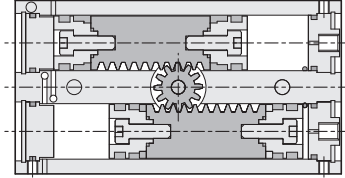
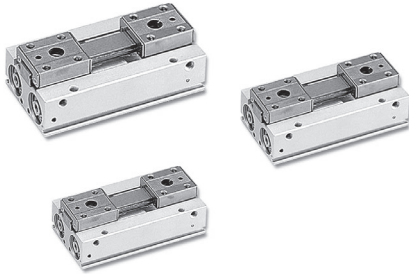


# HDF series - Parallel gripper (Thin type)

## Operation specification and Ordering expression

CHELIC

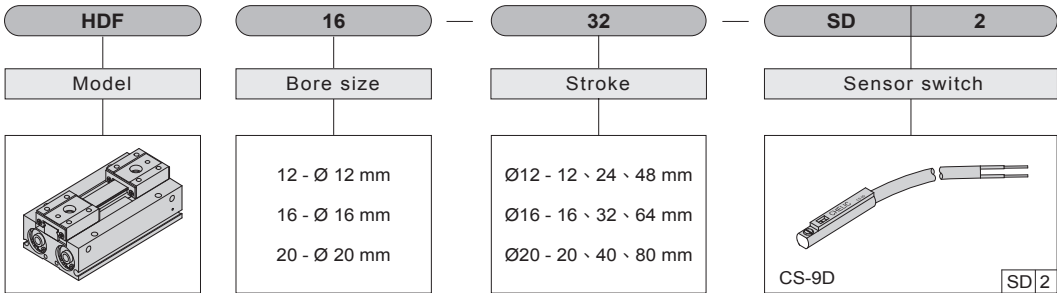
### Internal structure



### Specification

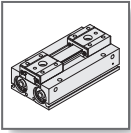
| Item                          | Model                     | HDF-12               | HDF-16     | HDF-20     |
|-------------------------------|---------------------------|----------------------|------------|------------|
| Bore size                     |                           | Ø12                  | Ø16        | Ø20        |
| Type of operation             |                           | Double acting        |            |            |
| Fluid                         |                           | Air                  |            |            |
| Pressure range                | kgf/cm <sup>2</sup> (kpa) | 1.5 ~ 7 (150 ~ 700)  |            |            |
| Ambient and fluid temperature | °C                        | 0 ~ 60               |            |            |
| Max. operating frequency      | min                       | 100                  |            |            |
| Lubricated                    | Cylinder                  | Lubrication free     |            |            |
|                               | Rail                      | Lubrication required |            |            |
| Gripper stroke                |                           | 12, 24, 48           | 16, 32, 64 | 20, 40, 80 |
| Port size                     |                           | M5×0.8P              |            |            |
| Sensing device                |                           | With magnet          |            |            |

### How to order



HDF :  
Parallel gripper

- None : without sensor switch  
**SD** : Sensor switch code (CS-9D)  
**SB** : Sensor switch code (CS-9B)  
**SH** : Sensor switch code (CS-9H)  
**SDN** : Sensor switch code (CS-9DN)  
**SDP** : Sensor switch code (CS-9DP)  
**SG** : Sensor switch code (CS-8G)  
**SGN** : Sensor switch code (CS-8GN)  
**SGP** : Sensor switch code (CS-8GP)  
 ※ CS-9H use for voltage AC/DC 5~240V  
**2** : Number of sensor switch  
 1=1 PCS  
 2=2 PCS



# HDF series - Parallel gripper (Thin type)

## Model selection

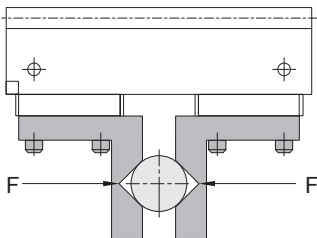
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### Selection procedure

