

Hydro-Clamp Type Valve Finisher

# HVF Series

## Drastically shortened time and reduced costs!

Cooperated with  NT TOOL CORPORATION MITSUBISHI MATERIALS CORPORATION

# Hydro-Clamp Type Valve Finisher

# *HVF Series*

## Greatly Reduced Costs

The head and holder combination dramatically reduces the work required for tool replacement.

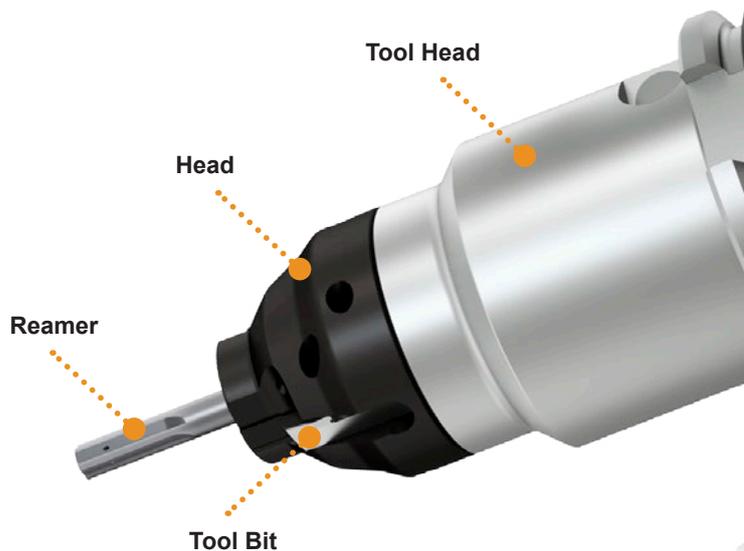


Integrated Type  
(Conventional)



Assembly Type  
(Separated Head)

Suitable for small-quantity, large-variety production  
(Heads can be prepared for each vehicle model).  
Price : Assembly type < Integrated type



## Successful Tool Standardization

Reduced amounts of spare tools make management easier.

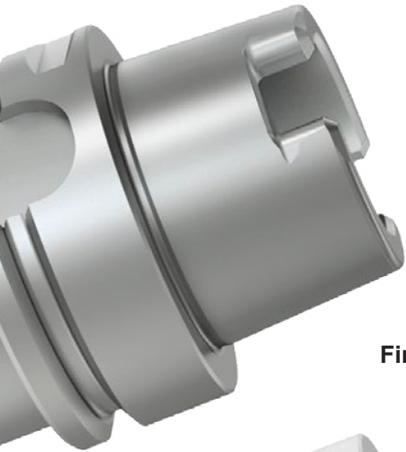


## Improved Accuracy

An optimal coolant supply to the cutting edge improves accuracy while also extending tool life.



Rough Processing

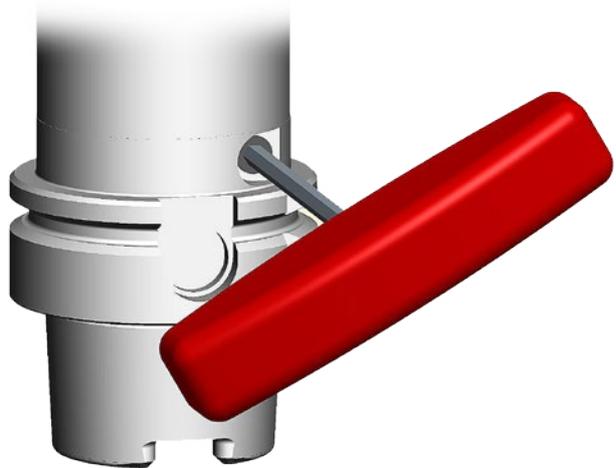


Finish Processing



## Drastically Shortened Time

The reamer and head can be clamped simultaneously with one-touch operation (While maintaining high rigidity).



