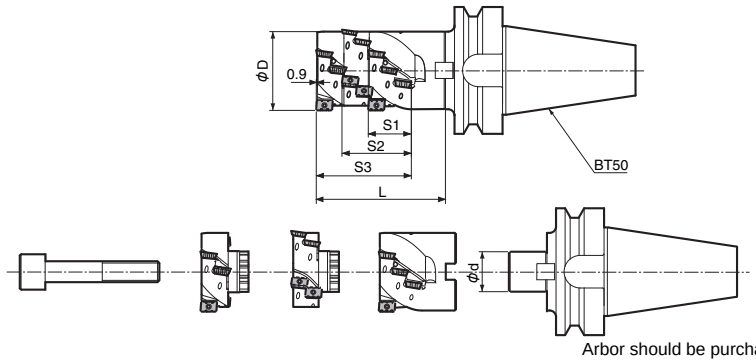
MHD Helical Endmill

Shouldering | Deep Slotting | Facing

MHD-FMA-SA Arbor-Free type (Base Unit+2 Front Pieces+Clamp Bolt)



Arbor should be purchased separately.

Use notched insert (-N2, -N3).

Toolholder Dimensions

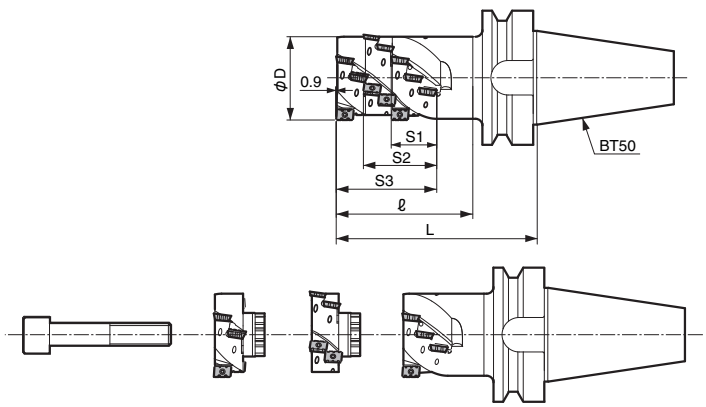
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	ød	L	C	S1	S2	S3	A.R.	R.R.	
MHD 63-FMA-SA	□	21	3	63	31.75	102.9	0.9	31.8	52.8	74.7	+9°	0°	1.6
80-FMA-SA	□	27		80	38.1	123.9			63.3	95.7			3.5
100-FMA-SA	□	40	4	100	50.8	129.9		42.3	73.8	106.2			5.7

・Above weight does not include arbor's weight.

Applicable Insert and Composition of Toolholder

Endmill	Applicable Inserts ➡ M19	Base Unit ➡ M87	Front Piece (2pcs) ➡ M88	Applicable Arbor
MHD 63-FMA-SA	NDMM12T308ER-N2 / N3	MHD63-FMA-A	MHD63-F	BT50-FMA31.75-○○
80-FMA-SA		MHD80-FMA-A	MHD80-F	BT50-FMA38.1-○○
100-FMA-SA		MHD100-FMA-A	MHD100-F	BT50-FMA50.8-○○

MHD-BT50-SA Integral Arbor type (Base Unit+2 Front Pieces+Clamp Bolt)



Use notched insert (-N2, -N3).

Toolholder Dimensions

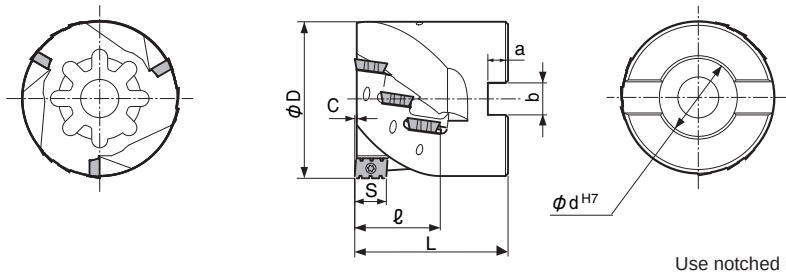
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	L	ℓ	C	S1	S2	S3	A.R.	R.R.	
MHD 63-BT50-SA	□	21	3	63	137	89	0.9	31.8	52.8	74.7	+9°	0°	5.3
80-BT50-SA	□	27		80	158	110			63.3	95.7			7.6
100-BT50-SA	□	40	4	100	168	129.9		42.3	73.8	106.2			10.2

