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SIC-EVO

Indexable End Mill SSV type



THE EVOLUTION
OF HIGH PERFORMANCE TOOLS



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SIC-EVO

Indexable End Mill SSV type

Multi functional indexable cutter “SIC-EVO” achieved high efficient and stable shoulder milling.

Feature 1

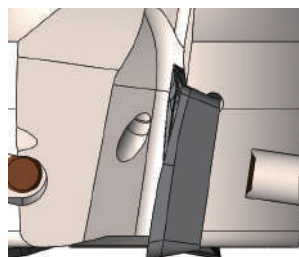
Max. depth of cut (a_p)=15mm is possible.
SIC-EVO is usable for wide applications
such as face milling, slotting, pocket milling.

Arc geometry on the periphery cutting edge

Cusp height can be smaller even in case of large a_p and
achieved high efficient & high precision machining for
vertical wall



Applicable to various milling,
such as ramping and helical machining



High positive geometry with
low cutting force

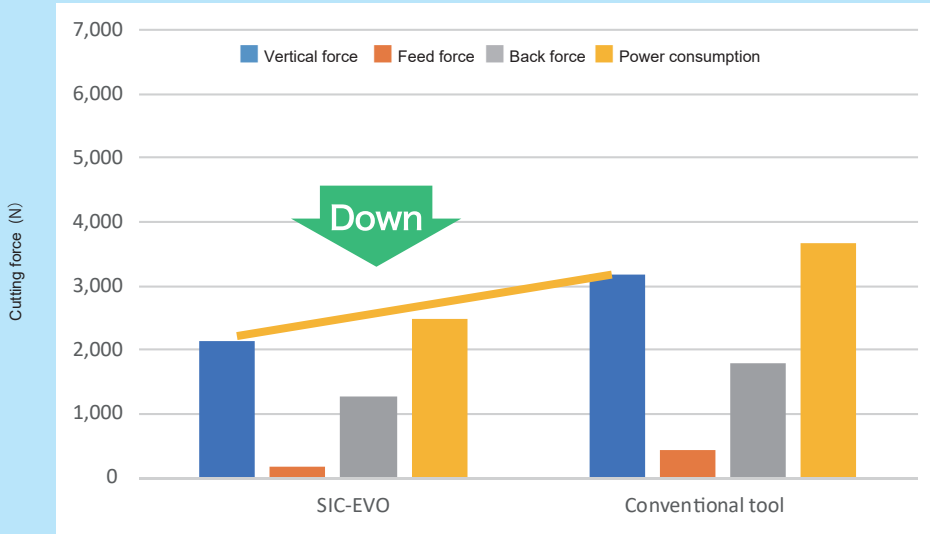
Feature 2

Conner radius, R0.4, R0.8, R1.6, R2.0 and R3.0 are available

Application

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

Cutting force comparison



Material : 1.1213

• Tool dia. : $\phi 25$

• Cutting conditions :

$V_c=200\text{m/min}$, $f_z=0.1\text{mm/t}$

$a_p=15\text{mm}$, $a_e=1\text{mm}$

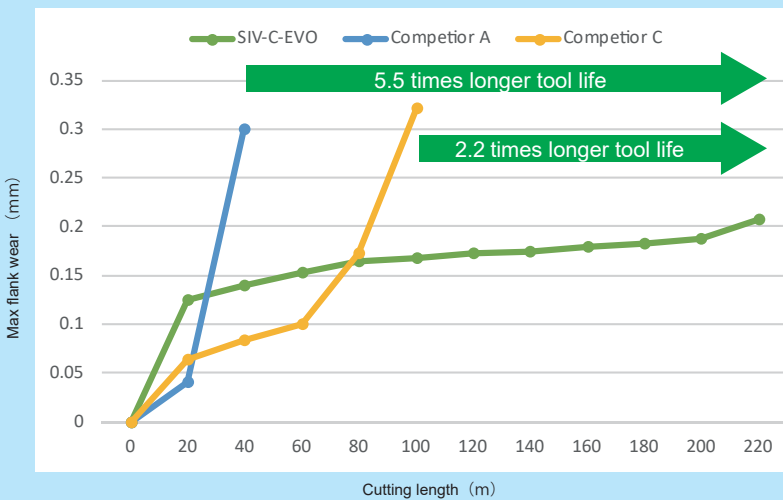
Test by one insert

Down cut,

Air blow (internal)

Achieved low cutting force

Tool life comparison



Material : 1.2311

• Tool dia. : $\phi 25$

• Cutting conditions :

$V_c=150\text{m/min}$, $f_z=0.3\text{mm/t}$

$a_p=14\text{mm}$, $a_e=1\text{mm}$

Test by one insert

Down cut,

Air blow (internal)

Cutting length	40m	80m	100m	180m
Competitor A				
Competitor C				
DIJET				

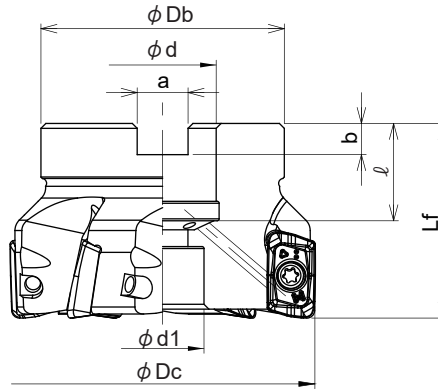
Possible to stable roughing!

Line up



● Facemill type

● Through coolant hole



Type	Cat. No.	Stock	No. of inserts	Dimensions								Set bolt	Weight (kg)	Applicable Inserts	
				ϕDc	L_f	ϕDb	ϕd	ϕd_1	a	b	ℓ				
Metric Bore	SSV-4040R-16	●	4	40	40	35	16	14	8.4	5.6	18	M8	Head cap screw (JIS Standard)	0.20	ZO*T1605**ZER**
	SSV-5050R-22	●	5	50	40	47	22	16	10.4	6.3	20	M10		0.33	
	SSV-6063R-22	●	6	63	40	50	22	17	10.4	6.3	20	M10		0.52	
	SSV-6063R-27	●	6	63	50	60	27	20	12.4	7	22	M12×1.75×30★		0.75	
	SSV-7080R-27	●	7	80	50	60	27	20	12.4	7	22	M12×1.75×30★		1.08	
	SSV-8100R-32	●	8	100	50	85	32	26	14.4	8	25	M16×2×30★		1.95	
	SSV-8125R-40	●	8	125	63	100	40	32	16.4	9	32	M20×2.5×40★		3.73	

●: Standard stock items

Note) 1. All cutters are supplied without inserts.

2. All cutters are supplied without wrench & MOLY.

3. ★ mark shows :these cutter bodies are equipped with the set bolt because of the specified bolt size.

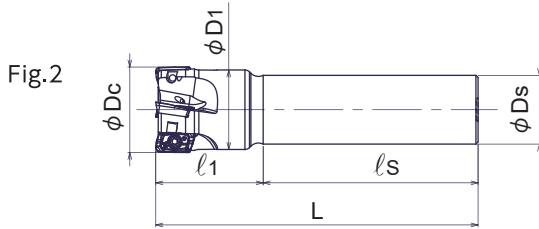
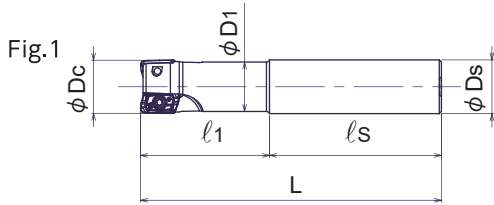
Except for these cutter bodies, please use the set bolt equipped with arbor.



4. Please see page 13-15 for recommended Cutting conditions for shoulder milling, 16-18 for recommended Cutting conditions for Facemilling.

Parts			
Clamp screw	Wrench (not be included)	Clamp screw	Recommended torque (N·m)
		DSW-4075H	3.6



Endmill type ● Without coolant hole



Cat. No.	Stock	No. of inserts	Dimensions						Fig.	Applicable Inserts	Parts
			φDc	l1	ls	L	φD1	φDs			Wrench
SSV-2025-60-S25+A	●	2	25	60	80	140	23	25	1	 ZO*T1605**ZER-**	 A-15
SSV-2025-100-S25+A	●	2	25	100	80	180	23	25	1		
SSV-3032-70-S32+A	●	3	32	70	80	150	29	32	1		
SSV-3032-120-S32+A	●	3	32	120	80	200	29	32	1		
SSV-4040-50-S32+A	●	4	40	50	100	150	37	32	2		
SSV-4040-50L-S32+A	●	4	40	50	150	200	37	32	2		

●: Standard stock items

Note)1. All cutters are supplied without inserts.

