MITSUBISHI MATERIALS

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WJX Series

DOUBLE-SIDED INSERT TYPE HIGH FEED RADIUS MILLING CUTTER

TOOL NEWS B235A

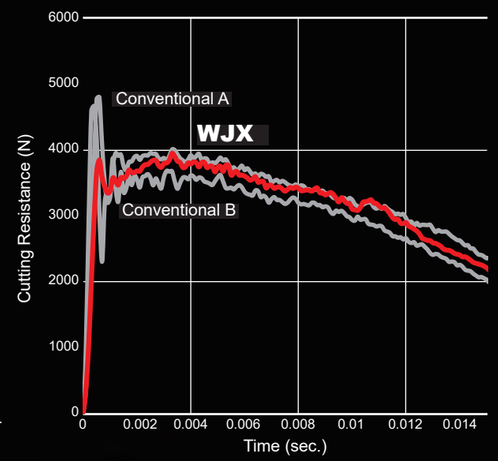
Fast Sharp Strong

WJX
Series

High feed radius milling cutter, with stronger double-sided insert type. Experiences low cutting resistance on start up, maintains stable machining even during interrupted machining and large depth of cut.

<Cutting Conditions>
Material : AISI 4140
Cutter Dia. : DCX=ø2.48"
Cutting Speed : vc=490 SFM
Feed per Tooth : fz=.059 IPT
Depth of Cut : ap=.059"
Width of Cut : ae=1.24"
Cutting Mode : Single Insert

WJX produces low cutting resistance when entering the cut.



Reliability Even in High Efficiency Cutting Conditions

Provides excellent sharpness and tool life as well as reducing cutting noise.
The WJX series was developed for reliability and economy even during high efficiency machining.

Unconventional Cutting Edge Design for Stable Milling

Wiper Cutting Edge

The wiper edge enables surface finishes that are more than sufficient for rough machining.

Straight Cutting Edge

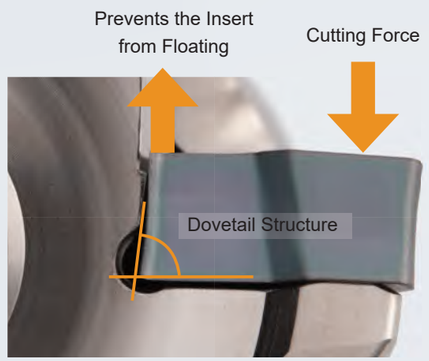
The straight cutting edge extending to the maximum depth of cut (APMX) allows for high feed machining even at large depths of cut.

Minor Cutting Edge

Stable chip formation, even at high ramping angles, is made possible with the straight cutting edge.

Highly-Reliable Clamping System

The dovetail pocket geometry prevents the insert from lifting and provides stable clamping without the use of a clamp bridge.



Complex Shape Flank Face Suitable for Ramping

The flank shape combines the strength and economy of negative inserts, with the sharpness and multi-functionality of positive inserts.

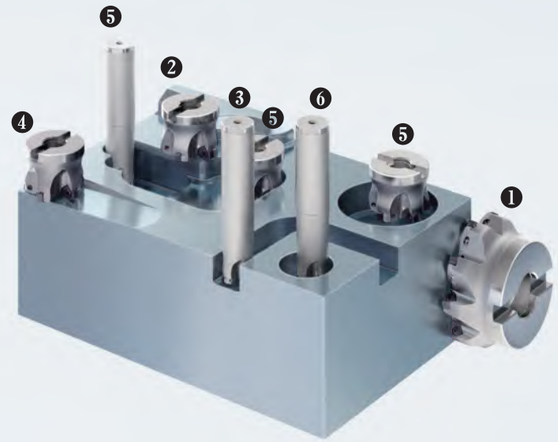
Single-sided : Positive Insert
Ramping Performance
Sharpness

+

Double-sided : Negative Insert
Cost Efficiency
Insert Strength
Fracture Resistance

Multi-functional Application Range

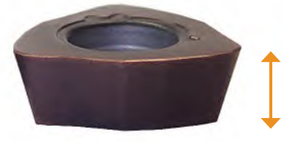
1. Face Milling
2. Shoulder Milling
3. Flute Milling
4. Ramping
5. Pocket Milling
6. Helical Milling



Increased Insert Thickness Provides Higher Strength

Increased thickness prevents the inserts from fracturing and makes the cutter body resistant to breakage.

WJX



Conventional

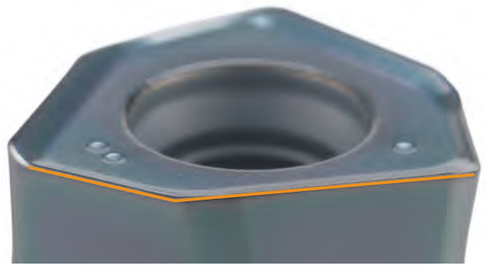
Cutting Length
15.748'

Cutting Length
11.811'

<Cutting Conditions>
Material : AISI 4140
Cutter Dia. : DCX=ø2.48"
Cutting Speed : vc=490 SFM
Feed per Tooth : fz=.079 IPT
Depth of Cut : ap=.079"
Width of Cut : ae=1.772"
Cutting Mode : Dry Cutting
Single Insert

Good Chip Formation

The cutting edge forms short chips that prevents chip jamming and tangling, as well as facilitating easy removal of the chips after machining.



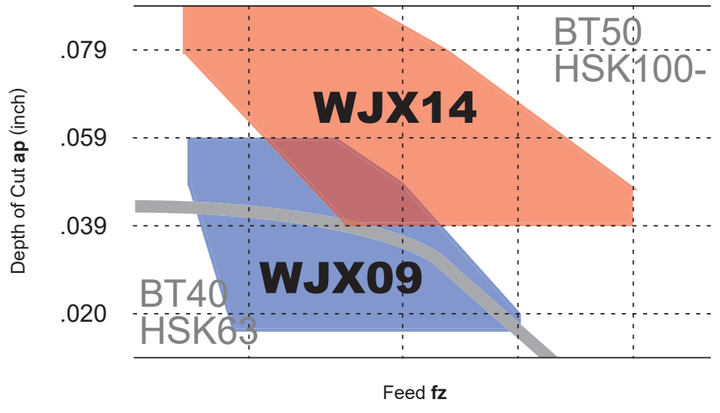
WJX

Conventional

<Cutting Conditions>
Material : AISI 4140
Cutter Dia. : DCX=ø2.48"
Cutting Speed : vc=490 SFM
Feed per Tooth : fz=.079 IPT
Depth of Cut : ap=.079"
Width of Cut : ae=1.772"
Cutting Mode : Dry Cutting
Single Insert

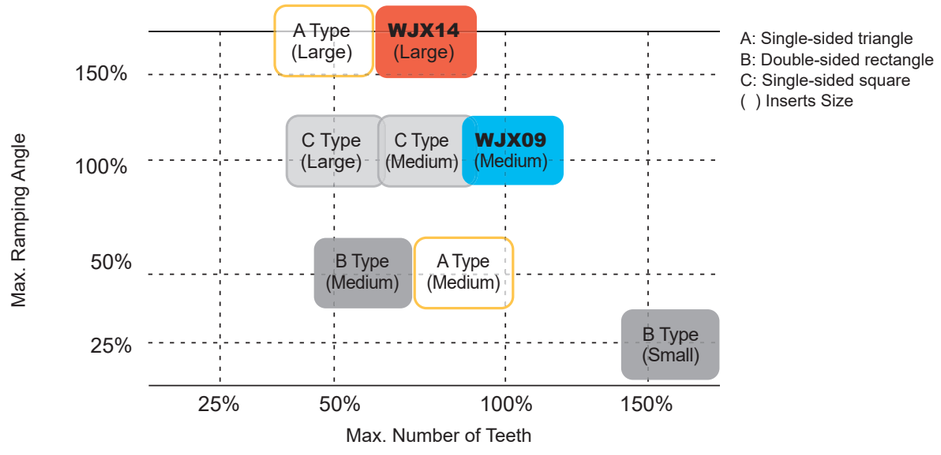
Using the WJX

The conditions for cutting at high feed rate will depend on rigidity of machine and workpiece and output of machine used.
Please adjust the cutting conditions accordingly (refer to the table of recommended cutting conditions).
Select a WJX series according to the figure below.



Multiple Cutting Edges and Multi-functionality

The WJX has achieved an excellent balance between cutting edge count and maximum ramping angle, making multi-functionality and high-efficiency cutting possible.



* Performance of the WJX09 is treated as standard (100%).

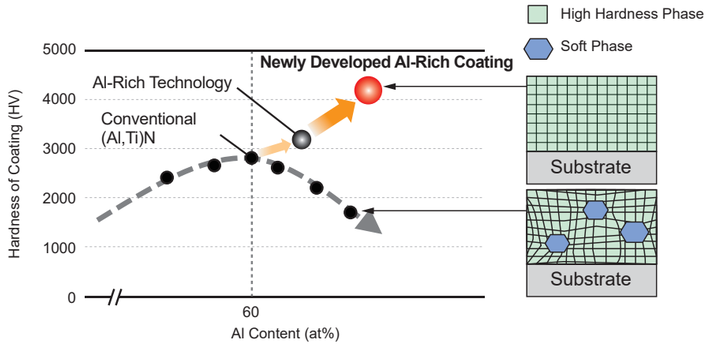
Coated Carbide Grade for Milling

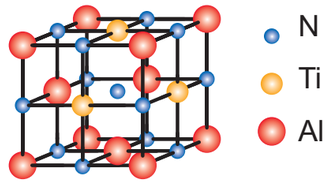
MV1020/MV1030

Newly Developed Al-Rich Coating

Advanced Wear and Thermal Shock Resistance

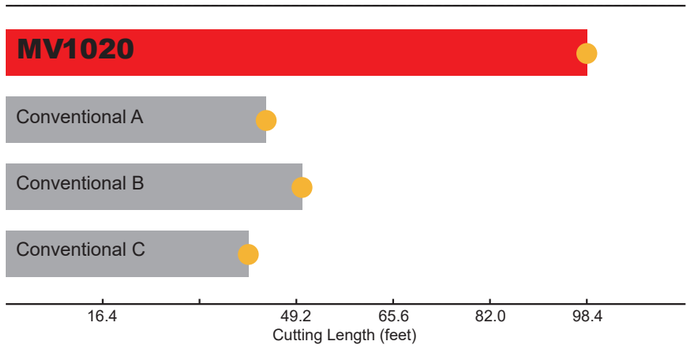
By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays a very high hardness. This greatly improves oxidation and wear resistance.
The extreme heat resistance of this new series achieves amazing stability not only during dry cutting, but also when wet cutting where inserts are usually prone to thermal cracking.
MV1020 offers overwhelmingly superior performance in high-speed cutting, and MV1030 achieves stable performance during interrupted and stainless steel machining.



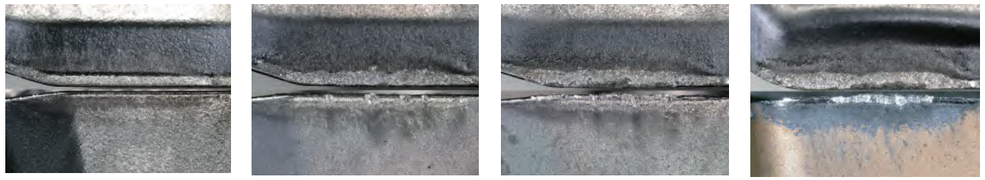


Crystal image of **MV1000** series

Comparison of wear resistance when machining ductile cast Iron 100-70-03



<Cutting Conditions>
Material : ASTM 100-70-03
Tool : WJX14
Inserts : JOMU140715ZZER-M
Cutting Speed : vc=720 SFM
Feed per Tooth : fz=.039 IPT
Depth of Cut : ap=.039"
Width of Cut : ae=1.772"
Cutting Mode : Dry Cutting
Single Insert



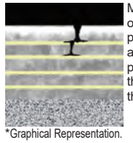
MV1020 (99.7') | Conventional A (44.6') | Conventional B (49.9') | Conventional C (42.0')

MP6100/MP7100/MP9100 Series

TOUGH-Σ Technology

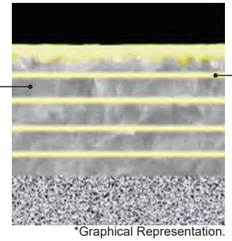
A fusion of the separate coating technologies; PVD and multi-layering provides extra toughness.

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



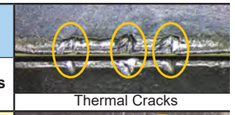
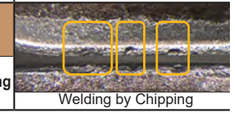
Multi-layering of the coating prevents any cracks penetrating through to the substrate.
*Graphical Representation.

Al-Ti-Cr-N Based PVD Coating



*Graphical Representation.

Best Layer of Each Workpiece Material

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

VP15TF

Stable machining properties are enabled when the coating is combined with a high wear and fracture resistant carbide substrate.

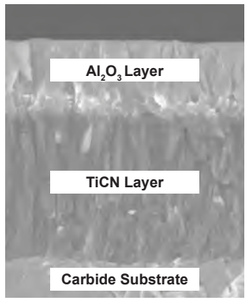
VP30RT

Ideal for heavy interrupted cutting of stainless and general steels because of the excellent fracture resistance properties.

