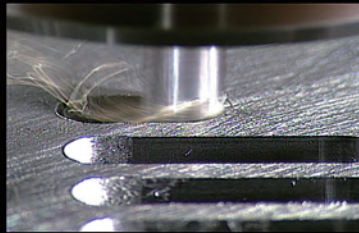
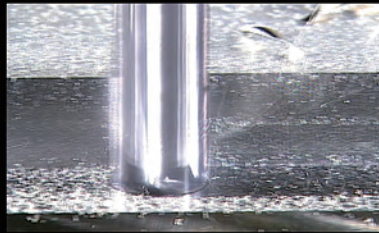
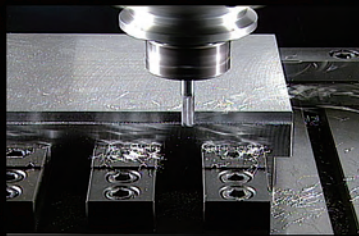
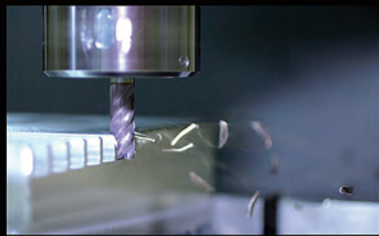
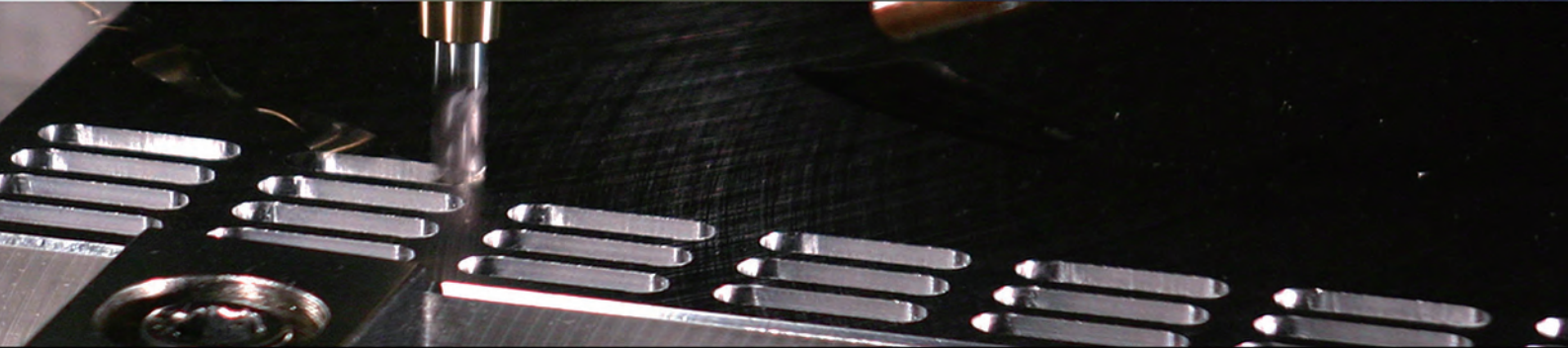
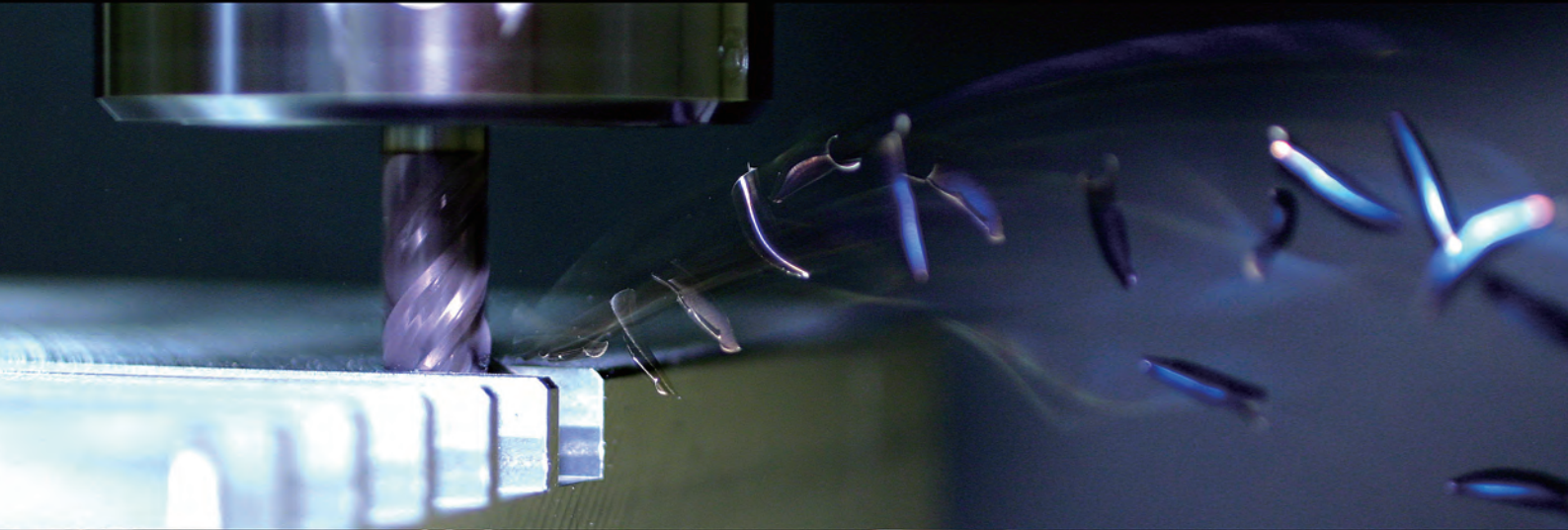


