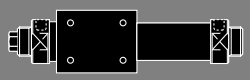
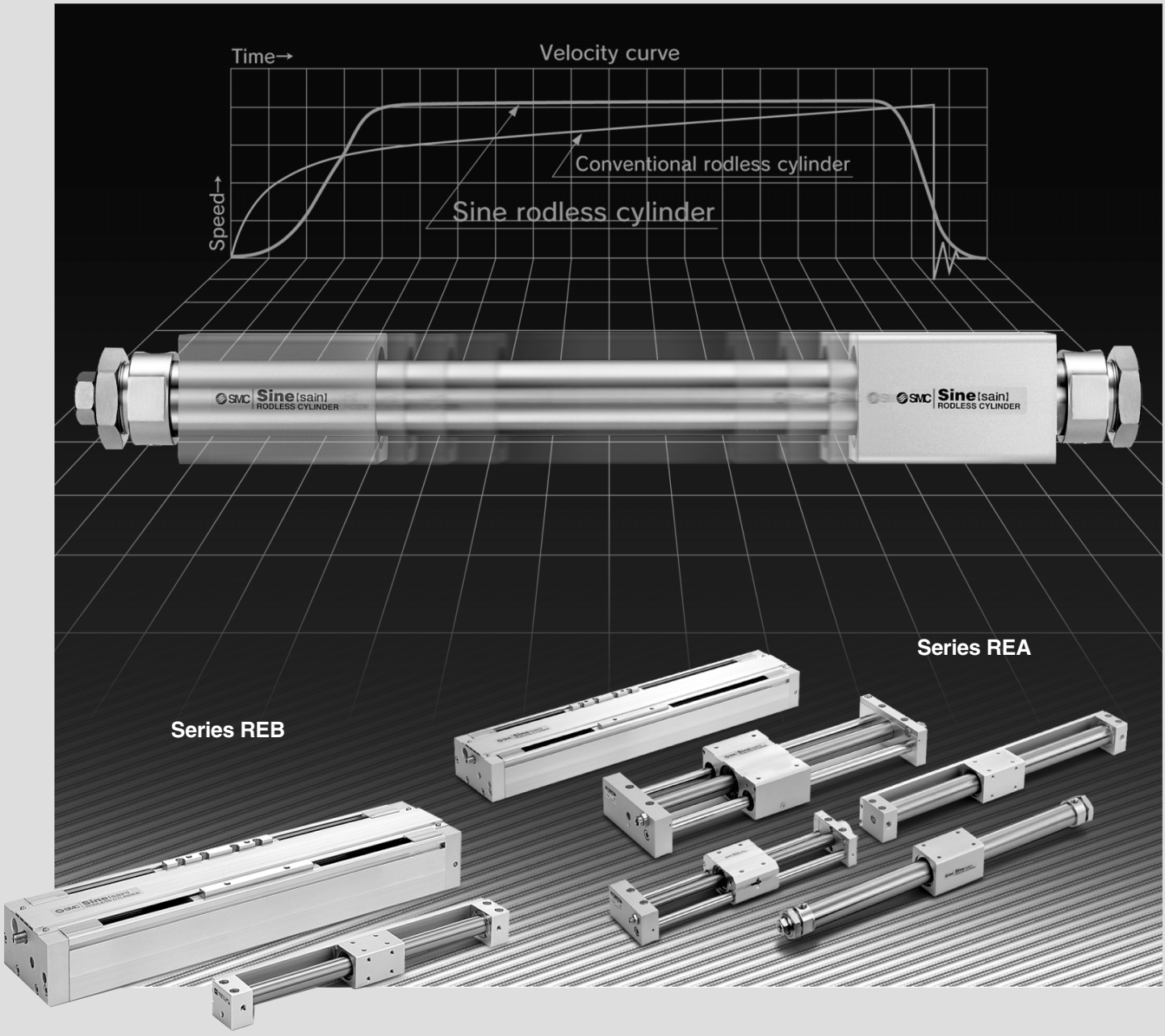


# Sine Rodless Cylinder

# *Series* REA/REB

(Maximum speed: 300 mm/s) (Maximum speed: 600 mm/s)






## *Series REA* (300 mm/s)


| Guide type | Model | Page |
|---|---|---|
| Basic type | REA | 10-2-6 |
| Direct mount type | REAR | 10-2-13 |
| Slider type (Slide bearing) | REAS | 10-2-14 |
| Slider type (Ball bushing bearing) | REAL | 10-2-36 |
| High precision guide type (Single axis) | REAH | 10-2-48 |
| High precision guide type (Double axis) | REAHT | 10-2-48 |


## *Series REB* (600 mm/s)


| Guide type | Model | Page |
|---|---|---|
| Direct mount type | REBR | 10-2-63 |
| High precision guide type (Single axis) | REBH | 10-2-73 |
| High precision guide type (Double axis) | REBHT | 10-2-73 |

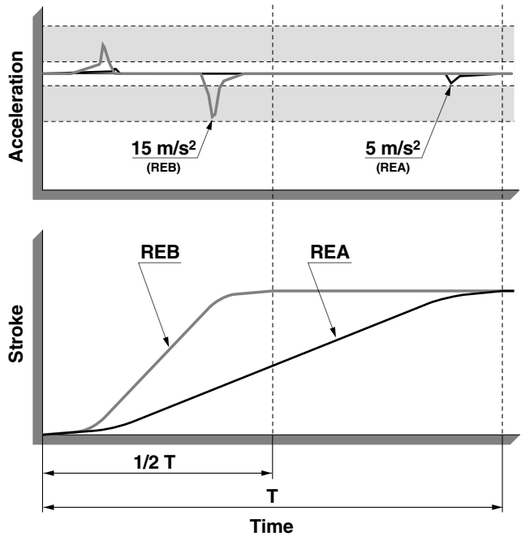
*Semiconductor wafers • Liquid crystal substrates*
*Magnetic disks • Ceramic products*
*Glass products*

# Allows rapid transfer of impact sensitive workpieces

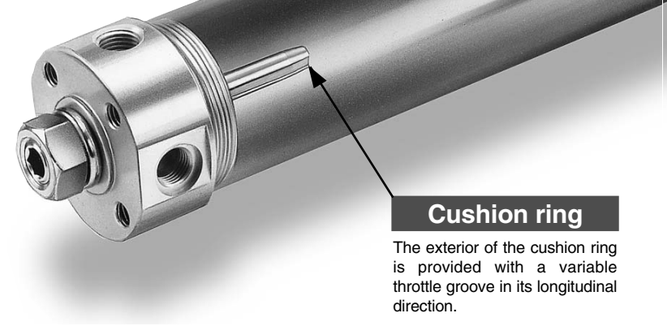
Sine rodless cylinder
**Series REA/REB**
Maximum speed (300 mm/s) Maximum speed (600 mm/s)

## Throughput dramatically increased (Maximum speed: **600** mm/s)

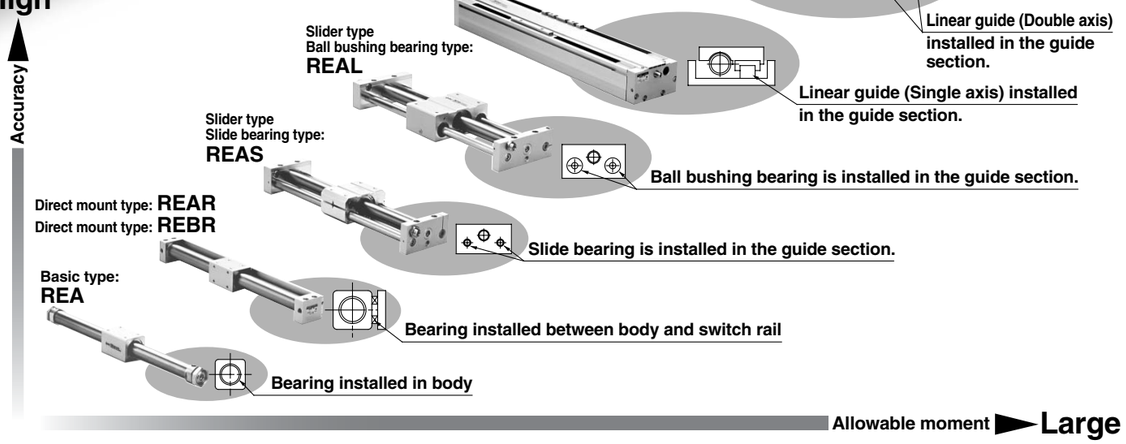
Series REB introduced with a maximum speed of 600 mm/s. Compared with the previous type (Series REA: 300 mm/s), the tact time can be shortened by approximately 1/2.



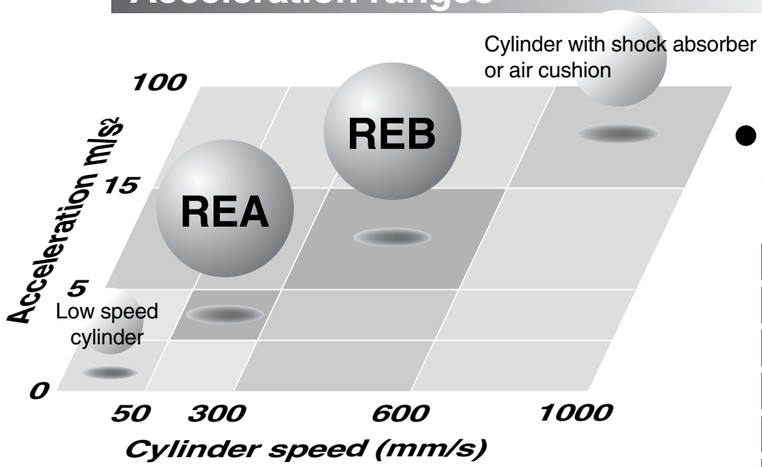

**Smooth acceleration & deceleration at 5 m/s² or less (REA) or 15 m/s² or less (REB)**




The exterior of the cushion ring is provided with a variable throttle groove in its longitudinal direction.




## Acceleration ranges




## ● Series Variations

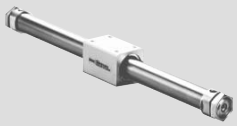
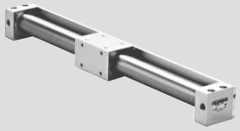
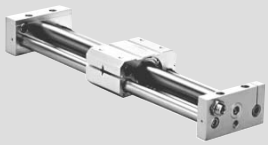
### *Series REA* (300 mm/s)

| Guide type | Base cylinder | Model | Bore size 10 | 15 | 20 | 25 | 32 | 40 | 50 | 63 |
|---|---|---|---|---|---|---|---|---|---|---|
| Basic type | CY1B | REA | | | | ● | ● | ● | ● | ● |
| Direct mount type | CY1R | REAR | | ● | ● | ● | ● | ● | | |
| Slider type (Slide bearing) | CY1S | REAS | | ● | ● | ● | ● | ● | | |
| Slider type (Ball bushing bearing) | CY1L | REAL | | ● | ● | ● | ● | ● | | |
| High precision guide type (Single axis) | CY1H | REAH | | ● | ● | ● | | | | |
| High precision guide type (Double axis) | CY1HT | REAHT | | | | ● | ● | | | |

### *Series REB* (600 mm/s)

| Guide type | Base cylinder | Model | Bore size 10 | 15 | 20 | 25 | 32 | 40 | 50 | 63 |
|---|---|---|---|---|---|---|---|---|---|---|
| Direct mount type | CY1R | REBR | | ● | ● | ● | ● | ● | | |
| High precision guide type (Single axis) | CY1H | REBH | | ● | | ● | | | | |
| High precision guide type (Double axis) | CY1HT | REBHT | | | | ● | ● | | | |

# *Series REA/REAR/REBR/REAS/REAL/REAH/REBH*
# Model Selection Criteria

| Model Selection Criteria | Recommended Cylinder | | | |
|---|---|---|---|---|
| | Appearance | | Features | |
| • When many different types of guides are used<br>• When a long stroke is necessary | Guide non-integrated type | ***Series REA***<br>Size: ø25, ø32, ø40, ø50, ø63<br>  | • Wide variations from ø25 to ø63. | • Long strokes available. |
| • When many different types of guides are used<br>• When auto switches are added to the basic style<br>• When used without a guide for a light load<br>• When space is very limited | Guide non-integrated type | ***Series REAR***<br>Size: ø10, ø15, ø20, ø25, ø32, ø40<br>***Series REBR***<br>Size: ø15, ø25, ø32<br>  | • Choice of the maximum speed of 300 mm/s or 600 mm/s is available. | • Cylinder can be directly mounted.<br>• Auto switch capable, with no cylinder lurching.<br>• Rotation can be stopped within an allowable range.<br>• Compact external dimensions<br>• Mounting can be performed from the top or one side. |
| • To ensure a permanent path<br>• When used for general transfer operations | Guide integrated type | ***Series REAS***<br>Size: ø10, ø15, ø20, ø25, ø32, ø40<br>  | • A load can be carried directly by the guide integrated type.<br>• The centralized piping type allows concentration of piping on one side plate.<br>• Auto switch capable.<br>• Choice of the maximum speed of 300 mm/s or 600 mm/s is available. (RE□H/High precision guide type) | • Smooth operation is made possible by using special slide bearings. |
| • To ensure a permanent path<br>• When smoother operation is required, even with an eccentric load | Guide integrated type | ***Series REAL***<br>Size: ø10, ø15, ø20, ø25, ø32, ø40<br>  | | • Stable operation is possible, even with an eccentric load, by using ball bushings. |
| • To ensure a permanent path<br>• When a large load, large moment or high precision is required<br>• When used for pick-and-place operations, etc. | Guide integrated type | ***Series REAH***<br>Size: ø10, ø15, ø20, ø25, ø32<br>***Series REBH***<br>Size: ø15, ø25, ø32<br>  | | • The use of a linear guide facilitates a large load, large moment and high precision.<br>• Mounting freedom is improved by providing T-slots on the mounting surfaces.<br>• A top cover mounted over the sliding parts of the cylinder prevents scratches and damage, etc. |

# Series REA/REB
# Specific Product Precautions 1

**Be sure to read before handling.**

## Disassembly and Maintenance

### ⚠ Warning

**1. Use caution as the attractive force of the magnets is very strong.**
When removing the external slider and piston slider from the cylinder tube for maintenance, etc., handle with caution, since the magnets installed in each slider have a very strong attractive force.

### ⚠ Caution

**1. Use caution when removing the external slider, as the piston slider will be directly attracted to it.**
When removing the external slider or piston slider from the cylinder tube, first force the sliders out of their magnetically coupled positions, and then remove them individually when there is no longer any holding force. If they are removed while still magnetically coupled, they will be directly attracted to one another and will not come apart.

**2. Do not disassemble the magnetic components (piston slider, external slider).**
This can cause a loss of holding force and malfunction.

**3. When disassembling to replace the seals and wear ring, refer to the separate disassembly instructions.**

**4. Use caution to the direction of the external slider and the piston slider.**
Since the external slider and piston slider are directional for size ø10, refer to the figures below when performing disassembly or maintenance. Put the external slider and piston slider together, and insert the piston slider into the cylinder tube so that they will have the correct positional relationship as shown in Fig. (1). If they align as shown in Fig. (2), reinsert the piston slider only, after turning it around 180°. If the direction is not correct, it will be impossible to obtain the specified holding force.

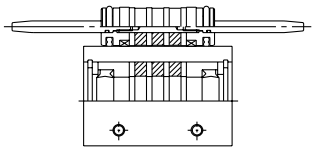


**Fig. (1) Correct position**

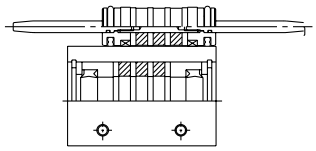


**Fig. (2) Incorrect position**

**5. During disassembly, use caution in handling the cushion ring.**
The cushion ring is a precision part, and any deformation, etc., can cause malfunction or poor performance.

## Speed Adjustment

### ⚠ Caution

**1.** SMC's "throttle" type speed controllers (Series AS) are recommended for speed adjustment. (Refer to Table (1).)

**2.** Speed adjustment is possible with meter-in/meter-out type speed controllers, but it may not be possible to obtain the cushion effect (smooth start-up, soft stop).

**3.** In the case of other than horizontal mounting, it is recommended that the system have a reduced pressure supply circuit installed at its lower side. (This is also effective as a countermeasure against start-up delay on an upward stroke, and for air conservation.)

**Table (1) Recommended Speed Controller**

| Bore size (mm) | Model | | |
|---|---|---|---|
| | Elbow type | Straight type | In-line type |
| **10** | AS1201F-M5-04-X214 | AS1301F-M5-04-X214 | AS1001F-04-X214 |
| **15** | AS1201F-M5-04-X214 | AS1301F-M5-04-X214 | AS1001F-04-X214 |
| **20** | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS2001F-06-X214 |
| **25** | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS2001F-06-X214 |
| **32** | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS2001F-06-X214 |
| **40** | AS2201F-02-06-X214 | AS2301F-02-06-X214 | AS2001F-06-X214 |
| **50** | AS3201F-02-08-X214 | AS3301F-02-08-X214 | AS3001F-08-X214 |
| **63** | AS3201F-02-08-X214 | AS3301F-02-08-X214 | AS3001F-08-X214 |

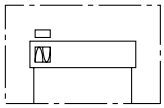
## Adjustment of Cushion Effect (Smooth start-up, Soft stop)

### ⚠ Caution

The cushion cannot be adjusted.
There is no cushion needle adjustment of the kind found on conventional cushion mechanisms.

# Sine Rodless Cylinder
# Basic Type
# *Series REA*
## ø25, ø32, ø40, ø50, ø63

**JIS Symbol**



## How to Order

**REA 25 — 300**

**Sine rodless cylinder (Basic type)**

**Bore size**

| | |
|---|---|
| **25** | 25 mm |
| **32** | 32 mm |
| **40** | 40 mm |
| **50** | 50 mm |
| **63** | 63 mm |

**Stroke (mm)**
Refer to "Standard Stroke" below.

## Specifications

| | |
|---|---|
| Fluid | Air |
| Proof pressure | 1.05 MPa |
| Maximum operating pressure | 0.7 MPa |
| Minimum operating pressure | 0.18 MPa |
| Ambient and fluid temperature | –10 to 60°C (No freezing) |
| Piston speed | 50 to 300 mm/s |
| Lubrication | Non-lube |
| Stroke length tolerance | 0 to 250 st: $^{+1.0}_{0}$, 251 to 100 st: $^{+1.4}_{0}$, 1001 st or longer: $^{+1.8}_{0}$ |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) | Maximum manufacturable stroke (mm) |
|---|---|---|
| **25** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | 4000 |
| **32** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | |
| **40** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 | 5000 |
| **50** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 | 6000 |
| **63** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 | |

Note 1) Intermediate stroke is available by the 1 mm interval.
Note 2) Strokes over 2000 mm are available as made-to-order. (Refer to -XB11 on page 10-21-1.)

## Magnetic Holding Force

(N)

| Bore size (mm) | **25** | **32** | **40** | **50** | **63** |
|---|---|---|---|---|---|
| Holding force | 363 | 588 | 922 | 1,470 | 2,260 |

## Weight

(kg)

| Bore size (mm) | **25** | **32** | **40** | **50** | **63** |
|---|---|---|---|---|---|
| Basic weight | 0.71 | 1.34 | 2.15 | 3.4 | 5.7 |
| Additional weight per each 50 mm of stroke | 0.05 | 0.07 | 0.08 | 0.095 | 0.12 |

Calculation: (Example) REA32-500
- Basic weight ·····1.34 (kg)
- Additional weight ·····0.07 (kg/50 st)
- Cylinder stroke ·····500 (st)

1.34 + 0.07 x 500 ÷ 50 = 2.04 kg

## Made to Order Specifications
**(For details, refer to page 10-21-1.)**

| Symbol | Specifications |
|---|---|
| **-XB11** | Long stroke |
| **-XC24** | With magnetic shielding plate |
| **-XC57** | With floating joint |
| **-X206** | Additional mounting tap positions for slider |
| **-X210** | Non-lubricated exterior specifications |
| **-X324** | Non-lubricated exterior specifications (With dust seal) |
| **-X168** | Helical insert thread specifications |

Refer to "Pneumatic Clean Series" catalog for clean room specifications.

# ⚠ Precautions

**Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.**

## Mounting

## ⚠ Caution

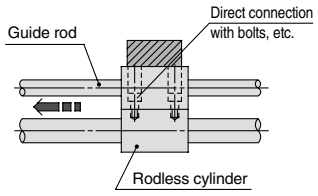
**1. Take care to avoid nicks or other damage on the outside surface of the cylinder tube.**
This can lead to a damage of the scraper and the wear ring, which in turn can cause malfunction.

**2. Use caution to the rotation of the external slider.**
Rotation should be controlled by connecting it to another shaft (linear guide, etc.).

**3. Do not operate with the magnetic coupling out of position.**
If the magnetic coupling is out of position, push the external slider by hand (or the piston slider with air pressure) back to the proper position at the stroke end.

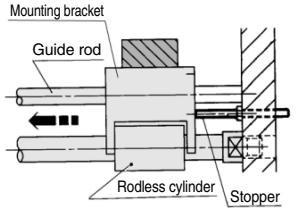
**4. Be sure that both head covers are secured to the mounting surface before operating the cylinder.**
Avoid operation with the external slider secured to the surface.

**5. Do not apply a lateral load to the external slider.**
When a load is mounted directly to the cylinder, variations in the alignment of each shaft center cannot be offset, which results in the generation of a lateral load that can cause malfunction. The cylinder should be operated using a connection method which allows for shaft alignment variations and deflection due to the cylinder's own weight. A drawing of a recommended mounting is shown in Fig. (2).




Variations in the load and cylinder shaft alignment cannot be offset and may result in a malfunction.

**Fig. (1) Incorrect mounting**




Shaft alignment variations are offset by providing clearance between the mounting bracket and cylinder.
Moreover, the mounting bracket is extended above the cylinder shaft center, so that the cylinder is not subjected to moment.

**Fig. (2) Recommended mounting**

**6. Use caution regarding the allowable load weight when operating in a vertical direction.**
The allowable load weight when operating in a vertical direction (reference values on page 10-2-10 is determined by the model selection method. However, if a load greater than the allowable value is applied, the magnetic coupling may break and there is a possibility of dropping the load. When using this type of application, please contact SMC regarding the operating conditions (pressure, load, speed, stroke, frequency, etc.).

## Disassembly and Maintenance

## ⚠ Caution

**1. When reattaching the head covers after disassembly, confirm that they are tightened securely.**
When disassembling, hold the wrench flats of one head cover with a vise, and remove the other cover using a spanner or adjustable wrench on the wrench flats. When retightening, first coat with Loctite® (no. 542 Red), and retighten 3 to 5 past the original position prior to removal.

## Stroke Adjustment

## ⚠ Caution

**1.** This mechanism is not intended for adjustment of the cushion effect (smooth start-up, soft stop). This mechanism is for matching of the cylinder's stroke end position to the mechanical stopper, etc., of a machine. (adjustment range from 0 to –2 mm)

**2.** Before adjustment is performed, shut off the drive air, release any residual pressure and implement measures to prevent dropping of workpieces, etc.

## Stroke End Adjustment

**(To ensure safety, implement with air shut down.)**

## ⚠ Caution

**1.** Loosen lock nut A.

**2.** Insert a wrench into the hexagon socket of the adjusting screw, and turn it to the left or right, matching the cushion ring holder (stroke end) with the position of the external stopper by moving it backward or forward.

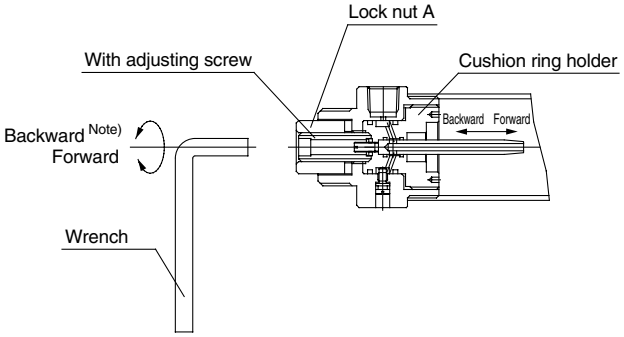
**3.** After the stroke end adjustment is completed, retighten lock nut A, and apply high strength Loctite® no. 262 or another comparable locking agent.

**Adjusting Screw Hexagon Socket**

| Model | Width across flats (mm) |
|---|---|
| **REA25** | 5 |
| **REA32** | 5 |
| **REA40** | 6 |
| **REA50** | 8 |
| **REA63** | 8 |

**Lock Nut A tightening Torque**

| Model | Tightening torque (N·m) |
|---|---|
| **REA25** | 1.2 |
| **REA32** | 1.2 |
| **REA40** | 2.1 |
| **REA50** | 3.4 |
| **REA63** | 3.4 |




Note) Do not move it backward, as it is set to a full stroke at the time of shipment.

# *Series REA*
# Model Selection 1

**Fn**: Allowable driving force (N)
**Pv**: Maximum operating pressure for vertical operation (MPa)
**WBmax**: Maximum connection fitting weight (kg)
**Wv**: Allowable load weight for vertical operation (kg)

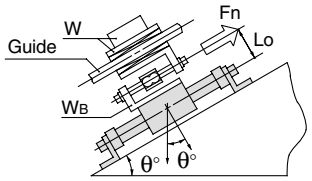
**Operating Conditions**

- **W: Load weight (kg)**
- **WB: Connection fitting weight (kg)**
- **μ: Guide's coefficient of friction**
- **Lo: Distance from cylinder shaft center to workpiece point of application (cm)**
- **Mode of operation (horizontal, inclined, vertical)**
- **P: Operating pressure (MPa)**
- **U: Maximum speed (mm/s)**
- **Stroke (mm)**

**Mode of operation**

**Horizontal operation** | **Inclined operation** | **Vertical operation**

**Review of load weight and operating pressure**



Inclined operation

**First tentative bore size determination**

$$\varnothing D \geq 1.6 \times \sqrt{\frac{F_1}{P}}$$

**First tentative bore size determination**

$$\varnothing D \geq 1.6 \times \sqrt{\frac{F_2}{P}}$$

**First tentative bore size determination**

$$\varnothing D \geq 1.6 \times \sqrt{\frac{F_3}{P}}$$

**Allowable Driving Force (Fn) (n = 1, 2, 3)**

| | |
|---|---|
| Horizontal | F1 = μ x (W + WB) x 9.8 |
| Inclined | F2 = (W + WB) x 9.8 x (μcosθ + sinθ) |
| Vertical | F3 = (W + WB) x 9.8 x (μ + 1) |

For the (Fn) of data (A), refer to the allowable driving force table.

**Determination of allowable load weight & pressure**

**W + WB ≤ Wv**
**P ≤ Pv**

**W + WB > Wv**
**P > Pv**

(For vertical operation, refer to page 10-2-10.)

(For connection fitting weight, refer to page 10-2-10.)

**Determination of connection fitting weight (WB)**

**WB > WBmax**
**Review of connection fitting**

**WB ≤ WBmax**

(Refer to data (A) on page 10-2-9.)

**Second tentative determination of bore size using the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)**

(Refer to data (B) on page 10-2-9.)

**Third tentative determination of bore size from the graph of maximum speed (U) and load weight (W).**

(Bore size is the largest of 3 tentative determinations.)

**Bore size determination**

Note)

**Consider made-to-order products, depending on an operating condition.**

(Refer to page 10-2-6.)

**Model selected**

Note) Made-to-order products should be considered, too, depending on an operating environment, etc.

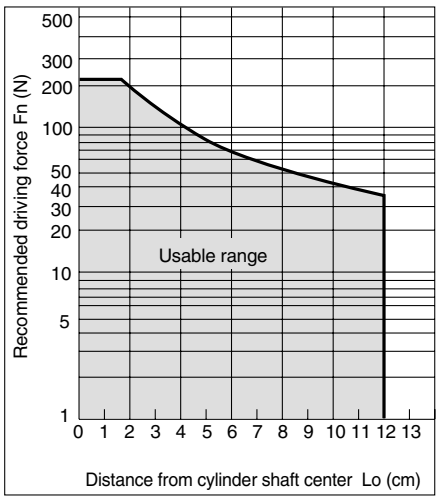
# Series REA
# Model Selection 2

## Caution on Design 1

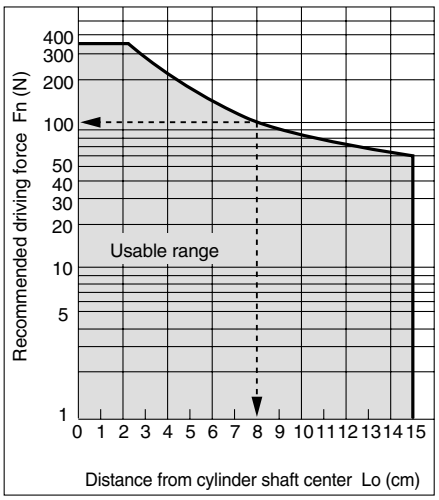
### Selection Method

**<Data (A): Distance from Cylinder Shaft Center———Allowable Driving Capacity>**

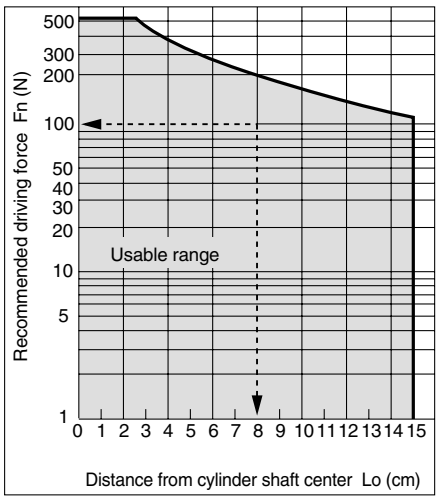
**ø25**



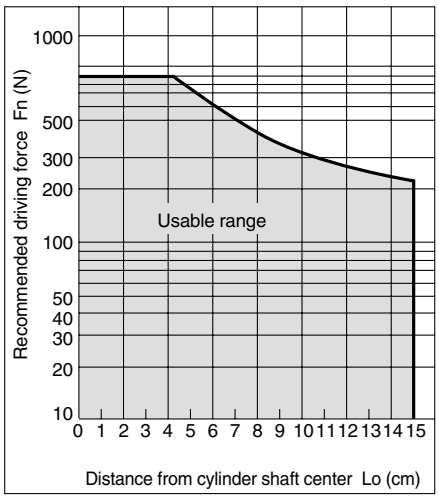

**ø32**



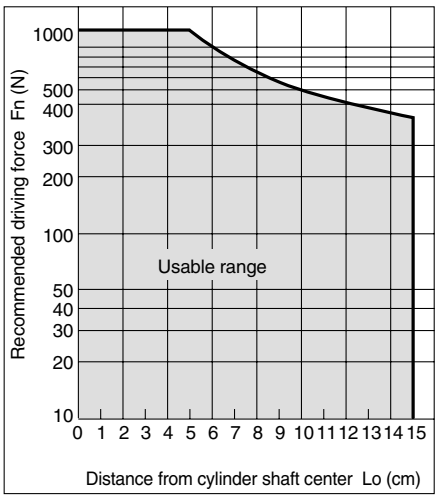

**ø40**



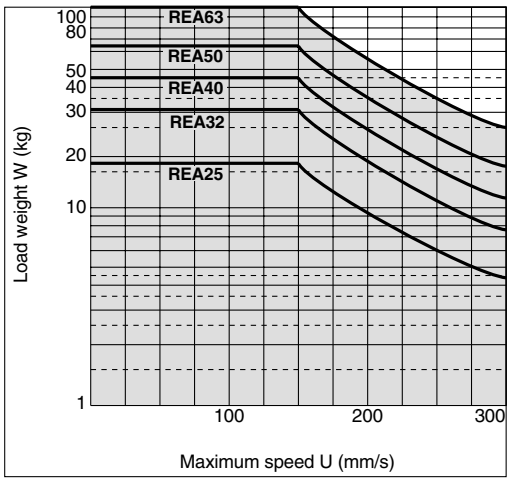

**ø50**




**ø63**




**<Data (B): Maximum Speed———Load Weight Chart>**

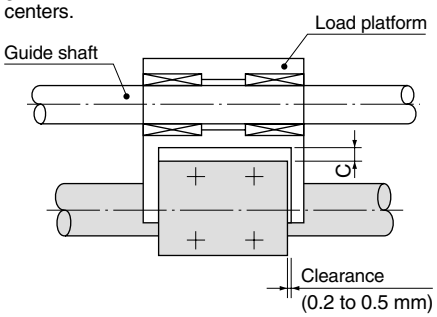


# Series REA
# Model Selection 3

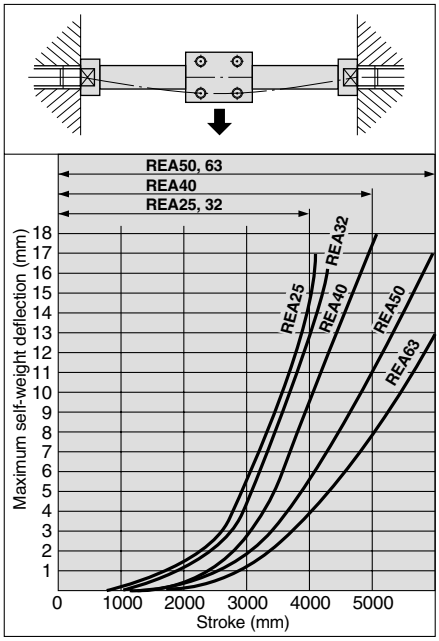
## Caution on Design 2

### Cylinder Self-weight Deflection

When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke the greater the amount of variation in the shaft centers.




∗ The clearance C is determined by considering the cylinder's self weight deflection and the amount of discrepancy with respect to the other shaft.
Normal value: (self-weight deflection) +1.5 to 2 mm




∗ The above deflection data indicate values for external movement within the stroke.

### Max. Connection Fitting Weight

REA (Basic type) is not directly connected to the load, and is guided by another shaft (LM guide, etc.). Load connection fittings should be designed so that they do not exceed the weights given in the table below.

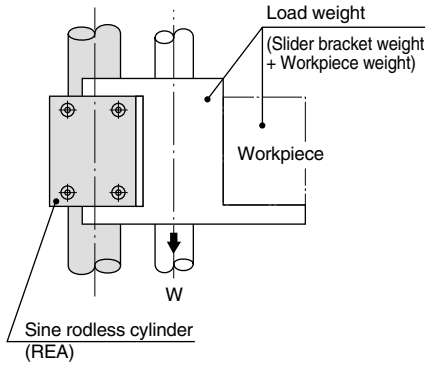
**Maximum Connection Fitting Weight** $W_{Bmax}$ (kg)

| Model | Maximum load (kg) |
|---|---|
| **REA25** | 1.2 |
| **REA32** | 1.5 |
| **REA40** | 2.0 |
| **REA50** | 2.5 |
| **REA63** | 3.0 |

∗ When loading the weight exceeding the above values, please consult with SMC.

### Vertical Operation

The load should be guided by a ball type bearing (LM guide, etc.). If a slide bearing is used, sliding resistance increases due to the load weight and load moment, which can cause malfunction.




| Model | Allowable load weight Wv (kg) | Maximum operating pressure Pv (MPa) |
|---|---|---|
| **REA25** | 18.5 | 0.65 |
| **REA32** | 30.0 | 0.65 |
| **REA40** | 47.0 | 0.65 |
| **REA50** | 75.0 | 0.65 |
| **REA63** | 115.0 | 0.65 |

Note) Use caution, since the magnetic coupling may be dislocated if it is used over the maximum operating pressure.

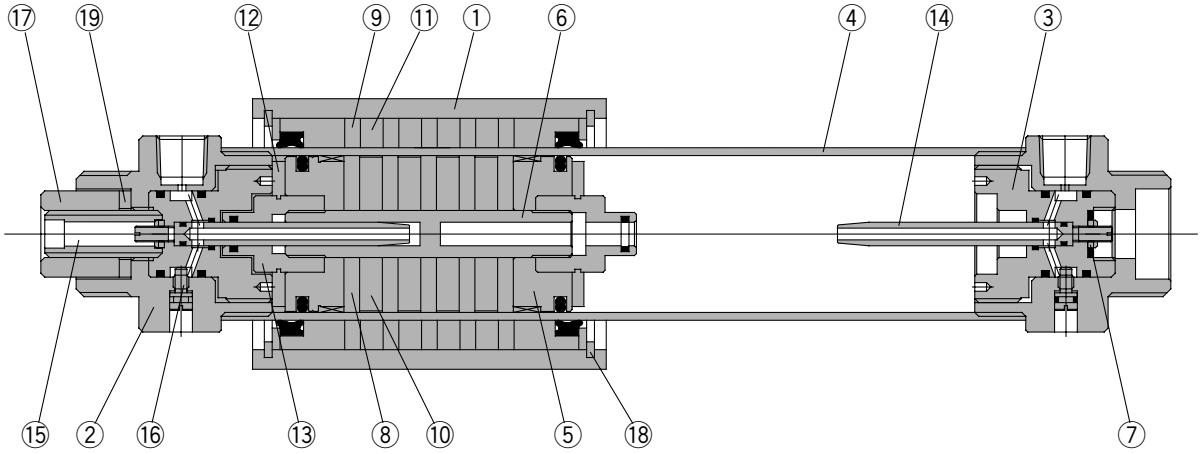
### Intermediate Stop

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using anexternal stopper, etc.

#### Cushion Stroke

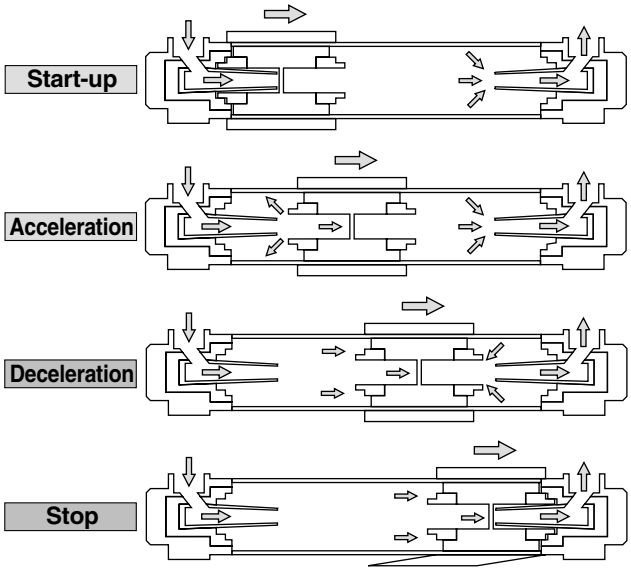
| Model | Stroke (mm) |
|---|---|
| **REA25** | 30 |
| **REA32** | 30 |
| **REA40** | 35 |
| **REA50** | 40 |
| **REA63** | 40 |

## Construction




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Anodized |
| ② | Head cover | Aluminum alloy | Anodized |
| ③ | Cushion ring holder | Aluminum alloy | Chromated |
| ④ | Cylinder tube | Stainless steel | |
| ⑤ | Piston | Aluminum alloy | Chromated |
| ⑥ | Shaft | Stainless steel | |
| ⑦ | Lock nut B | Carbon steel | Nickel plated |
| ⑧ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑨ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑩ | Magnet A | Rare earth magnet | |
| ⑪ | Magnet B | Rare earth magnet | |
| ⑫ | Bumper | Urethane rubber | |
| ⑬ | Cushion seal holder | Aluminum alloy | Chromated |
| ⑭ | Cushion ring | Brass | Electroless nickel plated |
| ⑮ | Adjusting screw | Carbon steel | Nickel plated |
| ⑯ | Stopper bolt | Carbon steel | Nickel plated |
| ⑰ | Lock nut A | Carbon steel | Nickel plated |
| ⑱ | Snap ring | Carbon tool steel | |
| ⑲ | Spring washer | Steel wire | |




### Working principle

**Start-up/Acceleration**

The driving air from the cylinder port passes through the inside of the cushion ring, and flows into the left chamber of the drive piston from the clearance between the cushion seal and the U-shaped groove in the outer surface of the cushion ring. Further, the exhaust air in the right chamber of the drive piston passes from inside the hollow cushion ring through the cylinder port and is released to the atmosphere by the drive solenoid valve.

When the differential pressure (thrust) generated on either side of the drive piston becomes larger than the starting resistance of the machinery, the drive piston begins to move to the right. As the drive piston moves to the right, the U-shaped groove in the outer surface of the cushion ring gradually becomes deeper, a flow corresponding to the drive speed of the drive piston flows into the left chamber of the drive piston, and the drive piston proceeds to accelerate. The U-shaped groove is machined into the cushion ring in such a way that this acceleration process can proceed smoothly (as a sine function).

