

SHF Series Low Profile Air Gripper



SHF

Low Profile Air Gripper

SHF:Double Acting, with magnet



Specification

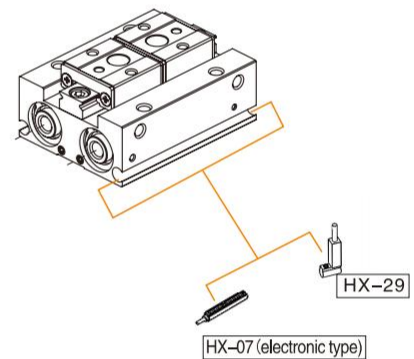
Bore Size	8	12	16	20
Acting Type	Double Acting			
Working Medium	Clean air(40 μm filtration)			
Applicable Pressure Reage	0.15~0.7MPa	0.1~0.7MPa		
Working Temperature	-20~70 (No freezing)			
Oil	Not required			
Repetition accuracy ①	± 0.05mm			
Maximum Frequency	Short Stroke	120c.p.m		
	Medium Stroke	120c.p.m		
	Long Stroke	60c.p.m		
Port Size	M3X0.5	M5X0.8		

① Is the value of the gripper without the role of bias load state; conversely, affected by the tooth gap between the rack and gear, the maximum value is 15mm

How to Order?

Series No.	Bore Size	Double Acting	Stroke	Connecting Type	Magnet No
SHF:Low Profile Air Gripper	8 12 16 20	D	Blank Short Stroke 1 Medium Stroke 2 Long Stroke	Blank:Axial Ported R:Side ported	Blank :With magnet
				Blank:Axial Ported	R:Side Ported

Optional Accessories



Note:Short stroke please use HX-29 series due to limited space.

Order Example: SHF Compact air gripper,Bore12,Medium stroke,Side air intake, with magnet,ERP code is:SHF12D1R

Products Features

1. Stainless steel gripper & linear ball guide design, high precision, good rigidity,good corrosion resistance for longer life spans.
2. Double piston structure design can provide bigger clamping force.
3. The bottom of the body is equipped with positioning pin holes to effectively enhance the installation accuracy and improve the consistency of repeated disassembly and positioning.
4. The Gripper can be installed from four directions freely.
5. Compared with the parallel air gripper with the same clamping force, this thin body design reduces the overall height by 50%, which effectively reduces the installation space and shaking torque, reduces the deviation, and improves the accuracy.
6. The body is designed with a buried induction switch slot to reduce the space.
7. All series are with magnetic.

Standrad Stroke

Stroke/Bore(mm)	Ø8	Ø12	Ø16	Ø20
Short Stroke	8mm	12mm	16mm	20mm
Medium Stroke	16mm	24mm	32mm	40mm
Long Stroke	32mm	48mm	64mm	80mm

Note: The short, medium and long strokes are standardized for each bore, and the most suitable stroke can be selected to be easier matched.

How to Order? (Adjustable)

Series No.	Bore Size	Double Acting	Stroke	Connecting Type	Magnet No	Adjustment Method	Adjustment Length
SHFJ:	8	D					
Adjustable Low	12		Blank	Blank:Axial Ported	Blank:With magnet	A: Open and Close Adjustment	
Profile Air Gripper	16		1	R:Side ported		B: Open Adjustment	
	20		2			C: Close Adjustment	
							1: Short Adjustment 2: Long Adjustment

Blank:Axial Ported	R:Side Ported

Order Example: The SHFJ adjustable thin-type pneumatic gripper has a cylinder diameter of 12 mm, medium stroke, side air inlet, with magnet, and features long adjustment on the open side. Its ERP code is: SHFJ12D1R-B2.

Standard Stroke

Bore Size (mm)	Short Stroke		Medium Stroke		Long Stroke	
	Full Stroke	Stroke Adjuster Width	Full Stroke	Stroke Adjuster Width	Full Stroke	Stroke Adjuster Width
Φ 8	8mm	Short Adjuster 4mm	16mm	Short Adjuster 6mm	32mm	Short Adjuster 12mm
		Long Adjuster 8mm		Long Adjuster 10mm		Long Adjuster 22mm
Φ 12	12mm	Short Adjuster 8mm	24mm	Short Adjuster 8mm	48mm	Short Adjuster 18mm
		Long Adjuster 12mm		Long Adjuster 14mm		Long Adjuster 28mm
Φ 16	16mm	Short Adjuster 10mm	32mm	Short Adjuster 8mm	64mm	Short Adjuster 16mm
		Long Adjuster 14mm		Long Adjuster 18mm		Long Adjuster 36mm
Φ 20	20mm	Short Adjuster 8mm	40mm	Short Adjuster 10mm	80mm	Short Adjuster 20mm
		Long Adjuster 18mm		Long Adjuster 20mm		Long Adjuster 40mm

Specification

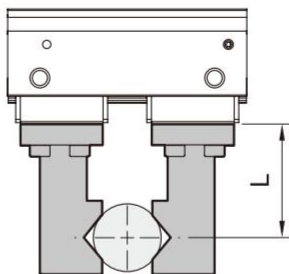
Bore Size (mm)	8	12	16	20
Action Type	Double-acting type			
Working Medium	Air (filtered through a mesh of 40 μm or finer);			
Operating Pressure Range	0.15~0.7MPa		0.1~0.7MPa	
Working Temperature (° C)	-20~70(non-freezing)			
Lubrication	NO			
Repeatability ①	± 0.05mm			
Maximum operating frequency	Short Stroke		120c.p.m	
	Medium Stroke		120c.p.m	
	Long Stroke		60c.p.m	
Piping diameter	M3X0.5		M5X0.8	

① The value is for the condition where there is no eccentric load on the fingers; otherwise, due to the backlash between the rack and pinion, the maximum value is ± 0.15 mm.

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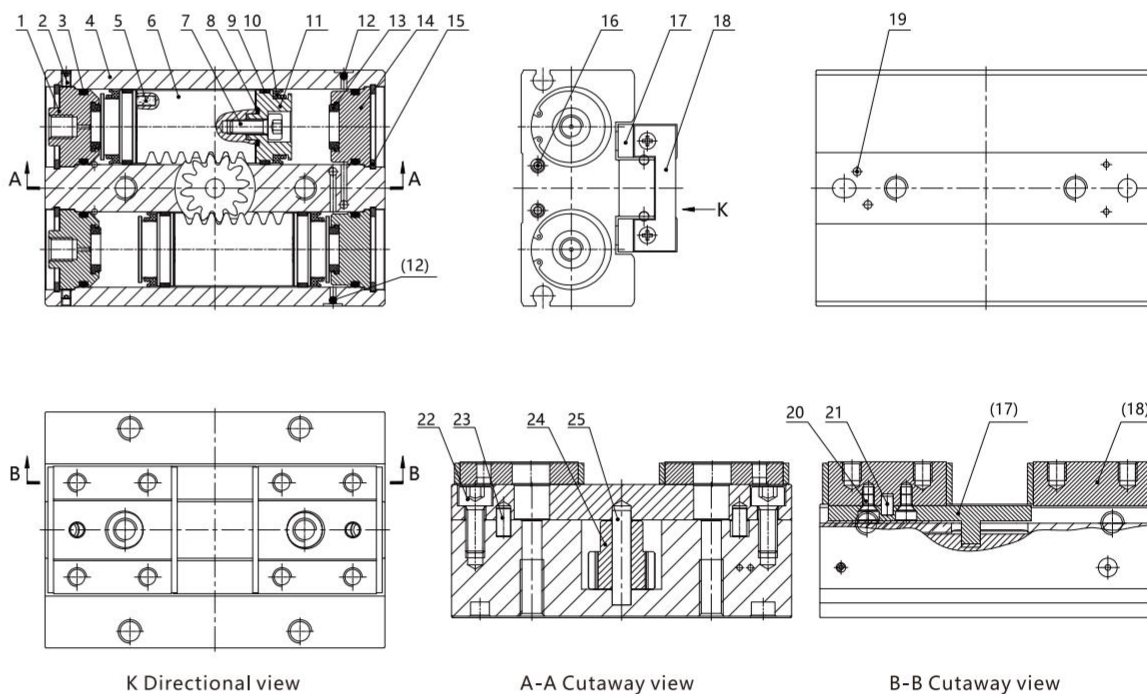
Gripping Force Table



Model Number	Effective clamping force of a single gripper(N)(*)	Weight(g)
SHF8D	19	59
SHF8D1		78
SHF8D2		110
SHF12D	48	145
SHF12D1		185
SHF12D2		270
SHF16D	90	344
SHF16D1		441
SHF16D2		642
SHF20D	141	659
SHF20D1		847
SHF20D2		1221

*Pressure 0.5MPa, clamping point L=20mm, and the value at the center of the stroke.

