

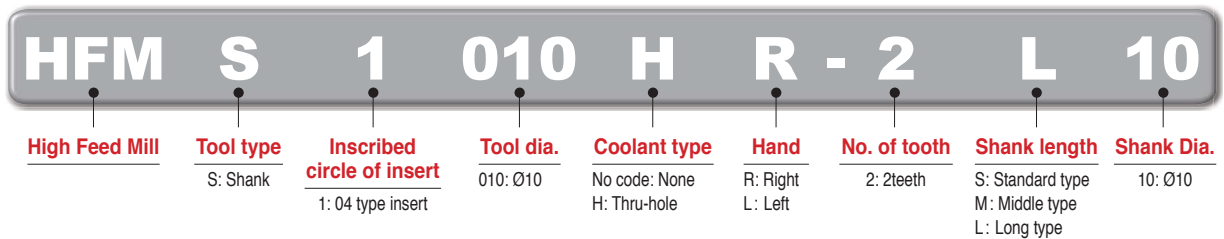
Stable machining, high efficiency milling tools for small diameter machining

HFM *new*

- Increase productivity through improved insert shape and size, high feed per tooth, and many cutting-edges, for small diameter machining
- Stable tool life through the combination of the reinforced toughness on corner and suitable grades of high hardness in the area of high speed and high hardness

Code system

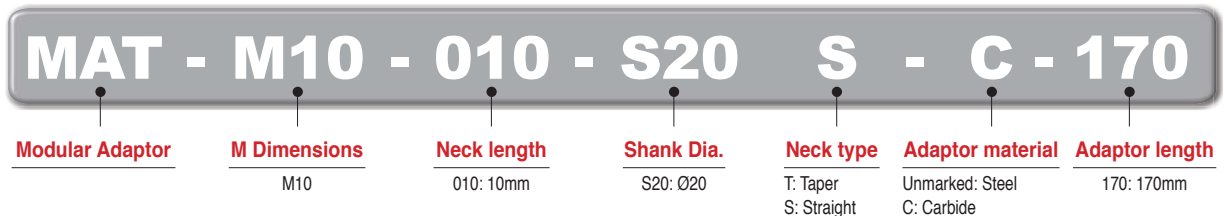
• Shank type



• Modular type



• Modular adaptor



Features

- Apply helix cutting-edge on insert, low cutting load and reinforce toughness on corner
- Increased rigidity with double relief angle (11, 13), prevent interference with high feed
- To apply the negative axial rake angle when set up the holder, increased chipping resistance
- Tool life is increased with suitable C/B and grade for every material





- **Holder setup**
 - To set up the negative axial rake angle, increased chipping resistance
- **No. of tooth**
 - Increased tool life with increased flutes
 - HRM(D) Ø20 (2 flutes) → HFM Ø20 (5 flutes)



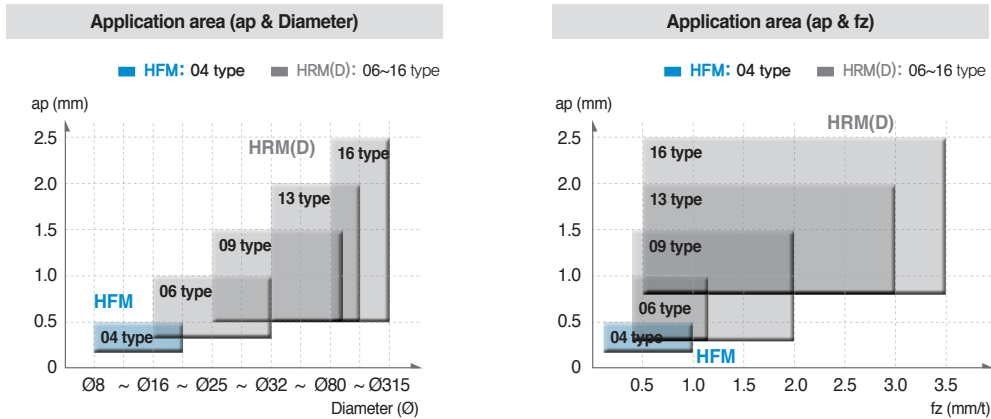
- **Relief angle**
 - 11, 13 double relief angle increase rigidity and prevent interference
- **Major cutting-edge**
 - Improved sharpness of principle edge
 - Improved toughness of corner edge

E Technical Information for HFM

Features of chip breakers

Chip breaker	Cutting-edge	Applications	Features
MF		Fine finishing Titanium & Inconel machining	• Low cutting resistance C/B, suitable for light cutting
None C/B		Super hard material machining	• High toughness shape, suitable for hard die steel cutting

Application area



Recommended cutting condition



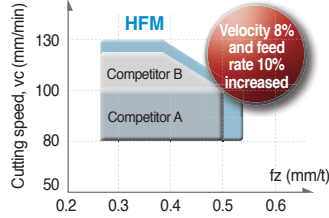
Workpiece	Workpiece			HB (HrC)	Grades	Cutting conditions				Chip breaker			
	KOR (KS)	USA (AISI)	GER (DIN)			vc (m/min)	fz (mm/t)	ap (mm)	ae (mm)	MF	None C/B		
P	Mild steel	SM20C	1020	C22	120~180	PC5400 (PC5300)	100~220	0.5~1.0	~0.5	0.7D~0.1D	●	-	
	Carbon steel	SM45C	1045	C45	200	PC5400 (PC5300)	100~200	0.5~1.0	~0.5	0.7D~0.1D	●	-	
	Alloy steel	SCM440	4140	41CrMo4	270 (28)	PC5300	100~200	0.5~1.0	~0.5	0.7D~0.1D	●	-	
	Pre-hardened steel	KP4M	P20 (Improved)	1.2738 (Improved)	300 (32)	PC5300 ^{new} (PC2510)	100~180	0.5~0.9	~0.4	0.7D~0.1D	●	○	
		NIMAX	P21 (Improved)	-	370 (40)	PC5300 ^{new} (PC2510)	100~180	0.5~0.9	~0.4	0.7D~0.1D	●	○	
		CENA1	P21 (Improved)	-	370 (40)	PC5300 ^{new} (PC2510)	100~180	0.5~0.9	~0.4	0.7D~0.1D	●	○	
		NAK80	P21 (Improved)	-	400 (43)	PC5300	100~160 100~180	0.5~0.7 0.5~0.9	~0.4 ~0.4	0.7D~0.1D 0.7D~0.1D	○ -	- ●	
	Alloy tool steel	STAVAX	420	X30Cr13	510 (52)	PC2510 ^{new} (PC5300)	80~150	0.3~0.6	~0.4	0.7D~0.1D	●	-	
		STD11 STD61	D2 H13	X155CrVMo12-1 X40CrMoV5-1	- (40~50)	PC2510 ^{new} (PC2505)	80~130	0.3~0.55	~0.3	0.7D~0.1D	-	●	
		STD11 (Cold forging)	D2	X155CrVMo12-1	630 (60)	PC2505 ^{new}	30~75	0.3~0.5	~0.2	0.7D~0.1D	-	●	
M	Stainless steel	STS316	316	X5CrNiMo17-12-2	Under 270	PC5400 (PC5300)	70~150	0.5~0.7	~0.5	0.7D~0.1D	●	-	
K	Gray cast iron, Ductile cast iron	GCD450	65-45-12	GGG40.3	Tensile Strength Over 450Mpa	PC5300	130~220	0.6~0.8	~0.5	0.7D~0.1D	●	-	
S	HRSA	Fe series	Incoloy901	N09901	- (WS 2.4662)	- (25~35)	PC5300 (PC5400)	30~100	0.3~0.5	~0.3	0.4D~0.7D	●	○
		Ni or Co series	Inconel718	N07718	NiCr19FeNbMo (WS 2.4668)	- (35~45)	PC5300 (PC5400)	20~50	0.3~0.6	~0.3	0.4D~0.7D	●	○
	Titanium	Ti-6Al-4V	R56400	TiAl6V4	- (40~45)	PC5300	30~50	0.4~1.0	~0.3	0.7D~0.1D	●	-	



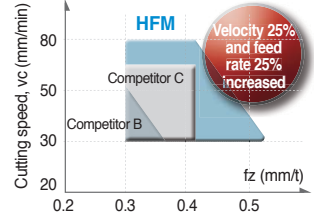
Performance evaluation

High speed machining

- Workpiece: STD11 (H_RC40~45)
- Insert: LPM(E)W0402□□R
- Recommended grade: PC2505 (1st), PC2510 (2nd)

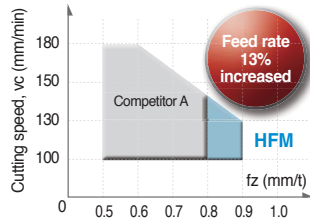


- Workpiece: STD11 (Over H_RC60)
- Insert: LPM(E)W0402□□R
- Recommended grade: PC2505 (1st), PC2510 (2nd)

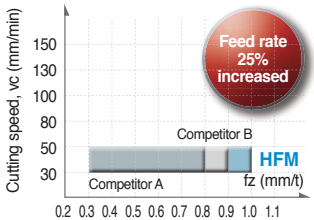


High feed machining

- Workpiece: KP4M (H_RC32), NAK80 (H_RC43)
- Insert: LPMT0402□□R-MF
- Recommended grade: PC5300 (1st), PC2510 (2nd)

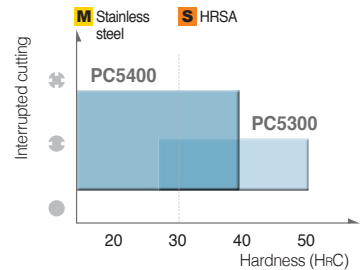
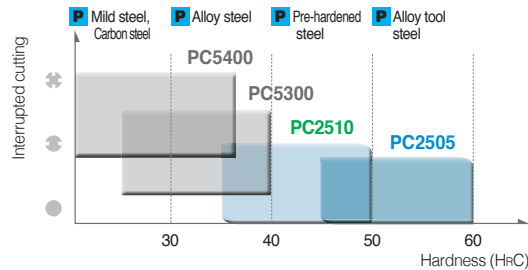


- Workpiece: Ti-6AL-4V (H_RC40~45)
- Insert: LPMT0402□□R-MF
- Recommended grade: PC5300 (1st), PC5400 (2nd)

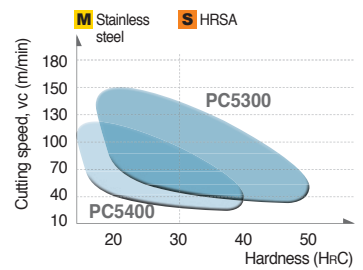
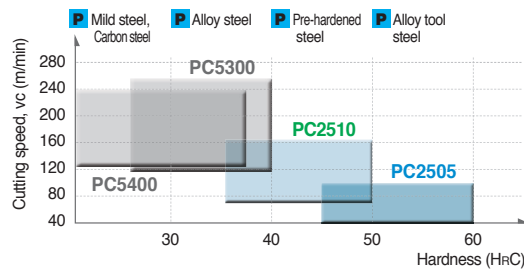


High hardness machining

- Recommended grades according to interruption



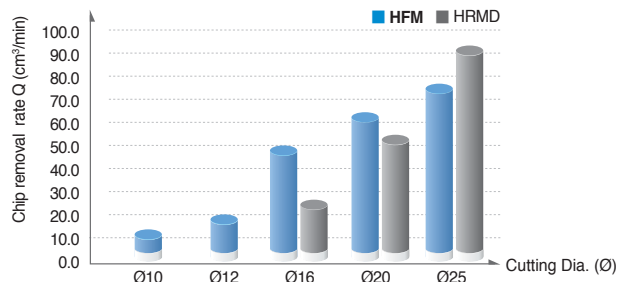
- Recommended grades according to velocity



Effective machining

- Machining center
 - BT40 and under, HFM recommended
 - BT50 and above, HRM(D) recommended

- Chip removal rate Q (cm³/min)
 - Ø8~Ø20, HFM recommended
 - Ø20 and above, HRM(D) recommended

