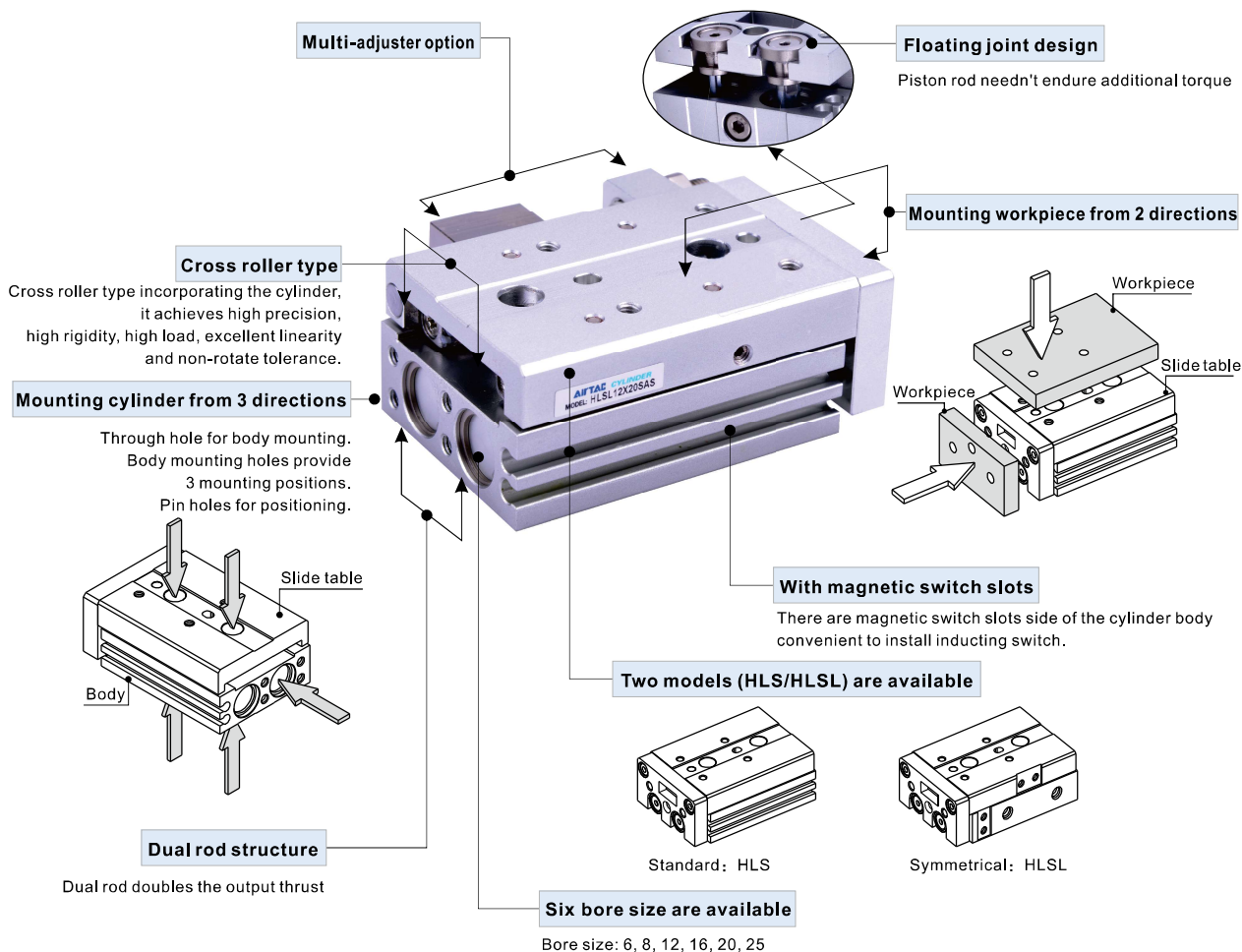




# Slide table cylinder(Cross roller type)——HLS Series

## Compendium of HLS\HLSL Series



## Criteria for selection: Cylinder thrust

Unit: Newton(N)

| Bore size | Rod size | Acting type   | Pressure area(mm <sup>2</sup> ) | Operating pressure(MPa) |     |     |     |     |     |     |
|-----------|----------|---------------|---------------------------------|-------------------------|-----|-----|-----|-----|-----|-----|
|           |          |               |                                 | 0.2                     | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |     |
| 6         | 3        | Double acting | Push-side                       | 42                      | 8   | 13  | 17  | 21  | 25  | 29  |
|           |          |               | Pull-side                       | 57                      | 11  | 17  | 23  | 29  | 34  | 40  |
| 8         | 4        | Double acting | Push-side                       | 75                      | 15  | 23  | 30  | 38  | 45  | 53  |
|           |          |               | Pull-side                       | 101                     | 20  | 30  | 40  | 51  | 61  | 71  |
| 12        | 6        | Double acting | Push-side                       | 170                     | 34  | 51  | 68  | 85  | 102 | 119 |
|           |          |               | Pull-side                       | 226                     | 45  | 68  | 90  | 113 | 136 | 158 |
| 16        | 8        | Double acting | Push-side                       | 302                     | 60  | 91  | 121 | 151 | 181 | 211 |
|           |          |               | Pull-side                       | 402                     | 80  | 121 | 161 | 201 | 241 | 281 |
| 20        | 10       | Double acting | Push-side                       | 471                     | 94  | 141 | 188 | 236 | 283 | 330 |
|           |          |               | Pull-side                       | 628                     | 126 | 188 | 251 | 314 | 377 | 440 |
| 25        | 12       | Double acting | Push-side                       | 756                     | 151 | 227 | 302 | 378 | 454 | 529 |
|           |          |               | Pull-side                       | 982                     | 186 | 295 | 393 | 491 | 589 | 687 |

## Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40μm or below .
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder 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.



# Slide table cylinder(Cross roller type)

## HLS、HLSL Series



### Specification

| Bore size(mm)      | 6                                          | 8 | 12 | 16                                      | 20   | 25 |
|--------------------|--------------------------------------------|---|----|-----------------------------------------|------|----|
| Acting type        | Double acting                              |   |    |                                         |      |    |
| Fluid              | Air(to be filtered by 40μm filter element) |   |    |                                         |      |    |
| Operating pressure | 0.2~0.7MPa(29~100psi)(2.0~7.0bar)          |   |    | 0.15~0.7MPa(22~100psi)(1.5~7.0bar)      |      |    |
| Proof pressure     | 1.2MPa(175psi)(12.0bar)                    |   |    |                                         |      |    |
| Temperature °C     | -20~70                                     |   |    |                                         |      |    |
| Speed range mm/s   | 50~500                                     |   |    |                                         |      |    |
| Stroke tolerance   | Strokes≤100 <sub>0</sub> <sup>+1.0</sup>   |   |    | Stroke>100 <sub>0</sub> <sup>+1.5</sup> |      |    |
| Cushion type       | Bumper(Both ends)、Shock absorber           |   |    |                                         |      |    |
| Sensor switches    | CMSh、DMSH、EMSH                             |   |    |                                         |      |    |
| Port size [Note1]  | M5×0.8                                     |   |    |                                         | 1/8" |    |

[Note1] G thread is available. Refer to P565 for detail of sensor switch.

### Symbol



### Stroke

| Bore size (mm) | Standard stroke (mm)          | Max.std stroke |
|----------------|-------------------------------|----------------|
| 6              | 10 20 30 40 50                | 50             |
| 8              | 10 20 30 40 50 75             | 75             |
| 12             | 10 20 30 40 50 75 100         | 100            |
| 16             | 10 20 30 40 50 75 100 125     | 125            |
| 20             | 10 20 30 40 50 75 100 125 150 | 150            |
| 25             | 10 20 30 40 50 75 100 125 150 | 150            |

[Note] Consult us for non-standard stroke.

### Ordering code

HLS 20 x 30 S AS G

① ② ③ ④ ⑤ ⑥

| ① Model                                                                                                                                                                  | ② Bore Size                    | ③ Stroke                                   | ④ Magnet          | ⑤ Adjuster option [Note1]                    | ⑥ Thread type [Note2] |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------|-------------------|----------------------------------------------|-----------------------|
| HLS: Slide table cylinder<br>(Double acting type)<br>(Cross roller type)<br><br>HLSL: Symmetrical slide<br>table cylinder<br>(Double acting type)<br>(Cross roller type) | 6<br>8<br>12<br>16<br>20<br>25 | Refer to<br>stroke<br>table for<br>details | S: With<br>magnet | Blank: Without adjuster(Basic type)          | G: G Thread           |
|                                                                                                                                                                          |                                |                                            |                   |                                              |                       |
|                                                                                                                                                                          |                                |                                            |                   | A: Adjustable rubber stopper(Both ends)<br>  |                       |
|                                                                                                                                                                          |                                |                                            |                   | B: Shock absorber(Both ends)<br>             |                       |
|                                                                                                                                                                          |                                |                                            |                   | AS: Adjustable rubber stopper(Extension)<br> |                       |
|                                                                                                                                                                          |                                |                                            |                   | BS: Shock absorber(Extension)<br>            |                       |
|                                                                                                                                                                          |                                |                                            |                   | AF: Adjustable rubber stopper(Retractio)<br> |                       |
|                                                                                                                                                                          |                                |                                            |                   | BF: Shock absorber(Retractio)<br>            |                       |

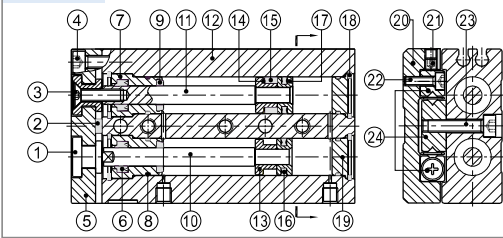
[Note1] B type, BS type, BF type are unavailable for bore size of Φ6. [Note2] When the thread is standard, the code is blank.

