ELECTROMAGNETIC FLOW METER

MF Pro Series

Overview

The smart Electromagnetic flow meter is of perfect performance and reliability. Based on the successfully proven smart flow technology of RC Instruments, the flow meter is widely used in industries of petroleum, chemical engineering, iron and steel, food electric power, paper making, water Treatment, petrochemistry & medicine etc.

Features

Measurement is independent of fluid density, humidity, temperature, pressure and conductivity. There are no obstacle elements in the conduit, no pressure Drop, the requirement of straight pipe is low. The sensor with advanced processing technology is of Venice resistance to negative pressure. The liquid crystal Display in the converter of smart series magnetic flow meter makes it easy to read in the sun or in the dark room. In bad environment parameters can be set up Through the infrared ray touch knobs without opening the cover of the converter.

The converter has alarm output function of self-diagnosis, empty load test High and low limit of the flow, two-stage flow value, etc. Not only apply in generally process test but also in the test of the mineral serosity, paper pulp as well As pastry liquid. High pressure type Electromagnetic Flow Sensor adopting pfa lining technology which is resistant to high pressure and negative pressure is Specially applicable in industries of oil, chemistry, etc. These flow meters are calibrated as per ISO 4185/8316.

MF-PRO Electromagnetic Flow Meter Converter

"MF-PRO" electromagnetic flow meter converter of "Pro-xxxMx" model is designed for measuring average volumetric flow rate and volume of various electrically conductive liquids in a wide range of operating conditions. "MF-PRO" flow meters can be used in a great variety of applications in power industry, oil, gas and mining industries, municipal engineering as well as in iron and nonferrous, chemical, oil refining, cellulose and paper, food and other industries. The flow meters can be used as a part of various integrated solutions, metering systems, automatic process control systems etc. The flow meters can be installed in both metal, and plastic (metal plastic) pipes.

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Depending on design type and firmware, "MF" flow meters of "Pro-xxxMx" model perform the following functions:

Remote Converter

- Measure average volumetric flow rate in either forward or reverse flow directions
- Totalizing volume of forward and reverse flows independently or calculating their algebraic sum with regard to flow direction.
- Batching of preset volume of liquid or in the start-stop mode, batching and determining the amount of batched liquid, batching time and flow rate - Displaying measurement results and emergency conditions.
- Outputting of measurement results to current, pulse or logical output
- Storing configuration settings in the Device's non-volatile memory
- Automatic monitoring and displaying alarm conditions and faults Transferring measurement, diagnostic, configuration, log data etc. via RS-485 serial interface.
- Protecting configuration settings from unauthorized access. The flow meter is also capable of monitoring how the pipeline is filled with liquid.

Specifications

The maximum Qmax, and the minimum Qmin flow rate values of measured average volumetric flow rates for various nominal diameters (DNs of the flow meter's flow channel) are given in Table 1.

- Minimal measured average volumetric flow rate for the flow meters with measuring range factor of 1:10, 1:80 and 1:150, respectively. Flow meter's sensitivity to flow velocity is 0.02 m/s.

Characteristics of the liquid-under-control:

- Specific conductivity - no less than 510-4 S/m Flow velocity - up to 10 m/s
- Temperature - from -10 to 150°C with fluoroplastic lining, and from -10 to 70° C with polyurethane lining.
- Pipeline pressure - up to 2.5 MPa.

Inputs and outputs of external communications:

- Universal outputs -
- 2 Control input -1
- Current output - 1 (optional)
- RS-485 interface -1.

Storing of configuration settings:

- User log - up to 1000 records
- Configuration settings registry - up to 8000 records.

When powered off, the flow meter stores configuration settings for no less than 1 year. Flow meter Power Supply:

- Input voltage is a stabilized 22 ... 29 V DC voltages with pulse level of no more than ±1.0%. The flow meter can be powered from mains 220V 50Hz via optional secondary power source.
- Power consumption is no more than 5.0 W.

Operational data:

- Mean time to failure -75000 h
- mean life time is 12 years. Environmental restrictions:
- Ambient temperature, from 5 to 50°C - Relative humidity shall be no more than 80% at 35°C, without moisture condensation RC
- Vibrational loads - within the range of 10-55 Hz, with displacement amplitude up to 0.35 mm
- Atmospheric pressure from 66.0 to 106.7 kPa. Flow meter protection level shall be IP65.

Metro logical specifications

Limits of permissible relative error for measurement, indication, logging, storage and transferring the results of average volumetric flow rate and volume measurement for various liquids and for any flow direction do not exceed the following ranges:

- ± 0.5%- for flow meters with flow rate range from Qmax to 0.1-Qmax (Qmin.1/10) ± 1.0% - for flow meters with flow rate range from Qmax to 0.0125-Qmax (Qmin.1/80)
- ± 2.0% - for flow meters with flow rate range from Qmax to 0.0067-Qmax (Qmin.1/150). Limits of permissible relative error for recording time of totalizer operation are ±0.1%.

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MF-T Electromagnetic Flow Meter Converter

"MF-T" electromagnetic flow meter converter of "T Series" model is designed for measuring average volumetric flow rate and volume of various electrically conductive liquids in a wide range of operating conditions.