2. All cutters are supplied without wrench & MOLY.

3. Please see page19-20 for recommended Cutting conditions for shoulder milling, 21-22 for recommended Cutting conditions for Facemilling.

Parts
Clamp screw



DSW-4075H

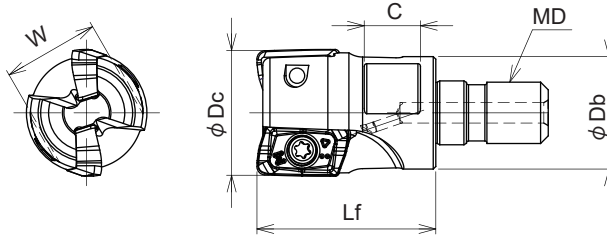
Clamp screw	Recommended torque (N·m)
DSW-4075H	3.6

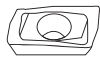
Line up



Modular head type

● Through coolant hole



Cat. No.	Stock	No. of inserts	Dimensions						Applicable Inserts
			ϕD_c	L_f	ϕD_b	MD	C	W	
SSV-2025-M12	●	2	25	35	22	M12	11	19	 ZO*T1605**ZER-**
SSV-3032-M16	●	3	32	43	29	M16	12	22	
SSV-3035-M16	□	3	35	43	29	M16	12	22	
SSV-4040-M16	●	4	40	43	29	M16	12	22	



● : Standard stock items, □ : Stock in Japan

Note) 1. All cutters are supplied without inserts.

2. All cutters are supplied without wrench & MOLY.

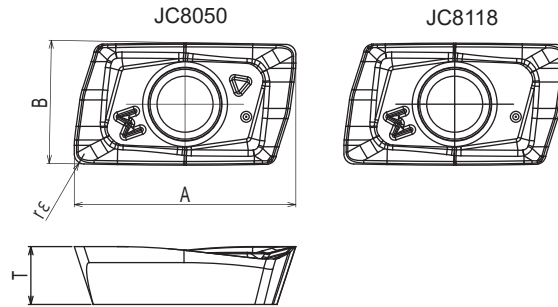
3. Please see page 7 for recommended tightening torque.

4. Please see page 23-24 for recommended Cutting conditions for shoulder milling, 25-26 for recommended Cutting conditions for Facemilling.

Parts	
Clamp screw	Wrench (not be included)
	
DSW-4075H	A-15

Clamp screw	Recommended torque (N·m)
DSW-4075H	3.6

● Inserts



Cat. No.	Tolerance	PVD Coated		Dimensions			
		JC8118	JC8050	A	B	T	rε
ZOMT160504ZER-PM	M	⊙	⊙	18	10	4.7	0.4
ZOMT160508ZER-PM	M	●	●	18	10	4.7	0.8
ZOMT160516ZER-PM	M	●	●	18	10	4.7	1.6
ZOMT160520ZER-PM	M	⊙	⊙	18	10	4.7	2.0
ZOMT160530ZER-PM	M	⊙	⊙	18	10	4.7	3.0

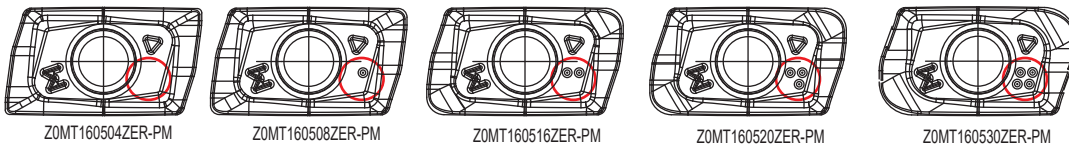
●: Standard stock items ⊙: Soon be stocked
10 inserts per case.

Cat. No.	Tolerance	PVD Coated		Un-Coated	Dimensions			
		JC8118	JC8050	FC18	A	B	T	rε
ZOET160508ZER-PM	E	⊙	⊙		18	10	4.7	0.8
ZOET160508ZFR-NL	E			⊙	18	10	4.7	0.8

●: Standard stock items ⊙: Soon be stocked
10 inserts per case.

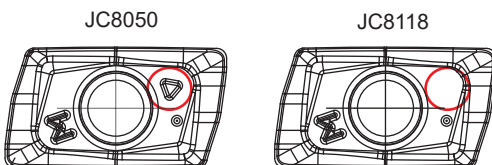
● Discrimination of corner radius for insert.

Each corner radius shows discrimination mark on the insert surface.



● Discrimination of grade for insert.

Each grade shows discrimination mark on the insert surface.



Discrimination mark of insert grade

Attention

⚠ Attention to mounting head and MSN/ MGN shank arbor.

■ Tightening procedure

① Cleaning

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

② Initial Tightening

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

③ Final Tightening

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

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

⚠ NOTE

- Note) 1. 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 arbor and modular

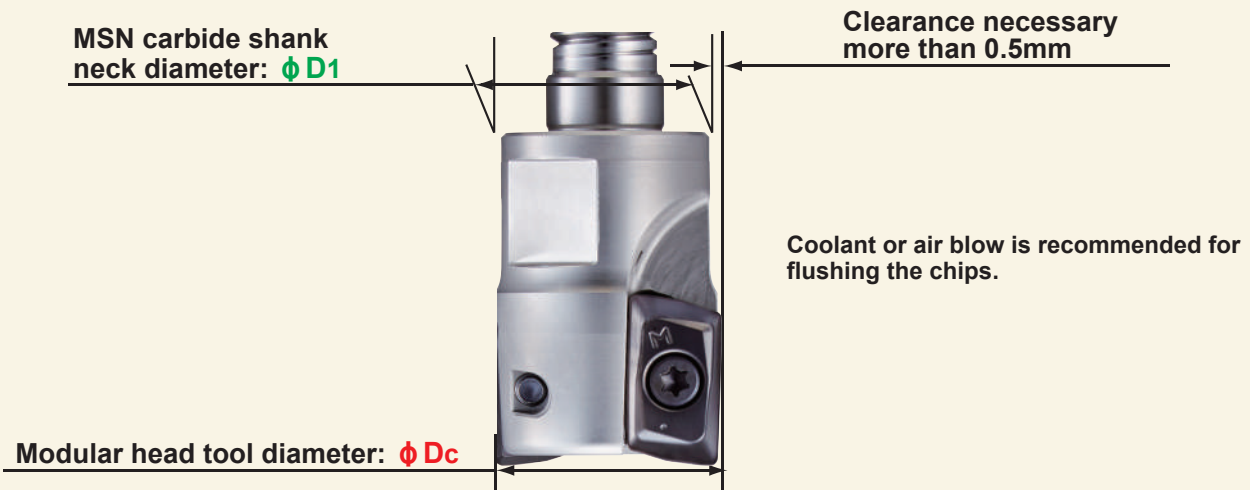
Thread	Tightening torque	Spanner size W (mm)
M6	8.0N·m	8☆, 10
M8	16N·m	12☆
M10	16N·m	14, 15
M12	20N·m	17, 19
M16	25N·m	22, 26

- Note) 1. Modular heads are supplied without spanner wrench.
 2. In case of choosing torque control spanner wrench, confirm that the wrench size is match to the dimensions W & C of each modular head.
 (There are some cases that modifying the thickness of spanner wrench is necessary)
 3. ☆ mark shows: DIJET have a stock of DS-8 and 12 type spanner wrenches.

⚠ Selection of "MSN Carbide shank arbor"

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

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



⚠ Caution for the mounting to shrink fit holder.

