







# Air gripper—HFZ, HFP, HFY, HFR Series

Product series **TRIMANTEC** Click here to shop online @ [www.trimantec.com](http://www.trimantec.com) or call 336-767-1379

| Product series | Image  | Acting type   | Bore size                 | Collocation of sensor switch |       |       |
|----------------|--|---------------|---------------------------|------------------------------|-------|-------|
|                |  |               |                           | CS1-G                        | DS1-G | DS1-H |
| HFZ Series     |     | Double acting | 6, 10, 16, 20, 25, 32, 40 |                              |       |       |
| HFP Series     |     | Single acting | 10, 16, 20, 25, 32        |                              |       |       |
| HFY Series     |   | Double acting | 6, 10, 16, 20, 25, 32     |                              |       |       |
| HFR Series     |  | Double acting | 10, 16, 20, 25, 32        |                              |       |       |

|      |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|
| Page | 352 | 358 | 362 | 365 | 397 |
|------|-----|-----|-----|-----|-----|

## Installation and application

 Please Click Page Code

1. Dirty substances in the pipe must be eliminated before air gripper is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40 μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the air gripper is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



# Air gripper(parallel style)

## HFZ Series



### Specification

| Bore size (mm)     |               | 6  | 10                                 | 16                  | 20            | 25 | 32        | 40 |  |
|--------------------|---------------|--|------------------------------------|---------------------|---------------|----|-----------|----|--|
| Acting type        |               | Double acting                                |                                    |                     | Single acting |    |           |    |  |
| Fluid              |               | Air(to be filtered by 40 μ m filter element) |                                    |                     |               |    |           |    |  |
| Operating pressure | Double acting | Φ6, Φ10                                      | 0.2~0.7MPa(28~100psi)(2.0~7.0bar)  |                     |               |    |           |    |  |
|                    | Others        |  | 0.1~0.7MPa(15~100psi)(1.0~7.0bar)  |                     |               |    |           |    |  |
|                    | Single acting | Φ6, Φ10                                      | 0.35~0.7MPa(50~100psi)(3.5~7.0bar) |                     |               |    |           |    |  |
| Others             |               | 0.25~0.7MPa(36~100psi)(2.5~7.0bar)           |                                    |                     |               |    |           |    |  |
| Temperature °C     |               | -20~70                                       |                                    |                     |               |    |           |    |  |
| Lubrication        |               | Not required                                 |                                    |                     |               |    |           |    |  |
| Repeatability mm   |               | ± 0.01                                       |                                    |                     |               |    | ± 0.02    |    |  |
| Max. frequency     |               | 180(c.p.m)                                   |                                    |                     |               |    | 60(c.p.m) |    |  |
| Sensor switches ①  |               | DS1-H  | CS1-G<br>DS1-G                     | CS1-G, DS1-G, DS1-H |               |    |           |    |  |
| Port size          |               | M3 × 0.5                                     |                                    |                     | M5 × 0.8      |    |           |    |  |

① Sensor switch should be ordered additionally, please refer to P397~420 for detail of sensor switch.

### Ordering code

**HFZ 20**

**Model**

- HFZ: Air finger(Double acting)
- HFSZ: Air finger(Single acting and normally closed)
- HFTZ: Air finger(Single acting and normally opened)

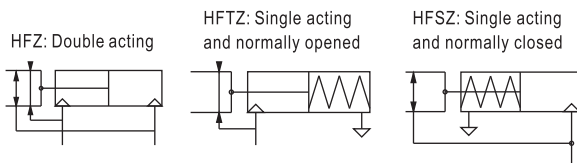
**Bore size**

- 6: Φ6mm
- 10: Φ10mm
- 16: Φ16mm
- 20: Φ20mm
- 25: Φ25mm
- 32: Φ32mm
- 40: Φ40mm

**Finger type**

- Blank: Standard
- R: Narrow type
- B: Side mounting type
- W: Side mounting and narrow type
- N: Thru.hole mounting type
- M: Thru.hole mounting and narrow type
- F: Bottom mounting type

### Symbol



### Product feature

1. Integrated design of linear guide rail, high rigidity and high precision.
2. A positioning pin is attached to the bottom of the linear guide rail, which can prevent the deviation of the positioning rail and body.
  - Integration of a linear guide rail
  - The positioning pin prevents the deviation of the rail and body
3. The hole of the body is deeper, which can improve the precision and the consistency of repeated dismounting and positioning.
4. According to the actual using requirements of customers, the initial position of clamping jaw can be customized to meet the different needs under different working conditions.
  - The positioning hole is deeper than the traditional type



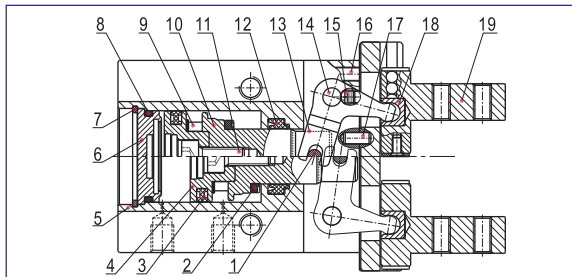
① Φ6, Φ32, Φ40 bore size don't have R, W & M type. Add) HFZ series are all attached with magnet.



# Air gripper(parallel style)

## HFZ Series

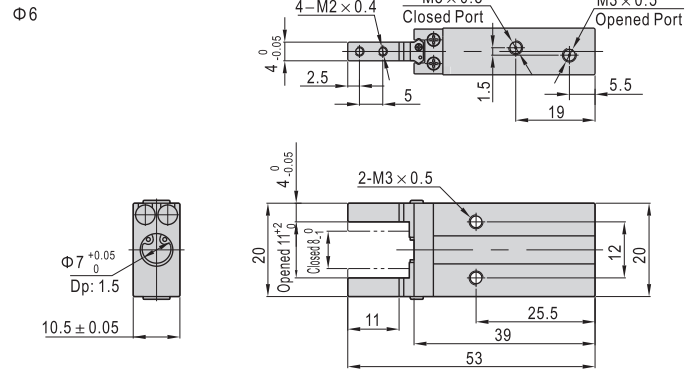
### Inner structure and material of major parts



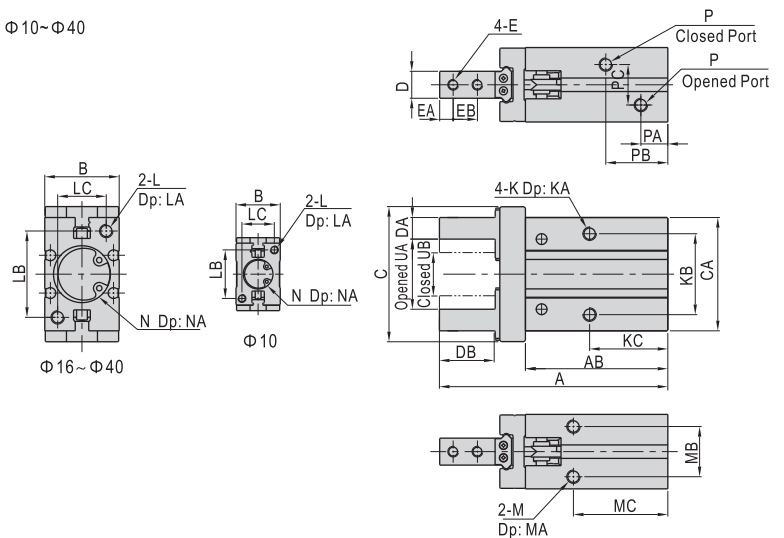
| NO. | Item                                    | Material                             |
|-----|---|--------------------------------------|
| 1   | Pin                                     | Stainless steel                      |
| 2   | Bumper                                  | TPU                                  |
| 3   | Piston seal                             | NBR                                  |
| 4   | Piston                                  | Aluminum alloy/Stainless steel       |
| 5   | Body                                    | Aluminum alloy                       |
| 6   | Back cover                              | Aluminum alloy                       |
| 7   | C clip                                  | Spring steel                         |
| 8   | O-ring                                  | NBR                                  |
| 9   | Magnet                                  | Sintered metal(Neodymium-iron-boron) |
| 10  | Piston rod                              | Aluminum alloy/Stainless steel       |
| 11  | Screw                                   | Carbon steel                         |
| 12  | Rod packing                             | NBR                                  |
| 13  | Curved bar                              | Stainless steel                      |
| 14  | Pin                                     | Stainless steel                      |
| 15  | Countersink screw                       | Carbon steel                         |
| 16  | Hexagon screw                           | Carbon steel                         |
| 17  | Pin                                     | Stainless steel                      |
| 18  | Guide sleeve                            | Stainless steel                      |
| 19  | Assembly of clamping jaw and guide rail | Stainless steel                      |

### Dimensions

#### Standard type



#### Φ10~Φ40



### Gripping force and stroke

| Acting        | Model           | Gripping force per finger Effective valve(N) |          | Opening/Closing stroke (Both sides)(mm) | Weight (g) |        |      |
|---------------|-----------------|--|----------|---|------------|--------|------|
|               |                 | External                                     | Internal |   | F Type     | Others |      |
| Double acting | HFZ6            | 3.3  | 6.1      | 4                                       | 24         | 25     |      |
|               | HFZ10           | 11   | 17       | 4                                       | 56         | 56     |      |
|               | HFZ16           | 34   | 45       | 6                                       | 124        | 124    |      |
|               | HFZ20           | 45   | 68       | 10                                      | 236        | 236    |      |
|               | HFZ25           | 69   | 102      | 14                                      | 418        | 428    |      |
|               | HFZ40           | 160  | 195      | 22                                      | 750        | 729    |      |
| Single acting | Normally opened | HFZ40  | 255      | 320                                     | 30         | 1340   | 1268 |
|               |                 | HFTZ6  | 1.9      | -                                       | 4          | 25     | 26   |
|               |                 | HFTZ10                                       | 7        | -                                       | 4          | 57     | 57   |
|               |                 | HFTZ16                                       | 27       | -                                       | 6          | 125    | 125  |
|               |                 | HFTZ20                                       | 35       | -                                       | 10         | 238    | 238  |
|               |                 | HFTZ25                                       | 55       | -                                       | 14         | 420    | 430  |
|               | Normally closed | HFTZ32                                       | 133      | -                                       | 22         | 799    | 778  |
|               |                 | HFTZ40                                       | 220      | -                                       | 30         | 1437   | 1365 |
|               |                 | HFSZ6  | -        | 3.7                                     | 4          | 25     | 26   |
|               |                 | HFSZ11                                       | -        | 13                                      | 4          | 57     | 57   |
|               |                 | HFSZ16                                       | -        | 38                                      | 6          | 125    | 125  |
|               |                 | HFSZ20                                       | -        | 59                                      | 10         | 238    | 238  |
| HFSZ25        | -               | 87   | 14       | 420                                     | 430        |        |      |
| HFSZ32        | -               | 163  | 22       | 799                                     | 778        |        |      |
| HFSZ40        | -               | 270  | 30       | 1437                                    | 1365       |        |      |

Note) The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 355 for the definition of "L".

| Model\Item | A        | AB     | B    | C   | CA   | D                                | DA                               | DB | E           | EA | EB  |
|------------|----------|--------|------|-----|------|----------------------------------|----------------------------------|----|-------------|----|-----|
| HFZ10      | 57       | 37.5   | 16.4 | 29  | 23   | 5 <sup>0</sup> <sub>-0.05</sub>  | 4 <sup>0</sup> <sub>-0.05</sub>  | 12 | M2.5 × 0.45 | 3  | 5.7 |
| HFZ16      | 67.5     | 42.5   | 23.6 | 38  | 30.5 | 8 <sup>0</sup> <sub>-0.05</sub>  | 5 <sup>0</sup> <sub>-0.05</sub>  | 15 | M3 × 0.5    | 4  | 7   |
| HFZ20      | 84.5     | 53     | 27.6 | 50  | 42   | 10 <sup>0</sup> <sub>-0.05</sub> | 8 <sup>0</sup> <sub>-0.05</sub>  | 20 | M4 × 0.7    | 5  | 9   |
| HFZ25      | 102.5    | 63.5   | 33.6 | 63  | 52   | 12 <sup>0</sup> <sub>-0.05</sub> | 10 <sup>0</sup> <sub>-0.05</sub> | 25 | M5 × 0.8    | 6  | 12  |
| HFZ32      | 113(122) | 67(76) | 40   | 97  | 60   | 15 <sup>0</sup> <sub>-0.05</sub> | 12 <sup>0</sup> <sub>-0.05</sub> | 29 | M6 × 1.0    | 7  | 14  |
| HFZ40      | 139(152) | 83(96) | 48   | 119 | 72   | 18 <sup>0</sup> <sub>-0.05</sub> | 14 <sup>0</sup> <sub>-0.05</sub> | 36 | M8 × 1.25   | 9  | 17  |