Internal Structure



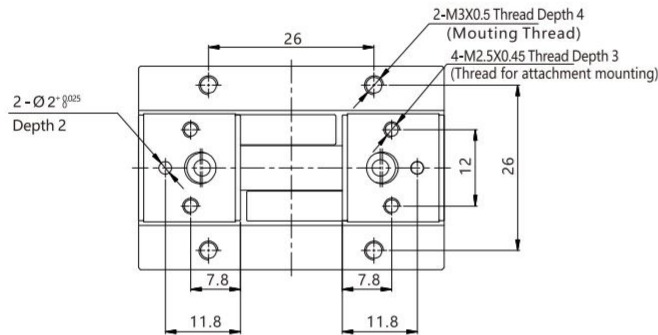
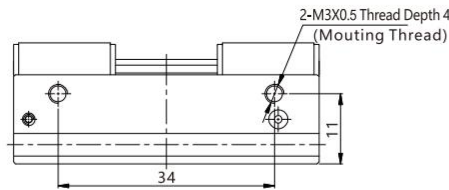
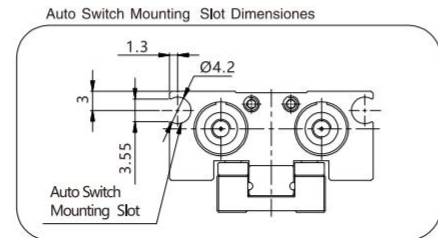
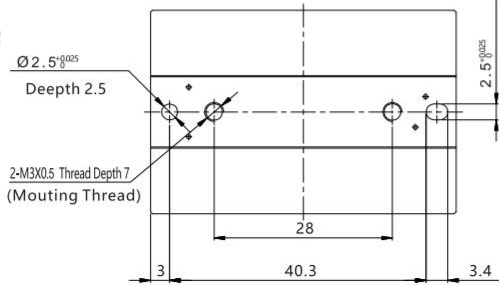
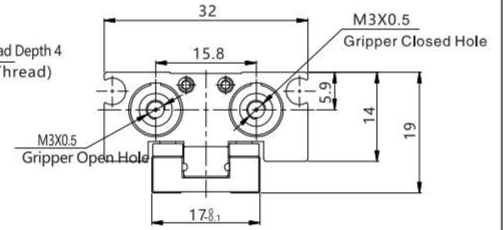
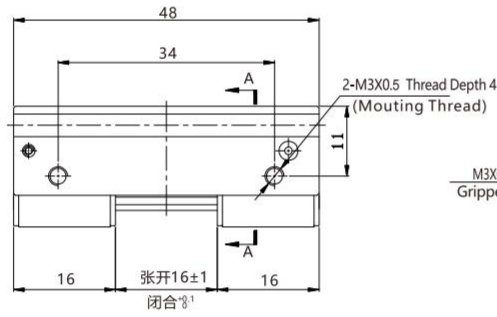
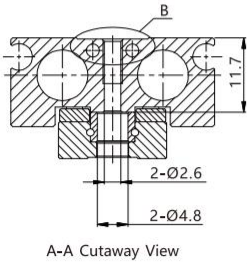
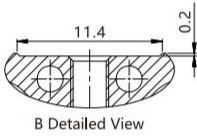
No.	Part Name	Material	No.	Part Name	Material	No.	Part Name	Material
1	Front cover	Aluminum alloy	10	Piston seal	NBR	19	Steel ball	Stainless steel
2	Hexagon socket set screw	Q235	11	Piston	Aluminum alloy	20	Screws	Stainless steel
3	O-ring	NBR	12	Steel ball	Stainless steel	21	Pin	Bearing Steel
4	Barrel	Aluminum alloy	13	Anti-bump cushion	TPU	22	Hexagon socket cap screw	Stainless steel
5	Magnet	Sintered NdFeB	14	Rear cover	Aluminum alloy	23	Positioning pins	Stainless steel
6	Rack	Stainless steel	15	C type ring	Spring steel	24	Gear	Carbon Steel
7	Hexagon socket cap screw	Stainless steel	16	Hexagon socket set screw	Q235	25	Pin	Bearing Steel
8	O-ring	NBR	17	Connector	Stainless steel			
9	Wear ring	PTFE	18	Linear ball sliding guide	Combined parts			

Note: 1. Commercially available socket cap screws are sufficient when E04-SHF12, 16 compact air grippers are used for body through-hole mounting.