"MF-T" flow meters can be used in a great variety of applications in power industry, oil, gas and mining industries, municipal engineering as well as in iron and nonferrous, chemical, oil refining, cellulose and paper, food and other industries. The flow meters can be used as a part of various integrated solutions, metering systems, automatic process control systems etc. The flow meters can be installed in both metal, and plastic (metal plastic) pipes.

Depending on design type and firmware, "MF-T" flow meters of "T Series" model perform the following functions:

The flow meter is designed to measure average volumetric flow rate and volume of the following liquid media

(e.g., in pressure pipelines) depending on the design version:

- Mains water
- Solutions of food and technical acids, alkalis, salts, and other strongly aggressive media
- Liquid food products (juice, vine, beer, milk, sour cream, mayonnaise and etc)
- Abrasive media (pulp, slurry, waste water etc)
- Poorly conductive liquids (spirits, syrups, chemical-organic liquids etc).

The flowmeter is designed for use either in metal or plastic (metal plastic) pipelines.

The flow meter is designed to measure average volumetric flow rate and volume of the following liquid media (e.g., in pressure pipelines) depending on the design version:

"AFLOWT MFT" Technological Magnetic Flow meter provides the functions to:

- Measure average volumetric flow rate in either forward or reverse flow directions.
- Totalizer volume of forward and reverse flows independently and calculate their algebraic sum with regard to flow direction.
- Record the time of operation
- Monitor filling of the pipeline with liquid.
- Batching of preset liquid volume or batching in the "start-stop".
- Display measurement results RC CE.
- Output measurement results to current, pulse or logical outputs.
- Automatically monitor and display alarm conditions and faults.
- Transfer measurement, diagnostic, configuration, and other data via RS-485 interface (using a cable, phone cable or radio channel) as well as via Ethernet, Profibus or HART interfaces
- Protect configuration settings from unauthorized access.

The flow meter also provides the calculation of the values of the mass flow and mass when introduced into the unit density values of the controlled fluid. The error in determining the mass flow and the mass is not normalized. The flow meter also can control the filling of the pipeline with fluid. The flow meter is powered from a stabilized (24 ± 2.0) V DC voltage. The flow meter can be powered from mains AC 220V 50Hz via Secondary Power Source.

Operating conditions:

Environmental:

- Ambient temperature range from - 25 °C to + 70 °C, relative humidity up to 100% at + 40°C or below with moisture condensation
- Atmospheric pressure from 66.0 to 106.7 kPa
- Vibration: within 10 ... 55 Hz range, with up to 0.35 mm amplitude.

Temperature of the medium under control:

- From - 10 to + 150°C (PFC covered with fluoroplastic lining)
- From - 5 to + 70°C (PFC covered with polyurethane).

Maximal excessive operating pressure of the medium under control:

- For the flanged flow meters (DN200, DN300) and flow meters of "wafer pipe" type: 2.5 MPa; for the flanged flow meters (DN20-DN150): 2.5 MPa or 4.0 MPa (optional)
- For the threaded (pipe connection) flow meters: 1.6 MPa. Protection provided by the enclosure: IP67 code

Metro logical specifications

Limits of permissible relative error for measuring, displaying, logging, storing and transferring of volume and average volumetric flow rate measurement data for various liquids regardless of flow direction with in 0.03-Qmax to Qmax range are as follows ±0.35%. Limits of the supposed basic resulted error for measuring, displaying, logging, storing and transferring of volume and average volumetric flow rate measurement data for various liquids regardless of flow direction with in 0.001-Qmax to 0.03-Qmax range are as follows ±0.35%. Limits of permissible relative error for recording the time of operation are no more than ±0.1%.

AFLOWT MF flow meter of "Lite M" modification is designed to measure average volumetric flow rate and volume of hot, cold and waste waters or other non-aggressive electrically conductive liquids within wide temperature and conductivity ranges.

The flow meter is typically used as part of heat meters, metering systems and automatic process control systems in power industry and municipal engineering. The flow meter is designed for use either in metal or plastic (metal plastic) pipelines. Optionally the flow meter can be adjusted for reverse flow measurements with indication of flow direction.

Smart Electromagnetic Flow meter Converter

Features and Applications

Smart signal converter which display all in English adopts embedded 16-bit micro controller. Full processing digitally, the converter has the function of bi-directional way measurement forward & reverses accumulated and difference and values. It ca be used to measure the volume flow of conductive liquid such as a water, sewage, acid, alkali and salt as well as mixture of liquid and solid.

Performance Specifications

Main power: AC 100V, 110V, 115/120V+10% AC200V, 220V, 220/240V + 10% DC24V +10%frequency: 50Hz or 60Hz power consumption:

<13W Display and push-buttons: the three-line LCD display with back lighting can display the percentage of the flow, the instantaneous flow and the total flow. Arithmometer: it is used for accumulative counting of the total forward flow and total reverse flow.

Input Signal

Flow signal: from the voltage signal of the direct relation to the flow from the detector. Contact input (optional): solid -state contact or no-voltage contact.

