG09 Type****■ Recommended Cutting Conditions - SKSG2-09 type -**

Material	Insert	Grade	Vc	fz	ap	ae
Austenitic Stainless Steel	SDEW (SDET)	JC7550	125 - 150	0.8 - 1.0	0.3 - 0.8	0.6 Dc
Martensitic Stainless Steel	SDEW	JC7550	155 - 190	0.8 - 1.0	0.3 - 0.8	0.6 Dc
Duplex Stainless Steel	SDEW	JC7518 (JC7550)	85 - 100	0.25 - 0.3	0.3 - 0.8	0.4~0.6 Dc
Titanium Alloy	SDEW	DS150 (DS118)	60	0.5 - 0.6	0.3 - 0.8	0.6 Dc
Heat Resistant Alloy	SDEW	JC7518 (JC7550)	25 - 30	0.5 - 0.6	0.2 - 0.5	0.4~0.6 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity. (the above table is guide for cutting on a BT50 machine.)
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.
5. Wet cutting is recommended for machining Super Duplex, Titanium Alloy, Heat Resistant Alloy.

SKS EXTREME

High-feed milling tools with double side inserts which achieve ultimate high-feed machining

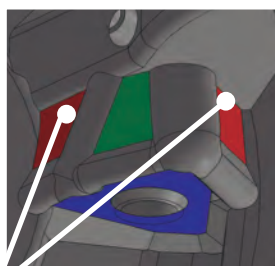
Feature 1

**Economical double-side insert
(with 6 cutting edges)**



Feature 2

Due to dovetail-shaped binding face, movement of inserts which occur by cutting force is prevented only single screw clamping



Dovetail-shaped



Feature 3

Application

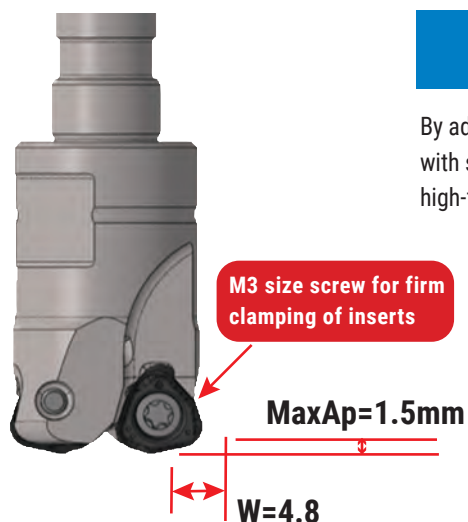
ISO	P					M					K				H		
	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30	H01	H10	H20
Applicable range			JC8050					JC8050									
			JC8118									JC8118				JC8118	
			JC7560						JC7560								

Adopted 3 insert grades:

PVD coated grade "JC7560" improved fracture toughness & heat impact resistance.

PVD coated grade "JC8118" achieved longer tool life for mold steel, high hardened die steel less than 50HRC & cast iron.

PVD coated grade "JC8050", that adopted carbide substrate with improved fracture toughness & coating layer can be widely applied for carbon steel, mold steel, & stainless steel.



EXSKS-05 type

By adopting multi blade specification with small diameter, high-feed machining is possible.

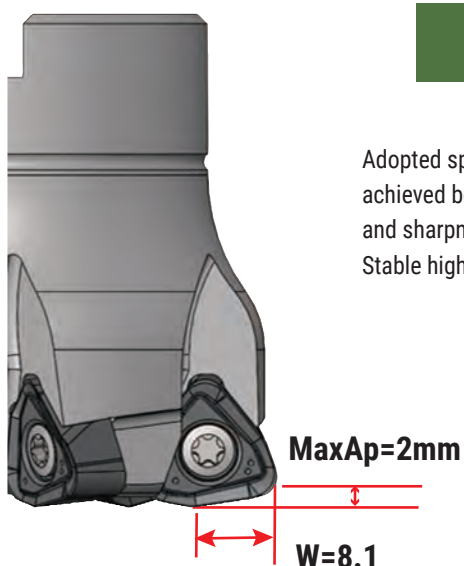
WNMU050320ZER-PM



grade : JC8050
JC8118

Optimal breaker for mold steel &
High hardened steel less than 50HRC

Coner radius for programming	Remains	Over cut
R2	0.59	0
R2.5	0.5	0
R3	0.41	0.13



EXSKS-07type

Adopted specifications which achieved both insert strength and sharpness.
Stable high-feed machining is possible.

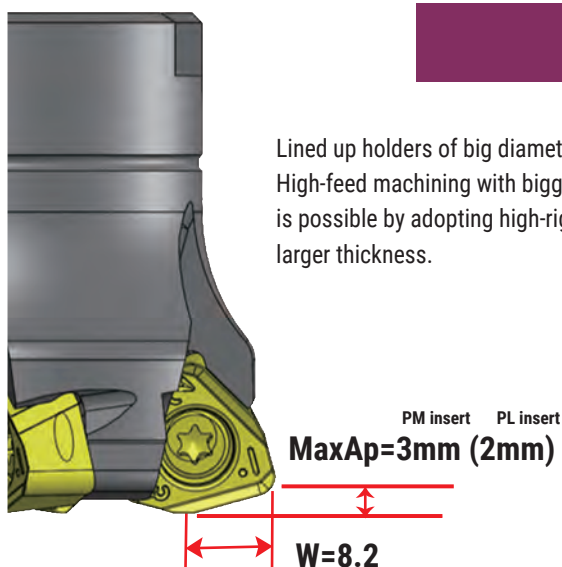
WNMU070620ZER-PM



grade : JC8050
JC8118

Optimal breaker for mold steel &
High hardened steel less than 50HRC

Coner radius for programming	Remains	Over cut
R3	0.80	0
R3.5	0.73	0.06
R4	0.66	0.21



EXSKS-09type

Lined up holders of big diameter.
High-feed machining with bigger depth of cut is possible by adopting high-rigid inserts with larger thickness.

WNMU090828ZER-PL

grade: JC8050 / JC8118

Suitable for machining shapes such as pocket milling with ap = 0.6 mm to ap = 1.2 mm.
The composite shape of the straight and radius cutting edges reduces fluctuations in cutting resistance during corner machining, realizing stable machining and extending tool life.



WNMU090720ZER-PM

grade : JC8050/JC8118/JC7560

Suitable for face milling of ap=1.4mm or more and shape machining such as pocket machining.



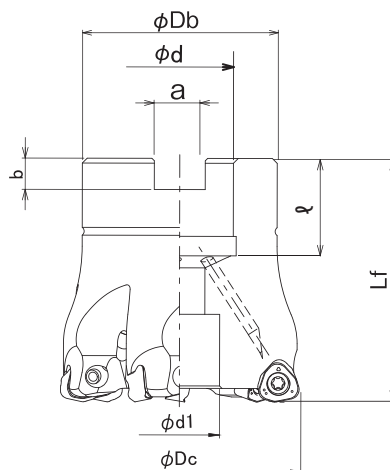
Coner radius for programming	Remains	Over cut
R3	1.41	0
R3.5	1.3	0
R4	1.19	0.025

SKS EXTREME

EXSKS/MEX Type

EXSKS-05
TYPE

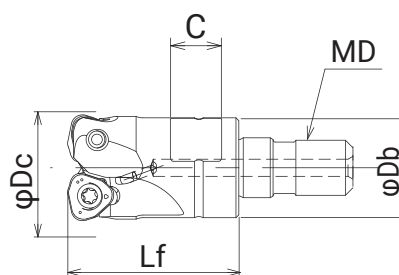
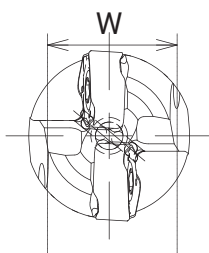
Bore Type



Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Insert 
			ϕDc	L_f	ϕDb	ϕd	$\phi d1$	a	b	ℓ			
EXSKS-5040R-05-16	●	5	40	45	35	16	13.5	8.4	5.8	19	M8	0.25	WNMU050320ZER-PM
EXSKS-7050R-05-22	●	7	50	50	40	22	16.5	10.4	6.3	20	M10	0.39	
EXSKS-7052R-05-22	●	7	52	50	40	22	16.5	10.4	6.3	20	M10	0.41	
EXSKS-8063R-05-22	○	8	63	50	48	22	17	10.4	6.3	20	M10	0.65	

MEX-05
TYPE

Modular Type



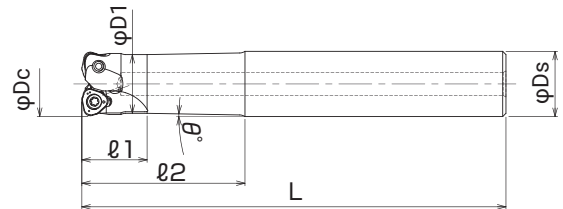
Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert 
			ϕDc	L_f	ϕDb	MD	C	W	
MEX-2020-05-M10	●	2	20	30	18	M10	9	14	WNMU050320ZER-PM
MEX-2021-05-M10	○	2	21	30	18	M10	9	14	
MEX-3025-05-M12	●	3	25	35	23	M12	11	19	
MEX-3026-05-M12	○	3	26	35	23	M12	11	19	
MEX-3028-05-M12	○	3	28	28	23	M12	11	19	
MEX-4030-05-M16	○	4	30	43	27	M16	12	22	
MEX-4032-05-M16	●	4	32	43	29	M16	12	22	
MEX-4033-05-M16	○	4	33	43	29	M16	12	22	
MEX-4035-05-M16	●	4	35	43	29	M16	12	22	
MEX-5040-05-M16	●	5	40	43	32	M16	14	26	

SKS EXTREME

EXSKS/MEX Type

EXSKS-05
TYPE

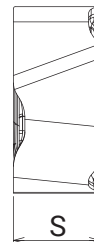
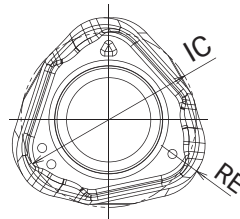
Shank Type

Through
coolant
hole

Cat.No.	Stock	No. of inserts	Dimensions (mm)							Inserts 
			φD_c	ℓ_1	ℓ_2	L	φd_1	φD_s	θ°	
EXSKS-2020-05-50-S20	●	2	20	20	50	130	18	20	1	WNMU050320ZER-PM
EXSKS-2020-05-80-S20	○	2	20	20	80	160	18	20	0.5	
EXSKS-2021-05-50-S20	○	2	21	20	50	130	18	20	1	
EXSKS-2021-05-80-S20	○	2	21	20	80	160	18	20	0.5	
EXSKS-3025-05-60-S25	●	3	25	25	60	140	23	25	1	
EXSKS-3025-05-100-S25	○	3	25	25	100	180	23	25	0.5	
EXSKS-3026-05-60-S25	○	3	26	25	60	140	23	25	1	
EXSKS-3026-05-100-S25	○	3	26	25	100	180	23	25	0.5	
EXSKS-4032-05-70-S32	●	4	32	30	70	150	29	32	1.5	
EXSKS-4032-05-120-S32	○	4	32	30	120	200	29	32	0.5	

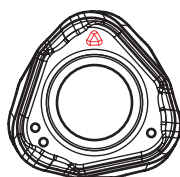
Screw	Torque(N.m)	Wrench
TSW-307H	2.1	A-10

Insert

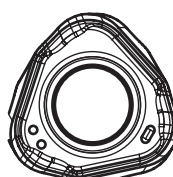


Cat.No.	Tolerance	PVD coated		Dimensions (mm)		
		JC8118	JC8050	RE	IC	S
WNMU050320ZER-PM	M	●	●	2	7.7	3.9

GRADE MARKING



JC8050



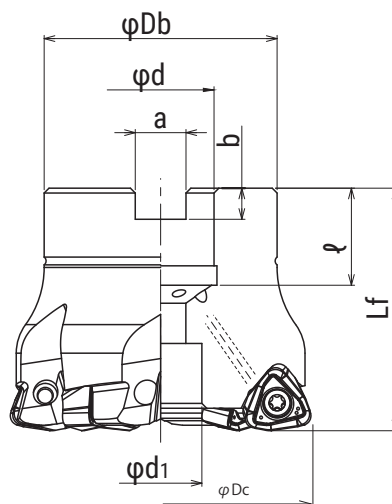
JC8118

SKS EXTREME

EXSKS/MEX Type

EXSKS-07
TYPE

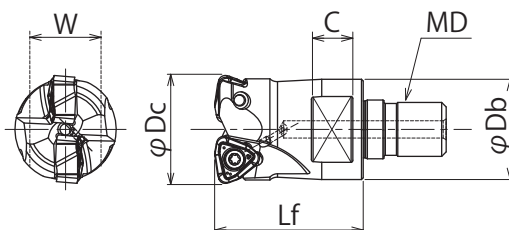
Bore Type



Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Insert 
			φDc	Lf	φDb	φd	φd1	a	b	φ			
EXSKS-5050R-07-22	●	5	50	50	40	22	16.5	10.4	6.3	20	M10	0.38	WNMU070620ZER-PM
EXSKS-5052R-07-22	●	5	52	50	40	22	16.5	10.4	6.3	20	M10	0.40	
EXSKS-6063R-07-22	●	6	63	50	48	22	17	10.4	6.3	20	M10	0.64	
EXSKS-7080R-07-27	●	7	80	55	65	27	20	12.4	7	22	M12X1.75X35★	1.23	
EXSKS-8100R-07-32	●	8	100	50	85	32	26	14.4	8	25	M16X2X25	1.76	

MEX-07
TYPE

Modular Type



Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert 
			φDc	Lf	φDb	MD	C	W	
MEX-2032-07-M16	●	2	32	43	29	M16	12	22	WNMU070620ZER-PM
MEX-3035-07-M16	●	3	35	43	29	M16	12	22	
MEX-4040-07-M16	●	4	40	43	32	M16	14	26	
MEX-4042-07-M16	●	4	42	43	32	M16	14	26	

SKS EXTREME

EXSKS/MEX Type

EXSKS-07
TYPE

Shank Type

Through
coolant
hole

Fig.1

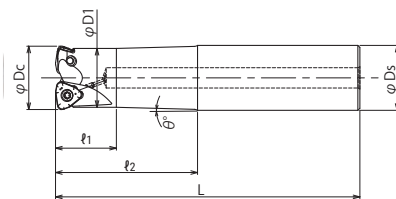
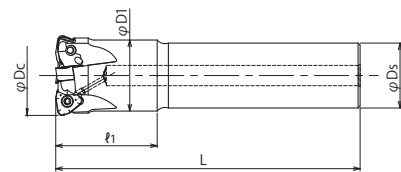


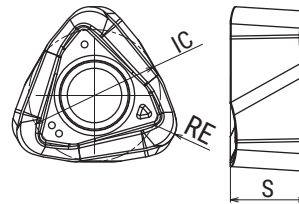
Fig.2



Cat.No.	Stock	No. of inserts	Dimensions (mm)							Fig.	Insert
			φD_c	ℓ_1	ℓ_2	L	φd_1	φD_s	θ°		
EXSKS-2032-07-70-S32	○	2	32	30	70	150	29	32	1.5	1	WNMU070620ZER-PM
EXSKS-2032-07-120-S32	○	2	32	30	120	200	29	32	0.6	1	
EXSKS-3035-07-40-S32	○	3	35	40	-	150	31	32	-	2	
EXSKS-3035-07-40L-S32	○	3	35	40	-	200	31	32	-	2	
EXSKS-4040-07-50-S32	○	4	40	50	-	150	35	32	-	2	
EXSKS-4040-07-50L-S32	○	4	40	50	-	200	35	32	-	2	

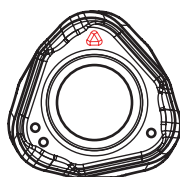
Screw	Torque(N.m)	Wrench
TSW-410H	3.5	A-15

Insert

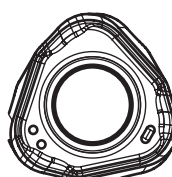


Cat.No.	Tolerance	PVD coated		Dimensions (mm)		
		JC8118	JC8050	RE	IC	S
WNMU070620ZER-PM	M	●	●	2	11.2	6.4

GRADE MARKING



JC8050



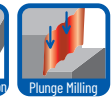
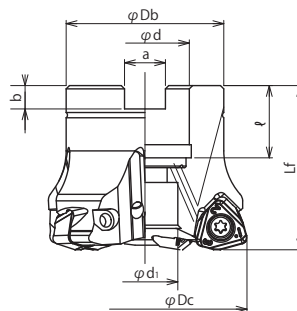
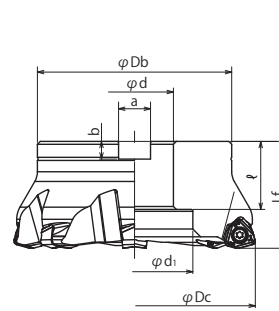
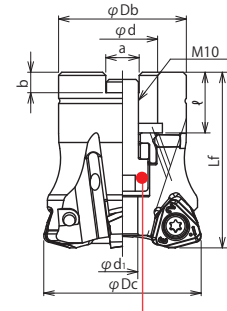
JC8118

SKS EXTREME

EXSKS/MEX Type

EXSKS-09
TYPE

Bore Type

Fig.1
Through coolant holeFig.2
Without coolant holeFig.3
Through coolant holeSet bolt built into
the cutter body

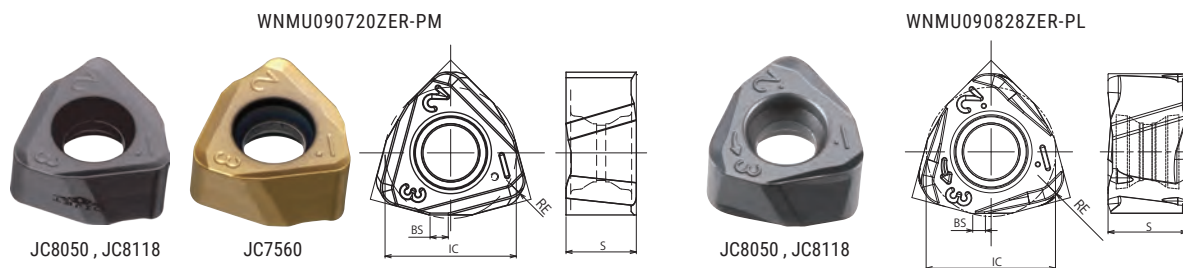
Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Fig.	Inserts 
			φDc	L_f	φDb	φd	φd_1	a	b	ℓ				
EXSKS-3050R-22	○	3	50	55	40	22	9.6	10.4	6.3	19	M10×1.5×25	0.4	3	WNMU090720ZER-PM WNMU090828ZER-PL
EXSKS-4050R-22	●	4	50	55	40	22	9.6	10.4	6.3	19	M10×1.5×25	0.3	3	
EXSKS-4052R-22	●	4	52	50	40	22	17	10.4	6.3	20	M10	0.4	1	
EXSKS-4063R-22	○	4	63	50	48	22	17	10.4	6.3	20	M10	0.5	1	
EXSKS-5063R-22	●	5	63	50	48	22	17	10.4	6.3	20	M10	0.5	1	
EXSKS-5063R-27	●	5	63	50	48	27	20	12.4	7	22	M12×1.75×30	0.5	1	
EXSKS-5066R-27	●	5	66	50	48	27	20	12.4	7	22	M12×1.75×30	0.5	1	
EXSKS-6080R-27	●	6	80	55	65	27	37	12.4	7	22	M12×1.75×40	0.9	1	
EXSKS-7100R-32	●	7	100	70	85	32	26	14.4	8	32	M16×2×45	1.9	1	
EXSKS-8125R-40	●	8	125	70	100	40	32	16.4	9	35	M20×2.5×45	3.9	1	
EXSKS-9160R-40	●	9	160	55	100	40	85	16.4	9	35	M20	3.9	2	

Screw	Torque(N.m)	Wrench
CSW-513H	5.5	A-20

SKS EXTREME

EXSKS/MEX Type

Insert



Cat.No.	Tolerance	PVD coated			Dimensions (mm)			
		JC8118	JC8050	JC7560	IC	S	BS	RE
WNMU090720ZER-PM	M	●	●	●	14	7.66	1.94	2
WNMU090828ZER-PL	M	●	●		13.91	8.66	1.37	2.8

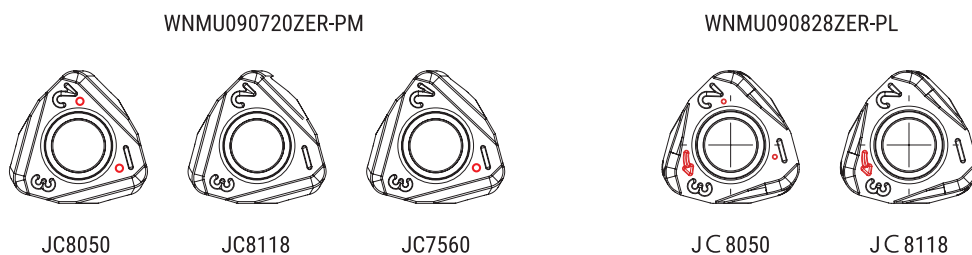
Note: When using PL inserts, tool dia. will be smaller than PM insert.

In case dia. $\phi 100$ holder, tool dia. is 0.06mm smaller.

In case dia. $\phi 125$ holder, tool dia. is 0.11mm smaller.

In case dia. $\phi 160$ holder, tool dia. is 0.15mm smaller

GRADE MARKING

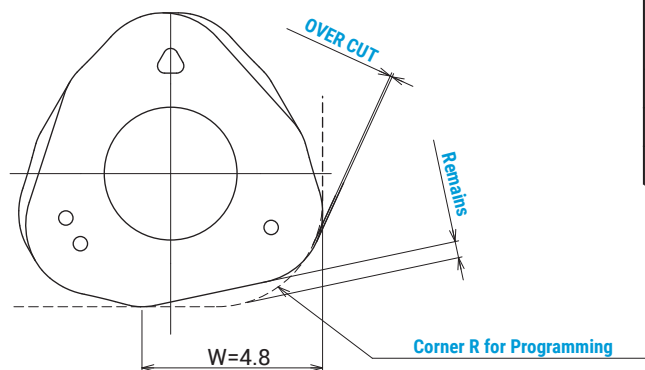


SKS EXTREME

EXSKS/MEX Type

EXSKS-05
TYPE

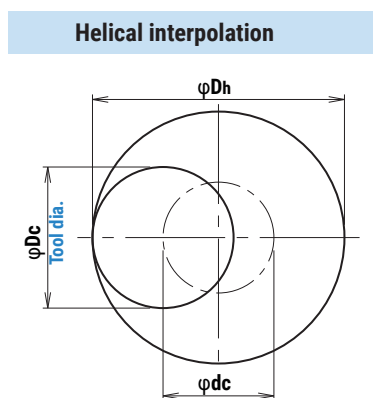
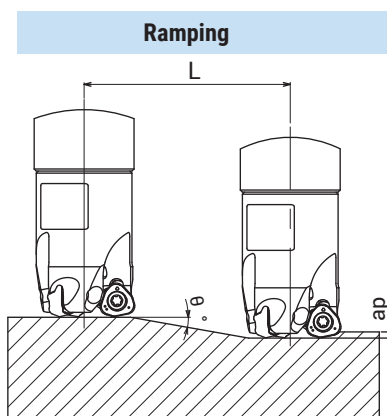
Definition of corner shape for programming



Corner radius for programming	Remains	Over cut
R2.0	0.59	0
R2.5 (Std.)	0.5	0
R3.0	0.41	0.13

(mm)

Attention for profile milling



● Calculation of tool pass dia.

$$\varphi D_c = \varphi D_h - \varphi D_c$$

Tool pass dia. Bore dia. Tool dia.

- Depth of cut per one circuit should not exceed max. depth of cut ap.

- Down cutting is recommended, so tool pass rotation should be counterclockwise.

- To obtain a flat bottom surface when helical milling, it requires to remove "the uncut part" in the center of the work material at a final pass.

- In case of ramping and helical interpolation, apply 70% or less feed speed from standard cutting condition table.
- In case of drilling, apply 50% or less Z axis feed speed from standard cutting condition table.
- Long consecutive chips may come out in case of drilling, confirm the safe condition sufficiently.

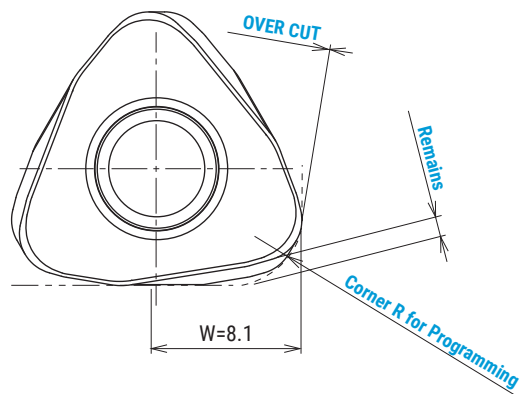
Cat. No.	Tool dia. (mm)	EFF. Cutting dia. (mm)	Max. depth of cut (mm) ap	Ramping		Helical interpolation			Max. drilling depth Z (mm)
				Max. ramping angle θ°	Total cutting length at Max ap	Min. bore dia. Dh min (mm)	Max. bore dia. Dh min (mm)	Dh min (mm)	
EXSKS-*020/MEX-*020	20	10	1.5	2.8	31	28	36	31	0.4
EXSKS-*021/MEX-*021	21	11	1.5	2.6	34	30	38	33	0.4
EXSKS-*025/MEX-*025	25	15	1.5	1.8	48	38	46	41	0.4
EXSKS-*026/MEX-*026	26	16	1.5	1.7	51	40	48	43	0.4
MEX-*028	28	18	1.5	1.5	58	44	52	47	0.4
MEX-*030	30	20	1.5	1.3	67	48	56	51	0.4
EXSKS-*032/MEX-*032	32	22	1.5	1.2	72	52	60	55	0.4
MEX-*033	33	23	1.5	1.1	79	54	62	57	0.4
MEX-*035	35	25	1.5	1	86	58	66	61	0.4
EXSKS-*040/MEX-*040	40	30	1.5	0.8	108	68	76	71	0.4
EXSKS-*050	50	40	1.5	0.6	144	88	96	91	0.4
EXSKS-*052	52	42	1.5	0.6	144	92	100	95	0.4
EXSKS-*063	63	53	1.5	0.5	172	114	122	117	0.4

SKS EXTREME

EXSKS/MEX Type

EXSKS-07
TYPE

Definition of corner shape for programming

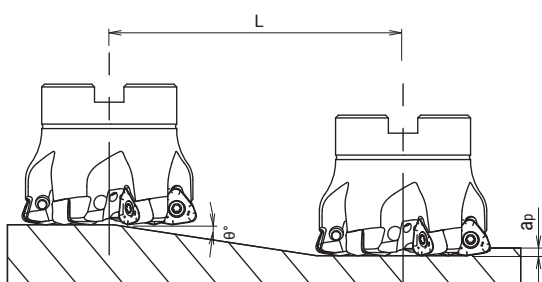


Corner radius for programming	Remains	Over cut
R3.0 (Std.)	0.8	0
R3.5	0.73	0.06
R4.0	0.66	0.21

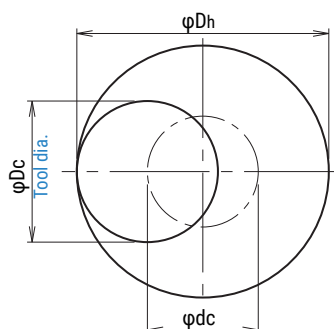
(mm)

Attention for profile milling

Ramping



Helical interpolation



● Calculation of tool pass dia.

$$\varphi D_c = \varphi D_h - \varphi D_c$$

Tool pass dia. Bore dia. Tool dia.

● Depth of cut per one circuit should not exceed max. depth of cut ap.

● Down cutting is recommended, so tool pass rotation should be counterclockwise.

● To obtain a flat bottom surface when helical milling, it requires to remove "the uncut part" in the center of the work material at a final pass.

- In case of ramping and helical interpolation, apply 70% or less feed speed from standard cutting condition table.
- In case of drilling, apply 50% or less Z axis feed speed from standard cutting condition table.
- Long consecutive chips may come out in case of drilling, confirm the safe condition sufficiently.

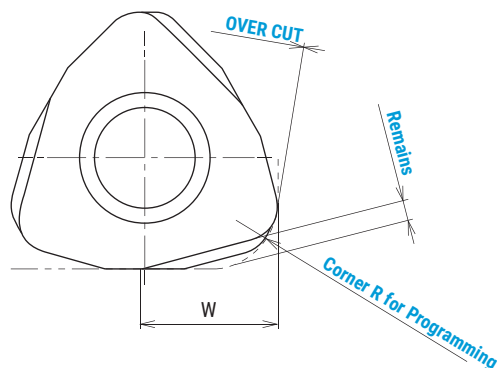
Cat. No.	Tool dia. (mm)	EFF. Cutting dia. (mm)	Max. depth of cut (mm) ap	Ramping		Helical interpolation			Max. drilling depth Z (mm)
				Max. ramping angle θ°	Total cutting length at Max ap	Min. bore dia. Dh min (mm)	Max. bore dia. Dh min (mm)	Dh min (mm)	
EXSKS-*032/MEX-*032	32	15	2	2.2	53	41	60	48	0.5
EXSKS-*035/MEX-*035	35	18	2	2.1	55	47	66	54	0.5
EXSKS-*040/MEX-*040	40	23	2	2	58	57	76	64	0.5
MEX-*042	42	25	2	1.8	64	61	80	68	0.5
EXSKS-*050	50	33	2	1.5	77	77	96	84	0.5
EXSKS-*052	52	35	2	1.2	96	81	100	88	0.5
EXSKS-*063	63	46	2	1	115	103	122	110	0.5
EXSKS-*080	80	63	2	0.8	144	137	156	144	0.5
EXSKS-*100	100	83	2	0.5	230	178	198	183	0.6

SKS EXTREME

EXSKS/MEX Type

EXSKS-09
TYPE

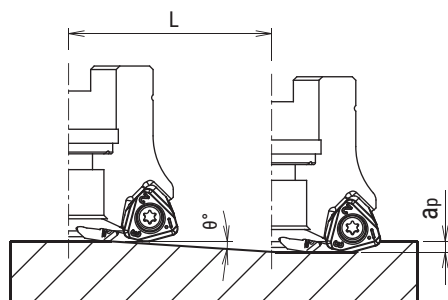
Definition of corner shape for programming



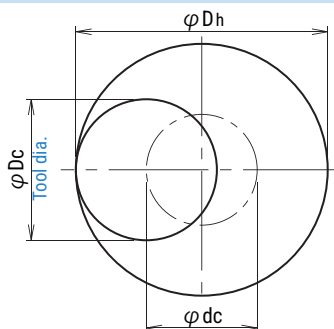
Insert	W	Corner radius for programming	Remains	Over cut
WNMU090720ZER-PM	8.2	R3.0	1.41	0
		R3.5	1.30	0
		R4.0	1.19	0.025
Insert	W	Corner radius for programming	Remains	Over cut
WNMU090828ZER-PL	8.4	R3.0	1.18	0
		R3.5	1.06	0
		R4.0	0.95	0.010

Attention for profile milling

Ramping



Helical interpolation



● Calculation of tool pass dia.

$$\phi_{dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool dia.

- Depth of cut per one circuit should not exceed max. depth of cut ap.
- Down cutting is recommended, so tool pass rotation should be counterclockwise.
- To obtain a flat bottom surface when helical milling, it requires to remove "the uncut part" in the center of the work material at a final pass.

- In case of ramping and helical interpolation, apply 70% or less feed speed from standard cutting condition table.
- In case of drilling, apply 50% or less Z axis feed speed from standard cutting condition table.
- Long consecutive chips may come out in case of drilling, confirm the safe condition sufficiently.

WNMU090720ZER-PM

Cat. No.	Tool dia. (mm)	EFF. Cutting dia. (mm)	Max. depth of cut (mm) ap	Ramping		Helical interpolation			Max. drilling depth Z (mm)
				Max. ramping angle α°	Total cutting length at Max ap	Min. bore dia. Dh min (mm)	Max. bore dia. Dh min (mm)	Dh min (mm)	
EXSKS-*050	50	33	3	2.5	69	73	96	81	1.1
EXSKS-*052	52	35	3	2.4	72	77	100	85	1.2
EXSKS-*063	63	46	3	1.8	96	99	122	107	1.2
EXSKS-*066	66	49	3	1.7	102	105	128	113	1.2
EXSKS-*080	80	63	3	1.3	133	133	156	141	1.3
EXSKS-*100	100	83	3	1	172	173	196	181	1.3
EXSKS-*125	125	108	3	0.9	191	223	246	231	1.3
EXSKS-*160	160	143	3	0.7	246	293	316	301	1.7

WNMU090828ZER-PL

Cat. No.	Tool dia. (mm)	EFF. Cutting dia. (mm)	Max. depth of cut (mm) ap	Ramping		Helical interpolation			Max. drilling depth Z (mm)
				Max. ramping angle α°	Total cutting length at Max ap	Min. bore dia. Dh min (mm)	Max. bore dia. Dh min (mm)	Dh min (mm)	
EXSKS-*050	50	33	2	2.3	50	74	96	82	1
EXSKS-*052	52	35	2	2.2	53	78	100	86	1
EXSKS-*063	63	46	2	1.8	64	100	122	108	1.2
EXSKS-*066	66	49	2	1.7	68	106	128	114	1.2
EXSKS-*080	80	63	2	1.3	89	134	156	142	1.3
EXSKS-*100	99.94	83	2	1	115	174	195	182	1.3
EXSKS-*125	124.89	108	2	0.9	128	224	245	232	1.4
EXSKS-*160	159.85	142	2	0.7	164	294	315	302	1.6

SKS EXTREME**EXSKS/MEX Type****■ Recommended Cutting Conditions - EXSKS-05 type -**

Material	Grade	Vc	fz	ap	ae
Carbon Steel below 250HB	JC8050 (JC8118)	120 - 200	0.7 - 1.2	0.4 - 1.0	0.7 Dc
Tool & Die Steel below 255HB	JC8050 (JC8118)	110 - 180	0.7 - 1.2	0.4 - 1.0	0.7 Dc
Mold Steel 30-36HRC	JC8118 (JC8050)	110- 180	0.7 - 1.2	0.4 - 1.0	0.7 Dc
Mold Steel 38-43HRC	JC8118 (JC8050)	80- 130	0.7 - 1.0	0.4 - 0.8	0.6 Dc
Hardened Die Steel 42-52HRC	JC8118	70- 100	0.5 - 0.8	0.5 - 0.7	0.5 Dc
Grey Cast Iron	JC8118 (JC8050)	130 - 200	0.8 - 1.4	0.5 - 1.0	0.7 Dc
Nodular Cast Iron	JC8118 (JC8050)	110 - 180	0.7 - 1,2	0.5 - 1.0	0.7 Dc
Austenitic Stainless Steel	JC8050	90 - 150	0.7 - 1.0	0.4 - 0.8	0.5 Dc
Martensitic Stainless Steel	JC8118 (JC8050)	100 - 170	0.9 - 1.2	0.5 - 1.0	0.5 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity. (the above table is guide for cutting on a BT50 machine.)
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.

SKS EXTREME

EXSKS/MEX Type

■ Recommended Cutting Conditions - EXSKS-07 type -

Material	Grade	Vc	fz	ap	ae
Carbon Steel below 250HB	JC8050	120 - 200	1.1 - 1.5	0.5 - 1.5	0.7 Dc
Tool & Die Steel below 255HB	JC8050	100 - 180	1.1 - 1.5	0.5 - 1.5	0.7 Dc
Mold Steel 30-36HRC	JC8118	100 - 180	1.1 - 1.5	0.5 - 1.5	0.7 Dc
Mold Steel 38-43HRC	JC8118	80 - 130	1.0 - 1.3	0.4 - 1.2	0.6 Dc
Hardened Die Steel 42-52HRC	JC8118	70 - 100	0.8 - 1.0	0.4 - 1.0	0.5 Dc
Grey Cast Iron	JC8118	120 - 200	1.1 - 1.5	0.5 - 2.0	0.7 Dc
Nodular Cast Iron	JC8118	100 - 170	1.1 - 1.5	0.5 - 1.5	0.7 Dc
Austenitic Stainless Steel	JC8050	80 - 150	1.0 - 1.2	0.4 - 1.2	0.5 Dc
Martensitic Stainless Steel	JC8118	100 - 170	1.0 - 1.3	0.5~1.5	0.5 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity. (the above table is guide for cutting on a BT50 machine.)
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.

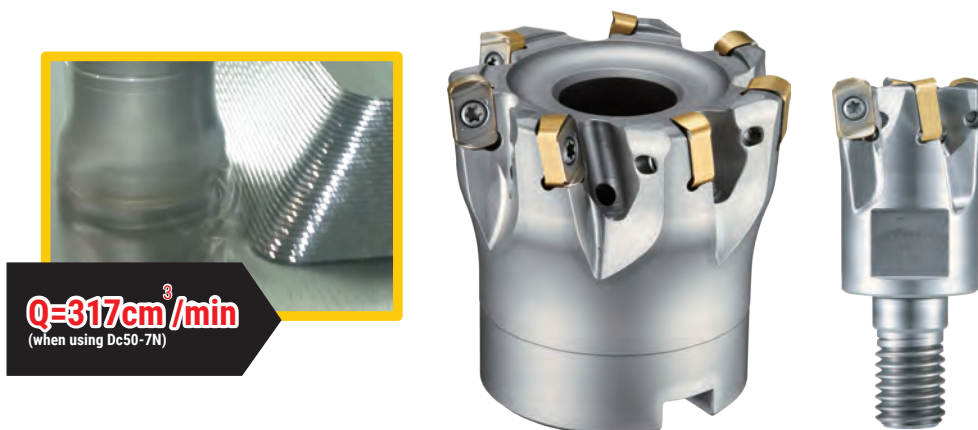
SKS EXTREME**EXSKS/MEX Type****■ Recommended Cutting Conditions - EXSKS-09 type -**

Material	Grade	Vc	fz	ap	ae
Carbon Steel below 250HB	JC7560 JC8050 (JC8118)	100 - 150	1.0 - 2.0	0.4 - 2.0	0.7 Dc
Tool & Die Steel below 255HB	JC7560 JC8050 (JC8118)	100 - 150	1.0 - 2.0	0.4 - 2.0	0.7 Dc
Mold Steel 30-36HRC	JC7560 JC8050 (JC8118)	90 - 130	1.0 - 2.0	0.4 - 2.0	0.7 Dc
Mold Steel 38-43HRC	JC8118 (JC8050)	70 - 110	0.5 - 1.0	0.4 - 1.5	0.6 Dc
Hardened Die Steel 42-52HRC	JC8118	60 - 80	0.5 - 1.0	0.4 - 1.5	0.5 Dc
Grey Cast Iron	JC8118	100 - 190	1.0 - 2.0	0.4 - 2.5	0.7 Dc
Nodular Cast Iron	JC8118	100 - 190	1.0 - 2.0	0.4 - 2.5	0.7 Dc
Stainless Steel	JC8050 (JC7560)	100 - 150	1.0 - 1.5	0.4 - 2.0	0.5 Dc

Note

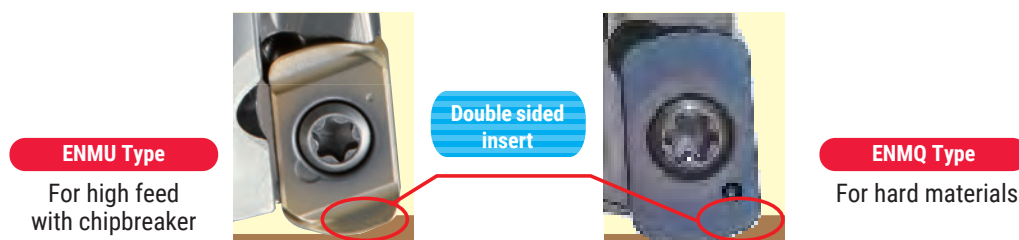
1. Please adjust cutting conditions according to machine rigidity or work rigidity. (the above table is guide for cutting on a BT50 machine.)
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.

Achieving high metal removal rates! High efficiency machining for versatile applications



Feature 1

Optimized cutting edge for a wide range of applications



Feature 2

**Economical double sided insert with 4 cutting edges for various types of materials;
Carbon steel, Hardened material <upto 62HRC>, Stainless steel, Titanium alloy**

● **Line up**



ENMU100412ZER-SL

- Low cutting force
 - Sharp cutting edge
 - Grade C7550, **JC7518**
- DS118, DS150



ENMU100412ZER-PH

- For general applications
- Grade JC8118, **JC8050**, JC7560



ENMU100312ZER-HL

- For hardened materials up to 60HRC
- enhanced cutting edge strength but retains sharpness
- Grade DH102



ENM0100312ZER

- Flat top insert
- Grade DH102
- For hardened materials over 60HRC

- **Insert grades**

ISO	P					M					K					S					H		
	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30	S01	S10	S20	S30	H01	H10	H20		
Range																	DS118						
																	DS150						
											DH102					DH102			DH102				
		JC8118				JC8118						JC8118				JC8118				JC8118			
			JC8050				JC8050						JC8050				JC8050						
		JC7518				JC7518										JC7518				JC7518			
		JC7550				JC7550										JC7550							
		JC7560				JC7560						JC7560				JC7560							

QM MAX GII

GMX/MXG Type

GMX
TYPE

Bore Type

Through
coolant
holeG-
Body

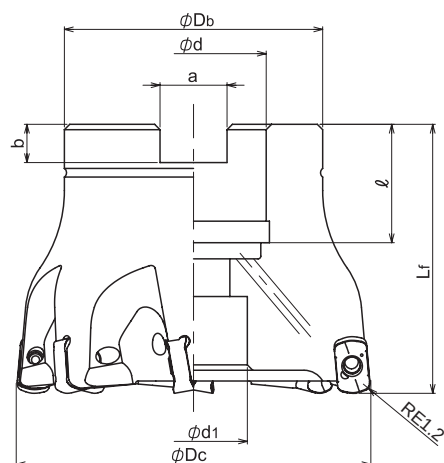
Face Milling

Copy Milling

Pocket Milling

Helical Interpolation

Plunge Milling



Cat.No	Stock	No. of inserts	Dimensions (mm)								Weight (kg)	Inserts
			φDc	Lf	φDb	φd	φd1	a	b	ℓ		
GMX-7050R-22	●	7	50	50	40	22	17	10.4	6.3	20	0.35	ENMU100412ZER-** ENM*100312ZER-**
GMX-7052R-22	●		52								0.40	
GMX-7063R-22	●		63		48	27	20	12.4	7	22	0.64	
GMX-7066R-27	●		66								0.66	

Screw	Torque(N.m)	Wrench
TSW-2567H	1.1	A-08

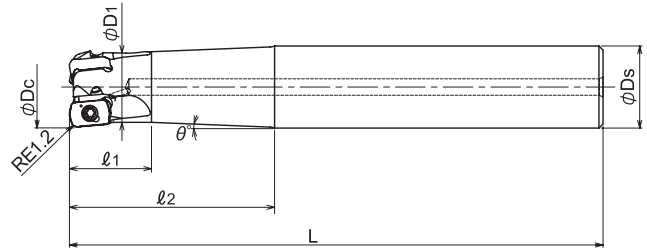
QM MAX GII

GMX/MXG Type

GMX
TYPE

Shank Type

Through
coolant
hole



Cat.No.	Stock	No. of inserts	Dimensions (mm)						θ° taper angle	Insert
			ϕD_c	ℓ_1	ℓ_2	L	ϕD_1	ϕD_s		
GMX-2016-30-S16	●	2	16	16	30	100	14	16	3.5°	ENMU100412ZER-** ENM*100312ZER-**
GMX-2016-50-S16	●				50	150			1.2°	
GMX-3020-50-S20	●	3	20	20	80	130	17.2	20	2.3°	
GMX-3020-80-S20	●				80	160			1°	
GMX-4025-60-S25	●	4	25	25	60	140	22	25	2°	
GMX-4025-100-S25	●				100	180			0.9°	
GMX-5032-70-S32	●	5	32	30	70	150	29	32	1.5°	
GMX-5032-120-S32	●				120	200			0.6°	

Screw	Torque(N.m)	Wrench
TSW-2567H	1.1	A-08

QM MAX GII

GMX/MXG Type

MXG
TYPE

Modular Type

Through
coolant
holeG-
Body

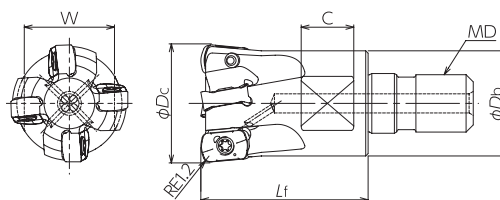
Face Milling

Copy Milling

Pocket Milling

Helical Interpolation

Plunge Milling



Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert	
			φD _C	L _f	φD _b	MD	C	W		
MXG-2016-M8	●	2	16	23	14	M8	8	12	ENMU100412ZER-** ENM*100312ZER-**	
MXG-2017-M8	●		17							
MXG-3020-M10	●	3	20	30	18	M10	9	14		
MXG-3021-M10	●		21							
MXG-3022-M10	○		22							
MXG-3025-M12	●	4	25	35	22	M12	11	19		
MXG-4025-M12	●		26		22.5					
MXG-4026-M12	●		28		23.6					
MXG-4028-M12	○									
MXG-5030-M16	●	5	30	43	27	M16	12	22		
MXG-5032-M16	●		32		29					
MXG-5035-M16	●		35							
MXG-6040-M16	●	6	40		32			14		26
MXG-6042-M16	●		42							

Screw	Torque(N.m)	Wrench
TSW-2567H	1.1	A-08

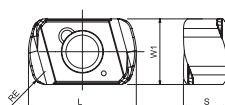
QM MAX GII

GMX/MXG Type

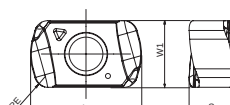
GMX/MXG TYPE

Insert

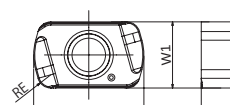
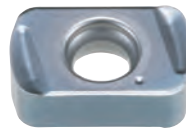
ENMU100412ZER-PH



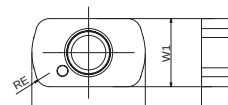
ENMU100412ZER-SL



ENMU100312ZER-HL



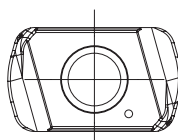
ENMQ100312ZER



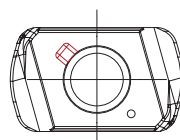
Cat. No.	Tolerance	PVD Coating								Dimensions (mm)			
		DH102	JC7518	JC7550	JC7560	JC8050	JC8118	DS118	DS150	RE	L	W1	S
ENMU100412ZER-PH	M				●	●	●			1.2	10	6	4
ENMU100412ZER-SL			●	●				●	●				3.2
ENMU100312ZER-HL		●											
ENMQ100312ZER		●											

GRADE MARKING

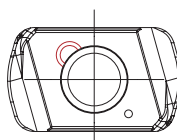
ENMU100412ZER-PH



JC8118

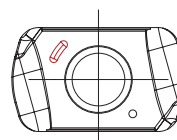


JC8050

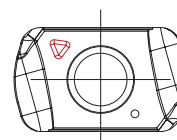


JC7560

ENMU100412ZER-SL



JC7518/DS118



JC7550/DS150

Insert selection guide

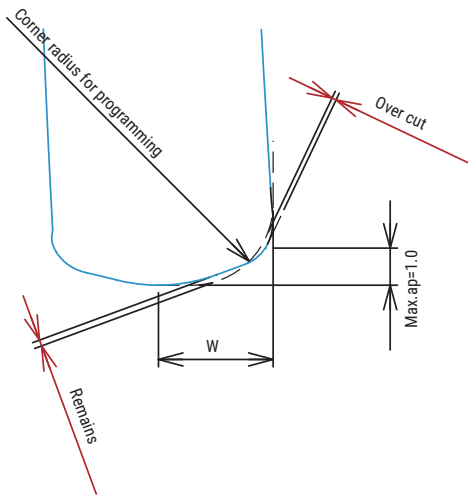
Materials	Grade	Cat.No.			
		ENMU100412ZER-PH	ENMU100412ZER-SL	ENMU100312ZER-HL	ENMQ100312ZER
Chip breaker		For general milling	Low cutting force	For Hardened materials	Flat top insert
Carbon steel (S50C, S55C) below 250HB	JC8118	○			
	JC8050	◎			
	JC7560	●			
	JC7550				
	JC7518		☆		
	DH102				
	DS118				
	DS150				
Tool & die steel (SKD61, SKD11) below 255HB	JC8118	○			
	JC8050	◎			
	JC7560	●			
	JC7550				
	JC7518		☆		
	DH102				
	DS118				
	DS150				
Mold steel (HPM7, PX5, P20) 30 - 36HRC	JC8118	○			
	JC8050	◎			
	JC7560	●			
	JC7550				
	JC7518		☆		
	DH102				
	DS118				
	DS150				
Mold steel (NAK80, HPM1, P21) 38 - 43HRC	JC8118	◎			
	JC8050	●			
	JC7560				
	JC7550				
	JC7518		☆		
	DH102				
	DS118				
	DS150				
Hardened die steel (SKD61, DAC, DHA) 42 - 52HRC	JC8118	◎			
	JC8050				
	JC7560				
	JC7550				
	JC7518		☆		
	DH102			●	
	DS118				
	DS150				
Hardened die steel (SKD11, SLD, DC11) 55 - 62HRC	JC8118	×			
	JC8050	×			
	JC7560	×			
	JC7550		×		
	JC7518		×		
	DH102			○	◎
	DS118				
	DS150				
Grey cast iron (FC, FCD) below 300HB	JC8118	◎			
	JC8050	○			
	JC7560	●			
	JC7550				
	JC7518				
	DH102				
	DS118				
	DS150				
Stainless steel (SUS304) below 250HB	JC8118	●			
	JC8050				
	JC7560				
	JC7550		○		
	JC7518				
	DH102				
	DS118				
	DS150		◎		
Titanium alloy (Ti-6Al-4V)	JC8118	●			
	JC8050				
	JC7560				
	JC7550		○		
	JC7518				
	DH102				
	DS118				
	DS150		◎		
Heat resistant alloy (INCO718)	JC8118	●			
	JC8050				
	JC7560				
	JC7550				
	JC7518		○		
	DH102				
	DS118		◎		
	DS150				

◎ : First choice ○ : For general milling ● : For unstable milling ☆ : For light cutting resistance × : Not recommended

QM MAX GII

GMX/MXG Type

Definition of Corner Shape for Programming



Cat.No.	W	Corner radius for programming	Remains	Over cut
ENMU100412ZER-PH	3.1	1.0	0.51	0
ENMU100412ZER-SL		1.5 (Standard)	0.36	0
		2.0	0.22	0.05

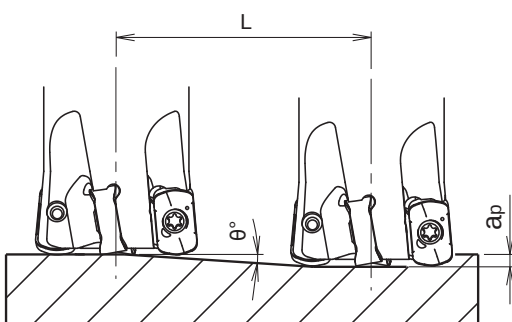
(mm)

Cat.No.	W	Corner radius for programming	Remains	Over cut
ENMU100312ZER-HL	3.3	1.0	0.55	0
ENMQ100312ZER		1.5 (Standard)	0.41	0
		2.0	0.26	0.04

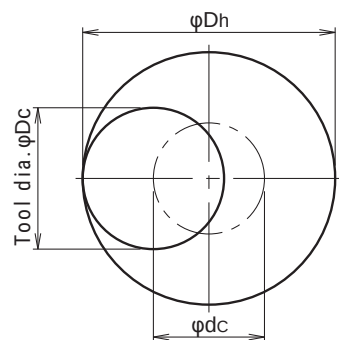
(mm)

Recommended Data for Profile Milling

Ramping



Helical interpolation



- Calculation of tool pass dia.

$$\varphi dc = \varphi Dh - \varphi Dc$$

Tool pass dia. Bore dia. Tool dia.

