

Low Friction Cylinders

MQ Series

Metal Seal Type

RoHS



Compact Low Friction Cylinder MQQ Series

P.322

| Series | Bore size (mm) | Operating pressure range (MPa) | Actuation speed (mm/s) |
|---|----------------|--------------------------------|------------------------|
| MQQT Standard type | 10 | 0.005 to 0.5 | 0.3 to 300 |
| | 16 | | |
| | 20 | | |
| MQQL Lateral load resisting type (Built-in ball bushing) | 25 | 0.005 to 0.7 | 0.5 to 500 |
| | 30 | | |
| | 40 | | |



Lateral Load Resisting Low Friction Cylinder MQM Series

P.331

| Series | Bore size (mm) | Operating pressure range (MPa) | Actuation speed (mm/s) |
|---|-------------------|---|------------------------|
| MQML Standard type | 6 (Standard only) | $\phi 6$: 0.02 to 0.7 $\phi 10$ to $\phi 25$: 0.005 to 0.7 | 0.5 to 1000 |
| | 10 | | |
| | 16 | | |
| MQML □ □ H High speed/frequency | 20 | 0.01 to 0.7 | 5 to 3000 |
| | 25 | | |



Low Friction Cylinder (Single Acting) MQP Series

P.342

| Series | Bore size (mm) | Operating pressure range (MPa) | Thrust control standard (N) |
|------------|----------------|--|-----------------------------|
| MQP | $\phi 4$ | 0.001 to 0.7 (Except for moving parts mass) | 0.01 to 8 |
| | $\phi 6$ | | 0.03 to 19 |
| | $\phi 10$ | | 0.08 to 50 |
| | $\phi 16$ | | 0.20 to 140 |
| | $\phi 20$ | | 0.30 to 200 |

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

-X□

Low pressure actuation

Minimal sliding resistance allows low pressure actuation at 0.005 MPa.
* Contact SMC regarding vacuum applications.

Low Friction Cylinders

MQQ Series

MQM Series

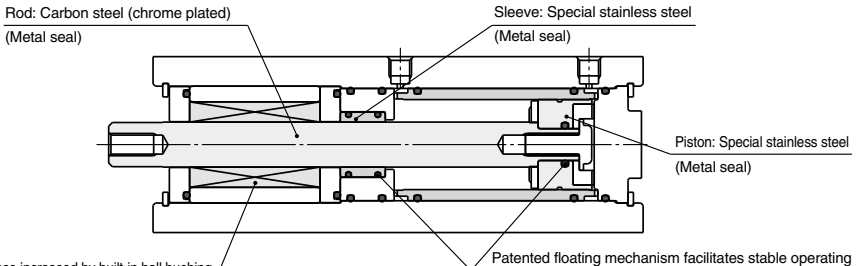
Metal seal structure with low sliding speed and an output control, which

Long service life

Long service life of 10,000 km or 100 million full cycles.

Low and uniform speed actuation

Smooth, uniform speed actuation ranges as low as 0.3 mm/s.



Lateral load resistance increased by built-in ball bushing
* MQQT type made of fluororesin.

Patented floating mechanism facilitates stable operating resistance without galling due to shaft slippage.

Low friction

Low sliding resistance and high stability allow force control as low as 0.05 N. (Based on cylinder Piston area x Pressure accuracy)
No increased sliding resistance after not operating for a long period of time.

Lateral load resistance

Lateral load resistance is increased by built-in ball bushing. (MQQL/MQML)

Series Variation

MQQ Series

Compact low friction cylinders designed for low pressure, low speed, uniform speed or low friction applications



| Series | Bore size (mm) | Stroke (mm) | | | | | | | | Operating pressure range (MPa) | Actuation speed (mm/s) |
|--|----------------|-------------|----|----|----|----|----|----|-----|--------------------------------|------------------------|
| | | 10 | 20 | 30 | 40 | 50 | 60 | 75 | 100 | | |
| MQQT Standard type | 10 | ● | ● | ● | ● | ● | ● | ● | ● | 0.005 to 0.5 | 0.3 to 300 |
| | 16 | ● | ● | ● | ● | ● | ● | ● | ● | | |
| | 20 | ● | ● | ● | ● | ● | ● | ● | ● | | |
| MQQL Lateral load resisting type (Built-in ball bushing) | 25 | ● | ● | ● | ● | ● | ● | ● | ● | 0.005 to 0.7 | 0.5 to 500 |
| | 30 | ● | ● | ● | ● | ● | ● | ● | ● | | |
| | 40 | ● | ● | ● | ● | ● | ● | ● | ● | | |

MQM Series

Lateral load resisting low friction cylinders for low pressure, low speed, uniform speed, low friction high pressure, high speed and high speed response (high frequency) actuation



| Series | Bore size (mm) | Stroke (mm) | | | | | Operating pressure range (MPa) | Actuation speed (mm/s) |
|---------------------------------|-------------------|-------------|----|----|----|----|---|------------------------|
| | | 15 | 30 | 45 | 60 | 75 | | |
| MQML Standard type | 6 (standard only) | ● | ● | ● | ● | ● | ø6: 0.02 to 0.7 ø10 to ø25: 0.005 to 0.7 | 0.5 to 1000 |
| | 10 | ● | ● | ● | ● | ● | | |
| | 16 | ● | ● | ● | ● | ● | | |
| MQML□□H High speed/frequency | 20 | ● | ● | ● | ● | ● | 0.01 to 0.7 | 5 to 3000 |
| | 25 | ● | ● | ● | ● | ● | | |

(Metal Seal Type)

/ $\varnothing 10, \varnothing 16, \varnothing 20, \varnothing 25, \varnothing 30, \varnothing 40$

/ $\varnothing 6, \varnothing 10, \varnothing 16, \varnothing 20, \varnothing 25$

resistance enables to cover the range of a driving were not available with the general cylinder.

High speed, High frequency actuation

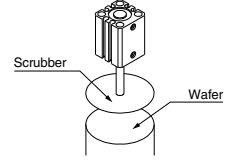
H type achieves speeds up to 3,000 mm/s (without fixed orifice), and continuous actuation up to 50 cycles per second. (MQML□□H)

*Refer to page 341 for kinetic energy.

Application Examples

For pressure controlling with fine pressure variations

Applicable models: MQQT/MQML



Polishing wafers

REA

REB

REC

Smooth

Low Speed

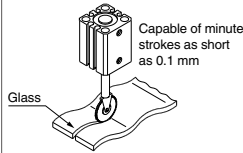
MQ

RHC

RZQ

For cutting glasses and lenses, requiring constant force

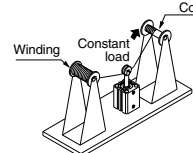
Applicable models: MQQL/MQML



Cutting wavy surfaces

Tension controlling responding to very low pressure and minute pressure variations

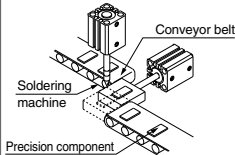
Applicable models: MQQL/MQML



Coil winding

For transferring precision components, etc., that require low or uniform speed actuation

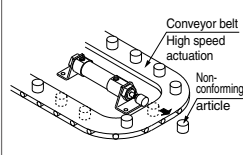
Applicable models: MQQT/MQML



Transferring precision components

For eliminating non-conforming articles requiring high speed actuation

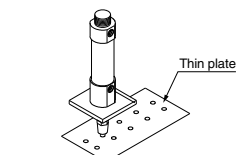
Applicable models: MQML/MQML□□H



Eliminating non-conforming articles

For punching operations requiring high frequency actuation

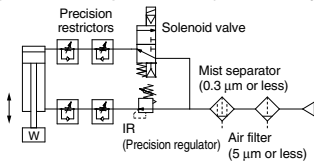
Applicable models: MQML/MQML□□H



Punching

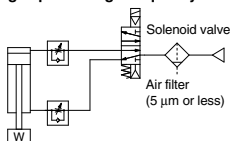
Recommended Circuit Examples

Example 1) Uniform & low speed actuation (no control of cylinder output)



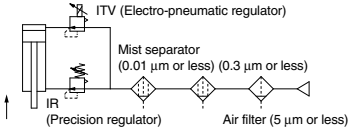
* When using a solenoid valve, use a metal seal type (VQ, VQZ, SQ series, etc.).

Example 3) High speed & high frequency actuation



* When using a solenoid valve, use a metal seal type (VQ, VQZ, SQ series, etc.).

Example 2) Low speed with output control



* When performing control of cylinder output, do not create a restriction circuit using a speed controller, etc. Pressure inside the cylinder will drop and control will become impossible. Always control actuation by means of pressure control. Besides, when using as pressing force or tension control (actuated by external force), air contained inside cylinder is discharged from a relief port on the regulator. When the pressure inside a cylinder is increased by displacement (stroke) or driving speed, etc., install an air tank.

Applications based on low friction specification

- 1) Operating resistance will vary with an offset load. Be sure to properly align the rod axis with the load and direction of movement when connecting. When an offset load is expected, provide a suitable mechanism such as a floating joint.
- 2) Use clean air (atmospheric pressure dew point temperature -10°C or less). Using the AM series mist separator (nominal filtration rating of 0.3 μm or less), or the AM + AMD series (nominal filtration rating of 0.01 μm or less) is recommended.

D-□

-X□

Low Friction Cylinder MQP Series



Fully covers a pressure force

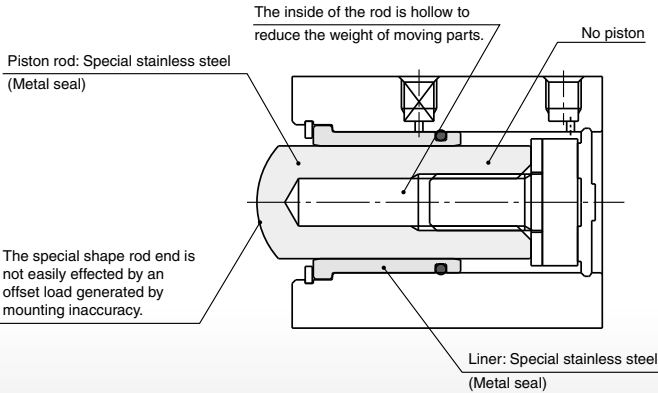
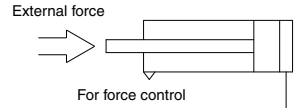
No lurching

Even extremely small degree lurching such as 0.01 mm does not occur. A special air supply, such as for static bearings, is not required.

No piston

Sliding resistance is drastically decreased because the piston and the rod share the same shaft.

Special single acting/Piston retraction by external force



Reduced thrust dispersion

Dispersion of piston diameter: 3 μm or less
Readjusting thrust is not necessary when the cylinder is replaced.
Dispersion of thrust does not occur even more than one cylinder is connected to the same circuit, either. (Depends on the operation environment.)

Low friction and soft-touching

Possible to control the output in increments of 0.01 N. (Depends on the piston area of a cylinder x pressure accuracy)
In addition, sliding resistance does not change after periods of non-operation.

High-precision linear control

Delicate and precise linear movement control is possible.

MQP Series

Low friction cylinder suitable for low friction, force control.

| Bore size [mm] (Pressure receiving diameter) | Stroke [mm] | Operating pressure range [MPa] | Mass of moving parts [g] | Thrust control standard [N] |
|---|-------------|--|--------------------------|-----------------------------|
| $\phi 4$ | 10 | 0.001 to 0.7 (Excluding the mass of moving parts) | 4 | 0.01 to 8 |
| $\phi 6$ | | | 8 | 0.03 to 19 |
| $\phi 10$ | | | 24 | 0.08 to 50 |
| $\phi 16$ | | | 62 | 0.20 to 140 |
| $\phi 20$ | | | 103 | 0.30 to 200 |

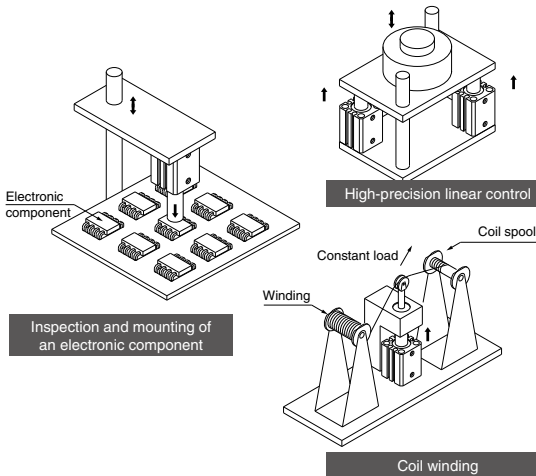
(Metal Seal Type/Single Acting)

/ $\varnothing 4, \varnothing 6, \varnothing 10, \varnothing 16, \varnothing 20$

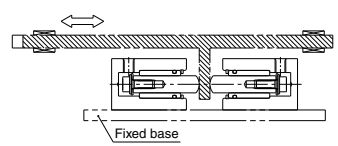
control range of 0.01 N to 200 N

Application Examples: For force control responding to a slight pressure fluctuation

Application examples for a single acting model



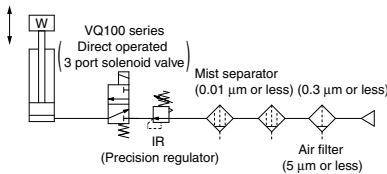
Application example for a double acting model



Using two MQP cylinders can improve the thrusting accuracy of an MQQ and/or MQM double acting metal cylinder. Additionally, equal strength of both extension and retracting thrust can be obtained.

