DeZURIK

INTRODUCTION

This specification covers the design, manufacture, and testing of the DeZURIK Pump & Control Valve Interface for Solenoid Operated Pump Control Valves, Model ECB-CP

PART 1 - GENERAL

1. Standard products - use the same manufacturer for multiple units of same type.

PART 2 - PRODUCTS

2.01 DeZURIK PUMP & CONTROL VALVE INTERFACE FOR SOLENOID OPERATED PUMP CONTROL VALVES, MODEL ECB-CP

A. GENERAL FUNCTION

The DeZURIK ECB-CP shall provide control interface between the pump control valve and the pump, to minimize pressure surges in the system when the pump starts or stops. The DeZURIK ECB-CP shall properly sequence and control the pump and pump control valve start-up and shut-down procedure, providing both visual and electronic status outputs for operating personnel. The DeZURIK ECB-CP shall protect the pumping system from damage due to mechanical, hydraulic or power failure. The DeZURIK ECB-CP shall be pre-wired and include an integral programmable valve controller to sequence the pump and pump control valve during all modes of operation. The DeZURIK ECB-CP shall be pre-programmed for most common pump control applications. The DeZURIK ECB-CP shall be easy to wire and adjust. The DeZURIK ECB-CP shall include the following features:

- Sequence timers
- Local visual indication of pump and control valve status.
- Displays time for system to build pressure and for valve to open
- Contacts for remote or automatic start signal
- Local pump start & pump stop buttons
- Local emergency stop button
- Automatic shutdown of pump in emergency situations
- Terminal block connections for solenoid controls, valve limit switch, pump starter relay, remote automatic contact, pressure switch
- LOR switch for remote or local operation

Custom application programming is available upon request. The DeZURIK ECB-CP shall include automatic recognition of common fault conditions and shall provide proper fault response sequencing to the pump control valve and pump starter as well as visual and electronic fault notification to operating personnel.

The integral programmable valve controller shall be housed in a NEMA 4X fiberglass enclosure with polycarbonate window, gasketed door, continuous stainless steel hinge, stainless steel twist/latch door fasteners, and a padlockable door hasp.

The DeZURIK ECB-CP shall include alarms, adjustable timers, system indicators, providing local visual indicators for both normal operation and alarm conditions.

The DeZURIK ECB-CP shall include an externally mounted three position “Local-Off-Remote” switch to provide local or remote pump start/stop operation. Externally mounted pump start and pump start buttons shall be provided for local operation. The DeZURIK ECB-CP shall be supplied with contacts for remote start, a pressure switch and a valve limit switch.

The DEZURIK ECB-CP shall require a minimal amount of field wiring.

B. SOLENOID OPERATED PUMP CONTROL VALVE

Upon receipt of a local or remote pump start command, the ECB-CP energizes the emergency solenoid pilot valve and activates the pump start output. The pump starts and pressure builds against a closed pump control valve. Once system pressure has been made, the normal solenoid valve is energized by the DeZURIK ECB-CP and the valve begins to slowly open. The opening rate of speed shall be controlled by the opening speed control. Line pressure is gradually increased to full pumping head.

When the pump is signaled to shut-off, the normal solenoid pilot valve shall first de-energize and the pump control valve begins to close slowly, at a rate controlled by the closing speed control. Flow is gradually reduced while the pump continues to run. When the pump control valve is nearing the fully closed position, a limit switch assembly affixed to the cover of the pump control valve indicates the valve is fully closed and the pump shuts off and the solenoid pilot valve is de-energized.

Should a power failure occur while the pump is running, both solenoid valves shall be de-energized and the pump control valve will close quickly, at the rate set by the emergency closing speed control, preventing reverse flow.

C. PANEL TECHNICAL INFORMATION AND CONSTRUCTION:

Visual Indications:

1. Pump Status - White = Pump Off, Amber = Pump On
2. Pressure Switch Status – Flashing Blue = Below Minimum, Steady Blue = Pressure OK
3. Valve Status - Red = Valve Closed, Flashing Green = Normal Solenoid Energized, Valve is Opening, Steady Green = Normal Solenoid Energized, Valve Fully Open
4. Emergency Stop Status - Emergency stop enabled when displayed
5. System Failure Status - Indicates a system failure when displayed
    a. Mode 1 = Insufficient Pump Pressure on Start-up
    b. Mode 2 = Valve did not Open on Start-up
    c. Mode 3 = Loss of Pressure to Pressure Switch
    d. Mode 4 = Valve Closed Without Command
    e. Mode 5 = Power Failure Delay
6. Time for Pump to build Pressure - Displays setting and countdown time in seconds
7. Time for Valve to Open - Displays setting and countdown time in seconds

D. **CONSTRUCTION**:

The DeZURIK ECB-CP shall have remote communication capabilities. The controller shall include six (6) configurable 4-20mA analog inputs; six (6) dry contact digital inputs; four (4) 4-20mA analog outputs; two (2) solid-state relays and two (2) mechanical relays. All inputs and outputs shall have a configuration menu which programs signal name, scaling, engineering units, precision, & filtering.

