

Quick Change Work-Holder System

SMART GRIP



The fixture creates the new machining process!

Interference x

Dovetail clamp

HSK Interface

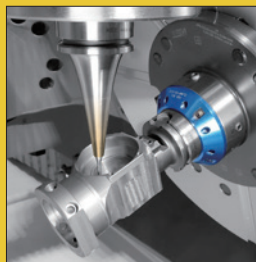
Work-piece

WORK HOLDER

HEAD

PAT.

5-axis machine



Clamping force

Robotic work-piece changing



3-axis + rotary table

29th Award
Small- and Medium-size Enterprises Award for Excellence in New Innovative Technologies and Products
The Resona Foundation for Small and Medium Enterprise Promotion and The Daily Industrial News



MST corporation

1911

MST's SMART GRIP is a work-piece clamping fixture with superior rigidity for multi-surface applications using 5-axis and 3-axis machining centers with a rotary table.

The system consists of a "HEAD" installed on a machine table and a "WORK HOLDER" that clamps the work-piece.

There are two types of "HEADS" — a manual clamping type and an "AUTO-HEAD" available for a robot. Also, we offer dovetail clamping and flange clamping types in a "WORK HOLDER" system.

The greatest feature of the system is its strong clamping force. We have adopted the two-face contact ISO-HSK standard clamping system, time-proven machine spindle interface for the connection between the "HEAD" and the "WORK HOLDER".

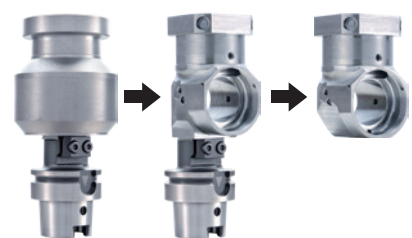
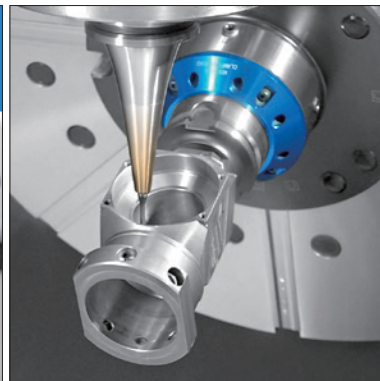
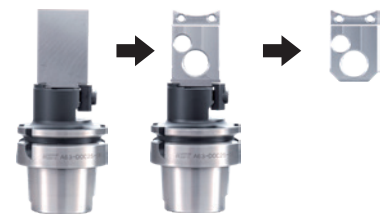
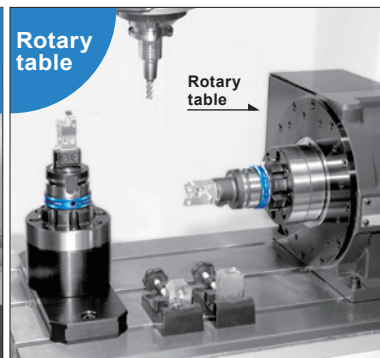
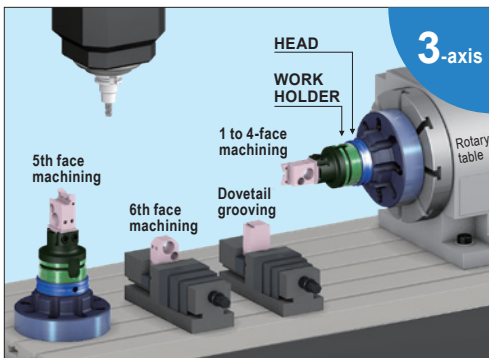
And, we have adopted a dovetail clamping system for work-piece clamping.

Both clamping systems firmly integrate the machine table, the SMART GRIP, and the work-piece with superior rigidity.

Also, the "HEAD" and "WORK HOLDER" allow multi-directional machining thanks to the compact design that provides superior accessibility enabling the system to meet various customer's applications.

