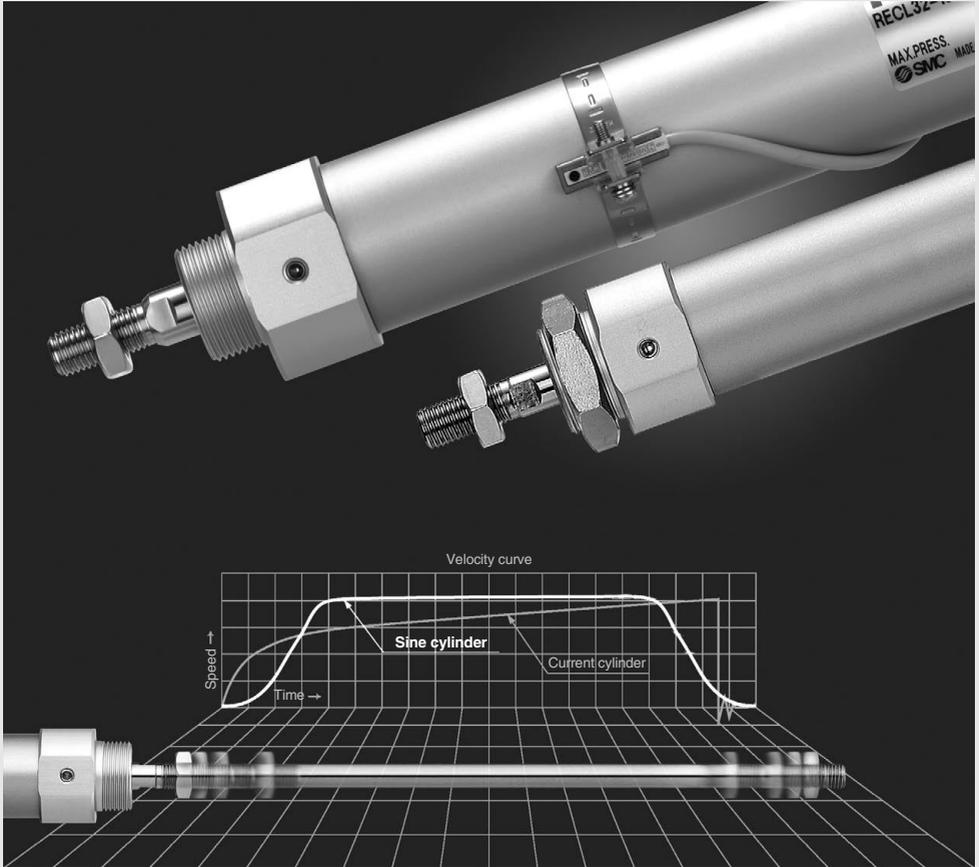


Sine Cylinder

REC Series

ø20, ø25, ø32, ø40

Allows high speed transfer of work with dramatically reduced shock/impact.



REA

REB

REC

Smooth

Low
Speed

MQ

RHC

RZQ

D-□

-X□

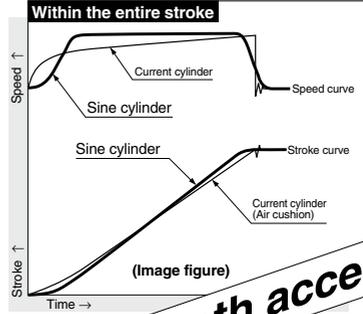
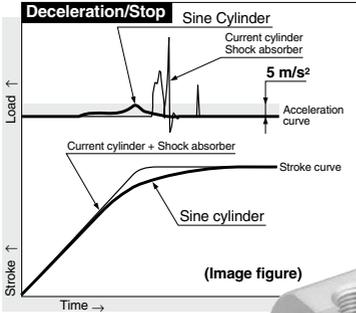


Sine Cylinder *REC Series*

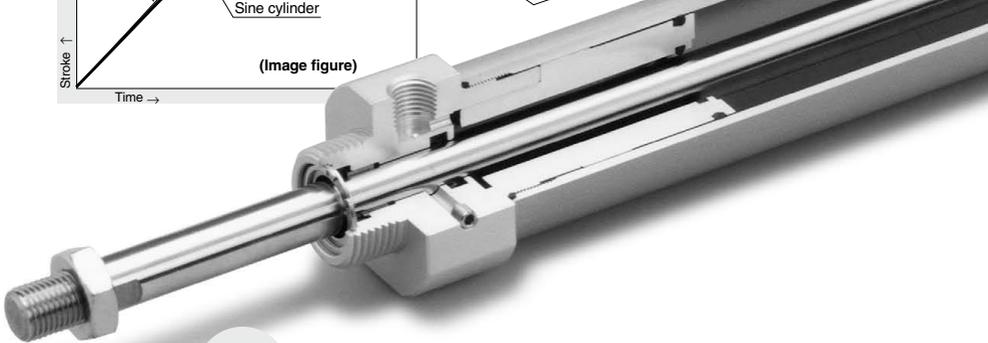
ø20,ø25,ø32,ø40

Allows rapid transfer of work

Motion comparison with the one with shock absorber



Smooth acceleration



Space-saving has been realized by simple circuit

Comparison to Shockless Transfer Systems

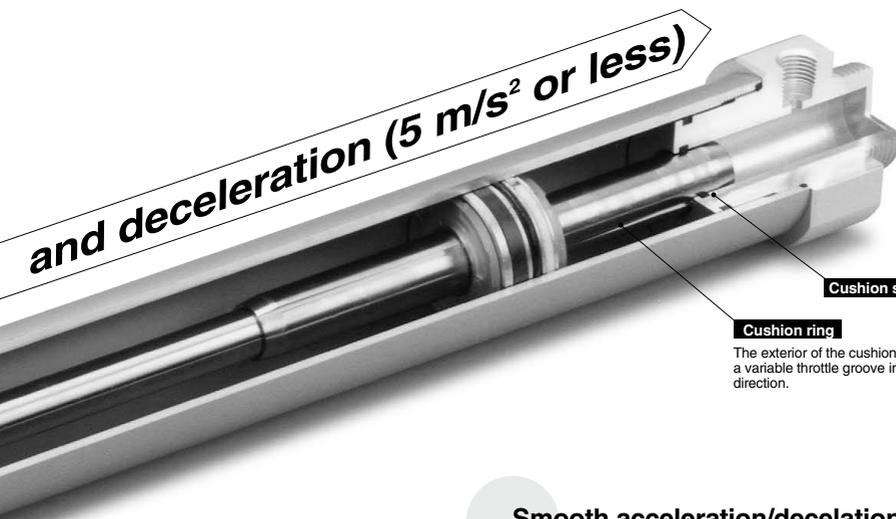
Sine Cylinder

| Current System | | | | Sine Cylinder |
|---------------------|--|---|--|---|
| Control method | Speed control by a flow control valve which can variable throttle flow according to indicated current. | Shock absorber | Multistage speed control by combining speed controllers and a directional control valve. | |
| System construction | <p>Symbol</p> <p>Current system 1</p> | | | <p>Cushioning keep up with depth of orifice as sine function which change depend on stroke.</p> |
| Acceleration | Smooth operation | Same start up as standard cylinder due to lack of slow controlled start function. | Smooth speed control cannot be achieved by digital control changes are associated with it. | <p>Smooth operation without sudden speed changes</p> <p>Smooth operation without sudden speed changes</p> <p>Simple</p> |
| Deceleration | Smooth operation | Initial impact is large. (Initial force against shock absorber) | Smooth speed control cannot be achieved by digital control, and sudden speed changes are associated with it. | |
| Construction | Complex | Simple | Complex | |

Compatible with Clean Room ISO Class 4 (ISO14644-1). (Refer to page 123.)

This model conforming to the clean room specification removes dust generated inside with an exhaust from the relief port or vacuum sweeping.

with dramatically reduced shock/impact.



and deceleration (5 m/s^2 or less)

Cushion seal

Cushion ring

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

- REA
- REB
- REC**
- Smooth
- Low Speed
- MQ
- RHC
- RZQ

Smooth acceleration/deceleration without having influence from load, speed or pressure fluctuation

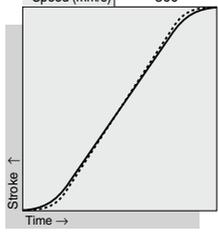
Reducing actuation cycle time

Max. 500 mm/s of high speed transfer is possible. Cycle time can be drastically reduced compared with current low speed cylinder (10 to 30 mm/s).

Reference Example) Motion on RECL32-300

Pressure Fluctuation

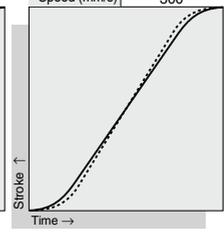
| | | |
|----------------|-----|-----|
| Pressure (MPa) | 0.3 | 0.5 |
| Load (kg) | 10 | |
| Speed (mm/s) | 300 | |



— P=0.5 MPa, M=10 kg
 P=0.3 MPa, M=10 kg

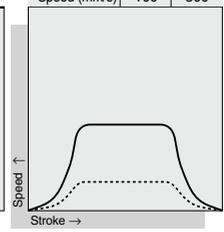
Load Fluctuation

| | | |
|----------------|-----|----|
| Pressure (MPa) | 0.5 | |
| Load (kg) | 10 | 30 |
| Speed (mm/s) | 300 | |



— M=10 kg
 M=30 kg

| | | |
|----------------|-----|-----|
| Pressure (MPa) | 0.5 | |
| Load (kg) | 10 | |
| Speed (mm/s) | 100 | 300 |



— V=300 mm/s
 V=100 mm/s

⚠ Caution

Recommended Speed Controllers

| Model | Model | | |
|--------------|--------------------|--------------------|-----------------|
| | Elbow type | Straight type | In-line type |
| REC20 | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS2001F-06-X214 |
| REC25 | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS2001F-06-X214 |
| REC32 | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS3001F-08-X214 |
| REC40 | AS3201F-02-08-X214 | AS3301F-02-08-X214 | AS3001F-08-X214 |

