

# HOW TO READ THE STANDARD OF TOOLING SYSTEM

## ● How this section page is organised

① Organised by product series. (Refer to the index on the next page.)

**TYPE/NAME OF PRODUCT**

**PRODUCT CATEGORY**

**PRODUCT SECTION**

**GEOMETRY**

**TOOLING SYSTEM**

**CARTRIDGE**

**LL ISO type**      Lever lock type

- Negative insert.
- Large breaker selection.
- Suitable for steel and cast iron.

**IDENTIFICATION**      P T F N R 10 CA 11

Clamp Structure	Insert Shape	Cutting Angle	Insert Clearance	Hand of Tool	Cutting Edge Height (mm)	Tool Type	Cutting Edge Length (mm)
P: Lever Lock	C: Square S: Square T: Triangle	F: 90° G: 90°/10° Set H: 75° L: 85° S: 45° T: 60° Y: 85°	N: 0°	R: Right Hand L: Left Hand	10: 10 12: 12 16: 16 20: 20	CA: A Type Cartridge	10: 10 11: 11 12: 12 12.7: 12.7

Type	Order Number	Stock	Geometry	Insert Number	Dimensions (mm)													Tools									
					H	B	Lf	h	h1	h2	h3	h4	h5	h6	h7	h8	h9	h10	h11	h12	h13	h14	h15	h16	h17	h18	h19
PTFN	PTFNRL10CA11	●●●		1103	12.5	11	50	20	2	8	5	10	14	0.4	40	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00016			
	PTFNRL12CA16	●●●		1604	15.5	16	55	20	2	8	6	12	20	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00020			
	PTFNRL16CA16	●●●		1604	16	17	63	25	2.5	8	—	16	25	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00025			
	PTFNRL20CA22	●●●		2204	20	19	70	30	2.5	10	—	20	25	0.8	70	—	—	LLCS105	QHL52	LLCS105	LLR2	K52	3HYR30R	HSC00030			
PTGN	PTGNRL12CA16	●●●		1604	15.5	16	55	20	2	8	6	12	20	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00020			
	PTGNRL16CA16	●●●		1604	16	17	63	25	2.5	8	—	16	25	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00025			
PSKN	PSKNRL10CA09	●●●		0903	12.5	11	50	20	2	8	5	10	14	0.8	40	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00016			
	PSKNRL12CA12	●●●		1204	15.5	16	55	20	2	8	6	12	20	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00020			
	PSKNRL16CA12	●●●		1204	16	17	63	25	2.5	8	—	16	25	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR2	K52	3HYR30R	HSC00025			
PCLN	PCLNRL12CA12	●●●		1204	15.5	16	55	20	2	8	6	12	20	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00020			
	PCLNRL16CA12	●●●		1204	16	17	63	25	2.5	8	—	16	25	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR2	K52	3HYR30R	HSC00025			
	PCLNRL20CA12	●●●		1204	20	19	70	30	2.5	10	—	20	25	0.8	70	—	—	LLCS105	QHL52	LLCS105	LLR2	K52	3HYR30R	HSC00030			
PSSN	PSSNRL10CA09	●●●		0903	12.5	11	44	20	2	8	5	10	14	0.8	40	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00016			
	PSSNRL12CA12	●●●		1204	15.5	16	47	20	2	8	6	12	20	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00020			
	PSSNRL16CA12	●●●		1204	16	17	53	25	2.5	8	—	16	25	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR2	K52	3HYR30R	HSC00025			
PTTN	PTTNRL12CA16	●●●		1604	15.5	16	55	20	2	8	6	12	13	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00020			
	PTTNRL16CA16	●●●		1604	16	17	63	25	2.5	8	—	16	15	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00025			
PSYN	PSYNR10CA09	●●●		0903	12.5	11	50	20	2	8	5	10	14	0.8	40	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00016			
	PSYNR12CA12	●●●		1204	15.5	16	55	20	2	8	6	12	20	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR1	K51	3HYR23P 3HYR23P 3HYR23P	HSC00020			
PSYN	PSYNR16CA12	●●●		1204	16	17	63	25	2.5	8	—	16	25	0.8	80	—	—	LLCS105	QHL52	LLCS105	LLR2	K52	3HYR30R	HSC00025			
	PSYNR20CA12	●●●		1204	20	19	70	30	2.5	10	—	20	25	0.8	70	—	—	LLCS105	QHL52	LLCS105	LLR2	K52	3HYR30R	HSC00030			

● Inventory maintained in Japan.

● Spare parts

● Reference page for applicable inserts

● Page reference

● Legend for stock status mark

● Product standards

**LEGEND FOR STOCK STATUS MARK**  
is shown on the left hand page of each double-page spread.

**REFERENCE PAGE FOR APPLICABLE INSERTS**  
indicates reference pages for details of inserts that are applicable to the title product.

**PAGE REFERENCE**  
indicates reference pages, including the above, on the right hand page of each double-page spread.

**PRODUCT STANDARDS**  
indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, minimum cutting diameters, standard corner radius, and spare parts.

- To Order : Please specify
- ① order number and hand of tool (right/left).

# MILLING TOOLS

# TOOLING SYSTEM

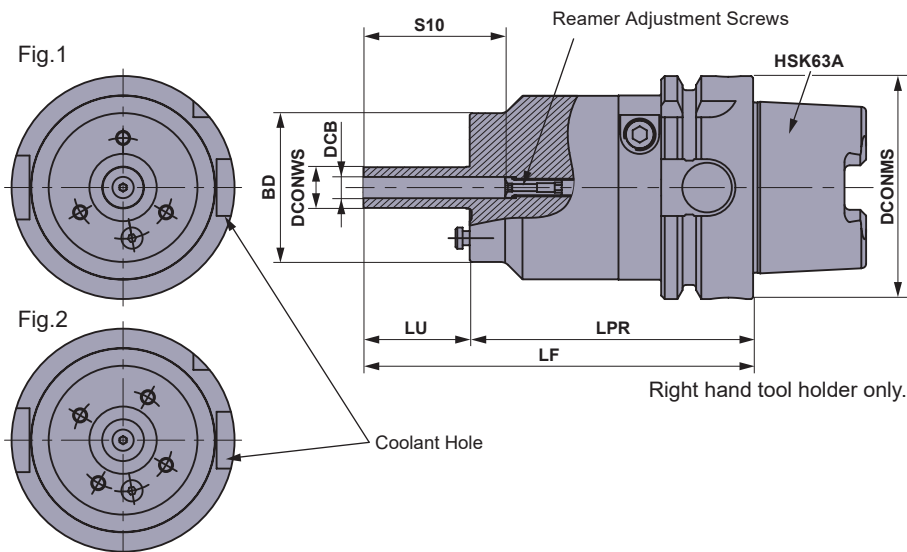
VALVE FINISHER .....	M002
CARTRIDGE	
LL TYPE CARTRIDGE .....	M006
BC TYPE CARTRIDGE .....	M008
SS TYPE CARTRIDGE .....	M010
BORING UNIT .....	M012
MI TYPE BORING BARS .....	M017
QUICK CHANGE TOOLING SYSTEM	
CLASSIFICATION OF QUICK CHANGE SYSTEM .....	M018
FACE MILL .....	M019
FACE MILLING ADAPTER .....	M020
SIDE CUTTER .....	M022
BORING TOOL .....	M023
MODULAR TOOLING SYSTEM	
ABS® License KOMET® .....	M024
HSK SYSTEM .....	M028

\*Arranged by Alphabetical order

M026 ABS○○-ES-M	M012 FA○-FA○○○○○	M021 QFA○○○○○
M026 ABS○○○-ES-M	M012 FA○-FA○○○○S	M020 QFA○○○○○B○R/L
M026 ABS○○○-ES-M1	M012 FV○-FV○○○○○	M020 QFA○○○○○N○R/L
M026 ABS○○○-ES-M1	M012 FV○-FV○○○○S	M021 QFB○○○○○R/L
M026 ABS○○○-ES-M3	M029 HSK-○○○M	M027 SBA○○○-ES-M
M026 ABS○○○-ES-M3	M029 HSK-○○○M	M027 SBA○○○-ES-M
M027 ABS○○○-ES-M4	M002 HVF06-HSK63A○○○○○	M027 SBA○○○-ES-M1
M027 ABS○○○-ES-M4	M002 HVS060519	M027 SBA○○○-ES-M1
M025 ABS○○-FS-W	M006 PCLNR/L○○CA○○	M017 SBR○○○
M025 ABS○○○-FS-W	M006 PSKNR/L○○CA○○	M010 SSKPR○○CA○○
M026 ABS○○M	M006 PSSNR/L○○CA○○	M010 SSSPR○○CA○○
M026 ABS○○M	M006 PSYNR○○CA○○	M010 SSYPR○○CA○○
M025 ABS○○W	M006 PTFNR/L○○CA○○	M010 STFPR/L○○CA○○
M025 ABS○○W	M006 PTGNR/L○○CA○○	M010 STGPR○○CA○○
M008 CSKPR○○CA○○	M006 PTTNR○○CA○○	M010 STTPR○○CA○○
M008 CSSPR10CA09	M023 QB○○○○○○○	



# VALVE FINISHER



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

## ■ Tool Holder

Order Number	Stock	Dimensions(mm)								Coolant Hole (Hole)	WT (kg)	Installation	Balance Accuracy
		BD	DCONWS	DCB	S10	LF	LU	LPR	DCONMS				
HVF06-HSK63A110A3	●	42	11.5	6	40	110	30	80	63	Fig.1 (3 Hole)	1.5	HSK63A (With Coolant Pipe)	G2.5 (5000min <sup>-1</sup> )
HVF06-HSK63A110A4	●	42	11.5	6	40	110	30	80	63	Fig.2 (4 Hole)	1.5		
HVF06-HSK63A180A3	●	42	11.5	6	40	180	30	150	63	Fig.1 (3 Hole)	2.6		
HVF06-HSK63A180A4	●	42	11.5	6	40	180	30	150	63	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)

Geometry	Order Number	Stock	Dimensions (mm)					
			MPCA	MPCB	MPCC	MPCD	MPCE	MPCF
	HVS060519	●	5.8	M5×0.8	17	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

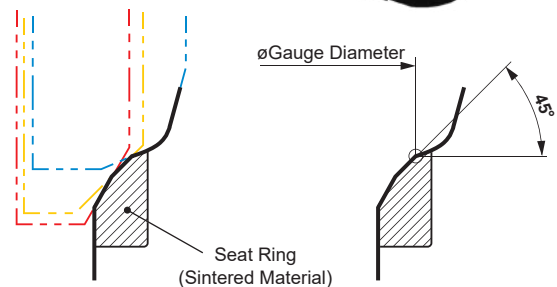
**Compatible Head Range** :  $\phi 20 \leq \text{Head Diameter} < \phi 35$   
(Seat Hole : 45°-Surface Gauge Diameter)

**Tool Bits** : 3 types



### MB4120

Fine CBN particles increase cutting edge toughness. Optimization of the sintering conditions strengthens adhesion between fine CBN particles. This increases both fracture and wear resistance, workpiece stability and allows for a longer tool life.



● 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 X = Unsuitable

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

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

M

TOOLING SYSTEM



# Procedure

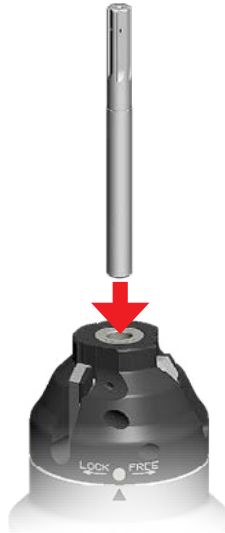
## STEP 1

Mount the head on the tool holder.



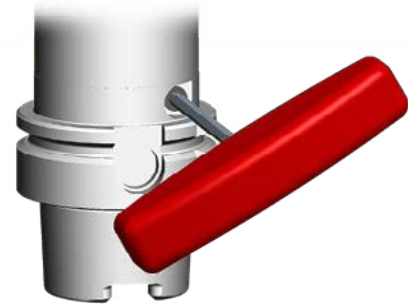
## STEP 2

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

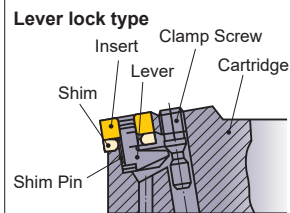


# CARTRIDGE

**LL ISO type**

**Lever lock type**

- Negative insert.
- Large breaker selection.
- Suitable for steel and cast iron.



