

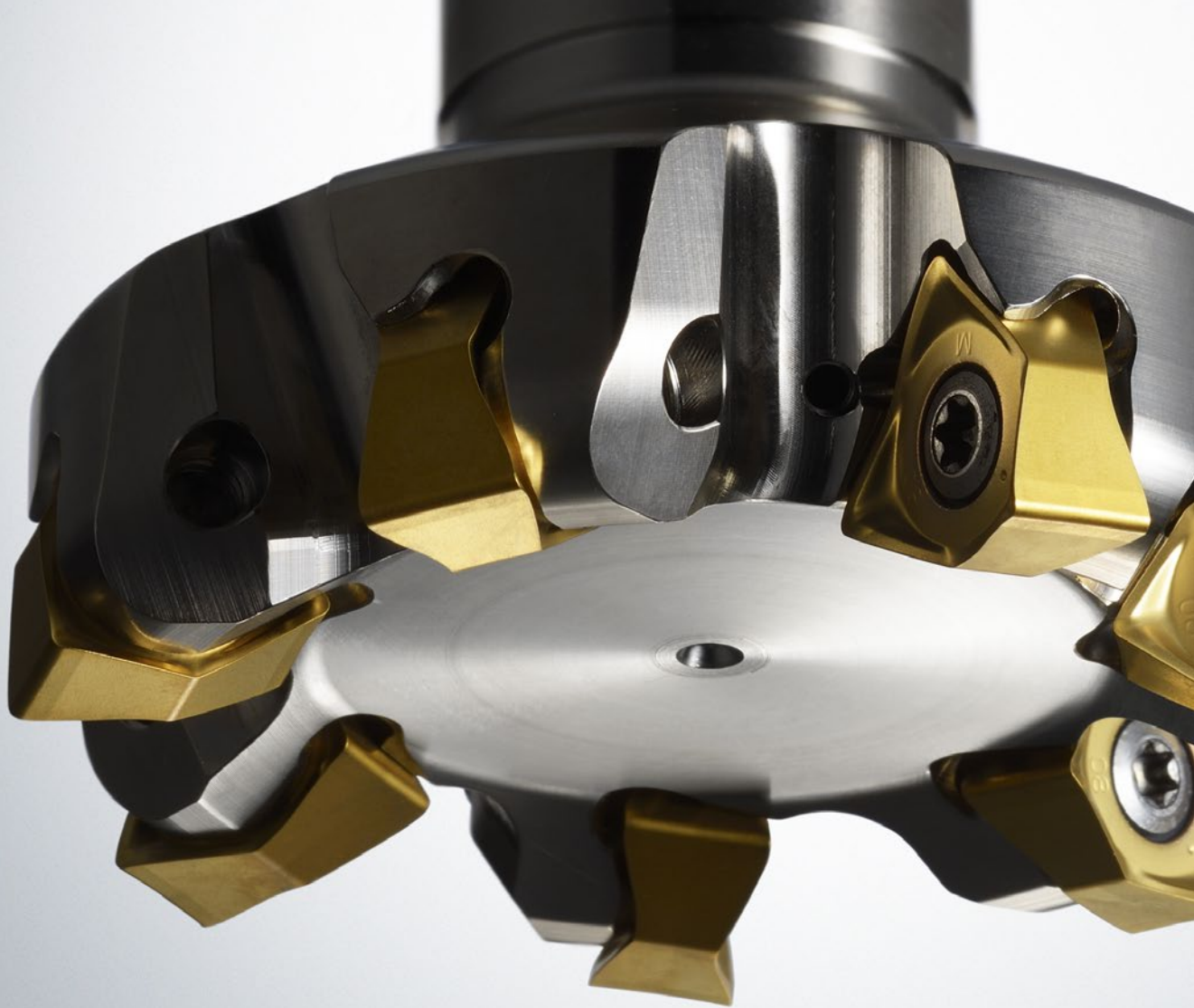
Double Sided Insert Type Shoulder Mill

WWX Series

Insert
Expansion

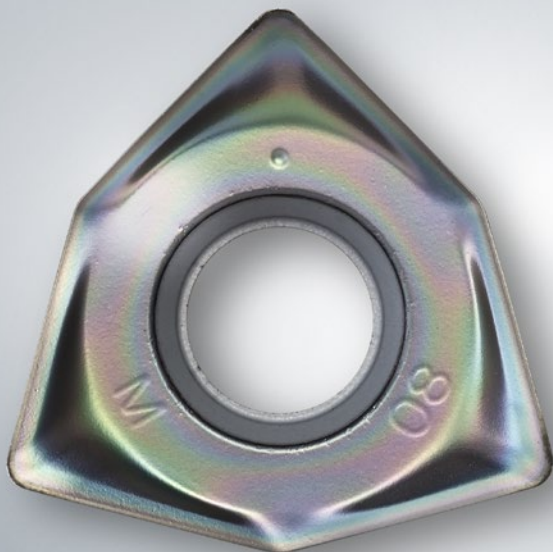
High Rigidity and High Quality Performance

Strong  Geometry



Double Sided Insert Type Shoulder Mill

WWX Series



Economical double sided insert with 6 corners.



The insert thickness was greatly increased to markedly improve the fracture resistance (MMC comparison).



Stable and Reliable

The optimized “X-type” insert realizes stable and high-quality machining.

Strong  Geometry



Body damage is suppressed by arching the insert support.



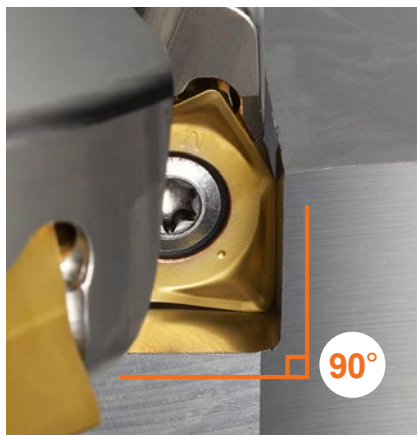
Wide variety of holder sizes and insert grades available covering most all machined workpiece material applications.



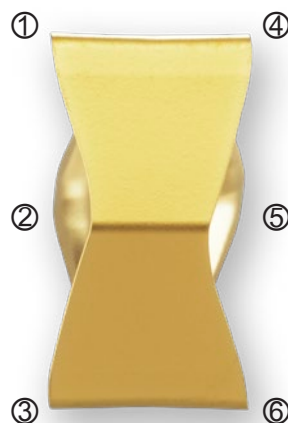
The optimized “X-type” insert meets the demand for greater strength.

■ The “X-Type” insert shape achieves both high quality surface finish and economic efficiency.

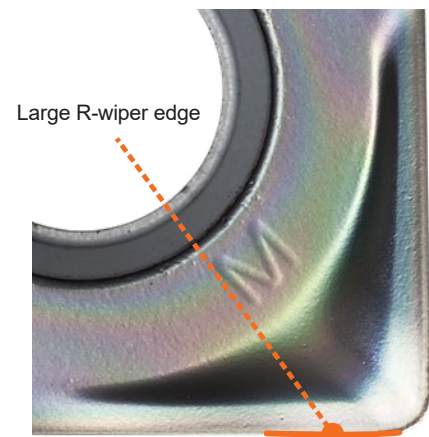
The insert's main cutting edge can machine a 90° wall surface. Additionally, the large R-wiper edge is adopted for achieving a good surface finish, while, the optimized “X-type” with 6 corners contributes to lower tool costs.



High-quality wall surface machining is possible.



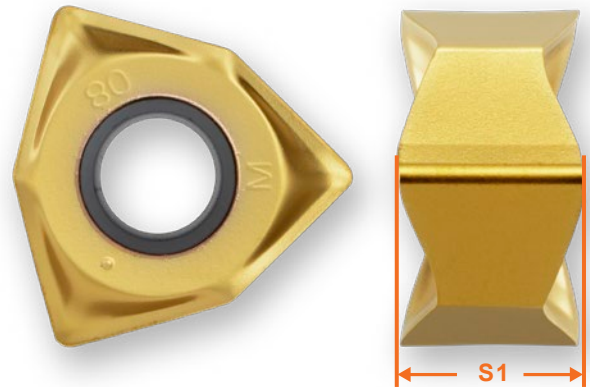
Economical double sided 6 corners.



Large R-wiper edge achieves a good surface finish.

■ The generous thickness of the insert provides high rigidity.

The WWX200 insert is 1.5 times thicker, and the WWX400 is 2.2 times thicker than the conventional ASX400 insert, achieving high rigidity and excellent fracture resistance. In addition, the increased rigidity eliminates the need for a seat component as direct clamping provides stable insert fixation.



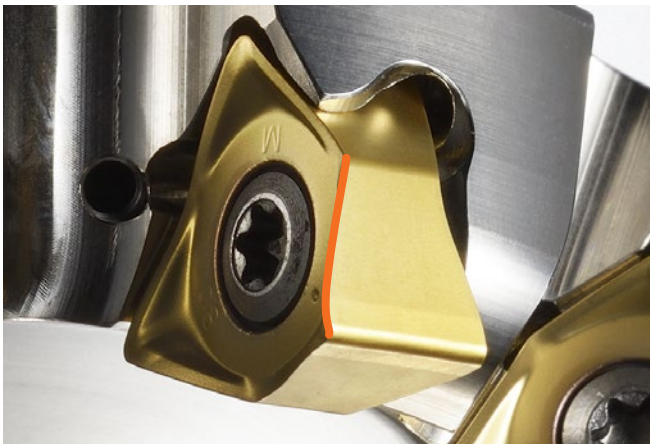
WWX200=.236 inch
WWX400=.354 inch

Strong Geometry

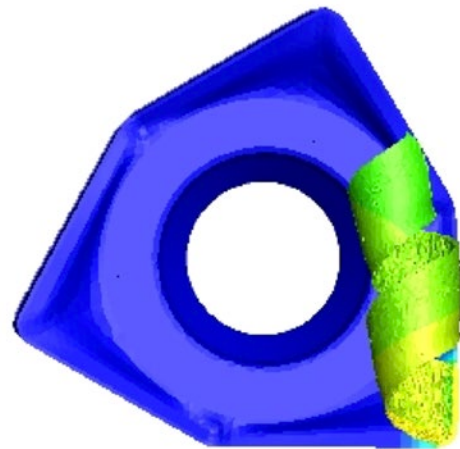
■ Excellent control and chip abrasion prevention.

Utilizing CAE*, the main cutting edge design was developed with a twisted cutting edge and a convex rake angle resulting in an optimal shape that provides excellent chip formation and evacuation greatly suppressing the scattering of chips at the bottom and periphery surface of the tool leading to high wall accuracy, a superior surface finish and markedly improved efficiency.

*CAE : Computer Aided Engineering



Curved cutting edge shape designed with an optimum rake face.



Chips are created with a good helical shape.

Comments from Developer

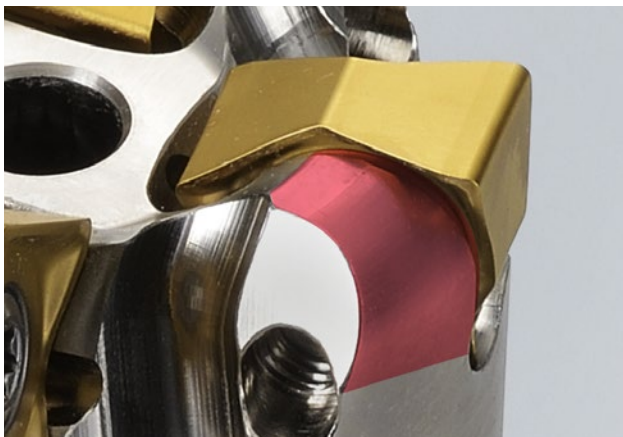
The WWX series was developed under the concept of “Stable and Worry-free” using an optimized insert shape with a maximum thickness of WWX200=.234”, WWX400=.354” in response to recent trends of unmanned operations and the demand for increased efficiency. The main attributes improved were rigidity and fracture resistance. Attention was also given to the cutting edge shape to achieve improved finished surface quality and good chip discharge. Be sure to experience the proprietary “X-type” insert developed by Mitsubishi Materials.



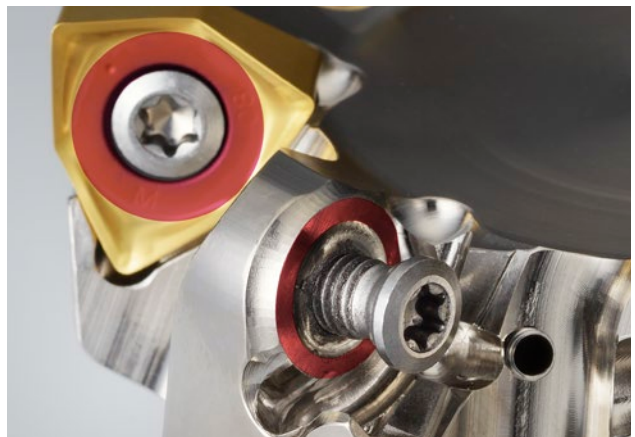
High-stability clamping and high-quality machining.

■ The optimized insert support and high clamp rigidity improve stability.

The conical shaped seating surface widely supports the insert surface area, while the arched insert support provides necessary clearance to suppress body damage from scratches and chip abrasion. Additionally, the strong clamping force of the M5 screws prevents loosening to provide robust clamping.



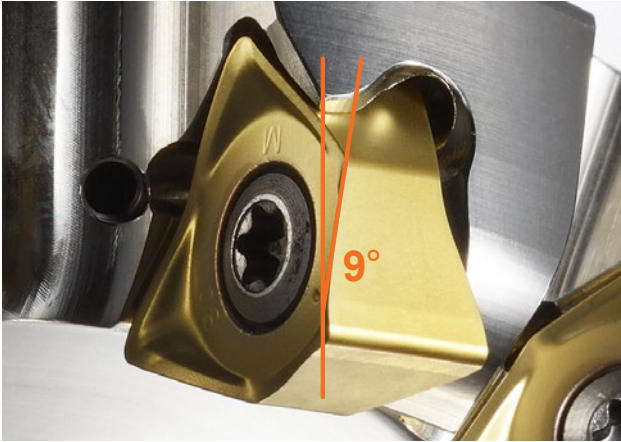
Arched insert support.



