

SERIES 92/93 ACTUATORS

The Bray Series 92/93 high pressure pneumatic actuators are ideally suited to a wide range of quarter turn applications including butterfly valves, ball valves and dampers. These rack and pinion actuators are available in Series 92 double acting (air to open, air to close) and Series 93 single acting (spring return) models.

The compact and robust design of the Series 92/93 actuators feature an extruded aluminum housing, polyester-coated die cast aluminum end caps, die cast aluminum opposed pistons, and a carbon steel zinc plated output pinion. Conforming to the ISO 5211 top flange standard, all Series 92/93 actuators are directly mounted to the valve top plate or saddle without the need for adapters or brackets.

Series 92/93 actuators are available with a wide range of factory-mounted Brayline accessories including pneumatic positioners, electro pneumatic positioners, solenoid valves, position indicators and manual declutchable gear override assemblies.



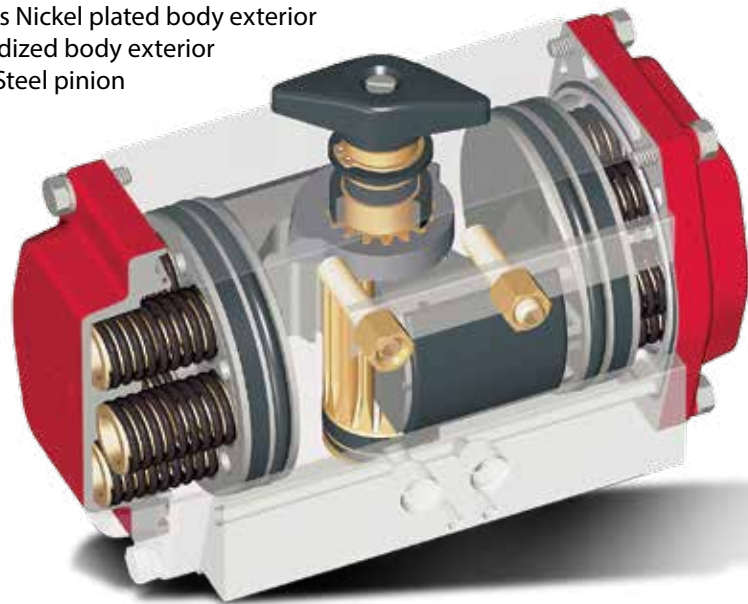
FEATURES

BENEFITS

| | |
|-----------------------------|--|
| Bi-Directional Travel Stops | Allows for precise open/close points. |
| IP 65 Enclosure | Suitable for outdoor use, subject to ambient temperature limits. |
| Optional Spring Cartridges | Provides easy conversion from double-acting to spring return. |
| Direct-Mount Design | No special hardware or mounting kits required. |
| Varied Control Options | On/Off, 3 - 15 psi pneumatic, and 4 - 20 mA electro-pneumatic. |

MATERIALS OF CONSTRUCTION

| | |
|----------------------------|--|
| Body | Extruded aluminum alloy, anodized |
| End Caps | Die cast aluminum alloy with corrosion resistant polyester coating |
| Pistons | Die cast aluminum alloy |
| Output Shaft/Pinion | Carbon Steel, zinc plated |
| Travel Stop | Alloy Steel |
| Shaft Bearings | Acetal |
| Piston Guides | Acetal |
| Fasteners | Stainless Steel |
| Springs | Spring Steel, protective coating |
| O-Ring Seals | Buna-N |
| Options | Polyester coated body exterior Electroless Nickel plated body exterior Hard Anodized body exterior Stainless Steel pinion |



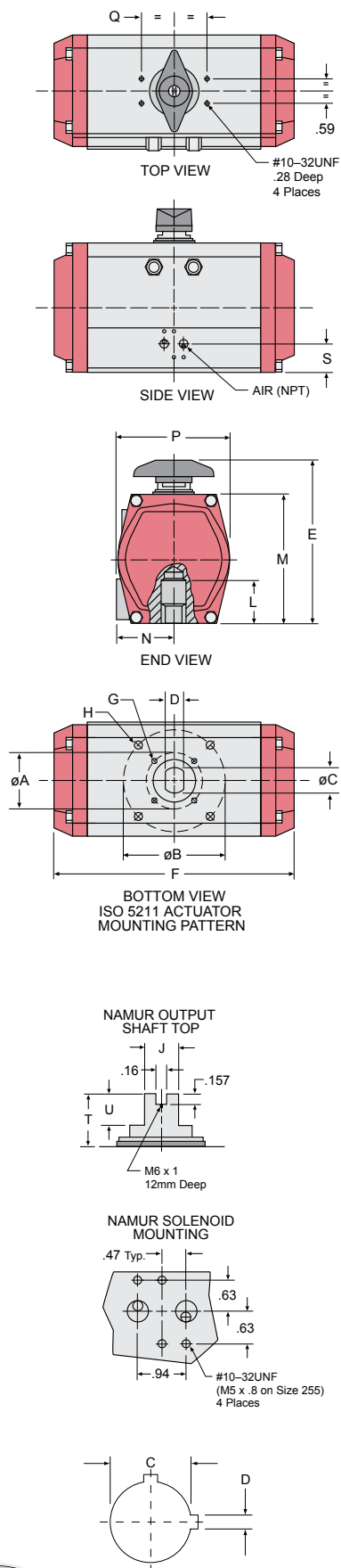
| Model Number | PSI | Actuator Torque Data (IN-LB) Double Acting | | | | |
|---------------|-----|--|--------|--------|---------|---------|
| | | 40 psi | 60 psi | 80 psi | 100 psi | 120 psi |
| 92-63 | | 145 | 221 | 297 | 373 | 449 |
| 92-83 | | 351 | 536 | 721 | 906 | 1091 |
| 92-93 | | 493 | 753 | 1013 | 1272 | 1532 |
| 92-119 | | 1058 | 1615 | 2171 | 2728 | 3285 |
| 92-128 | | 1410 | 2152 | 2894 | 3636 | 4378 |
| 92-160 | | 2797 | 4270 | 5742 | 7214 | 8687 |
| 92-210 | | 5783 | 8826 | 11870 | 14914 | 17957 |
| 92-255 | | 14211 | 21691 | 29171 | 36650 | 44130 |