- Depth of cut per one circuit should not exceed max. depth of cut A_p
- Down cutting is recommended, tool pass rotation should be counterclockwise

- In case of ramping and helical interpolation, apply 70% or less feed (V_f) from standard cutting condition table
- In case of drilling, apply 50% or less Z axis feed (F) from standard cutting condition table
- Long consecutive chips may result in case of drilling, confirm safe operating conditions

QM MAX GII

GMX/MXG Type

Cat.No.	Tool dia.	Effective Cutting dia.		Max. depth of cut: ap	Ramping	
		Insert			Ramping Max. ramping Angle θ	Max. depth of cut (ap) Total cutting length: L (mm)
		ENMU100412ZER-※※	ENM※100312ZER-※※			
MXG-2016-M8	16	10.1	9.6	0.7	1°36'	25.1
MXG-2017-M8	17	11	10.5	0.7	1°36'	25.1
MXG-3020-M10	20	13.9	13.5	1	1°30'	38.2
MXG-3021-M10	21	14.9	14.5	1	1°30'	38.2
MXG-※025-M12	25	18.9	18.4	1	1°12'	47.7
MXG-4026-M12	26	19.9	19.4	1	1°12'	47.7
MXG-5030-M16	30	23.9	23.4	1	0°54'	63.6
MXG-5032-M16	32	25.8	25.4	1	0°54'	63.6
MXG-5035-M16	35	28.8	28.4	1	0°42'	81.8
MXG-6040-M16	40	33.8	33.4	1	0°30'	114.5
MXG-6042-M16	42	35.8	35.4	1	0°30'	114.5
GMX-2016-※※-S16	16	10.1	9.6	0.7	1°36'	25.1
GMX-3020-※※-S20	20	13.9	13.5	1	1°30'	38.2
GMX-4025-※※-S25	25	18.9	18.4	1	1°12'	47.7
GMX-5032-※※-S32	32	25.8	25.4	1	0°54'	63.6
GMX-7050R-※※	50	43.8	43.4	1	0°24'	143.2
GMX-7052R-22	52	45.8	45.4	1	0°24'	143.2
GMX-7063R-※※	63	56.8	56.4	1	0°18'	190.9
GMX-7066R-※※	66	59.8	59.4	1	0°18'	190.9

Cat.No.	Tool dia.	Helical interpolation			Max.drilling depth : Z	
		Min.Bore dia.		Max. Bore dia.	Insert	
		ENMU100412ZER-※※	ENM※100312ZER-※※		ENMU100412ZER-※※	ENM※100312ZER-※※
MXG-2016-M8	16	22	21	30	0.3	0.2
MXG-2017-M8	17	24	23	32	0.3	0.2
MXG-3020-M10	20	30	29	38	0.4	0.2
MXG-3021-M10	21	32	31	40	0.4	0.2
MXG-※025-M12	25	40	39	48	0.5	0.3
MXG-4026-M12	26	42	41	50	0.5	0.3
MXG-5030-M16	30	50	49	58	0.6	0.4
MXG-5032-M16	32	54	53	62	0.6	0.4
MXG-5035-M16	35	60	59	68	0.6	0.4
MXG-6040-M16	40	70	69	78	0.7	0.5
MXG-6042-M16	42	74	73	82	0.7	0.5
GMX-2016-※※-S16	16	22	21	30	0.3	0.2
GMX-3020-※※-S20	20	30	29	38	0.4	0.2
GMX-4025-※※-S25	25	40	39	48	0.5	0.3
GMX-5032-※※-S32	32	54	53	62	0.6	0.4
GMX-7050R-※※	50	90	89	98	0.8	0.6
GMX-7052R-22	52	94	93	102	0.8	0.6
GMX-7063R-※※	63	116	115	124	0.8	0.6
GMX-7066R-※※	66	122	121	130	0.8	0.6

QM MAX GII

GMX/MXG Type

Recommended Cutting Conditions

Material	Insert	Grade	Vc	fz	ap	ae
Carbon Steel below 250HB	- PH	JC8050 (JC7560)	130- 180	1.2	0.4 - 1.0	0.7 Dc
Tool & Die Steel below 255HB	- PH	JC8050 (JC7560)	130 - 180	1.2	0.4 - 1.0	0.7 Dc
Mold Steel 30-36HRC	- PH	JC8050 (JC7560)	130 - 160	1.2	0.4 - 1.0	0.7 Dc
Mold Steel 38-43HRC	- PH	JC8118 (JC8050)	70- 100	0.8 - 1.1	0.3 - 0.8	0.7 Dc
Hardened Die Steel 42-52HRC	- PH (- SL)	JC8118 (JC7518)	70 - 90	0.8 - 1.1	0.1 - 0.6	0.6 Dc
Hardened Die Steel 55-62HRC	ENMQ (- HL)	DH102	60 - 80	0.25 - 0.3	0.1 - 0.2	0.4 Dc
Grey Cast Iron	- PH	JC8118 (JC8050)	150 - 200	1.2 - 1.5	0.4 - 1.0	0.7 Dc
Nodular Cast Iron	- PH	JC8118 (JC8050)	150 - 200	1.2 - 1.5	0.4 - 1.0	0.7 Dc
Austenitic Stainless Steel	- SL	JC7550 (JC7518)	100 - 120	0.8 - 1.0	0.3 - 0.8	0.6 Dc
Precipitation hardening Stainless Steel	- SL (- PH)	JC7550 (JC8050)	90 - 100	0.6 - 0.7	0.2 - 0.6	0.6 Dc
Duplex Stainless Steel	-SL (-PH)	JC7550 (JC8050)	90 - 100	0.2 - 0.3	0.3 - 0.8	0.6 Dc
Titanium Alloy	- SL	DS150 (DS118)	50 - 60	0.6 - 0.7	0.3 - 0.7	0.6 Dc
Heat Resistant Alloy	- SL	JC7518 (JC7550)	20 - 30	0.3	0.2~0.7	0.6 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity. (the above table is guide for cutting on a BT50 machine.)
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.

QM *Quick & Mini* MAX

New generation high feed mill "QM MAX"

Modular Type
 $\phi 16 \sim \phi 42$

Bore Type
 $\phi 40 \sim \phi 66$

G-
Body

Shank Type
 $\phi 16 \sim \phi 25$



Low cutting force geometry

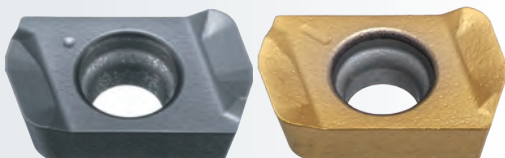
Unique 3D geometry insert provides stable cutting and less power consumption.

Multi - flutes specification

High speed and high efficient machining.

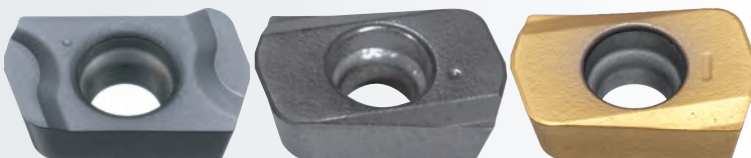
Vibration free

Control vibration with combination of MSN carbide shank holder

QM MAX**MQX/QXP Type****Insert Line-Up****High feed insert**

EPMT100312ZER

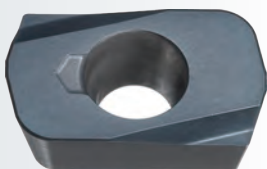
EPMT100312ZER

High feed insert for unfavorable conditions

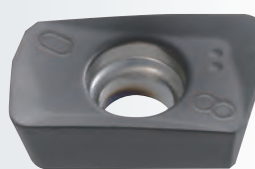
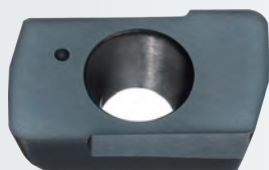
EPMW100312ZER

EPMW100312ZTR

EPMW100312ZTR

For high hardened steel

EPHW100316ZTR

Shoulder insert for aluminumZPMT1003...ZER-NL
(R0.4, 0.8, 2.0)**Shoulder insert for general steel**ZPMT1003...ZER-PL
(R0.4, 0.8, 2.0)**Shoulder insert for Ti alloy**ZPMT1003...ZER-SL
(R0.4, 0.8, 2.0)**"Mirror Insert"
for finishing side & bottom face**

YPHW1003...ZER-...

CBN insert

YPHW100308ZTR-F1

A variety of inserts all fit into the same body.

Multi-purpose cutter that can high feed, square up and finish.

QM MAX**MQX/QXP Type****QXP
TYPE****Bore Type**Through
coolant
hole**G-
Body**

Face Milling

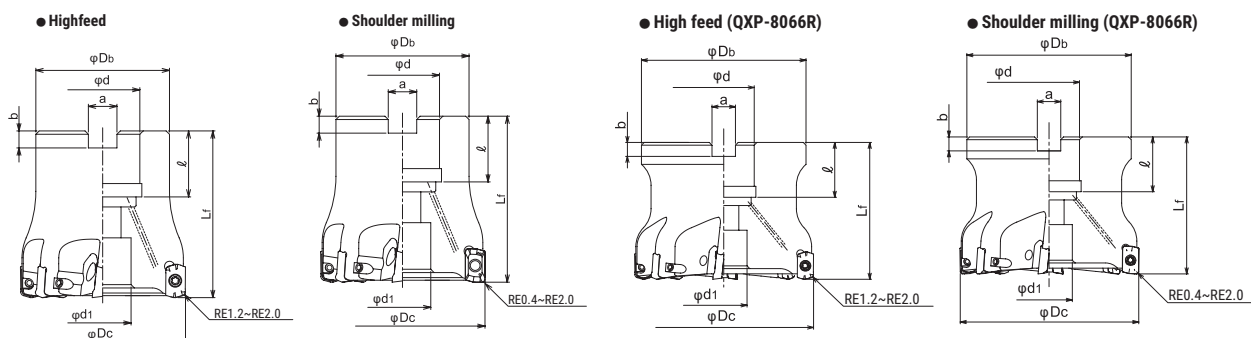
Shoulder Milling

Slotting

Copy Milling

Pocket Milling

Helical Interpolation



Cat.No.	Stock	No. of inserts	Dimensions (mm)								Insert
			φDc	Lf	φDb	φd	φd1	a	b	ℓ	
QXP-6040R-16	●	6	40	45	35	16	14	8.4	5.6	18	EP**1003**Z*R ZPMT1003**ZER-** YPHW1003**Z*R-**
QXP-7040R-16	●	7									
QXP-7050R-22	●	8	50	50	40	22	17	10.4	6.3	20	
QXP-8050R-22	●										
QXP-8052R-22	●		52								
QXP-8063R-22	●		63		48						
QXP-8066R-27	●	66	27			20	12.4	7	22		

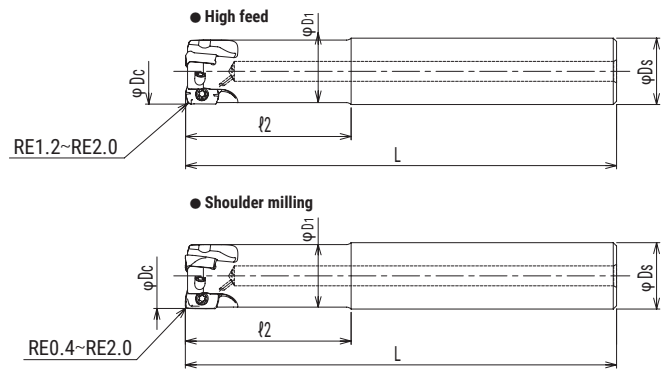
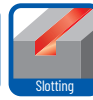
Screw	Torque(N.m)	Wrench
DSW-2563H	1.1	A-08

QM MAX

MQX/QXP Type

QXPS
TYPE

Shank Type



Cat.No	Stock	No. of inserts	Dimensions (mm)					Parts		Insert
			φDc	ℓ2	L	φD1	φDs	Screw	Wrench	
QXPS2016S16+A	●	2	16	30	100	15	16	TSW-2556H	A-08	EP**1003**Z*R
QXPS3020S20+A	●	3	20	50	130	18.85	20			ZPMT1003**ZER**
QXPS4025S25+A	●	4	25	60	140	23.6	25	DSW-2563H		YPHW1003**Z*R**

Screw	Torque(N.m)
TSW-2556H	1.1
DSW-2563H	

QM MAX

MQX/QXP Type

MQX
TYPE

Modular Type

Through
coolant
holeG-
Body

Face Milling

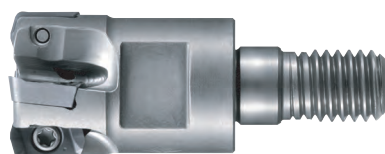
Shoulder Milling

Slotting

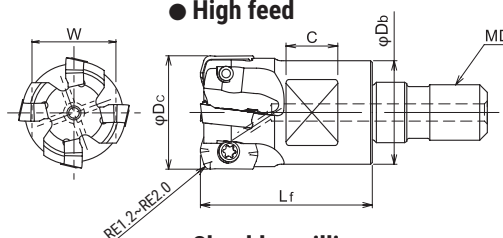
Copy Milling

Pocket Milling

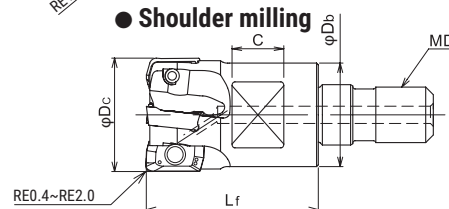
Helical Interpolation



● High feed



● Shoulder milling



Cat.No.	Stock	No. of inserts	Dimensions (mm)						Parts		Insert
			φDc	Lf	φDb	MD	C	W	Screw	Wrench	
MQX-2016-M8	●	2	16	23	14	M8	8	12	TSW-2556H	A-08	EP**1003**Z*R ZPMT1003**ZER-** YPHW1003**Z*R-**
MQX-2017-M8	●		17			M8					
MQX-3020-M10	●	3	20	30	18	M10	9	14			
MQX-4020-M10	●	4				M10					
MQX-4021-M10	●		21	M10							
MQX-4025-M12	●	5	25	35	22.5	M12	10	17	DSW-2563H		
MQX-5025-M12	●					M12					
MQX-4026-M12	○	4	26			M12					
MQX-5026-M12	●					M12					
MQX-5028-M12	○	5	28	23.6	M12						
MQX-5030-M16	○		30	27	M16	12	22				
MQX-5032-M16	●		32	29	M16						
MQX-6032-M16	●	M16									
MQX-5035-M16	●	5	35		M16						
MQX-6035-M16	●	6		M16							
MQX-6040-M16	●		7	40	32	M16	14	26			
MQX-7040-M16	●	6	M16								
MQX-6042-M16	●	6	42								

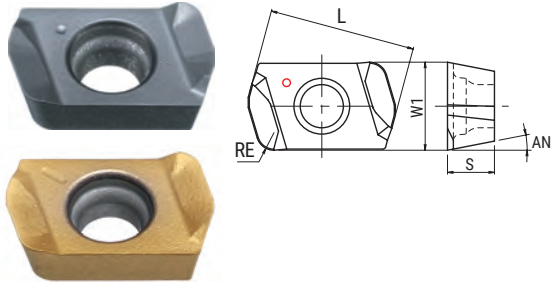
Screw	Torque(N.m)
TSW-2556H	1.1
DSW-2563H	

QM MAX

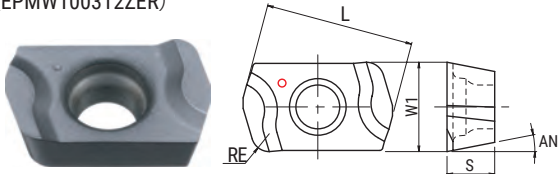
MQX/QXP Type

Insert

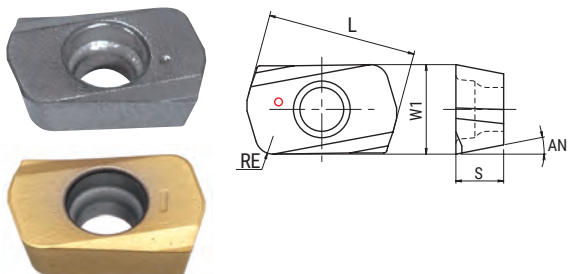
High feed insert
(EPMT1003 * * ZER)



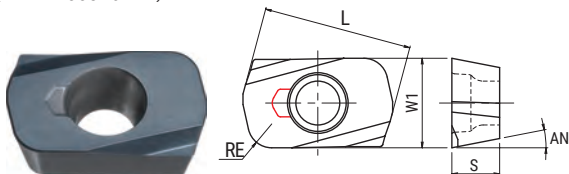
High feed insert for unfavorable conditions
(EPMW100312ZER)



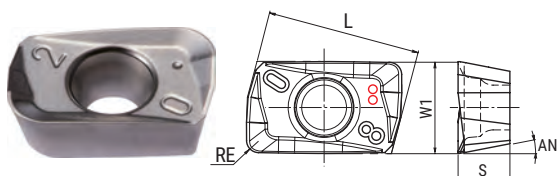
High feed insert for unfavorable conditions
(EPMW100312ZTR)



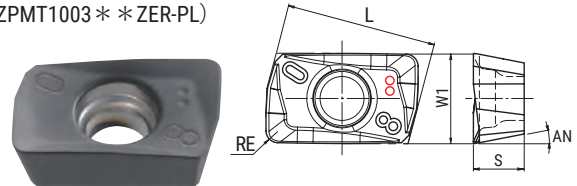
For high hardened steel
(EPHW100316ZTR)



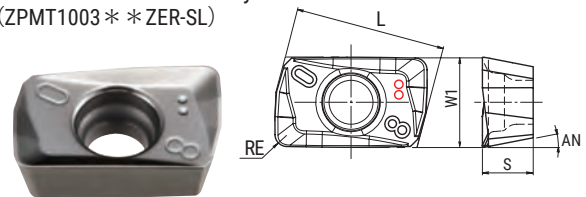
Shoulder insert for aluminum
(ZPMT1003 * * ZER-NL)



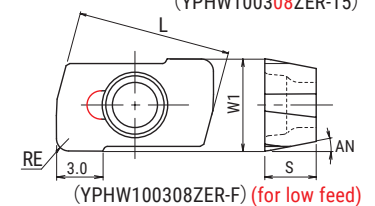
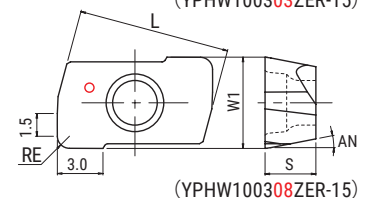
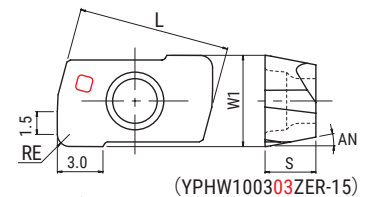
Shoulder insert for general steel
(ZPMT1003 * * ZER-PL)



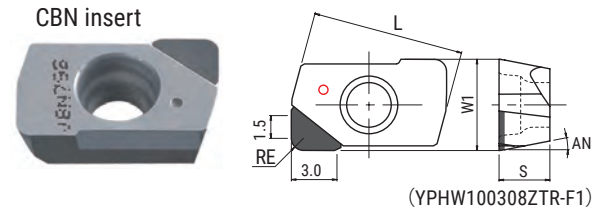
Shoulder insert for Ti alloy
(ZPMT1003 * * ZER-SL)



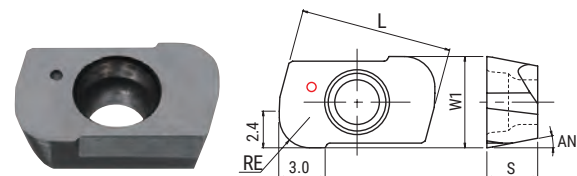
"Mirror Insert" for finishing side & bottom face
(YPHW1003 * * ZER-15) (YPHW100308ZTR-F1) (YPHW100308ZER-F)



CBN insert



"Mirror Insert" for finishing side & bottom face
(YPHW100320ZER-24)

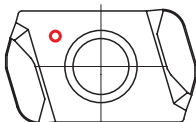


Type	Cat.No.	Tolerance	PVD coating								Uncoated	Cermet	CBN	Dimensions (mm)				
			JC8118	DH102	JC7518	JC7560	JC8015	JC8050	DS118	DS150	FC18	CX75	JBN795	L	S	W1	RE	AN
High feed insert	EPMT100312ZER	M	●			●		●	●	●				10	3.2	6	1.2	11°
	EPMT100320ZER	M	●											10	3.2	6	2.0	11°
High feed insert for unfavorable conditions	EPMW100312ZER	M	●					●						10	3.2	6	1.2	11°
	EPMW100312ZTR	M	●			●		●						10	3.2	6	1.2	11°
For high hardened steel	EPHW100316ZTR	H	●	●										10	3.2	6	1.6	11°
Shoulder insert for aluminum	ZPMT100304ZER-NL	M									●			10.08	3.4	6	0.4	11°
	ZPMT100308ZER-NL	M									●			10.08	3.4	6	0.8	11°
	ZPMT100320ZER-NL	M									●			10.08	3.4	6	2.0	11°
Shoulder insert for general steel	ZPMT100304ZER-PL	M	●	●				●				●		10.08	3.4	6	0.4	11°
	ZPMT100308ZER-PL	M	●	●				●				●		10.08	3.4	6	0.8	11°
	ZPMT100320ZER-PL	M	●	●				●				●		10.08	3.4	6	2.0	11°
Shoulder insert for Ti alloy	ZPMT100304ZER-SL	M			●				●					10.08	3.4	6	0.4	11°
	ZPMT100308ZER-SL	M			●				●					10.08	3.4	6	0.8	11°
	ZPMT100320ZER-SL	M			●				●					10.08	3.4	6	2.0	11°
"Mirror Insert" for finishing side & bottom face	YPHW100303ZER-15	H		●			●					●		10.06	3.35	6	0.3	11°
	YPHW100308ZER-15	H		●								●		10.06	3.35	6	0.8	11°
	YPHW100308ZER-F	H					●							10.06	3.35	6	0.8	11°
	YPHW100308ZTR-F1	H											●	10.06	3.35	6	0.8	11°
	YPHW100320ZER-24	H		●			●							10.06	3.35	6	2.0	11°

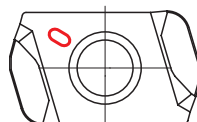
GRADE MARKING



JC8118 / DS118



JC8050 / JC7560 / DS150



QM MAX

MQX/QXP Type

■ Insert selection guide

Material	Carbon steel (S50C, S55C) below 250HB						Tool & die steel (SKD61, SKD11) below 255HB						Mold steel (HPM7, PX5, P20) 30-36HRC						Mold steel (NAK80, HPM1, P21) 38-43HRC					
Cat.No. Grade	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150
EPMT1003 **ZER	☆	☆	☆				☆	☆	☆				☆	☆	☆				☆	☆				
EPMW100312ZER																				○				
EPMW100312ZTR	○	○	◎				○	○	◎				○	○	◎				◎	○				
EPHW100316ZTR																								

Material	Hardened die steel (SKD61, DAC, DHA) 42-52 HRC						Hardened die steel (SKD11, SLD, DC11) 55-62HRC						Grey cast iron (FC, FCD) below 300HB						Stainless steel (SUS304) below 250HB					
Cat.No. Grade	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150
EPMT1003 **ZER	☆						×	×					○							◎	○			
EPMW100312ZER	○						○						◎							●				
EPMW100312ZTR	●						●						●		○									
EPHW100316ZTR	◎									◎														

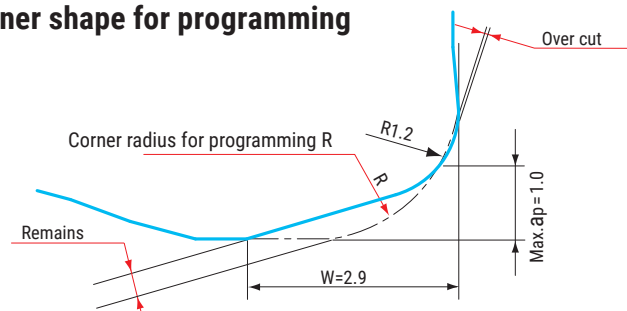
Material	Titanium alloy (Ti-6Al-4V)						Heat resistant alloy (INCO718)					
Cat.No. Grade	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150
EPMT1003 **ZER	○	○	●		○	◎	◎	○	○		○	○
EPMW100312ZER		●						●				
EPMW100312ZTR												
EPHW100316ZTR												

- EPMT Type : with chip breaker
- EPMW Type : without chip breaker
- EPMW Type : without chip breaker

- ◎ : First choice
- : For general milling
- : For unstable milling
- ☆ : For light cutting force
- × : Not recommended

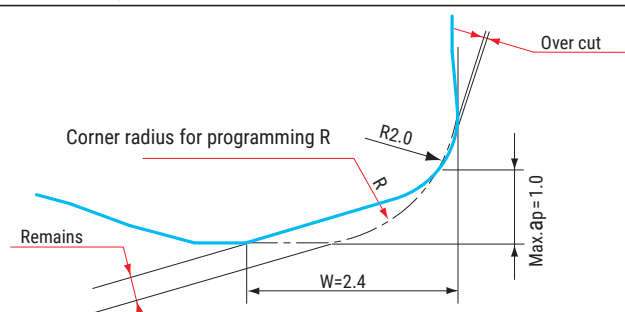
■ Definition of corner shape for programming

- EPMT/W Type
(RE=R1.2)



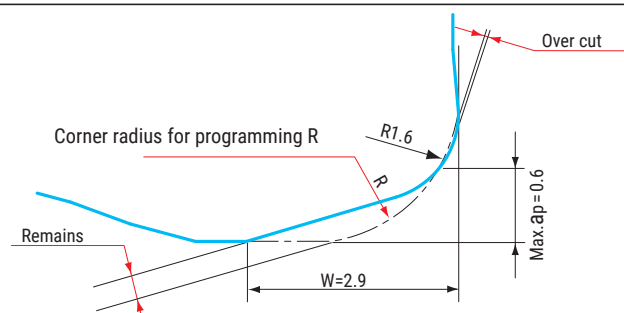
Corner radius for programming R	Over cut	Remains
R1.0	0	0.57
R1.5 (Std.)	0	0.45
R2.0	0.04	0.33
R2.5	0.21	0.21
R3.0	0.40	0.09

- EPMT Type
(RE=R2.0)



Corner radius for programming R	Over cut	Remains
R1.0	0	0.51
R1.5	0	0.31
R2.0 (Std.)	0	0.13
R2.5	0.12	0.04
R3.0	0.32	0

- EPHW Type



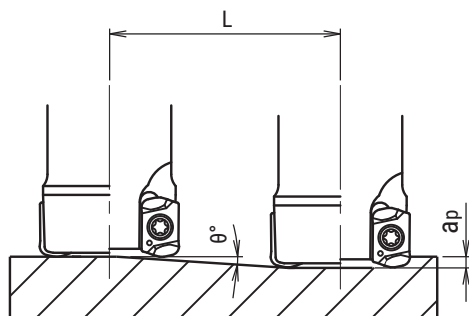
Corner radius for programming R	Over cut	Remains
R1.0	0	0.42
R1.5 (Std.)	0	0.33
R2.0	0.01	0.23
R2.5	0.17	0.14
R3.0	0.37	0.05

QM MAX

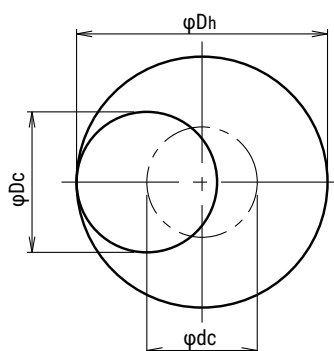
MQX/QXP Type

■ Recommended Data for Profile Milling

Ramping



Helical interpolation



- Calculation of tool pass dia.

$$\phi_{Dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool Dia.

- Depth of cut per one circuit should not exceed max. depth of cut A_p
- Down cutting is recommended, tool pass rotation should be counterclockwise

- In case of ramping and helical interpolation, apply 70% or less feed (V_f) from standard cutting condition table
- In case of drilling, apply 50% or less Z axis feed (F) from standard cutting condition table
- Long consecutive chips may result in case of drilling, confirm safe operating conditions

■ EPM*100312ZER

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : a_p	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (a_p) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- * 040R-16	40	34.1	1	0.5	114.6	70	78	0.6
QXP- * 050R- * *	50	44.1	1	0.4	143.2	90	98	0.6
QXP-8052R-22	52	46.1	1	0.35	163.7	94	102	0.6
QXP-8063R- * *	63	57.1	1	0.3	191	116	124	0.6
QXP-8066R- * *	66	60.1	1	0.3	191	122	130	0.6
QXPS2016S16+A	16	10.2	0.8	1.8	25.5	22	30	0.6
QXPS3020S20+A	20	14.1	0.8	1.4	32.7	30	38	0.6
QXPS4025S25+A	25	19.1	0.8	1	45.8	40	48	0.6
MQX- * 016-M8	16	10.2	0.8	1.8	25.5	22	30	0.6
MQX- * 017-M8	17	11.2	0.8	1.6	28.6	24	32	0.6
MQX- * 020-M10	20	14.1	0.8	1.4	32.7	30	38	0.6
MQX- * 021-M10	21	15.1	0.8	1.3	35.3	32	40	0.6
MQX- * 025-M12	25	19.1	0.8	1	45.8	40	48	0.6
MQX- * 026-M12	26	20.1	0.8	0.95	48.2	42	50	0.6
MQX- * 028-M12	28	22.1	0.8	0.85	53.9	46	54	0.6
MQX- * 030-M16	30	24.1	0.8	0.8	57.3	50	58	0.5
MQX- * 032-M16	32	26.1	0.8	0.7	65.5	54	62	0.5
MQX- * 035-M16	35	29.1	0.8	0.6	76.4	60	68	0.5
MQX- * 040-M16	40	34.1	0.8	0.5	91.7	70	78	0.6
MQX- * 042-M16	42	36.2	0.8	0.45	101.9	74	82	0.6

QM MAX

MQX/QXP Type

■ Recommended Data for Profile Milling

■ **EPMT100320ZER**

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- * 040R-16	40	35.1	1	0.55	104.2	72	78	0.7
QXP- * 050R- * *	50	45.1	1	0.4	143.2	92	98	0.7
QXP-8052R-22	52	47.2	1	0.4	143.2	96	102	0.7
QXP-8063R- * *	63	58.2	1	0.3	191	118	124	0.7
QXP-8066R- * *	66	61.2	1	0.3	191	124	130	0.7
QXPS2016S16+A	16	11.2	0.8	2.3	19.9	24	30	0.7
QXPS3020S20+A	20	15.1	0.8	1.5	30.6	32	38	0.7
QXPS4025S25+A	25	20.1	0.8	1.1	41.7	42	48	0.6
MQX- * 016-M8	16	11.2	0.8	2.3	19.9	24	30	0.7
MQX- * 017-M8	17	12.2	0.8	2	22.9	26	32	0.7
MQX- * 020-M10	20	15.1	0.8	1.5	30.6	32	38	0.7
MQX- * 021-M10	21	16.1	0.8	1.4	32.7	34	40	0.7
MQX- * 025-M12	25	20.1	0.8	1.1	41.7	42	48	0.6
MQX- * 026-M12	26	21.1	0.8	1	45.8	44	50	0.6
MQX- * 028-M12	28	23.1	0.8	0.9	50.9	48	54	0.6
MQX- * 030-M16	30	25.1	0.8	0.85	53.9	52	58	0.6
MQX- * 032-M16	32	27.1	0.8	0.75	61.1	56	62	0.6
MQX- * 035-M16	35	30.1	0.8	0.65	70.5	62	68	0.6
MQX- * 040-M16	40	35.1	0.8	0.55	83.3	72	78	0.7
MQX- * 042-M16	42	37.1	0.8	0.55	83.3	76	82	0.7

■ **EPMW100312ZTR**

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- * 040R-16	40	34.1	1	0.4	143.2	70	78	0.6
QXP- * 050R- * *	50	44.1	1	0.3	191	90	98	0.6
QXP-8052R-22	52	46.1	1	0.25	229.2	94	102	0.6
QXP-8063R- * *	63	57.1	1	0.2	286.5	116	124	0.6
QXP-8066R- * *	66	60.1	1	0.2	286.5	122	130	0.6
QXPS2016S16+A	16	10.2	0.8	1.7	27	22	30	0.6
QXPS3020S20+A	20	14.1	0.8	1.3	35.3	30	38	0.6
QXPS4025S25+A	25	19.1	0.8	0.9	50.9	40	48	0.6
MQX- * 016-M8	16	10.2	0.8	1.7	27	22	30	0.6
MQX- * 017-M8	17	11.2	0.8	1.5	30.6	24	32	0.6
MQX- * 020-M10	20	14.1	0.8	1.3	35.3	30	38	0.6
MQX- * 021-M10	21	15.1	0.8	1.2	38.2	32	40	0.6
MQX- * 025-M12	25	19.1	0.8	0.9	50.9	40	48	0.6
MQX- * 026-M12	26	20.1	0.8	0.85	53.9	42	50	0.6
MQX- * 028-M12	28	22.1	0.8	0.75	61.1	46	54	0.6
MQX- * 030-M16	30	24.1	0.8	0.7	65.5	50	58	0.5
MQX- * 032-M16	32	26.1	0.8	0.6	76.4	54	62	0.5
MQX- * 035-M16	35	29.1	0.8	0.5	91.7	60	68	0.5
MQX- * 040-M16	40	34.1	0.8	0.4	114.6	70	78	0.6
MQX- * 042-M16	42	36.2	0.8	0.35	131	74	82	0.6

QM MAX

MQX/QXP Type

EPHW100316ZTR

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- * 040R-16	40	34.1	0.6	0.3	114.6	70	78	0.6
QXP- * 050R- * *	50	44.1	0.6	0.2	171.9	90	98	0.6
QXP-8052R-22	52	46.1	0.6	0.2	171.9	94	102	0.6
QXP-8063R- * *	63	57.1	0.6	0.15	229.2	116	124	0.6
QXP-8066R- * *	66	60.1	0.6	0.15	229.2	122	130	0.6
QXPS2016S16+A	16	10.2	0.6	1.1	31.2	22	30	0.6
QXPS3020S20+A	20	14.1	0.6	0.8	43	30	38	0.6
QXPS4025S25+A	25	19.1	0.6	0.55	62.5	40	48	0.6
MQX- * 016-M8	16	10.2	0.6	1.1	31.2	22	30	0.6
MQX- * 017-M8	17	11.2	0.6	1	34.4	24	32	0.6
MQX- * 020-M10	20	14.1	0.6	0.8	43	30	38	0.6
MQX- * 021-M10	21	15.1	0.6	0.7	49.1	32	40	0.6
MQX- * 025-M12	25	19.1	0.6	0.55	62.5	40	48	0.6
MQX- * 026-M12	26	20.1	0.6	0.5	68.8	42	50	0.6
MQX- * 028-M12	28	22.1	0.6	0.45	76.4	46	54	0.6
MQX- * 030-M16	30	24.1	0.6	0.4	85.9	50	58	0.5
MQX- * 032-M16	32	26.1	0.6	0.4	85.9	54	62	0.5
MQX- * 035-M16	35	29.1	0.6	0.35	98.2	60	68	0.5
MQX- * 040-M16	40	34.1	0.6	0.3	114.6	70	78	0.6
MQX- * 042-M16	42	36.2	0.6	0.25	137.5	74	82	0.6

ZPMT100304ZER- **

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- * 040R-16	40	39	1	0.95	60.3	75.6	78.4	0.6
QXP- * 050R- * *	50	49	1	0.7	81.8	95.6	98.4	0.6
QXP-8052R-22	52	51	1	0.65	88.1	99.6	102.4	0.6
QXP-8063R- * *	63	62	1	0.55	104.2	121.6	124.4	0.6
QXP-8066R- * *	66	65	1	0.5	114.6	127.6	130.4	0.6
QXPS2016S16+A	16	15	0.8	3	15.3	27.6	30.4	0.6
QXPS3020S20+A	20	19	0.8	2.4	19.1	35.6	38.4	0.6
QXPS4025S25+A	25	24	0.8	1.7	27	45.6	48.4	0.6
MQX- * 016-M8	16	15	0.8	3	15.3	27.6	30.4	0.6
MQX- * 017-M8	17	16	0.8	3.2	14.3	29.6	32.4	0.6
MQX- * 020-M10	20	19	0.8	2.4	19.1	35.6	38.4	0.6
MQX- * 021-M10	21	20	0.8	2.2	20.8	37.6	40.4	0.6
MQX- * 025-M12	25	24	0.8	1.7	27	45.6	48.4	0.6
MQX- * 026-M12	26	25	0.8	1.6	28.6	47.6	50.4	0.6
MQX- * 028-M12	28	27	0.8	1.5	30.6	51.6	54.4	0.6
MQX- * 030-M16	30	29	0.8	1.3	35.3	55.6	58.4	0.5
MQX- * 032-M16	32	31	0.8	1.2	38.2	59.6	62.4	0.5
MQX- * 035-M16	35	34	0.8	1.1	41.7	65.6	68.4	0.5
MQX- * 040-M16	40	39	0.8	0.95	48.2	75.6	78.4	0.6
MQX- * 042-M16	42	41	0.8	0.85	53.9	79.6	82.4	0.6

QM MAX

MQX/QXP Type

■ Recommended Data for Profile Milling

■ **ZPMT100308ZER-****

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- * 040R-16	40	38.2	1	0.95	60.3	74.8	77.6	0.6
QXP- * 050R- * *	50	48.2	1	0.7	81.8	94.8	97.6	0.6
QXP-8052R-22	52	50.2	1	0.65	88.1	98.8	101.6	0.6
QXP-8063R- * *	63	61.2	1	0.55	104.2	120.8	123.6	0.6
QXP-8066R- * *	66	64.2	1	0.5	114.6	126.8	129.6	0.6
QXPS2016S16+A	16	14.2	0.8	3	15.3	26.8	29.6	0.6
QXPS3020S20+A	20	18.2	0.8	2.4	19.1	34.8	37.6	0.6
QXPS4025S25+A	25	23.2	0.8	1.7	27	44.8	47.6	0.6
MQX- * 016-M8	16	14.2	0.8	3	15.3	26.8	29.6	0.6
MQX- * 017-M8	17	15.2	0.8	3.2	14.3	28.8	31.6	0.6
MQX- * 020-M10	20	18.2	0.8	2.4	19.1	34.8	37.6	0.6
MQX- * 021-M10	21	19.2	0.8	2.2	20.8	36.8	39.6	0.6
MQX- * 025-M12	25	23.2	0.8	1.7	27	44.8	47.6	0.6
MQX- * 026-M12	26	24.2	0.8	1.6	28.6	46.8	49.6	0.6
MQX- * 028-M12	28	26.2	0.8	1.5	30.6	50.8	53.6	0.6
MQX- * 030-M16	30	28.2	0.8	1.3	35.3	54.8	57.6	0.5
MQX- * 032-M16	32	30.2	0.8	1.2	38.2	58.8	61.6	0.5
MQX- * 035-M16	35	33.2	0.8	1.1	41.7	64.8	67.6	0.5
MQX- * 040-M16	40	38.2	0.8	0.95	48.2	74.8	77.6	0.6
MQX- * 042-M16	42	40.2	0.8	0.85	53.9	78.8	81.6	0.6

■ **ZPMT100320ZER-****

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- * 040R-16	40	35.8	1	0.95	60.3	70	75.2	0.6
QXP- * 050R- * *	50	45.8	1	0.7	81.8	90	95.2	0.6
QXP-8052R-22	52	47.8	1	0.65	88.1	94	99.2	0.6
QXP-8063R- * *	63	58.8	1	0.55	104.2	116	121.2	0.6
QXP-8066R- * *	66	61.8	1	0.5	114.6	122	127.2	0.6
QXPS2016S16+A	16	11.8	0.8	3	15.3	22	27.2	0.6
QXPS3020S20+A	20	15.8	0.8	2.4	19.1	30	35.2	0.6
QXPS4025S25+A	25	20.8	0.8	1.7	27	40	45.2	0.6
MQX- * 016-M8	16	11.8	0.8	3	15.3	22	27.2	0.6
MQX- * 017-M8	17	12.8	0.8	3.2	14.3	24	29.2	0.6
MQX- * 020-M10	20	15.8	0.8	2.4	19.1	30	35.2	0.6
MQX- * 021-M10	21	16.8	0.8	2.2	20.8	32	37.2	0.6
MQX- * 025-M12	25	20.8	0.8	1.7	27	40	45.2	0.6
MQX- * 026-M12	26	21.8	0.8	1.6	28.6	42	47.2	0.6
MQX- * 028-M12	28	23.8	0.8	1.5	30.6	46	51.2	0.6
MQX- * 030-M16	30	25.8	0.8	1.3	35.3	50	55.2	0.5
MQX- * 032-M16	32	27.8	0.8	1.2	38.2	54	59.2	0.5
MQX- * 035-M16	35	30.8	0.8	1.1	41.7	60	65.2	0.5
MQX- * 040-M16	40	35.8	0.8	0.95	48.2	70	75.2	0.6
MQX- * 042-M16	42	37.8	0.8	0.85	53.9	74	79.2	0.6

QM MAX

MQX/QXP Type

YPHW100303ZER-15

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- *040R-16	40	39.3	0.3	1	17.2	77	78.7	0.3
QXP- *050R- * *	50	49.3	0.3	0.75	22.9	97	98.7	0.3
QXP-8052R-22	52	51.3	0.3	0.7	24.6	101	102.7	0.3
QXP-8063R- * *	63	62.3	0.3	0.6	28.6	123	124.7	0.3
QXP-8066R- * *	66	65.3	0.3	0.55	31.3	129	130.7	0.3
QXPS2016S16+A	16	15.3	0.3	1.3	13.2	29	30.7	0.2
QXPS3020S20+A	20	19.3	0.3	2.1	8.2	37	38.7	0.3
QXPS4025S25+A	25	24.3	0.3	1.8	9.5	47	48.7	0.3
MQX- *016-M8	16	15.3	0.3	1.3	13.2	29	30.7	0.2
MQX- *017-M8	17	16.3	0.3	1.7	10.1	31	32.7	0.3
MQX- *020-M10	20	19.3	0.3	2.1	8.2	37	38.7	0.3
MQX- *021-M10	21	20.3	0.3	2.4	7.2	39	40.7	0.3
MQX- *025-M12	25	24.3	0.3	1.8	9.5	47	48.7	0.3
MQX- *026-M12	26	25.3	0.3	1.7	10.1	49	50.7	0.3
MQX- *028-M12	28	27.3	0.3	1.6	10.7	53	54.7	0.3
MQX- *030-M16	30	29.3	0.3	1.4	12.3	57	58.7	0.3
MQX- *032-M16	32	31.3	0.3	1.3	13.2	61	62.7	0.3
MQX- *035-M16	35	34.3	0.3	1.2	14.3	67	68.7	0.3
MQX- *040-M16	40	39.3	0.3	1	17.2	77	78.7	0.3
MQX- *042-M16	42	41.3	0.3	0.9	19.1	81	82.7	0.3