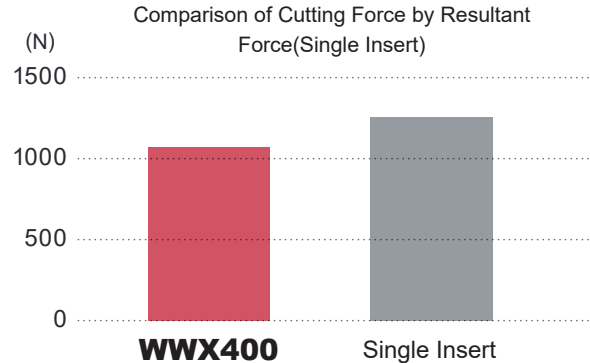
The conical seat surface and the M5 screw for WWX400, and the M3 screw for WWX200 provide a great clamping force.

Low cutting resistance suppresses chatter vibration even for thin workpiece materials.

Although a double-sided insert type with an axial rake angle of 9° (close to that of a single-sided insert type) is used, the WWX Series insert achieves lower cutting resistance than a single-sided insert (MMC comparison) and suppresses chatter vibration when machining thin workpiece materials.



Axial Rake Angle of 9°



<Cutting Conditions>

Workpiece Material : AISI 4140
Cutter Dia. : DC=3.000"
Cutting Speed : vc=525 SFM
Feed per Tooth : fz=.008 IPT
Depth of Cut : ap=.079"
Width of Cut : ae=2.520"
Cutting Mode : Dry Cutting

Variety of cutter types, diameters & pitches.

Increasing the insert thickness, while achieving seat-less clamping made it possible to incorporate a large number of teeth while maintaining large chip pockets to provide a variety of cutter options. A standard inventory is maintained consisting of 3 pitch types of both arbor and shank type cutters of same diameter. Fine pitch types in particular allow a high table feed and greatly improve efficiency.



DC=ø3.000"
Fine Pitch Type



DC=ø3.000"
Coarse Pitch Type

Comments from Developer

The result of pursuing "worry-free" is our cutter body. The highly rigid arching insert support achieves a stable installed feeling by using a conical shaped seat and the M5 screws. This design allows for long use and is the answer to the dissatisfied customers who have experienced "when damage to the insert has also made the cutter body unusable."

Double Sided Insert Type Shoulder Mill

WWX Series Classification

■ Arbor Type

The table feed is calculated from the recommended conditions of a M breaker for mild steel, during dry, stable cutting and with a cutting width of .5DC. APMX is the maximum depth of cut which differs from the recommended cutting conditions.

DC		WWX200 APMX= .197 inch						WWX400 APMX= .323 inch					
(inch)	(mm)	* No.T	Table Feed (IPM)	* No.T	Table Feed (IPM)	* No.T	Table Feed (IPM)	* No.T	Table Feed (IPM)	* No.T	Table Feed (IPM)	* No.T	Table Feed (IPM)
1.500	40	3	29.3	4	39.1	—	—	—	—	—	—	—	—
2.000	50	4	31.3	5	39.1	6	46.9	3	23.5	4	31.3	—	—
2.500	63	5	31.1	6	37.2	7	43.5	3	18.6	4	24.8	5	31.1
3.000	80	5	24.4	7	34.2	9	44.0	4	19.6	5	24.4	7	34.2
4.000	100	6	23.5	8	31.3	11	43.0	5	19.6	7	27.4	9	35.2
5.000	125	7	21.9	11	34.4	14	43.8	6	18.8	8	25.0	12	37.6
6.000	160	9	22.0	12	29.3	16	39.1	8	19.6	10	24.4	14	34.2
8.000	200	—	—	—	—	—	—	10	19.6	12	23.5	16	31.3
10.000	250	—	—	—	—	—	—	12	18.8	14	21.9	18	28.1

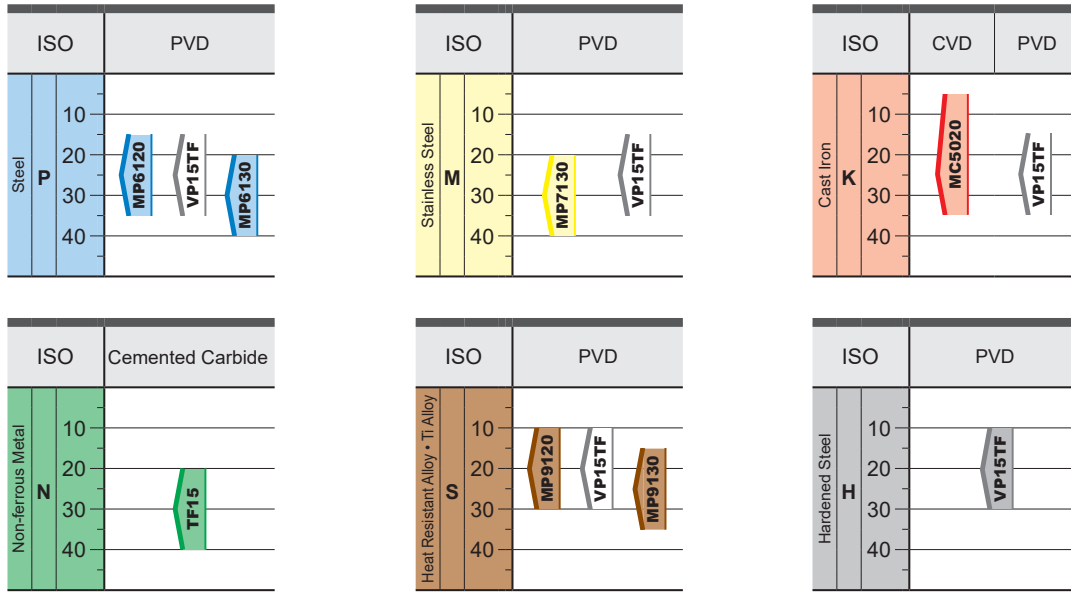
* Number of Teeth

■ Shank Type

DC		WWX200 APMX= .197 inch					WWX400 APMX= .323 inch				
(inch)	DCONMS	Functional Length LF		Number of Teeth			DCONMS	Functional Length LF	Number of Teeth		
1.000	1.000	4.750	8.500	2	—	—	—	—	—	—	—
1.125	1.000	8.500	—	2	—	—	—	—	—	—	—
1.250	1.000	5.125	—	2	3	—	—	—	—	—	—
	1.000	9.000	—	3	—	—	—	—	—	—	—
	1.250	5.125	—	2	3	—	—	—	—	—	—
	1.250	9.000	—	3	—	—	—	—	—	—	—
1.500	1.250	5.125	—	3	4	—	—	—	—	—	—
	1.250	9.000	—	4	—	—	—	—	—	—	—
2.000	—	—	—	—	—	—	1.250	4.750	3	4	—
2.500	—	—	—	—	—	—	1.250	4.750	3	4	5
3.000	—	—	—	—	—	—	1.250	4.750	4	5	7

DC		WWX200 APMX 5.0 mm					WWX400 APMX 8.2 mm				
(mm)	DCONMS	Functional Length LF		Number of Teeth			DCONMS	Functional Length LF	Number of Teeth		
25	20	115	—	2	—	—	—	—	—	—	—
	25	115	170	2	—	—	—	—	—	—	—
28	25	115	170	2	—	—	—	—	—	—	—
30	25	125	—	2	—	—	—	—	—	—	—
32	32	125	—	2	3	—	—	—	—	—	—
	32	190	—	3	—	—	—	—	—	—	—
35	32	190	—	3	—	—	—	—	—	—	—
40	32	125	—	3	4	—	—	—	—	—	—
50	32	125	—	4	5	6	32	125	3	4	—
63	—	—	—	—	—	—	32	125	3	4	5
80	—	—	—	—	—	—	32	125	4	5	7

Insert Grades for a Wide Range of Materials



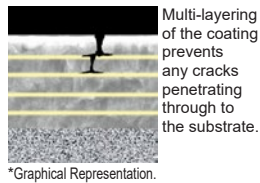
MP6100/MP7100/MP9100 Series

TOUGH-Σ Technology

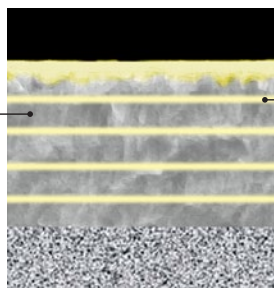
A fusion of the separate coating technologies; PVD and multi-layering provides extra toughness.

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.



Al-Ti-Cr-N Based PVD Coating



Best Layer of Each Work Material

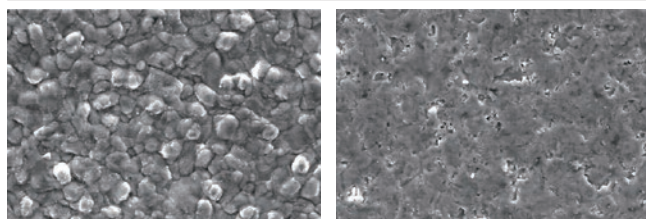
P		(Al,Cr)N	
		Tough! Thermal Cracks	Thermal Cracks
M		TiN	
		Tough! Notching	Notching
S		CrN	
		Tough! Resistant Chipping	Welding by Chipping

CVD Coating MC5020

First recommendation for cast iron milling.

MC5020 has excellent wear resistance and also controls thermal cracking and chipping that are common when machining ductile cast iron.

Comparison of Coating Surface



Conventional Coating

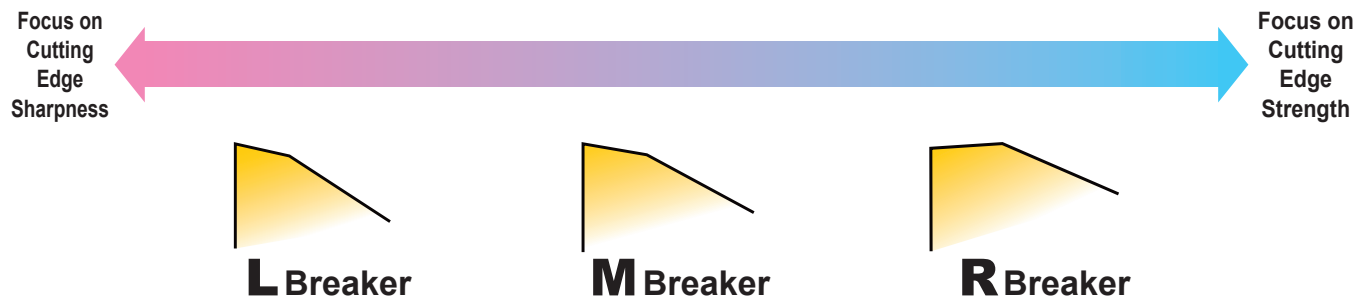
Black Super-smooth Coating

Black Super-smooth Coating

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

Double Sided Insert Type Shoulder Mill

Chip Breaker System



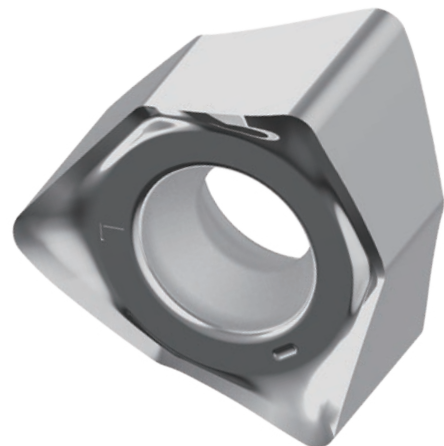
Workpiece Material	Cutting Conditions		
	Stable Cutting	General Cutting	Unstable Cutting
P			
M			
K			
N			
S			
H			

L chip breaker ideal for machining aluminum alloys and non-ferrous metals

Cost advantage of using 6 corners.

Precision grade provides high adhesion resistance and excellent machined surface quality.

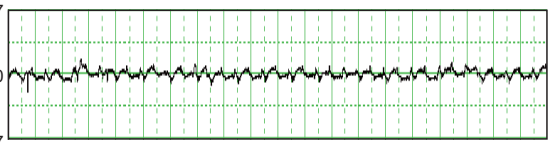
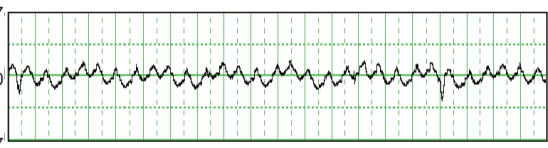
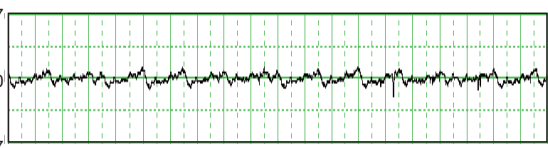
Low cutting force and good chip control.



Cutting Performance

AISI 4140 Finished Surface Comparison by Single Insert Cutting

WWX400 M class insert achieves the good surface finish as well as conventional G class product.

	Ra (μ-inch)	Rz (μ-inch)	Measured Value
WWX400 MP6120 (Grade M)	.009	.054	(μ-inch) 1.97 0.0 -1.97 
Conventional (Grade M)	.016	.090	(μ-inch) 1.97 0.0 -1.97 
Conventional (Grade G)	.011	.067	(μ-inch) 1.97 0.0 -1.97 

<Cutting Conditions>

Workpiece Material : AISI 4140
Cutter Dia. : DC=ø3.150"
Cutting Speed : vc = 720 SFM
Feed per Tooth : fz = .004 IPT
Depth of Cut : ap = .039"
Width of Cut : ae = 2.520" (.8DC)
Cutting Mode : Dry Cutting

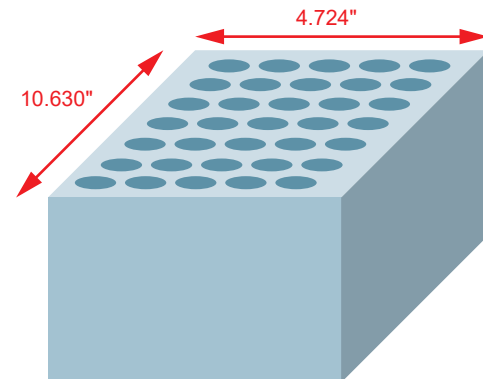
AISI 4140 Fracture Resistance Comparison

High stability is achieved without fracturing even at a feed of fz=.014 IPT.

fz (IPT)	.008	.010	.012	.014
Item				
WWX400 MP6120 (Grade M)	Good	Good	Good	Good
Conventional Single-sided Insert	NG			

Good : Cutting Length 5.32 Feet Possible

NG : Fracture



2.66 feet x 2 = 5.32 feet

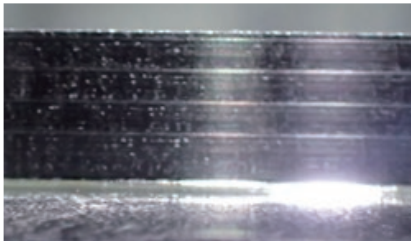
<Cutting Conditions>

Workpiece Material : AISI 4140
Cutter Dia. : DC=ø3.150"
Cutting Speed : vc = 460 SFM
Depth of Cut : ap = .079"
Width of Cut : ae = 1.575" (.5DC)
Cutting Mode : Dry Cutting
Single Insert

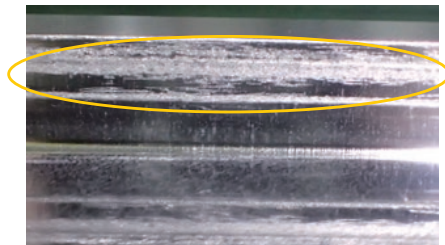
Cutting Performance

Comparison of Wall after Shoulder Milling Alloy Steel AISI 4140

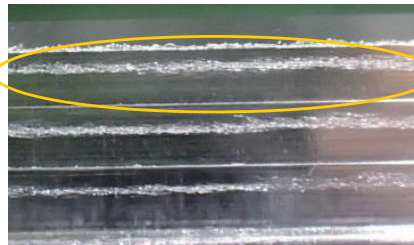
Excels in chip control and achieves a great, scratch-free wall surfaces.



