

SHF

Low Profile Air Gripper



Specification

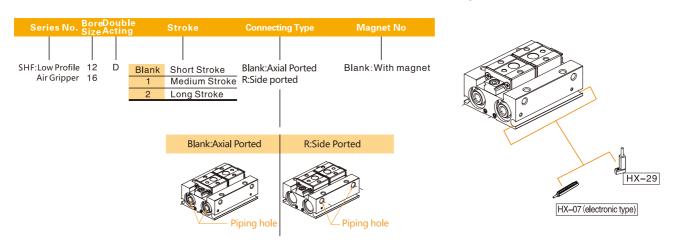


| Bore Size | | 12 | 16 | |
|----------------------|---------------|------------------------------|--------|--|
| Acting Type | | Double Acting | | |
| Working Med | dium | Clean air(40 µm filteration) | | |
| Applicable Pr | ressure Reage | 0.1~0. | 7MPa | |
| Working Temperature | | -20~70 (No freezing) | | |
| Oil | | Not required | | |
| Repetition ac | curacy ① | ± 0.05mm | | |
| | Short Stroke | 120c | .p.m | |
| Maximum Frequency | Medium Stroke | 1200 | :.p.m | |
| Trequency | Long Stroke | 60c. | p.m | |
| Port Size | | M5> | 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

O How to Order?

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.

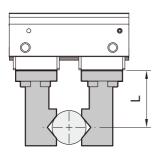
Standrad Stroke

| Stroke/Bore(mm) | Ø 12 | Ø16 |
|------------------|------|------|
| Short Stroke | 12mm | 16mm |
| Medium Stroke | 24mm | 32mm |
| Long Stroke | 48mm | 64mm |

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



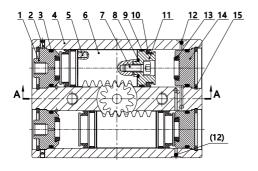
Clamping Force

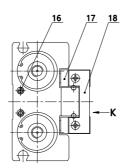


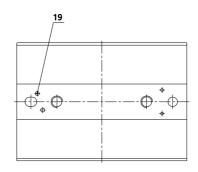
| Model Number | Effective clamping force of a single gripper(N)(*) | Weight(g) |
|--------------|--|-----------|
| SHF12D | 48 | 145 |
| SHF12D1 | | 185 |
| SHF12D2 | | 270 |
| SHF16D | | 344 |
| SHF16D1 | 90 | 441 |
| SHF16D2 | | 642 |

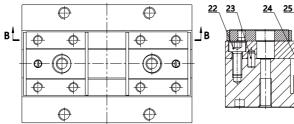
 $^{^{\}star}\textsc{Pressure}$ 0.5MPa,clamping point L=20mm,and the value at the center of the stroke.