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

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

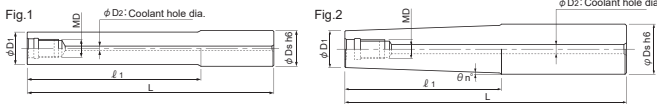
Line up

MSN Carbide shank arbor



End mill shank type

- Through coolant hole
- For high productivity



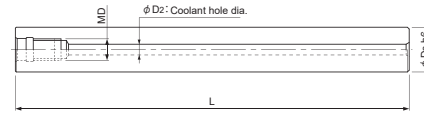
Cat. No.	Stock	Dimensions							Weight	Fig.
		ϕD_s	l_1	L	ϕD_1	θn°	MD	ϕD_2		
MSN-M12-25-S25C	●	25	25	90	24	-	M12	6	0.53	1
MSN-M12-55-S25C	●	25	55	120	24	-			0.72	1
MSN-M12-100T-S32C	□	32	100	180	23.5	2°			1.61	2
MSN-M12-105-S25C	●	25	105	170	24	-			1.03	1
MSN-M12-135-S25C	●	25	135	215	24	-			1.30	1
MSN-M12-155-S25C	●	25	155	220	24	-			1.34	1
MSN-M12-200-S25C	●	25	200	265	24	-			1.58	1
MSN-M16-25-S32C	●	32	25	90	29	-			M16	8
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'	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		

●: Standard stock item, □: Stock in Japan

Note) Please see page 7 for recommended tightening torque.

Straight arbor type

- Through coolant hole
- For high productivity



Cat. No.	Stock	Dimensions				Wight
		ϕD_s	L	MD	ϕD_2	
MSN-M12-185S-S23C	●	23	185	M12	6	0.98
MSN-M12-265S-S23C	●		265			1.42
MSN-M12-185S-S24C	●	24	185	M12	6	1.07
MSN-M12-265S-S24C	●		265			1.54
MSN-M12-145S-S25C	●	25	145	M12	6	0.91
MSN-M12-215S-S25C	●		215			1.36
MSN-M12-285S-S25C	●		285			1.80
MSN-M16-160S-S28C	●	28	160	M16	8	1.22
MSN-M16-230S-S28C	●		230			1.77
MSN-M16-310S-S28C	●		310			2.41
MSN-M16-157S-S32C	●	32	157	M16	8	1.61
MSN-M16-217S-S32C	●		217			2.22
MSN-M16-287S-S32C	●		287			2.94
MSN-M16-357S-S32C	●		357			3.66

●: Standard stock items

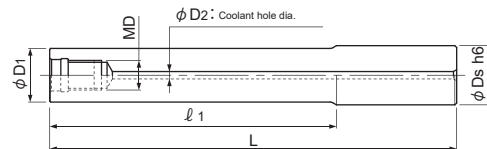
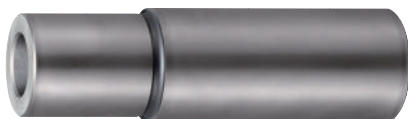
Note) Please see page 7 for recommended tightening torque.

MGN G-Body steel shank holder

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

End mill shank type

- Through coolant hole

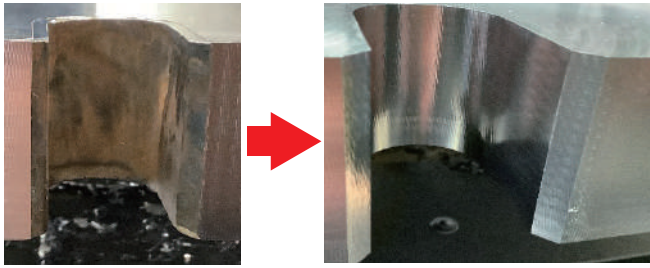


Cat. No.	Stock	Dimensions							Weight
		ϕD_s	l_1	L	ϕD_1	θn°	MD	ϕD_2	
MGN-M12-35-S25	□	25	35	105	24	-	M12	4	0.36
MGN-M12-85-S25	□	25	85	165	24	-	M12	4	0.57
MGN-M16-37-S32	□	32	37	107	29	-	M16	6	0.56
MGN-M16-77-S32	□	32	77	157	29	-	M16	6	0.83

●: Standard stock items, □: Stock in Japan

Note) 1. In case of using modular head combined with MGN steel shank holder, apply the recommended cutting conditions sheet (see page 13-30).
2. Please see page 7 for recommended tightening torque.

Cutting data



Result

Both machining noise and surface are good.

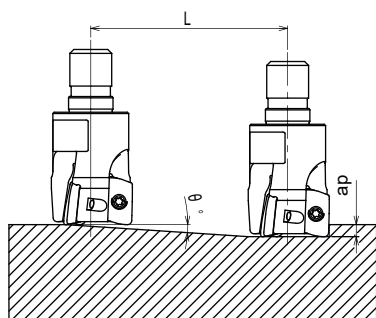
Work	Part name	die plate	
	Material	SS400 (JIS)	
	Hardness	-	
Tool	Tool No.	SSV-2025-M16	
	Insert No.	ZOMT160508ZER-PM (JC8118)	
Cutting conditions	Spindle speed Cutting speed	n	2500 (min ⁻¹)
		V_c	196 (m/min)
	Feed speed	V_f	2000 (mm/min)
		f_z	0.4 (mm/t)
	a_p (mm)		3 (mm)
	a_e (mm)		5 (mm)
	Coolant		Air blow (External)
Machine		Double column type MC	

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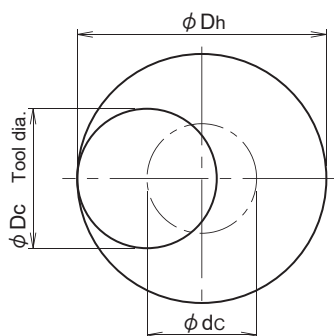


Attention for profile milling

Ramping



Helical interpolation



● Calculation of tool pass dia.

$$\phi dc = \phi Dh - \phi Dc$$

Tool pass dia. Bore dia. Tool dia.

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

- In case of ramping and helical interpolation, apply 80% 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.
- In case of helical interpolation, recommend wet cutting by coolant through the tool.
- Long consecutive chips may come out in case of drilling, confirm the safe condition sufficiently.

ZOMT160504ZER-PM

Cat. No.	Tool dia. (mm)	Eff. Cutting dia. (mm)	Max. depth of cut (mm)	Ramping		Helical interpolation		Max. drilling depth(mm)
				Max. ramping angle θ°	Total cutting length at Max. a_p	Min. bore dia. Dh min (mm)	Max. bore dia. Dh max (mm)	
SSV-2025-**	25	23.9	1.5	6.2	13.8	30	48.4	1.6
SSV-3032-**	32	30.9	1.5	4.4	19.5	44	62.4	1.6
SSV-3035-M16	35	33.9	1.5	4.3	19.9	50	68.4	1.6
SSV-4040-**	40	38.9	1.5	3.6	23.8	60	78.4	1.6
SSV-5050R-**	50	48.9	1.5	2.4	35.8	80	98.4	1.4
SSV-6063R-**	63	61.9	1.5	1.7	50.5	106	124.4	1.4
SSV-7080R-**	80	78.9	1.5	1.2	71.6	140	158.4	1.4
SSV-8100R-**	100	98.9	1.5	0.9	95.5	180	198.4	1.4
SSV-8125R-**	125	123.9	1.5	0.65	132.2	230	248.4	1.4

ZOMT160508ZER-PM

Cat. No.	Tool dia. (mm)	Eff. Cutting dia. (mm)	Max. depth of cut (mm)	Ramping		Helical interpolation		Max. drilling depth(mm)
				Max. ramping angle θ°	Total cutting length at Max. a_p	Min. bore dia. Dh min (mm)	Max. bore dia. Dh max (mm)	
SSV-2025-**	25	23.1	1.5	6.4	13.4	30	47.6	1.6
SSV-3032-**	32	30.1	1.5	4.4	19.5	44	61.6	1.6
SSV-3035-M16	35	33.1	1.5	4.3	19.9	50	67.6	1.6
SSV-4040-**	40	38.1	1.5	3.6	23.8	60	77.6	1.6
SSV-5050R-**	50	48.1	1.5	2.4	35.8	80	97.6	1.4
SSV-6063R-**	63	61.1	1.5	1.7	50.5	106	123.6	1.4
SSV-7080R-**	80	78.1	1.5	1.2	71.6	140	157.6	1.4
SSV-8100R-**	100	98.1	1.5	0.9	95.5	180	197.6	1.4
SSV-8125R-**	125	123.1	1.5	0.65	132.2	230	247.6	1.4