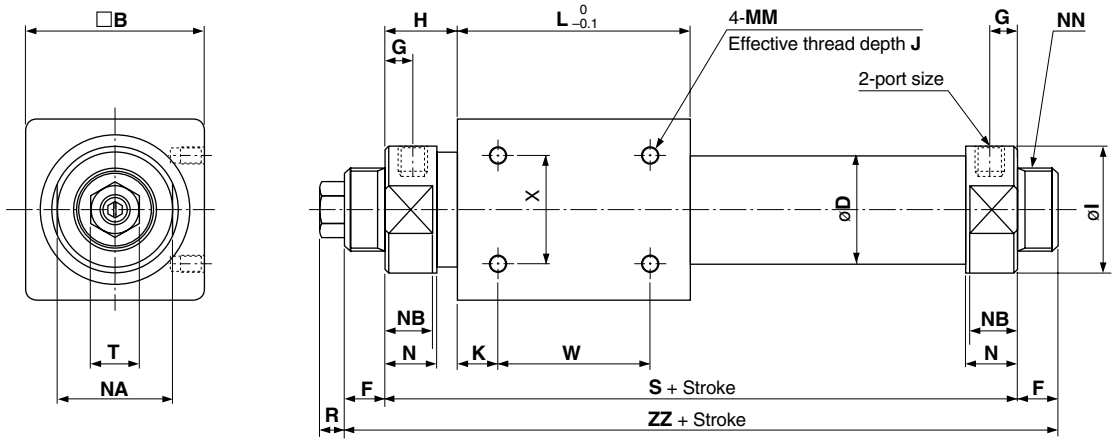
**Deceleration/Stop**

In conventional cushion mechanisms, when the cushion seal installed on the drive piston is pushed into the cushion ring at the right stroke end, the drive piston's right chamber is pressurized and a sudden braking force is generated. However, in a sine rodless cylinder, due to the U-shaped groove provided on the outer surface of the cushion ring, whose depth changes as a sine function, a large quantity of the air in the cushion chamber is discharged when the cushion seal is pushed in, and a sudden braking force is not generated. With the progression of the cushion stroke, the discharge flow from the cushion chamber is restricted, and therefore, a soft stop is achieved at the stroke end.

# Series REA

## Dimensions

### REA25/32/40

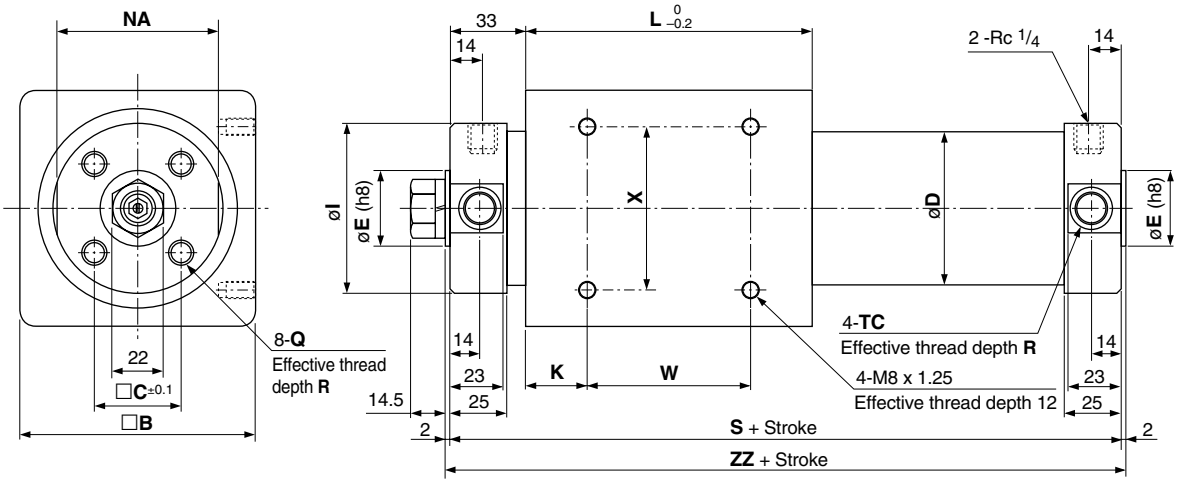



(mm)

| Model | Port size | B | D | F | G | H | I | K | L | MM x J | N | NA | NB | NN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REA25** | Rc 1/8 | 46 | 27.8 | 13 | 8 | 20.5 | 34 | 10 | 70 | M5 x 0.8 x 8 | 15 | 30 | 13 | M26 x 1.5 |
| **REA32** | Rc 1/8 | 60 | 35 | 16 | 9 | 22 | 40 | 15 | 80 | M6 x 1.0 x 8 | 17 | 36 | 15 | M26 x 1.5 |
| **REA40** | Rc 1/4 | 70 | 43 | 16 | 11 | 29 | 50 | 16 | 92 | M6 x 1.0 x 10 | 21 | 46 | 19 | M32 x 2.0 |

| Model | S | W | X | ZZ | R | T |
|---|---|---|---|---|---|---|
| **REA25** | 111 | 50 | 30 | 137 | 8 | 17 |
| **REA32** | 124 | 50 | 40 | 156 | 8 | 17 |
| **REA40** | 150 | 60 | 40 | 182 | 10 | 19 |

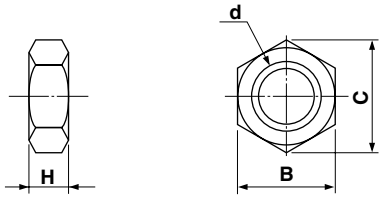
### REA50/63




(mm)

| Model | B | C | D | E (h8) | I | K | L | NA | Q x R | S | TC x R | W | X | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REA50** | 86 | 32 | 53 | $30^{0}_{-0.033}$ | 58.2 | 25 | 110 | 55 | M8 x 1.25 x 16 | 176 | M12 x 1.25 x 7.5 | 60 | 60 | 180 |
| **REA63** | 100 | 38 | 66 | $32^{0}_{-0.039}$ | 72.2 | 26 | 122 | 69 | M10 x 1.5 x 16 | 188 | M14 x 1.5 x 11.5 | 70 | 70 | 192 |

## Mounting Nuts: 2 pcs. Packaged with Each Cylinder




| Part no. | Applicable bore size (mm) | d | H | B | C |
|---|---|---|---|---|---|
| **SN-032B** | **25**, **32** | M26 x 1.5 | 8 | 32 | 37 |
| **SN-040B** | **40** | M32 x 2.0 | 11 | 41 | 47.3 |

# Sine Rodless Cylinder
# Direct Mount Type
# *Series REAR*
## ø10, ø15, ø20, ø25, ø32, ø40

## How to Order

**REA R 25 — 300 — Y7BW**

**Direct mount type**

**Bore size**

| | |
|---|---|
| **10** | 10 mm |
| **15** | 15 mm |
| **20** | 20 mm |
| **25** | 25 mm |
| **32** | 32 mm |
| **40** | 40 mm |

**Standard stroke**
Refer to "Standard Stroke" on page 10-2-14.

**Switch rail**

| | |
|---|---|
| **Nil** | With switch rail |
| **N** | Without switch rail |

Note 1) When equipped with switch rails, magnets for switches are built-in.
Note 2) In the case of ø15, magnets for switches are built-in even when not equipped with switch rails.

**Auto switch**

| | |
|---|---|
| **Nil** | Without auto switch |

Note ) In the case of ø20 with switch rail but without switches, the cylinder configuration is for reed switches.
∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

**Number of auto switches**

| | |
|---|---|
| **Nil** | 2 pcs. |
| **S** | 1 pc. |
| **n** | "n" pcs. |

**Applicable Auto Switch**/Refer to page 10-20-1 for further information on auto switches.

**For ø10, ø15, ø20**

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch model | Lead wire length (m)∗ 0.5 (Nil) | 3 (L) | 5 (Z) | Pre-wire connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | **A96** | ● | ● | — | — | IC circuit | — |
| | | | | 2-wire | 24 V | 12 V | 100 V | **A93** | ● | ● | — | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | **M9N** | ● | ● | ○ | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | **M9P** | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | **M9B** | ● | ● | ○ | ○ | — | |
| | Diagnostic indication (2-color indication) | | | 3-wire (NPN) | | 5 V, 12 V | | **F9NW** | ● | ● | ○ | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | **F9PW** | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | **F9BW** | ● | ● | ○ | ○ | — | |

**For ø25, ø32, ø40**

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch model | Lead wire length (m)∗ 0.5 (Nil) | 3 (L) | 5 (Z) | Pre-wire connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | **Z76** | ● | ● | — | — | IC circuit | — |
| | | | | 2-wire | 24 V | 12 V | 100 V | **Z73** | ● | ● | ● | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | **Y59A** | ● | ● | ○ | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | **Y7P** | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | **Y59B** | ● | ● | ○ | ○ | — | |
| | Diagnostic indication (2-color indication) | | | 3-wire (NPN) | | 5 V, 12 V | | **Y7NW** | ● | ● | ○ | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | **Y7PW** | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | **Y7BW** | ● | ● | ○ | ○ | — | |

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A93
3 m ····· L (Example) Y59BL
5 m ····· Z (Example) F9NWZ

∗ Solid state switches marked with "○" are produced upon receipt of order.

• Since there are other applicable auto switches than listed, refer to page 10-2-23 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

# Series REAR

## Specifications

| | |
|---|---|
| Fluid | Air |
| Proof pressure | 1.05 MPa |
| Maximum operating pressure | 0.7 MPa |
| Minimum operating pressure | 0.18 MPa |
| Ambient and fluid temperature | –10 to 60°C |
| Piston speed | 50 to 300 mm/s |
| Lubrication | Non-lube |
| Stroke length tolerance | 0 to 250 st: $^{+1.0}_{0}$, 251 to 100 st: $^{+1.4}_{0}$, 1001 st or longer: $^{+1.8}_{0}$ |
| Mounting | Direct mount style |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) | Maximum manufacturable stroke (mm) | Maximum stroke with switch stroke (mm) |
|---|---|---|---|
| **10** | 150, 200, 250, 300 | 500 | 500 |
| **15** | 150, 200, 250, 300, 350, 400<br>450, 500 | 1000 | 750 |
| **20** | 200, 250, 300, 350, 400, 450<br>500, 600, 700, 800 | 1500 | 1000 |
| **25** | | 2000 | 1500 |
| **32** | | | |
| **40** | 200, 250, 300, 350, 400, 450<br>500, 600, 700, 800, 900, 1000 | 2000 | 1500 |

Note) Intermediate stroke is available by the 1 mm interval.

## Made to Order Specifications

(For details, refer to page 10-21-1.)

| Symbol | Specifications |
|---|---|
| **-XC57** | With floating joint |

## Magnetic Holding Force

(N)

| Bore size (mm) | **10** | **15** | **20** | **25** | **32** | **40** |
|---|---|---|---|---|---|---|
| Holding force | 53.9 | 137 | 231 | 363 | 588 | 922 |

## Weight

(kg)

| Item \ Bore size (mm) | | **10** | **15** | **20** | **25** | **32** | **40** |
|---|---|---|---|---|---|---|---|
| Basic weight (for 0 st) | **REAR□ (with switch rail)** | 0.111 | 0.277 | 0.440 | 0.660 | 1.27 | 2.06 |
| | **REAR□-□N (without switch rail)** | 0.080 | 0.230 | 0.370 | 0.580 | 1.15 | 1.90 |
| Additional weight per each 50 mm of stroke (when equipped with switch rail) | | 0.034 | 0.045 | 0.071 | 0.083 | 0.113 | 0.133 |
| Additional weight per each 50 mm of stroke (when not equipped with switch rail) | | 0.014 | 0.020 | 0.040 | 0.050 | 0.070 | 0.080 |

Calculation: (Example) REAR25-500 (with switch rail)
- Basic weight ..... 0.660 (kg)
- Additional weight ..... 0.083 (kg/50 st)
- Cylinder stroke ..... 500 (st)

0.660 + 0.083 x 500 ÷ 50 = 1.49 kg

# ⚠ Precautions

**Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.**

## Mounting

## ⚠ Caution

**1. Take care to avoid nicks or other damage on the outside surface of the cylinder tube.**
This can lead to a damage of the scraper and the wear ring, which in turn can cause malfunction.

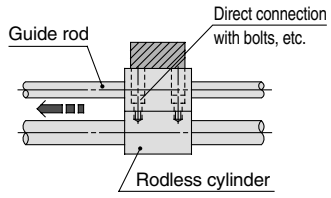
**2. Use caution to the rotation of the external slider.**
Rotation should be controlled by connecting it to another shaft (linear guide, etc.).

**3. Do not operate with the magnetic coupling out of position.**
If the magnetic coupling is out of position, push the external slider by hand (or the piston slider with air pressure) back to the proper position at the stroke end.

**4. The cylinder is mounted with bolts through the mounting holes in the end covers. Be sure they are tightened securely.**

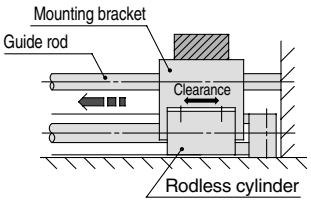
**5. Be sure that both end covers are secured to the mounting surface before operating the cylinder.**
Avoid operation with the external slider secured to the surface.

**6. Do not apply a lateral load to the external slider.**
When a load is mounted directly to the cylinder, variations in the alignment of each shaft center cannot be offset, which results in the generation of a lateral load that can cause malfunction. The cylinder should be operated using a connection method which allows for shaft alignment variations and deflection due to the cylinder's own weight. A drawing of a recommended mounting is shown in Fig. (2).




Variations in the load and cylinder shaft alignment cannot be offset and may result in a malfunction.

**Figure (1) Incorrect mounting**




Shaft alignment variations are offset by providing clearance between the mounting bracket and cylinder.
Moreover, the mounting bracket is extended above the cylinder shaft center, so that the cylinder is not subjected to moment.

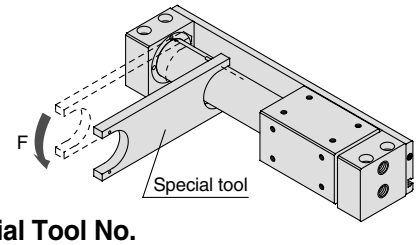
**Figure (2) Recommended mounting**

**7. Use caution regarding the allowable load weight when operating in a vertical direction.**
The allowable load weight when operating in a vertical direction (reference values on page 10-2-18) is determined by the model selection method, however, if a load greater than the allowable value is applied, the magnetic coupling may break and there is a possibility of dropping the load. When using this type of application, please contact SMC regarding the operating conditions (pressure, load, speed, stroke, frequency, etc.).

## Disassembly and Maintenance

## ⚠ Caution

**1. Special tools are necessary for disassembly.**




**Special Tool No.**

| Part no. | Applicable bore size (mm) |
|---|---|
| **CYRZ-V** | 10, 15, 20 |
| **CYRZ-W** | 25, 32, 40 |

# Series REAR
# Model Selection 1

**Fn**: Allowable driving force (N)
**MD**: Maximum allowable moment when connection fitting, etc., is directly loaded (N·m)
**Pv**: Maximum operating pressure for vertical operation (MPa)
**WBmax**: Maximum load weight when loaded directly on the body (kg)
**Wv**: Allowable load weight for vertical operation (kg)

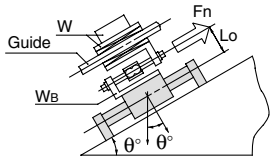
**Operating Conditions**

- **W:** Load weight (kg)
- **WB:** Connection fitting weight (kg)
- **μ:** Guide's coefficient of friction
- **Lo:** Distance from cylinder shaft center to workpiece point of application (cm)
- **L1:** Distance from the cylinder shaft center to the center of the gravity of connection fitting, etc. (mm)
- Presence of switches
- **P:** Operating pressure (MPa)
- **U:** Maximum speed (mm/s)
- **Stroke** (mm)
- Mode of operation (horizontal, inclined, vertical)

Mode of operation

- Horizontal operation
- Inclined operation
- Vertical operation

Review of load weight and operating pressure



Inclined operation

**First tentative bore size determination**

$$\text{ø}D \geq 1.6 \times \sqrt{\frac{F_1}{P}}$$

**First tentative bore size determination**

$$\text{ø}D \geq 1.6 \times \sqrt{\frac{F_2}{P}}$$

**First tentative bore size determination**

$$\text{ø}D \geq 1.6 \times \sqrt{\frac{F_3}{P}}$$

**Allowable Driving Force (Fn) (n = 1, 2, 3)**

| | |
|---|---|
| Horizontal | F1 = μ x (W + WB) x 9.8 |
| Inclined | F2 = (W + WB) x 9.8 x (μcosθ + sinθ) |
| Vertical | F3 = (W + WB) x 9.8 x (μ + 1) |

For the (Fn) of data (A), refer to the allowable driving force table.

W + WB ≤ Wv
P ≤ Pv

Determination of allowable load weight & pressure

W + WB > Wv
P > Pv

(For vertical operation, refer to page 10-2-18.)

(For max. load weight when loaded directly on the body, refer to page 10-2-18.)

WB > WBmax
Review of connection fitting

Determination of connection fitting weight (WB)

WB ≤ WBmax

(For "Standard Stroke", refer to page 10-2-14.)

Review of switches and stroke

Presence of switch rail — Yes → Presence of switch — Yes → Determination of stroke with switch — NG → Review of switches and stroke

None (Refer to data (A) on page 10-2-17.)

None

OK

Second tentative determination of bore size from the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)

Presence of external guide system — Yes → Second tentative determination of bore size from the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)

None

(Refer to data (B) on page 10-2-17.)

Third tentative determination of bore size from the graph of maximum speed (U) and load weight (W).

Note 2)
WB x L1 > MD

Determination of rotational moment

(For body non-rotating accuracy and max. allowable moment, refer to page 10-2-19.)

WB x L1 ≤ MD

(For body non-rotating accuracy and max. allowable moment, refer to page 10-2-19.)

(Bore size is the largest of 3 tentative determinations.)

Bore size determination

Note 2)
NG

Determination of allowable stroke — NG → Consider made-to-order products, depending on an operating condition.

OK

Note 1)
Consider made-to-order products, depending on an operating condition.

(Refer to page 10-2-14.)

Model selected

Note 1) Made-to-order products should be considered, too, depending on an operating environment, etc.

Note 2) An external guide system should be installed when it is used beyond specifications.

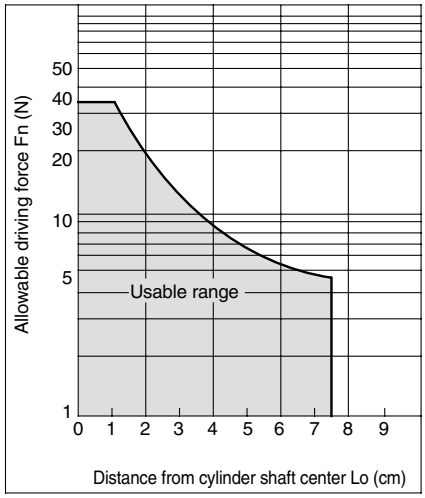
# Series REAR
# Model Selection 2

## Caution on Design 1

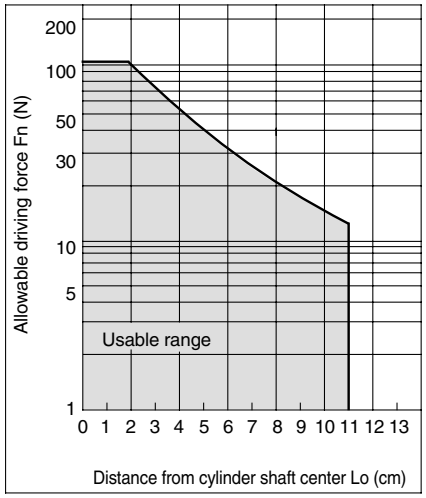
### Selection Method

**<Data (A): Distance from Cylinder Shaft Center ——— Allowable Driving Capacity>**

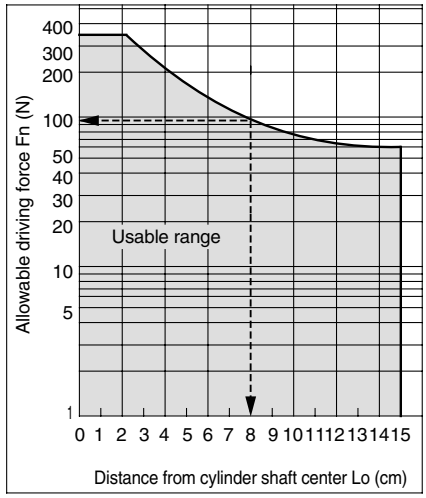
**ø10**



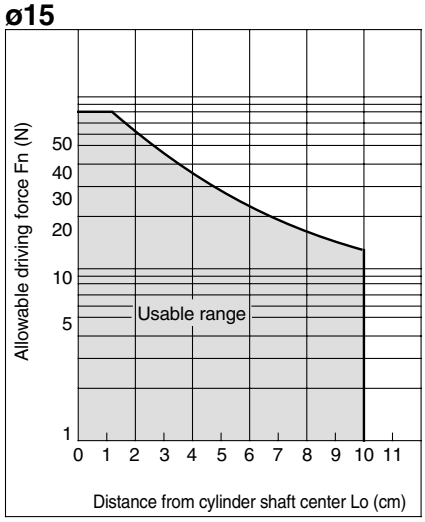

**ø20**



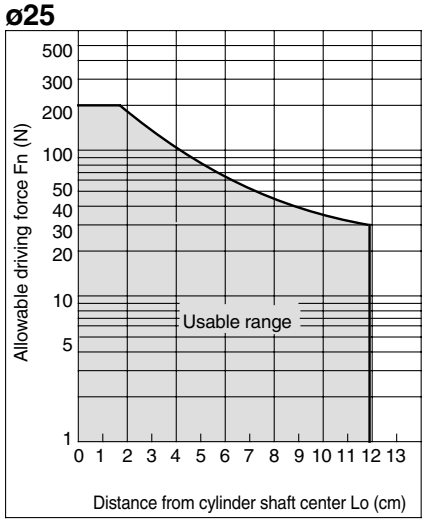

**ø32**



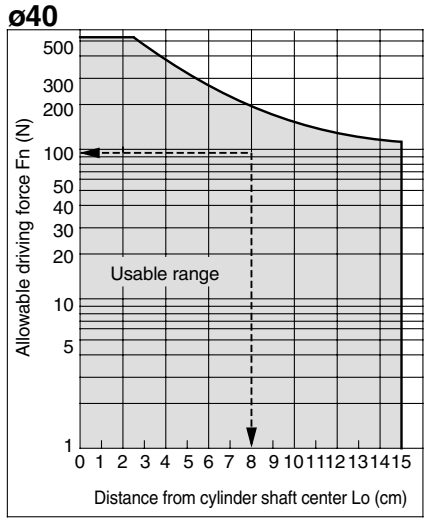

**ø15**



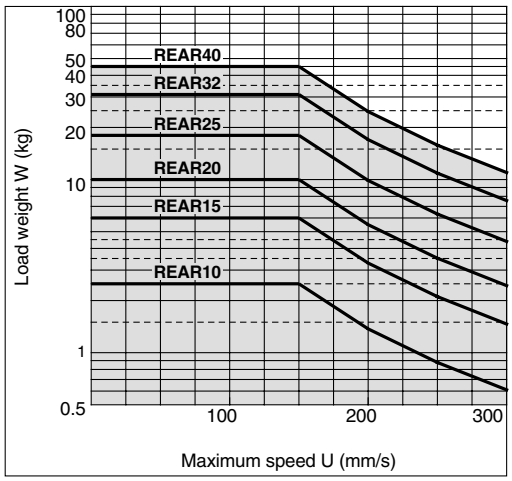

**ø25**




**ø40**




**<Data (B): Maximum Speed ——— Load Weight Chart>**

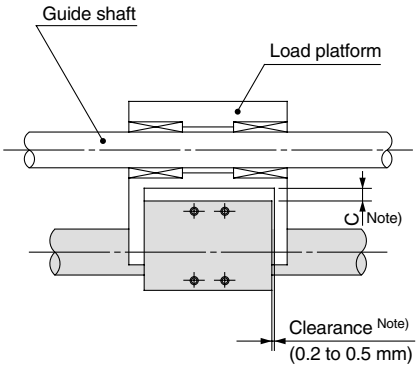


# Series REAR
# Model Selection 3

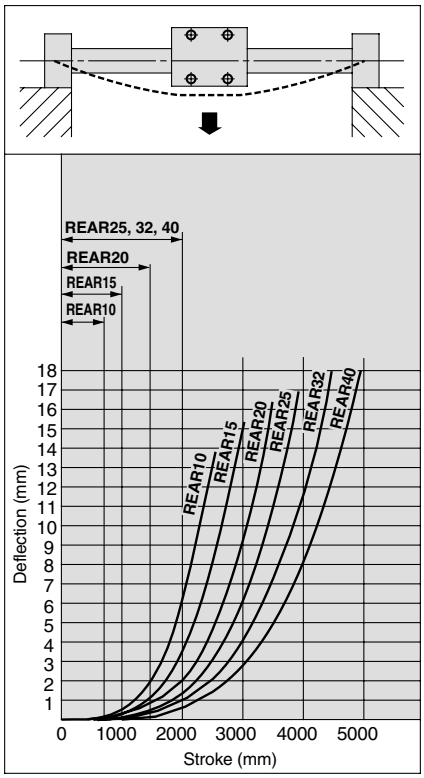
## Caution on Design 2

### Cylinder Self-weight Deflection

When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke, the greater the amount of variation in the shaft centers. Therefore, a connection method should be considered which allows for this variation as shown in the drawing.



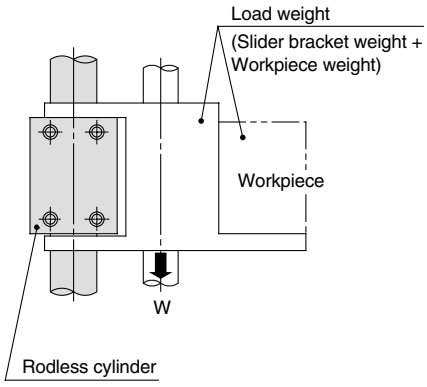

Note) Referring to the self-weight deflection in the graph below, provide clearance so that the cylinder does not touch the mounting surface or the load section, and is able to operate smoothly within the minimum operating pressure range for a full stroke.




∗ The above deflection data indicate values when the external slider has moved to the middle of the stroke.

### Vertical Operation

The load should be guided by a ball type bearing (LM guide, etc.). If a slide bearing is used, sliding resistance will increase due to the load weight and moment, and this can cause malfunction.



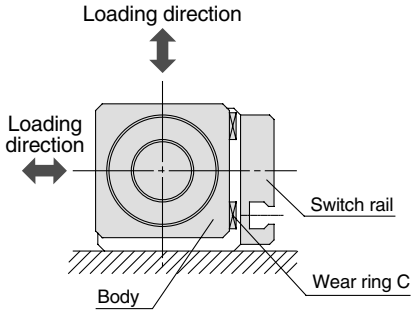

| Bore size (mm) | Model | Allowable load weight Wv (kg) | Maximum operating pressure Pv (MPa) |
|---|---|---|---|
| **10** | **REAR10** | 2.7 | 0.55 |
| **15** | **REAR15** | 7.0 | 0.65 |
| **20** | **REAR20** | 11.0 | 0.65 |
| **25** | **REAR25** | 18.5 | 0.65 |
| **32** | **REAR32** | 30.0 | 0.65 |
| **40** | **REAR40** | 47.0 | 0.65 |

Note) Use caution, since the magnetic coupling may be dislocated if it is used over the maximum operating pressure.

### Maximum Load Weight when Loaded Directly on Body

When the load is applied directly to the body, it should be no greater than the maximum values shown in the table below.

| Model | Maximum load weight $W_{Bmax}$ (kg) |
|---|---|
| **REAR 10** | 0.4 |
| **REAR 15** | 1.0 |
| **REAR 20** | 1.1 |
| **REAR 25** | 1.2 |
| **REAR 32** | 1.5 |
| **REAR 40** | 2.0 |



# Series REAR
# Model Selection 4

## Caution on Design 3

### Intermediate Stop

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or return from an intermediate stop using an external stopper, etc.

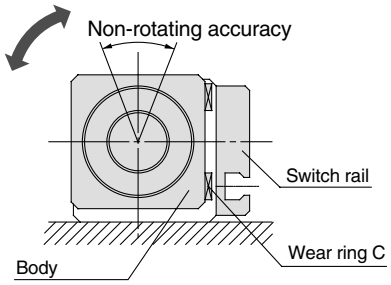
### Cushion Stroke

| Model | Stroke (mm) |
|---|---|
| **REAR10** | 20 |
| **REAR15** | 25 |
| **REAR20** | 30 |
| **REAR25** | 30 |
| **REAR32** | 30 |
| **REAR40** | 35 |

### Body Non-rotating Accuracy and Max. Allowable Moment (With switch rail) (Reference values)

Reference values for non-rotating accuracy and maximum allowable moment at stroke end are indicated below.

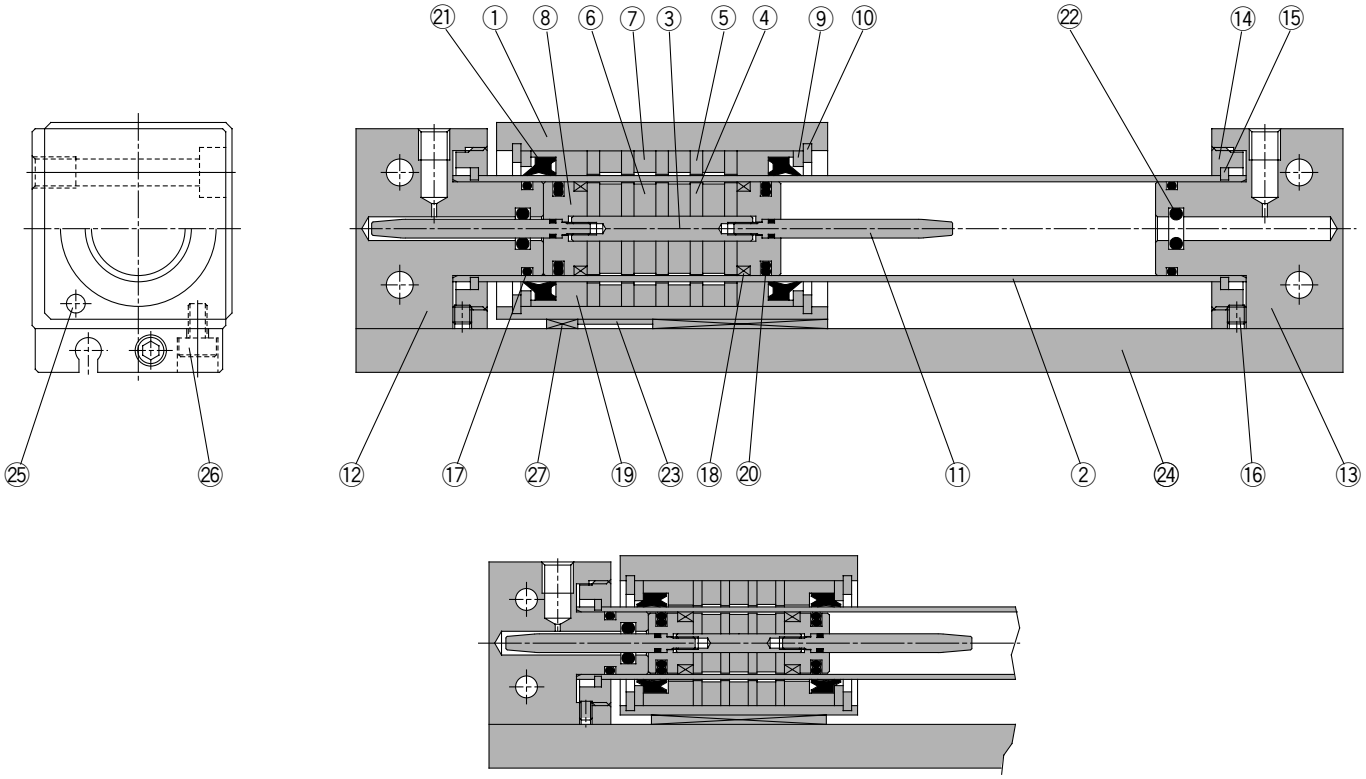
| Bore size (mm) | Non-rotating accuracy (° ) | Maximum allowable moment $M_D$ (N·m) | Allowable[(2)] stroke (mm) |
|---|---|---|---|
| **10** | 6.0 | 0.05 | 100 |
| **15** | 4.5 | 0.15 | 200 |
| **20** | 3.7 | 0.20 | 300 |
| **25** | 3.7 | 0.25 | 300 |
| **32** | 3.1 | 0.40 | 400 |
| **40** | 2.8 | 0.62 | 400 |




Note 1) Avoid operations where rotational torque (moment) is applied. In such a case, the use of an external guide is recommended.
Note 2) The above reference values will be satisfied within the allowable stroke ranges. However, caution is necessary because as the stroke becomes longer the inclination (rotation angle) within the stroke can be expected to increase.
Note 3) When a load is applied directly to the body, the loaded weight should be no greater than the allowable load weights on page 10-2-18.

# Series REAR

## Construction: ø10, ø15






**REAR10**

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Hard anodized |
| ② | Cylinder tube | Stainless steel | |
| ③ | Shaft | Stainless steel | Zinc chromated |
| ④ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑤ | External slider side yoke | Rolled steel plate | |
| ⑥ | Magnet A | Rare earth magnet | |
| ⑦ | Magnet B | Rare earth magnet | |
| ⑧ | Piston | Brass | Electroless nickel plated |
| ⑨ | Spacer | Rolled steel plate | Nickel plated |
| ⑩ | Snap ring | Carbon tool steel | Nickel plated |
| ⑪ | Cushion ring | Stainless steel | |
| ⑫ | End cover A | Aluminum alloy | Hard anodized |
| ⑬ | End cover B | Aluminum alloy | Hard anodized |
| ⑭ | Attachment ring | Aluminum alloy | Hard anodized |
| ⑮ | Type C snap ring for axis | Stainless steel | REAR10 |
| | | Hard steel wire material | Nickel plated (REAR15) |
| ⑯ | Hexagon socket head set screw | Chromium steel | Nickel plated |
| ⑰* | Cylinder tube gasket | NBR | |
| ⑱* | Wear ring A | Special resin | |
| ⑲* | Wear ring B | Special resin | |
| ⑳* | Piston seal | NBR | |
| ㉑* | Scraper | NBR | |
| ㉒* | Cushion seal | NBR | |
| ㉓ | Magnetic shielding plate | Rolled steel plate | Chromated |
| ㉔ | Switch rail | Aluminum alloy | Clear anodized |
| ㉕ | Magnet | Rare earth magnet | |
| ㉖ | Hexagon socket head cap screw | Chromium steel | Nickel plated |
| ㉗* | Wear ring C | Special resin | |

* Seal kit includes ⑰ to ㉒, ㉗. Order the seal kit, based on each bore size.

### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 10 | REAR10-PS | Above nos. ⑰, ⑱, ⑲, ⑳, ㉑, ㉒, ㉗ |
| 15 | REAR15-PS | |

## Switch Rail Accessory Kit

**CYR 10 E —** ☐

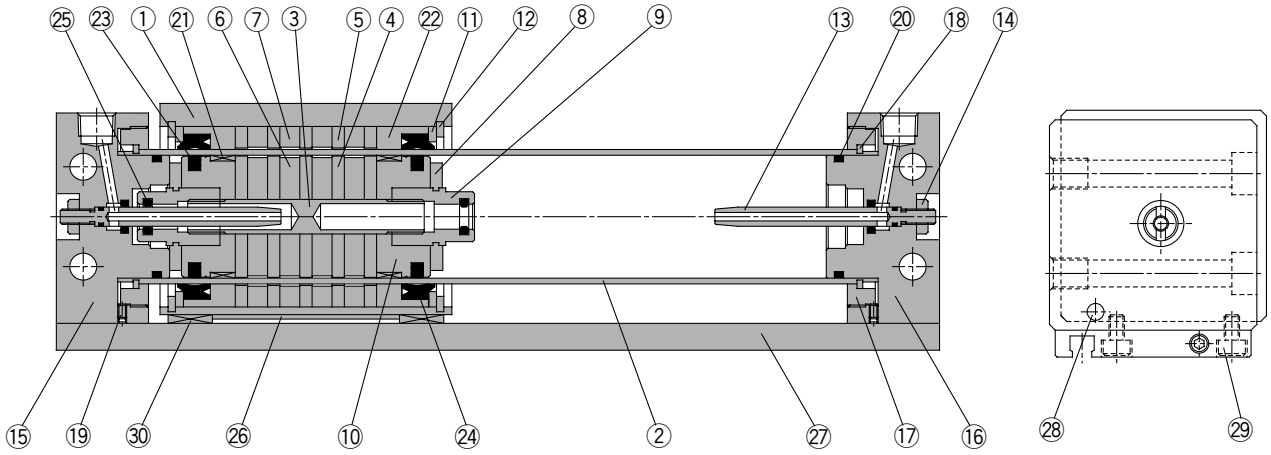
**Bore size** ● **Stroke** ●

### Switch Rail Accessory Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 10 | CYR10E-☐ | Above nos. ㉔, ㉕, ㉖, ㉗ |
| 15 | CYR15E-☐ | Above nos. ㉓, ㉔, ㉖, ㉗ (2) |

Note 1) ☐ indicates the stroke.
Note 2) ø15 has internal magnets in the body.

## Construction: ø20 to ø40




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Hard anodized |
| ② | Cylinder tube | Stainless steel | |
| ③ | Shaft | Stainless steel | |
| ④ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑤ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | Magnet A | Rare earth magnet | |
| ⑦ | Magnet B | Rare earth magnet | |
| ⑧ | Bumper | Urethane rubber | |
| ⑨ | Cushion seal holder | Aluminum alloy | Chromated |
| ⑩ | Piston | Aluminum alloy | Chromated |
| ⑪ | Spacer | Rolled steel plate | Nickel plated |
| ⑫ | Snap ring | Carbon tool steel | Nickel plated |
| ⑬ | Cushion ring | Brass | Electroless nickel plated (REAR 32, 40) |
| | | Stainless steel | REAR 20, 25 |
| ⑭ | Lock nut B | Carbon steel | Nickel plated |
| ⑮ | End cover A | Aluminum alloy | Hard anodized |
| ⑯ | End cover B | Aluminum alloy | Hard anodized |
| ⑰ | Attachment ring | Aluminum alloy | Hard anodized |
| ⑱ | Type C snap ring for axis | Stainless steel | REAR 25, 32 |
| | | Hard steel wire material | Nickel plated (REAR 20, 40) |
| ⑲ | Hexagon socket head set screw | Chromium steel | Nickel plated |
| ⑳ | Cylinder tube gasket | NBR | |

| No. | Description | Material | Note |
|---|---|---|---|
| ㉑* | Wear ring A | Special resin | |
| ㉒* | Wear ring B | Special resin | |
| ㉓* | Piston seal | NBR | |
| ㉔* | Scraper | NBR | |
| ㉕* | Cushion seal | NBR | |
| ㉖ | Magnetic shielding plate | Rolled steel plate | Chromated |
| ㉗ | Switch rail | Aluminum alloy | Clear anodized |
| ㉘ | Magnet | Rare earth magnet | |
| ㉙ | Hexagon socket head cap screw | Chromium steel | Nickel plated |
| ㉚* | Wear ring C | Special resin | |

* Seal kit includes ⑳ to ㉕, ㉚. Order the seal kit, based on each bore size.

### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 20 | REAR20-PS | Set of nos. above ⑳, ㉑, ㉒, ㉓, ㉔, ㉕, ㉚ |
| 25 | REAR25-PS | |
| 32 | REAR32-PS | |
| 40 | REAR40-PS | |

## Switch Rail Accessory Kit

**CYR 20 E —** ☐

- ☐ → Stroke
- 20 → Bore size

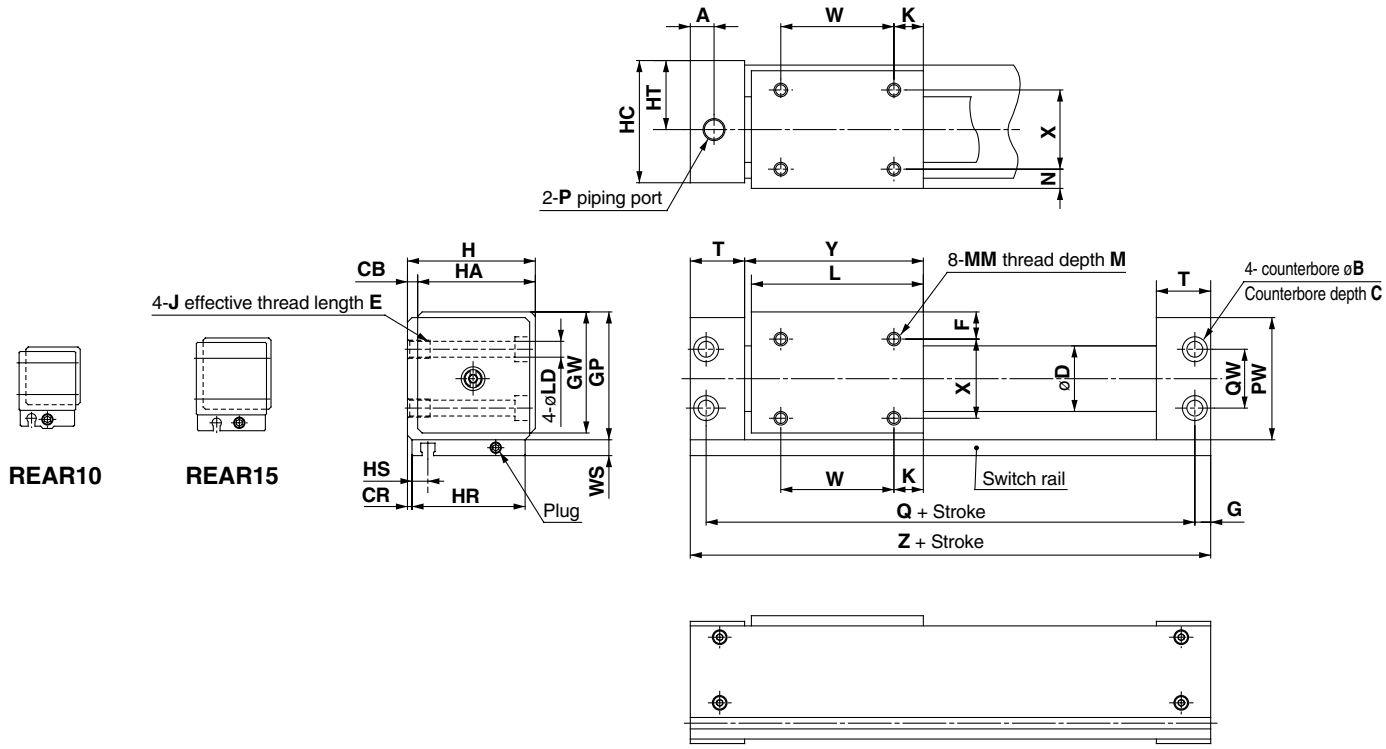
### Switch Rail Accessory Kit

| Bore size (mm) | | Kit no. | Contents |
|---|---|---|---|
| 20 | For reed switch | CYR20E-☐ | Set of nos. above ㉖, ㉗, ㉘, ㉙, ㉚ |
| | For solid state switch | CYR20EN-☐ | |
| 25 | | CYR25E-☐ | |
| 32 | | CYR32E-☐ | |
| 40 | | CYR40E-☐ | |

Note ) ☐ indicates the stroke.

# Series REAR

## Dimensions

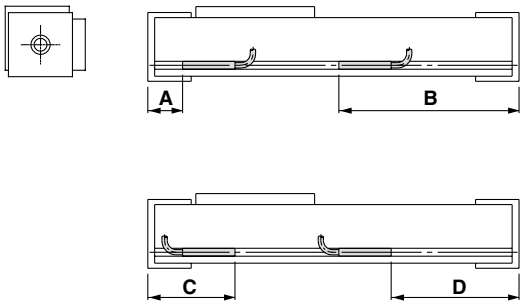



(mm)

| Model | A | B | C | CB | CR | D | F | G | GP | GW | H | HA | HC | HR | HS | HT | J x E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAR10** | 10.5 | 6.5 | 3.2 | 2 | 0.5 | 12 | 6.5 | 6 | 27 | 25.5 | 26 | 24 | 25 | 24 | 5 | 14 | M4 x 0.7 x 6 |
| **REAR15** | 12 | 8 | 4.2 | 2 | 0.5 | 17 | 8 | 7 | 33 | 31.5 | 32 | 30 | 31 | 30 | 8.5 | 17 | M5 x 0.8 x 7 |
| **REAR20** | 9 | 9.5 | 5.2 | 3 | 1 | 22.8 | 9 | 6 | 39 | 37.5 | 39 | 36 | 38 | 36 | 7.5 | 21 | M6 x 1 x 8 |
| **REAR25** | 8.5 | 9.5 | 5.2 | 3 | 1 | 27.8 | 8.5 | 6 | 44 | 42.5 | 44 | 41 | 43 | 41 | 6.5 | 23.5 | M6 x 1 x 8 |
| **REAR32** | 10.5 | 11 | 6.5 | 3 | 1.5 | 35 | 10.5 | 7 | 55 | 53.5 | 55 | 52 | 54 | 51 | 7 | 29 | M8 x 1.25 x 10 |
| **REAR40** | 10 | 11 | 6.5 | 5 | 2 | 43 | 13 | 7 | 65 | 63.5 | 67 | 62 | 66 | 62 | 8 | 36 | M8 x 1.25 x 10 |

| Model | K | L | LD | M | MM | N | P | PW | Q | QW | T | W | WS | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAR10** | 9 | 38 | 3.5 | 4 | M3 x 0.5 | 4.5 | M5 x 0.8 | 26 | 68 | 14 | 19.5 | 20 | 8 | 15 | 39.5 | 80 |
| **REAR15** | 14 | 53 | 4.3 | 5 | M4 x 0.7 | 6 | M5 x 0.8 | 32 | 84 | 18 | 21 | 25 | 7 | 18 | 54.5 | 98 |
| **REAR20** | 11 | 62 | 5.6 | 5 | M4 x 0.7 | 7 | Rc 1/8 | 38 | 95 | 17 | 20.5 | 40 | 7 | 22 | 64 | 107 |
| **REAR25** | 15 | 70 | 5.6 | 6 | M5 x 0.8 | 6.5 | Rc 1/8 | 43 | 105 | 20 | 21.5 | 40 | 7 | 28 | 72 | 117 |
| **REAR32** | 13 | 76 | 7 | 7 | M6 x 1 | 8.5 | Rc 1/8 | 54 | 116 | 26 | 24 | 50 | 7 | 35 | 79 | 130 |
| **REAR40** | 15 | 90 | 7 | 8 | M6 x 1 | 11 | Rc 1/4 | 64 | 134 | 34 | 26 | 60 | 7 | 40 | 93 | 148 |

## Proper Auto Switch Mounting Position (Detection at stroke end)




### ø10 to ø20

| Bore size (mm) \ Auto switch model | A dimension | | B dimension | | C dimension | | D dimension | |
|---|---|---|---|---|---|---|---|---|
| | D-A9□ | D-M9□ | D-A9□ | D-M9□ | D-A9□ | D-M9□ | D-A9□ | D-M9□ |
| **10** | 28 | 32 | 48 | 44 | 48 | 44 | 28 | 32 |
| **15** | 17.5 | 21.5 | 76.5 | 72.5 | — | — | 56.5 | 60.5 |
| **20** | 19.5 | 23.5 | 87.5 | 83.5 | 39.5 | 35.5 | 67.5 | 71.5 |

Note) Auto switches cannot be installed in Area C in the case of ø15.

### ø25 to ø40

| Bore size (mm) \ Auto switch model | A dimension | | B dimension | | C dimension | | D dimension | |
|---|---|---|---|---|---|---|---|---|
| | D-Z7□ D-Z8□ | D-Y5□ D-Y6□ D-Y7□ | D-Z7□ D-Z8□ | D-Y5□ D-Y6□ D-Y7□ | D-Z7□ D-Z8□ | D-Y5□ D-Y6□ D-Y7□ | D-Z7□ D-Z8□ | D-Y5□ D-Y6□ D-Y7□ |
| **25** | 18 | 18 | 99 | 99 | 43 | 43 | 74 | 74 |
| **32** | 21.5 | 21.5 | 108.5 | 108.5 | 46.5 | 46.5 | 83.5 | 83.5 |
| **40** | 23.5 | 23.5 | 124.5 | 124.5 | 48.5 | 48.5 | 99.5 | 99.5 |

### Operating Range

| Auto switch model | Bore size (mm) | | | | | |
|---|---|---|---|---|---|---|
| | **10** | **15** | **20** | **25** | **32** | **40** |
| **D-A9□** | 13 | 8 | 6 | — | — | — |
| **D-M9□** | 7 | 3 | 2.5 | — | — | — |
| **D-Z7□/Z8□** | — | — | — | 9 | 9 | 11 |
| **D-Y5□/Y6□/Y7□** | — | — | — | 7 | 6 | 6 |

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

## Auto Switch Specifications

1. Switches (switch rail) can be added to the standard type (without switch rail). Switch rail accessory kits are mentioned on pages 10-2-20 and 21 and can be ordered together with auto switches.
2. For switch magnet installation procedures, refer to the separate disassembly steps.

Other than the models listed in “How to Order”, the following auto switches are applicable. For detailed specifications, refer to page 10-20-1.

| Type | Model | Electrical entry (Fetching direction) | Features |
|---|---|---|---|
| Reed switch | D-A90 | Grommet (In-line) | Without indicator light |
| | D-Z80 | | |
| Solid state switch | D-Y69A | Grommet (Perpendicular) | 3-wire (NPN) |
| | D-Y69B | | 2-wire |
| | D-Y7PV | | 3-wire (PNP) |
| | D-Y7NWV | | Diagnostic indication (2-color indication) |
| | D-Y7PWV | | |
| | D-Y7BWV | | |

∗ Normally closed (NC = b contact), solid state switch (D-F9G/F9H/Y7G/Y7H type) are also available.

# Sine Rodless Cylinder
# Slider Type: Slide Bearing
# *Series REAS*
## ø10, ø15, ø20, ø25, ø32, ø40

## How to Order

**REA S 25 — 300 — J79W**

**Slider type (Slide bearing)**

**Bore size**

| | |
|---|---|
| **10** | 10 mm |
| **15** | 15 mm |
| **20** | 20 mm |
| **25** | 25 mm |
| **32** | 32 mm |
| **40** | 40 mm |

**Standard stroke**
Refer to "Standard Stroke" on page 10-2-25.

**Auto switch**

| | |
|---|---|
| **Nil** | Without auto switch |

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).
∗ In cases without auto switches, there are switch rails only.

**Number of auto switches**

| | |
|---|---|
| **Nil** | 2 pcs. |
| **S** | 1 pc. |
| **n** | "n" pcs. |

**Applicable Auto Switch**/Refer to page 10-20-1 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | Load voltage DC | Load voltage AC | Auto switch model: Perpendicular | Auto switch model: In-line | Lead wire length (m)∗ 0.5 (Nil) | 3 (L) | 5 (Z) | None (N) | Pre-wire connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | **—** | **A76H** | ● | ● | — | — | — | IC circuit | — |
| | | | | 2-wire | — | — | 200 V | **A72** | **A72H** | ● | ● | — | — | — | — | Relay, PLC |
| | | | | | 24 V | 12 V | 100 V | **A73** | **A73H** | ● | ● | ● | — | — | | |
| | | Connector | | | | | — | **A73C** | **—** | ● | ● | ● | ● | — | | |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | **F7NV** | **F79** | ● | ● | ○ | — | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | **F7PV** | **F7P** | ● | ● | ○ | — | ○ | | |
| | | | | 2-wire | | 12 V | | **F7BV** | **J79** | ● | ● | ○ | — | ○ | — | |
| | | Connector | | | | | | **J79C** | **—** | ● | ● | ● | ● | — | | |
| | Diagnostic indication (2-color indication) | Grommet | | 3-wire (NPN) | | 5 V, 12 V | | **F7NWV** | **F79W** | ● | ● | ○ | — | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | **—** | **F7PW** | ● | ● | ○ | — | ○ | | |
| | | | | 2-wire | | 12 V | | **F7BWV** | **J79W** | ● | ● | ○ | — | ○ | — | |
| | Water resistant (2-color indication) | | | | | | | **—** | **F7BA** | — | ● | ○ | — | ○ | | |
| | | | | | | | | **F7BAV** | **—** | — | ● | ○ | — | – | | |
| | With diagnostic output (2-color indication) | | | 4-wire (NPN) | | 5 V, 12 V | | **—** | **F79F** | ● | ● | ○ | — | ○ | IC circuit | |

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A73C
3 m ····· L (Example) A73CL
0.5 m ····· Z (Example) A73CZ
None ····· N (Example) A73CN

∗ Solid state switches marked with "○" are produced upon receipt of order.

• Since there are other applicable auto switches than listed, refer to page 10-2-35 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

## Specifications

| | |
|---|---|
| Fluid | Air |
| Proof pressure | 1.05 MPa |
| Maximum operating pressure | 0.7 MPa |
| Minimum operating pressure | 0.18 MPa |
| Ambient and fluid temperature | –10 to 60°C |
| Piston speed | 50 to 300 mm/s |
| Lubrication | Non-lube |
| Stroke length tolerance | 0 to 250 st: $^{+1.0}_{0}$, 251 to 100 st: $^{+1.4}_{0}$, 1001 st or longer: $^{+1.8}_{0}$ |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) | Maximum manufacturable stroke (mm) |
|---|---|---|
| **10** | 150, 200, 250, 300 | 500 |
| **15** | 150, 200, 250, 300, 350, 400, 450, 500 | 750 |
| **20** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | 1000 |
| **25** | | 1500 |
| **32** | | |
| **40** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 | 1500 |

Note) Intermediate stroke is available by the 1 mm interval.

## Magnetic Holding Force

(N)

| Bore size (mm) | **10** | **15** | **20** | **25** | **32** | **40** |
|---|---|---|---|---|---|---|
| Holding force | 53.9 | 137 | 231 | 363 | 588 | 922 |

## Weight

(kg)

| Bore size (mm) | **10** | **15** | **20** | **25** | **32** | **40** |
|---|---|---|---|---|---|---|
| Basic weight | 0.48 | 0.91 | 1.48 | 1.84 | 3.63 | 4.02 |
| Additional weight per each 50 mm of stroke | 0.074 | 0.104 | 0.138 | 0.172 | 0.267 | 0.406 |

Calculation: (Example) REAS32-500
- Basic weight ····· 3.63 (kg)
- Additional weight ····· 0.267 (kg/50 st)
- Cylinder stroke ····· 500 (st)

3.63 + 0.267 x 500 ÷ 50 = 6.3 kg

## Made to Order Specifications

(For details, refer to page 10-21-1.)

| Symbol | Specifications |
|---|---|
| **-X210** | Non-lubricated exterior specifications |
| **-X324** | Non-lubricated exterior specifications (With dust seal) |
| **-X431** | Switch rail mounting on both sides (With 2 pcs.) |
| **-X168** | Helical insert thread specifications |

# ⚠ Precautions

**Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.**

## Operation

## ⚠ Warning

**1. Be aware of the space between the plates and the slide block.**
Take sufficient care to avoid getting your hands or fingers caught when the cylinder is operated.

**2. Do not apply a load to a cylinder which is greater than the allowable value stated in the "Model Selection" pages.**

## Mounting

## ⚠ Caution

**1. Avoid operation with the external slider fixed to the mounting surface.**
The cylinder should be operated with the plates fixed to the mounting surface.

**2. Perform mounting so that the external slider will operate through the entire stroke at the minimum operating pressure.**
If the mounting surface is not flat, the guides will be warped, increasing the minimum operating pressure and causing premature wear of the bearings. Therefore, mounting should be performed so that the external slider will operate through the entire stroke at the minimum operating pressure. A mounting surface with a high degree of flatness is desirable, but in cases where this is not possible, adjust with shims, etc.

# Series REAS
# Model Selection 1

**Pv**: Maximum operating pressure for vertical operation (MPa)
**WA**: Allowable load weight based on these operating conditions (kg)
**Wv**: Allowable load weight for vertical operation (kg)
σ: Stroke coefficient

$$\sigma = \frac{\text{Load weight in stroke}}{\text{Maximum load weight}}$$

**Operating Conditions**

- W: Load weight (kg)
- U: Maximum speed (mm/s)
- P: Operating pressure (MPa)
- Stroke (mm)
- Lo: Distance from slide block mounting surface to workpiece center of gravity (cm)
- Mode of operation (horizontal, inclined, vertical)

Mode of operation

- Horizontal operation
- Inclined operation
- Vertical operation

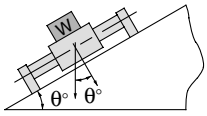
Review of load weight and operating pressure

First tentative bore size determination

$$\varnothing D \geq 2.8 \times \sqrt{\frac{W}{P}}$$

First tentative bore size determination

$$\varnothing D \geq 5.0 \times \sqrt{\frac{0.3 \times W\cos\theta + W\sin\theta}{P}}$$



Inclined operation

First tentative bore size determination

$$\varnothing D \geq 5.0 \times \sqrt{\frac{0.3 \times W + W}{P}}$$

Determination of allowable load weight & pressure

W > Wv
P > Pv

(For vertical operation, refer to page 10-2-30.)

W ≤ Wv
P ≤ Pv

(For formula to find σ, refer to page 10-2-28.)

Calculate stroke coefficient (σ) with stroke and tentatively determined bore size

$$\sigma = \frac{\text{Load weight in stroke}}{\text{Maximum load weight}}$$

Select an example calculation for allowable weight based on cylinder mounting orientation.

(Refer to pages 10-2-28 and 29.)

Calculate (WA) from the formula for the tentatively determined bore size

W > WA — Review of bore size, stroke and Lo

W ≤ WA

(Refer to data (B) on page 10-2-28.)

Ball bushing bearing of bore size from graph of maximum speed (U) and load weight (W)

(The larger bore size is selected from two tentative determinations.) Bore size determination

Note) Made-to-order products should be considered, too, depending on an operating environment, etc.

Note)
Consider made-to-order products, depending on an operating condition.

(Refer to page 10-2-25.)

Model selected

# Series REAS
# Model Selection 2

## Caution on Design 1

### How to Find σ when Selecting the Allowable Load Weight

Since the maximum load weight with respect to the cylinder stroke changes as shown in the table below, s should be considered as a coefficient determined in accordance with each stroke.
Example) For REAS25-650

(1) Maximum load weight = 20 kg
(2) Load weight for 650 st = 13.6 kg
(3) $\sigma = \frac{13.6}{20} = 0.68$ is the result.

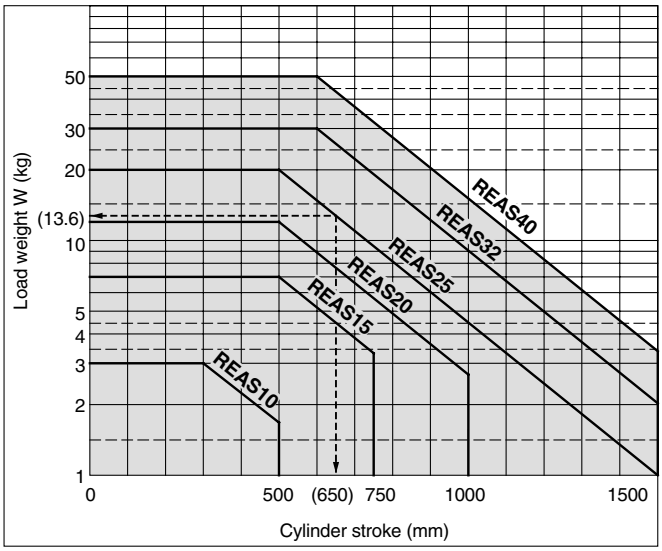
### Calculation Formula for σ (σ ≤ 1)

ST: Stroke (mm)

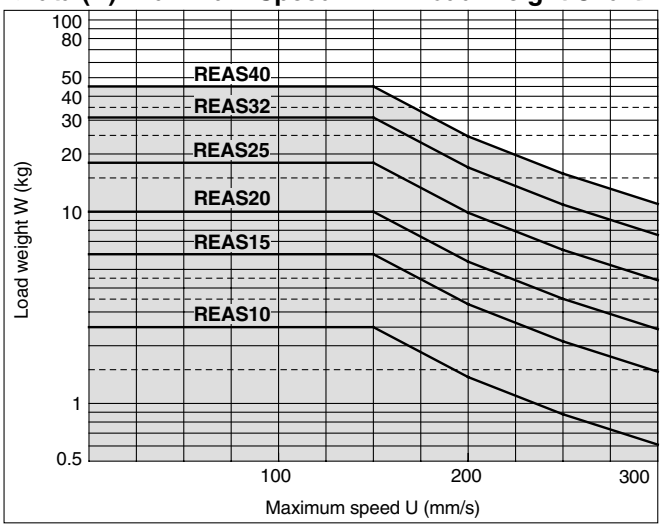
| Model | REAS10 | REAS15 | REAS20 |
|---|---|---|---|
| σ = | $\frac{10^{(0.86 - 1.3 \times 10^{-3} \times ST)}}{3}$ | $\frac{10^{(1.5 - 1.3 \times 10^{-3} \times ST)}}{7}$ | $\frac{10^{(1.71 - 1.3 \times 10^{-3} \times ST)}}{12}$ |

| Model | REAS25 | REAS32 | REAS40 |
|---|---|---|---|
| σ = | $\frac{10^{(1.98 - 1.3 \times 10^{-3} \times ST)}}{20}$ | $\frac{10^{(2.26 - 1.3 \times 10^{-3} \times ST)}}{30}$ | $\frac{10^{(2.48 - 1.3 \times 10^{-3} \times ST)}}{50}$ |

Note) Calculate with σ = 1 for all applications up to ø10–300 mmST, ø15–500 mmST, ø20–500 mmST , ø25–500 mmST, ø32–600 mmST, ø40–600 mmST.

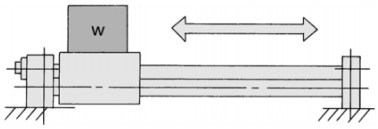



**<Data (B): Maximum Speed———Load Weight Chart>**




### Example of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

#### 1. Horizontal Operation (Floor mounting)

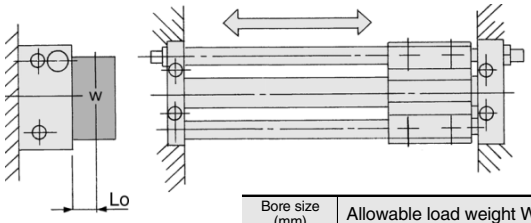



**Maximum Load Weight (Center of slide block)** (kg)

| Bore size (mm) | 10 | 15 | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|---|
| Max. load weight (kg) | 3 | 7 | 12 | 20 | 30 | 50 |
| Stroke (Max.) | Up to 300 st | Up to 500 st | Up to 500 st | Up to 500 st | Up to 600 st | Up to 600 st |

The above maximum load weight values will change with the stroke length for each cylinder size, due to limitation from warping of the guide shafts. (Take note of the coefficient σ.)
Moreover, depending on the operating direction, the allowable load weight may be different from the maximum load weight.

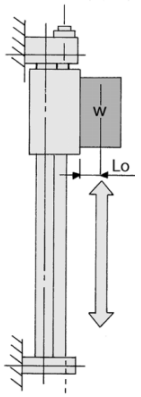
#### 2. Horizontal Operation (Wall mounting)




Lo: Distance from mounting surface to load center of gravity (cm)

| Bore size (mm) | Allowable load weight $W_A$ (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 12.0}{8.4 + 2Lo}$ |
| 15 | $\frac{\sigma \cdot 36.4}{10.6 + 2Lo}$ |
| 20 | $\frac{\sigma \cdot 74.4}{12 + 2Lo}$ |
| 25 | $\frac{\sigma \cdot 140}{13.8 + 2Lo}$ |
| 32 | $\frac{\sigma \cdot 258}{17 + 2Lo}$ |
| 40 | $\frac{\sigma \cdot 520}{20.6 + 2Lo}$ |

#### 3. Vertical Operation




| Bore size (mm) | Allowable load weight $W_A$ (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 4.16}{2.2 + Lo}$ |
| 15 | $\frac{\sigma \cdot 13.23}{2.7 + Lo}$ |
| 20 | $\frac{\sigma \cdot 26.8}{2.9 + Lo}$ |
| 25 | $\frac{\sigma \cdot 44.0}{3.4 + Lo}$ |
| 32 | $\frac{\sigma \cdot 88.2}{4.2 + Lo}$ |
| 40 | $\frac{\sigma \cdot 167.8}{5.1 + Lo}$ |

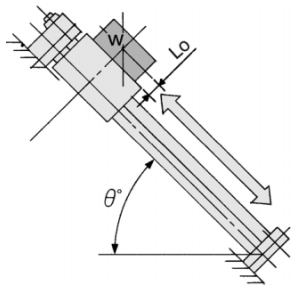
Lo: Distance from mounting surface to load center of gravity (cm)
Note) Consider a safety factor for drop prevention.

# Series REAS
# Model Selection 3

## Caution on Design 1

## Example of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

### 4. Inclined Operation (in operating direction)

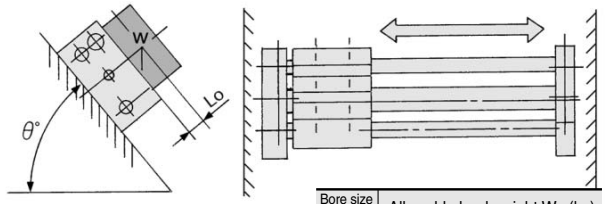



| Angle | Up to 45° | Up to 60° | Up to 75° | Up to 90° |
|---|---|---|---|---|
| k | 1 | 0.9 | 0.8 | 0.7 |

| Bore size (mm) | Allowable load weight WA (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 10.5 \cdot K}{3.5\cos\theta + 2\,(2.2 + Lo)\,\sin\theta}$ |
| 15 | $\frac{\sigma \cdot 35 \cdot K}{5\cos\theta + 2\,(2.7 + Lo)\,\sin\theta}$ |
| 20 | $\frac{\sigma \cdot 72 \cdot K}{6\cos\theta + 2\,(2.9 + Lo)\,\sin\theta}$ |
| 25 | $\frac{\sigma \cdot 120 \cdot K}{6\cos\theta + 2\,(3.4 + Lo)\,\sin\theta}$ |
| 32 | $\frac{\sigma \cdot 210 \cdot K}{7\cos\theta + 2\,(4.2 + Lo)\,\sin\theta}$ |
| 40 | $\frac{\sigma \cdot 400 \cdot K}{8\cos\theta + 2\,(5.1 + Lo)\,\sin\theta}$ |

Angle coefficient (k): k = [up to 45° (= θ)] = 1,
[up to 60°] = 0.9, [up to 75°] = 0.8,
[up to 90°] = 0.7
Lo: Distance from mounting surface to load center of gravity (cm)

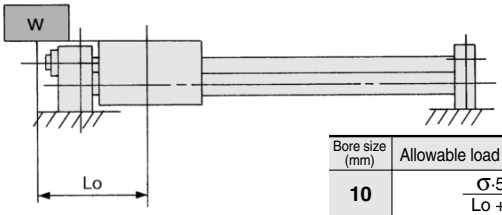
### 5. Inclined Operation (at a right angle to operating direction)




Lo: Distance from mounting surface to load center of gravity (cm)

| Bore size (mm) | Allowable load weight WA (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 12.0}{4 + 2\,(2.2 + Lo)\,\sin\theta}$ |
| 15 | $\frac{\sigma \cdot 36.4}{5.2 + 2\,(2.7 + Lo)\,\sin\theta}$ |
| 20 | $\frac{\sigma \cdot 74.4}{6.2 + 2\,(2.9 + Lo)\,\sin\theta}$ |
| 25 | $\frac{\sigma \cdot 140}{7 + 2\,(3.4 + Lo)\,\sin\theta}$ |
| 32 | $\frac{\sigma \cdot 258}{8.6 + 2\,(4.2 + Lo)\,\sin\theta}$ |
| 40 | $\frac{\sigma \cdot 520}{10.4 + 2\,(5.1 + Lo)\,\sin\theta}$ |

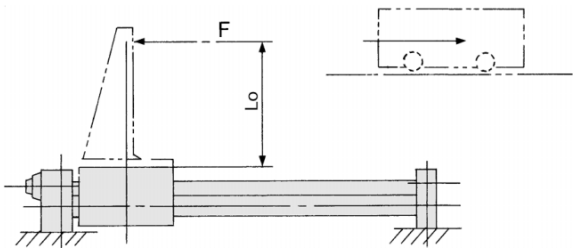
### 6. Load Center Offset in Operating Direction (Lo)




Lo: Distance from center of slide block to load's center of gravity (cm)

| Bore size (mm) | Allowable load weight WA (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 5.25}{Lo + 3.5}$ |
| 15 | $\frac{\sigma \cdot 17.5}{Lo + 5.0}$ |
| 20 | $\frac{\sigma \cdot 36}{Lo + 6.0}$ |
| 25 | $\frac{\sigma \cdot 60}{Lo + 6.0}$ |
| 32 | $\frac{\sigma \cdot 105}{Lo + 7.0}$ |
| 40 | $\frac{\sigma \cdot 200}{Lo + 8.0}$ |

### 7. Horizontal Operation (Pushing load, Pusher)

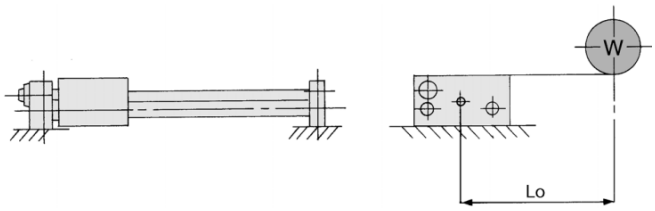



F: Drive (from slide block to position Lo) resistance force (kg)
Lo: Distance from mounting surface to load center of gravity (cm)

| Bore size (mm) | 10 | 15 | 20 |
|---|---|---|---|
| Allowable load weight WA (kg) | $\frac{\sigma \cdot 5.25}{2.2 + Lo}$ | $\frac{\sigma \cdot 17.5}{2.7 + Lo}$ | $\frac{\sigma \cdot 36}{2.9 + Lo}$ |

| Bore size (mm) | 25 | 32 | 40 |
|---|---|---|---|
| Allowable load weight WA (kg) | $\frac{\sigma \cdot 60}{3.4 + Lo}$ | $\frac{\sigma \cdot 105}{4.2 + Lo}$ | $\frac{\sigma \cdot 200}{5.1 + Lo}$ |

### 8. Horizontal Operation (Load, Lateral offset Lo)




Lo: Distance from mounting surface to load center of gravity (cm)

| Bore size (mm) | 10 | 15 | 20 |
|---|---|---|---|
| Allowable load weight WA (kg) | $\frac{\sigma \cdot 8.40}{4 + Lo}$ | $\frac{\sigma \cdot 25.48}{5.2 + Lo}$ | $\frac{\sigma \cdot 52.1}{6.2 + Lo}$ |

| Bore size (mm) | 25 | 32 | 40 |
|---|---|---|---|
| Allowable load weight WA (kg) | $\frac{\sigma \cdot 98}{7.0 + Lo}$ | $\frac{\sigma \cdot 180}{8.6 + Lo}$ | $\frac{\sigma \cdot 364}{10.4 + Lo}$ |

# Series REAS
# Model Selection 4

## Caution on Design 3

### Vertical Operation

When operating a load vertically, it should be operated within the allowable load weights and maximum operating pressures shown in the table below.
Use caution, as operating above the prescribed values may lead to dropping of the load.

| Bore size (mm) | Model | Allowable load weight Wv (kg) | Max. operating pressure Pv (MPa) |
|---|---|---|---|
| 10 | **REAS10** | 2.7 | 0.55 |
| 15 | **REAS15** | 7.0 | 0.65 |
| 20 | **REAS20** | 11.0 | 0.65 |
| 25 | **REAS25** | 18.5 | 0.65 |
| 32 | **REAS32** | 30.0 | 0.65 |
| 40 | **REAS40** | 47.0 | 0.65 |

### Intermediate Stop

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

#### Cushion Stroke

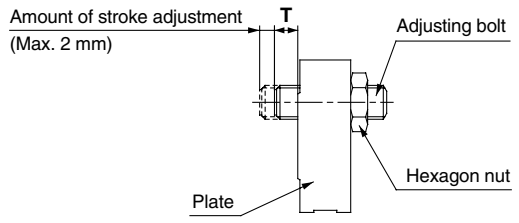
| Model | Stroke (mm) |
|---|---|
| **REAS10** | 20 |
| **REAS15** | 25 |
| **REAS20** | 30 |
| **REAS25** | 30 |
| **REAS32** | 30 |
| **REAS40** | 35 |

### Stroke Adjustment

The adjusting bolt is adjusted to the optimum position for smooth acceleration and deceleration at the time of shipment, and should be operated at the full stroke. When stroke adjustment is necessary, the maximum amount of adjustment on one side is 2 mm. (Do not adjust more than 2 mm, as it will not be possible to obtain smooth acceleration and deceleration.)

**Stroke adjustment method**

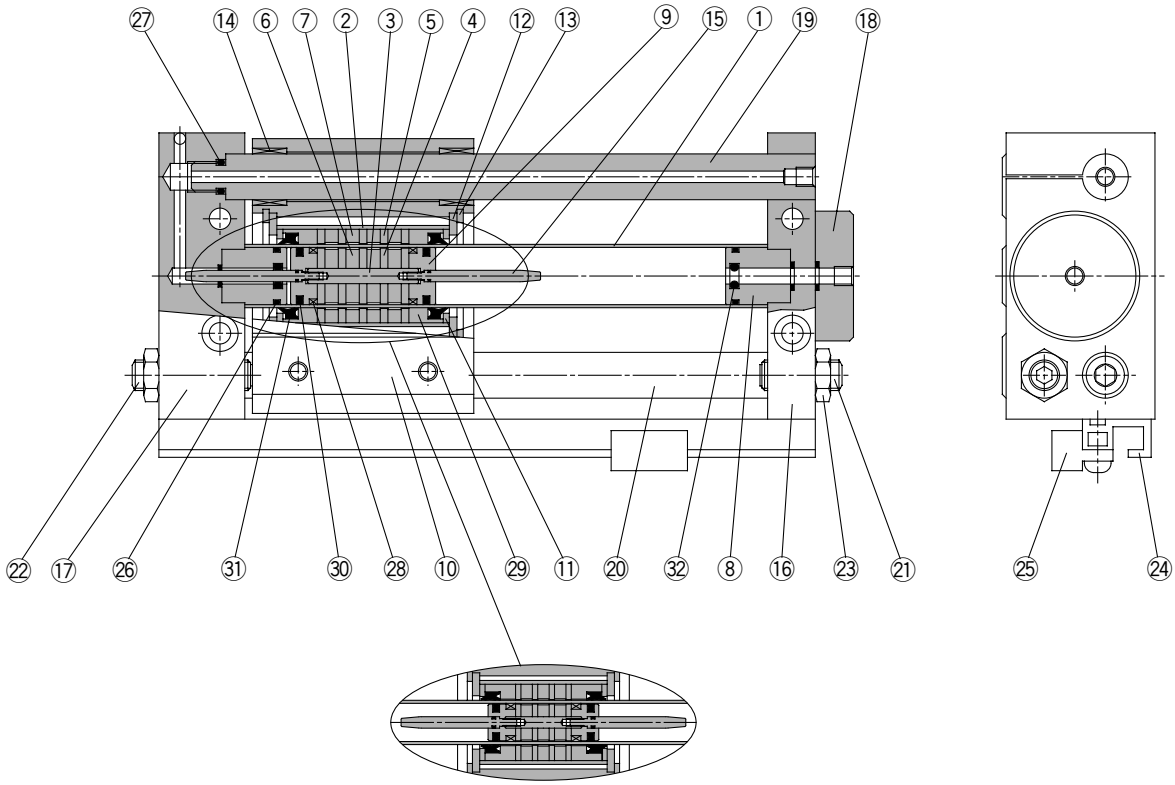
Loosen the hexagon nut, and after performing the stroke adjustment from the plate side with a hexagon wrench, retighten and secure the hexagon nut.




### Adjusting Bolt Position (at the time of shipment), Hexagon Nut Tightening Torque

| Model | T (mm) | Tightening torque (N·m) |
|---|---|---|
| **REAS10** | 1 | 1.67 |
| **REAS15** | 1 | |
| **REAS20** | 1.5 | 3.14 |
| **REAS25** | 1.5 | 10.8 |
| **REAS32** | 3 | 23.5 |
| **REAS40** | 2 | |

## Construction: ø10, ø15




**REAS10**

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Cylinder tube | Stainless steel | |
| ② | External slider tube | Aluminum alloy | |
| ③ | Shaft | Stainless steel | |
| ④ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑤ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | Magnet A | Rare earth magnet | |
| ⑦ | Magnet B | Rare earth magnet | |
| ⑧ | Cushion seal holder | Aluminum alloy | Anodized |
| ⑨ | Piston | Brass | Electroless nickel plated |
| ⑩ | Slide block | Aluminum alloy | Hard anodized |
| ⑪ | Spacer | Rolled steel plate | Nickel plated |
| ⑫ | Slider spacer | Rolled steel plate | Nickel plated |
| ⑬ | Snap ring | Carbon tool steel | Nickel plated |
| ⑭ | Bushing | Oil retaining bearing material | |
| ⑮ | Cushion ring | Stainless steel | |
| ⑯ | Plate A | Aluminum alloy | Hard anodized |

| No. | Description | Material | Note |
|---|---|---|---|
| ⑰ | Plate B | Aluminum alloy | Hard anodized |
| ⑱ | Port cover | Aluminum alloy | Hard anodized |
| ⑲ | Guide shaft A | Carbon steel | Hard chrome plated |
| ⑳ | Guide shaft B | Carbon steel | Hard chrome plated |
| ㉑ | Adjusting bolt A | Chromium molybdenum steel | Nickel plated |
| ㉒ | Adjusting bolt B | Chromium molybdenum steel | Nickel plated |
| ㉓ | Hexagon nut | Carbon steel | Nickel plated |
| ㉔ | Switch mounting rail | Aluminum alloy | |
| ㉕ | Auto switch | — | |
| ㉖* | Cylinder tube gasket | NBR | |
| ㉗* | Guide shaft gasket | NBR | |
| ㉘* | Wear ring A | Special resin | |
| ㉙* | Wear ring B | Special resin | |
| ㉚* | Piston seal | NBR | |
| ㉛* | Scraper | NBR | |
| ㉜* | Cushion seal | NBR | |

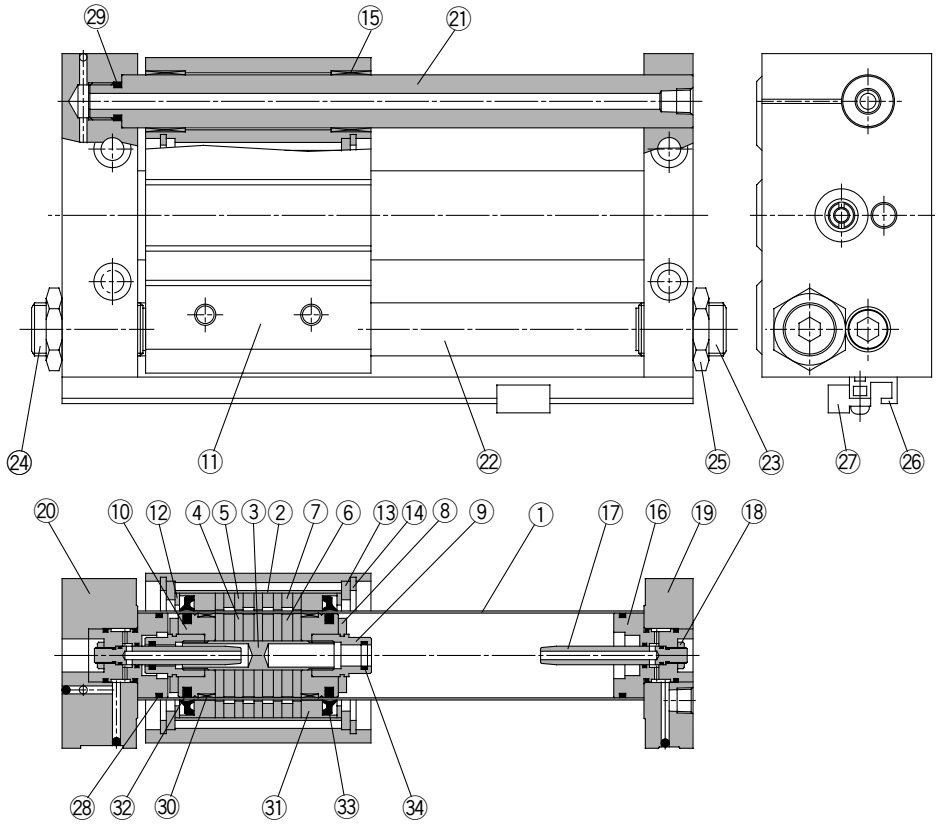
∗ Seal kit includes ㉖ to ㉜. Order the seal kit, based on each bore size.

### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 10 | REAS10-PS | Set of nos. above ㉖, ㉗, ㉘, ㉙, ㉚, ㉛, ㉜ |
| 15 | REAS15-PS | |

# Series REAS

## Construction: ø20 to ø40




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Cylinder tube | Stainless steel | |
| ② | External slider tube | Aluminum alloy | |
| ③ | Shaft | Stainless steel | |
| ④ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑤ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | Magnet A | Rare earth magnet | |
| ⑦ | Magnet B | Rare earth magnet | |
| ⑧ | Bumper | Urethane rubber | |
| ⑨ | Cushion seal holder | Aluminum alloy | Chromated |
| ⑩ | Piston | Aluminum alloy | Chromated |
| ⑪ | Slide block | Aluminum alloy | Hard anodized |
| ⑫ | Spacer | Rolled steel plate | Nickel plated |
| ⑬ | Slider spacer | Rolled steel plate | Nickel plated |
| ⑭ | Snap ring | Carbon tool steel | Nickel plated |
| ⑮ | Bushing | Oil retaining bearing material | |
| ⑯ | Cushion ring holder | Aluminum alloy | Anodized |
| ⑰ | Cushion ring | Brass | Electroless nickel plated (REAS32, 40) |
| | | Stainless steel | REAS20, 25 |

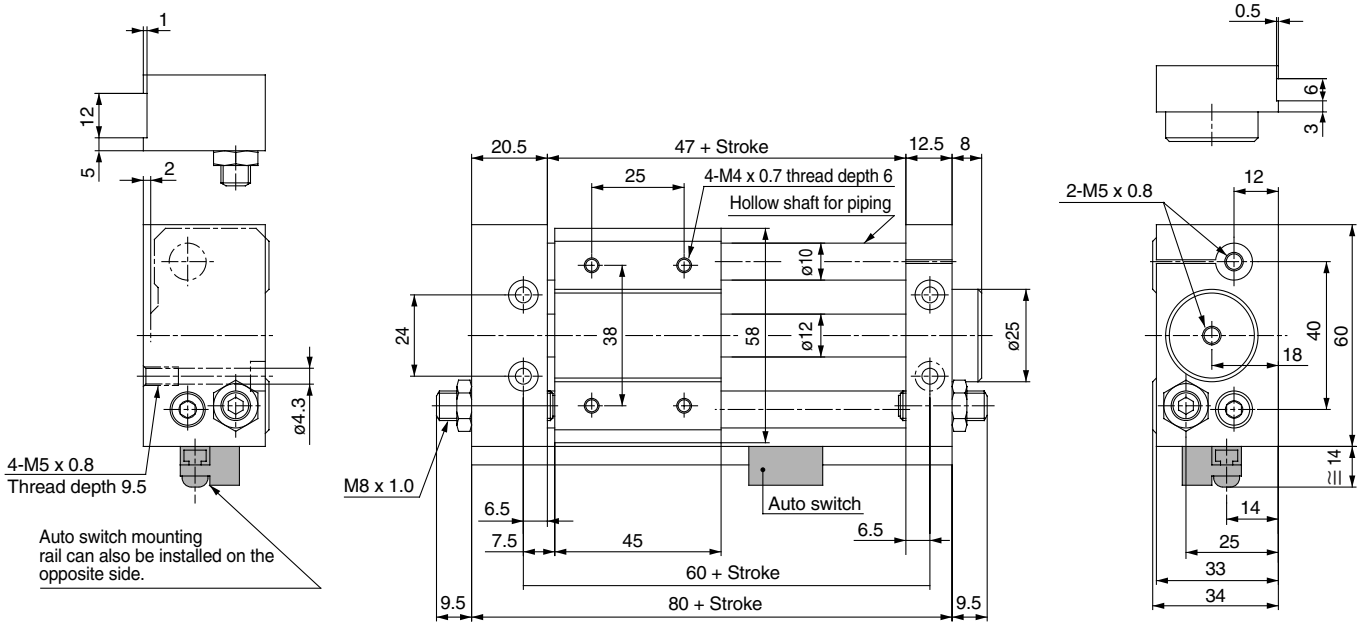
| No. | Description | Material | Note |
|---|---|---|---|
| ⑱ | Lock nut B | Carbon steel | Nickel plated |
| ⑲ | Plate A | Aluminum alloy | Hard anodized |
| ⑳ | Plate B | Aluminum alloy | Hard anodized |
| ㉑ | Guide shaft A | Carbon steel | Hard chrome plated |
| ㉒ | Guide shaft B | Carbon steel | Hard chrome plated |
| ㉓ | Adjusting bolt A | Chromium molybdenum steel | Nickel plated |
| ㉔ | Adjusting bolt B | Chromium molybdenum steel | Nickel plated |
| ㉕ | Hexagon nut | Carbon steel | Nickel plated |
| ㉖ | Switch mounting rail | Aluminum alloy | |
| ㉗ | Auto switch | — | With auto switch |
| ㉘* | Cylinder tube gasket | NBR | |
| ㉙* | Guide shaft gasket | NBR | |
| ㉚* | Wear ring A | Special resin | |
| ㉛* | Wear ring B | Special resin | |
| ㉜* | Piston seal | NBR | |
| ㉝* | Scraper | NBR | |
| ㉞* | Cushion seal | NBR | |

* Seal kit includes ㉘ to ㉞. Order the seal kit, based on each bore size.

### Replacement Parts: Seal Kit

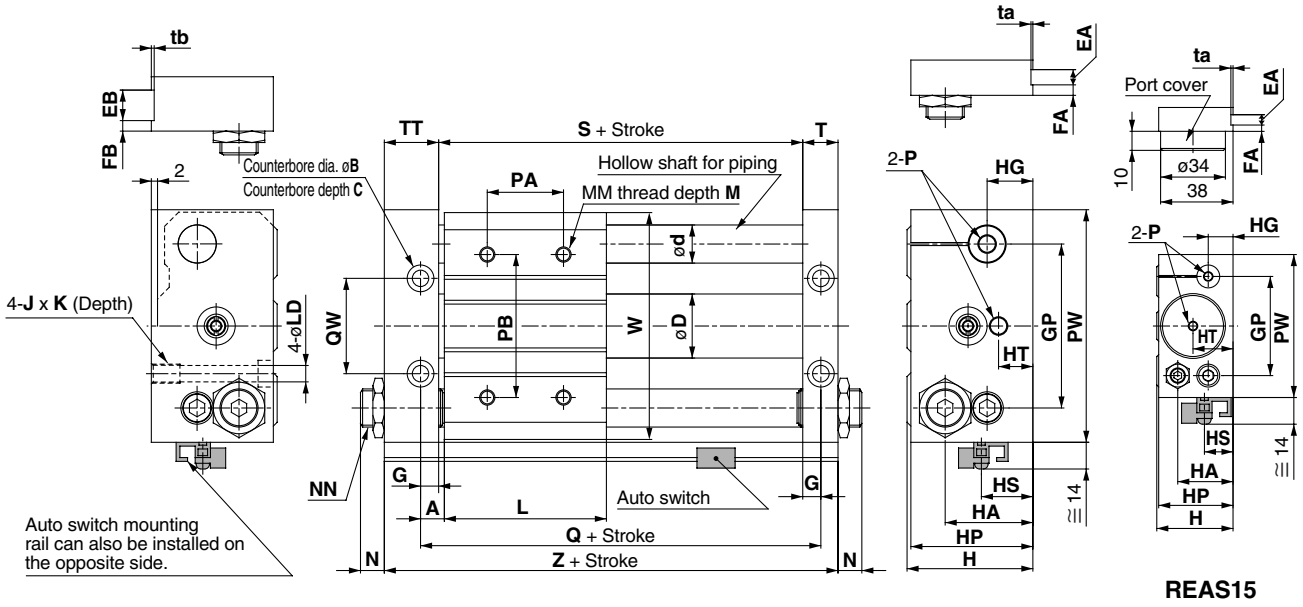
| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 20 | REAS20-PS | Set of nos. above ㉘, ㉙, ㉚, ㉛, ㉜, ㉝, ㉞ |
| 25 | REAS25-PS | |
| 32 | REAS32-PS | |
| 40 | REAS40-PS | |

## Dimensions: ø10



# Series REAS

## Dimensions: ø15 to ø40




REAS15

(mm)

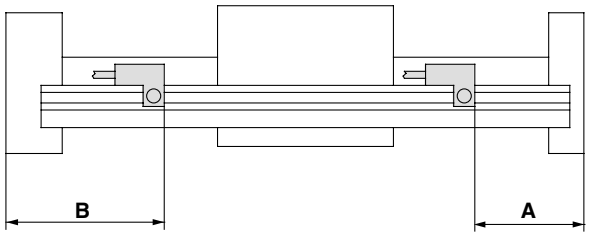
| Model | A | B | C | D | d | EA | EB | FA | FB | G | GP | H | HA | HG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAS15** | 7.5 | 9.5 | 5 | 16.6 | 12 | 6 | 13 | 3 | 6 | 6.5 | 52 | 40 | 29 | 13 |
| **REAS20** | 10 | 9.5 | 5 | 21.6 | 16 | — | — | — | — | 8.5 | 62 | 46 | 36 | 17 |
| **REAS25** | 10 | 11 | 6.5 | 26.4 | 16 | 8 | 14 | 4 | 7 | 8.5 | 70 | 54 | 40 | 20 |
| **REAS32** | 12.5 | 14 | 8 | 33.6 | 20 | 8 | 16 | 5 | 7 | 9.5 | 86 | 66 | 46 | 24 |
| **REAS40** | 12.5 | 14 | 8 | 41.6 | 25 | 10 | 20 | 5 | 10 | 10.5 | 104 | 76 | 57 | 25 |

| Model | HP | HS | HT | J x K | L | LD | M | MM | N | NN |
|---|---|---|---|---|---|---|---|---|---|---|
| **REAS15** | 39 | 15 | 21 | M6 x 1.0 x 9.5 | 60 | 5.6 | 8 | M5 x 0.8 | 7.5 | M8 x 1.0 |
| **REAS20** | 45 | 25.5 | 10 | M6 x 1.0 x 9.5 | 70 | 5.6 | 10 | M6 x 1.0 | 9.5 | M10 x 1.0 |
| **REAS25** | 53 | 23 | 10 | M8 x 1.25 x 10 | 70 | 7 | 10 | M6 x 1.0 | 11 | M14 x 1.5 |
| **REAS32** | 64 | 27 | 17 | M10 x 1.5 x 15 | 85 | 8.7 | 12 | M8 x 1.25 | 11.5 | M20 x 1.5 |
| **REAS40** | 74 | 31 | 14 | M10 x 1.5 x 15 | 95 | 8.7 | 12 | M8 x 1.25 | 10.5 | M20 x 1.5 |

| Model | P | PA* | PB | PW | Q | QW | S | T | TT | ta | tb | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAS15** | M5 x 0.8 | 30 | 50 | 75 | 75 | 30 | 62 | 12.5 | 22.5 | 0.5 | 1 | 72 | 97 |
| **REAS20** | Rc 1/8 | 40 | 70 | 90 | 90 | 38 | 73 | 16.5 | 25.5 | — | — | 87 | 115 |
| **REAS25** | Rc 1/8 | 40 | 70 | 100 | 90 | 42 | 73 | 16.5 | 25.5 | 0.5 | 1 | 97 | 115 |
| **REAS32** | Rc 1/8 | 40 | 75 | 122 | 110 | 50 | 91 | 18.5 | 28.5 | 0.5 | 1 | 119 | 138 |
| **REAS40** | Rc 1/4 | 65 | 105 | 145 | 120 | 64 | 99 | 20.5 | 35.5 | 1 | 1 | 142 | 155 |

* PA dimensions are for split from center.

## Proper Auto Switch Mounting Position (Detection at stroke end)




| Auto switch model / Bore size (mm) | A dimension | | | | B dimension | |
|---|---|---|---|---|---|---|
| | D-A73/A80 | D-A72<br>D-A7□H/A80H<br>D-A73C/A80C<br>D-F7□/J79<br>D-F7□W/J79W<br>D-J79C<br>D-F7□V/F□WV<br>D-F7BA□<br>D-F79F | D-F7NTL | D-A73/A80 | D-A72<br>D-A7□H/A80H<br>D-A73C/A80C<br>D-F7□/J79<br>D-F7□W/J79W<br>D-J79C<br>D-F7□V/F7□WV<br>D-F7BA□<br>D-F79F | D-F7NTL |
| **10** | 35 | 35.5 | 40.5 | 45 | 44.5 | 39.5 |
| **15** | 34.5 | 35 | 40 | 62.5 | 62 | 57 |
| **20** | 64 | 64.5 | 69.5 | 50 | 49.5 | 44.5 |
| **25** | 44 | 44.5 | 49.5 | 71 | 70.5 | 65.5 |
| **32** | 55 | 55.5 | 60.5 | 83 | 82.5 | 77.5 |
| **40** | 61 | 61.5 | 66.5 | 94 | 93.5 | 88.5 |

### Operating Range

| Auto switch model | Bore size (mm) | | | | | |
|---|---|---|---|---|---|---|
| | **10** | **15** | **20** | **25** | **32** | **40** |
| **D-A7□/A8□** | 6 | 6 | 6 | 6 | 6 | 6 |
| **D-F7□/J7□/F79F** | 3 | 4 | 3 | 3 | 3 | 3.5 |

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

Other than the models listed in “How to Order”, the following auto switches are applicable. For detailed specifications, refer to page 10-20-1.

| Type | Model | Electrical entry (Fetching direction) | Features |
|---|---|---|---|
| Reed switch | D-A80 | Grommet (Perpendicular) | Without indicator light |
| | D-A80H | Grommet (In-line) | |
| | D-A80C | Connector (Perpendicular) | |

∗ Timer equipped type, solid state switch (D-F7NTL type) is also available.
∗ With pre-wire connector is available for D-F7NTL type, too.

# Sine Rodless Cylinder
# Slider Type: Ball Bushing Bearing
# *Series REAL*
## ø10, ø15, ø20, ø25, ø32, ø40

## How to Order

**REA L 25 — 300 — J79W** ☐

**Slider type (Ball bushing bearing)**

**Bore size**

| | | | |
|---|---|---|---|
| **10** | 10 mm | **25** | 25 mm |
| **15** | 15 mm | **32** | 32 mm |
| **20** | 20 mm | **40** | 40 mm |

**Standard stroke (mm)**
Refer to "Standard Stroke" on page 10-2-37.

**Auto switch**

| | |
|---|---|
| **Nil** | Without auto switch |

**Number of auto switches**

| | |
|---|---|
| **Nil** | 2 pcs. |
| **S** | 1 pc. |
| **n** | "n" pcs. |

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).
∗ In cases without auto switches, there are switch rails only.

**Applicable Auto Switch**/Refer to page 10-20-1 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switches model Perpendicular | Auto switches model In-line | Lead wire length (m)∗ 0.5 (Nil) | 3 (L) | 5 (Z) | None (N) | Pre-wire connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | — | **A76H** | ● | ● | — | — | — | IC circuit | — |
| | | | | 2-wire | — | — | 200 V | **A72** | **A72H** | ● | ● | — | — | — | — | Relay, PLC |
| | | | | | 24 V | 12 V | 100 V | **A73** | **A73H** | ● | ● | ● | — | — | | |
| | | Connector | | | | | — | **A73C** | **—** | ● | ● | ● | ● | — | | |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | **F7NV** | **F79** | ● | ● | ○ | — | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | **F7PV** | **F7P** | ● | ● | ○ | — | ○ | | |
| | | | | 2-wire | | 12 V | | **F7BV** | **J79** | ● | ● | ○ | — | ○ | — | |
| | | Connector | | | | | | **J79C** | **—** | ● | ● | ● | ● | — | | |
| | Diagnostic indication (2-color indication) | Grommet | | 3-wire (NPN) | | 5 V, 12 V | | **F7NWV** | **F79W** | ● | ● | ○ | — | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | **—** | **F7PW** | ● | ● | ○ | — | ○ | | |
| | | | | 2-wire | | 12 V | | **F7BWV** | **J79W** | ● | ● | ○ | — | ○ | — | |
| | Water resistant (2-color indication) | | | | | | | **—** | **F7BA** | — | ● | ○ | — | ○ | | |
| | | | | | | | | **F7BAV** | **—** | — | ● | ○ | — | — | | |
| | With diagnostic output (2-color indication) | | | 4-wire (NPN) | | 5 V, 12 V | | **—** | **F79F** | ● | ● | ○ | — | ○ | IC circuit | |

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A73C
3 m ····· L (Example) A73CL
5 m ····· Z (Example) A73CZ
None ····· N (Example) A73CN

∗ Solid state switches marked with "○" are produced upon receipt of order.

• Since there are other applicable auto switches than listed, refer to page 10-2-47 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

## Specifications

| | |
|---|---|
| Fluid | Air |
| Proof pressure | 1.05 MPa |
| Maximum operating pressure | 0.7 MPa |
| Minimum operating pressure | 0.18 MPa |
| Ambient and fluid temperature | –10 to 60°C |
| Piston speed | 50 to 300 mm/s |
| Lubrication | Non-lube |
| Stroke length tolerance | 0 to 250 st: $^{+1.0}_{0}$, 251 to 1000 st: $^{+1.4}_{0}$, 1001 st and up: $^{+1.8}_{0}$ |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) | Maximum manufacturable stroke (mm) |
|---|---|---|
| **10** | 150, 200, 250, 300 | 500 |
| **15** | 150, 200, 250, 300, 350, 400, 450, 500 | 750 |
| **20** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | 1000 |
| **25** | | 1500 |
| **32** | | |
| **40** | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 | 1500 |

Note) Intermediate stroke is available by the 1 mm interval.

## Magnetic Holding Force

(N)

| Bore size (mm) | **10** | **15** | **20** | **25** | **32** | **40** |
|---|---|---|---|---|---|---|
| Holding force | 53.9 | 137 | 231 | 363 | 588 | 922 |

## Weight

(kg)

| Bore size (mm) | **10** | **15** | **20** | **25** | **32** | **40** |
|---|---|---|---|---|---|---|
| Basic weight | 0.580 | 1.10 | 1.85 | 2.21 | 4.36 | 4.83 |
| Additional weight per each 50 mm of stroke | 0.077 | 0.104 | 0.138 | 0.172 | 0.267 | 0.406 |

Calculation: (Example) REAL32-500
- Basic weight ····· 4.36 (kg)
- Additional weight ····· 0.267 (kg/50 st)
- Cylinder stroke ····· 500 (st)

4.36 + 0.267 x 500/50 = 7.03 kg

## Made to Order Specifications (For details, refer to page 10-21-1.)

| Symbol | Specifications |
|---|---|
| **-X431** | Auto switch rails on both side faces (With 2 pcs.) |
| **-X168** | Helical insert thread specifications |

# ⚠ Precautions

**Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.**

## Operation

## ⚠ Warning

**1. Be aware of the space between the plates and the slide block.**

Take sufficient care to avoid getting your hands or fingers caught when the cylinder is operated.

**2. Do not apply a load to a cylinder which is greater than the allowable value stated in the "Model Selection" pages.**

## Mounting

## ⚠ Caution

**1. Avoid operation with the external slider fixed to the mounting surface.**

The cylinder should be operated with the plates fixed to the mounting surface.

**2. Perform mounting so that the external slider will operate through the entire stroke at the minimum operating pressure.**

If the mounting surface is not flat, the guides will be warped, increasing the minimum operating pressure and causing premature wear of the bearings. Therefore, mounting should be performed so that the external slider will operate through the entire stroke at the minimum operating pressure. A mounting surface with a high degree of flatness is desirable, but in cases where this is not possible, adjust with shims, etc.

# *Series REAL*
# Model Selection 1

**Pv**: Maximum operating pressure for vertical operation (MPa)
**WA**: Allowable load weight based on these operating conditions (kg)
**Wv**: Allowable load weight for vertical operation (kg)
**σ**: Stroke coefficient

$$\sigma = \frac{\text{Load weight in stroke}}{\text{Maximum load weight}}$$

**Operating Conditions**

- **W: Load weight (kg)**
- **U: Maximum speed (mm/s)**
- **P: Operating pressure (MPa)**
- **Stroke (mm)**
- **Lo: Distance from slide block mounting surface to workpiece center of gravity (cm)**
- **Mode of operation (horizontal, inclined, vertical)**

**Mode of operation**

**Horizontal operation**

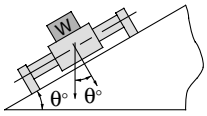
**First tentative bore size determination**

$$\varnothing D \geq 1.6 \times \sqrt{\frac{W}{P}}$$

**Inclined operation**

**First tentative bore size determination**

$$\varnothing D \geq 5.0 \times \sqrt{\frac{0.1 \times W\cos\theta + W\sin\theta}{P}}$$



Inclined operation

**Vertical operation**

**First tentative bore size determination**

$$\varnothing D \geq 5.0 \times \sqrt{\frac{0.1 \times W + W}{P}}$$

**Review of load weight and operating pressure**

**Determination of allowable load weight & pressure**

**W > Wv**
**P > Pv**

(For vertical operation, refer to page 10-2-42.)

**W ≤ Wv**
**P ≤ Pv**

(For formula to find σ, refer to page 10-2-40.)

**Calculate stroke coefficient (σ) with stroke and tentatively determined bore size**

$$\sigma = \frac{\text{Load weight in stroke}}{\text{Maximum load weight}}$$

**Select an example calculation for allowable weight based on cylinder mounting orientation.**

(Refer to page 10-2-40 and 41.)

**Calculate (WA) from the formula for the tentatively determined bore size**

**W > WA**

**Review of bore size, stroke and Lo**

**W ≤ WA**

(Refer to data (B) on page 10-2-40.)

**Second tentative determination of bore size from graph of maximum speed (U) and load weight (W)**

**Bore size determination** (The larger bore size is selected from two tentative determinations.)

Note)

**Consider made-to-order products, depending on an operating condition.**

Note) Made-to-order products should be considered, too, depending on an operating environment, etc.

(Refer to page 10-2-37.)

**Model selected**

# Series REAL
# Model Selection 2

## Caution on Design 1

### How to Find σ when Selecting the Allowable Load Weight

Since the maximum load weight with respect to the cylinder stroke changes as shown in the table below, s should be considered as a coefficient determined in accordance with each stroke.
Example) For REAS25-650

(1) Maximum load weight = 20 kg
(2) Load weight for 650 st = 13.6 kg
(3) $\sigma = \frac{13.6}{20} = 0.68$ is the result.

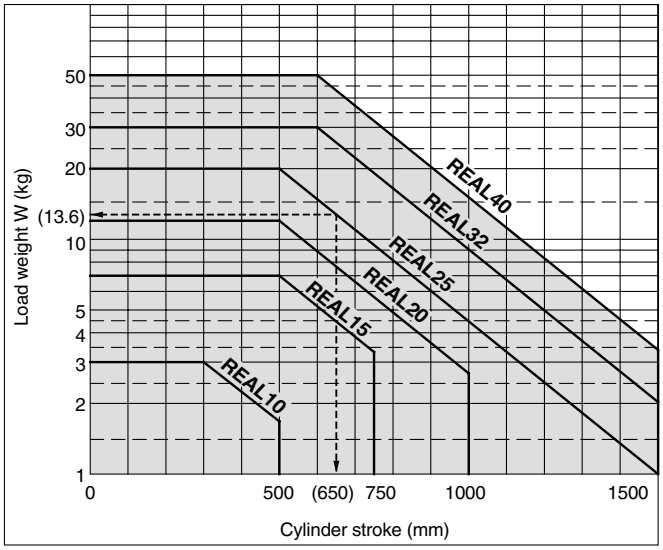
### Calculation Formula for σ (σ ≤ 1)

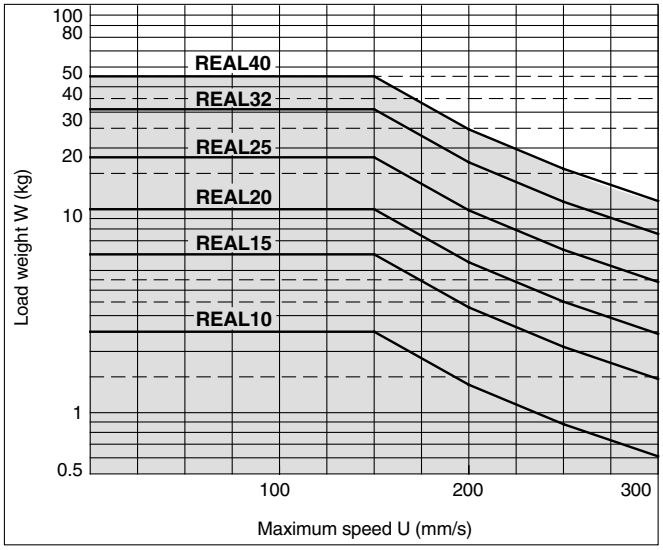
ST: Stroke (mm)

| Model | REAL10 | REAL15 | REAL20 |
|---|---|---|---|
| σ = | $\frac{10^{(0.86 - 1.3 \times 10^{-3} \times ST)}}{3}$ | $\frac{10^{(1.5 - 1.3 \times 10^{-3} \times ST)}}{7}$ | $\frac{10^{(1.71 - 1.3 \times 10^{-3} \times ST)}}{12}$ |

| Model | REAL25 | REAL32 | REAL40 |
|---|---|---|---|
| σ = | $\frac{10^{(1.98 - 1.3 \times 10^{-3} \times ST)}}{20}$ | $\frac{10^{(2.26 - 1.3 \times 10^{-3} \times ST)}}{30}$ | $\frac{10^{(2.48 - 1.3 \times 10^{-3} \times ST)}}{50}$ |

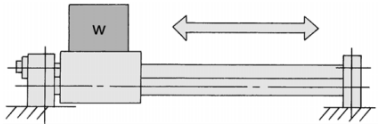
Note) Calculate with σ = 1 for all applications up to ø10—300 mmST, ø15—500 mmST, ø20—500 mmST , ø25—500 mmST, ø32—600 mmST, ø40—600 mmST.




### Examples of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

#### 1. Horizontal Operation (Floor mounting)

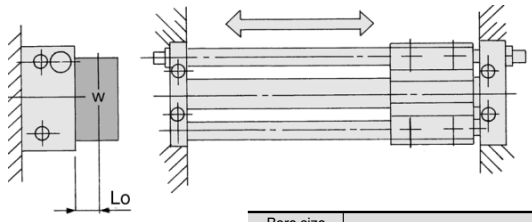



**Maximum Load Weight (Center of slide block)** (kg)

| Bore size (mm) | 10 | 15 | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|---|
| Maximum load weight (kg) | 3 | 7 | 12 | 20 | 30 | 50 |
| Stroke (max) | Up to 300 st | Up to 500 st | Up to 500 st | Up to 500 st | Up to 600 st | Up to 600 st |

The above maximum load weight values will change with the stroke length for each cylinder size, due to limitation from warping of the guide shafts. (Take note of the coefficient σ.)
Moreover, depending on the operating direction, the allowable load weight may be different from the maximum load weight.

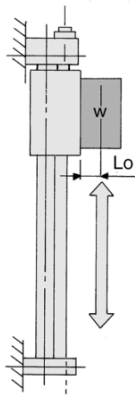
#### 2. Horizontal Operation (Wall mounting)




Lo: Distance from mounting surface to load center of gravity (cm)

| Bore size (mm) | Allowable load weight $W_A$ (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 15.0}{8.9 + 2Lo}$ |
| 15 | $\frac{\sigma \cdot 45.5}{11.3 + 2Lo}$ |
| 20 | $\frac{\sigma \cdot 101}{13.6 + 2Lo}$ |
| 25 | $\frac{\sigma \cdot 180}{15.2 + 2Lo}$ |
| 32 | $\frac{\sigma \cdot 330}{18.9 + 2Lo}$ |
| 40 | $\frac{\sigma \cdot 624}{22.5 + 2Lo}$ |

#### 3. Vertical Operation




| Bore size (mm) | Allowable load weight $W_A$ (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 5.00}{1.95 + Lo}$ |
| 15 | $\frac{\sigma \cdot 15.96}{2.4 + Lo}$ |
| 20 | $\frac{\sigma \cdot 31.1}{2.8 + Lo}$ |
| 25 | $\frac{\sigma \cdot 54.48}{3.1 + Lo}$ |
| 32 | $\frac{\sigma \cdot 112.57}{3.95 + Lo}$ |
| 40 | $\frac{\sigma \cdot 212.09}{4.75 + Lo}$ |

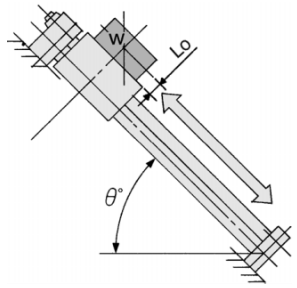
Lo: Distance from mounting surface to load center of gravity (cm)
Note) Consider a safety factor for drop prevention.

# Series REAL
# Model Selection 3

## Caution on Design 2

## Examples of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

### 4. Inclined Operation (in operating direction)



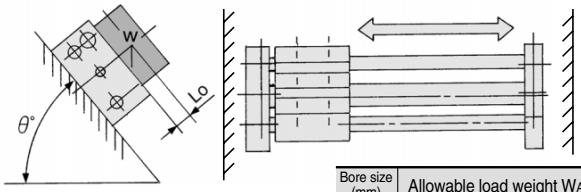

| Angle | up to 45° | up to 60° | up to 75° | up to 90° |
|---|---|---|---|---|
| k | 1 | 0.9 | 0.8 | 0.7 |

| Bore size (mm) | Allowable load weight $W_A$ (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 10.2 \cdot K}{2.8\cos\theta + 2\,(1.95 + Lo)\sin\theta}$ |
| 15 | $\frac{\sigma \cdot 31.1 \cdot K}{2.9\cos\theta + 2\,(2.4 + Lo)\sin\theta}$ |
| 20 | $\frac{\sigma \cdot 86.4 \cdot K}{6\cos\theta + 2\,(2.8 + Lo)\sin\theta}$ |
| 25 | $\frac{\sigma \cdot 105.4 \cdot K}{3.55\cos\theta + 2\,(3.1 + Lo)\sin\theta}$ |
| 32 | $\frac{\sigma \cdot 178 \cdot K}{4\cos\theta + 2\,(3.95 + Lo)\sin\theta}$ |
| 40 | $\frac{\sigma \cdot 361.9 \cdot K}{5.7\cos\theta + 2\,(4.75 + Lo)\sin\theta}$ |

Angle coefficient (k): k = [up to 45° (= θ)] = 1,
[up to 60°] = 0.9, [up to 75°] = 0.8,
[up to 90°] = 0.7

Lo: Distance from mounting surface to load center of gravity (cm)

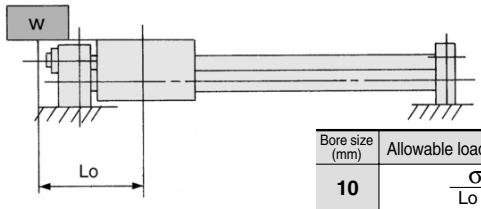
### 5. Inclined Operation (at a right angle to operating direction)




Lo: Distance from mounting surface to load center of gravity (cm)

| Bore size (mm) | Allowable load weight $W_A$ (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 15}{5 + 2\,(1.95 + Lo)\sin\theta}$ |
| 15 | $\frac{\sigma \cdot 45.5}{6.5 + 2\,(2.4 + Lo)\sin\theta}$ |
| 20 | $\frac{\sigma \cdot 115}{8 + 2\,(2.8 + Lo)\sin\theta}$ |
| 25 | $\frac{\sigma \cdot 180}{9 + 2\,(3.1 + Lo)\sin\theta}$ |
| 32 | $\frac{\sigma \cdot 330}{11 + 2\,(3.95 + Lo)\sin\theta}$ |
| 40 | $\frac{\sigma \cdot 624}{13 + 2\,(4.75 + Lo)\sin\theta}$ |

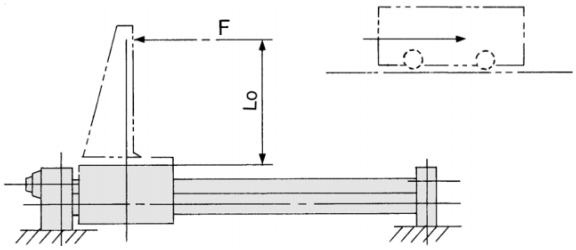
### 6. Load Center Offset in Operating Direction (Lo)




Lo: Distance from center of slide block to load's center of gravity (cm)

| Bore size (mm) | Allowable load weight $W_A$ (kg) |
|---|---|
| 10 | $\frac{\sigma \cdot 5.6}{Lo + 2.8}$ |
| 15 | $\frac{\sigma \cdot 13.34}{Lo + 2.9}$ |
| 20 | $\frac{\sigma \cdot 43.2}{Lo + 6}$ |
| 25 | $\frac{\sigma \cdot 46.15}{Lo + 3.55}$ |
| 32 | $\frac{\sigma \cdot 80}{Lo + 4}$ |
| 40 | $\frac{\sigma \cdot 188.1}{Lo + 5.7}$ |

### 7. Horizontal Operation (Pushing load, Pusher)

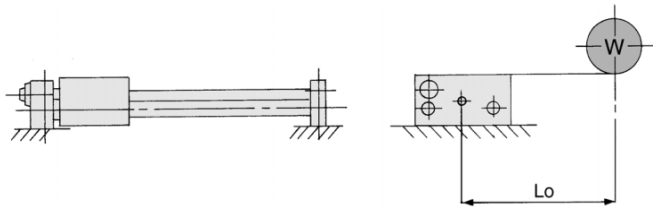



F: Drive (from slide block to position Lo) resistance force (kg)
Lo: Distance from mounting surface to load center of gravity (cm)

| Bore size (mm) | 10 | 15 | 20 |
|---|---|---|---|
| Allowable load weight $W_A$ (kg) | $\frac{\sigma \cdot 5.55}{1.95 + Lo}$ | $\frac{\sigma \cdot 15.96}{2.4 + Lo}$ | $\frac{\sigma \cdot 41.7}{2.8 + Lo}$ |

| Bore size (mm) | 25 | 32 | 40 |
|---|---|---|---|
| Allowable load weight $W_A$ (kg) | $\frac{\sigma \cdot 58.9}{3.1 + Lo}$ | $\frac{\sigma \cdot 106.65}{3.95 + Lo}$ | $\frac{\sigma \cdot 228}{4.75 + Lo}$ |

### 8. Horizontal Operation (Load, Lateral offset Lo)




Lo: Distance from center of side block to load's center of gravity (cm)

| Bore size (mm) | 10 | 15 | 20 |
|---|---|---|---|
| Allowable load weight $W_A$ (kg) | $\frac{\sigma \cdot 15}{5 + Lo}$ | $\frac{\sigma \cdot 45.5}{6.5 + Lo}$ | $\frac{\sigma \cdot 80.7}{8 + Lo}$ |

| Bore size (mm) | 25 | 32 | 40 |
|---|---|---|---|
| Allowable load weight $W_A$ (kg) | $\frac{\sigma \cdot 144}{9 + Lo}$ | $\frac{\sigma \cdot 275}{11 + Lo}$ | $\frac{\sigma \cdot 520}{13 + Lo}$ |

# Series REAL
# Model Selection 4

## Caution on Design 3

### Vertical Operation

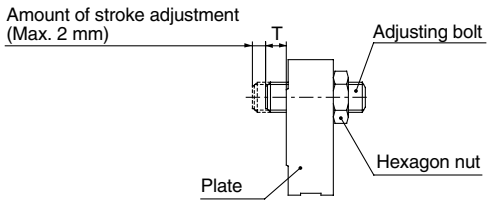
When operating a load vertically, it should be operated within the allowable load weights and maximum operating pressures shown in the table below.
Use caution, as operating above the prescribed values may lead to dropping of the load.

| Bore size (mm) | Model | Allowable load weight Wv (kg) | Maximum operating pressure Pv (MPa) |
|---|---|---|---|
| **10** | **REAL10** | 2.7 | 0.55 |
| **15** | **REAL15** | 7.0 | 0.65 |
| **20** | **REAL20** | 11.0 | 0.65 |
| **25** | **REAL25** | 18.5 | 0.65 |
| **32** | **REAL32** | 30.0 | 0.65 |
| **40** | **REAL40** | 47.0 | 0.65 |

### Stroke Adjustment

The adjusting bolt is adjusted to the optimum position for smooth acceleration and deceleration at the time of shipment, and should be operated at the full stroke. When stroke adjustment is necessary, the maximum amount of adjustment on one side is 2 mm. (Do not adjust more than 2 mm, as it will not be possible to obtain smooth acceleration and deceleration.)

**Stroke adjustment method**
Loosen the hexagon nut, and after performing the stroke adjustment from the plate side with a hexagon wrench, retighten and secure the hexagon nut.




### Adjusting Bolt Position (at the time of shipment), Hexagon Nut Tightening Torque

| Model | T (mm) | Tightening torque (N·m) |
|---|---|---|
| **REAL10** | 1 | 1.67 |
| **REAL15** | 1 | |
| **REAL20** | 1 | 3.14 |
| **REAL25** | 1 | 10.8 |
| **REAL32** | 1 | 23.5 |
| **REAL40** | 1 | |

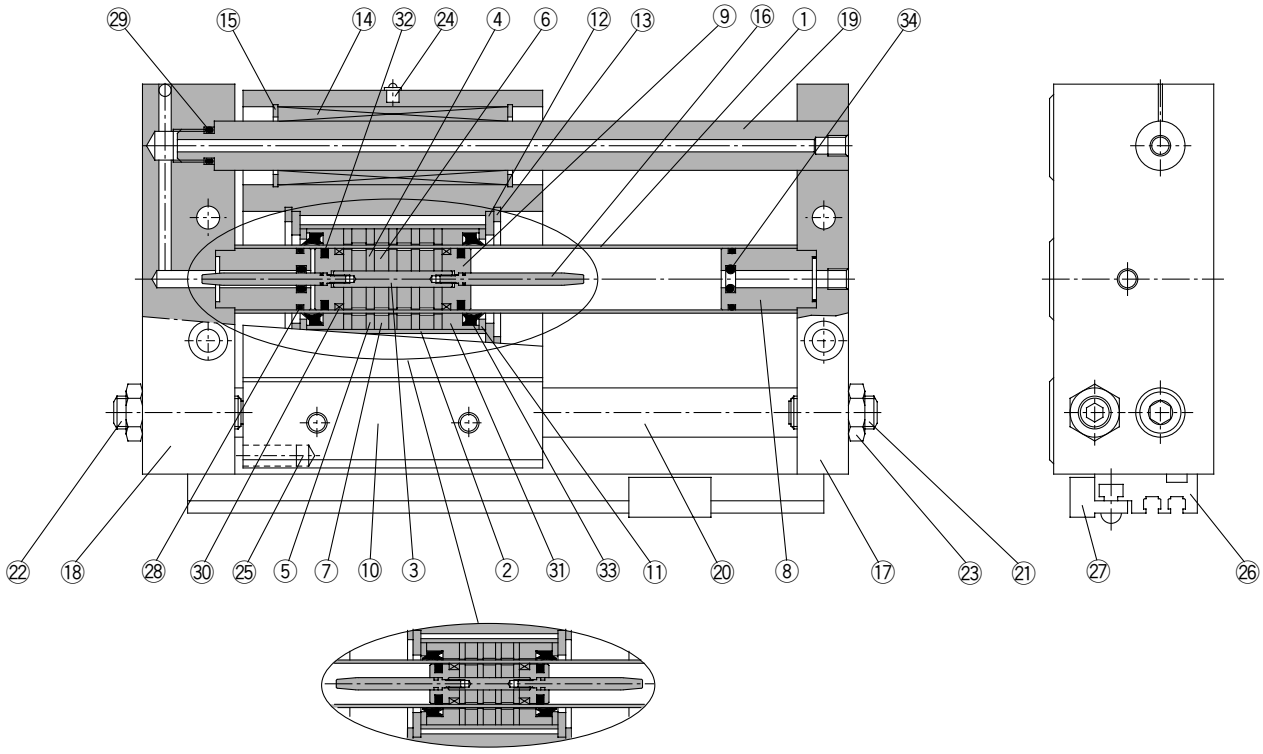
### Intermediate Stop

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or return from an intermediate stop using an external stopper, etc.