CVD Coated Grade for Milling of Steel and Stainless Steel

MC7020

MC7020 suppresses crater wear that can occur during high speed cutting and also achieves stability when high efficiency machining.



Structure of **MC7020**

Improved Wear Resistance

The micro-grain wear resistant Al_2O_3 and fibrous TiCN layers deliver excellent wear resistance in high speed cutting.

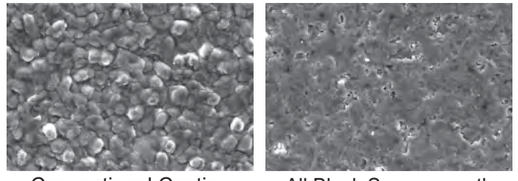
Improved Fracture Resistance

Use of a specially developed cemented carbide that provides superior resistance to fracture and thermal cracking prevents the cutting edge from sudden fracturing.

Reduced Abnormal Damage

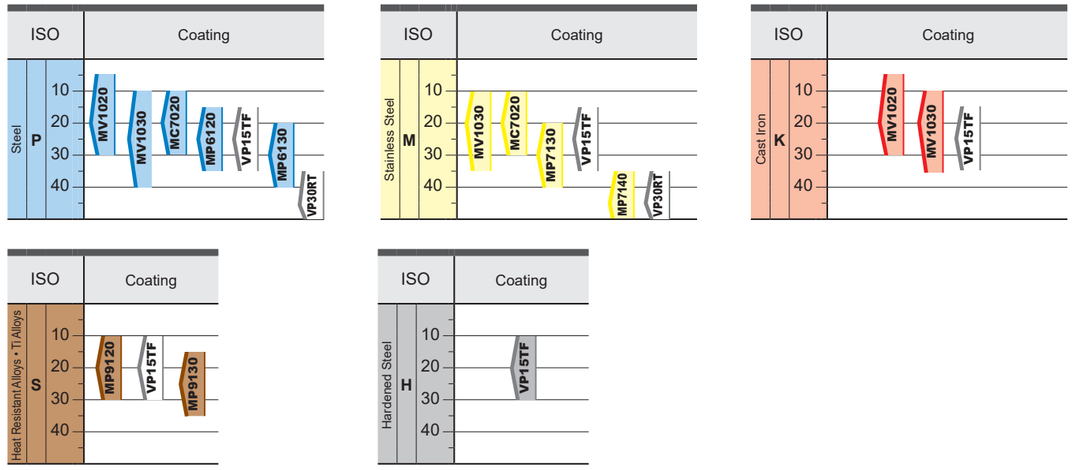
An extremely smooth black super-smooth coating prevents abnormal damage such as chip welding.

Comparison of Coating Surface

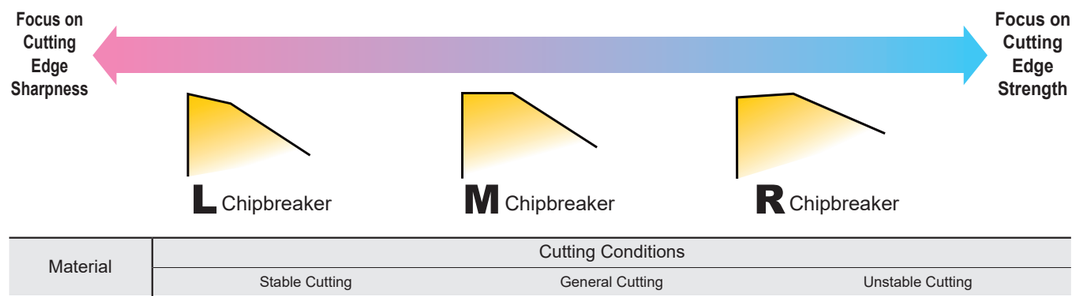


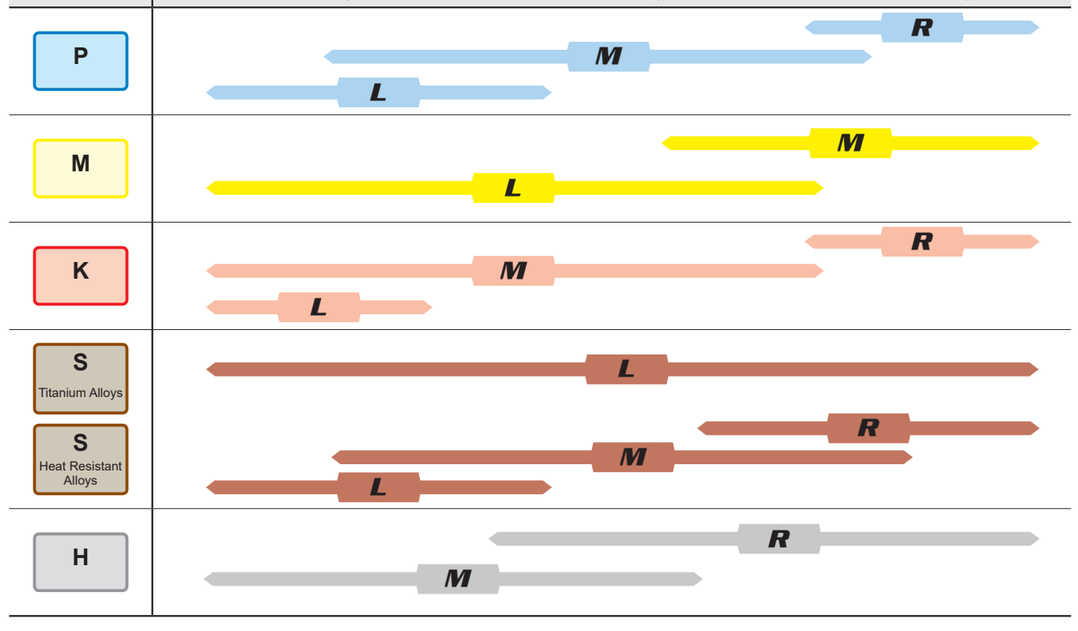
Conventional Coating | All Black Super-smooth Coating

Insert Grades for a Wide Range of Materials



Chipbreaker System





MULTI-FUNCTIONAL MILLING

WJX09

P M K N S H

Fig.1
ø1.500"

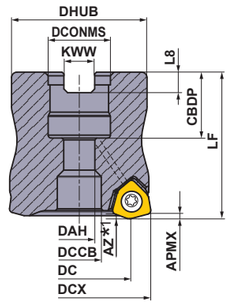
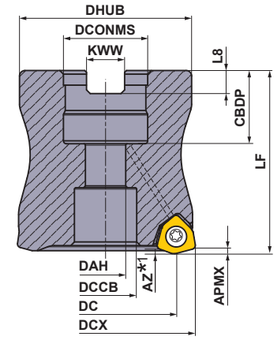


Fig.2
ø2.000"
ø2.500"



Right hand tool holder only.

Arbor Type

With Coolant Through

(inch)

DCONMS	Set Bolt	Geometry	
.500	HSCU25011H	①	① ②
.750	HSCU37513H	②	
1.000	HSCU50014H		
			With Coolant Through

DCONMS = inch size

(inch)

DCX	Order Number	Stock R	*2 No.T	DC	LF	DCONMS	WT (lbs)	APMX	RPMX (min^{-1})	Fig.	Insert Type
1.500	**WJX09UR1.5004SA**	●	4	1.060	1.750	.500	0.5	.047	24000	1	JOMU0905
2.000	**WJX09UR2.0004AA**	●	4	1.557	2.000	.750	0.9	.047	19800	2	JOMU0905
2.000	**WJX09UR2.0006AA**	●	6	1.557	2.000	.750	0.9	.047	19800	2	JOMU0905
2.500	**WJX09UR2.5005CA**	●	5	2.057	2.000	1.000	1.7	.047	17200	2	JOMU0905
2.500	**WJX09UR2.5007CA**	●	7	2.057	2.000	1.000	1.7	.047	17200	2	JOMU0905

*1 Refer to page 30, for the maximum drilling depth (**AZ**).
*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.

Mounting Dimensions

(inch)

DCX	Order Number	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
1.500	**WJX09UR1.5004SA**	.500	.630	.276	.433	1.438	.250	.156	1
2.000	**WJX09UR2.0004AA**	.750	.748	.413	.630	1.750	.313	.187	2
2.000	**WJX09UR2.0006AA**	.750	.748	.413	.630	1.750	.313	.187	2
2.500	**WJX09UR2.5005CA**	1.000	.945	.539	.787	2.375	.375	.219	2
2.500	**WJX09UR2.5007CA**	1.000	.945	.539	.787	2.375	.375	.219	2

CUTTING CONDITIONS ➤ P28–P30

● : USA Stock.

Double-Sided Insert Type, High Feed Radius Milling Cutter

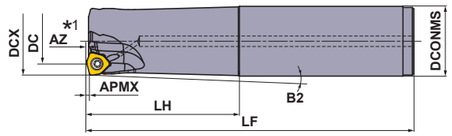


Fig.1

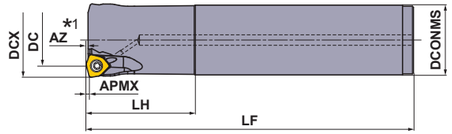


Fig.2

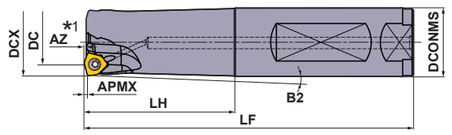


Fig.3

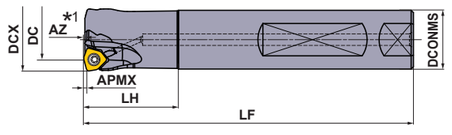


Fig.4

Right hand tool holder only.

Shank Type

With Coolant Through

(inch)

DCX	Order Number	Stock R	*2 No.T	DC	LF	LH	DCONMS	B2	APMX	RPMX (min^{-1})	Fig.	Insert Type
1.000	**WJX09UR1602FA16S**	●	2	.565	5.625	2.375	1.000	1.09°	.047	33000	3	JOMU0905
1.000	**WJX09UR1603FA16S**	●	3	.565	5.625	2.375	1.000	1.09°	.047	33000	3	JOMU0905
1.000	**WJX09UR1602SA16L**	●	2	.565	8.000	4.750	1.000	0.53°	.047	33000	1	JOMU0905
1.000	**WJX09UR1603SA16L**	●	3	.565	8.000	4.750	1.000	0.53°	.047	33000	1	JOMU0905
1.125	**WJX09UR1802FA16S**	●	2	.687	5.625	1.625	1.000	—	.047	29800	4	JOMU0905
1.125	**WJX09UR1803FA16S**	●	3	.687	5.625	1.625	1.000	—	.047	29800	4	JOMU0905
1.125	**WJX09UR1802SA16L**	●	2	.687	8.000	1.625	1.000	—	.047	29800	2	JOMU0905
1.125	**WJX09UR1803SA16L**	●	3	.687	8.000	1.625	1.000	—	.047	29800	2	JOMU0905
1.250	**WJX09UR2002FA20S**	●	2	.811	6.000	2.750	1.250	0.93°	.047	27500	3	JOMU0905
1.250	**WJX09UR2003FA20S**	●	3	.811	6.000	2.750	1.250	0.93°	.047	27500	3	JOMU0905
1.250	**WJX09UR2002SA20L**	●	2	.811	8.000	4.750	1.250	0.53°	.047	27500	1	JOMU0905
1.250	**WJX09UR2003SA20L**	●	3	.811	8.000	4.750	1.250	0.53°	.047	27500	1	JOMU0905
1.500	**WJX09UR2403FA20S**	●	3	1.060	6.000	2.000	1.250	—	.047	24000	4	JOMU0905
1.500	**WJX09UR2404FA20S**	●	4	1.060	6.000	2.000	1.250	—	.047	24000	4	JOMU0905
1.500	**WJX09UR2403SA20L**	●	3	1.060	10.000	2.000	1.250	—	.047	24000	2	JOMU0905
1.500	**WJX09UR2404SA20L**	●	4	1.060	10.000	2.000	1.250	—	.047	24000	2	JOMU0905

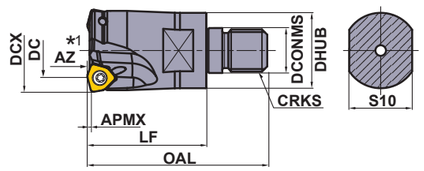
*1 Refer to page 30, for the maximum drilling depth (**AZ**).
*2 Number of Teeth

Spare Parts

Holder Type	*  Clamp Screw	 Wrench (Insert)	 Anti-seize Lubricant
WJX09	TPS3R	TIP10D	MK1KS

* Clamp Torque (lbf-in) : TS3R = 17.7

● : **USA Stock.**



Right hand tool holder only.

