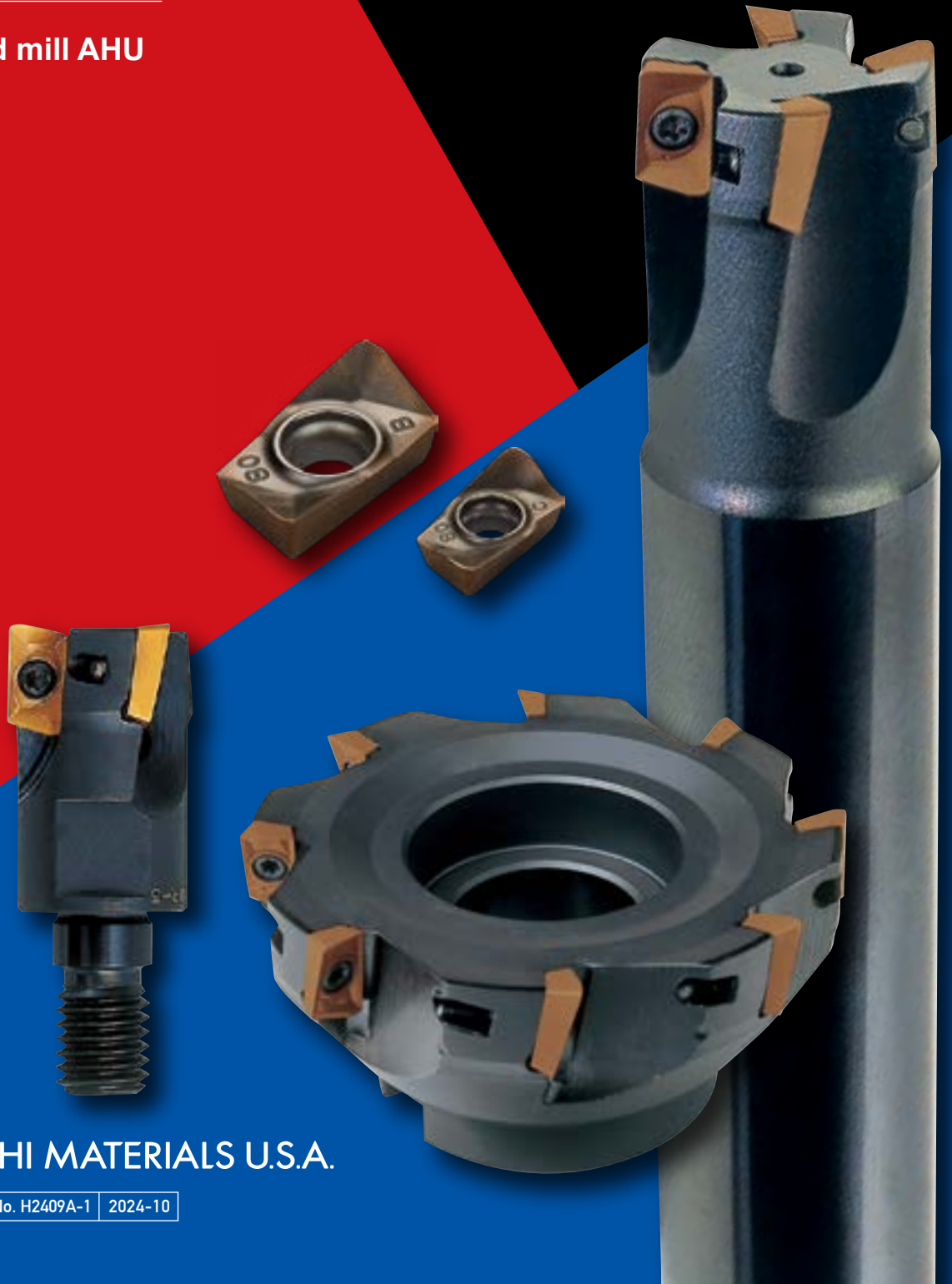


NEW

AHU

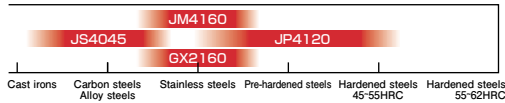
High Feed end mill AHU



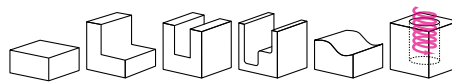
 **MITSUBISHI MATERIALS U.S.A.**

New Product News | No. H2409A-1 | 2024-10

Technology



Applications



Features and Applications

- AHU has the outstanding sharpness and toughness.
- Evolved into the multi-function tool in which a ramping operation is possible.
- Enlarging the range of applications. Especially, AHU is suitable for turbine-blade machining.

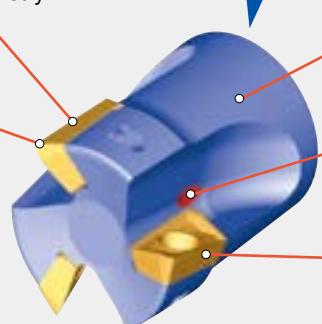
It is lineup about two series by cutting edge length.

- AHU(L)10 type** Multi-flute type for low depth of cut.
- AHU(L)15 type** High rigidity type for high depth of cut.

Cutting force is reduced by high rake geometry.

Ramping operation is possible.

Cutting Dia.
=Shank dia. +1mm(.039") type is standardized.



30% increased rigidity compared with conventional by Using Proprietary steel and chip pocket geometry.

Coolant through is available.

Increasing tool life and suitable for high speed cutting by new substrate and coating.

Repertory
AHUL1021R-3
AHUL1026R-3

Recommended grades map

Insert cross-section	Low cutting force edge shape → Tough cutting edge shape				
	Sharp edge	Positive land (Large rake)	Positive land (Small rake)	General purpose	Tough cutting edge
	FA type	B5/B7 type	C5/C7 type	FW type, FF type, Conventional	TFW type
Application	Aluminum use	Stainless steel materials Titanium alloy, Nickel-based alloy	Stainless steel materials Nickel-based alloy	General Breaker	Forged surface cutting; Strong intermittent cutting
Mild steels, Carbon steels Alloy steels, Die steels	—	—	JP4120	JS4045 JS4060	JS4060
Pre-hardened steels (30~40HRC)	—	—	—	JP4120	JP4120
Stainless steels	—	JM4160(Wet) JP4120(Semi finishing)	GX2160(Dry)	JM4160(PTH30E)	JM4160
Cast irons	—	—	—	PTH13S(JP4120)	—
Aluminum alloys	WH10 SD5010	—	—	HD7010 (Cast aluminum alloy material)	—
Titanium alloys	—	JP4120	—	PTH30E	—
Nickel-based alloys	—	(JM4160) (ST treatment)	JP4120 (AG treatment)	—	—

New inserts are added for difficult-to-cut materials. Newly appear two kind of breakers



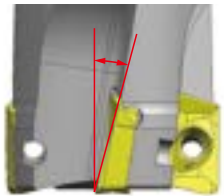
B5/B7 type breaker High-rake low-cutting force breaker

For Machining Stainless Steels, Titanium Alloys and Nickel- Based Alloys.

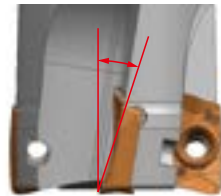
Features 1

- Achieves low cutting force by larger axial rake angle

Conventional Insert : 15 degrees



New breaker B/C type: 18 degrees



C5/C7 type breaker Mildly-raked low-cutting-force breaker

For machining of stainless steel materials and nickel-based alloys.

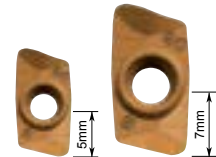
Features 2

- The cutting flute length is shortened to suppress chattering vibrations during slotting, etc.

10Type **APMX=5mm(.197")**

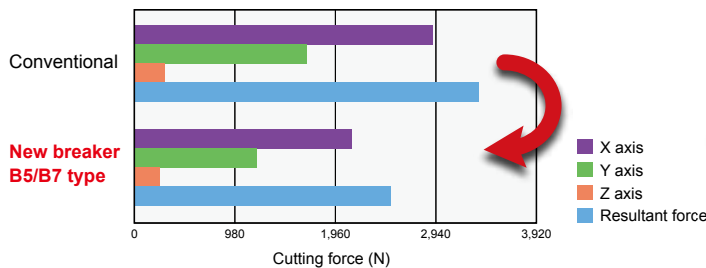
15Type **APMX=7mm(.276")**

For 10 type, APMX=5mm(.197").



When using B5/C5 or B7/C7 breakers, there are restrictions on APMX. Please Check Machining conditions Beforehand.

Comparison of cutting force



Cutting force is reduced by 25% compared to conventional breakers!

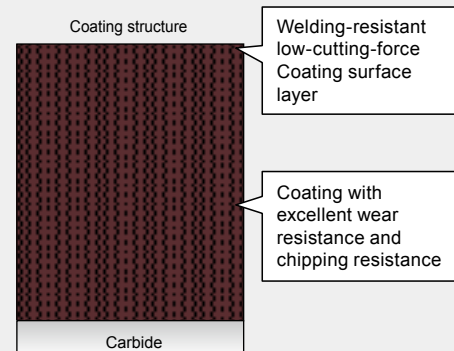
Features of AJ Coating series

- Employs an AlTiN layer with a new composition created by increasing the Al content of conventional layers.
- Excellent wear resistance, chipping resistance, and heat resistance!

New technology!!

- The new layer with high Al content employs a new composition and optimizes the structure to improve wear resistance and chipping resistance!
- Employs a low-friction-effect coating with excellent welding resistance as the top-most surface layer. This reduces welding to the work and decreases cutting force!

