

MOTOYAMA

General Specifications

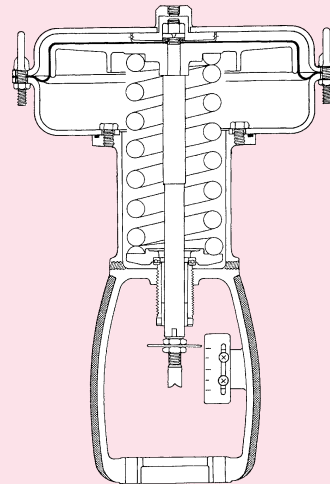
Model 2800

SINGLE-SPRING TYPE DIAPHRAGM ACTUATORS

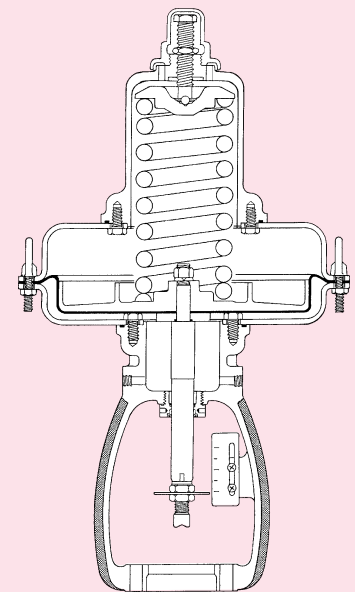
Model 2800 diaphragm actuators provide the operation to control the valve travel balancing between the force on the diaphragm by the signal air pressure, and the spring force.

The Model 2800 diaphragm actuators are designed for large output thrust applying single-spring type, to be installed on large size valve bodies.

Direct Action (DA)
(Air-to stem down)



Reverse Action (RA)
(Air-to stem up)



1. SPECIFICATIONS

| | | | | | | |
|--|---|---|--------------|------|--------------|-------|
| Type | Model 2800 Pneumatic single-acting spring diaphragm actuator | | | | | |
| Action | Direct action (DA), Reverse action (RA) | | | | | |
| Actuator Sizes | 500S | 500L | 650S | 650L | 650XS | 650XL |
| Max Stroke (mm) | 65 | 100 | 65 | 130 | 65 | 130 |
| Output Thrust N (kgf) [at off-balance 80kPaG (0.8kgf/cm ² G)] | 9490 (968) | | 16470 (1680) | | 32950 (3360) | |
| Hysteresis Error | With positioner | Max. 1 % F.S. ⁽²⁾ | | | | |
| | Without positioner | Max. 4 % F.S. ⁽²⁾ | | | | |
| Linearity | With positioner | Max. ± 1 % F.S. ⁽²⁾ | | | | |
| | Without positioner | Max. ± 5 % F.S. ⁽²⁾ | | | | |
| Materials | Diaphragm | Cloth reinforced chloroprene rubber (※ Ethylene propylene rubber) | | | | |
| | Yoke | FC200 (※ SCPH2) | | | | |
| Supply Air Pressure kPaG (kgf/cm²G) | 120 (1.2), 240 (2.4), 280 (2.8), (120 only for 500 S / L) | | | | | |
| Spring Range kPaG (kgf/cm²G) | 20 ~ 100(0.2 ~ 1.0), 40 ~ 200(0.4 ~ 2.0), 60 ~ 220(0.6 ~ 2.2), 80 ~ 240(0.8 ~ 2.4), 100 ~ 220 (1.0 ~ 2.2) [(20 ~ 100 only for 500 S/L)] | | | | | |
| Air Connection | Rc 1/4 (500S, 500L), Rc 3/8 (650S, 650L, 650XS, 650XL), ※ NPT | | | | | |
| Ambient Temperature | - 30 °C ~ + 70 °C (※ - 50 °C ~ - 30 °C, + 70 °C ~ + 100 °C) | | | | | |
| Dimensions, Masses | See page 2 Table 1. | | | | | |
| Painting Color | Silver | | | | | |
| Options* | Additional Mechanisms | Top-mounted handwheel, Side-mounted handwheel, Travel stop, Oil dash pot | | | | |
| | Accessories | Pneumatic positioner (IP300), Electro-pneumatic positioner (EA91A, EA90A, EA10S), Air filter regulator (MR2000), Limit switch, Solenoid valve, Booster relay, Speed controller, Lock up valve | | | | |

[Note] (1) ※ is available as option.