WWX200



Biting of Chips Occurs
Conventional A

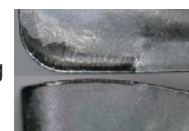
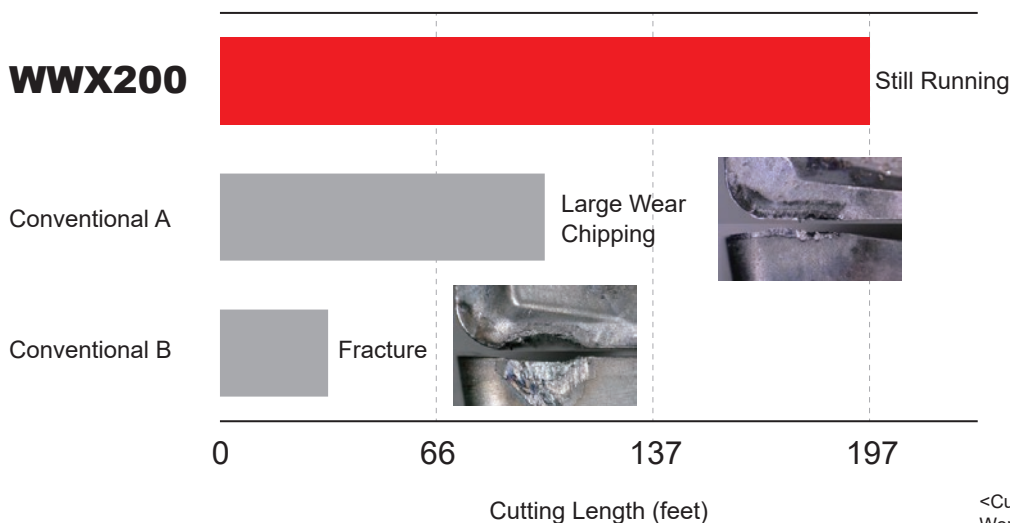


Biting of Chips Occurs
Conventional B

<Cutting Conditions>
Workpiece Material : AISI 4140
Cutter Dia. : DC=ø2.000 inch
Cutting Speed : vc = 590 SFM
Feed per Tooth : fz = .004 IPT
Depth of Cut : ap = .039 inch
Width of Cut : ae = 1.575 inch
Cutting Mode : Dry Cutting
Single Insert

Comparison of Alloy Steel AISI 4140 Cutting Length

It has excellent wear and fracture resistance, and contributes to the extension of cutting length.



<Cutting Conditions>
Workpiece Material : AISI 4140
Cutter Dia. : DC=ø2.000 inch
Inserts : M Breaker, MP6120
Cutting Speed : vc = 590 SFM
Feed per Tooth : fz = .006 IPT
Depth of Cut : ap = .079 inch
Width of Cut : ae = 1.575 inch
Cutting Mode : Dry Cutting
Single Insert

SHOULDER MILLING

<GENERAL CUTTING>



WWX200

P

M

K

N

S

H



Fig.1

ø1.500"
ø2.000"

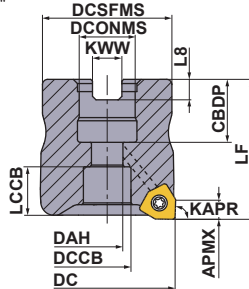
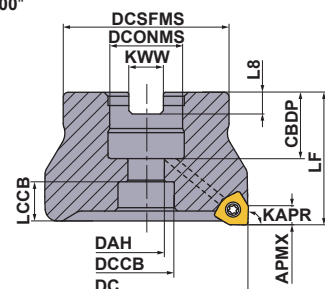


Fig.2

ø2.500"
ø3.000"



Right hand tool holder only.

Arbor Type

DCONMS=inch size

(inch)

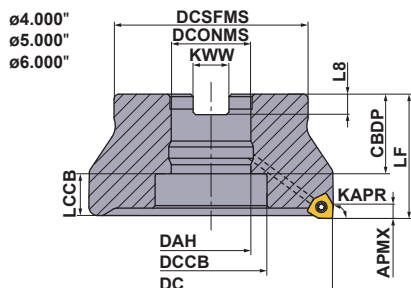
DC	Order Number	Stock R	*1 Coolant Thru	*2 No.T	LF	DCONMS	WT (lbs)	APMX	RPMX (min ⁻¹)	Fig.
1.500	WWX200UR1.5003SA	●	Y	3	1.750	.500	.6	.197	21600	1
1.500	WWX200UR1.5004SA	●	Y	4	1.750	.500	.5	.197	21600	1
2.000	WWX200UR2.0004AA	●	Y	4	1.750	.750	.9	.197	18600	1
2.000	WWX200UR2.0005AA	●	Y	5	1.750	.750	.9	.197	18600	1
2.000	WWX200UR2.0006AA	●	Y	6	1.750	.750	.9	.197	18600	1
2.500	WWX200UR2.5005CA	●	Y	5	2.000	1.000	1.7	.197	16000	2
2.500	WWX200UR2.5006CA	●	Y	6	2.000	1.000	1.6	.197	16000	2
2.500	WWX200UR2.5007CA	●	Y	7	2.000	1.000	1.6	.197	16000	2
3.000	WWX200UR3.0005CA	●	Y	5	2.000	1.000	2.2	.197	13600	2
3.000	WWX200UR3.0007CA	●	Y	7	2.000	1.000	2.2	.197	13600	2
3.000	WWX200UR3.0009CA	●	Y	9	2.000	1.000	2.1	.197	13600	2
4.000	WWX200UR4.0006EA	●	Y	6	2.500	1.500	5.1	.197	11700	3
4.000	WWX200UR4.0008EA	●	Y	8	2.500	1.500	5.0	.197	11700	3
4.000	WWX200UR4.0011EA	●	Y	11	2.500	1.500	4.9	.197	11700	3
5.000	WWX200UR5.0007EA	●	Y	7	2.500	1.500	7.8	.197	10100	3
5.000	WWX200UR5.0011EA	●	Y	11	2.500	1.500	7.6	.197	10100	3
5.000	WWX200UR5.0014EA	●	Y	14	2.500	1.500	7.6	.197	10100	3
6.000	WWX200UR6.0009EA	●	N	9	2.500	1.500	10.0	.197	8600	3
6.000	WWX200UR6.0012EA	●	N	12	2.500	1.500	9.8	.197	8600	3
6.000	WWX200UR6.0016EA	●	N	16	2.500	1.500	9.8	.197	8600	3

*1 Y=Yes, N=No

*2 Number of Teeth

WWX200

Fig.3



Right hand tool holder only.

DC	Set Bolt	Geometry	
1.500	HSCU25011H	①	
2.000	HSCU37513H		
2.500	HSCU50014H		
3.000	HSCU50014H		
4.000	MBAU75016H	②	
5.000	MBAU75016H		
6.000	MBAU75016H		

Mounting Dimensions

(inch)

DC	Order Number	DCONMS	CBDB	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
1.500	WWX200UR1.5003SA	.500	.630	.276	.433	.680	1.438	.250	.156	1
1.500	WWX200UR1.5004SA	.500	.630	.276	.433	.680	1.438	.250	.156	1
2.000	WWX200UR2.0004AA	.750	.748	.413	.630	.561	1.750	.313	.187	1
2.000	WWX200UR2.0005AA	.750	.748	.413	.630	.561	1.750	.313	.187	1
2.000	WWX200UR2.0006AA	.750	.748	.413	.630	.561	1.750	.313	.187	1
2.500	WWX200UR2.5005CA	1.000	.945	.539	.787	.680	2.188	.375	.219	2
2.500	WWX200UR2.5006CA	1.000	.945	.539	.787	.680	2.188	.375	.219	2
2.500	WWX200UR2.5007CA	1.000	.945	.539	.787	.680	2.188	.375	.219	2
3.000	WWX200UR3.0005CA	1.000	.945	.539	.787	.693	2.188	.375	.219	2
3.000	WWX200UR3.0007CA	1.000	.945	.539	.787	.693	2.188	.375	.219	2
3.000	WWX200UR3.0009CA	1.000	.945	.539	.787	.693	2.188	.375	.219	2
4.000	WWX200UR4.0006EA	1.500	1.654	1.500	2.205	.800	3.500	.625	.375	3
4.000	WWX200UR4.0008EA	1.500	1.654	1.500	2.205	.800	3.500	.625	.375	3
4.000	WWX200UR4.0011EA	1.500	1.654	1.500	2.205	.800	3.500	.625	.375	3
5.000	WWX200UR5.0007EA	1.500	1.654	1.500	2.205	.800	3.813	.625	.375	3
5.000	WWX200UR5.0011EA	1.500	1.654	1.500	2.205	.800	3.813	.625	.375	3
5.000	WWX200UR5.0014EA	1.500	1.654	1.500	2.205	.800	3.813	.625	.375	3
6.000	WWX200UR6.0009EA	1.500	1.654	1.500	2.205	.800	3.813	.625	.375	3
6.000	WWX200UR6.0012EA	1.500	1.654	1.500	2.205	.800	3.813	.625	.375	3
6.000	WWX200UR6.0016EA	1.500	1.654	1.500	2.205	.800	3.813	.625	.375	3

Spare Parts

(inch)

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

* Clamp Torque (lbf-in) : TPS3R = 17.7



Fig.1

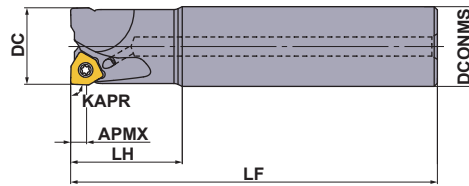


Fig.3

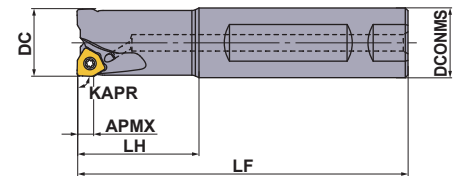


Fig.2

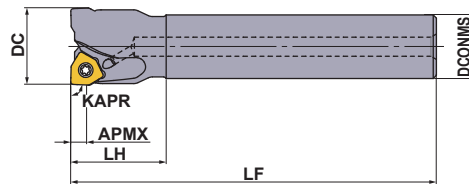
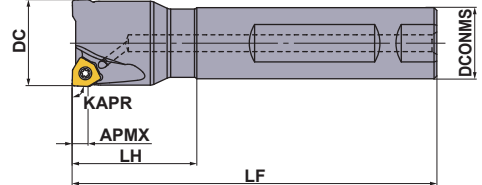


Fig.4



Right hand tool holder only.

Shank Type

With Air / Coolant through

(inch)

DC	Order Number	Stock R	* No.T	LF	DCONMS	LH	WT (lbs)	APMX	RPMX (min ⁻¹)	Fig.
1.000	WWX200UR1602FA16S	●	2	4.750	1.000	1.750	.9	.197	29600	3
1.000	WWX200UR1602SA16L	●	2	8.500	1.000	2.500	1.7	.197	29600	1
1.125	WWX200UR1802SA16L	●	2	8.500	1.000	1.750	1.8	.197	27400	2
1.250	WWX200UR2002FA16S	●	2	5.125	1.000	1.750	1.1	.197	25100	4
1.250	WWX200UR2003FA16S	●	3	5.125	1.000	1.750	1.1	.197	25100	4
1.250	WWX200UR2003SA16L	●	3	9.000	1.000	1.750	1.9	.197	25100	2
1.250	WWX200UR2002FA20S	●	2	5.125	1.250	2.000	1.5	.197	25100	3
1.250	WWX200UR2003FA20S	●	3	5.125	1.250	2.000	1.5	.197	25100	3
1.250	WWX200UR2003SA20L	●	3	9.000	1.250	3.000	2.8	.197	25100	1
1.500	WWX200UR2403FA20S	●	3	5.125	1.250	2.000	1.7	.197	21600	4
1.500	WWX200UR2404FA20S	●	4	5.125	1.250	2.000	1.7	.197	21600	4
1.500	WWX200UR2404SA20L	●	4	9.000	1.250	2.000	3.0	.197	21600	2

* Number of Teeth

Spare Parts

(inch)

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

* Clamp Torque (lbf-in) : TPS3R = 17.7

Double Sided Insert Type Shoulder Mill

SHOULDER MILLING

<GENERAL CUTTING>

WWX200

P

M

K

N

S

H



Fig.1

ø40
ø50

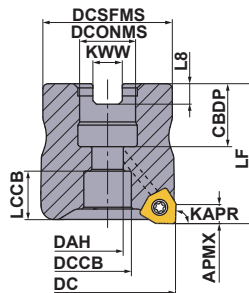
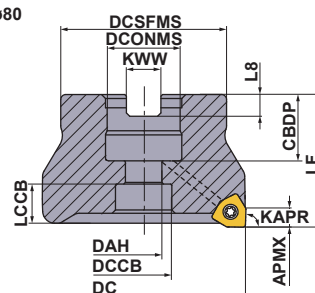


Fig.2

ø63
ø80



Right hand tool holder only.

