Electromagnetic Flowmeter 6500
MagProbe 6510 (Insertion Type)

Measuring your Liquid Flow

Introduction

Series 6500 is a new range of Bipolar Pulsed DC Insertion Type Electromagnetic Flowmeter. It is suitable for pipes with nominal diameters of 100 mm & above. The Flowmeter is based on Faraday's law of Electromagnetic Induction.

Series 6500 has excellent accuracy and flow rangeability within its class. 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 100 mm & above
- With or without Integral Transmitter.
- Use of Isolating Ball Valve and Pressure Seal arrangement permits ease of mechanical Insertion and removal without disturbing the flow
- Absolute zero stability and noise elimination due to pulse D.C. excitation
- Measurement independent of liquid properties
- Optional inbuilt potentiometer provides full scale flow rate adjustments.
- Negligible pressure loss.
- Maintenance free design due to absence of any moving parts.
- Display of flow rate directly in user specified engineering units

Applications

- Water Supply Networks
- Chemical and Process Industries
- Pharmaceutical Industry
- Waste - Water Management
- Sugar, Food and Beverages Idustries
- Effluent Treatment Plants

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 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 Units on LED Display.

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.

$E = K.B.\bar{v}.D$ where E : Induced voltage
K : Flow Tube Constant
B : Magnetic field velocity
$\bar{v}$: Mean flow velocity
and D : Electrode Spacing

Volume flow is calculated by equation :

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

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

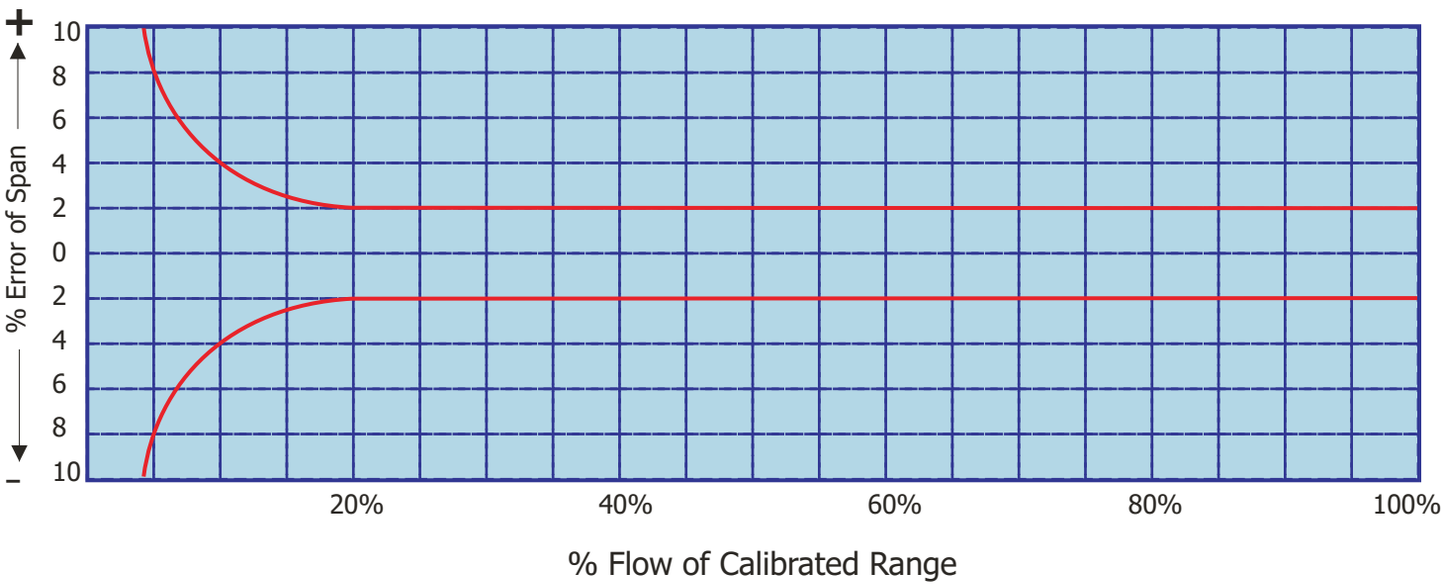
The induced voltage is not affected by the physical properties of liquid like temperature, viscosity, pressure, density and conductivity, as long as conductivity of the measure liquid is above minimum threshold level. For reliable measurement the pipe must be completely full of liquid.