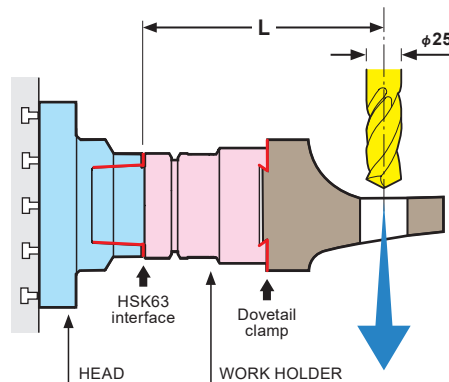
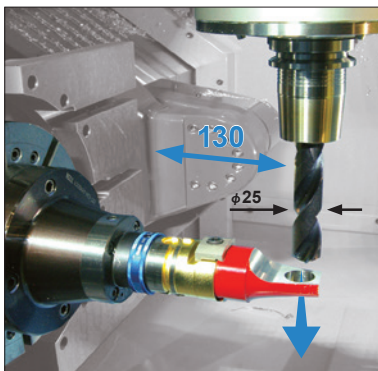
Multi-surface machining

Process integration on a 3-axis machining center with a rotary table and 5-axis machining center

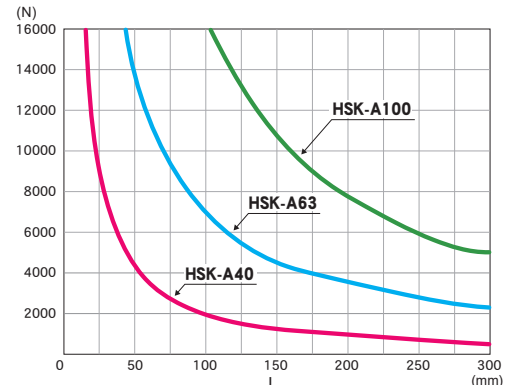


Clamping force

HSK (2-face contact interface) and dovetail clamping

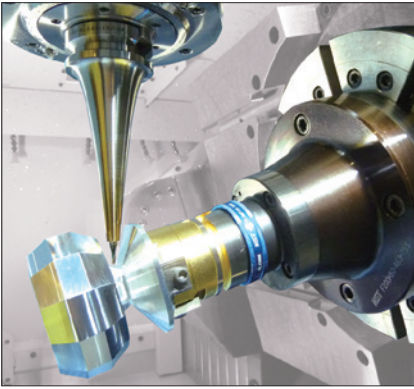


Maximum cutting force

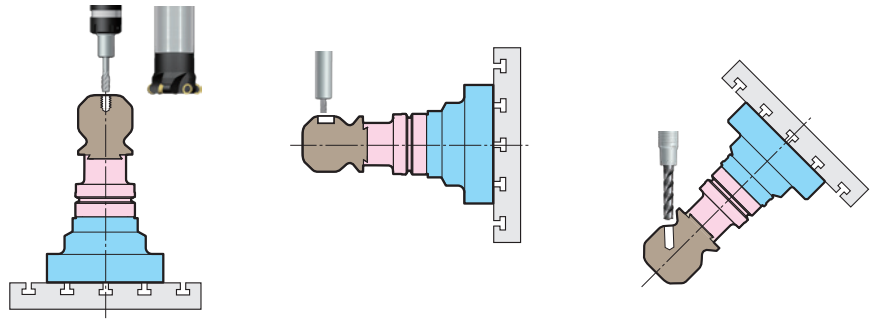


Avoid interference

The fixture(work-holders and heads) design is much smaller than the work-piece.



- The fixture has less interference with a tool holder and a cutting tool and it endures large machining force in a different direction.

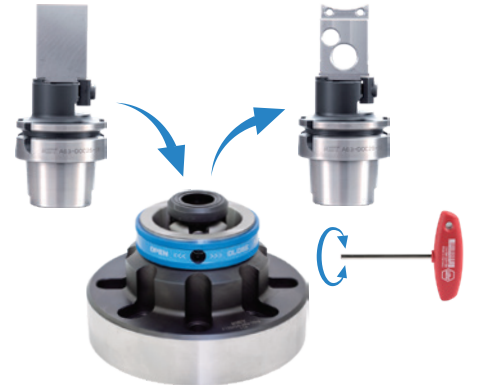


Quick change

Clamping 5-sec. Unclamping 5-sec. (Manual Clamping Head)



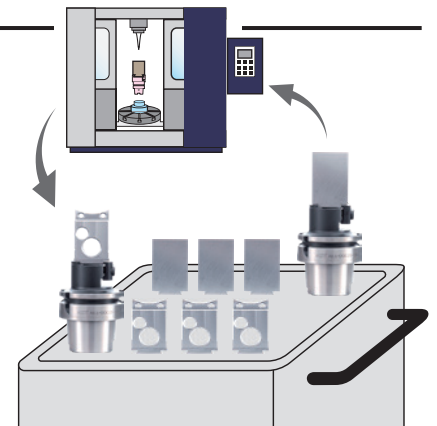
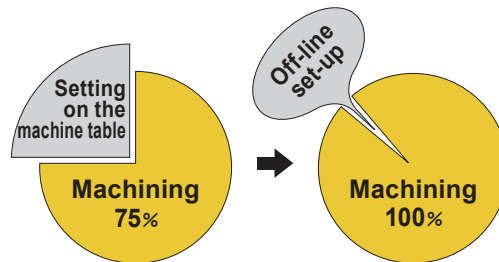
- Easy operation – just mount the work holder on the head and tighten with a wrench.



