



DemiMag DM Series

Electromagnetic Flow Tubes

EMCO's DemiMag DM Electromagnetic Flow Meter System consists of the patented DemiMag Flow Tube and 4411e Transmitter. DemiMags can meter expensive raw materials or additives with greater efficiency, thus improving product quality.

Features

- Totally encapsulated sensor components
- No liner; no meter failure due to a defective liner
- Low conductivity media $> 0.08 \mu\text{S} / \text{cm}$
- Patented AC coil excitation (high coil current and high pulsation frequency)
- Low flow range capability, down to 0.01 gpm (5 lph)
- Option for quick disconnect process connections
- Fast time constant of 0.03 seconds
- Internal grounding electrodes
- For use in explosive atmospheres
- High signal-to-noise ratio for immunity to media noise



The DemiMag DM flow tube.

EMCO DemiMag DM flow tubes are sized from 1/16" to 1/2" (1.5mm to 12mm), all with 1/2" connectors. DemiMag flow tubes do not have a liner and therefore will never fail due to a defective liner.

Each sensor includes an exciter coil and reference coil. Voltage is generated in the flow tube by the media in accordance with Faraday's Law, from which volumetric flow is calculated.

Application Guide

Materials of Construction	Diameter		Maximum Temperature		Maximum Pressure	
	inches	mm	°F	°C	psi	bar
Kynar (polyvinylidene fluoride PVDF, PVDF2) flow tube with fused conductive Kynar electrodes	1/8"	4mm	250 70	120 20	40 150	3 10
	1/4"	8mm				
Aluminum trioxide ceramic flow tube with fused-in platinum electrodes and type 316 stainless steel grounding	1/16"	1.5mm	285	140	150	10
	1/2"	12mm				

Media Conductivity

Typical required conductivity: $\geq 5 \mu\text{S}/\text{cm}$ (5 micromhos/cm)

Low conductivity option: for conductivities > 0.08 or $< 5 \mu\text{S}/\text{cm}$ use the UniMag pre-amplifier option

All DemiMag DM Series flow tubes are equipped with a pre-amp; however, for media $< 5 \mu\text{S}/\text{cm}$ a booster pre-amp is embodied.

For deionized, distilled or demineralized water, consult EMCO.

Performance Specifications

Accuracy and Traceability	
Accuracy	$\pm 0.5\%$ of rate for flows $\geq 1.5 \text{ fps}$ (0.45 m/s) $\pm 0.0075 \text{ fps}$ ($\pm 0.00225 \text{ m/s}$) for flows $< 1.5 \text{ fps}$ (0.45 m/s)
Accuracy Notes	Accuracy is unaffected by electrode coatings such as sewage, grease, calcium carbonate, algae or similar.

1 For media such as ferric chloride, ferric sulfate (Odophos) or similar highly conductive media, flow meter performance can be adversely affected.

Please consult EMCO for these types of applications.



DemiMag DM Flow Rates at 0.5% Accuracy

Line Size		Minimum Flow Velocity		Maximum Flow Velocity	
inches	mm	gpm	lph	gpm	lph
1/16	2	0.01	5	0.3	100
1/8	4	0.06	20	1.2	410
1/4	8	0.25	90	4.6	1650
1/2	12	1.00	190	19	3700

Power Requirements for 4411e Flow Transmitter

Power Supply Options	120V, 60Hz 230V, 50Hz 120V, 50Hz
Analog Output	2 x 4-20 mA 2-wire system
Pulse Output	2-wire potential-free output

Physical Specifications

Materials of Construction	PVDF or Ceramic flow tubes, Viton or Kalrez seals, 316 Stainless Steel or PVDF connections
Process Connections	Flanged ANSI 150 RF Flanged ANSI 300 RF Flanged DIN/BS4504 PN10-40 Flanged JIS10krf Flanged BS/AS2129 Table D Flanged BS/AS2129 Table E Threaded G $\frac{1}{2}$ " to ISO 228 Threaded NPT Tri-Clamp Sanitary Ends DIN 11851 Sanitary Ends