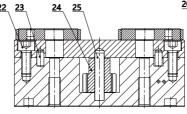
Internal Structure

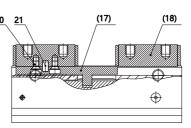












K Directional view

A-A Cutaway view

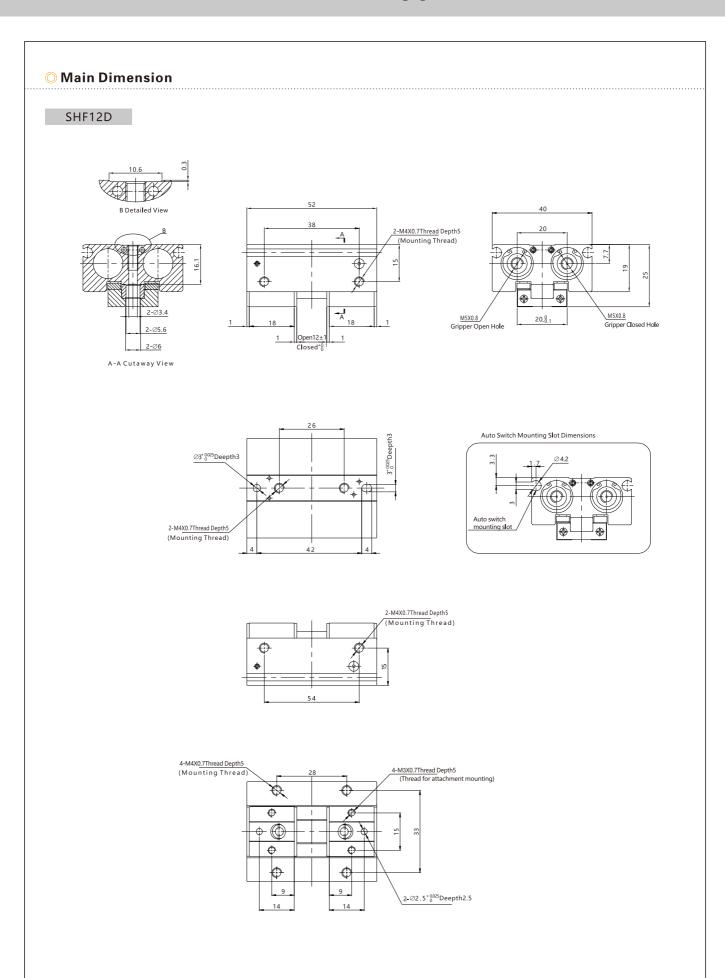
B-B Cutaway view

| No. | Part Name | Material | No. | Part Name | Material | No. | Part Name | Material |
|-----|--------------------------|-----------------|-----|---------------------------|-----------------|-----|-------------------------|-----------------|
| 1 | Front cover | Aluminum aloy | 10 | Piston seal | NBR | 19 | Steel ball | Stainless steel |
| 2 | Hexagon socket set screw | Q235 | 11 | Piston | Aluminum aloy | 20 | Screws | Stainless steel |
| 3 | O-ring | NBR | 12 | Steel ball | Stainless steel | 21 | Pin | Bearing Steel |
| 4 | Barrel | Aluminum aloy | 13 | Anti-bump cushion | TPU | 22 | Heagon socket cap screw | Stainless steel |
| 5 | Magnet | Sintered NdFeB | 14 | Rear cover | Aluminum aloy | 23 | Positioning pins | Stainless steel |
| 6 | Rack | Stainless steel | 15 | C type ring | Spring steel | 24 | Gear | Carbon Steel |
| 7 | Heagon 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.