2. In the above table, SE04-HF12D short stroke without wear ring.

Clamping Force

SHF8D1

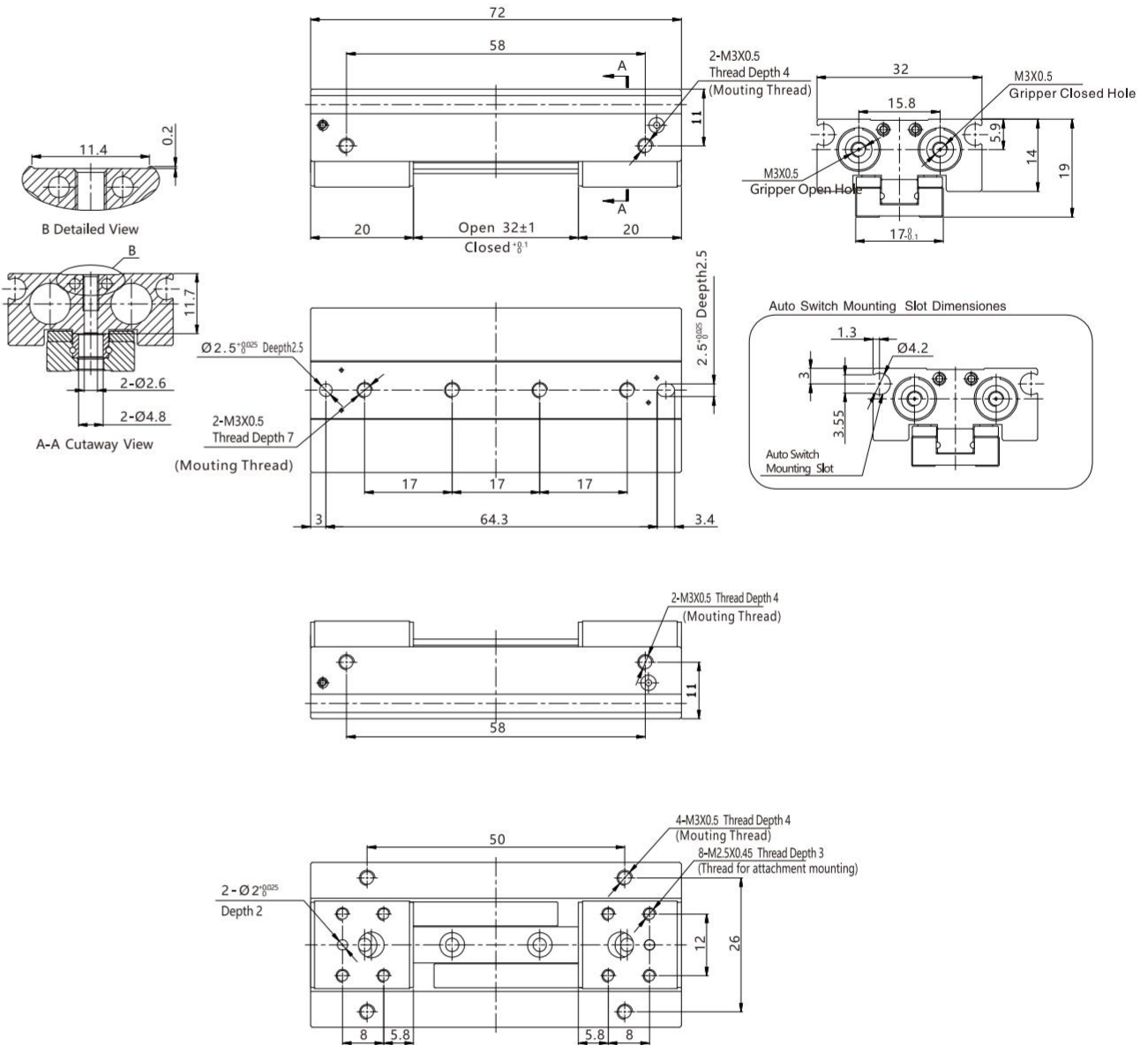


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Main Dimension

SHF8D2

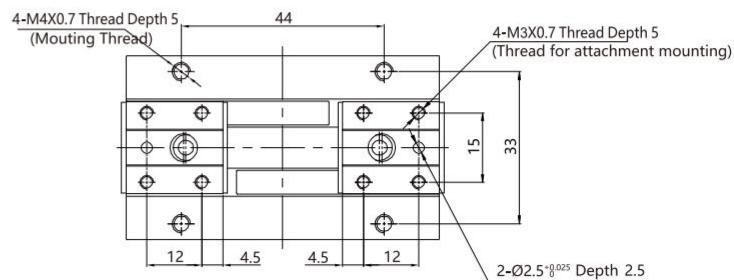
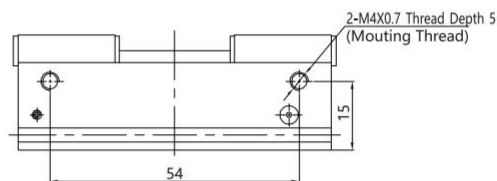
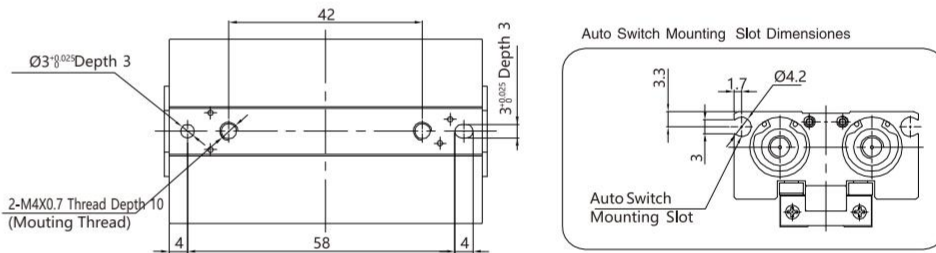
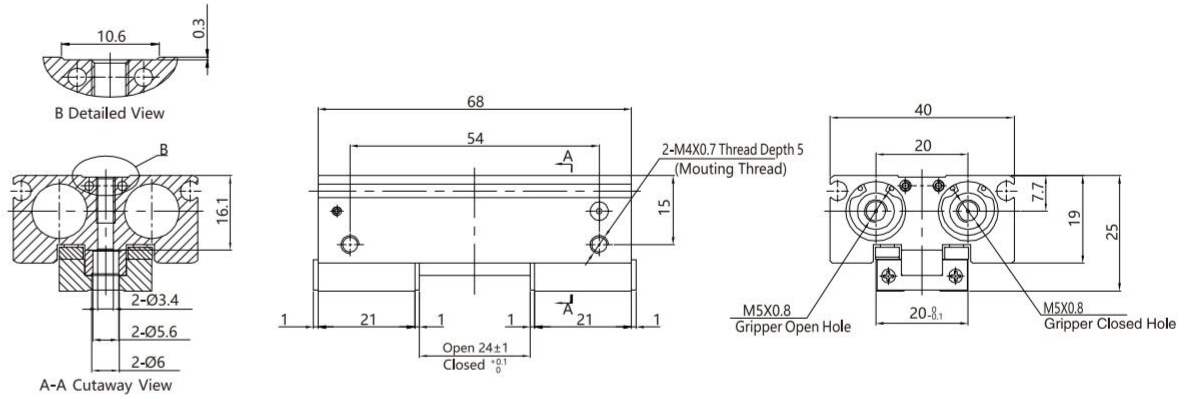


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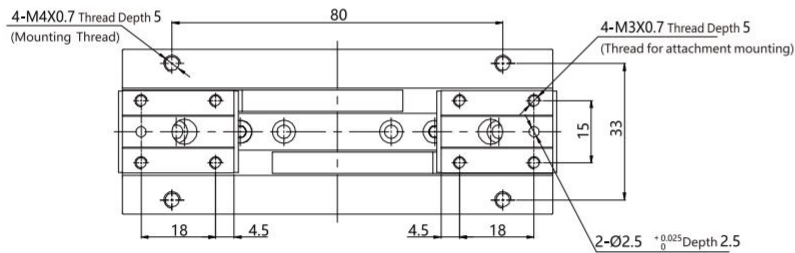
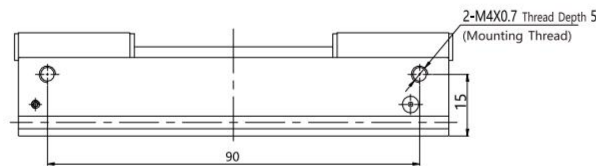
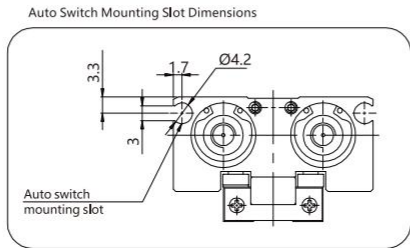
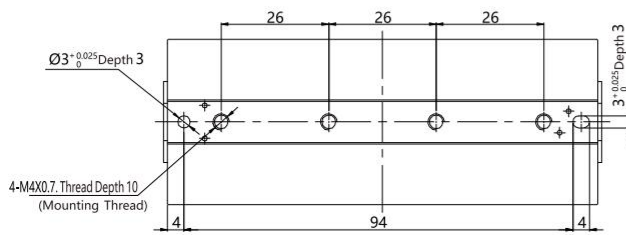
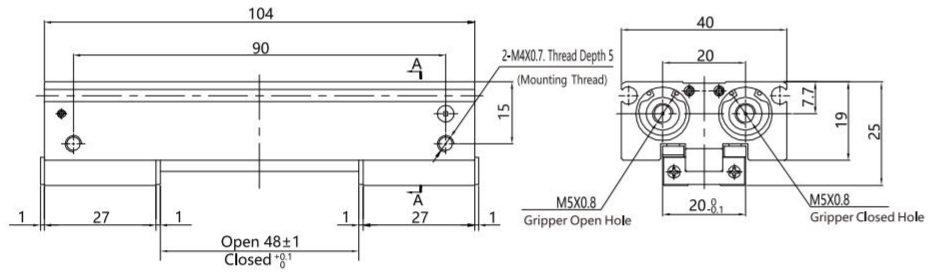
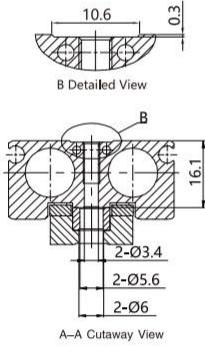
Main Dimension