#### Cushion Stroke

| Model | Stroke (mm) |
|---|---|
| **REAL10** | 20 |
| **REAL15** | 25 |
| **REAL20** | 30 |
| **REAL25** | 30 |
| **REAL32** | 30 |
| **REAL40** | 35 |

## Construction: ø10, ø15




**REAL10**

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Cylinder tube | Stainless steel | |
| ② | External slider tube | Aluminum alloy | |
| ③ | Shaft | Stainless steel | |
| ④ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑤ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | Magnet A | Rare earth magnet | |
| ⑦ | Magnet B | Rare earth magnet | |
| ⑧ | Cushion seal holder | Aluminum alloy | Anodized |
| ⑨ | Piston | Brass | Electroless nickel plated |
| ⑩ | Slide block | Aluminum alloy | Hard anodized |
| ⑪ | Spacer | Rolled steel plate | Nickel plated |
| ⑫ | Slider spacer | Rolled steel plate | Nickel plated |
| ⑬ | Snap ring | Carbon tool steel | Nickel plated |
| ⑭ | Ball bushing | —— | |
| ⑮ | Snap ring | Carbon tool steel | Nickel plated |
| ⑯ | Cushion ring | Stainless steel | |
| ⑰ | Plate A | Aluminum alloy | Hard anodized |

| No. | Description | Material | Note |
|---|---|---|---|
| ⑱ | Plate B | Aluminum alloy | Hard anodized |
| ⑲ | Guide shaft A | Carbon steel | Hard chrome plated |
| ⑳ | Guide shaft B | Carbon steel | Hard chrome plated |
| ㉑ | Adjusting bolt A | Chromium molybdenum steel | Nickel plated |
| ㉒ | Adjusting bolt B | Chromium molybdenum steel | Nickel plated |
| ㉓ | Hexagon nut | Carbon steel | Nickel plated |
| ㉔ | Grease nipple | Carbon steel | Nickel plated (Except REAL10) |
| ㉕ | Magnet for auto switch | Rare earth magnet | |
| ㉖ | Switch mounting rail | Aluminum alloy | |
| ㉗ | Auto switch | —— | |
| ㉘* | Cylinder tube gasket | NBR | |
| ㉙* | Guide shaft gasket | NBR | |
| ㉚* | Wear ring A | Special resin | |
| ㉛* | Wear ring B | Special resin | |
| ㉜* | Piston seal | NBR | |
| ㉝* | Scraper | NBR | |
| ㉞* | Cushion seal | NBR | |

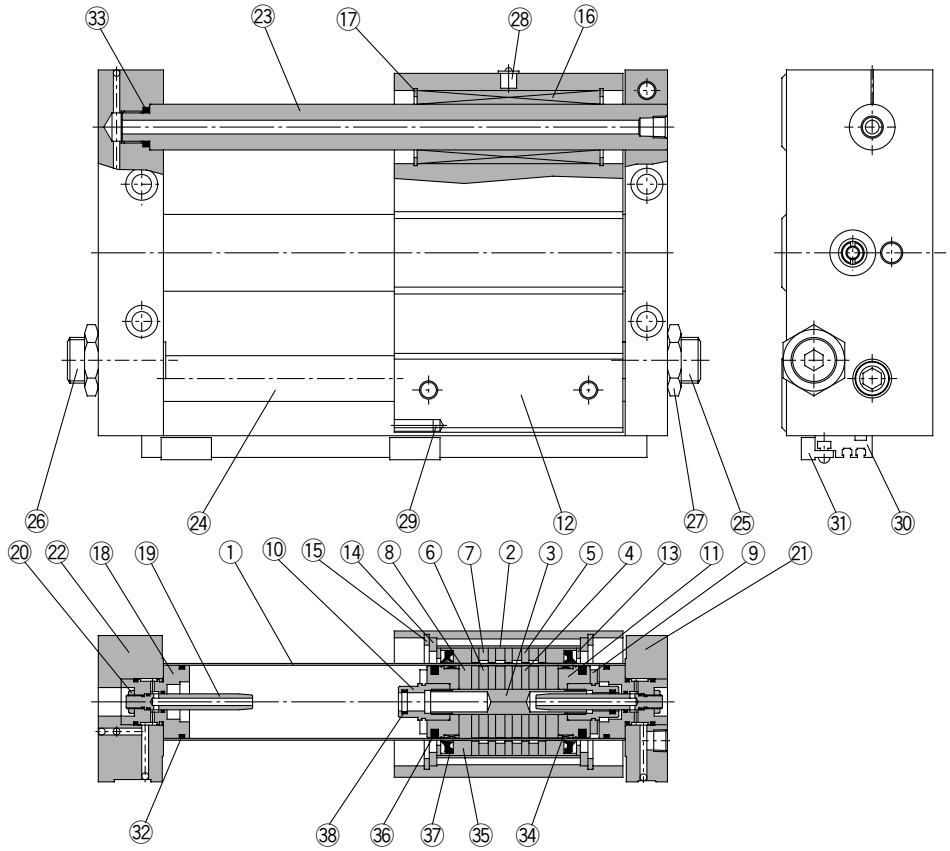
* Seal kit includes ㉘ to ㉞. Order the seal kit, based on each bore size.

### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 10 | REAL10-PS | Set of nos. above ㉘, ㉙, ㉚, ㉛, ㉜, ㉝, ㉞ |
| 15 | REAL15-PS | |

# Series REAL

## Construction: ø20 to ø40




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Cylinder tube | Stainless steel | |
| ② | External slider tube | Aluminum alloy | |
| ③ | Shaft | Stainless steel | |
| ④ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑤ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | Magnet A | Rare earth magnet | |
| ⑦ | Magnet B | Rare earth magnet | |
| ⑧ | Piston side spacer | Aluminum alloy | Chromated |
| ⑨ | Bumper | Urethane rubber | |
| ⑩ | Cushion seal holder | Aluminum alloy | Chromated |
| ⑪ | Piston | Aluminum alloy | Chromated |
| ⑫ | Slide block | Aluminum alloy | Hard anodized |
| ⑬ | Spacer | Rolled steel plate | Nickel plated |
| ⑭ | Slider spacer | Carbon steel | Nickel plated |
| ⑮ | Snap ring | Carbon tool steel | Nickel plated |
| ⑯ | Ball bushing | —— | |
| ⑰ | Snap ring | Carbon tool steel | Nickel plated |
| ⑱ | Cushion ring holder | Aluminum alloy | Anodized |
| ⑲ | Cushion ring | Brass | Electroless nickel plated (REAL32, 40) |
| | | Stainless steel | REAL20, 25 |

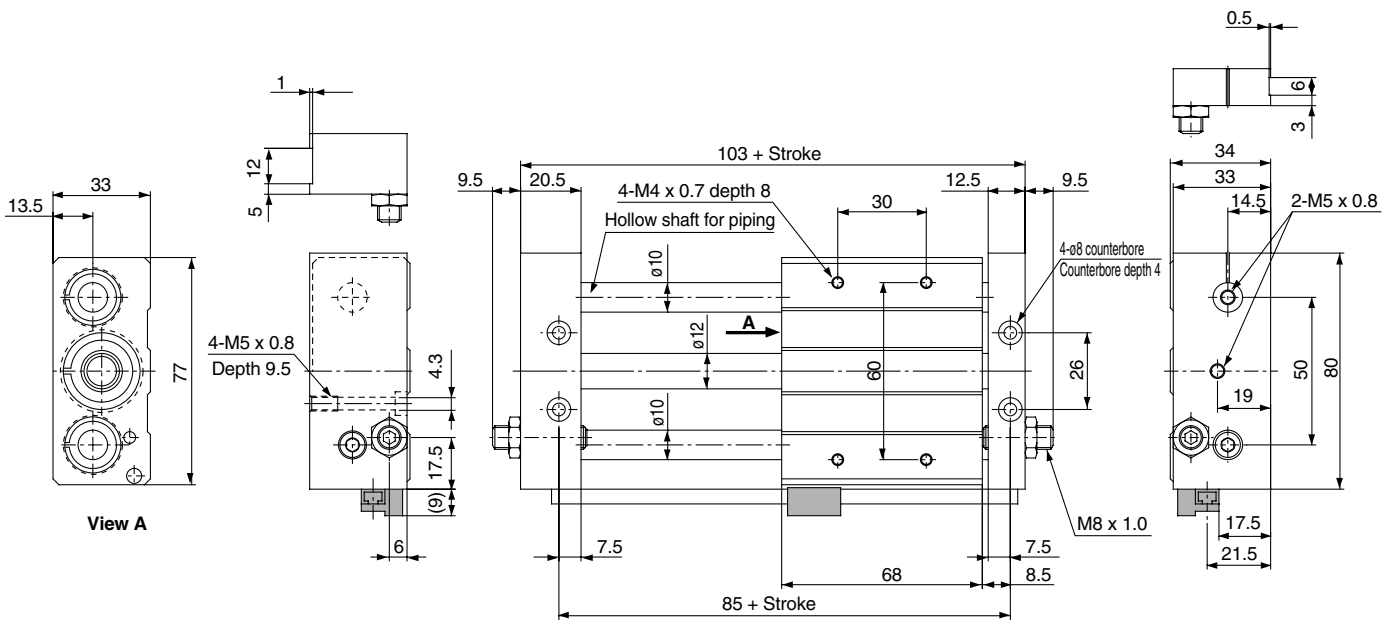
| No. | Description | Material | Note |
|---|---|---|---|
| ⑳ | Lock nut B | Carbon steel | Nickel plated |
| ㉑ | Plate A | Aluminum alloy | Hard anodized |
| ㉒ | Plate B | Aluminum alloy | Hard anodized |
| ㉓ | Guide shaft A | Carbon steel | Hard chrome plated |
| ㉔ | Guide shaft B | Carbon steel | Hard chrome plated |
| ㉕ | Adjusting bolt A | Chromium molybdenum steel | Nickel plated |
| ㉖ | Adjusting bolt B | Chromium molybdenum steel | Nickel plated |
| ㉗ | Hexagon nut | Carbon steel | Nickel plated |
| ㉘ | Grease nipple | Brass | Nickel plated |
| ㉙ | Magnet for auto switch | Rare earth magnet | |
| ㉚ | Switch mounting rail | Aluminum alloy | |
| ㉛ | Auto switch | —— | |
| ㉜* | Cylinder tube gasket | NBR | |
| ㉝* | Guide shaft gasket | NBR | |
| ㉞* | Wear ring A | Special resin | |
| ㉟* | Wear ring B | Special resin | |
| ㊱* | Piston seal | NBR | |
| ㊲* | Scraper | NBR | |
| ㊳* | Cushion seal | NBR | |

* Seal kit includes ㉜ to ㊳. Order the seal kit, based on each bore size.

### Replacement Parts: Seal Kit

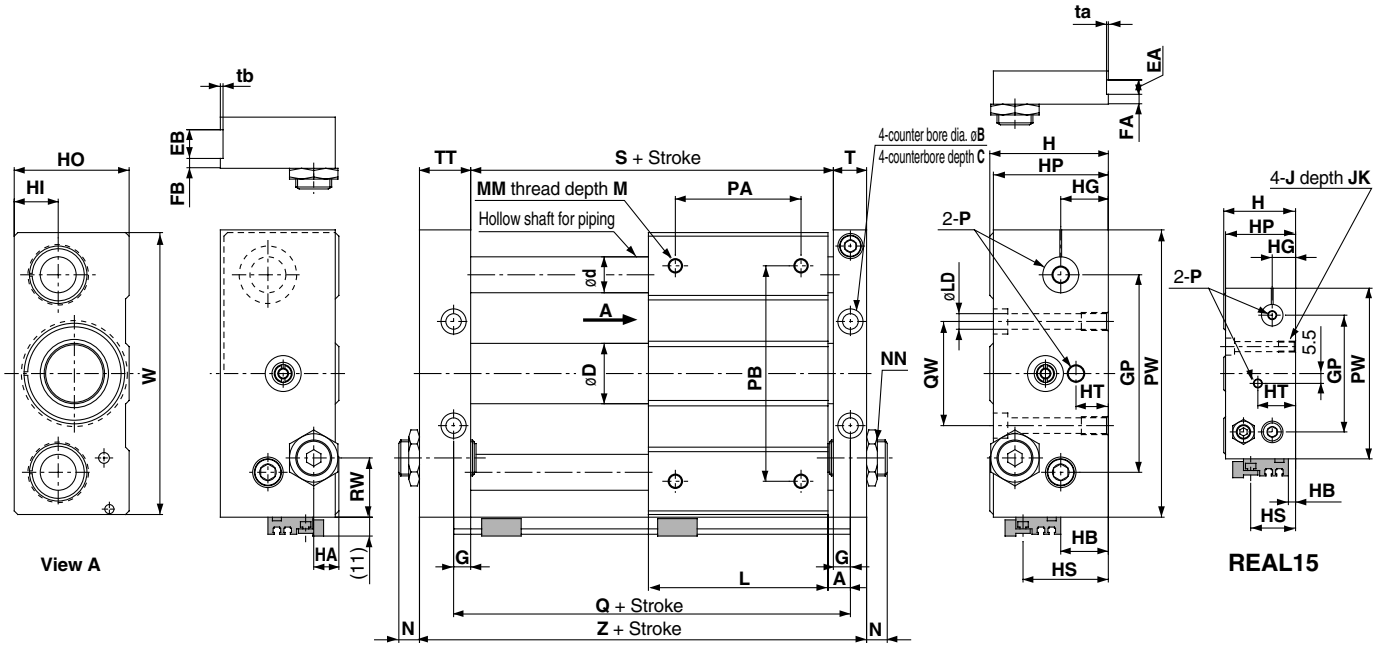
| Bore size (mm) | Seal kit no. | Contents |
|---|---|---|
| 20 | REAL20-PS | Set of nos. above ㉜, ㉝, ㉞, ㉟, ㊱, ㊲, ㊳ |
| 25 | REAL25-PS | |
| 32 | REAL32-PS | |
| 40 | REAL40-PS | |

## Dimensions: ø10



# Series REAL

## Dimensions: ø15 to ø40




(mm)

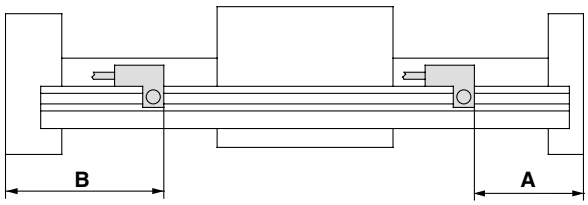
| Model | A | B | C | D | d | EA | EB | FA | FB | G | GP | H | HA | HB | HG | HI | HO | HP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAL15** | 7.5 | 9.5 | 5 | 16.6 | 12 | 6 | 13 | 3 | 6 | 6.5 | 65 | 40 | 6.5 | 4 | 16 | 14 | 38 | 39 |
| **REAL20** | 9.5 | 9.5 | 5 | 21.6 | 16 | — | — | — | — | 8.5 | 80 | 46 | 9 | 10 | 18 | 16 | 44 | 45 |
| **REAL25** | 9.5 | 11 | 6.5 | 26.4 | 16 | 8 | 14 | 4 | 7 | 8.5 | 90 | 54 | 9 | 18 | 23 | 21 | 52 | 53 |
| **REAL32** | 10.5 | 14 | 8 | 33.6 | 20 | 8 | 16 | 5 | 7 | 9.5 | 110 | 66 | 12 | 26.5 | 26.5 | 24.5 | 64 | 64 |
| **REAL40** | 11.5 | 14 | 8 | 41.6 | 25 | 10 | 20 | 5 | 10 | 10.5 | 130 | 78 | 12 | 35 | 30.5 | 28.5 | 76 | 74 |

| Model | HS | HT | J | JK | L | LD | M | MM | N | NN | P | PA* | PB | PW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAL15** | 25 | 21 | M6 x 1.0 | 9.5 | 75 | 5.6 | 8 | M5 x 0.8 | 7.5 | M8 x 1.0 | M5 x 0.8 | 45 | 70 | 95 |
| **REAL20** | 31 | 10 | M6 x 1.0 | 10 | 86 | 5.6 | 10 | M6 x 1.0 | 10 | M10 x 1.0 | Rc 1/8 | 50 | 90 | 120 |
| **REAL25** | 39 | 10 | M8 x 1.25 | 10 | 86 | 7 | 10 | M6 x 1.0 | 11 | M14 x 1.5 | Rc 1/8 | 60 | 100 | 130 |
| **REAL32** | 47.5 | 17 | M10 x 1.5 | 15 | 100 | 9.2 | 12 | M8 x 1.25 | 11.5 | M20 x 1.5 | Rc 1/8 | 70 | 120 | 160 |
| **REAL40** | 56 | 14 | M10 x 1.5 | 15 | 136 | 9.2 | 12 | M8 x 1.25 | 10.5 | M20 x 1.5 | Rc 1/4 | 90 | 140 | 190 |

∗ PA dimensions are for split from center.

| Model | Q | QW | RW | S | T | TT | ta | tb | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|
| **REAL15** | 90 | 30 | 15 | 77 | 12.5 | 22.5 | 0.5 | 1.0 | 92 | 112 |
| **REAL20** | 105 | 40 | 28 | 88 | 16.5 | 25.5 | — | — | 117 | 130 |
| **REAL25** | 105 | 50 | 22 | 88 | 16.5 | 25.5 | 0.5 | 1.0 | 127 | 130 |
| **REAL32** | 121 | 60 | 33 | 102 | 18.5 | 28.5 | 0.5 | 1.0 | 157 | 149 |
| **REAL40** | 159 | 84 | 35 | 138 | 20.5 | 35.5 | 1.0 | 1.0 | 187 | 194 |

## Proper Auto Switch Mounting Position (Detection at stroke end)




| Auto switch model / Bore size (mm) | A dimension | | | | B dimension | |
|---|---|---|---|---|---|---|
| | D-A73/A80 | D-A72<br>D-A7□H/A80H<br>D-A73C/A80C<br>D-F7□/J79<br>D-F7□W/J79W<br>D-J79C<br>D-F7□V/F7□WV<br>D-F7BA□<br>D-F79F | D-F7NTL | D-A73/A80 | D-A72<br>D-A7□H/A80H<br>D-A73C/A80C<br>D-F7□/J79<br>D-F7□W/J79W<br>D-J79C<br>D-F7□V/F7□WV<br>D-F7BA□<br>D-F79F | D-F7NTL |
| **10** | 58 | 58.5 | 63.5 | 45 | 44.5 | 39.5 |
| **15** | 65 | 65.5 | 70.5 | 47 | 46.5 | 41.5 |
| **20** | 76 | 76.5 | 81.5 | 54 | 53.5 | 48.5 |
| **25** | 76 | 76.5 | 81.5 | 54 | 53.5 | 48.5 |
| **32** | 92 | 92.5 | 97.5 | 57 | 56.5 | 51.5 |
| **40** | 130 | 130.5 | 135.5 | 64 | 63.5 | 58.5 |

Note) D-F7LF type cannot be mounted on bore size ø10.

### Operating Range

| Auto switch model | Bore size (mm) | | | | | |
|---|---|---|---|---|---|---|
| | 10 | 15 | 20 | 25 | 32 | 40 |
| **D-A7□/A8□** | 6 | 6 | 6 | 6 | 6 | 6 |
| **D-F7□/J7□/F79F** | 3 | 4 | 3 | 3 | 3 | 3.5 |

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

Other than the models listed in "How to Order", the following auto switches are applicable. For detailed specifications, refer to page 10-20-1.

| Type | Model | Electrical entry (Fetching direction) | Features |
|---|---|---|---|
| Reed switch | D-A80 | Grommet (Perpendicular) | Without indicator light |
| | D-A80H | Grommet (In-line) | |
| | D-A80C | Connector (Perpendicular) | |

∗ Timer equipped type, solid state switch (D-F7NTL type) is also available.
∗ With pre-wire connector is available for D-F7NTL type, too.

# Sine Rodless Cylinder
# High Precision Guide Type
# *Series REAH*
## ø10, ø15, ø20, ø25, ø32

## How to Order

**REA H** [ ] **25** — **300** — **Y7BW** [ ]

**High precision guide type**

**Guide**

| Symbol \ Bore size (mm) | | 10 | 15 | 20 | 25 | 32 |
|---|---|---|---|---|---|---|
| Nil | 1 axis | ● | ● | ● | ● | — |
| T | 2 axes | — | — | — | ● | ● |

**Bore size**

| | |
|---|---|
| 10 | 10 mm |
| 15 | 15 mm |
| 20 | 20 mm |
| 25 | 25 mm |
| 32 | 32 mm |

**Standard stroke (mm)**
Refer to "Standard Stroke" on page 10-2-49.

**Auto switch**

| | |
|---|---|
| Nil | Without auto switch |

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

**Number of auto switches**

| | |
|---|---|
| Nil | 2 pcs. |
| S | 1 pc. |
| n | "n" pcs. |

**Applicable Auto Switch**/Refer to page 10-20-1 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | Load voltage DC | Load voltage AC | Auto switches model: Perpendicular | Auto switches model: In-line | Lead wire length (m)∗: 0.5 (Nil) | 3 (L) | 5 (Z) | Pre-wire connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | — | Z76 | ● | ● | — | — | IC circuit | — |
| | | | | 2-wire | 24 V | 12 V | 100 V | — | Z73 | ● | ● | ● | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | Y69A | Y59A | ● | ● | ○ | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | Y7PV | Y7P | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | Y69B | Y59B | ● | ● | ○ | ○ | – | |
| | Diagnostic indication (2-color indication) | | | 3-wire (NPN) | | 5 V, 12 V | | Y7NWV | Y7NW | ● | ● | ○ | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | Y7PWV | Y7PW | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | Y7BWV | Y7BW | ● | ● | ○ | ○ | – | |

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) Y59A
3 m ····· L (Example) Y59AL
5 m ····· Z (Example) Y59AZ

∗ Solid state switches marked with "○" are produced upon receipt of order.

• Since there are other applicable auto switches than listed, refer to page 10-2-52 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

## Specifications

| Bore size (mm) | 10 | 15 | 20 | 25 | 32 |
|---|---|---|---|---|---|
| Fluid | Air | | | | |
| Action | Double acting | | | | |
| Maximum operating pressure | 0.7 MPa | | | | |
| Minimum operating pressure | 0.2 MPa | | | | |
| Proof pressure | 1.05 MPa | | | | |
| Ambient and fluid temperature | –10 to 60°C | | | | |
| Piston speed | 70 to 300 mm/s | | | | |
| Lubrication | Non-lube | | | | |
| Stroke length tolerance | 0 to 1.8 mm | | | | |
| Piping | Centralized piping type | | | | |
| Piping port size | M5 x 0.8 | | Rc 1/8 | | |

## Standard Stroke

| Bore size (mm) | Number of axes | Standard stroke (mm) | Maximum manufacturable stroke (mm) |
|---|---|---|---|
| **10** | 1 axis | 150, 200, 300 | 500 |
| **15** | | 150, 200, 300, 400, 500 | 750 |
| **20** | | 200, 300, 400, 500, 600 | 1000 |
| **25** | | 200, 300, 400, 500, 600, 800 | 1200 |
| **25** | 2 axes | 200, 300, 400, 500, 600, 800, 1000 | |
| **32** | | | 1500 |

Note 1) Stroke exceeding the standard stroke will be available upon request for special.
Note 2) Intermediate strokes other than made-to-order (refer to -XB10) are available as special.

## Made to Order Specifications (For details, refer to page 10-21-1.)

| Symbol | Specifications |
|---|---|
| **-XB10** | Intermediate stroke (Using exclusive body) |
| **-X168** | Helical insert thread specifications |

## Weight

(kg)

| Model | Standard stroke (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 150 | 200 | 300 | 400 | 500 | 600 | 800 | 1000 |
| **REAH10** | 1.2 | 1.3 | 1.6 | — | — | — | — | — |
| **REAH15** | 2.5 | 2.7 | 3.2 | 3.6 | 4.1 | — | — | — |
| **REAH20** | — | 3.5 | 4.0 | 4.4 | 4.9 | 5.4 | — | — |
| **REAH25** | — | 5.3 | 6.0 | 6.6 | 7.3 | 8.0 | 9.4 | — |
| **REAHT25** | — | 6.2 | 7.3 | 8.3 | 9.4 | 10.4 | 12.5 | 14.6 |
| **REAHT32** | — | 9.6 | 10.7 | 11.9 | 13.0 | 14.2 | 16.5 | 18.8 |

## Magnetic Holding Force

| Bore size (mm) | 10 | 15 | 20 | 25 | 32 |
|---|---|---|---|---|---|
| Holding force (N) | 53.9 | 137 | 231 | 363 | 588 |

## Theoretical Output

(N)

| Bore size (mm) | Piston area ($mm^2$) | Operating pressure (MPa) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| **10** | 78 | 15 | 23 | 31 | 39 | 46 | 54 |
| **15** | 176 | 35 | 52 | 70 | 88 | 105 | 123 |
| **20** | 314 | 62 | 94 | 125 | 157 | 188 | 219 |
| **25** | 490 | 98 | 147 | 196 | 245 | 294 | 343 |
| **32** | 804 | 161 | 241 | 322 | 402 | 483 | 563 |

Note) Theoretical output (N) = Pressure (MPa) x Piston area ($mm^2$)

# ⚠ Precautions

**Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.**

## Mounting

### ⚠ Caution

**1. The interior is protected to a certain extent by the top cover, however, when performing maintenance, etc., take care not to cause scratches or other damage to the cylinder tube, slide table or linear guide by striking them or placing objects on them.**

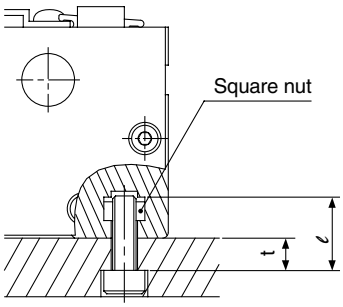
Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation.

**2. Because the slider is supported by precision bearings, take care not to apply strong impacts or excessive moments to the table when loading a workpiece.**

**3. Mounting of the cylinder body**

The body is mounted using the square nuts, which are included, in the two T-slots on the bottom of the body. Refer to the table below for mounting bolt dimensions and tightening torque.

| Model | | REAH10 | REAH15 | REAH20 | REAH25 | REAHT25 | REAHT32 |
|---|---|---|---|---|---|---|---|
| Bolt dimensions | Thread size | M4 x 0.7 | M5 x 0.8 | | M6 x 1.0 | | M8 x 1.25 |
| | Dimension t | ℓ-7 | ℓ-8 | | ℓ-9 | | ℓ-12 |
| Tightening torque | N·m | 1.37 | 2.65 | | 4.4 | | 13.2 |




## Operation

### ⚠ Caution

**1. The unit can be used with a direct load within the allowable range, but when connecting to a load which has an external guide mechanism, careful alignment is necessary.**

Since variation of the shaft center increases as the stroke becomes longer, a connection method should be devised which allows for this displacement.

**2. Since the guide is adjusted at the time of shipment, unintentional movement of the adjustment setting should be avoided.**

**3. Please contact SMC before operating in an environment where there will be contact with cutting chips, dust (paper debris, lint, etc.) or cutting oil (gas oil, water, warm water, etc.).**

**4. Do not operate with the magnetic coupling out of position.**

In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).

## Series REAH

# Model Selection 1

**Pv**: Maximum operating pressure for vertical operation (MPa)
**Wv**: Allowable load weight for vertical operation (kg)
α: Load factor

$$\Sigma\alpha = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}}$$

**Operating Conditions**

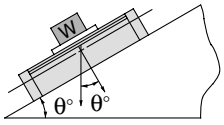
- W: Load weight (kg)
- U: Maximum speed (mm/s)
- P: Operating pressure (MPa)
- Stroke (mm)
- Position of workpiece center of gravity (m)
- Mode of operation (horizontal, inclined, vertical)

**Mode of operation**

- **Horizontal operation**
- **Inclined operation**
- **Vertical operation**

**First tentative bore size determination**

- Horizontal: $\varnothing D \geq 1.6 \times \sqrt{\frac{W}{P}}$
- Inclined: $\varnothing D \geq 5.0 \times \sqrt{\frac{0.1 \times W\cos\theta + W\sin\theta}{P}}$
- Vertical: $\varnothing D \geq 5.0 \times \sqrt{\frac{0.1 \times W + W}{P}}$



Inclined operation

**Determination of allowable load weight & pressure**

- $W > Wv$, $P > Pv$ → Review of load weight and operating pressure
- $W \leq Wv$, $P \leq Pv$ → (For vertical operation, refer to page 10-2-54.)

(Refer to page 10-2-52.)

**Determination of load factor (Σα)**

- $\Sigma\alpha > 1$ → Review of operating conditions

$$\Sigma\alpha = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}}$$

- $\Sigma\alpha \leq 1$

(Refer to data (B) on page 10-2-52.)

**Second tentative determination of bore size from the graph of maximum speed (U) and load weight (W)**

**Bore size determination** (The larger bore size is selected from two tentative determinations)

Note)
**Consider made-to-order products, depending on an operating condition.**

Note) Made-to-order products should be considered, too, depending on an operating environment, etc.

(Refer to page 10-2-49.)

**Model selected**

# Series REAH
# Model Selection 2

## Caution on Design 1

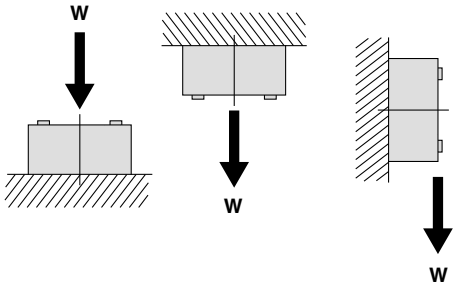
The load mass allowable moment differs depending on the workpiece mounting method, cylinder mounting orientation and piston speed. In making a determination of usability, do not allow the sum ($\Sigma\alpha n$) of the load factors ($\alpha n$) for each mass and moment to exceed "1".

$$\Sigma\alpha n = \frac{\text{Load weight (W)}}{\text{Maximum load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}} \leq 1$$

## Load Weight

### Maximum Load Weight (kg)

| Model | $W_{max}$ |
|---|---|
| **REAH10** | 4 |
| **REAH15** | 9 |
| **REAH20** | 16 |
| **REAH25** | 25 |
| **REAHT25** | |
| **REAHT32** | 40 |

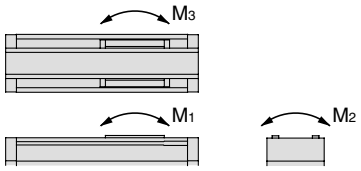



## Moment

### Allowable Moment (Static moment/Dynamic moment) (N·m)

| Model | $M_1$ | $M_2$ | $M_3$ |
|---|---|---|---|
| **REAH10** | 1.5 | 2.5 | 1.5 |
| **REAH15** | 10 | 16 | 10 |
| **REAH20** | 13 | 16 | 13 |

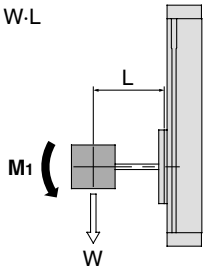
| Model | $M_1$ | $M_2$ | $M_3$ |
|---|---|---|---|
| **REAH25** | 28 | 26 | 28 |
| **REAHT25** | 56 | 85 | 56 |
| **REAHT32** | 64 | 96 | 64 |



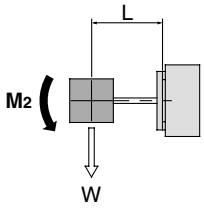

### Static Moment

Moment generated by the workpiece weight even when the cylinder is stopped

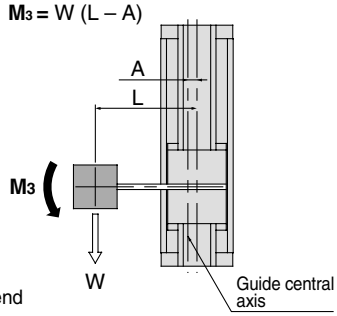
**■ Pitch moment**
$M_1 = W \cdot L$




**■ Roll moment**
$M_2 = W \cdot L$




**■ Yaw moment**
$M_3 = W (L - A)$




(mm)

| Model | A |
|---|---|
| **REAH10** | 15 |
| **REAH15** | 17.5 |
| **REAH20** | 19.5 |
| **REAH25** | 23.5 |
| **REAHT25** | 0* |
| **REAHT32** | 0* |

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

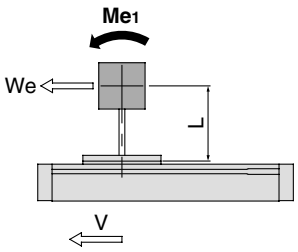
### Dynamic Moment

Moment generated by the load equivalent to impact at the stroke end

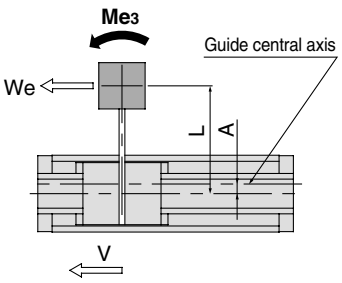
$$We = 5 \times 10^{-3} \cdot W \cdot g \cdot U$$

We: Load equivalent to impact [N]
W: Load weight [kg]
U: Maximum speed [mm/s]
g: Gravitational acceleration (≅ 9.8 m/s²)

**■ Pitch moment**
$Me_1 = 1/3 \cdot We \cdot L$




**■ Yaw moment**
$Me_3 = 1/3 \cdot We (L - A)$

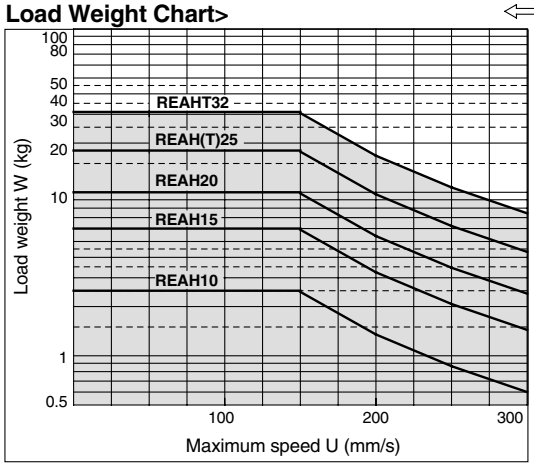



(mm)

| Model | A |
|---|---|
| **REAH10** | 15 |
| **REAH15** | 17.5 |
| **REAH20** | 19.5 |
| **REAH25** | 23.5 |
| **REAHT25** | 0* |
| **REAHT32** | 0* |

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

**<Data B: Maximum Speed—Load Weight Chart>**



# Series REAH
# Model Selection 3

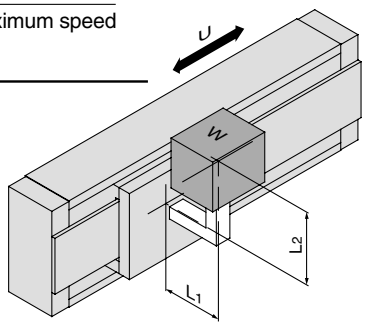
## Selection Calculation

The selection calculation finds the load factors ($\alpha n$) of the items below, where the total ($\Sigma \alpha n$) does not exceed 1.

$$\Sigma \alpha n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$$

| Item | Load factor $\alpha n$ | Note |
|---|---|---|
| **1. Max. load weight** | $\alpha_1$ = W/Wmax | Review W.<br>Wmax is the maximum load weight. |
| **2. Static moment** | $\alpha_2$ = M/Mmax | Review $M_1$, $M_2$, $M_3$.<br>Mmax is the allowable moment. |
| **3. Dynamic moment** | $\alpha_3$ = Me/Memax | Review $Me_1$, $Me_3$.<br>Memax is the allowable moment. |

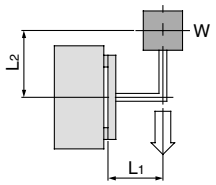
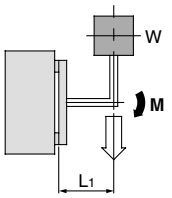
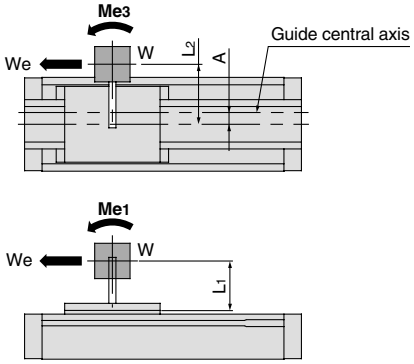
U: Maximum speed




### Calculation Example

**Operating Conditions**

Cylinder: REAH15
Mounting: Horizontal wall mounting style
Maximum speed: U = 300 [mm/s]
Load weight: W = 1 [kg] (Except weight of arm section)
L1 = 200 [mm]
L2 = 200 [mm]

| Item | Load factor $\alpha n$ | Note |
|---|---|---|
| **1. Maximum load weight**  | $\alpha_1$ = W/Wmax<br>= 1/9<br>**= 0.111** | Examine W. |
| **2. Static moment**  | $M_2 = W \cdot L_1$<br>= 10 x 0.2<br>= 2 [N·m]<br>$\alpha_2 = M_2/M_2max$<br>= 2/16<br>**= 0.125**<br>W = 1 [kg]<br>= 10 [N] | Examine $M_2$.<br>Since $M_1$ & $M_3$ are not generated, investigation is unnecessary. |
| **3. Dynamic moment**  | $We = 5 \times 10^{-3} \cdot W \cdot g \cdot U$<br>= 5 x $10^{-3}$ x 1 x 9.8 x 300<br>= 15 [N]<br>$Me_3 = 1/3 \cdot We\ (L_2 - A)$<br>= 1/3 x 15 x 0.182<br>= 0.91 [N·m]<br>$\alpha_3$ = $Me_3/Me_3max$<br>= 0.91/10<br>**= 0.091** | Examine $Me_3$. |
| | $Me_1 = 1/3 \cdot We \cdot L_1$<br>= 1/3 x 15 x 0.2<br>= 1 [N·m]<br>$\alpha_4$ = $Me_1/Me_1max$<br>= 1/10<br>**= 0.1** | Examine $Me_1$. |

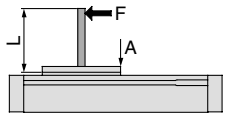
$\Sigma \alpha n = \alpha_1 + \alpha_2 + \alpha_3 + \alpha_4$
= 0.111 + 0.125 + 0.091 + 0.10
= 0.427 Can be used base on $\Sigma \alpha n = 0.427 \leq 1$

# Series REAH
# Model Selection 4

## Caution on Design 2

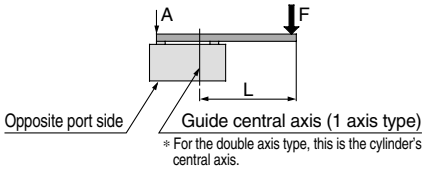
## Table Deflection Amount

**Displacement of Table due to Pitch Moment Load**



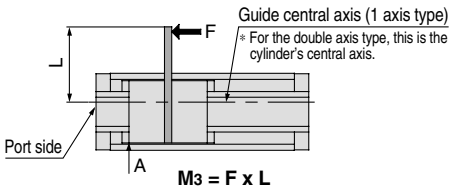

$M_1 = F \times L$

**Displacement of Table due to Roll Moment Load**




$M_2 = F \times L$

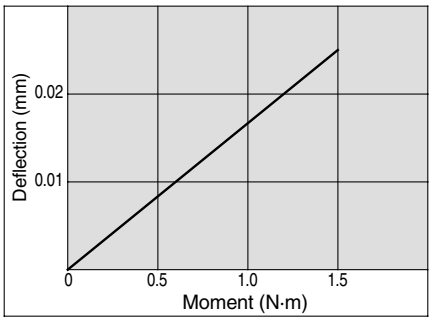
**Displacement of Table due to Yaw Moment Load**



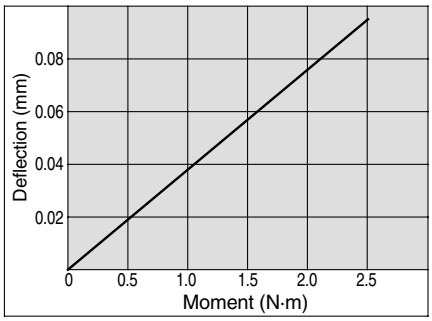

$M_3 = F \times L$

Note) Deflection: Displacement of section A when force acts on section F

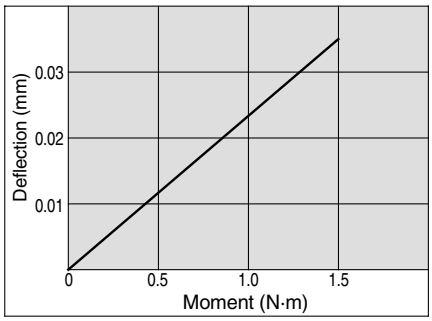
**REAH10**



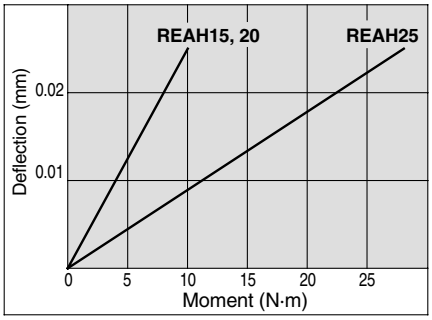

**REAH10**



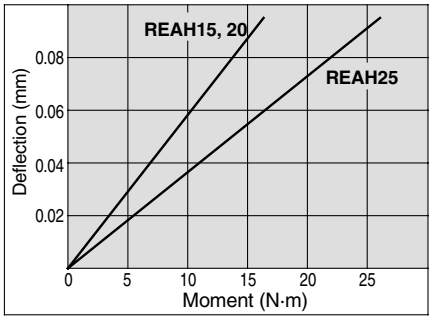

**REAH10**



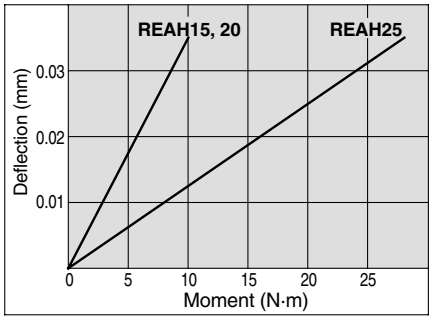

**REAH15/20/25**



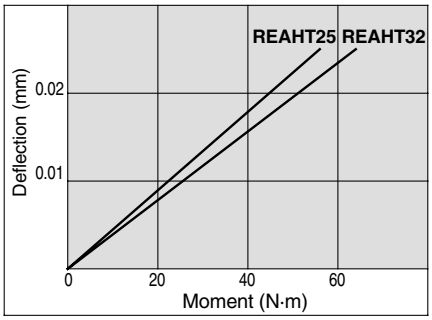

**REAH15/20/25**



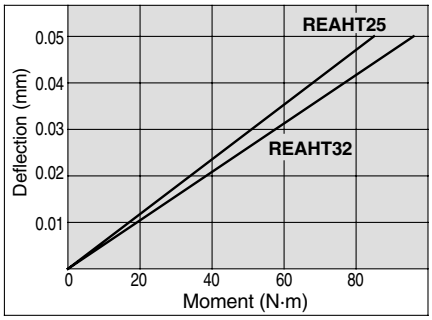

**REAH15/20/25**



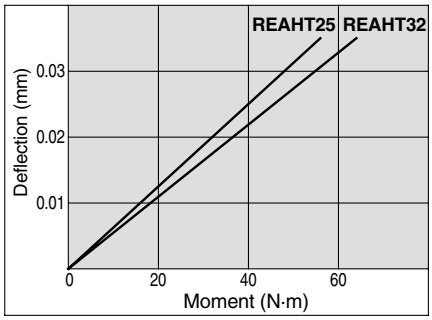

**REAHT25/32**




**REAHT25/32**




**REAHT25/32**




## Vertical Operation

When using in vertical operation, prevention of workpiece dropping due to breaking of the magnetic coupling should be considered. The allowable load weight and maximum operating pressure should be as shown in the table below.

| Model | Allowable load weight Wv (kg) | Maximum operating pressure Pv (MPa) |
|---|---|---|
| **REAH10** | 2.7 | 0.55 |
| **REAH15** | 7.0 | 0.65 |
| **REAH20** | 11.0 | 0.65 |
| **REAH25** | 18.5 | 0.65 |
| **REAHT25** | 18.5 | 0.65 |
| **REAHT32** | 30.0 | 0.65 |

## Intermediate Stop

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

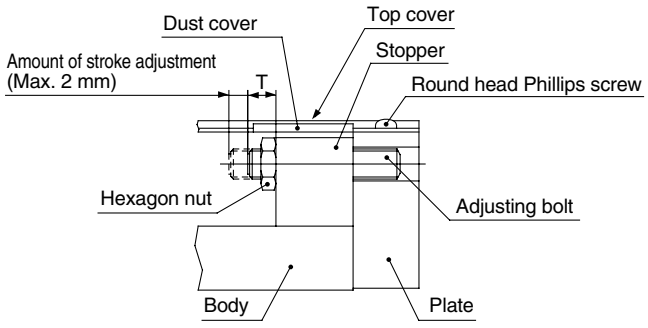
### Cushion Stroke

| Model | Stroke (mm) |
|---|---|
| **REAH10** | 20 |
| **REAH15** | 25 |
| **REAH20** | 30 |
| **REAH25** | 30 |
| **REAHT25** | 30 |
| **REAHT32** | 30 |

## Stroke Adjustment

The adjusting bolt is adjusted to the optimum position for smooth acceleration and deceleration at the time of shipment, and should be operated at the full stroke. When stroke adjustment is necessary, the maximum amount of adjustment on one side is 2 mm. (Do not adjust more than 2 mm, as it will not be possible to obtain smooth acceleration and deceleration.)
Do not adjust based on the stopper's movement, as this can cause cylinder damage.