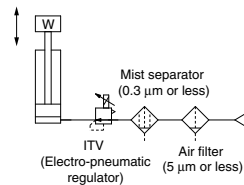
Recommended Circuit Examples

Example 1) Normal operation



- 1) When using a solenoid valve, SMC recommends you use the VQ100 series in which the lubricant in the main valve will not flow out.
- 2) Do not use a speed controller in the circuit. If it is used, accurate thrust control may not be possible because the internal pressure of a cylinder will drop. Be sure to employ pressure control for control operations.

Example 2) Soft-touch operation



Made to Order

- Vacuum retraction cylinder
- Single acting, spring return type (Built-in springs)
- Tubing with a maximum of $\varnothing 40$ (I.D.) is available.

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

Metal Seal

Compact Low Friction Cylinder

MQQ Series

ø10, ø16, ø20, ø25, ø30, ø40



How to Order

MQQ **T** **B** **10** **-** **10** **D**

Compact low friction specification

Type

| | |
|---|---|
| T | Standard type |
| L | Lateral load resisting type (Built-in ball bushing) |

Mounting

| | |
|----------|---|
| B | Through hole & Double end tapped (Standard) |
| L | Foot type |
| F | Rod side flange type |
| G | Head side flange type |
| D (Note) | Double clevis type |

Note) Available with the MQQL□ only.
* Mounting brackets are included when shipped, but unassembled.

Bore size

| | |
|----|-------|
| 10 | 10 mm |
| 16 | 16 mm |
| 20 | 20 mm |
| 25 | 25 mm |
| 30 | 30 mm |
| 40 | 40 mm |

Body option

| | |
|----------|----------------------------------|
| Nil | Standard (Rod end female thread) |
| M (Note) | Rod end male thread |

Note) A rod end thread adapter is attached.
* A rod end thread adapter is shipped being assembled.

Action

| | |
|---|---------------|
| D | Double acting |
|---|---------------|

Cylinder stroke

| Bore size (mm) | Standard stroke (mm) |
|----------------|-----------------------------|
| 10 | 10, 20, 30, 40 |
| 16 | 10, 20, 30, 40, 50, 60 |
| 20 | 10, 20, 30, 40, 50, 60 |
| 25 | 10, 20, 30, 40, 50, 75, 100 |
| 30 | 10, 20, 30, 40, 50, 75, 100 |
| 40 | 10, 20, 30, 40, 50, 75, 100 |

* Strokes are available in 1 mm increments by installing a spacer in standard stroke cylinders.
Example: MQQTB10-15D
(5 mm width spacer is installed in MQQTB10-20D to adjust the stroke.)

Port thread type

| | | |
|-----|----------|------------|
| Nil | M thread | ø10 to ø20 |
| | Rc | |
| TN | NPT | ø25 to ø40 |
| TF | G | |

* The MQQ series is not auto switch capable.

Mounting Bracket Part No.

| Bore size (mm) | Foot (Note 1) | Flange | Double clevis | Rod end thread adapter (with nut) |
|----------------|---------------|----------|---------------|-----------------------------------|
| 10 | CQS-L016 | CQS-F016 | CQS-D016 | MQ10-M |
| 16 | CQS-L020 | CQS-F020 | CQS-D020 | MQ16-M |
| 20 | CQS-L025 | CQS-F025 | CQS-D025 | MQ20-M |
| 25 | MQ-L032 | MQ-F032 | MQ-D032 | MQ25-M |
| 30 | MQ-L040 | MQ-F040 | MQ-D040 | MQ28-M |
| 40 | CQ-L050 | CQ-F050 | MQ-D050 | |

Note 1) When ordering a foot bracket, order 2 pcs. for each cylinder.

Note 2) The following parts are included with a bracket respectively.

Foot, Flange Body mounting bolts
Double clevis Clevis pin, C type retaining ring for shaft, Body mounting bolts

Specifications: Standard Type/MQQT



| Bore size (mm) | 10 | 16 | 20 | 25 | 30 | 40 |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----|
| Seal construction | Metal seal | | | | | |
| Action | Double acting, Single rod | | | | | |
| Fluid | Air | | | | | |
| Proof pressure | 1.05 MPa | | | | | |
| Maximum operating pressure | 0.5 MPa | | | | | |
| Minimum operating pressure <small>Note 1)</small> | 0.005 MPa | | | | | |
| Ambient and fluid temperature | -10 to 80°C | | | | | |
| Cushion | Rubber bumper (Standard) | | | | | |
| Lubrication <small>Note 2)</small> | Not required (Non-lube) | | | | | |
| Rod end thread | Female thread | | | | | |
| Stroke length tolerance | +1.0 0 | | | | | |
| Piston speed <small>Note 3)</small> | 0.3 to 300 mm/s (Refer to page 340.) | | | | | |
| Total leakage <small>Note 4)</small> | Supply pressure 0.1 MPa | 150 cm ³ /min | 200 cm ³ /min | 300 cm ³ /min | 400 cm ³ /min | |
| | Supply pressure 0.3 MPa | 800 cm ³ /min | 1000 cm ³ /min | 1200 cm ³ /min | 1600 cm ³ /min | |
| | Supply pressure 0.5 MPa | 1500 cm ³ /min | 2000 cm ³ /min | 3000 cm ³ /min | 4000 cm ³ /min | |

Note 1) Value when horizontal. (Use clean, dry, and nonfreezing air) However, as the stroke increases, it will likely be affected by the mass of its moving parts and the pressure will likely increase by approx. 0.003 to 0.005 MPa due to an offset load from the mass of the rod.

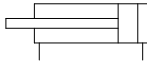
Note 2) Refer to precautions on page 339 regarding lubrication. This product uses turbine oil as an initial lubricant. Lubricant may seep out of the rod or the piping port.

Note 3) Control low speed actuation with differential pressure and a speed controller, etc. (Refer to recommended circuit examples on page 319 for further details.)

Note 4) The values are only for reference and are not guaranteed.

Symbol

Double acting, Single rod



Specifications: Lateral Load Resisting Type/MQQL

| Bore size (mm) | 10 | 16 | 20 | 25 | 30 | 40 |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----|
| Seal construction | Metal seal | | | | | |
| Action | Double acting, Single rod | | | | | |
| Fluid | Air | | | | | |
| Proof pressure | 1.05 MPa | | | | | |
| Maximum operating pressure | 0.7 MPa | | | | | |
| Minimum operating pressure <small>Note 1)</small> | 0.005 MPa | | | | | |
| Ambient and fluid temperature | -10 to 80°C | | | | | |
| Cushion | Rubber bumper (Standard) | | | | | |
| Lubrication <small>Note 2)</small> | Not required (Non-lube) | | | | | |
| Rod end thread | Female thread | | | | | |
| Stroke length tolerance | +1.0 0 | | | | | |
| Piston speed <small>Note 3)</small> | 0.5 to 500 mm/s (Refer to page 340.) | | | | | |
| Total leakage <small>Note 4)</small> | Supply pressure 0.1 MPa | 150 cm ³ /min | 200 cm ³ /min | 300 cm ³ /min | 400 cm ³ /min | |
| | Supply pressure 0.3 MPa | 800 cm ³ /min | 1000 cm ³ /min | 1200 cm ³ /min | 1600 cm ³ /min | |
| | Supply pressure 0.5 MPa | 1500 cm ³ /min | 2000 cm ³ /min | 3000 cm ³ /min | 4000 cm ³ /min | |

Note 1) Value when horizontal. (Use clean, dry, and nonfreezing air) However, as the stroke increases, it will likely be affected by the mass of its moving parts and the pressure will likely increase by approx. 0.003 to 0.005 MPa due to an offset load from the mass of the rod.

Note 2) Refer to precautions on page 339 regarding lubrication. This product uses turbine oil as an initial lubricant. Lubricant may seep out of the rod or the piping port.

Note 3) Control low speed actuation with differential pressure and a speed controller, etc. (Refer to recommended circuit examples on page 319 for further details.)

Note 4) The values are only for reference and are not guaranteed.

Weight: Standard Type/MQQT

| Bore size (mm) | Cylinder stroke (mm) | | | | | | | Unit: g |
|----------------|----------------------|-----|-----|------|------|-----|------|---------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 75 | |
| 10 | 94 | 118 | 142 | 166 | — | — | — | — |
| 16 | 166 | 206 | 246 | 286 | 326 | 366 | — | — |
| 20 | 228 | 290 | 352 | 414 | 476 | 538 | — | — |
| 25 | 395 | 487 | 579 | 671 | 763 | — | 993 | 1223 |
| 30 | 479 | 567 | 655 | 743 | 831 | — | 1052 | 1272 |
| 40 | 728 | 846 | 964 | 1082 | 1200 | — | 1495 | 1790 |

Weight: Lateral Load Resisting Type/MQQL (Built-in Ball Bushing)

| Bore size (mm) | Cylinder stroke (mm) | | | | | | | Unit: g |
|----------------|----------------------|------|------|------|------|-----|------|---------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 75 | |
| 10 | 148 | 172 | 196 | 220 | — | — | — | — |
| 16 | 284 | 324 | 364 | 404 | 444 | 484 | — | — |
| 20 | 383 | 445 | 507 | 569 | 631 | 693 | — | — |
| 25 | 552 | 644 | 736 | 828 | 920 | — | 1150 | 1380 |
| 30 | 911 | 999 | 1087 | 1175 | 1263 | — | 1485 | 1705 |
| 40 | 1337 | 1455 | 1573 | 1691 | 1809 | — | 2104 | 2359 |

* Refer to page 340 for moving parts mass.

Theoretical Output (Guide)



| Bore size (mm) | Rod size (mm) | Direction | Piston area (mm ²) | Operating pressure (MPa) | | | | | | |
|----------------|---------------|-----------|--------------------------------|--------------------------|-------|-------|-------|-------|-------|-------|
| | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| 10 | 6 | IN | 50.3 | 5.0 | 10.1 | 15.1 | 20.1 | 25.2 | 30.2 | 35.2 |
| | | OUT | 78.5 | 7.9 | 15.7 | 23.6 | 31.4 | 39.3 | 47.1 | 55.0 |
| 16 (15.8) | 8 | IN | 145.8 | 14.9 | 29.2 | 43.7 | 58.3 | 72.9 | 87.5 | 102.1 |
| | | OUT | 196.1 | 19.6 | 39.2 | 58.9 | 78.4 | 98.1 | 117.7 | 137.3 |
| 20 | 10 | IN | 235.6 | 23.6 | 47.1 | 70.7 | 94.2 | 117.8 | 141.4 | 164.9 |
| | | OUT | 314.2 | 31.4 | 62.8 | 94.3 | 125.7 | 157.1 | 188.5 | 219.9 |
| 25 | 12 | IN | 377.8 | 37.8 | 75.6 | 113.3 | 151.1 | 188.9 | 226.7 | 262.5 |
| | | OUT | 490.9 | 49.1 | 98.2 | 147.3 | 196.4 | 245.5 | 294.5 | 343.6 |
| 30 | 16 | IN | 505.8 | 50.6 | 101.2 | 151.8 | 202.4 | 253.0 | 303.6 | 354.2 |
| | | OUT | 706.9 | 70.7 | 141.4 | 212.1 | 282.8 | 353.5 | 424.2 | 494.9 |
| 40 | 16 | IN | 1055.6 | 105.6 | 211.2 | 316.8 | 422.4 | 528.0 | 633.6 | 739.2 |
| | | OUT | 1256.6 | 125.7 | 251.4 | 377.1 | 502.8 | 628.5 | 754.2 | 879.9 |

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

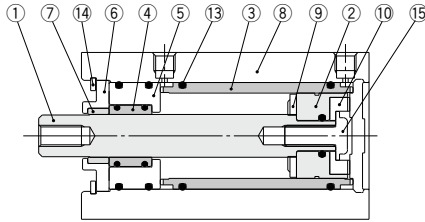
D-□

X-□

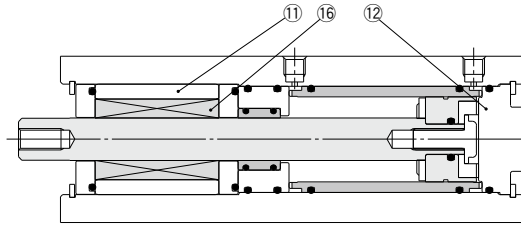
MQQ Series

Construction

Standard type: MQQT



Lateral load resisting type: MQQL (Built-in ball bushing)