Note: Assemblies are sized at 80 psi.

ACTUATOR TORQUE DATA (IN-LB) - SPRING RETURN

| Model Number | Springs (Pairs) | Air Supply (psi) | | | | | | | | | | Spring | |
|--------------|-----------------|------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|------------|
| | | 40 | | 60 | | 80 | | 100 | | 120 | | Spring Start | Stroke End |
| | | Start | End | Start | End | Start | End | Start | End | Start | End | | |
| 93-632 | 2 | 91 | 65 | 167 | 141 | 243 | 217 | 319 | 293 | 395 | 369 | 80 | 54 |
| 93-633 | 3 | 64 | 27 | 140 | 103 | 216 | 179 | 292 | 255 | 368 | 331 | 118 | 81 |
| 93-634 | 4 | | | 113 | 65 | 189 | 141 | 265 | 217 | 341 | 293 | 156 | 108 |
| 93-635 | 5 | | | 86 | 27 | 162 | 103 | 238 | 179 | 314 | 255 | 194 | 135 |
| 93-636 | 6 | | | | | 135 | 65 | 211 | 141 | 287 | 217 | 232 | 162 |
| 93-632 | 2 | 210 | 167 | 395 | 352 | 580 | 537 | 765 | 722 | 950 | 907 | 184 | 141 |
| 93-833 | 3 | 156 | 76 | 341 | 261 | 526 | 446 | 711 | 631 | 896 | 816 | 275 | 195 |
| 93-834 | 4 | | | 281 | 176 | 466 | 361 | 651 | 546 | 836 | 731 | 360 | 255 |
| 93-835 | 5 | | | 220 | 97 | 405 | 282 | 590 | 467 | 775 | 652 | 439 | 316 |
| 93-836 | 6 | | | | | 369 | 185 | 554 | 370 | 739 | 555 | 536 | 352 |
| 93-932 | 2 | 310 | 232 | 570 | 492 | 830 | 752 | 1089 | 1011 | 1349 | 1271 | 261 | 183 |
| 93-933 | 3 | 218 | 101 | 478 | 361 | 738 | 621 | 997 | 880 | 1257 | 1140 | 392 | 275 |
| 93-934 | 4 | | | 386 | 231 | 646 | 491 | 905 | 750 | 1165 | 1010 | 522 | 367 |
| 93-935 | 5 | | | 294 | 94 | 554 | 354 | 813 | 613 | 1073 | 873 | 659 | 459 |
| 93-936 | 6 | | | | | 462 | 229 | 721 | 488 | 981 | 748 | 784 | 551 |
| 93-1192 | 2 | 692 | 469 | 1249 | 1026 | 1805 | 1582 | 2362 | 2139 | 2919 | 2696 | 589 | 366 |
| 93-1193 | 3 | 509 | 174 | 1066 | 731 | 1622 | 1287 | 2179 | 1844 | 2736 | 2401 | 884 | 549 |
| 93-1194 | 4 | | | 883 | 437 | 1439 | 993 | 1996 | 1550 | 2553 | 2107 | 1178 | 732 |
| 93-1195 | 5 | | | 700 | 142 | 1256 | 698 | 1813 | 1255 | 2370 | 1812 | 1473 | 915 |
| 93-1196 | 6 | | | | | 1073 | 404 | 1630 | 961 | 2187 | 1518 | 1767 | 1098 |
| 93-1282 | 2 | 880 | 465 | 1622 | 1207 | 2364 | 1949 | 3106 | 2691 | 3848 | 3433 | 945 | 530 |
| 93-1283 | 3 | | | 1357 | 733 | 2099 | 1475 | 2841 | 2217 | 3583 | 2959 | 1419 | 795 |
| 93-1284 | 4 | | | 1094 | 261 | 1836 | 1003 | 2578 | 1745 | 3320 | 2487 | 1891 | 1058 |
| 93-1285 | 5 | | | | | 1568 | 529 | 2310 | 1271 | 3052 | 2013 | 2365 | 1326 |
| 93-1286 | 6 | | | | | 1302 | 57 | 2044 | 799 | 2786 | 1541 | 2837 | 1592 |
| 93-1602 | 2 | 1819 | 1118 | 3292 | 2591 | 4764 | 4063 | 6236 | 5535 | 7709 | 7008 | 1679 | 978 |
| 93-1603 | 3 | 1399 | 349 | 2872 | 1822 | 4344 | 3294 | 5816 | 4766 | 7289 | 6239 | 2448 | 1398 |
| 93-1604 | 4 | | | 2452 | 1123 | 3924 | 2595 | 5396 | 4067 | 6869 | 5540 | 3147 | 1818 |
| 93-1605 | 5 | | | 2030 | 353 | 3502 | 1825 | 4974 | 3297 | 6447 | 4770 | 3917 | 2240 |
| 93-1606 | 6 | | | | | 3154 | 1196 | 4626 | 2668 | 6099 | 4141 | 4546 | 2588 |
| 93-2102 | 2 | 3833 | 2508 | 6876 | 5551 | 9920 | 8595 | 12964 | 11639 | 16007 | 14682 | 3275 | 1950 |
| 93-2103 | 3 | 2859 | 868 | 5902 | 3911 | 8946 | 6955 | 11990 | 9999 | 15033 | 13042 | 4915 | 2924 |
| 93-2104 | 4 | | | 4930 | 2275 | 7974 | 5319 | 11018 | 8363 | 14061 | 11406 | 6551 | 3896 |
| 93-2105 | 5 | | | 3949 | 638 | 6993 | 3682 | 10037 | 6726 | 13080 | 9769 | 8188 | 4877 |
| 93-2106 | 6 | | | | | 6022 | 2031 | 9066 | 5075 | 12109 | 8118 | 9839 | 5848 |
| 93-2552 | 2 | 9487 | 6747 | 16967 | 14227 | 24447 | 21707 | 31926 | 29186 | 39406 | 36666 | 7464 | 4724 |
| 93-2553 | 3 | 7125 | 3015 | 14605 | 10495 | 22085 | 17975 | 29564 | 25454 | 37044 | 32934 | 11196 | 7086 |
| 93-2554 | 4 | | | 12243 | 6762 | 19723 | 14242 | 27202 | 21721 | 34682 | 29201 | 14929 | 9448 |
| 93-2555 | 5 | | | 9880 | 3030 | 17360 | 10510 | 24839 | 17989 | 32319 | 25469 | 18661 | 11811 |
| 93-2556 | 6 | | | | | 14998 | 6778 | 22477 | 14257 | 29957 | 21737 | 22393 | 14173 |