The electromagnetic field coil assembly is excited by pulsed DC technique, which eliminates the interfering noise and provides automatic zero correction.

Specifications

Suitable for Pipe Sizes	:	DN 100 to DN 2000
Media Conductivity (Min.)	:	10 µS/cm (Consult factory for 5 µS/cm)
Media Pressure	:	Upto 15 kg/cm ^{2}
Media Temperature (PTFE)	:	0°- 75°C
Ambient Temperature Range	:	0°- 50°C
Materials : Pipe	:	SS 316 (Non - magnetic)
Wetted Parts	:	PTFE (Teflon), SS 316
Electrode	:	SS 316 / Hastelloy C / Ta / Ti / Pt
Weld in Socket with flange	:	Carbon Steel
Connecting flanges	:	Carbon Steel
Transmitter	:	Cast Aluminium (LM6) , Epoxy painted
Mounting	:	Using a 2" Ball Valve Assembly
Power Supply	:	110 / 240V AC ± 15%, 50Hz
Power Consumption	:	20 VA
Cable Gland Entry	:	1/2" NPT (F)
Analog Output (Isolated)	:	4-20 mA DC / 0-20 mA DC
Pulsed Output (Optional)	:	Low Pulsed Rate Output 10 to 36000 pulses per hour a) Output to drive directly external electromagnetic counter of 12/24V DC @ 200 mA capacity OR b) Open Collector Output , High Pulse Rate Output, 0.5 KHz/1 KHz/10KHz/ (Open Collector Output)
Communication Port (Optional)	:	RS - 232 / RS - 485 MODBUS RTU Protocol
Maximum Load Resistance	:	1000 Ω
Response Time	:	10 seconds
Flow Velocity Range	:	0.3 to 10 m/s
Ingress Protection	:	IP - 65 for Flow Transmitter and IP-68 for Sensor Assembly
LED Display	:	4 Digit Indication for Flow Rate and 8 Digit Indication for Totaliser Programming from Front Keyboard for Engineering Units
Accuracy	:	± 2% of Span
For Flow between 0 to 100%	:	Refer Error Diagram
Reference Conditions		
Power Supply	:	Nominal
Ambient Temperature	:	25° ± 2° C
Load Resistance	:	500 Ω
Repeatability	:	± 0.2% of span
Effect of Ambient Temperature	:	Less than 0.2% per 10°C
Effect of Power Supply	:	Less than 0.1% per 10% Voltage variation
Effect of Load Resistance	:	Less than 0.1% of span

Error Diagram :