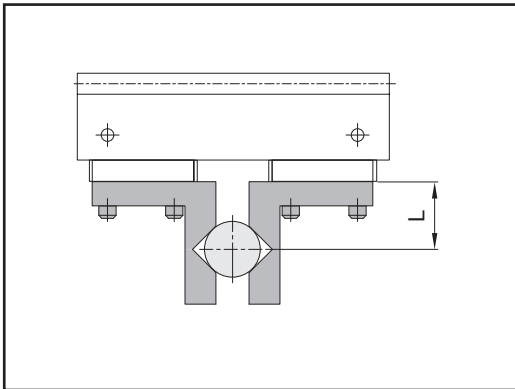


### Step 1

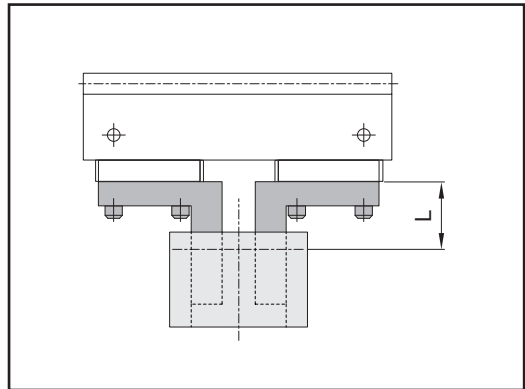
- Confirm gripping force : HDF series
- Expressing the effective gripping force



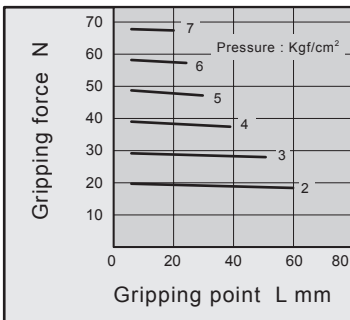
### External gripping



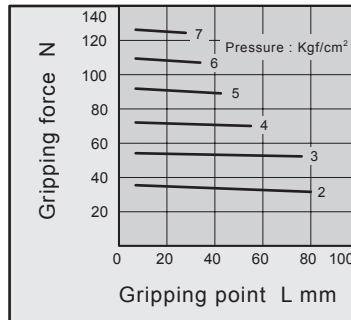
### Internal gripping



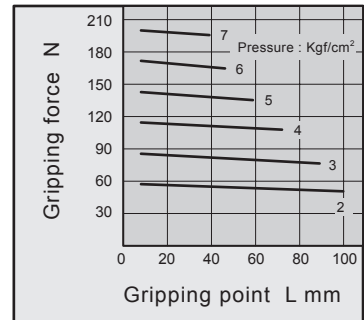
### HDF - 12

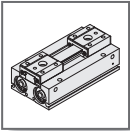


### HDF - 16



### HDF - 20





# HDF series - Parallel gripper (Thin type)

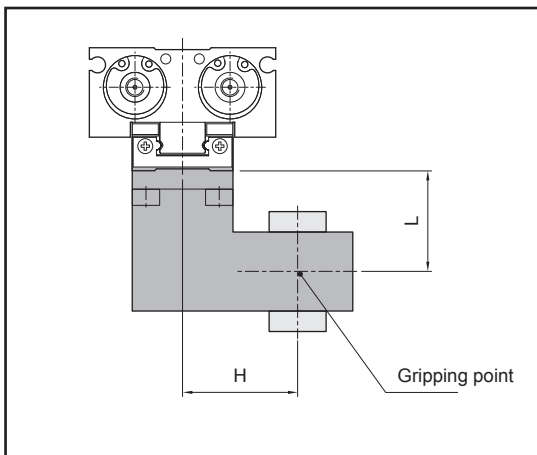
## Model selection

CHELIC

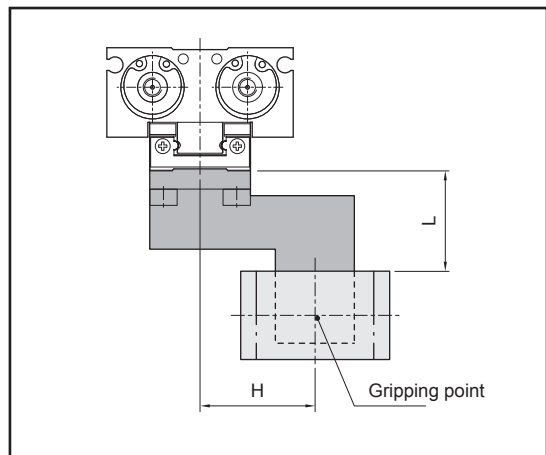
### Step 2

- Confirmation of the gripping position : HDF series
- The gripping position of a workpiece should be operated so that the amount of overhang (H) will stay the range given in the graphs below.
- If the gripping position of a workpiece over the range limits, this will have an adverse effect on the life of the gripper