YPHW100308ZER-15

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- *040R-16	40	38.3	0.3	1	17.2	75	77.7	0.3
QXP- *050R- * *	50	48.3	0.3	0.75	22.9	95	97.7	0.3
QXP-8052R-22	52	50.3	0.3	0.7	24.6	99	101.7	0.3
QXP-8063R- * *	63	61.3	0.3	0.6	28.6	121	123.7	0.3
QXP-8066R- * *	66	64.3	0.3	0.55	31.3	127	129.7	0.3
QXPS2016S16+A	16	14.3	0.3	1.4	12.3	27	29.7	0.2
QXPS3020S20+A	20	18.3	0.3	2.2	7.8	35	37.7	0.3
QXPS4025S25+A	25	23.3	0.3	1.9	9	45	47.7	0.3
MQX- *016-M8	16	14.3	0.3	1.4	12.3	27	29.7	0.2
MQX- *017-M8	17	15.3	0.3	1.8	9.5	29	31.7	0.3
MQX- *020-M10	20	18.3	0.3	2.2	7.8	35	37.7	0.3
MQX- *021-M10	21	19.3	0.3	2.5	6.9	37	39.7	0.3
MQX- *025-M12	25	23.3	0.3	1.9	9	45	47.7	0.3
MQX- *026-M12	26	24.3	0.3	1.8	9.5	47	49.7	0.3
MQX- *028-M12	28	26.3	0.3	1.7	10.1	51	53.7	0.3
MQX- *030-M16	30	28.3	0.3	1.5	11.5	55	57.7	0.3
MQX- *032-M16	32	30.3	0.3	1.4	12.3	59	61.7	0.3
MQX- *035-M16	35	33.3	0.3	1.2	14.3	65	67.7	0.3
MQX- *040-M16	40	38.3	0.3	1	17.2	75	77.7	0.3
MQX- *042-M16	42	40.3	0.3	0.9	19.1	79	81.7	0.3

QM MAX

MQX/QXP Type

■ Recommended Data for Profile Milling

■ **YPHW100320ZER-24**

Cat.No.	Tool dia.	Effective Cutting dia.	Max.depth of cut : ap	Ramping		Helical interpolation		Max.drilling depth Z(mm)
				Max.ramping angle θ	Max.depth of cut (ap) Total cutting length L (mm)	Min.Bore dia.	Max.Bore dia.	
QXP- * 040R-16	40	35.9	0.3	1.1	15.6	70.2	75.3	0.3
QXP- * 050R- * *	50	45.9	0.3	0.9	19.1	90.2	95.3	0.3
QXP-8052R-22	52	47.9	0.3	0.85	20.2	94.2	99.3	0.3
QXP-8063R- * *	63	58.9	0.3	0.65	26.4	116.2	121.3	0.3
QXP-8066R- * *	66	61.9	0.3	0.65	26.4	122.2	127.3	0.3
QXPS2016S16+A	16	11.9	0.3	1.9	9	22.2	27.3	0.3
QXPS3020S20+A	20	15.9	0.3	2.5	6.9	30.2	35.3	0.3
QXPS4025S25+A	25	20.9	0.3	2.2	7.8	40.2	45.3	0.3
MQX- * 016-M8	16	11.9	0.3	1.9	9	22.2	27.3	0.3
MQX- * 017-M8	17	12.9	0.3	2.2	7.8	24.2	29.3	0.3
MQX- * 020-M10	20	15.9	0.3	2.5	6.9	30.2	35.3	0.3
MQX- * 021-M10	21	16.9	0.3	2.8	6.1	32.2	37.3	0.3
MQX- * 025-M12	25	20.9	0.3	2.2	7.8	40.2	45.3	0.3
MQX- * 026-M12	26	21.9	0.3	2	8.6	42.2	47.3	0.3
MQX- * 028-M12	28	23.9	0.3	1.8	9.5	46.2	51.3	0.3
MQX- * 030-M16	30	25.9	0.3	1.6	10.7	50.2	55.3	0.3
MQX- * 032-M16	32	27.9	0.3	1.5	11.5	54.2	59.3	0.3
MQX- * 035-M16	35	30.9	0.3	1.4	12.3	60.2	65.3	0.3
MQX- * 040-M16	40	35.9	0.3	1.1	15.6	70.2	75.3	0.3
MQX- * 042-M16	42	37.9	0.3	1.1	15.6	74.2	79.3	0.3

QM MAX

MQX/QXP Type

■ Recommended Cutting Conditions

Material		High Feed		Shoulder Milling	Side Finishing	Bottom Finishing
		EPMT / EPMW	EPHW	ZPMT		
Carbon Steel below 250HB	Grade	JC7560 (JC8050 JC8118)	-	JC8050 (JC8118)	JC8050 (JC8118)	JC8050 (JC8118)
	Vc	130 - 180	-	130 - 160	190 - 320	90 - 180
	fz	0.7 - 0.9	-	0.12 - 0.15	0.18 - 0.30	0.1 - 0.15
	ap	0.4 - 1.0	-	~5.0	~5.0	~0.2
	ae	0.7 Dc	-	~0.16 Dc	~0.2	0.4 - 1.0 Dc
Tool & Die Steel below 255HB	Grade	JC7560 (JC8050 JC8118)	-	JC8050 (JC8118)	JC8050 (JC8118)	JC8050 (JC8118)
	Vc	130 - 180	-	120 - 150	180 - 300	80 - 160
	fz	0.7 - 0.9	-	0.12 - 0.15	0.15 - 0.25	0.1 - 0.15
	ap	0.4 - 1.0	-	~5.0	~5.0	~0.2
	ae	0.7 Dc	-	~0.16 Dc	~0.2	0.4 - 1.0 Dc
Mold Steel 30-36HRC	Grade	JC8118 (JC7560 JC8050)	-	JC8118 (JC8050)	JC8118 (JC8050)	JC8118 (JC8050)
	Vc	130 - 180	-	120 - 150	180 - 300	80 - 160
	fz	0.7 - 1.0	-	0.12 - 0.15	0.15 - 0.25	0.1 - 0.15
	ap	0.4 - 1.0	-	~5.0	~5.0	~0.2
	ae	0.7 Dc	-	~0.16 Dc	~0.2	0.4 - 1.0 Dc
Mold Steel 38-43HRC	Grade	JC8118 (JC8050)	-	JC8118 (JC8050)	JC8118 (JC8050)	JC8118 (JC8050)
	Vc	70 - 100	-	100 - 120	150 - 250	70 - 140
	fz	0.6 - 0.7	-	0.1 - 0.12	0.15 - 0.25	0.1 - 0.15
	ap	0.3 - 0.8	-	~4.0	~4.0	~0.2
	ae	0.6 Dc	-	~0.15 Dc	~0.2	0.4 - 1.0 Dc
Hardened Die Steel 42-52HRC	Grade	JC8118	JC8118	JC8118 (DH102)	JC8118 (DH102)	JC8118 (DH102)
	Vc	60 - 70	70 - 90	80 - 100	120 - 210	75 - 100
	fz	0.5	0.5 - 0.8	0.09 - 0.12	0.12 - 0.20	0.1 - 0.12
	ap	0.2 - 0.6	0.1 - 0.3	~3.5	~3.5	~0.2
	ae	0.6 Dc	0.6 Dc	~0.14 Dc	~0.2	0.4 - 1.0 Dc
Hardened Die Steel 55-62HRC	Grade	-	DH102	DH102	DH102	DH102
	Vc	-	60 - 80	50 - 70	100 - 180	50 - 70
	fz	-	0.2 - 0.3	0.1	0.09 - 0.15	0.08 - 0.1
	ap	-	0.1 - 0.2	~2.5	~2.5	~0.15
	ae	-	0.4 Dc	~0.14 Dc	~0.15	0.4 - 1.0 Dc
Grey & Nodular Cast Iron below 300HB	Grade	JC8118	-	JC8118 (DH102)	JC8118 (DH102)	JC8118 (DH102)
	Vc	110 - 150	-	120 - 150	160 - 280	90 - 180
	fz	0.8 - 1.2	-	0.16 - 0.2	0.18 - 0.30	0.12 - 0.18
	ap	0.4 - 1.0	-	~5.0	~5.0	~0.2
	ae	0.7 Dc	-	~0.2 Dc	~0.2	0.4 - 1.0 Dc
Stainless Steel	Grade	JC8050 (JC7560)	-	JC8050 (JC8118 JC7518)	JC8050 (JC8118 JC7518)	JC8050 (JC8118 JC7518)
	Vc	130 - 150	-	120 - 150	180 - 300	80 - 160
	fz	0.6 - 0.8	-	0.12 - 0.15	0.15 - 0.25	0.1 - 0.15
	ap	0.3 - 0.8	-	~5.0	~5.0	~0.2
	ae	0.6 Dc	-	~0.16 Dc	~0.2	0.4 - 1.0 Dc
Titanium Alloy	Grade	DS150 (JC8050 DS118)	-	DS118 (JC7518)	DS118 (JC7518)	DS118 (JC7518)
	Vc	50 - 60	-	50 - 60	60 - 100	25 - 50
	fz	0.4	-	0.12 - 0.15	0.15 - 0.25	0.1 - 0.12
	ap	0.2 - 0.8	-	~5.0	~5.0	~0.2
	ae	0.6 Dc	-	~0.15 Dc	~0.2	0.4 - 1.0 Dc
Heat Resistant Alloy	Grade	JC8118 (JC8050)	-	JC7518	JC7518	JC7518
	Vc	20 - 30	-	25 - 30	30 - 50	15 - 30
	fz	0.3	-	0.11 - 0.15	0.15 - 0.25	0.1 - 0.12
	ap	0.2 - 0.8	-	~5.0	~5.0	~0.2
	ae	0.6 Dc	-	~0.15 Dc	~0.20	0.4 - 1.0 Dc
Aluminium	Grade	-	-	FC18	FC18	FC18
	Vc	-	-	300 - 600	420 - 700	300 - 600
	fz	-	-	0.16 - 0.2	0.18 - 0.30	0.1 - 0.15
	ap	-	-	~5.0	~5.0	~0.3
	ae	-	-	~0.4 Dc	~0.3	0.4 - 1.0 Dc

QM MAX

MQX/QXP Type

■ Recommended Cutting Conditions

Material		Contouring	Side Finishing	Bottom Finishing	Vertical Side Finishing	Side Finishing	Bottom Finishing	Vertical Side Finishing
		YPHW-24	YPHW-15			YPHW-F (CBN)		
Carbon Steel below 250HB	Grade	-	JC8015 (DH102)	DH102	JC8015 (DH102)	-	-	-
	Vc	-	450 - 650	170 - 260	350 - 450	-	-	-
	fz	-	0.1 - 0.15	0.18 - 0.25	0.08 - 0.18	-	-	-
	ap	-	0.7 - 2.0	~0.2	Pf 0.5 - 1.12	-	-	-
	ae	-	~0.2	~0.6 Dc	~0.2	-	-	-
Tool & Die Steel below 255HB	Grade	-	JC8015 (DH102)	DH102	JC8015 (DH102)	-	-	-
	Vc	-	350 - 450	150 - 240	300 - 400	-	-	-
	fz	-	0.1 - 0.15	0.18 - 0.25	0.08 - 0.18	-	-	-
	ap	-	0.7 - 2.0	~0.2	Pf 0.5 - 1.12	-	-	-
	ae	-	~0.2	~0.6 Dc	~0.2	-	-	-
Mold Steel 30-36HRC	Grade	-	JC8015 (DH102)	DH102	JC8015 (DH102)	-	-	-
	Vc	-	350 - 450	140 - 220	250 - 350	-	-	-
	fz	-	0.1 - 0.15	0.17 - 0.2	0.07 - 0.15	-	-	-
	ap	-	0.7 - 2.0	~0.2	Pf 0.5 - 1.12	-	-	-
	ae	-	~0.2	~0.6 Dc	~0.2	-	-	-
Mold Steel 38-43HRC	Grade	JC8015 (DH102)	JC8015 (DH102)	DH102	JC8015 (DH102)	-	-	-
	Vc	220	350 - 400	150 - 200	180 - 250	-	-	-
	fz	0.25	0.08 - 0.12	0.1 - 0.12	0.07 - 0.12	-	-	-
	ap	0.15 - 0.4	0.7 - 2.0	~0.2	Pf 0.5 - 1.12	-	-	-
	ae	~0.4 Dc	~0.2	~0.6 Dc	~0.2	-	-	-
Hardened Die Steel 42-52HRC	Grade	JC8015 (DH102)	JC8015 (DH102)	DH102	DH102 (JC8015)	JBN795	JBN795	JBN795
	Vc	160	170 - 200	60 - 100	120 - 170	400 - 450	300 - 350	400 - 450
	fz	0.25	0.08 - 0.1	0.1	0.06 - 0.1	0.07 - 0.08	0.06 - 0.08	0.07 - 0.08
	ap	0.1 - 0.25	~1.5	~0.2	Pf 0.5 - 1.12	~1.2	~0.08	Pf 0.5 - 1.12
	ae	~0.4 Dc	~0.2	~0.6 Dc	~0.15	~0.1	~0.6 Dc	~0.1
Hardened Die Steel 55-62HRC	Grade	DH102	DH102	DH102	-	JBN795	JBN795	-
	Vc	100	150 - 180	50 - 70	-	300 - 400	200	-
	fz	0.2	0.08 - 0.1	0.05 - 0.07	-	0.06 - 0.08	0.05 - 0.06	-
	ap	0.1 - 0.2	~1.0	~0.2	-	~1.2	~0.06	-
	ae	~0.3 Dc	~0.2	~0.4 Dc	-	~0.1	~0.6 Dc	-
Grey Cast Iron	Grade	-	JC8015 (DH102)	DH102	JC8015 (DH102)	JBN795	JBN795	JBN795
	Vc	-	450 - 550	130 - 200	450 - 550	750	700	750
	fz	-	0.1 - 0.15	0.1 - 0.2	0.1 - 0.15	0.1 - 0.135	0.1 - 0.12	0.1 - 0.135
	ap	-	0.7 - 2.0	~0.2	Pf 0.5 - 1.12	~1.5	~0.1	Pf 0.5 - 1.12
	ae	-	~0.2	~0.6 Dc	~0.2	~0.1	~0.6 Dc	~0.1
Nodular Cast Iron	Grade	-	JC8015 (DH102)	DH102	JC8015 (DH102)	JBN795	-	JBN795
	Vc	-	450 - 550	130 - 200	450 - 550	700	-	700
	fz	-	0.1 - 0.15	0.1 - 0.2	0.1 - 0.15	0.1 - 0.135	-	0.1 - 0.135
	ap	-	0.7 - 2.0	~0.2	Pf 0.5 - 1.12	~1.5	-	Pf 0.5
	ae	-	~0.2	~0.6 Dc	~0.2	~0.1	-	~0.1
Stainless Steel	Grade	-	JC8015 (DH102)	JC8015 (DH102)	-	-	-	-
	Vc	-	350 - 450	130 - 180	-	-	-	-
	fz	-	0.1 - 0.15	0.1 - 0.15	-	-	-	-
	ap	-	0.7 - 2.0	~0.2	-	-	-	-
	ae	-	~0.2	~0.6 Dc	-	-	-	-
Titanium Alloy	Grade	-	JC8015 (DH102)	DH102	-	-	-	-
	Vc	-	70 - 90	30 - 50	-	-	-	-
	fz	-	0.08 - 0.12	0.1 - 0.15	-	-	-	-
	ap	-	0.7 - 2.0	~0.2	-	-	-	-
	ae	-	~0.2	~0.6 Dc	-	-	-	-

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.
5. When using Endmill type, reduce cutting conditions by 10-20%.

QM MILL

MPM/PME Type

**Low cutting
force geometry**

- Unique 3D geometry insert provides stable cutting and less power consumption.
- BT30 Capable of running on low horse power & compact machines.



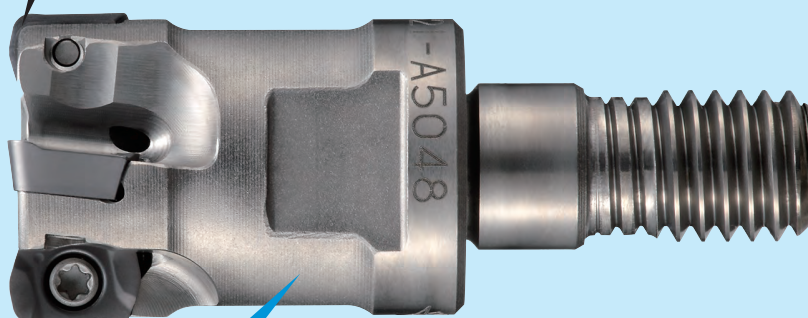
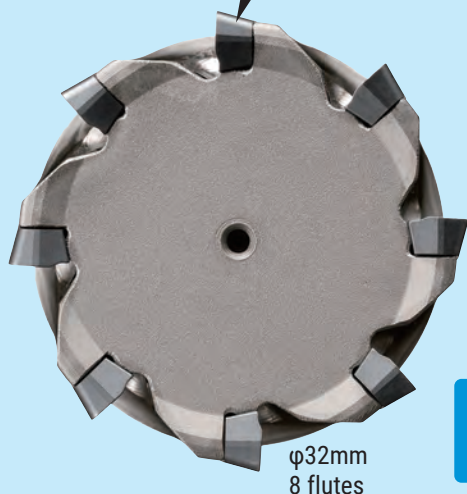
**Multi - flutes
specification**

- High speed and high efficient machining.

Vibration free

- Control vibration with combination of MSN carbide shank holder for longer tool life.

Low cutting force geometry **High feed machining with Multi-flutes specification**



Adopted G-Body

**Possible to use even
for finishing applications**

Insert Line-Up

A variety of inserts all fit into the same body.

High feed insert



EOMT0602...ZER (R1.0, 2.0)

High feed insert for unfavorable conditions



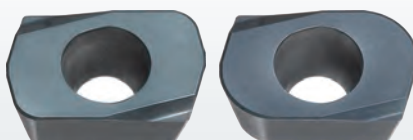
EOMW060210ZER

Shoulder insert



ZOMT0602...ZER-PL (R0.2,0.4,0.8)

For high hardened steel



EOHW0602...ZTR (R1.0, 2.0)

**"Mirror Insert"
for finishing side & bottom face**



YOHW0602...ZER-12

QM MILL

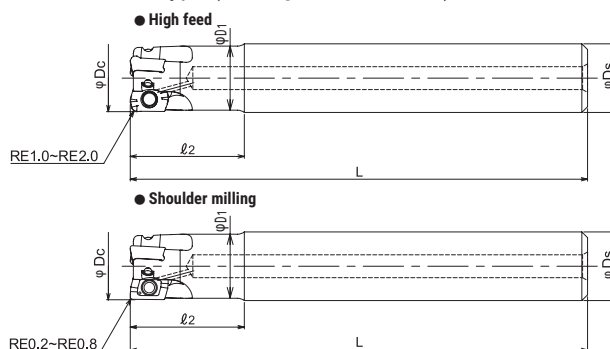
MPM/PME Type

PME
TYPE

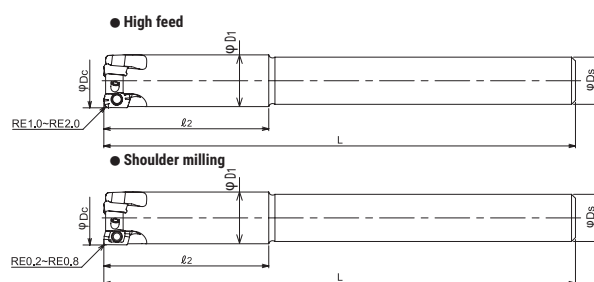
Shank Type



■ PME type (Through coolant hole)



■ PME-LS type (No coolant hole)



Type	Cat.No.	Stock	No. of inserts	Dimensions (mm)					Insert
				ϕD_c	ℓ_2	L	ϕD_1	ϕD_s	
Standard	PME2010S10	●	2	10	20	80	9.3	10	EO**0602**Z*R ZOMT0602**ZER YOHWO602**ZER-12
	PME3012S12	●	3	12			11.2	12	
	PME3014S12	●		14			13.15	12	
Long shank	PME2011S10-LS	●	2	11	33	120	10.3	10	
	PME3013S12-LS	●	3	13	39		12.2	12	
	PME3014S12-LS	●		14	42		13.15	12	

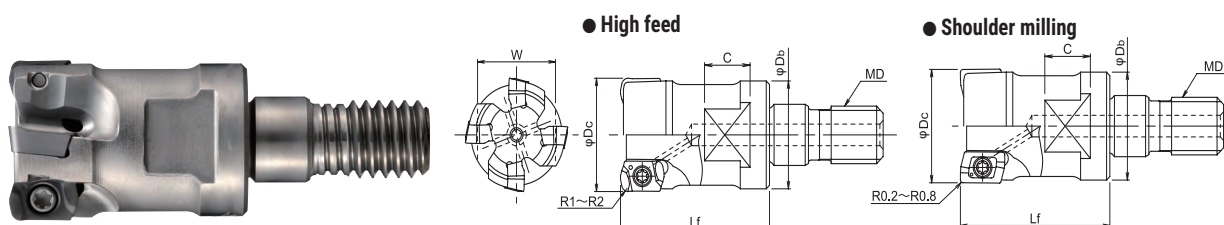
Screw	Torque(N.m)	Wrench
DSW-1840H	0.4	A-06

QM MILL

MPM/PME Type

MPM
TYPE

Modular Type

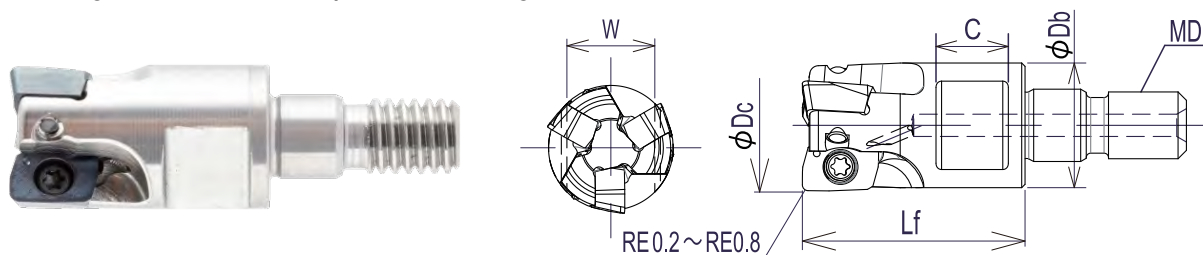


Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert
			φDc	Lf	φDb	MD	C	W	
MPM-2010-M6	●	2	10	18	9.5	M6	6.5	8	EO**0602**Z*R ZOMT0602**ZER YOHW0602**ZER-12
MPM-2011-M6	●		11		9.7	M6			
MPM-3012-M6	●	3	12	20	11.2	M6	8		
MPM-3013-M6	●		13		11.5	M6			
MPM-3015-M8	○	4	15	23	14	M8	8	12	
MPM-4016-M8	●		16		15	M8			
MPM-4017-M8	●		17			M8			
MPM-4018-M8	○		18			M8			
MPM-5020-M10	●	5	20	30	19	M10	9	14	
MPM-5021-M10	●		21			M10			
MPM-6025-M12	●	6	25	35	23.6	M12	10	17	
MPM-7030-M16	●	7	30	43	29	M16	12	22	
MPM-8032-M16	●	8	32			M16			

MPT
TYPE

High Precision "QM MILL"

High tolerance insert-pocket for the ground inserts



Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert
			φDc	Lf	φDb	MD	C	W	
MPT-2010A00-M6	●	2	10	18	9.5	M6	6.5	8	ZOMT0602**ZER YOHW0602**ZER-12
MPT-2011A00-M6	○		11		9.7				
MPT-3012A00-M6	●	3	12	20	11.2				
MPT-3013A00-M6	○		13		11.5				
MPT-4016A00-M8	●	4	16	23	15	M8	8	12	

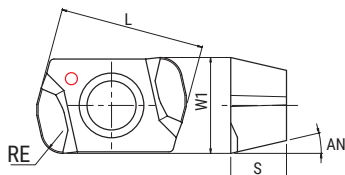
Screw	Torque(N.m)	Wrench
DSW-1840H	0.4	A-06

QM MILL

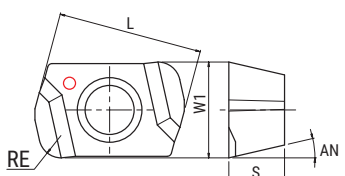
MPM/PME Type

Insert

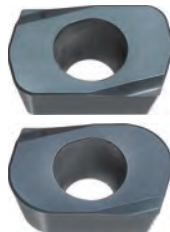
High feed insert



High feed insert for unfavorable conditions



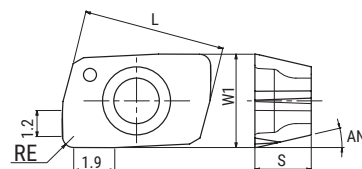
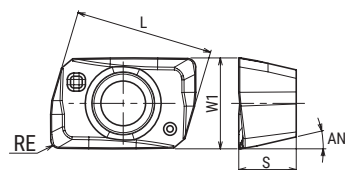
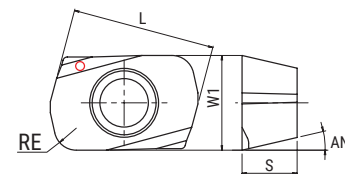
For high hardened steel



Shoulder insert



"Mirror Insert" for finishing side & bottom face

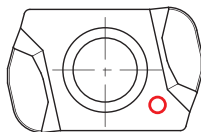


Type	Cat.No.	Tolerance	PVD Coating						Dimensions (mm)									
			DH102	DS118	DS150	JC7560	JC8015	JC8050	JC8118	RE	L	W1	S	AN				
High feed insert	EOMT060210ZER	M		●	●	●		●	●	1	6.5		2.5					
	EOMT060220ZER			●	●		●	●	2									
High feed insert for unfavorable conditions	EOMW060210ZER	H				●		●	●	1					6.62	4.3	2.7	13°
For high hardened steel	EOHW060210ZTR		●						●	2								
	EOHW060220ZTR	●						●										
shoulder insert	ZOMT060202ZER-PL	M						●	●	0.2	6.5		2.6					
	ZOMT060204ZER-PL						●	●	0.4									
	ZOMT060208ZER-PL							●	●	0.8								
"Mirror Insert" for finishing side & bottom face	YOHW060203ZER-12	H	●							0.3	6.5		2.6					
	YOHW060205ZER-12		●				●			0.5								
	YOHW060208ZER-12		●				●			0.8								
							●											

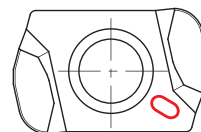
GRADE MARKINGS



JC8118/DS118



JC8050/JC7560/DS150



MAGNETIZER



- Magnetizing and demagnetizing a wrench can easily be done by inserting the tip into the magnetizer and rubbing lightly.
- Do not use in the vicinity of the equipment that can be influenced with magnetism.

Cat.No.	Stock
MAGNETISER	●

QM MILL

MPM/PME Type

■ Insert selection guide

Material	Carbon steel (S50C, S55C) below 250HB						Tool & die steel # (SKD61, SKD11) below 255HB					
Cat.No. \ Grade	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150
EOMT0602*0ZER	☆	☆	☆				☆	☆	☆			
EOMW060210ZER	○	○	◎				○	○	◎			
EOHW0602*0ZTR												

Material	Mold steel (HPM7, PX5, KPM30) 30-36HRC						Mold steel (NAK80, HPM1) 38-43HRC					
Cat.No. \ Grade	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150
EOMT0602*0ZER	☆	☆	☆				☆	☆				
EOMW060210ZER	○	○	◎				◎	○				
EOHW0602*0ZTR												

Material	Hardened die steel (SKD61, DAC, DHA) 42-52HRC						Hardened die steel (SKD11, SLD, DC11) 55-62HRC					
Cat.No. \ Grade	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150
EOMT0602*0ZER	☆						×	×				
EOMW060210ZER	○	●					○					
EOHW0602*0ZTR	◎						●			◎		

Material	Cast iron (FC, FCD) below 300HB						Stainless steel (SUS304) below 250HB					
Cat.No. \ Grade	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150
EOMT0602*0ZER	○							◎	○			
EOMW060210ZER	◎		●					●				
EOHW0602*0ZTR												

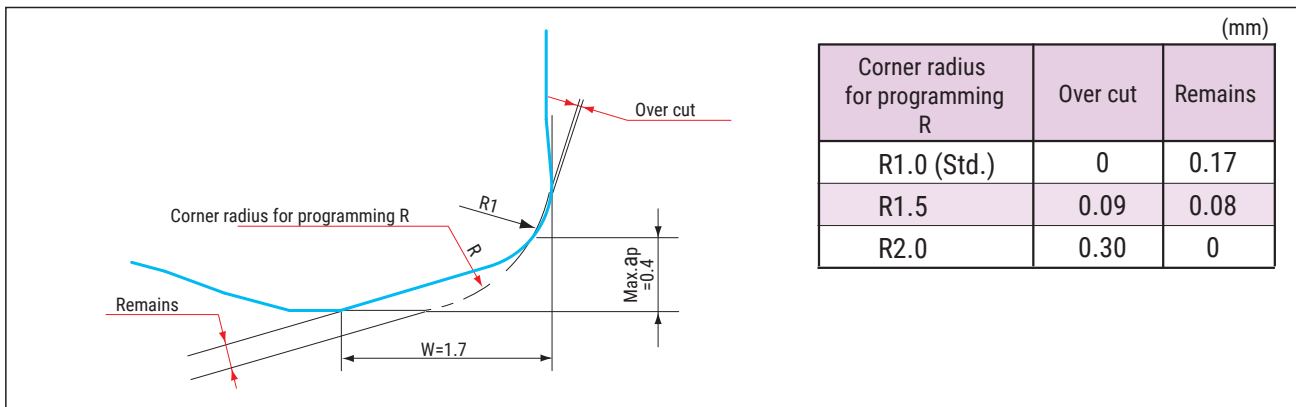
Material	Titanium alloy (Ti-6Al-4V)						Heat resistant alloy (INCO718)					
Cat.No. \ Grade	JC8118	JC8050	JC7560	DH102	DS118	DS150	JC8118	JC8050	JC7560	DH102	DS118	DS150
EOMT0602*0ZER	○	○	◎		○	◎	◎	○	○		○	○
EOMW060210ZER			●					●				
EOHW0602*0ZTR												

◎: First choice ○: For general milling ●: For unstable milling ☆: For light cutting force ×: Not recommended

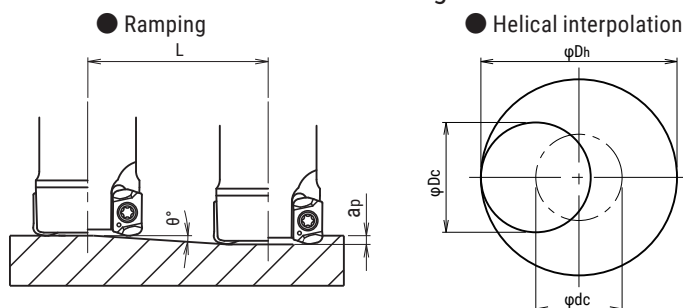
QM MILL

MPM/PME Type

■ Definition of corner shape for programming



■ Recommended Data for Profile Milling



- Calculation of tool pass dia.

$$\phi_{dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool Dia.

- Depth of cut per one circuit should not exceed max. depth of cut a_p
- Down cutting is recommended, tool pass rotation should be counterclockwise

- In case of ramping and helical interpolation, apply 70% or less feed (V_f) from standard cutting condition table
- In case of drilling, apply 50% or less Z axis feed (F) from standard cutting condition table
- Long consecutive chips may result in case of drilling, confirm safe operating conditions

Cat.No.	Tool dia. (mm)	Effective cutting dia. (mm)	Max.depth of cut: a_p (mm)	Ramping		Helical interpolation	
				Max. ramping angle θ	Max. depth of cut (a_p) Total cutting length L(mm)	Min. Bore dia. (mm)	Max. Bore dia. (mm)
MPM-2010-M6	10	6.6	0.3	2°18'	7.5	15	18
MPM-2011-M6	11	7.6	0.3	1°54'	9	17	20
MPM-3012-M6	12	8.5	0.3	1°36'	10.7	19	22
MPM-3013-M6	13	9.5	0.3	1°24'	12.3	21	24
MPM-3015-M8	15	11.5	0.4	1°12'	19.1	25	28
MPM-4016-M8	16	12.5	0.4	1°	22.9	27	30
MPM-4017-M8	17	13.5	0.4	0°54'	25.5	29	32
MPM-4018-M8	18	14.5	0.4	0°51'	27.0	31	34
MPM-5020-M10	20	16.5	0.4	0°45'	30.6	35	38
MPM-5021-M10	21	17.5	0.4	0°42'	32.7	37	40
MPM-6025-M12	25	21.5	0.4	0°30'	45.8	45	48
MPM-7030-M16	30	26.5	0.4	0°27'	50.9	55	58
MPM-8032-M16	32	28.5	0.4	0°24'	57.3	59	62
PME2010S10	10	6.6	0.3	2°18'	7.5	15	18
PME2011S10-LS	11	7.6	0.3	1°54'	9	17	20
PME3012S12	12	8.5	0.3	1°36'	10.7	19	22
PME3013S12-LS	13	9.5	0.3	1°24'	12.3	21	24
PME3014S12 (-LS)	14	10.5	0.3	1°18'	13.2	23	26

QM MILL

MPM Type

Recommended Cutting Conditions

Material		High Feed		Side Finishing	Bottom Finishing
		EOMT / EOMW	EOHW	YOHW	YOHW
Carbon Steel below 250HB	Grade	JC7560 (JC8050 JC8118)	-	JC8015 (DH102)	JC8015 (DH102)
	Vc	95 - 120	-	280 - 400	160 - 250
	fz	0.5 - 0.9	-	0.1 - 0.15	0.14 - 0.2
	ap	0.2 - 0.4	-	~1.2	~0.12
	ae	0.7 Dc	-	~0.1	0.6 Dc
Tool & Die Steel below 255HB	Grade	JC7560 (JC8050 JC8118)	-	JC8015 (DH102)	JC8015 (DH102)
	Vc	90 - 110	-	250 - 360	150 - 230
	fz	0.5 - 0.9	-	0.1 - 0.15	0.13 - 0.18
	ap	0.15 - 0.4	-	~1.0	~0.12
	ae	0.7 Dc	-	~0.1	0.6 Dc
Mold Steel 30-36HRC	Grade	JC8118 (JC7560 JC8050)	-	JC8015 (DH102)	JC8015 (DH102)
	Vc	90 - 110	-	250 - 360	150 - 230
	fz	0.5 - 0.9	-	0.1 - 0.15	0.13 - 0.18
	ap	0.2 - 0.4	-	~1.0	~0.12
	ae	0.7 Dc	-	~0.1	0.6 Dc
Mold Steel 38-43HRC	Grade	JC8118 (JC8050)	-	DH102 (JC8015)	DH102 (JC8015)
	Vc	70 - 90	-	200 - 280	130 - 200
	fz	0.5 - 0.7	-	0.08 - 0.12	0.08 - 0.12
	ap	0.2 - 0.3	-	~1.0	~0.12
	ae	0.6 Dc	-	~0.1	0.6 Dc
Hardened Die Steel 42-52HRC	Grade	JC8118	JC8118	DH102 (JC8015)	DH102 (JC8015)
	Vc	50 - 70	70 - 90	140 - 200	90 - 120
	fz	0.45 - 0.6	0.3 - 0.6	0.08 - 0.1	0.08 - 0.1
	ap	0.15 - 0.3	0.1 - 0.25	~0.8	~0.1
	ae	0.6 Dc	0.6 Dc	~0.1	0.4 Dc
Hardened Die Steel 55-62HRC	Grade	-	DH102	DH102	DH102
	Vc	-	70 - 80	100 - 150	50 - 70
	fz	-	0.27 - 0.3	0.08 - 0.1	0.06 - 0.08
	ap	-	0.1 - 0.15	~0.5	~0.1
	ae	-	0.4 Dc	~0.1	0.4 Dc
Grey & Nodular Cast Iron below 300HB	Grade	JC8118	-	JC8015 (DH102)	JC8015 (DH102)
	Vc	120 - 150	-	280 - 400	130 - 200
	fz	0.5 - 0.9	-	0.1 - 0.15	0.1 - 0.15
	ap	0.2 - 0.4	-	~1.2	~0.15
	ae	0.7 Dc	-	~0.12	0.6 Dc
Stainless Steel	Grade	JC8050 (JC7560)	-	JC8015 (DH102)	JC8015 (DH102)
	Vc	95 - 120	-	250 - 360	150 - 230
	fz	0.5 - 0.9	-	0.1 - 0.15	0.13 - 0.18
	ap	0.15 - 0.4	-	~1.0	~0.12
	ae	0.6 Dc	-	~0.1	0.6 Dc
Titanium Alloy	Grade	DS150 (JC7560 JC8050 DS118)	-	JC8015 (DH102)	JC8015 (DH102)
	Vc	50 - 60	-	55 - 80	30 - 50
	fz	0.4 - 0.5	-	0.08 - 0.12	0.09 - 0.12
	ap	0.15 - 0.3	-	~1.0	~0.12
	ae	0.6 Dc	-	~0.1	0.6 Dc
Heat Resistant Alloy	Grade	JC8118 (JC8050)	-	-	-
	Vc	25 - 30	-	-	-
	fz	0.3 - 0.4	-	-	-
	ap	0.15 - 0.3	-	-	-
	ae	0.6 Dc	-	-	-

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.

QM MILL

MPM Type

■ Recommended Cutting Conditions

Material		Shoulder Milling	Side Finishing	Bottom Finishing
		ZOMT	ZOMT	ZOMT
Carbon Steel below 250HB	Grade	JC8050 (JC8118)	JC8050 (JC8118)	JC8050 (JC8118)
	Vc	128 - 160	145 - 240	90 - 180
	fz	0.06 - 0.08	0.07 - 0.13	0.1 - 0.15
	ap	~4.0	~4.0	~0.15
	ae	~0.15 Dc	~0.1	~0.6 Dc
Tool & Die Steel below 255HB	Grade	JC8050 (JC8118)	JC8050 (JC8118)	JC8050 (JC8118)
	Vc	120 - 150	130 - 215	80 - 160
	fz	0.04 - 0.06	0.07 - 0.13	0.1 - 0.15
	ap	~4.0	~4.0	~0.15
	ae	~0.15 Dc	~0.1	~0.6 Dc
Mold Steel 30-36HRC	Grade	JC8118 (JC8050)	JC8118 (JC8050)	JC8118 (JC8050)
	Vc	120 - 150	130 - 215	80 - 160
	fz	0.03 - 0.05	0.07 - 0.13	0.1 - 0.15
	ap	~4.0	~4.0	~0.15
	ae	~0.15 Dc	~0.1	~0.6 Dc
Mold Steel 38-43HRC	Grade	JC8118 (JC8050)	JC8118 (JC8050)	JC8118 (JC8050)
	Vc	90 - 120	110 - 185	70 - 140
	fz	0.03 - 0.05	0.05 - 0.1	0.1 - 0.15
	ap	~3.0	~3.0	~0.15
	ae	~0.13 Dc	~0.1	~0.6 Dc
Hardened Die Steel 42-52HRC	Grade	JC8118	JC8118	JC8118
	Vc	80 - 100	90 - 120	75 - 100
	fz	0.03 - 0.05	0.05 - 0.07	0.1 - 0.12
	ap	~2.5	~2.5	~0.1
	ae	~0.12 Dc	~0.1	~0.6 Dc
Grey & Nodular Cast Iron below 300HB	Grade	JC8118	JC8118	JC8118
	Vc	120 - 150	125 - 210	90 - 180
	fz	0.06 - 0.08	0.07 - 0.15	0.12 - 0.18
	ap	~4.0	~4.0	~0.15
	ae	~0.15 Dc	~0.1	~0.6 Dc
Stainless Steel	Grade	JC8050	JC8050	JC8050
	Vc	120 - 150	130 - 215	80 - 160
	fz	0.04 - 0.06	0.07 - 0.13	0.1 - 0.15
	ap	~4.0	~4.0	~0.15
	ae	~0.15 Dc	~0.1	~0.6 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.

EXTREME SAP

EXSAP/MSX Type

EXTREME SAP

EXSAP/MSX TYPE



Facemill type



Modular head type



Shank type

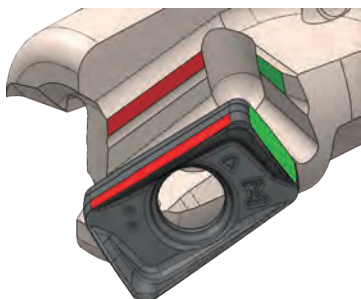
Various line up

Capable of a variety of applications such as facemilling, slotting and plunging

Arc-shaped cutting edge trajectory

Due to the arc-geometry on peripheral cutting edge, cusp height can be smaller even in case of large ap.

Achieves high efficient & high precision machining for side walls.



Strong clamping system

Due to unique clamping system that holds insert in place, it is possible to achieve high efficient machining in roughing application.

High precision G class periphery ground

capable of semi-finishing



Double sided 4 cutting edge insert

EXTREME SAP

EXSAP/MSX Type

■ EXSAP-11 type



High speed machining
with multi flutes & small insert

Accuracy of tool diameter : 0-0.1mm
Achieves higher precision on semi-finishing process



Grade: JC8050
JC8118

PM breaker for general steel (up to 50HRC)



Grade: JC7550
JC7518
DS118
DS150

SL breaker for hard to cut material
such as Titanium alloy, Heat resistant alloy

■ EXSAP-17 type



Max.depth of cut (ap)=15mm
From roughing to semi-finishing

High rigidity insert
Achieves high precision machining even when using
large ap



Grade: JC8050
JC8118

PM breaker for general steel (up to 50HRC)

■ Insert grades

ISO	P					M					K				S			
	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30	S01	S10	S20	S30
Range			JC8118					JC8118					JC8118			DS118		
				JC8050					JC8050								DS150	
			JC7518					JC7518									JC7518	
				JC7550					JC7550								JC7550	

EXTREME SAP

EXSAP/MSX Type

EXSAP-11
TYPE

Bore Type

Through
coolant
hole

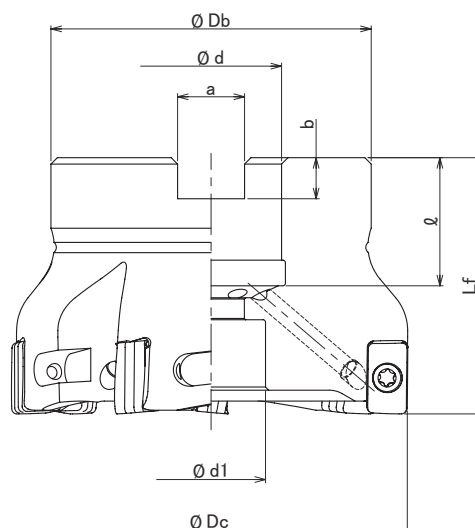
Face Milling

Shoulder Milling

Slotting

Helical Interpolation

Plunge Milling



Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Inserts
			φDc	Lf	φDb	φd	φd1	a	b	ℓ			
EXSAP-6040R-11-16	●	6	40	40	35	16	14	8.4	5.6	18	M8	0.22	ZNGU1105**ZER-**
EXSAP-7050R-11-22	●	7	50		47	22	16.5	10.4	6.3	20	M10	0.38	
EXSAP-7052R-11-22	●		52								M10	0.39	
EXSAP-7063R-11-22	●		63								50	17	
EXSAP-7063R-11-27	●			50	27	20	12.4	7	22	M12X1.75X30★	0.62		
EXSAP-8080R-11-27	●	8	80		56						M12X1.75X30★	0.99	

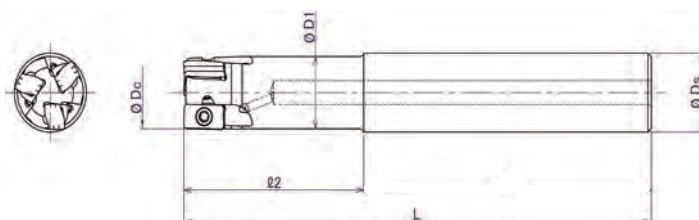
Screw	Torque(N.m)	Wrench
TSW-307H	2.1	A-10

EXTREME SAP

EXSAP/MSX Type

EXSAP-11
TYPE

Shank Type



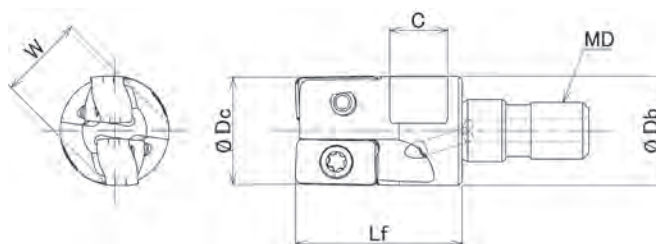
Cat.No.	Stock	No. of inserts	Dimensions (mm)					Insert
			φDc	ℓ2	L	φD1	φDs	
EXSAP-2016-11-50-S16+A	●	2	16	50	110	14.6	16	ZNGU1105**ZER-**
EXSAP-3020-11-50-S20	●	3	20	50	130	18.3	20	
EXSAP-3025-11-50-S25+A	●	2	25	50	130	23.4	25	
EXSAP-4032-11-70-S32	●	4	32	70	150	29	32	

Note) +A types has no coolant holes.

