

Overview

MaxiFlo™ smart electromagnetic flow meter is hallmarked by its high performance and reliability that are based on successful, field-proven technology. It's being widely used in industries such as petroleum, chemical engineering, iron and steel, food, electric power, paper mill, water treatment, petrochemical, medicine, etc.

Main Features

- Measurement is independent of fluid density, humidity, temperature, pressure and conductivity.
- There is no obstructive in the conduit and no pressure drop, and the straight pipe required is relatively short.
- The sensor is equipped with the advanced processing technology that provides excellent immunity to negative pressure.
- The LCD of the converter makes it easy to read during daylight and in darkness.
- Parameters can be set up using infrared touch nubs without having to open the cover of the converter.
- The converter has alarm function for self-diagnosis, empty load test, high and low limit of flow, two-stage flow value, etc.
- It's applicable not only to general process, but also in tough applications such as mining, papermaking, pastry, etc.
- High-pressure sensor adopting PFA lining technology is resistant to high pressure and negative pressure, and is especially good in industries of oil, chemistry, etc.

Measuring Principle

The measurement of flow rate of the electromagnetic flowmeter is based on Faraday's law of electromagnetic induction.

When the conductive liquid moves within the magnetic field, voltage is induced in it, whose magnitude is proportional to the velocity of the conductor.

The equation is as below;

$$E=KBVD$$

- K: Coefficient of the flowmeter
 B: Pulsed magnetic flux density
 V: Average velocity of the media
 D: Inner diameter of the measuring pipe

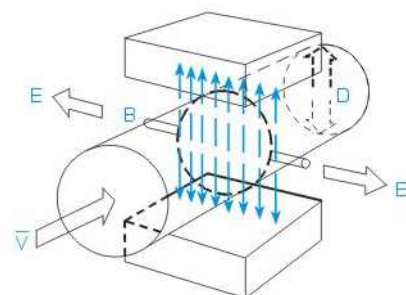
Please see the picture to the right.

100% Customer Satisfaction

MAXIFLO

Electromagnetic Flow/Heat Meter (Series ME)

ELECTROMAGNETIC



Measuring Principle of Electromagnetic Flowmeter

SMART CONVERTER

ME series Electromagnetic Flowmeter

Features and Applications

ME series smart electromagnetic flowmeter converter with new technology is made for high performance. It adopts embedded 16-bit microprocessor technology. It features normal-reverse direction flow measurement, positive or negative total flow, etc. above else. It can measure volume flow of conductive liquids such as water, sewage, acid, alkali and salt as well as mixture of liquid and solid.

Technical Specifications

ELECTROMAGNETIC



Integral Converter



Remote Converter



Heat Meter Converter

Flow Measurement Range: 0.3 ~ 10 m/s

Power Supply:

80~250 VAC (50/60Hz)

20~36VDC

Battery

Power Consumption: ≤ 20W

Display with Push Buttons: The big LCD with backlight displays percentage of flow, instantaneous flow and total flow, and alarm status.

Totalizer: It's used for calculating the accumulative total for forward and reverse flow.

Output Signal:

1. **Analog Output:**

4-20mA: Load Resistance 0 ~ 750 Ω

0-10mA: Load Resistance 0~1.5 KΩ

2. **Frequency Output:** Forward and reverse flow output with frequency range set between 1 ~ 5000Hz. The external voltage must be lower than 35V and the maximum output current is 250mA when the transistor is turned on.

3. **Alarm Output:** Two outputs from the collectors of photoelectric isolate transistors are for alarm signals. The external voltage must be lower than 35V and the max output current is 250mA when the transistor is turned on. Alarms are set for empty pipe, excitation circuit failure, flow limit exceeded, etc.

4. **Pulse Output:** For output in forward and reverse flow measurement, upper frequency of pulse output can be up to 5000 cp/s. The flow per pulse is from 0.0001 to 1.0m³/cp. The width of the pulse can be set to 20ms or square waveform automatically. The collector of transistor with photoelectric isolation is open circuited. The external voltage must be lower than 35V and maximum of output current is 250mA when the transistor is turned on.