DIMENSIONS



| | 63 | 83 | 93 | 119 | 128 | 160 | 210 | 255 |
|----------------------|------------------|------------------|------------------|------------------|------------------|-----------------|------------------|--------------------|
| Air | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 |
| A ISO "F"† | 1.97 F 05 | 1.97 F 05 | 1.97 F 05 | 2.76 F 07 | 2.76 F 07 | — | 4.92 F 12 | 6.50 F 16 |
| B ISO "F"† | 2.76 F 07 | 2.76 F 07 | 2.76 F 07 | 4.92 F 12 | 4.92 F 12 | 4.92 F 12 | 6.50 F 16 | 7.87x4.72 Rect. |
| C | .55 | .75 | .75 | 1.18 | 1.18 | 1.18 | 1.97 | 2.50 |
| D | .40 | .51 | .51 | .87 | .87 | .87 | .47 | .62 |
| E | 4.53 | 5.43 | 5.78 | 7.28 | 8.09 | 9.36 | 11.45 | 13.35 |
| F | 5.58 | 7.40 | 9.10 | 11.90 | 12.31 | 15.54 | 17.80 | 26.70 |
| G (UNC) | 1/4-20 x .32 | 1/4-20 x .32 | 1/4-20 x .32 | 5/16-18 x .46 | 5/16-18 x .46 | — | 1/2-13 x .78 | M16x2 x 28mm |
| H (UNC) | 5/16-18 x .40 | 5/16-18 x .40 | 5/16-18 x .40 | 1/2-13 x .69 | 1/2-13 x .69 | 1/2-13 x .75 | 5/8-11 x 1.11 | M16x2 x 28mm |
| J | .38 | .50 | .50 | 1.12 | 1.12 | 1.12 | 1.12 | 1.12 |
| L | 1.38 | 1.46 | 1.46 | 2.20 | 2.20 | 2.20 | 2.76 | 4.25 |
| M | 3.46 | 4.27 | 4.61 | 5.52 | 6.32 | 7.80 | 10.04 | 11.89 |
| N | 1.72 | 2.02 | 2.47 | 2.78 | 2.88 | 3.07 | 4.25 | 4.75 |
| P | 3.11 | 3.83 | 4.44 | 5.15 | 5.58 | 6.82 | 8.83 | 10.75 |
| Q | 3.15 | 3.15 | 3.16 | 3.16 | 3.16 | 5.12 | 5.12 | 5.12 |
| S | .89 | .89 | 1.32 | 1.64 | 1.64 | 1.39 | 1.44 | 1.50 |
| T | .79 | .79 | .79 | .79 | .79 | 1.18 | 1.18 | 1.18 |
| U | .47 | .47 | .47 | .47 | .47 | .75 | .75 | .75 |

Note: Double Acting and Spring Return actuators have the same overall dimensions.
† ISO "F" means mounting flange-drilling pattern.