Type	Order Number	Stock		Geometry	Insert Number
		R	L		
PTFN	PTFNR/L10CA11	●	●		1103
	PTFNR/L12CA16	●	●		1604
	PTFNR/L16CA16	●	●		1604
	PTFNR/L20CA22	●			2204
PTGN	PTGNR/L12CA16	●	●		1604
	PTGNR/L16CA16	●	●		1604
PSKN	PSKNR/L10CA09	●	●		0903
	PSKNR/L12CA12	●	●		1204
	PSKNR/L16CA12	●	●		1204
PCLN	PCLNR/L12CA12	●	●		1204
	PCLNR/L16CA12	●	●		1204
	PCLNR/L20CA12	●			1204
PSSN	PSSNR/L10CA09	●	●		0903
	PSSNR/L12CA12	●	●		1204
	PSSNR/L16CA12	●	●		1204
PTTN	PTTNR12CA16	●			1604
	PTTNR16CA16	●			1604
PSYN	PSYNR10CA09	●			0903
	PSYNR12CA12	●			1204
	PSYNR16CA12	●			1204

\*1 Clamp Torque (N • m) : LLCS105=1.5, LLCS106=2.2, LLCS106S=2.2, LLCS108S=3.3

Note1) Dimensions shown for insert corner RE (\*2).

● : Inventory maintained in Japan.



IDENTIFICATION

**P T F N R 10 CA 11**

Clamp Structure	
P	Lever Lock

Insert Shape	
C	80°Rhombic
S	Square
T	Triangle

Cutting Angle	
F	90°
G	90°(Off Set)
K	75°
L	95°
S	45°
T	60°
Y	85°

Insert Clearance	
N	0°

Hand of Tool	
R	Right Hand
L	Left Hand

Cutting Edge Height (mm)	
10	10
12	12
16	16
20	20

Tool Type	
CA	ISO A Type Cartridge

Cutting Edge Length (mm)			
Insert Shape		Inscribed Circle	
80° Rhombic	Square	Triangle	
—	—	11	6.35
—	09	16	9.525
12	12	22	12.7

Dimensions(mm)												LLSCN	LLSSN	LLSTN	Shim	Shim Pin	Clamp Lever	Lever Spring	Clamp Screw	Radial Screw	Axial Screw	Wrench	Set Bolt
H	B	LF	MHD	ADJRG	ASP	MHH	HF	WF	RE <sup>*2</sup>	DMIN													
12.5	11	50	20	2	8	5	10	14	0.4	40	—	—	LLCL12S	⊙HLS1	LLCS105	LLR1	KS1	⊙HKY25R ⊙HKY20F			HSC06016		
15.5	16	55	20	2	8	6	12	20	0.8	50	—	—	LLCL13S	⊙HLS2	LLCS105	LLR1	KS1	⊙HKY25R ⊙HKY20F			HSC06020		
16	17	63	25	2.5	8	—	16	25	0.8	60	LLSTN32	LLP13	LLCL13	—	LLCS106	LLR1	KS2	⊙HKY25R ⊙HKY20F			HBH08025		
20	19	70	30	2.5	10	—	20	25	0.8	70	LLSTN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	⊙HKY30R			HBH08030		
15.5	16	55	20	2	8	6	12	20	0.8	50	—	—	LLCL13S	⊙HLS2	LLCS105	LLR1	KS1	⊙HKY25R ⊙HKY20F			HSC06020		
16	17	63	25	2.5	8	—	16	25	0.8	60	LLSTN32	LLP13	LLCL13	—	LLCS106	LLR1	KS2	⊙HKY25R ⊙HKY20F			HBH08025		
12.5	11	50	20	2	8	5	10	14	0.8	40	—	—	LLCL13S	⊙HLS2	LLCS105	LLR1	KS1	⊙HKY20R ⊙HKY25R ⊙HKY25R ⊙HKY20F			HSC06016		
15.5	16	55	20	2	8	6	12	20	0.8	50	—	—	LLCL14S	⊙HLS3	LLCS106S	LLR1	KS1	⊙HKY25R ⊙HKY20F			HSC06020		
16	17	63	25	2.5	8	—	16	25	0.8	60	LLSSN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	⊙HKY30R			HBH08025		
15.5	16	55	20	2	8	6	12	20	0.8	50	—	—	LLCL14S	⊙HLS3	LLCS106S	LLR1	KS1	⊙HKY25R ⊙HKY20F			HSC06020		
16	17	63	25	2.5	8	—	16	25	0.8	60	LLSCN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	⊙HKY30R			HBH08025		
20	19	70	30	2.5	10	—	20	25	0.8	70	LLSCN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	⊙HKY30R			HBH08030		
12.5	11	44	20	2	8	5	10	14	0.8	40	—	—	LLCL13S	⊙HLS2	LLCS105	LLR1	KS1	⊙HKY20R ⊙HKY25R			HSC06016		
15.5	16	47	20	2	8	6	12	20	0.8	50	—	—	LLCL14S	⊙HLS3	LLCS106S	LLR1	KS1	⊙HKY25R ⊙HKY20F			HSC06020		
16	17	53	25	2.5	8	—	16	25	0.8	60	LLSSN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	⊙HKY30R			HBH08025		
15.5	16	55	20	2	8	6	12	13	0.8	50	—	—	LLCL13S	⊙HLS2	LLCS105	LLR1	KS1	⊙HKY25R ⊙HKY20F			HSC06020		
16	17	63	25	2.5	8	—	16	15	0.8	60	LLSTN32	LLP13	LLCL13	—	LLCS106	LLR1	KS2	⊙HKY25R ⊙HKY20F			HBH08025		
12.5	11	50	20	2	8	5	10	14	0.8	40	—	—	LLCL13S	⊙HLS2	LLCS105	LLR1	KS1	⊙HKY20R ⊙HKY25R			HSC06016		
15.5	16	55	20	2	8	6	12	20	0.8	50	—	—	LLCL14S	⊙HLS3	LLCS106S	LLR1	KS1	⊙HKY25R ⊙HKY20F			HSC06020		
16	17	63	25	2.5	8	—	16	25	0.8	60	LLSSN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	⊙HKY30R			HBH08025		

M

TOOLING SYSTEM

CN type inserts > A074—A080  
 SN type inserts > A089—A094  
 TN type inserts > A095—A101  
 SPARE PARTS > P001

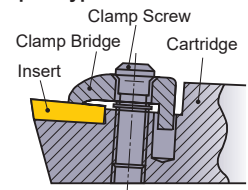


# CARTRIDGE

**BC** ISO type

Clamp on type

Clamp on type



- 11° positive insert.
- Suitable for steel, cast iron, aluminium alloys and copper alloys.

Type	Order Number	Stock		Geometry	Insert Number	
		R				
CSKP	CSKPR10CA09	●			SPMN SPMR SPGN	0903
	CSKPR16CA12	●				1203
CSSP	CSSPR10CA09	●				0903

\*1 Clamp Torque (N • m) : BC4L=2.5, BC6=5.0

\*2 Dimensions shown for insert corner RE0.8.

IDENTIFICATION

**C S K P R 10 CA 09**

Clamp Structure	
C	Clamp On

Insert Shape	
S	Square

Cutting Angle	
K	75°
S	45°








Insert Clearance	
P	11°

Hand of Tool	
R	Right Hand

Cutting Edge Height (mm)	
10	10
16	16

Tool Type	
CA	ISO A Type Cartridge

Cutting Edge Length (mm)	
Insert Shape	Inscribed Circle
Square	
09	9.525
12	12.7

Dimensions(mm)																		
H	B	LF	MHD	ADJRG	ASP	MHH	HF	WF	RE <sup>*2</sup>	DMIN		Shim	Shim Pin	Radial Screw	Axial Screw	Clamp Set	Wrench	Set Bolt
12.5	11	50	20	2	8	5	10	14	0.8	38	—	—	TSS05006	KS1	BC4L	TKY10R	HSC06016	
16	17	63	25	2	8	—	16	25	0.8	55	PS42	BCP251	TSS06010	KS2	BC6	TKY20R	HBH08025	
12.5	11	44	20	2	8	5	10	14	0.8	38	—	—	TSS05006	KS1	BC4L	TKY10R	HSC06016	

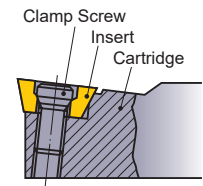
# CARTRIDGE

**SS** ISO type

Screw on type

Screw on type

- 11° positive insert.
- Suitable for steel, cast iron, aluminium alloys and copper alloys.



Type	Order Number	Stock		Geometry	Insert Number		
		R	L				
STFP	STFPR/L10CA11	●	●	<p>Right hand tool holder shown.</p>	TPMX TPGX	1103○○○ 1603○○○	
	STFPR/L12CA16	●	●				
STGP	STGPR10CA11	●		<p>Right hand tool holder only.</p>	TPMX TPGX	1103○○○ 1603○○○ 1603○○○	
	STGPR12CA16	●					
	STGPR16CA16	●					
SSKP	SSKPR10CA09	●		<p>Right hand tool holder only.</p>	SPMT SPGX	0903○○○ 1203○○○	
	SSKPR12CA12	●					
SSSP	SSSPR10CA09	●		<p>Right hand tool holder only.</p>	SPMT SPGX	0903○○○ 1203○○○	
	SSSPR12CA12	●					
STTP	STTPR10CA11	●		<p>Right hand tool holder only.</p>	TPMX TPGX	1103○○○ 1603○○○ 1603○○○	
	STTPR12CA16	●					
	STTPR16CA16	●					
SSYP	SSYPR10CA09	●		<p>Right hand tool holder only.</p>	SPMT SPGX	0903○○○ 1203○○○	
	SSYPR12CA12	●					

\*1 Clamp Torque (N · m) : CS300890T=1.0, TS4=3.5, TS5=7.5  
 Note1) Dimensions shown for insert corner RE (\*2).

● : Inventory maintained in Japan.

IDENTIFICATION

**S T F P R 10 CA 11**

Clamp Structure	
S	Screw On

Insert Shape	
S	Square
T	Triangle

Cutting Angle	
F	90°
G	90°(Off Set)
K	75°
S	45°
T	60°
Y	85°

Insert Clearance	
P	11°

Hand of Tool	
R	Right Hand
L	Left Hand

Cutting Edge Height (mm)	
10	10
12	12
16	16

Tool Type	
CA	ISO A Type Cartridge

Cutting Edge Length (mm)		
Insert Shape		Inscribed Circle
Square	Triangle	
—	11	6.35
09	16	9.525
12	22	12.7

Dimensions(mm)												*1				
H	B	LF	MHD	ADJRG	ASP	MHH	HF	WF	RE	DMIN		Clamp Screw	Radial Screw	Axial Screw	Wrench	Set Bolt
12.5	11	50	20	2	8	5	10	14	0.4	35		CS300890T	TSS05006	KS1	TKY08F TKY10F	HSC06016
15.5	16	55	20	2	8	6	12	20	0.8	50		TS4	TSS06010	KS1	TKY15F TKY20F	HSC06020
12.5	11	50	20	2	8	5	10	14	0.4	35		CS300890T	TSS05006	KS1	TKY08F TKY10F	HSC06016
15.5	16	55	20	2	8	6	12	20	0.8	50		TS4	TSS06010	KS1	TKY15F TKY20F	HSC06020
16	17	63	25	2	8	—	16	25	0.8	55		TS4	TSS06012	KS2	TKY15F TKY20F	HBH08025
12.5	11	50	20	2	8	5	10	14	0.8	35		TS4	TSS05006	KS1	TKY10F TKY15F	HSC06016
15.5	16	55	20	2	8	6	12	20	0.8	50		TS5	TSS06010	KS1	TKY20F TKY25F	HSC06020
12.5	11	44	20	2	8	5	10	14	0.8	35		TS4	TSS05006	KS1	TKY10F TKY15F	HSC06016
15.5	16	47	20	2	8	6	12	20	0.8	50		TS5	TSS06010	KS1	TKY20F TKY25F	HSC06020
12.5	11	50	20	2	8	5	10	9	0.4	35		CS300890T	TSS05006	KS1	TKY08F TKY10F	HSC06016
15.5	16	55	20	2	8	6	12	13	0.8	50		TS4	TSS06010	KS1	TKY15F TKY20F	HSC06020
16	17	63	25	2	8	—	16	15	0.8	55		TS4	TSS06012	KS2	TKY15F TKY20F	HBH08025
12.5	11	50	20	2	8	5	10	14	0.8	35		TS4	TSS05006	KS1	TKY10F TKY15F	HSC06016
15.5	16	55	20	2	8	6	12	20	0.8	50		TS5	TSS06010	KS1	TKY20F TKY25F	HSC06020

M

TOOLING SYSTEM

SP type inserts > A134  
 TP type inserts > A139—A141  
 SPARE PARTS > P001

M011

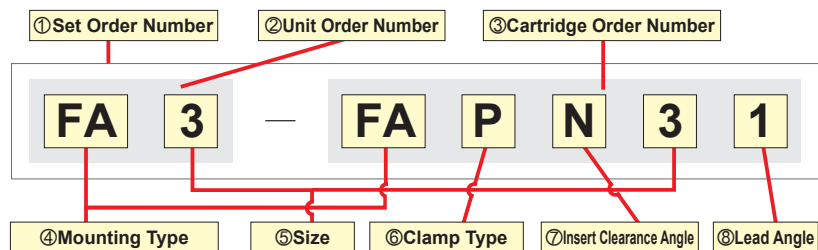
# BORING UNIT

## FA, FV



- Precision finish boring unit.
- Facilitates precision adjustment.
- High accuracy.

### IDENTIFICATION



\* Sets are delivered with unit and cartridge assembled.

