*Square, thin body allows selection of mounting and piping direction, and expands flexibility of device design.*

# JIG CYLINDERS WITH GUIDES
# φ12～φ63

## Select guide rod bearing according to application

Wide range includes scraper specification to prevent dust from entering.

1.Slide bearing type
Superior wear resistance makes it optimum for stopper or other devices needing resistance to lateral loads with shocks.

2.Rolling bearing type
Smooth operation with high precision makes it optimum for pushers and lifters.

## Enables piping from 2 directions

Rational device design allows selection of piping location according to the mounting environment. In addition, the piping for dust collection ports used in cylinders for clean systems can also be approached from 2 directions.

## Cylinders for clean systems also in line-up

Cleanliness rating corresponds to Class 5 (FED-STD209E Class 100 equivalent) (according to Koganei test standards).

## Slender-figured sensor switch

Magnets for sensor switches are standard on all models. Embedded shape avoids protrusion of switches, to simplify mounting in tight spaces.

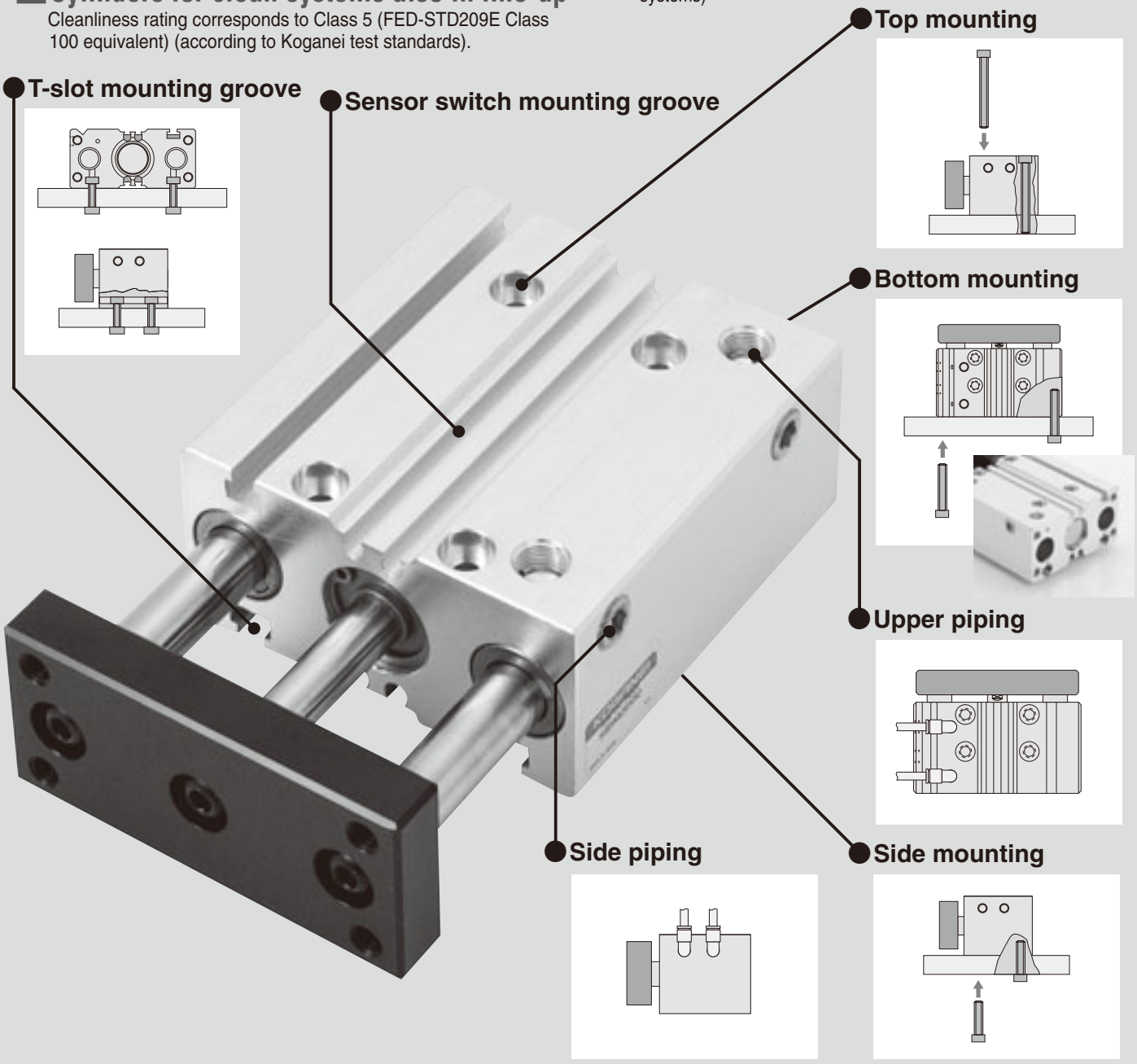
## End keep cylinder also available

End keep mechanism supports stable operation in the vertical direction to prevent workpiece from falling caused by shut off in the air supply or any decrease of air pressure.

## Four types of mounting possible

## Non-ion as a Standard

Can be used on Cathode-ray tube (CRT) manufacturing lines, etc., since copper materials are not used. (Except cylinders for clean systems)



Slim & Compact shape

**JIG CYLINDERS WITH GUIDES**

Optimum for conveyor line stoppers or lifters.
Moreover, end keep mechanism for greater use!

# SQUARE FLEXIBLE POWERFUL

## ■ Standard Cylinders

## ■ Stroke Adjusting Cylinders

## ■ End Keep Cylinders

## ● Stroke Adjusting Cylinders

Adjusting rod can be used to adjust the range of the push-side stroke by 0～10mm [0～0.394in.].

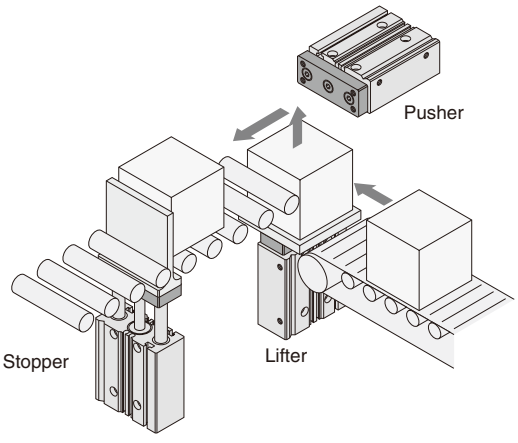
## ● End Keep Cylinders

Flat shape prevents the keep portion from protruding from the side surface, to allow easy mounting in tight spaces.

## ■ Cylinders for Clean Systems

## ■ Sensor Switches

Application example



# Handling Instructions and Precautions

## Mounting

1. While any mounting direction is allowed, the mounting surface should always be flat. Twisting or bending during mounting may disturb the accuracy and may also result in air leaks or improper operation.
2. Care should be taken that scratches or dents on the cylinder's mounting surface may damage its flatness.
3. The hexagon socket head bolt on the rod end plate has been secured with adhesive. Always confirm that the rod end plate and hexagon socket head bolts are secured before using the cylinder.
4. In applications subject to large shocks, reinforcing the bolt mounting, by installing a support to the cylinder body for example, is recommended.
5. Ensure that the mounting bolts for the cylinder body and end plate are sufficiently strong.
6. Take preventive measures when shocks or vibrations might loosen the bolts.
7. Do not leave scratches or dents in the areas where the piston rod and the guide rod contact. It could result in damage to the seal or in air leaks.
8. The piston rod and guide rod are coated with grease. Do not wipe it off, as it may result in improper operation. Apply grease if no lubrication is visible.
   Grease: General type; Lithium grease No. 2

## Sensor switch

The magnet for sensor switches is built into the cylinder. Mounting sensor switch will enable use in sensor switch applications.

**Caution:** For the sensor switch mounting location and moving instructions, see p.734.

## Atmosphere

1. If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use a cover to protect the unit.
2. Do not use the cylinder in ambient atmospheres that could result in corrosion. Application in this kind of environment may result in damage or in improper operation.
3. Do not use in extremely dry conditions.
4. The most desirable temperature range for cylinders is 5～60°C [41～140°F]. Do not use in condition where temperatures exceed 60°C [140°F], as it could result in damage or in improper operation. In addition, since the moisture content at temperatures below 5°C [41°F] could freeze, resulting in damage or in improper operation, care should be taken to prevent freezing.

## General precautions

1. Always thoroughly blow off (use compressed air) the tubing before piping. Entering chips, sealing tape, rust, etc., generated during piping work could result in air leaks or other defective operation.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40 μm) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically. Collected liquid or dust entering the cylinder may cause improper operation.
3. The product can be used without lubrication, if lubrication is required, use Turbine Oil Class 1 (ISO VG32) or equivalent. Avoid using spindle oil or machine oil.

## When in use

1. Do not place hands, etc., in the cylinder's operating range.
2. Pay full attention to the cylinder operating direction during set up.
3. Care should be taken to avoid trapping body or fingers between the cylinder body and the end plate when the cylinder retracts.
4. Confirm that no residual pressure remains inside the cylinder before commencing maintenance.
5. In its application as a stopper, it is assumed that the carried objects will be cardboard boxes, plastic cases, etc. In cases where steel and other metal blocks are carried, select a sufficiently margined safer product or take measures to fully absorb the impacts.
6. Use the cylinder at speed of 500mm/s [19.7in./sec.] or less. But when the speed and loads are high even within the allowable ranges, install an external stopper, etc., to ensure that the cylinder is not exposed to direct shocks.
7. Do not use **SGDA□Q** (rolling bearing type) as a stopper.

## Control circuit for the end keep cylinder

1. For control of the Jig End Keep Cylinder with Guide, we recommend the use of 2-position, 4-, 5-port valves. Avoid the use of control circuit with ABR connection (exhaust center) 3-position valves that exhaust air from 2 delivery ports.
2. Always use meter-out control for speed control. Meter-in control may result in failure of the locking mechanism to release.

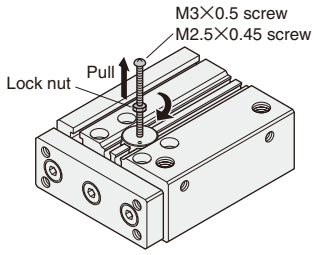
**Cautions: 1.** It is dangerous to supply air to a connection port on a side with a locking mechanism while the cylinder has already been exhausted, because the piston rod may suddenly extend (or retract). In addition, since the lock piston could also cause galling of the lock piston and piston rod, resulting in defective operation. Always supply air to the connection port on the opposite side of the locking mechanism to ensure applying back pressure.

**2.** When restarting operations after air has been exhausted from the cylinder due to completion of operations or to an emergency stop, always start by supplying air to a connection port on the opposite side of the locking mechanism.

**3.** Connect the valve port A (NC) to the connection port on the side with the locking mechanism.

## Manual operation of locking mechanism

While the locking mechanism is normally released automatically through cylinder operations, it can also be released manually. For manual release, insert an M3×0.5 ( $\phi$ 12, 16 is M2.5×0.45) screw that has 30mm [1.18in.] screw length into the opening for manual override, thread it in about 3 turns into the internal lock piston, and then pull up the screw. To maintain the manual override for adjustment, etc., thread the locknut onto the screw and, with the locking mechanism in a released state, tighten the locknut against the cylinder.




**Cautions: 1.** It is dangerous to release the lock when load (weight) is present on the piston rod, because it may cause the unintended piston rod's extension (or retraction). In this case, always supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.

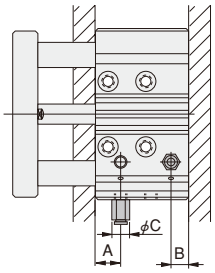
**2.** If the locking mechanism cannot easily be released even with manual override, it could be the result of galling of the lock piston and piston rod. In this case, supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.

**3.** Water, oil, dust, etc., intruding through the opening for manual override may be a cause of defective locks or other erratic operation. If using in locations subject to dripping water, dripping oil, etc., or large amounts of dust, use a cover to protect the unit.



## Precautions for Mounting of Fittings

● In the installation shown in the diagram below, be aware of the fitting outer diameter.

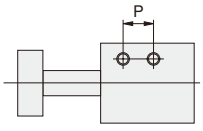



※ Positions A and B are dimensions of the port location closer to the end surface of the body.

mm [in.]

| Bore size | Port size | Port location A | Port location B | Fitting outer diameter $\phi$C |
|---|---|---|---|---|
| **12 [0.472]** | M5× 0.8 | 9 [0.354] | 6 [0.236] | $\phi$11 [0.433] or less |
| **16 [0.630]** | | | 7.5 [0.295] | $\phi$13 [0.512]or less |
| **20 [0.787]** | Rc1/8 | 11 [0.433] | 10 [0.394] | $\phi$19 [0.748] or less |
| **25 [0.984]** | | 12 [0.472] | | |
| **32 [1.260]** | Rc1/8 | 10 [0.394] | 12 [0.472] | $\phi$19 [0.748] or less |
| **40 [1.575]** | | 14 [0.551] | 13 [0.512] | $\phi$25 [0.984] or less |
| **50 [1.969]** | Rc1/4 | 10 [0.394] | 15 [0.591] | $\phi$19 [0.748] or less |
| **63 [2.480]** | | | 14 [0.551] | |

● In products with a stroke of 10mm, be aware of the P dimension when using the side ports.




mm [in.]

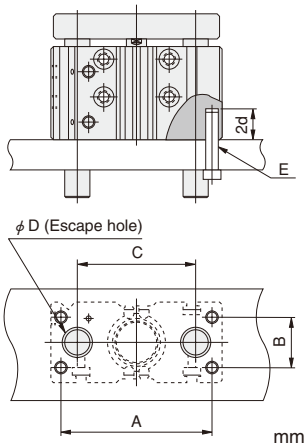
| Bore size | Port size | Between-ports dimension P | Fitting outer diameter $\phi$C |
|---|---|---|---|
| **12 [0.472]** | M5× 0.8 | 12 [0.472] | $\phi$11 [0.433] or less |
| **16 [0.630]** | | | |
| **20 [0.787]** | Rc1/8 | 15 [0.591] | $\phi$14 [0.551] or less |
| **25 [0.984]** | | | |
| **32 [1.260]** | | | |
| **40 [1.575]** | | | |
| **50 [1.969]** | Rc1/4 | 16 [0.630] | $\phi$15 [0.591] or less |
| **63 [2.480]** | | | |

Caution: Apply sealants when re-using a block-off plug. Avoid getting sealant into the cylinder.

## Precautions When Bottom Mounting

● Drill the guide rod escape hole when the stroke is 75mm or longer (except for **SGDAK**□ 12).

● When using as a stopper, etc., subject to shocks, the mounting screw's mating thread length should be as close to 2d as possible.