Actuator Speeds

| | 63 | 83 | 92 | 118 | 127 | 160 | 210 | 255 |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-------|
| Open Stroke/ Close Stroke | 1/4 | 1/4 | 1/4 | 1/2 | 1/2 | 1 | 2 | 2-3/4 |

Note: Times shown are in seconds at 80 PSIG supply pressure with 6ft. tubing having an internal diameter of approximately 1/4". Bray S92/93 actuation times are very dependent on the flow capacity of their air supply. The use of smaller port solenoids, solenoid manifolds, smaller I.D. air supply tubing and/or extended lengths of tubing can significantly reduce the actuation time and/or initial response to the command signal.

Actuator Weights

| | 63 | 83 | 93 | 119 | 128 | 160 | 210 | 255 |
|---------------|-----|-----|------|------|------|------|-------|-------|
| Double Acting | 3.3 | 6.3 | 8.5 | 18.0 | 21.5 | 39.0 | 78.0 | 143.5 |
| Spring Return | 3.9 | 8.1 | 10.9 | 23.4 | 28.1 | 53.4 | 111.0 | 214.9 |

Weights are in lbs.
Spring Return unit weights are with full set of springs per piston.

Solenoid - Series 63

Features

Pneumatic connection: 1/4" NPT
Electrical connection: 1/2" NPT
Manual override, standard.
Direct mount to NAMUR standards
Mountable in any position.
Mounting hardware included.

Standard Enclosures

Combination General Purpose and Watertight Types
NEMA 1, 2, 3, 3S, 4, and 4X

Electrical

24/50-60 Hz, 120/60, 110/50, 240/60, 220/50 Volts AC,
6,12,24,120 Volts DC

Nominal Power (Watts)

NEMA Housings: A.C - 6.3, DC - 6.9
DIN Housing: A.C - 2.5, DC - 3.0

Normal Ambient Temperature Range

NEMA Housings:
AC: -13°F (-25°C) to +140°F (+67°C)
DC: -13°F (-25°C) to +77°F (+25°C)
DIN Housing: AC & DC:
-13°F (-25°C) to +140°F (+67°C)

Approvals

UL recognized components, CSA certified



Pneumatic Solenoid - Series 63

| Model No. | Description |
|-----------------|---|
| 630250-21440536 | Solenoid, 24 VAC for electric on/off control of S92/93 actuators |
| 630250-21410536 | Solenoid, 120 VAC for electric on/off control of S92/93 actuators |
| 630250-21430536 | Solenoid, 220 VAC for electric on/off control of S92/93 actuators |

Materials of Construction

| | |
|--------------------|------------------------------------|
| Body | Anodized Aluminum |
| Spring | Phosphate treated black steel |
| Shading Coil | Copper |
| Seals | NBR + PUR |
| Core & Core Tube | Stainless Steel / Brass |
| End Covers & Plate | 6/6 glass filled polyamide (PA/FV) |
| Spool | Aluminum |
| Internal Parts | Zamak, Steel, Acetal |

Pneumatic Positioner - V200P

| | |
|-----------------------------|--|
| Supply Pressure | <145 PSI (<1MPa) |
| Linearity Error | <0.7% f.s |
| Hysteresis | <0.4% f.s |
| Repeatability | <0.3% f.s |
| Temperature Range | -40° to +185 F -40° to +185 F -40° to +185 F * -40° to +85°C -40° to +85°C -40° to +85°C * *Temp. range depending on certification |
| Air Consumption | .35 SCFM @ 87 PSI |
| Output Flow Capacity | 28.3 SCFM @ 87 PSI |
| Air Connections | 1/4" NPT |
| Gauges: | 1/8" NPT |
| Cable Entry | 1/2" NPT |

| | |
|---|------------------|
| Ingress & Corrosion Protection | NEMA 4X and IP66 |
| Standard Coating | Polyester |
| Weight | 3.2 lbs (1,45kg) |
| Weight with Gauges | 3.4 lbs (1,54kg) |



Pneumatic Positioner - V200P

| Model No. | Description |
|-----------|--|
| V200P | Pneumatic Positioner, Double or Single Acting |
| V200M | Mech Aux Switch for V200P |
| V200R | Reed Aux Switch for V200P |
| V200MA | 4 to 20 mA feedback module for V200P |
| V200MMA | Mech switch aux switch and 4 to 20 mA feedback for V200P |
| V200RMA | Reed Aux Switch and 4-20 mA feedback for V200P |
| V200B | Beacon Indicator for V200P |

Electro-Pneumatic Positioner - Series 6A

Bray's Series 6A Intelligent Electro-Pneumatic Positioners offer precise flow control, advanced communication and enhanced diagnostics. Utilizing proven technology, the Series 6A features rugged reliability, high quality components and outstanding performance.