Heat Meter Function (Optional): Can function as heat meter using 2 temperature inputs of Pt-100 ohm or Pt-1000 ohm RTD (Heat Calculation Standard: EN1434/CJ128-2007)

Accuracy: ±0.5% of reading, ±0.3% or 0.2% available

Damping Time: Adjustable between 0 and 100 (90%)

Communication Interface: RS-232C, RS-485 or HART, with lightning protection

Power Failure: A fail-safe clock is designed in the flowmeter, which can save the power failure records for 16 times.

Protection: IP65/IP67 (dustproof and submersion for short time)

Ex-Proof Class: EXmdIIBT4

SENSOR (Inline type)
ME series Electromagnetic Flowmeter

Technical Specifications

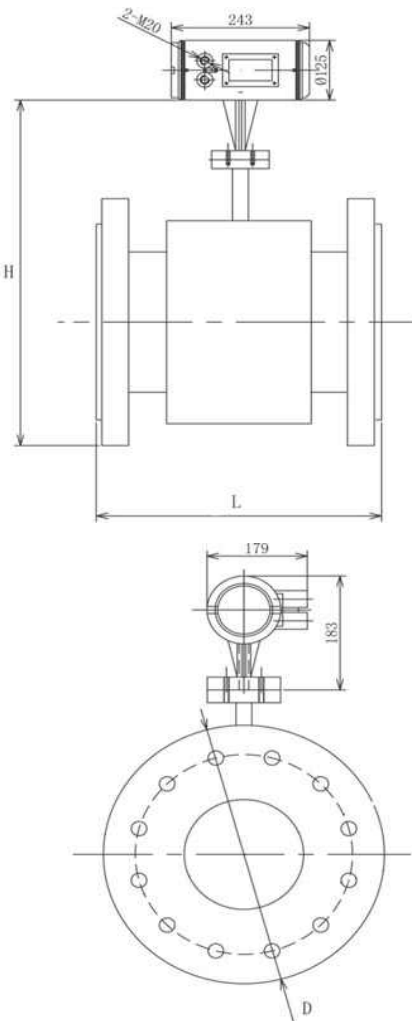
Pipe Sizes: DN10 ~ DN3000 mm
Nominal Pressure: 0.6 ~ 4.0 Mpa
Accuracy: ±0.5% of reading, ±0.3% or 0.2% available
Liner Material: PTFE, PFA, FEP, Neoprene, Polyurethane, etc.
Electrode Material: SUS316L, Hastelloy-B, Hastelloy-C, Titanium, Tantalum, Platinum-iridium, Stainless steel covered with tungsten
Medium Temperature:
 Rubber – -20°C ~ +70°C
 Teflon (PTFE/PFA/FEP) - -40°C ~ +180°C
 Polyurethane – -10°C ~ +60°C
Ambient Temperature: -25°C ~ + 60°C
Ambient Humidity: 5 ~ 100% RH
Medium Electrical Conductivity: ≥ 5 μS/cm
Measuring Range: 1500:1, flow velocity of 0.3 ~ 10 m/s
Protection Class: IP65 (dustproof and watertight), IP68
Ex-Proof: ExmdIIBT4



