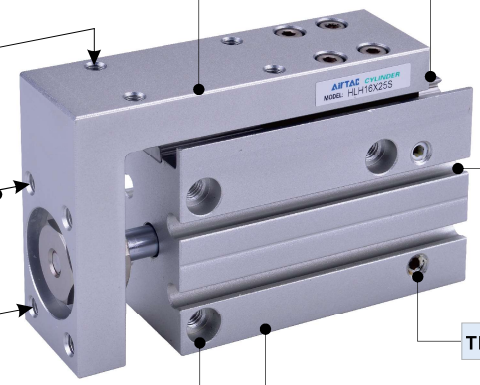
## Compendium of HLH Series

**Exactitude pilot**

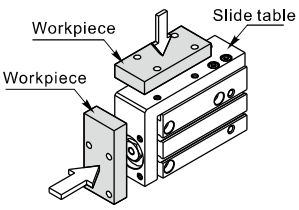
With the excellent straightness and non-rotation precision, it is more suitable for precision assembly.

**Integrative design**

Miniature linear roller ball bearing integrated wise cylinder.



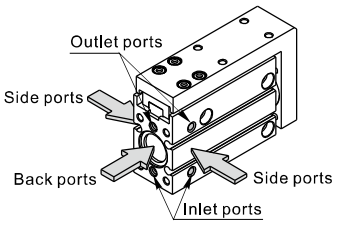

**Mounting workpiece from 2 directions**



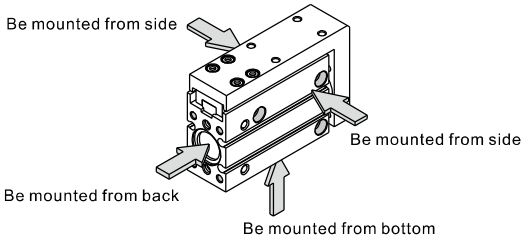

**With magnetic switch slots**

There are magnetic switch slots both sides of the cylinder body convenient to install inducting switch.

**Three groups of inlet and outlet air ports**




**Mounting cylinder from 4 directions**




**Four bore size are available**

Bore size: 6, 10, 16, 20

## Criteria for selection: Cylinder thrust

Unit : Newton(N)

| Bore size | Rod size | Acting type | | Pressure area($mm^2$) | Operating pressure(MPa) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| 6 | 3 | Double acting | Push-side | 28.3 | - | 5.7 | 8.5 | 11.3 | 14.2 | 17.0 | 19.8 |
| | | | Pull-side | 21.2 | - | 4.2 | 6.4 | 8.5 | 10.6 | 12.7 | 14.8 |
| 10 | 4 | Double acting | Push-side | 78.5 | 7.9 | 15.7 | 23.6 | 31.4 | 39.3 | 47.1 | 55.0 |
| | | | Pull-side | 66.0 | 6.6 | 13.2 | 19.8 | 26.4 | 33.0 | 39.6 | 46.2 |
| 16 | 6 | Double acting | Push-side | 201.0 | 20.1 | 40.2 | 60.3 | 80.4 | 100.5 | 120.6 | 140.7 |
| | | | Pull-side | 172.7 | 17.3 | 34.5 | 51.8 | 69.1 | 86.4 | 103.6 | 120.9 |
| 20 | 8 | Double acting | Push-side | 314.0 | 31.4 | 62.8 | 94.2 | 125.6 | 157.0 | 188.4 | 219.8 |
| | | | Pull-side | 263.8 | 26.4 | 52.8 | 79.1 | 105.5 | 131.9 | 158.3 | 184.7 |

## 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

## HLH Series

## Specification

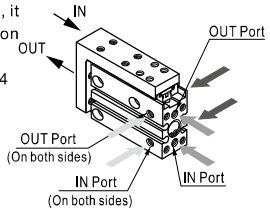
| Bore size(mm) | 6 | 10 | 16 | 20 |
|---|---|---|---|---|
| Acting type | Double acting | | | |
| Fluid | Air(to be filtered by 40μm filter element) | | | |
| Operating pressure | 0.2~0.7MPa(29~100psi)(2.0~7.0bar) | | 0.15~0.7MPa(22~100psi)(1.5~7.0bar) | |
| Proof pressure | 1.2MPa(175psi)(12.0bar) | | | |
| Temperature ℃ | -20~70 | | | |
| Speed range mm/s | 50~500 | | | |
| Allowable kinetic energy(J) | 0.008 | 0.025 | 0.05 | 0.1 |
| Stroke tolerance | $^{+1.0}_{0}$ | | | |
| Cushion type | Bumper | | | |
| Sensor switches [Note1] | CMSH, DMSH, EMSH | | | |
| Port size | M5×0.8 | | | |

[Note1] Refer to P362 for detail of sensor switch.

