

PRODUCT NEWS

PN-E-018

SERIES EXPANSION



Multi blade • High efficient • High feed tools

Qm Quick & Mini Series

"QM MILL & QM MAX" New generation high feed mill

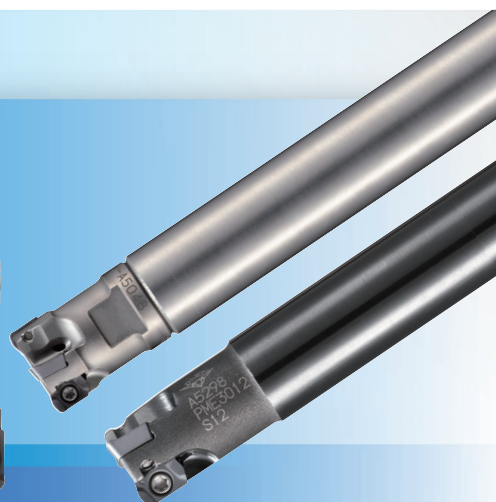
QmMill

Modular head
 $\phi 10 \sim \phi 32$

Endmill
 $\phi 10 \sim \phi 14$

MPM/PME type

6 page



QmMax

Modular head
 $\phi 16 \sim \phi 42$

Face mill
 $\phi 40 \sim \phi 66$

MQX/QXP type

31 page



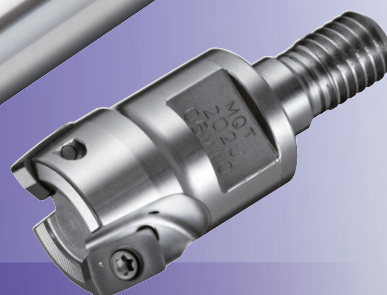
High precision

QmMax

Modular head
 $\phi 16 \sim \phi 35$

MQT type

87 page



Product type

SKS series
($a_p \leq 3\text{mm}$ / high machine power
/ high rigidity insert)

SKS series (high rigidity insert)

For high power machine (over BT50)

Multi EXTREME
(EXM, MEX)



- Double-side insert (6 corners)
- $a_p \leq 2\text{mm}$
- 2 types of holder is available by using same insert. HF type for high feed milling and SM type for shoulder milling.
- Corner radius for programming : R3.0

SKS G II
(SKG, MSG)



- Insert with 4 corners
- $a_p \leq 2.5\text{mm}$
- High cutting depth / High feed / High efficient machining
- Corner radius for programming : R3.0-4.0

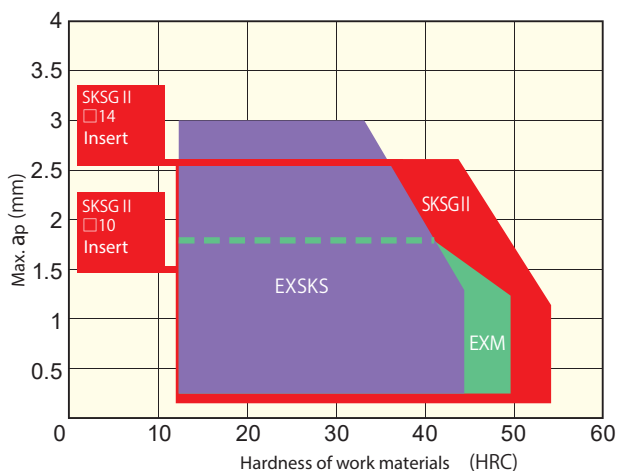
SKS EXTREME
(EXSKS)



- Double-side insert (6 corners)
- $a_p \leq 3\text{mm}$
- Suitable for high output machine (over BT50)
- Corner radius for programming : R3.5

SKS Series

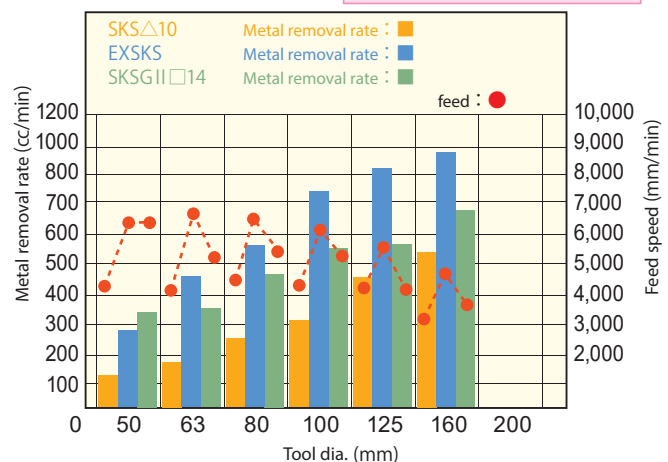
Application range



SKS Series

Comparing machining efficiency

Cutting conditions
1) Work material : C50
2) Overhung length : 200mm
3) $a_e = D_c \times 0.6$



Product type

QM series
($a_p \leq 1\text{ mm}$ / Multi blades /
small-sized insert)

QM series (small-sized insert)

For high speed machine (BT30-BT50)

QMMill
(MPM, PME)



P.6

- Insert with 2 corners
- Low cutting force insert & achieved high feed machining
- $a_p \leq 0.3\text{ mm}$
- Suitable for high speed machine (BT30-BT40)
- Corner radius for programming : R1.0

QM Max
(MQX, QXP)



P.31

- Insert with 2 corners
- Multifunctional cutter which can respond from roughing to finishing.
- $a_p \leq 1\text{ mm}$
- Suitable for high speed machine (BT40-BT50)
- Corner radius for programming : R1.5

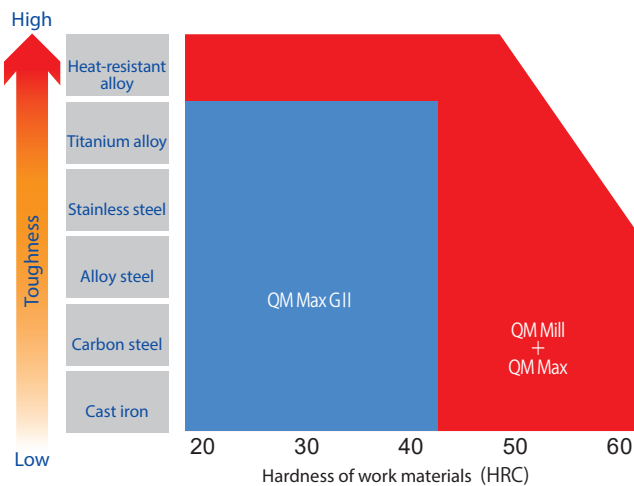
QM Max G II
(MXG, GMX)



- Double-side insert (4 corners)
- Specializing in roughing
- $a_p \leq 1\text{ mm}$
- Suitable for high speed machine (BT40-BT50)
- Corner radius for programming : R1.5

QM Series

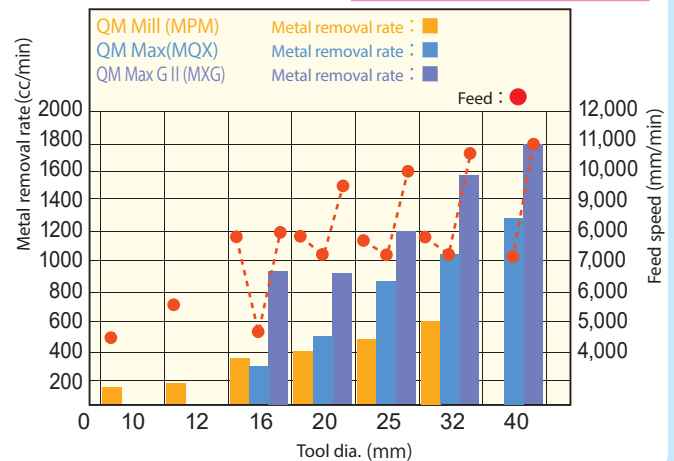
Application range



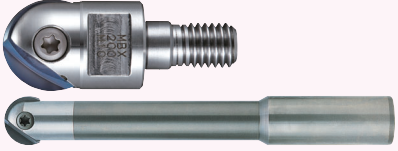
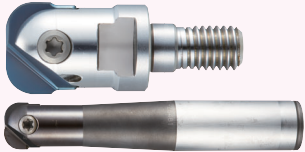
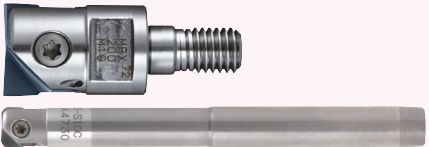
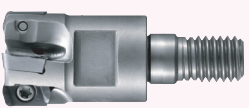
QM Series

Comparing machining efficiency

Cutting conditions
1) Work material : S50C
2) Overhung length : $L/D \leq 4$
3) $a_e = D_c \times 0.6$



Finishing application for indexable tool

Product name	Tool dia.		Appearance
Holder No. () shows insert No.	Modular head / End mill type (effective No. of flutes)	Face mill type (effective No. of flutes)	
Mirror Ball MBX/BNM (BNM, BNM-SS, BNM-TG, BNM-TS)	$\phi 6 \sim \phi 32$ (2N)	—	
Mirror Ball radius type insert MBX/BNM (GRM)	$\phi 16 \sim \phi 30$ (2N)	—	
Mirror Radius MRX/RNM (RNM, FRM)	$\phi 6 \sim \phi 32$ (2N)	—	
QM Mill MPM (EOHW0602* *ZTR YOHW0602* *ZER-12)	$\phi 10 \sim \phi 32$ (2N~8N)	—	
Q M Max MQX/QXP (EPHW1003* *ZTR YPHW1003* *Z*R-* *)	$\phi 16 \sim \phi 42$ (2N~7N)	$\phi 40 \sim \phi 66$ (6N~8N)	 
High precision QM Max MQT (XPH*1003* *ZER-R YPHW1003* *Z*R-* *)	$\phi 16 \sim \phi 35$ (2N~6N)	—	
Indexable Finish-One MFO	$\phi 10 \sim \phi 21$ (1N)	—	
Back Draft MDB/DBD	$\phi 20 \sim \phi 40$ (1N~3N)	$\phi 50 \sim \phi 80$ (4N~6N)	 
Finish Jet Mill FJM	—	$\phi 80 \sim \phi 250$ (4N)	
New Back & Forth Cutter MPF/PFC	$\phi 30 \sim \phi 40$ (2N~3N)	$\phi 50 \sim \phi 80$ (4N~8N)	 

Type of machining				Work materials (P.M.K.H)				
				Please see page of cutting condition when selecting insert type.				
				Hardness (HRC)				
Shoulder	Slope	Bottom	Copy	~20	30	40	50	60
				Coated / CBN (for cast iron)				
				Coated / CBN (for cast iron)				
				Coated				
				Coated				
				Cermet / Coated / CBN				
				Cermet / Coated / CBN				
				Cermet / Coated				
				Cermet / Coated / CBN				
				Cermet / Coated				
				CBN / Coated				

Attention



Attention to mounting head and MSN/ MGN shank holder.

Tightening procedure

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



- Note) 1. Only use the torque control spanner wrench or DIJET DS type spanner wrench.
2. Please gently apply pressure on wrench.
3. Please confirm that there is no gap between MSN/MGN shank holder and modular head.

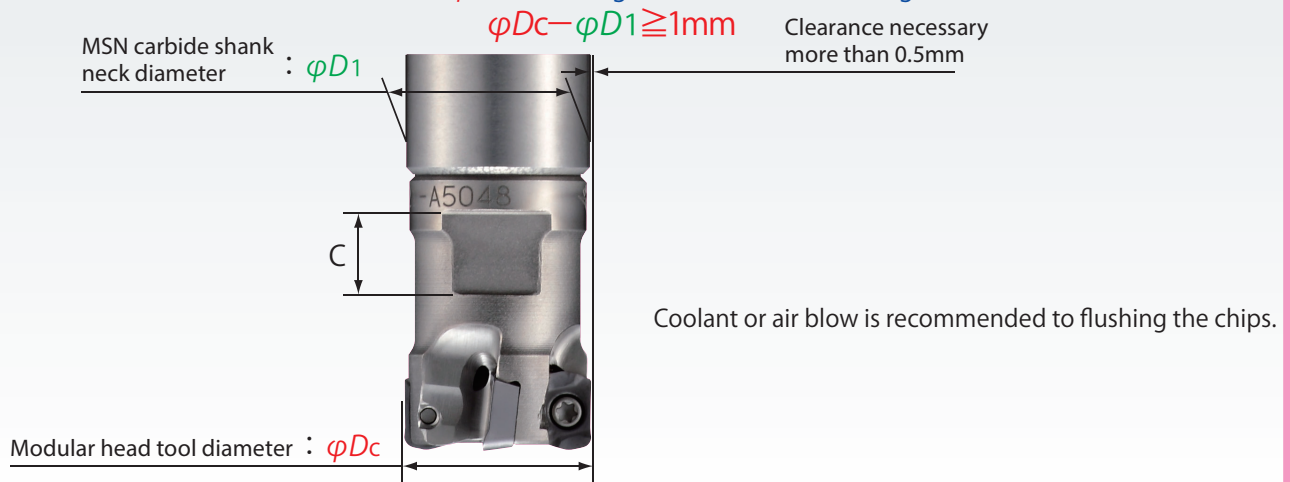
Thread	Tightening Torque	Spanner size W (mm)
M6	8.0N·m	8 [☆]
M8	16N·m	10, 12 [☆]
M10	16N·m	14, 15
M12	20N·m	17, 19
M16	25N·m	22, 26

- 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 holder"

In case of using modular head over $\phi 16\text{mm}$, please select MSN carbide shank that diameter ($\phi D1$) is 1mm or more smaller than modular head (ϕDc). A wrong selection causes damage to the carbide shank.



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 carbide shank without mounting a modular head together. Please mount a modular head after shrinking fit operation.

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

Features

Low cutting force

- Adopted unique 3D geometry inserts with low cutting force and multi blades specification, even if small inserts, QM MILL achieved high speed and high efficient machining.
- Possible to use by low power and compact machines such as BT30.

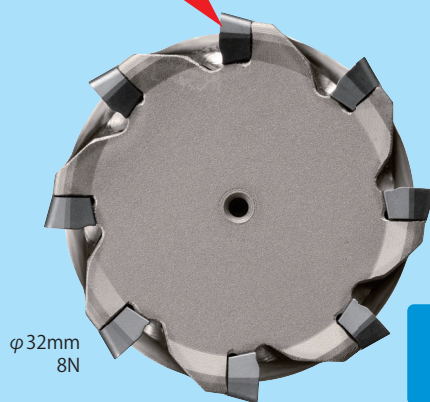
Multi blades specification

Multi blades specification: 10 mm dia. for 2N and 32 mm dia. for 8N.

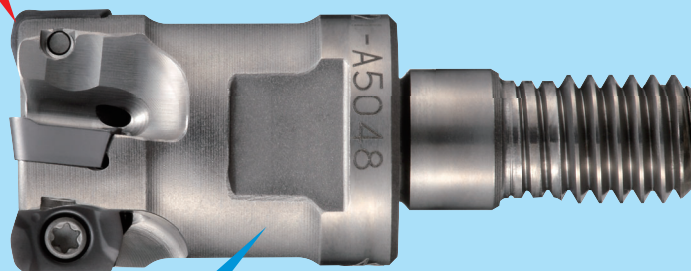
Vibration free

"QM-MILL" MPM type can be possible high efficient machining and longer tool life, due to control the vibration by the combination of MSN carbide shank holder.

Insert with low cutting forces



Multi blades specification even if small inserts achieved maximum feed speed $V_f=10\text{m/min}$ on general steel.



Adopted high rigid G-Body.

Highly accurate G-Body can correspond from high feed to finishing.

Inserts variation

High feed and shoulder milling can be processed with same body.

High feed insert



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

High feed insert for unfavorable condition



EOMW060210ZER

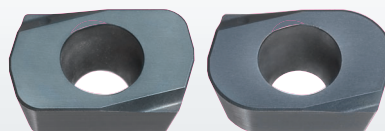
NEW

Shoulder milling insert for steel



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

High hardened steel



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

NEW

"MIRROR INSERT" for finishing side & bottom face



YOHW0602...ZER-12

Adopted PVD coated grade "JC8118" possible to cut general steel, hardened material, titanium alloys and heat-resistant alloy, tough grade "JC8050" for interrupted cutting, and new PVD coated grade "JC7560" improved heat-fracture resistance & impact strength and tool life. Moreover, adopted new PVD coated grade "DH102" suitable for high hardened material. And, available now "MIRROR INSERT" YOHW type for finishing side & bottom face.

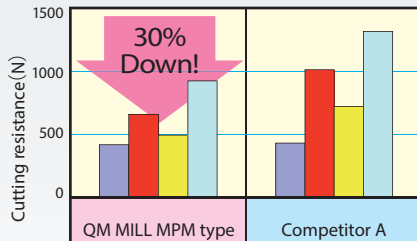
Cutting performance

Cutting force comparison ($f=5.2\text{mm/rev}$)

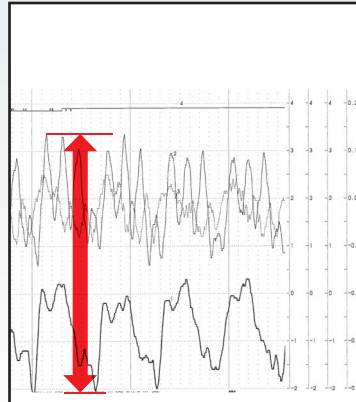
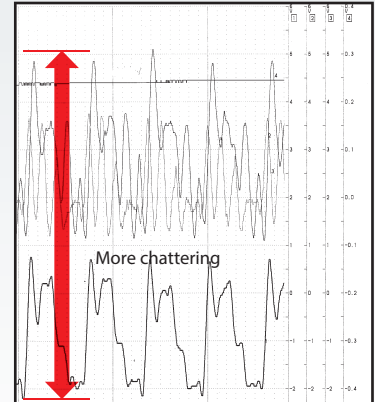
Material: S50C C50, 1049

Cutting conditions: $D_c=16\text{mm}$, $V_c=120\text{m/min}$, $a_p=0.3\text{mm}$, $a_e=9\text{mm}$, Down Cut

Low cutting force

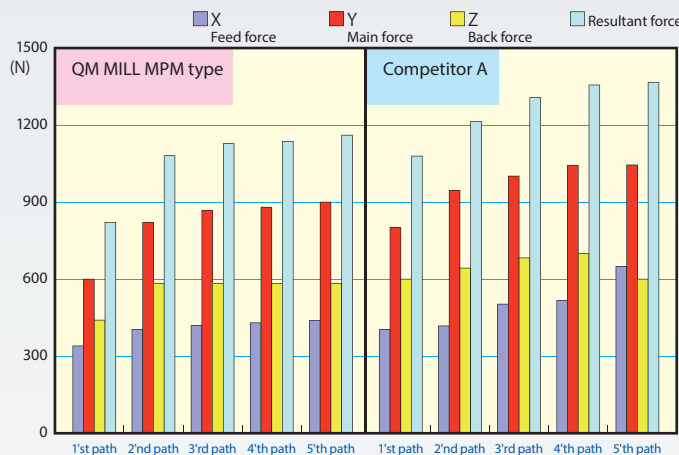


X Feed force	420	430
Y Main force	660	1020
Z Back force	500	730
Resultant force	928	1326

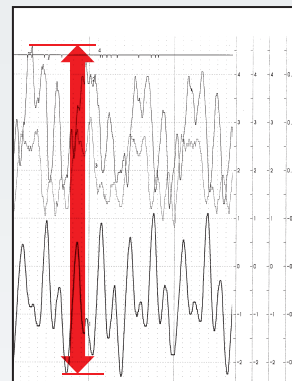

QM MILL MPM type
 $f=5.2\text{mm/rev}$

Competitor A
 $f=5.2\text{mm/rev}$

Cutting force comparison ($f=4.0\text{mm/rev}$)

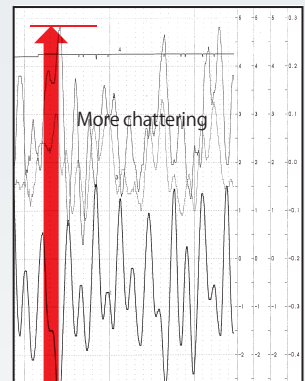
Material: S50C C50, 1049

Cutting conditions: $D_c=16\text{mm}$, $V_c=120\text{m/min}$, $a_p=0.3\text{mm}$, $a_e=9\text{mm}$, Down Cut


Cutting forces of QM mill is kept constant since 3rd path.



QM MILL MPM type: MPM: 5th path



Competitor A: 5th path

Chip shape ($f=4.0\text{mm/rev}$)

	1'st path	2'nd path	3'rd path	4'th path	5'th path
QM MILL MPM type					
Competitor A					

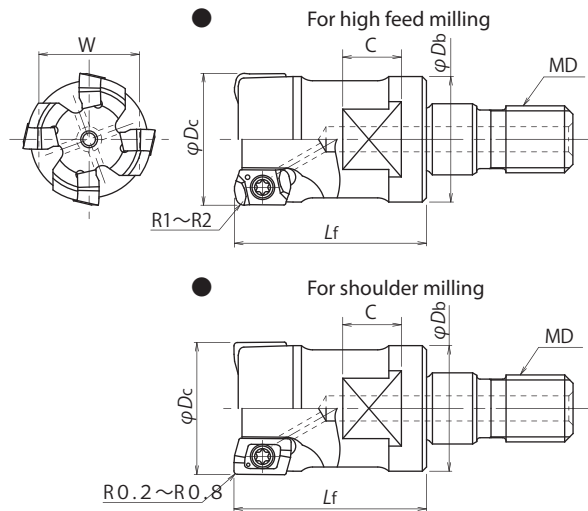
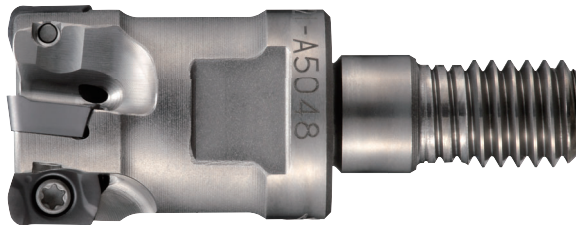
Chips by QM mill show smooth cut and less heat generation.

MPM
TYPE

Modular head MPM type

Through coolant hole

G-Body



Item code	Stock	No. of inserts	Dimensions (mm)						Applicable inserts	Parts	
			φD_c	L_f	φD_b	MD	C	W		Clamp screw	Wrench Not be included
MPM-2010-M6	●	2	10	18	9.5	M6	6.5	8			
MPM-2011-M6	●	2	11	18	9.7	M6	6.5	8			
MPM-3012-M6	●	3	12	20	11.2	M6	6.5	8			
MPM-3013-M6	●	3	13	20	11.5	M6	6.5	8			
NEW MPM-3015-M8	□	3	15	23	14	M8	8	12			
MPM-4016-M8	●	4	16	23	15	M8	8	12	EO * * 0602 * * Z * R		
MPM-4017-M8	●	4	17	23	15	M8	8	12	ZOMT0602 * * ZER- * *	DSW-1840H	A-06
NEW MPM-4018-M8	□	4	18	23	15	M8	8	12	YOHW0602 * * ZER-12		
MPM-5020-M10	●	5	20	30	19	M10	9	14			
MPM-5021-M10	●	5	21	30	19	M10	9	14			
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	43	29	M16	12	22			

Arbor 12~15 Page

Cutting conditions 17~30 Page

Note) 1. All cutters are supplied without inserts.

2. Please see page 5 for recommended tightening torque.

(When mounting M6 or M8 head to shank, recommend to use DIJET DS type spanner wrench.)

3. All cutters are supplied without wrench & MOLY since February 2019 for our stock production.

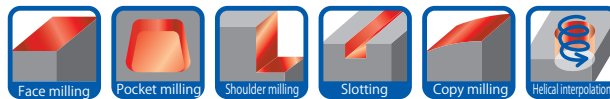
Clamp screw	Recommended torque (N・m)
DSW-1840H	0.4

◆Spanner (M6, M8)

	Item code	Thread	Tightening torque	W Spanner size	Thickness	Total length
	DS-8	M6	8.0 N・m	8	4	85
	DS-12	M8	16 N・m	12	4	93

* DS type spanner wrench prevented over-tightening, due to short handle specification.

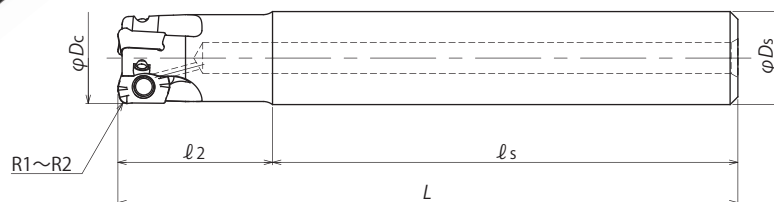
End mill type



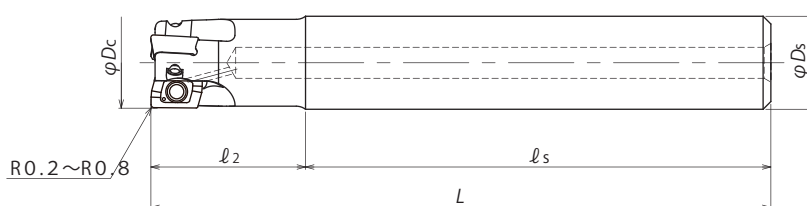
■PME type

Through coolant hole

●For high feed milling

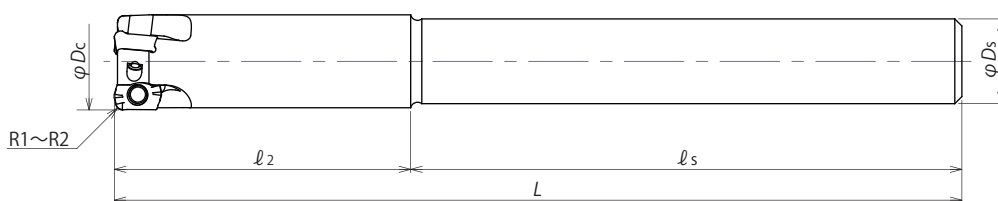


●For shoulder milling

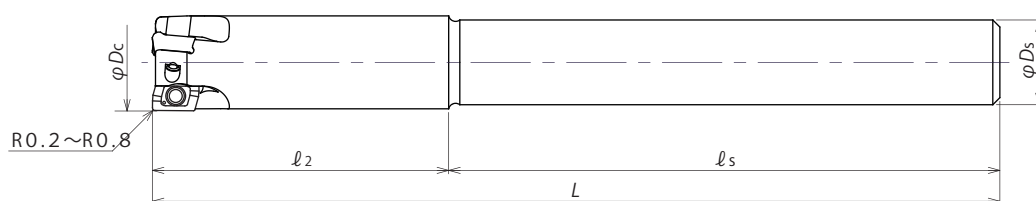


■PME-LS type

●For high feed milling



●For shoulder milling



Type	Cat. No.	Stock	No. of inserts	Coolant hole	Dimensions (mm)					Applicable inserts	Parts	
					φD_c	ℓ_2	ℓ_s	L	φD_s		Clamp screw	Wrench (Not be included)
Regular type	PME2010S10	●	2	With	10	20	60	80	10			
	PME3012S12	●	3	With	12	20	60	80	12			
	PME3014S12	●	3	With	14	20	60	80	12			
Long shank type	PME2011S10-LS	●	2	Without	11	33	87	120	10			
	PME3013S12-LS	●	3	Without	13	39	81	120	12			
	PME3014S12-LS	●	3	Without	14	42	78	120	12			

Note) 1. All cutters are supplied without inserts.

2. All cutters are supplied without wrench & MOLY since February 2019 for our stock production.

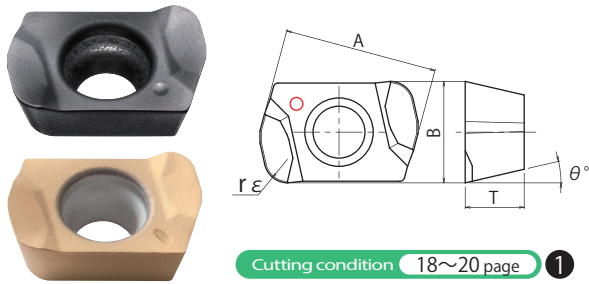
Cutting conditions 17~30 page

Clamp screw	Recommended torque (N·m)
DSW-1840H	0.4

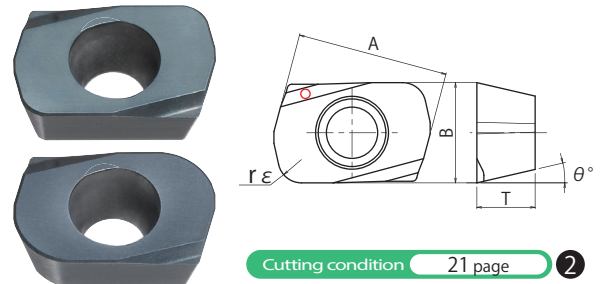
MPM/PME TYPE

Inserts

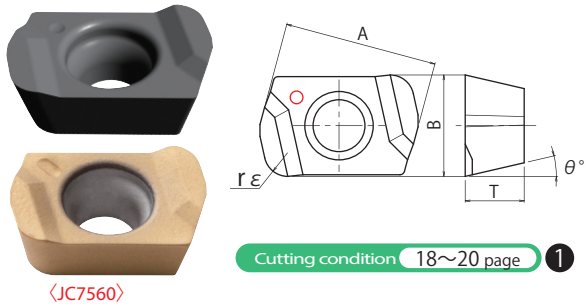
High feed insert (EOMT0602 * * ZER)



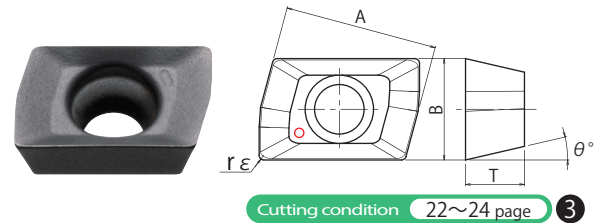
High hardened steel (EOHW0602 * * ZTR)



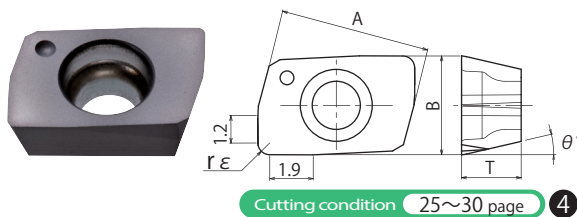
High feed insert for unfavorable condition (EOMW060210ZER)



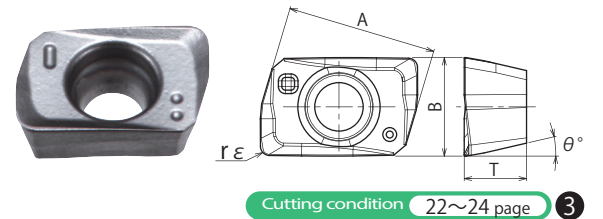
Shoulder milling insert (ZOMT0602 * * ZER)



"MIRROR INSERT" for finishing side & bottom face
(YOHW0602 * * ZER-12)



Shoulder milling insert for steel (ZOMT0602 * * ZER-PL)

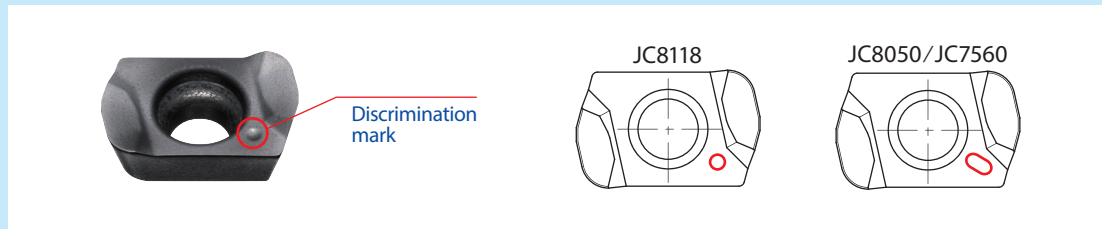


Type	Item code	Tolerance	PVD coated						Dimensions (mm)				
			JC8118	JC5118	DH102	JC7560	JC8015	JC8050	A	T	B	r ε	θ °
High feed insert	EOMT060210ZER	M	●			●		●	6.5	2.5	4.3	1.0	13°
	EOMT060220ZER	M	●					●	6.5	2.5	4.3	2.0	13°
High feed insert for unfavorable condition	EOMW060210ZER	M	●			●		●	6.5	2.5	4.3	1.0	13°
High hardened steel	EOHW060210ZTR	H	●		●				6.5	2.5	4.3	1.0	13°
	EOHW060220ZTR	H	□		●				6.5	2.5	4.3	2.0	13°
Shoulder milling insert for steel	ZOMT060202ZER-PL	M	●					●	6.62	2.7	4.3	0.2	13°
	ZOMT060204ZER-PL	M	●					●	6.62	2.7	4.3	0.4	13°
	ZOMT060208ZER-PL	M	●					●	6.62	2.7	4.3	0.8	13°
“MIRROR INSERT” for finishing side & bottom face	YOHW060203ZER-12	H			●		●		6.5	2.6	4.3	0.3	13°
	YOHW060205ZER-12	H			●		●		6.5	2.6	4.3	0.5	13°
	YOHW060208ZER-12	H			●		●		6.5	2.6	4.3	0.8	13°

10 inserts per case.

Discrimination of grade for MPM / PME insert

Each grade shows different mark around the hole for fool proof.



MAGNETISER



- Magnetizing and demagnetizing can be easily done only by inserting the tip of wrench into the Magnetizer + and rubbing lightly.
- The work efficiency when insert is setting by magnetizing the tip of wrench improves.

※Please do not use it in the vicinity of the equipment to be influenced with magnetism.

Item code	Stock
MAGNETISER	☐

1 piece per case.

