Electromagnetic flow meters are mainly used in various industries, ETP, STP, WTP Plants,Borewell and for conductive liquids for measuring the flow rate & totalizer.

Working Principle :

Electromagnetic Flowmeters are based on Faraday's Law of Electromagnetic Induction.

In an Electromagnetic Flowmeter, the magnetic field is generated by a set of coils. As the conductive liquid passes through the electromagnetic field, an electric voltage is induced in the liquid which is directly proportional to its velocity. This induced voltage is perpendicular to both, the liquid flow direction and the electromagnetic field direction. The voltage sensed by the electrodes is further processed by the transmitter to give standardised output signal or displayed in appropriate engineering unit.

Technical specifications :

Parameters	
Media	Liquids (Conductive)
Nominal dia (mm)	15 to 3000
Working pressure (kg/cm^2)	10, 16, 25, 40
Working temperature	180^{0}C FOR PTFE LINING & 85^{0}C FOR RUBBER LINING
Electrode material	SS 316L Std.*/HASTALLOY C/PLATANIUM/TITANIUM/TENTALUM
Sensor lining	Std. Rubber*/PTFE/CERAMIC
Display version	Integral/Remote
Measuring tube material	SS 304 Std.*
Sensor housing material	Std. CS*
End connection	Flange/Wafer/Tri-clamp/SMS
Flange standard	ANSI 150*
Measuring range	0.2 to 12 m/sec. Bidirectional
Accuracy % of measured value	±O.5% (±O.2% consult factory)
Conductivity	Liquids (Conductive) > 5 µs/cm
Repeatability	±0.2% of Span
Display	GRAPHIC DISPLAY/16X2 LINE DISPLAY
Display units	All standard engineering units in m^3, litre, gallon, ft^3
Output	Std. 4 - 20 mA* /RS485/PULSE/PROFEBUS
Power supply	24 - 48 V DC or 80 - 300 V AC Solar powered
Protection class for sensor	Std. IP 65 Option IP 67/IP 68 forflow tube in remote type
Protection class for transmitter	IP 65/IP66/IP67
Cable length for remote	Std. 5 m*
Installation	Inline flanged type

The flux density of the electromagnetic field in a given Flowmeter and the distance between the electrodes are constant. Therefore, the induced voltage is only a function of liquid velocity.

$$E = K \times B \times \overline{V} \times D$$

where E : Induced voltage
K : Flow tube constant
B : Magnetic field strength
$\overline{V}$: Mean flow velocity
D : Electrode spacin

Volume flow is calculated by the equation

$$Q = \bar{v} \times D^2 \times \pi / 4$$

Therefore,

$$Q = \frac{E \times D \times \pi}{K \times B \times 4}$$

The induced voltage is not affected by the physical properties of liquids like temperature, viscosity, pressure, density and conductivity as long as the conductivity of the measured liquid is above the minimum threshold level. For reliable measurement, the pipe must be completely full of liquid. The electromagnetic field coil assembly is excited by pulsed DC technique which eliminates the interfering noise and provides automatic zero correction.

Size	M3/hr.		LPM		LPS		USGPM	
DN in mm	Min.	Max.	Min	Max	Min.	Max	Min.	Max.
15	0.13	7.63	2.12	127.21	0.04	2.11	0.56	33.61
20	0.23	13.56	3.77	226.15	0.06	3.77	1.00	59.75
25	0.35	21.19	5.89	353.36	0.10	5.88	1.56	93.35
32	0.58	34.91	9.65	578.96	0.16	9.65	2.55	152.95
40	0.90	54.28	15.08	904.63	0.25	15.07	3.98	238.98
50	1.41	84.82	23.56	1413.49	0.39	23.56	6.22	373.40
65	2.39	143.28	39.82	2389.20	0.66	39.80	10.52	631.06
80	3.62	217.08	60.31	3618.55	1.01	60.30	15.93	955.92
100	5.65	339.24	94.23	5653.99	1.57	94.22	24.89	1493.63
125	8.84	530.16	147.24	8834.38	2.45	147.24	38.90	2333.80
150	12.72	763.32	212.03	12721.50	3.53	212.02	56.01	3360.66
200	22.60	1356.00	376.93	22616.00	6.28	376.93	99.58	5974.51
250	35.20	2112.00	588.96	35337.50	9.82	588.96	155.59	9335.18
300	50.89	3053.16	848.10	50886.00	14.14	848.10	224.04	13442.65
350	69.26	4155.72	1154.36	69261.50	19.24	1154.36	304.95	18297.00
400	90.46	5427.84	1507.73	90464.02	25.13	1507.74	398.30	23898.12
450	114.49	6869.64	1908.40	114503.76	31.81	1908.43	504.10	30246.00
500	141.35	8481.00	2355.83	141350.03	39.26	2355.85	622.35	37340.76
600	203.54	12212.52	3392.40	203544.04	56.54	3392.42	896.18	53770.68
700	277.04	16622.40	4618.08	277084.68	76.96	4617.47	1219.90	73193.88
800	365.44	21926.40	6090.65	365439.00	101.51	6090.48	1593.20	95592.24
900	457.98	27478.80	7633.87	458032.32	127.23	7634.04	2016.79	121007.52
1000	568.16	34089.60	9469.50	568169.76	157.82	9469.44	2489.38	149362.92
1200	814.18	48850.80	13569.60	814176.12	227.27	13636.44	3584.74	215084.16
1400	1108.18	66490.80	18471.94	1108316.28	307.88	18472.68	4880.30	292818.24
1600	1447.42	86845.20	24125.37	1447522.44	402.08	24124.68	6372.82	382369.20
1800	1831.90	109914.00	30809.45	1848566.76	513.50	30810.12	8139.39	488363.16
2000	2261.60	135696.00	37880.56	2272833.60	631.34	37880.52	9957.53	597451.80
2700	4121.76	247305.96	68696.11	4121766.82	114.94	68696.64	181475.99	1088855.99

Installation 3D Drawing

Installation precautions

Installation location should be such that the Flowmeter will always remain full of liquid.

Minimum 5D inlet & 3D outlet straight lengths should be maintained at installation locations where 'D' is the pipe diameter.

The Flowmeter installation location should be free of bends, elbows, tees, valves, etc