



Technical Specification for Electric, Spring Return, Rotary Actuators

General

A spring return, electric actuator shall consist of an aluminum enclosure containing an electric motor, a high-efficiency gear train, torsion spring, double-throw limit switches and a terminal block. Internal wiring shall be 18-AWG 600-volt UL/CSA-approved insulated wire that is terminated at the terminal block. The actuator housing shall have a suitably sized female NPT entry to facilitate the installation of conduit or cabling. Each actuator shall include a copy of the relevant wiring diagram and field installation instructions.

Enclosure

The actuator enclosure shall be designed to meet the following environmental requirements:

- NEMA 4 (weatherproof) or
- NEMA 4X (weatherproof/corrosion resistant) or
- NEMA 7 (explosionproof) or
- NEMA 4/6/7 (weatherproof/submersible/explosionproof)

When required, certification of the above shall be provided by a recognized, independent testing authority, such as the following certifications by the Canadian Standards Association:

- CSA NRTL/C* – Class I, Divisions 1 & 2, Groups C & D
- CSA NRTL/C* – Class II, Divisions 1 & 2, Groups E, F & G
- CSA NRTL/C* – approved to UL standard No. 429 – Electrically Operated Valves
- CSA NRTL/C* – approved to UL standard No. 1604 – Electrical Equipment for Use in Class I and II, Division 2; Class III Hazardous (Classified) Locations

**The "NRTL/C" indicator adjacent to the CSA Mark signifies that the product has been evaluated to the applicable ANSI/UL and CSA Standards for use in the U.S. and Canada. NRTL, i.e. Nationally Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories that have been recognized to perform certification to U.S. Standards.*

Actuator mounting shall be universal to facilitate field or factory installation to the valve, damper or other type of driven equipment. The mounting surface shall permit 90° degree indexing to allow efficient electrical conduit runs with minimal interference from piping or structural components. The actuator shall be capable of operating in any mounting position. The enclosure will have an industrial quality coating. External bolting will be stainless steel.

Sizing

The actuator shall be sized and selected against operating torque requirements as stated by the equipment manufacturer. The actuator shall be sized to have a minimum safety factor of 1.5 to 1, or so that the rated spring ending torque is 1.5 times the maximum required torque of the driven equipment. Maximum torque is defined as the torque encountered during the spring stroke of the valve when operating under maximum working pressure / load conditions.

Intermittent (Open/Close) Service

For on/off service, the actuator shall be rated for 25% duty at the maximum rated spring ending torque.



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Throttling or Modulating Service

For on/off service, the actuator shall be rated for 50% duty at the maximum rated spring ending torque. A feedback potentiometer shall be furnished in the actuator to provide a feedback signal for the positioning device. Speed of rotation for modulating service shall be a minimum of 10 seconds per 90° rotation or slower.

Temperature Range

Normal operating environments:

The actuator shall be suitable for operation in ambient temperature ranging from -40° to +150° Fahrenheit (+65°C).

Elevated ambient temperature environments:

The actuator shall be suitable for service in elevated temperature environments when supplied with a thermal insulating cover. The actuator shall be capable of operation after exposure to an ambient temperature of 482° Fahrenheit (250° Celsius) for a minimum of 1 or a maximum of 3 hours. To prevent thermal transference, the actuator shall be suitably insulated from the driven device.

The actuator shall full comply with the requirements of NFPA 130, 1997 edition.

Actuators with Alternating Current Motors

The AC motor shall be a fractional horsepower, permanent split-phase capacitor-type, electric motor designed to operate on a 120VAC-1PH-60HZ power supply. The motor winding insulation shall be class "B". A thermal switch shall be imbedded in the motor for overload protection. When required by the application, the motor thermal switch may be bypassed.

Gearing

Reduction gearing shall be designed to withstand the actual motor stall torque. This gearing shall be high efficiency, spur type. The gearing shall be manufactured of hardened alloy steel and permanently lubricated. The gearing shall be connected to the output shaft by means of a clutch assembly that is capable of uncoupling the motor during spring operation for maximum spring force. On loss of electrical power, the spring shall drive the shaft and gear train in the predetermined rotary direction from any point in the rotary travel. The actuator assembly shall be available as a spring drive clockwise, or counterclockwise, to suit the requirements of the system. The spring stroke shall take no more than 8 seconds to complete.

Spring

Springs shall be manufactured from oil tempered, spring steel and Teflon® coated to prevent corrosion.

Mechanical Stops

Each actuator shall be supplied with mechanical travel stops for each direction of travel. These stop bolts will permit end stroke adjustment of +/- 5° of travel.



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Limit Switches

Two adjustable, cam-actuated, end-of-travel switches shall be provided to stop the actuator at the ends of travel. These switches shall be of the snap-acting, double-throw type rated to 250VAC. The limit switches shall be UL/CSA listed to carry a power load equal to or greater than the locked rotor current of the actuator.

Manual Override

The actuator shall be capable of being equipped with an optional manual override to permit operation of the valve in the event of electrical power failure or system malfunction. The override device must be permanently attached to the actuator. The override shall not rotate when the actuator is electrically operated.

Visual and Remote Position Feedback

The actuator shall be supplied with local visual indication of valve position. Potentiometers will be furnished for remote position indication or for feedback signal on modulation service.

Accessories

The valve or damper actuator shall be RCS SurePowr Series, models Sure24, Sure25, Sure49 or Sure100. These actuators shall have provisions for the following options:

- Temperature controlled space heater to prevent the build up of moisture due to condensation.
- Auxiliary limit switches with the contacts wired to a terminal block for customer use. These contacts are to be dry. These switches are to be adjustable throughout the entire stroke and may be set at any actuator position.
- Feedback potentiometers that provide continuous, remote indication of actuator position.
- An electronic, analog positioning module capable of accepting a variable D.C. analog signal input. This module shall position the valve with an accuracy of .5% to 1% of total travel. This device shall also transmit a variable D.C. analog signal for remote indication of valve position.
- An electronic module capable of transmitting a variable D.C. analog signal for remote indication of actuator position. The module shall be capable of driving a 500Ω load.