SMC

## Compact Guide Cylinder

# Series MGP

### ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

New end lock type
introduced to Series MGP

ALMOTION

# Compact Guide Cylinder

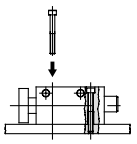
# *Series MGP*

ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

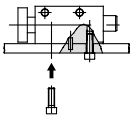
## Four mounting types provided

**1. Top mount**

• Easy positioning
Knock pin holes provided on each mounting surface

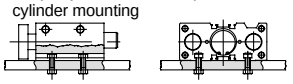


**2. Side mount**

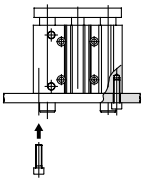


**3. T-slot side mount**

Easy adjustment of work piece and cylinder mounting

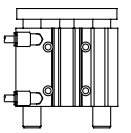


**4. Bottom mount**

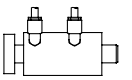


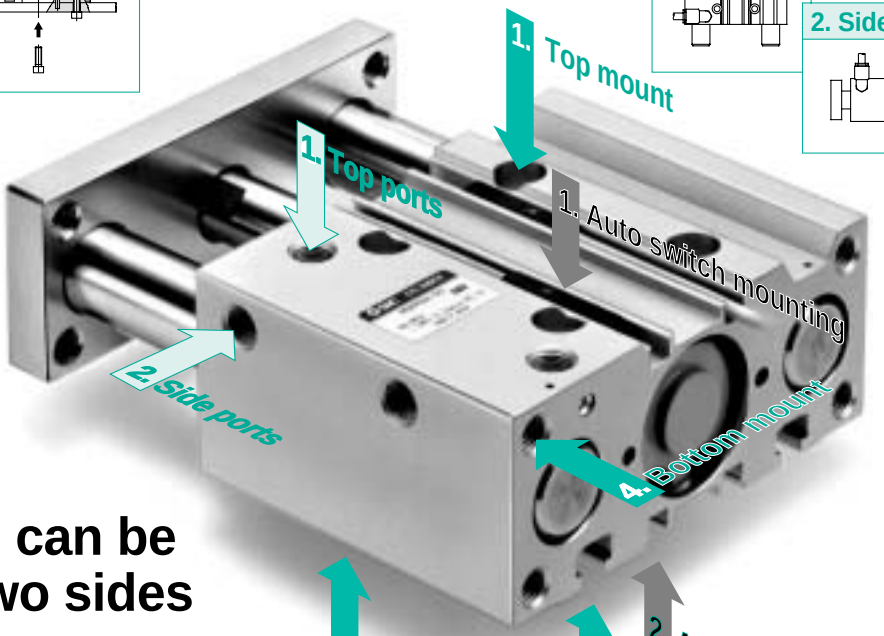
## Piping is possible from two directions

**1. Top ports**

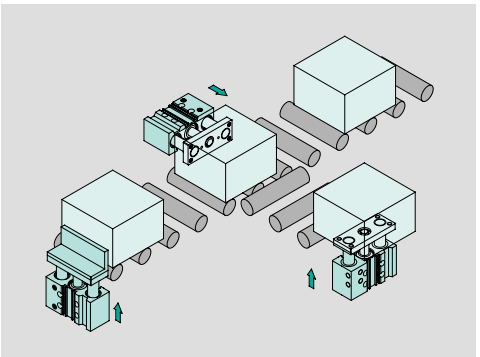


**2. Side ports**






## Auto switches can be mounted on two sides



- **Two types of guide rod bearing to accommodate various applications**

**Slide bearing**

The withstood lateral load is more than twice that of a conventional stopper cylinder (round bar type), and is suitable for use with lateral loads accompanied by impact, as in stoppers.

**Ball bushing**

Suitable for use as a pusher and lifter.

- **Long strokes up to 400mm standardised.**

### ■ Stroke Variations

| Bearing type | Bore size (mm) | Stroke (mm) | Intermediate strokes | Order made |
|---|---|---|---|---|
| | | 10 20 25 30 40 50 75 100 125 150 175 200 250 300 350 400 | | |
| MGPM Slide bearing | 12 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | Spacer type available in stroke increments of 1mm & 5mm. | 1. Intermediate stroke (using special body) |
| | 16 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | 2. With air cushion/Intermediate stroke (spacer type) |
| | 20 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | 3. Heat resistant cylinder |
| | 25 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | 4. Low speed cylinder |
| | 32 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | 5. Fluoro rubber seals |
| | 40 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | 6. With heavy duty scraper New |
| MGPL Ball bushing | 50 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | Special body type (-XB10) available in stroke increments of 1mm. | 7. With coil scraper New |
| | 63 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | 8. Variable stroke cylinder Adjustable extension type New |
| | 80 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | 9. Variable stroke cylinder Adjustable retraction type New |
| | 100 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● | | 10. Stainless steel piston rod & plate, etc. New |



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New

## • End lock type introduced

- Holds the cylinder's home position even if the air supply is cut off.
- Compact body length is only 25mm longer than standard.

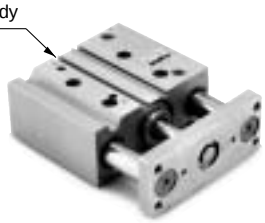
### ■ Stroke Variations

| Bearing type | Bore size (mm) | Stroke (mm) | Intermediate strokes | Locking direction | Manual release |
|---|---|---|---|---|---|
| MGPM Slide bearing | 20, 25, 32, 40, 50, 63, 80, 100 | 25 50 75 100 125 150 175 200 250 300 350 400 | Spacer type available in 5mm stroke increments. | Front lock / Rear lock | Non-locking type / Locking type |
| MGPL Ball bushing | | | | | |

## • Air cushion type standardized

- An air cushion has been added to the compact guide cylinder to suppress vibration and noise at the stroke end.
  It can absorb nearly three times as much kinetic energy as a rubber bumper.

Cushion valve is built into the body



### ■ Stroke Variations

| Bearing type | Bore size (mm) | Stroke (mm) | Intermediate strokes |
|---|---|---|---|
| MGPM Slide bearing | 16, 20, 25, 32, 40, 50, 63, 80, 100 | 25 50 75 100 125 150 175 200 | Strokes available in 1mm increments by changing the collar. |
| MGPL Ball bushing | | | |

## • Heavy duty guide rod type with improved load resistance

- Lateral load resistance: 10% increase
- Eccentric load resistance: 25% increase
- Impact load resistance: 140% increase
  (Compared with MGPM50 compact guide cylinder)

| Bore size (mm) | Guide rod diameter (mm) | |
|---|---|---|
| | MGPS | MGPM |
| 50 | 30 | 25 |
| 80 | 45 | 30 |

### ■ Stroke Variations

| Bearing type | Bore size (mm) | Stroke (mm) |
|---|---|---|
| MGPS Slide bearing | 50, 80 | 25 50 75 100 125 150 175 200 |

### ■ Series Variations

| Series | Bearing type | Cushion |
|---|---|---|
| Standard type MGP | Slide bearing / Ball bushing | Rubber bumper |
| With air cushion MGP | | Air cushion |
| With end lock MGP | | Rubber bumper |
| Heavy duty guide rod type MGPS | Slide bearing | Rubber bumper |

Bore size (mm): 12 16 20 25 32 40 50 63 80 100

- Clean room series: ø12 to ø63
- Water resistant type: ø20 to ø100 Note)
- Copper-free specification: ø12 to ø100

• Copper-free (20-)

Note) Available with ø20 to ø100 slide bearing type only





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# Compact Guide Cylinder
# Series MGP
## ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100



## How to Order

**Compact Guide Cylinder**

**MGP** | **M** | **25** | **30** | **Z73** | _

**Compact guide cylinder**

**Bearing type**

| | |
|---|---|
| **M** | Slide bearing |
| **L** | Ball bushing |

**Bore size**

| | | | |
|---|---|---|---|
| **12** | 12mm | **40** | 40mm |
| **16** | 16mm | **50** | 50mm |
| **20** | 20mm | **63** | 63mm |
| **25** | 25mm | **80** | 80mm |
| **32** | 32mm | **100** | 100mm |

**Cylinder stroke (mm)**
Refer to the standard stroke table on page 2.

**Auto switch type**

| | |
|---|---|
| **Nil** | Without auto switch (built-in magnet cylinder) |

∗ Refer to the table below for auto switch model numbers.

**Number of auto switches**

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

## Applicable auto switches

| Type | Special function | Electrical entry | Indicator light | Wiring (output) | Load voltage DC | Load voltage DC | Load voltage AC | Auto switch model: Electrical entry direction: Perpendicular | Auto switch model: Electrical entry direction: In-line | Lead wire length (m) Note 1): 0.5 (Nil) | Lead wire length (m) Note 1): 3 (L) | Lead wire length (m) Note 1): 5 (Z) | Applicable load | | Detailed specifications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire | — | 5V | — | — | **Z76** | ● | ● | — | IC circuit | — | P. 59 |
| | | | | 2 wire | 24V | 12V | 100V | — | **Z73** | ● | ● | ● | — | Relay, PLC | |
| | | | No | | | 5V 12V | 100V or less | — | **Z80** | ● | ● | — | IC circuit | | |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V 12V | — | **Y69A** | **Y59A** | ● | ● | ○ | IC circuit | Relay, PLC | P. 60 |
| | | | | 3 wire (PNP) | | | | **Y7PV** | **Y7P** | ● | ● | ○ | | | |
| | | | | 2 wire | | 12V | | **Y69B** | **Y59B** | ● | ● | ○ | — | | |
| | Diagnostic indication (2 colour indicator) | | | 3 wire (NPN) | | 5V 12V | | **Y7NWV** | **Y7NW** | ● | ● | ○ | IC circuit | | P. 61 |
| | | | | 3 wire (PNP) | | | | **Y7PWV** | **Y7PW** | ● | ● | ○ | | | |
| | | | | 2 wire | | 12V | | **Y7BWV** | **Y7BW** | ● | ● | ○ | — | | |
| | Water resistant (2 colour indicator) | | | | | | | — | **Y7BA** | — | ● | ○ | | | P. 62 |
| | Magnetic field resistant (2 colour indicator) | | | | | — | | — | **P5DW** Note 3) | — | ● | ● | | | P. 63 |

Note 1) Lead wire symbols 0.5m ..... Nil (Example) Y69B
3m ..... L Y69BL
5m ..... Z Y69BZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.
Note 3) Type D-P5DW cannot be mounted on bore sizes of ø32 or less.

# Series MGP

## Specifications

| | | |
|---|---|---|
| Action | Double acting | |
| Fluid | Air | |
| Proof pressure | 1.5MPa | |
| Maximum operating pressure | 1.0MPa | |
| Minimum operating pressure | ø12, ø16 | 0.12MPa |
| | ø20 to ø100 | 0.1MPa |
| Ambient and fluid temperature | –10 to 60°C (with no freezing) | |
| Piston speed | ø12 to ø63 | 50 to 500mm/s |
| | ø80, ø100 | 50 to 400mm/s |
| Cushion | Rubber bumper at both ends | |
| Lubrication | Non-lube | |
| Stroke length tolerance | $^{+1.5}_{0}$ mm | |

## Standard Strokes

| Bore size (mm) | Standard stroke (mm) |
|---|---|
| **12, 16** | 10, 20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250 |
| **20, 25** | 20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400 |
| **32 to 100** | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400 |

## Manufacture of Intermediate Strokes

| | | | | |
|---|---|---|---|---|
| **Modification method** | Spacer installation type<br>Spacers are installed in a standard stroke cylinder.<br>• **ø12 to 32 :** Available in 1mm stroke increments<br>• **ø40 to 100 :** Available in 5mm stroke increments | | Special body type (-XB10)<br>A special body is manufactured for the specified stroke.<br>• All bore sizes are available in 1mm increments. | |
| **Part number** | Refer to standard part numbers and ordering procedure. | | Indicate -XB10 at the end of the standard model no. Refer to P.52 for order made specifications. | |
| **Applicable stroke (mm)** | **ø12, ø16** | 1 to 249 | **ø12, ø16** | 11 to 249 |
| | **ø20, ø25, ø32** | 1 to 399 | **ø20, ø25** | 21 to 399 |
| | **ø40 to ø100** | 5 to 395 | **ø32 to ø100** | 26 to 399 |
| **Example** | Part no.: **MGPM20—39**<br>A spacer 1mm in width is installed in a **MGPM20—40**. C dimension is 77mm. | | Part no.: **MGPM20—39—XB10**<br>Special body manufactured for 39mm stroke. C dimension is 76mm. | |

Note) The minimum stroke for mounting auto switches is 10mm or more for two switches, and 5mm or more for one switch.

### Auto switch mounting bracket part no. for D-P5DW

| Bore size (mm) | Mounting bracket part no. | Notes |
|---|---|---|
| 40, 50, 63, 80, 100 | BMG1-040 | Switch mounting bracket<br>Hexagon socket head cap screw (M2.5 x 0.45 x 8ℓ) 2 pcs.<br>Hexagon socket head cap screw (M3 x 0.5 x 16ℓ) 2 pcs.<br>Spring washer (nominal size 3) |

## Theoretical Output

OUT IN

(N)

| Bore size (mm) | Rod size (mm) | Operating direction | Piston area (mm²) | Operating pressure (MPa) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **0.2** | **0.3** | **0.4** | **0.5** | **0.6** | **0.7** | **0.8** | **0.9** | **1.0** |
| **12** | 6 | OUT | 113 | 23 | 34 | 45 | 57 | 68 | 79 | 90 | 102 | 113 |
| | | IN | 85 | 17 | 26 | 34 | 43 | 51 | 60 | 68 | 77 | 85 |
| **16** | 8 | OUT | 201 | 40 | 60 | 80 | 101 | 121 | 141 | 161 | 181 | 201 |
| | | IN | 151 | 30 | 45 | 60 | 76 | 91 | 106 | 121 | 136 | 151 |
| **20** | 10 | OUT | 314 | 63 | 94 | 126 | 157 | 188 | 220 | 251 | 283 | 314 |
| | | IN | 236 | 47 | 71 | 94 | 118 | 142 | 165 | 189 | 212 | 236 |
| **25** | 12 | OUT | 491 | 98 | 147 | 196 | 246 | 295 | 344 | 393 | 442 | 491 |
| | | IN | 378 | 76 | 113 | 151 | 189 | 227 | 265 | 302 | 340 | 378 |
| **32** | 16 | OUT | 804 | 161 | 241 | 322 | 402 | 482 | 563 | 643 | 724 | 804 |
| | | IN | 603 | 121 | 181 | 241 | 302 | 362 | 422 | 482 | 543 | 603 |
| **40** | 16 | OUT | 1257 | 251 | 377 | 503 | 629 | 754 | 880 | 1006 | 1131 | 1257 |
| | | IN | 1056 | 211 | 317 | 422 | 528 | 634 | 739 | 845 | 950 | 1056 |
| **50** | 20 | OUT | 1963 | 393 | 589 | 785 | 982 | 1178 | 1374 | 1570 | 1767 | 1963 |
| | | IN | 1649 | 330 | 495 | 660 | 825 | 990 | 1154 | 1319 | 1484 | 1649 |
| **63** | 20 | OUT | 3117 | 623 | 935 | 1247 | 1559 | 1870 | 2182 | 2494 | 2805 | 3117 |
| | | IN | 2803 | 561 | 841 | 1121 | 1402 | 1682 | 1962 | 2242 | 2523 | 2803 |
| **80** | 25 | OUT | 5027 | 1005 | 1508 | 2011 | 2514 | 3016 | 3519 | 4022 | 4524 | 5027 |
| | | IN | 4536 | 907 | 1361 | 1814 | 2268 | 2722 | 3175 | 3629 | 4082 | 4536 |
| **100** | 30 | OUT | 7854 | 1571 | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7069 | 7854 |
| | | IN | 7147 | 1429 | 2144 | 2859 | 3574 | 4288 | 5003 | 5718 | 6432 | 7147 |

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

## Weights

### Slide bearing: MGPM12 to 100

(kg)

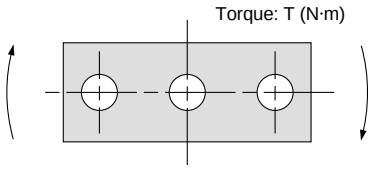
| Bore size (mm) | Model | Standard stroke (mm) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 |
| 12 | MGPM12 | 0.24 | 0.28 | — | 0.31 | 0.35 | 0.39 | 0.50 | 0.59 | 0.70 | 0.79 | 0.89 | 0.98 | 1.17 | — | — | — |
| 16 | MGPM16 | 0.33 | 0.38 | — | 0.43 | 0.48 | 0.53 | 0.68 | 0.80 | 0.97 | 1.09 | 1.22 | 1.35 | 1.60 | — | — | — |
| 20 | MGPM20 | — | 0.67 | — | 0.75 | 0.83 | 0.91 | 1.17 | 1.37 | 1.57 | 1.76 | 1.96 | 2.16 | 2.63 | 3.03 | 3.42 | 3.82 |
| 25 | MGPM25 | — | 0.95 | — | 1.05 | 1.16 | 1.27 | 1.65 | 1.92 | 2.19 | 2.47 | 2.74 | 3.01 | 3.67 | 4.21 | 4.76 | 5.30 |
| 32 | MGPM32 | — | — | 1.69 | — | — | 2.07 | 2.47 | 2.85 | 3.24 | 3.62 | 4.00 | 4.38 | 5.33 | 6.09 | 6.86 | 7.62 |
| 40 | MGPM40 | — | — | 1.95 | — | — | 2.37 | 2.83 | 3.25 | 3.68 | 4.10 | 4.53 | 4.95 | 5.99 | 6.85 | 7.70 | 8.55 |
| 50 | MGPM50 | — | — | 3.36 | — | — | 4.00 | 4.73 | 5.37 | 6.01 | 6.65 | 7.29 | 7.93 | 9.54 | 10.8 | 12.1 | 13.4 |
| 63 | MGPM63 | — | — | 4.18 | — | — | 4.94 | 5.78 | 6.54 | 7.29 | 8.05 | 8.80 | 9.56 | 11.4 | 12.9 | 14.4 | 15.9 |
| 80 | MGPM80 | — | — | 6.49 | — | — | 7.43 | 8.67 | 9.61 | 10.5 | 11.5 | 12.4 | 13.4 | 15.8 | 17.7 | 19.5 | 21.4 |
| 100 | MGPM100 | — | — | 10.5 | — | — | 11.9 | 13.6 | 14.9 | 16.3 | 17.6 | 18.9 | 20.2 | 23.6 | 26.2 | 28.9 | 31.5 |

### Ball bushing: MGPL12 to 100

(kg)

| Bore size (mm) | Model | Standard stroke (mm) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 |
| 12 | MGPL12 | 0.24 | 0.27 | — | 0.30 | 0.35 | 0.39 | 0.47 | 0.56 | 0.66 | 0.74 | 0.83 | 0.91 | 1.08 | — | — | — |
| 16 | MGPL16 | 0.34 | 0.39 | — | 0.43 | 0.51 | 0.56 | 0.67 | 0.79 | 0.93 | 1.04 | 1.16 | 1.28 | 1.50 | — | — | — |
| 20 | MGPL20 | — | 0.70 | — | 0.77 | 0.89 | 0.97 | 1.14 | 1.31 | 1.52 | 1.69 | 1.87 | 2.04 | 2.42 | 2.77 | 3.12 | 3.47 |
| 25 | MGPL25 | — | 0.98 | — | 1.07 | 1.25 | 1.34 | 1.57 | 1.81 | 2.08 | 2.31 | 2.54 | 2.77 | 3.27 | 3.74 | 4.20 | 4.66 |
| 32 | MGPL32 | — | — | 1.54 | — | — | 1.85 | 2.30 | 2.62 | 2.99 | 3.31 | 3.62 | 3.94 | 4.63 | 5.26 | 5.89 | 6.52 |
| 40 | MGPL40 | — | — | 1.79 | — | — | 2.15 | 2.64 | 3.00 | 3.42 | 3.78 | 4.14 | 4.50 | 5.28 | 6.00 | 6.72 | 7.44 |
| 50 | MGPL50 | — | — | 3.11 | — | — | 3.66 | 4.41 | 4.96 | 5.60 | 6.15 | 6.70 | 7.25 | 8.48 | 9.57 | 10.7 | 11.8 |
| 63 | MGPL63 | — | — | 3.93 | — | — | 4.59 | 5.46 | 6.12 | 6.88 | 7.54 | 8.21 | 8.87 | 10.3 | 11.7 | 13.0 | 14.3 |
| 80 | MGPL80 | — | — | 6.25 | — | — | 7.39 | 8.69 | 9.51 | 10.3 | 11.1 | 12.0 | 12.8 | 14.7 | 16.3 | 18.0 | 19.6 |
| 100 | MGPL100 | — | — | 9.89 | — | — | 11.6 | 13.4 | 14.5 | 15.7 | 16.9 | 18.1 | 19.3 | 21.9 | 24.2 | 26.6 | 28.9 |

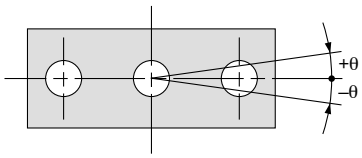
## Allowable Rotational Torque of Plate




T (N·m)

| Bore size (mm) | Bearing type | Stroke (mm) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 |
| 12 | MGPM | 0.39 | 0.32 | — | 0.27 | 0.24 | 0.21 | 0.43 | 0.36 | 0.31 | 0.27 | 0.24 | 0.22 | 0.19 | — | — | — |
| | MGPL | 0.61 | 0.45 | — | 0.35 | 0.58 | 0.50 | 0.37 | 0.29 | 0.24 | 0.20 | 0.18 | 0.16 | 0.12 | — | — | — |
| 16 | MGPM | 0.69 | 0.58 | — | 0.49 | 0.43 | 0.38 | 0.69 | 0.58 | 0.50 | 0.44 | 0.40 | 0.36 | 0.30 | — | — | — |
| | MGPL | 0.99 | 0.74 | — | 0.59 | 0.99 | 0.86 | 0.65 | 0.52 | 0.43 | 0.37 | 0.32 | 0.28 | 0.23 | — | — | — |
| 20 | MGPM | — | 1.05 | — | 0.93 | 0.83 | 0.75 | 1.88 | 1.63 | 1.44 | 1.28 | 1.16 | 1.06 | 0.90 | 0.78 | 0.69 | 0.62 |
| | MGPL | — | 1.26 | — | 1.03 | 2.17 | 1.94 | 1.52 | 1.25 | 1.34 | 1.17 | 1.03 | 0.93 | 0.76 | 0.65 | 0.56 | 0.49 |
| 25 | MGPM | — | 1.76 | — | 1.55 | 1.38 | 1.25 | 2.96 | 2.57 | 2.26 | 2.02 | 1.83 | 1.67 | 1.42 | 1.24 | 1.09 | 0.98 |
| | MGPL | — | 2.11 | — | 1.75 | 3.37 | 3.02 | 2.38 | 1.97 | 2.05 | 1.78 | 1.58 | 1.41 | 1.16 | 0.98 | 0.85 | 0.74 |
| 32 | MGPM | — | — | 6.35 | — | — | 5.13 | 5.69 | 4.97 | 4.42 | 3.98 | 3.61 | 3.31 | 2.84 | 2.48 | 2.20 | 1.98 |
| | MGPL | — | — | 5.95 | — | — | 4.89 | 5.11 | 4.51 | 6.34 | 5.79 | 5.33 | 4.93 | 4.29 | 3.78 | 3.38 | 3.04 |
| 40 | MGPM | — | — | 7.00 | — | — | 5.66 | 6.27 | 5.48 | 4.87 | 4.38 | 3.98 | 3.65 | 3.13 | 2.74 | 2.43 | 2.19 |
| | MGPL | — | — | 6.55 | — | — | 5.39 | 5.62 | 4.96 | 6.98 | 6.38 | 5.87 | 5.43 | 4.72 | 4.16 | 3.71 | 3.35 |
| 50 | MGPM | — | — | 13.0 | — | — | 10.8 | 12.0 | 10.6 | 9.50 | 8.60 | 7.86 | 7.24 | 6.24 | 5.49 | 4.90 | 4.43 |
| | MGPL | — | — | 9.17 | — | — | 7.62 | 9.83 | 8.74 | 11.6 | 10.7 | 9.83 | 9.12 | 7.95 | 7.02 | 6.26 | 5.63 |
| 63 | MGPM | — | — | 14.7 | — | — | 12.1 | 13.5 | 11.9 | 10.7 | 9.69 | 8.86 | 8.16 | 7.04 | 6.19 | 5.52 | 4.99 |
| | MGPL | — | — | 10.2 | — | — | 8.48 | 11.0 | 9.74 | 13.0 | 11.9 | 11.0 | 10.2 | 8.84 | 7.80 | 6.94 | 6.24 |
| 80 | MGPM | — | — | 21.9 | — | — | 18.6 | 22.9 | 20.5 | 18.6 | 17.0 | 15.6 | 14.5 | 12.6 | 11.2 | 10.0 | 9.11 |
| | MGPL | — | — | 15.1 | — | — | 23.3 | 22.7 | 20.6 | 18.9 | 17.3 | 16.0 | 14.8 | 12.9 | 11.3 | 10.0 | 8.94 |
| 100 | MGPM | — | — | 38.8 | — | — | 33.5 | 37.5 | 33.8 | 30.9 | 28.4 | 26.2 | 24.4 | 21.4 | 19.1 | 17.2 | 15.7 |
| | MGPL | — | — | 27.1 | — | — | 30.6 | 37.9 | 34.6 | 31.8 | 29.3 | 27.2 | 25.3 | 22.1 | 19.5 | 17.3 | 15.5 |

## Non-rotating Accuracy of Plate

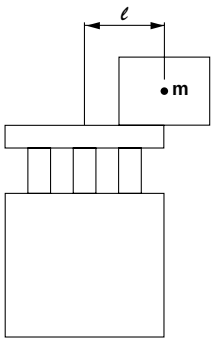
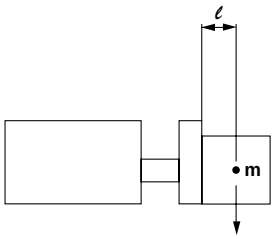



For non-rotating accuracy θ without load, use a value no more than the values in the table as a guide.

| Bore size (mm) | Non-rotating accuracy θ | |
|---|---|---|
| | MGPM | MGPL |
| 12 | ±0.08° | ±0.10° |
| 16 | | |
| 20 | ±0.07° | ±0.09° |
| 25 | | |
| 32 | ±0.06° | ±0.08° |
| 40 | | |
| 50 | ±0.05° | ±0.06° |
| 63 | | |
| 80 | ±0.04° | ±0.05° |
| 100 | | |

# Series MGP
# Model Selection

## Selecting Conditions

| | Vertical | | Horizontal | |
|---|---|---|---|---|
| Mounting orientation |  | |  | |
| Maximum speed (mm/s) | 200 | 400 | 200 | 400 |
| Graph (Slide bearing) | 1, 2 | 3, 4 | 13, 14 | 15, 16 |
| Graph (Ball bushing) | 5 to 8 | 9 to 12 | 17, 18 | 19, 20 |

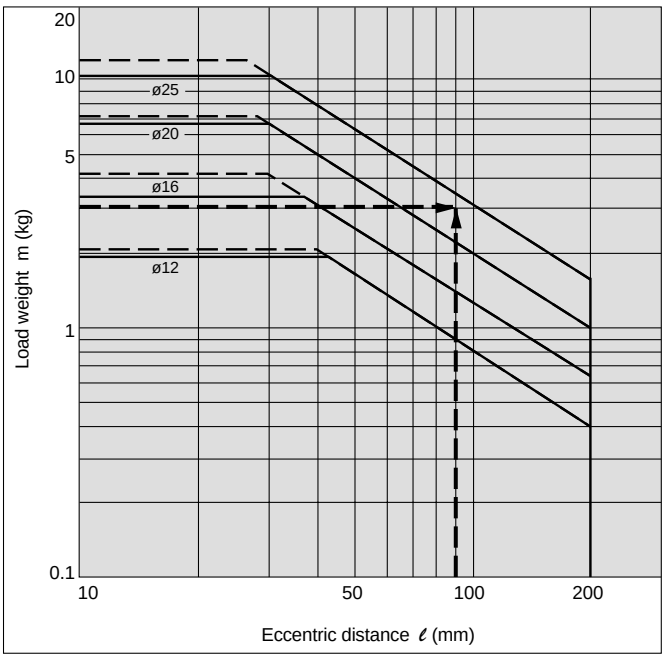


## Selection Example 1 (Vertical Mounting)

**Selecting conditions**
- **Mounting: Vertical**
- **Bearing type: Ball bushing**
- **Stroke: 30mm**
- **Maximum speed: 200mm/s**
- **Load weight: 3kg**
- **Eccentric distance: 90mm**

**Find the point of intersection for the load weight of 3kg and the eccentric distance of 90mm on graph 5, based on vertical mounting, ball bushing, 30mm stroke, and the speed of 200mm/s.**
**→MGPL25-30 is selected.**

**5 Less than 40mm stroke V = 200mm/s**

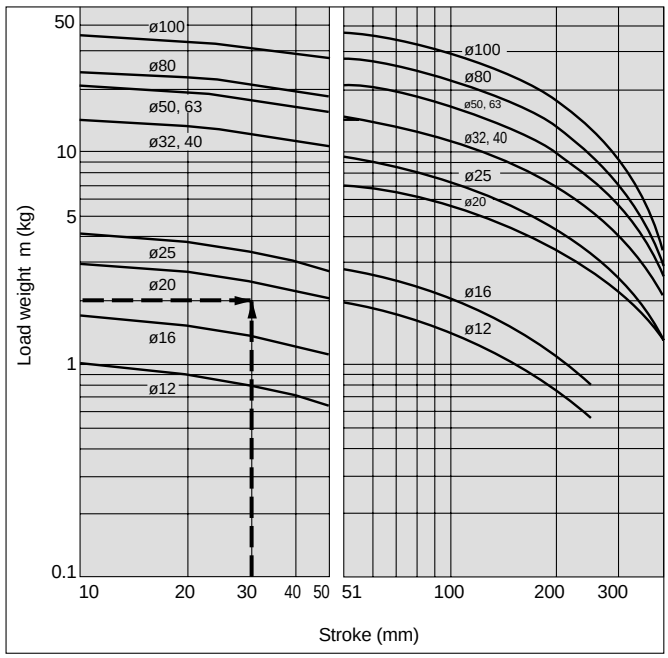



## Selection Example 2 (Horizontal Mounting)

**Selecting conditions**
- **Mounting: Horizontal**
- **Bearing type: Slide bearing**
- **Distance between plate and load center of gravity: 50mm**
- **Maximum speed: 200mm/s**
- **Load weight: 2kg**
- **Stroke: 30mm**

**Find the point of intersection for the load weight of 2kg and stroke of 30mm on graph 13, based on horizontal mounting, slide bearing, the distance of 50mm between the plate and load center of gravity, and the speed of 200mm/s.**
**→MGPM20-30 is selected.**

**13 ℓ = 50mm V = 200mm/s**



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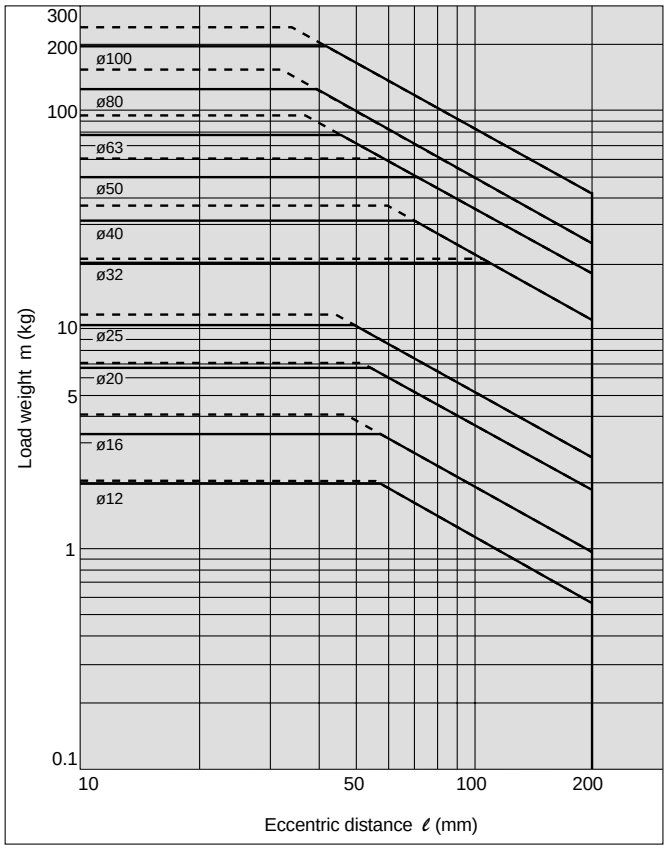
## Vertical Mounting Slide Bearing

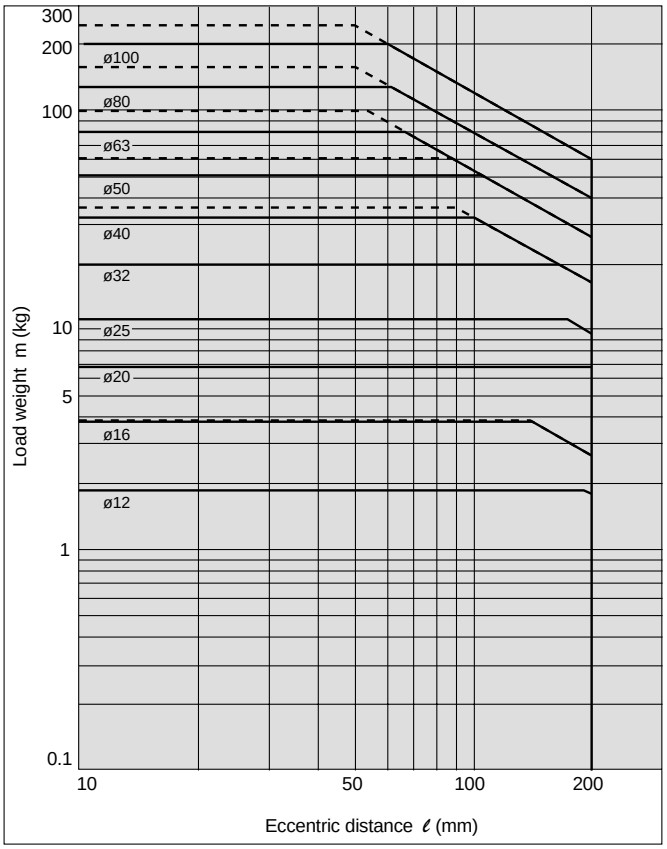
——— Operating pressure: 0.4MPa
- - - - - Operating pressure: 0.5MPa or more

### MGPM12 to 100

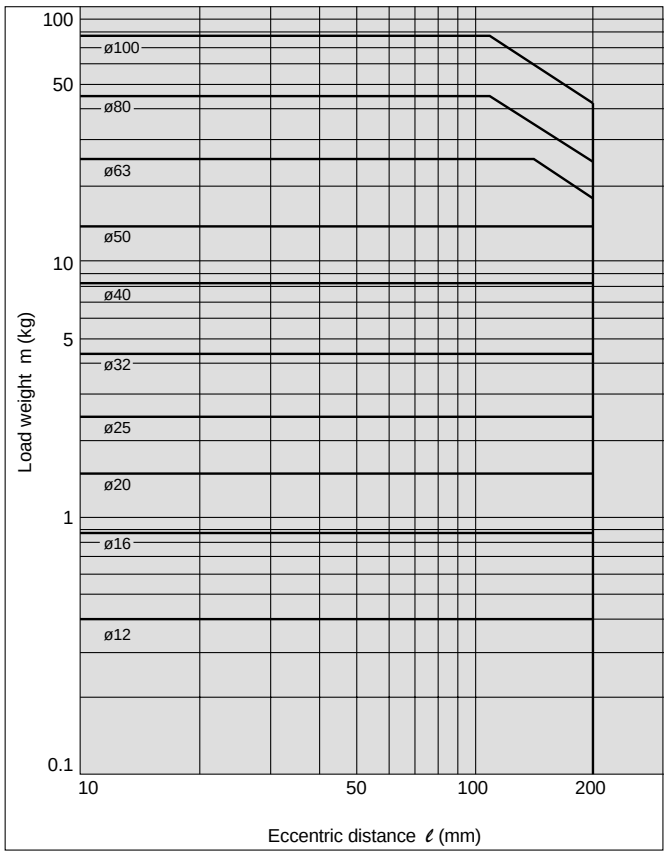
**1** 50mm stroke or less V = 200mm/s



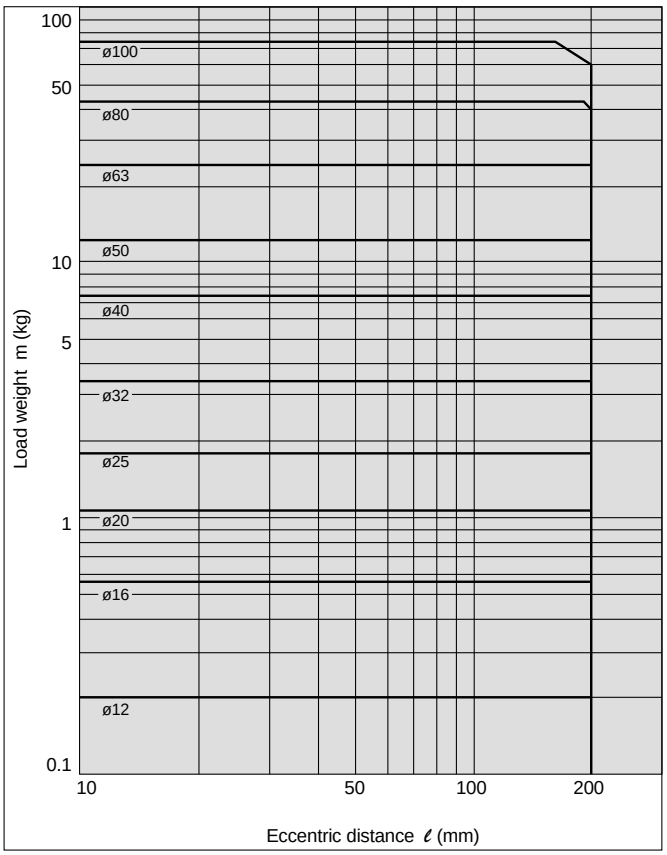

**2** Over 50mm stroke V = 200mm/s




**3** 50mm stroke or less V = 400mm/s




**4** Over 50mm stroke V = 400mm/s





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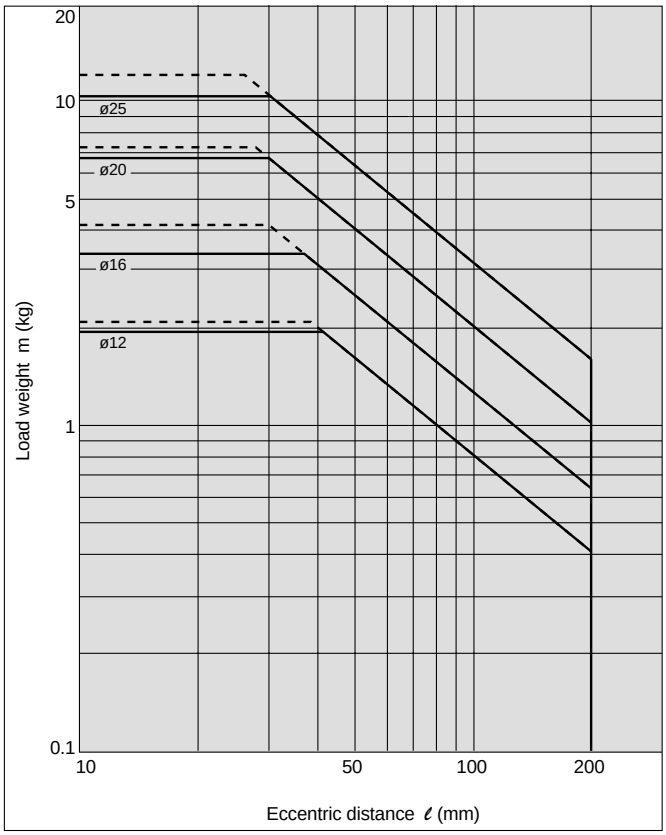
# Series MGP

## Vertical Mounting Ball Bushing

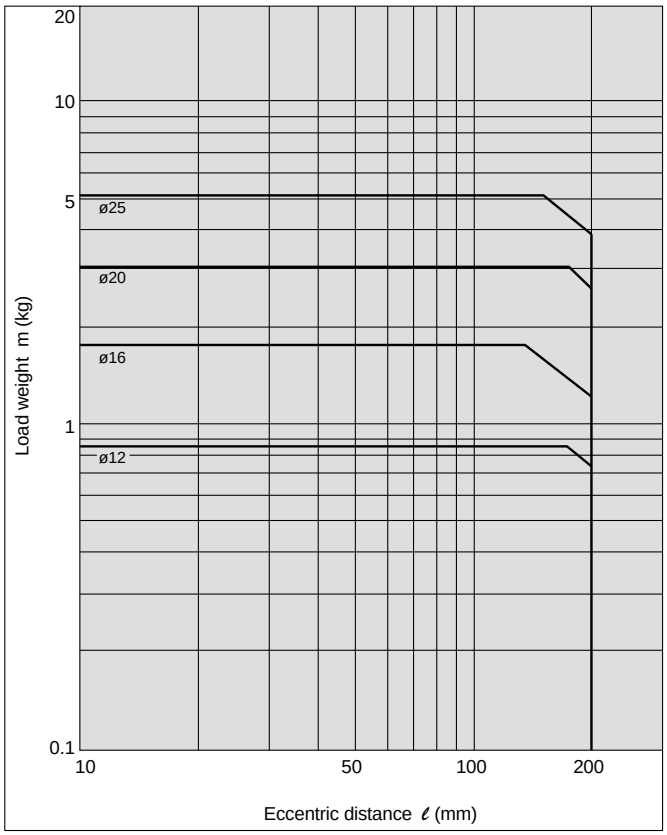
Operating pressure: 0.4MPa
Operating pressure: 0.5MPa or more

### MGPL12 to 25

**5 30mm stroke or less V = 200mm/s**

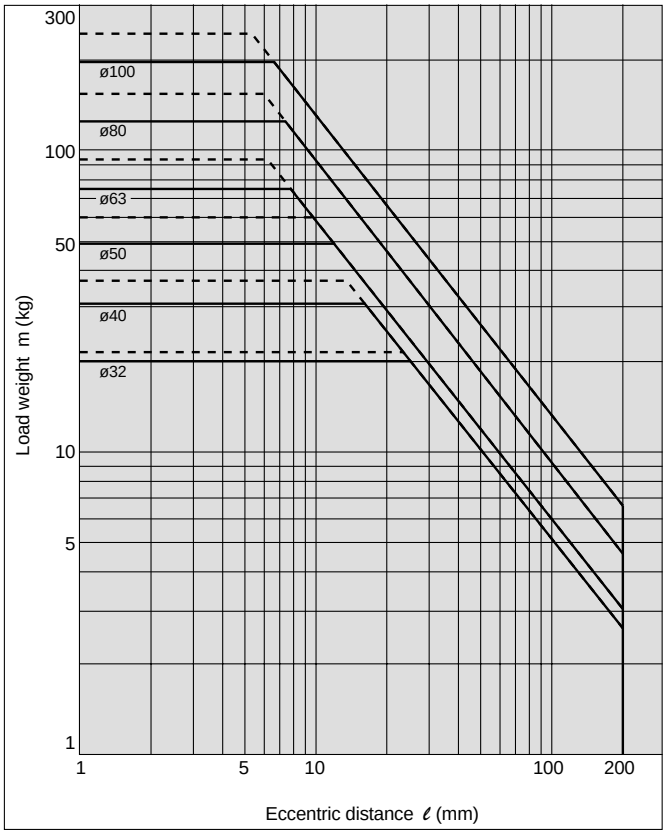



**6 Over 30mm stroke V = 200mm/s**

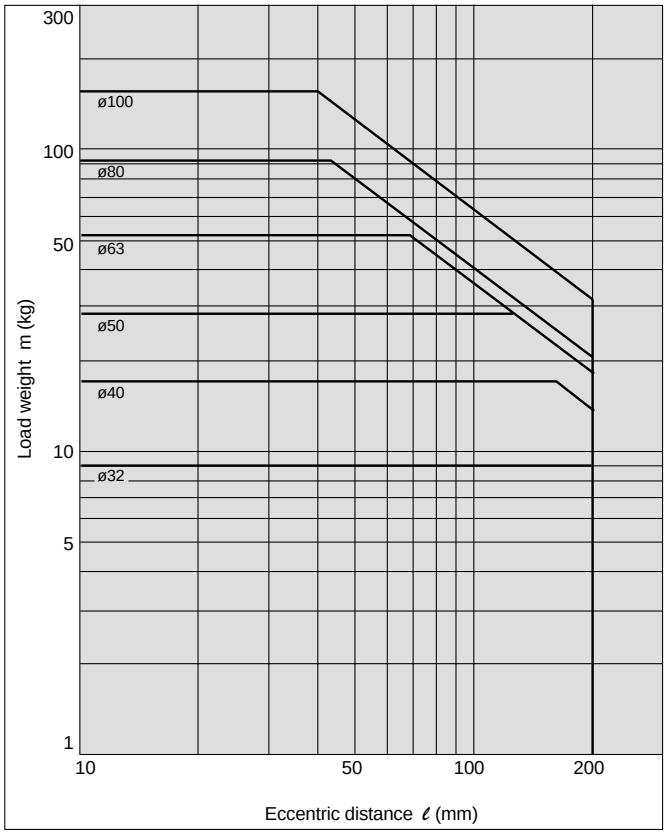



### MGPL32 to 100

**7 50mm stroke or less V = 200mm/s**




**8 Over 50mm stroke V = 200mm/s**



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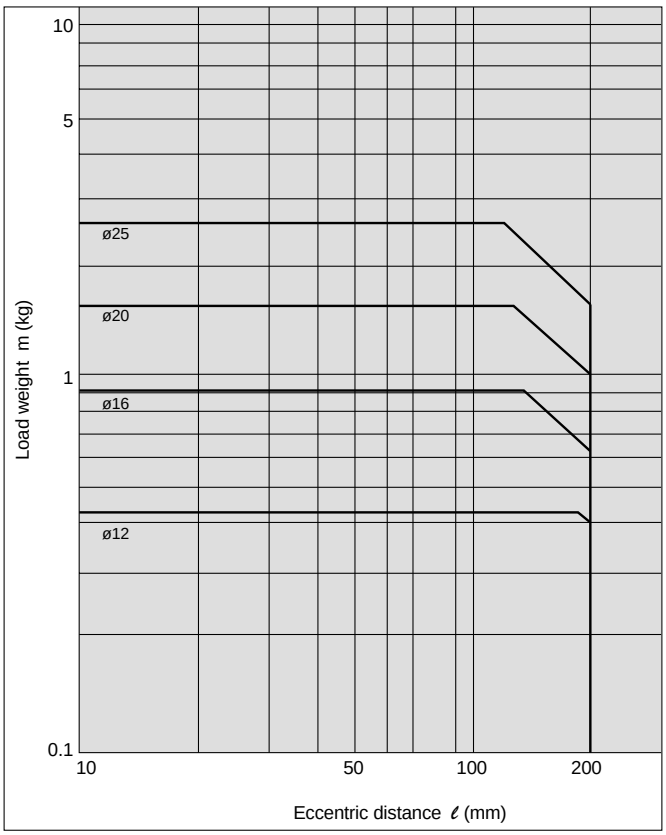
## Vertical Mounting Ball Bushing

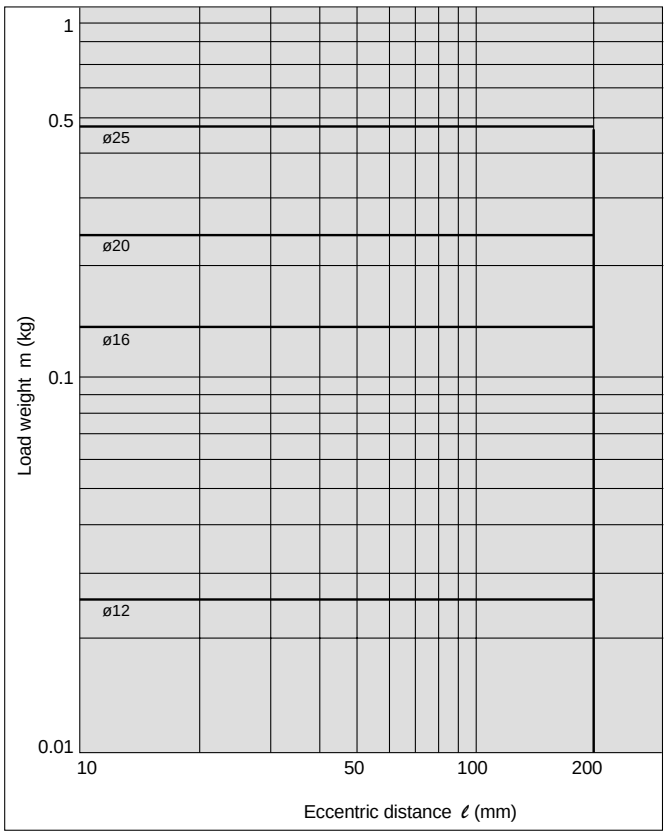
Operating pressure: 0.4MPa

### MGPL12 to 25

**9 30mm stroke or less V = 400mm/s**

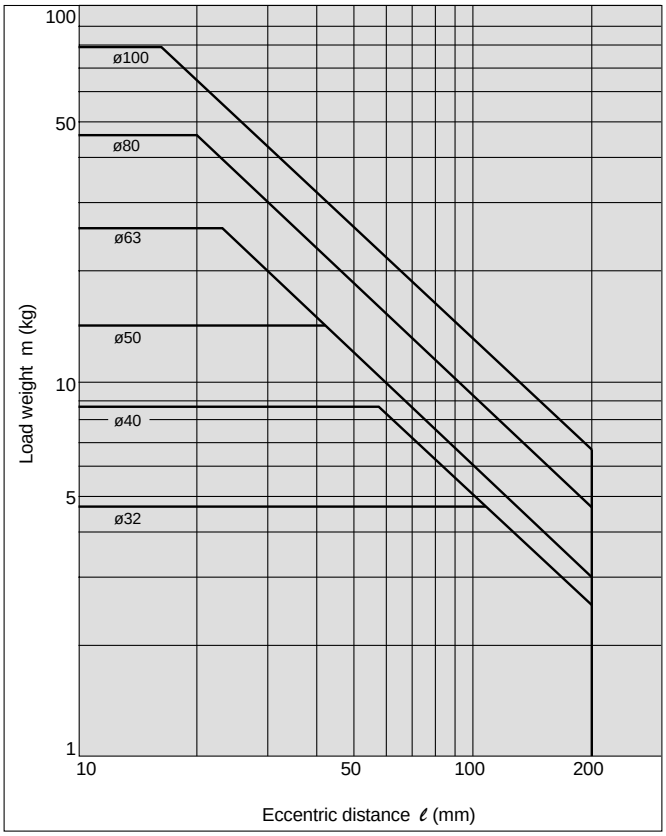



**10 Over 30mm stroke V = 400mm/s**

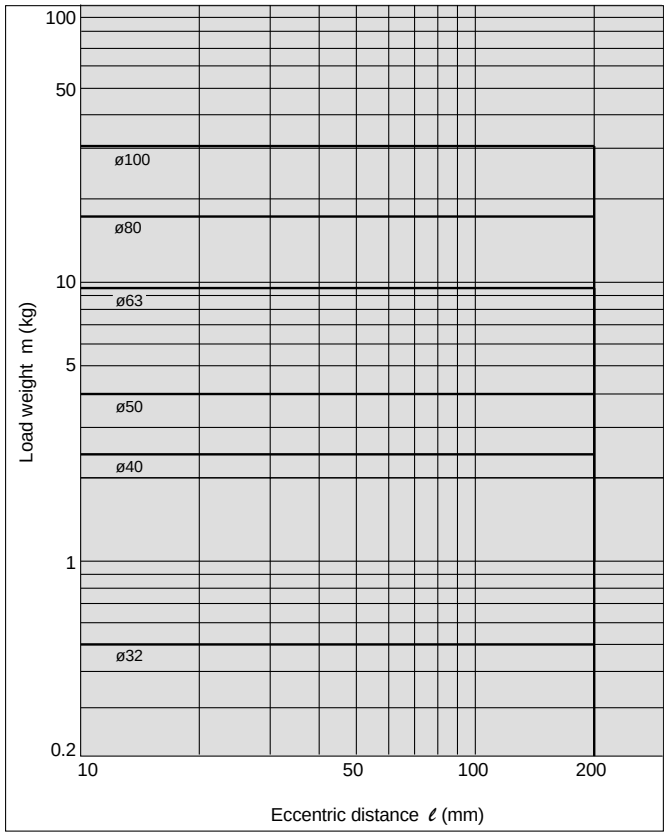



### MGPL32 to 100

**11 50mm stroke or less V = 400mm/s**




**12 Over 50mm stroke V = 400mm/s**





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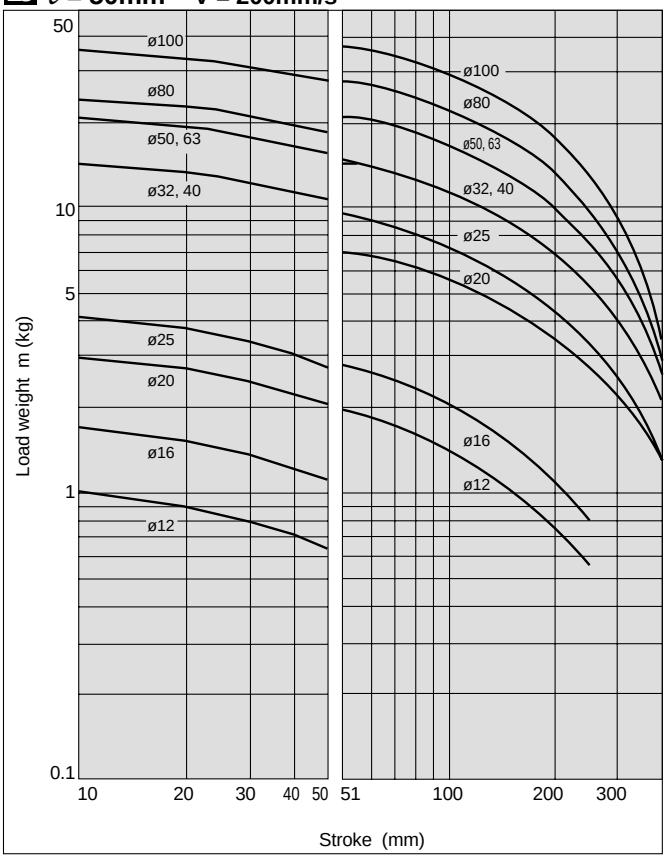
# Series MGP