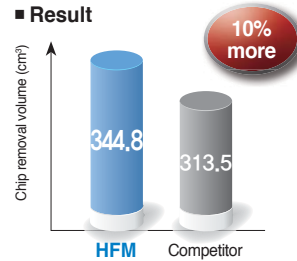


E Technical Information for HFM

Performance evaluation

P Carbon steel [C45 (DIN)/1045 (AISI)/SM45C (KS), HB200]

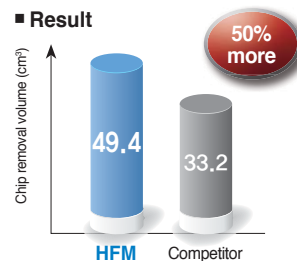
- **Workpiece** Mold
- **Cutting conditions** vc (m/min) = 150, fz (mm/t) = 0.6
ap (mm) = 0.4, ae (mm) = 5
dry
- **Tools** **Insert** LPMT040210R-MF (PC5300)
Holder HFMS1010HR-2S10



- Chip removal rate Q (cm³/min): 11.5
- Cutting time (min): 30

P Pre-hardened steel [P21 (Improved) (AISI)/NAK80 (KS), HRC40~41]

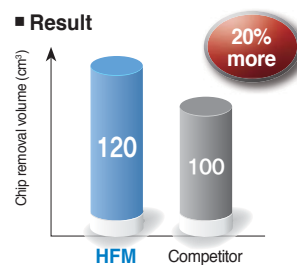
- **Workpiece** Mold
- **Cutting conditions** vc (m/min) = 100, fz (mm/t) = 1.26
ap (mm) = 0.3, ae (mm) = 10
dry
- **Tools** **Insert** LPMT040210R-MF (PC5300)
Holder HFMS1016HR-4S16



- Chip removal rate Q (cm³/min): 15
- Cutting time (min): 3.29

P Alloy tool steel [X155CrVMo12-1 (DIN)/D2 (AISI)/STD11 (KS), HRC40~45]

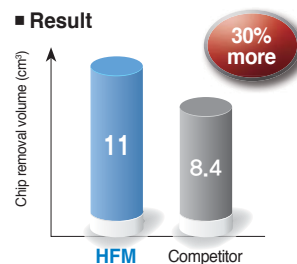
- **Workpiece** Mold
- **Cutting conditions** vc (m/min) = 80, fz (mm/t) = 0.5
ap (mm) = 0.3, ae (mm) = 10
dry
- **Tools** **Insert** LPMW040210R (PC2510)
Holder HFMS1016HR-4S16



- Chip removal rate Q (cm³/min): 4.8
- Cutting time (min): 25

P Alloy tool steel [X155CrVMo12-1 (DIN)/D2 (AISI)/STD11 (KS), HRC60]

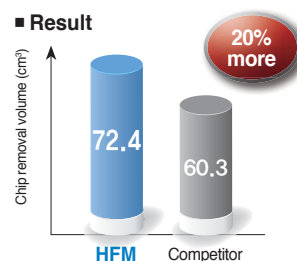
- **Workpiece** Mold
- **Cutting conditions** vc (m/min) = 75, fz (mm/t) = 0.4
ap (mm) = 0.15, ae (mm) = 5
dry
- **Tools** **Insert** LPMW040210R (PC2505)
Holder HFMS1010HR-2S10



- Chip removal rate Q (cm³/min): 1.4
- Cutting time (min): 7.85

S HRSA [TiAl6V4 (DIN)/R56400 (AISI)/Ti-6Al-4V (KS), HRC48]

- **Workpiece** Aviation parts
- **Cutting conditions** vc (m/min) = 50, fz (mm/t) = 1.2
ap (mm) = 0.3, ae (mm) = 10
wet
- **Tools** **Insert** LPMT040210R-MF (PC5300)
Holder HFMS1016HR-4S16

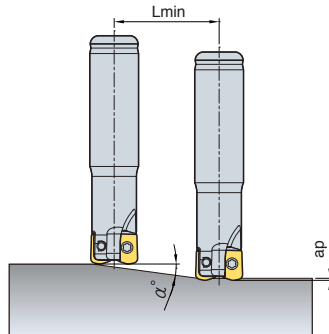


- Chip removal rate Q (cm³/min): 7.2
- Cutting time (min): 10.05



Ramping and helical cutting

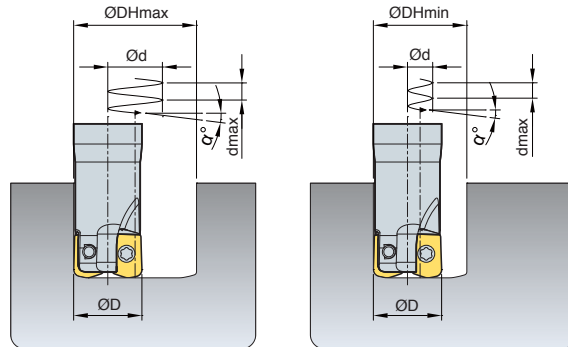
Ramping



$$Lmin = \frac{ap}{\tan \alpha^\circ} \text{ (mm)}$$

* Lmin: Min. inclination cutting length
 α°: Max. ramping angle
 ap: Depth of cut

Helical cutting



- ØD = Tool dia. (mm)
- Ød = Tool path (mm) = ØDH Min, Max - ØD
- ØDH Min (Min diameter, mm) = ØD × 2 - 5.4
- ØDH Max (Max diameter, mm) = ØD × 2 - 2

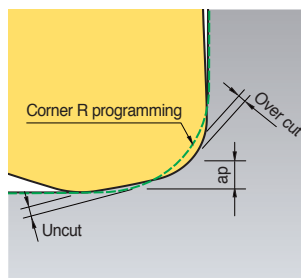
(mm)

Designation	Tool dia. ØD	Depth of cut ap	Ramping		Helical cutting		
			Max ramping angle α (°)	Lmin	Max diameter ØDH Max	Min diameter ØDH Min	Max pitch dmax
HFMS1010HR	10	0.4~0.5	3.5	7	18	15	0.4
HFMS1011HR	11	0.4~0.5	3.1	8	20	17	0.4
HFMS1012HR	12	0.4~0.5	2.7	9	22	19	0.4
HFMS1013HR	13	0.4~0.5	2.4	10	24	21	0.4
HFMS1014HR	14	0.4~0.5	2.2	11	26	23	0.4
HFMS1015HR	15	0.4~0.5	2.0	12	28	25	0.4
HFMS1016HR	16	0.4~0.5	1.8	13	30	27	0.4
HFMS1017HR	17	0.4~0.5	1.7	14	32	29	0.4
HFMS1018HR	18	0.4~0.5	1.6	15	34	31	0.4
HFMS1019HR	19	0.4~0.5	1.5	16	36	33	0.4
HFMS1020HR	20	0.4~0.5	1.4	17	38	35	0.4
HFMS1021HR	21	0.4~0.5	1.3	18	40	37	0.4
HFMM1025HR	25	0.4~0.5	1.1	22	48	45	0.4
HFMM1026HR	26	0.4~0.5	1.0	23	50	47	0.4
HFMM1030HR	30	0.4~0.5	0.9	27	58	55	0.4
HFMM1032HR	32	0.4~0.5	0.8	29	62	59	0.4
HFMM1033HR	33	0.4~0.5	0.8	30	64	61	0.4

- Adjust feed to under 70% of recommended cutting condition when ramping & helical cutting
- In helical ramping, max. cutting depth per 1 helical revolution of cutter should not exceed max. cutting depth as per insert size
- In ramping, max. cutting depth per 1 ramping process of cutter should not exceed max. depth of cut as per used insert size

Corner R programming

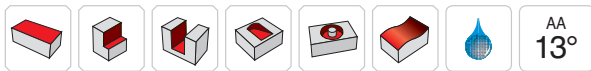
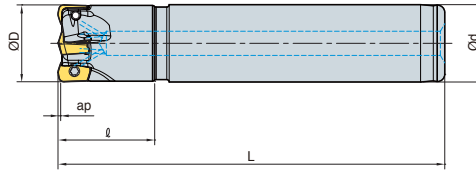
(mm)



Insert	Corner R programming	Cutting conditions		Over Cut	Uncut
		Nose R	Max. ap		
LPMT040210R-MF	R1.0 (Standard)	1.0	0.4	0	0.17
LPMW040210R	R1.5			0.10	0.08
LPEW040210R	R2.0			0.31	0
LPMT040220R-MF	R1.0	2.0	0.5	0	0.41
LPMW040220R	R1.5			0	0.2
LPEW040220R	R2.0 (Standard)			0	0

- When using CNC program, overcut & uncut occurs on the corner processing site if entering the correct program corner R value for each insert
- To prevent overcut, you will need to complete a CNC program considering the above overcut

HFMS1000 new



AA
13°
• AR: -4°
• RR: -14° ~ -7°

(mm)

Designation		ØD	Ød	ℓ	L	ap	
HFMS 1008HR-1S10	1	8	10	20	80	0.4-0.5	0.03
1008HR-1M10	1	8	10	25	100	0.4-0.5	0.03
1008HR-1L10	1	8	10	35	120	0.4-0.5	0.03
1010HR-2S08	2	10	8	20	80	0.4-0.5	0.03
1010HR-2M08	2	10	8	25	100	0.4-0.5	0.04
1010HR-2L08	2	10	8	35	120	0.4-0.5	0.04
1010HR-2S10	2	10	10	20	80	0.4-0.5	0.04
1010HR-2M10	2	10	10	25	105	0.4-0.5	0.05
1010HR-2L10	2	10	10	35	120	0.4-0.5	0.06
1011HR-2S10	2	11	10	20	80	0.4-0.5	0.04
1011HR-2M10	2	11	10	25	105	0.4-0.5	0.06
1011HR-2L10	2	11	10	35	120	0.4-0.5	0.07
1012HR-3S10	3	12	10	20	80	0.4-0.5	0.05
1012HR-3M10	3	12	10	25	105	0.4-0.5	0.06
1012HR-3L10	3	12	10	35	120	0.4-0.5	0.07
1012HR-3S12	3	12	12	20	80	0.4-0.5	0.06
1012HR-3M12	3	12	12	25	105	0.4-0.5	0.08
1012HR-3L12	3	12	12	35	120	0.4-0.5	0.09
1013HR-3S12	3	13	12	20	80	0.4-0.5	0.06
1013HR-3M12	3	13	12	25	105	0.4-0.5	0.09
1013HR-3L12	3	13	12	40	120	0.4-0.5	0.10
1014HR-3S12	3	14	12	20	80	0.4-0.5	0.07
1014HR-3M12	3	14	12	25	105	0.4-0.5	0.09
1014HR-3L12	3	14	12	40	120	0.4-0.5	0.10

Available inserts



Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC5630	PC6510	PC5300	PC5400		ST30A	G10	H01
LPMT 040210R-MF							●					●	●				E11 E12
040220R-MF							●					●	●				
LPMW 040210R						●	●					●	●				
040220R						●	●					●	●				
LPEW 040210R						●	●					●	●				
040220R						●	●					●	●				

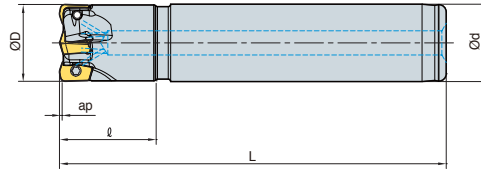
Parts

Specification		
Ø8-Ø10	FTKA01840	TW06S-A
Ø11-Ø14	FTKA01842	

Available inserts E11, E12



HFMS1000 new



AA
13°

• AR: -4°
• RR: -6° ~ -3°

(mm)

