



Flow Monitoring Solutions

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About SBEM

SBEM was established in 1974 and is India's market leader in Level, Flow and Pressure Instrumentation. With a futuristic approach and a warm beginning in providing Oil Companies, with tank Level Gauging Solutions, SBEM has evolved into an organization offering multiple Products. SBEM Pvt. Ltd. has established itself as a FLOW MEASUREMENT Solutions Provider & it also deals in Automation Packages Business. An ISO 9001:2015 and ISO 45001:2018 certified company with a DSIR approved R & D Centre. SBEM's core strength is its ability to custom design solutions for each Application and Customer's from every Industry including :

Public Health Engineering

PHE Instrumentation Package, WTP Automation Package Over head tanks (OHT), Elevated storage reservoirs (ESR), Reservoirs and Distributed Pipelines. 24 X 7 Water Supply Scheme and Tubewell Applications.

Thermal Power

Steam Turbine, Turbo Generator, Condenser / Heat Exchanger, Condensate Polishing Unit (CPU), Coal Handling Plant (CHP), Ash Handling Plant (AHP), Fuel Oil Handling, DM Plant, Pre Treatment – Water Treatment Plant (PT-WTP), Effluent Treatment Plant (ETP), Cooling Tower and Fire Protection

Indian Navy

Oil Refineries & Gas (End To End)

Cement

Steel

Edible Oil

Vision:

To become the Preferred Partner and Solution Provider in the Process Control and Automation Industry

Mission:

To provide Continuous Value Addition to our Customers by offering Reliable, Cost effective and Customized Solutions

SBEM in a capsule:

- Pioneer in Level ,Flow & Pressure Measurement Solutions since 1974
- One of first MSME to obtain ISO 9001:2015 & ISO 45001:2018 certification in India
- Largest number of installed Tank Farm Management Systems in India
- The only 100% indigenous Servo Gauge in 1992
- Integration of Radar Gauges (other makes) with SBEM Tank Farm Management systems
- Indigenously developed Phased Capacitance Level Transmitters and Ultrasonic Switches for Indian Naval Submarines
- Accurate Magnetostrictive Level Probes for Retail Outlet Automation

Certifications :

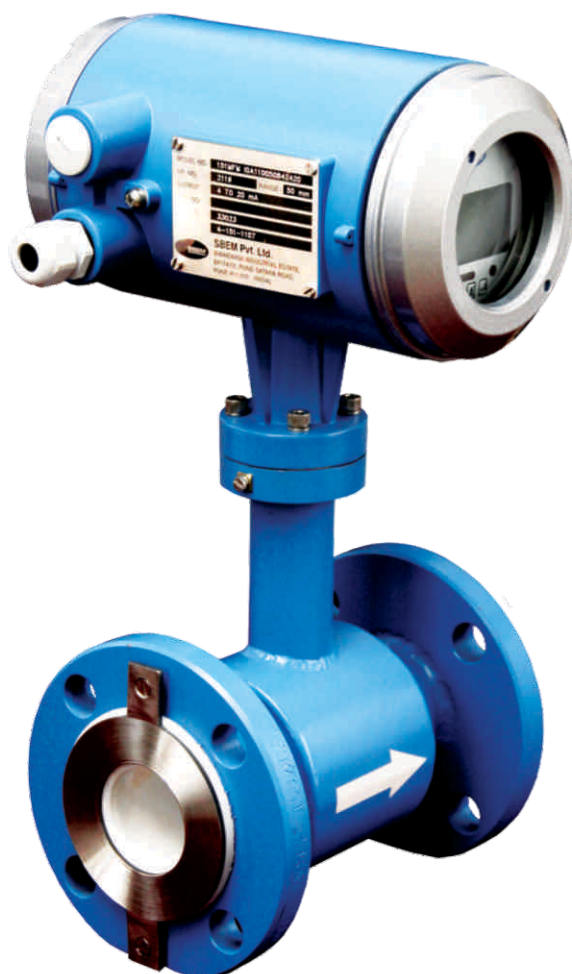
- ATEX & IECEX Certified Retail Outlet Tank Gauging System as per IEC 60079-0 and IEC 60079-11
- NABL accredited Calibration Laboratory as per ISO/IEC 17025
 - Flow Meter
 - Residential Water Meter
- ISO 4064:2014 / W&M (OIML R49:2013) / Drinking Water Approval
 - * - As per OIMLR49 / ISO4064
- SIL 2 certified 139 Servo Gauge as per IEC 61508
- CE Certified Level Transmitters as per EN Directives

Magflow Meter, 151 MFM

Site

Features

- Maximum Range (Velocity): 10 m/s
- Meter Sizes: 15 To 3000 mm
- Process Connection: Flange (ANSI/AWWA/ DIN) & Wafer
- Electrode Material: SS/Hastalloy C/ Tantalum/Titanium
- Lining Material: Rubber/ Neoprene/ Hard Rubber/ PTFE
- Measuring Tube Material: SS 304/ SS 316
- Coil Housing Material: CS/ SS 304/ SS 316
- Power Supply: 85-265 VAC or 24VDC
- Analog 4-20 mA superimposed with HART output
- Application: All conductive liquids having Conductivity $\geq 20 \mu\text{S/cm}$
- Empty pipe detection



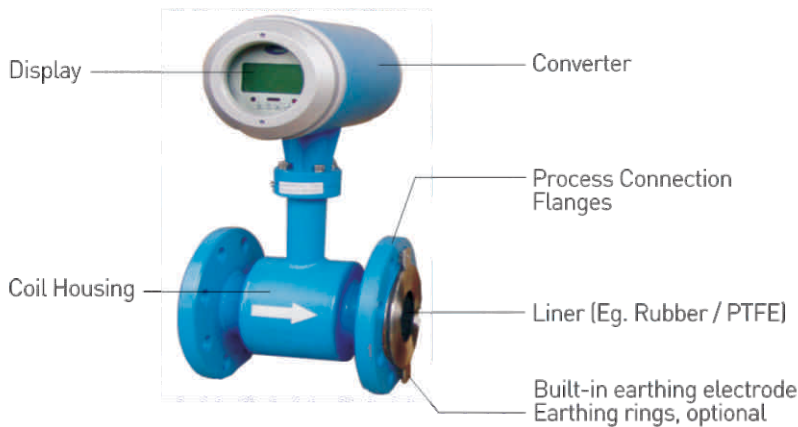
Product Benefits

- Suitable for all conductive liquids
- No wear & tear, long life
- No pressure loss
- No process losses

Features

- Two Line LCD Display, 16 characters per line Or Graphical LCD display
- High measurement accuracy up to $\pm 0.3\%$
- Available in all types of Electrode material
- Low Power Consumption
- Versions for high temperature up to 150°C
- Integral & Remote Versions
- RS 232/RS 485 (MODBUS Protocol)
- GSM/ GPRS connectivity for communicating field data through SMS on mobile phones and/or control & monitoring through central SCADA system
- In-built data logger
- Built In Self Diagnosis Feature
- Bidirectional Flow Measurement
- Selectable Response Time
- Protection Class
Sensors: IP 67 (Std) / IP 68 (for remote versions only)
Indicator-Converter: IP 67
- Interchangeable Converter
- No earthing rings required because of built in Earthing Electrode
- Earthing Rings in SS 304/ SS 316 also available
- Lengths in accordance with ISO : 13359
- Five level Password
- Flameproof and Weatherproof versions

Electromagnetic Flow Meter Components



Areas of Application

- Water & Waste Water Management
- Submerged in Water or Buried in Ground
- Chemical, Petrochemical and Process Industries
- Fertilizer Industries
- Mining Industries
- Cement
- Paper and Pulp Industries
- Pharmaceutical Industries
- Food and Drug Industries
- Beverage Industries

Overview

Features/Model	151MFM W	151MFM E	151MFM P	151MFM B
Accuracy	± 0.5%	± 0.3%	± 0.3%	± 0.5 %
Display	2 line LCD, backlit	2 line LCD, backlit	Graphical LCD, backlit	Graphical LCD
4-20 mA current output	Yes	Yes	Yes	No
MODBUS - RS 232	Add-on	Add-on	Add-on	No
MODBUS - RS 485	Add-on	Add-on	Add-on	Add-on
HART	Add-on	Add-on	Add-on	No
GSM - SMS	M2M	M2M	M2M	Add-on
GPRS	M2M	M2M	M2M	Add-on
In-built Data Logger	No	No	Add-on	Add-on
Digital output	1 Pulse / Frequency 1 digital output (configurable)	1 Pulse / Frequency 1 digital output (configurable)	1 Pulse / Frequency 4 digital output	1 Pulse / Frequency 1 digital output (configurable)

For possible combination of outputs, please refer to ordering codes on page nos. 11, 13, 15 and 17



Application

The 151 MFM electromagnetic flow meter has been designed to measure volume flow rates of electrically conductive liquids in closed piping systems. Measurements can be done in both flow directions, with high measurement accuracy over a wide range of flow rates. The minimum required conductivity of the measured medium is 20 $\mu\text{S}/\text{cm}$.