**Stroke adjustment method**
Loosen the round head Phillips screws, and remove the top covers and dust covers (4 pcs.). Then loosen the hexagon nut, and after performing the stroke adjustment from the plate side with a hexagon wrench, retighten and secure the hexagon nut.




## Adjusting Bolt Position (at the time of shipment), Hexagon Nut Tightening Torque

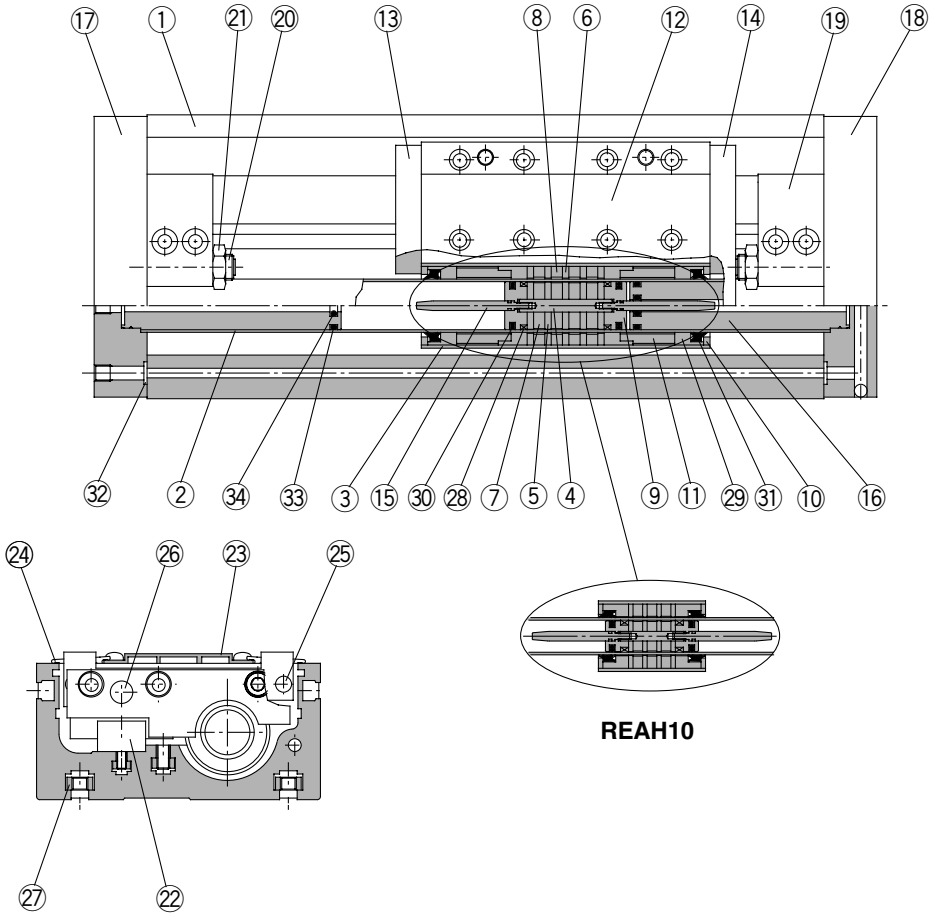
| Model | T (mm) | Tightening torque (N·m) |
|---|---|---|
| **REAH10** | 7 | 1.67 |
| **REAH15** | 7 | |
| **REAH20** | 7 | |
| **REAH25** | 9 | 3.14 |
| **REAHT25** | 9 | |
| **REAHT32** | 9 | |

After adjusting the stroke, replace the top covers and dust covers. Tighten the round head Phillips screws for securing the top covers with a torque of 0.58 N·m.

# Series REAH

## Construction: ø10, ø15

### Single axis type: REAH




REAH10

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Hard anodized |
| ② | Cylinder tube | Stainless steel | |
| ③ | External slider tube | Aluminum alloy | |
| ④ | Shaft | Stainless steel | |
| ⑤ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑦ | Magnet A | Rare earth magnet | |
| ⑧ | Magnet B | Rare earth magnet | |
| ⑨ | Piston | Brass | Electroless nickel plated |
| ⑩ | Spacer | Rolled steel plate | Nickel plated |
| ⑪ | Space ring | Aluminum alloy | Chromated (Except REAH10) |
| ⑫ | Slide table | Aluminum alloy | Hard anodized |
| ⑬ | Side plate A | Aluminum alloy | Hard anodized |
| ⑭ | Side plate B | Aluminum alloy | Hard anodized |
| ⑮ | Cushion ring | Stainless steel | |
| ⑯ | Internal stopper | Aluminum alloy | Anodized |
| ⑰ | Plate A | Aluminum alloy | Hard anodized |

| No. | Description | Material | Note |
|---|---|---|---|
| ⑱ | Plate B | Aluminum alloy | Hard anodized |
| ⑲ | Stopper | Aluminum alloy | Anodized |
| ⑳ | Adjusting bolt | Chromium molybdenum steel | Nickel plated |
| ㉑ | Hexagon nut | Carbon steel | Nickel plated |
| ㉒ | Linear guide | | |
| ㉓ | Top cover | Aluminum alloy | Hard anodized |
| ㉔ | Dust cover | Special resin | |
| ㉕ | Magnet (for auto switch) | Rare earth magnet | |
| ㉖ | Parallel pin | Carbon steel | Nickel plated |
| ㉗ | Square nut for body mounting | Carbon steel | Nickel plated (Accessory) |
| ㉘* | Wear ring A | Special resin | |
| ㉙* | Wear ring B | Special resin | |
| ㉚* | Piston seal | NBR | |
| ㉛* | Scraper | NBR | |
| ㉜* | O-ring | NBR | |
| ㉝* | O-ring | NBR | |
| ㉞* | Cushion seal | NBR | |

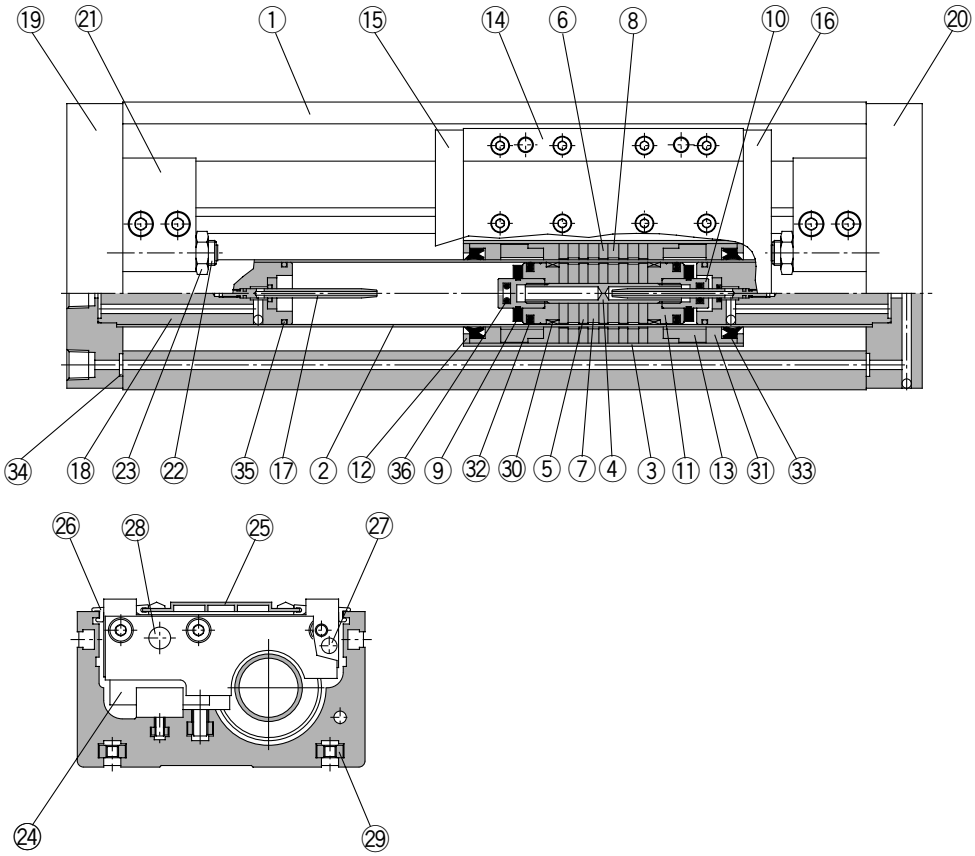
∗ Seal kit includes ㉘ to ㉞. Order the seal kit, based on each bore size.

### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 10 | REAH10-PS | Set of nos. above ㉘, ㉙, ㉚, ㉛, ㉜, ㉝, ㉞ |
| 15 | REAH15-PS | |

## Construction: ø20, ø25

### Single axis type: REAH




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Hard anodized |
| ② | Cylinder tube | Stainless steel | |
| ③ | External slider tube | Aluminum alloy | |
| ④ | Shaft | Stainless steel | |
| ⑤ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑦ | Magnet A | Rare earth magnet | |
| ⑧ | Magnet B | Rare earth magnet | |
| ⑨ | Bumper | Urethane rubber | |
| ⑩ | Cushion seal holder | Aluminum alloy | Chromated |
| ⑪ | Piston | Aluminum alloy | Chromated |
| ⑫ | Spacer | Rolled steel plate | Nickel plated |
| ⑬ | Space ring | Aluminum alloy | Chromated |
| ⑭ | Slide table | Aluminum alloy | Hard anodized |
| ⑮ | Side plate A | Aluminum alloy | Hard anodized |
| ⑯ | Side plate B | Aluminum alloy | Hard anodized |
| ⑰ | Cushion ring | Stainless steel | |
| ⑱ | Internal stopper | Aluminum alloy | Anodized |

| No. | Description | Material | Note |
|---|---|---|---|
| ⑲ | Plate A | Aluminum alloy | Hard anodized |
| ⑳ | Plate B | Aluminum alloy | Hard anodized |
| ㉑ | Stopper | Aluminum alloy | Anodized |
| ㉒ | Adjusting bolt | Chromium molybdenum steel | Nickel plated |
| ㉓ | Hexagon nut | Carbon steel | Nickel plated |
| ㉔ | Linear guide | | |
| ㉕ | Top cover | Aluminum alloy | Hard anodized |
| ㉖ | Dust cover | Special resin | |
| ㉗ | Magnet (for auto switch) | Rare earth magnet | |
| ㉘ | Parallel pin | Carbon steel | Nickel plated |
| ㉙ | Square nut for body mounting | Carbon steel | Nickel plated (Accessory) |
| ㉚* | Wear ring A | Special resin | |
| ㉛* | Wear ring B | Special resin | |
| ㉜* | Piston seal | NBR | |
| ㉝* | Scraper | NBR | |
| ㉞* | O-ring | NBR | |
| ㉟* | O-ring | NBR | |
| ㊱* | Cushion seal | NBR | |

* Seal kit includes ㉚ to ㊱. Order the seal kit, based on each bore size.

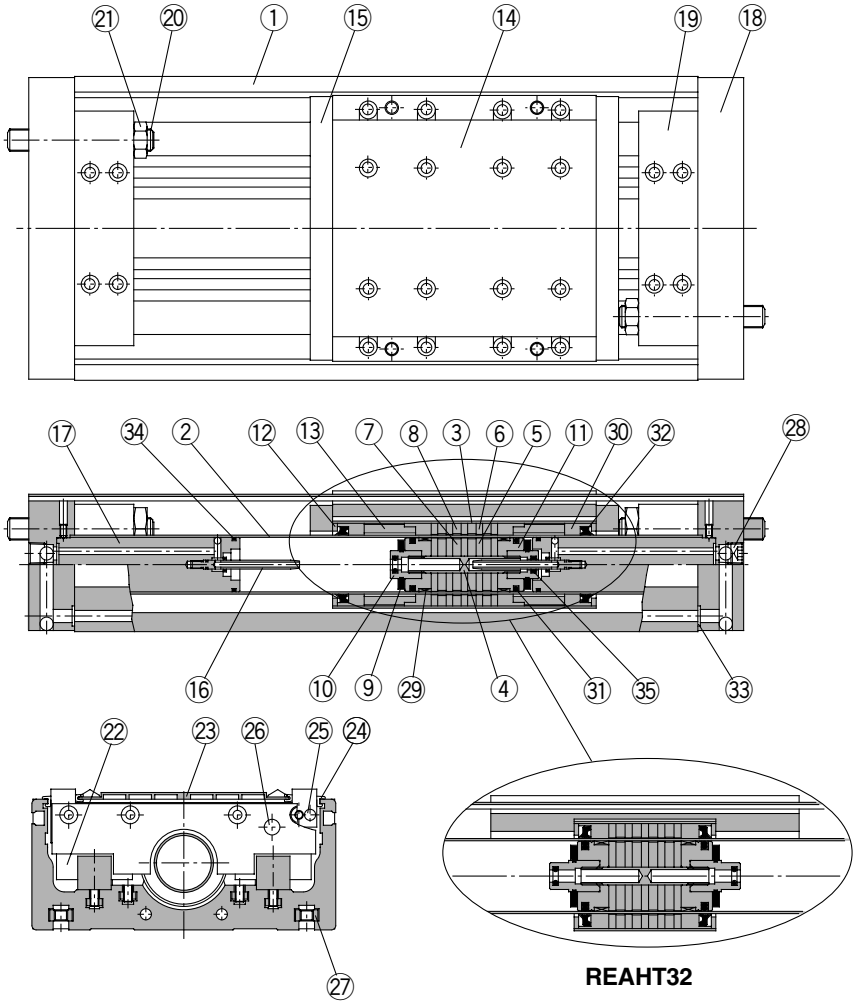
### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 20 | REAH20-PS | Set of nos. above ㉚, ㉛, ㉜, ㉝, ㉞, ㉟, ㊱ |
| 25 | REAH25-PS | |

# Series REAH

## Construction: ø25, ø32

### Double axis type: REAHT




**REAHT32**

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Hard anodized |
| ② | Cylinder tube | Stainless steel | |
| ③ | External slider tube | Aluminum alloy | |
| ④ | Shaft | Stainless steel | |
| ⑤ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑦ | Magnet A | Rare earth magnet | |
| ⑧ | Magnet B | Rare earth magnet | |
| ⑨ | Bumper | Urethane rubber | |
| ⑩ | Cushion seal holder | Aluminum alloy | Chromated |
| ⑪ | Piston | Aluminum alloy | Chromated |
| ⑫ | Spacer | Rolled steel plate | Nickel plated |
| ⑬ | Space ring | Aluminum alloy | Chromated (Except REAHT32) |
| ⑭ | Slide table | Aluminum alloy | Hard anodized |
| ⑮ | Side plate | Aluminum alloy | Hard anodized (Except REAHT32) |
| ⑯ | Cushion ring | Brass | Electroless nickel plated (REAHT32) |
| | | Stainless steel | REAHT25 |
| ⑰ | Internal stopper | Aluminum alloy | Anodized |

| No. | Description | Material | Note |
|---|---|---|---|
| ⑱ | Plate | Aluminum alloy | Hard anodized |
| ⑲ | Stopper | Aluminum alloy | Anodized |
| ⑳ | Adjusting bolt | Chromium molybdenum steel | Nickel plated |
| ㉑ | Hexagon nut | Carbon steel | Nickel plated |
| ㉒ | Linear guide | | |
| ㉓ | Top cover | Aluminum alloy | Hard anodized |
| ㉔ | Dust cover | Special resin | |
| ㉕ | Magnet (for auto switch) | Rare earth magnet | |
| ㉖ | Parallel pin | Carbon steel | Nickel plated |
| ㉗ | Square nut for body mounting | Carbon steel | Nickel plated (Accessory) |
| ㉘ | Hexagon socket head taper plug | Carbon steel | Nickel plated |
| ㉙* | Wear ring A | Special resin | |
| ㉚* | Wear ring B | Special resin | |
| ㉛* | Piston seal | NBR | |
| ㉜* | Scraper | NBR | |
| ㉝* | O-ring | NBR | |
| ㉞* | O-ring | NBR | |
| ㉟* | Cushion seal | NBR | |

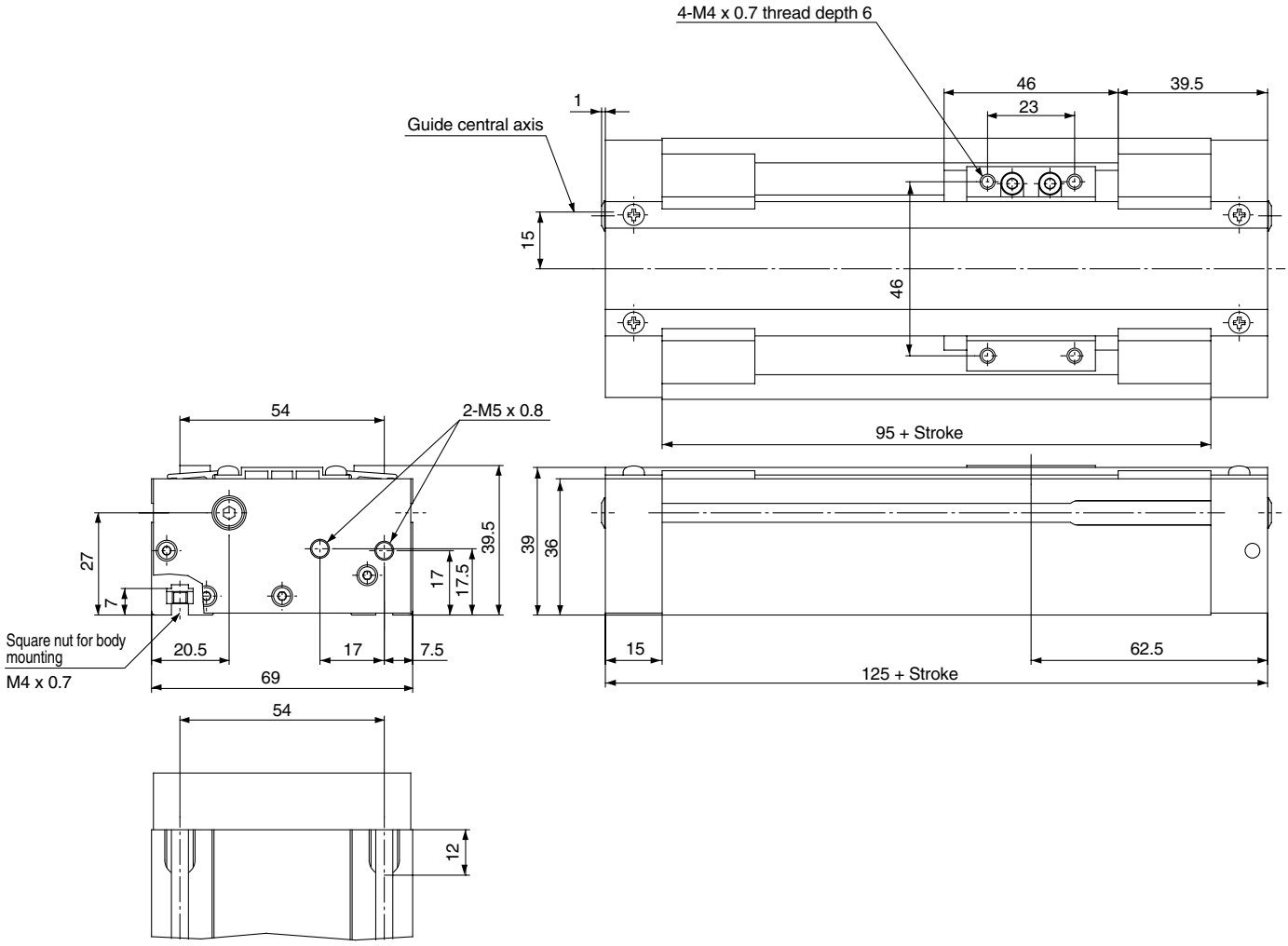
* Seal kit includes ㉙ to ㉟. Order the seal kit, based on each bore size.

### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 25 | REAHT25-PS | Set of nos. above ㉙, ㉚, ㉛, ㉜, ㉝, ㉞, ㉟ |
| 32 | REAHT32-PS | |

## Dimensions: ø10

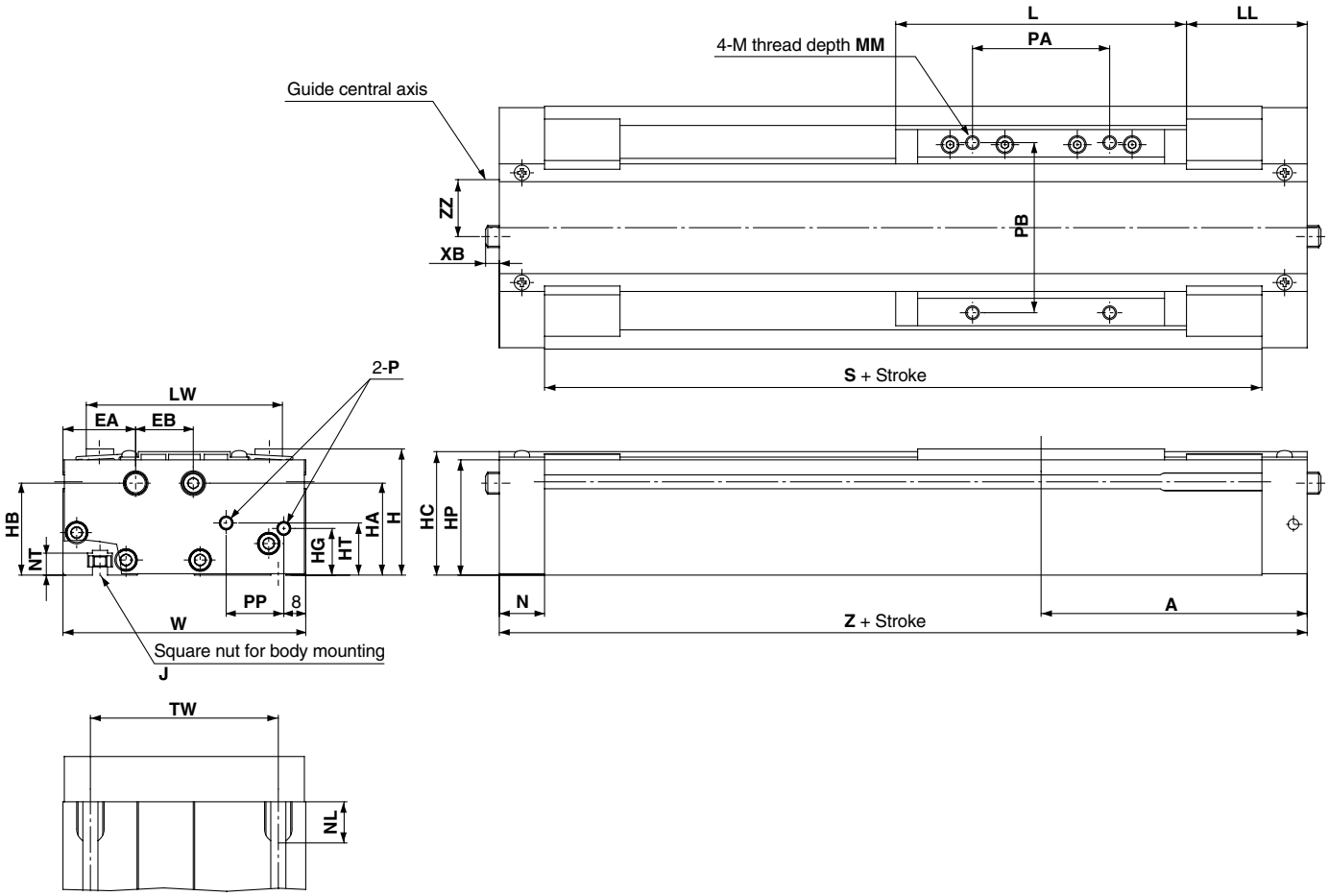
### Single axis type: REAH



# Series REAH

## Dimensions: ø15, ø20, ø25

### Single axis type: REAH



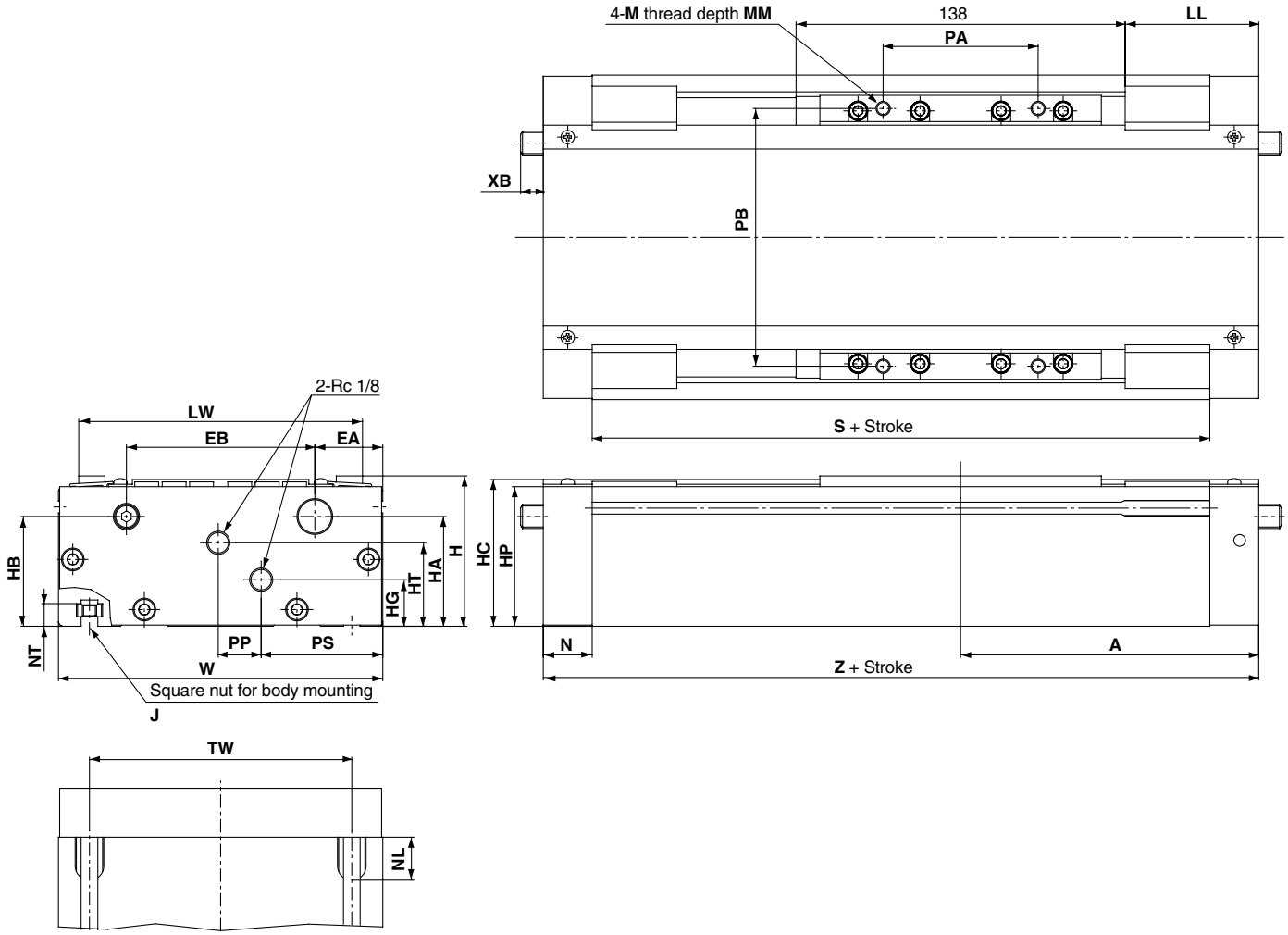

(mm)

| Model | A | EA | EB | H | HA | HB | HC | HG | HP | HT | J | L | LL | LW | M | MM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAH15** | 97 | 26.5 | 21 | 46 | 33.5 | 33.5 | 45 | 17 | 42 | 19 | M5 x 0.8 | 106 | 44 | 71.5 | M5 x 0.8 | 8 |
| **REAH20** | 102.5 | 26.5 | 22 | 54 | 42.5 | 41.5 | 53 | 16 | 50 | 23.5 | M5 x 0.8 | 108 | 48.5 | 75.5 | M5 x 0.8 | 8 |
| **REAH25** | 125 | 29 | 24 | 63 | 46 | 46 | 61.5 | 25 | 58.5 | 28 | M6 x 1.0 | 138 | 56 | 86 | M6 x 1.0 | 10 |

| Model | N | NL | NT | P | PA | PB | PP | S | TW | W | XB | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAH15** | 16.5 | 15 | 8 | M5 x 0.8 | 50 | 62 | 21 | 161 | 65 | 88.5 | — | 194 | 17.5 |
| **REAH20** | 18 | 15 | 8 | Rc 1/8 | 50 | 65 | 23 | 169 | 70 | 92.5 | — | 205 | 19.5 |
| **REAH25** | 20.5 | 18 | 9 | Rc 1/8 | 65 | 75 | 27 | 209 | 75 | 103 | 9.5 | 250 | 23.5 |

## Dimensions: ø25, ø32

### Double axis type: REAHT



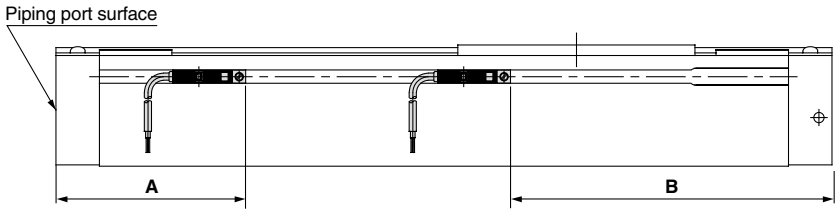

(mm)

| Model | A | EA | EB | H | HA | HB | HC | HG | HP | HT | J | LL | LW | M | MM | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAHT25** | 125 | 28.5 | 79 | 63 | 46 | 46 | 61.5 | 19.5 | 58.5 | 35 | M6 x 1.0 | 56 | 119 | M6 x 1.0 | 10 | 20.5 |
| **REAHT32** | 132.5 | 30 | 90 | 75 | 52.5 | 57.5 | 72.5 | 25 | 69.5 | 43 | M8 x 1.25 | 63.5 | 130 | M8 x 1.25 | 12 | 23 |

| Model | NL | NT | PA | PB | PP | PS | S | TW | W | XB | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REAHT25** | 18 | 9 | 65 | 108 | 18 | 51 | 209 | 110 | 136 | 9.5 | 250 |
| **REAHT32** | 22.5 | 12 | 66 | 115 | 14 | 61 | 219 | 124 | 150 | 2 | 265 |

# Series REAH

## Proper Auto Switch Mounting Position (Detection at stroke end)




### Proper Auto Switch Mounting Position

(mm)

| Auto switch model / Cylinder model | A dimension | | | B dimension | | |
|---|---|---|---|---|---|---|
| | D-Z7□ D-Z80 | D-Y7□W D-Y7□WV | D-Y5□ D-Y6□ D-Y7P D-Y7PV | D-Z7□ D-Z80 | D-Y7□W D-Y7□WV | D-Y5□ D-Y6□ D-Y7P D-Y7PV |
| **REAH10** | 65.5 | 65.5 | 65.5 | 59.5 | 59.5 | 59.5 |
| **REAH15** | 72 | 72 | 72 | 122 | 122 | 122 |
| **REAH20** | 77.5 | 77.5 | 77.5 | 127.5 | 127.5 | 127.5 |
| **REAH25** | 86 | 86 | 86 | 164 | 164 | 164 |
| **REAHT25** | 86 | 86 | 86 | 164 | 164 | 164 |
| **REAHT32** | 82 | 82 | 82 | 183 | 183 | 183 |

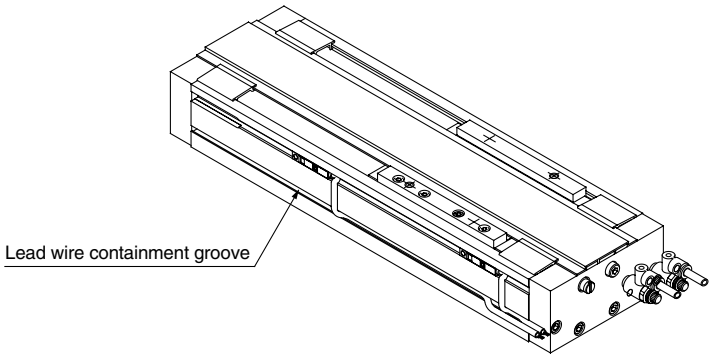
### Operating Range

| Auto switch model | Bore size (mm) | | | | | |
|---|---|---|---|---|---|---|
| | REAH | | | | REAHT | |
| | 10 | 15 | 20 | 25 | 25 | 32 |
| **D-Z7□/Z8□** | 8 | 6 | 6 | 6 | 6 | 9 |
| **D-Y5□/Y6□/Y7□** | 6 | 5 | 5 | 5 | 5 | 6 |

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

## Auto Switch Lead Wire Containment Groove

On models REAH20 and REAH25 a groove is provided on the side of the body (one side only) to contain auto switch lead wires. This should be used for placement of wiring.




Other than the models listed in “How to Order”, the following auto switches are applicable. For detailed specifications, refer to page 10-20-1.

| Type | Model | Electrical entry (Fetching direction) | Features |
|---|---|---|---|
| Reed switch | D-Z80 | Grommet (In-line) | Without indicator light |

∗ Normally closed (NC = b contact), solid state switch (D-Y7G/Y7H type) are also available.

CAD

# Sine Rodless Cylinder
## Direct Mount Type
# *Series REBR*
## ø15, ø25, ø32



## How to Order

**REB R 25 — 300 □ — Y7BW □**

**Direct mount type**

**Bore size**

| | |
|---|---|
| **15** | 15 mm |
| **25** | 25 mm |
| **32** | 32 mm |

**Standard stroke (mm)**
Refer to "Standard Stroke" on page 10-2-64.

**Switch rail**

| | |
|---|---|
| **Nil** | With switch rail |
| **N** | Without switch rail |

Note 1) When equipped with switch rails, magnets for switches are built-in.
Note 2) In the case of ø15, magnets for switches are built-in even when not equipped with switches.

**Auto switch**

| | |
|---|---|
| **Nil** | Without auto switch |

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

**Number of auto switches**

| | |
|---|---|
| **Nil** | 2 pcs. |
| **S** | 1 pc. |
| **n** | "n" pcs. |

**Applicable Auto Switch**/Refer to page 10-20-1 for further information on auto switches.

**For ø15**

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch model | Lead wire length (m)∗ 0.5 (Nil) | 3 (L) | 5 (Z) | Pre-wire connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | **A96** | ● | ● | — | — | IC circuit | — |
| | | | | 2-wire | 24 V | 12 V | 100 V | **A93** | ● | ● | — | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | **M9N** | ● | ● | ○ | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | **M9P** | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | **M9B** | ● | ● | ○ | ○ | — | |
| | Diagnostic indication (2-color indication) | | | 3-wire (NPN) | | 5 V, 12 V | | **F9NW** | ● | ● | ○ | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | **F9PW** | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | **F9BW** | ● | ● | ○ | ○ | — | |

**For ø25, ø32**

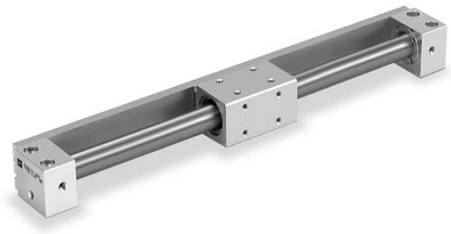
| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch model | Lead wire length (m)∗ 0.5 (Nil) | 3 (L) | 5 (Z) | Pre-wire connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | **Z76** | ● | ● | — | — | IC circuit | — |
| | | | | 2-wire | 24 V | 12 V | 100 V | **Z73** | ● | ● | ● | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | **Y59A** | ● | ● | ○ | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | **Y7P** | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | **Y59B** | ● | ● | ○ | ○ | — | |
| | Diagnostic indication (2-color indication) | | | 3-wire (NPN) | | 5 V, 12 V | | **Y7NW** | ● | ● | ○ | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | **Y7PW** | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | **Y7BW** | ● | ● | ○ | ○ | — | |

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A93
3 m ····· L (Example) Y59BL
5 m ····· Z (Example) F9NWZ

∗ Solid state switches marked with "○" are produced upon receipt of order.