ELECTROMAGNETIC

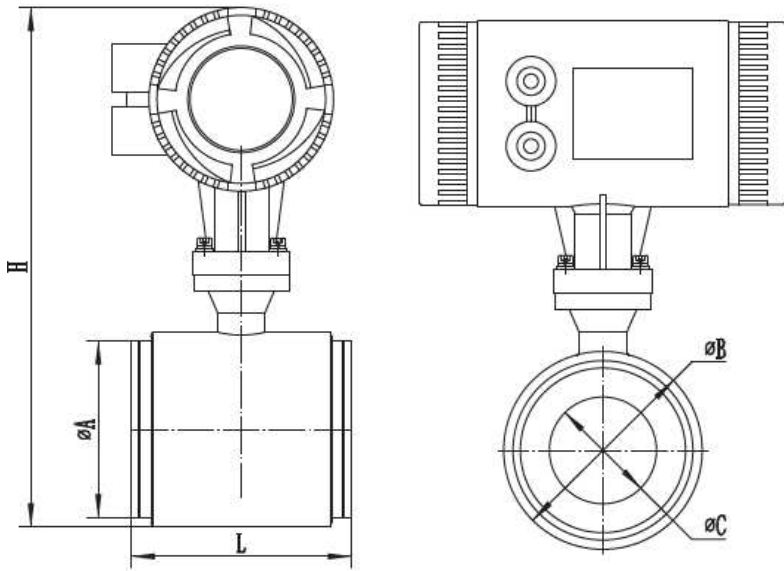
Dimensions

Flanged Type

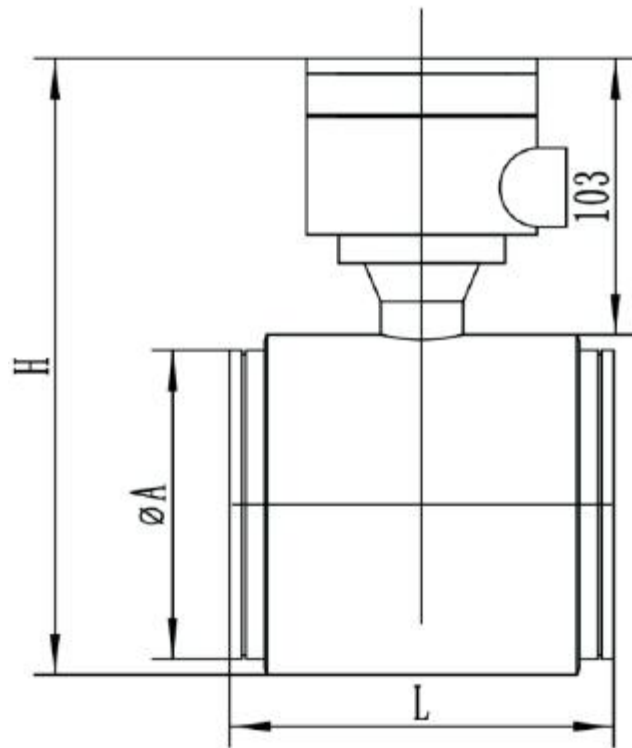
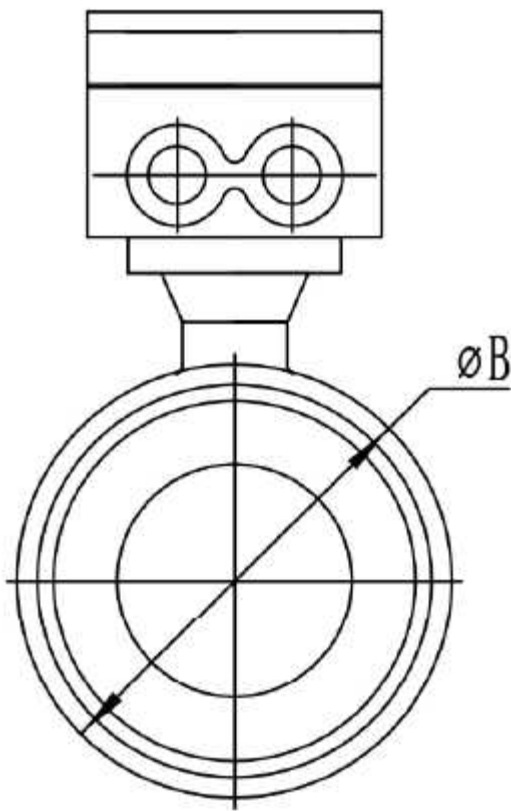