# Slide table cylinder(Cross roller type)

## HLS、HLSL Series

### Inner structure and material of major parts

#### Basic type



| NO. | Item           | Material        | NO. | Item                    | Material                              |
|-----|----------------|-----------------|-----|-------------------------|---------------------------------------|
| 1   | Floating joint | Carbon steel    | 13  | Magnet holder           | Brass                                 |
| 2   | Bumper         | TPU             | 14  | Magnet washer           | NBR                                   |
| 3   | Screw          | Carbon steel    | 15  | Magnet                  | Sintered metal (Neodymium-iron-boron) |
| 4   | Screw          | Carbon steel    | 16  | Piston seal             | NBR                                   |
| 5   | Fixing plate   | Aluminum alloy  | 17  | Piston                  | Brass                                 |
| 6   | Rod seal       | NBR             | 18  | C clip                  | Spring steel                          |
| 7   | Front cover    | Aluminum alloy  | 19  | Back cover              | Aluminum alloy                        |
| 8   | O-ring         | NBR             | 20  | Slide table             | Aluminum alloy                        |
| 9   | Bumper         | TPU             | 21  | Nut                     | Carbon steel                          |
| 10  | Piston rod A   | Carbon steel    | 22  | Screw                   | Carbon steel                          |
| 11  | Piston rod B   | Stainless steel | 23  | Screw                   | Carbon steel                          |
| 12  | Body           | Aluminum alloy  | 24  | Slide guide combination | subassembly                           |

Note: inner structure & material data sheet is based on certain bore size.  
Please contact Airtac if you need inner structure & material data sheet for specific bore size.

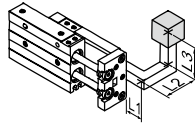
### Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

#### A) Operating conditions(According to mounting position and work form)

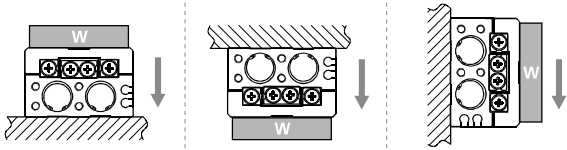
1. Model used(Bore size, Stroke)
2. Type of cushion(Bumper, Shock absorber)
3. Mounting position of work(Top, front)
4. Mounting direction(Axial, Vertical)
5. Average speed  $V_a$ (mm/s)
6. Applied load  $W$ (N)
7. Overhang  $L_1, L_2, L_3$ (mm)

Fig. 1



Explain:  $L_1$  is the distance of load's center beyond the end plank's plane.  
If load's center is not beyond the end plank's plane,  $L_1$  is negative.

Fig. 1: Applied load



#### B) Kinetic energy check

1. Calculate kinetic energy of load  $E$ (J)  

$$E = \frac{1}{2} \times \frac{W}{g} \times \left( \frac{1.4 \times V_a}{1000} \right)^2$$

$$E_a = K \times E_{max}$$
2. Calculate allowable kinetic energy  $E_a$ (J)  
 $K$ : Mounting work coefficient (Fig 2)  
 $E_{max}$ : Maximum allowable kinetic energy (Table 1)
3. Check that kinetic energy of load doesn't exceed allowable kinetic energy:  $E \leq E_a$

#### C) Load check

1. Calculate allowable applied load  $W_a$ (N)  
 $W_a = K \times \beta \times W_{max}$   
 $K$ : Mounting work coefficient (Fig 2)  
 $W_{max}$ : Maximum allowable applied load (Table 1)  
 $\beta$ : Applied load coefficient (Fig 3)
2. Check that load( $W$ ) doesn't exceed allowable applied load( $W_a$ ):  $W \leq W_a$

Fig 2: Mounting work coefficient (K)

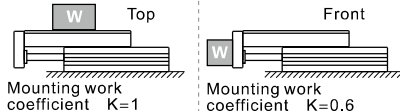
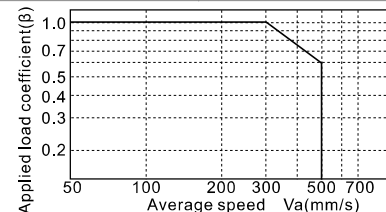


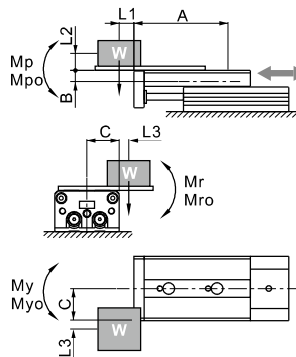
Fig 3: Applied load coefficient ( $\beta$ )



#### D) Moment check

##### Horizontal

1. Calculate actual moment:  $M_p, M_{po}, M_y, M_{yo}, M_r, M_{ro}$  (Nm)



Dynamic moment:  
 $M_p = W \times (L_1 + A) / 1000$

Static moment:  
 $M_{po} = \frac{W \times (L_1 + A)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$

Dynamic moment:  
 $M_r = W \times (C + L_3) / 1000$

Static moment:  
 $M_{ro} = (W \times a \times (C + L_3)) / 1000g$

Dynamic moment:  
 $M_y = 0$

Static moment:  
 $M_{yo} = (W \times a \times (C + L_3)) / 1000g$

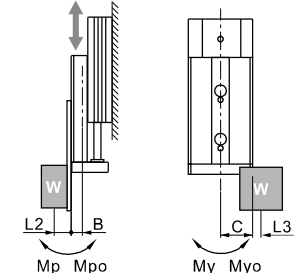
2. Check

Dynamic moment:  $\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_r}{M_{r_{max}}} \leq 1$

Static moment:  $\frac{M_{po}}{M_{po_{max}}} + \frac{M_{yo}}{M_{yo_{max}}} + \frac{M_{ro}}{M_{ro_{max}}} \leq 1$

##### Vertical

1. Calculate actual moment:  $M_p, M_{po}, M_y, M_{yo}$ (Nm)



Dynamic moment:  
 $M_p = W \times (L_2 + B) / 1000$

Static moment:  
 $M_{po} = \frac{W \times (L_2 + B)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$

Dynamic moment:  
 $M_y = W \times (C + L_3) / 1000$

Static moment:  
 $M_{yo} = \frac{W \times a \times (C + L_3)}{1000g} + \frac{W \times (C + L_3)}{1000}$

2. Check

Dynamic moment:  $\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} \leq 1$

Static moment:  $\frac{M_{po}}{M_{po_{max}}} + \frac{M_{yo}}{M_{yo_{max}}} \leq 1$

Explain:  
 $L_1/L_2/L_3$ : The distance of load center to mount plane(Determined by actuality).  
 $A/B/C$ : Correction value for center position distance of moment(Refer to table 2).  
 $M_{p_{max}}/M_{y_{max}}/M_{r_{max}}/M_{po_{max}}/M_{yo_{max}}/M_{ro_{max}}$ : Maximum allowable moment(Refer to table 2).  
 $g$ : Acceleration of gravity( $g=9.81m/s^2$ ).  
 $a$ : Acceleration of inertia  
 (Bumper:  $a=1600 \times (V_a/1000)^2$ , Shock absorber:  $a=400 \times (V_a/1000)^2$ )  
 $W$ : Load weight(Determined by actuality).

# Slide table cylinder(Cross roller type)

## HLS、HLSL Series

**Table 1:** Maximum allowable kinetic energy(Emax)  
Maximum allowable applied load(Wmax)

| Model | Max. allowable kinetic energy |                     |                     | Max. allowable applied load Wmax(N) |
|-------|-------------------------------|---------------------|---------------------|-------------------------------------|
|       | Basic type                    | Rubber stopper type | Shock absorber type |                                     |
| HLS6  | 0.01                          | 0.01                | —                   | 4                                   |
| HLS8  | 0.024                         | 0.024               | 0.048               | 8                                   |
| HLS12 | 0.05                          | 0.05                | 0.1                 | 15                                  |
| HLS16 | 0.1                           | 0.1                 | 0.2                 | 30                                  |
| HLS20 | 0.13                          | 0.13                | 0.26                | 40                                  |
| HLS25 | 0.22                          | 0.22                | 0.44                | 70                                  |

**Note:** Symbol and unit

| Symbol                                                       | Item                                                    | Unit             |
|--------------------------------------------------------------|---------------------------------------------------------|------------------|
| A, B, C                                                      | Correction value for center position distance of moment | mm               |
| a                                                            | Acceleration of inertia                                 | —                |
| E                                                            | Kinetic energy                                          | J                |
| Ea                                                           | Allowable kinetic energy                                | J                |
| Emax                                                         | Maximum allowable kinetic energy                        | J                |
| g                                                            | Acceleration of gravity g=9.81                          | m/s <sup>2</sup> |
| K                                                            | Mounting work coefficient                               | —                |
| L1, L2, L3                                                   | Overhang                                                | mm               |
| Mp, My, Mr                                                   | Dynamic moment(Pitch、Yaw、Roll)                          | Nm               |
| Mp <sub>max</sub> , My <sub>max</sub> , Mr <sub>max</sub>    | Maximum allowable dynamic moment (Pitch、Yaw、Roll)       | Nm               |
| Mpo, Myo, Mro                                                | Static moment(Pitch、Yaw、Roll)                           | Nm               |
| Mpo <sub>max</sub> , Myo <sub>max</sub> , Mro <sub>max</sub> | Maximum allowable static moment (Pitch、Yaw、Roll)        | Nm               |
| Va                                                           | Average speed                                           | mm/s             |
| W                                                            | Applied load                                            | N                |
| Wmax                                                         | Maximum allowable applied load                          | N                |
| β                                                            | Applied load coefficient                                | —                |