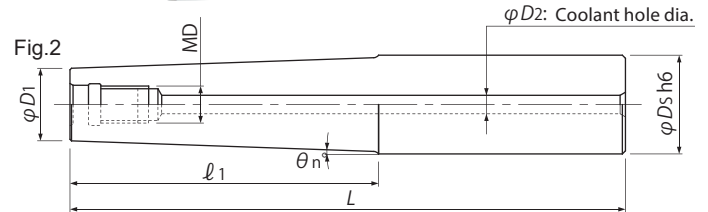
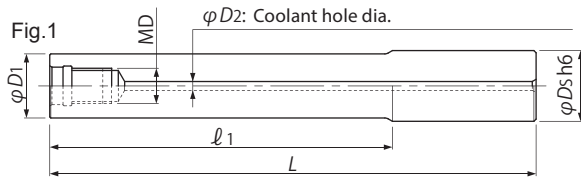


MSN Carbide shank holder

Through coolant hole

For high productivity

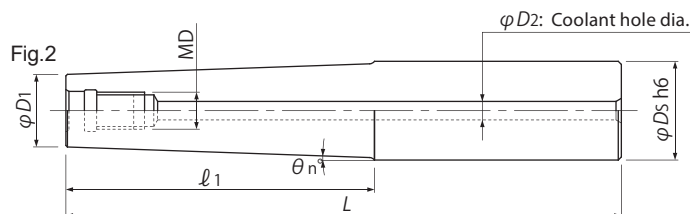
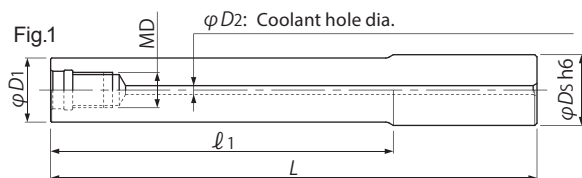
頑固一徹



End mill shank type

Item code	Stock	Dimensions (mm)							Weight (kg)	Fig.
		φDs	ℓ1	L	φD1	θn°	MD	φD2		
MSN-M6-12-S10C	●	10	12	60	9.7	—			0.06	1
MSN-M6-15-S12C	●	12	15	60	11.5	—			0.08	1
NEW MSN-M6-15-S16C	●	16	15	60	13.5	—			0.15	1
MSN-M6-30-S10C	●	10	30	80	9.7	—			0.07	1
MSN-M6-30-S12C	●	12	30	80	11.5	—			0.11	1
NEW MSN-M6-30-S16C	●	16	30	80	13.5	—			0.19	1
MSN-M6-35T-S12C	□	12	35	92	9.5	1°30′			0.12	2
MSN-M6-50-S10C	●	10	50	100	9.7	—	M6	3	0.09	1
MSN-M6-50-S12C	●	12	50	100	11.5	—			0.13	1
NEW MSN-M6-50-S16C	●	16	50	100	13.5	—			0.23	1
MSN-M6-57T-S12C	●	12	57	114	9.5	1°			0.14	2
MSN-M6-65T-S16C	●	16	65	125	11.2	1°45′			0.28	2
MSN-M6-80-S10C	●	10	80	130	9.7	—			0.12	1
MSN-M6-80-S12C	●	12	80	130	11.5	—			0.18	1
NEW MSN-M6-80-S16C	●	16	80	130	13.5	—			0.28	1
MSN-M8-20-S16C	●	16	20	75	15.5	—			0.17	1
MSN-M8-40-S16C	●	16	40	95	15.5	—			0.22	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′	M8	4	0.49	2
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-M10-20-S20C	●	20	20	80	19.5	—			0.29	1
MSN-M10-40-S20C	●	20	40	100	19.5	—			0.39	1
MSN-M10-40T-S20C	●	20	40	100	18.5	0°43′	M10	4	0.39	2
MSN-M10-70-S20C	●	20	70	130	19.5	—			0.50	1
MSN-M10-85T-S25C	●	25	85	161	18.5	2°			0.90	2

Note) Please see page 5 for recommended tightening torque.



End mill shank type

Item code	Stock	Dimensions (mm)							Weight (kg)	Fig.
		φDs	ℓ1	L	φD1	θn°	MD	φD2		
MSN-M10-90-S20C	●	20	90	150	19.5	—			0.60	1
MSN-M10-90T-S20C	●	20	90	150	18.5	0°19′			0.58	2
MSN-M10-140-S20C	●	20	140	200	19.5	—	M10	4	0.80	1
MSN-M10-140T-S20C	●	20	140	200	18.5	0°12′			0.77	2
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-M12-25-S25C	●	25	25	90	24	—			0.53	1
MSN-M12-55-S25C	●	25	55	120	24	—			0.72	1
MSN-M12-100T-S32C	□	32	100	180	23.5	2°			1.61	2
MSN-M12-105-S25C	●	25	105	170	24	—	M12	6	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	—			1.58	1
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-M16-117T-S32C	□	32	117	197	29	0°38′			1.88	2
MSN-M16-127-S32C	●	32	127	207	29	—			1.89	1
MSN-M16-127T-S32C	□	32	127	207	29	0°30′	M16	8	2.23	2
MSN-M16-155-S32C	●	32	155	220	29	—			2.04	1
MSN-M16-177-S32C	●	32	177	257	29	—			2.32	1
MSN-M16-177T-S32C	●	32	177	257	29	0°23′			2.78	2
MSN-M16-195-S32C	●	32	195	260	29	—			2.40	1
MSN-M16-197T-S32C	□	32	197	277	29	0°23′			3.00	2
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

Note) Please see page 5 for recommended tightening torque.

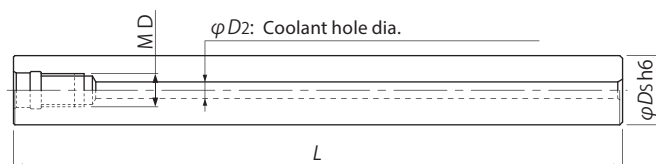


MSN Carbide shank holder

Through coolant hole

For high productivity

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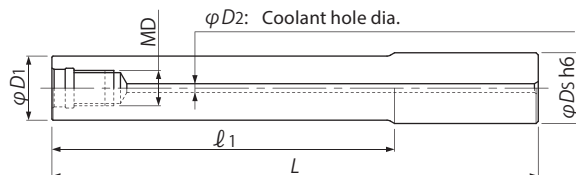


Straight arbor type

Item code	Stock	Dimensions (mm)				Weight (kg)
		ϕD_s	L	MD	ϕD_2	
MSN-M6-67S-S9.8C	●	9.8	67	M6	3	0.06
MSN-M6-107S-S9.8C	●		107			0.10
MSN-M6-82S-S10C	●	10	82	M6	3	0.08
MSN-M6-122S-S10C	●		122			0.12
MSN-M6-80S-S11.8C	●	11.8	80	M6	3	0.11
MSN-M6-120S-S11.8C	●		120			0.17
MSN-M6-90S-S12C	●	12	90	M6	3	0.13
MSN-M6-130S-S12C	●		130			0.19
NEW MSN-M8-87S-S14C	●	14	87	M8	4	0.16
NEW MSN-M8-137S-S14C	●		137			0.26
MSN-M8-97S-S15C	●	15	97	M8	4	0.21
MSN-M8-147S-S15C	●		147			0.33
MSN-M8-197S-S15C	●	16	197	M8	4	0.44
MSN-M8-107S-S16C	●		107			0.27
MSN-M8-157S-S16C	●	18	157	M8	4	0.40
MSN-M10-130S-S18C	●		130			0.42
MSN-M10-190S-S18C	●	20	190	M10	4	0.62
MSN-M10-240S-S18C	●		240			0.89
MSN-M10-130S-S20C	●	23	130	M10	4	0.53
MSN-M10-190S-S20C	●		190			0.78
MSN-M10-250S-S20C	●	24	250	M10	4	1.02
MSN-M12-185S-S23C	●		185	M12	6	0.98
MSN-M12-265S-S23C	●	25	265			1.42
MSN-M12-185S-S24C	●		185	M12	6	1.07
MSN-M12-265S-S24C	●	28	265			1.54
MSN-M12-145S-S25C	●		145	M12	6	0.91
MSN-M12-215S-S25C	●	32	215			1.36
MSN-M12-285S-S25C	●		285	M12	6	1.80
MSN-M16-160S-S28C	●	28	160			1.22
MSN-M16-230S-S28C	●		230	M16	8	1.77
MSN-M16-310S-S28C	●	32	310			2.41
MSN-M16-157S-S32C	●		157	M16	8	1.61
MSN-M16-217S-S32C	●	357	217			2.22
MSN-M16-287S-S32C	●		287	M16	8	2.94
MSN-M16-357S-S32C	●		357			3.66

Note) Please see page 5 for recommended tightening torque.

- Adopted ultra-rigid and improved body durability "G-Body".
- Short type
- Cost-effective and high strength steel shank holder.



End mill shank type

Item code	Stock	Dimensions (mm)							Weight (kg)
		ϕD_s	ℓ_1	L	ϕD_1	θ_n°	MD	ϕD_2	
MGN-M8-17-S16	☐	16	17	97	15.5	—	M8	4	0.13
MGN-M10-30-S20	☐	20	30	100	19	—	M10	4	0.21
MGN-M12-35-S25	☐	25	35	105	24	—	M12	4	0.36
MGN-M12-85-S25	☐	25	85	165	24	—	M12	4	0.57
MGN-M16-37-S32	☐	32	37	107	29	—	M16	6	0.56
MGN-M16-77-S32	☐	32	77	157	29	—	M16	6	0.83

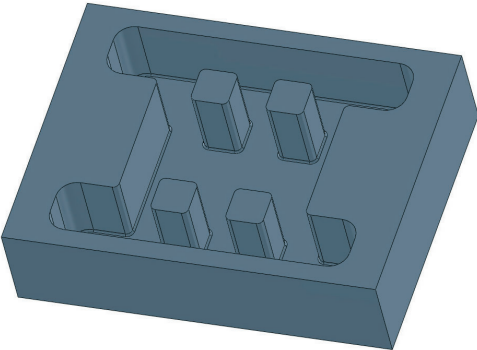
Note) In case of using MPM / MQX type combined with MGN steel shank holder, apply the recommended cutting conditions sheet (see page 17–30, page 40–92).



Adopted GN surface-hardening treatment on thermal resistant high strength steel gives high hardness over 65HRC and secure insert pocket and holder against thermal deformation, improved body durability and tool life by 30% or more, compared with competitor's tool. Make it difficult to be damaged even under severe cutting conditions. Also rust-proof and anti-welding effect is much improved.

Cutting data for "QM MILL"

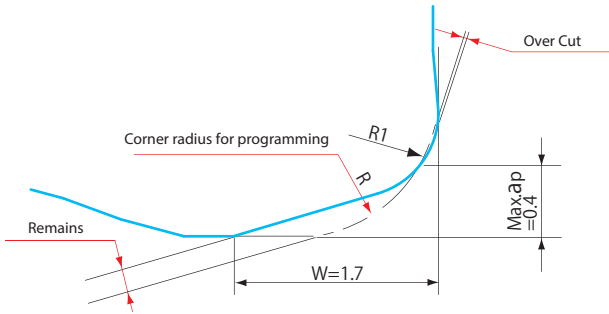
1. Replacement from solid carbide tool to MPM in roughing.

Overhung length : 70mm 	Work	Part name	Mold
		Material	P21
		Hardness	40HRC
	Tool	Tool No.	MPM-3012-M6 MSN-M6-50-S12C
		Insert No. Grade	EOMT060210ZER JC8118
	Cutting conditions	$n, (V_c)$	$n=3,000\text{min}^{-1}, V_c=110\text{m/min}$
		$V_f, (f)$	$V_f=4,500\text{mm/min}, f=1.5\text{mm/rev}$
		$a_p(\text{mm})$	0.3mm
		$a_e(\text{mm})$	6mm
		Coolant	Air blow
Machine		Vertical MC	
Result			
MPM reduced the tool cost & the vibration when machining. Achieved 1.5 hours in machining time and 200m in cutting length.			

2. Improved machining accuracy in finishing on 1.2344.

Overhung length : 50mm  Result Improved seat surface accuracy and shorten grinding time in next process compared with conventional cutter of M class inserts.	Work	Part name	Mold
		Material	1.2344
		Hardness	50~52HRC
	Tool	Tool No.	MPM-2010-M6 MSN-M6-30-S10C
		Insert No. Grade	YOHWO60208ZER-12 DH102
	Cutting conditions	$n, (V_c)$	$n=2,550\text{min}^{-1}, V_c=80\text{m/min}$
		$V_f, (f)$	$V_f=1,000\text{mm/min}, f=0.4\text{mm/rev}$
		$a_p(\text{mm})$	0.05mm
		$a_e(\text{mm})$	5mm
		Coolant	Oil coolant
Machine		Vertical MC	

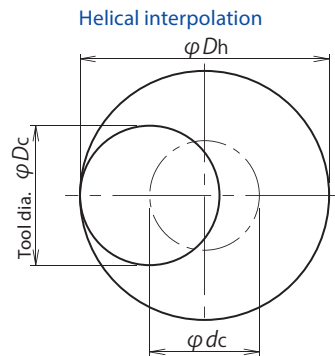
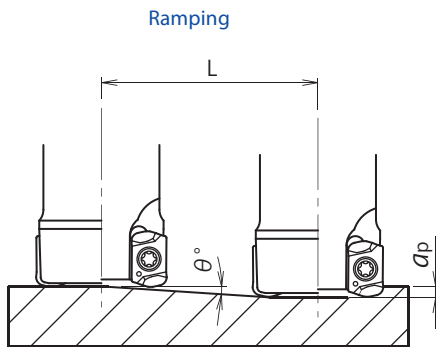
Definition of corner shape for programming



(mm)		
Corner radius for programming	Over Cut	Remains
R1.0 (Standard)	0	0.17
R1.5	0.09	0.08
R2.0	0.30	0

Note) In case of setting corner radius for programming to R2, recommend to use corner radius R2 type insert (EOMT060220ZER or EOHW060220ZTR).

Attention for profile milling with EO * *-type inserts



- 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, so tool pass rotation should be counterclockwise.

- 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.

Item code	Tool dia. (mm)	Eff. Cutting dia. (mm)	Max. depth of cut (mm)	Ramping		Helical interpolation	
				Max. ramping angle θ°	Total cutting length at Max. a_p	Min. bore dia. Dh min (mm)	Max. bore dia. Dh max (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

Note) The ramping angle 0.5° or less is recommended (please refer to the above table).

Recommended cutting conditions for "EOMT / W-type inserts"

1

MPM and MSN type

Work materials	Grades	Tool dia. (mm)														
		10 / 11					12 / 13 / 15					16 / 17 / 18				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	50	0.3	~6	3,820	4,580	60	0.3	~8	3,180	5,720	70	0.4	~12	2,390	8,600
		75	0.25	~6	3,440	3,720	80	0.25	~8	2,860	4,630	120	0.3	~12	2,150	6,970
		100	0.2	~5	3,060	2,940	110	0.2	~7	2,540	3,660	160	0.25	~12	1,910	5,500
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	50	0.3	~6	3,500	4,200	60	0.3	~8	2,920	5,260	70	0.4	~12	2,190	7,880
		75	0.2	~6	3,150	3,400	80	0.2	~8	2,630	4,260	120	0.3	~12	1,970	6,380
		100	0.15	~5	2,800	2,690	110	0.15	~7	2,340	3,370	160	0.25	~12	1,750	4,900
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	50	0.3	~6	3,500	4,200	60	0.3	~8	2,920	5,260	70	0.4	~12	2,190	7,880
		75	0.25	~6	3,150	3,400	80	0.25	~8	2,630	4,260	120	0.3	~12	1,970	6,380
		100	0.2	~5	2,800	2,690	110	0.2	~7	2,340	3,370	160	0.25	~12	1,750	4,900
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	50	0.3	~6	2,860	3,150	60	0.3	~8	2,390	3,940	70	0.3	~12	1,790	5,010
		75	0.25	~6	2,570	2,540	80	0.25	~8	2,150	3,190	120	0.25	~12	1,610	4,060
		100	0.2	~5	2,290	2,010	110	0.2	~7	1,910	2,520	160	0.2	~12	1,430	3,200
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	50	0.25	~6	2,230	2,230	60	0.25	~8	1,860	2,790	70	0.3	~12	1,390	3,340
		75	0.15	~6	2,010	1,810	80	0.15	~8	1,670	2,250	120	0.2	~12	1,250	2,700
		100	-	-	-	-	110	-	-	-	-	160	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EOMW形	50	0.1	~6	950	470	60	0.1	~8	800	600	70	0.15	~12	600	600
		75	-	-	-	-	80	-	-	-	-	120	0.1	~12	540	490
		100	-	-	-	-	110	-	-	-	-	160	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	50	0.3	~6	4,780	5,740	60	0.3	~8	3,980	7,160	70	0.4	~12	2,980	10,730
		75	0.25	~6	4,300	4,640	80	0.25	~8	3,580	5,800	120	0.35	~12	2,680	8,680
		100	0.2	~6	3,820	3,670	110	0.2	~8	3,180	4,580	160	0.3	~12	2,380	6,850
Stainless steel Below 250HB	JC8050 (JC7560)	50	0.3	~6	3,820	4,580	60	0.3	~8	3,180	5,720	70	0.4	~12	2,390	8,600
		75	0.2	~6	3,440	3,720	80	0.2	~8	2,860	4,630	120	0.3	~12	2,150	6,880
		100	0.15	~5	3,060	2,940	110	0.15	~7	2,540	3,660	160	0.25	~12	1,910	5,350
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	50	0.3	~6	1,910	1,910	60	0.3	~8	1,590	2,380	70	0.3	~12	1,190	2,380
		75	0.2	~6	1,720	1,550	80	0.2	~8	1,430	1,930	120	0.25	~12	1,070	1,930
		100	0.15	~5	1,530	1,220	110	0.15	~7	1,270	1,520	160	0.2	~12	950	1,520
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	50	0.3	~6	950	760	60	0.3	~8	800	960	70	0.3	~12	600	960
		75	0.2	~6	850	760	80	0.2	~8	720	780	120	0.25	~12	540	780
		100	0.15	~5	760	610	110	0.15	~7	640	610	160	0.2	~12	480	610

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

Recommended cutting conditions for "EOMT / W-type inserts"

1

MPM and MSN type

Work materials	Grades	Tool dia. (mm)									
		20 / 21					25				
		No. of teeth 5N					No. of teeth 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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	70	0.4	~14	1,910	8,600	90	0.4	~18	1,530	8,260
		120	0.3	~14	1,720	6,970	140	0.3	~18	1,380	6,710
		190	0.25	~14	1,530	5,510	210	0.25	~18	1,220	5,270
Die steel (1.2311, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	70	0.4	~14	1,750	7,880	90	0.4	~18	1,400	7,560
		120	0.3	~14	1,580	6,400	140	0.3	~18	1,260	6,120
		190	0.25	~14	1,400	5,040	210	0.25	~18	1,120	4,840
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	70	0.4	~14	1,750	7,880	90	0.4	~18	1,400	7,560
		120	0.3	~14	1,580	6,400	140	0.3	~18	1,260	6,120
		190	0.25	~14	1,400	5,040	210	0.25	~18	1,120	4,840
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	70	0.3	~14	1,430	5,000	90	0.3	~18	1,150	4,830
		120	0.25	~14	1,290	4,060	140	0.25	~18	1,040	3,930
		190	0.2	~14	1,140	3,190	210	0.2	~18	920	3,090
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	70	0.3	~14	1,110	3,330	90	0.3	~18	890	3,200
		120	0.2	~14	1,000	2,700	140	0.2	~18	800	2,590
		190	–	–	–	–	210	–	–	–	–
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EOMW type	70	0.15	~14	480	600	90	0.15	~18	380	570
		120	0.1	~14	430	480	140	0.1	~18	340	460
		190	–	–	–	–	210	–	–	–	–
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	70	0.4	~14	2,390	10,750	90	0.4	~18	1,910	10,310
		120	0.35	~14	2,150	8,710	140	0.35	~18	1,720	8,360
		190	0.3	~14	1,910	6,880	210	0.3	~18	1,530	6,610
Stainless steel Below 250HB	JC8050 (JC7560)	70	0.4	~14	1,910	8,600	90	0.4	~18	1,530	8,260
		120	0.3	~14	1,720	6,970	140	0.3	~18	1,380	6,710
		190	0.25	~14	1,530	5,510	210	0.25	~18	1,220	5,270
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	70	0.3	~14	950	2,380	90	0.3	~18	760	2,280
		120	0.25	~14	860	1,940	140	0.25	~18	680	1,840
		190	0.2	~14	760	1,520	210	0.2	~18	610	1,460
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	70	0.3	~14	480	960	90	0.3	~18	380	910
		120	0.25	~14	430	860	140	0.25	~18	340	730
		190	0.2	~14	380	610	210	0.2	~18	300	580

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

Recommended cutting conditions for "EOMT / W-type inserts"

1

MPM and MSN type

Work materials	Grades	Tool dia. (mm)									
		30					32				
		No. of teeth 7N					No. of teeth 8N				
		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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	100	0.4	~22	1,270	8,000	100	0.4	~24	1,190	8,570
		150	0.3	~22	1,140	6,460	150	0.3	~24	1,070	6,930
		210	0.25	~22	1,020	5,140	210	0.25	~24	950	5,470
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	100	0.4	~22	1,170	7,370	100	0.4	~24	1,090	7,850
		150	0.3	~22	1,050	5,950	150	0.3	~24	980	6,350
		210	0.25	~22	940	5,330	210	0.25	~24	870	5,010
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	100	0.4	~22	1,170	7,370	100	0.4	~24	1,090	7,850
		150	0.3	~22	1,050	5,950	150	0.3	~24	980	6,350
		210	0.25	~22	940	5,330	210	0.25	~24	870	5,010
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	100	0.3	~22	950	4,660	100	0.3	~24	900	5,040
		150	0.25	~22	860	3,790	150	0.25	~24	810	4,080
		210	0.2	~22	760	2,980	210	0.2	~24	720	3,220
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	100	0.3	~22	740	3,110	100	0.3	~24	700	3,360
		150	0.2	~22	670	2,530	150	0.2	~24	600	2,590
		210	0.15	~22	590	1,980	210	0.15	~24	500	1,920
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EOMW type	100	0.15	~22	320	560	100	0.15	~24	300	600
		150	0.1	~22	290	460	150	0.1	~24	270	490
		210	–	–	–	–	210	–	–	–	–
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	100	0.4	~22	1,590	10,000	100	0.4	~24	1,490	10,730
		150	0.35	~22	1,430	8,110	150	0.35	~24	1,340	8,680
		210	0.3	~22	1,270	6,400	210	0.3	~24	1,190	6,850
Stainless steel Below 250HB	JC8050 (JC7560)	100	0.4	~22	1,270	8,000	100	0.4	~24	1,190	8,570
		150	0.3	~22	1,140	6,460	150	0.3	~24	1,070	6,930
		210	0.25	~22	1,020	5,140	210	0.25	~24	950	5,470
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	100	0.3	~22	640	2,240	100	0.3	~24	600	2,400
		150	0.25	~22	580	1,830	150	0.25	~24	540	1,940
		210	0.2	~22	510	1,430	210	0.2	~24	480	1,540
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	100	0.3	~22	320	900	100	0.3	~24	300	960
		150	0.25	~22	290	730	150	0.25	~24	270	780
		210	0.2	~22	260	580	210	0.2	~24	240	610

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

Recommended cutting conditions for "EOHW-type inserts"

2

MPM and MSN type

Work materials	Grades	Tool dia. (mm)														
		10 / 11					12 / 13 / 15					16 / 17 / 18				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	40	0.20	~6	2,860	2,860	50	0.20	~7	2,390	3,590	65	0.25	~12	1,790	4,300
		60	0.15	~6	2,570	2,060	70	0.15	~7	2,150	2,580	95	0.20	~12	1,610	3,090
		80	0.10	~6	2,290	1,370	95	0.10	~7	1,910	1,720	125	0.10	~12	1,430	2,060
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	40	0.15	~6	2,550	1,530	50	0.15	~7	2,120	1,900	65	0.15	~12	1,590	1,900
		60	0.10	~6	2,300	1,240	70	0.10	~7	1,910	1,550	95	0.10	~12	1,430	1,520
		80	-	-	-	-	95	-	-	-	-	125	-	-	-	-

Work materials	Grades	Tool dia. (mm)									
		20 / 21					25				
		No. of teeth 5N					No. of teeth 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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	80	0.25	~14	1,430	4,290	100	0.25	~18	1,150	4,140
		120	0.2	~14	1,290	3,100	150	0.2	~18	1,040	3,000
		160	0.10	~14	1,140	2,050	200	0.10	~18	920	1,990
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	80	0.15	~14	1,270	1,900	100	0.15	~18	1,020	1,840
		120	0.1	~14	1,140	1,540	150	0.1	~18	920	1,490
		160	-	-	-	-	200	-	-	-	-

Work materials	Grades	Tool dia. (mm)									
		30					32				
		No. of teeth 7N					No. of teeth 8N				
		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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	120	0.25	~22	950	3,990	120	0.25	~24	900	4,320
		180	0.20	~22	860	2,890	180	0.20	~24	810	3,110
		240	0.10	~22	760	1,920	240	0.10	~24	720	2,070
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	120	0.15	~22	850	1,780	120	0.15	~24	800	1,920
		180	0.10	~22	760	1,430	180	0.10	~24	720	1,560
		240	-	-	-	-	240	-	-	-	-

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

Recommended cutting conditions for "ZOMT *-PL-type inserts"

3

MPM and MSN type

Work materials	Applicable inserts	Grades	Tool dia. (mm)														
			10 / 11					12 / 13 / 15					16 / 17 / 18				
			No. of teeth 2N					No. of teeth 3N					No. of teeth 4N				
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118)	50	~4.0	~6.0	5,090	810	60	~4.0	~8.0	4,240	1,020	70	~5.0	~10.0	3,180	1,020
			75	~1.2	~1.8	4,580	640	80	~1.7	~2.6	3,820	800	120	~2.0	~3.0	2,860	800
			100	~0.5	~0.8	4,070	490	110	~0.6	~1.2	3,400	610	160	~0.7	~1.3	2,550	610
Die steel (1.2311, P21) Below 255HB	PL type	JC8050 (JC8118)	50	~4.0	~6.0	4,770	570	60	~4.0	~8.0	3,980	720	70	~5.0	~10.0	2,980	720
			75	~1.2	~1.8	4,300	430	80	~1.7	~2.6	3,580	540	120	~2.0	~3.0	2,690	540
			100	~0.5	~0.8	3,820	310	110	~0.6	~1.2	3,180	380	160	~0.7	~1.3	2,390	380
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	50	~4.0	~6.0	4,770	480	60	~4.0	~8.0	3,980	600	70	~5.0	~10.0	2,980	600
			75	~1.2	~1.8	4,300	340	80	~1.7	~2.6	3,580	430	120	~2.0	~3.0	2,690	430
			100	~0.5	~0.8	3,820	230	110	~0.6	~1.2	3,180	290	160	~0.7	~1.3	2,390	290
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	50	~3.0	~4.0	3,820	380	60	~3.0	~4.5	3,180	480	70	~4.0	~6.0	2,390	480
			75	~1.2	~1.6	3,440	280	80	~1.3	~1.8	2,860	340	120	~1.7	~2.2	2,150	340
			100	~0.5	~0.8	3,060	180	110	~0.6	~1.0	2,550	230	160	~0.6	~1.1	1,910	230
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118	50	~2.5	~3.0	3,180	320	60	~2.5	~3.5	2,650	400	70	~3.5	~5.5	1,990	400
			75	~1.0	~1.4	2,860	230	80	~1.0	~1.5	2,390	290	120	~1.4	~2.0	1,790	290
			100	~0.5	~0.6	2,550	150	110	~0.5	~0.8	2,120	190	160	~0.5	~1.0	1,590	190
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118	50	~4.0	~6.0	4,770	760	60	~4.0	~8.0	3,980	960	70	~5.0	~10.0	2,980	950
			75	~1.2	~1.8	4,300	600	80	~1.7	~2.6	3,580	750	120	~2.0	~3.0	2,690	750
			100	~0.5	~0.8	3,820	460	110	~0.6	~1.2	3,180	570	160	~0.7	~1.3	2,390	570
Stainless steel Below 250HB	PL type	JC8050	50	~4.0	~6.0	4,770	570	60	~4.0	~8.0	3,980	720	70	~5.0	~10.0	2,980	720
			75	~1.2	~1.8	4,300	430	80	~1.7	~2.6	3,580	540	120	~2.0	~3.0	2,690	540
			100	~0.5	~0.8	3,820	310	110	~0.6	~1.2	3,180	380	160	~0.7	~1.3	2,390	380

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.
- 6) When using ZOMT *-PL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "ZOMT*-PL-type inserts"

3

MPM and MSN type

Work materials	Applicable inserts	Grades	Tool dia. (mm)									
			20 / 21					25				
			No. of teeth 5N					No. of teeth 6N				
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118)	70	~5.0	~16.0	2,550	1,020	90	~5.0	~20.0	2,040	980
			120	~4.0	~8.0	2,290	800	140	~4.0	~10.0	1,830	770
			190	~3.0	~4.0	2,040	610	210	~3.0	~8.0	1,630	590
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (JC8118)	70	~5.0	~16.0	2,390	720	90	~5.0	~20.0	1,910	690
			120	~4.0	~8.0	2,150	540	140	~4.0	~10.0	1,720	520
			190	~3.0	~4.0	1,910	380	210	~3.0	~8.0	1,530	370
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	70	~5.0	~16.0	2,390	600	90	~5.0	~20.0	1,910	570
			120	~4.0	~8.0	2,150	430	140	~4.0	~10.0	1,720	410
			190	~3.0	~4.0	1,910	290	210	~3.0	~8.0	1,530	280
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	70	~4.0	~16.0	1,910	480	90	~4.0	~20.0	1,530	460
			120	~3.0	~8.0	1,720	340	140	~3.0	~10.0	1,380	330
			190	~2.0	~4.0	1,530	230	210	~2.0	~8.0	1,220	220
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118	70	~3.5	~10.0	1,590	400	90	~3.5	~12.5	1,270	380
			120	~2.5	~5.0	1,430	290	140	~2.5	~6.2	1,150	280
			190	~1.2	~2.5	1,270	190	210	~1.2	~3.2	1,020	180
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118	70	~5.0	~18.0	2,390	960	90	~5.0	~25.0	1,910	920
			120	~4.0	~10.0	2,150	750	140	~4.0	~12.0	1,720	720
			190	~3.0	~5.0	1,910	570	210	~3.0	~9.0	1,530	550
Stainless steel Below 250HB	PL type	JC8050	70	~5.0	~16.0	2,390	720	90	~5.0	~20.0	1,910	690
			120	~4.0	~8.0	2,150	540	140	~4.0	~10.0	1,720	520
			190	~3.0	~4.0	1,910	380	210	~3.0	~8.0	1,530	370

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.
- 6) When using ZOMT*-PL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "ZOMT *-PL-type inserts"

3

MPM and MSN type

Work materials	Applicable inserts	Grades	Tool dia. (mm)									
			30					32				
			No. of teeth 7N					No. of teeth 8N				
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118)	100	~5.0	~22.0	1,700	950	100	~5.0	~22.0	1,590	1,020
			150	~4.0	~15.0	1,530	750	150	~4.0	~15.0	1,430	800
			210	~3.0	~8.0	1,360	570	210	~3.0	~8.0	1,270	610
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (JC8118)	100	~5.0	~22.0	1,590	670	100	~5.0	~22.0	1,490	720
			150	~4.0	~15.0	1,430	500	150	~4.0	~15.0	1,340	540
			210	~3.0	~8.0	1,270	360	210	~3.0	~8.0	1,190	380
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	100	~5.0	~22.0	1,590	560	100	~5.0	~22.0	1,490	600
			150	~4.0	~15.0	1,430	400	150	~4.0	~15.0	1,340	430
			210	~3.0	~8.0	1,270	270	210	~3.0	~8.0	1,190	290
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	100	~5.0	~22.0	1,270	440	100	~5.0	~22.0	1,190	480
			150	~4.0	~15.0	1,150	320	150	~4.0	~15.0	1,070	340
			210	~3.0	~8.0	1,020	210	210	~3.0	~8.0	950	230
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118	100	~4.0	~15.0	1,060	370	100	~4.0	~15.0	990	400
			150	~3.0	~7.5	950	270	150	~3.0	~7.5	900	290
			210	~2.0	~3.8	850	180	210	~2.0	~3.8	800	190
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118	100	~5.0	~24.0	1,590	890	100	~5.0	~24.0	1,490	950
			150	~4.0	~16.0	1,430	700	150	~4.0	~16.0	1,340	750
			210	~3.0	~9.0	1,270	530	210	~3.0	~9.0	1,190	570
Stainless steel Below 250HB	PL type	JC8050	100	~5.0	~22.0	1,590	670	100	~5.0	~22.0	1,490	720
			150	~4.0	~15.0	1,430	500	150	~4.0	~15.0	1,340	540
			210	~3.0	~8.0	1,270	360	210	~3.0	~8.0	1,190	380

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.
- 6) When using ZOMT *-PL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "YOHV-type inserts" (For side finishing)

