

ELECTRO MAGNETIC FLOW METER **MODEL NO. FDI-EMF-210**

As one of the pioneering manufacturers in ELECTRO MAGNETIC FLOW METER technology, Fidicon Devices India has created a contrasting and proven portfolio of flow measuring equipment's, installed and in use across virtually every industry.

Electro Magnetic Flow Meter offered are suitable to be used for handling fluid capacity from range with 0.3 to 100 m/s LPS high-performance and accuracy.



PRINCIPLE OPERATIONS

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 flowrate using the equation of conductivity.

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.

WORKING MATHEMATICAL FORMULAE

$$U = B \times V \times D \times C$$

Where,

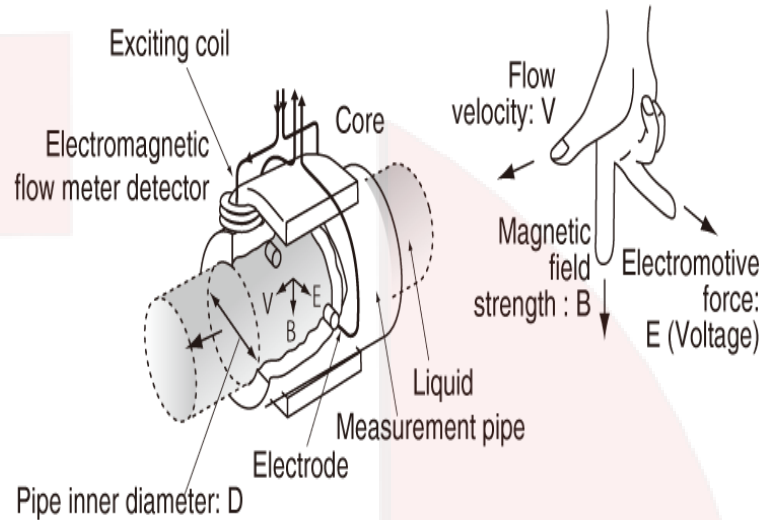
U = INDUCED VOLTAGE

V = AVERAGE VELOCITY

D = INTERNAL DIA OF FLOW TUBE

C = INSTRUMENT CONSTANT

B = MAGNETIC FIELD STRENGTH



Continuity Equation

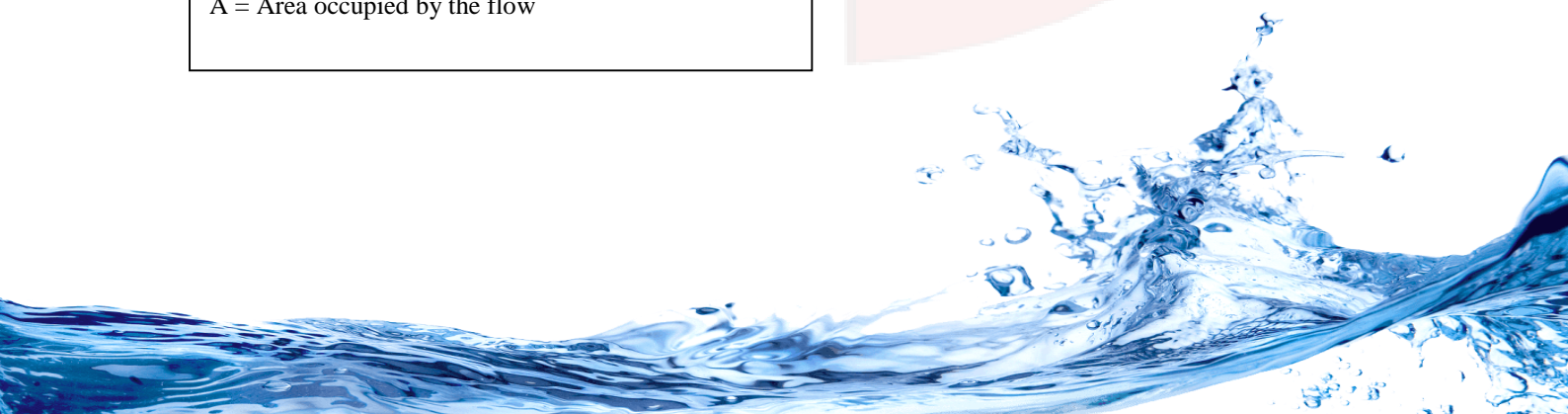
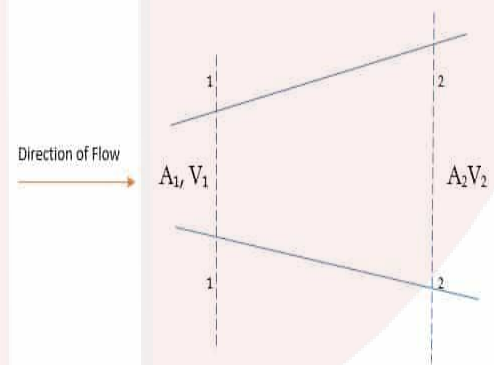
The **continuity equation** is developed based on the principle of conservation of mass. The **continuity equation** states that the rate of fluid flow through the pipe is constant at all cross-sections. That is, the quantity of fluid per second is constant throughout the pipe section.