**Table 2:** Maximum allowable moment(Nm),  
Correction value for center position distance of moment(mm)

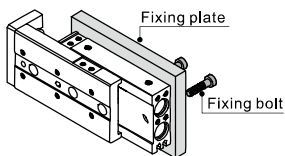
| Bore size | Stroke | Static moment      |                    |                    | Dynamic moment    |                   |                   | Correction value |      |    |
|-----------|--------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|------------------|------|----|
|           |        | Mpo <sub>max</sub> | Myo <sub>max</sub> | Mro <sub>max</sub> | Mp <sub>max</sub> | My <sub>max</sub> | Mr <sub>max</sub> | A                | B    | C  |
| 6         | 10     | 3.3                | 3.8                | 2.6                | 0.7               | 0.7               | 0.6               | 27               | 7.3  | 16 |
|           | 20     | 3.3                | 3.8                | 2.6                | 0.7               | 0.8               | 0.6               | 42               |      |    |
|           | 30     | 3.3                | 3.8                | 2.6                | 0.7               | 0.8               | 0.6               | 52               |      |    |
|           | 40     | 7.2                | 7.9                | 3.6                | 1.3               | 1.3               | 0.6               | 72               |      |    |
|           | 50     | 12.4               | 12.7               | 4.7                | 1.8               | 1.8               | 0.6               | 87               |      |    |
| 8         | 10     | 10.1               | 9.1                | 8.8                | 2.5               | 2.5               | 2.0               | 32               | 8.5  | 20 |
|           | 20     | 10.1               | 9.1                | 8.8                | 2.6               | 2.6               | 2.0               | 42               |      |    |
|           | 30     | 10.1               | 9.1                | 8.8                | 2.8               | 2.8               | 2.0               | 57               |      |    |
|           | 40     | 12.4               | 10.8               | 10.1               | 3.4               | 3.4               | 2.3               | 72               |      |    |
|           | 50     | 23.6               | 24.8               | 13.9               | 4.4               | 4.4               | 2.1               | 92               |      |    |
| 12        | 75     | 32.8               | 35.3               | 16.4               | 4.6               | 4.6               | 1.8               | 132              | 10   | 25 |
|           | 10     | 33.0               | 34.3               | 30.9               | 7.3               | 7.3               | 5.8               | 48               |      |    |
|           | 20     | 33.0               | 34.3               | 30.9               | 7.6               | 7.6               | 5.8               | 58               |      |    |
|           | 30     | 33.0               | 34.3               | 30.9               | 7.8               | 7.8               | 5.8               | 68               |      |    |
|           | 40     | 33.0               | 34.3               | 30.9               | 8.0               | 8.0               | 5.8               | 78               |      |    |
| 16        | 50     | 53.4               | 49.6               | 39.7               | 9.8               | 9.8               | 5.8               | 88               | 11   | 30 |
|           | 75     | 78.8               | 71.9               | 48.6               | 14.2              | 14.2              | 6.8               | 125              |      |    |
|           | 100    | 78.8               | 71.9               | 48.6               | 14.7              | 14.7              | 6.8               | 160              |      |    |
|           | 125    | 143.7              | 144.5              | 53.3               | 24.8              | 24.8              | 7.8               | 204              |      |    |
|           | 10     | 60.1               | 50.5               | 72.8               | 14.5              | 14.5              | 15.2              | 47               | 16.5 | 35 |
| 20        | 20     | 60.1               | 50.5               | 72.8               | 15.2              | 15.2              | 15.2              | 57               |      |    |
|           | 30     | 60.1               | 50.5               | 72.8               | 15.7              | 15.7              | 15.2              | 67               |      |    |
|           | 40     | 60.1               | 50.5               | 72.8               | 16.3              | 16.3              | 15.2              | 82               |      |    |
|           | 50     | 60.1               | 50.5               | 72.8               | 16.6              | 16.6              | 15.2              | 92               |      |    |
| 25        | 75     | 169.3              | 154.3              | 114.4              | 41.2              | 41.2              | 22.0              | 136              | 20.3 | 42 |
|           | 100    | 169.3              | 154.3              | 114.4              | 42.8              | 42.8              | 22.0              | 176              |      |    |
|           | 125    | 169.3              | 154.3              | 114.4              | 43.6              | 43.6              | 22.0              | 205              |      |    |
|           | 150    | 267.5              | 286.6              | 145.6              | 49.0              | 49.0              | 20.5              | 249              |      |    |
|           | 10     | 60.1               | 50.5               | 72.8               | 16.3              | 16.3              | 17.6              | 52               |      |    |
| 30        | 20     | 60.1               | 50.5               | 72.8               | 17.0              | 17.0              | 17.6              | 62               | 20.3 | 42 |
|           | 30     | 60.1               | 50.5               | 72.8               | 17.4              | 17.4              | 17.6              | 72               |      |    |
|           | 40     | 60.1               | 50.5               | 72.8               | 17.8              | 17.8              | 17.6              | 82               |      |    |
|           | 50     | 60.1               | 50.5               | 72.8               | 18.2              | 18.2              | 17.6              | 96               |      |    |
|           | 75     | 169.3              | 154.3              | 114.4              | 45.2              | 45.2              | 25.3              | 141              |      |    |
| 35        | 100    | 169.3              | 154.3              | 114.4              | 46.2              | 46.2              | 25.3              | 165              | 20.3 | 42 |
|           | 125    | 169.3              | 154.3              | 114.4              | 48.0              | 48.0              | 25.3              | 210              |      |    |
|           | 150    | 267.5              | 286.6              | 145.6              | 65.0              | 65.0              | 28.3              | 254              |      |    |

## Installation and application

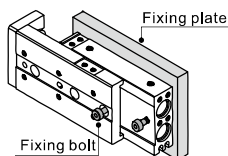
1. How to mount cylinder:

1.1) Cylinder can be mounted from 3 directions

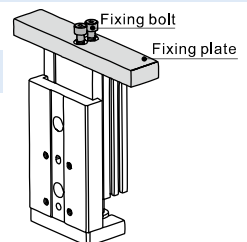
### Vertical Mounting(Body thread holes)



### Vertical Mounting(Body through holes)



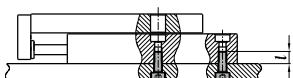
### Axial Mounting (Body thread holes)



1.2) When mounting an compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque.

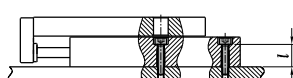
If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.

### Vertical Mounting(Body thread holes)



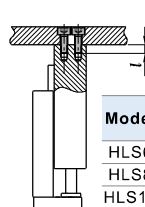
| Model | Bolt used | Max. tightening torque (Nm) | Max. screw-in depth(mm) |
|-------|-----------|-----------------------------|-------------------------|
| HLS6  | M4×0.7    | 2.1                         | 8                       |
| HLS8  | M4×0.7    | 2.1                         | 8                       |
| HLS12 | M5×0.8    | 4.4                         | 10                      |
| HLS16 | M6×1.0    | 4.4                         | 10                      |
| HLS20 | M6×1.0    | 7.4                         | 12                      |
| HLS25 | M8×1.25   | 18.0                        | 16                      |

### Vertical Mounting(Body through holes)



| Model | Bolt used | Max. tightening torque (Nm) | Body depth(mm) |
|-------|-----------|-----------------------------|----------------|
| HLS6  | M3×0.5    | 1.2                         | 11.0           |
| HLS8  | M3×0.5    | 1.2                         | 12.5           |
| HLS12 | M4×0.7    | 2.8                         | 18.0           |
| HLS16 | M5×0.8    | 5.7                         | 25.0           |
| HLS20 | M5×0.8    | 5.7                         | 28.0           |
| HLS25 | M6×1.0    | 10.0                        | 36.2           |

### Axial Mounting(Body thread holes)



| Model | Bolt used | Max. tightening torque (Nm) | Max. screw-in depth(mm) |
|-------|-----------|-----------------------------|-------------------------|
| HLS6  | M2.5×0.45 | 0.5                         | 3.5                     |
| HLS8  | M3×0.5    | 0.9                         | 4.0                     |
| HLS12 | M4×0.7    | 2.1                         | 6.0                     |
| HLS16 | M5×0.8    | 4.4                         | 7.0                     |
| HLS20 | M5×0.8    | 4.4                         | 8.0                     |
| HLS25 | M6×1.0    | 7.4                         | 10.0                    |

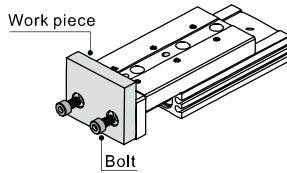
# Slide table cylinder(Cross roller type)

## HLS、HLSL Series

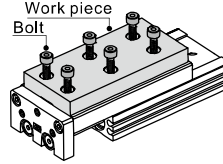
### 2. Work Piece Mounting:

2.1) Work pieces can be mounted on 2 surfaces of the compact slide.

**Front Mounting**

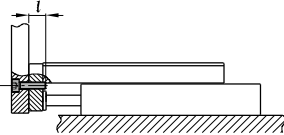


**Top Mounting**



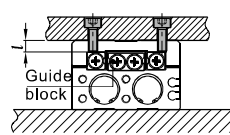
2.2) When mounting a work piece, tighten the bolts properly at a torque value within the limiting range. Use bolts at least 0.5mm shorter than maximum thread depth to prevent bolts from contacting the guide block. If the bolts are too long, they hit the guide block and cause damage.

**Front Mounting**



| Model | Bolt used | Max. tightening torque (Nm) | Max. screw-in depth(mm) |
|-------|-----------|-----------------------------|-------------------------|
| HLS6  | M3×0.4    | 0.9                         | 5                       |
| HLS8  | M4×0.7    | 2.1                         | 6                       |
| HLS12 | M5×0.8    | 4.4                         | 8                       |
| HLS16 | M6×1.0    | 7.4                         | 10                      |
| HLS20 | M6×1.0    | 7.4                         | 13                      |
| HLS25 | M8×1.25   | 18.0                        | 15                      |

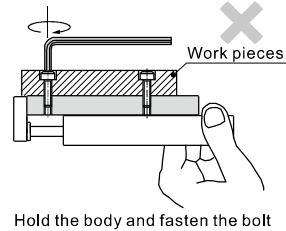
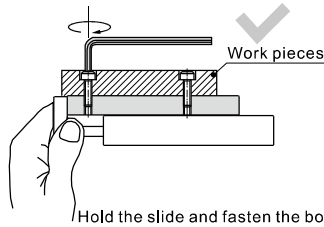
**Top Mounting**



| Model | Bolt used | Max. tightening torque (Nm) | Max. screw-in depth(mm) |
|-------|-----------|-----------------------------|-------------------------|
| HLS6  | M3×0.5    | 0.9                         | 4.2                     |
| HLS8  | M3×0.5    | 0.9                         | 4.5                     |
| HLS12 | M4×0.7    | 2.1                         | 5                       |
| HLS16 | M5×0.8    | 4.4                         | 6                       |
| HLS20 | M5×0.8    | 4.4                         | 9.5                     |
| HLS25 | M6×1.0    | 7.4                         | 13                      |

2.3) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

2.4) Hold the slide when fastening work pieces to it with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.



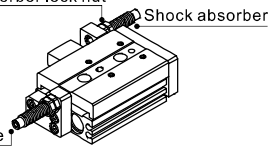
### 3. About shock absorber:

3.1) Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.

3.2) Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.

3.3) Follow the table for tightening torque of shock absorber to lock nuts.