Output Signal

1. Analog output: 4 20 mA DC (digital output is selectable) Without SFC communication: 0.8 mA 22.4 mA (-20% +115%) load resistance: 0 600 with SFC communication: 3.2 mA 22.4mA (-5% +115%) External power source for SFC communication: DC16-45V (optional) load resistance (U) = (External power source for communication 8.5V)/0.025 2)
2. Digital output: DE (analog output is selectable)
3. Contact output (optional) open collector, contact capacity 30V DC max, 200mA max (selectable)

- Alarm output: output alarm under the following conditions: self-diagnostic result, empty detection and high/low meter limit alarm.
- Range switch output: the status of low rang. Large small in dual range. Normal or reverse.
- Counter preset status output (for pulse output model): activates when the counter reaches the preset values.
- Self-check result output: activate only when a self-diagnostic abnormality occurs.
- Empty load detection output: activates only when an empty status occurs.
- High/low limited alarm output: activates when the first high/low limit alarm (H/L) occurs and the second the high/low limit (HH/LL) occurs.

1. Pulse output (optional): open collector, pulse frequency 2000 Hz max, pulse width from 0.3 to 999.9ms random setting or fixed at 50% of the duty. 5)
2. Communication: hart of FF fieldbus (optional)

- Accuracy: 0.5% of the value displayed, 0.3% or 0.2% are optional
- Damping time: adjustable between 0.5 and 199.9 seconds.
- Low flow cut-off: adjustable between 0 and 10% of the preset range. Below selected value, output is driven to the zero flow rate signal level.

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- Ex-proof Mark: FM/SCA ex-proof certificate for class I/II/III, area II, group (A, B, C, D, F, G) or no-hazard areas.
- Protection Class: IP67 (dustproof and submerging for short time) Lighting Protection: 12KV, 1000A, equipped with the lighting arrester in the power source and external input and output terminals.
- Electrical Connection:G1/2 internal threads watertight gland.
- Power Failure: An EEPROM retains data record of totalized value when pulse output is used (retention period approximately 10 years).
- Weight: 3.7 kg

Smart Electromagnetic Flow Sensor (flange Type)

Performance Specifications:-

- Size: DN10 DN3000mm
- Nominal Pressure: 0.6~4.0MPa
- Accuracy: ± 0.5% of the value displayed, ± 0.3% or ± 0.2% are optional
- Liner Material: Teflon, PFA, F46, Neoprene, Polyurethane.
- Electrode Type: General type, Scraper type and Replaceable type. Electrode Material: SS316, Hastelloy B, Hastelloy C, Titanium, Tantalum, Platinum-iridium, stainless steel covered with tungsten.
- Medium Temperature Integral type:- 10°C ~+ 80°C
- Remote Type: Neoprene & Polyurethane Liner -- - 10°C ~+ 80°C, PTFE, PFA, F46 Liner -- 10°C~+ 160°C
- Ambient Temperature:- 25°C~+ 60°C •
- Ambient Humidity: 5~100% RH (relative humidity).
- Medium Electrical conductivity: ≥5.0 s/cm
- Measuring Range: 1500:1, flow rate 15m/s
- Structure Type: Integral type, remote type, submersible type, ex proof type.
- Protection Class: IP65, IP68 (optional), IP65 Dust Proof and Watertight: IP68 Dustproof and submersible for long (only for remote type)
- Ex-proof Mark: ExmdIIBT4

Smart Electromagnetic Flow Sensor (clamped Type)

Performance Specifications:-

- Size: DN10~ DN 200mm
- Nominal Pressure: 10~40Bar
- Accuracy: ± 0.5% of the value display, ± 0.3% or ± 0.2 are optional
- Medium Temperature: Integral type: - 10°C~+80°C
- Remote type: - 10°C~+ 160°C Ambient Temperature:- 25 °C~+ 60°C
- Medium Electrical conductivity: ≥5.0 s/cm
- Liner Material: PFA, F46
- Electrode Material: S316, Hastelloy B, Hastelloy C, Titanium, Tantalum, Platinum-iridium
- Electrode Type: Electrode can be tear down.
- Structure Type: Integral type, Remote type.
- Protection Class: IP65, IP68 (optional).

Electromagnetic Integral type flow meter

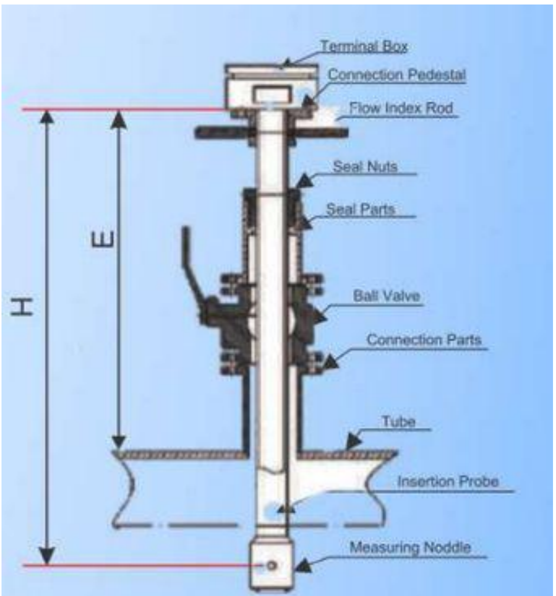
Smart Electromagnetic Flow Sensor (Insertion Type)

Overview

Being based on faraday's law to electromagnetic induction. Smart insertion electromagnetic flow meter is of high intellect and reliability with advanced international techniques. It has been widely used in the area of big-size flow meter with its high performance-price ratio.

