

Control Valve Actuator Range

Catalogue 8500



Welcome to Koso Kent Intrl Limited

Recently acquired by Nihon Koso Co. Ltd. of Japan, Koso Kent Intrl Ltd is based in Brighouse West Yorkshire. Originally formed in 1967 under the name of Intrl Ltd, it has seen various changes over the years. Each change has seen the company become much stronger and well positioned to meet the demands of a forever changing market place.

Koso Kent Intrl specialises in the supply of Standard Service Control Valves, Severe Service Control Valves and High Technology Surface Choke Valves. We have gained a reputation for supplying specially designed high quality valves for the most onerous service conditions.

With operating facilities worldwide, Nihon Koso's goal is "to achieve the possibilities of the future as we exceed the expectations of today".



The Koso Group of Companies

The Koso group of companies specialise in the Controls and Process Automation Systems market. The key products and services that we provide are; Control Valves, High Technology Surface Choke Valves, Actuators, Instrumentation, Factory Automation Systems, Chemical Pumps and Production



- 1** Koso International Inc.
Pacific Seismic Products Inc.
- 2** Koso America Inc. Houston Office.
- 3** Koso America Inc.
- 4** Koso Kent Intrl Ltd.
- 5** Koso Fluid Controls PVT Ltd.
Kent Intrl PVT Ltd.

- 6** Koso Controls Asia Pte. Ltd.
Koso Kent Intrl Ltd. Singapore Office.
- 7** Nihon Koso Co. Ltd Beijing Office.
- 8** Koso Control Engineering (Wuxi) Co. Ltd.
Koso Control Engineering Co. Ltd.
Wuxi Koso Valve Castings Co. Ltd.

- 9** Ar-Koso Automatic Control Instrument Co. Ltd.
- 10** Korea Koso Co. Ltd.
Korea Koso Engineering Co. Ltd.
- 11** Hangzhou Hangyang Koso Pump & Valve Co. Ltd.
- 12** Nihon Koso Co. Ltd.

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Valve Fitted With Piston Actuator

Koso Kent Intrl's Control Valve Actuator Products

At Koso Kent Intrl an unrivalled blend of proven expertise, innovative design technology and skilled engineering is the motivating force behind the development of the Intrl range of high quality actuators. Thousands of Intrl Series C,D and G Actuators are installed around the world on projects for some of the worlds leading oil and gas production companies.

Koso Kent Intrl manufactures from it's plant in the UK, with global sales and application support from specialist sales people and carefully selected channel partners throughout the world.

Quality Manufacturing

Maintaining the highest standards of quality throughout design, production and customer service is the cornerstone of Koso Kent Intrl's philosophy. Our plant is accredited in accordance with Quality Management System ISO 9001 and Environmental Management System ISO 14001. In addition all chokes, where applicable, conform to ATEX, PED and are CE marked accordingly. Safety is the key element in anything we do.



Series G Spring Return Diaphragm Actuator

The G Series actuator is a well proven design, its robust design makes it suitable for the majority of control valve applications. It is a field proven design (50,000 units first supplied in 1986). It is available in a number of sizes, built with field reversible fail action with no additional parts.

Performance

- Reliability.
- High Power.
- Full response.
- Low Hysteresis.

Design Flexibility

- Reversible fail action without extra parts.
- Split Coupling for easy attachment to valve plug stem.
- Wide selection of optional accessories available, many without modification of standard unit.
- Involute rolling diaphragm simplifies actuator design.
- Variable travel / stroke up to 8.

Design Integrity

- Robust steel construction.
- Low stressed alloy steel springs.
- Twin seal seal box with wiper system.

Quality Manufacturing

- High quality material with traceability throughout manufacture.
- Quality Assurance systems in accordance with ISO9000 2000
- Comprehensively tested to ensure specified performance on site.

The G Series diaphragm has been developed from Introl's highly successful 'A' Series range. The use of an involute rolling diaphragm permits the long travels required without the need for the expensive hardware normally associated with rolling diaphragm types. A wide selection of spring ranges are available and the use of ball thrust races prevents torsional loads being applied to the diaphragm as well as reducing the effort required to precompress the spring. The modular design allows retrofitting of many of the optional extras without modification of the basic unit. For standard application the diaphragm actuator offers the following advantages over the conventional piston type:

- Increased life and reliability, accurate honed bores with delicate sealing systems are not required.
- Low cost, simple maintenance.
- High performance, low friction rolling diaphragm gives comparable hysteresis with piston types.

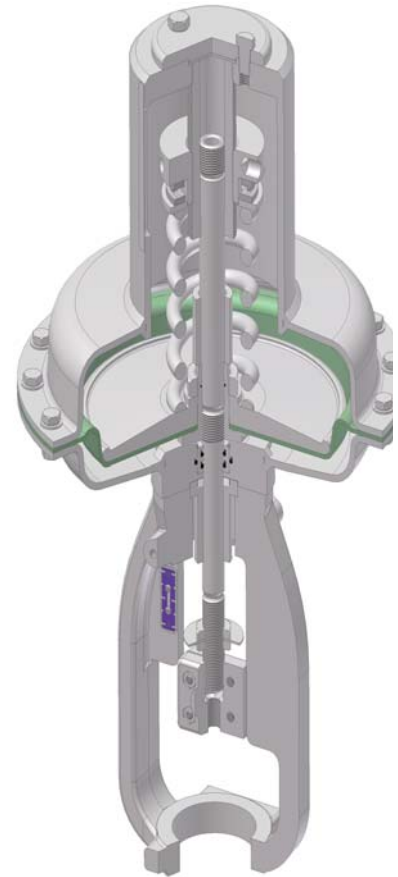


Fig.1 'G' Series Diaphragm Actuator

Table: 1 Actuator working conditions.

| Actuator Details | Size | | Max. Travel | | Max. Continuous Working Pressure at 20°C | | Max. Working Temperature | | Min. Storage Temperature | | Max. Working Temperature | |
|------------------------------|-----------------|-----------------|-------------|-----|--|---------------------|--------------------------|-----|--------------------------|-----|--------------------------|----|
| | in ² | cm ² | ins | mm | lbf/in ² | kgf/cm ² | °F | °C | °F | °C | °F | °C |
| Series 'G' Diaphragm/ Spring | 75 | 483 | 8 | 203 | 60 | 4.1 | -40 | -40 | -67 | -55 | 194 | 90 |
| Series 'G' Diaphragm/ Spring | 150 | 968 | 8 | 203 | 60 | 4.1 | -40 | -40 | -67 | -55 | 194 | 90 |
| Series 'G' Diaphragm/ Spring | 300 | 1930 | 8 | 203 | 60 | 4.1 | -40 | -40 | -67 | -55 | 194 | 90 |
| Series 'H' Diaphragm/ Spring | All | 1930 | 8 | 203 | 60 | 4.1 | -40 | -40 | -67 | -55 | 194 | 90 |

Top Mounted Handwheel/ Jacking Screw

(Fig.2)

The Introl top mounted handwheel is of the continuously connected design. It is available for the 075 and 150 size actuators and may be fitted retrospectively without any modification of the standard unit. The handwheel is capable of providing operating forces in either direction and does not rely on the actuator spring to provide return motion. The handwheel can also act as a limit stop to limit either the amount of valve opening or closing.