Flow Rate Table

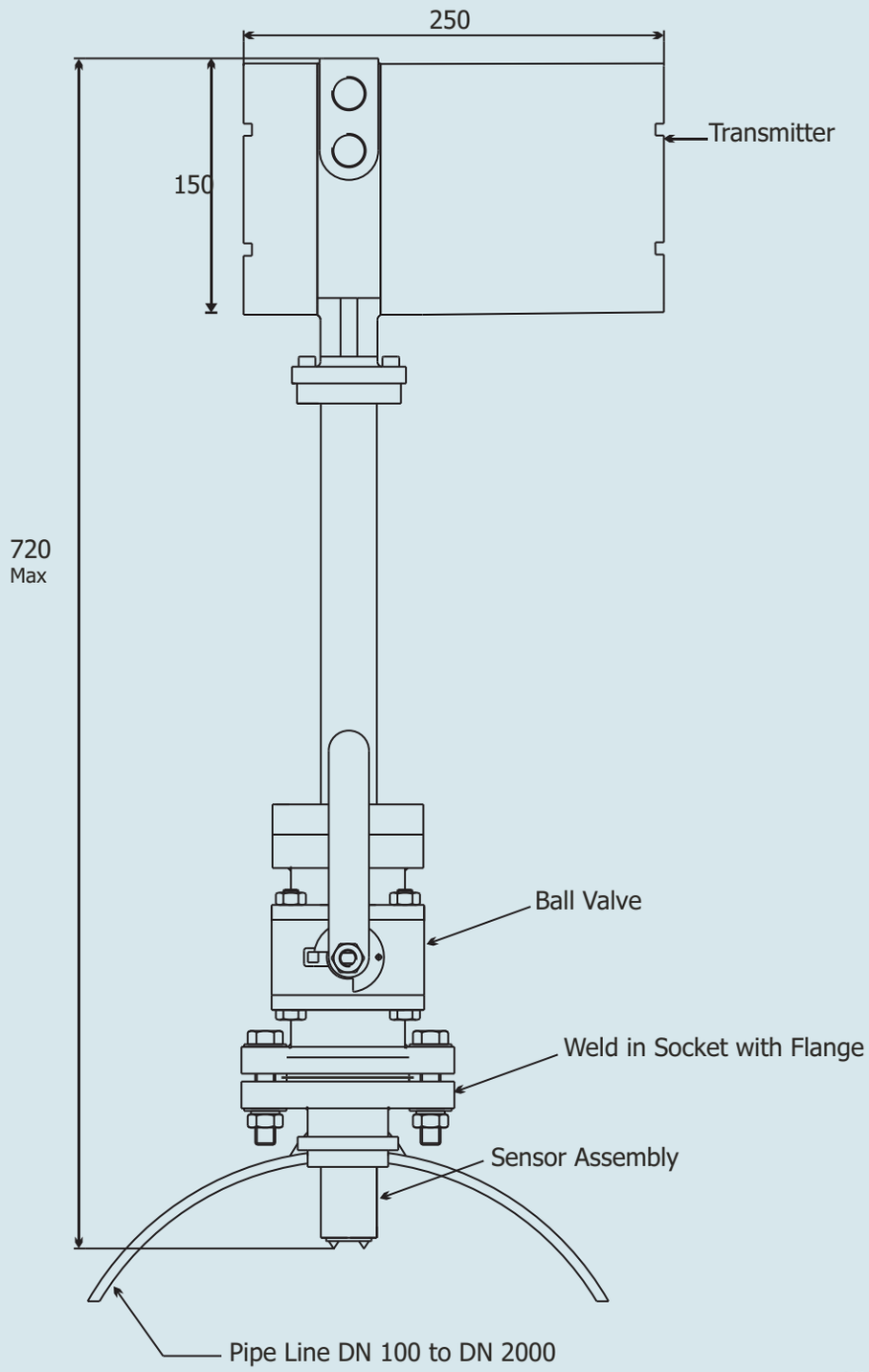
Flow Rate at V = 1 m/Sec.

DN	m^3/Hr	LPM	LPS
100	28.27	471.2	7.9
150	63.61	1060.1	17.7
200	113.08	1884.7	31.4
250	176.69	2944.8	49.1
300	254.43	4240.5	70.7
350	346.31	5771.8	96.2
400	452.32	7538.7	125.6
500	706.75	11779.2	196.3
600	1017.72	16962.0	282.7
700	1385.23	23087.2	384.8
800	1809.28	30154.7	502.6
900	2289.87	38164.5	636.1
1000	2827.00	47116.7	785.3
1200	4070.88	67848.0	1130.8
1400	5540.92	92348.7	1539.2
1600	7237.12	120618.7	2010.3
1800	9159.48	152658.0	2544.3
2000	11308.00	188466.7	3141.1

NOTES :

1) A Ball Valve Assembly with Socket Flange will be supplied in advance. Socket Flange is to be welded onto the Pipe Line for Flowmeter installation. This will enable you to install the Flowmeter even if the line is charged.
2) A minimum 10 D upstream and 5D 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.
3) Installation location should be such that the pipe will be always full with water and in no case it should be partially filled.

Dimensional Drawing :



All Dimensions in mm

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