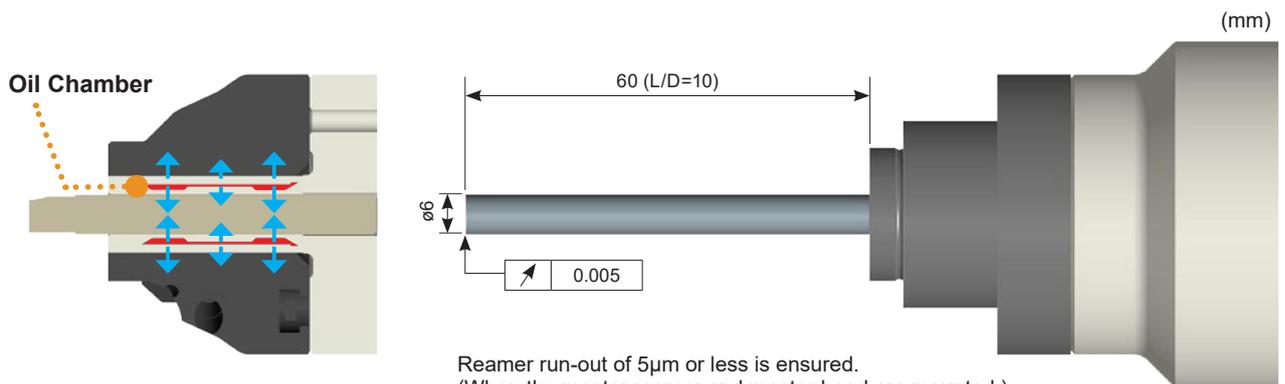
Simple control reduces the required setup time.

**Important!**

Be sure to mount the reamer and head before clamping. If connection is performed while either of them is not mounted, the joining surface of the clamp may be deformed and breakage may occur.

## This is the strength of the hydro chuck!

Simultaneous clamp connection of the inner and outer diameters while maintaining high rigidity allows high accuracy, making reamer run-out adjustment virtually unnecessary.



Reamer run-out of 5 $\mu$ m or less is ensured.  
(When the master reamer and master head are mounted.)

# Hydro-Clamp Type Valve Finisher

## HVF

M 
  K 
  N 
  S 
  H

Sintered Alloy



Fig.1

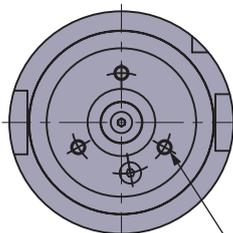
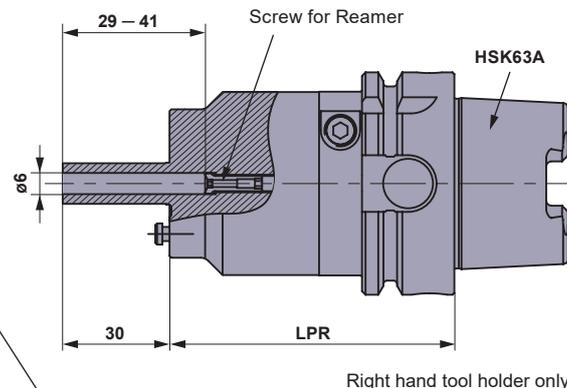
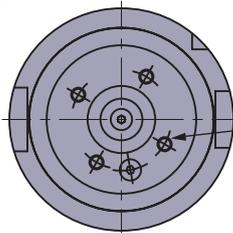


Fig.2



\* The Mitsubishi Materials tool holder (Patent held in Japan) is manufactured under license by **NT TOOL CORPORATION**

### Tool Holder

(mm)

Order Number	Stock	LPR	Coolant Hole (Hole)	WT (kg)	Installation	Balance Accuracy
HVF06-HSK63A110A3	●	80	Fig.1 (3 Hole)	1.5	HSK63A (With Coolant Pipe)	G2.5 (5000min <sup>-1</sup> )
HVF06-HSK63A110A4	●	80	Fig.2 (4 Hole)	1.5		
HVF06-HSK63A180A3	●	150	Fig.1 (3 Hole)	2.6		
HVF06-HSK63A180A4	●	150	Fig.2 (4 Hole)	2.6		

\* A variety of other tool holders, such as BT shanks with their distinctive double face contact, can be mounted as well.

