
BATTERY POWERED DATA LOGGER AND FLOW METERING PACKAGE

INTRODUCTION

This specification covers the design and manufacture of a battery powered data logger and flow metering package mounted on an automatic control valve.

PART 1 - PRODUCTS

1.01 Battery Powered Data Logger and Flow Metering Package

A. FUNCTION

The data logger and flow metering package shall be capable of logging data from field supplied instrumentation, accurately metering and totalizing the flow through an automatic control valve.

The package shall assimilate data from valve-mounted inlet and outlet pressure transmitters, and a valve-mounted position transmitter to meter flow.

Using a proprietary algorithm, the flow rate through the automatic control valve shall be calculated and shown via a Wi-Fi connection on a mobile smartphone, tablet, or computer. Local configuration of the logger/metering package can also be done over the same Wi-Fi connection.

The package shall have the ability to retransmit inlet pressure, outlet pressure, valve position, flow, and totalized flow via a cellular connection to the control valve manufacturer asset management database for data viewing and analysis. It shall also have the ability to log all data, in a CSV file format, to an internal micro-SD slot/card. The package shall be capable of exporting the CSV data/file.

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

B. COMPONENTS

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

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

Various accessories shall be offered by the package manufacturer. These available accessories shall include (but not limited to):

- External batteries to increase working life.
- Antenna extensions to increase wireless range.

1.02 VALVE LOGGER SUB-COMPONENT ASSEMBLY

A. FUNCTION

The valve logger assembly shall accept signals from the pressure transmitters and the valve position transmitter. Physical wiring from the pressure and position transmitters shall be connected to the valve logger junction box. One pre-wired cable connections shall pass on the transmitter signals from the junction box to the valve logger housing for processing.

The logger module shall use a proprietary algorithm program to calculate a flow measurement. Real-time data can be logged to an onboard micro-SD slot/card.

The logger module shall also have the ability to accept additional analog (ratiometric, 0-5V, or 0-10V) signals and digital (dry contact or pulse) from field instrumentation for further logging functionality.

The package shall have the ability to retransmit logged data via cellular 4G or 2G connection to the control valve manufacturer asset management database for data viewing and analysis

Configuration of the module shall be done on a customer provided PC, smartphone, or tablet via a Wi-Fi 802.11n/ac connection.

B. SPECIFICATIONS

Logger /Flow Module Enclosure & Junction Box Enclosure:

- IP-68 water resistant up to 6.6 ft (2m) for 1 month

- UV resistant PC/ABS plastic

Power Requirements:

- Standard: Internal (accessible) lithium battery with a 38 amp-hour rated capacity

- Option 1: External high-capacity lithium battery with a total rated 133 amp-hour capacity

- Option 2: External 6-30VDC power supply (no battery included)

Inputs:

- 4x analog (ratiometric, 0-5V, or 0-10V)

- 2x digital (dry contact or pulse)

Communication:

- 4G (LTE-M1, NB-IoT) and 2G (GPRS)

Logging & Data Storage:

- Configurable logging interval

- Internal logging: 16MB flash plus 8GB micro-SD slot/card (*card included*)

- External logging: Cellular connection to control valve manufacturer asset management database

Temperature Range:

- Operating temperature: 14°F to 158°F (-10C to 70C)

- Storage temperature: -4°F to 176°F (-20C to 80C)

Mounting:

- Available only as wall mount (brackets included)

1.02 VALVE POSITION TRANSMITTER SUB-COMPONENT

A. FUNCTION

The valve position transmitter shall provide 0-10 VDC analog electrical indication of the position of the automatic control valve.

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

B. SPECIFICATIONS

Enclosure:

IP-68 water resistant up to 6.6 ft (2m) for 1 month

Stainless steel 316 housing

Pyrex sight tube

Electrical Connection:

Cable length: 6.6 Feet (2m)

Power supply voltage: 15-30 VDC

Output signal: 0-10 VDC

Temperature Range:

Ambient temperature: -13°F to 185°F (-25C to 85C)

Fluid temperature: 32°F to 185°F (0C to 85C)

Parameters:

Pressure rating: 360 psi max

Accuracy: $\pm 100 \mu\text{m}$

1.03 PRESSURE TRANSMITTER SUB-COMPONENT ASSEMBLY

A. FUNCTION

Two pressure transmitter assemblies shall provide 0.5 – 4.5 VDC ratiometric signals representative of the inlet and outlet pressures of the automatic control valve. The transmitter assemblies shall be installed on the inlet & outlet body ports of the automatic control valve.

Each pressure transmitter assembly shall consist of a single point pressure transmitter, an analog 2.5" dial (63mm) pressure gauge and a stainless-steel isolation ball valve.

B. SPECIFICATIONS

Enclosure:

IP-67

Process Connection:

1/4" NPT Male Threaded

Electrical Connection:

Supply voltage: 5 VDC

Output signal: 2 Wire 0.5 - 4.5 VDC ratiometric

Cable length: 6.5 Feet (2m)

Temperature Range:

Ambient temperature: -40°F to 176°F (-40C to 80C)

Fluid temperature: 32°F to 176°F (0C to 80C)

Parameters:

Pressure range: 0-290 psi

Accuracy: $\pm 0.25\%$ of span (per IEC 61298-2)

Pressure overload: 2x max scale

Wetted Material:

Stainless steel 316

PART 2 - MANUFACTURE

Each logger and flow metering package shall be supplied and assembled by the control valve manufacturer.

The package manufacturer shall warrant its logging/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 battery powered logging and metering package with internal battery shall be a model XP2F-CV35-IN as manufactured by Cla-Val Co., Costa Mesa, CA, 92627. The Model XP2F-CV-IN package shall consist of a model CV-Log-35 Data Logger assembly, a model e-Lift-35 valve position transmitter and two model X141-PTV pressure transmitter assemblies.

The battery powered logging and metering package with external battery shall be a model XP2F-CV35-EXT as manufactured by Cla-Val Co., Costa Mesa, CA, 92627. The Model XP2F-CV35-EXT package shall consist of a model CV-Log-35 Data Logger assembly, a model e-Lift-35 valve position transmitter and two model X141-PTV pressure transmitter assemblies.

The battery powered logging and metering package with external user supplied VDC power supply shall be a model XP2F-CV35-DC as manufactured by Cla-Val Co., Costa Mesa, CA, 92627. The Model XP2F-CV35-DC package shall consist of a model CV-Log-35 Data Logger assembly, a model e-Lift-35 valve position transmitter and two model X141-PTV pressure transmitter assemblies.

END OF SECTION