Features And Applications

- Measurement is independent of fluid density, viscosity, humidity, temperature, pressure and conductivity.
- There is no obstacle part in the measuring tube, no pressure damage the tube.
- The high reliable out-insertion installing mode with which the sensor can be installed without removing the measuring pipe makes the flow meter particularly applicable in fields where the water can't be cut off for long. In addition, it can be equipped on the old pipe locale hatching.



Sensor structure

Performance Specifications:-

- Size: DN300~DN3000mm
- Nominal pressure: 16 Bar
- Measuring probe material: carbon steel, SS304 stainless steel
- Electrode Material: SS316, Hastelloy B, Hastelloy C
- Accuracy: flow rate= 0.5m/s ± 0.5 Flow rate of full range > Im/s, ± 1.0%
- Medium Temperature: PVC, ABS-- + 60 polypropylene-- +80 °C
- Ambient Temperature: 25°C~+60°C
- Relativity Humidity:5%~95%
- Atmosphere Pressure: 86~106KPa.
- Length of straight pipe: upstream 10D: downstream 5D
- Protection Class: IP65, IP68 (optional)
- Connection Mode: Flange type
- Ex-proof mark Exmd Bt4

RC MF Lite M Magnetic Flow Meter

RC MF flow meter of "Lite M" modification is designed to measure average volumetric flow rate and volume of hot, cold and waste waters or other non-aggressive electrically conductive liquids within wide temperature and conductivity ranges. The flow meter is typically used as part of heat meters, metering systems and automatic process control systems in power industry and municipal engineering. The flow meter is designed for use either in metal or plastic (metal-plastic) pipelines. Optionally the flow meter can be adjusted for reverse flow measurements with indication of flow direction.

Advantages

- Available in sizes from DN 20 to 50 mm (3/4"-2");
- Bidirectional flow measurement (on request);
- Full-bore meter design eliminates pressure loss in measurement section;
- No filtering required;
- Short straight pipe runs required for installation;
- Protection against unauthorized access;
- Connection types: wafer;
- Suitable for mounting on polymer pipes;

Application (hot and cold water measurement):

- water abstraction;
- water treatment;
- water distribution network;
- irrigation;
- wastewater treatment;
- filtration plants;
- heat distribution systems;
- heat generation plants;
- industrial water applications.

Specification:

Parameter	Value
Pipe size, DN, mm	**20 - 50**
Accuracy, %	**from ±2.0**
Maximum pipeline pressure, Mpa	**2.5**
Minimum conductivity, μS/cm	**5**
Fluid temperature range, °C	**minus 10 – 150**
Ambient temperature range, °C	**5 – 50`**
Minimum straight pipe runs	**5 DN upstream and 2 DN downstream**
Protection	**IP65**
Power supply, VDC	**24**

Outputs:

- LCD (on request);
- 2 pulse outputs;
- RS-485 interface (on request).

Design (material):

- housing and flow sensor for wafer-type DN20-50 m`m - plastic;
- electrodes - stainless steel.
- for wafer-type DN20-50 mm lining - high-strength heat-resistant polymer.