The converter electronic unit includes a display to show the measured values where various operational parameters of the meter can be selected by means of an associated keyboard. Current, frequency / pulse, digital outputs are also available. GSM interface allows sending flow rate and totalised flow through SMS on mobile phones. Wireless communication between flow meter and PC is possible with the GPRS connectivity.

Working

The electromagnetic flow meter consists of a sensor through which the measured liquid flows, and a converter (electronic unit) where the low-level signal from the sensor is amplified for further processing. The output signal is proportional to the volume flow rate of the measured liquid. The electromagnetic flow meters can be applied only where the measured liquid is conductive and non-magnetic. The electromagnetic flow meter can be designed either as an integral device or with the sensor separated from the associated converter (electronic unit). In the Integral type, the electronics is fitted directly onto the sensor and in another case i.e., of remote type, the converter is connected to the sensor by special cable.

Operating Principle

The function of an electromagnetic flow meter is based on Faraday's law of electromagnetic induction. The sensor consists of a non-magnetic and non-conductive tube with two embedded measuring electrodes to pick up the induced voltage. To create an alternating magnetic field, two coils are fitted onto the tube in parallel with the plane defined by the active parts of the measuring electrodes. Now if a conductive liquid flows across magnetic field **B**, voltage **U** will appear on the measuring electrodes proportional to the flow velocity **v** and the distance between conductor **d**.

$$U = B \times d \times v$$

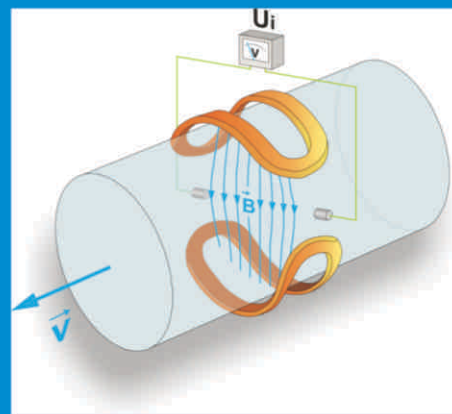
U induced voltage

B magnetic flux density

d distance between the measuring electrodes

v liquid flow velocity

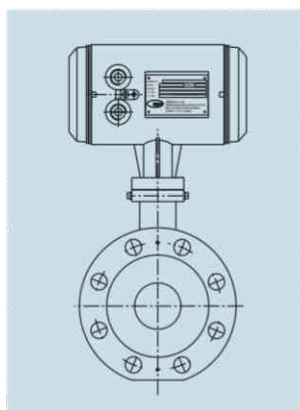
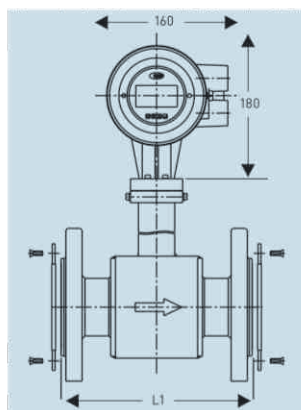
As the magnetic flux density and distance between the electrodes are constant, the induced voltage is proportional to the liquid flow velocity in the tube. The value of the volume flow rate can then be readily determined as a product of the flow velocity and square section of the tube, $Q = v \times S$.



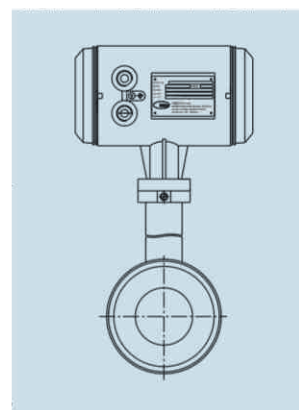
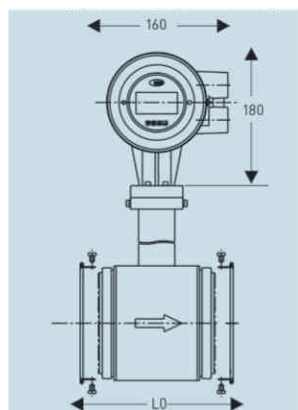
Versions

A) Integral

A.1 Flanged

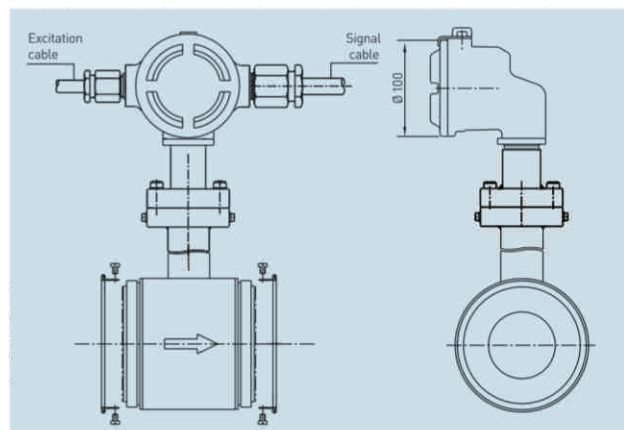
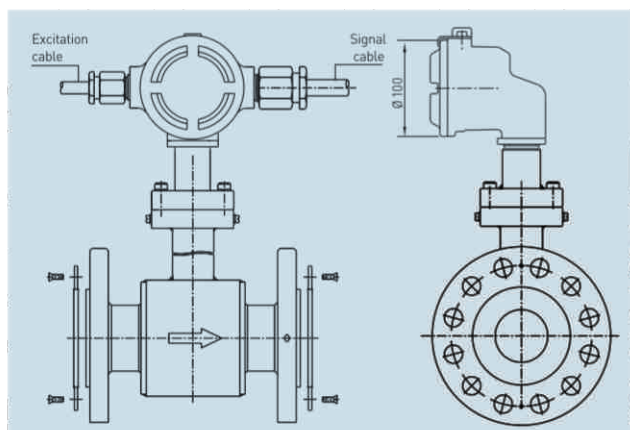


A.2. Wafer

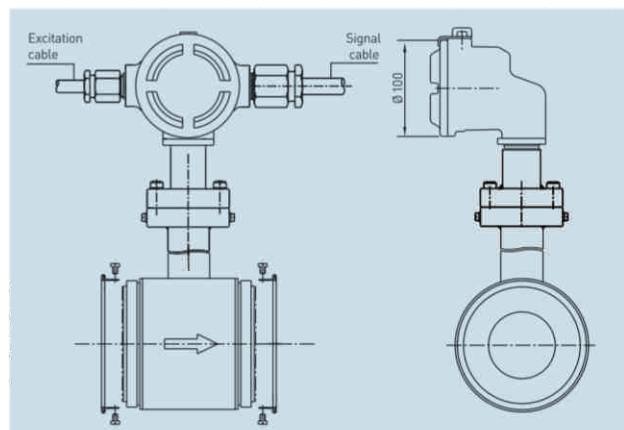


B) Remote - Sensor

B.1 Flanged

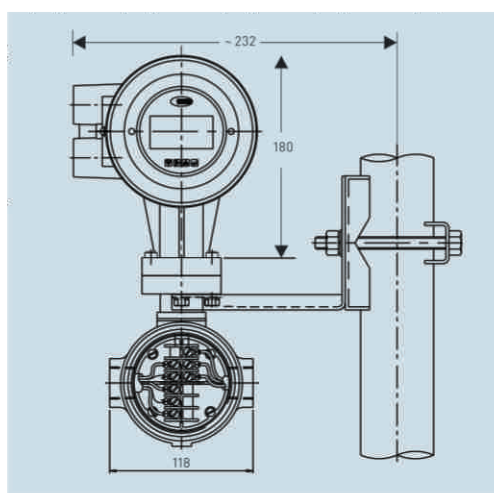
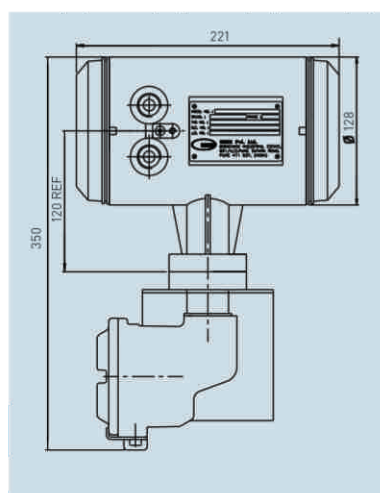