Off-line set-up

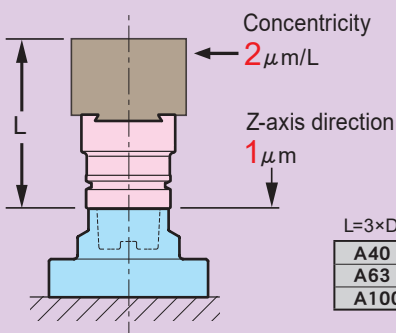
Minimizing machine downtime.

- You can start machining the next work-piece quickly when it is mounted in a work holder in advance.
- The machine runs continuously, so you can maximize the machine utilization ratio.

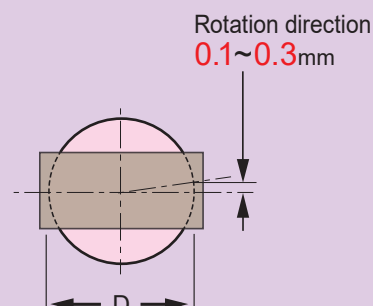


Repeatability

No alignment by experienced workers required.



L=3×D	D	L
A40	40	120
A63	63	190
A100	100	300

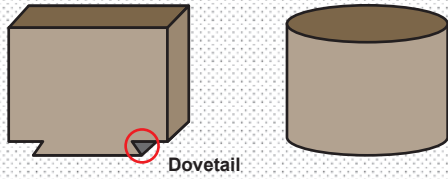


If necessary, please off-set the rotational direction using a touch probe.

BLUM high-accuracy touch probe



WORK-PIECE



Dovetail

WORK HOLDER



Dovetail clamping work holder P.5



Flange clamping work holder P.6



The custom design

- Dovetail vise clamping work holder P.6
- Side-screw clamping work holder P.7
- Collet holder

HEAD



Manual interchange
Manual Clamping Head P.5



You can clamp and unclamp the work holder using a T-handle wrench.

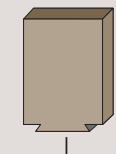
HSK-A40
HSK-A63
HSK-A100

Automatic interchange
Automatic Clamping Head P.8



The hydraulic clamping design allows you to combine your machining centers with robots to create a fully-automated system.

Direct-mounting type on the machine table
Direct-mounting P.7



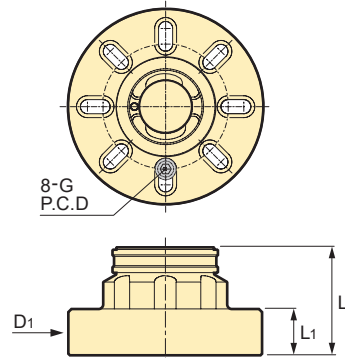
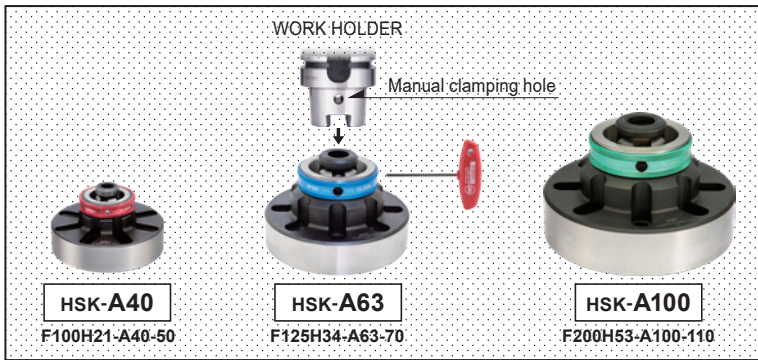
Provides a larger machining center machining area.