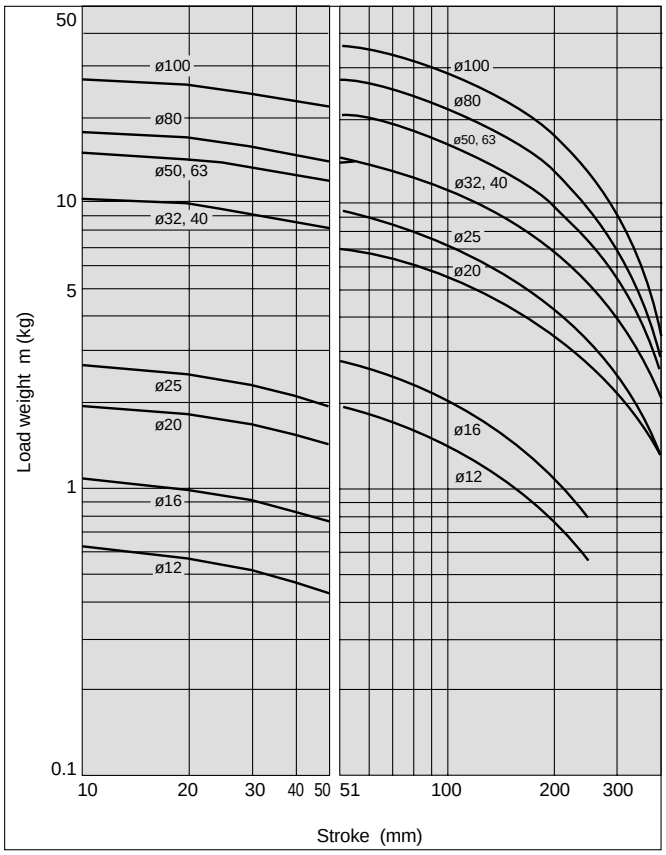
## Horizontal Mounting Slide Bearing

### MGPM12 to 100

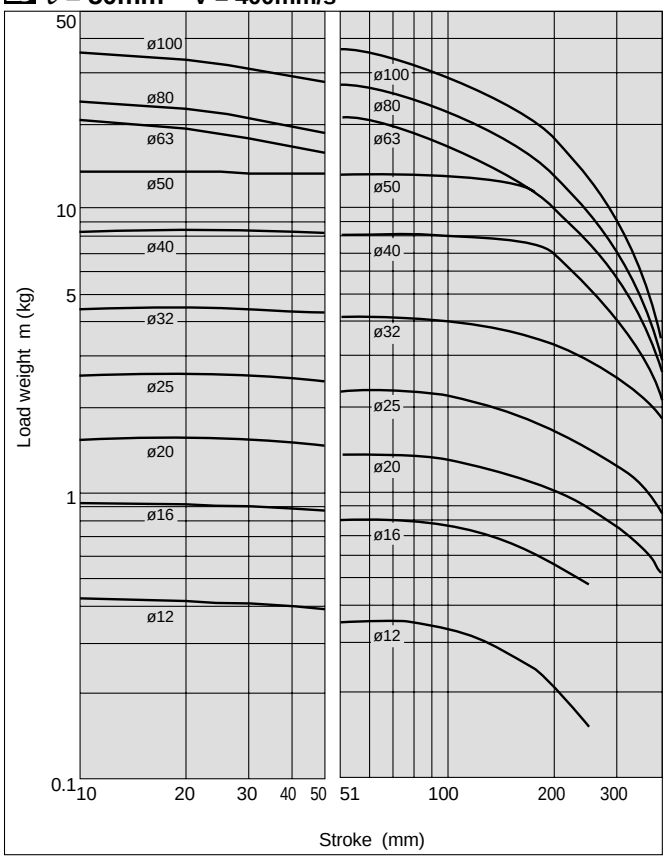
**13** $\ell$ = 50mm V = 200mm/s



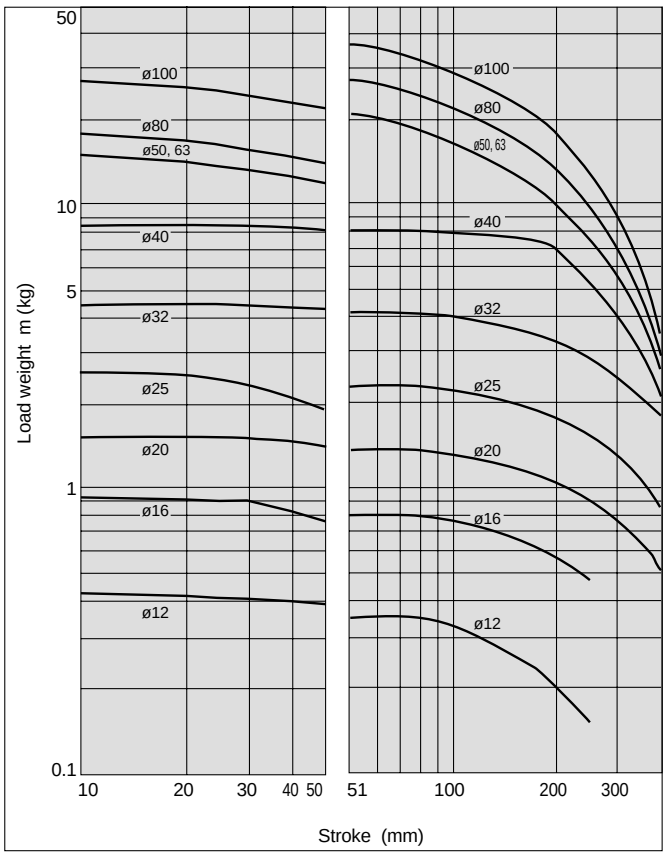

**14** $\ell$ = 100mm V = 200mm/s




**15** $\ell$ = 50mm V = 400mm/s




**16** $\ell$ = 100mm V = 400mm/s



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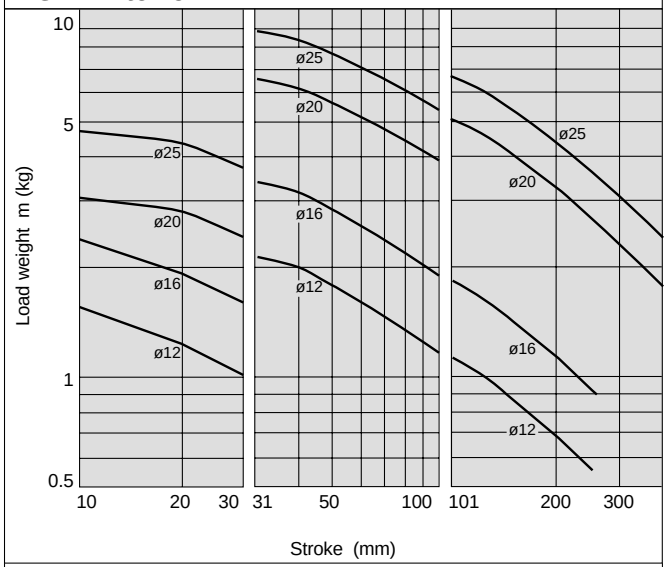
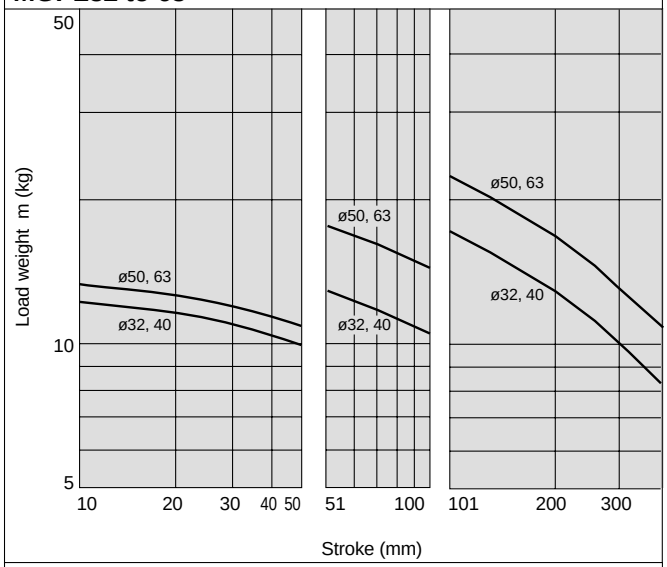
## Horizontal Mounting **Ball Bushing**

### 17 ℓ = 50mm V = 200m/s

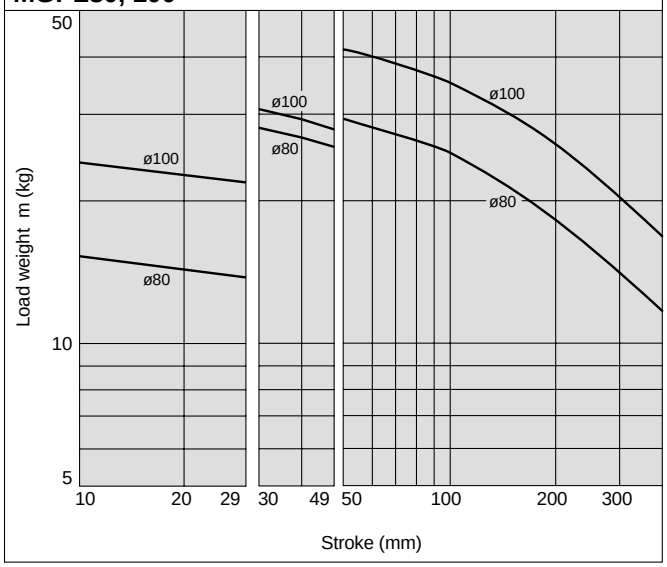
#### MGPL12 to 25




#### MGPL32 to 63

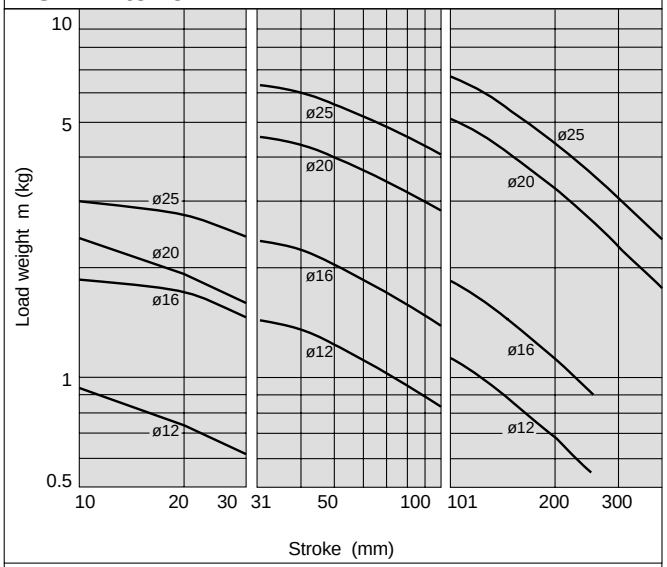



#### MGPL80, 100

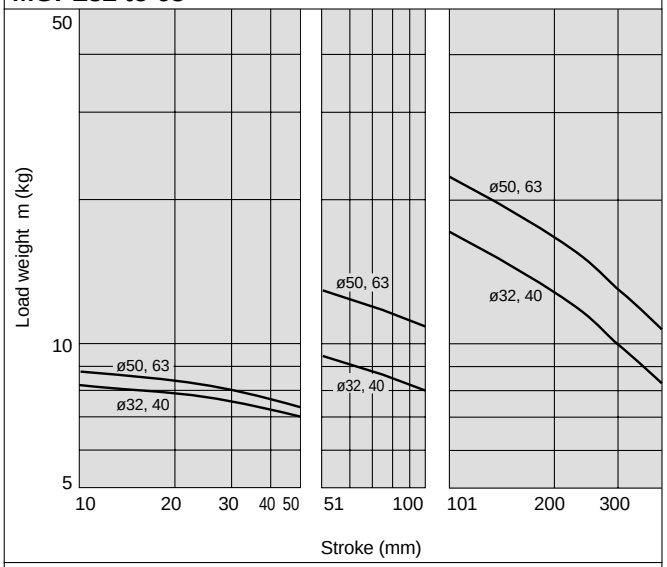



### 18 ℓ = 100mm V = 200m/s

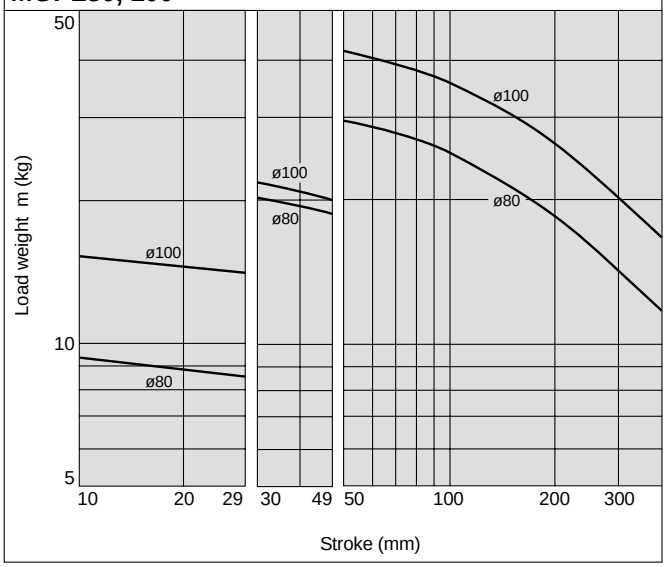
#### MGPL12 to 25




#### MGPL32 to 63




#### MGPL80, 100

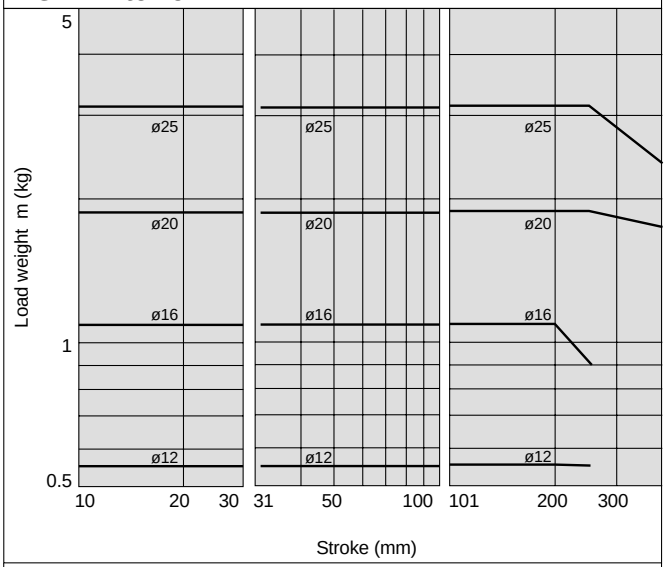


# Series MGP

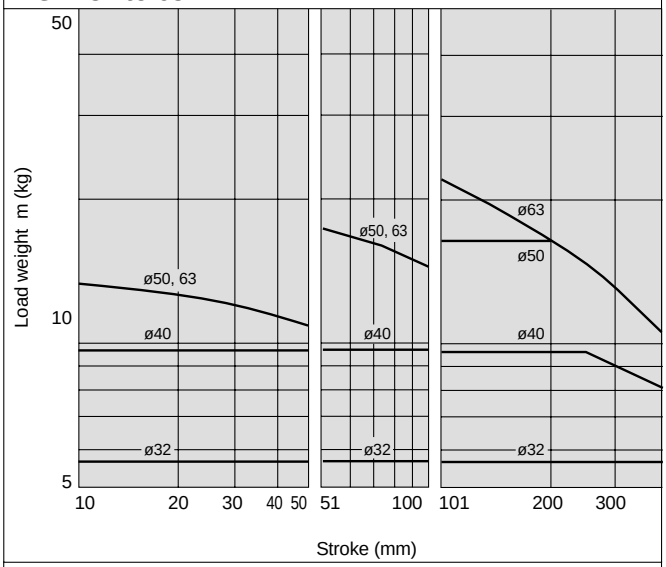
## Horizontal Mounting Ball Bushing

### 19 ℓ = 50mm V = 400m/s

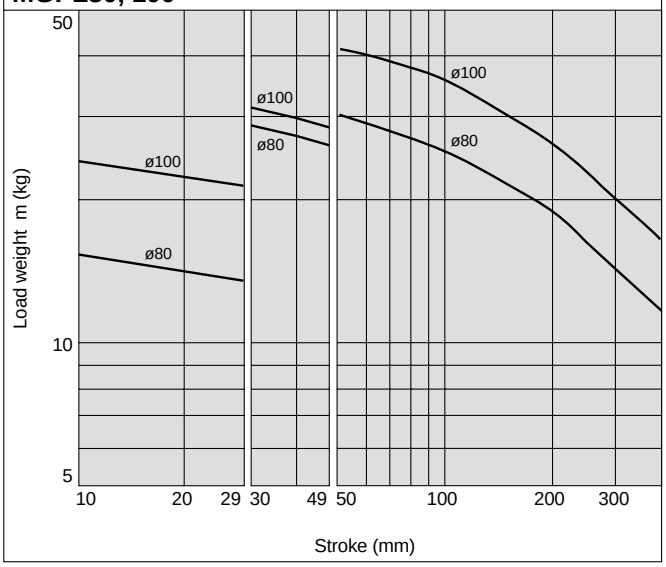
#### MGPL12 to 25




#### MGPL32 to 63

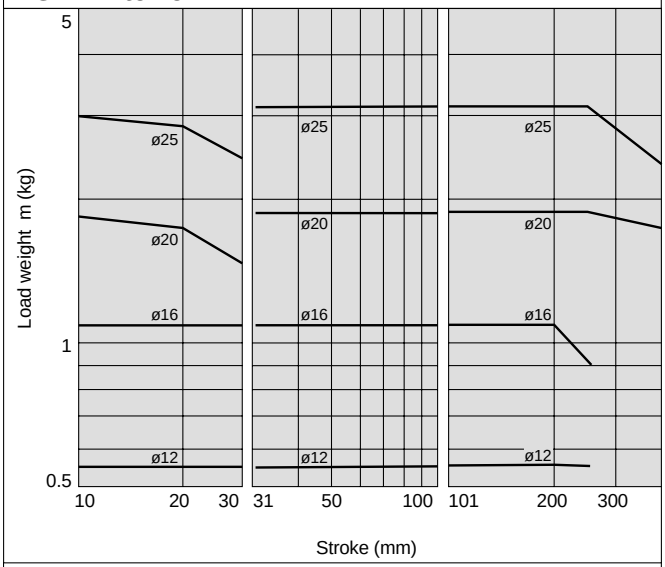



#### MGPL80, 100

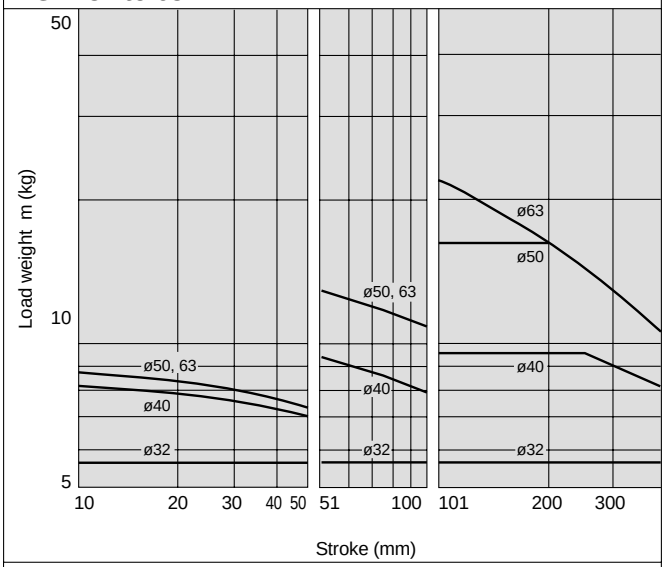



### 20 ℓ = 100mm V = 400m/s

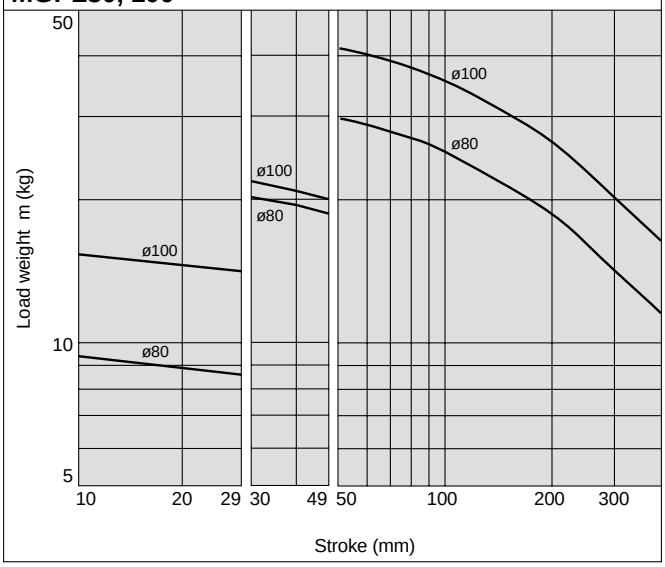
#### MGPL12 to 25




#### MGPL32 to 63




#### MGPL80, 100



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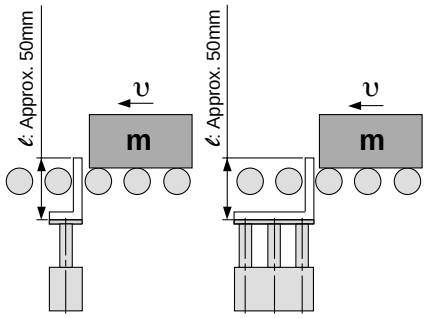
## Operating Range when Used as Stopper

### Bore Sizes ø12 to 25/MGPM12 to 25 (Slide bearing)




* When selecting a model with a longer ℓ dimension, be sure to choose a bore size which is sufficiently large.

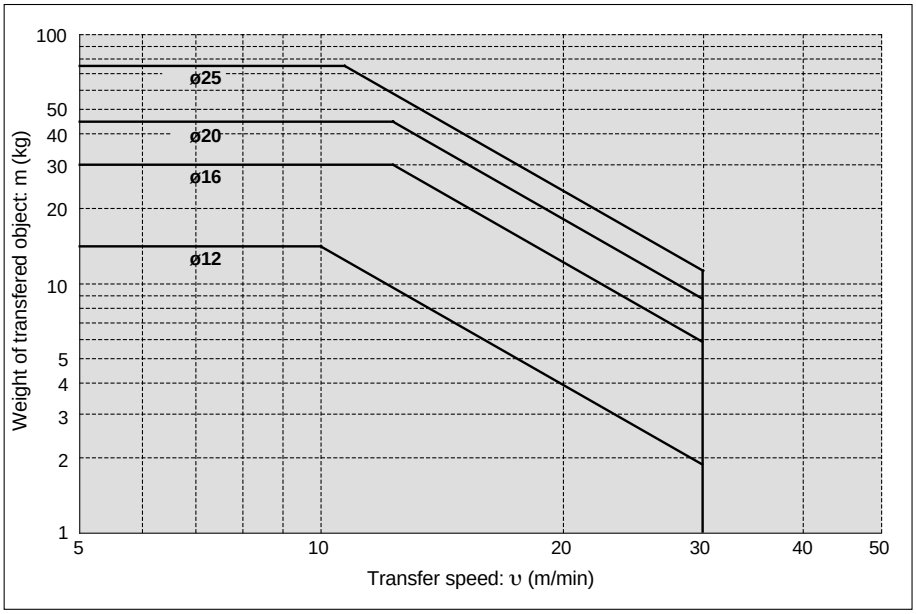
**⚠Caution**

**Handling precautions**

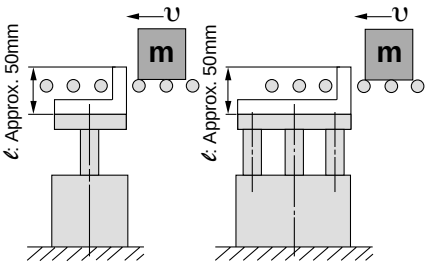
Note 1) When using as a stopper, select a model with a stroke of 30mm or less.

**Note 2) Model MGPL (ball bushing) cannot be used as a stopper.**

**MGPM12 to 25 (Slide bearing)**




### Bore Sizes ø32 to 100/MGPM32 to 100 (Slide bearing)




* When selecting a model with a longer ℓ dimension, be sure to choose a bore size which is sufficiently large.

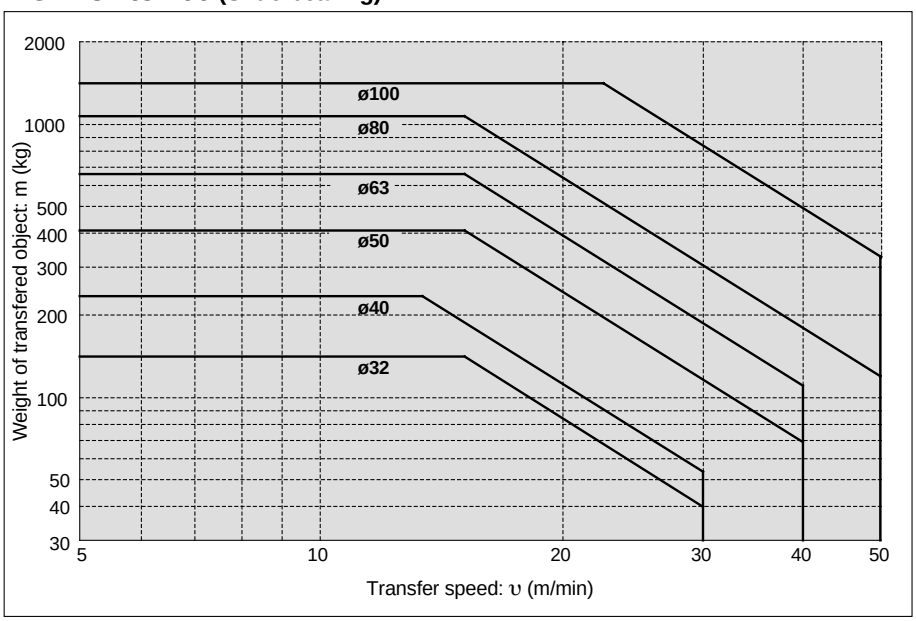
**⚠Caution**

**Handling precautions**

Note 1) When using as a stopper, select a model with a stroke of 50mm or less.

**Note 2) Model MGPL (ball bushing) cannot be used as a stopper.**

**MGPM32 to 100 (Slide bearing)**



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# Series MGP

## 1. Water Resistant

Ideal for use in a machine tool envrionment exposed to coolants. Also applicable for use in an environment with water splashing such as food processing and car wash equipment, etc.

### Specifications

| Applicable series | | MGPM |
|---|---|---|
| Bearing type | | Slide bearing |
| Bore size (mm) | | 20, 25, 32, 40, 50, 63, 80, 100 |
| Cushion | MGPM□R | Rubber cushion |
| | MGPM□V | Without cushion |

∗ Specifications other than above are identical to the standard basic type.

### How to Order

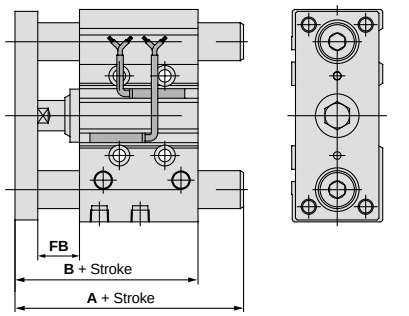
MGPM [Bore size] **R** — [Stroke] — Y7BAL

- Y7BAL: Water resistant 2 color indication solid state switch
- R: Water resistant cylinder

| | |
|---|---|
| R | NBR (nitrile rubber) seal |
| V | FKM (fluoro rubber) seal |

∗ Stainless steel parts are available as special order products.

### Dimensions




(mm)

| Bore size (mm) | A | | B | FB |
|---|---|---|---|---|
| | 50mm stroke or less | 51mm stroke or more | | |
| **20** | 66 | 97.5 | 66 | 19 |
| **25** | 67.5 | 99 | 67.5 | 20 |
| **32** | 109 | 114 | 71.5 | 22 |
| **40** | 109 | 114 | 78 | 22 |
| **50** | 117.5 | 129 | 83 | 23 |
| **63** | 117.5 | 129 | 88 | 23 |
| **80** | 121 | 148 | 102.5 | 24 |
| **100** | 141 | 166 | 120 | 29 |

∗ Other dimensions are identical to the standard type.

## 2. Copper-free Series (applicable to CRT manufacturing process)

**To prevent the influence of copper ions or halogen ions during CRT manufacturing processes, copper and fluorine materials are not used as component parts.**

### Specifications

| Applicable series | MGPM | MGPL |
|---|---|---|
| Bearing type | Slide bearing | Ball bushing |
| Bore size (mm) | 12, 16, 20, 25, 32<br>40, 50, 63, 80, 100 | |

∗ Specifications and dimensions other than above are identical to the standard basic type.

### How to Order

**20** — MGP [M] [Bore size] — [Stroke]

- M: Bearing type

| | |
|---|---|
| M | Slide bearing |
| L | Ball bushing |

- 20: Copper-free specification

## 3. Clean Room Series

Applicable in a clean room environment.
Ideal for use in conveyor lines for semi-conductor (LSI), liquid crystal (LCD), food processing, pharmaceutical, and electronic parts, etc.

### Specifications

| Applicable series | MGPL | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bearing type | Ball bushing | | | | | | | |
| Bore size (mm) | 12 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| Stroke (mm) | 10 to 100 | | 20 to 200 | | 25 to 200 | | | |

∗ Specifications other than above are identical to the standard basic type.

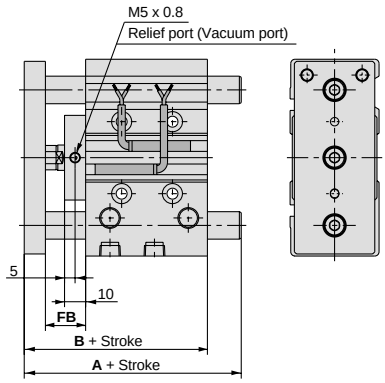
### How to Order

**12** — MGPL [Bore size] — [Stroke]

- 12: Clean room specification

| | |
|---|---|
| 12 | Relief port type |
| 13 | Vacuum port type |

### Dimensions




(mm)

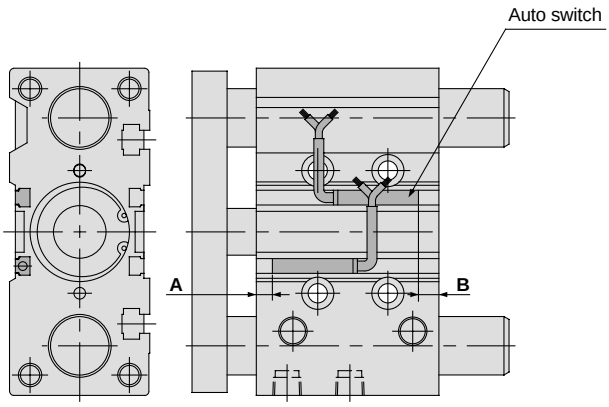
| Bore size (mm) | A | | | B | FB |
|---|---|---|---|---|---|
| | 30mm stroke or less | Over 30mm to 100mm stroke | Over 100mm stroke | | |
| **12** | 56 | 68 | — | 55 | 18 |
| **16** | 62 | 78 | — | 59 | 18 |
| **20** | 76 | 93 | 117 | 66 | 19 |
| **25** | 82.5 | 98.5 | 117.5 | 66.5 | 19 |

(mm)

| Bore size (mm) | A | | | B | FB |
|---|---|---|---|---|---|
| | 50mm stroke or less | Over 50mm to 100mm stroke | Over 100mm stroke | | |
| **32** | 93 | 110 | 130 | 71.5 | 22 |
| **40** | 93 | 110 | 130 | 78 | 22 |
| **50** | 104 | 125 | 145 | 83 | 23 |
| **63** | 104 | 125 | 145 | 88 | 23 |

∗ Other dimensions are identical to the standard type.

## Auto Switches/Proper Mounting Position for Stroke End Detection




**Proper mounting position** (mm)

| Bore size (mm) | A | B |
|---|---|---|
| **12** | 1.5 | 3 |
| **16** | 4.5 | 4 |
| **20** | 4 | 8 |
| **25** | 4.5 | 8 |
| **32** | 5.5 | 7 |

(mm)

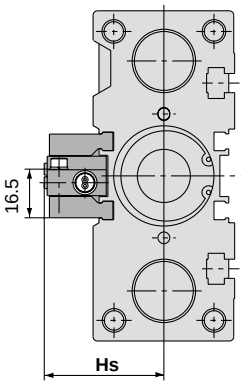
| Bore size (mm) | A | B |
|---|---|---|
| **40** | 9.5 | 9.5 |
| **50** | 7.5 | 11.5 |
| **63** | 10 | 14 |
| **80** | 13 | 18.5 |
| **100** | 17.5 | 23.5 |

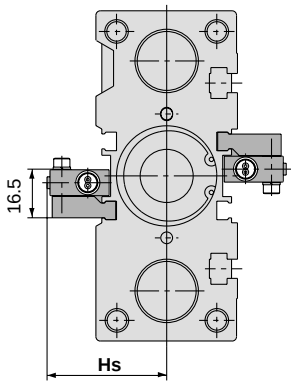
Note 1) Minimum mountable strokes for auto switch are 10mm or more for two switches, and 5mm or more for one switch.

Note 2) Type D-P5DW can be mounted only on bore sizes ø40 through ø100.

### For D-P5DW (∗ Cannot be mounted on bore sizes ø32 or less.)

#### ø40 to ø63

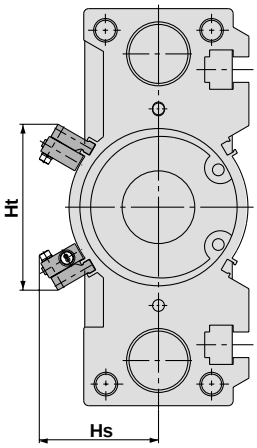



**For 25mm stroke**

∗ For bore sizes ø40 through 63 with two switches, one switch is mounted on each side.

#### ø80, ø100




(mm)

| Bore size (mm) | Hs | Ht |
|---|---|---|
| **40** | 44.5 | — |
| **50** | 50 | — |
| **63** | 57 | — |
| **80** | 60.7 | 84.4 |
| **100** | 70.8 | 96.1 |

∗ Minimum mountable strokes for auto switch are 10mm or more for two switches, and 5mm or more for one switch.

## Auto Switch Mounting

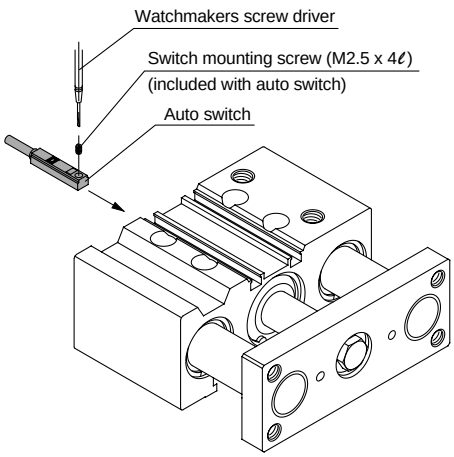
### ⚠Caution

**Auto switch mounting tool**

• When tightening the auto switch mounting screw (included with auto switch), use a watchmakers screw driver with a handle about 5 to 6mm in diameter.

**Tightening torque**

• Tighten with a torque of 0.05 to 0.1N·m. As a rule, it should be turned about 90° past the point at which tightening can be felt.




### For D-P5DW

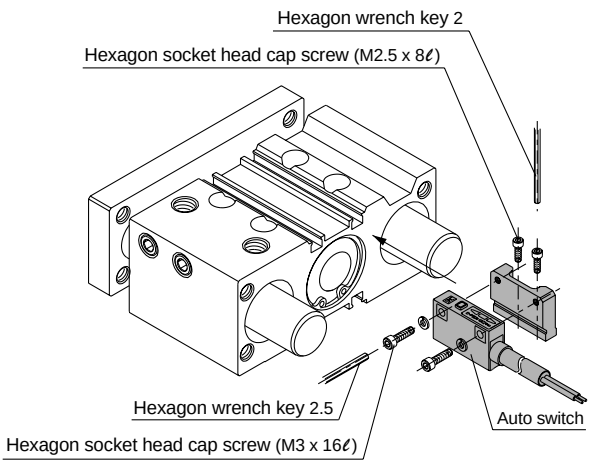
### ⚠Caution

**Auto switch mounting tool**

• When tightening hexagon socket head cap screws of the auto switch, use hexagon wrench key 2 or 2.5 with the appropriate screws.

**Tightening torque**

• Tighten M2.5 screws with a torque of about 0.3 to 0.5N·m, and M3 screws with a torque of about 0.5 to 0.7 N·m.





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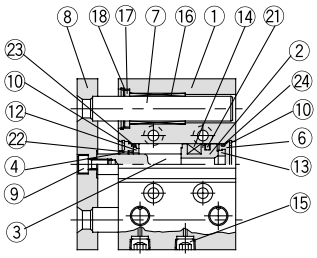
# Series MGP

## Construction

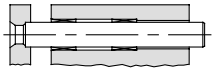
### Series MGPM

#### MGPM12 to 25

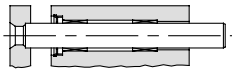



50mm stroke or less

ø12, ø16 50mm stroke or less

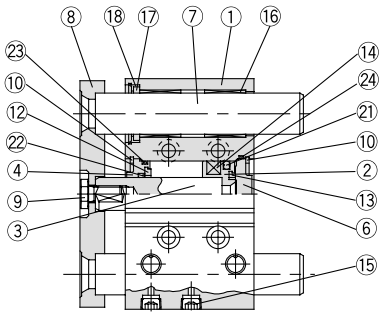


ø12, ø16 over 50mm stroke

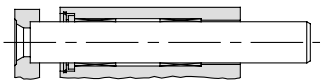


ø20, ø25 over 50mm stroke

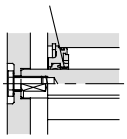
#### MGPM32 to 100




50mm stroke or less



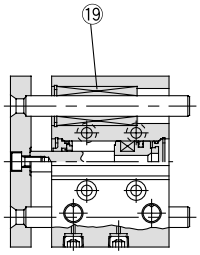
Over 50mm stroke



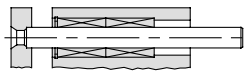
ø50 or larger

### Series MGPL

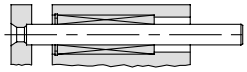
#### MGPL12 to 25



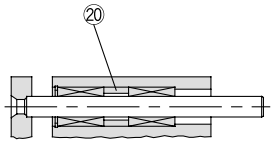

30mm stroke or less



ø12, ø16 over 30mm stroke

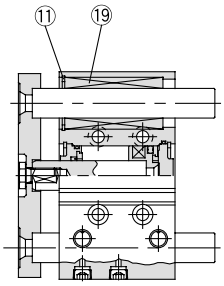


ø20, ø25 over 30mm to 100mm stroke

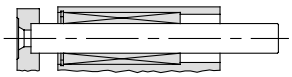



ø20, ø25 over 100mm stroke

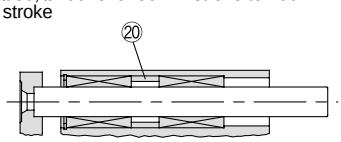
#### MGPL32 to 100




50mm stroke or less



ø32 to ø63 over 50mm to100mm stroke
ø80, ø100 over 50mm stroke to 200mm stroke




ø32 to ø63 over 100mm stroke
ø80, ø100 over 200mm stroke

### Parts list

| No. | Description | Material | Note | |
|---|---|---|---|---|
| 1 | Body | Aluminum alloy | Hard anodized | |
| 2 | Piston | Aluminum alloy | Chromated | |
| 3 | Piston rod | Stainless steel | ø12 to ø25 | |
| | | Carbon steel | ø32 to ø100 | Hard chrome plated |
| 4 | Collar | Aluminum bearing alloy | ø12 to ø40 | Clear anodized |
| | | Aluminum alloy casting | ø50 to ø100 | Coated |
| 5 | Bushing | Lead bronze casting | ø50 to ø100 | |
| 6 | Head cover | Aluminum alloy | ø12 to ø63 | Clear chromated |
| | | | ø80 to ø100 | Coated |
| 7 | Guide rod | Carbon steel | Hard chrome plated | |
| 8 | Plate | Carbon steel | Nickel plated | |
| 9 | Plate mounting bolt | Carbon steel | Nickel plated | |
| 10 | Snap ring | Carbon tool steel | Phosphate coated | |
| 11 | Snap ring | Carbon tool steel | Phosphate coated | |

### Parts list

| No. | Description | Material | Note | |
|---|---|---|---|---|
| 12 | Bumper A | Urethane | | |
| 13 | Bumper B | Urethane | | |
| 14 | Magnet | Synthetic rubber | | |
| 15 | Plug (M-5P) | Brass | ø12, ø16 | Nickel plated |
| | Hexagon socket head taper plug | Carbon steel | ø20 to ø100 | Nickel plated |
| 16 | Slide bearing | Lead bronze casting | | |
| 17 | Felt | Felt | | |
| 18 | Holder | Resin | | |
| 19 | Ball bushing | | | |
| 20 | Spacer | Aluminum alloy | | |
| 21* | Piston seal | NBR | | |
| 22* | Rod seal | NBR | | |
| 23* | Gasket A | NBR | | |
| 24* | Gasket B | NBR | | |

### Replacement parts: Seal kits

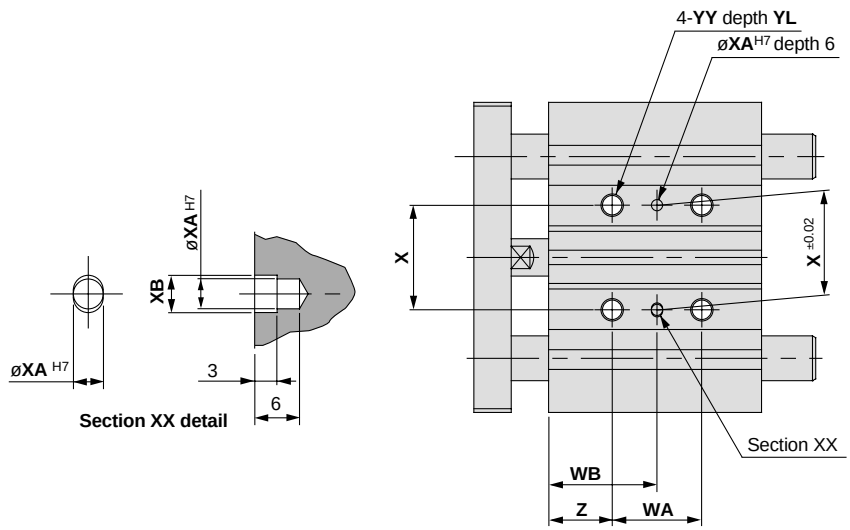
| Bore size (mm) | Order No. | Contents |
|---|---|---|
| 12 | MGP12-PS | Kits include items 21, 22, 23, and 24 from the table above. |
| 16 | MGP16-PS | |
| 20 | MGP20-PS | |
| 25 | MGP25-PS | |
| 32 | MGP32-PS | |

### Replacement parts: Seal kits

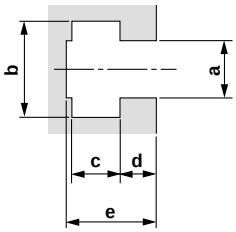
| Bore size (mm) | Order no. | Contents |
|---|---|---|
| 40 | MGP40-PS | Kits include items 21, 22, 23, and 24 from the table above. |
| 50 | MGP50-PS | |
| 63 | MGP63-PS | |
| 80 | MGP80-PS | |
| 100 | MGP100-PS | |

* Seal kits are sets consisting of items 21 through 24 above, and can be ordered using the order number for each bore size.

# ø12 to ø25/MGPM, MGPL

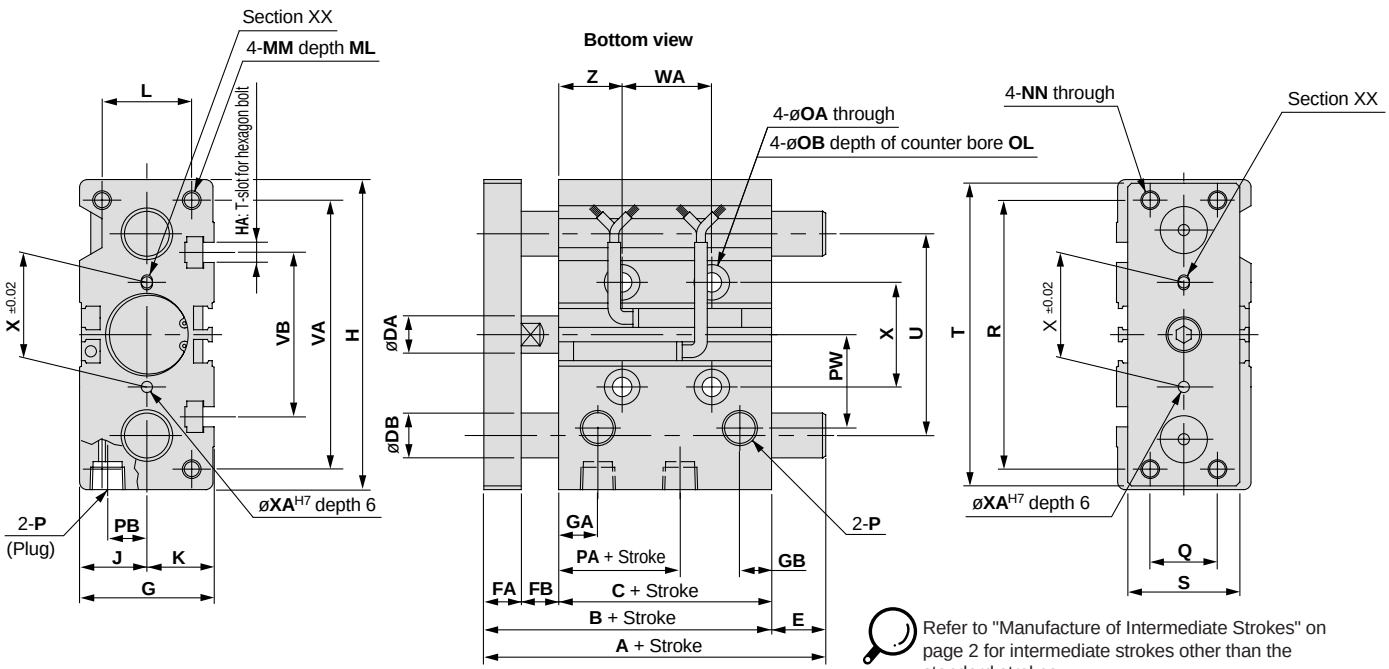



**T-slot dimensions**




(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 12 | 4.4 | 7.4 | 3.7 | 2 | 6.2 |
| 16 | 4.4 | 7.4 | 3.7 | 2.5 | 6.7 |
| 20 | 5.4 | 8.4 | 4.5 | 2.8 | 7.8 |
| 25 | 5.4 | 8.4 | 4.5 | 3 | 8.2 |




Refer to "Manufacture of Intermediate Strokes" on page 2 for intermediate strokes other than the standard strokes.