⚠ Caution

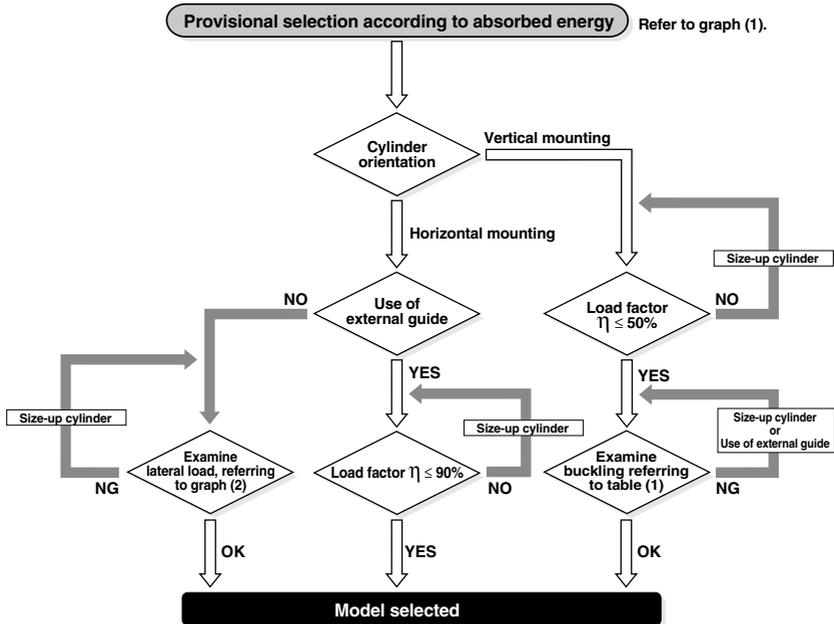
Use the recommended speed controllers. (Refer to page 133.)

- D
- X



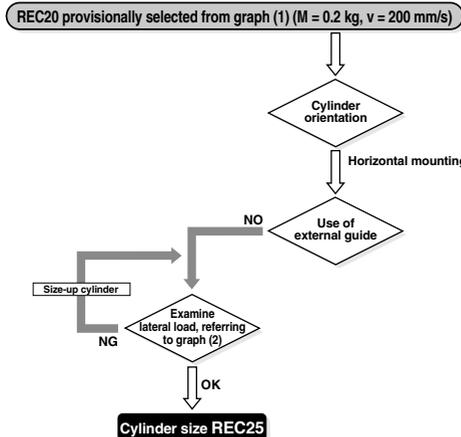
REC Series Model Selection

Selection Step



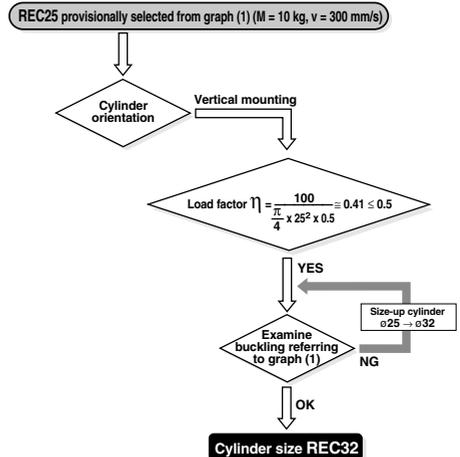
Selection Example 1

Actuating orientation: Horizontal transfer of work (without external guide)
 Load mass: $M = 0.2$ kg (2N)
 Cylinder stroke: 300 mm
 Maximum speed: $v = 200$ mm/s
 Supply pressure: $P = 0.5$ MPa

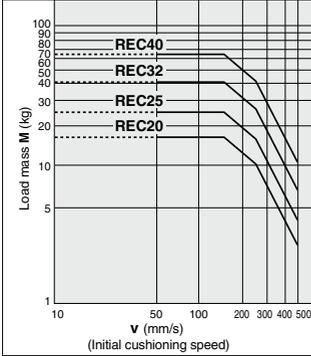


Selection Example 2

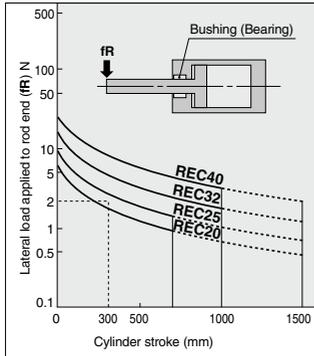
Actuating orientation: Vertical transfer of work (Rod side flange)
 Load mass: $M = 10$ kg
 Cylinder stroke: 400 mm
 Maximum speed: $v = 300$ mm/s
 Supply pressure: $P = 0.5$ MPa



Graph (1) Absorbed Energy Curve



Graph (2) Applicable Max. Stroke Against Lateral Load*



* The above curve in the graph refers to P = 0.5 MPa of supply pressure. If supply pressure is other than P = 0.5 MPa, please figure out a max. stroke, using proportional calculation.

Example) If P = 0.6 MPa, a max. stroke = the respective stroke in the graph x $\frac{0.6}{0.5}$

Figure (1)

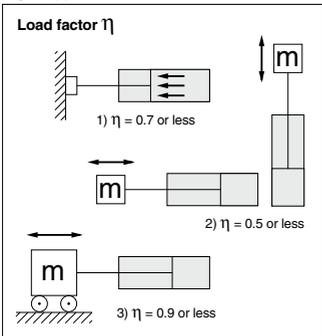


Table (1) Relation between Cylinder Size and Max. Stroke

(cm)

| Mounting type | | | Symbol | Operating pressure (MPa) | Applicable max. stroke according to bucking strength | | | | |
|------------------------------------|--------------------------------|---------------------------------|--------|--------------------------|--|-----|-----|-----|-----|
| Mounting bracket symbol and figure | | | | | REC | | | | |
| | | | | | ø20 | ø25 | ø32 | ø40 | |
| Foot type: L | Rod side flange type: F | Head side flange type: G | | 0.3 | 39 | 50 | 56 | 61 | |
| | | | | | 0.5 | 30 | 38 | 43 | 47 |
| | | | | | | 0.7 | 24 | 31 | 36 |
| | | | 0.3 | 11 | 17 | | 19 | 21 | |
| | | | | 0.5 | 7 | 11 | 13 | 13 | |
| | | | | | 0.7 | 4 | 7 | 9 | 9 |
| | | | 0.3 | 32 | 42 | 48 | 52 | | |
| | | | | 0.5 | 22 | 30 | 35 | 37 | |
| | | | | | 0.7 | 17 | 24 | 27 | 29 |
| | | | 0.3 | 82 | 103 | 116 | 127 | | |
| | | | | 0.5 | 62 | 79 | 89 | 97 | |
| | | | | | 0.7 | 52 | 66 | 75 | 81 |
| | | | 0.3 | 33 | 43 | 49 | 53 | | |
| | | | | 0.5 | 23 | 31 | 36 | 39 | |
| | | | | | 0.7 | 18 | 25 | 29 | 31 |
| | | | 0.3 | 118 | 148 | 167 | 182 | | |
| | | | | 0.5 | 90 | 114 | 128 | 140 | |
| | | | | | 0.7 | 76 | 95 | 108 | 117 |
| | | | 0.3 | 51 | 66 | 75 | 81 | | |
| | | | | 0.5 | 37 | 49 | 55 | 60 | |
| | | | | | 0.7 | 30 | 39 | 45 | 49 |
| | | | 0.3 | 168 | 211 | 237 | 259 | | |
| | | | | 0.5 | 129 | 162 | 183 | 199 | |
| | | | | | 0.7 | 109 | 136 | 154 | 168 |
| | | | 0.3 | 76 | 97 | 110 | 119 | | |
| | | | | 0.5 | 56 | 73 | 83 | 90 | |
| | | | | | 0.7 | 46 | 60 | 68 | 74 |

- 1) In the case where cylinder is used for static action: Load factor $\eta = 0.7$ or less
- 2) In the case where cylinder is used for dynamic action: Load factor $\eta = 0.5$ or less
- 3) In the case where guide is used in horizontal orientation: Load factor $\eta = 0.9$ or less

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

-X□

Sine Cylinder

REC Series

ø20, ø25, ø32, ø40

How to Order

REC B 25 - 150 - M9BW - C

Sine cylinder → REC

Rod type → B

Mounting type → C

Bore size → 25

Cylinder stroke (mm) → 150

Port type → M9BW

Auto switch → C

Number of auto switches → C

| | | | |
|----------|-----------------------|----------|-------------------------|
| B | Basic type | C | Single clevis type |
| L | Axial foot type | D | Double clevis type |
| F | Rod side flange type | U | Rod side trunnion type |
| G | Head side flange type | T | Head side trunnion type |

| | |
|-----------|-------|
| 20 | 20 mm |
| 25 | 25 mm |
| 32 | 32 mm |
| 40 | 40 mm |

| | |
|------------|-----|
| Nil | Rc |
| TN | NPT |
| TF | G |

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

Auto switch

| | |
|------------|---------------------------------------|
| Nil | Without auto switch (Built-in magnet) |
|------------|---------------------------------------|

* Select an applicable auto switch part number from the table below.