| Model\Item | K         | KA  | KB | KC     | L         | LA | LB | LC | M         | MA  | MB   | MC     |
|------------|-----------|-----|----|--------|-----------|----|----|----|-----------|-----|------|--------|
| HFZ10      | M3 × 0.5  | 5.5 | 16 | 23     | M3 × 0.5  | 6  | 18 | 12 | M3 × 0.5  | 6   | 11.5 | 27     |
| HFZ16      | M4 × 0.7  | 8   | 24 | 24.5   | M4 × 0.7  | 8  | 22 | 15 | M4 × 0.7  | 4.5 | 16   | 30     |
| HFZ20      | M5 × 0.8  | 10  | 30 | 29     | M5 × 0.8  | 10 | 32 | 18 | M5 × 0.8  | 8   | 18.5 | 35     |
| HFZ25      | M6 × 1.0  | 12  | 36 | 30     | M6 × 1.0  | 12 | 40 | 22 | M6 × 1.0  | 10  | 22   | 36.5   |
| HFZ32      | M6 × 1.0  | 13  | 46 | 40(49) | M6 × 1.0  | 13 | 46 | 26 | M6 × 1.0  | 10  | 26   | 48(57) |
| HFZ40      | M8 × 1.25 | 16  | 56 | 49(62) | M8 × 1.25 | 17 | 56 | 32 | M8 × 1.25 | 13  | 32   | 58(71) |

| Model\Item | N                                 | NA  | P        | PA  | PB     | PC | UA(Opened)                      | UB(Closed)                      |
|------------|-----------------------------------|-----|----------|-----|--------|----|---------------------------------|---------------------------------|
| HFZ10      | Φ11 <sup>+0.05</sup> <sub>0</sub> | 2   | M3 × 0.5 | 7.5 | 19     | 10 | 15.5 <sup>+2</sup> <sub>0</sub> | 11.5 <sup>-1</sup> <sub>0</sub> |
| HFZ16      | Φ17 <sup>+0.05</sup> <sub>0</sub> | 2   | M5 × 0.8 | 7.5 | 19     | 13 | 21 <sup>+2</sup> <sub>0</sub>   | 15 <sup>-1</sup> <sub>0</sub>   |
| HFZ20      | Φ21 <sup>+0.05</sup> <sub>0</sub> | 3   | M5 × 0.8 | 9.5 | 23     | 15 | 26.5 <sup>+2</sup> <sub>0</sub> | 16.5 <sup>-1</sup> <sub>0</sub> |
| HFZ25      | Φ26 <sup>+0.05</sup> <sub>0</sub> | 3.5 | M5 × 0.8 | 10  | 24     | 20 | 33.5 <sup>+2</sup> <sub>0</sub> | 19.5 <sup>-1</sup> <sub>0</sub> |
| HFZ32      | Φ34 <sup>+0.05</sup> <sub>0</sub> | 4   | M5 × 0.8 | 11  | 31(40) | 24 | 48 <sup>+2.5</sup> <sub>0</sub> | 26 <sup>-1</sup> <sub>0</sub>   |
| HFZ40      | Φ42 <sup>+0.05</sup> <sub>0</sub> | 4   | M5 × 0.8 | 12  | 38(50) | 28 | 60 <sup>+2.5</sup> <sub>0</sub> | 30 <sup>-1</sup> <sub>0</sub>   |

Note) The values in "( )" in the above table are single acting type sizes.



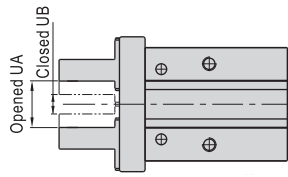
Back  
HFZ

# Air gripper(parallel style)

## HFZ Series

### Narrow type(R type)

Φ10~Φ25

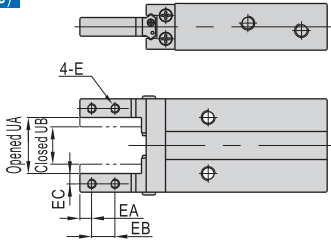


| Model\Item | UA(Opened)                      | UB(Closed)                     |
|------------|---------------------------------|--------------------------------|
| HFZ10-R    | 10 <sup>+2</sup> <sub>0</sub>   | 6 <sup>0</sup> <sub>-1</sub>   |
| HFZ16-R    | 12.5 <sup>+2</sup> <sub>0</sub> | 6.5 <sup>0</sup> <sub>-1</sub> |
| HFZ20-R    | 17 <sup>+2</sup> <sub>0</sub>   | 7 <sup>0</sup> <sub>-1</sub>   |
| HFZ25-R    | 23 <sup>+2.5</sup> <sub>0</sub> | 9 <sup>0</sup> <sub>-1</sub>   |

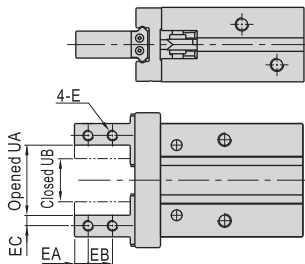
Note) The other dimensions are the same as standard type.

### Side mounting type(B type)

Φ6



Φ10~Φ40

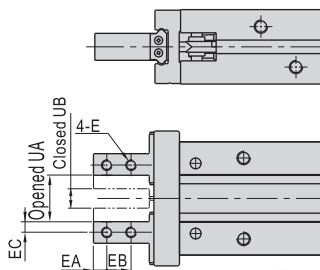


| Model\Item | E           | EA  | EB  | EC  | UA(Opened)                      | UB(Closed)                      |
|------------|-------------|-----|-----|-----|---------------------------------|---------------------------------|
| HFZ6-B     | M2 × 0.4    | 2.5 | 5   | 2   | 11 <sup>+2</sup> <sub>0</sub>   | 8 <sup>0</sup> <sub>-1</sub>    |
| HFZ10-B    | M2.5 × 0.45 | 3   | 5.7 | 2   | 15.5 <sup>+2</sup> <sub>0</sub> | 11.5 <sup>0</sup> <sub>-1</sub> |
| HFZ16-B    | M3 × 0.5    | 4   | 7   | 2.5 | 21 <sup>+2</sup> <sub>0</sub>   | 15 <sup>0</sup> <sub>-1</sub>   |
| HFZ20-B    | M4 × 0.7    | 5   | 9   | 4   | 26.5 <sup>+2</sup> <sub>0</sub> | 16.5 <sup>0</sup> <sub>-1</sub> |
| HFZ25-B    | M5 × 0.8    | 6   | 12  | 5   | 33.5 <sup>+2</sup> <sub>0</sub> | 19.5 <sup>0</sup> <sub>-1</sub> |
| HFZ32-B    | M6 × 1.0    | 7   | 14  | 6   | 48 <sup>+2.5</sup> <sub>0</sub> | 26 <sup>0</sup> <sub>-1</sub>   |
| HFZ40-B    | M8 × 1.25   | 9   | 17  | 7   | 60 <sup>+2.5</sup> <sub>0</sub> | 30 <sup>0</sup> <sub>-1</sub>   |

Note) The other dimensions are the same as standard type.

### Side mounting and narrow type(W type)

Φ10~Φ25

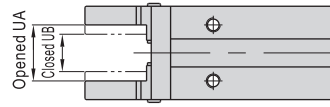
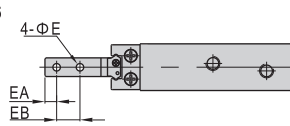


| Model\Item | E           | EA | EB  | EC  | UA(Opened)                      | UB(Closed)                     |
|------------|-------------|----|-----|-----|---------------------------------|--------------------------------|
| HFZ10-W    | M2.5 × 0.45 | 3  | 5.7 | 2   | 10 <sup>+2</sup> <sub>0</sub>   | 6 <sup>0</sup> <sub>-1</sub>   |
| HFZ16-W    | M3 × 0.5    | 4  | 7   | 2.5 | 12.5 <sup>+2</sup> <sub>0</sub> | 6.5 <sup>0</sup> <sub>-1</sub> |
| HFZ20-W    | M4 × 0.7    | 5  | 9   | 4   | 17 <sup>+2</sup> <sub>0</sub>   | 7 <sup>0</sup> <sub>-1</sub>   |
| HFZ25-W    | M5 × 0.8    | 6  | 12  | 5   | 23 <sup>+2.5</sup> <sub>0</sub> | 9 <sup>0</sup> <sub>-1</sub>   |

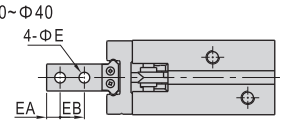
Note) The other dimensions are the same as standard type.

### Thru. hole mounting type(N type)

Φ6



Φ10~Φ40



| Model\Item | E   | EA  | EB  | UA(Opened)                      | UB(Closed)                      |
|------------|-----|-----|-----|---------------------------------|---------------------------------|
| HFZ6-N     | 2.3 | 2.5 | 5   | 11 <sup>+2</sup> <sub>0</sub>   | 8 <sup>0</sup> <sub>-1</sub>    |
| HFZ10-N    | 2.8 | 3   | 5.7 | 15.5 <sup>+2</sup> <sub>0</sub> | 11.5 <sup>0</sup> <sub>-1</sub> |
| HFZ16-N    | 3.3 | 4   | 7   | 21 <sup>+2</sup> <sub>0</sub>   | 15 <sup>0</sup> <sub>-1</sub>   |
| HFZ20-N    | 4.5 | 5   | 9   | 26.5 <sup>+2</sup> <sub>0</sub> | 16.5 <sup>0</sup> <sub>-1</sub> |
| HFZ25-N    | 5.5 | 6   | 12  | 33.5 <sup>+2</sup> <sub>0</sub> | 19.5 <sup>0</sup> <sub>-1</sub> |
| HFZ32-N    | 6.5 | 7   | 14  | 48 <sup>+2.5</sup> <sub>0</sub> | 26 <sup>0</sup> <sub>-1</sub>   |
| HFZ40-N    | 9   | 9   | 17  | 60 <sup>+2.5</sup> <sub>0</sub> | 30 <sup>0</sup> <sub>-1</sub>   |

Note) The other dimensions are the same as standard type.

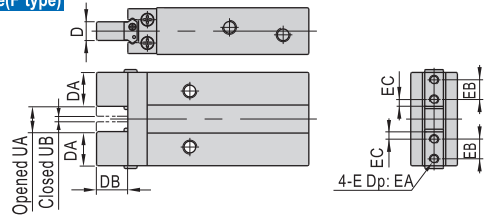
### Thru. hole mounting and narrow type(M type)

| Model\Item | E   | EA | EB  | UA(Opened)                      | UB(Closed)                     |
|------------|-----|----|-----|---------------------------------|--------------------------------|
| HFZ10-M    | 2.8 | 3  | 5.7 | 10 <sup>+2</sup> <sub>0</sub>   | 6 <sup>0</sup> <sub>-1</sub>   |
| HFZ16-M    | 3.3 | 4  | 7   | 12.5 <sup>+2</sup> <sub>0</sub> | 6.5 <sup>0</sup> <sub>-1</sub> |
| HFZ20-M    | 4.5 | 5  | 9   | 17 <sup>+2</sup> <sub>0</sub>   | 7 <sup>0</sup> <sub>-1</sub>   |
| HFZ25-M    | 5.5 | 6  | 12  | 23 <sup>+2.5</sup> <sub>0</sub> | 9 <sup>0</sup> <sub>-1</sub>   |

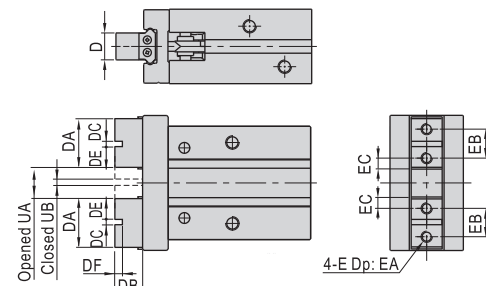
Note) The other dimensions are the same as standard type.