Applicable Inserts and Composition of Toolholder

Endmill	Applicable Inserts ➡ M19	Base Unit ➡ M87	Front Piece (2pcs) ➡ M88
MHD 63-BT50-SA	NDMM12T308ER-N2 / N3	MHD63-BT50-A	MHD63-F
80-BT50-SA		MHD80-BT50-A	MHD80-F
100-BT50-SA		MHD100-BT50-A	MHD100-F

● : Std. Item □ : Check Availability

MHD-FMA-A Base Unit (FMA Arbor-Free type)



Use notched insert (-N2, -N3).

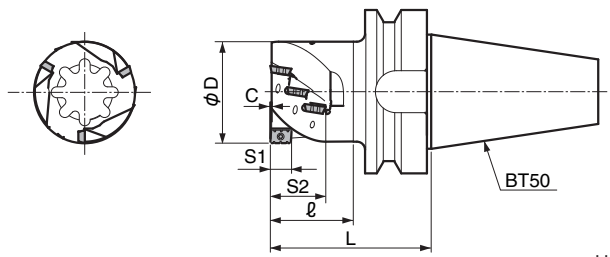
Toolholder Dimensions

Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	ød	L	ℓ	C	a	b	A.R.	R.R.	
MHD 63-FMA-A	□	9	3	63	31.75	60.9	32.7	0.9	8	12.7	+9°	0°	0.8
80-FMA-A	□			80	38.1				10	15.9			1.4
100-FMA-A	□	16	4	100	50.8	66.9	43.2		11	19.0			2.3

Applicable Inserts, Front Piece and Arbor

Endmill	Applicable Inserts ➡ M19	Applicable Front Piece ➡ M88	Applicable Arbor
MHD 63-FMA-A	NDMM12T308ER-N2 / N3	MHD63-F	BT50-FMA31.75-○○
80-FMA-A		MHD80-F	BT50-FMA38.1-○○
100-FMA-A		MHD100-F	BT50-FMA50.8-○○

MHD-BT50-A Base Unit (BT50 Integral Arbor type)



Use notched insert (-N2, -N3).

Toolholder Dimensions

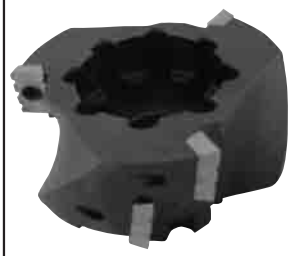
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	L	ℓ	C	S1	S2		A.R.	R.R.	
MHD 63-BT50-A	□	9	3	63	94.1	46.1	0.9	11.8	31.8		+9°	+0°	4.5
80-BT50-A	□			80									5.5
100-BT50-A	□	16	4	100	104	66.0			42.3				6.8

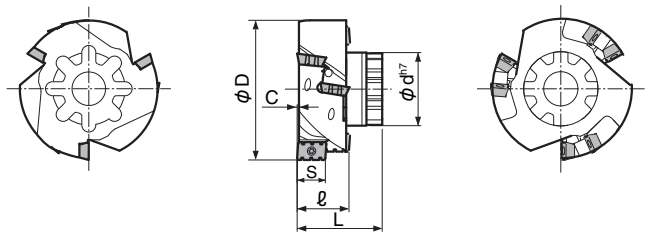
Applicable Inserts and Front Piece

Endmill	Applicable Inserts ➡ M19	Applicable Front Piece ➡ M88
MHD 63-BT50-A	NDMM12T308ER-N2 / N3	MHD63-F
80-BT50-A		MHD80-F
100-BT50-A		MHD100-F

● : Std. Item □ : Check Availability

MHD-F (Front Piece)





Use notched insert (-N2, -N3).