Mounting plate



HEAD

The Manual Clamping Head (Manual exchange)

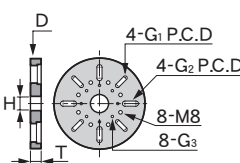


CODE	Interface	L	φD ₁	L ₁	G	P.C.D.	Clamping force (kN)	kg
F 100H21-A40 - 50	HSK-A40	50	100	25	M 6×30	55~ 85	10	1.7
F 125H34-A63 - 70	HSK-A63	70	125	30	M 8×35	80~100	20	3.8
F 200H53-A100-110	HSK-A100	110	200	50	M12×50	125~160	30	14

- **Std access.**
 - T-handle wrench
 - Mounting bolt × 4pcs.
- **Option**
 - Mounting plate
- **Note**
 - A manual clamping hole on the work holder is required for mounting.

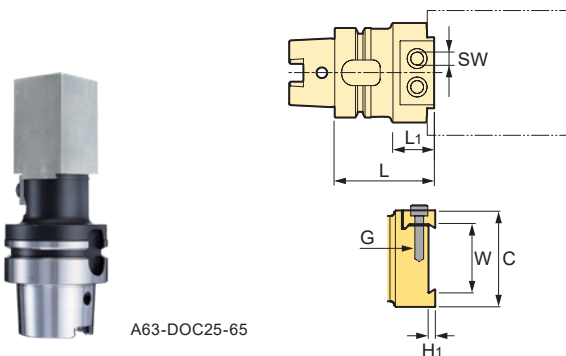
Please use a mounting plate if the fixing hole of the head doesn't match with a T-groove on the machine table. Also, we can make a custom-designed mounting plate for you if necessary.

CODE	Interface	T	φD	φH	G ₁	G ₂	G ₃	P.C.D.	kg
F160H32-A40	HSK-A40	20	160	32	M 5×20	M 6×20	M 6	80~125	2.6
F200H32-A40		25	200		M 8×25	M10×25		100~160	5
F160H50-A63	HSK-A63	20	160	50	M 5×20	M 6×20	M 6	80~125	2.4
F200H50-A63		25	200		M 8×25	M10×25		100~160	4.7
F250H50-A63		30	250		M10×30	M12×30	M12	140~200	9.4
F250H80-A100	HSK-A100	30	250	80	M10×30	M12×30	M12	140~200	8.7



WORK HOLDER

Dovetail clamping work holder



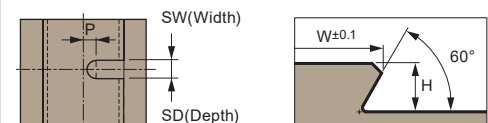
CODE	L	L ₁	φC	W	H ₁	G	SW	kg
A40 -DOC 17.5-55	55	25	30	17.5	2	M 5	4	0.4
-DOC 25 -55		28	40	25	3	M 6	5	0.6
-DOC 35 -55		25	50	35				0.7
-DOC 50 -60	60	30	70	50	5	M 8	6	1.2
A63 -DOC 25 -65	65	27	40	25	3	M 6	5	1.2
-DOC 35 -65			50	35				1.3
-DOC 50 -70		70	30	70	50	5	M 8	6
-DOC 70 -75	75	35	100	70		M10	8	3
A100-DOC 35 -70	70	27	50	35	3	M 6	5	3.3
-DOC 50 -75		32	70	50	5	M 8	6	3.8
-DOC 70 -75		35	100	70		M10	8	5
-DOC100 -85	85	40	140	100	10			7.7

Dovetail grooving

Dovetail grooving of the work-piece clamping area using an angular cutter is required prior to machining. After machining, cut off the dovetail of the work-piece.

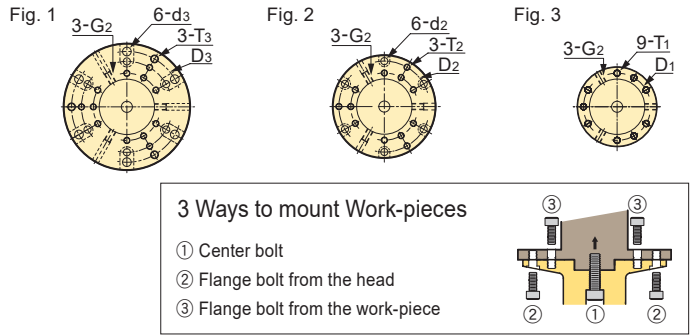
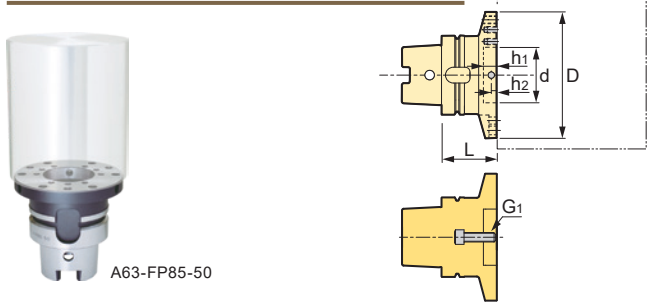