SHF12D1



Main Dimension

SHF12D2

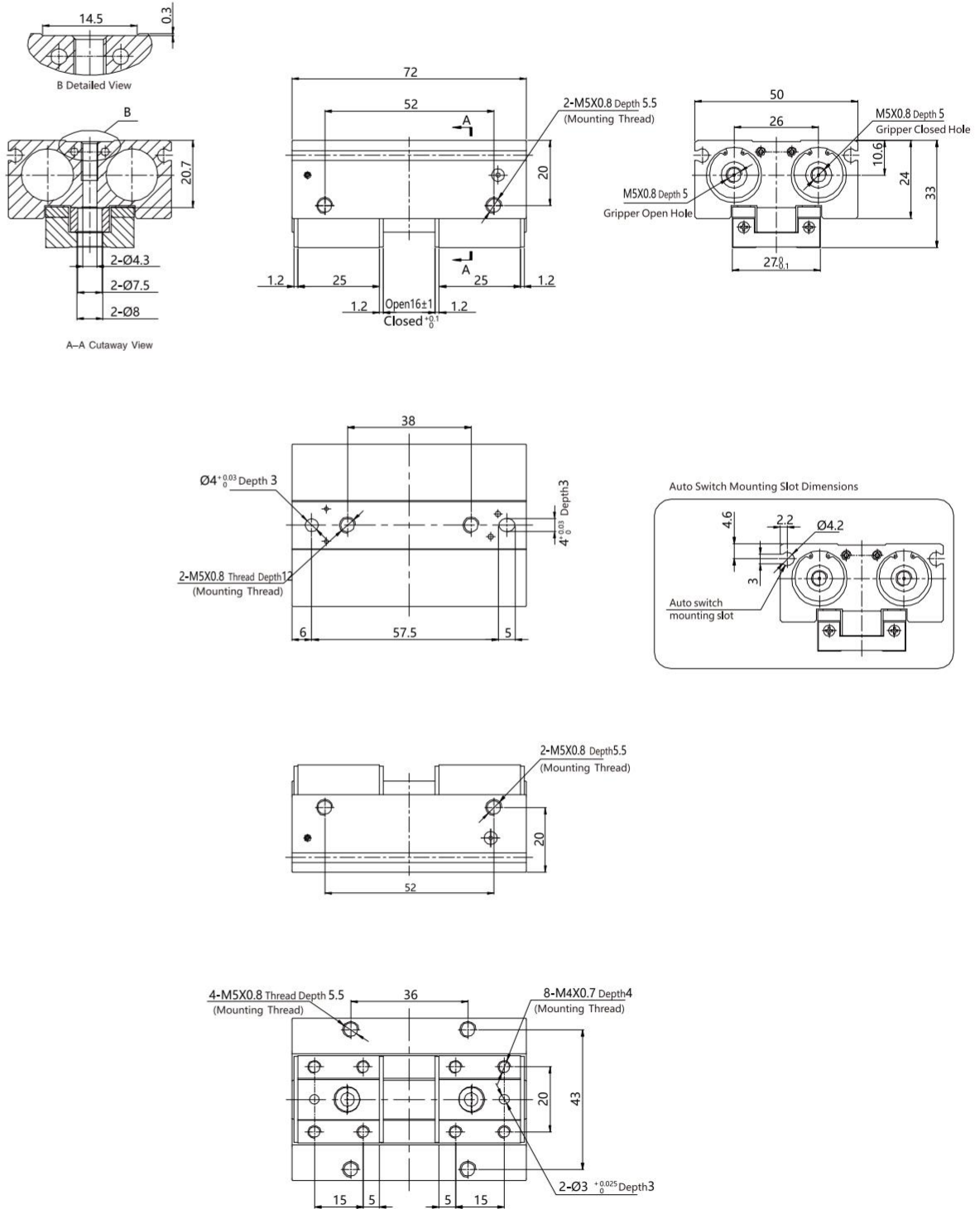


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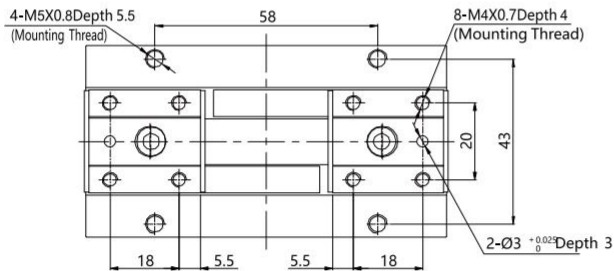
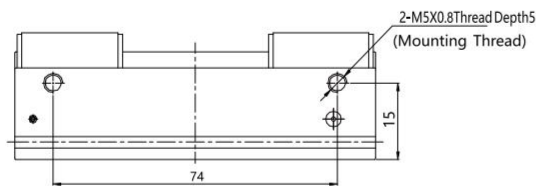
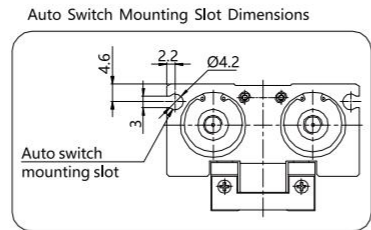
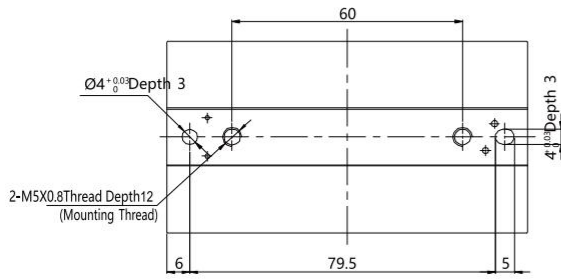
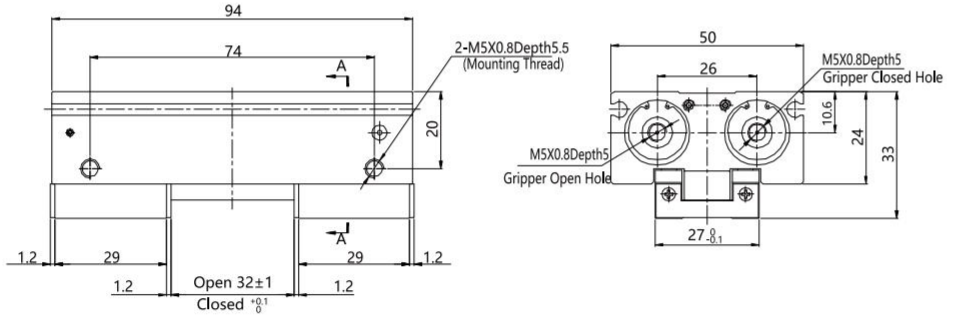
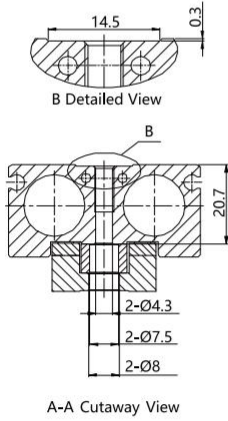
Main Dimension

SHF16D



Main Dimension

SHF16D1

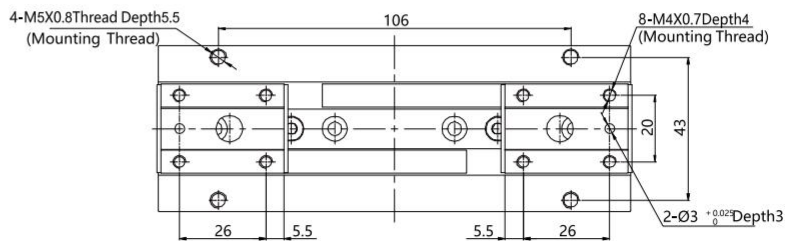
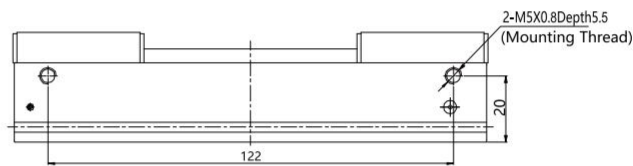
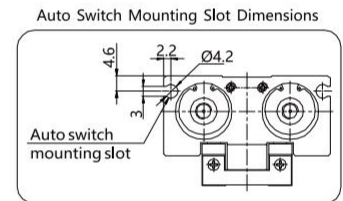
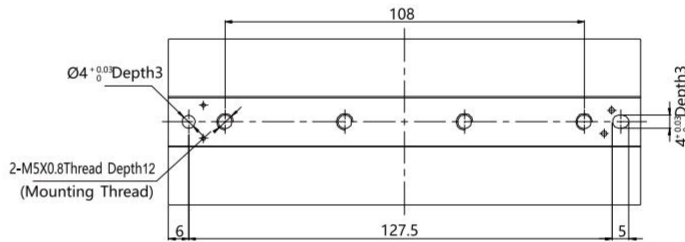
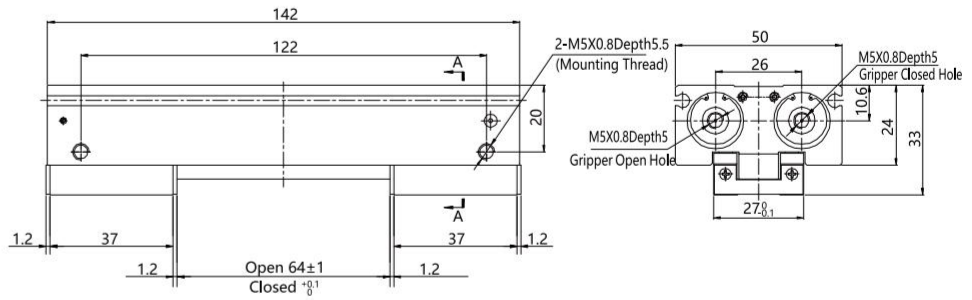
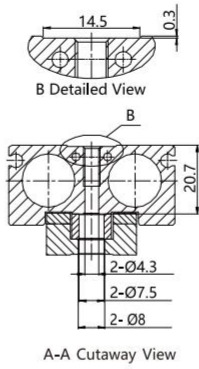


