

For Pneumatic Rack & Pinion Actuators



This specification covers the design of rack and pinion pneumatic actuators used in plant-wide valve automation applications.

1.0 *aero*² PNEUMATIC RACK AND PINION ACTUATORS

- 1.1 The pneumatic actuator shall be quarter-turn, opposed piston rack and pinion type of a totally enclosed design with no external moving linkages.
- 1.2 The actuator shall be capable of 100° rotation and shall include open and closed position stops with minimum 20° total travel adjustment.
- 1.3 The actuator shall be rated for continuous operation using dry or lubricated non-corrosive gas and be suitable for mounting in any position.
- 1.4 Trims shall be available for temperature ranges from -40°F to +350°F (-40°C to +177°C).

2.0 CONSTRUCTION

- 2.1 Actuator body shall be precision extruded aluminum alloy, hard anodized inside and out after finished machining.
- 2.2 All metal fasteners shall be 300 series stainless steel.
- 2.3 The output shaft/pinion shall be one piece stainless steel (see Brochure for model selection), bottom loaded, blowout proof secured by a non-exposed, redundant stainless steel retaining ring for safety.
- 2.4 End caps shall be cast aluminum, UV and chip resistant polyester powder coated.
- 2.5 Actuator shall incorporate internal porting to permit use of either NAMUR direct mount or remote controls.
- 2.6 Actuator shall be provided with a mechanical indexable visual position indicator and NAMUR accessory drive.

3.0 DESIGN

- 3.1 Double-acting and spring-return models shall be field convertible without the use of special tools.
- 3.2 All spring assemblies shall be of self contained and service safe design.
- 3.3 All actuators shall be designed and manufactured in accordance with ISO 9001 quality standards to meet NAMUR and ISO/DIN dimensional standards.
- 3.4 Actuator shall have replaceable, self-lubricating thermoplastic upper and lower pinion, piston head and heel bearings.
- 3.5 Pressure containing seals shall be outboard of all bearings.
- 3.6 Use of self-threading thread forming fasteners and metal-to-metal pressure seals are strictly prohibited.
- 3.7 All spring designs shall be qualified by fatigue and load test.
- 3.8 Actuator shall include side located bi-directional pinion travel stops which provide a guaranteed ±5° of valve travel adjustment between 80° and 100° of actuator travel. Travel stops shall be designed to absorb the maximum rated torque of the actuator and the maximum impact loads associated with recommended maximum stroke speed.
- 3.9 Full tooth engagement, at the pitch line shall be maintained throughout full range of travel.
- 3.10 Attachment of shaft driven accessories shall not require removal of the visual position indicator.
- 3.11 Actuator shall incorporate a one-piece blowout proof pinion.
- 3.12 A secondary extended bolt pattern shall be provided to accommodate installation on non ISO/DIN valve designs.
- 3.13 Gear teeth shall be designed to AGMA specifications, minimizing back lash and suitable for throttling applications.

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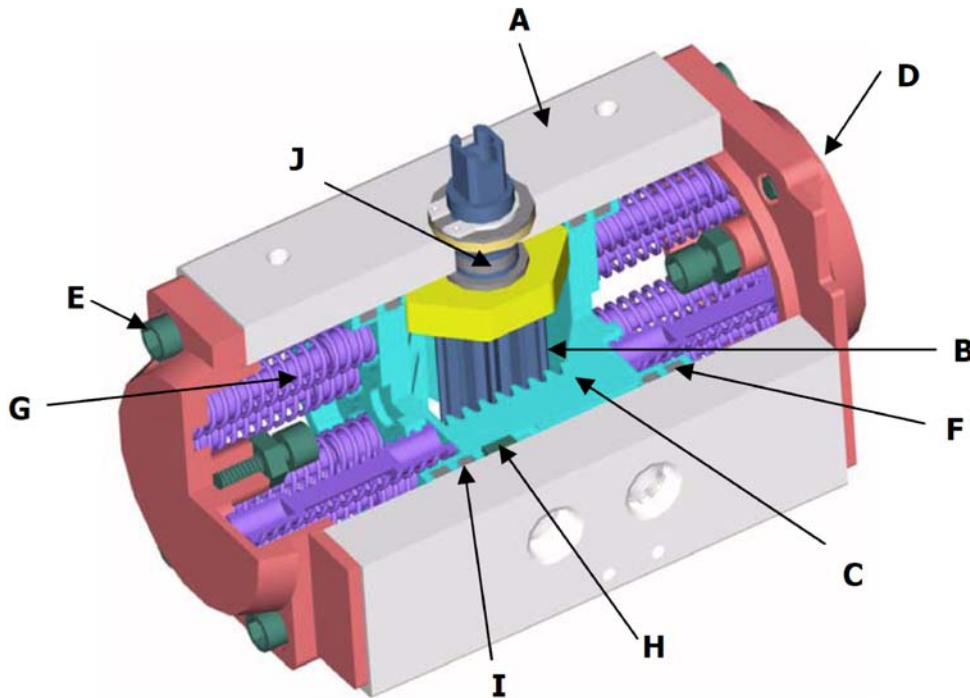
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MATERIALS OF CONSTRUCTION

- A. **Body:** Precision-extruded aluminum alloy, hard anodized inside and out after finished machining.
- B. **Pinion Gear:** Alloy stainless steel or alloy steel corrosion protected.
- C. **Pistons:** Cast aluminum alloy dichromate dipped.
- D. **End Caps:** Cast aluminum alloy polyester powder coated.
- E. **Fasteners:** 300 series stainless steel
- F. **Seals:** Low temperature Nitrile is standard -40°F to 180°F (-40°C to +82°C). Options, Viton 0°F to +350°F (-18°C to +177°C).
- G. **Springs:** Carbon steel, shot peened, and corrosion protected by a pliable coating.
- H. **Heel Bearings:** Acetal, self-lubricating.
- I. **Piston Bearings:** Acetal, self-lubricating.
- J. **Pinion Gear (output shaft) Bearings:** Standard trim; Upper-Acetal; Lower-Acetal; Thrust-Acetal. Optional high temperature trim has PEEK composite upper and lower bearings.



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