Screw-in Type

With Coolant Through

(inch)

DCX	Order Number	Stock R	*2 No.T	DC	LF	OAL	DCONMS	DHUB	S10	CRKS	WT (lbs)	APMX	RPMX (min^{-1})	Insert Type
1.000	**WJX09UR1602AM1235**	●	2	.565	1.378	2.244	.492	.925	.748	M12	.2	.047	33000	JOMU0905
1.000	**WJX09UR1603AM1235**	●	3	.565	1.378	2.244	.492	.925	.748	M12	.2	.047	33000	JOMU0905
1.125	**WJX09UR1802AM1235**	●	2	.687	1.378	2.244	.492	.925	.748	M12	.3	.047	29800	JOMU0905
1.125	**WJX09UR1803AM1235**	●	3	.687	1.378	2.244	.492	.925	.748	M12	.2	.047	29800	JOMU0905
1.250	**WJX09UR2002AM1645**	●	2	.811	1.772	2.677	.669	1.122	.945	M16	.5	.047	27500	JOMU0905
1.250	**WJX09UR2003AM1645**	●	3	.811	1.772	2.677	.669	1.122	.945	M16	.5	.047	27500	JOMU0905
1.375	**WJX09UR2202AM1645**	●	2	.936	1.772	2.677	.669	1.122	.945	M16	.6	.047	25600	JOMU0905
1.375	**WJX09UR2203AM1645**	●	3	.936	1.772	2.677	.669	1.122	.945	M16	.5	.047	25600	JOMU0905
1.375	**WJX09UR2204AM1645**	●	4	.936	1.772	2.677	.669	1.122	.945	M16	.5	.047	25600	JOMU0905

*1 Refer to page 30, for the maximum drilling depth (**AZ**).
*2 Number of Teeth

Spare Parts

Holder Type	*  Clamp Screw	 Wrench (Insert)	 Anti-seize Lubricant
WJX09	TPS3R	TIP10D	MK1KS

* Clamp Torque (lbf-in) : TS3R = 17.7

CUTTING CONDITIONS ➢ P28–P30

Double-Sided Insert Type, High Feed Radius Milling Cutter

MULTI-FUNCTIONAL MILLING

WJX09

P | M | K | N | S | H

Fig.1
ø40

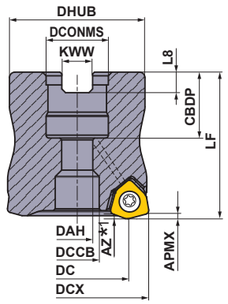
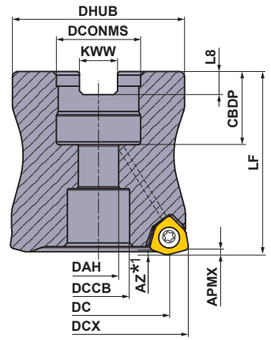


Fig.2
ø50
ø52
ø63
ø66



Right hand tool holder only.

(mm)

DCONMS		Set Bolt	Geometry	
inch size	mm size			
	ϕ16	HFF08033H	①	① ②
ϕ22.225	ϕ22	HSC10030H	②	
	ϕ27	HSC12035H		
				With Coolant Through

Metric Standard

Arbor Type

With Coolant Through
DCONMS = inch size

(mm)

DCX	Order Number	Stock R	*2 No.T	DC	LF	DCONMS	WT (kg)	APMX	RPMX (min^{-1})	Fig.	Insert Type
50	**WJX09R05004BA**	★	4	38.8	50	22.225	0.4	1.2	20000	2	JOMU0905
50	**WJX09R05006BA**	★	6	38.8	50	22.225	0.4	1.2	20000	2	JOMU0905
63	**WJX09R06305BA**	★	5	51.8	50	22.225	0.8	1.2	17300	2	JOMU0905
63	**WJX09R06307BA**	★	7	51.8	50	22.225	0.8	1.2	17300	2	JOMU0905

DCONMS = mm size

(mm)

DCX	Order Number	Stock R	*2 No.T	DC	LF	DCONMS	WT (kg)	APMX	RPMX (min^{-1})	Fig.	Insert Type
40	**WJX09-040A04AR**	★	4	28.8	40	16	0.2	1.2	23200	1	JOMU0905
40	**WJX09-040A05AR**	★	5	28.8	40	16	0.2	1.2	23200	1	JOMU0905
50	**WJX09-050A04AR**	★	4	38.8	50	22	0.4	1.2	20000	2	JOMU0905
50	**WJX09-050A06AR**	★	6	38.8	50	22	0.4	1.2	20000	2	JOMU0905
52	**WJX09-052A06AR**	★	6	40.8	50	22	0.5	1.2	19500	2	JOMU0905
63	**WJX09-063A05AR**	★	5	51.8	50	22	0.8	1.2	17300	2	JOMU0905
63	**WJX09-063A07AR**	★	7	51.8	50	22	0.8	1.2	17300	2	JOMU0905
63	**WJX09-063X07AR**	★	7	51.8	50	27	0.7	1.2	17300	2	JOMU0905
66	**WJX09-066X07AR**	★	7	54.8	50	27	0.8	1.2	16800	2	JOMU0905

*1 Refer to page 30, for the maximum drilling depth (**AZ**).
*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.

★ : Stocked in Japan.

Mounting Dimensions

(mm)

DCX	Order Number	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
40	**WJX09-040A04AR**	16	18	8.5	12	37	8.4	5.6	1
40	**WJX09-040A05AR**	16	18	8.5	12	37	8.4	5.6	1
50	**WJX09-050A04AR**	22	20	11	17	47	10.4	6.3	2
50	**WJX09-050A06AR**	22	20	11	17	47	10.4	6.3	2
50	**WJX09R05004BA**	22.225	19	11	17	47	8.4	5	2
50	**WJX09R05006BA**	22.225	19	11	17	47	8.4	5	2
52	**WJX09-052A06AR**	22	20	11	17	47	10.4	6.3	2
63	**WJX09-063A05AR**	22	20	11	17	60	10.4	6.3	2
63	**WJX09-063A07AR**	22	20	11	17	60	10.4	6.3	2
63	**WJX09R06305BA**	22.225	19	11	17	60	8.4	5	2
63	**WJX09R06307BA**	22.225	19	11	17	60	8.4	5	2
63	**WJX09-063X07AR**	27	23	13	20	60	12.4	7	2
66	**WJX09-066X07AR**	27	23	13	20	60	12.4	7	2

Spare Parts

Holder Type	* 		
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WJX09	TPS3R	TIP10D	MK1KS

* Clamp Torque (N • m) : TPS3R = 2.0

CUTTING CONDITIONS ➤ P28–P30

Double-Sided Insert Type, High Feed Radius Milling Cutter

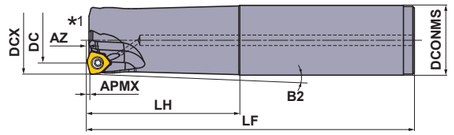


Fig.1

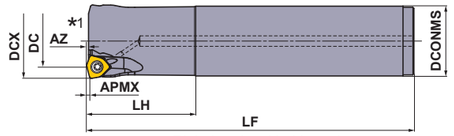


Fig.2

Right hand tool holder only.

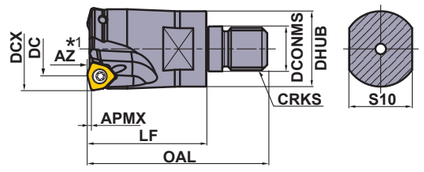
Metric Standard

Shank Type

With Coolant Through

(mm)

DCX	Order Number	Stock R	*2 No.T	DC	LF	LH	DCONMS	B2	APMX	RPMX (min^{-1})	Fig.	Insert Type
25	**WJX09R2502SA25S**	★	2	14	140	60	25	1.09°	1.2	33500	1	JOMU0905
25	**WJX09R2503SA25S**	★	3	14	140	60	25	1.09°	1.2	33500	1	JOMU0905
25	**WJX09R2502SA25L**	★	2	14	200	120	25	0.54°	1.2	33500	1	JOMU0905
25	**WJX09R2503SA25L**	★	3	14	200	120	25	0.54°	1.2	33500	1	JOMU0905
25	**WJX09R2502SA25EL**	★	2	14	300	180	25	0.35°	1.2	33500	1	JOMU0905
28	**WJX09R2802SA25S**	★	2	16.9	140	40	25	—	1.2	30300	2	JOMU0905
28	**WJX09R2803SA25S**	★	3	16.9	140	40	25	—	1.2	30300	2	JOMU0905
28	**WJX09R2802SA25L**	★	2	16.9	200	40	25	—	1.2	30300	2	JOMU0905
28	**WJX09R2803SA25L**	★	3	16.9	200	40	25	—	1.2	30300	2	JOMU0905
28	**WJX09R2802SA25EL**	★	2	16.9	300	40	25	—	1.2	30300	2	JOMU0905
32	**WJX09R3202SA32S**	★	2	20.9	150	70	32	0.93°	1.2	27300	1	JOMU0905
32	**WJX09R3203SA32S**	★	3	20.9	150	70	32	0.93°	1.2	27300	1	JOMU0905
32	**WJX09R3202SA32L**	★	2	20.9	200	120	32	0.54°	1.2	27300	1	JOMU0905
32	**WJX09R3203SA32L**	★	3	20.9	200	120	32	0.54°	1.2	27300	1	JOMU0905
32	**WJX09R3202SA32EL**	★	2	20.9	300	180	32	0.35°	1.2	27300	1	JOMU0905
35	**WJX09R3503SA32S**	★	3	23.8	150	50	32	—	1.2	25500	2	JOMU0905
35	**WJX09R3504SA32S**	★	4	23.8	150	50	32	—	1.2	25500	2	JOMU0905
35	**WJX09R3503SA32L**	★	3	23.8	200	50	32	—	1.2	25500	2	JOMU0905
35	**WJX09R3504SA32L**	★	4	23.8	200	50	32	—	1.2	25500	2	JOMU0905
35	**WJX09R3502SA32EL**	★	2	23.8	300	50	32	—	1.2	25500	2	JOMU0905
40	**WJX09R4003SA32S**	★	3	28.8	150	50	32	—	1.2	23200	2	JOMU0905
40	**WJX09R4004SA32S**	★	4	28.8	150	50	32	—	1.2	23200	2	JOMU0905
40	**WJX09R4003SA32L**	★	3	28.8	250	50	32	—	1.2	23200	2	JOMU0905
40	**WJX09R4004SA32L**	★	4	28.8	250	50	32	—	1.2	23200	2	JOMU0905
40	**WJX09R4003SA32EL**	★	3	28.8	300	50	32	—	1.2	23200	2	JOMU0905



Metric Standard

Right hand tool holder only.

Screw-in Type

With Coolant Through

(mm)

DCX	Order Number	Stock R	*2 No.T	DC	LF	OAL	DCONMS	DHUB	S10	CRKS	WT (kg)	APMX	RPMX (min^{-1})	Insert Type
25	**WJX09R2502AM1235**	★	2	14	35	57	12.5	23.5	19	M12	0.1	1.2	33500	JOMU0905
25	**WJX09R2503AM1235**	★	3	14	35	57	12.5	23.5	19	M12	0.1	1.2	33500	JOMU0905
28	**WJX09R2802AM1235**	★	2	16.9	35	57	12.5	23.5	19	M12	0.1	1.2	30300	JOMU0905
28	**WJX09R2803AM1235**	★	3	16.9	35	57	12.5	23.5	19	M12	0.1	1.2	30300	JOMU0905
32	**WJX09R3202AM1645**	★	2	20.9	45	68	17.0	28.5	24	M16	0.2	1.2	27300	JOMU0905
32	**WJX09R3203AM1645**	★	3	20.9	45	68	17.0	28.5	24	M16	0.2	1.2	27300	JOMU0905
35	**WJX09R3502AM1645**	★	2	23.8	45	68	17.0	28.5	24	M16	0.3	1.2	25500	JOMU0905
35	**WJX09R3503AM1645**	★	3	23.8	45	68	17.0	28.5	24	M16	0.2	1.2	25500	JOMU0905
35	**WJX09R3504AM1645**	★	4	23.8	35	68	17.0	28.5	24	M16	0.2	1.2	25500	JOMU0905
40	**WJX09R4003AM1645**	★	3	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905
40	**WJX09R4004AM1645**	★	4	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905
40	**WJX09R4005AM1645**	★	5	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905

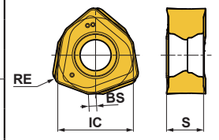
*1 Refer to page 30, for the maximum drilling depth (**AZ**).
*2 Number of Teeth
● : **USA Stock. (10 inserts in one case)** ★ : **Stocked in Japan.**

Inserts

(inch)

Material		
	P	Steel
	M	Stainless Steel
	K	Cast Iron
	S	Heat Resistant Alloys, Titanium Alloys
	H	Hardened Steel

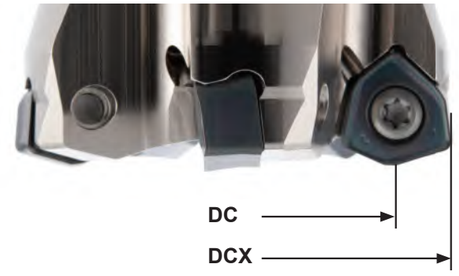
This is the selection guideline for WJX.
Please note that the cutting conditions differ depending on multiple factors, for more details refer to the Recommended Cutting Conditions.
Edge Preparation (Honing) :
E : Round **S :** Camfer + Hone

Shape	Order Number	Class	Edge Preparation	Coated MV1020	MV1030	MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	IC	S	BS	RE	Geometry
	**JOMU090512ZZER-L**	M	E	●	●	●	●	●	●	●	●	●	●	●	.375	.186	.035	.047	
	JOMU090512ZZER-M	M	E	●	●	●	●	●	●	●	●	●	●	●	.375	.187	.035	.047	
	JOMU090512ZZER-R	M	S	●	●	●	●	●					●	●	.375	.190	.035	.047	

Right hand insert only.