Fig. 2 top mounted handwheel/ jacking screw

Side Mounted Handwheel unit (Continuously Connected)

(Fig.3)

This unit is available for all sizes of actuator with travels up to and including 8. The arrangement operates through a permanently lubricated worm gear box which is conveniently located between the yoke and actuator to give a readily accessible handwheel position. The gearing has been selected to ensure easy operation even with the maximum actuator power. The side mounted handwheel unit may be fitted retrospectively if required.



Fig. 3. Side mounted Handwheel Unit

Minimum / Maximum Limit Stops

(Fig.4 & 5).

Top mounted limit stops may be fitted to all sizes of actuator and may be fitted retrospectively without modification of the standard actuator. They can be used to limit either valve opening or closing and are fully

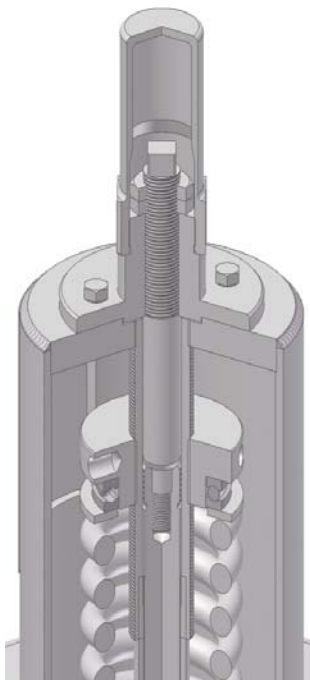


Fig 4. Minimum Limit Stop

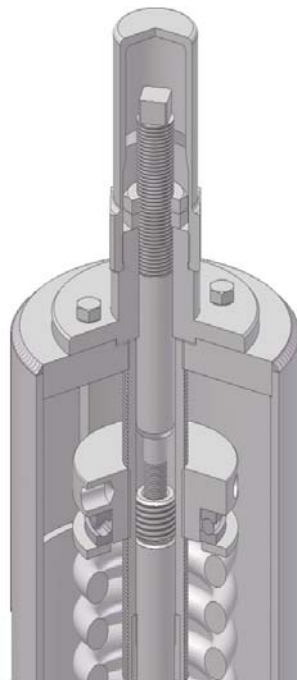


Fig 5. Maximum Limit Stop

Table: 2 Handwheel Specification

| Actuator Resistance | Top Mounted Handwheel | | | | | | | | Side Mounted Handwheel | | | | | | | |
|---------------------|-----------------------|-----|-------------------|---------------------|---------------------|-----------|-----------|------------|------------------------|----------------|-----------|-------------------|---------------|-----------|------------|------|
| | Handwheel Dia. | | Turns/Inch Travel | Turning Force | | | | Stem Force | | Handwheel Dia. | | Turns/Inch Travel | Turning Force | | Stem Force | |
| | Ins. (mm) | 305 | | Assisting lbf (kgf) | Resisting lbf (kgf) | lbf (kgf) | lbf (kgf) | Ins. (mm) | 305 | lbf (kgf) | lbf (kgf) | | lbf (kgf) | lbf (kgf) | | |
| 75 | 12 | 305 | 6 | 25 | 11 | 12 | 23 | 3375 | 1531 | 12 | 12 | 30 | 23 | 10 | 3375 | 1531 |
| 150 | 12 | 305 | 6 | 96 | 44 | 12 | 71 | 6750 | 3063 | 12 | 12 | 30 | 45 | 20 | 6750 | 3063 |
| 300 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 12 | 12 | 48 | 46 | 21 | 10500 | 4764 |

Table: 3 Air Capacities

| Actuator Reference | Travel | | Volume | | | | | |
|--------------------|--------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | in | mm | Zero Travel | | Swept | | Full Travel | |
| | | | in ³ | mm ³ | in ³ | mm ³ | in ³ | mm ³ |
| 75 | 1 1/8 | 28 | 31 | 508 | 85 | 1393 | 116 | 1901 |
| | 1 1/2 | 38 | | | 114 | 1868 | 145 | 2376 |
| | 2 1/4 | 57 | | | 170 | 2786 | 201 | 3294 |
| 150 | 1 1/8 | 28 | 123 | 2016 | 167 | 2737 | 290 | 4753 |
| | 1 1/2 | 38 | | | 222 | 3638 | 345 | 5654 |
| | 2 1/4 | 57 | | | 333 | 5457 | 456 | 7473 |
| | 3 1/2 | 89 | | | 518 | 8488 | 641 | 10504 |
| | 4 | 102 | | | 592 | 9701 | 715 | 11717 |
| | 5 | 127 | | | 740 | 12126 | 863 | 14142 |
| 300 | 1 1/8 | 28 | 268 | 4392 | 351 | 5752 | 619 | 10144 |
| | 1 1/2 | 38 | | | 468 | 7669 | 736 | 12061 |
| | 2 1/4 | 57 | | | 702 | 11504 | 970 | 15896 |
| | 3 1/2 | 89 | | | 1092 | 17895 | 1360 | 22287 |
| | 4 | 102 | | | 1248 | 20451 | 1516 | 24843 |
| | 5 | 127 | | | 1560 | 25564 | 1828 | 29956 |
| | 6 | 152 | | | 1872 | 30677 | 2140 | 35069 |
| | 7 | 178 | | | 2184 | 35789 | 2452 | 40181 |
| | 8 | 203 | | | 2496 | 40902 | 2764 | 45294 |

