

Flowserve Corporation
Flow Control Division
www.flowserve.com

1350 N. Mountain Springs Parkway
Springville, Utah 84663-3004
Phone: 801 489 8611

1978 Foreman Dr.
Cookeville, TN 38501
Phone: 931 432 4021

Apex 4000 Pneumatic Positioner

Introduction:

The Apex 4000 Pneumatic Positioner provides accurate valve positioning for rotary and linear actuators in either double acting or spring return configurations. It may be used with 3-15 psi pneumatic control signals (as shown), or fitted with current-to-pressure transducers for 4-20 mA signal inputs. The modular design of the Apex 4000 allows for field retrofitting of the I/P options. The compact, lightweight positioner also conforms to NAMUR VDI/VDE 3845 mounting standards and features a low profile visual position indicator. The Apex 4000 is available with the following options: high and low flow spool valves and multiple feedback cams.



Applications:

Two spool valve options make the Apex 4000 well suited for use with all pneumatic rotary actuator types including: Rack-and-pinion, Scotch Yoke, Vane, and others. The Apex 4000 is equally well suited for use with pneumatic linear actuators and cylinders.

The Apex 4000 may be installed on any actuator conforming to the NAMUR standard for accessory mounting bolt pattern and pinion height without a coupler. This reduces deadband and is less expensive. Automax offers a full line of mounting hardware for non-NAMUR actuators.

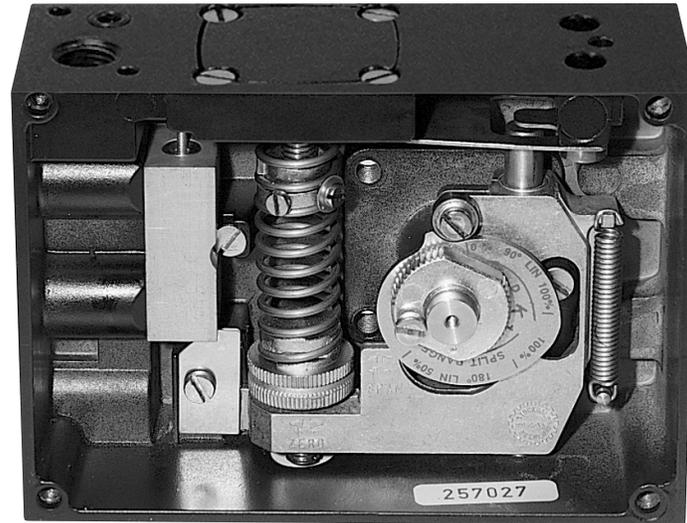
Durable construction and corrosion resistant materials and coatings provide protection against the toughest applications in all process industries, including:

1. Chemical and Petrochemical
2. Power
3. Food and Beverage
4. Pharmaceutical
5. Municipal and Wastewater

Flowserve Corporation
Flow Control Division
www.flowserve.com

1350 N. Mountain Springs Parkway
Springville, Utah 84663-3004
Phone: 801 489 8611

1978 Foreman Dr.
Cookeville, TN 38501
Phone: 931 432 4021

**Features:**

1. **Corrosion Resistant Materials.** All exposed parts are either stainless steel or epoxy powder coated aluminum to permit use in corrosive environments. The gold-plated spool valve offers a high degree of protection against moisture laden and/or corrosive supply air.
2. **Captive Cover Screws** permit calibration without potential for losing screws.
3. **Field Upgradeable.** The Apex 4000 is field upgradeable to any of the electro-pneumatic I/P options without removing the cover.
4. **Multiple Cam Options.** The standard Apex 4000 linear cam allows operation for 0-90°, 0-180°, split ranging, and direct or reverse action applications. Optional characterized cams are available for a wide range of applications.
5. **Compact, Rugged Design** has few moving parts, adding to its reliability and performance.
6. **Low Profile Visual Position Indicator** provides high-contrast viewing of valve position.
7. **Quick and Simple Calibration** is done with thumbwheels, requiring only a flat head screwdriver for calibration. The span adjustment is performed internally with an external zero adjustment.