## Symbol

## Product feature

1. Miniature linear roller ball bearing integrated wise cylinder.
2. With the excellent straightness and non-rotation precision, it is more suitable for precision assembly.
3. Mounting is possible from 4 directions.
4. Piping is possible from 3 directions.




## Stroke

| Bore size (mm) | Standard stroke (mm) | Max.std stroke |
|---|---|---|
| 6 | 5 10 15 20 25 30 | 30 |
| 10 | 5 10 15 20 25 30 40 50 | 50 |
| 16 | 5 10 15 20 25 30 40 50 60 | 60 |
| 20 | 5 10 15 20 25 30 40 50 60 | 60 |

[Note] Consult us for non-standard stroke.

## Ordering code

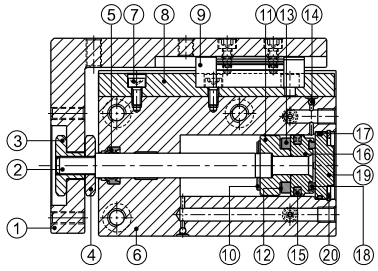
HLH 20 × 30 S

① ② ③ ④

| ①Model | ②Bore size | ③Stroke | ④Magnet |
|---|---|---|---|
| HLH: Slide table cylinder(Double acting type) | 6 10 16 20 | Refer to stroke table for details | S: With magnet |

## Inner structure and material of major parts

HLH

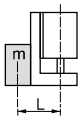
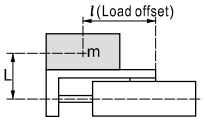



| NO. | Item | Material | NO. | Item | Material |
|---|---|---|---|---|---|
| 1 | Slide table | Aluminum alloy | 12 | Magnet washer | NBR |
| 2 | Piston rod | Stainless steel | 13 | Magnet | Sintered metal (Neodymium-iron-boron) |
| 3 | Hexagon nut | Carbon steel | | | |
| 4 | Hexagon nut | Carbon steel | 14 | Steel ball | SUS304 |
| 5 | Rod seal | NBR | 15 | Piston seal | NBR |
| 6 | Body | Aluminum alloy | 16 | Piston | Aluminum alloy |
| 7 | Screw | Carbon steel | 17 | O-ring | NBR |
| 8 | Linear guide | Stainless steel | 18 | Bumper | TPU |
| 9 | Slide block | | 19 | Back cover | Aluminum alloy |
| 10 | Bumper | TPU | 20 | C clip | Spring steel |
| 11 | Magnet holder | Aluminum alloy | | | |

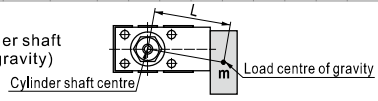
Note: inner structure & material data sheet is based on certain bore size.
Please contact AirTAC if you need inner structure & material data sheet for specific bore size.

## Model Selection Method

1. Select the bore size according to the thrust and practicality. Refer to the table on page 187.
2. Determine the selection conditions in order, starting from the upper row in the table below, and choose one of the selection graphs to be used.

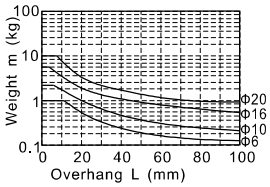
| | Vertical | | | Horizontal | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mounting position |  | | |  | | | | | | | | |
| Maximum speed(mm/s) | ≤100 | ≤300 | ≤500 | ≤100 | | | ≤300 | | | ≤500 | | |
| Load offset l(mm) | - | - | - | 50 | 100 | 200 | 50 | 100 | 200 | 50 | 100 | 200 |
| Selection graph | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |

L: Overhang
(the distance from the cylinder shaft centre to the load centre of gravity)

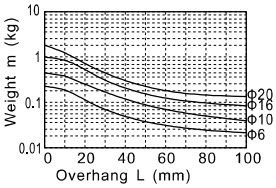



2.1) The relation between loading and overhang(Selection graphs)