Layer structure AJ Coating



Technology

PVD Technology

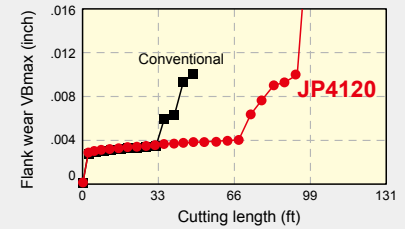
Grade for machining pre-hardened or hardened materials **JP4120**

Features

- Employs a fine carbide substrate with an excellent balance between wear resistance and toughness and the new "AJ Coating" to provide improved wear resistance and chipping resistance.
- Highly versatile with excellent wear resistance and chipping resistance when machining steel materials with hardnesses of 30 to 50 HRC.

Strengths

- Exhibits excellent cutting performance when machining pre-hardened or hardened steel with hardnesses of 30 to 50 HRC.
- Exhibits excellent wear resistance even on difficult-to-cut diecast tool steel or precipitation-hardened stainless steels, or for finishing.



Work material : P21(40HRC)
 Tool : AHU1532R-3, Insert : JDMT150508R
 Cutting conditions :
 $V_c=394$ SFM, $f_z=.006$ IPT
 $a_p \times a_e=.118" \times .394"$, Dry
 ※Single-flute cutting

PVD Technology

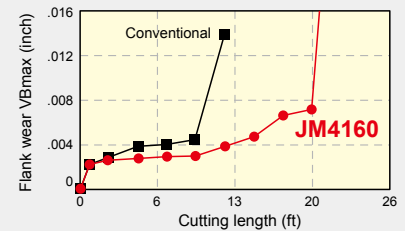
Grade for machining stainless-steel materials **JM4160**

Features

- Employs a carbide substrate with high toughness and the new "AJ Coating" to improve wear resistance and chipping resistance when machining stainless-steel materials.
- Employs AJ Coating with excellent Wear and Chipping Resistance to reduce the welding to work material that occurs when machining stainless steel materials.

Strengths

- Provides long tool life for general processing of stainless-steel materials



Work material : SUS630 (35HRC)
 Tool : AHU1532R-3, Insert : JDMT150508R
 Cutting conditions :
 $V_c=394$ SFM, $f_z=.005$ IPT
 $a_p \times a_e=.118" \times .197"$, Dry ※Single-flute cutting

PVD Technology

General purpose for steel **JS4045**

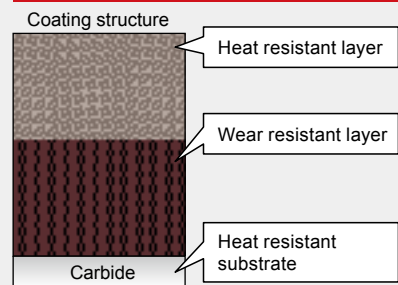
Features

- JS4045 adopts heat resistant layer, reduces the crater wear by high-speed cutting.
- JS4045 adopts heat resistant substrate, reduces wear and improves tool life.
- Improves tool life on dry cutting.

Strengths

- Continuous and light interrupted cutting of less than 35HRC dry cutting.

Layer structure **JS Coating**



CVD Technology

Grade for processing stainless-steel materials **GX2160**

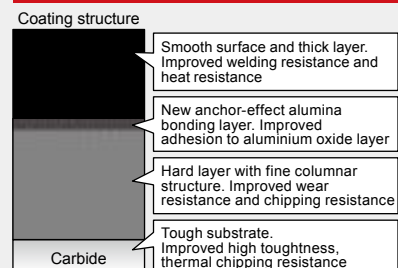
Features

- Increasing the fineness of the membrane's columnar structure improves wear resistance.

Strengths

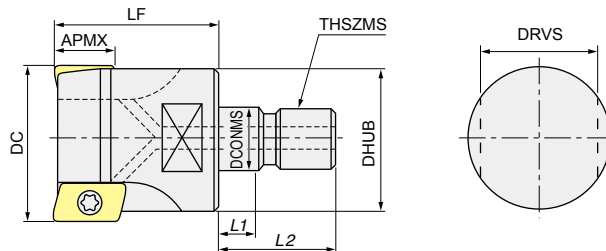
- Adopt CVD coating with excellent heat resistance improves wear resistance and provides long life when dry-cutting stainless steel materials.

Layer structure **GX Coating**



Line Up

Modular Type



Metric AHUM○○○○R-○ (-M○○)

Numeric figure in a circle ○

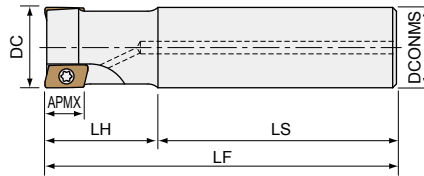
Item code	Stock	No. of flutes	Size(mm)									Inserts
			DC	LF	APMX	DCONMS	THSZMS	DHUB	L1	L2	DRVS	
AHUM1016R-2	★	2	16	25	9 (5)*	8.5	M8	12.8	5.5	17	10	JDMT1003○○R JDMT1003○○R-FW JDMT1003○○R-B5/C5* JDET1003○○R-FF JDET100304R-FA
※1 AHUM1018R-2	★	2	18	25		8.5	M8	14.5	5.5	17	10	
※1 AHUM1020R-2-M8	★	2	20	25		8.5	M8	14.5	5.5	17	10	
AHUM1020R-3	★	3	20	30		10.5	M10	17.8	5.5	19	15	
※1 AHUM1022R-3	★	3	22	30		10.5	M10	17.8	5.5	19	15	
※1 AHUM1025R-2-M10	★	2	25	30		10.5	M10	17.8	5.5	19	15	
AHUM1025R-4	★	4	25	35		12.5	M12	20.8	5.5	22	17	
※1 AHUM1028R-4	★	4	28	35		12.5	M12	23	5.5	22	17	
※1 AHUM1030R-2-M12	★	2	30	35		12.5	M12	23	5.5	22	17	
AHUM1030R-5	★	5	30	40		17	M16	28.8	6	23	22	
AHUM1032R-5	★	5	32	40		17	M16	28.8	6	23	22	
※1 AHUM1035R-2	★	2	35	40		17	M16	28.8	6	23	22	
※1 AHUM1035R-5	★	5	35	40		17	M16	28.8	6	23	22	
※1 AHUM1040R-6	★	6	40	40		17	M16	28.8	6	23	22	
AHUM1525R-2	●	2	25	35	14 (7)*	12.5	M12	20.8	5.5	22	17	JDMT1505○○R JDMT1505○○R-FW JDMT150508R-TFW JDMT1505○○R-B7/C7* JDET1505○○R-FF JDET1505○○R-FA
※1 AHUM1528R-2	★	2	28	35		12.5	M12	23	5.5	22	17	
※1 AHUM1528R-3	★	3	28	35		12.5	M12	23	5.5	22	17	
※1 AHUM1530R-2-M12	★	2	30	35		12.5	M12	23	5.5	22	17	
AHUM1530R-3	★	3	30	40		17	M16	28.8	6	23	22	
AHUM1532R-3	●	3	32	40		17	M16	28.8	6	23	22	

【Note】

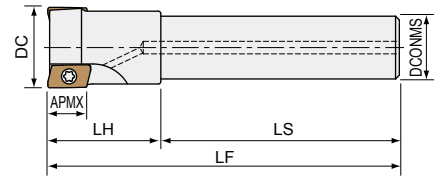
- ①※ The APMX in the case of using JDMT1003○○R-B5/C5, JDMT1505○○R-B7/C7 is a value shown in ().
- ②Slotting by AHUM○○○○R-○-M○○ has a possibility that a tool may be damaged. Please adjust a cutting condition with reference to the diagram of P15.
- ③Please refer to the D4 table for the combination of modular mill and carbide shank.
- ④Do not apply lubricants such as grease, etc. to the "contact faces" and "modular screws" of the "modular mill", "dedicated shanks" and "dedicated arbor".
- ⑤When※1 and carbide shank are used together as a set, there is no interference.

Line Up

Shank type



A type
(Standard type)



B type
(Undercut type)

Inch IAHU1516R-2

Item code	Stock	No. of flutes	Size(inch)						Shape	Inserts
			DC	LF	APMX	LH	LS	DCONMS		
IAHU1516R-2	●	2	1.000	4.000	.551	1.500	2.500	1.000	A	JDMT1505...

Metric AHU(L)○○○○R-○

Numeric figure in a circle○.

