

Series 32
Piston Actuator

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Valve Model Numbering

| Series | Size | Fail Action | Handwheel | Adjustable Travel Stop |
|--------|------------|----------------|----------------------------|------------------------|
| 32 | 3A – P30 | 1 – Fail Open | N – None | 1 – Open |
| | 3B – P50 | 2 – Fail Close | T – Top Mounted Handwheel | 2 - Close |
| | 3C – P110 | 3 – Stay put | S – Side Mounted Handwheel | 3 - None |
| | 4A – P110L | | | |
| | 5A – P110D | | | |
| | 5B – P220D | | | |

Foreword

Series 32 actuators are available in 3-configurations

P30-0.75, P50-1.5, P110-2.5, P200-6

Spring failsafe Actuator with Tension nut

P100L-6

Spring failsafe Actuator w/o Tension nut

P100D-6,9,12, P200D-6,9,12

Spring-less Actuator w/o Tension nut

Series 32 actuators, when fitted with spring, are designed to overcome valve pressure unbalance force & Packing friction, and achieve fail safe position.

For very high thrust & longer travel springless double acting piston actuator may be used in combination with a volume tank & and trip mechanism to achieve reliable fail safe.

Tie-rod & Tension nut arrangement supports safe assembly & disassembly during manufacturing & servicing.

This feature is not available in P100L as the free length of the springs are too long.



P110D Spring-less Actuator
w/o Tension nut



P110 Spring failsafe Actuators
with Tension nut



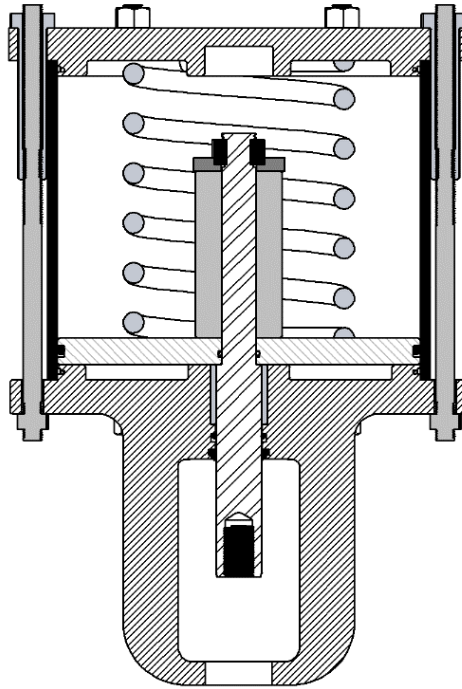
P110L Spring failsafe Actuator
W/o Tension nut

Engineering Data

| With Spring | |
|---------------------------|--|
| Sizes | P30, P50, P110, P110L-6, P220-6 |
| Travel | 0.75, 1.125, 1.5, 2, 2.5, 4, 5, 6 |
| Fail Action | Fail close, Fail open |
| Handwheel | Side mounted, Top mounted |
| Ambient Temperature | Minimum Temp : -20°C Maximum Temp: 80°C Special Material Options Available for use in low Temperature applications down to -55°C Special Material Options Available for use in high Temperature applications up to -100°C |
| Pneumatic Supply Pressure | Max pressure: 80 Psig |
| Without Spring | |
| Sizes | P110D-3, P110D-6, P110D-12, P220D-6, P220D-12 |
| Travel | 3, 4, 5, 6, 8, 9, 12 |
| Fail Action | Fail close, Fail open |
| Handwheel | Side mounted |
| Ambient Temperature | Minimum Temp: -40°C Maximum Temp: 93°C Special Material Options Available for use in low Temperature applications down to -54°C Special Material Options Available for use in high Temperature applications up to -204°C |
| Pneumatic Supply Pressure | Max pressure: 80 Psig |

