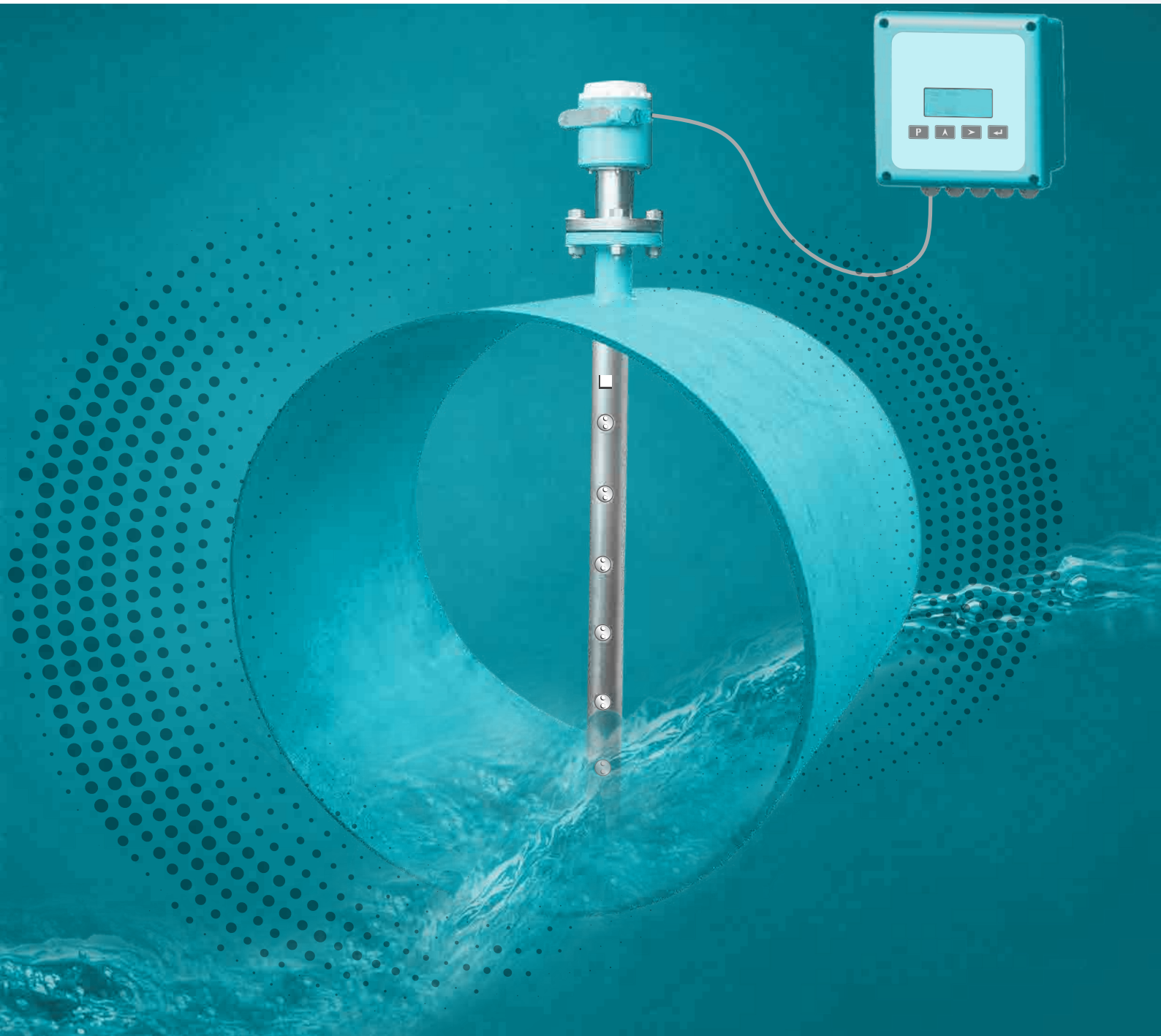




Introducing Glorinda POLYMETRIC



Multiparameter Measurement Sensor
www.glorinda.com



Section 1

About Glorinda

About Glorinda

Instruments

Glorinda Instruments is a well-established and innovative producer of process measuring instrumentation, dedicated to offering solutions and expertise in automation. Our comprehensive range encompasses flow, pressure, level, temperature, analytical, and panel instruments, meeting all your process measuring instrument needs. Equipped with a proficient workforce, in-house R&D specialists, and advanced production techniques, we assure top-tier quality.

Beyond our standard product offerings, we excel in tailoring solutions to your specific requirements. Our commitment extends to providing personalized, client-centric alternatives.

Take advantage of our committed after-sales support team, ensuring the smooth operation of numerous instruments in the field. Experience steady market growth with the reliability and excellence that define Glorinda Instruments.

Our Values

At Glorinda, our commitment is to ensure customer satisfaction through the prompt delivery of innovative, competitive, and reliable process control instruments.

This is achieved by dedicated research and development, coupled with continuous improvement in our processes and adherence to the latest international standard ISO 9001:2015.

Our Vision

We aim to be a prominent and respected solution provider in the field of process instrumentation. Our vision is realized through the adoption of the latest manufacturing standards and a commitment to stringent quality processes.



Our Mission

Glorinda's mission is to supply world-class process instrumentation for all processes and industries, upholding the highest quality standards.



Why Choose Us?

- ▶ **Global Presence:** Benefit from our extensive global customer base.
- ▶ **Manufacturing Excellence:** Rely on our proficiency in manufacturing and production.
- ▶ **Software Development Expertise:** Leverage our skills in software development.
- ▶ **Embrace Emerging Technologies:** Stay ahead with our understanding of cutting-edge technologies.
- ▶ **Market Insight:** We possess a deep understanding of target markets.
- ▶ **Competitive Pricing:** Enjoy competitive and attractive product pricing.
- ▶ **Exceptional Quality and Service:** Experience unmatched quality and customer service.
- ▶ **Cost-Efficient Processes:** Implement cost-saving processes to maximize efficiency.
- ▶ **In-House R&D Team:** Count on our dedicated in-house research and development team.

► **NABL Accredited Calibration Facility:** Our in-house NABL Accredited Calibration Facility for Flow and Pressure adheres to world wide standards, ensuring precision and reliability.

Lab Standards: Adhering to ISO/IEC 17025, ensuring competence in Testing and Calibration Laboratories.

Flow Measurement Precision: Following ISO 4185 for Liquid Flow in Closed Conduits Weighing Methods.

Accurate Volume Measurements: Complying with ISO 8316 for Liquid Flow in Closed Conduits Volume Method.

Versatile Sizing: Calibration for Line Sizes ranging from 15NB to 2000NB.

High Flow Rates: Handling Flow Rates of up to 7200 m³/hr with precision.

Minimal Uncertainty: Ensuring a minimal uncertainty rate of 0.2%.

► **Modern Production Techniques:** We employ modern techniques in our production processes.

► **Product Customization:** Tailor our products to your specific needs with our customization options.