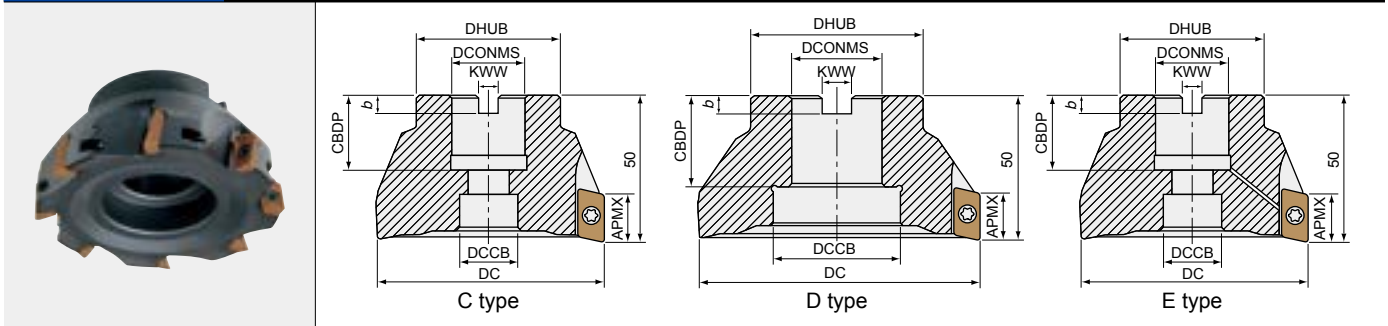
	Item code	Stock	No. of flutes	Size(mm)						Shape	Inserts	
				DC	LF	APMX	LH	LS	DCONMS			
Regular shank type	AHU1016R-2	★	2	16	100	9 (5)*	30	70	16	A	JDMT1003○○R	
	AHU1020R-3	★	3	20	110		30	80	20	A	JDMT1003○○R-FW	
	AHU1025R-4	★	4	25	120		35	85	25	A	JDMT1003○○R-B5/C5*	
	AHU1030R-5	★	5	30	120		45	75	32	A	JDET1003○○R-FF	
	AHU1032R-5	★	5	32	130		45	85	32	A	JDET100304R-FA	
	AHU1525R-2	●	2	25	125	14 (7)*	40	85	25	A	JDMT1505○○R	
	AHU1530R-2	★	2	30	130		45	85	25	B	JDMT1505○○R-FW	
	AHU1532R-3	●	3	32	140		45	95	32	A	JDMT1505○○R-FW	
	AHU1535R-3	★	3	35	140		45	95	32	B	JDMT150508R-TFW	
	AHU1540R-2	●	2	40	140		45	95	32	B	JDMT1505○○R-B7/C7*	
	AHU1540R-3	★	3	40	140		45	95	32	B	JDMT1505○○R-B7/C7*	
	AHU1540R-4	★	4	40	140		45	95	32	B	JDET1505○○R-FF	
	AHU1550R-3	★	3	50	140		45	95	32	B	JDET1505○○R-FA	
AHU1550R-5	★	5	50	140	45		95	32	B	JDET1505○○R-FA		
Long shank type	AHUL1016R-2	★	2	16	150		9 (5)*	50	100	16	A	JDMT1003○○R
	AHUL1020R-2	★	2	20	160	60		100	20	A		
	AHUL1020R-3	★	3	20	160	60		100	20	A		
	AHUL1021R-3	★	3	21	160	30		130	20	B		
	AHUL1025R-2	★	2	25	180	75		105	25	A	JDMT1003○○R-FW	
	AHUL1025R-3	★	3	25	180	75		105	25	A	JDMT1003○○R-B5/C5*	
	AHUL1026R-3	★	3	26	180	35		145	25	B	JDMT1003○○R-B5/C5*	
	AHUL1030R-2	★	2	30	180	45		135	25	B	JDET1003○○R-FF	
	AHUL1030R-3	★	3	30	180	45		135	25	B	JDET100304R-FA	
	AHUL1032R-4	★	4	32	200	90		110	32	A	JDET100304R-FA	
	AHUL1035R-2	★	2	35	200	45	155	32	B			
	AHUL1035R-4	★	4	35	200	45	155	32	B			
	AHUL1525R-2	●	2	25	180	14 (7)*	75	105	25	A	JDMT1505○○R	
	AHUL1530R-2	★	2	30	180		45	135	25	B		JDMT1505○○R-FW
	AHUL1532R-3	●	3	32	200		90	110	32	A		JDMT1505○○R-FW
	AHUL1535R-2	★	2	35	200		45	155	32	B		JDMT150508R-TFW
	AHUL1535R-3	★	3	35	200		45	155	32	B		JDMT150508R-TFW
	AHUL1540R-2	★	2	40	220		45	175	32	B	JDMT1505○○R-B7/C7*	
	AHUL1540R-3	★	3	40	220		45	175	32	B	JDMT1505○○R-B7/C7*	
	AHUL1540R-4	★	4	40	220		45	175	32	B	JDET1505○○R-FF	
AHUL1540R-5	●	5	40	220	45		175	32	B	JDET1505○○R-FA		
AHUL1550R-4	★	4	50	220	45		175	42	B	JDET1505○○R-FA		

[Note] * The APMX in the case of using JDMT1003○○R-B5/C5, JDMT1505○○R-B7/C7 is a value shown in ().

●:Inventory maintained in US ★:Inventory maintained in Japan

Bore type

Numeric figure in a circle ○



Inch IAHUB15○○R-○

Item code	Stock	No. of flutes	Size(inch)								Shape	Inserts
			DC	APMX	DCONMS	DCCB	DHUB	CBDP	KWW	b		
IAHUB1532R-5	●	5	2.000	.551" (.276")*	.750	.650	1.850	.748	.315	.197	C	JDMT1505○○R JDMT1505○○R-FW JDMT150508R-TFW JDMT1505○○R-B7/C7* JDET1505○○R-FF JDET1505○○R-FA
IAHUB1540R-6	●	6	2.500		.750	.650	2.362	.748	.315	.197	C	
IAHUB1548R-7	●	7	3.000		1.000	.830	2.756	1.378	.354	.236	C	
IAHUB1564R-8	●	8	4.000		1.500	1.260	3.543	1.378	.626	.394	C	

Metric AHUB○○○○R(M)-○

Item code	Stock	No. of flutes	Size(mm)								Shape	Inserts
			DC	APMX	DCONMS	DCCB	DHUB	CBDP	KWW	b		
AHUB1550R-3	★	3	50	14 (7)*	22.225	17	47	20	8.4	5	E	JDMT1505○○R JDMT1505○○R-FW JDMT150508R-TFW JDMT1505○○R-B7/C7* JDET1505○○R-FF JDET1505○○R-FA
AHUB1550R-5	★	5	50		22.225	17	47	20	8.4	5	C	
AHUB1550RM-3	★	3	50		22	17	47	20	10.4	6.3	E	
AHUB1550RM-5	●	5	50		22	17	47	20	10.4	6.3	C	
AHUB1563R-3	★	3	63		22.225	17	45	20	8.4	5	E	
AHUB1563R-6	★	6	63		22.225	17	45	20	8.4	5	C	
AHUB1563RM-3	★	3	63		22	17	45	20	10.4	6.3	E	
AHUB1563RM-6	●	6	63		22	17	45	20	10.4	6.3	C	
AHUB1580R-4	★	4	80		25.4	20	50	26	9.5	6	E	
AHUB1580R-7	●	7	80		25.4	20	50	26	9.5	6	C	
AHUB15100R-8	●	8	100	31.75	45	60	32	12.7	8	D		





[Note] The arbor screw for attaching the cutter is included with the cutter body of C type and E type.
A commercial face mill clamping bolt is required to mount a D type into our bore type arbor.
* The APMX in the case of using JDMT1505○○R-B7/C7 is a value shown in ().

Line Up

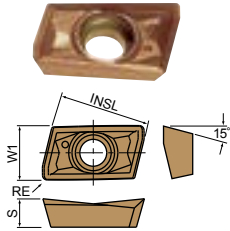
Parts

※ The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage.

Numeric figure in a circle○.

Parts	Clamp screw			Driver	Wrench	Screw anti-seizure agent
Shape Cutter body		Fastening torque				
		(N · m)	(lbp · in)			
AHU(L)1016R-2	250-141	1.1	9.7	104-T8	—	P-37
AHU(L)1020R-○~1035R-○	251-141	1.1	9.7			
AHU(L)15○R-○	412-141	2.9	25.7	104-T15	—	
AHUB1550R(M)-3~1563R(M)-3				—	105-T15	
AHUB1550R(M)-5~1563R(M)-6						
AHUB1580R-4						
AHUB1580R-7	250-141	1.1	9.7	104-T8	—	
AHUB15100R-8						
AHUM10○R-○(-M○)	412-141	2.9	25.7	104-T15	—	
AHUM15○R-○(-M○), IAHU(B)15○R-○						

Inserts



	FW, FF, Conventional (M-class)(E-class)	TFW type (M-class)	FA type (E-class)	B5/B7 type (M-class)	C5/C7 type (M-class)
Insert cross-section shape	Fig.1	Fig.2	Sharp edge Fig.3	Positive land (Large rake) Fig.4	Positive land (Small rake) Fig.5
Application	General purpose	Forged surface cutting; Strong intermittent cutting	Aluminum use	Stainless steels (Wet cutting) Titanium, Nickel based alloy use	Stainless steels (Dry cutting) Nickel based alloy use

[Note] When using the insert with Radius bigger than R2.0, it is necessary to carry out additional cutting of cutter body corner part.