④ Mounting Type	Cutting Mode	① Set Order Number *	Stock	② Unit Order Number	Stock	③ Cartridge Order Number	Stock	⑤ Size		⑥ Clamp Type		⑦ Insert Clearance Angle	
								Symbol	Min. Cutting Diameter (mm)	Symbol	Type	Symbol	Angle
FA Type (Angular Type)		FA0-FASC01	●	FA0	●	FASC01	●	0	19	S	Screw On	C	7
		FA0-FASC01S	●	FA0	●	FASC01S	●	0	19	S	Screw On	C	7
		FA1-FASP11	●	FA1	●	FASP11	●	1	25	S	Screw On	P	11
		FA1-FASP11S	●	FA1	●	FASP11S	●	1	25	S	Screw On	P	11
		FA2-FASP21	●	FA2	●	FASP21	●	2	36	S	Screw On	P	11
		FA2-FASP21S	●	FA2	●	FASP21S	●	2	36	S	Screw On	P	11
		FA2-FAPN21	●	FA2	●	FAPN21	●	2	36	P	Lever Lock	N	0
		FA3-FASP31	●	FA3	●	FASP31	●	3	47	S	Screw On	P	11
		FA3-FASP31S	●	FA3	●	FASP31S	●	3	47	S	Screw On	P	11
		FA3-FAPN31	●	FA3	●	FAPN31	●	3	47	P	Lever Lock	N	0
FA4-FAPN41	●	FA4	●	FAPN41	●	4	73	P	Lever Lock	N	0		
FV Type (Vertical Type)		FV0-FVSC01	●	FV0	●	FVSC01	●	0	19	S	Screw On	C	7
		FV0-FVSC01S	●	FV0	●	FVSC01S	●	0	19	S	Screw On	C	7
		FV1-FVSP11	●	FV1	●	FVSP11	●	1	25	S	Screw On	P	11
		FV1-FVSP11S	●	FV1	●	FVSP11S	●	1	25	S	Screw On	P	11
		FV2-FVSP21	●	FV2	●	FVSP21	●	2	36	S	Screw On	P	11
		FV2-FVSP21S	●	FV2	●	FVSP21S	●	2	36	S	Screw On	P	11
		FV2-FVPN21	●	FV2	●	FVPN21	●	2	36	P	Lever Lock	N	0
		FV3-FVSP31	●	FV3	●	FVSP31	●	3	47	S	Screw On	P	11
		FV3-FVSP31S	●	FV3	●	FVSP31S	●	3	47	S	Screw On	P	11
		FV3-FVPN31	●	FV3	●	FVPN31	●	3	47	P	Lever Lock	N	0
FV4-FVPN41	●	FV4	●	FVPN41	●	4	73	P	Lever Lock	N	0		

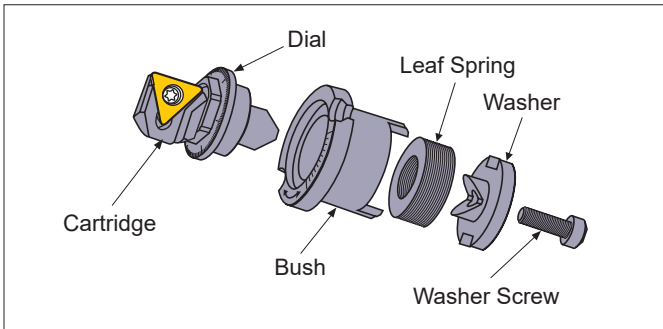
\* "S" at the end of the order number indicates left hand tool.

M

TOOLING SYSTEM

⑥ Cartridge Clamp Structure			⑧ Lead Angle	
S (Screw-on Type)	P (Lever Lock Type)	P (Lever Lock Type with Shim)	FA	FV
Applicable Size : 0,1,2,3	Applicable Size : 2,3	Applicable Size : 4	Lead Angle1 : 0°	Lead Angle1 : 0° 0°
Clamp Screw	Insert	Clamp Lever		
Insert	Clamp Screw	Clamp Lever		
		Clamp Screw		
		Shim		

● : Inventory maintained in Japan.



## BORING UNIT SPARE PARTS

Unit Order Number						
	Washer Screw	Unit Screw	Wrench	Bush	Washer	Leaf Spring
<b>FA0</b>	HSC02006	S1	HKY15R	<p>The parts above are not sold separately as accuracy can only be guaranteed by having the complete set. Please contact us for questions about parts replacement.</p>		
<b>FV0</b>	HSC02006	S1	HKY15R			
<b>FA1</b>	HSC02506	HY-A1	HKY20R			
<b>FV1</b>	HSC02506	HY-V1	HKY20R			
<b>FA2</b>	HSC03010	HY2	HKY20R.HKY25R			
<b>FV2</b>	HSC03010	HY2	HS-N2.HKY25R			
<b>FA3</b>	HSC04012	HY3	HKY20R.HKY30R			
<b>FV3</b>	HSC04012	HY3	HKY20R.HKY30R			
<b>FA4</b>	HSC05016	HY4	HKY30R.HKY40R			
<b>FV4</b>	HSC05016	HY4	HKY30R.HKY40R			

## CARTRIDGE SPARE PARTS

								Applicable Insert
Cartridge *1	Clamp Lever	Lever Spring	Clamp Screw *3	Shim	Shim Pin	Spanner *2	Wrench	
<b>FASC01(S)</b>	—	—	① TS2	—	—	HR00	① TKY06F	TCGT..L-F 060102
<b>FVSC01(S)</b>	—	—	① TS2	—	—	HR00	① TKY06F	TCGW 060104
<b>FASP11(S)</b>	—	—	① CS250T	—	—	HR12	① TKY08F	TPGX 090204
<b>FVSP11(S)</b>	—	—	① CS250T	—	—	HR12	① TKY08F	
<b>FASP21(S)</b>	—	—	① CS300890T	—	—	HR12	① TKY08F	TPMX..L/R 110304
<b>FVSP21(S)</b>	—	—	① CS300890T	—	—	HR12	① TKY08F	110308
<b>FAPN21</b>	LLCL12S	HLS1	② LLCS103	—	—	HR12	② HKY20F	TNGA 110304
<b>FVPN21</b>	LLCL12S	HLS1	② LLCS103	—	—	HR12	② HKY20F	TNGG..L/R 110308
<b>FASP31(S)</b>	—	—	① CS300890T	—	—	HR34	① TKY08F	TPGX 110304 TPMX..L/R 160408 TPMX..L/R 160412
<b>FVSP31(S)</b>	—	—	① CS300890T	—	—	HR34	① TKY08F	
<b>FAPN31</b>	LLCL12S	HLS1	② LLCS103	—	—	HR34	② HKY20F	110304
<b>FVPN31</b>	LLCL12S	HLS1	② LLCS103	—	—	HR34	② HKY20F	TNGA 110308
<b>FAPN41</b>	LLCL13	—	② LLCS106	LLSTN32	LLP13	HR34	② HKY25F	160404
<b>FVPN41</b>	LLCL13	—	② LLCS106	LLSTN32	LLP13	HR34	② HKY25F	160408 160412

Note 1) Use left hand inserts in the cartridge for right hand cutting and right hand inserts in the cartridge for left hand cutting.

\*1 "S" at the end of the cartridge number indicates left hand.

\*2 A spanner is only provided when ordered with a set.

\*3 Clamp Torque (N · m) : TS2=0.6, CS250T=1.0, CS300890T=1.0, LLCS103=1.5, LLCS106=2.2

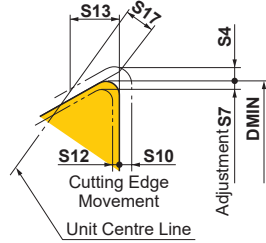
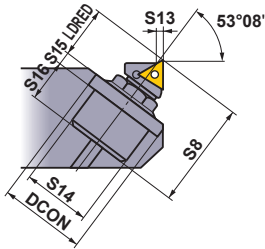
## INSERTS

Finish Cutting			Medium Cutting	Flat Top	
TCGT..L/R-F	TPGX..L/R	TPMX..L	TNGG..L/R	TPGX	TNGA
(06)  A135	(09,11)  A140	(09,11)  A140	(11,16)  A099	(09,11)  A141	(11,16)  A101

# BORING UNIT

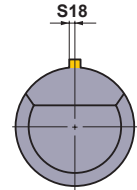
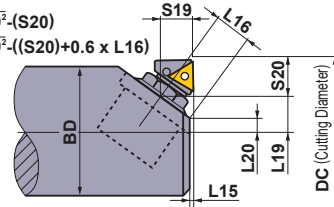
## MAIN DIMENSIONS

### ● FA TYPE (ANGULAR TYPE)



$$L19 = \sqrt{0.25DC^2 - (S18)^2} - (S20)$$

$$L20 = \sqrt{0.25DC^2 - (S18)^2} - ((S20) + 0.6 \times L16)$$



Clockwise (right hand) tool shown.  
Minimum cutting diameters (DMIN) correspond to RE0.2 (0 type) and RE0.4 (1—4 type).

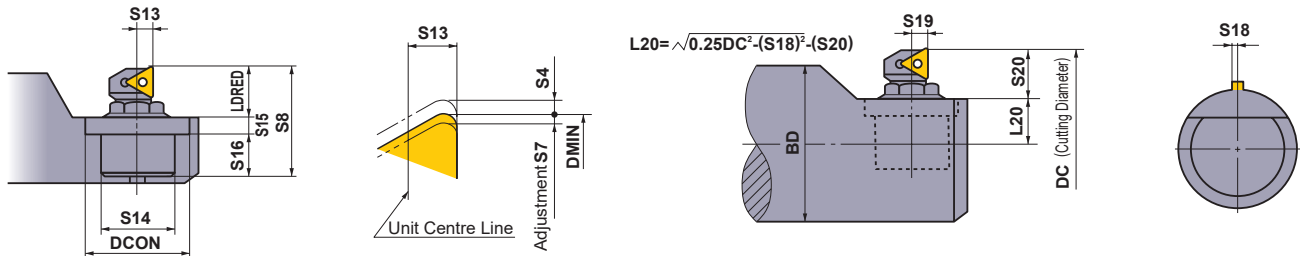
Unit : mm

Set Order Number	*1 RE	*2 DMIN	Adjustment		Dimensions (mm)																BD Max.
			S4	S7	LDRED	S8	S10	S12	S13	S14	DCON	S15	S16	S17	S18	S19	S20	L15	L16		
FA0-FASC01(S)	0.2	19	0.32	0.16	9.0	19.9	0.30	0.12	1.5	11.11	15.06	2.7	8.2	1.11	1.2	6.4	6.5	1.0	6.8	DC-2	
	0.4	19	0.32	0.16	8.8	19.7	0.30	0.12	1.6	11.11	15.06	2.7	8.2	1.11	1.2	6.4	6.4	1.0	6.8	DC-2	
FA1-FASP11(S)	0.4	25	0.5	0.3	11.7	23.9	0.38	0.23	0.8	15.08	19.05	3.2	9.0	0.46	1.0	7.6	9.1	0.9	8.4	DC-2	
FA2-FASP21(S)	0.4	36	0.7	0.4	14.9	33.4	0.53	0.30	1.1	19.05	24.58	4.0	14.5	0.7	1.2	9.7	11.5	0.8	11.1	DC-2	
	0.8	36	0.7	0.4	14.5	33.0	0.53	0.30	1.3	19.05	24.58	4.0	14.5	0.7	1.2	9.7	11.2	0.8	11.1	DC-2	
FA2-FAPN21	0.4	36	0.7	0.4	14.9	33.4	0.53	0.30	1.1	19.05	24.58	4.0	14.5	0.7	2.75	9.7	11.5	0.8	11.1	DC-2	
	0.8	36	0.7	0.4	14.5	33.0	0.53	0.30	1.3	19.05	24.58	4.0	14.5	0.7	2.75	9.7	11.2	0.8	11.1	DC-2	
FA3-FASP31(S)	0.4	47	1.0	0.6	18.35	42.85	0.75	0.45	0.9	22.225	31.75	4.8	19.7	0.54	1.9	11.7	14.4	1.2	13.1	DC-3	
	0.8	47	1.0	0.6	17.95	42.45	0.75	0.45	1.1	22.225	31.75	4.8	19.7	0.54	1.9	11.7	14.1	1.2	13.1	DC-3	
FA3-FAPN31	0.4	47	1.0	0.6	18.35	42.85	0.75	0.45	0.9	22.225	31.75	4.8	19.7	0.54	3.21	11.7	14.4	1.2	13.1	DC-3	
	0.8	47	1.0	0.6	17.95	42.45	0.75	0.45	1.1	22.225	31.75	4.8	19.7	0.54	3.21	11.7	14.1	1.2	13.1	DC-3	
FA4-FAPN41	0.4	73	1.5	0.7	28.0	65.4	1.13	0.53	1.3	31.75	46.02	6.4	31.0	0.86	5.2	17.7	21.9	1.3	20.5	DC-3	
	0.8	73	1.5	0.7	27.6	65.0	1.13	0.53	1.5	31.75	46.02	6.4	31.0	0.86	5.2	17.7	21.6	1.3	20.5	DC-3	
	1.2	73	1.5	0.7	27.2	64.6	1.13	0.53	1.7	31.75	46.02	6.4	31.0	0.86	5.2	17.7	21.3	1.3	20.5	DC-3	

\*1 "S" at the end of the order number indicates left hand tool.  
\*2 Dimensions shown for insert corner RE 0.2, 0.4, 0.8, and 1.2.