• Since there are other applicable auto switches than listed, refer to page 10-2-72 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

# Series REBR



## Specifications

| | |
|---|---|
| Fluid | Air |
| Proof pressure | 1.05 MPa |
| Maximum operating pressure | 0.7 MPa |
| Minimum operating pressure | 0.18 MPa |
| Ambient and fluid temperature | –10 to 60°C |
| Piston speed | 50 to 600 mm/s |
| Lubrication | Non-lube |
| Stroke length tolerance | 0 to 250 st: $^{+1.0}_{0}$, 251 to 1000 st: $^{+1.4}_{0}$, 1001 st and up to: $^{+1.8}_{0}$ |
| Mounting | Direct mount type |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) | Maximum manufacturable stroke (mm) | Maximum stroke with switch (mm) |
|---|---|---|---|
| **15** | 150, 200, 250, 300, 350, 400 450, 500 | 1000 | 750 |
| **25** | 200, 250, 300, 350, 400, 450 500, 600, 700, 800 | 2000 | 1500 |
| **32** | | | |

Note) Intermediate stroke is available by the 1 mm interval.

## Magnetic Holding Force

(N)

| Bore size (mm) | **15** | **25** | **32** |
|---|---|---|---|
| Holding force | 137 | 363 | 588 |

## Weight

(kg)

| Item \ Bore size (mm) | | **15** | **25** | **32** |
|---|---|---|---|---|
| Basic weight (for 0 st) | **REBR□ (with switch rail)** | 0.277 | 0.660 | 1.27 |
| | **REBR□-□N (without switch rail)** | 0.230 | 0.580 | 1.15 |
| Additional weight per each 50 mm of stroke (when equipped with switch rail) | | 0.045 | 0.083 | 0.113 |
| Additional weight per each 50 mm of stroke (when not equipped with switch rail) | | 0.020 | 0.050 | 0.070 |

Calculation: (Example) REBR25-500 (with switch rail)
- Basic weight ..... 0.660 (kg)
- Additional weight ..... 0.083 (kg/50 st)
- Cylinder stroke ..... 500 (st)

0.660 + 0.083 x 500 ÷ 50 = 1.49 kg

## Made to Order Specifications (For details, refer to page 10-21-1.)

| Symbol | Specifications |
|---|---|
| **-XC57** | Rodless Cylinder with Floating Joint |

# ⚠ Precautions

**Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for safety instructions and Actuator Precautions.**

## Mounting

## ⚠ Caution

**1. Take care to avoid nicks or other damage on the outside surface of the cylinder tube.**
This can lead to a damage of the scraper and the wear ring, which in turn can cause malfunction.

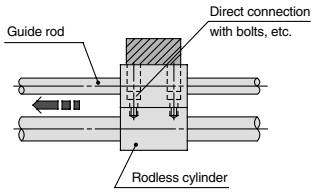
**2. Use caution to the rotation of the external slider.**
Rotation should be controlled by connecting it to another shaft (linear guide, etc.).

**3. Do not operate with the magnetic coupling out of position.**
If the magnetic coupling is out of position, push the external slider by hand (or the piston slider with air pressure) back to the proper position at the stroke end.

**4. The cylinder is mounted with bolts through the mounting holes in the end covers. Be sure they are tightened securely.**

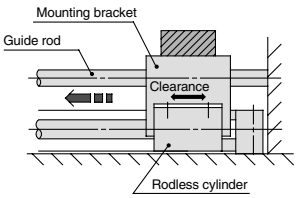
**5. Be sure that both end covers are secured to the mounting surface before operating the cylinder.**
Avoid operation with the external slider secured to the surface.

**6. Do not apply a lateral load to the external slider.**
When a load is mounted directly to the cylinder, variations in the alignment of each shaft center cannot be offset, which results in the generation of a lateral load that can cause malfunction. The cylinder should be operated using a connection method which allows for shaft alignment variations and deflection due to the cylinder's own weight. A drawing of a recommended mounting is shown in Fig. (2).




Variations in the load and cylinder shaft alignment cannot be offset and may result in a malfunction.

**Fig. (1) Incorrect mounting**




Shaft alignment variations are offset by providing clearance between the mounting bracket and cylinder. Moreover, the mounting bracket is extended above the cylinder shaft center, so that the cylinder is not subjected to moment.

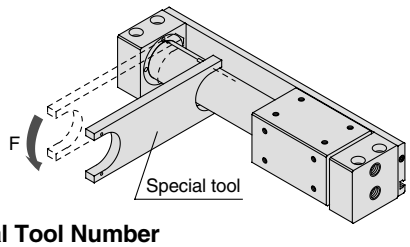
**Fig. (2) Recommended mounting**

**7. Use caution regarding the allowable load weight when operating in a vertical direction.**
The allowable load weight when operating in a vertical direction (reference values on page 10-2-68) is determined by the model selection method. However, if a load greater than the allowable value is applied, the magnetic coupling may break and there is a possibility of dropping the load. When using this type of application, please contact SMC regarding the operating conditions (pressure, load, speed, stroke, frequency, etc.).

## Disassembly and Maintenance

## ⚠ Caution

**1. Special tools are necessary for disassembly.**




**Special Tool Number**

| Part no. | Applicable bore size (mm) |
|---|---|
| **CYRZ-V** | 15 |
| **CYRZ-W** | 25, 32 |

# Series REBR
# Model Selection 1

**Fn**: Allowable driving force (N)
**MD**: Maximum allowable moment when connection fitting, etc., is directly loaded (N·m)
**Pv**: Maximum operating pressure for vertical operation (MPa)
**WBmax**: Maximum load weight when loaded directly on the body (kg)
**Wv**: Allowable load weight for vertical operation (kg)

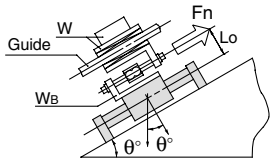
**Operating Conditions**

- **W:** Load weight (kg)
- **WB:** Connection fitting weight (kg)
- **μ:** Guide's coefficient of friction
- **Lo:** Distance from cylinder shaft center to workpiece point of application (cm)
- **L1:** Distance from the cylinder shaft center to the center of the gravity of connection fitting, etc. (mm)
- Presence of switches
- **P:** Operating pressure (MPa)
- **U:** Maximum speed (mm/s)
- Stroke (mm)
- Mode of operation (horizontal, inclined, vertical)

Mode of operation

- Horizontal operation
- Inclined operation
- Vertical operation

Review of load weight and operating pressure



Inclined operation

**Allowable Driving Force (Fn) (n = 1, 2, 3)**

| | |
|---|---|
| Horizontal | $F_1 = \mu \times (W + W_B) \times 9.8$ |
| Inclined | $F_2 = (W + W_B) \times 9.8 \times (\mu \cos\theta + \sin\theta)$ |
| Vertical | $F_3 = (W + W_B) \times 9.8 \times (\mu + 1)$ |

Refer to the allowable driving force table for (Fn) of data A.

First tentative bore size determination
$\varnothing D \geq 1.6 \times \sqrt{\frac{F_1}{P}}$

First tentative bore size determination
$\varnothing D \geq 1.6 \times \sqrt{\frac{F_2}{P}}$

First tentative bore size determination
$\varnothing D \geq 1.6 \times \sqrt{\frac{F_3}{P}}$

Determination of allowable load weight & pressure

- $W + W_B \leq W_V$, $P \leq P_V$
- $W + W_B > W_V$, $P > P_V$ → (For vertical operation, refer to page 10-2-68.)

Determination of connection fitting weight (WB)

- $W_B > W_{Bmax}$ → Review of connection fitting
- (For maximum load weight when loaded directly on the body, refer to page 10-2-68.)

$W_B \leq W_{Bmax}$

(For "Standard Stroke", refer to page 10-2-64.)

Review of switches and stroke

Presence of switch rail
- Yes → Presence of switch
- None → (Refer to data (A) on page 10-2-67.)

Presence of switch
- Yes → Determination of stroke with switch
- None

Determination of stroke with switch
- NG → Review of switches and stroke
- OK

Second tentative determination of bore size using the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)

(Refer to data (B) on page 10-2-67.)

Third tentative determination of bore size from the graph of maximum speed (U) and load weight (W).

(Bore size is the largest of 3 tentative determinations.)

Bore size determination

Note 1) Consider made-to-order products, depending on an operating condition.

(Refer to page 10-2-64.)

**Model selected**

Presence of external guide system
- Yes → Second tentative determination of bore size using the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)
- None

Note 2) $W_B \times L_1 > M_D$ → Determination of rotational moment

(For body non-rotating accuracy and maximum allowable moment, refer to page 10-2-69.)

- $W_B \times L_1 \leq M_D$
- (For body non-rotating accuracy and maximum allowable moment, refer to page 10-2-69.)

Note 2) Determination of allowable stroke
- NG → Second tentative determination of bore size using the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)
- OK

Note 1) Made-to-order products should be considered, too, depending on an operating environment, etc.
Note 2) An external guide system should be installed when it is used beyond specifications.

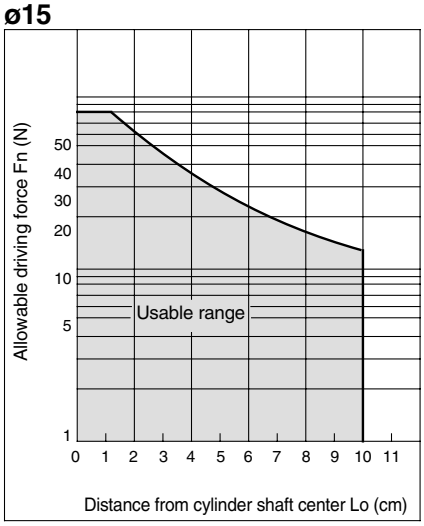
# Series REBR
# Model Selection 2

## Caution on Design 1

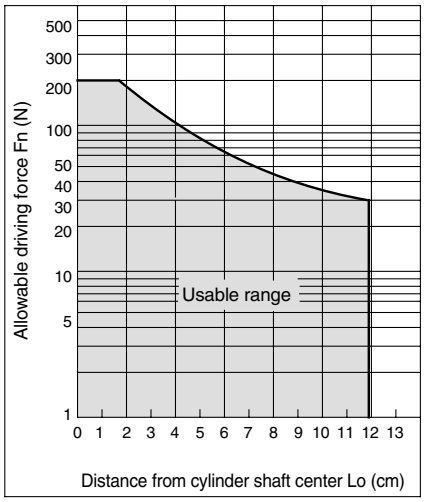
### Selection Method

**<Data A: Distance from Cylinder Shaft Center ———Allowable Driving Capacity>**

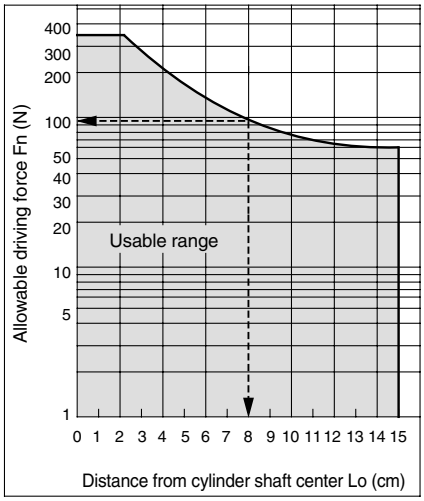
**ø15**



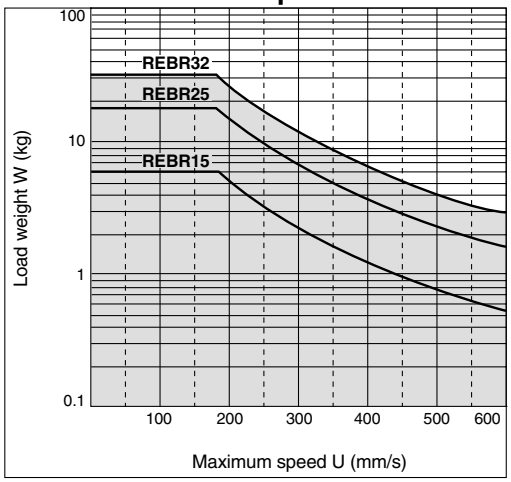

**ø25**




**ø32**




**<Data B: Maximum Speed ———Load Weight Chart>**

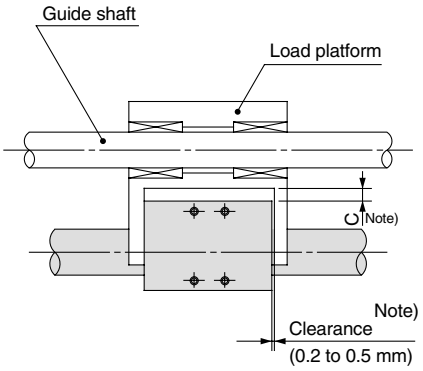


# Series REBR
# Model Selection 3

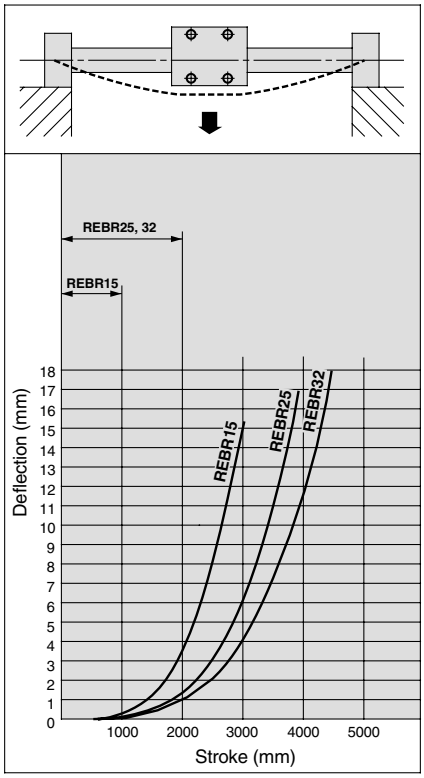
## Caution on Design 2

### Cylinder Self Weight Deflection

When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke, the greater the amount of variation in the shaft centers. Therefore, a connection method should be considered which allows for this variation as shown in the drawing.



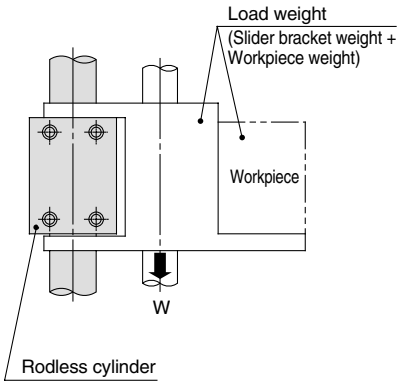

Note) Referring to the self-weight deflection in the graph below, provide clearance so that the cylinder does not touchthe mounting surface or the load section, and is able to operate smoothly within the minimum operating pressure range for a full stroke.




∗ The above deflection data indicate values when the external slider has moved to the middle of the stroke.

### Vertical Operation

The load should be guided by a ball type bearing (LM guide, etc.). If a slide bearing is used, sliding resistance will increase due to the load weight and moment, and this can cause malfunction.



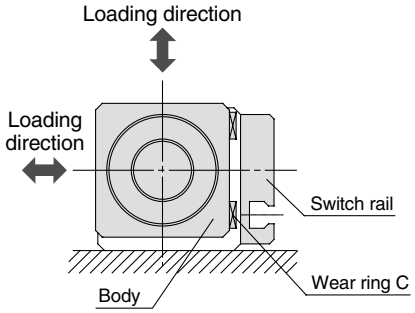

| Bore size (mm) | Model | Allowable load weight Wv (kg) | Maximum operating pressure Pv (MPa) |
|---|---|---|---|
| **15** | **REBR15** | 7.0 | 0.65 |
| **25** | **REBR25** | 18.5 | 0.65 |
| **32** | **REBR32** | 30.0 | 0.65 |

Note) Use caution, since the magnetic coupling may be dislocated if it is used over the maximum operating pressure.

### Maximum Load Weight when Loaded Directly on Body

When the load is applied directly to the body, it should be no greater than the maximum values shown in the table below.

| Model | Maximum load weight WBmax (kg) |
|---|---|
| **REBR15** | 1.0 |
| **REBR25** | 1.2 |
| **REBR32** | 1.5 |



# Series REBR
# Model Selection 4

## Caution on Design 3

### Intermediate Stop

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or return from an intermediate stop using an external stopper, etc.

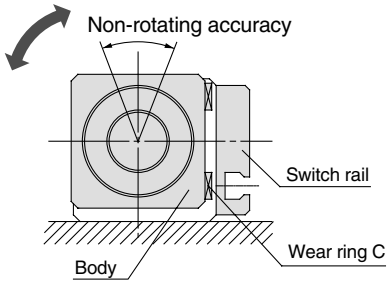
### Cushion Stroke

| Model | Stroke (mm) |
|---|---|
| **REBR15** | 25 |
| **REBR25** | 30 |
| **REBR32** | 30 |

### Body Non-rotating Accuracy and Max. Allowable Moment (With switch rail) (Reference values)

Reference values for non-rotating accuracy and maximum allowable moment at stroke end are indicated below.

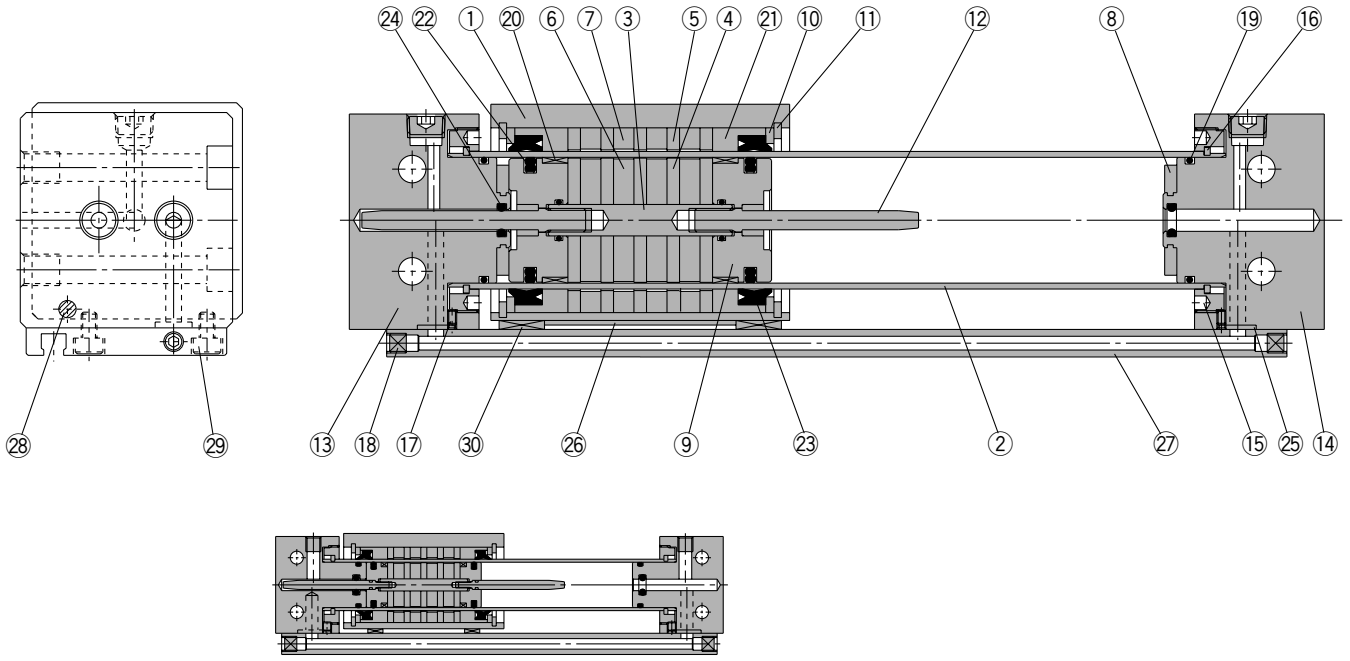
| Bore size (mm) | Non-rotating accuracy (° ) | Maximum allowable moment $M_D$ (N·m) | Allowable stroke (2) (mm) |
|---|---|---|---|
| **15** | 4.5 | 0.15 | 200 |
| **25** | 3.7 | 0.25 | 300 |
| **32** | 3.1 | 0.40 | 400 |




Note 1) Avoid operations where rotational torque (moment) is applied. In such a case, the use of an external guide is recommended.
Note 2) The above reference values will be satisfied within the allowable stroke ranges. However, caution is necessary because as the stroke becomes longer the inclination (rotation angle) within the stroke can be expected to increase.
Note 3) When a load is applied directly to the body, the loaded weight should be no greater than the allowable load weights on page 10-2-68.

# Series REBR

## Construction: ø15, ø25, ø32






**REBR15**

## Component Parts

| No. | Description | Material | Note | |
|---|---|---|---|---|
| ① | Body | Aluminum alloy | Hard anodized | |
| ② | Cylinder tube | Stainless steel | | |
| ③ | Shaft | Stainless steel | | |
| ④ | Piston side yoke | Rolled steel plate | Zinc chromated | |
| ⑤ | External slider side yoke | Rolled steel plate | Zinc chromated | |
| ⑥ | Magnet A | Rare earth magnet | | |
| ⑦ | Magnet B | Rare earth magnet | | |
| ⑧ | Bumper | Urethane rubber | Except REBR15 | |
| ⑨ | Piston | Aluminum alloy | Chromated | |
| ⑩ | Spacer | Rolled steel plate | Nickel plated | |
| ⑪ | Snap ring | Carbon tool steel | Nickel plated | |
| ⑫ | Cushion ring | Stainless steel | REBR15, 25 | Compound electroless nickel plated |
| | | Brass | REBR32 | |
| ⑬ | End cover A | Aluminum alloy | Hard anodized | |
| ⑭ | End cover B | Aluminum alloy | Hard anodized | |
| ⑮ | Attachment ring | Aluminum alloy | Hard anodized | |
| ⑯ | Type C snap ring for axis | Hard steel wire material | Nickel plated (REBR15) | |
| | | Stainless steel | REBR25, 32 | |
| ⑰ | Hexagon socket head set screw | Chromium steel | Nickel plated | |
| ⑱ | Hexagon socket head plug | Chromium steel | Nickel plated | |
| ⑲ | Cylinder tube gasket | NBR | | |

| No. | Description | Material | Note |
|---|---|---|---|
| ⑳ | Wear ring A | Special resin | |
| ㉑ | Wear ring B | Special resin | |
| ㉒ | Piston seal | NBR | |
| ㉓ | Scraper | NBR | |
| ㉔ | Cushion seal | NBR | |
| ㉕ | Switch rail gasket | NBR | |
| ㉖ | Magnetic shielding plate | Rolled steel plate/Chromated | |
| ㉗ | Switch rail | Aluminum alloy/Clear anodized | |
| ㉘ | Magnet | Rare earth magnet | |
| ㉙ | Hexagon socket head cap screw | Chromium steel/Nickel plated | |
| ㉚ | Wear ring C | Special resin | |

## Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 15 | REBR15-PS | Above nos. ⑲, ⑳, ㉑, ㉒, ㉓, ㉔, ㉕, ㉚ |
| 25 | REBR25-PS | |
| 32 | REBR32-PS | |

## Switch Rail Accessory Kit

**CYR 25 E —** □

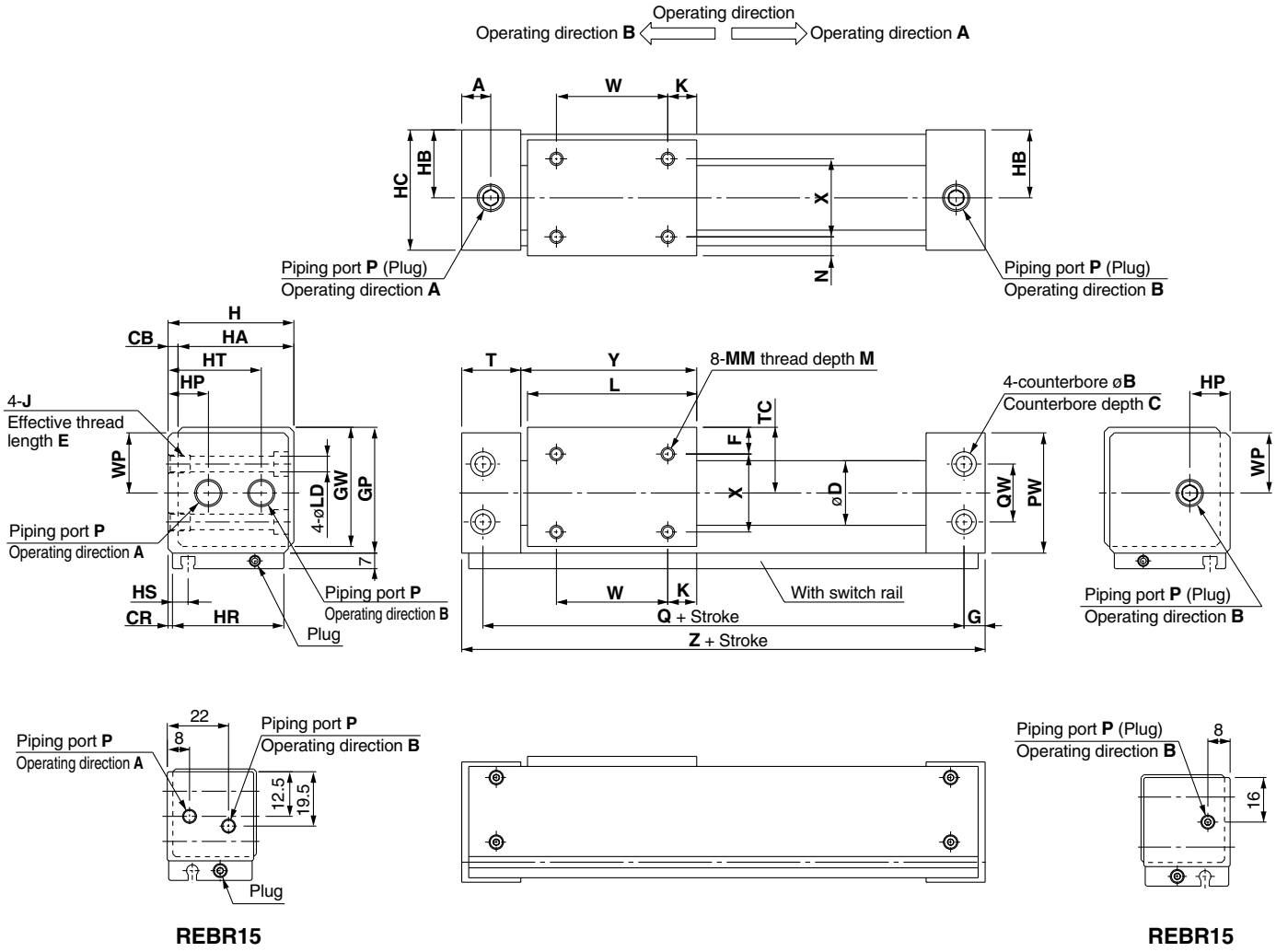
**Bore size** ● **Stroke** ●

### Switch Rail Accessory Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 15 | CYR15E-□ | Above nos. ㉖, ㉗, ㉘, ㉙, ㉚ |
| 25 | CYR25E-□ | |
| 32 | CYR32E-□ | |

Note 1) □ indicates the stroke.
Note 2) ø15 has internal magnets in the body.

## Dimensions: ø15, ø25, ø32




**REBR15** **REBR15**

(mm)

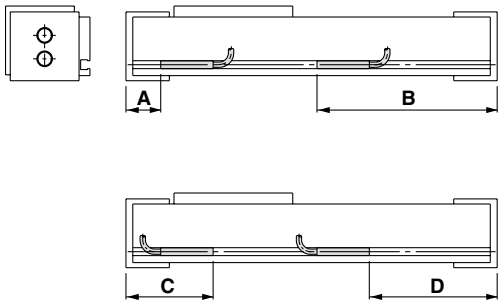
| Model | A | B | C | CB | CR | D | F | G | GP | GW | H | HA | HB | HC | HP | HR | HS | HT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REBR15** | 12 | 8 | 4.2 | 2 | 0.5 | 17 | 8 | 5 | 33 | 31.5 | 32 | 30 | 17 | 31 | — | 30 | 8.5 | — |
| **REBR25** | 12.5 | 9.5 | 5.2 | 3 | 1 | 27.8 | 8.5 | 10 | 44 | 42.5 | 44 | 41 | 23.5 | 43 | 14.5 | 41 | 6.5 | 33.5 |
| **REBR32** | 19.5 | 11 | 6.5 | 3 | 1.5 | 35 | 10.5 | 16 | 55 | 53.5 | 55 | 52 | 29 | 54 | 20 | 51 | 7 | 39 |

| Model | J x E | K | L | LD | M | MM | N | P | PW | Q | QW | T | TC | W | WP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REBR15** | M5 x 0.8 x 7 | 14 | 53 | 4.3 | 5 | M4 x 0.7 | 6 | M5 x 0.8 | 32 | 84 | 18 | 21 | 17 | 25 | — |
| **REBR25** | M6 x 1 x 8 | 15 | 70 | 5.6 | 6 | M5 x 0.8 | 6.5 | Rc 1/8 | 43 | 105 | 20 | 25.5 | 22.5 | 40 | 21.5 |
| **REBR32** | M8 x 1.25 x 10 | 13 | 76 | 7 | 7 | M6 x 1 | 8.5 | Rc 1/8 | 54 | 116 | 26 | 33 | 28 | 50 | 27 |

| Model | X | Y | Z |
|---|---|---|---|
| **REBR15** | 18 | 54.5 | 98 |
| **REBR25** | 28 | 72 | 125 |
| **REBR32** | 35 | 79 | 148 |

# Series REBR

## Proper Auto Switch Mounting Position (Detection at Stroke End)




### ø15

| Bore size (mm) \ Auto switch model | A dimension | | B dimension | | C dimension | | D dimension | |
|---|---|---|---|---|---|---|---|---|
| | D-A9□ | D-M9□ | D-A9□ | D-M9□ | D-A9□ | D-M9□ | D-A9□ | D-M9□ |
| 15 | 17.5 | 21.5 | 76.5 | 72.5 | — | — | 56.5 | 60.5 |

Note) Auto switches cannot be installed in Area C in the case of ø15.

### ø25, ø32

| Bore size (mm) \ Auto switch model | A dimension | | B dimension | | C dimension | | D dimension | |
|---|---|---|---|---|---|---|---|---|
| | D-Z7□ D-Z8□ | D-Y5□ D-Y6□ D-Y7□ | D-Z7□ D-Z8□ | D-Y5□ D-Y6□ D-Y7□ | D-Z7□ D-Z8□ | D-Y5□ D-Y6□ D-Y7□ | D-Z7□ D-Z8□ | D-Y5□ D-Y6□ D-Y7□ |
| 25 | 22 | 22 | 103 | 103 | 47 | 47 | 78 | 78 |
| 32 | 30.5 | 30.5 | 117.5 | 117.5 | 55.5 | 55.5 | 92.5 | 92.5 |

### Operating Range

| Auto switch model | Bore size (mm) | | |
|---|---|---|---|
| | 15 | 25 | 32 |
| D-A9□ | 8 | — | — |
| D-M9□ | 3 | — | — |
| D-Z7□/Z8□ | — | 9 | 9 |
| D-Y5□/Y6□/Y7□ | — | 7 | 6 |

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

## Auto Switch Specifications

1. Switches (switch rail) can be added to the standard type (without switch rail). Switch rail accessory kits are mentioned on page 10-2-70 and can be ordered together with auto switches.
2. For switch magnet installation procedures, refer to the separate disassembly steps.

Other than the models listed in “How to Order”, the following auto switches are applicable. For detailed specifications, refer to page 10-20-1.

| Type | Model | Electrical entry (Fetching direction) | Features |
|---|---|---|---|
| Reed switch | D-A90 | Grommet (In-line) | Without indicator light |
| | D-Z80 | | |
| Solid state switch | D-Y69A | Grommet (Perpendicular) | 3-wire (NPN) |
| | D-Y69B | | 2-wire |
| | D-Y7PV | | 3-wire (PNP) |
| | D-Y7NWV | | Diagnostic indication (2-color indication) |
| | D-Y7PWV | | |
| | D-Y7BWV | | |

∗ Normally closed (NC = b contact), solid state switch (D-F9G/F9H/Y7G/Y7H type) are also available.

# Sine Rodless Cylinder
# High Precision Guide Type
# *Series REBH*
## ø15, ø25, ø32

## How to Order

**REB H** [ ] **25** — **300** — **Y7BW** [ ]

**High precision guide type**

**Guide**

| Symbol \ Bore size (mm) | | 15 | 25 | 32 |
|---|---|---|---|---|
| Nil | 1 axis | ● | ● | — |
| T | 2 axes | — | ● | ● |

**Bore size**

| | |
|---|---|
| 15 | 15 mm |
| 25 | 25 mm |
| 32 | 32 mm |

**Standard stroke (mm)**

Refer to "Standard Stroke" on page 10-2-74.

**Auto switch**

| | |
|---|---|
| Nil | Without auto switch |

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

**Number of auto switches**

| | |
|---|---|
| Nil | 2 pcs. |
| S | 1 pc. |
| n | "n" pcs. |

**Applicable Auto Switch**/Refer to page 10-20-1 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch model: Perpendicular | Auto switch model: In-line | Lead wire length (m)∗ 0.5 (Nil) | 3 (L) | 5 (Z) | Pre-wire connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | — | Z76 | ● | ● | — | — | IC circuit | — |
| | | | | 2-wire | 24 V | 12 V | 100 V | — | Z73 | ● | ● | ● | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | Y69A | Y59A | ● | ● | ○ | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | Y7PV | Y7P | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | Y69B | Y59B | ● | ● | ○ | ○ | — | |
| | Diagnostic indication (2-color indication) | | | 3-wire (NPN) | | 5 V, 12 V | | Y7NWV | Y7NW | ● | ● | ○ | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | Y7PWV | Y7PW | ● | ● | ○ | ○ | | |
| | | | | 2-wire | | 12 V | | Y7BWV | Y7BW | ● | ● | ○ | ○ | — | |

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) Y59A
3 m ····· L (Example) Y59AL
5 m ····· Z (Example) Y59AZ

∗ Solid state switches marked with "○" are produced upon receipt of order.

• Since there are other applicable auto switches than listed, refer to page 10-2-86 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

# Series REBH

## Specifications

| Bore size (mm) | 15 | 25 | 32 |
|---|---|---|---|
| Fluid | Air | | |
| Action | Double acting | | |
| Maximum operating pressure | 0.7 MPa | | |
| Minimum operating pressure | 0.2 MPa | | |
| Proof pressure | 1.05 MPa | | |
| Ambient and fluid temperature | –10 to 60°C | | |
| Piston speed | 70 to 600 mm/s | | |
| Lubrication | Non-lube | | |
| Stroke length tolerance | 0 to 1.8 mm | | |
| Piping | Centralized piping type | | |
| Piping port size | M5 x 0.8 | Rc 1/8 | |

## Standard Stroke

| Bore size (mm) | Number of axes | Standard stroke (mm) | Maximum manufacturable stroke (mm) |
|---|---|---|---|
| **15** | 1 axis | 150, 200, 300, 400, 500 | 750 |
| **25** | | 200, 300, 400, 500, 600, 800 | 1200 |
| **25** | 2 axes | 200, 300, 400, 500, 600, 800, 1000 | |
| **32** | | | 1500 |

Note 1) Stroke exceeding the standard stroke will be available upon request for special.
Note 2) Intermediate strokes other than made-to-order (refer to -XB10) are available as special.

## Made to Order Specifications (For details, refer to page 10-21-1.)

| Symbol | Specifications |
|---|---|
| **-XB10** | Intermediate stroke (Using exclusive body) |
| **-X168** | Helical insert thread specifications |

## Weight

(kg)

| Model | Standard stroke (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 150 | 200 | 300 | 400 | 500 | 600 | 800 | 1000 |
| **REBH15** | 2.5 | 2.7 | 3.2 | 3.6 | 4.1 | — | — | — |
| **REBH25** | — | 5.3 | 6.0 | 6.6 | 7.3 | 8.0 | 9.4 | — |
| **REBHT25** | — | 6.2 | 7.3 | 8.3 | 9.4 | 10.4 | 12.5 | 14.6 |
| **REBHT32** | — | 9.6 | 10.7 | 11.9 | 13.0 | 14.2 | 16.5 | 18.8 |

## Magnetic Holding Force

| Bore size (mm) | 15 | 25 | 32 |
|---|---|---|---|
| Holding force (N) | 137 | 363 | 588 |

## Theoretical Output

(N)

| Bore size (mm) | Piston area ($mm^2$) | Operating pressure (MPa) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| **15** | 176 | 35 | 52 | 70 | 88 | 105 | 123 |
| **25** | 490 | 98 | 147 | 196 | 245 | 294 | 343 |
| **32** | 804 | 161 | 241 | 322 | 402 | 483 | 563 |

Note) Theoretical output (N) = Pressure (MPa) x Piston area ($mm^2$)

# ⚠ Precautions

**Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for safety instructions and Actuator Precautions.**

## Mounting

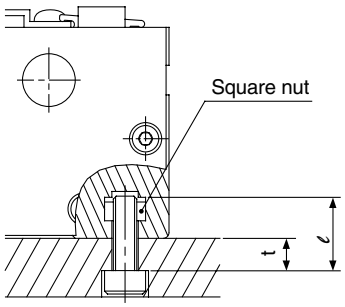
### ⚠ Warning

**1. The interior is protected to a certain extent by the top cover, however, when performing maintenance, etc., take care not to cause scratches or other damage to the cylinder tube, slide table or linear guide by striking them or placing objects on them.**
Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation.

**2. Because the slider is supported by precision bearings, take care not to apply strong impacts or excessive moments to the table when loading a workpiece.**

**3. Mounting of the cylinder body.**
The body is mounted using the square nuts, which are included, in the two T-slots on the bottom of the body. Refer to the table below for mounting bolt dimensions and tightening torque.

| Model | | REBH15 | REBH25 | REBHT25 | REBHT32 |
|---|---|---|---|---|---|
| Bolt dimensions | Thread size | M5 x 0.8 | M6 x 1.0 | | M8 x 1.25 |
| | Dimension t | ℓ-8 | ℓ-9 | | ℓ-12 |
| Tightening torque | N·m | 2.65 | 4.4 | | 13.2 |




## Operation

### ⚠ Warning

**1. The unit can be used with a direct load within the allowable range, but when connecting to a load which has an external guide mechanism, careful alignment is necessary.**
Since variation of the shaft center increases as the stroke becomes longer, a connection method should be devised which allows for this displacement.

**2. Since the guide is adjusted at the time of shipment, unintentional movement of the adjustment setting should be avoided**.

**3. Please contact SMC before operating in an environment where there will be contact with cutting chips, dust (paper debris, lint, etc.) or cutting oil (gas oil, water, warm water, etc.).**

**4. Do not operate with the magnetic coupling out of position.**
In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).

## Series REBH

# Model Selection 1

**Pv**: Maximum operating pressure for vertical operation (MPa)
**Wv**: Allowable load weight for vertical operation (kg)
$\alpha$: Load factor

$$\Sigma\alpha = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}}$$

**Operating Conditions**

- W: Load weight (kg)
- U: Maximum speed (mm/s)
- P: Operating pressure (MPa)
- Stroke (mm)
- Position of workpiece center of gravity (m)
- Mode of operation (horizontal, inclined, vertical)

**Mode of operation**

**Horizontal operation**

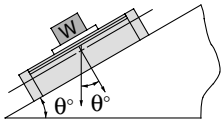
**First tentative bore size determination**

$$\varnothing D \geq 1.6 \times \sqrt{\frac{W}{P}}$$

**Inclined operation**

**First tentative bore size determination**

$$\varnothing D \geq 5.0 \times \sqrt{\frac{0.1 \times W\cos\theta + W\sin\theta}{P}}$$



Inclined operation

**Vertical operation**

**First tentative bore size determination**

$$\varnothing D \geq 5.0 \times \sqrt{\frac{0.1 \times W + W}{P}}$$

**Determination of allowable load weight & pressure**

**W > Wv**
**P > Pv**

Review of load weight and operating pressure

**W ≤ Wv**
**P ≤ Pv**

(For vertical operation, refer to page 10-2-79.)

**Determination of load factor ($\Sigma\alpha$)**

(Refer to page 10-2-77.)