Item code	Tolerance class	AJ Coating		GX Coating	JS Coating		TH Coating			DLC Coating	HD Coating	Carbide	Size(mm)				Insert cross-section shape					
		JP4120	JM4160	GX2160	JS4045	JS4060	PTH30E	PTH40H	PTH13S	SD5010	HD7010	WH10	INSL	W1	S	RE						
JDMT100304R	M	★			★	★	★		★				11	6.1	3.5	0.4	Fig.1					
JDMT100308R		★			★	★	★	★								0.8						
JDMT100320R		★			★	★	★									2.0						
JDMT100332R		★	★		★	★	★									3.2						
JDMT100304R-FW		★			★	★	★									0.4						
JDMT100308R-FW		★	★		★	★	★									0.8						
JDMT100308R-B5		★ ^{※1}	★							-	-	-				0.8		Fig.4				
JDMT100308R-C5		★ ^{※2}		★						-	-	-				0.8		Fig.5				
JDMT100320R-B5		★ ^{※1}	★							-	-	-				2.0		Fig.4				
JDMT100320R-C5		★ ^{※2}		★						-	-	-				2.0		Fig.5				
JDMT100330R-B5		★ ^{※1}	★							-	-	-				3.0		Fig.4				
JDMT100330R-C5		★ ^{※2}		★						-	-	-				3.0		Fig.5				
JDMT100332R-B5		★ ^{※1}	★							-	-	-				3.2		Fig.4				
JDMT100332R-C5		★ ^{※2}		★						-	-	-				3.2		Fig.5				
JDMT150504R		★				★	●		★							0.4		16	9.12	5	0.4	Fig.1
JDMT150508R		★			●	★	●	★	★							0.8						
JDMT150520R		★			★	★	★									2.0						
JDMT150530R		★			●	★	●	★								3.0						
JDMT150504R-FW		★			★	★	★									0.4						
JDMT150508R-FW		★	★		★	★	★									0.8						
JDMT150508R-TFW	★	★		★	★	★						0.8	Fig.2									
JDMT150508R-B7	● ^{※1}	●							-	-	-	0.8	Fig.4									
JDMT150508R-C7	● ^{※2}		●						-	-	-	0.8	Fig.5									
JDMT150520R-B7	● ^{※1}	★							-	-	-	2.0	Fig.4									
JDMT150520R-C7	● ^{※2}		★						-	-	-	2.0	Fig.5									
JDMT150530R-B7	● ^{※1}	★							-	-	-	3.0	Fig.4									
JDMT150530R-C7	● ^{※2}		★						-	-	-	3.0	Fig.5									
JDET100304R-FF	E				★	★				★	-	11	6.1	3.5	0.4	Fig.1						
JDET100308R-FF					★	★				★	-	11	6.1	3.5	0.8							
JDET150504R-FF					★	★				★	-	16	9.12	5	0.4							
JDET150508R-FF					★	★				★	-	16	9.12	5	0.8							
JDET100304R-FA		-	-	-	-	-	-	-	★		★	11	6.1	3.5	0.4	Fig.3						
JDET150502R-FA		-	-	-	-	-	-	-	●		★	16	9.12	5	0.2							
JDET150504R-FA		-	-	-	-	-	-	-	●		★	16	9.12	5	0.4							
JDET150530R-FA		-	-	-	-	-	-	-	●		★	16	9.12	5	3.0							

※1 For JMDT○○○○○○R-B○: JP4120, the primary recommended work material is S (titanium alloys) and the secondary recommended work material M (stainless-steel; semi-finishing).
 ※2 For JMDT○○○○○○R-C○: JP4120, the primary recommended work material is S (Ni-based alloys) and the secondary recommended work material is P (carbon steel).
 ※3 The stated recommended work materials are general criteria. In actual use, suitable recommended materials may be different depending on the cutting situation.

[Note] Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.

●: Inventory maintained in US ★: Inventory maintained in Japan No Mark: Manufactured upon request only -: No manufactured

Recommended Cutting Conditions

Inch

Red indicates primary recommended grade.

Work material	Recommended grade	Cutting conditions	Tool dia. DC							
			AHU/AHUM 10 type							
			Φ16mm 2 flutes		Φ20mm 3 flutes		Φ25mm 4 flutes		Φ32mm 5 flutes	
			Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)
Mild steel	JS4060	Revolution <i>n</i> / Feed speed <i>V_f</i>	3,180	25	2,390	42	1,910	45	1,490	44
		Cutting Speed <i>V_c</i> (SFM)	394 ~ 656 (525)				394 ~ 591 (492)			
		Feed Rate <i>f_z</i> (IPT)	.002 ~ .005 (.004)				.004 ~ .008 (.006)			
Carbon steel Alloy steel	JS4060 JS4045	Revolution <i>n</i> / Feed speed <i>V_f</i>	3,180	25	2,390	39	1,910	42	1,490	41
		Cutting Speed <i>V_c</i> (SFM)	394 ~ 656 (525)				394 ~ 591 (492)			
		Feed Rate <i>f_z</i> (IPT)	.002 ~ .004 (.003)				.003 ~ .008 (.006)			
Die steel (<300HB)	JS4060 JS4045	Revolution <i>n</i> / Feed speed <i>V_f</i>	2,980	24	2,230	37	1,780	39	1,390	38
		Cutting Speed <i>V_c</i> (SFM)	394 ~ 591 (492)				394 ~ 525 (459)			
		Feed Rate <i>f_z</i> (IPT)	.002 ~ .004 (.003)				.003 ~ .008 (.006)			
Pre-hardened steel (30~40HRC)	JP4120	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,990	16	1,590	26	1,270	28	990	27
		Cutting Speed <i>V_c</i> (SFM)	262 ~ 394 (328)				262 ~ 394 (328)			
		Feed Rate <i>f_z</i> (IPT)	.002 ~ .004 (.003)				.003 ~ .008 (.006)			
Stainless steel (Dry cutting)	GX2160 JM4160	Revolution <i>n</i> / Feed speed <i>V_f</i>	4,970	40	3,980	80	3,180	85	2,490	83
		Cutting Speed <i>V_c</i> (SFM)	656 ~ 984 (820)				656 ~ 984 (820)			
		Feed Rate <i>f_z</i> (IPT)	.004 ~ .006 (.005)				.006 ~ .008 (.007)			
Stainless steel (Wet cutting)	JM4160 PTH30E	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,990	16	1,590	32	1,270	34	990	33
		Cutting Speed <i>V_c</i> (SFM)	262 ~ 394 (328)				262 ~ 394 (328)			
		Feed Rate <i>f_z</i> (IPT)	.004 ~ .006 (.005)				.006 ~ .008 (.007)			
Cast iron	PTH13S JP4120	Revolution <i>n</i> / Feed speed <i>V_f</i>	2,980	24	2,230	39	1,780	42	1,390	41
		Cutting Speed <i>V_c</i> (SFM)	394 ~ 591 (492)				394 ~ 525 (459)			
		Feed Rate <i>f_z</i> (IPT)	.002 ~ .005 (.004)				.004 ~ .008 (.006)			
Aluminum alloy (wet condition)	WH10 SD5010	Revolution <i>n</i> / Feed speed <i>V_f</i>	6,960	56	6,370	113	5,090	120	3,980	117
		Cutting Speed <i>V_c</i> (SFM)	656 ~ 1640 (350)				656 ~ 600 (400)			
		Feed Rate <i>f_z</i> (IPT)	.004 ~ .006 (.005)				.004 ~ .008 (.006)			
Titanium alloy (wet condition)	JP4120 PTH30E	Revolution <i>n</i> / Feed speed <i>V_f</i>	900	7	720	13	570	13	450	13
		Cutting Speed <i>V_c</i> (SFM)	98 ~ 197 (148)				98 ~ 197 (148)			
		Feed Rate <i>f_z</i> (IPT)	.003 ~ .004 (.004)				.004 ~ .008 (.006)			
Ni based alloy (wet condition)	JP4120 JM4160	Revolution <i>n</i> / Feed speed <i>V_f</i>	800	6	640	7	510	8	400	8
		Cutting Speed <i>V_c</i> (SFM)	98 ~ 164 (131)				98 ~ 164 (131)			
		Feed Rate <i>f_z</i> (IPT)	.003 ~ .005 (.004)				.003 ~ .005 (.004)			

[Note] Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.

Inch

Red indicates primary recommended grade.

Work material	Recommended grade	Cutting conditions	Tool dia. DC													
			AHU/AHUM/AHUB 15 type													
			Φ25mm or Φ1" / 2 flutes		Φ32mm 3 flutes		Φ40mm 4 flutes		Φ50mm or Φ2" / 5 flutes		Φ63mm or Φ2.5" / 6 flutes		Φ80mm or Φ3" / 7 flutes		Φ100mm or Φ4" / 8 flutes	
			Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)	Revolution min ⁻¹	Feed speed (IPM)
Mild steel	JS4060	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,910	30	1,490	35	1,190	38	950	38	760	36	600	33	480	30
		Cutting Speed <i>V_c</i> (SFM)	394 ~ 591 (492)						394 ~ 591 (492)				394 ~ 591 (492)			
		Feed Rate <i>f_z</i> (IPT)	.006 ~ .010 (.008)													
Carbon steel Alloy steel	JS4060 JS4045	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,910	30	1,490	35	1,190	38	950	38	760	36	600	33	480	30
		Cutting Speed <i>V_c</i> (SFM)	394 ~ 591 (492)						394 ~ 591 (492)				394 ~ 591 (492)			
		Feed Rate <i>f_z</i> (IPT)	.006 ~ .010 (.008)													
Die steel (<300HB)	JS4060 JS4045	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,780	21	1,390	25	1,110	26	890	26	710	25	560	23	450	21
		Cutting Speed <i>V_c</i> (SFM)	394 ~ 525 (459)						394 ~ 525 (459)				394 ~ 525 (459)			
		Feed Rate <i>f_z</i> (IPT)	.004 ~ .008 (.006)													
Pre-hardened steel (30~40HRC)	JP4120	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,270	15	990	18	800	19	640	19	510	18	400	17	320	15
		Cutting Speed <i>V_c</i> (SFM)	262 ~ 394 (328)						262 ~ 394 (328)				262 ~ 394 (328)			
		Feed Rate <i>f_z</i> (IPT)	.004 ~ .008 (.006)													
Stainless steel (Dry cutting)	GX2160 JM4160	Revolution <i>n</i> / Feed speed <i>V_f</i>	3,180	38	2,490	44	1,990	47	1,590	47	1,260	45	990	41	760	36
		Cutting Speed <i>V_c</i> (SFM)	656 ~ 984 (820)						656 ~ 984 (820)				656 ~ 280 (240)			
		Feed Rate <i>f_z</i> (IPT)	.006 ~ .010 (.006)													
Stainless steel (Wet cutting)	JM4160 PTH30E	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,270	20	990	23	800	25	640	25	510	24	400	22	320	20
		Cutting Speed <i>V_c</i> (SFM)	262 ~ 394 (328)						262 ~ 394 (328)				262 ~ 394 (328)			
		Feed Rate <i>f_z</i> (IPT)	.006 ~ .010 (.008)													
Cast iron	PTH13S JP4120	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,780	28	1,390	33	1,110	35	890	35	710	34	560	31	450	28
		Cutting Speed <i>V_c</i> (SFM)	394 ~ 525 (459)						394 ~ 525 (459)				394 ~ 525 (459)			
		Feed Rate <i>f_z</i> (IPT)	.006 ~ .010 (.008)													
Aluminum alloy (wet condition)	WH10 SD5010	Revolution <i>n</i> / Feed speed <i>V_f</i>	5,090	68	3,980	80	3,180	85	2,550	85	2,530	102	1,990	93	1,590	85
		Cutting Speed <i>V_c</i> (SFM)	656 ~ 600 (400)						656 ~ 800 (1640)				656 ~ 800 (1640)			
		Feed Rate <i>f_z</i> (IPT)	.004 ~ .010 (.007)													
Titanium alloy (wet condition)	JP4120 PTH30E	Revolution <i>n</i> / Feed speed <i>V_f</i>	570	7	450	8	360	8	290	9	230	8	591	24	130	6
		Cutting Speed <i>V_c</i> (SFM)	98 ~ 197 (148)						98 ~ 197 (148)				98 ~ 164 (131)			
		Feed Rate <i>f_z</i> (IPT)	.004 ~ .008 (.006)													
Ni based alloy (wet condition)	JP4120 JM4160	Revolution <i>n</i> / Feed speed <i>V_f</i>	510	4	400	5	320	5	250	16	656	15	525	14	130	4
		Cutting Speed <i>V_c</i> (SFM)	98 ~ 164 (131)						98 ~ 164 (131)				98 ~ 164 (131)			
		Feed Rate <i>f_z</i> (IPT)	.003 ~ .005 (.004)													