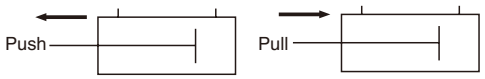



mm [in.]

| Bore size | A | B | C | $\phi$D SGDA□ Slide bearing | $\phi$D SGDA□Q Rolling bearing | Bolt E for mounting |
|---|---|---|---|---|---|---|
| **12 [0.472]** | 51 [2.008] | 18 [0.709] | 42 [1.654] | 10 [0.394] | 8 [0.315] | M4×0.7 |
| **16 [0.630]** | 60 [2.362] | 20 [0.787] | 47 [1.850] | 12 [0.472] | 10 [0.394] | M5×0.8 |
| **20 [0.787]** | 72 [2.835] | 26 [1.024] | 58 [2.283] | 16 [0.630] | 14 [0.551] | M6×1 |
| **25 [0.984]** | 80 [3.150] | 30 [1.181] | 63 [2.480] | 18 [0.709] | 16 [0.630] | M6×1 |
| **32 [1.260]** | 100 [3.937] | 34 [1.339] | 80 [3.150] | 22 [0.866] | 18 [0.709] | M8×1.25 |
| **40 [1.575]** | 106 [4.173] | 40 [1.575] | 90 [3.543] | 22 [0.866] | 18 [0.709] | M8×1.25 |
| **50 [1.969]** | 130 [5.118] | 44 [1.732] | 110 [4.331] | 27 [1.063] | 22 [0.866] | M10×1.5 |
| **63 [2.480]** | 144 [5.669] | 44 [1.732] | 122 [4.803] | 27 [1.063] | 22 [0.866] | M10×1.5 |

## Cylinder Thrust

Select a suitable cylinder bore size considering the load and air pressure to obtain the required thrust. Since the figures in the table are calculated values, select a bore size that results in a load ratio (load ratio = $\frac{\text{Load}}{\text{Calculated value}}$) of 70% or less (50% or less for high speed application).




N [lbf.]

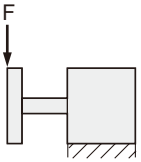
| Bore size mm [in.] | Piston rod diameter mm [in.] | Operation | Pressure area mm² [in²] | Air pressure MPa [psi.] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.1 [15] | 0.2 [29] | 0.3 [44] | 0.4 [58] | 0.5 [73] | 0.6 [87] | 0.7 [102] | 0.8 [116] | 0.9 [131] | 1.0 [145] |
| **12 [0.472]** | 6 [0.236] | Push side | 113.0 [0.1752] | 11.3 [2.54] | 22.6 [5.08] | 33.9 [7.62] | 45.2 [10.2] | 56.5 [12.7] | 67.8 [15.2] | 79.1 [17.8] | 90.4 [20.3] | 101.7 [22.86] | 113.0 [25.40] |
| | | Pull side | 84.8 [0.1314] | 8.5 [1.91] | 17.0 [3.82] | 25.4 [5.71] | 33.9 [7.62] | 42.4 [9.53] | 50.9 [11.4] | 59.3 [13.3] | 67.8 [15.2] | 76.3 [17.15] | 84.8 [19.06] |
| | | Stroke adjustment | 84.8 [0.1314] | 8.5 [1.91] | 17.0 [3.82] | 25.4 [5.71] | 33.9 [7.62] | 42.4 [9.53] | 50.9 [11.4] | 59.3 [13.3] | 67.8 [15.2] | 76.3 [17.15] | 84.8 [19.06] |
| **16 [0.630]** | 8 [0.315] | Push side | 201.0 [0.3116] | 20.1 [4.52] | 40.2 [9.04] | 60.3 [13.6] | 80.4 [18.1] | 100.5 [22.59] | 120.6 [27.11] | 140.7 [31.63] | 160.8 [36.15] | 180.9 [40.67] | 201.0 [45.18] |
| | | Pull side | 150.7 [0.2336] | 15.1 [3.39] | 30.1 [6.77] | 45.2 [10.2] | 60.3 [13.6] | 75.4 [16.95] | 90.4 [20.32] | 105.5 [23.72] | 120.6 [27.11] | 135.6 [30.48] | 150.7 [33.88] |
| | | Stroke adjustment | 150.7 [0.2336] | 15.1 [3.39] | 30.1 [6.77] | 45.2 [10.2] | 60.3 [13.6] | 75.4 [16.95] | 90.4 [20.32] | 105.5 [23.72] | 120.6 [27.11] | 135.6 [30.48] | 150.7 [33.88] |
| **20 [0.787]** | 10 [0.394] | Push side | 314.0 [0.4867] | 31.4 [7.06] | 62.8 [14.1] | 94.2 [21.2] | 125.6 [28.23] | 157.0 [35.29] | 188.4 [42.35] | 219.8 [49.41] | 251.2 [56.47] | 282.6 [63.53] | 314.0 [70.59] |
| | | Pull side | 235.5 [0.3650] | 23.6 [5.31] | 47.1 [10.6] | 70.7 [15.9] | 94.2 [21.18] | 117.8 [26.48] | 141.3 [31.76] | 164.9 [37.07] | 188.4 [42.35] | 212.0 [47.66] | 235.5 [52.94] |
| | | Stroke adjustment | 235.5 [0.3650] | 23.6 [5.31] | 47.1 [10.6] | 70.7 [15.9] | 94.2 [21.18] | 117.8 [26.48] | 141.3 [31.76] | 164.9 [37.07] | 188.4 [42.35] | 212.0 [47.66] | 235.5 [52.94] |
| **25 [0.984]** | 12 [0.472] | Push side | 490.6 [0.7604] | 49.1 [11.0] | 98.1 [22.1] | 147.2 [33.09] | 196.3 [44.13] | 245.3 [55.14] | 294.4 [66.18] | 343.4 [77.20] | 392.5 [88.24] | 441.6 [99.27] | 490.6 [110.3] |
| | | Pull side | 377.6 [0.5853] | 37.8 [8.50] | 75.5 [17.0] | 113.3 [25.47] | 151.0 [33.94] | 188.8 [42.44] | 226.6 [50.94] | 264.3 [59.41] | 302.1 [67.91] | 339.8 [76.39] | 377.6 [84.89] |
| | | Stroke adjustment | 377.6 [0.5853] | 37.8 [8.50] | 75.5 [17.0] | 113.3 [25.47] | 151.0 [33.94] | 188.8 [42.44] | 226.6 [50.94] | 264.3 [59.41] | 302.1 [67.91] | 339.8 [76.39] | 377.6 [84.89] |
| **32 [1.260]** | 16 [0.630] | Push side | 803.8 [1.2459] | 80.4 [18.1] | 160.8 [36.15] | 241.2 [54.22] | 321.5 [72.27] | 401.9 [90.35] | 482.3 [108.4] | 562.7 [126.5] | 643.1 [144.6] | 723.5 [162.6] | 803.8 [180.7] |
| | | Pull side | 602.9 [0.9345] | 60.3 [13.6] | 120.6 [27.11] | 180.9 [40.67] | 241.2 [54.22] | 301.4 [67.75] | 361.7 [81.31] | 422.0 [94.87] | 482.3 [108.4] | 542.6 [122.0] | 602.9 [135.5] |
| | | Stroke adjustment | 602.9 [0.9345] | 60.3 [13.6] | 120.6 [27.11] | 180.9 [40.67] | 241.2 [54.22] | 301.4 [67.75] | 361.7 [81.31] | 422.0 [94.87] | 482.3 [108.4] | 542.6 [122.0] | 602.9 [135.5] |
| **40 [1.575]** | 16 [0.630] | Push side | 1256.0 [1.9468] | 125.6 [28.23] | 254.2 [57.14] | 376.8 [84.70] | 502.4 [112.9] | 628.0 [141.2] | 753.6 [169.4] | 879.2 [197.6] | 1004.8 [225.9] | 1130.4 [254.1] | 1256.0 [282.3] |
| | | Pull side | 1055.0 [1.6353] | 105.5 [23.72] | 211.0 [47.43] | 316.5 [71.15] | 422.0 [94.87] | 527.0 [118.5] | 633.0 [142.3] | 738.5 [166.0] | 844.0 [189.7] | 949.5 [213.4] | 1055.0 [237.2] |
| | | Stroke adjustment | 1055.0 [1.6353] | 105.5 [23.72] | 211.0 [47.43] | 316.5 [71.15] | 422.0 [94.87] | 527.0 [118.5] | 633.0 [142.3] | 738.5 [166.0] | 844.0 [189.7] | 949.5 [213.4] | 1055.0 [237.2] |
| **50 [1.969]** | 20 [0.787] | Push side | 1962.5 [3.0419] | 196.3 [44.13] | 392.5 [88.23] | 588.8 [132.4] | 785.0 [176.5] | 981.3 [220.6] | 1177.5 [264.7] | 1373.8 [308.8] | 1570.0 [352.9] | 1766.3 [397.1] | 1962.5 [441.2] |
| | | Pull side | 1648.5 [2.5552] | 164.9 [37.07] | 329.7 [74.12] | 494.6 [111.2] | 659.4 [148.2] | 824.3 [185.3] | 989.1 [222.3] | 1154.0 [259.4] | 1318.8 [296.5] | 1483.7 [333.5] | 1648.5 [370.6] |
| | | Stroke adjustment | 1648.5 [2.5552] | 164.9 [37.07] | 329.7 [74.12] | 494.6 [111.2] | 659.4 [148.2] | 824.3 [185.3] | 989.1 [222.3] | 1154.0 [259.4] | 1318.8 [296.5] | 1483.7 [333.5] | 1648.5 [370.6] |
| **63 [2.480]** | 20 [0.787] | Push side | 3115.7 [4.8293] | 311.6 [70.05] | 623.1 [140.1] | 934.7 [210.1] | 1246.3 [280.2] | 1557.8 [350.2] | 1869.4 [420.2] | 2181.0 [490.3] | 2492.5 [560.3] | 2804.1 [630.4] | 3115.7 [700.4] |
| | | Pull side | 2801.7 [4.3426] | 280.2 [62.99] | 560.3 [126.0] | 840.5 [188.9] | 1120.7 [251.9] | 1400.8 [314.9] | 1681.0 [377.9] | 1961.2 [440.9] | 2241.3 [503.9] | 2521.5 [566.9] | 2801.7 [629.9] |
| | | Stroke adjustment | 2801.7 [4.3426] | 280.2 [62.99] | 560.3 [126.0] | 840.5 [188.9] | 1120.7 [251.9] | 1400.8 [314.9] | 1681.0 [377.9] | 1961.2 [440.9] | 2241.3 [503.9] | 2521.5 [566.9] | 2801.7 [629.9] |

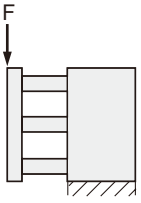
## Allowable Lateral Load

**● Lateral load (F) on the rod end should be at or below the figures in the table below.**

N [lbf.]

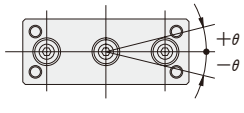
| Bore mm [in.] \ Stroke mm / Type | | 10 | 20 | 30 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | Slide bearing type | 29 [6.5] | 23 [5.2] | 19 [4.3] | 16.5 [3.7] | 15 [3.4] | 27.5 [6.2] | 23 [5.2] | — | — | — | — |
| | Rolling bearing type | 26 [5.8] | 20 [4.5] | 17 [3.8] | 14.5 [3.3] | 13 [2.9] | 24 [5.4] | 20 [4.5] | — | — | — | — |
| **16 [0.630]** | Slide bearing type | 37 [8.3] | 30.5 [6.9] | 26 [5.8] | 22.5 [5.1] | 20 [4.5] | 35 [7.9] | 30 [6.7] | — | — | — | — |
| | Rolling bearing type | 40 [9.0] | 32 [7.2] | 27 [6.1] | 24 [5.4] | 19 [4.3] | 34 [7.6] | 28 [6.3] | — | — | — | — |
| **20 [0.787]** | Slide bearing type | 69 [15.5] | 58 [13.0] | 50 [11.2] | 44 [9.9] | 40 [9.0] | 91 [20.5] | 78 [17.5] | 68 [15.3] | 60 [13.5] | 54 [12.1] | 49 [11.0] |
| | Rolling bearing type | 58 [13.0] | 49 [11.0] | 38 [8.5] | 36 [8.1] | 33 [7.4] | 77 [17.3] | 66 [14.8] | 58 [13.0] | 51 [11.5] | 46 [10.3] | 42 [9.4] |
| **25 [0.984]** | Slide bearing type | 95 [21.4] | 80.5 [18.1] | 70 [15.7] | 61 [13.7] | 55 [12.4] | 116 [26.1] | 100 [22.5] | 87 [19.6] | 77 [17.3] | 70 [15.7] | 63 [14.2] |
| | Rolling bearing type | 58 [13.0] | 49 [11.0] | 38 [8.5] | 37 [8.3] | 33 [7.4] | 77 [17.3] | 66 [14.8] | 58 [13.0] | 51 [11.5] | 46 [10.3] | 42 [9.4] |
| **32 [1.260]** | Slide bearing type | 273 [61.4] | 237 [53.3] | 209 [47.0] | 188 [42.3] | 170 [38.2] | 195 [43.8] | 160 [36.0] | 150 [33.7] | 134 [30.1] | 122 [27.4] | 111 [25.0] |
| | Rolling bearing type | 113 [25.4] | 98 [22.0] | 86 [19.3] | 77 [17.3] | 70 [15.7] | 150 [33.7] | 130 [29.2] | 115 [25.9] | 103 [23.2] | 94 [21.1] | 86 [19.3] |
| **40 [1.575]** | Slide bearing type | 273 [61.4] | 237 [53.3] | 209 [47.0] | 188 [42.3] | 170 [38.2] | 195 [43.8] | 160 [36.0] | 150 [33.7] | 134 [30.1] | 122 [27.4] | 111 [25.0] |
| | Rolling bearing type | 113 [25.4] | 98 [22.0] | 86 [19.3] | 77 [17.3] | 70 [15.7] | 150 [33.7] | 130 [29.2] | 115 [25.9] | 103 [23.2] | 94 [21.1] | 86 [19.3] |
| **50 [1.969]** | Slide bearing type | 398 [89.5] | 351 [78.9] | 314 [70.6] | 284 [63.8] | 260 [58.4] | 272 [61.1] | 240 [54.0] | 213 [47.9] | 193 [43.4] | 176 [39.6] | 161 [36.2] |
| | Rolling bearing type | 135 [30.3] | 119 [26.8] | 106.5 [23.9] | 96 [21.6] | 88 [19.8] | 170 [38.2] | 150 [33.7] | 134 [30.1] | 121 [27.2] | 110 [24.7] | 100 [22.5] |
| **63 [2.480]** | Slide bearing type | 398 [89.5] | 351 [78.9] | 314 [70.6] | 284 [63.8] | 260 [58.4] | 272 [61.1] | 240 [54.0] | 213 [47.9] | 193 [43.4] | 176 [39.6] | 161 [36.2] |
| | Rolling bearing type | 135 [30.3] | 119 [26.8] | 106.5 [23.9] | 96 [21.6] | 88 [19.8] | 170 [38.2] | 150 [33.7] | 134 [30.1] | 121 [27.2] | 110 [24.7] | 100 [22.5] |




## End Plate Non-rotation Accuracy $\theta$

| Bore size mm [in.] | SGDA | SGDAQ | SGDAKQ, CS-SGDAQ |
|---|---|---|---|
| **12 [0.472]** | ±0.1° | ±0.06° | ±0.06° |
| **16 [0.630]** | ±0.09° | ±0.06° | ±0.06° |
| **20 [0.787]** | ±0.08° | ±0.07° | ±0.05° |
| **25 [0.984]** | ±0.07° | ±0.07° | ±0.05° |
| **32 [1.260]** | ±0.06° | ±0.03° | ±0.03° |
| **40 [1.575]** | ±0.06° | ±0.03° | ±0.03° |
| **50 [1.969]** | ±0.05° | ±0.03° | ±0.03° |
| **63 [2.480]** | ±0.05° | ±0.03° | ±0.03° |

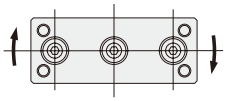



Note: When cylinder is retracted (initial value).
Guide rod deflection excluded.