Series 6A positioners are microprocessor controlled, delivering all the benefits of digital electronics. The microprocessor constantly compares the command signal to the actual valve position and makes precise, on-line adjustments until the two measurements match. The use of the piezoelectric control element results in near zero air consumption, ultra high resolution and extremely low hysteresis.

Series 6A positioners were designed with ease of installation, simple calibration, efficiency and economy in mind. The modular product line is easily customized for specific applications. Additional positioner functions may be obtained by installing optional circuit boards.



Shown with optional gages.

| | |
|----------------------------|--|
| Supply Pressure | 20 - 102psi (1.4 -7 Bar) |
| Air Consumption | <0.00035 scfm |
| Input Signal | |
| Analog | 4 -20 mADC |
| Bus | HART, Foundation Fieldbus, Profibus PA Connections |
| Supply | 1/4" NPT (G 1/4") |
| Signal (2 conduit entries) | 1/2" NPT (M20x1.5) |
| Resolution | <0.05% |
| Repeatability | 0.32% |
| Hysteresis | <0.2% |
| Temperature Range | -22°F(-30°C) to +176°F(+80°C) |
| Weight | 2.0 lbs. (0.9 kg) |
| Control Element Type | Piezoelectric |
| EMC Requirements | EN 61326/A1 Appendix A.1 NAMUR NE21 August 98 |
| Protection Class | NEMA 4,4x and IP66 |
| Materials | |
| Housing | Fiberglass Reinforced Polymer with Metalized Coated interior for EMC protection |
| Housing Fasteners | Stainless Steel |
| Position Indicator | ABS polymer |
| Positioner Mounting | VDI/VDE 3845 (NAMUR) |
| Available Approvals | FM, CSA, CE, ATEX |

Pneumatic Positioner - Series 6A

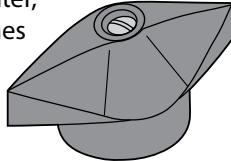
| Model No. | Description |
|---------------------|--|
| 6A6DR5-0200NN005KA0 | S6A Electro-pneumatic positioner, 4-20 mA, double-acting |
| 6A6DR5-0100NN005KA0 | S6A Electro-pneumatic positioner, 4-20 mA, single-acting |
| 6A6DR4-0048K | S6A Optional mechanical switch |
| 6A6DR4-0048J | S6A Optional position feedback module |
| S6A Gauge Block | S6A Optional gauge block assembly |
| 6A0630-24610536 | S6A Mounting kit, S92/93 sizes 63-127 |
| 6A1600-24610536 | S6A Mounting kit, S92/93 sizes 160-210 |
| 6A1600-22400536 | S6A Mounting kit, S92/93 sizes 210-255 |

Status Monitor - Series 50

Bray Controls is proud to offer the Brayline Series 50 Valve Status Monitor, the future of valve position signaling. Bray's extensive field experience, research and development has produced the finest multipurpose switch/control monitors for industrial plant automation. The Series 50 signals actuator and valve position to local and remote stations. The Series 50 has a die cast aluminum housing which is waterproof (NEMA-4,4X). The units have been designed for ease of wiring and a wide variety of switches.

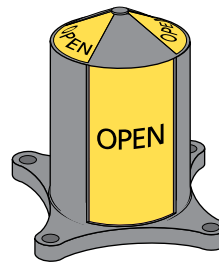


Bray has specially designed position indicators which locally signal valve position. The pointer, made of ABS, comes standard with all Series 50 units.

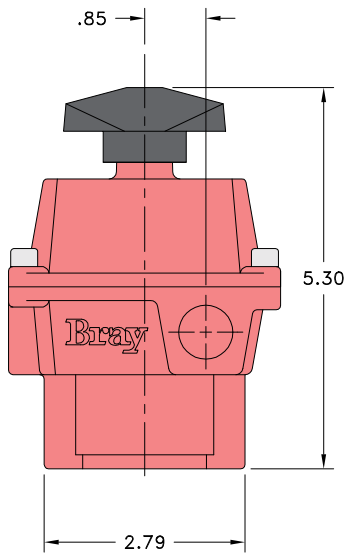


High visibility display AVAILABLE
Prominently labeled and color coded – yellow for pen, red for closed – the display indicates valve position through the full range of travel. Made of high impact, heat and chemical resistant clear polycarbonate, this display withstands caustic wash-down and offers excellent corrosion protection.

A compact, modular design allows direct mounting of the Brayline Valve Status Monitor to Bray Series 92 double acting and Series 93 spring return pneumatic actuators without any brackets or couplings. The mounting pattern complies with VDI/VDE 3845 (NAMUR recommendations).