## ● FV TYPE (VERTICAL TYPE)



Clockwise (right hand) tool shown.  
Minimum cutting diameters (DMIN) correspond to RE0.2 (0 type) and RE0.4 (1—4 type).

Unit : mm

Set Order Number	*1 RE	*2 DMIN	Adjustment		Dimensions (mm)										BD Max.
			S4	S7	LDRED	S8	S13	S14	DCON	S15	S16	S18	S19	S20	
FV0-FVSC01(S)	0.2	19	0.4	0.2	7.6	18.5	2.6	11.11	15.06	2.7	8.2	1.2	2.6	7.6	DC-2
	0.4	19	0.4	0.2	7.4	18.3	2.6	11.11	15.06	2.7	8.2	1.2	2.6	7.4	DC-2
FV1-FVSP11(S)	0.4	25	0.7	0.3	10.8	23.0	3.6	15.08	20.62	3.2	9.0	1.0	3.6	10.8	DC-2
FV2-FVSP21(S)	0.4	36	0.8	0.6	13.8	32.3	4.0	19.05	24.58	4.0	14.5	1.2	4.0	13.8	DC-2
	0.8	36	0.8	0.6	13.5	32.0	4.0	19.05	24.58	4.0	14.5	1.2	4.0	13.5	DC-2
FV2-FVPN21	0.4	36	0.8	0.6	13.8	32.3	4.0	19.05	24.58	4.0	14.5	2.1	4.0	13.8	DC-2
	0.8	36	0.8	0.6	13.5	32.0	4.0	19.05	24.58	4.0	14.5	2.1	4.0	13.5	DC-2
FV3-FVSP31(S)	0.4	47	1.3	0.7	16.7	41.2	4.8	22.225	31.75	4.8	19.7	1.9	4.8	16.7	DC-3
	0.8	47	1.3	0.7	16.4	40.9	4.8	22.225	31.75	4.8	19.7	1.9	4.8	16.4	DC-3
FV3-FVPN31	0.4	47	1.3	0.7	16.7	41.2	4.8	22.225	31.75	4.8	19.7	3.21	4.8	16.7	DC-3
	0.8	47	1.3	0.7	16.4	40.9	4.8	22.225	31.75	4.8	19.7	3.21	4.8	16.4	DC-3
FV4-FVPN41	0.4	73	1.8	1.0	25.0	62.4	7.1	31.75	46.02	6.4	31.0	5.2	7.1	25.0	DC-3
	0.8	73	1.8	1.0	24.7	62.1	7.1	31.75	46.02	6.4	31.0	5.2	7.1	24.7	DC-3
	1.2	73	1.8	1.0	24.4	61.8	7.1	31.75	46.02	6.4	31.0	5.2	7.1	24.4	DC-3

\*1 "S" at the end of the order number indicates left hand tool.

\*2 Dimensions shown for insert corner RE 0.2, 0.4, 0.8, and 1.2.

M

TOOLING SYSTEM

# BORING UNIT

## HI-BORE INSTALLATION GUIDE

### ASSEMBLY PRECAUTIONS

The cartridge, dial screw and thrust face must be cleaned and a lubricant such as Never seez applied before use.

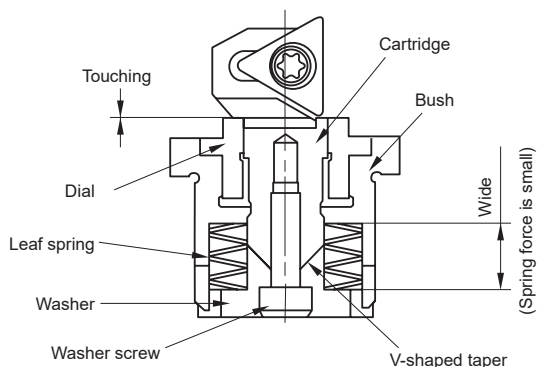
Please ensure that the unit is free from dust during assembly as this may affect the accuracy of adjustment.

(Torque adjustability and thrust face condition may deteriorate.)

### HOW TO ASSEMBLE CARTRIDGE

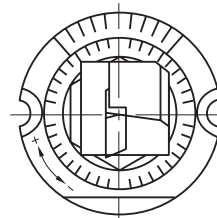
① The space between the bush and the washer is large which means that the spring force is small, therefore the torque required to turn the screw is low.

② Tighten the washer screw until the washer and V shaped taper touch.



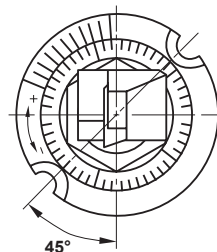
### CARTRIDGE INSTALLATION

#### Angular type (FA type)



When installing the cartridge the cutting edge should be positioned towards the chamfering on the bush as shown.

#### Vertical type (FV type)



When installing the cartridge the cutting edge should be placed at 45° to the locating screws as shown.

### RECOMMENDED WASHER SCREW TORQUE

Hi-bore size	Screw size	Recommended torque	
		N•m	kgf•m
Type 0	M2	0.49	0.05
Type 1	M2.5	0.98	0.10
Type 2	M3	2.25	0.23
Type 3	M4	5.19	0.53
Type 4	M5	10.29	1.05

### DIMENSIONAL ADJUSTMENT



- Dial scale FV type 50 divisions  
FA type 40 divisions
- 1 division on the inner scale corresponds to a radius increase of 0.01mm.
- Turn the dial clockwise to extend the Hi-bore and increase the hole diameter.

### CAUTIONS

Please exchange the consumable parts such as the clamping levers ahead of time.

Moreover, please request the overhaul to the manufacturer when accuracy has decreased.

# M TYPE BORING BARS



## IDENTIFICATION

**S** **B** **R** **1** **08**

① Clamp Type  
S Screw On Type

② Boring Bar Name

③ Shank Shape  
R Round Shank

④ Lead Angle	
1	0°
3	30°
4	45°
6	90°

⑤ Shank Size (mm)	
08	8
10	10
12	12
16	16

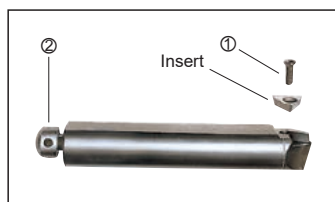
## STANDARD HOLDER

Geometry	Order Number	Stock	Insert Number *1	Dimensions (mm)							
				H	DCON	LF	LDRED	S11	HF	WF	RE*2
	<b>SBR108</b>	●	TPGX 0802	7	8	35	9	—	7	3.5	0.4
	<b>SBR110</b>	●	TPGX...L 0902	9	10	50	11	—	8	4.5	0.4
	<b>SBR112</b>	●	TPMX...L 1103	10	12	60	12	7	10	5.0	0.4
	<b>SBR308</b>	●	TPGX 0802	7	8	35	10	—	7	0.7	0.4
	<b>SBR310</b>	●	TPGX...L 0902	9	10	50	12	—	8	1.0	0.4
	<b>SBR312</b>	●	TPMX...L 1103	10	12	60	13	7	10	1.0	0.4
	<b>SBR408</b>	●	TPGX 0802	7	8	35	10	—	7	0.5	0.4
	<b>SBR410</b>	●	TPGX...L 0902	9	10	50	12	—	8	1.0	0.4
	<b>SBR412</b>	●	TPMX...L 1103	10	12	60	13	7	10	1.0	0.4
	<b>SBR416</b>	●	TPMX...L 1103	14	16	80	13	9	14	0	0.8
	<b>SBR608</b>	●	TPGX 0802	7	8	35	8.5	—	7	—	0.4
	<b>SBR610</b>	●	TPGX...L 0902	8	10	50	10	—	8	—	0.4
	<b>SBR612</b>	●	TPMX...L 1103	10	12	60	11	7	10	—	0.4

\*1 When using an insert with a breaker, please use a left hand insert.

Note1) Dimensions shown for insert corner RE (\*2).

## SPARE PARTS



Order Number				
	① Clamp Screw	② Pre-Set Screw	Wrench	
<b>SBR1</b>   <b>SBR6</b>	<b>08</b>	CS200T	—	TKY06F
	<b>10</b>	CS250T	—	TKY08F
	<b>12</b>	CS300890T	KS1S	TKY08F
	<b>16</b>	CS300890T	KS2S	TKY08F

\* Clamp Torque (N · m) : CS200T=0.6, CS250T=1.0, CS300890T=1.0

● : Inventory maintained in Japan.

TP type inserts > A139—A141  
SPARE PARTS > P001

M

TOOLING SYSTEM

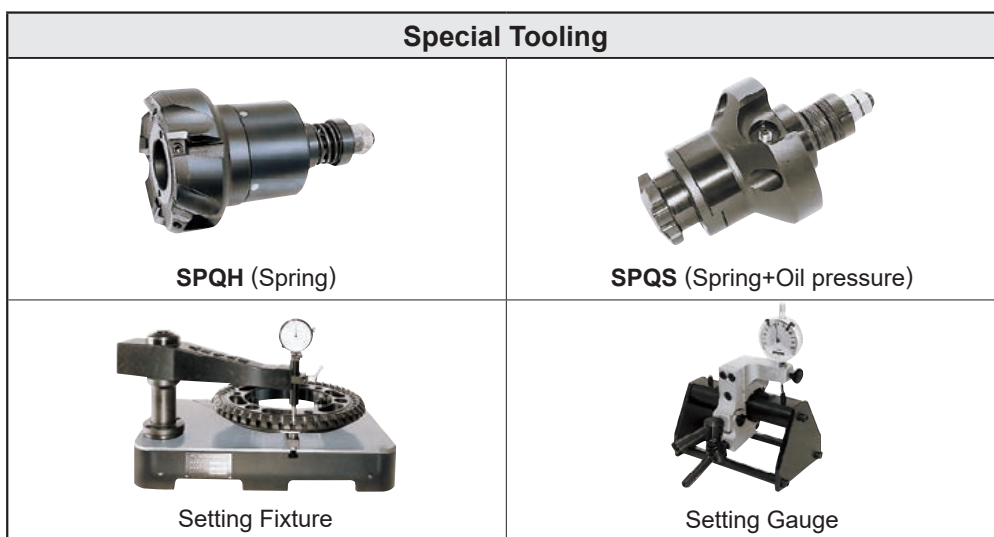
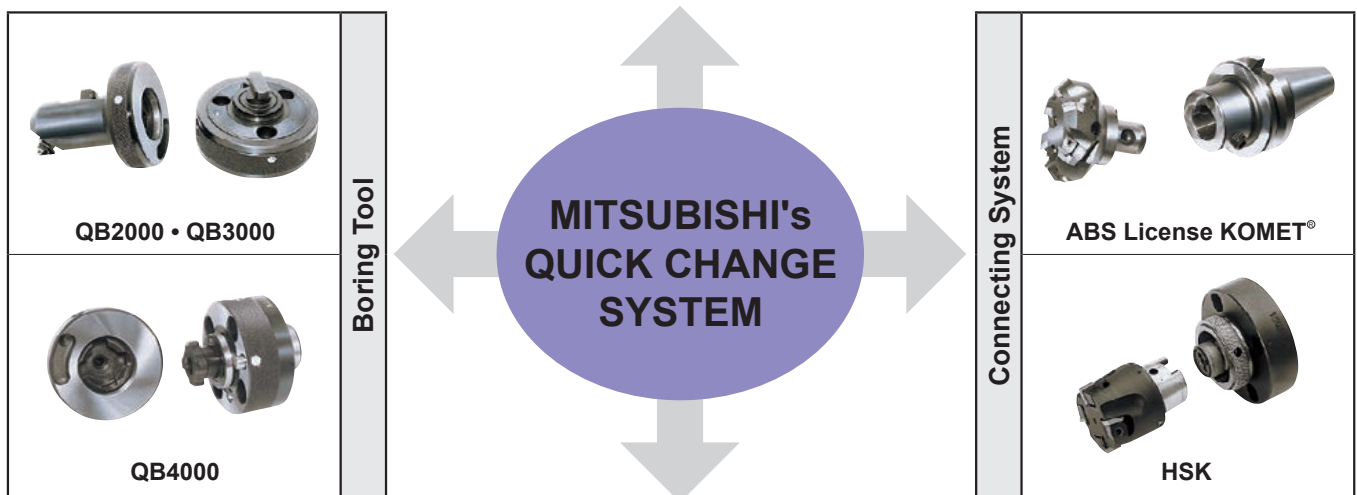
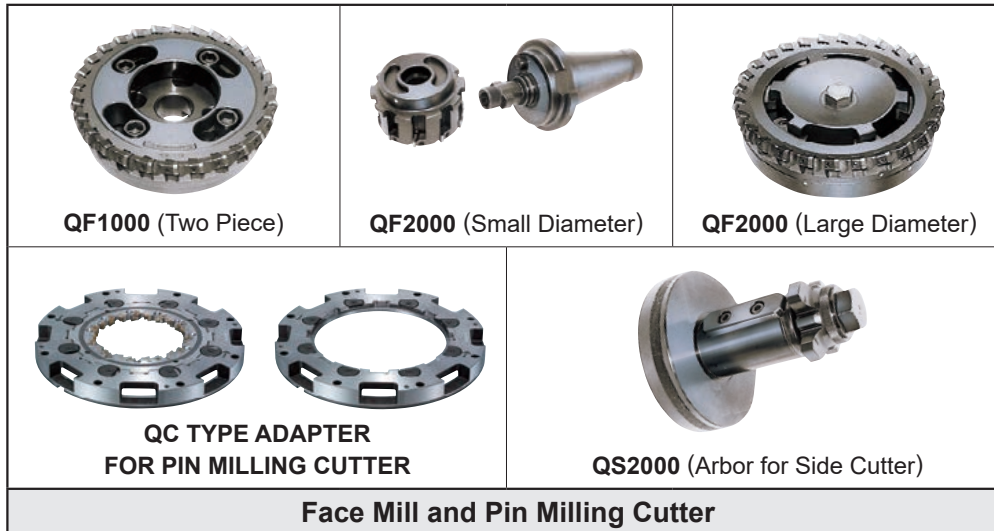
M017

# TOOLING SYSTEM

## CLASSIFICATION OF QUICK CHANGE MODULAR TOOLING SYSTEM

Mitsubishi's quick change system is a must for improving efficiency in mass production lines.