Industries

We Serve:

► Water And Wastewater Treatment

► Chemical And Petrochemicals

► Oil, Gas, And Refineries

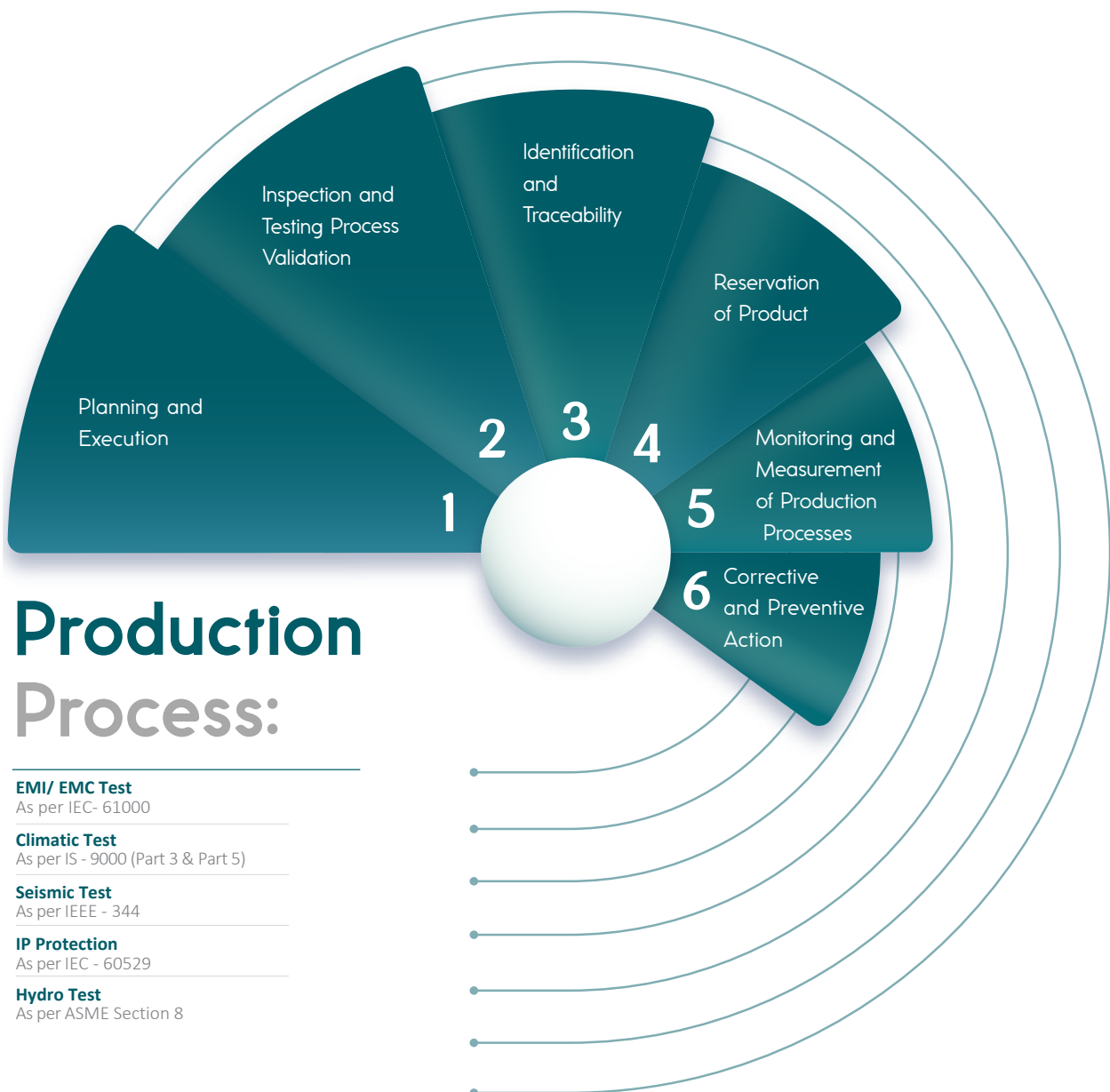
► Pharmaceuticals

► Food Industry

► Power Plants

► Automation Industry





Production Process:

EMI/ EMC Test

As per IEC- 61000

Climatic Test

As per IS - 9000 (Part 3 & Part 5)

Seismic Test

As per IEEE - 344

IP Protection

As per IEC - 60529

Hydro Test

As per ASME Section 8



Section 2

About

POLYMETRIC

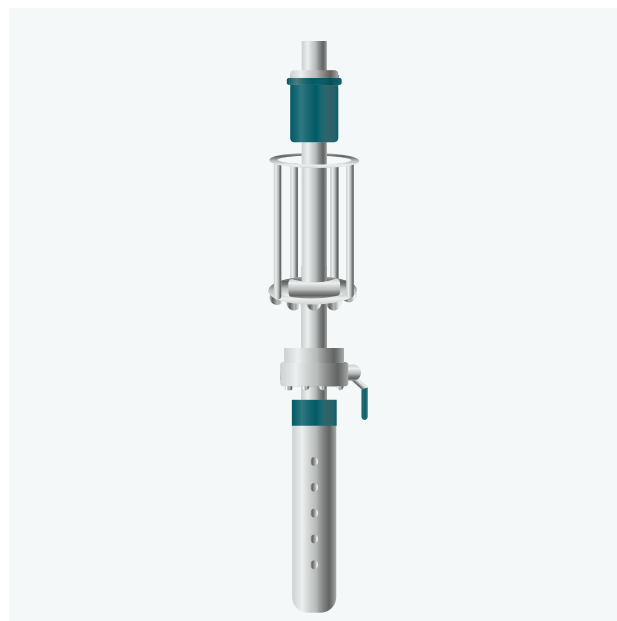
About

POLYMETRIC

Pioneering Innovation in Industry Multiparameter Measurement Sensor

POLYMETRIC is a Multiparameter Measurement Sensor – your all-in-one solution for Velocity, Flow, Level, Pressure, Temperature, and Conductivity measurements in conductive liquids. This innovative sensor redefines industry standards, serving as a cost-effective alternative to conventional high-cost flowmeters. Experience a remarkable 30-50% reduction in unit costs, as well as decreased expenses for installation and transportation, making POLYMETRIC an efficient and economical choice.

- ▶ Velocity
- ▶ Pressure
- ▶ Level
- ▶ Temperature
- ▶ Conductivity
- ▶ TDS
- ▶ Flow



Why POLYMETRIC?

Advanced Connectivity:

Seamlessly integrate IoT for enhanced operational capabilities.

Adaptable Signal Transmission:

Transmit signals effortlessly with the choice of wired or wireless options.

Innovative Insertion Sensor:

Experience cutting-edge functionality with a hot retractable insertion sensor.

User-Friendly Installation:

Enjoy a quick and straightforward setup for time-saving installation.

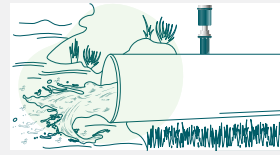
Comprehensive Data Transmission:

Efficiently transmit data for all parameters using RS485/GPRS communication.

Why POLYMETRIC?

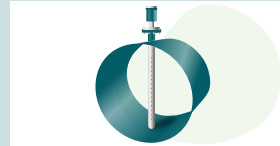
Versatility in Applications

Ideal for diverse applications, including flow measurement of partially filled and completely filled pipes.



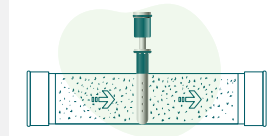
Efficient Measurement Solutions

Streamline processes with a single instrument handling multiple parameters.



Suitable for Challenging Liquids

Well-suited for challenging liquid environments, especially those with dirty conductive liquids.



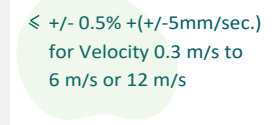
Cost-Effective Solution

Offers cost savings, being half the price of full-bore type flow meters.



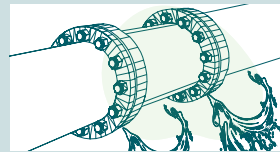
Equal Accuracy Assurance

Maintains the same level of accuracy as full-bore type flow meters.



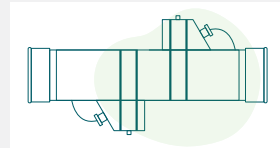
Avoiding Leakages

Minimize the risk of leaks by utilizing a single flange joint, in contrast to potential leaks from multiple joints.



No Alignment Hassle

Eliminates the need for sensor alignment, unlike clamp-on ultrasonic flow meters.



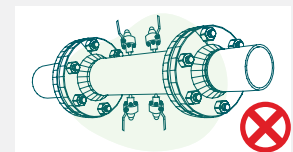
Low Initial Installation Cost

Lowers initial installation costs compared to full-bore flow meters.