### Bottom mounting type(F type)

Φ6



Φ10~Φ40



| Model\Item | D                                | DA   | DB   | DC                                 | DE   | DF  |
|------------|----------------------------------|------|------|------------------------------------|------|-----|
| HFZ6-F     | 4 <sup>0</sup> <sub>-0.05</sub>  | 7.5  | 7    | -                                  | -    | -   |
| HFZ10-F    | 5 <sup>0</sup> <sub>-0.05</sub>  | 11   | 5    | 2 <sup>+0.025</sup> <sub>0</sub>   | 4.5  | 2   |
| HFZ16-F    | 8 <sup>0</sup> <sub>-0.05</sub>  | 14   | 8    | 2.5 <sup>+0.025</sup> <sub>0</sub> | 5.8  | 2.5 |
| HFZ20-F    | 10 <sup>0</sup> <sub>-0.05</sub> | 18   | 10.5 | 3 <sup>+0.025</sup> <sub>0</sub>   | 7.5  | 3   |
| HFZ25-F    | 12 <sup>0</sup> <sub>-0.05</sub> | 22   | 13   | 4 <sup>+0.030</sup> <sub>0</sub>   | 9    | 4   |
| HFZ32-F    | 15 <sup>0</sup> <sub>-0.05</sub> | 34.5 | 18   | 5 <sup>+0.030</sup> <sub>0</sub>   | 14.8 | 5   |
| HFZ40-F    | 18 <sup>0</sup> <sub>-0.05</sub> | 41.5 | 22   | 6 <sup>+0.030</sup> <sub>0</sub>   | 17.7 | 6   |

| Model\Item | E           | EA | EB  | EC   | UA(Opened)                      | UB(Closed)                       |
|------------|-------------|----|-----|------|---------------------------------|----------------------------------|
| HFZ6-F     | M2 × 0.4    | 3  | 3.5 | 2    | 4 <sup>+1.5</sup> <sub>0</sub>  | 1.5 <sup>0</sup> <sub>-0.5</sub> |
| HFZ10-F    | M2.5 × 0.45 | 4  | 6   | 2.45 | 5.5 <sup>+2</sup> <sub>0</sub>  | 1.5 <sup>0</sup> <sub>-0.5</sub> |
| HFZ16-F    | M3 × 0.5    | 6  | 8   | 3.05 | 7.5 <sup>+2</sup> <sub>0</sub>  | 1.5 <sup>0</sup> <sub>-0.5</sub> |
| HFZ20-F    | M4 × 0.7    | 8  | 10  | 3.95 | 11.5 <sup>+2</sup> <sub>0</sub> | 1.5 <sup>0</sup> <sub>-0.5</sub> |
| HFZ25-F    | M5 × 0.8    | 10 | 12  | 4.9  | 16 <sup>+2.5</sup> <sub>0</sub> | 2 <sup>0</sup> <sub>-0.5</sub>   |
| HFZ32-F    | M6 × 1.0    | 12 | 20  | 7.3  | 25 <sup>+2.5</sup> <sub>0</sub> | 3 <sup>0</sup> <sub>-0.5</sub>   |
| HFZ40-F    | M8 × 1.25   | 16 | 24  | 8.7  | 33 <sup>+3</sup> <sub>0</sub>   | 3 <sup>0</sup> <sub>-0.5</sub>   |

Note) The other dimensions are the same as standard type.

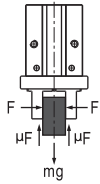


## HFZ Series

### How to select product

Please select pneumatic finger according to the following steps:  
 The selection of the effective gripping force → the confirmation of the gripping point  
 → the confirmation of the external force put on the gripping jaw.

#### 1. The selection of the gripping force



The work-pieces as shown in the left:  
 F: Gripping force (N)  
 $\mu$ : friction coefficient between fittings and work-pieces.  
 m: mass of work-pieces  
 g: acceleration of gravity ( $=9.8m/s^2$ )

The condition that the work-pieces won't drop is:  $2 \times \mu F > mg$

$$\text{so: } F > \frac{mg}{2 \times \mu}$$

Safety coefficient is a, so F is:

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

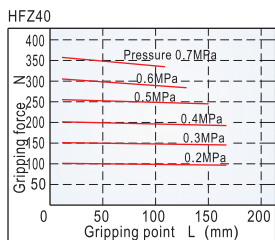
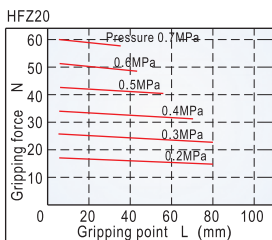
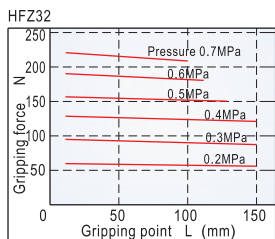
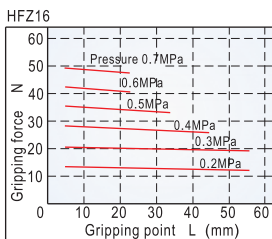
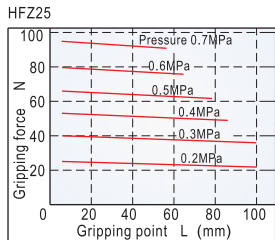
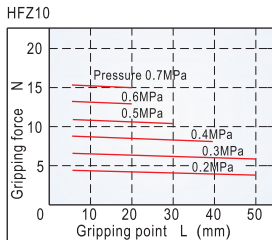
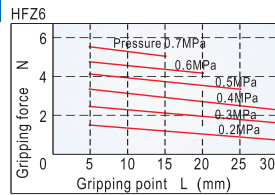
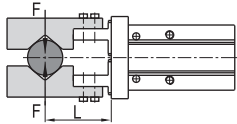
The gripping work-pieces shown above, on the impact condition of ordinary handling state, taking safety coefficient  $a=4$ , have a gripping force that is more than 10-20 times of the mass of the gripped objects.

|   |   |
|---|---|
| $\mu = 0.2$                                 | $\mu = 0.1$                                 |
| $F = \frac{mg}{2 \times 0.2} \times 4$      | $F = \frac{mg}{2 \times 0.1} \times 4$      |
| $= 10 \times mg$                            | $= 20 \times mg$                            |
| 10 times of the mass of the gripped objects | 20 times of the mass of the gripped objects |

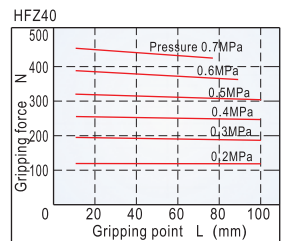
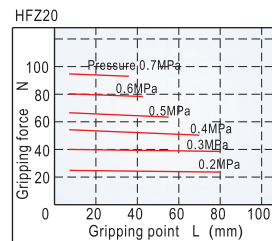
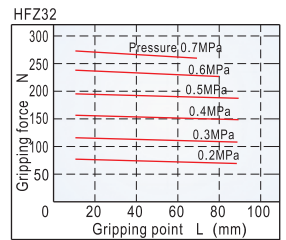
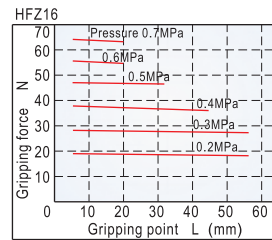
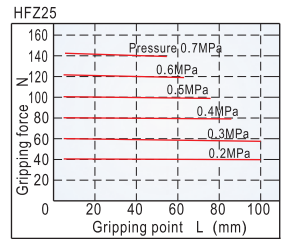
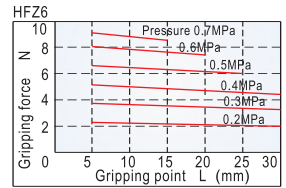
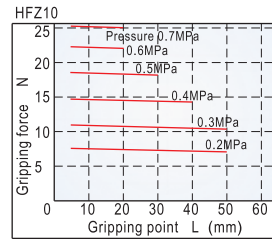
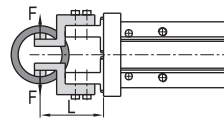
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10-20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

#### 1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

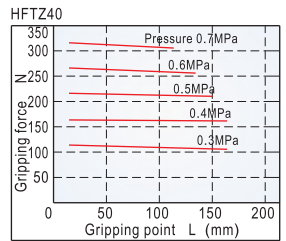
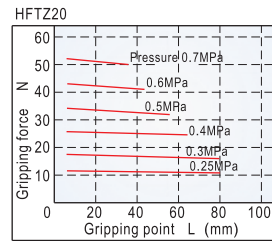
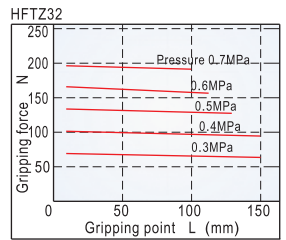
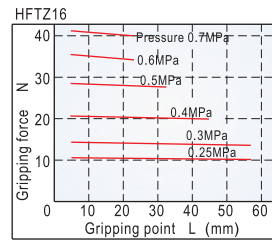
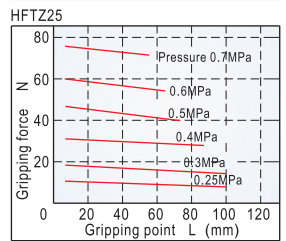
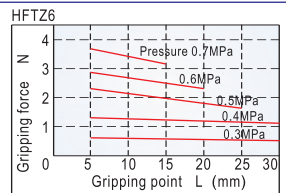
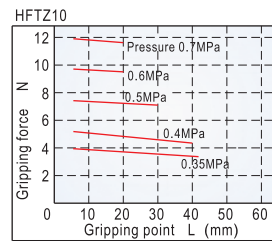
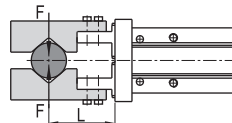
#### Double acting type closed gripping force



#### Double acting type opened gripping force



#### Single acting normally opened gripping force

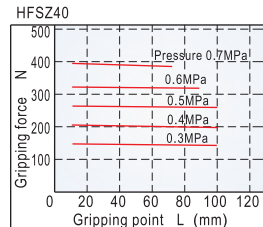
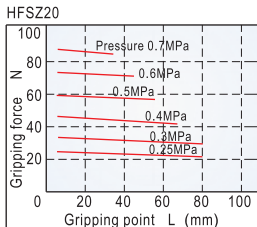
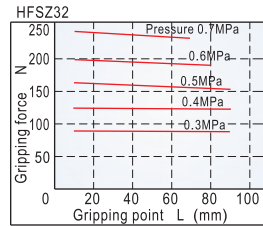
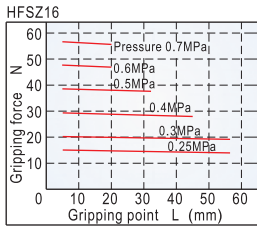
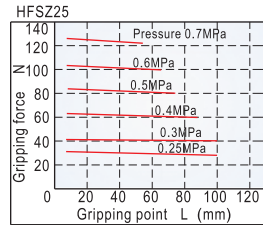
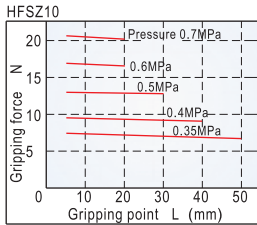
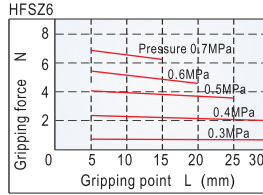
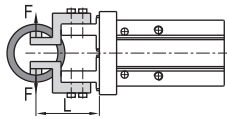


Back HFZ

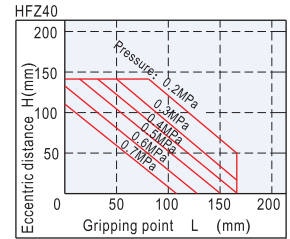
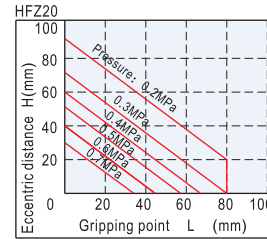
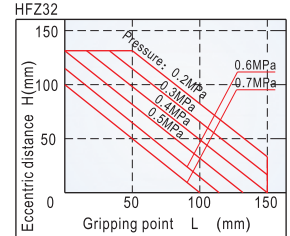
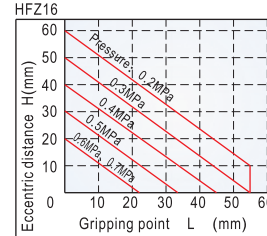
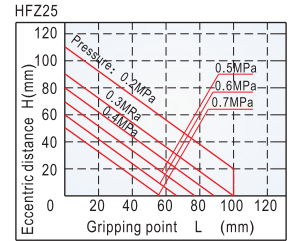
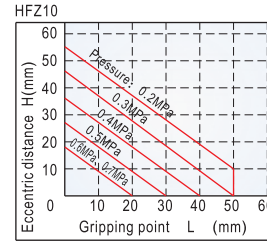
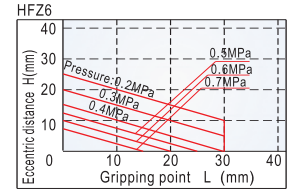
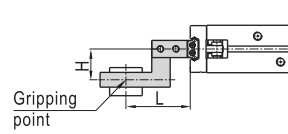


## HFZ Series

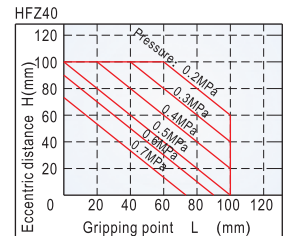
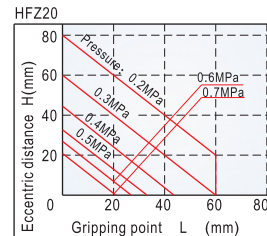
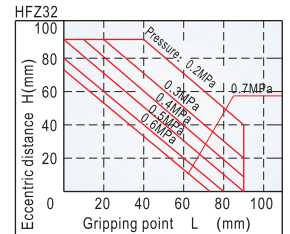
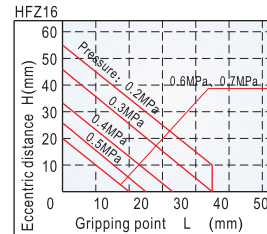
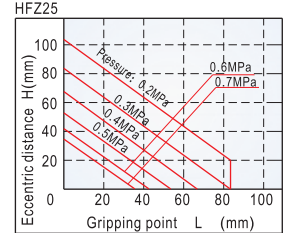
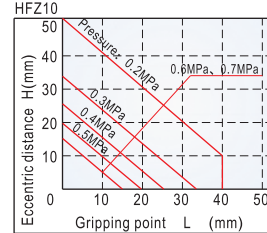
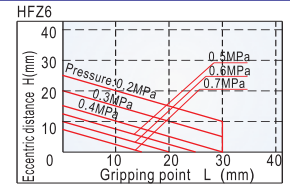
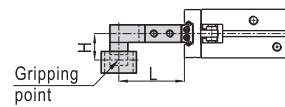
### Single acting normally closed clamping force



