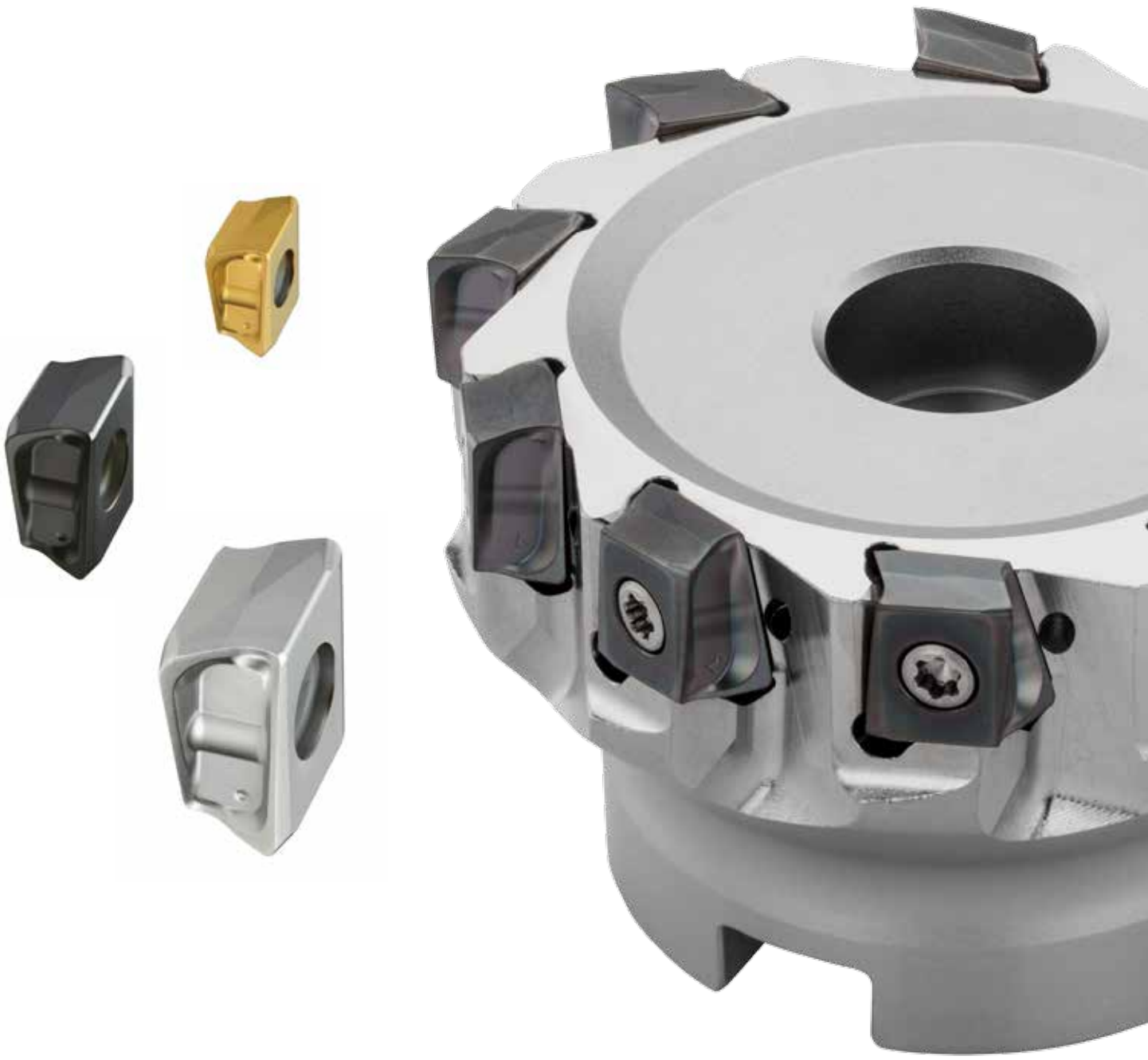
2018.04

VPX SERIES

BOOST MILLING PERFORMANCE WITH A TOUGH TANGENTIAL INSERT CUTTER



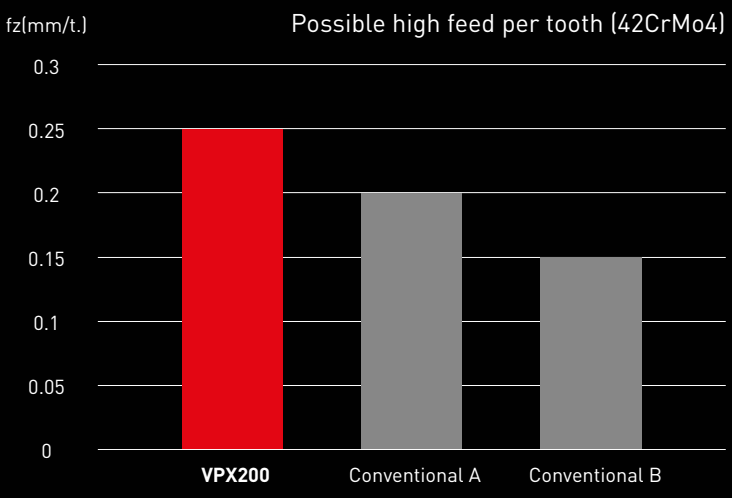
DIAEDGE

MITSUBISHI MATERIALS

TOUGH & MULTI-FUNCTIONAL

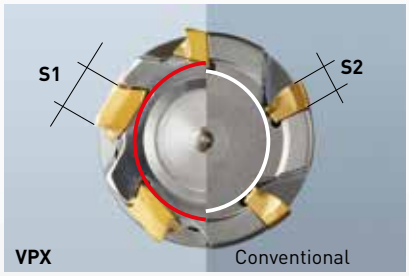
VPX SERIES

Extreme rigidity and functionality.
Thoroughly designed to completely
change the thinking on tangential cutters.



ABOUT TOUGH

PURSUING THE TOUGH MACHINING CHARACTERISTICS OF TANGENTIAL BLADE INSERTS



Arranging the inserts tangentially secures high holder rigidity. The section that is subjected to the highest loads during machining is larger (S1>S2), therefore providing higher fracture resistance and utilisation for high efficiency machining.

The large insert seating surfaces provides extra secure insert clamping. This suppresses any deflection of the insert caused by vibrations during machining.

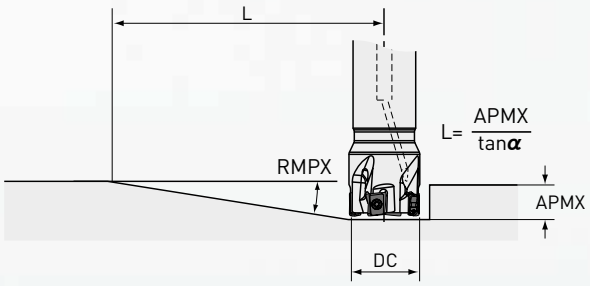
COMMENTS FROM THE DEVELOPERS

Durability born through repeated destructive tests.

In order to improve durability, development began by first applying ever increasing loads to the cutter until breakage occurred. The process of repeated design modification and destructive testing proceeded until a cutter with outstanding durability was produced. Thus the goal for a tool that was highly suitable for reliable, unmanned operation and high efficiency machining was achieved.

ABOUT MULTI

SOLVING PROBLEMS AS A MULTI-FUNCTIONAL CUTTER



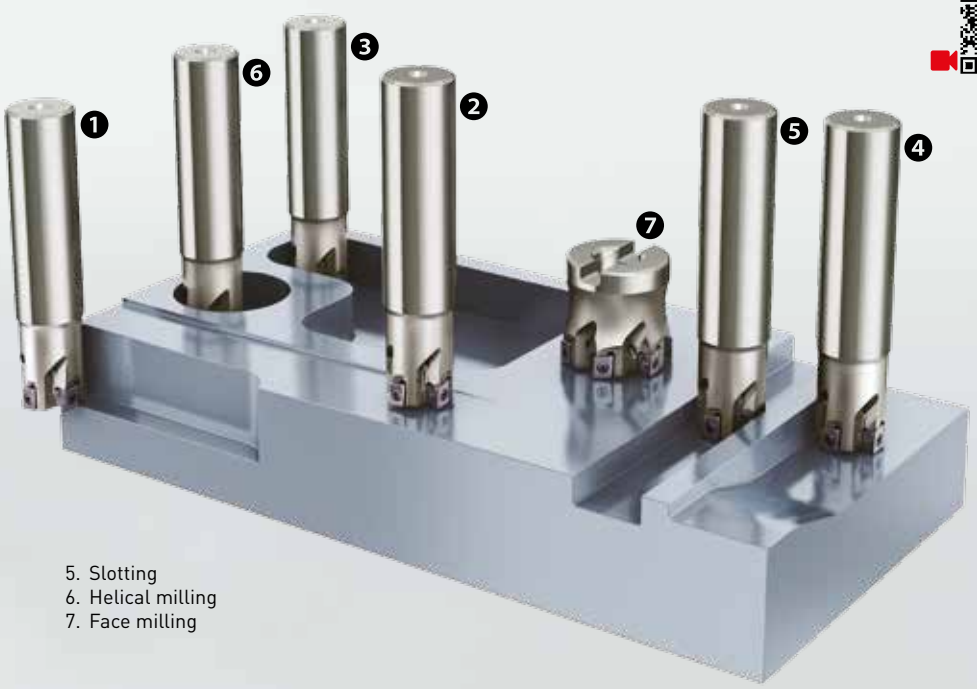
COMMENTS FROM THE DEVELOPERS

Industry problems solved through trial and error.

The surface-to-surface balance of the insert is what allows the multi-functionality of ramping to be achieved, while simultaneously maintaining a good chip ejection and cutting performance inherent to tangential insert cutters.

Most tangential insert cutters must be changed with dedicated inserts when ramping is required. It was a priority to unify these two styles of inserts, to avoid the trouble of managing two types of inserts, and to prevent installation mistakes. By focusing on the design of these new inserts, and through repeated trial and error, one of the metal cutting industries major dilemmas was resolved.

DIFFERENT METHODS OF MACHINING TO COVER A WIDE VARIETY OF APPLICATIONS

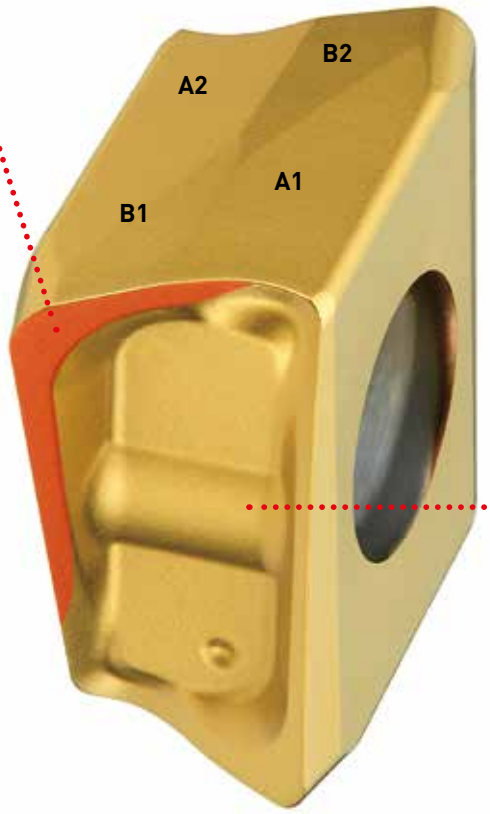


1. Shoulder milling
2. Ramping
3. Pocketing
4. 3D Profiling
5. Slotting
6. Helical milling
7. Face milling

VPX INSERTS

DOUBLE-SIDED TANGENTIAL INSERT THAT HAS REVOLUTIONIZED MULTI-FUNCTIONAL MILLING

Single flat surface rake face improves chip ejection



Two-sided structure supports insert performance

A) Makes ramping possible
B) Enables good surface finishes

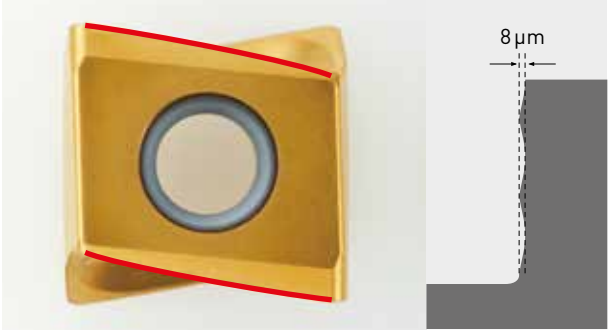
Improved insert strength with a convex location bar

COMMENTS FROM THE DEVELOPERS

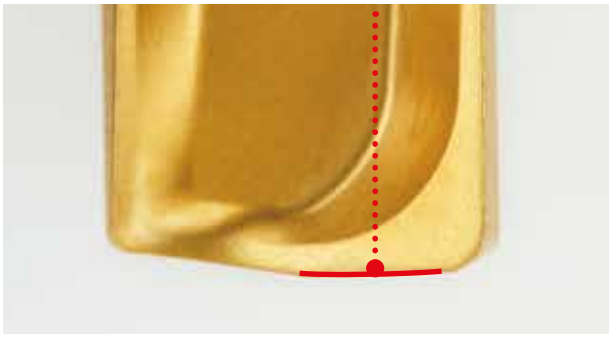
An insert shape that was possible to design, but difficult to commercialise.

The geometry of the insert provides the required toughness togther with the ability for multi-functionality. Extreme challenges had to be overcome to develop the prototype into a stable shape that could be effectively and viably produced. This product, which has finally been commercialised through repeated improvements, is known as one of the jewels of Mitsubishi Materials technologies.

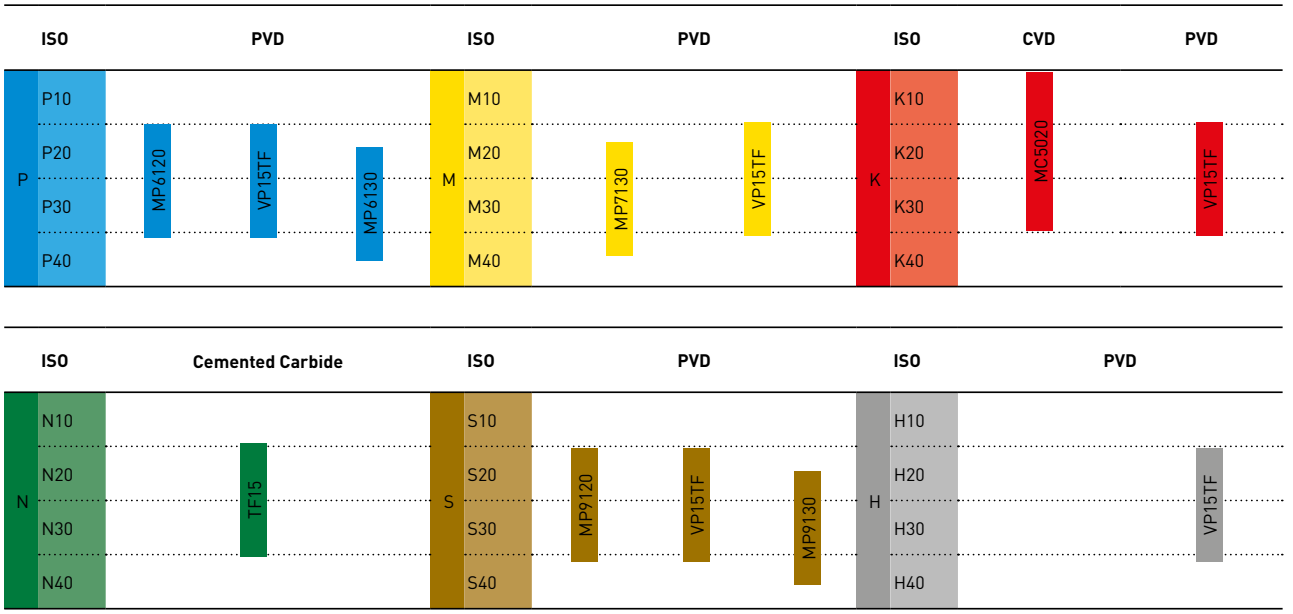
Highly accurate wall surfaces



Minor cutting edge with large radius achieves good surface finishes



INSERT GRADES FOR A WIDE RANGE OF MATERIALS



MP6100/MP7100/MP9100 SERIES

TOUGH-∑ Technology

A fusion of different coating technologies; PVD and multi-layering provides extra toughness.