Nominal Size		Dimensions			Nominal Size		Dimensions		
inch	mm	L	D	H	inch	mm	L	D	H
1/8	3	200	90	220	16	400	600	580	665
1/4	6	200	90	220	18	450	600	640	720
3/8	10	200	90	220	20	500	600	715	783
1/2	15	200	95	220	24	600	600	840	897
3/4	20	200	105	220	28	700	700	895	982
1	25	200	115	223	32	800	800	1015	1092
1 1/4	32	200	140	240	36	900	900	1115	1192
1 1/2	40	200	150	250	40	1000	1000	1230	1299
2	50	200	165	263	48	1200	1200	1405	1488
2 1/2	65	200	185	283	56	1400	1400	1630	1700
3	80	200	200	290	64	1600	1600	1830	1924
4	100	250	235	318	72	1800	1800	2045	2134
5	125	250	270	350	80	2000	2000	2265	2344
6	150	300	300	380	88	2200	2200	2475	2549
8	200	350	340	430	96	2400	2400	2685	2754
10	250	450	405	495	104	2600	2600	2905	3169
12	300	500	460	547	112	2800	2800	2905	3169
14	350	550	520	602	120	3000	3000	3315	3369

Wafer Type – Integral Type



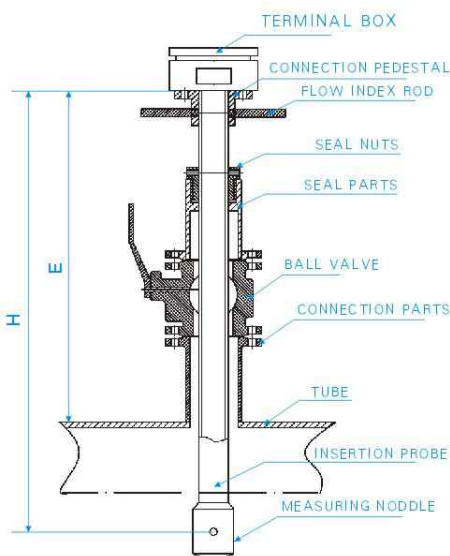
Nominal Size		Dimensions				
inch	mm	L (mm)	ϕA (mm)	ϕB (mm)	ϕC (mm)	H (mm)
1	25	100	60.5	68	22	295
1 1/4	32	100	68.5	76	30	303
1 1/2	40	100	74.5	89	36	316
2	50	100	90.8	102	48	329
2 1/2	65	150	109.8	119.5	64	346.5
3	80	150	120.7	133	77	360
4	100	150	150.2	159	102	386
5	125	200	174.8	190	121	417
6	150	200	204.7	219	147	446
8	200	200	257.8	237	207	500



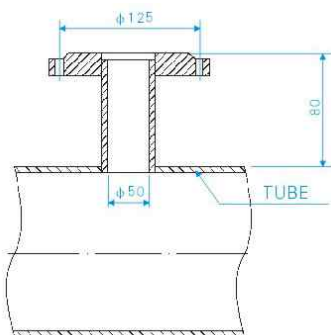
SENSOR (Insertion type) ME series Electromagnetic Flowmeter



Flange Type
Insertion Sensor



Construction of the Insertion Sensor



Insertion Sensor Install Dimensions

Overview

Being based on Faraday's law of electromagnetic induction, MaxiFlo ME series insertion type electromagnetic flowmeter provides high versatility and reliability with advanced, field-proven technologies. This type is used widely in the applications where the pipe size is relatively large but the high performance-price ratio is required.

Features and Applications

- Measurement is independent of fluid density, humidity, temperature, pressure and conductivity.
- There is no obstructive in the conduit, and therefore, there's no pressure damage to the pipe.
- The sensor can be installed through a hot-tapped insertion hole and therefore doesn't need to stop the process flow for installation. This makes it most suitable in fields where the water can't be shut off for long. In addition, it can be installed on the old pipes with local hatching.
- Because it doesn't have lining to affect the accuracy, it's more reliable and accurate as compared to inline type sensors.
- The wide range of pipe size makes it suitable for all the pipe sizes between DN100 and DN3000
- The integral grounded electrode guarantees good grounding.
- The sensor with advanced process technology guarantees high precision and stability.