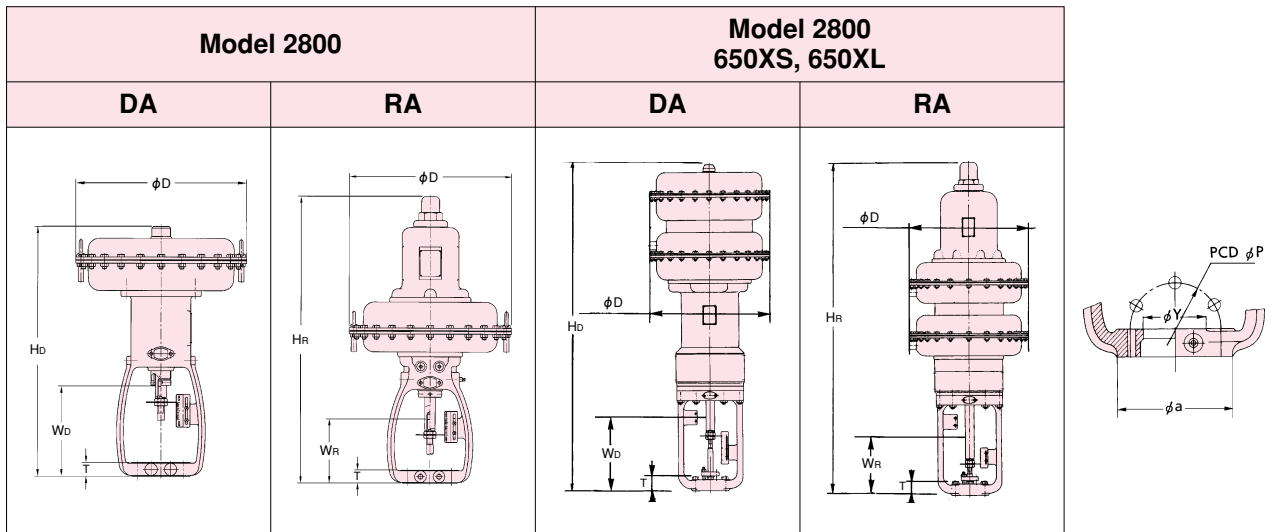
(2) Without positioner, the performance may vary in combination with valve type and gland packing.

(3) Material designation is represented by new JIS (SI Unit). Please consent in advance that approval drawings and other documents may represent with old material designation.

Table 1. Dimensions and Weight

Unit : mm

| Actuator Size | | 500S | 500L | 650S | 650L | 650XS | 650XL | |
|--|---|---------------------|-----------------------------|-------|----------------------------|-------|-----------|------|
| Effective Diaphragm Area (cm ²) | | 1210 | | 2100 | | 4200 | | |
| Max. Diaphragm Chamber Volume (cm ³) | DA | 10100 | 13500 | 16400 | 27600 | 16400 | 27600 | |
| | RA | 11500 | 16200 | 17800 | 29100 | 17800 | 29100 | |
| External Dimensions (mm) | Outside Dia. of Diaphragm Casing ϕD | 500 | | 650 | | | | |
| | Height | DA ; H _D | 734 | 820 | 1030 | 1133 | 1509 | 1744 |
| | | RA ; H _R | 885 | 955 | 1270 | 1425 | 1803 | 2038 |
| | Stem Length | DA ; W _D | 265 | | 273 | 309 | 308 | 370 |
| | | RA ; W _R | 200 | 165 | 207 | 179 | 243 | 240 |
| | Threads of valve stem | | W 3/4 ¹⁰ threads | | W 7/8 ⁹ threads | | M30 × 2.0 | |
| | Yoke Insertion Dia. ϕY | | 100 | | 120 | | | |
| | Yoke Thickness T | | 40 | | 43 | | 60 | |
| | Yoke Mounted Thread Hole PCD ϕP | | 135 | | 160 | | | |
| | No. and Dia. of Yoke Mounted Thread Hole | | 6- ϕ 19 | | 6- ϕ 23 | | | |
| Yoke Spud Dia ϕa | | 170 | | 200 | | | | |
| Approximate Weight (kg) | DA | 85 | 102 | 270 | 275 | 365 | 395 | |
| | RA | 100 | 120 | 295 | 300 | 395 | 425 | |



