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Range of Electromagnetic Flowmeters

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Electromagnetic Flowmeter Series 6400

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.

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.

$$E = K \times B \times \bar{v} \times D$$

where **E** : Induced voltage
K : Flow tube constant
B : Magnetic field strength
$\bar{v}$: Mean flow velocity
and **D** : Electrode spacing

Volume flow is calculated by the equation

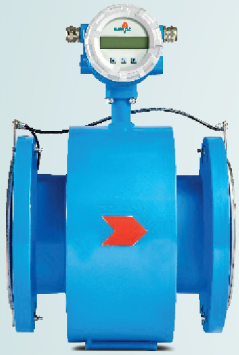
$$Q = \bar{v} \times D^2 \times \pi / 4$$

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

MagFlow 6410

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.



MagFlow 6410

EcoMag 6420

MagBP 6440

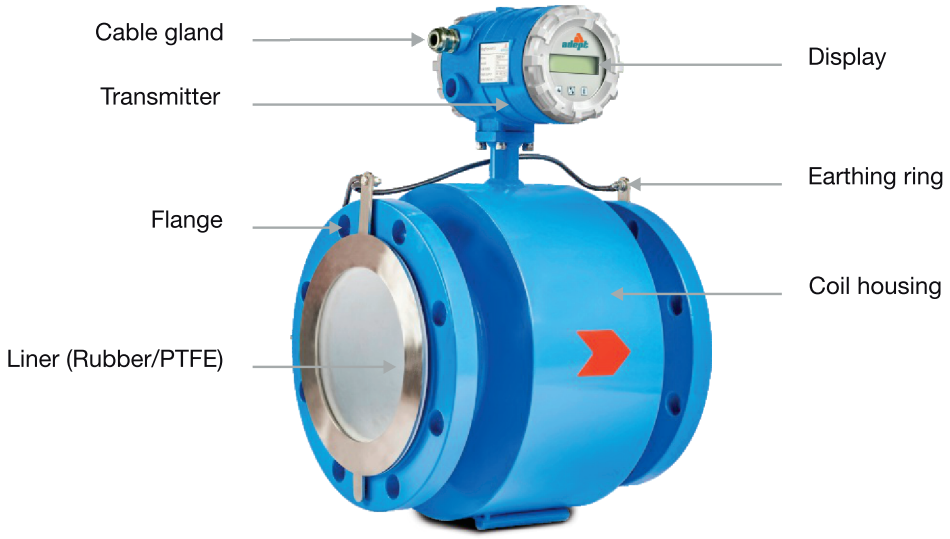
MagProbe 6450

Technical Specifications: Series 6400

Parameters	MagFlow 6410	EcoMag 6420	MagBP 6440	MagProbe 6450
Nominal dia (mm)	10 to 3000	10 to 200	10 to 1200	100 to 3000
Working pressure (kg/cm^2)	10, 16, 25, 40	5	10, 16, 25, 40	20
Working temperature	Integral PTFE - 120^{0}C Remote PTFE - 180^{0}C Others - 70^{0}C	Up to 55^{0}C	Up to 55^{0}C	Up to 120^{0}C
Electrode material	SS 316L Std.*	SS 316L Std.*	SS 316L Std.*	SS 316L Std.*
Sensor lining	Std. Rubber*	NA	Std. Rubber*	NA
Display version	Integral/Remote	Integral/Remote	Integral/Remote	Integral/Remote
Measuring tube material	SS 304 Std.*	HDPE	SS 304 Std.*	SS 316 Std.*
Sensor housing material	Std. CS*	HDPE	Std. CS*	NA
End connection	Flange/Wafer/Tri-clamp/SMS	Flange	Flange/Wafer/Tri-clamp/SMS	NA
Flange standard	ANSI 150*	ANSI 150*	ANSI 150*	NA
Measuring range	0.2 to 12 m/sec. Bidirectional	0.2 to 12 m/sec. Bidirectional	0.2 to 12 m/sec. Bidirectional	0.2 to 12 m/sec. Bidirectional
Accuracy % of measured value	±0.5% (±0.2% consult factory)	±1%	±0.5%	±2%
Repeatability	±0.2% of Span	±0.2% of Span	±0.2% of Span	±0.2% of Span
Display	2 line LCD	2 line LCD	4 line LCD	2 line LCD
Display units	All standard engineering units in m^3, litre, gallon, ft^3, Imperial gallon	All standard engineering units in m^3, litre, gallon, ft^3, Imperial gallon	All standard engineering units in m^3, litre, gallon, ft^3, Imperial gallon, Pressure - Kg/cm2	All standard engineering units in m^3, litre, gallon, ft^3, Imperial gallon
Output	Std. 4 - 20 mA*, pulse, relay	Std. 4 - 20 mA*	Pulse*	Std. 4 - 20 mA*
Power supply	12 - 60 V DC or 80 - 300 V AC/DC wide supply, solar supply	12 - 60 V DC or 80 - 300 V AC/DC Solar powered	Battery powered 10 years' battery life	12 - 60 V DC or 80 - 300 V AC/DC Solar powered
Protection class for sensor	Std. IP 65 Option IP 67/IP 68 for flow tube in remote type	Std. IP 65 Option IP 67/IP 68 for flow tube in remote type	Std. IP 65 Option IP 67/IP 68 for flow tube in remote type	Std. IP 68
Protection class for transmitter	IP 67/IP 68	IP 67/IP 68	IP 67/IP 68	IP 67
Cable length for remote	Std. 10 m*	Std. 10 m*	Std. 10 m*	Std. 10 m*
Installation	Inline flanged type	Inline flanged type	Inline flanged type	Insertion type with use of isolating ball valve assembly on pipeline