Table: 4 Actuator Power

| Actuator Extended Size | Max. Travel | Max. Op. Pressure | Spring Range | Gross Thrust | Nett Thrust | Spring | | | | | |
|------------------------|-------------|-------------------|--------------|--------------|-------------|--------|-----------------|-------|------|------|------|
| 75 | 2.25 | 57 | 60 | 4.1 | 4500 | 2042 | 3-15 0.2-1.0 | 3375 | 1531 | 225 | 102 |
| | | | | | | | 6-18 0.4-1.2 | 3150 | 1429 | 450 | 204 |
| | | | | | | | 6-30 0.4-2.0 | 2250 | 1021 | 450 | 204 |
| | | | | | | | 8-32 0.55-2.2 | 2100 | 953 | 600 | 272 |
| | | | | | | | 11-22 0.75-1.55 | 2850 | 1295 | 825 | 375 |
| | | | | | | | 14-30 1.0-2.0 | 2250 | 1022 | 1050 | 476 |
| | | | | | | | 14-33 1.0-2.3 | 2025 | 920 | 1050 | 476 |
| 150 | 5.00 | 127 | 60 | 4.1 | 9000 | 4083 | 3-15 0.2-1.0 | 6750 | 3063 | 450 | 204 |
| | | | | | | | 6-18 0.4-1.2 | 6300 | 2858 | 900 | 408 |
| | | | | | | | 6-30 0.4-2.0 | 4500 | 2042 | 900 | 408 |
| | | | | | | | 8-32 0.55-2.2 | 4200 | 1906 | 1200 | 544 |
| | | | | | | | 11-21 0.75-1.45 | 5850 | 2659 | 1650 | 749 |
| | | | | | | | 11-28 0.75-1.95 | 4800 | 2181 | 1650 | 749 |
| | | | | | | | 12-21 0.85-1.45 | 5850 | 2659 | 1800 | 818 |
| | | | | | | | 12-28 0.75-1.95 | 4800 | 2181 | 1800 | 818 |
| | | | | | | | 15-31 1.0-2.2 | 4350 | 1977 | 2250 | 1021 |
| 15-33 1.0-2.3 | 4050 | 1840 | 2250 | 1021 | | | | | | | |
| 300 | 8.00 | 203 | 50 | 3.4 | 15000 | 6806 | 3-15 0.2-1.0 | 10500 | 4764 | 900 | 408 |
| | | | | | | | 6-18 0.4-1.2 | 9600 | 4356 | 1800 | 817 |
| | | | | | | | 6-30 0.4-2.0 | 6000 | 2722 | 1800 | 817 |
| | | | | | | | 8-32 0.55-2.2 | 5400 | 2450 | 2400 | 1089 |
| | | | | | | | 10-19 0.7-1.3 | 9300 | 4227 | 3000 | 1363 |
| | | | | | | | 10-29 0.7-2.0 | 6300 | 2863 | 3000 | 1363 |
| | | | | | | | 11-21 0.75-1.45 | 8700 | 3954 | 3300 | 1497 |
| | | | | | | | 12-29 0.85-2.0 | 6300 | 2863 | 3600 | 1633 |
| | | | | | | | 14-32 1.0-2.2 | 5400 | 2450 | 4200 | 1906 |
| | | | | | | | 14-33 1.0-2.3 | 5100 | 2318 | 4200 | 1906 |
| | | | | | | | 15-32 1.0-2.2 | 5400 | 2450 | 4500 | 2042 |
| | | | | | | | 15-33 1.0-2.3 | 5100 | 2318 | 4500 | 2042 |
| | | | | | | | 16-33 1.1-2.3 | 5100 | 2318 | 4800 | 2178 |
| 20-40 1.4-2.8 | 3000 | 1363 | 6000 | 2727 | | | | | | | |

Table 5. Standed Available Spring Rangers.

| Actuator size | Background Colour | Travel Range | | Spring No. | No. of Stripes | Colour | | | |
|---------------|-------------------|--------------------|-------------|--------------------|--------------------|---------|-------------|-------------------|-------------------|
| | | In | mm | | | | | | |
| 75 | Green | 1.125 | 28 | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 1 | NONE | NONE | |
| | | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 2 | ONE | BLACK | |
| | | | | 11-22 - | 0.75-1.55 | 32 | ONE | RED | |
| | | | | 14-33 - | 1.0-2.8 | 33 | TWO | BLUE | |
| | Green | 1.5 | 38 | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 32 | ONE | RED | |
| | | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 33 | TWO | BLUE | |
| | Purple | 2.25 | 57 | 14-30 | 1.0-2.0 | 42 | TWO | GRAY | |
| | Purple | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 41 | ONE | GRAY | |
| 150 | Yellow | 1.125 | 28 | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 42 | TWO | GRAY | |
| | | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 4 | ONE | WHITE | |
| | | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 5 | TWO | WHITE | |
| | | | | 11-21- | 0.75-1.45 | 7 | NONE | NONE | |
| | Yellow | 1.50 | 38 | 14-33 | 1.0-2.3 | 8 | ONE | BLACK | |
| | | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 7 | NONE | NONE | |
| | | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 8 | ONE | BLACK | |
| | | | | 12-21- | 0.85-1.45 | 10 | ONE | RED | |
| | Yellow | 2.25 | 57 | 15-33 | 1.0-2.3 | 11 | ONE | BLUE | |
| | | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 10 | ONE | RED | |
| | Yellow | 2.25 | 57 | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 11 | ONE | BLUE | |
| | | | | Gray | 15-31 | 1.0-2.2 | 44 | TWO | RED |
| | Gray | 3.50 | 89 | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 43 | ONE | RED | |
| | | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 44 | TWO | RED | |
| | | | | 12-28- | 0.85-1.95 | 48 | TWO | BLUE | |
| | | | | Gray | 4.00 | 102 | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 45 |
| | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 46 | | | | TWO | WHITE | |
| | Gray | 5.00 | 125 | 11-28- | 0.75-1.95 | 48 | TWO | BLUE | |
| | | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 47 | ONE | BLUE | |
| | | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 48 | TWO | BLUE | |
| | | | | 300 | Brown | 1.125 | 28 | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) |
| | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 58 | | | | | TWO | ORANGE |
| | 11-21- | 0.75-1.45 | 13G | | | | | FOUR | WHITE |
| | 14-32 | 1.1-2.2 | 14G | | | | | THREE | WHITE |
| Brown | 1.50 | 38 | *20-40 | | 1.4-2.8 | 59 | THREE | ORANGE | |
| | | | 3-15 (6-18) | | 0.2-1.0 (0.4-1.2) | 13G | FOUR | WHITE | |
| | | | 6-30 (8-32) | | 0.4-2.0 (0.55-2.2) | 14G | THREE | WHITE | |
| | | | 16-33 | | 1.1-2.3 | 17 | ONE | BLACK | |
| Brown | 2.25 | 57 | *20-40 | | 1.4-2.8 | 60 | FIVE | WHITE | |
| | | | 3-15 (6-18) | | 0.2-1.0 (0.4-1.2) | 16 | NONE | NONE | |
| | | | 6-30 (8-32) | | 0.4-2.0 (0.55-2.2) | 17 | ONE | BLACK | |
| | | | 10-19- | | 0.7-1.3 | 20G | TWO | RED | |
| Brown | 3.50 | 89 | 15-33 | 1.0-2.3 | 21G | THREE | BLUE | | |
| | | | *20-40 | 1.4-2.8 | 61 | THREE | BLACK | | |
| | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 20G | TWO | RED | | |
| | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 21G | THREE | BLUE | | |
| Brown | 4.00 | 102 | 14-33 | 1.0-2.3 | 50 | TWO | BLUE | | |
| | | | *20-40 | 1.4-2.8 | 62 | FOUR | BLUE | | |
| | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 24G | THREE | GREEN | | |
| | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 25G | FOUR | GREEN | | |
| Red | 5.00 | 125 | 15-33 | 1.0-2.3 | 52 | TWO | GREEN | | |
| | | | *20-40 | 1.4-2.8 | 63 | FIVE | GREEN | | |
| | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 49 | ONE | BLUE | | |
| | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 50 | TWO | BLUE | | |
| Red | 6.00 | 150 | 15-32 | 1.0-2.2 | 54 | TWO | YELLOW | | |
| | | | *20-40 | 1.4-2.8 | 64 | THREE | BLUE | | |
| | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 51 | ONE | GREEN | | |
| | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 52 | TWO | GREEN | | |
| Red | 7.00 | 175 | 12-29- | 0.85-2.0 | 56 | TWO | PURPLE | | |
| | | | *20-40 | 1.4-2.8 | 65 | THREE | GREEN | | |
| | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 53 | ONE | YELLOW | | |
| | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 66 | THREE | YELLOW | | |
| Red | 8.00 | 200 | 10-29- | 0.7-2.0 | 56 | TWO | PURPLE | | |
| | | | 3-15 (6-18) | 0.2-1.0 (0.4-1.2) | 55 | ONE | PURPLE | | |
| | | | | 6-30 (8-32) | 0.4-2.0 (0.55-2.2) | 56 | TWO | PURPLE | |

