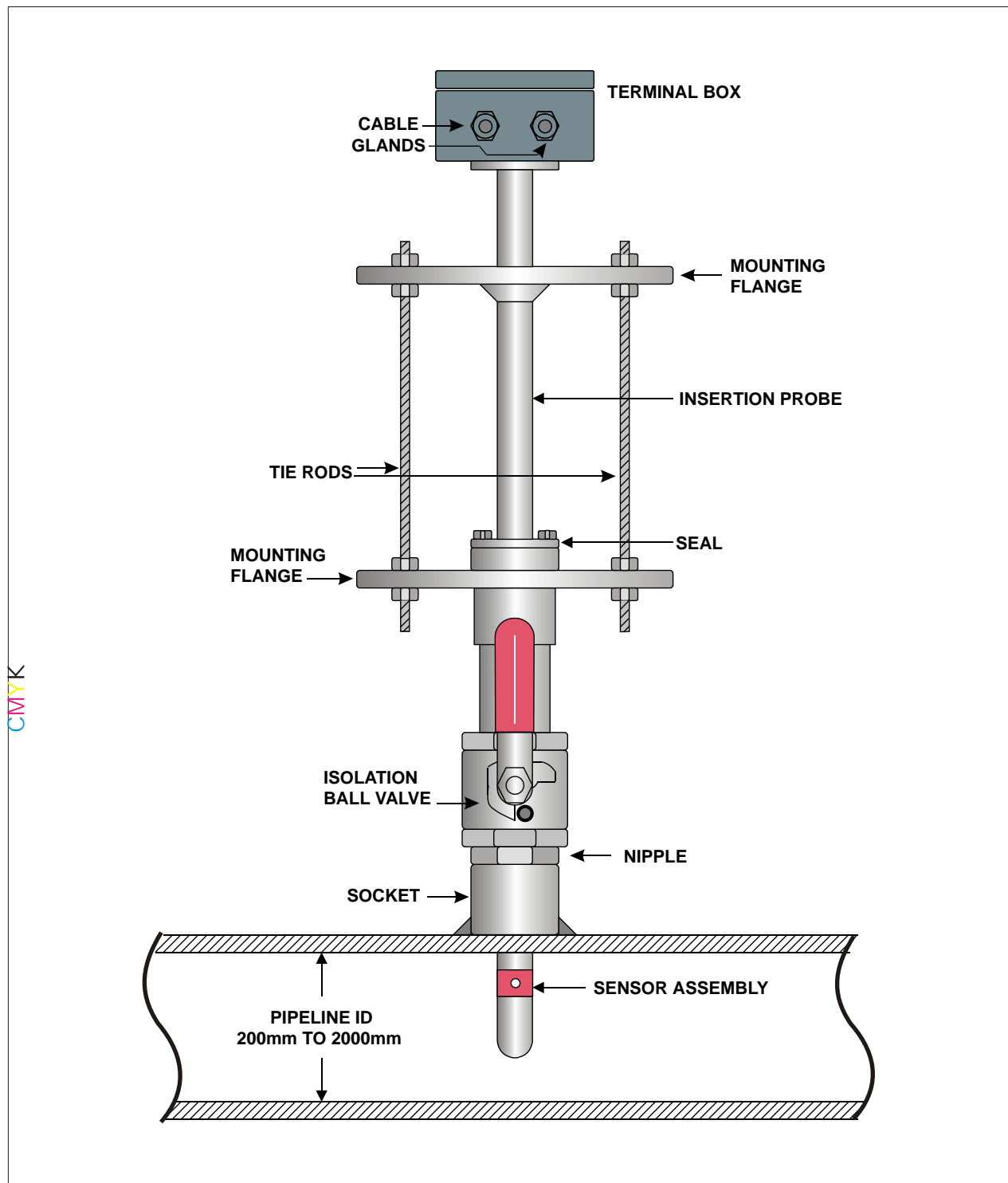


SCHEMATIC DIAGRAM FOR INSERTION PROBE ASSEMBLY



manas



we
measure
wide
aqua
flow

SroaTTM
1000 *i*

INSERTION TYPE FLOW METER

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MAGNETIC FLOW METER SROAT -1000 i

INTRODUCTION :

The Manas make Insertion Type Electromagnetic flow meter, called SROAT - 1000 i is an ideal solution for water flow measurement in large diameter pipes. Fairly good accuracy of measurement (typically $\pm 1\%$ of flow rate) can be achieved with little care in installation of probe and transmitter. The electrical conductivity of liquid under measurement can be as low as 20 microsiemens / cm. Being insertion type, there is virtually no pressure loss. Most economical as compared to its counterpart in full bore measurement or ultrasonic measurement.