Straight Run Piping Requirements

Piping	Upstream	Downstream
All piping configurations	10 D	5 D
Pump Upstream	5 D	0 D
Pump Downstream	10 D	3 D

D is equal to the internal diameter of the pipe

Other Installation Considerations

Mounting Recommendations

The DemiMag may be mounted into a pipeline in any attitude, taking note of the flow direction arrow on the flow tube. To obtain accurate measurement, the pipe must be completely full and air must not be entrained in the flow.

Straight Run Requirements

For particularly poor velocity profiles caused, for example, by upstream bends in two or more planes or partially open valves, the DemiMag requires a minimum of 10 pipe diameters of straight pipe upstream from the flow tube, and a minimum of 5 diameters downstream.

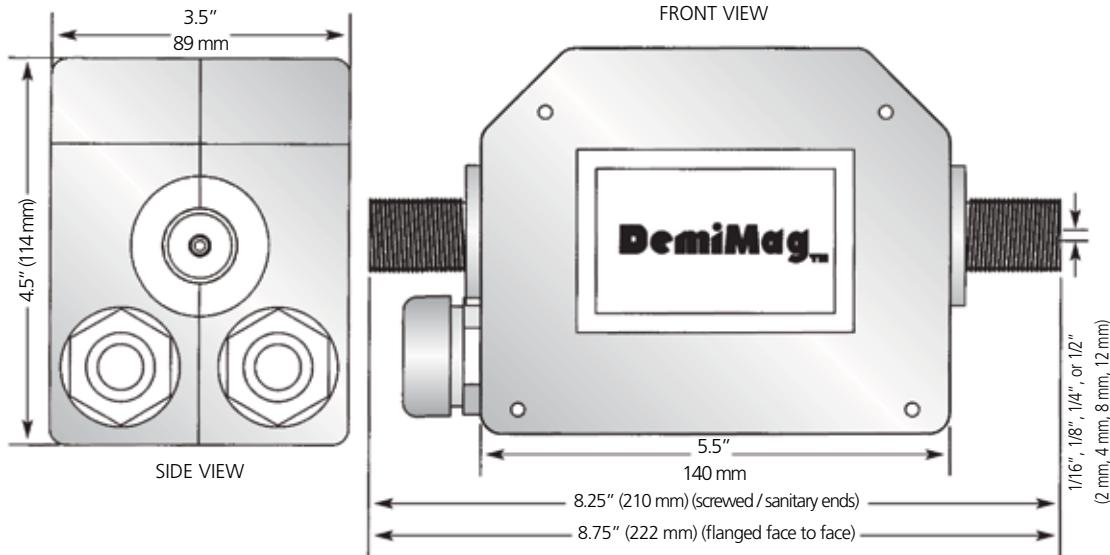
Non-Homogenous Media

For particularly non-homogenous slurries, pulps or pastes, the flow tube should be mounted in a vertical pipe to obtain the most even distribution of solids and fibers. There must be a minimum of 20 pipe diameters between any media mixing point and the DemiMag flow tube.