The DeZURIK ECB-CP shall have a maximum of four (4) PID loops for use with any DeZURIK Pump Control Valve. Each loop shall have the ability to be broken into (4) different control zones with customizable PID parameters in each. Each PID loop shall have an independent output limiting feature which limits the duration a solenoid can remain energized, providing ultimate valve protection.

When specified, an optional heater with integral thermostat shall be provided.

A gasketed emergency shut-down pushbutton shall be provided (locking type, with manual reset). Labeled, screw-type terminal blocks shall be provided for all input and output connections and supply voltage connection. A minimum of (8) spare terminal blocks shall be provided.

The DeZURIK ECB-CP shall have relay outputs capable of Alarm indication to SCADA and shall be capable of generating and sending signal loss warnings and other configurable control actions. Actions (alarm) can include system failures.

The DeZURIK ECB-CP shall have a high speed logging feature which captures all I/O at a maximum sample rate of 1Hz. Captured data shall be downloadable in .csv file format to a portable memory device such as a USB drive or FTP server.

The integral controller in the DeZURIK ECB-CP shall have a color TFT screen to graphically display the valve application with real-time system information. The controller display shall have the ability to show all I/O signal readings, PID settings, I/O configuration settings, along with pump status, pressure switch status, valve status, solenoid status, emergency stop status, system failures, & timers/timer settings.

Security key codes shall be provided to protect against unauthorized changes. An IP-68 rated enclosure shall be provided to house the controller for environmental protection.

Sufficient clearance around the DeZURIK ECB-CP shall be made for adequate access/wiring. Considerations should be made to comply with all the various local codes, standards and best practices.

INPUTS:
The Pump Control Panel shall be capable of monitoring the following inputs:

- Remote Start Command
- Valve Limit Switch Signal
- Discharge Pressure Switch Signal
- Local Start Pump Command
- Local Stop Pump Command
- Emergency Stop Command

Local inputs shall be entered by means of the integral controller and shall include set-up screen for setting of timers and user-selectable options. If a pressure switch is not used, a jumper can be inserted across its contacts.

OUTPUTS:
The DEZURIK ECB-CP shall provide the following powered outputs:

- (1) Pump Start Command
- Up to (3) Valve Solenoid/s
- Up to (5) Alarms

The pump start command is a non-powered dry contact normally open signal with maximum amperage of 10 amps across the relay contact. The valve solenoid outputs are powered by the incoming VAC supply voltage and protected by a 5 amp circuit breaker. The alarm outputs 4-20 ma with 4 ma indicating alarm off, and 20 ma indication alarm on.

E. MODBUS COMMUNICATIONS

The DeZURIK ECB-CP shall come standard with Modbus protocol. This protocol defines a message structure that PLC's will recognize and use, regardless of the type of networks over which they communicate. The valve controller can be configured to communicate on standard Modbus networks using either of two transmission modes: TCP/IP or RTU. Users shall have the ability to select the desired mode, along with communication parameters (IP address, subnet mask, baud rate, etc.). The electronic valve controller shall have a built in VNC server. A viewer/client uses TCP port 5900 to connect to a server (or 5800 for browser access), but can also be set to use any other port.

G. MANUFACTURE

1. Each DeZURIK ECB-CP shall be factory assembled by the control valve manufacturer.
2. Each DeZURIK ECB-CP shall be provided with an identifying nameplate
3. Each DeZURIK ECB-CP shall undergo full factory functional and operational testing.

H. PRODUCT DATA

1. DeZURIK ECB-CP manufacturer's technical product data shall be provided.

The DeZURIK ECB-CP manufacturer shall warrant the controller to be free of defects in material and workmanship for a period of two years from date of shipment provided the control panel is installed and used in accordance with all applicable instructions.

The **Pump & Control Valve Interface for Solenoid Operated Pump Control Valves** shall be **DeZURIK ECB-CP**, as manufactured by DeZURIK 250 Riverside Ave, N. Sartell, Minnesota 56377.

END OF SECTION