## ***MSTAR***

### high helix end mill series

**Possible to achieve high efficiency machining of a wide range of work materials, such as carbon and stainless steel and difficult to machine materials.**

By using a special flute geometry that enables high chip disposal, it is possible to achieve high performance machining.



# MSTAR high helix end mill series

**MSSH D MSMHD**  
**MSJHD MSMHDRB**  
**MSMHZD**

Realize high efficiency machining in Carbon steel, Stainless steel and difficult-to-cut materials.

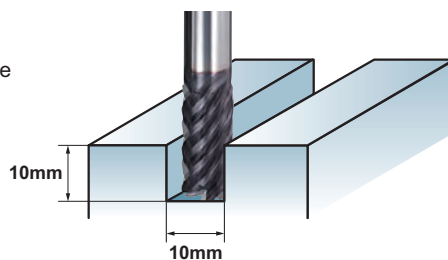
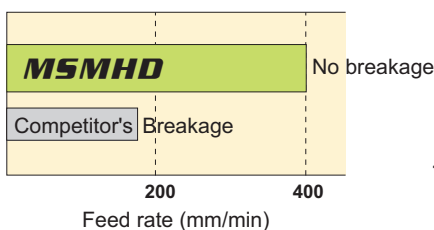
- A new flute geometry for slotting, with excellent chip disposability.
- For high efficiency slotting and conventional milling.
- 3 flute end mill series that can be used for non-step vertical feed and slotting.

4 flute	<p><b>Flute shape</b></p> <p>Special flute geometry for improved chip disposal.</p> <p>Conventional geometry      <b>MSTAR</b> high power end mill</p>	<p><b>Close up of the flute geometry</b></p> <p>Poor chip disposal      Chips are guided by the bump to improve chip disposal</p> <p>Conventional geometry      <b>MSTAR</b> high power end mill</p>
	<p><b>Flute shape</b></p> <p>High rigidity and smooth chip flow is realized.</p> <p>A chip flow is smooth      High rigidity      Big care dia</p> <p>Wide relief width      High rigidity</p> <p><b>MSMHZD</b>      Conventional</p>	<p><b>Gash geometry</b></p> <p>Smooth chip flow due to big chip pocket at plunging.</p> <p>Big chip pocket</p> <p><b>MSMHZD</b>      Conventional</p>

## Machining Example 1

### Slotting

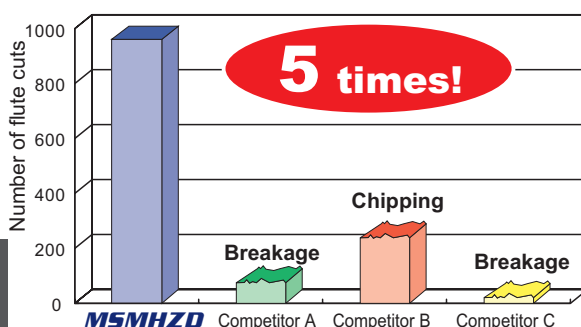
Newly designed geometry for excellent chip disposability during slotting.



