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## **ELECTROMEGNETIC FLOWMETER 6400 MAG FLOW 6410 (FULL BORE TYPE)**

### **Measuring your Liquid Flow**

### **INTRODUCTION:-**

“TORQUE” make series 6400 ( Full Bore Type ) are new range of Bipolar Pulsed DC Full Bore type Electromagnetic Flow meters. It is suitable for pipes with nominal diameters of DN 10 to DN 600 . They are based on faraday’s law of Electromagnetic Induction. The Series 6400 meters features flanged construction and is available with choice of liner and Electrode materials. Series 6400 has excellent accuracy and flow range ability. The meter is suitable for use on wide range of corrosive and aggressive range of conductive liquids.



### **SALIENT FEATURES:-**

- Based on faraday’s law of Electromagnetic Induction
- Suitable for pipe sizes of diameters 10 mm to 600mm
- Coil Assembly in hermetically sealed welded construction
- Choice of PTFE / Neoprene rubber / Polyurethane liners
- Integral or remote transmitter
- Field Interchangeable electronics
- Optional LED display for flow rate or Totaliser indication in engineering units.
- No pressure loss
- Absolute zero stability and noise elimination.
- Measurement independent of liquid properties.
- Display of flow rate directly in user specified engineering units
- Negligible pressure loss
- Maintenance free design due to absence of any moving parts
- High linearity due to characteristic magnetic field



**REMOTE TYPE**



**INTEGRAL TYPE**



**INSERTION TYPE**

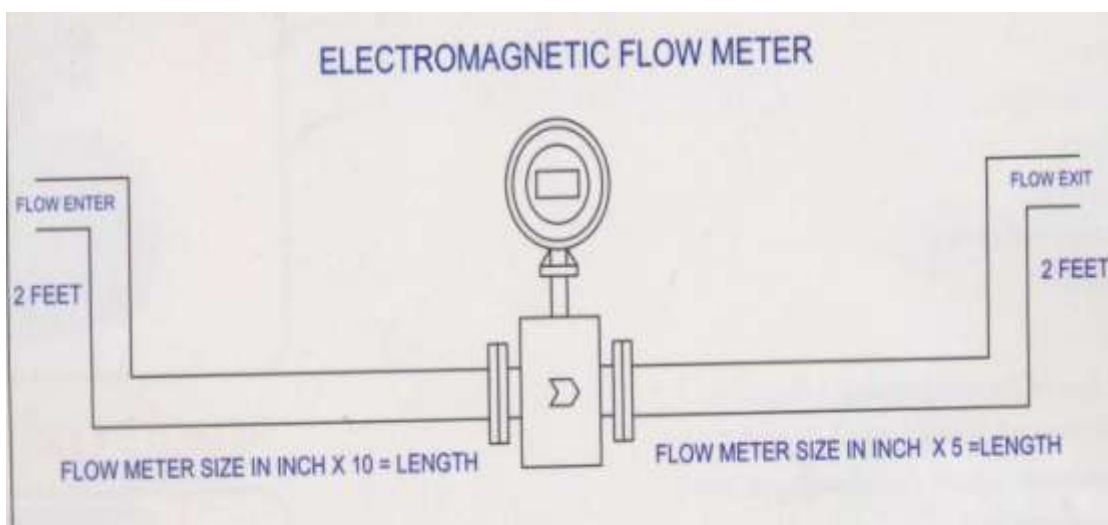
## **APPLICATIONS:-**

- Water Supply Networks
- Chemical , Petrochemical and Process Industries
- Pharmaceutical Industries
- Waste – Water management
- Sugar, Food , Drug and Beverages Industries
- Effluent Treatment Plants
- Fertilizer Industries
- Beverage Industries
- Paper and pulp Industries
- Aluminium , Steel , Mining and Dredging Industries
- And Many Others