## MGPM, MGPL Common dimensions

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | DA | FA | FB | G | GA | GB | H | HA | J | K | L | MM | ML | NN | OA | OB | OL | P | PA | PB | PW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 10, 20, 30, 40, 50, 75, 100 | 42 | 29 | 6 | 8 | 5 | 26 | 11 | 7.5 | 58 | M4 | 13 | 13 | 18 | M4 x 0.7 | 10 | M4 x 0.7 | 4.3 | 8 | 4.5 | M5 x 0.8 | 13 | 8 | 18 |
| 16 | 125, 150, 175, 200, 250 | 46 | 33 | 8 | 8 | 5 | 30 | 11 | 8 | 64 | M4 | 15 | 15 | 22 | M5 x 0.8 | 12 | M5 x 0.8 | 4.3 | 8 | 4.5 | M5 x 0.8 | 15 | 10 | 19 |
| 20 | 20, 30, 40, 50, 75, 100 125, 150, 175, 200 250, 300, 350, 400 | 53 | 37 | 10 | 10 | 6 | 36 | 10.5 | 8.5 | 83 | M5 | 18 | 18 | 24 | M5 x 0.8 | 13 | M5 x 0.8 | 5.6 | 9.5 | 5.5 | Rc 1/8 | 12.5 | 10.5 | 25 |
| 25 | | 53.5 | 37.5 | 12 | 10 | 6 | 42 | 11.5 | 9 | 93 | M5 | 21 | 21 | 30 | M6 x 1.0 | 15 | M6 x 1.0 | 5.6 | 9.5 | 5.5 | Rc 1/8 | 12.5 | 13.5 | 28.5 |

| Bore size (mm) | Q | R | S | T | U | VA | VB | WA | | | | | WB | | | | | X | XA | XB | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 30st or less | Over 30st to 100st | Over 100st to 200st | Over 200st to 300st | Over 300st | 30st or less | Over 30st to 100st | Over 100st to 200st | Over 200st to 300st | Over 300st | | | | | | |
| 12 | 14 | 48 | 22 | 56 | 41 | 50 | 37 | 20 | 40 | 110 | 200 | — | 15 | 25 | 60 | 105 | — | 23 | 3 | 3.5 | M5 x 0.8 | 10 | 5 |
| 16 | 16 | 54 | 25 | 62 | 46 | 56 | 38 | 24 | 44 | 110 | 200 | — | 17 | 27 | 60 | 105 | — | 24 | 3 | 3.5 | M5 x 0.8 | 10 | 5 |
| 20 | 18 | 70 | 30 | 81 | 54 | 72 | 44 | 24 | 44 | 120 | 200 | 300 | 29 | 39 | 77 | 117 | 167 | 28 | 3 | 3.5 | M6 x 1.0 | 12 | 17 |
| 25 | 26 | 78 | 38 | 91 | 64 | 82 | 50 | 24 | 44 | 120 | 200 | 300 | 29 | 39 | 77 | 117 | 167 | 34 | 4 | 4.5 | M6 x 1.0 | 12 | 17 |

## MGPM (slide bearing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 50st or less | Over 50st to 100st | Over 100st | | 50st or less | Over 50st to 100st | Over 100st |
| 12 | 42 | 60.5 | 85 | 8 | 0 | 18.5 | 43 |
| 16 | 46 | 64.5 | 95 | 10 | 0 | 18.5 | 49 |

## MGPL (ball bushing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 30st or less | Over 30st to 100st | Over 100st | | 30st or less | Over 30st to 100st | Over 100st |
| 12 | 43 | 55 | 85 | 6 | 1 | 13 | 43 |
| 16 | 49 | 65 | 95 | 8 | 3 | 19 | 49 |

## MGPM (slide bearing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 50st or less | Over 50st to 200st | Over 200st | | 50st or less | Over 50st to 200st | Over 200st |
| 20 | 53 | 84.5 | 122 | 12 | 0 | 31.5 | 69 |
| 25 | 53.5 | 85 | 122 | 16 | 0 | 31.5 | 68.5 |

## MGPL (ball bushing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | | DB | E | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 30st or less | Over 30st to 100st | Over 100st to 200st | Over 200st | | 30st or less | Over 30st to 100st | Over 100st to 200st | Over 200st |
| 20 | 63 | 80 | 104 | 122 | 10 | 10 | 27 | 51 | 69 |
| 25 | 69.5 | 85.5 | 104.5 | 122 | 13 | 16 | 32 | 51 | 68.5 |





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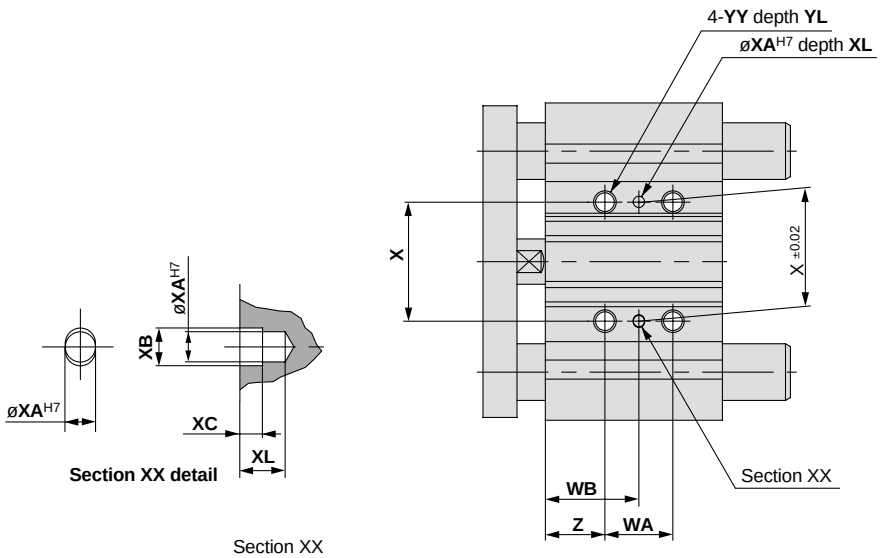
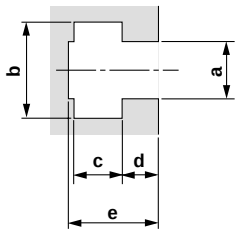
# Series MGP

## ø32 to ø63/MGPM, MGPL

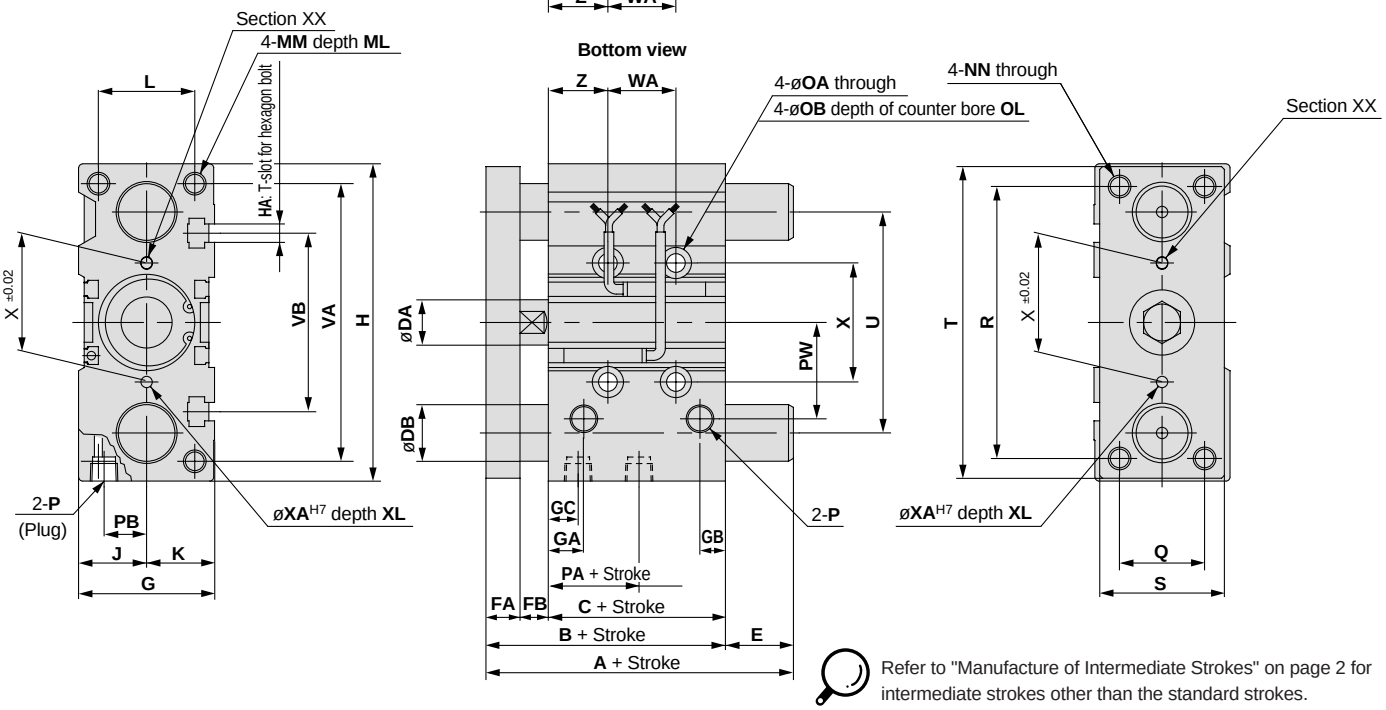



### T-slot dimensions




(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 32 | 6.5 | 10.5 | 5.5 | 3.5 | 9.5 |
| 40 | 6.5 | 10.5 | 5.5 | 4 | 11 |
| 50 | 8.5 | 13.5 | 7.5 | 4.5 | 13.5 |
| 63 | 11 | 17.8 | 10 | 7 | 18.5 |




Refer to "Manufacture of Intermediate Strokes" on page 2 for intermediate strokes other than the standard strokes.

### MGPM, MGPL Common dimensions

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | DA | FA | FB | G | GA | GB | GC | H | HA | J | K | L | MM | ML | NN | OA | OB | OL | P | PA | PB | PW | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 25, 50, 75, 100, 125, 150, 175, 200 250, 300, 350, 400 | 59.5 | 37.5 | 16 | 12 | 10 | 48 | 12.5 | 9 | 12.5 | 112 | M6 | 24 | 24 | 34 | M8 x 1.25 | 20 | M8 x 1.25 | 6.6 | 11 | 7.5 | Rc 1/8 | 7 | 15 | 34 | 30 |
| 40 | | 66 | 44 | 16 | 12 | 10 | 54 | 14 | 10 | 14 | 120 | M6 | 27 | 27 | 40 | M8 x 1.25 | 20 | M8 x 1.25 | 6.6 | 11 | 7.5 | Rc 1/8 | 13 | 18 | 38 | 30 |
| 50 | | 72 | 44 | 20 | 16 | 12 | 64 | 14 | 11 | 12 | 148 | M8 | 32 | 32 | 46 | M10 x 1.5 | 22 | M10 x 1.5 | 8.6 | 14 | 9 | Rc 1/4 | 9 | 21.5 | 47 | 40 |
| 63 | | 77 | 49 | 20 | 16 | 12 | 78 | 16.5 | 13.5 | 16.5 | 162 | M10 | 39 | 39 | 58 | M10 x 1.5 | 22 | M10 x 1.5 | 8.6 | 14 | 9 | Rc 1/4 | 14 | 28 | 55 | 50 |

| Bore size (mm) | R | S | T | U | VA | VB | WA | | | | | WB | | | | | X | XA | XB | XC | XL | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 25st or less | Over 25st to 100st | Over 100st to 200st | Over 200st to 300st | Over 300st | 25st or less | Over 25st to 100st | Over 100st to 200st | Over 200st to 300st | Over 300st | | | | | | | | |
| 32 | 96 | 44 | 110 | 78 | 98 | 63 | 24 | 48 | 124 | 200 | 300 | 33 | 45 | 83 | 121 | 171 | 42 | 4 | 4.5 | 3 | 6 | M8 x 1.25 | 16 | 21 |
| 40 | 104 | 44 | 118 | 86 | 106 | 72 | 24 | 48 | 124 | 200 | 300 | 34 | 46 | 84 | 122 | 172 | 50 | 4 | 4.5 | 3 | 6 | M8 x 1.25 | 16 | 22 |
| 50 | 130 | 60 | 146 | 110 | 130 | 92 | 24 | 48 | 124 | 200 | 300 | 36 | 48 | 86 | 124 | 174 | 66 | 5 | 6 | 4 | 8 | M10 x 1.5 | 20 | 24 |
| 63 | 130 | 70 | 158 | 124 | 142 | 110 | 28 | 52 | 128 | 200 | 300 | 38 | 50 | 88 | 124 | 174 | 80 | 5 | 6 | 4 | 8 | M10 x 1.5 | 20 | 24 |

### MGPM (slide bearing)/Dimensions A, DB, E

(mm)

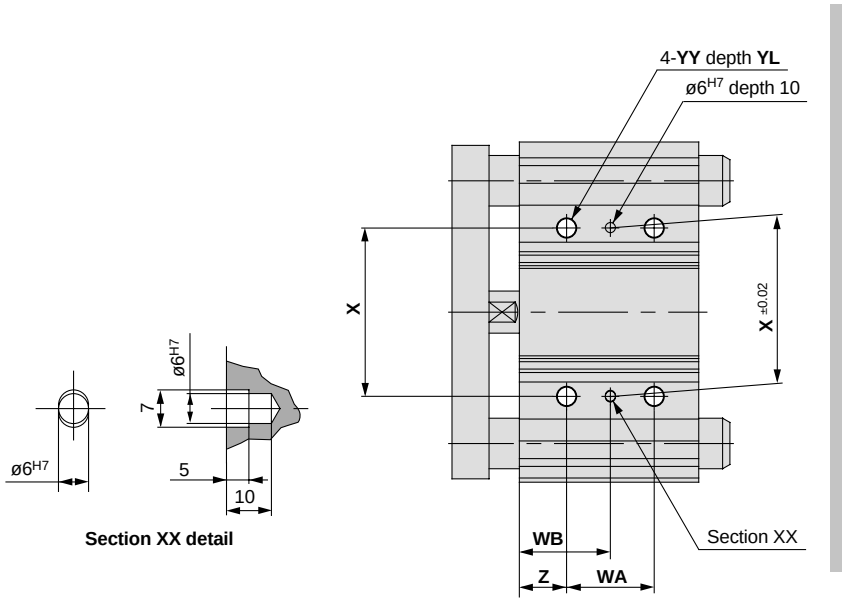
| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 50st or less | Over 50st to 200st | Over 200st | | 50st or less | Over 50st to 200st | Over 200st |
| 32 | 97 | 102 | 140 | 20 | 37.5 | 42.5 | 80.5 |
| 40 | 97 | 102 | 140 | 20 | 31 | 36 | 74 |
| 50 | 106.5 | 118 | 161 | 25 | 34.5 | 46 | 89 |
| 63 | 106.5 | 118 | 161 | 25 | 29.5 | 41 | 84 |

### MGPL (ball bushing)/Dimensions A, DB, E

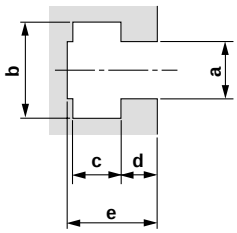
(mm)

| Bore size (mm) | A | | | | DB | E | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 50st or less | Over 50st to 100st | Over 100st to 200st | Over 200st | | 50st or less | Over 50st to 100st | Over 100st to 200st | Over 200st |
| 32 | 81 | 98 | 118 | 140 | 16 | 21.5 | 38.5 | 58.5 | 80.5 |
| 40 | 81 | 98 | 118 | 140 | 16 | 15 | 32 | 52 | 74 |
| 50 | 93 | 114 | 134 | 161 | 20 | 21 | 42 | 62 | 89 |
| 63 | 93 | 114 | 134 | 161 | 20 | 16 | 37 | 57 | 84 |

# ø80, ø100/MGPM, MGPL

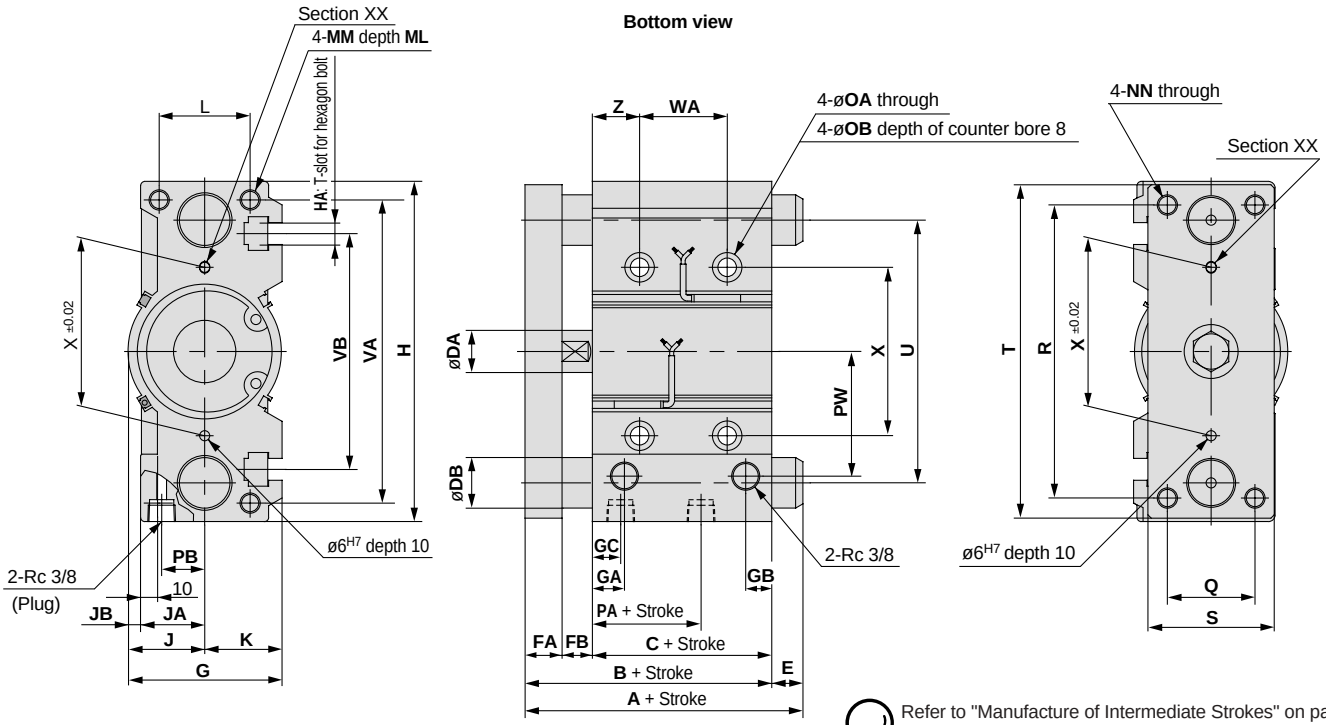



**T-slot dimensions**




(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 80 | 13.3 | 20.3 | 12 | 8 | 22.5 |
| 100 | 15.3 | 23.3 | 13.5 | 10 | 30 |




Refer to "Manufacture of Intermediate Strokes" on page 2 for intermediate strokes other than the standard strokes.

## MGPM, MGPL Common dimensions

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | DA | FA | FB | G | GA | GB | GC | H | HA | J | JA | JB | K | L | MM | ML | NN | OA | OB | PA | PB | PW | Q | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 25, 50, 75, 100, 125, 150, 175, 200 250, 300, 350, 400 | 96.5 | 56.5 | 25 | 22 | 18 | 91.5 | 19 | 15.5 | 14.5 | 202 | M12 | 45.5 | 38 | 7.5 | 46 | 54 | M12 x 1.75 | 25 | M12 x 1.75 | 10.6 | 17.5 | 14.5 | 25.5 | 74 | 52 | 174 |
| 100 | | 116 | 66 | 30 | 25 | 25 | 111.5 | 23 | 19 | 18 | 240 | M14 | 55.5 | 45 | 10.5 | 56 | 62 | M14 x 2.0 | 31 | M14 x 2.0 | 12.5 | 20 | 17.5 | 32.5 | 89 | 64 | 210 |

| Bore size (mm) | S | T | U | VA | VB | WA | | | | | WB | | | | | X | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 25st or less | Over 25st to 100st | Over 100st to 200st | Over 200st to 300st | Over 300st | 25st or less | Over 25st to 100st | Over 100st to 200st | Over 200st to 300st | Over 300st | | | | |
| 80 | 75 | 198 | 156 | 180 | 140 | 28 | 52 | 128 | 200 | 300 | 42 | 54 | 92 | 128 | 178 | 100 | M12 x 1.75 | 24 | 28 |
| 100 | 90 | 236 | 188 | 210 | 166 | 48 | 72 | 148 | 220 | 320 | 35 | 47 | 85 | 121 | 171 | 124 | M14 x 2.0 | 28 | 11 |

## MGPM (slide bearing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 50st or less | Over 50st to 200st | Over 200st | | 50st or less | Over 50st to 200st | Over 200st |
| 80 | 115 | 142 | 193 | 30 | 18.5 | 45.5 | 96.5 |
| 100 | 137 | 162 | 203 | 36 | 21 | 46 | 87 |

## MGPL (ball bushing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | | DB | E | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 25st or less | Over 25st to 50st | Over 50st to 200st | Over 200st | | 25st or less | Over 25st to 50st | Over 50st to 200st | Over 200st |
| 80 | 109.5 | 130 | 160 | 193 | 25 | 13 | 33.5 | 63.5 | 96.5 |
| 100 | 121 | 147 | 180 | 203 | 30 | 5 | 31 | 64 | 87 |





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# Compact Guide Cylinder: With Air Cushion

# Series MGP

## ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

## How to Order

**Compact Guide Cylinder**

**MGP** | **M** | **32** | **50** | **A** | **Z73** | _____

**Compact guide cylinder**

**Bearing type**

| | |
|---|---|
| **M** | Slide bearing |
| **L** | Ball bushing |

**Bore size**

| | | | |
|---|---|---|---|
| **16** | 16mm | **50** | 50mm |
| **20** | 20mm | **63** | 63mm |
| **25** | 25mm | **80** | 80mm |
| **32** | 32mm | **100** | 100mm |
| **40** | 40mm | | |

**With air cushion**

**Cylinder stroke (mm)**

Refer to the standard stroke table on page 19.

**Auto switch type**

| | |
|---|---|
| **Nil** | Without auto switch (built-in magnet cylinder) |

∗ Refer to the table below for auto switch model numbers.

**Number of auto switches**

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

## Applicable auto switches

| Type | Special function | Electrical entry | Indicator light | Wiring (output) | Load voltage | | | Auto switch model | | Lead wire length (m) Note 1) | | | Applicable load | | Detailed specifications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | DC | | AC | Electrical entry direction | | 0.5 (Nil) | 3 (L) | 5 (Z) | | | |
| | | | | | | | | Perpendicular | In-line | | | | | | |
| Reed switch | — | Grommet | Yes | 3 wire | — | 5V | — | — | **Z76** | ● | ● | — | IC circuit | — | P. 59 |
| | | | | 2 wire | 24V | 12V | 100V | — | **Z73** | ● | ● | ● | — | Relay, PLC | |
| | | | No | | | 5V 12V | 100V or less | — | **Z80** | ● | ● | — | IC circuit | | |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V 12V | — | **Y69A** | **Y59A** | ● | ● | ○ | IC circuit | Relay, PLC | P. 60 |
| | | | | 3 wire (PNP) | | | | **Y7PV** | **Y7P** | ● | ● | ○ | | | |
| | | | | 2 wire | | 12V | | **Y69B** | **Y59B** | ● | ● | ○ | — | | |
| | Diagnostic indication (2 colour indicator) | | | 3 wire (NPN) | | 5V 12V | | **Y7NWV** | **Y7NW** | ● | ● | ○ | IC circuit | | P. 61 |
| | | | | 3 wire (PNP) | | | | **Y7PWV** | **Y7PW** | ● | ● | ○ | | | |
| | | | | 2 wire | | 12V | | **Y7BWV** | **Y7BW** | ● | ● | ○ | — | | |
| | Water resistant (2 colour indicator) | | | | | | | — | **Y7BA** | — | ● | ○ | | | P. 62 |
| | Magnetic field resistant (2 colour indicator) | | | | | — | | — | **P5DW** Note 3) | — | ● | ● | | | P. 63 |

Note 1) Lead wire symbols 0.5m ..... Nil (Example) Y69B
3m ..... L Y69BL
5m ..... Z Y69BZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.

Note 3) Type D-P5DW cannot be mounted on bore sizes of ø32 or less.

## Specifications

| | | |
|---|---|---|
| Action | Double acting | |
| Fluid | Air | |
| Proof pressure | 1.5MPa | |
| Maximum operating pressure | 1.0MPa | |
| Minimum operating pressure | ø16 | 0.15MPa |
| | ø20 to ø100 | 0.12MPa |
| Ambient and fluid temperature | –10 to 60°C (with no freezing) | |
| Piston speed | ø16 to ø63 | 50 to 500mm/s |
| | ø80, ø100 | 50 to 400mm/s |
| Cushion | Air cushion at both ends (without bumper) | |
| Lubrication | Non-lube | |
| Stroke length tolerance | $^{+1.5}_{0}$mm | |

## Standard Strokes

| Bore size (mm) | Standard stroke (mm) |
|---|---|
| **16** | 25, 50, 75, 100 |
| **20 to 63** | 25, 50, 75, 100, 125, 150, 175, 200 |
| **80, 100** | 50, 75, 100, 125, 150, 175, 200 |

## Manufacture of Intermediate Strokes

| | | |
|---|---|---|
| **Modification method** | Strokes provided in 1mm increments by changing the collar on a standard stroke cylinder. | |
| **Part number** | Indicate -XC19 at the end of the standard part number. | |
| **Applicable stroke (mm)** | **ø16** | 26 to 99 |
| | **ø20 to ø63** | 26 to 199 |
| | **ø80, ø100** | 51 to 199 |
| **Example** | Part no.: **MGPM20–35A–XC19**<br>A collar 15mm in width is installed in a **MGPM20–50A.**<br>C dimension is 112mm. | |

Note 1) Intermediate strokes (in 1mm increments) with a special body are available by special order.

### Auto switch mounting bracket part no. for D-P5DW

| Bore size (mm) | Mounting bracket part no. | Notes |
|---|---|---|
| 40, 50, 63, 80, 100 | BMG1-040 | Switch mounting bracket<br>Hexagon socket head cap screw (M2.5 x 0.45 x 8ℓ) 2 pcs.<br>Hexagon socket head cap screw (M3 x 0.5 x 16ℓ) 2 pcs.<br>Spring washer (nominal size 3) |

## Theoretical Output

OUT (N) IN (N)

(N)

| Bore size (mm) | Rod size (mm) | Operating direction | Piston area (mm²) | Operating pressure (MPa) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| **16** | 8 | OUT | 201 | 40 | 60 | 80 | 101 | 121 | 141 | 161 | 181 | 201 |
| | | IN | 151 | 30 | 45 | 60 | 76 | 91 | 106 | 121 | 136 | 151 |
| **20** | 10 | OUT | 314 | 63 | 94 | 126 | 157 | 188 | 220 | 251 | 283 | 314 |
| | | IN | 236 | 47 | 71 | 94 | 118 | 142 | 165 | 189 | 212 | 236 |
| **25** | 12 | OUT | 491 | 98 | 147 | 196 | 246 | 295 | 344 | 393 | 442 | 491 |
| | | IN | 378 | 76 | 113 | 151 | 189 | 227 | 265 | 302 | 340 | 378 |
| **32** | 16 | OUT | 804 | 161 | 241 | 322 | 402 | 482 | 563 | 643 | 724 | 804 |
| | | IN | 603 | 121 | 181 | 241 | 302 | 362 | 422 | 482 | 543 | 603 |
| **40** | 16 | OUT | 1257 | 251 | 377 | 503 | 629 | 754 | 880 | 1006 | 1131 | 1257 |
| | | IN | 1056 | 211 | 317 | 422 | 528 | 634 | 739 | 845 | 950 | 1056 |
| **50** | 20 | OUT | 1963 | 393 | 589 | 785 | 982 | 1178 | 1374 | 1570 | 1767 | 1963 |
| | | IN | 1649 | 330 | 495 | 660 | 825 | 990 | 1154 | 1319 | 1484 | 1649 |
| **63** | 20 | OUT | 3117 | 623 | 935 | 1247 | 1559 | 1870 | 2182 | 2494 | 2805 | 3117 |
| | | IN | 2803 | 561 | 841 | 1121 | 1402 | 1682 | 1962 | 2242 | 2523 | 2803 |
| **80** | 25 | OUT | 5027 | 1005 | 1508 | 2011 | 2514 | 3016 | 3519 | 4022 | 4524 | 5027 |
| | | IN | 4536 | 907 | 1361 | 1814 | 2268 | 2722 | 3175 | 3629 | 4082 | 4536 |
| **100** | 30 | OUT | 7854 | 1571 | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7069 | 7854 |
| | | IN | 7147 | 1429 | 2144 | 2859 | 3574 | 4288 | 5003 | 5718 | 6432 | 7147 |

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

# Series MGP

## Weights

### Slide bearing: MGPM16 to 100

(kg)

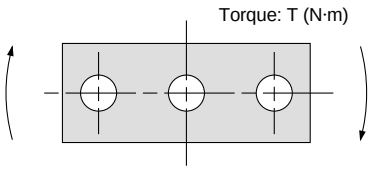
| Bore size (mm) | Model | Standard stroke (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| 16 | MGPM16 | 0.51 | 0.69 | 0.78 | 0.91 | — | — | — | — |
| 20 | MGPM20 | 0.89 | 1.14 | 1.34 | 1.54 | 1.74 | 1.94 | 2.13 | 2.33 |
| 25 | MGPM25 | 1.23 | 1.60 | 1.87 | 2.14 | 2.41 | 2.68 | 2.95 | 3.23 |
| 32 | MGPM32 | 1.98 | 2.51 | 2.77 | 3.15 | 3.53 | 3.91 | 4.29 | 4.68 |
| 40 | MGPM40 | 2.34 | 2.91 | 3.21 | 3.64 | 4.06 | 4.49 | 4.92 | 5.34 |
| 50 | MGPM50 | 3.92 | 4.75 | 5.29 | 5.93 | 6.57 | 7.21 | 7.85 | 8.49 |
| 63 | MGPM63 | 4.94 | 5.89 | 6.54 | 7.29 | 8.05 | 8.81 | 9.56 | 10.32 |
| 80 | MGPM80 | — | 8.98 | 9.64 | 10.6 | 11.5 | 12.5 | 13.4 | 14.3 |
| 100 | MGPM100 | — | 14.2 | 15.1 | 16.5 | 17.8 | 19.1 | 20.5 | 21.8 |

### Ball bushing: MGPL16 to 100

(kg)

| Bore size (mm) | Model | Standard stroke (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| 16 | MGPL16 | 0.56 | 0.66 | 0.78 | 0.89 | — | — | — | — |
| 20 | MGPL20 | 0.97 | 1.12 | 1.30 | 1.50 | 1.68 | 1.85 | 2.03 | 2.20 |
| 25 | MGPL25 | 1.34 | 1.54 | 1.78 | 2.05 | 2.28 | 2.51 | 2.74 | 2.97 |
| 32 | MGPL32 | 1.81 | 2.34 | 2.57 | 2.94 | 3.26 | 3.58 | 3.89 | 4.21 |
| 40 | MGPL40 | 2.15 | 2.73 | 3.01 | 3.42 | 3.78 | 4.14 | 4.50 | 4.86 |
| 50 | MGPL50 | 3.65 | 4.47 | 4.95 | 5.71 | 6.14 | 6.69 | 7.24 | 7.79 |
| 63 | MGPL63 | 4.66 | 5.60 | 6.20 | 7.07 | 7.61 | 8.28 | 8.95 | 9.61 |
| 80 | MGPL80 | — | 8.88 | 9.63 | 10.5 | 11.3 | 12.1 | 12.9 | 13.7 |
| 100 | MGPL100 | — | 13.7 | 14.9 | 16.0 | 17.2 | 18.4 | 19.6 | 20.8 |

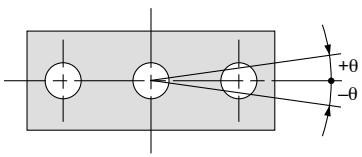
## Allowable Rotational Torque of Plate (Air Cushion)




T (N·m)

| Bore size (mm) | Bearing type | Stroke (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| 16 | MGPM | 0.53 | 0.84 | 0.69 | 0.58 | — | — | — | — |
| | MGPL | 1.27 | 0.86 | 0.65 | 0.52 | — | — | — | — |
| 20 | MGPM | 0.99 | 2.23 | 1.88 | 1.63 | 1.44 | 1.28 | 1.16 | 1.06 |
| | MGPL | 2.66 | 1.94 | 1.52 | 1.57 | 1.34 | 1.17 | 1.03 | 0.93 |
| 25 | MGPM | 1.64 | 3.51 | 2.96 | 2.57 | 2.26 | 2.02 | 1.83 | 1.67 |
| | MGPL | 4.08 | 3.02 | 2.38 | 2.41 | 2.05 | 1.78 | 1.58 | 1.41 |
| 32 | MGPM | 6.35 | 6.64 | 5.69 | 4.97 | 4.42 | 3.98 | 3.61 | 3.31 |
| | MGPL | 5.95 | 5.89 | 5.11 | 6.99 | 6.34 | 5.79 | 5.33 | 4.93 |
| 40 | MGPM | 7.00 | 7.32 | 6.27 | 5.48 | 4.87 | 4.38 | 3.98 | 3.65 |
| | MGPL | 6.55 | 6.49 | 5.62 | 7.70 | 6.98 | 6.38 | 5.87 | 5.43 |
| 50 | MGPM | 13.0 | 13.8 | 12.0 | 10.6 | 9.50 | 8.60 | 7.86 | 7.24 |
| | MGPL | 9.17 | 11.2 | 9.8 | 12.8 | 11.6 | 10.7 | 9.80 | 9.10 |
| 63 | MGPM | 14.7 | 15.6 | 13.5 | 11.9 | 10.7 | 9.69 | 8.86 | 8.16 |
| | MGPL | 10.2 | 12.5 | 11.0 | 14.3 | 13.0 | 11.9 | 11.0 | 10.2 |
| 80 | MGPM | — | 26.0 | 22.9 | 20.5 | 18.6 | 17.0 | 15.6 | 14.5 |
| | MGPL | — | 25.2 | 22.7 | 20.6 | 18.9 | 17.3 | 16.0 | 14.8 |
| 100 | MGPM | — | 41.9 | 37.5 | 33.8 | 30.9 | 28.4 | 26.2 | 24.4 |
| | MGPL | — | 41.7 | 37.9 | 34.6 | 31.8 | 29.3 | 27.2 | 25.3 |

## Non-rotating Accuracy of Plate



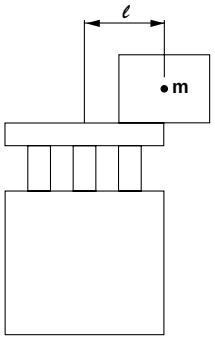
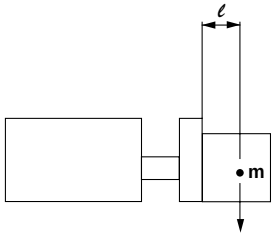

For non-rotating accuracy θ without load, use a value no more than the values in the table as a guide.

| Bore size (mm) | Non-rotating accuracy θ | |
|---|---|---|
| | MGPM | MGPL |
| 16 | ±0.08° | ±0.10° |
| 20 | ±0.07° | ±0.09° |
| 25 | | |
| 32 | ±0.06° | ±0.08° |
| 40 | | |
| 50 | ±0.05° | ±0.06° |
| 63 | | |
| 80 | ±0.04° | ±0.05° |
| 100 | | |

# Series MGP (With Air Cushion)
# Model Selection



## Selecting Conditions

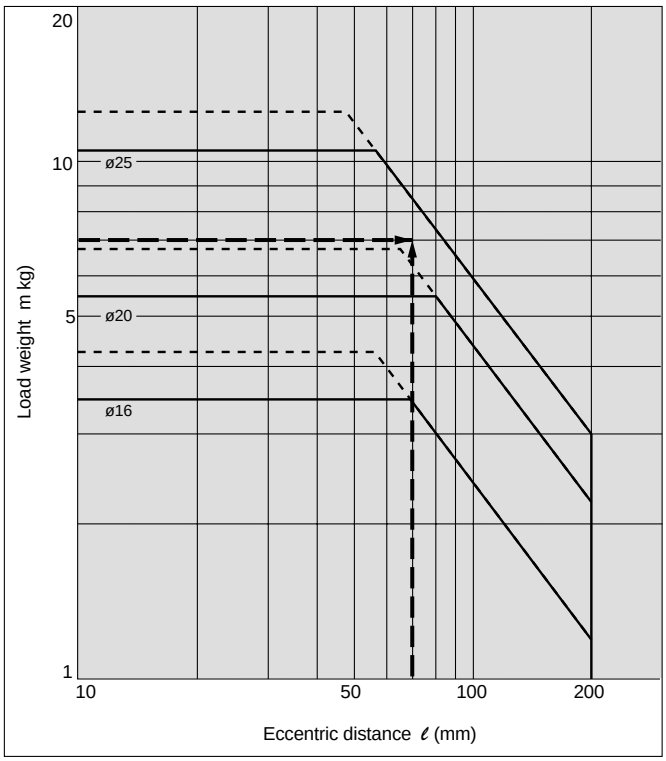
| | Vertical | | Horizontal | |
|---|---|---|---|---|
| Mounting orientation |  | |  | |
| Maximum speed (mm/s) | 200 | 400 | 200 | 400 |
| Graph (Slide bearing type) | 1, 2 | 3, 4 | 15, 16 | 17, 18 |
| Graph (Ball bushing type) | 5 to 9 | 10 to 14 | 19, 20 | 21, 22 |

## Selection Example 1 (Vertical Mounting)

**Selecting conditions**
- **Mounting: Vertical**
- **Bearing type: Ball bushing**
- **Stroke: 75mm**
- **Maximum speed: 200mm/s**
- **Load weight: 7kg**
- **Eccentric distance:70mm**

**Find the point of intersection for the load weight of 7kg and the eccentric distance of 70mm on graph 5, based on vertical mounting, ball bushing, 75mm stroke, and the speed of 200mm/s.**
**→MGPL25-75A is selected.**

**5 75mm stroke or less V = 200mm/s**

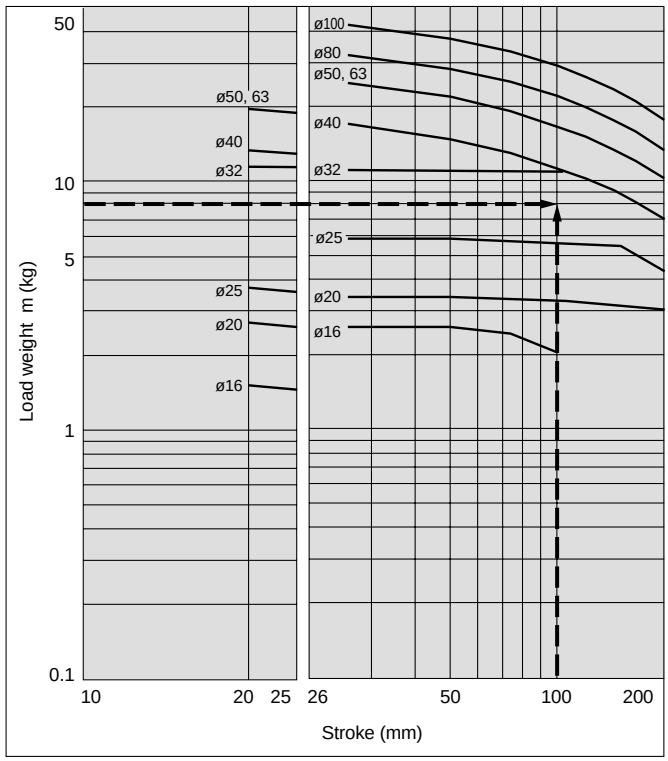



## Selection Example 2 (Horizontal Mounting)

**Selecting conditions**
- **Mounting: Horizontal**
- **Bearing type: Slide bearing**
- **Distance between plate and load center of gravity: 40mm**
- **Maximum speed: 300mm/s**
- **Load weight: 8kg**
- **Stroke: 100mm**

**Find the point of intersection for the load weight of 8kg and stroke of 100mm on graph 17, based on horizontal mounting, slide bearing, the distance of 40mm between the plate and load center of gravity, and the speed of 300mm/s.**
**→MGPM32-100A is selected.**

**17 ℓ = 50mm V = 400mm/s**



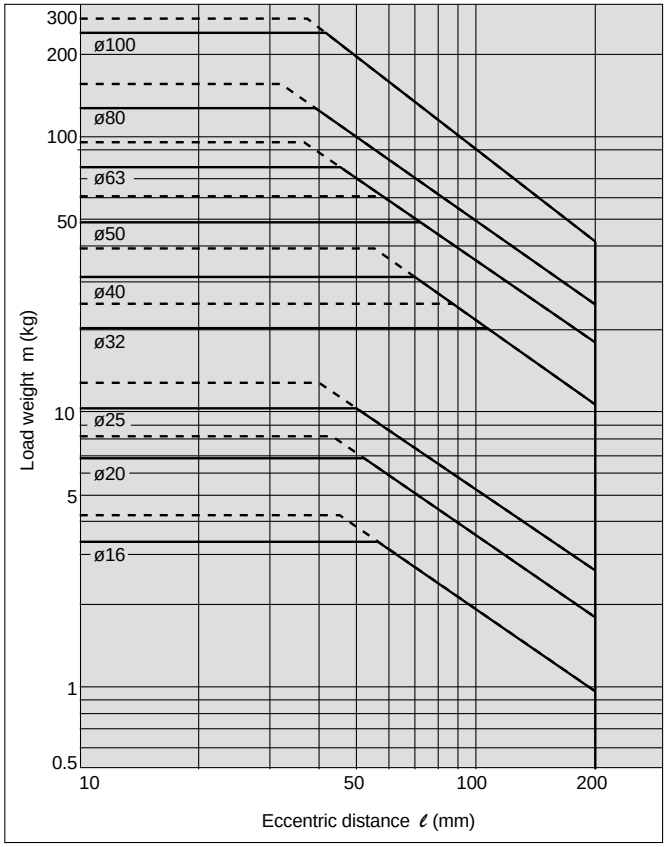
# Series MGP

## Vertical Mounting Slide Bearing

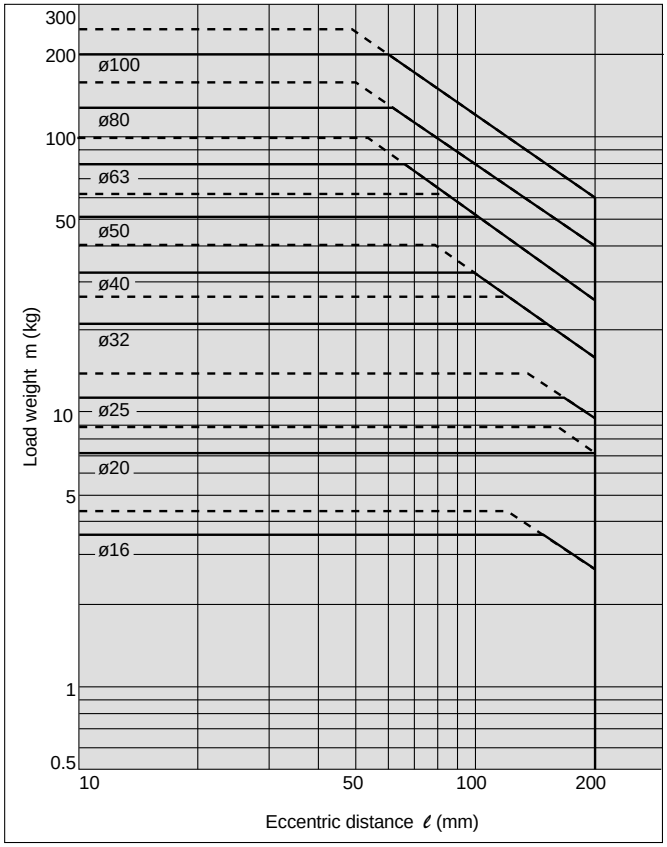
——— Operating pressure: 0.4MPa
- - - - - Operating pressure: 0.5MPa or more

### MGPM16 to 100

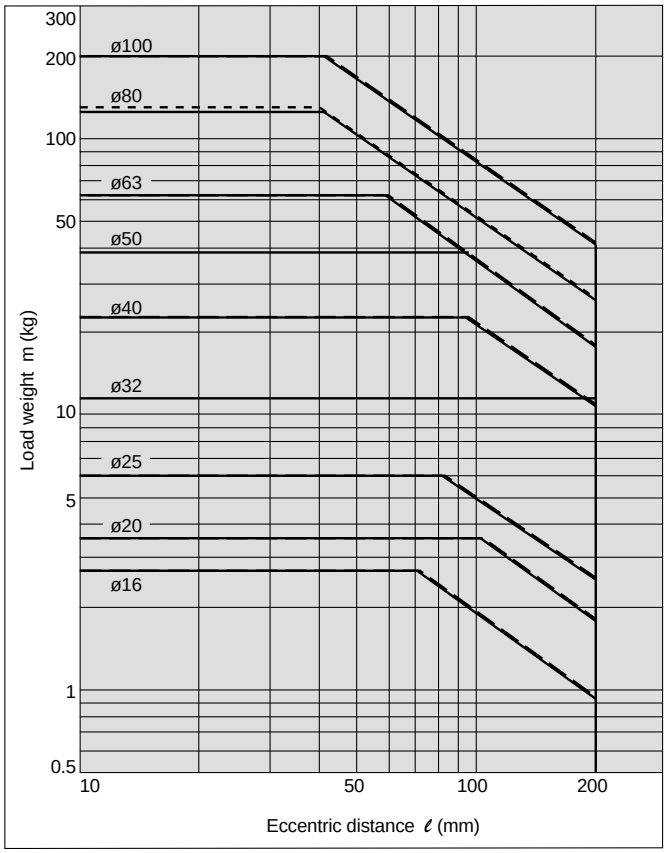
**1** 25mm stroke V = 200mm/s



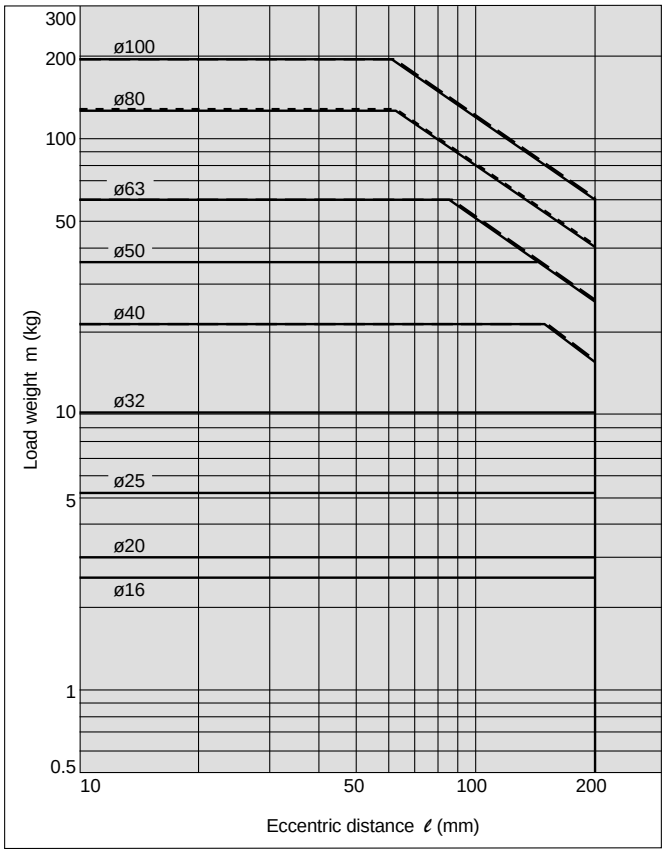

**2** Over 25mm stroke V = 200mm/s




**3** 25mm stroke V = 400mm/s




**4** Over 25mm stroke V = 400mm/s

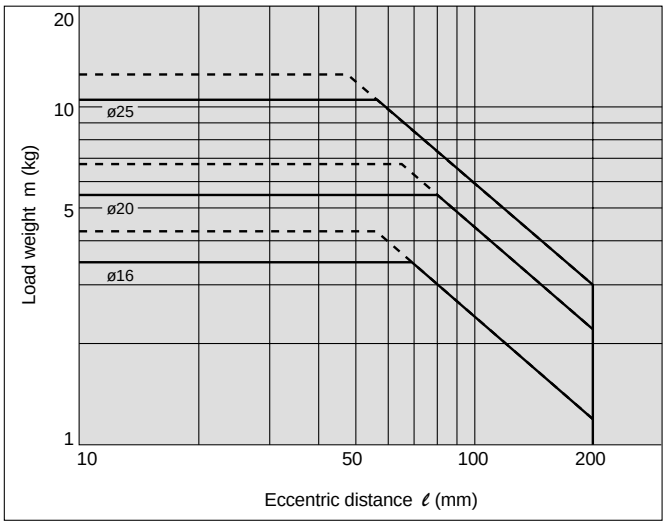


## Vertical Mounting Ball Bushing

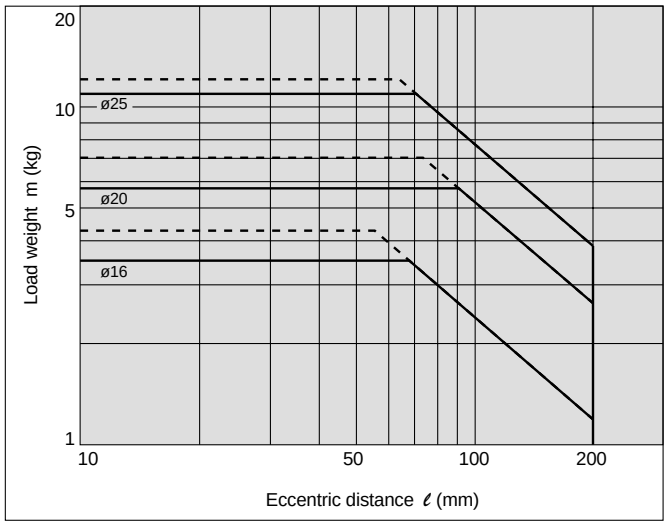
——— Operating pressure: 0.4MPa
- - - - - Operating pressure: 0.5MPa or more

### MGPL16 to 25

**5** 75mm stroke or less V = 200mm/s

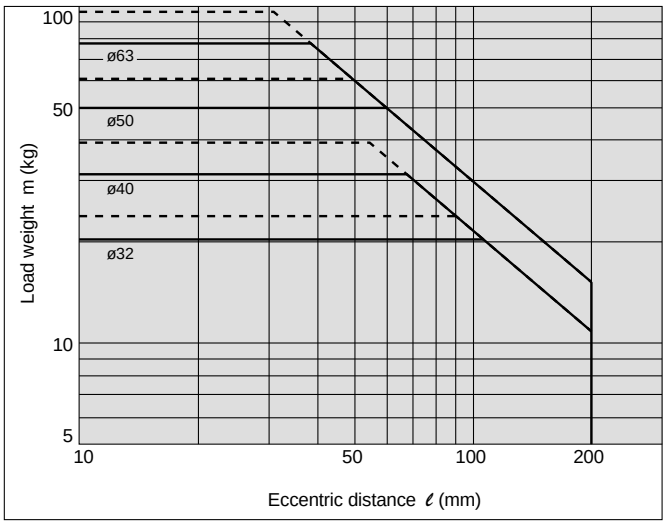



**6** Over 75mm stroke V = 200mm/s

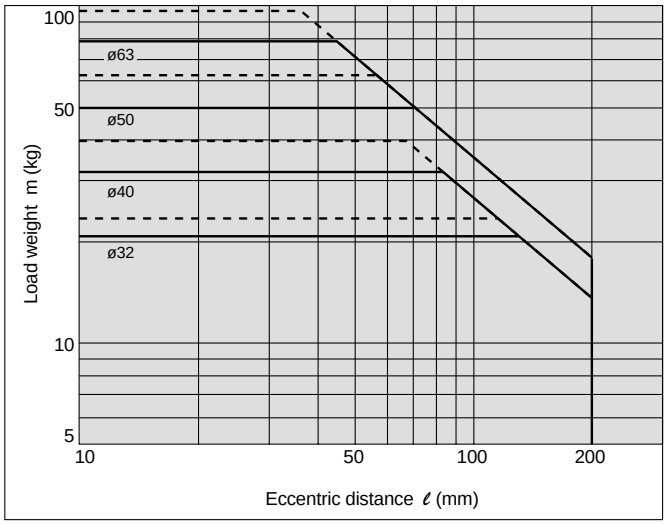



### MGPL32 to 63

**7** 25mm stroke V = 200mm/s

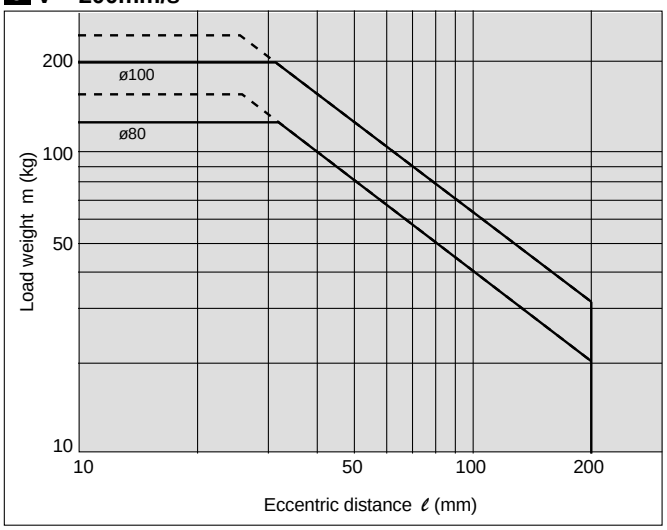



**8** Over 25mm stroke V = 200mm/s




### MGPL80, 100

**9** V = 200mm/s





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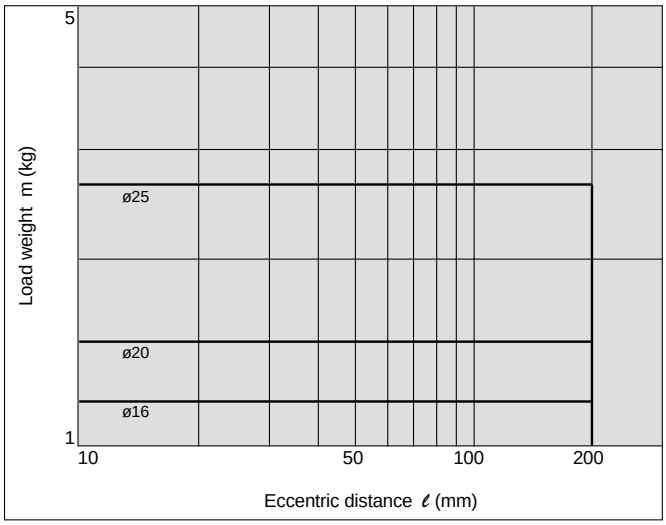
# Series MGP