Tie-rod Tension nut arrangement is not available for P110L-6

Cross-sectional View

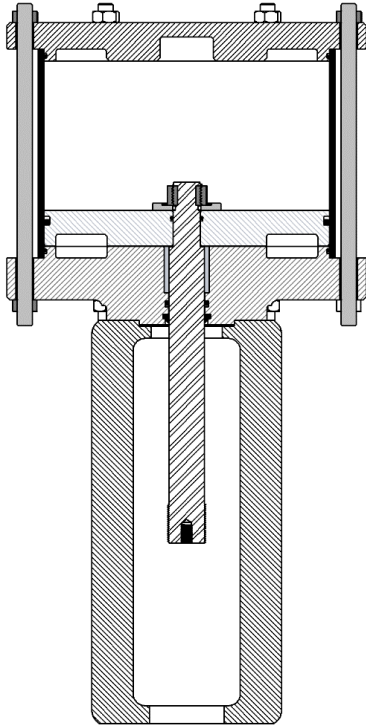


P110 Spring failsafe Actuator
with Tension nut

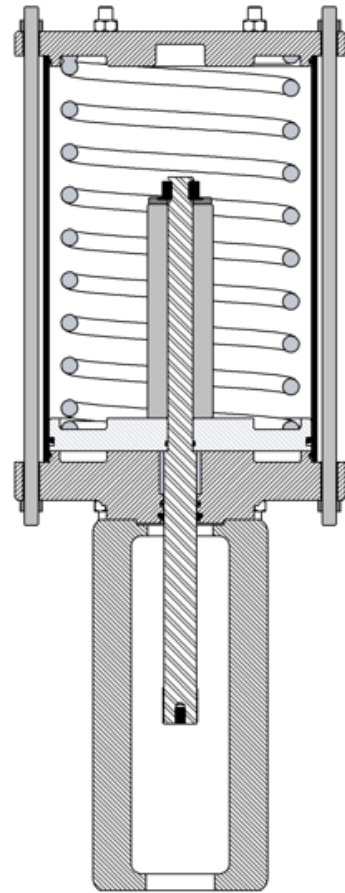
Part List

| S.No | Item Description | Materials | S.No | Item Description | Materials |
|------|---------------------|--------------------|------|---------------------|------------------------|
| 1 | Top Plate | Carbon Steel | 9 | Guide bush | Leaded Bronze / Oilite |
| 2 | Yoke and Baseplate* | Carbon Steel | 10 | Wiper Ring | Nitrile |
| 3 | Cylinder | Carbon Steel | 11 | C Clamp | CF8M / 316SS |
| 4 | Piston | Aluminium | 12 | Spring | 51CrV4 |
| 5 | Piston rod | 316SS | 13 | Spacer | Aluminium |
| 6 | Stroke Stop | Aluminium | 14 | Tie rod Fabrication | B7, 2H w/ HDG |
| 7 | Tie Rod | Carbon Steel - HDG | 15 | Tension nut | A194 Gr 2H, HDG |
| 8 | O ring (Cap) | Nitrile | | | |

Cross-sectional View



P110D-6 Spring-less Actuator
w/o Tension nut



P110L-6 Spring failsafe Actuator
w/o Tension nut

Part List

| S.No | Item Description | Materials | S.No | Item Description | Materials |
|------|------------------|--------------------|------|------------------|------------------------|
| 1 | Top Plate | Carbon Steel | 9 | O ring (Cap) | Nitrile |
| 2 | Yoke | Carbon Steel | 10 | Guide bush | Leaded Bronze / Oilite |
| 3 | Baseplate | Carbon Steel | 11 | Wiper Ring | Nitrile |
| 4 | Cylinder | Carbon Steel | 12 | C Clamp | CF8M / 316SS |
| 5 | Piston | Aluminium | 13 | Spring | 51CrV4 |
| 6 | Piston rod | 316SS | 14 | Spacer | Aluminium |
| 7 | Stroke Stop | Aluminium | 15 | Studs & Nuts | B7, 2H w/ HDG |
| 8 | Tie Rod | Carbon Steel - HDG | | | |