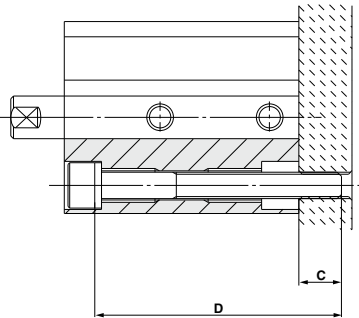
Component Parts

| No. | Description | Material | Note |
|-----|-----------------|-------------------------|--------------------|
| 1 | Rod | Carbon steel | Hard chrome plated |
| 2 | Piston | Special stainless steel | |
| 3 | Liner | Special stainless steel | |
| 4 | Sleeve | Special stainless steel | |
| 5 | Sleeve retainer | Aluminum alloy | |
| 6 | Plate | Aluminum alloy | Hard anodized |
| 7 | Guide | Fluororesin | |
| 8 | Cylinder tube | Aluminum alloy | Hard anodized |
| 9 | Bumper A | Polyurethane | |
| 10 | Bumper B | Polyurethane | |
| 11 | Bushing | Aluminum alloy | |
| 12 | Bottom plate | Aluminum alloy | Hard anodized |
| 13 | O-ring | NBR | |
| 14 | Retaining ring | Carbon tool steel | Phosphate coated |
| 15 | Bolt | Carbon tool steel | Chromated |
| 16 | Ball bushing | | |

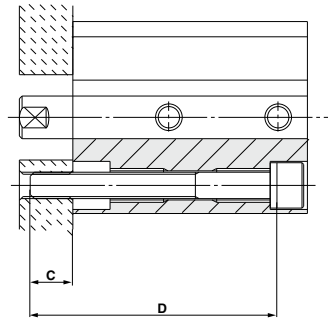
Mounting

Mounting bolts

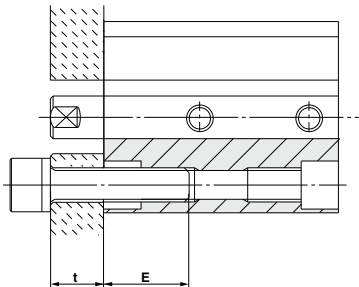
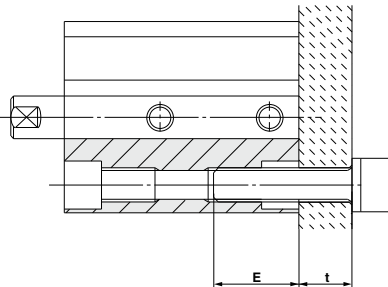
a) Mounting type A (when using the mounting plate threads)



Note) Be sure to use a flat washer for the A type mounting.



b) Mounting type B (when using the cylinder tube threads)



REA
REB
REC
Smooth
Low Speed
MQ
RHC
RZQ

Compatible Mounting Bolt Dimensions

| Model | Mounting type A | | | Mounting type B | | |
|---|--------------------|----------|---------------------|--------------------|-----------|----------|
| | Mounting bolt size | C (mm) | D: Bolt length (mm) | Mounting bolt size | E (mm) | |
| Standard type MQQT | MQQTB10-□D | M3 x 0.5 | 7 | 35 + Stroke | M4 x 0.7 | 8 to 11 |
| | MQQTB16-□D | | 7 | 35 + Stroke | | |
| | MQQTB20-□D | M5 x 0.8 | 8.5 | 40 + Stroke | M6 x 1 | 13 to 17 |
| | MQQTB25-□D | | 9 | 45 + Stroke | | |
| | MQQTB30-□D | | 7.5 | 50 + Stroke | | |
| MQQTB40-□D | M6 x 1 | 6 | 50 + Stroke | M8 x 1.25 | 16 to 22 | |
| Lateral load resisting type MQQL (Built-in ball bushing) | MQQLB10-□D | M3 x 0.5 | 7 | 65 + Stroke | M4 x 0.7 | 8 to 11 |
| | MQQLB16-□D | | 5.5 | 70 + Stroke | | |
| | MQQLB20-□D | M5 x 0.8 | 8 | 80 + Stroke | M6 x 1 | 13 to 17 |
| | MQQLB25-□D | | 6.5 | 85 + Stroke | | |
| | MQQLB30-□D | | 7 | 105 + Stroke | | |
| | MQQLB40-□D | M6 x 1 | 7 | 105 + Stroke | M8 x 1.25 | 16 to 22 |

□: Stroke

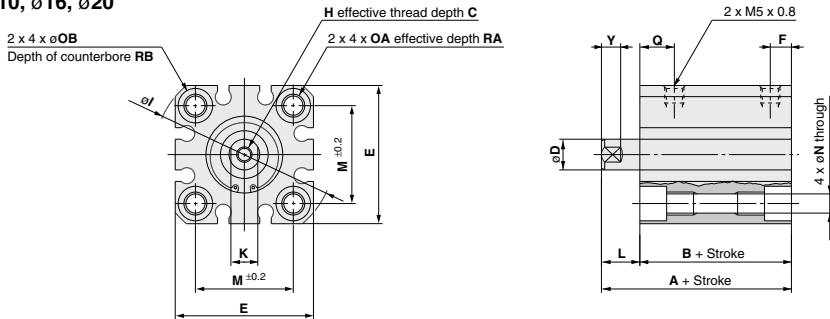
D-□
-X□

MQQ Series

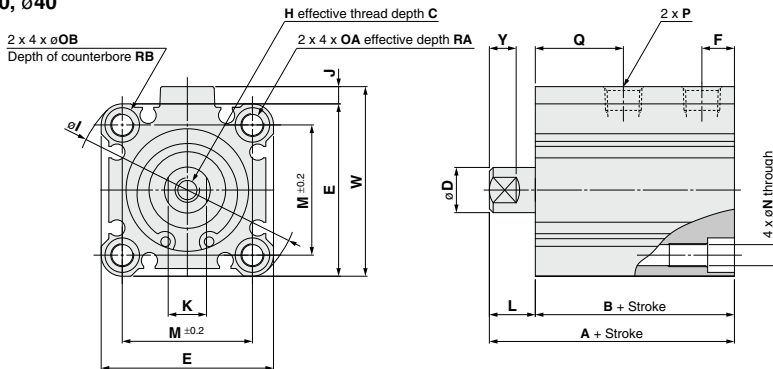
Dimensions

Standard type (Through hole & Double end tapped): MQQT B

ø10, ø16, ø20



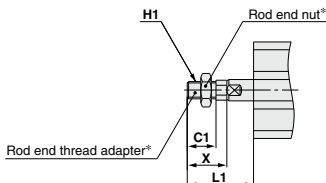
ø25, ø30, ø40



| Bore size (mm) | Stroke range (mm) | A | B | C | D ^(Note) | E | F | H | I | J | K | L | M | N | OA | OB | P | | | Q | RA | RB | W | Y |
|----------------|-------------------|------|------|----|---------------------|----|-----|-----------|----|-----|----|----|------|-----|-----------|-----|--------|---------|-------|------|----|----|------|----|
| | | | | | | | | | | | | | | | | | — | TN | TF | | | | | |
| 10 | 10 to 40 | 39.5 | 31.5 | 6 | 6 (5.8) | 29 | 5.5 | M3 x 0.5 | 38 | — | 5 | 8 | 20 | 3.5 | M4 x 0.7 | 6.5 | — | — | — | 14.5 | 7 | 4 | — | 5 |
| 16 | 10 to 60 | 44 | 34 | 8 | 8 (7.8) | 36 | 5.5 | M4 x 0.7 | 47 | — | 7 | 10 | 25.5 | 5.4 | M6 x 1.0 | 9 | — | — | — | 18 | 10 | 7 | — | 5 |
| 20 | 10 to 60 | 47.5 | 37.5 | 10 | 10 (9.8) | 40 | 5.5 | M5 x 0.8 | 52 | — | 8 | 10 | 28 | 5.4 | M6 x 1.0 | 9 | — | — | — | 19.5 | 10 | 7 | — | 6 |
| 25 | 10 to 50, 75, 100 | 54 | 42 | 12 | 12 (11.8) | 45 | 8.5 | M6 x 1.0 | 60 | 4.5 | 10 | 12 | 34 | 5.5 | M6 x 1.0 | 9 | Rc 1/8 | NPT 1/8 | G 1/8 | 23 | 10 | 7 | 49.5 | 7 |
| 30 | 10 to 50, 75, 100 | 60.5 | 48.5 | 13 | 16 (15.8) | 52 | 8.5 | M8 x 1.25 | 69 | 5 | 14 | 12 | 40 | 5.5 | M6 x 1.0 | 9 | Rc 1/8 | NPT 1/8 | G 1/8 | 26 | 10 | 7 | 57 | 10 |
| 40 | 10 to 50, 75, 100 | 62 | 50 | 13 | 16 (15.8) | 64 | 12 | M8 x 1.25 | 86 | 7 | 14 | 12 | 50 | 6.6 | M8 x 1.25 | 11 | Rc 1/4 | NPT 1/4 | G 1/4 | 26 | 14 | 8 | 71 | 10 |

Note () : Rod end dimensions

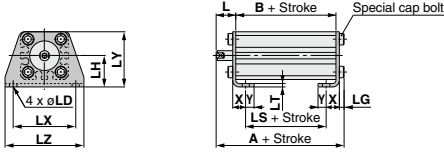
With rod end male thread: MQQ□-□DM



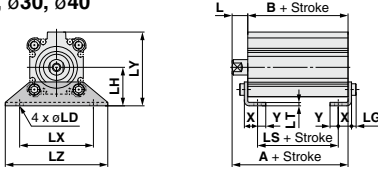
| Bore size (mm) | L1 | C1 | H1 | X |
|----------------|------|------|------------|------|
| 10 | 23.5 | 10.5 | M5 x 0.8 | 15.5 |
| 16 | 26.5 | 11.5 | M6 x 1.0 | 16.5 |
| 20 | 28.5 | 13.5 | M8 x 1.25 | 18.5 |
| 25 | 34.5 | 16.5 | M10 x 1.25 | 22.5 |
| 30 | 40.5 | 22.5 | M14 x 1.5 | 28.5 |
| 40 | 40.5 | 22.5 | M14 x 1.5 | 28.5 |

* Refer to page 330 for details regarding the rod end thread adapter and the rod end nut.

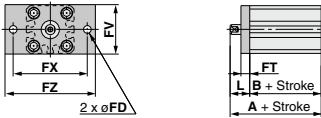
Foot type: MQQTL
ø10, ø16, ø20



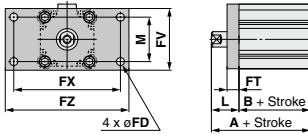
ø25, ø30, ø40



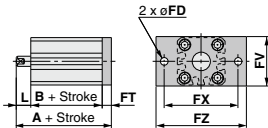
Rod side flange type: MQQTF
ø10, ø16, ø20



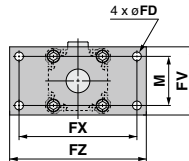
ø25, ø30, ø40



Head side flange type: MQQTG
ø10, ø16, ø20



ø25, ø30, ø40



| Bore size (mm) | Stroke range (mm) | A | B | L | LD | LG | LH |
|----------------|-------------------|------|------|----|-----|-----|----|
| 10 | 10 to 40 | 44.3 | 31.5 | 8 | 4.5 | 2.8 | 19 |
| 16 | 10 to 60 | 51.2 | 34 | 10 | 6.6 | 4 | 24 |
| 20 | 10 to 60 | 54.7 | 37.5 | 10 | 6.6 | 4 | 26 |
| 25 | 10 to 50,75,100 | 61.2 | 42 | 12 | 6.6 | 4 | 30 |
| 30 | 10 to 50,75,100 | 67.7 | 48.5 | 12 | 6.6 | 4 | 33 |
| 40 | 10 to 50,75,100 | 70.2 | 50 | 12 | 9 | 5 | 39 |

| Bore size (mm) | LS | LT | LX | LY | LZ | X | Y |
|----------------|------|-----|----|------|----|------|-----|
| 10 | 19.5 | 2 | 38 | 33.5 | 48 | 8 | 5 |
| 16 | 22 | 3.2 | 48 | 42 | 62 | 9.2 | 5.8 |
| 20 | 22.5 | 3.2 | 52 | 46 | 66 | 10.7 | 5.8 |
| 25 | 26 | 3.2 | 57 | 57 | 71 | 11.2 | 5.8 |
| 30 | 32.5 | 3.2 | 64 | 64 | 78 | 11.2 | 7 |
| 40 | 27 | 3.2 | 79 | 78 | 95 | 14.7 | 8 |

| Bore size (mm) | Stroke range (mm) | A | B | FD | FT | FV | FX |
|----------------|-------------------|------|------|-----|-----|----|----|
| 10 | 10 to 40 | 49.5 | 31.5 | 4.5 | 5.5 | 30 | 45 |
| 16 | 10 to 60 | 54 | 34 | 6.6 | 8 | 39 | 48 |
| 20 | 10 to 60 | 57.5 | 37.5 | 6.6 | 8 | 42 | 52 |
| 25 | 10 to 50,75,100 | 64 | 42 | 5.5 | 8 | 48 | 56 |
| 30 | 10 to 50,75,100 | 70.5 | 48.5 | 5.5 | 8 | 54 | 62 |
| 40 | 10 to 50,75,100 | 72 | 50 | 6.6 | 9 | 67 | 76 |

| Bore size (mm) | FZ | L | M |
|----------------|----|----|----|
| 10 | 55 | 18 | — |
| 16 | 60 | 20 | — |
| 20 | 64 | 20 | — |
| 25 | 65 | 22 | 34 |
| 30 | 72 | 22 | 40 |
| 40 | 89 | 22 | 50 |

| Bore size (mm) | Stroke range (mm) | A | L |
|----------------|-------------------|------|----|
| 10 | 10 to 40 | 45 | 8 |
| 16 | 10 to 60 | 52 | 10 |
| 20 | 10 to 60 | 55.5 | 10 |
| 25 | 10 to 50,75,100 | 62 | 12 |
| 30 | 10 to 50,75,100 | 68.5 | 12 |
| 40 | 10 to 50,75,100 | 71 | 12 |

(Dimensions other than A and L are the same as the rod side flange type.)