**Shock absorber lock nut**



The screws are not adjustable otherwise would cause oil leakage.

| Model | Shock absorber         | Tightening torque |
|-------|------------------------|-------------------|
| HLS6  | Without shock absorber |                   |
| HLS8  | ACA0806-1N             | 1.67(Nm)          |
| HLS12 | ACA0806-1N             | 1.67(Nm)          |
| HLS16 | ACA1007-1N             | 3.14(Nm)          |
| HLS20 | ACA1210-1N             | 3.14(Nm)          |
| HLS25 | ACA1412-1N             | 10.8(Nm)          |

### 4. How to mount sensor switch:

4.1) HLS Series are all with magnet. The matching sensor switches are CSMH、DMSH、EMSH) series.

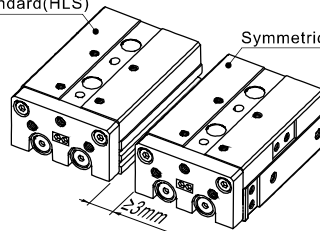
4.2) Maintain a minimum spacing of at least 3mm if two compact cylinders are used side by side in order to avoid malfunction.

5. Make sure to connect the compact cylinder to speed controller at the meter-out side, and the speed of compact cylinder must below 500mm/s.

6. Don't apply a load beyond the range of the operation limits. Different load or torque will cause different deflection to table, please see below for details.

**Standard(HLS)**

**Symmetrical(HLSL)**

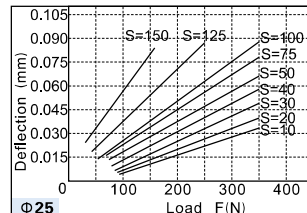
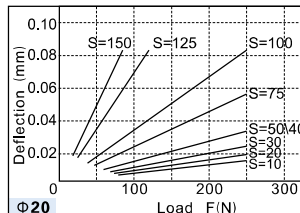
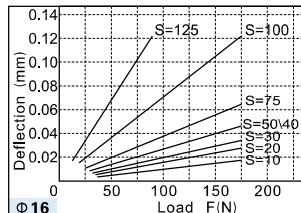
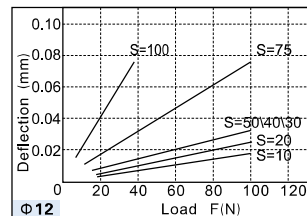
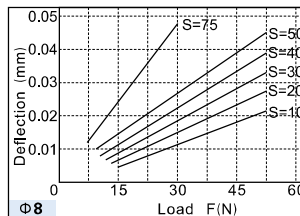
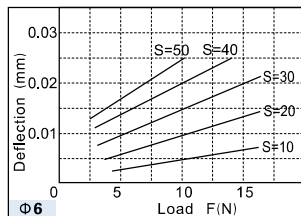


# Slide table cylinder(Cross roller type)

## HLS、HLSL Series

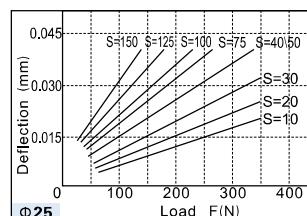
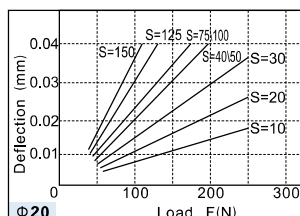
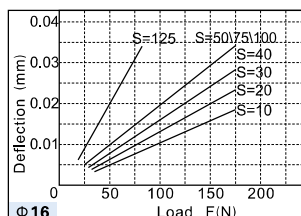
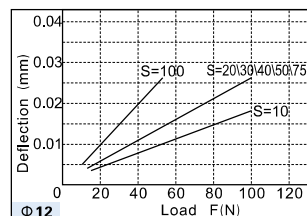
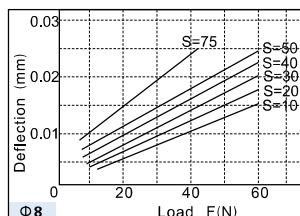
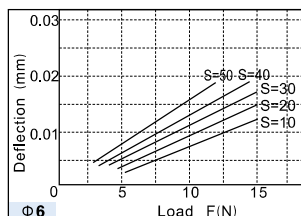
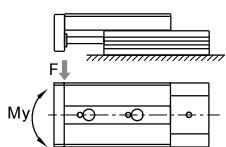
### 6.1) Table deflection due to pitch moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



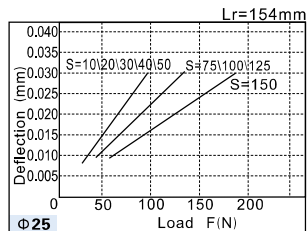
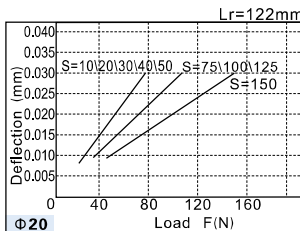
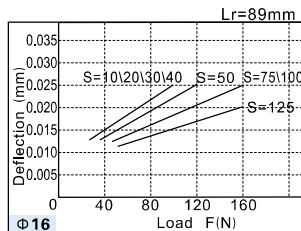
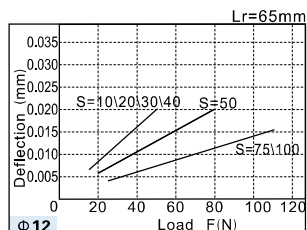
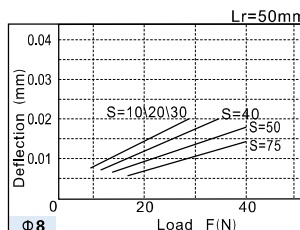
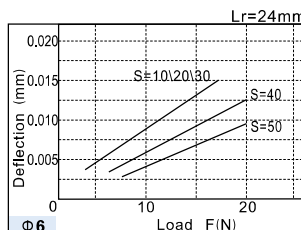
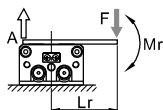
### 6.2) Table deflection due to yaw moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



### 6.3) Table deflection due to roll moment:

Table deflects (A) when a load acts upon section F at the full stroke of the compact slide.



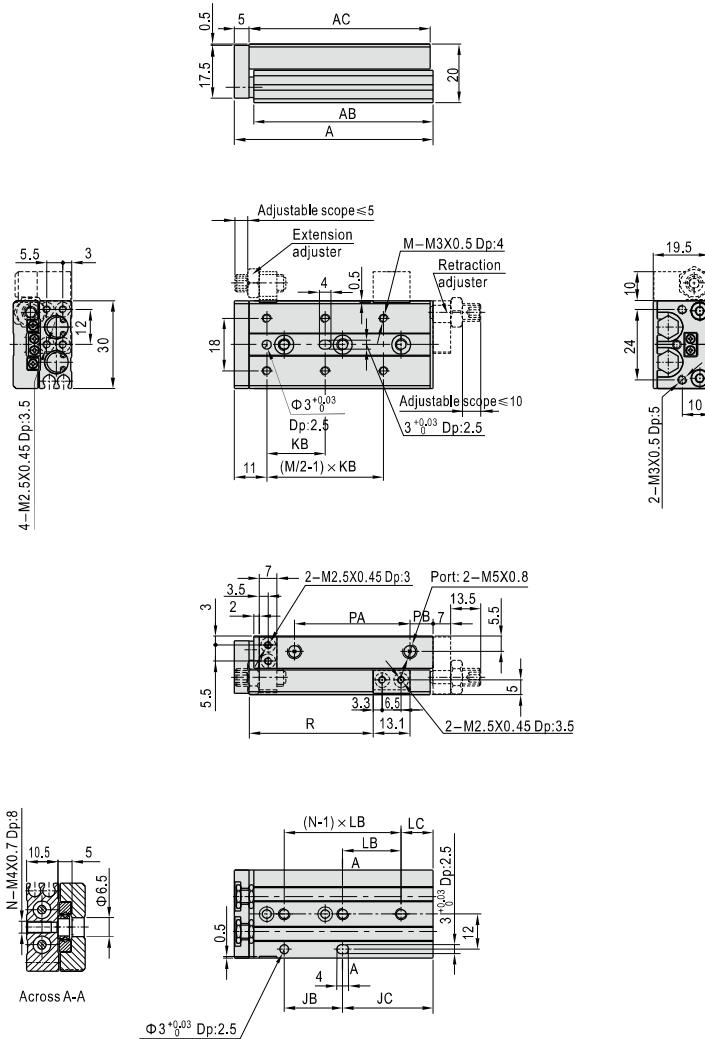


# Slide table cylinder(Cross roller type)

HLS、HLSL Series

## Dimensions

### HLS6



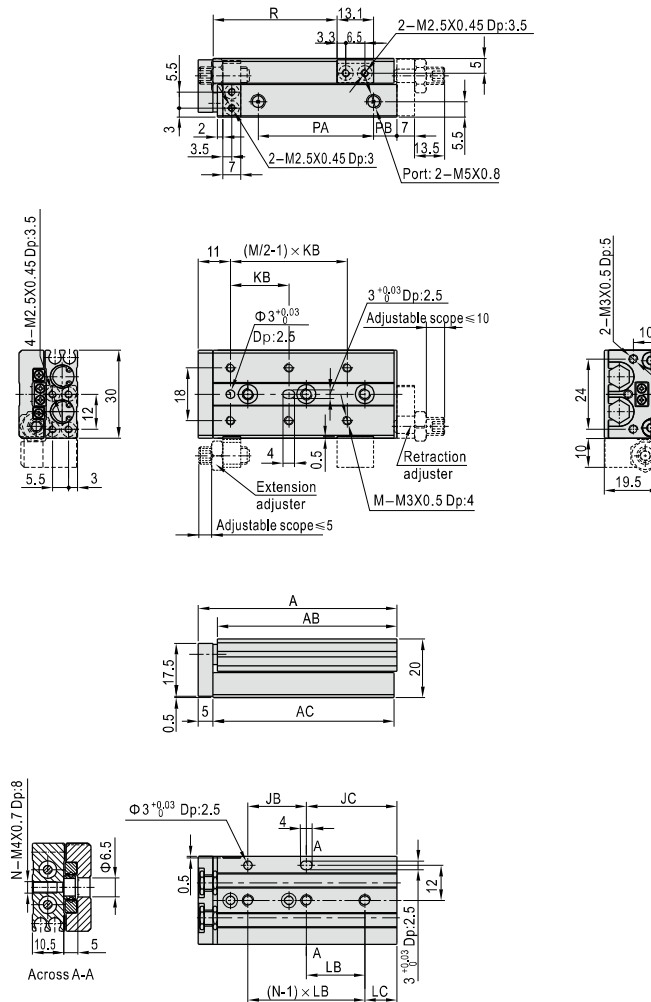
| Stroke\Item | A   | AB   | AC  | JB | JC | KB | LB | LC | M | N | PA | PB | R    |
|-------------|-----|------|-----|----|----|----|----|----|---|---|----|----|------|
| 10          | 48  | 41.5 | 42  | 20 | 11 | 20 | 25 | 6  | 4 | 2 | 19 | 8  | 21.5 |
| 20          | 58  | 51.5 | 52  | 20 | 21 | 30 | 35 | 6  | 4 | 2 | 28 | 9  | 31.5 |
| 30          | 68  | 61.5 | 62  | 20 | 31 | 20 | 20 | 11 | 6 | 3 | 39 | 8  | 41.5 |
| 40          | 90  | 83.5 | 84  | 30 | 43 | 28 | 30 | 13 | 6 | 3 | 51 | 18 | 51.5 |
| 50          | 106 | 99.5 | 100 | 48 | 41 | 38 | 24 | 17 | 6 | 4 | 61 | 24 | 61.5 |