Recommended Cutting Conditions

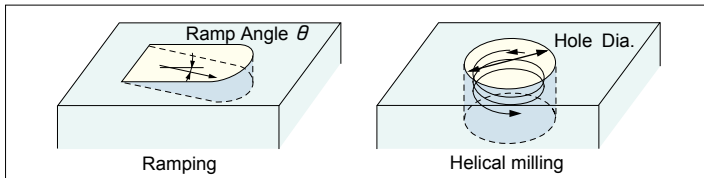
Adjustment of cutting conditions

- Feed rate and spindle revolution must be adjusted to correspond to tool overhang and machining conditions.
- Please consider the standard cutting conditions as 100% and adjust the machining conditions by referring to the table below.

		Overhang		
		<3DC	3DC~5DC	5DC<
Surfacing Shoulder milling	Rotation speed n	100%	70%	50%
	Feed rate V_f	100%	70%	50%
Slotting	Rotation speed n	100%	70%	50%
	Feed rate V_f	70%	50%	35%
Ramping	Rotation speed n	100%	70%	50%
	Feed rate V_f	80%	55%	40%

Ramping

Although ramp angle is limited due to cutting edge design, direct milling is possible without pre-drill-hole with ramping and helical milling methods like next pictures.



① AHU(L)/AHUM 15 type

Tool dia. DC	1.000"
Maximum ramp angle θ	5°
Hole Dia. (inch)	1.370~1.882

② AHUB15 type

Tool dia. DC	2.000"	2.500"	3.000"	4.000"
Maximum ramp angle θ	2°	1.5°	1.0°	0.5°
Hole Dia. (inch)	3.331~3.843	3.976~4.843	5.016~5.843	6.740~7.843

[Note]

- ① The ramp angle θ should be set within the ranges listed above. **Use at ramp angles of 1° or less is recommended.**
- ② For hole diameters outside the ranges listed above, a pilot hole should be drilled before milling.

⚠ Attention on Safety

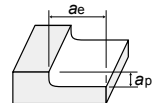
- ① The steel chips may cause cuts, burns or damages to eyes. Be sure to install the safety cover around the tool and wear the safety glasses when carrying out any works.
- ② Do not use non-water-soluble cutting oils. Such oils may result in fire.

○ Cutting conditions for cutting aluminum alloy and copper using SD5010

Inch <Shoulder cutting> : **$ae=0.5DC$**

Work material	Cutting conditions	AHU/AHUM 10 type					AHU/AHUB/AHUM 15 type							
		φ16mm 2 Flutes	φ20mm 3 Flutes	φ25mm or φ1" 4 Flutes	φ32mm 5 Flutes	φ35mm 5 Flutes	φ25mm or φ1" 2 Flutes	φ32mm 3 Flutes	φ35mm 3 Flutes	φ40mm 4 Flutes	φ50mm or φ2" 5 Flutes	φ63mm or φ2.5" 6 Flutes	φ80mm or φ3" 7 Flutes	φ100mm or φ4" 8 Flutes
Expanded aluminum alloy material A5052 A7075 etc. Air-blow or wet: Water-soluble agent	Revolution n (min ⁻¹)	15,900	15,900	12,700	11,900	10,910	12,000	9,950	9,090	9,500	7,640	6,060	5,970	4,770
	Cutting speed v_c (SFM)	2,621	3,274	3,323	3,892	3,934	3,140	3,254	3,278	3,729	3,998	3,964	4,686	4,993
	Feed speed v_f (IPM)	188	281	300	351	322	190	236	215	300	302	287	330	301
	Feed rate f_z (IPT)	.006	.006	.006	.006	.006	.008	.008	.008	.008	.008	.008	.008	.008
	Axial depth of cut a_p (inch)	.118	.118	.118	.118	.118	.197	.197	.197	.197	.197	.197	.197	.197
Cast aluminum alloy material AC4A ADC12 etc Air-blow or wet: Water-soluble agent	Revolution n (min ⁻¹)	12,700	12,700	10,160	9,520	8,730	9,600	7,960	7,270	7,600	6,110	4,850	4,780	3,820
	Cutting speed v_c (SFM)	2,094	2,615	2,659	3,114	3,148	2,512	2,604	2,621	2,983	3,198	3,173	3,752	3,998
	Feed speed v_f (IPM)	150	225	240	281	258	152	189	172	240	241	230	264	241
	Feed rate f_z (IPT)	.006	.006	.006	.006	.006	.008	.008	.008	.008	.008	.008	.008	.008
	Axial depth of cut a_p (inch)	.118	.118	.118	.118	.118	.197	.197	.197	.197	.197	.197	.197	.197
Pure copper C1100 C1020 etc Wet: Water-soluble agent	Revolution n (min ⁻¹)	5,970	4,770	3,820	2,980	2,730	3,820	2,980	2,730	2,390	1,910	1,520	1,190	955
	Cutting speed v_c (SFM)	984	982	1,000	975	984	1,000	975	984	938	1,000	994	934	1,000
	Feed speed v_f (IPM)	70	84	90	88	81	60	71	65	76	75	72	66	60
	Feed rate f_z (IPT)	.006	.006	.006	.006	.006	.008	.008	.008	.008	.008	.008	.008	.008
	Axial depth of cut a_p (inch)	.118	.118	.118	.118	.118	.197	.197	.197	.197	.197	.197	.197	.197

- [Note]**
- ① Use the appropriate coolant for the work material and machining shape.
 - ② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
 - ③ When cutting grooves, reduce the feed rate by 30% (set it to 0.7 times the value shown above).
 - ④ When L/D = 4 or higher, reduce the rotation speed and feed rate by 60% (set them to 0.4 times the values shown above).
 - ⑤ Use on a machine equipped with splashguards. During use, be sure to wear protective equipment such as safety glasses, and always perform work in a safe environment.
 - ⑥ When using a machine that cannot provide the rotation speed shown above, set the highest rotation speed possible and calculate the feed rate using the f_z value.
 - ⑦ Be sure to use this tool at rotation speeds within the acceptable range for the milling chuck being used. If the acceptable rotation speed range is below the rotation speed shown above, set the highest acceptable rotation speed and calculate the feed rate using the f_z value.



○ Cutting conditions for cutting graphite and cast aluminium alloy

Inch

Work material	Recommended grade	Cutting conditions	AHU/AHUM 10 type		AHU/AHUB/AHUM 15 type		
			φ16mm	φ20mm~35mm	φ25mm~50mm or 1" ~ 2"	φ3mm~80mm or 2.5" ~ 3"	φ100mm or 4"
Graphite	HD7010	Cutting speed V_c (SFM)	492~984	492~984	492~984	492~984	492~984
		Feed rate f_z (IPT)	.004~.008	.004~.008	.004~.010	.004~.010	.004~.010
Cast aluminum alloy AC4A, ADC12 etc. Air-blow or wet: water-soluble agent	HD7010	Cutting speed V_c (SFM)	656~1640	656~1640	656~1970	656~1970	656~1970
		Feed rate f_z (IPT)	.004~.008	.10~.20	.004~.010	.004~.010	.004~.010

- [Note]**
- ① Use the appropriate coolant for the work material and machining shape.
 - ② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
 - ③ Since there is a danger of breakage when using this tool, be sure to use the cutting area cover, protective goggles, safety shoes, etc.