Cutter Diameter and Flat Surface Milling

The maximum cutting diameter (DCX) shown in the WJX items table is not the same as the possible dimensions for plane cutting.
The possible dimensions for plane cutting are given as the cutting axle DC value. Please note that this is smaller than the DCX value.



CUTTING CONDITIONS ➢ P28–P30

MULTI-FUNCTIONAL MILLING

WJX14

P | M | K | N | S | H

Fig.1
ø2.000"

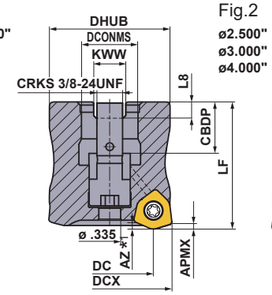


Fig.2
ø2.500"
ø3.000"
ø4.000"

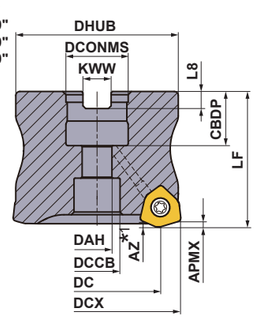
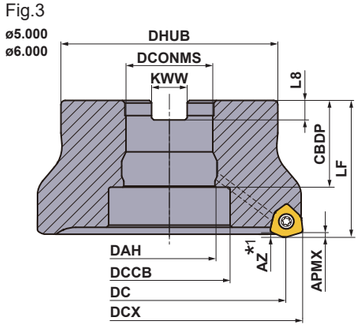


Fig.3
ø5.000
ø6.000



Right hand tool holder only.

(inch)

DCX	DCONMS	Set Bolt	Geometry	
ϕ2.500, ϕ3.000	ϕ1.000	HSCU50014H	①	① ② With Coolant Through
ϕ3.000	ϕ1.250	HSCU62516H		
ϕ4.000	ϕ1.500	HSCU75016H		
ϕ5.000	ϕ1.500	MBAU75016H	②	
ϕ6.000	ϕ2.000	MBAU100016H		

Note 1) The milling cutter with cutting diameter maximum DCX = 2.000" has a built in set bolt.
Please use ϕ.276" allen wrench to tighten/loosen the set bolt.

Arbor Type

With Coolant Through
DCONMS = inch size

(inch)

DCX	Order Number	Stock R	*2 No.T	DC	LF	DCONMS	WT (lbs)	APMX	RMPX	RPMX (min^{-1})	Fig.
2.000	**WJX14UR2.0003AA**	●	3	1.388	2.000	.750	.882	.079	4.3°	5000	1
2.000	**WJX14UR2.0004AA**	●	4	1.388	2.000	.750	.882	.079	4.3°	5000	1
2.500	**WJX14UR2.5004CA**	●	4	1.887	2.000	1.000	1.5	.079	3°	18100	2
2.500	**WJX14UR2.5005CA**	●	5	1.887	2.000	1.000	1.5	.079	3°	18100	2
3.000	**WJX14UR3.0005CA**	●	5	2.387	2.000	1.000	2.3	.079	2.2°	16100	2
3.000	**WJX14UR3.0006CA**	●	6	2.387	2.000	1.000	2.3	.079	2.2°	16100	2
3.000	**WJX14UR3.0005DA**	●	5	2.387	2.500	1.250	2.7	.079	2.2°	16100	2
3.000	**WJX14UR3.0006DA**	●	6	2.387	2.500	1.250	2.7	.079	2.2°	16100	2
4.000	**WJX14UR4.0006EA**	●	6	3.386	2.500	1.500	5.4	.079	1.5°	13300	2
4.000	**WJX14UR4.0007EA**	●	7	3.386	2.500	1.500	5.5	.079	1.5°	13300	2
5.000	**WJX14UR5.0007EA**	●	7	4.386	2.500	1.500	7.0	.079	1.1°	11500	3
5.000	**WJX14UR5.0009EA**	●	9	4.386	2.500	1.500	7.0	.079	1.1°	11500	3
6.000	**WJX14UR6.0009FA**	●	9	5.386	2.500	2.000	10.3	.079	0.9°	9900	3

*1 Refer to page 34, for the maximum drilling depth (**AZ**).
*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.

● : USA Stock.

Mounting Dimensions

(inch)

DCX	Order Number	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
2.000	**WJX14UR2.0003AA**	.750	.858	—	—	1.750	.313	.187	1
2.000	**WJX14UR2.0004AA**	.750	.858	—	—	1.750	.313	.187	1
2.500	**WJX14UR2.5004CA**	1.000	.945	.539	.787	2.375	.375	.219	2
2.500	**WJX14UR2.5005CA**	1.000	.945	.539	.787	2.375	.375	.219	2
3.000	**WJX14UR3.0005CA**	1.000	.945	.539	.787	2.750	.375	.219	2
3.000	**WJX14UR3.0006CA**	1.000	.945	.539	.787	2.750	.375	.219	2
3.000	**WJX14UR3.0005DA**	1.250	1.260	.669	1.024	2.875	.500	.281	2
3.000	**WJX14UR3.0006DA**	1.250	1.260	.669	1.024	2.875	.500	.281	2
4.000	**WJX14UR4.0006EA**	1.500	1.181	.787	1.181	3.813	.625	.375	2
4.000	**WJX14UR4.0007EA**	1.500	1.181	.787	1.181	3.813	.625	.375	2
5.000	**WJX14UR5.0007EA**	1.500	1.654	1.575	2.205	3.813	.625	.375	3
5.000	**WJX14UR5.0009EA**	1.500	1.654	1.575	2.205	3.813	.625	.375	3
6.000	**WJX14UR6.0009FA**	2.000	1.693	2.087	3.228	4.875	.750	.437	3

Spare Parts

Holder Type	 * Clamp Screw	 Wrench (Insert)	 Anti-seize Lubricant
WJX14	TS5R	TKY20T	MK1KS

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

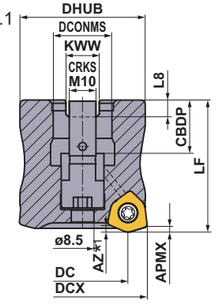
CUTTING CONDITIONS ➤ P31–P34

MULTI-FUNCTIONAL MILLING

WJX14

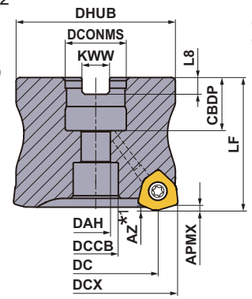
P M K N S H

Fig.1



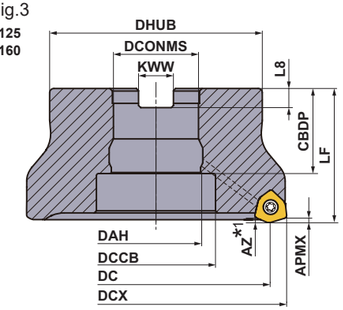
ø50
ø52

Fig.2



ø63
ø66
ø80
ø100

Fig.3

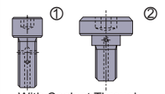


ø125
ø160

Right hand tool holder only.

(mm)

DCONMS		Set Bolt	Geometry
inch size	mm size		
ϕ22.225	ϕ22	HSC10030H	①
ϕ31.75	ϕ27	HSC12035H	①
ϕ38.1	ϕ32	HSC16040H	①
ϕ50.8	ϕ40	MBA20040H	②
		MBA24045H	②



With Coolant Through

Note 1) The milling cutter with cutting diameter maximum DCX = 50mm and 52mm has a built in set bolt.
Please use 7mm allen wrench to tighten/loosen the set bolt.

Metric Standard

Arbor Type

With Coolant Through
DCONMS = inch size

(mm)

DCX	Order Number	Stock R	*2 No.T	DC	LF	DCONMS	WT (kg)	APMX	RPMX (min^{-1})	Fig.	Insert Type
50	**WJX14R05003BA**	★	3	34.5	50	22.225	0.4	2	5000	1	JOMU1407
50	**WJX14R05004BA**	★	4	34.5	50	22.225	0.4	2	5000	1	JOMU1407
63	**WJX14R06304BA**	★	4	47.5	50	22.225	0.7	2	18200	2	JOMU1407
63	**WJX14R06305BA**	★	5	47.5	50	22.225	0.7	2	18200	2	JOMU1407
80	**WJX14R08005DA**	★	5	64.4	63	31.75	1.4	2	15600	2	JOMU1407
80	**WJX14R08006DA**	★	6	64.4	63	31.75	1.4	2	15600	2	JOMU1407
100	**WJX14R10006DA**	★	6	84.4	63	31.75	2.5	2	13500	2	JOMU1407
100	**WJX14R10007DA**	★	7	84.4	63	31.75	2.5	2	13500	2	JOMU1407
125	**WJX14R12507EA**	★	7	109.4	63	38.1	3.2	2	11600	3	JOMU1407
125	**WJX14R12509EA**	★	9	109.4	63	38.1	3.1	2	11600	3	JOMU1407
160	**WJX14R16009FA**	★	9	144.4	63	50.8	4.5	2	9900	3	JOMU1407

DCONMS = mm size

(mm)

DCX	Order Number	Stock R	*2 No.T	DC	LF	DCONMS	WT (kg)	APMX	RPMX (min^{-1})	Fig.	Insert Type
50	**WJX14-050A03AR**	★	3	34.5	50	22	0.4	2	5000	1	JOMU1407
50	**WJX14-050A04AR**	★	4	34.5	50	22	0.4	2	5000	1	JOMU1407
52	**WJX14-052A04AR**	★	4	36.5	50	22	0.4	2	5000	1	JOMU1407
63	**WJX14-063A04AR**	★	4	47.5	50	22	0.7	2	18200	2	JOMU1407
63	**WJX14-063A05AR**	★	5	47.5	50	22	0.7	2	18200	2	JOMU1407
63	**WJX14-063X05AR**	★	5	47.5	50	27	0.6	2	18200	2	JOMU1407
66	**WJX14-066X05AR**	★	5	50.4	50	27	0.7	2	17700	2	JOMU1407
80	**WJX14-080A05AR**	★	5	64.4	50	27	1.2	2	15600	2	JOMU1407
80	**WJX14-080A06AR**	★	6	64.4	50	27	1.2	2	15600	2	JOMU1407
100	**WJX14-100A06AR**	★	6	84.4	63	32	2.5	2	13500	2	JOMU1407
100	**WJX14-100A07AR**	★	7	84.4	63	32	2.5	2	13500	2	JOMU1407
125	**WJX14-125B07AR**	★	7	109.4	63	40	3.2	2	11600	3	JOMU1407
125	**WJX14-125B09AR**	★	9	109.4	63	40	3.1	2	11600	3	JOMU1407
160	**WJX14-160B09AR**	★	9	144.4	63	40	4.9	2	9900	3	JOMU1407

*1 Refer to page 34, for the maximum drilling depth (**AZ**).
*2 Number of Teeth
Note 1) The maximum spindle speeds **RPMX** are set to ensure tool and insert stability.

★ : **Stocked in Japan.**

Mounting Dimensions

(mm)

DCX	Order Number	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
50	**WJX14-050A03AR**	22	20	—	—	47	10.4	6.3	1
50	**WJX14-050A04AR**	22	20	—	—	47	10.4	6.3	1
50	**WJX14R05003BA**	22.225	20	—	—	47	8.4	5	1
50	**WJX14R05004BA**	22.225	20	—	—	47	8.4	5	1
52	**WJX14-052A04AR**	22	20	—	—	47	10.4	6.3	1
63	**WJX14-063A04AR**	22	20	11	17	60	10.4	6.3	2
63	**WJX14-063A05AR**	22	20	11	17	60	10.4	6.3	2
63	**WJX14R06304BA**	22.225	19	11	17	60	8.4	5	2
63	**WJX14R06305BA**	22.225	19	11	17	60	8.4	5	2
63	**WJX14-063X05AR**	27	23	13	20	60	12.4	7	2
66	**WJX14-066X05AR**	27	23	13	20	60	12.4	7	2
80	**WJX14-080A05AR**	27	23	13	20	76	12.4	7	2
80	**WJX14-080A06AR**	27	23	13	20	76	12.4	7	2
80	**WJX14R08005DA**	31.75	32	17	26	76	12.7	8	2
80	**WJX14R08006DA**	31.75	32	17	26	76	12.7	8	2
100	**WJX14R10006DA**	31.75	32	17	26	96	12.7	8	2
100	**WJX14R10007DA**	31.75	32	17	26	96	12.7	8	2
100	**WJX14-100A06AR**	32	26	17	26	96	14.4	8	2
100	**WJX14-100A07AR**	32	26	17	26	96	14.4	8	2
125	**WJX14R12507EA**	38.1	40	40	56	100	15.9	10	3
125	**WJX14R12509EA**	38.1	40	40	56	100	15.9	10	3
125	**WJX14-125B07AR**	40	40	42	56	100	16.4	9	3
125	**WJX14-125B09AR**	40	40	42	56	100	16.4	9	3
160	**WJX14-160B09AR**	40	40	42	56	100	16.4	9	3
160	**WJX14R16009FA**	50.8	43	53	72	100	19.1	11	3

*1 Refer to page 34, for the maximum drilling depth (**AZ**).
*2 Number of Teeth
Note 1) The milling cutter with cutting diameter DC = 50 mm and 52 mm has a built-in set bolt cannot be replaced.
Therefore, absolutely do not disassemble the milling cutter.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

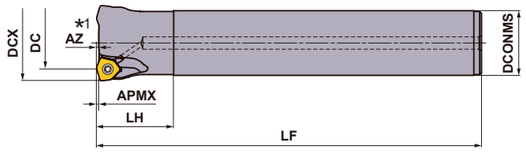
Spare Parts

Holder Type	*  Clamp Screw	 Wrench (Insert)	 Anti-seize Lubricant
WJX14	TS5R	TKY20T	MK1KS

* Clamp Torque (N • m) : TS5R = 5.0

CUTTING CONDITIONS ➤ P31–P34

Double-Sided Insert Type, High Feed Radius Milling Cutter



Right hand tool holder only.