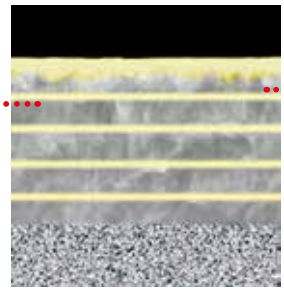
Base layer
high Al-(Al, Ti)N

The new technology Al-(Al, Ti)N coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

*Graphical Representation.

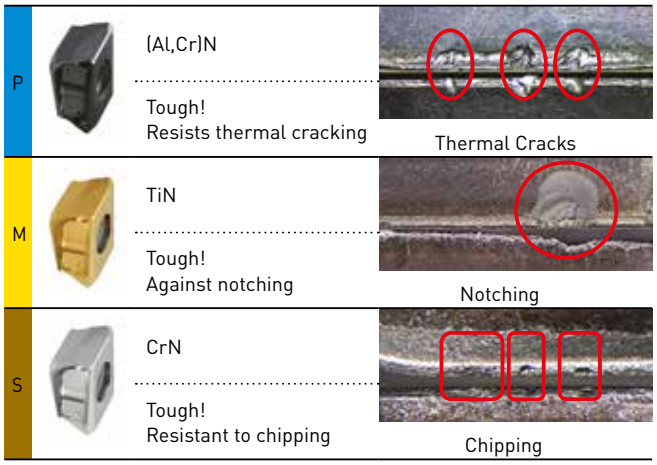
Multi-layering of the coating prevents any cracks penetrating through to the substrate.

Al-Ti-Cr-N based PVD coating



*Graphical representation.

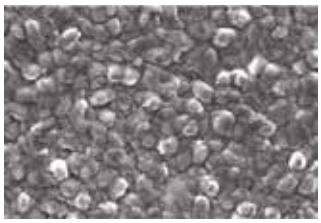
Optimum layer for each work material



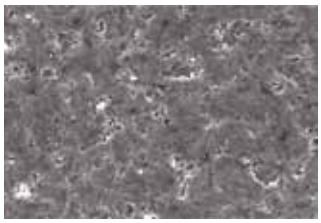
CVD COATING MC5020

First recommendation for cast iron milling. MC5020 has excellent wear resistance and also controls the thermal cracking and chipping commonly found when machining ductile cast irons.

Comparison of Coating Surface



Conventional coating



Black Super-smooth coating

Black Super-smooth coating

Black super-smooth coating prevents abnormal damage such as weld chipping.

VPX200

P M K N S H

Fig.1

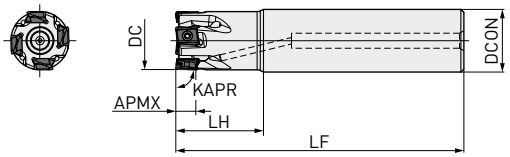
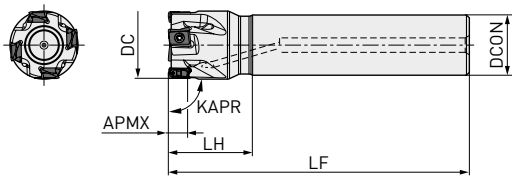


Fig.2



CYLINDRICAL SHANK

With through coolant hole

Right hand tool holder only.

(mm)

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

1. The maximum spindle speeds are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

Vc ➤ P22

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

VPX200

P M K N S H

WELDON SHANK TYPE

With through coolant hole

Fig.1

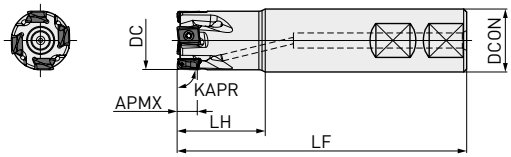
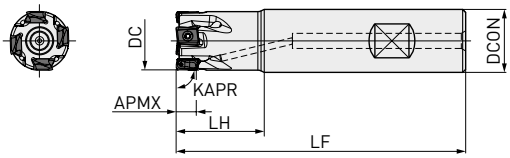


Fig.2



Right hand tool holder only.

(mm)

	Order Number	DC	Stock	Teeth	DCON	LF	LH	APMX	RMPX	Max. Spindle Speed (min^{-1})	WT (kg)	Fig.	
SHORT TYPE	VPX200R1602WA16S	16	●	2	16	73	25	8	1.85°	37900	0.09	2	LOGU09
	VPX200R2002WA20S	20	●	2	20	80	30	8	1.35°	33200	0.17	2	LOGU09
	VPX200R2003WA20S	20	●	3	20	80	30	8	1.35°	33200	0.16	2	LOGU09
	VPX200R2503WA25S	25	●	3	25	91	35	8	0.97°	29000	0.29	1	LOGU09
	VPX200R2504WA25S	25	●	4	25	91	35	8	0.97°	29000	0.29	1	LOGU09
	VPX200R3203WA32S	32	●	3	32	105	45	8	0.71°	25100	0.58	1	LOGU09
	VPX200R3204WA32S	32	●	4	32	105	45	8	0.71°	25100	0.57	1	LOGU09
	VPX200R3205WA32S	32	●	5	32	105	45	8	0.71°	25100	0.57	1	LOGU09
MEDIUM TYPE	VPX200R1602WA16M	16	●	2	16	85	37	8	1.85°	37900	0.11	1	LOGU09
	VPX200R2002WA20M	20	●	2	20	100	50	8	1.35°	33200	0.20	1	LOGU09
	VPX200R2003WA20M	20	●	3	20	100	50	8	1.35°	33200	0.20	1	LOGU09
	VPX200R2503WA25M	25	●	3	25	115	59	8	0.97°	29000	0.37	1	LOGU09
	VPX200R2504WA25M	25	●	4	25	115	59	8	0.97°	29000	0.37	1	LOGU09
	VPX200R3203WA32M	32	●	3	32	125	65	8	0.71°	25100	0.68	1	LOGU09
	VPX200R3204WA32M	32	●	4	32	125	65	8	0.71°	25100	0.68	1	LOGU09
	VPX200R3205WA32M	32	●	5	32	125	65	8	0.71°	25100	0.68	1	LOGU09

1. The maximum spindle speeds are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

Vc ➤ P22

SPARE PARTS

(mm)

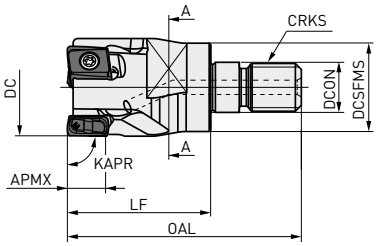
Tool Holder Type	DC	Clamp Screw	Wrench	Anti-seize Lubricant
VPX200R16	16	TPS27F1	TIP07F	MK1KS
VPX200R18	18	TPS27F1	TIP07F	MK1KS
VPX200R20	20	TPS27F1	TIP07F	MK1KS
VPX200R22	22	TPS27F2	TIP07F	MK1KS
VPX200R25	25	TPS27F2	TIP07F	MK1KS
VPX200R28	28	TPS27F2	TIP07F	MK1KS
VPX200R30	30	TPS27F2	TIP07F	MK1KS
VPX200R32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

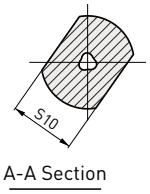
* Clamp Torque (N • m) : TPS27F1 = 1.0,TPS27F2 = 1.0

VPX200

90° KAPR

P M K N S H





A-A Section

SCREW-IN TYPE

Right hand tool holder only.

With through coolant hole

(mm)

Order Number	DC	Stock	Teeth	DCON	DCSFMS	OAL	LF	S10	CRKS	WT (kg)	APMX	RMPX	
VPX200R1602AM0830	16	●	2	8.5	14.5	48	30	10	M08	0.03	8	1.85°	LOGU09
VPX200R1802AM0830	18	★	2	8.5	14.5	48	30	10	M08	0.04	8	1.56°	LOGU09
VPX200R2002AM1030	20	●	2	10.5	18.5	49	30	14	M10	0.06	8	1.35°	LOGU09
VPX200R2003AM1030	20	●	3	10.5	18.5	49	30	14	M10	0.06	8	1.35°	LOGU09
VPX200R2202AM1030	22	★	2	10.5	18.5	49	30	14	M10	0.06	8	1.16°	LOGU09
VPX200R2203AM1030	22	★	3	10.5	18.5	49	30	14	M10	0.06	8	1.16°	LOGU09
VPX200R2503AM1235	25	●	3	12.5	23.5	57	35	19	M12	0.11	8	0.97°	LOGU09
VPX200R2504AM1235	25	●	4	12.5	23.5	57	35	19	M12	0.11	8	0.97°	LOGU09
VPX200R3203AM1640	32	●	3	17	28.5	63	40	24	M16	0.21	8	0.71°	LOGU09
VPX200R3204AM1640	32	●	4	17	28.5	63	40	24	M16	0.21	8	0.71°	LOGU09
VPX200R3205AM1640	32	●	5	17	28.5	63	40	24	M16	0.21	8	0.71°	LOGU09
VPX200R3503AM1640	35	★	3	17	28.5	63	40	24	M16	0.24	8	0.63°	LOGU09
VPX200R3505AM1640	35	★	5	17	28.5	63	40	24	M16	0.23	8	0.63°	LOGU09
VPX200R4004AM1640	40	●	4	17	28.5	63	40	24	M16	0.26	8	0.54°	LOGU09
VPX200R4006AM1640	40	●	6	17	28.5	63	40	24	M16	0.26	8	0.54°	LOGU09

1. For screw-in type arbors, refer to page 20.

Vc ➤ P22

SPARE PARTS

(mm)

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

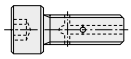
* Clamp Torque (N • m) : TPS27F1 = 1.0, TPS27F2 = 1.0

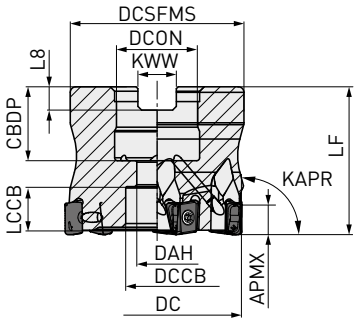
● : Inventory maintained. ★ : Inventory maintained in Japan.

VPX200

90° KAPR

P M K N S H

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



Right hand tool holder only.

ARBOR TYPE

With through coolant hole

GAMP :–6° T :+5°
GAMF :–25° I :+4° (mm)

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

1. The maximum spindle speeds are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

Vc ➤ P22

MOUNTING DIMENSIONS

(mm)

Order Number	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8
VPX200-032A03AR	18	9	14	8	30	8.4	5.6
VPX200-032A05AR	18	9	14	8	30	8.4	5.6
VPX200-040A04AR	18	9	14	13	37	8.4	5.6
VPX200-040A06AR	18	9	14	13	37	8.4	5.6
VPX200-050A05AR	20	11	17	11	47	10.4	6.3
VPX200-050A07AR	20	11	17	11	47	10.4	6.3
VPX200-063A06AR	20	11	17	11	60	10.4	6.3
VPX200-063A09AR	20	11	17	11	60	10.4	6.3

SPARE PARTS

(mm)

Tool Holder Type	DC	* Clamp Screw	Wrench	Anti-seize Lubricant
VPX200-032	32	TPS27F2	TIP07F	MK1KS
VPX200-040	40	TPS27F2	TIP07F	MK1KS
VPX200-050	50	TPS27F2	TIP07F	MK1KS
VPX200-063	63	TPS27F2	TIP07F	MK1KS

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

VPX200

INSERTS

(mm)

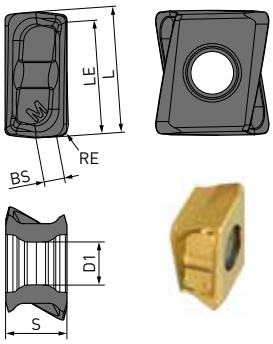
		MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15
P	Steel		◔	✣				◔	
M	Stainless Steel				◔			◔	
K	Cast Iron	◔						✣	
N	Non-ferrous Material								◔
S	Heat-resistant Alloy, Titanium Alloy					◔	✣	◔	
H	Hardened Steel							◔	

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

Honing :
E : Round F : Sharp

Order Number	Class	Honing	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	L	RE	LE	S	BS	D1
LOGU0904020PNER-M	G	E	★	★	★	★	★	★	★		8.7	0.2	7.6	4.3	1.7	3
LOGU0904040PNER-M	G	E	●	●	●	●	●	●	★		8.7	0.4	7.6	4.3	1.6	3
LOGU0904080PNER-M	G	E	●	●	●	●	●	●	★		8.7	0.8	7.6	4.3	1.2	3
LOGU0904100PNER-M	G	E	★	★	★	★	★	★	★		8.7	1	7.6	4.3	1	3
LOGU0904120PNER-M	G	E	★	★	★	★	★	★	★		8.7	1.2	7.6	4.3	0.9	3
LOGU0904160PNER-M	G	E	●	●	●	●	●	●	★		8.7	1.6	7.6	4.3	0.5	3
LOGU0904020PNFR-M	G	F								●	8.7	0.2	7.6	4.3	1.7	3
LOGU0904040PNFR-M	G	F								●	8.7	0.4	7.6	4.3	1.6	3
LOGU0904080PNFR-M	G	F								●	8.7	0.8	7.6	4.3	1.2	3
LOGU0904100PNFR-M	G	F								★	8.7	1	7.6	4.3	1	3
LOGU0904120PNFR-M	G	F								★	8.7	1.2	7.6	4.3	0.9	3
LOGU0904160PNFR-M	G	F								★	8.7	1.6	7.6	4.3	0.5	3

Geometry

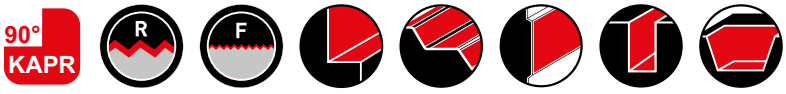


Right hand insert only.

■ : MIRACLE SIGMA ● : Inventory maintained. ★ : Inventory maintained in Japan.

MEMO

VPX300



P M K N S H

Fig.1

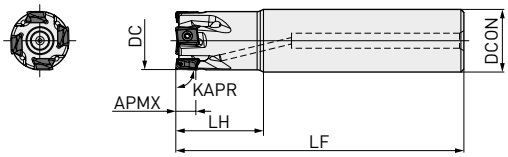
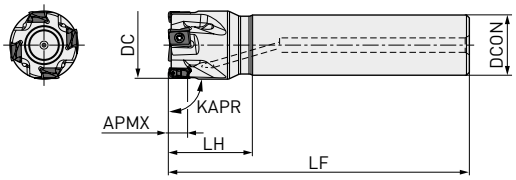


Fig.2



CYLINDRICAL SHANK TYPE

With through coolant hole

Right hand tool holder only.