Recommended Cutting Conditions

Overhang and Cutting Area

Inch

• Cutting Speed : $V_c=394$ SFM • Work material : AISI1050 (220HB) • Machine : BT50 M/C

AHU (L) 10 type		AHU (L) 15 type	
<p>$\phi 16\text{mm}$ $f_z = .004$ (IPT)</p>	<p>Overhang: 2DC AHU1016R-2 Overhang: 3DC, 4DC AHUL1016R-2 DC: Tool Dia.</p>	<p>$\phi 1''$ or $\phi 25\text{mm}$ $f_z = .006$ (IPT)</p>	<p>Overhang: 3DC IAHU1516R-2 AHU1525R-2 Overhang: 4DC AHUL1525R-2 DC: Tool Dia.</p>
<p>$\phi 20\text{mm}$ $f_z = .006$ (IPT)</p>	<p>Overhang: 2DC, 3DC AHU1020R-3 Overhang: 4DC, 5DC AHUL1020R-3 DC: Tool Dia.</p>	<p>$\phi 32\text{mm}$ $f_z = .006$ (IPT)</p>	<p>Overhang: 1.4DC AHU1532R-3 Overhang: 3DC, 4DC AHUL1532R-3 DC: Tool Dia.</p>
<p>$\phi 25\text{mm}$ $f_z = .006$ (IPT)</p>	<p>Overhang: 3DC AHU1025R-4 Overhang: 4DC AHUL1025R-3 DC: Tool Dia.</p>	<p>$\phi 40\text{mm}$ $f_z = .006$ (IPT)</p>	<p>Overhang: 1.5DC, 2DC AHU1540R-4 Overhang: 3DC AHUL1540R-4 DC: Tool Dia.</p>
<p>$\phi 32\text{mm}$ $f_z = .006$ (IPT)</p>	<p>Overhang: 3DC AHU1032R-5 Overhang: 4DC AHUL1032R-4 DC: Tool Dia.</p>	<p>$\phi 50\text{mm}$ $f_z = .006$ (IPT)</p>	<p>Overhang: 2DC AHU1550R-5 Overhang: 3DC AHUL1550R-4 DC: Tool Dia.</p>

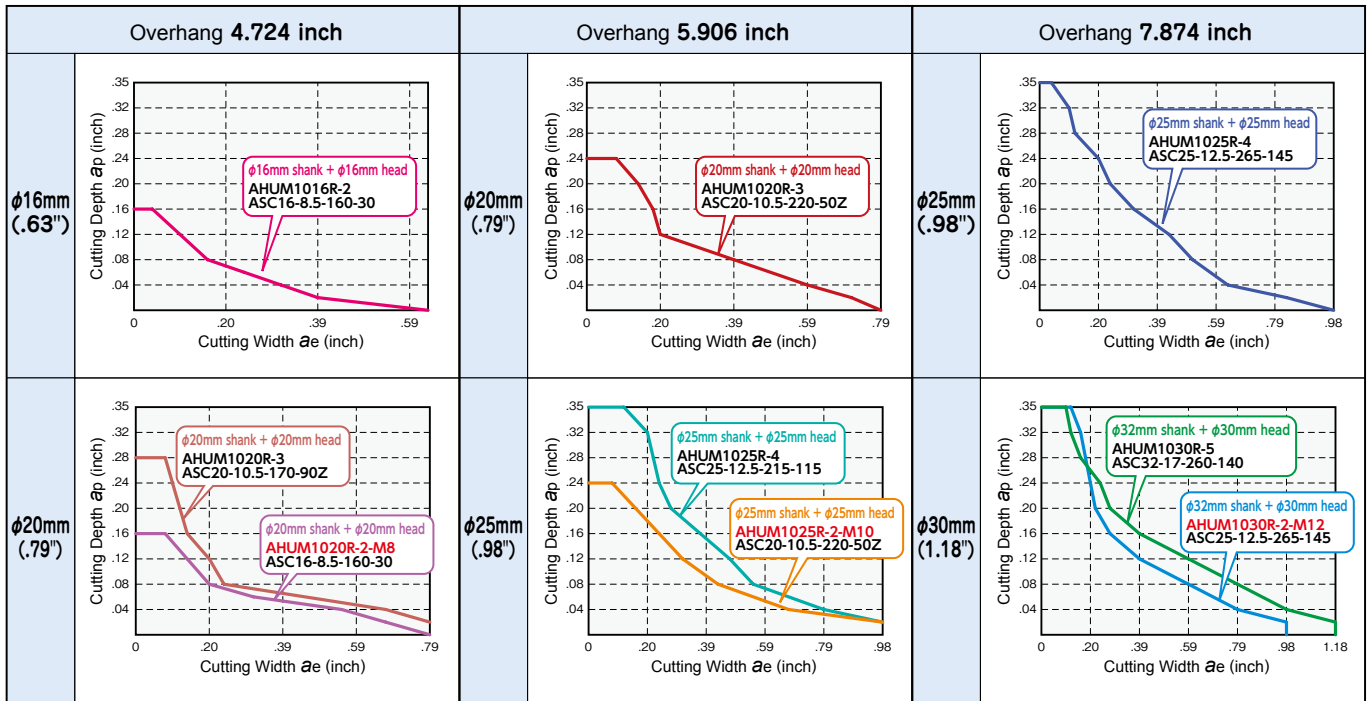
[Note]

Please adjust the cutting condition with reference to the above-stated graph depending on the stiffness of a work piece or a machine.

Cutting area of modular mill

Inch

- Work material : AISI1050 (220HB) • Cutting Speed : $V_c=328$ SFM
- Feed rate : $f_z=.004$ IPT • Machine : BT50



[Note]

Please adjust the cutting condition with reference to the above-stated graph depending on the stiffness of a work piece or a machine.

Recommended Cutting Conditions

Metric

Red indicates primary recommended grade.

Work material	Recommended grade	Cutting conditions	Tool dia. DC							
			AHU/AHUM 10 type							
			Φ16mm 2 flutes		Φ20mm 3 flutes		Φ25mm 4 flutes		Φ32mm 5 flutes	
			Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)
Mild steel	JS4060	Revolution <i>n</i> / Feed speed <i>V_f</i>	3,180	570	2,390	1,080	1,910	1,150	1,490	1,120
		Cutting Speed <i>V_c</i> (m/min)	120 ~ 200 (160)		120 ~ 180 (150)					
		Feed Rate <i>f_z</i> (mm/t)	0.06 ~ 0.12 (0.09)		0.1 ~ 0.2 (0.15)					
Carbon steel Alloy steel	JS4060 JS4045	Revolution <i>n</i> / Feed speed <i>V_f</i>	3,180	450	2,390	1,000	1,910	1,070	1,490	1,040
		Cutting Speed <i>V_c</i> (m/min)	120 ~ 200 (160)		120 ~ 180 (150)					
		Feed Rate <i>f_z</i> (mm/t)	0.05 ~ 0.1 (0.07)		0.08 ~ 0.2 (0.14)					
Die steel (<300HB)	JS4060 JS4045	Revolution <i>n</i> / Feed speed <i>V_f</i>	2,980	420	2,230	940	1,780	1,000	1,390	970
		Cutting Speed <i>V_c</i> (m/min)	120 ~ 180 (150)		120 ~ 160 (140)					
		Feed Rate <i>f_z</i> (mm/t)	0.05 ~ 0.1 (0.07)		0.08 ~ 0.2 (0.14)					
Pre-hardened steel (30~40HRC)	JP4120	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,990	280	1,590	670	1,270	710	990	700
		Cutting Speed <i>V_c</i> (m/min)	80 ~ 120 (100)		80 ~ 120 (100)					
		Feed Rate <i>f_z</i> (mm/t)	0.05 ~ 0.1 (0.07)		0.08 ~ 0.2 (0.14)					
Stainless steel (Dry cutting)	GX2160 JM4160	Revolution <i>n</i> / Feed speed <i>V_f</i>	4,970	1,190	3,980	2,030	3,180	2,160	2,490	2,110
		Cutting Speed <i>V_c</i> (m/min)	200 ~ 300 (250)		200 ~ 300 (250)					
		Feed Rate <i>f_z</i> (mm/t)	0.1 ~ 0.15 (0.12)		0.15 ~ 0.2 (0.17)					
Stainless steel (Wet cutting)	JM4160 PTH30E	Revolution <i>n</i> / Feed speed <i>V_f</i>	1,990	480	1,590	810	1,270	870	990	850
		Cutting Speed <i>V_c</i> (m/min)	80 ~ 120 (100)		80 ~ 120 (100)					
		Feed Rate <i>f_z</i> (mm/t)	0.1 ~ 0.15 (0.12)		0.15 ~ 0.2 (0.17)					
Cast iron	PTH13S JP4120	Revolution <i>n</i> / Feed speed <i>V_f</i>	2,980	540	2,230	1,000	1,780	1,070	1,390	1,040
		Cutting Speed <i>V_c</i> (m/min)	120 ~ 180 (150)		120 ~ 160 (140)					
		Feed Rate <i>f_z</i> (mm/t)	0.06 ~ 0.12 (0.09)		0.1 ~ 0.2 (0.15)					
Aluminum alloy (wet condition)	WH10 SD5010	Revolution <i>n</i> / Feed speed <i>V_f</i>	6,960	1,670	6,370	2,860	5,090	3,060	3,980	2,980
		Cutting Speed <i>V_c</i> (m/min)	200 ~ 500 (350)		200 ~ 600 (400)					
		Feed Rate <i>f_z</i> (mm/t)	0.1 ~ 0.15 (0.12)		0.1 ~ 0.2 (0.15)					
Titanium alloy (wet condition)	JP4120 PTH30E	Revolution <i>n</i> / Feed speed <i>V_f</i>	900	160	720	320	570	340	450	340
		Cutting Speed <i>V_c</i> (m/min)	30 ~ 60 (45)		30 ~ 60 (45)					
		Feed Rate <i>f_z</i> (mm/t)	0.08 ~ 0.1 (0.09)		0.1 ~ 0.2 (0.15)					
Ni based alloy (wet condition)	JP4120 JM4160	Revolution <i>n</i> / Feed speed <i>V_f</i>	800	160	640	190	510	200	400	200
		Cutting Speed <i>V_c</i> (m/min)	30 ~ 50 (40)		30 ~ 50 (40)					
		Feed Rate <i>f_z</i> (mm/t)	0.07 ~ 0.13 (0.1)		0.07 ~ 0.13 (0.1)					

[Note]

Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.