Screw	Torque(N.m)	Wrench
TSW-307H	2.1	A-10

EXTREME SAP

EXSAP/MSX Type

MSX-11
TYPE**Modular Type**Through
coolant
hole

Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert
			φDc	Lf	φDb	MD	C	W	
MSX-2016-11-M8	●	2	16	23	15	M8	8	12	ZNGU1105**ZER**
MSX-2017-11-M8	○		17						
MSX-2018-11-M8	○		18						
MSX-3020-11-M10	●	3	20	30	18	M10	9	14	
MSX-3021-11-M10	○		21						
MSX-3025-11-M12	●		25	35	22	M12	11	19	
MSX-3026-11-M12	○		26						
MSX-3028-11-M12	○	28							
MSX-4030-11-M16	○	4	30	43	29	M16	12	22	
MSX-4032-11-M16	●		32						
MSX-4033-11-M16	○		33						
MSX-4035-11-M16	○		35						
MSX-5040-11-M16	●	5	40						

Screw	Torque(N.m)	Wrench
TSW-307H	2.1	A-10

EXTREME SAP

EXSAP/MSX Type

Insert



Fig 1

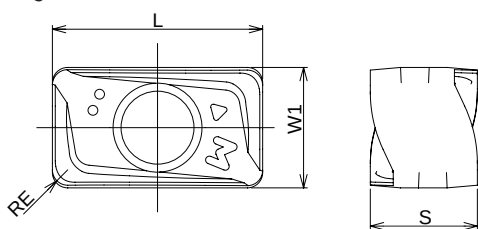
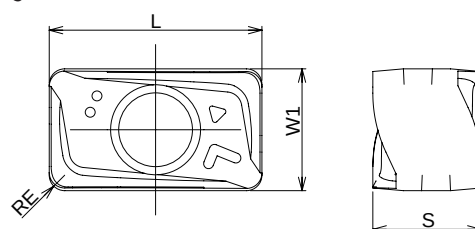
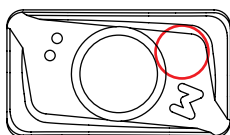


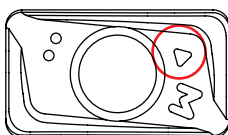
Fig 2



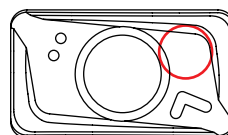
Cat.No.	Tolerance	PVD Coating						Dimensions (mm)				Fig.
		DS118	DS150	JC7518	JC7550	JC8050	JC8118	RE	L	W1	S	
ZNGU110504ZER-PM	G					●	●	0.4	11	6.3	5.6	1
ZNGU110508ZER-PM						●	●	0.8				
ZNGU110516ZER-PM						●	●	1.6				
ZNGU110504ZER-SL		●	●	●	●			0.4				2
ZNGU110508ZER-SL		●	●	●	●			0.8				
ZNGU110516ZER-SL		●	●	●	●			1.6				

 Grade markings


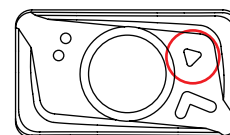
JC8118



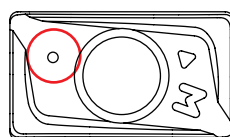
JC8050



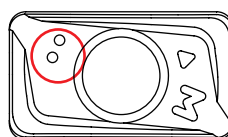
JC7518 / DS118



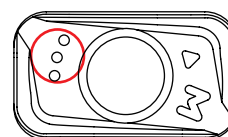
JC7550 / DS150



ZNGU110504ZER



ZNGU110508ZER



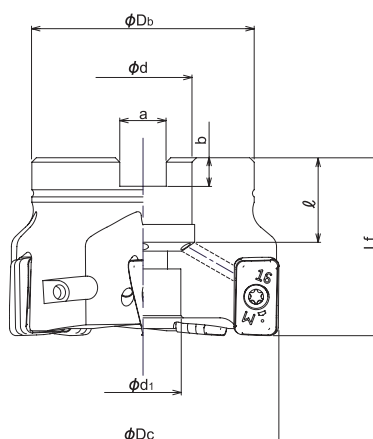
ZNGU110516ZER

EXTREME SAP

EXSAP/MSX Type

EXSAP-17
TYPE

Bore Type



Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Insert	
			φDc	Lf	φDb	φd	φd1	a	b	ℓ				
EXSAP-4050R-22	●	4	50	40	47	22	17	10.4	6.3	20	M10	0.38	ZNGU1709**ZER-PM	
EXSAP-5050R-22	●	5										0.38		
EXSAP-5052R-22	●											52		0.41
EXSAP-5063R-22	●											63		0.58
EXSAP-7080R-27	●	7	80	50	56	27	20	12.4	7	22	M12X1.75X30★	1.09		
EXSAP-7100R-32	●		100		85	32	26	14.4	8	25	M16X2X25★	1.93		
EXSAP-8125R-40	●	8	125	63	100	40	32	16.4	9	32	M20X2.5X40★	3.66		

Screw	Torque(N.m)	Wrench
TSW-410H	3.5	A-15T

EXTREME SAP

EXSAP/MSX Type

EXSAP-17
TYPE

Shank Type



Cat.No.	Stock	No. of inserts	Dimensions (mm)					Insert
			φDc	ℓ2	L	φD1	φDs	
EXSAP-2025-60-S25	●	2	25	60	140	23	25	ZNGU1709**ZER-PM
EXSAP-2025-100-S25	○			100	180			
EXSAP-2032-70-S32	○		32	70	150	29	32	
EXSAP-2032-120-S32	○	120		200				
EXSAP-3032-70-S32	●	3		70	150			
EXSAP-3032-120-S32	○			120	200			

Screw	Torque(N.m)	Wrench
TSW-410H	3.5	A-15

EXTREME SAP

EXSAP/MSX Type

MSX-17
TYPE**Modular Type**Through
coolant
hole**G-
Body**

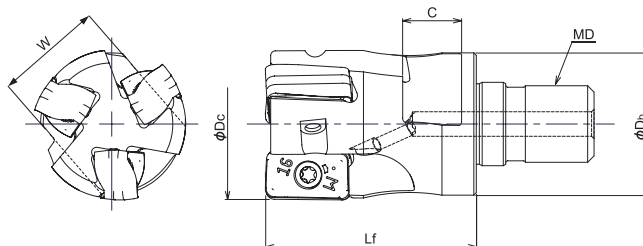
Face Milling

Shoulder Milling

Slotting

Helical Interpolation

Plunge Milling



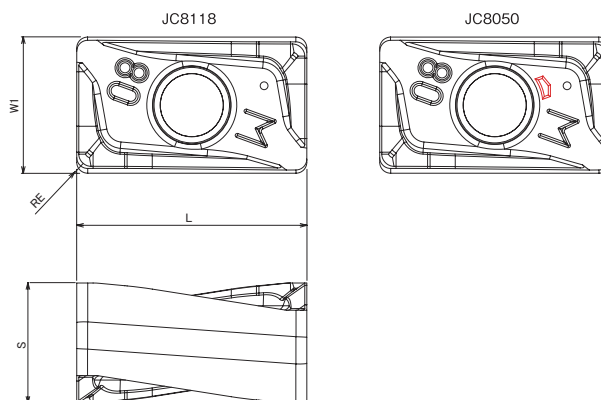
Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert
			φDc	Lf	φDb	MD	C	W	
MSX-2025-M12	●	2	25	35	22	M12	11	19	ZNGU1709**ZER-PM
MSX-2026-M12	○		26						
MSX-2028-M12	○		28						
MSX-2030-M16	○		30						
MSX-2032-M16	●	3	32	43	29	M16	12	22	
MSX-3032-M16	●		33						
MSX-3033-M16	○								
MSX-3035-M16	○								
MSX-4040-M16	●	4	40						

Screw	Torque(N.m)	Wrench
TSW-410H	3.5	A-15

EXTREME SAP

EXSAP/MSX Type

Insert



Cat.No.	Tolerance	PVD Coating		Dimensions (mm)			
		JC8050	JC8118	RE	L	W1	S
ZNGU170904ZER-PM	G	●	●	0.4	16.9	10	8.8
ZNGU170908ZER-PM		●	●	0.8			
ZNGU170916ZER-PM		●	●	1.6			
ZNGU170920ZER-PM		●	●	2			
ZNGU170930ZER-PM		●	●	3			8.6

Cat.No.	Tolerance	PVD Coating	Dimensions (mm)			
		JC7550	RE	L	W1	S
ZNGU170908ZER-SM	G	●	0.8	16.9	10	8.8

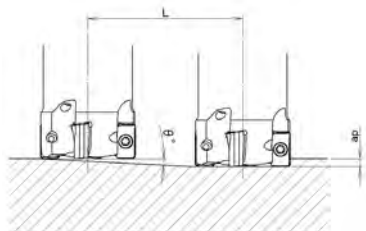
EXTREME SAP

EXSAP/MSX Type

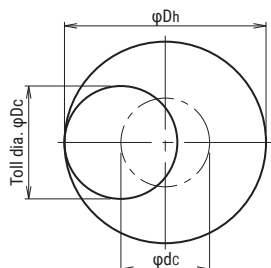
Recommended Data for Profile Milling

EXSAP-11 Type

Ramping



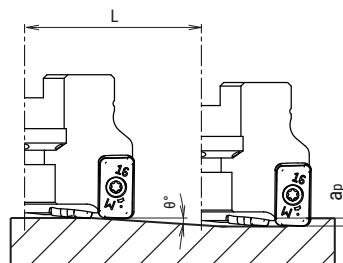
Helical interpolation



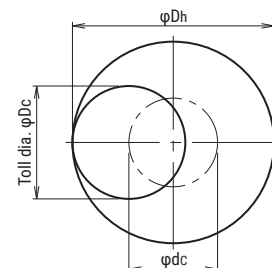
Cat. No.	Tool dia.	Effective Cutting dia.	Max. depth of cut : ap	Ramping		Helical interpolation	
				Max. ramping angle θ	Max. depth of cut : ap Total cutting length L(mm)	Min. Bore dia.	Max. Bore dia.
MSX-2016-11-M8	16	14.1	1.5	1.0°	86	18	29.6
MSX-3020-11-M10	20	18.1	1.5	0.7°	123	26	37.6
MSX-3025-11-M12	25	23.1	1.5	0.4°	215	36	47.6
MSX-4030-11-M16	30	28.1	1.5	0.3°	286	46	57.6
MSX-4032-11-M16	32	30.1	1.5	0.3°	286	50	61.6
MSX-5040-11-M16	40	38.1	1.5	0.2°	430	66	77.6
EXSAP-2016-11-**-S16	16	14.1	1.5	1.0°	86	18	29.6
EXSAP-3020-11-**-S20	20	18.1	1.5	0.7°	123	26	37.6
EXSAP-3025-11-**-S25	25	23.1	1.5	0.4°	215	36	47.6
EXSAP-4030-11-**-S32	30	28.1	1.5	0.3°	286	46	57.6
EXSAP-4032-11-**-S32	32	30.1	1.5	0.3°	286	50	61.6
EXSAP-5040-11-**-S32	40	38.1	1.5	0.2°	430	66	77.6
EXSAP-6040R-11-16	40	38.1	1.5	0.2°	430	66	77.6
EXSAP-7050R-11-22	50	48.1	1.5	0.15°	573	86	97.6
EXSAP-7052R-11-22	52	50.1	1.5	0.15°	573	90	101.6
EXSAP-7063R-11-22	63	61.1	1.5	Not recommended			
EXSAP-7063R-11-27	63	61.1	1.5				
EXSAP-8080R-11-27	80	78.1	1.5				

EXSAP-17 Type

Ramping



Helical interpolation



Cat. No.	Tool dia.	Effective Cutting dia.	Max. depth of cut : ap	Ramping		Helical interpolation	
				Max. ramping angle θ	Max. depth of cut : ap Total cutting length L(mm)	Min. Bore dia.	Max. Bore dia.
EXSAP/MSX-2025	25	21.5	1.5	0.7°	123	34	46
MSX-2026-M12	26	22.5	1.5	0.7°	123	36	48
MSX-2028-M12	28	25.5	1.5	0.6°	143	40	52
MSX-2030-M16	30	26.5	1.5	0.6°	143	44	56
EXSAP/MSX-032	32	28.5	1.5	0.5°	172	48	60
MSX-3033-M16	33	29.5	1.5	0.5°	172	50	62
MSX-3035-M16	35	31.5	1.5	0.4°	215	54	66
MSX-4040-M16	40	36.5	1.5	0.4°	215	64	76
EXSAP-050R-22	50	46.5	1.5	0.3°	286	84	96
EXSAP-5052R-22	52	48.5	1.5	0.3°	286	88	100
EXSAP-5063R-22	63	59.5	1.5	0.2°	430	110	122
EXSAP-7080R-27	80	76.5	1.5	0.15°	573	144	156
EXSAP-7100R-32	100	96.5	Not recommended				
EXSAP-8125R-40	125	121.5					

● In case of ramping and helical interpolation, apply 80% or less feed (Vf) from standard cutting condition table

● In case of helical interpolation, recommend wet cutting by coolant through the tool

● Calculation of tool pass dia.

$$\phi_{dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool Dia.

● Depth of cut per one circuit should not exceed max. depth of cut Ap

● Down cutting is recommended, tool pass rotation should be counterclockwise

EXTREME SAP

EXSAP/MSX Type

■ Recommended Cutting Conditions

● EXSAP-11 type / Side Milling

Material	Grade	Vc	fz		Tool dia. (mm)							
					16	20	25	32	40	50	63	80
Carbon Steel below 250HB	JC8050 (JC8118)	140 - 180	0.14 - 0.20	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~4	~5	~7.2	~9.8	~14	~24	~30	~36
Cast Steel below 285HB	JC8050 (JC8118)	140 - 180	0.14 - 0.20	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~4	~5	~7.2	~9.8	~14	~24	~30	~36
Tool & Die Steel below 255HB	JC8050 (JC8118)	140 - 180	0.14 - 0.20	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~4	~5	~7.2	~9.8	~14	~24	~30	~36
Mold Steel 30-36HRC	JC8118 (JC8050)	110 - 130	0.10 - 0.18	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~4	~5	~7.2	~9.8	~14	~24	~30	~36
Mold Steel 38-43HRC	JC8118 (JC8050)	90 - 120	0.10 - 0.18	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~3.4	~4	~6	~8	~10	~20	~24	~28
Hardened Die Steel 42-52HRC	JC8118	80 - 100	0.07 - 0.12	ap	~3	~3.5	~4	~4	~4.5	~6	~9	~9
				ap x ae	~1.6	~2	~3.2	~3.6	~4	~8	~9	~10
Grey Cast Iron below 160-260HB	JC8118 (JC8050)	160 - 200	0.14 - 0.20	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~5	~6	~9.8	~12	~16	~28	~34	~40
Nodular Cast Iron below 170-300HB	JC8118 (JC8050)	140 - 180	0.12 - 0.20	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~5	~6	~9.8	~12	~16	~28	~34	~40
Austenitic Stainless Steel	JC8050 (JC7550)	100 - 120	0.10 - 0.18	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~4	~5	~7.2	~9.8	~14	~24	~30	~36
Martensitic Stainless Steel	JC8050 (JC7550)	100 - 140	0.10 - 0.18	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~3.2	~5	~7.2	~9.8	~14	~24	~30	~36
Titanium Alloy	DS150 (JC7550)	50 - 70	0.11 - 0.13	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~3.2	~4	~6	~8	~10	~20	~26	~30
Heat Resistant Alloy	JC7518 (JC8118)	20 - 30	0.08 - 0.10	ap	~5	~5	~6	~6	~7	~8	~9	~9
				ap x ae	~3.2	~4	~6	~8	~10	~20	~26	~30

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.

EXTREME SAP

EXSAP/MSX Type

■ Recommended Cutting Conditions

● EXSAP-11 type / Face Milling

Material	Grade	Vc	fz		Tool dia. (mm)							
					16	20	25	32	40	50	63	80
Carbon Steel below 250HB	JC8050 (JC8118)	130 - 180	0.11 - 0.2	ap	~1	~1.2	~1.2	~1.5	~1.8	~2	~2	~2
				ae	~10	~12	~15	~18	~24	~30	~30	~48
Cast Steel below 285HB	JC8050 (JC8118)	130 - 180	0.11 - 0.2	ap	~1	~1.2	~1.2	~1.5	~1.8	~2	~2	~2
				ae	~10	~12	~15	~18	~24	~30	~30	~48
Tool & Die Steel below 255HB	JC8050 (JC8118)	130 - 180	0.11 - 0.2	ap	~1	~1.2	~1.2	~1.5	~1.8	~2	~2	~2
				ae	~10	~12	~15	~18	~24	~30	~30	~48
Mold Steel 30-36HRC	JC8118 (JC8050)	110 - 130	0.1 - 0.18	ap	~1	~1.2	~1.2	~1.5	~1.8	~2	~2	~2
				ae	~10	~12	~15	~18	~24	~30	~30	~48
Mold Steel 38-43HRC	JC8118 (JC8050)	90 - 120	0.1 - 0.16	ap	~0.8	~1	~1	~1.2	~1.4	~1.8	~1.8	~1.8
				ae	~10	~12	~15	~18	~24	~30	~30	~48
Hardened Die Steel 42-52HRC	JC8118	80 - 100	0.08 - 0.12	ap	~0.4	~0.5	~0.5	~0.6	~0.8	~1	~1	~1
				ae	~8	~8	~10	~12	~16	~20	~25	~32
Grey Cast Iron below 160-260HB	JC8118 (JC8050)	160 - 200	0.11 - 0.2	ap	~1	~1.2	~1.2	~1.5	~1.8	~2	~2	~2
				ae	~10	~12	~15	~18	~24	~30	~30	~48
Nodular Cast Iron below 170-300HB	JC8118 (JC8050)	130 - 180	0.11 - 0.2	ap	~1	~1.2	~1.2	~1.5	~1.8	~2	~2	~2
				ae	~10	~12	~15	~18	~24	~30	~30	~48
Austenitic Stainless Steel	JC8050 (JC7550)	100 - 120	0.11 - 0.18	ap	~1	~1.2	~1.2	~1.5	~1.8	~2	~2	~2
				ae	~6	~8	~10	~12	~16	~20	~25	~32
Martensitic Stainless Steel	JC8050 (JC7550)	100 - 150	0.11 - 0.18	ap	~1	~1.2	~1.2	~1.5	~1.8	~2	~2	~2
				ae	~10	~12	~15	~18	~24	~30	~30	~48
Titanium Alloy	DS150 (JC7550)	50 - 70	0.08 - 0.12	ap	~0.8	~1	~1	~0.8	~1.4	~1.8	~1.8	~1.8
				ae	~6	~8	~10	~12	~16	~20	~25	~32
Heat Resistant Alloy	JC7518 (JC8118)	20 - 30	0.06 - 0.11	ap	~0.8	~1	~1	~0.8	~1.4	~1.8	~1.8	~1.8
				ae	~6	~8	~10	~12	~16	~20	~25	~32

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.
5. When using for slot milling, apply 50% or less feed (Vf) from standard cutting condition.

EXTREME SAP

EXSAP/MSX Type

■ Recommended Cutting Conditions

● EXSAP-17 type / Side Milling

Material	Grade	Vc	fz		Tool dia. (mm)							
					25	32	40	50	63	80	100	125
Carbon Steel below 250HB	JC8050	150 - 200	0.2 - 0.35	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Cast Steel below 285HB	JC8050	130 - 180	0.2 - 0.35	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Tool & Die Steel below 255HB	JC8050	150 - 200	0.2 - 0.35	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Mold Steel 30-36HRC	JC8118	110 - 150	0.2 - 0.35	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Mold Steel 38-43HRC	JC8118	90 - 120	0.15 - 0.25	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~12	~18	~20	~30	~30	~30	~30	~30
Hardened Die Steel 42-52HRC	JC8118	80 - 100	0.1 - 0.2	ap	~10	~12	~12	~15	~15	~15	~15	~15
				ap x ae	~7	~8	~12	~18	~25	~25	~25	~25
Grey Cast Iron below 160-260HB	JC8118	200 - 250	0.2 - 0.35	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Nodular Cast Iron below 170-300HB	JC8118	110 - 150	0.15 - 0.3	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Austenitic Stainless Steel	JC8050 (JC7550)	100 - 120	0.1 - 0.2	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Martensitic Stainless Steel	JC8118	130 - 180	0.15 - 0.3	ap	~10	~12	~15	~15	~15	~15	~15	~15
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.

EXTREME SAP

EXSAP/MSX Type

■ Recommended Cutting Conditions

● EXSAP-17 type / Face Milling

Material	Grade	Vc	fz		Tool dia. (mm)							
					25	32	40	50	63	80	100	125
Carbon Steel below 250HB	JC8050	110 - 150	0.20 - 0.30	ap	~3	~3.5	~3.5	~4	~4	~4	~4	~4
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Cast Steel below 285HB	JC8050	110 - 150	0.20 - 0.30	ap	~3	~3.5	~3.5	~4	~4	~4	~4	~4
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Tool & Die Steel below 255HB	JC8050	110 - 150	0.15 - 0.25	ap	~3	~3.5	~3.5	~4	~4	~4	~4	~4
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Mold Steel 30-36HRC	JC8118	110 - 130	0.15 - 0.25	ap	~3	~3.5	~3.5	~4	~4	~4	~4	~4
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Mold Steel 38-43HRC	JC8118	90 - 110	0.15 - 0.25	ap	~2	~2.5	~2.5	~3	~3	~3	~4	~4
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Hardened Die Steel 42-52HRC	JC8118	70 - 90	0.10 - 0.20	ap	~1	~2	~2	~2.5	~2.5	~2.5	~4	~4
				ae	~20	~25	~32	~40	~55	~65	~80	~100
Grey Cast Iron below 160-260HB	JC8118	130 - 180	0.20 - 0.30	ap	~5	~5.5	~5.5	~6	~6	~6	~4	~4
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Nodular Cast Iron below 170-300HB	JC8118	110 - 130	0.15 - 0.25	ap	~3	~3.5	~3.5	~4	~4	~4	~4	~4
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Austenitic Stainless Steel	JC8050 (JC7550)	90 - 110	0.10 - 0.20	ap	~3	~3.5	~3.5	~4	~4	~4	~4	~4
				ae	~20	~25	~32	~40	~55	~65	~80	~100
Martensitic Stainless Steel	JC8118	110 - 150	0.15 - 0.25	ap	~3	~3.5	~3.5	~4	~4	~4	~4	~4
				ae	~25	~32	~40	~50	~63	~80	~100	~125

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.
5. When using for slot milling, apply 50% or less feed (Vf) from standard cutting condition.

SHOULDER SIX

EXSIX Type

Double sided insert with 6 cutting edge

SHOULDER SIX

Unique 3D insert

Due to arch-geometry on the peripheral cutting edge, cusp height can be smaller even in case of large ap.

Achieves low cutting force

Achieves high efficient & high precision machining for side walls.

**Features**

This tool can accommodate an array of applications such as face milling, slotting and plunging. The unique 3D design of the insert has 6 positive axial cutting edges which decreases tool pressure.

Double - sided insert with 6 cutting edge.

The robust insert is 7.5mm in thickness allowing for stable machining and longer tool life.



ISO	P					M					K				H		
	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30	H01	H10	H20
Range			JC8118					JC8118				JC8118				JC8118	
				JC8050				JC8050									

SHOULDER SIX

EXSIX Type

EXSIX
TYPE

Bore Type

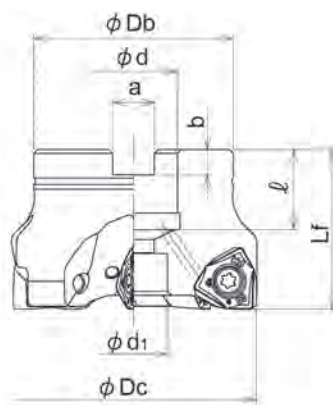


Fig.1
(Through coolant hole)

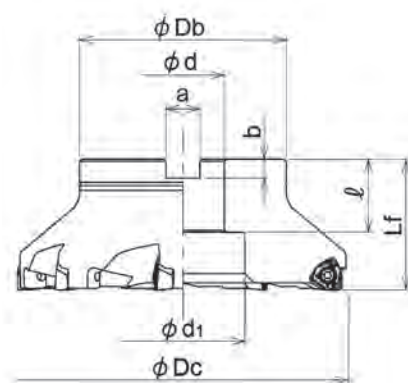


Fig.2
(No coolant hole)

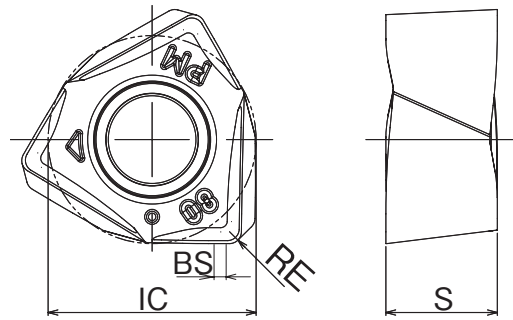
Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Inserts	Fig.
			ϕDc	L_f	ϕDb	ϕd	ϕd_1	a	b	ℓ				
EXSIX-4050R-22	●	4	50	40	47	22	14	10.4	6.3	20	M10X1.5X25★	0.33	YCMU0907**ZER-PM	1
EXSIX-4052R-22	●		52								M10X1.5X25★	0.35		
EXSIX-5063R-22	●	5	63	50	50	22	17	10.4	6.3	20	M10	0.50		1
EXSIX-5066R-22	●		66								M10	0.53		
EXSIX-6080R-27	●	6	80	50	56	27	20	12.4	7	22	M12X1.75X30★	0.93		2
EXSIX-7100R-32	●	7	100		85	32	26	14.4	8	25	M16X2X30★	1.88		
EXSIX-8125R-40	●	8	125	63	100	40	32	16.4	9	32	M20X2.5X40★	3.62		
EXSIX-9160R-40	●	9	160				60			35	M20	4.67		

Screw	Torque(N.m)	Wrench
CSW-513H	5.5	A-20

SHOULDER SIX

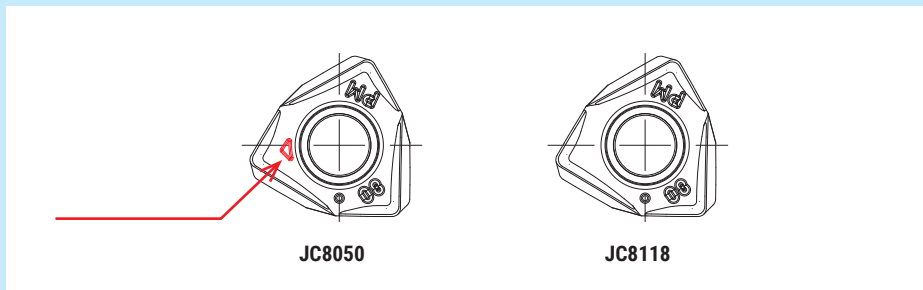
EXSIX Type

Insert



Cat.No.	Tolerance	PVD Coating		Dimensions (mm)			
		JC8050	JC8118	RE	BS	IC	S
YCMU090708ZER-PM	M	●	●	0.8	1.41	14	7.5
YCMU090716ZER-PM		●	●	1.6	0.62		

GRADE MARKING



SHOULDER SIX

EXSIX Type

■ Recommended Cutting Conditions

Material	Grade	Shoulder Milling				Face Milling				Plunge Milling			
		Vc	fz	ap	ap x ae	Vc	fz	ap	ae	Vc	fz	ap	Pf
Carbon Steel below 250HB	JC8050	160 - 200	0.20 - 0.35	~9.0	~45	110 - 150	0.20 - 0.30	~4.0	~1.0Dc	180	0.25	~5	~0.5Dc
Cast Steel below 285HB	JC8050	140 - 180	0.20 - 0.35	~9.0	~45	110 - 150	0.20 - 0.30	~4.0	~1.0Dc	160	0.25	~5	~0.5Dc
Tool & Die Steel below 255HB	JC8050	160 - 200	0.20 - 0.35	~9.0	~45	110 - 150	0.15 - 0.25	~4.0	~1.0Dc	180	0.20	~5	~0.5Dc
Mold Steel 30-36HRC	JC8118	120 - 150	0.20 - 0.35	~9.0	~45	110 - 130	0.15 - 0.25	~4.0	~1.0Dc	130	0.20	~5	~0.5Dc
Mold Steel 38-43HRC	JC8118	90 - 120	0.15 - 0.25	~9.0	~30	90 - 110	0.10 - 0.25	~3.0	~1.0Dc	100	0.20	~5	~0.5Dc
Hardened Die Steel 42-52HRC	JC8118	80 - 100	0.10 - 0.20	~9.0	~25	70 - 90	0.10 - 0.20	~2.5	~0.8Dc	90	0.10	~5	~0.5Dc
Grey Cast Iron below 160-260HB	JC8118	210 - 250	0.20 - 0.35	~9.0	~45	130 - 180	0.20 - 0.30	~6.0	~1.0Dc	200	0.30	~5	~0.5Dc
Nodular Cast Iron below 170-300HB	JC8118	110 - 150	0.15 - 0.30	~9.0	~45	110 - 130	0.15 - 0.25	~4.0	~1.0Dc	130	0.20	~5	~0.5Dc
Austenitic Stainless Steel	JC8050	100 - 120	0.10 - 0.20	~9.0	~45	90 - 110	0.10 - 0.20	~4.0	~0.8Dc	110	0.15	~5	~0.5Dc
Martensitic Stainless Steel	JC8118	140 - 180	0.15 - 0.30	~9.0	~45	110 - 150	0.15 - 0.25	~4.0	~1.0Dc	160	0.20	~5	~0.5Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use air blow.
5. When using for slot milling, apply 50% or less feed (Vf) from standard cutting condition.
6. Ramping and helical interpolation are not recommended.

SIC-EVO

SSV Type

進化した。SIC-EVO



Capable of ramping & helical interpolation

Feature 1

Max. depth of cut (ap) = 15mm is possible.

Usable for a wide range of applications such as face milling, slotting, pocket milling & side milling.

Arc geometry on peripheral cutting edge

Cusp height can be smaller even in case of large ap. achieves high efficient & high precision machining for vertical walls.



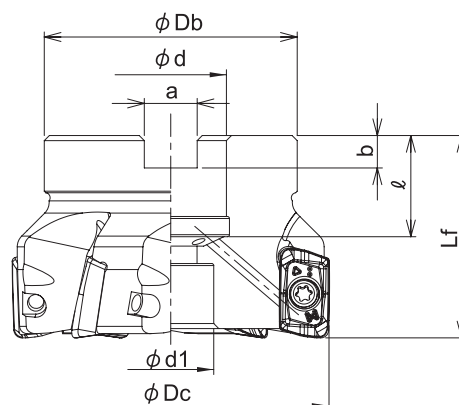
High positive geometry with low cutting force

Feature 2

Available corner radius: R0.4, R0.8, R1.6, R2.0 & R3.0

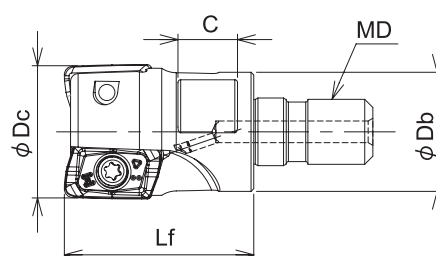
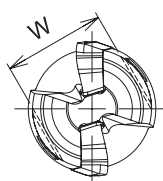
Insert grades

ISO	P					M					K				H		
	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30	H01	H10	H20
Range	JC8118					JC8118					JC8118				JC8118		
	JC8050					JC8050											

SIC-EVO**SSV Type****SSV
TYPE****Bore Type**Through
coolant
hole

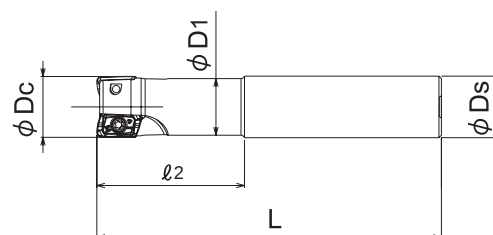
Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Insert
			φDc	Lf	φDb	φd	φd1	a	b	ℓ			
SSV-4040R-16	●	4	40	40	35	16	14	8.4	5.6	18	M8	0.20	ZOMT1605**ZER-PM ZOET1605**ZFR-NL
SSV-5050R-22	●	5	50		47	22	17	10.4	6.3	20	M10	0.33	
SSV-6063R-22	●	6	63		50						M10	0.52	
SSV-6063R-27	●			50	60	27	20	12.4	7	22	M12X1.75X30★	0.75	
SSV-7080R-27	●	7	80								M12X1.75X30	1.08	
SSV-8100R-32	●	8	100								85	32	
SSV-8125R-40	●		125	63	100	40	32	16.4	9	32	M20X2.5X40★	3.73	

Screw	Torque(N.m)	Wrench
DSW-4075H	3.6	A-15T

SIC-EVO**SSV Type****SSV
TYPE****Modular Type**Through
coolant
hole

Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert
			φ^{D_c}	Lf	φ^{D_b}	MD	C	W	
SSV-2025-M12	●	2	25	35	22	M12	11	19	ZOMT1605**ZER-PM ZOET1605**ZFR-NL
SSV-2028-M12	○		28						
SSV-3030-M16	○	3	30	43	29	M16	12	22	
SSV-3032-M16	●		32						
SSV-3035-M16	●		35						
SSV-4040-M16	●	4	40						

Screw	Torque(N.m)	Wrench
DSW-4075H	3.6	A-15

SIC-EVO**SSV Type****SSV
TYPE****Shank Type**

Cat.No.	Stock	No. of inserts	Dimensions (mm)					Insert
			φDc	ℓ2	L	φD1	φDs	
SSV-2025-60-S25+A	●	2	25	60	140	23	25	ZOMT1605**ZER-PM ZOET1605**ZFR-NL
SSV-2025-100-S25+A	●			100	180			
SSV-3032-70-S32+A	●	3	32	70	150	29	32	
SSV-3032-120-S32+A	●			120	200			
SSV-4040-50-S32+A	●	4	40	50	150	37		
SSV-4040-50L-S32+A	●			200				

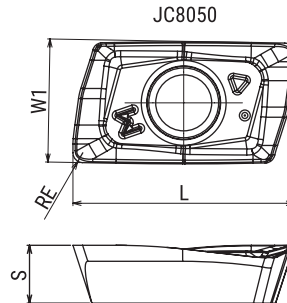
Screw	Torque(N.m)	Wrench
DSW-4075H	3.6	A-15

SIC-EVO

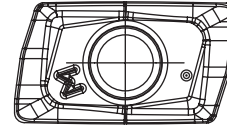
SSV Type

Insert

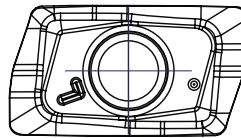
For Steel



JC8118



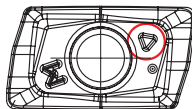
For Aluminum alloy



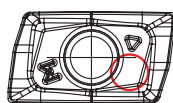
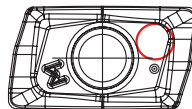
Cat.No.	Tolerance	PVD Coating		Uncoated	Dimensions (mm)			
		JC8050	JC8118	FC18	RE	L	W1	S
ZOMT160504ZER-PM	M	●	●		0.4	18	10	4.7
ZOMT160508ZER-PM		●	●		0.8			
ZOMT160516ZER-PM		●	●		1.6			
ZOMT160520ZER-PM		●	●		2			
ZOMT160530ZER-PM		●	●		3			
ZOET160504ZFR-NL	E			●	0.4	18	10	4.7
ZOET160508ZFR-NL				●	0.8			

GRADE MARKINGS

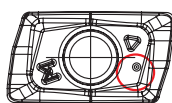
JC8050



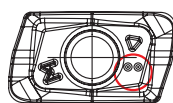
JC8118



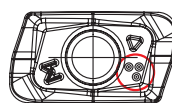
ZOMT160504ZER-PM



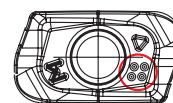
ZOMT160508ZER-PM



ZOMT160516ZER-PM



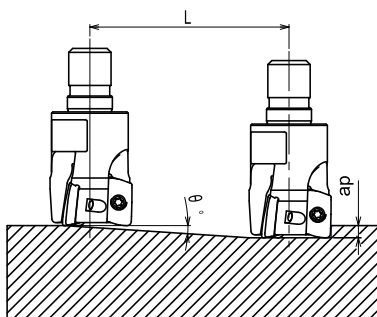
ZOMT160520ZER-PM



ZOMT160530ZER-PM

Recommended Data for Profile Milling

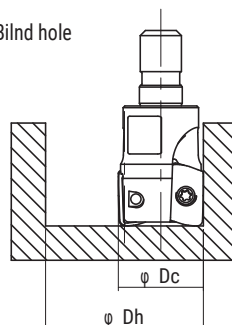
Ramping



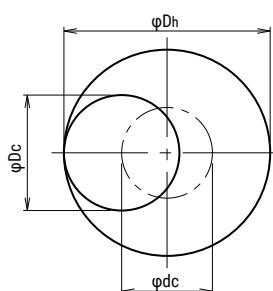
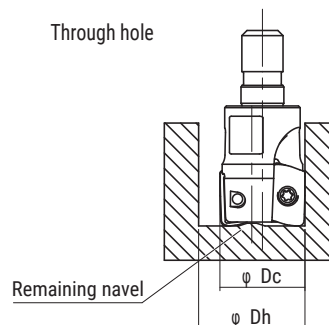
- In case of ramping and helical interpolation, apply 80% or less feed (Vf) from standard cutting condition table
- In case of drilling, apply 50% or less feed (Vf) from standard cutting condition table
- In case of helical interpolation, recommend wet cutting by coolant through the tool
- Long chips may come out in case of drilling, confirm safe operating conditions

Helical interpolation

Blind hole



Through hole



- Calculation of tool pass dia.

$$\phi_{Dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool Dia.

- Depth of cut per one circuit should not exceed max. depth of cut Ap
- Down cutting is recommended, tool pass rotation should be counterclockwise

ZOMT160504ZER-PM

Cat.No.	Tool dia. (mm)	Effective cutting dia. (mm)	Max.depth of cut: ap (mm)	Ramping		Helical interpolation			Max. drilling depth: Z
				Max. ramping angle θ	Max. depth of cut (ap) Total cutting length L(mm)	Through hole Min. Bore dia. (mm)	Blind hole Min. Bore dia. (mm)	Blind hole Max. Bore dia. (mm)	
SSV-2025-**	25	23.9	1.5	6.2	13.8	31	48	48.8	1.6
SSV-2028-M12	28	26.9	1.5	5.3	16.2	37	54	54.8	1.6
SSV-3030-**	30	28.9	1.5	4.8	17.9	41	58	58.8	1.6
SSV-3032-**	32	30.9	1.5	4.4	19.5	45	62	62.8	1.6
SSV-3035-M16	35	33.9	1.5	4.3	19.9	51	68	68.8	1.6
SSV-4040-**	40	38.9	1.5	3.6	23.8	61	78	78.8	1.6
SSV-5050R-**	50	48.9	1.5	2.4	35.8	81	98	98.8	1.4
SSV-6063R-**	63	61.9	1.5	1.7	50.5	107	124	124.8	1.4
SSV-7080R-**	80	78.9	1.5	1.2	71.6	141	158	158.8	1.4
SSV-8100R-**	100	98.9	1.5	0.9	95.5	181	198	198.8	1.4
SSV-8125R-**	125	123.9	1.5	0.65	132.2	231	248	248.8	1.4

ZOMT160508ZER-PM

Cat.No.	Tool dia. (mm)	Effective cutting dia. (mm)	Max.depth of cut: ap (mm)	Ramping		Helical interpolation			Max. drilling depth: Z
				Max. ramping angle θ	Max. depth of cut (ap) Total cutting length L(mm)	Through hole Min. Bore dia. (mm)	Blind hole Min. Bore dia. (mm)	Blind hole Max. Bore dia. (mm)	
SSV-2025-**	25	23.1	1.5	6.4	13.4	31	47.2	48	1.6
SSV-2028-M12	28	26.1	1.5	5.4	15.9	37	53.2	54	1.6
SSV-3030-**	30	28.1	1.5	4.8	17.9	41	57.2	58	1.6
SSV-3032-**	32	30.1	1.5	4.4	19.5	45	61.2	62	1.6
SSV-3035-M16	35	33.1	1.5	4.3	19.9	51	67.2	68	1.6
SSV-4040-**	40	38.1	1.5	3.6	23.8	61	77.2	78	1.6
SSV-5050R-**	50	48.1	1.5	2.4	35.8	81	97.2	98	1.4
SSV-6063R-**	63	61.1	1.5	1.7	50.5	107	123.2	124	1.4
SSV-7080R-**	80	78.1	1.5	1.2	71.6	141	157.2	158	1.4
SSV-8100R-**	100	98.1	1.5	0.9	95.5	181	197.2	198	1.4
SSV-8125R-**	125	123.1	1.5	0.65	132.2	231	247.2	248	1.4

SIC-EVO

SSV Type

ZOMT160516ZER-PM

Cat.No.	Tool dia. (mm)	Effective cutting dia. (mm)	Max.depth of cut: ap (mm)	Ramping		Helical interpolation			Max. drilling depth: Z
				Max. ramping angle θ	Max. depth of cut (ap) Total cutting length L(mm)	Through hole Min. Bore dia. (mm)	Blind hole Min. Bore dia. (mm)	Blind hole Max. Bore dia. (mm)	
SSV-2025-**-	25	21.5	1.5	6.7	12.8	31	45.8	46.4	1.5
SSV-2028-M12	28	24.5	1.5	5.6	15.3	37	51.8	52.4	1.5
SSV-3030-**-	30	26.5	1.5	5	17.1	41	55.8	56.4	1.5
SSV-3032-**-	32	28.5	1.5	4.7	18.2	45	59.8	60.4	1.5
SSV-3035-M16	35	31.5	1.5	4.6	18.6	51	65.8	66.4	1.5
SSV-4040-**-	40	36.5	1.5	3.8	22.6	61	75.8	76.4	1.5
SSV-5050R-**-	50	46.5	1.5	2.5	34.4	81	95.8	96.4	1.4
SSV-6063R-**-	63	59.5	1.5	1.8	47.7	107	121.8	122.4	1.4
SSV-7080R-**-	80	76.5	1.5	1.2	71.6	141	155.8	156.4	1.4
SSV-8100R-**-	100	96.5	1.5	0.9	95.5	181	195.8	196.4	1.4
SSV-8125R-**-	125	121.5	1.5	0.65	132.2	231	245.8	246.4	1.4

ZOMT160520ZER-PM

Cat.No.	Tool dia. (mm)	Effective cutting dia. (mm)	Max.depth of cut: ap (mm)	Ramping		Helical interpolation			Max. drilling depth: Z
				Max. ramping angle θ	Max. depth of cut (ap) Total cutting length L(mm)	Through hole Min. Bore dia. (mm)	Blind hole Min. Bore dia. (mm)	Blind hole Max. Bore dia. (mm)	
SSV-2025-**-	25	20.7	1.5	6.9	12.4	31	45	45.6	1.5
SSV-2028-M12	28	23.7	1.5	5.7	15.0	37	51	51.6	1.5
SSV-3030-**-	30	25.7	1.5	5	17.1	41	55	55.6	1.5
SSV-3032-**-	32	27.7	1.5	4.7	18.2	45	59	59.6	1.5
SSV-3035-M16	35	30.7	1.5	4.6	18.6	51	65	65.6	1.5
SSV-4040-**-	40	35.7	1.5	3.8	22.6	61	75	75.6	1.5
SSV-5050R-**-	50	45.7	1.5	2.5	34.4	81	95	95.6	1.4
SSV-6063R-**-	63	58.7	1.5	1.8	47.7	107	121	121.6	1.4
SSV-7080R-**-	80	75.7	1.5	1.2	71.6	141	155	155.6	1.4
SSV-8100R-**-	100	95.7	1.5	0.9	95.5	181	195	195.6	1.4
SSV-8125R-**-	125	120.7	1.5	0.65	132.2	231	245	245.6	1.4

ZOMT160530ZER-PM

Cat.No.	Tool dia. (mm)	Effective cutting dia. (mm)	Max.depth of cut: ap (mm)	Ramping		Helical interpolation			Max. drilling depth: Z
				Max. ramping angle θ	Max. depth of cut (ap) Total cutting length L(mm)	Through hole Min. Bore dia. (mm)	Blind hole Min. Bore dia. (mm)	Blind hole Max. Bore dia. (mm)	
SSV-2025-**-	25	18.7	1.5	7.2	11.9	31	43	43.6	1.5
SSV-2028-M12	28	21.7	1.5	6	14.3	37	49	49.6	1.5
SSV-3030-**-	30	23.7	1.5	5.3	16.2	41	53	53.6	1.5
SSV-3032-**-	32	25.7	1.5	4.8	17.9	45	57	57.6	1.5
SSV-3035-M16	35	28.7	1.5	4.7	18.2	51	63	63.6	1.5
SSV-4040-**-	40	33.7	1.5	3.9	22.0	61	73	73.6	1.5
SSV-5050R-**-	50	43.7	1.5	2.5	34.4	81	93	93.6	1.4
SSV-6063R-**-	63	56.7	1.5	1.8	47.7	107	119	119.6	1.4
SSV-7080R-**-	80	73.7	1.5	1.3	66.1	141	153	153.6	1.4
SSV-8100R-**-	100	93.7	1.5	0.95	90.5	181	193	193.6	1.4
SSV-8125R-**-	125	118.7	1.5	0.65	132.2	231	243	243.6	1.4

SIC-EVO

SSV Type

■ Recommended Cutting Conditions - Shoulder Milling -

Material	Grade	Vc	fz		Tool dia. (mm)							
					25	32	40	50	63	80	100	125
Carbon Steel below 250HB	JC8050	160 - 200	0.20 - 0.35	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Cast Steel below 285HB	JC8050	140 - 180	0.20 - 0.30	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Tool & Die Steel below 255HB	JC8050	160 - 200	0.20 - 0.35	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Mold Steel 30-36HRC	JC8118	120 - 150	0.20 - 0.35	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Mold Steel 38-43HRC	JC8118	90 - 120	0.15 - 0.25	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~12	~18	~20	~30	~30	~45	~45	~45
Hardened Die Steel 42-52HRC	JC8118	80 - 100	0.10 - 0.20	ap	~10.0	~12.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~8	~12	~12	~18	~25	~45	~45	~45
Grey Cast Iron below 160-260HB	JC8118	210 - 250	0.20 - 0.35	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Nodular Cast Iron below 170-300HB	JC8118	110 - 150	0.15 - 0.30	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Austenitic Stainless Steel	JC8050	100 - 120	0.10 - 0.20	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Martensitic Stainless Steel	JC8118	140 - 180	0.15 - 0.30	ap	~10.0	~12.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~15	~24	~30	~40	~45	~45	~45	~45
Aluminium	FC18	700 - 900	0.07 - 0.20	ap	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0	~15.0
				ap x ae	~75	~75	~75	~75	~75	~75	~75	~75

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use airflow. (For Aluminium machining Wet cutting is recommended.)

SIC-EVO

SSV Type

■ Recommended Cutting Conditions - Face Milling -

Material	Grade	Vc	fz		Tool dia. (mm)							
					25	32	40	50	63	80	100	125
Carbon Steel below 250HB	JC8050	110 - 150	0.20 - 0.35	ap	~3.0	~3.5	~3.5	~4.0	~4.0	~4.0	~4.0	~4.0
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Cast Steel below 285HB	JC8050	110 - 150	0.20 - 0.35	ap	~3.0	~3.5	~3.5	~4.0	~4.0	~4.0	~4.0	~4.0
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Tool & Die Steel below 255HB	JC8050	110 - 150	0.15 - 0.30	ap	~3.0	~3.5	~3.5	~4.0	~4.0	~4.0	~4.0	~4.0
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Mold Steel 30-36HRC	JC8118	110 - 130	0.15 - 0.30	ap	~3.0	~3.5	~3.5	~4.0	~4.0	~4.0	~4.0	~4.0
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Mold Steel 38-43HRC	JC8118	90 - 110	0.15 - 0.25	ap	~2.0	~2.5	~2.5	~3.0	~3.0	~3.0	~3.0	~3.0
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Hardened Die Steel 42-52HRC	JC8118	70 - 90	0.10 - 0.20	ap	~1.5	~2.0	~2.0	~2.5	~2.5	~2.5	~2.5	~2.5
				ae	~20	~26	~32	~40	~55	~65	~80	~100
Grey Cast Iron below 160-260HB	JC8118	130 - 200	0.20 - 0.35	ap	~5.0	~5.5	~5.5	~6.0	~6.0	~6.0	~6.0	~6.0
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Nodular Cast Iron below 170-300HB	JC8118	110 - 130	0.15 - 0.30	ap	~3.0	~3.5	~3.5	~4.0	~4.0	~4.0	~4.0	~4.0
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Austenitic Stainless Steel	JC8050	90 - 110	0.10 - 0.20	ap	~3.0	~3.5	~3.5	~4.0	~4.0	~4.0	~4.0	~4.0
				ae	~20	~26	~32	~40	~55	~65	~80	~100
Martensitic Stainless Steel	JC8118	110 - 150	0.15 - 0.30	ap	~3.0	~3.5	~3.5	~4.0	~4.0	~4.0	~4.0	~4.0
				ae	~25	~32	~40	~50	~63	~80	~100	~125
Aluminium	FC18	700 - 900	0.07 - 0.20	ap	~7.0	~7.0	~7.0	~7.0	~7.0	~7.0	~7.0	~7.0
				ae	~18	~22	~28	~35	~44	~56	~70	~87

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or rpm and keep feed per tooth.
3. ap should be reduced when using on low rigidity machine.
4. Use airflow. (For Aluminium machining Wet cutting is recommended.)

MIRROR BALL

BNM Type

BNM
TYPE

Shank Type

High Precision Indexable Ball Nose End Mill



- Insert radius from accuracy is **below ± 0.010 mm** when fixed to the holder.
(accuracy **below ± 0.006 mm** in insert alone).