Designation		ØD	Ød	l	L	ap		
HFMS	1015HR-4S12	4	15	12	20	80	0.4~0.5	0.07
	1015HR-4M12	4	15	12	25	105	0.4~0.5	0.09
	1015HR-4L12	4	15	12	40	120	0.4~0.5	0.11
	1016HR-4S16	4	16	16	20	80	0.4~0.5	0.11
	1016HR-4M16	4	16	16	25	105	0.4~0.5	0.14
	1016HR-4L16	4	16	16	40	120	0.4~0.5	0.16
	1017HR-4S16	4	17	16	20	80	0.4~0.5	0.11
	1017HR-4M16	4	17	16	25	105	0.4~0.5	0.15
	1017HR-4L16	4	17	16	40	120	0.4~0.5	0.17
	1018HR-4S16	4	18	16	20	80	0.4~0.5	0.11
	1018HR-4M16	4	18	16	25	105	0.4~0.5	0.15
	1018HR-4L16	4	18	16	40	120	0.4~0.5	0.17
	1019HR-4S16	4	19	16	20	80	0.4~0.5	0.12
	1019HR-4M16	4	19	16	25	105	0.4~0.5	0.16
	1019HR-4L16	4	19	16	40	120	0.4~0.5	0.18
	1020HR-4S20	4	20	20	20	80	0.4~0.5	0.17
	1020HR-4M20	4	20	20	25	105	0.4~0.5	0.22
	1020HR-4L20	4	20	20	40	120	0.4~0.5	0.26
	1020HR-5S20	5	20	20	20	80	0.4~0.5	0.17
	1020HR-5M20	5	20	20	25	105	0.4~0.5	0.23
1020HR-5L20	5	20	20	40	120	0.4~0.5	0.27	
1021HR-5S20	5	21	20	20	80	0.4~0.5	0.17	
1021HR-5M20	5	21	20	25	105	0.4~0.5	0.23	
1021HR-5L20	5	21	20	40	120	0.4~0.5	0.27	

Available inserts



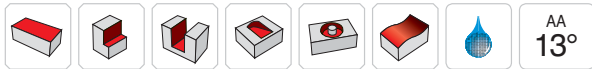
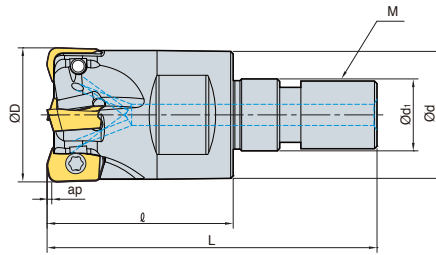
Designation	Cermet		Coated							Uncoated			page				
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3900	PC3600	PC3930	PC6510	PC5300		PC5400	ST30A	G10	H01
LPMT	040210R-MF						●					●	●				E11
	040220R-MF						●					●	●				
LPMW	040210R					●	●					●	●				E12
	040220R					●	●					●	●				
LPEW	040210R					●	●					●	●				
	040220R					●	●					●	●				

Parts

Specification		
Ø15-Ø21	FTKA01842	TW06S-A

Available inserts E11, E12

HFMM new



AA
13°
• AR: -4°
• RR: -14° ~ -3°

(mm)

Designation		ØD	Ød	Ød1	ℓ	L	M	ap	
HFMM 1008HR-M06	1	8	9.5	6.5	17	32	M06	0.4~0.5	0.01
1010HR-M06	2	10	9.5	6.5	17	32	M06	0.4~0.5	0.01
1011HR-M06	2	11	9.5	6.5	17	32	M06	0.4~0.5	0.01
1012HR-M06	3	12	11	6.5	19	34	M6B	0.4~0.5	0.01
1013HR-M06	3	13	11	6.5	19	34	M6B	0.4~0.5	0.01
1016HR-M08	4	16	14.5	8.5	22	39	M08	0.4~0.5	0.03
1017HR-M08	4	17	14.5	8.5	22	39	M08	0.4~0.5	0.03
1020HR-M10	5	20	18	10.5	25	46	M10	0.4~0.5	0.06
1021HR-M10	5	21	18	10.5	25	46	M10	0.4~0.5	0.06
1025HR-M12	6	25	23	12.5	27	51	M12	0.4~0.5	0.11
1026HR-M12	6	26	23	12.5	27	51	M12	0.4~0.5	0.11
1030HR-M16	7	30	29	17	30	60	M16	0.4~0.5	0.17
1032HR-M16	8	32	29	17	30	60	M16	0.4~0.5	0.18
1033HR-M16	8	33	29	17	30	60	M16	0.4~0.5	0.18

Available inserts



Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5360	PC2505	PC2510	PC3500	PC3600	PC3630	PC6510	PC5300	PC5400		ST30A	G10	H01
LPMT 040210R-MF							●					●	●				E11 E12
040220R-MF							●					●	●				
LPMW 040210R						●	●					●	●				
040220R						●	●					●	●				
LPEW 040210R						●	●					●	●				
040220R						●	●					●	●				

Parts

Specification		
Ø8~Ø10 Ø11~Ø33	FTKA01840 FTKA01842	TW06S-A

Available inserts E11, E12 Available adaptor E342~E343

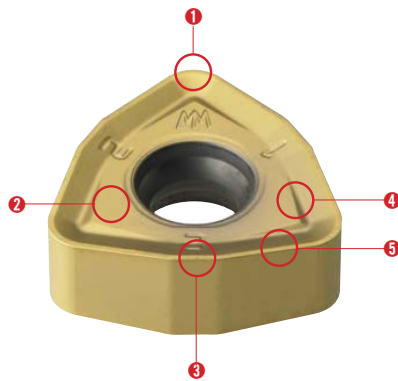


HRMD is more economical due to the use of 6 cutting-edges compared to HRM tool with a 3-edge positive insert

HRMDouble

- HRMD is more economical due to the use of 6 cutting-edges compared to HRM tool with a 3-edge positive insert
- High-rake angle cutting-edge and chip breaker reduces cutting load
- Negative geometry has been designed for rigidity of cutting-edge and double-sided function
- Screw on system and stable support achieves strong clamping force
- Unique insert design for high feed and multifunctional machining
- HRMD insert with symmetrical cutting-edge is applicable for both R and L type machining

Features of insert



1 Nose-R

- Security of rigid edge in ramping pocket machining
- Round edge suitable for high feed rates insert geometry
- Possible to use R/L type machining

2 Clamping surface

- Design for stable clamping
- Prevention of friction by chip

3 Minor cutting-edge

- Improvement of surface roughness in high feed machining
- Special design for decreasing thrust force
- Symmetrical insert design for R/L type tool

4 Chip breaker

- Reduction of cutting load due to High-rake angle
- Improvement of chip flow and evacuation in various applications
- Prevention of damage on clamping face of insert

5 Major cutting-edge

- Symmetrical design insert for R/L type tool
- Superior cutting performance due to high rake angle cutting-edge
- Low cutting resistance in high feed
- Special design for decreasing thrust force

Features of cutter



Inner coolant system

- Improvement of chip control and evacuation
- Longer tool life due to reduced cutting temperature

3-surface constrained system

- Strong clamping system
- Stable clamping system against different cutting resistances in various machining applications

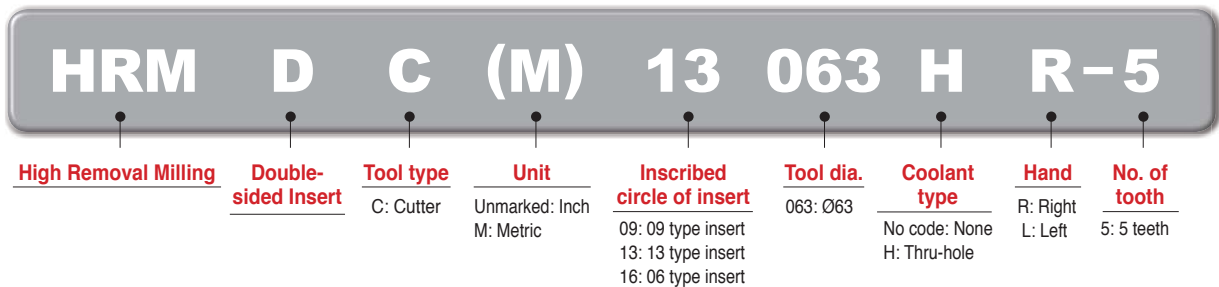
Simple screw on system

- Strong clamping of screw on system
- Convenient clamping system
- Wide chip pocket for better chip evacuation

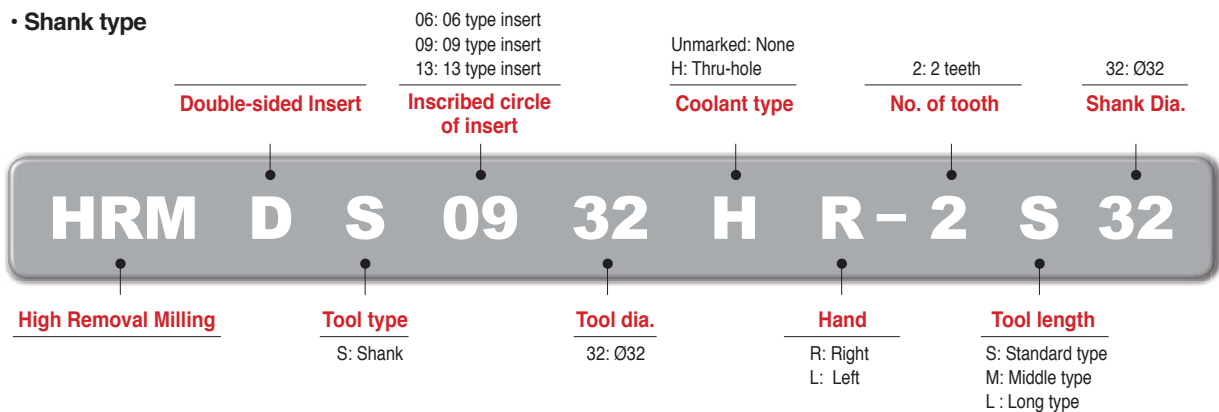
E Technical Information for HRMDouble

Code system

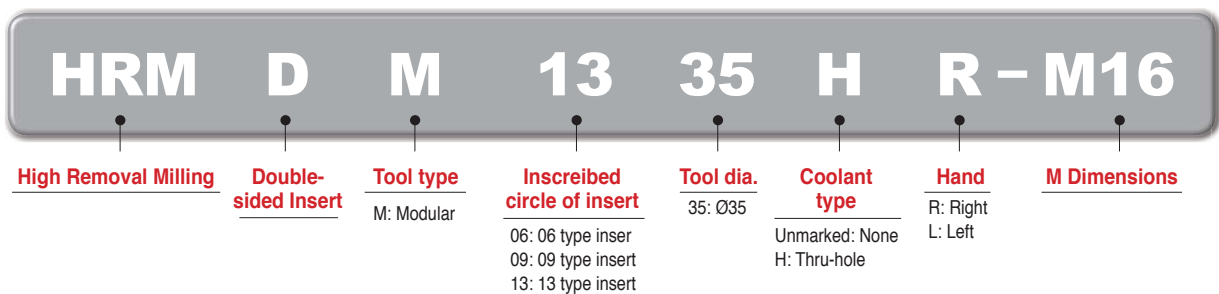
• Cutter type



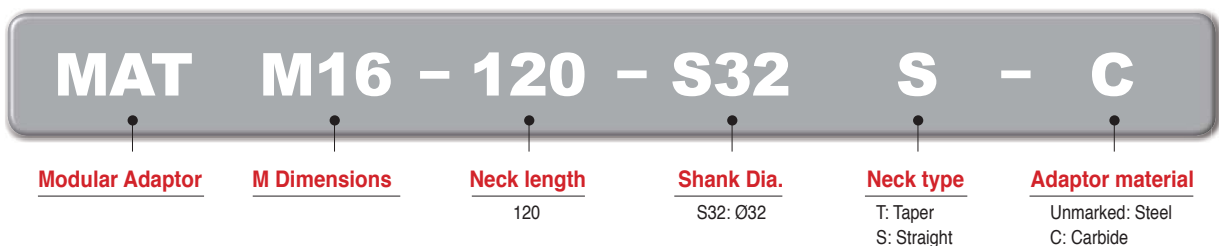
• Shank type



• Modular head



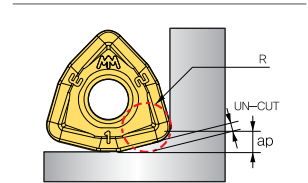
• Modular adaptor



Corner R programming

Designation	Cutting condition		Approx. R (mm)	
	Max.ap (mm)	Max.fz (mm/t)	Input. R	Uncut
WNMX060312ZNN-□□	1.0	1.2	1.8	0.4
WNMX09T316ZNN-□□	1.5	2.0	2.5	0.6
WNMX130520ZNN-□□	2.0	3.0	3.0	0.8
WNMX160720ZNN-□□	2.5	3.5	3.5	1.2