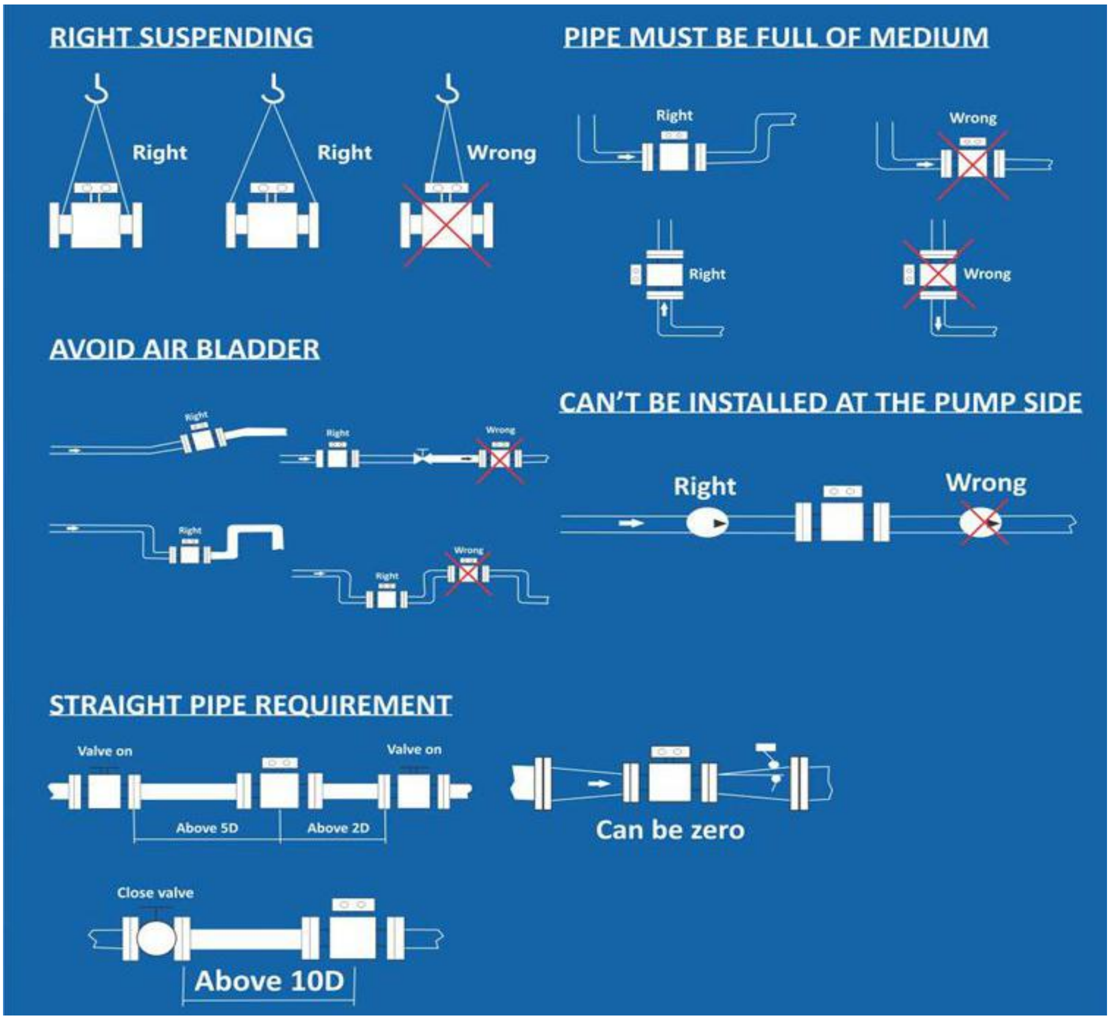
Table 1. Main performances of the liner materials:

Liner Material	Main Performances	Applications
PTEF	1. The most steady plastic material, resistant to boiling hydrochloric acid, vitriol, aqua fortis, strong alkali, and organic impregnates.2. Not perfect in abrasion resistance.	Strong corrosive mediums such as strong acid and alkali.
PFA	- Same abrasion resistance as PTFE.- Strong load pressure resistance.	Applicable in state of load pressure.
F46	1. Same abrasion resistance as PTFE.2. Resistible for low abrasion.3. Strong resistance to load pressure.	1. Same as PTFE.2. Applicable in mediums of low abrasion.
Neoprene	1. Good elasticity, refractivity, and abrasion resistance.2. Resistant to low acid, alkali, and salt but not to oxidation mediums.	Water, sewage, slurry, and mineral serosity of low abrasion.
Polyurethane	1. Good abrasion resistibility (≈10× caoutchouc).2. Not perfect in acid/alkali resistance.3. Not usable for water mixed with organic impregnates.	Applicable in mineral serosity slurry and coal slurry of high abrasion.

Table 2. Main performances of the electrode materials:

Electrode Material	Applications
0Cr18Ni12Mo2Ti	Water, sewage, and corrosive mediums. Widely used in petroleum, chemistry, carbamide, etc.
Stainless steel with tungsten	Mediums of no corrosion and low abrasion.
Hastelloy B (HB)	Strong resistance to hydrochloric acid (below boiling point). Also resistant to vitriol, phosphate, hydrofluoric acid, and other oxidizable acids, alkalis, and non-oxidizable salts.
Hastelloy C (HC)	Resistant to oxidizable acids (e.g., nitric acid), mixed acids, and salts like Fe+++, Cu+++, and seawater.
Titanium (Ti)	Seawater, chloride, hypochlorite salt, oxidizable acid, organic acid, alkali, etc.
Tantalum (Ta)	Resistant to corrosive mediums like glass; applicable to most chemical mediums except hydrofluoric acid, oleum, and alkali.
Platinum-iridium	Applicable in almost all chemical mediums except aqua fortis and ammonium salt.

Installation Diagram



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2015	IOTAFLOW make Electromagnetic Flow Meters	Data Sheet Ver 1.0