Cat.No.	Stock	Dimensions (mm)									Parts		Inserts	Fig				
		φDc	R	ℓ1	ℓ2	L	φD1	θ	θk	φDs	Screws	Wrench						
BNMS-060017S-S06C	●	6	3	—	17	60	5.5	—	—	6	FSW-2005H	A-06	BNM-060	1				
BNMS-060030T-S10C	●			15	30	80		6°	4°14'	10				2				
BNMM-060035S-S06C	●				35	92				6				1				
BNML-060017S-S06C	●				17	120									2			
BNMS-080025S-S08C	●	8	4	—	25	90	7.5	—	—	8	FSW-2506H	A-07	BNM-080 RNM-080	1				
BNMM-080035S-S08C	●				35	92												
BNML-080075S-S08C	●				75	140												
BNML-080095S-S08C	●				95	160												
BNML-080075T-S12C	●			20	75	132		2°	1°37'	12				2				
BNMS-100030S-S10C	●	10	5	—	30	100	9.5	—	—	10	FSW-3007H	A-08	BNM-100 RNM-100	1				
BNMM-100043S-S10C	●				43													
BNML-100075S-S10C	●				75										140			
BNML-100080S-S10C	●				80										220			
BNML-100095S-S10C	●				95										160			
BNML-100140S-S10C	●				140										220			
BNML-100075T-S12C	●			32.1	75	132		1°30'	0°49'						2			
BNMS-120028S-S12C	●	12	6	—	28	84	11.5	—	—	12	FSW-3509H	A-10	BNM-120 RNM-120	1				
BNMM-120053S-S12C	●				53	110												
BNML-120095S-S12C	●				95	160												
BNML-120100S-S12C	●				100	220												
BNML-120085T-S16C	●			33.8	85	145		2°	1°27'	16				2				
BNML-120130S-S12C	●			—	130	200		—	—	12				1				
BNML-120150S-S12C	●				150	220												
BNMS-160033S-S16C	●	16	8	—	33	93	15	4°	2°5'	20	FSW-4013H	A-15	BNM-160 RNM-160	2				
BNMM-160063T-S20C	●				37.5	63									123			
BNML-160070S-S16C	●				70	140									—	—	16	1
BNML-160090S-S16C	●					90												
BNML-160100S-S16C	●			44.5	100	220		2°	1°15'	20				2				
BNML-160100T-S20C	●				166													
BNML-160110S-S16C	●			—	110	180		—	—	16				1				
BNML-160150S-S16C	●				150	220												
BNMS-200039S-S20C	●				39	105									19	—	—	20
BNMM-200075S-S20C	●	75	141															

MIRROR BALL

BNM Type

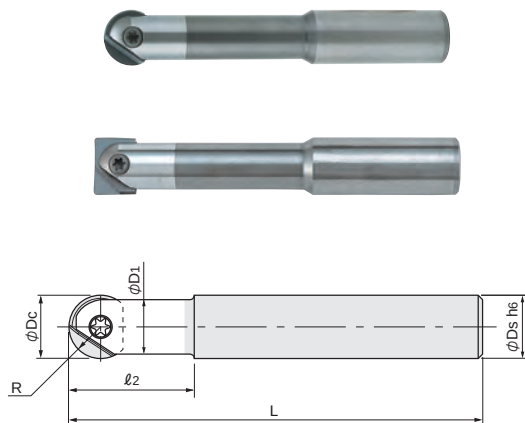


Fig 1

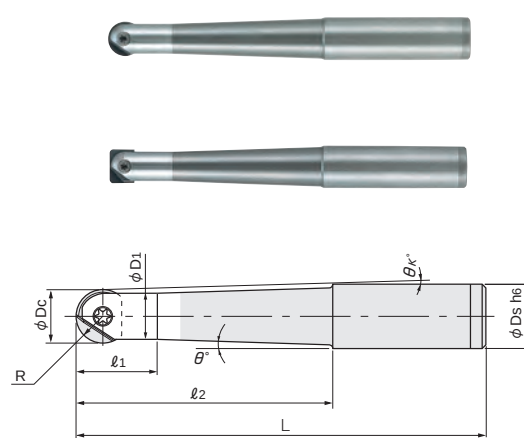


Fig 2

Cat.No.	Stock	Dimensions (mm)								Parts		Inserts	Fig.		
		φDc	R	ℓ1	ℓ2	L	φD1	θ	θk	φDs	Screws			Wrench	
BNML-200100S-S20C	●	20	10	—	100	220	19	—	—	20	FSW-5016H	A-20W	BNM-200 RNM-200	1	
BNML-200105S-S20C	●			105	180	2°		1°22'	25	20				2	
BNML-200115T-S25C	●			64.3	115										191
BNML-200125S-S20C	●			125	200										
BNML-200170S-S20C	●			170	250										
BNML-200220S-S20C	●			220	300										
BNMM-250090S-S25C	●	25	12.5	—	90	166	24	—	—	25	FSW-6020	A-30	BNM-250 RNM-250	1	
BNML-250100S-S25C	●				100	220									
BNML-250140S-S25C	●				140	220									
BNML-250170S-S25C	●				170	250									
BNMM-300120S-S32C	●	30	15		120	200	29			32	FSW-8025S	A-30	BNM-300/320 RNM-300		
BNML-300100S-S32C	●				100	220									
BNML-300140S-S32C	●			140	220										
BNML-300170S-S32C	●			170	250										
BNML-300220S-S32C	●			220	300										

Screw	Torque(N.m)
FSW-2005H	0.5
FSW-2506H	0.9
FSW-3007H	1.2
FSW-3509H	2.0
FSW-4013H	3.0
FSW-5016H	4.0
FSW-6020	6.0
FSW-8025S	6.0

MIRROR BALL

BNM Type

MBX
TYPE

Modular Type

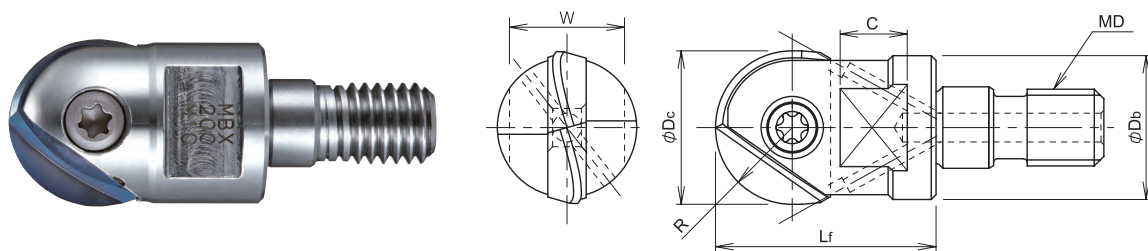
Through
coolant
hole

Slotting

Copy Milling

Pocket Milling

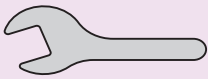
- Insert radius from accuracy is **below ± 0.010 mm** when fixed to the holder (accuracy **below ± 0.006 mm** in insert alone).
- O.D. runout is below 0.015 mm when fixed to MSN carbide shank holder.



Cat.No.	Stock	Dimensions (mm)							Parts		Inserts
		φDc	R	Lf	φDb	MD	C	W	Screws	Wrench	
MBX-100-M6	●	10	5	18	9.7	M6	6.5	8	FSW-3007H	A-08	BNM-100
MBX-120-M6	●	12	6	20	11.5	M6			FSW-3509H	A-10	BNM-120
MBX-160-M8	●	16	8	23	15	M8	8	12	FSW-4013H	A-15	BNM-160
MBX-200-M10	●	20	10	30	19	M10		14	FSW-5016H	A-20W	BNM-200
MBX-250-M12	●	25	12.5	35	24	M12	10	17	FSW-6020	A-30	BNM-250
MBX-300-M16	●	30	15	43	29	M16	12.5	22	FSW-8025S	A-30	BNM-300/320

Screw	Torque(N.m)
FSW-3007H	1.2
FSW-3509H	2.0
FSW-4013H	3.0
FSW-5016H	4.0
FSW-6020	6.0
FSW-8025S	6.0

■ Spanner

	Cat.No.	MD	Torque	width across flat	Thickness	Length
	DS-08	M6	8.0 N.m	8	4	85
	DS-12	M8	16 N.m	12	4	93

MIRROR BALL

BNM Type

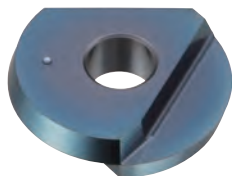
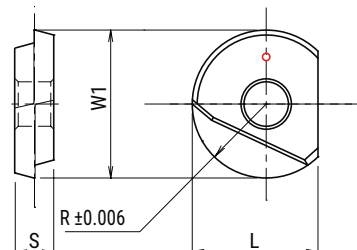
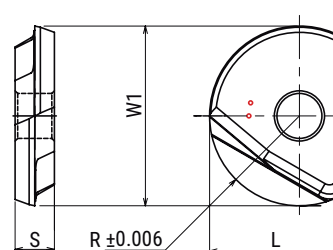
BNM
TYPE

Neutral style geometry

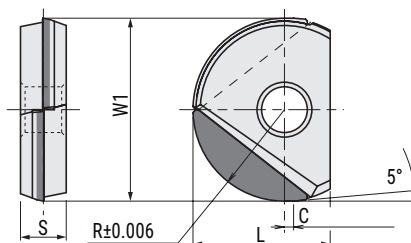
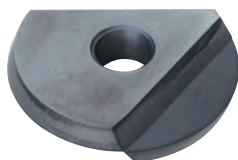
strictly for finishing applications

Radius accuracy
 ± 0.006 mm

● DH111, JC10000, KT9

 $W1 \leq 10$  $W1 \geq 12$ 

● CBN



Cat.No.	PVD Coating	CBN	Diamond Coating	Uncoated	Dimensions(mm)				
	DH111	JBN245	JC10000	KT9	R	W1	L	C	S
BNM-060	●		○	●	3	6	5	-	2
BNM-080	●		○	●	4	8	7	-	2.4
BNM-100	●		○	●	5	10	8.5	-	2.6
BNM-120	●		○	●	6	12	10	-	3
BNM-160	●	○	○	●	8	16	12	0.8	4
BNM-200	●	○	○	●	10	20	15	1	5
BNM-250	●	○		○	12.5	25	18.5	1	6
BNM-300	○	○		○	15	30	22.5	1	7
BNM-320	●			○	16	32	23.5	-	7

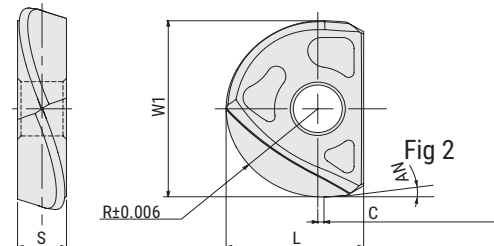
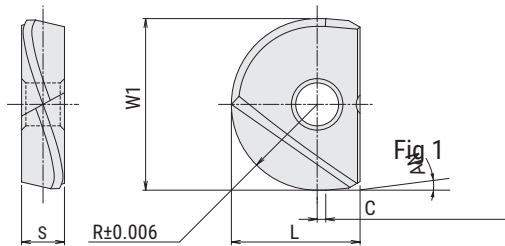
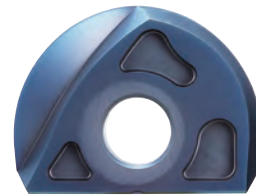
MIRROR BALL

BNM Type

Radius accuracy
 ± 0.006 mm**BNM-SS**
TYPE

Sharp Helical geometry

good for finishing and semi finishing general steel , mold steel & stainless steel

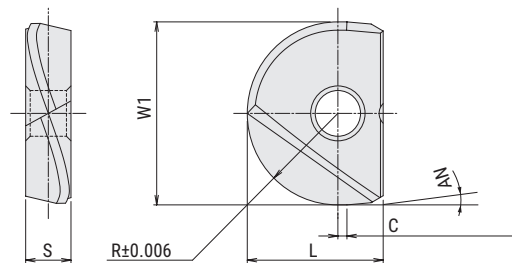


Cat.No.	PVD Coating		Dimensions(mm)						Fig.
	DH108	DS108	R	L	W1	S	C	AN	
BNM-060-SS	●	●	3	5	6	2	—	10°	1
BNM-080-SS	●	●	4	7	8	2.4	0.5	5°	
BNM-100-SS	●	●	5	8.5	10	2.6	1		
BNM-120-SS	●	●	6	10	12	3			
BNM-160-SS	●	●	8	12	16	4			
BNM-200-SS	●	●	10	15	20	5			
BNM-250-SS	●	●	12.5	18.5	25	6			2
BNM-300-SS	○	○	15	22.5	30	7			
BNM-320-SS	●	●	16	23.5	32				

Radius accuracy
 ± 0.006 mm**BNM-S**
TYPE

Sharp Helical geometry

good for semi-finishing & finishing non-ferrous metals such as aluminium, copper



Cat.No.	Uncoated	DLC Coating	Dimensions (mm)					
	FZ05	JC20003	R	L	W1	S	C	AN
BNM-060-S	●	○	3	5	6	2	—	10°
BNM-080-S	●	○	4	7	8	2.4	0.5	5°
BNM-100-S	●	○	5	8.5	10	2.6	1	
BNM-120-S	●	○	6	10	12	3		
BNM-160-S	●	○	8	12	16	4		
BNM-200-S	●	○	10	15	20	5		
BNM-250-S	○	○	12.5	18.5	25	6		
BNM-300-S	○	○	15	22.5	30	7		

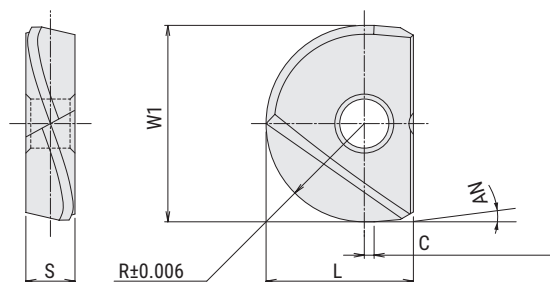
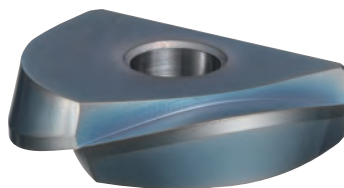
MIRROR BALL

BNM Type

BNM-TG
TYPE

Helical geometry

good for finishing hard material/weld up to 60 HRC

Radius accuracy
 ± 0.006 mm

Cat.No.	PVD Coating	Dimensions(mm)					
	DH102	R	L	W1	S	C	AN
BNM-060-TG	●	3	5	6	2	—	10°
BNM-080-TG	●	4	7	8	2.4	0.5	5°
BNM-100-TG	●	5	8.5	10	2.6	1	
BNM-120-TG	●	6	10	12	3	1.5	
BNM-160-TG	●	8	12	16	4		
BNM-200-TG	●	10	15	20	5	2	
BNM-250-TG	●	12.5	18.5	25	6		
BNM-300-TG	○	15	22.5	30	7		
BNM-320-TG	●	16	32	32			

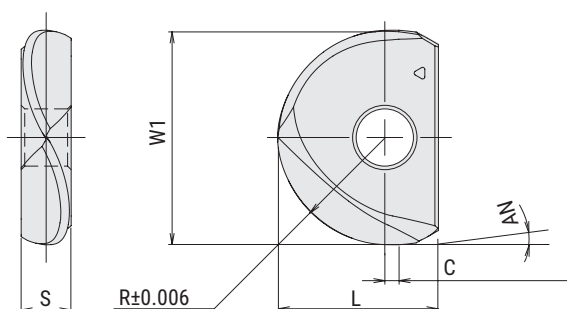
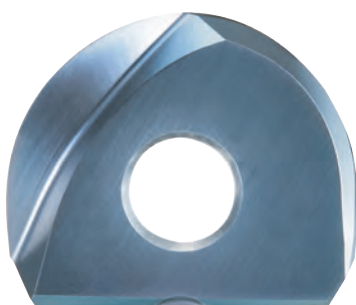
MIRROR BALL

BNM Type

Radius accuracy
 ± 0.006 mmBNM-TS
TYPE

High Helix geometry

good for semi-finishing & finishing hard materials up to 60HRC



Cat.No.	PVD Coating	Dimensions(mm)					
	DH102	R	W1	L	S	C	AN
BNM-060-TS	●	3	6	5	2	—	10°
BNM-080-TS	●	4	8	7	2.4	0.5	5°
BNM-100-TS	●	5	10	8.5	2.6	1	
BNM-120-TS	●	6	12	10	3	1.5	
BNM-160-TS	●	8	16	12	4		
BNM-200-TS	●	10	20	15	5	2	
BNM-250-TS	●	12.5	25	18.5	6		
BNM-300-TS	○	15	30	22.5	7		
BNM-320-TS	●	16	32	23.5			

MIRROR BALL

BNM Type

■ Controlled Torque Wrenches (with replaceable blade)

Wrenches are pre-set to protect screws and bodies against damage during both the tightening and loosening process



● Controlled Torque Wrenches (with replaceable blade)

Cat. No.	Torque #	Screw torque	Replacement blade	Applicable inserts
TQC-06	T6	0.5Nm	B-06	BNM○-06... RNM○-06...
TQC-07	T7	0.9Nm	B-07	BNM○-08... RNM○-08...
TQC-08	T8	1.2Nm	B-08	BNM○-10... RNM○-10...
TQC-10	T10	2.0Nm	B-10	BNM○-12... RNM○-12...

● Replacement blade

Cat. No.	Torque #	Applicable wrench
B-06	T6	TQC-06
B-07	T7	TQC-07
B-08	T8	TQC-08
B-10	T10	TQC-10

★ Insert mounting information

1. Make sure the insert seat on body is carefully cleaned.
2. Make sure insert itself is clean, especially hole and face location.
3. Change insert screw when threads start to wear.
(approximately every 10-15 inserts)
4. Do not over tighten screw, see table for torque specifications.

tool dia.(mm)	Tecomended torque
φDc	N·m
6	0.5
8	0.9
10	1.2
12	2.0
16	3.0
20	4.0
25	5.0
30	6.0
32	6.0

MIRROR BALL

BNM Type

■ Grade Selection Guide

Material	BNM				BNM-S		BNM-SS		BNM-TG	BNM-TS
	DH111	JC10000	KT9	JBN245	FZ05	JC20003	DH108	DS108	DH102	DH102
Carbon steel below 250HB	◎☆						◎			
Cast steel below 285HB	◎☆						◎			
Tool & Die steel below 255HB	◎☆						◎			
Mold steel 30 - 36HRC	○						◎			
Mold steel 38 - 43HRC	○						◎			
Hardened die steel 42 - 52HRC	○						◎		○	○
Hardened die steel 55 - 62HRC							○		◎	◎
HSS 63 - 70HRC									◎	◎
Grey cast iron 160 - 260HB	○			★			○		◎	◎
Nodular cast iron 170 - 300HB	○			★			○		◎	◎
Austenitic stainless steel (304,316,317) 17Cr	◎☆						◎			
Ferritic & martensitic stainless steel (403,420J2,430) 13Cr	◎☆						◎			
Aluminium alloy (A5052)			◎		◎	◎				
Aluminium alloy (A7075)			◎		◎	◎				
Aluminium alloy Si below 13%			◎		◎	◎				
Copper alloy (C1100)			◎		◎	◎				
Graphite		○				◎				
Titanium alloy (Ti-6Al-4V) 35 - 43HRC	◎☆						◎	◎		
Heat resistant alloy (INCO718) 35 - 43HRC	◎☆						◎			

◎ : First choice ○ : Second choice ☆ : Wet cutting ★ : High speed machining

MIRROR BALL

BNM Type

■ Recommended Cutting Conditions

Material	Cat.No	Grade		Tool dia.(mm)								
				6	8	10	12	16	20	25	30	32
Carbon steel below 250HB	BNM BNM-SS	DH111 DH108	$n(\text{min}^{-1})$	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
			$V_f(\text{mm/min})$	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
			$a_p(\text{mm})$	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Cast steel below 285HB	BNM BNM-SS	DH111 DH108	$n(\text{min}^{-1})$	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
			$V_f(\text{mm/min})$	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
			$a_p(\text{mm})$	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Tool & Die steel below 255HB	BNM BNM-SS	DH111 DH108	$n(\text{min}^{-1})$	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
			$V_f(\text{mm/min})$	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
			$a_p(\text{mm})$	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Mold steel 30 - 36HRC	BNM BNM-SS	DH111 DH108	$n(\text{min}^{-1})$	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
			$V_f(\text{mm/min})$	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
			$a_p(\text{mm})$	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Mold steel 38 - 43HRC	BNM BNM-SS	DH111 DH108	$n(\text{min}^{-1})$	15,920	11,940	11,140	9,280	7,960	6,370	5,730	4,770	4,480
			$V_f(\text{mm/min})$	3,180	2,390	3,340	2,780	3,980	3,820	3,440	2,860	2,690
			$a_p(\text{mm})$	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Hardened die steel 42 - 52HRC	BNM BNM-SS	DH111 DH108	$n(\text{min}^{-1})$	13,260	9,950	9,550	7,960	6,960	5,570	5,090	4,240	3,980
			$V_f(\text{mm/min})$	2,650	1,990	2,870	2,390	3,480	3,340	3,050	2,540	2,390
			$a_p(\text{mm})$	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Hardened die steel 55 - 62HRC	BNM-TG BNM-TS	DH102	$n(\text{min}^{-1})$	10,610	7,960	7,960	6,630	5,970	4,770	4,460	3,710	3,480
			$V_f(\text{mm/min})$	2,120	1,590	2,390	1,990	2,990	2,860	2,680	2,230	2,090
			$a_p(\text{mm})$	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
			$a_e(\text{mm})$	0.1	0.15	0.15	0.2	0.25	0.3	0.4	0.5	0.5
HSS 63 - 70HRC	BNM-TG BNM-TS	DH102	$n(\text{min}^{-1})$	7,960	5,970	6,370	5,310	4,970	3,980	3,820	3,180	2,980
			$V_f(\text{mm/min})$	1,590	1,190	1,270	1,060	1,490	1,190	1,530	1,270	1,190
			$a_p(\text{mm})$	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
			$a_e(\text{mm})$	0.05	0.1	0.1	0.1	0.1	0.15	0.2	0.3	0.3
Grey & Nodular cast iron below 300 HB	BNM BNM-TG BNM-TS	DH111 DH102	$n(\text{min}^{-1})$	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
			$V_f(\text{mm/min})$	7,430	5,570	6,370	5,310	6,270	5,730	5,100	4,250	3,980
			$a_p(\text{mm})$	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Stainless steel	BNM BNM-SS	DH111 DH108	$n(\text{min}^{-1})$	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
			$V_f(\text{mm/min})$	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
			$a_p(\text{mm})$	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Aluminium	BNM BNM-S	KT9 FZ05 JC20003	$n(\text{min}^{-1})$	23,870	17,900	15,920	13,260	10,940	8,750	7,640	6,370	5,970
			$V_f(\text{mm/min})$	9,550	7,160	7,960	6,630	7,660	7,000	6,110	5,100	4,780
			$a_p(\text{mm})$	0.2	0.2	0.25	0.25	0.25	0.25	0.25	0.25	0.25
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Copper alloy	BNM BNM-S	KT9 FZ05 JC20003	$n(\text{min}^{-1})$	23,870	17,900	15,920	13,260	10,940	8,750	7,640	6,370	5,970
			$V_f(\text{mm/min})$	9,550	7,160	7,960	6,630	7,660	7,000	6,110	5,100	4,780
			$a_p(\text{mm})$	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Graphite	BNM BNM-S	JC10000 JC20003	$n(\text{min}^{-1})$	23,870	17,900	15,920	13,260	10,940	8,750	7,640	6,370	5,970
			$V_f(\text{mm/min})$	9,550	7,160	7,960	6,630	7,660	7,000	6,110	5,100	4,780
			$a_p(\text{mm})$	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			$a_e(\text{mm})$	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Titanium alloy (Ti-6Al-4V)	BNM BNM-SS	DH111 DS108	$n(\text{min}^{-1})$	10,610	7,960	9,550	7,960	5,970	4,770	4,460	3,710	3,480
			$V_f(\text{mm/min})$	3,180	2,390	3,820	3,180	2,990	2,860	2,680	2,230	2,090
			$a_p(\text{mm})$	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
			$a_e(\text{mm})$	0.1	0.15	0.15	0.2	0.25	0.3	0.4	0.5	0.5
Heat resistant alloy (INC0718)	BNM BNM-SS	DH111 DS108	$n(\text{min}^{-1})$	7,960	5,970	6,370	5,310	4,970	3,980	3,820	3,180	2,980
			$V_f(\text{mm/min})$	1,590	1,190	1,910	1,590	1,990	1,590	1,530	1,270	1,190
			$a_p(\text{mm})$	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
			$a_e(\text{mm})$	0.1	0.1	0.1	0.1	0.1	0.15	0.2	0.3	0.3

Note 1. Please adjust cutting conditions according to machine rigidity or work rigidity.

2. These cutting conditions represent stable machining at length $3 \times D_c$.

Please adjust cutting conditions according to overhang length.

3. In case of chatter occurring, recommended to reduce a_p or feed.

4. Use air blow.

Overhang length l/D_c	n (min^{-1})	V_f (mm/min)
$\sim 3D_c$	100%	100%
$3D_c \sim 5D_c$	70%	70%
$5D_c \sim 10D_c$	50%	50%

MIRROR BALL

BNM Type

■ Recommended Cutting Conditions

Material	Cat.No	Grade		Tool dia.(mm)			
				16	20	25	30
Grey cast iron 160- 260 HB	BNM	JBN245	$n(\text{min}^{-1})$	23,870	19,100	15,280	12,730
			$V_f(\text{mm/min})$	11,940	11,460	9,170	8,910
			$a_p(\text{mm})$	0.05	0.05	0.05	0.05
			$a_e(\text{mm})$	0.25	0.3	0.4	0.5
Nodular cast iron 170- 300 HB	BNM	JBN245	$n(\text{min}^{-1})$	19,890	15,920	12,730	10,610
			$V_f(\text{mm/min})$	7,960	7,960	6,370	6,370
			$a_p(\text{mm})$	0.05	0.05	0.05	0.05
			$a_e(\text{mm})$	0.25	0.3	0.4	0.5

Note

1. These cutting conditions represent on high speed machine.
2. These cutting conditions represent stable machining at length 3 x Dc.
Please adjust cutting conditions according to overhang length.
3. Use carbide shank holder.
4. For better surface finish , mist coolant is recommended.
5. Plunging is not recommended.
- 6 Please keep the stock uniform by pre-machining.

Overhang length l/D_c	n (min^{-1})	V_f (mm/min)
$\sim 3D_c$	100%	100%
$3D_c \sim 5D_c$	70%	70%
$5D_c \sim 10D_c$	50%	50%

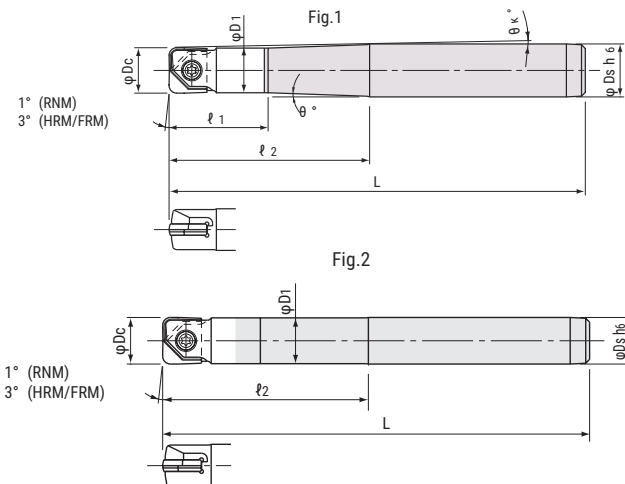
MIRROR RADIUS

RNM Type

RNM
TYPE

Shank Type

High Precision Indexable Radius End Mill

● Corner radius accuracy below $\pm 0.010\text{mm}$ 

Cat.No.	Stock	Dimensions (mm)							Parts		Inserts	Fig.	
		φD _C	ℓ ₁	ℓ ₂	L	φD ₁	θ°	θ _k	φD _S	Screws			Wrench
RNMS-060015U-S06C	●	6	—	15	60	5.7	—	—	6	FSW-2005H	A-06	RNM-060 HRM-060 FRM-060	2
RNMM-060030U-S06C	●			30	80								
RNMS-080020U-S08C	●	8	—	20	70	7.6	2°	2°12'	8	FSW-2506H	A-07	RNM-080 HRM-080/090 FRM-080	1
RNMM-080040U-S08C	●			40	90								
RNMM-080053T-S12C	●			20	53	110			7.8				
RNML-080075S-S08C	●	10	—	75	140	9.5	1°	1°7'		12	FSW-3007H	A-08	RNM-100 HRM-100/110 FRM-100
RNMS-100025U-S10C	●			25	75								
RNMM-100050U-S10C	●			50	100								
RNMM-100050S-S10C	●			110									
RNMM-100053T-S12C	●			22.5	53	110			9.8				
RNML-100075S-S10C	●	12	—	75	140	11.5	12	FSW-3509H		A-10	RNM-120 HRM-120/130 FRM-120	2	
RNMS-120030U-S12C	●			30	80								
RNMM-120060U-S12C	●			60	110								
RNMM-120053S-S12C	●			53	110								
RNML-120095S-S12C	●			95	160								
RNMS-160035U-S16C	●	16	—	35	90	15.5	—	—	16	FSW-4013H	A-15	RNM-160 HRM-160/170 FRM-160	2
RNMM-160070S-S16C	●			70	140	15.8							
RNMM-160090S-S16C	●			90	160								
RNML-160120S-S16C	●			120	210								
RNML-160150S-S16C	●			150	220								

Screw	Torque (N.m)
FSW-2005H	0.5
FSW-2506H	0.9
FSW-3007H	1.2
FSW-3509H	2.0
FSW-4013H	3.0

MIRROR RADIUS

RNM Type

RNM
TYPE

Shank Type

High Precision Indexable Radius End Mill

- Corner radius accuracy below $\pm 0.010\text{mm}$

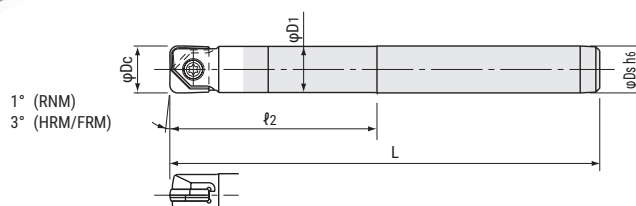


Fig 2

Cat.No.	Stock	Dimensions (mm)					Parts		Inserts	Fig
		φD _c	ℓ ₂	L	φD ₁	φD _s	Screws	Wrench		
RNMS-200040U-S20C	●	20	40	105	19.5	20	FSW-5016H	A-20W	RNM-200 HRM-200/220 FRM-200/210	2
RNMM-200075S-S20C	●		75	141	19.8					
RNMM-200105S-S20C	●		105	180						
RNML-200150S-S20C	●		150	220						
RNML-200170S-S20C	●		170	250						
RNMM-250090S-S25C	●	25	90	166	24.8	25	FSW-6020	A-30	RNM-250 FRM-250/260	
RNMM-250140S-S25C	●		140	220						
RNML-250190S-S25C	●		190	260						
RNMM-300106S-S32C	●	30	106	186	29.8	32	FSW-8025S	A-30	RNM-300 FRM-300	
RNMM-320106S-S32C	●	32			31.8					

Screw	Torque (N.m)
FSW-5016H	4.0
FSW-6020	5.0
FSW-8025S	6.0

MIRROR RADIUS

MRX Type

MRX
TYPE

Modular Type

High Precision Indexable Radius End Mill

Through
coolant
hole

Face Milling

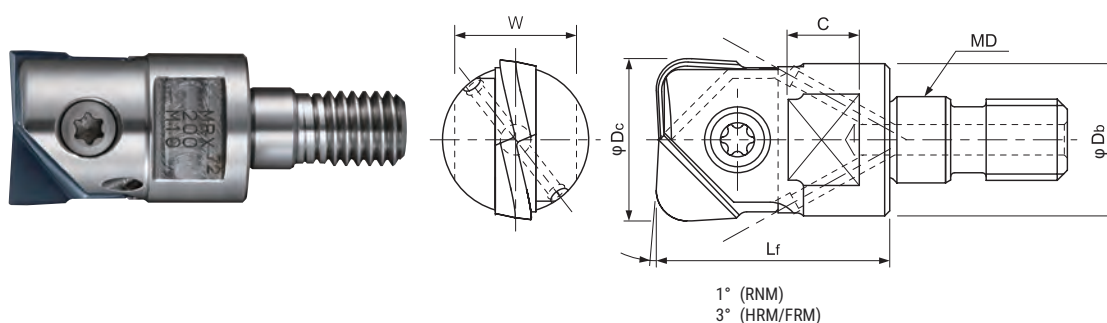
Shoulder Milling

Copy Milling

Pocket Milling

Helical Interpolation

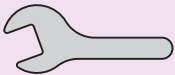
- RNM / Corner radius accuracy **below $\pm 0.010\text{mm}$**
- HRM / Corner radius accuracy **$\pm 0.015\text{ mm}$**
- FRM / Corner radius accuracy **$\pm 0.010\text{ mm}$**
- O.D. run out / MRX + MSN carbide shank **below $\pm 0.015\text{mm}$**



Cat.No.	Stock	Dimensions (mm)						Parts		Inserts
		φDc	Lf	φDb	MD	C	W	Screws	Wrench	
MRX-100-M6	●	10	18	9.7	M6	6.5	8	FSW-3007H	A-08	RNM-100 HRM-100/110 FRM-100...
MRX-120-M6	●	12	20	11.5	M6			FSW-3509H	A-10	RNM-120 HRM-120/130 FRM-120
MRX-160-M8	●	16	23	15	M8	8	12	FSW-4013H	A-15	RNM-160 HRM-160/170 FRM-160/170...
MRX-200-M10	●	20	30	18.5	M10		14	FSW-5016H	A-20W	RNM-200 HRM-200/220 FRM-200/210
MRX-250-M12	●	25	35	24	M12	10	17	FSW-6020	A-30	RNM-250 FRM-250
MRX-300-M16	●	30	43	29	M16	12.5	22	FSW-8025S	A-30	RNM-300 FRM-300
MRX-320-M16	●	32		30	M16					RNM-320 FRM-320

Screw	Torque (N.m)
FSW-3007H	1.2
FSW-3509H	2.0
FSW-4013H	3.0
FSW-5016H	4.0
FSW-6020	5.0
FSW-8025S	6.0

■ Spanner

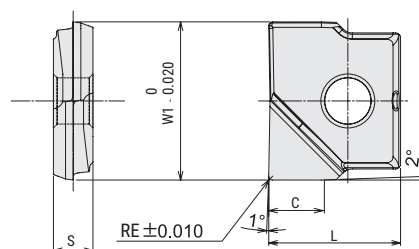
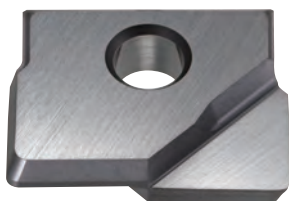
	Cat.No.	MD	Torque	width across flat	Thickness	Length
	DS-08	M6	8.0 N.m	12	4	85
	DS-12	M8	16 N.m	12	4	93

MIRROR RADIUS

RNM/MRX Type

Corner radius accuracy
 ± 0.010 mm**RNM**
TYPE**Neutral geometry**

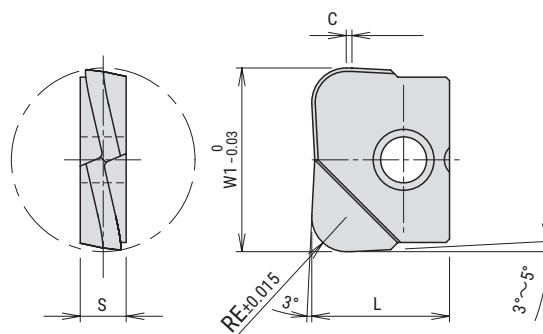
good for finishing non-ferrous materials such as Aluminium, Copper



Cat.No.	Diamond Coating	Uncoated	Dimensions(mm)				
	JC10000	KT9 (K10)	RE	L	W1	S	C
RNM-080-R03		○	0.3	7	8	2.4	2.7
RNM-080-R05	●	●	0.5				
RNM-080-R10	○	●	1				
RNM-100-R03		○	0.3	8.5	10	2.6	3.3
RNM-100-R05	●	●	0.5				
RNM-100-R10	○	●	1				
RNM-100-R15		○	1.5				
RNM-100-R20		○	2	10	12	3	4
RNM-120-R03		○	0.3				
RNM-120-R05	○	●	0.5				
RNM-120-R10	○	●	1				
RNM-120-R15		○	1.5				
RNM-120-R20		●	2	12	16	4	5.3
RNM-160-R03		●	0.3				
RNM-160-R05		●	0.5				
RNM-160-R10		●	1				
RNM-160-R15		○	1.5				
RNM-160-R20		○	2	15	20	5	6.7
RNM-200-R03		○	0.3				
RNM-200-R05		○	0.5				
RNM-200-R10		●	1				
RNM-200-R15		○	1.5				
RNM-200-R20		○	2				

MIRROR RADIUS

RNM/MRX Type

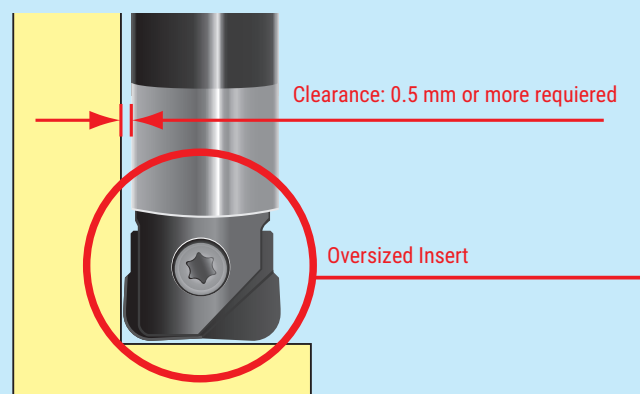
Corner radius accuracy
 ± 0.015 mm**HRM**
TYPE**High feed geometry**
from Semi-finishing to finishing

Cat.No.	PVD Coating	Dimensions(mm)				
	JC8015	RE	L	W1	S	C
HRM-060-R05	●	0.5	5	6	2	—
HRM-060-R10	●	1				
HRM-060-R15	●	1.5				
HRM-080-R20	●	2	7	8	2.4	0.3
HRM-090-R20	●			9		
HRM-100-R20	●		8.5	10	2.6	
HRM-110-R20	●			11		
HRM-120-R20	●		10	12	3	
HRM-130-R20	●			13		
HRM-160-R20	●	3	12	16	4	0.5
HRM-160-R30	●			17		
HRM-170-R30	●		20	5		
HRM-200-R20	●	2	15		20	
HRM-200-R30	●	3				
HRM-220-R30	○					

Mirror Radius Oversized Insert

Recommended to use oversized insert ※ for increasing side clearance to prevent the damage of shank by sticking chips.

(※) HRM-090-R20, HRM-110-R20, HRM-130-R20,
HRM-170-R30, HRM-220-R30

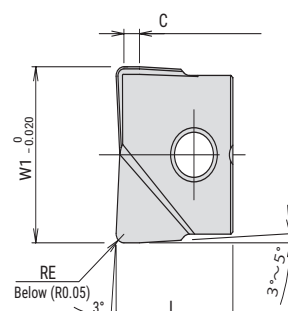
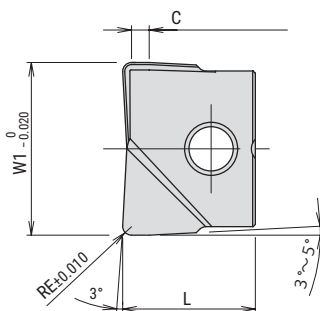
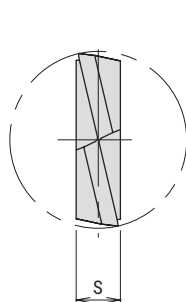
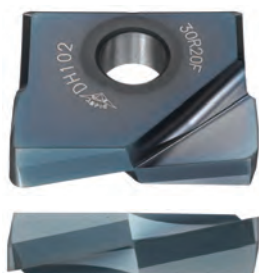


Corner radius accuracy
±0.010 mm

FRM
TYPE

High feed geometry
from Semi-finishing to finishing

■FRM-□□□-R0



Cat.No.	PVD Coating		Dimensions(mm)				
	DH102	JC8015	RE	L	W1	S	C
FRM-060-R0		●	※	5	6	2	0.8
FRM-060-R03	●	◎	0.3				
FRM-060-R05	●	●	0.5				
FRM-060-R10	●	●	1				
FRM-080-R0		●	※	7	8	2.4	1.2
FRM-080-R03	●	●	0.3				
FRM-080-R05	●	●	0.5				
FRM-080-R10	●	●	1				
FRM-100-R0		●	※	8.5	10	2.6	1.5
FRM-100-R03	●	◎	0.3				
FRM-100-R05	●	●	0.5				
FRM-100-R10	●	●	1				
FRM-100-R20	●	●	2	10	12	3	1.5
FRM-120-R0		●	※				
FRM-120-R03	●	●	0.3				
FRM-120-R05	●	●	0.5				
FRM-120-R10	●	●	1				
FRM-120-R15	◎		1.5				
FRM-120-R20	●	●	2				
FRM-120-R30	●		3	10	13	3	1.5
FRM-130-R05		◎	0.5				
FRM-130-R10		◎	1				
FRM-160-R0		●	※	12	16	4	2
FRM-160-R03	●	●	0.3				
FRM-160-R05	●	●	0.5				
FRM-160-R10	●	●	1				
FRM-160-R15	●		1.5				
FRM-160-R20	●	●	2				
FRM-160-R30	●		3				
FRM-170-R03		◎	0.3	12	17	4	2
FRM-170-R05		◎	0.5				
FRM-170-R10	●	●	1				
FRM-170-R20		◎	2				

Cat.No.	PVD Coating		Dimensions(mm)				
	DH102	JC8015	RE	L	W1	S	C
FRM-200-R0		●	※	15	20	5	2
FRM-200-R03	●	◎	0.3				
FRM-200-R05	●	●	0.5				
FRM-200-R10	●	●	1				
FRM-200-R15	●		1.5				
FRM-200-R20	●	●	2				
FRM-200-R30	●	◎	3	15	21	5	2
FRM-210-R05		◎	0.5				
FRM-210-R10	●	●	1				
FRM-210-R20		◎	2	18.5	25	6	2.5
FRM-250-R03	●	●	0.3				
FRM-250-R05	●	●	0.5				
FRM-250-R10	●	●	1				
FRM-250-R15	◎		1.5				
FRM-250-R20	●	●	2				
FRM-250-R30	●	●	3	18.5	26	6	2.5
FRM-260-R03		◎	0.3				
FRM-260-R05		◎	0.5				
FRM-260-R10		◎	1	22.5	30	7	3
FRM-300-R03	○	○	0.3				
FRM-300-R05	○	○	0.5				
FRM-300-R10	○	○	1				
FRM-300-R20	○	○	2				
FRM-300-R30	○	○	3				
FRM-320-R03	●	●	0.3	23.5	32	7	3
FRM-320-R05	●	●	0.5				
FRM-320-R10	●	●	1				
FRM-320-R20	●	●	2				
FRM-320-R30	●		3				

MIRROR RADIUS

RNM/MRX Type

■ Grade Selection Guide

Material	Insert	Grade	RNM		HRM	FRM	
			JC10000	KT9	JC8015	DH102	JC8015
Carbon steel below 250HB	FRM HRM	JC8015			◎		◎
Cast steel below 285HB	FRM HRM	JC8015			◎		◎
Tool & Die steel below 255HB	FRM HRM	JC8015			◎		◎
Mold steel 30 - 36HRC	FRM HRM	JC8015			◎		◎
Mold steel 38 - 43HRC	FRM HRM	JC8015			◎		◎
Hardened die steel 42 - 52HRC	FRM HRM	DH102 JC8015			○	◎	○
Hardened die steel 55 - 62HRC	FRM	DH102				◎	
HSS 63 - 70HRC	FRM	DH102				◎	
Grey & Nodular cast iron below 300HB	FRM HRM	DH102 JC8015			○	◎	○
Austenitic stainless steel (304,316,317) 17Cr	FRM HRM	JC8015			◎	○	◎
Aluminium alloy (A5052)	RNM	KT9		◎			
Copper alloy (C1100)	RNM	KT9		◎			
Graphite	RNM	JC10000	◎				
Titanium alloy (Ti-6Al-4V) 35 - 43HRC	HRM FRM	JC8015			◎		◎
Heat resistant alloy (INCO718) 35 - 43HRC	HRM FRM	JC8015			◎		◎

MIRROR RADIUS

RNM/MRX Type

■ Recommended Cutting Conditions - Side Finishing

Material	Cat.No	Grade		Tool dia.(mm)								
				6	8	10	12/13	16/17	20/21	25/26	30	32
Carbon steel below 250HB	FRM HRM	JC8015	n(min ⁻¹)	15,920	11,940	9,550	7,960	5,970	4,770	3,820	3,180	2,980
			Vf(mm/min)	3,980	2,990	2,870	2,390	2,390	1,910	1,530	1,270	1,190
			ap(mm)	0.2	0.3	0.3	0.3	0.4	0.5	0.8	1.0	1.2
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cast steel below 285HB	FRM HRM	JC8015	n(min ⁻¹)	15,920	11,940	9,550	7,960	5,970	4,770	3,820	3,180	2,980
			Vf(mm/min)	3,980	2,990	2,870	2,390	2,390	1,910	1,530	1,270	1,190
			ap(mm)	0.2	0.3	0.3	0.3	0.4	0.5	0.8	1.0	1.2
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Tool & Die steel below 255HB	FRM HRM	JC8015	n(min ⁻¹)	15,920	11,940	9,550	7,960	5,970	4,770	3,820	3,180	2,980
			Vf(mm/min)	3,980	2,990	2,870	2,390	2,390	1,910	1,530	1,270	1,190
			ap(mm)	0.2	0.3	0.3	0.3	0.4	0.5	0.8	1.0	1.2
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mold steel 30 - 36HRC	FRM HRM	JC8015	n(min ⁻¹)	15,920	11,940	9,550	7,960	5,970	4,770	3,820	3,180	2,980
			Vf(mm/min)	3,980	2,990	2,870	2,390	2,390	1,910	1,530	1,270	1,190
			ap(mm)	0.2	0.3	0.3	0.3	0.4	0.5	0.8	1.0	1.2
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mold steel 38 - 43HRC	FRM HRM	JC8015	n(min ⁻¹)	14,850	11,140	8,910	7,430	5,570	4,460	3,570	2,970	2,790
			Vf(mm/min)	3,710	2,790	2,670	2,230	1,670	1,340	1,070	890	840
			ap(mm)	0.2	0.2	0.3	0.3	0.4	0.5	0.8	1.0	1.2
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened die steel 42 - 52HRC	FRM HRM	DH102 JC8015	n(min ⁻¹)	13,260	9,950	7,960	6,630	4,970	3,980	3,180	2,650	2,490
			Vf(mm/min)	1,330	1,000	800	660	750	600	480	400	370
			ap(mm)	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.8	1.0
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened die steel 55 - 62HRC	FRM	DH102	n(min ⁻¹)	10,610	7,960	6,370	5,310	3,980	3,180	2,550	2,120	1,990
			Vf(mm/min)	1,060	800	640	530	600	480	380	320	300
			ap(mm)	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.8	1.0
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
HSS 63 - 70HRC	FRM	DH102	n(min ⁻¹)	7,960	5,970	4,770	3,980	2,980	2,390	1,910	1,590	1,490
			Vf(mm/min)	320	240	290	320	300	240	190	160	150
			ap(mm)	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Grey & Nodular cast iron below 300 HB	FRM HRM	DH102 JC8015	n(min ⁻¹)	18,570	13,930	11,140	9,280	6,960	5,570	4,460	3,710	3,480
			Vf(mm/min)	6,500	4,880	3,900	3,250	3,480	3,340	2,680	2,230	2,090
			ap(mm)	0.2	0.3	0.3	0.3	0.4	0.5	0.8	1.0	1.2
			ae(mm)	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Stainless steel	FRM HRM	JC8015	n(min ⁻¹)	14,850	11,140	8,910	7,430	5,570	4,460	3,570	2,970	2,790
			Vf(mm/min)	4,460	3,340	2,670	2,230	2,230	1,780	1,430	1,190	1,120
			ap(mm)	0.2	0.3	0.3	0.3	0.4	0.5	0.8	1.0	1.0
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aluminium	RNM	KT9	n(min ⁻¹)	18,570	13,930	11,140	9,280	6,960	5,570	4,460	3,710	3,480
			Vf(mm/min)	7,430	5,570	4,460	3,710	3,500	2,800	2,230	1,860	1,740
			ap(mm)	0.3	0.4	0.5	0.6	0.8	1.0	1.2	1.6	1.6
			ae(mm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Copper alloy	RNM	KT9	n(min ⁻¹)	13,260	9,950	7,960	6,630	4,970	3,980	3,180	2,650	2,490
			Vf(mm/min)	5,300	3,980	3,180	2,650	2,500	2,000	1,590	1,330	1,250
			ap(mm)	0.2	0.3	0.3	0.4	0.5	0.7	0.8	1.0	1.0
			ae(mm)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Graphite	RNM	JC10000	n(min ⁻¹)	18,570	13,930	11,140	9,280	6,960	5,570	4,460	3,710	3,480
			Vf(mm/min)	7,430	5,570	4,460	3,710	3,500	2,800	2,230	1,860	1,740
			ap(mm)	0.3	0.4	0.5	0.6	0.8	1.0	1.2	1.6	1.6
			ae(mm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Titanium alloy (Ti-6Al-4V)	HRM FRM	JC8015	n(min ⁻¹)	5,310	3,980	3,180	2,650	1,990	1,590	1,270	1,060	990
			Vf(mm/min)	1,060	800	760	640	480	380	320	270	250
			ap(mm)	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Heat resistant alloy (INC0718)	HRM FRM	JC8015	n(min ⁻¹)	4,240	3,180	2,550	2,120	1,590	1,270	1,020	850	800
			Vf(mm/min)	850	640	610	510	380	300	260	210	200
			ap(mm)	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4
			ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Note) 1. Please adjust cutting conditions according to machine rigidity or work rigidity.