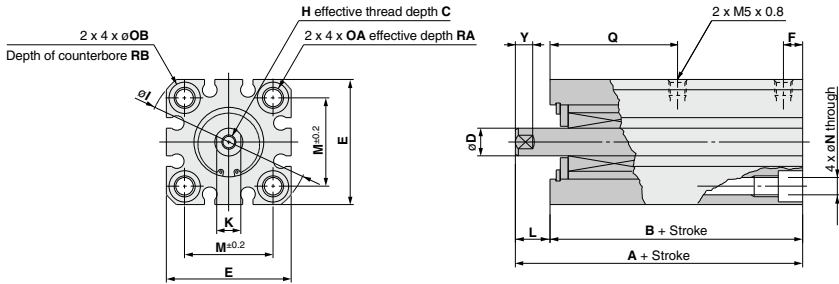
- REA
- REB
- REC
- Smooth
- Low Speed
- MQ
- RHC
- RZQ

MQQ Series

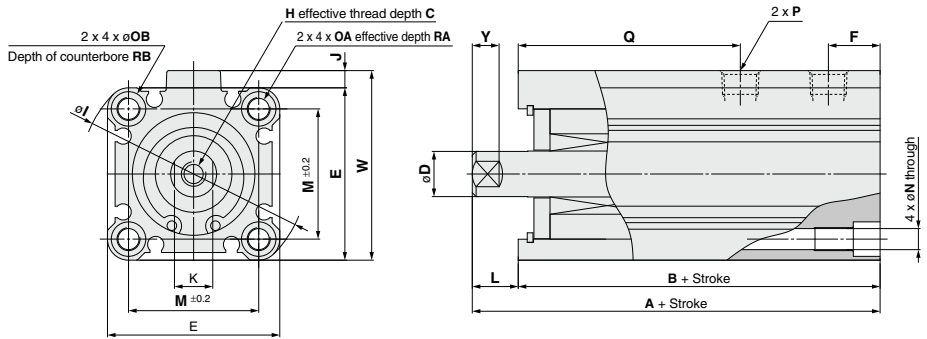
Dimensions

Lateral load resisting type (Through hole & Double end tapped): MQQLB

ø10, ø16, ø20



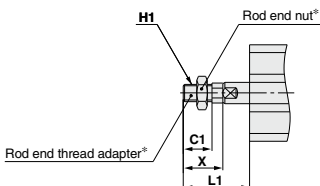
ø25, ø30, ø40



| Bore size (mm) | Stroke range (mm) | A | B | C | D (Note) | E | F | H | I | J | K | L | M | N | OA | OB | P | | | Q | RA | RB | W | Y |
|----------------|-------------------|------|------|----|-----------|----|------|-----------|----|-----|----|----|------|-----|-----------|-----|--------|---------|-------|------|----|----|------|----|
| | | | | | | | | | | | | | | | | | — | TN | TF | | | | | |
| 10 | 10 to 40 | 69.5 | 61.5 | 6 | 6 (5.8) | 29 | 9 | M3 x 0.5 | 38 | — | 5 | 8 | 20 | 3.5 | M4 x 0.7 | 6.5 | — | — | — | 39.5 | 7 | 4 | — | 5 |
| 16 | 10 to 60 | 80.5 | 70.5 | 8 | 8 (7.8) | 36 | 11 | M4 x 0.7 | 47 | — | 7 | 10 | 25.5 | 5.4 | M6 x 1.0 | 9 | — | — | — | 48.5 | 10 | 7 | — | 5 |
| 20 | 10 to 60 | 89 | 79 | 10 | 10 (9.8) | 40 | 11.5 | M5 x 0.8 | 52 | — | 8 | 10 | 28 | 5.4 | M6 x 1.0 | 9 | — | — | — | 55 | 10 | 7 | — | 6 |
| 25 | 10 to 50, 75, 100 | 96.5 | 84.5 | 12 | 12 (11.8) | 45 | 13.5 | M6 x 1.0 | 60 | 4.5 | 10 | 12 | 34 | 5.5 | M6 x 1.0 | 9 | Rc 1/8 | NPT 1/8 | G 1/8 | 58 | 10 | 7 | 49.5 | 7 |
| 30 | 10 to 50, 75, 100 | 116 | 104 | 13 | 16 (15.8) | 52 | 17.5 | M8 x 1.25 | 69 | 5 | 14 | 12 | 40 | 5.5 | M6 x 1.0 | 9 | Rc 1/8 | NPT 1/8 | G 1/8 | 71 | 10 | 7 | 57 | 10 |
| 40 | 10 to 50, 75, 100 | 116 | 104 | 13 | 16 (15.8) | 64 | 17.5 | M8 x 1.25 | 86 | 7 | 14 | 12 | 50 | 6.6 | M8 x 1.25 | 11 | Rc 1/4 | NPT 1/4 | G 1/4 | 71 | 14 | 8 | 71 | 10 |

Note () : Rod end dimensions

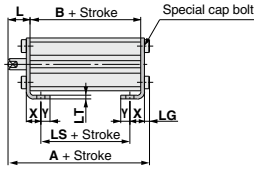
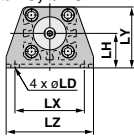
With rod end male thread: MQQ□-DM



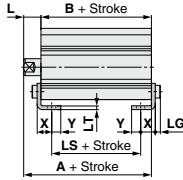
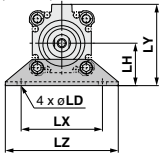
| Bore size (mm) | (mm) | | | |
|----------------|------|------|------------|------|
| | L1 | C1 | H1 | X |
| 10 | 23.5 | 10.5 | M5 x 0.8 | 15.5 |
| 16 | 26.5 | 11.5 | M6 x 1.0 | 16.5 |
| 20 | 28.5 | 13.5 | M8 x 1.25 | 18.5 |
| 25 | 34.5 | 16.5 | M10 x 1.25 | 22.5 |
| 30 | 40.5 | 22.5 | M14 x 1.5 | 28.5 |
| 40 | 40.5 | 22.5 | M14 x 1.5 | 28.5 |

* Refer to page 330 for details regarding the rod end thread adapter and the rod end nut.

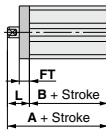
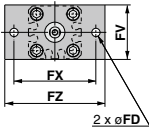
Foot type: MQQLL
ø10, ø16, ø20



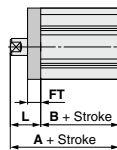
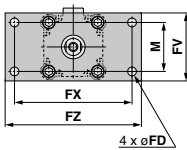
ø25, ø30, ø40



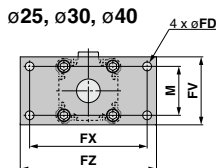
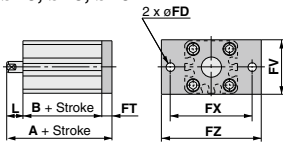
Rod side flange type: MQQLF
ø10, ø16, ø20



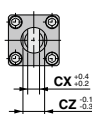
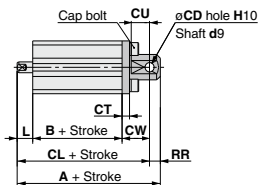
ø25, ø30, ø40



Head side flange type: MQQLG
ø10, ø16, ø20



Double clevis type: MQQLD



| (mm) | | | | | | | |
|----------------|-------------------|-------|------|----|-----|-----|----|
| Bore size (mm) | Stroke range (mm) | A | B | L | LD | LG | LH |
| 10 | 10 to 40 | 74.3 | 61.5 | 8 | 4.5 | 2.8 | 19 |
| 16 | 10 to 60 | 87.7 | 70.5 | 10 | 6.6 | 4 | 24 |
| 20 | 10 to 60 | 96.2 | 79 | 10 | 6.6 | 4 | 26 |
| 25 | 10 to 50,75,100 | 103.7 | 84.5 | 12 | 6.6 | 4 | 30 |
| 30 | 10 to 50,75,100 | 123.2 | 104 | 12 | 6.6 | 4 | 33 |
| 40 | 10 to 50,75,100 | 124.2 | 104 | 12 | 9 | 5 | 39 |

| Bore size (mm) | LS | LT | LX | LY | LZ | X | Y |
|----------------|------|-----|----|------|----|------|-----|
| 10 | 49.5 | 2 | 38 | 33.5 | 48 | 8 | 5 |
| 16 | 58.5 | 3.2 | 48 | 42 | 62 | 9.2 | 5.8 |
| 20 | 64 | 3.2 | 52 | 46 | 66 | 10.7 | 5.8 |
| 25 | 68.5 | 3.2 | 57 | 57 | 71 | 11.2 | 5.8 |
| 30 | 88 | 3.2 | 64 | 64 | 78 | 11.2 | 7 |
| 40 | 81 | 3.2 | 79 | 78 | 95 | 14.7 | 8 |

| (mm) | | | | | | | |
|----------------|-------------------|-------|------|-----|-----|----|----|
| Bore size (mm) | Stroke range (mm) | A | B | FD | FT | FV | FX |
| 10 | 10 to 40 | 79.5 | 61.5 | 4.5 | 5.5 | 30 | 45 |
| 16 | 10 to 60 | 90.5 | 70.5 | 6.6 | 8 | 39 | 48 |
| 20 | 10 to 60 | 99 | 79 | 6.6 | 8 | 42 | 52 |
| 25 | 10 to 50,75,100 | 106.5 | 84.5 | 5.5 | 8 | 48 | 56 |
| 30 | 10 to 50,75,100 | 126 | 104 | 5.5 | 8 | 54 | 62 |
| 40 | 10 to 50,75,100 | 126 | 104 | 6.6 | 9 | 67 | 76 |

| Bore size (mm) | FZ | L | M |
|----------------|----|----|----|
| 10 | 55 | 18 | — |
| 16 | 60 | 20 | — |
| 20 | 64 | 20 | — |
| 25 | 65 | 22 | 34 |
| 30 | 72 | 22 | 40 |
| 40 | 89 | 22 | 50 |

| (mm) | | | |
|----------------|-------------------|-------|----|
| Bore size (mm) | Stroke range (mm) | A | L |
| 10 | 10 to 40 | 75 | 8 |
| 16 | 10 to 60 | 88.5 | 10 |
| 20 | 10 to 60 | 97 | 10 |
| 25 | 10 to 50,75,100 | 104.5 | 12 |
| 30 | 10 to 50,75,100 | 124 | 12 |
| 40 | 10 to 50,75,100 | 125 | 12 |

(Dimensions other than A and L are the same as the rod side flange type.)

| (mm) | | | | | | | |
|----------------|-------------------|-------|------|----|-------|----|----|
| Bore size (mm) | Stroke range (mm) | A | B | CD | CL | CT | CU |
| 10 | 10 to 40 | 90.5 | 61.5 | 5 | 84.5 | 4 | 10 |
| 16 | 10 to 60 | 107.5 | 70.5 | 8 | 98.5 | 5 | 12 |
| 20 | 10 to 60 | 119 | 79 | 10 | 109 | 5 | 14 |
| 25 | 10 to 50,75,100 | 126.5 | 84.5 | 10 | 116.5 | 5 | 14 |
| 30 | 10 to 50,75,100 | 148 | 104 | 10 | 138 | 6 | 14 |
| 40 | 10 to 50,75,100 | 158 | 104 | 14 | 144 | 7 | 20 |

| Bore size (mm) | CW | CX | CZ | L | RR |
|----------------|----|-----|----|----|----|
| 10 | 15 | 6.5 | 12 | 8 | 6 |
| 16 | 18 | 8 | 16 | 10 | 9 |
| 20 | 20 | 10 | 20 | 10 | 10 |
| 25 | 20 | 18 | 36 | 12 | 10 |
| 30 | 22 | 18 | 36 | 12 | 10 |
| 40 | 28 | 22 | 44 | 12 | 14 |