B.2 Wafer

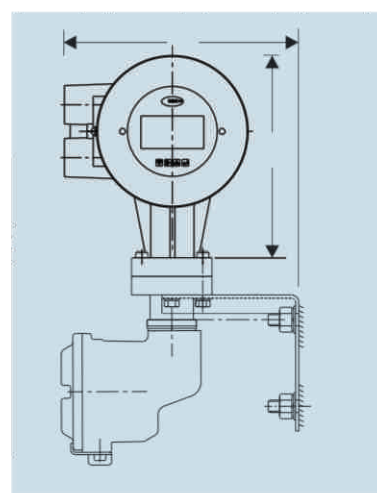


C) Remote - Converter

Pipe Mounting Arrangement



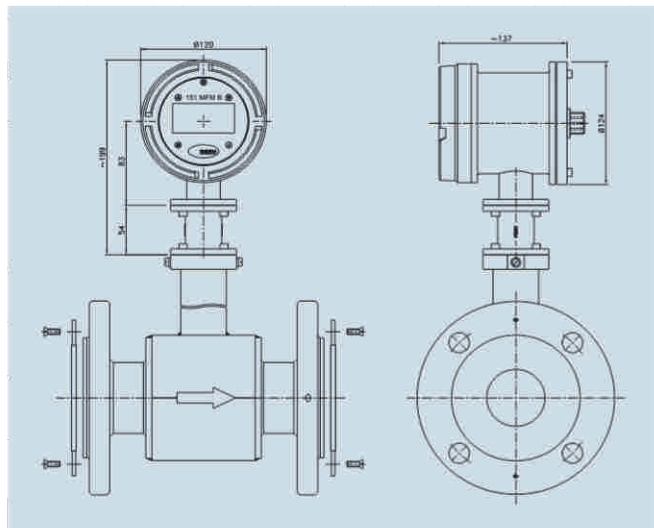
Wall Mounting Arrangement



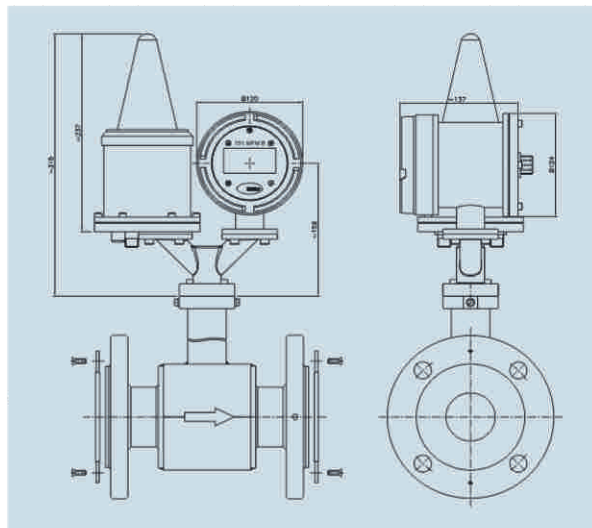
Versions

D) Battery Operated Flow Meter

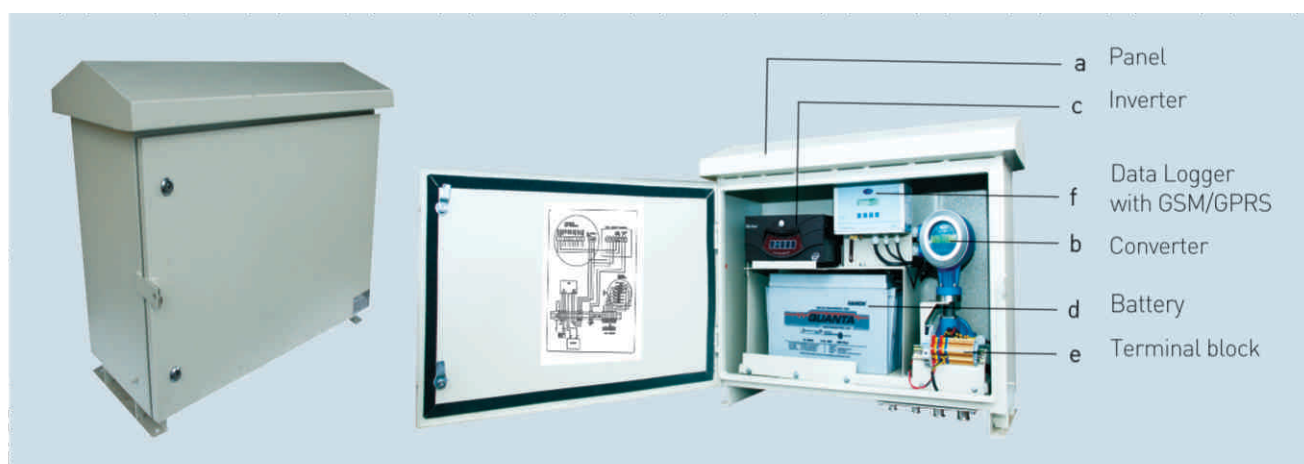
D.1 Basic Model



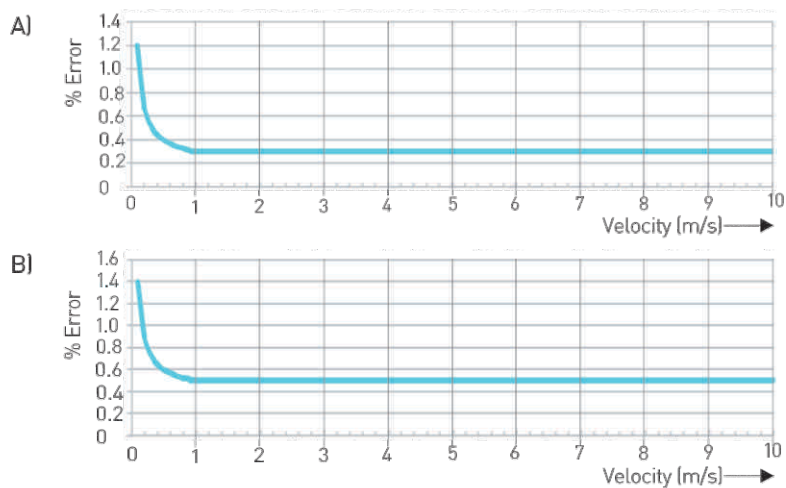
D.2 Add-On Facilities



Converter & Data Logger Mounting Inside Panel With Battery Backup



Accuracy



Curve	Velocity $\geq 1\text{m/s}$	Velocity $< 1\text{m/s}$
A	$\pm 0.3\%$	$\pm 0.2\%$ $\pm 1\text{mm/s}$
B	$\pm 0.5\%$	$\pm 0.4\%$ $\pm 1\text{mm/s}$

At constant flow.

* Under reference conditions

Specifications for 151MFM- W

Nominal internal diameter DN (mm)	15 to 3000
Working pressure	6 Kg/cm ² or 10 Kg/cm ² or 16 Kg/cm ²
Ambient Temperature	-10° C to 55° C
Electrode Material	Std.- Stainless Steel SS 316; Optional - SS 316L, Hastelloy C, Titanium or Tantalum
Conductivity of measured liquid	≥ 20μS/cm
Sensor lining	Rubber/ Teflon (PTFE)/ Hard Rubber /Neoprene / Polyurethane
Display version	Integral or Remotely mounted
Measuring Tube Material	Std. - SS 304 ; Optional - SS 316
Sensor Housing Material	Std. - CS ; Optional - SS 304/ SS 316
End Connection	Flanged (ANSI/DIN/AWWA) or Wafer
Measuring Range	Upto 15 m/s
Accuracy	± 0.5 % of flow *
Repeatability	± 0.2 %
Display	Liquid Crystal Display, Two Line, Backlit 16 characters per line, 5 digit - Instantaneous flow & 9 digit - Total flow
Displayed units	Totalised flow : m ³ ,L Instantaneous flow : m ³ /hr, m ³ /min, m ³ /sec, L/hr, L/min, L/sec
Outputs	Std.- Current 4 to 20 mA, Frequency (0 to 5000 Hz) / Pulse (0.001 to 1 m ³) Optional - RS 232(MODBUS RTU) / RS 485 (MODBUS RTU)/ HART /
Power Supply	Std.- 85 to 265 VAC,45 to 65 Hz or Optional - 24 VDC
Protection Class	Sensor : Weather Proof - IP 67 - Standard , IP 68 - Optional for Remote version Converter/ Transmitter : IP 67
Cable Length (For Remote version)	10 m (Std.) / Additional metres on request. Maximum cable length up to 300 m.**

* Under reference conditions ** For cable length higher than 300mtrs., Consult H.O.

Sensor Size (mm), FLOW@ 3 m/s

Sensor Size (mm)	25	32	40	50	65	80	100	125	150	200	250	300	350	400
Flow @ 3 m/s (m ³ /h)	5	9	14	21	36	54	85	133	191	340	530	764	1040	1357

Sensor Size (mm)	450	500	600	700	800	900	1000
Flow @ 3 m/s (m ³ /h)	1717	2120	3053	4156	5428	6870	8481

Sensor Size (mm)	1200	1400	1600	1800	2000
Flow @ 3 m/s (m ³ /h)	12213	16623	21711	27478	33924