### Spare Parts (Reamer Adjustment Screws)

(mm)

Geometry	Order Number	Stock	MPCA	MPCB	MPCC	MPCD	MPCE	MPCF
	HSC05016HW	●	5.8	M5×0.8	14	2	2	2.5

Reamer adjustment screws can be operated using a wrench from both the reamer insertion hole side and the mounting side.

The reamer adjustment screw is an accessory (1 piece), which can also be additionally purchased as a stand-alone item.

A hexagon socket set screw (M4) is included with the tool holder. It should be used as a stopper when discharging coolant with the use of an external oil supply.

● : Inventory maintained in Japan.

## Produced-to-Order Products

Please inquire with our Sales Department regarding production.

## For Valve Guide Hole Reaming

Compatible Reamer Range :  $\leq \phi 6$  (Guide Hole Diameter)



### RT9005

Optimization and strengthening of the hard phase (WC) particle diameter and bonded phase (Co) have improved the wear resistance and fracture resistance, for the creation of a unique cemented carbide.

### EF05

An ultra-high hardness, ultra micro-particle cemented carbide that contains specialized components. Just as with RT9005, its wear resistance and fracture resistance have been improved.

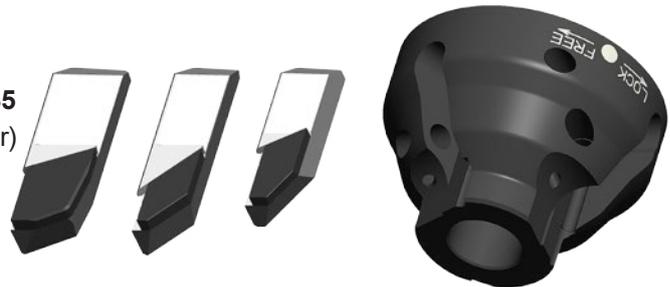
### Coating (TiN)

The hard coating with smooth surface properties can maintain an excellent finished surface over extended periods of time.

## For Seat Surface Machining

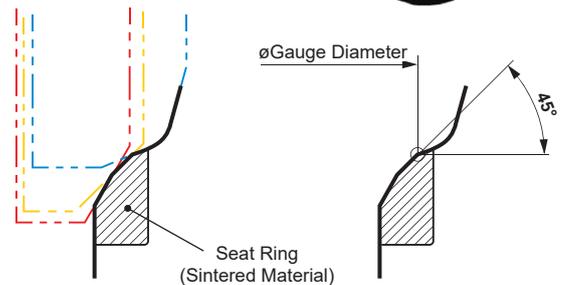
Compatible Head Range :  $\phi 20 \leq \text{Head Diameter} < \phi 35$   
(Seat Hole : 45°-Surface Gauge Diameter)

Tool Bits : 3 types



### MB4020

High edge toughness has been achieved with a newly-developed special binder. The even sharper cutting edge shape can suppress the creation of burrs and ensure high accuracy. CBN, which is included with a high chemical content, has outstanding welding resistance so that a constant dimensional accuracy can be maintained.



● The seat surface is composed of 3 faces at different angles (Cutting with 3 types of edges).

## Relationship between number of head cutting edge grooves and tool holders

\* HVF06-HSK63A110A○ : Suitable for cases with no processing beyond the angle plate

\* HVF06-HSK63A180A○ : Suitable for cases with processing beyond the angle plate

Order Number	Coolant Hole (Hole)	Number of Cutting Edge Grooves on Head			
		1	2	3	4
HVF06-HSK63A110A3	3	○	×	○	×
HVF06-HSK63A180A3	3	○	×	○	×
HVF06-HSK63A110A4	4	○	○	×	○
HVF06-HSK63A180A4	4	○	○	×	○

○ = Suitable × = Unsuitable

\* Hexagon socket set screws (M4) are included as separately-packaged accessories.