End mill	MSMHD $\phi 10$
Work material	Stainless steel (SUS304)
Revolution	1,600min <sup>-1</sup> (50m/min)
Feed rate	50–400mm/min
Cutting method	Slotting, Air blow

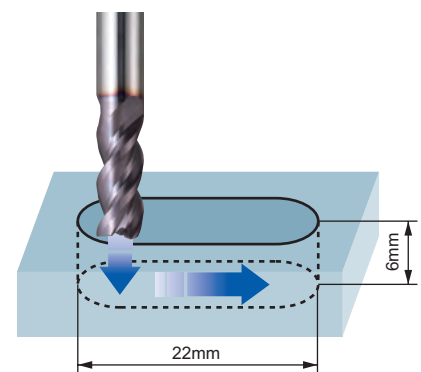
## Machining Example 2

### Slotting



#### Cutting conditions

End mill	MSMHZD $\phi 6$
Work material	S55C
Revolution	4,800min <sup>-1</sup>
Feed rate	Plunging 300mm/min Slotting 720mm/min
Cutting method	Air blow



# MSTAR END MILL

## MSSHDD NEW

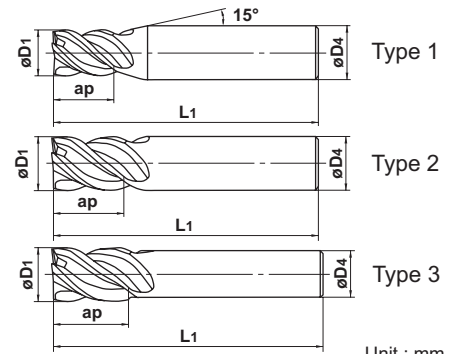
High power, Short cut length, 4 flute



D1 ≤ 12 0 - -0.02  
12 < D1 0 - -0.03



● High rigidity short cut length type which adopted a new flute geometry and high helix.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSSHDD0300	3	4.5	45	6	4	●	1
D0350	3.5	5.3	45	6	4	●	1
D0400	4	6	45	6	4	●	1
D0450	4.5	6.8	45	6	4	●	1
D0500	5	7.5	50	6	4	●	1
D0550	5.5	8.3	50	6	4	●	1
D0600	6	9	50	6	4	●	2
D0650	6.5	9.8	60	8	4	●	1
D0700	7	10.5	60	8	4	●	1
D0750	7.5	11.3	60	8	4	●	1
D0800	8	12	60	8	4	●	2
D0850	8.5	12.8	70	10	4	●	1
D0900	9	13.5	70	10	4	●	1
D0950	9.5	14.3	70	10	4	●	1
D1000	10	15	70	10	4	●	2
D1100	11	16.5	75	12	4	●	1
D1200	12	18	75	12	4	●	2
D1300	13	19.5	75	12	4	●	3
D1400	14	21	90	16	4	●	1
D1500	15	22.5	90	16	4	●	1
D1600	16	24	90	16	4	●	2
D1700	17	25.5	100	16	4	●	3
D1800	18	27	100	16	4	●	3
D1900	19	28.5	110	20	4	●	1
D2000	20	30	110	20	4	●	2

● : Inventory maintained.

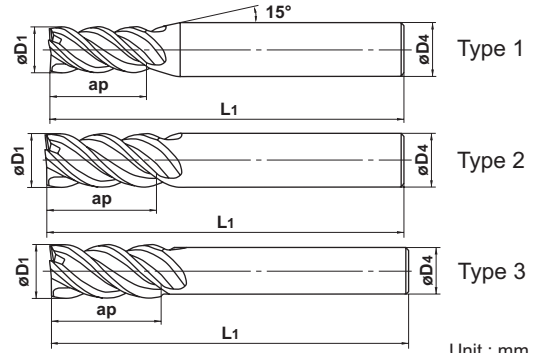
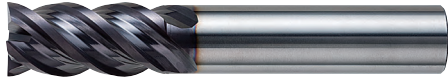
# MSTAR END MILL