# Slide table cylinder(Cross roller type)

**Airtac**

HLS、HLSL Series

HLSL6

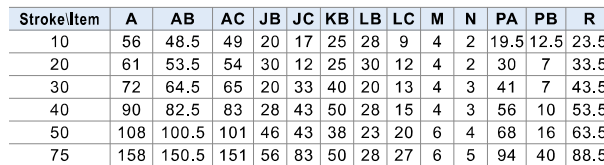


| Stroke\Item | A   | AB   | AC  | JB | JC | KB | LB | LC | M | N | PA | PB | R    |
|-------------|-----|------|-----|----|----|----|----|----|---|---|----|----|------|
| 10          | 48  | 41.5 | 42  | 20 | 11 | 20 | 25 | 6  | 4 | 2 | 19 | 8  | 21.5 |
| 20          | 58  | 51.5 | 52  | 20 | 21 | 30 | 35 | 6  | 4 | 2 | 28 | 9  | 31.5 |
| 30          | 68  | 61.5 | 62  | 20 | 31 | 20 | 20 | 11 | 6 | 3 | 39 | 8  | 41.5 |
| 40          | 90  | 83.5 | 84  | 30 | 43 | 28 | 30 | 13 | 6 | 3 | 51 | 18 | 51.5 |
| 50          | 106 | 99.5 | 100 | 48 | 41 | 38 | 24 | 17 | 6 | 4 | 61 | 24 | 61.5 |



**AirTAC**

HLS8



Adjustable scope  
St.max=18.5  
ACA0806-1N

Extension adjuster

ACA0806-1N

8.5

28.5

Adjustable scope  
St.max=19.5

Retraction adjuster

22.5

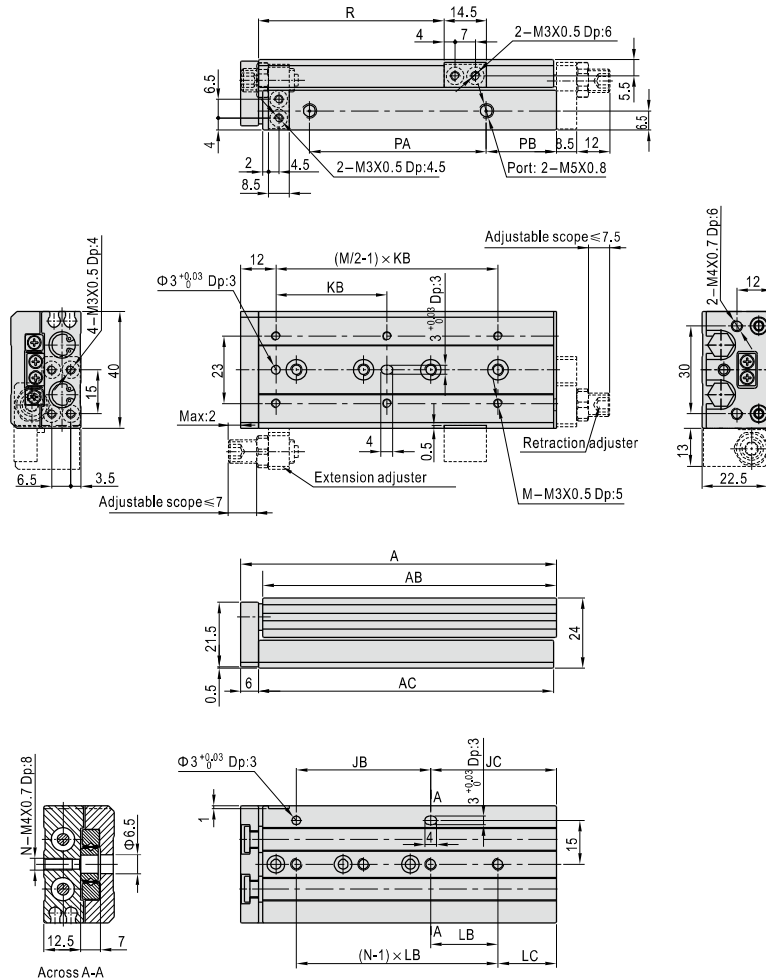
13

# Slide table cylinder(Cross roller type)

**AIRTAC**

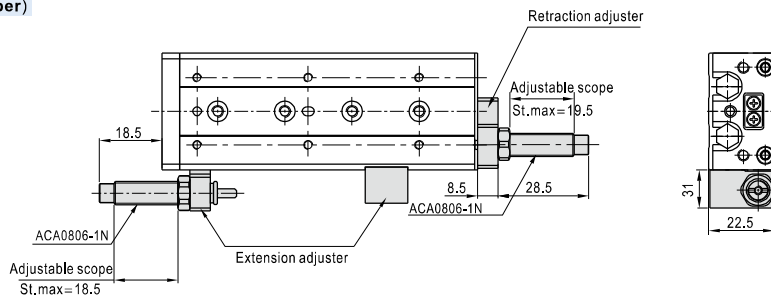
HLS、HLSL Series

HLSL8



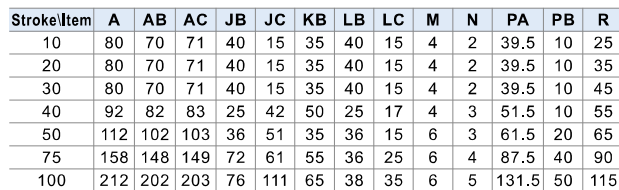
| Stroke\Item | A   | AB    | AC  | JB | JC | KB | LB | LC | M | N | PA   | PB   | R    |
|-------------|-----|-------|-----|----|----|----|----|----|---|---|------|------|------|
| 10          | 56  | 48.5  | 49  | 20 | 17 | 25 | 28 | 9  | 4 | 2 | 19.5 | 12.5 | 23.5 |
| 20          | 61  | 53.5  | 54  | 30 | 12 | 25 | 30 | 12 | 4 | 2 | 30   | 7    | 33.5 |
| 30          | 72  | 64.5  | 65  | 20 | 33 | 40 | 20 | 13 | 4 | 3 | 41   | 7    | 43.5 |
| 40          | 90  | 82.5  | 83  | 28 | 43 | 50 | 28 | 15 | 4 | 3 | 56   | 10   | 53.5 |
| 50          | 108 | 100.5 | 101 | 46 | 43 | 38 | 23 | 20 | 6 | 4 | 68   | 16   | 63.5 |
| 75          | 158 | 150.5 | 151 | 56 | 83 | 50 | 28 | 27 | 6 | 5 | 94   | 40   | 88.5 |

HLSL8(With shock absorber)



## AirTAC

HLS12



Technical drawing of the ACA0806-1N cable gland, showing side and end views with dimensions and labels.

**Labels:**

- Adjustable scope St.max=17.5 ACA0806-1N
- Extension adjuster
- ACA0806-1N
- Adjustable scope St.max=17
- Retraction adjuster

