

EMCO DemiMag DL Series Electromagnetic Flow Meter With 4411e Flow Transmitter

Engineering Specifications

January, 2005 / RO

1.0 INSTRUMENT

- A. There shall be furnished an electromagnetic flow meter suitable for fixed-site monitoring of bi-directional flow in a full pipe. The flow meter shall consist of a flowtube and a remote flow transmitter, which shall indicate flow rate, totalize and transmit signals. The flow meter shall use a flow tube with integral electrodes and grounding to accurately measure low flow rates, including pulsatile flows from chemical feed pumps and similar.

2.0 SPOOL PIECE FLOW TUBE AND SENSORS

- A. The nominal diameter of the flowtube shall be [$\frac{3}{4}$ "] [1"] [$1\frac{1}{2}$ "]¹.
- B. The flowtube shall be made of Kynar [polyvinylidene fluoride (PVDF, PVF2)], approved for sanitary applications by the US Food and Drug Administration (FDA). O ring seals for the electrodes and between the flow tube and process connections shall be made of [Viton] [Kalrez]².
 - 1. The flowtube shall not require a separate electrical insulating liner.
 - 2. The flowtube shall be supplied with process connections [AISI 316 stainless steel wetted parts with fixed stainless steel flanges] [PVDF wetted parts having PVC non-wetted, rotary flanges]³.
The connection types shall be [ANSI 150rf] [ANSI 300rf] [DIN/BS4504 PN10-40] [JIS 10k rf] [BS/AS2129 Table D] [BS/AS2129 Table E] [Tri-Clamp sanitary ends] [DIN 11851 sanitary ends] [schedule 80 outside diameter plain ends]⁴. The nominal size of the process connections shall be as the flowtube nominal diameter.
- C. The flowtube shall contain a coil, a pair of flow sensing and grounding electrodes. External grounding rings and straps shall not be necessary.
- D. The flow sensing and grounding electrode material shall be [316 stainless steel] [Hastelloy C] [Titanium] [Tantalum]⁵.
- E. All flowtube components shall be encapsulated in a removable gel. The flow tube housing shall be [Fusion bonded polyester on carbon steel] [Type 316 stainless steel]⁶.

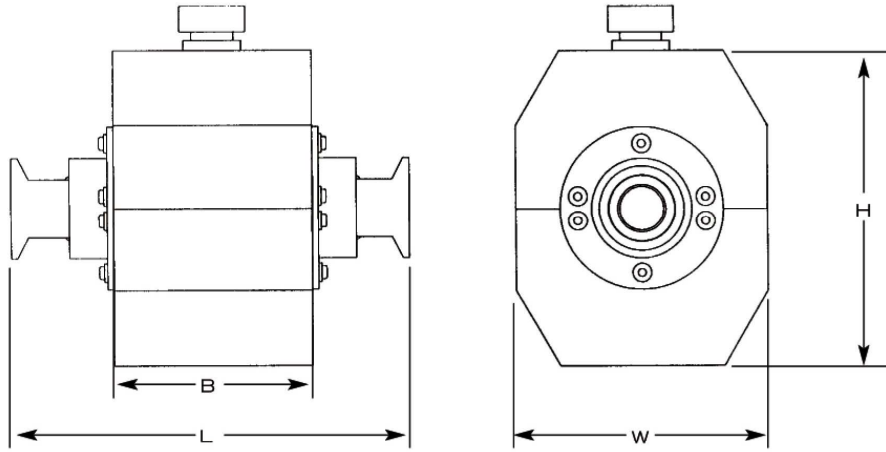
- F. The flowtube shall use unipolar pulsed electromagnetic excitation, with typical magnetizing current of not less than 1 A base to peak, and frequency of not less than 2/3 of power supply frequency (40 Hz for a 60 Hz power supply frequency), to ensure a high signal-to-media noise ratio.
- G. The minimum media conductivity shall be 1 microS/cm. For conductivity < 5 microS/cm or cable lengths > 15 feet a booster pre-amp shall be embodied.
- H. The maximum media temperature and pressure shall be [250 degrees F (120 degrees C) @ 40 psig, or 150 psig @ 70 degrees F.
- I. The mean velocity measurement range shall be from 0 to 2 feet per second (0 to 0.6 meters per second) to 0 to 30 feet per second (0 to 10 meters per second).
- J. The minimum detectable mean velocity shall be 0.02 feet per second (0.006 meters per second).
- K. The accuracy shall be :
 $\pm 0.5\%$ of rate for flows > 1.0 fps (0.3 m/s)
 ± 0.005 fps (0.0015 m/s) for < 1.0 fps (0.3 m/s)
 This accuracy shall be traceable to the US National Institute of Standards and Technology (NIST). A NIST traceable calibration certificate shall be provided with each flow meter.
- L. The temperature coefficient shall be less than 0.05% per 10 degrees F (0.09% per 10 degrees C).
- M. The wiring from the converter to the flow tube shall be 3 separate 2 conductor cables, 18 gauge (0.75 mm²), twisted and shielded. [The wiring from the converter to the flow tube shall be 15 feet (5 m) long.] [The wiring from the converter to the flow tube shall be _____ long.]⁷
- N. The flowtube and sensors shall meet the NEMA 6 (IP68) standard, and shall be indefinitely submersible to 10 feet (3 m) water column.
- M. The flow tube assembly shall be certified to conform to [UL and CSA standards for use in ordinary locations] [NEC and CSA Class 1, Division 2 explosive areas, with the transmitter to be located in the safe area].⁸