Information for uncut part by using "Input.R" for CAM program

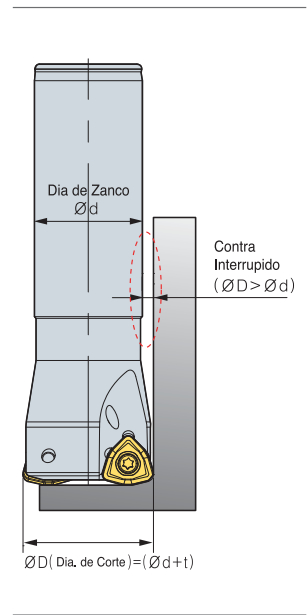


Uncut part can be changed by poor machine condition or weak clamp of workpiece, etc

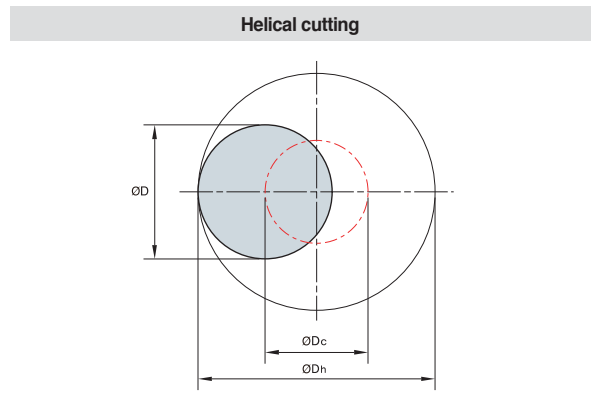
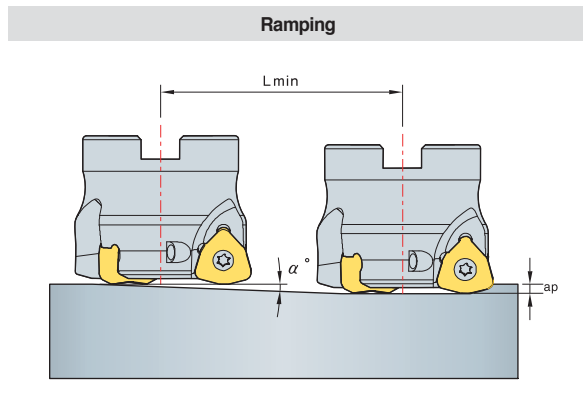
Interference prevent system

Designation	ØD (mm)	Ød (mm)	t (mm)
HRMDS0617HR-2□16	17	16	1
HRMDS0618HR-2□16	18	16	2
HRMDS0621HR-2□20	21	20	1
HRMDS0626HR-3□25	26	25	1
HRMDS0633HR-4□32	33	32	1
HRMDS0926HR-2□25	26	25	1
HRMDS0933HR-3□32	33	32	1
HRMDS0935HR-4□32	35	32	3
HRMDS0940HR-4□32	40	32	8
HRMDS0950HR-5□32	50	32	18
HRMDS0950HR-5□40	50	40	10
HRMDS0950HR-5□42	50	42	8
HRMDS1333HR-3□32	33	32	1
HRMDS1335HR-4□32	35	32	3
HRMDS1340HR-4□30	40	30	8
HRMDS1350HR-4□32	50	32	18
HRMDS1350HR-4□40	50	40	10
HRMDS1350HR-4□42	50	42	8
HRMDS1363HR-5□32	63	32	31
HRMDS1363HR-5□40	63	40	23
HRMDS1363HR-5□42	63	42	21

The side clearance prevents to interference between tool and workpiece even in deep hole machining



Ramping & helical cutting technical data



E Technical Information for HRMDouble

$$L_{min} = \frac{ap}{\tan \alpha^{\circ}} \quad (\text{mm})$$

$$\text{ØDc} = \text{ØDh} - \text{ØD}$$

ØDc = Tool pass of tool center

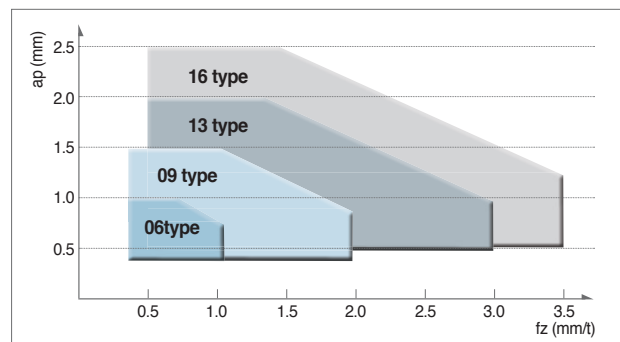
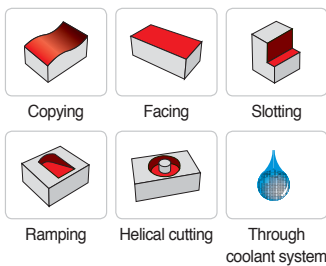
ØDh = Desirable hole diameter on workpiece

ØD = Tool dia.

- Adjust feed to under 70% of Recommended cutting condition when ramping & helical cutting
- In helical ramping, max. cutting depth per 1 helical revolution of cutter should not exceed max. cutting depth as per insert size
- in ramping, max. cutting depth for 1 ramping process should not exceed max. depth of cut as per used insert size

Designation	Tool dia. ØD (mm)	Efficient cutting diameter ØDe (mm)	Ramping			Helical ramping	
			Max. ap (mm)	Max. angle α°	Cutting Length Lmin (mm)	Dh Min. Cutting diameter (mm)	Dh Max. Cutting diameter (mm)
HRMDS0616HR	16	9.5	1	4.8	11	23.8	29.6
HRMDS0617HR	17	10.5	1	4.1	13	25.8	31.6
HRMDS0618HR	18	11.5	1	3.5	16	27.8	33.6
HRMDS0620HR	20	13.5	1	2.5	22	31.8	37.6
HRMDS0621HR	21	14.5	1	2.2	26	33.8	39.6
HRMDS0625HR	25	18.5	1	1.3	44	41.8	47.6
HRMDS0626HR	26	19.5	1	1.2	47	43.8	49.6
HRMDS0632HR	32	25.5	1	0.6	95	55.8	61.6
HRMDS0633HR	33	26.5	1	0.5	114	57.8	63.6
HRMDS0925HR	25	15.4	1.5	5.4	15.8	37.6	46.8
HRMDS0926HR	26	16.4	1.5	5.0	17.0	39.6	48.8
HRMDS0930HR	30	20.4	1.5	3.9	22.0	47.6	56.8
HRMDS0932HR	32	22.3	1.5	3.5	24.5	51.6	60.8
HRMDS0933HR	33	23.3	1.5	3.3	25.8	53.6	62.8
HRMDS0935HR	35	25.4	1.5	3.0	28.3	57.6	66.8
HRMDS0940HR	40	30.2	1.5	2.5	34.5	67.6	76.8
HRMDS0950HR	50	40.2	1.5	1.8	47.0	87.6	96.8
HRMDS1332HR	32	19.3	2	5.7	20.0	47	60
HRMDS1333HR	33	20.3	2	5.4	21.3	49	62
HRMDS1335HR	35	22.3	2	4.8	24.0	53	66
HRMDS1340HR	40	27.2	2	3.7	30.7	63	76
HRMDS1350HR	50	37	2	2.6	44.0	83	96
HRMDS1363HR	63	50	2	1.9	61.3	109	122
HRMDCM09040HR	40	30.2	1.5	2.5	34.5	67.6	76.8
HRMDCM09050HR	50	40.2	1.5	1.8	47.0	87.6	96.8
HRMDCM09063HR	63	53.1	1.5	1.4	63.3	113.6	122.8
HRMDC(M)09080HR	80	70.1	1.5	1.0	84.5	147.6	156.8
HRMDC(M)09100HR	100	90	1.5	0.8	109.5	187.6	196.8
HRMDCM13050HR	50	37	2	2.6	44.0	83	96
HRMDCM13063HR	63	50	2	1.9	61.3	109	122
HRMDC(M)13080HR	80	66.9	2	1.4	84.0	143	156
HRMDC(M)13100HR	100	86.9	2	1.0	110.7	183	196
HRMDC(M)13125HR	125	111.9	2	0.8	144.0	233	246
HRMDC(M)16080HR	80	63.3	2.5	1.4	102	138	156
HRMDC(M)16100HR	100	83.3	2.5	1	143	178	196
HRMDC(M)16125HR	125	108.3	2.5	0.7	204	228	246
HRMDC(M)16160R	160	143.3	2.5	0.5	286	298	316
HRMDC(M)16200R	200	183.3	2.5	0.3	477	378	396
HRMDC(M)16250R	250	233.3	2.5	0.2	716	478	496
HRMDC(M)16315R	315	298.3	2.5	0.1	1432	608	626

Application area



Recommended cutting condition

ISO	Workpiece	Material	Grades	Cutting speed, vc (m/min)		
P	Carbon steel	Low carbon steel	SUM22, C = 0.1~25	PC5300 280 PC5400 245		
		General carbon steel	C = 0.30~55	PC5300 255 PC5400 220		
		High carbon steel	C = 0.55~80	PC5300 240 PC5400 205		
		Low alloy steel (Alloy constituent < 5%)	-	SCM415(H), SCM420, SCM440	PC5300 195 PC5400 170	
			Hardened		PC5300 115 PC5400 100	
			High alloy steel (Alloy constituent > 5%)	SKD61	PC5300 150 PC5400 130	
	M	Stainless steel	Ferritic/Martensitic	SUS410, SUS420, SUS430	PC5300 160 PC5400 135	
				SUS303, SUS304, SUS316	PC5300 130 PC5400 110	
			Austenitic	SUS303, SUS304, SUS316	PC5300 100 PC5400 85	
				Duplex (Austenitic/Ferritic)	F51	PC5300 170 PC5400 150
K			Gray cast iron	Low tensile	GC200, GC250	PC5300 170 PC5400 150
				High tensile	GC300, GC350	PC5300 150 PC5400 130
	Ductile cast iron	Ferritic		GCD400, GCD500	PC5300 170 PC5400 150	
		Pearlitic		GCD600, GCD700	PC5300 150 PC5400 130	
	S	Fe Base	-	Incoloy	PC5300 60 PC5400 50	
		Ni Base	-	Inconel, Nimonic, Hastelloy	PC5300 55 PC5400 45	
Co Base		-	stellite	PC5300 25 PC5400 20		
		Titanium alloys	-	pure Ti	PC5300 130 PC5400 105	
				alloy (TiAl6V4)	PC5300 65 PC5400 55	

Machining example



Working condition

- Work piece SM45C (HRC22)
- Cutting speed vc = 283 m/min (1,803¹)
fz = 1.4 mm/tooth
vf = 10,097 mm/min
ap = 0.8 mm
ae = 35 mm
Coolant: Dry, Machining: Copying
Machine: Horizontal MCT
Overhang of tool: 250 mm
- Tool information HRMDCM13050HR-4
WNMX130520ZNN-MM (PC3500)

40% Increased productivity
80% Reduced tool cost

Test result

In comparing HRMD with our competitor using the same cutting conditions, the cutting speed of HRMD was higher with the same depth of cut (apxae), the cycle time was reduced by 40% and the tool life was increased to over 60%. HRMD is economically more efficient due to the use of 6 cutting-edges compared to EDNW type with positive insert