Technical Specifications

Pipe Sizes: DN100 ~ DN2000 mm

Measuring Range: 0.3 ~ 10 m/s

Nominal Pressure: 1.6 Mpa

Accuracy: ±1.5% of reading

Electrode Material: SUS316L, Hastelloy-B, Hastelloy-C

Electrode Enclosure Material: PVC, ABS, Polypropylene, etc.

Measuring Probe Material: Carbon Steel, SUS304

Medium Temperature: PVC/ABS: 10°C ~ +60°C, Polypropylene: ~+80°C

Ambient Temperature: -25°C ~ + 60°C

Ambient Humidity: 5 ~ 95% RH

Atmospheric Pressure: 86 ~ 106 KPa

Straight Pipe Length Required: 10D upstream, 5D downstream

Protection Class: IP65, IP68 (Optional)

Connection: 2" G Thread Male (BSP Male) / Flange

Ex-Proof: ExmdIIBT4

SELECTION PRINCIPLES

ME series Electromagnetic Flowmeter

The medium being measured must be conductive liquid whose electrical conductivity should be more than 5 $\mu\text{S}/\text{cm}$. The medium shouldn't contain much magnetic matter or air bubble. Pressure rating, lining material, electrode material and the configuration type should be selected according to the medium's temperature, corrosiveness, abrasiveness, etc. Also, the following points should be considered;

- Normally, the size of the meter should be the same as the pipe size.
- Recommended flow velocity is 1 ~ 3 m/s if the medium contains particles. If the actual flow velocity is too big, then select higher size to reduce the flow velocity and the abrasion onto the pipe wall.
- Recommended flow velocity is 2 ~ 5 m/s if there is deposit in the pipe. Select lower meter size to increase the flow velocity and reduce the negative influence on the accuracy by the deposit if the actual flow velocity is too low and if it's not easy to change the pipe.
- If the flow velocity is too small and a high accuracy is required, then smaller meter size is recommended to increase the flow velocity and ensure the accuracy.

VELOCITY-FLOW RATE TABLE

Pipe Size		Min. Flow Rate (0 ~ 0.5 m/s)	Max. Flow Rate (0 ~ 10 m/s)
mm	Inch	l/min, m3/h	l/min, m3/h
10	3/8	0 ~ 2 l/min	0 ~ 40 l/min
15	1/2	0 ~ 5 l/min	0 ~ 100 l/min
20	3/4	0 ~ 7.5 l/min	0 ~ 150 l/min
25	1	0 ~ 10 l/min	0 ~ 200 l/min
32	1.25	0 ~ 20 l/min	0 ~ 400 l/min
40	1.5	0 ~ 30 l/min	0 ~ 600 l/min
50	2	0 ~ 3 m3/h	0 ~ 60 m3/h
65	2.5	0 ~ 6 m3/h	0 ~ 120 m3/h
80	3	0 ~ 9 m3/h	0 ~ 180 m3/h
100	4	0 ~ 12 m3/h	0 ~ 240 m3/h
125	5	0 ~ 21 m3/h	0 ~ 420 m3/h
150	6	0 ~ 30 m3/h	0 ~ 600 m3/h
200	8	0 ~ 54 m3/h	0 ~ 1080 m3/h
250	10	0 ~ 90 m3/h	0 ~ 1800 m3/h
300	12	0 ~ 120 m3/h	0 ~ 2400 m3/h
350	14	0 ~ 165 m3/h	0 ~ 3300 m3/h
400	16	0 ~ 225 m3/h	0 ~ 4500 m3/h
450	18	0 ~ 300 m3/h	0 ~ 6000 m3/h
500	20	0 ~ 330 m3/h	0 ~ 6600 m3/h
600	24	0 ~ 480 m3/h	0 ~ 9600 m3/h
700	28	0 ~ 660 m3/h	0 ~ 13200 m3/h
800	32	0 ~ 900 m3/h	0 ~ 18000 m3/h
900	36	0 ~ 1200 m3/h	0 ~ 24000 m3/h
1000	40	0 ~ 1350 m3/h	0 ~ 27000 m3/h