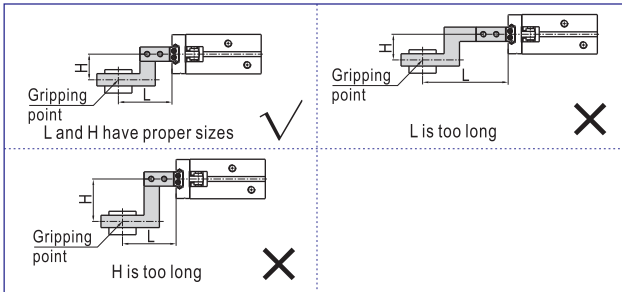
### The range of the closed gripping points



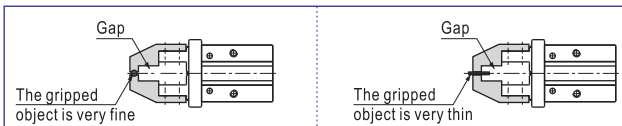
### The range of the opened clamping point



- The selection of the gripping point
- 1.) Please select the gripping point within the limited field shown below.  
Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



- 2.) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.
- 2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



## HFZ Series

3. The confirmation of the external force put on the gripping jaw.

| Bore size | The allowed vertical loads Fv(N) | Mp   | Max. permissible torque (Nm) |      |  |
|-----------|----------------------------------|------|------------------------------|------|--|
|           |                                  |      | My                           | Mr   |  |
| 6         | 10                               | 0.04 | 0.04                         | 0.08 |  |
| 10        | 58                               | 0.26 | 0.26                         | 0.53 |  |
| 16        | 98                               | 0.68 | 0.68                         | 1.36 |  |
| 20        | 147                              | 1.32 | 1.32                         | 2.65 |  |
| 25        | 255                              | 1.94 | 1.94                         | 3.88 |  |
| 32        | 343                              | 3    | 3                            | 6    |  |
| 40        | 490                              | 4.5  | 4.5                          | 9    |  |

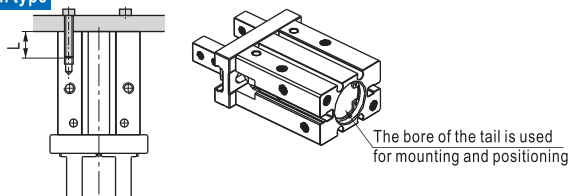
Note) The loads and torque values of said are all static values.

| The calculation of allowable forces when moment loads work   | Examples of calculation   |
|--|---|
| $\text{Allowable load(N)} = \frac{M(\text{Maximum permissible moment})(\text{N.m})}{L \times 10^{-3}}$ <p>Unit conversion constant</p> | In the guide rail of HFZ16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N.<br>$\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}} = 22.7(\text{N})$<br>Actual load f=10(N) < 22.7(N)<br>To meet the using requirements |

### Installation and application

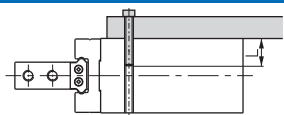
- Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
- Don't use the air gripper under strong external force and impact force.
- Please contact with us when the single acting type clamps only with the spring force.
- When install and fix the air gripper, avoid falling down, collision and damage.
- When fixing the gripping jaw parts, don't twist the gripping jaw.
- There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

#### Tail installation type



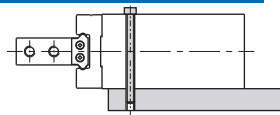
| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) | The aperture of the positioning bore(mm) | The depth of the positioning bore(mm) |
|-----------|----------------|--------------------------|-------------------------|--|---------------------------------------|
| 10        | M3 × 0.5       | 0.88                     | 6                       | Φ 11 <sup>+0.05</sup> <sub>0</sub>       | 2                                     |
| 16        | M4 × 0.7       | 2.1                      | 8                       | Φ 17 <sup>+0.05</sup> <sub>0</sub>       | 2                                     |
| 20        | M5 × 0.8       | 4.3                      | 10                      | Φ 21 <sup>+0.05</sup> <sub>0</sub>       | 3                                     |
| 25        | M6 × 1.0       | 7.3                      | 12                      | Φ 26 <sup>+0.05</sup> <sub>0</sub>       | 3.5                                   |
| 32        | M6 × 1.0       | 7.9                      | 13                      | Φ 34 <sup>+0.05</sup> <sub>0</sub>       | 4                                     |
| 40        | M8 × 1.25      | 17.7                     | 17                      | Φ 42 <sup>+0.05</sup> <sub>0</sub>       | 4                                     |

#### The installation of the front threaded hole



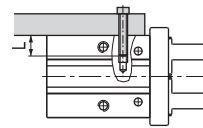
| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 6         | M3 × 0.5       | 0.88                     | 10                      |
| 10        | M3 × 0.5       | 0.69                     | 5                       |
| 16        | M4 × 0.7       | 2.1                      | 8                       |
| 20        | M5 × 0.8       | 4.3                      | 10                      |
| 25        | M6 × 1.0       | 7.3                      | 12                      |
| 32        | M6 × 1.0       | 7.9                      | 13                      |
| 40        | M8 × 1.25      | 17.7                     | 16                      |

#### The installation of the front through hole



| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 6         | M2.5 × 0.45    | 0.49                     | -                       |
| 10        | M2.5 × 0.45    | 0.49                     | 5                       |
| 16        | M3 × 0.5       | 0.88                     | 8                       |
| 20        | M4 × 0.7       | 2.1                      | 10                      |
| 25        | M5 × 0.8       | 4.3                      | 12                      |
| 32        | M5 × 0.8       | 4.3                      | 13                      |
| 40        | M6 × 1.0       | 7.3                      | 16                      |

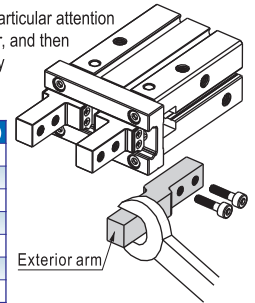
#### Surface installation type



| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 10        | M3 × 0.5       | 0.9                      | 6                       |
| 16        | M4 × 0.7       | 1.6                      | 4.5                     |
| 20        | M5 × 0.8       | 3.3                      | 8                       |
| 25        | M6 × 1.0       | 5.9                      | 10                      |
| 32        | M6 × 1.0       | 5.9                      | 10                      |
| 40        | M8 × 1.25      | 13.7                     | 13                      |

7. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

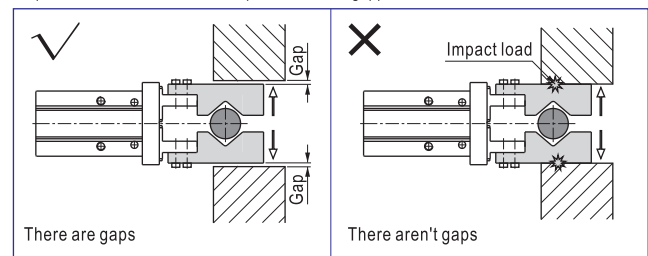


| Bore size | The bolts type | Max. locking moment (Nm) |
|-----------|----------------|--------------------------|
| 6         | M2 × 0.4       | 0.15                     |
| 10        | M2.5 × 0.45    | 0.31                     |
| 16        | M3 × 0.5       | 0.59                     |
| 20        | M4 × 0.7       | 1.4                      |
| 25        | M5 × 0.8       | 2.8                      |
| 32        | M6 × 1.0       | 4.9                      |
| 40        | M8 × 1.25      | 11.8                     |

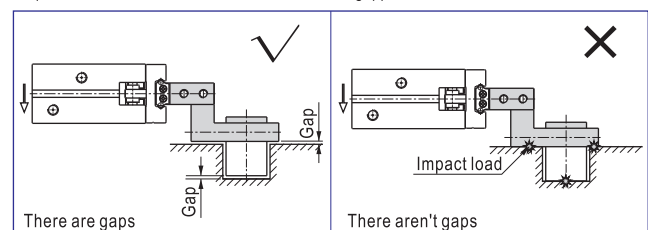
8. Confirm that there is no external forces exerted on the gripping jaw.

Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

8.1) The end of stroke under the open state of air gripper

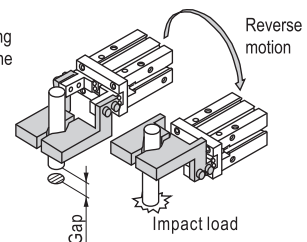


8.2) The end of stroke under the move state of air gripper

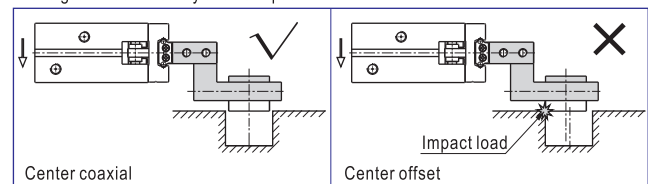


8.3) Reverse motion state

When reverse motion state, the gripping point must be precision, otherwise in the reverse motion state the air gripper maybe impact with ambience and will cause impact load .



9. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.



- Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
- People can not enter the movement path of air gripper and articles can not be placed on the path too.
- Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.



# Air gripper (mechanical parallel style)

## HFP Series

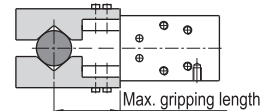


### Specification

| Bore size (mm)           |               | 10   | 16                                 | 20 | 25                | 32        |
|--------------------------|---------------|--|------------------------------------|----|-------------------|-----------|
| Acting type              |               | Double acting, Single acting                           |                                    |    |                   |           |
| Fluid                    |               | Air(to be filtered by 40 μ m filter element)           |                                    |    |                   |           |
| Operating pressure       | Double acting | Φ10  | 0.2~0.7MPa(28~100psi)(2.0~7.0bar)  |    |                   |           |
|                          |               | Others   | 0.1~0.7MPa(15~100psi)(1.0~7.0bar)  |    |                   |           |
|                          | Single acting | Φ10  | 0.35~0.7MPa(50~100psi)(3.5~7.0bar) |    |                   |           |
|                          |               | Others   | 0.25~0.7MPa(36~100psi)(2.5~7.0bar) |    |                   |           |
| Proof pressure           |               | 1.05MPa(150psi)(10.5bar)                               |                                    |    |                   |           |
| Temperature °C           |               | -10~70   |                                    |    |                   |           |
| Lubrication              |               | Cylinder: Not required; Gripper jaws: Lubricate grease |                                    |    |                   |           |
| Max. gripping length① mm |               | 30   | 40                                 | 60 | 70                | 90        |
| Max. frequency           |               | 180(c.p.m)   |                                    |    |                   | 60(c.p.m) |
| Sensor switches ②        |               | CS1-G/DS1-G  |                                    |    | CS1-G/DS1-G、DS1-H |           |
| Port size                |               | M3 × 0.5   |                                    |    | M5 × 0.8          |           |

① Refer to right graph for the definition of max. gripping length.

② Sensor switch should be ordered additionally, please refer to P397~420 for detail of sensor switch.



### Ordering code

HFP 20

**Model**

HFP: Air finger(Double acting)  
(mechanical parallel style)

HFTP: Air finger(Single acting and normally closed)  
(mechanical parallel style)

**Figur type**

Blank: Standard

N: Thru-hole mounting type

**Bore size**

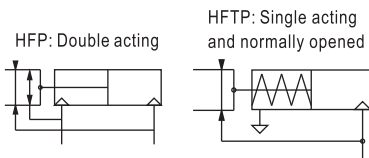
10: Φ 10mm  
16: Φ 16mm  
20: Φ 20mm  
25: Φ 25mm  
32: Φ 32mm

Add) HFP series are all attached with magnet.