3.0 FLOW TRANSMITTER

- A. The flow transmitter shall be a remote, microprocessor based Pulsed AC technology with an auto zero feature to allow exciter frequencies of $2/3$ x power frequency for all size flowtubes, without zero offset.
 - B. The flow transmitter shall have an input impedance of 10^{12} ohms
 - C. The flow transmitter shall have a time constant of not less than 30ms.
 - D. The flow transmitter shall include bi-directional isolated, internally powered 4 – 20mA outputs from separate terminals into a maximum load of 800 Ohms. A scaleable pulse frequency output shall be available, with a frequency mode 0 – 1000Hz to 0 – 10000Hz, 30Vdc, 250mA or externally powered relay 125Vac, 1A, 30VA.
 - E. The flow transmitter shall be [Entela approved to UL and CSA standards for use in ordinary locations][Entela approved to NEC and CSA standards for Class 1, Division 2 explosive atmospheres, with the transmitter located in the safe area]⁹.
 - F. The flow transmitter shall operate on [120Vac, 60Hz][230Vac, 50Hz][120Vac, 50Hz]¹⁰ line power. Typical power consumption shall be 15W.
 - G. The flow transmitter shall be housed in a wall mounting, UV ray resistant fiber glass enclosure. It shall be watertight, dust-tight and corrosion resistant to NEMA 4X and IP65. The enclosure shall embody lockable stainless steel latches, as well as a screwed down lid. Electrical connections shall be suitable for conduit connections.
 - H. The transmitter shall have a waterproof and backlit LCD display, 4 lines with 20 characters.
 - I. The transmitter shall be programmable using a tactile feedback, waterproof and sealed keypad. All necessary diagnostics, user security password readings and system status shall be available using the keypad. A separate calibration box shall be unnecessary.
- 4.0 The flowmeter shall be a DemiMag DL Series electromagnetic flowmeter with a 4411e transmitter, or equal.