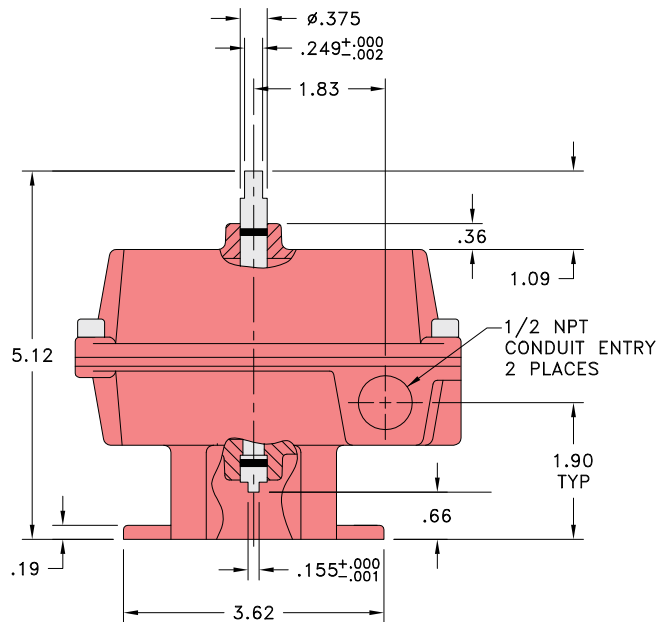
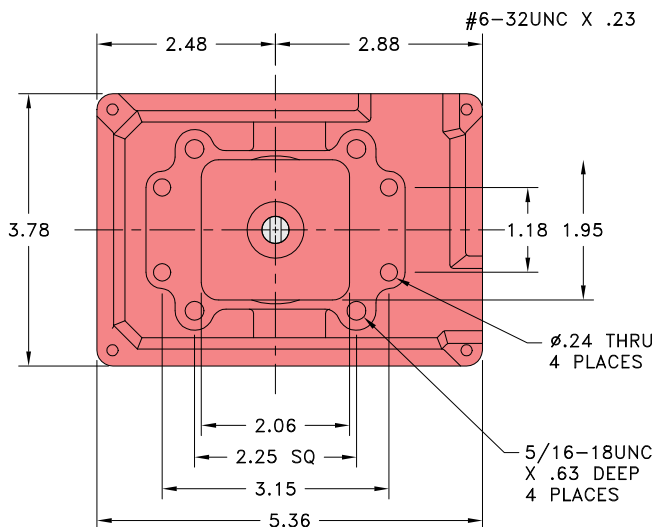


High-visibility display is 3" in height. For cover removal, allow an additional 3" clearance.



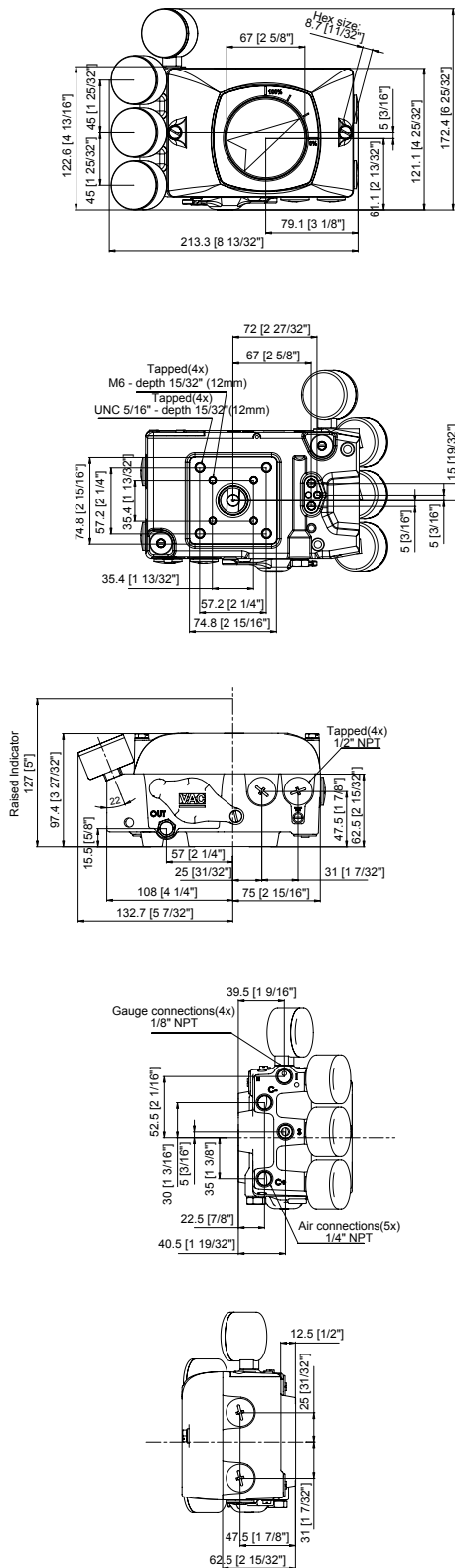
Pneumatic Positioner - Series 50

| Model No. | Description |
|-----------------|---|
| 500406-12610532 | S50 Status monitor, 2 SPDT mechanical switches, S92/93 actuators (requires mounting hardware kit for sizes 160-255) |
| 501600-22303536 | S50 Mounting kit S90/91 sizes 210-255 actuators |
| 501600-24603536 | S50 Mounting kit S92/93 size 160 actuator |