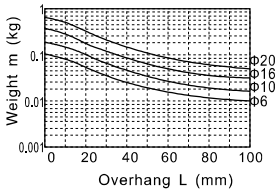
**Selection Graphs(1)**
Maximum speed 100(mm/s) or less



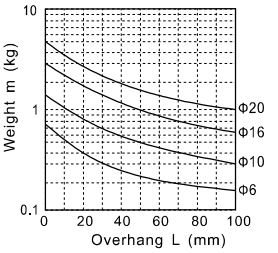

**Selection Graphs(2)**
Maximum speed 300(mm/s) or less



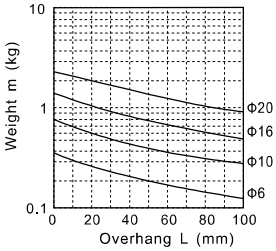

**Selection Graphs(3)**
Maximum speed 500(mm/s) or less



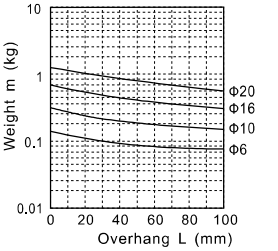

**Selection Graphs(4)**
Maximum speed 100(mm/s) or less
Load eccentricity 50mm



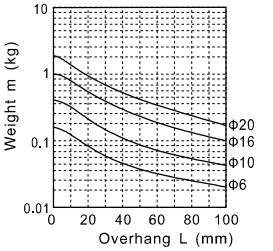

**Selection Graphs(5)**
Maximum speed 100(mm/s) or less
Load eccentricity 100mm



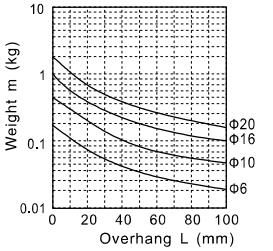

**Selection Graphs(6)**
Maximum speed 100(mm/s) or less
Load eccentricity 200mm



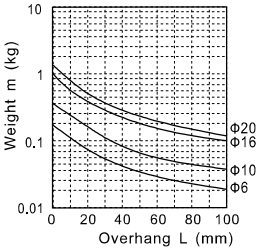

**Selection Graphs(7)**
Maximum speed 300(mm/s) or less
Load eccentricity 50mm



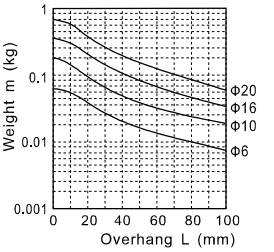

**Selection Graphs(8)**
Maximum speed 300(mm/s) or less
Load eccentricity 100mm



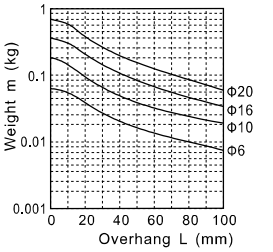

**Selection Graphs(9)**
Maximum speed 300(mm/s) or less
Load eccentricity 200mm



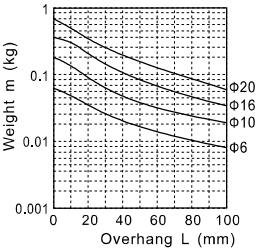

**Selection Graphs(10)**
Maximum speed 500(mm/s) or less
Load eccentricity 50mm




**Selection Graphs(11)**
Maximum speed 500(mm/s) or less
Load eccentricity 100mm




**Selection Graphs(12)**
Maximum speed 500(mm/s) or less
Load eccentricity 200mm




2.2) Selection Examples

Example ①: Mounting: Vertical
Maximum speed: 500mm/s
Overhang: 40mm
Load weight: 0.1Kg

Refer to Graph based on vertical mounting and a speed of 500mm/s.
In Graph , find the intersection of a 40mm overhang and load weight of 0.1Kg, which results in a selection of ø20.

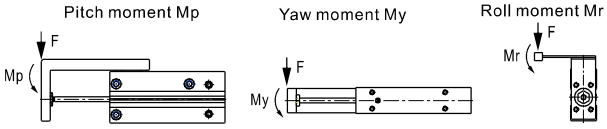
Example ②: Mounting: Horizontal
Maximum speed: 500mm/s
Load eccentricity: 50mm
Overhang: 30mm
Load weight: 0.1Kg

Refer to Graph based on horizontal mounting, a speed of 500mm/s and load eccentricity of 50mm.In Graph , find the intersection of a 30mm overhang and load weight of 0.1Kg, which results in a selection of ø16.