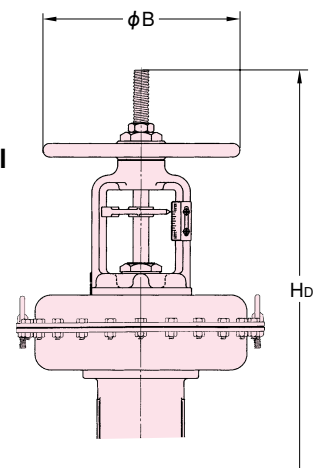
2. ADDITIONAL MECHANISMS

1 Top-mounted Handwheels (only for 500S, 500L DA)

Table 2. Dimensions and Weights for unit with Top-mounted Handwheel

| Actuator Size | 500 S | 500 L |
|----------------------------|-------|-------|
| Handwheel Dia. ϕB | 400 | |
| Max. Height H _D | 1159 | 1245 |
| Max. Stroke | 65 | 100 |
| Turns for Max. Stroke | 12.8 | 19.7 |
| Approximate Weight (kg) | 110 | 130 |

Unit : mm



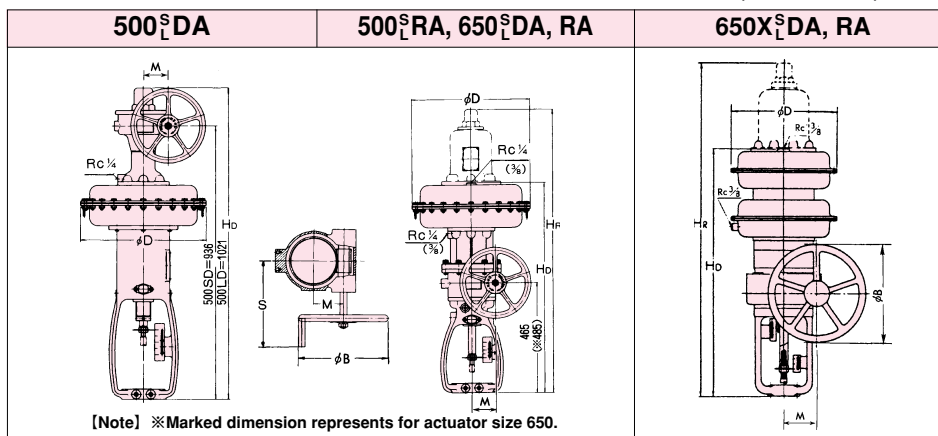
2 Side-mounted Handwheels

Table 3. Dimensions and Weight for unit with Side-mounted Handwheel

Unit : mm

| Actuator Size | 500S | 500L | 650S | 650L | 650XS | 650XL | |
|-----------------------------|---------------------|----------|----------|----------|----------|----------|------|
| Handwheel Dia ϕ B | 300 | | 400 | | 500 | | |
| Handwheel Projection S | 285 | | 300 | | 330 | | |
| Height | DA ; H _D | 1113 | 1198 | 1140 | 1243 | 1722 | 1957 |
| | RA ; H _R | 1180 | 1250 | 1380 | 1535 | 2016 | 2251 |
| Center-to-center distance M | 100 | | 115 | | 204 | | |
| Max. Stroke | 65 | 100 | 65 | 130 | 65 | 130 | |
| Turns for Max. Stroke | 177.5 | 273 | 92.2 | 184.4 | 148 | 297 | |
| Approximate Weight (kg) | 130(150) | 150(175) | 315(330) | 320(350) | 415(440) | 450(485) | |

[Note] Dimensions in parenthesis represent for Reverse Action (RA).