Metric

Red indicates primary recommended grade.

Work material	Recommended grade	Cutting conditions	Tool dia. DC													
			AHU/AHUM/AHUB 15 type													
			Φ25mm or Φ1" / 2 flutes		Φ32mm 3 flutes		Φ40mm 4 flutes		Φ50mm or Φ2" / 5 flutes		Φ63mm or Φ2.5" / 6 flutes		Φ80mm or Φ3" / 7 flutes		Φ100mm or Φ4" / 8 flutes	
			Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)	Revolution min ⁻¹	Feed speed (mm/min)
Mild steel	JS4060	Revolution n / Feed speed Vf	1,910	760	1,490	900	1,190	950	950	950	760	910	600	840	480	760
		Cutting Speed Vc (m/min)	120 ~ 180 (150)						120 ~ 180 (150)				120 ~ 180 (150)			
		Feed Rate fz (mm/t)	0.15 ~ 0.25 (0.2)													
Carbon steel Alloy steel	JS4060 JS4045	Revolution n / Feed speed Vf	1,910	760	1,490	900	1,190	950	950	950	760	910	600	840	480	760
		Cutting Speed Vc (m/min)	120 ~ 180 (150)						120 ~ 180 (150)				120 ~ 180 (150)			
		Feed Rate fz (mm/t)	0.15 ~ 0.25 (0.2)													
Die steel (<300HB)	JS4060 JS4045	Revolution n / Feed speed Vf	1,780	530	1,390	630	1,110	670	890	670	710	640	560	580	450	530
		Cutting Speed Vc (m/min)	120 ~ 160 (140)						120 ~ 160 (140)				120 ~ 160 (140)			
		Feed Rate fz (mm/t)	0.1 ~ 0.2 (0.15)													
Pre-hardened steel (30~40HRC)	JP4120	Revolution n / Feed speed Vf	1,270	380	990	450	800	480	640	480	510	450	400	420	320	380
		Cutting Speed Vc (m/min)	80 ~ 120 (100)						80 ~ 120 (100)				80 ~ 120 (100)			
		Feed Rate fz (mm/t)	0.1 ~ 0.2 (0.15)													
Stainless steel (Dry cutting)	GX2160 JM4160	Revolution n / Feed speed Vf	3,180	1,270	2,490	1,490	1,990	1,590	1,590	1,590	1,260	1,520	990	1,390	760	1,220
		Cutting Speed Vc (m/min)	200 ~ 300 (250)						200 ~ 300 (250)				200 ~ 280 (240)			
		Feed Rate fz (mm/t)	0.15 ~ 0.25 (0.2)													
Stainless steel (Wet cutting)	JM4160 PTH30E	Revolution n / Feed speed Vf	1,270	510	990	600	800	640	640	640	510	610	400	560	320	510
		Cutting Speed Vc (m/min)	80 ~ 120 (100)						80 ~ 120 (100)				80 ~ 120 (100)			
		Feed Rate fz (mm/t)	0.15 ~ 0.25 (0.2)													
Cast iron	PTH13S JP4120	Revolution n / Feed speed Vf	1,780	710	1,390	840	1,110	890	890	890	710	850	560	780	450	710
		Cutting Speed Vc (m/min)	120 ~ 160 (140)						120 ~ 160 (140)				120 ~ 160 (140)			
		Feed Rate fz (mm/t)	0.15 ~ 0.25 (0.2)													
Aluminum alloy (wet condition)	WH10 SD5010	Revolution n / Feed speed Vf	5,090	1,730	3,980	2,030	3,180	2,160	2,550	2,160	2,530	2,580	1,990	2,370	1,590	2,160
		Cutting Speed Vc (m/min)	200 ~ 600 (400)						200 ~ 800 (500)				200 ~ 800 (500)			
		Feed Rate fz (mm/t)	0.1 ~ 0.25 (0.17)													
Titanium alloy (wet condition)	JP4120 PTH30E	Revolution n / Feed speed Vf	570	170	450	200	360	210	290	210	230	200	180	190	130	150
		Cutting Speed Vc (m/min)	30 ~ 60 (45)						30 ~ 60 (45)				30 ~ 50 (40)			
		Feed Rate fz (mm/t)	0.1 ~ 0.2 (0.15)													
Ni based alloy (wet condition)	JP4120 JM4160	Revolution n / Feed speed Vf	510	100	400	120	320	130	250	130	200	120	160	110	130	100
		Cutting Speed Vc (m/min)	30 ~ 50 (40)						30 ~ 50 (40)				30 ~ 50 (40)			
		Feed Rate fz (mm/t)	0.07 ~ 0.13 (0.1)													

Recommended Cutting Conditions

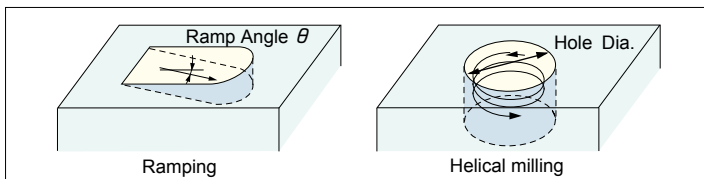
Adjustment of cutting conditions

- Feed rate and spindle revolution must be adjusted to correspond to tool overhang and machining conditions.
- Please consider the standard cutting conditions as 100% and adjust the machining conditions by referring to the table below.

		Overhang		
		<3DC	3DC~5DC	5DC<
Surfacing Shoulder milling	Rotation speed n	100%	70%	50%
	Feed rate V_f	100%	70%	50%
Slotting	Rotation speed n	100%	70%	50%
	Feed rate V_f	70%	50%	35%
Ramping	Rotation speed n	100%	70%	50%
	Feed rate V_f	80%	55%	40%

Ramping

Although ramp angle is limited due to cutting edge design, direct milling is possible without pre-drill-hole with ramping and helical milling methods like next pictures.



① AHU(L)/AHUM 10 type

Tool dia. DC	$\phi 16$	$\phi 20$	$\phi 21$	$\phi 25$	$\phi 26$	$\phi 30$	$\phi 32$	$\phi 35$
Maximum ramp angle θ	4°	3°	3°	2.5°	2.5°	2°	2°	1.5°
Hole Dia.	21~29	29~37	31~39	39~47	41~49	49~56	53~61	59~66

② AHU(L)/AHUM 15 type

Tool dia. DC	$\phi 25$	$\phi 30$	$\phi 32$	$\phi 35$	$\phi 40$	$\phi 50$
Maximum ramp angle θ	5°	4°	4°	3.5°	3°	2°
Hole Dia.	34~47	43~56	47~60	54~66	64~76	83~96

③ AHUB15 type

Tool dia. DC	$\phi 50$	$\phi 63$	$\phi 80$	$\phi 100$
Maximum ramp angle θ	2°	1.5°	1.0°	0.5°
Hole Dia.	83~96	100~116	135~152	168~192

[Note]

- ① The ramp angle θ should be set within the ranges listed above. **Use at ramp angles of 1° or less is recommended.**
- ② For hole diameters outside the ranges listed above, a pilot hole should be drilled before milling.

⚠ Attention on Safety

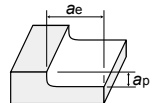
- ① The steel chips may cause cuts, burns or damages to eyes. Be sure to install the safety cover around the tool and wear the safety glasses when carrying out any works.
- ② Do not use non-water-soluble cutting oils. Such oils may result in fire.

Cutting conditions for cutting aluminum alloy and copper using SD5010

Metric <Shoulder cutting> : $a_e=0.5DC$

Work material	Cutting conditions	AHU/AHUM 10 type					AHU/AHUB/AHUM 15 type							
		φ16mm 2 Flutes	φ20mm 3 Flutes	φ25mm 4 Flutes	φ32mm 5 Flutes	φ35mm 5 Flutes	φ25mm or φ1" 2 Flutes	φ32mm 3 Flutes	φ35mm 3 Flutes	φ40mm 4 Flutes	φ50mm or φ2" 5 Flutes	φ63mm or φ2.5" 6 Flutes	φ80mm or φ3" 7 Flutes	φ100mm or φ4" 8 Flutes
Expanded aluminum alloy material A5052 A7075 etc. Air-blow or wet: Water-soluble agent	Revolution n (min ⁻¹)	15,900	15,900	12,700	11,900	10,910	12,000	9,950	9,090	9,500	7,640	6,060	5,970	4,770
	Cutting speed v_c (m/min)	800	1,000	1,000	1,200	1,200	950	1,000	1,000	1,200	1,200	1,200	1,500	1,500
	Feed speed v_f (mm/min)	4,770	7,150	7,620	8,920	8,180	4,800	5,970	5,450	7,600	7,640	7,270	8,360	7,630
	Feed rate f_z (mm/t)	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Axial depth of cut a_p (mm)	3	3	3	3	3	5	5	5	5	5	5	5	5
Cast aluminum alloy material AC4A ADC12 etc Air-blow or wet: Water-soluble agent	Revolution n (min ⁻¹)	12,700	12,700	10,160	9,520	8,730	9,600	7,960	7,270	7,600	6,110	4,850	4,780	3,820
	Cutting speed v_c (m/min)	640	800	800	960	960	760	800	800	960	960	960	1,200	1,200
	Feed speed v_f (mm/min)	3,820	5,720	6,100	7,140	6,550	3,840	4,780	4,360	6,080	6,110	5,820	6,690	6,100
	Feed rate f_z (mm/t)	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Axial depth of cut a_p (mm)	3	3	3	3	3	5	5	5	5	5	5	5	5
Pure copper C1100 C1020 etc Wet: Water-soluble agent	Revolution n (min ⁻¹)	5,970	4,770	3,820	2,980	2,730	3,820	2,980	2,730	2,390	1,910	1,520	1,190	955
	Cutting speed v_c (m/min)	300	300	300	300	300	300	300	300	300	300	300	300	300
	Feed speed v_f (mm/min)	1,790	2,150	2,290	2,240	2,050	1,530	1,790	1,640	1,910	1,910	1,820	1,670	1,530
	Feed rate f_z (mm/t)	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Axial depth of cut a_p (mm)	3	3	3	3	3	5	5	5	5	5	5	5	5

- [Note]**
- ① Use the appropriate coolant for the work material and machining shape.
 - ② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
 - ③ When cutting grooves, reduce the feed rate by 30% (set it to 0.7 times the value shown above).
 - ④ When L/D = 4 or higher, reduce the rotation speed and feed rate by 60% (set them to 0.4 times the values shown above).
 - ⑤ Use on a machine equipped with splashguards. During use, be sure to wear protective equipment such as safety glasses, and always perform work in a safe environment.
 - ⑥ When using a machine that cannot provide the rotation speed shown above, set the highest rotation speed possible and calculate the feed rate using the f_z value.
 - ⑦ Be sure to use this tool at rotation speeds within the acceptable range for the milling chuck being used. If the acceptable rotation speed range is below the rotation speed shown above, set the highest acceptable rotation speed and calculate the feed rate using the f_z value.