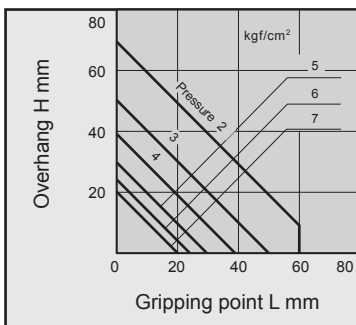
#### External gripping



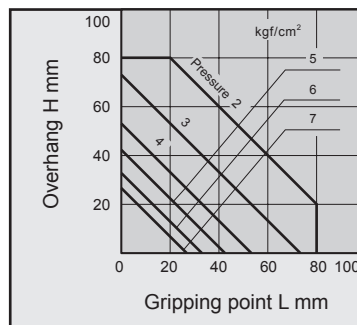
#### Internal gripping



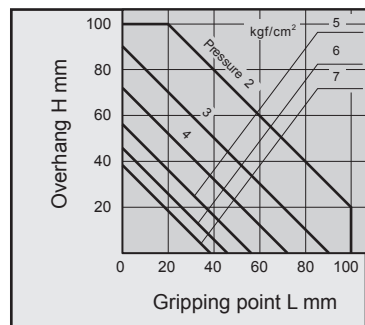
#### HDF - 12

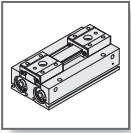


#### HDF - 16



#### HDF - 20





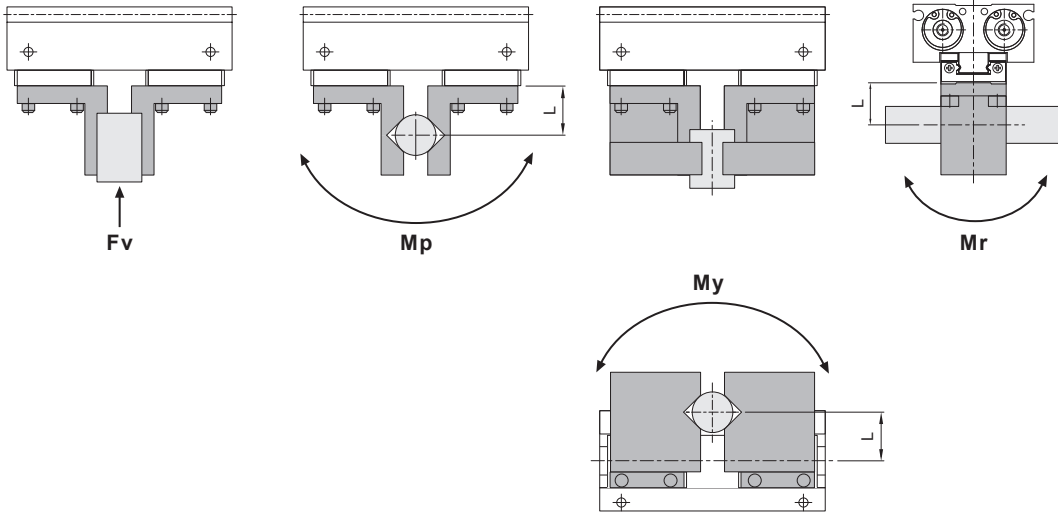
# HDF series - Parallel gripper (Thin type)

## Model selection

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### Step 3

- Confirmation of external force on fingers : HDF series

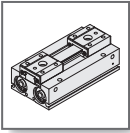


L : Distance to the point at which the load is applied

| Model    | Allowable vertical load<br>Fv(N) | Maximum allowable moment |            |            |
|----------|----------------------------------|--------------------------|------------|------------|
|          |                                  | Mp (N · m)               | My (N · m) | Mr (N · m) |
| HDF - 12 | 98                               | 0.68                     | 0.68       | 1.4        |
| HDF - 16 | 176                              | 1.4                      | 1.4        | 2.8        |
| HDF - 20 | 294                              | 2                        | 2          | 4          |