Metric Standard

Arbor Type

DCONMS = inch size

(mm)

DC	Order Number	Stock R	*1 Coolant Thru	*2 No.T	LF	DCONMS	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.
80	WWX200R08005CA	★	Y	5	50	25.4	1.1	5.0	13600	2
80	WWX200R08007CA	★	Y	7	50	25.4	1.1	5.0	13600	2
80	WWX200R08009CA	★	Y	9	50	25.4	1.0	5.0	13600	2
100	WWX200R10006DA	★	Y	6	50	31.75	1.6	5.0	11700	3
100	WWX200R10008DA	★	Y	8	50	31.75	1.5	5.0	11700	3
100	WWX200R10011DA	★	Y	11	50	31.75	1.5	5.0	11700	3
125	WWX200R12507EA	★	Y	7	63	38.1	2.8	5.0	10100	3
125	WWX200R12511EA	★	Y	11	63	38.1	2.8	5.0	10100	3
125	WWX200R12514EA	★	Y	14	63	38.1	2.8	5.0	10100	3
160	WWX200R16009FA	★	Y	9	63	50.8	4.6	5.0	8600	3
160	WWX200R16012FA	★	Y	12	63	50.8	4.5	5.0	8600	3
160	WWX200R16016FA	★	Y	16	63	50.8	4.5	5.0	8600	3

*1 Y=Yes, N=No

*2 Number of Teeth

Note1) A set bolt to the arbor is not supplied with the body. Please refer to page 17, when ordering.

Note2) Please use a set bolt of the FMA type on the cutter body from 80 to 160 in diameter(DC).

Fig.3

ø100
ø125
ø160

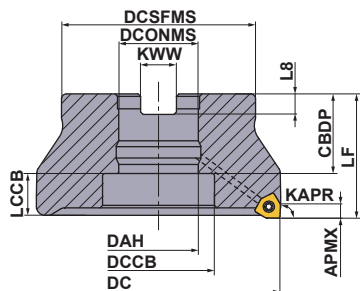
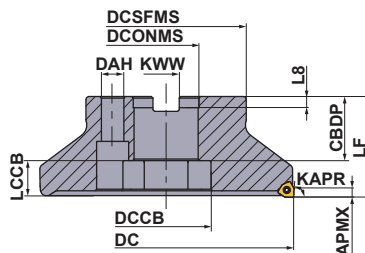


Fig.4

ø160



Right hand tool holder only.

Metric Standard

Arbor Type

DCONMS = mm size

(mm)

DC	Order Number	Stock R	*1 Coolant Thru	*2 No.T	LF	DCONMS	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.
40	WWX200-040A03AR	★	Y	3	40	16	0.2	5.0	21600	1
40	WWX200-040A04AR	★	Y	4	40	16	0.2	5.0	21600	1
50	WWX200-050A04AR	★	Y	4	40	22	0.4	5.0	18600	1
50	WWX200-050A05AR	★	Y	5	40	22	0.4	5.0	18600	1
50	WWX200-050A06AR	★	Y	6	40	22	0.3	5.0	18600	1
63	WWX200-063A05AR	★	Y	5	40	22	0.5	5.0	16000	2
63	WWX200-063A06AR	★	Y	6	40	22	0.5	5.0	16000	2
63	WWX200-063A07AR	★	Y	7	40	22	0.5	5.0	16000	2
80	WWX200-080A05AR	★	Y	5	50	27	1.1	5.0	13600	2
80	WWX200-080A07AR	★	Y	7	50	27	1.0	5.0	13600	2
80	WWX200-080A09AR	★	Y	9	50	27	1.0	5.0	13600	2
100	WWX200-100B06AR	★	Y	6	50	32	1.7	5.0	11700	3
100	WWX200-100B08AR	★	Y	8	50	32	1.7	5.0	11700	3
100	WWX200-100B11AR	★	Y	11	50	32	1.7	5.0	11700	3
125	WWX200-125B07AR	★	Y	7	63	40	3.1	5.0	10100	3
125	WWX200-125B11AR	★	Y	11	63	40	3.0	5.0	10100	3
125	WWX200-125B14AR	★	Y	14	63	40	3.0	5.0	10100	3
160	WWX200-160C09NR	★	N	9	63	40	4.6	5.0	8600	4
160	WWX200-160C12NR	★	N	12	63	40	4.6	5.0	8600	4
160	WWX200-160C16NR	★	N	16	63	40	4.6	5.0	8600	4

*1 Y=Yes, N=No

*2 Number of Teeth

Note1) A set bolt to the arbor is not supplied with the body. Please refer to page 17, when ordering.

Note2) Please use a set bolt of the FMC type on the cutter body from 40 to 100 in diameter(DC).

Note3) Please use a set bolt of the FMA type on the cutter body from 125 to 160 in diameter(DC).

Spare Parts

(mm)

Tool Holder Type			
WWX200	TPS3R	TIP10D	MK1KS

* Clamp Torque (N · m) : TPS3R = 2.0

WWX200

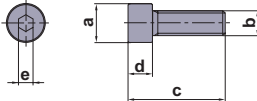
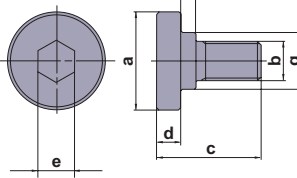
Mounting Dimensions

(mm)

DC	Order Number	DCONMS	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
40	WWX200-040A03AR	16	18	9	13.6	13.8	37	8.4	5.6	1
40	WWX200-040A04AR	16	18	9	13.6	13.8	37	8.4	5.6	1
50	WWX200-050A04AR	22	20	11	17	11.8	47	10.4	6.3	1
50	WWX200-050A05AR	22	20	11	17	11.8	47	10.4	6.3	1
50	WWX200-050A06AR	22	20	11	17	11.8	47	10.4	6.3	1
63	WWX200-063A05AR	22	20	11	17	11.8	50	10.4	6.3	2
63	WWX200-063A06AR	22	20	11	17	11.8	50	10.4	6.3	2
63	WWX200-063A07AR	22	20	11	17	11.8	50	10.4	6.3	2
80	WWX200R08005CA	25.4	26	13	20	11.8	56	9.5	6	2
80	WWX200R08007CA	25.4	26	13	20	11.8	56	9.5	6	2
80	WWX200R08009CA	25.4	26	13	20	11.8	56	9.5	6	2
80	WWX200-080A05AR	27	23	13	20	11.8	56	12.4	7	2
80	WWX200-080A07AR	27	23	13	20	11.8	56	12.4	7	2
80	WWX200-080A09AR	27	23	13	20	11.8	56	12.4	7	2
100	WWX200R10006DA	31.75	37	31.75	45	16.8	70	12.7	8	3
100	WWX200R10008DA	31.75	37	31.75	45	16.8	70	12.7	8	3
100	WWX200R10011DA	31.75	37	31.75	45	16.8	70	12.7	8	3
100	WWX200-100B06AR	32	26	32	45	16.8	78	14.4	8	3
100	WWX200-100B08AR	32	26	32	45	16.8	78	14.4	8	3
100	WWX200-100B11AR	32	26	32	45	16.8	78	14.4	8	3
125	WWX200R12507EA	38.1	42	38.1	56	21.8	80	15.9	10	3
125	WWX200R12511EA	38.1	42	38.1	56	21.8	80	15.9	10	3
125	WWX200R12514EA	38.1	42	38.1	56	21.8	80	15.9	10	3
125	WWX200-125B07AR	40	35	42	56	21.8	89	16.4	9	3
125	WWX200-125B11AR	40	35	42	56	21.8	89	16.4	9	3
125	WWX200-125B14AR	40	35	42	56	21.8	89	16.4	9	3
160	WWX200-160C09NR	40	40	—	56	21.8	100	16.4	9	4
160	WWX200-160C12NR	40	40	—	56	21.8	100	16.4	9	4
160	WWX200-160C16NR	40	40	—	56	21.8	100	16.4	9	4
160	WWX200R16009FA	50.8	45	50.8	72	21.8	100	19.1	11	3
160	WWX200R16012FA	50.8	45	50.8	72	21.8	100	19.1	11	3
160	WWX200R16016FA	50.8	45	50.8	72	21.8	100	19.1	11	3

Parts Sold Separately Set Bolt

(mm)

Tool Holder Type	Set Bolt		Fig.	Reference Dimensions							Geometry
	With Coolant Thru	Without Coolant Thru		a	b	c	d	e	f	g	
	Order Number	Order Number									
WWX200R080	HSC12035H	HSC12035	1	18	M12x1.75	47	12	10	—	—	Fig.1 
WWX200R100	MBA16033H	—	2	40	M16x2	43	10	14	6	23	
WWX200R125	MBA20040H	—	2	50	M20x2.5	54	14	17	6	27	
WWX200R160	MBA24045H	—	2	65	M24x3	59	14	17	10	37	
WWX200-040A	HSC08025H	—	1	13	M8x1.25	33	8	5	—	—	Fig.2 
WWX200-050A	HSC10030H	HSC10035	1	16	M10x1.5	40(45)	10	6	—	—	
WWX200-063A	HSC10030H	HSC10035	1	16	M10x1.5	40(45)	10	6	—	—	
WWX200-080A	HSC12035H	HSC12035	1	18	M12x1.75	47	12	10	—	—	
WWX200-100B	MBA16033H	—	2	40	M16x2	43	10	14	6	23	
WWX200-125B	MBA20040H	—	2	50	M20x2.5	54	14	17	6	27	
WWX200-160C	No Coolant Thru	—	2	50	M20x2.5	54	14	17	6	27	

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

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



Fig.1

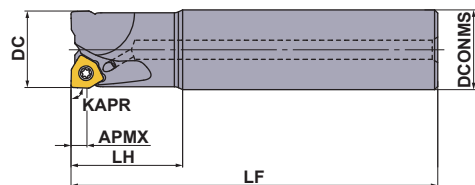
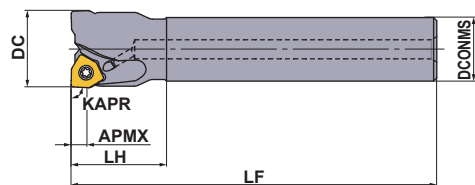


Fig.2



Right hand tool holder only.

Metric Standard

Shank Type

With Air / Coolant through

DC	Order Number	Stock	* No.T	LF	DCONMS	LH	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.
		R								
25	WWX200R2502SA20S	★	2	115	20	30	0.3	5	29600	2
25	WWX200R2502SA25S	★	2	115	25	35	0.4	5	29600	1
25	WWX200R2502SA25L	★	2	170	25	70	0.6	5	29600	1
28	WWX200R2802SA25S	★	2	115	25	35	0.4	5	27400	2
28	WWX200R2802SA25L	★	2	170	25	35	0.6	5	27400	2
30	WWX200R3002SA25S	★	2	125	25	35	0.5	5	26200	2
32	WWX200R3202SA32S	★	2	125	32	45	0.7	5	26200	1
32	WWX200R3203SA32S	★	3	125	32	45	0.7	5	26200	1
32	WWX200R3203SA32L	★	3	190	32	90	1.0	5	26200	1
35	WWX200R3503SA32L	★	3	190	32	45	1.1	5	25100	2
40	WWX200R4003SA32S	★	3	125	32	45	0.8	5	21600	2
40	WWX200R4004SA32S	★	4	125	32	45	0.8	5	21600	2
50	WWX200R5004SA32S	★	4	125	32	45	0.9	5	18600	2
50	WWX200R5005SA32S	★	5	125	32	45	0.9	5	18600	2
50	WWX200R5006SA32S	★	6	125	32	45	0.9	5	18600	2

★ Number of Teeth

Spare Parts

Tool Holder Type	* (mm)		
			
WWX200	TPS3R	TIP10D	MK1KS

★ Clamp Torque (N • m) : TPS3R = 2.0

WWX200

(inch)

● = NEW

SHOULDER MILLING

<GENERAL CUTTING>



WWX400 2.000"

P

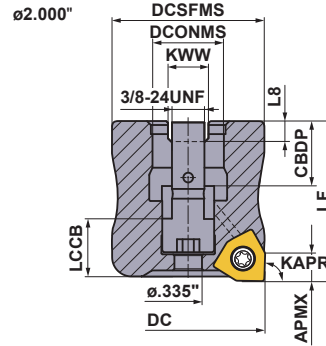
M

K

N

S

H



Right hand tool holder only.

The set bolt is built in.

Allen wrench (1/4 inch Hex Key size) is used to tighten the set bolt.

Arbor Type

DCONMS=inch size

(inch)

DC	Order Number	Stock R	*1 Coolant Thru	*2 No. T	LF	DCONMS	WT (lbs)	APMX	RMPX	RPMX (min ⁻¹)
2.000	WWX400UR2.0003AA	●	Y	3	2.125	.750	1.1	.323	.4°	5000
2.000	WWX400UR2.0004AA	●	Y	4	2.125	.750	1.1	.323	.4°	5000

*1 Y=Yes, N=No

*2 Number of Teeth

Note 1) The maximum spindle speeds **RPMX** are set to ensure tool and insert stability.

Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

Note 3) The milling cutter has a built-in set bolt. The set bolt cannot be replaced.

Therefore, absolutely do not disassemble the milling cutter.

Mounting Dimensions

(inch)

DC	Order Number	DCONMS	CBDP	LCCB	DCSFMS	KWW	L8
2.000	WWX400UR2.0003AA	.750	.858	.787	1.750	.313	.187
2.000	WWX400UR2.0004AA	.750	.858	.787	1.750	.313	.187

Spare Parts

(inch)

Tool Holder Type			
WWX400	TS5R	TKY20T	MK1KS

* Clamp Torque (lbf-in) : TS5R = 44

Double Sided Insert Type Shoulder Mill

SHOULDER MILLING

<GENERAL CUTTING>

WWX400

P

M

K

N

S

H



Fig.1

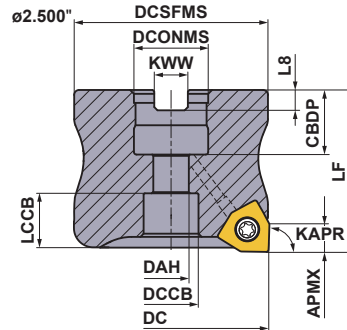
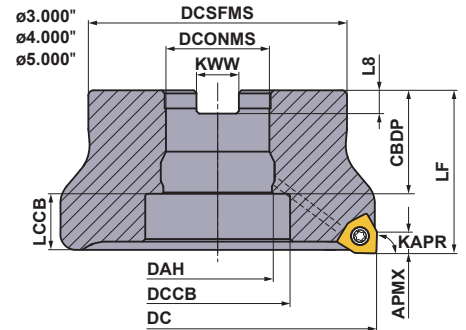


Fig.2



Right hand tool holder only.