ZOMT160516ZER-PM

Cat. No.	Tool dia. (mm)	Eff. Cutting dia. (mm)	Max. depth of cut (mm)	Ramping		Helical interpolation		Max. drilling depth(mm)
				Max. ramping angle θ°	Total cutting length at Max. Δp	Min. bore dia. Dh min (mm)	Max. bore dia. Dh max (mm)	
SSV-2025-**	25	21.5	1.5	6.7	12.8	28	46	1.5
SSV-3032-**	32	28.5	1.5	4.7	18.2	42	60	1.5
SSV-3035-M16	35	31.5	1.5	4.6	18.6	48	66	1.5
SSV-4040-**	40	36.5	1.5	3.8	22.6	58	76	1.5
SSV-5050R-**	50	46.5	1.5	2.5	34.4	78	96	1.4
SSV-6063R-**	63	59.5	1.5	1.8	47.7	104	122	1.4
SSV-7080R-**	80	76.5	1.5	1.2	71.6	138	156	1.4
SSV-8100R-**	100	96.5	1.5	0.9	95.5	178	196	1.4
SSV-8125R-**	125	121.5	1.5	0.65	132.2	228	246	1.4

ZOMT160520ZER-PM

Cat. No.	Tool dia. (mm)	Eff. Cutting dia. (mm)	Max. depth of cut (mm)	Ramping		Helical interpolation		Max. drilling depth(mm)
				Max. ramping angle θ°	Total cutting length at Max. Δp	Min. bore dia. Dh min (mm)	Max. bore dia. Dh max (mm)	
SSV-2025-**	25	20.7	1.5	6.9	12.4	27	45.2	1.5
SSV-3032-**	32	27.7	1.5	4.7	18.2	41	59.2	1.5
SSV-3035-M16	35	30.7	1.5	4.6	18.6	47	65.2	1.5
SSV-4040-**	40	35.7	1.5	3.8	22.6	57	75.2	1.5
SSV-5050R-**	50	45.7	1.5	2.5	34.4	77	95.2	1.4
SSV-6063R-**	63	58.7	1.5	1.8	47.7	103	121.2	1.4
SSV-7080R-**	80	75.7	1.5	1.2	71.6	137	155.2	1.4
SSV-8100R-**	100	95.7	1.5	0.9	95.5	177	195.2	1.4
SSV-8125R-**	125	120.7	1.5	0.65	132.2	227	245.2	1.4

ZOMT160530ZER-PM

Cat. No.	Tool dia. (mm)	Eff. Cutting dia. (mm)	Max. depth of cut (mm)	Ramping		Helical interpolation		Max. drilling depth(mm)
				Max. ramping angle θ°	Total cutting length at Max. Δp	Min. bore dia. Dh min (mm)	Max. bore dia. Dh max (mm)	
SSV-2025-**	25	18.7	1.5	7.2	11.9	25	43.2	1.5
SSV-3032-**	32	25.7	1.5	4.8	17.9	39	57.2	1.5
SSV-3035-M16	35	28.7	1.5	4.7	18.2	45	63.2	1.5
SSV-4040-**	40	33.7	1.5	3.9	22.0	55	73.2	1.5
SSV-5050R-**	50	43.7	1.5	2.5	34.4	75	93.2	1.4
SSV-6063R-**	63	56.7	1.5	1.8	47.7	101	119.2	1.4
SSV-7080R-**	80	73.7	1.5	1.3	66.1	135	153.2	1.4
SSV-8100R-**	100	93.7	1.5	0.95	90.5	175	193.2	1.4
SSV-8125R-**	125	118.7	1.5	0.65	132.2	225	243.2	1.4

Recommended cutting conditions for shoulder milling

FaceMill type

Work materials	Grades	Tool dia.									
		40					50				
		No. of teeth 4N					No. of teeth 5N				
		l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~100	~15.0	~30	1,590	1,910	~100	~15.0	~40	1,270	1,910
		150	~12.0	~20	1,430	1,430	150	~12.0	~25	1,150	1,440
		200	~10.0	~12	1,270	1,020	200	~10.0	~15	1,020	1,020
Cast steel (1.7225) Below 285HB	JC8050	~100	~15.0	~30	1,430	1,720	~100	~15.0	~40	1,150	1,730
		150	~12.0	~20	1,270	1,270	150	~12.0	~25	1,020	1,280
		200	~10.0	~12	1,110	890	200	~10.0	~15	890	890
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~100	~15.0	~30	1,590	1,910	~100	~15.0	~40	1,270	1,910
		150	~12.0	~20	1,430	1,430	150	~12.0	~25	1,150	1,440
		200	~10.0	~12	1,270	1,020	200	~10.0	~15	1,020	1,020
Mold steel (1.2311, P20) 30~36HRC	JC8118	~100	~15.0	~30	1,190	1,430	~100	~15.0	~40	950	1,430
		150	~12.0	~20	1,070	1,070	150	~12.0	~25	860	1,080
		200	~10.0	~12	950	760	200	~10.0	~15	760	760
Mold steel (1.2311, P21) 38~43HRC	JC8118	~100	~15.0	~20	950	950	~100	~15.0	~30	760	950
		150	~12.0	~15	840	670	150	~12.0	~20	670	670
		200	~10.0	~8	720	430	200	~10.0	~12	570	430
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~100	~12.0	~12	800	640	~100	~15.0	~18	640	640
		150	~10.0	~8	720	430	150	~12.0	~12	570	430
		200	~8.0	~3	640	260	200	~10.0	~5	510	260
Cast iron (GG25) 160~260HB	JC8118	~100	~15.0	~30	1,990	2,390	~100	~15.0	~40	1,590	2,390
		150	~12.0	~20	1,830	1,830	150	~12.0	~25	1,460	1,830
		200	~10.0	~12	1,670	1,340	200	~10.0	~15	1,340	1,340
Nodular cast iron (GGG70) 170~300HB	JC8118	~100	~15.0	~30	1,190	1,190	~100	~15.0	~40	950	1,190
		150	~12.0	~20	1,030	820	150	~12.0	~25	830	830
		200	~10.0	~12	880	530	200	~10.0	~15	700	530
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~100	~15.0	~30	950	760	~100	~15.0	~40	760	760
		150	~12.0	~20	880	530	150	~12.0	~25	700	530
		200	~10.0	~12	800	320	200	~10.0	~15	640	320
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~100	~15.0	~30	1,430	1,430	~100	~15.0	~40	1,150	1,440
		150	~12.0	~20	1,270	1,020	150	~12.0	~25	1,020	1,020
		200	~10.0	~12	1,110	670	200	~10.0	~15	890	670

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 to flush the chip out.

In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

 FaceMill type

Work materials	Grades	Tool dia.									
		63					80				
		No. of teeth 6N					No. of teeth 7N				
		l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~100	~15.0	~45	1,010	2,120	~100	~15.0	~45	800	1,960
		150	~12.0	~30	910	1,640	150	~12.0	~30	720	1,510
		200	~10.0	~20	810	1,220	200	~10.0	~20	640	1,120
Cast steel (1.7225) Below 285HB	JC8050	~100	~15.0	~45	910	1,910	~100	~15.0	~45	720	1,760
		150	~12.0	~30	810	1,460	150	~12.0	~30	640	1,340
		200	~10.0	~20	710	1,070	200	~10.0	~20	560	980
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~100	~15.0	~45	1,010	2,120	~100	~15.0	~45	800	1,960
		150	~12.0	~30	910	1,640	150	~12.0	~30	720	1,510
		200	~10.0	~20	810	1,220	200	~10.0	~20	640	1,120
Mold steel (1.2311, P20) 30~36HRC	JC8118	~100	~15.0	~45	760	1,600	~100	~15.0	~45	600	1,470
		150	~12.0	~30	680	1,220	150	~12.0	~30	540	1,130
		200	~10.0	~20	610	920	200	~10.0	~20	480	840
Mold steel (1.2311, P21) 38~43HRC	JC8118	~100	~15.0	~30	610	920	~100	~15.0	~30	480	840
		150	~12.0	~25	530	640	150	~12.0	~25	420	590
		200	~10.0	~15	450	410	200	~10.0	~15	360	380
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~100	~15.0	~25	510	610	~100	~15.0	~25	400	560
		150	~12.0	~15	450	410	150	~12.0	~15	360	380
		200	~10.0	~8	400	240	200	~10.0	~8	320	220
Cast iron (GG25) 160~260HB	JC8118	~100	~15.0	~45	1,260	2,650	~100	~15.0	~45	990	2,430
		150	~12.0	~30	1,160	2,090	150	~12.0	~30	920	1,930
		200	~10.0	~20	1,060	1,590	200	~10.0	~20	840	1,470
Nodular cast iron (GGG70) 170~300HB	JC8118	~100	~15.0	~45	760	1,370	~100	~15.0	~45	600	1,260
		150	~12.0	~30	660	990	150	~12.0	~30	520	910
		200	~10.0	~20	560	670	200	~10.0	~20	440	620
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~100	~15.0	~45	610	730	~100	~15.0	~45	480	670
		150	~12.0	~30	560	500	150	~12.0	~30	440	460
		200	~10.0	~20	510	310	200	~10.0	~20	400	280
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~100	~15.0	~45	910	1,640	~100	~15.0	~45	720	1,510
		150	~12.0	~30	810	1,220	150	~12.0	~30	640	1,120
		200	~10.0	~20	710	850	200	~10.0	~20	560	780

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 to flush the chip out.

