HALOGEN VALVE SYSTEMS, INC.

Specification

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Emergency Shut Off System Series CR-1Y (Triplex) for Chlorine Cylinder and Ton Container Automatic Switchover Systems

1. Scope

This specification describes the Series CR-1Y Emergency Shut off System for Chlorine Cylinder and Ton container valves as manufactured by Halogen Valve Systems, Inc. These systems are designed for installation in conjunction with automatic switch over systems (provided by others) employing three chlorine containers providing an uninterrupted flow of chlorine.

2. Description

The emergency shut off system shall be the Halogen Series CR-1-Y comprised of three (3) electrically driven Actuators that act directly upon the cylinder or ton container valve stem. The Actuators shall mount upon the cylinder or ton container valve and yoke assemblies by means of a clamping mechanism and a valve stem coupling so as to be removable during cylinder changes.

The Actuator shall deliver 40-50 Ft.-Lb. of closing torque to the valve stem upon receipt of a shutdown signal. The Actuator shall be powered only in the closing direction with provision for manual override in either the open or closed direction. Power for the Actuator shall be supplied by an uninterruptable 12V battery power supply and control system.

3. Actuator Design

Each Actuator shaft shall couple to the valve stem and provide an extension through the Actuator such that a standard chlorine wrench may be applied to the extension to manually operate the valve while the actuator is in place. The extension shaft shall be coupled to the drive motor and reduction gearing by means of a one way, positive engagement clutch that may be selectively disengaged for manual operation. Pushing in on the shaft shall disengage the clutch for manual operation of the valve. The clutch shall have a toggle mechanism such that it remains disengaged, free to rotate in either direction, for manual operation. The clutch shall automatically reengage, for automatic closure upon activation of the motor and gear train.

4. Actuator Components

4.1 Motor Driver.

Motive power for the Actuators shall be provided by 12V dc electric motors acting through a gear reduction system.

4.2 Clutch & Shaft.

The Actuator shall be constructed of materials suitable for the chlorine environment. The valve stem extension shaft shall be machined from a single piece of Monel. The valve stem connection coupling and shaft bearing/seal shall be of Aluminum-Silicon Bronze, C-642 Teflon coated for additional corrosion resistance. The valve stem engagement spring shall be of heat treated Hastelloy C-276.

4.3 Valve Stem Coupling

The element that couples the driven shaft to the valve stem shall be designed to accommodate slight misalignment of the Actuator shaft with the axis of the valve stem without restricting rotation.

4.4 Clamp/Frame.

The clamping mechanism for yoke mounting (Series CR-1-Y) shall require no tools for installation on the valve and valve yoke.

Adapters shall be available to unitize the Actuator with regulator clamping systems commonly used in the industry. Regulator mounting shall require only an adjustable wrench for mating to the regulator. The regulator manufacturer is to be specified.

All clamp and frame components shall be coated with fusion bonded polyester for corrosion resistance.

4.5 Sealing Devices

Shaft entrances to the Actuator mechanism shall be sealed with double "O" ring seals of Viton and/or Teflon. The motor canister and main enclosure will be sealed with static, Viton "O" ring seals.

5. Control Panel Design

The Triplex control panels shall be contained within a single electrical enclosure of NEMA 4X rating. All cables, connectors, switches and fittings shall be of a similar rating to resist the chemical environment. The actuators shall have a dedicated power source (battery) and microprocessor controller. Electrical power shall be delivered to each Actuator by means a flexible cable. Each individual control panel shall have indicator lights to display the status of key system elements. The control panel shall accept signals from sources such as gas detectors, remote station alarms, seismic or fire sensors and manual switches to trigger the Actuator or Actuators to automatically close one or all of the cylinder or ton container valves connected to the system. The panel shall have the capability of accepting input signals to initiate either simultaneous or independent operation of each Actuator and valve.

6. Control Panel Components

6.1 Control circuitry

An electronic circuit board in the control panel shall contain a microprocessor programmed to precisely control the valve closing cycle and the torque applied to the valve stem. The microprocessor shall also monitor and display status of the battery, charging power and system readiness as well as provide a diagnostic system check during the test cycle. Electro-mechanical relays or contacts, which are susceptible to corrosion failure, shall not be used in the control circuitry. The entire control system shall be comprised of encapsulated solid state devices.

In the event of a sustained loss of charging power (seven to ten days), the microprocessor shall detect a declining battery charge to initiate Actuator closure while sufficient power remains to apply the specified torque to the valve stem.

6.2 Battery and Charger.

The batteries shall be of the gel-cell lead-acid type rated at 7 ampere-hours. Each charging system shall provide a variable controlled charge current that is temperature compensated to optimize battery performance and service life.

6.3 Status Lights

The control panel enclosure shall have a window in the front cover through which the operator may observe the status lights. The status lights for each respective system are as follows:

1. **Charge Power**--(Normally On) Green to indicate that charge power is available.
2. **Armed/Ready**--(Normally On) Rapidly pulsating Green to indicate the microprocessor is functioning and ready to operate. Flashing Green during operation and for a 15 second reset period after activation.
3. **Battery Low** --(Normally Off) Flashing red to indicate that the battery should be replaced.

6.4 Input Signals

The control panel shall contain a terminal strip to accept multiple incoming signals for either simultaneous or individual Actuator operation. External signals shall consist of a "Normally Open" dry contact, closure to initiate the Actuator.

6.5 Output Signal

Upon initiation of the Actuator, the control system shall provide an output signal (0.2 amp @ 24V dc/ac) to indicate Actuator operation. These may be employed to trigger other displays or alarms.

6.6 Testing

Mounted externally on the control panel shall be a **Test** switch to provide a full cycle test of the each individual actuator. During the test cycle the microprocessor shall self-test as well as check cable-motor continuity, and the battery under load conditions. Test procedures as outlined on the Actuator and control panel labels shall provide the operator with "Go"-"No-Go" criteria. Test results are confirmed by operator observation and the tactile force required in re-opening the valve.

7. Power Requirements

The power supply to operate the control panel shall be (115 V ac, 60 Hz) single phase. Current consumption shall be 0.5 amp at 115V ac.

8. Options

8.1 Solar Power

Sustaining battery charge power shall be provided by a Siemens M-5 Solar Module rated for 5 Watts at 15V. Solar powered versions shall not require 115 V power.

9. Accessories

Standard accessories for each Actuator system shall include (1) Stowage bracket for temporary placement of the Actuator during cylinder changes. (2) A twisted type chlorine cylinder wrench.