Arbor Type

DCONMS=inch size

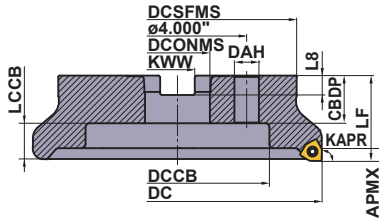
(inch)

DC	Order Number	Stock R	*1 Coolant thru	*2 No.T	LF	DCONMS	WT (lbs)	APMX	RMPX	RPMX (min ⁻¹)	Fig.
2.500	WWX400UR2.5003CA	●	Y	3	2.000	1.000	1.6	.323	.26°	14000	1
2.500	WWX400UR2.5004CA	●	Y	4	2.000	1.000	1.5	.323	.26°	14000	1
2.500	WWX400UR2.5005CA	●	Y	5	2.000	1.000	1.5	.323	.26°	14000	1
3.000	WWX400UR3.0004CA	●	Y	4	2.000	1.000	2.1	.323	.16°	12600	2
3.000	WWX400UR3.0005CA	●	Y	5	2.000	1.000	2.1	.323	.16°	12600	2
3.000	WWX400UR3.0007CA	●	Y	7	2.000	1.000	1.9	.323	.16°	12600	2
4.000	WWX400UR4.0005EA	●	Y	5	2.500	1.500	4.9	.323	—	10700	2
4.000	WWX400UR4.0007EA	●	Y	7	2.500	1.500	4.8	.323	—	10700	2
4.000	WWX400UR4.0009EA	●	Y	9	2.500	1.500	4.7	.323	—	10700	2
5.000	WWX400UR5.0006EA	●	Y	6	2.500	1.500	7.6	.323	—	9400	2
5.000	WWX400UR5.0008EA	●	Y	8	2.500	1.500	7.5	.323	—	9400	2
5.000	WWX400UR5.0012EA	●	Y	12	2.500	1.500	7.3	.323	—	9400	2
6.000	WWX400UR6.0008EA	●	Y	8	2.500	1.500	9.9	.323	—	8500	2
6.000	WWX400UR6.0010EA	●	Y	10	2.500	1.500	9.8	.323	—	8500	2
6.000	WWX400UR6.0014EA	●	Y	14	2.500	1.500	9.7	.323	—	8500	2
8.000	WWX400UR8.0010MN	●	N	10	2.500	2.500	17.3	.323	—	7200	3
8.000	WWX400UR8.0012MN	●	N	12	2.500	2.500	17.2	.323	—	7200	3
8.000	WWX400UR8.0016MN	●	N	16	2.500	2.500	17	.323	—	7200	3
10.000	WWX400UR10.0012MN	●	N	12	2.500	2.500	29.3	.323	—	6400	3
10.000	WWX400UR10.0014MN	●	N	14	2.500	2.500	29.3	.323	—	6400	3
10.000	WWX400UR10.0018MN	●	N	18	2.500	2.500	29	.323	—	6400	3

*1 Y=Yes, N=No

*2 Number of Teeth

Fig.3
 ø8.000"
 ø10.000"



Right hand tool holder only.

DC	Set Bolt	Geometry	
2.500	HSCU50014H	①	
3.000	HSCU50014H		
4.000	MBAU75016H	②	
5.000	MBAU75016H		
6.000	MBAU75016H	—	
8.000	—		
10.000	—		

Mounting Dimensions

(inch)

DC	Order Number	DCONMS	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
2.500	WWX400UR2.5003CA	1.000	.945	.539	.787	.670	2.190	.375	.219	1
2.500	WWX400UR2.5004CA	1.000	.945	.539	.787	.670	2.190	.375	.219	1
2.500	WWX400UR2.5005CA	1.000	.945	.539	.787	.670	2.190	.375	.219	1
3.000	WWX400UR3.0004CA	1.000	.945	.539	.787	.670	2.190	.375	.219	2
3.000	WWX400UR3.0005CA	1.000	.945	.539	.787	.670	2.190	.375	.219	2
3.000	WWX400UR3.0007CA	1.000	.945	.539	.787	.670	2.190	.375	.219	2
4.000	WWX400UR4.0005EA	1.500	1.654	1.500	2.205	.776	3.500	.625	.375	2
4.000	WWX400UR4.0007EA	1.500	1.654	1.500	2.205	.776	3.500	.625	.375	2
4.000	WWX400UR4.0009EA	1.500	1.654	1.500	2.205	.776	3.500	.625	.375	2
5.000	WWX400UR5.0006EA	1.500	1.654	1.500	2.205	.776	3.813	.625	.375	2
5.000	WWX400UR5.0008EA	1.500	1.654	1.500	2.205	.776	3.813	.625	.375	2
5.000	WWX400UR5.0012EA	1.500	1.654	1.500	2.205	.776	3.813	.625	.375	2
6.000	WWX400UR6.0008EA	1.500	1.654	1.500	2.205	.776	3.813	.625	.375	2
6.000	WWX400UR6.0010EA	1.500	1.654	1.500	2.205	.776	3.813	.625	.375	2
6.000	WWX400UR6.0014EA	1.500	1.654	1.500	2.205	.776	3.813	.625	.375	2
8.000	WWX400UR8.0010MN	2.500	1.378	.709	5.512	1.052	6.890	1.000	.560	3
8.000	WWX400UR8.0012MN	2.500	1.378	.709	5.512	1.052	6.890	1.000	.560	3
8.000	WWX400UR8.0016MN	2.500	1.378	.709	5.512	1.052	6.890	1.000	.560	3
10.000	WWX400UR10.0012MN	2.500	1.378	.709	7.087	1.052	8.661	1.000	.560	3
10.000	WWX400UR10.0014MN	2.500	1.378	.709	7.087	1.052	8.661	1.000	.560	3
10.000	WWX400UR10.0018MN	2.500	1.378	.709	7.087	1.052	8.661	1.000	.560	3

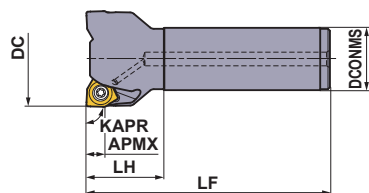
Spare Parts

(inch)

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

* Clamp Torque (lbf-in) : TS5R = 44

WWX400



Right hand tool holder only.

Shank Type

With Air / Coolant through

(inch)

DC	Order Number	Stock	* No.T	LF	DCONMS	LH	WT (lbs)	APMX	RMPX	RPMX (min ⁻¹)
		R								
2.000	WWX400UR3203FA20M	●	3	4.750	1.250	1.500	1.7	.323	.4°	15800
2.000	WWX400UR3204FA20M	●	4	4.750	1.250	1.500	1.7	.323	.4°	15800
2.500	WWX400UR4003FA20M	●	3	4.750	1.250	1.500	2.1	.323	.26°	14000
2.500	WWX400UR4004FA20M	●	4	4.750	1.250	1.500	2	.323	.26°	14000
2.500	WWX400UR4005FA20M	●	5	4.750	1.250	1.500	2	.323	.26°	14000
3.000	WWX400UR4804FA20M	●	4	4.750	1.250	1.500	2.5	.323	.16°	12600
3.000	WWX400UR4805FA20M	●	5	4.750	1.250	1.500	2.4	.323	.16°	12600
3.000	WWX400UR4807FA20M	●	7	4.750	1.250	1.500	2.3	.323	.16°	12600

* Number of Teeth

Spare Parts

(inch)

Tool Holder Type	*		
			
WWX400	TS5R	TKY20T	MK1KS

* Clamp Torque (lbf-in) : TS5R = 44

SHOULDER MILLING

<GENERAL CUTTING>



WWX400

P

M

K

N

S

H

ø50



Fig.1
ø50

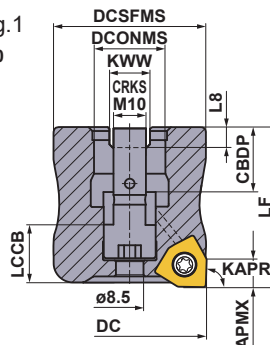
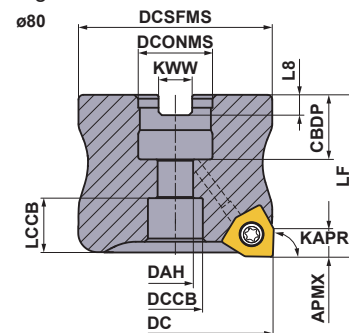


Fig.2
ø80



Right hand tool holder only.

Metric Standard

Arbor Type

DCONMS = inch size

(mm)

DC	Order Number	Stock R	*1 Coolant Thru	*2 No. T	LF	DCONMS	WT (kg)	APMX	RMPX	RPMX (min ⁻¹)	Fig.
80	WWX400R08004CA	★	Y	4	50	25.4	1.0	8.2	0.16°	12200	2
80	WWX400R08005CA	★	Y	5	50	25.4	1.0	8.2	0.16°	12200	2
80	WWX400R08007CA	★	Y	7	50	25.4	0.9	8.2	0.16°	12200	2
100	WWX400R10005DA	★	Y	5	50	31.75	1.4	8.2	—	10700	3
100	WWX400R10007DA	★	Y	7	50	31.75	1.4	8.2	—	10700	3
100	WWX400R10009DA	★	Y	9	50	31.75	1.3	8.2	—	10700	3
125	WWX400R12506EA	★	Y	6	63	38.1	2.8	8.2	—	9500	3
125	WWX400R12508EA	★	Y	8	63	38.1	2.8	8.2	—	9500	3
125	WWX400R12512EA	★	Y	12	63	38.1	2.7	8.2	—	9500	3
160	WWX400R16008FA	★	Y	8	63	50.8	4.5	8.2	—	8300	3
160	WWX400R16010FA	★	Y	10	63	50.8	4.4	8.2	—	8300	3
160	WWX400R16014FA	★	Y	14	63	50.8	4.3	8.2	—	8300	3
200	WWX400R20010KN	★	N	10	63	47.625	8.1	8.2	—	7300	5
200	WWX400R20012KN	★	N	12	63	47.625	8.1	8.2	—	7300	5
200	WWX400R20016KN	★	N	16	63	47.625	8.0	8.2	—	7300	5
250	WWX400R25012KN	★	N	12	63	47.625	12.1	8.2	—	6400	5
250	WWX400R25014KN	★	N	14	63	47.625	12.1	8.2	—	6400	5
250	WWX400R25018KN	★	N	18	63	47.625	12.0	8.2	—	6400	5

*1 Y=Yes, N=No

*2 Number of Teeth

Note1) A set bolt to the arbor is not supplied with the body. Please refer to page 26, when ordering.

Note2) Please use a set bolt of the FMA type on the cutter body from 80 to 250 in diameter(DC).

WWX400

Fig.3

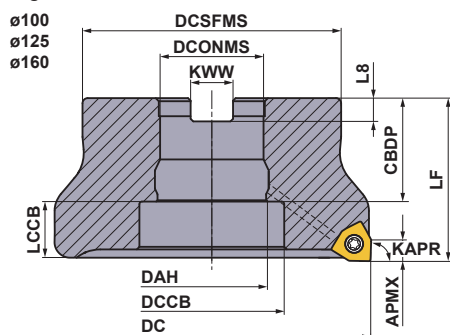


Fig.4

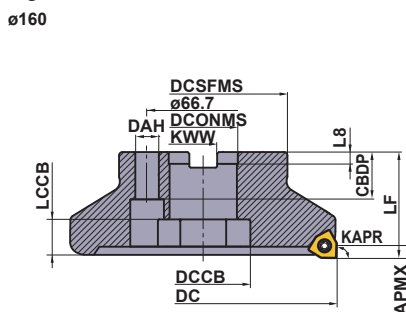
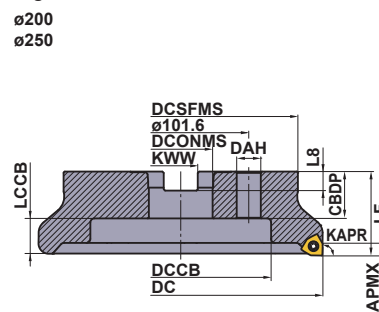


Fig.5



Right hand tool holder only.

Metric Standard

Arbor Type

DCONMS = mm size

(mm)

DC	Order Number	Stock R	*1 Coolant Thru	*2 No. T	LF	DCONMS	WT (kg)	APMX	RMPX	RPMX (min ⁻¹)	Fig.
50	WWX400-050A03AR	★	Y	3	55	22	0.5	8.2	0.4°	5000	1
50	WWX400-050A04AR	★	Y	4	55	22	0.5	8.2	0.4°	5000	1
63	WWX400-063A03AR	★	Y	3	40	22	0.5	8.2	0.26°	14100	2
63	WWX400-063A04AR	★	Y	4	40	22	0.5	8.2	0.26°	14100	2
63	WWX400-063A05AR	★	Y	5	40	22	0.5	8.2	0.26°	14100	2
80	WWX400-080A04AR	★	Y	4	50	27	1.0	8.2	0.16°	12200	2
80	WWX400-080A05AR	★	Y	5	50	27	1.0	8.2	0.16°	12200	2
80	WWX400-080A07AR	★	Y	7	50	27	0.9	8.2	0.16°	12200	2
100	WWX400-100B05AR	★	Y	5	50	32	1.6	8.2	—	10700	3
100	WWX400-100B07AR	★	Y	7	50	32	1.5	8.2	—	10700	3
100	WWX400-100B09AR	★	Y	9	50	32	1.5	8.2	—	10700	3
125	WWX400-125B06AR	★	Y	6	63	40	3.0	8.2	—	9500	3
125	WWX400-125B08AR	★	Y	8	63	40	3.0	8.2	—	9500	3
125	WWX400-125B12AR	★	Y	12	63	40	2.9	8.2	—	9500	3
160	WWX400-160C08NR	★	N	8	63	40	4.5	8.2	—	8300	4
160	WWX400-160C10NR	★	N	10	63	40	4.4	8.2	—	8300	4
160	WWX400-160C14NR	★	N	14	63	40	4.4	8.2	—	8300	4
200	WWX400-200C10NR	★	N	10	63	60	6.7	8.2	—	7300	5
200	WWX400-200C12NR	★	N	12	63	60	6.7	8.2	—	7300	5
200	WWX400-200C16NR	★	N	16	63	60	6.6	8.2	—	7300	5
250	WWX400-250C12NR	★	N	12	63	60	11.5	8.2	—	6400	5
250	WWX400-250C14NR	★	N	14	63	60	11.5	8.2	—	6400	5
250	WWX400-250C18NR	★	N	18	63	60	11.4	8.2	—	6400	5

*1 Y=Yes, N=No

*2 Number of Teeth

Note1) A set bolt to the arbor is not supplied with the body. Please refer to page 26, when ordering.