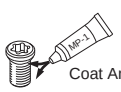
Toolholder Dimensions

Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm) øD	ød	L	ℓ	C	S	Rake Angle (°) A.R.	R.R.	Weight (kg)	Applicable Inserts ➔M19
MHD 63-F	□	6	3	63	32.5	37.9	21.9	0.9	11.8	+9°	0°	0.3	NDMM12T308ER-N2 / N3
80-F	□	9		80	42	51.9	32.4					0.9	
100-F	□	12	4	100	61	56.4	32.4					1.4	

Spare Parts

Description		Spare Parts: Clamp Screw	Wrench	Clamp Bolt	Wrench	Anti-seize Compound
Arbor -Free Type ➔M86	MHD 63-FMA-SA	SB-3080TR	DT-10	HH16X90	LW-14	MP-1
	80-FMA-SA			HH20X110	LW-17	
	100-FMA-SA			HH24X110	LW-19	
Base Unit ➔M87	MHD 63-FMA-A			HH16X90	LW-14	
	80-FMA-A			HH20X110	LW-17	
	100-FMA-A			HH24X110	LW-19	
Arbor Integral Type ➔M86	MHD 63-BT50-SA			HH16X65	LW-14	
	80-BT50-SA			HH20X90	LW-17	
	100-BT50-SA			HH24X90	LW-19	
Base Unit ➔M87	MHD 63-BT50-A			HH16X65	LW-14	
	80-BT50-A			HH20X90	LW-17	
	100-BT50-A			HH24X90	LW-19	
Front Piece ➔M88	MHD 63-F			-	-	-
	80-F					
	100-F					

・If purchasing the front piece only, the wrench (DT-10) is not included.
・When purchasing the base unit and front pieces separately for assembly, the clamp bolt and wrench (for bolt) are not included. Please purchase them separately.
・Various clamp bolts for front pieces are available. ➔M91



Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

● : Std. Item □ : Check Availability

Applicable Inserts (common to MHD-SA / -SB / -C)

Toolholder	Applicable Inserts ➔ M17, M18				Applicable Inserts ➔ M18, M19		
			 1-Notched	 2-Notched		 2-Notched	 3-Notched
MHD 32-S32-SA	NDKW 090304ER	NDKT 090304ER-V	NDKT 090304ER-N1	NDKT 090304ER-N2	-	-	-
MHD 20S-S20-C			-	-			
MHD 25-S25-C	-	-	NDKT 090304ER-N1	NDKT 090304ER-N2			
32-S32-C							
MHD 40-S32-SA	-	-	-	-	NDMM 12T308ER-T	NDMM 12T308ER-N2	NDMM 12T308ER-N3
40-S40-SA							
40-S42-SA							
50-S42-SA							
MHD 40-S42-SB							
50-S42-SB							
MHD 40-S42-C							
50-S42-C							
MHD 63-FMA-SA	-	-	-	-	-		
80-FMA-SA							
100-FMA-SA							
MHD 63-BT50-SA							
80-BT50-SA							
100-BT50-SA							

・For installation of nicked insert, make sure to see **M90**.

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Insert Grade (Cutting Speed Vc: m/min)												
			Cermet			PVD Coated Carbide								Carbide	
	øD ø20~ø32	øD ø40~ø100	TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10
Stainless Steel	0.05~0.13	0.05~0.18		☆ 100~200		☆ 80~180	☆ 80~180				★ 60~150			
Carbon Steel	0.05~0.15	0.05~0.2		★ 100~200		☆ 80~180	★ 80~180				☆ 60~150			
Alloy Steel	0.05~0.15	0.05~0.2		★ 80~180		☆ 80~180	★ 80~180				☆ 60~150			
Mold Steel	0.05~0.15	0.05~0.2		★ 80~180		☆ 60~150	★ 60~150				☆ 60~130			
Cast Iron	0.05~0.15	0.05~0.2										★ 60~150		☆ 60~130
Non-ferrous Metals	0.05~0.15	0.05~0.2												★ 100~300

・Reduce the ap by 20-50% when cutting with long overhang length or using long shank types.
・Reduce the cutting speed by 20-50% when cutting with multiple front pieces.
・Compressed air is recommended to aid in chip evacuation.