## MSMHD

High power, Medium cut length, 4 flute



D1 ≤ 12 0 - -0.02  
12 < D1 0 - -0.03



Unit : mm

● A new flute geometry and high helix allows heavy cutting in shoulder milling and slotting.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSMHDD0200	2	4	45	4	4	●	1
D0210	2.1	5	45	4	4	●	1
D0220	2.2	5	45	4	4	●	1
D0230	2.3	5	45	4	4	●	1
D0240	2.4	5	45	4	4	●	1
D0250	2.5	5	45	4	4	●	1
D0260	2.6	6	45	4	4	●	1
D0270	2.7	6	45	4	4	●	1
D0280	2.8	6	45	4	4	●	1
D0290	2.9	6	45	4	4	●	1
D0300	3	8	45	6	4	●	1
D0310	3.1	8	45	6	4	●	1
D0320	3.2	8	45	6	4	●	1
D0330	3.3	8	45	6	4	●	1
D0340	3.4	8	45	6	4	●	1
D0350	3.5	8	45	6	4	●	1
D0360	3.6	11	45	6	4	●	1
D0370	3.7	11	45	6	4	●	1
D0380	3.8	11	45	6	4	●	1
D0390	3.9	11	45	6	4	●	1
D0400	4	11	45	6	4	●	1
D0410	4.1	12	45	6	4	●	1
D0420	4.2	12	45	6	4	●	1
D0430	4.3	12	45	6	4	●	1
D0440	4.4	12	45	6	4	●	1
D0450	4.5	12	45	6	4	●	1
D0460	4.6	13	50	6	4	●	1
D0470	4.7	13	50	6	4	●	1
D0480	4.8	13	50	6	4	●	1
D0490	4.9	13	50	6	4	●	1
D0500	5	13	50	6	4	●	1
D0510	5.1	13	50	6	4	●	1
D0520	5.2	13	50	6	4	●	1
D0530	5.3	13	50	6	4	●	1
D0540	5.4	13	50	6	4	●	1
D0550	5.5	13	50	6	4	●	1
D0560	5.6	13	50	6	4	●	1
D0570	5.7	13	50	6	4	●	1

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	
<b>MSMHDD0580</b>	5.8	13	50	6	4	●	1	
<b>D0590</b>	5.9	13	50	6	4	●	1	
<b>D0600</b>	6	13	50	6	4	●	2	
<b>D0650</b>	6.5	16	60	8	4	●	1	
<b>D0700</b>	7	19	60	8	4	●	1	
<b>D0750</b>	7.5	19	60	8	4	●	1	
<b>D0800</b>	8	19	60	8	4	●	2	
<b>D0850</b>	8.5	19	70	10	4	●	1	
<b>D0900</b>	9	22	70	10	4	●	1	
<b>D0950</b>	9.5	22	70	10	4	●	1	
<b>D1000</b>	10	22	70	10	4	●	2	
<b>D1100</b>	11	26	75	12	4	●	1	
<b>D1200S10</b>	12	26	75	10	4	●	3	
<b>D1200</b>	12	26	75	12	4	●	2	
<b>D1300</b>	13	26	75	12	4	●	3	
<b>D1400</b>	14	30	90	16	4	●	1	
<b>D1500</b>	15	35	90	16	4	●	1	
<b>D1600</b>	16	35	90	16	4	●	2	
<b>D1700</b>	17	35	100	16	4	●	3	
<b>D1800</b>	18	40	100	16	4	●	3	
<b>D1900</b>	19	40	110	20	4	●	1	
<b>D2000</b>	20	45	110	20	4	●	2	
<b>D2200</b>	22	50	125	20	4	●	3	
<b>D2500</b>	25	55	125	25	4	●	2	