### Inner structure and material of major parts

| NO. | Item              | Material                          | NO. | Item           | Material                                 |
|-----|-------------------|-----------------------------------|-----|----------------|--|
| 1   | C clip            | Spring steel                      | 11  | Gripping jaws  | Stainless steel                          |
| 2   | O-ring            | NBR                               | 12  | Pin            | Stainless steel                          |
| 3   | Piston seal       | NBR                               | 13  | Screw          | Carbon steel                             |
| 4   | Magnet washer     | NBR                               | 14  | Magnet         | Sintered metal<br>(Neodymium-iron-boron) |
| 5   | Piston rod        | Aluminum alloy<br>Stainless steel | 15  | Piston         | Aluminum alloy<br>Stainless steel        |
| 6   | Rod packing       | NBR                               | 16  | Bumper         | TPU                                      |
| 7   | Countersink screw | Carbon steel                      | 17  | Back cover     | Aluminum alloy                           |
| 8   | Curved bar        | Stainless steel                   | 18  | Body           | Aluminum alloy                           |
| 9   | Pin               | Stainless steel                   | 19  | Retaining ring | Stainless steel                          |
| 10  | Guide sleeve      | Stainless steel                   | 20  | Stopper sleeve | Stainless steel                          |

### Symbol



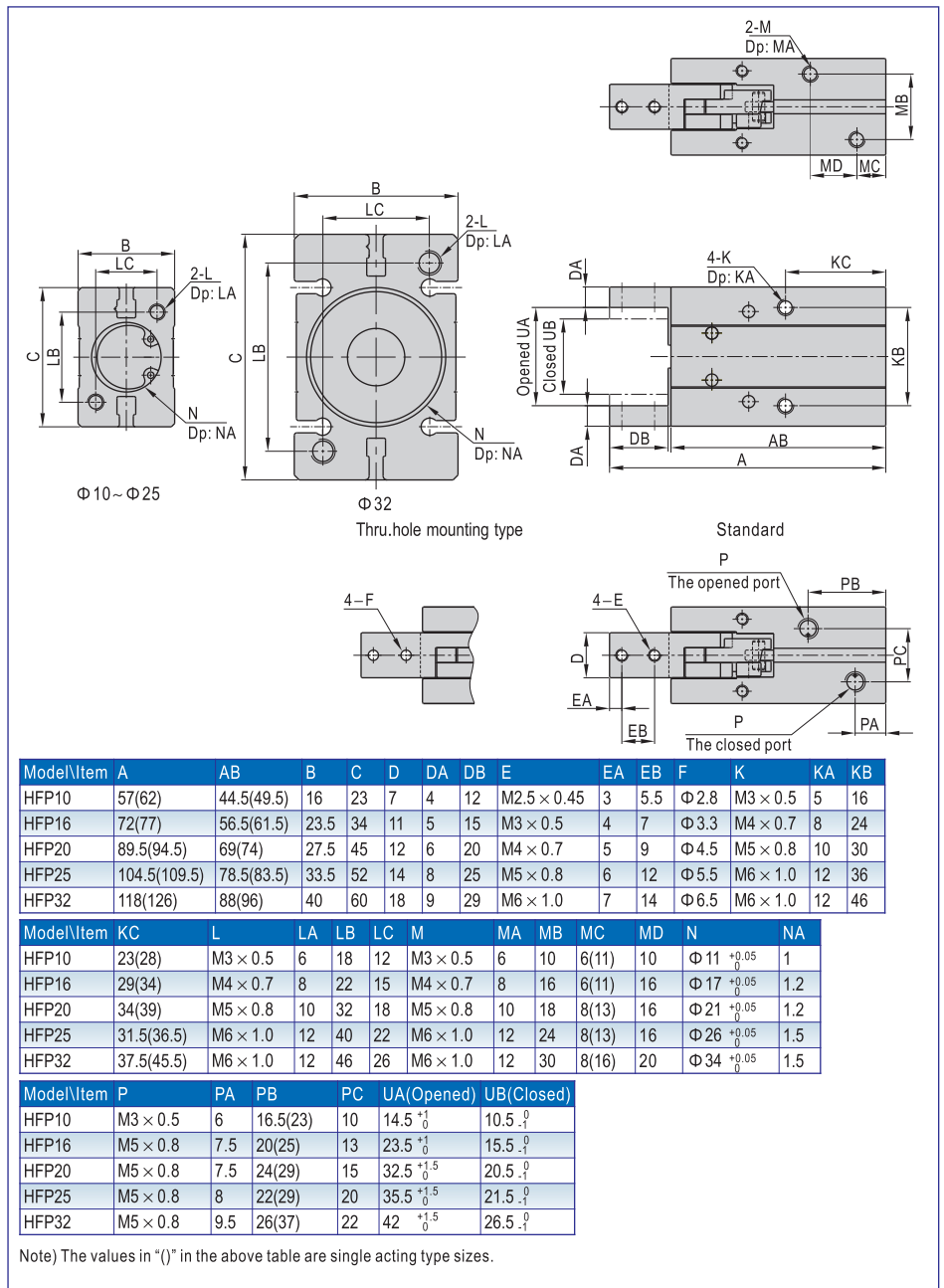
### Product feature

1. A structure of lever type gripping is designed to reduce the cost under the premise of accuracy.
2. A sheet metal is installed between the finger and body to reduce abrasion and extend the service life.
3. The contact area between finger and body is enlarged to reduce shaking and enhance the gripping accuracy.
4. The finger clamps when the piston rod pushes out and stretches when the piston rod retracts. The gripping force is 20%~30% greater than the tensile force.
5. Can be mounted from three directions.
6. Magnet is included in the standard configuration.





### ■ Dimensions



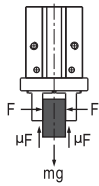
Back  
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## HFP Series

### How to select product

Please select pneumatic finger according to the following steps:  
 The selection of the effective gripping force → the confirmation of the gripping point  
 → the confirmation of the external force put on the gripping jaw.

#### 1. The selection of the gripping force



The work-pieces as shown in the left:  
 F: Gripping force (N)  
 $\mu$ : friction coefficient between fittings and work-pieces.  
 m: mass of work-pieces  
 g: acceleration of gravity (=9.8m/s<sup>2</sup>)

The condition that the work-pieces won't drop is:  $2 \times \mu F > mg$

$$\text{so: } F > \frac{mg}{2 \times \mu}$$

Safety coefficient is a, so F is:

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

The gripping work-pieces shown above, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

|  |  |
|--|--|
| $\mu = 0.2$                            | $\mu = 0.1$                            |
| $F = \frac{mg}{2 \times 0.2} \times 4$ | $F = \frac{mg}{2 \times 0.1} \times 4$ |
| $= 10 \times mg$                       | $= 20 \times mg$                       |

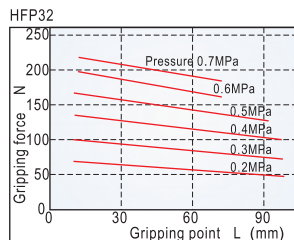
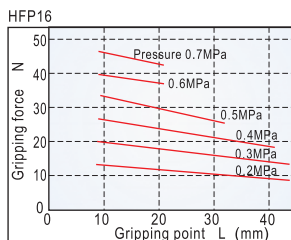
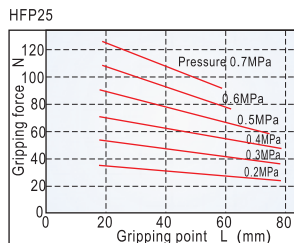
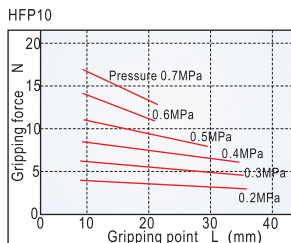
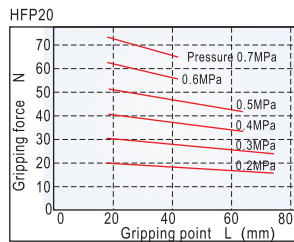
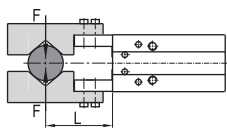
10 times of the mass of the gripped objects

20 times of the mass of the gripped objects

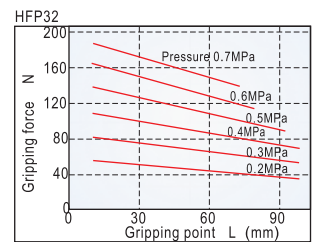
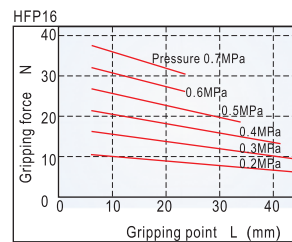
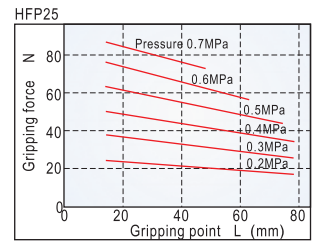
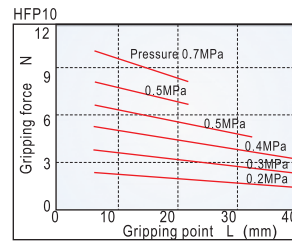
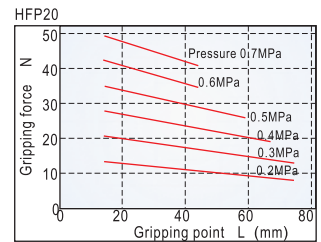
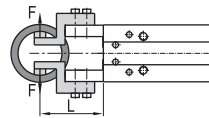
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10-20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

#### 1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

##### Double acting type closed gripping force

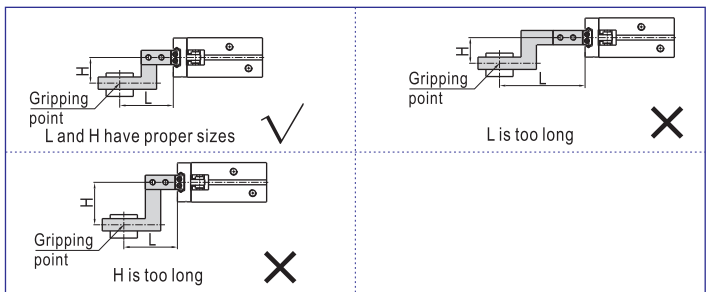


##### Double acting type opened gripping force



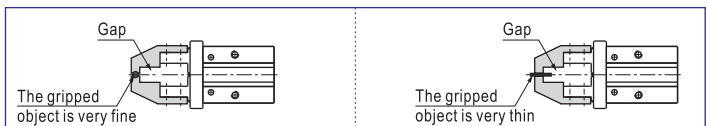
#### 2. The selection of the gripping point

2.1) Select the gripping point within the maximum gripping length range. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.

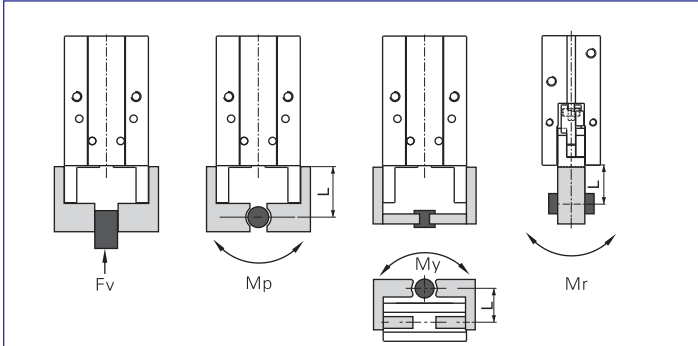


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## HFP Series

3. The confirmation of the external force put on the gripping jaw.



| Bore size | The allowed vertical loads Fv(N) | Max. permissible torque (Nm) |      |      |  |
|-----------|----------------------------------|------------------------------|------|------|--|
|           |                                  | Mp                           | My   | Mr   |  |
| 10        | 58                               | 0.26                         | 0.26 | 0.53 |  |
| 16        | 98                               | 0.68                         | 0.68 | 1.36 |  |
| 20        | 147                              | 1.32                         | 1.32 | 2.65 |  |
| 25        | 255                              | 1.94                         | 1.94 | 3.88 |  |
| 32        | 343                              | 3                            | 3    | 6    |  |

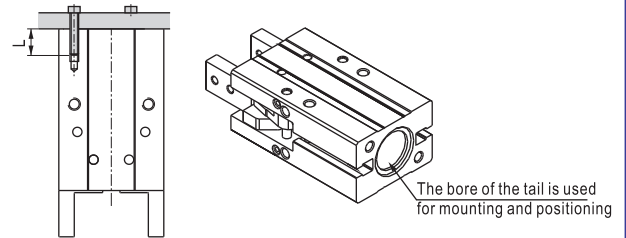
Note) The loads and torque values of said are all static values.

| The calculation of allowable forces when moment loads work   | Examples of calculation  |
|--|--|
| Allowable load (N)<br>$= \frac{M(\text{Maximum permissible moment})(\text{N.m})}{L \times 10^{-3}}$ Unit conversion constant | In the guide rail of HFP16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N,<br><br>$\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}} = 22.7(\text{N})$ Actual load f=10(N)<22.7(N)<br>To meet the using requirements |

## Installation and application

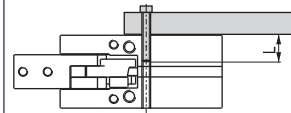
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

### Tail installation type



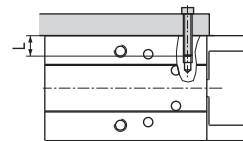
| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) | The aperture of the positioning bore(mm) | The depth of the positioning bore(mm) |
|-----------|----------------|--------------------------|-------------------------|--|---------------------------------------|
| 10        | M3 × 0.5       | 1                        | 6                       | $\Phi 11^{+0.05}_0$                      | 1                                     |
| 16        | M4 × 0.7       | 2                        | 8                       | $\Phi 17^{+0.05}_0$                      | 1.2                                   |
| 20        | M5 × 0.8       | 4.5                      | 10                      | $\Phi 21^{+0.05}_0$                      | 1.2                                   |
| 25        | M6 × 1.0       | 7                        | 12                      | $\Phi 26^{+0.05}_0$                      | 1.5                                   |
| 32        | M6 × 1.0       | 7                        | 13                      | $\Phi 34^{+0.05}_0$                      | 1.5                                   |

### The installation of the front threaded hole



| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 10        | M3 × 0.5       | 0.7                      | 5                       |
| 16        | M4 × 0.7       | 2                        | 8                       |
| 20        | M5 × 0.8       | 4.5                      | 10                      |
| 25        | M6 × 1.0       | 7                        | 12                      |
| 32        | M6 × 1.0       | 7                        | 12                      |

### Surface installation type



| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 10        | M3 × 0.5       | 1                        | 6                       |
| 16        | M4 × 0.7       | 2                        | 8                       |
| 20        | M5 × 0.8       | 4.5                      | 10                      |
| 25        | M6 × 1.0       | 7                        | 12                      |
| 32        | M6 × 1.0       | 7                        | 12                      |

6. Other contents of installation and operation are the same with those of HFZ. Refer to the "Installation and Operation" instruction of HFZ.