Details of dovetail dimensions



Holder type	W	H	P	SW	SD
DOC 17.5	17.5	2.5	2.5	4	2
DOC 25	25	3.5		6	2.5
DOC 35	35		5.5	8	
DOC 50	50	5.5	9	10	4
DOC 70	70		18	12	
DOC100	100	10.5	26	15	

Flange clamping work holder



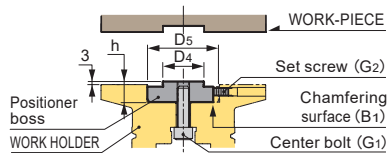
3 Ways to mount Work-pieces

- Center bolt
- Flange bolt from the head
- Flange bolt from the work-piece

CODE	Fig.	L	φD	φD1	φD2	φD3	φd	h1	h2	T1	T2	T3	φd2	φd3	G1	G2	Kg
A40 -FP 40-35	3	35	40	32	—	—	25	12	4	M4×6	—	—	—	—	M 6×15	M4×8	0.3
-FP 63-40	2	40	63	—	50	—	+0.053 +0.020	—	—	—	M5	—	5.5	—	M 6×20	—	0.5
A63 -FP 63-45	3	45	63	50	—	—	40	13	5	M5×8	—	—	—	—	M10×20	M6×10	0.9
-FP 85-50	2	50	85	—	73	—	+0.064 +0.025	—	—	—	M6	—	6.6	—	M10×25	—	1.2
-FP110-55	1	55	110	—	95	—	—	—	—	—	M6×9	M 8	9	—	M10×30	—	1.7
A100-FP100-55	3	55	100	85	—	—	70	17	7	M8×12	—	—	—	—	M12×25	M8×16	3.0
-FP130-65	2	65	130	—	115	—	+0.076 +0.030	—	—	—	M8	—	9	—	M12×35	—	4.2
-FP160-70	1	70	160	—	140	—	—	—	—	—	M8×12	M10	11	—	M12×40	—	5.3

- Std access.**
- Center bolt (G1)×1pc.
 - Set screw (G2)×3pcs.
 - M6 special small-head bolt (the head diameter size is the same as the M5 bolt)×6pcs. (A63FP-85-50 / A63-FP110-55)
 - *Regular M6 cap screw doesn't fit.
- Option**
- Positioner boss
 - Adapter
- Note**
- Use the center bolt(G1) when you use the center bolt to clamp the work-piece. When you need whirl-stop machining of a work-piece, make a flat surface on the work-piece and clamp it using a set screw (G2).

Please use a positioner boss when you need centering.



CODE	Holder type	φD4	φD5	h	Kg
IR15-A40 FP	HSK-A40	15 ⁰ _{-0.027}	25	15	0.05
IR25-A63 FP	HSK-A63	25 ⁰ _{-0.033}	40	16	0.1
IR40-A100FP	HSK-A100	40 ⁰ _{-0.039}	70	20	0.5

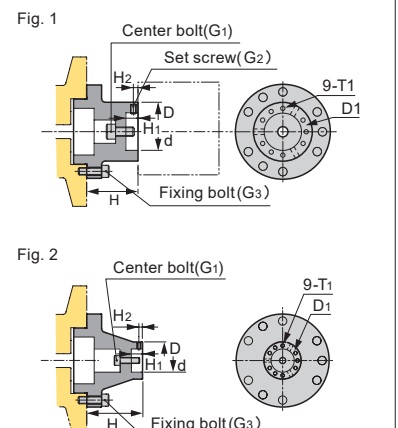
- Note**
- When you do not want the work-piece to rotate, make a flat surface on the O.D. (B1) of the boss, and attach it using a set screw (G2).
-

Please use an adapter for small size work-pieces.

Minimizing clamping area for a small-size work-pieces reduces the interference area.