(mm)

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

1. The maximum spindle speeds are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

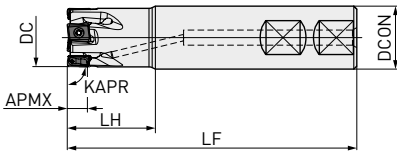
➤P30

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

VPX300

P M K N S H

Fig.1



Right hand tool holder only.

WELDON SHANK TYPE

With through coolant hole

(mm)

	Order Number	DC	Stock	Teeth	DCON	LF	LH	APMX	RMPX	Max. Spindle Speed (min^{-1})	WT (kg)	Fig.	
SHORT TYPE	VPX300R2502WA25S	25	●	2	25	91	35	11	2.13°	24100	0.29	1	LOGU12
	VPX300R3202WA32S	32	●	2	32	105	45	11	1.47°	20600	0.56	1	LOGU12
	VPX300R3203WA32S	32	●	3	32	105	45	11	1.47°	20600	0.55	1	LOGU12

1. The maximum spindle speeds are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

Vc ➤P30

SPARE PARTS

(mm)

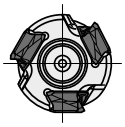
Tool Holder Type	DC			
		Clamp Screw	Wrench	Anti-seize Lubricant
VPX300R25	25	TPS40F1	TIP15W	MK1KS
VPX300R28	28	TPS40F1	TIP15W	MK1KS
VPX300R30	30	TPS40F1	TIP15W	MK1KS
VPX300R32	32	TPS40F1	TIP15W	MK1KS
VPX300R35	35	TPS40F1	TIP15W	MK1KS
VPX300R40	40	TPS40F1	TIP15W	MK1KS
VPX300R50	50	TPS40F1	TIP15W	MK1KS

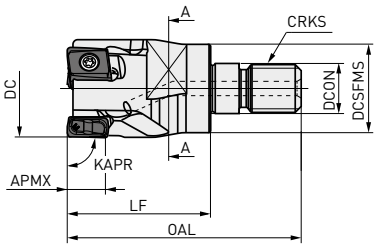
* Clamp Torque (N • m) : TPS40F1 = 3.0

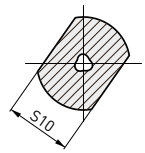
VPX300

90° KAPR

P M K N S H







A-A Section

SCREW-IN TYPE

Right hand tool holder only.

With through coolant hole

(mm)

Order Number	DC	Stock	Teeth	DCON	DCSFMS	OAL	LF	S10	CRKS	WT (kg)	APMX	RMPX	
VPX300R2502AM1235	25	●	2	12.5	23.5	57	35	19	M12	0.10	11	2.13°	LOGU12
VPX300R2802AM1235	28	★	2	12.5	23.5	57	35	19	M12	0.12	11	1.77°	LOGU12
VPX300R3202AM1640	32	●	2	17	28.5	63	40	24	M16	0.20	11	1.47°	LOGU12
VPX300R3203AM1640	32	●	3	17	28.5	63	40	24	M16	0.19	11	1.47°	LOGU12
VPX300R3502AM1640	35	★	2	17	28.5	63	40	24	M16	0.22	11	1.28°	LOGU12
VPX300R3503AM1640	35	★	3	17	28.5	63	40	24	M16	0.22	11	1.28°	LOGU12
VPX300R4003AM1640	40	●	3	17	28.5	63	40	24	M16	0.26	11	1.06°	LOGU12
VPX300R4004AM1640	40	●	4	17	28.5	63	40	24	M16	0.26	11	1.06°	LOGU12

1. For screw-in type arbors, refer to page 20.

Vc ➤P30

SPARE PARTS

(mm)

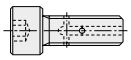
Tool Holder Type	DC	Clamp Screw	Wrench	Anti-seize Lubricant
VPX300R25	25	TPS40F1	TIP15W	MK1KS
VPX300R28	28	TPS40F1	TIP15W	MK1KS
VPX300R30	30	TPS40F1	TIP15W	MK1KS
VPX300R32	32	TPS40F1	TIP15W	MK1KS
VPX300R35	35	TPS40F1	TIP15W	MK1KS
VPX300R40	40	TPS40F1	TIP15W	MK1KS
VPX300R50	50	TPS40F1	TIP15W	MK1KS

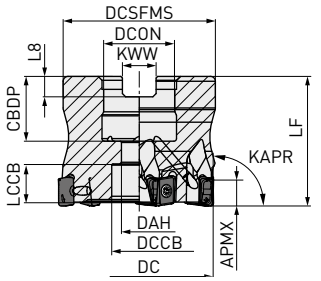
* Clamp Torque (N • m) : TPS40F1 = 3.0

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

VPX300

P M K N S H

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



Right hand tool holder only.

ARBOR TYPE

With through coolant hole

GAMP :–6° T :+5°
GAMF :–22.5° I :+5° (mm)

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

1. The maximum spindle speeds are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

Vc ➤P30

MOUNTING DIMENSIONS

(mm)

Order Number	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8
VPX300-040A03AR	18	9	14	12.4	37	8.4	5.6
VPX300-040A04AR	18	9	14	12.4	37	8.4	5.6
VPX300-050A04AR	20	11	17	10.4	47	10.4	6.3
VPX300-050A06AR	20	11	17	10.4	47	10.4	6.3
VPX300-063A06AR	20	11	17	10.4	60	10.4	6.3
VPX300-063A08AR	20	11	17	10.4	60	10.4	6.3
VPX300-080A07AR	23	13	20	13.4	56	12.4	7
VPX300-080A10AR	23	13	20	13.4	56	12.4	7

SPARE PARTS

(mm)

Tool Holder Type	DC	* Clamp Screw	Wrench	Anti-seize Lubricant
VPX300-040	40	TPS40F1	TIP15W	MK1KS
VPX300-050	50	TPS40F1	TIP15W	MK1KS
VPX300-063	63	TPS40F1	TIP15W	MK1KS
VPX300R080	80	TPS40F1	TIP15W	MK1KS
VPX300-080	80	TPS40F1	TIP15W	MK1KS

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

VPX300

INSERTS

(mm)

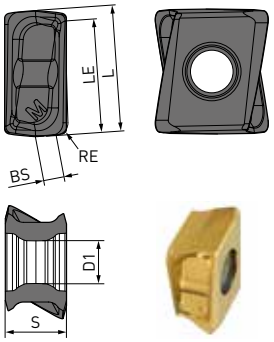
P	Steel			◔	✣				◔	
M	Stainless Steel					◔			◔	
K	Cast Iron		◔						✣	
N	Non-ferrous Material									◔
S	Heat-resistant Alloy, Titanium Alloy						◔	✣	◔	
H	Hardened Steel								◔	

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

Honing :
E : Round F : Sharp

Order Number	Class	Honing	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	L	RE	LE	S	BS	D1
LOGU1207020PNER-M	G	E	★	★	★	★	★	★	★		12.4	0.2	11.3	7.0	3.0	4.4
LOGU1207040PNER-M	G	E	●	●	●	●	●	●	★		12.4	0.4	11.3	7.0	2.8	4.4
LOGU1207080PNER-M	G	E	●	●	●	●	●	●	★		12.4	0.8	11.3	7.0	2.4	4.4
LOGU1207100PNER-M	G	E	★	★	★	★	★	★	★		12.4	1.0	11.3	7.0	2.3	4.4
LOGU1207120PNER-M	G	E	●	●	●	●	●	●	★		12.4	1.2	11.3	7.0	2.1	4.4
LOGU1207160PNER-M	G	E	●	●	●	●	●	●	★		12.4	1.6	11.3	7.0	1.7	4.4
LOGU1207200PNER-M	G	E	●	●	●	●	●	●	★		12.4	2.0	11.3	7.0	1.4	4.4
LOGU1207240PNER-M	G	E	●	●	●	●	●	●	★		12.4	2.4	11.3	7.0	1.0	4.4
LOGU1207300PNER-M	G	E	★	★	★	★	★	★	★		12.4	3.0	11.3	7.0	0.5	4.4
LOGU1207320PNER-M	G	E	●	●	●	●	●	●	★		12.4	3.2	11.3	7.0	0.3	4.4
LOGU1207020PNFR-M	G	F								★	12.4	0.2	11.3	7.0	3.0	4.4
LOGU1207040PNFR-M	G	F								●	12.4	0.4	11.3	7.0	2.8	4.4
LOGU1207080PNFR-M	G	F								●	12.4	0.8	11.3	7.0	2.4	4.4
LOGU1207100PNFR-M	G	F								★	12.4	1.0	11.3	7.0	2.3	4.4
LOGU1207120PNFR-M	G	F								●	12.4	1.2	11.3	7.0	2.1	4.4
LOGU1207160PNFR-M	G	F								●	12.4	1.6	11.3	7.0	1.7	4.4
LOGU1207200PNFR-M	G	F								●	12.4	2.0	11.3	7.0	1.4	4.4
LOGU1207240PNFR-M	G	F								●	12.4	2.4	11.3	7.0	1.0	4.4
LOGU1207300PNFR-M	G	F								★	12.4	3.0	11.3	7.0	0.5	4.4
LOGU1207320PNFR-M	G	F								●	12.4	3.2	11.3	7.0	0.3	4.4

Geometry



Right hand insert only.

■ : MIRACLE SIGMA ● : Inventory maintained. ★ : Inventory maintained in Japan.

MEMO

ARBORS

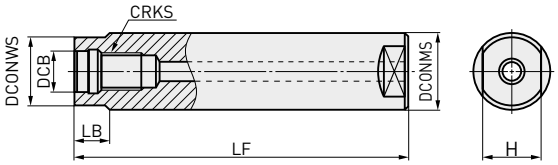
ARBORS FOR SCREW-IN TOOLS

STRAIGHT SHANK ARBOR

(mm)

	Order Number	Stock	DCB	DCONMS	DCONWS	LF	LB	H	CRKS
STEEL SHANK TYPE	SC16M08S100S	★	8.5	16	14.5	100	10	10	M8
	SC16M08S200L	★	8.5	16	14.5	200	10	10	M8
	SC20M10S120S	★	10.5	20	18.5	120	10	14	M10
	SC20M10S220L	★	10.5	20	18.5	220	10	14	M10
	SC25M12S125S	★	12.5	25	23.5	125	10	19	M12
	SC25M12S245L	★	12.5	25	23.5	245	10	19	M12
	SC32M16S140S	★	17	32	28.5	140	15	24	M16
	SC32M16S280L	★	17	32	28.5	280	15	24	M16
CARBIDE SHANK TYPE	SC16M08S100SW	★	8.5	16	14.5	100	10	10	M8
	SC16M08S200LW	★	8.5	16	14.5	200	10	10	M8
	SC20M10S120SW	★	10.5	20	18.5	120	10	14	M10
	SC20M10S220LW	★	10.5	20	18.5	220	10	14	M10
	SC25M12S125SW	★	12.5	25	23.5	125	10	19	M12
	SC25M12S245LW	★	12.5	25	23.5	245	10	19	M12
	SC32M16S140SW	★	17	32	28.5	140	15	24	M16
	SC32M16S280LW	★	17	32	28.5	280	15	24	M16

Geometry



HOW TO INSTALL THE SCREW-IN HEAD

1. Thoroughly clean the clamping section of the head and the arbor with an air blower or brush before installation.
2. Tighten the head to the recommended torque and ensure there is no gap between the head and arbor.

Screw Size	Recommended Torque (N • m)	Wrench Size (mm)
M8	23	10
M10	46	14
M12	80	19
M16	90	24

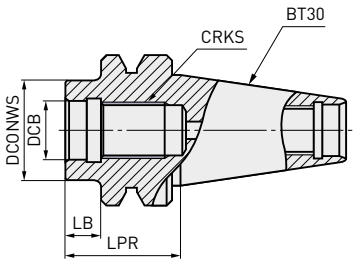
Cutting tools become extremely hot during cutting. Never touch them with bare hands after operation as this may produce risk of injuries or burns. Do not handle the cutting tools with bare hands as this may cause injuries.

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

BT30 SHANK ARBOR

(mm)

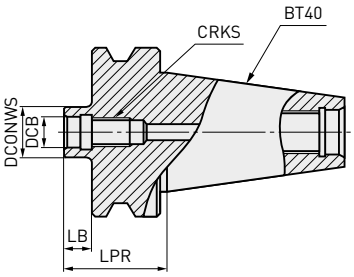
Order Number	Stock	DCB	DCONWS	LPR	LB	CRKS
SC16M08S10-BT30	★	8.5	14.5	32	10	M8
SC20M10S10-BT30	★	10.5	18.5	32	10	M10
SC25M12S10-BT30	★	12.5	23.5	32	10	M12
SC32M16S10-BT30	★	17.0	28.5	32	10	M16



BT40 SHANK ARBOR

(mm)

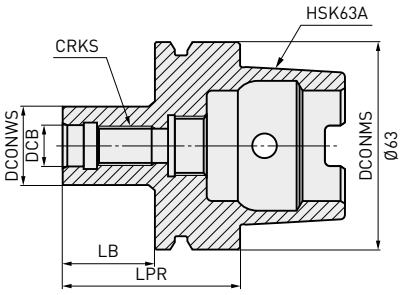
Order Number	Stock	DCB	DCONWS	LPR	LB	CRKS
SC16M08S10-BT40	★	8.5	14.5	37	10	M8
SC20M10S10-BT40	★	10.5	18.5	37	10	M10
SC25M12S10-BT40	★	12.5	23.5	37	10	M12
SC32M16S10-BT40	★	17.0	28.5	37	10	M16



HSK63A SHANK ARBOR

(mm)

Order Number	Stock	DCB	DCONWS	LPR	LB	CRKS
SC16M08S22-HSK63A	★	8.5	14.5	48	22	M8
SC20M10S24-HSK63A	★	10.5	18.5	50	24	M10
SC25M12S27-HSK63A	★	12.5	23.5	53	27	M12
SC32M16S28-HSK63A	★	17.0	28.5	54	28	M16