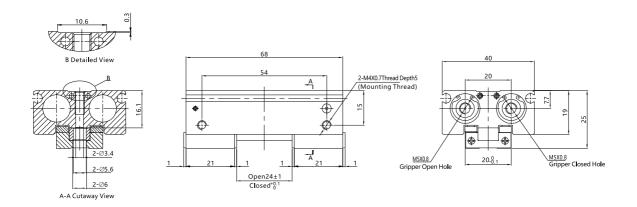


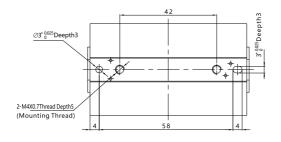


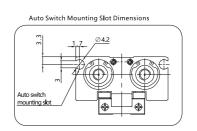


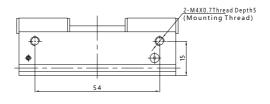


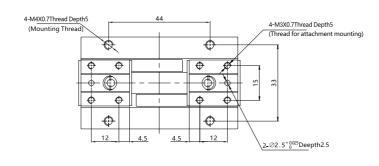
SHF12D1



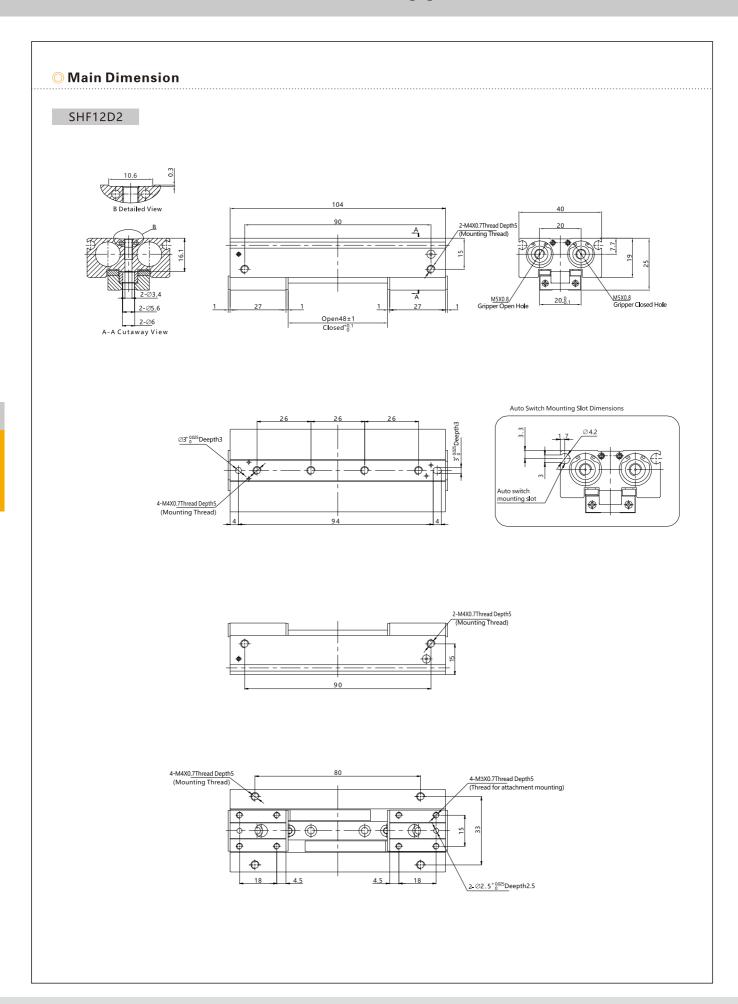




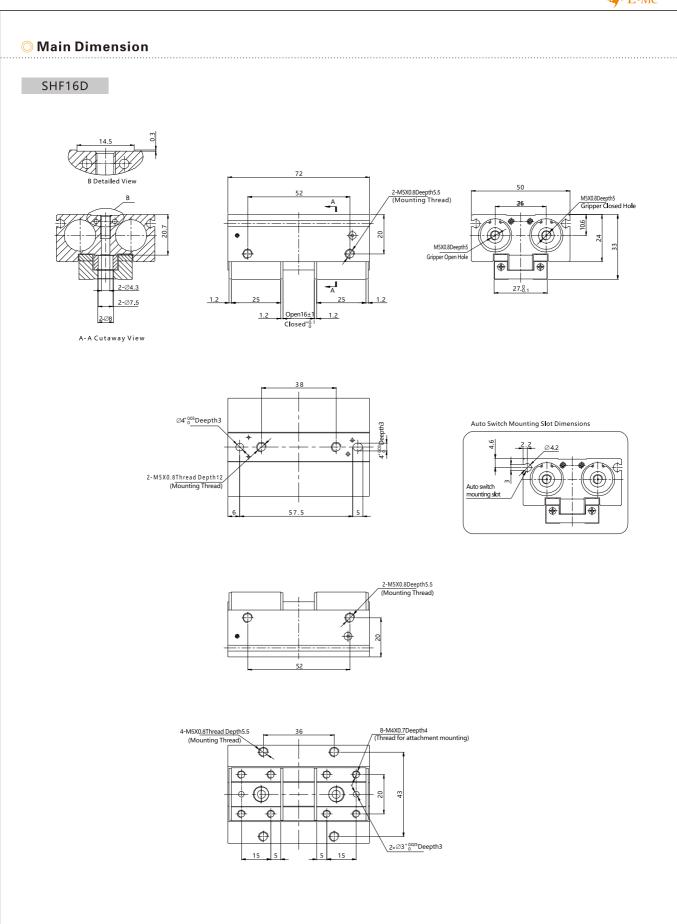




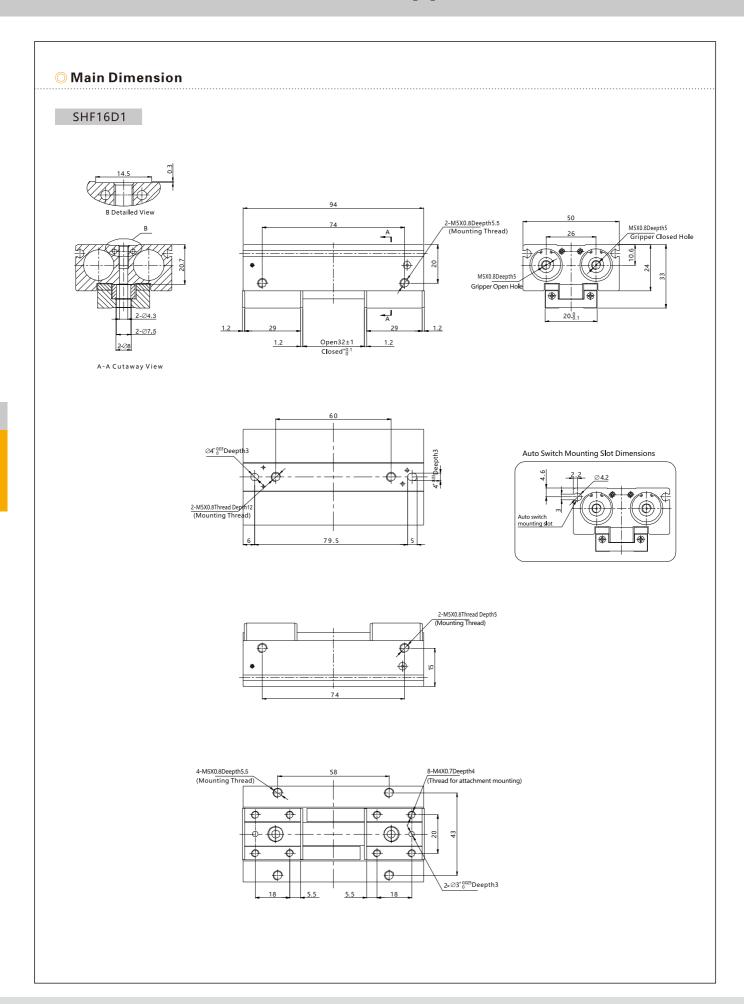




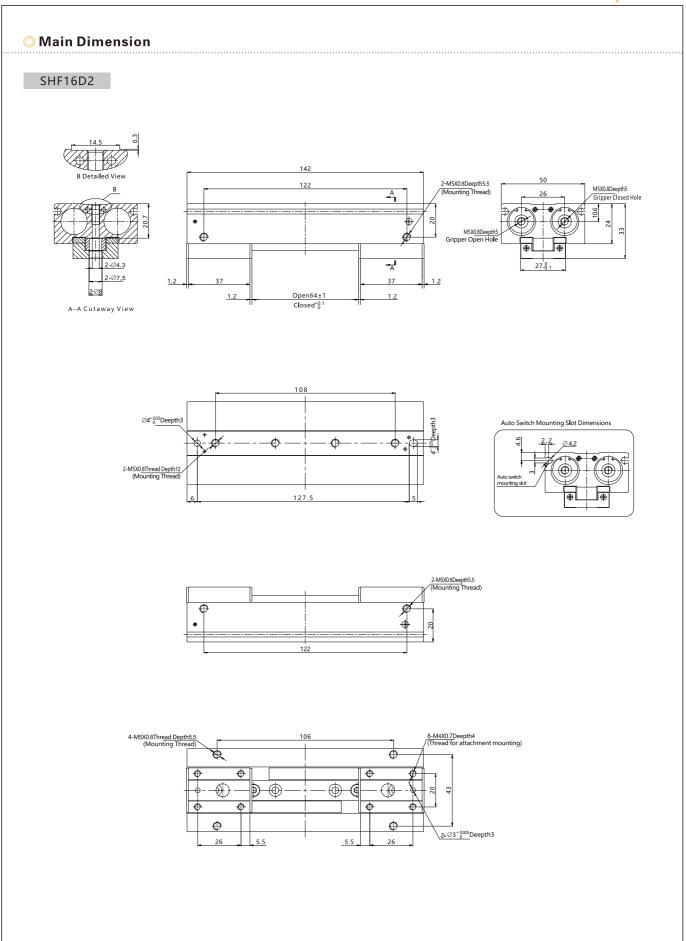




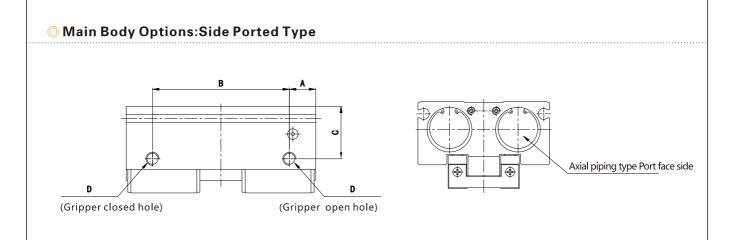






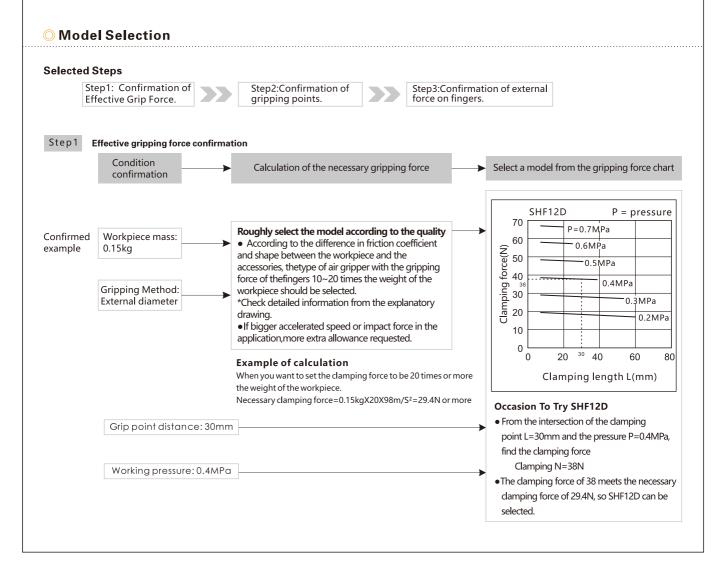






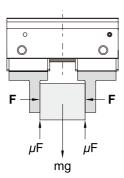
