

# WATER FLOW CONTROLLERS

## FLV400 Series



- ✓ Linear 0 to 5 Vdc Output Signal
- ✓ Liquid Flow Rates as Low as 13 mL/min
- ✓ Superior Long-Term Stability, Accuracy, and Repeatability
- ✓ Removable Sensor
- ✓ Very Low Average Power Demand (Approximately 1.25 W)

The FLV400 Series controller accurately measures and controls liquid flows. The sensors are matched to the servo valve for each of the ranges to be covered—up to 2 L/min in liquids. A linear electrical output signal is provided for recording data. These controllers eliminate the need for continuous monitoring and manual readjustment of water pressures.

The heart of the FLV400 is the flow sensor, which uses a Pelton-type turbine wheel to determine the flow rate. The rotation rate of the turbine wheel is linear over a wide dynamic range. The electro-optical system consists of a diode emitting energy in the infrared spectrum. Light energy is alternately reflected and absorbed from “spokes” deposited on the small turbine wheel. A photo diode detects this reflected light. Thus, as the turbine wheel rotates in response to flow rates, electrical pulses are generated. Processing circuitry produces a DC voltage output proportional to the flow rate. A bidirectional linear stepper motor moves a micro-flow control valve in response to any error between the desired flow rate and the actual flow rate as measured by this flow sensor. In addition, precise flow rate settings may be set and maintained automatically over long periods. The user can also change the flow rate from one setting to another remotely. Flow rate is unidirectional and is marked for proper direction on the serial number nameplate.



FLV400 Series liquid flow controller, shown smaller than actual size.

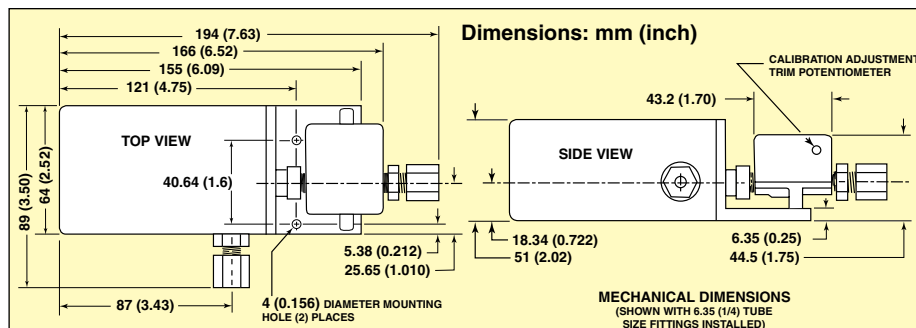
### SPECIFICATIONS

**Accuracy:**  $\pm 3\%$  FS  
**Linearity:**  $\pm 3\%$  FS  
**Repeatability:**  $\pm 1\%$  FS  
**Attitude Sensitivity:** Not sensitive  
**20 to 95% of Full Scale Response:** 10 s  
**Temperature Range:** 10 to 40°C (50 to 104°F)  
**Storage Temperature:** 0 to 50°C (32 to 122°F)  
**Max Pressure:** 100 psig  
**Max Viscosity:** 10 centistokes  
**Input:** 0 to 5 Vdc  
**Output Signal:** 0 to 5 Vdc (into a 2500  $\Omega$  minimum load impedance; short circuit protected)

**Command Signal:** 0 to 5 Vdc (from a voltage source with a maximum impedance of 5000  $\Omega$ )  
**Input Power:** 12 Vdc at 0.17 A (2 W); DC voltage can range from 11 to 15 Vdc  
**Note:** 0.6 m (2') long leads are supplied; #26 gauge signal, command and power (see color code with cable)  
**Weight:** 0.57 kg (1.25 lb)  
**Wetted Materials:** 40% glass-filled polyphenylene sulfide, glass window, stainless steel pivots, valve stems, bearing supports and sapphire bearings; white epoxy paint deposited on turbine wheels to simulate “spokes” and PTFE TFE or acetal (Polyoxymethylene)  
**Tube Fitting:**  $\frac{1}{8}$ " tube fittings for flow rates through 100 mL/min;  $\frac{1}{4}$ " tube fittings for higher flow rates; flow controllers are normally shipped with FKM O-rings and Polyoxymethylene (acetal) fittings; customer may specify PVDF fittings (available at additional cost upon request).

### WARNING:

Do not exceed flow rate specified. Running sensor continuously at flow rates higher than specified values can damage sapphire bearings and stainless steel support shafts.



### CUSTOM MODELS BUILT TO ORDER!

To Order	
Model No.	Water Flow Range
FLV401-(* )	13 to 100 mL/min
FLV402-(* )	20 to 200 mL/min
FLV403-(* )	50 to 500 mL/min
FLV404-(* )	60 to 1000 mL/min

\* Specify inlet/outlet pressure. Comes complete with operator's manual, 0.9 m (3') cable with 9-pin D connector and mating connector with stripped leads cable. For optional 4-point NIST calibration certificate add suffix “-NISTWATER” to the model number for additional cost, (NIST Cert for FLV401-(\* ) has only 3-points).  
**Ordering Example:** FLV403-Water-50/0 psig, 50 to 500 mL/min controller for water.