4

MPM and MSN type

Work materials	Grades	Tool dia. (mm)									
		10 / 11					12 / 13 / 15				
		No. of teeth 2N					No. of teeth 3N				
		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 (C50, C55) Below 250HB	JC8015 (DH102)	~50	≤1.2	≤0.10	12,600	3,780	~60	≤1.2	≤0.10	10,600	4,770
		75	≤0.8	≤0.08	8,820	2,120	80	≤0.8	≤0.08	7,420	2,670
		100	≤0.6	≤0.08	8,820	1,760	110	≤0.6	≤0.08	7,420	2,230
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~50	≤1.0	≤0.10	11,400	3,420	~60	≤1.0	≤0.10	9,550	4,300
		75	≤0.7	≤0.08	7,980	1,920	80	≤0.7	≤0.08	6,690	2,400
		100	≤0.5	≤0.08	7,980	1,600	110	≤0.5	≤0.08	6,690	2,000
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~50	≤1.0	≤0.10	11,400	3,420	~60	≤1.0	≤0.10	9,550	4,300
		75	≤0.7	≤0.08	7,980	1,920	80	≤0.7	≤0.08	6,690	2,400
		100	≤0.5	≤0.08	7,980	1,600	110	≤0.5	≤0.08	6,690	2,000
Mold steel (1.2311, P21) 38-43HRC	DH102 (JC8015)	~50	≤1.0	≤0.10	8,880	2,130	~60	≤1.0	≤0.10	7,430	2,670
		75	≤0.7	≤0.08	6,180	1,240	80	≤0.7	≤0.08	5,200	1,560
		100	≤0.5	≤0.08	6,180	990	110	≤0.5	≤0.08	5,200	1,250
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~50	≤0.8	≤0.10	6,360	1,270	~60	≤0.8	≤0.10	5,300	1,590
		75	≤0.5	≤0.08	4,440	710	80	≤0.5	≤0.08	3,710	890
		100	-	-	-	-	110	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~50	≤0.5	≤0.10	4,740	950	~60	≤0.5	≤0.10	3,980	1,190
		75	≤0.3	≤0.08	3,300	530	80	≤0.3	≤0.08	2,790	670
		100	-	-	-	-	110	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~50	≤1.2	≤0.12	12,600	3,780	~60	≤1.2	≤0.12	10,600	4,770
		75	≤0.8	≤0.10	8,820	2,120	80	≤0.8	≤0.10	7,420	2,670
		100	≤0.6	≤0.08	8,820	1,760	110	≤0.6	≤0.08	7,420	2,230
Stainless steel Below 250HB	JC8015 (DH102)	~50	≤1.0	≤0.10	11,400	3,420	~60	≤1.0	≤0.10	9,550	4,300
		75	≤0.7	≤0.08	7,980	1,920	80	≤0.7	≤0.08	6,690	2,400
		100	≤0.5	≤0.08	7,980	1,600	110	≤0.5	≤0.08	6,690	2,000
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~50	≤1.0	≤0.10	2,520	600	~60	≤1.0	≤0.10	2,120	760
		75	≤0.7	≤0.08	1,740	350	80	≤0.7	≤0.08	1,480	450
		100	≤0.5	≤0.08	1,740	280	110	≤0.5	≤0.08	1,480	360

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

Recommended cutting conditions for "YOHW-type inserts" (For side finishing)

4

MPM and MSN type

Work materials	Grades	Tool dia. (mm)									
		16 / 17 / 18					20 / 21				
		No. of teeth 4N					No. of teeth 5N				
		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 (C50, C55) Below 250HB	JC8015 (DH102)	~80	≤1.2	≤0.10	7,960	4,770	~100	≤1.2	≤0.10	6,300	4,770
		120	≤0.8	≤0.08	5,560	2,670	150	≤0.8	≤0.08	4,410	2,670
		160	≤0.6	≤0.08	5,560	2,230	190	≤0.6	≤0.08	4,410	2,230
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~80	≤1.0	≤0.10	7,160	4,300	~100	≤1.0	≤0.10	5,700	4,300
		120	≤0.7	≤0.08	5,000	2,400	150	≤0.7	≤0.08	3,990	2,400
		160	≤0.5	≤0.08	5,000	2,000	190	≤0.5	≤0.08	3,990	2,000
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~80	≤1.0	≤0.10	7,160	4,300	~100	≤1.0	≤0.10	5,700	4,300
		120	≤0.7	≤0.08	5,000	2,400	150	≤0.7	≤0.08	3,990	2,400
		160	≤0.5	≤0.08	5,000	2,000	190	≤0.5	≤0.08	3,990	2,000
Mold steel (1.2311, P21) 38-43HRC	DH102 (JC8015)	~80	≤1.0	≤0.10	5,560	2,670	~100	≤1.0	≤0.10	4,440	2,670
		120	≤0.7	≤0.08	3,900	1,560	150	≤0.7	≤0.08	3,090	1,560
		160	≤0.5	≤0.08	3,900	1,250	190	≤0.5	≤0.08	3,090	1,250
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~80	≤0.8	≤0.10	3,980	1,590	~100	≤0.8	≤0.10	3,180	1,590
		120	≤0.5	≤0.08	2,780	890	150	≤0.5	≤0.08	2,220	890
		160	-	-	-	-	190	-	-	-	-
Hardened die steel (1.2311, 1.2379) 55-62HRC	DH102	~80	≤0.5	≤0.10	2,980	1,190	~100	≤0.5	≤0.10	2,370	1,190
		120	≤0.3	≤0.08	2,080	670	150	≤0.3	≤0.08	1,650	670
		160	-	-	-	-	190	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~80	≤1.2	≤0.12	7,960	4,770	~100	≤1.2	≤0.12	6,300	4,770
		120	≤0.8	≤0.10	5,560	2,670	150	≤0.8	≤0.10	4,410	2,670
		160	≤0.6	≤0.08	5,560	2,230	190	≤0.6	≤0.08	4,410	2,230
Stainless steel Below 250HB	JC8015 (DH102)	~80	≤1.0	≤0.10	7,160	4,300	~100	≤1.0	≤0.10	5,700	4,300
		120	≤0.7	≤0.08	5,000	2,400	150	≤0.7	≤0.08	3,990	2,400
		160	≤0.5	≤0.08	5,000	2,000	190	≤0.5	≤0.08	3,990	2,000
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~80	≤1.0	≤0.10	1,600	760	~100	≤1.0	≤0.10	1,260	760
		120	≤0.7	≤0.08	1,120	450	150	≤0.7	≤0.08	870	450
		160	≤0.5	≤0.08	1,120	360	190	≤0.5	≤0.08	870	360

l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

Recommended cutting conditions for "YOHV-type inserts" (For side finishing)

4

MPM and MSN type

Work materials	Grades	Tool dia. (mm)														
		25					30					32				
		No. of teeth 6N					No. of teeth 7N					No. of teeth 8N				
		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 (C50, C55) Below 250HB	JC8015 (DH102)	~120	≤1.2	≤0.10	5,090	4,580	~160	≤1.2	≤0.10	4,200	4,410	~160	≤1.2	≤0.10	3,980	4,770
		190	≤0.8	≤0.08	3,560	2,560	240	≤0.8	≤0.08	2,940	2,470	240	≤0.8	≤0.08	2,780	2,670
		235	≤0.6	≤0.08	3,560	2,140	290	≤0.6	≤0.08	2,940	2,060	290	≤0.6	≤0.08	2,780	2,230
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~120	≤1.0	≤0.10	4,580	4,120	~160	≤1.0	≤0.10	3,800	3,990	~160	≤1.0	≤0.10	3,580	4,300
		190	≤0.7	≤0.08	3,200	2,300	240	≤0.7	≤0.08	2,660	2,230	240	≤0.7	≤0.08	2,500	2,400
		235	≤0.5	≤0.08	3,200	1,920	290	≤0.5	≤0.08	2,660	1,860	290	≤0.5	≤0.08	2,500	2,000
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~120	≤1.0	≤0.10	4,580	4,120	~160	≤1.0	≤0.10	3,800	3,990	~160	≤1.0	≤0.10	3,580	4,300
		190	≤0.7	≤0.08	3,200	2,300	240	≤0.7	≤0.08	2,660	2,230	240	≤0.7	≤0.08	2,500	2,400
		235	≤0.5	≤0.08	3,200	1,920	290	≤0.5	≤0.08	2,660	1,860	290	≤0.5	≤0.08	2,500	2,000
Mold steel (1.2311, P21) 38-43HRC	DH102 (JC8015)	~120	≤1.0	≤0.10	3,560	2,560	~160	≤1.0	≤0.10	2,960	2,490	~160	≤1.0	≤0.10	2,780	2,670
		190	≤0.7	≤0.08	2,490	1,490	240	≤0.7	≤0.08	2,060	1,440	240	≤0.7	≤0.08	1,950	1,560
		235	≤0.5	≤0.08	2,490	1,200	290	≤0.5	≤0.08	2,060	1,150	290	≤0.5	≤0.08	1,950	1,250
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~120	≤0.8	≤0.10	2,550	1,530	~160	≤0.8	≤0.10	2,120	1,480	~160	≤0.8	≤0.10	1,990	1,590
		190	≤0.5	≤0.08	1,780	850	240	≤0.5	≤0.08	1,480	830	240	≤0.5	≤0.08	1,390	890
		235	-	-	-	-	290	-	-	-	-	290	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~120	≤0.5	≤0.10	1,910	1,150	~160	≤0.5	≤0.10	1,580	1,110	~160	≤0.5	≤0.10	1,490	1,190
		190	≤0.3	≤0.08	1,340	640	240	≤0.3	≤0.08	1,100	620	240	≤0.3	≤0.08	1,040	670
		235	-	-	-	-	290	-	-	-	-	290	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~120	≤1.2	≤0.12	5,090	4,580	~160	≤1.2	≤0.12	4,200	4,410	~160	≤1.2	≤0.12	3,980	4,770
		190	≤0.8	≤0.10	3,560	2,560	240	≤0.8	≤0.10	2,940	2,470	240	≤0.8	≤0.10	2,780	2,670
		235	≤0.6	≤0.08	3,560	2,140	290	≤0.6	≤0.08	2,940	2,060	290	≤0.6	≤0.08	2,780	2,230
Stainless steel Below 250HB	JC8015 (DH102)	~120	≤1.0	≤0.10	4,580	4,120	~160	≤1.0	≤0.10	3,800	3,990	~160	≤1.0	≤0.10	3,580	4,300
		190	≤0.7	≤0.08	3,200	2,300	240	≤0.7	≤0.08	2,660	2,230	240	≤0.7	≤0.08	2,500	2,400
		235	≤0.5	≤0.08	3,200	1,920	290	≤0.5	≤0.08	2,660	1,860	290	≤0.5	≤0.08	2,500	2,000
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~120	≤1.0	≤0.10	1,020	730	~160	≤1.0	≤0.10	840	710	~160	≤1.0	≤0.10	800	760
		190	≤0.7	≤0.08	710	430	240	≤0.7	≤0.08	580	410	240	≤0.7	≤0.08	560	450
		235	≤0.5	≤0.08	710	340	290	≤0.5	≤0.08	580	320	290	≤0.5	≤0.08	560	360

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

MPM and MSN type

Work materials	Grades	Tool dia. (mm)									
		10 / 11					12 / 13 / 15				
		No. of teeth 2N					No. of teeth 3N				
		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 (C50, C55) Below 250HB	JC8015 (DH102)	~50	≤0.12	5~10	7,920	3,170	~60	≤0.12	6~12	6,630	3,980
		75	≤0.10	5~10	5,940	1,900	80	≤0.10	6~12	4,970	2,380
		100	≤0.10	5~8	5,100	1,430	110	≤0.10	6~10	4,300	1,800
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~50	≤0.12	5~10	7,320	2,640	~60	≤0.12	6~12	6,100	3,290
		75	≤0.10	5~10	5,460	1,580	80	≤0.10	6~12	4,580	1,980
		100	≤0.10	5~8	4,740	1,190	110	≤0.10	6~10	3,960	1,500
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~50	≤0.12	5~10	7,320	2,640	~60	≤0.12	6~12	6,100	3,290
		75	≤0.10	5~10	5,460	1,580	80	≤0.10	6~12	4,580	1,980
		100	≤0.10	5~8	4,740	1,190	110	≤0.10	6~10	3,960	1,500
Mold steel (1.2311, P21) 38-43HRC	DH102 (JC8015)	~50	≤0.12	5~10	6,360	1,530	~60	≤0.12	6~12	5,300	1,910
		75	≤0.10	5~10	4,800	920	80	≤0.10	6~12	3,980	1,150
		100	≤0.10	5~8	4,140	700	110	≤0.10	6~10	3,450	870
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~50	≤0.10	5~10	3,840	770	~60	≤0.10	6~12	3,180	960
		75	≤0.08	5~10	2,880	460	80	≤0.08	6~12	2,380	570
		100	—	—	—	—	110	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~50	≤0.10	5~10	2,220	350	~60	≤0.10	6~12	1,860	450
		75	≤0.08	5~10	1,680	210	80	≤0.08	6~12	1,400	270
		100	—	—	—	—	110	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~50	≤0.15	5~10	6,360	1,910	~60	≤0.15	6~12	5,300	2,380
		75	≤0.12	5~10	4,800	1,150	80	≤0.12	6~12	3,980	1,430
		100	≤0.10	5~8	4,140	810	110	≤0.10	6~10	3,450	1,010
Stainless steel Below 250HB	JC8015 (DH102)	~50	≤0.12	5~10	7,320	2,640	~60	≤0.12	6~12	6,100	3,290
		75	≤0.10	5~10	5,460	1,580	80	≤0.10	6~12	4,580	1,980
		100	≤0.10	5~8	4,740	1,190	110	≤0.10	6~10	3,960	1,500
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~50	≤0.12	5~10	1,560	370	~60	≤0.12	6~12	1,330	480
		75	≤0.10	5~10	1,200	230	80	≤0.10	6~12	1,000	290
		100	≤0.10	5~8	1,020	170	110	≤0.10	6~10	860	220

 l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

Recommended cutting conditions for "YOHW-type inserts" (For bottom face finishing)

4

MPM and MSN type

Work materials	Grades	Tool dia. (mm)									
		16 / 17 / 18					20 / 21				
		No. of teeth 4N					No. of teeth 5N				
		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 (C50, C55) Below 250HB	JC8015 (DH102)	~80	≤0.12	8~16	4,980	3,980	~100	≤0.12	10~20	3,960	3,980
		120	≤0.10	8~16	3,740	2,380	150	≤0.10	10~20	2,970	2,380
		160	≤0.10	8~13	3,240	1,800	190	≤0.10	10~16	2,550	1,800
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~80	≤0.12	8~16	4,580	3,290	~100	≤0.12	10~20	3,660	3,290
		120	≤0.10	8~16	3,440	1,980	150	≤0.10	10~20	2,730	1,980
		160	≤0.10	8~13	2,980	1,500	190	≤0.10	10~16	2,370	1,500
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~80	≤0.12	8~16	4,580	3,290	~100	≤0.12	10~20	3,660	3,290
		120	≤0.10	8~16	3,440	1,980	150	≤0.10	10~20	2,730	1,980
		160	≤0.10	8~13	2,980	1,500	190	≤0.10	10~16	2,370	1,500
Mold steel (1.2311, P21) 38-43HRC	DH102 (JC8015)	~80	≤0.12	8~16	3,980	1,910	~100	≤0.12	10~20	3,180	1,910
		120	≤0.10	8~16	2,980	1,150	150	≤0.10	10~20	2,400	1,150
		160	≤0.10	8~13	2,580	870	190	≤0.10	10~16	2,070	870
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~80	≤0.10	8~16	2,380	960	~100	≤0.10	10~20	1,920	960
		120	≤0.08	8~16	1,780	570	150	≤0.08	10~20	1,440	570
		160	-	-	-	-	190	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~80	≤0.10	8~16	1,400	450	~100	≤0.10	10~20	1,110	450
		120	≤0.08	8~16	1,040	270	150	≤0.08	10~20	840	270
		160	-	-	-	-	190	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~80	≤0.15	8~16	3,980	2,380	~100	≤0.15	10~20	3,180	2,380
		120	≤0.12	8~16	2,980	1,430	150	≤0.12	10~20	2,400	1,430
		160	≤0.10	8~13	2,580	1,010	190	≤0.10	10~16	2,070	1,010
Stainless steel Below 250HB	JC8015 (DH102)	~80	≤0.12	8~16	4,580	3,290	~100	≤0.12	10~20	3,660	3,290
		120	≤0.10	8~16	3,440	1,980	150	≤0.10	10~20	2,730	1,980
		160	≤0.10	8~13	2,980	1,500	190	≤0.10	10~16	2,370	1,500
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~80	≤0.12	8~16	1,000	480	~100	≤0.12	10~20	780	480
		120	≤0.10	8~16	740	290	150	≤0.10	10~20	600	290
		160	≤0.10	8~13	640	220	190	≤0.10	10~16	510	220

 l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

Recommended cutting conditions for "YOHW-type inserts" (For bottom face finishing)

4

MPM and MSN type

Work materials	Grades	Tool dia. (mm)														
		25					30					32				
		No. of teeth 6N					No. of teeth 7N					No. of teeth 8N				
		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 (C50, C55) Below 250HB	JC8015 (DH102)	~120	≤0.12	12~25	3,180	3,820	~160	≤0.12	15~30	2,640	3,700	~160	≤0.12	16~32	2,490	3,980
		190	≤0.10	12~25	2,380	2,280	240	≤0.10	15~30	1,980	2,220	240	≤0.10	16~32	1,870	2,380
		235	≤0.06	12~20	2,070	1,740	290	≤0.06	15~24	1,700	1,670	290	≤0.06	16~26	1,620	1,800
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~120	≤0.12	12~25	2,930	3,160	~160	≤0.12	15~30	2,440	3,070	~160	≤0.12	16~32	2,290	3,290
		190	≤0.10	12~25	2,200	1,900	240	≤0.10	15~30	1,820	1,830	240	≤0.10	16~32	1,720	1,980
		235	≤0.06	12~20	1,900	1,440	290	≤0.06	15~24	1,580	1,390	290	≤0.06	16~26	1,490	1,500
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~120	≤0.12	12~25	2,930	3,160	~160	≤0.12	15~30	2,440	3,070	~160	≤0.12	16~32	2,290	3,290
		190	≤0.10	12~25	2,200	1,900	240	≤0.10	15~30	1,820	1,830	240	≤0.10	16~32	1,720	1,980
		235	≤0.06	12~20	1,900	1,440	290	≤0.06	15~24	1,590	1,390	290	≤0.06	16~26	1,490	1,500
Mold steel (1.2311, P21) 38-43HRC	DH102 (JC8015)	~120	≤0.12	12~25	2,550	1,840	~160	≤0.12	15~30	2,120	1,780	~160	≤0.12	16~32	1,990	1,910
		190	≤0.10	12~25	1,910	1,100	240	≤0.10	15~30	1,600	1,080	240	≤0.10	16~32	1,490	1,150
		235	≤0.06	12~20	1,660	840	290	≤0.06	15~24	1,380	810	290	≤0.06	16~26	1,290	870
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~120	≤0.10	12~25	1,530	920	~160	≤0.10	15~30	1,280	900	~160	≤0.10	16~32	1,190	960
		190	≤0.08	12~25	1,150	550	240	≤0.08	15~30	960	540	240	≤0.08	16~32	890	570
		235	-	-	-	-	290	-	-	-	-	290	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~120	≤0.10	12~25	890	430	~160	≤0.10	15~30	740	410	~160	≤0.10	16~32	700	450
		190	≤0.08	12~25	670	260	240	≤0.08	15~30	560	250	240	≤0.08	16~32	520	270
		235	-	-	-	-	290	-	-	-	-	290	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~120	≤0.15	12~25	2,550	2,300	~160	≤0.15	15~30	2,120	2,230	~160	≤0.15	16~32	1,990	2,380
		190	≤0.12	12~25	1,910	1,380	240	≤0.12	15~30	1,600	1,340	240	≤0.12	16~32	1,490	1,430
		235	≤0.10	12~20	1,660	970	290	≤0.10	15~24	1,380	940	290	≤0.10	16~26	1,290	1,010
Stainless steel Below 250HB	JC8015 (DH102)	~120	≤0.12	12~25	2,930	3,160	~160	≤0.12	15~30	2,440	3,070	~160	≤0.12	16~32	2,290	3,290
		190	≤0.12	12~25	2,200	1,900	240	≤0.12	15~30	1,820	1,830	240	≤0.12	16~32	1,720	1,980
		235	≤0.10	12~20	1,900	1,440	290	≤0.10	15~24	1,590	1,390	290	≤0.10	16~26	1,490	1,500
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~120	≤0.12	12~25	640	460	~160	≤0.12	15~30	520	440	~160	≤0.12	16~32	500	480
		190	≤0.10	12~25	480	280	240	≤0.10	15~30	400	270	240	≤0.10	16~32	370	290
		235	≤0.06	12~20	420	210	290	≤0.06	15~24	340	200	290	≤0.06	16~26	320	220

l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case of using PME/PME-LS end mill type, shorten overhung length to 60% of the above data.

QM Quick & Mini Max

New generation high feed mill "QM MAX"

Modular head
 $\phi 16 \sim \phi 42$

Face mill
 $\phi 40 \sim \phi 66$

G-Body



Low cutting force

Adopted unique 3D geometry inserts with low cutting force (25% lower than conventional tool), QM MAX achieved high efficient machining up to $ap = 1\text{mm}$. Maintain stable cutting force & power consumption after 1.7mm depth, in case of deep cavity milling.

Multi blades specification

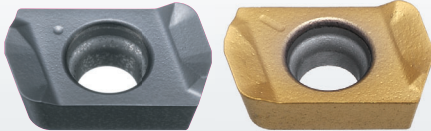
Multi blades specification achieved $Q=144\text{cc/min}$.

Vibration free

"QM MAX" MQX type can be possible high efficient machining and longer tool life, due to control the vibration

Inserts variation

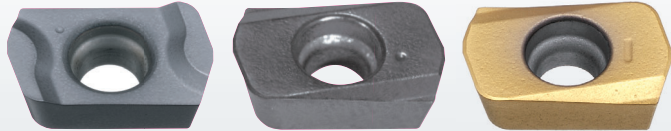
High feed insert



EPMT100312ZER

EPMT100312ZER

High feed insert for unfavorable condition

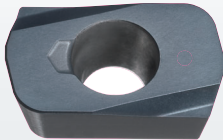


EPMW100312ZER

EPMW100312ZTR

EPMW100312ZTR

High hardened steel



EPHW100316ZTR

NEW

Shoulder milling insert
for aluminum alloy



ZPMT1003...ZER-NL
(Corner R0.4, 0.8, 2.0)

NEW

Shoulder milling insert
for steel



ZPMT1003...ZER-PL
(Corner R0.4, 0.8, 2.0)

NEW

Shoulder milling insert
for Ti-alloy



ZPMT1003...ZER-SL
(Corner R0.4, 0.8, 2.0)

"MIRROR INSERT" for finishing side &
bottom face / contouring milling



YPHW1003...ZER-...

CBN insert



YPHW100308ZTR-F1

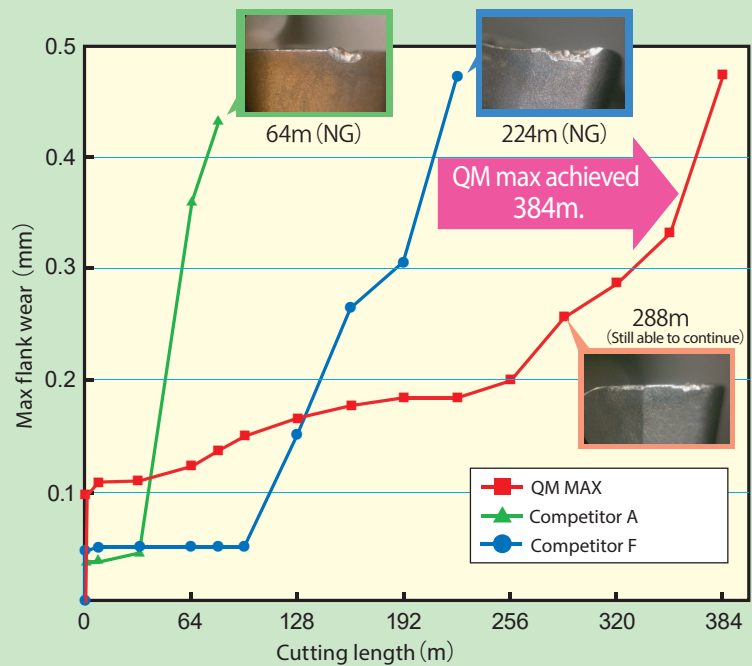
High feed and shoulder milling can be processed with same body. Moreover, adopted "MIRROR INSERT" achieved high efficient finishing side & bottom face.

Adopted new PVD coated grade "JC8118" possible to cut general steel, hardened material, Ti-alloy and heat-resistant alloy, tough grade "JC8050" for interrupted cutting, and new PVD coated grade "JC7560" improved heat-fracture resistance & impact strength and tool life. And, available now uncoated grade "FC18" for aluminum alloy & new PVD coated grade "JC7518" for Ti-alloy. Moreover, "MIRROR INSERT" YPHW type adopted generic PVD coated grade "JC8015" that have a wide application, cermet "CX75", PVD coated grade "DH102" for high speed machining in high hardened material, and CBN grade for high speed machining.

Cutting performance

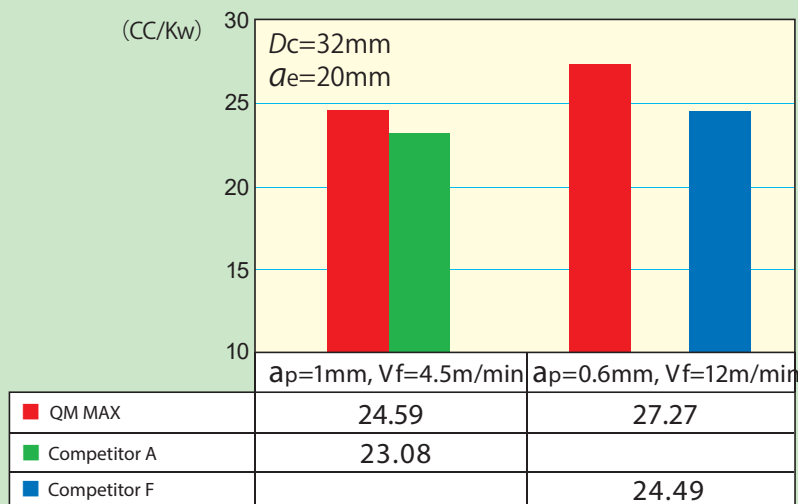
Tool life comparison

Material:
P21, 40HRC
Insert No.:
EPMT100312ZER (JC8050)
Cutting conditions:
Dc=32mm, Vc=120.6m/min ($n=1,200\text{min}^{-1}$),
f=3mm/rev (Vf=3,600mm/min) (6N),
ap=0.6mm, ae=19mm, Q=41cc/min
Overhung length: $\ell=100\text{mm}$
Shoulder cutting, Down cut, Dry (Air blow)



Metal removal rate comparison

Metal removal rate / 1Kw on C50



Metal removal Q / Kw of QM MAX is 6% – 10% higher than Competitor's tool.



Lower power consumption

MQX
TYPE

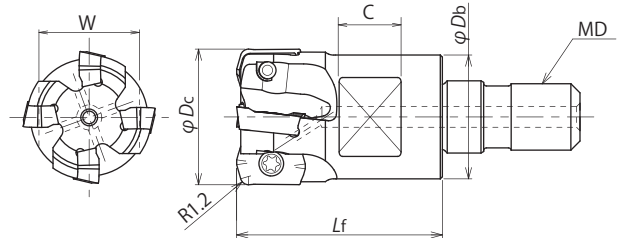
Modular head MQX type

Through coolant hole

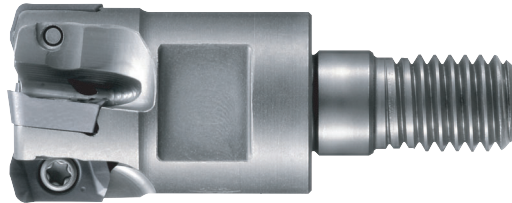
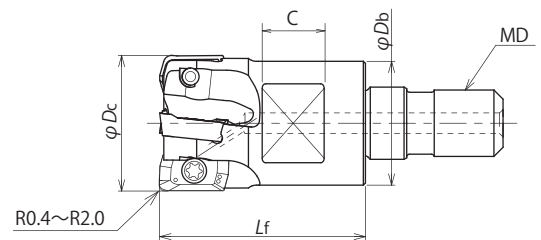
G-Body



● For high feed milling



● For shoulder milling



Item code	Stock	No. of inserts	Dimensions (mm)						Applicable inserts	Parts	
			φDc	Lf	φDb	MD	C	W		Clamp screw	Wrench (Not be included)
MQX-2016-M8	●	2	16	23	14	M8	8	12			
MQX-2017-M8	●	2	17	23	14	M8	8	12			
MQX-3020-M10	●	3	20	30	18	M10	9	14		TSW-2556H	
MQX-4020-M10	●	4	20	30	18	M10	9	14			
MQX-4021-M10	●	4	21	30	18	M10	9	14			
MQX-4025-M12	●	4	25	35	22.5	M12	10	17			
MQX-5025-M12	●	5	25	35	22.5	M12	10	17			
MQX-4026-M12	□	4	26	35	22.5	M12	10	17			
MQX-5026-M12	●	5	26	35	22.5	M12	10	17	EP * 1003 * * Z * R		
NEW MQX-5028-M12	□	5	28	35	23.6	M12	10	17	ZPMT1003 * * ZER- * *		A-08
									YPHW1003 * * Z * R- * *		
MQX-5030-M16	□	5	30	43	27	M16	12	22			
MQX-5032-M16	●	5	32	43	29	M16	12	22		DSW-2563H	
MQX-6032-M16	●	6	32	43	29	M16	12	22			
MQX-5035-M16	●	5	35	43	29	M16	12	22			
MQX-6035-M16	●	6	35	43	29	M16	12	22			
MQX-6040-M16	●	6	40	43	32	M16	14	26			
MQX-7040-M16	●	7	40	43	32	M16	14	26			
MQX-6042-M16	●	6	42	43	32	M16	14	26			

Note) 1. All cutters are supplied without inserts.

2. Please see page 5 for recommended tightening torque.

(When mounting M8 head to shank, recommend to use DIJET DS type spanner wrench.)

3. All cutters are supplied without wrench & MOLY since February 2019 for our stock production.

Arbor 12~15 Page

Cutting conditions 39~86 Page

Clamp screw	Recommended torque (N·m)
TSW-2556H	1.1
DSW-2563H	1.1

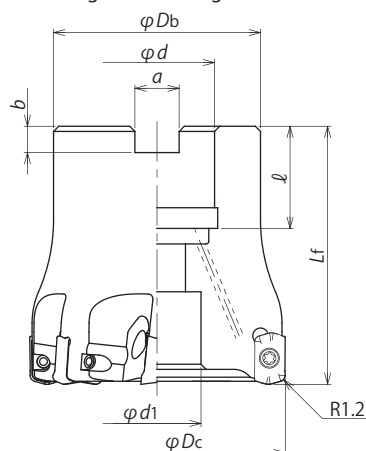
Facemill type

G-Body

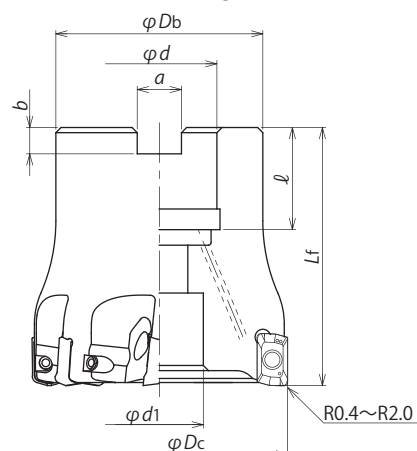
Through coolant hole



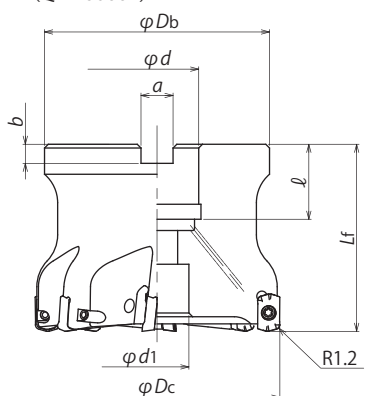
● For high feed milling



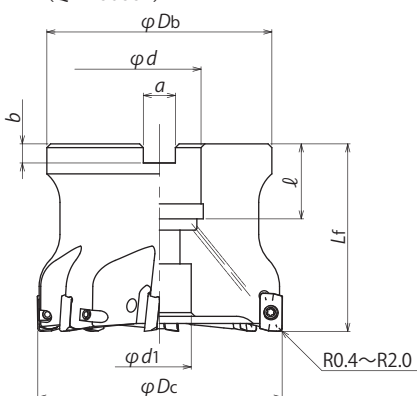
● For shoulder milling



● For high feed milling
(QXP-8066R)



● For shoulder milling
(QXP-8066R)



Type	Item code	Stock	No. of inserts	Dimensions (mm)								Applicable inserts	Parts
				φD_c	L_f	φD_b	φd	φd_1	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 - * *	Clamp screw
	QXP-7040R-16	●	7	40	45	35	16	14	8.4	5.6	18		
	QXP-7050R-22	●	7	50	50	40	22	17	10.4	6.3	20		DSW-2563H
Metric Bore	QXP-8050R-22	●	8	50	50	40	22	17	10.4	6.3	20		Wrench (Not be included)
	QXP-8052R-22	●	8	52	50	40	22	17	10.4	6.3	20		
	QXP-8063R-22	●	8	63	50	48	22	17	10.4	6.3	20		
	QXP-8066R-27	●	8	66	50	48	27	20	12.4	7	22		A-08

Note) 1. All cutters are supplied without inserts.

2. All cutters are supplied without wrench & MOLY since February 2019 for our stock production.

Cutting conditions 39~86Page

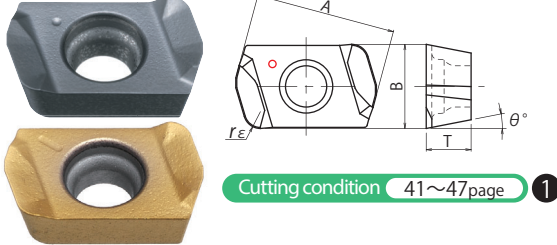
Clamp screw	Recommended torque (N·m)
DSW-2563H	1.1

MQX/QXP TYPE

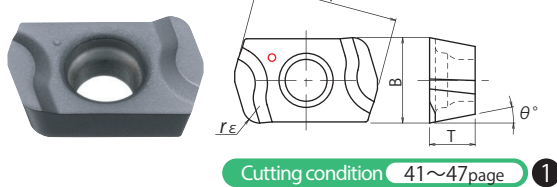
Inserts

NEW ZPMT-PL/NL/SL type: Shoulder milling insert possible to machine from roughing to semi-finishing & finishing for side & bottom face. 3 type is available by use (for steel, for aluminum alloy, or for Ti-alloy).

