**EUMAG FLOWMETER**

*AS PER PED 97/23/EC AGAINST SPECIFIC REQUIREMENT ONLY.*

**EUREKA INDUSTRIAL EQUIPMENTS PVT. LTD.**

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[www.eurekaflow.com](http://www.eurekaflow.com)
Electromagnetic Flowmeters

Electromagnetic Flowmeters, commonly known as Magmeters are a type of inferential flow metering devices used to measure the flow of electrically conductive liquid in closed pipe applications where the magnetic flux permeates the entire cross sectional area of the liquid flow. Magmeters measure electromotive force to determine liquid velocity using Faraday’s Law of Electromagnetic Induction and compute the flow rate using the equation of conductivity.

Eureka make Eumag Flowmeters operate with electrically conductive liquids and are relatively immune to the effects of Pressure, Temperature, Density & Viscosity of the liquid medium. For Eumag Flowmeters the electrically conductive liquid is defined as a liquid with a Conductivity of at least 5 Micro Siemens/Cm.

Principle of Operation:

Faraday’s law states that when a conductor moves through a magnetic field of a given strength, a voltage is produced in the Electrode dependent on and proportional to the relative velocity between the conductor and the magnetic field.

The mathematical representation is as follows:

\[ U = B \times V \times D \times C \]

Where,

- \( U \) = Induced Voltage
- \( V \) = Average Velocity
- \( D \) = Internal Dia. Of Flow Tube
- \( C \) = Instrument Constant
- \( B \) = Magnetic Field Strength

The flowrate equation is

\[ Q = VA \]

Sensor:
The Sensor consist of a measurement Flow Tube section, non conductive Liner, Electrodes & Coils. The Flow tube Sensor, is made of material that is permeable to magnetic flux, such as SS 304, or SS316, or other nonmagnetic material. The inner surface of the Flow Tube is lined with nonconductive material to insulate it from the process liquid. This prevents the voltage generated by the velocity of the flowing media, from shorting out on the measurement section & allows the Electrodes to detect the voltage.

The Electrodes are made of SS316 or an alloy with high nickel content such as Hastelloy.

Converter:
The voltage detected by the Electrodes is amplified and processed by an electronic Transmitter which outputs an electrical signal proportional to the fluid flow rate, and powers the coils generating the magnetic field. This microprocessor based Transmitter, commonly known as Converter, can be equipped with a LCD for Flow Rate indication and the programming of all important parameters such as Output Signal, empty Pipe etc. This Converter can be mounted on the Sensor or remote.

Grounding device:
Eumag Flowmeter is provided with special Grounding Electrodes to short any stray electrical potential in the process liquid to an earth ground. The ground through the grounding electrodes prevents electrical potential from passing through the meter and avoids noisy & inaccurate reading.
## Specifications For Series Eumag--0/1

### BASIC FLOWMETER SENSOR

1. Technique: PULSED DC
2. Line Sizes: 1/2 inch to 12 inches
3. Velocity Range: 0.3 - 12 m/s (adjustable In Convertor)
4. Minimum Conductivity: 5 Micro Siemens or better
5. Lining: Neoprene / PTFE / Hard Rubber, Other On Request
8. Operating Temp.: up to 60°C For Neoprene
    - up to 180°C for PTFE
9. Pressure Rating: 40бар (as per Lining Material)
10. Operable Flow Range: 100:1
11. Protection: IP-65, IP-67, IP-68 (against special request)
12. CE as per PED/97/23 & EMC, LVD against specific requirement

### SIGNAL CONVERTOR:

1. Accuracy: ±0.5% Of Flow Rate or better
2. Supply Voltage: 110/220 VAC, 50Hz
3. Programmability through MMI or Serial Port
   - Pipe Diameter, Flow Units, Pulse Output Units
   - Resolution, Low-flow Cut-off
   - percentage, Bidirectional Flow

### CONVERTOR WITH INPUTS DISPLAY:

Apart from the above features, it has isolated RS 485 or RS 232 or HART capability. It also includes the Batching option, Logging option etc.