Actuator Thrust

| Actuator Size | Actuator Travel (inch) | Effective Area (in ²) | | Spring | Spring Rate (lbf/in) | Spring Thrust (lbf) | Net Pneumatic Thrust @60 Psig | | Net Pneumatic Thrust @80 Psig | | |
|---------------|------------------------|-----------------------------------|---------|---------|----------------------|---------------------|-------------------------------|----------------|-------------------------------|----------------|------|
| | | Upper | Lower | | | | Close Pos (lbf) | Open Pos (lbf) | Close Pos (lbf) | Open Pos (lbf) | |
| P30 | 0.75 | 31.9 | 31.5 | Light | 100 | 175 | 1715 | 1664 | 2345 | 2302 | |
| | | | | Medium | 200 | 350 | 1540 | 1472 | 2170 | 2110 | |
| | | | | Heavy | 450 | 788 | 1103 | 789 | 1732.5 | 1427 | |
| P50 | 0.75 | 55.2 | 54 | Light | 150 | 300 | 2940 | 2864 | 4020 | 3968 | |
| | | | | Medium | 400 | 800 | 2440 | 2218 | 3520 | 3322 | |
| | | | | Heavy | 500 | 1000 | 2240 | 1811 | 3320 | 2915 | |
| | 1.125 | 55.2 | 54 | Light | 150 | 300 | 2940 | 2803 | 4020 | 3907 | |
| | | | | Medium | 400 | 800 | 2440 | 2068 | 3520 | 3172 | |
| | | | | Heavy | 500 | 1000 | 2240 | 1606 | 3320 | 2710 | |
| | 1.5 | 55.2 | 54 | Light | 150 | 300 | 2940 | 2612 | 4020 | 3716 | |
| | | | | Medium | 400 | 800 | 2440 | 1919 | 3520 | 3023 | |
| | | | | Heavy | 500 | 1000 | 2240 | 1401 | 3320 | 2505 | |
| P110 | 1.125 | 113 | 111.3 | Light | 350 | 700 | 5978 | 5616 | 8204 | 7876 | |
| | | | | Medium | 550 | 1100 | 5578 | 5061 | 7804 | 7321 | |
| | | | | Heavy | 700 | 1400 | 5278 | 4593 | 7504 | 6853 | |
| | | | | | Outer 1 | 250 | 500 | 6178 | 5999 | 8404 | 8259 |
| | | | | | Outer 2 | 692 | 1730 | 4948 | 4272 | 7174 | 6532 |
| | | | | | Light | 350 | 700 | 5978 | 5476 | 8204 | 7736 |
| | 1.5 | 113 | 111.3 | Medium | 550 | 1100 | 5578 | 4855 | 7804 | 7115 | |
| | | | | Heavy | 700 | 1400 | 5278 | 4330 | 7504 | 6590 | |
| | | | | Outer 1 | 250 | 500 | 6178 | 5905 | 8404 | 8165 | |
| | | | | | Outer 2 | 692 | 1730 | 4948 | 4012 | 7174 | 6272 |
| | | | | | Light | 350 | 700 | 5978 | 5290 | 8204 | 7550 |
| | | | | | Medium | 550 | 1100 | 5578 | 4580 | 7804 | 6840 |
| 2 | 113 | 111.3 | Heavy | 700 | 1400 | 5278 | 3980 | 7504 | 6240 | | |
| | | | Outer 1 | 250 | 500 | 6178 | 5780 | 8404 | 8040 | | |
| | | | Outer 2 | 692 | 1730 | 4948 | 3666 | 7174 | 5926 | | |
| 2.5 | 113 | 111.3 | Light | 350 | 700 | 5978 | 5104 | 8204 | 7364 | | |
| | | | Medium | 550 | 1100 | 5578 | 4305 | 7804 | 6565 | | |
| | | | Heavy | 700 | 1400 | 5278 | 3630 | 7504 | 5890 | | |
| | | | | Outer 1 | 250 | 500 | 6178 | 5655 | 8404 | 7915 | |
| | | | | Outer 2 | 692 | 1730 | 4948 | 3320 | 7174 | 5580 | |

Actuator Thrust

| Actuator | Actuator | Effective Area | | Spring | Spring | Spring | Net Pneumatic Thrust @60 Psig | | Net Pneumatic Thrust @80 Psig | |
|----------|----------|--------------------|-------|---------|-----------|--------|-------------------------------|----------|-------------------------------|----------|
| | | Upper | Lower | | | | Close Pos | Open Pos | Close Pos | Open Pos |
| Size | Travel | (in ²) | | | Rate | Thrust | (lbf) | (lbf) | (lbf) | (lbf) |
| | (inch) | | | | (lbf/ in) | (lbf) | (lbf) | (lbf) | (lbf) | (lbf) |
| P110L | 3 | 113 | 111.3 | Medium | 90 | 996 | 5682 | 5353 | 7908 | 7613 |
| | | | | Outer 1 | 50 | 1266 | 5412 | 5931 | 7638 | 8191 |
| | | | | Outer 2 | 100 | 1993 | 4685 | 4462 | 6911 | 6722 |
| | 4 | 113 | 111.3 | Medium | 90 | 996 | 5682 | 5262 | 7908 | 7522 |
| | | | | Outer 1 | 50 | 1266 | 5412 | 5881 | 7638 | 8141 |
| | | | | Outer 2 | 100 | 1993 | 4685 | 4361 | 6911 | 6621 |
| | 5 | 113 | 111.3 | Medium | 90 | 996 | 5682 | 5172 | 7908 | 7432 |
| | | | | Outer 1 | 50 | 1266 | 5412 | 5831 | 7638 | 8091 |
| | | | | Outer 2 | 100 | 1993 | 4685 | 4260 | 6911 | 6520 |
| | 6 | 113 | 111.3 | Medium | 90 | 996 | 5682 | 5081 | 7908 | 7341 |
| | | | | Outer 1 | 50 | 1266 | 5412 | 5781 | 7638 | 8041 |
| | | | | Outer 2 | 100 | 1993 | 4685 | 4159 | 6911 | 6419 |
| P110D | 12 | 113 | 111.3 | - | - | - | 6678 | 6780 | 8904 | 9040 |
| P220D | 12 | 216.7 | 213.5 | - | - | - | 12810 | 13002 | 17336 | 17336 |