## Installation and application

1. The actual loading and moment of cylinder must be less than it's allowable loading and moment:

1.1) The allowable moment of cylinder

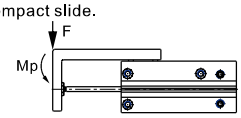



| Model/Allowable torque (Nm) | Pitch moment Mp | Yaw moment My | Roll moment Mr |
|---|---|---|---|
| HLH6 | 0.25 | 0.25 | 0.41 |
| HLH10 | 0.95 | 0.95 | 1.49 |
| HLH16 | 3.28 | 3.28 | 3.45 |
| HLH20 | 6.29 | 6.29 | 6.61 |

1.2) When the cylinder is subjected to different type of moment, there will be different degree of shift in performance, please refer to the following table for details.

**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.



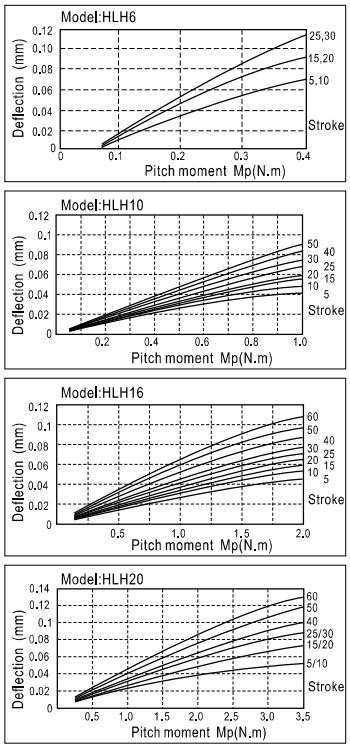
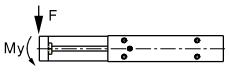




**Table deflection due to yaw moment**

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



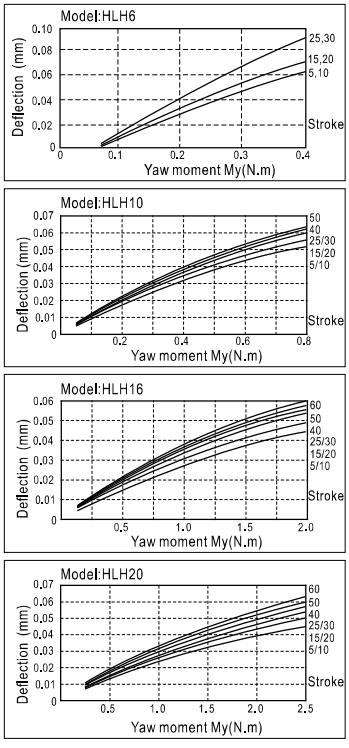
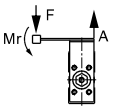
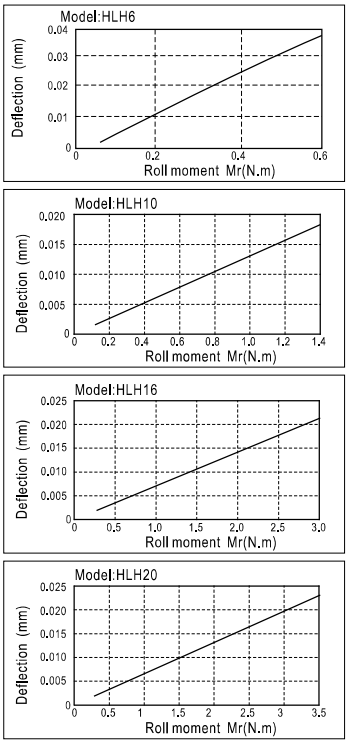



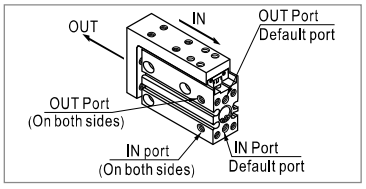

**Table deflection due to roll moment**

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

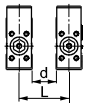



2. The compact slide can be piped from 3 directions. Confirm the pressure ports and operating direction. (See drawing right )




3. In compact slides with sensor switch, there is a danger of sensor switch malfunction if the mounting pitch is less than the dimensions shown in Table right. Be sure to allow at least the indicated interval.




| At least indicated interval (mm)/Model | HLH6 | HLH10 | HLH16 | HLH20 |
|---|---|---|---|---|
| d | 5 | 5 | 10 | 15 |
| L | 21 | 25 | 35 | 47 |

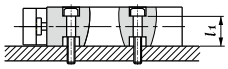
4. When the output of the compact slide will be directly applied to the table, it should be applied along the rod axis. (See drawing below.)