| Model Number | SHF12DR | SHF12D1R | SHF12D2R | SHF16DR | SHF16D1R | SHF16D2R | |
|--------------|---------|----------|----------|---------|----------|----------|--|
| A | 7 | | 9 | | | | |
| В | 38 | 54 | 90 | 54 | 76 | 124 | |
| С | 14.8 | | | 14.8 | | | |
| D | M5×0.8 | | | | M5×0.8 | | |

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



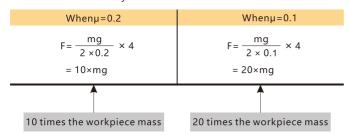
Model Selection

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.

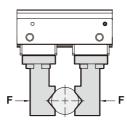


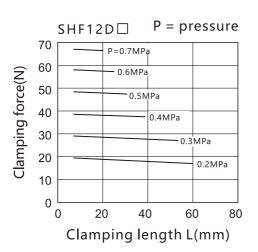
Note:1.When the friction coefficient is higher than μ =0.2, for safety, our company recommends that the model should be selected at 10 to 20 times the weight of the workpiece.

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

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.





When clamping the workpiece shown on the left

F: Clamping force(N)

μ: Friction coefficient of attachments and work pieces

ቆ E•MC[®]

m: Workpiece mass(kg)

g: Gravitational acceleration(=98m/s²)

mg: Workpiece gravity(N)

