

SPECIFICATION

Electric Valve Actuators with Two Wire Digital Communications

Actuators shall contain motor, gearing, manual over-ride, limit switches, torque switches, drive coupling, integral motor controls and mechanical dial position indicator (where required). Actuator shall be capable of mounting in any position.

The motor shall be specifically designed for actuator service. The motor will be of the induction type with class F insulation and protected by means of thermal switches imbedded in the motor windings. Motor enclosure will be totally enclosed, non-ventilated.

Motors will be capable of operating on 460 volt - 3 phase - 60 hertz power.

Actuator enclosure shall be NEMA 4 (watertight). All external fasteners on the electric actuator will be stainless steel. Fasteners on limit switch and terminal compartments shall be captured to prevent loss while covers are removed. All torque and thrust bearing housings, except motor housings, shall be cast iron.

All gearing shall be grease lubricated and designed to withstand the full stall torque of the motor.

Manual over-ride shall be by handwheel. Manual operation will be via power gearing to minimize required rimpull and facilitate easy change-over from motor to manual operation when actuator is under load. Return from manual to electric mode of operation will be automatic upon motor operation. A seized or inoperable motor shall not prevent manual operation.

Limit switches shall be furnished at each end of travel. Limit switch adjustment shall not be altered by manual operation. Limit switch drive shall be by countergear. Limit switches must be capable of quick adjustment requiring no more than five (5) turns of the limit switch adjustment spindle. One set of normally open and one set of normally closed contacts will be furnished at each end of travel where indicated. Contacts shall be of silver and capable of reliably switching low voltage DC source from the control system furnished by others. Batteries to back-up limit sensing devices shall not be used to avoid malfunction of the actuator in case of power failure.

Mechanically operated torque switches shall be furnished at each end of travel. Torque switches will trip when the valve load exceeds the torque switch setting. The torque switch adjustment device must be calibrated directly in engineering units of torque and independently settable for the 'open' and 'closed' directions of travel. Electronic torque sensing shall not be used.

Electric Valve Actuator Specification (continued)

All wiring shall be terminated at a plug and socket connector.

Quarterturn actuators will be furnished with mechanical stops that restrict the valve/actuator travel.

Actuator must be capable of the following valve closing times/operating speeds:

- quarterturn valves - 60 second closing time
- gate valves and sluice gates – 10 to 12 inches per minute operating speed

Actuators will be capable of operating in an ambient temperature range -20 to +160 degrees F.

Actuators shall be furnished with a local indicator, which continuously shows the valve travel from the fully open to the fully closed positions. The indicator shall be mechanically driven and must indicate the valve position during the electric and manual modes of operation.

Actuators in modulating service will be selected such that the required dynamic valve torque is no more than 60% of the electric actuator's maximum rated breakaway torque. Power gearing in modulating actuators shall have zero backlash between the motor and actuator output.

All actuators will be furnished with integral motor controls consisting of:

- reversing starters
- power supply/control transformer
- phase discriminator
- digital interface with the control system
- "open-stop-close" pushbuttons / "local-off-remote" selector switch / red and green indicating lights

Integral controls to be field separable from actuator gearcase by means of plug and socket electrical connection.

Integral pilot device station must be capable of repositioning at 90 degree increments so the pushbuttons, indicating lights and selector switch are accessible to the operator.

Transmission of control information shall be by two-wire system.

Bus communication shall not be reliant on electro-mechanical devices.

Communication between the actuators and control panel shall be by DeviceNet conforming to the Open Device Vendor Association, Inc. (ODVA) DeviceNet Specification or Modbus RTU/ASCII. Proprietary signal or communication protocols will not be permitted. If an actuator loses power and communication, it must have the capability to come back on-line without requiring operator intervention upon power recovery.

Electric Valve Actuator Specification (continued)

The actuator digital communications board must be capable of providing the following:

- Control features
 - OPEN
 - CLOSE
 - Run to setpoint position
- Indications (typical)
 - End-of-travel positions (OPEN / CLOSED)
 - Continuous valve position
 - Selector switch in position (LOCAL / REMOTE)
 - Open torque switch tripped
 - Closed torque switch tripped
- Fault indications (typical)
 - Motor protection tripped
 - Phase failure / Wrong phase sequence
 - Open torque switch tripped in mid-travel (available)
 - Closed torque switch tripped in mid-travel (available)
- Minimum 3 analog inputs
- Minimum 8 digital inputs
- Minimum 4 digital outputs
- 4-20mA valve position output

Communication parameters:

- Protocol to be DeviceNet or Modbus RTU/ASCII
- Proprietary protocols will not be permitted
- System to be capable of simultaneous reception by all nodes
- Removal of node to be permitted without severing network
- 1500V ESD protection
- Actuators must be capable of coming back on-line without operator intervention when power is lost and then recovered
- DeviceNet
 - Statement of Conformance by the ODVA required
 - Electronic Data Sheet (EDS) file available via the internet
 - System speed 125k baud, 250k baud, or 500k baud
 - Communication input shall be optically isolate form the microprocessor circuit
- Modbus
 - System speed to be 1.2k baud, 2.4k baud, 9.6k baud or 19.2k baud
 - Capable of Modbus RTU or Modbus Ascii over RS-485
 - Nodes addressable from 0 to 255

Electric Valve Actuator Specification (continued)

The board must have the following status indications visible from outside the actuator:

- Processor status
- Bus communication status
- Overall status

The following algorithms must be resident on the field digital communications board:

1. Positioning (0 to 100% open)
2. Open/close interlock
3. Direction reversal time delay
4. Fail open, fail close, fail as is, fail to preset

Electronic board removal and/or failure shall not prevent the actuator from operating electrically with the "local-off-remote" selector switch in the "local" position.

Actuators shall be as manufactured by AUMA Actuators, Inc.

Issue 1.07