Auto switch mounting bracket ^{Note)}

Note) This symbol is indicated when the D-A9□ or M9□ type auto switch is specified. This mounting bracket does not apply to other auto switches (D-C7□ and H7□, etc.) (Nil)

Applicable Auto Switches

Refer to pages 947 to 1067 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator type | Wiring (Output) | Load voltage | | Auto switch model | | Lead wire length (m) | | | | | Pre-wired connector | Applicable load | | |
|-------------------------|--|------------------|----------------|-------------------------|--------------|-----------|-------------------|---------|----------------------|--------|---------------|-------|----------|---------------------|-----------------|------------|------------|
| | | | | | DC | AC | Perpendicular | In-line | 0.5 (Nil) | 1 (M) | 3 (L) | 5 (Z) | None (N) | | | | |
| Solid state auto switch | — | Grommet | No | 3-wire (NPN) | 5 V, 12 V | — | M9NV | M9N | ● | ● | ● | ○ | ○ | — | IC circuit | | |
| | | | | 3-wire (PNP) | | | M9PV | M9P | ● | ● | ● | ○ | ○ | | | | |
| | | 2-wire | | 12 V | — | M9BV | M9B | ● | ● | ● | ○ | ○ | — | — | | | |
| | | — | | | | H7C | ● | ● | ● | ● | ● | | | | | | |
| | Diagnostic indication (2-color indicator) | Connector | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | M9NWV | M9NW | ● | ● | ● | ○ | ○ | — | IC circuit | |
| | | | | 3-wire (PNP) | | | | M9PWV | M9PW | ● | ● | ● | ○ | ○ | | | |
| | Water resistant (2-color indicator) | Grommet | No | 2-wire | 12 V | — | — | M9B WV | M9B W | ● | ● | ● | ○ | ○ | — | — | |
| | | | | 3-wire (NPN) | | | | M9NA*1 | M9NA*1 | ○ | ○ | ○ | ○ | ○ | | | — |
| | With diagnostic output (2-color indicator) | Grommet | No | 3-wire (PNP) | 5 V, 12 V | — | — | M9PA*1 | M9PA*1 | ○ | ○ | ○ | ○ | ○ | — | IC circuit | |
| | | | | 2-wire | | | | M9BA*1 | M9BA*1 | ○ | ○ | ○ | ○ | ○ | | | |
| Feed auto switch | — | Grommet | Yes | 4-wire (NPN) | 5 V, 12 V | — | — | H7NF | ● | ● | ● | ○ | ○ | — | IC circuit | | |
| | | | | 2-wire (NPN equivalent) | | | — | 5 V | A96V | A96 | ● | ● | ● | | | ○ | ○ |
| | | Connector | | No | 2-wire | 24 V | 12 V | — | — | A93V*2 | A93 | ● | ● | ● | ○ | — | IC circuit |
| | | | | | | | | | | Yes | 100 V | A90V | A90 | ● | ● | | |
| | | Grommet | | No | 2-wire | 24 V | 12 V | — | — | — | B54 | ● | ● | ● | ○ | — | — |
| | | | | | | | | | | Yes | 100 V, 200 V | — | B64 | ● | ● | | |
| | | Connector | | Yes | 2-wire | 24 V | 12 V | — | — | — | C73C | ● | ● | ● | ● | — | IC circuit |
| | | | | | | | | | | No | 200 V or less | — | C80C | ● | ● | | |
| | | Grommet | | No | 2-wire | 24 V | 12 V | — | — | — | B59W | ● | ● | ● | ○ | — | — |
| | | | | | | | | | | Yes | 24 V or less | — | — | — | — | | |

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. A water-resistant type cylinder is recommended for use in an environment which requires water resistance. However, please contact SMC for water-resistant products of ø20 and ø25.

*2 1 m type lead wire is only applicable to D-A93.

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
 1 m M (Example) M9NWM
 3 m L (Example) M9NWL
 5 m Z (Example) M9NWZ
 None N (Example) H7CN

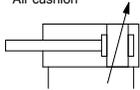
* Solid state auto switches marked with "○" are produced upon receipt of order.

* Since there are other applicable auto switches than listed, refer to page 132 for details.
 * For details about auto switches with pre-wired connector, refer to pages 1014 and 1015.
 * D-A9□(V)/M9□(V)/M9□W(V), M9□A(V) auto switches are shipped together (not assembled).
 (Only auto switch mounting brackets are assembled before shipped.)

Standard Specifications



Symbol
Air cushion



| Bore size (mm) | 20 | 25 | 32 | 40 |
|----------------------------------|---|----|----|----|
| Action | Double acting, Single rod | | | |
| Fluid | Air | | | |
| Proof pressure | 1.5 MPa | | | |
| Maximum operating pressure | 1.0 MPa | | | |
| Minimum operating pressure | 0.2 MPa | | | |
| Ambient and fluid temperature | -10 to 60°C | | | |
| Piston speed | 50 to 500 mm/s | | | |
| Cushion | Air cushion (End rubber bumper) | | | |
| Effective cushioning stroke (mm) | 45 | 45 | 50 | 60 |
| Lubrication | Not required (Non-lube) | | | |
| Stroke length tolerance | Up to 1000 st: $^{+1.4}_0$, 1001 to 1500 st: $^{+1.8}_0$ | | | |

Standard Stroke

| Bore size (mm) | Minimum stroke (1) (Recommended) | Standard stroke (2) (mm) | Maximum manufacturable stroke (mm) |
|----------------|-------------------------------------|-----------------------------|------------------------------------|
| 20 | 150 | Up to 700 | 1500 |
| 25 | 150 | Up to 700 | |
| 32 | 150 | Up to 1000 | |
| 40 | 200 | Up to 1000 | |

Note 1) The recommended minimum strokes or shorter lengths are available. However, since the effective cushion stroke is longer, the cushion performance may differ from the standard specifications.

Note 2) When exceeding the standard strokes, it will be out of warranty.

Weight

| Bore size (mm) | | 20 | 25 | 32 | 40 |
|--|-------------------------------------|------|------|------|------|
| Basic Weight | Basic type | 0.32 | 0.47 | 0.74 | 1.25 |
| | Axial foot type | 0.47 | 0.63 | 0.90 | 1.52 |
| | Flange type | 0.38 | 0.56 | 0.83 | 1.37 |
| | Single clevis type | 0.36 | 0.51 | 0.78 | 1.34 |
| | Double clevis type | 0.37 | 0.53 | 0.79 | 1.38 |
| | Trunnion type | 0.36 | 0.54 | 0.81 | 1.35 |
| Additional weight per each 50 mm of stroke | | 0.05 | 0.07 | 0.09 | 0.13 |
| Mounting bracket | Pivot bracket for clevis (With pin) | 0.07 | 0.07 | 0.14 | 0.14 |
| | Single knuckle joint | 0.06 | 0.06 | 0.06 | 0.23 |
| | Double knuckle joint (With pin) | 0.07 | 0.07 | 0.07 | 0.20 |

* Calculation: (Example) **RECL32-200**
 Basic weight 0.90 (Foot type ø32)
 Additional weight 0.09/50 st
 Cylinder stroke 200 (st)
 $0.90 + 0.09 \times 200/50 = 1.26$ kg

Accessory (Option)

Refer to pages 127 and 128 for part numbers and dimensions of the single knuckle joint, double knuckle joint, clevis pin, and knuckle pin.

Mounting Bracket Part No.

| Mounting bracket | Minimum order | Bore size (mm) | | | | Description (when ordering a minimum number) |
|-----------------------------|---------------|----------------|----------|----------|----|--|
| | | 20 | 25 | 32 | 40 | |
| Axial foot * | 2 | CM-L020B | CM-L032B | CM-L040B | | Foot 2 pcs., Mounting nut 1 pc. |
| Flange | 1 | CM-F020B | CM-F032B | CM-F040B | | Flange 1 pc. |
| Single clevis** | 1 | CM-C020B | CM-C032B | CM-C040B | | Single clevis 1 pc., Liner 3 pcs. |
| Double clevis (With pin)*** | 1 | CM-D020B | CM-D032B | CM-D040B | | Double clevis 1 pc., Liner 3 pcs., Clevis pin 1 pc., Retaining ring 2 pcs. |
| Trunnion (With nut) | 1 | CM-T020B | CM-T032B | CM-T040B | | Trunnion 1 pc., Trunnion nut 1 pc. |

* When ordering foot bracket, order 2 pieces per cylinder.
 ** 3 liners are included in the clevis bracket for adjusting an angle when mounting it.
 *** Clevis pin and retaining ring (cotter pin for ø40) are packaged together.

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

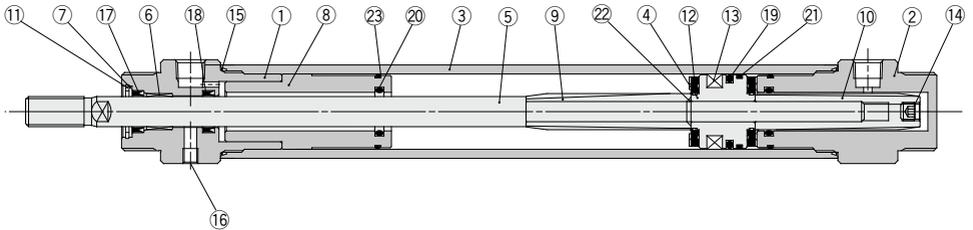
D-□

-X□



REC Series

Construction



Component Parts

| No. | Description | Material | Qty. | Note |
|-----|-------------------------------|-----------------|------|---------------------------|
| 1 | Rod cover | Aluminum alloy | 1 | Clear anodized |
| 2 | Head cover | Aluminum alloy | 1 | Clear anodized |
| 3 | Cylinder tube | Aluminum alloy | 1 | Hard anodized |
| 4 | Piston | Aluminum alloy | 1 | Chromated |
| 5 | Piston rod | Stainless steel | 1 | Hard chrome plated |
| 6 | Bushing | Bearing alloy | 1 | |
| 7 | Seal retainer | Stainless steel | 1 | |
| 8 | Cushion seal holder | Aluminum alloy | 1 | Chromated |
| 9 | Cushion ring A | Brass | 1 | Electroless nickel plated |
| 10 | Cushion ring B | Brass | 1 | Electroless nickel plated |
| 11 | Retaining ring | Carbon steel | 1 | Phosphate coated |
| 12 | Bumper | Urethane | 2 | |
| 13 | Magnet | — | 1 | |
| 14 | Hexagon socket head set screw | Carbon steel | 1 | Zinc chromated |
| 15 | Cylinder tube gasket | NBR | 2 | |
| 16 | Hexagon socket head set screw | Carbon steel | 1 | Zinc chromated |

Component Parts

| No. | Description | Material | Qty. | Note |
|-----|---------------|----------|------|------|
| 17 | Rod seal A | NBR | 1 | |
| 18 | Rod seal B | NBR | 1 | |
| 19 | Piston seal | NBR | 1 | |
| 20 | Cushion seal | NBR | 2 | |
| 21 | Wear ring | Resin | 1 | |
| 22 | Piston gasket | NBR | 1 | |
| 23 | Holder gasket | NBR | 2 | |

Replacement Parts/Seal Kit

| Bore size (mm) | Kit no. | Contents |
|----------------|----------|---|
| 20 | REC20-PS | Set of nos. above (15, 17, 19, 20, 21, 23) |
| 25 | REC25-PS | |
| 32 | REC32-PS | |
| 40 | REC40-PS | |

* Seal kit includes a grease pack (10 g).