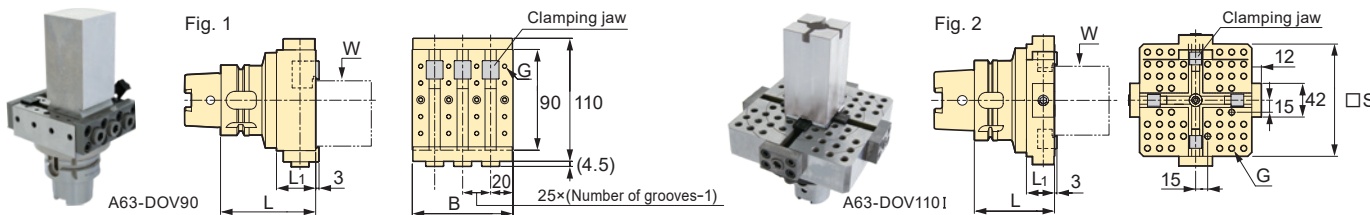


CODE	Work holder	Fig.	φD	φD1	φd	H1	H2	H	T1	G1	G2	G3	Kg
RS-A63 -A40	A63 -FP 63-45	1	40	32	25	12	4	50	M4×6	M 6×20	M4×8	M5×16	0.5
	-FP 85-50		+0.064 +0.025										
	-FP110-55												
RS-A100-A40	A100-FP100-55	2	40	32	25	12	4	60	M4×6	M 6×20	M4×8	M8×25	1.5
	-FP130-65		+0.053 +0.020										
	-FP160-70												
RS-A100-A63	A100-FP100-55	1	63	50	40	13	5	55	M5×8	M10×20	M6×10	M8×25	1.7
	-FP130-65		+0.053 +0.020										
	-FP160-70												



- Std access.**
- Center bolt (G1)×1pc.
 - Set screw (G2)×3pcs.
 - Fixing bolt (G3)×3pcs.
- Note**
- Attach the work-piece with the center bolt (G1). When you do not want the work-piece to rotate, secure the chamfering surface using a set screw(G2).

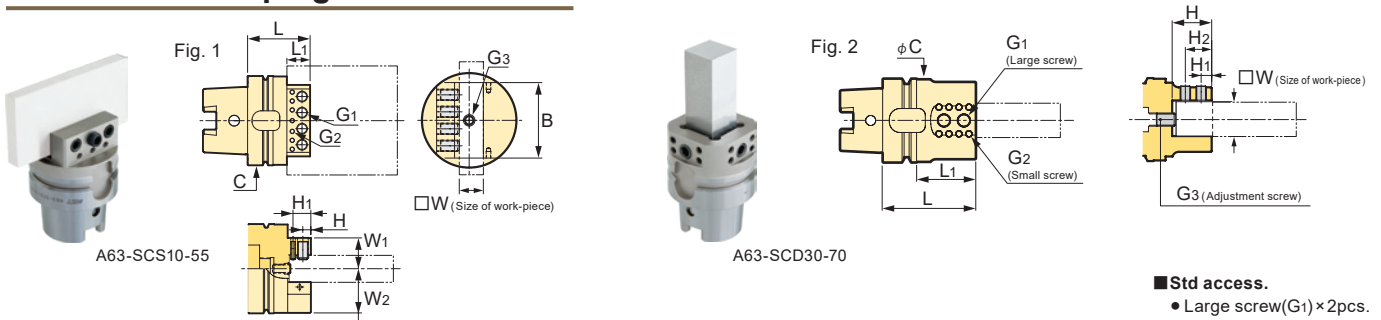
Dovetail Vise clamping work holder



CODE	Fig.	□S	Number of grooves	B	W	G (Depth)	L	L1	Kg
A63 -DOV 90	1	—	3	90	12~ 73	20-M4(6)	85	35	3.8
110I	2	110	—	—	36~ 80	24-M8(10)	90	—	5.7
A100-DOV140	1	—	5	140	12~ 73	30-M4(6)	100	35	7.7
140I	2	140	—	—	36~ 110	52-M8(10)	—	—	9.9

- Std access.**
- 8mm hexagonal wrench
- Angular cutter**
- For more information, please contact us.
- Note**
- Dovetail grooving of the work-piece clamping area using an angular cutter is required prior to machining. After machining, cut off the dovetail of the work-piece.
 - Work-piece clamping jaws move individually.
 - Please use the screw hole on the top face as necessary.