Back  
HFP

# Air gripper(angular style)

## HFY Series



### Specification

| Bore size (mm)     |               | 6  | 10                                 | 16            | 20          | 25 | 32 |
|--------------------|---------------|--|------------------------------------|---------------|-------------|----|----|
| Acting type        |               | Double acting  |                                    | Single acting |             |    |    |
| Fluid              |               | Air(to be filtered by 40 μm filter element)            |                                    |               |             |    |    |
| Operating pressure | Double acting | φ6   | 0.15~0.7MPa(22~100psi)(1.5~7.0bar) |               |             |    |    |
|                    |               | φ10~φ32  | 0.1~0.7MPa(15~100psi)(1.0~7.0bar)  |               |             |    |    |
|                    | Single acting | φ6   | 0.3~0.7MPa(45~100psi)(3.0~7.0bar)  |               |             |    |    |
|                    |               | φ10~φ32  | 0.25~0.7MPa(36~100psi)(2.5~7.0bar) |               |             |    |    |
| Temperature °C     |               | -20~70   |                                    |               |             |    |    |
| Lubrication        |               | Cylinder: Not required; Gripper jaws: Lubricate grease |                                    |               |             |    |    |
| Cushion type       |               | Bumper   |                                    |               |             |    |    |
| Max. frequency     |               | 180(c.p.m)   |                                    |               |             |    |    |
| Sensor switches ①  |               | DS1-H  |                                    |               | CS1-G、DS1-G |    |    |

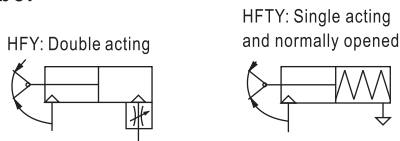
① Sensor switch should be ordered additionally, please refer to P397~420 for detail of sensor switch.

### Ordering code

| HFY 20   |           |
|--|-----------|
| Model  | Bore size |
| HFY: Air finger(Angle style, Double acting)                      | 6: φ6mm   |
| HFTY: Air finger(Angle style, Single acting and normally opened) | 10: φ10mm |
|  | 16: φ16mm |
|  | 20: φ20mm |
|  | 25: φ25mm |
|  | 32: φ32mm |

Add) HFY series are all attached with magnet.

### Symbol



### Product feature

1. Using a single piston structure, large gripping torque.
2. Integrated with variable flow valve, it is easy and convenient to adjust the speed of opening and closing of gripping jaw.
3. Reasonable gripping angle, wide range of actual use.
4. Precise positioning accuracy, it is more accurate and reliable when gripping work-piece.
5. Various types of installation, it is convenient for the use in different occasions.
6. All series are attached with magnet, so that it is easy to control.

### Gripping force and stroke

| Acting                        | Model  | Theoretical gripping torque (N·cm) |          | Max. length of gripping point (L)(mm) | Opening angle                 | Closing angle                 |
|-------------------------------|--------|------------------------------------|----------|---------------------------------------|-------------------------------|-------------------------------|
|                               |        | Closed                             | Opened   |                                       |                               |                               |
| Double acting                 | HFY6   | 7.4 × P                            | 10.6 × P | 30                                    | 30 <sup>+3</sup> <sub>0</sub> | -10 <sup>0</sup> <sub>3</sub> |
|                               | HFY10  | 17.6 × P                           | 29.4 × P | 30                                    |                               |                               |
|                               | HFY16  | 90 × P                             | 129 × P  | 40                                    |                               |                               |
|                               | HFY20  | 152 × P                            | 252 × P  | 60                                    |                               |                               |
|                               | HFY25  | 304 × P                            | 473 × P  | 70                                    |                               |                               |
|                               | HFY32  | 637 × P                            | 904 × P  | 85                                    |                               |                               |
| Single acting Normally opened | HFTY6  | 5.7 × P                            | -        | 30                                    | 30 <sup>+3</sup> <sub>0</sub> | -10 <sup>0</sup> <sub>3</sub> |
|                               | HFTY10 | 11.8 × P                           | -        | 30                                    |                               |                               |
|                               | HFTY16 | 71.2 × P                           | -        | 40                                    |                               |                               |
|                               | HFTY20 | 122.4 × P                          | -        | 60                                    |                               |                               |
|                               | HFTY25 | 252 × P                            | -        | 70                                    |                               |                               |
|                               | HFTY32 | 589 × P                            | -        | 85                                    |                               |                               |

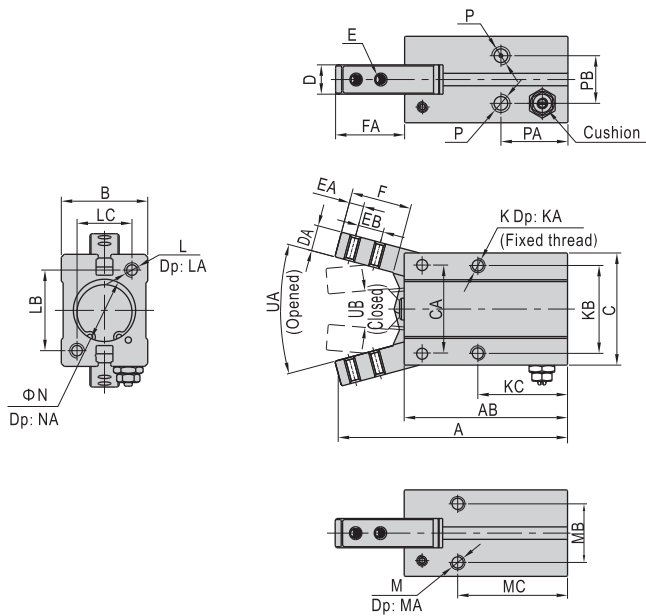
Note) The P in the gripping torque shown in the above chart represents the actual use of air pressure.

### Inner structure and material of major parts

| NO. | Item              | Material                              |
|-----|-------------------|---------------------------------------|
| 1   | Gripping jaws     | Carbon steel                          |
| 2   | Pin               | Stainless steel                       |
| 3   | Front cover       | Aluminum alloy                        |
| 4   | Rod packing       | NBR                                   |
| 5   | Piston rod        | Aluminum alloy/Stainless steel        |
| 6   | Bumper            | TPU                                   |
| 7   | Countersink screw | Carbon steel                          |
| 8   | Magnet washer     | NBR                                   |
| 9   | Piston            | Aluminum alloy/Stainless steel        |
| 10  | Bumper            | TPU                                   |
| 11  | C clip            | Spring steel                          |
| 12  | Back cover        | Aluminum alloy                        |
| 13  | Steel ball        | Stainless steel                       |
| 14  | O-ring            | NBR                                   |
| 15  | O-ring            | NBR                                   |
| 16  | Screw cap         | Carbon steel                          |
| 17  | Adjustable nut    | Brass                                 |
| 18  | Fixed nut         | Brass                                 |
| 19  | O-ring            | NBR                                   |
| 20  | Piston seal       | NBR                                   |
| 21  | Magnet            | Sintered metal (Neodymium-iron-boron) |
| 22  | Body              | Aluminum alloy                        |
| 23  | Countersink screw | Carbon steel                          |
| 24  | Pin               | Stainless steel                       |
| 25  | Pin sheath        | Stainless steel                       |



### ■ Dimensions



| Bore size\Item | A    | AB   | B    | C    | CA | D   | DA | E           | EA  | EB  | F  | FA   |
|----------------|------|------|------|------|----|-----|----|-------------|-----|-----|----|------|
| 6              | 47.5 | 36   | 10.5 | 20   | 14 | 4   | 4  | M2 × 0.4    | 2.5 | 5   | 11 | 12   |
| 10             | 52.5 | 38.5 | 16.5 | 23   | 14 | 6.4 | 4  | M2.5 × 0.45 | 3   | 5.7 | 12 | 14.5 |
| 16             | 62.5 | 44.5 | 23.5 | 30.5 | 24 | 8   | 7  | M3 × 0.5    | 4   | 7   | 16 | 19   |
| 20             | 78   | 55   | 27.5 | 42   | 30 | 10  | 8  | M4 × 0.7    | 5   | 9   | 20 | 23.5 |
| 25             | 92   | 60.5 | 33.5 | 52   | 36 | 12  | 10 | M5 × 0.8    | 8   | 12  | 27 | 33   |
| 32             | 96.5 | 68   | 40   | 60   | 42 | 18  | 10 | M6 × 1.0    | 6   | 14  | 27 | 29.5 |

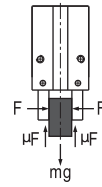
| Bore size\Item | K        | KA           | KB | KC   | L        | LA | LB | LC | M        | MA |
|----------------|----------|--------------|----|------|----------|----|----|----|----------|----|
| 6              | M3 × 0.5 | Thru. thread | 12 | 26   | -        | -  | -  | -  | -        | -  |
| 10             | M3 × 0.5 | 5            | 16 | 23   | M3 × 0.5 | 6  | 18 | 12 | M3 × 0.5 | 6  |
| 16             | M4 × 0.7 | 8            | 24 | 24.5 | M4 × 0.7 | 8  | 22 | 15 | M4 × 0.7 | 8  |
| 20             | M5 × 0.8 | 10           | 30 | 29   | M5 × 0.8 | 10 | 32 | 18 | M5 × 0.8 | 10 |
| 25             | M6 × 1.0 | 12           | 36 | 30   | M6 × 1.0 | 12 | 40 | 22 | M6 × 1.0 | 10 |
| 32             | M6 × 1.0 | 16           | 44 | 37.5 | M6 × 1.0 | 12 | 46 | 26 | M6 × 1.0 | 10 |

| Bore size\Item | MB   | MC   | N                                | NA  | P        | PA   | PB  | UA(Opened) | UB(Closed) |
|----------------|------|------|----------------------------------|-----|----------|------|-----|------------|------------|
| 6              | -    | -    | 7 <sup>+0.05</sup> <sub>0</sub>  | 1.5 | M3 × 0.5 | 19   | 1.5 | 30°        | 10°        |
| 10             | 11.5 | 27   | 11 <sup>+0.05</sup> <sub>0</sub> | 1.5 | M3 × 0.5 | 19   | 10  | 30°        | 10°        |
| 16             | 16   | 30   | 17 <sup>+0.05</sup> <sub>0</sub> | 1.5 | M5 × 0.8 | 18.5 | 13  | 30°        | 10°        |
| 20             | 18.5 | 35   | 21 <sup>+0.05</sup> <sub>0</sub> | 1.5 | M5 × 0.8 | 22   | 15  | 30°        | 10°        |
| 25             | 22   | 36.5 | 26 <sup>+0.05</sup> <sub>0</sub> | 1.5 | M5 × 0.8 | 23.5 | 20  | 30°        | 10°        |
| 32             | 26   | 30   | 34 <sup>+0.05</sup> <sub>0</sub> | 2   | M5 × 0.8 | 31   | 24  | 30°        | 10°        |

### ■ How to select product

#### 1. The selection of gripping force

Please determine the gripping force according to the below methods.