Ordering Code

151 MFM -										W				2				0				N																															
Accuracy Class & Display										Sensor Size										Approval																																	
W: $\pm 0.5\%$ of measured flow; 2 line LCD										0015 - 15 mm (1/2") 0025 - 25 mm (1") 0032 - 32 mm (1 1/4") 0040 - 40 mm (1 1/2") 0050 - 50 mm (2") 0065 - 65 mm (2 1/2") 0080 - 80 mm (3") 0100 - 100 mm (4") 0125 - 125 mm (5") 0150 - 150 mm (6") 0200 - 200 mm (8") 0250 - 250 mm (10") 0300 - 300 mm (12") 0350 - 350mm(14") 0400 - 400mm(16") 0450 - 450 mm (18") 0500 - 500 mm (20") 0600 - 600 mm (24") 0700 - 700 mm (28") 0800 - 800 mm (32") 0900 - 900 mm (36") 1000 - 1000 mm (39") 1200 - 1200 mm (47") 1400 - 1400 mm (55") 1600 - 1600 mm(63") 1800 - 1800 mm(71") 2000 - 2000 mm(79") 2200 - 2200 mm(87") 2400 - 2400 mm(94") 2600 - 2600 mm(102") 2800 - 2800 mm(110") 3000 - 3000 mm(118") See Note 3***										P: Non-hazardous area S: Flameproof																																	
Indicator-Converter type																				Protection Class for Sensor																																	
I: Integral R: Remote, field mounted																				7: IP 67 8: IP 68																																	
Power Supply																				Coil Housing																																	
1: 24 VDC 4: Universal Power supply 85 to 265VAC@45 to 65 Hz																				2 : CS 4 : SS 304 6 : SS 316 9: Others **																																	
Output																				Measuring Tube																																	
2: 4 to 20 mA																				4 : SS 304 6 : SS 316 9: Others **																																	
Communication Interface																				Earth Rings																																	
0 - Not Applicable 1 - RS 232 (MODBUS RTU) 2 - RS 485 (MODBUS RTU) 3 - HART																				1 : None. With built-in earthing electrode See Note 4**** 4 : SS 304 6 : SS 316 7 : SS 316L 9: Others **																																	
Data Logger																				Electrode material																																	
0 : Not applicable																				3: Titanium 5: Tantalum 6: SS 316 7: SS 316L 8: Hastelloy C 9: Others **																																	
Cable Entry																																																					
G: PG 13.5 N: 1/2"NPT																																																					
Pressure Rating (Kg/cm²)										Design of the measuring sensor										Flange Material										Sensor Lining																							
1: 6 Kg/cm ² 2: 10 Kg/cm ² 3: 16 Kg/cm ² 9: Others **										W: Wafer D: Flanged-DIN A: Flanged ANSI S: Flanged AWWA 9: Others **										0: Not Applicable 1: CS 4: SS304 6: Ss316 9: Others **										1: Rubber 2: Teflon (PTFE) 3: Hard Rubber 4: Neoprene 5: Polyurethane 9: Others **																							

Notes:

- * Flameproof version available for Sensor sizes up-to 400mm
- ** Other material/ options on request, please refer to H. O.
- *** Other line sizes available on request, please refer to H. O.
- **** Built-in earthing electrode is available for sensor sizes 40 mm and above. Up to 32 mm, earthing rings are compulsory.
- ***** In corrosive application if selected Hastelloy C, Titanium & Tantalum sensing electrode, then earthing electrode / earthing ring should be of same material
- ***** In case of non-metallic pipeline earthing rings are compulsory.

Specifications for 151MFM- E

Nominal internal diameter DN (mm)	15 to 3000
Working pressure	6 Kg/cm ² or 10 Kg/cm ² or 16 Kg/cm ²
Ambient Temperature	-10 ⁰ C to 55 ⁰ C
Electrode Material	Std.- Stainless Steel SS 316; Optional - SS 316L, Hastelloy C, Titanium or Tantalum
Conductivity of measured liquid	≥ 20μS/cm
Sensor lining	Rubber/ Teflon (PTFE)/ Hard Rubber /Neoprene / Polyurethane
Display version	Integral or Remotely mounted
Measuring Tube Material	Std. - SS 304 ; Optional - SS 316
Sensor Housing Material	Std. - CS ; Optional - SS 304/ SS 316
End Connection	Flanged (ANSI/DIN/AWWA) or Wafer
Measuring Range	Upto 15 m/s
Accuracy	± 0.3 % of flow *
Repeatability	± 0.1 %
Display	Liquid Crystal Display, Two Line, Backlit 16 characters per line 5 digit - Instantaneous flow & 9 digit - Total flow
Displayed units	Totalised flow : m ³ ,L Instantaneous flow : m ³ /hr, m ³ /min, m ³ /sec, L/hr, L/min, L/sec
Outputs	Std.- Current 4 to 20 mA, Frequency (0 to 5000 Hz) / Pulse (0.001 to 1 m ³) Optional - RS 232(MODBUS RTU) / RS 485 (MODBUS RTU)/ HART /
Power Supply	Std.- 85 to 265 VAC,45 to 65 Hz or Optional - 24 VDC
Protection Class	Sensor : Weather Proof - IP 67 - Standard , IP 68 - Optional for Remote version Converter/ Transmitter : IP 67
Cable Length (For Remote version)	10 m (Std.) / Additional metres on request. Maximum cable length up to 300 m.**

* Under reference conditions ** For cable length higher than 300mtrs., Consult H.O.

Ordering Code

151 MFM -										E				2				0				N																															
Accuracy Class & Display										Sensor Size										Approval																																	
E: ± 0.3% of measured flow, 2 line LCD										0015 - 15 mm (1/2") 0025 - 25 mm (1") 0032 - 32 mm (1 1/4") 0040 - 40 mm (1 1/2") 0050 - 50 mm (2") 0065 - 65 mm (2 1/2") 0080 - 80 mm (3") 0100 - 100 mm (4") 0125 - 125 mm (5") 0150 - 150 mm (6") 0200 - 200 mm (8") 0250 - 250 mm (10") 0300 - 300 mm (12") 0350 - 350mm(14") 0400 - 400mm(16") 0450 - 450 mm (18") 0500 - 500 mm (20") 0600 - 600 mm (24") 0700 - 700 mm (28") 0800 - 800 mm (32") 0900 - 900 mm (36") 1000 - 1000 mm (39") 1200 - 1200 mm (47") 1400 - 1400 mm (55") 1600 - 1600 mm(63") 1800 - 1800 mm(71") 2000 - 2000 mm(79") 2200 - 2200 mm(87") 2400 - 2400 mm(94") 2600 - 2600 mm(102") 2800 - 2800 mm(110") 3000 - 3000 mm(118") See Note 3***										P - Non-hazardous area S - Flameproof																																	
Indicator-Converter type																				Protection Class for Sensor																																	
I: Integral R: Remote, field mounted																				7: IP 67 8: IP 68																																	
Power Supply																				Coil Housing																																	
1: 24 VDC 4: Universal Power supply 85 to 265VAC@45 to 65 Hz																				2: CS 4: SS 304 6: SS 316 9: Others **																																	
Output																				Measuring Tube																																	
2: 4 to 20 mA																				4: SS 304 6: SS 316 9: Others **																																	
Communication Interface																				Earth Rings																																	
0 - Not Applicable 1 - RS 232 (MODBUS RTU) 2 - RS 485 (MODBUS RTU) 3 - HART																				1: None. With built-in earthing electrode See Note 4**** 4: SS 304 6: SS 316 7: SS 316L 9: Others **																																	
Data Logger																				Electrode material																																	
0: Not applicable																				3: Titanium 5: Tantalum 6: SS 316 7: SS 316L 8: Hastelloy C 9: Others **																																	
Cable Entry																																																					
G: PG 13.5 N: 1/2"NPT																																																					
Pressure Rating (Kg/cm²)										Design of the measuring sensor										Flange Material										Sensor Lining																							
1: 6 Kg/cm ² 2: 10 Kg/cm ² 3: 16 Kg/cm ² 9: Others **										W: Wafer D: Flanged-DIN A: Flanged ANSI S: Flanged AWWA 9: Others **										0: Not Applicable 1: CS 4: SS304 6: SS316 9: Others **										1: Rubber 2: Teflon (PTFE) 3: Hard Rubber 4: Neoprene 5: Polyurethane 9: Others **																							

Notes:

- * Flameproof version available for Sensor sizes up-to 400mm
- ** Other material/ options on request, please refer to H. O.
- *** Other line sizes available on request, please refer to H. O.
- **** Built-in earthing electrode is available for sensor sizes 40 mm and above. Up to 32 mm, earthing rings are compulsory.
- ***** In corrosive application if selected Hastelloy C, Titanium & Tantalum sensing electrode, then earthing electrode / earthing ring should be of same material
- ***** In case of non-metallic pipeline earthing rings are compulsory.

Specifications for 151MFM- P

Nominal internal Diameter DN (mm)	15 to 3000
Working Pressure	6 Kg/cm ² or 10 Kg/cm ² or 16 Kg/cm ²
Ambient Temperature	-10° C to 55° C
Electrode Material	Std.- Stainless Steel SS 316; Optional - SS 316L, Hastelloy C, Titanium or Tantalum
Conductivity of measured liquid	≥ 20µS/cm
Sensor lining	Rubber/ Teflon (PTFE)/ Hard Rubber /Neoprene / Polyurethane
Display version	Integral or Remotely mounted
Measuring Tube Material	Std. - SS 304 ; Optional - SS 316
Sensor Housing Material	Std. - CS ; Optional - SS 304/ SS 316
End Connection	Flanged (ANSI/DIN/AWWA) or Wafer
Measuring Range	Upto 15 m/s
Accuracy	± 0.3 % of flow *
Repeatability	± 0.1%
Display	Graphical backlit LCD, 3 line 5 digit - Instantaneous flow & 9 digit - Total flow
Displayed units	Totalised flow : m ³ ,L Instantaneous flow : m ³ /hr, m ³ /min, m ³ /sec, L/hr, L/min, L/sec
Outputs	Std.- Current 4 to 20 mA, Frequency (0 to 5000 Hz) / Pulse (0.001 to 1 m ³) Optional - RS 232(MODBUS RTU) / RS 485 (MODBUS RTU)/ HART / Optional - Data Logger
Power Supply	Std.- 85 to 265 VAC,45 to 65 Hz or Optional - 24 VDC
Protection Class	Sensor : Weather Proof - IP 67 - Standard , IP 68 - Optional for Remote version Converter/ Transmitter : IP 67
Cable Length (For Remote version)	10 m (Std.) / Additional metres on request. Maximum cable length up to 300 m.**

* Under reference conditions ** For cable length higher than 300mtrs., Consult H.O.