The loading and piston rod are coaxial

The loading and piston rod are offset

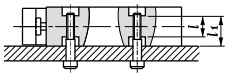
5. Be sure to use a flow control valve, and adjust the speed to 500mm/s or less.
6. A compact slide can be mounted from 4 directions. Don't exceed the max. fastening torque then frightening the mounting bolts.

**Lateral Mounting(Through Holes)**



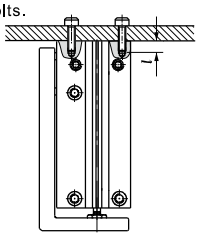
| Model | Bolts | Max.fastening torque | L1 |
|---|---|---|---|
| HLH6 | M3×0.5 | 1.1(Nm) | 12.7 |
| HLH10 | M4×0.7 | 2.5(Nm) | 15.6 |
| HLH16 | M4×0.7 | 2.5(Nm) | 20.6 |
| HLH20 | M5×0.8 | 5.1(Nm) | 24.0 |

**Lateral Mounting(Tapped Holes)**

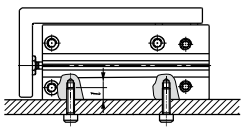


| Model | Bolts | Max.fastening torque | L1 | L |
|---|---|---|---|---|
| HLH6 | M4×0.7 | 2.5(Nm) | 12.7 | 9.4 |
| HLH10 | M5×0.8 | 5.1(Nm) | 15.6 | 11.2 |
| HLH16 | M5×0.8 | 5.1(Nm) | 20.6 | 16.2 |
| HLH20 | M6×1.0 | 8.1(Nm) | 24.0 | 16.0 |

**Axial Mounting(Tapped Holes)**



**Vertical Mounting(Tapped Holes)**

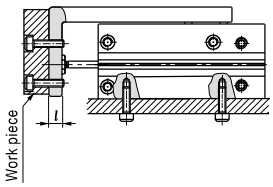


| Model | Bolts | Max.fastening torque | L |
|---|---|---|---|
| HLH6 | M3×0.5 | 1.1(Nm) | 5 |
| HLH10 | M4×0.7 | 2.5(Nm) | 6 |
| HLH16 | M4×0.7 | 2.5(Nm) | 6 |
| HLH20 | M5×0.8 | 5.1(Nm) | 8 |

7. Work Piece Mounting

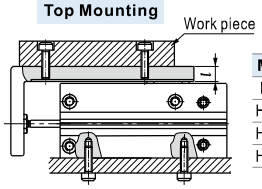
7.1) Work pieces can be mounted on 2 surfaces of the compact slide. When mounting a work piece, tighten the bolts properly at a torque value within the limiting range.

**Front Mounting**




| Model | Bolts | Max.fastening torque | L |
|---|---|---|---|
| HLH6 | M3×0.5 | 1.1(Nm) | 5.5 |
| HLH10 | M4×0.7 | 2.5(Nm) | 7.5 |
| HLH16 | M4×0.7 | 2.5(Nm) | 10 |
| HLH20 | M5×0.8 | 5.1(Nm) | 11 |

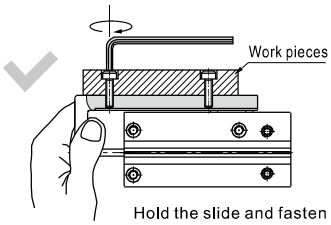
**Top Mounting**



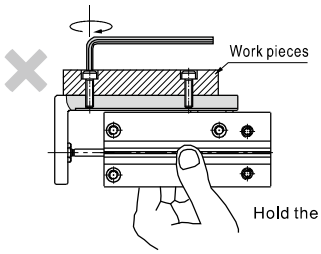

| Model | Bolts | Max.fastening torque | L |
|---|---|---|---|
| HLH6 | M3×0.5 | 1.1(Nm) | 6.5 |
| HLH10 | M4×0.7 | 2.5(Nm) | 8 |
| HLH16 | M4×0.7 | 2.5(Nm) | 9 |
| HLH20 | M5×0.8 | 5.1(Nm) | 9.5 |