Order with the following part number when only the grease pack is needed.

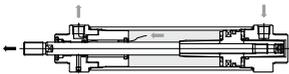
Grease pack part no.: GR-S-010 (10 g)

⚠ Caution

When disassembling cylinders with bore sizes of $\phi 20$ to $\phi 40$, grip the double flat part of either the tube cover or the rod cover with a vise and loosen the other side with a wrench or an adjustable angle wrench, and then remove the cover. When re-tightening, tighten approximately 2 degrees more than the original position.

Working Principle

1. Start-up



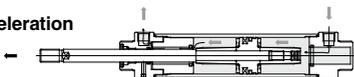
Actuating air passes from cylinder port on head side and enters the right hand side of chamber of the cylinder from space between cushion seal and U-shaped groove on the outer surface of cushion spear. Air in the left hand side of chamber of the cylinder passes through space between cushion seal and piston rod, and is released to the cylinder port on rod side.

2. In-rush/acceleration



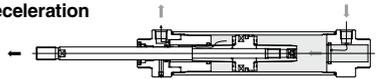
Differential pressure (theoretical force) generated on the left and right sides of piston becomes larger than starting resistance, and piston starts to actuate. With the actuation, U-shaped groove on the cushion spear outer surface gradually becomes deeper, air flow necessary for piston enters the right hand side of chamber of the cylinder, and piston accelerates. This acceleration process can be achieved smoothly (as a sine function) by using a cushion spear on which a U-shaped groove is machined.

3. Acceleration



When piston starts to actuate, air can go in and out freely because cushion spear on head side is released from cushion seal. With this actuation, piston speed accelerates (or maintains the same speed).

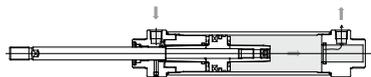
4. Deceleration



When cushion spear on rod side meets cushion seal, air in cushion chamber on rod side flows through space between cushion spear groove and cushion seal.

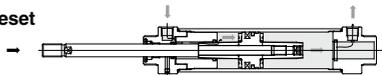
Since the space is reduced as a sine function, the cylinder rod decelerates smoothly.

5. Stop



The piston stops at the stroke end on rod side with smooth cushioning. Air flow which is switched by solenoid valve is reversed from the one indicated in the above "1. Start-up".

6. Reset



Actuating air passes from cylinder port on rod side and enters the left chamber of the cylinder from space between cushion seal and U-shaped groove on the outer surface of cushion spear. Also, air in right hand side of chamber of piston is exhausted from cylinder port. As U-shaped groove on the cushion spear outer surface gradually becomes deeper, the cylinder accelerates.

Clean Series

10 — REC **Mounting type** **Bore size** — **Stroke**

Clean Series

| | |
|-----------|-------------|
| 10 | Relief type |
| 11 | Vacuum type |

The type which is applicable for using inside the clean room graded ISO Class 4 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room. The plug (M5 x 0.8) in the standard dimensions becomes a relief port.



For detailed specifications about the clean series, refer to the "Pneumatic Clean Series" (CAT.E02-23).

Specifications

| | |
|-----------------------------------|--|
| Action | Double acting, Single rod |
| Bore size | ø20, ø25, ø32, ø40 |
| Maximum operating pressure | 1.0 MPa |
| Minimum operating pressure | 0.2 MPa |
| Cushion | Air cushion |
| Relief port size | M5 x 0.8 |
| Piston speed | 50 to 400 mm/s |
| Mounting | Basic type, Axial foot type, Rod side flange type, Head side flange type |

* Auto switch can be mounted.

REA

REB

REC

Smooth

Low Speed

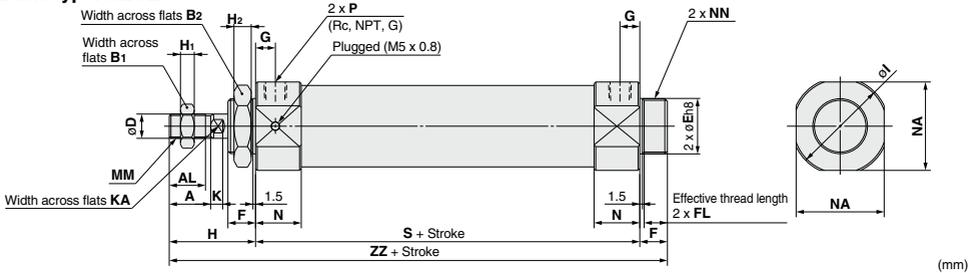
MQ

RHC

RZQ

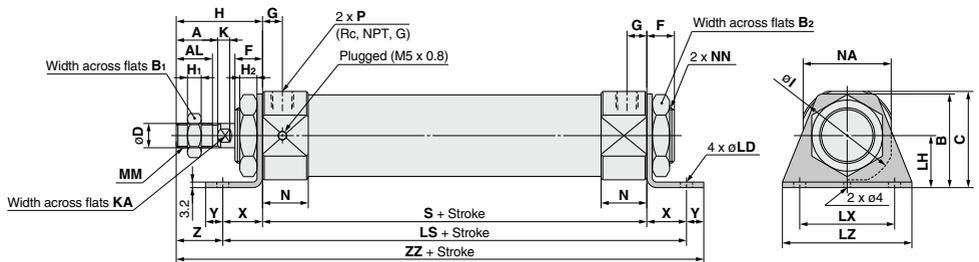
Dimensions

Basic type: RECB



| Bore (mm) | A | AL | B1 | B2 | D | E | F | FL | G | H | H1 | H2 | I | K | KA | MM | N | NA | NN | P | S | ZZ |
|-----------|----|------|----|----|----|---------------------|----|------|------|----|----|----|------|-----|----|------------|------|------|-----------|-----|-----|-----|
| 20 | 18 | 15.5 | 13 | 26 | 8 | 20 _{0.033} | 13 | 10.5 | 10 | 41 | 5 | 8 | 33.5 | 5 | 6 | M8 x 1.25 | 20 | 30 | M20 x 1.5 | 1/8 | 146 | 200 |
| 25 | 22 | 19.5 | 17 | 32 | 10 | 26 _{0.033} | 13 | 10.5 | 10 | 45 | 6 | 8 | 37.5 | 5.5 | 8 | M10 x 1.25 | 20 | 34.5 | M26 x 1.5 | 1/8 | 146 | 204 |
| 32 | 22 | 19.5 | 17 | 32 | 12 | 26 _{0.033} | 13 | 10.5 | 11 | 45 | 6 | 8 | 46.5 | 5.5 | 10 | M10 x 1.25 | 22 | 42.5 | M26 x 1.5 | 1/8 | 159 | 217 |
| 40 | 24 | 21 | 22 | 41 | 14 | 32 _{0.039} | 16 | 13.5 | 12.5 | 50 | 8 | 10 | 56 | 7 | 12 | M14 x 1.5 | 26.5 | 51 | M32 x 2 | 1/4 | 181 | 247 |

Axial foot type: RECL



| Bore (mm) | A | AL | B | B1 | B2 | C | D | F | G | H | H1 | H2 | I | K | KA | LD | LH | LS | LX | LZ | MM | N | NA |
|-----------|----|------|----|----|----|------|----|----|------|----|----|----|------|-----|----|-----|----|-----|----|----|------------|------|------|
| 20 | 18 | 15.5 | 40 | 13 | 26 | 40 | 8 | 13 | 10 | 41 | 5 | 8 | 33.5 | 5 | 6 | 6.8 | 25 | 186 | 40 | 55 | M8 x 1.25 | 20 | 30 |
| 25 | 22 | 19.5 | 47 | 17 | 32 | 45.5 | 10 | 13 | 10 | 45 | 6 | 8 | 37.5 | 5.5 | 8 | 6.8 | 28 | 186 | 40 | 55 | M10 x 1.25 | 20 | 34.5 |
| 32 | 22 | 19.5 | 47 | 17 | 32 | 49.5 | 12 | 13 | 11 | 45 | 6 | 8 | 46.5 | 5.5 | 10 | 6.8 | 28 | 199 | 40 | 55 | M10 x 1.25 | 22 | 42.5 |
| 40 | 24 | 21 | 54 | 22 | 41 | 55.5 | 14 | 16 | 12.5 | 50 | 8 | 10 | 56.2 | 7 | 12 | 7 | 30 | 227 | 55 | 75 | M14 x 1.5 | 26.5 | 51 |

| Bore (mm) | NN | P | S | X | Y | Z | ZZ |
|-----------|-----------|-----|-----|----|----|----|-----|
| 20 | M20 x 1.5 | 1/8 | 146 | 20 | 8 | 21 | 215 |
| 25 | M26 x 1.5 | 1/8 | 146 | 20 | 8 | 25 | 219 |
| 32 | M26 x 1.5 | 1/8 | 159 | 20 | 8 | 25 | 232 |
| 40 | M32 x 2 | 1/4 | 181 | 23 | 10 | 27 | 264 |

* Bracket is shipped together with the product.