Note: Figures in parenthesis denote alternative spring bench setting. *G 300 High Power (HP) actuator range. Other spring ranges are available on request.

Dimensions

Table: 6 G75 Actuators.

| Travel | | Spring Range psi | Spring No. | Bonnet MTG.DIA.A | | H 1 | | H 2 | | H 3 | |
|--------|----|---------------------|------------|------------------|----|-------|-----|-------|------|-------|-----|
| ins. | mm | | | ins. | mm | ins | mm | ins | mm | ins | mm |
| 1.12 | 28 | 3 to 15 | 1 | 2.12 | 54 | 22.12 | 562 | 37.37 | 949 | 34 | 864 |
| | | 6 to 30 | 2 | | | | | | | | |
| | | 11 to 22 | 32 | | | | | | | | |
| | | 14 to 33 | 33 | | | | | | | | |
| 1.12 | 28 | 3 to 15 | 1 | 2.81 | 71 | 23.5 | 597 | 38.75 | 984 | 35.37 | 898 |
| | | 6 to 30 | 2 | | | | | | | | |
| | | 11 to 22 | 32 | | | | | | | | |
| | | 14 to 33 | 33 | | | | | | | | |
| 1.5 | 38 | 3 to 15 | 32 | 2.12 | 54 | 22.12 | 562 | 37.75 | 959 | 34 | 864 |
| | | 6 to 30 | 33 | | | | | | | | |
| | | 14 to 30 | 42 | | | | | | | | |
| 1.5 | 38 | 3 to 15 | 32 | 2.81 | 71 | 23.5 | 597 | 39.12 | 994 | 35.37 | 898 |
| | | 6 to 30 | 33 | | | | | | | | |
| | | 14 to 30 | 42 | | | | | | | | |
| | | 24.87 | 632 | | | | | | | | |
| 2.25 | 57 | 3 to 15 | 41 | 2.81 | 71 | 24.87 | 632 | 41.25 | 1048 | 36.75 | 933 |
| | | 6 to 30 | 42 | | | | | | | | |

Note: Max. handwheel height with valve locked open.

Table: 7 G150 Actuators.

| Travel | | Spring Range psi | Spring No. | Bonnet MTG.DIA.A | | H 1 | | H 2 | | H 3 | |
|--------|-----|---------------------|------------|------------------|----|-------|------|-------|------|-------|------|
| ins. | mm | | | ins. | mm | ins | mm | ins | mm | ins | mm |
| 1.12 | 28 | 3 to 15 | 4 | 2.12 | 54 | 27.5 | 699 | 44.12 | 1121 | 37.75 | 959 |
| | | 6 to 30 | 5 | | | | | | | | |
| | | 11 to 21 | 7 | | | | | | | | |
| | | 14 to 33 | 8 | | | | | | | | |
| 1.12 | 28 | 3 to 15 | 4 | 2.81 | 71 | 28.87 | 733 | 45.5 | 1156 | 39.12 | 994 |
| | | 6 to 30 | 5 | | | | | | | | |
| | | 11 to 21 | 7 | | | | | | | | |
| | | 14 to 33 | 8 | | | | | | | | |
| 1.5 | 38 | 3 to 15 | 7 | 2.12 | 54 | 27.5 | 699 | 44.5 | 1130 | 37.75 | 959 |
| | | 6 to 30 | 8 | | | | | | | | |
| | | 12 to 21 | 10 | | | | | | | | |
| | | 14 to 33 | 11 | | | | | | | | |
| 1.5 | 38 | 3 to 15 | 7 | 2.81 | 71 | 28.87 | 733 | 45.87 | 1165 | 39.12 | 994 |
| | | 6 to 30 | 8 | | | | | | | | |
| | | 12 to 21 | 10 | | | | | | | | |
| | | 15 to 33 | 11 | | | | | | | | |
| 2.25 | 57 | 3 to 15 | 10 | 2.81 | 71 | 30.62 | 778 | 48.37 | 1229 | 40.87 | 1038 |
| | | 6 to 30 | 11 | | | | | | | | |
| | | 15 to 31 | 44 | | | | | | | | |
| 2.25 | 57 | 3 to 15 | 10 | 3.56 | 91 | 32 | 813 | 49.75 | 1264 | 42.25 | 1073 |
| | | 6 to 30 | 11 | | | | | | | | |
| | | 15 to 31 | 44 | | | | | | | | |
| 3.5 | 89 | 3 to 15 | 43 | 3.56 | 91 | 35.75 | 908 | 62.5 | 1588 | 53.75 | 1365 |
| | | 6 to 30 | 44 | | | | | | | | |
| | | 12 to 28 | 48 | | | | | | | | |
| 4 | 102 | 3 to 15 | 45 | 3.56 | 91 | 35.75 | 984 | 65.5 | 1664 | 56.75 | 1441 |
| | | 6 to 30 | 46 | | | | | | | | |
| | | 11 to 28 | 48 | | | | | | | | |
| 5 | 127 | 3 to 15 | 47 | 3.56 | 91 | 35.75 | 908 | 63 | 1600 | 53.75 | 1365 |
| | | 6 to 30 | 48 | | | | | | | | |
| 5 | 127 | 3 to 15 | 47 | 3.56 | 91 | 38.75 | 984 | 66 | 1676 | 56.75 | 1441 |
| | | 6 to 30 | 48 | | | | | | | | |
| 5 | 127 | 3 to 15 | 47 | 3.56 | 91 | 39.75 | 1010 | 68 | 1727 | 57.75 | 1467 |
| | | 6 to 30 | 48 | | | | | | | | |

Note: Max. handwheel height with valve locked open.