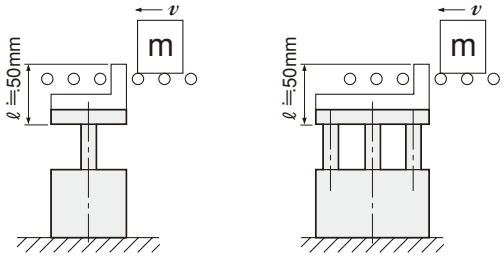
## Allowable Twisting Torque for the End Plate

N·m [ft·lbf]

| Bore mm [in.] \ Stroke mm | Type | 10 | 20 | 30 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 [0.472] | Slide bearing type | 0.30 [0.221] | 0.24 [0.178] | 0.20 [0.148] | 0.17 [0.125] | 0.16 [0.118] | 0.29 [0.214] | 0.24 [0.177] | — | — | — | — |
| | Rolling bearing type | 0.27 [0.199] | 0.21 [0.155] | 0.18 [0.133] | 0.15 [0.111] | 0.14 [0.103] | 0.25 [0.184] | 0.21 [0.155] | — | — | — | — |
| 16 [0.630] | Slide bearing type | 0.43 [0.317] | 0.36 [0.266] | 0.31 [0.229] | 0.26 [0.192] | 0.24 [0.177] | 0.41 [0.302] | 0.35 [0.258] | — | — | — | — |
| | Rolling bearing type | 0.47 [0.347] | 0.38 [0.280] | 0.32 [0.236] | 0.28 [0.207] | 0.22 [0.162] | 0.40 [0.295] | 0.33 [0.243] | — | — | — | — |
| 20 [0.787] | Slide bearing type | 1.00 [0.738] | 0.84 [0.620] | 0.73 [0.538] | 0.64 [0.472] | 0.58 [0.428] | 1.32 [0.974] | 1.13 [0.833] | 0.99 [0.730] | 0.87 [0.642] | 0.78 [0.575] | 0.71 [0.524] |
| | Rolling bearing type | 0.84 [0.620] | 0.71 [0.524] | 0.55 [0.406] | 0.52 [0.384] | 0.48 [0.354] | 1.12 [0.826] | 0.96 [0.708] | 0.84 [0.620] | 0.74 [0.546] | 0.67 [0.494] | 0.61 [0.450] |
| 25 [0.984] | Slide bearing type | 1.50 [1.106] | 1.27 [0.937] | 1.10 [0.811] | 0.96 [0.708] | 0.87 [0.642] | 1.83 [1.350] | 1.58 [1.165] | 1.37 [1.011] | 1.21 [0.892] | 1.10 [0.811] | 0.99 [0.730] |
| | Rolling bearing type | 0.91 [0.671] | 0.77 [0.568] | 0.60 [0.443] | 0.58 [0.428] | 0.52 [0.384] | 1.21 [0.892] | 1.04 [0.767] | 0.91 [0.671] | 0.80 [0.590] | 0.72 [0.531] | 0.66 [0.487] |
| 32 [1.260] | Slide bearing type | 5.46 [4.027] | 4.74 [3.496] | 4.18 [3.083] | 3.76 [2.773] | 3.40 [2.508] | 3.90 [2.877] | 3.20 [2.360] | 3.00 [2.213] | 2.68 [1.976] | 2.44 [1.800] | 2.22 [1.637] |
| | Rolling bearing type | 2.26 [1.667] | 1.96 [1.446] | 1.72 [1.269] | 1.54 [1.136] | 1.40 [1.033] | 3.00 [2.213] | 2.60 [1.918] | 2.30 [1.696] | 2.06 [1.519] | 1.88 [1.387] | 1.72 [1.269] |
| 40 [1.575] | Slide bearing type | 6.14 [4.529] | 5.33 [3.931] | 4.70 [3.467] | 4.23 [3.120] | 3.83 [2.825] | 4.39 [3.238] | 3.60 [2.655] | 3.38 [2.493] | 3.02 [2.228] | 2.75 [2.028] | 2.50 [1.844] |
| | Rolling bearing type | 2.54 [1.874] | 2.21 [1.630] | 1.94 [1.431] | 1.73 [1.276] | 1.58 [1.165] | 3.38 [2.493] | 2.93 [2.161] | 2.59 [1.910] | 2.32 [1.711] | 2.12 [1.564] | 1.94 [1.431] |
| 50 [1.969] | Slide bearing type | 10.95 [8.077] | 9.65 [7.118] | 8.64 [6.373] | 7.81 [5.761] | 7.15 [5.274] | 7.48 [5.517] | 6.60 [4.868] | 5.86 [4.322] | 5.31 [3.917] | 4.84 [3.570] | 4.43 [3.268] |
| | Rolling bearing type | 3.71 [2.736] | 3.27 [2.412] | 2.93 [2.161] | 2.64 [1.947] | 2.42 [1.785] | 4.68 [3.452] | 4.13 [3.046] | 3.69 [2.722] | 3.33 [2.456] | 3.03 [2.235] | 2.75 [2.028] |
| 63 [2.480] | Slide bearing type | 12.05 [8.888] | 10.71 [7.900] | 9.58 [7.066] | 8.66 [6.388] | 7.93 [5.849] | 8.30 [6.122] | 7.32 [5.399] | 6.50 [4.794] | 5.89 [4.344] | 5.37 [3.961] | 4.91 [3.622] |
| | Rolling bearing type | 4.12 [3.039] | 3.63 [2.677] | 3.25 [2.397] | 2.93 [2.161] | 2.68 [1.977] | 5.19 [3.828] | 4.58 [3.378] | 4.09 [3.017] | 3.69 [2.722] | 3.36 [2.478] | 3.05 [2.250] |



## Allowable Range When Used as a Stopper

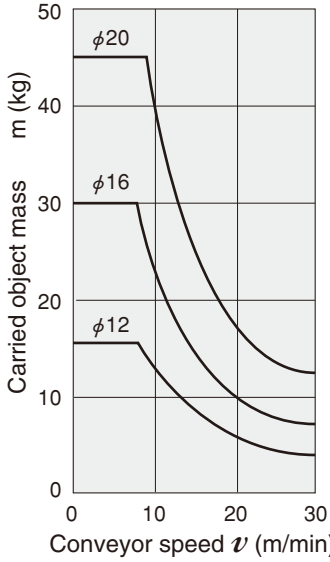



※ For product selection when the ℓ dimension is longer, select one with a sufficient cylinder bore.

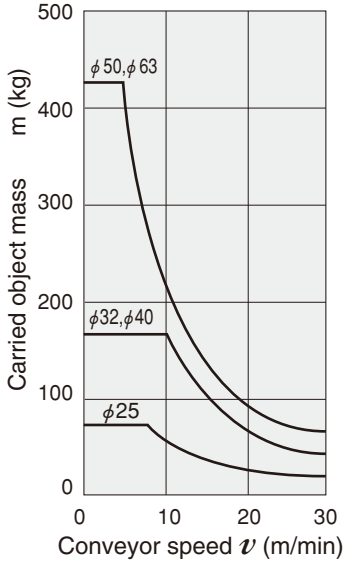
Precautions for handling

Notes: 1. When using as a stopper, select product with a stroke of 50mm or less.
2. The rolling bearing type cannot be used as a stopper.
3. When the stopper becomes subject to friction force generated by friction between the carried object and the conveyor, etc., keep the friction force at the allowable lateral load or below .

**ϕ12 [0.472in.] ～ ϕ20 [0.787in.] (Slide bearing)**




**ϕ25 [0.984in.] ～ ϕ63 [2.480in.] (Slide bearing)**



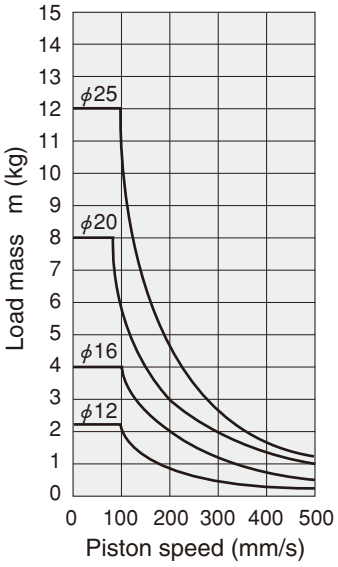

Notes: 1. Figures assume that the carried objects are plastic containers.
2. Figures for ϕ12～ϕ25 are st = 30, and for ϕ32～ϕ63 are st = 50.

1kg = 2.205lb. 1m/min. = 3.281ft./min.

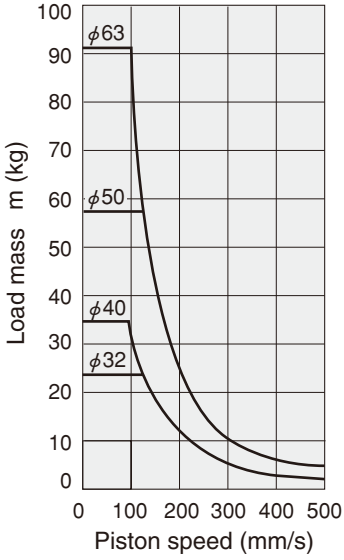
## Allowable Load Range

Use the graph values below for the relation between the load and piston speed. When these values are exceeded, install an external stopper.

**ϕ12 [0.472in.] ～ϕ25 [0.984in.]**




**ϕ32 [1.260in.] ～ϕ63 [2.480in.]**

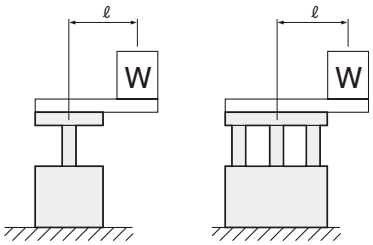



1kg = 2.205lb. 1mm/s = 0.0394in./sec.

## Allowable Range When Used as a Lifter

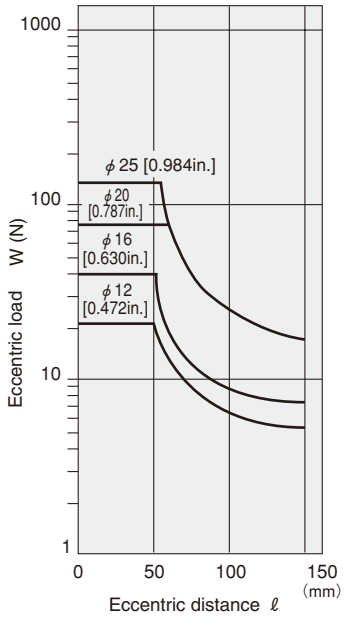
● Select a cylinder bore so that the total mass of the load is the theoretical output (in the graphs below) or less.

| Bore size mm [in.] | Theoretical output |
|---|---|
| ϕ 12 [0.472], ϕ 16 [0.630] | 40% or less |
| ϕ 20 [0.787], ϕ 25 [0984] | 50% or less |
| ϕ 32 [1.260]～ϕ 63 [2.480] | 60% or less |

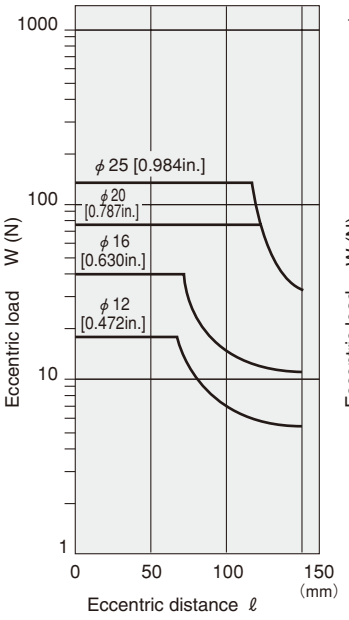



### ■ Slide bearing type (Applied pressure P = 0.5MPa [73psi.])

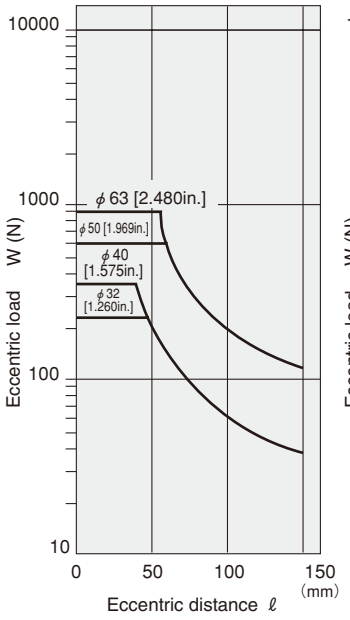
● **ϕ 12 [0.472in.] ～ ϕ 25 [0.984in.] (50mm or shorter strokes)**



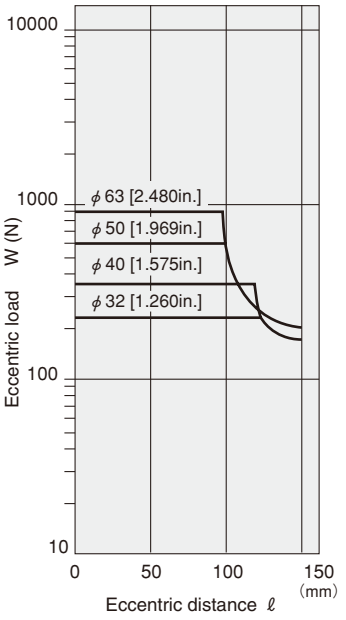

**(75mm or longer strokes)**




● **ϕ 32 [1.260in.] ～ ϕ 63 [2.480in.] (50mm or shorter strokes)**



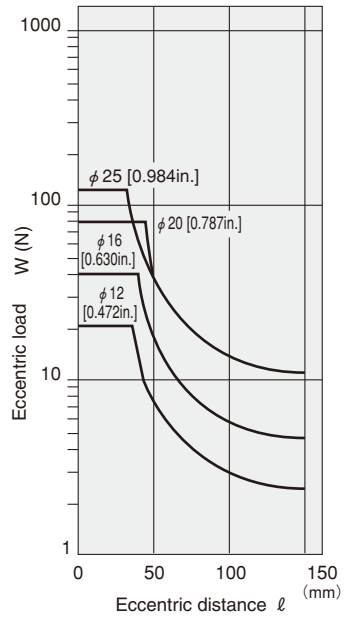

**(75mm or longer strokes)**



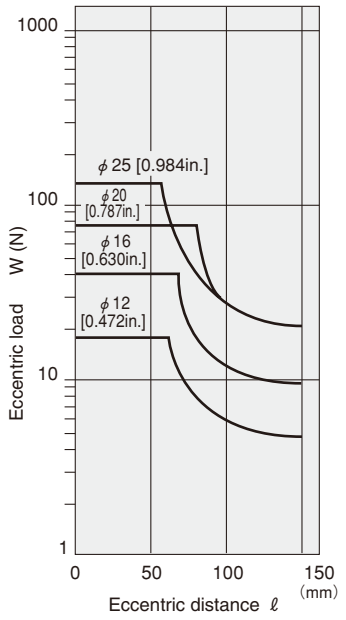

1N = 0.2248lbf.
1mm = 0.0394in.