Note : the load and moment values in the table is static values

| Calculation of allowable external force<br>(when moment load is applied)   | Calculation examples   |
|--|--|
| Allowable load F(N) =<br>$\frac{M(\text{Maximum allowable moment}) (\text{N} \cdot \text{m})}{L \times 10^{-3}}$ | When a load f= 10 N operating, which applies pitch moment to point 30mm from the end of the HDF - 12<br>$\text{Allowable load } F = \frac{1.4}{10 \times 10^{-3}}$ $= 46.6 (\text{N})$ $F = 46.6 > 10 \text{ can be used}$ |

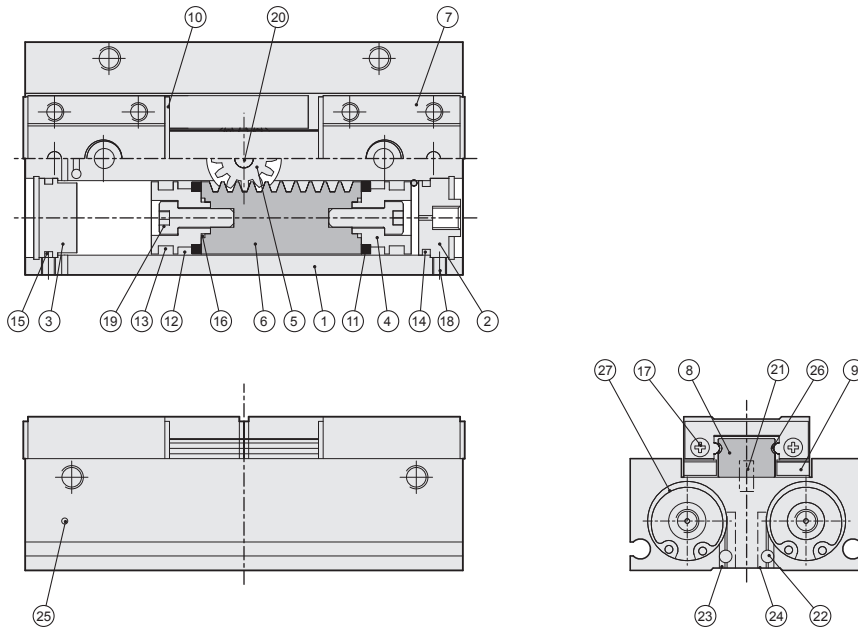


# HDF series - Parallel gripper (Thin type)

## Components and Material list

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### Internal structure

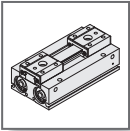


### Components and Material list

| No. | Item                   | Material            | No. | Item              | Material        |
|-----|------------------------|---------------------|-----|-------------------|-----------------|
| 01  | Body                   | Aluminum alloy      | 15  | Rear cover O-ring | NBR             |
| 02  | Front cover            | Aluminum alloy      | 16  | Piston O-ring     | NBR             |
| 03  | Rear cover             | Aluminum alloy      | 17  | Screw             | Alloy steel     |
| 04  | Piston                 | Aluminum alloy      | 18  | Screw             | Alloy steel     |
| 05  | Gear shaft             | Carbon steel        | 19  | Piston rod screw  | Alloy steel     |
| 06  | Gear                   | Stainless steel     | 20  | Gear pin          | Bearing steel   |
| 07  | Slide base             | Stainless steel     | 21  | Slide rail pin    | Bearing steel   |
| 08  | Rail                   | Stainless steel     | 22  | Steel ball        | Stainless steel |
| 09  | Slide table stir slice | Stainless steel     | 23  | Steel ball        | Stainless steel |
| 10  | Roller block           | Stainless steel     | 24  | Steel ball        | Stainless steel |
| 11  | Magnet                 | Rare earth material | 25  | Steel ball        | Stainless steel |
| 12  | Wear ring              | POM                 | 26  | Steel ball        | Stainless steel |
| 13  | Piston Packing         | NBR                 | 27  | Clip              | Spring steel    |
| 14  | O-Ring                 | NBR                 |     |                   |                 |