## Vertical Mounting Ball Bushing

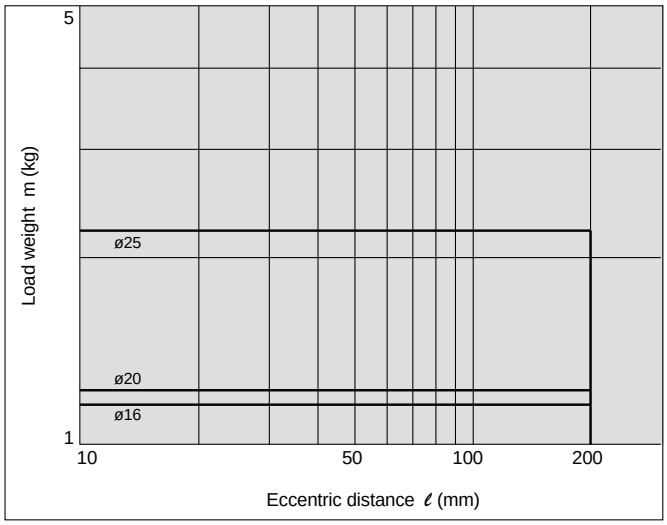
Operating pressure: 0.4MPa

### MGPL16 to 25

**10 75mm stroke or less V = 400mm/s**

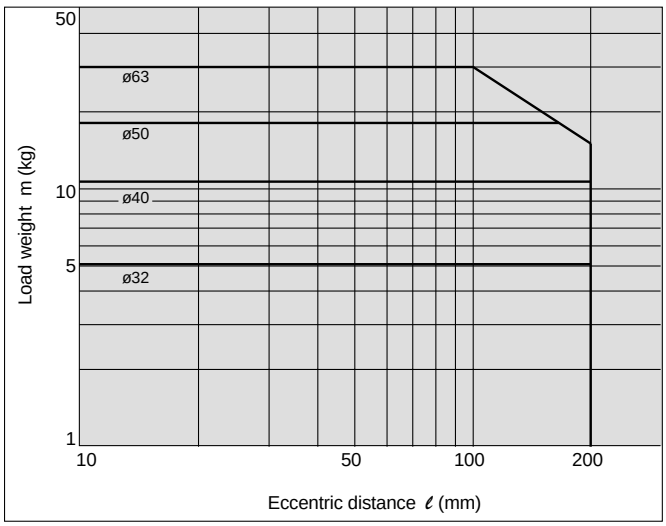



**11 Over 75mm stroke V = 400mm/s**

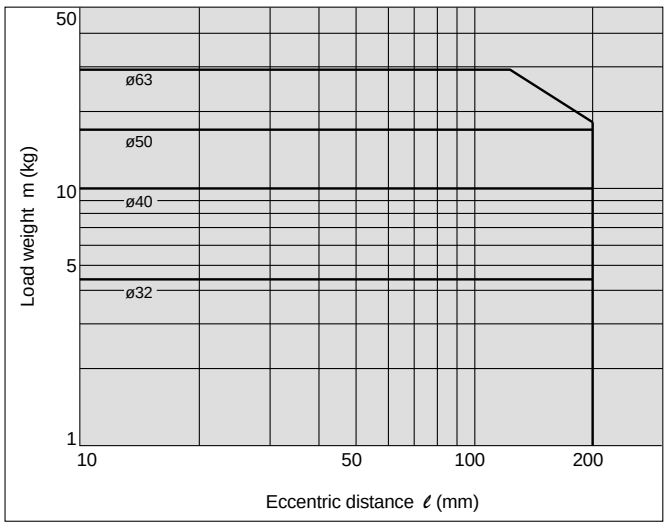



### MGPL32 to 63

**12 25mm stroke V = 400mm/s**

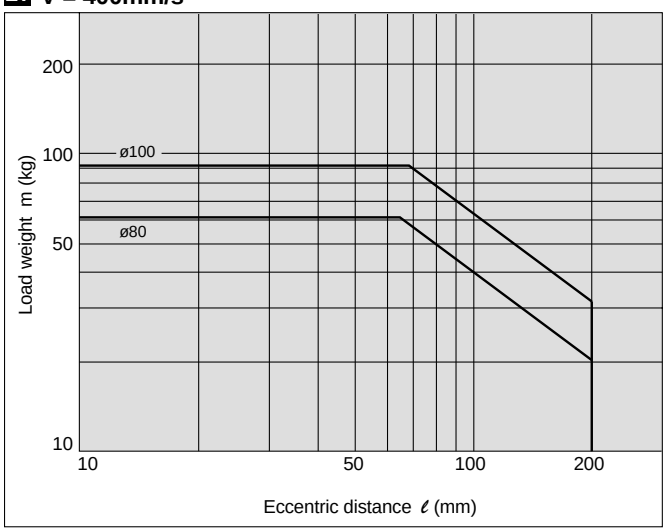



**13 Over 25mm stroke V = 400mm/s**




### MGPL80, 100

**14 V = 400mm/s**



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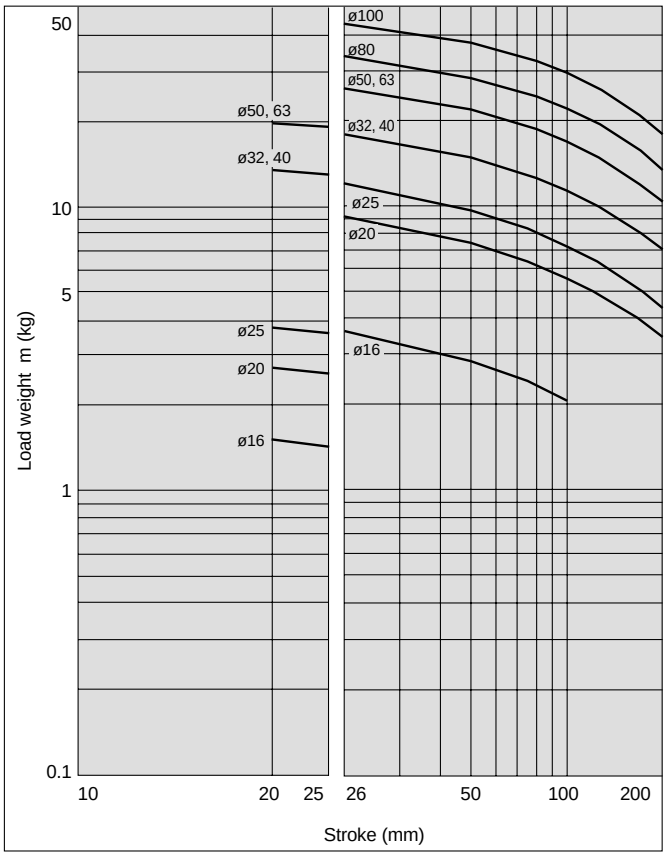
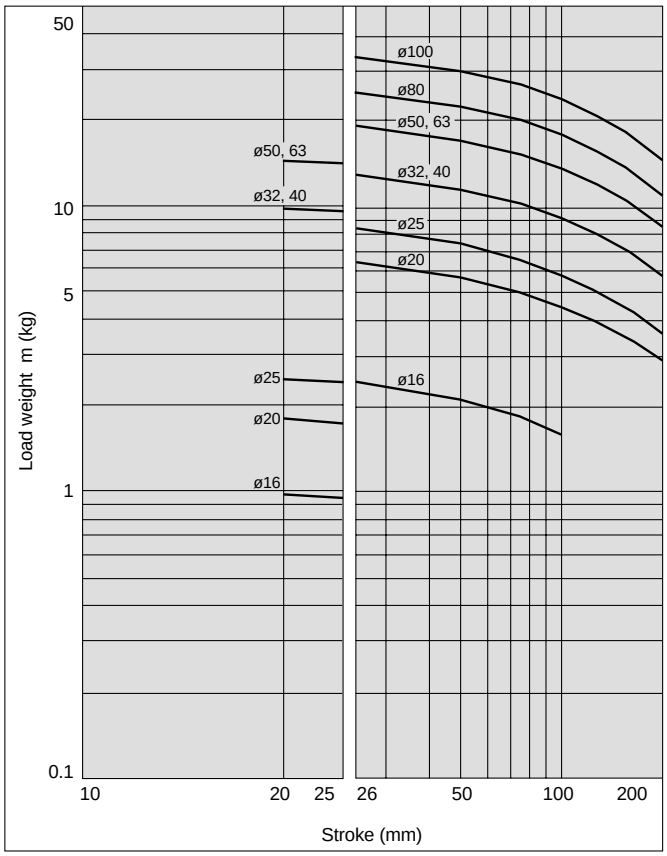
## Horizontal Mounting Slide Bearing

### MGPM16 to 100

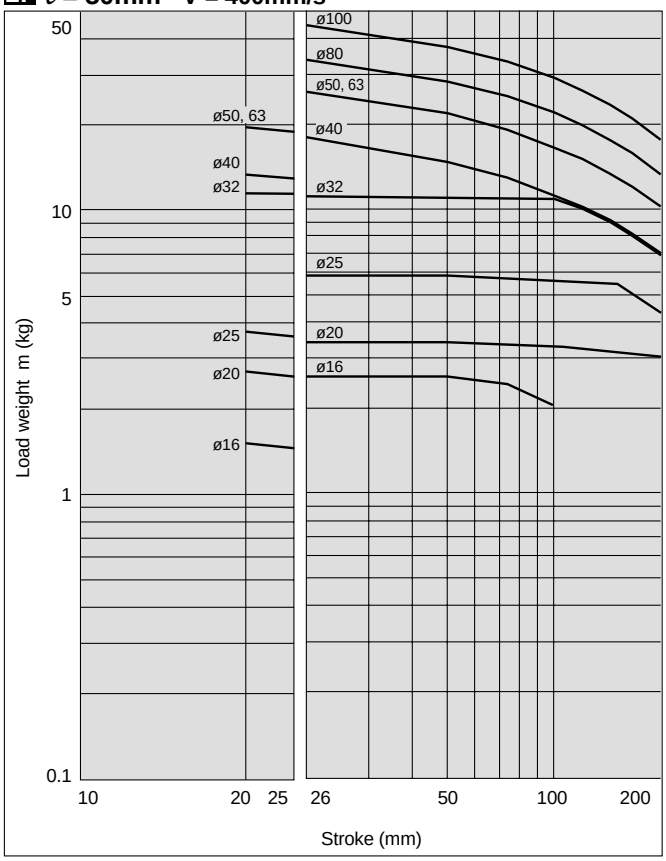
**15** $\ell$ = 50mm V = 200mm/s



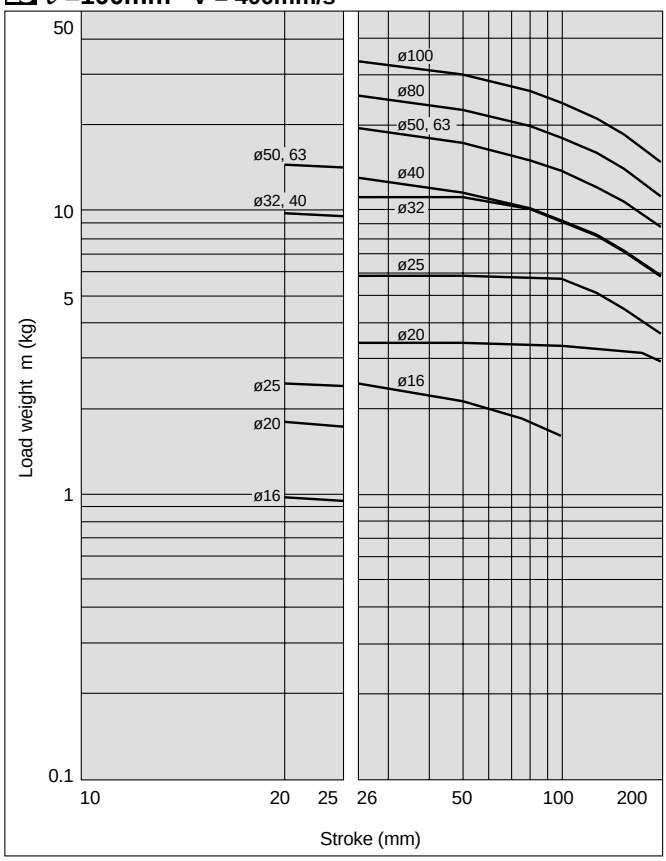

**16** $\ell$ =100mm V = 200mm/s




**17** $\ell$ = 50mm V = 400mm/s




**18** $\ell$ =100mm V = 400mm/s

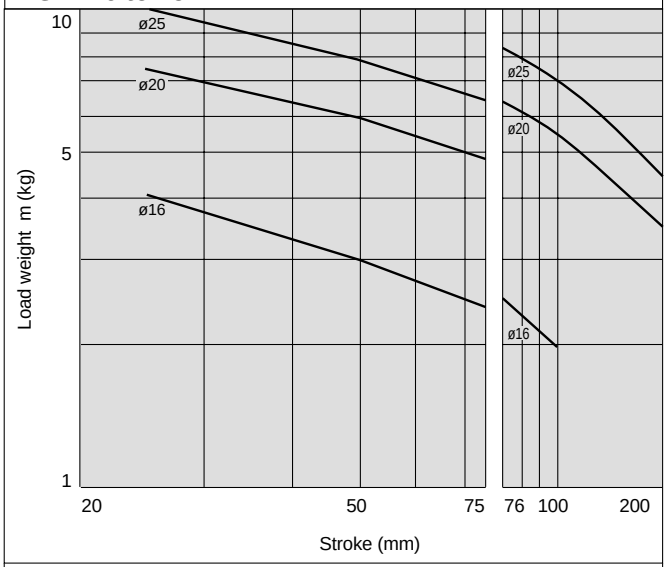


# Series MGP

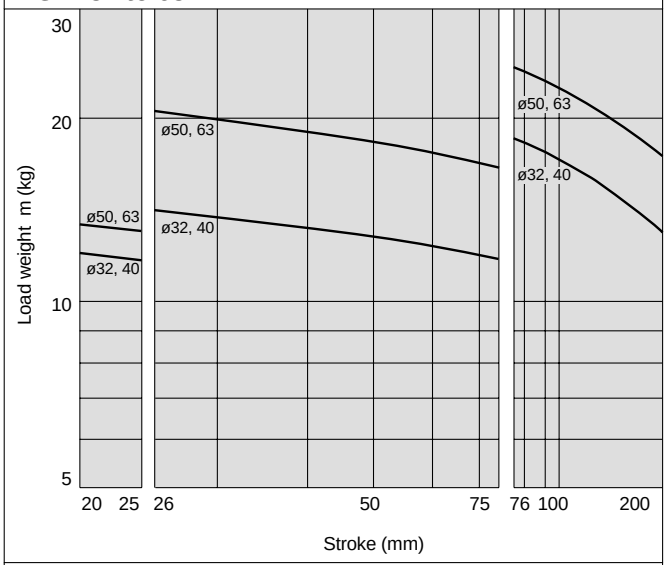
## Horizontal Mounting Ball Bushing

### 19 ℓ = 50mm V = 200m/s

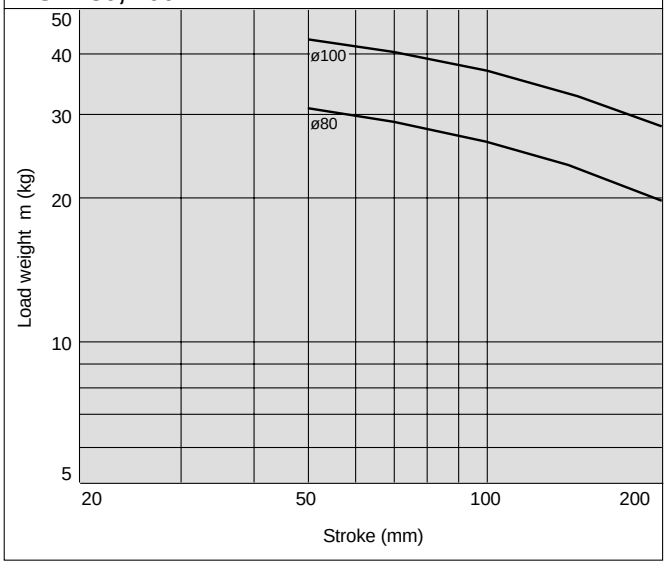
#### MGPL16 to 25




#### MGPL32 to 63

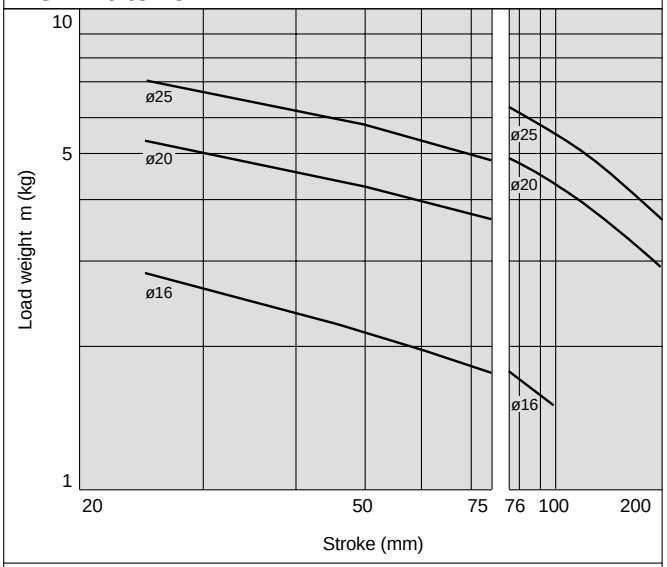



#### MGPL80, 100

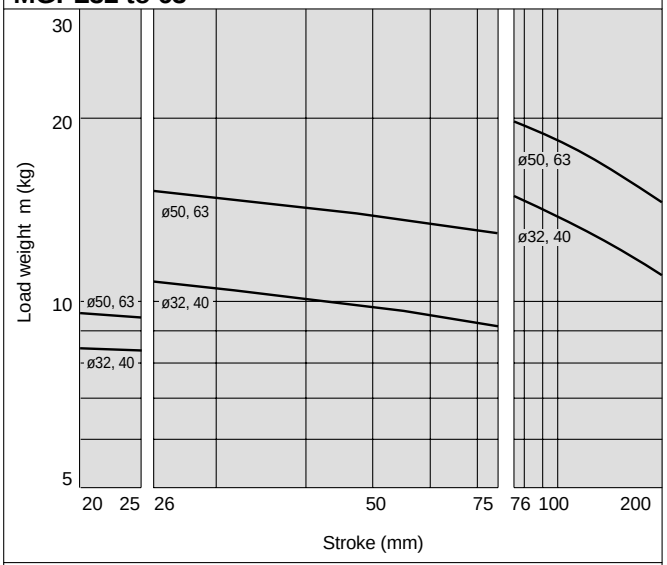



### 20 ℓ =100mm V = 200m/s

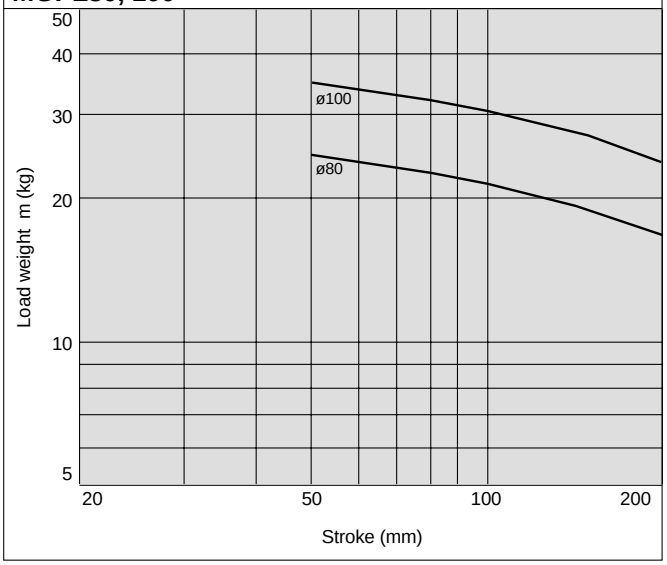
#### MGPL16 to 25




#### MGPL32 to 63



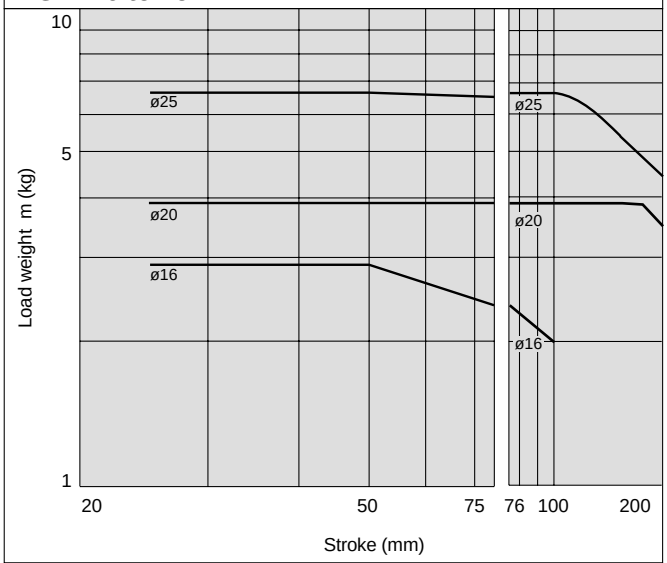

#### MGPL80, 100



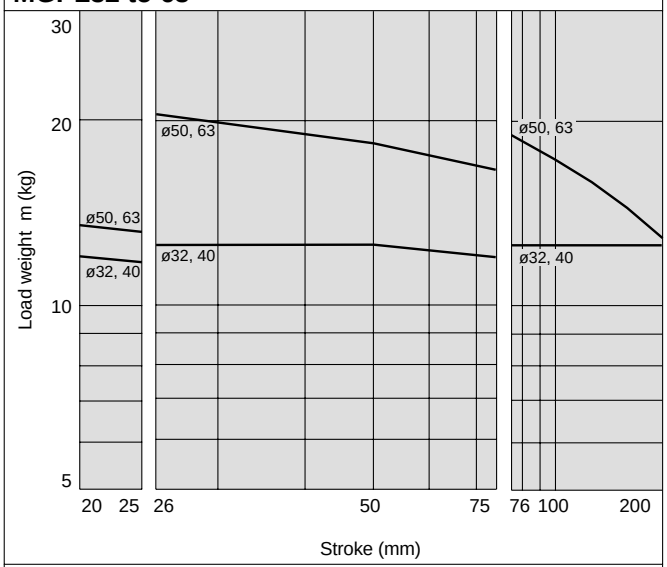
## Horizontal Mounting Ball Bushing

### 21 ℓ = 50mm V = 400m/s

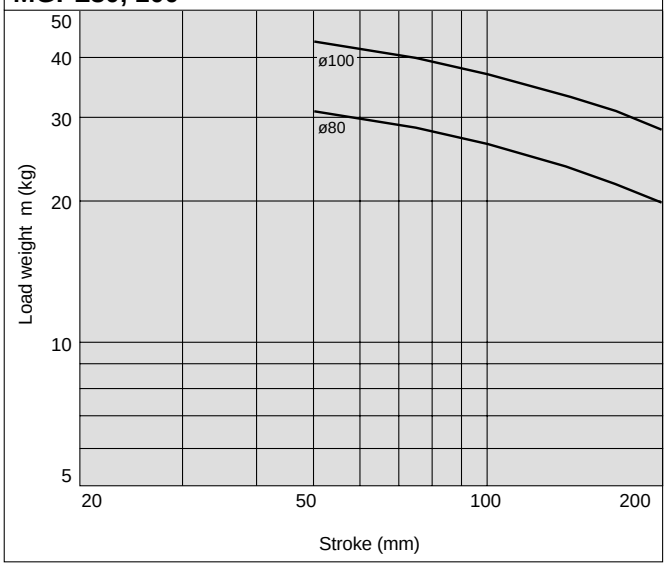
#### MGPL16 to 25




#### MGPL32 to 63

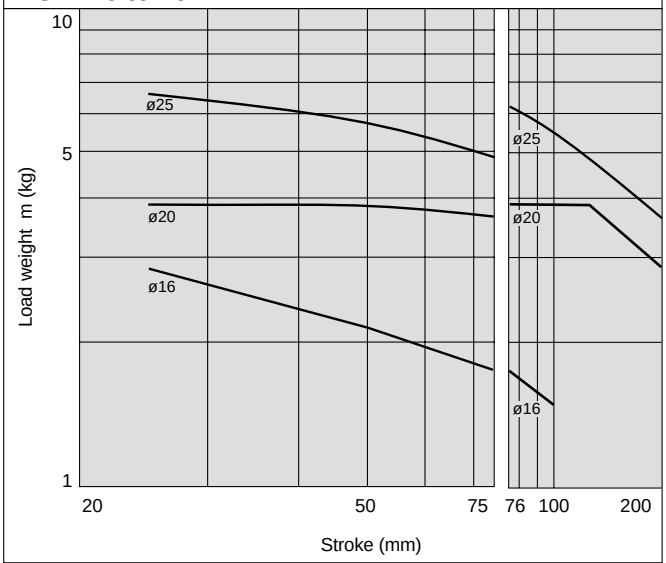



#### MGPL80, 100

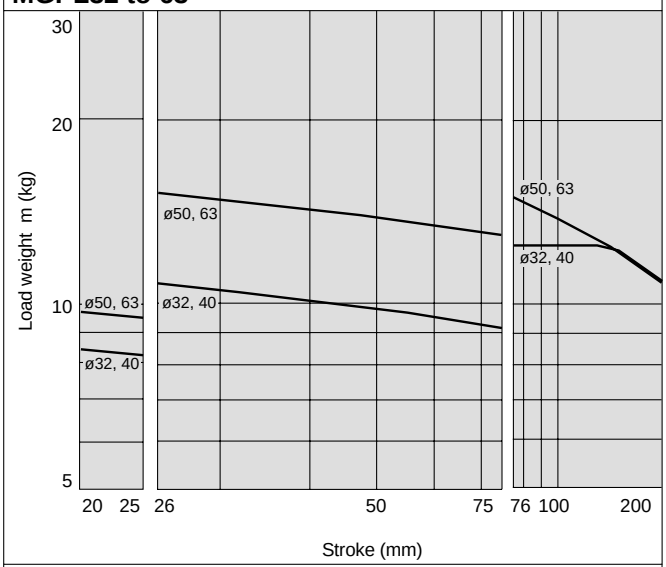



### 22 ℓ =100mm V = 400m/s

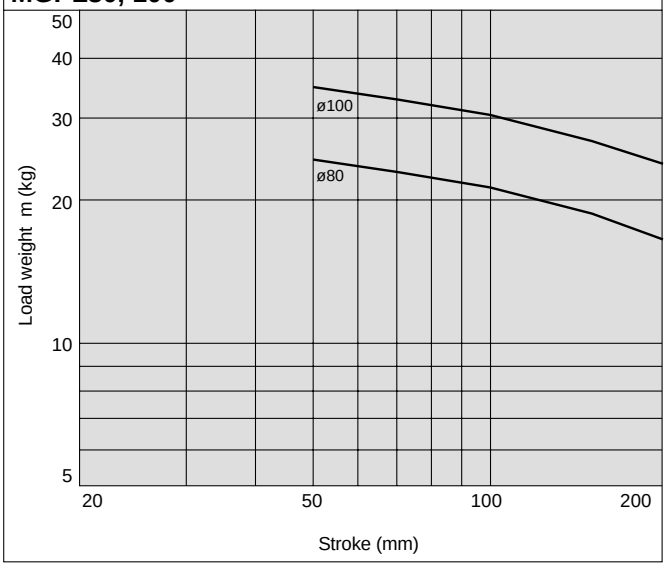
#### MGPL16 to 25




#### MGPL32 to 63

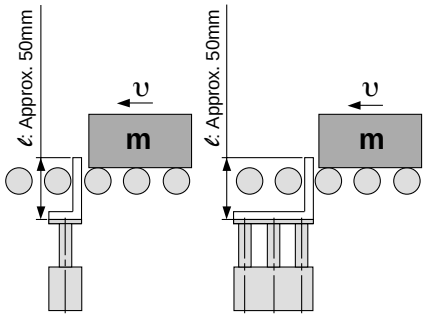



#### MGPL80, 100



## Operating Range when Used as Stopper

### Bore Sizes ø16 to 25/MGPM16 to 25 (Slide bearing)




∗ When selecting a model with a longer ℓ dimension, be sure to choose a bore size which is sufficiently large.

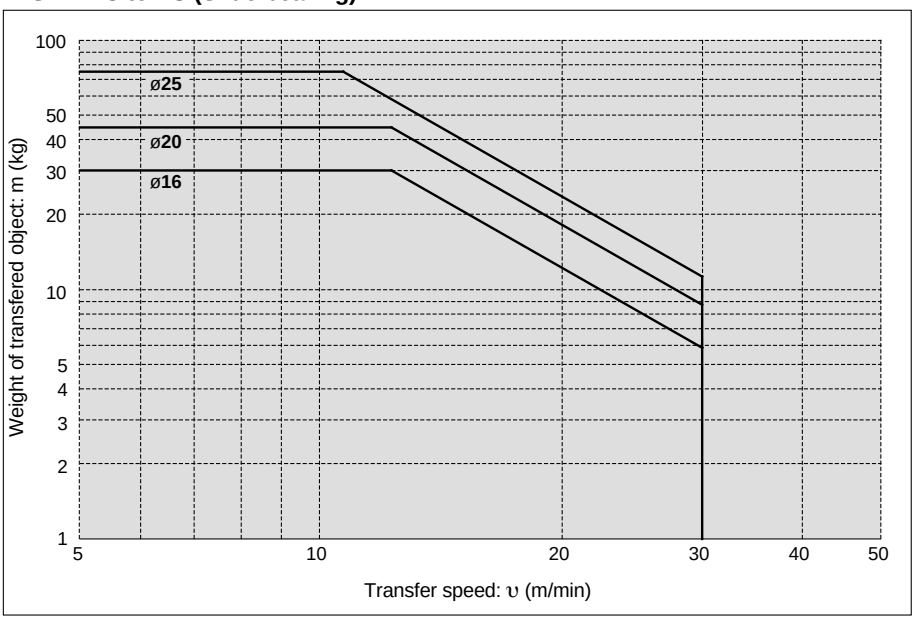
**⚠Caution**

**Handling precautions**

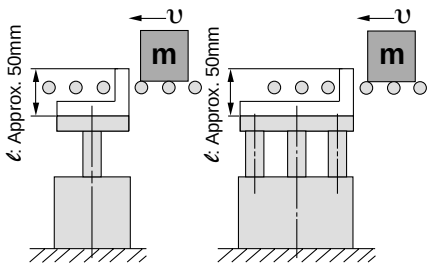
Note 1) When using as a stopper, select a model with a stroke of 25mm or less.

**Note 2) Model MGPL (ball bushing) cannot be used as a stopper.**

**MGPM16 to 25 (Slide bearing)**




### Bore Sizes ø32 to 100/MGPM32 to 100 (Slide bearing)




∗ When selecting a model with a longer ℓ dimension, be sure to choose a bore size which is sufficiently large.

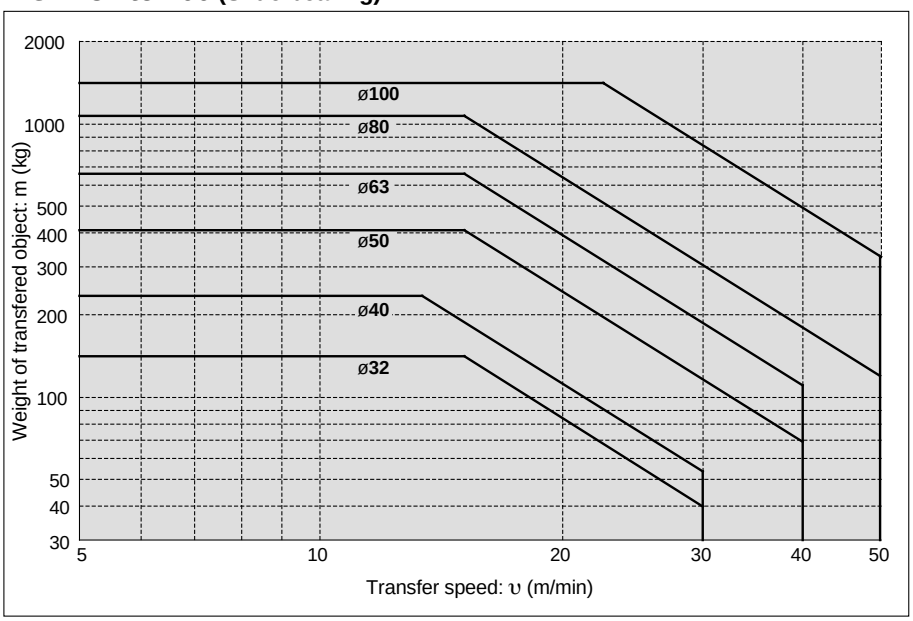
**⚠Caution**

**Handling precautions**

Note 1) When using as a stopper, select a model with a stroke of 50mm or less.

**Note 2) Model MGPL (ball bushing) cannot be used as a stopper.**

**MGPM32 to 100 (Slide bearing)**



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## Copper-free Series (Applicable to CRT Manufacturing Process)

**To prevent the influence of copper ions or halogen ions during CRT manufacturing processes, copper and fluorine materials are not used as component parts.**

### Specifications

| Applicable series | MGPM | MGPL |
|---|---|---|
| Bearing type | Slide bearing | Ball bushing |
| Bore size (mm) | 16, 20, 25, 32, 40, 50, 63, 80, 100 | |

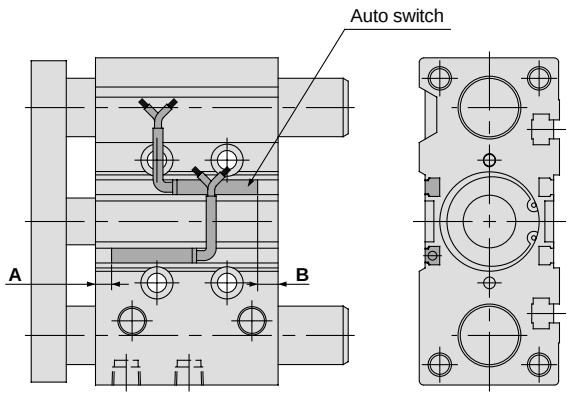
∗ Specifications and dimensions other than above are identical to the standard basic type.

### How to Order

20 — MGP | M | Bore size | Stroke | A

- M: Bearing type
  - M: Slide bearing
  - L: Ball bushing
- Bore size
- Stroke
- A: With air cushion
- 20: Copper-free specification

## Auto Switches/Proper Mounting Position for Stroke End Detection



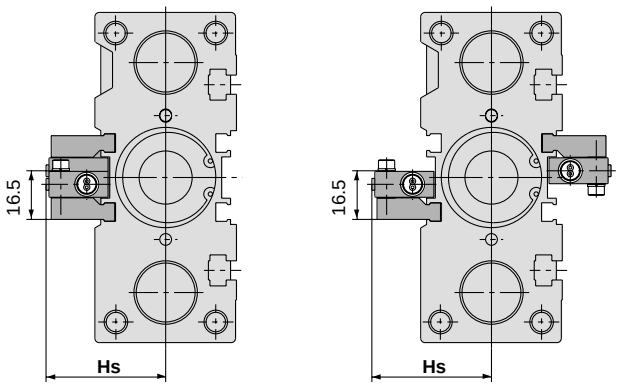

**Proper mounting position** (mm)

| Bore size (mm) | A | B |
|---|---|---|
| 16 | 17.5 | 15.5 |
| 20 | 26 | 11 |
| 25 | 23 | 14.5 |
| 32 | 16 | 21.5 |
| 40 | 26 | 18 |
| 50 | 27.5 | 16.5 |
| 63 | 28 | 21 |
| 80 | 25 | 31.5 |
| 100 | 28.5 | 37.5 |

Note 1) Minimum mountable strokes for auto switch are 10mm or more for two switches, and 5mm or more for one switch.

### For D-P5DW (∗ Cannot be mounted on bore sizes ø32 or less.)

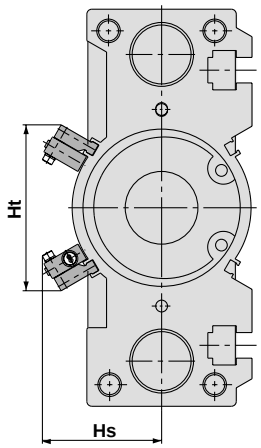
**ø40 to ø63**




**For 25mm stroke**

∗ For bore sizes ø40 through 63 with two switches, one switch is mounted on each side.

**ø80, ø100**




(mm)

| Bore size (mm) | Hs | Ht |
|---|---|---|
| 40 | 44.5 | — |
| 50 | 50 | — |
| 63 | 57 | — |
| 80 | 60.7 | 84.4 |
| 100 | 70.8 | 96.1 |

∗ Minimum mountable strokes for auto switch are 10mm or more for two switches, and 5mm or more for one switch.

## Auto Switch Mounting

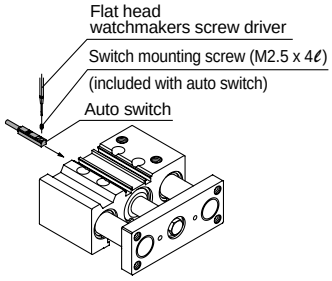
### ⚠ Caution

**Auto switch mounting tool**

- When tightening the auto switch mounting screw (included with auto switch), use a watchmakers screw driver with a handle about 5 to 6mm in diameter.

**Tightening torque**

- Tighten with a torque of 0.05 to 0.1N·m. As a rule, it should be turned about 90° past the point at which tightening can be felt.




### For D-P5DW

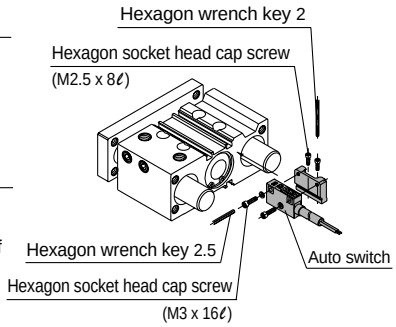
### ⚠ Caution

**Auto switch mounting tool**

- When tightening hexagon socket head cap screws of the auto switch, use hexagon wrench key 2 or 2.5 with the appropriate screws.

**Tightening torque**

- Tighten M2.5 screws with a torque of about 0.3 to 0.5N·m, and M3 screws with a torque of about 0.5 to 0.7 N·m.



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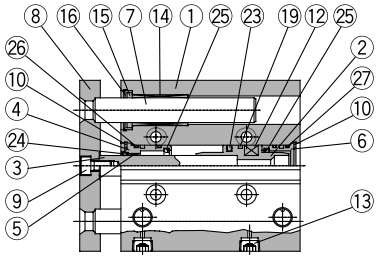
# Series MGP

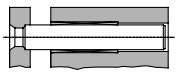
## Construction (With Air Cushion)

### Series MGPM

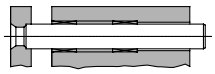
#### MGPM16 to 25



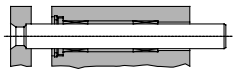

25mm stroke



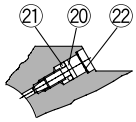
ø16: 25mm stroke



ø16: 50mm stroke or larger

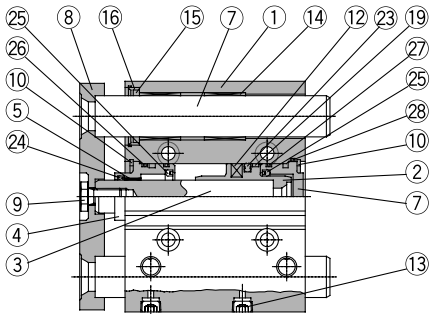


ø20, ø25: 50mm stroke or larger

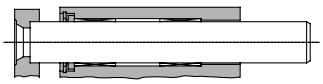



Cushion valve section

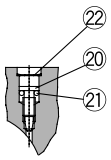
#### MGPM32 to 100




25mm stroke



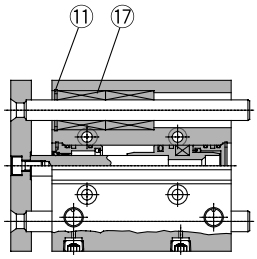
50mm stroke or larger

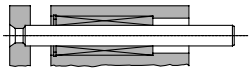



Cushion valve section

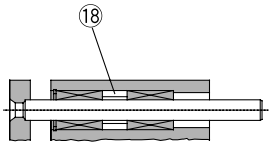
### Series MGPL

#### MGPL16 to 25



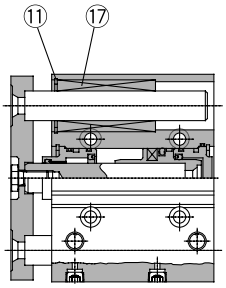



ø20, ø25: 75mm stroke or less

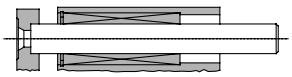



ø20, ø25: 100mm stroke or larger

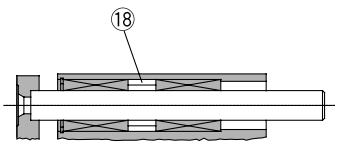
#### MGPL32 to 100




25mm stroke



ø32 to ø63: 50, 75mm stroke
ø80, ø100: 50mm stroke or larger




ø32 to ø63: 100mm stroke or larger

### Parts list

| No. | Description | Material | Note | |
|---|---|---|---|---|
| 1 | Body | Aluminum alloy | Hard anodized | |
| 2 | Piston | Aluminum alloy | Chromated | |
| 3 | Piston rod | Stainless steel | ø16 to ø25 | |
| | | Carbon steel | ø32 to ø100 | Hard chrome plated |
| 4 | Collar | Aluminum alloy | ø16 to ø63 | Clear anodized |
| | | | ø80, ø100 | Coated |
| 5 | Bushing | Lead bronze casting | | |
| 6 | Head cover | Aluminum alloy | ø16 to ø25 | Clear anodized |
| | | | ø32 to ø100 | Coated |
| 7 | Guide rod | Carbon steel | Hard chrome plated | |
| 8 | Plate | Carbon steel | Nickel plated | |
| 9 | Plate mounting bolt | Carbon steel | Nickel plated | |
| 10 | Snap ring | Carbon tool steel | Phosphate coated | |
| 11 | Snap ring | Carbon tool steel | Phosphate coated | |
| 12 | Magnet | Synthetic rubber | | |
| 13 | Plug (M-5P) | Brass | ø16 | Nickel plated |
| | Hexagon socket head taper plug | Carbon steel | ø20 to ø100 | Nickel plated |
| 14 | Slide bearing | Lead bronze casting | | |
| 15 | Felt | Felt | | |
| 16 | Holder | Resin | | |
| 17 | Ball bushing | | | |

### Parts list

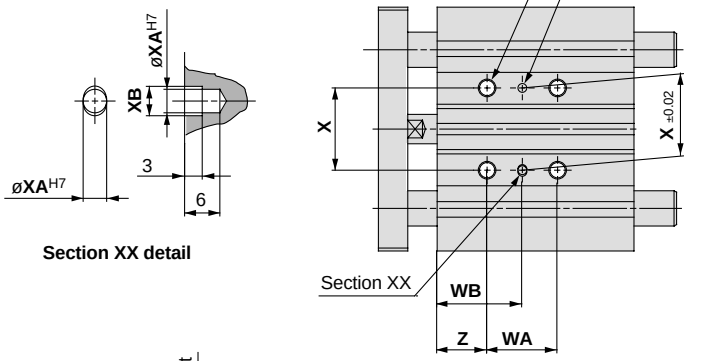
| No. | Description | Material | Note |
|---|---|---|---|
| 18 | Spacer | Aluminum alloy | |
| 19 | Wear ring | Resin | |
| 20 | Cushion valve | Steel | |
| 21 | Gasket | NBR | |
| 22 | Snap ring | Carbon tool steel | Except ø16 |
| 23* | Piston seal | NBR | |
| 24* | Rod seal | NBR | |
| 25* | Cushion seal | Urethane | |
| 26* | Gasket A | NBR | |
| 27* | Gasket B | NBR | |
| 28* | Gasket C | NBR | |

### Replacement parts: Seal kits

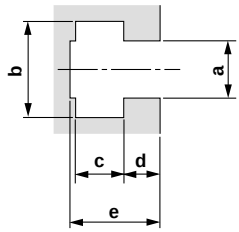
| Bore size (mm) | Kit no. | Contents | Bore size (mm) | Kit no. | Contents |
|---|---|---|---|---|---|
| 16 | MGP16-A-PS | Kits include items 23, 24, 25 26, 27, 28 from the table above. | 50 | MGP50-A-PS | Kits include items 23, 24, 25 26, 27, 28 from the table above. |
| 20 | MGP20-A-PS | | 63 | MGP63-A-PS | |
| 25 | MGP25-A-PS | | 80 | MGP80-A-PS | |
| 32 | MGP32-A-PS | | 100 | MGP100-A-PS | |
| 40 | MGP40-A-PS | | | | |

* Seal kits are sets consisting of items 23 through 28 above, and can be ordered using the kit number for each bore size.

# ø16 to ø25/MGPM, MGPL (With Air Cushion)

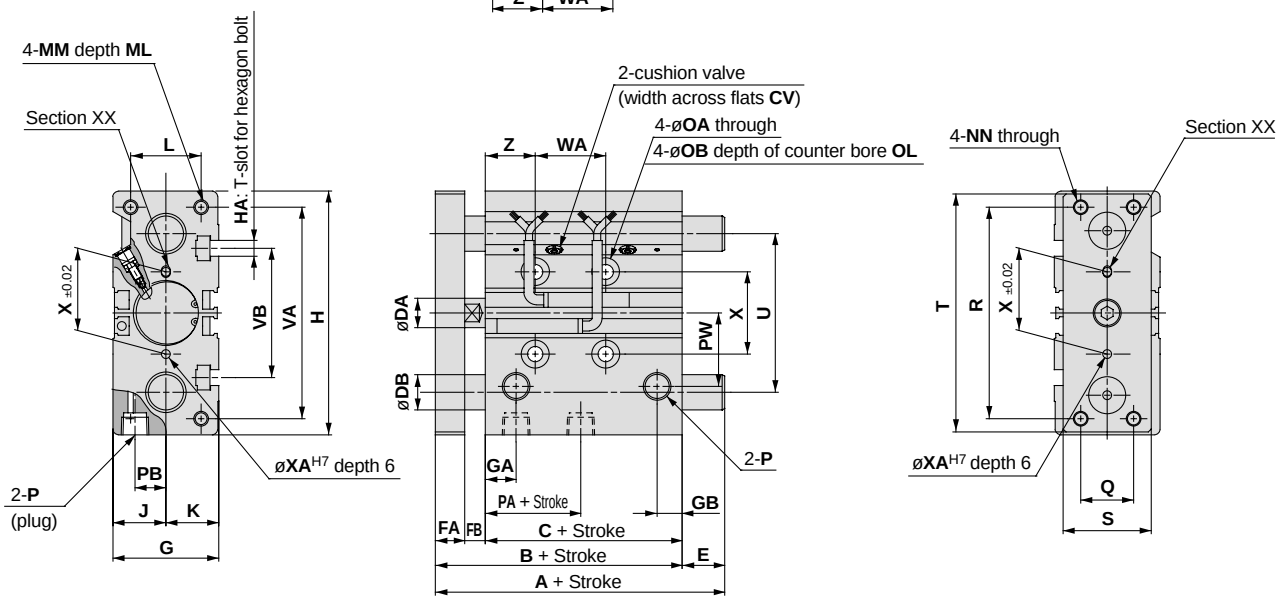



**T-slot dimensions**




(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 16 | 4.4 | 7.4 | 3.7 | 2.5 | 6.7 |
| 20 | 5.4 | 8.4 | 4.5 | 2.8 | 7.8 |
| 25 | 5.4 | 8.4 | 4.5 | 3 | 8.2 |




Note 1) Refer to "Manufacture of Intermediate Strokes" on page 19 for intermediate strokes.
Note 2) When adjusting the ø16 cushion valve, use a 3mm flat head watchmakers screw driver.

## MGPM, MGPL Common dimensions

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | CV | DA | FA | FB | G | GA | GB | H | HA | J | K | L | MM | ML | NN | OA | OB | OL | P | PA | PB | PW | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 25, 50, 75, 100 | 71 | 58 | — | 8 | 8 | 5 | 30 | 11 | 8 | 64 | M4 | 15 | 15 | 22 | M5 x 0.8 | 12 | M5 x 0.8 | 4.3 | 8 | 4.5 | M5 x 0.8 | 40 | 10 | 19 | 16 |
| 20 | 25, 50, 75, 100, 125, 150, 175, 200 | 78 | 62 | 1.5 | 10 | 10 | 6 | 36 | 10.5 | 8.5 | 83 | M5 | 18 | 18 | 24 | M5 x 0.8 | 13 | M5 x 0.8 | 5.6 | 9.5 | 5.5 | Rc 1/8 | 37.5 | 10.5 | 25 | 18 |
| 25 | | 78.5 | 62.5 | 1.5 | 12 | 10 | 6 | 42 | 11.5 | 9 | 93 | M5 | 21 | 21 | 30 | M6 x 1.0 | 15 | M6 x 1.0 | 5.6 | 9.5 | 5.5 | Rc 1/8 | 37.5 | 13.5 | 28.5 | 26 |

| Bore size (mm) | Standard stroke (mm) | R | S | T | U | VA | VB | WA | | | WB | | | X | XA | XB | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 75st or less | 100 to 175st | 200st | 75st or less | 100 to 175st | 200st | | | | | | |
| 16 | 25, 50, 75, 100 | 54 | 25 | 62 | 46 | 56 | 38 | 44 | 110 | — | 27 | 60 | — | 24 | 3 | 3.5 | M5 x 0.8 | 10 | 5 |
| 20 | 25, 50, 75, 100, 125, 150, 175, 200 | 70 | 30 | 81 | 54 | 72 | 44 | 44 | 120 | 200 | 39 | 77 | 117 | 28 | 3 | 3.5 | M6 x 1.0 | 12 | 17 |
| 25 | | 78 | 38 | 91 | 64 | 82 | 50 | 44 | 120 | 200 | 39 | 77 | 117 | 34 | 4 | 4.5 | M6 x 1.0 | 12 | 17 |

## MGPM (slide bearing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 25st | 50st | 75st or more | | 25st | 50st | 75st or more |
| 16 | 71 | 89.5 | 71 | 10 | 0 | 18.5 | 0 |
| 20 | 78 | 86.5 | 84.5 | 12 | 0 | 8.5 | 6.5 |
| 25 | 78.5 | 87 | 85 | 16 | 0 | 8.5 | 6.5 |

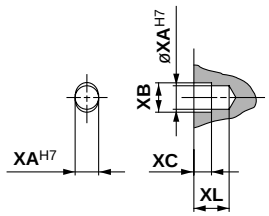
## MGPL (ball bushing)/Dimensions A, DB, E

(mm)

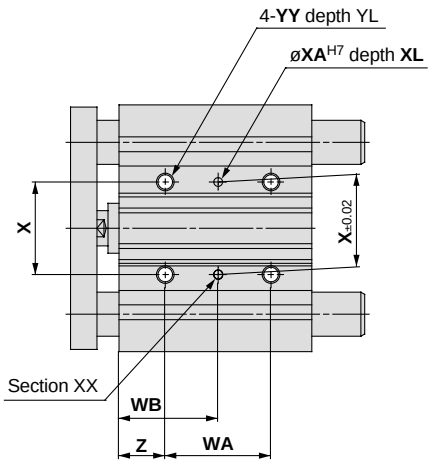
| Bore size (mm) | A | | | | DB | E | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 25st | 50, 75st | 100st | 125st or more | | 25st | 50, 75st | 100st | 125st or more |
| 16 | 80 | 71 | 71 | — | 8 | 9 | 0 | 0 | — |
| 20 | 95 | 80 | 99 | 104 | 10 | 17 | 2 | 21 | 26 |
| 25 | 100.5 | 85.5 | 99.5 | 104.5 | 13 | 22 | 7 | 26 | 26 |

# Series MGP

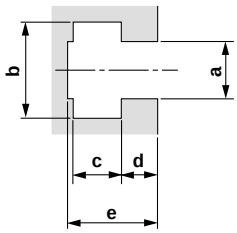
## ø32 to ø63/MGPM, MGPL (With Air Cushion)




Section XX detail

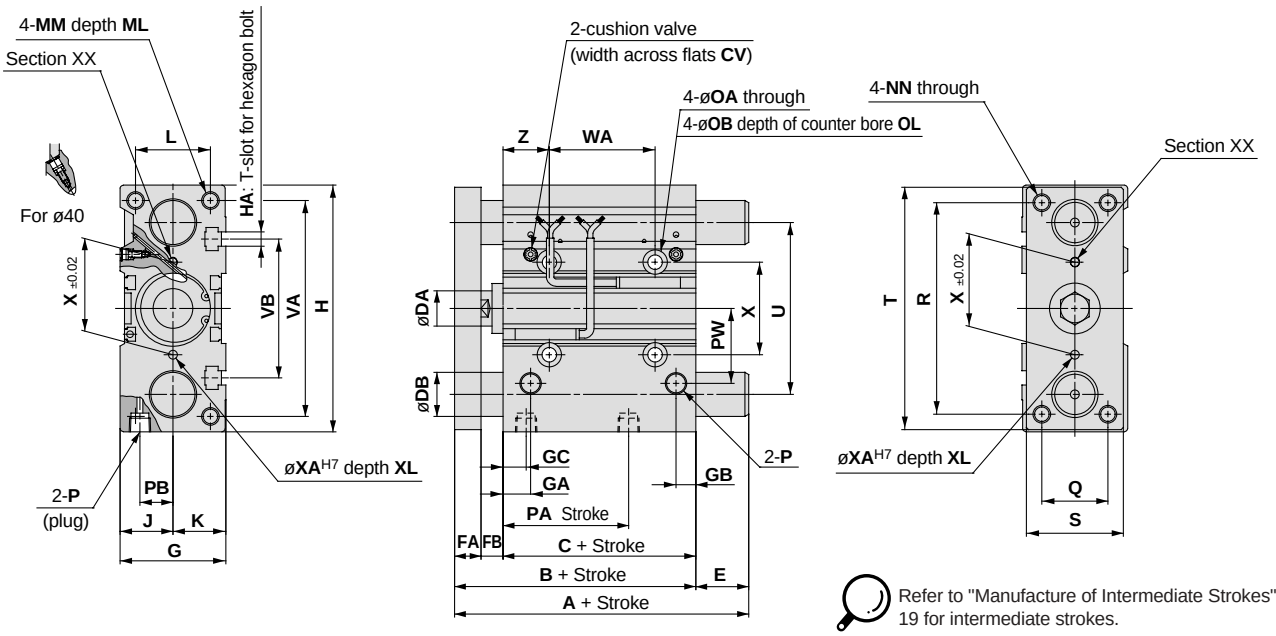



### T-slot dimensions




(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 32 | 6.5 | 10.5 | 5.5 | 3.5 | 9.5 |
| 40 | 6.5 | 10.5 | 5.5 | 4 | 11 |
| 50 | 8.5 | 13.5 | 7.5 | 4.5 | 13.5 |
| 63 | 11 | 17.8 | 10 | 7 | 18.5 |




Refer to "Manufacture of Intermediate Strokes" on page 19 for intermediate strokes.