- Shorten tool change times and increase machine efficiency.
- Reduce tool weight. Thus, tool change is safer and easier.
- Improve cutting edge accuracy.



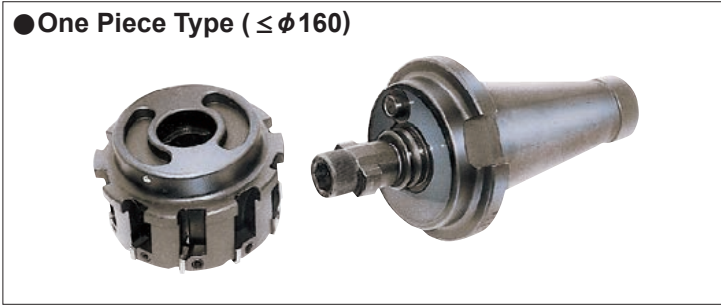
M

TOOLING SYSTEM

# FACE MILL

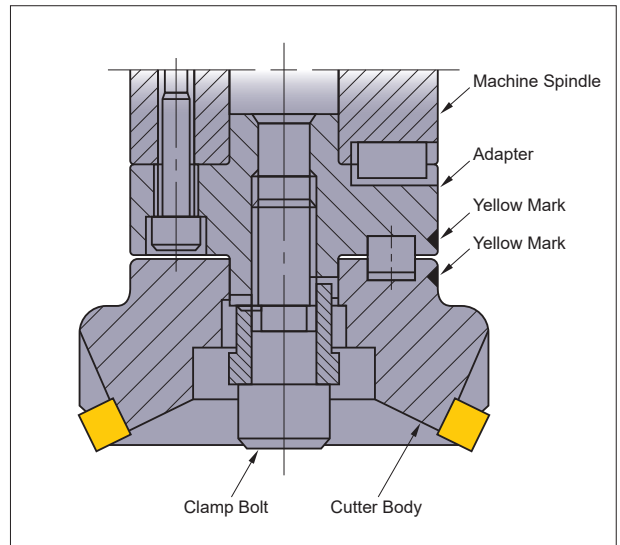
## QF2000 (SINGLE BOLT MOUNTING TYPE)

### ● One Piece Type ( $\leq \phi 160$ )

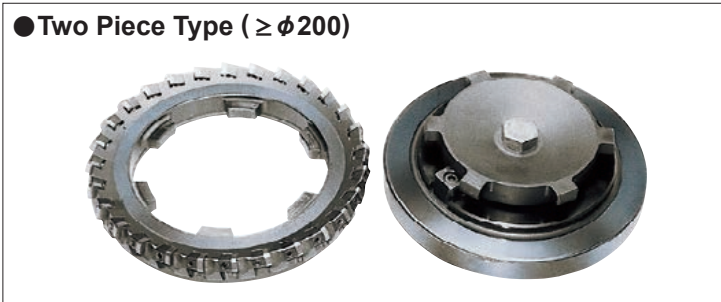


#### ■ FEATURES

1. Simply turning a clamp bolt fixed to the adapter a few times enables cutter exchange.
2. The cutter needs to be turned 90° before removal. This prevents the cutter from falling free.
3. Applicable to both face milling and boring tools.
4. Cutter exchange time is less than 1 min.

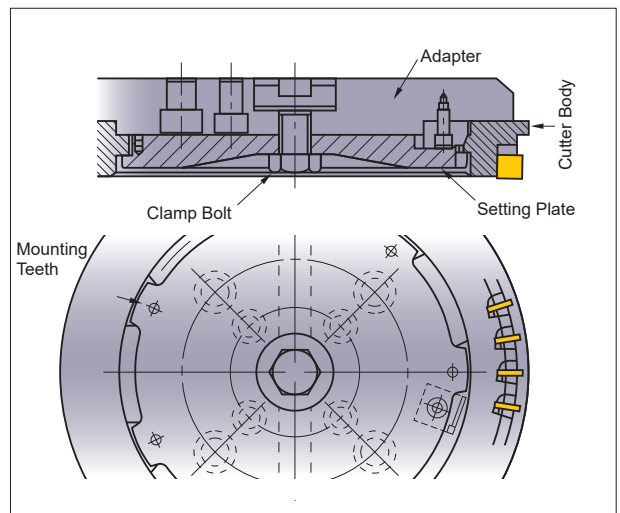


### ● Two Piece Type ( $\geq \phi 200$ )



#### ■ FEATURES

1. Internal diameter of the cutter body has 4–6 mounting teeth. The adapter has the same mounting teeth and a single clamp bolt for installation.
2. The cutter needs to be turned 15° before removal. This prevents the cutter from falling free.
3. Cutter exchange time is less than 1 min.



## QF1000 (GOURD SHAPED HOLE TYPE)

### ● One Piece Type (O Type $\phi 200$ )



### ● Two Piece Type (T Type $\geq \phi 250$ )

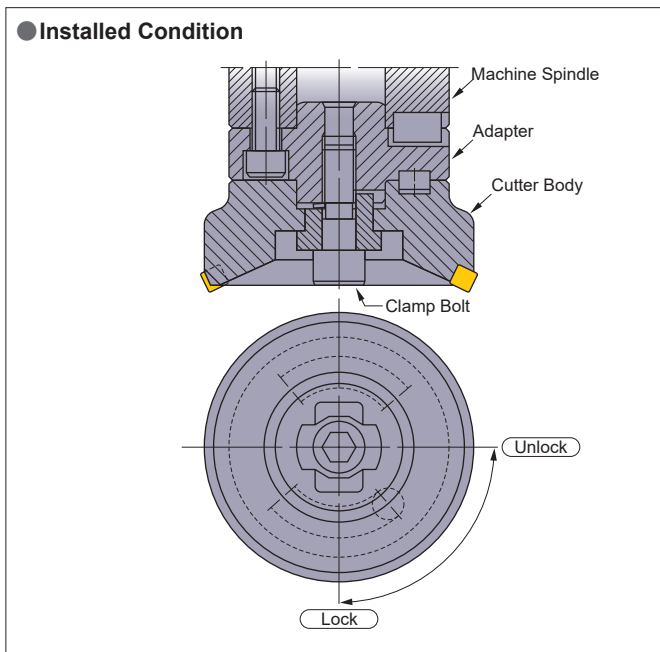
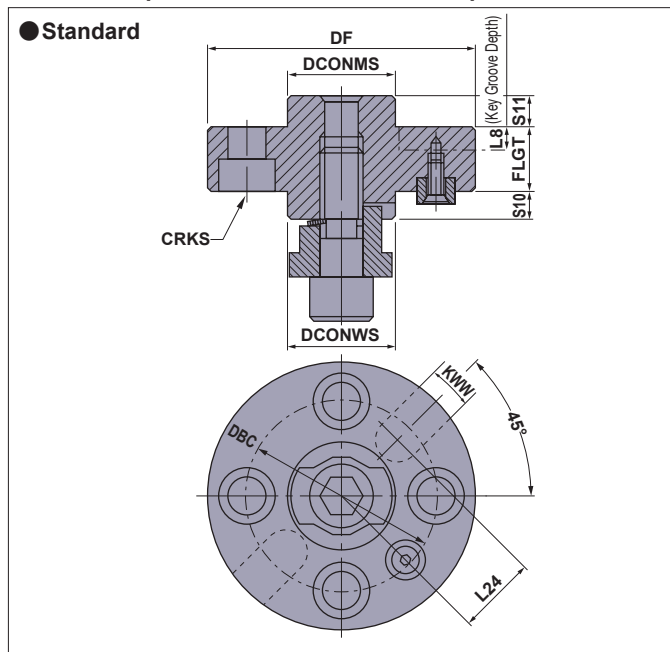


#### ■ FEATURES

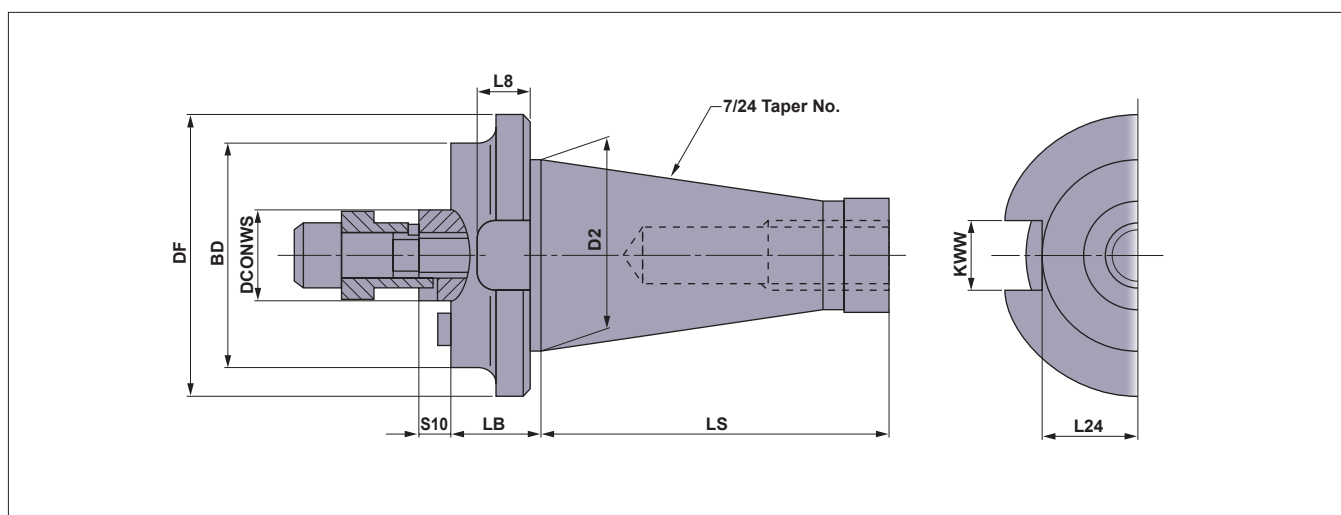
1. Gourd shaped hole type is employed. Turning 4–6 bolts enables cutter exchange.
2. The cutter needs to be turned 15° before removal. This prevents the cutter from falling free.
3. Cutters with  $\geq \phi 250$  are made up of 2 parts. Thus, weight at the time of installation is reduced and safety is improved.
4. Standard adapters facilitate installation of cutters with the same diameter and different insert shapes.
5. Cutter exchange time is less than 3–5 min.