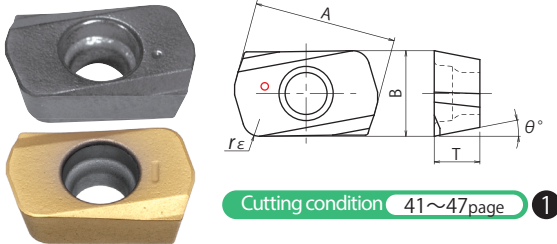
High feed insert
(EPMT1003 * * ZER)



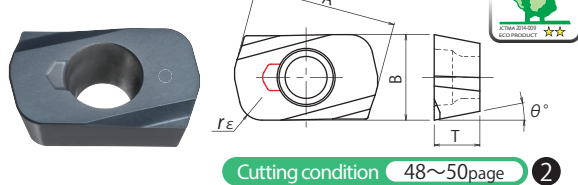
High feed insert for unfavorable condition
(EPMW100312ZER)



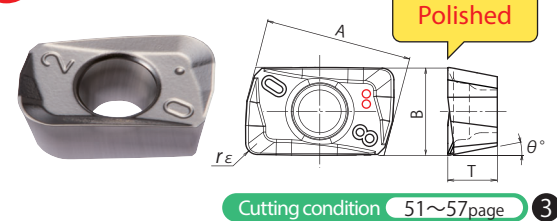
High feed insert for unfavorable condition
(EPMW100312ZTR)



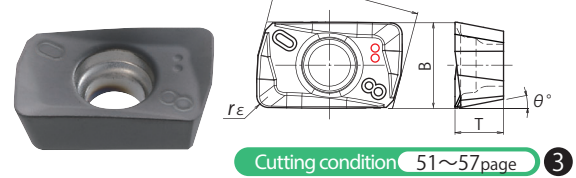
High hardened steel
(EPHW100316ZTR)



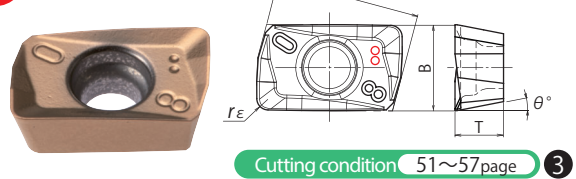
NEW Shoulder milling insert for aluminum alloy
(ZPMT1003 * * ZER-NL)



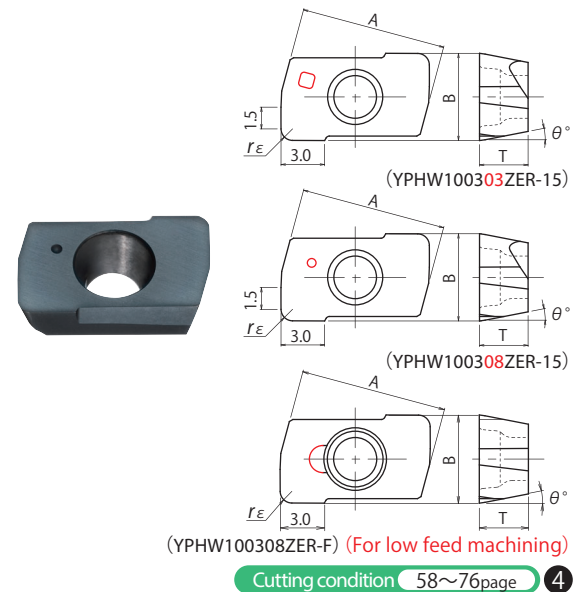
NEW Shoulder milling insert for steel
(ZPMT1003 * * ZER-PL)



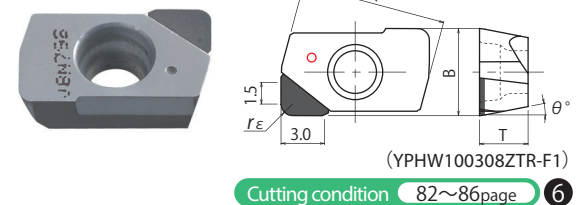
NEW Shoulder milling insert for Ti-alloy
(ZPMT1003 * * ZER-SL)



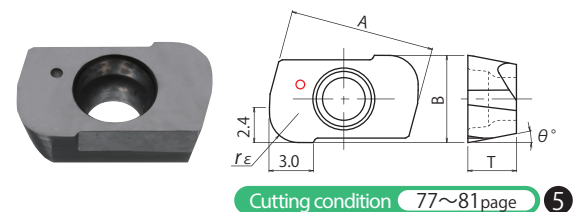
"MIRROR INSERT" for finishing side & bottom face
(YPHW1003 * * ZER-15) (YPHW100308ZTR-F1) (YPHW100308ZER-F)



CBN insert



"MIRROR INSERT" for finishing side & bottom face / contouring milling
(YPHW100320ZER-24)



MQX/QXP
TYPE

Inserts

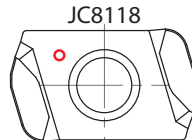
Type	Item code	Tolerance	PVD coated							Uncoated	Cermet	CBN	Dimensions (mm)				
			NEW JC8118	DH102	JC7518	JC7550	JC7560	JC8015	JC8050	FC18	CX75	JBN795	A	T	B	r_ϵ	θ°
High feed insert	EPMT100312ZER	M	●			●	●		●				10	3.2	6	1.2	11°
	EPMT100320ZER	M	●										10	3.2	6	2.0	11°
High feed insert for unfavorable condition	EPMW100312ZER	M	●						●				10	3.2	6	1.2	11°
	EPMW100312ZTR	M	●				●		●								
High hardened steel	EPHW100316ZTR	H	□	●									10	3.2	6	1.6	11°
for aluminum alloy	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 milling insert for 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 milling 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 / contouring milling	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°

10 inserts per case, but grade JBN795 insert is packed in 1 piece per case.

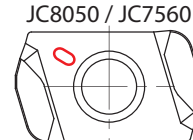
Discrimination of grade for MQX / QXP insert

Each grade shows different mark around the hole for fool proof.

Discrimination mark



JC8118



JC8050 / JC7560

Cutting data for "QM MAX"

1. Improved tool life in roughing on 1.2344.

Overhung length : 60mm 	Work	Part name	Mold
		Material	1.2344
		Hardness	50~52HRC
	Tool	Tool No.	MQX-2017-M8 MSN-M8-40-S16C
		Insert No. Grade	EPHW100316ZTR DH102
	Cutting conditions	$n, (V_c)$	$n = 3,000\text{min}^{-1}, V_c = 160\text{m/min}$
		$V_f, (f)$	$V_f = 2,500\text{mm/min}, f = 0.84\text{mm/rev}$
		$a_p(\text{mm})$	0.5mm
		$a_e(\text{mm})$	10mm
		Coolant	Water soluble
Machine		Vertical MC	
Result		After 90 min, insert showed just normal wear and still able to continue. Achieved 1.5 times longer tool life compared with conventional tool.	

2. Improved machining accuracy & efficiency in finishing on 1.2344.

Overhung length : 100mm 	Work	Part name	Mold
		Material	1.2344
		Hardness	50~52HRC
	Tool	Tool No.	MQX-4021-M10 MSN-M10-70-S20C
		Insert No. Grade	YPHW100308ZER-15 DH102
	Cutting conditions	$n, (V_c)$	$n = 3,000\text{min}^{-1}, V_c = 200\text{m/min}$
		$V_f, (f)$	$V_f = 1,000\text{mm/min}, f = 0.33\text{mm/rev}$
		$a_p(\text{mm})$	0.15~0.18mm
		$a_e(\text{mm})$	0.05mm
		Coolant	Water soluble
Machine		Vertical MC	
Result		Improved machining accuracy on slope surface. Achieved machining efficiency by 1.25 times compared with conventional ball nose end mill. Able to machining for 3 hours.	

Application for the choice of EP * * type inserts

Materials	Carbon steel (C50, C55) Below 250HB				Die steel (1.2344, 1.2379) Below 255HB				Mold steel (1.2311, P20) 30-36HRC				Mold steel (1.2311, P21) 38-43HRC			
Item code / Grades	JC8118	JC8050	JC7560	DH102	JC8118	JC8050	JC7560	DH102	JC8118	JC8050	JC7560	DH102	JC8118	JC8050	JC7560	DH102
EPMT1003 * * ZER	☆	☆	☆		☆	☆	☆		☆	☆	☆		☆	☆		
EPMW100312ZER														○		
EPMW100312ZTR	○	○	◎		○	○	◎		○	○	◎		◎	○		
EPHW100316ZTR																

Materials	Hardened die steel (1.2344, 1.2379) 42-52HRC				Hardened die steel (1.2344, 1.2379) 55-62HRC				Grey & Nodular cast iron (GG, GGG) Below 300HB				Stainless steel Below 250HB			
Item code / Grades	JC8118	JC8050	JC7560	DH102	JC8118	JC8050	JC7560	DH102	JC8118	JC8050	JC7560	DH102	JC8118	JC8050	JC7560	DH102
EPMT1003 * * ZER	☆				×	×			○					◎	○	
EPMW100312ZER	○				○				◎					●		
EPMW100312ZTR	●				●				●		○					
EPHW100316ZTR	◎							◎								

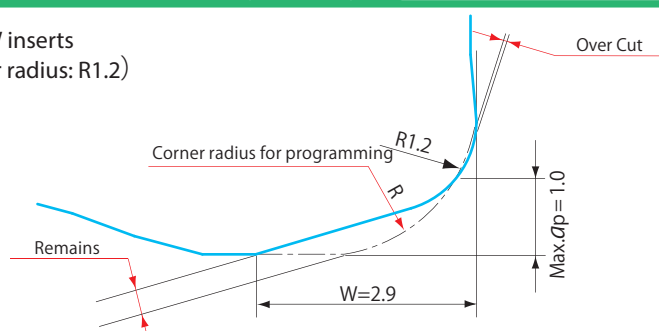
Materials	(Ti-6Al-4V) Titanium alloy				(INCO718) Inconel			
Item code / Grades	JC8118	JC8050	JC7560	DH102	JC8118	JC8050	JC7560	DH102
EPMT1003 * * ZER	○	○	◎		◎	○	○	
EPMW100312ZER		●				●		
EPMW100312ZTR								
EPHW100316ZTR								

- EPMT type: with chipbreaker
- EPMW type: without chipbreaker
- EPHW type: without chipbreaker

◎: First choice, Good condition ☆: Light cutting
○: Moderate condition ×: No good
●: Unfavorable condition

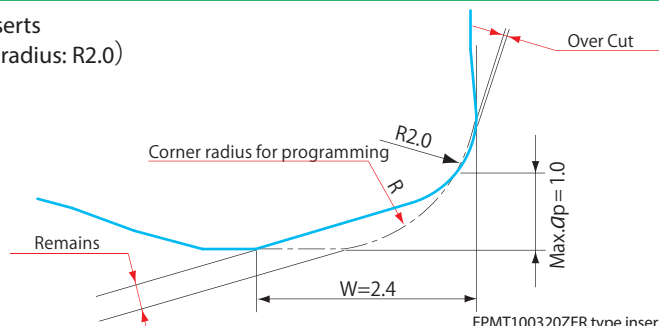
Definition of corner shape for programming

■ EPMT/ W inserts (Corner radius: R1.2)



Corner radius for programming	Over Cut (mm)	Remains (mm)
R1.0	0	0.57
R1.5 (Standard)	0	0.45
R2.0	0.04	0.33
R2.5	0.21	0.21
R3.0	0.40	0.09

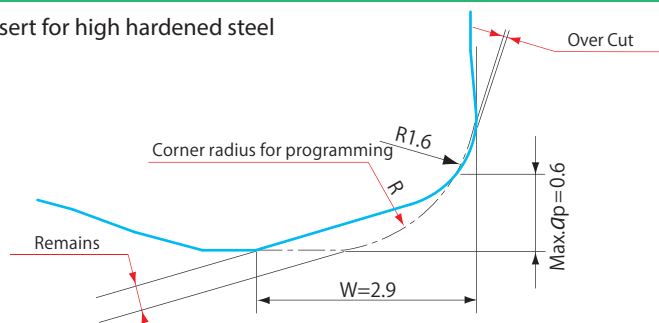
■ EPMT inserts (Corner radius: R2.0)



Corner radius for programming	Over Cut (mm)	Remains (mm)
R1.0	0	0.51
R1.5	0	0.31
R2.0 (Standard)	0	0.13
R2.5	0.12	0.04
R3.0	0.32	0

EPMT100320ZER type insert is able to reduce remains and lighten the burden imposed on next process.

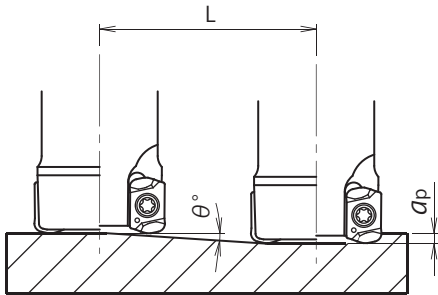
■ EPHW insert for high hardened steel



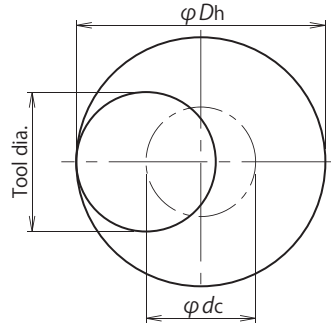
Corner radius for programming	Over Cut (mm)	Remains (mm)
R1.0	0	0.42
R1.5 (Standard)	0	0.33
R2.0	0.01	0.23
R2.5	0.17	0.14
R3.0	0.37	0.05

Attention for profile milling with EPMT/W-type inserts

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, so tool pass rotation should be counterclockwise.

- 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.

Item code	Tool dia. (mm)	Eff. Cutting dia. (mm)	Max. depth of cut (mm)	Ramping		Helical interpolation	
				Max. ramping angle θ°	Total cutting length at Max. ap	Min. bore dia. Dh min (mm)	Max. bore dia. Dh max (mm)
MQX- *016-M8	16	10.2	0.8	1° 48'	25.5	22	30
MQX- *017-M8	17	11.2	0.8	1° 36'	28.6	24	32
MQX- *020-M10	20	14.1	0.8	1° 24'	32.7	30	38
MQX- *021-M10	21	15.1	0.8	1° 18'	35.3	32	40
MQX- *025-M12	25	19.1	0.8	1°	45.8	40	48
MQX- *026-M12	26	20.1	0.8	0° 57'	48.2	42	50
MQX- *028-M12	28	22.1	0.8	0° 51'	53.9	46	54
MQX- *030-M16	30	24.1	0.8	0° 48'	57.3	50	58
MQX- *032-M16	32	26.1	0.8	0° 42'	65.5	54	62
MQX- *035-M16	35	29.1	0.8	0° 36'	76.4	60	68
MQX- *040-M16	40	34.1	0.8	0° 30'	91.7	70	78
MQX- *042-M16	42	36.2	0.8	0° 27'	101.9	74	82
QXP- *040R-16	40	34.1	1	0° 30'	114.6	70	78
QXP-8050R	50	44.1	1	0° 24'	143.2	90	98
QXP- *050R-22	50	44.1	1	0° 24'	143.2	90	98
QXP-8052R-22	52	46.1	1	0° 21'	163.7	94	102
QXP-8063R	63	57.1	1	0° 18'	191	116	124
QXP-8063R-22	63	57.1	1	0° 18'	191	116	124
QXP-8066R	66	60.1	1	0° 18'	191	122	130
QXP-8066R-27	66	60.1	1	0° 18'	191	122	130

Note) The ramping angle 0.5° or less is recommended (please refer to the above table).

Recommended cutting conditions for "EPMT/W-type inserts"

1

MQX and MSN type

Work materials	Grades	Tool dia. (mm)														
		16 / 17					20					20 / 21				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	~70	0.6	~10	3,600	4,900	~70	0.6	~14	2,850	5,800	~70	0.6	~14	2,850	7,700
		120	0.5	~10	3,600	4,500	120	0.5	~14	2,850	5,300	120	0.5	~14	2,850	7,000
		160	0.35	~10	3,000	4,200	190	0.35	~14	2,400	4,900	190	0.35	~14	2,400	6,500
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	~70	0.6	~10	3,600	4,900	~70	0.6	~14	2,850	5,800	~70	0.6	~14	2,850	7,700
		120	0.5	~10	3,600	4,500	120	0.5	~14	2,850	5,300	120	0.5	~14	2,850	7,000
		160	0.35	~10	3,000	4,200	190	0.35	~14	2,400	4,900	190	0.35	~14	2,400	6,500
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	~70	0.6	~10	3,600	4,900	~70	0.6	~14	2,850	5,800	~70	0.6	~14	2,850	7,700
		120	0.5	~10	3,600	4,500	120	0.5	~14	2,850	5,300	120	0.5	~14	2,850	7,000
		160	0.35	~10	3,000	4,200	190	0.35	~14	2,400	4,900	190	0.35	~14	2,400	6,500
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	~70	0.5	~10	1,900	2,600	~70	0.5	~14	1,500	3,050	~70	0.5	~14	1,500	4,050
		120	0.3	~10	1,900	2,400	120	0.3	~14	1,500	2,800	120	0.3	~14	1,500	3,700
		160	0.2	~10	1,600	2,200	190	0.2	~14	1,250	2,600	190	0.2	~14	1,250	3,400
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	~70	0.4	~10	1,400	1,400	~70	0.4	~14	1,100	1,650	~70	0.4	~14	1,100	2,200
		120	0.3	~10	1,400	1,400	120	0.3	~14	1,100	1,650	120	0.3	~14	1,100	2,200
		160	—	—	—	—	190	—	—	—	—	190	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EPMW形	~70	0.15	~10	600	180	~70	0.15	~14	500	230	~70	0.15	~14	500	300
		120	0.1	~10	600	180	120	0.1	~14	500	230	120	0.1	~14	500	300
		160	—	—	—	—	190	—	—	—	—	190	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	~70	0.8	~10	3,000	5,000	~70	0.8	~14	2,400	6,000	~70	0.8	~14	2,400	8,000
		120	0.6	~10	3,000	4,500	120	0.6	~14	2,400	5,400	120	0.6	~14	2,400	7,200
		160	0.5	~10	2,200	3,750	190	0.5	~14	1,750	4,500	190	0.5	~14	1,750	6,000
Stainless steel Below 250HB	JC8050 (JC7560)	~70	0.6	~10	3,100	4,200	~70	0.6	~14	2,500	5,100	~70	0.6	~14	2,500	6,800
		120	0.5	~10	3,000	4,000	120	0.5	~14	2,400	4,900	120	0.5	~14	2,400	6,500
		160	0.35	~10	3,000	4,000	190	0.35	~14	2,400	4,900	190	0.35	~14	2,400	6,500
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	~70	0.5	~10	1,200	960	~70	0.5	~14	950	1,140	~70	0.5	~14	950	1,500
		120	0.3	~10	1,200	960	120	0.3	~14	950	1,140	120	0.3	~14	950	1,500
		160	0.2	~10	1,200	960	190	0.2	~14	950	1,140	190	0.2	~14	950	1,500
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	~70	0.5	~10	630	380	~70	0.5	~14	500	450	~70	0.5	~14	500	600
		120	0.3	~10	630	380	120	0.3	~14	500	450	120	0.3	~14	500	600
		160	0.2	~10	630	380	190	0.2	~14	500	450	190	0.2	~14	500	600

 l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT100320ZER-PL insert in high feed condition, reduce 10-30% of the above data.

Recommended cutting conditions for "EPMT/W-type inserts"

1

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		25 / 26					25 / 26 / 28				
		No. of teeth 4N					No. of teeth 5N				
		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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	~90	0.8	~19	2,300	6,200	~90	0.8	~19	2,300	7,700
		140	0.6	~19	2,300	5,600	140	0.6	~19	2,300	7,000
		210	0.4	~19	1,900	5,200	210	0.4	~19	1,900	6,500
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	~90	0.8	~19	2,300	6,200	~90	0.8	~19	2,300	7,700
		140	0.6	~19	2,300	5,600	140	0.6	~19	2,300	7,000
		210	0.4	~19	1,900	5,200	210	0.4	~19	1,900	6,500
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	~90	0.8	~19	2,300	6,200	~90	0.8	~19	2,300	7,700
		140	0.6	~19	2,300	5,600	140	0.6	~19	2,300	7,000
		210	0.4	~19	1,900	5,200	210	0.4	~19	1,900	6,500
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	~90	0.6	~19	1,200	3,250	~90	0.6	~19	1,200	4,050
		140	0.4	~19	1,200	3,000	140	0.4	~19	1,200	3,700
		210	0.3	~19	1,000	2,700	210	0.3	~19	1,000	3,400
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	~90	0.4	~19	900	1,800	~90	0.4	~19	900	2,250
		140	0.3	~19	900	1,800	140	0.3	~19	900	2,250
		210	—	—	—	—	210	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EPMW形	~90	0.15	~19	400	240	~90	0.15	~19	400	300
		140	0.1	~19	400	240	140	0.1	~19	400	300
		210	—	—	—	—	210	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	~90	0.8	~19	1,900	6,400	~90	0.8	~19	1,900	8,000
		140	0.6	~19	1,900	5,800	140	0.6	~19	1,900	7,200
		210	0.5	~19	1,600	4,800	210	0.5	~19	1,600	6,000
Stainless steel Below 250HB	JC8050 (JC7560)	~90	0.8	~19	2,000	5,450	~90	0.8	~19	2,000	6,800
		140	0.6	~19	2,000	5,200	140	0.6	~19	2,000	6,500
		210	0.35	~19	1,900	4,950	210	0.35	~19	1,900	6,200
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	~90	0.5	~19	750	1,200	~90	0.5	~19	750	1,500
		140	0.3	~19	750	1,200	140	0.3	~19	750	1,500
		210	0.2	~19	750	1,200	210	0.2	~19	750	1,500
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	~90	0.5	~19	400	480	~90	0.5	~19	400	600
		140	0.3	~19	400	480	140	0.3	~19	400	600
		210	0.2	~19	400	480	210	0.2	~19	400	600

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT100320ZER-PL insert in high feed condition, reduce 10-30% of the above data.

Recommended cutting conditions for "EPMT/W-type inserts"

1

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		30 / 32 / 35					32 / 35				
		No. of teeth 5N					No. of teeth 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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	~100	0.8	~25	1,900	6,350	~100	0.8	~25	1,900	7,600
		150	0.6	~25	1,800	6,000	150	0.6	~25	1,800	7,200
		210	0.4	~25	1,500	5,000	210	0.4	~25	1,500	6,000
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	~100	0.8	~25	1,900	6,350	~100	0.8	~25	1,900	7,600
		150	0.6	~25	1,800	6,000	150	0.6	~25	1,800	7,200
		210	0.4	~25	1,500	5,000	210	0.4	~25	1,500	6,000
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	~100	0.8	~25	1,900	6,350	~100	0.8	~25	1,900	7,600
		150	0.6	~25	1,800	6,000	150	0.6	~25	1,800	7,200
		210	0.4	~25	1,500	5,000	210	0.4	~25	1,500	6,000
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	~100	0.6	~25	950	3,200	~100	0.6	~25	950	3,800
		150	0.4	~25	950	3,200	150	0.4	~25	950	3,800
		210	0.3	~25	800	2,650	210	0.3	~25	800	3,200
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	~100	0.4	~25	700	1,750	~100	0.4	~25	700	2,100
		150	0.3	~25	700	1,750	150	0.3	~25	700	2,100
		210	—	—	—	—	210	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EPMW形	~100	0.15	~25	300	250	~100	0.15	~25	300	300
		150	0.1	~25	300	250	150	0.1	~25	300	300
		210	—	—	—	—	210	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	~100	1	~25	1,500	6,250	~100	1	~25	1,500	7,500
		150	0.8	~25	1,500	5,750	150	0.8	~25	1,500	6,900
		210	0.6	~25	1,250	4,850	210	0.6	~25	1,250	5,800
Stainless steel Below 250HB	JC8050 (JC7560)	~100	0.8	~25	1,700	5,700	~100	0.8	~25	1,700	6,800
		150	0.6	~25	1,600	5,350	150	0.6	~25	1,600	6,400
		210	0.35	~25	1,500	5,000	210	0.35	~25	1,500	6,000
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	~100	0.5	~25	600	1,250	~100	0.5	~25	600	1,500
		150	0.3	~25	600	1,250	150	0.3	~25	600	1,500
		210	0.2	~25	600	1,250	210	0.2	~25	600	1,500
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	~100	0.5	~25	300	500	~100	0.5	~25	300	580
		150	0.3	~25	300	500	150	0.3	~25	300	580
		210	0.2	~25	300	500	210	0.2	~25	300	580

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT100320ZER-PL insert in high feed condition, reduce 10-30% of the above data.

Recommended cutting conditions for "EPMT/W-type inserts"

1

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		40 / 42					40				
		No. of teeth 6N					No. of teeth 7N				
		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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	~100	0.8	~32	1,500	6,300	~100	0.8	~32	1,500	7,500
		150	0.6	~32	1,400	5,900	150	0.6	~32	1,400	7,000
		210	0.4	~32	1,200	5,000	210	0.4	~32	1,200	6,000
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	~100	0.8	~32	1,500	6,300	~100	0.8	~32	1,500	7,500
		150	0.6	~32	1,400	5,900	150	0.6	~32	1,400	7,000
		210	0.4	~32	1,200	5,000	210	0.4	~32	1,200	6,000
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	~100	0.8	~32	1,500	6,300	~100	0.8	~32	1,500	7,500
		150	0.6	~32	1,400	5,900	150	0.6	~32	1,400	7,000
		210	0.4	~32	1,200	5,000	210	0.4	~32	1,200	6,000
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	~100	0.6	~32	750	3,000	~100	0.6	~32	750	3,500
		150	0.4	~32	750	3,000	150	0.4	~32	750	3,500
		210	0.3	~32	620	2,500	210	0.3	~32	620	2,900
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	~100	0.4	~32	550	1,650	~100	0.4	~32	550	1,900
		150	0.3	~32	550	1,650	150	0.3	~32	550	1,900
		210	—	—	—	—	210	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EPMW形	~100	0.15	~32	250	240	~100	0.15	~32	250	280
		150	0.1	~32	250	240	150	0.1	~32	250	280
		210	—	—	—	—	210	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	~100	1	~32	1,200	6,150	~100	1	~32	1,200	7,200
		150	0.8	~32	1,200	5,650	150	0.8	~32	1,200	6,600
		210	0.6	~32	1,000	4,700	210	0.6	~32	1,000	5,500
Stainless steel Below 250HB	JC8050 (JC7560)	~100	0.8	~32	1,350	5,850	~100	0.8	~32	1,350	6,800
		150	0.6	~32	1,300	5,550	150	0.6	~32	1,300	6,500
		210	0.35	~32	1,200	5,150	210	0.35	~32	1,200	6,000
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	~100	0.5	~32	480	1,150	~100	0.5	~32	480	1,350
		150	0.3	~32	480	1,150	150	0.3	~32	480	1,350
		210	0.2	~32	480	1,150	210	0.2	~32	480	1,350
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	~100	0.5	~32	250	450	~100	0.5	~32	250	520
		150	0.3	~32	250	450	150	0.3	~32	250	520
		210	0.2	~32	250	450	210	0.2	~32	250	520

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT100320ZER-PL insert in high feed condition, reduce 10-30% of the above data.

Recommended cutting conditions for "EPMT/W-type inserts"

1

QXP type (facemill type)

Work materials	Grades	ℓ (mm) Overhung length	Tool dia. (mm)							
			40							
			No. of teeth 6N				No. of teeth 7N			
			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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	~150	0.8	~32	1,250	6,000	0.8	~32	1,250	7,000
		200	0.6	~32	1,100	5,300	0.6	~32	1,100	6,200
		250	0.5	~32	1,000	4,800	0.5	~32	1,000	5,600
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	~150	0.8	~32	1,250	6,000	0.8	~32	1,250	7,000
		200	0.6	~32	1,100	5,300	0.6	~32	1,100	6,200
		250	0.5	~32	1,000	4,800	0.5	~32	1,000	5,600
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	~150	0.8	~32	1,250	6,000	0.8	~32	1,250	7,000
		200	0.6	~32	1,100	5,300	0.6	~32	1,100	6,200
		250	0.5	~32	1,000	4,800	0.5	~32	1,000	5,600
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	~150	0.6	~32	680	2,850	0.6	~32	680	3,300
		200	0.4	~32	640	2,650	0.4	~32	640	3,100
		250	0.3	~32	600	2,500	0.3	~32	600	2,900
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	~150	0.4	~32	520	1,550	0.4	~32	520	1,800
		200	0.2	~32	520	1,550	0.2	~32	520	1,800
		250	—	—	—	—	—	—	—	—
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EPMW形	~150	0.15	~32	240	230	0.15	~32	240	270
		200	0.1	~32	220	210	0.1	~32	220	250
		250	—	—	—	—	—	—	—	—
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	~150	0.8	~32	1,100	6,600	0.8	~32	1,100	7,700
		200	0.6	~32	1,000	6,000	0.6	~32	1,000	7,000
		250	0.5	~32	900	5,400	0.5	~32	900	6,300
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Stainless steel Below 250HB	JC8050 (JC7560)	~150	0.6	~32	1,200	5,400	0.6	~32	1,200	6,300
		200	0.4	~32	1,100	4,950	0.4	~32	1,100	5,800
		250	0.3	~32	1,000	4,450	0.3	~32	1,000	5,200
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	~150	0.6	~32	480	1,150	0.6	~32	480	1,350
		200	0.4	~32	440	1,050	0.4	~32	440	1,230
		250	0.3	~32	440	1,050	0.3	~32	440	1,230
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	~150	0.6	~32	240	430	0.6	~32	240	500
		200	0.4	~32	200	360	0.4	~32	200	420
		250	0.3	~32	200	360	0.3	~32	200	420
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT100320ZER-PL insert in high feed condition, reduce 10-30% of the above data.

Recommended cutting conditions for "EPMT/W-type inserts"

1

QXP type (facemill type)

Work materials	Grades	ℓ (mm) Overhung length	Tool dia. (mm)							
			50				50 / 52			
			No. of teeth 7N				No. of teeth 8N			
			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 (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	~150	1	~40	1,000	6,300	1	~40	1,000	7,200
		200	0.8	~40	1,000	5,950	0.8	~40	1,000	6,800
		250	0.6	~40	900	5,350	0.6	~40	900	6,100
		300	0.5	~40	800	4,750	0.5	~40	800	5,450
		350	0.4	~40	800	4,750	0.4	~40	800	5,450
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	~150	1	~40	1,000	6,300	1	~40	1,000	7,200
		200	0.8	~40	1,000	5,950	0.8	~40	1,000	6,800
		250	0.6	~40	900	5,350	0.6	~40	900	6,100
		300	0.5	~40	800	4,750	0.5	~40	800	5,450
		350	0.4	~40	800	4,750	0.4	~40	800	5,450
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC8050)	~150	1	~40	1,000	6,300	1	~40	1,000	7,200
		200	0.8	~40	1,000	5,950	0.8	~40	1,000	6,800
		250	0.6	~40	900	5,350	0.6	~40	900	6,100
		300	0.5	~40	800	4,750	0.5	~40	800	5,450
		350	0.4	~40	800	4,750	0.4	~40	800	5,450
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	~150	0.8	~40	540	2,600	0.8	~40	540	3,000
		200	0.6	~40	540	2,600	0.6	~40	540	3,000
		250	0.4	~40	510	2,500	0.4	~40	510	2,850
		300	0.3	~40	480	2,350	0.3	~40	480	2,700
		350	0.3	~40	480	2,000	0.3	~40	480	2,300
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	~150	0.6	~40	400	1,400	0.6	~40	400	1,600
		200	0.4	~40	400	1,400	0.4	~40	400	1,600
		250	0.2	~40	400	1,400	0.2	~40	400	1,600
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EPMW形	~150	0.15	~40	190	210	0.15	~40	190	240
		200	0.15	~40	170	190	0.15	~40	170	220
		250	0.1	~40	170	190	0.1	~40	170	220
		300	—	—	—	—	—	—	—	—
		350	—	—	—	—	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	~150	1	~40	900	7,500	1	~40	900	8,600
		200	0.8	~40	900	6,300	0.8	~40	900	7,200
		250	0.6	~40	850	5,950	0.6	~40	850	6,800
		300	0.5	~40	800	5,600	0.5	~40	800	6,400
		350	0.4	~40	800	5,600	0.4	~40	800	6,400
Stainless steel Below 250HB	JC8050 (JC7560)	~150	0.8	~40	950	5,600	0.8	~40	950	6,400
		200	0.6	~40	950	5,000	0.6	~40	950	5,700
		250	0.4	~40	900	4,700	0.4	~40	900	5,400
		300	0.3	~40	900	4,700	0.3	~40	900	5,400
		350	0.3	~40	850	4,450	0.3	~40	850	5,100
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	~150	0.8	~40	380	1,050	0.8	~40	380	1,220
		200	0.6	~40	380	1,050	0.6	~40	380	1,220
		250	0.4	~40	350	980	0.4	~40	350	1,120
		300	0.3	~40	350	980	0.3	~40	350	1,120
		350	0.3	~40	320	890	0.3	~40	320	1,020
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	~150	0.8	~40	190	390	0.8	~40	190	450
		200	0.6	~40	190	390	0.6	~40	190	450
		250	0.4	~40	160	330	0.4	~40	160	380
		300	0.3	~40	160	330	0.3	~40	160	380
		350	0.3	~40	130	270	0.3	~40	130	310

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT100320ZER-PL insert in high feed condition, reduce 10-30% of the above data.