Shank Type

With Coolant Through

(mm)

DCX	Order Number	Stock R	∗2 No.T	DC	LF	LH	DCONMS	APMX	RPMX (min^{-1})	Insert Type
50	**WJX14R5003SA42S**	★	3	34.5	150	50	42	2	21200	JOMU1407
50	**WJX14R5003SA42L**	★	3	34.5	250	50	42	2	21200	JOMU1407

∗1 Refer to page 33, for the maximum drilling depth (**AZ**).
∗2 Number of Teeth

Spare Parts

Holder Type	 ∗		
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WJX14	TS5R	TKY20D	MK1KS

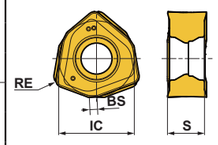
∗ Clamp Torque (N • m) : TS5R = 5.0

Inserts

(inch)

Material		
P	Steel	◆ ◆ ◆ ◆ ◆ ◆ ◆
M	Stainless Steel	◆ ◆ ◆ ◆ ◆ ◆ ◆
K	Cast Iron	◆ ◆ ◆ ◆
S	Heat Resistant Alloys, Titanium Alloys	◆ ◆ ◆ ◆
H	Hardened Steel	◆

This is the selection guideline for WJX.
Please note that the cutting conditions differ depending on multiple factors, for more details refer to the Recommended Cutting Conditions.
Edge Preparation (Honing) :
E : Round **S :** Chamfer + Hone

Shape	Order Number	Class	Edge Preparation	Coated MV1020	MV1030	MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT	IC	S	BS	RE	Geometry
	**JOMU140715ZZER-L**	M	E	●	●	●	●	●	●	●	●	●	●	●	.551	.259	.051	.059	
	JOMU140715ZZER-M	M	E	●	●	●	●	●	●	●	●	●	●	●	.551	.261	.051	.059	
	JOMU140715ZZER-R	M	S	●	●	●	●	●					●	●	.551	.266	.051	.059	

Right hand insert only.

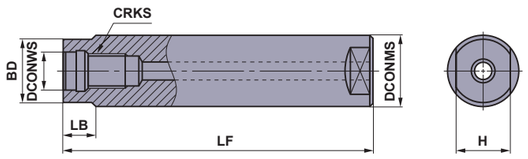
● :USA Stock. (10 inserts in one case) ★ : Stocked in Japan.

CUTTING CONDITIONS ➤ P31−P34

Memo

SCREW-IN HOLDERS

STRAIGHT SHANK TYPE



Steel Shank Type

With Coolant Through (inch)

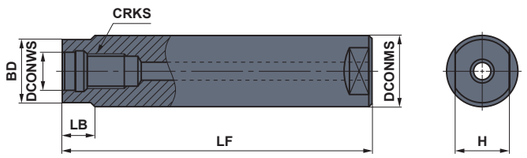
CRKS	Order Number	Stock	DCONMS	LF	DCONWS	BD	LB	H	WT (lbs)
M8	**SCU10M08S100S**	●	.625	3.937	.335	.571	.394	.394	.2
M8	**SCU10M08S200L**	●	.625	7.874	.335	.571	.394	.394	.7
M10	**SCU12M10S120S**	●	.750	4.724	.413	.728	.394	.551	.4
M10	**SCU12M10S220L**	●	.750	8.661	.413	.728	.394	.551	.9
M12	**SCU16M12S125S**	●	1.000	4.921	.492	.925	.394	.748	.9
M12	**SCU16M12S245L**	●	1.000	9.646	.492	.925	.394	.748	2.0
M16	**SCU20M16S140S**	●	1.250	5.512	.669	1.122	.591	.945	1.8
M16	**SCU20M16S280L**	●	1.250	11.024	.669	1.122	.591	.945	3.5

Metric Standard

With Coolant Through (mm)

CRKS	Order Number	Stock	DCONMS	LF	DCONWS	BD	LB	H	WT (kg)
M8	**SC16M08S100S**	★	16	100	8.5	14.5	10	10	0.1
M8	**SC16M08S200L**	★	16	200	8.5	14.5	10	10	0.3
M10	**SC20M10S120S**	★	20	120	10.5	18.5	10	14	0.3
M10	**SC20M10S220L**	★	20	220	10.5	18.5	10	14	0.5
M12	**SC25M12S125S**	★	25	125	12.5	23.5	10	19	0.4
M12	**SC25M12S245L**	★	25	245	12.5	23.5	10	19	0.8
M16	**SC32M16S140S**	★	32	140	17	28.5	15	24	0.8
M16	**SC32M16S280L**	★	32	280	17	28.5	15	24	1.6

● : USA Stock. ★ : Stocked in Japan.



Carbide Shank Type

With Coolant Through (inch)

CRKS	Order Number	Stock	DCONMS	LF	DCONWS	BD	LB	H	WT (lbs)
M8	**SCU10M08S100SW**	●	.625	3.937	.335	.571	.394	.394	.4
M8	**SCU10M08S200LW**	●	.625	7.874	.335	.571	.394	.394	1.1
M10	**SCU12M10S120SW**	●	.750	4.724	.413	.728	.394	.551	.9
M10	**SCU12M10S220LW**	●	.750	8.661	.413	.728	.394	.551	1.8
M12	**SCU16M12S125SW**	●	1.000	4.921	.492	.925	.394	.748	1.8
M12	**SCU16M12S245LW**	●	1.000	9.646	.492	.925	.394	.748	3.5
M16	**SCU20M16S140SW**	●	1.250	5.512	.669	1.122	.591	.945	3.1
M16	**SCU20M16S280LW**	●	1.250	11.024	1.250	1.122	.591	.945	6.4

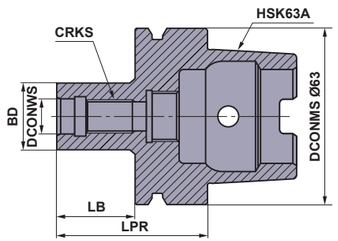
Metric Standard

With Coolant Through (mm)

CRKS	Order Number	Stock	DCONMS	LF	DCONWS	BD	LB	H	WT (kg)
M8	**SC16M08S100SW**	★	16	100	8.5	14.5	10	10	0.2
M8	**SC16M08S200LW**	★	16	200	8.5	14.5	10	10	0.5
M10	**SC20M10S120SW**	★	20	120	10.5	18.5	10	14	0.5
M10	**SC20M10S220LW**	★	20	220	10.5	18.5	10	14	0.9
M12	**SC25M12S125SW**	★	25	125	12.5	23.5	10	19	0.8
M12	**SC25M12S245LW**	★	25	245	12.5	23.5	10	19	1.5
M16	**SC32M16S140SW**	★	32	140	17	28.5	15	24	1.4
M16	**SC32M16S280LW**	★	32	280	17	28.5	15	24	2.8

SCREW-IN HOLDERS

HSK63A Shank Arbor



Metric Standard

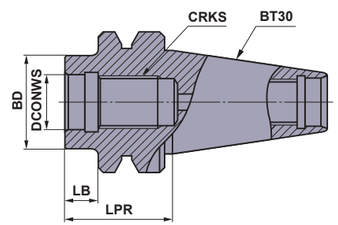
With Coolant Through

(mm)

CRKS	Order Number	Stock	DCONWS	BD	LPR	LB	WT (kg)
M8	**SC16M08S22-HSK63A**	★	8.5	14.5	48	22	0.7
M10	**SC20M10S24-HSK63A**	★	10.5	18.5	50	24	0.7
M12	**SC25M12S27-HSK63A**	★	12.5	23.5	53	27	0.7
M16	**SC32M16S28-HSK63A**	★	17	28.5	54	28	0.8

Note 1) The HSK63A shank type has a built-in coolant pipe for installation.

BT30 Shank Arbor



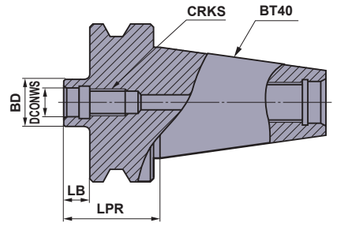
Metric Standard

With Coolant Through

(mm)

CRKS	Order Number	Stock	DCONWS	BD	LPR	LB	WT (kg)
M8	**SC16M08S10-BT30**	★	8.5	14.5	32	10	0.4
M10	**SC20M10S10-BT30**	★	10.5	18.5	32	10	0.4
M12	**SC25M12S10-BT30**	★	12.5	23.5	32	10	0.4
M16	**SC32M16S10-BT30**	★	17	28.5	32	10	0.4

BT40 Shank Arbor



Metric Standard

With Coolant Through

(mm)

CRKS	Order Number	Stock	DCONWS	BD	LPR	LB	WT (kg)
M8	**SC16M08S10-BT40**	★	8.5	14.5	37	10	1
M10	**SC20M10S10-BT40**	★	10.5	18.5	37	10	1
M12	**SC25M12S10-BT40**	★	12.5	23.5	37	10	1
M16	**SC32M16S10-BT40**	★	17	28.5	37	10	1

★ : Stocked in Japan.

How To Install the Screw-in Head

①Thoroughly clean the clamp section of the head and the arbor with an air blower or brush before installation.

②Tighten the head at the recommended torque and ensure that there is no gap between the head and arbor.

Screw Size	Recommended Torque (lbf-ft)	Wrench Size (inch)
M8	17.0	.394
M10	33.9	.551
M12	59.0	.748
M16	66.4	.945

- 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.

WJX09

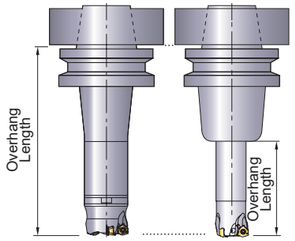
Recommended Cutting Conditions

Correction Value According to Overhang Length

Multiply the recommended cutting conditions by the corrections factor x overhang length.

(inch)

Type	Cutting Dia. Max. **DCX**	Overhang Length	Correction Value According		
			Cutting Speed **vc** (SFM)	Depth of Cut **ap**	Feed **fz**(IPT)
Shank Type Screw-in Type	.984-1.575	< 2.5×DCONMS	100%	100%	100%
		3.0×DCONMS	90%	100%	90%
		4.0×DCONMS	85%	90%	85%
		5.0×DCONMS	80%	85%	80%
		7.5×DCONMS	70%	75%	75%
Arbor Type	1.500-2.598	< 2.5×DCX	100%	100%	100%
		3.0×DCX	85%	100%	90%
		4.0×DCX	80%	80%	80%
		5.0×DCX	75%	75%	60%
		6.0×DCX	70%	70%	40%



DCONMS=Connection Dia.

Cutting Speed (Dry Cutting)

(inch)

Material		Properties	Cutting Speed **vc** (SFM)					
P			MV1020	MV1030	MP6130	MP6120/VP15TF	MC7020	VP30RT
	Mild Steel	≤180HB	755(590—920)	525(360—655)	525(360—655)	560(395—720)	755(590—920)	460(330—590)
	Carbon Steel Alloy Steel	180—280HB	720(560—885)	490(260—720)	460(295—655)	525(330—720)	720(560—885)	395(260—560)
	Carbon Steel Alloy Steel	280—350HB	720(560—885)	490(260—720)	460(295—655)	525(330—720)	720(560—885)	395(260—560)
	Alloy Tool Steel	≤350HB (Annealing)	—	—	460(295—655)	525(330—720)	720(560—885)	395(260—560)
	Pre-hardened Steel	35—45HRC	—	—	330(195—460)	395(260—525)	—	295(165—425)
M			MV1030	MC7020	MP7130	VP15TF	MP7140	VP30RT
	Austenitic Stainless Steel	≤200HB	525(425—655)	720(560—885)	525(425—655)	525(425—655)	490(395—590)	490(395—590)
	Austenitic Stainless Steel	>200HB	460(260—655)	620(460—785)	460(330—655)	460(330—655)	425(260—590)	425(260—590)
	Ferritic and Martensitic Stainless Steel	≤200HB	525(425—655)	720(560—885)	490(330—655)	490(330—655)	425(260—590)	425(260—590)
	Duplex Stainless Steel	≤280HB	525(425—655)	590(425—755)	425(260—590)	425(260—590)	360(195—525)	360(195—525)
	Precipitation Hardening Stainless Steel	<450HB	—	560(395—720)	360(195—525)	360(195—525)	295(165—425)	295(165—425)
K			MV1020	MV1030	VP15TF			
	Gray Cast Iron	≤350MPa	690(525—850)	525(395—690)	590(460—720)			
	Ductile Cast Iron	≤450MPa	690(525—850)	525(395—690)	525(395—690)			
	Ductile Cast Iron	≤800MPa	620(460—785)	425(295—560)	425(295—560)			
S			MP9130	MP9120	VP15TF			
	Titanium Alloys	—	130(100—195)	165(100—210)	165(100—210)			
	Heat Resistant Alloys	—	100(65—130)	130(65—165)	130(65—165)			
H			VP15TF					
	Hardened Steel	40—55HRC	230(130—330)					

Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
Note 2) When wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25%.
Note 3) When large vibration occurs, reduce the cutting conditions.
Note 4) For interrupted cutting, reduce the cutting speed and feed rate by 20%.