VPX200

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED / DRY CUTTING

	Work Material	Properties	Cutting Conditions	Insert Grade	Insert Chip Breaker	ae <0.25x DC	ae 0.25–0.5 DC	ae 0.5–0.75 DC	ae 1.0 DC
						Vc (m/min)			
P	Mild Steel	<180HB	● ●	MP6120	M	230 (180–270)	220 (170–260)	180 (140–210)	180 (140–210)
			● ●	VP15TF	M	230 (180–270)	220 (170–260)	180 (140–210)	180 (140–210)
			✲	MP6130	M	200 (150–240)	190 (140–230)	150 (110–180)	150 (110–180)
	Carbon Steel Alloy Steel Alloy Tool Steel	180–350HB <350HB	● ●	MP6120	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
			● ●	VP15TF	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
			✲	MP6130	M	150 (110–180)	140 (100–170)	110 (80–130)	110 (80–130)
	Pre-hardened Steel	35–45HRC	● ●	MP6120	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
			● ●	VP15TF	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
			✲	MP6130	M	100 (80–120)	90 (70–110)	80 (60–100)	80 (60–100)
M	Austenitic Stainless Steel	<200HB	● ● ✲	MP7130	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
			● ●	VP15TF	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
		>200HB	● ● ✲	MP7130	M	150 (110–180)	140 (100–160)	110 (80–130)	110 (80–130)
			● ●	VP15TF	M	150 (110–180)	140 (100–160)	110 (80–130)	110 (80–130)
	Duplex Stainless Steel	<280HB	● ● ✲	MP7130	M	140 (110–170)	130 (90–150)	100 (70–120)	100 (70–120)
			● ●	VP15TF	M	140 (110–170)	130 (90–150)	100 (70–120)	100 (70–120)
	Ferritic and Martensitic Stainless Steel		● ● ✲	MP7130	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
			● ●	VP15TF	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
	Precipitation Hardening Stainless Steel	<450HB	● ● ✲	MP7130	M	130 (100–160)	120 (80–140)	90 (60–110)	90 (60–110)
			● ●	VP15TF	M	130 (100–160)	120 (80–140)	90 (60–110)	90 (60–110)
K	Gray Cast Iron	<350MPa	● ●	MC5020	M	250 (200–300)	240 (190–290)	210 (160–260)	210 (160–260)
			● ●	VP15TF	M	200 (150–250)	190 (140–240)	160 (110–210)	160 (110–210)
	Ductile Cast Iron	<800MPa	● ●	MC5020	M	180 (150–200)	170 (140–190)	150 (120–170)	150 (120–170)
			● ● ✲	VP15TF	M	130 (100–150)	120 (90–140)	100 (80–120)	100 (80–120)
N	Aluminium Alloy	Si<5%	● ● ✲	TF15	M	600 (400–1000)	600 (400–1000)	600 (400–1000)	600 (400–1000)
H	Hardened Steel	40–55HRC	● ● ✲	VP15TF	M	90 (70–100)	85 (60–100)	70 (50–80)	70 (50–80)

1. These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.
   If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.
2. Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommendedation or below.
3. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

DEPTH OF CUT / FEED PER TOOTH

	Work Material	Properties	ae	Cutting Conditions	DC Ø16–Ø18 ap	DC Ø16–Ø18 fz (mm/t.)	DC Ø20–Ø25 ap	DC Ø20–Ø25 fz (mm/t.)	DC Ø28–Ø63 ap	DC Ø28–Ø63 fz (mm/t.)
P	Mild Steel	<180HB	<0.25DC	● ● ✲	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.25
			0.25–0.5DC	● ● ✲	<5	0.08–0.12	<8	0.1–0.15	<8	0.1–0.2
			0.5–0.75DC	● ● ✲	<4	0.08–0.12	<6	0.08–0.12	<6	0.1–0.15
			1.0 DC	● ● ✲	<2	0.06–0.1	<4	0.06–0.1	<4	0.08–0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	180–280HB	<0.25DC	● ● ✲	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.25
			0.25–0.5DC	● ● ✲	<5	0.08–0.12	<8	0.1–0.15	<8	0.1–0.2
			0.5–0.75DC	● ● ✲	<4	0.08–0.12	<6	0.08–0.12	<6	0.1–0.15
			1.0 DC	● ● ✲	<2	0.06–0.1	<4	0.06–0.1	<4	0.08–0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	280–350HB <350HB (Annealing)	<0.25DC	● ● ✲	<6	0.1–0.15	<8	0.1–0.15	<8	0.1–0.2
			0.25–0.5DC	● ● ✲	<5	0.08–0.12	<8	0.08–0.12	<8	0.1–0.15
			0.5–0.75DC	● ● ✲	<4	0.08–0.12	<6	0.06–0.1	<6	0.08–0.12
			1.0 DC	● ● ✲	<2	0.06–0.1	<4	0.06–0.1	<4	0.05–0.1
	Pre-hardened Steel	35–45HRC	<0.25DC	● ● ✲	<6	0.1–0.15	<8	0.1–0.15	<8	0.1–0.2
			0.25–0.5DC	● ● ✲	<5	0.08–0.12	<8	0.08–0.12	<8	0.1–0.15
			0.5–0.75DC	● ● ✲	<4	0.08–0.12	<6	0.06–0.1	<6	0.08–0.12
			1.0 DC	● ● ✲	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1

DEPTH OF CUT / FEED PER TOOTH

	Work Material	Properties	ae	Cutting Conditions	DC Ø16–Ø18 ap	Ø16–Ø18 fz (mm/t.)	Ø20–Ø25 ap	Ø20–Ø25 fz (mm/t.)	Ø28–Ø63 ap	Ø28–Ø63 fz (mm/t.)
M	Austenitic Stainless Steel	–	<0.25 DC		<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
					<6	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
			0.25–0.5 DC		<5	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
					<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC		<4	0.06–0.1	<6	0.08–0.12	<6	0.08–0.12
					<4	0.06–0.08	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC		<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
					<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.08
	Duplex Stainless Steel	<280HB	<0.25 DC		<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
					<6	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
			0.25–0.5 DC		<5	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
					<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC		<4	0.06–0.1	<6	0.08–0.12	<6	0.08–0.12
					<4	0.06–0.08	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC		<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
					<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.08
	Ferritic and Martensitic Stainless Steel	–	<0.25 DC		<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
					<6	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
			0.25–0.5 DC		<5	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
					<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC		<4	0.06–0.1	<6	0.08–0.12	<6	0.08–0.12
					<4	0.06–0.08	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC		<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
					<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.08
	Precipitation Hardening Stainless Steel	<450HB	<0.25 DC		<6	0.1–0.15	<8	0.1–0.15	<8	0.1–0.15
					<6	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
			0.25–0.5 DC		<5	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
					<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC		<4	0.06–0.1	<6	0.06–0.1	<6	0.06–0.1
					<4	0.06–0.08	<6	0.06–0.08	<6	0.06–0.08
			1.0 DC		<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
					<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.08
K	Gray Cast Iron	<350MPa	<0.25 DC		<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.25
					<6	0.08–0.12	<8	0.08–0.15	<8	0.1–0.2
			0.25–0.5 DC		<5	0.08–0.12	<8	0.08–0.15	<8	0.1–0.2
					<5	0.06–0.1	<8	0.08–0.12	<8	0.1–0.15
			0.5–0.75 DC		<4	0.08–0.12	<6	0.08–0.12	<6	0.1–0.15
					<4	0.08–0.12	<6	0.06–0.1	<6	0.08–0.12
			1.0 DC		<2	0.06–0.1	<4	0.06–0.1	<4	0.08–0.15
					<2	0.06–0.08	<4	0.06–0.08	<4	0.08–0.1
	Ductile Cast Iron	<800MPa	<0.25 DC		<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
					<6	0.08–0.12	<8	0.1–0.15	<8	0.1–0.15
			0.25–0.5 DC		<5	0.08–0.12	<8	0.1–0.15	<8	0.1–0.15
					<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC		<4	0.08–0.12	<6	0.08–0.12	<6	0.08–0.12
					<4	0.08–0.12	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC		<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
					<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.08
N	Aluminium Alloy	Si<5%	<0.25 DC		<6	0.1–0.2	<8	0.1–0.25	<8	0.1–0.25
					<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
			0.25–0.5 DC		<5	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
					<5	0.08–0.12	<8	0.1–0.15	<8	0.1–0.15
			0.5–0.75 DC		<4	0.08–0.12	<6	0.06–0.15	<6	0.08–0.15
					<4	0.06–0.1	<6	0.06–0.15	<6	0.08–0.15
			1.0 DC		<2	0.06–0.1	<4	0.06–0.15	<4	0.08–0.15
					<2	0.06–0.08	<4	0.06–0.12	<4	0.08–0.12
H	Hardened Steel	40–55HRC	<0.25 DC		<4	0.08–0.15	<4	0.08–0.15	<4	0.08–0.15
					<4	0.08–0.12	<4	0.08–0.12	<4	0.08–0.12
			0.25–0.5 DC		<3	0.08–0.12	<3	0.08–0.12	<3	0.08–0.12
					<3	0.06–0.1	<3	0.08–0.1	<3	0.06–0.1
			0.5–0.75 DC		<2	0.06–0.1	<2	0.08–0.1	<2	0.06–0.1
					<2	0.06–0.08	<2	0.06–0.08	<2	0.06–0.08
			1.0 DC		<1	0.06–0.1	<1	0.06–0.1	<1	0.06–0.1
					<1	0.06–0.08	<1	0.06–0.08	<1	0.06–0.08

1. These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.
   If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.
2. Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommendedation or below.
3. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

VPX200

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED/ WET CUTTING

	Work Material	Properties	Cutting Conditions	Insert Grade	Insert Chip Breaker	ae <0.25DC	ae 0.25–0.5DC	ae 0.5–0.75DC	ae 1.0 DC
						Vc (m/min)			
P	Mild Steel	<180HB	● ●	MP6120	M	140 (100–190)	130 (90–180)	100 (70–120)	100 (70–120)
			● ●	VP15TF	M	140 (100–190)	130 (90–180)	100 (70–120)	100 (70–120)
			✻	MP6130	M	140 (100–190)	130 (90–180)	100 (70–120)	100 (70–120)
	Carbon Steel Alloy Steel Alloy Tool Steel	180–350HB <350HB	● ●	MP6120	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
			● ●	VP15TF	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
			✻	MP6130	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
	Pre-hardened Steel	35–45HRC	● ●	MP6120	M	100 (80–120)	90 (70–110)	80 (60–100)	80 (60–100)
			● ●	VP15TF	M	100 (80–120)	90 (70–110)	80 (60–100)	80 (60–100)
			✻	MP6130	M	100 (80–120)	90 (70–110)	80 (60–100)	80 (60–100)
M	Austenitic Stainless Steel	<200HB	● ● ✻	MP7130	M	120 (100–150)	110 (90–140)	90 (70–120)	90 (70–120)
			● ●	VP15TF	M	120 (100–150)	110 (90–140)	90 (70–120)	90 (70–120)
		>200HB	● ● ✻	MP7130	M	100 (80–130)	90 (70–110)	70 (50–100)	70 (50–100)
			● ●	VP15TF	M	100 (80–130)	90 (70–110)	70 (50–100)	70 (50–100)
	Duplex Stainless Steel	<280HB	● ● ✻	MP7130	M	100 (80–130)	90 (70–120)	70 (50–100)	70 (50–100)
			● ●	VP15TF	M	100 (80–130)	90 (70–120)	70 (50–100)	70 (50–100)
	Ferritic and Martensitic Stainless Steel	–	● ● ✻	MP7130	M	120 (100–150)	110 (90–140)	90 (70–120)	90 (70–120)
			● ●	VP15TF	M	120 (100–150)	110 (90–140)	90 (70–120)	90 (70–120)
	Precipitation Hardening Stainless Steel	<450HB	● ● ✻	MP7130	M	90 (70–120)	80 (60–110)	60 (40–90)	60 (40–90)
			● ●	VP15TF	M	90 (70–120)	80 (60–110)	60 (40–90)	60 (40–90)
K	Gray Cast Iron	<350MPa	● ●	MC5020	M	180 (160–220)	170 (150–210)	150 (130–190)	150 (130–190)
			● ● ✻	VP15TF	M	130 (100–150)	120 (90–140)	100 (80–120)	100 (80–120)
	Ductile Cast Iron	<800MPa	● ●	MC5020	M	160 (140–180)	150 (130–170)	130 (110–150)	130 (110–150)
			● ● ✻	VP15TF	M	110 (80–140)	100 (70-130)	80 (60–120)	80 (60–120)
N	Aluminium Alloy	Si<5%	● ● ✻	TF15	M	600 (400–1000)	600 (400–1000)	600 (400–1000)	600 (400–1000)
S	Titanium Alloy (Ti-6Al-4V,etc.)	–	● ●	MP9120	M	50 (40–70)	50 (40–70)	50 (40–70)	50 (40–70)
			● ●	VP15TF	M	50 (40–70)	50 (40–70)	50 (40–70)	50 (40–70)
			✻	MP9130	M	40 (30–60)	40 (30–60)	40 (30–60)	40 (30–60)
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	–	● ●	MP9120	M	30 (20–40)	30 (20–40)	30 (20–40)	30 (20–40)
			● ●	VP15TF	M	30 (20–40)	30 (20–40)	30 (20–40)	30 (20–40)
			✻	MP9130	M	30 (20–40)	30 (20–40)	30 (20–40)	30 (20–40)
	Heat Resistant Alloy	–	● ●	MP9120	M	40 (30–60)	40 (30–60)	40 (30–60)	40 (30–60)
			● ●	VP15TF	M	40 (30–60)	40 (30–60)	40 (30–60)	40 (30–60)
			✻	MP9130	M	30 (20–40)	30 (20–40)	30 (20–40)	30 (20–40)
H	Hardened Steel	40–55HRC	● ● ✻	VP15TF	M	90 (70-100)	85 (60–100)	70 (50–80)	70 (50–80)

1. These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.
   If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.
2. Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommendedation or below.
3. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