Ordering Code

151 MFM - P 2 N									
Accuracy Class & Display P : ± 0.3% of measured flow; Graphical LCD		Sensor Size				Approval P - Non-hazardous area S - Flameproof			
Indicator-Converter type I: Integral R: Remote, field mounted		0015 - 15 mm (1/2") 0025 - 25 mm (1") 0032 - 32 mm (1 1/4") 0040 - 40 mm (1 1/2") 0050 - 50 mm (2") 0065 - 65 mm (2 1/2") 0080 - 80 mm (3") 0100 - 100 mm (4") 0125 - 125 mm (5") 0150 - 150 mm (6") 0200 - 200 mm (8") 0250 - 250 mm (10") 0300 - 300 mm (12") 0350 - 350mm(14") 0400 - 400mm(16") 0450 - 450 mm (18") 0500 - 500 mm (20") 0600 - 600 mm (24") 0700 - 700 mm (28") 0800 - 800 mm (32") 0900 - 900 mm (36") 1000 - 1000 mm (39") 1200 - 1200 mm (47") 1400 - 1400 mm (55") 1600 - 1600 mm(63") 1800 - 1800 mm(71") 2000 - 2000 mm(79") 2200 - 2200 mm(87") 2400 - 2400 mm(94") 2600 - 2600 mm(102") 2800 - 2800 mm(110") 3000 - 3000 mm(118") See Note 3***				Protection Class for Sensor 7: IP 67 8: IP 68			
Power Supply 1: 24 VDC 4: Universal Power supply 85 to 265VAC@45 to 65 Hz						Coil Housing 2 : CS 4 : SS 304 6 : SS 316 9: Others **			
Output 2: 4 to 20 mA		Measuring Tube 4 : SS 304 6 : SS 316 9: Others **							
Communication Interface 0 - Not Applicable 1 - RS 232 (MODBUS RTU) 2 - RS 485 (MODBUS RTU) 3 - HART		Earth Rings 1 : None. With built-in earthing electrode See Note 4**** 4 : SS 304 6 : SS 316 7 : SS 316L 9: Others **							
Data Logger 0: Not applicable 1: Yes See Note 5*****		Electrode material 3: Titanium 5: Tantalum 6: SS 316 7: SS 316L 8: Hastelloy C 9: Others **							
Cable Entry G: PG 13.5 N: 1/2"NPT									
Pressure Rating (Kg/cm²) 1: 6 Kg/cm ² 2: 10 Kg/cm ² 3: 16 Kg/cm ² 9: Others **	Design of the measuring sensor W: Wafer D: Flanged-DIN A: Flanged ANSI S: Flanged AWWA 9: Others **	Flange Material 0: Not Applicable 1: CS 4: SS304 6: SS316 9: Others **	Sensor Lining 1: Rubber 2: Teflon (PTFE) 3: Hard Rubber 4: Neoprene 5: Polyurethane 9: Others **						

Notes:

- * Flameproof version available for Sensor sizes up-to 400mm
- ** Other material/ options on request, please refer to H. O.
- *** Other line sizes available on request, please refer to H. O.
- **** Built-in earthing electrode is available for sensor sizes 40 mm and above. Up to 32 mm, earthing rings are compulsory.
- ***** When data logger is selected, communication interface will be Rs232
- ***** In corrosive application if selected Hastelloy C, Titanium & Tantalum sensing electrode, then earthing electrode / earthing ring should be of same material
- ***** In case of non-metallic pipeline earthing rings are compulsory.

Battery Operated Electromagnetic Flow Meter

Specifications for 151MFM-B

Nominal Internal Diameter DN (mm)	15 to 1000
Working Pressure	6 Kg/cm ² or 10 Kg/cm ² or 16 Kg/cm ²
Ambient Temperature	0°C to 55°C
Electrode Material	SS 316 / SS 316L / Hastelloy C / Titanium
Conductivity of measured liquid	≥ 50µS/cm
Sensor lining	Rubber/ Teflon (PTFE)/ Hard Rubber /Neoprene / Polyurethane
Display Version	Integral or Remote (Cable Length Max. 10m)
Measuring Tube Material	SS 304, SS 316
Sensor Housing Material	Std. - CS ; Optional - SS 304, SS 316
End Connection	ANSI/DIN/AWWA
Measuring Range	Upto 15 m/s
Accuracy	± 0.5 % of flow *
Repeatability	± 0.2%
Display	Graphical LCD
Alarm Indication	Sensor Fault (Excitation Open Circuit), Reverse Flow, High / Low Flow, Low Battery, Empty Pipe
Optional Input (For Pressure Measurement)	From SBEM make Pressure Transducer (SS304, IP68, 1" BSP Male Threading, 5 m cable) Pressure Range-0-4.6, 10, 20 or 24 bar (Absolute) Accuracy : ≤ ± 0.5% of Span
Outputs	Opto-mos Relay Pulse output, 50 Hz maximum.
Power Supply	3.6 V Battery Pack
Protection Class	Sensor-W/P IP 67-Standard, IP 68-Optional For Remote Sensor Converter / Transmitter-IP67
Communication Interface	RS 485 (Optional) / GSM/GPRS (Optional)
Displayed units	Totalised flow : m ³ , L Instantaneous flow : m ³ /hr, m ³ /min, m ³ /sec, L/hr, L/min, L/sec

* Under reference conditions

Ordering Code

151 MFM -																													
Accuracy Class & Display B : Battery operated ± 0.5% of measured value; Graphic LCD										Sensor Size 0015 - 15 mm (1/2") 0025 - 25 mm (1") 0032 - 32 mm (1 1/4") 0040 - 40 mm (1 1/2") 0050 - 50 mm (2") 0065 - 65 mm (2 1/2") 0080 - 80 mm (3") 0100 - 100 mm (4") 0125 - 125 mm (5") 0150 - 150 mm (6") 0200 - 200 mm (8") 0250 - 250 mm (10") 0300 - 300 mm (12") 0350 - 350mm(14") 0400 - 400mm(16") 0450 - 450 mm (18") 0500 - 500 mm (20") 0600 - 600 mm (24") 0700 - 700 mm (28") 0800 - 800 mm (32") 0900 - 0900 mm(36") 1000 - 1000 mm(39") See Note 2***										Approval P - Non-hazardous area Protection Class 7: IP 67 Sensor 8: IP 68 Sensor Coil Housing 2 : CS 4 : SS 304 6 : SS 316 9: Others * Measuring Tube 4 : SS 304 6 : SS 316 9: Others * Earth Rings 1 : None. With built-in earthing electrode See Note 3*** 4 : SS 304 6 : SS 316 7 : SS 316L 9: Others * Electrode material 3: Titanium 5: Tantalum 6: SS 316 7: SS 316L 8: Hastelloy C 9: Others *									
Indicator-Converter type I - Integral R - Remote, field mounted Power Supply 5 - Internal Battery Output 1 - Open Collector Pulse Output Communication Interface 0 - Not Applicable 2 - RS 485 4 - GSM/GPRS Data Logger 0 - Not required 1 - Yes Pressure Input 0 - Not Required 1 - Required										Pressure Rating (Kg/cm²) 1: 6 Kg/cm ² 2: 10 Kg/cm ² 3: 16 Kg/cm ² 9: Others * Design of the measuring sensor D: Flanged-DIN A: Flanged ANSI S: Flanged AWWA 9: Others * Flange Material 0-Not Applicable 1-CS 4-SS304 6-SS316 9: Others * Sensor Lining 1: Rubber 2: Teflon (PTFE) 3: Hard Rubber 4: Neoprene 5: Polyurethane 9: Others *																			

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- * Flame proof version available for sensors upto 400 mm.
- ** Other material/ options on request, please refer to H. O.
- *** Other line sizes available on request, please refer to H. O.
- **** Built-in earthing electrode is available for sensor sizes 40 mm and above. Up to 32 mm, earthing rings are compulsory.
- ***** When Data Logger is selected, communication interface will be Rs232
- ***** In corrosive application if selected Hastelloy C, Titanium & Tantalum sensing electrode, then earthing electrode / earthing ring should be of same material
- ***** In case of non-metallic pipeline earthing rings are compulsory.