Magnetic Flow meter- XXX X X X X X X X X X X X X X X X X

Size	MM 4 mm	4
	MM 8 mm	8
	MM 10 Mm	10
	MM 15 Mm	15
	MM 20 Mm	20
	MM 25 Mm	25
	MM 32 Mm	32
	MM 40 Mm	40
	MM 50 Mm	50
	MM 65 Mm	65
	MM 80 Mm	80
	MM 100 Mm	100
	MM 125 Mm	125
	MM 150 Mm	150
	MM 200 Mm	200
	MM 250 Mm	250
	MM 300 Mm	300
	MM 350 Mm	350
	MM 400 Mm	400
	MM 450 Mm	450
	MM 500 Mm	500
	MM 600 Mm	600
	MM 700 Mm	700
	MM 800 Mm	800
	MM 900 Mm	900
	MM 1000 Mm	1000
	MM 1100 Mm	1100
	MM 1200 Mm	1200
	MM 1400 Mm	1400
	MM 1500 Mm	1500
	MM 1600 Mm	1600
	MM 1800 Mm	1800
	MM 2000 Mm	2000
Mounting	MM Insertion	2
	MM Inline	1
Flow Tube Material	FMT SS304	S
	FMT SS316	F
Liner Material	FML F46	H
	FML Hard Rubber	R
	FML PTFE	T
	FML PFA	F
	FML Ceramic	C
	FML Polyurathene	P
Electrode Material	MME SS316	S
	MME Hastalloy B	B
	MME Hastalloy C	H
	MME Titanium	N
	MME SS Covered With	K
	MME Tantalum	T
	MME Platinum Iridium	P
Flow Sensor Protect	MMT IP68	IP68
	MMT IP65	IP65
Structure	MM Integral	1
	MM Remote	2
	MM Integral + Remot	3
Process Connection & Element Housing	MMP Wafer End	W
	MMP CS Flange	M
	MMP SS 304 Flange	F
	MMP SS 316 Flange	G
	MMP SMS Union	S
	MMP TC End(SS 316)	T
MM Pressure Rating	MM 10 Bar	A
	MM 16 Bar	P
	MM 25 Bar	C
	MM 40 Bar	F
	MM 60 Bar	M
	MM 100 Bar	H
	MM 320 Bar	N
	MM 400 Bar	W
Flange Class	MM # 150	1
	MM # 600	4
	MM # 300	7
	MM Wafer	5
	MM PN 10/16	2
	MM PN 20	11
	MM PN 40	3
	MM Tril-clover End	6
	MM ANSI 1500	9
	MM ANSI 2500	8
	MM ANSI 2500	9
	MM PN 25	10
Display Enclosure	MMD Skip	O
	MM IP 65	B
	MM IP67	C
	MM Ex-Proof	E
Output	MMO Skip	O
	MM Flow Volume 4-20	C
	MM Flow Volume HART	D
	Remote Telemetry Unit	T
Power Supply	MMP Skip	O
	MM 24 VDC	2
	MM Battery	B
	MM 220 VAC 50 Hz	1
Signal Cable	MM Skip	N
	MM Signal Cable	S
Matching Flange	MMF Skip	O
	MMF Mating Flanges	P
Data Logger	MML Skip	O
	MM Data Logger	P
Converter	Regular	R
	MF-Pro	P
	MFT	T
	Slurry	S

Line Size (mm)	Flow Range(m^3/h) at 0.3 ~ 10 m/s
10	0.06 ~ 2.00
15	0.20 ~ 6.40
20	0.34 ~ 11.3
25	0.53 ~ 17.7
40	1.40 ~ 45.2
50	2.00 ~ 70.7
65	3.58 ~ 119
80	5.43 ~ 181
100	8.48 ~ 282
150	19.08 ~ 636
200	33.9 ~ 1131
250	53.0 ~ 1767
300	76.3 ~ 2544
350	103.9 ~ 3463
400	135.7 ~ 4524
450	171.7 ~ 5726
500	212.0 ~ 7069
600	305 ~ 10179

CX Capacitive Electromagnetic Flow sensor

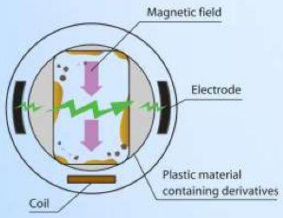
Five "No"s and Five "Can"s

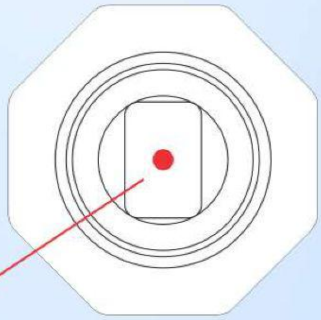
- Resistant to foreign substances
- Resistant to deposits
- Straight piping is not required

The CX offers five "No"s for easy operations!

"No" electrodes are exposed to fluids. 2

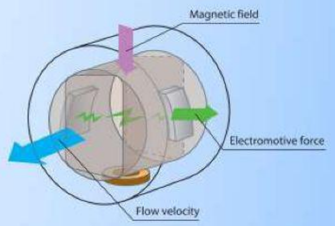
The plastic material containing derivatives is used in the flow channel to prevent the electrodes from being exposed to fluids. This made the CX strong against foreign substances and deposits.





"No" moving parts 1

The CX uses the law of electromagnetic induction in its measurement principle. With its no-obstruct structure with no moving parts in the flow channel, it has only little pressure loss with high durability.



"No" straight piping required 3

The rectangle structure is adapted to the flow channel in order to stabilize flows and eliminate straight piping.

The rectangular structure is the key!