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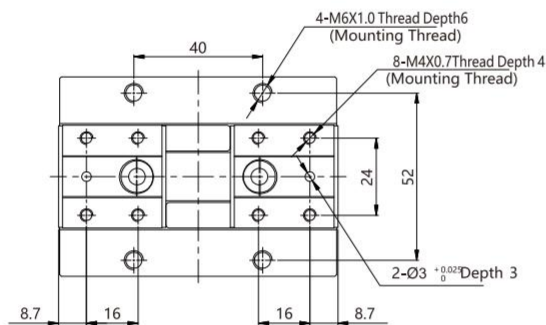
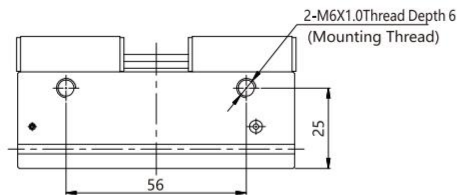
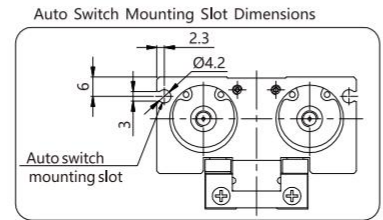
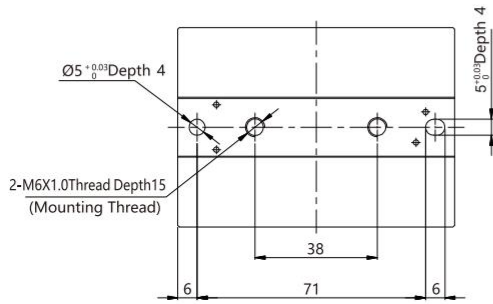
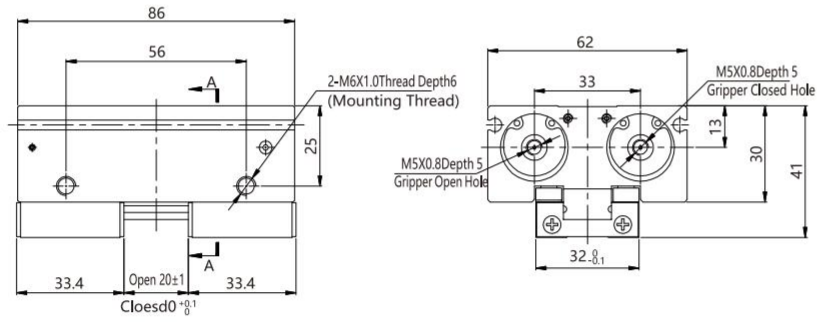
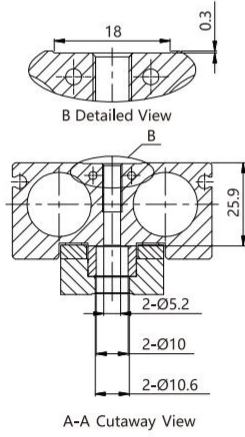
Main Dimension

SHF16D2



Main Dimension

SHF20D

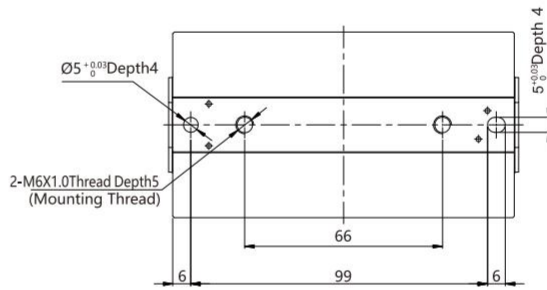
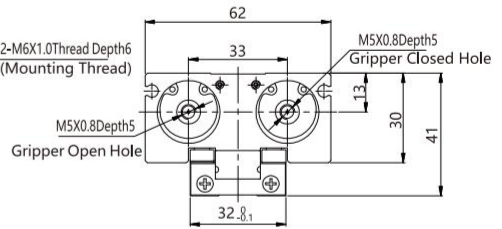
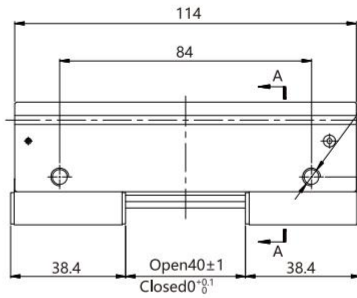
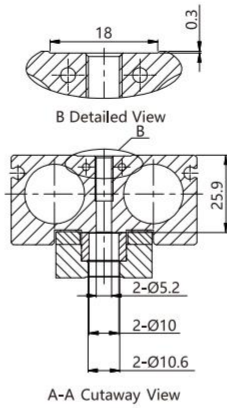


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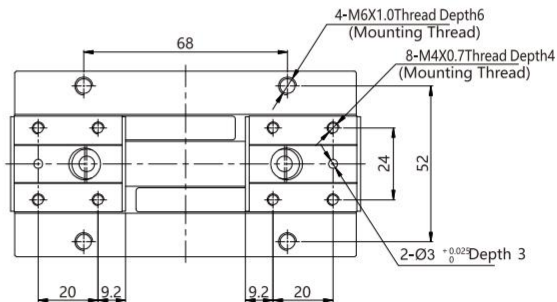
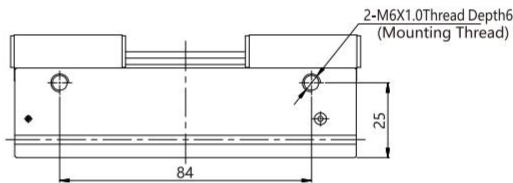
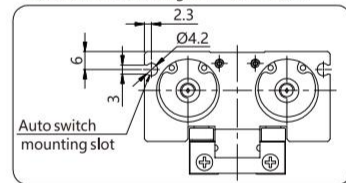


Main Dimension

SHF20D1

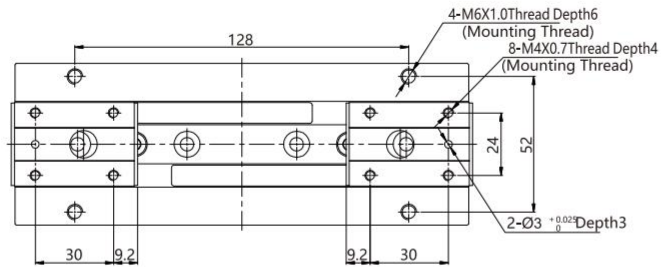
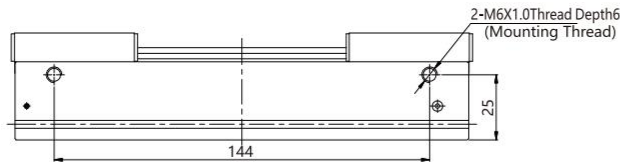
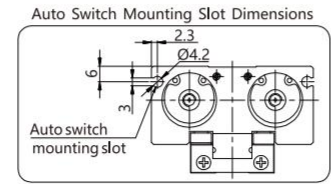
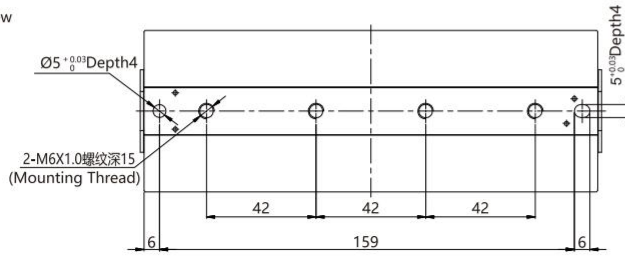
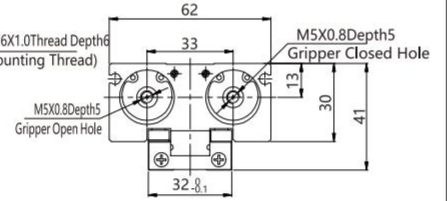
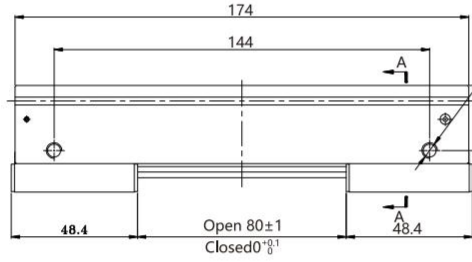
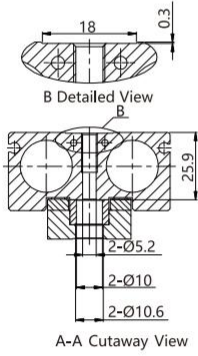