### ■ Rolling bearing type (applied pressure P = 0.5MPa [73psi.])

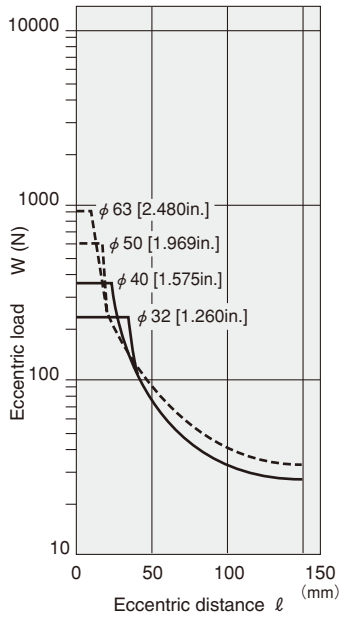
● **ϕ 12 [0.472in.] ～ ϕ 25 [0.984in.] (50mm or shorter strokes)**



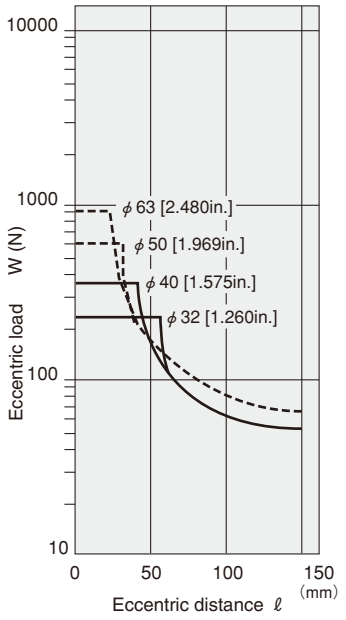

**(75mm or longer strokes)**




● **ϕ 32 [1.260in.] ～ ϕ 63 [2.480in.] (50mm or shorter strokes)**



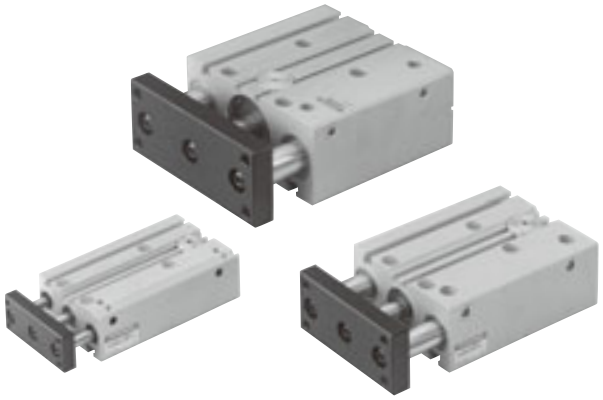

**(75mm or longer strokes)**




1N = 0.2248lbf.
1mm = 0.0394in.

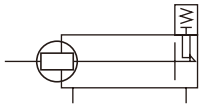
# JIG CYLINDERS WITH GUIDES

## End Keep Cylinders $\phi$12～$\phi$63

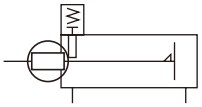


## Symbols

●**Head side end keep**



●**Rod side end keep**



## Specifications

| Item \ Bore size mm [in.] | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| Operation type | Double acting type | | | | | | | |
| Media | Air | | | | | | | |
| Operating pressure range MPa [psi.] | 0.2～1.0 [29～145] | | | 0.15～1.0 [22～145] | | | | |
| Proof pressure MPa [psi.] | 1.5 [218] | | | | | | | |
| Operating temperature range °C [°F] | 0～60 [32～140] | | | | | | | |
| Operating speed range mm/s [in./sec.] | 100～500 [3.9～19.7] | | | | | | | |
| Cushion | Rubber bumper | | | | | | | |
| Lubrication | Not required (If lubrication is required, use Turbine Oil Class 1 [ISO VG32] or equivalent.) | | | | | | | |
| Port size | M5×0.8 | | Rc1/8 | | | | Rc1/4 | |
| Stroke tolerance mm [in.] | $^{+1.5}_{0}$ [$^{+0.059}_{0}$] | | | | | | | |
| Maximum holding force (At end keep)[Note] N [lbf.] | 79.1 [17.8] | 140.7 [31.6] | 219.8 [49.4] | 343.4 [77.2] | 562.7 [126.5] | 879.2 [197.6] | 1373.8 [308.8] | 2181 [490.3] |
| Backlash (At end keep) mm [in.] | 1.5 [0.059] | | 2.0 [0.079] | | | | | |

Note: Durability at maximum holding force is 0.5million operations.

## Bore Size and Stroke

mm

| Bore size | Standard strokes | Maximum available stroke |
|---|---|---|
| **12** | 10, 20, 30, 40, 50, 75, 100 | 100 |
| **16** | | |
| **20** | 10, 20, 30, 40, 50, 75, 100, 125, 150, 175, 200 | 200 |
| **25** | | |
| **32** | | |
| **40** | | |
| **50** | | |
| **63** | | |

Remarks: 1. Non-standard strokes are available at 5mm intervals. Since the manufacturing method is collar packed, the total length, etc., are the same dimensions as the next size up standard stroke cylinder. (Note that this cannot be applicable to rod side end keep)
2. For strokes of 75mm or longer, use long bushing type.

# Order Codes for End Keep Cylinder

## ■ End keep position

Head side


Rod side


## ■ Bearing specification

**Blank :** Slide bearing type
**Q :** Rolling bearing type

## ■ Cylinder

**K :** End keep cylinder

## ■ Operation type

**DA :** Double acting type

## ■ Sensor switch Note

**Blank :** No sensor switch

**-ZE135 :** With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

**-ZE155 :** With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

**-ZE235 :** With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

**-ZE255 :** With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

**-ZE101 :** With ZE101
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Horizontal lead wire

**-ZE102 :** With ZE102
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Horizontal lead wire

**-ZE201 :** With ZE201
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Vertical lead wire

**-ZE202 :** With ZE202
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Vertical lead wire

## ■ Lead wire length

**A :** 1000mm [39in.]
**B :** 3000mm [118in.]

## ■ Number of sensor switches

**Blank :** No sensor switch

**1 :** With 1 sensor switch

**2 :** With 2 sensor switches

| Basic type | | | | Bore size×Stroke | | | | |
|---|---|---|---|---|---|---|---|---|
| SG | DA | K | Q | × | -HL<br>-RL | -ZE135<br>-ZE235<br>-ZE155<br>-ZE255<br>-ZE101<br>-ZE201<br>-ZE102<br>-ZE202 | A<br>B | 1<br>2<br>⋮<br>n |

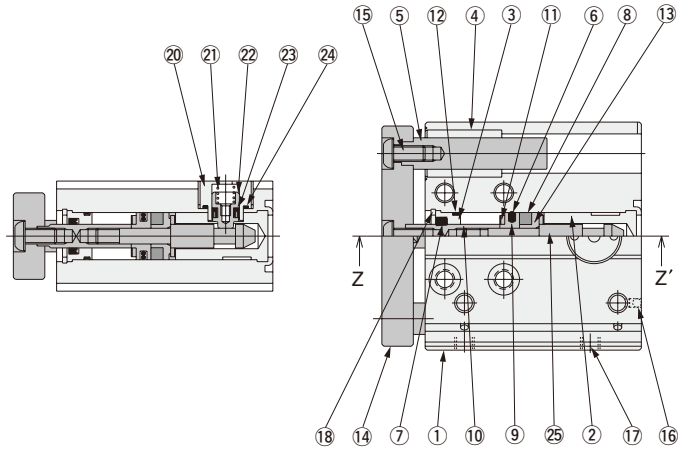
● See the bore size and stroke on p.720.
● For the order codes for sensor switches only, see p.733.

Note: For details of sensor switches, see p.733

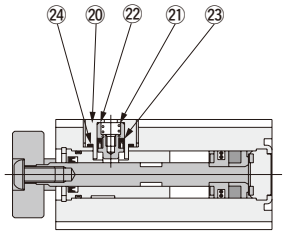
## Inner Construction and Major Parts

■**End keep cylinder** (Diagram is for $\phi$ 12 [0.472in.].)

**Slide bearing type**
**(Head side end keep: -HL)**

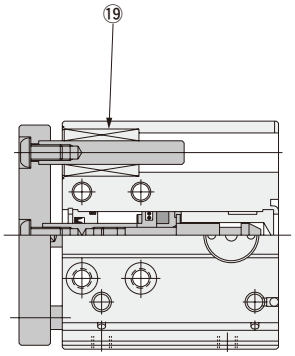



**Slide bearing type**
**(Rod side end keep: -RL)**

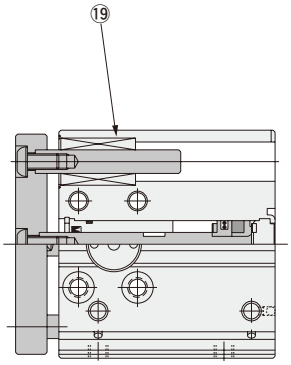



Section Z—Z′

**Rolling bearing type**
**(Head side end keep: -HL)**




**Rolling bearing type**
**(Rod side end keep: -RL)**




Remark: The number of bearings for 50mm stroke or shorter is 1 bearing per shaft. At 75mm stroke or longer, 2 bearings per shaft. The plate, piston rod, and guide rod cannot be disassembled.

## Major Parts and Materials

| No. | Parts / Bore mm | 12 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
|---|---|---|---|---|---|---|---|---|---|
| ① | Cylinder body | Aluminum alloy (anodized) | | | | | | | |
| ② | Head cover | Aluminum alloy (anodized) | | | | | | | |
| ③ | Rod cover | Aluminum alloy (special wear-resistant treatment) | | | | | | | |
| ④ | Slide bearing | Aluminum alloy (special wear-resistant treatment) | | | | | | | |
| ⑤ | Guide rod | Steel (hard chrome plated)〔rolling bearing type: Steel〕 | | | | | | | |
| ⑥ | Piston seal | Synthetic rubber (NBR) | | | | | | | |
| ⑦ | Rod seal | Synthetic rubber (NBR) | | | | | | | |
| ⑧ | Magnet | Plastic magnet | | | | | | | |
| ⑨ | Piston | Aluminum alloy (special rust prevention treatment) | | | | | | | |
| ⑩ | Piston rod | Stainless steel (hard chrome plated) | | | | Steel (hard chrome plated) | | | |
| ⑪ | Bumper | Synthetic rubber (NBR) | | | | | | | |
| ⑫ | O-ring (cylinder section) | Synthetic rubber (NBR) | | | | | | | |
| ⑬ | Support | Aluminum alloy (special rust prevention treatment) | | | | | | | |
| ⑭ | Plate | Aluminum alloy (black anodized) | | | | | | | |
| ⑮ | Bolt | Steel (nickel plated) | | | | | | | |
| ⑯ | Steel ball | Steel | | | | | | | |
| ⑰ | Plug | Mild steel (zinc plated) | | | | | | | |
| ⑱ | Snap ring | Steel (phosphate coating) | | | | | | | |
| ⑲ | Rolling bearing | Steel, plastic | | | | | | | |
| ⑳ | Lock guide | Aluminum alloy (anodized) | | | | | | | |
| ㉑ | Spring | Piano wire | | | | | | | |
| ㉒ | Lock piston | Stainless steel | | | | | | | |
| ㉓ | Lock piston seal | Synthetic rubber (NBR) | | | | | | | |
| ㉔ | O-ring (lock guide section) | Synthetic rubber (NBR) | | | | | | | |
| ㉕ | Lock end | Stainless steel (hard chrome plated) | | | | Steel (zinc plated) | | | |

## Seals

| Type / Parts / Bore size mm | End keep cylinder | | | | | |
|---|---|---|---|---|---|---|
| | Rod seal | Piston seal | Tube gasket | | Lock piston seal | Lock guide gasket |
| | | | Rod side | Head side | | |
| **12** | MYR-6 | COP-12 | Y090260 | None | MYN-4 | Y090066 |
| **16** | MYR-8 | COP-16 | Y090207 | Y090207 | MYN-4 | Y090066 |
| **20** | MYR-10 | COP-20 | Y090216 | Y090216 | MYN-5 | Y090225 |
| **25** | MYR-12 | COP-25 | Y090210 | Y090210 | MYN-5 | Y090225 |
| **32** | MYR-16 | COP-32 | L090084 | L090084 | MYN-10A | Y090217 |
| **40** | MYR-16 | COP-40 | L090151 | L090151 | MYN-10A | Y090217 |
| **50** | MYR-20 | COP-50 | L090174 | L090174 | MYN-16 | Y090237 |
| **63** | MYR-20 | COP-63 | L090180 | L090180 | MYN-16 | Y090237 |

## Mass

g [oz.]