DEPTH OF CUT / FEED PER TOOTH

	Work Material	Properties	ae	Cutting Conditions	DC Ø16–Ø18 ap	DC Ø16–Ø18 fz (mm/t.)	DC Ø20–Ø25 ap	DC Ø20–Ø25 fz (mm/t.)	DC Ø28–Ø63 ap	DC Ø28–Ø63 fz (mm/t.)
P	Mild Steel	<180HB	<0.25 DC	● ● ✻	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.25
			0.25–0.5 DC	● ● ✻	<5	0.1–0.15	<8	0.1–0.15	<8	0.1–0.2
			0.5–0.75 DC	● ● ✻	<4	0.08–0.12	<6	0.08–0.12	<6	0.1–0.15
			1.0 DC	● ● ✻	<2	0.06–0.1	<4	0.06–0.1	<4	0.08–0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	180–280HB	<0.25 DC	● ● ✻	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.25
			0.25–0.5 DC	● ● ✻	<5	0.08–0.12	<8	0.1–0.15	<8	0.1–0.2
			0.5–0.75 DC	● ● ✻	<4	0.08–0.12	<6	0.08–0.12	<6	0.1–0.15
			1.0 DC	● ● ✻	<2	0.06–0.1	<4	0.06–0.1	<4	0.08–0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	280–350HB <350HB	<0.25 DC	● ● ✻	<6	0.1–0.15	<8	0.1–0.15	<8	0.1–0.2
			0.25–0.5 DC	● ● ✻	<5	0.08–0.12	<8	0.08–0.12	<8	0.1–0.15
			0.5–0.75 DC	● ● ✻	<4	0.08–0.12	<6	0.06–0.1	<6	0.08–0.12
			1.0 DC	● ● ✻	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
	Pre-hardened Steel	35–45HRC	<0.25 DC	● ● ✻	<6	0.1–0.15	<8	0.1–0.15	<8	0.1–0.2
			0.25–0.5 DC	● ● ✻	<5	0.08–0.12	<8	0.08–0.12	<8	0.1–0.15
			0.5–0.75 DC	● ● ✻	<4	0.08–0.12	<6	0.06–0.1	<6	0.08–0.12
			1.0 DC	● ● ✻	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
M	Austenitic Stainless Steel	–	<0.25 DC	● ●	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
				✻	<6	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
			0.25–0.5 DC	● ●	<5	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
				✻	<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC	● ●	<4	0.06–0.1	<6	0.08–0.12	<6	0.08–0.12
				✻	<4	0.06–0.08	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC	● ●	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
				✻	<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.08
	Duplex Stainless Steel	<280HB	<0.25 DC	● ●	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
				✻	<6	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
			0.25–0.5 DC	● ●	<5	0.08–0.12	<8	0.08–0.15	<8	0.08–0.12
				✻	<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC	● ●	<4	0.06–0.1	<6	0.08–0.12	<6	0.08–0.12
				✻	<4	0.06–0.08	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC	● ●	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
				✻	<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.08
	Ferritic and Martensitic Stainless Steel	–	<0.25 DC	● ●	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
				✻	<6	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
			0.25–0.5 DC	● ●	<5	0.08–0.12	<8	0.08–0.15	<8	0.08–0.15
				✻	<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC	● ●	<4	0.06–0.1	<6	0.08–0.12	<6	0.08–0.12
				✻	<4	0.06–0.08	<6	0.06–0.1	<6	0.05–0.1
			1.0 DC	● ●	<2	0.06–0.1	<4	0.06–0.1	<4	0.05–0.1
				✻	<2	0.06–0.08	<4	0.06–0.08	<4	0.05–0.08
	Precipitation Hardening Stainless Steel	<450HB	<0.25 DC	● ●	<6	0.1–0.15	<8	0.1–0.15	<8	0.1–0.15
				✻	<6	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
			0.25–0.5 DC	● ●	<5	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
				✻	<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC	● ●	<4	0.06–0.1	<6	0.06–0.1	<6	0.05–0.1
				✻	<4	0.06–0.08	<6	0.06–0.08	<6	0.05–0.08
			1.0 DC	● ●	<2	0.06–0.1	<4	0.06–0.1	<4	0.05–0.1
				✻	<2	0.06–0.08	<4	0.06–0.08	<4	0.05–0.08
K	Gray Cast Iron	<350MPa	<0.25 DC	● ●	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.25
				✻	<6	0.08–0.12	<8	0.08–0.15	<8	0.1–0.2
			0.25–0.5 DC	● ●	<5	0.08–0.12	<8	0.08–0.15	<8	0.1–0.2
				✻	<5	0.06–0.1	<8	0.08–0.12	<8	0.1–0.15
			0.5–0.75 DC	● ●	<4	0.08–0.12	<6	0.06–0.1	<6	0.1–0.15
				✻	<4	0.08–0.12	<6	0.06–0.1	<6	0.08–0.12
			1.0 DC	● ●	<2	0.06–0.1	<4	0.06–0.1	<4	0.08–0.15
				✻	<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.1
	Ductile Cast Iron	<800MPa	<0.25 DC	● ●	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
				✻	<6	0.08–0.12	<8	0.1–0.15	<8	0.1–0.15
			0.25–0.5 DC	● ●	<5	0.08–0.12	<8	0.1–0.15	<8	0.1–0.15
				✻	<5	0.06–0.1	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC	● ●	<4	0.08–0.12	<6	0.08–0.12	<6	0.08–0.12
				✻	<4	0.08–0.12	<6	0.08–0.12	<6	0.06–0.1
			1.0 DC	● ●	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
				✻	<2	0.06–0.08	<4	0.06–0.08	<4	0.06–0.08

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RECOMMENDED CUTTING CONDITIONS

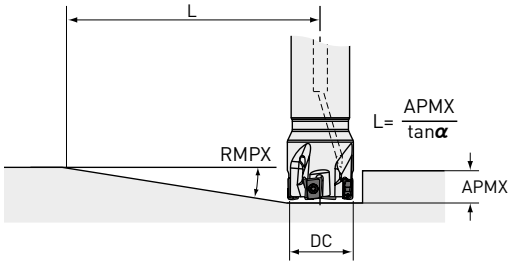
DEPTH OF CUT / FEED PER TOOTH

	Work Material	Properties	ae	Cutting Conditions	DC Ø16–Ø18 ap	DC Ø16–Ø18 fz (mm/t.)	DC Ø20–Ø25 ap	DC Ø20–Ø25 fz (mm/t.)	DC Ø28–Ø63 ap	DC Ø28–Ø63 fz (mm/t.)
N	Aluminium Alloy	Si<5%	<0.25 DC	● ◐	<6	0.1–0.2	<8	0.1–0.25	<8	0.1–0.25
				✲	<6	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
			0.25–0.5 DC	● ◐	<5	0.1–0.15	<8	0.1–0.2	<8	0.1–0.2
				✲	<5	0.08–0.12	<8	0.1–0.15	<8	0.1–0.15
			0.5–0.75 DC	● ◐	<4	0.08–0.12	<6	0.06–0.15	<6	0.08–0.15
				✲	<4	0.06–0.1	<6	0.06–0.15	<6	0.08–0.15
			1.0 DC	● ◐	<2	0.06–0.1	<4	0.06–0.15	<4	0.08–0.15
				✲	<2	0.06–0.08	<4	0.06–0.12	<4	0.08–0.12
S	Titanium Alloy (Ti-6Al-4V,etc.)	–	1.0 DC	● ◐ ✲	<6	0.08–0.15	<8	0.08–0.15	<8	0.08–0.15
			0.25–0.5 DC	● ◐ ✲	<5	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC	● ◐ ✲	<4	0.06–0.1	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC	● ◐ ✲	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	–	1.0 DC	● ◐ ✲	<6	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
			0.25–0.5 DC	● ◐ ✲	<5	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC	● ◐ ✲	<4	0.06–0.1	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC	● ◐ ✲	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
	Heat Resistant Alloy	–	1.0 DC	● ◐ ✲	<6	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
			0.25–0.5 DC	● ◐ ✲	<5	0.08–0.12	<8	0.08–0.12	<8	0.08–0.12
			0.5–0.75 DC	● ◐ ✲	<4	0.06–0.1	<6	0.06–0.1	<6	0.06–0.1
			1.0 DC	● ◐ ✲	<2	0.06–0.1	<4	0.06–0.1	<4	0.06–0.1
H	Hardened Steel	40–55HRC	1.0 DC	● ◐	<4	0.08–0.15	<4	0.08–0.15	<4	0.08–0.15
				✲	<4	0.08–0.12	<4	0.08–0.12	<4	0.08–0.12
			0.25–0.5 DC	● ◐	<3	0.08–0.12	<3	0.08–0.12	<3	0.08–0.12
				✲	<3	0.06–0.1	<3	0.06–0.1	<3	0.06–0.1
			0.5–0.75 DC	● ◐	<2	0.06–0.1	<2	0.06–0.1	<2	0.06–0.1
				✲	<2	0.06–0.1	<2	0.06–0.1	<2	0.06–0.1
			1.0 DC	● ◐	<1	0.06–0.1	<1	0.06–0.1	<1	0.06–0.1
				✲	<1	0.06–0.1	<1	0.06–0.1	<1	0.06–0.1

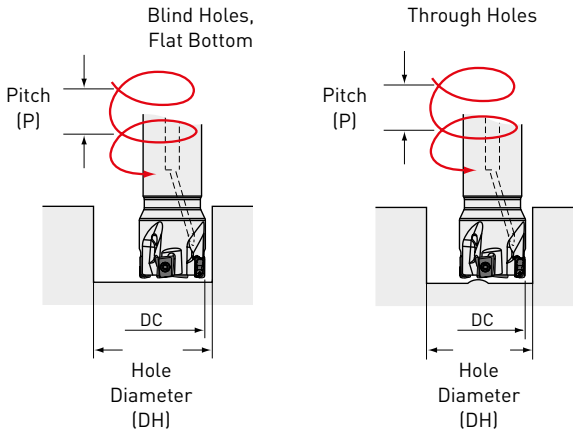
1. These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.
   If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.
2. Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommendedation or below.
3. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

RAMPING / HELICAL MILLING

Ramping



Helical Milling



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

(mm)

DC	RE	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
		RMPX	L*	DH max.	P max.	DH min.	P max.	DH min.	P max.
16	0.2	1.85°	248	31	1.5	27.5	1.2	24.2	0.8
	0.4	1.85°	248	30.6	1.5	27.5	1.2	24.2	0.8
	0.8	1.85°	248	29.8	1.4	27.5	1.2	24.2	0.8
	1	1.85°	248	29.4	1.4	27.5	1.2	24.2	0.8
	1.2	1.85°	248	29	1.3	27.5	1.2	24.2	0.8
	1.6	1.85°	248	28.2	1.2	27.5	1.2	24.2	0.8
18	0.2	1.56°	294	35	1.5	31.5	1.2	28.1	0.9
	0.4	1.56°	294	34.6	1.4	31.5	1.2	28.1	0.9
	0.8	1.56°	294	33.8	1.4	31.5	1.2	28.1	0.9
	1	1.56°	294	33.4	1.3	31.5	1.2	28.1	0.9
	1.2	1.56°	294	33	1.3	31.5	1.2	28.1	0.9
	1.6	1.56°	294	32.2	1.2	31.5	1.2	28.1	0.9
20	0.2	1.35°	340	39	1.4	35.5	1.1	32	0.9
	0.4	1.35°	340	38.6	1.4	35.5	1.1	32	0.9
	0.8	1.35°	340	37.8	1.3	35.5	1.1	32	0.9
	1	1.35°	340	37.4	1.3	35.5	1.1	32	0.9
	1.2	1.35°	340	37	1.3	35.5	1.1	32	0.9
	1.6	1.35°	340	36.2	1.2	35.5	1.1	32	0.9
22	0.2	1.16°	396	43	1.3	39.5	1.1	36	0.9
	0.4	1.16°	396	42.6	1.3	39.5	1.1	36	0.9
	0.8	1.16°	396	41.8	1.3	39.5	1.1	36	0.9
	1	1.16°	396	41.4	1.2	39.5	1.1	36	0.9
	1.2	1.16°	396	41	1.2	39.5	1.1	36	0.9
	1.6	1.16°	396	40.2	1.2	39.5	1.1	36	0.9
25	0.2	0.97°	473	49	1.3	45.5	1.1	42	0.9
	0.4	0.97°	473	48.6	1.3	45.5	1.1	42	0.9
	0.8	0.97°	473	47.8	1.2	45.5	1.1	42	0.9
	1	0.97°	473	47.4	1.2	45.5	1.1	42	0.9
	1.2	0.97°	473	47	1.2	45.5	1.1	42	0.9
	1.6	0.97°	473	46.2	1.1	45.5	1.1	42	0.9
28	0.2	0.84°	546	55	1.2	51.5	1.1	48	0.9
	0.4	0.84°	546	54.6	1.2	51.5	1.1	48	0.9
	0.8	0.84°	546	53.8	1.2	51.5	1.1	48	0.9
	1	0.84°	546	53.4	1.2	51.5	1.1	48	0.9
	1.2	0.84°	546	53	1.2	51.5	1.1	48	0.9
	1.6	0.84°	546	52.2	1.1	51.5	1.1	48	0.9
30	0.2	0.77°	596	59	1.2	55.5	1.1	52	0.9
	0.4	0.77°	596	58.6	1.2	55.5	1.1	52	0.9
	0.8	0.77°	596	57.8	1.2	55.5	1.1	52	0.9
	1	0.77°	596	57.4	1.2	55.5	1.1	52	0.9
	1.2	0.77°	596	57	1.1	55.5	1.1	52	0.9
	1.6	0.77°	596	56.2	1.1	55.5	1.1	52	0.9
32	0.2	0.71°	646	62.8	1.2	59.4	1.1	56	0.9
	0.4	0.71°	646	62.4	1.2	59.4	1.1	56	0.9
	0.8	0.71°	646	61.6	1.2	59.4	1.1	56	0.9
	1	0.71°	646	61.2	1.1	59.4	1.1	56	0.9
	1.2	0.71°	646	60.8	1.1	59.4	1.1	56	0.9
	1.6	0.71°	646	60	1.1	59.4	1.1	56	0.9

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

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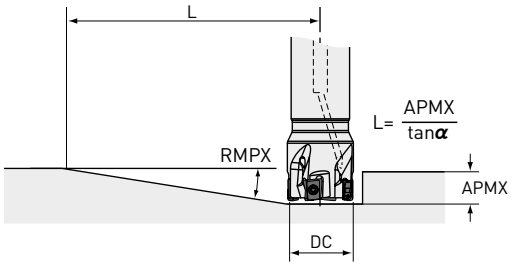
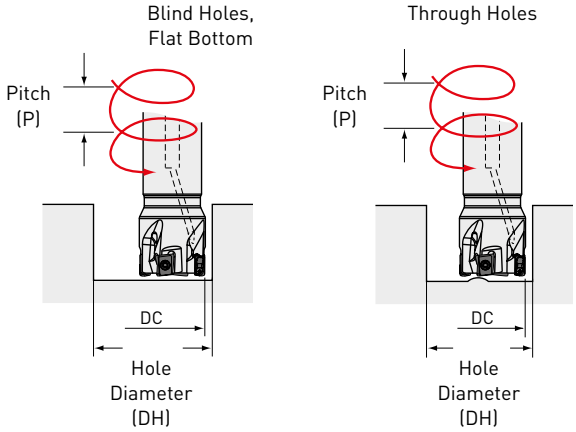
RAMPING / HELICAL MILLING

Ramping



Helical Milling



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

DC	RE	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
		RMPX	L*	DH max.	P max.	DH min.	P max.	DH min.	P max.
35	0.2	0.63°	728	69	1.2	65.5	1.1	62	0.9
	0.4	0.63°	728	68.6	1.2	65.5	1.1	62	0.9
	0.8	0.63°	728	67.8	1.1	65.5	1.1	62	0.9
	1	0.63°	728	67.4	1.1	65.5	1.1	62	0.9
	1.2	0.63°	728	67	1.1	65.5	1.1	62	0.9
	1.6	0.63°	728	66.2	1.1	65.5	1.1	62	0.9
40	0.2	0.54°	849	78.8	1.2	75.4	1	72	0.9
	0.4	0.54°	849	78.4	1.1	75.4	1	72	0.9
	0.8	0.54°	849	77.6	1.1	75.4	1	72	0.9
	1	0.54°	849	77.2	1.1	75.4	1	72	0.9
	1.2	0.54°	849	76.8	1.1	75.4	1	72	0.9
	1.6	0.54°	849	76	1.1	75.4	1	72	0.9
50	0.2	0.42°	1092	98.8	1.1	95.4	1	92	1
	0.4	0.42°	1092	98.4	1.1	95.4	1	92	1
	0.8	0.42°	1092	97.6	1.1	95.4	1	92	1
	1	0.42°	1092	97.2	1.1	95.4	1	92	1
	1.2	0.42°	1092	96.8	1.1	95.4	1	92	1
	1.6	0.42°	1092	96	1.1	95.4	1	92	1
63	0.2	0.32°	1433	124.8	1.1	121.4	1	118	1
	0.4	0.32°	1433	124.4	1.1	121.4	1	118	1
	0.8	0.32°	1433	123.6	1.1	121.4	1	118	1
	1	0.32°	1433	123.2	1.1	121.4	1	118	1
	1.2	0.32°	1433	122.8	1.1	121.4	1	118	1
	1.6	0.32°	1433	122	1	121.4	1	118	1

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

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RECOMMENDED CUTTING CONDITIONS FOR PLUNGING AND DRILLING

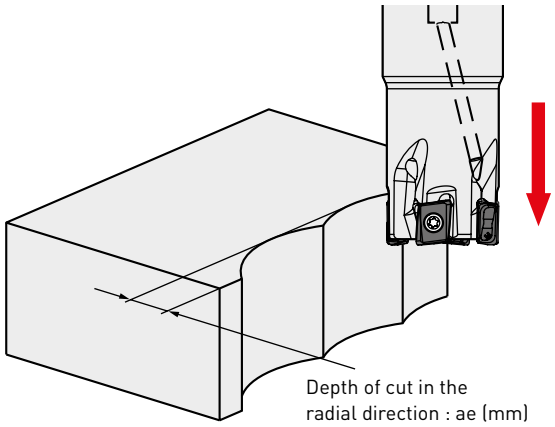
Follow the cutting conditions for slot milling for the feed per tooth and cutting speed.