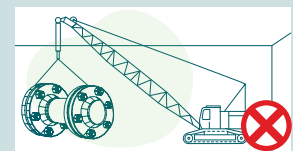
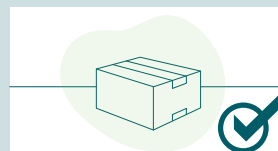
Minimal Intrusion Design

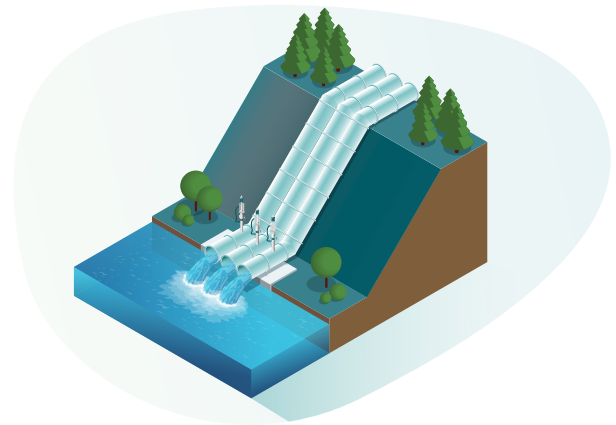
Requires only a single intrusion on top of the pipe, avoiding multiple intrusions.



Cost-Effective Transportation

Reduces transportation costs compared to other large-sized flow meters.



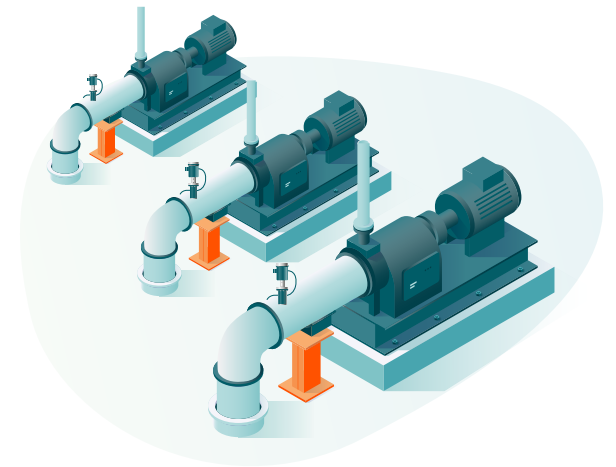


Applications:

1. Municipal Water Utilities:

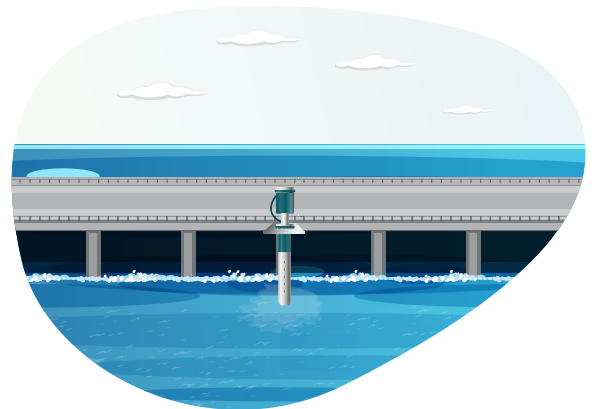
Raw Water Intake Treatment Units:

- Chemical Pacing
- Filter Balancing
- Plant Balancing
- Backwashing



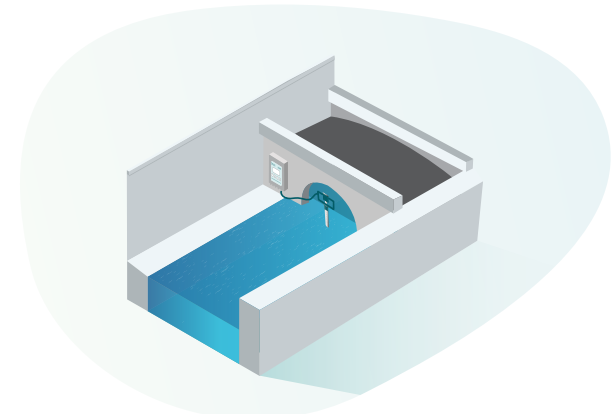
Plant Flow:

- Billing
- Storage Management
- Pump Station Management



Water Loss Management:

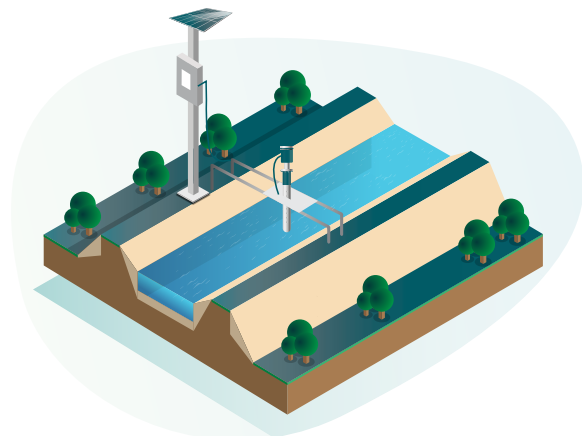
- District Metering
- Minimum Night Flow Monitoring
- PRV Flow Based Modulation
- Water Leak Detection & Water Distribution Control in Water Distribution Lines





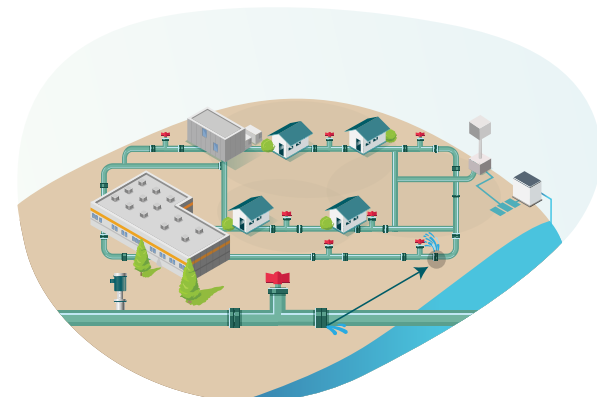
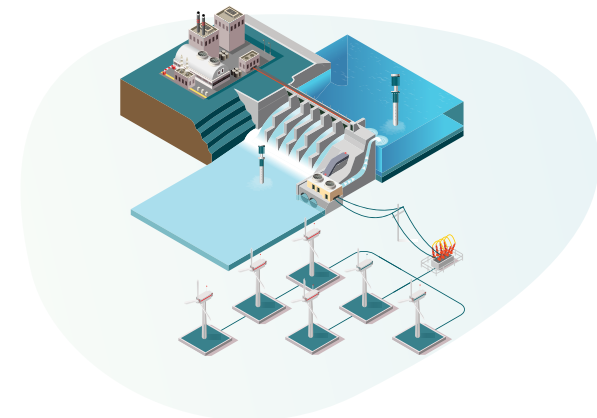
2. Industrial Processes:

- Cooling/Chilled Water
- Water Intake Flow & Pressure Measurements in Nuclear Power Plant
- Pumping Station Flow, Pressure, and Other Parameter Measurements
- Flow and pressure measurement in pipe without shutting down the flow



3.Environmental and Infrastructure Monitoring:

- Large Diameter Pipework
- Raw River
- Non-ragging Effluent
- Storm Water Discharge Control Flow Measurement with GPRS Transmission
- Intake Flow Measurements Open Channel / Closed Pipes
- Irrigation Canal Open Chanel Flow Measurements
- Flow Measurements in Turbine / Dam Intake
- Replacement of Unsatisfactory Flow Meters (e.g., pitot tube, propeller, single point, velocity meter, differential pressure meter, full bore mag meters...)