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

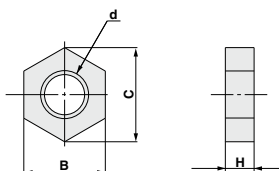
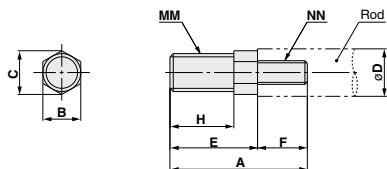
-X□

MQQ Series

Accessory Dimensions

Rod end thread adapter (With rod end nut shown in the right figure)

Rod end nut



Material: Stainless steel

| Part no. | Applicable bore size (mm) | A | B | C | D | E | F |
|---------------|---------------------------|------|----|------|----|------|----|
| MQ10-M | 10 | 20.5 | 8 | 9.2 | 6 | 15.5 | 5 |
| MQ16-M | 16 | 22.5 | 8 | 9.2 | 8 | 16.5 | 6 |
| MQ20-M | 20 | 24.5 | 8 | 9.2 | 10 | 18.5 | 6 |
| MQ25-M | 25 | 33.5 | 10 | 11.5 | 12 | 22.5 | 11 |
| MQ28-M | 30, 40 | 40.5 | 14 | 16 | 16 | 28.5 | 12 |

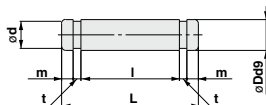
Material: Carbon steel

| Part no. | Applicable bore size (mm) | B | C | d | H | Weight |
|-----------------|---------------------------|----|------|------------|---|--------|
| NTJ-015C | 10 | 8 | 9.2 | M5 x 0.8 | 4 | 1.5 g |
| NT-015A | 16 | 10 | 11.5 | M6 x 1.0 | 5 | 2.5 g |
| NT-02 | 20 | 13 | 15 | M8 x 1.25 | 5 | 4.0 g |
| NT-03 | 25 | 17 | 19.6 | M10 x 1.25 | 6 | 8.0 g |
| NT-04 | 30, 40 | 22 | 25.4 | M14 x 1.5 | 8 | 17.0 g |

| Part no. | Applicable bore size (mm) | H | MM | NN | Weight ^(Note) |
|---------------|---------------------------|------|------------|-----------|--------------------------|
| MQ10-M | 10 | 10.5 | M5 x 0.8 | M3 x 0.5 | 5.5 g |
| MQ16-M | 16 | 11.5 | M6 x 1.0 | M4 x 0.7 | 7.5 g |
| MQ20-M | 20 | 13.5 | M8 x 1.25 | M5 x 0.8 | 11.5 g |
| MQ25-M | 25 | 16.5 | M10 x 1.25 | M6 x 1.0 | 22.5 g |
| MQ28-M | 30, 40 | 22.5 | M14 x 1.5 | M8 x 1.25 | 52.0 g |

Note) Rod end nut is included

Clevis pin



Material: Carbon steel

| Part no. | Applicable bore size (mm) | Dd9 | L | d | l | m | t | Applicable retaining ring |
|----------------|---------------------------|--|------|------|------|------|------|---------------------------|
| IY-J015 | 10 | 5 ^{-0.030} _{-0.040} | 16.6 | 4.8 | 12.2 | 1.5 | 0.7 | C type 5 for shaft |
| IY-G02 | 16 | 8 ^{-0.040} _{-0.076} | 21 | 7.6 | 16.2 | 1.5 | 0.9 | C type 8 for shaft |
| IY-G03 | 20 | 10 ^{-0.040} _{-0.076} | 25.6 | 9.6 | 20.2 | 1.55 | 1.15 | C type 10 for shaft |
| IY-G04 | 25, 30 | 10 ^{-0.040} _{-0.076} | 41.6 | 9.6 | 36.2 | 1.55 | 1.15 | C type 10 for shaft |
| IY-G05 | 40 | 14 ^{-0.050} _{-0.093} | 50.6 | 13.4 | 44.2 | 2.05 | 1.15 | C type 14 for shaft |

* C-type retaining ring for shaft is included.

Metal Seal

Lateral Load Resisting Low Friction Cylinder

MQM Series

ø6, ø10, ø16, ø20, ø25



How to Order

MQML B 10 [] [] - 15 D

Lateral load resisting low friction specification

Type

L Lateral load resisting type (Built-in ball bushing)

Mounting

| | |
|-----------------------------|--|
| B | Basic type |
| L | Foot type |
| F | Rod side flange type |
| G | Head side flange type (Except for ø6) |
| C ^{Note 1)} | Single clevis type (Non-integrated type) |
| D ^{Note 2)} | Double clevis type |

Note 1) Bore size: 20, 25 mm only

* Mounting brackets are included when shipped, but unassembled. (Except for clevis type.)

Note 2) ø6, ø10, ø16 Integrated type
ø20, ø25 Non-integrated type

Bore size

| | |
|-----------|-------|
| 6 | 6 mm |
| 10 | 10 mm |
| 16 | 16 mm |
| 20 | 20 mm |
| 25 | 25 mm |

Action

D Double acting

Cylinder stroke

| Bore size (mm) | Standard stroke (mm) |
|----------------|-------------------------|
| 6 | 15, 30, 45, 60 |
| 10 | 15, 30, 45, 60, 75, 100 |
| 16 | 15, 30, 45, 60, 75, 100 |
| 20 | 15, 30, 45, 60, 75, 100 |
| 25 | 15, 30, 45, 60, 75, 100 |

* Strokes are available in 1mm increments by installing spacers in standard stroke cylinders.

Example: MQMLB10-20D

(10 mm width spacer is installed in MQMLB10-30D to adjust the stroke.)

Function

| | |
|---------------------------|--|
| Nil | Standard type |
| H ^{Note)} | High speed/high frequency type (Without fixed orifice) |

Note) Except for 6 mm bore size.

Port thread type

| | | |
|------------|----------|-----------|
| Nil | M thread | ø6 to ø16 |
| | Rc | |
| TN | NPT | ø20, ø25 |
| TF | G | |

* The MQM series is not auto switch capable.

Mounting Type/Accessories

| Mounting bracket | | B: Basic | L: Foot | F: Rod side flange | G: Head side flange | C: Single clevis | D: Double clevis | Note |
|------------------|---------------------------------|-----------|------------|--------------------|---------------------|----------------------|----------------------|----------|
| Standard | Mounting nut ^{Note 1)} | ● (1 pc.) | ● (2 pcs.) | ● (1 pc.) | ● (1 pc.) | — ^{Note 1)} | — ^{Note 2)} | |
| | Rod end nut | ● | ● | ● | ● | ● | ● | |
| | Clevis pin | — | — | — | — | — | ● | |
| Option | T-bracket | — | — | — | — | — | ● | With pin |

Note 1) Mounting nut is not included with the integrated clevis, single clevis and double clevis types.

Note 2) Pin and retaining ring are packed with the double clevis type.

Mounting Bracket Part No.

| Bore size (mm) | Foot ^{Note 1)} | Flange | Single clevis | Double clevis (with pin) ^{Note 2)} | T-bracket ^{Note 3)} |
|----------------|-------------------------|-----------|---------------|---|------------------------------|
| 6 | CJK-L016C | CJK-F016C | — | — | CJ-T010C |
| 10 | MQM-L010 | | — | — | |
| 16 | MQM-L016 | CLJ-F016B | — | — | CJ-T016C |
| 20 | CM-L020B | CM-F020B | CM-C020B | CM-D020B | — |
| 25 | CM-L032B | CM-F032B | CM-C032B | CM-D032B | — |

Note 1-1) Bore size 6 mm:

1 foot bracket is included.

When ordering foot brackets, order 1 piece per a cylinder unit.

Note 1-2) Bore size other than 6 mm (10, 16, 20 and 25 mm) (Same as CM series):

2 foot brackets and 1 mounting nut (1 set) are used for a cylinder unit.

When ordering foot brackets, order 2 pieces per a cylinder unit (shipped as a set).

Note 2) Clevis pin and retaining ring are included in package.

Note 3) T-bracket is applicable to the double clevis type (D).

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

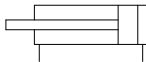
-X□





Symbol

Double acting, Single rod



Specifications

| Bore size (mm) | | 6 | 10 | 16 | 20 | 25 |
|--|---|---------------------------------------|-------------------------------------|---------------------------|---------------------------|---------------------------|
| Seal construction | | Metal seal | | | | |
| Action | | Double acting, Single rod | | | | |
| Fluid | | Air | | | | |
| Proof pressure | | 1.05 MPa | | | | |
| Maximum operating pressure | | 0.7 MPa | | | | |
| Minimum operating pressure <small>Note 1)</small> | Standard type | 0.02MPa | 0.005 MPa | | | |
| | H (High speed/High frequency type) | — | 0.01 MPa | | | |
| Ambient and fluid temperature | | -10 to 80°C | | | | |
| Cushion | | Rubber bumper (Standard) | | | | |
| Lubrication <small>Note 2)</small> | | Not required (Non-lube) | | | | |
| Stroke length tolerance | | +1.0 0 | | | | |
| Piston speed <small>Note 3)</small> | Standard type | 0.5 to 1000 mm/s (Refer to page 341.) | | | | |
| | H (High speed/High frequency type) | — | 5 to 3000 mm/s (Refer to page 341.) | | | |
| Total leakage <small>Note 4)</small> | Supply pressure 0.1 MPa | 150 cm ³ /min | 250 cm ³ /min | 300 cm ³ /min | 300 cm ³ /min | 300 cm ³ /min |
| | Supply pressure 0.3 MPa | 800 cm ³ /min | 1000 cm ³ /min | 1200 cm ³ /min | 1200 cm ³ /min | 1200 cm ³ /min |
| | Supply pressure 0.5 MPa | 1500 cm ³ /min | 2500 cm ³ /min | 3000 cm ³ /min | 3000 cm ³ /min | 3000 cm ³ /min |

Note 1) Value when horizontal. (Use clean, dry, and nonfreezing air) However, as the stroke increases, it will likely be affected by the mass of its moving parts and the pressure will likely increase by approx. 0.003 to 0.005 MPa due to an offset load from the mass of the rod.

Note 2) Refer to precautions on page 339 regarding lubrication. This product uses turbine oil (standard type) or lithium soap based grease (high speed/high frequency type) as an initial lubricant. Lubricant may seep out of the rod or the piping port.

Note 3) Control low speed actuation with differential pressure and a speed controller, etc. (Refer to recommended circuit examples on page 319 for further details.)

Note 4) The values are only for reference and are not guaranteed.

Weight: Standard Type, High Speed/High Frequency Type

Unit: g

| Bore size (mm) | Cylinder stroke (mm) | | | | | |
|----------------|----------------------|-------|-------|-------|-------|-------|
| | 15 | 30 | 45 | 60 | 75 | 100 |
| 6 | 52.5 | 60.7 | 68.9 | 77.1 | — | — |
| 10 | 92.4 | 102.7 | 113.0 | 123.3 | 133.6 | 143.9 |
| 16 | 152.4 | 175.2 | 198.0 | 220.8 | 243.6 | 266.4 |
| 20 | 349.8 | 392.6 | 435.4 | 478.2 | 521.0 | 563.8 |
| 25 | 460.8 | 510.0 | 559.2 | 608.4 | 657.6 | 706.8 |

* Refer to page 341 for moving parts mass.