**$\Sigma\alpha > 1$**

**Review of operating conditions**

$$\Sigma\alpha = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}}$$

**$\Sigma\alpha \leq 1$**

(Refer to data (B) on page 10-2-78.)

**Second tentative determination of bore size from the graph of maximum speed (U) and load weight (W)**

**Bore size determination** (The larger bore size is selected from two tentative determinations.)

Note)

**Consider made-to-order products, depending on an operating condition.**

Note) Made-to-order products should be considered, too, depending on an operating environment, etc.

(Refer to page 10-2-74.)

**Model selected**

# *Series REBH*
# Model Selection 2

## Caution on Design 1

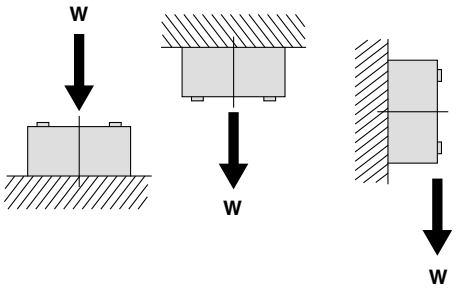
The load mass allowable moment differs depending on the workpiece mounting method, cylinder mounting orientation and piston speed. In making a determination of usability, do not allow the sum ($\Sigma\alpha n$) of the load factors ($\alpha n$) for each mass and moment to exceed "1".

$$\Sigma\alpha n = \frac{\text{Load weight (W)}}{\text{Maximum load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}} \leq 1$$

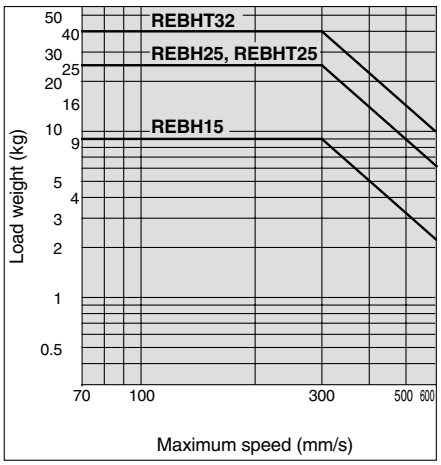
## Load Weight

**Maximum Load Weight** (kg)

| Model | $W_{max}$ |
|---|---|
| **REBH15** | 9 |
| **REBH25** | 25 |
| **REBHT25** | |
| **REBHT32** | 40 |




**W**



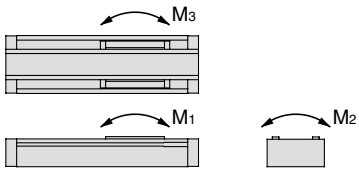

**<Graph (1)>**

## Moment

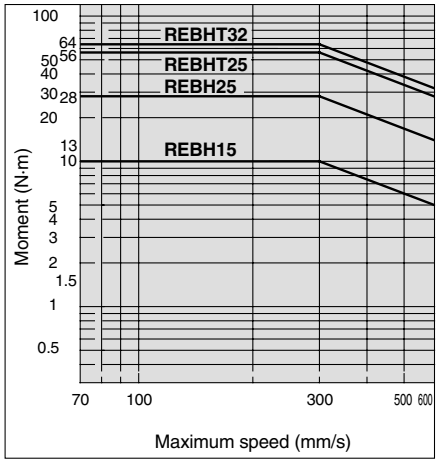
**Allowable Moment (Static moment/Dynamic moment)**

(N·m)

| Model | $M_1$ | $M_2$ | $M_3$ |
|---|---|---|---|
| **REBH15** | 10 | 16 | 10 |
| **REBH25** | 28 | 26 | 28 |
| **REBHT25** | 56 | 85 | 56 |
| **REBHT32** | 64 | 96 | 64 |

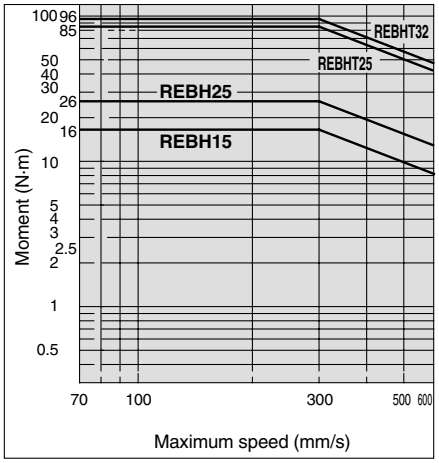



**M1, M3**




**<Graph (2)>**

**M2**



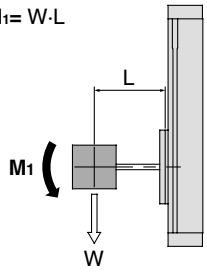

**<Graph (3)>**

# Series REBH

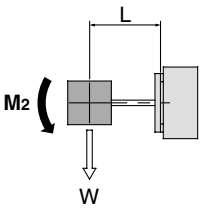
## Static Moment

Moment generated by the workpiece weight even when the cylinder is stopped

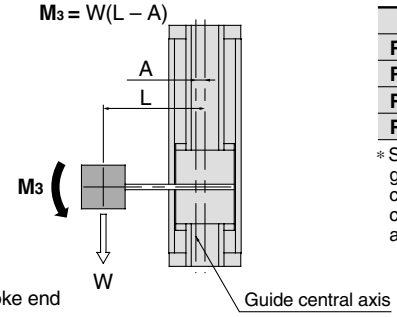
■ **Pitch moment**
**$M_1$** = W·L




■ **Roll moment**
**$M_2$** = W·L




■ **Yaw moment**
**$M_3$** = W(L – A)




(mm)

| Model | **A** |
|---|---|
| **REBH15** | 17.5 |
| **REBH25** | 23.5 |
| **REBHT25** | 0* |
| **REBHT32** | 0* |

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

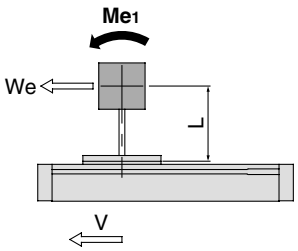
## Dynamic Moment

Moment generated by the load equivalent to impact at the stroke end

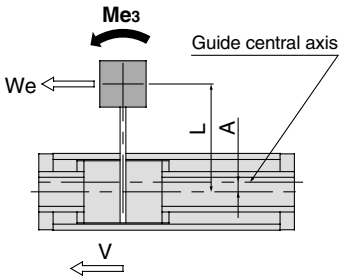
$We = 5 \times 10^{-3} \cdot W \cdot g \cdot U$

We: Load equivalent to impact [N]
W: Load weight [kg]
U: Maximum speed [mm/s]
g: Gravitational acceleration (9.8 m/s²)

■ **Pitch moment**
**$Me_1$** = 1/3·We·L




■ **Yaw moment**
**$Me_3$** = 1/3·We (L – A)

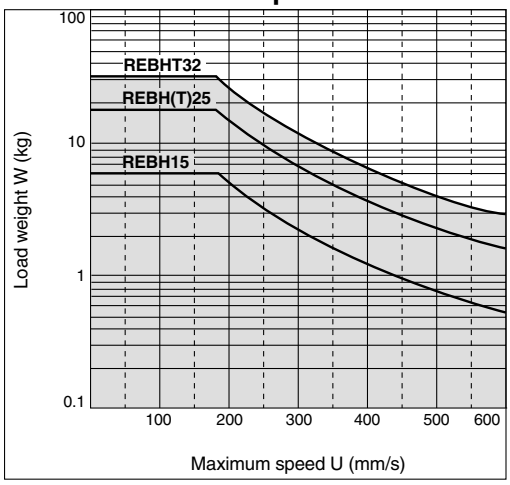



(mm)

| Model | **A** |
|---|---|
| **REBH15** | 17.5 |
| **REBH25** | 23.5 |
| **REBHT25** | 0* |
| **REBHT32** | 0* |

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

### <Data B: Maximum speed——Load Weight Chart>



# Series REBH
# Model Selection 3

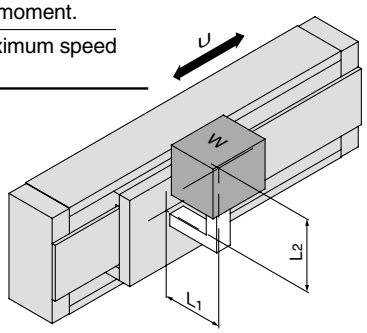
## Selection Calculation

The selection calculation finds the load factors ($\alpha n$) of the items below, where the total ($\Sigma\alpha n$) does not exceed 1.

$$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$$

| Item | Load factor $\alpha n$ | Note |
|---|---|---|
| **1. Max. load weight** | $\alpha_1$ = W/Wmax | Review W.<br>Wmax is the maximum load weight. |
| **2. Static moment** | $\alpha_2$ = M/Mmax | Review $M_1$, $M_2$, $M_3$.<br>Mmax is the allowable moment. |
| **3. Dynamic moment** | $\alpha_3$ = Me/Memax | Review $Me_1$, $Me_3$.<br>Memax is the allowable moment. |

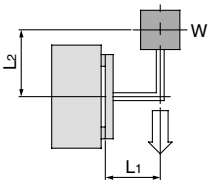
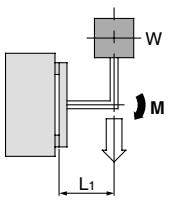
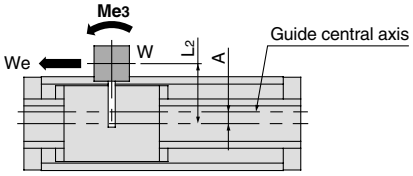
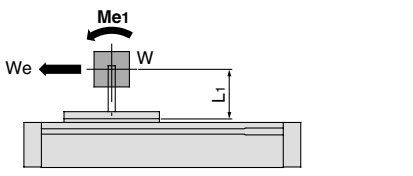
U: Maximum speed




### Calculation Example

**Operating Conditions**

Cylinder: REBH15
Mounting: Horizontal wall mounting style
Maximum speed: U = 500 [mm/s ]
Load weight: W = 1 [kg] (excluding weight of arm section)
$L_1$ = 200 [mm]
$L_2$ = 200 [mm]

| Item | Load factor $\alpha n$ | Note |
|---|---|---|
| **1. Maximum load weight**   | $\alpha_1$ = W/Wmax<br>= 1/3<br>**= 0.111**<br>**= 0.333** | Examine W.<br>(For Wmax, find the value in <Graph (1)> when U = 500 mm/s.) |
| **2. Static moment**   | $M_2$ = W·$L_1$<br>= 10 x 0.2<br>= 2 [N·m]<br>$\alpha_2$ = $M_2$/$M_2$max<br>= 2/16<br>**= 0.125**<br>W = 1 [kg]<br>= 10 [N] | Examine $M_2$.<br>Since $M_1$ & $M_3$ are not generated, investigation is unnecessary. |
| **3. Dynamic moment**   | We = 5 x $10^{-3}$·W·g·U<br>= 5 x $10^{-3}$ x 1 x 9.8 x 500<br>= 25 [N]<br>$Me_3$ = 1/3·We($L_2$ – A)<br>= 1/3 x 25 x 0.182<br>= 1.52 [N·m]<br>$\alpha_3$ = $Me_3$/$Me_3$max<br>= 1.52/6<br>**= 0.25** | Examine $Me_3$.<br>(For Memax, find the value in <Graph (2)> when U = 500 mm/s.) |
|   | $Me_1$ = 1/3·We·$L_1$<br>= 1/3 x 25 x 0.2<br>= 1.6 [N·m]<br>$\alpha_4$ = $Me_1$ /$Me_1$max<br>= 1.6/6<br>**= 0.27** | Examine $Me_1$.<br>(For Memax, find the value in <Graph (2)> when U = 500 mm/s.) |

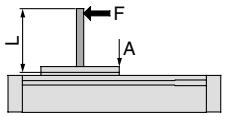
$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha_3 + \alpha_4$
= 0.333 + 0.125 + 0.25 + 0.27
= 0.978 ≤ 1
And it is possible to use.

# Series REBH
# Model Selection 4

## Caution on Design 2

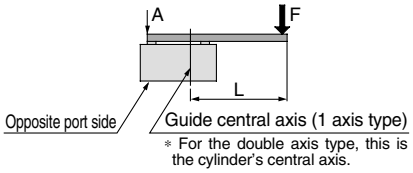
### Table Deflection Amount

**Displacement of Table due to Pitch Moment Load**



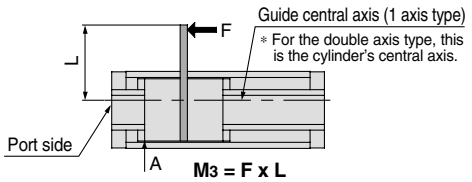

$M_1 = F \times L$

**Displacement of Table due to Roll Moment Load**




$M_2 = F \times L$

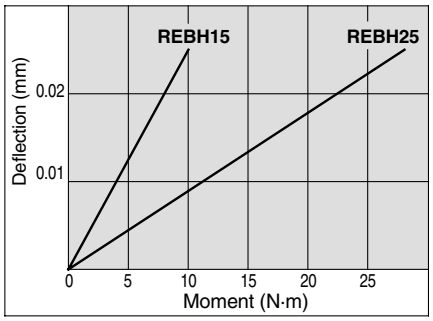
**Displacement of Table due to Yaw Moment Load**



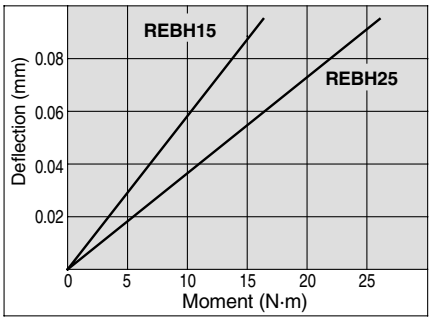

$M_3 = F \times L$

Note) Deflection: Displacement of section A when force acts on section F

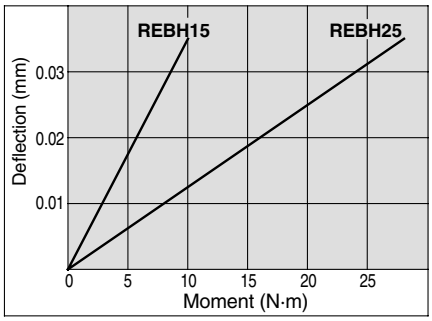
**REBH15/25**



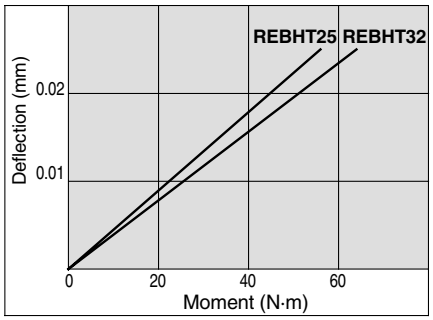

**REBH15/25**



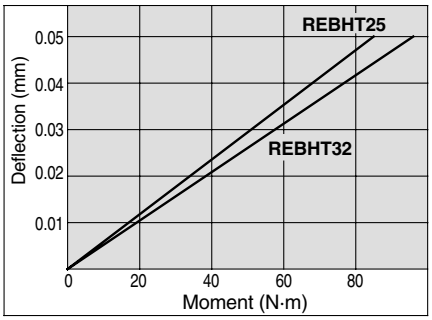

**REBH15/25**



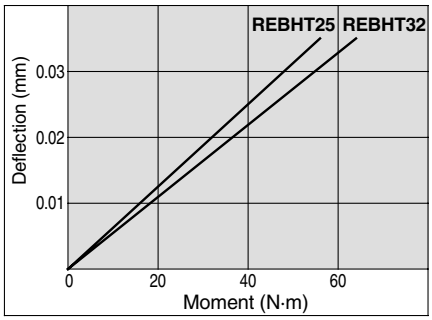

**REBHT25/32**




**REBHT25/32**




**REBHT25/32**




### Vertical Operation

When using in vertical operation, prevention of workpiece dropping due to breaking of the magnetic coupling should be considered. The allowable load weight and maximum operating pressure should be as shown in the table below.

| Model | Allowable load weight Wv (kg) | Maximum operating pressure Pv (MPa) |
|---|---|---|
| **REBH15** | 7.0 | 0.65 |
| **REBH25** | 18.5 | 0.65 |
| **REBHT25** | 18.5 | 0.65 |
| **REBHT32** | 30.0 | 0.65 |

### Intermediate Stop

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

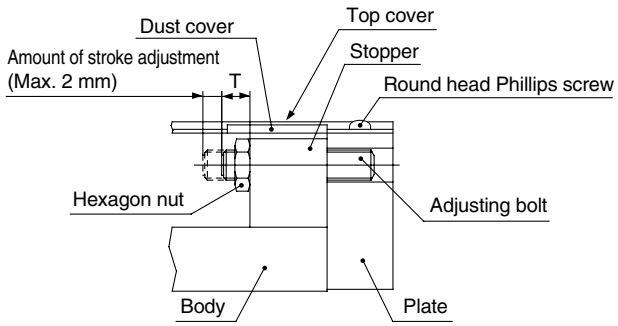
#### Cushion Stroke

| Model | Stroke (mm) |
|---|---|
| **REBH15** | 25 |
| **REBH25** | 30 |
| **REBHT25** | 30 |
| **REBHT32** | 30 |

## Stroke Adjustment

The adjusting bolt is adjusted to the optimum position for smooth acceleration and deceleration at the time of shipment, and should be operated at the full stroke. When stroke adjustment is necessary, the maximum amount of adjustment on one side is 2 mm. (Do not adjust more than 2 mm, as it will not be possible to obtain smooth acceleration and deceleration.)
Do not adjust based on the stopper's movement, as this can cause cylinder damage.

**Stroke adjustment method**
Loosen the round head Phillips screws, and remove the top covers and dust covers (4 pcs.). Then loosen the hexagon nut, and after performing the stroke adjustment from the plate side with a hexagon wrench, retighten and secure the hexagon nut.




## Adjusting Bolt Position (at the time of shipment), Hexagon Nut Tightening Torque

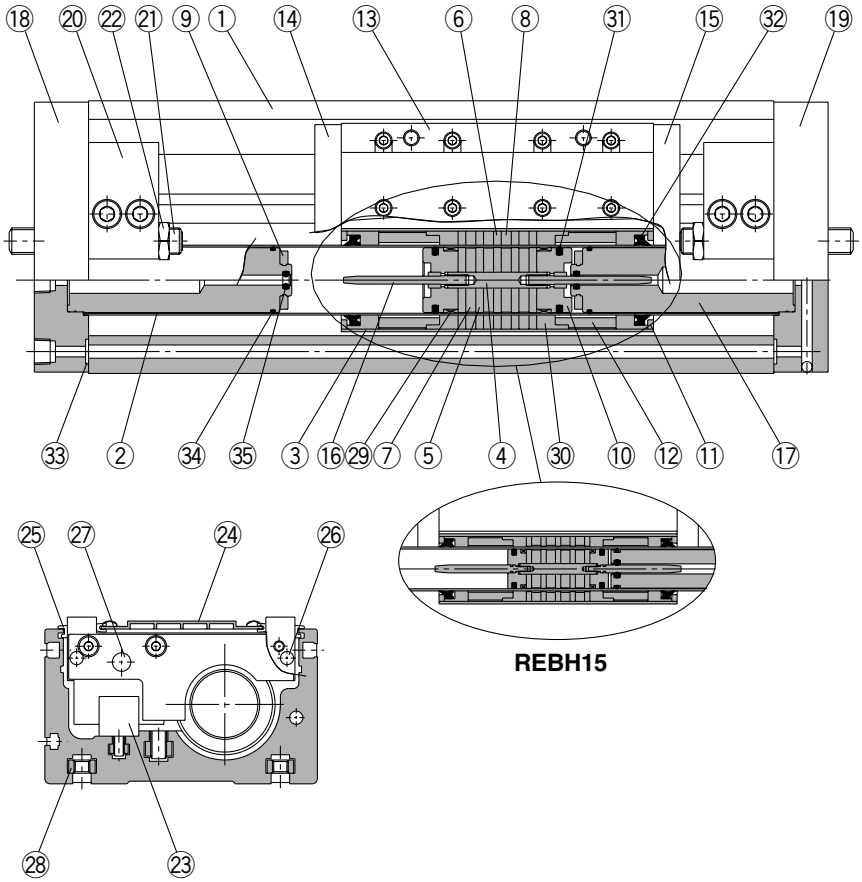
| Model | T (mm) | Tightening torque (N•m) |
|---|---|---|
| **REBH15** | 7 | 1.67 |
| **REBH25** | 9 | 3.14 |
| **REBHT25** | 9 | |
| **REBHT32** | 9 | |

After adjusting the stroke, replace the top covers and dust covers.
Tighten the round head Phillips screws for securing the top covers with a torque of 0.58 N·m.

# Series REBH

## Construction: ø15, ø25

### Single axis type: REBH




REBH15

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Hard anodized |
| ② | Cylinder tube | Stainless steel | |
| ③ | External slider tube | Aluminum alloy | |
| ④ | Shaft | Stainless steel | |
| ⑤ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑦ | Magnet A | Rare earth magnet | |
| ⑧ | Magnet B | Rare earth magnet | |
| ⑨ | Bumper | Urethane rubber | Except REBH15 |
| ⑩ | Piston | Aluminum alloy | Chromated |
| ⑪ | Spacer | Rolled steel plate | Nickel plated |
| ⑫ | Space ring | Aluminum alloy | Chromated |
| ⑬ | Slide table | Aluminum alloy | Hard anodized |
| ⑭ | Side plate A | Aluminum alloy | Hard anodized |
| ⑮ | Side plate B | Aluminum alloy | Hard anodized |
| ⑯ | Cushion ring | Stainless steel | Compound electroless nickel plated |
| ⑰ | Internal stopper | Aluminum alloy | Anodized |
| ⑱ | Plate A | Aluminum alloy | Hard anodized |

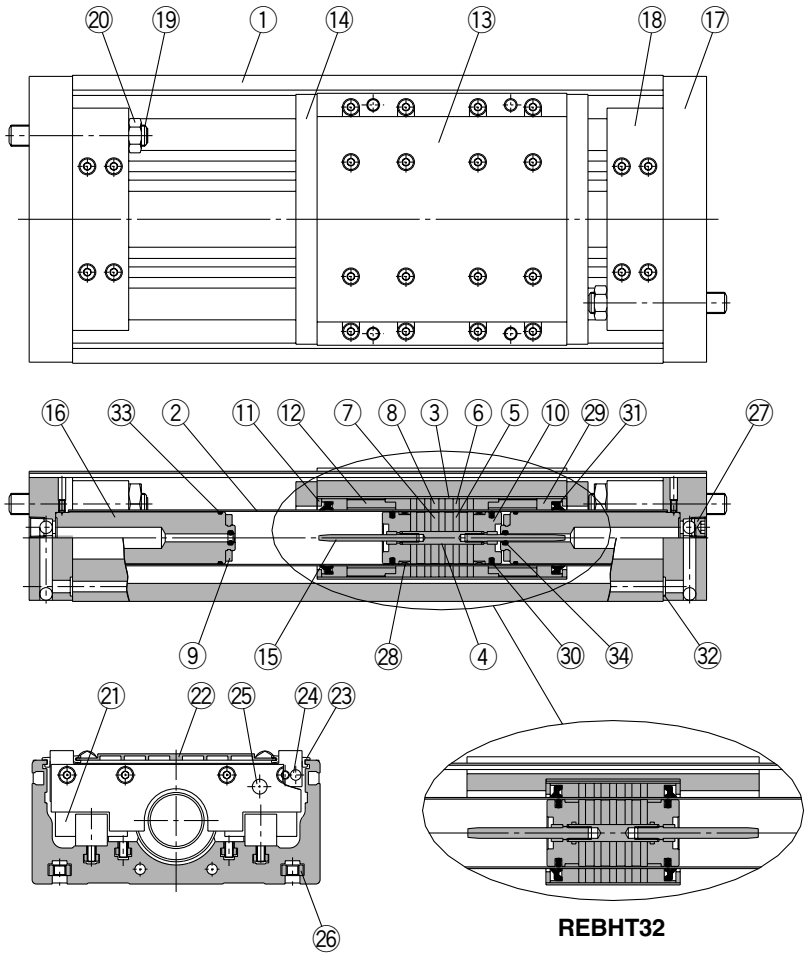
| No. | Description | Material | Note |
|---|---|---|---|
| ⑲ | Plate B | Aluminum alloy | Hard anodized |
| ⑳ | Stopper | Aluminum alloy | Anodized |
| ㉑ | Adjusting bolt | Chromium molybdenum steel | Nickel plated |
| ㉒ | Hexagon nut | Carbon steel | Nickel plated |
| ㉓ | Linear guide | | |
| ㉔ | Top cover | Aluminum alloy | Hard anodized |
| ㉕ | Dust cover | Special resin | |
| ㉖ | Magnet (for auto switch) | Rare earth magnet | |
| ㉗ | Parallel pin | Carbon steel | Nickel plated |
| ㉘ | Square nut for body mounting | Carbon steel | Nickel plated (Accessory) |
| ㉙ | Wear ring A | Special resin | |
| ㉚ | Wear ring B | Special resin | |
| ㉛ | Piston seal | NBR | |
| ㉜ | Scraper | NBR | |
| ㉝ | O-ring | NBR | |
| ㉞ | O-ring | NBR | |
| ㉟ | Cushion seal | NBR | |

### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 10 | REBH15-PS | Set of nos. above ㉙, ㉚, ㉛, ㉜, ㉝, ㉞, ㉟ |
| 15 | REBH25-PS | |

## Construction: ø25, ø32

### Double axis type: REBHT




**REBHT32**

### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Hard anodized |
| ② | Cylinder tube | Stainless steel | |
| ③ | External slider tube | Aluminum alloy | |
| ④ | Shaft | Stainless steel | |
| ⑤ | Piston side yoke | Rolled steel plate | Zinc chromated |
| ⑥ | External slider side yoke | Rolled steel plate | Zinc chromated |
| ⑦ | Magnet A | Rare earth magnet | |
| ⑧ | Magnet B | Rare earth magnet | |
| ⑨ | Bumper | Urethane rubber | |
| ⑩ | Piston | Aluminum alloy | Chromated |
| ⑪ | Spacer | Rolled steel plate | Nickel plated |
| ⑫ | Space ring | Aluminum alloy | Chromated (Except REBHT32) |
| ⑬ | Slide table | Aluminum alloy | Hard anodized |
| ⑭ | Side plate | Aluminum alloy | Hard anodized (Except REBHT32) |
| ⑮ | Cushion ring | Stainless steel | REBHT25 — Compound electroless nickel plated |
| | | Brass | REBHT32 — Compound electroless nickel plated |
| ⑯ | Internal stopper | Aluminum alloy | Anodized |
| ⑰ | Plate | Aluminum alloy | Hard anodized |

| No. | Description | Material | Note |
|---|---|---|---|
| ⑱ | Stopper | Aluminum alloy | Anodized |
| ⑲ | Adjusting bolt | Chromium molybdenum steel | Nickel plated |
| ⑳ | Hexagon nut | Carbon steel | Nickel plated |
| ㉑ | Linear guide | | |
| ㉒ | Top cover | Aluminum alloy | Hard anodized |
| ㉓ | Dust cover | Special resin | |
| ㉔ | Magnet (for auto switch) | Rare earth magnet | |
| ㉕ | Parallel pin | Carbon steel | Nickel plated |
| ㉖ | Square nut for body mounting | Carbon steel | Nickel plated (Accessory) |
| ㉗ | Hexagon socket head taper plug | Carbon steel | Nickel plated |
| ㉘ | Wear ring A | Special resin | |
| ㉙ | Wear ring B | Special resin | |
| ㉚ | Piston seal | NBR | |
| ㉛ | Scraper | NBR | |
| ㉜ | O-ring | NBR | |
| ㉝ | O-ring | NBR | |
| ㉞ | Cushion seal | NBR | |

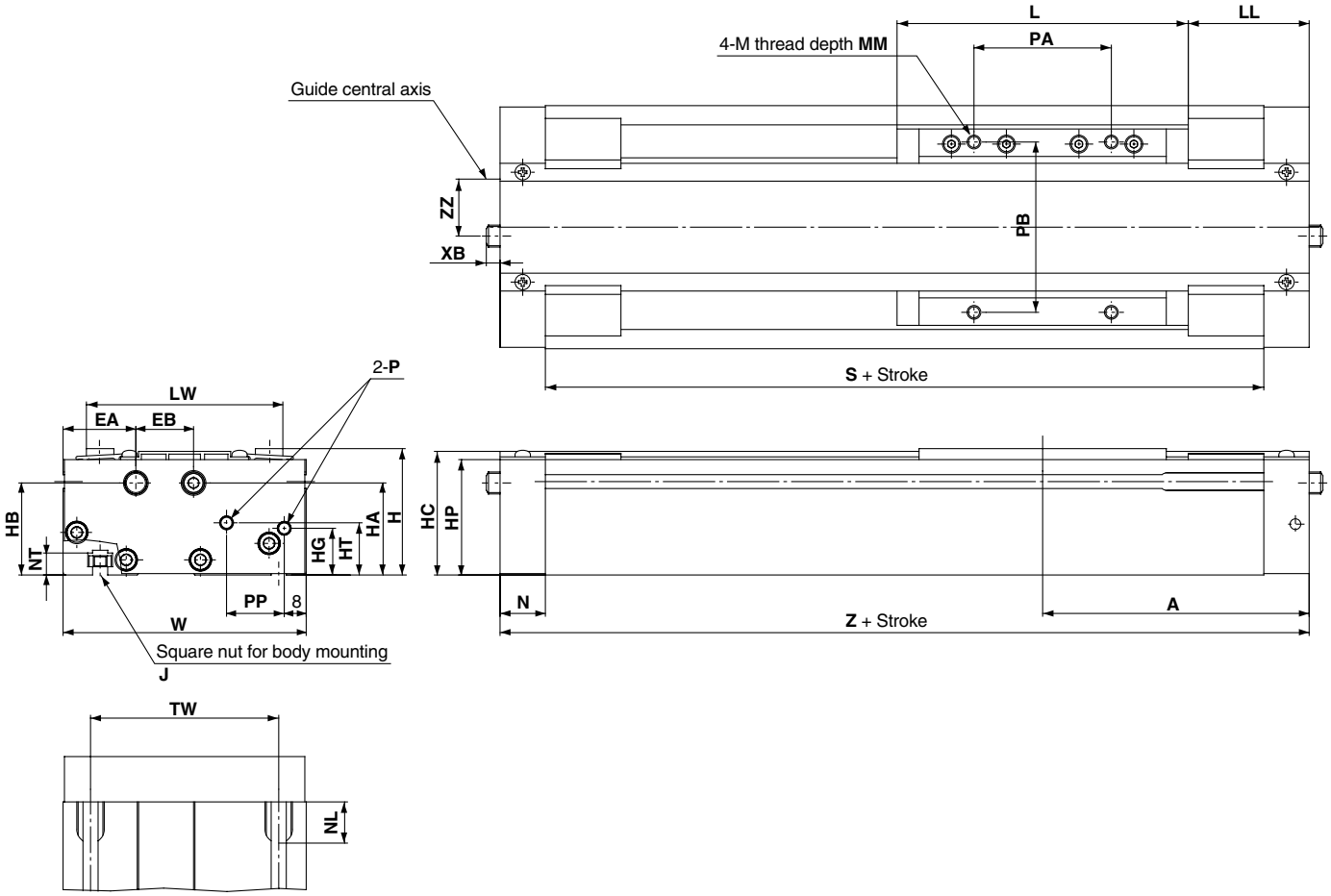
### Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 25 | REBHT25-PS | Set of nos. above ㉘, ㉙, ㉚, ㉛, ㉜, ㉝, ㉞ |
| 32 | REBHT32-PS | |

# Series REBH

## Dimensions: ø15, ø25

### Single axis type: REBH



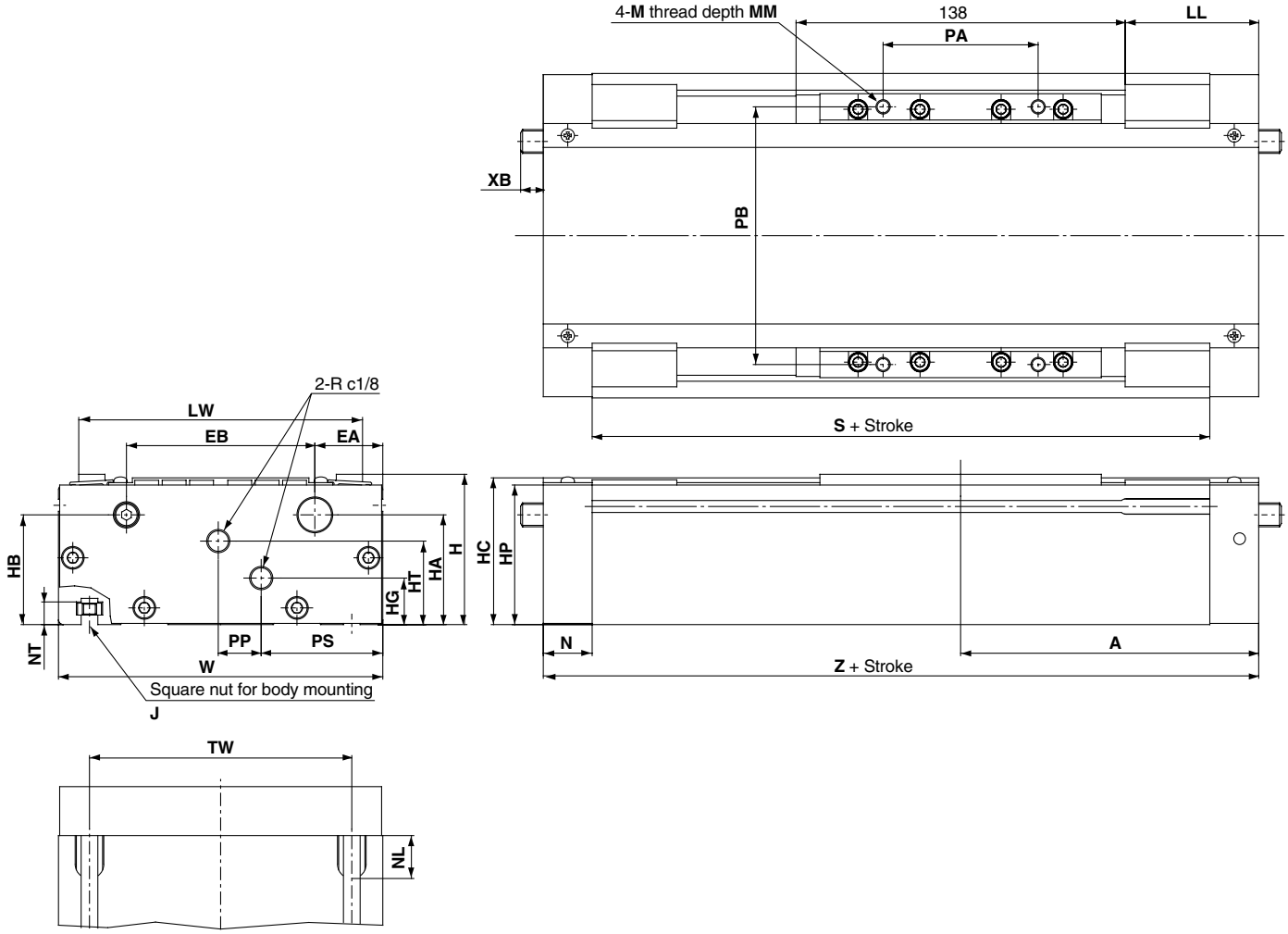

(mm)

| Model | A | EA | EB | H | HA | HB | HC | HG | HP | HT | J | L | LL | LW | M | MM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REBH15** | 97 | 26.5 | 21 | 46 | 33.5 | 33.5 | 45 | 17 | 42 | 19 | M5 x 0.8 | 106 | 44 | 71.5 | M5 x 0.8 | 8 |
| **REBH25** | 125 | 29 | 24 | 63 | 46 | 46 | 61.5 | 25 | 58.5 | 28 | M6 x 1.0 | 138 | 56 | 86 | M6 x 1.0 | 10 |

| Model | N | NL | NT | P | PA | PB | PP | S | TW | W | XB | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REBH15** | 16.5 | 15 | 8 | M5 x 0.8 | 50 | 62 | 21 | 161 | 65 | 88.5 | — | 194 | 17.5 |
| **REBH25** | 20.5 | 18 | 9 | Rc 1/8 | 65 | 75 | 27 | 209 | 75 | 103 | 9.5 | 250 | 23.5 |

## Dimensions: ø25, ø32

### Double axis type: REBHT



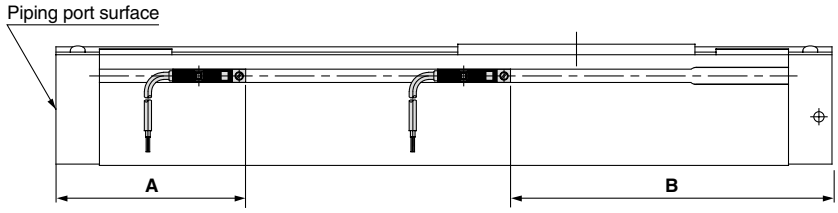

(mm)

| Model | A | EA | EB | H | HA | HB | HC | HG | HP | HT | J | LL | LW | M | MM | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REBHT25** | 125 | 28.5 | 79 | 63 | 46 | 46 | 61.5 | 19.5 | 58.5 | 35 | M6 x 1.0 | 56 | 119 | M6 x 1.0 | 10 | 20.5 |
| **REBHT32** | 132.5 | 30 | 90 | 75 | 52.5 | 57.5 | 72.5 | 25 | 69.5 | 43 | M8 x 1.25 | 63.5 | 130 | M8 x 1.25 | 12 | 23 |

| Model | NL | NT | PA | PB | PP | PS | S | TW | W | XB | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REBHT25** | 18 | 9 | 65 | 108 | 18 | 51 | 209 | 110 | 136 | 9.5 | 250 |
| **REBHT32** | 22.5 | 12 | 66 | 115 | 14 | 61 | 219 | 124 | 150 | 2 | 265 |

# Series REBH

## Proper Auto Switch Mounting Position (Detection at stroke end)




### Proper Auto Switch Mounting Position

(mm)

| Auto switch model / Cylinder model | A dimension | | | B dimension | | |
|---|---|---|---|---|---|---|
| | D-Z7□ D-Z80 | D-Y7□W D-Y7□WV | D-Y5□ D-Y6□ D-Y7P D-Y7PV | D-Z7□ D-Z80 | D-Y7□W D-Y7□WV | D-Y5□ D-Y6□ D-Y7P D-Y7PV |
| REBH15 | 72 | 72 | 72 | 122 | 122 | 122 |
| REBH25 | 86 | 86 | 86 | 164 | 164 | 164 |
| REBHT25 | 86 | 86 | 86 | 164 | 164 | 164 |
| REBHT32 | 82 | 82 | 82 | 183 | 183 | 183 |

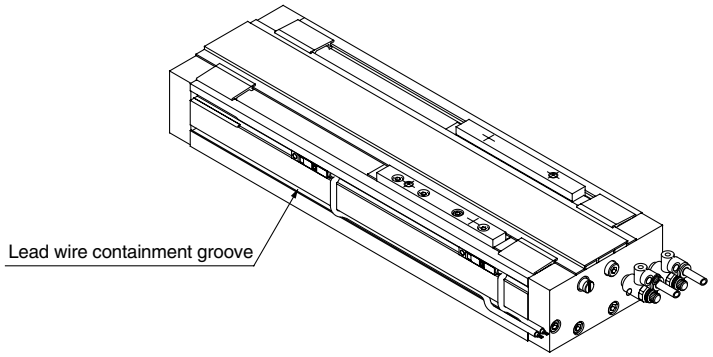
### Operating Range

| Auto switch model | Bore size (mm) | | | |
|---|---|---|---|---|
| | REBH | | REBHT | |
| | 15 | 25 | 25 | 32 |
| D-Z7□/Z8□ | 6 | 6 | 6 | 9 |
| D-Y5□/Y6□/Y7□ | 5 | 5 | 5 | 6 |

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

## Auto Switch Lead Wire Containment Groove

On model REBH25 a groove is provided on the side of the body (one side only) to contain auto switch lead wires. This should be used for placement of wiring.




Other than the models listed in “How to Order”, the following auto switches are applicable. For detailed specifications, refer to page 10-20-1.

| Type | Model | Electrical entry (Fetching direction) | Features |
|---|---|---|---|
| Reed switch | D-Z80 | Grommet (In-line) | Without indicator light |

∗ Normally closed (NC = b contact), solid state switch (D-Y7G/Y7H type) are also available.