**Important!** Install screws in any unused coolant holes.

## Recommended Cutting Conditions

### Valve Guide Hole Reaming

Work Material	Reamer Material			Cutting Speed <b>vc</b> (m/min)	Feed per Tooth <b>fz</b> (mm/t.)
	Grade	Hardness (HRA)	Bending Strength (Gpa)		
Steel-based Sintered Alloy	<b>RT9005</b>	92.2	2.0	40 – 60	0.03 – 0.05
Cast Iron	<b>EF05</b>	94.0	2.5		

### Seat Surface Machining

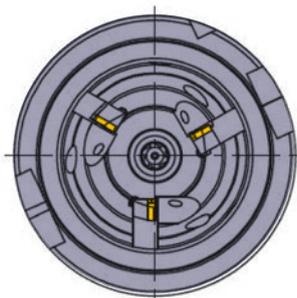
Work Material	Priority	CBN Material for Bits	Cutting Speed <b>vc</b> (m/min)	Feed per Tooth <b>fz</b> (mm/t.)
Sintered Alloy	1	<b>MB4020</b>	60 – 120	0.05 – 0.10
	2	<b>MB825</b>		
	2	<b>MB835</b>		

\* Select materials in accordance with seat material characteristics.

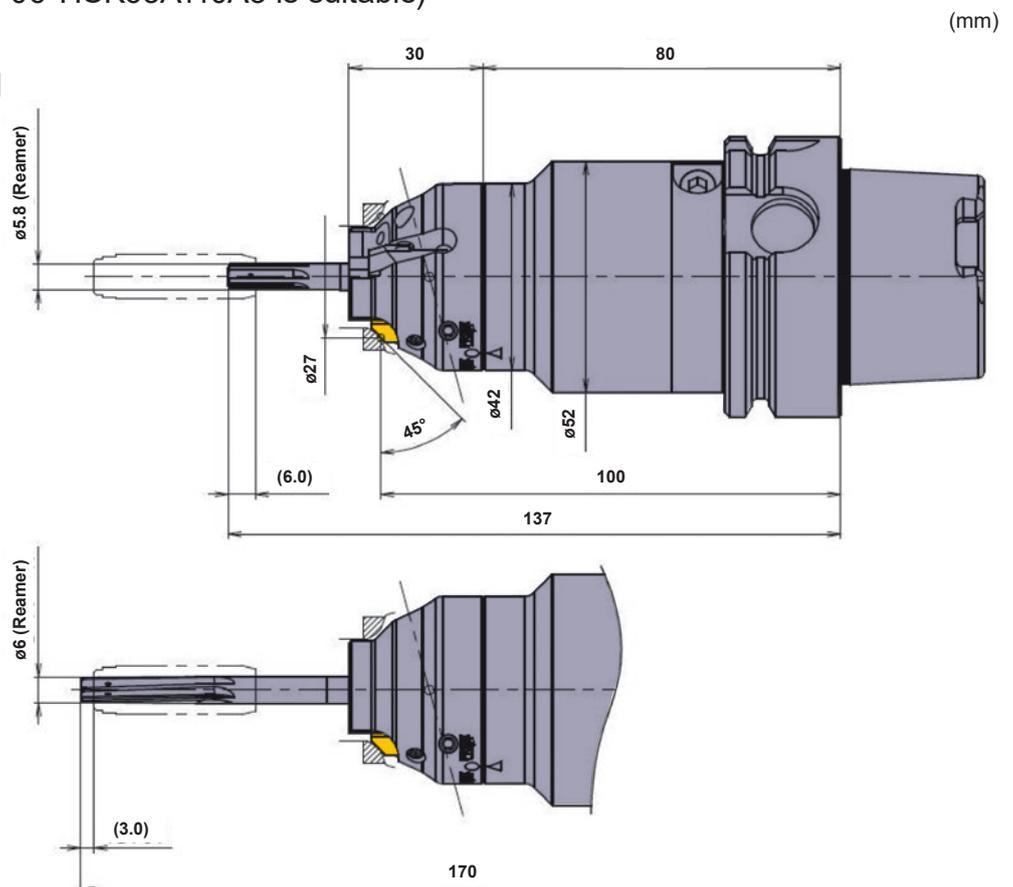
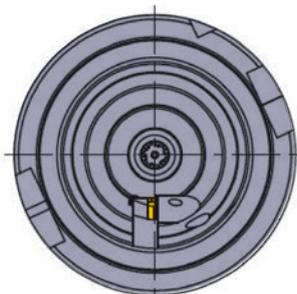
## Setup Reference Diagram