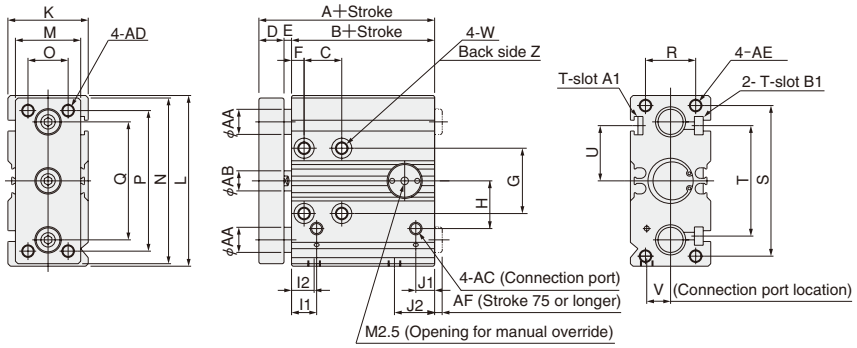
| Type / Mass / Bore size mm [in.] | | End keep cylinder | | | | Option | |
|---|---|---|---|---|---|---|---|
| | | Slide bearing type | | Rolling bearing type | | Additional mass of sensor switch | |
| | | Zero stroke mass | Additional mass for each 1mm [0.0394in.] stroke | Zero stroke mass | Additional mass for each 1mm [0.0394in.] stroke | ZE□□□A | ZE□□□B |
| **12 [0.472]** | 50st or shorter | 146 [5.15] | 3.99 [0.1407] | 139 [4.90] | 3.63 [0.1280] | 15 [0.53] | 35 [1.23] |
| | 75st or longer | 156 [5.50] | 3.99 [0.1407] | 149 [5.26] | 3.63 [0.1280] | | |
| **16 [0.630]** | 50st or shorter | 277 [9.77] | 5.2 [0.183] | 238 [8.40] | 5.17 [0.1824] | | |
| | 75st or longer | 307 [10.83] | 5.2 [0.183] | 279 [9.84] | 5.17 [0.1824] | | |
| **20 [0.787]** | 50st or shorter | 490 [17.28] | 9.0 [0.317] | 421 [14.85] | 8.4 [0.2963] | | |
| | 75st or longer | 540 [19.05] | 9.0 [0.317] | 502 [17.71] | 8.4 [0.2963] | | |
| **25 [0.984]** | 50st or shorter | 687 [24.23] | 10.81 [0.3813] | 617 [21.76] | 10.12 [0.3570] | | |
| | 75st or longer | 765 [26.98] | 10.81 [0.3813] | 695 [24.51] | 10.12 [0.3570] | | |
| **32 [1.260]** | 50st or shorter | 1027 [36.23] | 16 [0.564] | 1018 [35.91] | 13.71 [0.4836] | | |
| | 75st or longer | 1404 [49.52] | 16 [0.564] | 1233 [43.49] | 13.71 [0.4836] | | |
| **40 [1.575]** | 50st or shorter | 1313 [46.31] | 17.61 [0.6212] | 1213 [42.79] | 15.78 [0.5566] | | |
| | 75st or longer | 1553 [54.78] | 17.61 [0.6212] | 1513 [53.37] | 15.78 [0.5566] | | |
| **50 [1.969]** | 50st or shorter | 2123 [74.89] | 26.5 [0.935] | 2057 [72.56] | 23.27 [0.8208] | | |
| | 75st or longer | 2426 [85.57] | 26.5 [0.935] | 2394 [84.44] | 23.27 [0.8208] | | |
| **63 [2.480]** | 50st or shorter | 2760 [97.35] | 29.65 [1.0459] | 2690 [94.89] | 26.97 [0.9513] | | |
| | 75st or longer | 3060 [107.94] | 29.65 [1.0459] | 3028 [106.81] | 26.97 [0.9513] | | |

## Dimensions of -HL Head Side End Keep Cylinder (mm)

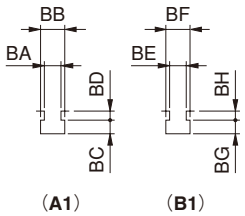
**Slide bearing type** **SGDAK** Bore size × Stroke **-HL**

CAD SGDAK Bore size : SGDAK Bore size

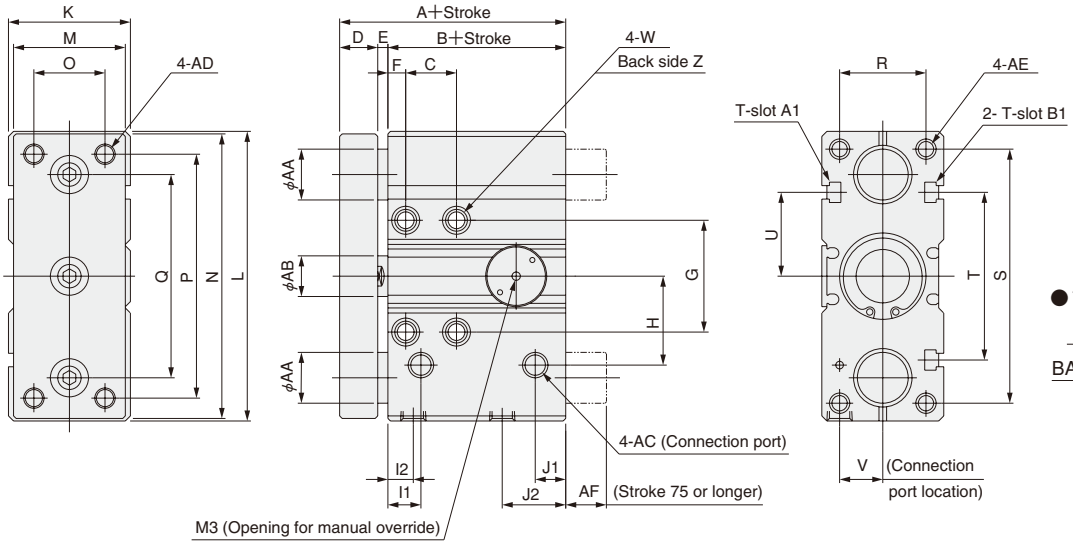
● **φ12, φ16** (Drawings show φ16.)



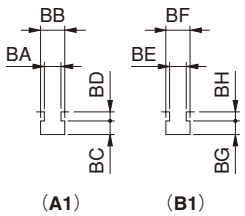

● T-slot **A1**, **B1** dimensions




● **φ20～φ63** (Drawings show φ32.)




● T-slot **A1**, **B1** dimensions




| Bore mm [in.] \ Code | A | B | C Stroke 10 | 20 | 30 | 40 | 50～100 | 125 or more | D | E | F | G | H | I1 | I2 | J1 | J2 | K | L | M | N | O | P | Q | R | S | T | U | V Note | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | 56 | 45 | 15 | 25 | 35 | 45 | 55 | — | 8 | 3 | 5 | 22 | 17 | 10 | 9 | 6 | 14 | 28 | 58 | 22 | 56 | 14 | 48 | 42 | 18 | 51 | 37 | 18.5 | 8.5 | φ4.2 (Thru hole) Counterbore φ8 Depth 4.5 |
| **16 [0.630]** | 60 | 47 | 15 | 25 | 35 | 45 | 55 | — | 10 | 3 | 5 | 26 | 19 | 10 | 9 | 7.5 | 16 | 32 | 68 | 26 | 66 | 16 | 56 | 47 | 20 | 60 | 44 | 22 | 9.5 | φ4.2 (Thru hole) Counterbore φ8 Depth 4.5 |
| **20 [0.787]** | 72 | 56 | 20 | 30 | 40 | 50 | 60 | 110 | 12 | 4 | 6 | 30 | 27 | 11 | 11 | 10 | 20 | 40 | 82 | 36 | 80 | 24 | 66 | 58 | 26 | 72 | 54 | 27 | 13.5 | φ5.2 (Thru hole) Counterbore φ9.5 Depth 5.5 |
| **25 [0.984]** | 74 | 58 | 20 | 30 | 40 | 50 | 60 | 110 | 12 | 4 | 6 | 33 | 29 | 12 | 12 | 10 | 21 | 42 | 92 | 38 | 90 | 26 | 76 | 63 | 30 | 80 | 54 | 27 | 14.5 | φ5.2 (Thru hole) Counterbore φ9.5 Depth 5.5 |
| **32 [1.260]** | 79 | 60 | 20 | 30 | 40 | 50 | 60 | 110 | 15 | 4 | 7 | 44 | 35 | 13 | 10 | 12 | 25 | 48 | 114 | 44 | 112 | 28 | 96 | 80 | 34 | 100 | 66 | 33 | 17 | φ6.8 (Thru hole) Counterbore φ11 Depth 7 |
| **40 [1.575]** | 83 | 64 | 20 | 30 | 40 | 50 | 60 | 110 | 15 | 4 | 7 | 52 | 40 | 14 | 14 | 13 | 25 | 54 | 124 | 50 | 122 | 34 | 106 | 90 | 40 | 106 | 82 | 41 | 18 | φ6.8 (Thru hole) Counterbore φ11 Depth 7 |
| **50 [1.969]** | 100 | 77 | 20 | 30 | 40 | 50 | 60 | 110 | 18 | 5 | 8 | 66 | 52.5 | 15.5 | 10 | 15 | 31 | 66 | 150 | 62 | 148 | 42 | 120 | 110 | 44 | 130 | 100 | 50 | 22 | φ8.6 (Thru hole) Counterbore φ14 Depth 9 |
| **63 [2.480]** | 100 | 77 | 20 | 30 | 40 | 50 | 60 | 110 | 18 | 5 | 8 | 78 | 60 | 17 | 10 | 14 | 31 | 76 | 162 | 72 | 160 | 52 | 132 | 122 | 44 | 144 | 120 | 60 | 24 | φ8.6 (Thru hole) Counterbore φ14 Depth 9 |

Note: The **V** dimension shows the side connection port location.

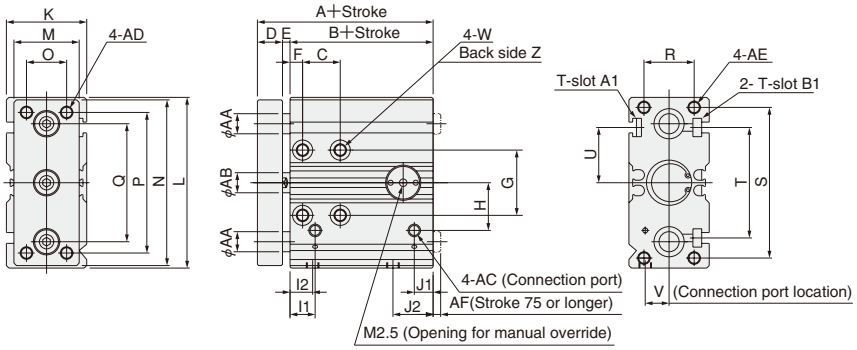
| Bore mm [in.] \ Code | Z | AA | AB | AC | AD | AE | AF | T-slot A1 | T-slot B1 | BA | BB | BC | BD | BE | BF | BG | BH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | M5×0.8 Depth 8 | 8 | 6 | M5×0.8 | M4×0.7 | M4×0.7 Depth 8 | — | M3×0.5 | M4×0.7 | 3.3 | 5.8 | 3 | 1.5 | 4.3 | 7.3 | 3.5 | 2.5 |
| **16 [0.630]** | M5×0.8 Depth 11 | 10 | 8 | M5×0.8 | M5×0.8 | M5×0.8 Depth 10 | 3 | M4×0.7 | M4×0.7 | 4.3 | 7.3 | 3.5 | 1.5 | 4.3 | 7.3 | 3.5 | 3 |
| **20 [0.787]** | M6×1 Depth 12 | 14 | 10 | Rc1/8 | M6×1 | M6×1 Depth 12 | 7 | M4×0.7 | M5×0.8 | 4.3 | 7.3 | 4 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **25 [0.984]** | M6×1 Depth 12 | 16 | 12 | Rc1/8 | M6×1 | M6×1 Depth 12 | 8 | M4×0.7 | M5×0.8 | 4.3 | 7.3 | 4 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **32 [1.260]** | M8×1.25 Depth 16 | 20 | 16 | Rc1/8 | M8×1.25 | M8×1.25 Depth 16 | 16 | M5×0.8 | M5×0.8 | 5.3 | 8.3 | 4.5 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **40 [1.575]** | M8×1.25 Depth 16 | 20 | 16 | Rc1/8 | M8×1.25 | M8×1.25 Depth 16 | 12 | M5×0.8 | M6×1 | 5.3 | 8.3 | 4.5 | 3 | 6.3 | 10.3 | 5.5 | 3 |
| **50 [1.969]** | M10×1.5 Depth 20 | 25 | 20 | Rc1/4 | M10×1.5 | M10×1.5 Depth 20 | 9 | M5×0.8 | M8×1.25 | 5.3 | 8.3 | 4.5 | 3 | 8.3 | 13.3 | 7 | 4.5 |
| **63 [2.480]** | M10×1.5 Depth 20 | 25 | 20 | Rc1/4 | M10×1.5 | M10×1.5 Depth 20 | 9 | M5×0.8 | M8×1.25 | 5.3 | 8.3 | 4.5 | 3 | 8.3 | 13.3 | 7 | 4.5 |

## Dimensions of -HL Head Side End Keep Cylinder (mm)

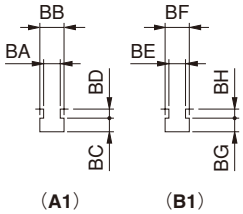
**Rolling bearing type** **SGDAKQ** Bore size × Stroke **-HL**

CAD SGDAKQ Bore size : SGDAKQ Bore size

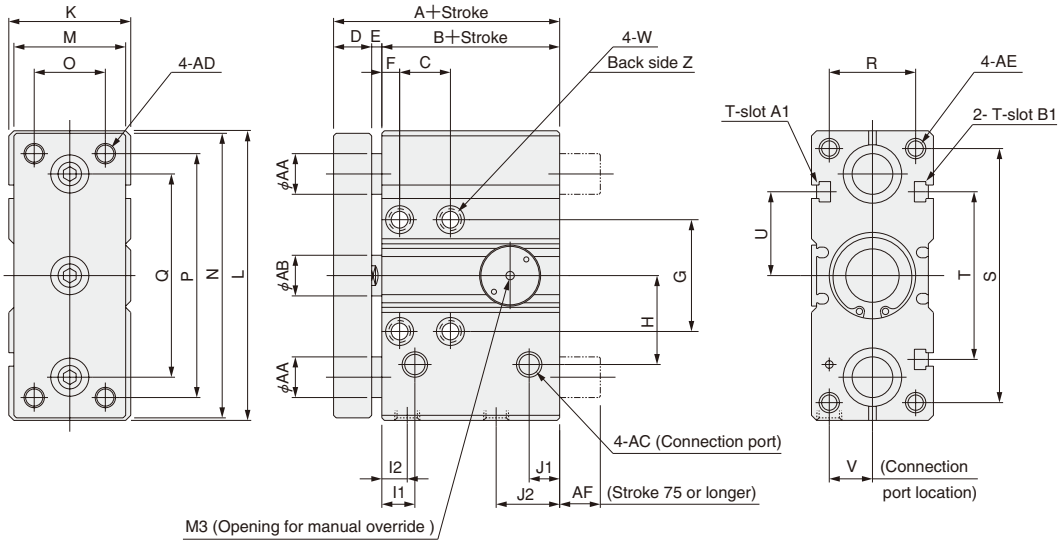
● **φ12, φ16** (Drawings show φ16.)



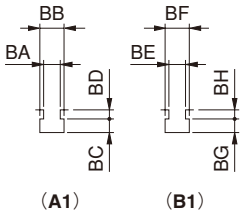

● T-slot **A1**, **B1** dimensions




● **φ20～φ63** (Drawings show φ32.)