★: 1st Recommendation ☆: 2nd Recommendation

No. of inserts to be installed in the Plus Mill

Description		No. of Inserts	No. of Flutes	NDK □ 09 type Without notch	NDK □ 09 type With notch N1	NDK □ 09 type With notch N2	FPMT09 Type	RPMT10 Type
Separate Type	MHD 32-S32-SA	10	2	-	5	5	-	-
	32-S32-4RSA				4	4	2	
Base Unit	MHD 32-S32-A	2	2	-	1	1	-	-
Front Piece	MHD 32-F	4	2	-	2	2	-	-
	32-4RF				1	1	2	
Integral Type	MHD 20S-S20-C	3	1	3	-	-	-	-
	25-S25-C	8	2	-	4	4		
	32-S32-C	10	2	-	5	5		
	MHD 20-S20-4RC	3	1	2	-	-	1	-
	25S-S25-4RC	4					2	
	32-S32-5RC	10	2	-	4	4	-	2

Description		No. of Inserts	No. of Flutes	NDMM12 type With notch N2	NDMM12 type With notch N3	RPMT10 Type	RPMT12 Type
Separate Type	MHD 40-S32-SA 40-S40-SA 40-S42-SA 50-S42-SA	10	2	5	5	-	-
	MHD 63-FMA-SA	21	3	7	14		
	80-FMA-SA	27	3	9	18		
	100-FMA-SA	40	4	20	20		
	MHD 63-BT50-SA	21	3	7	14		
	80-BT50-SA	27	3	9	18		
	100-BT50-SA	40	4	20	20		
	MHD 40-S32-5RSA 40-S42-5RSA	10	2	4	4	2	-
	50-S42-6RSA					-	2
	MHD 40-S42-SB 50-S42-SB	10	2	5	5	-	-
Base Unit	MHD 40-S32-A 40-S40-A 40-S42-A 50-S42-A	2	2	1	1	-	-
	MHD 63-FMA-A 80-FMA-A	9	3	3	6		
	100-FMA-A	16	4	8	8		
	MHD 63-BT50-A 80-BT50-A	9	3	3	6		
	100-BT50-A	16	4	8	8		
	MHD 40-S42-B 50-S42-B	6	2	3	3		
Front Piece	MHD 40-F 50-F	4	2	2	2	-	-
	63-F 80-F	6 9	3	2 3	4 6		
	100-F	12	4	6	6		
	MHD 40-5RF 50-6RF	4	2	1	1	2 -	- 2
Integral Type	MHD 40-S42-C 50-S42-C	10	2	5	5	-	-
	MHD 40-S42-5RC 50-S42-6RC	10	2	4	4	2 -	- 2

Caution when installing Notched Insert

When installing Notched Insert, it is important to install it in the correct position. When it is installed wrongly, the tool cannot cut the workpiece and it may damage the toolholder body.

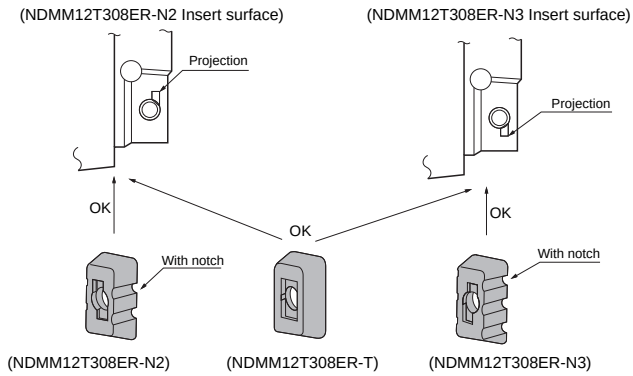
Description of Notched Insert	Applicable Toolholder
	In case of having insert installation mark
NDKT 090304ER-N1 / N2	MHD25,32
NDMM 12T308ER-N2 / N3	MHD40,50,63,80,100