"No" need to have a large 4 installation space

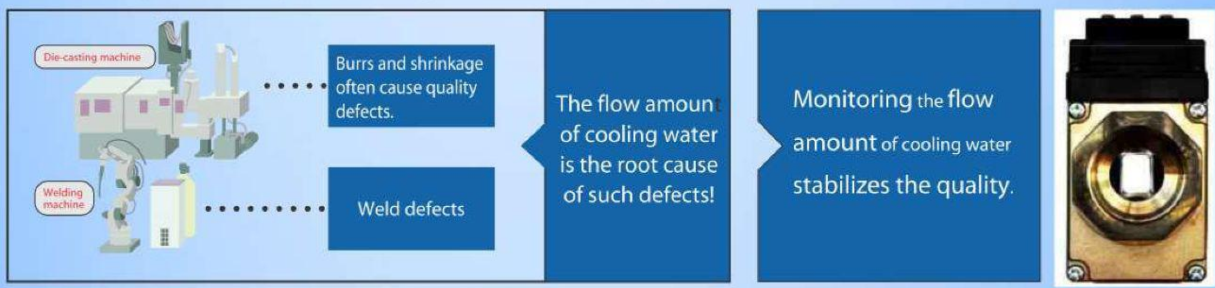
The device can be installed in a small space due to the compact body size without straight piping.

"No" measures are required 5 against power supply noise

No measures are needed against power supply noise even if an inexpensive switching power supply device is used.
It conforms to the EC Directive and obtained the CE mark.

Applications

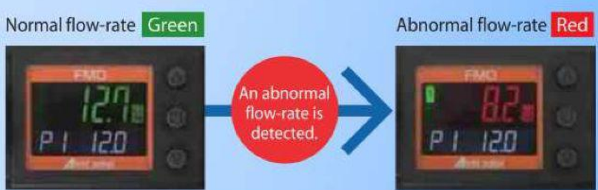
For die-casting machines, injection molding machines and welding machines



Only the CX can offer five "Can"s!

1. Abnormal flow-rates can be identified at a glance.

By setting a level-judgment value to determine abnormal flow-rates, the CX indicates normal flow rates in the green LED light while it automatically changes to indicate abnormal flow rates in the red LED light. Just by looking at the LED indicator, the status of flow-rate monitoring can be checked.



* In these examples, the value to determine abnormal flow rates is set at 12.0 L/min.

2. Multiple units installed can be identified.

Use characters A to Z, 0 to 9, and symbols to set up arbitrary names and numbers.

3. The meters can be controlled by external input.

When using the functions of trip flow volume accumulation or zero point adjustment, resetting the accumulated value of trip flow volume or adjusting the zero point by external input signals can be performed.

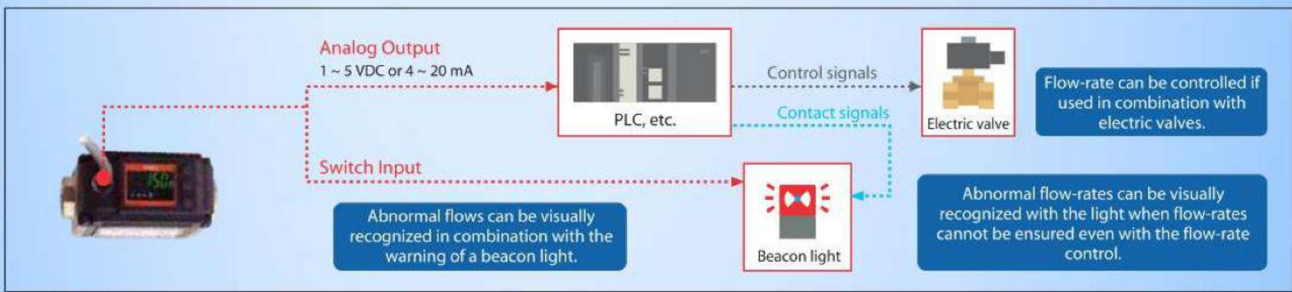
4. The flow displays can be switched over.

The values of the main and sub displays can be switched over.

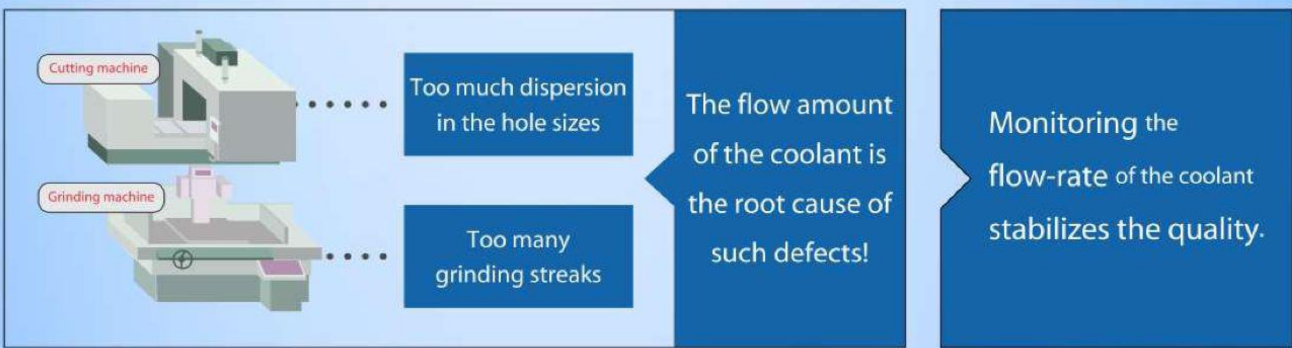
5. The flow direction can be changed.