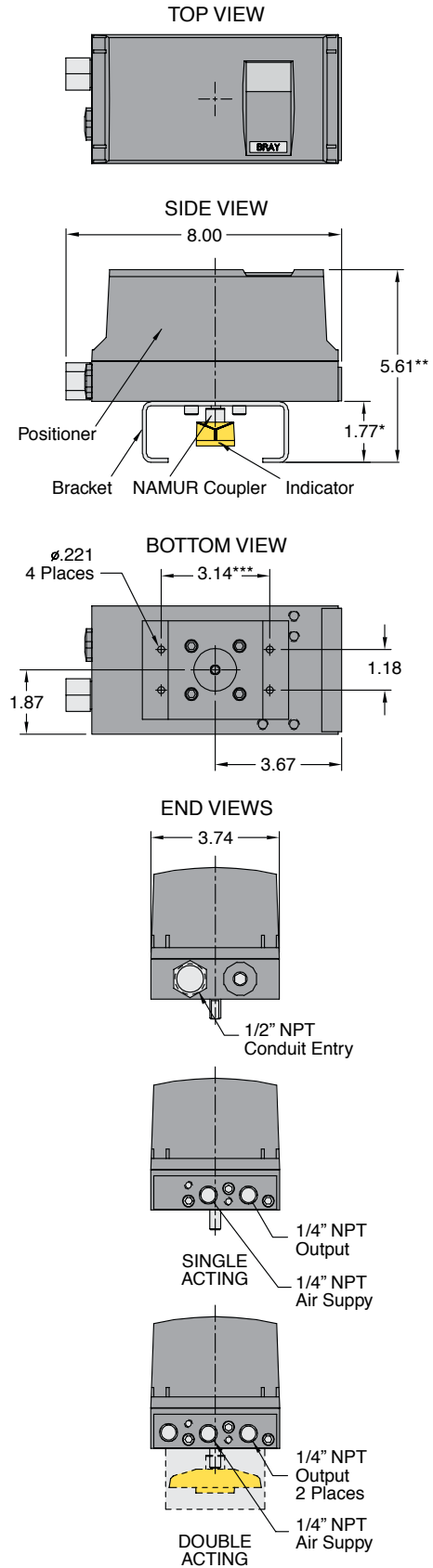


Positioner Dimensions

V200



6A



Manual Overrides - Series 05

Available for 2"-36" (50mm-900mm) valves. This operator is excellent for the safe handling of spring return actuators. During pneumatic operation, the worm of the gear unit is disengaged. Should the valve require opening or closing in the event of power loss, manual rotation of the declutch lever will provide a camming action and engage the worm to the segmented worm gear, allowing rotation of the valve using the handwheel. The Series 5 can be installed in the field with existing Bray pneumatic actuators.

| Size 20:1 (2,000 lb.in) | | | | | Actuator Size | | | | | | | | | | | | | | | | |
|-------------------------|------|------|------|------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----|------|
| Valve | | | | | 63 | | | 83 | | | 92 | | | 118 | | | 127 | | | | |
| SIZE | A | B | C | D | E | F | G | E | F | G | E | F | G | E | F | G | E | F | G | *H | 1.92 |
| 2 | 2.00 | 1.62 | 6.75 | 2.22 | 2.79 | 5.88 | 1.72 | 3.70 | 6.78 | 2.28 | 4.30 | 7.13 | 2.47 | | | | | | | J | 8.88 |
| 2.5 | 2.50 | 1.75 | 7.25 | 2.47 | 2.79 | 5.88 | 1.72 | 3.70 | 6.78 | 2.28 | 4.30 | 7.13 | 2.47 | | | | | | | K | 8.00 |
| 3 | 3.00 | 1.75 | 7.50 | 2.81 | 2.79 | 5.88 | 1.72 | 3.70 | 6.78 | 2.28 | 4.30 | 7.13 | 2.47 | | | | | | | | |
| 4 | 4.00 | 2.00 | 8.25 | 3.41 | | | | 3.70 | 6.78 | 2.28 | 4.30 | 7.13 | 2.47 | 5.95 | 8.63 | 2.78 | 6.16 | 9.44 | 2.88 | | |
| 5 | 5.00 | 2.12 | 8.75 | 4.03 | | | | 3.70 | 6.78 | 2.28 | 4.30 | 7.13 | 2.47 | 5.95 | 8.63 | 2.78 | 6.16 | 9.44 | 2.88 | | |
| 6 | 6.00 | 2.12 | 9.25 | 4.53 | | | | 3.70 | 6.78 | 2.28 | 4.30 | 7.13 | 2.47 | 5.95 | 8.63 | 2.78 | 6.16 | 9.44 | 2.88 | | |