[Note] *Marked dimension represents for actuator size 650.

3 Travel Stops

Travel stops are used to limit the valve travel to certain position for application purpose.

< Example >

Actuator size 500 S, direct action, push-down close, to limit full open

500S -DU-O

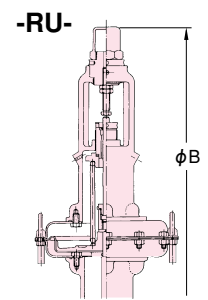
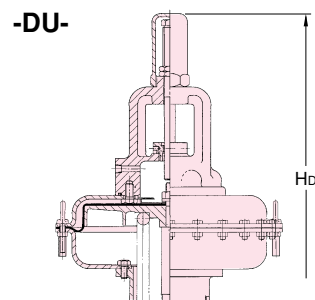
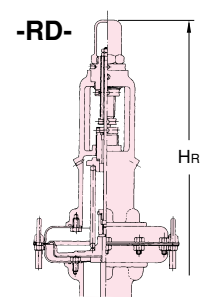
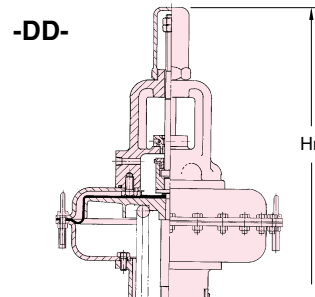
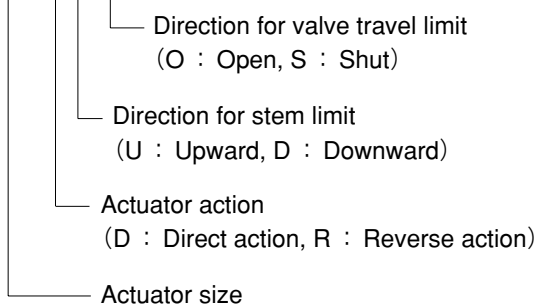


Table 4. Heights of Travel Stop and Classification

Unit : mm

| Actuator Action | Direction for Stem Limit | Symbol | Direction for Valve Travel Limit | Application | Height | Actuator Size | | | |
|---------------------|--------------------------|--------|----------------------------------|--|----------------|---------------|------|------|------|
| | | | | | | 500S | 500L | 650S | 650L |
| Direct Action (DA) | Downward-D | -DD | Shut-S | Limit for full shut of push-down close valve | H _D | 1031 | 1152 | 1443 | 1546 |
| | | | Open-O | Limit for full shut of push-down open valve | | | | | |
| | Upward-U | -DU | Shut-S | Limit for full shut of push-down open valve | | | | | |
| | | | Open-O | Limit for full shut of push-down close valve | | | | | |
| Reverse Action (RA) | Downward-D | -RD | Shut-S | Limit for full shut of push-down close valve | H _R | 1164 | — | — | — |
| | Upward-U | -RU | Open-O | Limit for full shut of push-down close valve | | 1095 | — | — | — |

[Note] The stroke range of travel stop may be limited by conditions in service.