Table: 8 G300 Actuators.

| Travel ins. | mm | Spring Range psi | Spring No. | Bonnet MTG. DIA.A | | H1 | | H3 | |
|----------------|-----|---------------------|------------|-------------------|-----|-------|------|-------|------|
| | | | | ins. | mm | ins. | mm | ins. | mm |
| 1.12 | 28 | 3 to 15 | 57 | 2.81 | 71 | 36.75 | 933 | 52.5 | 1335 |
| | | 6 to 30 | 58 | | | | | | |
| | | 11 to 21 | 13G | | | | | | |
| | | 14 to 32 | 14G | | | | | | |
| 1.5 | 38 | 3 to 15 | 13G | 2.81 | 71 | 36.75 | 933 | 52.5 | 1335 |
| | | 6 to 30 | 14G | | | | | | |
| | | 16 to 33 | 17 | | | | | | |
| 2.25 | 57 | 3 to 15 | 16 | 2.81 | 71 | 36.75 | 933 | 52.5 | 1335 |
| | | 6 to 30 | 17 | | | | | | |
| | | 10 to 19 | 20G | | | | | | |
| | | 15 to 33 | 21G | | | | | | |
| 2.25 | 57 | 3 to 15 | 16 | 3.56 | 91 | 38.12 | 968 | 53.93 | 1370 |
| | | 6 to 30 | 17 | | | | | | |
| | | 10 to 19 | 20G | | | 39.87 | 1013 | 55.68 | 1414 |
| | | 15 to 33 | 21G | | | | | | |
| 3.5 | 89 | 3 to 15 | 20G | 3.56 | 91 | 39.87 | 1013 | 55.68 | 1414 |
| | | 6 to 30 | 21G | | | | | | |
| | | 14 to 33 | 50 | | | | | | |
| 3.5 | 89 | 3 to 15 | 20G | 5.75 | 146 | 42.12 | 1070 | 57.93 | 1471 |
| | | 6 to 30 | 21G | | | | | | |
| | | 14 to 33 | 50 | | | | | | |
| 4 | 102 | 3 to 15 | 24G | 3.56 | 91 | 39.87 | 1013 | 55.68 | 1414 |
| | | 6 to 30 | 25G | | | | | | |
| | | 15 to 33 | 52 | | | 45.37 | 1152 | 61.18 | 1554 |
| 4 | 102 | 3 to 15 | 24G | 5.75 | 146 | 42.12 | 1070 | 57.93 | 1471 |
| | | 6 to 30 | 25G | | | | | | |
| | | 15 to 33 | 52 | | | | | | |
| 5 | 127 | 3 to 15 | 49 | 3.56 | 91 | 41.87 | 1063 | 64.50 | 1638 |
| | | 6 to 30 | 50 | | | | | | |
| | | 15 to 33 | 54 | | | 47.37 | 1203 | 70 | 1778 |
| 5 | 127 | 3 to 15 | 49 | 5.75 | 146 | 44.12 | 1121 | 66.75 | 1696 |
| | | 6 to 30 | 50 | | | | | | |
| | | 15 to 32 | 54 | | | 49.62 | 1260 | 72.25 | 1835 |
| 6 | 152 | 3 to 15 | 51 | 3.56 | 91 | 47.37 | 1203 | 70 | 1778 |
| | | 6 to 30 | 52 | | | | | | |
| | | 12 to 29 | 56 | | | 50.62 | 1286 | 73.25 | 1860 |
| 6 | 152 | 3 to 15 | 51 | 5.75 | 146 | 49.62 | 1260 | 72.25 | 1835 |
| | | 6 to 30 | 52 | | | | | | |
| | | 12 to 29 | 56 | | | 52.87 | 1343 | 75.50 | 1918 |
| 7 | 178 | 3 to 15 | 53 | 5.75 | 146 | 51.62 | 1311 | 80.25 | 2038 |
| | | 6 to 30 | 66 | | | | | | |
| | | 10 to 29 | 56 | | | 54.87 | 1394 | 83.50 | 2121 |
| 3 to 15 | 55 | | | | | | | | |
| 8 | 203 | 6 to 30 | 56 | 5.75 | 146 | 54.87 | 1394 | 83.50 | 2121 |

Table: 9 G300 HP Actuators.

| Travel ins. | mm | Spring Range psi | Spring No. | Bonnet MTG. DIA.A | | H1 | | H3 | |
|----------------|-----|---------------------|------------|-------------------|-----|-------|------|-------|------|
| | | | | ins. | mm | ins. | mm | ins. | mm |
| 1.12 | 28 | 20 to 40 | 59 | 2.81 | 71 | 36.75 | 933 | 52.56 | 1335 |
| 1.5 | 38 | 20 to 40 | 60 | | | | | | |
| 2.25 | 57 | 20 to 40 | 61 | | | | | | |
| 2.25 | 57 | 20 to 40 | 61 | 3.56 | 91 | 38.12 | 968 | 53.93 | 1370 |
| 3.5 | 89 | 20 to 40 | 62 | | | 45.5 | 1156 | 61.37 | 1559 |
| 3.5 | 89 | 20 to 40 | 62 | 5.75 | 146 | 47.75 | 1213 | 63.62 | 1616 |
| 4 | 102 | 20 to 40 | 63 | 3.56 | 91 | 45.5 | 1156 | 61.37 | 1559 |
| 4 | 102 | 20 to 40 | 63 | 5.75 | 146 | 47.75 | 1213 | 63.62 | 1616 |
| 5 | 127 | 20 to 40 | 64 | 3.56 | 91 | 55.37 | 1406 | 78 | 1981 |
| 5 | 127 | 20 to 40 | 64 | 5.75 | 146 | 57.62 | 1463 | 80.25 | 2038 |
| 6 | 152 | 20 to 40 | 65 | 3.56 | 91 | 55.37 | 1406 | 78 | 1981 |
| 6 | 152 | 20 to 40 | 65 | 5.75 | 146 | 57.62 | 1463 | 80.25 | 2038 |

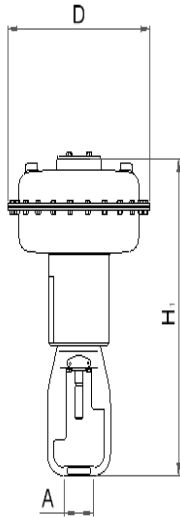


Fig. 6 Standard Diaphragm Actuator Direct Acting.

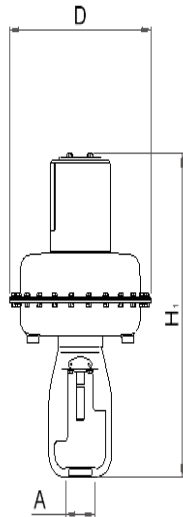


Fig. 7 Standard Diaphragm Actuator Reverse Acting.

Fig.8 Diaphragm Actuator With Top Mounted Handwheel Direct/Reverse Acting.