Depth of Cut / Feed per Tooth

(inch)

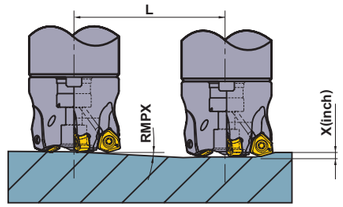
Material		Properties	Depth of Cut **ap**	Chipbreaker	DCX=1.000", 1.125", 25mm, 28mm Number of Teeth=2 Feed **fz**(IPT)	DCX=1.000", 1.125", 25mm, 28mm Number of Teeth=3 Feed **fz**(IPT)	DCX≥1.250", 32mm Feed **fz**(IPT)	Cutting Mode
P	Mild Steel	Hardness ≤180HB	≤.020	M,R	.051(.016—.079)	.051(.016—.079)	.059(.020—.079)	Dry
				L	.047(.016—.063)	.047(.016—.063)	.047(.016—.063)	
			≤.039	M,R	.039(.012—.051)	.031(.012—.039)	.047(.016—.059)	
				L	.031(.012—.047)	.031(.012—.039)	.031(.012—.047)	
			≤.059	M,R	.024(.012—.039)	—	.031(.016—.047)	
	Carbon Steel Alloy Steel	Hardness 180—280HB	≤.020	M,R	.051(.016—.067)	.051(.016—.067)	.059(.016—.079)	Dry
				L	.047(.012—.059)	.047(.012—.059)	.047(.012—.059)	
			≤.039	M,R	.031(.012—.039)	.028(.012—.035)	.039(.012—.051)	
				L	.028(.008—.039)	.028(.008—.035)	.028(.008—.039)	
			≤.059	M,R	.020(.012—.028)	—	.028(.012—.039)	
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	≤.020	M,R	.051(.016—.067)	.051(.016—.067)	.059(.016—.079)	Dry
				L	.047(.012—.059)	.047(.012—.059)	.047(.012—.059)	
			≤.039	M,R	.031(.012—.039)	.028(.012—.035)	.039(.012—.051)	
				L	.028(.008—.039)	.028(.008—.035)	.028(.008—.039)	
			≤.059	M,R	.020(.012—.028)	—	.028(.012—.039)	
	Pre-hardened Steel	Hardness 35—45HRC	≤.020	M,R	.039(.012—.051)	.039(.012—.051)	.047(.012—.059)	Dry
				L	.031(.012—.047)	.031(.012—.047)	.031(.012—.047)	
			≤.039	M,R	.024(.008—.031)	.024(.008—.031)	.031(.008—.039)	
				L	.020(.008—.031)	.020(.008—.031)	.020(.008—.031)	
M	Austenitic Stainless Steel	—	≤.020	L	.031(.012—.039)	.031(.012—.039)	.031(.012—.039)	Dry
				M	.039(.016—.047)	.039(.016—.047)	.039(.016—.047)	
			≤.039	L	.024(.008—.031)	.024(.008—.031)	.024(.008—.031)	
				M	.031(.012—.039)	.031(.012—.039)	.031(.012—.039)	
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	≤.020	L	.031(.012—.039)	.031(.012—.039)	.031(.012—.039)	Dry
				M	.039(.016—.047)	.039(.016—.047)	.039(.016—.047)	
			≤.039	L	.024(.008—.031)	.024(.008—.031)	.024(.008—.031)	
				M	.031(.012—.039)	.031(.012—.039)	.031(.012—.039)	
	Duplex Stainless Steel	Hardness ≤280HB	≤.020	L	.024(.012—.031)	.024(.012—.031)	.024(.012—.031)	Dry
				M	.028(.012—.039)	.028(.012—.039)	.028(.012—.039)	
			≤.039	L	.020(.008—.028)	.020(.008—.028)	.020(.008—.028)	
				M	.024(.012—.028)	.024(.012—.028)	.024(.012—.028)	
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤.020	L	.024(.012—.031)	.024(.012—.031)	.024(.012—.031)	Dry
				M	.028(.012—.039)	.028(.012—.039)	.028(.012—.039)	
			≤.039	L	.020(.008—.028)	.020(.008—.028)	.020(.008—.028)	
				M	.024(.012—.028)	.024(.012—.028)	.024(.012—.028)	
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤.020	M,R	.051(.016—.079)	.051(.016—.079)	.059(.020—.079)	Dry
				L	.047(.016—.063)	.047(.016—.063)	.047(.016—.063)	
			≤.039	M,R	.039(.012—.051)	.031(.012—.039)	.047(.016—.059)	
				L	.039(.012—.051)	.031(.012—.039)	.039(.012—.051)	
			≤.059	M,R	.024(.012—.039)	—	.031(.016—.047)	
	Ductile Cast Iron	Tensile Strength ≤450MPa	≤.020	M,R	.051(.016—.067)	.051(.016—.067)	.059(.016—.079)	Dry
				L	.039(.012—.051)	.039(.012—.051)	.039(.012—.051)	
			≤.039	M,R	.031(.012—.039)	.028(.012—.035)	.039(.012—.051)	
				L	.031(.008—.039)	.028(.008—.035)	.031(.008—.047)	
			≤.059	M,R	.020(.012—.028)	—	.028(.012—.039)	
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤.020	M,R	.039(.008—.059)	.039(.008—.059)	.051(.012—.067)	Dry
				L	.031(.012—.047)	.031(.012—.047)	.031(.012—.047)	
			≤.039	M,R	.031(.008—.039)	.024(.008—.031)	.039(.012—.047)	
				L	.020(.008—.031)	.020(.008—.031)	.020(.008—.031)	
S	Titanium Alloys	—	≤.020	L	.012(.008—.024)	.012(.008—.024)	.012(.008—.024)	Wet
			≤.039	L	.012(.008—.016)	.012(.008—.016)	.012(.008—.016)	
	Heat Resistant Alloys	—	≤.020	L,M,R	.031(.012—.047)	.031(.012—.047)	.031(.012—.047)	Wet
			≤.039	L,M,R	.028(.012—.039)	.028(.012—.039)	.028(.012—.039)	
H	Hardened Steel	Hardness 40—55HRC	≤.020	R,M	.024(.012—.039)	.024(.012—.039)	.024(.012—.039)	Dry
			≤.039	R,M	.020(.012—.031)	.016(.012—.024)	.020(.012—.031)	

Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
Note 2) When large vibration occurs, reduce the cutting conditions.
Note 3) For interrupted cutting, reduce the cutting speed and feed rate by 20%.
Note 4) If ap is set at .079" or more, avoid machining on the walls or ramping.

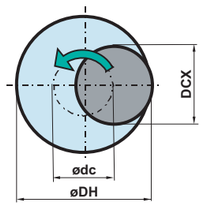
WJX09

Maximum Capacities by Mode

Ramping



Helical Milling



● How to derive a locus of the center of the tool.

ødc = øDH - DCX

Locus of the Center of the Tool | Desired Hole Diameter | Cutting Diameter Maximum

(inch)

Tool Holder Type	DCX	DC	APMX	Ramping RMPX	Ramping L : Required Distance for X : Depth x=.039	Helical Milling (Blind Hole, Flat Bottom) DH Min.	Helical Milling (Blind Hole, Flat Bottom) DH Max.	Helical Milling (Through Hole) DH Min.	Helical Milling (Through Hole) P max.	AZ
WJX09UR16	1.000	.565	.047	4.5	.496	1.510	1.914	1.343	.047	.035
WJX09UR18	1.125	.687	.047	5.3	.420	1.756	2.164	1.516	.047	.047
WJX09UR20	1.250	.811	.047	4.3	.519	2.005	2.413	1.760	.047	.047
WJX09UR22	1.375	.936	.047	3.6	.620	2.255	2.664	2.006	.047	.047
WJX09UR24	1.500	1.060	.047	3.1	.720	2.504	2.913	2.254	.047	.047
WJX09UR1.50	1.500	1.060	.047	3.1	.720	2.504	2.913	2.254	.047	.047
WJX09UR2.00	2.000	1.557	.047	2	1.117	3.501	3.913	3.244	.047	.047
WJX09UR2.50	2.500	2.057	.047	1.4	1.596	4.500	4.913	4.243	.047	.047
WJX09R25	.984	.551	.047	4.7	.474	1.496	1.850	1.339	.047	.047
WJX09R28	1.102	.665	.047	5.6	.398	1.732	2.087	1.496	.047	.047
WJX09R32	1.260	.823	.047	4.2	.531	2.047	2.402	1.811	.047	.047
WJX09R35	1.378	.937	.047	3.6	.620	2.283	2.638	2.047	.047	.047
WJX09R40	1.575	1.134	.047	2.9	.770	2.677	3.031	2.402	.047	.047
WJX09-040	1.575	1.134	.047	2.9	.770	2.677	3.031	2.402	.047	.047
WJX09-050	1.969	1.528	.047	2	1.117	3.465	3.819	3.189	.047	.047
WJX09R050	1.969	1.528	.047	2	1.117	3.465	3.819	3.189	.047	.047
WJX09-052	2.047	1.606	.047	1.9	1.176	3.622	3.976	3.346	.047	.047
WJX09-063	2.480	2.039	.047	1.4	1.596	4.488	4.843	4.213	.047	.047
WJX09R063	2.480	2.039	.047	1.4	1.596	4.488	4.843	4.213	.047	.047
WJX09-066	2.598	2.157	.047	1.4	1.596	4.724	5.079	4.449	.047	.047

DCX = Cutting Dia. Max. **DC** = Cutting Dia. **DH** = Desired Hole Dia.
APMX = Depth of Cut Max. **RMPX** = Ramping Angle Max. **AZ** = Plunge Depth Max.

Note 1) When ramping and helical milling, it is recommended to reduce the feed per tooth.
Note 2) When ramping, helical milling and drilling, long continuous chips may be scattered so please be careful.

<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, ensure that the depth of cut per helical pass doesn’t exceed the maximum depth of cut (APMX).
<Drilling>
When drilling, set the axial feed per revolution at .008 IPR or less.

WJX14

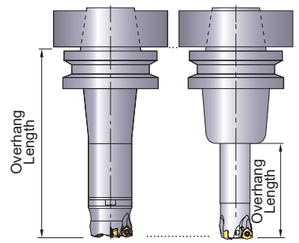
Recommended Cutting Conditions

Correction Value According to Overhang Length

Multiply the recommended cutting conditions on pages 17 - 19 by the corrections factor x overhang length.

(inch)

Type	Cutting Dia. Max. DCX	Overhang Length	Correction Value According: Cutting Speed vc (SFM)	Depth of Cut ap	Feed fz (IPT)
Shank Type	1.969	< 2.5 × DCONMS	100%	100%	100%
		3.0 × DCONMS	90%	100%	90%
		4.0 × DCONMS	80%	80%	90%
Arbor Type	2.000—3.150	< 2.5 × DCX	100%	100%	100%
		3.0 × DCX	85%	100%	90%
		4.0 × DCX	80%	80%	80%
		5.0 × DCX	75%	75%	60%
		6.0 × DCX	70%	70%	40%
	≥3.937	8.0	100%	100%	100%
		12.0	85%	100%	90%
		16.0	80%	80%	80%



DCONMS=Connection Dia.