## **SPECIFICATION:-**

<b>Suitable for pipe sizes</b>	:DN 10 to DN 2000
<b>Media Conductivity (Min)</b>	:10 $\mu$ S / cm (Consult factory for 5 $\mu$ S/cm)
<b>Media pressure</b>	:PN 40 up to DN 80,PN 16 upto DN 200 & PN 10 up to DN 600
<b>Media Temperature (PTFE)</b>	:0°-180° C with remote transmitter :0°-120° C with integral transmitter 0°-90° C max for other liners
<b>Material : Pipe</b>	: SS 316 (Non – Magnetic )
<b>Liner</b>	: PTFE / Neoprene / Polyurethane
<b>Electrode</b>	: SS/ Hastelloy C / Ta / Ti / PL
<b>End Connection / Flanges</b>	: Carbon steel / SS 304 / SS 316 / SS 316L
<b>Coil Housing</b>	: Carbon steel / SS, Epoxy painted
<b>Transmitter</b>	: Cast aluminum (LM6), Epoxy painted
<b>Power supply</b>	:110 / 240 V AC + 15 %, 50 Hz
<b>Power consumption</b>	:20 VA
<b>Analog Output</b>	:4-20 mA / DC / 0-20 mA DC
<b>Communication port (Optional)</b>	:RS – 232 / RS – 485 MODBUS RTU protocol
<b>Response time</b>	: 5 Second
<b>Flow velocity Range</b>	:0.3 to 10 m/s
<b>Ingress Protection</b>	: IP – 65 ( IP 68 on request)
<b>LED Display</b>	:4 Digit Indication for flow rate and 8 digit indication for Totaliser programming from keyboard for engineering unit
<b>Accuracy</b>	: $\pm$ 0.5 % of measured value (calibrated) at reference conditions

## **INSTALLATION DIAGRAM :-**



## NOTE:-

- Please Provide proper earthing for flow meter.
- Please Use voltage stabilizer for flow meter.
- Please do not switch ON-OFF Frequently power supply to flow meter.
- Please ensure proper velocity and ensure full pipe line filling at flow meter.

Install flow meter as shown in figure

## RANGE:-

METER SIZE IN INCHES	MIN TO MAX FLOW RATE IN LPM	MIN TO MAX VELOCITY IN M/S
1" IN	29 TO 290 LPM	1 TO 10 M/S
1.5 " IN	75 TO 750 LPM	1 TO 10 M/S
2" IN	117 TO 1170 LPM	1 TO 10 M/S
2.5" IN	199 TO 1990 LPM	1 TO 10 M/S
3" IN	301 TO 3010 LPM	1 TO 10 M/S
4" IN	471 TO 4710 LPM	1 TO 10 M/S
5" IN	736 TO 7360 LPM	1 TO 10 M/S
6" IN	1060 TO 10600 LPM	1 TO 10 M/S
8" IN	1884 TO 18840 LPM	1 TO 10 M/S
10" IN	2944 TO 29440 LPM	1 TO 10 M/S
12" IN	4240 TO 42400 LPM	1 TO 10 M/S
14" IN	5771 TO 57710 LPM	1 TO 10 M/S
16" IN	7538 TO 75380 LPM	1 TO 10 M/S
18" IN	9541 TO 95410 LPM	1 TO 10 M/S
20" IN	11779 TO 117790 LPM	1 TO 10 M/S
24" IN	16962 TO 169620 LPM	1 TO 10 M/S

## OPERATIONS:-

❖ Electromagnetic Flowmeters are based on Faraday's law of Electromagnetic Induction. In a Electromagnetic Flowmeter, 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 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 standardized output signal or displayed In appropriate Engineering Units on LED Display.

❖ The flux density of the electromagnetic field In a given Flow meter and the distance between the electrodes are constant, therefore, the induced voltage is only a function of liquid velocity.

**E = K.B.v.D** where **E** : Induced voltage  
**K** : flow Tube Constant  
**B** : Magnetic field velocity  
**v** : Mean flow velocity  
and **D** : Electrode Spacing

Volume flow Is calculated by equation :

