ENGINEERING SPECIFICATION

Emergency Shutoff System for Chlorine Ton Containers

Duplex II Controller with Two (2) Eclipse Valve Actuators

The following specification describes an Emergency Chlorine Shutoff System as manufactured by Halogen Valve Systems, Inc. for two (2) ton containers. The system consists of one (1) 2-channel controller and two (2) Eclipse valve actuators.

Specification

The Chlorine Emergency Shutoff System shall comply with all items listed in Chlorine Institute document, "Recommendations for Emergency Closure Devices for Container Valves".

The emergency shutoff system shall consist of one 2-channel Duplex II controller and two (2) electrically driven Eclipse valve actuators as manufactured by Halogen Valve Systems Inc., Tustin, CA.

ACTUATOR

Actuator shall mount upon the ton container valve and yoke assembly by means of a hand clamping mechanism and a valve stem to allow easy removal and installation during tank change. No tools shall be required to install or remove the actuator. When a direct mount vacuum regulator is to be used, adapters shall be provided as necessary to allow both actuator and direct mount vacuum regulator to be installed on the same tank.

The actuator shall be **powered only in the closing direction** to eliminate unintended or accidental opening of the container valve. **The actuator while installed shall have a valve stem extension shaft that allows manual opening and closing of the container valve using a standard chlorine valve wrench. Actuator shall not restrict access to the valve packing nut and yoke/clamp in the event they need to be tightened**. Actuator power shall be 12VDC supplied by a VRLA battery located within the controller.

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. All clamp and frame steel components shall be epoxy powder coated for corrosion resistance. 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 shall be sealed with static, Viton O-ring seals.

Flexible cable shall connect actuator to controller. Actuator cable length shall be _____ (12 ft standard, max 40 ft).

CONTROLLER

A 2-channel controller 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 controller shall have an internal dedicated power source (battery).

The controller and actuators shall be DC powered. The battery shall be located within the controller and shall be of the high rate, valve regulated lead acid type, rated at 8.0Ah. AC power shall provide a variable controlled battery charge current that is temperature compensated to optimize battery life. In the event of a loss of charging power, the controller shall display a warning and continue to monitor battery charge. Battery shall provide total system backup power for up to 3 days, after which system shall automatically initiate an emergency closure while sufficient battery power remains to apply the specified valve stem torque.

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The controller shall contain a microprocessor programmed to precisely control the valve closing cycle and the torque applied to the valve stem. **The controller shall measure and deliver 40-50 lb-ft of closing torque by controlling the current flow to the actuator during an emergency shutdown. System shall indicate locally and remotely if proper torque is not achieved on the valve stem**. The microprocessor shall monitor and display the status of the battery and charging power as well as provide diagnostic information to check comprehensive system readiness. The controller shall be comprised of solid state encapsulated devices not susceptible to corrosion.

The controller shall have a membrane panel on the front cover where the operator may observe actuator ARMED/READY lights and system status lights for OK, WARNING and ERROR. An alphanumeric LED display screen shall have two lines of 20 characters each. The display shall indicate additional information on battery, actuators and microprocessor status, and warnings and errors.

The membrane panel shall have an actuator test button for each actuator. When pressed, the controller shall activate the specific actuator and apply only 20-30 lb-ft of torque to the valve stem per Chlorine Institute recommendations. Test sequence shall also self-test the microprocessor, check cable/motor continuity, and load-test the battery. Testing procedures as outlined on the control panel label shall provide the operator with Go/No-Go criteria. **Test results shall be confirmed by operator's observation and the force required to re-open the valve manually with a standard valve wrench**.

INPUTS / OUTPUTS

The controller shall accept contact signals from gas detectors, remote station alarms, fire sensors and manual switches to initiate an emergency simultaneous close of all cylinder valves connected to the system. Input shall be configurable for normally open or normally closed contacts.

When an emergency close sequence is completed and proper torque has been achieved, the controller shall momentarily close one low voltage output relay (0.2-amp @ 24V AC/DC) for each actuator.

The power source to operate the battery charging circuit shall be 115/230VAC, 50 to 60 Hz, single phase. Current consumption shall be 0.5 amps at 115VAC.

INCLUDED ACCESSORIES

Each emergency shutoff system shall include (1) storage bracket per actuator for temporary placement of the actuator during tank change. One (1) twisted chlorine cylinder type wrench and one (1) remote mountable emergency shutoff switch shall be provided with each controller.

OPTIONS

RELAY INTERFACE MODULE (RIM)

A Relay Interface Module (RIM) shall be provided in the controller. The RIM shall have three output relays rated 5.0 amps @ 115 / 230 AC and shall be configurable as normally open or normally closed. Each relay may be configured to activate when one of 10 preset warnings, errors or system status conditions is triggered.

SERIAL OUTPUT for SCADA

An RS232 Serial Port shall be provided. Output shall transmit status of (23) System Conditions/Alarms in ASCII format.

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