# FACE MILLING ADAPTER

## Q TYPE (SINGLE BOLT TYPE) $\phi 80$ — $\phi 160$



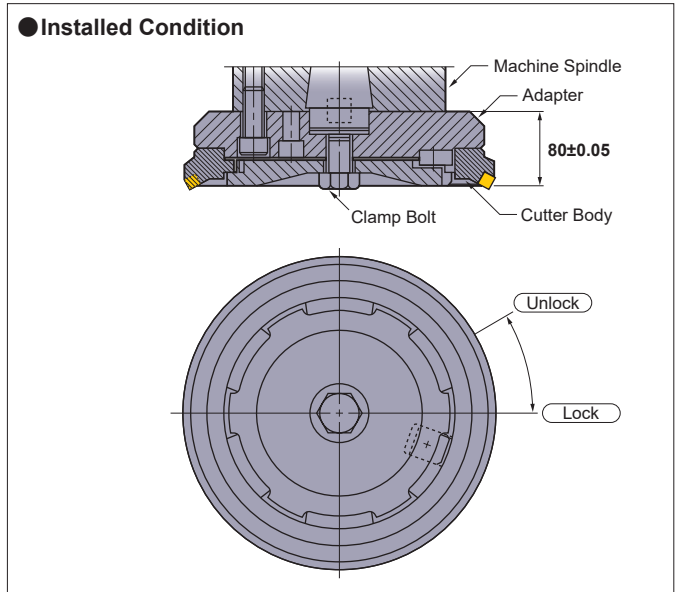
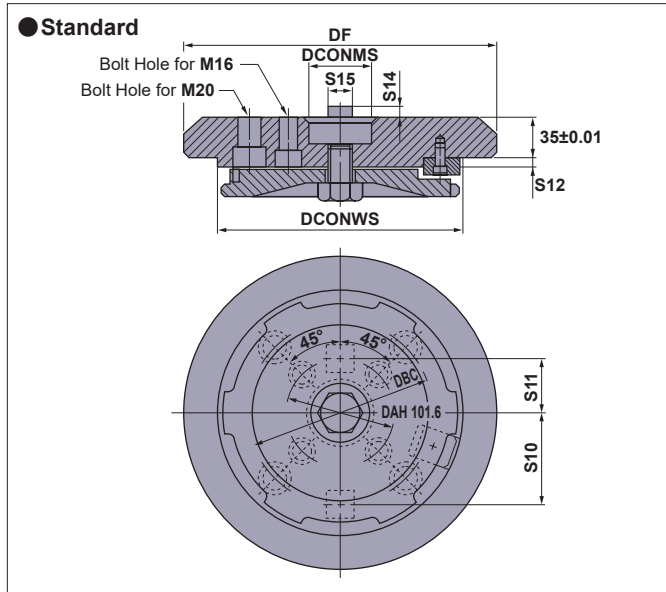
Order Number	Cutter Diameter (DC)	Cutter Dimensions (mm)			Machine Dimensions (mm)								Tool Weight (kg)
		DF	DCONWS	FLGT	DCONMS	DBC	CRKS	KWW	L8	L24	S10	S11	
QFA08025BCR/L	80	70	25.4	25	25.4	45	M12	9.5	7	18.4	13	15	0.8
QFA10025BDR/L	100	80	31.75	25	31.75	55	M16	12.7	8	23.2	13	15	1.2
QFA12530BER/L	125	100	38.1	30	38.1	70	M20	15.9	10	28	13	15	2.1
QFA16030BFR/L	160	125	50.8	30	50.8	85	M20	19	11	36	13	15	3.2



Order Number	Cutter Diameter (DC)	Cutter Dimensions (mm)			Machine Dimensions (mm)								Tool Weight (kg)
		BD	DCONWS	LB	DF	No.	D2	LS	KWW	L8	L24	S10	
QFA08025N4R/L	80	70	25.4	25	70	40	44.45	93.4	16.1	16	22.5	13	1.4
QFA10025N4R/L	100	80	31.75	25	80	40	44.45	93.4	16.1	16	22.5	13	1.7
QFA12530N4R/L	125	100	38.1	30	100	40	44.45	93.4	16.1	16	22.5	13	2.7
QFA16030N4R/L	160	125	50.8	30	125	40	44.45	93.4	16.1	16	22.5	13	3.8
QFA08025N5R/L	80	70	25.4	25	100	50	69.85	126.8	25.7	19	35.3	13	3.2
QFA10025N5R/L	100	80	31.75	25	100	50	69.85	126.8	25.7	19	35.3	13	3.4
QFA12530N5R/L	125	100	38.1	30	100	50	69.85	126.8	25.7	19	35.3	13	4.0
QFA16030N5R/L	160	125	50.8	30	125	50	69.85	126.8	25.7	19	35.3	13	5.1

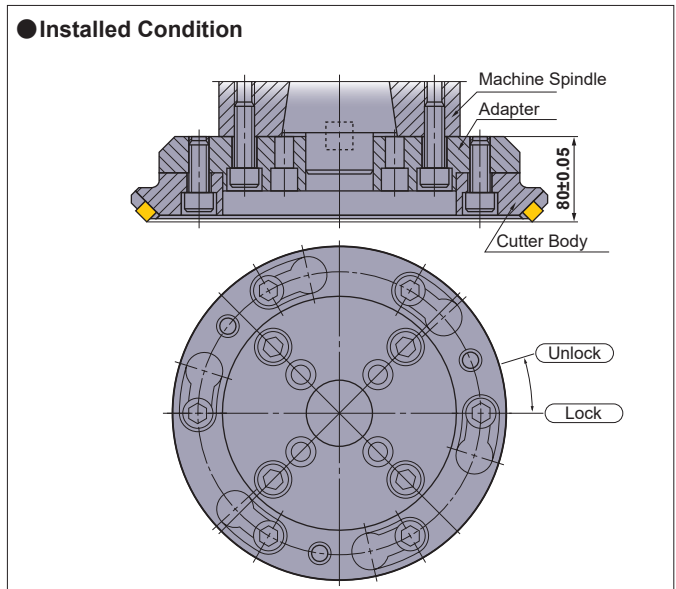
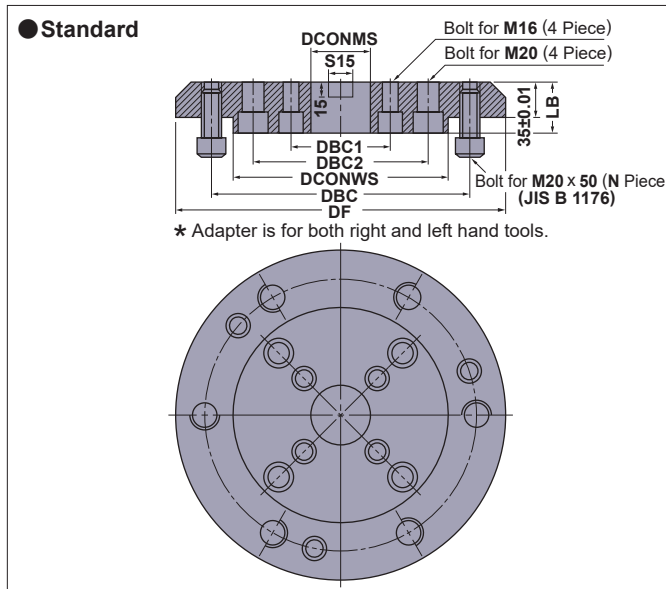


## Q TYPE (SINGLE BOLT TYPE) $\phi 200$ — $\phi 500$



Order Number	Cutter Diameter (DC)	Cutter Dimensions (mm)			Machine Dimensions (mm)						Tool Weight (kg)
		DCONWS	DF	DCONMS	DBC	S10	S11	S12	S14	S15	
QFB20035KR/L	200	125	190	47.625	—	—	50.8	10	11	25.4	9
QFB25035KR/L	250	175	240	47.625	—	—	50.8	10	11	25.4	16
QFB31535PR/L	315	240	305	47.625	177.8	88.9	50.8	10	11	25.4	28
QFB35535PR/L	355	280	345	47.625	177.8	88.9	50.8	10	11	25.4	37
QFB40035PR/L	400	325	390	47.625	177.8	88.9	50.8	10	11	25.4	49
QFB50035PR/L	500	425	490	47.625	177.8	88.9	50.8	10	11	25.4	83

## T TYPE (SIX BOLT TYPE) $\phi 250$ — $\phi 400$



Order Number	Cutter Diameter (DC)	Cutter Dimensions (mm)					Machine Dimensions (mm)				Tool Weight (kg)
		DCONWS	DBC	DF	LB	N	DCONMS	DBC1	DBC2	S15	
QFA25035K	250	110	155	230	45	4	47.625	101.6	—	25.4	9
QFA31535P	315	175	220	295	50	6	47.625	101.6	177.8	25.4	16
QFA35535P	355	215	260	335	50	6	47.625	101.6	177.8	25.4	22
QFA40035P	400	260	305	380	50	6	47.625	101.6	177.8	25.4	29



# SIDE CUTTER

## QC TYPE ADAPTER FOR PIN MILLING CUTTER

● Cutter Body



● Adapter Body



### ■ FEATURES

1. Makes installation of Pin milling cutter easy, quick, and accurate.
2. Clamping the entire periphery of the cutter body improves rigidity and lateral run-out of the cutting edges.
3. Facilitates stable heavy cutting such as counter weight cutting and prevents sudden insert fracture.

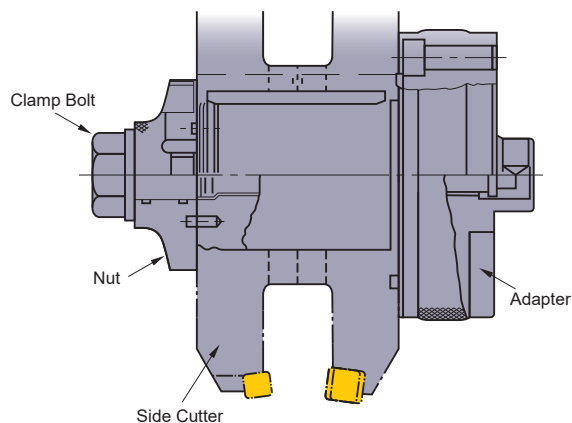
## QS2000 (INSTALLATION METHOD FOR SIDE CUTTER)

● Appearance



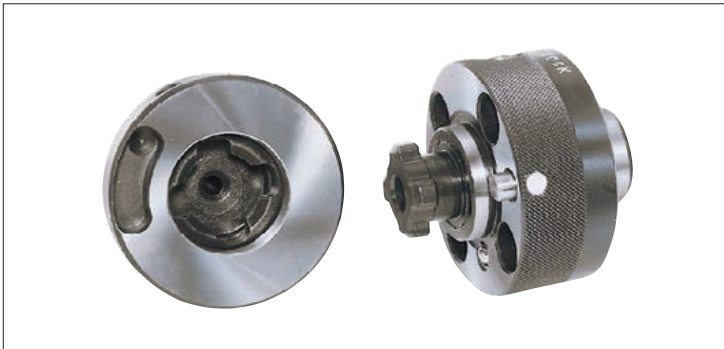
### ■ FEATURES

1. Turning the bolt a few times turns nut 45° and enables installation and detachment of the cutter.
2. Installation and detachment of the cutter is possible without taking the bolt and nut off the adapter.
3. The cutter is a solid type. Thus, the rigidity is high.
4. Cutter exchange time is less than 1 min.



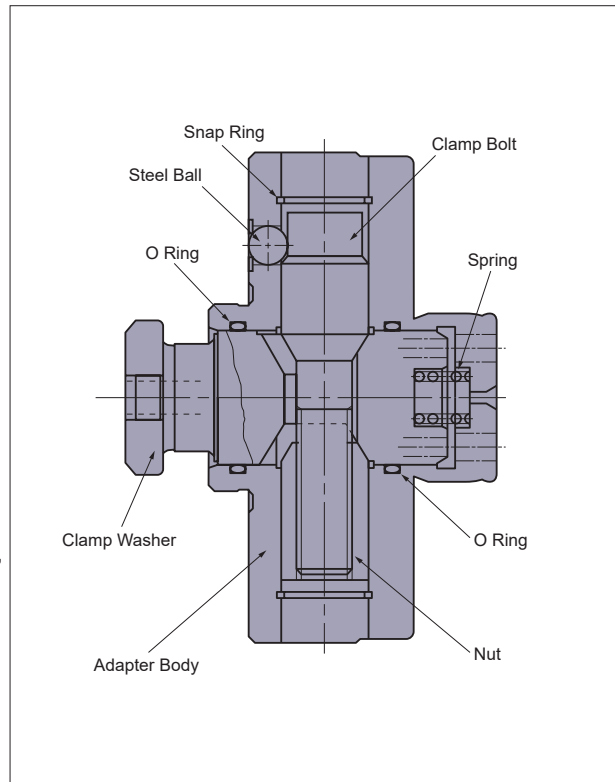
# BORING TOOL

## QB4000 TYPE (SIDE CLAMP TYPE)

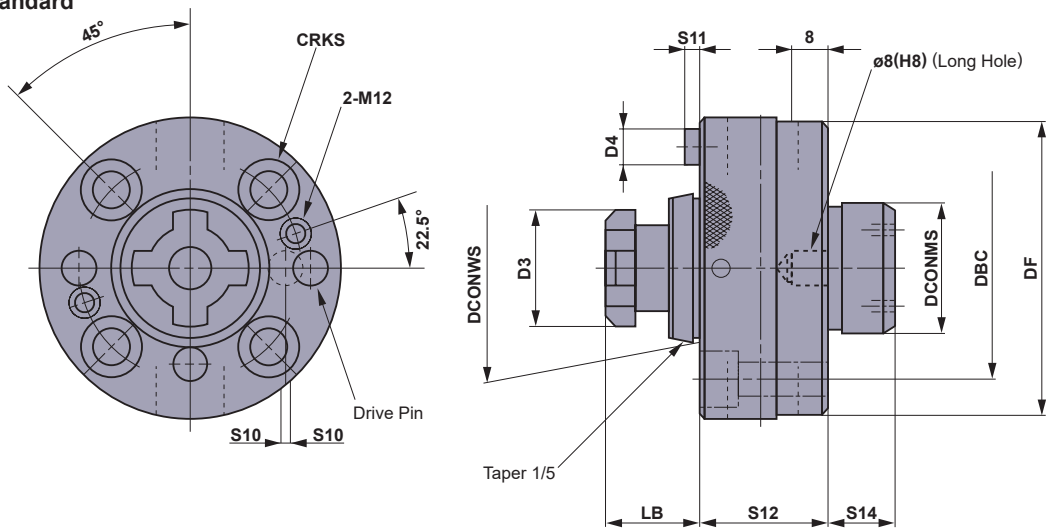


### FEATURES

1. Tightening the clamp bolt (or clamp nut) draws the clamp washer in and securely holds the boring head.
2. The clamp washer has mounting teeth at the end. Turning the clamp washer 45° enables installation and detachment of the boring head.
3. Both 1/5 taper and cutter locating faces support the boring head. Thus, clamp rigidity and installation repeatability accuracy are high (2–3μm).
4. A side clamp structure is employed. Thus, a spindle turning stopper is unnecessary. This structure prevents the boring head from falling free.
5. Insert location close to the adapter body allows for convenient head exchange.
6. Suitable for a wide range of boring, from small to large diameters.
7. Head exchange time is less than 1 min.