PLUNGING

(mm)

DC	ae max.
16	3.9
18	3.9
20	3.9
22	4
25	4
28	4
30	4
32	4
35	4
40	4
50	4
63	4

1. No step feed necessary.

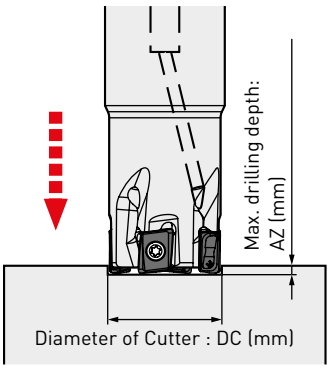


DRILLING

(mm)

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

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



VPX300

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED / DRY CUTTING

	Work Material	Properties	Cutting Conditions	Insert Grade	Insert Chip Breaker	ae <0.25 DC	ae 0.25–0.5 DC	ae 0.5–0.75 DC	ae 1.0 DC
						Vc (m/min)			
P	Mild Steel	<180HB	● ●	MP6120	M	230 (180–270)	220 (170–260)	180 (140–210)	180 (140–210)
			● ●	VP15TF	M	230 (180–270)	220 (170–260)	180 (140–210)	180 (140–210)
			✻	MP6130	M	200 (150–240)	190 (170–260)	150 (110–180)	150 (110–180)
	Carbon Steel Alloy Steel Alloy Tool Steel	180–350HB <350HB (Annealing)	● ●	MP6120	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–180)
			● ●	VP15TF	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–180)
			✻	MP6130	M	150 (110–180)	140 (100–170)	110 (80–130)	110 (80–130)
	Pre-hardened Steel	35–45HRC	● ●	MP6120	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
			● ●	VP15TF	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
			✻	MP6130	M	100 (80–120)	90 (70–110)	80 (60–100)	80 (60–100)
M	Austenitic Stainless Steel	<200HB	● ● ✻	MP7130	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
			● ●	VP15TF	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
		>200HB	● ● ✻	MP7130	M	150 (110–180)	140 (100–160)	110 (80–130)	110 (80–130)
			● ●	VP15TF	M	150 (110–180)	140 (100–160)	110 (80–130)	110 (80–130)
	Duplex Stainless Steel	<280HB	● ● ✻	MP7130	M	140 (110–170)	130 (90–150)	100 (70–120)	100 (70–120)
			● ●	VP15TF	M	140 (110–170)	130 (90–150)	100 (70–120)	100 (70–120)
	Ferritic and Martensitic Stainless Steel	—	● ● ✻	MP7130	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
			● ●	VP15TF	M	180 (140–210)	170 (130–200)	140 (110–160)	140 (110–160)
	Precipitation Hardening Stainless Steel	<450HB	● ● ✻	MP7130	M	130 (100–160)	120 (80–140)	90 (60–110)	90 (60–110)
			● ●	VP15TF	M	130 (100–160)	120 (80–140)	90 (60–110)	90 (60–110)
K	Gray Cast Iron	Tensile Strength <350MPa	● ●	MC5020	M	250 (200–300)	240 (190–290)	210 (160–260)	140 (110–160)
			● ● ✻	VP15TF	M	200 (150–250)	190 (140–240)	160 (110–210)	160 (110–210)
	Ductile Cast Iron	Tensile Strength <800MPa	● ●	MC5020	M	180 (150–200)	170 (140–190)	150 (120–170)	150 (120–170)
			● ● ✻	VP15TF	M	130 (100–150)	120 (90–140)	100 (80–120)	100 (80–120)
N	Aluminium Alloy	Si<5%	● ● ✻	TF15	M	600 (400–1000)	600 (400–1000)	600 (400–1000)	600 (400–1000)
H	Hardened Steel	40–55HRC	● ● ✻	VP15TF	M	90 (70–100)	85 (60–100)	70 (50–80)	70 (50–80)

1. These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.
   If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.
2. Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommendedation or below.
3. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

DEPTH OF CUT / FEED PER TOOTH

	Work Material	Properties	ae	Cutting Conditions	DC Ø25 ap	DC Ø25 fz (mm/t.)	DC Ø28–Ø80 ap	DC Ø28–Ø80 fz (mm/t.)
P	Mild Steel	<180HB	<0.25 DC	● ● ✻	<11	0.1–0.2	<11	0.1–0.3
			0.25–0.5 DC	● ● ✻	<11	0.1–0.15	<11	0.1–0.25
			0.5–0.75 DC	● ● ✻	<8	0.08–0.12	<8	0.1–0.2
			1.0 DC	● ● ✻	<5	0.06–0.1	<5	0.08–0.15
	Carbon Steel Alloy Steel Alloy Tool Steel	180–280HB	<0.25 DC	● ● ✻	<11	0.1–0.2	<11	0.1–0.3
			0.25–0.5 DC	● ● ✻	<11	0.1–0.15	<11	0.1–0.25
			0.5–0.75 DC	● ● ✻	<8	0.08–0.12	<8	0.1–0.2
			1.0 DC	● ● ✻	<5	0.06–0.1	<5	0.08–0.15
	Carbon Steel Alloy Steel Alloy Tool Steel	280–350HB <350HB	<0.25 DC	● ● ✻	<11	0.1–0.15	<11	0.1–0.25
			0.25–0.5 DC	● ● ✻	<11	0.08–0.12	<11	0.1–0.2
			0.5–0.75 DC	● ● ✻	<8	0.06–0.1	<8	0.1–0.15
			1.0 DC	● ● ✻	<5	0.06–0.1	<5	0.08–0.12
	Pre-hardened Steel	35–45HRC	<0.25 DC	● ● ✻	<11	0.1–0.15	<11	0.1–0.25
			0.25–0.5 DC	● ● ✻	<11	0.08–0.12	<11	0.1–0.2
			0.5–0.75 DC	● ● ✻	<8	0.06–0.1	<8	0.1–0.15
			1.0 DC	● ● ✻	<5	0.06–0.1	<5	0.08–0.12

DEPTH OF CUT / FEED PER TOOTH

	Work Material	Properties	ae	Cutting Conditions	DC Ø25 ap	DC Ø25 fz (mm/t.)	DC Ø28–Ø80 ap	DC Ø28–Ø80 fz (mm/t.)
M	Austenitic Stainless Steel	–	<0.25 DC	●	<11	0.1–0.2	<11	0.1–0.2
				✲	<11	0.08–0.15	<11	0.08–0.15
			0.25–0.5 DC	●	<11	0.08–0.15	<11	0.08–0.15
				✲	<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC	●	<8	0.08–0.12	<8	0.08–0.12
				✲	<8	0.06–0.1	<8	0.06–0.1
			1.0 DC	●	<5	0.06–0.1	<5	0.06–0.1
				✲	<5	0.06–0.08	<5	0.06–0.08
	Duplex Stainless Steel	<280HB	<0.25 DC	●	<11	0.1–0.2	<11	0.1–0.2
				✲	<11	0.08–0.15	<11	0.08–0.15
			0.25–0.5 DC	●	<11	0.08–0.15	<11	0.08–0.15
				✲	<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC	●	<8	0.08–0.12	<8	0.08–0.12
				✲	<8	0.06–0.1	<8	0.06–0.1
			1.0 DC	●	<5	0.06–0.1	<5	0.06–0.1
				✲	<5	0.06–0.08	<5	0.06–0.08
	Ferritic and Martensitic Stainless Steel	–	<0.25 DC	●	<11	0.1–0.2	<11	0.1–0.2
				✲	<11	0.08–0.15	<11	0.08–0.15
			0.25–0.5 DC	●	<11	0.08–0.15	<11	0.08–0.15
				✲	<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC	●	<8	0.08–0.12	<8	0.08–0.12
				✲	<8	0.06–0.1	<8	0.06–0.1
			1.0 DC	●	<5	0.06–0.1	<5	0.06–0.1
				✲	<5	0.06–0.08	<5	0.06–0.08
	Precipitation Hardening Stainless Steel	<450HB	<0.25 DC	●	<11	0.1–0.15	<11	0.1–0.15
				✲	<11	0.08–0.12	<11	0.08–0.12
			0.25–0.5 DC	●	<11	0.08–0.12	<11	0.08–0.12
				✲	<11	0.08–0.12	<11	0.06–0.1
			0.5–0.75 DC	●	<8	0.06–0.1	<8	0.06–0.1
				✲	<8	0.06–0.08	<8	0.06–0.08
			1.0 DC	●	<5	0.06–0.1	<5	0.06–0.1
				✲	<5	0.06–0.08	<5	0.06–0.08
K	Gray Cast Iron	<350MPa	<0.25 DC	●	<11	0.1–0.2	<11	0.1–0.3
				✲	<11	0.08–0.15	<11	0.1–0.25
			0.25–0.5 DC	●	<11	0.08–0.15	<11	0.1–0.25
				✲	<11	0.08–0.12	<11	0.1–0.2
			0.5–0.75 DC	●	<8	0.08–0.12	<8	0.1–0.2
				✲	<8	0.06–0.1	<8	0.08–0.15
			1.0 DC	●	<5	0.06–0.1	<5	0.08–0.15
				✲	<5	0.06–0.08	<5	0.08–0.12
	Ductile Cast Iron	<800MPa	<0.25 DC	●	<11	0.1–0.2	<11	0.1–0.25
				✲	<11	0.1–0.15	<11	0.1–0.2
			0.25–0.5 DC	●	<11	0.1–0.15	<11	0.1–0.2
				✲	<11	0.08–0.12	<11	0.1–0.15
			0.5–0.75 DC	●	<8	0.08–0.12	<8	0.1–0.15
				✲	<8	0.08–0.12	<8	0.08–0.12
			1.0 DC	●	<5	0.06–0.1	<5	0.08–0.12
				✲	<5	0.06–0.08	<5	0.06–0.1
N	Aluminium Alloy	Si<5%	<0.25 DC	●	<11	0.1–0.25	<11	0.1–0.25
				✲	<11	0.1–0.2	<11	0.1–0.2
			0.25–0.5 DC	●	<11	0.1–0.2	<11	0.1–0.2
				✲	<11	0.1–0.15	<11	0.1–0.15
			0.5–0.75 DC	●	<8	0.06–0.15	<8	0.08–0.15
				✲	<8	0.06–0.15	<8	0.08–0.15
			1.0 DC	●	<5	0.06–0.15	<5	0.08–0.15
				✲	<5	0.06–0.15	<5	0.08–0.12
H	Hardened Steel	40–55HRC	<0.25 DC	●	<5	0.08–0.15	<5	0.08–0.15
				✲	<5	0.08–0.12	<5	0.08–0.12
			0.25–0.5 DC	●	<4	0.08–0.12	<4	0.08–0.12
				✲	<4	0.06–0.1	<4	0.06–0.1
			0.5–0.75 DC	●	<3	0.06–0.1	<3	0.06–0.1
				✲	<3	0.06–0.08	<3	0.06–0.08
			1.0 DC	●	<2	0.06–0.1	<2	0.06–0.1
				✲	<2	0.06–0.08	<2	0.06–0.08

1. These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.
   If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.
2. Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommendedation or below.
3. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

VPX300

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED/ WET CUTTING

	Work Material	Properties	Cutting Conditions	Insert Grade	Insert Chip Breaker	ae <0.25 DC	ae 0.25–0.5 DC	ae 0.5–0.75 DC	ae 1.0 DC
						Vc (m/min)			
P	Mild Steel	<180HB	● ●	MP6120	M	140 (100–190)	130 (90–180)	100 (70–120)	100 (70–120)
			● ●	VP15TF	M	140 (100–190)	130 (90–180)	100 (70–120)	100 (70–120)
			✱	MP6130	M	140 (100–190)	130 (90–180)	100 (70–120)	100 (70–120)
	Carbon Steel Alloy Steel Alloy Tool Steel	180–350HB <350HB	● ●	MP6120	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
			● ●	VP15TF	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
			✱	MP6130	M	120 (90–140)	110 (80–130)	100 (70–120)	100 (70–120)
	Pre-hardened Steel	35–45HRC	● ●	MP6120	M	100 (80–120)	90 (70–110)	80 (60–100)	80 (60–100)
			● ●	VP15TF	M	100 (80–120)	90 (70–110)	80 (60–100)	80 (60–100)
			✱	MP6130	M	100 (80–120)	90 (70–110)	80 (60–100)	80 (60–100)
M	Austenitic Stainless Steel	<200HB	● ● ✱	MP7130	M	120 (100–150)	110 (90–140)	90 (70–120)	90 (70–120)
			● ●	VP15TF	M	120 (100–150)	110 (90–140)	90 (70–120)	90 (70–120)
		>200HB	● ● ✱	MP7130	M	100 (80–130)	90 (70–120)	70 (50–100)	70 (50–100)
			● ●	VP15TF	M	100 (80–130)	90 (70–120)	70 (50–100)	70 (50–100)
	Duplex Stainless Steel	<280HB	● ● ✱	MP7130	M	100 (80–130)	90 (70–120)	70 (50–100)	70 (50–100)
			● ●	VP15TF	M	100 (80–130)	90 (70–120)	70 (50–100)	70 (50–100)
	Ferritic and Martensitic Stainless Steel	–	● ● ✱	MP7130	M	120 (100–150)	110 (90–140)	90 (70–120)	90 (70–120)
			● ●	VP15TF	M	120 (100–150)	110 (90–140)	90 (70–120)	90 (70–120)
	Precipitation Hardening Stainless Steel	<450HB	● ● ✱	MP7130	M	90 (70–120)	80 (60–110)	60 (40–90)	60 (40–90)
			● ●	VP15TF	M	90 (70–120)	80 (60–110)	60 (40–90)	60 (40–90)
K	Gray Cast Iron	<350MPa	● ●	MC5020	M	180 (160–220)	170 (150–210)	150 (130–190)	150 (130–190)
			● ● ✱	VP15TF	M	130 (100–150)	120 (90–140)	100 (80–120)	100 (80–120)
	Ductile Cast Iron	<800MPa	● ●	MC5020	M	160 (140–180)	150 (130–170)	130 (110–150)	130 (110–150)
			● ● ✱	VP15TF	M	110 (80–140)	100 (70–130)	80 (60–120)	80 (60–120)
N	Aluminium Alloy	Si<5%	● ● ✱	TF15	M	600 (400–1000)	600 (400–1000)	600 (400–1000)	600 (400–1000)
S	Titanium Alloy (Ti-6Al-4V,etc.)	–	● ● ✱	MP9120	M	50 (40–70)	50 (40–70)	50 (40–70)	50 (40–70)
			● ●	VP15TF	M	50 (40–70)	50 (40–70)	50 (40–70)	50 (40–70)
			✱	MP9130	M	40 (30–60)	40 (30–60)	40 (30–60)	40 (30–60)
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	–	● ●	MP9120	M	30 (20–40)	30 (20–40)	30 (20–40)	30 (20–40)
			● ●	VP15TF	M	30 (20–40)	30 (20–40)	30 (20–40)	30 (20–40)
			✱	MP9130	M	30 (20–40)	30 (20–40)	30 (20–40)	30 (20–40)
	Heat Resistant Alloy	–	● ●	MP9120	M	40 (30–60)	40 (30–60)	40 (30–60)	40 (30–60)
			● ●	VP15TF	M	40 (30–60)	40 (30–60)	40 (30–60)	40 (30–60)
			✱	MP9130	M	30 (20–40)	30 (20–40)	30 (20–40)	30 (20–40)
H	Hardened Steel	40–55HRC	● ● ✱	VP15TF	M	90 (70–100)	85 (60–100)	70 (50–80)	70 (50–80)