The work-pieces as shown in the left:  
 F: Gripping force (N)  
 $\mu$ : friction coefficient between fittings and work-pieces.  
 m: mass of work-pieces  
 g: acceleration of gravity (=9.8m/s<sup>2</sup>)

The condition that the work-pieces won't drop is:  $2 \times \mu F > mg$

$$\text{so: } F > \frac{mg}{2 \times \mu}$$

Safety coefficient is a, so F is:

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

The gripping work-pieces shown above, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

|  |  |
|--|--|
| $\mu = 0.2$                            | $\mu = 0.1$                            |
| $F = \frac{mg}{2 \times 0.2} \times 4$ | $F = \frac{mg}{2 \times 0.1} \times 4$ |
| $= 10 \times mg$                       | $= 20 \times mg$                       |

10 times of the mass of the gripped objects

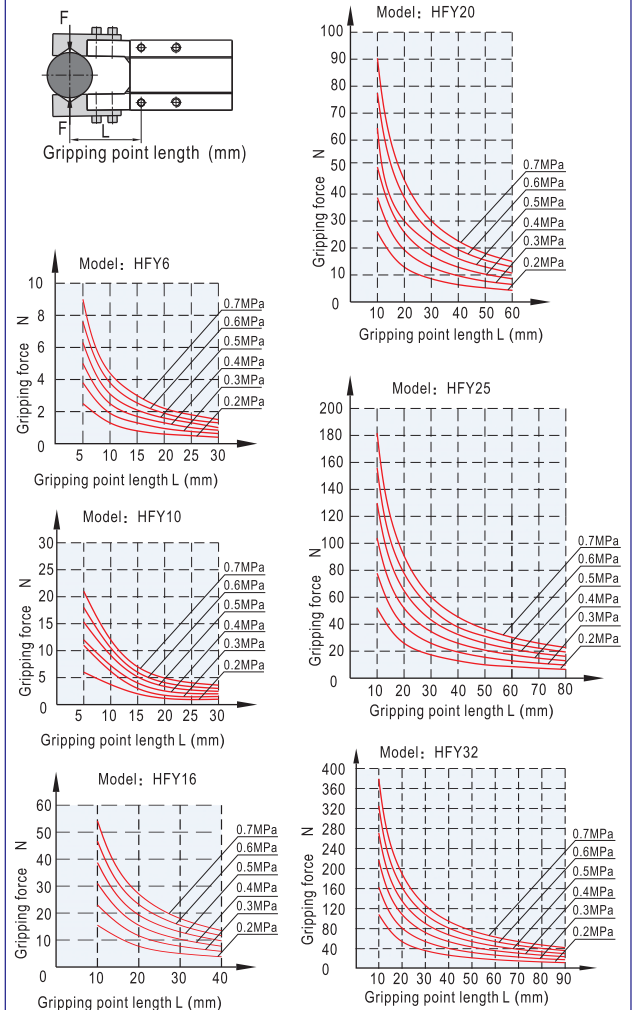
20 times of the mass of the gripped objects

Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

#### 2. The selection of the gripping point

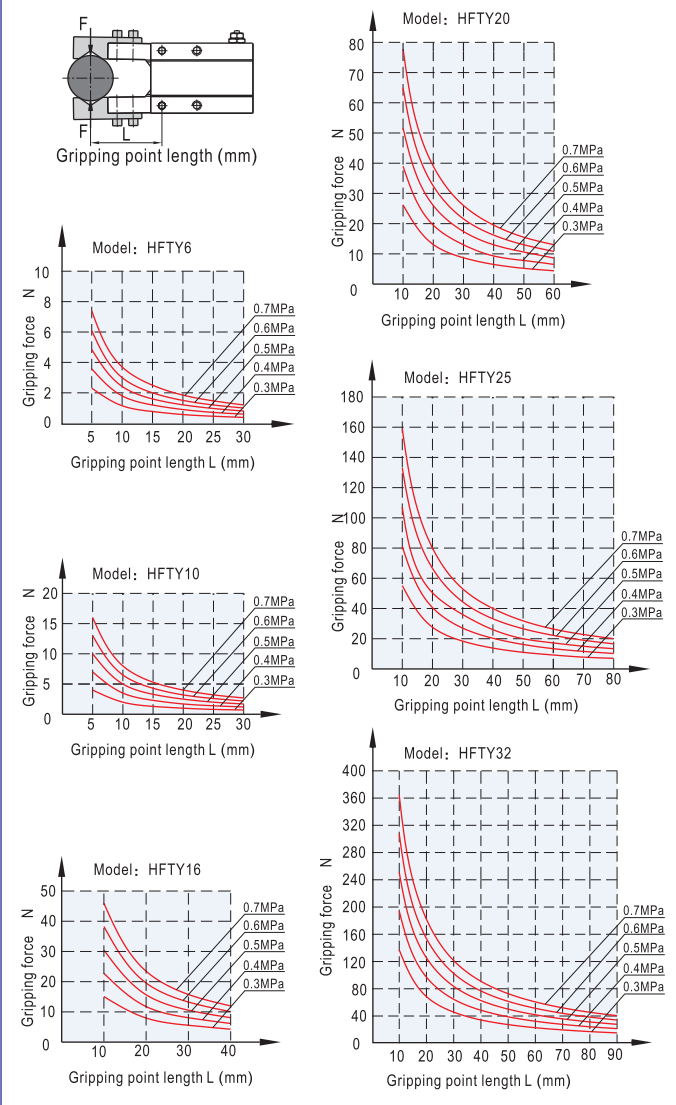
When the gripping force is determined, select the gripping point according to the limitation ranges shown in the below chart. If the gripping point is over the limit, the gripping jaw will be subjected to excessive moment load, and lead to short life of air gripper.

#### Double acting type closed gripping force



Back  
HFY

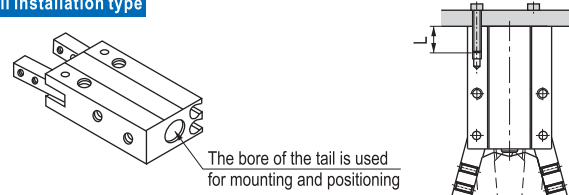
### Single acting closed gripping force



### Installation and application

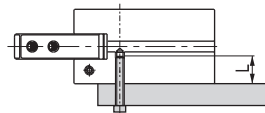
- Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
- Don't use the air gripper under strong external force and impact force.
- When install and fix the air gripper, avoid falling down, collision and damage.
- When fixing the gripping jaw parts, don't twist the gripping jaw.
- There are several kinds of installation method, and the torque of fastening screw must be within the prescribed moment range shown in the below chart. If the locking moment is too large, it will cause the dysfunctional. If the locking moment is too small, it will cause the position deviation and fall.

#### Tail installation type



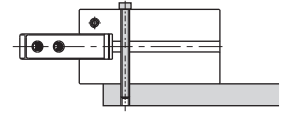
| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) | The aperture of positioning bore(mm) | The depth of the positioning bore(mm) |
|-----------|----------------|--------------------------|-------------------------|--------------------------------------|---------------------------------------|
| 6         | -              | -                        | -                       | Φ 7H9                                | 1.5                                   |
| 10        | M3 × 0.5       | 0.88                     | 6                       | Φ 11H9                               | 1.5                                   |
| 16        | M4 × 0.7       | 2.1                      | 8                       | Φ 17H9                               | 1.5                                   |
| 20        | M5 × 0.8       | 4.3                      | 10                      | Φ 21H9                               | 1.5                                   |
| 25        | M6 × 1.0       | 7.3                      | 12                      | Φ 26H9                               | 1.5                                   |
| 32        | M6 × 1.0       | 7.3                      | 12                      | Φ 34H9                               | 1.5                                   |

#### The installation of front threaded hole



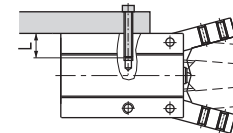
| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 6         | M3 × 0.5       | 0.69                     | 5                       |
| 10        | M3 × 0.5       | 0.69                     | 5                       |
| 16        | M4 × 0.7       | 2.1                      | 8                       |
| 20        | M5 × 0.8       | 4.3                      | 10                      |
| 25        | M6 × 1.0       | 7.3                      | 12                      |
| 32        | M6 × 1.0       | 7.3                      | 12                      |

#### The installation of front through hole



| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 6         | M2.5 × 0.45    | 0.49                     | 5                       |
| 10        | M2.5 × 0.45    | 0.49                     | 5                       |
| 16        | M3 × 0.5       | 0.88                     | 8                       |
| 20        | M4 × 0.7       | 2.1                      | 10                      |
| 25        | M5 × 0.8       | 4.3                      | 12                      |
| 32        | M5 × 0.8       | 4.3                      | 12                      |

#### Surface installation type

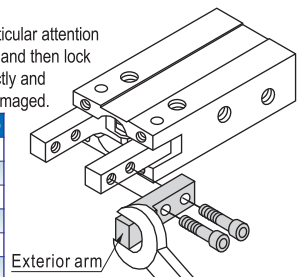


| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 10        | M3 × 0.5       | 0.88                     | 6                       |
| 16        | M4 × 0.7       | 1.6                      | 6.5                     |
| 20        | M5 × 0.8       | 3.3                      | 8                       |
| 25        | M6 × 1.0       | 5.9                      | 10                      |
| 32        | M6 × 1.0       | 5.9                      | 10                      |

#### 6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

| Bore size | The bolts type | Max. locking moment(Nm) |
|-----------|----------------|-------------------------|
| 6         | M2 × 0.4       | 0.15                    |
| 10        | M2.5 × 0.45    | 0.31                    |
| 16        | M3 × 0.5       | 0.59                    |
| 20        | M4 × 0.7       | 1.4                     |
| 25        | M5 × 0.8       | 2.8                     |
| 32        | M6 × 1.0       | 4.9                     |



- When gripping work-piece, the work-piece must be located in the center line of the two gripping jaws, and the two gripping jaws also need to touch the work-piece at the same time, otherwise they will be easily damaged.
- Confirm that there is no additional external forces that are exerted on the gripping jaw. Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.
- When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.
- Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
- People can not enter the movement path of air gripper and articles can not be placed on the path too.
- Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.



# Air gripper (180° open/close type)

## HFR Series



### Specification

|                     |  |         |         |         |         |
|---------------------|--|---------|---------|---------|---------|
| Bore size (mm)      | 10   | 16      | 20      | 25      | 32      |
| Acting type         | Double acting  |         |         |         |         |
| Fluid               | Air (to be filtered by 40 μm filter element)           |         |         |         |         |
| Operating pressure  | 0.15~0.7MPa (21~100psi) (1.5~7.0bar)                   |         |         |         |         |
| Temperature °C      | -10~70   |         |         |         |         |
| Lubrication         | Cylinder: Not required; Gripper jaws: Lubricate grease |         |         |         |         |
| Cushion type        | Bumper   |         |         |         |         |
| Max. frequency      | 60(c.p.m)  |         |         |         |         |
| Repeatability       | ± 0.2mm  |         |         |         |         |
| Gripping force ①    | 0.16N.m  | 0.55N.m | 1.10N.m | 2.30N.m | 5.00N.m |
| Open or close angle | Open: -2° ~ -5° Close: 180° ± 2°                       |         |         |         |         |
| Port size           | M5 × 0.8   |         |         |         |         |
| Sensor switches ②   | DS1-H  |         |         |         |         |

① The gripping force is the value when the operating pressure is 0.5MPa.

② Sensor switch should be ordered additionally, please refer to P397~420 for detail of sensor switch.

### Ordering code

**HFR 20**

**Model**  
HFR: 180° open/close air gripper

**Bore size**

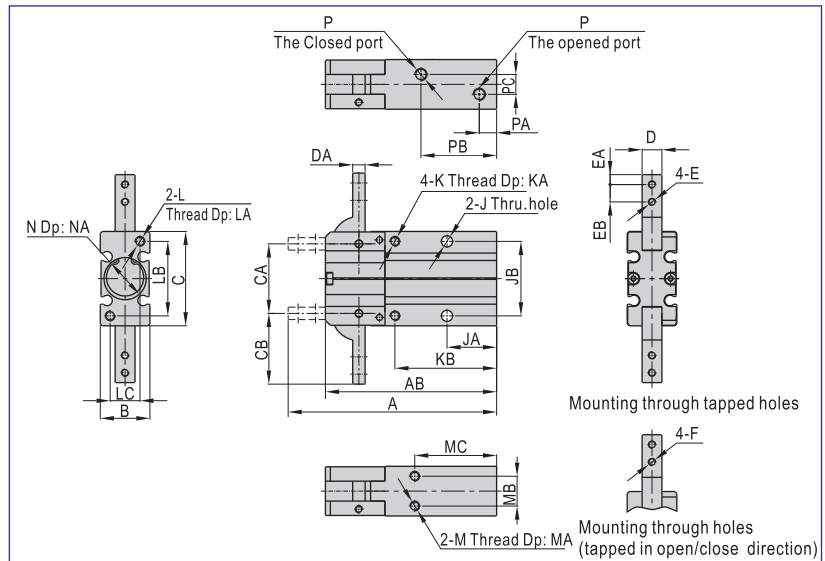
- 10: Φ10mm
- 16: Φ16mm
- 20: Φ20mm
- 25: Φ25mm
- 32: Φ32mm

**Mounting type**

- Blank: Mounting through tapped holes
- N: Mounting through holes (tapped in open/close direction)

① HFR series are all attached with magnet.