Working condition

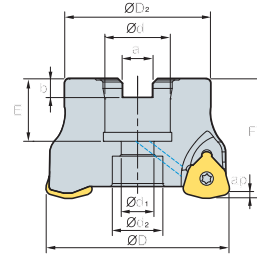
- Work piece STS304
- Cutting speed vc = 130 m/min (414-1)
fz = 1.2 mm/tooth
vf = 2,981 mm/min
ap = 1.0 mm
ae = 80 mm
Coolant: Wet, Machining: Facing and Slotting
Machine: Vertical MCT
Overhang of tool: 250 mm
- Tool information HRMDCM13100HR-6
WNMX130520ZNN-MM (PC3545)

80% Increased productivity
25% Reduced tool cost

Test result

In comparing HRMD with our competitor using the same cutting conditions, the cutting speed of HRMD was higher with the same depth of cut (apxae), the cycle time was reduced by 80% and the tool life was same, but HRMD is economically more efficient due to the use of 6 cutting-edges compared to SDKN type with positive insert

HRMDC(M)09



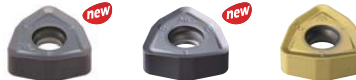
AA
14°
• AR: -7°
• RR: -12°~ -18°

(mm)

Designation		ØD	ØD2	Ød	Ød1	Ød2	a	b	E	F	ap		Bolt	
HRMDCM	09040HR-3	3	40	34	16	9	14	8.4	5.6	19	40	1.5	0.2	SB0825
	09040HR-4	4	40	34	16	9	14	8.4	5.6	19	40	1.5	0.2	
	09050HR-4	4	50	42	22	11	18	10.4	6.3	21	40	1.5	0.3	
	09050HR-5	5	50	42	22	11	18	10.4	6.3	21	40	1.5	0.3	
	09063HR-5	5	63	49	22	11	18	10.4	6.3	21	40	1.5	0.5	SB1025
	09063HR-6	6	63	49	22	11	18	10.4	6.3	21	40	1.5	0.5	
	09080HR-6	6	80	57	27	14	20	12.4	7	23	50	1.5	1.1	SB1230
	09080HR-7	7	80	57	27	14	20	12.4	7	23	50	1.5	1.1	
	09100HR-7	7	100	67	32	18	26	14.4	8	25	50	1.5	1.7	SB1630
09100HR-8	8	100	67	32	18	26	14.4	8	25	50	1.5	1.7		
HRMDC	09080HR-6	6	80	57	25.4	14	20	9.5	6	24	50	1.5	1.1	SB1230
	09080HR-7	7	80	57	25.4	14	20	9.5	6	24	50	1.5	1.1	
	09080HR-31.75-6	6	80	67	31.75	18	26	12.7	8	32	63	1.5	1.5	SB1630
	09080HR-31.75-7	7	80	67	31.75	18	26	12.7	8	32	63	1.5	1.5	
	09100HR-7	7	100	67	31.75	18	26	12.7	8	32	63	1.5	2.1	SB1630
	09100HR-8	8	100	67	31.75	18	26	12.7	8	32	63	1.5	2.1	

Available inserts

WNMX-MF WNMX-ML WNMX-MM

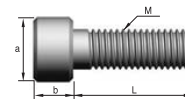


Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3630	PC6510	PC5300	PC5400		ST30A	G10	H01
WNMX 09T316ZNN-MF									●			●	●				E28
09T316ZNN-ML												●	●				
09T316ZNN-MM						●	●	●	●	●		●	●				

Available arbors

Designation	NC arbors	
HRMDCM	09040HR-□	BT□□-FMC16-□□ SK□□-FMC16-□□
	09050HR-□	BT□□-FMC22-□□
	09063HR-□	SK□□-FMC22-□□
	09080HR-□	BT□□-FMC27-□□ SK□□-FMC27-□□
	09100HR-□	BT□□-FMC32-□□ SK□□-FMC32-□□
	HRMDC	09080HR-□
09080HR-31.75-□		BT□□-FMA31.75-□□
09100HR-□		SK□□-FMA31.75-□□

Bolt



Designation	Dimensions (mm)				
	M	a	b	L	pitch
SB0825	M08	13	8	25	1.25
SB1025	M10	16	10	25	1.5
SB1230	M12	18	12	30	1.75
SB1630	M16	24	16	30	2.0

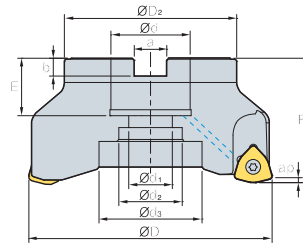
Parts

Specification		
Ø40~Ø100	Screw FTKA0307	Wrench TW09S

Available inserts E28 Available arbors and bolt E371-E373



HRMDC(M)13



AA **14°**
 • AR: -7°
 • RR: -12°~ -4°

(mm)

Designation	ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg	Bolt		
HRMDCM	13050HR-3	3	50	42	22	11	17	-	10.4	6.3	21	40	2	0.3	SB1025
	13050HR-4	4	50	42	22	11	17	-	10.4	6.3	21	40	2	0.3	
	13063HR-4	4	63	49	22	11	18	-	10.4	6.3	21	40	2	0.5	SB1025
	13063HR-5	5	63	49	22	11	18	-	10.4	6.3	21	40	2	0.5	
	13080HR-5	5	80	57	27	14	20	-	12.4	7	23	50	2	1	SB1230
	13080HR-6	6	80	57	27	14	20	-	12.4	7	23	50	2	1	
	13100HR-6	6	100	67	32	18	26	-	14.4	8	25	50	2	1.6	SB1630
	13100HR-7	7	100	67	32	18	26	-	14.4	8	25	50	2	1.6	
13125HR-7	7	125	87	40	22	32	52	16.4	9	29	63	2	3.2	SB2040 MBA-M20	
13125HR-8	8	125	87	40	22	32	52	16.4	9	29	63	2	3.2		
HRMDC	13080HR-5	5	80	57	25.4	14	20	-	9.5	6	24	50	2	1	SB1230
	13080HR-6	6	80	57	25.4	14	20	-	9.5	6	24	50	2	1	
	13080HR-31.75-5	5	80	67	31.75	18	26	-	12.7	8	32	63	2	1.4	SB1630
	13080HR-31.75-6	6	80	67	31.75	18	26	-	12.7	8	32	63	2	1.4	
	13100HR-6	6	100	67	31.75	18	26	-	12.7	8	32	63	2	2.1	SB1630
	13100HR-7	7	100	67	31.75	18	26	-	12.7	8	32	63	2	2.1	
	13125HR-7	7	125	87	38.1	22	32	52	15.9	10	35	63	2	3.3	SB2040 MBA-M20
	13125HR-8	8	125	87	38.1	22	32	52	15.9	10	35	63	2	3.3	

Available inserts

WNMX-MF WNMX-ML WNMX-MM

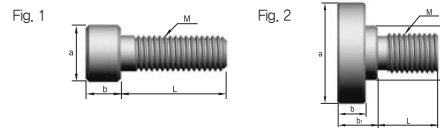


Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN80	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC9330	PC6510	PC5300	PC5400		ST30A	G10	H01
WNMX 130520ZNN-MF									●			●	●				E28
130520ZNN-ML												●	●				
130520ZNN-MM						●	●	●	●	●		●	●				

Available arbors

Designation	NC arbors	
HRMDCM	13050HR-□	BT□-FMC22-□□ SK□-FMC22-□□
	13063HR-□	BT□-FMC22-□□ SK□-FMC27-□□
	13080HR-□	BT□-FMC32-□□ SK□-FMC32-□□
	13100HR-□	BT□-FMC40-□□ SK□-FMC40-□□
	13125HR-□	SK□-FMA25.4-□□ BT□-FMA25.4-□□
HRMDC	13080HR-□	BT□-FMA31.75-□□ SK□-FMA31.75-□□
	13080HR-31.75-□	BT□-FMA31.75-□□ SK□-FMA31.75-□□
	13100HR-□	BT□-FMA38.1-□□ SK□-FMA38.1-□□
	13125HR-□	SK□-FMA38.1-□□

Bolt



Designation	Dimensions (mm)						pitch	Fig.
	M	a	b	b1	C	L		
SB1025	M10	16	10	-	-	25	1.5	1
SB1230	M12	18	12	-	-	30	1.75	1
SB1630	M16	24	16	-	-	30	2.0	1
SB2040	M20	30	20	-	-	40	2.5	1
MBA-M20	M20	50	14	20	27	30	2.5	2

Parts

Specification	Screw	Wrench
Ø50~Ø125	FTKA0412B	TW15S

Available inserts E28 Available arbors and bolt E371~E373

HRMDC(M)16 new

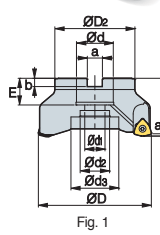


Fig. 1

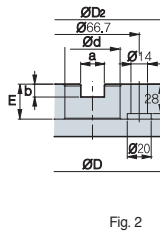


Fig. 2

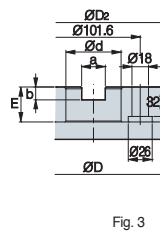


Fig. 3

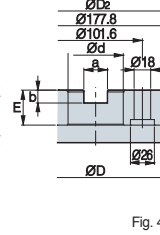
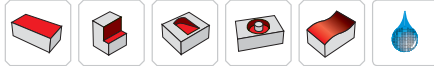


Fig. 4



AA **14°**
 • AR: -7°
 • RR: -12°~ -4°

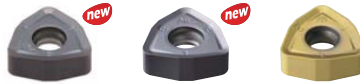
(mm)

Designation	ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	$\frac{ap}{kg}$	Bolt	Fig.		
HRMDC (HRMDCM)	16080HR-4	4	80	65	25.4 (27)	14	20	-	9.5 (12.4)	6 (7)	25 (23)	50	2.5	0.99	SB1230	1
	16080HR-5	5	80	65	25.4 (27)	14	20	-	9.5 (12.4)	6 (7)	25 (23)	50	2.5	0.91		
	16100HR-5	5	100	85	31.75 (32)	18	26	-	12.7 (14.4)	8	33 (25)	63 (50)	2.5	1.68	SB1630	1
	16100HR-6	6	100	85	31.75 (32)	18	26	-	12.7 (14.4)	8	33 (25)	63 (50)	2.5	1.64		
	16125HR-6	6	125	100	38.1 (40)	22	32	52	15.9 (16.4)	10 (9)	36 (29)	63	2.5	3.23	SB2040	1
	16125HR-7	7	125	100	38.1 (40)	22	32	52	15.9 (16.4)	10 (9)	36 (29)	63	2.5	3.24		
	16160R-7	7	160	107	50.8 (40)	-	90	-	19 (16.4)	11 (9)	38 (32)	63	2.5	3.73	MBA-M24	2
	16160R-8	8	160	107	50.8 (40)	-	90	-	19 (16.4)	11 (9)	38 (32)	63	2.5	3.77		
	16200R-8	8	200	145	47.625 (60)	-	132	-	25.4 (25.7)	14	38	63	2.5	6.48	-	3
	16200R-10	10	200	145	47.625 (60)	-	132	-	25.4 (25.7)	14	38	63	2.5	6.61		
	16250R-10	10	250	190	47.625 (60)	-	190	-	25.4 (25.7)	14	38	63	2.5	11.01	-	3
	16250R-12	12	250	190	47.625 (60)	-	190	-	25.4 (25.7)	14	38	63	2.5	11.04		
	16315R-12	12	315	250	47.625 (60)	-	238	-	25.4 (25.7)	14	38	63	2.5	18.34	-	4
	16315R-14	14	315	250	47.625 (60)	-	238	-	25.4 (25.7)	14	38	63	2.5	18.35		

() Metric size

Available inserts

WNMX-MF WNMX-ML WNMX-MM



Designation	Cermet	Coated										Uncoated			page		
		CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3630	PC6510	PC5300	PC5400		ST30A	G10
WNMX 160720ZNN-MF									●			●	●				E28
160720ZNN-ML																	
160720ZNN-MM									●				●				