Cutting conditions for cutting graphite and cast aluminium alloy

Metric

Work material	Recommended grade	Cutting conditions	AHU/AHUM 10 type		AHU/AHUB/AHUM 15 type		
			φ16mm	φ20mm~35mm	φ25mm~50mm or φ1"~2"	φ3mm~80mm or φ2.5"~3"	φ100mm or φ4"
Graphite	HD7010	Cutting speed V_c (m/min)	150~300	150~300	150~300	150~300	150~300
		Feed rate f_z (mm/t)	0.10~0.20	0.10~0.20	0.1~0.25	0.1~0.25	0.1~0.25
Cast aluminum alloy AC4A, ADC12 etc. Air-blow or wet: water-soluble agent	HD7010	Cutting speed V_c (m/min)	200~500	200~500	200~600	200~600	200~600
		Feed rate f_z (mm/t)	0.10~0.20	0.10~0.20	0.1~0.25	0.1~0.25	0.1~0.25

- [Note]**
- ① Use the appropriate coolant for the work material and machining shape.
 - ② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
 - ③ Since there is a danger of breakage when using this tool, be sure to use the cutting area cover, protective goggles, safety shoes, etc.

Recommended Cutting Conditions

Overhang and Cutting Area

Metric

• Cutting Speed : $V_c=120\text{m/min}$ • Work material : AISI1050 (220HB) • Machine : BT50 M/C

AHU (L) 10 type		AHU (L) 15 type	
<p>$\phi 16\text{mm}$ $f_z=0.1$ (mm/t)</p>	<p>Overhang: 2DC AHU1016R-2 Overhang: 3DC, 4DC AHUL1016R-2 DC: Tool Dia.</p>	<p>$\phi 25$ or $\phi 1"$ $f_z=0.15$ (mm/t)</p>	<p>Overhang: 3DC AHU1525R-2 IAHU1516R-2 Overhang: 4DC AHUL1525R-2 DC: Tool Dia.</p>
<p>$\phi 20\text{mm}$ $f_z=0.15$ (mm/t)</p>	<p>Overhang: 2DC, 3DC AHU1020R-3 Overhang: 4DC, 5DC AHUL1020R-3 DC: Tool Dia.</p>	<p>$\phi 32\text{mm}$ $f_z=0.15$ (mm/t)</p>	<p>Overhang: 1.4DC AHU1532R-3 Overhang: 3DC, 4DC AHUL1532R-3 DC: Tool Dia.</p>
<p>$\phi 25\text{mm}$ $f_z=0.15$ (mm/t)</p>	<p>Overhang: 3DC AHU1025R-4 Overhang: 4DC AHUL1025R-3 DC: Tool Dia.</p>	<p>$\phi 40\text{mm}$ $f_z=0.15$ (mm/t)</p>	<p>Overhang: 1.5DC, 2DC AHU1540R-4 Overhang: 3DC AHUL1540R-4 DC: Tool Dia.</p>
<p>$\phi 32\text{mm}$ $f_z=0.15$ (mm/t)</p>	<p>Overhang: 3DC AHU1032R-5 Overhang: 4DC AHUL1032R-4 DC: Tool Dia.</p>	<p>$\phi 50\text{mm}$ $f_z=0.15$ (mm/t)</p>	<p>Overhang: 2DC AHU1550R-5 Overhang: 3DC AHUL1550R-4 DC: Tool Dia.</p>

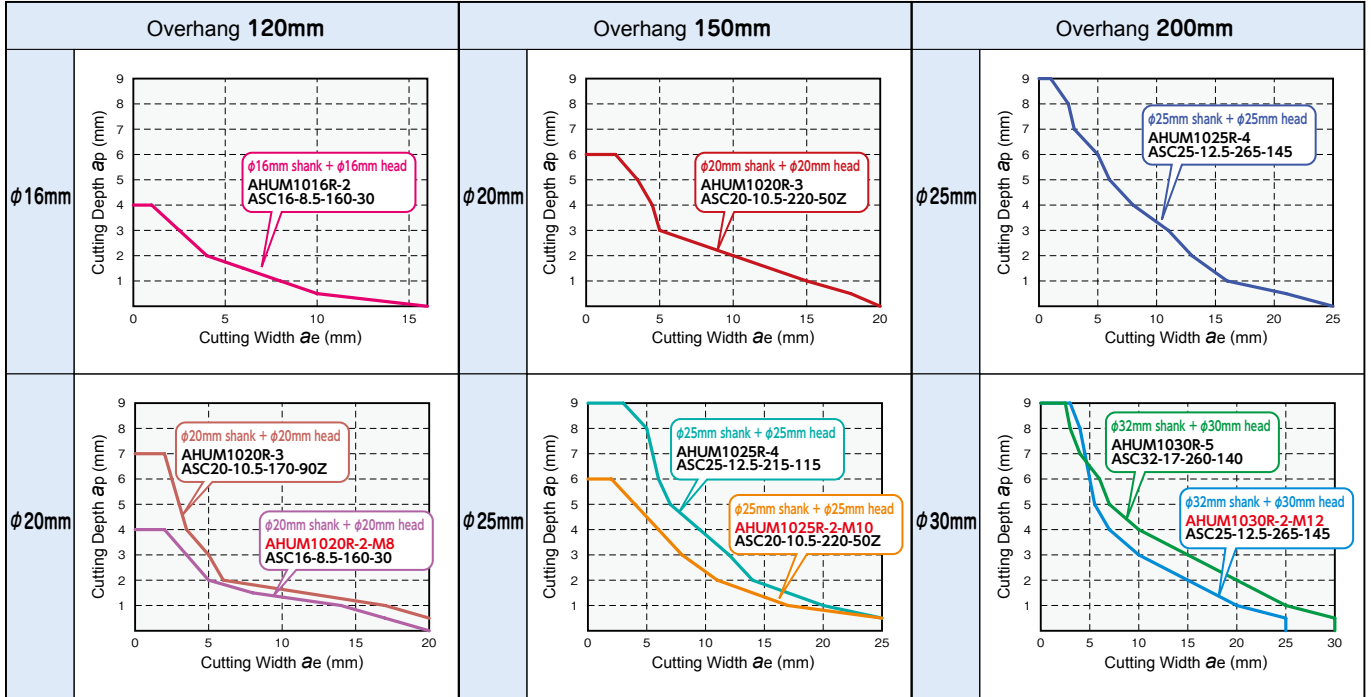
[Note]

Please adjust the cutting condition with reference to the above-stated graph depending on the stiffness of a work piece or a machine.

Cutting area of modular mill

Metric

- Work material : AISI1050C (220HB) • Cutting Speed : $V_c=100\text{m/min}$
- Feed rate : $f_z=0.1\text{mm/t}$ • Machine : BT50



[Note]

Please adjust the cutting condition with reference to the above-stated graph depending on the stiffness of a work piece or a machine.

California Office [Headquarters]

3535 Hyland Avenue, Suite 200
Costa Mesa, CA 92626
Customer Service: 800.523.0800
Technical Service: 800.486.2341

Detroit Office [MOLDINO Products Customer Service]

41700 Gardenbrook Road, Suite 120 Novi, MI 48375
Customer Service: 833.924.3100
Technical Service: 833-407-7700
Main: 248.308.2620
Fax: 248.308.2627
Email: rfqHTdiv@mmus.com (MOLDINO Product & Technical Inquiry)

Toronto Office [Canada Branch]

3535 Laird Road
Units 15 & 16
Mississauga, Ontario, Canada L5L 5Y7
Main: 905.814.0240
Fax: 905.814.0245

MMC Metal de Mexico, S.A. DE C.V.

Av. La Cañada No.16,
Parque Industrial Bernardo
Quintana, El Marques,
Queretaro C.P. 76246 MEXICO
Main: +52.442.221.61.36
Fax: +52.442.221.61.34

Chicago Office [Engineering]

300 N. Martingale Road, Suite 500
Schaumburg, IL 60173
Main: 847.252.6300
Fax: 847.519.1732

North Carolina-MTEC [Marketing & Technical Center]

105 Corporate Center Drive, Suite A
Mooresville, NC 28117
Main: 980.312.3100
Fax: 704.746.9292

DISTRIBUTED BY:

MOLDINO Tool Engineering, Ltd.

<https://data.moldino.com/en-US/>

(Manufacturer)

H2409A-1

Tools Specifications subject to change without notice.