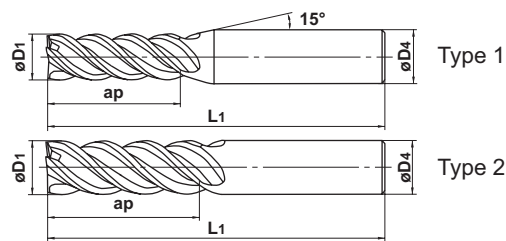
# MSTAR END MILL

## MSJHD NEW

High power, Semi long cut length, 4 flute



D1 ≤ 12 0 - -0.02  
12 < D1 0 - -0.03



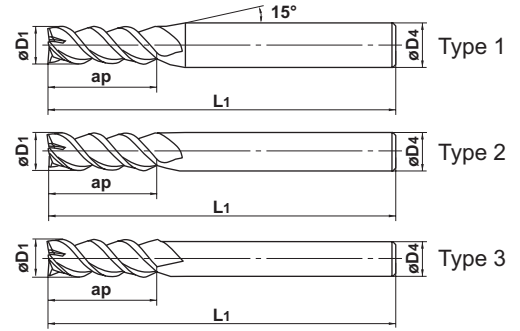
- Semi long cut length suitable for deep wall machining and adopted a new flute geometry and high helix.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSJHDD0200	2	8	60	6	4	●	1
D0250	2.5	10	60	6	4	●	1
D0300	3	12	60	6	4	●	1
D0350	3.5	14	60	6	4	●	1
D0400	4	16	60	6	4	●	1
D0450	4.5	18	60	6	4	●	1
D0500	5	20	60	6	4	●	1
D0600	6	24	60	6	4	●	2
D0700	7	25	80	8	4	●	1
D0800	8	28	80	8	4	●	2
D0900	9	32	90	10	4	●	1
D1000	10	35	90	10	4	●	2
D1100	11	35	100	12	4	●	1
D1200	12	36	100	12	4	●	2
D1400	14	42	110	16	4	●	1
D1500	15	45	110	16	4	●	1
D1600	16	48	125	16	4	●	2
D2000	20	55	140	20	4	●	2



● The single end mill for both plunging and slotting.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
* MSMHZDD0100	1	2	45	4	3	●	1
* D0150	1.5	3	45	4	3	●	1
D0200	2	4	50	6	3	●	1
D0250	2.5	5	50	6	3	●	1
D0300	3	6	50	6	3	●	1
D0350	3.5	8	50	6	3	●	1
D0400	4	8	50	6	3	●	1
D0450	4.5	10	50	6	3	●	1
D0500	5	10	50	6	3	●	1
D0550	5.5	13	50	6	3	●	1
D0600	6	13	60	6	3	●	2
D0650	6.5	16	60	8	3	●	1
D0700	7	16	60	8	3	●	1
D0750	7.5	16	60	8	3	●	1
D0800	8	19	70	8	3	●	2
D0850	8.5	19	70	10	3	●	1
D0900	9	19	70	10	3	●	1
D0950	9.5	19	70	10	3	●	1
D1000	10	22	80	10	3	●	2
D1100	11	22	80	12	3	●	1
D1200	12	26	90	12	3	●	2
D1300	13	26	90	12	3	●	3
D1400	14	26	90	12	3	●	3
D1500	15	26	110	16	3	●	1
D1600	16	30	110	16	3	●	2
D2000	20	32	140	20	3	●	2

\* Expansion

# MSTAR END MILL

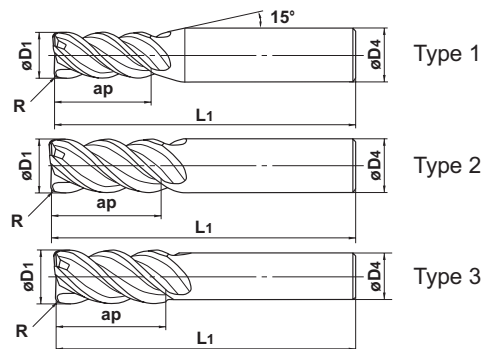
## MSMHDRB



Corner radius end mill, High power, Medium cut length, 4 flute



$D_1 \leq 12$  0 - -0.02  
 $12 < D_1$  0 - -0.03



Unit : mm

● Radius end mill which adopted a new flute geometry and high helix.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type
MSMHDRBD0200R020	2	4	45	4	0.2	4	●	1
D0200R030	2	4	45	4	0.3	4	●	1
D0300R020	3	8	45	6	0.2	4	●	1
D0300R030	3	8	45	6	0.3	4	●	1
D0300R050	3	8	45	6	0.5	4	●	1
D0400R020	4	11	45	6	0.2	4	●	1
D0400R030	4	11	45	6	0.3	4	●	1
D0400R050	4	11	45	6	0.5	4	●	1
D0500R020	5	13	50	6	0.2	4	●	1
D0500R030	5	13	50	6	0.3	4	●	1
D0500R050	5	13	50	6	0.5	4	●	1
D0500R100	5	13	50	6	1	4	●	1
D0600R030	6	13	50	6	0.3	4	●	2
D0600R050	6	13	50	6	0.5	4	●	2
D0600R100	6	13	50	6	1	4	●	2
D0800R030	8	19	60	8	0.3	4	●	2
D0800R050	8	19	60	8	0.5	4	●	2
D0800R100	8	19	60	8	1	4	●	2
D0800R150	8	19	60	8	1.5	4	●	2
D1000R030	10	22	70	10	0.3	4	●	2
D1000R050	10	22	70	10	0.5	4	●	2
D1000R100	10	22	70	10	1	4	●	2
D1000R150	10	22	70	10	1.5	4	●	2
D1000R200	10	22	70	10	2	4	●	2
D1200R050S10	12	26	75	10	0.5	4	●	3
D1200R100S10	12	26	75	10	1	4	●	3
D1200R150S10	12	26	75	10	1.5	4	●	3
D1200R200S10	12	26	75	10	2	4	●	3
D1200R300S10	12	26	75	10	3	4	●	3
D1200R050	12	26	75	12	0.5	4	●	2
D1200R100	12	26	75	12	1	4	●	2
D1200R150	12	26	75	12	1.5	4	●	2
D1200R200	12	26	75	12	2	4	●	2
D1200R300	12	26	75	12	3	4	●	2
D1600R100	16	35	90	16	1	4	●	2
D1600R150	16	35	90	16	1.5	4	●	2
D1600R200	16	35	90	16	2	4	●	2
D1600R300	16	35	90	16	3	4	●	2