2. These cutting conditions represent stable machining at length 3 x Dc.

Please adjust cutting conditions according to overhang length.

3. In case of chatter occurring, recommended to reduce ap or feed.

4. Use air blow.

Overhang length ℓ/Dc	n (min ⁻¹)	Vf (mm/min)
~3Dc	100%	100%
3Dc~5Dc	70%	70%
5Dc~10Dc	50%	50%

MIRROR RADIUS

RNM/MRX Type

■ Recommended Cutting Conditions - Bottom Finishing

Material	Cat.No	Grade		Tool dia.(mm)								
				6	8	10	12/13	16/17	20/21	25/26	30	32
Carbon steel below 250HB	FRM HRM	JC8015	$n(\text{min}^{-1})$	13,790	10,350	8,280	6,900	5,170	4,140	3,310	2,760	2,590
			$V_f(\text{mm/min})$	3,450	3,110	2,480	2,070	2,070	1,660	1,320	1,100	1,040
			$ap(\text{mm})$	0.1	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Cast steel below 285HB	FRM HRM	JC8015	$n(\text{min}^{-1})$	13,790	10,350	8,280	6,900	5,170	4,140	3,310	2,760	2,590
			$V_f(\text{mm/min})$	3,450	3,110	2,480	2,070	2,070	1,660	1,320	1,100	1,040
			$ap(\text{mm})$	0.1	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Tool & Die steel below 255HB	FRM HRM	JC8015	$n(\text{min}^{-1})$	13,790	10,350	8,280	6,900	5,170	4,140	3,310	2,760	2,590
			$V_f(\text{mm/min})$	3,450	3,110	2,480	2,070	2,070	1,660	1,320	1,100	1,040
			$ap(\text{mm})$	0.1	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Mold steel 30 - 36HRC	FRM HRM	JC8015	$n(\text{min}^{-1})$	13,790	10,350	8,280	6,900	5,170	4,140	3,310	2,760	2,590
			$V_f(\text{mm/min})$	3,450	3,110	2,480	2,070	2,070	1,660	1,320	1,100	1,040
			$ap(\text{mm})$	0.1	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Mold steel 38 - 43HRC	FRM HRM	JC8015	$n(\text{min}^{-1})$	12,730	9,550	7,640	6,370	4,770	3,820	3,060	2,550	2,390
			$V_f(\text{mm/min})$	3,180	2,870	2,290	1,910	1,430	1,150	920	770	720
			$ap(\text{mm})$	0.1	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Hardened die steel 42 - 52HRC	FRM HRM	DH102 JC8015	$n(\text{min}^{-1})$	10,080	7,560	6,050	5,040	3,780	3,020	2,420	2,020	1,890
			$V_f(\text{mm/min})$	1,010	760	610	600	570	450	360	300	280
			$ap(\text{mm})$	0.05	0.06	0.08	0.1	0.1	0.15	0.15	0.15	0.15
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Hardened die steel 55 - 62HRC	FRM	DH102	$n(\text{min}^{-1})$	6,900	5,170	4,140	3,450	2,590	2,070	1,660	1,380	1,290
			$V_f(\text{mm/min})$	690	520	410	410	390	310	250	210	190
			$ap(\text{mm})$	0.05	0.06	0.08	0.1	0.1	0.15	0.15	0.15	0.15
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
HSS 63 - 70HRC	FRM	DH102	$n(\text{min}^{-1})$	5,310	3,980	3,180	2,650	1,990	1,590	1,270	1,060	990
			$V_f(\text{mm/min})$	210	160	190	210	200	160	130	110	100
			$ap(\text{mm})$	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
			$ae(\text{mm})$	1.0(~2)	1.2(~3)	1.2(~4)	1.5(~5)	2.0(~6)	2.5(~8)	4.0(~10)	4.2(~12)	4.2(~13)
Grey & Nodular cast iron below 300 HB	FRM HRM	DH102 JC8015	$n(\text{min}^{-1})$	15,920	11,940	9,550	7,960	5,970	4,770	3,820	3,180	2,980
			$V_f(\text{mm/min})$	4,780	4,180	3,340	3,180	2,390	1,910	1,910	1,590	1,490
			$ap(\text{mm})$	0.1	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Stainless steel	FRM HRM	JC8015	$n(\text{min}^{-1})$	12,730	9,550	7,640	6,370	4,770	3,820	3,060	2,550	2,390
			$V_f(\text{mm/min})$	3,180	2,870	2,290	1,910	1,910	1,530	1,220	1,020	960
			$ap(\text{mm})$	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Aluminium	RNM	KT9	$n(\text{min}^{-1})$	15,920	11,940	9,550	7,960	5,970	4,770	3,820	3,180	2,980
			$V_f(\text{mm/min})$	6,370	4,780	3,820	3,180	3,580	2,860	2,290	1,910	1,790
			$ap(\text{mm})$	0.2	0.25	0.25	0.25	0.25	0.3	0.3	0.3	0.3
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Copper alloy	RNM	KT9	$n(\text{min}^{-1})$	10,610	7,960	6,370	5,310	3,980	3,180	2,550	2,120	1,990
			$V_f(\text{mm/min})$	3,180	2,390	1,910	1,590	1,190	950	770	640	600
			$ap(\text{mm})$	0.15	0.2	0.2	0.2	0.2	0.25	0.25	0.25	0.25
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Graphite	RNM	JC10000	$n(\text{min}^{-1})$	15,920	11,940	9,550	7,960	5,970	4,770	3,820	3,180	2,980
			$V_f(\text{mm/min})$	6,370	4,780	3,820	3,180	3,580	2,860	2,290	1,910	1,790
			$ap(\text{mm})$	0.2	0.25	0.25	0.25	0.25	0.3	0.3	0.3	0.3
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Titanium alloy (Ti-6Al-4V)	HRM FRM	JC8015	$n(\text{min}^{-1})$	2,920	2,190	1,750	1,460	1,090	880	700	580	550
			$V_f(\text{mm/min})$	580	440	350	290	220	180	140	120	110
			$ap(\text{mm})$	0.1	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2
			$ae(\text{mm})$	1.0(~3)	1.2(~4)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)
Heat resistant alloy (INCO718)	HRM FRM	JC8015	$n(\text{min}^{-1})$	2,920	2,190	1,750	1,460	1,090	880	700	580	550
			$V_f(\text{mm/min})$	580	440	350	290	220	180	140	120	110
			$ap(\text{mm})$	0.1	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2
			$ae(\text{mm})$	1.0(~3)	1.2(~5)	1.2(~5)	1.5(~5)	2.0(~9)	2.5(~13)	4.0(~18)	4.2(~23)	4.2(~25)

Note) 1. Please adjust cutting conditions according to machine rigidity or work rigidity.

2. These cutting conditions represent stable machining at length 3 x Dc.

Please adjust cutting conditions according to overhang length.

3. In case of chatter occurring, recommended to reduce ap or feed.

4. Use air blow.

Overhang length ℓ/Dc	n (min^{-1})	V_f (mm/min)
~3Dc	100%	100%
3Dc~5Dc	70%	70%
5Dc~10Dc	50%	50%

MIRROR RADIUS

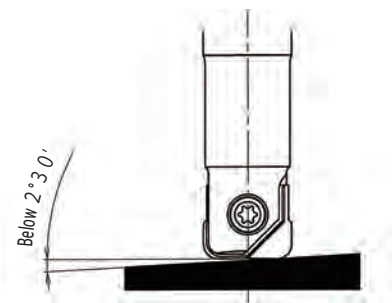
RNM/MRX Type

■ Recommended Cutting Conditions - <HRM type> High Feed / Semi finishing

Material		Tool dia.(mm)									
		φ6×R1.5		φ8×R2/φ9×R2				φ10×R2/φ11×R2			
		2.5 D	5.0 D	2.5 D	5.0 D	7.5 D	10 D	2.5 D	5.0 D	7.5 D	10 D
Carbon steel below 250HB	$n(\text{min}^{-1})$	9,000	9,000	7,500	7,500	7,500	7,500	6,000	6,000	6,000	6,000
	$V_f(\text{mm/min})$	8,000	7,200	8,200	6,750	6,750	6,750	7,200	6,000	6,000	6,000
	$a_p(\text{mm})$	0.2	0.15	0.4	0.4	0.25	0.2	0.4	0.4	0.25	0.2
	$a_e(\text{mm})$	2.1	2.1	2.8	2.8	2.8	2.8	4.2	4.2	4.2	4.2
Mold steel 30 - 43HRC	$n(\text{min}^{-1})$	8,500	8,500	7,100	7,100	7,100	7,100	5,700	5,700	5,700	5,700
	$V_f(\text{mm/min})$	7,600	6,800	7,800	6,400	6,400	6,400	6,800	5,700	5,700	5,700
	$a_p(\text{mm})$	0.2	0.15	0.4	0.4	0.25	0.2	0.4	0.4	0.25	0.2
	$a_e(\text{mm})$	2.1	2.1	2.8	2.8	2.8	2.8	4.2	4.2	4.2	4.2
Tool & Die steel below 255HB	$n(\text{min}^{-1})$	8,500	8,500	7,100	7,100	7,100	7,100	5,700	5,700	5,700	5,700
	$V_f(\text{mm/min})$	7,600	6,800	7,800	6,400	6,400	6,400	6,800	5,700	5,700	5,700
	$a_p(\text{mm})$	0.2	0.15	0.4	0.4	0.25	0.2	0.4	0.4	0.25	0.2
	$a_e(\text{mm})$	2.1	2.1	2.8	2.8	2.8	2.8	4.2	4.2	4.2	4.2
Stainless steel below 250HB	$n(\text{min}^{-1})$	8,000	8,000	6,700	6,700	6,700	6,700	5,400	5,400	5,400	5,400
	$V_f(\text{mm/min})$	6,400	5,600	7,300	6,000	6,000	6,000	6,400	5,400	5,400	5,400
	$a_p(\text{mm})$	0.2	0.15	0.4	0.4	0.25	0.2	0.4	0.4	0.25	0.2
	$a_e(\text{mm})$	2.1	2.1	2.8	2.8	2.8	2.8	4.2	4.2	4.2	4.2
Hardened die steel 40 - 50HRC	$n(\text{min}^{-1})$	6,900	6,900	6,000	6,000	6,000	6,000	4,700	4,700	4,700	4,700
	$V_f(\text{mm/min})$	5,500	4,800	6,600	4,800	4,800	4,800	5,600	4,700	4,700	4,700
	$a_p(\text{mm})$	0.15	0.1	0.2	0.2	0.15	0.1	0.2	0.2	0.15	0.1
	$a_e(\text{mm})$	2.1	2.1	2.8	2.8	2.8	2.8	4.2	4.2	4.2	4.2
Grey & Nodular cast iron below 300 HB	$n(\text{min}^{-1})$	7,400	7,400	6,400	6,400	6,400	6,400	5,100	5,100	5,100	5,100
	$V_f(\text{mm/min})$	6,600	5,900	7,600	5,700	5,700	5,700	6,100	5,100	5,100	5,100
	$a_p(\text{mm})$	0.2	0.15	0.4	0.4	0.25	0.2	0.4	0.4	0.25	0.2
	$a_e(\text{mm})$	2.1	2.1	2.8	2.8	2.8	2.8	4.2	4.2	4.2	4.2

ap adjustment by corner radius ap × ratio	Tool dia.(mm)	$a_p(\text{mm})$
	φ6×R0.5	65%
	φ6×R1.0	80%
	φ6×R1.5	100%

- Note) 1. Please adjust cutting conditions according to machine rigidity or work rigidity.
 2. In case of chatter occurring, recommended to reduce a_p or V_f .
 3. Recommended to reduce the parameters when using on low horse power machine.
 4. Use air blow.
 5. Reduce a_p , n & V_f by 30% in case of cutting material 50-55HRC.
 6. Reduce V_f for better surface finish.
 7. Use angle $2^\circ 30'$ or below in case of ramping (see right figure).
 8. In case of slotting with over $5x D_c$, reduce V_f or a_p appropriately.



★ Insert Mounting Information

1. Make sure the insert seat on body is carefully cleaned.
2. Make sure insert itself is clean, especially the hole and face location.
3. Change insert screw when threads starts to wear.
4. Do not over tighten screw. See table for torque specifications.

Toll dia. (mm)	Torque
ϕD_c	N·m
6	0.5
8	0.9
10	1.2
12	2.0
16	3.0
20	4.0

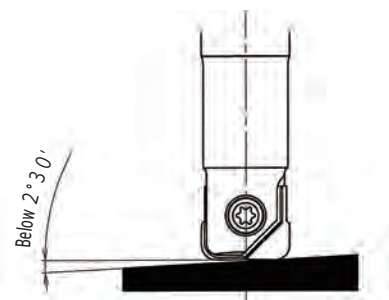
MIRROR RADIUS

RNM/MRX Type

■ Recommended Cutting Conditions - <HRM type>High Feed / Semi finishing

Material		Tool dia.(mm)											
		$\phi 12 \times R2 / \phi 13 \times R2$				$\phi 16 \times R3 / \phi 17 \times R3$				$\phi 20 \times R3 / \phi 22 \times R3$			
		2.5 D	5.0 D	7.5 D	10 D	2.5 D	5.0 D	7.5 D	10 D	2.5 D	5.0 D	7.5 D	10 D
Carbon steel below 250HB	$n(\text{min}^{-1})$	5,000	5,000	5,000	5,000	3,800	3,800	3,800	3,800	3,000	3,000	3,000	3,000
	$V_f(\text{mm/min})$	6,000	5,000	5,000	5,000	4,500	3,800	3,800	3,800	3,600	3,000	3,000	3,000
	$a_p(\text{mm})$	0.5	0.4	0.25	0.2	0.6	0.6	0.4	0.3	0.6	0.6	0.4	0.3
	$a_e(\text{mm})$	5.6	5.6	5.6	5.6	7	7	7	7	9.8	9.8	9.8	9.8
Mold steel 30 - 43HRC	$n(\text{min}^{-1})$	4,700	4,700	4,700	4,700	3,500	3,500	3,500	3,500	2,800	2,800	2,800	2,800
	$V_f(\text{mm/min})$	5,600	4,700	4,700	4,700	4,200	3,500	3,500	3,500	3,300	2,800	2,800	2,800
	$a_p(\text{mm})$	0.4	0.4	0.25	0.2	0.6	0.6	0.4	0.3	0.6	0.6	0.4	0.3
	$a_e(\text{mm})$	5.6	5.6	5.6	5.6	7	7	7	7	9.8	9.8	9.8	9.8
Tool & Die steel below 255HB	$n(\text{min}^{-1})$	4,700	4,700	4,700	4,700	3,500	3,500	3,500	3,500	2,800	2,800	2,800	2,800
	$V_f(\text{mm/min})$	5,600	4,700	4,700	4,700	4,200	3,500	3,500	3,500	3,300	2,800	2,800	2,800
	$a_p(\text{mm})$	0.4	0.4	0.25	0.2	0.6	0.6	0.4	0.3	0.6	0.6	0.4	0.3
	$a_e(\text{mm})$	5.6	5.6	5.6	5.6	7	7	7	7	9.8	9.8	9.8	9.8
Stainless steel below 250HB	$n(\text{min}^{-1})$	4,500	4,500	4,500	4,500	3,400	3,400	3,400	3,400	2,700	2,700	2,700	2,700
	$V_f(\text{mm/min})$	5,400	4,500	4,500	4,500	4,000	3,400	3,400	3,400	3,200	2,700	2,700	2,700
	$a_p(\text{mm})$	0.4	0.4	0.25	0.2	0.6	0.6	0.4	0.3	0.6	0.6	0.4	0.3
	$a_e(\text{mm})$	5.6	5.6	5.6	5.6	7	7	7	7	9.8	9.8	9.8	9.8
Hardened die steel 40 - 50HRC	$n(\text{min}^{-1})$	4,000	4,000	4,000	4,000	3,000	3,000	3,000	3,000	2,400	2,400	2,400	2,400
	$V_f(\text{mm/min})$	4,800	4,000	4,000	4,000	3,600	3,000	3,000	3,000	2,800	2,400	2,400	2,400
	$a_p(\text{mm})$	0.2	0.2	0.15	0.1	0.3	0.3	0.25	0.2	0.3	0.3	0.25	0.2
	$a_e(\text{mm})$	5.6	5.6	5.6	5.6	7	7	7	7	9.8	9.8	9.8	9.8
Grey & Nodular cast iron below 300 HB	$n(\text{min}^{-1})$	4,200	4,200	4,200	4,200	3,200	3,200	3,200	3,200	2,500	2,500	2,500	2,500
	$V_f(\text{mm/min})$	5,000	4,200	4,200	4,200	3,800	3,200	3,200	3,200	3,000	2,500	2,500	2,500
	$a_p(\text{mm})$	0.4	0.4	0.25	0.2	0.6	0.6	0.4	0.3	0.6	0.6	0.4	0.3
	$a_e(\text{mm})$	5.6	5.6	5.6	5.6	7	7	7	7	9.8	9.8	9.8	9.8
a_p adjustment by corner radius $a_p \times \text{ratio}$						Tool dia.(mm)		$a_p(\text{mm})$		Tool dia.(mm)		$a_p(\text{mm})$	
						$\phi 16 \times R2.0$		75%		$\phi 20 \times R2.0$		75%	
						$\phi 16 \times R3.0$		100%		$\phi 20 \times R3.0$		100%	

- Note) 1. Please adjust cutting conditions according to machine rigidity or work rigidity.
 2. In case of chatter occurring, recommended to reduce a_p or V_f .
 3. Recommended to reduce the parameters when using on low horse power machine.
 4. Use air blow.
 5. Reduce a_p , n & V_f by 30% in case of cutting material 50-55HRC.
 6. Reduce V_f for better surface finish.
 7. Use angle $2^\circ 30'$ or below in case of ramping (see right figure).
 8. In case of slotting with over $5 \times D_c$, reduce V_f or a_p appropriately.



★ Insert Mounting Information

1. Make sure the insert seat on body is carefully cleaned.
2. Make sure insert itself is clean, especially the hole and face location.
3. Change insert screw when threads starts to wear.
4. Do not over tighten screw. See table for torque specifications.

Tool dia. (mm)	Torque
ϕD_c	N·m
6	0.5
8	0.9
10	1.2
12	2.0
16	3.0
20	4.0

DIEMASTER 5G

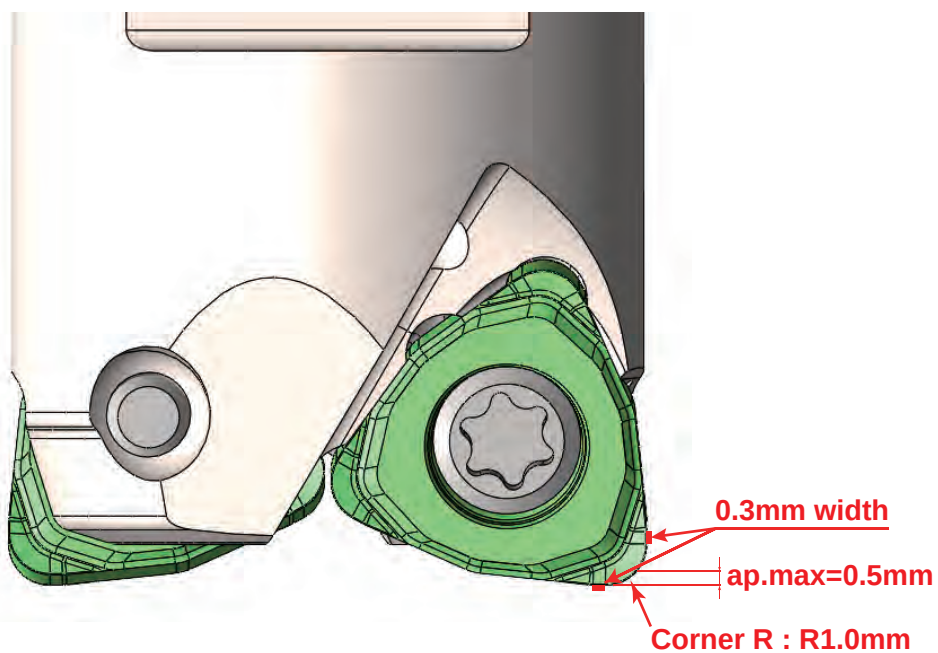
Multi-Purpose tool for semi-Finishing , Finishing



Feature 1

Double wiper insert

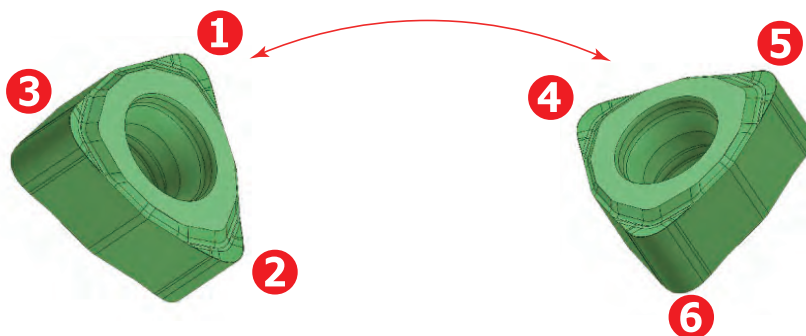
Wiper for face cutting and for periphery cutting



Feature 2

Economical **double-sided** insert (with 6 cutting edges)

High accuracy with H class tolerance



DIEMASTER 5G

MXF/XFG Type

XFG
TYPE

Bore Type

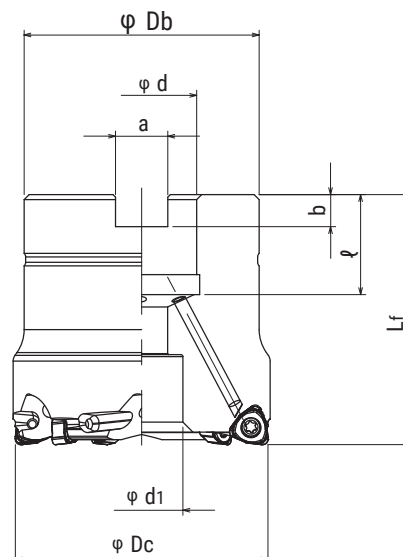
Through
coolant
hole

Face Milling

Copy Milling

Shoulder Milling

Plunge Milling

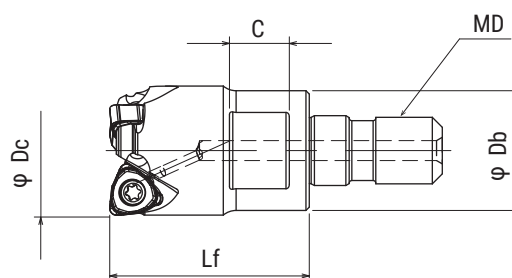
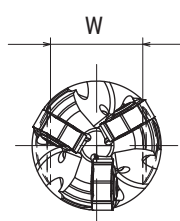


Cat.No.	Stock	No. of inserts	Dimensions (mm)								Arbor set bolt	Weight (kg)	Inserts
			φD_c	L_f	φD_b	φd	φd_1	a	b	ℓ			
XFG-6052R-22	●	6	52	50	47	22	16.5	10.4	6.3	20	M10	0.56	WNHU04T310ZER
XFG-7066R-27	●	7	66	50	48	27	20.0	12.4	7	22	M12×1.75×30★	0.72	

Screw	Torque(N.m)	Wrench
TSW-2567H	1.1	A-08

Through
coolant
holeMXF
TYPE

Modular Type



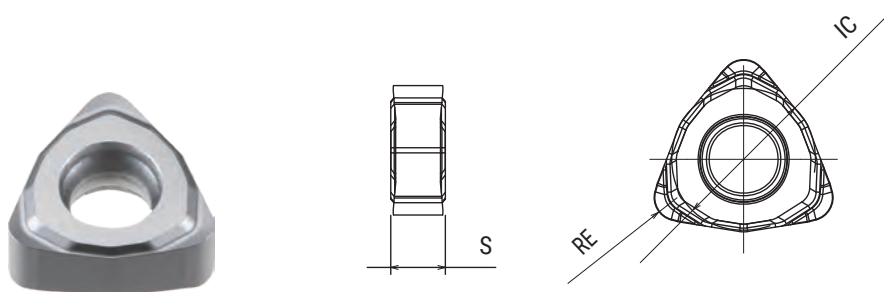
Cat.No.	Stock	No. of inserts	Dimensions (mm)						Insert
			φD_c	L_f	φD_b	MD	C	W	
MXF-2016-M8	●	2	16	23	14	M8	8	12	WNHU04T310ZER
MXF-3020-M10	●	3	20	30	18	M10	9	14	
MXF-4025-M12	●	4	25	35	22	M12	11	19	
MXF-5035-M16	●	5	35	43	29	M16	12	22	
MXF-6042-M16	●	6	42	43	32	M16	14	26	

Screw	Torque(N.m)	Wrench
TSW-2567H	1.1	A-08

DIEMASTER 5G

MXF/XFG Type

Insert



Cat.No.	Tolerance	PVD coated		Dimensions (mm)		
		DH103	JC8015	RE	IC	S
WNHU04T310ZER	H	●	●	1.0	6.35	3.33

DIEMASTER 5G

MXF/XFG Type

● Attention



Attention to mounting head and MSN/ MGN shank arbor.

■ Tightening procedure

① Cleaning

Remove dirt and chips with air from the connecting thread and face of modular head and MSN/MGN shank arbor.

② Initial Tightening

Tighten by hand until the head and the shank arbor faces touch.

③ Final Tightening

Tighten slowly with torque control spanner wrench or DIJET DS type spanner wrench and confirm that there is no gap.

Attention: Final tightening without initial tightening cause connecting thread damage.



NOTE

Note: 1. Please gently apply pressure on wrench.

2. Please confirm that there is no gap between MSN/MGN shank arbor and modular

Thread	Tightening torque	Spanner size W (mm)
M8	16N · m	12 ☆
M10	16N · m	14, 15
M12	20N · m	17, 19
M16	25N · m	22, 26

Note: 1. Modular heads are supplied without spanner wrench.

2. In case of choosing torque control spanner wrench, confirm that the wrench size is match to the dimensions W & C of each modular head. (There are some cases that modifying the thickness of spanner wrench is necessary)

3. ☆ mark shows: DIJET have a stock of DS-8 and 12 type spanner wrenches.

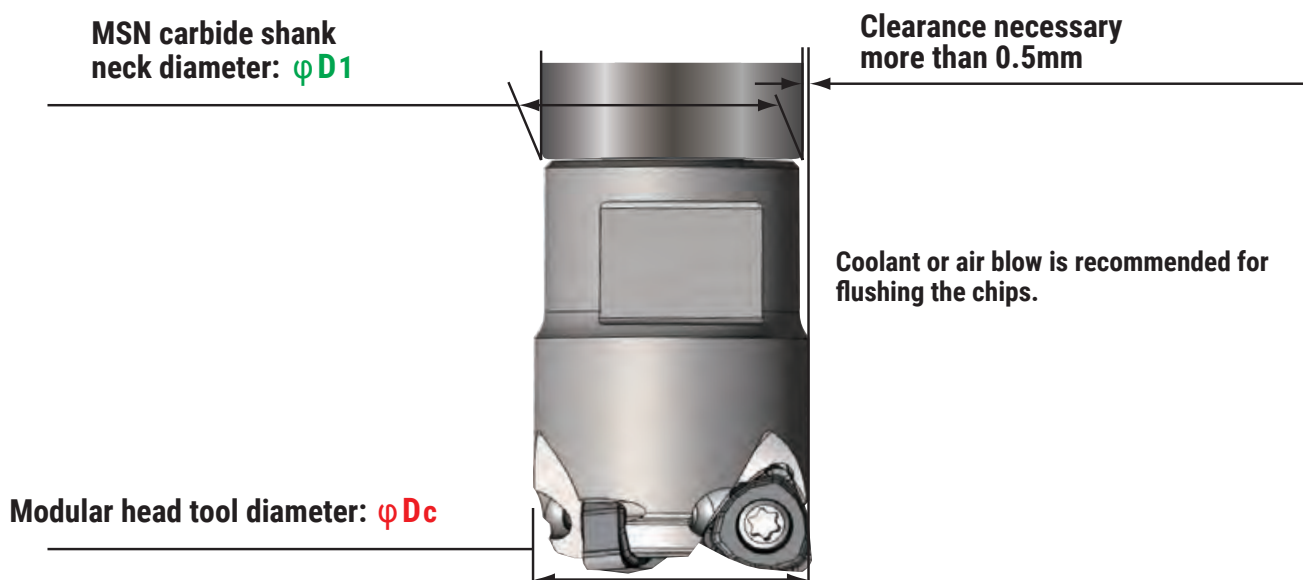


Selection of "MSN Carbide shank arbor"

In case of using modular head over $\varnothing 16\text{mm}$, please select **MSN carbide shank arbor that diameter ($\varnothing D1$) is 1mm or more smaller than modular head ($\varnothing Dc$).**

A wrong selection causes damage to the carbide shank.

$$\varnothing Dc - \varnothing D1 \geq 1\text{mm}$$



Caution for the mounting to shrink fit holder.

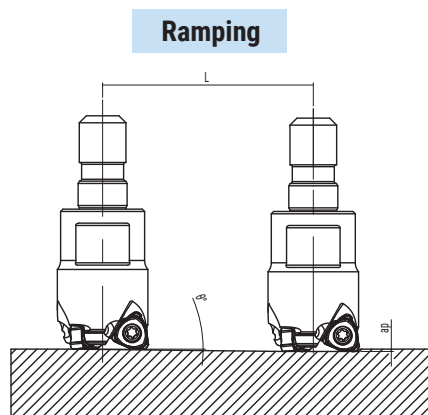
When you use a carbide shank and a modular head on the shrink fit holder, please shrink fit the only the carbide shank without modular head. **Please mount a modular head after cooling off.**

Note: In case of shrink fit MSN shank + modular head together, it will be difficult to loose due to heat desipation.

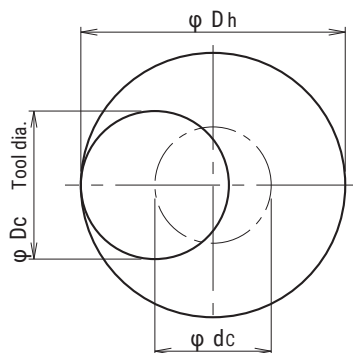
DIEMASTER 5G

MXF/XFG Type

Attention for profile milling



Helical interpolation



- In case of ramping and helical interpolation, apply 80% or less feed speed from standard cutting condition table.
- In case of helical interpolation, recommend wet cutting by coolant through the tool.

● Calculation of tool pass dia.

$$\phi_{dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool dia.

- Depth of cut per one circuit should not exceed max. depth of cut a_p
- Down cutting is recommended, so tool pass rotation should be counterclockwise.
- To obtain a flat bottom surface when helical milling, it requires to remove "the uncut part" in the center of work materials at final pass.

Cat. No.	Tool dia. (mm)	Max. depth of cut (mm)	Ramping		Helical interpolation		
			Max. ramping angle θ°	Total cutting length at Max. a_p	Through hole Min. bore dia. Dh min (mm)	Through hole Max. bore dia. Dh max (mm)	Flat bottom Max. bore dia. Dh min (mm)
MXF-2016-M8	16	0.5	0.4	72	28.2	31	29.6
MXF-3020-M10	20	0.5	0.3	95	36.2	39	37.6
MXF-4025-M12	25	0.5	0.2	143	46.2	49	47.6
MXF-5035-M16	35	0.5	0.15	191	66.2	69	67.6
MXF-6042-M16	42	0.5	0.1	286	80.2	83	81.6
XFG-6052R-22	52	0.5	0.1	286	100.2	103	101.6
XFG-7066R-27	66	0.5	Ramping & helical interpolation is not recommended.				

※ Drilling is not recommended.

DIEMASTER 5G

MXF/XFG Type

■ Recommended Cutting Conditions

Material	Grade		Finishing		Semi Finishing
			Side Wall	Bottom Face	
Carbon steel below 250HB	JC8015	Vc(mm/min)	300	260	190
		fz(mm/t)	0.20	0.20	0.4 - 0.6
		ap(mm)	0.30	0.20	0.20
		ae(mm)	0.10	~ 0.7 Dc	0.5Dc
Cast steel below 285HB	JC8015	Vc(mm/min)	300	260	190
		fz(mm/t)	0.20	0.20	0.4 - 0.6
		ap(mm)	0.30	0.20	0.20
		ae(mm)	0.10	~ 0.7 Dc	0.5Dc
Tool & die steel below 255HB	JC8015	Vc(mm/min)	300	260	175
		fz(mm/t)	0.20	0.20	0.4 - 0.6
		ap(mm)	0.30	0.20	0.20
		ae(mm)	0.10	~ 0.7 Dc	0.5Dc
Mold steel 30-36 HRC	DH103 JC8015	Vc(mm/min)	300	260	175
		fz(mm/t)	0.20	0.20	0.4 - 0.6
		ap(mm)	0.30	0.20	0.20
		ae(mm)	0.10	~ 0.7 Dc	0.5Dc
Mold steel 38-43HRC	DH103 JC8015	Vc(mm/min)	280	240	160
		fz(mm/t)	0.15	0.15	0.4 - 0.6
		ap(mm)	0.30	0.20	0.20
		ae(mm)	0.10	~ 0.7 Dc	0.5Dc
Hardened die steel 42-52HRC	DH103 JC8015	Vc(mm/min)	250	190	150
		fz(mm/t)	0.08	0.08	0.4 - 0.6
		ap(mm)	0.30	0.15	0.20
		ae(mm)	0.10	~ 0.7 Dc	0.5Dc
Grey cast iron 160-260HB	DH103 JC8015	Vc(mm/min)	350	300	160
		fz(mm/t)	0.25	0.20	0.4 - 0.6
		ap(mm)	0.30	0.20	0.20
		ae(mm)	0.20	~ 0.7 Dc	0.5Dc
Nodular cast iron 170-300HB	DH103 JC8015	Vc(mm/min)	350	300	160
		fz(mm/t)	0.25	0.20	0.4 - 0.6
		ap(mm)	0.30	0.20	0.20
		ae(mm)	0.20	~ 0.7 Dc	0.5Dc
Stainless steel	JC8015	Vc(mm/min)	280	240	170
		fz(mm/t)	0.20	0.20	0.4 - 0.6
		ap(mm)	0.30	0.15	0.20
		ae(mm)	0.10	~ 0.7 Dc	0.5Dc
Titanium alloy Ti-6Al-4V 35-43HRC	JC8015	Vc(mm/min)	100	55	-
		fz(mm/t)	0.12	0.10	-
		ap(mm)	0.25 - 0.30	0.20	-
		ae(mm)	0.10	~ 0.7 Dc	-
Heat resistant alloy INCO718 35-43HRC	JC8015	Vc(mm/min)	80	55	-
		fz(mm/t)	0.12	0.10	-
		ap(mm)	0.25 - 0.30	0.20	-
		ae(mm)	0.10	~ 0.7 Dc	-

Vc : Cutting speed fz : Feed rate per tooth ap : Depth of cut ae : Width of cut

Note

1. The above cutting conditions should be adjusted according to the machine rigidity and workpiece rigidity.
2. The above cutting conditions are for a overhung length of 3Dc.
Adjust the rotation speed n (min-1) and feed rate Vf (mm/min) according to the protrusion length.
3. If chattering occurs, reduce the depth of cut to a shallower depth than the above values or lower the feed rate.
4. Remove chips by air blow. Be especially careful when machining cavities with a vertical MC.
5. When using a steel shank, reduce the rotation speed n (min-1) and feed rate Vf (mm/min) to 80% of the above conditions.

DIEMASTER 5G

MXF/XFG Type

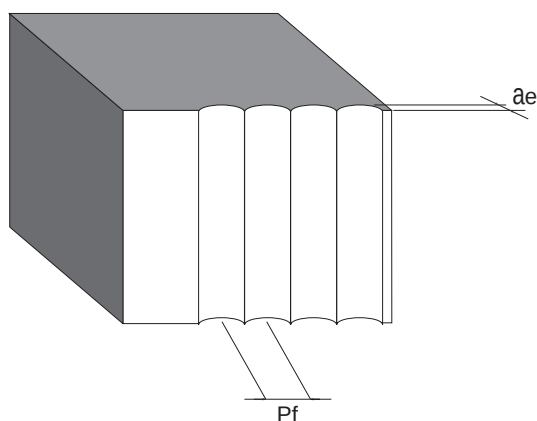
■ Recommended Cutting Conditions

Material	Grade		Plunging	
			Finishing	Semi Finishing
Carbon steel below 250HB	JC8015	Vc(mm/min)	400	300
		fz(mm/t)	0.10	0.15
		ae(mm)	~0.2	~2
		Pf(mm)	-	~0.15Dc
Cast steel below 285HB	JC8015	Vc(mm/min)	400	300
		fz(mm/t)	0.10	0.15
		ae(mm)	~0.2	~2
		Pf(mm)	-	~0.15Dc
Tool & die steel below 255HB	JC8015	Vc(mm/min)	350	260
		fz(mm/t)	0.10	0.15
		ae(mm)	~0.2	~2
		Pf(mm)	-	~0.15Dc
Mold steel 30-36 HRC	DH103 JC8015	Vc(mm/min)	300	220
		fz(mm/t)	0.10	0.12
		ae(mm)	~0.2	~2
		Pf(mm)	-	~0.15Dc
Mold steel 38-43HRC	DH103 JC8015	Vc(mm/min)	200	150
		fz(mm/t)	0.10	0.12
		ae(mm)	~0.2	~2
		Pf(mm)	-	~0.15Dc
Hardened die steel 42-52HRC	DH103 JC8015	Vc(mm/min)	140	100
		fz(mm/t)	0.07	0.10
		ae(mm)	~0.2	~2
		Pf(mm)	-	~0.15Dc
Grey cast iron 160-260HB	DH103 JC8015	Vc(mm/min)	500	370
		fz(mm/t)	0.10	0.15
		ae(mm)	~0.2	~2
		Pf(mm)	-	~0.15Dc
Nodular cast iron 170-300HB	DH103 JC8015	Vc(mm/min)	500	370
		fz(mm/t)	0.10	0.15
		ae(mm)	~0.2	~2
		Pf(mm)	-	~0.15Dc

Vc : Cutting speed fz : Feed rate per tooth ae : Width of cut Pf : Pick Feed

Note

1. The above cutting conditions should be adjusted according to the machine rigidity and workpiece rigidity.
2. The above cutting conditions are for a overhung length of 3Dc.
Adjust the rotation speed n (min-1) and feed rate Vf (mm/min) according to the protrusion length.
3. If chattering occurs, reduce the depth of cut to a shallower depth than the above values or lower the feed rate.
4. Remove chips by air blow. Be especially careful when machining cavities with a vertical MC.
5. When using a steel shank, reduce the rotation speed n (min-1) and feed rate Vf (mm/min) to 80% of the above conditions.



SUPER DIEMASTER

HDM/SDH Type

HDM
TYPE

Bore Type / Standard Pitch
High Efficient Indexable Radius Tool

Through coolant
hole

G-Body

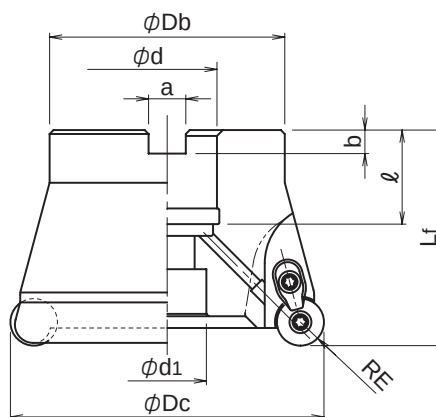
Face Milling

Copy Milling

Pocket Milling

Helical Interpolation

- High rigidity insert for stable machining.
- Positive axial rake reduces cutting force.



Cat.No.	Stock	No. of inserts	Dimensions(mm)									Arbor set bolt	Parts		Weight (kg)	Inserts
			φDc	RE	Lf	φDb	φd	φd1	a	b	ℓ		Screw	Wrench		
HDM-3050-12R-22	●	3	50	6	50	47	22	16.5	10.4	6.3	20	M10	DSW-410H	A-15T	0.5	RD**1204MO...
HDM-3050-16R-22	●			8	55							M10	DSW-4512H	A-20	0.5	RD**1606MO...
HDM-4063-12R-22	●	4	63	6	50	60						M10	DSW-410H	A-15T	0.7	RD**1204MO...
HDM-4063-16R-22	●			8	M10							DSW-4512H	A-20	0.7	RD**1606MO...	

Screw	Torque (N.m)
DSW-410H	3.6
DSW-4512H	6.0

MD	Hexagonal wrench(mm) for Arbor set bolt
M10	8
M12	10
M16	14
M20	17
M24	19

Inserts	Screw	Clamp	Wrench
RD**1204MO*	DSW-410H	DCM-18	A-15T
RD**1606MO*	DSW-4512H	DCM-17	A-20

SUPER DIEMASTER

HDM/SDH Type

HDM
TYPE

Bore Type / Fine Pitch

 Through
coolant
hole

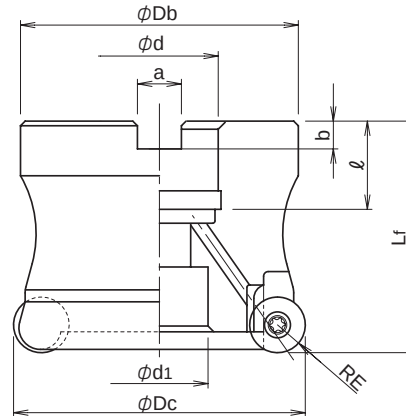
G-
Body

Face Milling

Copy Milling

Pocket Milling

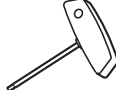
Helical Interpolation



Cat.No.	Stock	No. of inserts	Dimensions(mm)									Arbor set bolt	Weight (kg)	Parts		Inserts
			φDc	RE	Lf	φDb	φd	φd1	a	b	ℓ			Screw	Wrench	
HDM-4050-16R-22	●	4	50	8	55	47	22	16.5	10.4	6.3	20	M10	0.4	DSW-4512H	A-20	RD**1606MO...
HDM-5050-12R-22	●	5		6	50							60	M10	0.4	DSW-410H	A-15T
HDM-5052-12R-22	●		52	6		40							M10	0.5	DSW-410H	A-15T
HDM-5063-16R-27	●		63	8		60	27	20	12.4	7	22		M12	0.7	DSW-4512H	A-20
HDM-6063-12R-27	●	6		6	M12							0.8	DSW-410H	A-15T	RD**1204MO...	
HDM-6080-16R-27	●	6	8	55	76	M12						1.3	DSW-4512H	A-20	RD**1606MO...	
HDM-7080-12R-27	●	7	6			M12						1.4	DSW-410H	A-15T	RD**1204MO...	

Screw	Torque (N.m)
DSW-4512H	6
DSW-410H	3.6

MD	Hexagonal wrench(mm) for Arbor set bolt
M10	8
M12	10
M16	14
M20	17
M24	19

Inserts	Screw	Wrench
		
RD**1204MO*	DSW-410H	A-15T
RD**1606MO*	DSW-4512H	A-20

SUPER DIEMASTER

HDM/SDH Type

SDH
TYPE

Modular Type / Standard Pitch

Through
coolant
hole

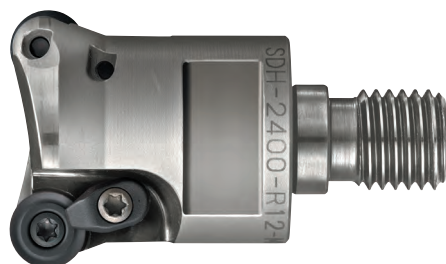
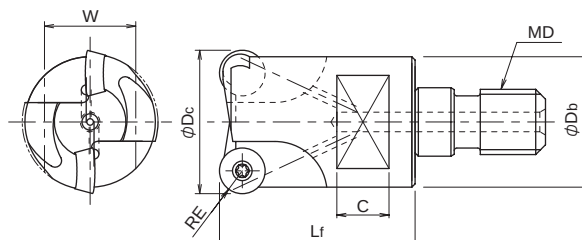
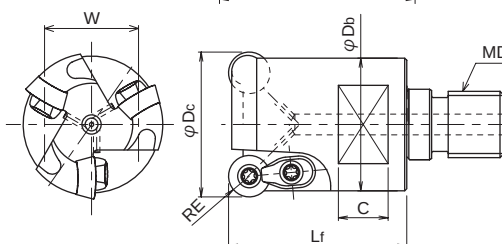
G
Body

Face Milling

Copy Milling

Pocket Milling

Helical Interpolation


Fig 1

Fig 2


Cat.No.	Stock	No. of inserts	Dimensions(mm)							Parts			Inserts	Fig.		
			φDc	RE	Lf	φDb	MD	C	W	Screw	Clamp	Wrench				
SDH-2150-R07-M8	●	2	15	3.5	23	13.8	M8	8	12	TSW-2556H	-	A-08SD	RD**07T2MO...	1		
SDH-2160-R07-M8	●		16			15	M8								14	
SDH-2200-R07-M10	●		20		30	18	M10									
SDH-2220-R07-M10	●		22			20	M10									
SDH-2250-R10-M12	●	3	25	5	35	23	M12	10	17	CSW-408H	DCM-18	A-15	RD**1004MO...	2		
SDH-2280-R10-M12	●		28			25	M12								22	
SDH-2300-R10-M16	●		30		43	28	M16		12							26
SDH-2320-R12-M16	●		32				6								M16	
SDH-3320-R10-M16	●	35	5	32		M16	DSW-410H									
SDH-2350-R12-M16	●		6			M16	CSW-408H									
SDH-3350-R10-M16	●	3	5	M16		CSW-408H										
SDH-2400-R12-M16	●	2	40	6		M16	13	26	DSW-410H							

Screw	Torque (N.m)
TSW-2556H	1.1
CSW-408H	3.6
DSW-410H	3.6

SUPER DIEMASTER

HDM/SDH Type

SDH
TYPE

Modular Type / Fine Pitch

Through
coolant
hole

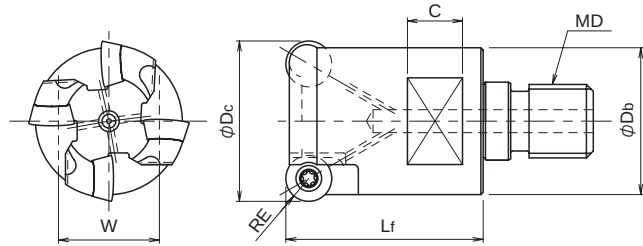
G-
Body

Face Milling

Copy Milling

Pocket Milling

Helical Interpolation



Cat.No.	Stock	No. of inserts	Dimensions(mm)							Parts		Inserts
			ϕD_c	RE	Lf	ϕD_b	MD	C	W	Screw	Wrench	
SDH-3200-R07-M10	●	3	20	3.5	30	18	M10	8	14	TSW-2556H	A-08SD	RD**07T2MO...
SDH-3220-R07-M10	●		22			20	M10					
SDH-3250-R07-M12	●		25			23	M12					
SDH-3250-R10-M12	●	4	28	5	35	25	M12	10	17	CSW-408H	A-15	RD**1004MO...
SDH-3280-R10-M12	●		30			28	M16					
SDH-3300-R10-M16	●		32				M16					
SDH-4300-R10-M16	●	3	35	6	43	32	M16	12	22	DSW-410H	A-15	RD**1204MO...
SDH-4350-R10-M16	●		40				M16			CSW-408H		RD**1004MO...
SDH-4400-R12-M16	●		42				M16	13	26	DSW-410H		RD**1204MO...
SDH-5420-R10-M16	●	5	42	5			M16			CSW-408H		RD**1004MO...