Available arbors

Designation	HRMDC	HRMDCM
HRMDCM 16080HR-4	BT□□-FMA25.4-□□	BT□□-FMC27-□□
16080HR-5		
16100HR-5	BT□□-FMA31.75-□□	BT□□-FMC32-□□
16100HR-6		
16125HR-6	BT□□-FMA38.1-□□	
16125HR-7		BT□□-FMB40-□□
16160R-7	BT□□-FMA50.8-□□	BT□□-FMC40-□□
16160R-8		
16200R-8		
16200R-10		
16250R-10	BT□□-FMA47.625-□□	
16250R-12		BT□□-FMB60-□□
16315R-12		
16315R-14		

Bolt

Fig. 1

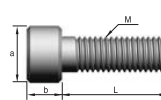
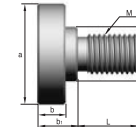


Fig. 2



Designation	Dimensions (mm)							Fig.
	M	a	b	b1	C	L	pitch	
SB1025	M10	16	10	-	-	25	1.5	1
SB1230	M12	18	12	-	-	30	1.75	1
SB1630	M16	24	16	-	-	30	2.0	1
SB2040	M20	30	20	-	-	40	2.5	1
MBA-M20	M20	50	14	20	27	30	2.5	2
MBA-M24	M24	65	14	24	37	36	3.0	2

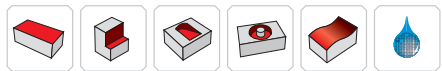
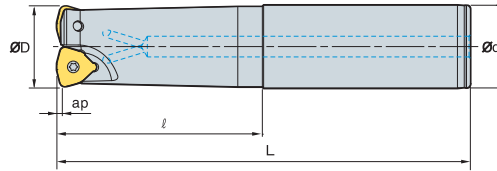
Parts

Specification	Screw	Wrench
Ø80~Ø315	FTGA0513-P	TW20-100

Available inserts E28 Available arbors and bolt E371~E373



HRMDS06 new



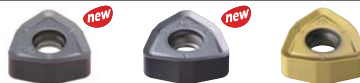
AA
14°
• AR: -7°
• RR: -17°~ -25°

(mm)

Designation		Flutes	ØD	Ød	ℓ	L	ap	kg
HRMDS	0616HR-2S16	2	16	16	30	110	1.0	0.15
	0616HR-2M16	2	16	16	70	150	1.0	0.20
	0616HR-2L16	2	16	16	100	200	1.0	0.26
	0617HR-2S16	2	17	16	20	110	1.0	0.15
	0617HR-2M16	2	17	16	20	150	1.0	0.21
	0617HR-2L16	2	17	16	20	200	1.0	0.28
	0618HR-2S16	2	18	16	20	110	1.0	0.15
	0618HR-2M16	2	18	16	20	150	1.0	0.21
	0618HR-2L16	2	18	16	20	200	1.0	0.28
	0620HR-2S20	2	20	20	50	130	1.0	0.28
	0620HR-2M20	2	20	20	100	180	1.0	0.38
	0620HR-2L20	2	20	20	130	250	1.0	0.53
	0621HR-2S20	2	21	20	20	130	1.0	0.29
	0621HR-2M20	2	21	20	20	180	1.0	0.40
	0621HR-2L20	2	21	20	20	250	1.0	0.57
	0625HR-3S25	3	25	25	60	140	1.0	0.44
	0625HR-3M25	3	25	25	80	180	1.0	0.57
	0625HR-3L25	3	25	25	120	250	1.0	0.80
	0626HR-3S25	3	26	25	30	140	1.0	0.46
	0626HR-3M25	3	26	25	30	180	1.0	0.60
0626HR-3L25	3	26	25	30	250	1.0	0.84	
0632HR-4S32	4	32	32	70	150	1.0	0.82	
0632HR-4M32	4	32	32	100	200	1.0	1.10	
0632HR-4L32	4	32	32	180	300	1.0	1.66	
0633HR-4S32	4	33	32	40	200	1.0	1.14	
0633HR-4M32	4	33	32	40	250	1.0	1.43	
0633HR-4L32	4	33	32	40	300	1.0	1.73	

Available inserts

WNMX-MF WNMX-ML WNMX-MM



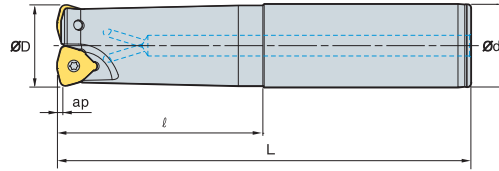
Designation	Cermet		Coated										Uncoated			page	
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC9530	PC6510	PC5300	PC5400	ST30A	G10		H01
WNMX 060312ZNN-MF									●			●	●				E28
060312ZNN-ML									●			●	●				
060312ZNN-MM						●	●		●			●	●				

Parts

Specification	Screw	Wrench
Ø16-Ø33	ETNA02506	TW07S

Available inserts E28

HRMDS09



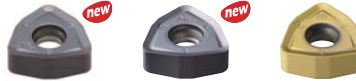
AA
14°
• AR: -7°
• RR: -17°~ -25°

(mm)

Designation		ØD	Ød	l	L	ap	
HRMDS 0925HR-2S25	2	25	25	60	140	1.5	0.5
0925HR-2M25	2	25	25	120	200	1.5	0.6
0925HR-2L25	2	25	25	180	300	1.5	1
0926HR-2S25	2	26	25	60	140	1.5	0.5
0926HR-2M25	2	26	25	60	200	1.5	0.7
0926HR-2L25	2	26	25	60	300	1.5	1
0930HR-3S32	3	30	32	70	150	1.5	0.8
0930HR-3M32	3	30	32	120	200	1.5	1
0930HR-3L32	3	30	32	180	300	1.5	1.5
0932HR-3S32	3	32	32	70	150	1.5	0.8
0932HR-3M32	3	32	32	120	200	1.5	1.1
0932HR-3L32	3	32	32	180	300	1.5	1.7
0933HR-3S32	3	33	32	70	150	1.5	0.8
0933HR-3M32	3	33	32	70	200	1.5	1.1
0933HR-3L32	3	33	32	70	300	1.5	1.7
0935HR-4S32	4	35	32	50	150	1.5	0.9
0935HR-4M32	4	35	32	50	200	1.5	1.1
0935HR-4L32	4	35	32	50	300	1.5	1.7
0940HR-4S32	4	40	32	50	150	1.5	0.9
0940HR-4M32	4	40	32	50	250	1.5	1.5
0940HR-4L32	4	40	32	50	300	1.5	1.8
0940HR-4S40	4	40	40	60	150	1.5	1.3

Available inserts

WNMX-MF WNMX-ML WNMX-MM



Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3630	PC6510	PC5300	PC5400		ST30A	G10	H01
WNMX 09T316ZNN-MF									●			●	●				E28
09T316ZNN-ML												●	●				
09T316ZNN-MM						●	●	●	●	●		●	●				

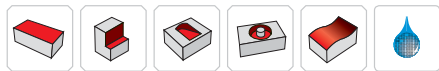
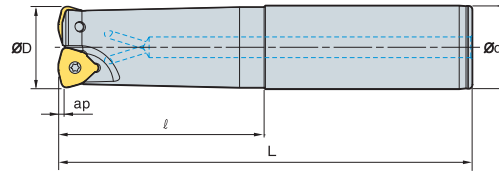
Parts

Specification		
Ø25-Ø40	FTKA0307	TW09S

Available inserts E28



HRMDS09



AA
14°
• AR: -7°
• RR: -17°~ -25°

(mm)

Designation	齿数	ØD	Ød	l	L	ap	kg
HRMDS 0940HR-4M40	4	40	40	130	250	1.5	2.2
0940HR-4L40	4	40	40	180	300	1.5	2.7
0940HR-4S42	4	40	42	60	150	1.5	1.4
0940HR-4M42	4	40	42	130	250	1.5	2.3
0940HR-4L42	4	40	42	180	300	1.5	2.8
0950HR-4S32	4	50	32	40	150	1.5	1.1
0950HR-4M32	4	50	32	40	250	1.5	1.6
0950HR-4L32	4	50	32	40	300	1.5	2
0950HR-4S40	4	50	40	40	150	1.5	1.4
0950HR-4M40	4	50	40	40	250	1.5	2.4
0950HR-4L40	4	50	40	40	300	1.5	2.9
0950HR-4S42	4	50	42	40	150	1.5	1.6
0950HR-4M42	4	50	42	40	250	1.5	2.6
0950HR-4L42	4	50	42	40	300	1.5	3.1
0950HR-5S32	5	50	32	40	150	1.5	1.1
0950HR-5M32	5	50	32	40	250	1.5	1.6
0950HR-5L32	5	50	32	40	300	1.5	2
0950HR-5S40	5	50	40	40	150	1.5	1.4
0950HR-5M40	5	50	40	40	250	1.5	2.4
0950HR-5L40	5	50	40	40	300	1.5	2.9
0950HR-5S42	5	50	42	40	150	1.5	1.6
0950HR-5M42	5	50	42	40	250	1.5	2.6
0950HR-5L42	5	50	42	40	300	1.5	3.1

Available inserts

WNMX-MF WNMX-ML WNMX-MM



Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN80	NC6330	NC5340	NC6350	PC2505	PC2510	PC3500	PC3600	PC9530	PC6510	PC5300	PC5400		ST30A	G10	H01
WNMX 09T316ZNN-MF									●			●	●				E28
09T316ZNN-ML												●	●				
09T316ZNN-MM						●	●	●	●	●		●	●				

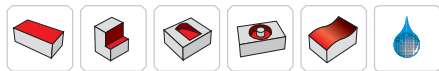
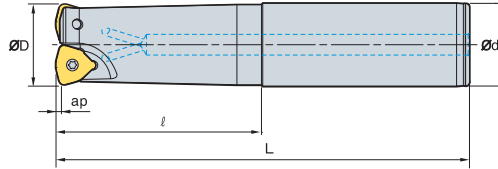
Parts

Specification	Screw	Wrench
Ø40~Ø50	FTKA0307	TW09S

Available inserts E28



HRMDS13



AA
14°
• AR: -7°
• RR: -14° ~ -16°

(mm)

Designation	齿数	ØD	Ød	l	L	ap	kg
HRMDS 1350HR-4S32	4	50	32	50	150	2	1.1
1350HR-4M32	4	50	32	50	250	2	1.7
1350HR-4L32	4	50	32	50	300	2	2
1350HR-4S40	4	50	40	50	150	2	1.5
1350HR-4M40	4	50	40	50	250	2	2.4
1350HR-4L40	4	50	40	50	300	2	2.9
1350HR-4S42	4	50	42	50	150	2	1.6
1350HR-4M42	4	50	42	50	250	2	2.6
1350HR-4L42	4	50	42	50	300	2	3.1
1363HR-4S32	4	63	32	50	150	2	1.4
1363HR-4M32	4	63	32	50	250	2	2.1
1363HR-4L32	4	63	32	50	300	2	2.4
1363HR-4S40	4	63	40	50	150	2	1.8
1363HR-4M40	4	63	40	50	250	2	2.8
1363HR-4L40	4	63	40	50	300	2	3.2
1363HR-4S42	4	63	42	50	150	2	1.9
1363HR-4M42	4	63	42	50	250	2	3
1363HR-4L42	4	63	42	50	300	2	3.5
1363HR-5S32	5	63	32	50	150	2	1.5
1363HR-5M32	5	63	32	50	250	2	2
1363HR-5L32	5	63	32	50	300	2	2.3
1363HR-5S40	5	63	40	50	150	2	1.8
1363HR-5M40	5	63	40	50	250	2	2.8
1363HR-5L40	5	63	40	50	300	2	3.2
1363HR-5S42	5	63	42	50	150	2	1.9
1363HR-5M42	5	63	42	50	250	2	3
1363HR-5L42	5	63	42	50	300	2	3.5