Recommended cutting conditions for "EPMT/W-type inserts"

1

QXP type (facemill type)

Work materials	Grades	ℓ (mm) Overhung length	Tool dia. (mm)						
			63 / 66						
			No. of teeth 8N						
			a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)			
Carbon steel (C50, C55) Below 250HB	JC7560 (JC8050) (JC8118)	~200	1	~50	800	5,750			
		250	0.8	~50	800	5,450			
		300	0.6	~50	720	4,900			
		350	0.5	~50	640	4,350			
		400	0.4	~50	640	4,350			
Die steel (1.2344, 1.2379) Below 255HB	JC7560 (JC8050) (JC8118)	~200	1	~50	800	5,750			
		250	0.8	~50	800	5,450			
		300	0.6	~50	720	4,900			
		350	0.5	~50	640	4,350			
		400	0.4	~50	640	4,350			
Mold steel (1.2311, P20) 30-36HRC	JC8118 (JC7560) (JC8050)	~200	1	~50	800	5,750			
		250	0.8	~50	800	5,450			
		300	0.6	~50	720	4,900			
		350	0.5	~50	640	4,350			
		400	0.4	~50	640	4,350			
Mold steel (1.2311, P21) 38-43HRC	JC8118 (JC8050)	~200	0.8	~50	430	2,400			
		250	0.6	~50	430	2,400			
		300	0.4	~50	410	2,300			
		350	0.3	~50	370	2,100			
		400	0.3	~50	370	1,800			
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118 (JC8050)	~200	0.6	~50	320	1,300			
		250	0.4	~50	320	1,300			
		300	0.2	~50	320	1,300			
		350	—	—	—	—			
		400	—	—	—	—			
Hardened die steel (1.2344, 1.2379) 55-62HRC	JC8118 EPMW形	~200	0.15	~50	150	190			
		250	0.15	~50	130	170			
		300	0.1	~50	130	170			
		350	—	—	—	—			
		400	—	—	—	—			
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8118 (JC7560)	~200	1	~50	720	6,900			
		250	0.8	~50	720	5,750			
		300	0.6	~50	680	5,450			
		350	0.5	~50	640	5,100			
		400	0.4	~50	640	5,100			
Stainless steel Below 250HB	JC8050 (JC7560)	~200	0.8	~50	750	5,050			
		250	0.6	~50	750	4,500			
		300	0.4	~50	710	4,250			
		350	0.3	~50	710	4,250			
		400	0.3	~50	670	4,000			
Titanium alloy (Ti-6Al-4V)	JC7560 (JC8118) (JC8050)	~200	0.8	~50	300	960			
		250	0.6	~50	300	960			
		300	0.4	~50	280	900			
		350	0.3	~50	280	900			
		400	0.3	~50	250	800			
Inconel (INCO718)	JC8118 (JC7560) (JC8050)	~200	0.8	~50	150	350			
		250	0.6	~50	150	350			
		300	0.4	~50	130	310			
		350	0.3	~50	130	310			
		400	0.3	~50	100	240			

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Spindle speed and keep feed per tooth.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT100320ZER-PL insert in high feed condition, reduce 10-30% of the above data.

Recommended cutting conditions for "EPHW-type inserts"

2

MQX and MSN type

Work materials	Grades	Tool dia.(mm)														
		16 / 17					20					20 / 21				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	~70	0.30	~10	1,790	2,860	~80	0.30	~14	1,430	3,430	~80	0.30	~14	1,430	4,570
		100	0.25	~10	1,610	2,060	120	0.25	~14	1,290	2,480	120	0.25	~14	1,290	3,300
		130	0.20	~10	1,430	1,370	160	0.20	~14	1,140	1,640	160	0.20	~14	1,140	2,190
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~70	0.20	~10	1,590	950	~80	0.20	~14	1,270	1,140	~80	0.20	~14	1,270	1,520
		100	0.15	~10	1,430	770	120	0.15	~14	1,140	920	120	0.15	~14	1,140	1,230
		130	0.10	~10	1,270	610	160	0.10	~14	1,020	730	160	0.10	~14	1,020	980

Work materials	Grades	Tool dia. (mm)									
		25 / 26					25 / 26 / 28				
		刃数 No. of teeth 4N					No. of teeth 5N				
		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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	~100	0.30	~18	1,150	3,680	~100	0.30	~18	1,150	4,600
		150	0.25	~18	1,040	2,660	150	0.25	~18	1,040	3,330
		200	0.20	~18	920	1,770	200	0.20	~18	920	2,210
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	0.20	~18	1,020	1,220	~100	0.20	~18	1,020	1,530
		150	0.15	~18	920	990	150	0.15	~18	920	1,240
		200	0.10	~18	820	790	200	0.10	~18	820	980

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "EPHW-type inserts"

2

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		30 / 32 / 35					32 / 35				
		No. of teeth 5N					No. of teeth 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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	~130	0.30	~24	900	3,600	~130	0.30	~24	900	4,320
		190	0.25	~24	810	2,590	190	0.25	~24	810	3,110
		250	0.20	~24	720	1,730	250	0.20	~24	720	2,070
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~130	0.20	~24	800	1,200	~130	0.20	~24	800	1,440
		190	0.15	~24	720	970	190	0.15	~24	720	1,160
		250	0.10	~24	640	770	250	0.10	~24	640	920

Work materials	Grades	Tool dia. (mm)									
		40 / 42					40				
		No. of teeth 6N					No. of teeth 7N				
		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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	~130	0.30	~32	720	3,460	~130	0.30	~32	720	4,030
		190	0.25	~32	650	2,500	190	0.25	~32	650	2,910
		250	0.20	~32	580	1,670	250	0.20	~32	580	1,950
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~130	0.20	~32	640	1,150	~130	0.20	~32	640	1,340
		190	0.15	~32	580	940	190	0.15	~32	580	1,100
		250	0.10	~32	510	740	250	0.10	~32	510	860

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "EPHW-type inserts"

2

QXP type (facemill type)

Work materials	Grades	Tool dia.(mm)								
		40								
		No. of teeth 6N					No. of teeth 7N			
		r (mm)	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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	~100	0.30	~32	720	3,460	0.30	~32	720	4,030
		150	0.25	~32	650	2,500	0.25	~32	650	2,910
		200	0.20	~32	580	1,670	0.20	~32	580	1,950
		250	0.10	~32	580	1,670	0.10	~32	580	1,950
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	0.20	~32	640	1,150	0.20	~32	640	1,340
		150	0.15	~32	580	940	0.15	~32	580	1,100
		200	0.10	~32	510	740	0.10	~32	510	860
		250	—	—	—	—	—	—	—	—

Work materials	Grades	Tool dia. (mm)								
		50					50 / 52			
		No. of teeth 7N					No. of teeth 8N			
		r (mm)	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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	~150	0.30	~40	570	3,190	0.30	~40	570	3,650
		200	0.25	~40	510	2,280	0.25	~40	510	2,610
		250	0.20	~40	460	1,550	0.20	~40	460	1,770
		300	0.10	~40	460	1,550	0.10	~40	460	1,770
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~150	0.20	~40	510	1,070	0.20	~40	510	1,220
		200	0.15	~40	460	870	0.15	~40	460	990
		250	0.10	~40	410	690	0.10	~40	410	790
		300	—	—	—	—	—	—	—	—

Work materials	Grades	Tool dia. (mm)							
		63 / 66							
		No. of teeth 8N							
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)			
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8118	~200	0.30	~50	450	2,880			
		250	0.25	~50	410	2,100			
		300	0.20	~50	360	1,380			
		350	0.10	~50	360	1,380			
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~200	0.20	~50	400	960			
		250	0.15	~50	360	780			
		300	0.10	~50	320	610			
		350	—	—	—	—			

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "ZPMT * -PL/NL/SL-type inserts"

3

MQX and MSN type

Work materials	Applicable inserts	Grades	Tool dia. (mm)													
			16 / 17					20					20 / 21			
			No. of teeth 2N					No. of teeth 3N					No. of teeth 4N			
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118) (CX75)	~80	≤5.0	≤12.8	3,180	950	~100	≤5.0	≤16.0	2,550	1,150	≤5.0	≤16.0	2,550	1,530
			120	≤3.0	≤6.4	2,860	770	150	≤3.0	≤8.0	2,300	930	≤3.0	≤8.0	2,300	1,240
			160	≤2.0	≤3.2	2,540	610	190	≤2.0	≤4.0	2,040	730	≤2.0	≤4.0	2,040	980
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (JC8118)	~80	≤5.0	≤12.8	2,980	890	~100	≤5.0	≤16.0	2,390	1,080	≤5.0	≤16.0	2,390	1,430
			120	≤3.0	≤6.4	2,680	720	150	≤3.0	≤8.0	2,150	870	≤3.0	≤8.0	2,150	1,160
			160	≤2.0	≤3.2	2,380	570	190	≤2.0	≤4.0	1,910	690	≤2.0	≤4.0	1,910	920
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	~80	≤5.0	≤12.8	2,980	890	~100	≤5.0	≤16.0	2,390	1,080	≤5.0	≤16.0	2,390	1,430
			120	≤3.0	≤6.4	2,680	720	150	≤3.0	≤8.0	2,150	870	≤3.0	≤8.0	2,150	1,160
			160	≤2.0	≤3.2	2,380	570	190	≤2.0	≤4.0	1,910	690	≤2.0	≤4.0	1,910	920
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	~80	≤4.0	≤9.6	2,390	570	~100	≤4.0	≤12.0	1,910	690	≤4.0	≤12.0	1,910	920
			120	≤2.5	≤4.8	2,150	470	150	≤2.5	≤6.0	1,720	570	≤2.5	≤6.0	1,720	760
			160	≤2.0	≤2.4	1,910	380	190	≤2.0	≤3.0	1,530	460	≤2.0	≤3.0	1,530	610
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118 (DH102)	~80	≤3.5	≤8.0	1,990	480	~100	≤3.5	≤10.0	1,590	570	≤3.5	≤10.0	1,590	760
			120	≤2.5	≤4.0	1,790	390	150	≤2.5	≤5.0	1,430	460	≤2.5	≤5.0	1,430	620
			160	≤1.2	≤2.0	1,590	300	190	≤1.2	≤2.5	1,270	360	≤1.2	≤2.5	1,270	480
Hardened die steel (1.2344, 1.2379) 55-62HRC	PL type	DH102	~80	≤2.5	≤6.4	1,390	280	~100	≤2.5	≤8.0	1,110	330	≤2.5	≤8.0	1,110	440
			120	≤1.5	≤3.2	1,250	230	150	≤1.5	≤4.0	1,000	270	≤1.5	≤4.0	1,000	360
			160	-	-	-	-	190	-	-	-	-	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118 (DH102)	~80	≤5.0	≤16.0	2,980	1,190	~100	≤5.0	≤20.0	2,390	1,430	≤5.0	≤20.0	2,390	1,910
			120	≤4.0	≤8.0	2,680	960	150	≤4.0	≤10.0	2,150	1,160	≤4.0	≤10.0	2,150	1,550
			160	≤3.0	≤4.0	2,380	760	190	≤3.0	≤5.0	1,910	920	≤3.0	≤5.0	1,910	1,220
Stainless steel Below 250HB	PL type (SL type)	JC8050 (JC8118) (JC7518)	~80	≤5.0	≤12.8	2,980	890	~100	≤5.0	≤16.0	2,390	1,080	≤5.0	≤16.0	2,390	1,430
			120	≤3.0	≤6.4	2,680	720	150	≤3.0	≤8.0	2,150	870	≤3.0	≤8.0	2,150	1,160
			160	≤2.0	≤3.2	2,380	570	190	≤2.0	≤4.0	1,910	690	≤2.0	≤4.0	1,910	920
Titanium alloy (Ti-6Al-4V)	SL type	JC7518	~80	≤5.0	≤9.6	1,190	360	~100	≤5.0	≤12.0	950	430	≤5.0	≤12.0	950	570
			120	≤3.0	≤4.8	1,070	290	150	≤3.0	≤6.0	860	350	≤3.0	≤6.0	860	460
			160	≤2.0	≤2.4	950	230	190	≤2.0	≤3.0	760	270	≤2.0	≤3.0	760	360
Inconel (INCO718)	SL type	JC7518	~80	≤5.0	≤9.6	600	180	~100	≤5.0	≤12.0	480	220	≤5.0	≤12.0	480	290
			120	≤3.0	≤4.8	540	140	150	≤3.0	≤6.0	430	170	≤3.0	≤6.0	430	230
			160	≤2.0	≤2.4	480	110	190	≤2.0	≤3.0	380	140	≤2.0	≤3.0	380	180
Aluminum alloy 50-110HB	NL type	FC18	~80	≤5.0	≤32.0	12,000	4,800	~100	≤5.0	≤40.0	9,550	5,730	≤5.0	≤40.0	9,550	7,640
			120	≤4.0	≤16.0	9,000	3,240	150	≤4.0	≤20.0	7,160	3,870	≤4.0	≤20.0	7,160	5,160
			160	≤3.0	≤8.0	6,000	1,920	190	≤3.0	≤10.0	4,780	2,290	≤3.0	≤10.0	4,780	3,060

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT * -PL/NL/SL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "ZPMT * -PL/NL/SL-type inserts"

3

MQX and MSN type

Work materials	Applicable inserts	Grades	Tool dia. (mm)								
			25 / 26					25 / 26 / 28			
			No. of teeth 4N					No. of teeth 5N			
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118) (CX75)	~120	≤5.0	≤20.0	2,040	1,220	≤5.0	≤20.0	2,040	1,530
			190	≤3.0	≤10.0	1,840	990	≤3.0	≤10.0	1,840	1,240
			235	≤2.0	≤5.0	1,630	780	≤2.0	≤5.0	1,630	980
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (JC8118)	~120	≤5.0	≤20.0	1,910	1,150	≤5.0	≤20.0	1,910	1,430
			190	≤3.0	≤10.0	1,720	930	≤3.0	≤10.0	1,720	1,160
			235	≤2.0	≤5.0	1,530	730	≤2.0	≤5.0	1,530	920
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	~120	≤5.0	≤20.0	1,910	1,150	≤5.0	≤20.0	1,910	1,430
			190	≤3.0	≤10.0	1,720	930	≤3.0	≤10.0	1,720	1,160
			235	≤2.0	≤5.0	1,530	730	≤2.0	≤5.0	1,530	920
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	~120	≤4.0	≤15.0	1,530	740	≤4.0	≤15.0	1,530	920
			190	≤2.5	≤7.5	1,380	610	≤2.5	≤7.5	1,380	760
			235	≤1.5	≤3.8	1,220	490	≤1.5	≤3.8	1,220	610
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118 (DH102)	~120	≤3.5	≤12.5	1,270	610	≤3.5	≤12.5	1,270	760
			190	≤2.5	≤6.2	1,140	490	≤2.5	≤6.2	1,140	620
			235	≤1.2	≤3.2	1,020	390	≤1.2	≤3.2	1,020	490
Hardened die steel (1.2344, 1.2379) 55-62HRC	PL type	DH102	~120	≤2.5	≤10.0	890	360	≤2.5	≤10.0	890	440
			190	≤1.5	≤5.0	800	290	≤1.5	≤5.0	800	360
			235	—	—	—	—	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118 (DH102)	~120	≤5.0	≤25.0	1,910	1,530	≤5.0	≤25.0	1,910	1,910
			190	≤4.0	≤12.5	1,720	1,240	≤4.0	≤12.5	1,720	1,550
			235	≤3.0	≤6.2	1,530	980	≤3.0	≤6.2	1,530	1,220
Stainless steel Below 250HB	PL type (SL type)	JC8050 (JC8118) (JC7518)	~120	≤5.0	≤20.0	1,910	1,150	≤5.0	≤20.0	1,910	1,430
			190	≤3.0	≤10.0	1,720	930	≤3.0	≤10.0	1,720	1,160
			235	≤2.0	≤5.0	1,530	730	≤2.0	≤5.0	1,530	920
Titanium alloy (Ti-6Al-4V)	SL type	JC7518	~120	≤5.0	≤15.0	760	460	≤5.0	≤15.0	760	570
			190	≤3.0	≤7.5	680	370	≤3.0	≤7.5	680	460
			235	≤2.0	≤3.8	610	290	≤2.0	≤3.8	610	370
Inconel (INCO718)	SL type	JC7518	~120	≤5.0	≤15.0	380	230	≤5.0	≤15.0	380	280
			190	≤3.0	≤7.5	340	180	≤3.0	≤7.5	340	230
			235	≤2.0	≤3.8	300	140	≤2.0	≤3.8	300	180
Aluminum alloy 50-110HB	NL type	FC18	~120	≤5.0	≤50.0	7,640	6,110	≤5.0	≤50.0	7,640	7,640
			190	≤4.0	≤25.0	5,730	4,120	≤4.0	≤25.0	5,730	5,160
			235	≤3.0	≤12.5	3,820	2,440	≤3.0	≤12.5	3,820	3,060

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT * -PL/NL/SL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "ZPMT * -PL/NL/SL-type inserts"

3

MQX and MSN type

Work materials	Applicable inserts	Grades	Tool dia. (mm)								
			30 / 32 / 35					32 / 35			
			No. of teeth 5N					No. of teeth 6N			
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118) (CX75)	~160	≤5.0	≤24.0	1,590	1,190	≤5.0	≤24.0	1,590	1,430
			240	≤3.0	≤12.0	1,430	960	≤3.0	≤12.0	1,430	1,160
			290	≤2.0	≤6.0	1,270	760	≤2.0	≤6.0	1,270	910
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (JC8118)	~160	≤5.0	≤24.0	1,490	1,120	≤5.0	≤24.0	1,490	1,340
			240	≤3.0	≤12.0	1,340	900	≤3.0	≤12.0	1,340	1,080
			290	≤2.0	≤6.0	1,190	710	≤2.0	≤6.0	1,190	860
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	~160	≤5.0	≤24.0	1,490	1,120	≤5.0	≤24.0	1,490	1,340
			240	≤3.0	≤12.0	1,340	900	≤3.0	≤12.0	1,340	1,080
			290	≤2.0	≤6.0	1,190	710	≤2.0	≤6.0	1,190	860
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	~160	≤4.0	≤18.0	1,200	720	≤4.0	≤18.0	1,200	860
			240	≤2.5	≤9.0	1,080	600	≤2.5	≤9.0	1,080	710
			290	≤2.0	≤4.5	960	480	≤2.0	≤4.5	960	580
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118 (DH102)	~160	≤3.5	≤15.0	1,000	600	≤3.5	≤15.0	1,000	720
			240	≤2.5	≤7.5	900	490	≤2.5	≤7.5	900	580
			290	≤1.2	≤3.8	800	380	≤2.0	≤3.8	800	460
Hardened die steel (1.2344, 1.2379) 55-62HRC	PL type	DH102	~160	≤2.5	≤12.0	700	350	≤2.5	≤12.0	700	420
			240	≤1.5	≤6.0	630	280	≤1.5	≤6.0	630	340
			290	–	–	–	–	–	–	–	–
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118 (DH102)	~160	≤5.0	≤30.0	1,490	1,490	≤5.0	≤30.0	1,490	1,790
			240	≤4.0	≤15.0	1,340	1,210	≤4.0	≤15.0	1,340	1,450
			290	≤3.0	≤7.5	1,190	950	≤3.0	≤7.5	1,190	1,140
Stainless steel Below 250HB	PL type (SL type)	JC8050 (JC8118) (JC7518)	~160	≤5.0	≤24.0	1,490	1,120	≤5.0	≤24.0	1,490	1,340
			240	≤3.0	≤12.0	1,340	900	≤3.0	≤12.0	1,340	1,080
			290	≤2.0	≤6.0	1,190	710	≤2.0	≤6.0	1,190	860
Titanium alloy (Ti-6Al-4V)	SL type	JC7518	~160	≤5.0	≤18.0	600	450	≤5.0	≤18.0	600	540
			240	≤3.0	≤9.0	540	360	≤3.0	≤9.0	540	440
			290	≤2.0	≤4.5	480	290	≤2.0	≤4.5	480	340
Inconel (INCO718)	SL type	JC7518	~160	≤5.0	≤18.0	300	230	≤5.0	≤18.0	300	270
			240	≤3.0	≤9.0	270	180	≤3.0	≤9.0	270	220
			290	≤2.0	≤4.5	240	140	≤2.0	≤4.5	240	170
Aluminum alloy 50-110HB	NL type	FC18	~160	≤5.0	≤64.0	5,970	5,970	≤5.0	≤64.0	5,970	7,160
			240	≤4.0	≤32.0	4,480	4,030	≤4.0	≤32.0	4,480	4,840
			290	≤3.0	≤16.0	2,990	2,390	≤3.0	≤16.0	2,990	2,870

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT * -PL/NL/SL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "ZPMT * -PL/NL/SL-type inserts"

3

MQX and MSN type

Work materials	Applicable inserts	Grades	Tool dia. (mm)								
			40 / 42					40			
			No. of teeth 6N					No. of teeth 7N			
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118) (CX75)	~160	≤5.0	≤32.0	1,270	1,140	≤5.0	≤32.0	1,270	1,330
			240	≤3.0	≤16.0	1,140	920	≤3.0	≤16.0	1,140	1,080
			290	≤2.0	≤8.0	1,020	730	≤2.0	≤8.0	1,020	860
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (JC8118)	~160	≤5.0	≤32.0	1,190	1,070	≤5.0	≤32.0	1,190	1,250
			240	≤3.0	≤16.0	1,070	870	≤3.0	≤16.0	1,070	1,010
			290	≤2.0	≤8.0	950	680	≤2.0	≤8.0	950	800
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	~160	≤5.0	≤32.0	1,190	1,070	≤5.0	≤32.0	1,190	1,250
			240	≤3.0	≤16.0	1,070	870	≤3.0	≤16.0	1,070	1,010
			290	≤2.0	≤8.0	950	680	≤2.0	≤8.0	950	800
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	~160	≤4.0	≤24.0	950	680	≤4.0	≤24.0	950	800
			240	≤2.5	≤12.0	860	570	≤2.5	≤12.0	860	660
			290	≤2.0	≤6.0	760	460	≤2.0	≤6.0	760	530
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118 (DH102)	~160	≤3.5	≤20.0	800	580	≤3.5	≤20.0	800	670
			240	≤2.5	≤10.0	720	470	≤2.5	≤10.0	720	540
			290	≤1.2	≤5.0	640	370	≤1.2	≤5.0	640	430
Hardened die steel (1.2344, 1.2379) 55-62HRC	PL type	DH102	~160	≤2.5	≤16.0	560	340	≤2.5	≤16.0	560	390
			240	≤1.5	≤8.0	500	270	≤1.5	≤8.0	500	310
			290	—	—	—	—	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118 (DH102)	~160	≤5.0	≤40.0	1,190	1,430	≤5.0	≤40.0	1,190	1,670
			240	≤4.0	≤20.0	1,070	1,160	≤4.0	≤20.0	1,070	1,350
			290	≤3.0	≤10.0	950	910	≤3.0	≤10.0	950	1,060
Stainless steel Below 250HB	PL type (SL type)	JC8050 (JC8118) (JC7518)	~160	≤5.0	≤32.0	1,190	1,070	≤5.0	≤32.0	1,190	1,250
			240	≤3.0	≤16.0	1,070	870	≤3.0	≤16.0	1,070	1,010
			290	≤2.0	≤8.0	950	680	≤2.0	≤8.0	950	800
Titanium alloy (Ti-6Al-4V)	SL type	JC7518	~160	≤5.0	≤24.0	480	430	≤5.0	≤24.0	480	500
			240	≤3.0	≤12.0	430	350	≤3.0	≤12.0	430	410
			290	≤2.0	≤6.0	380	270	≤2.0	≤6.0	380	320
Inconel (INCO718)	SL type	JC7518	~160	≤5.0	≤24.0	240	220	≤5.0	≤24.0	240	250
			240	≤3.0	≤12.0	220	180	≤3.0	≤12.0	220	210
			290	≤2.0	≤6.0	190	140	≤2.0	≤6.0	190	160
Aluminum alloy 50-110HB	NL type	FC18	~160	≤5.0	≤80.0	4,780	5,740	≤5.0	≤80.0	4,780	6,690
			240	≤4.0	≤40.0	3,580	3,870	≤4.0	≤40.0	3,580	4,510
			290	≤3.0	≤20.0	2,390	2,290	≤3.0	≤20.0	2,390	2,680

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT * -PL/NL/SL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "ZPMT * -PL/NL/SL-type inserts"

3

QXP type (facemill type)

Work materials	Applicable inserts	Grades	Tool dia. (mm)								
			40								
			No. of teeth 6N					No. of teeth 7N			
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (UC8118) (CX75)	~150	≤5.0	≤32.0	1,270	1,140	≤5.0	≤32.0	1,270	1,330
			200	≤3.0	≤16.0	1,140	920	≤3.0	≤16.0	1,140	1,080
			250	≤2.0	≤8.0	1,020	730	≤2.0	≤8.0	1,020	860
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (UC8118)	~150	≤5.0	≤32.0	1,190	1,070	≤5.0	≤32.0	1,190	1,250
			200	≤3.0	≤16.0	1,070	870	≤3.0	≤16.0	1,070	1,010
			250	≤2.0	≤8.0	950	680	≤2.0	≤8.0	950	800
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (UC8050)	~150	≤5.0	≤32.0	1,190	1,070	≤5.0	≤32.0	1,190	1,250
			200	≤3.0	≤16.0	1,070	870	≤3.0	≤16.0	1,070	1,010
			250	≤2.0	≤8.0	950	680	≤2.0	≤8.0	950	800
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (UC8050)	~150	≤4.0	≤24.0	950	680	≤4.0	≤24.0	950	800
			200	≤2.5	≤12.0	860	570	≤2.5	≤12.0	860	660
			250	≤2.0	≤6.0	760	460	≤2.0	≤6.0	760	530
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118 (DH102)	~150	≤3.5	≤20.0	800	580	≤3.5	≤20.0	800	670
			200	≤2.5	≤10.0	720	470	≤2.5	≤10.0	720	540
			250	≤1.2	≤5.0	640	370	≤1.2	≤5.0	640	430
Hardened die steel (1.2344, 1.2379) 55-62HRC	PL type	DH102	~150	≤2.5	≤16.0	560	340	≤2.5	≤16.0	560	390
			200	≤1.5	≤8.0	500	270	≤1.5	≤8.0	500	310
			250	—	—	—	—	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118 (DH102)	~150	≤5.0	≤40.0	1,190	1,430	≤5.0	≤40.0	1,190	1,670
			200	≤4.0	≤20.0	1,070	1,160	≤4.0	≤20.0	1,070	1,350
			250	≤3.0	≤10.0	950	910	≤3.0	≤10.0	950	1,060
Stainless steel Below 250HB	PL type (SL type)	JC8050 (UC8118) (JC7518)	~150	≤5.0	≤32.0	1,190	1,070	≤5.0	≤32.0	1,190	1,250
			200	≤3.0	≤16.0	1,070	870	≤3.0	≤16.0	1,070	1,010
			250	≤2.0	≤8.0	950	680	≤2.0	≤8.0	950	800
Titanium alloy (Ti-6Al-4V)	SL type	JC7518	~150	≤5.0	≤24.0	480	430	≤5.0	≤24.0	480	500
			200	≤3.0	≤12.0	430	350	≤3.0	≤12.0	430	410
			250	≤2.0	≤6.0	380	270	≤2.0	≤6.0	380	320
Inconel (INCO718)	SL type	JC7518	~150	≤5.0	≤24.0	240	220	≤5.0	≤24.0	240	250
			200	≤3.0	≤12.0	220	180	≤3.0	≤12.0	220	210
			250	≤2.0	≤6.0	190	140	≤2.0	≤6.0	190	160
Aluminum alloy 50-110HB	NL type	FC18	~150	≤5.0	≤80.0	4,780	5,740	≤5.0	≤80.0	4,780	6,690
			200	≤4.0	≤40.0	3,580	3,870	≤4.0	≤40.0	3,580	4,510
			250	≤3.0	≤20.0	2,390	2,290	≤3.0	≤20.0	2,390	2,680

l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT * -PL/NL/SL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "ZPMT * -PL/NL/SL-type inserts"

3

QXP type (facemill type)

Work materials	Applicable inserts	Grades	Tool dia. (mm)								
			50					50 / 52			
			No. of teeth 7N					No. of teeth 8N			
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118) (CX75)	~200	≤5.0	≤40.0	1,020	1,070	≤5.0	≤40.0	1,020	1,220
			250	≤3.0	≤20.0	920	870	≤3.0	≤20.0	920	990
			300	≤2.0	≤10.0	820	690	≤2.0	≤10.0	820	790
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (JC8118)	~200	≤5.0	≤40.0	950	1,000	≤5.0	≤40.0	950	1,140
			250	≤3.0	≤20.0	860	810	≤3.0	≤20.0	860	930
			300	≤2.0	≤10.0	760	640	≤2.0	≤10.0	760	730
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	~200	≤5.0	≤40.0	950	1,000	≤5.0	≤40.0	950	1,140
			250	≤3.0	≤20.0	860	810	≤3.0	≤20.0	860	930
			300	≤2.0	≤10.0	760	640	≤2.0	≤10.0	760	730
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	~200	≤4.0	≤30.0	760	640	≤4.0	≤30.0	760	730
			250	≤2.5	≤15.0	680	520	≤2.5	≤15.0	680	600
			300	≤2.0	≤7.5	610	430	≤2.0	≤7.5	610	490
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118 (DH102)	~200	≤3.5	≤25.0	640	540	≤3.5	≤25.0	640	610
			250	≤2.0	≤12.5	580	440	≤2.0	≤12.5	580	500
			300	≤1.2	≤6.0	510	340	≤1.2	≤6.0	510	390
Hardened die steel (1.2344, 1.2379) 55-62HRC	PL type	DH102	~200	≤2.5	≤20.0	450	320	≤2.5	≤20.0	450	360
			250	≤1.5	≤10.0	400	250	≤1.5	≤10.0	400	290
			300	≤1.0	≤5.0	360	200	≤1.0	≤5.0	360	230
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118 (DH102)	~200	≤5.0	≤50.0	950	1,330	≤5.0	≤50.0	950	1,520
			250	≤4.0	≤25.0	860	1,080	≤4.0	≤25.0	860	1,240
			300	≤3.0	≤12.5	760	850	≤3.0	≤12.5	760	970
Stainless steel Below 250HB	PL type (SL type)	JC8050 (JC8118) (JC7518)	~200	≤5.0	≤40.0	950	1,000	≤5.0	≤40.0	950	1,140
			250	≤3.0	≤20.0	860	810	≤3.0	≤20.0	860	930
			300	≤2.0	≤10.0	760	640	≤2.0	≤10.0	760	730
Titanium alloy (Ti-6Al-4V)	SL type	JC7518	~200	≤5.0	≤30.0	380	400	≤5.0	≤30.0	380	460
			250	≤3.0	≤15.0	340	320	≤3.0	≤15.0	340	370
			300	≤2.0	≤7.5	300	250	≤2.0	≤7.5	300	290
Inconel (INCO718)	SL type	JC7518	~200	≤5.0	≤30.0	190	200	≤5.0	≤30.0	190	230
			250	≤3.0	≤15.0	170	160	≤3.0	≤15.0	170	180
			300	≤2.0	≤7.5	150	130	≤2.0	≤7.5	150	140
Aluminum alloy 50-110HB	NL type	FC18	~200	≤5.0	≤100.0	3,820	5,350	≤5.0	≤100.0	3,820	6,110
			250	≤4.0	≤50.0	2,860	3,600	≤4.0	≤50.0	2,860	4,120
			300	≤3.0	≤25.0	1,910	2,140	≤3.0	≤25.0	1,910	2,440

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT * -PL/NL/SL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "ZPMT * -PL/NL/SL-type inserts"

3

QXP type (facemill type)

Work materials	Applicable inserts	Grades	Tool dia. (mm)							
			63 / 66							
			No. of teeth 8N							
			r (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)			
Carbon steel (C50, C55) Below 250HB	PL type	JC8050 (JC8118) (CX75)	~250	≤5.0	≤50.0	810	970			
			300	≤3.0	≤25.0	730	790			
			350	≤2.0	≤12.5	650	620			
Die steel (1.2344, 1.2379) Below 255HB	PL type	JC8050 (JC8118)	~250	≤5.0	≤50.0	760	910			
			300	≤3.0	≤25.0	680	730			
			350	≤2.0	≤12.5	610	580			
Mold steel (1.2311, P20) 30-36HRC	PL type	JC8118 (JC8050)	~250	≤5.0	≤50.0	760	910			
			300	≤3.0	≤25.0	680	730			
			350	≤2.0	≤12.5	610	580			
Mold steel (1.2311, P21) 38-43HRC	PL type	JC8118 (JC8050)	~250	≤4.0	≤38.0	610	590			
			300	≤2.5	≤19.0	550	480			
			350	≤2.0	≤9.5	490	390			
Hardened die steel (1.2344, 1.2379) 42-52HRC	PL type	JC8118 (DH102)	~250	≤3.5	≤32.0	500	480			
			300	≤2.5	≤16.0	450	390			
			350	≤1.5	≤7.5	400	310			
Hardened die steel (1.2344, 1.2379) 55-62HRC	PL type	DH102	~250	≤2.5	≤25.0	350	280			
			300	≤1.5	≤12.5	320	230			
			350	≤1.0	≤6.5	280	180			
Grey & Nodular cast iron (GG, GGG) Below 300HB	PL type	JC8118 (DH102)	~250	≤5.0	≤64.0	760	1,220			
			300	≤4.0	≤32.0	680	980			
			350	≤3.0	≤16.0	610	780			
Stainless steel Below 250HB	PL type (SL type)	JC8050 (JC8118) (JC7518)	~250	≤5.0	≤50.0	760	910			
			300	≤3.0	≤25.0	680	730			
			350	≤2.0	≤12.5	610	580			
Titanium alloy (Ti-6Al-4V)	SL type	JC7518	~250	≤5.0	≤38.0	300	360			
			300	≤3.0	≤19.0	270	290			
			350	≤2.0	≤9.5	240	230			
Inconel (INCO718)	SL type	JC7518	~250	≤5.0	≤38.0	150	180			
			300	≤3.0	≤19.0	140	150			
			350	≤2.0	≤9.5	120	110			
Aluminum alloy 50-110HB	NL type	FC18	~250	≤5.0	≤128.0	3,030	4,850			
			300	≤4.0	≤63.0	2,270	3,270			
			350	≤3.0	≤31.5	1,520	1,940			