Flowserve Corporation
Flow Control Division
www.flowserve.com

1350 N. Mountain Springs Parkway
Springville, Utah 84663-3004
Phone: 801 489 8611

1978 Foreman Dr.
Cookeville, TN 38501
Phone: 931 432 4021

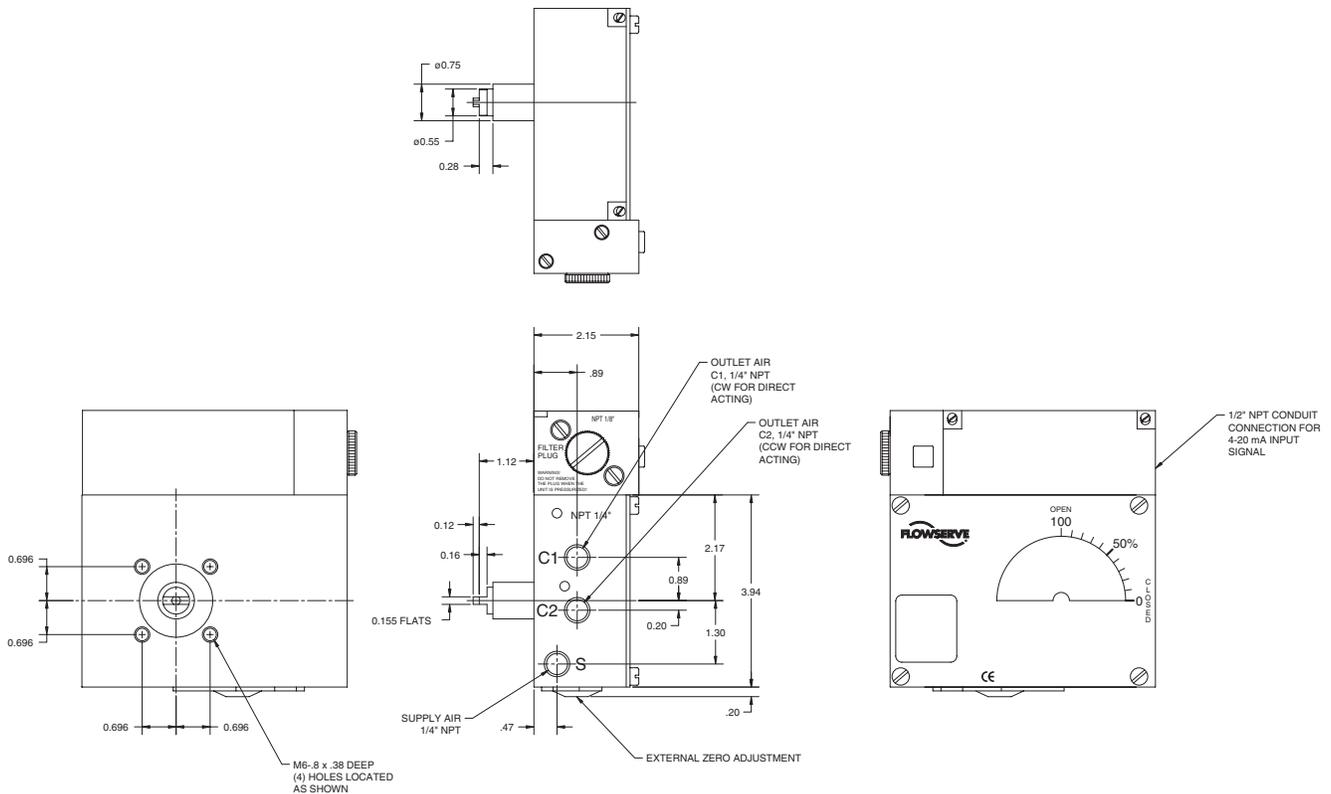
Materials of Construction:

Part	Materials
Housing/Cover	Epoxy Coated Aluminum
Shaft	Stainless Steel
Diaphragm Cover	Epoxy Coated Aluminum
Diaphragm	Nitrile Rubber
Diaphragm Washer	Zinc-Plated Steel
Balance Arm	Stainless Steel
Feedback Spring	Stainless Steel
Lower Arm Assembly	Die Cast Aluminum
Rod	Stainless Steel
Spring	Stainless Steel
Twist Stop	Stainless Steel
Spool Valve	Gold-Plated Steel
Cam Locknut	Zinc-Plated Steel
Ball Bearing	Stainless Steel
Cam	Stainless Steel
Indicator Pointer	Aluminum

Performance Specifications:

Parameter	Value
Repeatability	.5% Full Scale
Hysteresis & Deadband	.8% Full Scale
Linearity	.7% Full Scale
Air Capacity	Std. 9.6 SCFM
@ 60 psi	High 18 SCFM
Position Sensitivity	.2% of Span
Air Consumption	.31 SCFM @ 87 psi
Temperature Range	-4°F to 185°F
Input Signal	3-15 psi
Max. Supply Pressure	150 psi
Weight	2 lbs

Dimensions:



Principles of Operation:

The unit operates on a force balance principle. The opposing force is achieved through the feedback spring and is proportional to the position of the lower arm. The lower arm position is determined by the position of the cam that is secured to the spindle and connected to the actuator shaft, thus providing the feedback from the actuator/valve. When these two forces are equal, the balance arm and the spool in the pilot valve are in the neutral position, the complete unit is in a balanced position. Air is supplied to the pilot valve through Port S and controls the air flow through Ports C1 and C2.

Assume an equilibrium position. An increased control signal will deflect the diaphragm (1) down, compressing the feedback spring (3). The balance arm (2) moves the spool (7) in the pilot valve (8) supplying air to the actuator. At the same time, air is exhausted from the actuator and is vented to atmosphere through the pilot valve. When the pressure imbalance exists, the actuator rotates moving the positioner shaft (6). The shaft and cam (5) rotate, forcing the lower arm (4) upwards compressing the feedback spring (3). The motion will continue until the two forces are equal and the unit is in an equilibrium position.