Water Balancing SCADA (WBS)

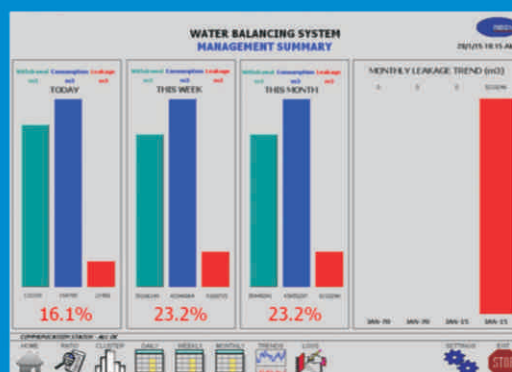
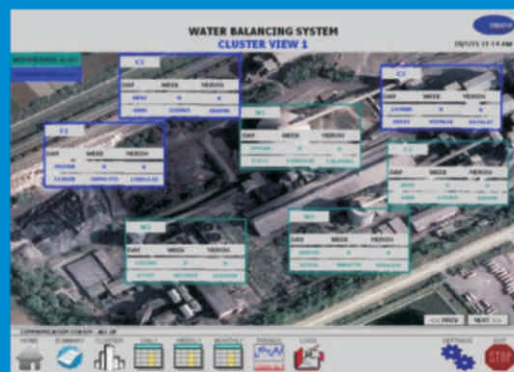
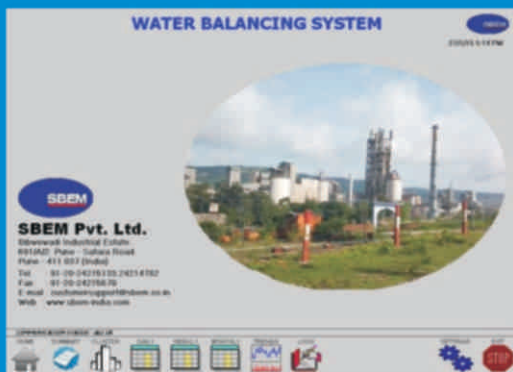
SBEM's Water Monitoring / Balancing System is used in large industrial setups (Power, Cement, Chemical etc.) for reliable online monitoring of water withdrawals from Water Sources, Consumptions & thereby calculating losses. Real time / totalized flow data is read from SBEM flow meters by SBEM M2M (Machine to Machine interface) & sent to centralized Water Balancing System SCADA by using GPRS Communication. The collected data is represented to the user in the form of various Screens & Reports for intensify Water usage / loss trends.

Product Features

- Real time monitoring of instantaneous flow rate & cumulative flow.
- Reliable Measurement & wireless data transfer considering remote locations.
- Seamless integration with SCADA using standard MODBUS TCP or SBEM proprietary protocol (ASCII).
- TCP/IP or UDP Transport Layer. Displays the Flow rate trends & reports of the field devices with selectable Date / Time ranges.
- Historical data of Individual Cluster with multiple Flow Meters for measuring the Withdrawals/Consumptions.
- Separate Consumptions are provided for Industrial / Domestic Purpose.
- New Stages, Clusters, devices can be added as per user requirement.
- Multi Location monitoring to view data / reports simultaneously.
- Other process instruments (level, pressure etc.) can be integrated with the system.
- Provision for virtual flow meters
- Daily / Weekly / Monthly Consumption
- Expandability in System.
- Export Data to Excel
- Customized Reports

Applications

Water and Waste water Management (WTP).
Effluent Treatment Plant (ETP).
Public Health Engineering (PHE).
Elevated Storage Reservoirs & Distributed
Pipeline Monitoring

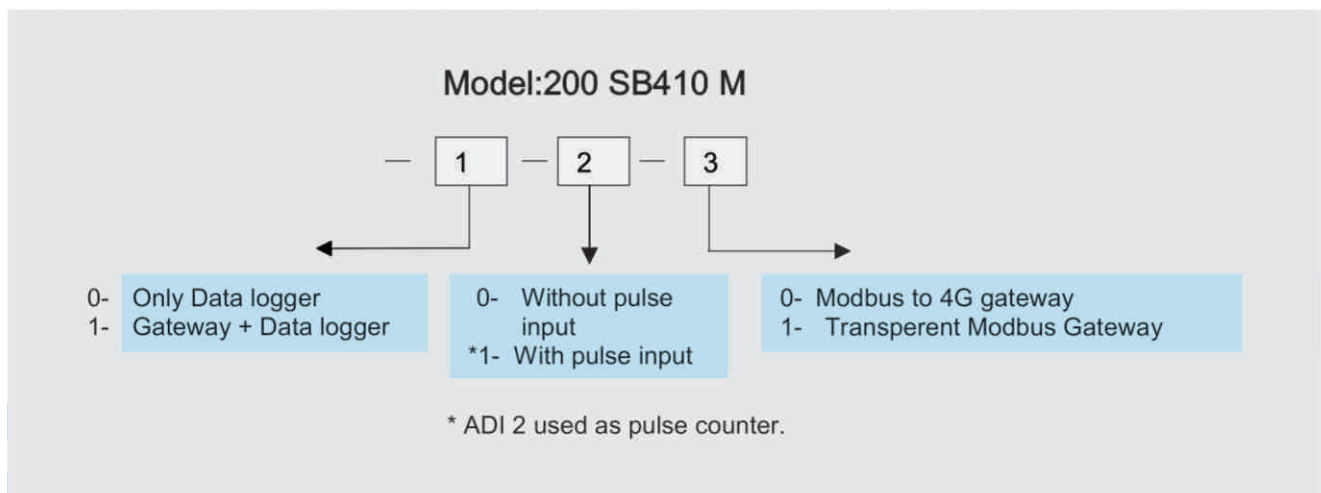


Machine to Machine Interface [M2M]

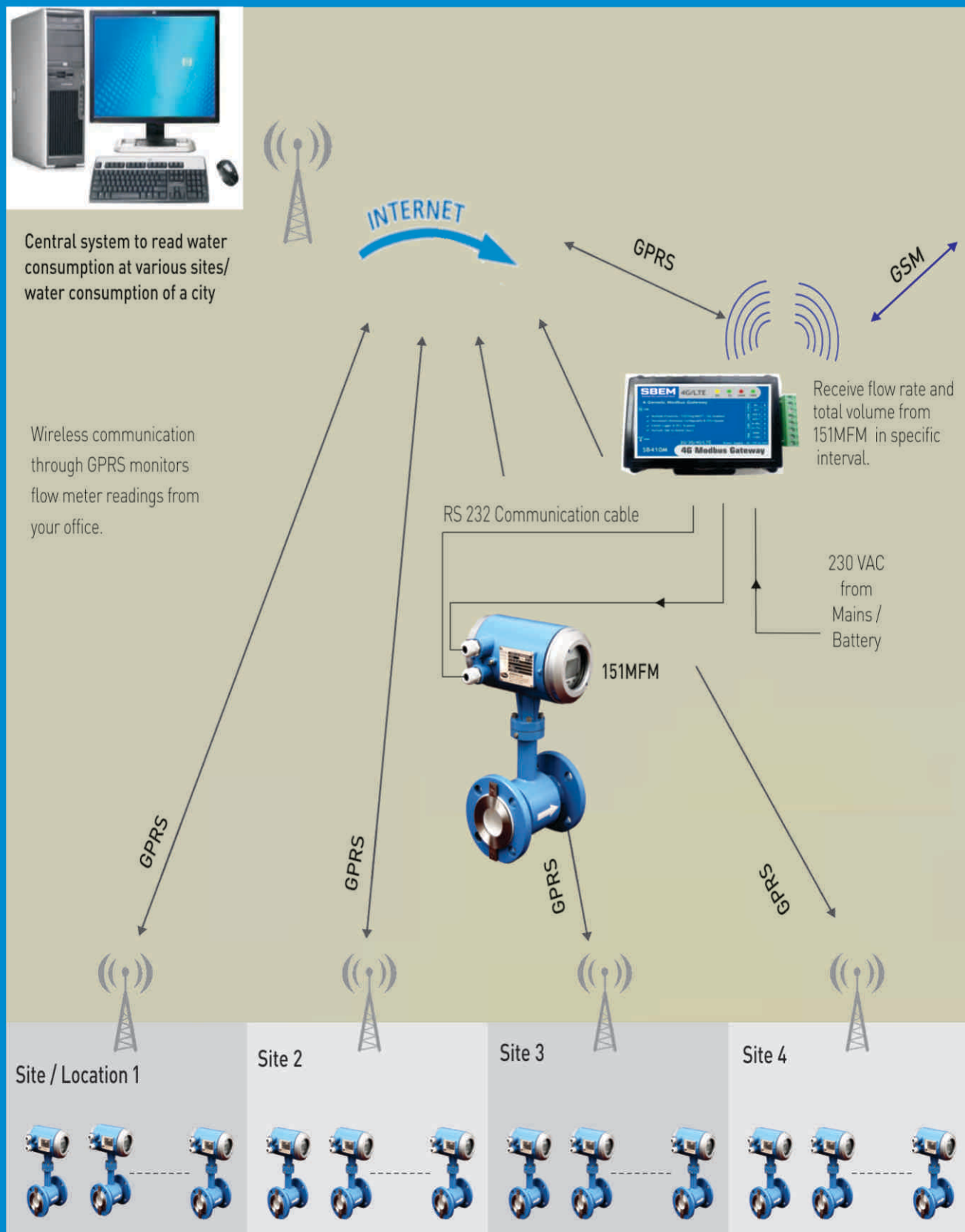
Specifications for 200 – M2M

PARAMETERS	SPECIFICATIONS
Network Support	2G/3G/4G / LTE
Operating Voltage	12 VDC to 26 VDC
Current consumption	40 mA @ 12 V standby & 100mA @ 12 V peak
Operating temperature	-20° C to 85° C
Input port (ADI 1 & ADI 2)	2 channel (0 to 24 V) analog / Digital input
Analog port (AI)	1 channel 4 to 20mA DC
Protocols	GSM (SMS) and/or GPRS. Data formats: .csv ,json etc.
RS 485 (std. modbus)	8 modbus and slave device
Memory (no. of records)	17000
Serial Port	USB port for device configuration on PC utility.
Serial Interface	Rs232 or RS485
Baud Rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps

Ordering Code



GSM/ GPRS connectivity



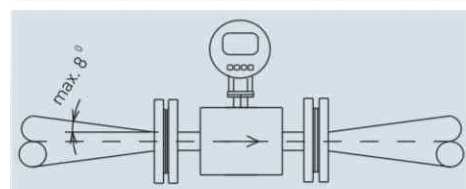
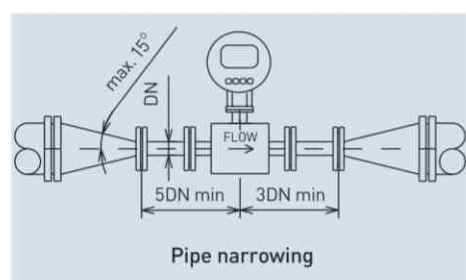
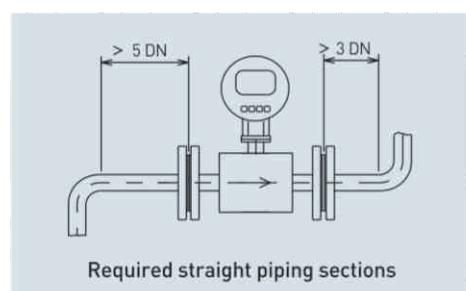
Installation Guidelines

The meter performance will be the best if the liquid flow in the piping is well stabilized; therefore it is necessary to observe specific rules for the sensor placement in piping. In the contact planes between the sensor and the adjoining piping sections should be no edges as these would cause flow turbulence. Make sure that straight piping sections are provided before and after the sensor; their required length is proportional to the inner diameter of the piping concerned.

If more than one flow-disturbing elements such as pipe bend or fitting are located near the sensor, the required length of straight piping section on the sensor side should be multiplied by the quantity of such Elements.

Inner diameter of the connected pipeline must not be smaller than and should not be bigger than inner diameter of sensor.

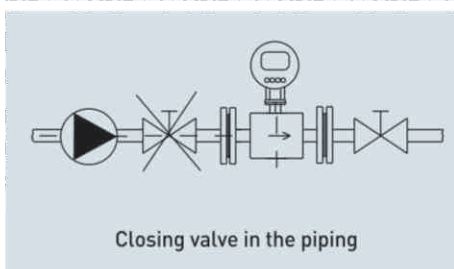
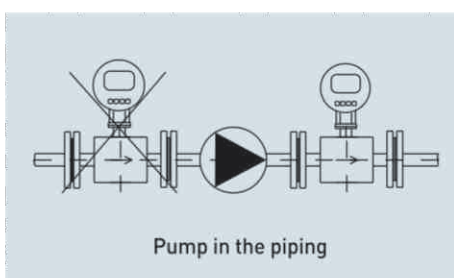
In the case of bi-directional flow, the same principles are valid before and after flow meter's body.



In the case where the pipeline nominal size is bigger than nominal size of flow meter, it is necessary to use conical reduction with the maximum slope 15°. In the case of bi-directional flow, conical reduction must be installed on both sides, both with minimum straight piping 5 DN.

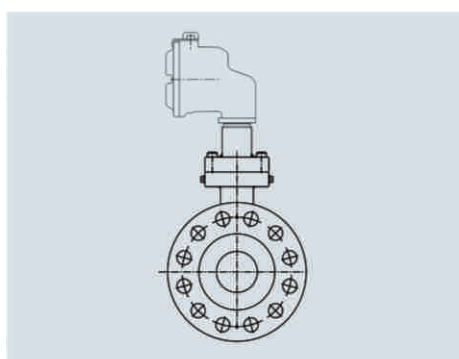
Pipe narrowing sections with angles not exceeding 8° can be taken for straight sections.

In the cases where the liquid is pumped, the flow sensor shall always be placed at the output side of the pump to prevent underpressure in the piping which might damage the sensor.



For the same reason, the sensor shall be always placed before the closing valve in the piping.

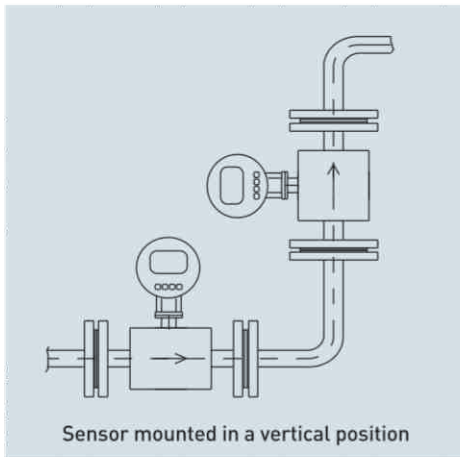
The sensor can be fitted in the piping in either horizontal or vertical position. However, make sure that the electrode axis is always horizontal and, if the sensor is mounted in a Horizontal position, the flange section.



Must Do

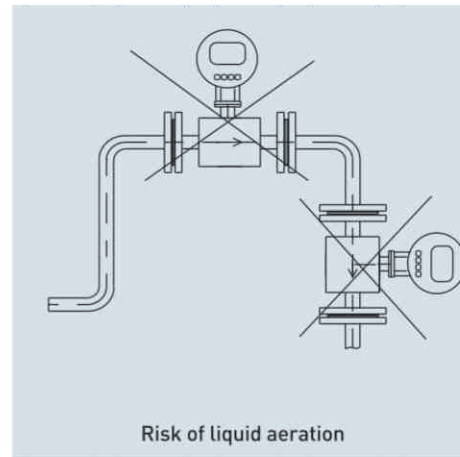
- Measuring tube must be fully filled at all times
- Earthing Ring/Electrodes must be installed
- No exposure to direct sunlight, canopy is recommended.

Installation Guidelines

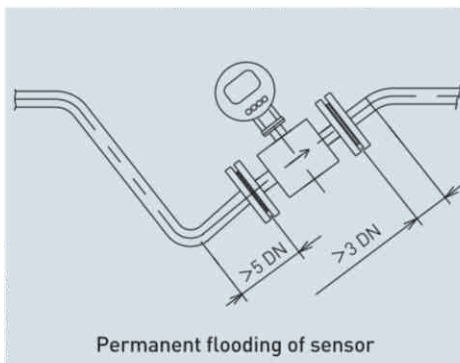


In the cases where the sensor is mounted in a vertical position, the flow direction shall always be upwards.

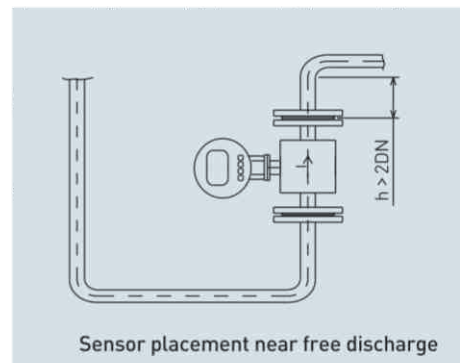
To ensure correct meter function at all times, the measured liquid shall completely fill up the sensor and no air bubbles shall be permitted to



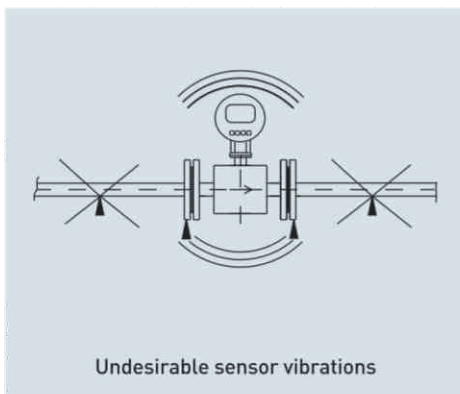
accumulate or develop in the sensor tube. Therefore the sensor shall never be placed in the upper Pocket of the piping or in a vertical piping section where the flow direction is downwards.



In piping systems where complete flooding of the piping cannot always be guaranteed, consider placing the sensor in a bottom pocket where full flooding is sure.