General Q & A:

SR. NO	QUESTIONS
<p>Q</p> <p>A.</p>	<p>How can POLYMETRIC detect water loss in a water distribution system?</p> <p>POLYMETRIC, equipped with a built-in pressure sensor and flow measurement capabilities, easily identifies water leaks. The information is promptly transmitted via GPRS to the control room.</p>
<p>Q</p> <p>A.</p>	<p>Can POLYMETRIC be used for flow measurements in water and wastewater applications, including sludges and slurries?</p> <p>Yes. POLYMETRIC utilizes the electromagnetic flow measuring principle, making it suitable for measuring the flow of conductive sludges and slurries.</p>
<p>Q</p> <p>A.</p>	<p>Can POLYMETRIC be installed without cutting the pipe?</p> <p>Yes. Installation involves drilling a 50mm hole on the top of the pipe, and welding the supplied socket along with POLYMETRIC.</p>
<p>Q</p> <p>A.</p>	<p>Can POLYMETRIC be used where mains power supply is not available?</p> <p>Yes. POLYMETRIC can be equipped with a solar panel option, enabling its use in locations without mains power. In such cases, data is transferred through GSM/GPRS.</p>
<p>Q</p> <p>A.</p>	<p>Can POLYMETRIC provide a 4-20mA or a pulse signal?</p> <p>Yes.</p>
<p>Q</p> <p>A.</p>	<p>Is POLYMETRIC compatible with chemicals in process industries?</p> <p>Yes. The Material of Construction for POLYMETRIC is selected based on process parameters.</p>
<p>Q</p> <p>A.</p>	<p>What is the minimum velocity for which the Electromagnetic Flow Meter can work with consistent readings?</p> <p>The calibration range is from 0.3 m/s to 12 m/s, falling within the stated accuracy.</p>
<p>Q</p> <p>A.</p>	<p>Will pipe insulation/thickness affect the reading?</p> <p>No. POLYMETRIC is not affected by pipe insulation or thickness, ensuring consistent and accurate readings.</p>

Measuring Principle

Pressure Measurement:

The POLYMETRIC features a state-of-the-art piezo-resistive pressure sensor with built-in temperature compensation. Its standard pressure range spans from 0 to 20 kg/cm² gauge, ensuring precise and reliable measurements.

Temperature Measurement:

The POLYMETRIC incorporates an RTD PT100 Sensor dedicated to fluid temperature measurement. With a measurable temperature range spanning from -20 to +100°C or -20 to +250°C, it ensures accurate temperature readings.

Level Measurement:

The POLYMETRIC employs a level probe guided by stainless steel tubes arranged in the insertion sensor, ensuring precise fluid level detection.

Flow Measurement:

The POLYMETRIC features multiple bores along the probe axis, housing electrodes and electromagnetic excitation coil pairs. Our flow measurement technique is rooted in Faraday's Law of Electromagnetic Induction. As an electrically conductive fluid flows within an electrically insulated pipe through a magnetic field generated by field coils, a voltage (V) is induced, represented by the equation:

V=v.k.B.D

where:

- v is the mean flow velocity,
- κ is the geometry correction factor,
- B is the magnetic field strength,
- D is the distance between electrodes.
- V is the voltage generated

The unique design of the multi-bore sensor in POLYMETRIC meticulously addresses calculations for variable flow profiles, encompassing both laminar and turbulent conditions. This design precision enables accuracy comparable to full-bore electromagnetic flow meters. The quantity of bores within POLYMETRIC is contingent on the pipe's inside diameter, with an adjustment for larger line sizes by increasing the number of bores to meet the necessary measurement accuracy.

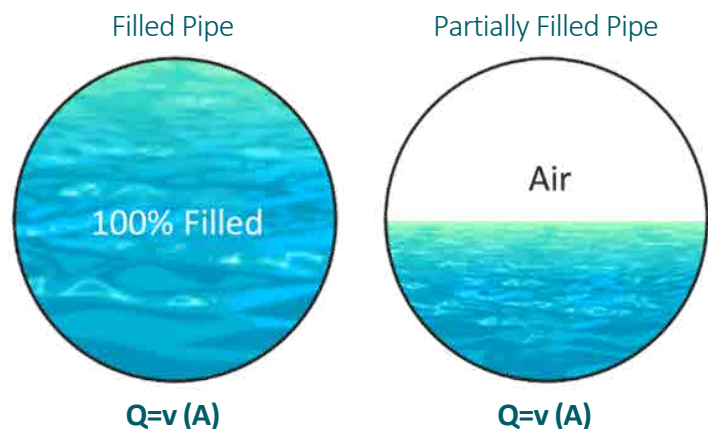
Calculation of Partial / Filled Pipe Flow:

The flow rate:

$$Q = A * V$$

Where A - Area of the liquid section

V - Velocity of the Liquid



Open Channel Flow Measurement:

All Open Channel flow meters adopt inferential Flow measurement, where the height or head of the liquid passing over an obstruction is measured. From this height or head, the Flow rate is inferred or calculated.

For this inferential measurement, a restriction is introduced in the liquid flow path to create a height gradient corresponding to the liquid flow. However, this method is constrained by limited accuracy (typically +/-5 to 10%) and is influenced by liquid surface conditions such as whirl or turbulence, with additional construction costs contributing to the overall expense.

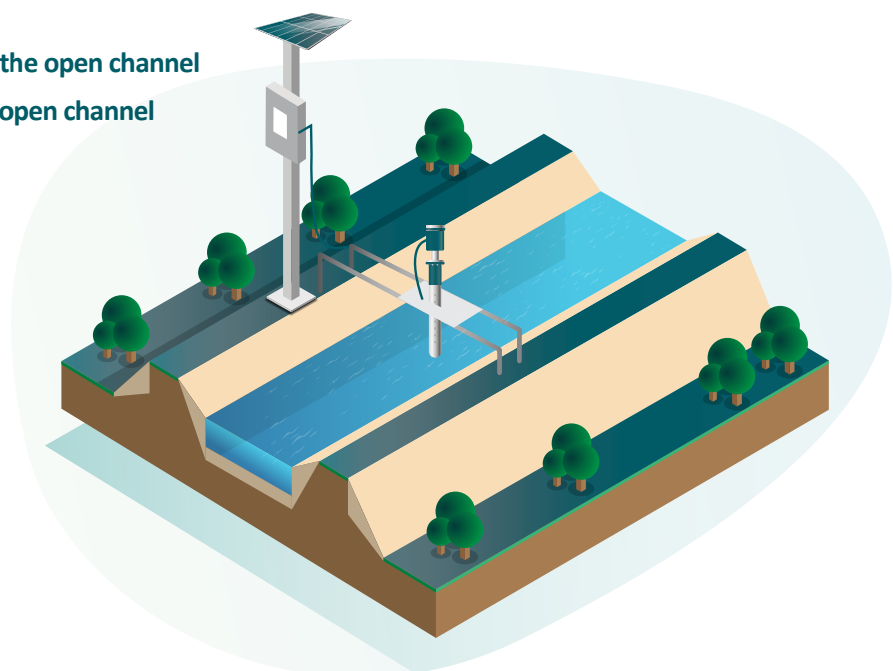
POLYMETRIC introduces a groundbreaking approach with its unique multipoint velocity and liquid level measurement technology, offering the most accurate and efficient solution for open channel flow measurement. POLYMETRIC measures velocity at multiple points across the height of flowing liquid, simultaneously determining the actual liquid level in the open channel. Leveraging multipoint velocity and liquid height measurements, POLYMETRIC calculates the precise flow rate using the discharge formula provided below.

$$Q = A * V$$

Where

A - Area of the liquid section in the open channel

V - Velocity of the Liquid in the open channel



Customizable Flow Path Selection:

POLYMETRIC sets itself apart by offering programmable flow path selection in its Display and Controller unit. This feature accommodates various channel shapes, including Rectangular, Trapezoidal, Triangular, Circular, and parabolic channels. Thanks to its advanced multipoint velocity measurement capability, POLYMETRIC delivers significantly more accurate and realistic open channel flow measurements compared to other meters. Notably, POLYMETRIC eliminates the impact of whirls and flow turbulence without the need for constructing restrictions in the flow path.