Side screw clamping work holder

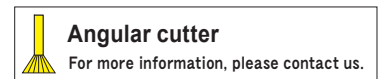
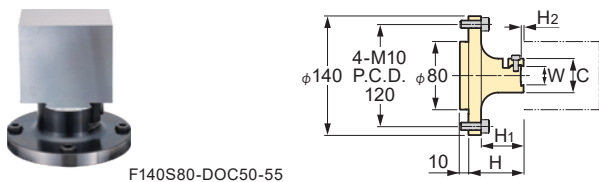


■ Std access.
 • Large screw(G1) × 2pcs.

CODE	Fig.	□W	W ₁	W ₂	B	L	L ₁	φC	H	H ₁	H ₂	G ₁ (Bolt)	G ₂	G ₃	KG
A40 -SCS10-40	1	5 ~ 10	13	18.6	30	40	11	39	4.5	—	—	M 6×10	—	M 6	0.5
-SCD20-55	2	15 ~ 20	—	—	—	55	30	49	25	11	—	M 8×16	M4	M10	—
A63 -SCS10-55	1	5 ~ 10	20	23.5	50	55	21	62	7.5	17	—	M10×15	M5	M10	1.1
-SCS20-55		15 ~ 20	25	28.5											
-SCD20-65	2		—	—	—	65	30	49	25	11		M 8×16	M4		1.2
-SCD25-70		20 ~ 25				70	35	56	30	8	20				1.3
-SCD30-70		25 ~ 30					44	62	35	9	24	M10×20	M5		1.4
-SCD40-85		35 ~ 40				85	52	76	45	12	30	M12×20	M6		1.9
A100 -SCS20-70	1	12 ~ 20	29.5	34	80	70	26	99	9	20	—	M12×20	M5	M12	3.6
-SCS30-70		22 ~ 30	34.5	39											
-SCD20-70	2	15 ~ 20	—	—	—		30	49	25	11		M 8×16	M4	M10	3
-SCD25-75		20 ~ 25				75	35	56	30	8	20				3.4
-SCD30-80		25 ~ 30				80		62	35	9	24	M10×20	M5		3.5
-SCD40-90		35 ~ 40				90	45	76	45	12	30	M12×20	M6		3.9

Direct-mounting (Direct-mounting type on the machine table)

Dovetail clamping type

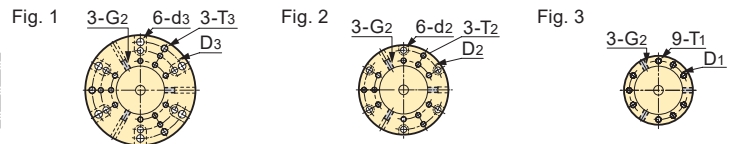
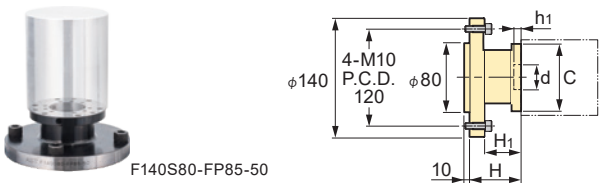


- Std access.
 - Mounting bolt×4pcs. (DOC100)
- Option
 - Mounting plate
- Note
 - Dovetail grooving of the work-piece clamping area using an angular cutter is required prior to machining. After machining, cut off the dovetail of the work-piece.

CODE	H	H ₁	H ₂	φC	W	KG
F140S80-DOC17.5-60	60	45	2	30	17.5	2.5
-DOC25 -60			3	40	25	2.6
-DOC35 -55	55	40		50	35	2.8

CODE	H	H ₁	H ₂	φC	W	KG
F140S80-DOC 50-55	55	40	5	70	50	3.4
-DOC 70-55				100	70	4.7
-DOC100-55			10	140	100	5.5

Flange clamping type



CODE	Fig.	H	H ₁	φC	φD ₁	φD ₂	φD ₃	φd	h ₁	T ₁	T ₂	T ₃	d ₂	d ₃	G ₂	KG
F140S80-FP 63-50	3	50	25	63	50	—	—	40	13	M5× 8	—	—	—	—	M6×10	2.6
-FP 85-50	2			85		73					M6		6.6			3.1
-FP110-70	1	70	45	110			95				M6×9	M8	9			3.7
-FP130-75	2	75		130	85	115	—	70	17	M8×12	M8	—	9	—	M8×16	5.5