### Packing and O-Ring

| Item  | Piston Packing | Front cover O-Ring                        | Rear cover O-ring                         | Piston O-Ring                            |
|---|----------------|---|---|--|
| Bore size $\frac{\text{mm}}{\text{Number}}$ | 4              | 2   | 2   | 4  |
| HDF - 12                                    | DYP - 12       | $\varnothing 10 \times \varnothing 1$     | $\varnothing 10 \times \varnothing 1$     | $\varnothing 4 \times \varnothing 1$     |
| HDF - 16                                    | DYP - 16       | $\varnothing 13.5 \times \varnothing 1.5$ | $\varnothing 14.5 \times \varnothing 1.5$ | $\varnothing 7.4 \times \varnothing 1.2$ |
| HDF - 20                                    | DYP - 20       | $\varnothing 17.5 \times \varnothing 1.5$ | $\varnothing 17.5 \times \varnothing 1.5$ | $\varnothing 5.8 \times \varnothing 1.9$ |

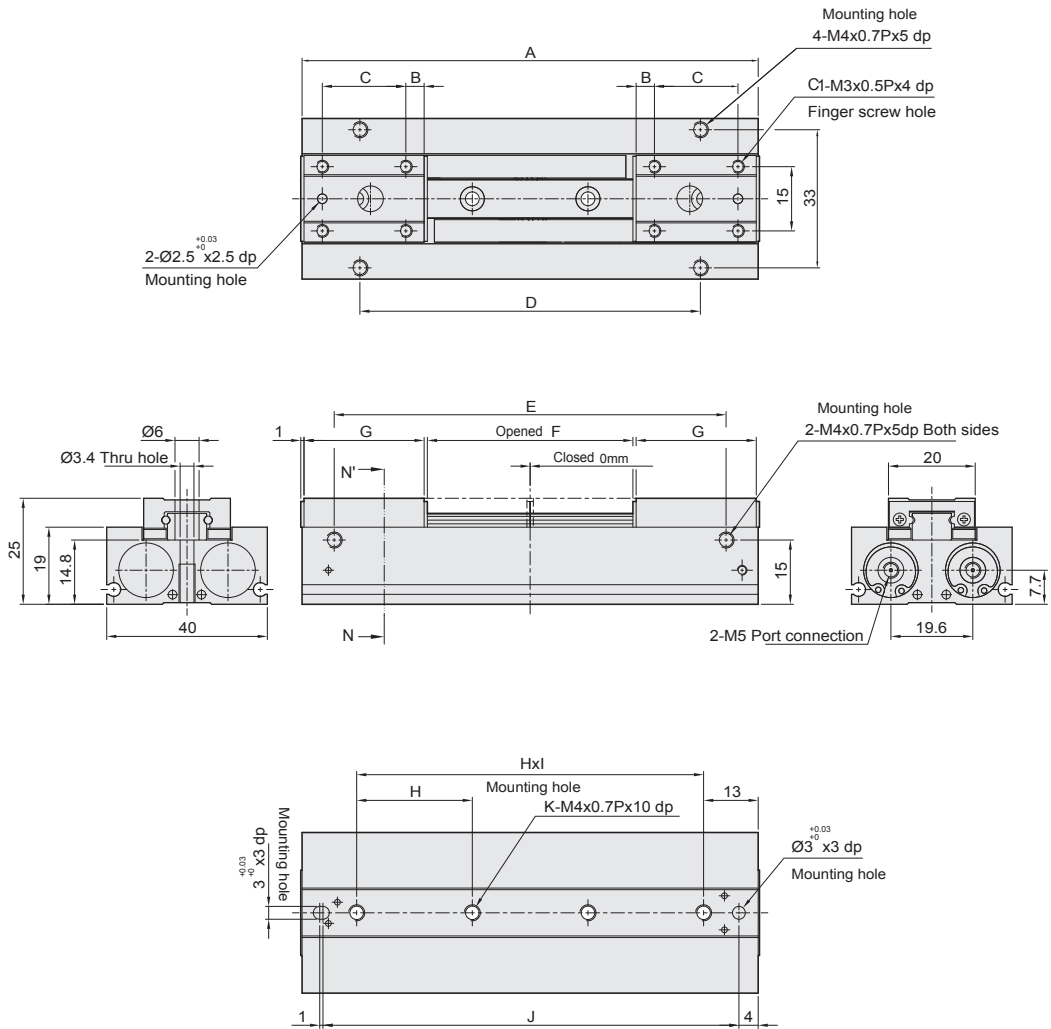


# HDF series - Parallel gripper (Thin type)

## External dimension

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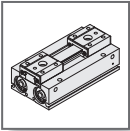
### ● HDF - 12



| Code        | A   | B   | C  | C1 | D  | E  | F  | G  | H  | I | J    | K |
|-------------|-----|-----|----|----|----|----|----|----|----|---|------|---|
| HDF-12X12st | 52  | 9   | -  | 4  | 28 | 38 | 12 | 18 | 26 | 1 | 43.5 | 2 |
| HDF-12X24st | 68  | 4.5 | 12 | 8  | 44 | 54 | 24 | 21 | 42 | 1 | 59.5 | 2 |
| HDF-12X48st | 104 | 4.5 | 18 | 8  | 80 | 90 | 48 | 27 | 26 | 3 | 95.5 | 4 |