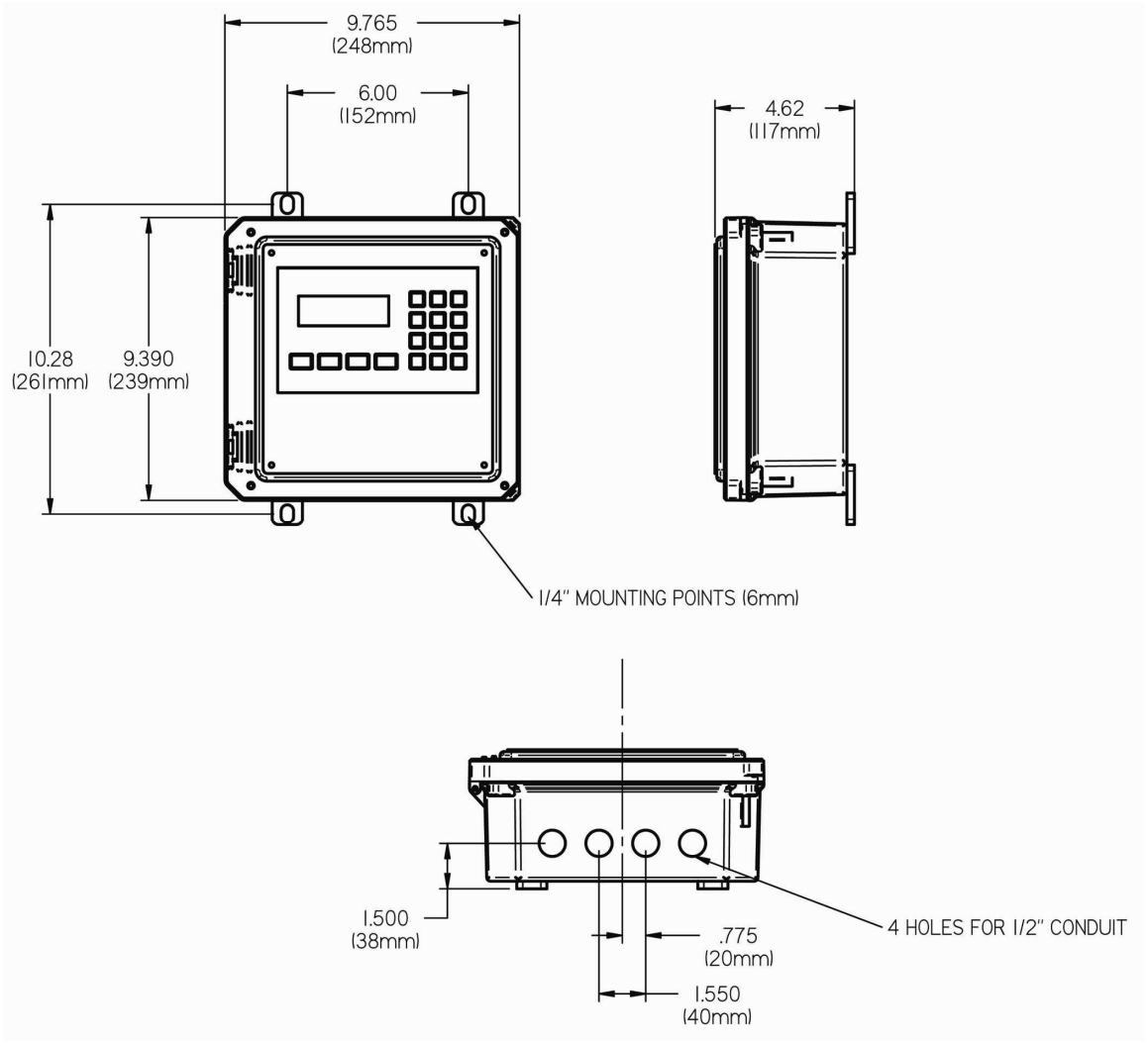
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- 1 Specify nominal diameter. All flow tubes have the same size process connections.
 - 2 Specify O ring seal material.
 - 3 Specify process connection material.
 - 4 Specify process connections.
 - 5 Specify electrodes and grounding material
 - 6 Specify housing material.
 - 7 Specify optional special cable length (max. 100 ft / 30 m).
 - 8/9 Specify remote flow transmitter installation.
 - 10 Specify power supply

EMCO DemiMag DL



Part No.	Nom. Size	L	B	W	H	Weights (Flanged)	
						LB	KG
DL20	0.75" (20 mm)	7.87" (200 mm)	3.92" (100 mm)	5.00" (125 mm)	6.30" (160 mm)	13	6
DL25	1" (25 mm)	7.87" (200 mm)	3.92" (100 mm)	5.00" (125 mm)	6.30" (160 mm)	18	8
DL40	1.5" (40 mm)	7.87" (200 mm)	3.92" (100 mm)	5.50" (138 mm)	7.00" (175 mm)	26	12

4411e Flow Transmitter



Weight: 7 lb (3.2 kg)