● T-slot **A1**, **B1** dimensions




| Code / Bore mm [in.] | A | B | C Stroke 10 | 20 | 30 | 40 | 50～100 | 125 or more | D | E | F | G | H | I1 | I2 | J1 | J2 | K | L | M | N | O | P | Q | R | S | T | U | V Note | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | 56 | 45 | 15 | 25 | 35 | 45 | 55 | — | 8 | 3 | 5 | 22 | 17 | 10 | 9 | 6 | 14 | 28 | 58 | 22 | 56 | 14 | 48 | 42 | 18 | 51 | 37 | 18.5 | 8.5 | φ4.2 (Thru hole) Counterbore φ8 Depth 4.5 |
| **16 [0.630]** | 60 | 47 | 15 | 25 | 35 | 45 | 55 | — | 10 | 3 | 5 | 26 | 19 | 10 | 9 | 7.5 | 16 | 32 | 68 | 26 | 66 | 16 | 56 | 47 | 20 | 60 | 44 | 22 | 9.5 | φ4.2 (Thru hole) Counterbore φ8 Depth 4.5 |
| **20 [0.787]** | 72 | 56 | 20 | 30 | 40 | 50 | 60 | 110 | 12 | 4 | 6 | 30 | 27 | 11 | 11 | 10 | 20 | 40 | 82 | 36 | 80 | 24 | 66 | 58 | 26 | 72 | 54 | 27 | 13.5 | φ5.2 (Thru hole) Counterbore φ9.5 Depth 5.5 |
| **25 [0.984]** | 74 | 58 | 20 | 30 | 40 | 50 | 60 | 110 | 12 | 4 | 6 | 33 | 29 | 12 | 12 | 10 | 21 | 42 | 92 | 38 | 90 | 26 | 76 | 63 | 30 | 80 | 54 | 27 | 14.5 | φ5.2 (Thru hole) Counterbore φ9.5 Depth 5.5 |
| **32 [1.260]** | 79 | 60 | 20 | 30 | 40 | 50 | 60 | 110 | 15 | 4 | 7 | 44 | 35 | 13 | 10 | 12 | 25 | 48 | 114 | 44 | 112 | 28 | 96 | 80 | 34 | 100 | 66 | 33 | 17 | φ6.8 (Thru hole) Counterbore φ11 Depth 7 |
| **40 [1.575]** | 83 | 64 | 20 | 30 | 40 | 50 | 60 | 110 | 15 | 4 | 7 | 52 | 40 | 14 | 14 | 13 | 25 | 54 | 124 | 50 | 122 | 34 | 106 | 90 | 40 | 106 | 82 | 41 | 18 | φ6.8 (Thru hole) Counterbore φ11 Depth 7 |
| **50 [1.969]** | 100 | 77 | 20 | 30 | 40 | 50 | 60 | 110 | 18 | 5 | 8 | 66 | 52.5 | 15.5 | 10 | 15 | 31 | 66 | 150 | 62 | 148 | 42 | 120 | 110 | 44 | 130 | 100 | 50 | 22 | φ8.6 (Thru hole) Counterbore φ14 Depth 9 |
| **63 [2.480]** | 100 | 77 | 20 | 30 | 40 | 50 | 60 | 110 | 18 | 5 | 8 | 78 | 60 | 17 | 10 | 14 | 31 | 76 | 162 | 72 | 160 | 52 | 132 | 122 | 44 | 144 | 120 | 60 | 24 | φ8.6 (Thru hole) Counterbore φ14 Depth 9 |

Note: The **V** dimension shows the side connection port location.

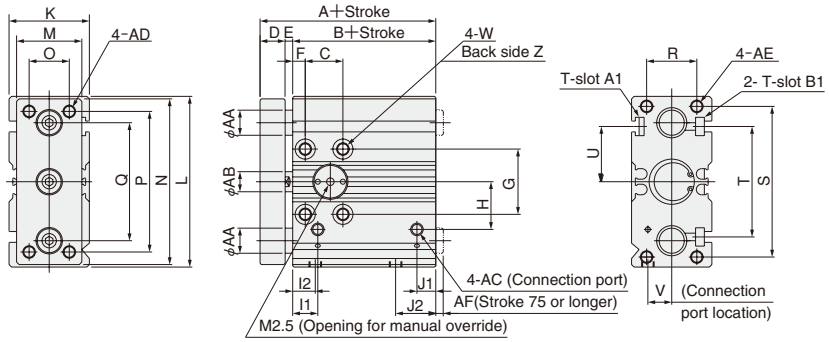
| Code / Bore mm [in.] | Z | AA | AB | AC | AD | AE | AF | T-slot A1 | T-slot B1 | BA | BB | BC | BD | BE | BF | BG | BH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | M5×0.8 Depth 8 | 6 | 6 | M5×0.8 | M4×0.7 | M4×0.7 Depth 8 | — | M3×0.5 | M4×0.7 | 3.3 | 5.8 | 3 | 1.5 | 4.3 | 7.3 | 3.5 | 2.5 |
| **16 [0.630]** | M5×0.8 Depth 11 | 8 | 8 | M5×0.8 | M5×0.8 | M5×0.8 Depth 10 | 3 | M4×0.7 | M4×0.7 | 4.3 | 7.3 | 3.5 | 1.5 | 4.3 | 7.3 | 3.5 | 3 |
| **20 [0.787]** | M6×1 Depth 12 | 12 | 10 | Rc1/8 | M6×1 | M6×1 Depth 12 | 7 | M4×0.7 | M5×0.8 | 4.3 | 7.3 | 4 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **25 [0.984]** | M6×1 Depth 12 | 13 | 12 | Rc1/8 | M6×1 | M6×1 Depth 12 | 8 | M4×0.7 | M5×0.8 | 4.3 | 7.3 | 4 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **32 [1.260]** | M8×1.25 Depth 16 | 16 | 16 | Rc1/8 | M8×1.25 | M8×1.25 Depth 16 | 16 | M5×0.8 | M5×0.8 | 5.3 | 8.3 | 4.5 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **40 [1.575]** | M8×1.25 Depth 16 | 16 | 16 | Rc1/8 | M8×1.25 | M8×1.25 Depth 16 | 12 | M5×0.8 | M6×1 | 5.3 | 8.3 | 4.5 | 3 | 6.3 | 10.3 | 5.5 | 3 |
| **50 [1.969]** | M10×1.5 Depth 20 | 20 | 20 | Rc1/4 | M10×1.5 | M10×1.5 Depth 20 | 9 | M5×0.8 | M8×1.25 | 5.3 | 8.3 | 4.5 | 3 | 8.3 | 13.3 | 7 | 4.5 |
| **63 [2.480]** | M10×1.5 Depth 20 | 20 | 20 | Rc1/4 | M10×1.5 | M10×1.5 Depth 20 | 9 | M5×0.8 | M8×1.25 | 5.3 | 8.3 | 4.5 | 3 | 8.3 | 13.3 | 7 | 4.5 |

## Dimensions of -RL Rod side End Keep Cylinder (mm)

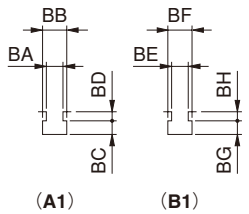
**Slide bearing type SGDAK** Bore size × Stroke **-RL**

CAD SGDAK Bore size : SGDAK Bore size

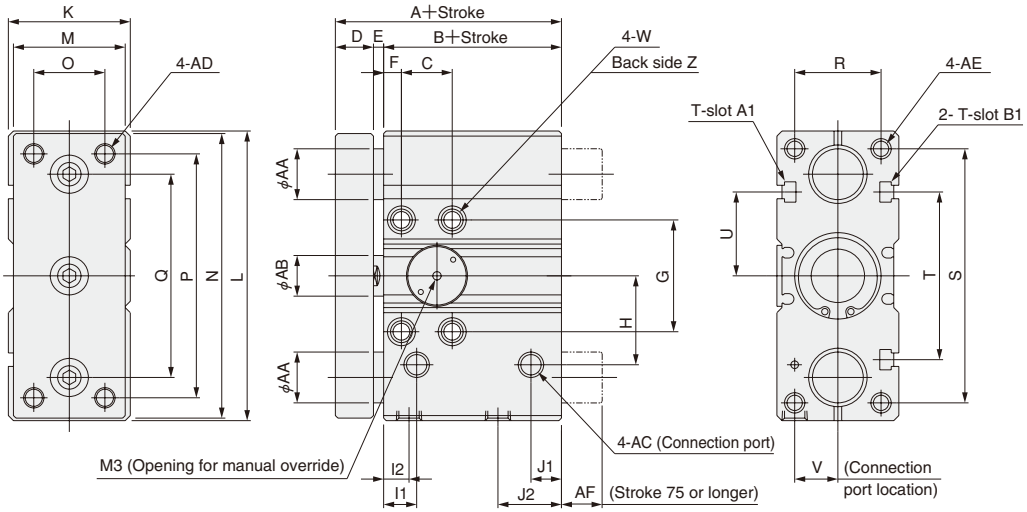
● **φ12, φ16** (Drawings show φ16.)



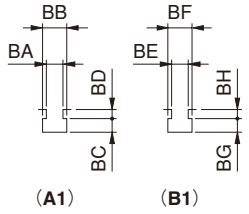

● T-slot **A1**, **B1** dimensions




● **φ20～φ63** (Drawings show φ32.)




● T-slot **A1**, **B1** dimensions




| Bore mm [in.] \ Code | A | B | C Stroke 10 | 20 | 30 | 40 | 50～100 | 125 or more | D | E | F | G | H | I1 | I2 | J1 | J2 | K | L | M | N | O | P | Q | R | S | T | U | V Note | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | 56 | 45 | 15 | 25 | 35 | 45 | 55 | — | 8 | 3 | 5 | 22 | 17 | 10 | 9 | 6 | 14 | 28 | 58 | 22 | 56 | 14 | 48 | 42 | 18 | 51 | 37 | 18.5 | 8.5 | φ4.2 (Thru hole) Counterbore φ8 Depth 4.5 |
| **16 [0.630]** | 60 | 47 | 15 | 25 | 35 | 45 | 55 | — | 10 | 3 | 5 | 26 | 19 | 10 | 9 | 7.5 | 16 | 32 | 68 | 26 | 66 | 16 | 56 | 47 | 20 | 60 | 44 | 22 | 9.5 | φ4.2 (Thru hole) Counterbore φ8 Depth 4.5 |
| **20 [0.787]** | 72 | 56 | 20 | 30 | 40 | 50 | 60 | 110 | 12 | 4 | 6 | 30 | 27 | 11 | 11 | 10 | 20 | 40 | 82 | 36 | 80 | 24 | 66 | 58 | 26 | 72 | 54 | 27 | 13.5 | φ5.2 (Thru hole) Counterbore φ9.5 Depth 5.5 |
| **25 [0.984]** | 74 | 58 | 20 | 30 | 40 | 50 | 60 | 110 | 12 | 4 | 6 | 33 | 29 | 12 | 12 | 10 | 21 | 42 | 92 | 38 | 90 | 26 | 76 | 63 | 30 | 80 | 54 | 27 | 14.5 | φ5.2 (Thru hole) Counterbore φ9.5 Depth 5.5 |
| **32 [1.260]** | 79 | 60 | 20 | 30 | 40 | 50 | 60 | 110 | 15 | 4 | 7 | 44 | 35 | 13 | 10 | 12 | 25 | 48 | 114 | 44 | 112 | 28 | 96 | 80 | 34 | 100 | 66 | 33 | 17 | φ6.8 (Thru hole) Counterbore φ11 Depth 7 |
| **40 [1.575]** | 83 | 64 | 20 | 30 | 40 | 50 | 60 | 110 | 15 | 4 | 7 | 52 | 40 | 14 | 14 | 13 | 25 | 54 | 124 | 50 | 122 | 34 | 106 | 90 | 40 | 106 | 82 | 41 | 18 | φ6.8 (Thru hole) Counterbore φ11 Depth 7 |
| **50 [1.969]** | 100 | 77 | 20 | 30 | 40 | 50 | 60 | 110 | 18 | 5 | 8 | 66 | 52.5 | 15.5 | 10 | 15 | 31 | 66 | 150 | 62 | 148 | 42 | 120 | 110 | 44 | 130 | 100 | 50 | 22 | φ8.6 (Thru hole) Counterbore φ14 Depth 9 |
| **63 [2.480]** | 100 | 77 | 20 | 30 | 40 | 50 | 60 | 110 | 18 | 5 | 8 | 78 | 60 | 17 | 10 | 14 | 31 | 76 | 162 | 72 | 160 | 52 | 132 | 122 | 44 | 144 | 120 | 60 | 24 | φ8.6 (Thru hole) Counterbore φ14 Depth 9 |

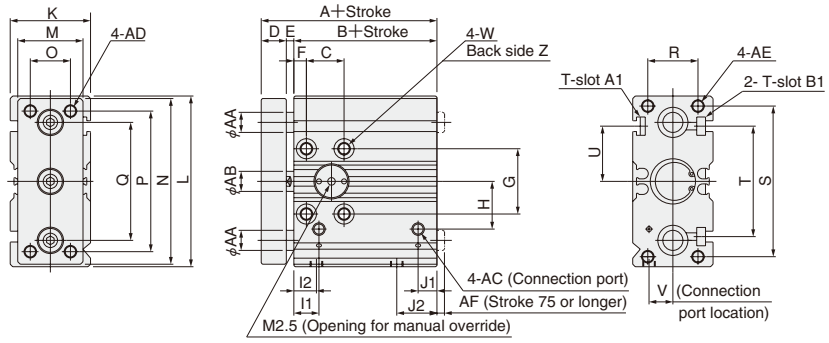
Note: The **V** dimension shows the side connection port location.

| Bore mm [in.] \ Code | Z | AA | AB | AC | AD | AE | AF | T-slot A1 | T-slot B1 | BA | BB | BC | BD | BE | BF | BG | BH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | M5×0.8 Depth 8 | 8 | 6 | M5×0.8 | M4×0.7 | M4×0.7 Depth 8 | — | M3×0.5 | M4×0.7 | 3.3 | 5.8 | 3 | 1.5 | 4.3 | 7.3 | 3.5 | 2.5 |
| **16 [0.630]** | M5×0.8 Depth 11 | 10 | 8 | M5×0.8 | M5×0.8 | M5×0.8 Depth 10 | 3 | M4×0.7 | M4×0.7 | 4.3 | 7.3 | 3.5 | 1.5 | 4.3 | 7.3 | 3.5 | 3 |
| **20 [0.787]** | M6×1 Depth 12 | 14 | 10 | Rc1/8 | M6×1 | M6×1 Depth 12 | 7 | M4×0.7 | M5×0.8 | 4.3 | 7.3 | 4 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **25 [0.984]** | M6×1 Depth 12 | 16 | 12 | Rc1/8 | M6×1 | M6×1 Depth 12 | 8 | M4×0.7 | M5×0.8 | 4.3 | 7.3 | 4 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **32 [1.260]** | M8×1.25 Depth 16 | 20 | 16 | Rc1/8 | M8×1.25 | M8×1.25 Depth 16 | 16 | M5×0.8 | M5×0.8 | 5.3 | 8.3 | 4.5 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **40 [1.575]** | M8×1.25 Depth 16 | 20 | 16 | Rc1/8 | M8×1.25 | M8×1.25 Depth 16 | 12 | M5×0.8 | M6×1 | 5.3 | 8.3 | 4.5 | 3 | 6.3 | 10.3 | 5.5 | 3 |
| **50 [1.969]** | M10×1.5 Depth 20 | 25 | 20 | Rc1/4 | M10×1.5 | M10×1.5 Depth 20 | 9 | M5×0.8 | M8×1.25 | 5.3 | 8.3 | 4.5 | 3 | 8.3 | 13.3 | 7 | 4.5 |
| **63 [2.480]** | M10×1.5 Depth 20 | 25 | 20 | Rc1/4 | M10×1.5 | M10×1.5 Depth 20 | 9 | M5×0.8 | M8×1.25 | 5.3 | 8.3 | 4.5 | 3 | 8.3 | 13.3 | 7 | 4.5 |