In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

Recommended cutting conditions for shoulder milling

FaceMill type

Work materials	Grades	Tool dia.									
		100					125				
		No. of teeth 8N					No. of teeth 8N				
		l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~100	~15.0	~45	640	1,790	~100	~15.0	~45	510	1,430
		150	~12.0	~30	570	1,370	150	~12.0	~30	460	1,100
		200	~10.0	~20	510	1,020	200	~10.0	~20	410	820
Cast steel (1.7225) Below 285HB	JC8050	~100	~15.0	~45	570	1,600	~100	~15.0	~45	460	1,290
		150	~12.0	~30	510	1,220	150	~12.0	~30	410	980
		200	~10.0	~20	450	900	200	~10.0	~20	360	720
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~100	~15.0	~45	640	1,790	~100	~15.0	~45	510	1,430
		150	~12.0	~30	570	1,370	150	~12.0	~30	460	1,100
		200	~10.0	~20	510	1,020	200	~10.0	~20	410	820
Mold steel (1.2311, P20) 30~36HRC	JC8118	~100	~15.0	~45	480	1,340	~100	~15.0	~45	380	1,060
		150	~12.0	~30	430	1,030	150	~12.0	~30	340	820
		200	~10.0	~20	380	760	200	~10.0	~20	310	620
Mold steel (1.2311, P21) 38~43HRC	JC8118	~100	~15.0	~30	380	760	~100	~15.0	~30	310	620
		150	~12.0	~25	330	530	150	~12.0	~25	270	430
		200	~10.0	~15	290	350	200	~10.0	~15	230	280
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~100	~15.0	~25	320	510	~100	~15.0	~25	250	400
		150	~12.0	~15	290	350	150	~12.0	~15	230	280
		200	~10.0	~8	250	200	200	~10.0	~8	200	160
Cast iron (GG25) 160~260HB	JC8118	~100	~15.0	~45	800	2,240	~100	~15.0	~45	640	1,790
		150	~12.0	~30	730	1,750	150	~12.0	~30	590	1,420
		200	~10.0	~20	670	1,340	200	~10.0	~20	530	1,060
Nodular cast iron (GGG70) 170~300HB	JC8118	~100	~15.0	~45	480	1,150	~100	~15.0	~45	380	910
		150	~12.0	~30	410	820	150	~12.0	~30	330	660
		200	~10.0	~20	350	560	200	~10.0	~20	280	450
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~100	~15.0	~45	380	610	~100	~15.0	~45	310	500
		150	~12.0	~30	350	420	150	~12.0	~30	280	340
		200	~10.0	~20	320	260	200	~10.0	~20	250	200
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~100	~15.0	~45	570	1,370	~100	~15.0	~45	460	1,100
		150	~12.0	~30	510	1,020	150	~12.0	~30	410	820
		200	~10.0	~20	450	720	200	~10.0	~20	360	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 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 to flush the chip out.

In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

Recommended cutting conditions for face milling

FaceMill type

Work materials	Grades	Tool dia.									
		40					50				
		No. of teeth 4N					No. of teeth 5N				
		l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~100	~3.5	~40	1,190	1,430	~150	~4.0	~50	950	1,430
		150	~2.5	~32	1,030	1,030	200	~3.0	~40	830	1,040
		200	~1.5	~24	880	700	300	~2.0	~30	700	700
Cast steel (1.7225) Below 285HB	JC8050	~100	~3.5	~40	1,190	1,430	~150	~4.0	~50	950	1,430
		150	~2.5	~32	1,030	1,030	200	~3.0	~40	830	1,040
		200	~1.5	~24	880	700	300	~2.0	~30	700	700
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~100	~3.5	~40	1,190	1,190	~150	~4.0	~50	950	1,190
		150	~2.5	~32	1,030	820	200	~3.0	~40	830	830
		200	~1.5	~24	880	530	300	~2.0	~30	700	530
Mold steel (1.2311, P20) 30~36HRC	JC8118	~100	~3.5	~40	1,030	1,030	~150	~4.0	~50	830	1,040
		150	~2.5	~32	950	760	200	~3.0	~40	760	760
		200	~1.5	~24	880	530	300	~2.0	~30	700	530
Mold steel (1.2311, P21) 38~43HRC	JC8118	~100	~2.5	~40	880	880	~150	~3.0	~50	700	880
		150	~2.0	~32	800	640	200	~2.5	~40	640	640
		200	~1.5	~24	720	430	300	~1.5	~30	570	430
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~100	~2.0	~32	720	580	~150	~2.5	~40	570	570
		150	~1.5	~24	640	380	200	~2.0	~30	510	380
		200	~1.0	~16	560	220	300	~1.5	~20	450	230
Cast iron (GG25) 160~260HB	JC8118	~100	~5.5	~40	1,430	1,720	~150	~6.0	~50	1150	1,730
		150	~3.5	~32	1,190	1,190	200	~4.0	~40	950	1,190
		200	~1.5	~24	1,030	820	300	~2.0	~30	830	830
Nodular cast iron (GGG70) 170~300HB	JC8118	~100	~3.5	~40	1,030	1,030	~150	~4.0	~50	830	1,040
		150	~2.5	~32	950	760	200	~3.0	~40	760	760
		200	~1.5	~24	880	530	300	~2.0	~30	700	530
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~100	~3.5	~32	880	700	~150	~4.0	~40	700	700
		150	~2.5	~24	800	480	200	~3.0	~30	640	480
		200	~1.5	~16	720	290	300	~2.0	~20	570	290
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~100	~3.5	~40	1,190	1,190	~150	~4.0	~50	950	1,190
		150	~2.5	~32	1,030	820	200	~3.0	~40	830	830
		200	~1.5	~24	880	530	300	~2.0	~30	700	530

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 to flush the chip out.

In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

*5. In case of slotting, reduce Feed speed (V_f) to 50% or below of the above data.