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using ZPMT * -PL/NL/SL type insert in side finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "YPHW*-15/-F-type inserts" (For up & down finishing)

4

MQX and MSN type

Work materials	Grades	Tool dia. (mm)														
		16 / 17					20					20 / 21				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 4N				
		r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8015 (DH102)	~70	0.5	<0.2	8,950	2,680	~70	0.6	<0.2	7,160	3,220	~70	0.6	<0.2	7,160	4,290
		120	0.5	<0.2	6,960	1,390	120	0.6	<0.2	7,160	2,790	120	0.6	<0.2	7,160	3,720
		160	0.5	<0.2	6,960	1,110	190	0.6	<0.2	5,570	1,670	190	0.6	<0.2	5,570	2,230
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~70	0.5	<0.2	7,960	2,390	~70	0.6	<0.2	6,370	3,220	~70	0.6	<0.2	6,370	4,290
		120	0.5	<0.2	5,970	1,190	120	0.6	<0.2	6,370	2,480	120	0.6	<0.2	6,370	3,310
		160	0.5	<0.2	5,970	960	190	0.6	<0.2	4,770	1,430	190	0.6	<0.2	4,770	1,910
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~70	0.5	<0.2	6,960	1,670	~70	0.6	<0.2	5,570	2,000	~70	0.6	<0.2	5,570	2,670
		120	0.5	<0.2	4,970	840	120	0.6	<0.2	5,570	1,670	120	0.6	<0.2	5,570	2,230
		160	0.5	<0.2	4,970	700	190	0.6	<0.2	3,980	960	190	0.6	<0.2	3,980	1,280
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~70	0.5	<0.2	4,980	1,200	~70	0.6	<0.2	3,980	1,430	~70	0.6	<0.2	3,980	1,910
		120	0.5	<0.2	3,560	600	120	0.6	<0.2	3,980	1,190	120	0.6	<0.2	3,980	1,590
		160	0.5	<0.2	3,560	500	190	0.6	<0.2	2,840	690	190	0.6	<0.2	2,840	920
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~70	0.5	<0.15	3,380	680	~70	0.6	<0.15	2,710	810	~70	0.6	<0.15	2,710	1,080
		120	0.5	<0.15	2,400	340	120	0.6	<0.15	2,710	670	120	0.6	<0.15	2,710	890
		160	0.5	<0.15	2,400	280	190	0.6	<0.15	1,940	390	190	0.6	<0.15	1,940	520
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~70	0.5	<0.2	10,900	3,270	~70	0.6	<0.2	8,750	3,940	~70	0.6	<0.2	8,750	5,250
		120	0.5	<0.2	8,950	2,150	120	0.6	<0.2	7,160	2,580	120	0.6	<0.2	7,160	3,440
		160	0.5	<0.2	8,950	1,790	190	0.6	<0.2	7,160	2,150	190	0.6	<0.2	7,160	2,870

ℓ : Overhung length, P_f : Pick feed, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW*-15/-F-type inserts" (For up & down finishing)

4

MQX and MSN type

Work materials	Grades	Tool dia. (mm)														
		25 / 26					25 / 26 / 28					30 / 32 / 35				
		No. of teeth 4N					No. of teeth 5N					No. of teeth 5N				
		r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8015 (DH102)	~90	0.7	<0.2	5,730	4,120	~90	0.7	<0.2	5,730	6,210	~100	0.8	<0.2	4,480	4,030
		140	0.7	<0.2	5,730	3,440	140	0.7	<0.2	5,730	4,300	150	0.8	<0.2	4,480	4,030
		210	0.7	<0.2	4,460	2,140	210	0.7	<0.2	4,460	2,680	210	0.8	<0.2	3,480	2,610
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~90	0.7	<0.2	5,090	3,660	~90	0.7	<0.2	5,090	4,580	~100	0.8	<0.2	3,980	3,580
		140	0.7	<0.2	5,090	3,050	140	0.7	<0.2	5,090	3,810	150	0.8	<0.2	3,980	3,580
		210	0.7	<0.2	3,820	1,830	210	0.7	<0.2	3,820	2,290	210	0.8	<0.2	2,980	1,740
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~90	0.7	<0.2	4,460	2,680	~90	0.7	<0.2	4,460	3,350	~100	0.8	<0.2	3,480	2,610
		140	0.7	<0.2	4,460	2,140	140	0.7	<0.2	4,460	2,680	150	0.8	<0.2	3,480	2,610
		210	0.7	<0.2	3,180	1,270	210	0.7	<0.2	3,180	1,590	210	0.8	<0.2	2,490	1,250
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~90	0.7	<0.2	3,180	1,530	~90	0.7	<0.2	3,180	1,910	~100	0.8	<0.2	2,490	1,500
		140	0.7	<0.2	3,180	1,220	140	0.7	<0.2	3,180	1,520	150	0.8	<0.2	2,490	1,500
		210	0.7	<0.2	2,270	730	210	0.7	<0.2	2,270	910	210	0.8	<0.2	1,780	720
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~90	0.7	<0.15	2,160	860	~90	0.7	<0.15	2,160	1,080	~100	0.8	<0.15	1,690	850
		140	0.7	<0.15	2,160	690	140	0.7	<0.15	2,160	860	150	0.8	<0.15	1,690	850
		210	0.7	<0.15	1,540	410	210	0.7	<0.15	1,540	510	210	0.8	<0.15	1,210	410
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~90	0.7	<0.2	7,000	4,200	~90	0.7	<0.2	7,000	5,250	~100	0.8	<0.2	5,470	4,100
		140	0.7	<0.2	5,730	2,750	140	0.7	<0.2	5,730	3,440	150	0.8	<0.2	5,470	4,100
		210	0.7	<0.2	5,730	2,290	210	0.7	<0.2	5,730	2,860	210	0.8	<0.2	4,480	2,240

ℓ : Overhung length, P_f : Pick feed, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW*-15/-F-type inserts" (For up & down finishing)

4

MQX and MSN type

Work materials	Grades	Tool dia. (mm)														
		32 / 35					40 / 42					40				
		No. of teeth 6N					No. of teeth 6N					No. of teeth 7N				
		r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8015 (DH102)	~100	0.8	<0.2	4,480	4,830	~100	0.88	<0.2	3,580	3,870	~100	0.88	<0.2	3,580	4,520
		150	0.8	<0.2	4,480	4,830	150	0.88	<0.2	3,580	3,870	150	0.88	<0.2	3,580	4,520
		210	0.8	<0.2	3,480	3,130	210	0.88	<0.2	2,790	2,010	210	0.88	<0.2	2,790	2,350
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~100	0.8	<0.2	3,980	4,300	~100	0.88	<0.2	3,180	3,430	~100	0.88	<0.2	3,180	4,000
		150	0.8	<0.2	3,980	4,300	150	0.88	<0.2	3,180	3,430	150	0.88	<0.2	3,180	4,000
		210	0.8	<0.2	2,980	2,090	210	0.88	<0.2	2,390	1,720	210	0.88	<0.2	2,390	2,010
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~100	0.8	<0.2	3,480	3,130	~100	0.88	<0.2	2,790	2,510	~100	0.88	<0.2	2,790	2,930
		150	0.8	<0.2	3,480	3,130	150	0.88	<0.2	2,790	2,510	150	0.88	<0.2	2,790	2,930
		210	0.8	<0.2	2,490	1,500	210	0.88	<0.2	1,990	1,430	210	0.88	<0.2	1,990	1,670
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~100	0.8	<0.2	2,490	1,800	~100	0.88	<0.2	1,990	1,430	~100	0.88	<0.2	1,990	1,670
		150	0.8	<0.2	2,490	1,800	150	0.88	<0.2	1,990	1,430	150	0.88	<0.2	1,990	1,670
		210	0.8	<0.2	1,780	860	210	0.88	<0.2	1,420	820	210	0.88	<0.2	1,420	960
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~100	0.8	<0.15	1,690	1,020	~100	0.88	<0.15	1,350	810	~100	0.88	<0.15	1,350	950
		150	0.8	<0.15	1,690	1,020	150	0.88	<0.15	1,350	810	150	0.88	<0.15	1,350	950
		210	0.8	<0.15	1,210	490	210	0.88	<0.15	960	460	210	0.88	<0.15	960	540
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~100	0.8	<0.2	5,470	4,920	~100	0.88	<0.2	4,380	3,940	~100	0.88	<0.2	4,380	4,600
		150	0.8	<0.2	5,470	4,920	150	0.88	<0.2	4,380	3,940	150	0.88	<0.2	4,380	4,600
		210	0.8	<0.2	4,480	2,690	210	0.88	<0.2	3,580	2,580	210	0.88	<0.2	3,580	3,010

ℓ : Overhung length, P_f : Pick feed, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)														
		40										50				
		No. of teeth 6N					No. of teeth 7N					No. of teeth 7N				
		r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	r (mm)	P_f (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8015 (DH102)	~150	0.88	<0.2	3,580	3,870	~150	0.88	<0.2	3,580	4,520	~150	1	<0.2	2,860	3,600
		200	0.88	<0.2	3,580	3,870	200	0.88	<0.2	3,580	4,520	200	1	<0.2	2,860	3,600
		250	0.88	<0.2	3,580	3,220	250	0.88	<0.2	3,580	3,760	250	1	<0.2	2,860	3,600
		300	0.88	<0.2	2,790	2,010	300	0.88	<0.2	2,790	2,350	300	1	<0.2	2,860	3,000
		350	-	-	-	-	350	-	-	-	-	350	1	<0.2	2,860	3,000
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~150	0.88	<0.2	3,180	3,430	~150	0.88	<0.2	3,180	4,000	~150	1	<0.2	2,550	3,210
		200	0.88	<0.2	3,180	3,430	200	0.88	<0.2	3,180	4,000	200	1	<0.2	2,550	3,210
		250	0.88	<0.2	3,180	2,860	250	0.88	<0.2	3,180	3,340	250	1	<0.2	2,550	3,210
		300	0.88	<0.2	2,390	1,720	300	0.88	<0.2	2,390	2,010	300	1	<0.2	2,550	2,680
		350	-	-	-	-	350	-	-	-	-	350	1	<0.2	2,550	2,680
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~150	0.88	<0.2	2,790	2,510	~150	0.88	<0.2	2,790	2,930	~150	1	<0.2	2,230	2,340
		200	0.88	<0.2	2,790	2,510	200	0.88	<0.2	2,790	2,930	200	1	<0.2	2,230	2,340
		250	0.88	<0.2	2,790	2,010	250	0.88	<0.2	2,790	2,350	250	1	<0.2	2,230	2,340
		300	0.88	<0.2	1,990	1,190	300	0.88	<0.2	1,990	1,390	300	1	<0.2	2,230	1,870
		350	-	-	-	-	350	-	-	-	-	350	1	<0.2	2,230	1,870
Mold steel (1.2344, 1.2379) 38-43HRC	JC8015 (DH102)	~150	0.88	<0.2	1,990	1,430	~150	0.88	<0.2	1,990	1,670	~150	1	<0.2	1,590	1,340
		200	0.88	<0.2	1,990	1,430	200	0.88	<0.2	1,990	1,670	200	1	<0.2	1,590	1,340
		250	0.88	<0.2	1,990	1,150	250	0.88	<0.2	1,990	1,340	250	1	<0.2	1,590	1,340
		300	0.88	<0.2	1,420	680	300	0.88	<0.2	1,420	790	300	1	<0.2	1,590	1,070
		350	-	-	-	-	350	-	-	-	-	350	1	<0.2	1,590	1,070
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~150	0.88	<0.15	1,350	810	~150	0.88	<0.15	1,350	950	~150	1	<0.15	1,080	760
		200	0.88	<0.15	1,350	810	200	0.88	<0.15	1,350	950	200	1	<0.15	1,080	760
		250	0.88	<0.15	1,350	650	250	0.88	<0.15	1,350	760	250	1	<0.15	1,080	760
		300	0.88	<0.15	960	390	300	0.88	<0.15	960	460	300	1	<0.15	1,080	610
		350	-	-	-	-	350	-	-	-	-	350	1	<0.15	1,080	610
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~150	0.88	<0.2	4,380	3,940	~150	0.88	<0.2	4,380	4,600	~150	1	<0.2	3,500	3,680
		200	0.88	<0.2	4,380	3,940	200	0.88	<0.2	4,380	4,600	200	1	<0.2	3,500	3,680
		250	0.88	<0.2	3,580	2,580	250	0.88	<0.2	3,580	3,010	250	1	<0.2	3,500	3,680
		300	0.88	<0.2	3,580	2,150	300	0.88	<0.2	3,580	2,510	300	1	<0.2	2,860	2,400
		350	-	-	-	-	350	-	-	-	-	350	1	<0.2	2,860	2,400

ℓ : Overhung length, P_f : Pick feed, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)														
		50 / 52					63 / 66									
		No. of teeth 8N					No. of teeth 8N									
		r (mm)	Pf (mm)	a_e (mm)	n (min ⁻¹)	Vf (mm/min)	r (mm)	Pf (mm)	a_e (mm)	n (min ⁻¹)	Vf (mm/min)					
Carbon steel (C50, C55) Below 250HB	JC8015 (DH102)	~150	1	<0.2	2,860	4,110	~200	1.12	<0.2	2,270	3,260					
		200	1	<0.2	2,860	4,110	250	1.12	<0.2	2,270	3,260					
		250	1	<0.2	2,860	4,110	300	1.12	<0.2	2,270	3,260					
		300	1	<0.2	2,860	3,430	350	1.12	<0.2	2,270	2,720					
		350	1	<0.2	2,860	3,430	400	1.12	<0.2	2,270	2,720					
Die steel (1.2344, 1.2379) Below 255HB	JC8015 (DH102)	~150	1	<0.2	2,550	3,670	~200	1.12	<0.2	2,020	2,910					
		200	1	<0.2	2,550	3,670	250	1.12	<0.2	2,020	2,910					
		250	1	<0.2	2,550	3,670	300	1.12	<0.2	2,020	2,910					
		300	1	<0.2	2,550	3,060	350	1.12	<0.2	2,020	2,420					
		350	1	<0.2	2,550	3,060	400	1.12	<0.2	2,020	2,420					
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~150	1	<0.2	2,230	2,670	~200	1.12	<0.2	1,770	2,120					
		200	1	<0.2	2,230	2,670	250	1.12	<0.2	1,770	2,120					
		250	1	<0.2	2,230	2,670	300	1.12	<0.2	1,770	2,120					
		300	1	<0.2	2,230	2,140	350	1.12	<0.2	1,770	1,700					
		350	1	<0.2	2,230	2,140	400	1.12	<0.2	1,770	1,700					
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~150	1	<0.2	1,590	1,530	~200	1.12	<0.2	1,260	1,210					
		200	1	<0.2	1,590	1,530	250	1.12	<0.2	1,260	1,210					
		250	1	<0.2	1,590	1,530	300	1.12	<0.2	1,260	1,210					
		300	1	<0.2	1,590	1,220	350	1.12	<0.2	1,260	970					
		350	1	<0.2	1,590	1,220	400	1.12	<0.2	1,260	970					
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102 (JC8015)	~150	1	<0.15	1,080	870	~200	1.12	<0.15	860	690					
		200	1	<0.15	1,080	870	250	1.12	<0.15	860	690					
		250	1	<0.15	1,080	870	300	1.12	<0.15	860	690					
		300	1	<0.15	1,080	700	350	1.12	<0.15	860	550					
		350	1	<0.15	1,080	700	400	1.12	<0.15	860	550					
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~150	1	<0.2	3,500	4,210	~200	1.12	<0.2	2,780	3,340					
		200	1	<0.2	3,500	4,210	250	1.12	<0.2	2,780	3,340					
		250	1	<0.2	3,500	4,210	300	1.12	<0.2	2,780	3,340					
		300	1	<0.2	2,860	2,740	350	1.12	<0.2	2,270	2,180					
		350	1	<0.2	2,860	2,740	400	1.12	<0.2	2,270	2,180					

 ℓ : Overhung length, Pf: Pick feed, a_e : Radial depth of cut, n : Spindle speed, Vf: Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW*-15/F-type inserts" (For side finishing)

4

MQX and MSN type

Work materials	Grades	Tool dia. (mm)														
		16 / 17					20					20 / 21				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 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 (C50, C55) Below 250HB	CX75 (JC8015) (DH102)	~70	1.5	<0.2	12,900	3,870	~70	1.5	<0.2	10,300	4,640	~70	1.5	<0.2	10,300	6,190
		120	1	<0.2	8,950	2,150	120	1	<0.2	7,160	2,580	120	1	<0.2	7,160	3,440
		160	0.7	<0.2	8,950	1,790	190	0.7	<0.2	7,160	2,150	190	0.7	<0.2	7,160	2,870
Die steel (1.2344, 1.2379) Below 255HB	CX75 (JC8015) (DH102)	~70	1.5	<0.2	8,950	2,680	~70	1.5	<0.2	7,160	3,220	~70	1.5	<0.2	7,160	4,290
		120	1	<0.2	8,950	2,150	120	1	<0.2	7,160	2,580	120	1	<0.2	7,160	3,440
		160	0.7	<0.2	6,960	1,390	190	0.7	<0.2	5,570	1,670	190	0.7	<0.2	5,570	2,230
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~70	1.5	<0.2	8,950	2,680	~70	1.5	<0.2	7,160	3,220	~70	1.5	<0.2	7,160	4,290
		120	1	<0.2	8,950	2,150	120	1	<0.2	7,160	2,580	120	1	<0.2	7,160	3,440
		160	0.7	<0.2	6,960	1,390	190	0.7	<0.2	5,570	1,670	190	0.7	<0.2	5,570	2,230
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~70	1.5	<0.2	7,960	1,910	~70	1.5	<0.2	6,370	2,290	~70	1.5	<0.2	6,370	3,050
		120	1	<0.2	6,960	1,390	120	1	<0.2	5,570	1,670	120	1	<0.2	5,570	2,230
		160	0.7	<0.2	6,960	1,110	190	0.7	<0.2	5,570	1,340	190	0.7	<0.2	5,570	1,790
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~70	1.5	<0.2	3,980	800	~70	1.5	<0.2	3,180	950	~70	1.5	<0.2	3,180	1,270
		120	1	<0.2	3,380	540	120	1	<0.2	2,710	630	120	1	<0.2	2,710	840
		160	-	-	-	-	190	-	-	-	-	190	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~70	1	<0.2	3,580	720	~70	1	<0.2	2,860	860	~70	1	<0.2	2,860	1,150
		120	0.7	<0.2	2,980	480	120	0.7	<0.2	2,390	570	120	0.7	<0.2	2,390	760
		160	-	-	-	-	190	-	-	-	-	190	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~70	1.5	<0.2	10,900	3,270	~70	1.5	<0.2	8,750	3,940	~70	1.5	<0.2	8,750	5,250
		120	1	<0.2	8,950	2,150	120	1	<0.2	7,160	2,580	120	1	<0.2	7,160	3,440
		160	0.7	<0.2	8,950	1,790	190	0.7	<0.2	7,160	2,150	190	0.7	<0.2	7,160	2,870
Stainless steel Below 250HB	JC8015 (DH102)	~70	1.5	<0.2	8,950	2,680	~70	1.5	<0.2	7,160	3,220	~70	1.5	<0.2	7,160	4,290
		120	1	<0.2	8,950	2,150	120	1	<0.2	7,160	2,580	120	1	<0.2	7,160	3,440
		160	0.7	<0.2	6,960	1,390	190	0.7	<0.2	5,570	1,670	190	0.7	<0.2	5,570	2,230
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~70	1.5	<0.2	1,790	430	~70	1.5	<0.2	1,430	520	~70	1.5	<0.2	1,430	690
		120	1	<0.2	1,390	280	120	1	<0.2	1,110	330	120	1	<0.2	1,110	440
		160	0.7	<0.2	1,390	220	190	0.7	<0.2	1,110	270	190	0.7	<0.2	1,110	360

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW*-15/-F-type inserts" (For side finishing)

4

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		25 / 26					25 / 26 / 28				
		No. of teeth 4N					No. of teeth 5N				
		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 (C50, C55) Below 250HB	CX75 (JC8015) (DH102)	~90	1.5	<0.2	8,280	4,970	~90	1.5	<0.2	8,280	6,210
		140	1	<0.2	5,730	2,750	140	1	<0.2	5,730	3,440
		210	0.7	<0.2	5,730	2,290	210	0.7	<0.2	5,730	2,860
Die steel (1.2344, 1.2379) Below 255HB	CX75 (JC8015) (DH102)	~90	1.5	<0.2	5,730	3,440	~90	1.5	<0.2	5,730	4,300
		140	1	<0.2	5,730	2,750	140	1	<0.2	5,730	3,440
		210	0.7	<0.2	4,460	1,780	210	0.7	<0.2	4,460	2,230
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~90	1.5	<0.2	5,730	3,440	~90	1.5	<0.2	5,730	4,300
		140	1	<0.2	5,730	2,750	140	1	<0.2	5,730	3,440
		210	0.7	<0.2	4,460	1,780	210	0.7	<0.2	4,460	2,230
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~90	1.5	<0.2	5,090	2,440	~90	1.5	<0.2	5,090	3,050
		140	1	<0.2	4,460	1,780	140	1	<0.2	4,460	2,230
		210	0.7	<0.2	4,460	1,430	210	0.7	<0.2	4,460	1,790
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~90	1.5	<0.2	2,550	1,020	~90	1.5	<0.2	2,550	1,280
		140	1	<0.2	2,160	690	140	1	<0.2	2,160	860
		210	–	–	–	–	210	–	–	–	–
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~90	1	<0.2	2,290	920	~90	1	<0.2	2,290	1,150
		140	0.7	<0.2	1,910	610	140	0.7	<0.2	1,910	760
		210	–	–	–	–	210	–	–	–	–
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~90	1.5	<0.2	7,000	4,200	~90	1.5	<0.2	7,000	5,250
		140	1	<0.2	5,730	2,750	140	1	<0.2	5,730	3,440
		210	0.7	<0.2	5,730	2,290	210	0.7	<0.2	5,730	2,860
Stainless steel Below 250HB	JC8015 (DH102)	~90	1.5	<0.2	5,730	3,440	~90	1.5	<0.2	5,730	4,300
		140	1	<0.2	5,730	2,750	140	1	<0.2	5,730	3,440
		210	0.7	<0.2	4,460	1,780	210	0.7	<0.2	4,460	2,230
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~90	1.5	<0.2	1,150	550	~90	1.5	<0.2	1,150	690
		140	1	<0.2	890	360	140	1	<0.2	890	450
		210	0.7	<0.2	890	280	210	0.7	<0.2	890	350

l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		30 / 32 / 35					32 / 35				
		No. of teeth 5N					No. of teeth 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 (C50, C55) Below 250HB	CX75 (JC8015) (DH102)	~100	1.5	<0.2	6,470	4,850	~100	1.5	<0.2	6,470	5,820
		150	1.2	<0.2	4,480	2,690	150	1.2	<0.2	4,480	3,230
		210	1	<0.2	4,480	2,240	210	1	<0.2	4,480	2,690
Die steel (1.2344, 1.2379) Below 255HB	CX75 (JC8015) (DH102)	~100	1.5	<0.2	4,480	3,360	~100	1.5	<0.2	4,480	4,030
		150	1.2	<0.2	4,480	2,690	150	1.2	<0.2	4,480	3,230
		210	1	<0.2	3,480	1,740	210	1	<0.2	3,480	2,090
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~100	1.5	<0.2	4,480	3,360	~100	1.5	<0.2	4,480	4,030
		150	1.2	<0.2	4,480	2,690	150	1.2	<0.2	4,480	3,230
		210	1	<0.2	3,480	1,740	210	1	<0.2	3,480	2,090
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~100	1.5	<0.2	3,980	2,390	~100	1.5	<0.2	3,980	2,870
		150	1.2	<0.2	3,480	1,740	150	1.2	<0.2	3,480	2,090
		210	1	<0.2	3,480	1,390	210	1	<0.2	3,480	1,670
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~100	1.5	<0.2	2,000	1,000	~100	1.5	<0.2	2,000	1,200
		150	1.2	<0.2	1,690	680	150	1.2	<0.2	1,690	820
		210	1	<0.2	1,690	680	210	1	<0.2	1,690	820
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	1	<0.2	1,790	900	~100	1	<0.2	1,790	1,080
		150	0.8	<0.2	1,490	600	150	0.8	<0.2	1,490	720
		210	0.7	<0.2	1,490	420	210	0.7	<0.2	1,490	500
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~100	1.5	<0.2	5,470	4,100	~100	1.5	<0.2	5,470	4,920
		150	1.2	<0.2	4,480	2,690	150	1.2	<0.2	4,480	3,230
		210	1	<0.2	4,480	2,240	210	1	<0.2	4,480	2,690
Stainless steel Below 250HB	JC8015 (DH102)	~100	1.5	<0.2	4,480	3,360	~100	1.5	<0.2	4,480	4,030
		150	1.2	<0.2	4,480	2,690	150	1.2	<0.2	4,480	3,230
		210	1	<0.2	3,480	1,740	210	1	<0.2	3,480	2,090
(Ti-6Al-4V) Titanium alloy	JC8015 (DH102)	~100	1.5	<0.2	900	540	~100	1.5	<0.2	900	650
		150	1.2	<0.2	700	350	150	1.2	<0.2	700	420
		210	1	<0.2	700	280	210	1	<0.2	700	340

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW*-15/-F-type inserts" (For side finishing)

4

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		40 / 42					40				
		No. of teeth 6N					No. of teeth 7N				
		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 (C50, C55) Below 250HB	CX75 (JC8015) (DH102)	~100	1.5	<0.2	5,170	4,650	~100	1.5	<0.2	5,170	5,420
		150	1.5	<0.2	5,170	4,650	150	1.5	<0.2	5,170	5,420
		210	1	<0.2	3,580	2,580	210	1	<0.2	3,580	3,010
Die steel (1.2344, 1.2379) Below 255HB	CX75 (JC8015) (DH102)	~100	1.5	<0.2	3,580	3,220	~100	1.5	<0.2	3,580	3,760
		150	1.5	<0.2	3,580	3,220	150	1.5	<0.2	3,580	3,760
		210	1	<0.2	2,790	2,010	210	1	<0.2	2,790	2,350
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~100	1.5	<0.2	3,580	3,220	~100	1.5	<0.2	3,580	3,760
		150	1.5	<0.2	3,580	3,220	150	1.5	<0.2	3,580	3,760
		210	1	<0.2	2,790	2,010	210	1	<0.2	2,790	2,350
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~100	1.5	<0.2	3,180	2,290	~100	1.5	<0.2	3,180	2,670
		150	1.5	<0.2	3,180	2,290	150	1.5	<0.2	3,180	2,670
		210	1	<0.2	2,790	1,670	210	1	<0.2	2,790	1,950
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~100	1.5	<0.2	1,590	950	~100	1.5	<0.2	1,590	1,110
		150	1.5	<0.2	1,590	950	150	1.5	<0.2	1,350	1,110
		210	1	<0.2	1,350	650	210	1	<0.2	1,350	760
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	1	<0.2	1,430	860	~100	1	<0.2	1,430	1,000
		150	1	<0.2	1,430	860	150	1	<0.2	1,430	1,000
		210	0.7	<0.2	1,190	570	210	0.7	<0.2	1,190	670
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~100	1.5	<0.2	4,380	3,940	~100	1.5	<0.2	4,380	4,600
		150	1.5	<0.2	3,580	3,940	150	1.5	<0.2	3,580	4,600
		210	1	<0.2	3,580	2,580	210	1	<0.2	3,580	3,010
Stainless steel Below 250HB	JC8015 (DH102)	~100	1.5	<0.2	3,580	3,220	~100	1.5	<0.2	3,580	3,760
		150	1.5	<0.2	3,580	3,220	150	1.5	<0.2	3,580	3,760
		210	1	<0.2	2,790	2,010	210	1	<0.2	2,790	2,350
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~100	1.5	<0.2	720	520	~100	1.5	<0.2	720	610
		150	1.5	<0.2	560	520	150	1.5	<0.2	560	610
		210	1	<0.2	560	340	210	1	<0.2	560	400

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)									
		40									
		No. of teeth 6N					No. of teeth 7N				
		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 (C50, C55) Below 250HB	CX75 (JC8015) (DH102)	~150	1.5	<0.2	5,170	4,650	~150	1.5	<0.2	5,170	5,430
		200	1.5	<0.2	5,170	4,650	200	1.5	<0.2	5,170	5,430
		250	1	<0.2	3,580	2,580	250	1	<0.2	3,580	3,010
		300	0.7	<0.2	3,580	2,360	300	0.7	<0.2	3,580	2,750
		350	—	—	—	—	350	—	—	—	—
Die steel (1.2344, 1.2379) Below 255HB	CX75 (JC8015) (DH102)	~150	1.5	<0.2	3,580	3,220	~150	1.5	<0.2	3,580	3,760
		200	1.5	<0.2	3,580	3,220	200	1.5	<0.2	3,580	3,760
		250	1	<0.2	2,790	2,010	250	1	<0.2	2,790	2,350
		300	0.7	<0.2	2,790	1,670	300	0.7	<0.2	2,790	1,950
		350	—	—	—	—	350	—	—	—	—
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~150	1.5	<0.2	3,580	3,220	~150	1.5	<0.2	3,580	3,760
		200	1.5	<0.2	3,580	3,220	200	1.5	<0.2	3,580	3,760
		250	1	<0.2	2,790	2,010	250	1	<0.2	2,790	2,350
		300	0.7	<0.2	2,790	1,670	300	0.7	<0.2	2,790	1,950
		350	—	—	—	—	350	—	—	—	—
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~150	1.5	<0.2	3,180	2,290	~150	1.5	<0.2	3,180	2,670
		200	1.5	<0.2	3,180	2,290	200	1.5	<0.2	3,180	2,670
		250	1	<0.2	2,790	1,670	250	1	<0.2	2,790	1,950
		300	0.7	<0.2	2,790	1,340	300	0.7	<0.2	2,790	1,560
		350	—	—	—	—	350	—	—	—	—
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~150	1.5	<0.2	1,590	950	~150	1.5	<0.2	1,590	1,110
		200	1.5	<0.2	1,590	950	200	1.5	<0.2	1,590	1,110
		250	1	<0.2	1,350	650	250	1	<0.2	1,350	760
		300	0.7	<0.2	1,350	650	300	0.7	<0.2	1,350	760
		350	—	—	—	—	350	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~150	1	<0.2	1,430	860	~150	1	<0.2	1,430	1,000
		200	1	<0.2	1,430	860	200	1	<0.2	1,430	1,000
		250	0.7	<0.2	1,190	570	250	0.7	<0.2	1,190	670
		300	0.5	<0.2	1,190	360	300	0.5	<0.2	1,190	420
		350	—	—	—	—	350	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~150	1.5	<0.2	4,380	3,940	~150	1.5	<0.2	4,380	4,600
		200	1.5	<0.2	4,380	3,940	200	1.5	<0.2	4,380	4,600
		250	1	<0.2	3,580	2,580	250	1	<0.2	3,580	3,010
		300	0.7	<0.2	3,580	2,150	300	0.7	<0.2	3,580	2,510
		350	—	—	—	—	350	—	—	—	—
Stainless steel Below 250HB	JC8015 (DH102)	~150	1.5	<0.2	3,580	3,220	~150	1.5	<0.2	3,580	3,760
		200	1.5	<0.2	3,580	3,220	200	1.5	<0.2	3,580	3,760
		250	1	<0.2	2,790	2,010	250	1	<0.2	2,790	2,350
		300	0.7	<0.2	2,790	1,670	300	0.7	<0.2	2,790	1,950
		350	—	—	—	—	350	—	—	—	—
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~150	1.5	<0.2	720	520	~150	1.5	<0.2	720	610
		200	1.5	<0.2	720	520	200	1.5	<0.2	720	610
		250	1	<0.2	560	340	250	1	<0.2	560	400
		300	0.7	<0.2	560	270	300	0.7	<0.2	560	320
		350	—	—	—	—	350	—	—	—	—