Note2) The milling cutter with cutting diameter DC=50 mm has a built-in set bolt. The set bolt cannot be replaced.

Therefore, do not disassemble the milling cutter.

Note3) Please use a set bolt of the FMC type on the cutter body from 63 to 100 in diameter(DC).

Note4) Please use a set bolt of the FMA type on the cutter body from 125 to 250 in diameter(DC).

Spare Parts

(mm)

Tool Holder Type	★		
WWX400	TS5R	TKY20T	MK1KS

* Clamp Torque (N · m) : TS5R = 5.0

★ : Stocked in Japan

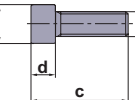
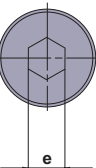
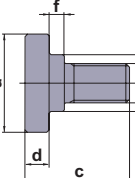
Mounting Dimensions

(mm)

DC	Order Number	DONMS	CBDP	DAH	DCCB	LCCB	DCSFS	KWW	L8	Fig.
50	WWX400-050A03AR	22	20	—	—	12.2	47	10.4	6.3	1
50	WWX400-050A04AR	22	20	—	—	12.2	47	10.4	6.3	1
63	WWX400-063A03AR	22	20	11	17	11.2	50	10.4	6.3	2
63	WWX400-063A04AR	22	20	11	17	11.2	50	10.4	6.3	2
63	WWX400-063A05AR	22	20	11	17	11.2	50	10.4	6.3	2
80	WWX400R08004CA	25.4	26	13	20	14.2	56	9.5	6	2
80	WWX400R08005CA	25.4	26	13	20	14.2	56	9.5	6	2
80	WWX400R08007CA	25.4	26	13	20	14.2	56	9.5	6	2
80	WWX400-080A04AR	27	23	13	20	14.2	56	12.4	7	2
80	WWX400-080A05AR	27	23	13	20	14.2	56	12.4	7	2
80	WWX400-080A07AR	27	23	13	20	14.2	56	12.4	7	2
100	WWX400R10005DA	31.75	37	31.75	45	11.2	70	12.7	8	3
100	WWX400R10007DA	31.75	37	31.75	45	11.2	70	12.7	8	3
100	WWX400R10009DA	31.75	37	31.75	45	11.2	70	12.7	8	3
100	WWX400-100B05AR	32	32	32	45	16.2	78	14.4	8	3
100	WWX400-100B07AR	32	32	32	45	16.2	78	14.4	8	3
100	WWX400-100B09AR	32	32	32	45	16.2	78	14.4	8	3
125	WWX400R12506EA	38.1	42	38.1	56	19.2	80	15.9	10	3
125	WWX400R12508EA	38.1	42	38.1	56	19.2	80	15.9	10	3
125	WWX400R12512EA	38.1	42	38.1	56	19.2	80	15.9	10	3
125	WWX400-125B06AR	40	40	40	56	21.2	89	16.4	9	3
125	WWX400-125B08AR	40	40	40	56	21.2	89	16.4	9	3
125	WWX400-125B12AR	40	40	40	56	21.2	89	16.4	9	3
160	WWX400-160C08NR	40	40	14	56	21.2	100	16.4	9	4
160	WWX400-160C10NR	40	40	14	56	21.2	100	16.4	9	4
160	WWX400-160C14NR	40	40	14	56	21.2	100	16.4	9	4
160	WWX400R16008FA	50.8	45	50.8	72	16.2	100	19.1	11	3
160	WWX400R16010FA	50.8	45	50.8	72	16.2	100	19.1	11	3
160	WWX400R16014FA	50.8	45	50.8	72	16.2	100	19.1	11	3
200	WWX400R20010KN	47.625	35	18	135	26.2	175	25.4	14.22	5
200	WWX400R20012KN	47.625	35	18	135	26.2	175	25.4	14.22	5
200	WWX400R20016KN	47.625	35	18	135	26.2	175	25.4	14.22	5
200	WWX400-200C10NR	60	32	18	135	29.2	160	25.7	14.22	5
200	WWX400-200C12NR	60	32	18	135	29.2	160	25.7	14.22	5
200	WWX400-200C16NR	60	32	18	135	29.2	160	25.7	14.22	5
250	WWX400R25012KN	47.625	35	18	180	26.2	210	25.4	14.22	5
250	WWX400R25014KN	47.625	35	18	180	26.2	210	25.4	14.22	5
250	WWX400R25018KN	47.625	35	18	180	26.2	210	25.4	14.22	5
250	WWX400-250C12NR	60	32	18	180	29.2	210	25.7	14.22	5
250	WWX400-250C14NR	60	32	18	180	29.2	210	25.7	14.22	5
250	WWX400-250C18NR	60	32	18	180	29.2	210	25.7	14.22	5

Parts Sold Separately Set Bolt

(mm)

Tool Holder Type	Set Bolt		Fig.	Reference Dimensions								Geometry
	With Coolant Thru	Without Coolant Thru		a	b	c	d	e	f	g		
	Order Number	Order Number										
WWX400R08000CA	HSC12035H	HSC12035	1	18	M12×1.75	47	12	10	—	—	Fig.1 	
WWX400R10000DA	MBA16033H	—	2	40	M16×2	43	10	14	6	23		
WWX400R12500EA	MBA20040H	—	2	50	M20×2.5	54	14	17	6	27	Fig.2 	
WWX400R16000FA	MBA24045H	—	2	65	M24×3	59	14	17	10	37		
WWX400R20000KN	No Coolant Thru	—	1	24	M16×2	43	16	14	—	—		
WWX400R25000KN	No Coolant Thru	—	1	24	M16×2	43	16	14	—	—		
WWX400-063A00AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	—	—		
WWX400-080A00AR	HSC12035H	HSC12035	1	18	M12×1.75	47	12	10	—	—		
WWX400-100B00AR	MBA16033H	—	2	40	M16×2	43	10	14	6	23		
WWX400-125B00AR	MBA20040H	—	2	50	M20×2.5	54	14	17	6	27		
WWX400-160C00NR	No Coolant Thru	—	2	50	M20×2.5	54	14	17	6	27		
WWX400-200C00NR	No Coolant Thru	—	1	24	M16×2	43	16	14	—	—		
WWX400-250C00NR	No Coolant Thru	—	1	24	M16×2	43	16	14	—	—		

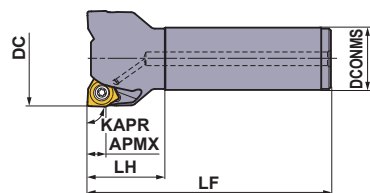
Note 1) Please purchase the appropriate set bolt after confirming the reference dimensions. The items with an order number listed under the Set Bolt columns are also sold by MITSUBISHI MATERIALS.

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

Note 3) The milling cutter with cutting diameter DC=50 mm has a built-in set bolt.

Please use a 7 mm Allen wrench to tighten/loosen the set bolt.

WWX400



Right hand tool holder only.

Metric Standard

Shank Type

With Air / Coolant through

DC	Order Number	Stock	* No.T	LF	DCONMS	LH	WT (kg)	APMX	RMPX	RPMX (min ⁻¹)
		R								
50	WWX400R5003SA32M	★	3	125	32	40	0.8	8.2	0.4°	16000
50	WWX400R5004SA32M	★	4	125	32	40	0.8	8.2	0.4°	16000
63	WWX400R6303SA32M	★	3	125	32	40	1.0	8.2	0.26°	14100
63	WWX400R6304SA32M	★	4	125	32	40	1.0	8.2	0.26°	14100
63	WWX400R6305SA32M	★	5	125	32	40	1.0	8.2	0.26°	14100
80	WWX400R8004SA32M	★	4	125	32	40	1.3	8.2	0.16°	12200
80	WWX400R8005SA32M	★	5	125	32	40	1.3	8.2	0.16°	12200
80	WWX400R8007SA32M	★	7	125	32	40	1.2	8.2	0.16°	12200

* Number of Teeth

Spare Parts

Tool Holder Type	* 		
WWX400	TS5R	TKY20T	MK1KS

* Clamp Torque (N • m) : TS5R = 5.0

(inch)

Instructions for Use of Wiper Inserts



When choosing a wiper insert select a general grade that is similar to the ideal cutting conditions.

WWX200/400

Cutting Conditions (Guide) :

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

Recommended Cutting Conditions

■ Dry Cutting Cutting Speed

(inch)

Workpiece Material	Properties	Cutting Conditions	Grade	Width of Cut ae		
				.5DC≥	.8DC≥	DC(Slot)
				Cutting Speed vc (SFM)		
P	Mild Steel	●	MP6120	785(655—920)	720(590—850)	655(525—785)
		●	MP6130	755(620—885)	690(560—820)	620(490—755)
		✖	MP6130,VP15TF	690(560—820)	620(490—755)	560(425—690)
	Carbon Steel Alloy Steel	●	MP6120	690(560—820)	620(490—755)	560(425—690)
		●	MP6130	655(525—785)	590(460—720)	525(395—655)
		✖	MP6130,VP15TF	590(460—720)	525(395—655)	460(330—590)
	Carbon Steel Alloy Steel Alloy Tool Steel	●	MP6120	655(525—785)	590(460—720)	525(395—655)
		●	MP6130	620(490—755)	560(425—690)	490(360—620)
		✖	MP6130,VP15TF	560(425—690)	490(360—620)	425(295—560)
	Pre-hardened Steel	●	MP6120	460(395—525)	—	—
		●	MP6130	395(330—460)	—	—
		✖	MP6130,VP15TF	360(295—425)	—	—
M	Austenitic Stainless Steel	●	MP7130	590(525—655)	525(460—590)	—
		●	MP7130,VP15TF	560(490—620)	490(425—560)	—
		✖	MP7130,VP15TF	490(425—560)	425(360—490)	—
	Austenitic Stainless Steel	●	MP7130	560(490—620)	490(425—560)	—
		●	MP7130,VP15TF	525(460—590)	460(395—525)	—
		✖	MP7130,VP15TF	460(395—525)	395(330—460)	—
	Ferritic and Martensitic Stainless Steel	●	MP7130	590(525—655)	525(460—590)	—
		●	MP7130,VP15TF	560(490—620)	490(425—560)	—
		✖	MP7130,VP15TF	490(425—560)	425(360—490)	—
	Duplex Stainless Steel	●	MP7130	525(460—590)	460(395—525)	—
		●	MP7130,VP15TF	490(425—560)	425(360—490)	—
		✖	MP7130,VP15TF	425(360—490)	360(295—425)	—
	Precipitation Hardening Stainless Steel	●	MP7130	460(395—525)	—	—
		●	MP7130,VP15TF	425(360—490)	—	—
		✖	MP7130,VP15TF	360(295—425)	—	—
K	Gray Cast Iron	●	MC5020	820(690—950)	755(620—885)	690(560—820)
		●	MC5020	785(655—920)	720(590—850)	655(525—785)
		●	VP15TF	785(655—920)	720(590—850)	—
		✖	MC5020,VP15TF	720(590—850)	655(525—785)	590(460—720)
	Ductile Cast Iron	●	MC5020	720(590—850)	655(525—785)	590(460—720)
		●	MC5020	690(560—820)	620(490—755)	560(425—690)
		●	VP15TF	690(560—820)	620(490—755)	—
		✖	MC5020,VP15TF	620(490—755)	560(425—690)	490(360—620)
	Ductile Cast Iron	●	MC5020	590(460—720)	525(395—655)	460(330—590)
		●	MC5020	560(425—690)	490(360—620)	425(295—560)
		●	VP15TF	560(425—690)	490(360—620)	—
		✖	MC5020,VP15TF	490(360—620)	425(295—560)	360(230—490)
H	Hardened Steel	●	VP15TF	165(100—230)	—	—
		●	MP6120	130(100—230)	—	—

Note 1) The recommended cutting speed has been calculated for a depth of cut .079 inch. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

WWX200/400

Recommended Cutting Conditions

Wet Cutting Cutting Speed

(inch)

	Workpiece Material	Properties	Cutting Conditions	Grade	Width of Cut a_e		
					.5DC $\geq$	.8DC $\geq$	DC(Slot)
					Cutting Speed v_c (SFM)		
P	Mild Steel	Hardness $\leq 180\text{HB}$		MP6120	490(460—525)	425(395—460)	395(360—425)
				MP6130	460(425—490)	395(360—425)	360(330—395)
				MP6130,VP15TF	395(360—425)	330(295—360)	295(260—330)
	Carbon Steel Alloy Steel	Hardness 180—280HB		MP6120	490(460—525)	425(395—460)	395(360—425)
				MP6130	460(425—490)	395(360—425)	360(330—395)
				MP6130,VP15TF	395(360—425)	330(295—360)	295(260—330)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB $\leq 350\text{HB}$ (Annealing)		MP6120	460(425—490)	395(360—425)	360(330—395)
				MP6130	425(395—460)	360(330—395)	330(295—360)
				MP6130,VP15TF	360(330—395)	295(260—330)	260(230—295)
	Pre-hardened Steel	Hardness 35—45HRC		MP6120	360(330—395)	—	—
				MP6130	330(295—360)	—	—
				MP6130,VP15TF	260(230—295)	—	—
M	Austenitic Stainless Steel	Hardness $\leq 200\text{HB}$		MP7130	425(395—460)	360(330—395)	—
				MP7130,VP15TF	395(360—425)	330(295—360)	—
				MP7130,VP15TF	330(295—360)	260(230—295)	—
	Austenitic Stainless Steel	Hardness > 200HB		MP7130	425(395—460)	360(330—395)	—
				MP7130,VP15TF	395(360—425)	330(295—360)	—
				MP7130,VP15TF	330(295—360)	260(230—295)	—
	Ferritic and Martensitic Stainless Steel	Hardness $\leq 200\text{HB}$		MP7130	425(395—460)	360(330—395)	—
				MP7130,VP15TF	395(360—425)	330(295—360)	—
				MP7130,VP15TF	330(295—360)	260(230—295)	—
	Duplex Stainless Steel	Hardness $\leq 280\text{HB}$		MP7130	395(360—425)	330(295—360)	—
				MP7130,VP15TF	360(330—395)	295(260—330)	—
				MP7130,VP15TF	295(260—330)	230(195—260)	—
	Precipitation Hardening Stainless Steel	Hardness < 450HB		MP7130	395(360—425)	—	—
				MP7130,VP15TF	360(330—395)	—	—
				MP7130,VP15TF	295(260—330)	—	—
K	Gray Cast Iron	Tensile Strength $\leq 350\text{MPa}$		MC5020	560(490—620)	490(425—560)	425(360—490)
				MC5020	525(460—590)	460(395—525)	395(330—460)
				VP15TF	525(460—590)	460(395—525)	—
				MC5020,VP15TF	460(395—525)	395(330—460)	330(260—395)
	Ductile Cast Iron	Tensile Strength $\leq 450\text{MPa}$		MC5020	560(490—620)	490(425—560)	425(360—490)
				MC5020	525(460—590)	460(395—525)	395(330—460)
				VP15TF	525(460—590)	460(395—525)	—
				MC5020,VP15TF	460(395—525)	395(330—460)	330(260—395)
	Ductile Cast Iron	Tensile Strength $\leq 800\text{MPa}$		MC5020	525(490—560)	460(425—490)	395(360—425)
				MC5020	490(460—525)	425(395—460)	360(330—395)
				VP15TF	490(460—525)	425(395—460)	—
				MC5020,VP15TF	425(395—460)	360(330—395)	295(260—330)
N	Aluminum Alloys	Content Si < 5%		TF15	1640(985—2950)	1640(985—2950)	1640(985—2950)
				TF15	1640(985—2950)	1640(985—2950)	1640(985—2950)
				TF15	1310(655—2625)	1310(655—2625)	1310(655—2625)
S	Titanium Alloys	—		MP9120	260(195—330)	—	—
				MP9120	230(165—295)	—	—
				MP9130	195(130—260)	—	—
	Heat Resistant Alloys	—		MP9120	195(165—230)	—	—
				MP9120	165(100—195)	—	—
				MP9130	130(65—130)	—	—
H	Hardened Steel	Hardness 40—55HRC		VP15TF	165(100—230)	—	—
				MP6120	130(100—230)	—	—