Recommended cutting conditions for face milling

FaceMill type

Work materials	Grades	Tool dia.									
		63					80				
		No. of teeth 6N					No. of teeth 7N				
		l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~150	~4.0	~63	760	1,600	~150	~4.0	~80	600	1,470
		200	~3.0	~55	660	1,190	200	~3.0	~65	520	1,090
		300	~2.0	~40	560	840	300	~2.0	~50	440	770
Cast steel (1.7225) Below 285HB	JC8050	~150	~4.0	~63	760	1,600	~150	~4.0	~80	600	1,470
		200	~3.0	~55	660	1,190	200	~3.0	~65	520	1,090
		300	~2.0	~40	560	840	300	~2.0	~50	440	770
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~150	~4.0	~63	760	1,370	~150	~4.0	~80	600	1,260
		200	~3.0	~55	660	990	200	~3.0	~65	520	910
		300	~2.0	~40	560	670	300	~2.0	~50	440	620
Mold steel (1.2311, P20) 30~36HRC	JC8118	~150	~4.0	~63	660	1,190	~150	~4.0	~80	520	1,090
		200	~3.0	~55	610	920	200	~3.0	~65	480	840
		300	~2.0	~40	560	670	300	~2.0	~50	440	620
Mold steel (1.2311, P21) 38~43HRC	JC8118	~150	~3.0	~63	560	840	~150	~3.0	~80	440	770
		200	~2.5	~55	510	610	200	~2.5	~65	400	560
		300	~1.5	~40	450	410	300	~1.5	~50	360	380
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~150	~2.5	~55	450	540	~150	~2.5	~65	360	500
		200	~2.0	~40	400	360	200	~2.0	~50	320	340
		300	~1.5	~32	350	210	300	~1.5	~35	280	200
Cast iron (GG25) 160~260HB	JC8118	~150	~6.0	~63	910	1,910	~150	~6.0	~80	720	1,760
		200	~4.0	~55	760	1,370	200	~4.0	~65	600	1,260
		300	~2.0	~40	660	990	300	~2.0	~50	520	910
Nodular cast iron (GGG70) 170~300HB	JC8118	~150	~4.0	~63	660	1,190	~150	~4.0	~80	520	1,090
		200	~3.0	~55	610	920	200	~3.0	~65	480	840
		300	~2.0	~40	560	670	300	~2.0	~50	440	620
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~150	~4.0	~55	560	670	~150	~4.0	~65	440	620
		200	~3.0	~40	510	460	200	~3.0	~50	400	420
		300	~2.0	~32	450	270	300	~2.0	~35	360	250
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~150	~4.0	~63	760	1,370	~150	~4.0	~80	600	1,260
		200	~3.0	~55	660	990	200	~3.0	~65	520	910
		300	~2.0	~40	560	670	300	~2.0	~50	440	620

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 to flush the chip out.

In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

*5. In case of slotting, reduce Feed speed (V_f) to 50% or below of the above data.

 FaceMill type

Work materials	Grades	Tool dia.									
		100					125				
		No. of teeth 8N					No. of teeth 8N				
		l (mm)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)	l (mm)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~150	~4.0	~100	480	1,340	~150	~4.0	~125	380	1,060
		200	~3.0	~80	410	980	200	~3.0	~100	330	790
		300	~2.0	~60	350	700	300	~2.0	~75	280	560
Cast steel (1.7225) Below 285HB	JC8050	~150	~4.0	~100	480	1,340	~150	~4.0	~125	380	1,060
		200	~3.0	~80	410	980	200	~3.0	~100	330	790
		300	~2.0	~60	350	700	300	~2.0	~75	280	560
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~150	~4.0	~100	480	1,150	~150	~4.0	~125	380	910
		200	~3.0	~80	410	820	200	~3.0	~100	330	660
		300	~2.0	~60	350	560	300	~2.0	~75	280	450
Mold steel (1.2311, P20) 30~36HRC	JC8118	~150	~4.0	~100	410	980	~150	~4.0	~125	330	790
		200	~3.0	~80	380	760	200	~3.0	~100	310	620
		300	~2.0	~60	350	560	300	~2.0	~75	280	450
Mold steel (1.2311, P21) 38~43HRC	JC8118	~150	~3.0	~100	350	700	~150	~3.0	~125	280	560
		200	~2.5	~80	320	510	200	~2.5	~100	250	400
		300	~1.5	~60	290	350	300	~1.5	~75	230	280
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~150	~2.5	~80	290	460	~150	~2.5	~100	230	370
		200	~2.0	~60	250	300	200	~2.0	~75	200	240
		300	~1.5	~40	220	180	300	~1.5	~50	180	140
Cast iron (GG25) 160~260HB	JC8118	~150	~6.0	~100	570	1,600	~150	~6.0	~125	460	1,290
		200	~4.0	~80	480	1,150	200	~4.0	~100	380	910
		300	~2.0	~60	410	820	300	~2.0	~75	330	660
Nodular cast iron (GGG70) 170~300HB	JC8118	~150	~4.0	~100	410	980	~150	~4.0	~125	330	790
		200	~3.0	~80	380	760	200	~3.0	~100	310	620
		300	~2.0	~60	350	560	300	~2.0	~75	280	450
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~150	~4.0	~80	350	560	~150	~4.0	~100	280	450
		200	~3.0	~60	320	380	200	~3.0	~75	250	300
		300	~2.0	~40	290	230	300	~2.0	~50	230	180
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~150	~4.0	~100	480	1,150	~150	~4.0	~125	380	910
		200	~3.0	~80	410	820	200	~3.0	~100	330	660
		300	~2.0	~60	350	560	300	~2.0	~75	280	450

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 to flush the chip out.

In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

*5. In case of slotting, reduce Feed speed (V_f) to 50% or below of the above data.

Recommended cutting conditions for shoulder milling

Endmill type

Work materials	Grades	Tool dia.									
		25					32				
		No. of teeth 2N					No. of teeth 3N				
		l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	60	~10.0	~15	2,550	1,380	70	~12.0	~24	1,990	1,610
		100	~7.0	~10	2,290	1,050	120	~9.0	~18	1,790	1,240
Cast steel (1.7225) Below 285HB	JC8050	60	~10.0	~15	2,290	1,240	70	~12.0	~24	1,790	1,450
		100	~7.0	~10	2,040	940	120	~9.0	~18	1,590	1,100
Die steel (1.2344, 1.2379) Below 255HB	JC8050	60	~10.0	~15	2,550	1,380	70	~12.0	~24	1,990	1,610
		100	~7.0	~10	2,290	1,050	120	~9.0	~18	1,790	1,240
Mold steel (1.2311, P20) 30~36HRC	JC8118	60	~10.0	~15	1,910	1,030	70	~12.0	~24	1,490	1,210
		100	~7.0	~10	1,720	790	120	~9.0	~18	1,340	920
Mold steel (1.2311, P21) 38~43HRC	JC8118	60	~10.0	~12	1,530	700	70	~12.0	~18	1,190	820
		100	~7.0	~6	1,340	480	120	~9.0	~13	1,040	560
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	60	~10.0	~8	1,270	460	70	~12.0	~12	990	530
		100	~7.0	~4	1,150	320	120	~9.0	~8	900	380
Cast iron (GG25) 160~260HB	JC8118	60	~10.0	~15	3,180	1,720	70	~12.0	~24	2,490	2,020
		100	~7.0	~10	2,930	1,350	120	~9.0	~18	2,290	1,580
Nodular cast iron (GGG70) 170~300HB	JC8118	60	~10.0	~15	1,910	880	70	~12.0	~24	1,490	1,030
		100	~7.0	~10	1,660	600	120	~9.0	~18	1,290	700
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	60	~10.0	~15	1,530	550	70	~12.0	~24	1,190	640
		100	~7.0	~10	1,400	390	120	~9.0	~18	1,090	460
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	60	~10.0	~15	2,290	1,050	70	~12.0	~24	1,790	1,240
		100	~7.0	~10	2,040	730	120	~9.0	~18	1,590	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 to flush the chip out.

In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

Endmill type

Work materials	Grades	Tool dia.									
		40									
		No. of teeth 4N									
		l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)					
Carbon steel (C50, C55) Below 250HB	JC8050	50	~15.0	~30	1,590	1,720					
		100	~10.0	~20	1,430	1,320					
Cast steel (1.7225) Below 285HB	JC8050	50	~15.0	~30	1,430	1,540					
		100	~10.0	~20	1,270	1,170					
Die steel (1.2344, 1.2379) Below 255HB	JC8050	50	~15.0	~30	1,590	1,720					
		100	~10.0	~20	1,430	1,320					
Mold steel (1.2311, P20) 30~36HRC	JC8118	50	~15.0	~30	1,190	1,290					
		100	~10.0	~20	1,070	980					
Mold steel (1.2311, P21) 38~43HRC	JC8118	50	~15.0	~20	950	870					
		100	~10.0	~15	840	600					
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	50	~12.0	~12	800	580					
		100	~10.0	~8	720	400					
Cast iron (GG25) 160~260HB	JC8118	50	~15.0	~30	1,990	2,150					
		100	~10.0	~20	1,830	1,680					
Nodular cast iron (GGG70) 170~300HB	JC8118	50	~15.0	~30	1,190	1,090					
		100	~10.0	~20	1,030	740					
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	50	~15.0	~30	950	680					
		100	~10.0	~20	880	490					
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	50	~15.0	~30	1,430	1,320					
		100	~10.0	~20	1,270	910					

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 to flush the chip out.
In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