Air Connection: Standard: 1/4" NPT – Size P30 | 3/8" NPT – Size P50 | 3/8" NPT – Size P110 | 1/2" NPT – Size P110D & P220D.

Volumetric Data

| Actuator | Travel | Effective Area | Zero Volume | Swept Volume | Volume at full travel |
|----------|--------|--------------------|--------------------|--------------------|-----------------------|
| Size | (inch) | (in ²) | (in ³) | (in ³) | (in ³) |
| P30 | 0.75 | 31.49 | 5.52 | 21.7 | 27.22 |
| P50 | 1.5 | 53.98 | 13.62 | 75.0 | 88.62 |
| P50 | 1.125 | 53.98 | 13.62 | 56.3 | 69.92 |
| P50 | 0.75 | 53.98 | 13.62 | 21.7 | 35.32 |
| P110 | 2.5 | 113.04 | 29.61 | 279.6 | 309.21 |
| | 1.5 | 113.04 | 29.61 | 167.8 | 197.41 |
| | 1.125 | 113.04 | 29.61 | 127 | 157 |
| P110L | 6 | 113.04 | 29.61 | 671.0 | 700.61 |
| | 5 | 113.04 | 29.61 | 559.2 | 588.81 |
| | 4 | 113.04 | 29.61 | 447.4 | 477.01 |
| P110D | 12 | 113.04 | 29.61 | 1342.1 | 1371.71 |
| | 9 | 113.04 | 29.61 | 1006.6 | 1036.21 |
| | 8 | 113.04 | 29.61 | 894.7 | 924.31 |
| P220 | 6 | 216.68 | 36.67 | 1341.5 | 1378.17 |
| | 5 | 216.68 | 36.67 | 1117.9 | 1154.57 |
| | 4 | 216.68 | 36.67 | 447.4 | 484.07 |
| P220D | 12 | 216.68 | 36.67 | 3460.6 | 3497.27 |
| | 9 | 216.68 | 36.67 | 2012.2 | 2048.87 |
| | 8 | 216.68 | 36.67 | 1788.6 | 1825.27 |