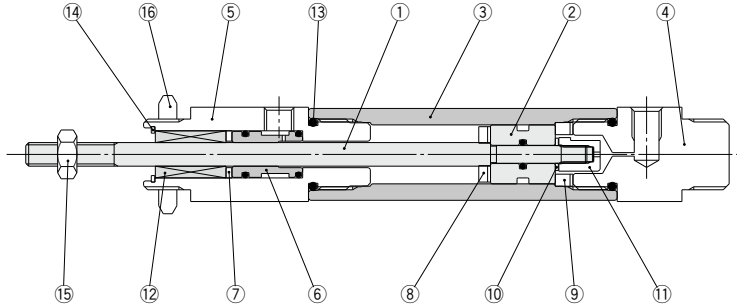
Theoretical Output (Guide)



Unit: N

| Bore size (mm) | Rod size (mm) | Direction | Piston area (mm ²) | Operating pressure (MPa) | | | | | | |
|------------------|---------------|-----------|--------------------------------|--------------------------|------|-------|-------|-------|-------|-------|
| | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| 6 | 4 | IN | 15.7 | 1.6 | 3.2 | 4.7 | 6.3 | 7.9 | 9.4 | 11.0 |
| | | OUT | 28.3 | 2.8 | 5.7 | 8.5 | 11.3 | 14.2 | 17.0 | 19.8 |
| 10 | 4 | IN | 66.0 | 6.6 | 13.2 | 19.8 | 26.4 | 33.0 | 39.6 | 46.2 |
| | | OUT | 78.5 | 7.9 | 15.7 | 23.6 | 31.4 | 39.3 | 47.1 | 55.0 |
| 16 (15.8) | 5 | IN | 176.4 | 17.6 | 35.3 | 52.9 | 70.6 | 88.2 | 105.8 | 123.5 |
| | | OUT | 196.1 | 19.6 | 39.2 | 58.9 | 78.4 | 98.1 | 117.8 | 137.3 |
| 20 | 8 | IN | 263.9 | 26.4 | 52.8 | 79.2 | 105.6 | 132.0 | 158.3 | 184.7 |
| | | OUT | 314.2 | 31.4 | 62.8 | 94.3 | 125.7 | 157.1 | 188.5 | 219.9 |
| 25 | 10 | IN | 412.3 | 41.2 | 82.5 | 123.7 | 164.9 | 206.2 | 247.4 | 288.6 |
| | | OUT | 490.9 | 49.1 | 98.2 | 147.3 | 196.4 | 245.5 | 294.5 | 343.6 |

Construction



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

Component Parts

| No. | Description | Material | Note |
|-----|----------------|--------------------------------------|--------------------|
| 1 | Rod | Carbon steel | Hard chrome plated |
| 2 | Piston | Special stainless steel | |
| 3 | Tube | Special stainless steel | |
| 4 | Head cover | Aluminum alloy | Hard anodized |
| 5 | Rod cover | Aluminum alloy | Hard anodized |
| 6 | Sleeve | Special stainless steel | |
| 7 | Seat | NBR | |
| 8 | Bumper A | Polyurethane | |
| 9 | Bumper B | Polyurethane | |
| 10 | Bumper C | Polyurethane | |
| 11 | Nut | Aluminum alloy | |
| 12 | Ball bushing | | |
| 13 | O-ring | NBR | |
| 14 | Retaining ring | Carbon tool steel | Phosphate coated |
| 15 | Rod end nut | Carbon steel | Chromated |
| 16 | Mounting nut | Brass/Carbon steel ^(Note) | |

Note) Bore size: ø6, ø10, ø16……Brass
Bore size: ø20, ø25……Carbon steel

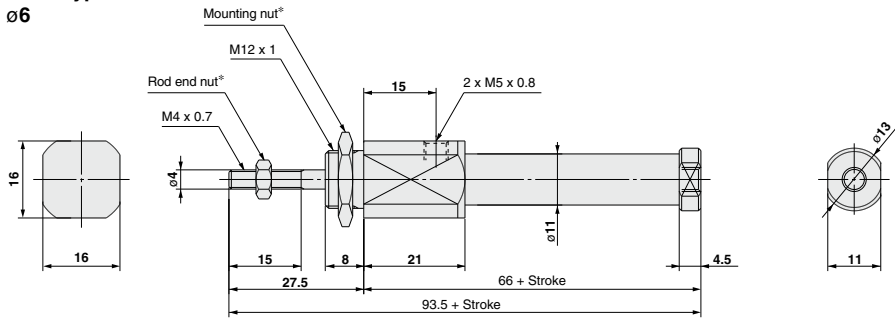
| |
|-----|
| D-□ |
| -X□ |

MQM Series

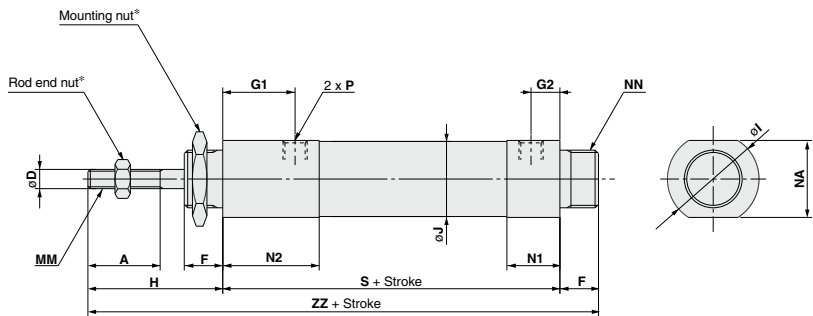
Dimensions

Basic type: MQMLB

ø6



ø10, ø16, ø20, ø25



| Bore size (mm) | A | D | F | G1 | G2 | H | I | J | MM | N1 | N2 | NA | NN | P | | | S | ZZ |
|-------------------|----|----|----|----|-----|------|------|------|------------|------|----|------|-----------|----------|---------|-------|-------|-----|
| | | | | | | | | | | | | | | — | TN | TF | | |
| | | | | | | | | | | | | | | | | | | |
| 10 | 15 | 4 | 8 | 15 | 6 | 28 | 18.5 | 16 | M4 x 0.7 | 11 | 20 | 16 | M12 x 1 | M5 x 0.8 | — | — | 65 | 101 |
| 16 | 15 | 5 | 10 | 15 | 6 | 30 | 22 | 22 | M5 x 0.8 | 12 | 21 | 19.5 | M14 x 1 | M5 x 0.8 | — | — | 74 | 114 |
| 20 | 18 | 8 | 13 | 25 | 8.5 | 40.5 | 31.5 | 28.5 | M8 x 1.25 | 20.5 | 33 | 29 | M20 x 1.5 | Rc 1/8 | NPT 1/8 | G 1/8 | 97.5 | 151 |
| 25 | 18 | 10 | 13 | 30 | 8.5 | 44.5 | 34.5 | 32 | M10 x 1.25 | 20.5 | 38 | 32 | M26 x 1.5 | Re 1/8 | NPT 1/8 | G 1/8 | 102.5 | 160 |

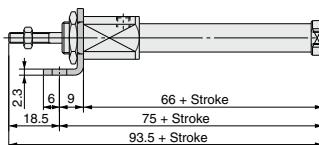
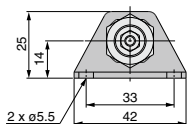
* Refer to page 338 for details regarding the rod end nut and the mounting nut.

Dimensions

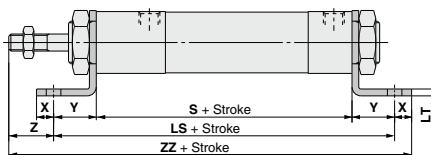
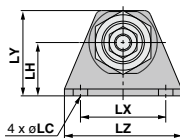
Refer to the basic type on page 334 for other dimensions.

Foot type: MQMLL

ø6



ø10, ø16, ø20, ø25

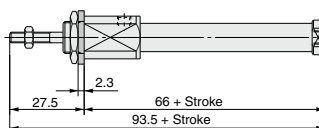
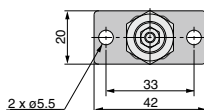


(mm)

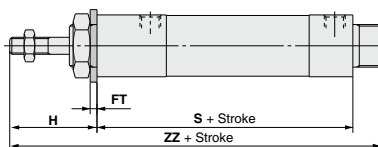
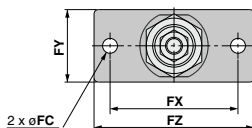
| Bore size (mm) | LC | LH | LS | LT | LX | LY | LZ | S | X | Y | Z | ZZ |
|----------------|-----|----|-------|-----|----|----|----|-------|---|----|------|-----|
| 10 | 5.5 | 14 | 83 | 2.3 | 33 | 25 | 42 | 65 | 6 | 9 | 19 | 108 |
| 16 | 5.5 | 18 | 92 | 2.3 | 42 | 30 | 54 | 74 | 6 | 9 | 21 | 119 |
| 20 | 6.8 | 25 | 137.5 | 3.2 | 40 | 40 | 55 | 97.5 | 8 | 20 | 20.5 | 166 |
| 25 | 6.8 | 28 | 142.5 | 3.2 | 40 | 47 | 55 | 102.5 | 8 | 20 | 24.5 | 175 |

Rod side flange type: MQMLF

ø6



ø10, ø16, ø20, ø25



(mm)

| Bore size (mm) | FC | FT | FX | FY | FZ | H | S | ZZ |
|----------------|-----|-----|----|----|----|------|-------|-----|
| 10 | 5.5 | 2.3 | 33 | 20 | 42 | 28 | 65 | 101 |
| 16 | 5.5 | 2.3 | 42 | 24 | 54 | 30 | 74 | 114 |
| 20 | 7 | 4 | 60 | 34 | 75 | 40.5 | 97.5 | 151 |
| 25 | 7 | 4 | 60 | 40 | 75 | 44.5 | 102.5 | 160 |

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

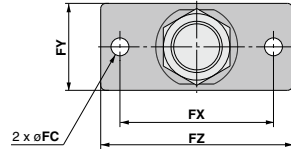
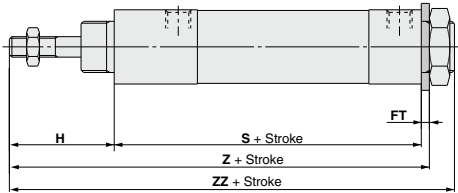
-X□

MQM Series

Refer to the basic type on page 334 for other dimensions.

Dimensions

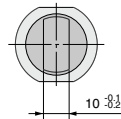
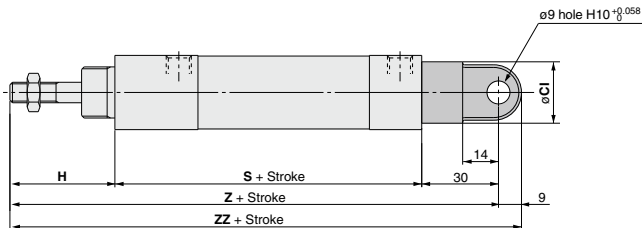
Head side flange type: MQMLG (Except for $\phi 6$)
 $\phi 10, \phi 16, \phi 20, \phi 25$



(mm)

| Bore size (mm) | FC | FT | FX | FY | FZ | H | S | Z | ZZ |
|----------------|-----|-----|----|----|----|------|-------|-------|-----|
| 10 | 5.5 | 2.3 | 33 | 20 | 42 | 28 | 65 | 95.3 | 101 |
| 16 | 5.5 | 2.3 | 42 | 24 | 54 | 30 | 74 | 106.3 | 114 |
| 20 | 7 | 4 | 60 | 34 | 75 | 40.5 | 97.5 | 142 | 151 |
| 25 | 7 | 4 | 60 | 40 | 75 | 44.5 | 102.5 | 151 | 160 |

Single clevis type: MQMLC ($\phi 20$ and $\phi 25$ only)
 $\phi 20, \phi 25$ (Non-integrated type)



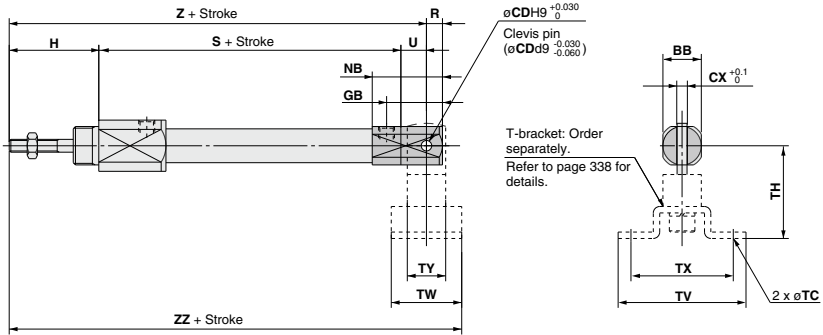
(mm)

| Bore size (mm) | Cl | H | S | Z | ZZ |
|----------------|----|------|-------|-----|-----|
| 20 | 24 | 40.5 | 97.5 | 168 | 177 |
| 25 | 30 | 44.5 | 102.5 | 177 | 186 |

(Refer to the basic type on page 334 for other dimensions.)

Dimensions

Double clevis type: MQMLD ø6, ø10, ø16 (Integrated type)



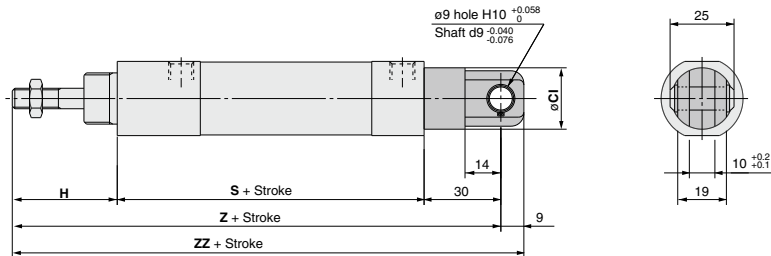
| Bore size (mm) | BB | CD | CX | GB | H | NB | R | S | U | Z | ZZ |
|----------------|----|-----|-----|------|------|----|---|------|----|-----|-----|
| 6 | 12 | 3.3 | 3.3 | 17.5 | 27.5 | 22 | 5 | 70.5 | 8 | 106 | 117 |
| 10 | 12 | 3.3 | 3.3 | 19 | 28 | 24 | 5 | 65 | 8 | 101 | 112 |
| 16 | 18 | 5 | 6.6 | 24 | 30 | 30 | 8 | 74 | 10 | 114 | 128 |

T-bracket Related Dimensions Note)

| Part no. | Applicable bore size (mm) | TC | TH | TV | TW | TX | TY |
|----------|---------------------------|-----|----|----|----|----|----|
| CJ-T010C | 6, 10 | 4.5 | 29 | 40 | 22 | 32 | 12 |
| CJ-T016C | 16 | 5.5 | 35 | 48 | 28 | 38 | 16 |

Note) Refer to page 338 for details.