Auto Switch Mounting Slot Dimensions



Main Dimension

SHF20D2

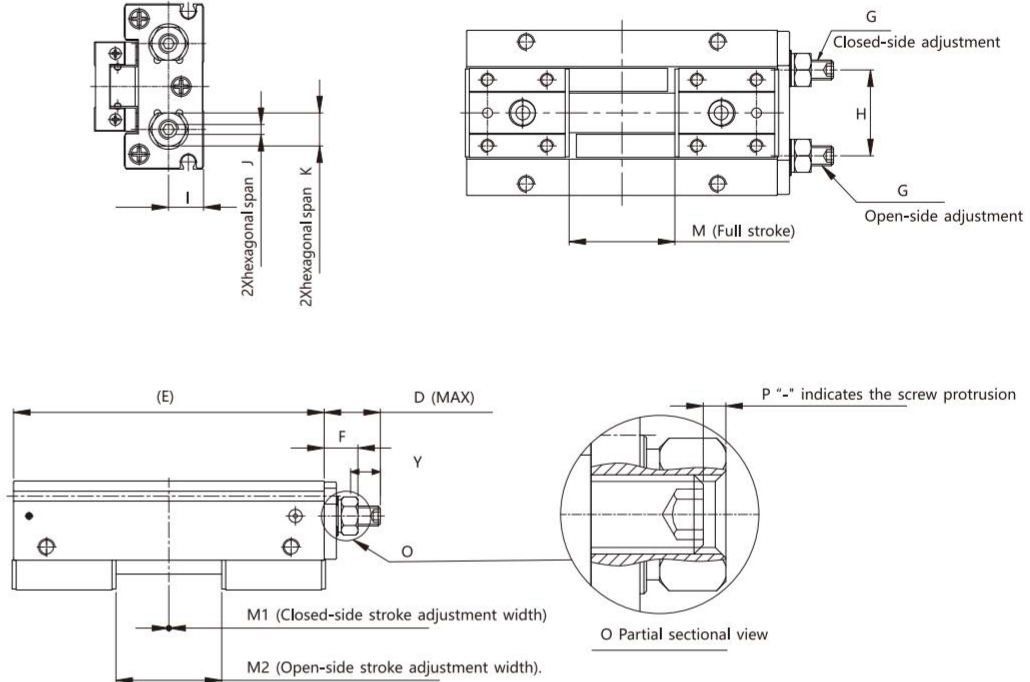


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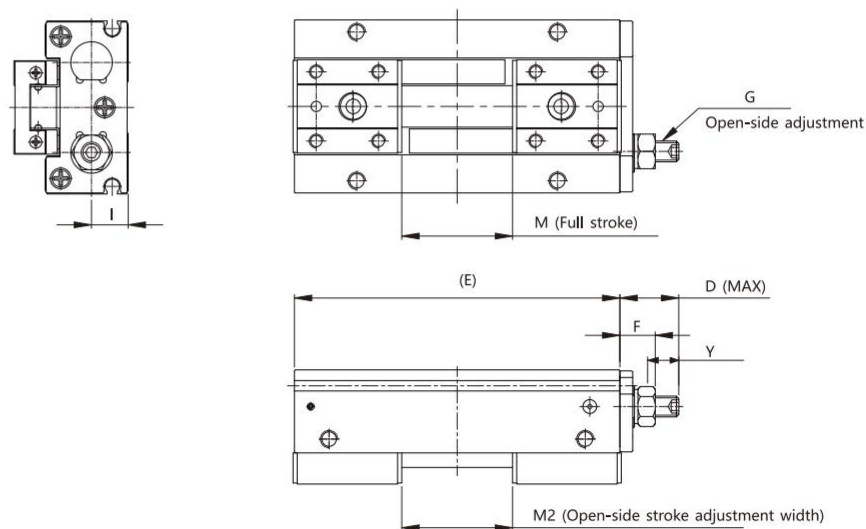


Main Dimension (Adjustable Type)

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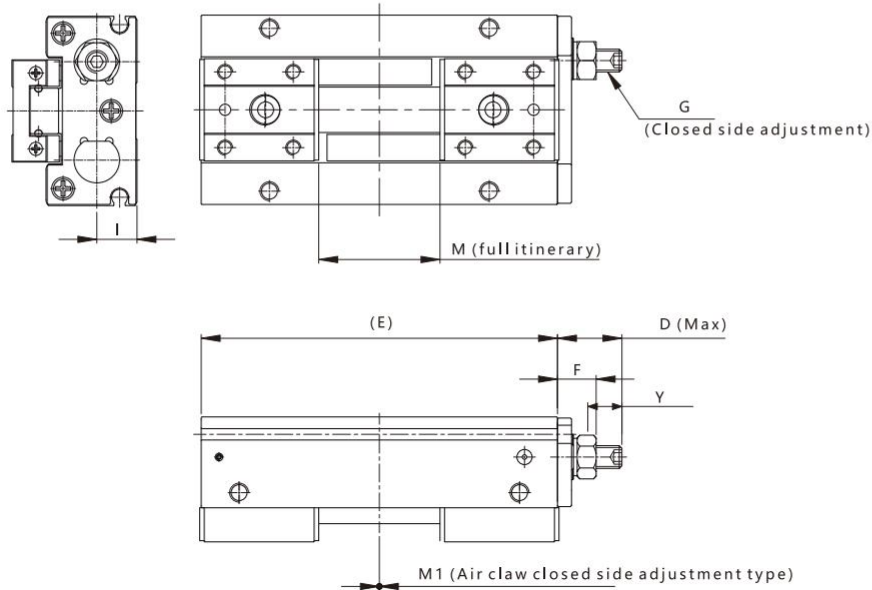


SHFJ□□-B□



Main Dimension (adjustable)