Recommended cutting conditions for face milling

Endmill type

Work materials	Grades	Tool dia.									
		25					32				
		No. of teeth 2N					No. of teeth 3N				
		l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~60	~3.0	~25	1,910	1,030	~70	~3.5	~32	1,490	1,210
		100	~2.0	~20	1,660	760	120	~2.5	~26	1,290	890
Cast steel (1.7225) Below 285HB	JC8050	~60	~3.0	~25	1,910	1,030	~70	~3.5	~32	1,490	1,210
		100	~2.0	~20	1,660	760	120	~2.5	~26	1,290	890
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~60	~3.0	~25	1,910	880	~70	~3.5	~32	1,490	1,030
		100	~2.0	~20	1,660	600	120	~2.5	~26	1,290	700
Mold steel (1.2311, P20) 30~36HRC	JC8118	~60	~3.0	~25	1,660	760	~70	~3.5	~32	1,290	890
		100	~2.0	~20	1,530	550	120	~2.5	~26	1,190	640
Mold steel (1.2311, P21) 38~43HRC	JC8118	~60	~2.0	~25	1,400	640	~70	~2.5	~32	1,090	750
		100	~1.5	~20	1,270	460	120	~2.0	~26	990	530
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~60	~1.5	~20	1,150	410	~70	~2.0	~26	900	490
		100	~1.0	~15	1,020	290	120	~1.5	~19	800	340
Cast iron (GG25) 160~260HB	JC8118	~60	~5.0	~25	2,550	1,380	~70	~5.5	~32	1,990	1,610
		100	~3.0	~20	2,290	1,050	120	~3.5	~26	1,790	1,240
Nodular cast iron (GGG70) 170~300HB	JC8118	~60	~3.0	~25	1,660	760	~70	~3.5	~32	1,290	890
		100	~2.0	~20	1,530	550	120	~2.5	~26	1,190	640
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~60	~3.0	~20	1,400	500	~70	~3.5	~26	1,090	590
		100	~2.0	~15	1,270	360	120	~2.5	~19	990	420
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~60	~3.0	~25	1,910	880	~70	~3.5	~32	1,490	1,030
		100	~2.0	~20	1,660	600	120	~2.5	~26	1,290	700

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 to flush the chip out.
In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.
- *5. In case of slotting, reduce Feed speed (V_f) to 50% or below of the above data.

Recommended cutting conditions for face milling

 Endmill type

Work materials	Grades	Tool dia.								
		40								
		No. of teeth 4N								
ℓ (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)						
Carbon steel (C50,C55) Below 250HB	JC8050	~50	~3.5	~40	1,190	1,290				
		100	~2.5	~32	1,030	950				
Cast steel (1.7225) Below 285HB	JC8050	~50	~3.5	~40	1,190	1,290				
		100	~2.5	~32	1,030	950				
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~50	~3.5	~40	1,190	1,090				
		100	~2.5	~32	1,030	740				
Mold steel (1.2311, P20) 30~36HRC	JC8118	~50	~3.5	~40	1,030	950				
		100	~2.5	~32	950	680				
Mold steel (1.2311, P21) 38~43HRC	JC8118	~50	~2.5	~40	880	810				
		100	~2.0	~32	800	580				
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~50	~2.0	~32	720	520				
		100	~1.5	~24	640	360				
Cast iron (GG25) 160~260HB	JC8118	~50	~5.5	~40	1,590	1,720				
		100	~3.5	~32	1,430	1,320				
Nodular cast iron (GGG70) 170~300HB	JC8118	~50	~3.5	~40	1,030	950				
		100	~2.5	~32	950	680				
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~50	~3.5	~32	880	630				
		100	~2.5	~24	800	450				
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~50	~3.5	~40	1,190	1,090				
		100	~2.5	~32	1,030	740				

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 to flush the chip out.
In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.
- *5. In case of slotting, reduce Feed speed (V_f) to 50% or below of the above data.

Recommended cutting conditions for shoulder milling

Modular head type

Work materials	Grades	Tool dia.									
		25					32				
		No. of teeth 2N					No. of teeth 3N				
		l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~90	~10.0	~15	2,550	1,530	~100	~12.0	~24	1,990	1,790
		140	~7.0	~10	2,290	1,150	150	~9.0	~18	1,790	1,340
		210	~4.0	~5	2,040	820	210	~6.0	~9	1,590	950
Cast steel (1.7225) Below 285HB	JC8050	~90	~10.0	~15	2,290	1,370	~100	~12.0	~24	1,790	1,610
		140	~7.0	~10	2,040	1,020	150	~9.0	~18	1,590	1,190
		210	~4.0	~5	1,780	710	210	~6.0	~9	1,390	830
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~90	~10.0	~15	2,550	1,530	~100	~12.0	~24	1,990	1,790
		140	~7.0	~10	2,290	1,150	150	~9.0	~18	1,790	1,340
		210	~4.0	~5	2,040	820	210	~6.0	~9	1,590	950
Mold steel (1.2311, P20) 30~36HRC	JC8118	~90	~10.0	~15	1,910	1,150	~100	~12.0	~24	1,490	1,340
		140	~7.0	~10	1,720	860	150	~9.0	~18	1,340	1,010
		210	~4.0	~5	1,530	610	210	~6.0	~9	1,190	710
Mold steel (1.2311, P21) 38~43HRC	JC8118	~90	~10.0	~12	1,530	770	~100	~12.0	~18	1,190	890
		140	~7.0	~6	1,340	540	150	~9.0	~13	1,040	620
		210	~4.0	~2	1,150	350	210	~6.0	~7	900	410
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~90	~10.0	~8	1,270	510	~100	~12.0	~12	990	590
		140	~7.0	~4	1,150	350	150	~9.0	~8	900	410
		210	~4.0	~2	1,020	200	210	~6.0	~3	800	240
Cast iron (GG25) 160~260HB	JC8118	~90	~10.0	~15	3,180	1,910	~100	~12.0	~24	2,490	2,240
		140	~7.0	~10	2,930	1,470	150	~9.0	~18	2,290	1,720
		210	~4.0	~5	2,670	1,070	210	~6.0	~12	2,090	1,250
Nodular cast iron (GGG70) 170~300HB	JC8118	~90	~10.0	~15	1,910	960	~100	~12.0	~24	1,490	1,120
		140	~7.0	~10	1,660	660	150	~9.0	~18	1,290	770
		210	~4.0	~5	1,400	420	210	~6.0	~9	1,090	490
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~90	~10.0	~15	1,530	610	~100	~12.0	~24	1,190	710
		140	~7.0	~10	1,400	420	150	~9.0	~18	1,090	490
		210	~4.0	~5	1,270	250	210	~6.0	~9	990	300
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~90	~10.0	~15	2,290	1,150	~100	~12.0	~24	1,790	1,340
		140	~7.0	~10	2,040	820	150	~9.0	~18	1,590	950
		210	~4.0	~5	1,780	530	210	~6.0	~9	1,390	630

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 to flush the chip out.