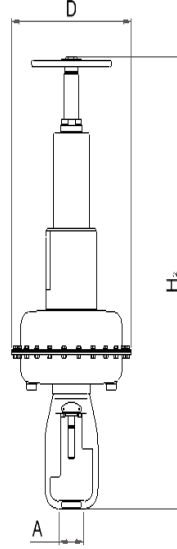


Fig.9 Diaphragm Actuator With Side Mounted Handwheel Direct/Reverse Acting.

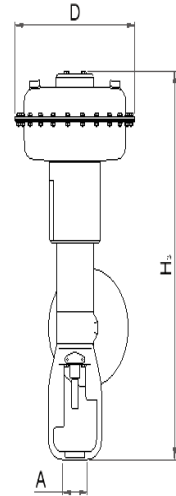


Table 10. 'G' Series Actuator Weights Required Without Handwheels.

| Actuator Size | Travel (ins.) | Bonnet MTG Dia.A (ins) | WT. (KG). | WT. (LB). | Dia.D (ins./mm) |
|---------------|---------------|------------------------|-----------|-----------|-----------------|
| 75 | 1 1/8 | 2 1/8 | 28 | 62 | 13 330 |
| | 1 1/2 | 2 13/16 | 29 | 64 | |
| | 2 1/4 | 2 13/16 | 32 | 70 | |
| 150 | 1 1/8 | 2 13/16 | 55 | 121 | 18 457 |
| | 1 1/4 | 2 13/16 | 56 | 123 | |
| | 2 1/4 | 3 9/16 | 62 | 136 | |
| | 3 1/2 | 3 9/16 | 70 | 154 | |
| | 4 | 3 9/16 | 70 | 154 | |
| 300 | 5 | 3 9/16 | 72 | 158 | 24 1/4 616 |
| | 2 1/4 | 2 13/16 | 60 | 132 | |
| | 1 1/8 | 2 13/16 | 140 | 308 | |
| | 1 1/2 | 2 13/16 | 142 | 312 | |
| | 2 1/4 | 3 9/16 | 144 | 317 | |
| | 3 1/2 | 3 9/16 | 161* | 354 | |
| | 4 | 3 9/16 | 146 | 321 | |
| | 5 | 3 9/16 | 162 | 356 | |
| | 6 | 3 9/16 | 172 | 378 | |
| | 6 | 5 3/4 | 174 | 383 | |
| 7 | 5 3/4 | 180 | 396 | | |
| 8 | 5 3/4 | 180 | 396 | | |

* With Limit Stop And Instrumentation Fitted. 141 KG Actuator Only.

Table 11. 'G' Series Actuator Weights Required With Handwheels.

| Acuator Size | Travel (ins) | Top Mounted | | Side Mounted | |
|--------------|--------------|-------------|----|--------------|-----|
| | | KG | LB | KG | LB |
| 75 | 1 1/8 | 40 | 88 | 38 | 84 |
| 150 | 2 1/4 | 20 | 44 | 82 | 181 |
| 300 | 3 1/2 | - | - | 216 | 476 |

Series C Pneumatic Spring Return Piston Actuator

The C Series actuator is a well proven design, its robust design makes it suitable for the majority of control valve applications. It is a field proven design (50,000 units first supplied in 1986). It is available in a number of sizes, built with field reversible fail action with no additional parts.

Performance

- Reliability.
- High Power.
- Full response.
- Low Hysteresis.

Design Flexibility

- Reversible fail action without extra parts.
- Split Coupling for easy attachment to valve plug stem.
- Wide selection of optional accessories available, many without modification of standard unit.
- Involute rolling diaphragm simplifies actuator design.
- Variable travel / stroke up to 8.

Design Integrity

- Robust steel construction.
- Low stressed alloy steel springs.
- Twin seal seal box with wiper system.

Quality Manufacturing

- High quality material with traceability throughout manufacture.
- Quality Assurance systems in accordance with ISO9000 2000
- Comprehensively tested to ensure specified performance on site.

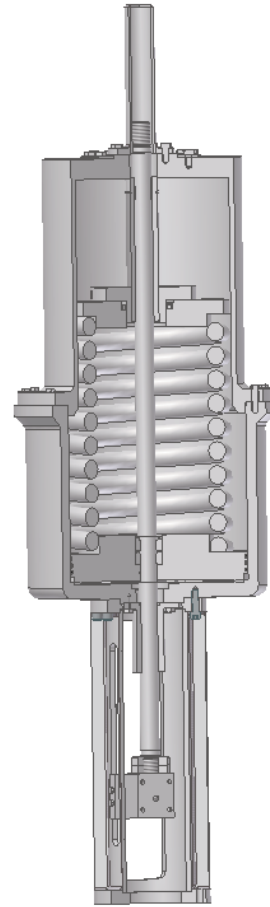


FIG. 10 Series 'C' Piston Actuators

The 'C' Series Spring Opposed Piston Pneumatic Actuator is manufactured in 300 in2 size. The Actuator design combines strokes up to 6 ins with spring powers up to 8700 Lbf (3590 Kg) and is used for both positive throttling and on/off applications, for Automatic Control Valves. The all steel construction ensures safe working pressures up to 100 psig (6.9 Bar), the single-spring power unit giving distributed loadings for smooth operation. The piston fitted with seals operates in a 'honed' steel cylinder which provides for smooth travel, minimising hysteresis and wear.

To ensure in-build reliability and low maintenance costs, the actuator is designed without linkages, and there are minimum of working parts.

The actuator air fail position may be reversed by inverting the spring/piston unit, re-assembling the yoke and stem cover plate. The frequency response of the Intron Piston Actuator is extremely high. Linear response to signal change is unaffected by the increasing or decreasing pressure, sensitivity being maintained over the working range.

The Series 'C' actuators are always operated through a valve positioner and an alternative of two types are available depending upon the application requirements.

From the 'C' Series the 'D' Series actuator was developed, the spring return feature is removed and a seal plate unit is inserted.

Series D Pneumatic Double Acting Actuator

The D Series actuator is a well proven design, its robust design makes it suitable for the majority of control valve applications. It is a field proven design (50,000 units first supplied in 1986). It is available in a number of sizes, built with field reversible fail action with no additional parts.

Performance

- Reliability.
- High Power.
- Full response.
- Low Hysteresis.

Design Flexibility

- Reversible fail action without extra parts.
- Split Coupling for easy attachment to valve plug stem.
- Wide selection of optional accessories available, many without modification of standard unit.
- Involute rolling diaphragm simplifies actuator design.
- Variable travel / stroke up to 8.

Design Integrity

- Robust steel construction.
- Low stressed alloy steel springs.
- Twin seal seal box with wiper system.

Quality Manufacturing

- High quality material with traceability throughout manufacture.
- Quality Assurance systems in accordance with ISO9000 2000
- Comprehensively tested to ensure specified performance on site.



Fig. 11 'D' series Pneumatic Double Acting Actuator

The 'D' series double acting piston has been developed from the original 'C' series piston actuator, which used the spring return feature.