In case of "having insert installation mark"

Caution during insert installation

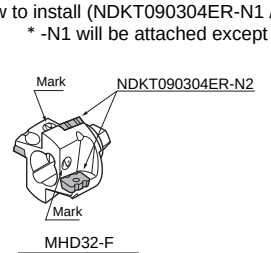
1) NDMM12T308ER-N2 or -3 in the insert pocket with projection (only MHD40 / 50)
2) ND□□○○○○○○ER-N2 in the insert pocket marked ②
3) ND□□○○○○○○ER-N3 in the insert pocket marked ③

1. How to install (MHD40, 50)

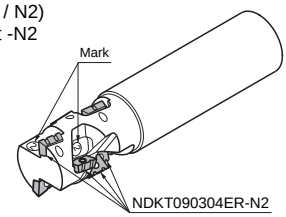


2. How to install (MHD25, 32, 63, 80, 100)

● How to install (NDKT090304ER-N1 / N2)
* -N1 will be attached except -N2

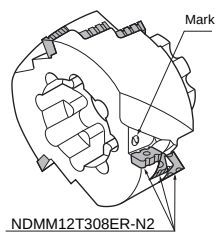


MHD32-F

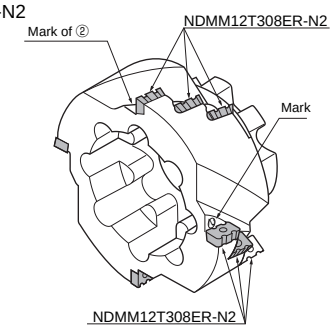


MHD25, 32 series.
(MHD25-S25-C shown)

● How to install (NDMM12T308ER-N2 / N3)
* -N3 will be attached except -N2



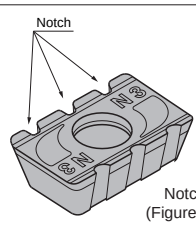
MHD63, 80
(MHD63-F shown)



MHD100
(MHD100-F Shown)

Notched Insert Benefits

The Notched Insert does not only lower cutting resistance but it also has a great effect on reducing the chattering owing to good workpiece approach.



Notched Insert
(Figure shows -N3.)

