

## Advanced instrumentation solutions crafted with highest precision





MagFlow 6410

### 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 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 liquid like temperature, viscosity, pressure, density and conductivity, as long as conductivity of the measured liquid is above 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.



EcoMag 6420

MagProbe 6450

MagBP 6440

## Technical Specifications : Series 6400

Parameters	MagFlow 6410	EcoMag 6420	MagBP 6440	MagProbe 6450
Nominal dia (mm)	10 to 2000	10 to 150	10 to 1000	> 100
Working pressure (kg/cm <sup>2</sup> )	10, 16, 25, 40	5	10, 16, 25, 40	20
Working temperature	Integral PTFE - 120°C Remote PTFE - 180°C Others - 70°C	Up to 55°C	Up to 55°C	Up to 120°C
Electrode material	SS 316 Std.*	SS 316 Std.*	SS 316 Std.*	SS 316 Std.*
Sensor lining	Std. Rubber*	NA	Std. Rubber*	NA
Display version	Integral/Remote	Integral/Remote	Integral/Remote	Integral/Remote
Measuring tube material	SS304 Std.*	HDPE	SS304 Std.*	SS316 Std.*
Sensor housing material	Std. CS*	HDPE	Std. CS*	NA
End connection	Flange/Wafer/Tri-clamp	Flange	Flange/Wafer/Tri-clamp	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%	±1%	±2%
Repeatability	±0.2% of span	±0.2% of span	±0.2% of span	±0.2% of span
Display	2 line LCD/LED	2 line LCD/LED	2 line LCD	2 line LCD/LED
Display units	All standard engineering units in m <sup>3</sup> , litre, gallon, ft <sup>3</sup> , Imperial gallon	All standard engineering units in m <sup>3</sup> , litre, gallon, ft <sup>3</sup> , Imperial gallon	All standard engineering units in m <sup>3</sup> , litre, gallon, ft <sup>3</sup> , Imperial gallon	All standard engineering units in m <sup>3</sup> , litre, gallon, ft <sup>3</sup> , Imperial gallon
Output	Std. 4-20 mA*	Std. 4-20 mA*	NA	Std. 4-20 mA*
Power supply	24 V DC or 80-300 V AC	24 V DC or 80-300 V AC	Battery powered 5 years battery life	24 V DC or 80-300 V AC
Protection class for sensor	Std. IP 65 Option IP 68 for flow tube in remote type	Std. IP 65 Option IP 68 for flow tube in remote type	Std. IP 65 Option IP 68 for flow tube in remote type	Std. IP 68
Protection class for transmitter	IP 67	IP 67	IP 67	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 Series 6400

## Electromagnetic Flowmeter Components



## Minimum - Maximum Flow Table

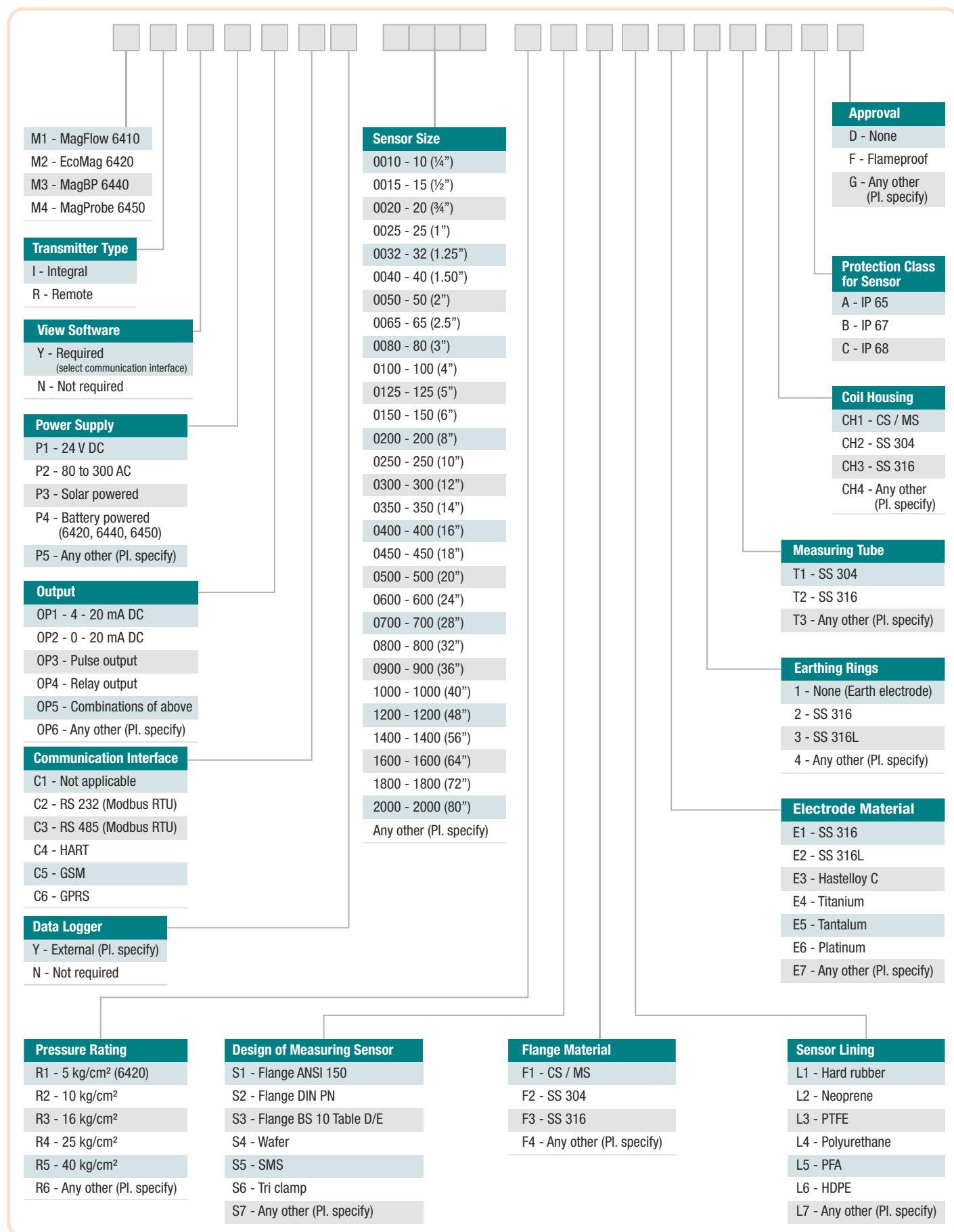
Velocity range - 0.2 m/sec. for minimum & 12 m/sec. for maximum

DN in mm	m <sup>3</sup> /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

### Installation precautions

1. Installation location should be such that the Flowmeter will always remain full with liquid.
2. A 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



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

## Sales and Service Network



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