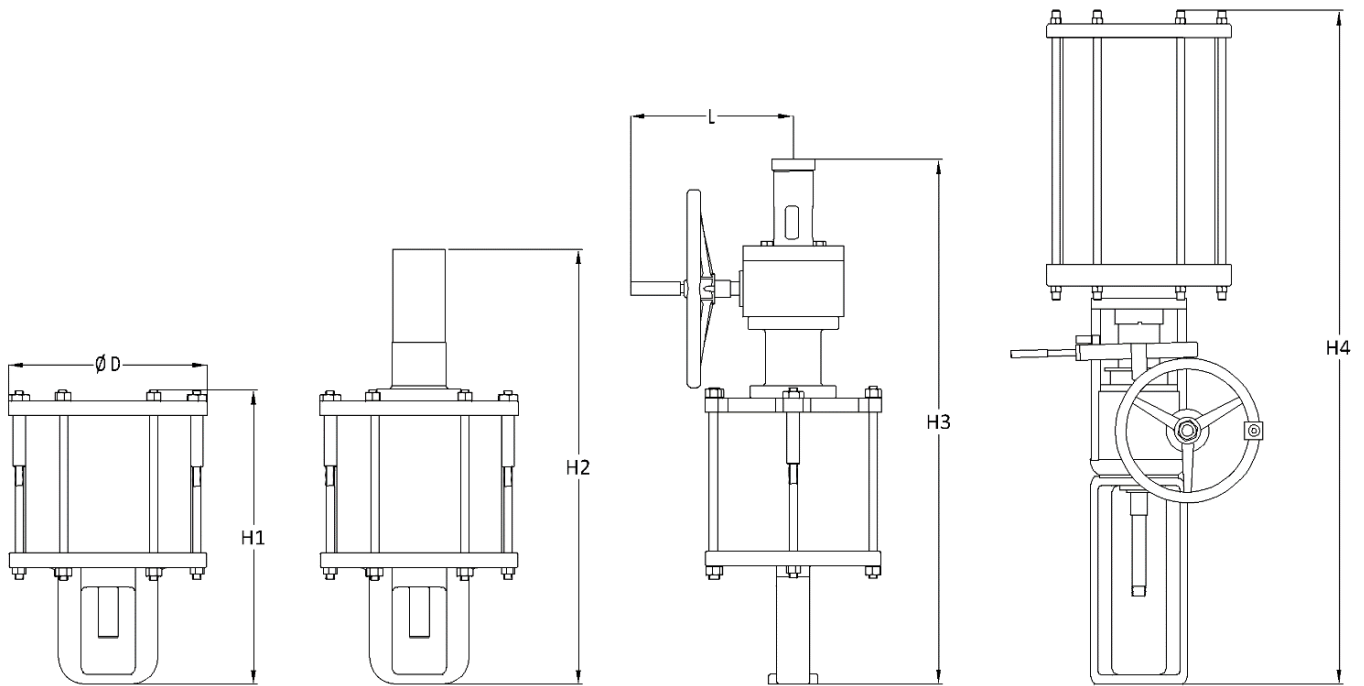
Handwheel

| Actuator | Max. Travel | H/W Dia (D1) | Turns per inch | Rim Force | Handwheel Output Force. Maximum |
|----------|-------------|--------------|----------------|-----------|---------------------------------|
| Size | (inch) | (inch) | No off | (lbf) | (lbf) |
| P30 | 0.75 | 9 | 5 | 84 | 2700 |
| P50 | 1.5 | 12 | 9 | 92 | 4500 |
| P110 | 2.5 | 15 | 17 | 98 | 7200 |
| P110L | 6 | 15 | 55 | 98 | 7200 |



P110 Actuator
with Top mounted Handwheel

Dimensions & Weight



| Act. | Max. Travel | Dimensions (mm) | | | | | | | Weight (kg) | | |
|--------|-------------|-----------------|--------|------|------|-----|------|-----|-------------|-----|--------|
| | | Size | (inch) | D | H1 | H2 | H3 | H4 | L | L1 | W/O HW |
| P30 | 0.75 | | 210 | 340 | 490 | 670 | - | 211 | - | 9.5 | 22 |
| P50 | 1.5 | | 260 | 450 | 650 | 780 | - | 229 | - | 16 | 33 |
| P110 | 2.5 | | 390 | 580 | 870 | 988 | - | 257 | - | 38 | 66 |
| P110L | 6 | | 390 | 1020 | 1485 | - | 1405 | - | 220 | 127 | 135 |
| P220 | 6 | | 527 | 1100 | 1565 | - | 2135 | - | 220 | 155 | 232 |
| P110D* | 12 | | 390 | 1020 | - | - | 2075 | - | 220 | 101 | 107 |
| P220D* | 12 | | 527 | 1100 | - | - | 2135 | - | 220 | 140 | 220 |

*Actuator without spring

Actuator Standout

| Actuator Size | Effective Area | Travel | Valve stem connection | Yoke Boss Diameter | Act. Standout* |
|---------------|----------------------|--------|-----------------------|--------------------|----------------|
| | (inch ²) | (inch) | (inch) | (inch) | (inch) |
| P30 | 31.5 | 0.75 | 0.375 | 2.36 | 4.2 |
| P50 | 54 | 1.5 | 0.5 | 2.36 | 4.5 |
| P110 | 111.3 | 2.5 | 0.75 | 2.36 | 5.2 |
| P110L | 111.3 | 6 | 1.5 | - | 7.6 |
| P110D | 111.3 | 12 | 1.5 | - | 7.6 |
| P220D | 213.5 | 12 | 1.5 | TBA | TBA |

*Actuator Standout for Air fail close.



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