The technique called as " Pulsed DC " is used which offers very high Zero stability and accuracy of measurement. The standard current output of 4-20 mA DC is provided which is linearly proportional to volumetric flow rate.

PRINCIPLE OF OPERATION :

The method of flow measurement is based on Faraday's law of electromagnetic induction. When a conductor moves within a magnetic field, voltage is induced in it which is proportional to the velocity of conductor.

In this case the conductor is flowing media. The equation is as below.

$$E = B.v.d$$

where,

E = Induced voltage [proportional to velocity]

B = Pulsed magnetic flux density.

v = Mean velocity of the media

d = Distance between the sensing electrodes

For a given probe and compatible amplifier the flux density 'B' is constant, the distance between the electrodes is constant. Hence, the induced voltage is proportional to the velocity of the flowing media. Thus, the unit can be calibrated in terms of volumetric flow rate by knowing the cross-sectional area of the pipe on which the probe is installed.

PRINCIPAL ADVANTAGES :

Excellent long term stability using pulsed dc magnetization and auto zero technique.

Measurement results are independent of density, viscosity, pressure, temperature, solid-impurities and conductivity variations (above 20 $\mu\text{S}/\text{cm}$)

No additional pressure drop across the meter.

Compatible with virtually all corrosive / non-corrosive liquids.

IP-65 class of protection offered.

APPLICATIONS :

Following industries find application of this flow measurement technique

Water Supply

Public Services & Utilities

Effluent Treatment Plants

Pharmaceutical Industries

Sugar Industries & Distilleries

Food & Drugs

INSERTION FLOW METER

INSERTION PROBE : SROAT 1000 i

Applicable line Sizes	: 200 mm to 2000 mm
Media Pressure	: 15 kg/cm ² max.
Media Temperature	: 0 - 80 °C
Ambient Temperature Range	: 0 - 50 °C
Materials : Insertion Probe	: SS 304
Electrodes	: SS 316
Wetted Parts	: SS 304, SS 316, Epoxy
Weld in socket	: SS 304
Flange Mounting Assembly	: SS 304
[Refer Sketch on rear page]	
Power Supply To Field Coils	: Pulsed DC
Terminal box	: IP-65
Cable Entries	: Ip-68

TRANSMITTER SROAT 1000 A i

1. Type	: Remote Mounted
2. Min. Media Conductivity	: 20 $\mu\text{S}/\text{cm}$
3. Signal Output	: 4-20 mA dc Isolated in max. 600 ohms
4. Coil Excitation Frequency	: 6.25 Hz