When operating as a 'D' series actuator, the spring return feature is removed and a seal plate inserted. This provides the basic facility of double acting piston where extra power may be obtained for the air fail action, by releasing a stored volume of air contained within a separate tank. This range is available for valve strokes up to 12 ins. Ancillary equipment comprising of a 3-way switching valve, lock-up valve, check valve, is required in addition to volume tank and pipework. The existing positioner is optioned for double action operation.

Handwheels

A side mounted handwheel of the continuously connected type is available for both 'C' and 'D' series actuators. The unit is always mounted on top of the actuator and can be fitted retrospectively without any additions/modifications to the existing actuator and without removing the actuator from the valve.

Because the unit is mounted on top of the actuator it allows it to be totally enclosed, thus preventing the ingress of any extraneous matter and hence increasing the life of the unit between service intervals.

The gearing has been selected to ensure easy operation even with the maximum actuator powers.

A declutchable handwheel unit is also available for the 'C' and 'D' series actuators. Again this is mounted on top of the actuator, thus incorporating the same advantages as previously stated.

Accessories.

A wide range of accessories may be fitted to the actuator, these include speed boosters, airlocks, position transmitters, switches etc., to suit individual applications.

Fig. 12 Standard Series 'C' Actuator

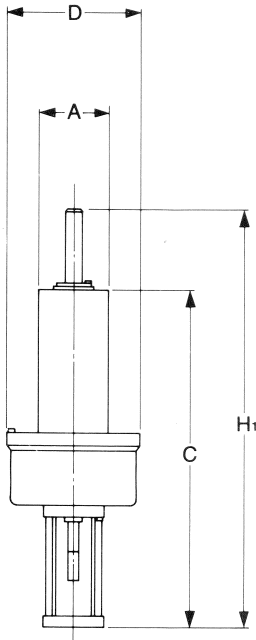


Fig.13 Series 'C' Reverse Acting Actuator with Handwheel

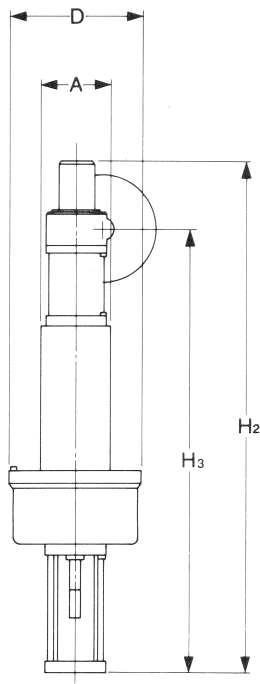


Fig. 14 Standard Series 'D' Actuator

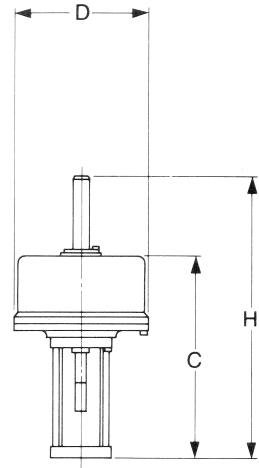


Fig. 15 Series 'D' Actuator with Handwheel

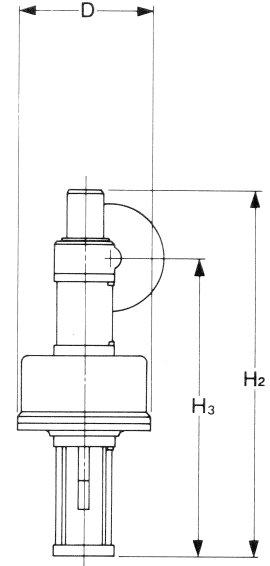
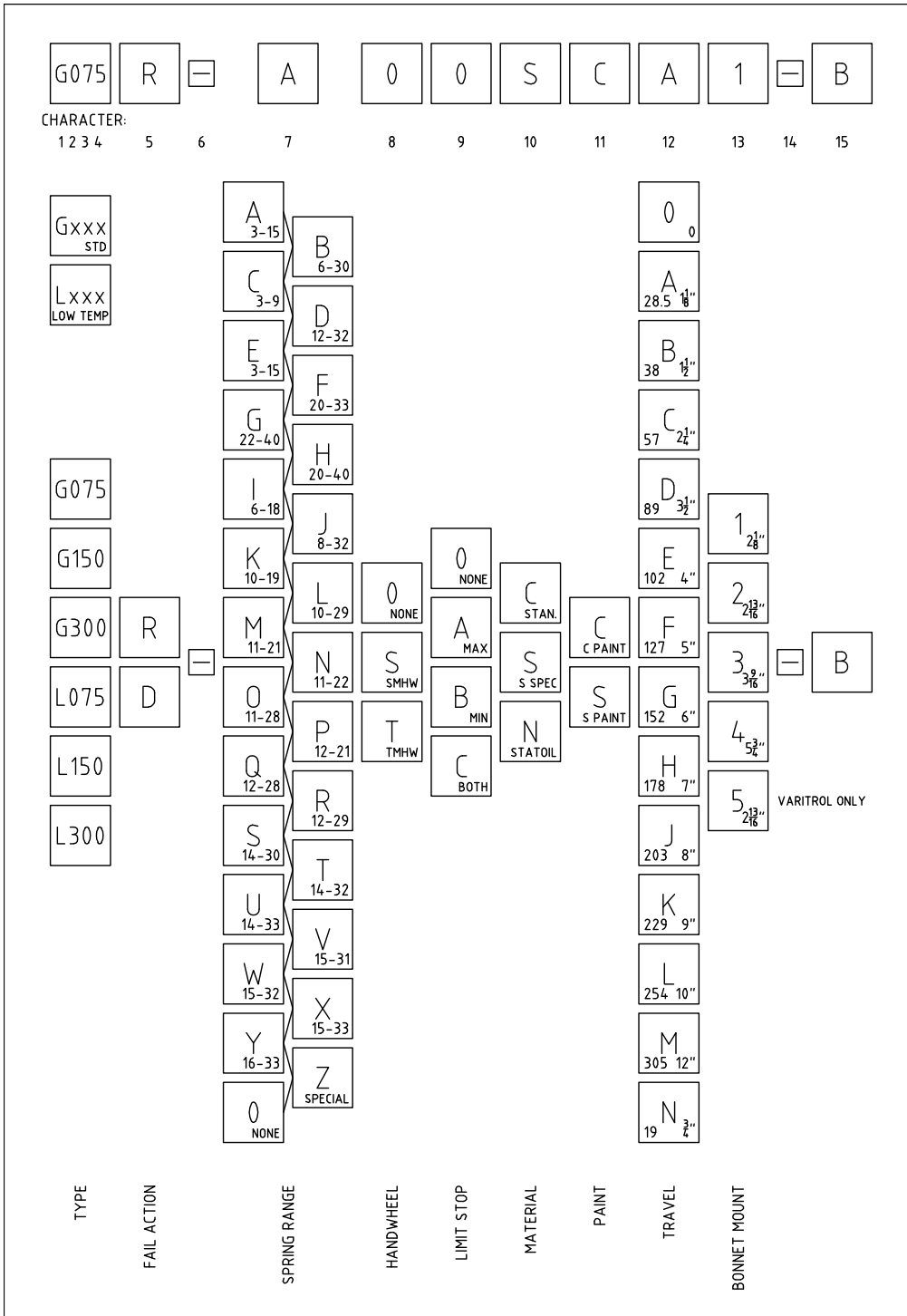