Continuity Equation/Flow Rate Equation

$$Q = V \times A$$

V = Average Velocity

A = Area occupied by the flow



ENGINEERING SPECIFICATIONS

ELECTRO MAGNETIC FLOW METER SENSOR

Accuracy	: $\pm 0.5\%$, $\pm 1\%$, $\pm 2\%$ of flow rate
Technique	: Pulsed DC
Liquid Conductivity	: 5 Micro Siemens or better
Line Size	: 4 NB to 1600 NB
Pressure Rating	: Up to 40 bar
Temperature Rating	: 60 ⁰ C for Neoprene lining, 180 ⁰ C for PTFE lining
Lining Material	: Neoprene, PTFE other on request
Electrode Material	: SS 316, SS 316 L, HASTELLOY-C, Titanium other on request
Protection Category	: P 65(Optional IP-67, IP-68)
Farthing Electrode	: Built in (no need for farthing rings)
Velocity Ranges	: Programmable 0+2.5 m/s, 0+5 m/s 0+10 m/s

Signal Convertor

Accuracy	: $\pm 0.5\%$ of Flow Rate or better in between 0.5 to 10m/sec. velocity
Supply Voltage	: 110/220 VAC, 50HZ optional - 24 VAC or 24 VDC
Programmability through MMI or Serial Port	: Pipe Diameter, Flow Units, Pulse Output Units and Resolution, Low-flow Cut-off percentage, Bidirectional Flow.



SALIENT FEATURES

- High accuracy & stable performance
- No moving parts
- Easy installation and operation
- Minimal maintenance
- Microprocessor based designs offering exceptional configuration flexibility
- Basic model has isolated current output
- Programmable through PC by serial port even in basic model
- Easy programmability using key board on Alpha numeric display
- Configuration personality stored in a pluggable personality module
- Advanced model having advance features of: RS 485 communication, HART, Batching, special parameter indications of pressure, temperature and energy metering like heating/cooling
- Compact and rugged, IP 65 protection class
- The display can be rotated in desired angle to offer ease in viewing
- Converter can be mounted away from the sensor

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.

- 16x2 Backlit Display (Ch. Size 3 mm)
- 6 Key Membrane Keyboard
- Serial Interface with basic MF board
- Serial Interface to field: RS 485 Galvanically Isolated for Modbus / Profibus Options
- Batching capability
- Operator Menu based Interface for Setting Up and Servicing.

BRIEFINGS:

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.

Convertor:

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 Convertor, 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 convertor can be mounted on the sensor or remote.