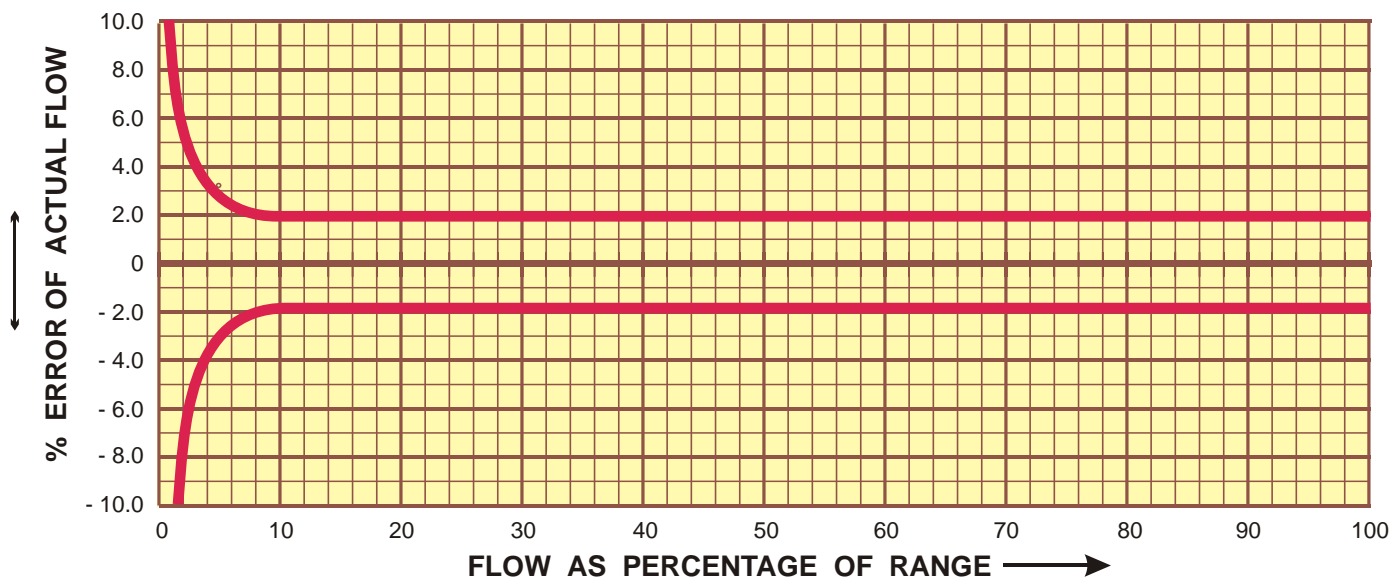
5. Display	: a) 3½ Digit LCD Calibrated in % or Engg. units b) 8 Digit LCD non- resettable type for totalised quantity [2½ years back-up for retaining the value]
6. Flow Velocity Range	: 0.1 m/s to 10 m/s
7. Accuracy	: $\pm 2\%$ Of Reading [for range between 100 % to 10 % of flow rate At Ref. Condition]
8. Reference conditions	: Power supply nominal, Amb. Temp. 27 °C $\pm 2^\circ\text{C}$
9. Ambient Temperature	: 0 - 50°C
10 Temperature Drift	: $\pm 0.015\%$ Per °C max..
11. Humidity	: 90% R. H. max. non condensing.
12. Material Of Housing	: Al. Die cast
13. Power Supply*	: 230 V ac / 110 V ac, 50 hz
14. Damping	: Adjustable from 5 to 30sec.
15. Cable Entries	: 4 No. ¾" ET
16. Ingress Protection	: IP-65

* Battery back-up can optionally be provided for measurement & totalisation of flow in case of power failure by providing a separate powering unit.

FLOW RATE TABLE : Flow Rate at v = 1 m / s

Dia. (mm)	M ³ / hr.	MLD	Cu.ft./Sec.	Dia. (mm)	M ³ / hr.	MLD	Cu.ft./Sec.
200	113.097	2.7143	1.1094	800	1809.556	43.4293	17.7511
250	176.714	4.2411	1.7335	900	2290.219	54.9652	22.4662
300	254.469	6.1072	2.4962	1000	2827.431	67.8583	27.7360
350	346.360	8.3126	3.3977	1200	4071.500	97.7160	39.9400
400	452.389	10.8573	4.4378	1400	5541.765	133.0024	54.3626
500	706.858	16.9646	6.9340	1600	7238.223	173.7174	71.0043
600	1017.875	24.4290	9.9850	1800	9160.876	219.8610	89.8648
700	1385.441	33.2506	13.5907	2000	11309.724	271.4333	110.9442

ERROR DIAGRAM



COMPARISON OF VARIOUS TYPES OF FLOW METERS

Parameters	Insertion Sroat 1000 i	Vortex	Turbine	Orifice
Accuracy	$\pm 2\%$	$\pm 1.5\%$	$\pm 3\%$	$\pm 5\%$
Min. Vel.	0.1 m/s	0.6 m/s	0.6 m/s	--
Pr. Drop	NIL	NIL	Considerable	Considerable
Effect of Viscosity & Density variations	No Effect	Very much	Very much	Very much
Solid Particle Impurities	No Effect	Wears out	Wears out	Wearsout
Vibration of Pipe	Immune	Affects Reading	Affects Reading	Not recommended
Orientation	No Effect	No Effect	Affects accuracy	--