### Installation Standard

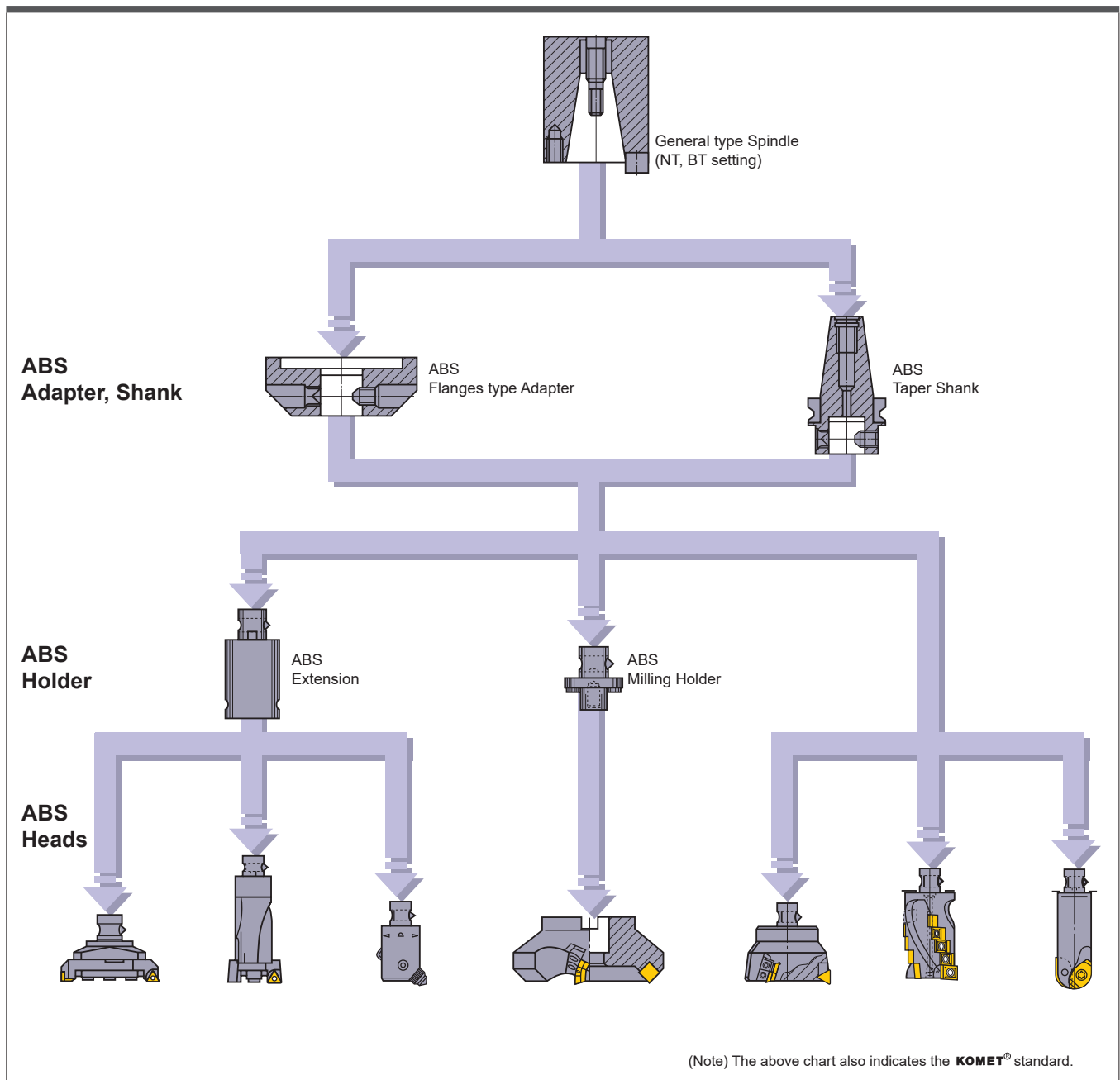


Order Number	Dimensions(mm)											
	DCONWS	DCONMS	DF	D3	DBC	CRKS	LB	D4	S10	S11	S12	S14
QB4350070	35	30	70	28	52	M8	22	8	0.5	5	30	15
QB4350088	35	30	88	28	70	M8	22	8	0.5	5	30	15
QB4400098	40	30	98	34	80	M8	24	8	0.5	5	30	15
QB4400118	40	30	118	34	90	M10	24	10	0.5	5	30	15
QB4500138	50	40	138	42	110	M12	30	12	0.5	5	30	15

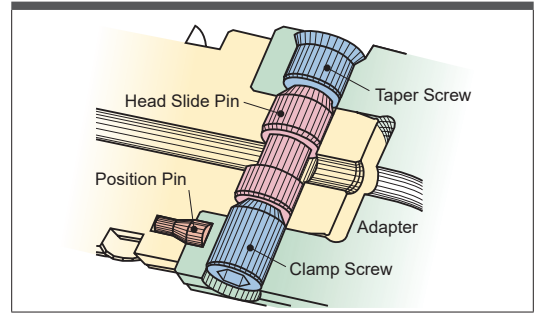
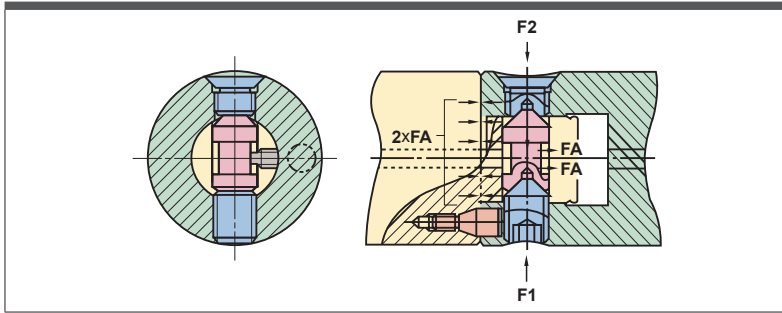
### ABS SYSTEM CHARACTERISTIC

- High rigidity and high coupling strength.  
The taper wedge effects produced by the clamping screw, the taper screw, and the slide pin enable strong and firm coupling between the head and the adapter.
- As the cutting torque acts as torsion force on the axis, 50–80% improvement is achieved for the clamping strength in the coupled portion axis direction.
- High accuracy is guaranteed.  
An attachment repeat accuracy of 2–3μm is constantly maintained in the coupled portion.
- From small (φ20) diameter to large diameter (φ200), a wide range of tooling is possible.
- Internal passage of the coolant (air) is possible without modifications to standard machinery.
- Tool head extensions are easy through the use of extension pieces.
- Through the use of reducers, tool head diameters are easily set.

### ABS SYSTEM MECHANISM



## ABS SYSTEM COMPONENT



\* This system is licensed from **KOMET**® of Germany. (JP Patent NO.1328669)

When the force F1 presses on the clamping screw, the slide pin moves in the radial direction and impinges on the taper screw, generation the reaction force F2. Since the centres of the clamping screw, the taper screw, and the slide pin are eccentric, a taper connection is made at sites separated by a 180° phase, with the clamping screw and the slide pin on the taper right impingement portion, and the slide pin and taper pin on the taper left impingement portion. The result is that, a vector analysis of those forces shows, as depicted in the diagram above, that the slides move in an identical direction, and the coupling force FA is doubled and transmitted accordingly. Further, cutting resistance generated during cutting becomes torsion stress and is transmitted accordingly. The forces F1 and F2 generated with the clamping screw and taper screw are expanded, and the coupling (jointing) force FA becomes as even greater force, and is generated accordingly.

## ABS SYSTEM SETTING STANDARDS Adapter Dimensions

	Order Number	Dimensions(mm)				
		BD	DCON	CBDP	L24	S10
	<b>ABS25W</b>	25	13	22	13	8.3
	<b>ABS32W</b>	32	16	25	16	10.3
	<b>ABS40W</b>	40	20	30	18.5	11.3
	<b>ABS50W</b>	50	28	34	22	13.3
	<b>ABS63W</b>	63	34	41	28	17.4
	<b>ABS80W</b>	80	46	48	34	20.4
	<b>ABS100W</b>	100	56	58	40.5	24.4
	<b>ABS125W</b>	125	70	76	51	30.5

### ● Parts for Adapter

	Pack Order Number	* Stock	Clamp Screw	Taper Screw
		<b>ABS25-FS-W</b>	●	ABS25-F1
	<b>ABS32-FS-W</b>	●	ABS32-F1	ABS32-F2
	<b>ABS40-FS-W</b>	●	ABS40-F1	ABS40-F2
	<b>ABS50-FS-W</b>	●	ABS50-F1	ABS50-F2
	<b>ABS63-FS-W</b>	●	ABS63-F1	ABS63-F2
	<b>ABS80-FS-W</b>	●	ABS80-F1	ABS80-F2
	<b>ABS100-FS-W</b>	●	ABS100-F1	ABS100-F2
	<b>ABS125-FS-W</b>	●	ABS125-F1	ABS125-F2

\* An order of the above type of screw and pin needs to be included in the set. Please use a "Pack Order Number" for your order.

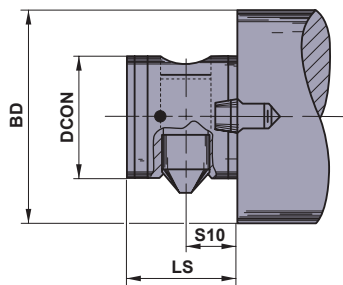
● : Inventory maintained in Japan.

M

TOOLING SYSTEM

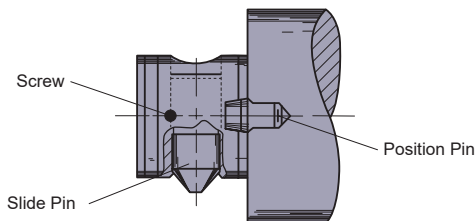
# TOOLING SYSTEM

## ● Head Dimensions



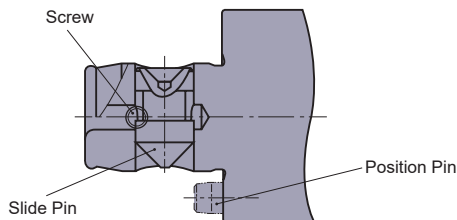
Order Number	Dimensions(mm)			
	BD	DCON	LS	S10
<b>ABS25M</b>	25	13	20	8
<b>ABS32M</b>	32	16	23	10
<b>ABS40M</b>	40	20	26	11
<b>ABS50M</b>	50	28	31	13
<b>ABS63M</b>	63	34	38	17
<b>ABS80M</b>	80	46	43	20
<b>ABS100M</b>	100	56	55	24
<b>ABS125M</b>	125	70	70	30

## ● Parts for Head



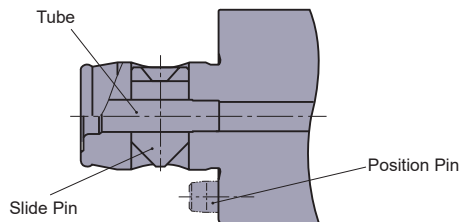
Pack Order Number *	Stock	Slide Pin	Position Pin	Screw
<b>ABS25-ES-M</b>	●	ABS25-E3	ABS25-E4	ABS25-E5
<b>ABS32-ES-M</b>	●	ABS32-E3	ABS32-E4	ABS32-E5
<b>ABS40-ES-M</b>	●	ABS40-E3	ABS40-E4	ABS40-E5
<b>ABS50-ES-M</b>	●	ABS50-E3	ABS50-E4	ABS50-E5
<b>ABS63-ES-M</b>	●	ABS63-E3	ABS63-E4	ABS63-E5
<b>ABS80-ES-M</b>	●	ABS80-E3	ABS80-E4	ABS80-E5
<b>ABS100-ES-M</b>	●	ABS100-E3	ABS100-E4	ABS100-E5
<b>ABS125-ES-M</b>	●	ABS125-E3	ABS125-E4	ABS125-E5