* Please refer to order code for options.

Electromagnetic Flowmeter Components



Minimum - Maximum Flow Table

Velocity range - 0.2 m/sec. for minimum & 12 m/sec. for maximum

DN in mm	m^3/hr.		LPM		LPS		USGPM	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
10	0.06	3.38	0.94	56.53	0.02	0.94	0.25	14.94
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 precautions:

1. Installation location should be such that the Flowmeter will always remain full of liquid.
2. Minimum 5D upstream & 3D downstream straight lengths should be maintained at installation locations where ‘D’ is the pipe diameter.
3. The Flowmeter installation location should be free of bends, elbows, tees, valves, etc.

Ordering Code : Series 6400

Model Code
M1 - MagFlow 6410
M2 - EcoMag 6420
M3 - MagBP 6440
M4 - MagProbe 6450

Transmitter Type
I - Integral
R - Remote
W - Integral without Display

Power Supply
P1 - 12 - 60 V DC
P2 - 80 - 300 V AC/DC
P3 - Battery Powered
P4 - Solar Powered

Output
OP1 - 4 - 20 mA DC
OP2 - 4 - 20 mA DC + Open Collector Pulse
OP3 - 4 - 20 mA DC + 24 V Active Pulse
OP4 - 4 - 20 mA DC + Relay - 1 No.
OP5 - 4 - 20 mA DC + Relay - 2 Nos.
OP6 - 4 - 20 mA DC + Open Collector Pulse + Relay 1 No.
OP7 - 4 - 20 mA DC + Digital Input with Batch Relay
OP8 - Open Collector Pulse
OP9 - Not Applicable
OP10 - 4 - 20 mA DC + Open Collector Pulse + 24 V Active Pulse
OP11 - 4 - 20 mA DC + Digital Input

Communication Interface	
C1 - Not Applicable	C5 - HART
C2 - RS 485 (Modbus RTU)	C6 - UART
C4 - GPRS	

Line Size
0010 - 10 (¼")
0015 - 15 (½")
0020 - 20 (¾")
0025 - 25 (1")
0032 - 32 (1.25")
0040 - 40 (1.50")
0050 - 50 (2")
0065 - 65 (2.5")
0080 - 80 (3")
0100 - 100 (4")
0125 - 125 (5")
0150 - 150 (6")
0200 - 200 (8")
0250 - 250 (10")
0300 - 300 (12")
0350 - 350 (14")
0400 - 400 (16")
0450 - 450 (18")
0500 - 500 (20")
0600 - 600 (24")
0700 - 700 (28")
0800 - 800 (32")
0900 - 900 (36")
1000 - 1000 (40")
1100 - 1100 (44")
1200 - 1200 (48")
1300 - 1300 (52")
1400 - 1400 (56")
1500 - 1500 (60")
1600 - 1600 (64")
1800 - 1800 (72")
2000 - 2000 (80")
2700 - 2700 (106")
Any other (Pl. Specify)