### Dimensions

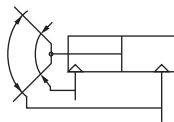


| Model\Item | A     | AB  | B  | C  | CA | CB   | D  | DA | E        | F    | EA | EB |
|------------|-------|-----|----|----|----|------|----|----|----------|------|----|----|
| 10         | 71    | 58  | 15 | 30 | 22 | 23.5 | 6  | 4  | M3 × 0.5 | Φ3.3 | 3  | 6  |
| 16         | 84    | 69  | 20 | 38 | 28 | 28.5 | 8  | 5  | M3 × 0.5 | Φ3.3 | 4  | 7  |
| 20         | 106   | 86  | 26 | 48 | 36 | 37   | 10 | 8  | M4 × 0.7 | Φ4.5 | 5  | 9  |
| 25         | 131   | 107 | 30 | 58 | 45 | 45   | 12 | 10 | M5 × 0.8 | Φ5.5 | 6  | 12 |
| 32         | 158.5 | 122 | 40 | 72 | 55 | 62.5 | 14 | 12 | M6 × 1.0 | Φ6.5 | 9  | 16 |

| Model\Item | J    | JA | JB | K        | KA | KB | L        | LA | LB | LC |
|------------|------|----|----|----------|----|----|----------|----|----|----|
| 10         | Φ3.3 | 18 | 24 | M3 × 0.5 | 6  | 35 | M3 × 0.5 | 6  | 24 | 9  |
| 16         | Φ4.5 | 20 | 30 | M4 × 0.7 | 8  | 41 | M4 × 0.7 | 8  | 30 | 12 |
| 20         | Φ5.5 | 25 | 36 | M5 × 0.8 | 10 | 50 | M5 × 0.8 | 10 | 38 | 16 |
| 25         | Φ6.5 | 30 | 42 | M6 × 1.0 | 12 | 60 | M6 × 1.0 | 12 | 46 | 18 |
| 32         | Φ6.5 | 35 | 46 | M6 × 1.0 | 12 | 64 | M6 × 1.0 | 14 | 46 | 26 |

| Model\Item | M        | MA | MB | MC | N                                 | NA  | P        | PA | PB   | PC |
|------------|----------|----|----|----|-----------------------------------|-----|----------|----|------|----|
| 10         | M3 × 0.5 | 4  | 9  | 30 | Φ11 <sup>+0.05</sup> <sub>0</sub> | 1.5 | M5 × 0.8 | 7  | 28.5 | 3  |
| 16         | M4 × 0.7 | 5  | 12 | 33 | Φ17 <sup>+0.05</sup> <sub>0</sub> | 1.5 | M5 × 0.8 | 7  | 30.5 | 8  |
| 20         | M5 × 0.8 | 8  | 14 | 42 | Φ21 <sup>+0.05</sup> <sub>0</sub> | 1.5 | M5 × 0.8 | 8  | 38.5 | 12 |
| 25         | M6 × 1.0 | 10 | 16 | 50 | Φ26 <sup>+0.05</sup> <sub>0</sub> | 1.5 | M5 × 0.8 | 8  | 48   | 14 |
| 32         | M6 × 1.0 | 12 | 26 | 59 | Φ34 <sup>+0.05</sup> <sub>0</sub> | 2   | M5 × 0.8 | 9  | 56   | 18 |

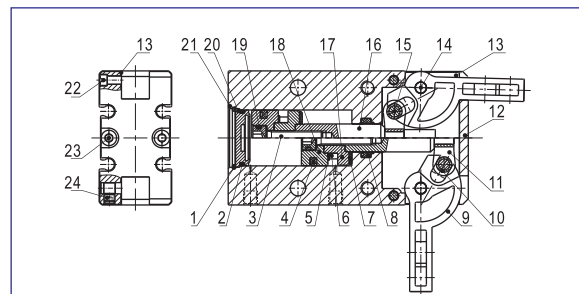
### Symbol



### Product feature

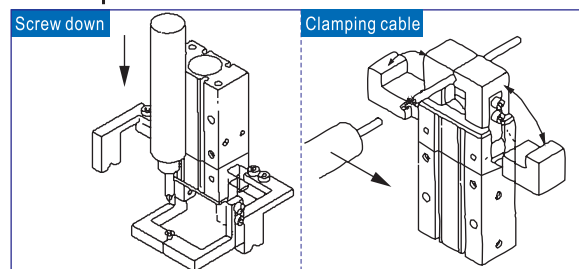
1. open/close type, simplify the gripping action.
2. A sheet metal is installed between the finger and body to reduce abrasion and extend the service life.
3. Dust proof is designed in the finger part, which is applicable to special working environment.
4. All series are all attached with magnet.
5. Many mounting types to be choosed.

### Inner structure and material of major parts



| NO. | Item              | Material                             | NO. | Item              | Material        |
|-----|-------------------|--------------------------------------|-----|-------------------|-----------------|
| 1   | C clip            | Spring steel                         | 12  | Front cover       | Aluminum alloy  |
| 2   | O-ring            | NBR                                  | 13  | Sheet metal       | Stainless steel |
| 3   | Countersink screw | Carbon steel                         | 14  | Pin               | Stainless steel |
| 4   | Piston seal       | NBR                                  | 15  | Pin               | Stainless steel |
| 5   | Magnet washer     | NBR                                  | 16  | Piston rod        | Stainless steel |
| 6   | Magnet            | Sintered metal (Neodymium-iron-iron) | 17  | Magnet holder     | Aluminum alloy  |
| 7   | Bumper            | TPU                                  | 18  | Piston            | Aluminum alloy  |
| 8   | Rod packing       | NBR                                  | 19  | O-ring            | NBR             |
| 9   | Gripping jaws     | Stainless steel                      | 20  | Back cover        | Aluminum alloy  |
| 10  | Pin sheath        | Stainless steel                      | 21  | Body              | Aluminum alloy  |
| 11  | Push block        | Stainless steel                      | 22  | Pin               | Stainless steel |
|     |                   |                                      | 23  | Countersink screw | Carbon steel    |
|     |                   |                                      | 24  | Countersink screw | Carbon steel    |

### Example



## HFR Series

### How to select product

#### 1. Confirmation of effective gripping force

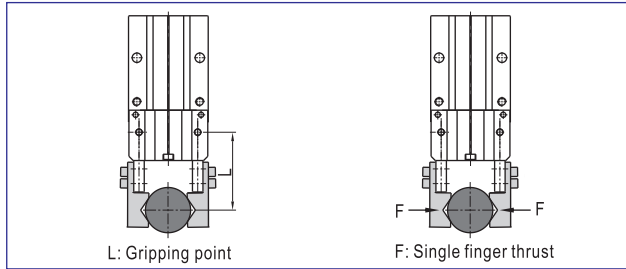
- 1.1) Though the coefficient of friction between the attachments and the workpiece is different, select a gripping force which is 10 to 20 times greater than the workpiece weight.
- 1.2) If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

Example: When the workpiece weight is 0.05 and the gripping point distance L is 30mm, the operating pressure will be 5kgf/cm<sup>2</sup>.

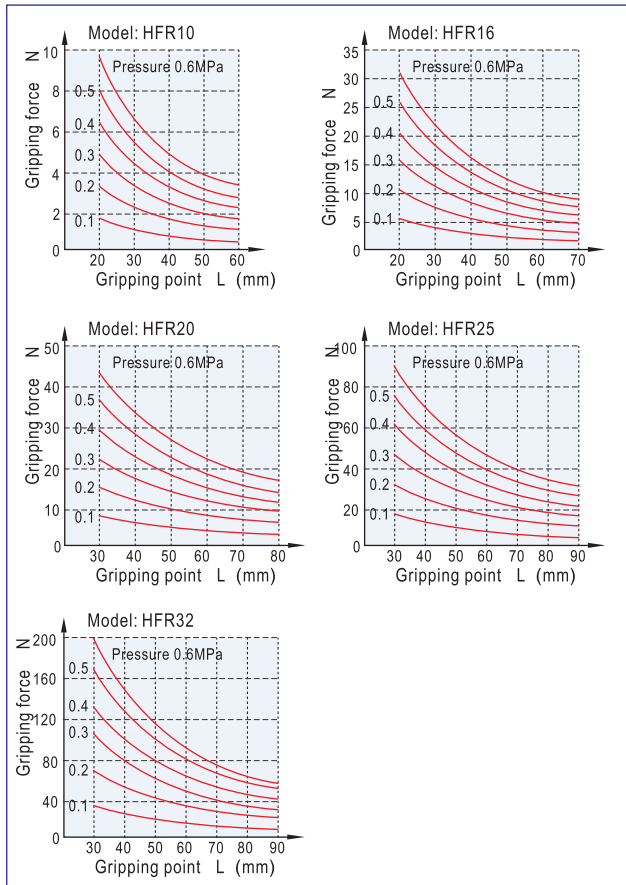
Effective gripping force=0.05kg×20 times×9.8m/s<sup>2</sup>=more than 10N

Model selection: HFR16 is recommended. The effective gripping force is 17N, which is 20 times greater than the set value of gripping force.

- 1.3) The finger thrust is expressed as F, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

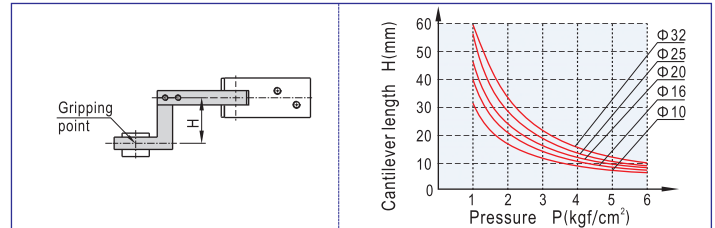


#### 2. Connection between gripping force and gripping point distance



#### 3. The selection of the gripping point

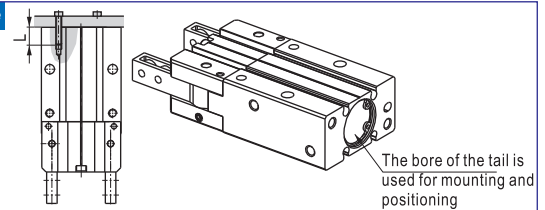
- 3.1) Please select the gripping point within the limited field shown left. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.
- 3.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.



### Installation and application

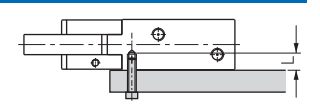
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

#### Tail installation type



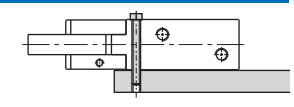
| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) | The aperture of the positioning bore (mm) | The depth of the positioning bore (mm) |
|-----------|----------------|--------------------------|-------------------------|---|--|
| 10        | M3 × 0.5       | 1                        | 6                       | Φ 11H9                                    | 1.5                                    |
| 16        | M4 × 0.7       | 2                        | 8                       | Φ 17H9                                    | 1.5                                    |
| 20        | M5 × 0.8       | 4.5                      | 10                      | Φ 21H9                                    | 1.5                                    |
| 25        | M6 × 1.0       | 7                        | 12                      | Φ 26H9                                    | 1.5                                    |
| 32        | M6 × 1.0       | 7                        | 14                      | Φ 34H9                                    | 2                                      |

#### The installation of the front threaded hole



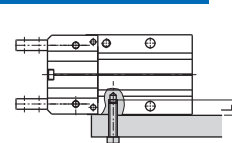
| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 10        | M3 × 0.5       | 1                        | 6                       |
| 16        | M4 × 0.7       | 2                        | 8                       |
| 20        | M5 × 0.8       | 4.5                      | 10                      |
| 25        | M6 × 1.0       | 7                        | 12                      |
| 32        | M6 × 1.0       | 7                        | 14                      |

#### The installation of the front through hole



| Bore size | The bolts type | Max. locking moment (Nm) |
|-----------|----------------|--------------------------|
| 10        | M3 × 0.5       | 1                        |
| 16        | M4 × 0.7       | 2                        |
| 20        | M5 × 0.8       | 4.5                      |
| 25        | M6 × 1.0       | 7                        |
| 32        | M6 × 1.0       | 7                        |

#### Surface installation type

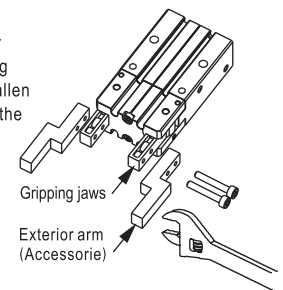


| Bore size | The bolts type | Max. locking moment (Nm) | Max. screwed depth (mm) |
|-----------|----------------|--------------------------|-------------------------|
| 10        | M3 × 0.5       | 0.6                      | 4                       |
| 16        | M4 × 0.7       | 1.5                      | 5                       |
| 20        | M5 × 0.8       | 3.5                      | 8                       |
| 25        | M6 × 1.0       | 6                        | 10                      |
| 32        | M6 × 1.0       | 6                        | 12                      |

#### 6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

| Bore size | The bolts type | Max. locking moment (Nm) |
|-----------|----------------|--------------------------|
| 10        | M3 × 0.5       | 0.6                      |
| 16        | M3 × 0.5       | 0.6                      |
| 20        | M4 × 0.7       | 0.8                      |
| 25        | M5 × 0.8       | 1.5                      |
| 32        | M6 × 1.0       | 3                        |



7. Other contents of installation and operation are the same with those of HFY. Refer to the "Installation and Operation" instruction of HFY.