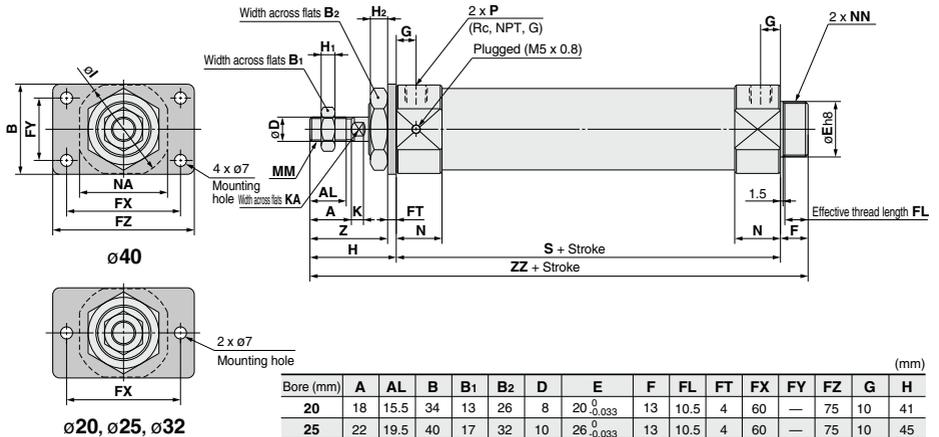
D-□

X-□

REC Series

Dimensions

Rod side flange type: REC F

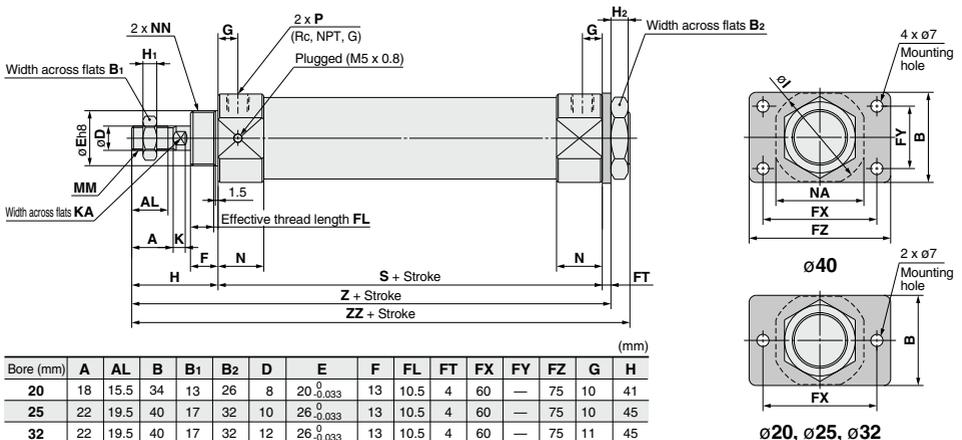


| Bore (mm) | A | AL | B | B ₁ | B ₂ | D | E | F | FL | FT | FX | FY | FZ | G | H |
|-----------|----|------|----|----------------|----------------|----|-----------------------------------|----|------|----|----|----|----|------|----|
| 20 | 18 | 15.5 | 34 | 13 | 26 | 8 | 20 ⁰ _{-0.033} | 13 | 10.5 | 4 | 60 | — | 75 | 10 | 41 |
| 25 | 22 | 19.5 | 40 | 17 | 32 | 10 | 26 ⁰ _{-0.033} | 13 | 10.5 | 4 | 60 | — | 75 | 10 | 45 |
| 32 | 22 | 19.5 | 40 | 17 | 32 | 12 | 26 ⁰ _{-0.033} | 13 | 10.5 | 4 | 60 | — | 75 | 11 | 45 |
| 40 | 24 | 21 | 52 | 22 | 41 | 14 | 32 ⁰ _{-0.039} | 16 | 13.5 | 5 | 66 | 36 | 82 | 12.5 | 50 |

| Bore (mm) | H ₁ | H ₂ | I | K | KA | MM | N | NA | NN | P | S | Z | ZZ |
|-----------|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|-----|----|-----|
| 20 | 5 | 8 | 33.5 | 5 | 6 | M8 x 1.25 | 20 | 30 | M20 x 1.5 | 1/8 | 146 | 37 | 200 |
| 25 | 6 | 8 | 37.5 | 5.5 | 8 | M10 x 1.25 | 20 | 34.5 | M26 x 1.5 | 1/8 | 146 | 41 | 204 |
| 32 | 6 | 8 | 46.5 | 5.5 | 10 | M10 x 1.25 | 22 | 42.5 | M26 x 1.5 | 1/8 | 159 | 41 | 217 |
| 40 | 8 | 10 | 56.2 | 7 | 12 | M14 x 1.5 | 26.5 | 51 | M32 x 2 | 1/4 | 181 | 45 | 247 |

* Bracket is shipped together with the product.

Head side flange type: REC G



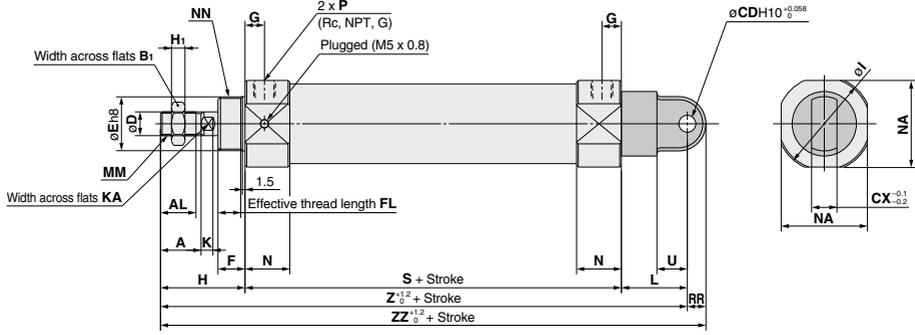
| Bore (mm) | A | AL | B | B ₁ | B ₂ | D | E | F | FL | FT | FX | FY | FZ | G | H |
|-----------|----|------|----|----------------|----------------|----|-----------------------------------|----|------|----|----|----|----|------|----|
| 20 | 18 | 15.5 | 34 | 13 | 26 | 8 | 20 ⁰ _{-0.033} | 13 | 10.5 | 4 | 60 | — | 75 | 10 | 41 |
| 25 | 22 | 19.5 | 40 | 17 | 32 | 10 | 26 ⁰ _{-0.033} | 13 | 10.5 | 4 | 60 | — | 75 | 10 | 45 |
| 32 | 22 | 19.5 | 40 | 17 | 32 | 12 | 26 ⁰ _{-0.033} | 13 | 10.5 | 4 | 60 | — | 75 | 11 | 45 |
| 40 | 24 | 21 | 52 | 22 | 41 | 14 | 32 ⁰ _{-0.039} | 16 | 13.5 | 5 | 66 | 36 | 82 | 12.5 | 50 |

| Bore (mm) | H ₁ | H ₂ | I | K | KA | MM | N | NA | NN | P | S | Z | ZZ |
|-----------|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|-----|-----|-----|
| 20 | 5 | 8 | 33.5 | 5 | 6 | M8 x 1.25 | 20 | 30 | M20 x 1.5 | 1/8 | 146 | 191 | 200 |
| 25 | 6 | 8 | 37.5 | 5.5 | 8 | M10 x 1.25 | 20 | 34.5 | M26 x 1.5 | 1/8 | 146 | 195 | 204 |
| 32 | 6 | 8 | 46.5 | 5.5 | 10 | M10 x 1.25 | 22 | 42.5 | M26 x 1.5 | 1/8 | 159 | 208 | 217 |
| 40 | 8 | 10 | 56.2 | 7 | 12 | M14 x 1.5 | 26.5 | 51 | M32 x 2 | 1/4 | 181 | 236 | 247 |

* Bracket is shipped together with the product.

Dimensions

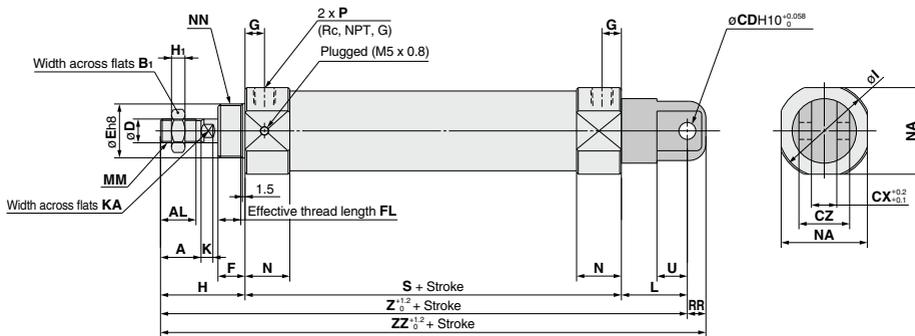
Single clevis type: RECC



| Bore (mm) | A | AL | B1 | CD | CX | D | E | F | FL | G | H | H1 | I | K | KA | L | MM | N |
|-----------|----|------|----|----|----|----|-----------------------------------|----|------|------|----|----|------|-----|----|----|------------|------|
| 20 | 18 | 15.5 | 13 | 9 | 10 | 8 | 20 ⁰ _{-0.033} | 13 | 10.5 | 10 | 41 | 5 | 33.5 | 5 | 6 | 30 | M8 x 1.25 | 20 |
| 25 | 22 | 19.5 | 17 | 9 | 10 | 10 | 26 ⁰ _{-0.033} | 13 | 10.5 | 10 | 45 | 6 | 37.5 | 5.5 | 8 | 30 | M10 x 1.25 | 20 |
| 32 | 22 | 19.5 | 17 | 9 | 10 | 12 | 26 ⁰ _{-0.033} | 13 | 10.5 | 11 | 45 | 6 | 46.5 | 5.5 | 10 | 30 | M10 x 1.25 | 22 |
| 40 | 24 | 21 | 22 | 10 | 15 | 14 | 32 ⁰ _{-0.039} | 16 | 13.5 | 12.5 | 50 | 8 | 56.2 | 7 | 12 | 39 | M14 x 1.5 | 26.5 |

| Bore (mm) | NA | NN | P | RR | S | U | Z | ZZ |
|-----------|------|-----------|-----|----|-----|----|-----|-----|
| 20 | 30 | M20 x 1.5 | 1/8 | 9 | 146 | 14 | 217 | 226 |
| 25 | 34.5 | M26 x 1.5 | 1/8 | 9 | 146 | 14 | 221 | 230 |
| 32 | 42.5 | M26 x 1.5 | 1/8 | 9 | 159 | 14 | 234 | 243 |
| 40 | 51 | M32 x 2 | 1/4 | 11 | 181 | 18 | 270 | 281 |