1. Backlit Display (ch. Size 3 mm)
2. Key Membrane Keyboard
3. Serial Interface with basic MF board
4. Serial Interface to field: RS 485 Galvanically Isolated for Modbus / Profibus Options
5. Batching capability
6. Operator Menu based Interface For Setting Up and Servicing.

Note: At any given time only one of the interfaces can be offered: RS 485 or RS 232 or HART.

### BASIC FEATURES:

1. Zero Adjustment
2. Range Adjustment
3. Empty Pipe Detection (optional)
4. Current Output: 4 - 20 mA Isolated
5. Pulse/Frequency Output (open Collector)
6. Pre-amplifier can be Located in the Signal Convertor enclosure
   - or can be separated for longer distances between Sensor Head & Convertor
7. Current Output Is HART Add-on ready. (optional)
8. Two additional Analog input reading capability (0 to 1.25 V DC) with AUS Supply.

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SPECIFICATIONS
EUMAG SERIES ' EUMAG ----L

Basic Flowmeter Sensor
1) Technique                Pulsed DC
2) Line Sizes               \( \frac{1}{2} \)" to 12"
3) Velocity Range           0.3-10 M/S (Adjustable in convertor)
4) Minimum Conductivity     5 Micro Siemens
5) Lining                   Neoprene/PTFE/Hard Rubber, Others on request
6) Electrode                SS316, SS316L, Hastelloy C. Others on request
7) Grounding Electrode      SS316, SS316L, Hastelloy C. Others on request
8) Operating Temp           Upto 60° C For Neoprene & Upto 180° C For PTFE
9) Pressure Rating          40 Bar For PTFE Lining & 20 Bar For Rubber Lining
10)Operable Flow Range      100 : 1
11)Protection               IP 65 on request.
12) Accuracy                ± 1% of flow rate

EUMAG SERIES 'EUMAG ----L—W

1) Technique                Pulsed DC
2) Line Sizes               2", 3", 4" & 6"
3) Velocity Range           0.3-10 M/S (Adjustable in convertor)
4) Minimum Conductivity     5 Micro Siemens
5) Lining                   Hard Rubber
6) Electrode                SS316, SS316L, Hastelloy C. Others on request
7) Grounding Electrode      SS316, SS316L, Hastelloy C. Others on request
8) Operating Temp           Upto 60° C For Hard Rubber
9) Pressure Rating          10 Bar
10)Operable Flow Range      100 : 1
11)Protection               IP 65 on request.
12) Accuracy                ± 1% of flow rate

Figures ' EUMAG ---- L '
The image contains a technical drawing and a table related to EUMAG flowmeters. The table specifies the dimensions and ANSI 150# for different models of the flowmeter, along with an image showing the flowmeter's components and dimensions.

**Table: EUMAG Flowmeter Specifications**

<table>
<thead>
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<th>Model No.</th>
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(Only Hard Rubber Lining)

**Diagram:**
- The diagram shows the flowmeter's front view, including dimensions such as Ø150 x 135 depth 120, L = 220, and H = 220.
- The diagram also illustrates the output as 4-20mA and supply as 230 VAC, 50Hz.
The adjoining Graph shows the relationship between flow velocity \( V \), flow quantity \( Q \) and Sensor dimension \( DN \). Normally the Sensor is selected so that \( V \) lies between measuring range 2-3 m/s for a given size.
Typical Applications

Eumag flowmeters are used in variety of applications.

Typical Industry

Typical Applications in these Industries:
- Slurries
- Paper waste
- Sludge
- Sewage flows with high levels of solids which cannot be measured by other types of Flow Meters.
- Obstructionless measurement with negligible Pressure loss and hence can be used for low pressure applications.
- Corrosive Liquids, Acids, Caustics and corrosive chemical additives.

To get the best performance from Eumag Flowmeter, it must be selected on the conditions under which it is expected to operate. As it has a minimum velocity requirement, it may be necessary to install the meter in reduced pipe sections. It is advised to select a meter in such a way that the flowing velocity lies between 0.6 to 3 m/s

Refer graph for selection of meter size.

*Dimensions indicated are approximate. Request GA drawing for correct dimensions

Note: We reserve the right to modify the Design & Specifications without notice.