Available inserts

WNMX-MF WNMX-ML WNMX-MM



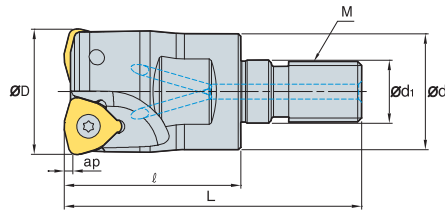
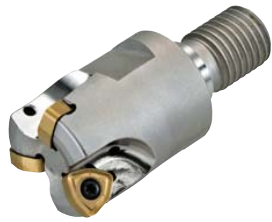
Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3530	PC6510	PC5300	PC5400		ST30A	G10	H01
WNMX 130520ZNN-MF	●								●			●	●				E28
130520ZNN-ML												●	●				
130520ZNN-MM						●	●	●	●	●		●	●				

Parts

Specification	Screw	Wrench
Ø50~Ø63	FTKA0412B	TW15S

Available inserts E28

HRMDM06 new



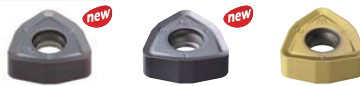
AA
14°
• AR: -7°
• RR: -18°~ -25°

(mm)

Designation	⊙	ØD	Ød	Ød ₁	ℓ	L	M	ap	⊙ kg	
HRMDM	0616HR-M08	2	16	14.5	8.5	25	42	M08	1.0	0.03
	0617HR-M08	2	17	14.5	8.5	25	42	M08	1.0	0.03
	0618HR-M08	2	18	14.5	8.5	25	42	M08	1.0	0.03
	0620HR-M10	2	20	18	10.5	30	51	M10	1.0	0.06
	0621HR-M10	2	21	18	10.5	30	51	M10	1.0	0.07
	0625HR-M12	3	25	23	12.5	35	59	M12	1.0	0.10
	0626HR-M12	3	26	23	12.5	35	59	M12	1.0	0.11
	0632HR-M16	4	32	29	17	40	67	M16	1.0	0.21
	0633HR-M16	4	33	29	17	40	67	M16	1.0	0.22

Available inserts

WNMX-MF WNMX-ML WNMX-MM



Designation	Cermet		Coated										Uncoated			page	
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3630	PC6510	PC5300	PC5400	ST30A	G10		H01
WNMX 060312ZNN-MF									●			●	●				E28
060312ZNN-ML												●	●				
060312ZNN-MM						●	●		●			●	●				

Available adaptor

Designation	Available adaptor	Designation	Available adaptor		
HRMDM	0616HR-M08	MAT- M08	HRMDM 0625HR-M12	MAT- M12	
	0617HR-M08	MAT- M08		0626HR-M12	MAT- M12
	0618HR-M08	MAT- M08		0632HR-M16	MAT- M16
	0620HR-M10	MAT- M10		0633HR-M16	MAT- M16
	0621HR-M10	MAT- M10			

Designation: HRMDM0625HR-M12
Modular head threading measure size (M12)

||

Adaptor spec.: MAT-M12-030-S20S
Adaptor threading measure (M12)

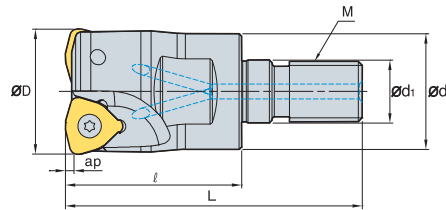
Parts

Specification	 Screw	 Wrench
Ø16~Ø33	ETNA02506	TW07S

Available inserts E28 Available adaptor E342~E343



HRMDM09



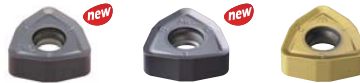
AA **14°**
 • AR: -7°
 • RR: -18°~ -25°

(mm)

Designation	⚙️	ØD	Ød	ød1	ℓ	L	M	ap	⚖️
HRMDM	0925HR-M12	2	25	23	12.5	35	59	M12	0.10
	0926HR-M12	2	26	23	12.5	35	59	M12	0.11
	0930HR-M16	3	30	29	17	40	67	M16	0.19
	0932HR-M16	3	32	29	17	40	67	M16	0.20
	0933HR-M16	3	33	29	17	40	67	M16	0.21
	0935HR-M16	4	35	29	17	40	67	M16	0.22
	0940HR-M16	4	40	29	17	40	67	M16	0.25

Available inserts

WNMX-MF WNMX-ML WNMX-MM



Designation	Cermet		Coated										Uncoated			page	
	CN2000	CN80	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC8530	PC6510	PC5300	PC5400	ST30A	G10		H01
WNMX	09T316ZNN-MF								●			●	●				E28
	09T316ZNN-ML											●	●				
	09T316ZNN-MM						●	●	●	●	●	●	●				

Available adaptor

Designation	Available adaptor
HRMDM 0925HR-M12	MAT- M12
0926HR-M12	
0930HR-M16	
0932HR-M16	MAT- M16
0933HR-M16	
0935HR-M16	
0940HR-M16	

Designation: HRMDM0932HR-M16
 Modular head threading measure size (M16)

||

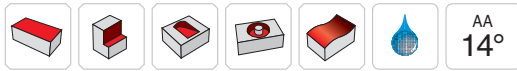
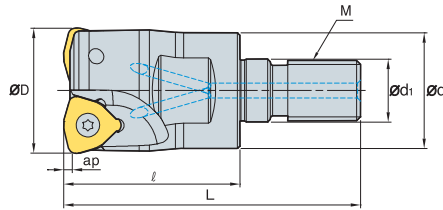
Adaptor spec.: MAT-M16-035-S32S
 Adaptor threading measure (M16)

Parts

Specification	Screw	Wrench
Ø25~Ø40	FTKA0307	TW09S

Available inserts E28 Available adaptor E342~E343

HRMDM13



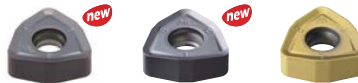
AA
14°
• AR: -7°
• RR: -18°~ -25°

(mm)

Designation	齿数	ØD	Ød	ød1	ℓ	L	M	ap	kg	
HRMDM	1332HR-M16	2	32	29	17	40	67	M16	2	0.20
	1333HR-M16	2	33	29	17	40	67	M16	2	0.20
	1335HR-M16	2	35	29	17	40	67	M16	2	0.22
	1340HR-M16	3	40	29	17	45	72	M16	2	0.26

Available inserts

WNMX-MF WNMX-ML WNMX-MM



Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC9530	PC8510	PC5300	PC5400		ST30A	G10	H01
WNMX 130520ZNN-MF									●			●	●				E28
130520ZNN-ML												●	●				
130520ZNN-MM						●	●	●	●	●		●	●				

Available adaptor

Designation	Available adaptor
HRMDM 1332HR-M16	MAT-M16
1333HR-M16	
1335HR-M16	
1340HR-M16	

Designation: HRMDM0932HR-M16
Modular head threading measure size (M16)

II

Adaptor spec.: MAT-M16-120-S32T
Adaptor threading measure (M16)

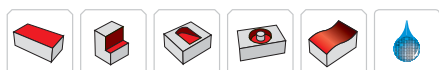
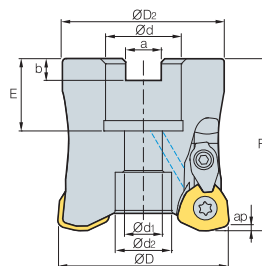
Parts

Specification	Screw	Wrench
Ø32~Ø40	FTKA0412B	TW15S

Available inserts E28 Available adaptor E342-E343



HRMC(M)13



AA **15°** • AR: 7°
• RR: -15°~ -5°

(mm)

Designation		ØD	ØD	Ød	Ød1	Ød2	a	b	E	F	ap		Bolt	
HRMC(M)	13050HR-3	3	50	47	22.225 (22)	11	16.4	8.0 (10.4)	5 (6.3)	20 (21)	50	2.0	0.4	SB1035
	13050HR-4	4	50	47	22.225 (22)	11	16.4	8.0 (10.4)	5 (6.3)	20 (21)	50	2.0	0.4	SB1035
	13063HR-4	4	63	60	22.225 (22)	11	17	8.0 (10.4)	5 (6.3)	20 (21)	50	2.0	0.7	SB1035
	13080HR-5	5	80	76	31.75 (27)	18 (13)	26 (20)	12.7 (12.4)	8 (7)	32 (23)	70	2.0	1.6	SB16 (12)45

() Metric size

Available inserts

WDKT-MH



Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3530	PC6510	PC5300	PC5400		ST30A	G10	H01
WDKT 130520ZDSR-MH						●	●	●	●	●	●	●	●				E27

Available arbors

Designation	HRMDC	HRMDCM	
HRMC(M)	13050HR-3		
	13050HR-4	BT□□-FMA22.225-□□	BT□□-FMC22-□□ SK□□-FMC22-□□
	13063HR-4		
13080HR-5			
		BT□□-FMA31.75-□□ SK□□-FMA31.75-□□	BT□□-FMC27-□□ SK□□-FMC27-□□

Bolt

Fig. 1

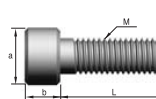
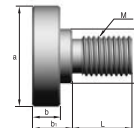


Fig. 2



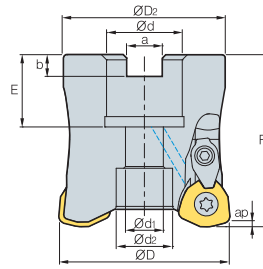
Designation	Dimensions (mm)							Fig
	M	a	b	b1	C	L	pitch	
SB1035	M10	16	10	-	-	35	1.5	1
SB1245	M12	18	12	-	-	45	1.75	1
SB1645	M16	24	16	-	-	45	2.0	1
SB2040	M20	30	20	-	-	40	2.5	1
MBA-M20	M20	50	14	20	27	30	2.5	2
MBA-M24	M24	65	14	24	37	36	3.0	2

Parts

Specification					
Ø50~Ø80	FTGA0513-P	CHH4.5R1	CTX04513H	CR03	TW20-100

Available inserts E27 Available arbors and bolt E371~E373

HRMC(M)15



• AR: 7°
• RR: -15°~ -5°

(mm)

Designation	ØD	ØD	Ød	Ød1	Ød2	a	b	E	F	ap	kg	Bolt	
HRMC(M) 15063HR-3	3	63	60	22.225 (22)	11	17	8.0 (10.4)	5 (6.3)	20 (21)	50	2.5	0.7	SB1035
15080HR-4	4	80	76	31.75 (27)	18 (13)	26 (20)	12.7 (12.4)	8 (7)	32 (23)	70	2.5	1.7	SB16 (12)45
15100HR-5	5	100	96	31.75 (32)	18	26	12.7 (14.4)	8 (8)	32 (26)	70	2.5	2.8	SB1645
15100HR-6	6	100	96	31.75 (32)	18	26	12.7 (14.4)	8 (8)	32 (26)	70	2.5	3.2	SB1645
15125HR-6	6	125	98	38.1 (40)	22	32	15.9 (16.4)	10 (9)	35 (29)	63	2.5	3.3	SB2040
15160R-7	7	160	100	50.8 (40)	-	72	19.0 (16.4)	11 (9)	38 (35)	63	2.5	4.3	MBA-M24 (M20)

() Metric size

Available inserts

WDKT-MH

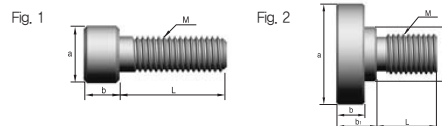


Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3630	PC6510	PC5300	PC5400		ST30A	G10	H01
WDKT 150625ZDSR-MH								●	●	●	●	●	●				E27

Available arbors

Designation	HRMDC	HRMDCM
HRMC(M) 15063HR-3	BT□□-FMA22.225-□□	BT□□-FMC22-□□ SK□□-FMC22-□□
15080HR-4	BT□□-FMA31.75-□□ SK□□-FMA31.75-□□	BT□□-FMC27-□□ SK□□-FMC27-□□
15100HR-5		BT□□-FMC32-□□
15100HR-6		SK□□-FMC32-□□
15125HR-6	BT□□-FMA38.1-□□ SK□□-FMA38.1-□□	BT□□-FMB40-□□ BT□□-FMC40-□□
15160R-7	BT□□-FMA50.8-□□	SK□□-FMC40-□□