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

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



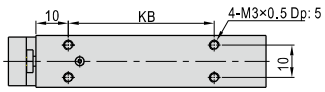

Hold the slide and fasten the bolt

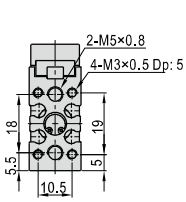


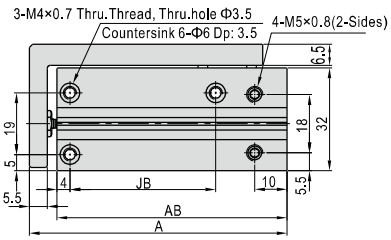

Hold the body and fasten the bolt

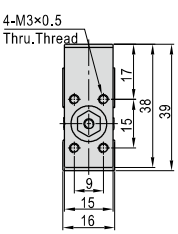
## Dimensions

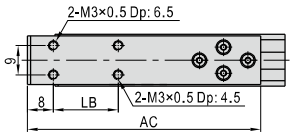
**HLH6**



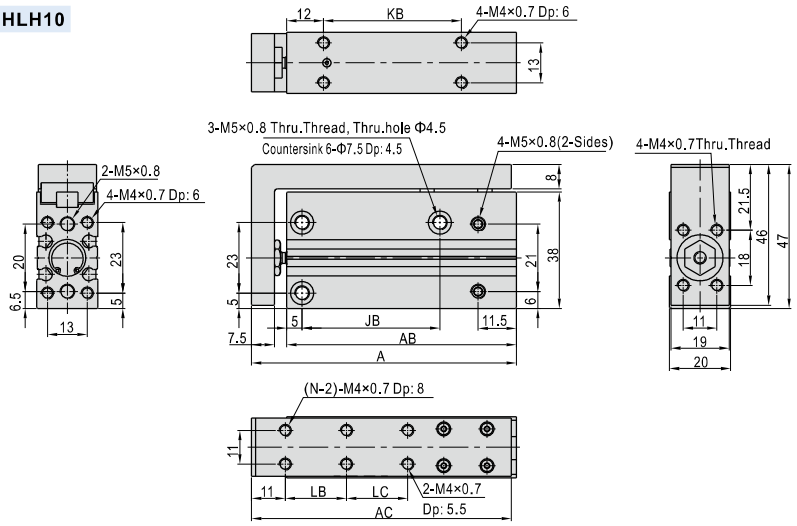



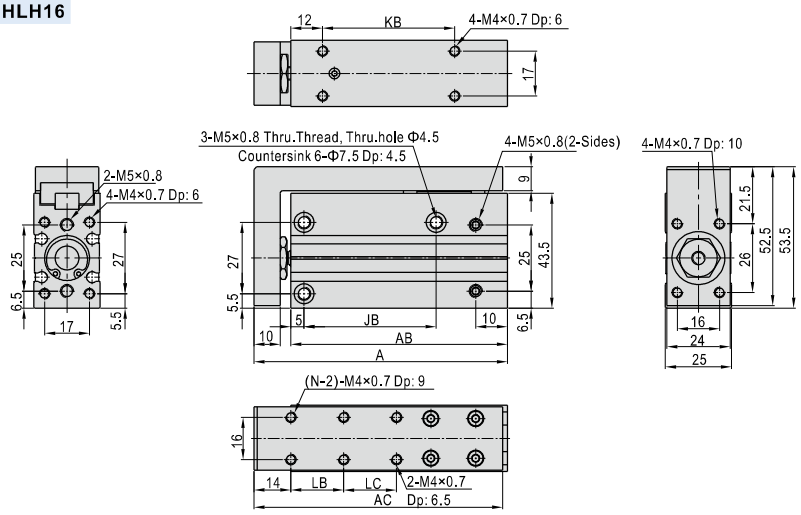

| Stroke\Item | A | AB | AC | JB | KB | LB |
|---|---|---|---|---|---|---|
| 5 | 44.5 | 36 | 42 | 14 | 10 | 10 |
| 10 | 49.5 | 41 | 42 | 14 | 15 | 10 |
| 15 | 54.5 | 46 | 52 | 24 | 20 | 20 |
| 20 | 59.5 | 51 | 52 | 24 | 25 | 20 |
| 25 | 64.5 | 56 | 62 | 30 | 30 | 30 |
| 30 | 69.5 | 61 | 62 | 30 | 35 | 30 |