Partially Closed Valves

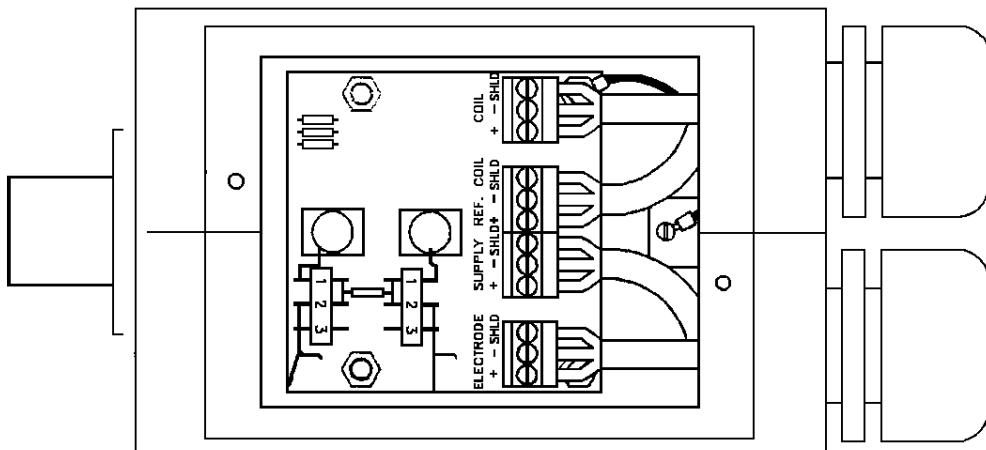
If the piping is horizontal and includes a partially closed valve, the valve should always be installed downstream of the DemiMag. This will allow the head pressure in the system to be adjusted, reducing the chance of air entrainment in the flow, and will prevent excessive irregular profiles forming upstream of the flow tube.

Dimensions and Weights



Weight: 7 lb (3 kg) with plastic enclosure
11 lb (5 kg) with stainless steel enclosure

Wiring Diagram



DemiMag Cable Connections			
Exciter Coils	Electrodes	Pre-Amp	Reference
Black to 4	Black to 24	Shield to 19	Black to 31
White to 5	White to 25	Black to 20	White to 32
Shield to 6	Shield to 26	White to 21	Shield to 19

Model and Suffix Codes

Category	Suffix Codes									
Model										
DemiMag DM Series Flow Tube	DM									
Nominal Size										
1/16 inch (2mm) Ceramic Only		02								
1/8 inch (4mm) PVDF Only		04								
1/4 inch (8mm) PVDF Only		08								
1/2 inch (12mm) Ceramic Only		12								
Flowtube Materials										
PVDF (Size Codes 04 and 08 Only)			F							
Ceramic (Size Codes 02 and 12 Only)			T							
Electrode Materials										
Conductive PVDF				F						
Fused Platinum (Ceramic Flow Tubes Only)				L						
Seal Materials										
Viton					V					
Kalrez					K					
Connection Materials										
316 Stainless Steel						T				
PVDF						F				
Process Connections¹										
Flanged ANSI 150 RF							A			
Flanged ANSI 300 RF							B			
Flanged DIN/BS4504 PN10-40							C			
Flanged JIS 10krf							D			
Flanged BS/AS2129 Table D							E			
Flanged BS/AS2129 Table E							F			
Threaded G 1/2" to ISO 228							G			
Threaded NPT							H			
Tri-Clamp Sanitary Ends							I			
DIN 11851 Sanitary Ends							J			
Conductivity Rating										
Conductivity ≥ 5 µS/cm							N			
Conductivity ≥ 0.08 µS/cm, < 5 µS/cm, or Cables Longer than 15 feet (5m) ²							A			

Category	Suffix Codes									
Enclosure										
Nylon								P		
Cable Lengths										
15 Feet (5m) Cables									N	
Special Cable Length									E	
Coil Supply										
120V Coil Supply										A
230V Coil Supply										B
	DM	02	F	F	V	T	H	N	P	N
										A

1 316 stainless steel process connections have sanitary, threaded or rotary stainless steel flanges. Kynar (PVDF) process connections have threaded or rotary PVC flanges.

2 All DM Series DemiMags have a pre-amplifier; however, for cables > 15 feet (5m) or media conductivity < 5 μ S/cm, a booster pre-amp is incorporated. For deionized or demineralized water applications, consult EMCO.

EMCO emco flow systems



EMCO Flow Systems is a division of Spirax Sarco, Inc. • 1150 Northpoint Blvd. • Blythewood, SC 29016

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