Double clevis type: RECD



| Bore (mm) | A | AL | B1 | CD | CX | CZ | D | E | F | FL | G | H | H1 | I | K | KA | L | MM |
|-----------|----|------|----|----|----|----|----|-----------------------------------|----|------|------|----|----|------|-----|----|----|------------|
| 20 | 18 | 15.5 | 13 | 9 | 10 | 19 | 8 | 20 ⁰ _{-0.033} | 13 | 10.5 | 10 | 41 | 5 | 33.5 | 5 | 6 | 30 | M8 x 1.25 |
| 25 | 22 | 19.5 | 17 | 9 | 10 | 19 | 10 | 26 ⁰ _{-0.033} | 13 | 10.5 | 10 | 45 | 6 | 37.5 | 5.5 | 8 | 30 | M10 x 1.25 |
| 32 | 22 | 19.5 | 17 | 9 | 10 | 19 | 12 | 26 ⁰ _{-0.033} | 13 | 10.5 | 11 | 45 | 6 | 46.5 | 5.5 | 10 | 30 | M10 x 1.25 |
| 40 | 24 | 21 | 22 | 10 | 15 | 30 | 14 | 32 ⁰ _{-0.039} | 16 | 13.5 | 12.5 | 50 | 8 | 56.2 | 7 | 12 | 39 | M14 x 1.5 |

| Bore (mm) | N | NA | NN | P | RR | S | U | Z | ZZ |
|-----------|------|------|-----------|-----|----|-----|----|-----|-----|
| 20 | 20 | 30 | M20 x 1.5 | 1/8 | 9 | 146 | 14 | 217 | 226 |
| 25 | 20 | 34.5 | M26 x 1.5 | 1/8 | 9 | 146 | 14 | 221 | 230 |
| 32 | 22 | 42.5 | M26 x 1.5 | 1/8 | 9 | 159 | 14 | 234 | 243 |
| 40 | 26.5 | 51 | M32 x 2 | 1/4 | 11 | 181 | 18 | 270 | 281 |

- REA
- REB
- REC**
- Smooth
- Low Speed
- MQ
- RHC
- RZQ

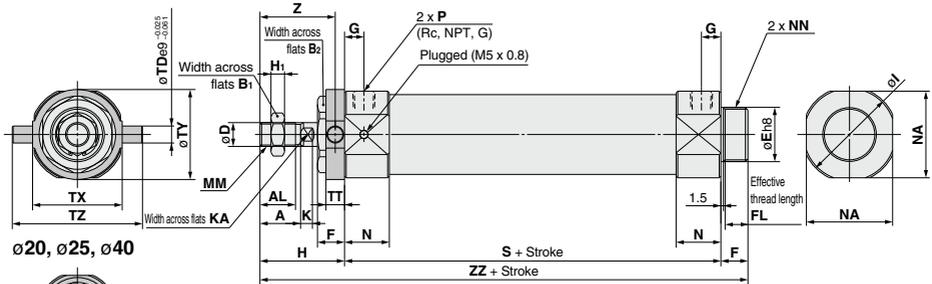
- D-□
- X□



REC Series

Dimensions

Rod side trunnion type: REC U



ø20, ø25, ø40

ø32

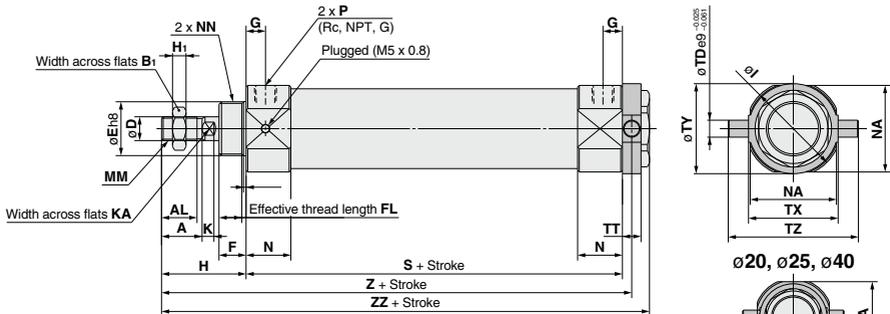
Note) For ø32, a trunnion pivot bracket NA (42.5) is used as standard.

| Bore (mm) | A | AL | B ₁ | B ₂ | D | E | F | FL | G | H | H ₁ | I | K | KA |
|-----------|----|------|----------------|----------------|----|-----------------------------------|----|------|------|----|----------------|------|-----|----|
| 20 | 18 | 15.5 | 13 | 26 | 8 | 20 ⁰ _{-0.033} | 13 | 10.5 | 10 | 41 | 5 | 33.5 | 5 | 6 |
| 25 | 22 | 19.5 | 17 | 32 | 10 | 26 ⁰ _{-0.033} | 13 | 10.5 | 10 | 45 | 6 | 37.5 | 5.5 | 8 |
| 32 | 22 | 19.5 | 17 | 32 | 12 | 26 ⁰ _{-0.033} | 13 | 10.5 | 11 | 45 | 6 | 46.5 | 5.5 | 10 |
| 40 | 24 | 21 | 22 | 41 | 14 | 32 ⁰ _{-0.039} | 16 | 13.5 | 12.5 | 50 | 8 | 56.2 | 7 | 12 |

| Bore (mm) | MM | N | NA | NN | P | S | TD | TT | TX | TY | TZ | Z | ZZ |
|-----------|------------|------|------|-----------|-----|-----|----|----|----|----|----|------|-----|
| 20 | M8 x 1.25 | 20 | 30 | M20 x 1.5 | 1/8 | 146 | 8 | 10 | 32 | 32 | 52 | 36 | 200 |
| 25 | M10 x 1.25 | 20 | 34.5 | M26 x 1.5 | 1/8 | 146 | 9 | 10 | 40 | 40 | 60 | 40 | 204 |
| 32 | M10 x 1.25 | 22 | 42.5 | M26 x 1.5 | 1/8 | 159 | 9 | 10 | 40 | 40 | 60 | 40 | 217 |
| 40 | M14 x 1.5 | 26.5 | 51 | M32 x 2 | 1/4 | 181 | 10 | 11 | 53 | 53 | 77 | 44.5 | 247 |

* Bracket is shipped together with the product.

Head side trunnion type: RECT



ø20, ø25, ø40

ø32

Note) For ø32, a trunnion pivot bracket NA (42.5) is used as standard.

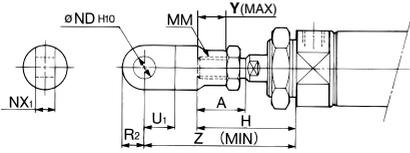
| Bore (mm) | A | AL | B ₁ | D | E | F | FL | G | H | H ₁ | I | K | KA | MM |
|-----------|----|------|----------------|----|-----------------------------------|----|------|------|----|----------------|------|-----|----|------------|
| 20 | 18 | 15.5 | 13 | 8 | 20 ⁰ _{-0.033} | 13 | 10.5 | 10 | 41 | 5 | 33.5 | 5 | 6 | M8 x 1.25 |
| 25 | 22 | 19.5 | 17 | 10 | 26 ⁰ _{-0.033} | 13 | 10.5 | 10 | 45 | 6 | 37.5 | 5.5 | 8 | M10 x 1.25 |
| 32 | 22 | 19.5 | 17 | 12 | 26 ⁰ _{-0.033} | 13 | 10.5 | 11 | 45 | 6 | 46.5 | 5.5 | 10 | M10 x 1.25 |
| 40 | 24 | 21 | 22 | 14 | 32 ⁰ _{-0.039} | 16 | 13.5 | 12.5 | 50 | 8 | 56.2 | 7 | 12 | M14 x 1.5 |

| Bore (mm) | N | NA | NN | P | S | TD | TT | TX | TY | TZ | Z | ZZ |
|-----------|------|------|-----------|-----|-----|----|----|----|----|----|-------|-----|
| 20 | 20 | 30 | M20 x 1.5 | 1/8 | 146 | 8 | 10 | 32 | 32 | 52 | 192 | 202 |
| 25 | 20 | 34.5 | M26 x 1.5 | 1/8 | 146 | 9 | 10 | 40 | 40 | 60 | 196 | 206 |
| 32 | 22 | 42.5 | M26 x 1.5 | 1/8 | 159 | 9 | 10 | 40 | 40 | 60 | 209 | 219 |
| 40 | 26.5 | 51 | M32 x 2 | 1/4 | 181 | 10 | 11 | 53 | 53 | 77 | 236.5 | 247 |

* Bracket is shipped together with the product.

Accessory Dimensions 1

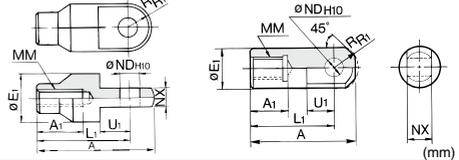
Single Knuckle Joint Mounting



| Bore (mm) | A | H | MM | ND H10 | NX1 | U1 | R2 | Y | Z |
|-----------|----|----|------------|-----------------------------------|------------------------------------|----|----|----|----|
| 20 | 18 | 41 | M8 x 1.25 | 9 ^{+0.058} ₀ | 9 ^{+0.1} _{-0.2} | 14 | 10 | 11 | 66 |
| 25, 32 | 22 | 45 | M10 x 1.25 | 9 ^{+0.058} ₀ | 9 ^{+0.1} _{-0.2} | 14 | 10 | 14 | 69 |
| 40 | 24 | 50 | M14 x 1.5 | 12 ^{+0.070} ₀ | 16 ^{+0.1} _{-0.3} | 20 | 14 | 13 | 92 |

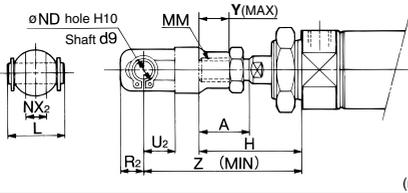
Single Knuckle Joint

I-020B, 032B Material: Rolled steel I-040B Material: Free cutting sulfur steel



| Part no. | Applicable bore size (mm) | A | A1 | E1 | L1 | MM | ND H10 | NX | R1 | U1 |
|----------|---------------------------|----|----|----|----|------------|-----------------------------------|------------------------------------|------|----|
| I-020B | 20 | 46 | 16 | 20 | 36 | M8 x 1.25 | 9 ^{+0.058} ₀ | 9 ^{+0.1} _{-0.2} | 10 | 14 |
| I-032B | 25, 32 | 48 | 18 | 20 | 38 | M10 x 1.25 | 9 ^{+0.058} ₀ | 9 ^{+0.1} _{-0.2} | 10 | 14 |
| I-040B | 40 | 69 | 22 | 24 | 55 | M14 x 1.5 | 12 ^{+0.070} ₀ | 16 ^{+0.1} _{-0.3} | 15.5 | 20 |