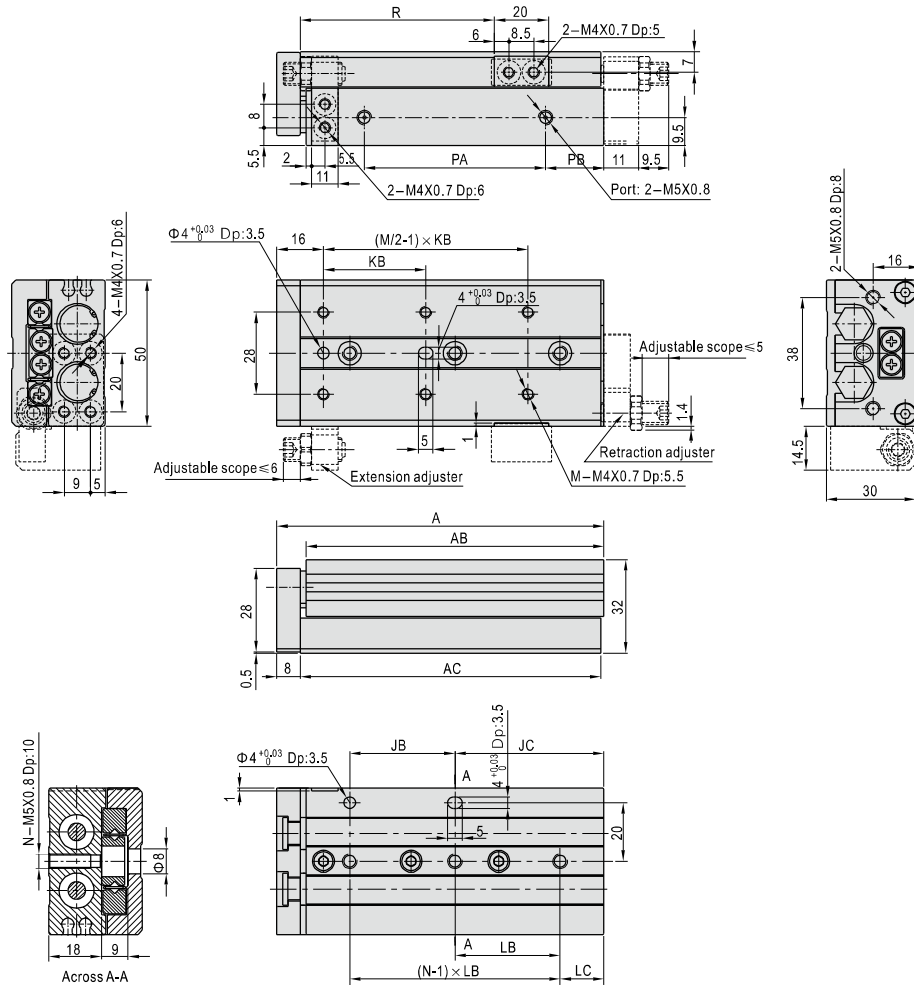
**Dimensions:**

- 15
- 0.5
- 11
- 26
- 30
- 14.5

# Slide table cylinder(Cross roller type)

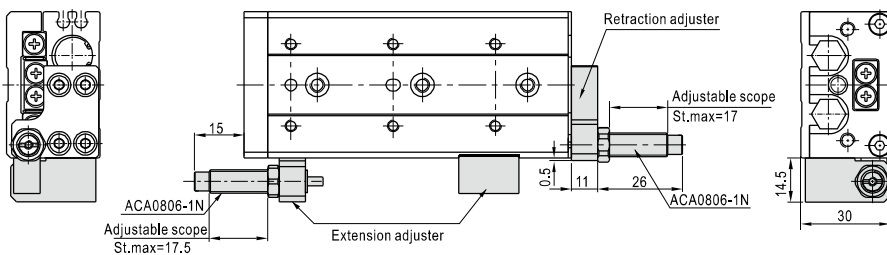
## HLS、HLSL Series

### HLSL12



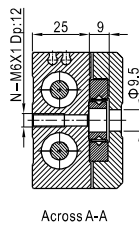
| Stroke\Item | A   | AB  | AC  | JB | JC  | KB | LB | LC | M | N | PA    | PB | R   |
|-------------|-----|-----|-----|----|-----|----|----|----|---|---|-------|----|-----|
| 10          | 80  | 70  | 71  | 40 | 15  | 35 | 40 | 15 | 4 | 2 | 39.5  | 10 | 25  |
| 20          | 80  | 70  | 71  | 40 | 15  | 35 | 40 | 15 | 4 | 2 | 39.5  | 10 | 35  |
| 30          | 80  | 70  | 71  | 40 | 15  | 35 | 40 | 15 | 4 | 2 | 39.5  | 10 | 45  |
| 40          | 92  | 82  | 83  | 25 | 42  | 50 | 25 | 17 | 4 | 3 | 51.5  | 10 | 55  |
| 50          | 112 | 102 | 103 | 36 | 51  | 35 | 36 | 15 | 6 | 3 | 61.5  | 20 | 65  |
| 75          | 158 | 148 | 149 | 72 | 61  | 55 | 36 | 25 | 6 | 4 | 87.5  | 40 | 90  |
| 100         | 212 | 202 | 203 | 76 | 111 | 65 | 38 | 35 | 6 | 5 | 131.5 | 50 | 115 |

### HLSL12(With shock absorber)



# AirTAC

## HLS16



**HLS16(With shock absorber)**

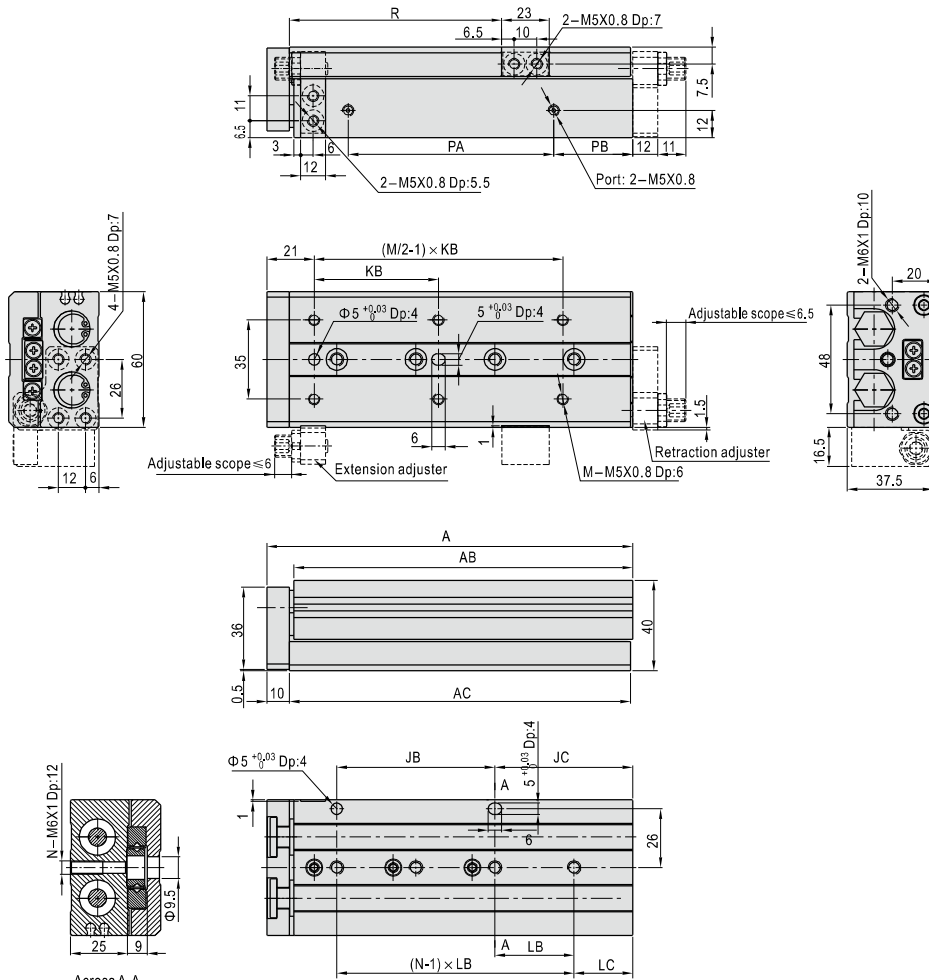


# Slide table cylinder(Cross roller type)

**AIRTAC**

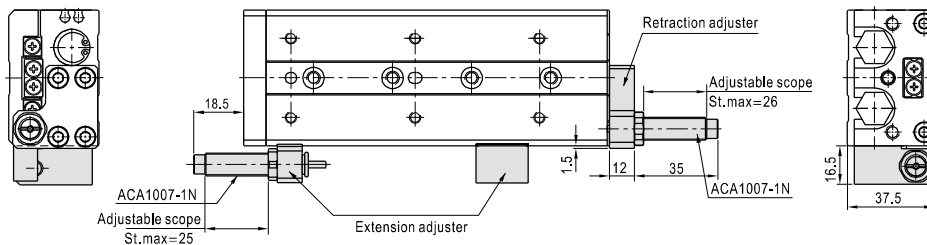
## HLS、HLSL Series

### HLSL16



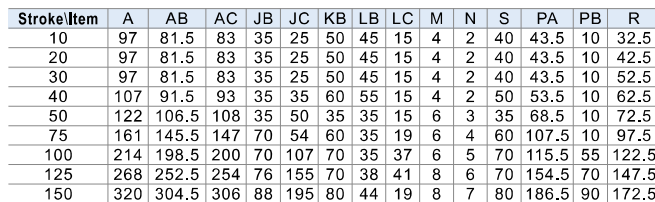
| Stroke\Item | A   | AB  | AC  | JB | JC  | KB | LB | LC | M | N | PA    | PB | R     |
|-------------|-----|-----|-----|----|-----|----|----|----|---|---|-------|----|-------|
| 10          | 87  | 75  | 76  | 40 | 16  | 35 | 40 | 16 | 4 | 2 | 42.5  | 8  | 28.5  |
| 20          | 87  | 75  | 76  | 40 | 16  | 35 | 40 | 16 | 4 | 2 | 42.5  | 8  | 38.5  |
| 30          | 87  | 75  | 76  | 40 | 16  | 35 | 40 | 16 | 4 | 2 | 42.5  | 8  | 48.5  |
| 40          | 97  | 85  | 86  | 50 | 16  | 40 | 50 | 16 | 4 | 2 | 52.5  | 8  | 58.5  |
| 50          | 112 | 100 | 101 | 30 | 51  | 30 | 30 | 21 | 6 | 3 | 63.5  | 12 | 68.5  |
| 75          | 162 | 150 | 151 | 70 | 61  | 55 | 35 | 26 | 6 | 4 | 90.5  | 35 | 93.5  |
| 100         | 210 | 198 | 199 | 70 | 109 | 65 | 35 | 39 | 6 | 5 | 118.5 | 55 | 118.8 |
| 125         | 260 | 248 | 249 | 70 | 159 | 70 | 35 | 19 | 8 | 7 | 153.5 | 70 | 143.5 |

### HLSL16(With shock absorber)



## AirTAC

HLS20



Technical drawing of the ACA1210-1N cable gland, showing front, side, and rear views with dimensions and labels.

**Front View (Left):** Shows the gland's profile with a diameter of  $\varnothing 12$  mm. The mounting plate has a diameter of  $\varnothing 14.5$  mm. The gland body has a diameter of  $\varnothing 15$  mm. The mounting plate has a diameter of  $\varnothing 14.5$  mm. The gland body has a diameter of  $\varnothing 15$  mm.

**Side View (Middle):** Shows the gland's profile with a diameter of  $\varnothing 12$  mm. The mounting plate has a diameter of  $\varnothing 14.5$  mm. The gland body has a diameter of  $\varnothing 15$  mm. The mounting plate has a diameter of  $\varnothing 14.5$  mm. The gland body has a diameter of  $\varnothing 15$  mm.

**Rear View (Right):** Shows the gland's profile with a diameter of  $\varnothing 12$  mm. The mounting plate has a diameter of  $\varnothing 14.5$  mm. The gland body has a diameter of  $\varnothing 15$  mm. The mounting plate has a diameter of  $\varnothing 14.5$  mm. The gland body has a diameter of  $\varnothing 15$  mm.