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type	
<b>MSMHDRBD1800R100</b>	18	40	100	16	1	4	●	3	
<b>D1800R150</b>	18	40	100	16	1.5	4	●	3	
<b>D1800R200</b>	18	40	100	16	2	4	●	3	
<b>D1800R300</b>	18	40	100	16	3	4	●	3	
<b>D2000R100</b>	20	45	110	20	1	4	●	2	
<b>D2000R150</b>	20	45	110	20	1.5	4	●	2	
<b>D2000R200</b>	20	45	110	20	2	4	●	2	
<b>D2000R300</b>	20	45	110	20	3	4	●	2	

# MSTAR END MILL

## MSSH D

High power, Short cut length, 4 flute

## MSMHD

High power, Medium cut length, 4 flute

### Side milling

Work material	Carbon steel, Alloy steel (-30HRC) Structural steel, AISI 1049, SCM, Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )
<b>2</b>	15,000	550	10,000	340	10,000	320	6,400	160
<b>3</b>	11,000	800	7,400	500	7,400	480	4,800	250
<b>4</b>	8,000	900	5,600	540	5,600	520	3,600	270
<b>5</b>	6,400	1,000	4,500	600	4,500	580	2,900	300
<b>6</b>	5,800	1,100	3,700	640	3,700	600	2,400	320
<b>8</b>	4,400	1,100	2,800	660	2,800	600	1,800	330
<b>10</b>	3,500	1,000	2,200	640	2,200	560	1,400	320
<b>12</b>	2,900	1,000	1,900	640	1,900	530	1,200	320
<b>16</b>	2,200	800	1,400	500	1,400	450	900	250
<b>20</b>	1,800	750	1,100	460	1,100	440	720	230
<b>25</b>	1,400	600	900	400	900	380	570	200

0.2D  
1.5D

0.1D  
1.5D

0.05D  
1.5D

D: Dia.

### Slotting

Work material	Carbon steel, Alloy steel (-30HRC) Structural steel, AISI 1049, SCM, Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )
<b>2</b>	12,000	400	7,000	200	7,000	100	4,200	80
<b>3</b>	9,000	600	5,300	300	5,300	150	3,200	130
<b>4</b>	7,200	720	4,000	360	4,000	180	2,400	140
<b>5</b>	5,800	720	3,200	360	3,200	180	1,900	150
<b>6</b>	5,000	800	2,700	400	2,700	200	1,600	160
<b>8</b>	3,700	800	2,000	400	2,000	200	1,200	170
<b>10</b>	3,000	720	1,600	360	1,600	180	960	160
<b>12</b>	2,500	720	1,300	360	1,300	180	800	160
<b>16</b>	2,000	600	1,000	280	1,000	150	600	130
<b>20</b>	1,600	540	800	250	800	130	480	120
<b>25</b>	1,300	480	640	220	640	120	380	100

1D  
1D (MAX. 12mm)

1D  
0.5D

1D  
0.2D

D: Dia.

- 1) When cutting austenitic steels, the use of water-soluble fluid is recommended.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) If the rigidity of the machine or the work material installation is very low, or chattering is generated, please reduce the revolution and feed rate proportionately, or set a smaller depth of cut.
- 4) For side milling, climb cutting is recommended.

