



2" SINGLE-MAG™ MODEL 282L  
FULL PIPE FLOWMETER SPECIFICATION



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## SINGLE-MAG™ MODEL 282L SPECIFICATION

### A. FLOWMETER

#### General

The flowmeter shall consist of two components: an electromagnetic sensor and an electronic unit. The electromagnetic sensor shall be capable of operating in pipe diameters from 6 to 96 inches. The flowmeter shall determine the volumetric flow rate by means of the Continuity Equation where flow rate "Q" equals mean velocity "V" times cross sectional area "A" ( $Q = V \times A$ ). The velocity measurement must be taken at a known location, then, through empirically established equations, the sensed velocity will be converted to a mean velocity. The meter shall be equivalent to the Model 282L electromagnetic flowmeter as manufactured by McCrometer, Inc., in Hemet, California, or approved equal.

#### Electronics

The flowmeter electronic unit shall be microprocessor based with a keypad for instrument setup and LCD displays for totalized flow, flow rate, engineering units and velocity or totalized flow. The electronic unit shall power the flow-sensing element and provide a galvanically isolated 4-20mA output for flow, and one flow proportional or frequency output (transistor type) for flow rate or for external totalizer. It shall be possible, in the test mode, to easily set the transmitter outputs to any desired value within their range. The 4-20mA scaling, time constant, pipe size, flow proportional output, engineering units and test mode values shall be easily set via the keypad and display. Two separate, fully programmable alarm outputs shall be provided to indicate high/low flow rates, empty pipe, fault conditions, reverse flow and over-range conditions. The transmitter shall periodically perform self-diagnostics and display any resulting error messages. All setup data and totalizer values may be protected by a password.

#### Sensor

The flow-sensing element shall be of an electromagnetic single point type design and factory calibrated to traceable standards, such as NIST. The sensor shall be made of a polyurethane with pure carbon or stainless steel electrodes exposed to flow. Installation of the sensor shall be accomplished under flowing conditions through a 2-inch valve, with final location being located near the inside wall of the flow conduit. To eliminate erroneous readings due to pipe wall effects, the sensor must have its electrodes located at least 3/16" from pipe wall and be designed with a curved tip shape, so as not to collect debris while in the operating position. Flat tipped or Doppler sensors shall not be acceptable.

#### Sensor Cable

The sensor cable is 20 feet of multi-conductor, abrasive resistant, jacketed cable flexible to -40°F. The sensor cable shall be permanently bonded to the sensor. Additional sensor cable, up to 300 feet, shall be available as an option.

### B. SPECIFICATION

#### Measurement

Volumetric flow in filled flow conduits 2"-96" (5-244 cm) in diameter utilizing insertable velocity sensor. Flow indication in English or Metric units.

#### Local Velocity Measurement

Method: Electromagnetic (Faraday's Law)

Range: -5 to +20 ft/s (-1.5 to +6.1 m/s)

Zero Stability:  $\pm 0.03$  ft/s ( $\pm 0.009$  m/s)

Accuracy:  $\pm 2\%$  of reading  $\pm$  zero stability at +0.3 ft/s to +10 ft/s (+0.9 m/s to +3.04 m/s)

Resolution: 0.01 ft/s (3.05 mm/s)

### Power Requirements

Universal switch mode.

AC: 90 to 265V 44 to 66 Hz (20W/25VA) or

DC: 10 to 35V (20W)

**AC or DC must be specified at time of ordering.**

### Materials

Sensor: Polyurethane exposed to flow

1" Sensor Mounting: 316 Stainless Steel exposed to flow.

2" Sensor Mounting: PVC and Stainless Steel exposed to flow. (Stainless Steel Insertion Tube Optional)

Compression Seal: Buna "N" exposed to flow

### Outputs

Analog: Galvanically isolated and fully programmable for zero and full scale. Output capability <20V (1000 ohm, 4-20 mA). Dual, identical analog available as an option. Secondary range enabled by external input or programmed alarm condition as a percent of full scale.

Pulse-Frequency: One frequency/pulse output for flow rate or for external totalizer. Isolated protected transistor switch capable of sinking <250mA @ <35V.

Dual Alarms (2 separate outputs): Isolated protected transistor switch capable of sinking <250 mA @ <35V. (Note: Not isolated from frequency output.) Fully programmable for high/low flow rates. Percent of range, empty-pipe, fault conditions, forward/reverse, polarity (normally open/close), analog over-range, pulse over-range, pulse cutoff, etc.

### Environmental

Sensor:

PVC Insertion Tube

150 PSI up to 105°F (41°C)

Stainless Steel Insertion Tube:

250 PSI up to 160°F (71°C)

(McCrometer recommends the use of Stainless Steel)

Electronics: Temperature limits -4° to 140°F (-20° to 60°C)

### Enclosure

NEMA 6. Separate termination and electronics compartments. Aluminum die-casted enclosure

Dimensions: 5.75" H x 5.75" W x 6.69" D (14.6 cm x 14.6 cm x 17.0 cm)

Weight: 6.8 lbs. (3.1 kg)

### Electrical Connections

Compression gland seals for 0.125" to 0.375" diameter round cable.

### Isolation

Galvanic separation to 50VDC between analog, pulse/alarm, and earth/ground.

### Electrical Safety

Meets ANSI/ISA-S82.10-1988 and S82.03-1998.

Vibration Specification

Meets BS2011: Part 2.1Fc: 1983

Keypad And Display

*Can be used to access and change all setup parameters using three membrane keys and multiline display.*

Internal Totalizer

6-digit totalizer. Can be programmed to reset via external input or the keypad.

Test Mode And Output Circuit Loop Verification

After converter has been programmed, operation of the simulation mode will drive all outputs to programmed value, providing a total system test.

C. MOUNTING HARDWARE

A PVC insertion tube and restraining rods shall be provided for the smooth installation and operation of the velocity sensor. The PVC insertion tube and rods shall be of sufficient length to allow a full profile of the flow conduit. The PVC hardware shall be rated for 150 PSI @ 105° F. Hardware must allow sensor to be secured by bolts when sensor is being inserted and retracted. A stainless steel compression seal with neoprene rubber exposed to flow shall also be supplied.

D. AVAILABLE OPTIONS

The unit shall have the ability to be upgraded to include the following options as required by the user.

Factory Installed Options

Sensor Cable:

Standard: 20 feet

Optional: up to 300 feet (For longer lengths, consult factory)

Field Installed Options

Stainless Steel Insertion Tube: rated for 250 PSI up to 160°F