Cutting Speed (Dry Cutting)

(inch)

Material		Properties	Cutting Speed vc (SFM)					
P			MV1020	MV1030	MP6130	MP6120/VP15TF	MC7020	VP30RT
	Mild Steel	Hardness ≤180HB	720(560—885)	425(260—590)	460 (295—590)	490 (330—655)	720 (560—885)	395 (260—525)
	Carbon Steel Alloy Steel	Hardness 180—280HB	655(490—820)	395(195—590)	395 (230—590)	460 (260—655)	655 (490—820)	330 (195—490)
	Carbon Steel Alloy Steel	Hardness 280—350HB	655(490—820)	395(195—590)	395 (230—590)	460 (260—655)	655 (490—820)	330 (195—490)
	Alloy Tool Steel	Hardness ≤350HB (Annealing)	—	—	395 (230—590)	460 (260—655)	655 (490—820)	330 (195—490)
	Pre-hardened Steel	Hardness 35—45HRC	—	—	295 (165—425)	360 (230—490)	—	260 (130—395)
M			MV1030	MC7020	MP7130	VP15TF	MP7140	VP30RT
	Austenitic Stainless Steel	Hardness ≤200HB	525(425—655)	720 (560—885)	525(425—655)	525(425—655)	490 (395—590)	490 (395—590)
	Austenitic Stainless Steel	Hardness >200HB	460(330—655)	620 (460—785)	460(330—655)	460(330—655)	425 (260—590)	425 (260—590)
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	525(425—655)	720 (560—885)	490(330—655)	490(330—655)	425 (260—590)	425 (260—590)
	Duplex Stainless Steel	Hardness ≤280HB	525(425—655)	590 (425—755)	425(260—590)	425(260—590)	360 (195—525)	360 (195—525)
	Precipitation Hardening Stainless Steel	Hardness <450HB	—	560 (395—720)	360(195—525)	360(195—525)	295 (165—425)	295 (165—425)
K			MV1020	MV1030	VP15TF			
	Gray Cast Iron	Tensile Strength ≤350MPa	655(490—820)	490(330—655)	525 (395—655)			
	Ductile Cast Iron	Tensile Strength ≤450MPa	655(490—820)	490(330—655)	490 (330—655)			
	Ductile Cast Iron	Tensile Strength ≤800MPa	590(425—755)	395(260—525)	395 (260—525)			
S			MP9130	MP9120	VP15TF			
	Titanium Alloys	—	130 (100—195)	165 (100—210)	165 (100—210)			
	Heat Resistant Alloys	—	100 (65—130)	130 (65—165)	130 (65—165)			
H			VP15TF					
	Hardened Steel	Hardness 40—55HRC	230 (130—330)					

Note 1) When wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25%.

WJX14

Depth of Cut / Feed per Tooth

(inch)

	Material	Properties	Depth of Cut **ap**	Chipbreaker	Cutting Dia. Max. DCX=2.000", 50mm, 52mm Feed **fz** (IPT)	Cutting Dia. Max. DCX≥2.500", 63mm Feed **fz** (IPT)	Cutting Mode
P	Mild Steel	Hardness ≤180HB	≤.040	M,R *	.059(.024—.098)	.067(.024—.110)	Dry
				L	.047(.016—.079)	.047(.016—.079)	Dry
			≤.060	M,R *	.051(.024—.079)	.059(.024—.098)	Dry
				L	.039(.016—.071)	.039(.016—.071)	Dry
			≤.080	M,R *	.047(.024—.079)	.051(.024—.098)	Dry
				L	.031(.016—.067)	.031(.016—.067)	Dry
			≤.100	M,R	.031(.012—.059)	.039(.012—.063)	Dry
			≤.120	M,R	.016(.008—.039)	.020(.008—.047)	Dry
	Carbon Steel Alloy Steel	Hardness 180-280HB	≤.040	M,R *	.059(.020—.079)	.067(.020—.098)	Dry
				L	.039(.012—.067)	.039(.012—.067)	Dry
			≤.060	M,R *	.047(.020—.067)	.051(.020—.098)	Dry
				L	.031(.012—.059)	.031(.012—.059)	Dry
			≤.080	M,R *	.039(.020—.059)	.047(.020—.079)	Dry
				L	.028(.012—.047)	.028(.012—.047)	Dry
			≤.100	M,R	.028(.012—.047)	.035(.012—.059)	Dry
			≤.120	M,R	.012(.008—.031)	.016(.008—.039)	Dry
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280-350HB ≤350HB (Annealing)	≤.040	M,R *	.059(.020—.079)	.067(.020—.098)	Dry
				L	.039(.012—.067)	.039(.012—.067)	Dry
			≤.060	M,R *	.047(.020—.067)	.051(.020—.087)	Dry
				L	.031(.012—.059)	.031(.012—.059)	Dry
			≤.080	M,R *	.039(.020—.059)	.047(.020—.079)	Dry
				L	.028(.012—.047)	.028(.012—.047)	Dry
			≤.100	M,R	.028(.012—.047)	.035(.012—.059)	Dry
			≤.120	M,R	.012(.008—.031)	.016(.008—.039)	Dry
	Pre-hardened Steel	Hardness 35-45HRC	≤.040	M,R *	.051(.016—.067)	.059(.016—.079)	Dry
				L	.028(.012—.047)	.028(.012—.047)	Dry
			≤.060	M,R *	.039(.016—.059)	.047(.016—.059)	Dry
				L	.024(.012—.039)	.024(.012—.039)	Dry
			≤.080	M,R *	.031(.016—.047)	.039(.016—.051)	Dry
				L	.020(.012—.031)	.020(.012—.031)	Dry
M	Austenitic Stainless Steel	—	≤.040	L *	.031(.012—.047)	.031(.012—.047)	Dry
				M	.039(.020—.047)	.039(.020—.047)	Dry
			≤.060	L *	.031(.012—.039)	.031(.012—.039)	Dry
				M	.039(.020—.039)	.039(.020—.039)	Dry
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	≤.040	L *	.031(.012—.047)	.031(.012—.047)	Dry
				M	.039(.020—.047)	.039(.020—.047)	Dry
			≤.060	L *	.031(.012—.039)	.031(.012—.039)	Dry
				M	.039(.020—.039)	.039(.020—.039)	Dry
	Duplex Stainless Steel	Hardness ≤280HB	≤.040	L *	.024(.012—.039)	.024(.012—.039)	Dry
				M	.031(.016—.039)	.031(.016—.039)	Dry
			≤.060	L *	.024(.012—.031)	.024(.012—.031)	Dry
				M	.031(.016—.031)	.031(.016—.031)	Dry
	Precipitation Hardening Stainless Steel	Hardness <450HB	≤.040	L *	.024(.012—.039)	.024(.012—.039)	Dry
				M	.031(.016—.039)	.031(.016—.039)	Dry
			≤.060	L *	.024(.012—.031)	.024(.012—.031)	Dry
				M	.031(.016—.031)	.031(.016—.031)	Dry

* The 1st recommend chipbreaker for each depth of cut (**ap**).
Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
Note 2) When large vibration occurs, reduce the cutting conditions.
Note 3) For interrupted cutting, reduce the cutting speed and feed rate by 20%.
Note 4) If ap is set at .079" or more, avoid machining on the walls or ramping.

(inch)

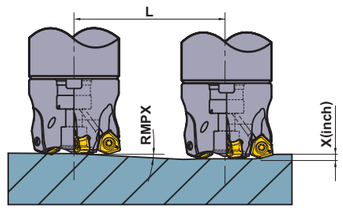
	Material	Properties	Depth of Cut **ap**	Chipbreaker	Cutting Dia. Max. DCX=2.000", 50mm, 52mm Feed **fz** (IPT)	Cutting Dia. Max. DCX≥2.500", 63mm Feed **fz** (IPT)	Cutting Mode
K	Gray Cast Iron	Tensile Strength ≤350MPa	≤.040	M,R *	.067(.024—.098)	.071(.024—.110)	Dry
				L	.051(.016—.079)	.051(.016—.079)	Dry
			≤.060	M,R *	.059(.024—.079)	.067(.024—.098)	Dry
				L	.047(.016—.071)	.047(.016—.071)	Dry
			≤.080	M,R *	.051(.024—.079)	.059(.024—.098)	Dry
				L	.039(.016—.059)	.039(.016—.059)	Dry
			≤.100	M,R	.031(.012—.059)	.039(.012—.063)	Dry
			≤.120	M,R	.016(.008—.039)	.020(.008—.047)	Dry
	Ductile Cast Iron	Tensile Strength ≤450MPa	≤.040	M,R *	.059(.020—.079)	.067(.020—.098)	Dry
				L	.047(.012—.079)	.047(.012—.079)	Dry
			≤.060	M,R *	.051(.020—.071)	.059(.020—.079)	Dry
				L	.039(.012—.067)	.039(.012—.067)	Dry
			≤.080	M,R *	.047(.020—.071)	.051(.020—.079)	Dry
				L	.031(.012—.059)	.031(.012—.059)	Dry
			≤.100	M,R	.028(.012—.047)	.035(.012—.059)	Dry
			≤.120	M,R	.012(.008—.031)	.016(.008—.039)	Dry
	Ductile Cast Iron	Tensile Strength ≤800MPa	≤.040	M,R *	.051(.016—.071)	.059(.016—.079)	Dry
				L	.039(.012—.067)	.039(.012—.067)	Dry
			≤.060	M,R *	.047(.016—.059)	.051(.016—.071)	Dry
				L	.031(.012—.059)	.031(.012—.059)	Dry
			≤.080	M,R *	.039(.016—.059)	.047(.016—.071)	Dry
				L	.028(.012—.047)	.028(.012—.047)	Dry
S	Titanium Alloys	—	≤.040	L	.012(.008—.024)	.012(.008—.024)	Wet
			≤.060	L	.012(.008—.020)	.012(.008—.020)	Wet
			≤.080	L	.012(.008—.016)	.012(.008—.016)	Wet
	Heat Resistant Alloys	—	≤.040	L,M,R	.039(.012—.051)	.039(.012—.051)	Wet
			≤.060	L,M,R	.031(.012—.047)	.031(.012—.047)	Wet
			≤.080	L,M,R	.028(.012—.047)	.028(.012—.047)	Wet
H	Hardened Steel	Hardness 40-55HRC	≤.040	R,M	.031(.012—.047)	.031(.012—.047)	Dry
			≤.060	R,M	.024(.012—.039)	.024(.012—.039)	Dry
			≤.080	R,M	.020(.012—.031)	.020(.012—.031)	Dry

* The 1st recommend chipbreaker for each depth of cut (**ap**).
Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
Note 2) When large vibration occurs, reduce the cutting conditions.
Note 3) For interrupted cutting, reduce the cutting speed and feed rate by 20%.
Note 4) If ap is set at .079" or more, avoid machining on the walls or ramping.

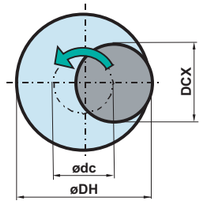
Double-Sided Insert Type, High Feed Radius Milling Cutter

Maximum Capacities by Mode

Ramping



Helical Milling



● How to derive a locus of the center of the tool.

ødc = øDH - DCX

- ødc: Locus of the Center of the Tool
- øDH: Desired Hole Diameter
- DCX: Cutting Diameter Maximum

(inch)

Holder Type	DCX	DC	APMX	Ramping			Helical Milling (Blind Hole, Flat Bottom)		Helical Milling (Through Hole)	AZ
				RMPX	L : Required Distance for X : Depth		DH		DH	
					x=.039	x=.079	Min.	Max.	Min.	
WJX14UR2.000	2.000	1.338	.079	4.3	.524	1.048	3.285	3.901	2.919	.082
WJX14UR2.500	2.500	1.887	.079	3°	.752	1.503	4.283	4.901	3.912	.082
WJX14UR3.000	3.000	2.387	.079	2.2°	1.025	2.050	5.283	5.901	4.909	.082
WJX14UR4.000	4.000	3.386	.079	1.5°	1.504	3.007	7.282	7.901	6.906	.082
WJX14UR5.000	5.000	4.386	.079	1.1°	2.051	4.101	9.281	9.901	8.904	.082
WJX14UR6.000	6.000	5.386	.079	0.9°	2.507	5.013	11.281	11.901	10.903	.082
WJX14R50	1.969	1.358	.079	4.4°	.512	1.024	3.228	3.819	2.874	.082
WJX14-050	1.969	1.358	.079	4.4	.512	1.024	3.228	3.819	2.874	.082
WJX14R050	1.969	1.358	.079	4.4	.512	1.024	3.228	3.819	2.874	.082
WJX14-052	2.047	1.437	.079	4.1	.551	1.102	3.386	3.976	3.031	.082
WJX14-063	2.480	1.870	.079	3°	.752	1.504	4.252	4.843	3.898	.082
WJX14R063	2.480	1.870	.079	3°	.752	1.504	4.252	4.843	3.898	.082
WJX14-066	2.598	1.984	.079	2.8°	.807	1.610	4.488	5.079	4.134	.082
WJX14-080	3.150	2.535	.079	2.1°	1.075	2.150	5.591	6.181	5.236	.082
WJX14R080	3.150	2.535	.079	2.1°	1.075	2.150	5.591	6.181	5.236	.082
WJX14-100	3.937	3.323	.079	1.5°	1.504	3.008	7.165	7.756	6.811	.082
WJX14R100	3.937	3.323	.079	1.5°	1.504	3.008	7.165	7.756	6.811	.082
WJX14-125	4.921	4.307	.079	1.2°	1.882	3.760	9.134	9.724	8.780	.082
WJX14R125	4.921	4.307	.079	1.2°	1.882	3.760	9.134	9.724	8.780	.082
WJX14-160	6.299	5.685	.079	0.8°	2.823	5.642	11.890	12.480	11.535	.082
WJX14R160	6.299	5.685	.079	0.8°	2.823	5.642	11.890	12.480	11.535	.082

DCX = Cutting Dia. Max. **DC** = Cutting Dia. **DH** = Desired Hole Dia.
APMX = Depth of Cut Max. **RMPX** = Ramping Angle Max. **AZ** = Plunge Depth Max.