ø20, ø25 (Non-integrated type)



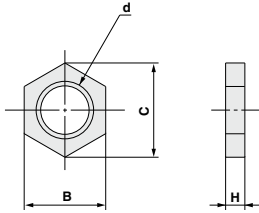
| Bore size (mm) | CI | H | S | Z | ZZ |
|----------------|----|------|-------|-----|-----|
| 20 | 24 | 40.5 | 97.5 | 168 | 177 |
| 25 | 30 | 44.5 | 102.5 | 177 | 186 |

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

- D-□
- X□

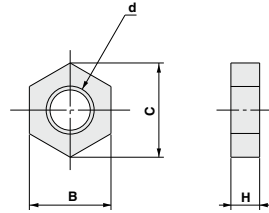
Accessory Dimensions

Mounting nut



| Part no. | Applicable bore size (mm) | B | C | d | H | Material |
|-----------|---------------------------|----|------|-----------|---|--------------|
| SNKJ-016C | 6, 10 | 17 | 19.6 | M12 x 1 | 4 | Brass |
| SNLJ-016B | 16 | 19 | 21.9 | M14 x 1 | 5 | Brass |
| SN-020B | 20 | 26 | 30 | M20 x 1.5 | 8 | Carbon steel |
| SN-032B | 25 | 32 | 37 | M26 x 1.5 | 8 | Carbon steel |

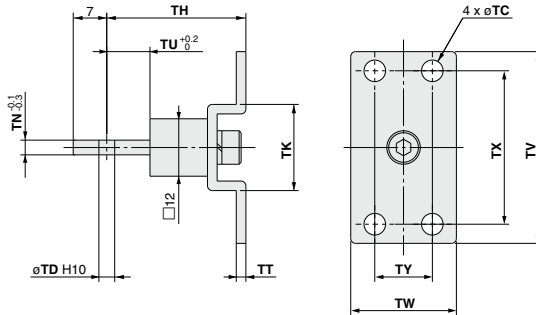
Rod end nut



Material: Carbon steel

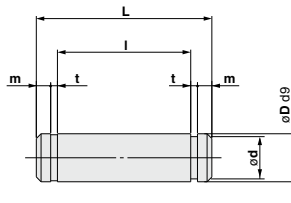
| Part no. | Applicable bore size (mm) | B | C | D | H | Weight |
|----------|---------------------------|----|------|------------|-----|--------|
| NTJ-010C | 6, 10 | 7 | 8.1 | M4 x 0.7 | 3.2 | 1.0 g |
| NTJ-015C | 16 | 8 | 9.2 | M5 x 0.8 | 4 | 1.5 g |
| NT-02 | 20 | 13 | 15 | M8 x 1.25 | 5 | 4.0 g |
| NT-03 | 25 | 17 | 19.6 | M10 x 1.25 | 6 | 8.0 g |

T-bracket



| Part no. | Applicable bore size (mm) | TC | TD | TH | TK | TN | TT | TU | TV | TW | TX | TY |
|----------|---------------------------|-----|-----|----|----|-----|-----|----|----|----|----|----|
| CJ-T010C | 6, 10 | 4.5 | 3.3 | 29 | 18 | 3.1 | 2 | 9 | 40 | 22 | 32 | 12 |
| CJ-T016C | 16 | 5.5 | 5 | 35 | 20 | 6.4 | 2.3 | 14 | 48 | 28 | 38 | 16 |

Clevis pin



| Part no. | Applicable bore size (mm) | d | D | l | L | m | t | Material | Applicable retaining ring |
|----------|---------------------------|-----|-----|------|------|------|------|-----------------|---------------------------|
| CD-J010 | 6, 10 | 3 | 3.3 | 12.2 | 15.2 | 1.2 | 0.3 | Stainless steel | C type 3.2 for shaft |
| CD-2015 | 16 | 4.8 | 5 | 18.3 | 22.7 | 1.5 | 0.7 | Stainless steel | C type 5 for shaft |
| CDP-1 | 20,25 | 8.6 | 9 | 19.2 | 25 | 1.75 | 1.15 | Carbon steel | C type 9 for shaft |

* C-type retaining ring for shaft is included.



MQQ/MQM Series

Specific Product Precautions 1

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.

Operation

Caution

1. When mounting, thoroughly flush out the connector piping and be sure that dirt and chips, etc., do not get inside the cylinder.
2. Install an air filter with a filtration degree of 5 μm or less on the air supply. Furthermore, when controlling for low speed or controlled output, use clean air (atmospheric pressure dew point temperature of -10°C). Installation of a mist separator (filtration degree 0.3 μm or less) is also recommended.

3. Use a metal seal type when using solenoid valves for cylinder actuation. If a rubber seal type is used, there may be an increase in operating resistance due to grease sprayed from the main valve.

4. Operate so that the load applied to the piston rod is normally in the axial direction.

In the event that a lateral load is unavoidable, do not exceed the range of the allowable lateral load at the rod end (refer to pages 340 and 341). (Use outside of the operating limits may cause an adverse effect on the life of the unit through problems such as looseness in the guide unit and a loss of precision.)

5. Take care not to scratch or gouge the sliding portion of the rod. This may cause malfunction or shorten the unit's life.

6. When attaching a work piece to the end of the rod, move the rod to the fully retracted position and use the wrench flats at the end of the rod. Fasten the work piece without applying a large amount of torque to the rod.

There are no wrench flats at the end of the rod in the MQM series, so use the attached rod end nut.

7. Be certain to connect a load so that the rod axis is aligned with the load and its direction of movement.

Especially when a cylinder rod is connected directly to a guide function (such as bearings, etc.) on the equipment side, the following is likely to occur. Either an offset load will occur and the sliding resistance will not be stable or galling will occur on the metal seal parts. Therefore, be sure to use a floating joint or a spherical joint.

8. When a piston rod is driven with a circuit from an external force such as force, control, tension control, etc., a stick-slip phenomenon will likely occur and sliding resistance will not be stable if the amount of displacement is 0.05 mm or less.

9. When it is used in locations where a constant vibration is applied, such as a polishing machine, etc., consult with us.

Disassembly

Caution

1. The component parts of the metal seal cylinder are manufactured to precision tolerances, and therefore cannot be disassembled.

Lubrication

Caution

1. Lubrication of non-lube type cylinder

Do not apply lubrication when controlling for low speed or controlled output. If lubrication is applied, there may be changes in operating resistance due to factors such as the viscosity and surface tension of the oil. Also, use a metal seal type when using solenoid valves for cylinder actuation. If a rubber seal type is used, there may be an increase in operating resistance due to grease sprayed from the main valve.

Lubrication is also unnecessary for high speed actuation, but in the event that lubrication is applied, use turbine oil class 1 (with no additives) ISO VG32. (Do not use spindle oil or machine oil.)

REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

-X□



MQQ/MQM Series Specific Product Precautions 2

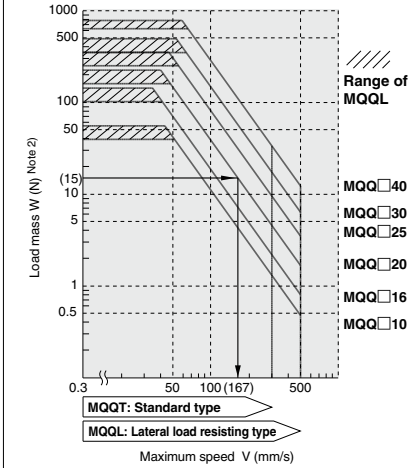
Be sure to read this before handling the products.
Refer to back page 50 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Selection

MQQ series

⚠ Caution Operating Speed

Load Mass and Maximum Speed: MQQT/MQQL



Example)
Driving a load of 15(N) using the MQQ□20 with a maximum speed of 167 (mm/sec)

Lateral load resisting type: MQQ□

| Bore size (mm) | Allowable kinetic energy (J) |
|----------------|------------------------------|
| 10 | 0.006 |
| 16 | 0.010 |
| 20 | 0.022 |
| 25 | 0.044 |
| 30 | 0.080 |
| 40 | 0.160 |

Note 1) When a load is attached to the rod end, adjust the speed so that the maximum speed is no more than that shown in the graph for the corresponding load mass.

Note 2) The mass of cylinder's moving parts is included in the load mass. (See the graph on the right.)

Moving Parts Mass

MQQ□ Moving Parts Mass

| Bore size (mm) | MQQT□ Moving parts mass (g) | MQQL□ Moving parts mass (g) |
|----------------|-------------------------------------|-------------------------------------|
| 10 | Mass = 8.9 + (3.1 x (stroke/10)) | Mass = 16.7 + (3.1 x (stroke/10)) |
| 16 | Mass = 22.9 + (4.0 x (stroke/10)) | Mass = 34.9 + (4.0 x (stroke/10)) |
| 20 | Mass = 34.8 + (6.6 x (stroke/10)) | Mass = 57.9 + (6.6 x (stroke/10)) |
| 25 | Mass = 66.9 + (8.8 x (stroke/10)) | Mass = 97.7 + (8.8 x (stroke/10)) |
| 30 | Mass = 115.0 + (15.8 x (stroke/10)) | Mass = 190.2 + (15.8 x (stroke/10)) |
| 40 | Mass = 182.2 + (15.8 x (stroke/10)) | Mass = 257.4 + (15.8 x (stroke/10)) |

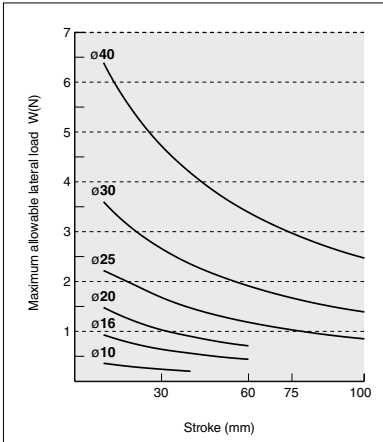
Note) For the rod side flange type, add 10 mm to the stroke length of the MQQ□F

$$\text{Kinetic energy } E \text{ (J)} = \frac{(m1 + m2) V^2}{2}$$

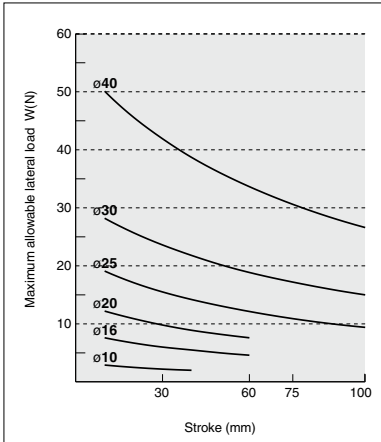
m1 : Mass of cylinder movable parts kg
m2 : Load mass kg
V : Piston speed m/s

Allowable Lateral Load at Rod End

Standard Type: MQQTB

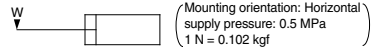


Lateral Load Resisting Type: MQQLB/Built-in Ball Bushing



Note 1) The indicated allowable lateral load at the rod end is for the rod end female thread.

Note 2) The allowable lateral load varies depending on the size of a load (the distance to the load's center of gravity). Please contact SMC for further details.





MQQ/MQM Series Specific Product Precautions 3

Be sure to read this before handling the products.

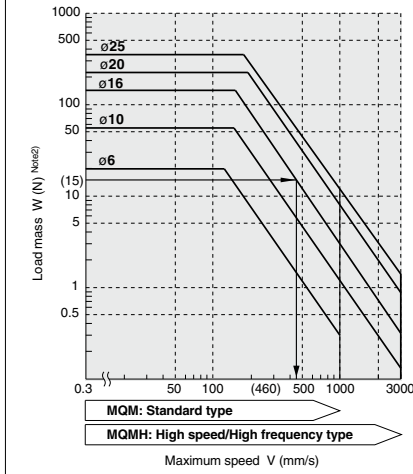
Refer to back page 50 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Selection

MQM series

⚠ Caution Operating Speed

Load Mass and Maximum Speed: MQML/MQML□□H



Example)
Driving a load of 15(N) using the MQM16 with a maximum speed of 460 (mm/sec)

Lateral load resisting type: MQML/MQML□□H

| Bore size (mm) | Allowable kinetic energy (J) |
|----------------|------------------------------|
| 6 | 0.015 |
| 10 | 0.059 |
| 16 | 0.161 |
| 20 | 0.386 |
| 25 | 0.597 |

Note 1) When a load is attached to the rod end, adjust the speed so that the maximum speed is no more than that shown in the graph for the corresponding load mass.