1. These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.
   If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.
2. Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommendedation or below.
3. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

DEPTH OF CUT / FEED PER TOOTH

	Work Material	Properties	ae	Cutting Conditions	DC Ø25 ap	DC Ø25 fz (mm/t.)	DC Ø28–Ø80 ap	DC Ø28–Ø80 fz (mm/t.)
P	Mild Steel	<180HB	<0.25 DC		<11	0.1–0.2	<11	0.1–0.3
					<11	0.1–0.15	<11	0.1–0.25
			0.25–0.5 DC		<11	0.1–0.15	<11	0.1–0.25
					<8	0.08–0.12	<8	0.1–0.2
			0.5–0.75 DC		<8	0.08–0.12	<8	0.1–0.2
					<5	0.06–0.1	<5	0.08–0.15
			1.0 DC		<5	0.06–0.1	<5	0.08–0.15
	Carbon Steel Alloy Steel Alloy Tool Steel	180–280HB	<0.25 DC		<11	0.1–0.2	<11	0.1–0.3
					<11	0.1–0.15	<11	0.1–0.25
			0.25–0.5 DC		<11	0.1–0.15	<11	0.1–0.25
					<8	0.08–0.12	<8	0.1–0.2
			0.5–0.75 DC		<8	0.08–0.12	<8	0.1–0.2
					<5	0.06–0.1	<5	0.08–0.15
			1.0 DC		<5	0.06–0.1	<5	0.08–0.15
	Carbon Steel Alloy Steel Alloy Tool Steel	280–350HB <350HB	<0.25 DC		<11	0.1–0.15	<11	0.1–0.25
					<11	0.08–0.12	<11	0.1–0.2
			0.25–0.5 DC		<8	0.06–0.1	<8	0.1–0.15
					<5	0.06–0.1	<5	0.08–0.12
			0.5–0.75 DC		<5	0.06–0.1	<5	0.08–0.12
					<11	0.1–0.15	<11	0.1–0.25
			1.0 DC		<11	0.08–0.12	<11	0.1–0.2
	Pre-hardened Steel	35–45HRC	<0.25 DC		<8	0.06–0.1	<8	0.1–0.15
					<5	0.06–0.1	<5	0.08–0.12
			0.25–0.5 DC		<11	0.1–0.15	<11	0.1–0.25
					<11	0.08–0.12	<11	0.1–0.2
			0.5–0.75 DC		<8	0.06–0.1	<8	0.1–0.15
					<5	0.06–0.1	<5	0.08–0.12
			1.0 DC		<5	0.06–0.1	<5	0.08–0.12
M	Austenitic Stainless Steel	–	<0.25 DC		<11	0.1–0.2	<11	0.1–0.2
					<11	0.08–0.15	<11	0.08–0.15
			0.25–0.5 DC		<11	0.08–0.12	<11	0.08–0.15
					<11	0.06–0.1	<11	0.08–0.12
			0.5–0.75 DC		<8	0.06–0.1	<8	0.08–0.12
					<8	0.06–0.1	<8	0.06–0.1
			1.0 DC		<5	0.06–0.1	<5	0.06–0.1
					<5	0.06–0.08	<5	0.06–0.08
	Duplex Stainless Steel	<280HB	<0.25 DC		<11	0.1–0.2	<11	0.1–0.2
					<11	0.08–0.15	<11	0.08–0.15
			0.25–0.5 DC		<11	0.08–0.15	<11	0.08–0.15
					<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC		<8	0.08–0.12	<8	0.08–0.12
					<8	0.06–0.1	<8	0.06–0.1
			1.0 DC		<5	0.06–0.1	<5	0.06–0.1
					<5	0.06–0.08	<5	0.06–0.08
	Ferritic and Martensitic Stainless Steel	–	<0.25 DC		<11	0.1–0.2	<11	0.1–0.2
					<11	0.08–0.15	<11	0.08–0.15
			0.25–0.5 DC		<11	0.08–0.15	<11	0.08–0.15
					<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC		<8	0.08–0.12	<8	0.08–0.12
					<8	0.06–0.1	<8	0.06–0.1
			1.0 DC		<5	0.06–0.1	<5	0.06–0.1
					<5	0.06–0.08	<5	0.06–0.08
	Precipitation Hardening Stainless Steel	<450HB	<0.25 DC		<11	0.1–0.15	<11	0.1–0.15
					<11	0.08–0.12	<11	0.08–0.12
			0.25–0.5 DC		<11	0.08–0.12	<11	0.08–0.12
					<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC		<8	0.06–0.1	<8	0.06–0.1
					<8	0.06–0.08	<8	0.06–0.08
			1.0 DC		<5	0.06–0.1	<5	0.06–0.1
					<5	0.06–0.08	<5	0.06–0.08
K	Gray Cast Iron	<350MPa	<0.25 DC		<11	0.1–0.2	<11	0.1–0.3
					<11	0.08–0.15	<11	0.1–0.25
			0.25–0.5 DC		<11	0.08–0.15	<11	0.1–0.25
					<11	0.08–0.12	<11	0.1–0.2
			0.5–0.75 DC		<8	0.08–0.12	<8	0.1–0.2
					<8	0.06–0.1	<8	0.08–0.15
			1.0 DC		<5	0.06–0.1	<5	0.08–0.15
					<5	0.06–0.08	<5	0.08–0.12
	Ductile Cast Iron	<800MPa	<0.25 DC		<11	0.1–0.2	<11	0.1–0.25
					<11	0.1–0.15	<11	0.1–0.2
			0.25–0.5 DC		<11	0.1–0.15	<11	0.1–0.2
					<11	0.08–0.12	<11	0.1–0.15
			0.5–0.75 DC		<8	0.08–0.12	<8	0.1–0.15
					<8	0.06–0.1	<8	0.08–0.12
			1.0 DC		<5	0.06–0.1	<5	0.08–0.12
					<5	0.06–0.08	<5	0.06–0.1

VPX300

RECOMMENDED CUTTING CONDITIONS

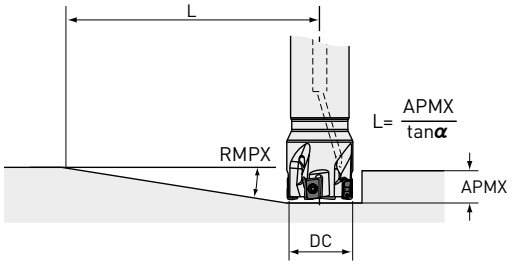
DEPTH OF CUT / FEED PER TOOTH

	Work Material	Properties	ae	Cutting Conditions	DC			
					Ø25		Ø28–Ø80	
					ap	fz (mm/t.)	ap	fz (mm/t.)
N	Aluminium Alloy	Si<5%	<0.25 DC	● ◐	<11	0.1–0.25	<11	0.1–0.25
				✲	<11	0.1–0.2	<11	0.1–0.2
			0.25–0.5 DC	● ◐	<11	0.1–0.2	<11	0.1–0.2
				✲	<11	0.1–0.15	<11	0.1–0.15
			0.5–0.75 DC	● ◐	<8	0.06–0.15	<8	0.08–0.15
				✲	<8	0.06–0.15	<8	0.08–0.15
			1.0 DC	● ◐	<5	0.06–0.15	<5	0.08–0.15
				✲	<5	0.06–0.15	<5	0.08–0.12
S	Titanium Alloy (Ti-6Al-4V,etc.)	—	<0.25 DC	● ◐ ✲	<11	0.08–0.15	<11	0.08–0.15
			0.25–0.5 DC	● ◐ ✲	<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC	● ◐ ✲	<8	0.06–0.1	<8	0.06–0.1
			1.0 DC	● ◐ ✲	<5	0.06–0.1	<5	0.06–0.1
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	—	<0.25 DC	● ◐ ✲	<11	0.08–0.12	<11	0.08–0.12
			0.25–0.5 DC	● ◐ ✲	<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC	● ◐ ✲	<8	0.06–0.1	<8	0.06–0.1
			1.0 DC	● ◐ ✲	<5	0.06–0.1	<5	0.06–0.1
	Heat Resistant Alloy	—	<0.25 DC	● ◐ ✲	<11	0.08–0.12	<11	0.08–0.12
			0.25–0.5 DC	● ◐ ✲	<11	0.08–0.12	<11	0.08–0.12
			0.5–0.75 DC	● ◐ ✲	<8	0.06–0.1	<8	0.06–0.1
			1.0 DC	● ◐ ✲	<5	0.06–0.1	<5	0.06–0.1
H	Hardened Steel	40–55HRC	<0.25 DC	● ◐	<5	0.08–0.15	<5	0.08–0.15
				✲	<5	0.08–0.12	<5	0.08–0.12
			0.25–0.5 DC	● ◐	<4	0.08–0.12	<4	0.08–0.12
				✲	<4	0.06–0.1	<4	0.06–0.1
			0.5–0.75 DC	● ◐	<3	0.06–0.1	<3	0.06–0.1
				✲	<3	0.06–0.1	<3	0.06–0.08
			1.0 DC	● ◐	<2	0.06–0.1	<2	0.06–0.1
				✲	<2	0.06–0.1	<2	0.06–0.08

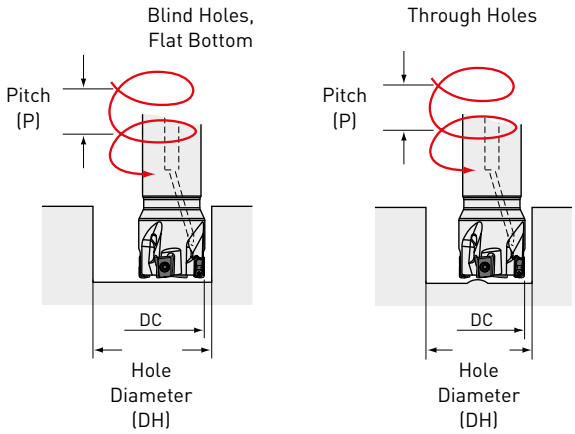
1. These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.
   If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.
2. Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommendedation or below.
3. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

RAMPING / HELICAL MILLING

Ramping



Helical Milling



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

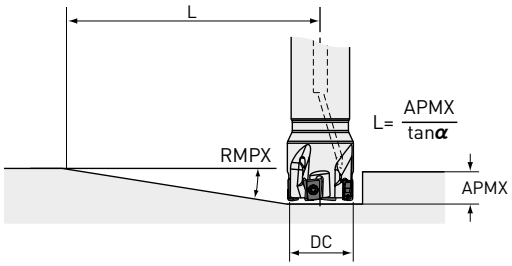
(mm)

DC	RE	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
		RMPX	L*	DH max.	P max.	DH min.	P max.	DH min.	P max.
25	0.2	2.13°	296	49	2.8	42.7	2.1	36.9	1.4
	0.4	2.13°	296	48.6	2.8	42.7	2.1	36.9	1.4
	0.8	2.13°	296	47.8	2.7	42.7	2.1	36.9	1.4
	1	2.13°	296	47.4	2.6	42.7	2.1	36.9	1.4
	1.2	2.13°	296	47	2.6	42.7	2.1	36.9	1.4
	1.6	2.13°	296	46.2	2.5	42.7	2.1	36.9	1.4
	2	2.13°	296	45.4	2.4	42.7	2.1	36.9	1.4
	2.4	2.13°	296	44.6	2.3	42.7	2.1	36.9	1.4
	3	2.13°	296	43.4	2.2	42.7	2.1	36.9	1.4
	3.2	2.13°	296	43	2.1	42.7	2.1	36.9	1.4
28	0.2	1.77°	356	55	2.6	48.7	2	42.7	1.4
	0.4	1.77°	356	54.6	2.6	48.7	2	42.7	1.4
	0.8	1.77°	356	53.8	2.5	48.7	2	42.7	1.4
	1	1.77°	356	53.4	2.5	48.7	2	42.7	1.4
	1.2	1.77°	356	53	2.4	48.7	2	42.7	1.4
	1.6	1.77°	356	52.2	2.4	48.7	2	42.7	1.4
	2	1.77°	356	51.4	2.3	48.7	2	42.7	1.4
	2.4	1.77°	356	50.6	2.2	48.7	2	42.7	1.4
	3	1.77°	356	49.4	2.1	48.7	2	42.7	1.4
	3.2	1.77°	356	49	2	48.7	2	42.7	1.4
30	0.2	1.61°	392	59	2.6	52.7	2	46.6	1.5
	0.4	1.61°	392	58.6	2.5	52.7	2	46.6	1.5
	0.8	1.61°	392	57.8	2.5	52.7	2	46.6	1.5
	1	1.61°	392	57.4	2.4	52.7	2	46.6	1.5
	1.2	1.61°	392	57	2.4	52.7	2	46.6	1.5
	1.6	1.61°	392	56.2	2.3	52.7	2	46.6	1.5
	2	1.61°	392	55.4	2.2	52.7	2	46.6	1.5
	2.4	1.61°	392	54.6	2.2	52.7	2	46.6	1.5
	3	1.61°	392	53.4	2.1	52.7	2	46.6	1.5
	3.2	1.61°	392	53	2	52.7	2	46.6	1.5
32	0.2	1.47°	429	63	2.5	56.7	2	50.6	1.5
	0.4	1.47°	429	62.6	2.5	56.7	2	50.6	1.5
	0.8	1.47°	429	61.8	2.4	56.7	2	50.6	1.5
	1	1.47°	429	61.4	2.4	56.7	2	50.6	1.5
	1.2	1.47°	429	61	2.3	56.7	2	50.6	1.5
	1.6	1.47°	429	60.2	2.3	56.7	2	50.6	1.5
	2	1.47°	429	59.4	2.2	56.7	2	50.6	1.5
	2.4	1.47°	429	58.6	2.1	56.7	2	50.6	1.5
	3	1.47°	429	57.4	2.1	56.7	2	50.6	1.5
	3.2	1.47°	429	57	2	56.7	2	50.6	1.5
35	0.2	1.28°	493	69	2.4	62.8	1.9	56.6	1.5
	0.4	1.28°	493	68.6	2.4	62.8	1.9	56.6	1.5
	0.8	1.28°	493	67.8	2.3	62.8	1.9	56.6	1.5
	1	1.28°	493	67.4	2.3	62.8	1.9	56.6	1.5
	1.2	1.28°	493	67	2.2	62.8	1.9	56.6	1.5
	1.6	1.28°	493	66.2	2.2	62.8	1.9	56.6	1.5
	2	1.28°	493	65.4	2.1	62.8	1.9	56.6	1.5
	2.4	1.28°	493	64.6	2.1	62.8	1.9	56.6	1.5
	3	1.28°	493	63.4	2	62.8	1.9	56.6	1.5
	3.2	1.28°	493	63	2	62.8	1.9	56.6	1.5