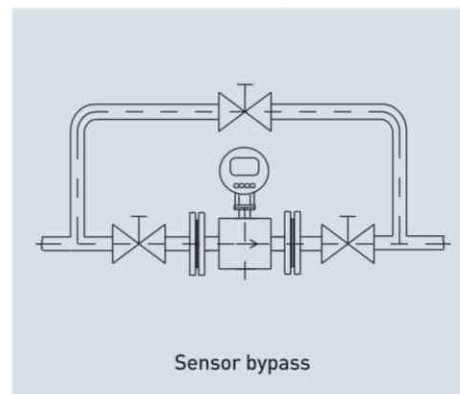


If the sensor is located near a free discharge point, such point shall be by at least 2 DN higher than the top part of the sensor.



Make sure that the adjoining piping is clamped/supported as close to the sensor as possible, to prevent vibrations and damage to the sensor.

In applications where continuous liquid flow is essential, a bypass shall be provided to allow



for sensor servicing. A Sensor bypass may be a also reasonable solution in the cases where, to dismantle the flow sensor from the piping, Liquid from a very long piping section would have to be discharged.

Our Clients Portfolio

Ingenious solutions from Indigenous source

Our products are used across multiple industries and clients. From raw water to sewage and treated water, SBEM has an extensive presence in the market. Illustrations are given below:

Water & Waste Water	Larsen & Toubro	NCC Ltd.	Vishwaraj Infrastructure	The Indian Hume Pipe	JMC Projects (I) Ltd.	Cimcon Software
Cement & Steel	Ambuja	India Cements	Aditya Birla	SAIL	Tata Steel	JSW
Power	BHEL	NTPC	Reliance	MAHAGENCO	ESSAR	Adani
	LANCO	Jindal Power	India Bulls	Tata Power	Coastal Energen	DVC
Oil, Refineries & Gas	IOCL	BPCL	HPCL	ONGC	NAYARA	EMERSON
	Indian Strategic Petroleum Reserves Limited		ONGC Petroleum Additions Limited		IOT Infrastructure & Energy Services Ltd	
Chemical, Sugar & Food	Deepak Nitrite Limited	Shree Renuka Sugars Ltd.	MECTECH	Cargill	Desmet ballestra	Ruchi Soya
Consultants	EIL	WAPCOS	TCE	Mecon	DCPL	STC
	PDIL	Jacobs	M.N.Dastur	Toyo Engg.	Uhde India	
Indian Navy & Marine	Mazagaon Dock Limited (MDL)	Ship Building Centre (SBC)	Defence Machinery Design Establishment (DMDE)		INS Sindhu dhvaj	INS Sindhukesari

Your Applications & Our Solutions

Public Health Engineering

Application	SBEM Solution
Gravity Filter beds	Loss of Head Level Indicator - Transmitters,
Sumps at Water Treatment	Ultrasonic Level Transmitters, 136 ULT
ESR at various Locations	Ultrasonic Level Transmitters, 136 ULT
Raw water intake, Distribution channels And Tube Wells	Flow Meters, 151 MFM, 153 UFM, Electromagnetic Flow Meters, 151 MFM
Sewage Treatment Plants	Open Channel Flow Meters, 136 ULT

Water & Waste Water Treatment / Distribution

Application	SBEM Solution
Raw Water Intake	Electromagnetic Flowmeter 151 MFM Ultrasonic Flow Meter 153 UFM Residential Water Meter 153 RWM
Coagulation	pH, Turbidity TURL, Conductivity Controller
Chlorine Injection	Free Chlorine, pH
Effluent Treatment Plant	pH, Conductivity Controller
Aeration Basin	Dissolved Oxygen DOT, pH, Conductivity Controller
Secondary Clarifier	pH, Conductivity Controller
Swimming Pool and Spa	Free Chlorine, pH

Steel Industry And Iron Ore

Application	SBEM Solution
Gas Holder	Float & Tape Level Gauge with Two Wire Transmitter, 133 ATLG +TWT
Iron Ore/ Direct Reduced Iron (DRI)	Ultrasonic Level Transmitter, 136 ULT, Pulse Radar, 138
Back Filter Hopper	Capacitance Type Level Switch, 114MLS
LPG Tanks	Servo Gauge, 139 M
Fuel Oil Tanks	Float & Tape Level Gauge with Two Wire Transmitter, 133 ATLG +TWT

Thermal Power

Application	SBEM Solution
Coal Bunkers	Pulse Radar, 138
Travelling Water Screens	Hydrostatic Pressure Transmitters, 103 HPT, Ultrasonic Transmitters, 136 ULT
Gravity Filter beds	Loss of Head Level Indicator - Transmitters, 104 LOH
Flow Measurement	Electromagnetic Flow Meters, 151 MFM
Various Tanks	Float, Displacer, Conductivity, Capacitance Type level
Ash Slurry	Ultrasonic Level Transmitters, 136 ULT, Pulse Radar,
Ash Hoppers	RF Admittance Type Level switches, 114 RFS

Oil, Gas & Refineries

Application	SBEM Solution
Cone Roof and Floating Roof Tank Mounded Vessels / Spheres	Float Operated Microprocessor based Level Transmitter & Indicator 133/STDT/CIU/SBTFMS Servo Operated Microprocessor based Level Transmitter & Indicator 139M/ TSIC / CIU
Mounded Vessels and Underground Bullets in Auto LPG Stations	Displacer Level Switch 137 Magnetostrictive Level Transmitter & Indicator, 134 DLI / 134 H / 134 S / 176
CAVERNS	Servo Operated Microprocessor based Level Transmitter & Indicator 139/ TSIC / CIU / SBTFMS

Cement Industry

Application	SBEM Solution
Coal Bunkers	Pulse Radar, 138; Paddle Type Level Switch, 135 LC
VRM Feed Belt Disc / VRM Lime Stone	
Coal Mill	Capacitance Level Switch, 114 MLS, Paddle Type Level Switch, 135 LC
Kiln & Cooler ESP	
Bauxite Storage	
Limestone Storage	
Fly Ash ESP Hoppers	Pulse Radar, 138
Cement Bins	
CM CLR Hoppers	Pulse Radar, 138, Paddle Type Level Switch, 135 LC
Lime Stone, Iron Ore, Bauxite, Lignite,	
Silo HLA	
Kiln Feed Bin	
Water Balancing System	151 MFM / 153 UFM + SCADA

Edible Oil

Application	SBEM Solution
Raw Material Storage	Paddle Level Switch, 135 LC, Float Type Level Switch, 137EA
Cleaning, Dehulling	Paddle Level Switch, 135 LC, Capacitance Level Switch, 114 MLS
Crush, Cooking, Expelling	Capacitance Level Switch, 114 MLS, Float type w Level Switch, 137EA, Displacer Type Level Switch 137 D
Refining, Deodorising	Side Mounted Float type Level Switch, 137EA, Displacer Type Level Switch 137 D, Capacitance Level Switch, 114 MLS
Oil Storage	
Hydrogenation	
Liquid Extraction	

Product Overview

Closed Pipe Flow Meters / Accessories



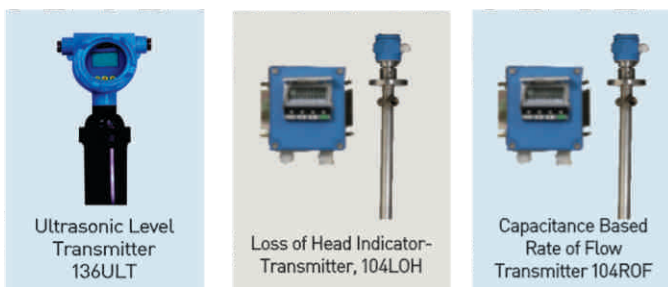
Level Indicators & Transmitters



Tank Gauging Systems



Open Channel Flow Meters



Tank gauging solutions

- Servo (139M) based, Float & Tape type level gauges (133ATLG) based, Magnetostrictive [134DLi] based etc.
- Tank farm management systems with field gauges, control room unit and SBTfms software
- Site survey, project planning, detailed engineering, execution, installation & commissioning, support & training

• Solutions for solids and liquids

• Multiple technologies

• Multiple segments

• Multiple parameters

• Multiple applications

Site Installations

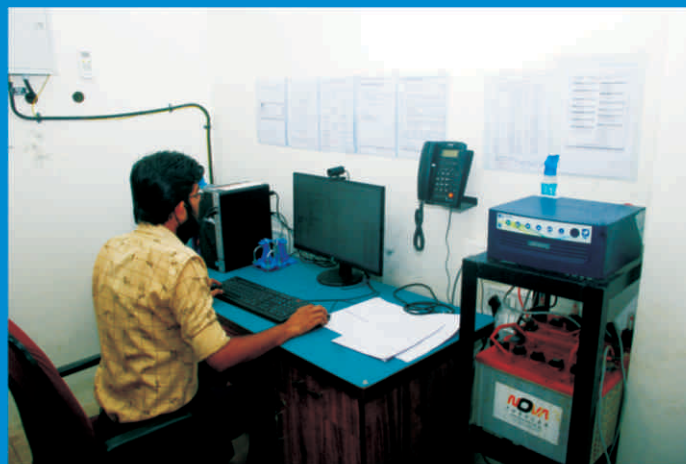
SBEM ensures the Highest Standards &
Quality of Measurements



NABL Accredited Flow Laboratory ISO / IEC 17025



Certificate No.:
CC-2440





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