(When Tool Holder : HVF06-HSK63A110A3 is suitable)

### Rough Processing



### Finish Processing



## Application Example (Finishing)

Application Example		Example 1	Example 2	
Reamer Material		<b>RT9005</b>	<b>RT9005+TiAlN Coating</b>	
Tool Bit Material		<b>MB4020</b>	<b>MB835</b>	
Workpiece				
Cutting Conditions	Guide Holes	Revolution (min <sup>-1</sup> )	2200	3000
		Cutting Speed (m/min)	35	47
		Feed per Tooth (mm/t.)	0.03	0.05
		Table Feed (mm/min)	360	900
	Seat Surface	Revolution (min <sup>-1</sup> )	1500	950
		Cutting Speed (m/min)	110	60
		Feed per Tooth (mm/t.)	0.06	0.08
		Table Feed (mm/min)	180	80
Cutting Mode		Wet Cutting (Internal Coolant 6Mpa)	Wet Cutting (Internal Coolant 3Mpa)	
Machine Used		Horizontal Machining Center	Horizontal Machining Center	
Result		<p>Eliminating the necessity for reamer adjustment has dramatically improved the machine utilization rate, with all of the specified requirement values for machining accuracy being fulfilled.</p> <p>Guide hole roundness : 0.001 mm or less            Seat surface run-out : 0.02 mm or less            Finished surface roughness : Ra 0.1 μm or less</p>	<p>Setup can be performed in a short time even by inexperienced workers. The small seat diameter maintains outstanding accuracy and finished surfaces over extended time periods.</p>	

# Procedure

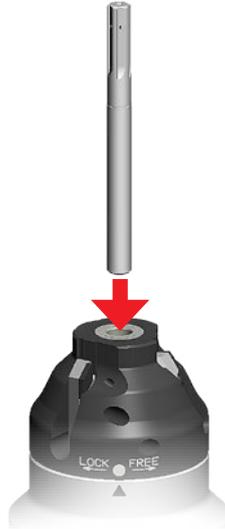
## STEP 1

Mount the head on the tool holder.



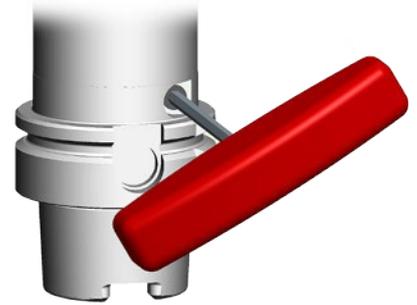
## STEP 2

Attach the reamer.



## STEP 3

Tightening and removing screws follow opposite procedures from the usual.



During use, line up the markings on the head and tool holder to secure them in place. When mounting and removing them, turn them to the side marked "FREE".



Secured Position



Mounting / Removal Position



### For Your Safety

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

## MITSUBISHI MATERIALS CORPORATION

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<http://www.mitsubishicarbide.com/en/>  
(Tools specifications subject to change without notice.)