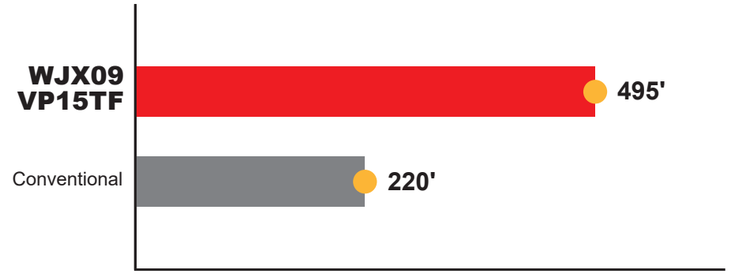
Note 1) When ramping and helical milling, it is recommended to reduce the feed per tooth.
Note 2) When ramping, helical milling and drilling, long continuous chips may be scattered so please be careful.

<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, ensure that the depth of cut per helical pass doesn’t exceed the maximum depth of cut (APMX).
<Drilling>
When drilling, set the axial feed per revolution at .008 IPR or less.

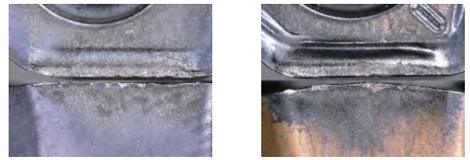
Cutting Performance

AISI 100-70-03 Wear Resistance Comparison

The excellent wear resistance can extend tool life significantly.



<Cutting Conditions>
Material : AISI 100-70-03
Cutter Dia. : DCX=ø1.250"
Inserts : JOMU090512ZZER-M
Cutting Speed : vc=655 SFM
Feed per Tooth : fz=.031 IPT
Depth of Cut : ap=.047"
Width of Cut : ae=.591"
Cutting Mode : Dry Cutting
Single Insert



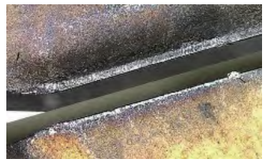
VP15TF (495')

Conventional

AISI 304 Wear Resistance Comparison

Suppresses notch wear and therefore provides a stable tool life.

<Cutting Conditions>
Material : AISI 304
Cutter Dia. : DCX=ø2.000"
Inserts : JOMU090512ZZER-L
Cutting Speed : vc=490 SFM
Feed per Tooth : fz=.024 IPT
Depth of Cut : ap=.035"
Width of Cut : ae=1.378"
Cutting Mode : Dry Cutting
Single Insert

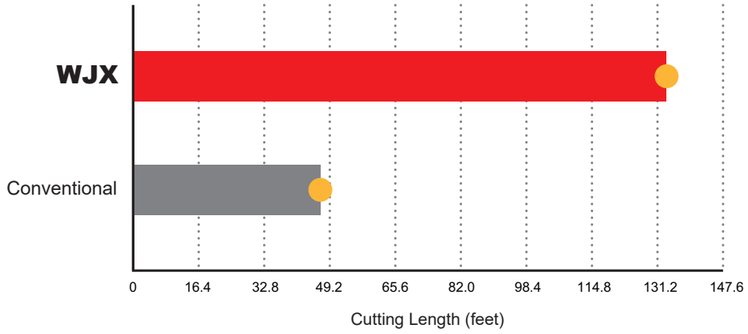


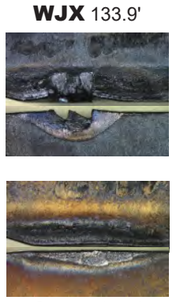
MP7130 (33')

Conventional (33')

AISI 4140 Wear Resistance Comparison

MC7020 has excellent crater wear resistance in high speed cutting.

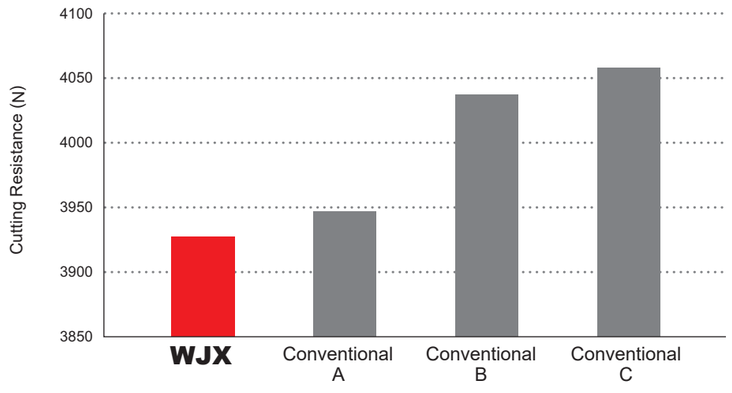




<Cutting Conditions>
Material : AISI 4140
Cutter Dia. : DCX=ø2.48"
Inserts : JOMU140715ZZER-M
Grade : MC7020
Cutting Speed : vc=755 SFM
Feed per Tooth : fz=.059 IPT
Depth of Cut : ap=.059"
Width of Cut : ae=1.772"
Cutting Mode : Dry Cutting
Single Insert

AISI 4140 Cutting Resistance Comparison

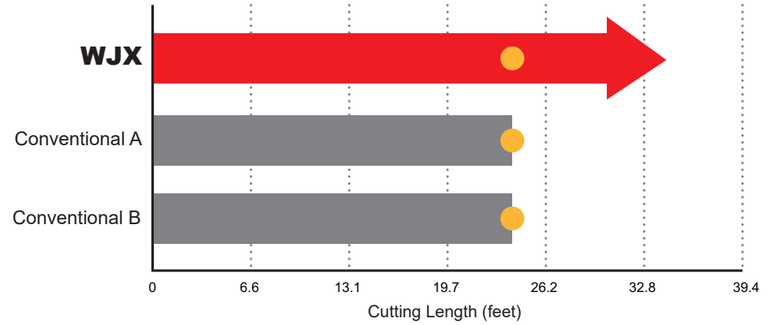
WJX reduces the spindle load for low cutting resistance.



<Cutting Conditions>
Material : AISI 4140
Cutter Dia. : DCX=ø2.48"
Inserts : JOMU140715ZZER-M
Grade : VP15TF
Cutting Speed : vc=490 SFM
Feed per Tooth : fz=.039 IPT
Depth of Cut : ap=.079"
Width of Cut : ae=1.772"
Cutting Mode : Dry Cutting
Single Insert

AISI 304 Wear Resistance Comparison

Excellent result in welding and wear resistance.



<Cutting Conditions>
Material : AISI 304
Cutter Dia. : DCX=ø2.48"
Inserts : JOMU140715ZZER-L
Grade : MP7130
Cutting Speed : vc=490 SFM
Feed per Tooth : fz=.024 IPT
Depth of Cut : ap=.059"
Width of Cut : ae=1.772"
Cutting Mode : Dry Cutting
Single Insert

WJX + L

Conventional A
Large Wear

Conventional B
Large Welding and Wear

AISI 4140 Fracture Resistance Comparison

Suitable for strong interrupted cutting due to high edge strength.

Testing under high load cutting conditions

(inch)

		Feed per Tooth **fz** (IPT)			
		.059	**.079**	**.098**	**.118**
Depth of Cut **ap**	**.059**	**OK**	**OK**	**OK**	**OK**
	.079	**OK**	**OK**	**OK**	**OK**

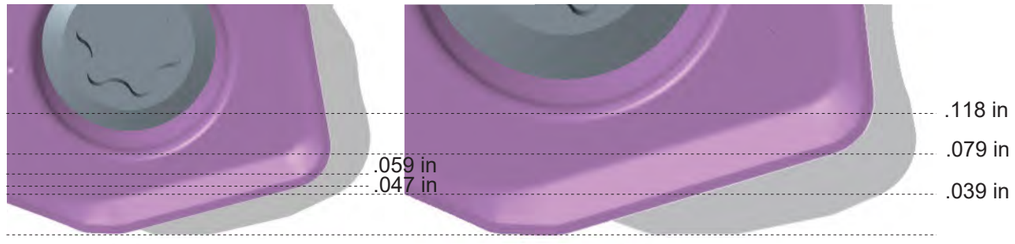
<Cutting Conditions>
Material : AISI 4140
Cutter Dia. : DCX=ø2.48"
Inserts : JOMU140715ZZER-R
Grade : VP15TF
Cutting Speed : vc=330 SFM
Width of Cut : ae=.787"
Cutting Mode : Dry Cutting
Center Cut Milling
Single Insert

Operational Guidance

Depth of Cut

Refer to the following table for the maximum depth of cut of the WJX.
The straight cutting edge extending to the maximum depth of cut (APMX) allows for stable machining even at high depths of cut.
For face milling, lowering the feed rate will allow to exceed the APMX, up to depths of cut shown in the following table (when using the corner R).
For details on the feed rate, refer to the recommended cutting conditions on pages 29 and 32-33.

	WJX09	WJX14
High feed and multi-function machining (APMX)	ap=.047"	ap=.079"
Low feed and Face machining	ap=.059"	ap=.118"

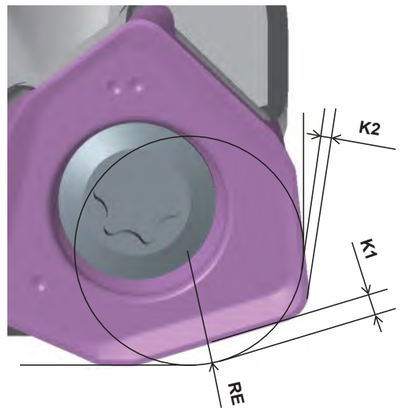


WJX09 Conventional Size 09

WJX14 Conventional Size 14

Remaining Stock

For CAM, use CAD data (from online catalogs), or use a definition as a radius milling cutter with reference to the following table.
The approximate radius RE, remaining stock K1, and over cutting amount K2 are as shown in the following table.



WJX09

RE	Remaining Stock K1	Over Cut K2
R.079 (Recommendation)	.037	.000
R.091	.034	.000
R.118	.028	.005

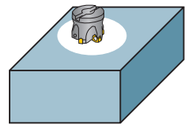
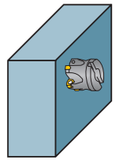
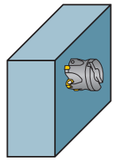
WJX14

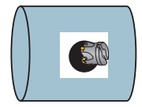
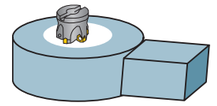
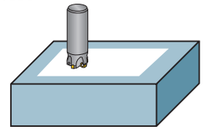
RE	Remaining Stock K1	Over Cut K2
R.118 (Recommendation)	.056	.000
R.126	.054	.000
R.157	.046	.004
R.197	.036	.015

(inch)

Depth of Cut ap	Remaining Stock H	
	WJX09	WJX14
.020	.001	–
.039	.003	.002
.059	–	.003
.079	–	.005

Application Examples

Holder	WJX14-063A05AR	WJX14-063A05AR	WJX14-063A04AR
Insert (Grade)	JOMU140715ZZER-M(VP15TF)	JOMU140715ZZER-M(MP6120)	JOMU140715ZZER-M(VP15TF)
Workpiece	Welded Structural Steel 	Tool Steel 	AISI H13 Mild Steel 
Component	Machined Parts	Machined Parts	Mold
Cutting Conditions: Cutting Speed **vc** (SFM)	590	395	590
Cutting Conditions: Feed per Tooth **fz** (IPT)	.039	.055	.063
Cutting Conditions: Depth of Cut (inch)	ap = .039, ae = 1.496	ap = .039, ae = 1.575	ap = .051 ae = 1.614
Cutting Mode	Wet Cutting, Helical Milling	Dry Cutting, Copy Milling	Dry Cutting, Contouring Milling
Results	Spinde load decreased by 10%. Cleaning has become easier because chip shape was suitable.	Cutting vibration was suppressed by WJX;therefore,it was able to increase feed rate, and also tool life has become 3 times.	Spindle load has decreased by about 30%, and also cutting efficiency has become double by WJX.

Holder	WJX14-063A05AR	WJX09-050A06AR	WJX09R2502SA25L
Insert (Grade)	JOMU140715ZZER-L(MP6130)	JOMU090512ZZER-M(MP6130)	JOMU090512ZZER-M(VP15TF)
Workpiece	Alloy Steel 	Tool Steel 	AISI 1050 
Component	Machined Parts	Machined Parts	Mold
Cutting Conditions: Cutting Speed **vc** (SFM)	620	985	640
Cutting Conditions: Feed per Tooth **fz** (IPT)	.055	.043	.014
Cutting Conditions: Depth of Cut (inch)	ap = .039	ap = .039, ae = 1.181	ap = .020, ae = .591
Cutting Mode	Wet Cutting, Helical Milling	Dry Cutting, Helical Milling	Dry Cutting, Pocket Milling
Results	WJX achieved 2 holes machining when conventional tool processed only one hole due to the tool life, and also WJX insert damage was smaller.	WJX cutting sound was better than conventional. Cutting efficiency has increased by 1.5 times due to both higher depth of cut and higher feed rate.	Cutting vibration at the pocket corner area was smaller than conventional; therefore, the spindle load reduced and the tool life improved.

The above application examples are customer's applications, so it can be different from the recommended conditions.

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FOR YOUR SAFETY

- Don't handle inserts and chips without gloves.
- Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage.
- Please use safety covers and wear safety glasses.
- When using compounded cutting oils, please take fire precautions.
- When attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

www.mmc-carbide.com/us

Tools specifications subject to change without notice.

B235A-US-2025.8