SECTION 409236

VALVE ACTUATORS, ELECTRIC

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electric valve operators and appurtenances specified in this Section and shown on the Drawings.

1.02 SYSTEM DESCRIPTION

A. General: Furnish and install electric valve actuators as shown on the Drawings.

1.03 SUBMITTALS

A. General: As specified in:

1. This Section.

B. Submit the following prior to valve manufacture:

1. Outline of manufacturer's representative services.

C. Submit the following prior to valve installation:

1. Manufacturer's installation instructions.

2. Manufacturer's Operation and Maintenance Data.

1.04 QUALITY ASSURANCE

A. Testing: Test valve operators with valves.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Rotork

2.02 ELECTRIC ACTUATORS

A. Electric actuator shall include motor, power gearing, limit switches, torque switches, built-in controls, de-clutch, and auxiliary handwheel for manual operation. Electric actuator shall have grease-tight, NEMA rated, weatherproof housing.

B. Actuator shall be sized to operate valve from full open to full closed in not less than two seconds per inch of valve diameter, plus or minus 50%.

C. Size actuators to deliver not less than 1.5 times required torque based upon maximum dynamic flow conditions.

D. Actuator shall drive valve shaft through a worm gear operator and intermediate link. Power gearing shall consist of helical or spur type gears of alloy heat-treated steel. Worm gears shall be carbonized and hardened alloy steel and ground after heat treatment. Worm gear pinion shall be alloy bronze. Gearing shall be designed so that gear ratio can be field changed and gearing can be field repaired. Design gearing for 100% overload.

E. Provide handwheel on electric actuator. Handwheel shall provide manual operation of valve. Handwheel shall not rotate during electric operation, and motor shall not rotate during hand operation. De-clutching lever shall mechanically (not electrically) disconnect motor drive from gear train. Failure of motor gearing or a fused motor shall not prevent hand operation. Hand operation shall not require more than 80 pounds of pull on handwheel rim. Handwheel shall rotate counterclockwise to open valve, unless otherwise specified. An arrow with the word OPEN shall be cast on handwheel. Operation shall automatically return to electric drive position when motor is energized.

F. Provide mechanical-type valve position indicator. Valve position indicator shall show valve position at all times. Indicator shall be part of an intermediate gear head or electric motor actuator.

G. Actuator motors shall be reversible, squirrel cage induction type. Actuator motors shall be designed for 480Volts, three phase, 60 Hertz power supply. Motors shall be totally enclosed, non-ventilated, with NEMA Class B insulation and a maximum continuous temperature rating of 120° C (rise plus ambient). Leads from motor shall be brought to limit switch compartment without external piping or conduit box.

H. Actuators shall have integrally mounted, full-voltage NEMA rated, reversing starters.

I. Actuators shall be provided with space heaters in the switch compartment and strip heaters in the motor.

J. Provide two adjustable torque switches of the quick break type. Torque switches shall be responsive to excessive load encountered in either opening or closing direction. Furnish four fully adjustable, double pole, double throw limit switches in addition to switches required for built-in control. Torque and limit switches shall be rated 10 amp. at 120 VAC. Furnish switch compartments with case heater.

K. Provide 12 contactor limit switches and gearing as an integral part of the actuator. Limit switch gearing shall be intermittent type. Limit switch gearing shall be totally enclosed in its own gear case and grease lubricated. Limit switch gearing shall be bronze.

L. Provide limit switches for over-travel protection and four auxiliary SPDT limit switches, each rated at 8 amps, minimum. Switches shall be independently adjustable over the full range of travel. Limit switches shall be wired to a terminal board for remote output.

M. Valve shall be modulating, or open-close type as shown on the drawings.

1. Modulating Actuators shall have Position Feedback, Position Command, General Fault, In Remote, 100% Opened and 100% Closed feedback.

2. Open-Close Actuators shall be Open Command, Close Command, General Fault, In Remote, 100% Opened and 100% Closed feedback.

N. Provide actuator with LOCAL/OFF/REMOTE selector switch and push buttons for local control.

1. Local Control

a. When LOCAL/OFF/REMOTE selector switch is in the “LOCAL” position, valve shall be controlled by actuator push buttons.

b. Provide three push buttons for local manual operation. Push buttons shall be marked “OPEN”, “STOP”, and “CLOSE”. Actuator shall drive valve to its limit of travel when “OPEN” or “CLOSE” push buttons are depressed. Actuator shall stop when the “STOP” push-button is depressed.

2. Off: When LOCAL/OFF/REMOTE selector switch is in the “OFF” position, actuator motor shall be off.

3. Remote Control

a. When LOCAL/OFF/REMOTE selector switch is in the “REMOTE” position, valve shall be controlled by signals from a remote source.

b. Provide interposing relays to interface with remote devices as shown on the Electrical Drawings and specified in Division 16.

B. Provide actuators with dry contact outputs indicating that the valve is in the “REMOTE” mode (available), and that the actuator is powered and not overloaded.

C. Provide indicating lights as follows:

1. Amber indicating light for “Power On”.

2. Red indicating light for “Torque Overload”.

3. Red indicating light for “Valve Closed”.

4. Green indicating light for “Valve Open”.

D. Wire leads for power and control signals shall be brought to a terminal board for field connection.

E. Wiring, switches, relays, and other electrical components shall be provided in a NEMA 4X weatherproof enclosure.

PART 3 - EXECUTION

3.01 INSTALLATION

A. In accordance with actuator manufacturer's written instructions.

3.02 TESTS

A. Hydrostatic Test: Test actuators with valves.

B. Functional Test

1. Following installation, inspect, and operate valve actuators.

2. After adjustments have been made and the actuator is properly lubricated, do the following:

a. Operate actuator with selector switch in "LOCAL" position.

1) Run actuator through one complete cycle from full-closed to full-open to full-closed.

2) Verify that that "STOP" push-button stops valve motion.

b. Operate actuator with selector switch in "REMOTE" position and test actuator operation from actuator terminal strip.

1) Run actuator through one complete cycle from full-closed to full-open to full-closed.

2) Verify that that remote stop signal stops valve motion.

c. Verify that contacts for remote monitoring of valve position and operation are functioning properly.

d. Verify that indicator lights are functioning properly.

e. Verify that limit switches are functioning properly.

END OF SECTION