### ● Weight

| Item   | HDF 12x12 | HDF 12x24 | HDF 12x48 |
|--------|-----------|-----------|-----------|
| Weight | 155g      | 190g      | 275g      |

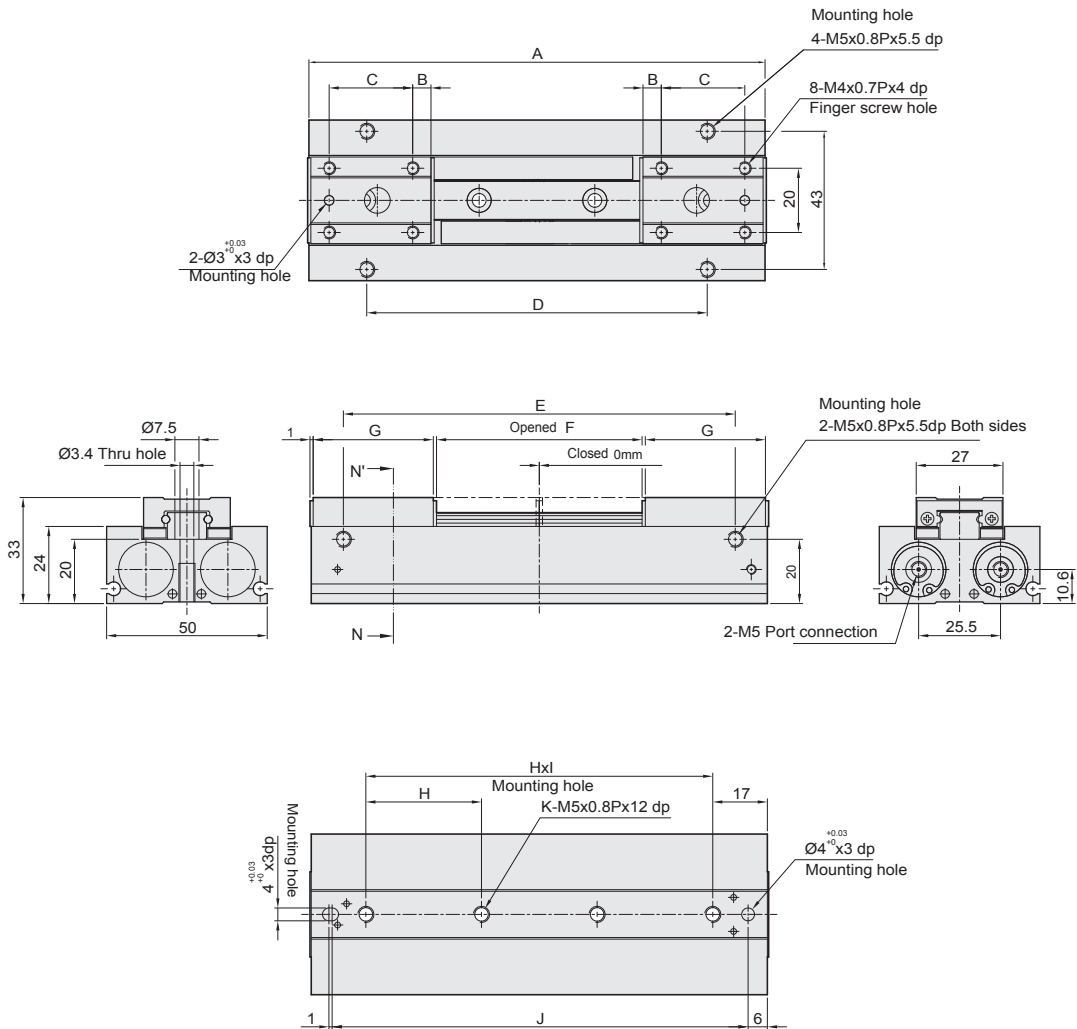


# HDF series - Parallel gripper (Thin type)

## External dimension

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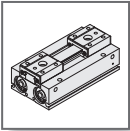
### ► HDF - 16