SHFJ□□-□□

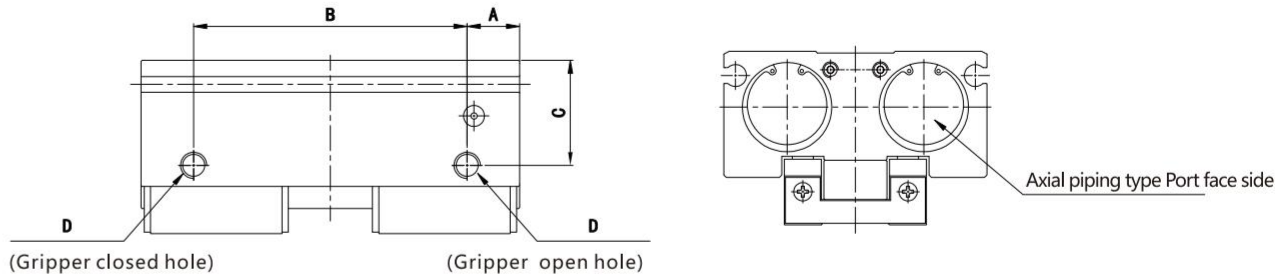


Type	Adjustable air claw opening and closing on both sides: A		Air claw open side adjustment type: B		Air claw closed side adjustment type: C		D	E	F	G	H	I	J	K	M	Y	P	
	M1	M2	M1	M2	M1	M2												
SHFJ8D/DR	-□1	0-4	4-8	/	4-8	0-4	/	9	36	6.8	M4X0.7	15.8	5.9	2	7	8	2	-0.2
	-□2	0-8	0-8	/	0-8	0-8	/	12									4	-1.2
SHFJ8D1/D1R	-□1	0-6	10-16	/	10-16	0-6	/	9	48	6.8	M4X0.7	15.8	5.9	2	7	16	3	0.8
	-□2	0-10	6-16	/	6-16	0-10	/	12									5	-0.2
SHFJ8D2/D2R	-□1	0-12	20-32	/	20-32	0-12	/	12	72	6.8	M4X0.7	15.8	5.9	2	7	32	6	0.8
	-□2	0-22	10-32	/	10-32	0-22	/	18									11	-0.2
SHFJ12D/DR	-□1	0-8	4-12	/	4-12	0-8	/	12	52	9.2	M5X0.8	20	7.7	2.5	8	12	4	1.2
	-□2	0-12	0-12	/	0-12	0-12	/	14									6	1.2
SHFJ12D1/D1R	-□1	0-8	16-24	/	16-24	0-8	/	12	68	9.2	M5X0.8	20	7.7	2.5	8	24	4	1.2
	-□2	0-14	10-24	/	10-24	0-14	/	14									7	2.2
SHFJ12D2/D2R	-□1	0-18	30-48	/	30-48	0-18	/	18	104	9.2	M5X0.8	20	7.7	2.5	8	48	9	0.2
	-□2	0-28	20-48	/	20-48	0-28	/	23									14	0.2
SHFJ16D/DR	-□1	0-10	6-16	/	6-16	0-10	/	14	72	10.21	M6X1.0	26	10.6	3	10	16	5	1.2
	-□2	0-14	2-16	/	2-16	0-14	/	17									7	0.2
SHFJ16D1/DIR	-□1	0-8	24-32	/	24-32	0-8	/	14	94	10.21	M6X1.0	26	10.6	3	10	32	4	0.2
	-□2	0-18	14-32	/	14-32	0-18	/	17									9	2.2
SHFJ16D2/D2R	-□1	0-16	48-64	/	48-64	0-16	/	17	142	10.21	M6X1.0	26	10.6	3	10	64	8	1.2
	-□2	0-36	28-64	/	28-64	0-36	/	28									18	0.2
SHFJ20D/DR	-□1	0-8	12-20	/	12-20	0-8	/	18	86	11.2	M6X1.25	33	13	4	12	20	4	-2.8
	-□2	0-18	2-20	/	2-20	0-18	/	23									9	-2.8
SHFJ20D1/DIR	-□1	0-10	30-40	/	30-40	0-10	/	18	114	11.2	M6X1.25	33	13	4	12	40	5	-1.8
	-□2	0-20	20-40	/	20-40	0-20	/	23									10	-1.8
SHFJ20D2/D2R	-□1	0-20	60-80	/	60-80	0-20	/	23	174	11.2	M6X1.25	33	13	4	12	80	10	-1.8
	-□2	0-40	40-80	/	40-80	0-40	/	33									20	-1.8

SHF Series Low Profile Air Gripper



Main Body Options: Side Ported Type

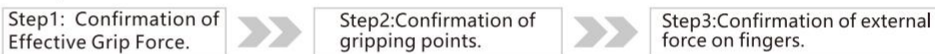


Model	SHF8DR	SHF8D1R	SHF8D2R	SHF12DR	SHF12D1R	SHF12D2R	SHF16DR	SHF16D1R	SHF16D2R	SHF20DR	SHF20D1R	SHF20D2R
A	5.5			7			9			10		
B	25	37	61	38	54	90	54	76	124	66	94	154
C	11			14.8			19			23		
D	M3×0.5			M5×0.8			M5×0.8			M5×0.8		

Note: Dimensions other than the above are the same as the Horizontal ported type

Model Selection

Selected Steps



Step 1 Effective gripping force confirmation



Confirmed example

Workpiece mass: 0.15kg

Gripping Method: External diameter

Roughly select the model according to the quality

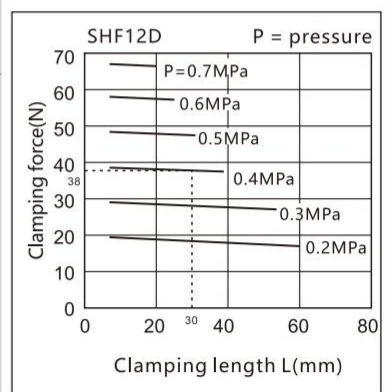
- According to the difference in friction coefficient and shape between the workpiece and the accessories, the type of air gripper with the gripping force of the fingers 10~20 times the weight of the workpiece should be selected.
- *Check detailed information from the explanatory drawing.
- If bigger accelerated speed or impact force in the application, more extra allowance requested.

Example of calculation

When you want to set the damping force to be 20 times or more the weight of the workpiece.
 Necessary damping force = $0.15\text{kg} \times 20 \times 9.8\text{m/S}^2 = 29.4\text{N}$ or more

Grip point distance: 30mm

Working pressure: 0.4MPa

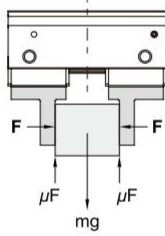


Occasion To Try SHF12D

- From the intersection of the clamping point $L=30\text{mm}$ and the pressure $P=0.4\text{MPa}$, find the damping force
Clamping $N=38\text{N}$
- The damping force of 38 meets the necessary damping force of 29.4N, so SHF12D can be selected.

Model Selection

Model selection instructions



About 10-20 times the weight of the workpiece
 • The recommended value (more than 10-20 times the weight of the workpiece) is calculated based on the impact generated by normal handling, etc., under the condition of the safety value $a=4$.

When $\mu=0.2$	When $\mu=0.1$
$F = \frac{mg}{2 \times 0.2} \times 4$ $= 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4$ $= 20 \times mg$
10 times the workpiece mass	20 times the workpiece mass

Note: 1. When the friction coefficient is higher than $\mu=0.2$, for safety, our company recommends that the model should be selected at 10 to 20 times the weight of the workpiece.

2. For excessive acceleration and impact, it is necessary to select a larger safety value.

When clamping the workpiece shown on the left

F: Clamping force(N)

μ : Friction coefficient of attachments and work pieces

m: Workpiece mass(kg)

g: Gravitational acceleration(=9.8m/s²)

mg: Workpiece gravity(N)

If the workpiece does not fall

$$2 \times \mu F > mg$$

Number of Fingers

Then

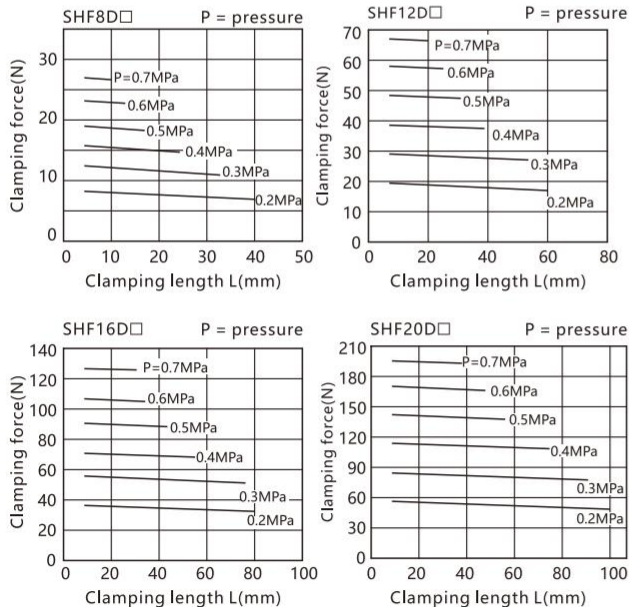
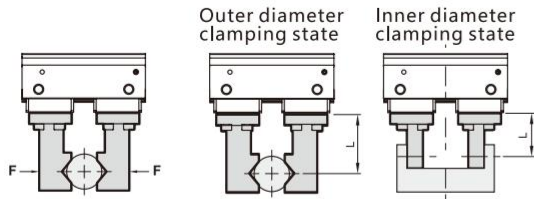
$$F > \frac{mg}{2 \times \mu}$$

The safety value is represented by a, and F is determined

$$F = \frac{mg}{2 \times \mu} \times a$$

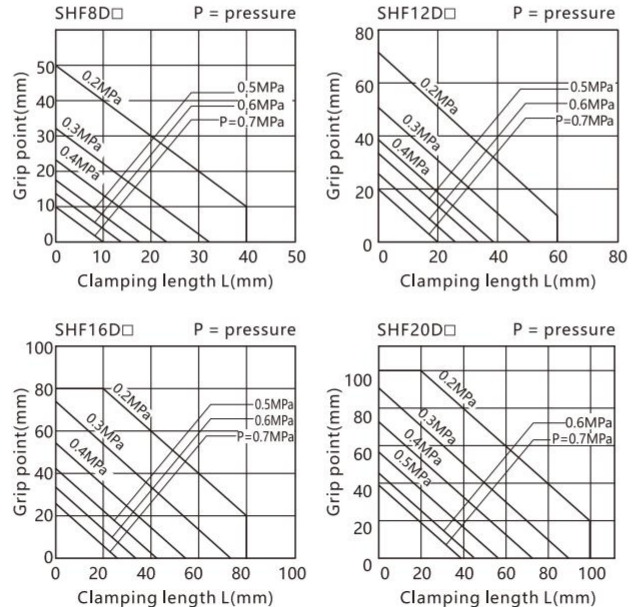
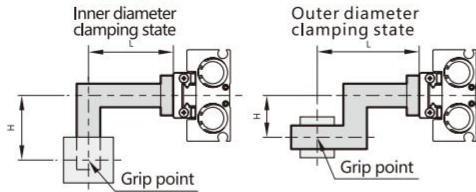
Step 1 Confirmation of Effective Grip Force

• Representation of Effective Grip Force
 The effective clamping force of the right picture, as shown in the figure below, the two fingers and accessories are in contact with the workpiece together, and the thrust on one finger is represented by F.