Cutting Edge Length of Plus Mill

Base Unit	No. of Flutes	No. of Inserts	Plus Mill → M82~M83, M87~M88				Radius Plus Mill → M134					
			Front Piece (Both Middle and End)		Length of cutting edge (mm)	Clamp Bolt	Front Piece (Middle)		Radius Front Piece (End)		Length of cutting edge (mm)	Clamp Bolt
			Description	No.of pcs			Description	No.of pcs	Description	No.of pcs		
MHD32-S32-A	2	6	**MHD32-F**	1	25.4	**HH8X35**	**MHD32-F**	0	**MHD32-4RF**	1	25.6	**HH8X35**
		10		2	41.8	**HH8X50**		1		1	42.0	**HH8X50**
		14		3	58.2	**HH8X70**		2		1	58.4	**HH8X65**
MHD40-S32-A (MHD40-S32-B) MHD40-S40-A MHD40-S42-A (MHD40-S42-B)	2	6	**MHD40-F**	1	32.8 (53.8)	**HH8X40**	**MHD40-F**	0	**MHD40-5RF**	1	27.2 (48.2)	**HH8X35**
		10		2	53.8 (74.8)	**HH8X65**		1		1	48.2 (69.2)	**HH8X55**
		14		3	74.8 (95.8)	**HH8X85**		2		1	69.2 (90.2)	**HH8X80**
		18		4	95.8 (116.8)	**HH8X110**		3		1	90.2 (111.2)	**HH8X100**
MHD50-S42-A (MHD50-S42-B)	2	6	**MHD50-F**	1	32.8 (53.8)	**HH12X40**	**MHD50-F**	0	**MHD50-6RF**	1	28.2 (49.2)	**HH12X40**
		10		2	53.8 (74.8)	**HH12X65**		1		1	49.2 (70.2)	**HH12X55**
		14		3	74.8 (95.8)	**HH12X85**		2		1	70.2 (91.2)	**HH12X80**
		18		4	95.8 (116.8)	**HH12X110**		3		1	91.2 (112.2)	**HH12X100**
		22		5	116.8 (137.8)	**HH12X130**		4		1	112.2 (133.2)	**HH12X120**
		26		6	137.8 (158.8)	**HH12X150**		5		1	133.2 (154.2)	**HH12X140**
MHD63-FMA-A	3	9	**MHD63-F**	0	32.7	**HH16X45**	-	-	-	-	-	-
		15		1	53.7	**HH16X65**						
		21		2	74.7	**HH16X90**						
		27		3	95.7	**HH16X110**						
		33		4	116.7	**HH16X130**						
MHD80-FMA-A	3	9	**MHD80-F**	0	32.7	**HH20X40**	-	-	-	-	-	-
		18		1	64.2	**HH20X75**						
		27		2	95.7	**HH20X110**						
		36		3	127.2	**HH20X140**						
		45		4	158.7	**HH20X170**						
MHD100-FMA-A	3	16	**MHD100-F**	0	43.2	**HH24X40**	-	-	-	-	-	-
		28		1	74.7	**HH24X75**						
		40		2	106.2	**HH24X110**						
		52		3	137.7	**HH24X140**						
		64		4	169.2	**HH24X170**						
MHD63-BT50-A	3	15	**MHD63-F**	1	53.7	**HH16X45**	-	-	-	-	-	-
		21		2	74.7	**HH16X65**						
		27		3	95.7	**HH16X90**						
		33		4	116.7	**HH16X110**						
MHD80-BT50-A	3	18	**MHD80-F**	1	64.2	**HH20X55**	-	-	-	-	-	-
		27		2	95.7	**HH20X90**						
		36		3	127.2	**HH20X120**						
		45		4	158.7	**HH20X150**						
MHD100-BT50-A	4	28	**MHD100-F**	1	74.7	**HH24X60**	-	-	-	-	-	-
		40		2	106.2	**HH24X90**						
		52		3	137.7	**HH24X120**						
		64		4	169.2	**HH24X150**						

・Dimension in ( ) is for Base Unit B.
・Clamp Bolt Description (HH ○○ X □□): ○○ ...indicates screw standard (M ○○), □□ ...indicates bolt's nominal length (mm).
・Clamp Bolt Descriptions are common to both Base Unit A and B.

Difference of Cutting Edge Length between Radius Plus Mill and Plus Mill

As shown in Fig.1, the edge length of front piece in Radius Plus Mill (ℓ2) and the edge length of front piece in Plus Mill (ℓ1) are different.

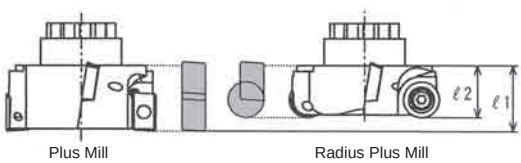


Fig.1

For Radius Plus Mill and Plus Mill,
the number of Front Piece required varies depending on the ap.

Difference of Clamp Bolt Length in the Front Piece

Radius Plus Mill's inserts protrude from the bottom of the body for the function of ramping or helical milling, as well as the difference of Front Piece Length.
For this reason, the Radius Plus Mill's clamp bolt length in the front piece is shorter than that of Plus Mill. (Fig.2)

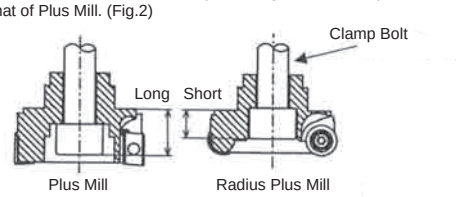


Fig.2

When using Radius Plus Mill's front piece, be careful for the difference of clamp bolt length as mentioned above.
If the length of clamp bolt is too long, the front piece will not be secured even when the bolt is tightened. Make sure to check the length of clamp bolt for installation of the front piece to avoid troubles such as tool damages.