If the workpiece does not fall

Then

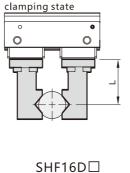
$$F > \frac{mg}{2 \times 11}$$

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

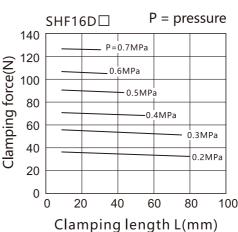
Inner diameter

clamping_istate

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



Outer diameter

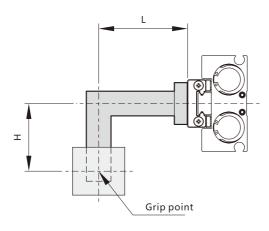




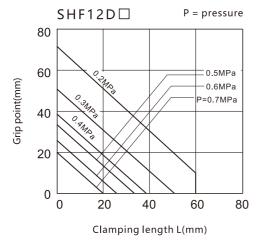
Model Selection

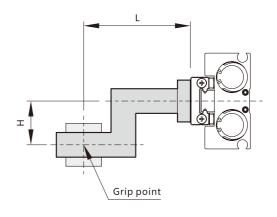
Step 2 Confirmation of clamping point

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

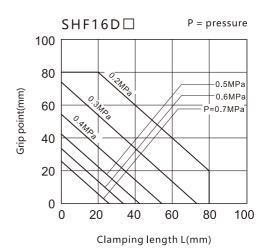


Inner diameter clamping state





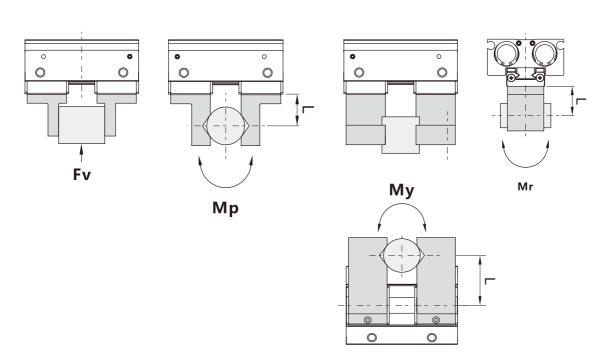
Outer diameter clamping state





Model Selection

Step3 Confirmation of external force on fingers



L: The distance to the load application point

| Model | Vertical direction | Maximum allowable torque | | | |
|--------|----------------------|--------------------------|---------------------------|-------------------------|--|
| Model | Allowable load Fv(N) | Bending torque Mp(N.m) | Deflection torque My(N.m) | Rotation torque Mr(N.m) | |
| SHF12D | 98 | 0.68 | 0.68 | 1.4 | |
| SHF16D | 176 | 1.4 | 1.4 | 2.8 | |

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 | |
|---|--|--|
| Allowable load F(N)= $\frac{M(\text{maximum allowable moment}) \; (\text{N.m})}{\text{L} \times \frac{10^{-3}}{\cancel{\times}}}$ (% Is the unit conversion constant) | When the actual static load f=10N, the bending moment of the point L=30mm from the end face of the jaw of SHF2-12D $ Allowable load F = \frac{0.68}{30\times10^{-3}} \\ = 22.7 \ (N) \\ Load f=10(N) < 22.7(N) $ so you can use. | |



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.

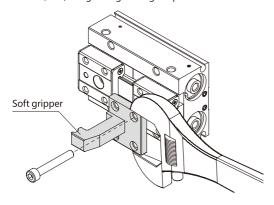
Slight deformation will cause poor accuracy and work not well.

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.

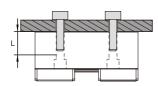


| Model | Screws used | Maximum tightening torque N.m | |
|--------|-------------|-------------------------------|--|
| SHF12D | M4×0.7 | 0.63 | |
| SHF16D | M5×0.8 | 1.5 | |

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.

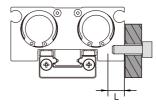
How to install the gripper attachment

Top mount type (main body screw hole)



| Model | Screws used | Maximum tightening torque N.m | Maximum thread entry depth Lmm |
|--------|-------------|----------------------------------|-----------------------------------|
| SHF12D | M4×0.7 | 2.2 | 10 |
| SHF16D | M5×0.8 | 4.5 | 12 |

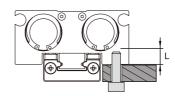
Side Mount Type (Through Hole in Body)



| Model | Screws used | Maximum tightening torque N.m | Maximum thread entry depth Lmm |
|--------|-------------|----------------------------------|-----------------------------------|
| SHF12D | M4×0.7 | 1.5 | 5 |
| SHF16D | M5×0.8 | 3 | 5.5 |

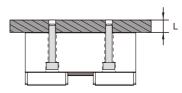
Bottom mount type (main body screw hole, main body through hole)

1. Use the main body screw holes



| Model | Screws used | Maximum tightening torque N.m | Maximum thread entry depth Lmm |
|--------|-------------|----------------------------------|-----------------------------------|
| SHF12D | M4×0.7 | 1.5 | 5 |
| SHF16D | M5×0.8 | 3 | 5.5 |

2. Use the empty holes without thread



| Model | Screws used | Maximum tightening torque N.m | Maximum thread entry depth Lmm |
|--------|-------------|----------------------------------|-----------------------------------|
| SHF12D | M3×0.5 | 0.63 | |
| SHF16D | M4×0.7 | 1.5 | |

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.

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