Screw	Torque (N.m)
TSW-2556H	1.1
CSW-408H	3.6
DSW-410H	3.6

SUPER DIEMASTER

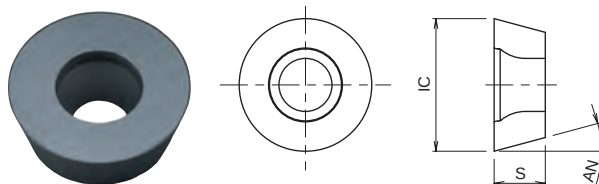
HDM/SDH Type

Insert

Standard type

Flat top inert

for General steel



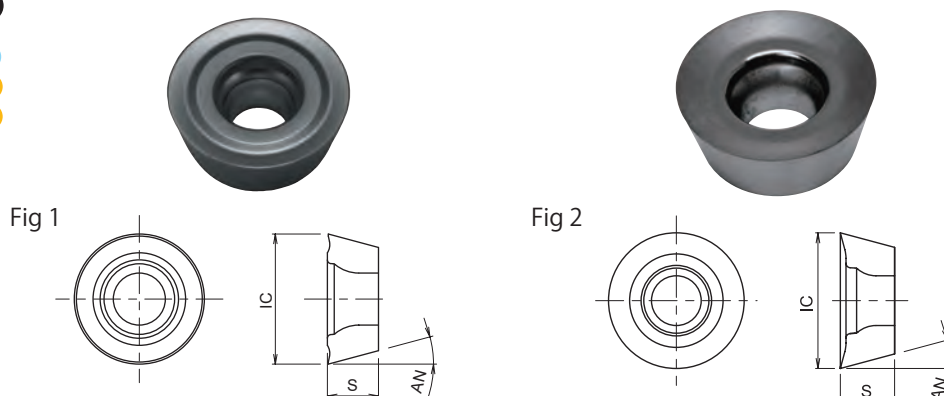
Cat.No.	Tolerance	PVD Coating			Dimensions(mm)		
		DH103	JC5040	JC8015	IC	S	AN
RDMW07T2MOT	M	●	●	●	7	2.7	15°
RDMW1004MOT		●	●	●	10	4.1	
RDMW1204MOT		●	●	●	12	4.8	
RDMW1606MOT		●	●	●	16	6	

Low cutting force

Chip breaker style

for Titanium + Inconel

for Stainless steel



Cat.No.	Tolerance	PVD Coating			Dimensions(mm)			Fig.
		JC8015	JC8050	JC8118	IC	S	AN	
RDGT07T2MOE	G	●	●		7	2.7	15°	1
RDGT1004MOE		●	●		10	4.1		
RDGT1004MOT		●	●		12	4.8		
RDGT1204MOE		●	●		16	6		
RDGT1204MOT		●	●					
RDGT1606MOE		●	●					
RDGT1606MOT	M	●	●		7	2.7		2
RDMT07T2MOE			●	●	10	4.1		
RDMT1004MOE			●	●	12	4.8		
RDMT1004MOE-ML			●	●				1
RDMT1004MOT			●	●				
RDMT1204MOE			●	●	16	6		2
RDMT1204MOE-ML			●	●				
RDMT1204MOT			●	●				
RDMT1606MOE			●	●				1
RDMT1606MOT			●	●				

SUPER DIEMASTER

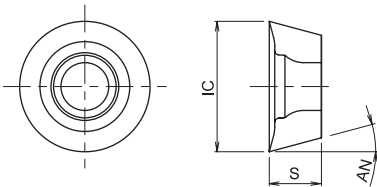
HDM/SDH Type

Insert

Low cutting force

Chip breaker style

for Aluminium

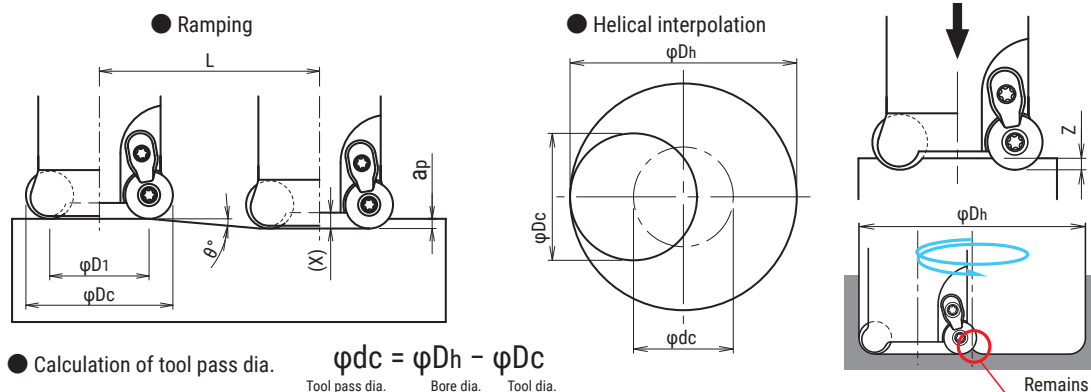


Cat.No.	Tolerance	Uncoated	Dimensions(mm)		
		FZ05	IC	S	AN
RDGT07T2MOF-AL	G	●	7	2.7	15°
RDGT1004MOF-AL		●	10	4.1	
RDGT1204MOF-AL		●	12	4.8	
RDGT1606MOF-AL		●	16	6	

SUPER DIEMASTER

HDM/SDH Type

Recommended Data for Profile Milling



Tool dia. (mm)	Insert dia. (R) (mm)	Effective cutting dia. ϕ_{D1} (mm)	Min. Bore dia. $D_h \text{ min}$ (mm)	Max. Bore dia. $D_h \text{ max}$ (mm)	Max. ramping angle: θ	Max.depth of cut: a_p (mm)	Max.depth of cut (a_p) Total cutting length: L (mm)	Max. drilling length: Z (mm)	Depth of holder face: X (mm)
15	7 (R3.5)	8	20	28	3°00'	3.5	66.8	0.4	1.0
16	7 (R3.5)	9	22	30	9°00'	3.5	22.1	1.5	2.5
20	7 (R3.5)	13	30	38	5°30'	3.5	36.3	1.5	2.5
22	7 (R3.5)	15	34	42	4°35'	3.5	43.6	1.5	2.5
25	7 (R3.5)	18	40	48	3°40'	3.5	54.6	1.5	2.5
25	10 (R5)	15	34	48	10°45'	5.0	26.3	2.5	3.5
28	10 (R5)	18	40	54	8°20'	5.0	34.1	2.5	3.5
30	10 (R5)	20	44	58	7°15'	5.0	39.3	2.5	3.5
32	10 (R5)	22	48	62	6°25'	5.0	44.4	2.5	3.5
32	12 (R6)	20	44	62	7°35'	6.0	45.1	2.5	3.5
35	10 (R5)	25	54	68	5°30'	5.0	51.9	2.5	3.5
35	12 (R6)	23	50	68	6°15'	6.0	54.7	2.5	3.5
40	12 (R6)	28	60	78	4°55'	6.0	69.7	2.5	3.5
42	10 (R5)	32	68	82	4°05'	5.0	70.0	2.5	3.5
50	12 (R6)	38	80	98	5°15'	6.0	65.2	3.5	4.5
50	16 (R8)	34	75	98	7°25'	8.0	61.4	4.0	5.0
52	12 (R6)	40	84	102	4°55'	6.0	69.7	3.5	4.5
52	16 (R8)	36	79	102	6°55'	8.0	65.9	4.0	5.0
63	12 (R6)	51	106	124	3°45'	6.0	91.5	3.5	4.5
63	16 (R8)	47	101	124	5°00'	8.0	91.4	4.0	5.0
66	12 (R6)	54	112	130	3°30'	6.0	98.1	3.5	4.5
66	16 (R8)	50	107	130	4°40'	8.0	98.0	4.0	5.0
80	12 (R6)	68	140	158	2°45'	6.0	124.9	3.5	4.5
80	16 (R8)	64	135	158	3°30'	8.0	130.7	4.0	5.0
100	16 (R8)	84	175	198	2°35'	8.0	177.3	4.0	5.0
125	16 (R8)	109	225	248	1°55'	8.0	239.1	4.0	5.0
160	16 (R8)	144	295	318	1°25'	8.0	223.5	4.0	5.0

SUPER DIEMASTER

HDM/SDH Type

Recommended Cutting Conditions

Material	Grade	Vc	Parameters	Insert Type			
				RD**07	RD**10	RD**12	RD**16
Carbon Steel below 250HB	JC8050	170 - 220	fz	~0.25	~0.30	~0.35	~0.37
	JC5040		ap	~1.5	~2.0	~2.5	~4.0
	JC8118		ae	0.7 Dc	0.7 Dc	0.7 Dc	0.7 Dc
Mold Steel 30-43HRC	JC8050	160 - 190	fz	~0.25	~0.29	~0.33	~0.34
	JC8118		ap	~1.5	~2.0	~2.5	~3.5
	JC8015		ae	0.6 Dc	0.6 Dc	0.6 Dc	0.6 Dc
Tool & Die Steel below 255HB	JC5040	160 - 190	fz	~0.25	~0.30	~0.35	~0.37
	JC8118		ap	~1.5	~2.0	~2.5	~4.0
			ae	0.7 Dc	0.7 Dc	0.7 Dc	0.7 Dc
Stainless Steel	JC8050	135 - 160	fz	~0.25	~0.26	~0.28	~0.32
	JC8015		ap	~1.5	~2.0	~2.5	~4.0
	JC8118		ae	0.6 Dc	0.6 Dc	0.6 Dc	0.6 Dc
Hardened Die Steel 40-50HRC	JC8015	120 - 140	fz	~0.20	~0.25	~0.25	~0.25
	DH103		ap	~0.8	~1.5	~1.5	~2.0
			ae	0.4 Dc	0.4 Dc	0.4 Dc	0.4 Dc
Grey & Nodular Cast Iron	JC8015	170 - 220	fz	~0.25	~0.30	~0.35	~0.40
	JC8118		ap	~1.5	~2.0	~2.5	~4.0
			ae	0.7 Dc	0.7 Dc	0.7 Dc	0.7 Dc
Titanium Alloy	JC8050	65	fz	~0.25	~0.25	~0.25	~0.25
	JC8015		ap	~0.5	~0.5	~1.0	~1.5
	JC8118		ae	0.6 Dc	0.6 Dc	0.6 Dc	0.6 Dc
Heat Resistant Alloy	JC8015	30	fz	~0.2	~0.2	~0.2	~0.25
	JC8118		ap	~0.5	~0.5	~1.0	~1.5
	JC8050		ae	0.6 Dc	0.6 Dc	0.6 Dc	0.6 Dc
Aluminium	FZ05	400 - 800	fz	~0.29	~0.30	~0.30	~0.39
			ap	~2.0	~3.5	~4.0	~5.5
			ae	0.6 Dc	0.6 Dc	0.6 Dc	0.6 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or Vf.
3. ap should be reduced when using on low rigidity machine.
4. Use airblow. (For cutting Aluminium, Titanium & Heat resistant alloy Wet cutting is recommended.)
5. When cutting Hard materials (50-55HRC), reduce ap, n & Vf by 30% from standard conditions.

SUPER DIEMASTER

HDM/SDH Type

■ Insert grades

ISO	P					M					K				N				S				H		
	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30	N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20
Range																									

■ Grade selection guide

Material	Cast iron	Carbon steel · Tool steel			Mold steel		Hardened steel	Titanium alloy Inconel		Stainless steel		Aluminium
Grade	JC8015 JC5118	JC5040	JC8118	JC8050	JC8015 JC8118	JC8050	DH103 (over 50HRC) JC8015 JC8118	JC8015 JC8118	JC8050	JC8015 JC8118	JC8050	FZ05
Cat.No.												
RDMW07T2MOT	◎	◎	○		◎		◎	○		○		
RD * T07T2MOE	☆		☆	●	☆	●		◎	●	◎	●	
RDMW1004MOT	◎	◎	○		◎		◎					
RD * T1004MOT	☆				○					○	●	
RD * T1004MOE			☆	●	☆	●		○	●	☆		
RDMT1004MOE-ML									◎		◎	
RDMW1204MOT	◎	◎	○		◎		◎					
RD * T1204MOT	☆				○					○	●	
RD * T1204MOE			☆	●	☆	●		○	●	☆		
RDMT1204MOE-ML									◎		◎	
RDMW1606MOT	◎	◎	○		◎		◎					
RD * T1606MOT	☆				○					○	●	
RD * T1606MOE			☆	●	☆	●		○	◎	☆	◎	
RDGT****MOF-AL												◎

■ Grade selection guide

Material	Cast iron	Carbon steel Tool steel	Mold steel	Hardened steel	Stainless steel	Aluminium
Cat.No./Grade	DH103	JC8015	JC8015	DH103	JC8015	FZ05
RDMW****MOT	◎	◎	◎	◎	◎	
RDGT****MOF-AL						◎

• RDMW type : without chip breaker • RD*T type : with chip breaker

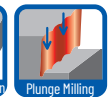
◎ : First choice ○ : General cutting ● : Unstable cutting ☆ : Light cutting

HEPTA MILL

HEP Type

HEP
TYPE

High Feed Mill with 7 Cutting-Edge



- Max. Depth of cut 5mm at fz=1mm/tooth is possible.
- Insert with thickness 6.35mm is durable for heavy roughing.
- Heptagonal insert with unique geometry for lower cutting force.
- Multi functional cutter for ramping , pocket milling , plunging.



Fig 1

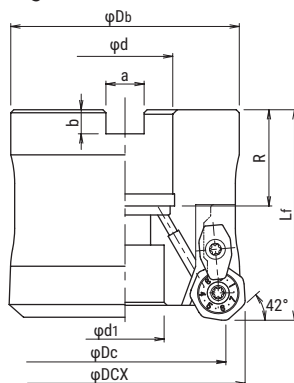


Fig 2

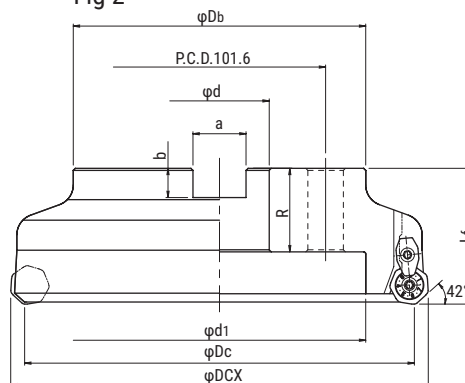
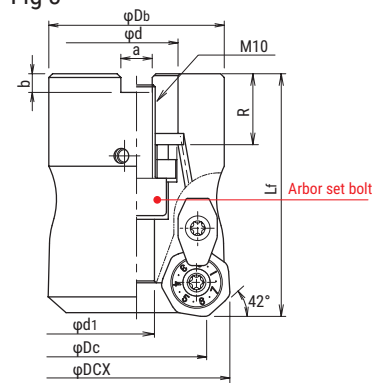


Fig 3



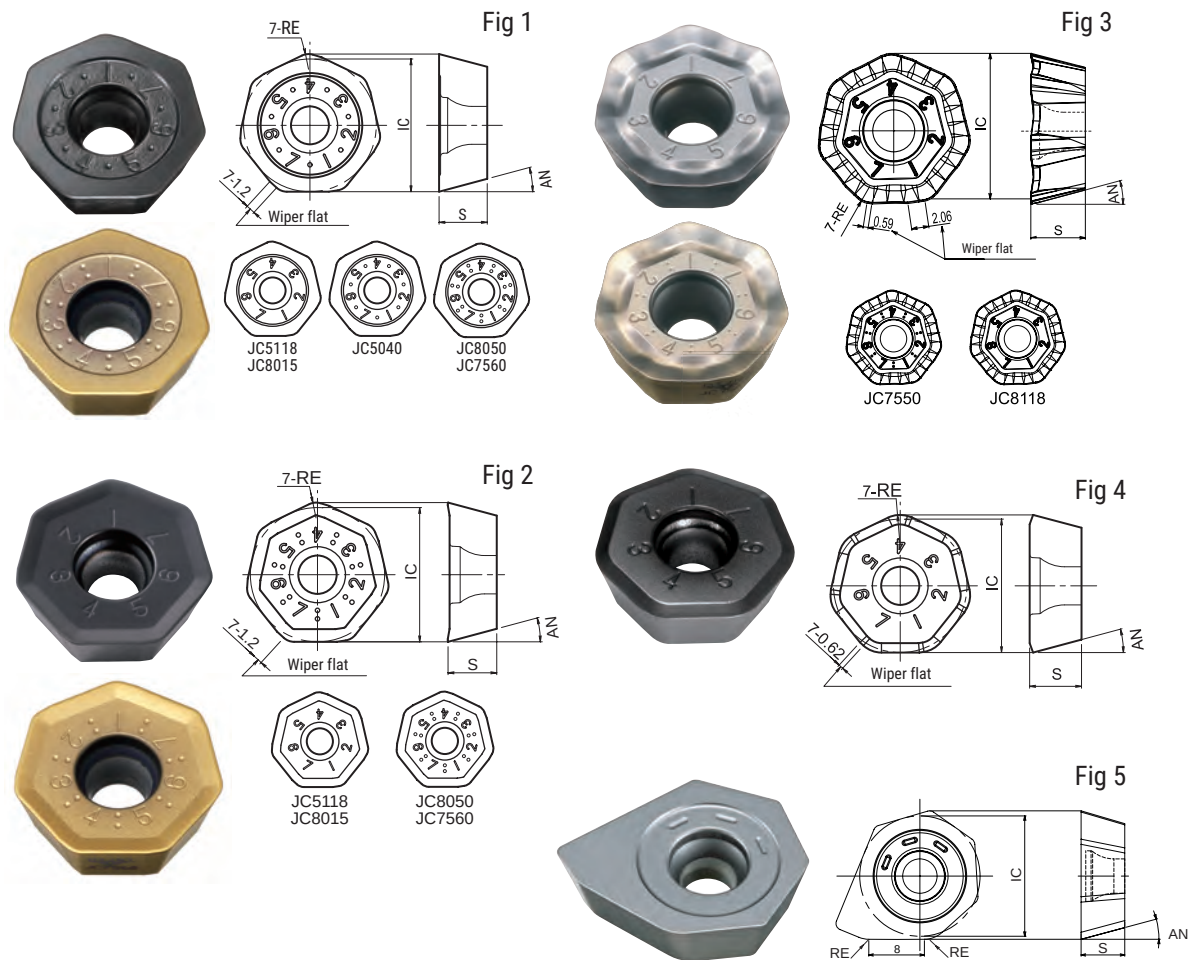
Cat.No.	Stock	No. of inserts	Dimensions (mm)									Arbor set bolt	Parts		Weight (kg)	Inserts	Fig
			φDc	φDCX	Lf	φDb	φd	φd1	a	b	ℓ		Screw	Wrench			
HEP-3050R-08-22	●	3	36.7	50	65	47	22	9.6	10.4	6.3	19	M10X1.5X25★	DSW-4512H	A-20	0.9	XD**080...	3
HEP-4063R-08-22	●	4	49.5	63	50	60		17			20	M10			1.1		
HEP-4063R-08-27	●						27	20	12.4	7	22	M12X1.75X30★			1.1		
HEP-5080R-08-27	●	5	66.6	80	55	76						M12X1.75X40★			1.9		
HEP-6100R-08-32	●	6	86.6	100	70	96	32	26	14.4	8	32	M16X2X45★			3.6		
HEP-7125R-08-40	●	7	111.6	125		100	40	32	16.4	9	35	M20X2.5X45★		5.5			
HEP-8160R-08-40	●	8	146.6	160								M20X2.5X45★		8.4	2		
HEP-9200R-08-60	●	9	186.6	200	65	140	60	140	25.4	14.3	40	M16		10.2			

Screw	Torque(N.m)
DSW-4512H	6

HEPTA MILL

HEP Type

Insert



Cat.No.	Tolerance	PVD Coating							Dimensions(mm)				Fig.
		JC5040	JC7550	JC7560	JC8011	JC8015	JC8050	JC8118	RE	IC	S	AN	
XDMW080620ZTR	M	●		●		●	●	●	2	17.5	6.35	15°	1
XDMW080635ZTR-S						●			3.5				4
XDMT080620ZER				●		●	●	●	2	17.341	6.5		2
XDMT080620ZER-ML			●					●					3
XDHW080610ZER-W	H				●				4	17.5	6.35		5

HEPTA MILL

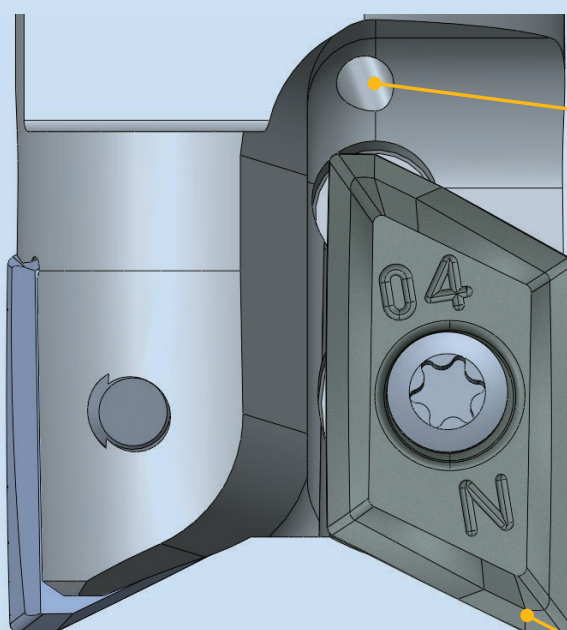
HEP Type

■ Recommended Cutting Conditions

Material	Insert	Grade	General Cutting			Unstable Cutting			ae
			Vc	fz	ap	Vc	fz	ap	
Carbon Steel below 250HB	XDMT080620ZER (XDMW080620ZTR) [XDMW080620ZTR]	JC7560 (JC5040) [JC7560]	140	~0.8	~4	120	~0.8	~4	0.7 Dc
Tool & Die Steel below 255HB	XDMT080620ZER (XDMW080620ZTR) [XDMW080620ZTR]	JC7560 (JC5040) [JC7560]	140	~0.7	~3	120	~0.7	~3	0.7 Dc
Mold Steel 30-36 HRC	XDMT080620ZER (XDMT080620ZER) [XDMW080620ZTR]	JC8118 (JC7560) [JC5040]	140	~0.7	~3	120	~0.7	~3	0.7 Dc
Mold Steel 38-43 HRC	XDMT080620ZER (XDMT080620ZER) [XDMW080620ZTR]	JC8118 (JC8015) [JC8118]	100	~0.7	~3	90	~0.7	~3	0.7 Dc
Hardened Die Steel 42-52 HRC	XDMT080620ZER (XDMT080620ZER) [XDMW080620ZTR]	JC8118 (JC8015) [JC8118]	70	~0.4	~2	70	~0.3	~2	0.4 Dc
Grey Cast Iron	XDMT080620ZTR (XDMT080620ZTR) [XDMW080635ZTR-S]	JC8015 (JC8118) [JC8015]	140	~1.0	~5	120	~1.0	~5	0.7 Dc
Nodular Cast Iron	XDMT080620ZTR (XDMT080620ZTR) [XDMW080635ZTR-S]	JC8015 (JC8118) [JC8015]	120	~0.8	~4	100	~0.7	~4	0.7 Dc
Austenitic Stainless Steel	XDMT080620ZER (XDMT080620ZER) [XDMT080620ZER-ML]	JC8050 (JC7560) [JC7550]	120	~0.5	~4	100	~0.5	~4	0.7 Dc
Titanium Alloy	XDMT080620ZER-ML (XDMT080620ZER) [XDMT080620ZER]	JC7550 JC5040 [JC8118]	60	~0.3	~3	50	~0.2	~3	0.6 Dc
Heat Resistant Alloy	XDMT080620ZER-ML (XDMT080620ZER) [XDMT080620ZER]	JC8118 (JC8118) [JC8015]	30	~0.2	~2	25	~0.2	~2	0.5 Dc

Note

1. Please adjust cutting conditions according to machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce ap or Vf.
3. Use airblow.
4. XDMW080635ZTR-S is recommended to cut cast steel with crusty and nonuniform surface.

AERO CHIPPER**ALX/MAL/AMX/MAM Type***Aerospace Tooling***High Precision and High Efficient Machining
on Aerospace tooling****Through coolant hole****High Precision**

Combination of high accuracy body and ground insert gives excellent side wall finish.

High Efficiency

Sharp & Unique 3D geometry insert enables high efficiency and low cutting resistance machining. Key in insert gives added security allowing high speed spindle machining.

Multi function

AERO CHIPPER

ALX/MAL/AMX/MAM Type

AMX/MAM
TYPE

- Bore type
 $\phi 40 - \phi 63$
- Modular Head type
 $\phi 16 - \phi 42$

MAX.ap = 8mm

XOET0803..PDFR
grade: FZ05

RE: 0.4 - 2.0

ALX/MAL
TYPE

- Bore type
 $\phi 50 - \phi 63$
- Modular Head type
 $\phi 20 - \phi 40$
- Shank type
 $\phi 20 - \phi 40$

MAX.ap = 15mm

XOGT1605..PDFR
grade: FZ05

RE: 0.2 - 4.0



XOGT1605..PDER
grade: JC5118

RE: 0.2 - 3.2

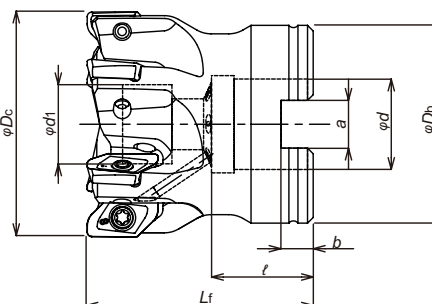
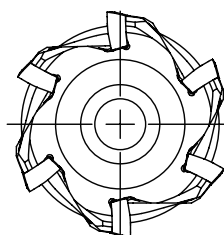


AERO CHIPPER

AMX/MAM Type

AMX
TYPE

Bore Type

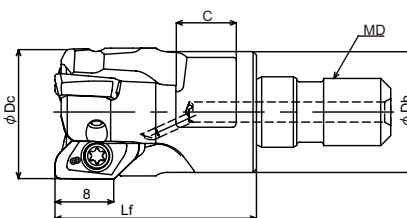
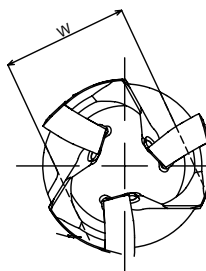
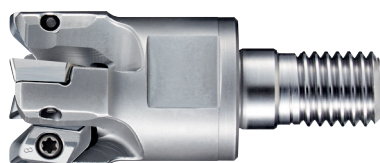
Through
coolant
hole

Cat.No.	Stock	No. of inserts	Dimensions(mm)								Max. spindle speed	Weight (kg)	Inserts
			ϕD_c	L_f	ϕD_b	ϕd	ϕd_1	a	b	ℓ			
AMX-6040R-16	●	6	40	40	35	16	14	8.4	5.6	18	28,000	0.2	XOET0803**PDFR
AMX-7050R-22	●	7	50	40	45	22	16.5	10.4	6.3	20	24,000	0.3	
AMX-8063R-22	●	8	63	40	50	22	17	10.4	6.3	20	21,000	0.48	

Screw	Torque(N.m)	Wrench
TSW-2567H	1.1	A-08

MAM
TYPE

Modular Type



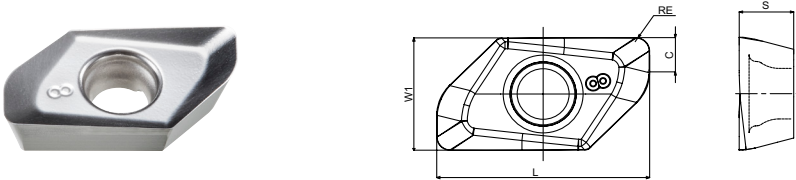
Cat.No.	Stock	No. of inserts	Dimensions(mm)						Max. spindle speed	Inserts	Parts	
			φD _c	L _f	φD _b	MD	C	W			Clamp screw	Wrench
MAM-2016-M8	●	2	16	23	14	M8	8	12	40,000	XOET0803**PDFR	TSW-2556H	A-08
MAM-3020-M10	●	3	20	30	18	M10	9	14	40,000		TSW-2567H	
MAM-3025-M12	○	3	25	35	22	M12	11	19	40,000			
MAM-4025-M12	●	4	25	35	22	M12	11	19	40,000			
MAM-4028-M12	○	4	28	35	23.6	M12	11	19	36,000			
MAM-4030-M16	○	4	30	43	27	M16	12	22	34,000			
MAM-5032-M16	●	5	32	43	29	M16	12	22	33,000			
MAM-5035-M16	○	5	35	43	32	M16	14	26	31,000			
MAM-6040-M16	●	6	40	43	32	M16	14	26	28,000			
MAM-6042-M16	○	6	42	43	32	M16	14	26	27,000			

Screw	Torque(N.m)	Wrench
TSW-2556H	1.1	A-08
TSW-2567H		

AERO CHIPPER

AMX/MAM Type

Insert



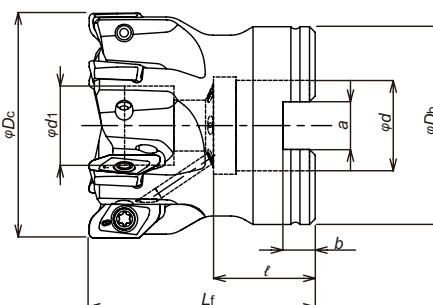
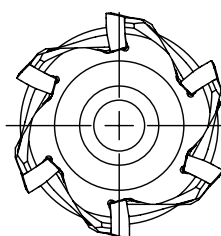
Cat.No.	Tolerance	Uncoated	Dimensions (mm)				
		FZ05	RE	L	W1	S	C
XOET080304PDFR	E	●	0.4	12.5	6.8	3.2	1.7
XOET080308PDFR		●	0.8	12.5	6.8	3.2	2
XOET080316PDFR		●	1.6	12.5	6.8	3.2	2.9
XOET080320PDFR		●	2.0	12.5	6.8	3.2	3

AERO CHIPPER

ALX/MAL Type

ALX
TYPE

Bore Type

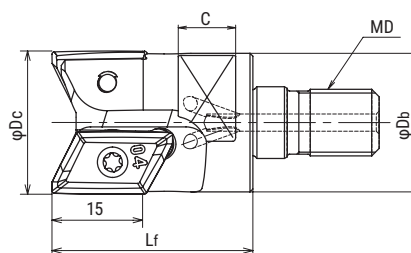
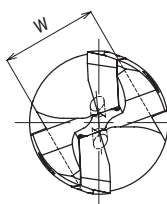
Through
coolant
hole

Cat.No.	Stock	No. of inserts	Dimensions(mm)								Max. spindle speed	Weight (kg)	Inserts
			φDc	Lf	φDb	φd	φd1	a	b	ℓ			
ALX4050R-22	●	4	50	50	45	22	16.5	10.4	6.3	20	24,000	0.4	XOGT1605**PD*R
ALX5063R-22	●	5	63		50						21,000	0.6	

Screw	Torque (N.m)	Wrench
DSW-4085	3.6	A-15T

Through
coolant
holeMAL
TYPE

Modular Type

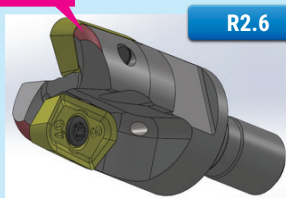


Cat.No.	Stock	No. of inserts	Dimensions(mm)						Max. spindle speed	Inserts
			φD _c	L _f	φD _b	MD	C	W		
MAL-1020-M10	●	1	20	35	19.5	M10	9	14	15,000	XOGT1605**PD*R
MAL-2025-M12	●	2	25		24	M12	10	19	40,000	
MAL-2028-M12	●		28						36,000	
MAL-2030-M16	●		30	28	M16	12	22	34,000		
MAL-2032-M16	●		32					29	33,000	
MAL-2035-M16	●		35						31,000	
MAL-3040-M16	●	3	40	32			14	26	28,000	

Screw	Torque (N.m)	Wrench
DSW-4085	3.6	A-15

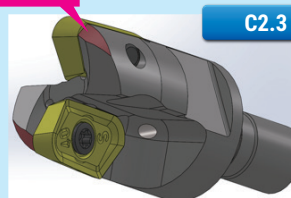
Part to be modified

R2.6



Part to be modified

C2.3



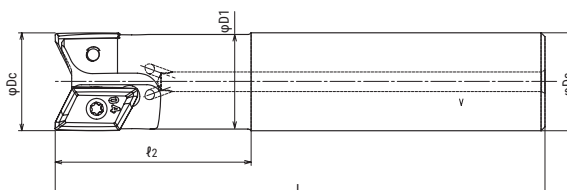
When using inserts with corner radius RE 4 (XOGT160540PDFR), Standard cutter body has to be modified with R2.6 or C2.3

AERO CHIPPER

ALX/MAL Type

ALXM
TYPE

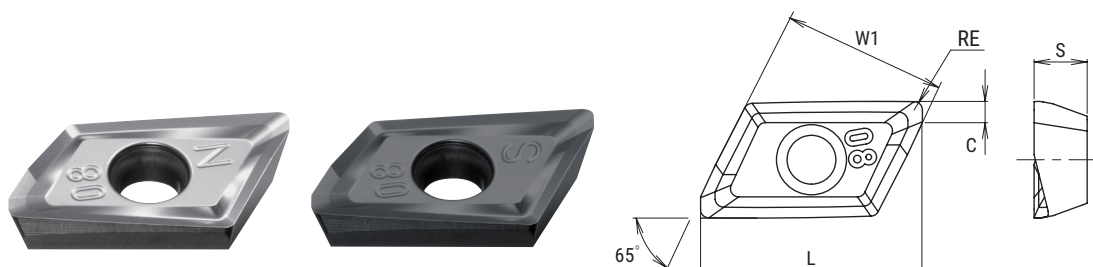
Shank Type

Through
coolant
holeG-
Body

Cat.No.	Stock	No. of inserts	Dimensions(mm)					Max. spindle speed	Parts		Inserts
			φDc	ℓ2	L	φD1	φDs		Screw	Wrench	
ALXM1020S20	●	1	20	35	110	19.18	20	15,000	DSW-4075H	A-15	XOGT1605**PD*R
ALXM2025S25	●	2	25	50	125	24	25	40,000	DSW-4085		
ALXM2028S25	●		28			26.87		36,000			
ALXM2032S32	●		32		150	30.5	32	33,000			
ALXM2035S32	●		35			33.32		31,000			
ALXM3040S32	●	3	40	80	170	37.96		28,000			

Screw	Torque (N.m)
DSW-4075H	3.6
DSW-4085	3.6

Insert



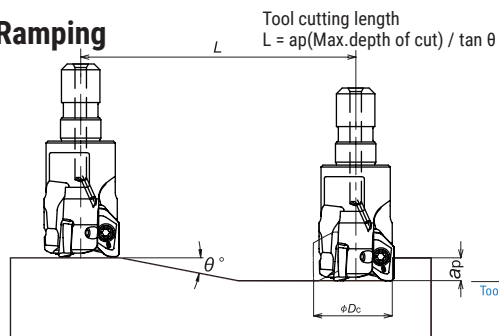
Cat.No.	Tolerance	PVD Coating	Uncoated	Dimensions (mm)					
		JC5118	FZ05	RE	L	W1	S	C	
XOGT160502PDFR	G		●	0.2	20.8	16.35	5	2.5	
XOGT160504PDFR			●	0.4	21.0			2.4	
XOGT160508PDFR			●	0.8					
XOGT160512PDFR			●	1.2	20.9			2.5	
XOGT160516PDFR			●	1.6	20.7			2.6	
XOGT160520PDFR			●	2.0	20.6			2.8	
XOGT160525PDFR			●	2.5	20.3			3.0	
XOGT160530PDFR			●	3.0	20.1			3.3	
XOGT160532PDFR			●	3.2	19.9			3.5	
XOGT160540PDFR			●	4.0	19.2			4.3	
XOGT160502PDER			●		0.2			20.8	2.5
XOGT160504PDER			●		0.4			21.0	2.4
XOGT160508PDER			●		0.8				
XOGT160512PDER			●		1.2			20.9	2.5
XOGT160516PDER			●		1.6			20.7	2.6
XOGT160520PDER			●		2.0			20.6	2.8
XOGT160530PDER			●		3.0			20.1	3.3
XOGT160532PDER			●		3.2			19.9	3.5

AERO CHIPPER

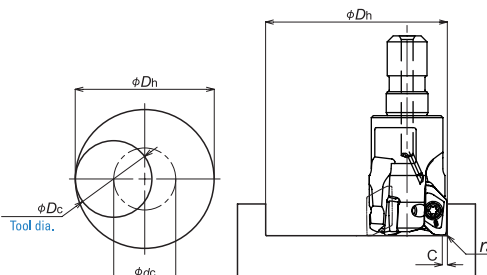
AMX/MAM Type

■ Recommended Data for Profile Milling

Ramping



Helical interpolation



● Calculation of tool pass dia.

$$\phi_{dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool dia.

● Depth of cut per one circuit should not exceed max. depth of cut ap.

● Down cutting is recommended, so tool pass rotation should be counterclockwise.

Cat.No.	Tool dia.	RE	Eff. Cutting dia. (mm)	Max. Depth of cut (mm) ap	Ramping		Helical interpolation			Max. Drilling Depth (mm)
					Max. ramping angle θ°	Total cutting length at Max. ap L (mm)	Through hole Min. bore dia. Dh min (mm)	Flat bottom Min. bore dia. Df min (mm)	Through hole Max. bore dia. ϕ_{Dh} max (mm)	
MAM-2016-M8	16	0.4	15.1	5	18	15.4	20	29.0	31	2.5
MAM-2016-M8	16	0.8	14.3	5	18	15.4	20	28.5	31	2.5
MAM-2016-M8	16	1.6	12.7	5	18	15.4	20	27.0	31	2.5
MAM-2016-M8	16	2.0	11.9	5	18	15.4	20	26.5	31	2.5
MAM-3020-M10	20	0.4	19.1	5	14	20.1	28	37.0	39	2.5
MAM-3020-M10	20	0.8	18.3	5	14	20.1	28	36.5	39	2.5
MAM-3020-M10	20	1.6	16.7	5	14	20.1	28	35.0	39	2.5
MAM-3020-M10	20	2.0	15.9	5	14	20.1	28	34.5	39	2.5
MAM-3025... / MAM-4025...	25	0.4	24.1	5	10	28.4	38	47.0	49	2.5
MAM-3025... / MAM-4025...	25	0.8	23.3	5	10	28.4	38	46.5	49	2.5
MAM-3025... / MAM-4025...	25	1.6	21.7	5	10	28.4	38	45.0	49	2.5
MAM-3025... / MAM-4025...	25	2.0	20.9	5	10	28.4	38	44.5	49	2.5
MAM-4028-M12	28	0.4	27.1	5	8.5	33.5	44	53.0	55	2.5
MAM-4028-M12	28	0.8	26.3	5	8.5	33.5	44	52.5	55	2.5
MAM-4028-M12	28	1.6	24.7	5	8.5	33.5	44	51.0	55	2.5
MAM-4028-M12	28	2.0	23.9	5	8.5	33.5	44	50.5	55	2.5
MAM-4030-M16	30	0.4	29.1	5	7.5	38.0	48	57.0	59	2.5
MAM-4030-M16	30	0.8	28.3	5	7.5	38.0	48	56.5	59	2.5
MAM-4030-M16	30	1.6	26.7	5	7.5	38.0	48	55.0	59	2.5
MAM-4030-M16	30	2.0	25.9	5	7.5	38.0	48	54.5	59	2.5
MAM-5032-M16	32	0.4	31.1	5	7	40.7	52	61.0	63	2.5
MAM-5032-M16	32	0.8	30.3	5	7	40.7	52	60.5	63	2.5
MAM-5032-M16	32	1.6	28.7	5	7	40.7	52	59.0	63	2.5
MAM-5032-M16	32	2.0	27.9	5	7	40.7	52	58.5	63	2.5
MAM-5035-M16	35	0.4	34.1	5	6	47.6	58	67.0	69	2.5
MAM-5035-M16	35	0.8	33.3	5	6	47.6	58	66.5	69	2.5
MAM-5035-M16	35	1.6	31.7	5	6	47.6	58	65.0	69	2.5
MAM-5035-M16	35	2.0	30.9	5	6	47.6	58	64.5	69	2.5
MAM-6040... / AMX-6040...	40	0.4	39.1	5	5	57.2	68	77.0	79	2.5
MAM-6040... / AMX-6040...	40	0.8	38.3	5	5	57.2	68	76.5	79	2.5
MAM-6040... / AMX-6040...	40	1.6	36.7	5	5	57.2	68	75.0	79	2.5
MAM-6040... / AMX-6040...	40	2.0	35.9	5	5	57.2	68	74.5	79	2.5
MAM-6042-M16	42	0.4	41.1	5	5	57.2	72	81.0	83	2.5
MAM-6042-M16	42	0.8	40.3	5	5	57.2	72	80.5	83	2.5
MAM-6042-M16	42	1.6	38.7	5	5	57.2	72	79.0	83	2.5
MAM-6042-M16	42	2.0	37.9	5	5	57.2	72	78.5	83	2.5
AMX-7050R-22	50	0.4	49.1	5	4	71.5	88	97.0	99	2.5
AMX-7050R-22	50	0.8	48.3	5	4	71.5	88	96.5	99	2.5
AMX-7050R-22	50	1.6	46.7	5	4	71.5	88	94.5	99	2.5
AMX-7050R-22	50	2.0	45.9	5	4	71.5	88	94.5	99	2.5
AMX-8063R-22	63	0.4	62.1	5	3	95.4	114	123.0	125	2.5
AMX-8063R-22	63	0.8	61.3	5	3	95.4	114	122.5	125	2.5
AMX-8063R-22	63	1.6	59.7	5	3	95.4	114	120.5	125	2.5
AMX-8063R-22	63	2.0	58.9	5	3	95.4	114	120.5	125	2.5

AERO CHIPPER

AMX/MAM Type

■ Recommended Cutting Conditions - Shoulder Milling -

● Bore Type

Material	Grade	Tool dia. (mm)														
		40					50					63				
		6N					7N					8N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	100	8	80	6000	5400	100	8	100	5700	5990	100	8	126	4500	5400
		150	6	42	6000	5400	150	8	80	5700	5990	150	8	126	4500	5400
		200	5	30	4800	4320	200	6	60	4600	4830	200	8	96	4500	5400

● Modular Type + MSN Type carbide shank holder

Material	Grade	Tool dia. (mm)														
		16					20					25				
		2N					2N					3N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	50	8	32	17900	5370	60	8	40	14300	6440	75	8	50	11500	5180
		80	6	15	17900	5370	100	6	18	14300	6440	125	6	24	11500	5180
		130	4	6	14300	4290	160	4	8	11500	5180	200	4	10	9200	4140

Material	Grade	Tool dia. (mm)									
		25/28					30				
		4N					4N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	75	8	50	11500	6900	90	8	60	9500	5700
		125	6	24	11500	6900	150	6	30	9500	5700
		200	4	10	9200	5520	240	4	12	7600	4560

Material	Grade	Tool dia. (mm)									
		32/35					40/42				
		5N					6N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	100	8	64	9000	6750	100	8	80	6000	5400
		160	6	30	9000	6750	160	6	36	6000	5400
		260	4	12	7200	5400	260	4	16	4800	4320

Note

1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water soluble cutting oil is recommended.

AERO CHIPPER**AMX/MAM Type****■ Recommended Cutting Conditions - Face Milling -****● Bore Type**

Material	Grade	Tool dia. (mm)														
		40					50					63				
		6N					7N					8N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	100	5	28	6000	5400	100	5	35	5700	5990	100	5	44	4500	5400
		150	2.5	28	6000	5400	150	3.5	35	5700	5990	150	5	44	4500	5400
		200	1.5	28	4800	4320	200	2.5	35	4600	4830	200	3	44	4500	5400

● Modular Type + MSN Type carbide shank holder

Material	Grade	Tool dia. (mm)														
		16					20					25				
		2N					2N					3N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	50	5	11	17900	5370	60	5	14	14300	6440	75	5	17.5	11500	5180
		80	2.5	11	17900	5370	100	2.5	14	14300	6440	125	2.5	17.5	11500	5180
		130	1	11	14300	4290	160	1	14	11500	5180	200	1	17.5	9200	4140

Material	Grade	Tool dia. (mm)									
		25/28					30				
		4N					4N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	75	5	17.5	11500	6900	90	5	21	9500	5700
		125	2.5	17.5	11500	6900	150	2.5	21	9500	5700
		200	1	17.5	9200	5520	240	1	21	7600	4560

Material	Grade	Tool dia. (mm)									
		32/35					40/42				
		5N					6N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	100	5	22.5	9000	6750	100	5	28	6000	5400
		160	2.5	22.5	9000	6750	160	2.5	28	6000	5400
		260	1	22.5	7200	5400	260	1	28	4800	4320

Note

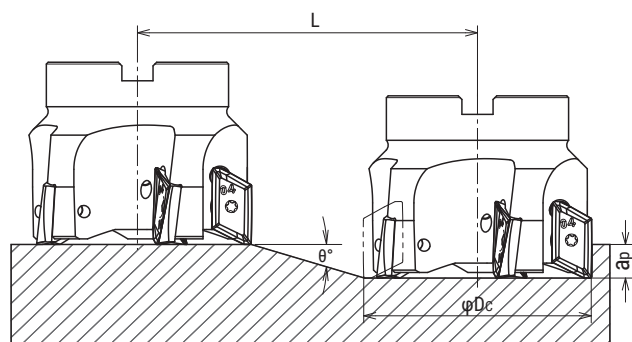
1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water soluble cutting oil is recommended.