Data Logger
N - Not Required
I - Built In
E - External

Cable Length
C1 - 10 meter
C2 - 15 meter
C3 - 20 meter
C4 - 25 meter
C5 - 30 meter
C6 - 50 meter
C7 - 80 meter
C9 - Not Applicable

Approval
D - None
F - Flameproof

Protection Class for Sensor
A - IP 65
B - IP 67
C - IP 68

Coil Housing
CH1 - Carbon Steel
CH2 - SS 304
CH3 - SS 316
CH4 - SS 316L
CH5 - HDPE
CH6 - Not Applicable

Measuring Tube
T1 - SS 304
T2 - SS 316
T3 - SS 316L
T4 - HDPE

Earthing Rings
G1 - None (Earth Electrode)
G2 - SS 316
G3 - SS 316L
G4 - Not Applicable

Accessories
A1 - Not Required
A2 - Mating Flanges
A3 - Mating Flanges + Gaskets + Nut Bolts
A4 - Mating Flanges + Gaskets
A5 - Mating Flanges + Nut Bolts
A6 - Gaskets
A7 - Panel
A8 - UPS
A9 - Surge Arrester
A10 - Dot Matrix Printer
A11 - Mating Flanges + Gaskets + Nut Bolts + Surge Arrester
A12 - Mating Flanges + Gaskets + Nut Bolts + Panel
A13 - UPS + Dot Matrix Printer
A14 - UPS + Dot Matrix Printer + Surge Arrestor
A15 - Mating Flanges + PC Software
A16 - Mating Flanges + Gaskets + Nut Bolts + UPS
A17 - UPS + Surge Arrester
A18 - Panel + Gasket + Nut Bolts in SS 316
A19 - External GSM + UPS
A20 - External GSM
A21 - Surge Arrester + UPS + Panel

Flange Standard/ Design of Measuring Sensor	
S1 - Flange ANSI 150	S10 - Flange BS 10 Table E
S2 - Flange ANSI 300	S11 - Flange BS 10 Table H
S3 - Flange ANSI 600	S12 - Wafer
S4 - Flange DIN PN 10	S13 - SMS
S5 - Flange DIN PN 16	S14 - Tri Clamp
S6 - Flange DIN PN 25	S15 - BSP Thread-end
S7 - Flange DIN PN 40	S16 - Not Applicable
S8 - Flange IS 1538	S17 - Flange AWWA
S9 - Flange BS 10 Table D	S18 - Any other (Pl. Specify)

Flange Material
F1 - Carbon Steel
F2 - SS 304
F3 - SS 316
F4 - SS316L
F5 - HDPE
F6 - Not Applicable

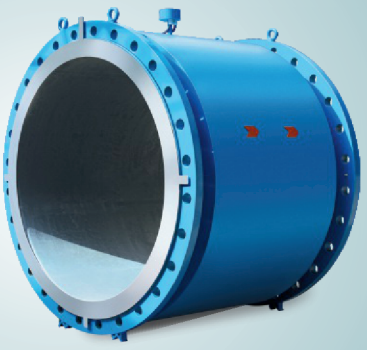
Sensor Lining
L1 - Hard Rubber
L2 - Neoprene
L3 - PTFE
L4 - Polyurethane
L5 - PFA
L6 - Polypropylene
L7 - Not Applicable

Electrode Material
E1 - SS 316L
E2 - SS 316
E3 - Hastelloy C
E4 - Titanium
E5 - Tantalum
E6 - Platinum
E7 - SS Duplex

Note: For MagProbe 6450 Insertion type Flowmeter - Sensor size, design of measuring sensor, flange material, sensor lining, earthing, coil housing choices are not available.

INDIA DESIGN MARK

India's largest 2700 mm line size, full bore Electromagnetic Flowmeter from Adept



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- Operating in the instrumentation business since 1983
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- ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 accreditation from TUV NORD, Germany
- Recipient of the prestigious India Design Mark
- Faster deliveries due to large in-house capacity
- Best in class, 24x7 service support
- Best specifications guarantee value for your money
- Using SAP ERP System for effectively managing operations
- Managed by professional technocrats and qualified, committed, responsive team

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