Note 2) The mass of cylinder's moving parts is included in the load mass. (See the graph on the right.)

Moving Parts Mass

MQM Moving Parts Mass

| Bore size (mm) | Moving parts mass (g) |
|----------------|------------------------------------|
| 6 | Mass = 8.2 + {1.6 x (stroke/15)} |
| 10 | Mass = 12.0 + {1.6 x (stroke/15)} |
| 16 | Mass = 28.6 + {2.2 x (stroke/15)} |
| 20 | Mass = 72.0 + {6.4 x (stroke/15)} |
| 25 | Mass = 117.6 + {9.2 x (stroke/15)} |

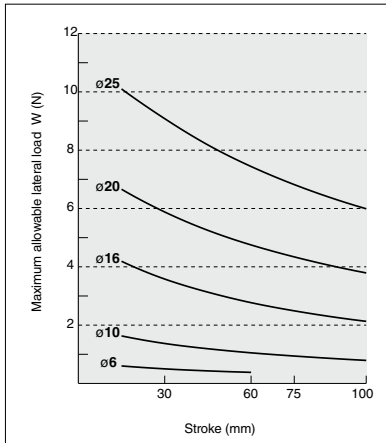
Note) Rod end nut is not included in the moving parts mass.

$$\text{Kinetic energy } E \text{ (J)} = \frac{(m1 + m2) V^2}{2}$$

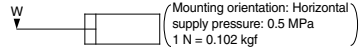
m1 : Mass of cylinder movable parts kg
m2 : Load mass kg
V : Piston speed m/s

Allowable Lateral Load at Rod End

Allowable Lateral Load at Rod End



Note 1) The allowable lateral load varies depending on the size of a load (the distance to the load's center of gravity). Please contact SMC for further details.



REA

REB

REC

Smooth

Low Speed

MQ

RHC

RZQ

D-□

-X□

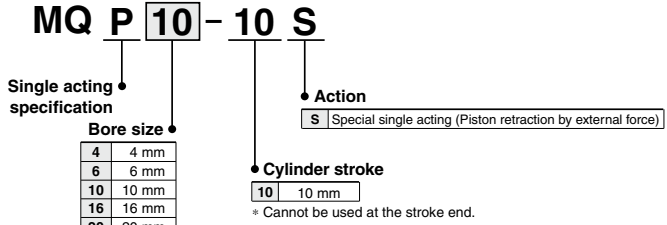
Low Friction Cylinder (Single Acting)

MQP Series

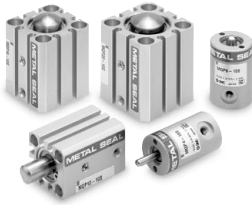
ø4, ø6, ø10, ø16, ø20



How to Order

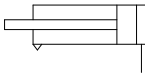


* The MQP series is not auto switch capable.



Symbol

Single acting (Pressing force)



Specifications

| Bore size (mm) | 4 | 6 | 10 | 16 | 20 |
|--|---|---------------------------|----|----|----|
| Seal construction | Metal seal | | | | |
| Action | Special single acting (Piston retraction by external force) | | | | |
| Proof pressure | 1.05 MPa | | | | |
| Maximum operating pressure | 0.7 MPa | | | | |
| Minimum operating pressure <small>Note 1)</small> | 0.001 MPa | | | | |
| Ambient and fluid temperature | +5 to +80°C | | | | |
| Lubrication <small>Note 2)</small> | Not required (Non-lube) | | | | |
| Stroke length tolerance | +1.0 0 | | | | |
| Total <small>Note 3)</small> leakage | Supply pressure 0.1 MPa | 100 cm ³ /min | | | |
| | Supply pressure 0.3 MPa | 500 cm ³ /min | | | |
| | Supply pressure 0.5 MPa | 1000 cm ³ /min | | | |

Note 1) Excluding the mass of moving parts.

Note 2) Refer to precautions on page 344 regarding lubrication. This product uses turbine oil as an initial lubricant. Lubricant may seep out of the rod or the piping port.

Note 3) The values are only for reference and are not guaranteed.

Moving Parts and Total Mass

Unit: g

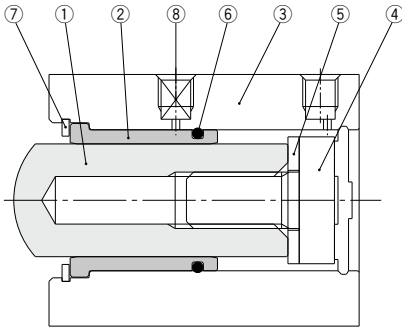
| Bore size (mm) | Moving parts mass | Total mass |
|----------------|-------------------|------------|
| 4 | 4 | 43 |
| 6 | 8 | 55 |
| 10 | 24 | 96 |
| 16 | 62 | 161 |
| 20 | 103 | 239 |

Theoretical Output (Guide)

Unit: N

| Bore size (mm) | Piston area (mm ²) | Operating pressure (MPa) | | | | | | |
|----------------|--------------------------------|--------------------------|------|------|-------|-------|-------|-------|
| | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| 4 | 12.6 | 1.3 | 2.6 | 3.9 | 5.2 | 6.5 | 7.8 | 9.1 |
| 6 | 28.3 | 2.8 | 5.6 | 8.4 | 11.2 | 14.0 | 16.8 | 19.6 |
| 10 | 78.5 | 7.9 | 15.7 | 23.6 | 31.4 | 39.3 | 47.1 | 55.0 |
| 16 | 201.1 | 20.1 | 40.2 | 60.3 | 80.4 | 100.6 | 120.7 | 140.8 |
| 20 | 314.2 | 31.4 | 62.8 | 94.3 | 125.7 | 157.1 | 188.5 | 219.9 |

Construction



Component Parts

| No. | Description | Material | Note |
|-----|----------------|-------------------------|------------------|
| 1 | Piston rod | Special stainless steel | |
| 2 | Liner | Special stainless steel | |
| 3 | Cylinder tube | Aluminum alloy | Hard anodized |
| 4 | Bolt | Carbon tool steel | Chromated |
| 5 | Bumper | Polycarbonate | |
| 6 | O-ring | NBR | |
| 7 | Retaining ring | Carbon tool steel | Phosphate coated |
| 8 | Plug | Carbon tool steel | Chromated |

REA

REB

REC

Smooth

Low Speed

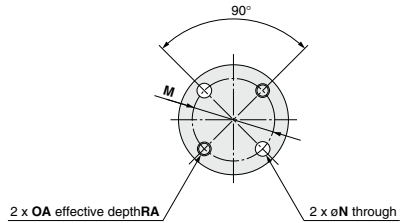
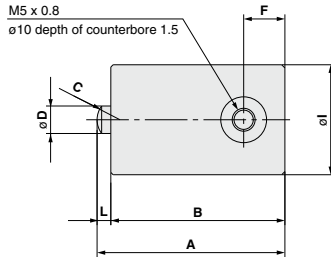
MQ

RHC

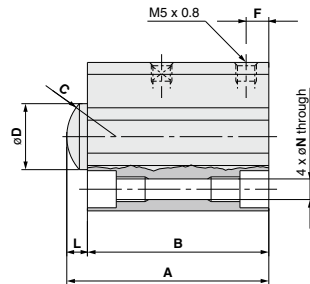
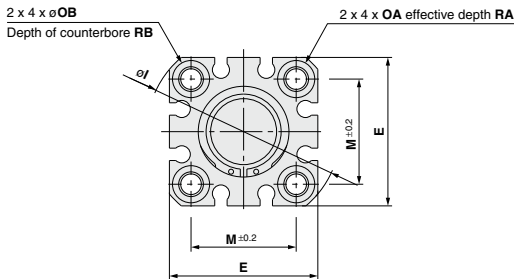
RZQ

Dimensions

ø4, ø6



ø10, ø16, ø20



(mm)

| Bore size (mm) | A | B | C | D ^{Note)} | E | F | I | L | M | N | OA | OB | RA | RB |
|----------------|------|------|------|--------------------|----|-----|----|---|------|-----|----------|-----|----|----|
| 4 | 41 | 38 | SR3 | 4 | — | 9 | 22 | 3 | 16 | 3.2 | M3 x 0.5 | — | 6 | — |
| 6 | 41 | 38 | SR5 | 6 | — | 9 | 24 | 3 | 18 | 3.2 | M3 x 0.5 | — | 6 | — |
| 10 | 46.5 | 41.5 | SR8 | 10 | 29 | 5.5 | 38 | 5 | 20 | 3.5 | M4 x 0.7 | 6.5 | 7 | 4 |
| 16 | 49 | 44 | SR12 | 16 | 36 | 5.5 | 47 | 5 | 25.5 | 5.4 | M6 x 1.0 | 9 | 10 | 7 |
| 20 | 52.5 | 47.5 | SR15 | 20(19) | 40 | 5.5 | 52 | 5 | 28 | 5.4 | M6 x 1.0 | 9 | 10 | 7 |

Note) (): Rod end dimensions

D-□

-X□



MQP Series

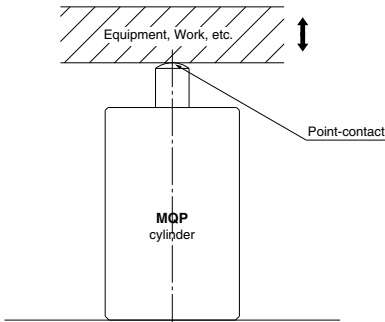
Specific Product Precautions

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.

Operation

1. When mounting, thoroughly flush out the connector piping and be sure that dirt and chips, etc., do not get inside the cylinder.
2. Install an air filter with a nominal filtration degree of $5\ \mu\text{m}$ or less on the air supply. Furthermore, when controlling for low speed or controlled output, use clean air (atmospheric pressure dew point temperature of -10°C or less). Installation of a mist separator (nominal filtration degree $0.3\ \mu\text{m}$ or less) is also recommended.
3. Use a metal seal type when using solenoid valves for cylinder actuation. If a rubber seal type is used, there may be an increase in operating resistance due to grease sprayed from the main valve.
4. This cylinder cannot be used at the end of its stroke. Use it with an intermediate stroke of 10 mm.
5. The rod end should not come in direct contact with an equipment or workpiece. Also, make sure that the opposite side of the rod end is flat to make point-contact with the spherical surface of the rod end.



The material of the cylinder rod is heat-treated stainless steel (HRC60). The roughness of the spherical contact of the attaching part (Equipment, Work, etc) should be Rz6.3 and the material should be HB100 or greater (Aluminum material: 2000 line or 7000 line or equivalent) When higher precision or longer service life is required, we recommend using a heat-treated material + flat polished machined material (Rz0.8)

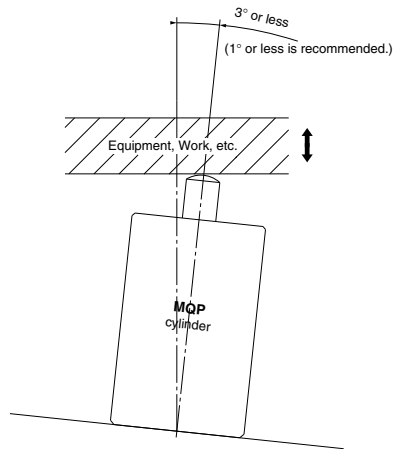
Also, although applying grease on the spherical contact parts will make the operation more smooth and reduce the abrasion, use caution to prevent any grease from being applied to the cylinder's sliding surface.

Operation

6. When connecting, be sure to align the rod axis with the load and the direction of movement.

The allowable angle of the cylinder's mounting surface in an equipment should be 3° or less.

(1° or less is recommended.) When not properly aligned, a lateral load will likely be applied to the rod and the spherical surface will likely skid. This will result in a reduction or dispersion of thrust and likely a malfunction.



Disassembly

1. The component parts of the metal seal cylinder are manufactured to precision tolerances, and therefore cannot be disassembled.

Lubrication

1. Lubrication of non-lube type cylinder

Do not apply lubrication when controlling for low speed or controlled output. If lubrication is applied, there may be changes in operating resistance due to factors such as the viscosity and surface tension of the oil. Also, use a metal seal type when using solenoid valves for cylinder actuation. If a rubber seal type is used, there may be an increase in operating resistance due to grease sprayed from the main valve.

Lubrication is also unnecessary for high speed actuation, but in the event that lubrication is applied, use turbine oil class 1 (with no additives) ISO VG32. (Do not use spindle oil or machine oil.)