Bolt



Designation	Dimensions (mm)							Fig.
	M	a	b	b1	C	L	Pitch	
SB1035	M10	16	10	-	-	35	1.5	1
SB1245	M12	18	12	-	-	45	1.75	1
SB1645	M16	24	16	-	-	45	2.0	1
SB2040	M20	30	20	-	-	40	2.5	1
MBA-M20	M20	50	14	20	27	30	2.5	2
MBA-M24	M24	65	14	24	37	36	3.0	2

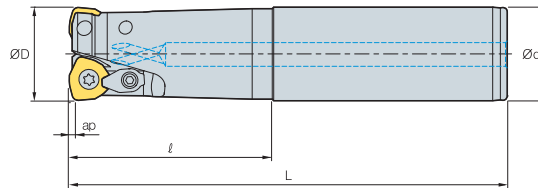
Parts

Specification	Screw	Clamp	Clamp screw	C-ring	Wrench
Ø63~Ø160	FTGA0513-P	CHH5.5R1	CTX0515	CR04	TW20-100

Available inserts E27 Available arbors and bolt E371-E373



HRMS08/10



AA 15°
 • AR: 7°
 • RR: -11° ~ -5°

(mm)

Designation		ØD	Ød	l	L	ap	
HRMS	0820HR-2S20	2	20	20	50	130	0.3
	0820HR-2M20	2	20	20	100	180	0.4
	0820HR-2L20	2	20	20	130	250	0.5
	0821HR-2S20	2	21	20	50	130	0.3
	0821HR-2M20	2	21	20	50	180	0.4
	0821HR-2L20	2	21	20	50	250	0.5
	1025HR-2S25	2	25	25	60	140	0.4
	1025HR-2M25	2	25	25	120	200	0.6
	1025HR-2L25	2	25	25	180	300	0.9
	1026HR-2S25	2	26	25	60	140	0.4
	1026HR-2M25	2	26	25	60	200	0.6
	1026HR-2L25	2	26	25	60	300	1.0
	1030HR-2S32	2	30	32	70	150	0.8
	1030HR-2M32	2	30	32	120	200	1.0
1030HR-2L32	2	30	32	180	300	1.5	

Available inserts

WDKT-MH



Type	Designation	Cermet		Coated										Uncoated			page	
		CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC9530	PC6510	PC5300	PC5400	ST30A	G10		H01
08 type	WDKT 080316ZDSR-MH						●	●	●	●	●	●	●	●				E27
10 type	WDKT 10T320ZDSR-MH						●	●	●	●	●	●	●					

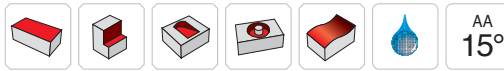
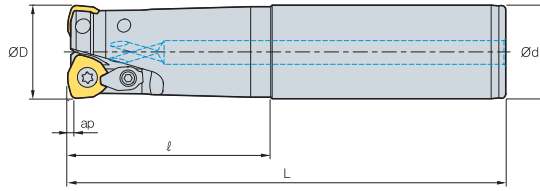
Parts

Specification					
Ø20~Ø21 (08 type)	FTNA0306	-	-	-	TW09P
Ø25~Ø30 (10 type)	FTKA0408	CHH3.5R1	CTX03510	CR03	TW15S

Available inserts E27



HRMS13



AA **15°**
 • AR: 7°
 • RR: -11°~ -5°

(mm)

Designation		ØD	Ød	ℓ	L	ap	
HRMS	1332HR-2S32	2	32	32	70	150	0.8
	1332HR-2M32	2	32	32	120	200	1.0
	1332HR-2L32	2	32	32	180	300	1.6
	1333HR-2S32	2	33	32	70	150	0.8
	1333HR-2M32	2	33	32	70	200	1.1
	1333HR-2L32	2	33	32	70	300	1.7
	1335HR-2S32	2	35	32	50	150	0.8
	1335HR-2M32	2	35	32	50	200	1.1
	1335HR-2L32	2	35	32	50	300	1.7
	1340HR-3S32	3	40	32	50	150	0.8
	1340HR-3M32	3	40	32	50	250	1.4
	1340HR-3L32	3	40	32	50	300	1.7
	1340HR-3S40	3	40	40	60	150	1.2
	1340HR-3M40	3	40	40	130	250	2.1
	1340HR-3L40	3	40	40	180	300	2.6
	1340HR-3S42	3	40	42	60	150	1.4
1340HR-3M42	3	40	42	130	250	2.3	
1340HR-3L42	3	40	42	180	300	2.7	

Available inserts

WDKT-MH



Designation	Cermet		Coated										Uncoated			page	
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC9530	PC8510	PC5300	PC5400	ST30A	G10		H01
WDKT 130520ZDSR-MH						●	●	●	●	●	●	●	●				E27

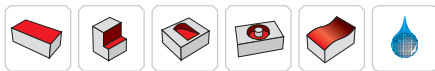
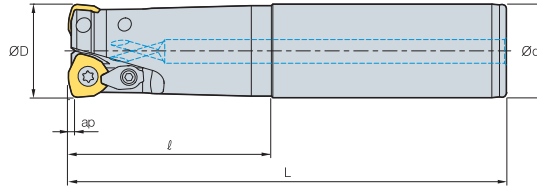
Parts

Specification					
	Screw	Clamp	Clamp screw	C-ring	Wrench
Ø32,33,35	FTGA0510-P	CHH4.5R1	CTX04513H	CR03	TW20
Ø40	FTGA0512-P	CHH5.5R1	CTX04513H	CR03	TW20

Available inserts E27



HRMS15



AA
15°
• AR: 7°
• RR: -8° ~ -6°

(mm)

Designation		ØD	Ød	l	L	ap	
HRMS	1550HR-3S32	3	50	32	50	150	1.0
	1550HR-3M32	3	50	32	50	250	1.6
	1550HR-3L32	3	50	32	50	300	1.9
	1550HR-3S40	3	50	40	50	150	1.4
	1550HR-3M40	3	50	40	50	250	2.3
	1550HR-3L40	3	50	40	50	300	2.8
	1550HR-3S42	3	50	42	50	150	1.5
	1550HR-3M42	3	50	42	50	250	2.5
	1550HR-3L42	3	50	42	50	300	3.0
	1563HR-4S32	4	63	32	50	150	1.3
	1563HR-4M32	4	63	32	50	250	1.9
	1563HR-4L32	4	63	32	50	300	2.2
	1563HR-4S40	4	63	40	50	150	1.7
	1563HR-4M40	4	63	40	50	250	2.6
	1563HR-4L40	4	63	40	50	300	3.1
	1563HR-4S42	4	63	42	50	150	1.8
1563HR-4M42	4	63	42	50	250	2.8	
1563HR-4L42	4	63	42	50	300	3.3	

Available inserts

WDKT-MH



Designation	Cermet		Coated								Uncoated			page			
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3630	PC6510	PC5300	PC5400		ST30A	G10	H01
WDKT 150625ZDSR-MH								●	●	●	●	●	●				E27

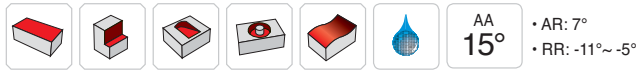
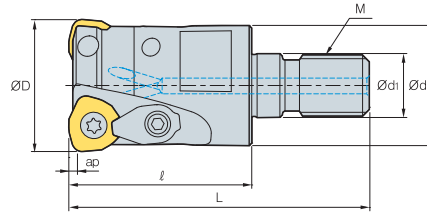
Parts

Specification					
Ø50~Ø63	FTGA0513-P	CHI5.5R1	CTX0515	CR04	TW20

Available inserts E27



HRMM08



(mm)

Designation	⊙	ØD	Ød	Ød1	ℓ	L	M	ap	⊕ kg	
HRMM	0820HR-M10	2	20	18	10.5	30	51	M10	1	0.06
	0821HR-M10	2	21	18	10.5	30	51	M10	1	0.06
	0825HR-M12	3	25	23	12.5	35	59	M12	1	0.11
	0826HR-M12	3	26	23	12.5	35	59	M12	1	0.11
	0828HR-M12	3	28	23	12.5	35	59	M12	1	0.12
	0832HR-M16	4	32	29	17	40	67	M16	1	0.21
	0833HR-M16	4	33	29	17	40	67	M16	1	0.21
	0835HR-M16	4	35	29	17	40	67	M16	1	0.23
0840HR-M16	5	40	29	17	40	67	M16	1	0.25	

Available inserts

WDKT-MH



Designation	Cermet		Coated										Uncoated			page	
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC9530	PC6510	PC5300	PC5400	ST30A	G10		H01
WDKT 080316ZDSR-MH						●	●	●	●	●	●	●	●				E27

Available adaptor

Designation	Available adaptor	
HRMM	0820HR-M10	MAT-M10
	0821HR-M10	
	0825HR-M12	MAT-M12
	0826HR-M12	
	0828HR-M12	
	0832HR-M16	MAT-M16
	0833HR-M16	
	0835HR-M16	
0840HR-M16		

Designation: HRMM0820HR-M10
Modular head threading measure size (M10)

II

Adaptor spec.: MAT-M10-030-S20S
Adaptor threading measure (M10)

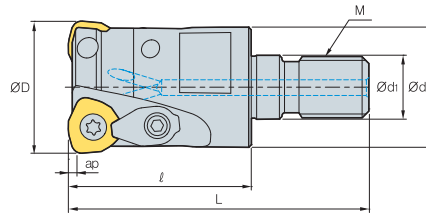
Parts

Specification						
Ø20~Ø40	FTNA0306	-	-	-	-	-

Available inserts E27 Available adaptor E342-E343



HRMM10/13



AA
15°
• AR: 7°
• RR: -11° ~ -5°

(mm)

Designation	⚙️	ØD	Ød	Ød1	ℓ	L	M	ap	📐
HRMM	1025HR-M12	2	25	23	12.5	35	59	M12	0.1
	1026HR-M12	2	26	23	12.5	35	59	M12	0.1
	1030HR-M16	2	30	29	17	40	67	M16	0.2
	1032HR-M16	3	32	29	17	45	72	M16	0.26
	1035HR-M16	3	35	29	17	45	72	M16	0.23
	1040HR-M16	4	40	29	17	45	72	M16	0.27
HRMM	1332HR-M16	2	32	29	17	40	67	M16	0.17
	1333HR-M16	2	33	29	17	40	67	M16	0.17
	1335HR-M16	2	35	29	17	40	67	M16	0.19
	1340HR-M16	3	40	29	17	45	72	M16	0.24

Available inserts

WDKT-MH



Type	Designation	Cermet		Coated										Uncoated			page					
		CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC9530	PC8510	PC5300	PC5400	ST30A	G10		H01				
10 type	WDKT 10T320ZDSR-MH						●	●	●	●	●	●	●	●	●	●	●					
13 type	WDKT 130520ZDSR-MH						●	●	●	●	●	●	●	●	●	●	●					E27

Available adaptor

Designation	Available adaptor
HRMM 1025HR-M12	MAT-M12
1026HR-M12	
1030HR-M16	
1032HR-M16	MAT-M16
1035HR-M16	
1040HR-M16	
1332HR-M16	MAT-M16
1333HR-M16	
1335HR-M16	
1340HR-M16	

Designation: HRMM0820HR-M10
Modular head threading measure size (M10)

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Adaptor spec.: MAT-M10-030-S20S
Adaptor threading measure (M10)

Parts

Specification						
	Screw	Clamp	Clamp screw	C-ring	Wrench	Wrench
Ø25~Ø40 (10 type)	FTKA0408	CHH3.5R1	CTX03510	CR03	TW15S	-
Ø32, 33, 35 (13 type)	FTGA0510-P	CHH4.5R1	CTX04513H	CR03	-	TW20
Ø40 (13 type)	FTGA0512-P	CHH5.5R1	CTX04513H	CR03	-	TW20

Available inserts E27 Available adaptor E342~E343