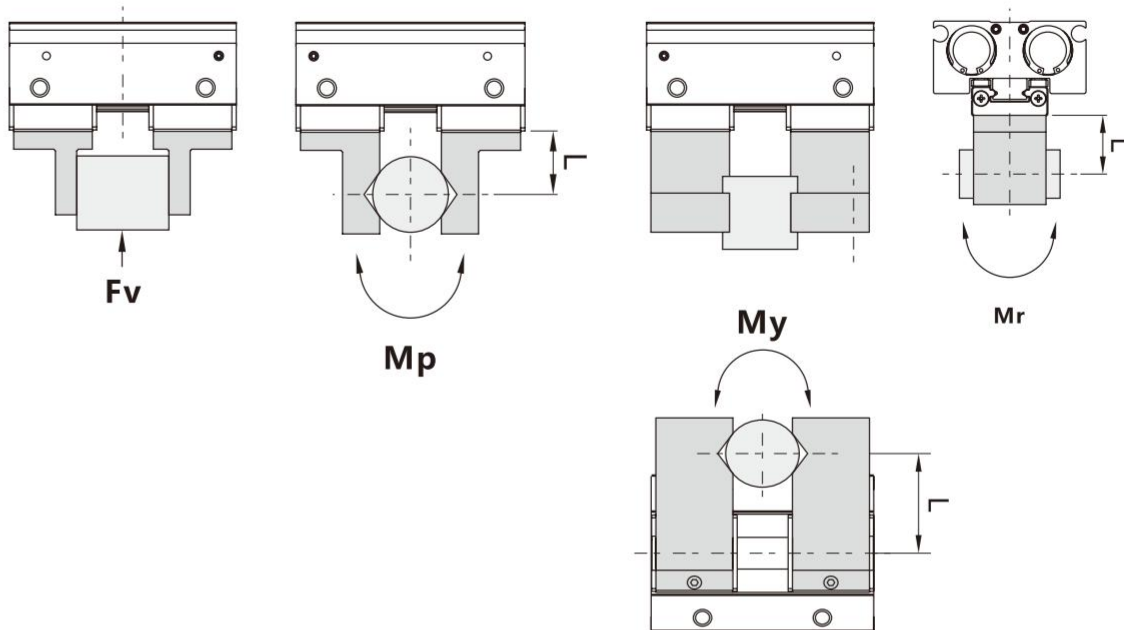
Step 2 Confirmation of clamping point

- The clamping point of the workpiece, according to the operating pressure, should be within the range shown in the figure below.
- If the clamping point of the workpiece are out of the range, it will reduce the service life of the gripper.



Model Selection

Step3 Confirmation of external force on fingers



L: The distance to the load application point

Model	Vertical direction Allowable load F_v (N)	Maximum allowable torque		
		Bending torque M_p (N.m)	Deflection torque M_y (N.m)	Rotation torque M_r (N.m)
SHF8D□	58	0.26	0.26	0.53
SHF12D□	98	0.68	0.68	1.4
SHF16D□	176	1.4	1.4	2.8
SHF20D□	294	2	2	4

Note: The load and moment values in the table are static values

Calculation of allowable external force (when moment load is applied)	Example of calculation
$\text{Allowable load } F(N) = \frac{M(\text{maximum allowable moment}) (N.m)}{L \times 10^{-3} \text{ ※}}$ <p>(※ Is the unit conversion constant)</p>	<p>When the actual static load $f=10\text{N}$, the bending moment of the point $L=30\text{mm}$ from the end face of the jaw of SHF2-12D</p> $\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}}$ $= 22.7 \text{ (N)}$ <p>Load $f=10\text{(N)} < 22.7\text{(N)}$</p> <p>so you can use.</p>

Installation and Use

1. When installing, do not let the air gripper fall or be hit, so as to avoid damage to the product and dents.

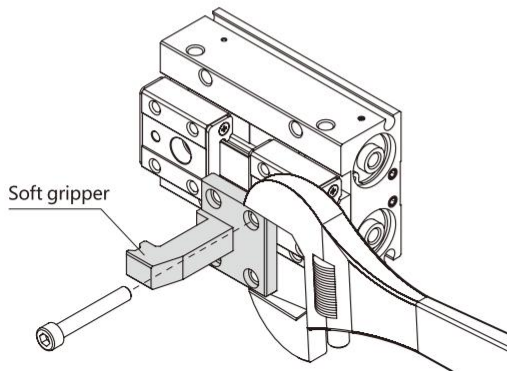
Slight deformation will cause poor accuracy and work not well.

2. When installing accessories, please properly tighten the screws within the limited torque range.

Tightening with a torque out of the torque range may cause malfunction, and if the tightening torque is insufficient, positional displacement or drop may occur.

How to install the gripper attachment

Attach the attachment to the mounting female thread of the jaws with screws, etc., using the tightening torque in the table below.



Model	Screws used	Maximum tightening torque N.m
SHF8D□	M2.5×0.45	0.36
SHF12D□	M3×0.5	0.63
SHF16D□	M4×0.7	1.5
SHF20D□	M4×0.7	1.5

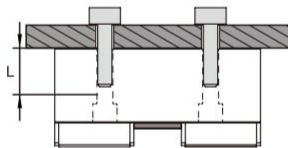
3. When installing the air gripper, please properly tighten the screws within the limited torque range.

Bad action if bigger tighten torque;

Position offset or fall if smaller tighten torque.

How to install the gripper attachment

Top mount type (main body screw hole)



Model	Screws used	Maximum tightening torque N.m	Maximum thread entry depth Lmm
SHF8D□	M3×0.5	0.95	7
SHF12D□	M4×0.7	2.2	10
SHF16D□	M5×0.8	4.5	12
SHF20D□	M6×1.0	7.8	15

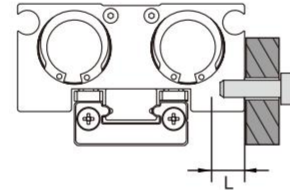
Use Environment



Pay attention to the corrosion resistance of linear guides.

The materials of Fingers & guides are martensitic stainless steel, which is weaker than. Martensitic stainless steel is used on fingers and rails; compared with austenitic stainless steel, the corrosion resistance is weak; especially in the environment where there are water droplets such as freezing dew, there is a problem of rust

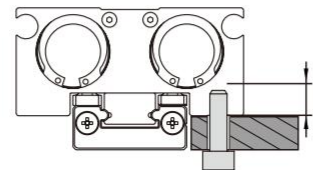
Side Mount Type (Through Hole in Body)



Model	Screws used	Maximum tightening torque N.m	Maximum thread entry depth Lmm
SHF8D□	M3×0.5	0.63	4
SHF12D□	M4×0.7	1.5	5
SHF16D□	M5×0.8	3	5.5
SHF20D□	M6×1.0	5.2	6

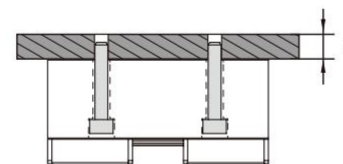
Bottom mount type (main body screw hole, main body through hole)

1. Use the main body screw holes



Model	Screws used	Maximum tightening torque N.m	Maximum thread entry depth Lmm
SHF8D□	M3×0.5	0.63	4
SHF12D□	M4×0.7	1.5	5
SHF16D□	M5×0.8	3	5.5
SHF20D□	M6×1.0	5.2	6

2. Use the empty holes without thread



Model	Screws used	Maximum tightening torque N.m	Maximum thread entry depth Lmm
SHF8D□	★M2.5×0.45	0.36	4.3
SHF12D□	M3×0.5	0.63	—
SHF16D□	M4×0.7	1.5	—
SHF20D□	M5×0.8	3	—

Note: When the SHF12, 16 thin air gripper is installed through the main body, the commercially available hexagon socket screws can be used; the screw depth depends on the specific installation situation.

Note: When SHF air grippers are used for body through-hole mounting:

★1: SHF8 use the included special screws

2: SHF12, 16 20 commercially available socket cap screws

3: The screw screwing depth depends on the customer's specific installation situation.