### MGPM, MGPL Common dimensions

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | CV | DA | FA | FB | G | GA | GB | GC | H | HA | J | K | L | MM | ML | NN | OA | OB | OL | P | PA | PB | PW | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 25, 50, 75, 100, 125, 150, 175, 200 | 84.5 | 62.5 | 1.5 | 16 | 12 | 10 | 48 | 12.5 | 9 | 12.5 | 112 | M6 | 24 | 24 | 34 | M8 x 1.25 | 20 | M8 x 1.25 | 6.6 | 11 | 7.5 | Rc 1/8 | 32 | 15 | 34 | 30 |
| 40 | | 91 | 69 | 1.5 | 16 | 12 | 10 | 54 | 14 | 10 | 14 | 120 | M6 | 27 | 27 | 40 | M8 x 1.25 | 20 | M8 x 1.25 | 6.6 | 11 | 7.5 | Rc 1/8 | 38 | 18 | 38 | 30 |
| 50 | | 97 | 69 | 2.5 | 20 | 16 | 12 | 64 | 14 | 11 | 12 | 148 | M8 | 32 | 32 | 46 | M10 x 1.5 | 22 | M10 x 1.5 | 8.6 | 14 | 9 | Rc 1/4 | 34 | 21.5 | 47 | 40 |
| 63 | | 102 | 74 | 2.5 | 20 | 16 | 12 | 78 | 16.5 | 13.5 | 16.5 | 162 | M10 | 39 | 39 | 58 | M10 x 1.5 | 22 | M10 x 1.5 | 8.6 | 14 | 9 | Rc 1/4 | 39 | 28 | 55 | 50 |

| Bore size (mm) | Standard stroke (mm) | R | S | T | U | VA | VB | WA | | | WB | | | X | XA | XB | XC | XL | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 25, 50, 75st | 100 to 175st | 200st | 25, 50, 75st | 100 to 175st | 200st | | | | | | | | |
| 32 | 25, 50, 75, 100, 125, 150, 175, 200 | 96 | 44 | 110 | 78 | 98 | 63 | 48 | 124 | 200 | 45 | 83 | 121 | 42 | 4 | 4.5 | 3 | 6 | M8 x 1.25 | 16 | 21 |
| 40 | | 104 | 44 | 118 | 86 | 106 | 72 | 48 | 124 | 200 | 46 | 84 | 122 | 50 | 4 | 4.5 | 3 | 6 | M8 x 1.25 | 16 | 22 |
| 50 | | 130 | 60 | 146 | 110 | 130 | 92 | 48 | 124 | 200 | 48 | 86 | 124 | 66 | 5 | 6 | 4 | 8 | M10 x 1.5 | 20 | 24 |
| 63 | | 130 | 70 | 158 | 124 | 142 | 110 | 52 | 128 | 200 | 50 | 88 | 124 | 80 | 5 | 6 | 4 | 8 | M10 x 1.5 | 20 | 24 |

### MGPM (slide bearing)/Dimensions A, DB, E

(mm)

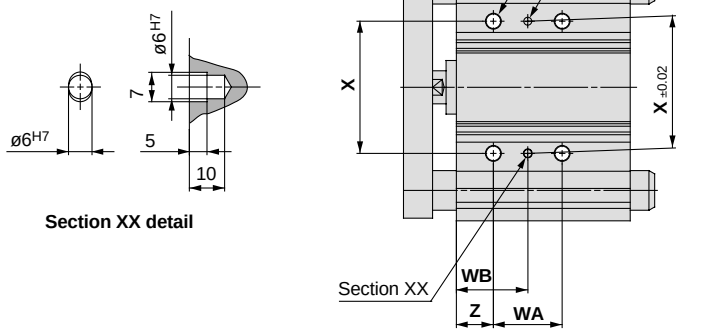
| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 25st | 50st | 75st or more | | 25st | 50st | 75st or more |
| 32 | 97 | 127 | 102 | 20 | 12.5 | 42.5 | 17.5 |
| 40 | 97 | 127 | 102 | 20 | 6 | 36 | 11 |
| 50 | 106.5 | 131.5 | 118 | 25 | 9.5 | 34.5 | 21 |
| 63 | 106.5 | 131.5 | 118 | 25 | 4.5 | 29.5 | 16 |

### MGPL (ball bushing)/Dimensions A, DB, E

(mm)

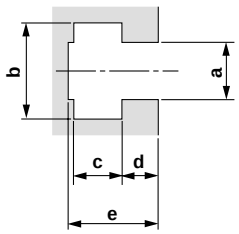
| Bore size (mm) | A | | | | | DB | E | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 25st | 50st | 75st | 100st | 125st or more | | 25st | 50st | 75st | 100st | 125st or more |
| 32 | 84.5 | 123 | 98 | 115.5 | 118 | 16 | 0 | 38.5 | 13.5 | 31 | 33.5 |
| 40 | 91 | 123 | 98 | 115.5 | 118 | 16 | 0 | 32 | 7 | 24.5 | 27 |
| 50 | 97 | 127.5 | 114 | 159 | 134 | 20 | 0 | 30.5 | 17 | 62 | 37 |
| 63 | 102 | 127.5 | 114 | 159 | 134 | 20 | 0 | 25.5 | 12 | 57 | 32 |

# ø80, ø100/MGPM, MGPL (With Air Cushion)



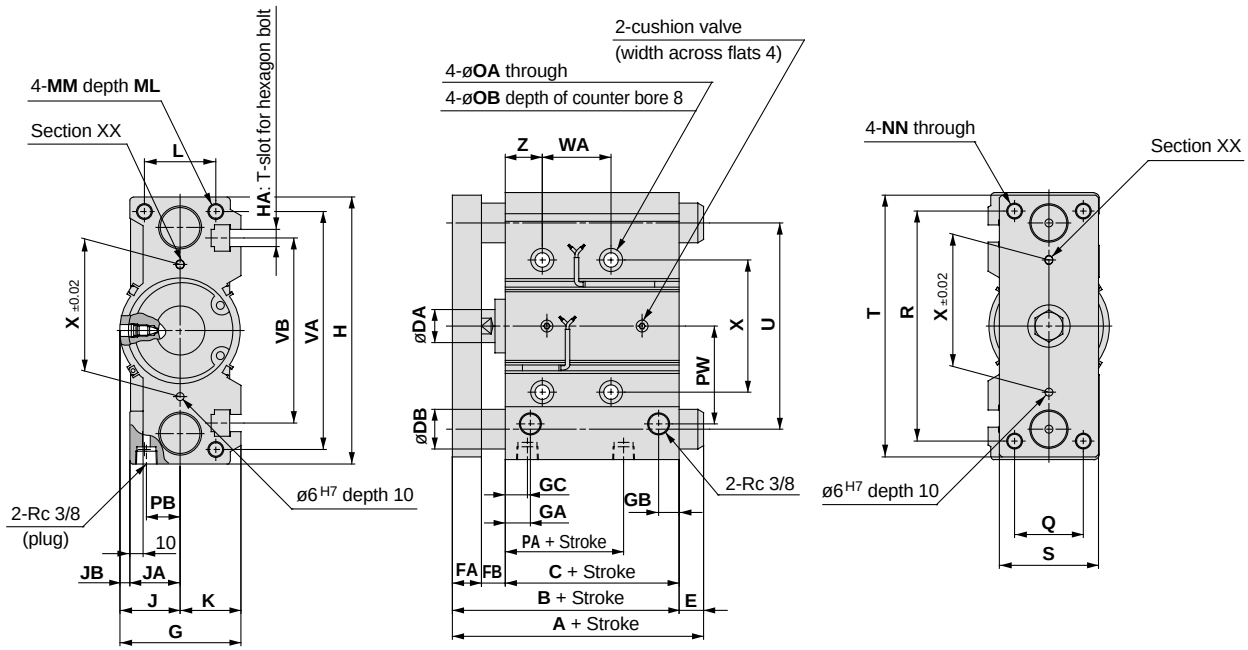

Section XX detail

## T-slot dimensions




(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 80 | 13.3 | 20.3 | 12 | 8 | 22.5 |
| 100 | 15.3 | 23.3 | 13.5 | 10 | 30 |




Refer to "Manufacture of Intermediate Strokes" on page 19 for intermediate strokes.

## MGPM, MGPL Common dimensions

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | DA | FA | FB | G | GA | GB | GC | H | HA | J | JA | JB | K | L | MM | ML | NN | OA | OB | PA | PB | PW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 50, 75, 100, 125, 150, 175, 200 | 121.5 | 81.5 | 25 | 22 | 18 | 91.5 | 19 | 15.5 | 14.5 | 202 | M12 | 45.5 | 38 | 7.5 | 46 | 54 | M12 x 1.75 | 25 | M12 x 1.75 | 10.6 | 17.5 | 39.5 | 25.5 | 74 |
| 100 | | 141 | 91 | 30 | 25 | 25 | 111.5 | 23 | 19 | 18 | 240 | M14 | 55.5 | 45 | 10.5 | 56 | 62 | M14 x 2.0 | 31 | M14 x 2.0 | 12.5 | 20 | 42.5 | 32.5 | 89 |

| Bore size (mm) | Standard stroke (mm) | Q | R | S | T | U | VA | VB | WA | | | WB | | | X | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 50, 75st | 100 to 175st | 200st | 50, 75st | 100 to 175st | 200st | | | | |
| 80 | 50, 75, 100, 125, 150, 175, 200 | 52 | 174 | 75 | 198 | 156 | 180 | 140 | 52 | 128 | 200 | 54 | 92 | 128 | 100 | M12 x 1.75 | 24 | 28 |
| 100 | | 64 | 210 | 90 | 236 | 188 | 210 | 166 | 72 | 148 | 220 | 47 | 85 | 121 | 124 | M14 x 2.0 | 28 | 11 |

## MGPM (slide bearing)/Dimensions A, DB, E (mm)

| Bore size (mm) | A | | DB | E | |
|---|---|---|---|---|---|
| | 50st | 75st or more | | 50st | 75st or more |
| 80 | 167 | 142 | 30 | 45.5 | 20.5 |
| 100 | 187 | 162 | 36 | 46 | 21 |

## MGPL (ball bushing)/Dimensions A, DB, E (mm)

| Bore size (mm) | A | | DB | E | |
|---|---|---|---|---|---|
| | 50st | 75st or more | | 50st | 75st or more |
| 80 | 168.5 | 160 | 25 | 47 | 38.5 |
| 100 | 178.5 | 180 | 30 | 37.5 | 39 |

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www.almotion.nl | www.linearmotion.nl | www.lineairegeleiding.nl

# Compact Guide Cylinder: With End Lock

# Series MGP

## ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100



## How to Order

**Compact Guide Cylinder**

**MGP** | **M** | **32** | **100** | **H** | **N** | **Z73** | |

**Compact guide cylinder**

**Bearing type**

| | |
|---|---|
| **M** | Slide bearing |
| **L** | Ball bushing |

**Bore size**

| | |
|---|---|
| **20** | 20mm |
| **25** | 25mm |
| **32** | 32mm |
| **40** | 40mm |
| **50** | 50mm |
| **63** | 63mm |
| **80** | 80mm |
| **100** | 100mm |

**Cylinder stroke (mm)**

Refer to the standard stroke table on page 36.

**Lock position**

| | |
|---|---|
| **H** | Rear lock |
| **R** | Front lock |

**Manual release type**

| | |
|---|---|
| **N** | Non-locking type |
| **L** | Locking type |

**Auto switch type**

| | |
|---|---|
| **Nil** | Without auto switch (built-in magnet cylinder) |

∗ Refer to the table below for auto switch model numbers.

**Number of auto switches**

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

## Applicable auto switches

| Type | Special function | Electrical entry | Indicator light | Wiring (output) | Load voltage DC | Load voltage DC | Load voltage AC | Auto switch model: Electrical entry direction: Perpendicular | Auto switch model: Electrical entry direction: In-line | Lead wire length (m) Note 1): 0.5 (Nil) | 3 (L) | 5 (Z) | Applicable load | | Detailed specifications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire | — | 5V | — | — | **Z76** | ● | ● | — | IC circuit | — | P. 59 |
| | | | | 2 wire | 24V | 12V | 100V | — | **Z73** | ● | ● | ● | — | Relay, PLC | |
| | | | No | | | 5V 12V | 100V or less | — | **Z80** | ● | ● | — | IC circuit | | |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V 12V | — | **Y69A** | **Y59A** | ● | ● | ○ | IC circuit | Relay, PLC | P. 60 |
| | | | | 3 wire (PNP) | | | | **Y7PV** | **Y7P** | ● | ● | ○ | | | |
| | | | | 2 wire | | 12V | | **Y69B** | **Y59B** | ● | ● | ○ | — | | |
| | Diagnostic indication (2 colour indicator) | | | 3 wire (NPN) | | 5V 12V | | **Y7NWV** | **Y7NW** | ● | ● | ○ | IC circuit | | P. 61 |
| | | | | 3 wire (PNP) | | | | **Y7PWV** | **Y7PW** | ● | ● | ○ | | | |
| | | | | 2 wire | | 12V | | **Y7BWV** | **Y7BW** | ● | ● | ○ | — | | |
| | Water resistant (2 colour indicator) | | | | | | | — | **Y7BA** | — | ● | ○ | | | P. 62 |
| | Magnetic field resistant (2 colour indicator) | | | | | — | | — | **P5DW** Note 3) | — | ● | ● | | | P. 63 |

Note 1) Lead wire symbols 0.5m ..... Nil (Example) Y69B
3m ..... L Y69BL
5m ..... Z Y69BZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.

Note 3) Type D-P5DW cannot be mounted on bore sizes of ø32 or less.



SMC
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# Series MGP

## Specifications

| | | |
|---|---|---|
| Action | Double acting | |
| Fluid | Air | |
| Proof pressure | 1.5MPa | |
| Maximum operating pressure | 1.0MPa | |
| Minimum operating pressure | 0.15MPa * | |
| Ambient and fluid temperature | –10 to 60°C (with no freezing) | |
| Piston speed | ø20 to ø63 | 50 to 500mm/s |
| | ø80, ø100 | 50 to 400mm/s |
| Cushion | Rubber bumper at both ends | |
| Lubrication | Non-lube | |
| Stroke length tolerance | $^{+1.5}_{0}$ mm | |

∗ 0.1MPa except for the lock unit.

## Lock Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Lock position** | Rear, Front side | | | | | | | |
| **Holding force (max.) N** | ø20 | ø25 | ø32 | ø40 | ø50 | ø63 | ø80 | ø100 |
| | 215 | 330 | 550 | 860 | 1340 | 2140 | 3450 | 5390 |
| **Backlash** | 2mm or less | | | | | | | |
| **Manual release** | Non-locking type, Locking type | | | | | | | |

Adjust switch positions for operation at both the stroke end and backlash (2mm) movement positions.

## Standard Strokes

| Bore size (mm) | Standard stroke (mm) |
|---|---|
| **20, 25, 32, 40, 50, 63, 80, 100** | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400 |

## Manufacture of Intermediate Strokes

| | |
|---|---|
| **Modification method** | Spacer installation type<br>Spacers are installed in a standard stroke cylinder. Available in 5mm stroke increments |
| **Part number** | Refer to page 35 for standard part numbers and ordering procedure. |
| **Applicable stroke (mm)** | 5 to 395 |
| **Example** | Part no.: **MGPM50–35–HN**<br>A spacer 15mm in width is installed in a **MGPM50–50–HN.** C dimension is 119mm. |

Note 1) The minimum stroke for mounting auto switches is 10mm or more for two switches, and 5mm or more for one switch.

Note 2) Intermediate strokes (in 1mm increments) with a special body are available by special order.

### Auto switch mounting bracket part no. for D-P5DW

| Bore size (mm) | Mounting bracket part no. | Notes |
|---|---|---|
| 40, 50, 63, 80, 100 | BMG1-040 | Switch mounting bracket<br>Hexagon socket head cap screw (M2.5 x 0.45 x 8ℓ) 2 pcs.<br>Hexagon socket head cap screw (M3 x 0.5 x 16ℓ) 2 pcs.<br>Spring washer (nominal size 3) |

## Theoretical Output

OUT IN

(N)

| Bore size (mm) | Rod size (mm) | Operating direction | Piston area (mm²) | Operating pressure (MPa) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **0.2** | **0.3** | **0.4** | **0.5** | **0.6** | **0.7** | **0.8** | **0.9** | **1.0** |
| **20** | 10 | OUT | 314 | 63 | 94 | 126 | 157 | 188 | 220 | 251 | 283 | 314 |
| | | IN | 236 | 47 | 71 | 94 | 118 | 142 | 165 | 189 | 212 | 236 |
| **25** | 12 | OUT | 491 | 98 | 147 | 196 | 246 | 295 | 344 | 393 | 442 | 491 |
| | | IN | 378 | 76 | 113 | 151 | 189 | 227 | 265 | 302 | 340 | 378 |
| **32** | 16 | OUT | 804 | 161 | 241 | 322 | 402 | 482 | 563 | 643 | 724 | 804 |
| | | IN | 603 | 121 | 181 | 241 | 302 | 362 | 422 | 482 | 543 | 603 |
| **40** | 16 | OUT | 1257 | 251 | 377 | 503 | 629 | 754 | 880 | 1006 | 1131 | 1257 |
| | | IN | 1056 | 211 | 317 | 422 | 528 | 634 | 739 | 845 | 950 | 1056 |
| **50** | 20 | OUT | 1963 | 393 | 589 | 785 | 982 | 1178 | 1374 | 1570 | 1767 | 1963 |
| | | IN | 1649 | 330 | 495 | 660 | 825 | 990 | 1154 | 1319 | 1484 | 1649 |
| **63** | 20 | OUT | 3117 | 623 | 935 | 1247 | 1559 | 1870 | 2182 | 2494 | 2805 | 3117 |
| | | IN | 2803 | 561 | 841 | 1121 | 1402 | 1682 | 1962 | 2242 | 2523 | 2803 |
| **80** | 25 | OUT | 5027 | 1005 | 1508 | 2011 | 2514 | 3016 | 3519 | 4022 | 4524 | 5027 |
| | | IN | 4536 | 907 | 1361 | 1814 | 2268 | 2722 | 3175 | 3629 | 4082 | 4536 |
| **100** | 30 | OUT | 7854 | 1571 | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7069 | 7854 |
| | | IN | 7147 | 1429 | 2144 | 2859 | 3574 | 4288 | 5003 | 5718 | 6432 | 7147 |

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

## Weights

### Slide bearing: MGPM20 to 100 (Basic weight)

(kg)

| Bore size (mm) | Model | Standard stroke (mm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 |
| 20 | MGPM20 | 0.86 | 1.12 | 1.32 | 1.52 | 1.71 | 1.91 | 2.11 | 2.31 | 2.78 | 3.18 | 3.57 | 3.97 |
| 25 | MGPM25 | 1.18 | 1.56 | 1.83 | 2.10 | 2.38 | 2.65 | 2.92 | 3.19 | 3.85 | 4.39 | 4.94 | 5.48 |
| 32 | MGPM32 | 1.92 | 2.32 | 2.70 | 3.09 | 3.47 | 3.85 | 4.23 | 4.61 | 5.56 | 6.32 | 7.09 | 7.85 |
| 40 | MGPM40 | 2.20 | 2.66 | 3.08 | 3.51 | 3.93 | 4.36 | 4.78 | 5.20 | 6.24 | 7.10 | 7.95 | 8.80 |
| 50 | MGPM50 | 3.73 | 4.46 | 5.10 | 5.74 | 6.38 | 7.02 | 7.66 | 8.30 | 9.91 | 11.2 | 12.5 | 13.8 |
| 63 | MGPM63 | 4.61 | 5.45 | 6.21 | 6.96 | 7.72 | 8.47 | 9.23 | 9.99 | 11.8 | 13.3 | 14.8 | 16.3 |
| 80 | MGPM80 | 7.88 | 8.70 | 9.49 | 10.3 | 11.2 | 12.0 | 12.8 | 13.9 | 15.5 | 17.2 | 18.8 | 20.5 |
| 100 | MGPM100 | 12.1 | 13.2 | 14.4 | 15.6 | 16.8 | 18.0 | 19.1 | 20.6 | 22.9 | 25.3 | 27.6 | 30.0 |

### Ball bushing: MGPL20 to 100 (Basic weight)

(kg)

| Bore size (mm) | Model | Standard stroke (mm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 |
| 20 | MGPL20 | 0.93 | 1.10 | 1.27 | 1.48 | 1.65 | 1.83 | 2.00 | 2.17 | 2.55 | 2.90 | 3.25 | 3.60 |
| 25 | MGPL25 | 1.27 | 1.50 | 1.74 | 2.01 | 2.24 | 2.47 | 2.70 | 2.94 | 3.44 | 3.91 | 4.37 | 4.83 |
| 32 | MGPL32 | 1.74 | 2.19 | 2.51 | 2.88 | 3.20 | 3.51 | 3.83 | 4.15 | 4.84 | 5.47 | 6.10 | 6.73 |
| 40 | MGPL40 | 2.02 | 2.51 | 2.87 | 3.29 | 3.65 | 4.01 | 4.37 | 4.73 | 5.51 | 6.23 | 6.95 | 7.67 |
| 50 | MGPL50 | 3.46 | 4.21 | 4.76 | 5.40 | 5.95 | 6.50 | 7.05 | 7.60 | 8.83 | 9.92 | 11.1 | 12.2 |
| 63 | MGPL63 | 4.33 | 5.20 | 5.86 | 6.62 | 7.28 | 7.95 | 8.61 | 9.27 | 10.7 | 12.1 | 13.4 | 14.7 |
| 80 | MGPL80 | 8.05 | 8.87 | 9.66 | 10.5 | 11.4 | 12.2 | 13.0 | 14.1 | 15.7 | 17.4 | 19.0 | 20.7 |
| 100 | MGPL100 | 12.4 | 13.5 | 14.7 | 15.9 | 17.1 | 18.3 | 19.4 | 20.9 | 23.2 | 25.6 | 27.9 | 30.3 |

### Lock unit additional weight

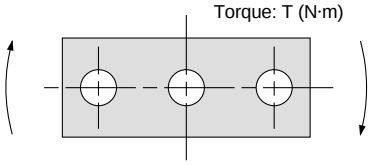
(kg)

| Bore size (mm) | With rear lock | | With front lock | |
|---|---|---|---|---|
| | HN | HL | RN | RL |
| 20 | 0.05 | 0.07 | 0.05 | 0.06 |
| 25 | 0.06 | 0.07 | 0.05 | 0.07 |
| 32 | 0.09 | 0.10 | 0.09 | 0.10 |
| 40 | 0.15 | 0.18 | 0.14 | 0.18 |
| 50 | 0.24 | 0.27 | 0.23 | 0.27 |

| Bore size (mm) | With rear lock | | With front lock | |
|---|---|---|---|---|
| | HN | HL | RN | RL |
| 63 | 0.36 | 0.40 | 0.35 | 0.39 |
| 80 | 0.90 | 0.97 | 1.03 | 1.10 |
| 100 | 1.52 | 1.60 | 1.60 | 1.68 |

Calculation (example) MGPM50-100-HN
- Basic weight + Lock unit additional weight
- 5.74 + 0.24 = 5.99kg

## Allowable Rotational Torque of Plate

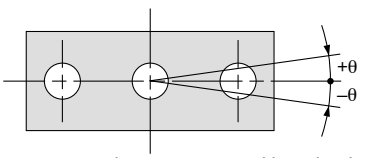



T (N·m)

| Bore size (mm) | Bearing type | Stroke (mm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 |
| 20 | MGPM | 0.99 | 0.75 | 1.88 | 1.63 | 1.44 | 1.28 | 1.16 | 1.06 | 0.90 | 0.78 | 0.69 | 0.62 |
| | MGPL | 2.66 | 1.94 | 1.52 | 1.25 | 1.34 | 1.17 | 1.03 | 0.93 | 0.76 | 0.65 | 0.56 | 0.49 |
| 25 | MGPM | 1.64 | 1.25 | 2.96 | 2.57 | 2.26 | 2.02 | 1.83 | 1.67 | 1.42 | 1.24 | 1.09 | 0.98 |
| | MGPL | 4.08 | 3.02 | 2.38 | 1.97 | 2.05 | 1.78 | 1.58 | 1.41 | 1.16 | 0.98 | 0.85 | 0.74 |
| 32 | MGPM | 6.35 | 5.13 | 5.69 | 4.97 | 4.42 | 3.98 | 3.61 | 3.31 | 2.84 | 2.48 | 2.20 | 1.98 |
| | MGPL | 5.95 | 4.89 | 5.11 | 4.51 | 6.34 | 5.79 | 5.33 | 4.93 | 4.29 | 3.78 | 3.38 | 3.04 |
| 40 | MGPM | 7.00 | 5.66 | 6.27 | 5.48 | 4.87 | 4.38 | 5.98 | 3.65 | 3.13 | 2.74 | 2.43 | 2.19 |
| | MGPL | 6.55 | 5.39 | 5.62 | 4.96 | 6.98 | 6.38 | 5.87 | 5.43 | 4.72 | 4.16 | 3.71 | 3.35 |
| 50 | MGPM | 13.0 | 10.8 | 12.0 | 10.6 | 9.50 | 8.60 | 7.86 | 7.24 | 6.24 | 5.49 | 4.90 | 4.43 |
| | MGPL | 9.17 | 7.62 | 9.83 | 8.74 | 11.6 | 10.7 | 9.83 | 9.12 | 7.95 | 7.02 | 6.26 | 5.63 |
| 63 | MGPM | 14.7 | 12.1 | 13.5 | 11.9 | 10.7 | 9.69 | 8.86 | 8.16 | 7.04 | 6.19 | 5.52 | 4.99 |
| | MGPL | 10.2 | 8.48 | 11.0 | 9.74 | 13.0 | 11.9 | 11.0 | 10.2 | 8.84 | 7.80 | 6.94 | 6.24 |
| 80 | MGPM | 21.9 | 18.6 | 22.9 | 20.5 | 18.6 | 17.0 | 15.6 | 14.5 | 12.6 | 11.2 | 10.0 | 9.11 |
| | MGPL | 15.1 | 23.3 | 22.7 | 20.6 | 18.9 | 17.3 | 16.0 | 14.8 | 12.9 | 11.3 | 10.0 | 8.94 |
| 100 | MGPM | 38.8 | 33.5 | 37.5 | 33.8 | 30.9 | 28.4 | 26.2 | 24.4 | 21.4 | 19.1 | 17.2 | 15.7 |
| | MGPL | 27.1 | 30.6 | 37.9 | 34.6 | 31.8 | 29.3 | 27.2 | 25.3 | 22.1 | 19.5 | 17.3 | 15.5 |

Model selection is the same as MGP/Standard.
Refer to page 4.

## Non-rotating Accuracy of Plate




For non-rotating accuracy θ without load, use a value no more than the values in the table as a guide.

| Bore size (mm) | Non-rotating accuracy θ | |
|---|---|---|
| | MGPM | MGPL |
| 20 | ±0.07° | ±0.09° |
| 25 | | |
| 32 | ±0.06° | ±0.08° |
| 40 | | |
| 50 | ±0.05° | ±0.06° |
| 63 | | |
| 80 | ±0.04° | ±0.05° |
| 100 | | |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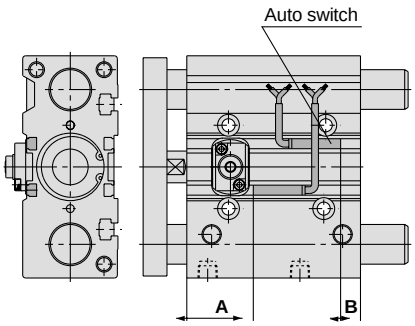
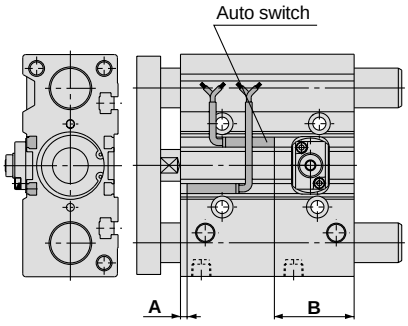
## Auto Switches/Proper Mounting Position for Stroke End Detection

### With front lock

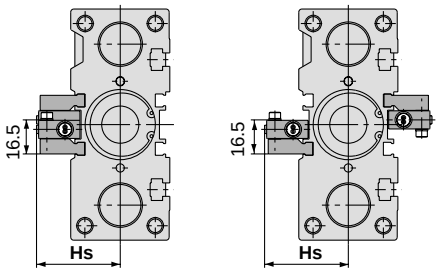



### With rear lock




### For D-P5DW (* Cannot be mounted on bore sizes ø32 or less.)

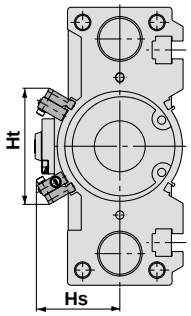
**ø40 to ø63**




**For 25mm stroke**

* For bore sizes ø40 through 63 with two switches, one switch is mounted on each side.

**ø80, ø100**




**Proper mounting position** (mm)

| Bore size (mm) | A | B |
|---|---|---|
| **20** | 47.5 | 1.5 |
| **25** | 35.5 | 1.5 |
| **32** | 32.5 | 5 |
| **40** | 38.5 | 5.5 |
| **50** | 38.5 | 4.5 |
| **63** | 42 | 7 |
| **80** | 63 | 18.5 |
| **100** | 67.5 | 23.5 |

* Minimum mountable strokes for auto switch are 10mm or more for two switches, and 5mm or more for one switch.

(mm)

| Bore size (mm) | A | B |
|---|---|---|
| **20** | 4 | 33 |
| **25** | 5 | 32.5 |
| **32** | 5.5 | 32 |
| **40** | 9.5 | 34.5 |
| **50** | 7.5 | 36.5 |
| **63** | 10 | 39 |
| **80** | 13 | 68.5 |
| **100** | 17.5 | 73.5 |

* Minimum mountable strokes for auto switch are 10mm or more for two switches, and 5mm or more for one switch.

(mm)

| Bore size (mm) | Hs | Ht |
|---|---|---|
| **40** | 44.5 | — |
| **50** | 50 | — |
| **63** | 57 | — |
| **80** | 60.7 | 84.4 |
| **100** | 70.8 | 96.1 |

* Minimum mountable strokes for auto switch are 10mm or more for two switches, and 5mm or more for one switch.

## Auto Switch Mounting

### ⚠ Caution

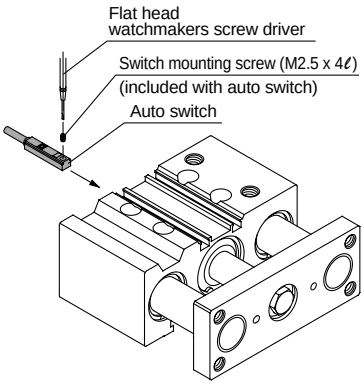
**Auto switch mounting tool**

- When tightening the auto switch mounting screw (included with auto switch), use a watchmakers screw driver with a handle about 5 to 6mm in diameter

**Tightening torque**

- Tighten with a torque of 0.05 to 0.1N·m. As a rule, it should be turned about 90° past the point at which tightening can be felt.

When mounting an auto switch on the side with the end lock, insert the auto switch from the rod side for the rear lock, and from the head side for the front lock.




### For D-P5DW

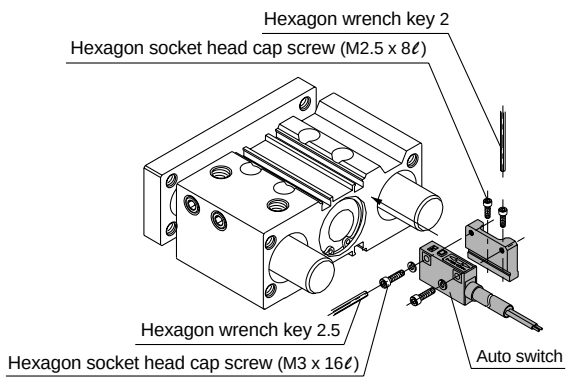
### ⚠ Caution

**Auto switch mounting tool**

- When tightening hexagon socket head cap screws of the auto switch, use hexagon wrench key 2 or 2.5 with the appropriate screws.

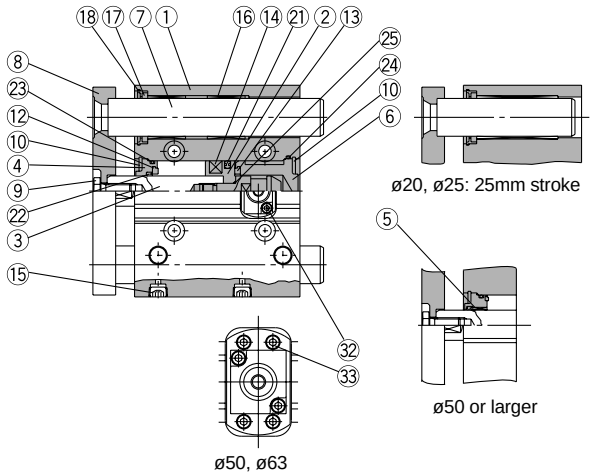
**Tightening torque**

- Tighten M2.5 screws with a torque of about 0.3 to 0.5N·m, and M3 screws with a torque of about 0.5 to 0.7 N·m.



## Construction

### Series MGPM

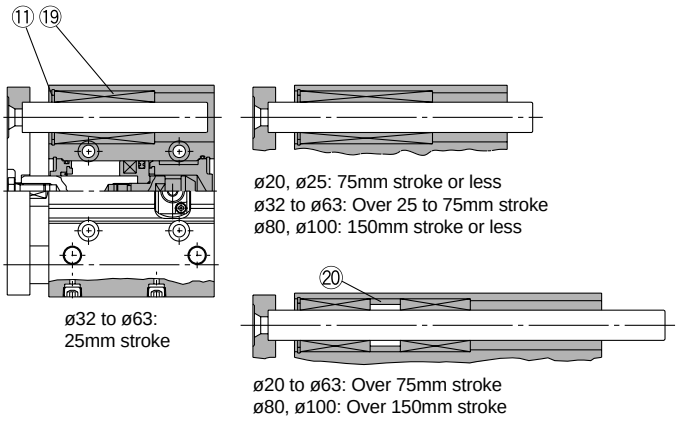



ø20, ø25: 25mm stroke

ø50 or larger

ø50, ø63

### Series MGPL



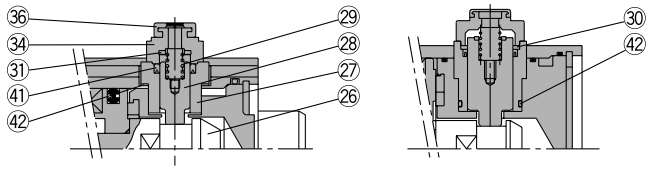

ø20, ø25: 75mm stroke or less
ø32 to ø63: Over 25 to 75mm stroke
ø80, ø100: 150mm stroke or less

ø32 to ø63:
25mm stroke

ø20 to ø63: Over 75mm stroke
ø80, ø100: Over 150mm stroke

### Non-locking type

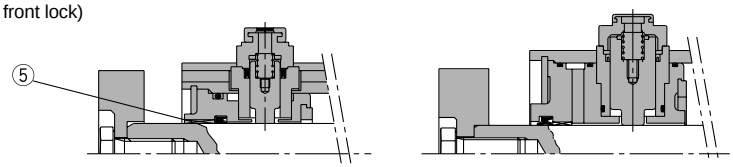
(Rear side lock)




ø20 to ø63

ø80, ø100

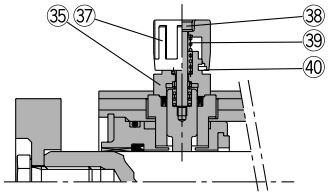
(With front lock)




ø20 to ø63

ø80, ø100

### Locking type




### Parts list

| No. | Description | Material | | Note |
|---|---|---|---|---|
| 1 | Body | Aluminum alloy | | Hard anodized |
| 2 | Piston | Aluminum alloy | | Chromated |
| 3 | Piston rod | Stainless steel | ø20, ø25 | Hard chrome plated with front end lock only |
| | | Carbon steel | ø32 to ø100 | Hard chrome plated |
| 4 | Collar | Aluminum alloy | | Clear anodized |
| 5 | Bushing | Lead bronze casting | | |
| 6 | Head cover | Aluminum alloy | | Colorless chromated |
| 7 | Guide rod | Carbon steel | | Hard chrome plated |
| 8 | Plate | Carbon steel | | Nickel plated |
| 9 | Plate mounting bolt | Carbon steel | | Nickel plated |
| 10 | Snap ring | Carbon tool steel | | Phosphate coated |
| 11 | Snap ring | Carbon tool steel | | Phosphate coated |
| 12 | Bumper A | Urethane | | |
| 13 | Bumper B | Urethane | | |
| 14 | Magnet | Synthetic rubber | | |
| 15 | Hexagon socket head taper plug | Carbon steel | | Nickel plated |
| 16 | Slide bearing | Lead bronze casting | | |
| 17 | Felt | Felt | | |
| 18 | Holder | Resin | | |
| 19 | Ball bushing | | | |
| 20 | Spacer | Aluminum alloy | | |
| 21* | Piston seal | NBR | | |

### Replacement parts: Seal kits

| Bore size (mm) | Kit No. | Contents |
|---|---|---|
| 20 | MGP20-B-PS | Kits include items 21, 22, 23, 24, 32, 33, 41 and 42 from the table above. |
| 25 | MGP25-B-PS | |
| 32 | MGP32-B-PS | |
| 40 | MGP40-B-PS | |
| 50 | MGP50-B-PS | |

* Seal kits are sets consisting of items 21 through 24, 32, 33, 41 and 42 above, and can be ordered using the kit number for each bore size.

### Parts list

| No. | Description | Material | Note |
|---|---|---|---|
| 22* | Rod seal | NBR | |
| 23* | Gasket A | NBR | |
| 24* | Gasket B | NBR | |
| 25 | Piston gasket | NBR | ø32 to ø100 only |
| 26 | Lock bolt | Carbon steel | Zinc chromated |
| 27 | Lock holder | Brass | Electroless nickel plated |
| 28 | Lock piston | Carbon steel | Nickel plated |
| 29 | Lock spring | Stainless steel | |
| 30 | Seal retainer | Carbon steel | Zinc chromated (ø80, ø100 only) |
| 31 | Bumper | Urethane | |
| 32* | Hexagon socket head cap screw | Carbon steel | Black zinc chromated |
| 33* | Hexagon socket head cap screw | Carbon steel | Nickel plated (ø50, ø63 only) |
| 34 | Cap A | Die-cast aluminum | Black coated |
| 35 | Cap B | Carbon steel | SQ treated |
| 36 | Rubber cap | Synthetic rubber | |
| 37 | M/O knob | Die-cast zinc | Black coated |
| 38 | M/O bolt | Alloy steel | Black zinc chromated |
| 39 | M/O spring | Steel wire | Chromated |
| 40 | Stopper ring | Carbon steel | Chromated |
| 41* | Lock piston seal | NBR | |
| 42* | Lock holder gasket | NBR | |

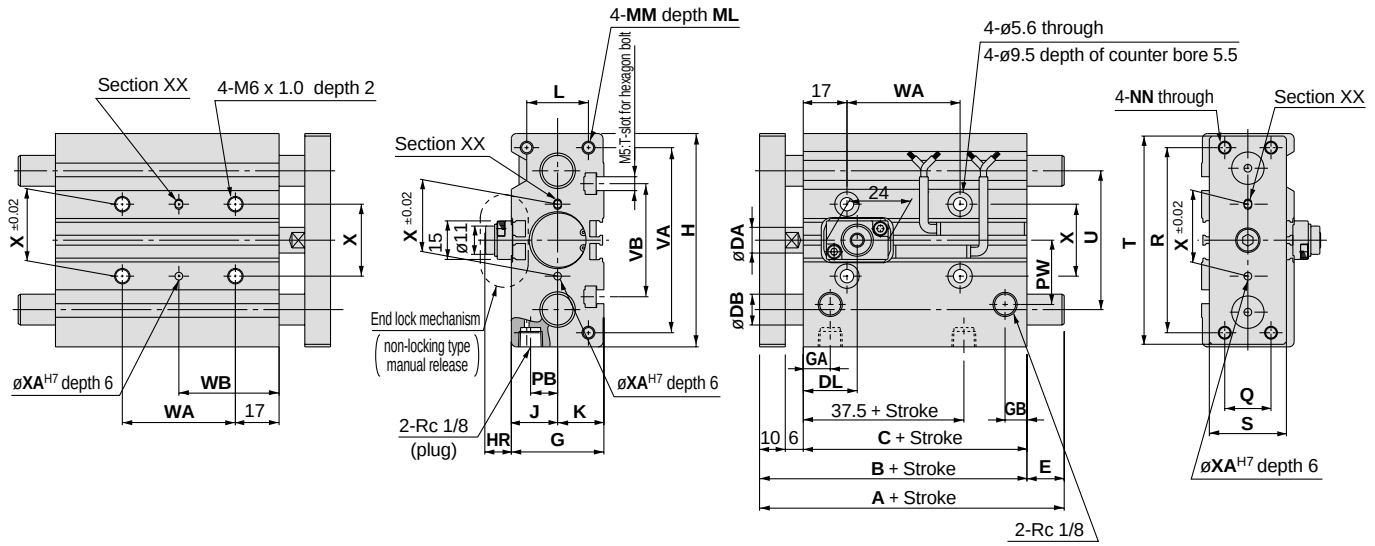
### Replacement parts: Seal kits

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 63 | MGP63-B-PS | Kits include items 21, 22, 23, 24, 32, 33, 41 and 42 from the table above. |
| 80 | MGP80-B-PS | |
| 100 | MGP100-B-PS | |

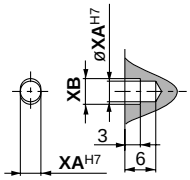
* Items 32 and 33 are not included for bores sizes 80 and 100.

# Series MGP

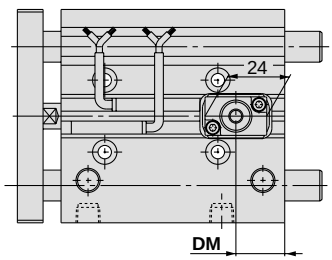
## Dimensions/ø20, ø25



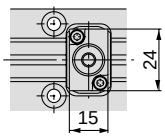

**With front lock**



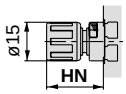

**Section XX detail**



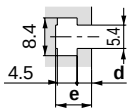

**With rear lock**




For ø25




**End lock mechanism (Locking type manual release)**




**T-slot dimensions** (mm)

| Bore size (mm) | d | e |
|---|---|---|
| **20** | 2.8 | 7.8 |
| **25** | 3 | 8.2 |

Refer to "Manufacture of Intermediate Strokes" on page 36 for intermediate strokes.

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | DA | G | GA | GB | H | J | K | L | MM | ML | NN | PB | PW | Q | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 25, 50, 75, 100, 125, 150, 175 | 78 | 62 | 10 | 36 | 10.5 | 8.5 | 83 | 18 | 18 | 24 | M5 x 0.8 | 13 | M5 x 0.8 | 10.5 | 25 | 18 | 70 |
| **25** | 200, 250, 300, 350, 400 | 78.5 | 62.5 | 12 | 42 | 11.5 | 9 | 93 | 21 | 21 | 30 | M6 x 1.0 | 15 | M6 x 1.0 | 13.5 | 28.5 | 26 | 78 |

(mm)

| Bore size (mm) | S | T | U | VA | VB | WA | | | | WB | | | | X | XA | XB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 75st or less | Over 75st to 175st | Over 175st to 250st | Over 250st | 75st or less | Over 75st to 175st | Over 175st to 250st | Over 250st | | | |
| **20** | 30 | 81 | 54 | 72 | 44 | 44 | 120 | 200 | 300 | 39 | 77 | 117 | 167 | 28 | 3 | 3.5 |
| **25** | 38 | 91 | 64 | 82 | 50 | 44 | 120 | 200 | 300 | 39 | 77 | 117 | 167 | 34 | 4 | 4.5 |

### End lock mechanism dimensions (mm)

| Bore size (mm) | DL | DM | HR | HN |
|---|---|---|---|---|
| **20** | 21 | 19 | 10.5 | 22 |
| **25** | 26.5 | 16 | 8 | 19.5 |

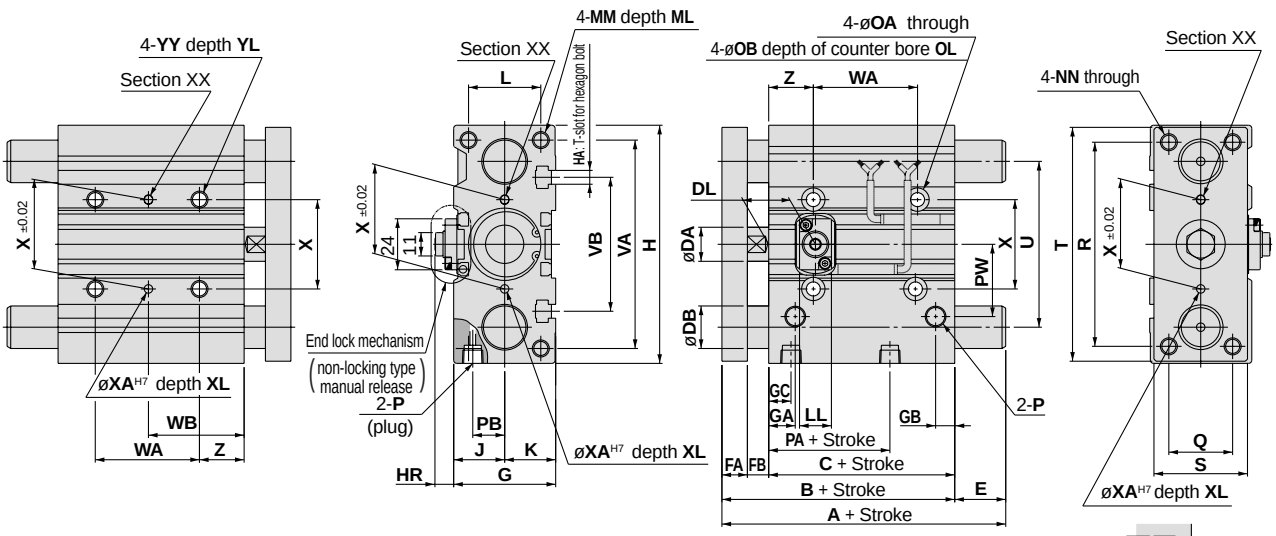
### MGPM (slide bearing)/Dimensions A, DB, E (mm)

| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 75st or less | Over 75st to 175st | Over 175st | | 75st or less | Over 75st to 175st | Over 175st |
| **20** | 78 | 84.5 | 122 | 12 | 0 | 6.5 | 44 |
| **25** | 78.5 | 85 | 122 | 16 | 0 | 6.5 | 43.5 |

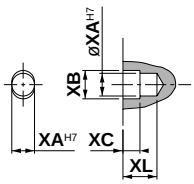
### MGPL (ball bushing)/Dimensions A, DB, E (mm)

| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 25st or less | Over 25st to 175st | Over 175st | | 25st or less | Over 25st to 175st | Over 175st |
| **20** | 80 | 104 | 122 | 10 | 2 | 26 | 44 |
| **25** | 85.5 | 104.5 | 122 | 13 | 7 | 26 | 43.5 |

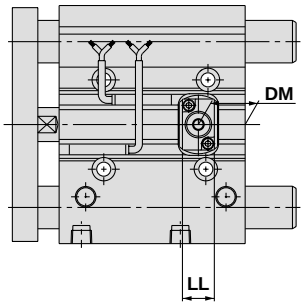
# Dimensions/ø32 to ø63



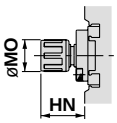

With front lock



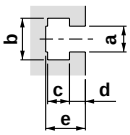

Section XX detail




With rear lock




End lock mechanism
(Locking type manual release)




T-slot dimensions (mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 32 | 6.5 | 10.5 | 5.5 | 3.5 | 9.5 |
| 40 | 6.5 | 10.5 | 5.5 | 4 | 11 |
| 50 | 8.5 | 13.5 | 7.5 | 4.5 | 13.5 |
| 63 | 11 | 17.8 | 10 | 7 | 18.5 |

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | DA | FA | FB | G | GA | GB | GC | H | HA | J | K | L | MM | ML | NN | OA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 25, 50, 75, 100 | 84.5 | 62.5 | 16 | 12 | 10 | 48 | 12.5 | 9 | 12.5 | 112 | M6 | 24 | 24 | 34 | M8 x 1.25 | 20 | M8 x 1.25 | 6.6 |
| 40 | 125, 150, 175 | 91 | 69 | 16 | 12 | 10 | 54 | 14 | 10 | 14 | 120 | M6 | 27 | 27 | 40 | M8 x 1.25 | 20 | M8 x 1.25 | 6.6 |
| 50 | 200, 250, 300 | 97 | 69 | 20 | 16 | 12 | 64 | 14 | 11 | 12 | 148 | M8 | 32 | 32 | 46 | M10 x 1.5 | 22 | M10 x 1.5 | 8.6 |
| 63 | 350, 400 | 102 | 74 | 20 | 16 | 12 | 78 | 16.5 | 13.5 | 16.5 | 162 | M10 | 39 | 39 | 58 | M10 x 1.5 | 22 | M10 x 1.5 | 8.6 |

(mm)

| Bore size (mm | OB | OL | P | PA | PB | PW | Q | R | S | T | U | VA | VB | WA | | | | WB | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | 75st or less | Over 75st to 175st | Over 175st to 275 st | Over 275st | 75st or less | Over 75st to 175st | Over175st to 275 st | Over 275st |
| 32 | 11 | 7.5 | Rc 1/8 | 32 | 15 | 34 | 30 | 96 | 44 | 110 | 78 | 98 | 63 | 48 | 124 | 200 | 300 | 45 | 83 | 121 | 171 |
| 40 | 11 | 7.5 | Rc 1/8 | 38 | 18 | 38 | 30 | 104 | 44 | 118 | 86 | 106 | 72 | 48 | 124 | 200 | 300 | 46 | 84 | 122 | 172 |
| 50 | 14 | 9 | Rc 1/4 | 34 | 21.5 | 47 | 40 | 130 | 60 | 146 | 110 | 130 | 92 | 48 | 124 | 200 | 300 | 48 | 86 | 124 | 174 |
| 63 | 14 | 9 | Rc 1/4 | 39 | 28 | 55 | 50 | 130 | 70 | 158 | 124 | 142 | 110 | 52 | 128 | 200 | 300 | 50 | 88 | 124 | 174 |

(mm)

| Bore size (mm) | X | XA | XB | XC | XL | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|
| 32 | 42 | 4 | 4.5 | 3 | 6 | M8 x 1.25 | 16 | 21 |
| 40 | 50 | 4 | 4.5 | 3 | 6 | M8 x 1.25 | 16 | 22 |
| 50 | 66 | 5 | 6 | 4 | 8 | M10 x 1.5 | 20 | 24 |
| 63 | 80 | 5 | 6 | 4 | 8 | M10 x 1.5 | 20 | 24 |

## MGPM (slide bearing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | DB | E | | |
|---|---|---|---|---|---|---|---|
| | 25st or less | Over 25st to 175st | Over 175st | | 25st or less | Over 25st to 175st | Over 175st |
| 32 | 97 | 102 | 140 | 20 | 12.5 | 17.5 | 55.5 |
| 40 | 97 | 102 | 140 | 20 | 6 | 11 | 49 |
| 50 | 106.5 | 118 | 161 | 25 | 9.5 | 21 | 64 |
| 63 | 106.5 | 118 | 161 | 25 | 4.5 | 16 | 59 |

## End lock mechanism

(mm)

| Bore size (mm) | DL | DM | HR | HN (max.) | LL | MO |
|---|---|---|---|---|---|---|
| 32 | 22 | 22 | 9.5 | 21 | 15 | 15 |
| 40 | 26 | 23 | 11.5 | 25.5 | 21 | 19 |
| 50 | 24 | 23 | 13 | 27 | 21 | 19 |
| 63 | 25 | 25.5 | 11 | 25 | 21 | 19 |

## MGPL (ball bushing)/Dimensions A, DB, E

(mm)

| Bore size (mm) | A | | | | DB | E | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 25st or less | Over 25st to 75st | Over 75st to 175st | Over 175st | | 25st or less | Over 25st to 75st | Over 75st to 175st | Over 175st |
| 32 | 84.5 | 98 | 118 | 140 | 16 | 0 | 13.5 | 33.5 | 55.5 |
| 40 | 91 | 98 | 118 | 140 | 16 | 0 | 7 | 27 | 49 |
| 50 | 97 | 114 | 134 | 161 | 20 | 0 | 17 | 37 | 64 |
| 63 | 102 | 114 | 134 | 161 | 20 | 0 | 12 | 32 | 59 |

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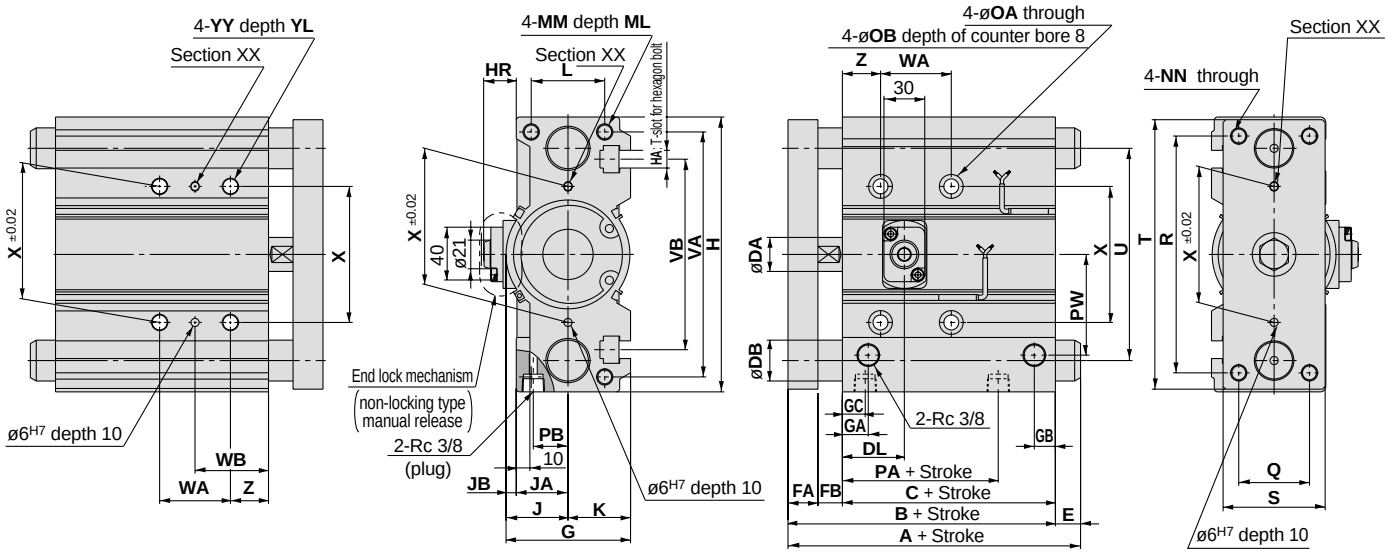
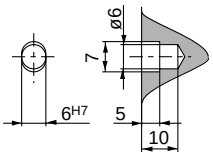
# Series MGP

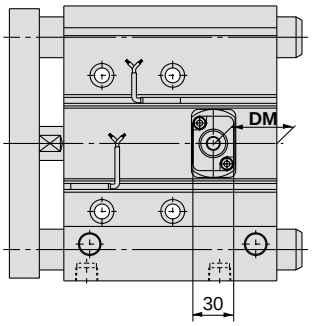
## Dimensions/Ø80, ø100



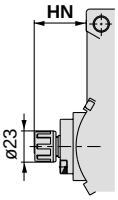

With front lock



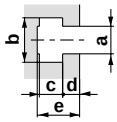

Section XX detail




With rear lock




End lock mechanism
(Locking type manual release)




T-slot dimensions

(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 80 | 13.3 | 20.3 | 12 | 8 | 22.5 |
| 100 | 15.3 | 23.3 | 13.5 | 10 | 30 |

(mm)

| Bore size (mm) | Standard stroke (mm) | B | C | DA | FA | FB | G | GA | GB | GC | H | HA | J | JA | JB | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 25, 50, 75, 100, 125, 150, 175 | 146.5 | 106.5 | 25 | 22 | 18 | 91.5 | 19 | 15.5 | 14.5 | 202 | M12 | 45.5 | 38 | 7.5 | 46 | 54 |
| 100 | 200, 250, 300, 350, 400 | 166 | 116 | 30 | 25 | 25 | 111.5 | 23 | 19 | 18 | 240 | M14 | 55.5 | 45 | 10.5 | 56 | 62 |

(mm)

| Bore size (mm) | MM | ML | NN | OA | OB | PA | PB | PW | Q | R | S | T | U | VA | VB | WA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | 50st or less | Over 50st to 150st | Over 150st to 250st | Over 250st |
| 80 | M12 x 1.75 | 25 | M12 x 1.75 | 10.6 | 17.5 | 64.5 | 25.5 | 74 | 52 | 174 | 75 | 198 | 156 | 180 | 140 | 52 | 128 | 200 | 300 |
| 100 | M14 x 2.0 | 31 | M14 x 2.0 | 12.5 | 20 | 67.5 | 32.5 | 89 | 64 | 210 | 90 | 236 | 188 | 210 | 166 | 72 | 148 | 220 | 320 |

(mm)

| Bore size (mm) | WB | | | | X | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|
| | 50st or less | Over 50st to 150st | Over 150st to 250st | Over 250st | | | | |
| 80 | 54 | 92 | 128 | 178 | 100 | M12 x 1.75 | 24 | 28 |
| 100 | 47 | 85 | 121 | 171 | 124 | M14 x 2.0 | 28 | 11 |

### End lock mechanism dimensions (mm)

| Bore size (mm) | DL | DM | HR | HN |
|---|---|---|---|---|
| 80 | 45.5 | 40.5 | 24 | 38.5 |
| 100 | 49 | 43.5 | 26.5 | 41 |

### MGPM (slide bearing)/Dimensions/A, DB, E (mm)

| Bore size (mm) | A | | DB | E | |
|---|---|---|---|---|---|
| | 150st or less | Over 150st | | 150st or less | Over 150st |
| 80 | 146.5 | 193 | 30 | 0 | 46.5 |
| 100 | 166 | 203 | 36 | 0 | 37 |

### MGPL (ball bushing)/Dimensions A, DB, E (mm)

| Bore size (mm) | A | | DB | E | |
|---|---|---|---|---|---|
| | 150st or less | Over 150st | | 150st or less | Over 150st |
| 80 | 160 | 193 | 25 | 13.5 | 46.5 |
| 100 | 180 | 203 | 30 | 14 | 37 |

# Compact Guide Cylinder: Heavy Duty Guide Rod Type

# Series MGPS

## ø50, ø80



## How to Order

**Compact Guide Cylinder** **MGP S 50 — 50 — Z73 □**

**Compact guide cylinder**

**Heavy duty guide rod type**

**Bore size**

| | |
|---|---|
| **50** | 50mm |
| **80** | 80mm |

**Cylinder stroke (mm)**
Refer to the standard stroke table on page 44.

**Auto switch type**

| | |
|---|---|
| **Nil** | Without auto switch (built-in magnet cylinder) |

∗ Refer to the table below for auto switch model numbers.