MODEL SELECTION CODE TABLE

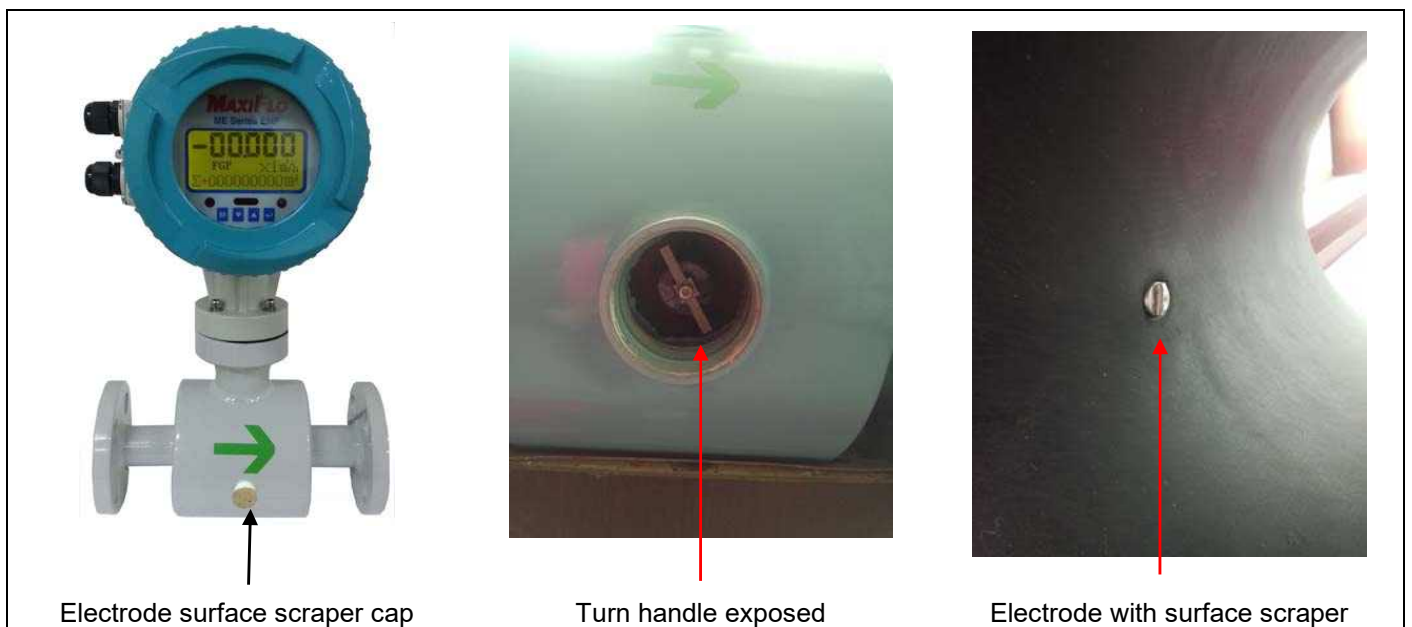
ME-###-#-#-##-##-##-Options		Code
Size		DN size
Installation Type	Integral	I
	Remote	R
	No Display	N
Sensor Type	Inline Sensor	G
	Insertion Sensor	I
Power Supply	85~245VAC, 50Hz	P1
	20~36VDC	P2
	Battery	P3
Electrode Material	SUS 316L	E1
	Hastelloy-B	E2
	Hastelloy-C	E3
	Titanium	E4
	Pt-Iridium Alloy	E5
	Tantalum	E6
	316L with Carbide Coating	E7
Lining Material	FEP	L1
	PTFE	L2
	PFA	L3
	Neoprene Rubber (optionally EPDM or Hard Rubber)	L4
	Polyurethane	L5
Connection Type	JIS Flange	F1
	ANSI Flange	F2
	DIN Flange	F3
	JIS Wafer	W1
	ANSI Wafer	W2
	DIN Wafer	W3
	Thread	F4
	Sanitary	F5
	Others	FX
Options	HART	/HT
	For Slurry/Sludge Application	/SL
	Ex-Proof	/EX
	Heat Meter Function	/H
	Partially-Filled Pipe Measurement	/PF
	Electrode Surface Scraper (only for "L4-Rubber Lining" option)	/SC
4-20mA Output for Battery Power (Only for "P3" power option)	/S1	