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)									
		50					50 / 52				
		No. of teeth 7N					No. of teeth 8N				
		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 (C50, C55) Below 250HB	CX75 (JC8015) (DH102)	~150	2	<0.2	4,140	4,350	~150	2	<0.2	4,140	4,970
		200	2	<0.2	4,140	4,350	200	2	<0.2	4,140	4,970
		250	2	<0.2	4,140	4,350	250	2	<0.2	4,140	4,970
		300	1.5	<0.2	2,860	2,400	300	1.5	<0.2	2,860	2,740
		350	1.5	<0.2	2,860	2,400	350	1.5	<0.2	2,860	2,740
Die steel (1.2344, 1.2379) Below 255HB	CX75 (JC8015) (DH102)	~150	2	<0.2	2,860	3,000	~150	2	<0.2	2,860	3,430
		200	2	<0.2	2,860	3,000	200	2	<0.2	2,860	3,430
		250	2	<0.2	2,860	3,000	250	2	<0.2	2,860	3,430
		300	1.5	<0.2	2,860	2,400	300	1.5	<0.2	2,860	2,740
		350	1.5	<0.2	2,860	2,400	350	1.5	<0.2	2,860	2,740
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~150	2	<0.2	2,860	3,000	~150	2	<0.2	2,860	3,430
		200	2	<0.2	2,860	3,000	200	2	<0.2	2,860	3,430
		250	2	<0.2	2,860	3,000	250	2	<0.2	2,860	3,430
		300	1.5	<0.2	2,860	2,400	300	1.5	<0.2	2,860	2,740
		350	1.5	<0.2	2,860	2,400	350	1.5	<0.2	2,860	2,740
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~150	2	<0.2	2,550	2,140	~150	2	<0.2	2,550	2,450
		200	2	<0.2	2,550	2,140	200	2	<0.2	2,550	2,450
		250	2	<0.2	2,550	2,140	250	2	<0.2	2,550	2,450
		300	1.5	<0.2	2,230	1,560	300	1.5	<0.2	2,230	1,780
		350	1.5	<0.2	2,230	1,560	350	1.5	<0.2	2,230	1,780
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~150	1.5	<0.2	1,270	890	~150	1.5	<0.2	1,270	1,020
		200	1.5	<0.2	1,270	890	200	1.5	<0.2	1,270	1,020
		250	1.5	<0.2	1,270	890	250	1.5	<0.2	1,270	1,020
		300	1.2	<0.2	1,080	600	300	1.2	<0.2	1,080	690
		350	1.2	<0.2	1,080	600	350	1.2	<0.2	1,080	690
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~150	1.5	<0.2	1,150	810	~150	1.5	<0.2	1,150	930
		200	1.5	<0.2	1,150	810	200	1.5	<0.2	1,150	930
		250	1.5	<0.2	1,150	810	250	1.5	<0.2	1,150	930
		300	1	<0.2	950	530	300	1	<0.2	950	610
		350	1	<0.2	950	530	350	1	<0.2	950	610
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~150	2	<0.2	3,500	3,680	~150	2	<0.2	3,500	4,210
		200	2	<0.2	3,500	3,680	200	2	<0.2	3,500	4,210
		250	2	<0.2	3,500	3,680	250	2	<0.2	3,500	4,210
		300	1.5	<0.2	2,860	2,400	300	1.5	<0.2	2,860	2,740
		350	1.5	<0.2	2,860	2,400	350	1.5	<0.2	2,860	2,740
Stainless steel Below 250HB	JC8015 (DH102)	~150	2	<0.2	2,860	3,000	~150	2	<0.2	2,860	3,430
		200	2	<0.2	2,860	3,000	200	2	<0.2	2,860	3,430
		250	2	<0.2	2,860	3,000	250	2	<0.2	2,860	3,430
		300	1.5	<0.2	2,860	2,400	300	1.5	<0.2	2,860	2,740
		350	1.5	<0.2	2,860	2,400	350	1.5	<0.2	2,860	2,740
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~150	2	<0.2	570	480	~150	2	<0.2	570	550
		200	2	<0.2	570	480	200	2	<0.2	570	550
		250	2	<0.2	570	480	250	2	<0.2	570	550
		300	1.5	<0.2	450	320	300	1.5	<0.2	450	370
		350	1.5	<0.2	450	320	350	1.5	<0.2	450	370

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW*-15/-F-type inserts" (For side finishing)

4

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)									
		63 / 66									
		No. of teeth 8N									
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)					
Carbon steel (C50, C55) Below 250HB	CX75 (JC8015) (DH102)	~200	2	<0.2	3,290	3,950					
		250	2	<0.2	3,290	3,950					
		300	2	<0.2	3,290	3,950					
		350	1.5	<0.2	2,270	2,180					
		400	1.5	<0.2	2,270	2,180					
Die steel (1.2344, 1.2379) Below 255HB	CX75 (JC8015) (DH102)	~200	2	<0.2	2,270	2,720					
		250	2	<0.2	2,270	2,720					
		300	2	<0.2	2,270	2,720					
		350	1.5	<0.2	2,270	2,180					
		400	1.5	<0.2	2,270	2,180					
Mold steel (1.2311, P20) 30-36HRC	JC8015 (DH102)	~200	2	<0.2	2,270	2,720					
		250	2	<0.2	2,270	2,720					
		300	2	<0.2	2,270	2,720					
		350	1.5	<0.2	2,270	2,180					
		400	1.5	<0.2	2,270	2,180					
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~200	2	<0.2	2,020	1,940					
		250	2	<0.2	2,020	1,940					
		300	2	<0.2	2,020	1,940					
		350	1.5	<0.2	1,770	1,410					
		400	1.5	<0.2	1,770	1,410					
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~200	1.5	<0.2	1,010	810					
		250	1.5	<0.2	1,010	810					
		300	1.5	<0.2	1,010	810					
		350	1.2	<0.2	860	550					
		400	1.2	<0.2	860	550					
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~200	1.5	<0.2	910	740					
		250	1.5	<0.2	910	740					
		300	1.5	<0.2	910	740					
		350	1	<0.2	750	480					
		400	1	<0.2	750	480					
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC8015 (DH102)	~200	2	<0.2	2,780	3,340					
		250	2	<0.2	2,780	3,340					
		300	2	<0.2	2,780	3,340					
		350	1.5	<0.2	2,270	2,180					
		400	1.5	<0.2	2,270	2,180					
Stainless steel Below 250HB	JC8015 (DH102)	~200	2	<0.2	2,270	2,720					
		250	2	<0.2	2,270	2,720					
		300	2	<0.2	2,270	2,720					
		350	1.5	<0.2	2,270	2,180					
		400	1.5	<0.2	2,270	2,180					
Titanium alloy (Ti-6Al-4V)	JC8015 (DH102)	~200	2	<0.2	450	440					
		250	2	<0.2	450	440					
		300	2	<0.2	450	440					
		350	1.5	<0.2	360	300					
		400	1.5	<0.2	360	300					

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

MQX and MSN type

Work materials	Grades	Tool dia.(mm)														
		16 / 17					20					20 / 21				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 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 (C50, C55) Below 250HB	CX75 (DH102)	~70	0.2	8~16	5,200	2,600	~70	0.2	10~20	4,200	3,150	~70	0.2	10~18	4,200	4,200
		120	0.2	8~16	3,900	1,550	120	0.2	10~20	3,200	1,950	120	0.2	10~18	3,200	2,550
		160	0.2	8~10	3,400	1,200	190	0.2	10~12	2,700	1,450	190	0.2	10~12	2,700	1,900
Die steel (1.2344, 1.2379) Below 255HB	CX75 (DH102)	~70	0.2	8~16	4,700	2,100	~70	0.2	10~20	3,800	2,550	~70	0.2	10~18	3,800	3,400
		120	0.2	8~16	3,500	1,400	120	0.2	10~20	2,900	1,750	120	0.2	10~18	2,900	2,350
		160	0.2	8~10	3,000	1,100	190	0.2	10~12	2,450	1,300	190	0.2	10~12	2,450	1,750
Mold steel (1.2311, P20) 30-36HRC	DH102	~70	0.2	8~16	4,350	1,750	~70	0.2	10~20	3,500	2,100	~70	0.2	10~18	3,500	2,800
		120	0.2	8~16	3,250	1,200	120	0.2	10~20	2,650	1,450	120	0.2	10~18	2,650	1,950
		160	0.2	8~10	2,750	950	190	0.2	10~12	2,250	1,150	190	0.2	10~12	2,250	1,500
Mold steel (1.2311, P21) 38-43HRC	DH102	~70	0.2	8~16	4,000	960	~70	0.2	10~20	3,200	1,150	~70	0.2	10~18	3,200	1,500
		120	0.2	8~16	3,000	600	120	0.2	10~20	2,400	720	120	0.2	10~18	2,400	960
		160	0.2	8~10	2,550	500	190	0.2	10~12	2,050	600	190	0.2	10~12	2,050	800
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102	~70	0.2	8~16	2,000	400	~70	0.2	10~20	1,600	480	~70	0.2	10~18	1,600	640
		120	0.2	8~16	1,600	320	120	0.2	10~20	1,280	380	120	0.2	10~18	1,280	510
		160	-	-	-	-	190	-	-	-	-	190	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~70	0.2	8~16	1,400	200	~70	0.2	10~20	1,120	240	~70	0.2	10~18	1,120	320
		120	0.2	8~16	1,000	100	120	0.2	10~20	800	120	120	0.2	10~18	800	160
		160	-	-	-	-	190	-	-	-	-	190	-	-	-	-
Grey & Nodular cast iron (GG, GGG) Below 300HB	DH102	~70	0.2	8~16	4,000	1,600	~70	0.2	10~20	3,180	1,910	~70	0.2	10~18	3,180	2,540
		120	0.2	8~16	3,000	900	120	0.2	10~20	2,390	1,080	120	0.2	10~18	2,390	1,430
		160	0.2	8~10	2,600	520	190	0.2	10~12	2,070	630	190	0.2	10~12	2,070	830
Stainless steel Below 250HB	DH102	~70	0.2	8~16	3,600	1,080	~70	0.2	10~20	2,860	1,290	~70	0.2	10~18	2,860	1,720
		120	0.2	8~16	2,600	620	120	0.2	10~20	2,070	750	120	0.2	10~18	2,070	1,000
		160	0.2	8~10	2,000	400	190	0.2	10~12	1,590	480	190	0.2	10~12	1,590	640
Titanium alloy (Ti-6Al-4V)	DH102	~70	0.2	8~16	1,000	300	~70	0.2	10~20	800	360	~70	0.2	10~18	800	480
		120	0.2	8~16	600	120	120	0.2	10~20	480	150	120	0.2	10~18	480	200
		160	0.2	8~10	600	120	190	0.2	10~12	480	150	190	0.2	10~12	480	200

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case that vibration prevents good surface roughness, recommend to use YPHW*-F type insert in low feed conditions. In case of low feed conditions, reduce Spindle speed n to 70-80% of the above data, and Feed speed V_f to 40-60%. And when using YPHW*-F/-24 type insert in low feed condition (for bottom face finishing), please scan the following QR code for the details of the cutting conditions table.

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		25 / 26					25 / 26 / 28				
		No. of teeth 4N					No. of teeth 5N				
		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 (C50, C55) Below 250HB	CX75 (DH102)	~90	0.2	12.5~25	3,400	3,400	~90	0.2	12.5~22	3,400	4,250
		140	0.2	12.5~25	2,500	2,000	140	0.2	12.5~22	2,500	2,500
		210	0.2	12.5~15	2,200	1,550	210	0.2	12.5~15	2,200	1,900
Die steel (1.2344, 1.2379) Below 255HB	CX75 (DH102)	~90	0.2	12.5~25	3,050	2,750	~90	0.2	12.5~22	3,050	3,400
		140	0.2	12.5~25	2,250	1,800	140	0.2	12.5~22	2,250	2,250
		210	0.2	12.5~15	2,000	1,400	210	0.2	12.5~15	2,000	1,750
Mold steel (1.2311, P20) 30-36HRC	DH102	~90	0.2	12.5~25	2,800	2,250	~90	0.2	12.5~22	2,800	2,800
		140	0.2	12.5~25	2,100	1,500	140	0.2	12.5~22	2,100	1,900
		210	0.2	12.5~15	1,800	1,200	210	0.2	12.5~15	1,800	1,500
Mold steel (1.2311, P21) 38-43HRC	DH102	~90	0.2	12.5~25	2,550	1,250	~90	0.2	12.5~22	2,550	1,500
		140	0.2	12.5~25	1,900	750	140	0.2	12.5~22	1,900	950
		210	0.2	12.5~15	1,650	650	210	0.2	12.5~15	1,650	850
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102	~90	0.2	12.5~25	1,270	510	~90	0.2	12.5~22	1,270	640
		140	0.2	12.5~25	1,020	410	140	0.2	12.5~22	1,020	510
		210	—	—	—	—	210	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~90	0.2	12.5~25	890	250	~90	0.2	12.5~22	890	310
		140	0.2	12.5~25	640	130	140	0.2	12.5~22	640	160
		210	—	—	—	—	210	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	DH102	~90	0.2	12.5~25	2,550	2,040	~90	0.2	12.5~22	2,550	2,550
		140	0.2	12.5~25	1,910	1,150	140	0.2	12.5~22	1,910	1,440
		210	0.2	12.5~15	1,660	660	210	0.2	12.5~15	1,660	820
Stainless steel Below 250HB	DH102	~90	0.2	12.5~25	2,290	1,370	~90	0.2	12.5~22	2,290	1,710
		140	0.2	12.5~25	1,660	800	140	0.2	12.5~22	1,660	1,000
		210	0.2	12.5~15	1,270	510	210	0.2	12.5~15	1,270	640
Titanium alloy (Ti-6Al-4V)	DH102	~90	0.2	12.5~25	640	380	~90	0.2	12.5~22	640	480
		140	0.2	12.5~25	380	150	140	0.2	12.5~22	380	190
		210	0.2	12.5~15	380	150	210	0.2	12.5~15	380	190

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case that vibration prevents good surface roughness, recommend to use YPHW*-F type insert in low feed conditions. In case of low feed conditions, reduce Spindle speed n to 70-80% of the above data, and Feed speed V_f to 40-60%. And when using YPHW*-F/-24 type insert in low feed condition (for bottom face finishing), please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "YPHW*-15-type inserts" (For bottom face finishing)

4

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		30 / 32 / 35					32 / 35				
		No. of teeth 5N					No. of teeth 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 (C50, C55) Below 250HB	CX75 (DH102)	~100	0.2	16~32	2,650	3,300	~100	0.2	16~30	2,650	3,950
		150	0.2	16~32	2,650	3,300	150	0.2	16~30	2,650	3,950
		210	0.2	16~32	2,000	2,000	210	0.2	16~30	2,000	2,400
Die steel (1.2344, 1.2379) Below 255HB	CX75 (DH102)	~100	0.2	16~32	2,400	2,700	~100	0.2	16~30	2,400	3,200
		150	0.2	16~32	2,400	2,700	150	0.2	16~30	2,400	3,200
		210	0.2	16~32	1,800	1,800	210	0.2	16~30	1,800	2,150
Mold steel (1.2311, P20) 30-36HRC	DH102	~100	0.2	16~32	2,200	2,200	~100	0.2	16~30	2,200	2,600
		150	0.2	16~32	2,200	2,200	150	0.2	16~30	2,200	2,600
		210	0.2	16~32	1,650	1,500	210	0.2	16~30	1,650	1,800
Mold steel (1.2311, P21) 38-43HRC	DH102	~100	0.2	16~32	2,000	1,200	~100	0.2	16~30	2,000	1,450
		150	0.2	16~32	2,000	1,200	150	0.2	16~30	2,000	1,450
		210	0.2	16~32	1,500	750	210	0.2	16~30	1,500	900
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102	~100	0.2	16~32	1,000	500	~100	0.2	16~30	1,000	600
		150	0.2	16~32	1,000	500	150	0.2	16~30	1,000	600
		210	0.2	16~20	800	400	210	0.2	16~20	800	480
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	0.2	16~32	700	250	~100	0.2	16~30	700	300
		150	0.2	16~32	700	250	150	0.2	16~30	700	300
		210	0.2	16~20	500	130	210	0.2	16~20	500	160
Grey & Nodular cast iron (GG, GGG) Below 300HB	DH102	~100	0.2	16~32	1,990	1,990	~100	0.2	16~30	1,990	2,390
		150	0.2	16~32	1,990	1,990	150	0.2	16~30	1,990	2,390
		210	0.2	16~32	1,490	1,120	210	0.2	16~30	1,490	1,340
Stainless steel Below 250HB	DH102	~100	0.2	16~32	1,790	1,340	~100	0.2	16~30	1,790	1,610
		150	0.2	16~32	1,790	1,340	150	0.2	16~30	1,790	1,610
		210	0.2	16~32	1,290	770	210	0.2	16~30	1,290	920
Titanium alloy (Ti-6Al-4V)	DH102	~100	0.2	16~32	500	380	~100	0.2	16~30	500	460
		150	0.2	16~32	500	380	150	0.2	16~30	500	460
		210	0.2	16~20	300	150	210	0.2	16~20	300	180

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case that vibration prevents good surface roughness, recommend to use YPHW *-F type insert in low feed conditions. In case of low feed conditions, reduce Spindle speed n to 70-80% of the above data, and Feed speed V_f to 40-60%. And when using YPHW *-F/-24 type insert in low feed condition (for bottom face finishing), please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "YPHW*-15-type inserts" (For bottom face finishing)

4

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		40 / 42					40				
		No. of teeth 6N					No. of teeth 7N				
		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 (C50, C55) Below 250HB	CX75 (DH102)	~100	0.2	20~40	2,100	3,150	~100	0.2	20~38	2,100	3,650
		150	0.2	20~40	2,100	3,150	150	0.2	20~38	2,100	3,650
		210	0.2	20~40	1,570	1,900	210	0.2	20~38	1,570	2,200
Die steel (1.2344, 1.2379) Below 255HB	CX75 (DH102)	~100	0.2	20~40	1,890	2,850	~100	0.2	20~38	1,890	3,300
		150	0.2	20~40	1,890	2,850	150	0.2	20~38	1,890	3,300
		210	0.2	20~40	1,410	1,700	210	0.2	20~38	1,410	2,000
Mold steel (1.2311, P20) 30-36HRC	DH102	~100	0.2	20~40	1,750	2,100	~100	0.2	20~38	1,750	2,450
		150	0.2	20~40	1,750	2,100	150	0.2	20~38	1,750	2,450
		210	0.2	20~40	1,300	1,400	210	0.2	20~38	1,300	1,650
Mold steel (1.2311, P21) 38-43HRC	DH102	~100	0.2	20~40	1,600	1,150	~100	0.2	20~38	1,600	1,350
		150	0.2	20~40	1,600	1,150	150	0.2	20~38	1,600	1,350
		210	0.2	20~40	1,200	720	210	0.2	20~38	1,200	840
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102	~100	0.2	20~40	800	480	~100	0.2	20~38	800	560
		150	0.2	20~40	800	480	150	0.2	20~38	800	560
		210	0.2	20~40	640	380	210	0.2	20~38	640	440
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	0.2	20~40	560	240	~100	0.2	20~38	560	280
		150	0.2	20~40	560	240	150	0.2	20~38	560	280
		210	0.2	20~40	400	120	210	0.2	20~38	400	140
Grey & Nodular cast iron (GG, GGG) Below 300HB	DH102	~100	0.2	20~40	1,590	1,910	~100	0.2	20~38	1,590	2,230
		150	0.2	20~40	1,590	1,910	150	0.2	20~38	1,590	2,230
		210	0.2	20~40	1,190	1,070	210	0.2	20~38	1,190	1,250
Stainless steel Below 250HB	DH102	~100	0.2	20~40	1,430	1,290	~100	0.2	20~38	1,430	1,500
		150	0.2	20~40	1,430	1,290	150	0.2	20~38	1,430	1,500
		210	0.2	20~40	1,030	740	210	0.2	20~38	1,030	870
Titanium alloy (Ti-6Al-4V)	DH102	~100	0.2	20~40	400	360	~100	0.2	20~38	400	420
		150	0.2	20~40	400	360	150	0.2	20~38	400	420
		210	0.2	20~40	240	140	210	0.2	20~38	240	170

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case that vibration prevents good surface roughness, recommend to use YPHW*-F type insert in low feed conditions. In case of low feed conditions, reduce Spindle speed n to 70-80% of the above data, and Feed speed V_f to 40-60%. And when using YPHW*-F/-24 type insert in low feed condition (for bottom face finishing), please scan the following QR code for the details of the cutting conditions table.

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)									
		40									
		No. of teeth 6N					No. of teeth 7N				
		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 (C50, C55) Below 250HB	CX75 (DH102)	~150	0.2	20~40	2,100	3,150	~150	0.2	20~38	2,100	3,680
		200	0.2	20~40	2,100	3,150	200	0.2	20~38	2,100	3,680
		250	0.2	20~40	1,570	1,890	250	0.2	20~38	1,570	2,200
		300	0.2	20~22	1,360	1,640	300	0.2	20~22	1,360	1,900
		350	—	—	—	—	350	—	—	—	—
Die steel (1.2344, 1.2379) Below 255HB	CX75 (DH102)	~150	0.2	20~40	1,890	2,830	~150	0.2	20~38	1,890	3,300
		200	0.2	20~40	1,890	2,830	200	0.2	20~38	1,890	3,300
		250	0.2	20~40	1,410	1,700	250	0.2	20~38	1,410	1,980
		300	0.2	20~22	1,220	1,470	300	0.2	20~22	1,220	1,710
		350	—	—	—	—	350	—	—	—	—
Mold steel (1.2311, P20) 30-36HRC	DH102	~150	0.2	20~40	1,750	2,100	~150	0.2	20~38	1,750	2,450
		200	0.2	20~40	1,750	2,100	200	0.2	20~38	1,750	2,450
		250	0.2	20~40	1,300	1,400	250	0.2	20~38	1,300	1,650
		300	0.2	20~22	1,150	1,150	300	0.2	20~22	1,150	1,350
		350	—	—	—	—	350	—	—	—	—
Mold steel (1.2311, P21) 38-43HRC	DH102	~150	0.2	20~40	1,600	1,150	~150	0.2	20~38	1,600	1,350
		200	0.2	20~40	1,600	1,150	200	0.2	20~38	1,600	1,350
		250	0.2	20~40	1,200	720	250	0.2	20~38	1,200	840
		300	0.2	20~22	1,050	630	300	0.2	20~22	1,050	740
		350	—	—	—	—	350	—	—	—	—
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102	~150	0.2	20~40	800	480	~150	0.2	20~38	800	560
		200	0.2	20~40	800	480	200	0.2	20~38	800	560
		250	0.2	20~40	640	380	250	0.2	20~38	640	440
		300	0.2	20~22	400	120	300	0.2	20~22	400	140
		350	—	—	—	—	350	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~150	0.2	20~40	560	240	~150	0.2	20~38	560	280
		200	0.2	20~40	560	240	200	0.2	20~38	560	280
		250	0.2	20~40	400	120	250	0.2	20~38	400	140
		300	0.2	20~22	400	120	300	0.2	20~22	400	140
		350	—	—	—	—	350	—	—	—	—
Grey & Nodular cast iron (GG, GGG) Below 300HB	DH102	~150	0.2	20~40	1,590	1,910	~150	0.2	20~38	1,590	2,230
		200	0.2	20~40	1,590	1,910	200	0.2	20~38	1,590	2,230
		250	0.2	20~40	1,190	1,070	250	0.2	20~38	1,190	1,250
		300	0.2	20~22	1,030	620	300	0.2	20~22	1,030	720
		350	—	—	—	—	350	—	—	—	—
Stainless steel Below 250HB	DH102	~150	0.2	20~40	1,430	1,290	~150	0.2	20~38	1,430	1,500
		200	0.2	20~40	1,430	1,290	200	0.2	20~38	1,430	1,500
		250	0.2	20~40	1,030	740	250	0.2	20~38	1,030	870
		300	0.2	20~22	800	480	300	0.2	20~22	800	560
		350	—	—	—	—	350	—	—	—	—
Titanium alloy (Ti-6Al-4V)	DH102	~150	0.2	20~40	400	360	~150	0.2	20~38	400	420
		200	0.2	20~40	400	360	200	0.2	20~38	400	420
		250	0.2	20~40	240	140	250	0.2	20~22	240	160
		300	0.2	20~22	240	140	300	0.2	20~22	240	160
		350	—	—	—	—	350	—	—	—	—

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case that vibration prevents good surface roughness, recommend to use YPHW*-F type insert in low feed conditions. In case of low feed conditions, reduce Spindle speed n to 70-80% of the above data, and Feed speed V_f to 40-60%. And when using YPHW*-F/-24 type insert in low feed condition (for bottom face finishing), please scan the following QR code for the details of the cutting conditions table.

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)									
		50					50 / 52				
		No. of teeth 7N					No. of teeth 8N				
		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 (C50, C55) Below 250HB	CX75 (DH102)	~150	0.2	25~50	1,700	2,970	~150	0.2	25~48	1,700	3,390
		200	0.2	25~50	1,700	2,970	200	0.2	25~48	1,700	3,390
		250	0.2	25~50	1,700	2,700	250	0.2	25~48	1,700	3,080
		300	0.2	25~50	1,280	1,790	300	0.2	25~48	1,280	2,040
		350	0.2	25~28	1,280	1,790	350	0.2	25~28	1,280	2,040
Die steel (1.2344, 1.2379) Below 255HB	CX75 (DH102)	~150	0.2	25~50	1,530	2,670	~150	0.2	25~48	1,530	3,050
		200	0.2	25~50	1,530	2,670	200	0.2	25~48	1,530	3,050
		250	0.2	25~50	1,530	2,430	250	0.2	25~48	1,530	2,770
		300	0.2	25~50	1,150	1,600	300	0.2	25~48	1,150	1,830
		350	0.2	25~28	1,150	1,600	350	0.2	25~28	1,150	1,830
Mold steel (1.2311, P20) 30-36HRC	DH102	~150	0.2	25~50	1,400	1,950	~150	0.2	25~48	1,400	2,200
		200	0.2	25~50	1,400	1,950	200	0.2	25~48	1,400	2,200
		250	0.2	25~50	1,400	1,750	250	0.2	25~48	1,400	2,000
		300	0.2	25~50	1,050	1,250	300	0.2	25~48	1,050	1,400
		350	0.2	25~28	1,050	1,250	350	0.2	25~28	1,050	1,400
Mold steel (1.2311, P21) 38-43HRC	DH102	~150	0.2	25~50	1,250	1,050	~150	0.2	25~48	1,250	1,200
		200	0.2	25~50	1,250	1,050	200	0.2	25~48	1,250	1,200
		250	0.2	25~50	1,250	880	250	0.2	25~48	1,250	1,000
		300	0.2	25~50	950	660	300	0.2	25~48	950	750
		350	0.2	25~28	950	660	350	0.2	25~28	950	750
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102	~150	0.2	25~50	510	360	~150	0.2	25~48	510	410
		200	0.2	25~50	510	360	200	0.2	25~48	510	410
		250	0.2	25~50	510	340	250	0.2	25~48	510	390
		300	0.2	25~50	380	270	300	0.2	25~48	380	310
		350	0.2	25~28	380	270	350	0.2	25~28	380	310
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~150	0.2	25~50	380	190	~150	0.2	25~48	380	220
		200	0.2	25~50	380	190	200	0.2	25~48	380	220
		250	0.2	25~50	380	160	250	0.2	25~48	380	180
		300	0.2	25~50	320	130	300	0.2	25~48	320	150
		350	0.2	25~28	320	130	350	0.2	25~28	320	150
Grey & Nodular cast iron (GG, GGG) Below 300HB	DH102	~150	0.2	25~50	1,270	1,780	~150	0.2	25~48	1,270	2,030
		200	0.2	25~50	1,270	1,780	200	0.2	25~48	1,270	2,030
		250	0.2	25~50	1,270	1,560	250	0.2	25~48	1,270	1,780
		300	0.2	25~50	950	1,000	300	0.2	25~48	950	1,140
		350	0.2	25~28	950	1,000	350	0.2	25~28	950	1,140
Stainless steel Below 250HB	DH102	~150	0.2	25~50	1,150	1,210	~150	0.2	25~48	1,150	1,380
		200	0.2	25~50	1,150	1,210	200	0.2	25~48	1,150	1,380
		250	0.2	25~50	1,150	1,090	250	0.2	25~48	1,150	1,250
		300	0.2	25~50	830	700	300	0.2	25~48	830	800
		350	0.2	25~28	830	700	350	0.2	25~28	830	800
Titanium alloy (Ti-6Al-4V)	DH102	~150	0.2	25~50	320	340	~150	0.2	25~48	320	390
		200	0.2	25~50	320	340	200	0.2	25~48	320	390
		250	0.2	25~50	320	300	250	0.2	25~48	320	340
		300	0.2	25~50	190	160	300	0.2	25~48	190	180
		350	0.2	25~28	190	160	350	0.2	25~28	190	180

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case that vibration prevents good surface roughness, recommend to use YPHW *-F type insert in low feed conditions. In case of low feed conditions, reduce Spindle speed n to 70-80% of the above data, and Feed speed V_f to 40-60%. And when using YPHW *-F/-24 type insert in low feed condition (for bottom face finishing), please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "YPHW*-15-type inserts" (For bottom face finishing)

4

QXP type (facemill type)

Work materials	Grades	Tool dia.(mm)									
		63 / 66									
		No. of teeth 8N									
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)					
Carbon steel (C50, C55) Below 250HB	CX75 (DH102)	~200	0.2	31~63	1,350	2,700					
		250	0.2	31~63	1,350	2,700					
		300	0.2	31~63	1,350	2,450					
		350	0.2	31~63	1,020	1,630					
		400	0.2	31~35	1,020	1,630					
Die steel (1.2344, 1.2379) Below 255HB	CX75 (DH102)	~200	0.2	31~63	1,210	2,420					
		250	0.2	31~63	1,210	2,420					
		300	0.2	31~63	1,210	2,190					
		350	0.2	31~63	910	1,450					
		400	0.2	31~35	910	1,450					
Mold steel (1.2311, P20) 30-36HRC	DH102	~200	0.2	31~63	1,110	1,750					
		250	0.2	31~63	1,110	1,750					
		300	0.2	31~63	1,110	1,580					
		350	0.2	31~63	830	1,110					
		400	0.2	31~35	830	1,110					
Mold steel (1.2311, P21) 38-43HRC	DH102	~200	0.2	31~63	1,000	960					
		250	0.2	31~63	1,000	960					
		300	0.2	31~63	1,000	800					
		350	0.2	31~63	750	590					
		400	0.2	31~35	750	590					
Hardened die steel (1.2344, 1.2379) 42-52HRC	DH102	~200	0.2	31~63	400	320					
		250	0.2	31~63	400	320					
		300	0.2	31~63	400	300					
		350	0.2	31~63	300	250					
		400	0.2	31~35	300	250					
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~200	0.2	31~63	300	170					
		250	0.2	31~63	300	170					
		300	0.2	31~63	300	140					
		350	0.2	31~63	250	120					
		400	0.2	31~35	250	120					
Grey & Nodular cast iron (GG, GGG) Below 300HB	DH102	~200	0.2	31~63	1,000	1,600					
		250	0.2	31~63	1,000	1,600					
		300	0.2	31~63	1,000	1,400					
		350	0.2	31~63	750	900					
		400	0.2	31~35	750	900					
Stainless steel Below 250HB	DH102	~200	0.2	31~63	910	1,090					
		250	0.2	31~63	910	1,090					
		300	0.2	31~63	910	990					
		350	0.2	31~63	660	640					
		400	0.2	31~35	660	640					
Titanium alloy (Ti-6Al-4V)	DH102	~200	0.2	31~63	250	300					
		250	0.2	31~63	250	300					
		300	0.2	31~63	250	270					
		350	0.2	31~63	150	140					
		400	0.2	31~35	150	140					

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) In case that vibration prevents good surface roughness, recommend to use YPHW*-F type insert in low feed conditions. In case of low feed conditions, reduce Spindle speed n to 70-80% of the above data, and Feed speed V_f to 40-60%. And when using YPHW*-F/-24 type insert in low feed condition (for bottom face finishing), please scan the following QR code for the details of the cutting conditions table.