Model 2800



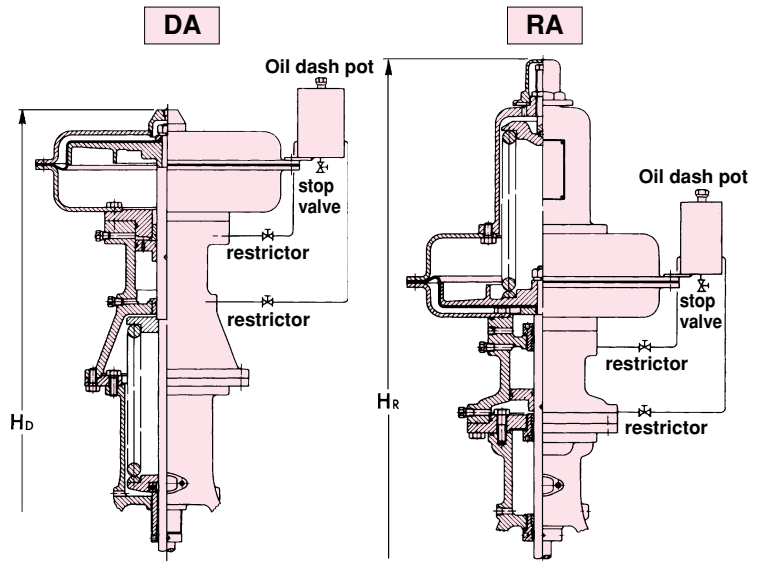
4 Oil Dash Pots (Dampers)

Please inquire to use the oil dash pot under the following conditions.

- For single seated valve,
fluid flows in direction to close the valve plug.
- For double seated valve,
 - (1) inlet pressure is high, and fluctuation of differential pressure is large.
 - (2) Velocity of fluid is high.

Table 5. Dimensions for Oil Dash Pot

| | | Unit : mm | | | |
|---------------|---------------------|-----------|------|------|------|
| Actuator Size | | 500S | 500L | 650S | 650L |
| Height (mm) | DA ; H _D | 1065 | 1220 | 1540 | 1645 |
| | RA ; H _R | 1105 | 1300 | 1560 | 1715 |



3. POSITIONER MOUNTING DIMENSIONS

1 Pneumatic Positioner IP300

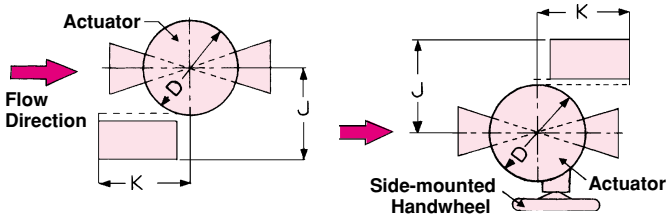


Table.6. Mounting Dimensions for IP300

| Actuator Size | Unit : mm | | | | | | | |
|--------------------------------|-----------|----|----|----|-------|----|----|----|
| | 500 S | | | | 500 L | | | |
| Actuator outside Dia. ϕD | 500 | | | | 650 | | | |
| Action | DA | RA | DA | RA | DA | RA | DA | RA |
| J | 170 | | | | 240 | | | |
| K | 270 | | | | 270 | | | |

2 Electro-pneumatic Positioner EA91A, EA90A

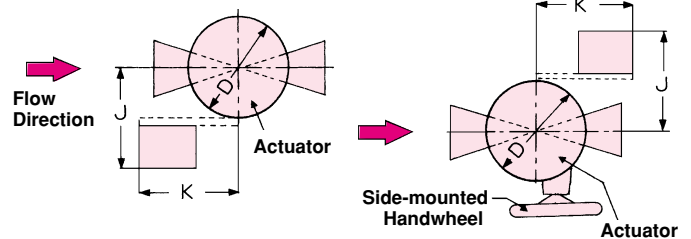


Table.7. Mounting Dimensions for EA91A, EA90A

| Actuator Size | Unit : mm | |
|--------------------------------|-------------------------------|-------------------------------|
| | 500 ^S _L | 650 ^S _L |
| Actuator outside Dia. ϕD | 500 | 650 |
| J | 225 | 300 |
| K | 245 | |

[Note] The mounting dimensions for other positioner may be different from the above mentioned.

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■ MOTOYAMA is continuously improving and upgrading its product design, specifications and/or dimensions. Information included herein is subject to change without notice.



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