**Number of auto switches**

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

## Applicable auto switches

| Type | Special function | Electrical entry | Indicator light | Wiring (output) | Load voltage | | | Auto switch model | | Lead wire length (m) Note 1) | | | Applicable load | | Detailed specifications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | DC | | AC | Electrical entry direction | | 0.5 (Nil) | 3 (L) | 5 (Z) | | | |
| | | | | | | | | Perpendicular | In-line | | | | | | |
| Reed switch | — | Grommet | Yes | 3 wire | — | 5V | — | — | **Z76** | ● | ● | — | IC circuit | — | P. 59 |
| | | | | 2 wire | 24V | 12V | 100V | — | **Z73** | ● | ● | ● | — | Relay, PLC | |
| | | | No | | | 5V 12V | 100V or less | — | **Z80** | ● | ● | — | IC circuit | | |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V 12V | — | **Y69A** | **Y59A** | ● | ● | ○ | IC circuit | Relay, PLC | P. 60 |
| | | | | 3 wire (PNP) | | | | **Y7PV** | **Y7P** | ● | ● | ○ | | | |
| | | | | 2 wire | | 12V | | **Y69B** | **Y59B** | ● | ● | ○ | — | | |
| | Diagnostic indication (2 colour indicator) | | | 3 wire (NPN) | | 5V 12V | | **Y7NWV** | **Y7NW** | ● | ● | ○ | IC circuit | | P. 61 |
| | | | | 3 wire (PNP) | | | | **Y7PWV** | **Y7PW** | ● | ● | ○ | | | |
| | | | | 2 wire | | 12V | | **Y7BWV** | **Y7BW** | ● | ● | ○ | — | | |
| | Water resistant (2 colour indicator) | | | | | | | — | **Y7BA** | — | ● | ○ | | | P. 62 |
| | Magnetic field resistant (2 colour indicator) | | | | | — | | — | **P5DW** | — | ● | ● | | | P. 63 |

Note 1) Lead wire symbols 0.5m ..... Nil (Example) Y69B
3m ..... L Y69BL
5m ..... Z Y69BZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.

# Series MGPS

## Specifications

| | |
|---|---|
| Action | Double acting |
| Fluid | Air |
| Proof pressure | 1.5MPa |
| Maximum operating pressure | 1.0MPa |
| Minimum operating pressure | 0.1MPa |
| Ambient and fluid temperature | –10 to 60°C (with no freezing) |
| Piston speed | 50 to 400mm/s |
| Cushion | Rubber bumper at both ends |
| Lubrication | Non-lube |
| Stroke length tolerance | $^{+1.5}_{0}$ mm |

## Standard Strokes

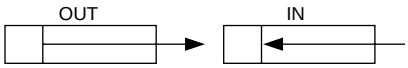
| Bore size (mm) | Standard stroke (mm) |
|---|---|
| **50, 80** | 25, 50, 75, 100, 125, 150, 175, 200 |

## Manufacture of Intermediate Strokes

| | |
|---|---|
| **Modification method** | Spacer installation type<br>Spacers are installed in a standard stroke cylinder.<br>Available in 5mm stroke increments |
| **Part number** | Refer to page 43 for standard part numbers and ordering procedure. |
| **Applicable stroke (mm)** | 5 to 195 |
| **Example** | Part no.: **MGPS50—35**<br>A spacer 15mm in width is installed in a **MGPS50—50**.<br>C dimension is 94mm. |

Note 1) The minimum stroke for mounting auto switches is 10mm or more for two switches, and 5mm or more for one switch.
Note 2) Intermediate strokes (in 1mm increments) with a special body are available by special order.

## Theoretical Output




(N)

| Bore size (mm) | Rod size (mm) | Operating direction | Piston area (mm²) | Operating pressure (MPa) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| **50** | 20 | OUT | 1963 | 393 | 589 | 785 | 982 | 1178 | 1374 | 1571 | 1767 | 1963 |
| | | IN | 1649 | 330 | 495 | 660 | 825 | 990 | 1155 | 1319 | 1484 | 1649 |
| **80** | 25 | OUT | 5027 | 1005 | 1508 | 2011 | 2513 | 3016 | 3519 | 4021 | 4524 | 5027 |
| | | IN | 4536 | 907 | 1361 | 1814 | 2268 | 2721 | 3175 | 3629 | 4082 | 4536 |

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

## Weights

(kg)

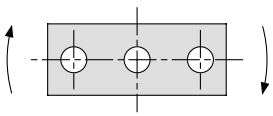
| Bore size (mm) | Model | Standard stroke (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| **50** | **MGPS50** | 3.90 | 4.68 | 5.74 | 6.52 | 7.30 | 8.08 | 8.86 | 9.64 |
| **80** | **MGPS80** | 9.21 | 10.7 | 13.0 | 14.5 | 15.9 | 17.9 | 18.9 | 20.3 |

### Auto switch mounting bracket part no. for D-P5DW

| Bore size (mm) | Mounting bracket part no. | Notes |
|---|---|---|
| 50, 80 | BMG1-040 | Switch mounting bracket<br>Hexagon socket head cap screw (M2.5 x 0.45 x 8ℓ) 2 pcs.<br>Hexagon socket head cap screw (M3 x 0.5 x 16ℓ) 2 pcs.<br>Spring washer (nominal size 3) |

## Allowable Rotational Torque of Plate

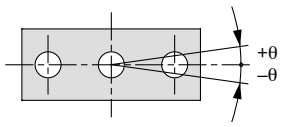
Torque: T (N·m)



T (N·m)

| Bore size (mm) | Model | Standard stroke (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| **50** | **MGPS50** | 15 | 12 | 16 | 15 | 13 | 12 | 11 | 9.8 |
| **80** | **MGPS80** | 49 | 41 | 51 | 45 | 41 | 38 | 35 | 32 |

## Non-rotating Accuracy of Plate

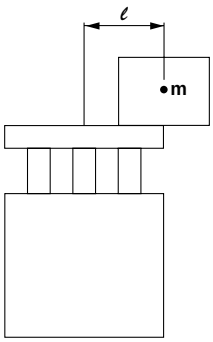
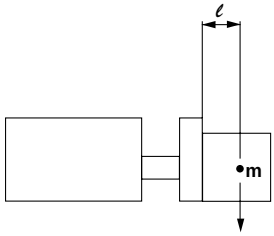



For non-rotating accuracy θ without load, use a value no more than the values in the table as a guide.

| Bore size (mm) | Model | Non-rotating accuracy θ |
|---|---|---|
| **50** | **MGPS50** | ±0.05° |
| **80** | **MGPS80** | ±0.04° |

# Series MGPS
# Model Selection

## Selecting Conditions

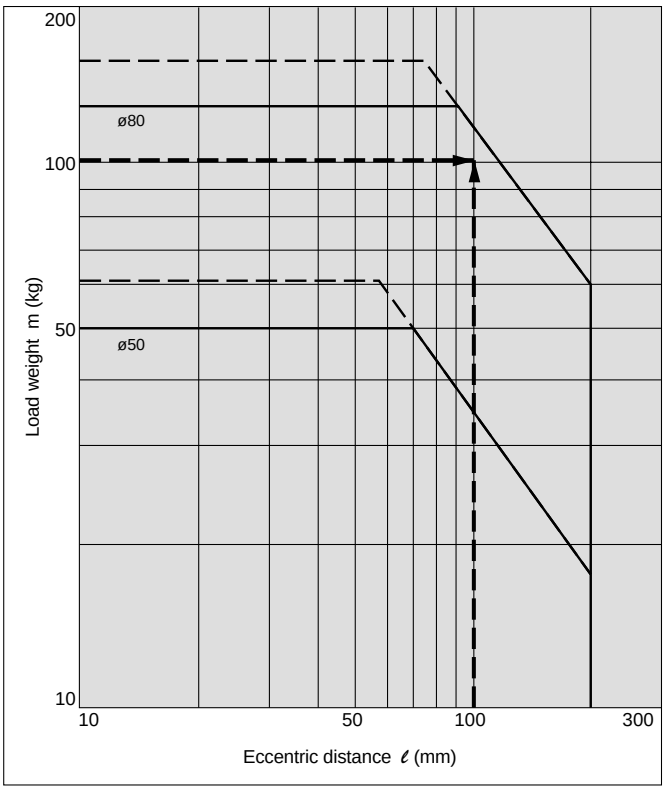
| | Vertical | | Horizontal | |
|---|---|---|---|---|
| Mounting orientation |  | |  | |
| Maximum speed (mm/s) | 200 | 400 | 200 | 400 |
| Graph (Slide bearing type) | 1, 2 | 3, 4 | 5, 6 | 7, 8 |

## Selection Example 1 (Vertical Mounting)

**Selecting conditions**
- **Mounting: Vertical**
- **Stroke: 50mm**
- **Maximum speed: 200mm/s**
- **Load weight: 100kg**
- **Eccentric distance: 100mm**

**Find the point of intersection for the load weight of 100kg and the eccentric distance of 100mm on graph 1, based on vertical mounting, 50mm stroke, and the speed of 200mm/s.**
**→MGPS80-50 is selected.**

**1 50mm stroke or less V = 200mm/s**

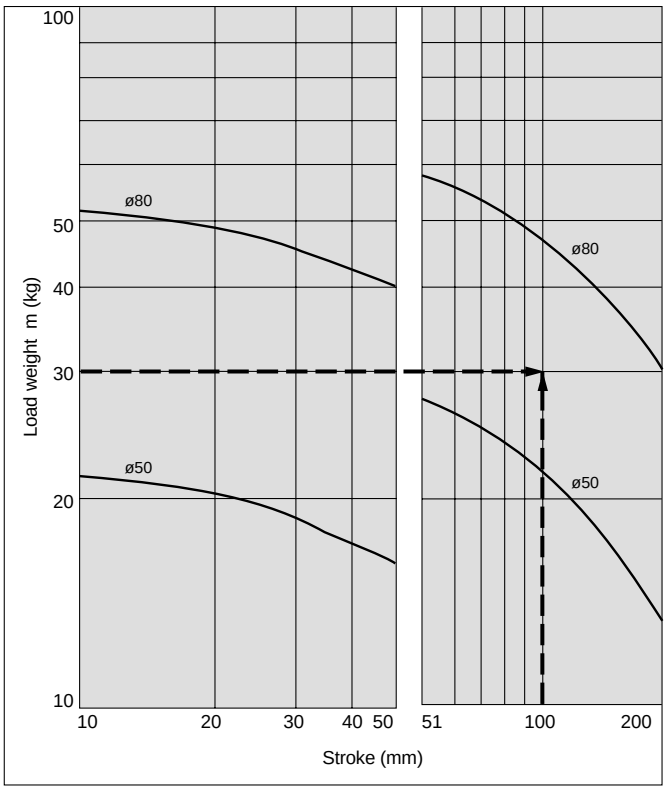



## Selection Example 2 (Horizontal Mounting)

**Selecting conditions**
- **Mounting: Horizontal**
- **Distance between plate and load center of gravity: 50mm**
- **Maximum speed: 200mm/s**
- **Load weight: 30kg**
- **Stroke: 100mm**

**Find the point of intersection for the load weight of 30kg and stroke of 100mm on graph 5, based on horizontal mounting, the distance of 50mm between the plate and load center of gravity, and the speed of 200mm/s.**
**→MGPS80-100 is selected.**

**5 ℓ = 50mm V= 200mm/s**





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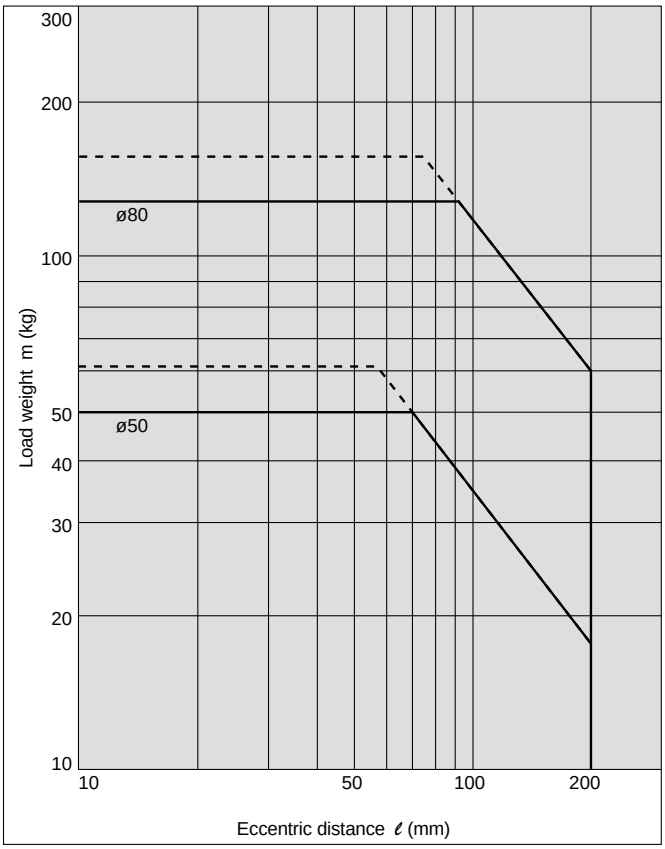
# Series MGPS

## Vertical Mounting Slide Bearing

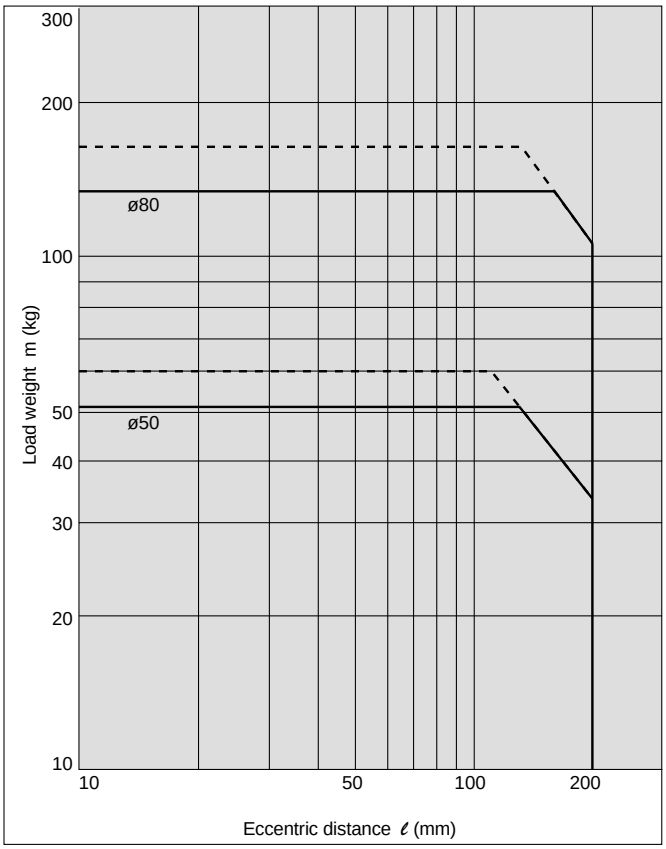
Operating pressure: 0.4MPa
Operating pressure: 0.5MPa or more

### MGPS50, 80

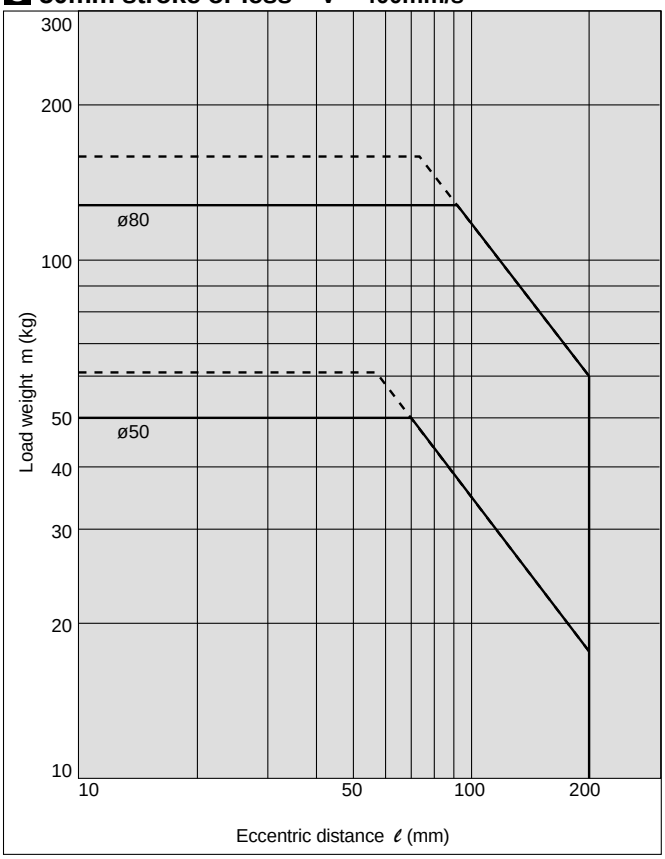
**1 50mm stroke or less V = 200mm/s**



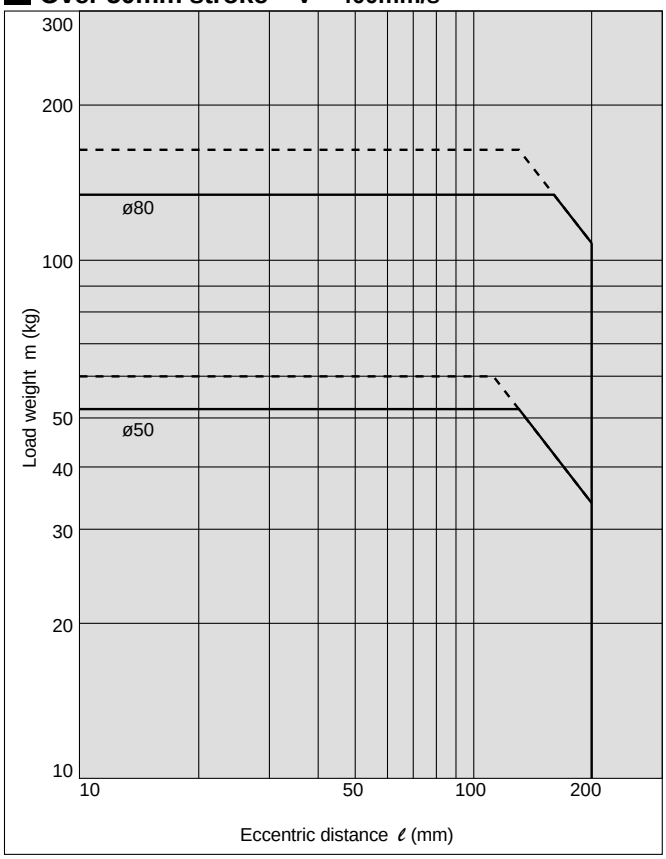

**2 Over 50mm stroke V = 200mm/s**




**3 50mm stroke or less V = 400mm/s**




**4 Over 50mm stroke V = 400mm/s**



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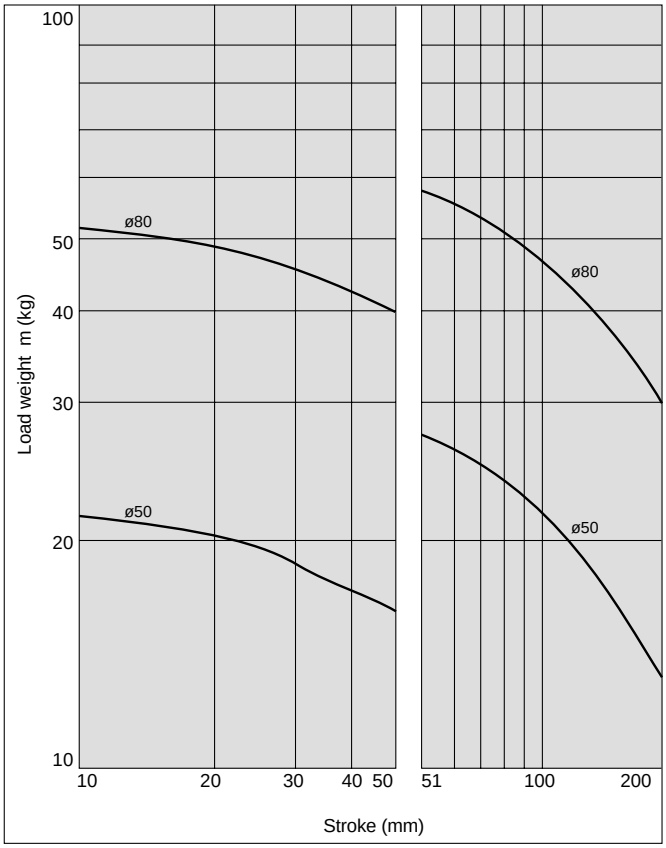
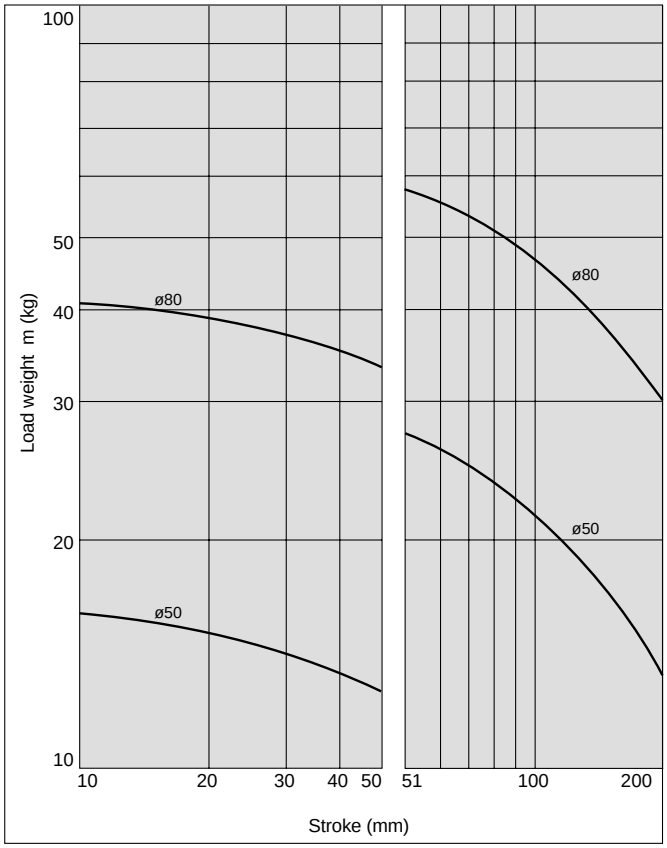
## Horizontal Mounting Slide Bearing

### MGPS50, 80

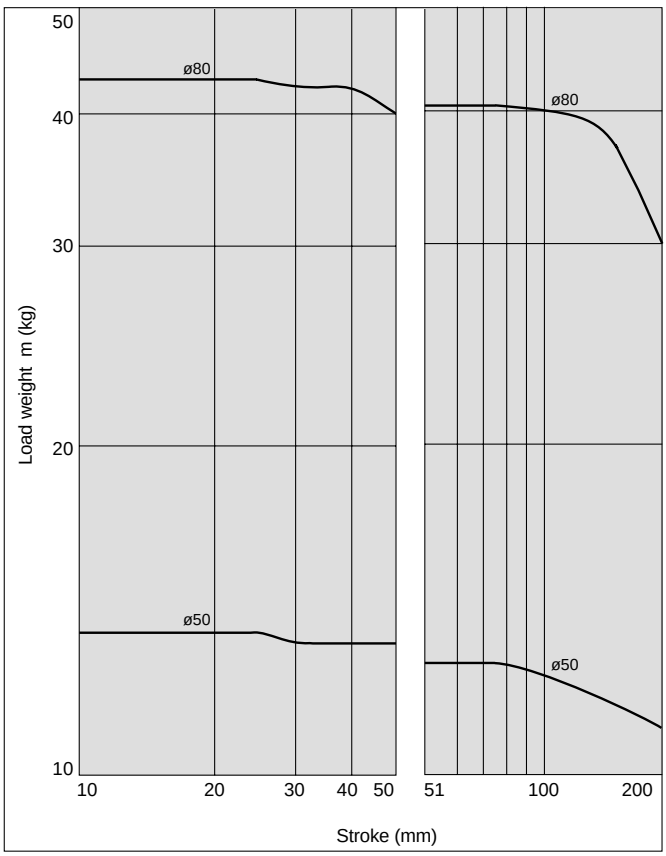
**5** $\ell$ = 50mm V = 200mm/s



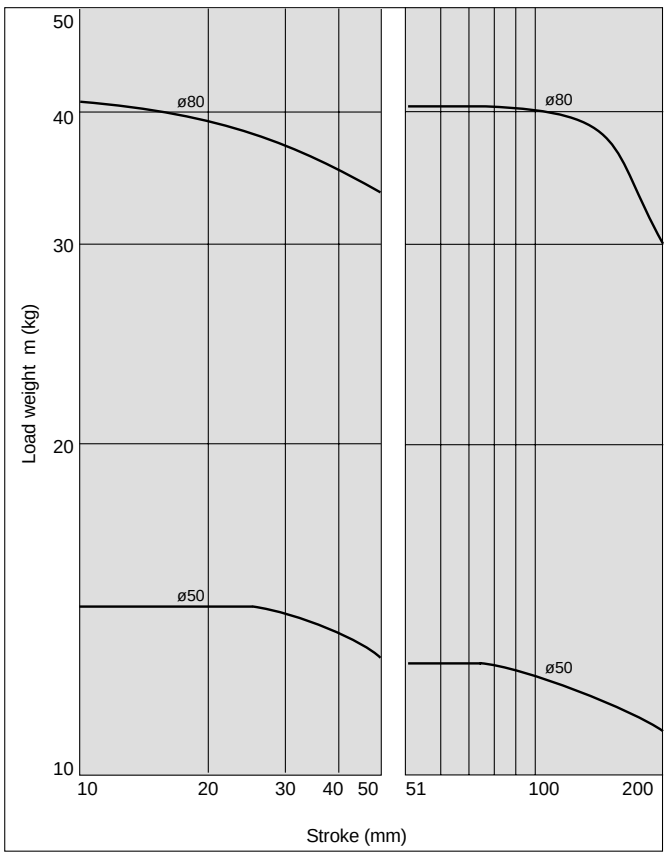

**6** $\ell$ = 100mm V = 200mm/s




**7** $\ell$ = 50mm V = 400mm/s




**8** $\ell$ = 100mm V = 400mm/s





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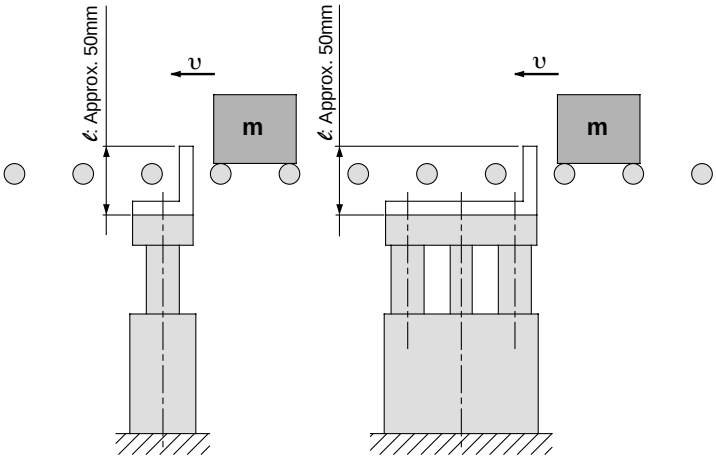
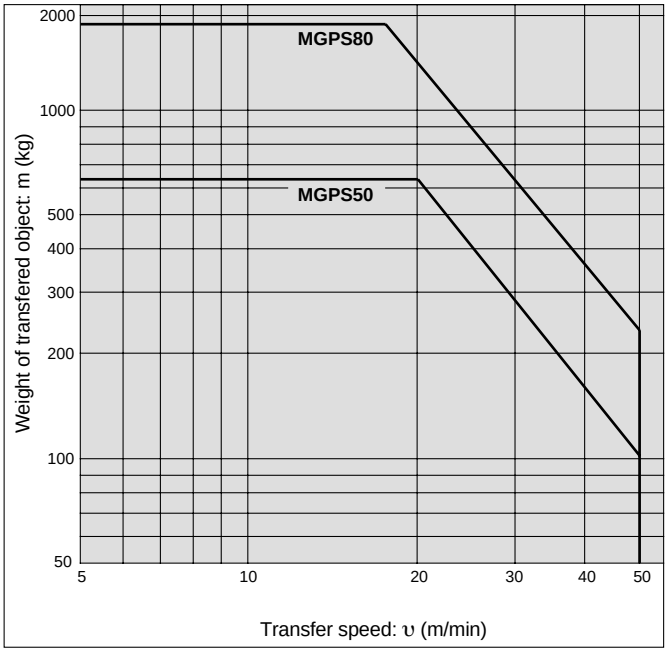
# Series MGPS

## Operating Range when Used as Stopper




∗ When selecting a model with a longer ℓ dimension, be sure to choose a bore size which is sufficiently large.

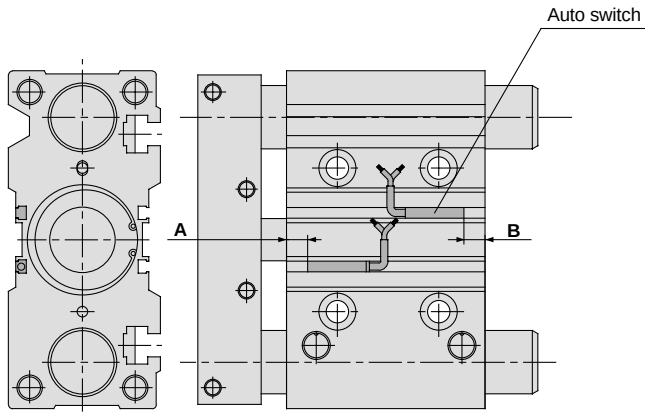



## ⚠Caution

**Handling precautions**

Note) When using as a stopper, select a model with a stroke of 50mm or less.

## Auto Switches/Proper Mounting Position for Stroke End Detection



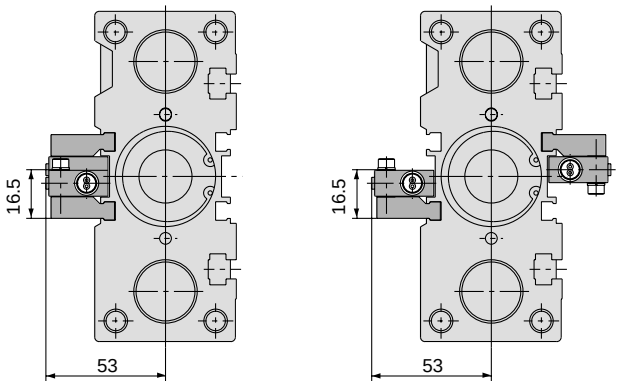

**Proper mounting position** (mm)

| Bore size (mm) | A | B |
|---|---|---|
| **50** | 7.5 | 11.5 |
| **80** | 13 | 37 |

Note ) Minimum mountable strokes for auto switch are 10mm or more for two switches, and 5mm or more for one switch.

### For D-P5DW

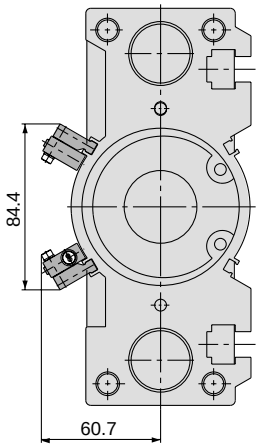
**ø50**




**For 25mm stroke**

* For bore sizes ø40 through 63 with two switches, one switch is mounted on each side.

**ø80**




## Auto Switch Mounting

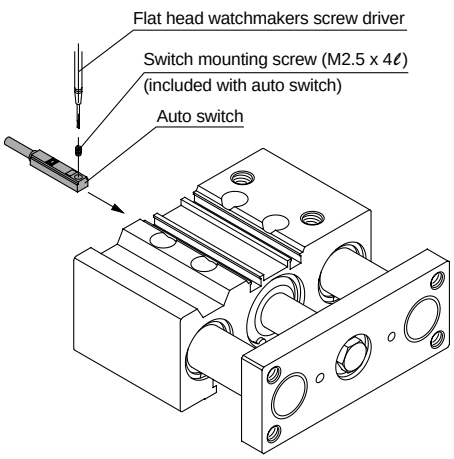
# ⚠Caution

**Auto switch mounting tool**

• When tightening the auto switch mounting screw (included with auto switch), use a watchmakers screw driver with a handle about 5 to 6mm in diameter.

**Tightening torque**

• Tighten with a torque of 0.05 to 0.1N·m. As a rule, it should be turned about 90° past the point at which tightening can be felt.




### For D-P5DW

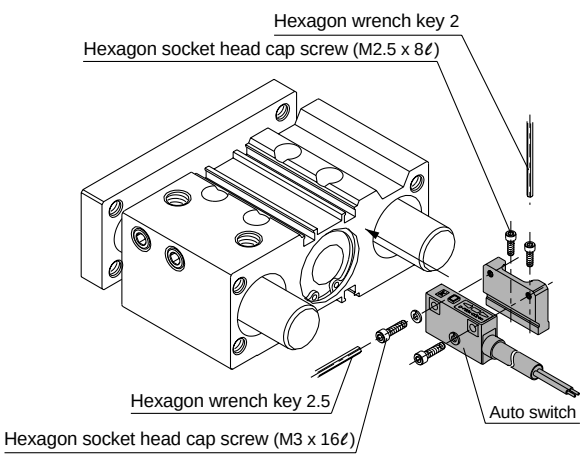
# ⚠Caution

**Auto switch mounting tool**

• When tightening hexagon socket head cap screws of the auto switch, use hexagon wrench key 2 or 2.5 with the appropriate screws.

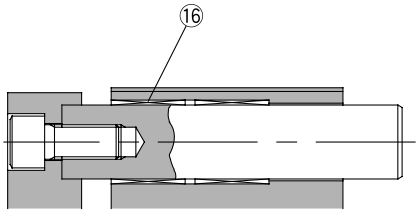
**Tightening torque**

• Tighten M2.5 screws with a torque of about 0.3 to 0.5N·m, and M3 screws with a torque of about 0.5 to 0.7N·m.

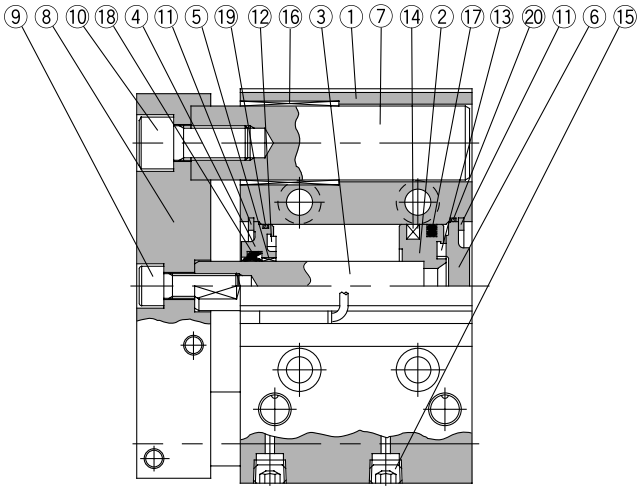


# Series MGPS

## Construction




Over 50mm stroke




50mm stroke or less

### Parts list

| No. | Description | Material | Note | |
|---|---|---|---|---|
| 1 | Body | Aluminum alloy | Hard anodized | |
| 2 | Piston | Aluminum alloy | Chromated | |
| 3 | Piston rod | Carbon steel | Hard chrome plated | |
| 4 | Collar | Aluminum alloy casting | Coated | |
| 5 | Bushing | Lead bronze casting | | |
| 6 | Head cover | Aluminum alloy | ø50 | Colorless chromated |
| | | | ø80 | Coated |
| 7 | Guide rod | Carbon steel | Hard chrome plated | |
| 8 | Plate | Carbon steel | Nickel plated | |
| 9 | Plate mounting bolt A | Carbon steel | Nickel plated | For piston rod |
| 10 | Plate mounting bolt B | Carbon steel | Nickel plated | For guide rod |

### Parts list

| No. | Description | Material | Note |
|---|---|---|---|
| 11 | Snap ring | Carbon tool steel | Phosphate coated |
| 12 | Bumper A | Urethane | |
| 13 | Bumper B | Urethane | |
| 14 | Magnet | Synthetic rubber | |
| 15 | Hexagon socket head taper plug | Carbon steel | Nickel plated |
| 16 | Slide bearing | Lead bronze casting | |
| 17* | Piston seal | NBR | |
| 18* | Rod seal | NBR | |
| 19* | Gasket A | NBR | |
| 20* | Gasket B | NBR | |

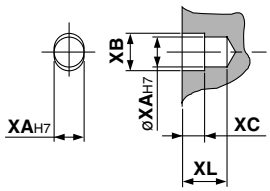
### Replacement parts: Seal kits

| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| 50 | MGP50-PS | Kits include items 17, 18, 19 and 20 from the table above. |
| 80 | MGP80-PS | |

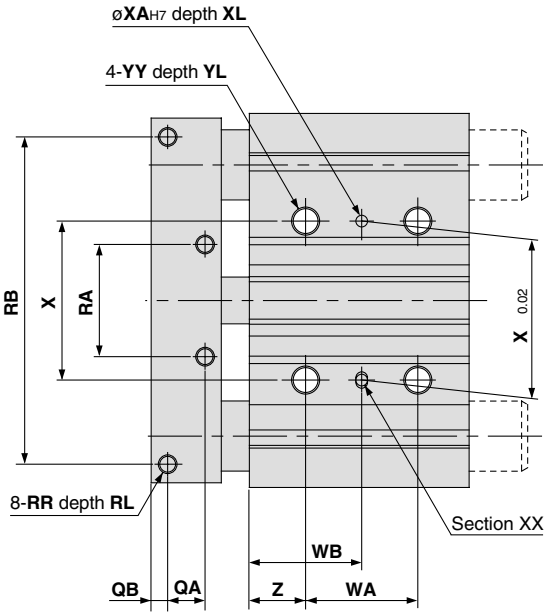
* Seal kits are sets consisting of items 17 through 20 above, and can be ordered using the kit number for each bore size.

## Dimensions

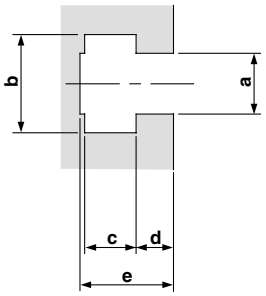
### MGPS50/80




Section XX detail

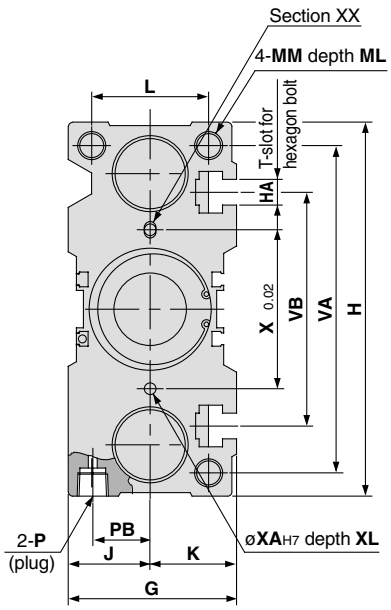


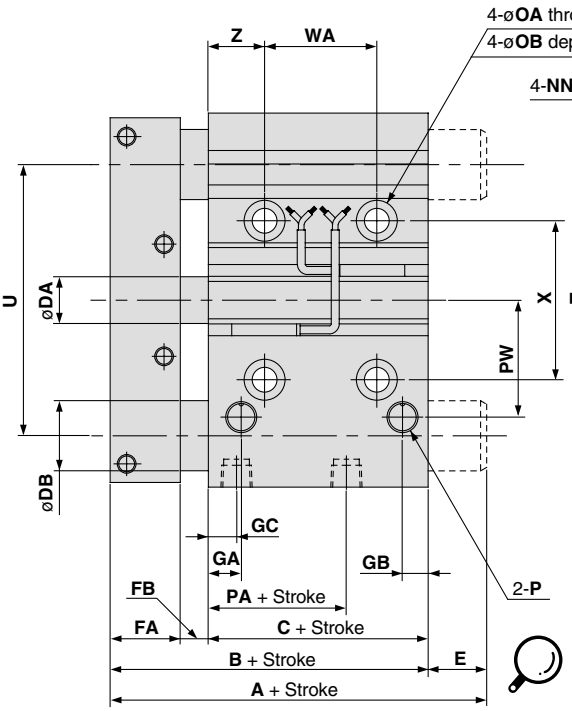

**T-slot dimensions**

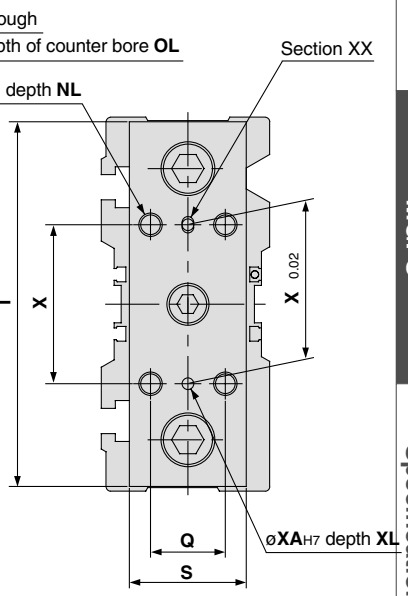



(mm)

| Bore size (mm) | T-slot dimensions | | | | |
|---|---|---|---|---|---|
| | a | b | c | d | e |
| 50 | 11 | 17.8 | 10 | 6 | 17.5 |
| 80 | 13.3 | 20.3 | 12 | 8 | 22.5 |




Refer to "Manufacture of Intermediate Strokes" on page 44 for intermediate strokes other than the standard strokes.

### Dimensions

(mm)

| Bore size (mm) | Standard stroke (mm) | A | | B | C | DA | DB | E | | FA | FB | G | GA | GB | GC | H | HA | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 25, 50st | Over 50st | | | | | 25, 50st | Over 50st | | | | | | | | | | | |
| 50 | 25, 50, 75, 100, 125, 150, 175, 200 | 86 | 110 | 86 | 44 | 20 | 30 | 0 | 24 | 29.5 | 12.5 | 72 | 14 | 11 | 12 | 160 | M10 | 35 | 37 | 50 |
| 80 | | 118 | 151 | 118 | 65 | 25 | 45 | 0 | 33 | 35 | 18 | 95 | 19 | 24 | 14.5 | 242 | M12 | 47 | 48 | 66 |

| Bore size (mm) | Standard stroke (mm) | MM | ML | NN | NL | OA | OB | OL | P | PA | PB | PW | Q | QA | QB | RA | RB | RR | RL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 25, 50, 75, 100, 125, 150 ,175, 200 | M12 x 1.75 | 20 | M10 x 1.5 | 20 | 10.6 | 17.5 | 13 | Rc 1/4 | 9 | 24.5 | 50 | 32 | 16 | 7 | 48 | 140 | M8 x 1.25 | 14 |
| 80 | | M16 x 2 | 32 | M12 x 1.75 | 24 | 12.5 | 20 | 17.5 | Rc 3/8 | 14.5 | 29 | 77 | 40 | 18 | 9 | 80 | 200 | M10 x 1.5 | 20 |

| Bore size (mm) | Standard stroke (mm) | S | T | U | VA | VB | WA | | | WB | | | X | XA | XB | XC | XL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 25st | 50, 75, 100st | Over 100st | 25st | 50, 75, 100st | Over 100st | | | | | |
| 50 | 25, 50, 75, 100, 125, 150, 175, 200 | 50 | 156 | 116 | 140 | 100 | 24 | 48 | 124 | 36 | 48 | 86 | 68 | 5 | 6 | 4 | 8 |
| 80 | | 65 | 228 | 170 | 214 | 138 | 28 | 52 | 128 | 42 | 54 | 92 | 100 | 6 | 7 | 5 | 10 |

| Bore size (mm) | Standard stroke (mm) | YY | YL | Z |
|---|---|---|---|---|
| 50 | 25, 50, 75, 100, 125, 150, 175, 200 | M12 x 1.75 | 24 | 24 |
| 80 | | M14 x 2 | 28 | 28 |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# Series MGP
# Order Made Specifications

**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

| | Order made specification | Symbol |
|---|---|---|
| ① | Intermediate stroke (special body type) | **-XB10** |
| ② | With air cushion/Intermediate stroke (spacer installed type) | **-XC19** |
| ③ | Heat resistant cylinder | **-XB6** |
| ④ | Low speed cylinder | **-XB13** |
| ⑤ | Fluoro rubber seal | **-XC22** |

| | Order made specification | Symbol |
|---|---|---|
| ⑥ | With heavy duty scraper | **-XC4** |
| ⑦ | With coil scraper | **-XC35** |
| ⑧ | Adjustable stroke cylinder/Adjustable extension type | **-XC8** |
| ⑨ | Adjustable stroke cylinder/Adjustable retraction type | **-XC9** |
| ⑩ | Stainless steel used for piston rod, plate, etc. | **-XC6** |

## ① Intermediate Strokes (Special Body Type) -XB10

MGP M/L | Bore size | Stroke | XB10

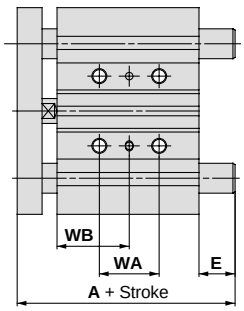
Intermediate stroke

When using an intermediate stroke, the overall length of the cylinder can be shortened by using a special body without the installation of spacers.

### Stroke ranges

| Bore size (mm) | Stroke range (mm) |
|---|---|
| 12, 16 | 10 to 250 |
| 20, 25 | 20 to 400 |
| 32, 40, 50, 63, 80, 100 | 25 to 400 |

* Specifications other than the stroke range are the same as standard products.