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		16 / 17									
		No. of teeth 2N									
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)					
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~70	0.4	<7	4,400	2,200					
		120	0.3	<7	4,400	2,200					
		160	0.2	<7	4,400	2,200					
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~70	0.25	<7	3,200	1,600					
		120	0.2	<7	3,200	1,600					
		160	-	-	-	-					
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~70	0.2	<6	2,000	800					
		120	0.15	<6	2,000	800					
		160	-	-	-	-					

Work materials	Grades	Tool dia. (mm)									
		20					20 / 21				
		No. of teeth 3N					No. of teeth 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)
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~70	0.4	<9	3,500	2,600	~70	0.4	<9	3,500	3,500
		120	0.3	<9	3,500	2,600	120	0.3	<9	3,500	3,500
		190	0.2	<9	3,500	2,600	190	0.2	<9	3,500	3,500
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~70	0.25	<9	2,550	1,900	~70	0.25	<9	2,550	2,550
		120	0.2	<9	2,550	1,900	120	0.2	<9	2,550	2,550
		190	-	-	-	-	190	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~70	0.2	<7	1,600	960	~70	0.2	<7	1,600	1,280
		120	0.15	<7	1,600	960	120	0.15	<7	1,600	1,280
		190	-	-	-	-	190	-	-	-	-

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW100320ZER-24-type inserts" (For contouring milling)

5

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		25 / 26					25 / 26 / 28				
		No. of teeth 4N					No. of teeth 5N				
		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)
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~90	0.4	<10	2,800	2,800	~90	0.4	<10	2,800	3,500
		140	0.3	<10	2,800	2,800	140	0.3	<10	2,800	3,500
		210	0.2	<10	2,800	2,800	210	0.2	<10	2,800	3,500
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~90	0.25	<10	2,040	2,040	~90	0.25	<10	2,040	2,550
		140	0.2	<10	2,040	2,040	140	0.2	<10	2,040	2,550
		210	-	-	-	-	210	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~90	0.2	<8	1,270	1,020	~90	0.2	<8	1,270	1,360
		140	0.15	<8	1,270	1,020	140	0.15	<8	1,270	1,360
		210	-	-	-	-	210	-	-	-	-

Work materials	Grades	Tool dia. (mm)									
		30 / 32 / 35					32 / 35				
		No. of teeth 5N					No. of teeth 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)
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~100	0.4	<13	2,200	2,750	~100	0.4	<13	2,200	3,300
		150	0.3	<13	2,200	2,750	150	0.3	<13	2,200	3,300
		210	0.2	<13	2,200	2,750	210	0.2	<13	2,200	3,300
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~100	0.25	<13	1,600	2,000	~100	0.25	<13	1,600	2,400
		150	0.2	<13	1,600	2,000	150	0.2	<13	1,600	2,400
		210	0.15	<13	1,600	2,000	210	0.15	<13	1,600	2,400
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	0.2	<10	1,000	1,000	~100	0.2	<10	1,000	1,200
		150	0.15	<10	1,000	1,000	150	0.15	<10	1,000	1,200
		210	0.1	<10	1,000	1,000	210	0.1	<10	1,000	1,200

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		40 / 42					40				
		No. of teeth 6N					No. of teeth 7N				
		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)
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~100	0.4	<17	1,750	2,620	~100	0.4	<17	1,750	3,060
		150	0.3	<17	1,750	2,620	150	0.3	<17	1,750	3,060
		210	0.2	<17	1,750	2,620	210	0.2	<17	1,750	3,060
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~100	0.25	<17	1,270	1,900	~100	0.25	<17	1,270	2,220
		150	0.2	<17	1,270	1,900	150	0.2	<17	1,270	2,220
		210	0.15	<17	1,270	1,900	210	0.15	<17	1,270	2,220
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	0.2	<13	800	960	~100	0.2	<13	800	1,120
		150	0.15	<13	800	960	150	0.15	<13	800	1,120
		210	0.1	<13	800	960	210	0.1	<13	800	1,120

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)									
		40					40				
		No. of teeth 6N					No. of teeth 7N				
		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)
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~100	0.4	<17	1,750	2,620	~100	0.4	<17	1,750	3,060
		150	0.3	<17	1,750	2,620	150	0.3	<17	1,750	3,060
		200	0.2	<17	1,750	2,620	200	0.2	<17	1,750	3,060
		250	0.15	<17	1,750	2,620	250	0.15	<17	1,750	3,060
		300	—	—	—	—	300	—	—	—	—
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~100	0.25	<17	1,270	1,900	~100	0.25	<17	1,270	2,220
		150	0.2	<17	1,270	1,900	150	0.2	<17	1,270	2,220
		200	0.15	<17	1,270	1,900	200	0.15	<17	1,270	2,220
		250	0.1	<17	1,270	1,900	250	0.1	<17	1,270	2,220
		300	—	—	—	—	300	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~100	0.2	<13	800	960	~100	0.2	<13	800	1,120
		150	0.15	<13	800	960	150	0.15	<13	800	1,120
		200	0.1	<13	800	960	200	0.1	<13	800	1,120
		250	—	—	—	—	250	—	—	—	—
		300	—	—	—	—	300	—	—	—	—

Work materials	Grades	Tool dia.(mm)									
		50					50 / 52				
		No. of teeth 7N					No. of teeth 8N				
		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)
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~150	0.4	<21	1,400	2,450	~150	0.4	<21	1,400	2,800
		200	0.3	<21	1,400	2,450	200	0.3	<21	1,400	2,800
		250	0.2	<21	1,400	2,450	250	0.2	<21	1,400	2,800
		300	0.15	<21	1,400	2,450	300	0.15	<21	1,400	2,800
		350	—	—	—	—	350	—	—	—	—
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~150	0.25	<21	1,020	1,780	~150	0.25	<21	1,020	2,040
		200	0.2	<21	1,020	1,780	200	0.2	<21	1,020	2,040
		250	0.15	<21	1,020	1,780	250	0.15	<21	1,020	2,040
		300	0.1	<21	1,020	1,780	300	0.1	<21	1,020	2,040
		350	—	—	—	—	350	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~150	0.2	<17	640	900	~150	0.2	<17	640	1,030
		200	0.15	<17	640	900	200	0.15	<17	640	1,030
		250	0.1	<17	640	900	250	0.1	<17	640	1,030
		300	—	—	—	—	300	—	—	—	—
		350	—	—	—	—	350	—	—	—	—

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW100320ZER-24-type inserts" (For contouring milling)

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)									
		63 / 66									
		No. of teeth 8N									
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)					
Mold steel (1.2311, P21) 38-43HRC	JC8015 (DH102)	~150	0.4	<26	1,110	2,220					
		200	0.4	<26	1,110	2,220					
		250	0.3	<26	1,110	2,220					
		300	0.2	<26	1,110	2,220					
		350	0.15	<26	1,110	2,220					
Hardened die steel (1.2344, 1.2379) 42-52HRC	JC8015 (DH102)	~150	0.25	<26	810	1,620					
		200	0.25	<26	810	1,620					
		250	0.2	<26	810	1,620					
		300	0.15	<26	810	1,620					
		350	0.1	<26	810	1,620					
Hardened die steel (1.2344, 1.2379) 55-62HRC	DH102	~150	0.2	<21	500	800					
		200	0.2	<21	500	800					
		250	0.15	<21	500	800					
		300	0.1	<21	500	800					
		350	-	-	-	-					

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.

Recommended cutting conditions for "YPHW-F1-type inserts" (For side finishing)

6

MQX and MSN type

Work materials	Grades	Tool dia.(mm)									
		16 / 17					20				
		No. of teeth 2N					No. of teeth 3N				
		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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JBN795	~80	≤1.2	<0.1	8,950	1,430	~100	≤1.2	<0.1	7,160	1,720
		120	≤1.0	<0.1	7,960	1,110	150	≤1.0	<0.1	6,370	1,340
		160	—	—	—	—	190	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JBN795	~80	≤1.0	<0.1	7,960	1,270	~100	≤1.0	<0.1	6,370	1,530
		120	≤0.8	<0.1	5,970	720	150	≤0.8	<0.1	4,770	860
		160	—	—	—	—	190	—	—	—	—
Grey cast iron (GG) Below 300HB	JBN795	~80	≤1.5	<0.1	14,900	4,020	~100	≤1.5	<0.1	11,900	4,820
		120	≤1.0	<0.1	14,900	3,580	150	≤1.0	<0.1	11,900	4,280
		160	≤0.7	<0.1	14,900	2,980	190	≤0.7	<0.1	11,900	3,570
Nodular cast iron (GGG) Below 300HB	JBN795	~80	≤1.5	<0.1	13,900	3,750	~100	≤1.5	<0.1	11,100	4,500
		120	≤1.0	<0.1	13,900	3,340	150	≤1.0	<0.1	11,100	4,000
		160	≤0.7	<0.1	13,900	2,780	190	≤0.7	<0.1	11,100	3,330

Work materials	Grades	Tool dia. (mm)									
		20 / 21									
		No. of teeth 4N									
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)					
Hardened die steel (1.2344, 1.2379) 42-52HRC	JBN795	~100	≤1.2	<0.1	7,160	2,290					
		150	≤1.0	<0.1	6,370	1,780					
		190	—	—	—	—					
Hardened die steel (1.2344, 1.2379) 55-62HRC	JBN795	~100	≤1.0	<0.1	6,370	2,040					
		150	≤0.8	<0.1	4,770	1,140					
		190	—	—	—	—					
Grey cast iron (GG) Below 300HB	JBN795	~100	≤1.5	<0.1	11,900	6,430					
		150	≤1.0	<0.1	11,900	5,710					
		190	≤0.7	<0.1	11,900	4,760					
Nodular cast iron (GGG) Below 300HB	JBN795	~100	≤1.5	<0.1	11,100	6,000					
		150	≤1.0	<0.1	11,100	5,330					
		190	≤0.7	<0.1	11,100	4,440					

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using YPHW*-F1 type insert (CBN) in up & down finishing finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "YPHW-F1-type inserts" (For side finishing)

6

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		25 / 26					25 / 26 / 28				
		No. of teeth 4N					No. of teeth 5N				
		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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JBN795	~120	≤1.2	<0.1	5,730	1,830	~120	≤1.2	<0.1	5,730	2,290
		190	≤1.0	<0.1	5,090	1,430	190	≤1.0	<0.1	5,090	1,780
		235	—	—	—	—	235	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JBN795	~120	≤1.0	<0.1	5,090	1,630	~120	≤1.0	<0.1	5,090	2,040
		190	≤0.8	<0.1	3,820	920	190	≤0.8	<0.1	3,820	1,150
		235	—	—	—	—	235	—	—	—	—
Grey cast iron (GG) Below 300HB	JBN795	~120	≤1.5	<0.1	9,550	5,160	~120	≤1.5	<0.1	9,550	6,450
		190	≤1.0	<0.1	9,550	4,580	190	≤1.0	<0.1	9,550	5,730
		235	≤0.7	<0.1	9,550	3,820	235	≤0.7	<0.1	9,550	4,780
Nodular cast iron (GGG) Below 300HB	JBN795	~120	≤1.5	<0.1	8,910	4,810	~120	≤1.5	<0.1	8,910	6,010
		190	≤1.0	<0.1	8,910	4,280	190	≤1.0	<0.1	8,910	5,350
		235	≤0.7	<0.1	8,910	3,560	235	≤0.7	<0.1	8,910	4,460

Work materials	Grades	Tool dia.(mm)									
		30 / 32 / 35					32 / 35				
		No. of teeth 5N					No. of teeth 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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JBN795	~160	≤1.2	<0.1	4,480	1,790	~160	≤1.2	<0.1	4,480	2,150
		240	≤1.0	<0.1	3,980	1,390	240	≤1.0	<0.1	3,980	1,670
		290	—	—	—	—	290	—	—	—	—
Hardened die steel (1.2344, 1.2379) 55-62HRC	JBN795	~160	≤1.0	<0.1	3,980	1,590	~160	≤1.0	<0.1	3,980	1,910
		240	≤0.8	<0.1	2,980	900	240	≤0.8	<0.1	2,980	1,070
		290	—	—	—	—	290	—	—	—	—
Grey cast iron (GG) Below 300HB	JBN795	~160	≤1.5	<0.1	7,460	5,040	~160	≤1.5	<0.1	7,460	6,040
		240	≤1.0	<0.1	7,460	4,480	240	≤1.0	<0.1	7,460	5,370
		290	≤0.7	<0.1	7,460	3,730	290	≤0.7	<0.1	7,460	4,480
Nodular cast iron (GGG) Below 300HB	JBN795	~160	≤1.5	<0.1	6,960	4,700	~160	≤1.5	<0.1	6,960	5,640
		240	≤1.0	<0.1	6,960	4,180	240	≤1.0	<0.1	6,960	5,010
		290	≤0.7	<0.1	6,960	3,480	290	≤0.7	<0.1	6,960	4,180

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using YPHW*-F1 type insert (CBN) in up & down finishing finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

MQX and MSN type

Work materials	Grades	Tool dia. (mm)									
		40 / 42					40				
		No. of teeth 6N					No. of teeth 7N				
		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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JBN795	~160	≤ 1.2	< 0.1	3,580	1,720	~160	≤ 1.2	< 0.1	3,580	2,000
		240	≤ 1.0	< 0.1	3,180	1,340	240	≤ 1.0	< 0.1	3,180	1,560
		290	–	–	–	–	290	–	–	–	–
Hardened die steel (1.2344, 1.2379) 55-62HRC	JBN795	~160	≤ 1.0	< 0.1	3,180	1,530	~160	≤ 1.0	< 0.1	3,180	1,780
		240	≤ 0.8	< 0.1	2,390	860	240	≤ 0.8	< 0.1	2,390	1,000
		290	–	–	–	–	290	–	–	–	–
Grey cast iron (GG) Below 300HB	JBN795	~160	≤ 1.5	< 0.1	5,970	4,840	~160	≤ 1.5	< 0.1	5,970	5,640
		240	≤ 1.0	< 0.1	5,970	4,300	240	≤ 1.0	< 0.1	5,970	5,010
		290	≤ 0.7	< 0.1	5,970	3,580	290	≤ 0.7	< 0.1	5,970	4,180
Nodular cast iron (GGG) Below 300HB	JBN795	~160	≤ 1.5	< 0.1	5,570	4,510	~160	≤ 1.5	< 0.1	5,570	5,260
		240	≤ 1.0	< 0.1	5,570	4,010	240	≤ 1.0	< 0.1	5,570	4,680
		290	≤ 0.7	< 0.1	5,570	3,340	290	≤ 0.7	< 0.1	5,570	3,900

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using YPHW*-F1 type insert (CBN) in up & down finishing finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "YPHW-F1-type inserts" (For side finishing)

6

QXP type (facemill type)

Work materials	Grades	Tool dia.(mm)									
		40									
		No. of teeth 6N					No. of teeth 7N				
		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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JBN795	~150	≤1.2	<0.1	3,580	1,720	~150	≤1.2	<0.1	3,580	2,000
		200	≤1.0	<0.1	3,180	1,340	200	≤1.0	<0.1	3,180	1,560
		250	-	-	-	-	250	-	-	-	-
		300	-	-	-	-	300	-	-	-	-
		350	-	-	-	-	350	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	JBN795	~150	≤1.0	<0.1	3,180	1,530	~150	≤1.0	<0.1	3,180	1,780
		200	≤0.8	<0.1	2,390	860	200	≤0.8	<0.1	2,390	1,000
		250	-	-	-	-	250	-	-	-	-
		300	-	-	-	-	300	-	-	-	-
		350	-	-	-	-	350	-	-	-	-
Grey cast iron (GG) Below 300HB	JBN795	~150	≤1.5	<0.1	5,970	4,840	~150	≤1.5	<0.1	5,970	5,640
		200	≤1.0	<0.1	5,970	4,300	200	≤1.0	<0.1	5,970	5,010
		250	≤0.7	<0.1	5,970	3,580	250	≤0.7	<0.1	5,970	4,180
		300	≤0.7	<0.1	5,970	3,580	300	≤0.7	<0.1	5,970	4,180
		350	-	-	-	-	350	-	-	-	-
Nodular cast iron (GGG) Below 300HB	JBN795	~150	≤1.5	<0.1	5,570	4,510	~150	≤1.5	<0.1	5,570	5,260
		200	≤1.0	<0.1	5,570	4,010	200	≤1.0	<0.1	5,570	4,680
		250	≤0.7	<0.1	5,570	3,340	250	≤0.7	<0.1	5,570	3,900
		300	≤0.7	<0.1	5,570	3,340	300	≤0.7	<0.1	5,570	3,900
		350	-	-	-	-	350	-	-	-	-

Work materials	Grades	Tool dia. (mm)									
		50					50 / 52				
		No. of teeth 7N					No. of teeth 8N				
		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)
Hardened die steel (1.2344, 1.2379) 42-52HRC	JBN795	~150	≤1.2	<0.1	2,860	1,600	~150	≤1.2	<0.1	2,860	1,830
		200	≤1.2	<0.1	2,860	1,600	200	≤1.2	<0.1	2,860	1,830
		250	≤1.0	<0.1	2,550	1,250	250	≤1.0	<0.1	2,550	1,430
		300	≤1.0	<0.1	2,550	1,250	300	≤1.0	<0.1	2,550	1,430
		350	-	-	-	-	350	-	-	-	-
Hardened die steel (1.2344, 1.2379) 55-62HRC	JBN795	~150	≤1.0	<0.1	2,550	1,430	~150	≤1.0	<0.1	2,550	1,630
		200	≤1.0	<0.1	2,550	1,430	200	≤1.0	<0.1	2,550	1,630
		250	≤0.8	<0.1	1,910	800	250	≤0.8	<0.1	1,910	920
		300	≤0.8	<0.1	1,910	800	300	≤0.8	<0.1	1,910	920
		350	-	-	-	-	350	-	-	-	-
Grey cast iron (GG) Below 300HB	JBN795	~150	≤1.5	<0.1	4,780	4,520	~150	≤1.5	<0.1	4,780	5,160
		200	≤1.5	<0.1	4,780	4,520	200	≤1.5	<0.1	4,780	5,160
		250	≤1.0	<0.1	4,780	4,020	250	≤1.0	<0.1	4,780	4,590
		300	≤1.0	<0.1	4,780	4,020	300	≤1.0	<0.1	4,780	4,590
		350	≤0.7	<0.1	4,780	3,350	350	≤0.7	<0.1	4,780	3,820
Nodular cast iron (GGG) Below 300HB	JBN795	~150	≤1.5	<0.1	4,460	4,210	~150	≤1.5	<0.1	4,460	4,820
		200	≤1.5	<0.1	4,460	4,210	200	≤1.5	<0.1	4,460	4,820
		250	≤1.0	<0.1	4,460	3,750	250	≤1.0	<0.1	4,460	4,280
		300	≤1.0	<0.1	4,460	3,750	300	≤1.0	<0.1	4,460	4,280
		350	≤0.7	<0.1	4,460	3,120	350	≤0.7	<0.1	4,460	3,570

l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using YPHW * -F1 type insert (CBN) in up & down finishing finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

Recommended cutting conditions for "YPHW-F1-type inserts" (For side finishing)

6

QXP type (facemill type)

Work materials	Grades	Tool dia. (mm)									
		63 / 66									
		No. of teeth 8N									
		r (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)					
Hardened die steel (1.2344, 1.2379) 42-52HRC	JBN795	~200	≤1.2	<0.1	2,270	1,450					
		250	≤1.2	<0.1	2,270	1,450					
		300	≤1.0	<0.1	2,020	1,130					
		350	≤1.0	<0.1	2,020	1,130					
		400	—	—	—	—					
Hardened die steel (1.2344, 1.2379) 55-62HRC	JBN795	~200	≤1.0	<0.1	2,020	1,290					
		250	≤1.0	<0.1	2,020	1,290					
		300	≤0.8	<0.1	1,520	730					
		350	≤0.8	<0.1	1,520	730					
		400	—	—	—	—					
Grey cast iron (GG) Below 300HB	JBN795	~200	≤1.5	<0.1	3,790	4,090					
		250	≤1.5	<0.1	3,790	4,090					
		300	≤1.0	<0.1	3,790	3,640					
		350	≤1.0	<0.1	3,790	3,640					
		400	≤0.7	<0.1	3,790	3,030					
Nodular cast iron (GGG) Below 300HB	JBN795	~200	≤1.5	<0.1	3,540	3,820					
		250	≤1.5	<0.1	3,540	3,820					
		300	≤1.0	<0.1	3,540	3,400					
		350	≤1.0	<0.1	3,540	3,400					
		400	≤0.7	<0.1	3,540	2,830					

 ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

NOTE

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p or Feed speed.
- 3) If machine does not have enough power, recommend to reduce the depth of cut a_p or Spindle speed and Feed speed.
- 4) Use air blow.
- 5) When using YPHW*-F1 type insert (CBN) in up & down finishing or bottom face finishing, please scan the following QR code for the details of the cutting conditions table.

High precision QM MAX

BARREL TOOL QM MAX

MQT type Modular head type $\phi 16 \sim \phi 35$

High precision
BARREL TOOL
Tuff Modular Heads System

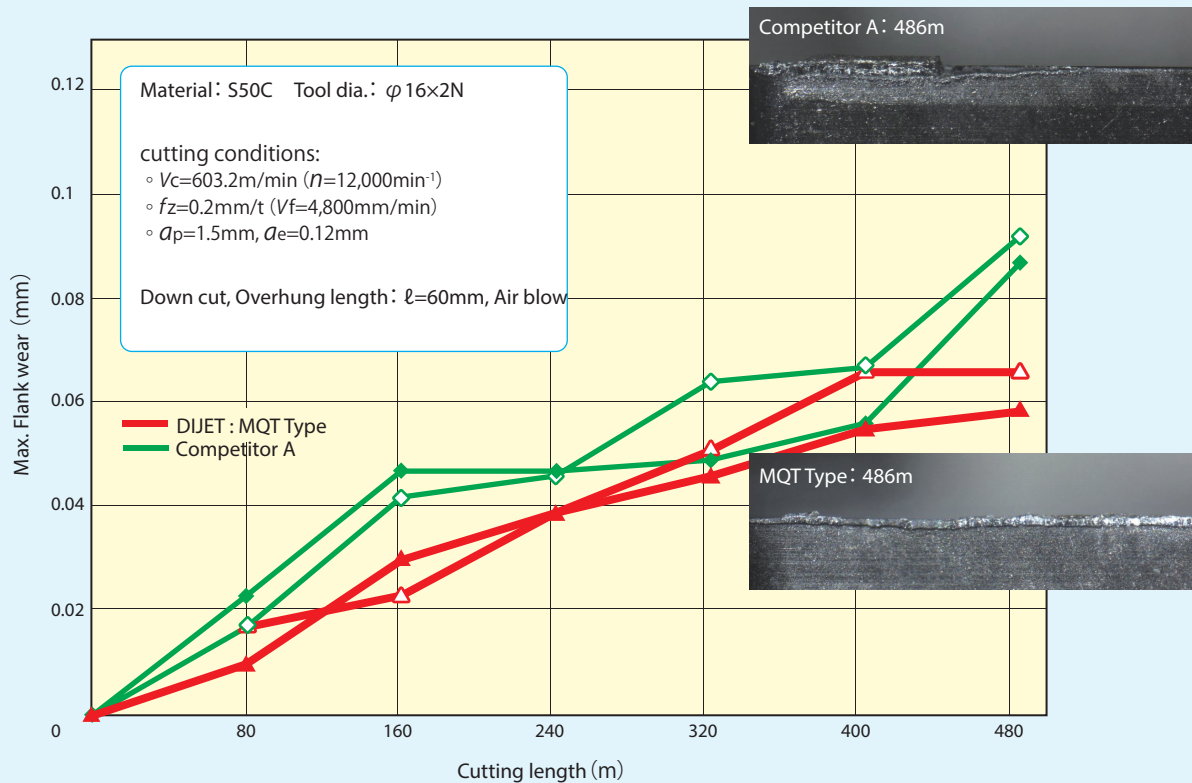


1. High precision QM Max MQT type improved balance of holder than conventional holders.
Possible to adapt multi-machining machines such as multi-tasking machines. Lined up high precision H grade inserts. High efficient machining is possible by adapting multi-blades specification.
→ Accuracy of tool dia. with master insert 0 ~ -0.03 (XPHW/T type inserts)
2. Lineup holders with cutting edge angle 3°, 5°. Complex shape machining with inclination is possible by 3 axis machine.
3. Adopted 3 grades: PVD coated grade "JC8015" for general & mold steel, stainless steel and cast iron.
Cermet grade "CX75" for improving surface roughness.
And new PVD coated grade "DH102" for high speed machining in high hardened material.

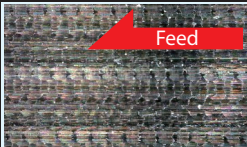
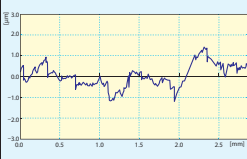
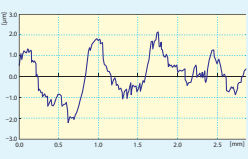


Cutting performance

1 Tool life comparison (5° tilted wall)



2 Surface roughness (After 486m machining) (Feed direction)

	XPHT100308ZER-R (Grades: JC8015)	Competitor A (PVD Coated)
Photo of work surface		
Surface roughness (2N) Feed direction	 Ra=0.19 μm Rz=1.18 μm	 Ra=0.44 μm Rz=2.02 μm
Machining time	101.2min	101.2min

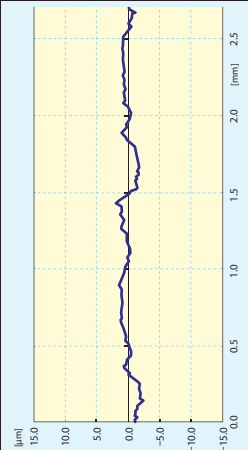
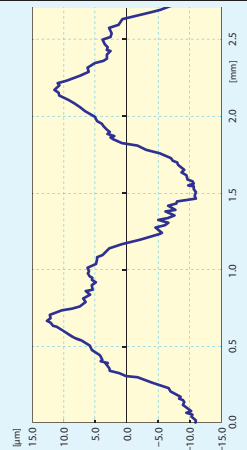
QM Max MQT type achieved good surface roughness and low cusp height even if $a_p = 1.5 \text{ mm}$. Frank wear also small.

Material: S50C Cutting conditions:

- Tool dia.: $\phi 16 \times 2N$
- $V_c = 603.2 \text{ m/min}$ ($n = 12,000 \text{ min}^{-1}$)
- $f = 0.4 \text{ mm/rev}$ ($V_f = 4,800 \text{ mm/min}$)
- $a_p = 1.5 \text{ mm}$, $a_e = 0.12 \text{ mm}$

Down cut, Overhung length: $\ell = 60 \text{ mm}$

3 Cusp height (After 486m machining) (Vertical direction of feed)

	XPHT100308ZER-R (Grade: JC8015)	Competitor A (PVD)
Surface roughness (2N) Vertical direction of feed	 Cusp height H=4 μm	 Cusp height H=26 μm

Material: S50C Cutting conditions:

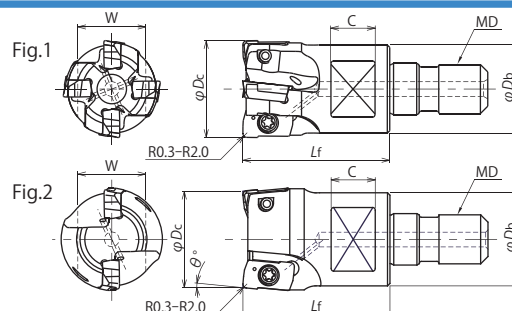
- Tool dia.: $\phi 16 \times 2N$
- $V_c = 603.2 \text{ m/min}$ ($n = 12,000 \text{ min}^{-1}$)
- $f = 0.4 \text{ mm/rev}$ ($V_f = 4,800 \text{ mm/min}$)
- $a_p = 1.5 \text{ mm}$, $a_e = 0.12 \text{ mm}$

Down cut, Overhung length: $\ell = 60 \text{ mm}$

MQT
TYPE

Modular head MQT type

Through coolant hole



Inclination angle θ°	Item code	Stock	No. of inserts	Dimensions (mm)						Applicable inserts	Parts		Fig
				φD_c	L_f	φD_b	MD	C	W		Clamp screw	Wrench(not be included)	
													
0°	MQT-2016A00-M8	●	2	16	23	14	M8	8	12	XP* * 100308ZER-R YPHW1003 * * Z * * R- * * ZPMT1003 * * ZER-PL	TSW-2556H		1
	MQT-4020A00-M10	●	4	20	30	18	M10	9	14		TSW-2556H		
	MQT-5025A00-M12	●	5	25	35	22.5	M12	10	17		DSW-2563H		
	 MQT-6032A00-M16	●	6	32	43	29	M16	12	22		DSW-2563H		
	MQT-6035A00-M16	●	6	35	43	29	M16	12	22		DSW-2563H	A-08	
3°	MQT-2016A03-M8	●	2	16	23	14	M8	8	12		TSW-2556H		2
	MQT-2020A03-M10	●	2	20	30	18	M10	9	14		TSW-2556H		
5°	MQT-2016A05-M8	●	2	16	23	14	M8	8	12		TSW-2556H		
	MQT-2020A05-M10	●	2	20	30	18	M10	9	14		TSW-2556H		

Arbor 12~15 page

Cutting conditions 90~92 page

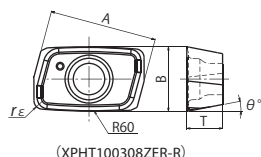
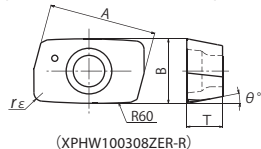
Note) 1. All cutters are supplied without inserts. 2. All cutters are supplied without wrench & MOLY. 3. Please see page 5 for recommended tightening torque. (When mounting M8 head to shank, recommend to use DIJET DS type spanner wrench.)

Clamp screw	Recommended torque (N · m)
TSW-2556H	1.1
DSW-2563H	1.1

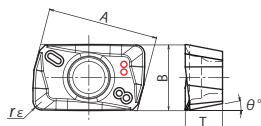
MQT
TYPE

Inserts

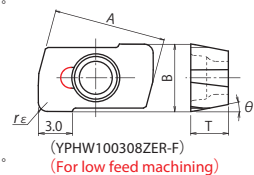
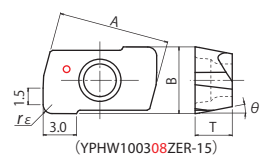
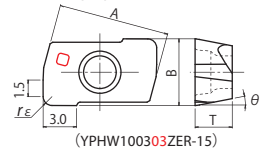
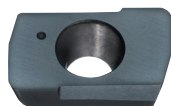
For tilted wall finishing
(XPHW100308ZER-R) (XPHT100308ZER-R)



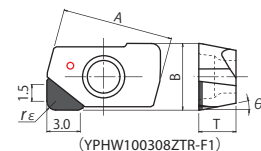
Shoulder milling insert
(From semi-finishing to finishing) (ZPMT1003* * ZER-PL)



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



CBN insert



Type	Item code	Tolerance	PVD coated				Cermet	CBN	Dimensions (mm)				
			JC8015	JC8050	JC8118	DH102	CX75	JBN795	A	T	B	$r\epsilon$	θ°
EW For tilted wall finishing	XPHW100308ZER-R	H	●			□	●		10.06	3.35	6	0.8	11°
	XPHT100308ZER-R	H	□				□		10.06	3.35	6	0.8	11°
For finishing side 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°
EW Shoulder milling insert (From semi-finishing to finishing)	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°

10 inserts per case, but grade JBN795 insert is packed in 1 piece per case.

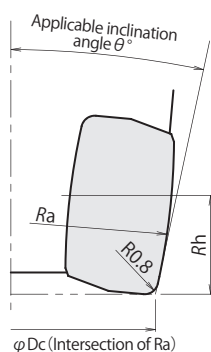
● : Standard stock items □ : Stock in Japan



Definition of flute shape for programming

MQT- • • • A03/A05 Holder

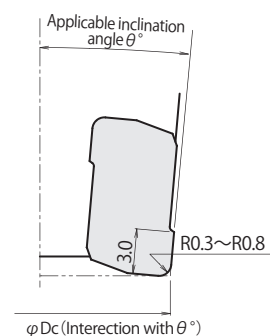
Fig.1 XPHW/T type



◦ Accuracy of tool dia. with master insert 0~—0.03

Applicable inclination angle θ°	Item code	Dimensions (mm)			Fig
		ϕDc	Ra	Rh	
1°~6°	MQT-2016A03-M8	15.5	R64.19	8.76	1
3°~8°	MQT-2016A05-M8	15.5	R64.34	10.98	1
1°~6°	MQT-2020A03-M10	19.5	R63.34	8.67	1
3°~8°	MQT-2020A05-M10	19.5	R63.46	10.85	1

Fig.2 YPHW type

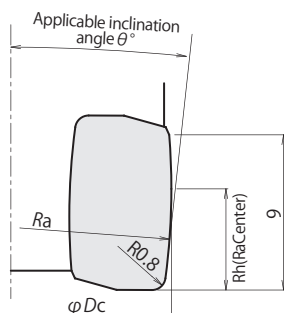


◦ Tool dia. with YPHW type inserts (Inclination angle: 3°, 5°)

Applicable inclination angle θ°	Item code	Dimensions (mm)	Fig
		ϕDc	
3°	MQT-2016A03-M8	16	2
5°	MQT-2016A05-M8	16	2
3°	MQT-2020A03-M10	20	2
5°	MQT-2020A05-M10	20	2

MQT- • • • A00 Holder

Fig.3 XPHW/T type



◦ Accuracy of tool dia. with master insert 0~—0.03

Applicable inclination angle θ°	Item code	Dimensions (mm)			Fig
		ϕDc	Ra	Rh	
0°~3°	MQT-2016A00-M8	16	R63.27	5.48	3
0°~3°	MQT-4020A00-M10	20	R64.29	5.48	3
0°~3°	MQT-5025A00-M12	25	R63.26	5.48	3
0°~3°	MQT-6032A00-M16	32	R62.41	5.48	3
0°~3°	MQT-6035A00-M16	35	R62.16	5.48	3

◦ Tool dia. with YPHW type inserts (Inclination angle: 0°)

Applicable inclination angle θ°	Item code	Dimensions (mm)	Fig
		ϕDc	
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	—

Note) 1. Shape of cutting edge is different depends on combination of inserts and holder. Please refer to the table above.

2. Regarding the detail of the tool shape, please download DXF/STEP file from "DJ-Search".
Please scan the following QR code.

Recommended cutting conditions for 'XPHT/W-type inserts' (For tilted wall finishing)

MQT and MSN type

Work materials	Grades	Tool dia. (mm)														
		16					20					20				
		No. of teeth 2N					No. of teeth 2N					No. of teeth 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 (C50, C55) Below 250HB	JC8015 XPHT type (XPHW type) (CX75)	~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
		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
Die steel (1.2344, 1.2379) Below 255HB	JC8015 XPHT type (XPHW type) (CX75)	~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
		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 (1.2311, P20) 30-36HRC	JC8015 XPHT type (XPHW type) (DH102)	~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
		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 (1.2311, P21) 38-43HRC	DH102 XPHW type (JC8015)	~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
		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 (1.2344, 1.2379) 42-52HRC	DH102 XPHW type (JC8015)	~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
		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 (1.2344, 1.2379) 55-62HRC	DH102 XPHW type	~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 (GG, GGG) Below 300HB	JC8015 XPHW type (XPHT type) (DH102)	~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
		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 Below 250HB	JC8015 XPHT type (XPHW type)	~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

ℓ : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

Theoretical cusp height : XPHT/W type

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

- 1) The parameter to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p and Pick feed a_e .
- 3) Use air blow.
- 4) Please see the below page for the cutting conditions table in case of using YPHW * -15/-F/-F1 or ZPMT * -PL type insert.
 • page 51-57 (ZPMT * -PL type) • page 58-76 (YPHW * -15/-F)
 • page 82-86 (YPHW * -F1)

Recommended cutting conditions for 'XPHT/W-type inserts' (For tilted wall finishing)

MQT and MSN type

Work materials	Grades	Tool dia. (mm)									
		25					32 / 35				
		No. of teeth 5N					No. of teeth 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 (C50, C55) Below 250HB	JC8015 XPHT type (XPHW type) (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
Die steel (1.2311, P20) Below 255HB	JC8015 XPHT type (XPHW type) (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 (1.2311, P20) 30-36HRC	JC8015 XPHT type (XPHW type) (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 (1.2311, P21) 38-43HRC	DH102 XPHW type (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 (1.2344, 1.2379) 42-52HRC	DH102 XPHW type (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 (1.2344, 1.2379) 55-62HRC	DH102 XPHW type	~90	≤1.5	<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 (GG, GGG) Below 300HB	JC8015 XPHW type (XPHT type) (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 Below 250HB	JC8015 XPHT type (XPHW type)	~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

l : Overhung length, a_p : Axial depth of cut, a_e : Radial depth of cut, n : Spindle speed, V_f : Feed speed

Theoretical cusp height : XPHT/W Type

Cusp height (μ m)	a_p (mm)	Cusp height (μ m)	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

- 1) The parameter to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut a_p and Pick feed a_e .
- 3) Use air blow.
- 4) Please see the below page for the cutting conditions table in case of using YPHW *-15/-F/-F1 or ZPMT *-PL type insert.
*page 51-57 (ZPMT *-PL type) *page 58-76 (YPHW *-15/-F)
*page 82-86 (YPHW *-F1)



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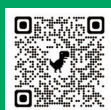
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