TDS / Conductivity Measurement:

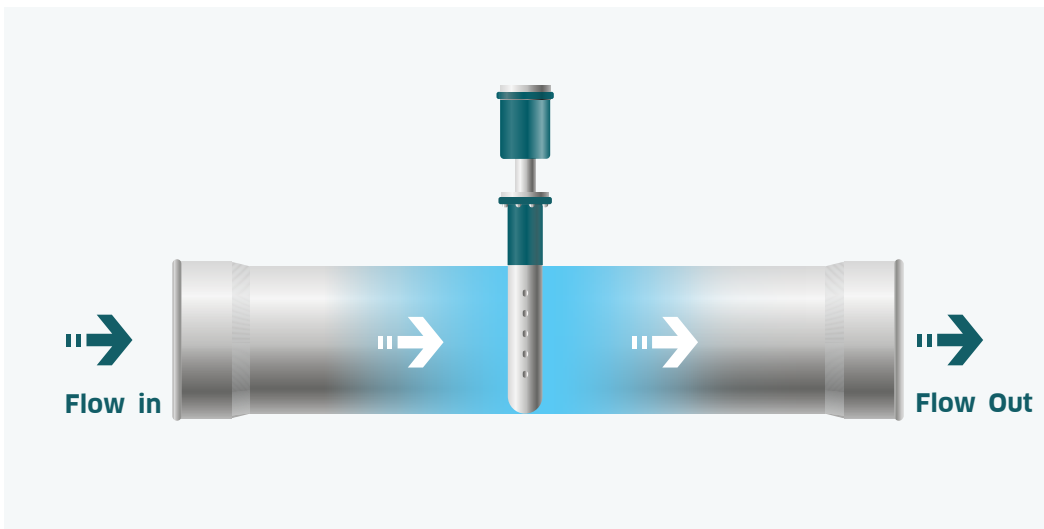
The POLYMETRIC is equipped with built-in conductivity sensors featuring a cell constant of 1, along with the necessary flow path. The measuring cell accurately measures TDS/conductivity within the specified measurement ranges.

Calibration:

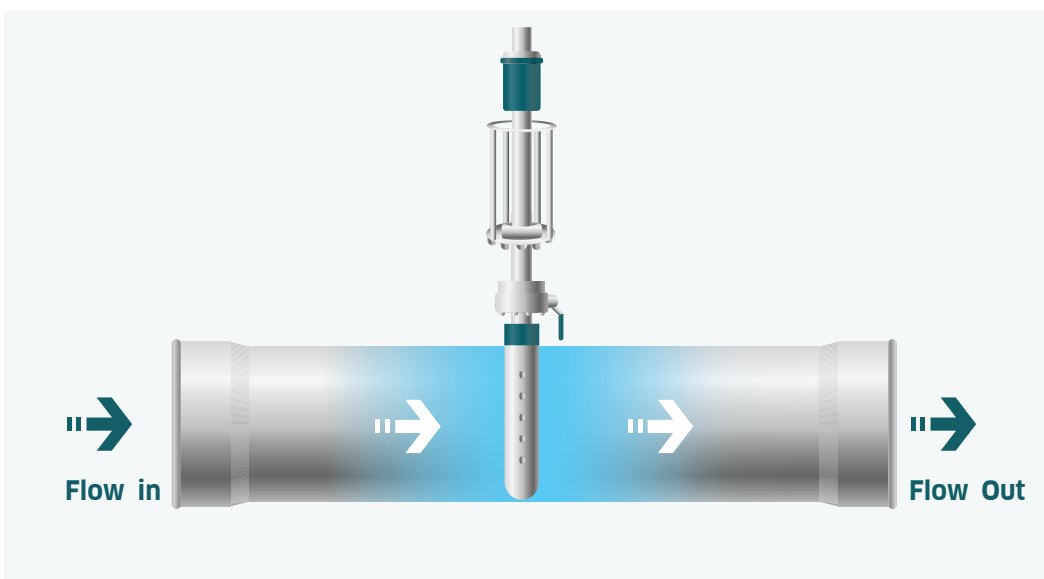
The POLYMETRIC undergoes meticulous manufacturing and calibration processes in our NABL Accredited (ISO17025) calibration lab. Calibrated for flow and pressure measurements, it is tailored for line sizes ranging from 250NB to 2000NB, ensuring unparalleled accuracy.

Installation:

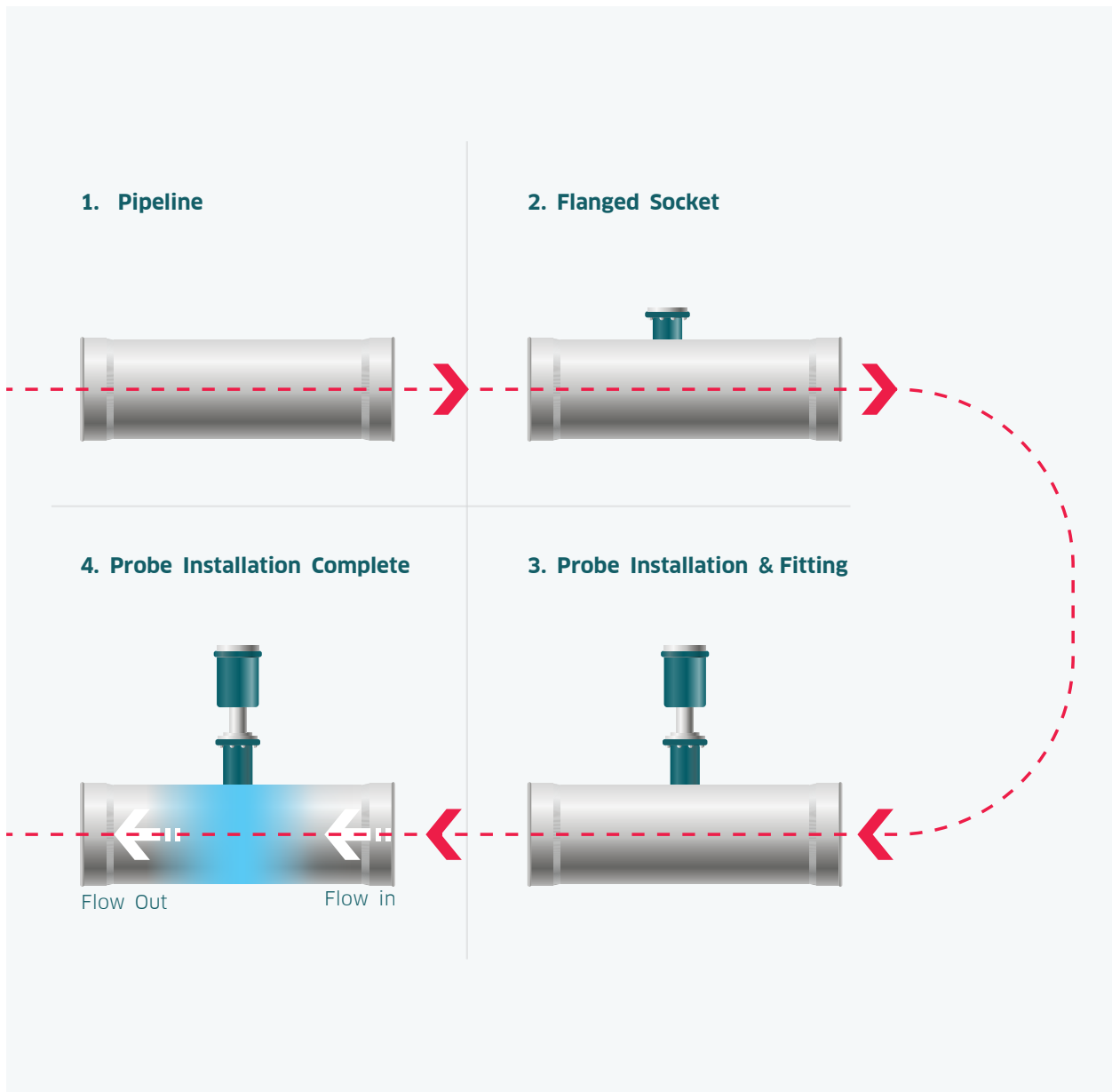
Flanged



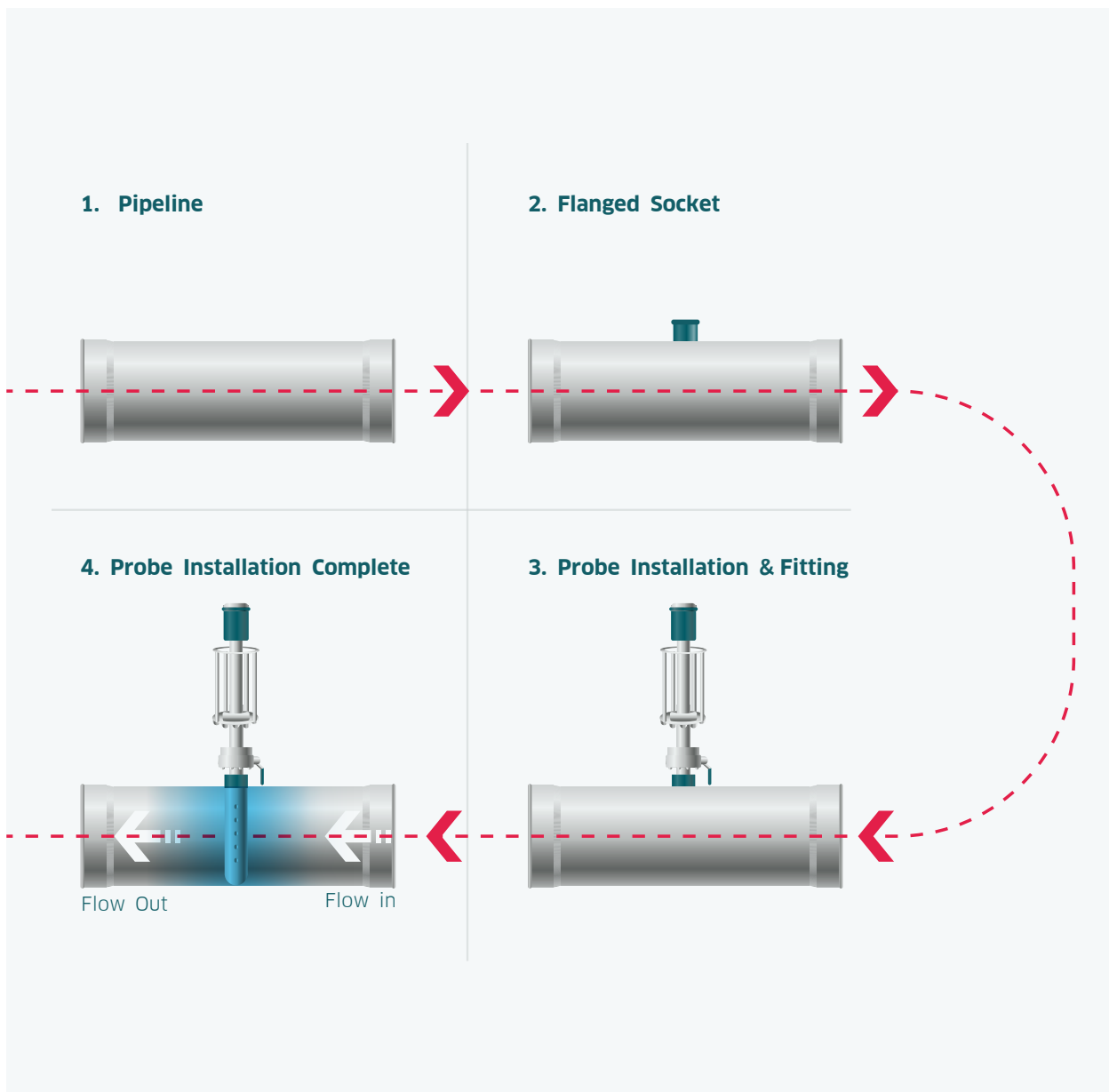
Hot Retractable



Flanged

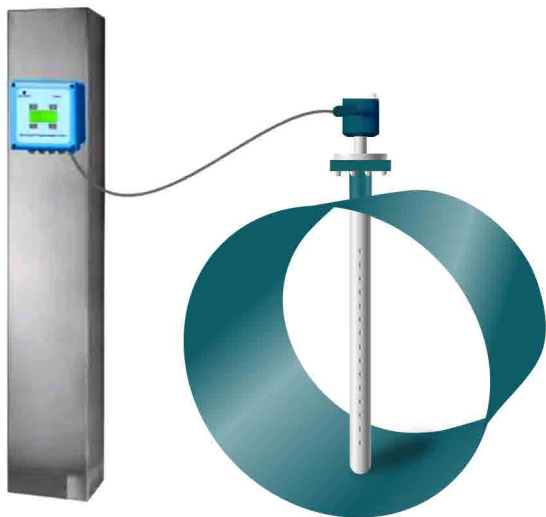


Hot Retractable



Power Source:

MAINS / 24V DC POWERED

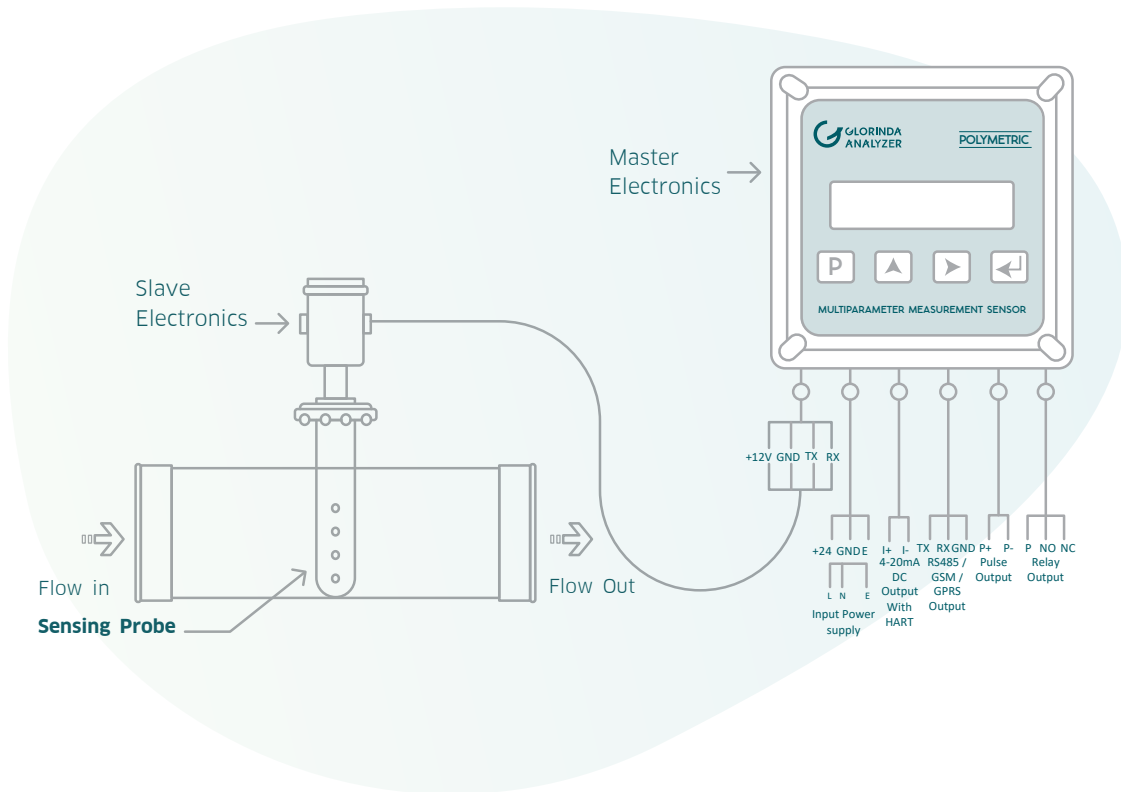


SOLAR POWERED



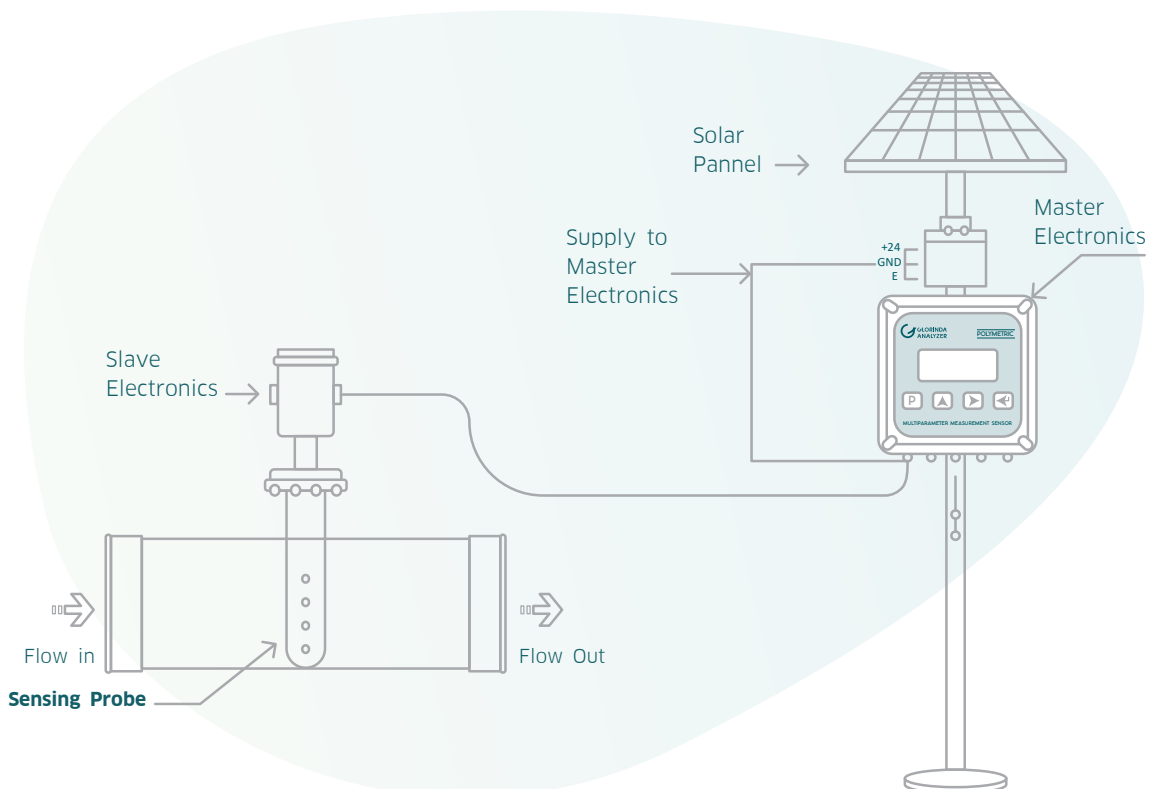
General Arrangement (GA) Drawing

POLYMETRIC: MAINS/ 24V DC POWERED



General Arrangement (GA) Drawing

POLYMETRIC: SOLAR POWERED



Technical Specification:

Measuring Parameter	Engineering Unit
Pressure	0 to 20 kg/cm ² Gauge
Velocity	0.3 m/s to 6 m/s
Flow	m ³ /hr, MLD as per Line Size
Temperature	0 to 100°C
Conductivity / TDS	10 to 10000 microsiemens / 0 to 2000 mg/litre
Fluid Level	0 to 5000mm (as per Probe Length)

Construction	
Sensor Probe	1) 2" BSP Threaded / Flanged 2" ASA 150 as per Pipe Diameter (150 NB to 1000 NB) & 3" ASA 150 (1100 NB & Above)
	2) * Hot Retractable Sensor Assembly -SS316 (150 to 1000 NB)
Slave Electronics	Integrated with Sensor Probe transmitting digital signal to Master Electronics
Master Electronics	Remote Mounted measurement electronics accepts signal from Slave Electronics

Note: * In case of hot tap sensor, maximum pressure is 6 kg/cm² & suitable for line size 150NB to 1000NB

Process Conditions

Process temperature	-20 to +200°C
Ambient temperature	0 to 65°C
Storage temperature	0 to 65°C
Measurement Range	0.3 to 6 m/s
Pressure Range	0 to 20 kg/cm ² Gauge
Electrical Conductivity	> 10 microsiemens/cm
Permissible solid content	< 20% (Size maximum 100 micron)
Density	< 1.15 kg / m ³

Measurement Accuracy

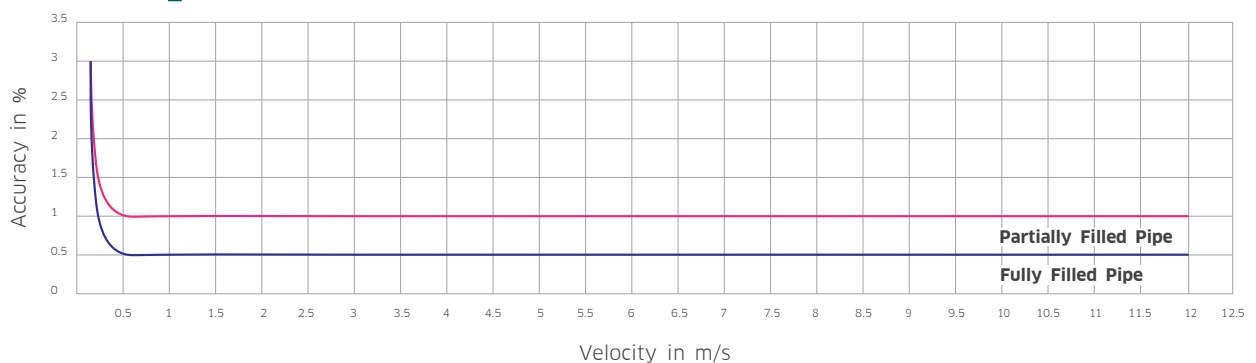
Pressure	+/- 0.25% of F.S.
Temperature	+/- 0.25% of F.S.
Conductivity	+/-2% of F.S.
Fluid Level	+/-2% of F.S.

Flow Accuracy

POLYMETRIC undergoes precise calibration through direct volume comparison. Our ISO 17025 NABL Accredited Calibration Laboratory validates the flow meter's performance under controlled laboratory conditions, ensuring compliance with stringent accuracy limits.

Laboratory Reference Conditions	Media : Water
	Temperature : 15 to 40°C
	Operating Pressure : 0.1 to 3.6 Bar Gauge
	Up Stream Length : 10D (up to 1000 NB line size)
	Down Stream Length : 5D (up to 1000 NB line size)
Accuracy of Fully Filled Pipe	<= +/- 0.5% of F.S. +(+/-5mm per sec.) for Velocity 0.3 m/s to 6 m/s
Accuracy of Partially Filled Pipe Line	<= +/- 1% of F.S. +(+/-5mm per sec.) for Velocity 0.3 m/s to 6 m/s

Graph



Master Electronics

Ingress Protection	Weatherproofs IP 65
Power Supply	1) 24V DC / 100 to 230V AC (50/60khz)
	2) Solar Powered (20Watt, 24V DC)
Power Consumption	Less than 20W
MOC of Enclosure	Aluminum Dia Cast PU Painted / SS316
Electrical Connection	M 20 x 1.5 (other on request)/Circular Metal Connector
Output 1	4 to 20mA DC with HART for Flow, Pressure, Temperature, Conductivity, Level
Output 2	Pulse Output Open Collector for Flow Measurement
Communication Output	RS485 (MODBUS RTU) / GSM / GPRS for Flow, Pressure, Temperature, TDS/Conductivity, Level

Slave Electronics

Ingress Protection	Weatherproof IP 68
Power Supply	+12V DC from Master Electronics
MOC of Enclosure	Aluminum Dia Cast PU Painted / SS316
Electrical Connection	M 20 x 1.5 (other on request)
Communication between Master Electronics & Slave Electronics	RS485 (MODBUS RTU)
Slave to Master Electronics Cable	Multicore Sheathed & PVC Insulated having size of 4C X 0.5 Sq.mm.