**Dimensions and Labels:**

- Adjustable scope St.max=23.5**: Dimension for the extension adjuster.
- ACA1210-1N**: Model number.
- Extension adjuster**: Label for the extension adjuster.
- 0.5**: Dimension for the extension adjuster.
- 15**: Dimension for the extension adjuster.
- 34**: Dimension for the extension adjuster.
- ACA1210-1N**: Model number.
- Adjustable scope St.max=25**: Dimension for the retraction adjuster.
- Retraction adjuster**: Label for the retraction adjuster.
- 46.5**: Dimension for the retraction adjuster.
- 21**: Dimension for the retraction adjuster.

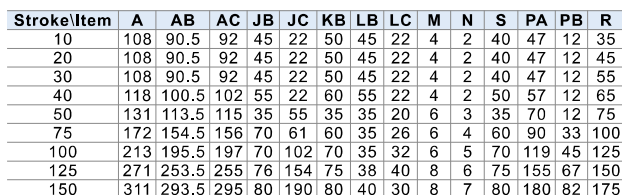


## AirTAC

| Stroke\Item | A   | AB    | AC  | JB | JC  | KB | LB | LC | M | N | S  | PA    | PB | R     |
|-------------|-----|-------|-----|----|-----|----|----|----|---|---|----|-------|----|-------|
| 10          | 97  | 81.5  | 83  | 35 | 25  | 50 | 45 | 15 | 4 | 2 | 40 | 43.5  | 10 | 32.5  |
| 20          | 97  | 81.5  | 83  | 35 | 25  | 50 | 45 | 15 | 4 | 2 | 40 | 43.5  | 10 | 42.5  |
| 30          | 97  | 81.5  | 83  | 35 | 25  | 50 | 45 | 15 | 4 | 2 | 40 | 43.5  | 10 | 52.5  |
| 40          | 107 | 91.5  | 93  | 35 | 35  | 60 | 55 | 15 | 4 | 2 | 50 | 53.5  | 10 | 62.5  |
| 50          | 122 | 106.5 | 108 | 35 | 50  | 35 | 35 | 15 | 6 | 3 | 35 | 68.5  | 10 | 72.5  |
| 75          | 161 | 145.5 | 147 | 70 | 54  | 60 | 35 | 19 | 6 | 4 | 60 | 107.5 | 10 | 97.5  |
| 100         | 214 | 198.5 | 200 | 70 | 107 | 70 | 35 | 37 | 6 | 5 | 70 | 115.5 | 55 | 122.5 |
| 125         | 268 | 252.5 | 254 | 76 | 155 | 70 | 38 | 41 | 8 | 6 | 70 | 154.5 | 70 | 147.5 |
| 150         | 320 | 304.5 | 306 | 88 | 195 | 80 | 44 | 19 | 8 | 7 | 80 | 186.5 | 90 | 172.5 |

# AirTAC

## HLS25



Technical drawing of the ACA1412-1N adjustable scope, showing front, side, and detail views with dimensions and labels.

**Front View (Left):** Shows the front of the scope with a central circular lens and four mounting holes. Dimensions include a total width of 56.5 and a height of 23.

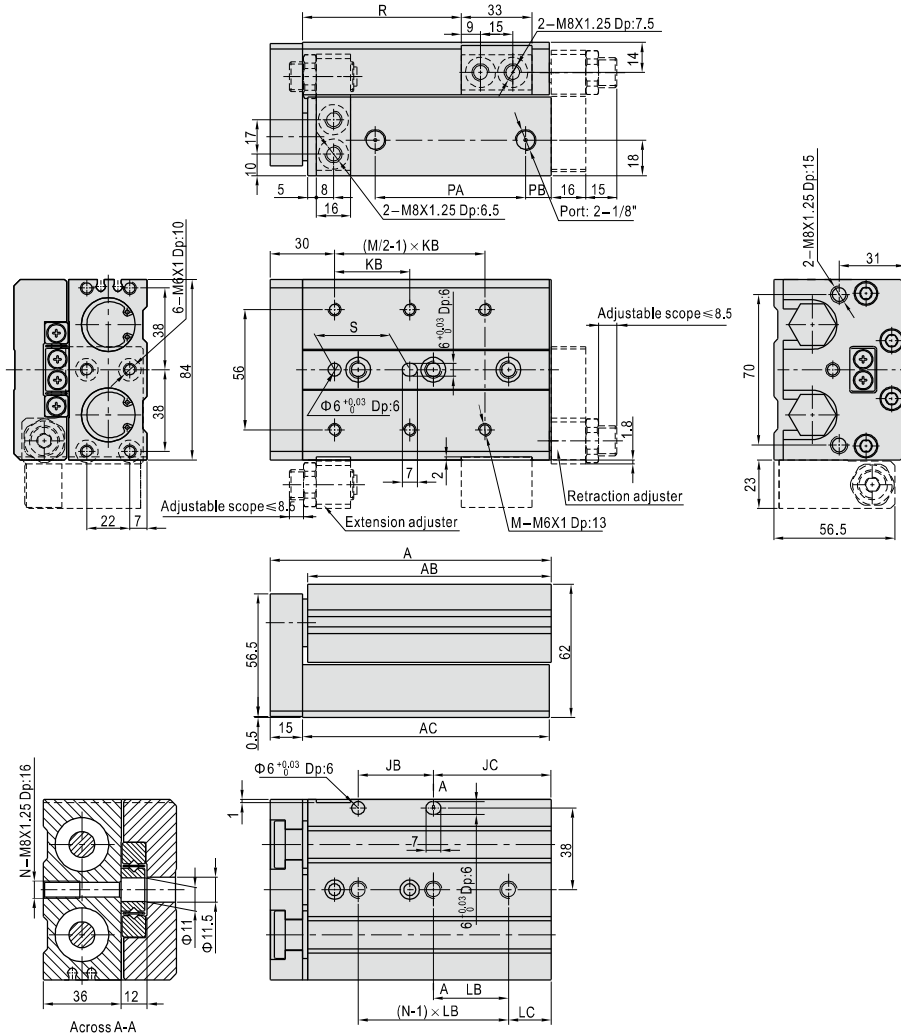
**Side View (Middle):** Shows the side of the scope with an adjustable scope (St.max=37.5) and an extension adjuster. Dimensions include a total length of 26, a mounting hole diameter of 1.8, and a distance of 16 from the extension adjuster to the mounting hole.

**Detail View (Right):** Shows a detail of the ACA1412-1N mounting hole with dimensions 49 and 16. It also shows an adjustable scope (St.max=38) and a retraction adjuster.

# Slide table cylinder(Cross roller type)

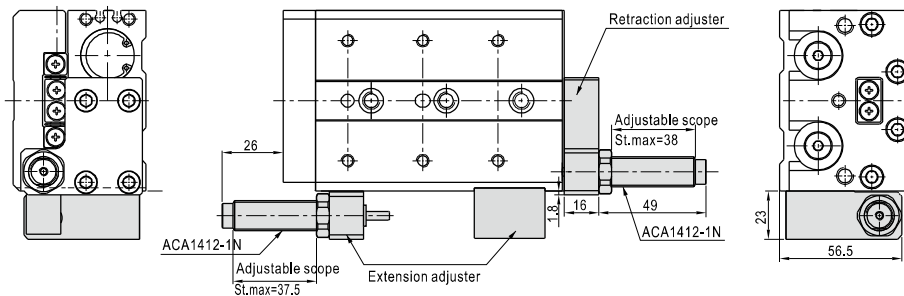
## HLS、HLSL Series

### HLSL25



| Stroke\Item | A   | AB    | AC  | JB | JC  | KB | LB | LC | M | N | S  | PA  | PB | R   |
|-------------|-----|-------|-----|----|-----|----|----|----|---|---|----|-----|----|-----|
| 10          | 108 | 90.5  | 92  | 45 | 22  | 50 | 45 | 22 | 4 | 2 | 40 | 47  | 12 | 35  |
| 20          | 108 | 90.5  | 92  | 45 | 22  | 50 | 45 | 22 | 4 | 2 | 40 | 47  | 12 | 45  |
| 30          | 108 | 90.5  | 92  | 45 | 22  | 50 | 45 | 22 | 4 | 2 | 40 | 47  | 12 | 55  |
| 40          | 118 | 100.5 | 102 | 55 | 22  | 60 | 55 | 22 | 4 | 2 | 50 | 57  | 12 | 65  |
| 50          | 131 | 113.5 | 115 | 35 | 55  | 35 | 35 | 20 | 6 | 3 | 35 | 70  | 12 | 75  |
| 75          | 172 | 154.5 | 156 | 70 | 61  | 60 | 35 | 26 | 6 | 4 | 60 | 90  | 33 | 100 |
| 100         | 213 | 195.5 | 197 | 70 | 102 | 70 | 35 | 32 | 6 | 5 | 70 | 119 | 45 | 125 |
| 125         | 271 | 253.5 | 255 | 76 | 154 | 75 | 38 | 40 | 8 | 6 | 75 | 155 | 67 | 150 |
| 150         | 311 | 293.5 | 295 | 80 | 190 | 80 | 40 | 30 | 8 | 7 | 80 | 180 | 82 | 175 |