| Size 30:1 (8,000 lb.in) | | | | | Actuator Size | | | | | | | | | | | | | |
|-------------------------|-------|------|-------|------|---------------|------|------|------|------|------|------|-------|------|------|-------|------|----|-------|
| Valve | | | | | 118 | | | 127 | | | 160 | | | 210 | | | | |
| SIZE | A | B | C | D | E | F | G | E | F | G | E | F | G | E | F | G | *H | 3.05 |
| 5 | 5.00 | 2.12 | 8.81 | 4.03 | 5.95 | 8.97 | 2.78 | 6.16 | 9.78 | 2.88 | 7.77 | 11.05 | 3.78 | 9.78 | 13.31 | 4.56 | J | 9.43 |
| 6 | 5.75 | 2.12 | 9.31 | 4.53 | 5.95 | 8.97 | 2.78 | 6.16 | 9.78 | 2.88 | 7.77 | 11.05 | 3.78 | 9.78 | 13.31 | 4.56 | K | 12.00 |
| 8 | 7.75 | 2.50 | 10.81 | 5.75 | 5.95 | 8.97 | 2.78 | 6.16 | 9.78 | 2.88 | 7.77 | 11.05 | 3.78 | 9.78 | 13.31 | 4.56 | | |
| 10 | 9.75 | 2.50 | 12.06 | 7.12 | 5.95 | 8.97 | 2.78 | 6.16 | 9.78 | 2.88 | 7.77 | 11.05 | 3.78 | 9.78 | 13.31 | 4.56 | | |
| 12 | 11.75 | 3.00 | 13.56 | 8.12 | 5.95 | 8.97 | 2.78 | 6.16 | 9.78 | 2.88 | 7.77 | 11.05 | 3.78 | 9.78 | 13.31 | 4.56 | | |

| Size 50:1 (13,000 lb.in) | | | | | Actuator Size | | | | | | | | | | |
|--------------------------|-------|------|-------|-------|---------------|-------|------|------|-------|------|-------|-------|------|----|-------|
| Valve | | | | | 160 | | | 210 | | | 255 | | | | |
| SIZE | A | B | C | D | E | F | G | E | F | G | E | F | G | *H | 3.34 |
| 10 | 9.75 | 2.50 | 12.56 | 7.12 | 7.77 | 13.74 | 3.78 | 9.78 | 16.00 | 4.56 | | | | J | 11.81 |
| 12 | 11.75 | 3.00 | 14.06 | 8.12 | 7.77 | 13.74 | 3.78 | 9.78 | 16.00 | 4.56 | | | | K | 12.00 |
| 14 | 13.25 | 3.00 | 15.43 | 9.38 | 7.77 | 13.74 | 3.78 | 9.78 | 16.00 | 4.56 | 14.39 | 18.87 | 5.40 | | |
| 16 | 15.25 | 4.00 | 16.56 | 10.75 | 7.77 | 13.74 | 3.78 | 9.78 | 16.00 | 4.56 | 14.39 | 18.87 | 5.40 | | |

| Size 80:1 (24,000 lb.in) | | | | | Actuator Size | | | | | | | | | | |
|--------------------------|-------|------|-------|-------|---------------|-------|------|------|-------|------|-------|-------|------|----|-------|
| Valve | | | | | 160 | | | 210 | | | 255 | | | | |
| SIZE | A | B | C | D | E | F | G | E | F | G | E | F | G | *H | 4.78 |
| 14 | 13.25 | 3.00 | 16.12 | 9.38 | 7.77 | 15.61 | 3.78 | 9.78 | 17.12 | 4.56 | 14.39 | 18.99 | 5.40 | J | 14.88 |
| 16 | 15.25 | 4.00 | 17.25 | 10.75 | 7.77 | 15.61 | 3.78 | 9.78 | 17.12 | 4.56 | 14.39 | 18.99 | 5.40 | K | 18.00 |
| 18 | 17.25 | 4.25 | 18.50 | 12.00 | 7.77 | 15.61 | 3.78 | 9.78 | 17.12 | 4.56 | 14.39 | 18.99 | 5.40 | | |
| 20 | 19.25 | 5.00 | 19.75 | 13.72 | 7.77 | 15.61 | 3.78 | 9.78 | 17.12 | 4.56 | 14.39 | 18.99 | 5.40 | | |
| 22 | 21.25 | 6.06 | 22.62 | 16.50 | | | | | | | 14.39 | 18.99 | 5.40 | | |
| 24 | 23.25 | 5.94 | 22.00 | 17.56 | | | | | | | 14.39 | 18.99 | 5.40 | | |

| Size 64:1 (36,000 lb.in) | | | | | Actuator Size | | | | |
|--------------------------|-------|------|-------|-------|---------------|-------|------|----|-------|
| Valve | | | | | 255 | | | | |
| SIZE | A | B | C | D | E | F | G | *H | 4.94 |
| 18 | 17.25 | 4.25 | 19.12 | 9.38 | 14.39 | 19.99 | 5.40 | J | 14.56 |
| 20 | 19.25 | 5.00 | 20.38 | 13.72 | 14.39 | 19.99 | 5.40 | K | 24.00 |
| 24 | 23.25 | 5.94 | 22.62 | 17.56 | 14.39 | 19.99 | 5.40 | | |
| 30 | 29.25 | 6.56 | 26.12 | 20.81 | 14.39 | 19.99 | 5.40 | | |