## MSJHD

High power, Semi long cut length, 4 flute

### Side milling

Work material	Carbon steel, Alloy steel (-30HRC) Structural steel, AISI 1049, SCM, Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )
<b>2</b>	11,000	370	7,000	230	7,000	210	5,000	100
<b>3</b>	8,000	550	5,100	320	5,100	300	3,800	190
<b>4</b>	6,200	620	4,000	350	4,000	340	3,000	210
<b>5</b>	5,000	670	3,200	370	3,200	360	2,400	220
<b>6</b>	4,200	750	2,600	400	2,600	390	2,000	220
<b>8</b>	3,200	780	2,000	420	2,000	400	1,500	230
<b>10</b>	2,500	690	1,600	410	1,600	380	1,200	210
<b>12</b>	2,100	670	1,300	380	1,300	340	1,000	190
<b>16</b>	1,600	570	1,000	320	1,000	280	750	170
<b>20</b>	1,200	470	800	290	800	260	600	150

0.05D  
2.5D

0.02D  
2.5D

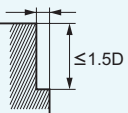
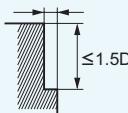
D: Dia.

- 1) When cutting austenitic stainless steels and wear resistant alloys, the use of non-water-soluble cutting fluid is especially effective.
- 2) If the rigidity of the machine or the work piece installation is very low, or chattering and noise are generated, please reduce the revolution, and feed rate proportionately.  
In addition, if the work pieces have bad surface finish, there is a possibility that chattering and noise are generated.
- 3) Climb cutting is recommended.

### Side milling

Work material	Carbon steel, Alloy steel (-30HRC) AISI 1049, SCM, SS		Hardened steel (30-45HRC) AISI H13		Stainless steel AISI 304, AISI316 Titanium alloy	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )
<b>1</b>	19,000	600	13,000	310	10,000	200
<b>1.5</b>	14,000	600	9,000	310	7,500	210
<b>2</b>	11,000	600	7,200	310	6,000	210
<b>3</b>	8,500	770	5,300	380	4,400	220
<b>4</b>	7,200	850	4,400	480	3,700	250
<b>6</b>	5,300	940	3,200	490	2,700	270
<b>8</b>	4,000	1,010	2,400	560	2,000	280
<b>10</b>	3,200	1,000	1,900	480	1,600	300
<b>12</b>	2,700	950	1,600	440	1,300	300
<b>16</b>	2,000	720	1,200	350	1,000	260
<b>20</b>	1,600	600	1,000	290	800	240

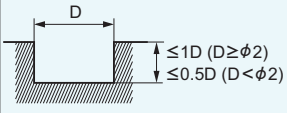
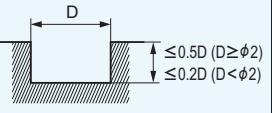
Depth of cut	$\leq 0.2D (D > \phi 3)$ $\leq 0.1D (D \leq \phi 3)$		$\leq 0.2D (D > \phi 3)$ $\leq 0.1D (D \leq \phi 3)$	
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D:Dia.

### Slotting

Work material	Carbon steel, Alloy steel (-30HRC) AISI 1049, SCM, SS		Hardened steel (30-45HRC) AISI H13		Stainless steel AISI 304, AISI316 Titanium alloy	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )
<b>1</b>	13,000	130	10,000	80	6,000	30
<b>1.5</b>	12,000	250	8,000	150	6,000	60
<b>2</b>	11,000	500	7,200	260	6,000	130
<b>3</b>	8,500	640	5,300	320	4,200	130
<b>4</b>	7,200	650	4,400	370	3,300	140
<b>6</b>	5,300	720	3,200	380	2,200	140
<b>8</b>	4,000	780	2,400	430	1,600	140
<b>10</b>	3,200	770	1,900	370	1,300	150
<b>12</b>	2,700	730	1,600	340	1,100	150
<b>16</b>	2,000	600	1,200	290	800	130
<b>20</b>	1,600	500	1,000	240	640	120

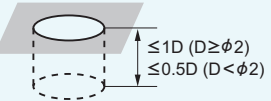
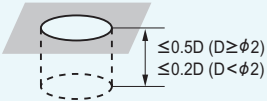
Depth of cut	$\leq 1D (D \geq \phi 2)$ $\leq 0.5D (D < \phi 2)$		$\leq 0.5D (D \geq \phi 2)$ $\leq 0.2D (D < \phi 2)$	
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D:Dia.