Double Knuckle Joint Mounting

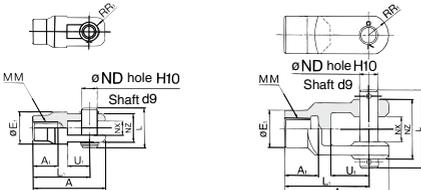


| Bore (mm) | A | H | L | MM | ND | NX2 | R2 | U2 | Y | Z |
|-----------|----|----|------|------------|----|------------------------------------|----|----|----|----|
| 20 | 18 | 41 | 25 | M8 x 1.25 | 9 | 9 ^{+0.2} _{-0.1} | 10 | 14 | 11 | 66 |
| 25, 32 | 22 | 45 | 25 | M10 x 1.25 | 9 | 9 ^{+0.2} _{-0.1} | 10 | 14 | 14 | 69 |
| 40 | 24 | 50 | 49.7 | M14 x 1.5 | 12 | 16 ^{+0.3} _{-0.1} | 13 | 25 | 13 | 92 |

Double Knuckle Joint

Y-020B, Y-032B Material: Rolled steel

Y-040B Material: Cast iron



| Part no. | Applicable bore size (mm) | A | A1 | E1 | L | L1 | MM | ND | NX | NZ | R1 | U1 | Applicable pin part no. | Retaining ring C9 for shaft | Retaining ring C9 for shaft |
|----------|---------------------------|----|----|----|------|----|------------|----|------------------------------------|----|----|----|-------------------------|-----------------------------|-----------------------------|
| Y-020B | 20 | 46 | 16 | 20 | 25 | 36 | M8 x 1.25 | 9 | 9 ^{+0.2} _{-0.1} | 18 | 5 | 14 | CDP-1 | Type C9 for shaft | Type C9 for shaft |
| Y-032B | 25, 32 | 48 | 18 | 20 | 25 | 38 | M10 x 1.25 | 9 | 9 ^{+0.2} _{-0.1} | 18 | 5 | 14 | CDP-1 | Type C9 for shaft | Type C9 for shaft |
| Y-040B | 40 | 68 | 22 | 24 | 49.7 | 55 | M14 x 1.5 | 12 | 16 ^{+0.3} _{-0.1} | 38 | 13 | 25 | CDP-3 | ø3 x 18 L | ø3 x 18 L |

* Knuckle pins and retaining rings (cotter pins for ø40) are included.

Double Clevis Pin/Material: Carbon steel

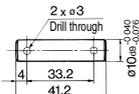
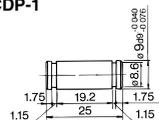
Bore size/ø20, ø25, ø32

Bore size/ø40

(mm)

CDP-1

CDP-2



Retaining ring: Type C9 for shaft

Cotter pin: ø3 x 18 L

* Retaining rings (cotter pins for ø40) are included.

Double Knuckle Pin/Material: Carbon steel

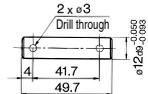
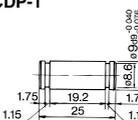
Bore size/ø20, ø25, ø32

Bore size/ø40

(mm)

CDP-1

CDP-3



Retaining ring: Type C9 for shaft

Cotter pin: ø3 x 18 L

* Retaining rings (cotter pins for ø40) are included.

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

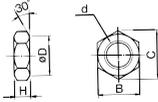
-X□

REC Series

Accessory Dimensions 2

Rod End Nut

Material: Carbon steel

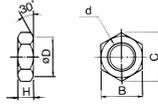


(mm)

| Part no. | Applicable bore size (mm) | B | C | D | d | H |
|----------|---------------------------|----|------|------|------------|---|
| NT-02 | 20 | 13 | 15.0 | 12.5 | M8 x 1.25 | 5 |
| NT-03 | 25, 32 | 17 | 19.6 | 16.5 | M10 x 1.25 | 6 |
| NT-04 | 40 | 22 | 25.4 | 21.0 | M14 x 1.5 | 8 |

Mounting Nut

Material: Carbon steel

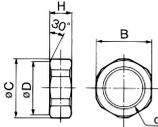


(mm)

| Part no. | Applicable bore size (mm) | B | C | D | d | H |
|----------|---------------------------|----|------|------|-----------|----|
| SN-020B | 20 | 26 | 30 | 25.5 | M20 x 1.5 | 8 |
| SN-032B | 25, 32 | 32 | 37 | 31.5 | M26 x 1.5 | 8 |
| SN-040B | 40 | 41 | 47.3 | 40.5 | M32 x 2.0 | 10 |

Trunnion Nut

Material: Carbon steel



(mm)

| Part no. | Applicable bore size (mm) | B | C | D | d | H |
|----------|---------------------------|----|----|------|-----------|----|
| TN-020B | 20 | 26 | 28 | 25.5 | M20 x 1.5 | 10 |
| TN-032B | 25, 32 | 32 | 34 | 31.5 | M26 x 1.5 | 10 |
| TN-040B | 40 | 41 | 45 | 40.5 | M32 x 2 | 10 |

Refer to page 1108 (CM2-XB12: External stainless steel cylinder) for stainless steel mounting brackets and accessories (some are not applicable).

* Same mounting brackets and accessories are used as CM2 series (Best Pneumatics No. 2-1).

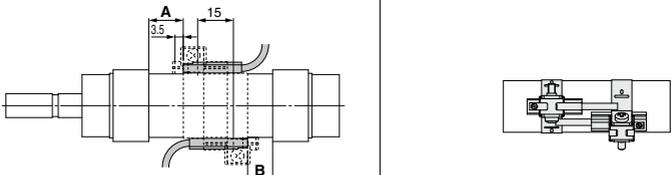
Auto Switch Mounting 1

Minimum Stroke for Auto Switch Mounting

| Auto switch model | No. of auto switches mounted | | | | n: No. of auto switches (mm) | |
|-------------------------------------|------------------------------|--------------------|--------------|--|--|--|
| | 1 | 2 | | n | | |
| | | Different surfaces | Same surface | Different surfaces | Same surface | |
| D-M9□ | 5 | 15 Note 1) | 40 Note 1) | $20 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 55 + 35 (n - 2) (n = 2, 3, 4, 5...) | |
| D-M9□W | 10 | 15 Note 1) | 40 Note 1) | $20 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 55 + 35 (n - 2) (n = 2, 3, 4, 5...) | |
| D-M9□A | 10 | 25 | 40 Note 1) | $25 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 60 + 35 (n - 2) (n = 2, 3, 4, 5...) | |
| D-A9□ | 5 | 15 | 30 Note 1) | $15 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 50 + 35 (n - 2) (n = 2, 3, 4, 5...) | |
| D-M9□V | 5 | 20 | 35 | $20 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 35 + 35 (n - 2) (n = 2, 3, 4, 5...) | |
| D-A9□V | 5 | 15 | 25 | $15 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 25 + 35 (n - 2) (n = 2, 3, 4, 5...) | |
| D-M9□WV D-M9□AV | 10 | 20 | 35 | $20 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 35 + 35 (n - 2) (n = 2, 3, 4, 5...) | |
| D-C7□ D-C80 | 5 | 20 | 60 | $20 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 60 + 45 (n - 2) (n = 2, 3, 4, 5...) | |
| D-H7□ D-H7□W D-H7BA D-H7NF | 10 | 25 | 70 | $25 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 70 + 45 (n - 2) (n = 2, 3, 4, 5...) | |
| D-C73C D-C80C D-H7C | 5 | 30 | 80 | $30 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 80 + 50 (n - 2) (n = 2, 3, 4, 5...) | |
| D-B5□ D-B64 D-G5□ D-K59□ | 5 | 25 | 70 | $25 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 70 + 50 (n - 2) (n = 2, 3, 4, 5...) | |
| D-B59W | 10 | 30 | 75 | $30 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3) | 75 + 50 (n - 2) (n = 2, 3, 4, 5...) | |

Note 3) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

Note 1) Auto switch mounting

| Auto switch model | With 2 auto switches | |
|---|-----------------------------|-----------------------------|
| | Different surfaces | Same surface |
|  <p>Correct auto switch mounting position is 3.5 mm from the back face of the switch holder.</p> <p>The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.</p> | | |
| D-M9□ D-M9□W | Less than 20 stroke Note 2) | Less than 55 stroke Note 2) |
| D-M9□A D-A9□ | Less than 25 stroke Note 2) | Less than 60 stroke Note 2) |
| | — | Less than 50 stroke Note 2) |

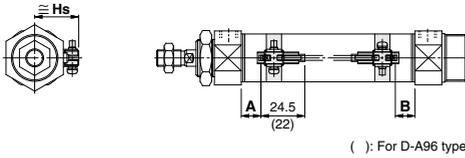
Note 2) Minimum stroke for auto switch mounting in types other than those mentioned in Note 1.