## ● Parts for Head [For Fine Boring]



Pack Order Number *	Stock	Slide Pin	Position Pin	Screw
<b>ABS25-ES-M1</b>	●	ABS25-E3	ABS25-E4.1	ABS25-E5
<b>ABS32-ES-M1</b>	●	ABS32-E3	ABS32-E4.1	ABS32-E5
<b>ABS40-ES-M1</b>	●	ABS40-E3	ABS40-E4.1	ABS40-E5
<b>ABS50-ES-M1</b>	●	ABS50-E3	ABS50-E4.1	ABS50-E5
<b>ABS63-ES-M1</b>	●	ABS63-E3	ABS63-E4.1	ABS63-E5
<b>ABS80-ES-M1</b>	●	ABS80-E3	ABS80-E4.1	ABS80-E5
<b>ABS100-ES-M1</b>	●	ABS100-E3	ABS100-E4.1	ABS100-E5

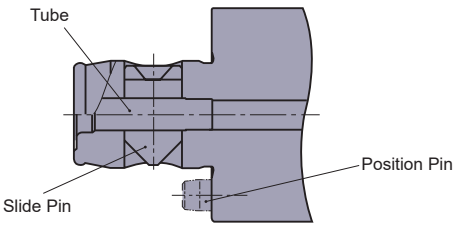
## ● Parts for Head [For Coolant Hole Type]



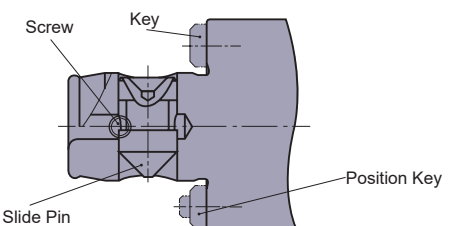
Pack Order Number *	Stock	Slide Pin	Position Pin	Tube
<b>ABS25-ES-M3</b>	●	ABS25-E3.2	ABS25-E4	ABS25-E6
<b>ABS32-ES-M3</b>	●	ABS32-E3.2	ABS32-E4	ABS32-E6
<b>ABS40-ES-M3</b>	●	ABS40-E3.2	ABS40-E4	ABS40-E6
<b>ABS50-ES-M3</b>	●	ABS50-E3.2	ABS50-E4	ABS50-E6
<b>ABS63-ES-M3</b>	●	ABS63-E3.2	ABS63-E4	ABS63-E6
<b>ABS80-ES-M3</b>	●	ABS80-E3.2	ABS80-E4	ABS80-E6
<b>ABS100-ES-M3</b>	●	ABS100-E3.2	ABS100-E4	ABS100-E6
<b>ABS125-ES-M3</b>	●	ABS125-E3.2	ABS125-E4	ABS125-E6

\* An order of the above type of screw, pin and tube needs to be included in the set. Please use a "Pack Order Number" for your order.

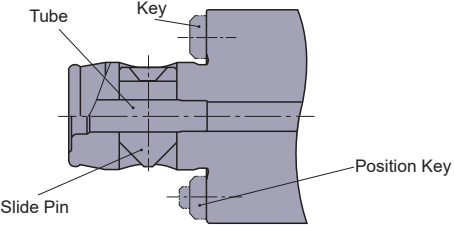
### ● Parts for Head [For Fine Boring with Coolant Hole]

	Pack Order Number *	Stock	Slide Pin	Position Pin	Tube
	<b>ABS25-ES-M4</b>	●	ABS25-E3.2	ABS25-E4.1	ABS25-E6
<b>ABS32-ES-M4</b>	●	ABS32-E3.2	ABS32-E4.1	ABS32-E6	
<b>ABS40-ES-M4</b>	●	ABS40-E3.2	ABS40-E4.1	ABS40-E6	
<b>ABS50-ES-M4</b>	●	ABS50-E3.2	ABS50-E4.1	ABS50-E6	
<b>ABS63-ES-M4</b>	●	ABS63-E3.2	ABS63-E4.1	ABS63-E6	
<b>ABS80-ES-M4</b>	●	ABS80-E3.2	ABS80-E4.1	ABS80-E6	
<b>ABS100-ES-M4</b>	●	ABS100-E3.2	ABS100-E4.1	ABS100-E6	

### ● Parts for Head [For Key Type]

	Pack Order Number *	Stock	Slide Pin	Key	Position Key	Screw
	<b>SBA25-ES-M</b>	●	ABS25-E3	SBA25-E4	SBA25-E4.1	ABS25-E5
<b>SBA32-ES-M</b>	●	ABS32-E3	SBA32-E4	SBA32-E4.1	ABS32-E5	
<b>SBA40-ES-M</b>	●	ABS40-E3	SBA40-E4	SBA40-E4.1	ABS40-E5	
<b>SBA50-ES-M</b>	●	ABS50-E3	SBA50-E4	SBA50-E4.1	ABS50-E5	
<b>SBA63-ES-M</b>	●	ABS63-E3	SBA63-E4	SBA63-E4.1	ABS63-E5	
<b>SBA80-ES-M</b>	●	ABS80-E3	SBA80-E4	SBA80-E4.1	ABS80-E5	
<b>SBA100-ES-M</b>	●	ABS100-E3	SBA100-E4	SBA100-E4.1	ABS100-E5	
<b>SBA125-ES-M</b>	●	ABS125-E3	SBA125-E4	SBA125-E4.1	ABS125-E5	

### ● Parts for Head [For Key Type with Coolant Hole]

	Pack Order Number *	Stock	Slide Pin	Key	Position Key	Tube
	<b>SBA25-ES-M1</b>	●	ABS25-E3.2	SBA25-E4	SBA25-E4.1	ABS25-E6
<b>SBA32-ES-M1</b>	●	ABS32-E3.2	SBA32-E4	SBA32-E4.1	ABS32-E6	
<b>SBA40-ES-M1</b>	●	ABS40-E3.2	SBA40-E4	SBA40-E4.1	ABS40-E6	
<b>SBA50-ES-M1</b>	●	ABS50-E3.2	SBA50-E4	SBA50-E4.1	ABS50-E6	
<b>SBA63-ES-M1</b>	●	ABS63-E3.2	SBA63-E4	SBA63-E4.1	ABS63-E6	
<b>SBA80-ES-M1</b>	●	ABS80-E3.2	SBA80-E4	SBA80-E4.1	ABS80-E6	
<b>SBA100-ES-M1</b>	●	ABS100-E3.2	SBA100-E4	SBA100-E4.1	ABS100-E6	
<b>SBA125-ES-M1</b>	●	ABS125-E3.2	SBA125-E4	SBA125-E4.1	ABS125-E6	

\* An order of the above type of screw, pin and tube needs to be included in the set. Please use a "Pack Order Number" for your order.

# HSK SYSTEM

## FEATURES OF THE HSK SYSTEM

● **Suitable for high-speed machining.**

When the taper hole is slightly separated during high-speed machining due to centrifugal force, the taper axis is continuously in contact with the taper hole because of elastic deformation. Thus, 2 face holding is maintained.

● **Guaranteed high accuracy.**

Installation repeatability of  $2\mu\text{m}$  is guaranteed.

● **High rigidity.**

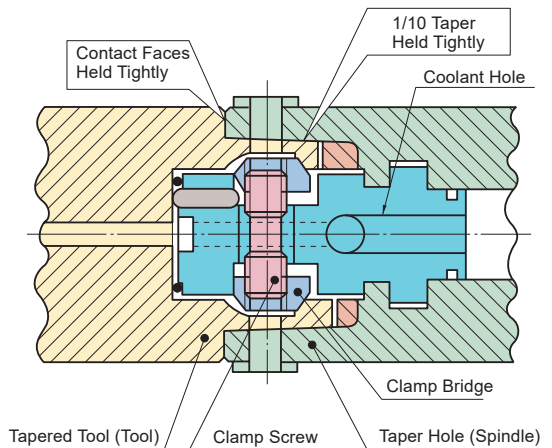
High rigidity in the radial and thrust direction due to the 2 face holding system.

● **Easy installation.**

Detachable support structure ensures separation of the tool even when the tool has undergone thermal expansion.

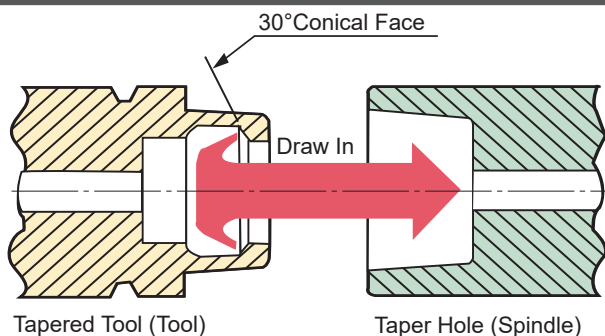
● **Coolant system selection.**

Centre coolant and angular flow coolant type.



\* HSK stands for **H**ole (Hollow) **S**chaft (axis) **K**egel (taper) in German.

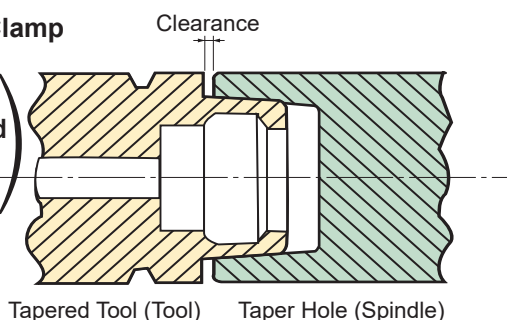
## HSK CLAMPING METHOD



● The 30° conical face of the taper axis is pulled in the direction of the tapered hole to clamp.

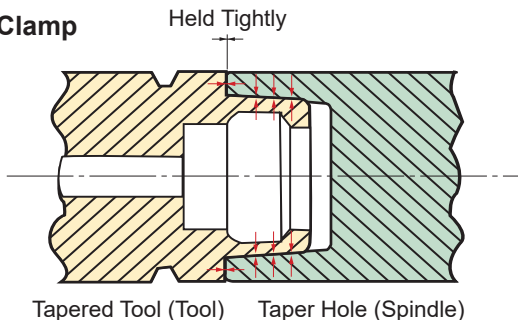
● **Temporary Clamp Position**

(The spindle taper face and the tool taper face contact.)



● Temporary clamp position has a clearance between the spindle and the tool contact faces.  
● Taper clamping force increases as the diameter increases.

● **Permanent Clamp Position**



● Hollow thin taper axis holds the taper faces and the contact faces tightly due to pressurized elastic deformation.



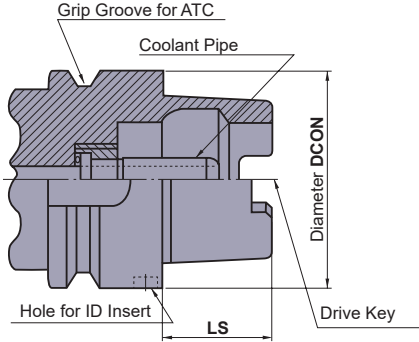
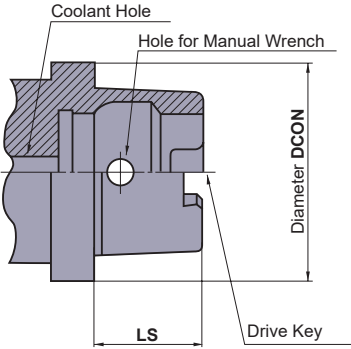
## HSK SYSTEM FORM

There are various HSK types.

Mitsubishi Materials produces A, B, C, and D types of taper axis (tool size) and C and D types (manual operation) of taper hole (spindle side).

Type	Application	Tapered Tool (Tool)	Tapered Hole (Spindle)
<b>A Type</b>	Automatic tool change (ATC), centre coolant (mainly milling tools)	<input type="checkbox"/>	
<b>B Type</b>	Automatic tool change (ATC), angular flow coolant (mainly turning tools)	<input type="checkbox"/>	
<b>C Type</b>	Manual tool change, centre coolant (mainly milling tools)	<input type="checkbox"/>	<input type="checkbox"/>
<b>D Type</b>	Manual tool change, angular flow coolant (mainly turning tools)	<input type="checkbox"/>	<input type="checkbox"/>

: Non stock, produced to order only.

Automatic Tool Change	A Type (Centre Coolant Type)	Milling Tool		Order Number	Dimensions (mm)	
					DCON	LS
				<b>HSK-A32M</b>	32	16
				<b>HSK-A40M</b>	40	20
				<b>HSK-A50M</b>	50	25
				<b>HSK-A63M</b>	63	32
				<b>HSK-A80M</b>	80	40
				<b>HSK-A100M</b>	100	50
Manual Tool Change	C Type (Centre Coolant Type)	Milling Tool		Order Number	Dimensions (mm)	
						DCON
				<b>HSK-C32M</b>	32	16
				<b>HSK-C40M</b>	40	20
				<b>HSK-C50M</b>	50	25
				<b>HSK-C63M</b>	63	32
				<b>HSK-C80M</b>	80	40
				<b>HSK-C100M</b>	100	50