### Dimensions

**MGPM, MGPL-XB10/Dimensions WA, WB** (mm)

| Bore size (mm) | Standard stroke (mm) | WA | | | | WB | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 10 to 39st | 40 to 100st | 101 to 200st | 201 to 250st | 10 to 39st | 40 to 100st | 101 to 200st | 201 to 250st |
| **12** | 10 to 250 | 20 | 40 | 110 | 200 | 15 | 25 | 60 | 105 |
| **16** | | 24 | 44 | 110 | 200 | 17 | 27 | 60 | 105 |

| Bore size (mm) | Standard stroke (mm) | WA | | | | | WB | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 20 to 39st | 40 to 124st | 125 to 200st | 201 to 300st | 301 to 400st | 20 to 39st | 40 to 124st | 125 to 200st | 201 to 300st | 301 to 400st |
| **20** | 20 to 400 | 24 | 44 | 120 | 200 | 300 | 29 | 39 | 77 | 117 | 167 |
| **25** | | 24 | 44 | 120 | 200 | 300 | 29 | 39 | 77 | 117 | 167 |

| Bore size (mm) | Standard stroke (mm) | WA | | | | | WB | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 25 to 49st | 50 to 124st | 125 to 200st | 201 to 300st | 301 to 400st | 25 to 49st | 50 to 124st | 125 to 200st | 201 to 300st | 301 to 400st |
| **32** | 25 to 400 | 24 | 48 | 124 | 200 | 300 | 33 | 45 | 83 | 121 | 171 |
| **40** | | 24 | 48 | 124 | 200 | 300 | 34 | 46 | 84 | 122 | 172 |
| **50** | | 24 | 48 | 124 | 200 | 300 | 36 | 48 | 86 | 124 | 174 |
| **63** | | 28 | 52 | 128 | 200 | 300 | 38 | 50 | 88 | 124 | 174 |
| **80** | | 28 | 52 | 128 | 200 | 300 | 42 | 54 | 92 | 128 | 178 |
| **100** | | 48 | 72 | 148 | 220 | 320 | 35 | 47 | 85 | 121 | 171 |

**MGPM (slide bearing)/Dimensions A, E** (mm)

| Bore size (mm) | A | | | E | | |
|---|---|---|---|---|---|---|
| | 10 to 74st | 75 to 100st | 101 to 250st | 10 to 74st | 75 to 100st | 101 to 250st |
| **12** | 42 | 60.5 | 85 | 0 | 18.5 | 43 |
| **16** | 46 | 64.5 | 95 | 0 | 18.5 | 49 |

| Bore size (mm) | A | | | E | | |
|---|---|---|---|---|---|---|
| | 20 to 74st | 75 to 200st | 201 to 400st | 20 to 74st | 75 to 200st | 201 to 400st |
| **20** | 53 | 84.5 | 122 | 0 | 31.5 | 69 |
| **25** | 53.5 | 85 | 122 | 0 | 31.5 | 68.5 |

| Bore size (mm) | A | | | E | | |
|---|---|---|---|---|---|---|
| | 25 to 74st | 75 to 200st | 201 to 400st | 25 to 74st | 75 to 200st | 201 to 400st |
| **32** | 97 | 102 | 140 | 37.5 | 42.5 | 80.5 |
| **40** | 97 | 102 | 140 | 31 | 36 | 74 |
| **50** | 106.5 | 118 | 161 | 34.5 | 46 | 89 |
| **63** | 106.5 | 118 | 161 | 29.5 | 41 | 84 |
| **80** | 115 | 142 | 193 | 18.5 | 45.5 | 96.5 |
| **100** | 137 | 162 | 203 | 21 | 46 | 87 |

* Dimensions other than those in the above tables are the same as standard products.

**MGPL (ball bushing)/Dimensions A, E** (mm)

| Bore size (mm) | A | | | E | | |
|---|---|---|---|---|---|---|
| | 10 to 39st | 40 to 100st | 101 to 250st | 10 to 39st | 40 to 100st | 101 to 250st |
| **12** | 43 | 55 | 85 | 1 | 13 | 43 |
| **16** | 49 | 65 | 95 | 3 | 19 | 49 |

| Bore size (mm) | A | | | | E | | | |
|---|---|---|---|---|---|---|---|---|
| | 20 to 39st | 40 to 124st | 125 to 200st | 201 to 400st | 20 to 39st | 40 to 124st | 125 to 200st | 201 to 400st |
| **20** | 63 | 80 | 104 | 122 | 10 | 27 | 51 | 69 |
| **25** | 69.5 | 85.5 | 104.5 | 122 | 16 | 32 | 51 | 68.5 |

| Bore size (mm) | A | | | | E | | | |
|---|---|---|---|---|---|---|---|---|
| | 25 to 74st | 75 to 124st | 125 to 200st | 201 to 400st | 25 to 74st | 75 to 124st | 125 to 200st | 201 to 400st |
| **32** | 81 | 98 | 118 | 140 | 21.5 | 38.5 | 58.5 | 80.5 |
| **40** | 81 | 98 | 118 | 140 | 15 | 32 | 52 | 74 |
| **50** | 93 | 114 | 134 | 161 | 21 | 42 | 62 | 89 |
| **63** | 93 | 114 | 134 | 161 | 16 | 37 | 57 | 84 |

| Bore size (mm) | A | | | | E | | | |
|---|---|---|---|---|---|---|---|---|
| | 25 to 49st | 50 to 74st | 75 to 200st | 201 to 400st | 25 to 49st | 50 to 74st | 75 to 200st | 201 to 400st |
| **80** | 109.5 | 130 | 160 | 193 | 13 | 33.5 | 63.5 | 96.5 |
| **100** | 121 | 147 | 180 | 203 | 5 | 31 | 64 | 87 |

# Series MGP
# Order Made Specifications

**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

## ② With Air Cushion/Intermediate Strokes (Spacer Installed Type) -XC19

MGP[M/L] Bore size – Stroke A – XC19

**With air cushion/Intermediate stroke**

The collar of of the standard stroke cylinder is changed to accommodate intermediate strokes in 1mm increments.

(Intermediate strokes (in 1mm increments) with a special body are available by special order.)

| Bore size (mm) | Stroke range (mm) |
|---|---|
| ø16 | 26 to 99 |
| ø20 to ø63 | 26 to 199 |
| ø80, ø100 | 51 to 199 |

∗ Specifications and dimensions are the same as the standard products with air cushion.

## ③ Heat Resistant Cylinder -XB6

MGPM Bore size – Stroke – XB6

**Heat resistant cylinder**

Cylinder with modified seal and grease materials to make possible high temperature operation up to an ambient temperature of 150°C.

### Specifications

| Applicable series | MGPM |
|---|---|
| Bearing type | Slide bearing |
| Cylinder bore size (mm) | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Ambient temperature range | –10 to 150°C |
| Seal material | Fluoro rubber |
| Grease | Heat resistant grease |
| Cushion | None |
| Auto switch | Not applicable |

∗ 1. Dimensions are the same as standard products.
∗ 2. Refer to page 56 for allowable kinetic energy.

## ④ Low Speed Cylinder -XB13

MGP[M/L] Bore size – Stroke – XB13

**Low speed cylinder**

Operates smoothly, without sticking and slipping, at drive speeds as low as 5 to 50mm/s.

### Specifications

| Applicable series | MGPM, MGPL |
|---|---|
| Bearing type | Slide bearing, Ball bushing |
| Cylinder bore size (mm) | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Piston speed | 5 to 50mm/s |
| Cushion | Rubber bumper |

∗ Dimensions are the same as standard products.

## ⑤ Fluoro Rubber Seals -XC22

MGPM Bore size – Stroke – XC22

**Fluoro rubber seals**

Seals are changed to a fluoro rubber material which has outstanding resistance to chemicals.

### Specifications

| Applicable series | MGPM |
|---|---|
| Bearing type | Slide bearing |
| Cylinder bore size (mm) | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Cushion | None |
| Auto switch | Mountable |

∗ 1. Dimensions are the same as standard products.
∗ 2. Refer to page 56 for allowable kinetic energy.

# Series MGP
# Order Made Specifications

**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

## 6 With Heavy Duty Scraper -XC4

MGP M/L | Bore size | Stroke | XC4 | ☐

With heavy duty scraper

Scraper specification

| | |
|---|---|
| Nil | Single side scraper |
| W | Double side scrapers |

With a heavy duty scraper used for the piston rod and guide rod sections, this specification is ideal for cylinders used in a dusty environment, or in environments where there is contact with earth and sand, such as molding machines, construction equipment, and industrial vehicles, etc.
Furthermore, depending on the mounting orientation, the scraper on the plate side only (–XC4) or the double side scraper (–XC4W) can be selected.

### Specifications

| Applicable series | | MGPM, MGPL |
|---|---|---|
| Bearing type | | Slide bearing, Ball bushing |
| Cylinder bore size (mm) | | 20, 25, 32, 40, 50, 63, 80, 100 |
| Minimum operating pressure | Single side | 0.12MPa |
| | Double side | 0.14MPa |

∗ Refer to the tables below for dimensions.

## 7 With Coil Scraper -XC35

MGPM | Bore size | Stroke | XC35 | ☐

With coil scraper

Scraper specification

| | |
|---|---|
| Nil | Single side scraper |
| W | Double side scraper |

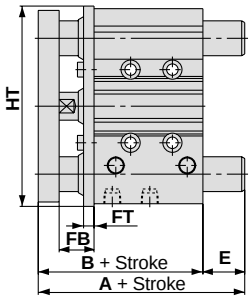
Removes frost, welding spatter, and machining chips from the piston rod and the guide rod, and protects the seals.
Furthermore, depending on the mounting orientation, the scraper on the plate side only (–XC35) or the double side scraper (–XC35W) can be selected.

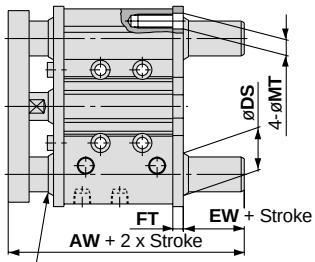
### Specifications

| Applicable series | | MGPM |
|---|---|---|
| Bearing type | | Slide bearing |
| Cylinder bore size (mm) | | 20, 25, 32, 40, 50, 63, 80, 100 |
| Minimum operating pressure | Single side | 0.12MPa |
| | Double side | 0.14MPa |

∗ Refer to the tables below for dimensions.

## With Heavy Duty Scraper/With Coil Scraper Common Dimensions




The figure shows the heavy duty scraper (–XC4).
Cylinders with coil scraper (–XC35) are without this lip.

**For cylinder with double side scraper**

**MGPM, MGPL**
**Common dimensions** (mm)

| Bore size (mm) | B | FB | FT |
|---|---|---|---|
| 20 | 63 | 16 | 5 |
| 25 | 63.5 | 16 | 5 |
| 32 | 69.5 | 20 | 6 |
| 40 | 76 | 20 | 6 |
| 50 | 82 | 22 | 6 |
| 63 | 87 | 22 | 6 |
| 80 | 106.5 | 28 | 6 |
| 100 | 126 | 35 | 9 |

**With double side scrapers**
**Dimensions AW, EW, MT, DS** (mm)

| Bore size (mm) | AW | EW | MT | DS ∗ | |
|---|---|---|---|---|---|
| | | | | MGPM | MGPL |
| 20 | 74 | 6 | 6 | 17 | 15 |
| 25 | 74.5 | 6 | 7 | 21 | 19 |
| 32 | 82.5 | 7 | 8.5 | 26 | 21 |
| 40 | 89 | 7 | 9 | 26 | 21 |
| 50 | 95 | 7 | 11 | 31 | 26 |
| 63 | 100 | 7 | 11 | 31 | 26 |
| 80 | 120.5 | 8 | 14 | 36 | 31 |
| 100 | 143 | 8 | 16 | 44 | 36 |

∗ By-pass port size for guide rod with bottom mount

**MGPM (slide bearing)/Dimensions A, E, HT** (mm)

| Bore size (mm) | A | | | E | | | HT | |
|---|---|---|---|---|---|---|---|---|
| | 50st or less | Over 50st to 200st | Over 200st | 50st or less | Over 50st to 200st | Over 200st | XC4 | XC35 |
| 20 | 63 | 94.5 | 132 | 0 | 31.5 | 69 | 80 | 80 |
| 25 | 63.5 | 95 | 132 | 0 | 31.5 | 68.5 | 93 | 93 |
| 32 | 97 | 112 | 150 | 27.5 | 42.5 | 80.5 | 113 | 110 |
| 40 | 97 | 112 | 150 | 21 | 36 | 74 | 121 | 118 |
| 50 | 106.5 | 128 | 171 | 24.5 | 46 | 89 | 153 | 146 |
| 63 | 106.5 | 128 | 171 | 19.5 | 41 | 84 | 167 | 160 |
| 80 | 125 | 152 | 203 | 18.5 | 45.5 | 96.5 | 205 | 200 |
| 100 | 147 | 172 | 213 | 21 | 46 | 87 | 244 | 238 |

**MGPL (ball bushing)/Dimensions A, E, HT** (mm)

| Bore size (mm) | A | | | | E | | | | HT |
|---|---|---|---|---|---|---|---|---|---|
| | 30st or less | Over 30st to 100st | Over 100st to 200st | Over 200st | 30st or less | Over 30st to 100st | Over 100st to 200st | Over 200st | |
| 20 | 73 | 90 | 114 | 132 | 10 | 27 | 51 | 69 | 80 |
| 25 | 79.5 | 95.5 | 114.5 | 132 | 16 | 32 | 51 | 68.5 | 93 |

| Bore size (mm) | A | | | | E | | | | HT |
|---|---|---|---|---|---|---|---|---|---|
| | 50st or less | Over 50st to 100st | Over 100st to 200st | Over 200st | 50st or less | Over 50st to 100st | Over 100st to 200st | Over 200st | |
| 32 | 91 | 108 | 128 | 150 | 21.5 | 38.5 | 58.5 | 80.5 | 110 |
| 40 | 91 | 108 | 128 | 150 | 15 | 32 | 52 | 74 | 118 |
| 50 | 103 | 124 | 144 | 171 | 21 | 42 | 62 | 89 | 146 |
| 63 | 103 | 124 | 144 | 171 | 16 | 37 | 57 | 84 | 160 |

| Bore size (mm) | A | | | | E | | | | HT |
|---|---|---|---|---|---|---|---|---|---|
| | 25st or less | Over 25st to 50st | Over 50st to 200st | Over 200st | 25st or less | Over 25st to 50st | Over 50st to 200st | Over 200st | |
| 80 | 119.5 | 140 | 170 | 203 | 13 | 33.5 | 63.5 | 96.5 | 201 |
| 100 | 131 | 157 | 190 | 213 | 5 | 31 | 64 | 87 | 238 |

# Series MGP
# Order Made Specifications

**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

## 8 Adjustable Stroke Cylinder/Adjustable Extension Type -XC8

MGP M/L | Bore size | Stroke | A | -XC8

**Stroke adjustment**

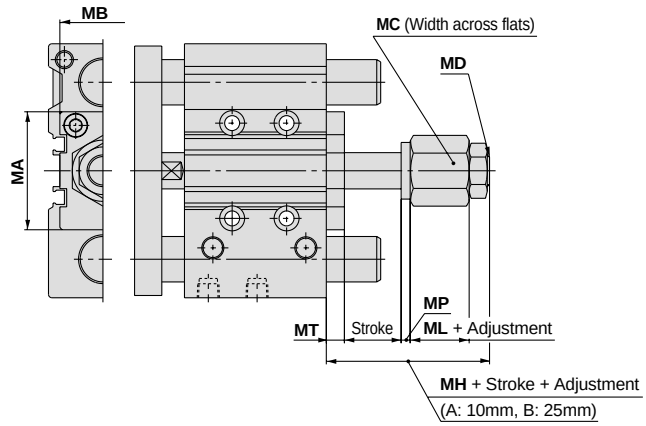
| | |
|---|---|
| A | 10mm adjustment |
| B | 25mm adjustment |

**Adjustable stroke cylinder**
**Adjustable extension type**

The extended stroke of the cylinder can be adjusted 0 to 10mm or 0 to 25mm from the full stroke.
Install a stroke adjustment mechanism at the head side to adjust the extended stroke.

### Specifications

| Applicable series | | MGPM, MGPL |
|---|---|---|
| Bearing type | | Slide bearing, Ball bushing |
| Cylinder bore size (mm) | | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Piston speed | ø12 to ø32 | 50 to 300mm/s |
| | ø40 to ø100 | 50 to 400mm/s |
| Stroke adjustment | A | 10mm |
| | B | 25mm |




### MGPM, MGPL Common dimensions (mm)

| Bore size (mm) | MA | MB | MC | MD | MH | ML | MP | MT |
|---|---|---|---|---|---|---|---|---|
| 12 | 28 | 16 | 14 | M5 x 0.8 | 22 | 9 | 3 | 5 |
| 16 | 29 | 19 | 14 | M5 x 0.8 | 22 | 9 | 3 | 5 |
| 20 | 34 | 30 | 22 | M8 x 1.25 | 30 | 12.5 | 3 | 8 |
| 25 | 40 | 30 | 22 | M8 x 1.25 | 30 | 12.5 | 3 | 8 |
| 32 | 52 | 38 | 27 | M14 x 1.5 | 37 | 16 | 4 | 8 |
| 40 | 60 | 38 | 27 | M14 x 1.5 | 37 | 16 | 4 | 8 |
| 50 | 68 | 50 | 36 | M18 x 1.5 | 47 | 20 | 4 | 9 |
| 63 | 84 | 50 | 36 | M18 x 1.5 | 47 | 20 | 4 | 9 |
| 80 | 114 | 50 | 46 | M22 x 1.5 | 58 | 28 | 4 | 12 |
| 100 | 140 | 65 | 46 | M22 x 1.5 | 62 | 28 | 4 | 16 |

## 9 Adjustable Stroke Cylinder/Adjustable Retraction Type -XC9

MGP M/L | Bore size | Stroke | A | -XC9

**Stroke adjustment**

| | |
|---|---|
| A | 10mm adjustment |
| B | 25mm adjustment |

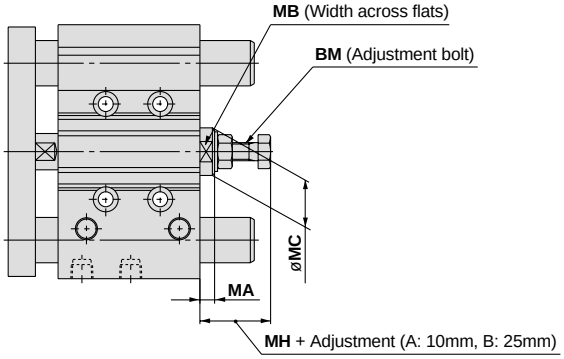
**Adjustable stroke cylinder**
**Adjustable retraction type**

With an adjustment bolt, the retracted stroke of the cylinder can be adjusted 0 to 10mm or 0 to 25mm from the full stroke. (After the stroke adjustment, only the rod side is equipped with a rubber bumper.)

### Specifications

| Applicable series | | MGPM, MGPL |
|---|---|---|
| Bearing type | | Slide bearing, Ball bushing |
| Cylinder bore size (mm) | | 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 |
| Piston speed | ø12 to ø32 | 50 to 300mm/s |
| | ø40 to ø100 | 50 to 400mm/s |
| Cushion | Rod side | Rubber bumper |
| | Head side | None |
| Stroke adjustment | A | 10mm |
| | B | 25mm |

∗ Refer to page 56 for the allowable kinetic energy on the retracted side.




### MGPM, MGPL Common dimensions (mm)

| Bore size (mm) | BM | MA | MB | MC | MH |
|---|---|---|---|---|---|
| 12 | M5 x 0.8 | 5 | 8 | 12.5 | 19 |
| 16 | M6 x 1.0 | 5 | 10 | 11.5 | 19 |
| 20 | M8 x 1.25 | 6.5 | 13 | 16 | 27 |
| 25 | M8 x 1.25 | 6.5 | 13 | 16 | 26.5 |
| 32 | M8 x 1.25 | 6.5 | 19 | 21 | 26.5 |
| 40 | M12 x 1.5 | 9 | 27 | 30 | 33 |
| 50 | M12 x 1.5 | 9 | 30 | 34 | 32.5 |
| 63 | M16 x 1.5 | 10 | 36 | 40 | 37 |
| 80 | M20 x 1.5 | 15 | 41 | 46 | 53.5 |
| 100 | M24 x 1.5 | 18 | 46 | 52 | 57.5 |





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# Series MGP
# Order Made Specifications

**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

## ⑩ Stainless Steel Piston Rod, Plate, etc. -XC6

MGP M/L | Bore size | Stroke | XC6 | A

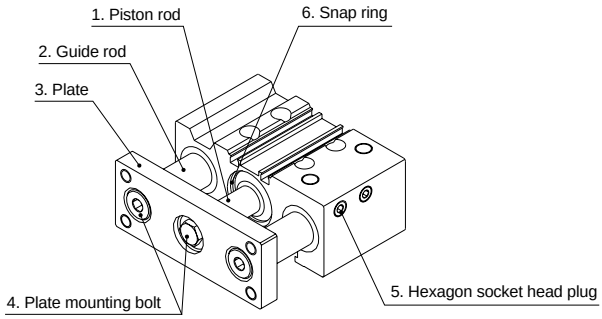
Stainless steel material

Stainless steel specification

| | |
|---|---|
| A | Stainless steel parts |
| B | Stainless steel rod parts |

The materials used for some of the standard product parts are modified to stainless steel.

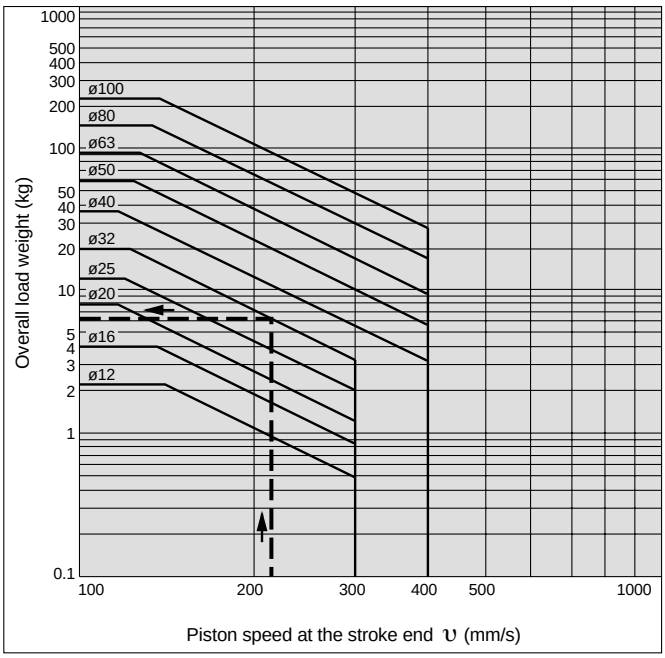
| | Stainless steel modified parts |
|---|---|
| XC6A | 1, 2, 3, 4, 5, 6 |
| XC6B | 1, 2, 5, 6 |




## ⚠ Allowable Kinetic Energy for Order Made Specifications (without Bumper)

Some of the order made specification cylinders have a construction without internal bumpers. For the following order made products, refer to the graph for their overall load weight (load weight + weight of the moving parts of the cylinder) and piston speed at the stroke end.

Applicable order made products:
- Heat resistant cylinder (-XB6)
- Adjustable stroke cylinder/Adjustable retraction type (–XC9)
- Fluoro rubber seals (–XC22)



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# Series MGP
# Order Made Specifications

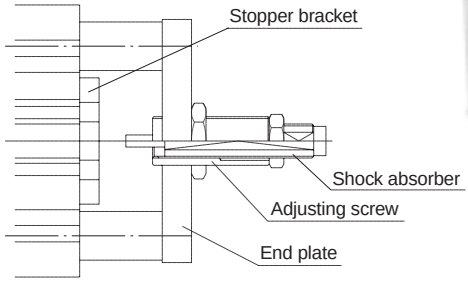
**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

## 11 Compact Guide Cylinder with Shock Absorber -XC69

Absorbs the impact at the extension stroke end.

Extension adjusting mechanism using an adjusting screw.

Extension stroke adjustment
- ø12 to ø25: 15mm
- ø32 to ø63: 25mm
- ø80, ø100: 30mm




## How to Order

MGP | M | 32 | 50 | Z73 | | XC69

**Compact guide cylinder**

**With shock absorber**

**Bearing type**

| | |
|---|---|
| **M** | Slide bearing |
| **L** | Ball bushing |

**Bore size**

| | | | |
|---|---|---|---|
| **12** | 12mm | **40** | 40mm |
| **16** | 16mm | **50** | 50mm |
| **20** | 20mm | **63** | 63mm |
| **25** | 25mm | **80** | 80mm |
| **32** | 32mm | **100** | 100mm |

**Cylinder stroke (mm)**

Refer to the standard stroke table.

**Number of auto switches**

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

**Auto switch type**

| | |
|---|---|
| **Nil** | Without auto switch (built-in magnet cylinder) |

∗ Refer to the table below for auto switch model numbers.

## Applicable auto switches

| Type | Special function | Electrical entry | Indicator light | Wiring (output) | Load voltage DC | Load voltage AC | Auto switch model: Electrical entry direction: Perpendicular | Auto switch model: Electrical entry direction: In-line | Lead wire length (m): 0.5 (Nil) | Lead wire length (m): 3 (L) | Lead wire length (m): 5 (Z) | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire | — 5V | — | — | **Z76** | ● | ● | — | IC circuit | — |
| | | | | 2 wire | 24V 12V | 100V | — | **Z73** | ● | ● | ● | — | Relay, PLC |
| | | | No | | 5V, 12V | 100V or less | — | **Z80** | ● | ● | — | IC circuit | |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 5V | — | **Y69A** | **Y59A** | ● | ● | ○ | IC circuit | Relay, PLC |
| | | | | 3 wire (PNP) | 12V | | **Y7PV** | **Y7P** | ● | ● | ○ | IC circuit | |
| | | | | 2 wire | 12V | | **Y69B** | **Y59B** | ● | ● | ○ | — | |
| | Diagnostic indication (2 color indicator) | | | 3 wire (NPN) | 5V | | **Y7NWV** | **Y7NW** | ● | ● | ○ | IC circuit | |
| | | | | 3 wire (PNP) | 12V | | **Y7PWV** | **Y7PW** | ● | ● | ○ | | |
| | Water resistant (2 color indicator) | | | 2 wire | 12V | | **Y7BWV** | **Y7BW** | ● | ● | ○ | — | |
| | | | | | | | — | **Y7BAL** | — | ● | ○ | | |
| | Magnetic field resistant (2 color indicator) | | | | | | | **P5DW** | — | ● | ● | | |

Note 1) Lead wire symbols 0.5m ..... Nil (Example) Y69B
3m ..... L Y69BL
5m ..... Z Y69BZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.

Note 3) Type P5DW is applicable only to bore sizes ø40 to ø100.
For a 25mm stroke, only one switch is mounted.





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# Series MGP
# Order Made Specifications

**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

## Specifications

| | | |
|---|---|---|
| Action | | Double acting |
| Fluid | | Air |
| Maximum operating pressure | | 1.0MPa |
| Proof Pressure | | 1.5MPa |
| Minimum operating pressure Note 1) | ø12, ø16 | 0.12MPa |
| | ø20 to ø100 | 0.10MPa |
| Ambient and fluid temperature | | –10 to 60°C |
| Piston speed Note 2) | | Refer to the graphs on the right. |
| Cushion | Extended end | Shock absorber |
| | Retracted end | Rubber cushion |
| Bearing type | | Slide bearing, Ball bushing |

Note 1) Excluding the cushion stroke generated by the shock absorber.
Note 2) Operate at a piston speed that does not exceed the cylinder's allowable kinetic energy.

## Standard Strokes

| Model | Standard stroke (mm) |
|---|---|
| MGP M 12, L 16 | 10, 20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250 |
| MGP M 20, L 25 | 20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400 |
| MGP M 32, 40, 50, L 63, 80, 100 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400 |

Note 1) Intermediate strokes (in 5mm increments) are produced by installing spacers of 5, 10, 15 and 20mm widths.
The overall length (A + stroke x 2) and the guide rod length (E + stroke) shown in the dimensions section do not include the spacer widths.
Contact SMC when a special intermediate stroke body is needed.

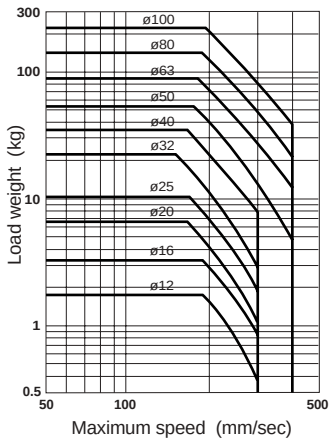
## Extension Adjustment Mechanism Specifications

| Bore size (mm) | 12, 16 | 20, 25 | 32, 40 | 50, 63 | 80, 100 |
|---|---|---|---|---|---|
| Shock absorber model | RB0806 | RB1007 | RB1411 | RB2015 | RB2725 |
| Max. absorbed energy (J) | 2.94 | 5.88 | 19.6 | 58.8 | 147 |
| Stroke adjustment range (mm) | 0 to –15 | | 0 to –25 | | 0 to –30 |

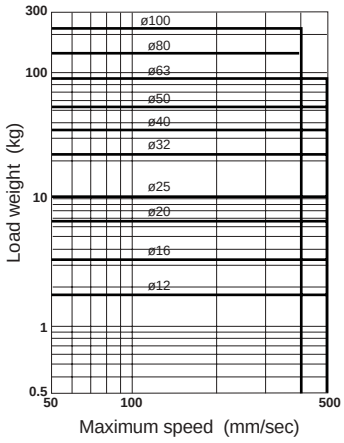
## Allowable Kinetic Energy

Operate with a load weight and maximum speed within the ranges shown in the graph below.

**Retraction stroke end (rubber bumper)**




**Extension stroke end (shock absorber)**




# ⚠ Specific Product Precautions

**Be sure to read before handling. Consult SMC when outside the specifications.**

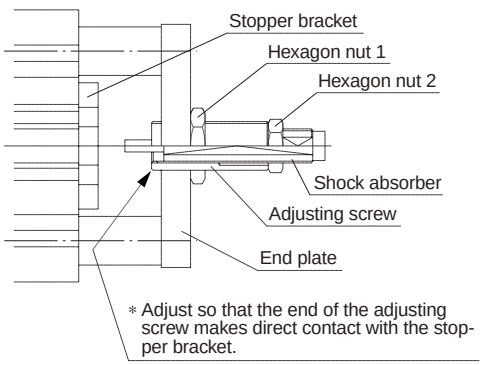
### Mounting

## ⚠ Warning

**Do not put hands or fingers, etc., near the cylinder during operation.**
If fingers, etc., are caught in the space between the shock absorber and body, human injury and damage to nearby equipment may occur. Implement protective measures such as mounting of protective covers as needed.

## ⚠ Caution

**As a rule, do not bottom mount the cylinder.**
Mounting space is limited at the bottom of the cylinder due to the guide rod and end plate. Use the top or side mount method to mount the cylinder.




### Adjustment

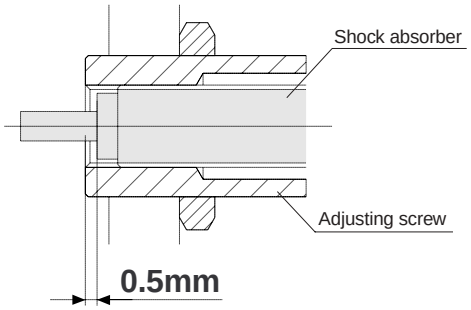
## ⚠ Caution

**1. Adjusting screw adjustment (stroke adjustment)**

To make a stroke adjustment, loosen only hexagon nut 1 and rotate the adjusting screw. After adjusting, lock the adjustment with hexagon nut 1. To put the end of the adjusting screw in direct contact with the stopper bracket, fix the adjusting screw at a position where its end protrudes from the end plate. (Refer to the figure on the top right.)

**2. Shock absorber replacement**

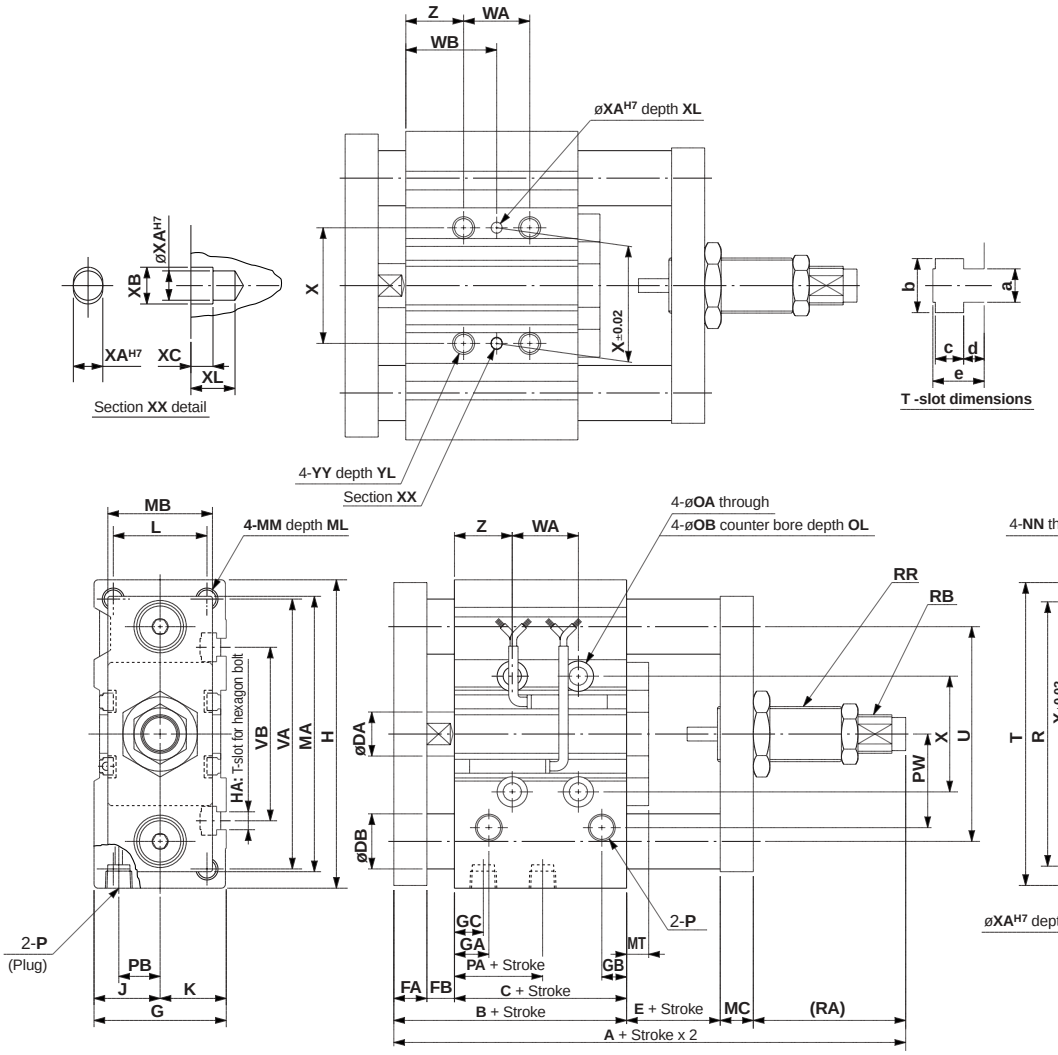
Loosen hexagon nut 2, then rotate the shock absorber counter clockwise and remove it. When mounting a new shock absorber, the end of the adjusting screw must protrude approximately 0.5mm from the shock absorber. (Refer to the figure on the right.)



# Series MGP
# Order Made Specifications

**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

## Dimensions/ø12 to ø63




(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 12 | 4.4 | 7.4 | 3.7 | 2 | 6.2 |
| 16 | 4.4 | 7.4 | 3.7 | 2.5 | 6.7 |
| 20 | 5.4 | 8.4 | 4.5 | 2.8 | 7.8 |
| 25 | 5.4 | 8.4 | 4.5 | 3 | 8.2 |
| 32 | 6.5 | 10.5 | 5.5 | 3.5 | 9.5 |
| 40 | 6.5 | 10.5 | 5.5 | 4 | 11 |
| 50 | 8.5 | 13.5 | 7.5 | 4.5 | 13.5 |
| 63 | 11 | 17.8 | 10 | 7 | 18.5 |

(mm)

| Bore size (mm) | Standard stroke (mm) | A | B | C | DA | DB | | E | FA | FB | G | GA | GB | GC | H | HA | J | K | L | MA | MB | MC | MT | MM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Slide bearing | Ball bushing | | | | | | | | | | | | | | | | | |
| 12 | 10, 20, 30, 40, 50, 75, 100, | 90 | 42 | 29 | 6 | 8 | 6 | 7 | 8 | 5 | 26 | 11 | 7.5 | 11 | 58 | M4 | 13 | 13 | 18 | 51 | 19 | 8 | 6 | M4 x 0.7 |
| 16 | 125, 150, 175, 200, 250 | 94 | 46 | 33 | 8 | 10 | 8 | 7 | 8 | 5 | 30 | 11 | 8 | 11 | 64 | M4 | 15 | 15 | 22 | 58 | 19 | 8 | 6 | M5 x 0.8 |
| 20 | 20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400 | 109 | 53 | 37 | 10 | 12 | 10 | 9 | 10 | 6 | 36 | 10.5 | 8.5 | 10.5 | 83 | M5 | 18 | 18 | 24 | 68 | 30 | 10 | 8 | M5 x 0.8 |
| 25 | | 109.5 | 53.5 | 37.5 | 12 | 16 | 13 | 9 | 10 | 6 | 42 | 11.5 | 9 | 11.5 | 93 | M5 | 21 | 21 | 30 | 82 | 30 | 10 | 8 | M6 x 1.0 |
| 32 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400 | 135.5 | 59.5 | 37.5 | 16 | 20 | 16 | 9 | 12 | 10 | 48 | 12.5 | 9 | 12.5 | 112 | M6 | 24 | 24 | 34 | 100 | 38 | 12 | 8 | M8 x 1.25 |
| 40 | | 142 | 66 | 44 | 16 | 20 | 16 | 9 | 12 | 10 | 54 | 14 | 10 | 14 | 120 | M6 | 27 | 27 | 40 | 108 | 38 | 12 | 8 | M8 x 1.25 |
| 50 | | 155 | 72 | 44 | 20 | 25 | 20 | 10 | 16 | 12 | 64 | 14 | 11 | 12 | 148 | M8 | 32 | 32 | 46 | 139 | 60 | 16 | 9 | M10 x 1.5 |
| 63 | | 160 | 77 | 49 | 20 | 25 | 20 | 10 | 16 | 12 | 78 | 16.5 | 13.5 | 16.5 | 162 | M10 | 39 | 39 | 58 | 153 | 60 | 16 | 9 | M10 x 1.5 |

(mm)

| Bore size (mm) | ML | NN | OA | OB | OL | P | PA | PB | PW | Q | R | RA | RB | RR | S | T | U | VA | VB | X | XA | XB | XC | XL | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 10 | M4 x 0.7 | 4.3 | 8 | 4.5 | M5 x 0.8 | 13 | 8 | 18 | 14 | 48 | 33 | RB0806 | M12 x 1.5 | 22 | 56 | 41 | 50 | 37 | 23 | 3 | 3.5 | 3 | 6 | M5 x 0.8 | 10 | 5 |
| 16 | 12 | M5 x 0.8 | 4.3 | 8 | 4.5 | M5 x 0.8 | 15 | 10 | 19 | 16 | 54 | 33 | RB0806 | M12 x 1.5 | 25 | 62 | 46 | 56 | 38 | 24 | 3 | 3.5 | 3 | 6 | M5 x 0.8 | 10 | 5 |
| 20 | 13 | M5 x 0.8 | 5.6 | 9.5 | 5.5 | Rc 1/8 | 12.5 | 10.5 | 25 | 18 | 70 | 37 | RB1007 | M14 x 1.5 | 30 | 81 | 54 | 72 | 44 | 28 | 3 | 3.5 | 3 | 6 | M6 x 1.0 | 12 | 17 |
| 25 | 15 | M6 x 1.0 | 5.6 | 9.5 | 5.5 | Rc 1/8 | 12.5 | 13.5 | 28.5 | 26 | 78 | 37 | RB1007 | M14 x 1.5 | 38 | 91 | 64 | 82 | 50 | 34 | 4 | 4.5 | 3 | 6 | M6 x 1.0 | 12 | 17 |
| 32 | 20 | M8 x 1.25 | 6.6 | 11 | 7.5 | Rc 1/8 | 7 | 15 | 34 | 30 | 96 | 55 | RB1412 | M20 x 1.5 | 44 | 110 | 78 | 98 | 63 | 42 | 4 | 4.5 | 3 | 6 | M8 x 1.25 | 16 | 21 |
| 40 | 20 | M8 x 1.25 | 6.6 | 11 | 7.5 | Rc 1/8 | 13 | 18 | 38 | 30 | 104 | 55 | RB1412 | M20 x 1.5 | 44 | 118 | 86 | 106 | 72 | 50 | 4 | 4.5 | 3 | 6 | M8 x 1.25 | 16 | 22 |
| 50 | 22 | M10 x 1.5 | 8.6 | 14 | 9 | Rc 1/4 | 9 | 21.5 | 47 | 40 | 130 | 57 | RB2015 | M27 x 1.5 | 60 | 146 | 110 | 130 | 92 | 66 | 5 | 6 | 4 | 8 | M10 x 1.5 | 20 | 24 |
| 63 | 22 | M10 x 1.5 | 8.6 | 14 | 9 | Rc 1/4 | 14 | 28 | 55 | 50 | 130 | 57 | RB2015 | M27 x 1.5 | 70 | 158 | 124 | 142 | 110 | 80 | 5 | 6 | 4 | 8 | M10 x 1.5 | 20 | 24 |

### MGP12 to 25/WA, WB Dimensions

(mm)

| Bore size (mm) | WA | | | | | WB | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 30 stroke or less | Over 30 stroke to 100 stroke | Over 100 stroke to 200 stroke | Over 200 stroke to 300 stroke | Over 300 stroke | 30 stroke or less | Over 30 stroke to 100 stroke | Over 100 stroke to 200 stroke | Over 200 stroke to 300 stroke | Over 300 stroke |
| 12 | 20 | 40 | 110 | 200 | - | 15 | 25 | 60 | 105 | - |
| 16 | 24 | 44 | 110 | 200 | - | 17 | 27 | 60 | 105 | - |
| 20 | 24 | 44 | 120 | 200 | 300 | 29 | 39 | 77 | 117 | 167 |
| 25 | 24 | 44 | 120 | 200 | 300 | 29 | 39 | 77 | 117 | 167 |

### MGP32 to 63/WA, WB Dimensions

(mm)

| Bore size (mm) | WA | | | | | WB | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 25 stroke or less | Over 25 stroke to 100 stroke | Over 100 stroke to 200 stroke | Over 200 stroke to 300 stroke | Over 300 stroke | 25 stroke or less | Over 25 stroke to 100 stroke | Over 100 stroke to 200 stroke | Over 200 stroke to 300 stroke | Over 300 stroke |
| 32 | 24 | 48 | 124 | 200 | 300 | 33 | 45 | 83 | 121 | 171 |
| 40 | 24 | 48 | 124 | 200 | 300 | 34 | 46 | 84 | 122 | 172 |
| 50 | 24 | 48 | 124 | 200 | 300 | 36 | 48 | 86 | 124 | 174 |
| 63 | 28 | 52 | 128 | 200 | 300 | 38 | 50 | 88 | 124 | 174 |





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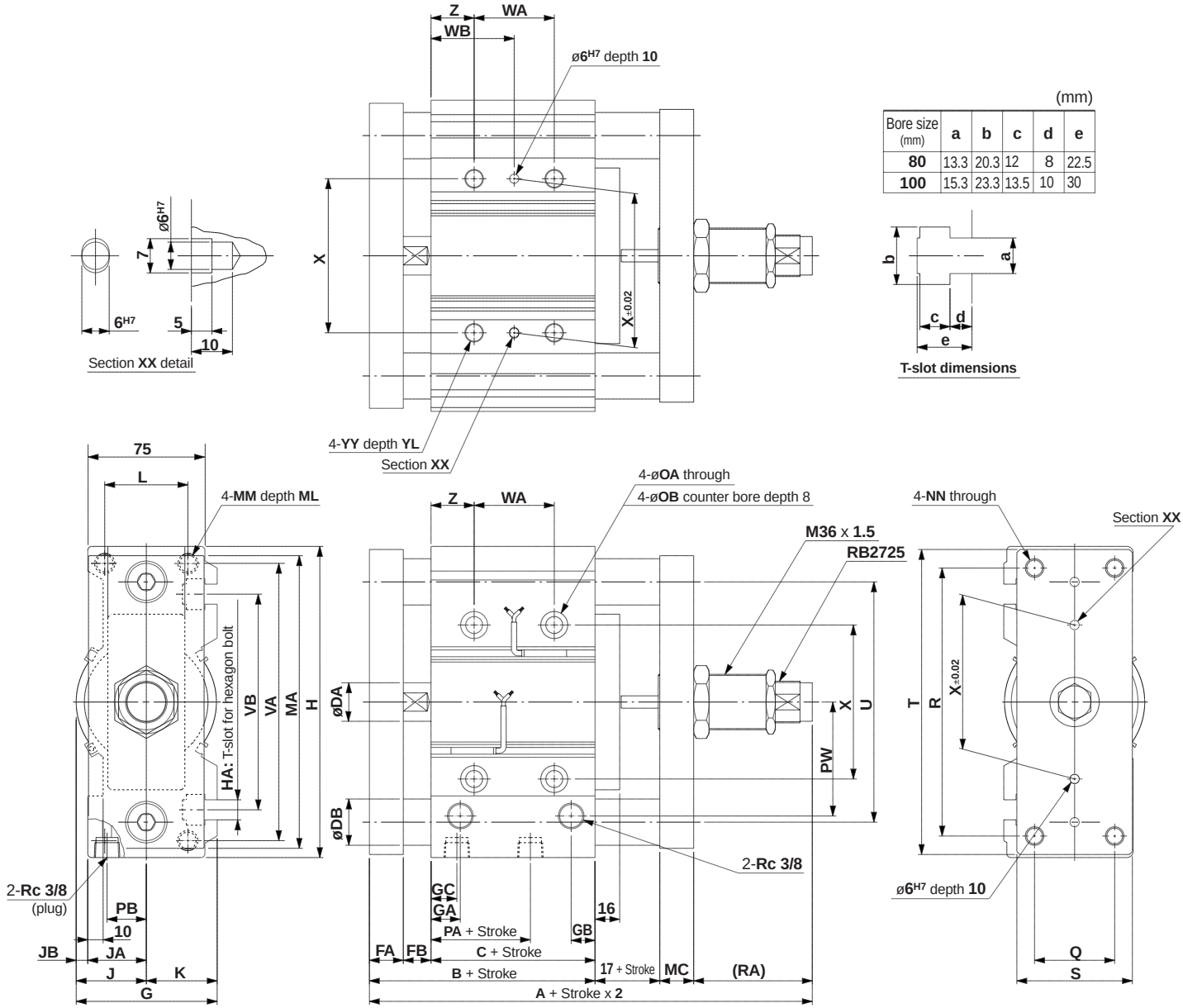
# Series MGP
# Order Made Specifications

**Contact SMC for detailed specifications and lead times, and for applications of cylinders with air cushion, heavy duty guide rod type, and lock type.**

## Dimensions/ø80, ø100




(mm)

| Bore size (mm) | a | b | c | d | e |
|---|---|---|---|---|---|
| 80 | 13.3 | 20.3 | 12 | 8 | 22.5 |
| 100 | 15.3 | 23.3 | 13.5 | 10 | 30 |

(mm)

| Bore size (mm) | Standard stroke (mm) | A | B | C | DA | DB | | FA | FB | G | GA | GB | GC | H | HA | J | JA | JB | K | L | MA | MC | MM | ML | NN | OA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Slide bearing | Ball bushing | | | | | | | | | | | | | | | | | | | |
| 80 | 25, 50, 75, 100 125, 150, 175, 200 250, 300, 350, 400 | 212.5 | 96.5 | 56.5 | 25 | 30 | 25 | 22 | 18 | 91.5 | 19 | 15.5 | 14.5 | 202 | M12 | 45.5 | 38 | 7.5 | 46 | 54 | 190 | 22 | M12 x 1.75 | 25 | M12 x 1.75 | 10.6 |
| 100 | | 232 | 116 | 66 | 30 | 36 | 30 | 25 | 25 | 111.5 | 23 | 19 | 18 | 240 | M14 | 55.5 | 45 | 10.5 | 56 | 62 | 228 | 25 | M14 x 2.0 | 31 | M14 x 2.0 | 12.5 |

(mm)

| Bore size (mm) | OB | PA | PB | PW | Q | R | RA | S | T | U | VA | VB | WA | | | | | WB | | | | | X | YY | YL | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | 25 stroke | Over 25 stroke to 100 stroke | Over 100 stroke to 200 stroke | Over 200 stroke to 300 stroke | Over 300 stroke | 25 stroke | Over 25 stroke to 100 stroke | Over 100 stroke to 200 stroke | Over 200 stroke to 300 stroke | Over 300 stroke | | | | |
| 80 | 17.5 | 14.5 | 25.5 | 74 | 52 | 174 | 77 | 75 | 198 | 156 | 180 | 140 | 28 | 52 | 128 | 200 | 300 | 42 | 54 | 92 | 128 | 178 | 100 | M12 x 1.75 | 24 | 28 |
| 100 | 20 | 17.5 | 32.5 | 89 | 64 | 210 | 74 | 90 | 236 | 188 | 210 | 166 | 48 | 72 | 148 | 220 | 320 | 35 | 47 | 85 | 121 | 171 | 124 | M14 x 2.0 | 28 | 11 |



SMC
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# Series MGP
# Auto Switch Common Specifications



## Auto Switch Common Specifications

| | | |
|---|---|---|
| **Type** | Reed switch | Solid state switch |
| **Leakage current** | None | 3 wire: 100μA or less, 2 wire: 0.8mA or less |
| **Operating time** | 1.2ms | 1ms or less |
| **Impact resistance** | 300m/s² | 1000m/s² |
| **Insulation resistance** | 50MΩ or more at 500VDC (between lead wire and case) | |
| **Withstand voltage** | 1500VAC for 1 min. (between lead wire and case) | 1000VAC for 1 min. (between lead wire and case) |
| **Ambient temperature** | –10 to 60°C | |
| **Enclosure** | IEC529 standard IP67, JISC0920 watertight construction | |

## Lead Wire Length

**Lead wire length indication**

**(Example)**

**D-Z73 L**

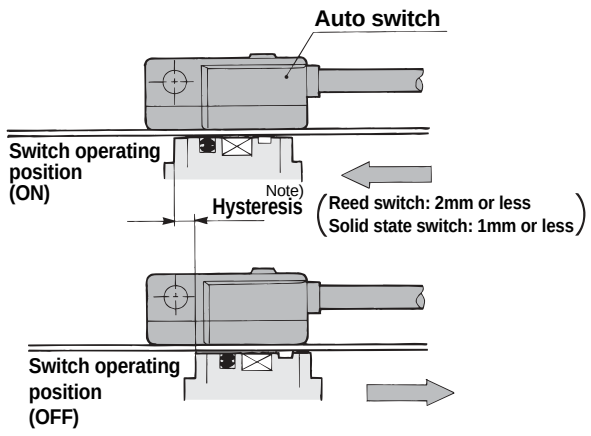
**Lead wire length**

| | |
|---|---|
| **Nil** | 0.5m |
| **L** | 3m |
| **Z** | 5m |

Note 1) Lead wire length Z: 5m applicable auto switch
Reed: D-Z73
Solid state: All types are produced upon receipt of order (standard availability).

## Auto Switch Hysteresis

Hysteresis is the distance from the position at which piston movement activates an auto switch to the position at which reverse movement turns the switch OFF. This hysteresis is included in part of the operating range (one side).




Note ) Hysteresis may fluctuate due to the operating environment, and is not guaranteed. Contact SMC if hysteresis causes an operational problem.

## Contact Protection Boxes/CD-P11, CD-P12

D-Z7 and D-Z8 type switches do not have internal contact protection circuits.

1. The operating load is an induction load.
2. The length of wiring to the load is 5m or more.
3. The load voltage is 100VAC.

A contact protection box should be used in any of the above situations.

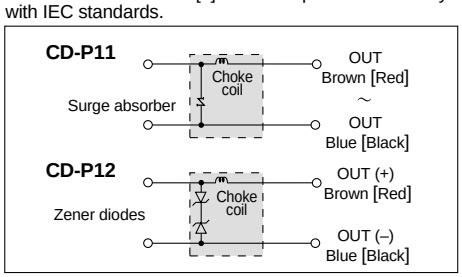
### Contact protection box specifications

| Part no. | CD-P11 | | CD-P12 |
|---|---|---|---|
| Load voltage | 100VAC or less | 200VAC | 24VDC |
| Maximum load current | 25mA | 12.5mA | 50mA |

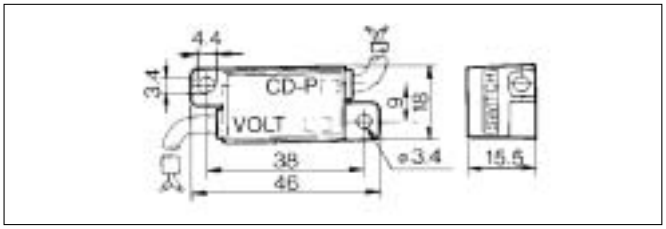
∗ Lead wire length …… Switch connection side 0.5m
Load connection side 0.5m

### Contact protection box internal circuits

Lead wire colors inside [ ] are those prior to conformity with IEC standards.




### Contact protection box dimensions




## Contact Protection Box Connection

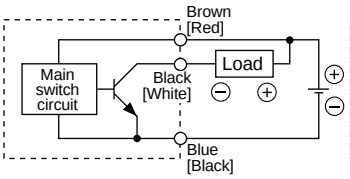
To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit.
Furthermore, the switch unit should be kept as close as possible to the contact protection box, with a lead wire length of no more than 1 meter between them.