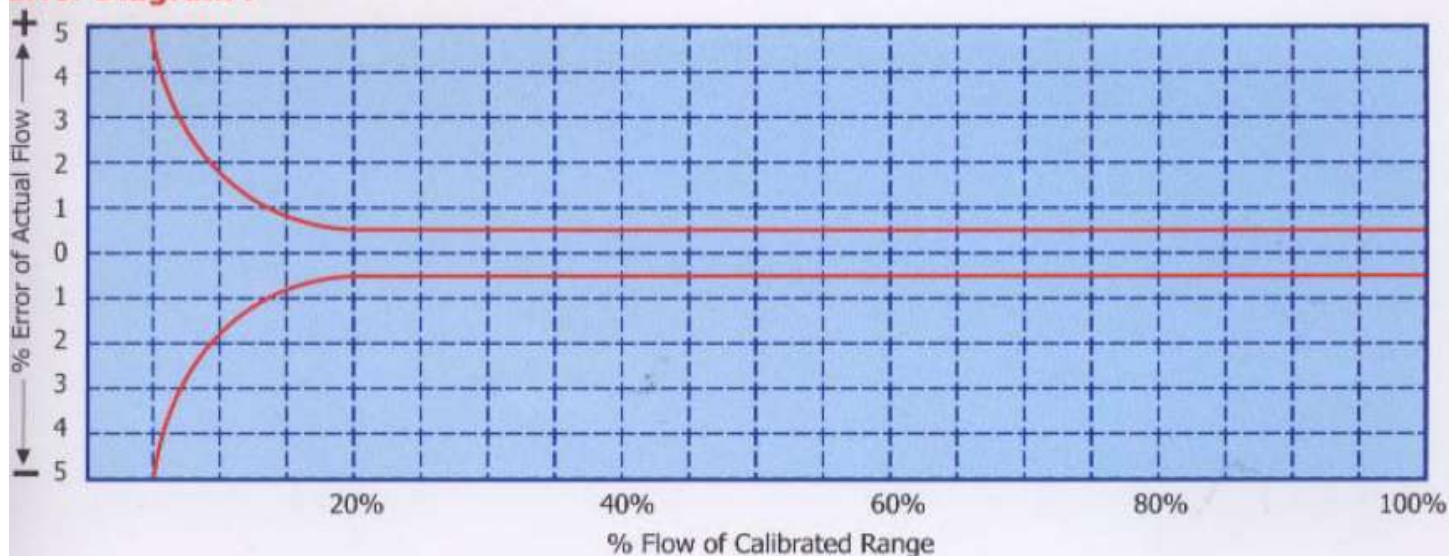
$$Q; v.D^2 \frac{\pi}{4}$$

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

❖ 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 measure 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.

## Error Diagram :



## Flow Rate Table Flow Rate at V = 1m/Sec.

DN	m3/hr	LPM	LPS	DN	m3/hr	LPM	LPS
10	0.282	4.711	0.078	125	44.18	736.198	12.270
15	0.636	10.601	0.176	150	63.61	1060.125	17.668
20	1.130	18.846	0.314	200	113.08	1884.667	31.411
25	1.766	29.447	0.490	250	176.69	2944.792	49.080
32	2.909	48.247	0.804	300	254.43	4240.500	70.675
40	4.523	75.386	1.256	350	346.31	5771.792	96.197
50	7.068	117.791	1.963	400	452.32	7538.668	125.645
65	11.944	199.100	3.317	450	572.47	9541.980	159.036
80	18.092	301.546	5.025	500	706.75	11779.169	196.321
100	28.270	471.166	7.852	600	1017.72	16962.003	282.702

## ORDERING INFORMATION:-

### POWER SUPPLY:-

- 1 240 ± 15% V AC 50 Hz
- 2 110 ± 15% V AC 50 Hz

### OUTPUT SIGNAL

1. 4-20 mA DC
2. 0-20 mA DC

### ELECTRODE MATERIAL:-

- 1 Stainless steel 316
- 2 Hast Alloy C
- 3 Tantalum
- 4 Titanium
- 5 Platinum
- 6 Any other

### FLANGE / END CONNECTIONS STANDARDS

1. DIN PN 40
2. DIN PN 16
3. DIN PN 10
4. ANSI 300
5. ANSI 300
6. Tri-Clamp
7. Any other

### COIL HOUSING:-

1. Carbon steel
2. Stainless steel 304
3. Stainless steel 316
4. Remote without Display

### FLOW TRANSMITTER

1. Integral without Display
2. Integral with Display
3. Remote with Display

**FLOWMETER SIZE:-**

DN-10	DN-15	DN-20	DN-25	DN-32	DN-40	DN-50	DN-65	DN-80	DN-100	DN-125
DN-150	DN-200	DN-250	DN-300	DN-350	DN-400	DN-450	DN-500	DN-600	Any Other	

**LINEAR MATERIAL:-**

1. Teflon (PTFE)
2. Neoprene
3. Hard Rubber
4. Polyurethane
5. Any Other

**FLANGE /END CONNECTIONS MATERIAL:-**

1. Carbon Steel
2. Stainless Steel 304
3. Stinless Steel 316
4. Any Other

**PULSED OUTPUT (Optional):-**

1. Low Pulse output
2. High Pulse output
3. Nil

**COMMUNICATION PORT (Optional)**

1. RS-232
2. RS- 485

**NOTES:-**

Flowmeter is supplied with 2 nos of SS 316 Earthing rings of 3mm thickness.