### HLSL25(With shock absorber)



# Slide table cylinder(Cross roller type)

## HLS、HLSL Series—Accessories

### Accessory selection

|                    | Accessories\Bore size |                               | 6          | 8          | 12         |
|--------------------|-----------------------|-------------------------------|------------|------------|------------|
| Standard (HLS)     | Both ends             | A(Adjustable rubber stopper)  | F-HLS6A    | F-HLS8A    | F-HLS12A   |
|                    |                       | B(Shock absorber)             | ×          | F-HLS8B    | F-HLS12B   |
|                    | Extension             | AS(Adjustable rubber stopper) | F-HLS6AS   | F-HLS8AS   | F-HLS12AS  |
|                    |                       | BS(Shock absorber)            | ×          | F-HLQ8BS   | F-HLQ12BS  |
|                    | Retraction            | AF(Adjustable rubber stopper) | F-HLQ6AF   | F-HLS8AF   | F-HLS12AF  |
|                    |                       | BF(Shock absorber)            | ×          | F-HLS8BF   | F-HLS12BF  |
|                    |                       |                               |            |            |            |
|                    | Accessories\Bore size |                               | 16         | 20         | 25         |
| Standard (HLS)     | Both ends             | A(Adjustable rubber stopper)  | F-HLS16A   | F-HLS20A   | F-HLS25A   |
|                    |                       | B(Shock absorber)             | F-HLS16B   | F-HLS20B   | F-HLS25B   |
|                    | Extension             | AS(Adjustable rubber stopper) | F-HLS16AS  | F-HLS20AS  | F-HLS25AS  |
|                    |                       | BS(Shock absorber)            | F-HLQ16BS  | F-HLQ20BS  | F-HLQ25BS  |
|                    | Retraction            | AF(Adjustable rubber stopper) | F-HLS16AF  | F-HLS20AF  | F-HLS25AF  |
|                    |                       | BF(Shock absorber)            | F-HLS16BF  | F-HLS20BF  | F-HLS25BF  |
|                    |                       |                               |            |            |            |
|                    | Accessories\Bore size |                               | 6          | 8          | 12         |
| Symmetrical (HLSL) | Both ends             | A(Adjustable rubber stopper)  | F-HLQL6A   | F-HLSL8A   | F-HLSL12A  |
|                    |                       | B(Shock absorber)             | ×          | F-HLSL8B   | F-HLSL12B  |
|                    | Extension             | AS(Adjustable rubber stopper) | F-HLS6AS   | F-HLS8AS   | F-HLS12AS  |
|                    |                       | BS(Shock absorber)            | ×          | F-HLQ8BS   | F-HLQ12BS  |
|                    | Retraction            | AF(Adjustable rubber stopper) | F-HLQL6AF  | F-HLSL8AF  | F-HLSL12AF |
|                    |                       | BF(Shock absorber)            | ×          | F-HLSL8BF  | F-HLSL12BF |
|                    |                       |                               |            |            |            |
|                    | Accessories\Bore size |                               | 16         | 20         | 25         |
| Symmetrical (HLSL) | Both ends             | A(Adjustable rubber stopper)  | F-HLSL16A  | F-HLSL20A  | F-HLSL25A  |
|                    |                       | B(Shock absorber)             | F-HLSL16B  | F-HLSL20B  | F-HLSL25B  |
|                    | Extension             | AS(Adjustable rubber stopper) | F-HLS16AS  | F-HLS20AS  | F-HLS25AS  |
|                    |                       | BS(Shock absorber)            | F-HLQ16BS  | F-HLQ20BS  | F-HLQ25BS  |
|                    | Retraction            | AF(Adjustable rubber stopper) | F-HLSL16AF | F-HLSL20AF | F-HLSL25AF |
|                    |                       | BF(Shock absorber)            | F-HLSL16BF | F-HLSL20BF | F-HLSL25BF |

Note): A=AS+AF; B=BS+BF.

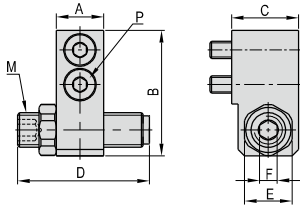
| F - HLS 20 AF |                   |             |                                           |
|---------------|-------------------|-------------|-------------------------------------------|
| 1 Accessory   | 2 Cylinder model  | 3 Bore size | 4 Accessory type[Note]                    |
|               | HLS: Standard     | 6           | A: Adjustable rubber stopper(Both ends)   |
|               |                   | 8           | AS: Adjustable rubber stopper(Extension)  |
|               |                   | 12          | AF: Adjustable rubber stopper(Retraction) |
|               |                   | 16          | B: Shock absorber (Both ends)             |
|               |                   | 20          | BF: Shock absorber (Retraction)           |
|               | HLSL: Symmetrical | 25          |                                           |

[Note]The list accessories are for HLS cylinder. Accessories that are adaptable to other cylinder are not shown. Please refer to accessory list for selection and ordering information.

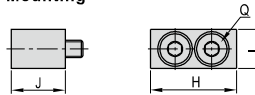
### Dimensions

#### AS: Adjustable rubber stopper(Extension)

##### Body Mounting



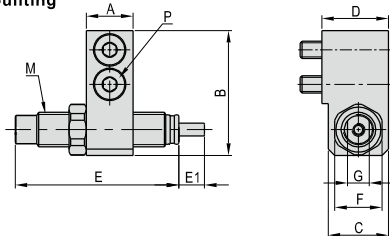
##### Table Mounting



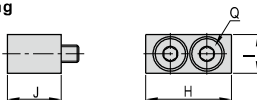
| Bore size\Item | Adjusting stroke range | A   | B    | C    | D    | E  | F | M       | P              | H    | I    | J    | Q              |
|----------------|------------------------|-----|------|------|------|----|---|---------|----------------|------|------|------|----------------|
| 6              | 5                      | 7   | 19   | 10.5 | 16.5 | 8  | 3 | M6×1.0  | M2.5 Length:10 | 12.5 | 6.5  | 10.5 | M2.5 Length:10 |
| 8              | 5                      | 8.5 | 21.5 | 14   | 21.5 | 11 | 4 | M8×1.0  | M3 Length:14   | 14.5 | 8    | 12   | M3 Length:14   |
| 12             | 5                      | 11  | 29   | 15.5 | 21.5 | 11 | 4 | M8×1.0  | M4 Length:16   | 20   | 9    | 13.5 | M4 Length:12   |
| 16             | 5                      | 12  | 36   | 17.5 | 24   | 14 | 5 | M10×1.0 | M5 Length:16   | 23   | 10.5 | 17   | M5 Length:16   |
| 20             | 5                      | 15  | 44.5 | 22   | 28   | 17 | 6 | M12×1.0 | M6 Length:20   | 25   | 12.5 | 21   | M6 Length:20   |
| 25             | 5                      | 16  | 53.5 | 24   | 32   | 19 | 6 | M14×1.5 | M8 Length:20   | 33   | 16.5 | 23   | M8 Length:20   |

#### BS: Shock absorber(Extension)

##### Body Mounting



##### Table Mounting



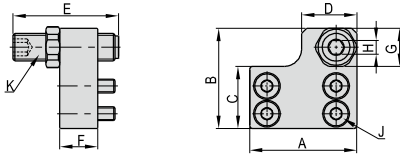
| Bore size\Item | A   | B    | C    | D    | E    | E1 | F  | G  | M       | P            | H    | I    | J    | Q            |
|----------------|-----|------|------|------|------|----|----|----|---------|--------------|------|------|------|--------------|
| 8              | 8.5 | 21.5 | 12.5 | 14   | 40   | 6  | 11 | 7  | M8×1.0  | M3 Length:14 | 14.5 | 8    | 12   | M3 Length:14 |
| 12             | 11  | 29   | 14   | 15.5 | 40   | 6  | 11 | 7  | M8×1.0  | M4 Length:16 | 20   | 9    | 13.5 | M4 Length:12 |
| 16             | 12  | 36   | 16   | 17.5 | 49   | 7  | 14 | 9  | M10×1.0 | M5 Length:16 | 23   | 10.5 | 17   | M5 Length:16 |
| 20             | 15  | 44.5 | 20   | 22   | 53.5 | 10 | 17 | 11 | M12×1.0 | M6 Length:20 | 25   | 12.5 | 21   | M6 Length:20 |
| 25             | 16  | 53.5 | 22   | 24   | 68.5 | 12 | 19 | 12 | M14×1.5 | M8 Length:20 | 33   | 16.5 | 23   | M8 Length:20 |

# Slide table cylinder(Cross roller type)

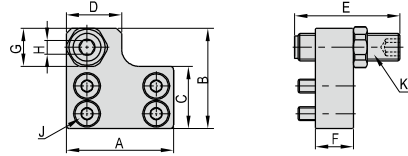
## HLS、HLSL Series—Accessories

### AF: Adjustable rubber stopper(Retraction)

#### For standard type



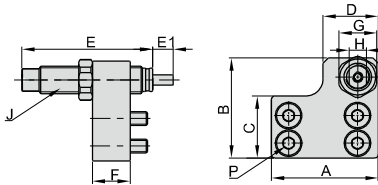
#### For symmetrical type



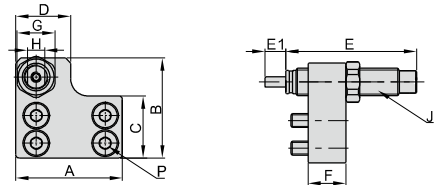
| Bore size\Item | Adjusting stroke range | A    | B    | C    | D  | E    | F   | G  | H | J             | K       |
|----------------|------------------------|------|------|------|----|------|-----|----|---|---------------|---------|
| 6              | 5                      | 18   | 19   | 11   | 8  | 21.5 | 7   | 8  | 3 | M2.5 Length:6 | M6×1.0  |
| 8              | 5                      | 24   | 22.5 | 13   | 14 | 21.5 | 8.5 | 11 | 4 | M3 Length:8   | M8×1.0  |
| 12             | 5                      | 31   | 29   | 18   | 16 | 21.5 | 11  | 11 | 4 | M4 Length:12  | M8×1.0  |
| 16             | 5                      | 37   | 37.5 | 23   | 18 | 24   | 12  | 14 | 5 | M5 Length:12  | M10×1.0 |
| 20             | 5                      | 45.5 | 47   | 28.5 | 23 | 28   | 15  | 17 | 6 | M5 Length:16  | M12×1.0 |
| 25             | 5                      | 54   | 56   | 34   | 28 | 32   | 16  | 19 | 6 | M6 Length:18  | M14×1.5 |

### BF: Shock absorber(Retraction)

#### For standard type



#### For symmetrical type



| Bore size\Item | A    | B    | C    | D  | E    | E1 | F   | G  | H  | J       | P            |
|----------------|------|------|------|----|------|----|-----|----|----|---------|--------------|
| 8              | 24   | 22.5 | 13   | 14 | 40   | 6  | 8.5 | 11 | 7  | M8×1.0  | M3 Length:8  |
| 12             | 31   | 29   | 18   | 16 | 40   | 6  | 11  | 11 | 7  | M8×1.0  | M4 Length:12 |
| 16             | 37   | 37.5 | 23   | 18 | 49   | 7  | 12  | 14 | 9  | M10×1.0 | M5 Length:12 |
| 20             | 45.5 | 47   | 28.5 | 23 | 53.5 | 10 | 15  | 17 | 11 | M12×1.0 | M5 Length:16 |
| 25             | 54   | 56   | 34   | 28 | 68.5 | 12 | 16  | 19 | 12 | M14×1.5 | M6 Length:18 |