## HLH10



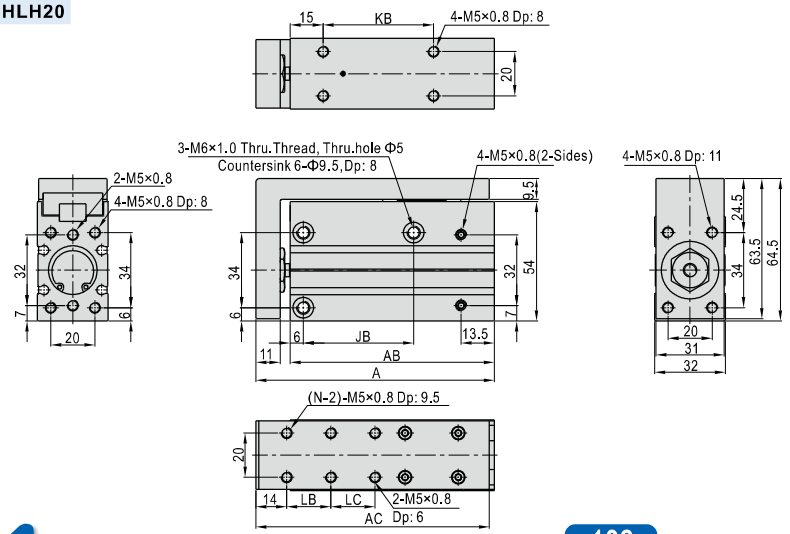

| Stroke\Item | A | AB | AC | JB | KB | LB | LC | N |
|---|---|---|---|---|---|---|---|---|
| 5 | 51.5 | 40 | 50 | 14 | 10 | 10 | - | 6 |
| 10 | 56.5 | 45 | 55 | 14 | 15 | 10 | - | 6 |
| 15 | 61.5 | 50 | 60.5 | 24 | 20 | 20 | - | 6 |
| 20 | 66.5 | 55 | 63 | 24 | 25 | 20 | - | 6 |
| 25 | 71.5 | 60 | 70.5 | 30 | 30 | 30 | - | 6 |
| 30 | 76.5 | 65 | 75.5 | 30 | 35 | 30 | - | 6 |
| 40 | 86.5 | 75 | 85.5 | 45 | 45 | 20 | 20 | 8 |
| 50 | 96.5 | 85 | 93 | 55 | 55 | 25 | 25 | 8 |

## HLH16




| Stroke\Item | A | AB | AC | JB | KB | LB | LC | N |
|---|---|---|---|---|---|---|---|---|
| 5 | 61 | 47 | 60 | 20 | 15 | 10 | - | 6 |
| 10 | 66 | 52 | 64.5 | 20 | 20 | 10 | - | 6 |
| 15 | 71 | 57 | 69.5 | 30 | 25 | 20 | - | 6 |
| 20 | 76 | 62 | 75 | 30 | 30 | 20 | - | 6 |
| 25 | 81 | 67 | 80 | 40 | 35 | 30 | - | 6 |
| 30 | 86 | 72 | 84.5 | 40 | 40 | 30 | - | 6 |
| 40 | 96 | 82 | 95 | 50 | 50 | 20 | 20 | 8 |
| 50 | 106 | 92 | 104.5 | 60 | 60 | 25 | 25 | 8 |
| 60 | 116 | 102 | 114.5 | 60 | 70 | 30 | 30 | 8 |

## HLH20




| Stroke\Item | A | AB | AC | JB | KB | LB | LC | N |
|---|---|---|---|---|---|---|---|---|
| 5 | 73 | 57.5 | 72 | 20 | 15 | 10 | - | 6 |
| 10 | 78 | 62.5 | 72 | 20 | 20 | 10 | - | 6 |
| 15 | 83 | 67.5 | 82 | 25 | 25 | 20 | - | 6 |
| 20 | 88 | 72.5 | 82 | 25 | 30 | 20 | - | 6 |
| 25 | 93 | 77.5 | 92 | 40 | 35 | 30 | - | 6 |
| 30 | 98 | 82.5 | 92 | 40 | 40 | 30 | - | 6 |
| 40 | 108 | 92.5 | 101.5 | 50 | 50 | 20 | 20 | 8 |
| 50 | 118 | 102.5 | 113.5 | 70 | 60 | 25 | 25 | 8 |
| 60 | 128 | 112.5 | 122.5 | 70 | 70 | 30 | 30 | 8 |