| Dimension Code | A   | B   | C  | D   | E   | F  | G    | H  | I | J     | K |
|----------------|-----|-----|----|-----|-----|----|------|----|---|-------|---|
| HDF-16X16st    | 72  | 5.2 | 15 | 36  | 52  | 16 | 25.4 | 38 | 1 | 59.5  | 2 |
| HDF-16X32st    | 94  | 5.7 | 18 | 58  | 74  | 32 | 29.4 | 60 | 1 | 81.5  | 2 |
| HDF-16X64st    | 142 | 5.7 | 26 | 106 | 122 | 64 | 37.4 | 36 | 3 | 129.5 | 4 |

### ► Weight

| Item   | HDF 16x16 | HDF 16x32 | HDF 16x64 |
|--------|-----------|-----------|-----------|
| Weight | 350g      | 445g      | 650g      |

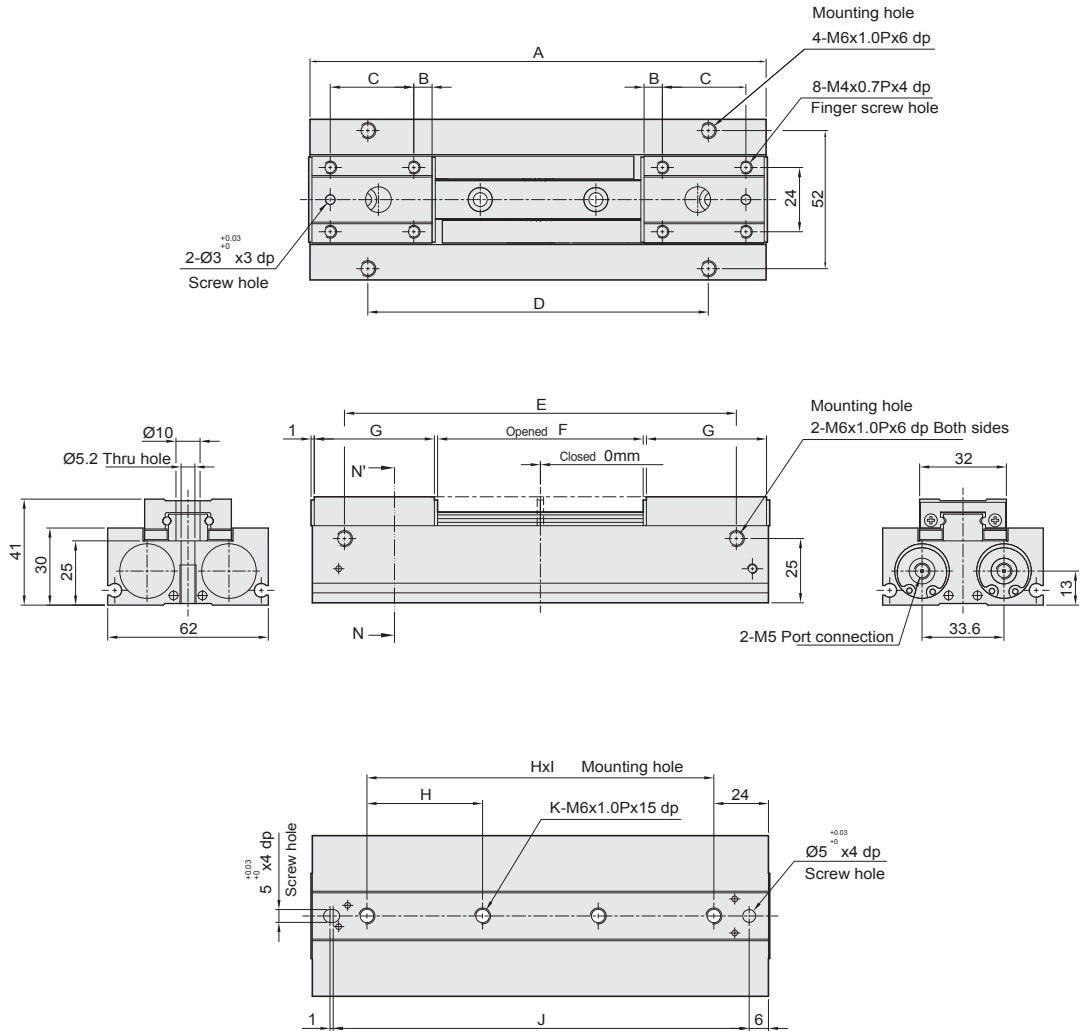


# HDF series - Parallel gripper (Thin type)

## External dimension

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### ► HDF - 20

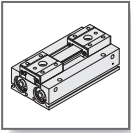


| Code<br>Dimension<br>Model | A   | B   | C  | D   | E   | F  | G    | H  | I | J     | K |
|----------------------------|-----|-----|----|-----|-----|----|------|----|---|-------|---|
| HDF-20X20st                | 86  | 7.7 | 16 | 40  | 56  | 20 | 31.4 | 38 | 1 | 73.5  | 2 |
| HDF-20X40st                | 114 | 8.2 | 20 | 68  | 84  | 40 | 36.4 | 66 | 1 | 101.5 | 2 |
| HDF-20X80st                | 174 | 8.2 | 30 | 128 | 144 | 80 | 46.4 | 42 | 3 | 161.5 | 4 |

### ► Weight

| Item   | HDF 20x20 | HDF 20x40 | HDF 20x80 |
|--------|-----------|-----------|-----------|
| Weight | 645g      | 850g      | 1225g     |



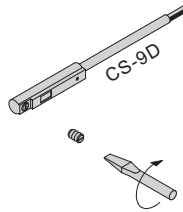