### Plunging

Work material	Carbon steel, Alloy steel (-30HRC) AISI 1049, SCM, SS		Hardened steel (30-45HRC) AISI H13		Stainless steel AISI 304, AISI316 Titanium alloy	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )
<b>1</b>	13,000	80	10,000	50	6,000	10
<b>1.5</b>	12,000	120	8,000	80	6,000	20
<b>2</b>	11,000	200	7,200	140	6,000	30
<b>3</b>	8,500	250	5,300	180	4,200	50
<b>4</b>	7,200	300	4,400	210	3,300	60
<b>6</b>	5,300	300	3,200	210	2,200	70
<b>8</b>	4,000	320	2,400	220	1,600	80
<b>10</b>	3,200	340	1,900	240	1,300	70
<b>12</b>	2,700	320	1,600	220	1,100	70
<b>16</b>	2,000	250	1,200	180	800	55
<b>20</b>	1,600	200	1,000	140	640	55

Depth of cut	$\leq 1D (D \geq \phi 2)$ $\leq 0.5D (D < \phi 2)$		$\leq 0.5D (D \geq \phi 2)$ $\leq 0.2D (D < \phi 2)$	
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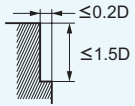
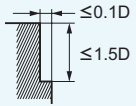
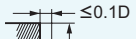
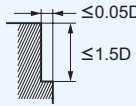
D:Dia.

- 1) The above table shows for standard milling.
- 2) In slotting, plunging, cutting stainless steels, please use water-soluble cutting fluid.
- 3) We recommend the use of coolant e.g. emulsion or water soluble in slotting, plunging and cutting stainless steels.

### Side milling

Work material	Carbon steel, Alloy steel (-30HRC) Structural steel, AISI 1049, SCM, Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )
2	15,000	550	10,000	340	10,000	320	6,400	160
3	11,000	800	7,400	500	7,400	480	4,800	250
4	8,000	900	5,600	540	5,600	520	3,600	270
5	6,400	1,000	4,500	600	4,500	580	2,900	300
6	5,900	1,100	3,700	640	3,700	600	2,400	320
8	4,400	1,100	2,800	660	2,800	600	1,800	330
10	3,500	1,000	2,300	640	2,300	560	1,400	320
12	2,900	1,000	1,900	640	1,900	530	1,200	320
16	2,200	800	1,400	500	1,400	450	900	250
18	2,000	800	1,250	480	1,250	450	800	240
20	1,800	750	1,100	460	1,100	440	720	230

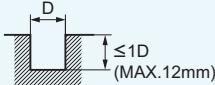
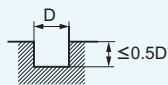
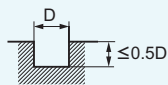
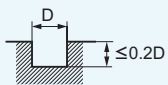
Depth of cut	Carbon steel, Alloy steel (-30HRC) Structural steel, AISI 1049, SCM, Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
								

D:Dia.

### Slotting

Work material	Carbon steel, Alloy steel (-30HRC) Structural steel, AISI 1049, SCM, Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
	Dia. (mm)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )	Feed rate (mm/min)	Revolution (min <sup>-1</sup> )
2	12,000	400	7,000	200	7,000	100	4,200	80
3	9,000	600	5,300	300	5,300	150	3,200	130
4	7,200	720	4,000	360	4,000	180	2,400	140
5	5,800	720	3,200	360	3,200	180	1,900	150
6	5,000	800	2,700	400	2,700	200	1,600	160
8	3,700	800	2,000	400	2,000	200	1,200	170
10	3,000	720	1,600	360	1,600	180	960	160
12	2,500	600	1,300	290	1,300	150	800	140
16	2,000	480	1,000	230	1,000	120	600	110
18	1,800	460	900	210	900	110	550	110
20	1,600	430	800	200	800	100	480	100

Depth of cut	Carbon steel, Alloy steel (-30HRC) Structural steel, AISI 1049, SCM, Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
								

D:Dia.

- 1) When cutting austenitic stainless steels and wear resistant alloys, the use of non-water-soluble cutting fluid is especially effective.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) If the rigidity of the machine or the work material installation is very low, or chattering is generated, please reduce the revolution and feed rate proportionately, or set a smaller depth of cut.
- 4) For side milling, climb cutting is recommended.



JQA-2522  
JQA-EM0941

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