Sensor Probe

Line Size	150 NB to 5000 NB
Master Electronics Location	Remote
Remote Cable Length	Max. 400 mtrs
Protection Class	IP 68
MOC	SS316 + PTFE / RUBBER
Process Connection Flange	2" ASA 150 Flange / 2" BSP Threaded / 3" ASA 150 Flange
MOC of Electrode	SS316L / Hastelloy C
Installation	Flanged Fixed Inline or Hot Retractable up to 1000 NB / Flanged Fixed Inline above 1000 NB

Note:

- 1) Suitable for clean conductive liquid having solid particles not more than 100 microns in size.
- 2) For slurry & other chemical applications, please consult factory.
- 3) POLYMETRIC will be supplied come with following components:
 - a) Master Electronics
 - b) Slave Electronics with required cable & connector
[Maximum cable Length 20 meters (additional optional)]
 - c) Sensor Probe
 - d) Sensor Mounting Socket (To be welded to pipe, refer instruction manual)
 - e) Hot retractable assembly with ball valve (Optional)

TABLE : Dimensional Details (Flow Meter with ANSI 150 Flange)

Line Size		Pipe OD (mm)	Effective Probe Length (mm)	Approx.Weight KG	Flow Range (m ³ /hr) for Velocity 0.3m/s	Flow Range (m ³ /hr) for Velocity 6.0m/s
Inch	NB					
6"	150	108	148	5.5	19	381
10"	250	273	253	6.0	53	1060
12"	300	324	305	6.5	76	1527
14"	350	356	337	7.0	104	2078
16"	400	406	387	7.5	136	2714
18"	450	457	438	8.0	172	3435
20"	500	508	489	8.5	212	4241
24"	600	610	591	9.0	305	6107
28"	700	711	671	9.5	416	8313
32"	800	813	773	10.0	543	10857
36"	900	914	874	10.5	687	13741
40"	1000	1016	976	11.0	848	16965
44"	1100	1118	1068	11.5	1026	20527
48"	1200	1219	1169	12.0	1221	24429
52"	1300	1321	1271	12.5	1434	28670
56"	1400	1422	1372	13.0	1663	33251
60"	1500	1524	1474	13.5	1909	38170
64"	1600	1626	1576	14.0	2171	43429
68"	1700	1727	1677	14.5	2451	49028
72"	1800	1829	1779	15.0	2748	54965
76"	1900	1930	1880	15.5	3062	61242
80"	2000	2032	1982	16.0	3393	67858
84"	2100	2135	2085	16.5	3741	74814
88"	2200	2238	2188	17.0	4105	82109
92"	2300	2342	2292	17.5	4487	89743
96"	2400	2445	2395	18.0	4886	97716
100"	2500	2545	2495	18.5	5301	106029
104"	2600	2645	2595	19.0	5734	114681
108"	2700	2745	2695	19.5	6184	123672
112"	2800	2845	2795	20.0	6650	133002
116"	2900	2948	2898	20.5	7134	142672
120"	3000	3048	2998	21.0	7634	152681

Note : •All dimensions are in ·mm· For higher line size please consult factory.

•Typical mounting dimensions are for reference only. •Wet Calibrated at IEC/ISO/EN17025 Accredited Calibration Laboratory.

Product Ordering Information: Order Code for Flow Transmitter

Sample Order Code :

ET3	PS1	EE2	EC1	OI1	OII1	AR2	CO1	P1	C2	T1
-----	-----	-----	-----	-----	------	-----	-----	----	----	----

Parameter		Code	Description	Parameter		Code	Description
ET	Electronics Transmitter	ET1	Master+Slave(150NB)	CO	Communication Output (Any One)	CO1	RS485 (MODBUS RTU)
		ET2	Master+Slave(200 to 250NB)			CO2	GSM
		ET3	Master+Slave(300, 350 to 400NB)			CO3	GPRS
		ET5	Master+Slave(450 to 1000NB)			COX	NA
		ET7	Master+Slave(1100 to 5000NB)				
PS	Power Supply	PS1	90 to 250 VAC	P	Process Pressure Calibration Range	P1	10 Kg
		PS2	24V DC			P2	20 Kg
		PS3	Solar Powered			PX	NA
EE	MOC Electronics Enclosure	EE1	Aluminium Die Cast	C	Conductivity Measurement Sensor Type	C1	Cell Constant 0.1
		EE2	SS316			C2	Cell Constant 1.0
EC	Electrical Connection	EC1	M20 ·1.5 F			CX	NA
		ECY	Other				
OI	Output 1	OI1	4 to 20 mA	T	Temperature Measurement Sensor	T1	PT - 100 RTD
		OIIX	NA			TX	NA
OII	Output 2	OII1	Pulse (Open Collector Type)	Note: •Accuracy defined at Lab Conditions. •Relay & Alarms are programmable. Relay 1 is programmable for High / Low. Relay 2 is programmable for High / Low.			
		OIIX	NA				
AR	Alarm Relay Output	AR1	1 Relay Output				
		AR2	2 Relay Outputs				
		ARX	NA				

Order Code for Flow Tube:

Sample Order Code :

Parameter	Code	Description	Code	Description	Parameter	Code	Description
ST Sensor Tube (2" :150NB to 1000NB) (3" :1100NB to 3000NB)	ST 250	250 NB	ST 1200	1200 NB	SP Sensor Probe MOC	SP1	SS316
	ST 300	300 NB	ST 1400	1400 NB		SP2	Hastelloy C
	ST 350	350 NB	ST 1500	1500 NB		SE Sensor Electrode MOC	SE1
	ST 400	400 NB	ST 1600	1600 NB	SE2		Hastelloy C
	ST 450	450 NB	ST 1800	1800 NB	SE3		Platinum
	ST 500	500 NB	ST 2000	2000 NB	SE4		Tantalum
	ST 600	600 NB	ST 2200	2200 NB	SE5		Titanium
	ST 700	700 NB	ST 2400	2400 NB	SI POLYMETRIC Sensor Installation	SI1	Fixed Inline
	ST 800	800 NB	ST 2600	2600 NB		SI2	Hot Retractable Assembly
	ST 900	900 NB	ST 2800	2800 NB	IP Inline Pressure Sensor	IP1	10 Kg
	ST 1000	1000 NB	ST 3000	3000 NB		IP2	20 Kg
	ST 1100	1100 NB				IPX	NA
RC Remote Cable Length	RC1	5 Meter		IC Inline Conductivity Sensor	IC1	Cell Constant 0.1	
	RC2	10 Meter			IC2	Cell Constant 1.0	
	RC3	15 Meter			ICX	NA	
	RC4	20 Meter			IT Inline Temperature Sensor	IT1	RTD PT -100
	RCY	Other				ITX	NA
FS MOC of Flow Sensor Assembly	FS1	ABS Plastic					
	FS2	PEEK					
SF Sensor Mounting Flange Ratings	SF1	ANSI 150 B16.5					
	SF2	ANSI 300 B16.5					

Note:

Due to our continuous product revisions, design specification and model numbers are subject to change without notice.
For other requirement please consult factory.
For line sizes more than 3000 mm, please consult factory.

Quick Questions to suggest you suitable Product Code

Power Supply:	
Line Size:	
Geometry of Flow Channel:	
Flowing Media:	
Flow Range:	
1. Minimum:	
2. Operating:	
3. Maximum:	
Process Temperature:	
Process Pressure:	
Required Outputs:	
Installation:	
1. Fixed:	
2. Hot Retractable:	
Required Quantity:	



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