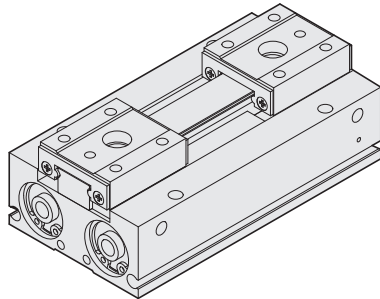


# HDF series - Parallel gripper ( Thin type )

## Sensing setting and Sensing installation

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### ▶ Sensing setting and Installation



CS-9D  
(Please refer to P.7-2.15 sensor switch information)

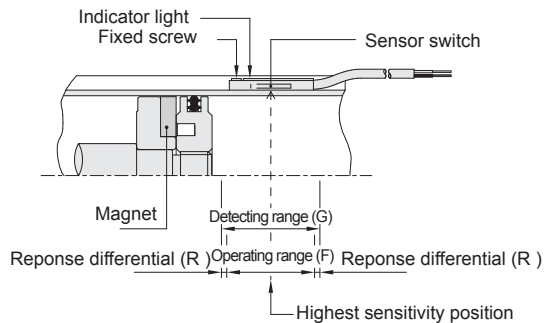
### ▶ Sensing range

Sensor switch is fixed on the cylinder body. The magnetic piston head will activate the sensor switch when it enters the operating range. It has 0.5mm differential.

### ▶ Operating range

When piston head moves the switch setting and adjustment will be based on the responding range generated by the magnetic field and the switch. (Please refer to the below table)

### ▶ Response differential and position adjustment

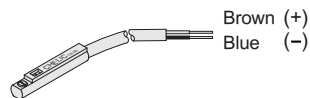


Unit : mm

| Model     | CS-9D(B/H)          |                          |
|-----------|---------------------|--------------------------|
| Bore size | Operating range (F) | Response differential(R) |
| 12        | 8                   | 1                        |
| 16        | 10                  | 1.2                      |
| 20        | 11                  | 1.2                      |

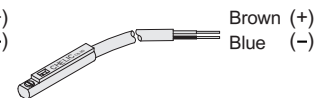
### ▶ Sensor switch introduction

#### CS-9D



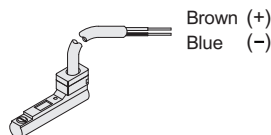
Rated voltage: DC 5 ~ 120V  
AC 5 ~ 120V

#### CS-9H



Rated voltage: DC 5 ~ 240V  
AC 5 ~ 240V

#### CS-9B



Rated voltage: DC 5 ~ 120V  
AC 5 ~ 120V

