DATA ACQUISITION AND FLOW METERING PACKAGE

INTRODUCTION

This specification covers the design, manufacture of data acquisition, and flow metering package supplied with an automatic control valve.

PART 1 - PRODUCTS

1.01 Data Acquisition and Flow Metering Package

A. FUNCTION

The data acquisition and flow metering package shall be capable of accurately metering and totalizing the flow through an automatic control valve. The package shall assimilate data from valve-mounted pressure transmitters and a valve-mounted position transmitter to meter the flow.

Using a proprietary algorithm, the flow rate through the automatic control valve shall be calculated and shown on a local display. Local configuration of the package can be done via a five-button keypad and an LCD display. The package shall also have the ability to log all data to a local SD card, which can be exported in CSV file format for analysis.

The data acquisition and flow metering package shall provide 4-20mA analog outputs giving the ability to retransmit the calculated flow, measured inlet and outlet pressures, and measured valve position to a nearby PLC/SCADA system.

The data acquisition and flow metering package shall be retrofittable on existing automatic control valves made by the data acquisition/metering manufacturer. The package shall offer the ability to meter flow on a full port, reduced port, globe, and angled control valves with either standard or anti-cavitation trim.

The data acquisition and flow metering package shall additionally offer the ability to meter reverse flow on control valves. The package shall offer the ability to adjust the flow curve output by applying a single gain factor to the entire metered flow curve or the ability to adjust the gain factors in 5% of valve open increments for the entire metered flow curve.

B. COMPONENTS

The data acquisition and flow metering package shall consist of the following sub-components:

- Valve data module assembly
- Valve-mounted position transmitter
- Valve-mounted inlet and outlet pressure transmitter assemblies

1.02 DATA MODULE

A. FUNCTION

The data module shall accept signals from the valve-mounted pressure transmitters and the position transmitter. The data module shall use a proprietary algorithm program to calculate a flow measurement.

The flow and transmitter measurements can be retransmitted via 4-20mA signals to PLC or SCADA systems. The data module can also accept additional field instrumentation signals to retransmit via a 4-20mA signal. Real-time data can be logged to an onboard SD card.

B. SPECIFICATION

Enclosure & Display:
- 5.19in (132mm) Diameter by 5.10in Deep (130mm)
- IP-68 Water Resistant up to 6.6 ft (2m) for 1 Month

Power Requirements:
- Voltage: 9-24 VDC Input Consumption (not including transmitters)
  - Display off: 2.2 watts
  - Display on: 3.3 watts
- Reverse Polarity Protection

Inputs:
- 4x Analog Inputs Type: 4-20mA
- Optionally Provides Loop Power

Outputs:
- 4x Analog Outputs Type: 4-20mA
- Provides Loop Power

Logging & Data Storage:
- 32GB SD Card Periodic Logging of Real-Time Data CSV File Format
- Configurable logging interval

Temperature Range:
- Operating Temperature: 14°F to 158°F (-10C to 70C)
- Storage Temperature: -4°F to 176°F (-20C to 80C)

Mounting:
- Available Mounted on Valve or Remote

1.03 VALVE POSITION TRANSMITTER

A. FUNCTION

The valve position transmitter shall provide a 4-20mA analog electrical indication of the position of an automatic control valve.

The valve position transmitter shall additionally offer the ability to visually see the movement of the valve stem through a sight glass.

B. SPECIFICATION

Enclosure:
- IP-68 Water Resistant up to 6.6 ft (2m) for 1 Month

Electrical Connection:
- Cable Length: 6.6 Feet (2m)
- Power Supply Voltage 15-30 VDC
- Output Signal 4-20mA or 0-10 VDC (configurable)

Temperature Range:
- Ambient Temperature: -13°F to 185°F (-25C to 85C)
- Fluid Temperature: 32°F to 185°F (0C to 85C) Mounting:

Parameters:
- Pressure Rating: 360 psi max
- Accuracy: ±100 µm

Standard Materials
- Site Tube: Pyrex Site Tube
- Housing: 316 Stainless Steel

1.04 PRESSURE TRANSMITTER ASSEMBLY

A. FUNCTION

Pressure transmitter assemblies shall be installed on the inlet & outlet ports of the automatic control valve. Each pressure transmitter assembly shall consist of a pressure transmitter, an analog pressure gauge, and a stainless-steel isolation ball valve.

The pressure transmitters shall provide a 4-20mA analog electrical indication of the inlet and outlet pressure of an automatic control valve.

B. SPECIFICATION

Pressure transmitters are as follows:
Enclosure:
- IP-67

Process Connection:
- 1/4” NPT Male Threaded

Electrical Connection:
- 2 Wire 4-20mA Supply
- Voltage 8-30 VDC
- Cable Length: 33 Feet (10m)

Temperature Range:
- Ambient Temperature: -40°F to 176°F (-40C to 80C)
- Fluid Temperature: 32°F to 176°F (0C to 80C)

Parameters:
- Pressure Ranges: 0-290 psi
- Accuracy ±0.5% of Span (per IEC 61298-2)
- Pressure Overload 2X Max Scale

Standard Material
Wetted Materials:
- 316 Stainless Steel

Analog pressure gauges are as follows:
Type:
- Glycerin-filled
- Dual scale (PSI/BAR)

Enclosure:
- Stainless steel case (Waterproof, Shock resistant)
- Bronze-wetted parts.

Process Connection:
- 1/4” NPT Male Threaded

Temperature Range:
- Ambient Temperature: -4°F to 140°F (-20C to 60C)
- Fluid Temperature: 32°F to 140°F (0C to 60C)

PART 2 - MANUFACTURE

Each data acquisition and metering package shall be supplied and assembled by the control valve manufacturer.

The package manufacturer shall warrant its data acquisition and metering package to be free of defects in material and workmanship for a period of one year from the date of shipment, provided the package and its components are installed and used in accordance with all applicable instructions.

The data acquisition and metering package shall be a model XP2F-X35 as manufactured by Cla-Val Co., Costa Mesa, CA, 92627. The Model XP2F-X35 package shall consist of a model X35 data module, a model X117H valve position transmitter, and two model X141-PT pressure transmitter assemblies.

END OF SECTION