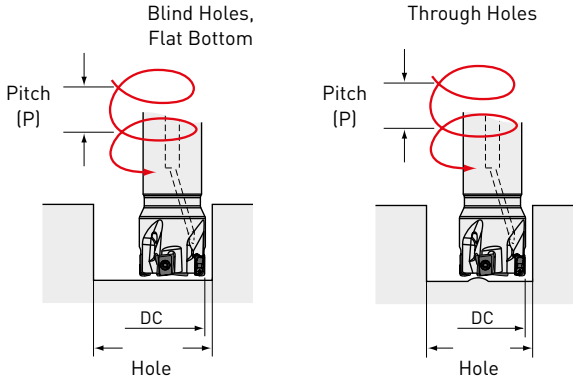
VPX300

RAMPING / HELICAL MILLING

Ramping



Helical Milling



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

(mm)

DC	RE	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
		RMPX	L*	DH max.	P max.	DH min.	P max.	DH min.	P max.
40	0.2	1.06°	595	78.8	2.3	72.7	1.9	66.5	1.5
	0.4	1.06°	595	78.4	2.2	72.7	1.9	66.5	1.5
	0.8	1.06°	595	77.6	2.2	72.7	1.9	66.5	1.5
	1	1.06°	595	77.2	2.2	72.7	1.9	66.5	1.5
	1.2	1.06°	595	76.8	2.1	72.7	1.9	66.5	1.5
	1.6	1.06°	595	76	2.1	72.7	1.9	66.5	1.5
	2	1.06°	595	75.2	2	72.7	1.9	66.5	1.5
	2.4	1.06°	595	74.4	2	72.7	1.9	66.5	1.5
	3	1.06°	595	73.2	1.9	72.7	1.9	66.5	1.5
	3.2	1.06°	595	72.8	1.9	72.7	1.9	66.5	1.5
50	0.2	0.79°	798	98.8	2.1	92.7	1.8	86.5	1.6
	0.4	0.79°	798	98.4	2.1	92.7	1.8	86.5	1.6
	0.8	0.79°	798	97.6	2.1	92.7	1.8	86.5	1.6
	1	0.79°	798	97.2	2	92.7	1.8	86.5	1.6
	1.2	0.79°	798	96.8	2	92.7	1.8	86.5	1.6
	1.6	0.79°	798	96	2	92.7	1.8	86.5	1.6
	2	0.79°	798	95.2	2	92.7	1.8	86.5	1.6
	2.4	0.79°	798	94.4	1.9	92.7	1.8	86.5	1.6
	3	0.79°	798	93.2	1.9	92.7	1.8	86.5	1.6
	3.2	0.79°	798	92.8	1.9	92.7	1.8	86.5	1.6
63	0.2	0.6°	1051	124.8	2	118.7	1.8	112.5	1.6
	0.4	0.6°	1051	124.4	2	118.7	1.8	112.5	1.6
	0.8	0.6°	1051	123.6	2	118.7	1.8	112.5	1.6
	1	0.6°	1051	123.2	2	118.7	1.8	112.5	1.6
	1.2	0.6°	1051	122.8	2	118.7	1.8	112.5	1.6
	1.6	0.6°	1051	122	1.9	118.7	1.8	112.5	1.6
	2	0.6°	1051	121.2	1.9	118.7	1.8	112.5	1.6
	2.4	0.6°	1051	120.4	1.9	118.7	1.8	112.5	1.6
	3	0.6°	1051	119.2	1.9	118.7	1.8	112.5	1.6
	3.2	0.6°	1051	118.8	1.8	118.7	1.8	112.5	1.6
80	0.2	0.45°	1401	158.8	1.9	152.6	1.8	146.5	1.6
	0.4	0.45°	1401	158.4	1.9	152.7	1.8	146.5	1.6
	0.8	0.45°	1401	157.6	1.9	152.7	1.8	146.5	1.6
	1	0.45°	1401	157.2	1.9	152.7	1.8	146.5	1.6
	1.2	0.45°	1401	156.8	1.9	152.7	1.8	146.5	1.6
	1.6	0.45°	1401	156	1.9	152.7	1.8	146.5	1.6
	2	0.45°	1401	155.2	1.9	152.7	1.8	146.5	1.6
	2.4	0.45	1401	154.4	1.8	152.7	1.8	146.5	1.6
	3	0.45	1401	153.2	1.8	152.7	1.8	146.5	1.6
	3.2	0.45	1401	152.8	1.8	152.7	1.8	146.5	1.6

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

VPX300

RECOMMENDED CUTTING CONDITIONS FOR PLUNGING AND DRILLING

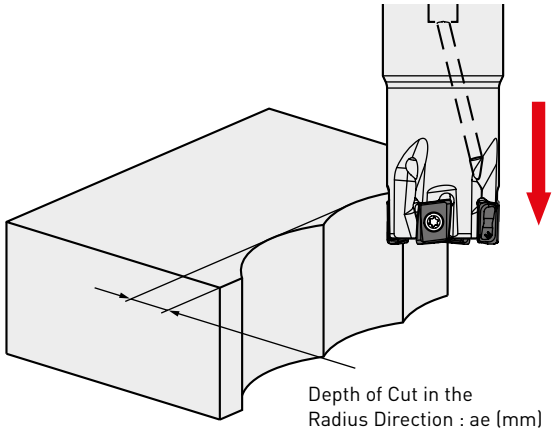
Follow the cutting conditions for slot milling for the feed per tooth and cutting speed.

PLUNGING

(mm)

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

1. No step feed necessary.

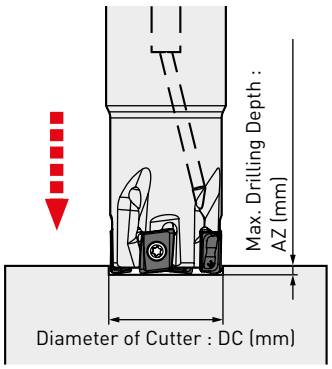


DRILLING

(mm)

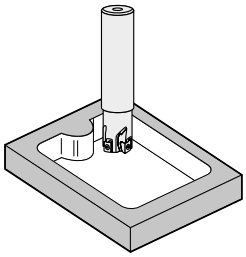
DC	AZ max.
25	0.55
28	0.55
30	0.55
32	0.55
35	0.55
40	0.55
50	0.55
63	0.55
80	0.55

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

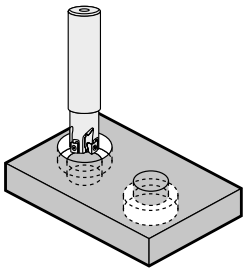


APPLICATION EXAMPLES

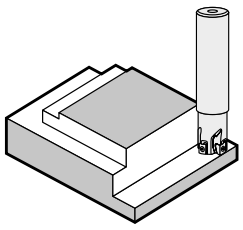
Holder	VPX200R2503SA25S
Insert (Grade)	LOGU0904080PNER-M(MP6120)
Workpiece	C45
Component	Bracket
Cutting Speed Vc (m/min)	150
Feed per Tooth fz (mm/t.)	0.11
Depth of Cut ap (mm)	4.5
Width of Cut ae (mm)	25 Max.
Cutting Mode	Dry cutting
Results	Compared to conventional products with varying tool life due to breakage, VPX has a stable performance with up to 1.7 times more tool life.



Holder	VPX200R1602SA16S
Insert (Grade)	LOGU0904080PNER-M(MP6130)
Workpiece	St37-2
Component	Clamp
Cutting Speed Vc (m/min)	85.4
Feed per Tooth fz (mm/t.)	0.095
Depth of Cut ap (mm)	4.25
Cutting Mode	Wet cutting
Results	Solves the problem of easily damaged clamp screws when using conventional products, ensuring an excellent finish.

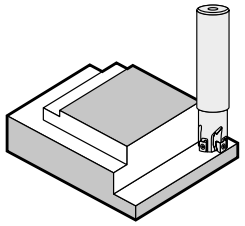


Holder	VPX200R2003SA20S
Insert (Grade)	LOGU0904080PNER-M(MP6120)
Workpiece	20MnCr5(Alloy Steel)
Component	Block
Cutting Speed Vc (m/min)	176
Feed per Tooth fz (mm/t.)	0.179
Depth of Cut ap (mm)	2
Cutting Mode	Dry Cutting
Results	Conventional products have achieved machining times of 330 min before breaking, whereas VPX can sustain machining for over 400 mins.

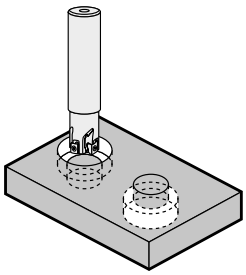


The examples shown are actual applications and can differ from the recommended cutting conditions.

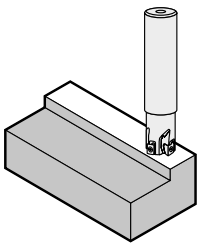
Holder	VPX200R2504SA25S
Insert (Grade)	LOGU0904080PNER-M(MP6120)
Workpiece	Cast Iron
Component	Automotive Components
Cutting Speed Vc (m/min)	200
Feed per Tooth fz (mm/t.)	0.173
Depth of Cut ap (mm)	3
Cutting Mode	Dry Cutting
Results	Capable of cutting speeds of 200 m/min compared to 170 m/min for conventional products, thereby increasing efficiency. Geometrical accuracy makes stable machining possible.



Holder	VPX200R2504SA25S
Insert (Grade)	LOGU0904080PNER-M(MP6120)
Workpiece	Carbon Steel
Component	Clamp
Cutting Speed Vc (m/min)	102
Feed per Tooth fz (mm/t.)	0.13
Depth of Cut ap (mm)	1.4
Width of Cut ae (mm)	11
Cutting Mode	Wet Cutting
Results	VPX exerts less axial load than conventional cutters, helping to achieve more than three times length of machining. The excellent clamping rigidity when compared to conventional products helps to prevent insert breakage.



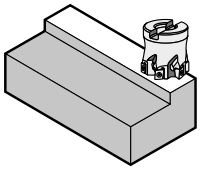
Holder	VPX200R3004SA25S
Insert (Grade)	LOGU0904080PNER-M(MP9130)
Workpiece	Precipitation Hardening Stainless Steel (38-43HRC) (PH)
Component	Block
Cutting Speed Vc (m/min)	40
Feed per Tooth fz (mm/t.)	0.06
Depth of Cut ap (mm)	1.8
Cutting Mode	Dry Cutting
Results	Good sharpness compared to conventional products allows VPX to achieve double tool life.



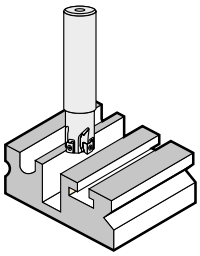
The examples shown are actual applications and can differ from the recommended cutting conditions.

APPLICATION EXAMPLES

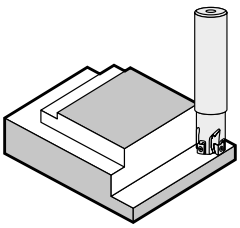
Holder	VPX200-050A05AR
Insert (Grade)	LOGU0904040PNER-M(VP15TF)
Workpiece	GS-C25 (1.0619)
Component	Bracket
Cutting Speed Vc (m/min)	345
Feed per Tooth fz (mm/t.)	0.14
Depth of Cut ap (mm)	2–3
Width of Cut ae (mm)	40
Cutting Mode	Wet Cutting
Results	Conventional vertical cutters can only be used for roughing, but VPX can also be used for finishing, thereby eliminating a process.



Holder	VPX200R2503SA25S
Insert (Grade)	LOGU0904080PNER-M(MP6120)
Workpiece	St37-2
Component	Guide block
Cutting Speed Vc (m/min)	118
Feed per Tooth fz (mm/t.)	0.16
Depth of Cut ap (mm)	6
Cutting Mode	Dry Cutting
Results	VPX achieves good chip ejection and surface finish compared to conventional products.

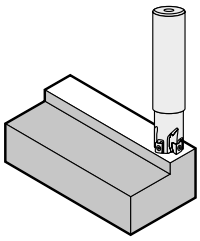


Holder	VPX200R2503SA25S
Insert (Grade)	LOGU0904040PNER-M(MP7130)
Workpiece	X5CrNi18-10
Component	Location block
Cutting Speed Vc (m/min)	180
Feed per Tooth fz (mm/t.)	0.6
Depth of Cut ap (mm)	2.7
Cutting Mode	–
Results	Less cutting noise than conventional products, allowing cutting conditions to be improved.

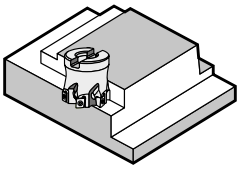


The examples shown are actual applications and can differ from the recommended cutting conditions.

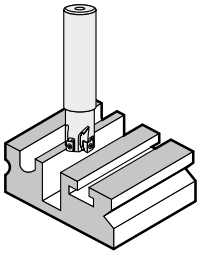
Holder	VPX300R4004SA32S
Insert (Grade)	LOGU1207080PNER-M(MP6120)
Workpiece	42CrMo4
Component	Centre Block
Cutting Speed Vc (m/min)	150
Feed per Tooth fz (mm/t.)	0.15
Depth of Cut ap (mm)	5
Cutting Mode	Dry Cutting
Results	Compared to conventional products, chattering and vibration is lower and wall surface accuracy is improved. Achieves more than three times the usual tool life.



Holder	VPX300-080A10AR
Insert (Grade)	LOGU1207080PNER-M(MP6120)
Workpiece	Alloy Tool Steel
Component	Locator
Cutting Speed Vc (m/min)	226
Feed per Tooth fz (mm/t.)	0.13
Depth of Cut ap (mm)	5
Width of Cut ae (mm)	70
Cutting Mode	–
Results	Achieves 2.7 times the length of machining of conventional products whilst maintaining good surface finishes.



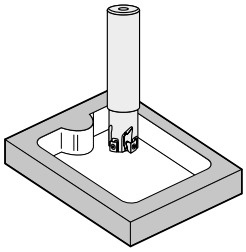
Holder	VPX300R4004SA32S
Insert (Grade)	LOGU1207080PNER-M(MP6120)
Workpiece	13CrMo4-5
Component	Guide block
Cutting Speed Vc (m/min)	160 - 180
Feed per Tooth fz (mm/t.)	0.12 - 0.15
Depth of Cut ap (mm)	3 - 4.2
Width of Cut ae (mm)	40
Cutting Mode	Wet Cutting
Results	Achieves twice the tool life of conventional products, even when changing to high efficiency cutting conditions.



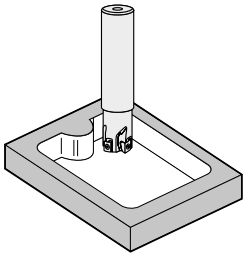
The examples shown are actual applications and can differ from the recommended cutting conditions.

APPLICATION EXAMPLES

Holder	VPX300R2502SA25S
Insert (Grade)	LOGU1207080PNER-M(VP15TF)
Workpiece	Tool Steel (55HRC)
Component	Die
Cutting Speed Vc (m/min)	70
Feed per Tooth fz (mm/t.)	0.08
Depth of Cut ap (mm)	5
Width of Cut ae (mm)	18.75
Cutting Mode	Dry Cutting
Results	When machining hardened steel, achieved 2 times the machining length of conventional products.



Holder	VPX200R2504SA25S
Insert (Grade)	LOGU0904080PNER-M(MP6120)
Workpiece	C50
Component	Die
Cutting Speed Vc (m/min)	200
Feed per Tooth fz (mm/t.)	0.15
Depth of Cut ap (mm)	3
Cutting Mode	Dry Cutting
Results	No seating deformation even when machining for 2,500 minutes.



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