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

Depth of Cut / Feed per Tooth

(inch)

	Workpiece Material	Properties	Cutting Conditions	Cutting Mode	Grade	Width of Cut ae		
						.5DC≥		
						Breaker	Width of Cut ap	Feed per Tooth fz (IPT)
P	Mild Steel	Hardness ≤180HB	●	Dry, Wet	MP6120	M	≤.118	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.118	.005(.004—.006)
			●	Dry, Wet		R	≤.118	.006(.004—.008)
			✖	Dry, Wet	MP6130,VP15TF	R	≤.118	.005(.004—.006)
	Carbon Steel Alloy Steel	Hardness 180—280HB	●	Dry, Wet	MP6120	M	≤.118	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.118	.005(.004—.006)
			●	Dry, Wet		R	≤.118	.006(.004—.008)
			✖	Dry, Wet	MP6130,VP15TF	R	≤.118	.005(.004—.006)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	●	Dry, Wet	MP6120	M	≤.118	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.118	.005(.004—.006)
			●	Dry, Wet		R	≤.118	.006(.004—.008)
			✖	Dry, Wet	MP6130,VP15TF	R	≤.118	.005(.004—.006)
	Pre-hardened Steel	Hardness 35—45HRC	●	Dry, Wet	MP6120	M	≤.078	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.078	.005(.004—.006)
			●	Dry, Wet		R	≤.078	.006(.004—.008)
			✖	Dry, Wet	MP6130,VP15TF	R	≤.078	.005(.004—.006)
M	Austenitic Stainless Steel	Hardness ≤200HB	● ●	Dry, Wet	MP7130	M	≤.118	.005(.004—.006)
			●	Dry, Wet	VP15TF	M	≤.118	.006(.004—.008)
			✖	Dry, Wet	MP7130,VP15TF	M	≤.118	.005(.004—.006)
	Austenitic Stainless Steel	Hardness >200HB	●	Dry	MP7130	M	≤.078	.005(.004—.006)
			●	Wet		M	≤.118	.005(.004—.006)
			●	Dry		M	≤.078	.005(.004—.006)
			●	Wet		M	≤.118	.005(.004—.006)
			●	Dry	VP15TF	M	≤.078	.006(.004—.008)
			●	Wet		M	≤.118	.006(.004—.008)
			✖	Dry		M	≤.078	.005(.004—.006)
			✖	Wet		M	≤.118	.005(.004—.006)
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	● ●	Dry, Wet	MP7130	M	≤.118	.005(.004—.006)
			●	Dry, Wet	VP15TF	M	≤.118	.006(.004—.008)
			✖	Dry, Wet	MP7130,VP15TF	M	≤.118	.005(.004—.006)
	Duplex Stainless Steel	Hardness ≤280HB	● ●	Dry	MP7130	M	≤.078	.005(.004—.006)
			● ●	Wet		M	≤.118	.005(.004—.006)
			●	Dry	VP15TF	M	≤.078	.006(.004—.008)
			●	Wet		M	≤.118	.006(.004—.008)
			✖	Dry	MP7130,VP15TF	M	≤.078	.005(.004—.006)
			✖	Wet		M	≤.118	.005(.004—.006)
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ●	Dry, Wet	MP7130	M	≤.078	.005(.004—.006)
			●	Dry, Wet	VP15TF	M	≤.078	.006(.004—.008)
			✖	Dry, Wet	MP7130,VP15TF	M	≤.078	.005(.004—.006)
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ●	Dry, Wet	MC5020	M	≤.118	.005(.004—.006)
			●	Dry, Wet	VP15TF	R	≤.118	.006(.004—.008)
			✖	Dry, Wet	MC5020,VP15TF	R	≤.118	.005(.004—.006)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ●	Dry, Wet	MC5020	M	≤.118	.005(.004—.006)
			●	Dry, Wet	VP15TF	R	≤.118	.006(.004—.008)
			✖	Dry, Wet	MC5020,VP15TF	R	≤.118	.005(.004—.006)
N	Aluminum Alloys	Content Si<5%	●	Wet	TF15	L	≤.118	.005(.004—.006)
			●	Wet				
			✖	Wet				
S	Titanium Alloys	—	● ●	Wet	MP9120	M	≤.078	.004(.002—.005)
			✖	Wet	MP9130	M	≤.078	.004(.002—.005)
	Heat Resistant Alloys	—	● ●	Wet	MP9120	M	≤.078	.004(.002—.005)
			✖	Wet	MP9130	M	≤.078	.004(.002—.005)
H	Hardened Steel	Hardness 40—55HRC	●	Dry, Wet	VP15TF	M	≤.078	.002(.002—.004)
			●	Dry, Wet	VP15TF,MP6120	R	≤.078	.002(.002—.004)

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

WWX200

Recommended Cutting Conditions

Depth of Cut / Feed per Tooth

(inch)

	Workpiece Material	Properties	Cutting Conditions	Cutting Mode	Grade	Width of Cut ae		
						.8DC≥		
						Breaker	Width of Cut ap	Feed per Tooth fz (IPT)
P	Mild Steel	Hardness ≤180HB	●	Dry, Wet	MP6120	M	≤.118	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.118	.005(.004—.006)
			●	Dry, Wet		R	≤.118	.006(.004—.008)
			✱	Dry, Wet	MP6130,VP15TF	R	≤.118	.005(.004—.006)
	Carbon Steel Alloy Steel	Hardness 180—280HB	●	Dry, Wet	MP6120	M	≤.118	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.118	.005(.004—.006)
			●	Dry, Wet		R	≤.118	.006(.004—.008)
			✱	Dry, Wet	MP6130,VP15TF	R	≤.118	.005(.004—.006)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	●	Dry, Wet	MP6120	M	≤.118	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.118	.005(.004—.006)
			●	Dry, Wet		R	≤.118	.006(.004—.008)
			✱	Dry, Wet	MP6130,VP15TF	R	≤.118	.005(.004—.006)
	Pre-hardened Steel	Hardness 35—45HRC	●	Dry, Wet	MP6120	—	—	—
			●	Dry, Wet	MP6130	—	—	—
			●	Dry, Wet		—	—	—
			✱	Dry, Wet	MP6130,VP15TF	—	—	—
M	Austenitic Stainless Steel	Hardness ≤200HB	● ●	Dry, Wet	MP7130	M	≤.118	.005(.004—.006)
			●	Dry, Wet	VP15TF	M	≤.118	.006(.004—.008)
			✱	Dry, Wet	MP7130,VP15TF	M	≤.118	.005(.004—.006)
	Austenitic Stainless Steel	Hardness >200HB	●	Dry	MP7130	M	≤.118	.005(.004—.006)
			●	Wet		M	≤.118	.005(.004—.006)
			●	Dry		M	≤.118	.005(.004—.006)
			●	Wet	VP15TF	M	≤.118	.005(.004—.006)
			●	Dry		M	≤.118	.006(.004—.008)
			●	Wet		M	≤.118	.006(.004—.008)
			✱	Dry	MP7130,VP15TF	M	≤.118	.005(.004—.006)
			✱	Wet		M	≤.118	.005(.004—.006)
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	● ●	Dry, Wet	MP7130	M	≤.118	.005(.004—.006)
			●	Dry, Wet	VP15TF	M	≤.118	.006(.004—.008)
			✱	Dry, Wet	MP7130,VP15TF	M	≤.118	.005(.004—.006)
	Duplex Stainless Steel	Hardness ≤280HB	● ●	Dry	MP7130	M	≤.118	.005(.004—.006)
			● ●	Wet		M	≤.118	.005(.004—.006)
			●	Dry	VP15TF	M	≤.118	.006(.004—.008)
			●	Wet		M	≤.118	.006(.004—.008)
			✱	Dry	MP7130,VP15TF	M	≤.118	.006(.004—.008)
			✱	Wet		M	≤.118	.005(.004—.006)
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ●	Dry, Wet	MP7130	—	—	—
			●	Dry, Wet	VP15TF	—	—	—
			✱	Dry, Wet	MP7130,VP15TF	—	—	—
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ●	Dry, Wet	MC5020	M	≤.118	.005(.004—.006)
			●	Dry, Wet	VP15TF	R	≤.118	.006(.004—.008)
			✱	Dry, Wet	MC5020,VP15TF	R	≤.118	.005(.004—.006)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ●	Dry, Wet	MC5020	M	≤.118	.005(.004—.006)
			●	Dry, Wet	VP15TF	R	≤.118	.006(.004—.008)
			✱	Dry, Wet	MC5020,VP15TF	R	≤.118	.005(.004—.006)
N	Aluminum Alloys	Content Si<5%	●	Wet	TF15	L	≤.118	.005(.004—.006)
			●	Wet				
			✱	Wet				
S	Titanium Alloys	—	● ●	Wet	MP9120	—	—	—
			✱	Wet	MP9130	—	—	—
	Heat Resistant Alloys	—	● ●	Wet	MP9120	—	—	—
			✱	Wet	MP9130	—	—	—
H	Hardened Steel	Hardness 40—55HRC	●	Dry, Wet	VP15TF	—	—	—
			●	Dry, Wet	VP15TF,MP6120	—	—	—

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

Cutting Conditions (Guide) :

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

Depth of Cut / Feed per Tooth

(inch)

	Workpiece Material	Properties	Cutting Conditions	Cutting Mode	Grade	Width of Cut ae		
						DC(Slot)		
						Breaker	Width of Cut ap	Feed per Tooth fz (IPT)
P	Mild Steel	Hardness ≤180HB	●	Dry, Wet	MP6120	M	≤.078	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.078	.005(.004—.006)
			●	Dry, Wet		—	—	—
			✖	Dry, Wet	MP6130,VP15TF	M	≤.078	.005(.004—.006)
	Carbon Steel Alloy Steel	Hardness 180—280HB	●	Dry, Wet	MP6120	M	≤.078	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.078	.005(.004—.006)
			●	Dry, Wet		—	—	—
			✖	Dry, Wet	MP6130,VP15TF	M	≤.078	.005(.004—.006)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	●	Dry, Wet	MP6120	M	≤.078	.005(.004—.006)
			●	Dry, Wet	MP6130	M	≤.078	.005(.004—.006)
			●	Dry, Wet		—	—	—
			✖	Dry, Wet	MP6130,VP15TF	M	≤.078	.005(.004—.006)
	Pre-hardened Steel	Hardness 35—45HRC	●	Dry, Wet	MP6120	—	—	—
			●	Dry, Wet	MP6130	—	—	—
			●	Dry, Wet		—	—	—
			✖	Dry, Wet	MP6130,VP15TF	—	—	—
M	Austenitic Stainless Steel	Hardness ≤200HB	● ●	Dry, Wet	MP7130	—	—	—
			●	Dry, Wet	VP15TF	—	—	—
			✖	Dry, Wet	MP7130,VP15TF	—	—	—
	Austenitic Stainless Steel	Hardness >200HB	●	Dry	MP7130	—	—	—
			●	Wet		—	—	—
			●	Dry		—	—	—
			●	Wet		—	—	—
			●	Dry	VP15TF	—	—	—
			●	Wet		—	—	—
			✖	Dry		—	—	—
			✖	Wet		—	—	—
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	● ●	Dry, Wet	MP7130	—	—	—
			●	Dry, Wet	VP15TF	—	—	—
			✖	Dry, Wet	MP7130,VP15TF	—	—	—
	Duplex Stainless Steel	Hardness ≤280HB	● ●	Dry	MP7130	—	—	—
			● ●	Wet		—	—	—
			●	Dry	VP15TF	—	—	—
			●	Wet		—	—	—
			✖	Dry	MP7130,VP15TF	—	—	—
			✖	Wet		—	—	—
	Precipitation Hardening Stainless Steel	Hardness <450HB	● ●	Dry, Wet	MP7130	—	—	—
			●	Dry, Wet	VP15TF	—	—	—
			✖	Dry, Wet	MP7130,VP15TF	—	—	—
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ●	Dry, Wet	MC5020	M	≤.078	.005(.004—.006)
			●	Dry, Wet	VP15TF	—	—	—
			✖	Dry, Wet	MC5020,VP15TF	R	≤.078	.005(.004—.006)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ●	Dry, Wet	MC5020	M	≤.078	.005(.004—.006)
			●	Dry, Wet	VP15TF	—	—	—
			✖	Dry, Wet	MC5020,VP15TF	R	≤.078	.005(.004—.006)
N	Aluminum Alloys	Content Si<5%	●	Wet	TF15	L	≤.078	.005(.004—.006)
			●	Wet				
			✖	Wet				
S	Titanium Alloys	—	● ●	Wet	MP9120	—	—	—
			✖	Wet	MP9130	—	—	—
	Heat Resistant Alloys	—	● ●	Wet	MP9120	—	—	—
			✖	Wet	MP9130	—	—	—
H	Hardened Steel	Hardness 40—55HRC	●	Dry, Wet	VP15TF	—	—	—
			●	Dry, Wet	VP15TF,MP6120	—	—	—