Table 12: 'C' & 'D' Series Piston Actuators Dimentions.

| Actuator | Spring | | | | | | | | | | | | | | | | |
|----------------------------|--------|-------|-------|--------|------|-----|-----|-----|--------|--------|--------|--------|--------|--------|--------|--------|------|
| | Travel | | Range | Bonnet | | A | | B | | C | | H1 | | H2 | | H3 | |
| | in | mm | psi | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| C300 Piston Spring Opposed | 2 1/4 | 57 | 3-15 | 3 9/16 | 90.5 | 12 | 305 | 23 | 584 | 41 3/4 | 1060 | 51 1/2 | 1308 | 61 7/8 | 1572 | 54 3/4 | 1391 |
| | 2 1/4 | 57 | 6-30 | 3 9/16 | 90.5 | 12 | 305 | 23 | 584 | 41 3/4 | 1060 | 51 1/2 | 1308 | 61 7/8 | 1572 | 54 3/4 | 1391 |
| | 2 1/4 | 57 | 29-40 | 3 9/16 | 90.5 | 12 | 305 | 23 | 584 | 49 7/8 | 1267 | 59 5/8 | 1514 | 79 3/4 | 2026 | 62 7/8 | 1597 |
| | 3 1/2 | 89 | 3-15 | 3 9/16 | 90.5 | 12 | 305 | 23 | 584 | 45 3/8 | 1152 | 56 7/8 | 1447 | 67 3/4 | 1721 | 60 1/2 | 1537 |
| | 3 1/2 | 89 | 6-30 | 3 9/16 | 90.5 | 12 | 305 | 23 | 584 | 45 3/8 | 1152 | 56 7/8 | 1447 | 67 3/4 | 1721 | 60 1/2 | 1537 |
| | 3 1/2 | 89 | 22-40 | 3 9/16 | 90.5 | 12 | 305 | 23 | 584 | 51 3/4 | 1314 | 63 1/4 | 1607 | 74 1/8 | 1883 | 66 1/2 | 1689 |
| | 3 1/2 | 89 | 3-15 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 47 5/8 | 1210 | 59 1/8 | 1502 | 70 | 1778 | 62 3/4 | 1594 |
| | 3 1/2 | 89 | 6-30 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 47 5/8 | 1210 | 59 1/8 | 1502 | 70 | 1778 | 62 3/4 | 1594 |
| | 3 1/2 | 89 | 22-40 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 54 | 1372 | 65 1/2 | 1664 | 76 3/8 | 1940 | 68 3/4 | 1746 |
| | 4 | 100 | 3-15 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 47 5/8 | 1210 | 59 1/8 | 1502 | 70 | 1778 | 62 3/4 | 1594 |
| | 4 | 100 | 6-30 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 47 5/8 | 1210 | 59 1/8 | 1502 | 70 | 1778 | 62 3/4 | 1594 |
| | 4 | 100 | 20-40 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 54 | 1372 | 65 1/5 | 1664 | 76 3/8 | 1940 | 68 3/4 | 1746 |
| | 5 | 125 | 3-15 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 47 3/4 | 1213 | 61 1/4 | 1556 | 76 1/8 | 1933 | 64 1/2 | 1638 |
| | 5 | 125 | 6-30 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 56 | 1422 | 69 1/2 | 1765 | 84 3/8 | 2143 | 72 3/4 | 1848 |
| | 5 | 125 | 20-40 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 56 | 1422 | 69 1/2 | 1765 | 84 3/8 | 2143 | 72 3/4 | 1848 |
| | 6 | 150 | 3-15 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 49 5/8 | 1260 | 63 1/8 | 1603 | 78 | 1981 | 66 3/8 | 1686 |
| 6 | 150 | 6-30 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 56 | 1422 | 69 1/2 | 1765 | 84 3/8 | 2143 | 72 3/4 | 1848 | |
| 6 | 150 | 20-40 | 5 3/4 | 146 | 12 | 305 | 23 | 584 | 59 1/2 | 1511 | 73 | 1856 | 87 7/8 | 2232 | 76 1/4 | 1937 | |
| D300 Piston Springless | 2 1/4 | 57 | - | 3 9/16 | 146 | - | - | 23 | 584 | 29 1/4 | 743 | 39 | 991 | 49 3/8 | 1254 | 42 1/4 | 1073 |
| | 3 1/2 | 89 | - | 3 9/16 | 146 | - | - | 23 | 584 | 31 | 787 | 42 1/2 | 1079 | 53 3/8 | 1356 | 45 3/4 | 1162 |
| | 3 1/2 | 89 | - | 5 3/4 | 146 | - | - | 23 | 584 | 33 1/4 | 846 | 44 3/4 | 1137 | 55 5/8 | 1413 | 48 | 1219 |
| | 4 | 100 | - | 5 3/4 | 146 | - | - | 23 | 584 | 33 1/4 | 846 | 44 3/4 | 1137 | 55 5/8 | 1413 | 48 | 1219 |
| | 5 | 125 | - | 5 3/4 | 146 | - | - | 23 | 584 | 35 1/4 | 895 | 48 3/4 | 1238 | 63 5/8 | 1616 | 52 | 1321 |
| | 6 | 150 | - | 5 3/4 | 146 | - | - | 23 | 584 | 35 1/4 | 895 | 48 3/4 | 1238 | 63 5/8 | 1616 | 52 | 1321 |
| | 7 | 175 | - | 5 3/4 | 146 | - | - | - | - | - | - | - | - | - | - | - | - |
| | 8 | 200 | - | 5 3/4 | 146 | - | - | - | - | - | - | - | - | - | - | - | - |
| | 9 | 225 | - | 5 3/4 | 146 | - | - | - | - | - | - | - | - | - | - | - | - |
| | 10 | 250 | - | 5 3/4 | 146 | - | - | 23 | 584 | 47 1/4 | 1200 | 66 3/4 | 1695 | 94 | 2388 | 70 | 1778 |
| | 11 | 275 | - | 5 3/4 | 146 | - | - | - | - | - | - | - | - | - | - | - | - |
| | 12 | 300 | - | 5 3/4 | 146 | - | - | - | - | - | - | - | - | - | - | - | - |

Actuator Code



GUARANTEE

All goods of the Company's manufacture are guaranteed against defects which, under proper conditions of use, develop within twelve calendar months from date of dispatch, and are proved to arise from faulty design materials or workmanship.

CONDITIONS OF SALE

All orders recieved and accepted by INTROL are acknowledged in writing and are subject to the INTROL conditions of sale.

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