Auto Switch Mounting 2

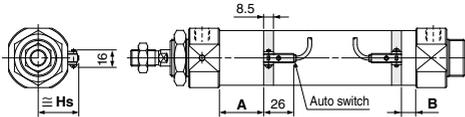
Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

Reed auto switch

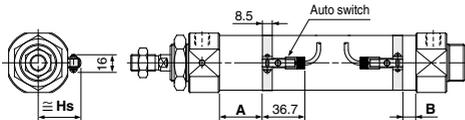
D-A9□



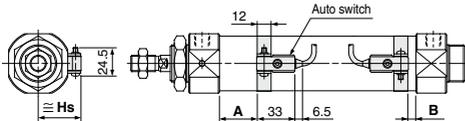
D-C7□, C80



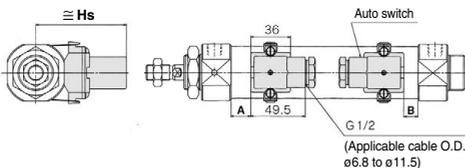
D-C73C, C80C



D-B5□, B64, B59W

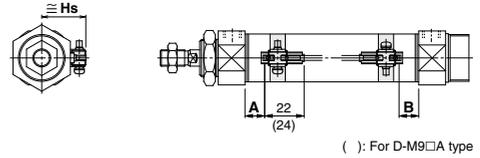


D-A44

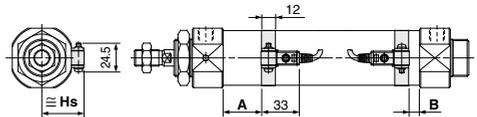


Solid state auto switch

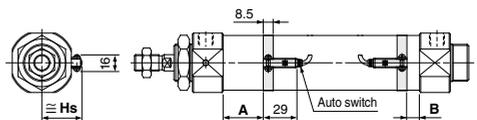
D-M9□
D-M9□A
D-M9□W



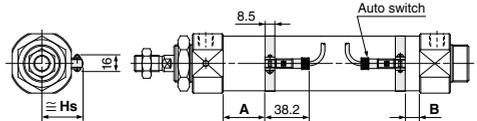
D-G5NT



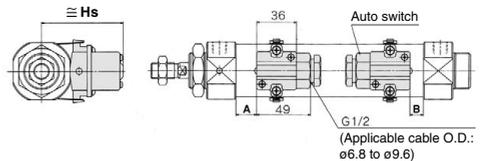
D-H7□, H7□W, H7NF, H7BA



D-H7C



D-A3□, G39, K39



Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

Auto Switch Proper Mounting Position

(mm)

| Auto Switch model Bore size (mm) | D-M9□(V) D-M9□W(V) D-M9□A(V) | | D-A9□(V) | | D-C7/C8 D-C73C D-C80C | | D-B5 D-B6 | | D-B59W | | D-A3□ D-G39 D-K39 D-A44 | | D-H7□ D-H7C D-H7□W D-H7BA D-H7NF | | D-G5NT | |
|-------------------------------------|------------------------------------|------|----------|------|-----------------------------|------|--------------|------|--------|------|----------------------------------|------|--|------|--------|------|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | 20 | 59.5 | 34 | 55.5 | 30.5 | 56 | 31 | 50 | 25 | 53 | 28 | 49.5 | 24.5 | 55 | 30 | 51.5 |
| 25 | 59.5 | 34 | 55.5 | 30.5 | 56 | 31 | 50 | 25 | 53 | 28 | 49.5 | 24.5 | 55 | 30 | 51.5 | 26.5 |
| 32 | 63 | 40 | 59 | 36 | 59.5 | 36.5 | 53.5 | 30.5 | 56.5 | 33.5 | 53 | 30 | 58.5 | 35.5 | 55 | 32 |
| 40 | 73.5 | 42.5 | 69.5 | 38.5 | 70 | 39 | 64 | 33 | 67 | 36 | 63.5 | 32.5 | 69 | 38 | 65.5 | 34.5 |

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

(mm)

| Auto Switch model Bore size (mm) | D-M9□(V) D-M9□W(V) D-M9□A(V) D-A9□(V) | | D-C7/C8 D-H7□ D-H7□W D-H7NF D-H7BA | | D-B5□ D-B64 D-B59W D-G5NT D-H7C | | D-C73C D-C80C | | D-A3□ D-G39 D-K39 | | D-A44 | |
|-------------------------------------|--|------|--|------|---|------|------------------|------|-------------------------|------|-------|------|
| | Hs | Hs | Hs | Hs | Hs | Hs | Hs | Hs | Hs | Hs | Hs | Hs |
| | 20 | 25 | 24.5 | 27.5 | 27 | 62 | 72 | 27 | 62 | 72 | 27 | 62 |
| 25 | 27.5 | 27 | 30 | 29.5 | 64.5 | 74.5 | 29.5 | 64.5 | 74.5 | 29.5 | 64.5 | 74.5 |
| 32 | 31 | 30.5 | 33.5 | 33 | 68 | 78 | 33 | 68 | 78 | 33 | 68 | 78 |
| 40 | 35.5 | 35 | 38 | 37.5 | 72.5 | 82.5 | 37.5 | 72.5 | 82.5 | 37.5 | 72.5 | 82.5 |

- REA
- REB
- REC**
- Smooth
- Low Speed
- MQ
- RHC
- RZQ

- D-□
- X□

Auto Switch Mounting 3

Operating Range

| Auto switch model | Bore size (mm) | | | |
|----------------------------|----------------|-----|-----|----|
| | 20 | 25 | 32 | 40 |
| D-A9□ | 7 | 6 | 8 | 8 |
| D-M9□ D-M9□W | 4 | 4 | 5 | 4 |
| D-C7□/C80 D-C73C/C80C | 8 | 10 | 9 | 10 |
| D-B5□/B64 D-B59W | 8 | 10 | 9 | 10 |
| D-H7□/H7□W D-H7NF/H7BA | 4 | 4 | 4.5 | 5 |
| D-H7C | 7 | 8.5 | 9 | 10 |
| D-A3□/D-A44 D-G39/D-K39 | 8 | 9 | 9 | 9 |
| D-G5NT D-G5NB | 4 | 4 | 4.5 | 5 |
| | 35 | 40 | 40 | 45 |

* 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 Mounting Bracket Part No.

| Auto switch model | Bore size (mm) | | | |
|--|----------------|-----------|-----------|-----------|
| | ø20 | ø25 | ø32 | ø40 |
| D-A9□(V) D-M9□(V) D-M9□W(V) D-M9□A(V) | BMA3-020 | BMA3-025 | BMA3-032 | BMA3-040 |
| D-C7□/C80 D-C73C D-C80C D-H7□ D-H7□W D-H7BA D-H7NF | BMA2-020A | BMA2-025A | BMA2-032A | BMA2-040A |
| D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G5BA/G59F D-G5NT D-G5NB | BA-01 | BA-02 | BA-32 | BA-04 |

Note 1) Set part number which includes the auto switch mounting band (BM2-□□□A) and the holder kit (BJ5-1/Switch bracket: Transparent).
Since the switch bracket (made from nylon) are affected in an environment where alcohol, chloroform, methylamines, hydrochloric acid or sulfuric acid is splashed over, so it cannot be used. Please consult SMC regarding other chemicals.

Note 2) Set part number which includes the auto switch mounting band (BM2-□□□AS/Stainless steel screw) and the holder kit (BJ4-1/Switch bracket: White).

Note 3) For the D-M9□A(V) type auto switch, do not install the switch bracket on the indicator light.

[Mounting screw set made of stainless steel]

The following set of mounting screws made of stainless steel is available. Use it in accordance with the operating environment.

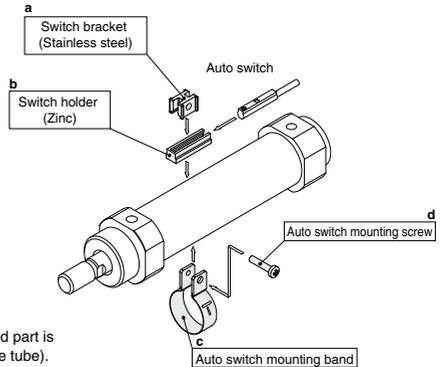
(Please order the auto switch mounting bracket separately, since it is not included.)

BBA4: For D-C7/C8/H7

Note 4) Refer to page 1048 for details of the BBA4.

The above stainless steel screws are used when a cylinder is shipped with the D-H7BA auto switch.

When only an auto switch is shipped independently, the BBA4 is attached.



- BJ□-1 is a set of "a" and "b".
- BM2-□□□A(S) is a set of "c" and "d".
Band (c) is mounted so that the projected part is on the internal side (contact side with the tube).
BJ4-1 (Switch bracket: White)
BJ5-1 (Switch bracket: Transparent)

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted.

For detailed specifications, refer to pages 941 to 1067.

| Auto switch type | Model | Electrical entry (Fetching direction) | Features | Applicable bore size |
|------------------|--------------------|---------------------------------------|---|----------------------|
| Reed | D-C73, C76 | Grommet (In-line) | — | ø20 to ø40 |
| | D-C80 | | Without indicator light | |
| | D-B53 | | — | ø20 to ø40 |
| Solid state | D-H7A1, H7A2, H7B | | — | ø20 to ø40 |
| | D-H7NW, H7PW, H7BW | | Diagnostic indication (2-color indicator) | |
| | D-G5NT | | With timer | ø20 to ø40 |

- * For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1014 and 1015 for details.
- * Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 959 for details.
- * Wide range detection type, solid state auto switches (D-G5NB type) are also available. Refer to page 1004 for details.



REC Series Specific Product Precautions

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

⚠ Caution

1. Speed Adjustment

Throttle speed controller, such as AS series, is recommended for speed adjustment.

Recommended Speed Controller

| Model | Model | | |
|--------------|--------------------|--------------------|-----------------|
| | Elbow type | Straight type | In-line type |
| REC20 | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS2001F-06-X214 |
| REC25 | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS2001F-06-X214 |
| REC32 | AS2201F-01-06-X214 | AS2301F-01-06-X214 | AS3001F-08-X214 |
| REC40 | AS3201F-02-08-X214 | AS3301F-02-08-X214 | AS3001F-08-X214 |

Symbol: Throttle valve



- Speed control is possible with meter-in and meter-out types of speed controllers. However, smooth acceleration and deceleration may not be obtained by these speed controllers.
- For installation other than horizontal mounting, it is recommended to use a system with reduced pressure supply circuit on the downward side. (This system is also effective for avoiding a start delay at rise and air consumption.)

2. Cushion Adjustment

Cushion adjustment mechanism is not designed.

Cushion adjustment is not necessary because the model can perform smooth acceleration and deceleration in a wide range of strokes without an adjusting cushion.

3. Plug (Relief Port)

For general conditions, a plug (M5 x 0.8) on the rod cover side is plugged with a hexagon socket head set screw . Do not remove it since dust may enter inside.

Hexagon socket set screw is not prepared for clean room specifications, and use it as relief port accordingly.

4. Cycle Time

Due to the nature of its construction, this cylinder starts and stops gradually. Therefore, the length of time for the stroke could be longer than that of standard cylinders.

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

-X□