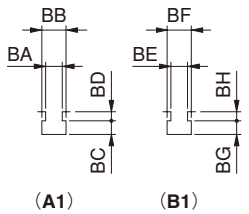
## Dimensions of -RL Rod Side End Keep Cylinder (mm)

**Rolling bearing type** **SGDAKQ** Bore size × Stroke **-RL** CAD SGDAKQ Bore size : SGDAKQ Bore size

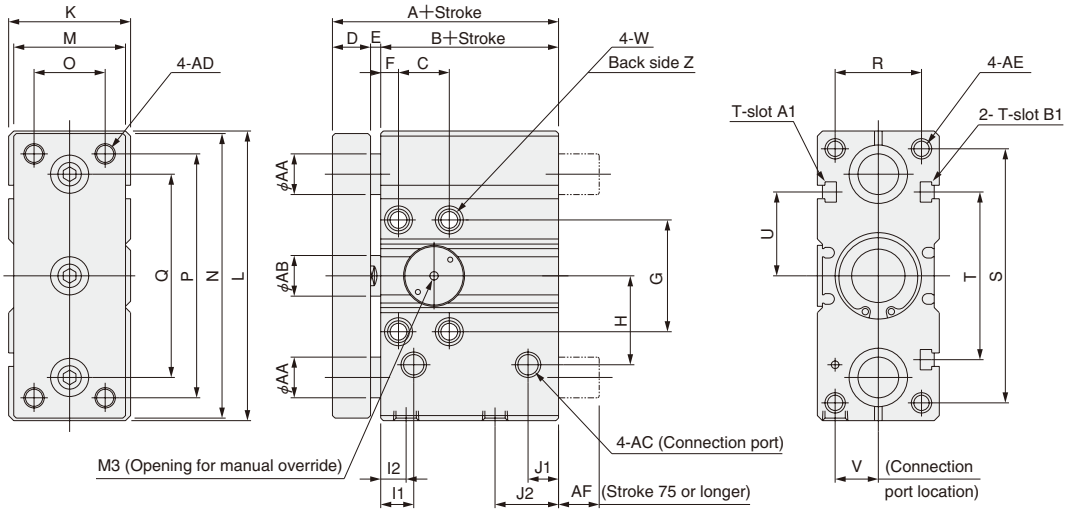
● **ϕ12, ϕ16** (Drawings show ϕ16.)



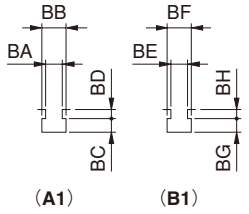

● T-slot **A1**, **B1** dimensions




● **ϕ20～ϕ63** (Drawings show ϕ32.)




● T-slot **A1**, **B1** dimensions



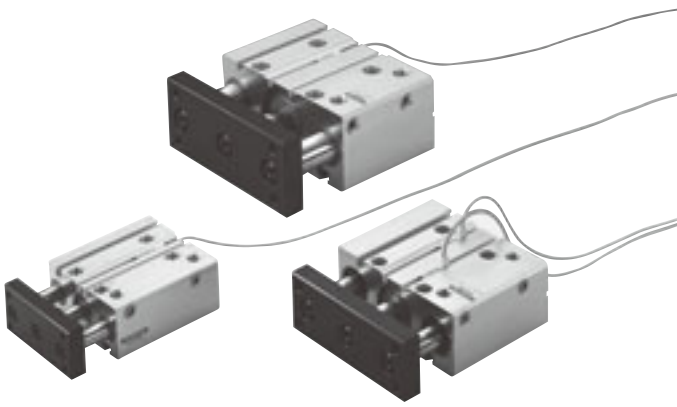

| Bore mm [in.] \ Code | A | B | C Stroke 10 | 20 | 30 | 40 | 50～100 | 125 or more | D | E | F | G | H | I1 | I2 | J1 | J2 | K | L | M | N | O | P | Q | R | S | T | U | V Note | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | 56 | 45 | 15 | 25 | 35 | 45 | 55 | — | 8 | 3 | 5 | 22 | 17 | 10 | 9 | 6 | 14 | 28 | 58 | 22 | 56 | 14 | 48 | 42 | 18 | 51 | 37 | 18.5 | 8.5 | ϕ4.2 (Thru hole) Counterbore ϕ8 Depth 4.5 |
| **16 [0.630]** | 60 | 47 | 15 | 25 | 35 | 45 | 55 | — | 10 | 3 | 5 | 26 | 19 | 10 | 9 | 7.5 | 16 | 32 | 68 | 26 | 66 | 16 | 56 | 47 | 20 | 60 | 44 | 22 | 9.5 | ϕ4.2 (Thru hole) Counterbore ϕ8 Depth 4.5 |
| **20 [0.787]** | 72 | 56 | 20 | 30 | 40 | 50 | 60 | 110 | 12 | 4 | 6 | 30 | 27 | 11 | 11 | 10 | 20 | 40 | 82 | 36 | 80 | 24 | 66 | 58 | 26 | 72 | 54 | 27 | 13.5 | ϕ5.2 (Thru hole) Counterbore ϕ9.5 Depth 5.5 |
| **25 [0.984]** | 74 | 58 | 20 | 30 | 40 | 50 | 60 | 110 | 12 | 4 | 6 | 33 | 29 | 12 | 12 | 10 | 21 | 42 | 92 | 38 | 90 | 26 | 76 | 63 | 30 | 80 | 54 | 27 | 14.5 | ϕ5.2 (Thru hole) Counterbore ϕ9.5 Depth 5.5 |
| **32 [1.260]** | 79 | 60 | 20 | 30 | 40 | 50 | 60 | 110 | 15 | 4 | 7 | 44 | 35 | 13 | 10 | 12 | 25 | 48 | 114 | 44 | 112 | 28 | 96 | 80 | 34 | 100 | 66 | 33 | 17 | ϕ6.8 (Thru hole) Counterbore ϕ11 Depth 7 |
| **40 [1.575]** | 83 | 64 | 20 | 30 | 40 | 50 | 60 | 110 | 15 | 4 | 7 | 52 | 40 | 14 | 14 | 13 | 25 | 54 | 124 | 50 | 122 | 34 | 106 | 90 | 40 | 106 | 82 | 41 | 18 | ϕ6.8 (Thru hole) Counterbore ϕ11 Depth 7 |
| **50 [1.969]** | 100 | 77 | 20 | 30 | 40 | 50 | 60 | 110 | 18 | 5 | 8 | 66 | 52.5 | 15.5 | 10 | 15 | 31 | 66 | 150 | 62 | 148 | 42 | 120 | 110 | 44 | 130 | 100 | 50 | 22 | ϕ8.6 (Thru hole) Counterbore ϕ14 Depth 9 |
| **63 [2.480]** | 100 | 77 | 20 | 30 | 40 | 50 | 60 | 110 | 18 | 5 | 8 | 78 | 60 | 17 | 10 | 14 | 31 | 76 | 162 | 72 | 160 | 52 | 132 | 122 | 44 | 144 | 120 | 60 | 24 | ϕ8.6 (Thru hole) Counterbore ϕ14 Depth 9 |

Note: The **V** dimension shows the side connection port location.

| Bore mm [in.] \ Code | Z | AA | AB | AC | AD | AE | AF | T-slot A1 | T-slot B1 | BA | BB | BC | BD | BE | BF | BG | BH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12 [0.472]** | M5×0.8 Depth 8 | 6 | 6 | M5×0.8 | M4×0.7 | M4×0.7 Depth 8 | — | M3×0.5 | M4×0.7 | 3.3 | 5.8 | 3 | 1.5 | 4.3 | 7.3 | 3.5 | 2.5 |
| **16 [0.630]** | M5×0.8 Depth 11 | 8 | 8 | M5×0.8 | M5×0.8 | M5×0.8 Depth 10 | 3 | M4×0.7 | M4×0.7 | 4.3 | 7.3 | 3.5 | 1.5 | 4.3 | 7.3 | 3.5 | 3 |
| **20 [0.787]** | M6×1 Depth 12 | 12 | 10 | Rc1/8 | M6×1 | M6×1 Depth 12 | 7 | M4×0.7 | M5×0.8 | 4.3 | 7.3 | 4 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **25 [0.984]** | M6×1 Depth 12 | 13 | 12 | Rc1/8 | M6×1 | M6×1 Depth 12 | 8 | M4×0.7 | M5×0.8 | 4.3 | 7.3 | 4 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **32 [1.260]** | M8×1.25 Depth 16 | 16 | 16 | Rc1/8 | M8×1.25 | M8×1.25 Depth 16 | 16 | M5×0.8 | M5×0.8 | 5.3 | 8.3 | 4.5 | 3 | 5.3 | 8.3 | 4.5 | 3 |
| **40 [1.575]** | M8×1.25 Depth 16 | 16 | 16 | Rc1/8 | M8×1.25 | M8×1.25 Depth 16 | 12 | M5×0.8 | M6×1 | 5.3 | 8.3 | 4.5 | 3 | 6.3 | 10.3 | 5.5 | 3 |
| **50 [1.969]** | M10×1.5 Depth 20 | 20 | 20 | Rc1/4 | M10×1.5 | M10×1.5 Depth 20 | 9 | M5×0.8 | M8×1.25 | 5.3 | 8.3 | 4.5 | 3 | 8.3 | 13.3 | 7 | 4.5 |
| **63 [2.480]** | M10×1.5 Depth 20 | 20 | 20 | Rc1/4 | M10×1.5 | M10×1.5 Depth 20 | 9 | M5×0.8 | M8×1.25 | 5.3 | 8.3 | 4.5 | 3 | 8.3 | 13.3 | 7 | 4.5 |

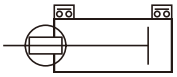
# SENSOR SWITCHES FOR JIG CYLINDERS WITH GUIDES

## Solid State Type, Reed Switch Type

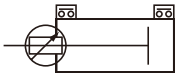


## Symbols

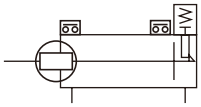
●**Standard cylinder**



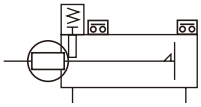
●**Stroke adjusting cylinder**



●**End keep cylinder (Head side)**



●**End keep cylinder (Rod side)**



## Order Codes

□ — □ — □ — **SGDA**

**Lead wire length**
**A** — 1000mm [39in.]
**B** — 3000mm [118in.]

**Cylinder specification**
**Blank** — Standard, Stroke adjusting, End keep
**CS** — For Clean systems

**Sensor switch**

| | | | |
|---|---|---|---|
| **ZE135** | Solid state type with indicator lamp | DC10V～28V | Horizontal lead wire |
| **ZE235** | Solid state type with indicator lamp | DC10V～28V | Vertical lead wire |
| **ZE101** | Reed switch type without indicator lamp | DC5V～28V<br>AC85～115V | Horizontal lead wire |
| **ZE201** | Reed switch type without indicator lamp | DC5V～28V<br>AC85～115V | Vertical lead wire |
| **ZE155** | Solid state type with indicator lamp | DC4.5V～28V | Horizontal lead wire |
| **ZE255** | Solid state type with indicator lamp | DC4.5V～28V | Vertical lead wire |
| **ZE102** | Reed switch type with indicator lamp | DC10V～28V<br>AC85～115V | Horizontal lead wire |
| **ZE202** | Reed switch type with indicator lamp | DC10V～28V<br>AC85～115V | Vertical lead wire |

●For details of sensor switches, see p.1544.

## Minimum Cylinder Strokes When Using Sensor Switches

### ●Solid state type

mm

| Bore size mm [in.] | 2 pcs. mounting Note | | 1 pc. mounting |
|---|---|---|---|
| | 1-surface mounting | 2-surface mounting | |
| 12～63 [0.472～2.480] | 10 | | 5 |

Note: 2 pcs. mounting is possible at stroke 5mm.
Be aware, however, that overlapping may occur.

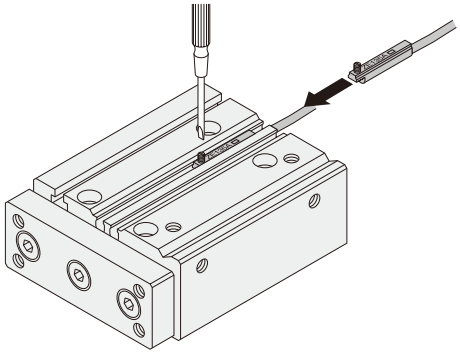
### ●Reed switch type

mm

| Bore size mm [in.] | 2 pcs. mounting | | 1 pc. mounting |
|---|---|---|---|
| | 1-surface mounting | 2-surface mounting | |
| 12～63 [0.472～2.480] | 10 | | 10 |

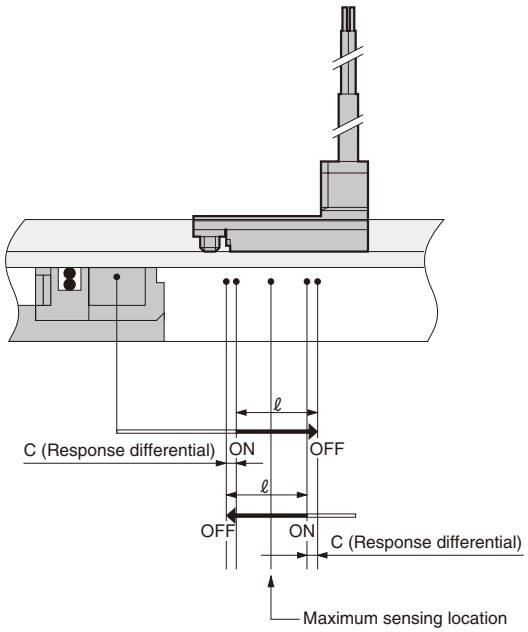
## Moving Sensor Switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove on the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1～0.2N·m [0.9～1.8in·lbf].



## Sensor Switch Operating Range, Response Differential, and Maximum Sensing Location

- **Operating range: ℓ**
  The distance the piston travels in one direction, while the switch is in the ON position.
- **Response differential: C**
  The distance between the point where the piston turns the switch ON and the point where the switch is turned OFF as the piston travels in the opposite direction.




### ●Solid state type

mm [in.]

| Item \ Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| Operating range: ℓ | 2～4 [0.079～0.157] | 2～5 [0.079～0.197] | 3.5～7.5 [0.138～0.295] | 4～8 [0.157～0.315] | 3～7 [0.118～0.276] | 3.5～7.5 [0.138～0.295] | 3.5～7.5 [0.138～0.295] | 4～8.5 [0.157～0.335] |
| Response differential: C | 1.0 [0.039] or less | | | | | | | |
| Maximum sensing location Note | 6 [0.236] | | | | | | | |

Note: This is the length measured from the switch's opposite end side to lead wire.
Remark: The above table shows reference values.