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

WWX400

Recommended Cutting Conditions

Depth of Cut / Feed per Tooth

	Workpiece Material	Properties	Cutting Conditions	Grade	Width of Cut a_e		
					.5DC $\geq$		
					Breaker	Depth of Cut a_p	Feed per Tooth f_z (IPT)
P	Mild Steel	Hardness $\leq 180\text{HB}$		MP6120	L,M	$\leq .157$	.005(.004—.006)
				MP6130	L,M	$\leq .157$	.005(.004—.006)
					M,R	$\leq .157$	.006(.004—.008)
				MP6130,VP15TF	M,R	$\leq .157$	.005(.004—.006)
	Carbon Steel Alloy Steel	Hardness 180—280HB		MP6120	L,M	$\leq .157$	.005(.004—.006)
				MP6130	L,M	$\leq .157$	.005(.004—.006)
					M,R	$\leq .157$	.006(.004—.008)
				MP6130,VP15TF	M,R	$\leq .157$	.005(.004—.006)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB $\leq 350\text{HB}$ (Annealing)		MP6120	L,M	$\leq .118$	.005(.004—.006)
				MP6130	L,M	$\leq .118$	.005(.004—.006)
					M,R	$\leq .118$	.006(.004—.008)
				MP6130,VP15TF	M,R	$\leq .118$	.005(.004—.006)
	Pre-hardened Steel	Hardness 35—45HRC		MP6120	L,M	$\leq .079$	.005(.004—.006)
				MP6130	L,M	$\leq .079$	.005(.004—.006)
					M,R	$\leq .079$	.006(.004—.008)
				MP6130,VP15TF	M,R	$\leq .079$	.005(.004—.006)
M	Austenitic Stainless Steel	Hardness $\leq 200\text{HB}$		MP7130	L,M	$\leq .157$	.005(.004—.006)
				VP15TF	M	$\leq .157$	.006(.004—.008)
				MP7130,VP15TF	M	$\leq .157$	.005(.004—.006)
	Austenitic Stainless Steel	Hardness $> 200\text{HB}$		MP7130	L,M	$\leq .157$	.005(.004—.006)
				MP7130	L,M	$\leq .118$	.005(.004—.006)
				VP15TF	M	$\leq .118$	.006(.004—.008)
				MP7130,VP15TF	M	$\leq .118$	.005(.004—.006)
	Ferritic and Martensitic Stainless Steel	Hardness $\leq 200\text{HB}$		MP7130	L,M	$\leq .157$	.005(.004—.006)
				VP15TF	M	$\leq .157$	.006(.004—.008)
				MP7130,VP15TF	M	$\leq .118$	.005(.004—.006)
	Duplex Stainless Steel	Hardness $\leq 280\text{HB}$		MP7130	L,M	$\leq .118$	.005(.004—.006)
				MP7130	L,M	$\leq .157$	.005(.004—.006)
				VP15TF	M	$\leq .118$	.006(.004—.008)
				VP15TF	M	$\leq .157$	.006(.004—.008)
				MP7130,VP15TF	M	$\leq .118$	.005(.004—.006)
				MP7130,VP15TF	M	$\leq .157$	.005(.004—.006)
	Precipitation Hardening Stainless Steel	Hardness $< 450\text{HB}$		MP7130	L,M	$\leq .079$	.005(.004—.006)
				MP7130	L,M	$\leq .079$	.005(.004—.006)
				VP15TF	M	$\leq .079$	.006(.004—.008)
				MP7130,VP15TF	M	$\leq .079$	.005(.004—.006)
K	Gray Cast Iron	Tensile Strength $\leq 350\text{MPa}$		MC5020	L,M	$\leq .157$	.005(.004—.006)
				VP15TF	M,R	$\leq .157$	.006(.004—.008)
				MC5020,VP15TF	M,R	$\leq .157$	.005(.004—.006)
	Ductile Cast Iron	Tensile Strength $\leq 800\text{MPa}$		MC5020	L,M	$\leq .157$	.005(.004—.006)
				VP15TF	M,R	$\leq .157$	.006(.004—.008)
				MC5020,VP15TF	M,R	$\leq .157$	.005(.004—.006)
N	Aluminum Alloys	Content Si $< 5\%$	  	TF15	L	$\leq .157$	.005(.004—.006)
S	Titanium Alloys	—		MP9120	L,M	$\leq .079$	.004(.002—.005)
				MP9130	L,M	$\leq .079$	.004(.002—.005)
	Heat Resistant Alloys	—		MP9120	L,M	$\leq .079$	.004(.002—.005)
				MP9130	L,M	$\leq .079$	.004(.002—.005)
H	Hardened Steel	Hardness 40—55HRC		VP15TF	M	$\leq .079$	.002(.002—.004)
				VP15TF	M,R	$\leq .079$	.002(.002—.004)

Note 1) Refer to the above table and set up cutting conditions according to cutting applications.

● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

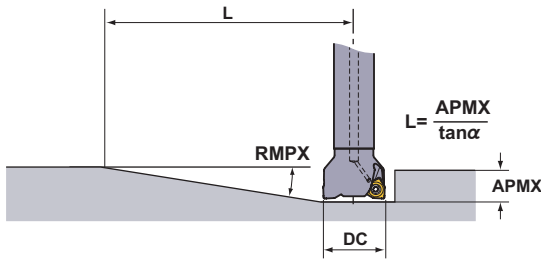
(inch)

	Width of Cut a_e						Cutting Mode
	.8DC $\geq$			DC(Slot)			
	Breaker	Depth of Cut a_p	Feed per Tooth f_z (IPT)	Breaker	Depth of Cut a_p	Feed per Tooth f_z (IPT)	
	L,M	$\leq .118$	.005(.004—.006)	L,M	$\leq .079$	.005(.004—.006)	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	L,M	$\leq .079$	.005(.004—.006)	Dry, Wet
	M,R	$\leq .118$	.006(.004—.008)	—	—	—	Dry, Wet
	M,R	$\leq .118$	.005(.004—.006)	M	$\leq .079$	.005(.004—.006)	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	L,M	$\leq .079$	.005(.004—.006)	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	L,M	$\leq .079$	.005(.004—.006)	Dry, Wet
	M,R	$\leq .118$	.006(.004—.008)	—	—	—	Dry, Wet
	M,R	$\leq .118$	.005(.004—.006)	M	$\leq .079$	.005(.004—.006)	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	L,M	$\leq .118$	.005(.004—.006)	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	L,M	$\leq .079$	.005(.004—.006)	Dry, Wet
	M,R	$\leq .118$	.006(.004—.008)	—	—	—	Dry, Wet
	M,R	$\leq .118$	.005(.004—.006)	M	$\leq .079$	.005(.004—.006)	Dry, Wet
	—	—	—	—	—	—	Dry, Wet
	—	—	—	—	—	—	Dry, Wet
	—	—	—	—	—	—	Dry, Wet
	—	—	—	—	—	—	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	—	—	—	Dry, Wet
	M	$\leq .118$	.006(.004—.008)	—	—	—	Dry, Wet
	M	$\leq .118$	.005(.004—.006)	—	—	—	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	—	—	—	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	—	—	—	Dry, Wet
	M	$\leq .118$	.006(.004—.008)	—	—	—	Dry, Wet
	M	$\leq .118$	.005(.004—.006)	—	—	—	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	—	—	—	Dry, Wet
	M	$\leq .118$	.006(.004—.008)	—	—	—	Dry, Wet
	M	$\leq .118$	.005(.004—.006)	—	—	—	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	—	—	—	Dry
	L,M	$\leq .118$	.005(.004—.006)	—	—	—	Wet
	M	$\leq .118$	.006(.004—.008)	—	—	—	Dry
	M	$\leq .118$	.006(.004—.008)	—	—	—	Wet
	M	$\leq .118$	.006(.004—.008)	—	—	—	Dry
	M	$\leq .118$	.005(.004—.006)	—	—	—	Wet
	—	—	—	—	—	—	Dry, Wet
	—	—	—	—	—	—	Dry, Wet
	—	—	—	—	—	—	Dry, Wet
	—	—	—	—	—	—	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	L,M	$\leq .079$	.005(.004—.006)	Dry, Wet
	M,R	$\leq .118$	.006(.004—.008)	—	—	—	Dry, Wet
	M,R	$\leq .118$	.005(.004—.006)	M,R	$\leq .079$	.005(.004—.006)	Dry, Wet
	L,M	$\leq .118$	.005(.004—.006)	L,M	$\leq .079$	.005(.004—.006)	Dry, Wet
	M,R	$\leq .118$	.006(.004—.008)	—	—	—	Dry, Wet
	M,R	$\leq .118$	.005(.004—.006)	M,R	$\leq .079$	.005(.004—.006)	Dry, Wet
	L	$\leq .118$	.005(.004—.006)	L	$\leq .079$	.005(.004—.006)	Wet
	—	—	—	—	—	—	Wet
	—	—	—	—	—	—	Wet
	—	—	—	—	—	—	Wet
	—	—	—	—	—	—	Wet
	—	—	—	—	—	—	Dry, Wet
	—	—	—	—	—	—	Dry, Wet

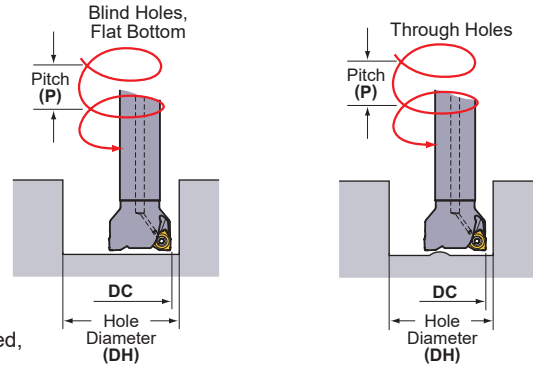
WWX400

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	APMX	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
inch	mm			Maximum Ramping Angle RMPX	Minimum Distance L	Maximum Hole Diameter DH max.	Maximum Pitch P max.	Minimum Hole Diameter DH min.	Maximum Pitch P max.	Minimum Hole Diameter DH min.	Maximum Pitch P max.
1.969	50	.016	.315	.40°	46.260	3.878	.042	3.748	.039	3.248	.028
1.969	50	.031	.315	.40°	46.260	3.846	.041	3.748	.039	3.248	.028
2.000	—	.016	.315	.40°	46.260	3.929	.042	3.811	.040	3.295	.028
2.000	—	.031	.315	.40°	46.260	3.898	.042	3.811	.040	3.295	.028
2.480	63	.016	.315	.26°	71.142	4.902	.035	4.772	.033	4.276	.024
2.480	63	.031	.315	.26°	71.142	4.870	.034	4.772	.033	4.276	.024
2.500	—	.016	.315	.26°	71.142	4.929	.035	4.811	.033	4.299	.026
2.500	—	.031	.315	.26°	71.142	4.898	.034	4.811	.033	4.299	.026
3.000	—	.016	.315	.16°	115.591	5.929	.026	5.811	.025	5.299	.020
3.000	—	.031	.315	.16°	115.591	5.898	.026	5.811	.025	5.299	.020
3.150	80	.016	.315	.16°	115.591	6.240	.027	6.110	.026	5.614	.020
3.150	80	.031	.315	.16°	115.591	6.209	.027	6.114	.026	5.614	.020

*Shows the distance until a maximum depth of cut of .315" is achieved at the maximum ramping angle $L (= .315''/\tan \alpha)$.

Note 1) When ramping and helical milling, it is recommended to reduce the feed per tooth.

Note 2) When ramping and helical milling, long continuous chips may be scattered so please be careful.

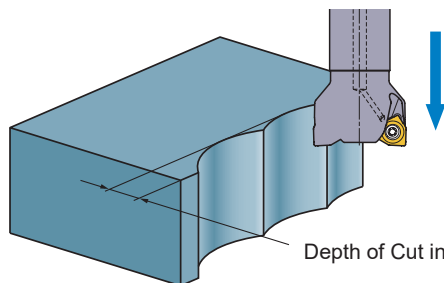
Note 3) WWX200 cannot be used for ramping or helical machining.

<Helical Milling>

To obtain a flat bottom surface when helical milling, it requires to remove "the uncut part" in the center of the workpiece material at a final pass. When helical milling, make sure that the depth of cut per helical pass doesn't exceed the maximum depth of cut (APMX).

WWX200/400

● Plunging



Depth of Cut in the Radius Direction : $ae = \text{WWX200 } .197 \text{ inch}$
 $\text{WWX400 } .315 \text{ inch}$



Double Sided Insert Type Shoulder Mill

WWX Series

For your safety

●Don't touch breakers and chips without gloves. ●Please machine within recommended application range, and exchange expired tools with new parts in advance. ●Please use safety cover and wear safety glasses. ●When using compounded cutting oils, please take fire prevention. ●When attaching inserts or spare parts, please use the attached wrench or driver. ●When using tools in revolution machining, please make a trial run to check run-out, vibration, abnormal sounds etc.

MITSUBISHI MATERIALS CORPORATION

MMC Hardmetal (Thailand) Co., Ltd.
622 Emporium Tower, Floor 22/1-4, Sukhumvit
Road, Klongton, Klongtoey, Bangkok 10110
Thailand Tel : +66-2661-8170 Fax : +66-2258-1790

Thailand Rayong Branch
789/283 m.1 Lifespace Building Floor. 4 Room no. B405
Nong Kham, Sriracha, Chonburi 20230 Thailand

Singapore Branch
33 Ubi Avenue3, #05-14 Vertex, Singapore
408868
Tel : +65-6634-8250 Fax : +65-6634.8257

Ho Chi Minh Representative Office
1205 12th Floor SROC, 2A-4A Ton Duc Thang, Ben
Nghe, Dist. 1, Ho Chi Minh City, Vietnam
Tel : +84-28-3829-7700 Fax : +84-28-3824-3344

Thailand Amata City Branch
Amata City Industrial Estate Phase 9
700/843 Moo 5, Tambon Nongkakha, Amphur
Phanthong, Chonburi, 20160 Thailand
Tel : +66-3821-0728 Fax : +66-3821-0732

Indonesia Representative Office
MM2100 Industrial Town
Jl. Jawa Blok GG-6 No.2 Jatiwangi, Cikarang,
Bekasi Indonesia 17520
Tel : +62-21-2214-3639 Fax : +62-21-2214-3745

Hanoi Representative Office
403A, 4th Fl. of The 6-Storey Block, Thang Long
Ford Building, 105 Lang Ha St., Dong Da District,
Hanoi, Vietnam
Tel : +84-24-3772-8362 Fax : +84-24-3772-8299