APPENDIX I. Electrode Surface Scraper

For applications where the liquid being measured is dirty and therefore the electrode may be coated with foreign materials, thereby undermining the performance of the meter, it is recommended that you choose the option “SC-Electrode Surface Cleaner”.

With this option installed, the user can periodically visit the site, open the cap of the scraper and turn the handle several times to remove unwanted coating built up on the surface of the electrode inside the pipe. It’s much more convenient to clean the surface with this option, because without it, the user has to stop the line, uninstall the meter and clean the electrode inside the pipe and install it back on the pipe.

Please note that this item is available for meters with “L4-Rubber Lining” option and for sizes of DN150 and up.



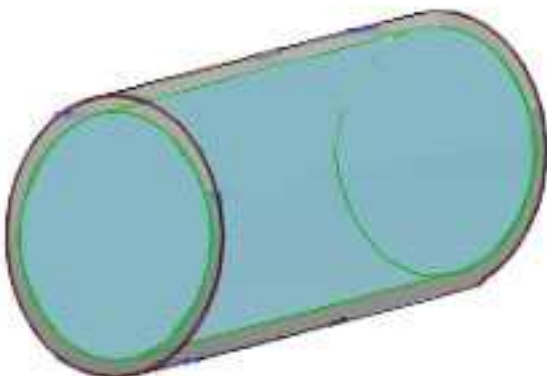
APPENDIX II. Partially Filled Pipe Measurement



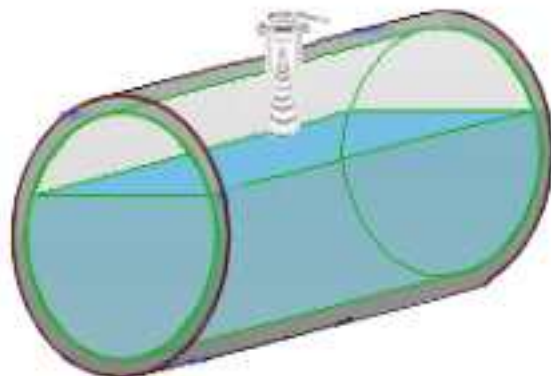
The liquids usually flow through closed conduits like pipes, tubes, hoses, etc. in 100% filled state as shown in the picture below on the left. Most of flow meters therefore assume the conduit to be 100% full. Because almost 95~97% of flow meter applications are like this, it's usually not a problem. The actual flow corresponds with the measured flow.

But in the case where the conduit is not full as shown in the picture below on the right, if you assume the pipe to be full, which is usual in areas of waste water, sewage, irrigation systems, etc., then the actual flow and the measured flow will not correspond with each other. The meter then will have an error. So, you need to know how full the pipe is and our ME series offers the option to measure the level of the liquid inside the pipe. Ultrasonic level transmitter is positioned on top of the pipe and measures the liquid level at real time. The meter combines this data with flow velocity measured by 3 pairs of electrodes that are strategically positioned to maximize the accuracy of the velocity profile.

Full Pipe



Partially-Filled Pipe



If the pipe is filled at least 10% of the pipe diameter, the meter can measure the flow. Of course, it can measure full or 100% filled pipes, too. The rated accuracy is $\pm 2.5\%$.

This function is available only for larger pipes of DN200 – DN1000 with rubber lining option.

MAXIFLO



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