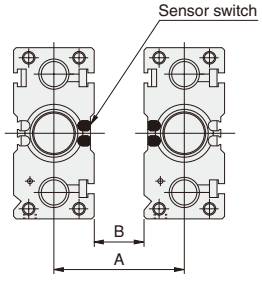
### ●Reed switch type

mm [in.]

| Item \ Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| Operating range: ℓ | 5.5～8 [0.217～0.315] | 6.5～9 [0.256～0.354] | 10～13 [0.394～0.512] | 11.5～15 [0.453～0.591] | 9～11.5 [0.354～0.453] | 10～13.5 [0.394～0.531] | 10.5～14.5 [0.413～0.571] | 11～15.5 [0.433～0.610] |
| Response differential: C | 1.0 [0.039] or less | 1.5 [0.059] or less | | | | | | |
| Maximum sensing location Note | 10 [0.394] | | | | | | | |

Note: This is the length measured from the switch's opposite end side to lead wire.
Remark: The above table shows reference values.

## When Mounting Cylinders with Sensor Switches in Close Proximity




When mounting cylinders in close proximity, install the cylinder so that it exceeds the values in the table below.

**The end plates are the same side** mm [in.]

| Bore size | Solid state type | | Reed switch type | |
|---|---|---|---|---|
| | A | B | A | B |
| **12 [0.472]** | 33 [1.299] | 5 [0.197] | 28 [1.102] | 0 |
| **16 [0.630]** | 37 [1.457] | | 32 [1.260] | |
| **20 [0.787]** | 45 [1.772] | | 40 [1.575] | |
| **25 [0.984]** | 50 [1.969] | 8 [0.315] | 42 [1.654] | |
| **32 [1.260]** | 56 [2.205] | | 48 [1.890] | |
| **40 [1.575]** | 62 [2.441] | | 54 [2.126] | |
| **50 [1.969]** | 78 [3.071] | 12 [0.472] | 66 [2.598] | |
| **63 [2.480]** | 88 [3.465] | | 76 [2.992] | |

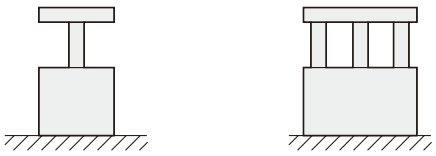
**The end plates are the opposite side** mm [in.]

| Bore size | Solid state type | | Reed switch type | |
|---|---|---|---|---|
| | A | B | A | B |
| **12 [0.472]** | 34 [1.339] | 6 [0.236] | 28 [1.102] | 0 |
| **16 [0.630]** | 38 [1.496] | | 32 [1.260] | |
| **20 [0.787]** | 46 [1.811] | | 40 [1.575] | |
| **25 [0.984]** | 54 [2.126] | 12 [0.472] | 42 [1.654] | |
| **32 [1.260]** | 60 [2.362] | | 48 [1.890] | |
| **40 [1.575]** | 66 [2.598] | | 54 [2.126] | |
| **50 [1.969]** | 84 [3.307] | 18 [0.709] | 66 [2.598] | |
| **63 [2.480]** | 94 [3.701] | | 76 [2.992] | |

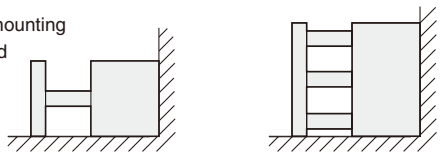
## Mounting and Removing Sensor Switches

In Jig Cylinders with Guides of φ12～φ63, be aware that sensor switches cannot be mounted or removed when strokes of 10mm or shorter mounted in the application shown below.

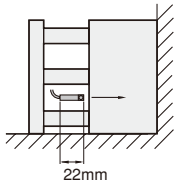
Bottom mounting



Right angled mounting (2 surfaces and 3 surfaces)



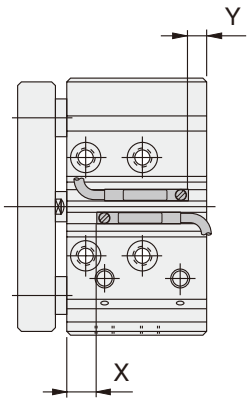
※ For strokes of 20mm or longer, sensor switches can be mounted and removed when the plate (rods extend) is extended.

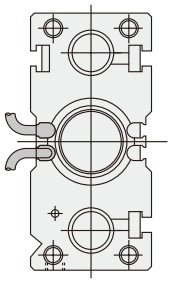


## Mounting Location of End of Stroke Detection Sensor Switch

When the sensor switch is mounted in the locations shown below (the figures in the tables are reference values), the magnet comes to the maximum sensing location of the sensor switch at the end of the stroke.

### ● Standard cylinder



※ The scraper specification has a configuration of the standard cylinder body length +10mm [0.394in.], with the retracted side connection port location shifted 10mm [0.394in.] toward the head side.

**■ Solid state type**

mm [in.]

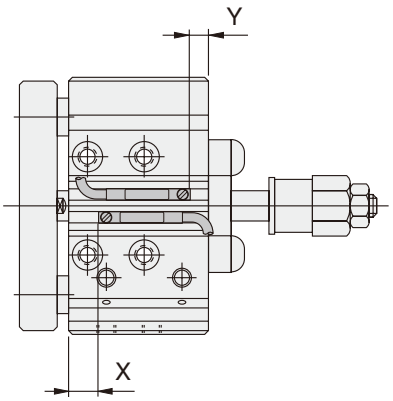
| Code | Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|---|
| X | Without scraper | 9.5 [0.374] | 11 [0.433] | 14 [0.551] | 16 [0.630] | 15 [0.591] | 16.5 [0.650] | 16.5 [0.650] | 16.5 [0.650] |
| | With scraper | 19.5 [0.768] | 21 [0.827] | 24 [0.945] | 26 [1.024] | 25 [0.984] | 26.5 [1.043] | 26.5 [1.043] | 26.5 [1.043] |
| Y | Without scraper | 3.5 [0.138] | 4.5 [0.177] | 10 [0.394] | 10 [0.394] | 13 [0.512] | 15.5 [0.610] | 18.5 [0.728] | 18.5 [0.728] |
| | With scraper | 3.5 [0.138] | 4.5 [0.177] | 10 [0.394] | 10 [0.394] | 13 [0.512] | 15.5 [0.610] | 18.5 [0.728] | 18.5 [0.728] |

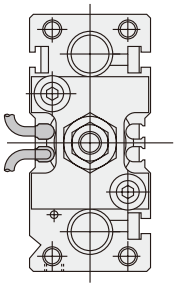
**■ Reed switch type**

mm [in.]

| Code | Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|---|
| X | Without scraper | 5.5 [0.217] | 7 [0.276] | 10 [0.394] | 12 [0.472] | 11 [0.433] | 12.5 [0.492] | 12.5 [0.492] | 12.5 [0.492] |
| | With scraper | 15.5 [0.610] | 17 [0.669] | 20 [0.787] | 22 [0.866] | 21 [0.827] | 22.5 [0.886] | 22.5 [0.886] | 22.5 [0.886] |
| Y | Without scraper | 0 [0] | 0 [0] | 6 [0.236] | 6 [0.236] | 9 [0.354] | 11.5 [0.453] | 14.5 [0.571] | 14.5 [0.571] |
| | With scraper | 0 [0] | 0 [0] | 6 [0.236] | 6 [0.236] | 9 [0.354] | 11.5 [0.453] | 14.5 [0.571] | 14.5 [0.571] |

### ● Stroke adjusting cylinder



**■ Solid state type**

mm [in.]

| Code | Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|---|
| X | | 7 [0.276] | 7 [0.276] | 10 [0.394] | 11 [0.433] | 15 [0.591] | 16.5 [0.650] | 16.5 [0.650] | 16.5 [0.650] |
| Y | | 6 [0.236] | 8 [0.315] | 14 [0.551] | 15 [0.591] | 13 [0.512] | 15.5 [0.610] | 18.5 [0.728] | 18.5 [0.728] |

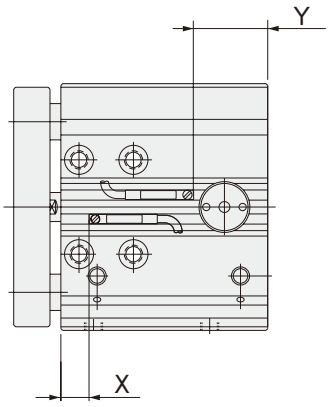
**■ Reed switch type**

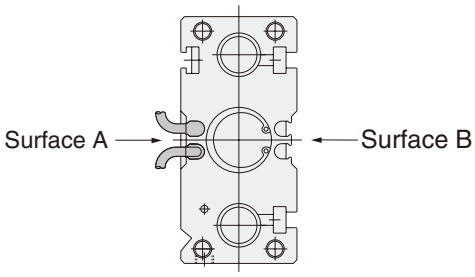
mm [in.]

| Code | Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|---|
| X | | 3 [0.118] | 3 [0.118] | 6 [0.236] | 7 [0.276] | 11 [0.433] | 12.5 [0.492] | 12.5 [0.492] | 12.5 [0.492] |
| Y | | 2 [0.079] | 4 [0.157] | 10 [0.394] | 11 [0.433] | 9 [0.354] | 11.5 [0.453] | 14.5 [0.571] | 14.5 [0.571] |

When the sensor switch is mounted in the locations shown below (the figures in the tables are reference values), the magnet comes to the maximum sensing location of the sensor switch at the end of the stroke.

## ●Head side end keep cylinder




### ■ Solid state type

mm [in.]

| Code \ Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| X | 9.5 [0.374] | 11 [0.433] | 14 [0.551] | 16 [0.630] | 15 [0.591] | 16.5 [0.650] | 16.5 [0.650] | 16.5 [0.650] |
| Y | 23.5 [0.925] | 24.5 [0.965] | 30 [1.181] | 30 [1.181] | 33 [1.299] | 35.5 [1.398] | 48.5 [1.909] | 48.5 [1.909] |

Remark: A sensor switch cannot be mounted on surface A when the cylinder is St=10 and a head side end keep. (Can be mounted on surface B)

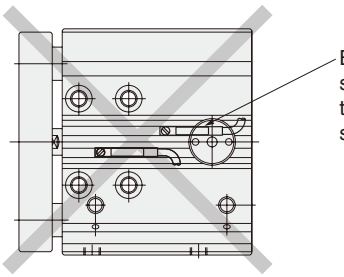
### ■ Reed switch type

mm [in.]

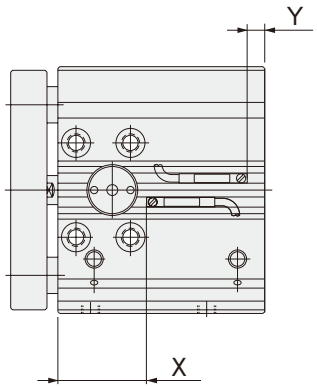
| Code \ Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| X | 5.5 [0.217] | 7 [0.276] | 10 [0.394] | 12 [0.472] | 11 [0.433] | 12.5 [0.492] | 12.5 [0.492] | 12.5 [0.492] |
| Y | 20 [0.787] | 20 [0.787] | 26 [1.024] | 26 [1.024] | 29 [1.142] | 31.5 [1.240] | 44.5 [1.752] | 44.5 [1.752] |

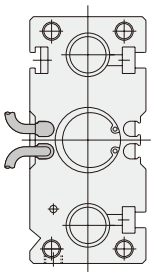
Remark: A sensor switch cannot be mounted on surface A when the cylinder is St=10 and a head side end keep. (Can be mounted on surface B)

**Caution:** As can be seen in the diagram to the right, when a sensor switch is mounted on a head side end keep cylinder (**-HL**), both the lead wires cannot be taken out on the head side. They can, however, be mounted on surface B.




## ●Rod side end keep cylinder



### ■ Solid state type

mm [in.]

| Code \ Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| X | 29.5 [1.161] | 31 [1.220] | 34 [1.339] | 36 [1.417] | 35 [1.378] | 36.5 [1.437] | 46.5 [1.831] | 46.5 [1.831] |
| Y | 3.5 [0.138] | 4.5 [0.177] | 10 [0.394] | 10 [0.394] | 13 [0.512] | 15.5 [0.610] | 18.5 [0.728] | 18.5 [0.728] |

### ■ Reed switch type

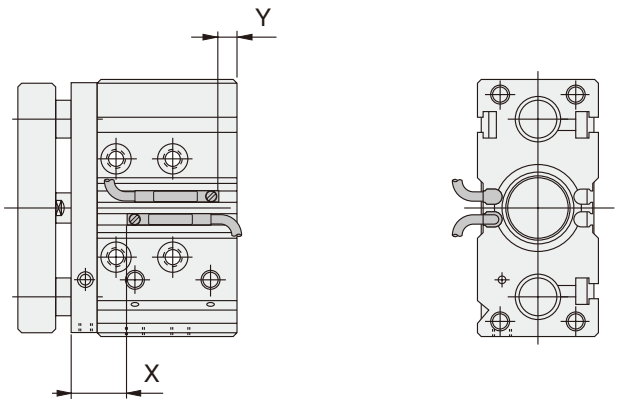
mm [in.]

| Code \ Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| X | 25.5 [1.004] | 27 [1.063] | 30 [1.181] | 32 [1.260] | 31 [1.220] | 32.5 [1.280] | 42.5 [1.673] | 42.5 [1.673] |
| Y | 0 [0] | 0 [0] | 6 [0.236] | 6 [0.236] | 9 [0.354] | 11.5 [0.453] | 14.5 [0.571] | 14.5 [0.571] |

## Mounting Location of End of Stroke Detection Sensor Switch

When the sensor switch is mounted in the locations shown below (the figures in the tables are reference values), the magnet comes to the maximum sensing location of the sensor switch at the end of the stroke.

### ●Cylinders for clean systems




**■ Solid state type**

mm [in.]

| Code \ Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| X | 19.5 [0.768] | 21 [0.827] | 24 [0.945] | 26 [1.024] | 25 [0.984] | 26.5 [1.043] | 26.5 [1.043] | 26.5 [1.043] |
| Y | 3.5 [0.138] | 4.5 [0.177] | 10 [0.394] | 10 [0.394] | 13 [0.512] | 15.5 [0.610] | 18.5 [0.728] | 18.5 [0.728] |

**■ Reed switch type**

mm [in.]

| Code \ Bore size | 12 [0.472] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
|---|---|---|---|---|---|---|---|---|
| X | 15.5 [0.610] | 17 [0.669] | 20 [0.787] | 22 [0.866] | 21 [0.827] | 22.5 [0.886] | 22.5 [0.886] | 22.5 [0.886] |
| Y | 0 [0] | 0 [0] | 6 [0.236] | 6 [0.236] | 9 [0.354] | 11.5 [0.453] | 14.5 [0.571] | 14.5 [0.571] |