AERO CHIPPER

ALX/MAL Type

■ Recommended Data for Profile Milling

Ramping

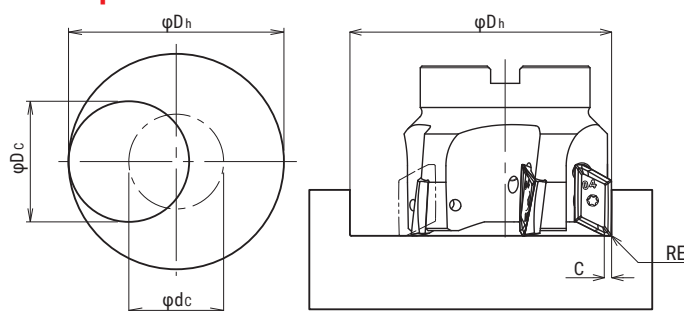


Tool dia. (mm)	Aluminium		Stainless steel		Titanium alloy		Max. Depth of cut (mm)
	Max. ramping angle (°)	Cutting length (mm)	Max. ramping angle (°)	Cutting length (mm)	Max. ramping angle (°)	Cutting length (mm)	
φDc	θ°	L	θ°	L	θ°	L	ap
20	16	28	10	45	10	45	8
25	11	41	9	51	9	51	8
28	9	51	7	65	7	65	8
30	8	57	6	76	6	76	8
32	7	65	6	76	6	76	8
35	6	76	6	76	6	76	8
40	5	91	5	91	5	91	8
50	4	114	4	114	4	114	8
63	3	153	3	153	3	153	8

Note

1. In case of ramping, apply 70% or less feed (Vf) from standard cutting condition table.
2. When cutting Titanium/Stainless steel, apply 0.005mm or less (fz) from standard cutting condition table.
3. Wet cutting is recommended.

Helical interpolation



- Calculation of tool pass dia.

$$\phi_{dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool dia.

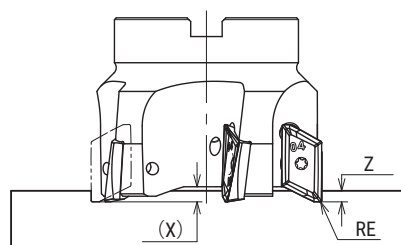
- Depth of cut per one circuit should not exceed max. depth of cut Ap
- Down cutting is recommended, tool pass rotation should be counterclockwise

Tool dia. (mm)	Min.bore dia. (mm)	Max. Bore dia. (mm)	Max.Depth of cut (mm)		
			Aluminium	Stainless steel	Titanium alloy
φDc	φDh min.	φDh max.			
20	35.8	38.6	15	9	9
25	45.8	48.6	13	11	11
28	51.8	54.6	12	10	10
30	55.8	58.6	11	10	10
32	59.8	62.6	11	10	10
35	65.8	68.6	11	11	11
40	75.8	78.6	10	10	10
50	96.8	98.6	10	10	10
63	122.8	124.6	10	10	10

Note

1. In case of helical interpolation, apply 70% or less feed (Vf) from standard cutting condition table.
2. When cutting Titanium/Stainless steel, apply 0.005mm or less (fz) from standard cutting condition table.
3. Wet cutting is recommended.

Drilling



Coner radius R (mm)	Max. depth of cut: Z (mm)
RE	Z
R2.5 or below	3
R3 / R3.2	2
R4	1.5

Note

1. Do not combine drilling and ramping together.
2. In case of drilling, apply 50% or less feed (Vf) from standard cutting condition table.
3. Long chips may come out in case of drilling, confirm safe operating conditions.

AERO CHIPPER**ALX/MAL Type****■ Recommended Cutting Conditions - Shoulder Milling -****● Bore Type**

Material	Grade	Tool dia. (mm)									
		50					63				
		4N					5N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	100	15	150	5,700	4,560	100	15	225	4,500	4,500
		150	12	96	5,700	4,560	150	12	168	4,500	4,500
		200	9	54	5,700	4,560	200	9	108	4,500	4,500
Stainless Steel Below 250HB	JC5118	100	10	80	640	260	100	10	120	510	260
		150	8	48	640	260	150	8	88	510	260
		200	6	27	640	260	200	6	54	510	260
Titanium Alloy 35-43 HRC	JC5118	100	15	120	380	120	100	15	180	300	120
		150	12	72	380	120	150	12	132	300	120
		200	9	40	380	120	200	9	81	300	120

● Shank Type

Material	Grade	Tool dia. (mm)									
		20					25/28				
		2N					2N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	35	12	40	14,300	1,430	50	15	75	11,500	4,600
		60	9	25	14,300	1,430	75	12	48	11,500	4,600
Stainless Steel Below 250HB	JC5118	35	2	12	1,590	160	50	10	40	1,270	250
		60	1.2	12	1,590	160	75	8	24	1,270	250
Titanium Alloy 35-43 HRC	JC5118	35	4	12	950	76	50	15	60	760	120
		60	2.5	12	950	76	75	12	36	760	120

Material	Grade	Tool dia. (mm)									
		32/35					40				
		2N					3N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	50	15	120	9,000	3,600	80	15	125	7,200	4,320
		100	12	60	9,000	3,600	120	12	75	7,200	4,320
Stainless Steel Below 250HB	JC5118	50	10	60	990	200	80	10	65	800	240
		100	8	30	990	200	120	8	40	800	240
Titanium Alloy 35-43 HRC	JC5118	50	15	96	600	96	80	15	100	480	120
		100	12	48	600	96	120	12	60	480	120

Note

1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water soluble cutting oil is recommended when machining Aluminium alloy or Titanium alloy.

AERO CHIPPER**ALX/MAL Type****■ Recommended Cutting Conditions - Shoulder Milling -****● Modular Type + MSN Type carbide shank holder**

Material	Grade	Tool dia. (mm)									
		20					25/28				
		1N					2N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	60	12	40	14,300	1,430	75	15	75	11,500	4,600
		100	9	18	14,300	1,430	125	12	36	11,500	4,600
		160	5	8	11,500	1,150	200	6	15	9,200	3,680
Stainless Steel Below 250HB	JC5118	60	8	20	1,590	160	75	10	40	1,270	250
		100	6	10	1,590	160	125	8	20	1,270	250
		160	3	4	1,270	130	200	4	8	1,020	200
Titanium Alloy 35-43 HRC	JC5118	60	12	32	950	76	75	15	60	760	120
		100	9	15	950	76	125	12	30	760	120
		160	5	6	760	61	200	6	12	610	98

Material	Grade	Tool dia. (mm)									
		30/32/35					40				
		2N					3N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	100	15	96	9,000	3,600	100	15	120	6,000	3,600
		160	12	48	9,000	3,600	160	12	60	6,000	3,600
		260	6	18	7,200	2,880	260	6	24	4,800	2,880
Stainless Steel Below 250HB	JC5118	100	10	50	990	200	100	10	65	660	200
		160	8	24	990	200	160	8	32	660	200
		260	4	10	800	160	260	4	12	530	160
Titanium Alloy 35-43 HRC	JC5118	100	15	75	600	96	100	15	96	400	96
		160	12	36	600	96	160	12	45	400	96
		260	6	15	480	77	260	6	18	320	77

Note

1. The figure to be adjusted according to the machine rigidity or work rigidity.
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3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water soluble cutting oil is recommended when machining Aluminium alloy or Titanium alloy.

AERO CHIPPER**ALX/MAL Type****■ Recommended Cutting Conditions - Face Milling -****● Bore Type**

Material	Grade	Tool dia. (mm)									
		50					63				
		4N					5N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	100	6	35	5,700	4,560	100	7	44	4,500	4,500
		150	4	35	5,700	4,560	150	5	44	4,500	4,500
		200	2	35	5,700	4,560	200	3	44	4,500	4,500
Stainless Steel Below 250HB	JC5118	100	3	30	640	260	100	4	38	510	260
		150	2	30	640	260	150	2.5	38	510	260
		200	1	30	640	260	200	1.5	38	510	260
Titanium Alloy 35-43 HRC	JC5118	100	6	30	380	120	100	7	38	300	120
		150	4	30	380	120	150	5	38	300	120
		200	2	30	380	120	200	3	38	300	120

● Shank Type

Material	Grade	Tool dia. (mm)									
		20					25/28				
		2N					2N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	35	4	14	14,300	1,430	50	6	17.5	11,500	4,600
		60	2.5	14	14,300	1,430	75	4	17.5	11,500	4,600
Stainless Steel Below 250HB	JC5118	35	2	12	1,590	160	50	3	15	1,270	250
		60	1.2	12	1,590	160	75	2	15	1,270	250
Titanium Alloy 35-43 HRC	JC5118	35	4	12	950	76	50	6	15	760	120
		60	2.5	12	950	76	75	4	15	760	120

Material	Grade	Tool dia. (mm)									
		32/35					40				
		2N					3N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	50	7	22.5	9,000	3,600	80	6	28	7,200	4,320
		100	4	22.5	9,000	3,600	120	4	28	7,200	4,320
Stainless Steel Below 250HB	JC5118	50	4	19	990	200	80	3	24	800	240
		100	2	19	990	200	120	2	24	800	240
Titanium Alloy 35-43 HRC	JC5118	50	7	19	600	96	80	6	24	480	120
		100	4	19	600	96	120	4	24	480	120

Note

1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water soluble cutting oil is recommended when machining Aluminium alloy or Titanium alloy.

AERO CHIPPER**ALX/MAL Type****■ Recommended Cutting Conditions - Face Milling -****● Modular Type + MSN Type carbide shank holder**

Material	Grade	Tool dia. (mm)									
		20					25/28				
		1N					2N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	60	4	14	14,300	1,430	75	6	17.5	11,500	4,600
		100	2	14	14,300	1,430	125	3	17.5	11,500	4,600
		160	0.8	14	11,500	1,150	200	1.2	17.5	9,200	3,680
Stainless Steel Below 250HB	JC5118	60	2	12	1,590	160	75	3	15	1,270	250
		100	1	12	1,590	160	125	1.5	15	1,270	250
		160	0.5	12	1,270	130	200	0.6	15	1,020	200
Titanium Alloy 35-43 HRC	JC5118	60	4	12	950	76	75	6	15	760	120
		100	2	12	950	76	125	3	15	760	120
		160	0.8	12	760	61	200	1.2	15	610	98

Material	Grade	Tool dia. (mm)									
		30/32/35					40				
		2N					3N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	100	6	22.5	9,000	3,600	100	6	28	6,000	3,600
		160	3	22.5	9,000	3,600	160	3	28	6,000	3,600
		260	1.2	22.5	7,200	2,880	260	1.2	28	4,800	2,880
Stainless Steel Below 250HB	JC5118	100	3	19	990	200	100	3	24	660	200
		160	1.5	19	990	200	160	1.5	24	660	200
		260	0.6	19	800	160	260	0.6	24	530	160
Titanium Alloy 35-43 HRC	JC5118	100	6	19	600	96	100	6	24	400	96
		160	3	19	600	96	160	3	24	400	96
		260	1.2	19	480	77	260	1.2	24	320	77

Note

1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water soluble cutting oil is recommended when machining Aluminium alloy or Titanium alloy.

S-HEAD

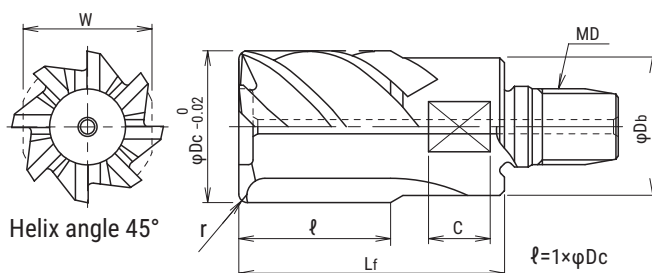
SMSA Type

SMSA
TYPE

Solid Carbide Modular Head

with highly repetitive ground screw

- Applicable for General steel, Stainless steel, Heat resistant alloys and Titanium alloys.
- High accuracy for finishing both side walls and bottom surfaces.
- Coolant through the center of head.
- Available in 6 or 8 flutes.

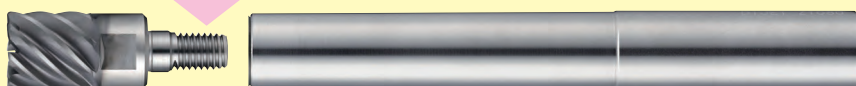


Cat.No.	Stock	No. of Flutes	Dimensions (mm)							
			φD _c	r	ℓ	L _f	φD _b	MD	C	W
SMSA-8160R05-M8	●	8	16	0.5	16	30	15	M8	5.5	14
SMSA-8160R10-M8	●			1						
SMSA-6160R20-M8	●	6		2						
SMSA-6160R30-M8	●		3							
SMSA-8200R05-M10	●	8	20	0.5	20	35	19	M10		17
SMSA-8200R10-M10	●			1						
SMSA-8200R20-M10	●			2						
SMSA-6200R30-M10	●	6		3						
SMSA-8250R10-M12	●	8	25	1	25	43	24	M12		22
SMSA-8250R20-M12	●			2						
SMSA-6250R30-M12	●	6		3						
SMSA-8300R10-M16	●	8	30	1	30	56	29	M16		27
SMSA-8300R20-M16	●			2						
SMSA-6300R30-M16	●	6		3						
SMSA-8320R10-M16	●	8	32	1	32		30			
SMSA-8320R20-M16	●			2						
SMSA-6320R30-M16	●	6		3						

PROPER MOUNTING OF S-HEAD

Use DIJET DS type spanner wrench
to prevent over-tightening

Tightening torque



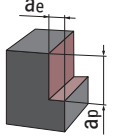
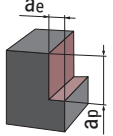
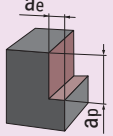
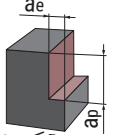
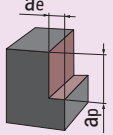
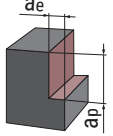
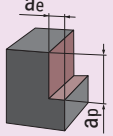
Tool dia. φDc (mm)	Width Across Flat W (mm)	Cat.No. 	Tightening torque
φ16	14	DS-14	10~11N·m
φ20	17	DS-17	10~16N·m
φ25	22	DS-22	15~20N·m
φ30	27	DS-27	20~25N·m
φ32	27	DS-27	20~25N·m

S-HEAD

SMSA Type

■ Recommended cutting conditions

● Side cutting

Material	Depth of cut 	Tool dia. (mm)					
		16			20		
		ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	 $a_p \leq D_c$ $a_e \leq 0.03D_c$	70	2,000	500	75	1,600	400
		110	1,800	400	125	1,400	300
		150	1,600	300	175	1,200	250
Mold steel (NAK80, HPM1, P21) 38-43HRC	 $a_p \leq D_c$ $a_e \leq 0.03D_c$	70	1,400	300	75	1,100	280
		110	1,200	240	125	950	200
		150	1,000	180	175	800	150
Austenitic stainless steel (SUS304, 316, 317)	 $a_p \leq D_c$ $a_e \leq 0.03D_c$	70	2,000	500	75	1,600	400
		110	1,800	400	125	1,400	300
		150	1,600	300	175	1,200	250
Aluminium alloy (A5052)	 $a_p \leq D_c$ $a_e \leq 0.03D_c$	70	4,000	900	75	3,200	800
		110	3,600	800	125	2,800	600
		150	3,200	700	175	2,500	500
Titanium alloy (Ti-6Al-4V) 35-43HRC	 $a_p \leq D_c$ $a_e \leq 0.03D_c$	70	1,400	300	75	1,100	280
		110	1,200	240	125	950	200
		150	1,000	180	175	800	150
Heat resistant alloy (INCO718) 35-43HRC	 $a_p \leq D_c$ $a_e \leq 0.03D_c$	70	800	200	75	600	150
		110	700	150	125	550	120
		150	600	120	175	500	100

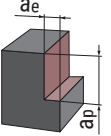
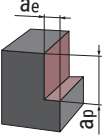
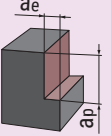
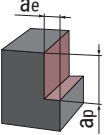
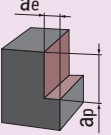
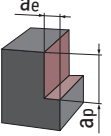
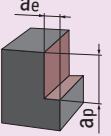
Note

1. When finishing side wall, reduce a_e and increase a_p for higher efficiency and for preventing more heat generation.
2. When finishing bottom face, reduce a_p and increase V_f to optimize use of corner radius geometry for high feed machining.
3. Use appropriate coolant.

S-HEAD**SMSA Type**

■ Recommended cutting conditions

● Side cutting

Material	Depth of cut 	Tool dia. (mm)					
		25			30/32		
		ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	 $ap \leq Dc$ $ae \leq 0.03Dc$	100	1,300	300	110	1,000	240
		150	1,150	250	160	900	200
		200	1,000	200	210	800	160
Mold steel (NAK80, HPM1, P21) 38-43HRC	 $ap \leq Dc$ $ae \leq 0.03Dc$	100	900	240	110	700	180
		150	800	180	160	600	130
		200	600	120	210	500	100
Austenitic stainless steel (SUS304, 316, 317)	 $ap \leq Dc$ $ae \leq 0.03Dc$	100	1,300	300	110	1,000	240
		150	1,150	250	160	900	200
		200	1,000	200	210	800	160
Aluminium alloy (A5052)	 $ap \leq Dc$ $ae \leq 0.03Dc$	100	2,600	650	110	2,000	500
		150	2,300	500	160	1,800	400
		200	2,000	400	210	1,600	300
Titanium alloy (Ti-6Al-4V) 35-43HRC	 $ap \leq Dc$ $ae \leq 0.03Dc$	100	900	240	110	700	180
		150	800	180	160	600	130
		200	600	120	210	500	100
Heat resistant alloy (INCO718) 35-43HRC	 $ap \leq Dc$ $ae \leq 0.03Dc$	100	500	120	110	400	100
		150	450	100	160	380	90
		200	400	80	210	350	80

Note

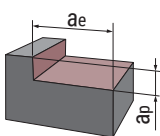
1. When finishing side wall, reduce ae and increase ap for higher efficiency and for preventing more heat generation.
2. When finishing bottom face, reduce ap and increase V_f to optimize use of corner radius geometry for high feed machining.
3. Use appropriate coolant.

S-HEAD

SMSA Type

■ Recommended cutting conditions

● Bottom cutting

Material	Depth of cut 	Tool dia. (mm)					
		16			20		
		ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	$a_e \leq D_c$ $a_p \leq 0.03D_c$	70	2,000	1,600	75	1,600	1,300
		110	1,800	1,400	125	1,400	1,100
		150	1,600	1,200	175	1,200	950
Mold steel (NAK80, HPM1, P21) 38-43HRC	$a_e \leq D_c$ $a_p \leq 0.03D_c$	70	1,400	1,100	75	1,100	900
		110	1,200	950	125	950	800
		150	1,000	800	175	800	600
Austenitic stainless steel (SUS304, 316, 317)	$a_e \leq D_c$ $a_p \leq 0.03D_c$	70	2,000	1,600	75	1,600	1,300
		110	1,800	1,400	125	1,400	1,100
		150	1,600	1,200	175	1,200	950
Aluminium alloy (A5052)	$a_e \leq D_c$ $a_p \leq 0.03D_c$	70	4,000	3,200	75	3,200	2,500
		110	3,600	2,800	125	2,800	2,200
		150	3,200	2,500	175	2,500	2,000
Titanium alloy (Ti-6Al-4V) 35-43HRC	$a_e \leq D_c$ $a_p \leq 0.03D_c$	70	1,400	1,100	75	1,100	900
		110	1,200	950	125	950	800
		150	1,000	800	175	800	600
Heat resistant alloy (INCO718) 35-43HRC	$a_e \leq D_c$ $a_p \leq 0.03D_c$	70	800	650	75	600	500
		110	700	550	125	550	450
		150	600	500	175	500	400

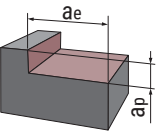
Note

1. When finishing side wall, reduce a_e and increase a_p for higher efficiency and for preventing more heat generation.
2. When finishing bottom face, reduce a_p and increase V_f to optimize use of corner radius geometry for high feed machining.
3. Use appropriate coolant.

S-HEAD**SMSA Type**

■ Recommended cutting conditions

● Bottom cutting

Material	Depth of cut 	Tool dia. (mm)					
		25			30/32		
		ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	$a_e \leq D_c$ $a_p \leq 0.03 D_c$	100	1,300	1,000	110	1,000	800
		150	1,150	900	160	900	700
		200	1,000	800	210	800	600
Mold steel (NAK80, HPM1, P21) 38-43HRC	$a_e \leq D_c$ $a_p \leq 0.03 D_c$	100	900	700	110	700	550
		150	800	600	160	600	500
		200	600	500	210	500	400
Austenitic stainless steel (SUS304, 316, 317)	$a_e \leq D_c$ $a_p \leq 0.03 D_c$	100	1,300	1,000	110	1,000	800
		150	1,150	900	160	900	700
		200	1,000	800	210	800	600
Aluminium alloy (A5052)	$a_e \leq D_c$ $a_p \leq 0.03 D_c$	100	2,600	2,000	110	2,000	1,600
		150	2,300	1,800	160	1,800	1,400
		200	2,000	1,600	210	1,600	1,200
Titanium alloy (Ti-6Al-4V) 35-43HRC	$a_e \leq D_c$ $a_p \leq 0.03 D_c$	100	900	700	110	700	550
		150	800	600	160	600	500
		200	600	500	210	500	400
Heat resistant alloy (INCO718) 35-43HRC	$a_e \leq D_c$ $a_p \leq 0.03 D_c$	100	500	400	110	400	320
		150	450	360	160	380	300
		200	400	320	210	360	280

Note

1. When finishing side wall, reduce a_e and increase a_p for higher efficiency and for preventing more heat generation.
2. When finishing bottom face, reduce a_p and increase V_f to optimize use of corner radius geometry for high feed machining.
3. Use appropriate coolant.

S-HEAD

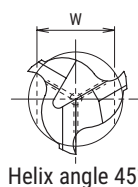
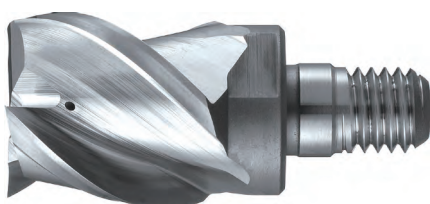
SMAL Type

SMAL
TYPE

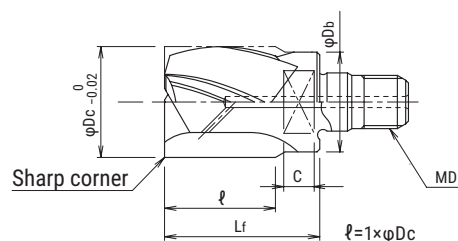
S-HEAD for Aluminium



- Solid carbide modular head with multi-edges for aluminum.
- Positive geometry with 45 degree helix angle & 20 degree rake angle.
- 3 flutes allow excellent chip ejection.
- Through coolant holes prevent material welding.



Helix angle 45°



Cat.No.	Stock	No. of Flutes	Dimensions (mm)						
			φD_c	ℓ	L_f	φD_b	MD	C	W
SMAL-3180-M8	●	3	18	18	26	15	M8	5.5	14
SMAL-3200-M10	●		20	20	28	18	M10		17
SMAL-3220-M10	●		22	22	31	19			19
SMAL-3250-M12	●		25	25	35	23	M12		22
SMAL-3280-M12	●		28	28	38	24			27
SMAL-3320-M16	●		32	32	42	29	M16		

PROPER MOUNTING OF S-HEAD

Use DIJET DS type spanner wrench to prevent over-tightening

Tightening torque

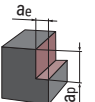
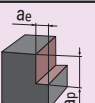
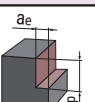
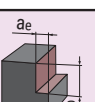


Tool dia ϕD_c (mm)	Screw	Width Across Flat W (mm)	Cat. No. 	Tightening torque
$\phi 18$	M8	14	DS-14	10~11N·m
$\phi 20$	M10	14	DS-14	10~16N·m
$\phi 22$	M10	17	DS-17	10~16N·m
$\phi 25$	M12	19	DS-19	15~20N·m
$\phi 28$	M12	22	DS-22	15~20N·m
$\phi 32$	M16	27	DS-27	20~25N·m

S-HEAD**SMAL Type**

■ Recommended cutting conditions

● Shoulder milling

Material	Depth of cut 	Toll dia. (mm)											
		18		20		22		25		28		32	
		n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)
Aluminium alloy (A5052)	 $a_p \leq D_c$ $a_e \leq 0.05D_c$	3,200	800	2,800	700	2,600	650	2,300	570	2,050	510	1,800	450
Aluminium alloy (A7075)	 $a_p \leq D_c$ $a_e \leq 0.05D_c$	2,600	650	2,400	600	2,100	520	1,900	470	1,700	420	1,500	370
Aluminium alloy (Below Si 13%)	 $a_p \leq D_c$ $a_e \leq 0.05D_c$	3,200	800	2,800	700	2,600	650	2,300	570	2,050	510	1,800	450
Copper alloy (C1100)	 $a_p \leq D_c$ $a_e \leq 0.05D_c$	1,800	450	1,600	400	1,400	350	1,300	320	1,150	280	1,000	250

Note

1. Use water-soluble coolant.
2. Confirm appropriate gripping length of shank.
3. When ramping, apply 40~70% parameters from standard cutting conditions table.
4. Use rigid and accurate machine as possible.
5. If rpm available is lower than that recommended, reduce the feed rate proportionately.
6. Do not use higher rpm than that recommended.

■ Additional cutting conditions for longer tools

The percentages below should be applied, according to L/Dc.

1. Shoulder milling

L / Dc	n (min ⁻¹)	Vf (mm/min)	
~4Dc	0%	0%	-
5~6Dc	25% or below	30% or below	-
7~8Dc	40% or below	50% or below	Over Dc22 is not recommended

2. Slot milling

L / Dc	n (min ⁻¹)	Vf (mm/min)	ap
~4Dc	0%	0%	0.15Dc or below
5~6Dc	not recommended		
7~8Dc	not recommended		

S-HEAD

SMSR Type

SMSR
TYPE

Anti-Vibration Solid Carbide Head

Through
coolant
holeDH
CoatingCorner
radius R

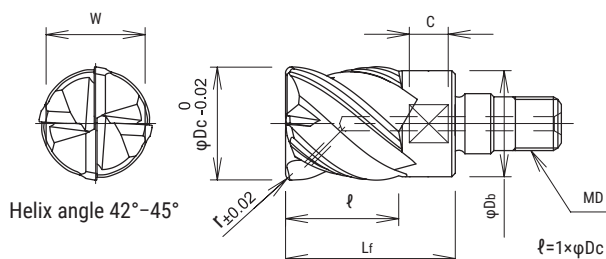
Shoulder Milling

Copy Milling

Pocket Milling

Helical Interpolation

- Unequal pitch & irregular helix achieves stable machining.
- Positive geometry and through coolant hole prevent material welding and gives excellent chip evacuation.
- Widely applied from Carbon steel, Mold steel, Stainless steel & Ti-Alloy.

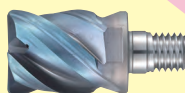


Cat.No.	Stock	No. of Flutes	Dimensions (mm)							
			φDc	r	ℓ	Lf	φDb	MD	C	W
SMSR-4160R05-M8	●	4	16	0.5	16	24	15	M8	5.5	14
SMSR-4160R10-M8	●			1						
SMSR-4160R20-M8	●			2						
SMSR-4160R30-M8	●			3						
SMSR-4200R05-M10	●		20	0.5	20	29	19	M10		17
SMSR-4200R10-M10	●			1						
SMSR-4200R20-M10	●			2						
SMSR-4200R30-M10	●			3						
SMSR-4250R10-M12	●		25	1	25	35	24	M12		22
SMSR-4250R20-M12	●			2						
SMSR-4250R30-M12	●			3						
SMSR-4300R10-M16	●		30	1	30	44	29	M16		27
SMSR-4300R20-M16	●			2						
SMSR-4300R30-M16	●			3						
SMSR-4320R10-M16	●		32	1	32	46	30			
SMSR-4320R20-M16	●			2						
SMSR-4320R30-M16	●			3						

PROPER MOUNTING OF S-HEAD

Use DIJET DS type spanner wrench
to prevent over-tightening

Tightening torque

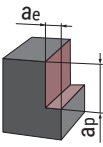
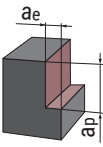
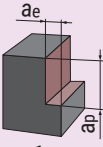
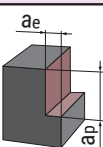
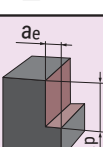
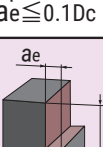


Tool dia φDc (mm)	Width Across Flat W (mm)	Cat. No. 	Tightening torque
φ16	14	DS-14	10~11N·m
φ20	17	DS-17	10~16N·m
φ25	22	DS-22	15~20N·m
φ30	27	DS-27	20~25N·m
φ32	27	DS-27	20~25N·m

S-HEAD**SMSR Type**

■ Recommended cutting conditions

● Side cutting

Material	Depth of cut 	Toll dia. (mm)								
		16			20			25		
		4N			4N			4N		
		ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (S50C, S55C) below 250HB	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	70	2,980	1,430	70	2,390	1,150	100	1,910	920
		110	2,690	1,230	125	2,150	980	150	1,720	780
		150	2,390	1,030	175	1,910	830	200	1,530	660
Mold steel (NAK80, HPM1, P21) 38-43HRC	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	70	2,390	1,150	70	1,910	920	100	1,530	730
		110	2,150	980	125	1,720	780	150	1,380	630
		150	1,910	830	175	1,530	660	200	1,220	530
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	70	1,390	670	70	1,110	530	100	890	430
		110	1,250	570	125	1,000	460	150	800	360
		150	1,110	480	175	890	380	200	710	310
Austenitic stainless steel (SUS304, 316, 317)	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	70	1,990	960	70	1,590	760	100	1,270	610
		110	1,790	820	125	1,430	650	150	1,150	520
		150	1,590	690	175	1,270	550	200	1,020	440
Titanium alloy (Ti-6Al-4V) 35-43HRC	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	70	1,590	640	70	1,270	510	100	1,020	410
		110	1,430	540	125	1,150	440	150	920	350
		150	1,270	460	175	1,020	370	200	810	290
Heat resistant alloy (INCO718) 35-43HRC	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	70	990	200	70	800	160	100	640	130
		110	900	170	125	720	140	150	570	110
		150	800	140	175	640	120	200	510	90

■ Additional cutting conditions for longer tools

The percentages below should be applied, according to L/Dc.

L/D	n (min ⁻¹)	V_f (mm/min)	ap (mm)	ae (mm)
$L \leq 4D$	0%	0%	0%	0%
$4D < L \leq 6D$	20% reduction	30% reduction	0%	$\sim 0.05Dc$
$6D < L$	30% reduction	50% reduction	$\sim 0.5Dc$	$\sim 0.025Dc$

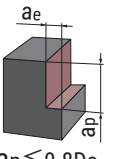
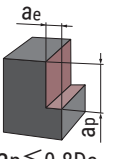
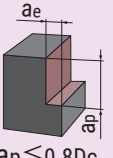
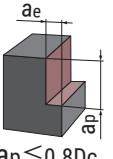
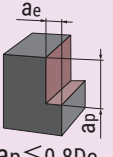
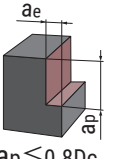
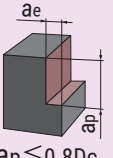
Note: Do not use for slot milling

S-HEAD

SMSR Type

■ Recommended cutting conditions

● Side cutting

Material	Depth of cut 	Toll dia. (mm)								
		30			32					
		4N			4N					
		ℓ (mm)	n (min ⁻¹)	V_f (mm/min)	ℓ (mm)	n (min ⁻¹)	V_f (mm/min)			
Carbon steel (S50C, S55C) below 250HB	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	110	1,590	760	110	1,490	720			
		160	1,430	650	160	1,340	610			
		210	1,270	550	210	1,190	510			
Mold steel (NAK80, HPM1, P21) 38-43HRC	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	110	1,270	610	110	1,190	570			
		160	1,150	520	160	1,070	490			
		210	1,020	440	210	950	410			
Hardened die steel (SKD61, DAC, DHA) 42-52HRC	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	110	740	360	110	700	340			
		160	670	310	160	630	290			
		210	590	250	210	560	240			
Austenitic stainless steel (SUS304, 316, 317)	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	110	1,060	510	110	990	480			
		160	950	430	160	900	410			
		210	850	370	210	800	350			
Titanium alloy (Ti-6Al-4V) 35-43HRC	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	110	850	340	110	800	320			
		160	760	290	160	720	270			
		210	680	240	210	640	230			
Heat resistant alloy (INCO718) 35-43HRC	 $ap \leq 0.8Dc$ $ae \leq 0.1Dc$	110	530	110	110	500	100			
		160	480	90	160	450	90			
		210	420	80	210	400	70			

S-HEAD

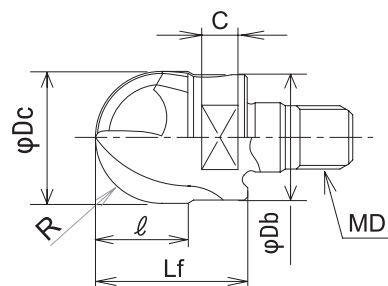
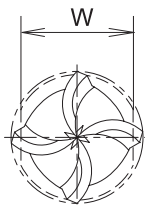
SMHB Type

SMHB
TYPE

4 Flute Solid Carbide Ball Modular Head

For Hard or Difficult to Cut Materials from Roughing to Finishing

- Unique blade shape with sub pocket in center of cutting edge allows stable machining & good chip evacuation.
- Torsional angles of the ball & peripheral flutes are increased to reduce cutting resistance & suppress vibration.



Cat.No.	Stock	No. of Flutes	Dimensions (mm)							
			φD _c	R	ℓ	L _f	φD _b	MD	C	W
SMHB-4160-M8	●	4	16	8	11.2	19	15	M8	5.5	14
SMHB-4200-M10	●		20	10	14	23	19	M10		17

◆ RECOMMENDED TIGHTENING TORQUE

Tool Dia. φDc(mm)	Tightening torque	Width Across Flat W (mm)	Cat.No.
φ16	10~11N·m	14	DS-14
φ20	10~16N·m	17	DS-17

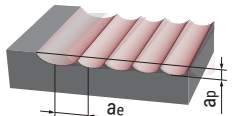
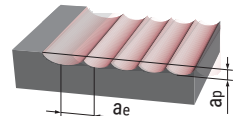
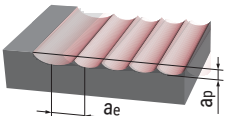
Use DIJET DS type spanner wrench
to prevent over-tightening

Radius tolerance (mm)

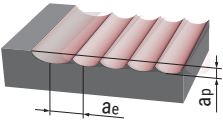
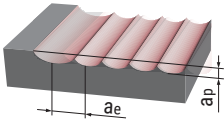
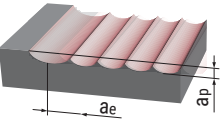
Radius	R tolerance
R8	±0.008
R10	±0.010

■ Recommended cutting conditions

■ FINISHING

Material		Carbon steel・Alloy steel		Hardened die steel (SKD61,DAC,DHA) 42~52HRC		Stainless steel・Heat resistant alloy 38~42HRC	
Type of machining		 $ap \leq 0.03Dc$ $ae \leq 0.03Dc$		 $ap \leq 0.03Dc$ $ae \leq 0.03Dc$		 $ap \leq 0.03Dc$ $ae \leq 0.03Dc$	
		Tool dia.		n (min ⁻¹)		Vf (mm/min)	
		R	φ Dc	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)
8	16	6,000	4,000	5,000	3,000	5,500	3,500
10	20	5,700	4,000	4,500	3,000	5,000	3,500

■ SEMI-FINISHING · ROUGHING

Material		Carbon steel・Alloy steel ~25HRC		Hardened die steel (SKD61,DAC,DHA) 42~52HRC		Stainless steel・Heat resistant alloy 38~42HRC	
Type of machining		 $ap \leq 0.1Dc$ $ae \leq 0.25Dc$		 $ap \leq 0.1Dc$ $ae \leq 0.25Dc$		 $ap \leq 0.1Dc$ $ae \leq 0.25Dc$	
Tool dia.		n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)
R	φ Dc						
8	16	4,500	3,000	3,800	2,200	4,200	2,600
10	20	4,300	3,000	3,400	2,200	3,800	2,600

Carbide Modular Head Holder

MSN Type

Through
coolant
holeMSN
TYPE

Solid Monoblock Carbide Body



Fig.1

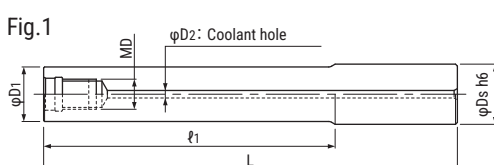
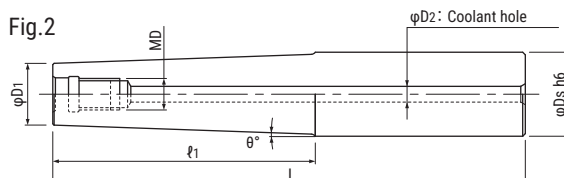


Fig.2



Cat.No.	Stock	Dimensions(mm)							Weight (kg)	Fig.
		ϕDs	ℓ_1	L	$\phi D1$	θ°	MD	$\phi D2$		
MSN-M6-12-S10C	●	10	12	60	9.7	-	M6	3	0.06	1
MSN-M6-30-S10C	●	10	30	80	9.7	-			0.07	1
MSN-M6-50-S10C	●	10	50	100	9.7	-			0.09	1
MSN-M6-80-S10C	●	10	90	130	9.7	-			0.12	1
NEW MSN-M6-120-S10C	●	10	120	170	9.7	-			0.16	1
NEW MSN-M6-170-S10C	●	10	170	220	9.7	-			0.20	1
MSN-M6-35T-S12C	○	12	35	92	9.5	1°30'			0.12	2
MSN-M6-57T-S12C	●	12	57	114	9.5	1°			0.14	2
MSN-M6-15-S12C	●	12	15	60	11.5	-			0.08	1
MSN-M6-30-S12C	●	12	30	80	11.5	-			0.11	1
MSN-M6-50-S12C	●	12	50	100	11.5	-			0.13	1
MSN-M6-80-S12C	●	12	80	130	11.5	-			0.18	1
NEW MSN-M6-120-S12C	●	12	120	170	11.5	-			0.23	1
NEW MSN-M6-170-S12C	●	12	170	220	11.5	-			0.30	1
MSN-M6-65T-S16C	●	16	65	125	11.2	1°45'			0.28	2
MSN-M6-15-S16C	●	16	15	60	13.5	-			0.15	1
MSN-M6-30-S16C	●	16	30	80	13.5	-			0.19	1
MSN-M6-50-S16C	●	16	50	100	13.5	-			0.23	1
MSN-M6-80-S16C	●	16	80	130	13.5	-			0.28	1
MSN-M8-20-S16C	●	16	20	75	15.5	-	M8	4	0.17	1
MSN-M8-40-S16C	●	16	40	95	15.5	-			0.22	1
MSN-M8-80-S16C	●	16	80	135	15.5	-			0.32	1
MSN-M8-120-S16C	●	16	120	175	15.5	-			0.42	1
MSN-M8-152-S16C	●	16	152	207	15.5	-			0.51	1
MSN-M8-40T-S20C	○	20	40	100	14.5	3°30'			0.36	2
MSN-M8-77T-S20C	●	20	77	143	14.5	1°45'			0.49	2
MSN-M10-20-S20C	●	20	20	80	19.5	-	M10	4	0.29	1
MSN-M10-40-S20C	●	20	40	100	19.5	-			0.39	1
MSN-M10-70-S20C	●	20	70	130	19.5	-			0.50	1
MSN-M10-90-S20C	●	20	90	150	19.5	-			0.60	1
MSN-M10-140-S20C	●	20	140	200	19.5	-			0.80	1
MSN-M10-160-S20C	●	20	160	220	19.5	-			0.87	1
MSN-M10-210-S20C	●	20	210	270	19.5	-			1.07	1
MSN-M10-40T-S20C	●	20	40	100	18.5	0°43'			0.39	2
MSN-M10-90T-S20C	●	20	90	150	18.5	0°19'			0.58	2
MSN-M10-140T-S20C	●	20	140	200	18.5	0°12'			0.77	2
MSN-M10-85T-S25C	●	25	85	161	18.5	2°			0.90	2

Carbide Modular Head Holder

MSN Type
**MSN
TYPE**
Solid Monoblock Carbide Body

 Through
coolant
hole


Fig.1

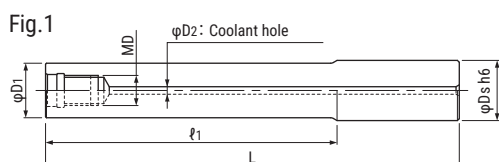
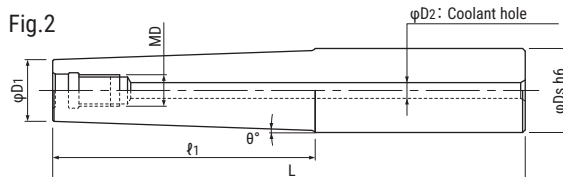


Fig.2



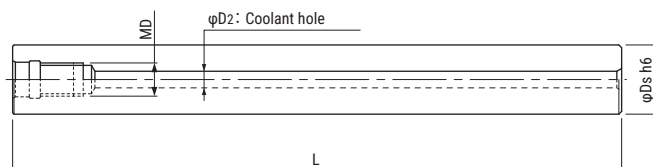
Cat.No.	Stock	Dimensions(mm)							Weight (kg)	Fig.
		φDs	l1	L	φD1	θ°	MD	φD2		
MSN-M12-25-S25C	●	25	25	90	24	-	M12	6	0.53	1
MSN-M12-55-S25C	●	25	55	120	24	-			0.72	1
MSN-M12-70-S25C	●	25	70	135	24	-			0.81	1
MSN-M12-105-S25C	●	25	105	170	24	-			1.03	1
MSN-M12-135-S25C	●	25	135	215	24	-			1.30	1
MSN-M12-155-S25C	●	25	155	220	24	-			1.34	1
MSN-M12-200-S25C	●	25	200	265	24	1°30'			1.58	1
NEW MSN-M12-255-S25C	●	25	255	320	24	-			1.91	1
MSN-M12-100T-S32C	●	32	100	180	23.5	2°	M16	8	1.61	2
MSN-M16-25-S32C	●	32	25	90	29	-			0.85	1
MSN-M16-55-S32C	●	32	55	120	29	-			1.13	1
MSN-M16-77-S32C	●	32	77	157	29	-			1.47	1
MSN-M16-97-S32C	●	32	97	177	29	-			1.64	1
MSN-M16-105-S32C	●	32	105	170	29	-			1.59	1
MSN-M16-127-S32C	●	32	127	207	29	-			1.89	1
MSN-M16-155-S32C	●	32	155	220	29	-			2.04	1
MSN-M16-177-S32C	●	32	177	257	29	-			2.32	1
MSN-M16-195-S32C	●	32	195	260	29	-			2.40	1
MSN-M16-225-S32C	●	32	225	290	29	-			2.57	1
MSN-M16-245-S32C	●	32	245	310	29	-			2.74	1
MSN-M16-295-S32C	●	32	295	360	29	-			3.17	1
NEW MSN-M16-315-S32C	●	32	315	380	29	-			3.34	1
MSN-M16-117T-S32C	●	32	117	197	29	0°38'			1.88	2
MSN-M16-127T-S32C	●	32	127	207	29	0°30'			2.23	2
MSN-M16-177T-S32C	●	32	177	257	29	0°23'			2.78	2
MSN-M16-197T-S32C	●	32	197	277	29	0°23'			3.00	2

Carbide Modular Head Holder

MSN Type

Through
coolant
hole**MSN-S**
TYPE

Solid Monoblock Carbide Body



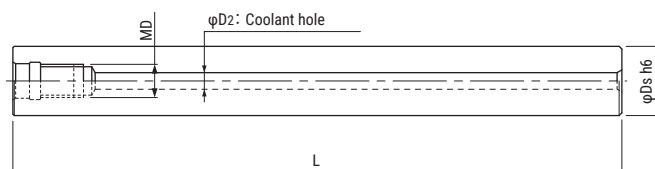
Cat.No.	Stock	Dimensions(mm)				Weight (kg)
		φDs	L	MD	φD2	
MSN-M6-67S-S9.8C	●	9.8	67	M6	3	0.06
MSN-M6-107S-S9.8C	●	9.8	107			0.10
MSN-M6-82S-S10C	●	10	82			0.08
MSN-M6-122S-S10C	●	10	122			0.12
NEW MSN-M6-167S-S10C	●	10	167			0.16
NEW MSN-M6-220S-S10C	●	10	220			0.21
MSN-M6-80S-S11.8C	●	11.8	80			0.11
MSN-M6-120S-S11.8C	●	11.8	120			0.17
MSN-M6-90S-S12C	●	12	90			0.13
MSN-M6-130S-S12C	●	12	130			0.19
NEW MSN-M6-170S-S12C	●	12	170			0.25
NEW MSN-M6-220S-S12C	●	12	220			0.32
MSN-M8-87S-S14C	●	14	87	M8	4	0.16
MSN-M8-137S-S14C	●	14	137			0.26
MSN-M8-97S-S15C	●	15	97			0.21
MSN-M8-147S-S15C	●	15	147			0.33
MSN-M8-197S-S15C	●	15	197			0.44
NEW MSN-M8-217S-S15C	●	15	217			0.49
MSN-M8-107S-S16C	●	16	107			0.27
MSN-M8-157S-S16C	●	16	157			0.40
NEW MSN-M8-220S-S16C	●	16	220			0.57

Carbide Modular Head Holder

MSN Type

MSN-S
TYPE

Solid Monoblock Carbide Body

Through
coolant
hole

Cat.No.	Stock	Dimensions(mm)				Weight (kg)
		φDs	L	MD	φD2	
MSN-M10-130S-S18C	●	18	130	M10	4	0.42
MSN-M10-190S-S18C	●	18	190			0.62
MSN-M10-240S-S18C	●	18	240			0.89
NEW MSN-M10-270S-S18C	●	18	270			0.9
MSN-M10-130S-S20C	●	20	130			0.53
MSN-M10-190S-S20C	●	20	190			0.78
MSN-M10-250S-S20C	●	20	250			1.02
NEW MSN-M10-270S-S20C	●	20	270			1.13
MSN-M12-185S-S23C	●	23	185	M12	6	0.98
MSN-M12-265S-S23C	●	23	265			1.42
MSN-M12-185S-S24C	●	24	185			1.07
MSN-M12-265S-S24C	●	24	265			1.54
MSN-M12-145S-S25C	●	25	145			0.91
MSN-M12-215S-S25C	●	25	215			1.36
MSN-M12-285S-S25C	●	25	285			1.80
NEW MSN-M12-320S-S25C	●	25	320			2.06
MSN-M16-160S-S28C	●	28	160	M16	8	1.22
MSN-M16-230S-S28C	●	28	230			1.77
MSN-M16-310S-S28C	●	28	310			2.41
NEW MSN-M16-380S-S28C	●	28	380			2.97
MSN-M16-157S-S32C	●	32	157			1.61
MSN-M16-217S-S32C	●	32	217			2.22
MSN-M16-287S-S32C	●	32	287			2.94
MSN-M16-357S-S32C	●	32	357			3.66
NEW MSN-M16-380S-S32C	●	32	380			3.98