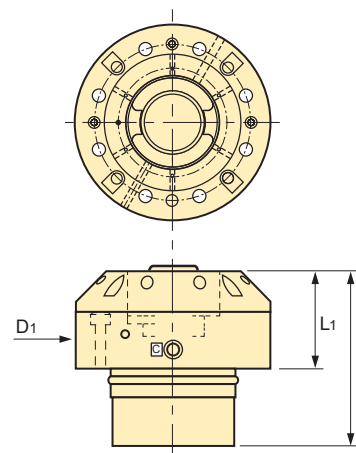
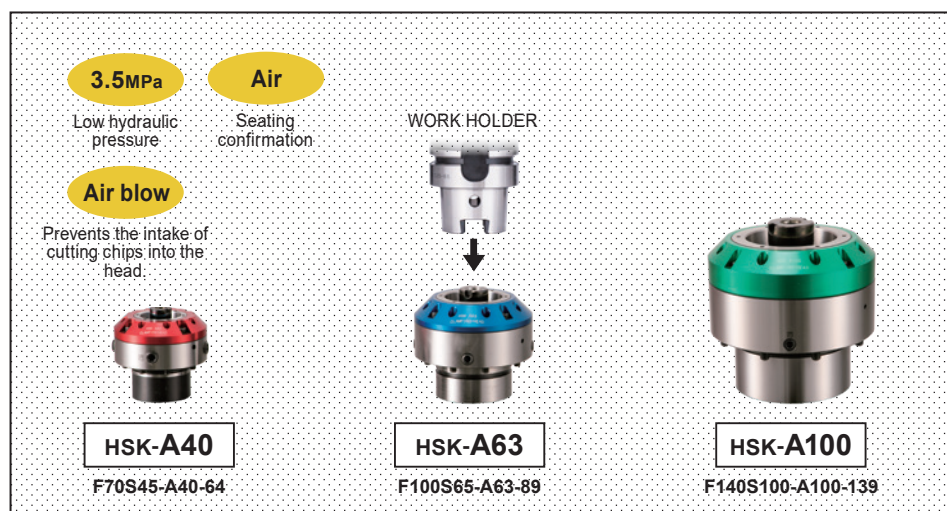
- Std access.
 - Mounting bolt×4pcs.
- Option
 - Mounting plate
 - Positioner boss
 - Adapter

The mounting plate is required.
 Also, we can make a custom design mounting plate.

CODE	KG
F200H80-MP140-25	4.3

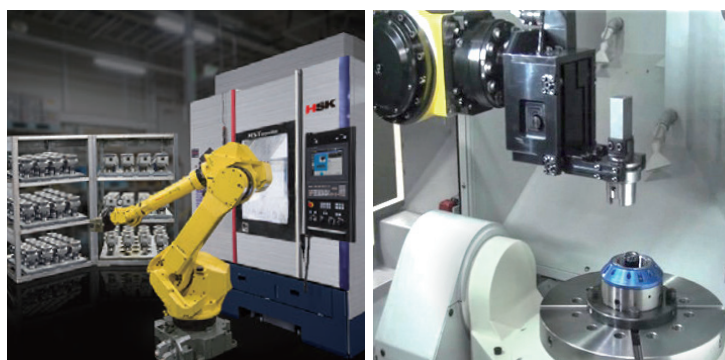
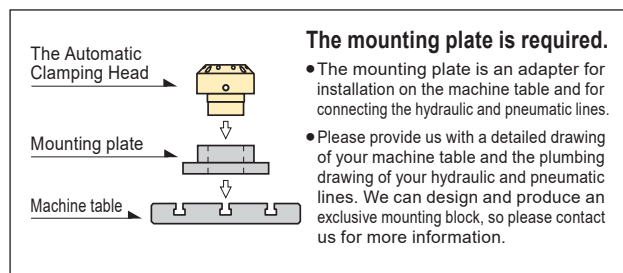
The Automatic Clamping Head (Automatic exchange)

The hydraulic clamping design allows you to interchange work-pieces automatically, and makes it possible for you to combine your machining centers with robots to create a fully-automated system.



CODE	Interface	L	$\phi D1$	L1	Clamping force (kN)	Max. loading weight (kg)	kg
F70S45 -A40 - 64	HSK-A40	64	70	35	6	50	1.1
F100S65 -A63 - 89	HSK-A63	89	100	50	24	140	3.1
F140S100-A100-139	HSK-A100	139	140	80	55	640	9.7

■ Note
 • Hydraulic pressure : 3.5MPa



Fully-automated system

We can provide the following items to automate your system:

- **Control unit**
- **Work-piece shelf**
- **Robot finger**