In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

Recommended cutting conditions for shoulder milling

Modular head type

Work materials	Grades	Tool dia.									
		35					40				
		No. of teeth 3N					No. of teeth 4N				
		l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	$a_p \times a_e$ (mm ²)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~100	~12.0	~24	1,820	1,640	~100	~15.0	~30	1,590	1,910
		150	~9.0	~18	1,640	1,230	150	~10.0	~20	1,430	1,430
		210	~6.0	~9	1,460	880	210	~8.0	~12	1,270	1,020
Cast steel (1.7225) Below 285HB	JC8050	~100	~12.0	~24	1,640	1,480	~100	~15.0	~30	1,430	1,720
		150	~9.0	~18	1,460	1,100	150	~10.0	~20	1,270	1,270
		210	~6.0	~9	1,270	760	210	~8.0	~12	1,110	890
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~100	~12.0	~24	1,820	1,640	~100	~15.0	~30	1,590	1,910
		150	~9.0	~18	1,640	1,230	150	~10.0	~20	1,430	1,430
		210	~6.0	~9	1,460	880	210	~8.0	~12	1,270	1,020
Mold steel (1.2311, P20) 30~36HRC	JC8118	~100	~12.0	~24	1,360	1,220	~100	~15.0	~30	1,190	1,430
		150	~9.0	~18	1,230	920	150	~10.0	~20	1,070	1,070
		210	~6.0	~9	1,090	650	210	~8.0	~12	950	760
Mold steel (1.2311, P21) 38~43HRC	JC8118	~100	~12.0	~18	1,090	820	~100	~15.0	~20	950	950
		150	~9.0	~13	950	570	150	~10.0	~15	840	670
		210	~6.0	~7	820	370	210	~8.0	~8	720	430
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~100	~12.0	~12	910	550	~100	~12.0	~12	800	640
		150	~9.0	~8	820	370	150	~10.0	~8	720	430
		210	~6.0	~3	730	220	210	~8.0	~3	640	260
Cast iron (GG25) 160~260HB	JC8118	~100	~12.0	~24	2,270	2,040	~100	~15.0	~30	1,990	2,390
		150	~9.0	~18	2,090	1,570	150	~10.0	~20	1,830	1,830
		210	~6.0	~12	1,910	1,150	210	~8.0	~12	1,670	1,340
Nodular cast iron (GGG70) 170~300HB	JC8118	~100	~12.0	~24	1,360	1,020	~100	~15.0	~30	1,190	1,190
		150	~9.0	~18	1,180	710	150	~10.0	~20	1,030	820
		210	~6.0	~9	1,000	450	210	~8.0	~12	880	530
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~100	~12.0	~24	1,090	650	~100	~15.0	~30	950	760
		150	~9.0	~18	1,000	450	150	~10.0	~20	880	530
		210	~6.0	~9	910	270	210	~8.0	~12	800	320
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~100	~12.0	~24	1,640	1,230	~100	~15.0	~30	1,430	1,430
		150	~9.0	~18	1,460	880	150	~10.0	~20	1,270	1,020
		210	~6.0	~9	1,270	570	210	~8.0	~12	1,110	670

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 to flush the chip out.
In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.

Recommended cutting conditions for face milling

Modular head type

Work materials	Grades	Tool dia.									
		25					32				
		No. of teeth 2N					No. of teeth 3N				
		l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~90	~3.0	~25	1,910	1,150	~100	~3.5	~32	1,490	1,340
		140	~2.0	~20	1,660	830	150	~2.5	~26	1,290	970
		210	~1.0	~15	1,400	560	210	~1.5	~19	1,090	650
Cast steel (1.7225) Below 285HB	JC8050	~90	~3.0	~25	1,910	1,150	~100	~3.5	~32	1,490	1,340
		140	~2.0	~20	1,660	830	150	~2.5	~26	1,290	970
		210	~1.0	~15	1,400	560	210	~1.5	19	1,090	650
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~90	~3.0	~25	1,910	960	~100	~3.5	~32	1,490	1,120
		140	~2.0	~20	1,660	660	150	~2.5	~26	1,290	770
		210	~1.0	~15	1,400	420	210	~1.5	~19	1,090	490
Mold steel (1.2311, P20) 30~36HRC	JC8118	~90	~3.0	~25	1,660	830	~100	~3.5	~32	1,290	970
		140	~2.0	~20	1,530	610	150	~2.5	~26	1,190	710
		210	~1.0	~15	1,400	420	210	~1.5	~19	1,090	490
Mold steel (1.2311, P21) 38~43HRC	JC8118	~90	~2.0	~25	1,400	700	~100	~2.5	~32	1,090	820
		140	~1.5	~20	1,270	510	150	~2.0	~26	990	590
		210	~1.0	~15	1,150	350	210	~1.5	~19	900	410
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~90	~1.5	~20	1,150	460	~100	~2.0	~26	900	540
		140	~1.0	~15	1,020	310	150	~1.5	~19	800	360
		210	~0.5	~10	890	180	210	~1.0	~13	700	210
Cast iron (GG25) 160~260HB	JC8118	~90	~5.0	~25	2,550	1,530	~100	~5.5	~32	1,990	1,790
		140	~3.0	~20	2,290	1,150	150	~3.5	~26	1,790	1,340
		210	~1.0	~15	2,040	820	210	~1.5	~19	1,590	950
Nodular cast iron (GGG70) 170~300HB	JC8118	~90	~3.0	~25	1,660	830	~100	~3.5	~32	1,290	970
		140	~2.0	~20	1,530	610	150	~2.5	~26	1,190	710
		210	~1.0	~15	1,400	420	210	~1.5	~19	1,090	490
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~90	~3.0	~20	1,400	560	~100	~3.5	~26	1,090	650
		140	~2.0	~15	1,270	380	150	~2.5	~19	990	450
		210	~1.0	~10	1,150	230	210	~1.5	~13	900	270
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~90	~3.0	~25	1,910	960	~100	~3.5	~32	1,490	1,120
		140	~2.0	~20	1,660	660	150	~2.5	~26	1,290	770
		210	~1.0	~15	1,400	420	210	~1.5	~19	1,090	490

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 to flush the chip out.
In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.
- *5. In case of slotting, reduce Feed speed (V_f) to 50% or below of the above data.

 Modular head type

Work materials	Grades	Tool dia.									
		35					40				
		No. of teeth 3N					No. of teeth 4N				
		l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)	l (mm)	a_p (mm)	a_e (mm)	n (min ⁻¹)	V_f (mm/min)
Carbon steel (C50, C55) Below 250HB	JC8050	~100	~3.5	~35	1,360	1,220	~100	~3.5	~40	1,190	1,430
		150	~2.5	~28	1,180	890	150	~2.5	~32	1,030	1,030
		210	~1.5	~21	1,000	600	210	~1.5	~24	880	700
Cast steel (1.7225) Below 285HB	JC8050	~100	~3.5	~35	1,360	1,220	~100	~3.5	~40	1,190	1,430
		150	~2.5	~28	1,180	890	150	~2.5	~32	1,030	1,030
		210	~1.5	~21	1,000	600	210	~1.5	~24	880	700
Die steel (1.2344, 1.2379) Below 255HB	JC8050	~100	~3.5	~35	1,360	1,020	~100	~3.5	~40	1,190	1,190
		150	~2.5	~28	1,180	710	150	~2.5	~32	1,030	820
		210	~1.5	~21	1,000	450	210	~1.5	~24	880	530
Mold steel (1.2311, P20) 30~36HRC	JC8118	~100	~3.5	~35	1,180	890	~100	~3.5	~40	1,030	1,030
		150	~2.5	~28	1,090	650	150	~2.5	~32	950	760
		210	~1.5	~21	1,000	450	210	~1.5	~24	880	530
Mold steel (1.2311, P21) 38~43HRC	JC8118	~100	~2.5	~35	1,000	750	~100	~2.5	~40	880	880
		150	~2.0	~28	910	550	150	~2.0	~32	800	640
		210	~1.5	~21	820	370	210	~1.5	~24	720	430
Hardened die steel (1.2344, 1.2379) 42~52HRC	JC8118	~100	~2.0	~28	820	490	~100	~2.0	~32	720	580
		150	~1.5	~21	730	330	150	~1.5	~24	640	380
		210	~1.0	~14	640	190	210	~1.0	~16	560	220
Cast iron (GG25) 160~260HB	JC8118	~100	~5.5	~35	1,820	1,640	~100	~5.5	~40	1,590	1,910
		150	~3.5	~28	1,640	1,230	150	~3.5	~32	1,430	1,430
		210	~1.5	~21	1,460	880	210	~1.5	~24	1,270	1,020
Nodular cast iron (GGG70) 170~300HB	JC8118	~100	~3.5	~35	1,180	890	~100	~3.5	~40	1,030	1,030
		150	~2.5	~28	1,090	650	150	~2.5	~32	950	760
		210	~1.5	~21	1,000	450	210	~1.5	~24	880	530
Stainless steel Austenitic (AISI 304, 316, 317)	JC8050	~100	~3.5	~28	1,000	600	~100	~3.5	~32	880	700
		150	~2.5	~21	910	410	150	~2.5	~24	800	480
		210	~1.5	~14	820	250	210	~1.5	~16	720	290
Stainless steel Ferritics/Martensitic (AISI 403, 420J2, 430)	JC8118	~100	~3.5	~35	1,360	1,020	~100	~3.5	~40	1,190	1,190
		150	~2.5	~28	1,180	710	150	~2.5	~32	1,030	820
		210	~1.5	~21	1,000	450	210	~1.5	~24	880	530

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 to flush the chip out.
In particular, Please pay attention to chip disposal when machining cavities with a vertical MC.
- *5. In case of slotting, reduce Feed speed (V_f) to 50% or below of the above data.



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