Remote Flow Transmitter is supplied with 2” pipe Mounting kit and 10 meter each electrode signal cable and coil supply cable.

Installation Location should be such that the flowmeter will always remain full with liquid.

A Minimum 5D upstream and 3D downstream straight lengths should be maintained at installation location.

Where D is the pipe diameter. The Flowmeter installation location should be free of bends , elbows , tees , valves etc.

**METER DIMENSIONS IN MM**

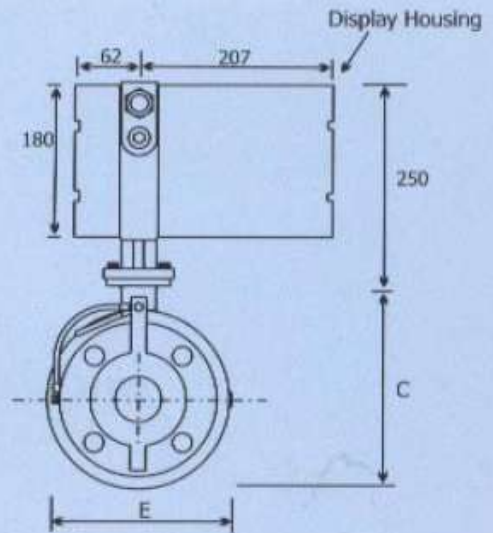
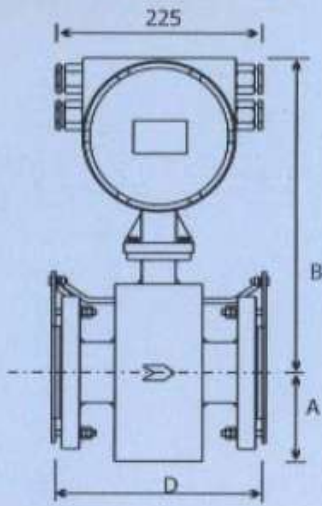
DN(mm)	A	B	C	D	E	F
10 , 15, 20	65	310	125	200	120	190
25 , 32	80	325	155	200	150	205
40 , 50	120	365	230	200	225	245
65 , 80	130	375	250	200	245	255
100 , 125	170	415	330	250	325	295
150	190	435	370	300	365	315
200	245	490	480	350	475	370
250	295	540	580	400	575	420
300	335	580	660	500	655	460
350	360	605	710	500	705	485
400	395	640	780	600	775	520
450	430	675	855	600	850	555
500	465	710	925	600	920	590
600	550	795	1090	600	1085	675

Notes:- 1. Above dimensions are with ANSI 150 / DIN PN 16 flanges  
(for other flanges-consult factory)

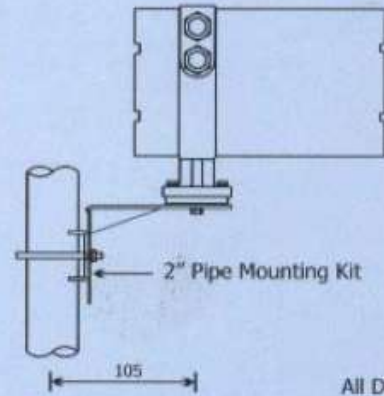
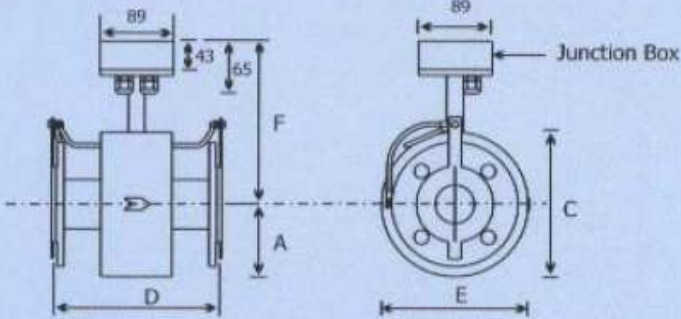
2. Add total 6mm for two earthing / Linear protection rings to dimension ‘D’

**Dimensional Drawing :**

**Integral Type**



**Remote Type**



All Dimensions in mm