# Series MGP
# Auto Switch Connections and Examples

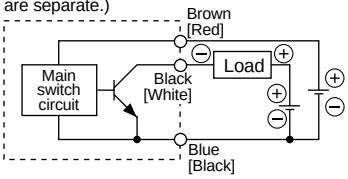
## Basic Wiring

Lead wire colours inside [ ] are those prior to conformity with IEC standards.

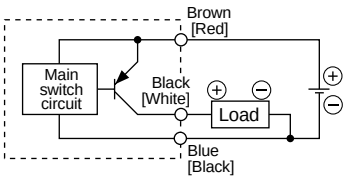
### Solid state 3 wire, NPN



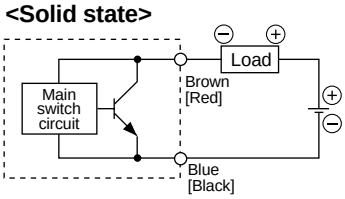

(Power supplies for switch and load are separate.)

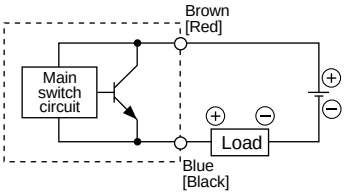



### Solid state 3 wire, PNP

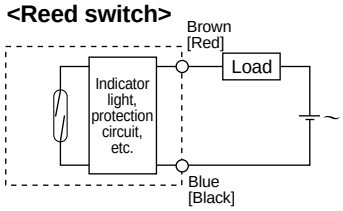


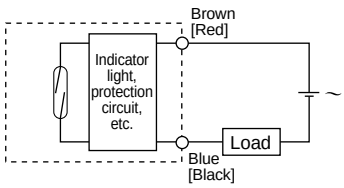

### 2 wire <Solid state>




### 2 wire <Reed switch>

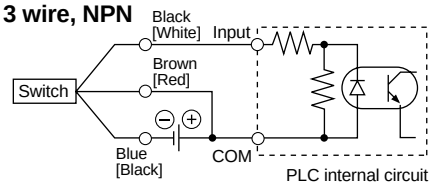


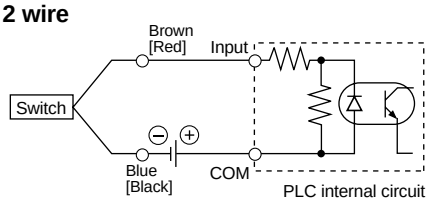

## Examples of Connection to PLC

### Sink input specifications

#### 3 wire, NPN

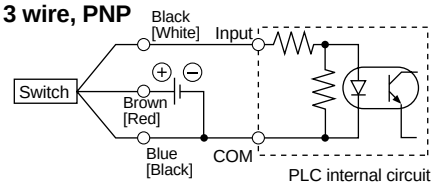



#### 2 wire

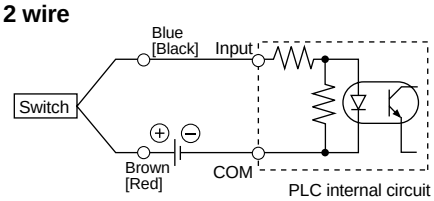



### Source input specifications

#### 3 wire, PNP




#### 2 wire

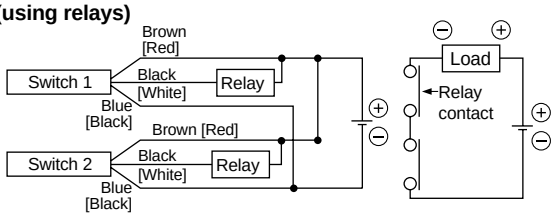



Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

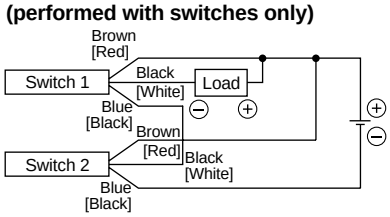
## Connection Examples for AND (Series) and OR (Parallel)

### 3 wire

#### AND connection for NPN output (using relays)

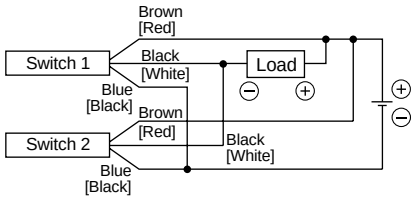



#### AND connection for NPN output (performed with switches only)

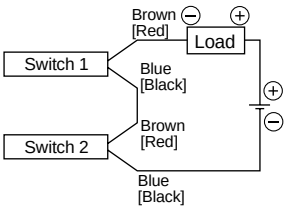



The indicator lights will light up when both switches are turned ON.

#### OR connection for NPN output




#### 2 wire with 2 switch AND connection

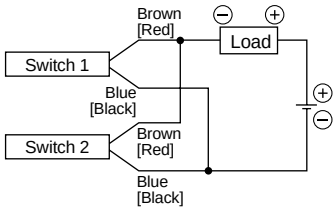



When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up if both of the switches are in the ON state.

Load voltage at ON = (Power supply voltage − Internal voltage drop) x 2 pcs.
= 24V – 4V x 2 pcs.
= 16V

Example: Power supply is 24VDC
Internal voltage drop in switch is 4V

#### 2 wire with 2 switch OR connection




<Solid state>
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

Load voltage at OFF = Leakage current x 2 pcs. x Load impedance
= 1mA x 2 pcs. x 3kΩ
= 6V

Example: Load impedance is 3kΩ
Leakage current from switch is 1mA

<Reed switch>
Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of switches in the ON state, the indicator lights may sometimes dim or not light up, because of dispersion and reduction of the current flowing to the switches.

# Reed Switches/Direct Mount Type
# D-Z73/Z76/Z80

## Auto Switch Specifications

### With indicator light

| Auto switch part no. | D-Z73 | | D-Z76 |
|---|---|---|---|
| Electrical entry direction | In-line | | |
| Applicable load | Relay, PLC | | IC circuit |
| Load voltage | 24VDC | 100VAC | 4 to 8VDC |
| Maximum load current or current range | 5 to 40mA | 5 to 20mA | 20mA |
| Contact protection circuit | None | | |
| Internal voltage drop | 2.4V or less (to 20mA)/3V or less (to 40mA) | | 0.8V or less |
| Indicator light | Red LED lights up when ON | | |

### Without indicator light

| Auto switch part no. | D-Z80 | | |
|---|---|---|---|
| Electrical entry direction | In-line | | |
| Applicable load | Relay, PLC, IC circuit | | |
| Load voltage | 24V AC/DC or less | 48V AC/DC | 100V AC/DC |
| Maximum load current | 50mA | 40mA | 20mA |
| Contact protection circuit | None | | |
| Internal resistance | 1Ω or less (including lead wire length of 3m) | | |

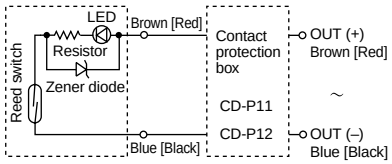
• Lead wire —— Oil resistant heavy duty vinyl cord, ø3.4,
0.2mm², 2 wire (Brown, Blue [Red, Black]), 3 wire (Brown, Black, Blue [Red, White, Black]),
0.5m (D-Z73 only ø2.7, 0.18mm², 2 wire)

Note) Refer to page 57 for auto switch common specifications and lead wire lengths.

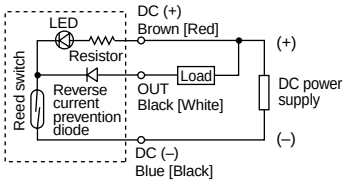
## Internal circuits

Lead wire colours inside [ ] are those prior to conformity with IEC standards.

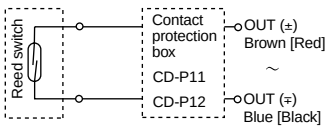
### D-Z73




### D-Z76




### D-Z80




Note) 1. The load is an induction load.
2. The lead wire length to the load is 5m or more.
3. The load voltage is 100VAC.

Use a contact protection box in any of the above situations, as the life of the contacts may otherwise be reduced. (Refer to page 57 for detailed specifications of the contact protection boxes.)

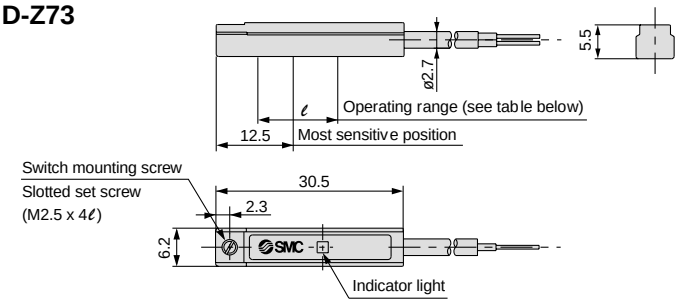
## Weights

Unit: g

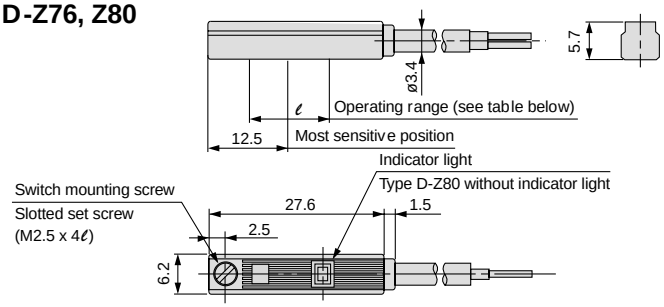
| Model | Lead wire length 0.5m | Lead wire length 3m |
|---|---|---|
| D-Z73 | 9 | 49 |
| D-Z76 | 10 | 55 |
| D-Z80 | 9 | 49 |

## Dimensions

### D-Z73




### D-Z76, Z80




| Bore size / Operating range | Bore size (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 12 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| Operating range ℓ (mm) | 7.5 | 10 | 10 | 10 | 10.5 | 10.5 | 10.5 | 11.5 | 11.5 | 12 |

Note) This is a standard including hysteresis, and is not guaranteed. There may be large variations depending on the surrounding environment (variations on the order of ±30%).

# Solid State Switches/Direct Mount Type
# D-Y59A/B/D-Y69A/B/D-Y7P(V)

## Auto Switch Specifications

### D-Y5, D-Y6, D-Y7P, D-Y7PV (with indicator light)

| Auto switch part no. | D-Y59A | D-Y69A | D-Y7P | D-Y7PV | D-Y59B | D-Y69B |
|---|---|---|---|---|---|---|
| Electrical entry direction | In-line | Perpendicular | In-line | Perpendicular | In-line | Perpendicular |
| Wiring type | 3 wire | | | | 2 wire | |
| Output type | NPN | | PNP | | – | |
| Applicable load | IC circuit, Relay, PLC | | | | 24VDC Relay, PLC | |
| Power supply voltage | 5, 12, 24VDC (4.5 to 28VDC) | | | | – | |
| Current consumption | 10mA or less | | | | – | |
| Load voltage | 28VDC or less | | – | | 24VDC (10 to 28VDC) | |
| Load current | 40mA or less | | 80mA or less | | 5 to 40mA | |
| Internal voltage drop | 1.5V or less (0.8V or less at 10mA load current) | | 0.8V or less | | 4V or less | |
| Leakage current | 100μA or less at 24VDC | | | | 0.8mA or less at 24VDC | |
| Indicator light | Red LED lights up when ON | | | | | |

• Lead wire — Oil resistant, flexible heavy duty vinyl cord, ø3.4, 0.15mm², 2 wire (Brown, Blue [Red, Black]), 3 wire (Brown, Black, Blue [Red, White, Black]), 0.5m

Note) Refer to page 57 for auto switch common specifications and lead wire lengths.

## Weights

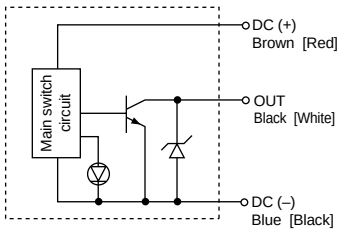
Unit: g

| Model | Lead wire length | |
|---|---|---|
| | 0.5m | 3m |
| D-Y59A, Y69A, Y7P | 10 | 53 |
| D-Y59B, Y69B, Y7PV | 9 | 50 |

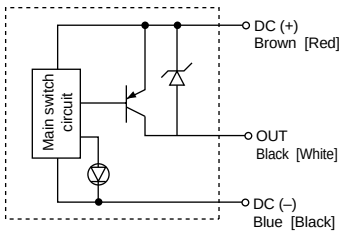
## Internal circuits

Lead wire colours inside [ ] are those prior to conformity with IEC standards.

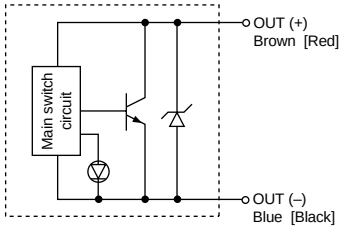
### D-Y59A, Y69A




### D-Y7P(V)

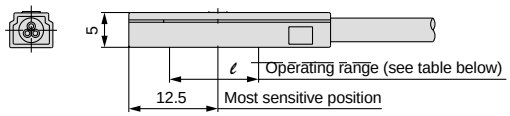



### D-Y59B, Y69B

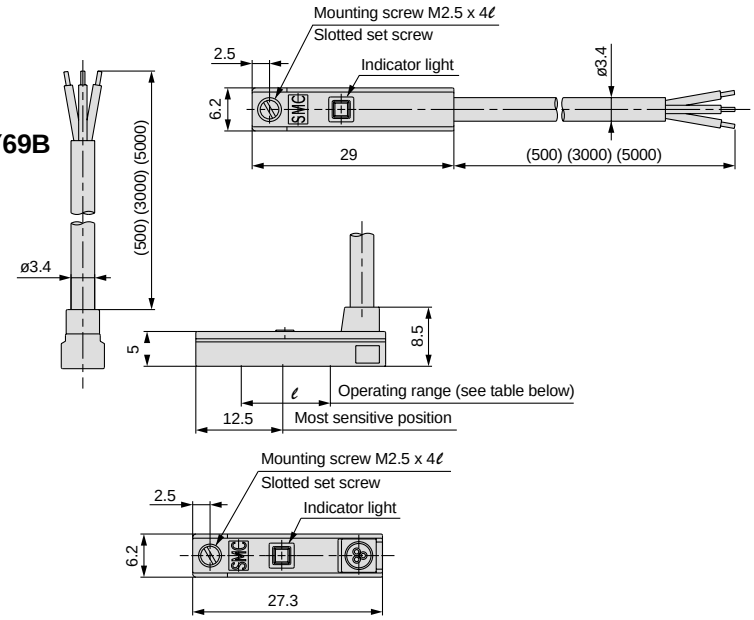



## Dimensions

### D-Y59A, Y59B
### D-Y7P




### D-Y69A, Y69B
### D-Y7PV




| Bore size / Operating range | Bore size (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 12 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| Operating range ℓ (mm) | 5.5 | 7.5 | 7.5 | 7 | 6.5 | 6 | 7 | 8 | 9.5 | 10 |

Note) This is a standard including hysteresis, and is not guaranteed. There may be large variations depending on the surrounding environment (variations on the order of ±30%).

# 2 Colour Indication Solid State Switches Direct Mount Type D-Y7NW(V)/Y7PW(V)/D-Y7BW(V)

## Auto Switch Specifications

### D-Y7□W, D-Y7□WV (with indicator light)

| Auto switch part no. | D-Y7NW | D-Y7NWV | D-Y7PW | D-Y7PWV | D-Y7BW | D-Y7BWV |
|---|---|---|---|---|---|---|
| Electrical entry direction | In-line | Perpendicular | In-line | Perpendicular | In-line | Perpendicular |
| Wiring type | 3 wire | | | | 2 wire | |
| Output type | NPN | | PNP | | – | |
| Applicable load | IC circuit, Relay, PLC | | | | 24VDC relay, PLC | |
| Power supply voltage | 5, 12, 24VDC (4.5 to 28VDC) | | | | – | |
| Current consumption | 10mA or less | | | | – | |
| Load voltage | 28VDC or less | | – | | 24VDC (10 to 28VDC) | |
| Load current | 40mA or less | | 80mA or less | | 5 to 40mA | |
| Internal voltage drop | 1.5V or less (0.8V or less at 10mA load current) | | 0.8V or less | | 4V or less | |
| Leakage current | 100μA or less at 24VDC | | | | 0.8mA or less at 24VDC | |
| Indicator light | Actuated position ..... Red LED lights up<br>Optimum operating position ..... Green LED lights up | | | | | |

• Lead wire — Oil resistant, flexible heavy duty vinyl cord, ø3.4, 0.15mm²,
3 wire (Brown, Black, Blue [Red, White, Black]), 2 wire (Brown, Blue [Red, Black]), 0.5m

Note) Refer to page 57 for auto switch common specifications and lead wire lengths.

## Weights

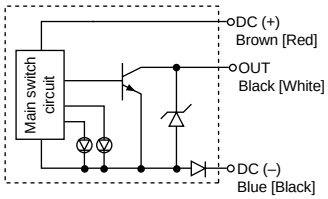
Unit: g

| Model | Lead wire length | |
|---|---|---|
| | 0.5m | 3m |
| D-Y7N, Y7P | 10 | 53 |
| D-Y7B | 9 | 50 |

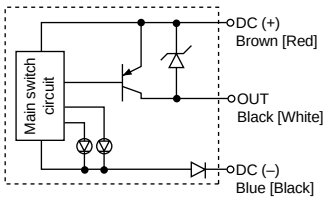
## Internal circuits

Lead wire colours inside [ ] are those prior to conformity with IEC standards.

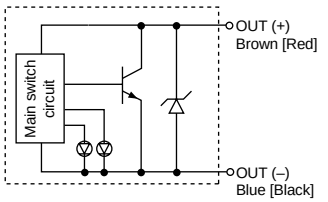
### D-Y7NW(V)/3 wire NPN output



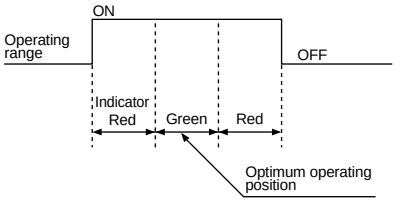

### D-Y7PW(V)/3 wire PNP output




### D-Y7BW(V)/2 wire

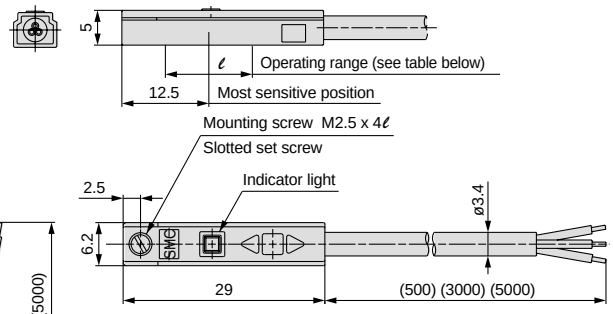



### Indicator light/Display method

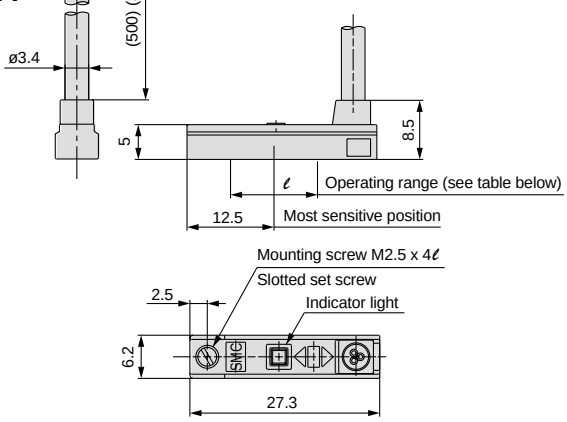



## Dimensions

### D-Y7□W




### D-Y7□WV




| Bore size / Operating range | Bore size (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 12 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| Operating range ℓ (mm) | 5.5 | 7.5 | 7.5 | 7 | 6.5 | 6 | 7 | 8 | 9.5 | 10 |

Note) This is a standard including hysteresis, and is not guaranteed. There may be large variations depending on the surrounding environment (variations on the order of ±30%).

# Water Resistant 2 Colour Indication Solid State Switches/Direct Mount Type D-Y7BAL

## Water (coolant) resistant type

## Auto Switch Specifications

### D-Y7BAL (with indicator light)

| Auto switch model no. | D-Y7BAL |
|---|---|
| Electrical entry direction | In-line |
| Wiring type | 2 wire |
| Applicable load | 24VDC relay, PLC |
| Load voltage | 24VDC (10 to 28VDC) |
| Load current | 5 to 40mA |
| Internal voltage drop | 4V or less |
| Leakage current | 1mA or less at 24VDC |
| Indicator light | Actuated position ..... Red LED lights up<br>Optimum operating position ..... Green LED lights up |

• Lead wire — Oil resistant, flexible heavy duty vinyl cord, ø3.4, 0.15mm², 2 wire (Brown, Blue [Red, Black]), 3m

Note) Refer to page 57 for auto switch common specifications and lead wire lengths.

## Weights

Unit: g

| Model | Lead wire length |
|---|---|
| | 3m |
| D-Y7BAL | 51 |

## Operating Precautions

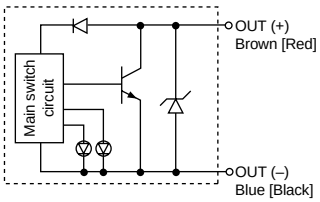
### ⚠ Caution

1. Contact SMC if a solution other than water is to be used.

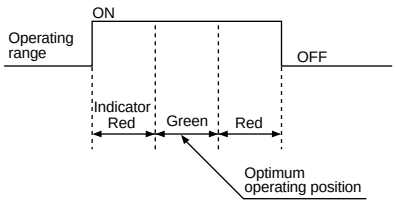
## Internal circuits

Lead wire colours inside [ ] are those prior to conformity with IEC standards.

### D-Y7BAL/2 wire

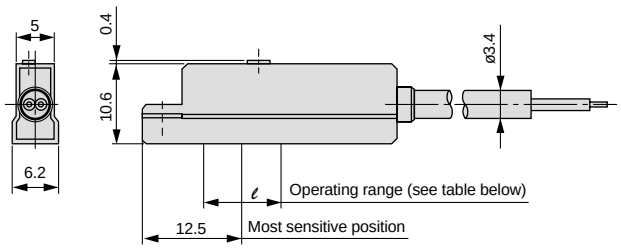


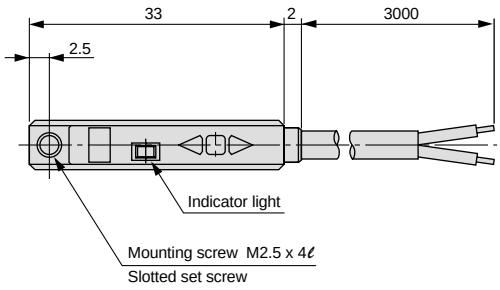

### Indicator light/Display method




## Dimensions

### D-Y7BAL




| Bore size / Operating range | Bore size (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 12 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| Operating range ℓ (mm) | 3.5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6.5 |

Note) This is a standard including hysteresis, and is not guaranteed. There may be large variations depending on the surrounding environment (variations on the order of ±30%).

# Magnetic Field Resistant 2 Colour Indication Solid State Switches/Rail Mount Type D-P5DWL



## Grommet

**Operational in an environment with magnetic field disturbance (AC magnetic field).**

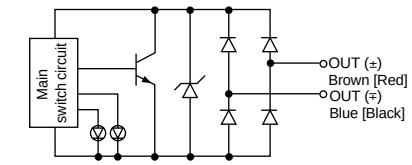
## ⚠Caution

### Handling Precautions

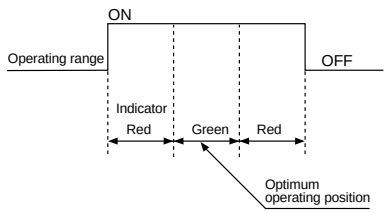
For use with single-phase AC welder.
Cannot be used with DC inverter welder (includes rectifying type), arc welder, or condenser type welder.

## Auto Switch Internal Circuit

Lead wire colours inside [ ] are those prior to conformity with IEC standards.




### Indicator light/Display method




## Auto Switch Specifications

| D-P5DW (with indicator light) | |
|---|---|
| Auto switch part no. | **D-P5DWL** |
| Wiring type | 2 wire (non-polar) |
| Applicable load | 24VDC relay, PLC |
| Load voltage | 24VDC (20 to 28VDC) |
| Load current | 6 to 40mA or less |
| Internal voltage drop | 5V or less |
| Leakage current | 1mA or less at 24VDC |
| Operating time | 40ms or less |
| Indicator light | Actuated position ..... Red LED lights up<br>Optimum operating position ... Green LED lights up |

• Lead wire — Oil resistant, heavy duty vinyl cord, ø6, 0.5mm², 2 wire (Brown, Blue [Red, Black]), 3m
Note) Refer to page 57 for auto switch common specifications and lead wire lengths.

## Magnetic Field Resistance

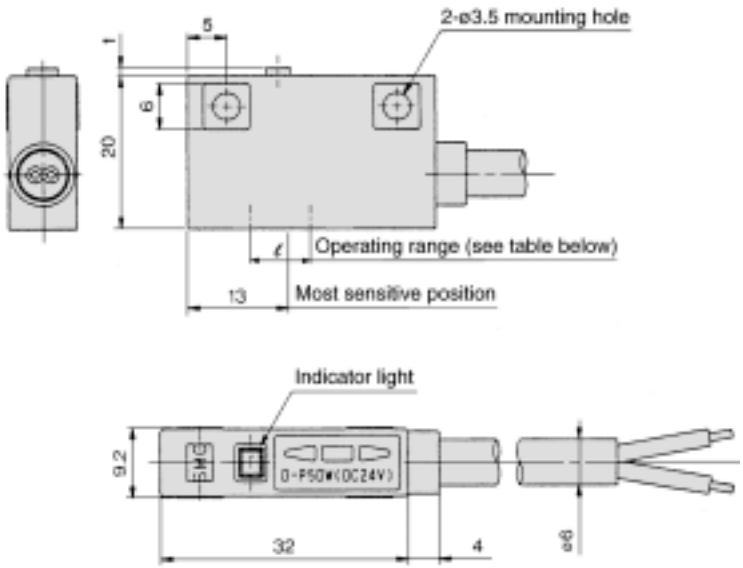
When the AC welding current is 16000A or less, the operational distance between the welding conductor (welding gun or cable) and the cylinder or auto switch is 0mm.
Consult SMC when exceeding 16000A.

## Auto Switch Weights

Unit: g

| Model | Lead wire length | |
|---|---|---|
| | 3m | 5m |
| **D-P5DWL** | 150 | 240 |

## Dimensions




| Bore size / Operating range | Bore size (mm) | | | | |
|---|---|---|---|---|---|
| | **40** | **50** | **63** | **80** | **100** |
| Operating range ℓ (mm) | 4.1 | 3.9 | 4.8 | 4.2 | 4.2 |

Note) This is a standard including hysteresis, and is not guaranteed. There may be large variations depending on the surrounding environment (variations on the order of ±30%).

# Series MGP
# Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

**⚠ Caution :** Operator error could result in injury or equipment damage.

**⚠ Warning :** Operator error could result in serious injury or loss of life.

**⚠ Danger :** In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

## ⚠ Warning

**1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

**2. Only trained personnel should operate pneumatically operated machinery and equipment.**

Compressed air can be dangerous if handled incorrectly. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

**3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.**

1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc. (Bleed air into the system gradually to create back pressure.)

**4. Contact SMC if the product is to be used in any of the following conditions:**

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

# Series MGP
# Actuator Precautions 1

**Be sure to read before handling.**



## Design

### ⚠Warning

**1. There is a danger of sudden action by air cylinders if sliding parts of machinery are twisted, etc., and changes in forces occur.**

In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be designed to avoid such dangers.

**2. A protective cover is recommended to minimize the risk of personal injury.**

If a stationary object and moving parts of a cylinder are in close proximity, personal injury may occur. Design the structure to avoid contact with the human body.

**3. Securely tighten all stationary parts and connected parts so that they will not become loose.**

Especially when a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

**4. A deceleration circuit or shock absorber, etc., may be required.**

When a driven object is operated at high speed or the load is heavy, a cylinder's cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning, or install an external shock absorber to relieve the impact. In this case, the rigidity of the machinery should also be examined.

**5. Consider a possible drop in circuit pressure due to a power outage, etc.**

When a cylinder is used in a clamping mechanism, there is a danger of work pieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

**6. Consider a possible loss of power source.**

Measures should be taken to protect against human injury and equipment damage in the event that there is a loss of power to equipment controlled by air pressure, electricity or hydraulics, etc.

**7. Design circuitry to prevent sudden lurching of driven objects.**

When a cylinder is driven by an exhaust center type directional control valve or when starting up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch at high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, equipment should be selected and circuits designed to prevent sudden lurching, because there is a danger of human injury and/or damage to equipment when this occurs.

**8. Consider emergency stops.**

Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions, a power outage or a manual emergency stop.

**9. Consider the action when operation is restarted after an emergency stop or abnormal stop.**

Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the cylinder has to be reset at the starting position, install safe manual control equipment.

## Selection

### ⚠Warning

**1. Confirm the specifications.**

The products advertised in this catalog are designed according to use in industrial compressed air systems. If the products are used in conditions where pressure, temperature, etc., are out of specification, damage and/or malfunction may be caused. Do not use in these conditions. (Refer to specifications.)

Consult SMC if you use a fluid other than compressed air.

**2. Intermediate stops.**

When intermediate stopping of a cylinder piston is performed with a 3 position closed center type directional control valve, it is difficult to achieve stopping positions as accurate and minute as with hydraulic pressure due to the compressibility of air.

Furthermore, since valves and cylinders, etc., are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time. Contact SMC in case it is necessary to hold a stopped position for an extended period.

### ⚠Caution

**1. Operate within the limits of the maximum usable stroke.**

The piston rod will be damaged when operated with the stroke exceeding the maximum stroke range. Refer to the air cylinder selection procedures regarding the maximum usable stroke.

**2. Operate the piston within a range such that collision damage will not occur at the end of the stroke.**

Operate within a range such that damage will not occur when the piston having inertial force stops by striking the cover at the stroke end. Refer to the cylinder selection procedures for the range within which damage will not occur.

**3. Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.**

**4. Provide an intermediate support for a cylinder with a long stroke.**

If the cylinder has a long stroke, provide an intermediate support to prevent the rod from sagging and the tube from flexing, as well as to prevent damage to the rod due to vibrations or external loads.

## Mounting

### ⚠Caution

**1. Be sure to connect the rod and the load so that their axial center and movement directions match.**

If they do not match, stress could be applied to the rod and the tube, causing the inner surface of the tube, the bushing, the rod surface, and the seals to wear and to become damaged.

**2. When an external guide is used, connect the external slider and the load in such a way that there is no interference at any point within the stroke.**

# Series MGP
# Actuator Precautions 2

**Be sure to read before handling.**

## Mounting

### ⚠Caution

**3. Do not scratch or gouge the sliding parts of the cylinder tube or piston rod, etc., by striking or grasping them with other objects.**

Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation. Also, scratches or gouges, etc., in the piston rod may lead to damaged seals and cause air leakage.

**4. Prevent the rotating parts from seizing.**

Apply grease to rotating parts (such as the pin) to prevent them from seizing.

**5. Do not use until you can verify that equipment can operate properly.**

Following mounting, maintenance or conversions, verify correct mounting by suitable function and leakage tests after compressed air and power are connected.

**6. Instruction manual**

The product should be mounted and operated after thoroughly reading the manual and understanding its contents.

Keep the instruction manual where it can be referred to as needed.

## Piping

### ⚠Caution

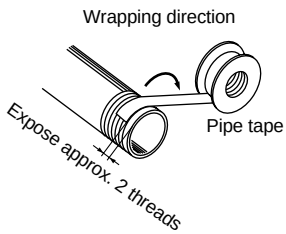
**1. Preparation before piping**

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

**2. Wrapping of pipe tape**

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping.

Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.




## Lubrication

### ⚠Caution

**1. Lubrication of lube type cylinder**

Install a lubricator in the circuit, and use class 1 turbine oil (with no additives) ISO VG32. Do not use machine oil or spindle oil.

**2. Lubrication of non-lube type cylinder**

The cylinder is lubricated at the factory and can be used without any further lubrication.

However, in the event that it will be lubricated, use class 1 turbine oil (with no additives) ISO VG32.

Stopping lubrication later may lead to malfunction due to the loss of the original lubricant. Therefore, lubrication must be continued once it has been started.

## Air Supply

### ⚠Warning

**1. Use clean air.**

Do not use compressed air that includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

### ⚠Caution

**1. Install air filters.**

Install air filters at the upstream side of valves. The filtration degree should be 5µm or finer.

**2. Install an air dryer, after-cooler or water separator, etc.**

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer, after-cooler or water separator, etc.

**3. Use the product within the specified range of fluid and ambient temperature.**

Take measures to prevent freezing, since moisture in circuits will be frozen under 5°C, and this may cause damage to seals and lead to malfunction.

Refer to SMC's "Air Cleaning Equipment" catalog for further details on compressed air quality.

## Operating Environment

### ⚠Warning

**1. Do not use in environments where there is a danger of corrosion.**

Refer to the construction drawings regarding cylinder materials.

**2. In dusty locations or where water, oil, etc., splash on the equipment, install a protective cover over the rod.**

Use cylinders with a heavy duty scraper (-XC4) in dusty areas. Use water resistant cylinders in areas where liquids are splashed or sprayed

**3. When using auto switches, do not operate in an environment with strong magnetic fields.**

## Maintenance

### ⚠Warning

**1. Perform maintenance according to the procedure indicated in the instruction manual.**

If handled improperly, malfunction and damage of machinery or equipment may occur.

**2. Removal of equipment, and supply/exhaust of compressed air.**

When machinery is removed, first check measures to prevent dropping of driven objects and run-away of equipment, etc. Then cut off the supply pressure and electric power, and exhaust all compressed air from the system.

When machinery is restarted, proceed with caution after confirming measures to prevent cylinder lurching.

### ⚠Caution

**1. Drain flushing**

Remove drainage from air filters regularly.

# Series MGP
# Auto Switch Precautions 1

**Be sure to read before handling.**



## Design and Selection

## ⚠Warning

### 1. Confirm the specifications.

Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside the range of specifications for current load, voltage, temperature or impact.

### 2. Take precautions when multiple cylinders are used close together.

When multiple auto switch cylinders are used in close proximity, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40mm. (When the allowable separation is indicated for each cylinder series, use the specified value.)

### 3. Pay attention to the length of time that a switch is ON at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

$$V(mm/s) = \frac{\text{Auto switch operating range (mm)}}{\text{Load operation time (ms)}} \times 1000$$

### 4. Keep wiring as short as possible.

**<Reed switches>**

As the length of the wiring to a load gets longer, the rush current at switching ON becomes greater, and this may shorten the product's life. (The switch will stay ON all the time.)

1) For an auto switch without a contact protection circuit, use a contact protection box when the wire length is 5m or longer.
2) Even if an auto switch has a built-in contact protection circuit, when the wiring is more than 30m long, it is not able to adequately absorb the rush current and its life maybe reduced. It is necessary to connect a contact protection box in order to extend its life. Contact SMC in this case.

**<Solid state switches>**

3) Although wire length should not affect switch function, use a wire 100m or shorter.

### 5. Pay attention to the internal voltage drop of switches.

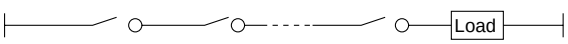
**<Reed switches>**

1) Switches with an indicator light (Except D-Z76)

- If auto switches are connected in series as shown below, take note that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to internal voltage drop in the auto switch specifications.)

[The voltage drop will be "n" times larger when "n" auto switches are connected.]

Even though an auto switch operates normally, the load may not operate.




- In the same way, when operating below a specified voltage, although an auto switch may operate normally, the load may not operate. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\text{Supply voltage} - \text{Internal voltage drop of switch} > \text{Minimum operating voltage of load}$$

2) If the internal resistance of a light emitting diode causes a problem, select a switch without an indicator light (Model D-Z80).

**<Solid state switches>**

3) Generally, the internal voltage drop will be greater with a 2 wire solid state auto switch than with a reed switch. Take the same precautions as in 1).

Also, note that a 12VDC relay is not applicable.

### 6. Pay attention to leakage current.

**<Solid state switches>**

With a 2 wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

Operating current of load (OFF condition) > Leakage current

If the criteria given in the above formula are not met, it will not reset correctly (stays ON). Use a 3 wire switch if this specification will not be satisfied.

Moreover, leakage current flow to the load will be "n" times larger when "n" auto switches are connected in parallel.

### 7. Do not use a load that generates surge voltage.

**<Reed switches>**

If driving a load such as a relay that generates a surge voltage, use a switch with a built-in contact protection circuit or use a contact protection box.

**<Solid state switches>**

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if the surge is applied repeatedly. When a load, such as a relay or solenoid which generates surge is directly driven, use a type of switch with a built-in surge absorbing element.

### 8. Cautions for use in an interlock circuit

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to avoid trouble by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch. Also perform periodic maintenance and confirm proper operation.

### 9. Ensure sufficient clearance for maintenance activities.

When designing an application, be sure to allow sufficient clearance for maintenance and inspections.

# Series MGP
# Auto Switch Precautions 2

**Be sure to read before handling.**

## Mounting and Adjustment

### ⚠Warning

**1. Do not drop or bump.**

Do not drop, bump or apply excessive impacts (300m/s² or more for reed switches and 1000m/s² or more for solid state switches) while handling.

Although the body of the switch may not be damaged, the inside of the switch could be damaged and cause a malfunction.

**2. Do not carry a cylinder by the auto switch lead wires.**

Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress.

**3. Mount switches using the proper fastening torque.**

When a switch is tightened beyond the range of fastening torque, the mounting screws, mounting bracket or switch may be damaged. On the other hand, tightening below the range of fastening torque may allow the switch to slip out of position.

**4. Mount a switch at the center of the operating range.**

Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON).

(The mounting position shown in the catalog indicates the optimum position at stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

## Wiring

### ⚠Warning

**1. Avoid repeatedly bending or stretching lead wires.**

Broken lead wires will result from wiring patterns which repeatedly apply bending stress or stretching force to the lead wires.

**2. Be sure to connect the load before power is applied.**

**<2 wire type>**

If the power is turned ON when an auto switch is not connected to a load, the switch will be instantly damaged because of excess current.

**3. Confirm proper insulation of wiring.**

Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

**4. Do not wire with power lines or high voltage lines.**

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits, including auto switches, may malfunction due to noise from these other lines.

## Wiring

### ⚠Warning

**5. Do not allow short circuit of loads.**

**<Reed switches>**

If the power is turned ON with a load in a short circuited condition, the switch will be instantly damaged because of excess current flow into the switch.

**<Solid state switches>**

All models of PNP output type switches do not have built-in short circuit protection circuits. If loads are short circuited, the switches will be instantly damaged as in the case of reed switches.
Take special care to avoid reverse wiring with the brown [red] power supply line and the black [white] output line on 3 wire type switches.

**6. Avoid incorrect wiring.**

**<Reed switches>**

A 24VDC switch with indicator light has polarity. The brown [red] lead wire or terminal no. 1 is (+), and the blue [black] lead wire or terminal no. 2 is (–).

1) If connections are reversed, a switch will operate, however, the light emitting diode will not light up.

Also note that a current greater than that specified will damage a light emitting diode and it will no longer operate.

Applicable models: D-Z73

**<Solid state switches>**

1) If connections are reversed on a 2 wire type switch, the switch will not be damaged if protected by a protection circuit, but the switch will always stay in an ON state. However, it is still necessary to avoid reversed connections, since the switch could be damaged by a load short circuit in this condition.

2) If connections are reversed (power supply line + and power supply line –) on a 3 wire type switch, the switch will be protected by a protection circuit. However, if the power supply line (+) is connected to the blue [black] wire and the power supply line (–) is connected to the black [white] wire, the switch will be damaged.

### ∗ Lead wire color changes

Lead wire colors of SMC switches have been changed in order to meet NECA Standard 0402 for production beginning September, 1996 and thereafter. Please refer to the tables provided.
Special care should be taken regarding wire polarity during the time that the old colors still coexist with the new colors.

**2 wire**

| | Old | New |
|---|---|---|
| Output (+) | Red | Brown |
| Output (–) | Black | Blue |

**3 wire**

| | Old | New |
|---|---|---|
| Power supply | Red | Brown |
| GND | Black | Blue |
| Output | White | Black |

**Solid state with diagnostic output**

| | Old | New |
|---|---|---|
| Power supply | Red | Brown |
| GND | Black | Blue |
| Output | White | Black |
| Diagnostic Output | Yellow | Orange |

**Solid state with latch type diagnostic output**

| | Old | New |
|---|---|---|
| Power supply | Red | Brown |
| GND | Black | Blue |
| Output | White | Black |
| Latch type diagnostic output | Yellow | Orange |

Note) Lead wire colours inside [ ] are those prior to conformity with NECA standards.

# Series MGP
# Auto Switch Precautions 3

**Be sure to read before handling.**



## Operating Environment

### ⚠Warning

**1. Never use in an atmosphere of explosive gases.**

The construction of auto switches is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

**2. Do not use in an area where a magnetic field is generated.**

Auto switches will malfunction or magnets inside cylinders will become demagnetized. (Consult SMC regarding the availability of a magnetic field resistant auto switch.)

**3. Do not use in an environment where the auto switch will be continually exposed to water.**

Do not use switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside switches may cause malfunction.

**4. Do not use in an environment with oil or chemicals.**

Consult SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, malfunction due to swelling of the potting resin, or hardening of the lead wires.

**5. Do not use in an environment with temperature cycles.**

Consult SMC if switches are used where there are temperature cycles other than normal temperature changes, as they may be adversely affected internally.

**6. Do not use in an environment where there is excessive impact shock.**

**<Reed switches>**

When excessive impact (300m/s² or more) is applied to a reed switch during operation, the contact point will malfunction and generate or cut off a signal momentarily (1ms or less). Consult SMC regarding the need to use a solid state switch depending upon the environment.

**7. Do not use in an area where surges are generated.**

**<Solid state switches>**

When there are units (solenoid type lifter, high frequency induction furnace, motor, etc.) which generate a large amount of surge in the area around cylinders with solid state auto switches, this may cause deterioration or damage to the switch. Avoid sources of surge generation and crossed lines.

**8. Avoid accumulation of iron waste or close contact with magnetic substances.**

When a large amount of ferrous waste such as machining chips or spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with an auto switch cylinder, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder.

## Maintenance

### ⚠Warning

**1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.**

1) Securely tighten switch mounting screws.

If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.

2) Confirm that there is no damage to lead wires.

To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.

3) Confirm the lighting of the green light on the 2 colour indicator type switch.

Confirm that the green LED is on when stopped at the established position. If the red LED is on, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

## Other

### ⚠Warning

**1. Consult SMC concerning water resistance, elasticity of lead wires, and usage at welding sites, etc.**

# Series MGP
# Specific Product Precautions

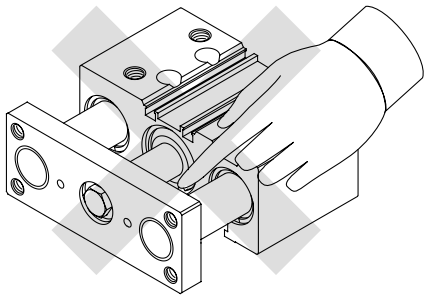
**Be sure to read before handling. Refer to pages 64 through 69 for safety instructions, actuator precautions and auto switch precautions.**

## Mounting

### ⚠Warning

**1. Do not put hands or fingers, etc. between the plate and body.**

Be careful that hands or fingers, etc., do not get caught in the space between the cylinder body and the plate when air pressure is applied.



### ⚠Caution

**1. Do not scratch or nick the sliding parts of the piston rod and guide rods.**

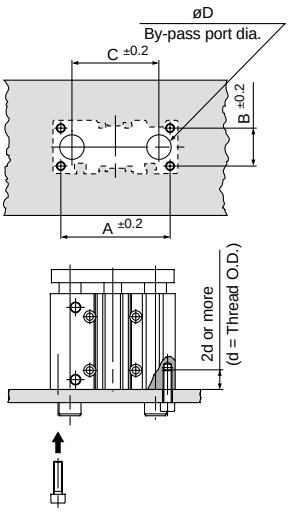
Damage to seals can cause air leaks or malfunction, etc.

**2. Bottom of cylinder.**

The guide rods protrude from the bottom of the cylinder at the end of the retracting stroke, and therefore, in cases where the cylinder is to be bottom mounted, it is necessary to provide by-pass ports in the mounting surface for the guide rods, as well as holes for the hexagon socket head screws which are used for mounting.

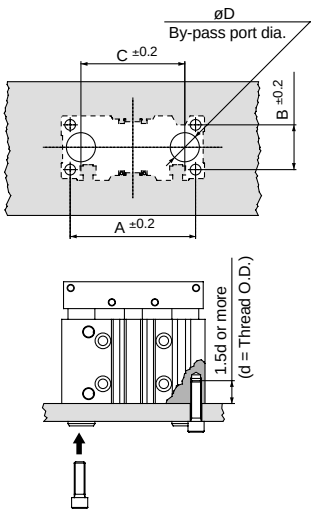
Moreover, in applications where impact occurs from a stopper, etc., the mounting bolts should be inserted to a depth of 2d or more (1.5d or more for MGPS).

#### Series MGP




| Bore size (mm) | A (mm) | B (mm) | C (mm) | D (mm) MGPM | D (mm) MGPL | Hexagon socket mounting bolt |
|---|---|---|---|---|---|---|
| **12** | 50 | 18 | 41 | 10 | 8 | M4 x 0.7 |
| **16** | 56 | 22 | 46 | 12 | 10 | M5 x 0.8 |
| **20** | 72 | 24 | 54 | 14 | 12 | M5 x 0.8 |
| **25** | 82 | 30 | 64 | 18 | 15 | M6 x 1.0 |
| **32** | 98 | 34 | 78 | 22 | 18 | M8 x 1.25 |
| **40** | 106 | 40 | 86 | 22 | 18 | M8 x 1.25 |
| **50** | 130 | 46 | 110 | 27 | 22 | M10 x 1.5 |
| **63** | 142 | 58 | 124 | 27 | 22 | M10 x 1.5 |
| **80** | 180 | 54 | 156 | 33 | 28 | M12 x 1.75 |
| **100** | 210 | 62 | 188 | 39 | 33 | M14 x 2.0 |

#### Series MGPS




| Bore size (mm) | A (mm) | B (mm) | C (mm) | D (mm) | Hexagon socket mounting bolt |
|---|---|---|---|---|---|
| **50** | 140 | 50 | 116 | 32 | M12 x 1.75 |
| **80** | 214 | 66 | 170 | 47 | M16 x 2 |

## Cushion

**When equipped with air cushion**

### ⚠Caution

**1. Keep the adjustment range of the cushion valve within 3 rotations of the completely closed position.**

When adjusting the cushion valve, use the following screw driver or hexagon wrenches. Keep the adjustment range of the cushion valve within 3 rotations of the completely closed position. Air leakage will occur if operated after opening by 4 rotations or more. Furthermore, a stopper mechanism is provided for the cushion valve, and it should not be forced open beyond that position.

| Bore size (mm) | Applicable tool |
|---|---|
| **16** | Flat head watchmakers screw driver 3mm |
| **20, 25, 32, 40** | JIS B4648 hexagon wrench key 1.5 |
| **50, 63** | JIS B4648 hexagon wrench key 2.5 |
| **80, 100** | JIS B4648 hexagon wrench key 4 |

**2. Be sure to activate the air cushion at the cylinder stroke end.**

Be sure to activate the air cushion at the end of the cylinder stroke. When it is intended to operate with the cushion valve fully opened, select a cylinder equipped with rubber bumper. If operated without confirming this point, the piston rod assembly, etc., may be damaged.

**3. Be sure to operate a cylinder equipped with air cushion to the end of the stroke.**

If it is not operated to the end of the stroke, the effect of the air cushion will not be fully exhibited. Consequently, in cases where the stroke is regulated by an external stopper, etc., caution must be exercised, as the air cushion may become completely ineffective.

## Piping

### ⚠Caution

**Depending on the operating conditions, piping port positions can be changed by using a plug.**

**1. For M5**

After tightening by hand, tighten an extra 1/6 to 1/4 rotation with a tightening tool.

**2. For taper thread**

Use the correct tightening torques listed below. Before tightening the plug, wrap pipe tape around it.

| Connection thread size | Correct tightening torque N·m |
|---|---|
| R 1/8 | 7 to 9 |
| R 1/4 | 12 to 14 |
| R 3/8 | 22 to 24 |

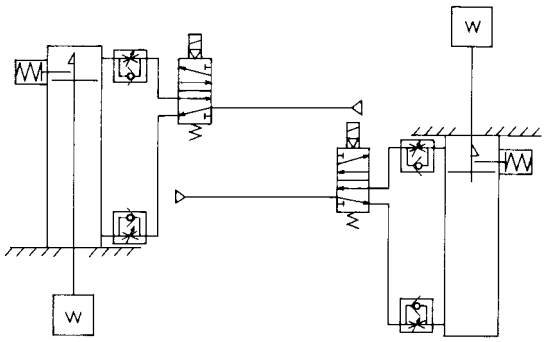
# Series MGP
# Specific Product Precautions

**Be sure to read before handling. Refer to pages 64 through 69 for safety instructions, actuator precautions and auto switch precautions.**

## Use the recommended pneumatic circuits.

### ⚠Caution

**• This is necessary for proper operation and release of the lock.**




With rear lock

With front lock

## Operation

### ⚠Caution

**1. Do not use 3 position solenoid valves.**

Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked.
Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.

**2. Back pressure is required when releasing the lock.**

Before starting operation, be sure to control the system so that air is supplied to the side without the lock mechanism as shown in the figure above. There is a possibility that the lock may not be released. (Refer to the section on releasing the lock.)

**3. Release the lock when mounting or adjusting the cylinder.**

If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.

**4. Operate with a load ratio of 50% or less.**

If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit. Furthermore, do not exceed the operating ranges indicated in the series MGP catalog (Best Pneumatics No. 2) when making selections.

**5. Do not operate multiple synchronized cylinders.**

Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.

**6. Use a speed controller with the meter-out function.**

It may not be possible to release the lock with meter-in control.

**7. Be sure to operate completely to the cylinder stroke end on the side with the lock.**

If the cylinder piston does not reach the end of the stroke, locking and unlocking may not be possible.

**8. Do not use an air cylinder as an air-hydro cylinder.**

This will cause leakage of hydraulic fluid.

**9. Adjust an auto switch's position so that it operates for movement to both the stroke and backlash (2mm) positions.**

A 2 color indication switch adjusted for green indication at the stroke end may change to red indication after the backlash return, but this is not abnormal.

## Operating Pressure

### ⚠Caution

**1.** Use air pressure of at least 0.15MPa for the port on the lock mechanism side. This is necessary to release the lock.

## Exhaust Speed

### ⚠Caution

**1.** Locking will occur automatically if the pressure applied to the port on the lock mechanism side falls to 0.05MPa or less. In cases where the piping on the lock mechanism side is long and thin, or the speed controller is separated at some distance from the cylinder port, the exhaust speed will be reduced. Take note that some time may be required for the lock to engage. In addition, clogging of a silencer mounted on the solenoid valve exhaust port can produce the same effect.

## Releasing the Lock

### ⚠Warning

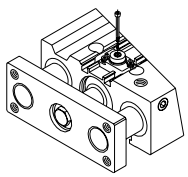
**1.** Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. (Refer to the recommended pneumatic circuits.) If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Furthermore, sudden movement of the piston rod is very dangerous.

## Manual Release

### ⚠Caution

**1. Non-locking type manual release**

Insert the accessory bolt from the top of the rubber cap (it is not necessary to remove the rubber cap), and after screwing it into the lock piston, pull it to release the lock. If you stop pulling the bolt, the lock will return to an operational state. Thread sizes, pulling forces and strokes are as shown below.

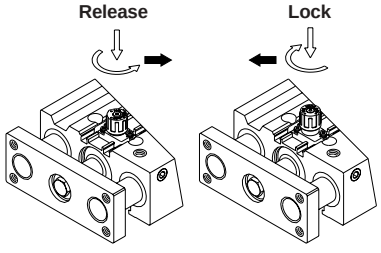


| Bore size (mm) | Thread size | Pulling force N | Stroke (mm) |
|---|---|---|---|
| **20, 25, 32** | M2.5 x 0.45 x 25ℓ or more | 4.9N | 2 |
| **40, 50, 63** | M3 x 0.5 x 30ℓ or more | 10N | 3 |
| **80, 100** | M5 x 0.8 x 40ℓ or more | 24.5N | 3 |

∗ Remove the bolt for normal operation. It can cause lock malfunction or faulty release.

**2. Locking type manual release**

While pushing the M/O knob turn it 90° counter clockwise. The lock is released (and remains in a released state) by aligning the ▲ mark on the cap with the ▼ OFF mark on the M/O knob. To operate the lock, turn the M/O knob 90° clockwise while pushing it all the way down, and align the ▲ mark on the cap with the ▼ ON mark on the M/O knob. When doing this, be sure that it locks into place with a click. Failure to click into place properly, can cause the lock to disengage.




Locked condition

Released condition

ALMOTION SMC

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