With a simple setting change, the direction of measuring can be reversed.

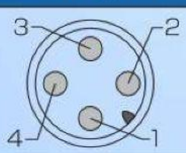
System Example



For cutting machines and grinding machines



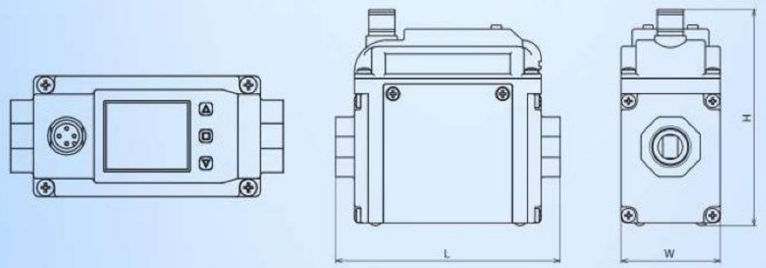
Pin assignment for the exclusive body-connection connector cable

Connector Pin Numbers on the Flowsensor Side	Body-connection connector portion Pin arrangement	Connection Cable (4 cores)	Contents
1		Brown	Power (+)
2		White	OUT 2: Analog output (Voltage or Current)
3		Blue	GND
4		Black	Out 1: Switch output

Model Codes

Basic Model	Nominal Diameters	Connection Shape	—	Switch Output	Analog Output	—	Accessory Cable	Option Bracket	Contents
CX									CX
	10								Flow-Rate Range: 0.5 ~ 15 L/min
	15								Flow-Rate Range: 2.0 ~ 60 L/min
	20								
		A							Nominal Diameter 10: Rc 3/8; Nominal Diameter 15: Rc 1/2; Nominal Diameter 20: Rc 3/4
				N					NPN transistor
				P					PNP transistor
					V				1 ~ 5 VDC
					A				4 ~ 20 mADC
							3		Body-connection connector cable: 3 m (standard)
							N		None
								B	Installation bracket
								N	None (standard)

External Dimensions



Unit: mm

Model	10A	15A	20A
L	90	95	
W	40		
H	86.8		

Capacitive Electromagnetic Flow sensor CX Specification

Model		CX		
Nominal Diameters		10	15	20
Accuracy-Guaranteed Flow-Rate Range		0.5 ~ 15 L/min	2.0 ~ 60 L/min	
Displayable Flow-Rate Range		0.0 ~ 18 L/min	0.0 ~ 72 L/min	
Low-Flow Cut-Off		0.45 L/min	1.8 L/min	
Repeatability Accuracy		±2% F.S. (No need of straight piping)		
Temperature Characteristics	Ambient Temperature	±5% F.S. (Relative error when changing from the standard temperature 25°C to 10°C or 50°C)		
	Fluid Temperature	±5% F.S. (Relative error when changing from the standard temperature 25°C to 1°C or 85°C)		
Piping Connection		Rc3/8	Rc1/2	Rc3/4
Fluid Temperature Range		0 ~ 85°C		
Conductivity Range		5μS/cm ~ 3mS/cm		
Measurable Fluids		Water, water-soluble coolant		
Working Pressure		0 ~ 1 MPa		
Pressure Resistance		2 MPa		
Pressure Drop		0.02 MPa or less		
Response Time (63% Response)		0.25s / 0.5s / 1s / 2s / 5s (Default Value: 1s)		
Working Ambient Temperature/Working Ambient Humidity		0 ~ 50°C / 35 ~ 85%RH (Non-condensing)		
LED Display		Main Display: 4 digits and 7 segments (Two-color display in green and red) Sub Display: 6 digits and 11 segments (White)		
	Main Display	Displays either instantaneous flow-rate or accumulated flow volume		
	Sub Display	Output mode or input mode, flow direction, arbitrary characters (Selectable)		
Display Unit		Instantaneous flow-rate: L/min; Accumulated flow volume: L, kL or ML (Selectable)		
Switch Output		NPN or PNP transistor output *Please select when ordering.		
	Maximum Load Voltage/Current	30 VDC / 50 mA		
	Output Modes	Level judgment mode/ Window judgment mode/ Trip accumulated flow volume output mode/ Accumulated flow volume pulse output mode/ Alarm output mode (Selectable) (Accumulated flow volume pulse output mode: Nominal Diameter 10: Pulse unit: 0.01 L/P, ON-time: 10 ± 5 ms ; Nominal Diameter 15 and 20: Pulse unit 0.1 L/P, ON-time: 50 ± 5 ms)		
Analog Output *1	Voltage/ Current	1 to 5 V DC load impedance: 50 kΩ or higher/4 to 20 mA load impedance: 500 Ω or less * Please select when ordering.		
Switch Input *1	Input Time	20 ms or longer		
	Short-Circuit Current	Approximately 2 mA		
Protection Class		IP65 (When using the body-connection connector cable)		
Current Consumption		65 mA or less		
Power Source		24 VDC ± 10% P-P Ripple within ± 10%		
Installation Position		Free		
Weight		Approx. 460 g	Approx. 490 g	Approx. 520 g
Wetted-Parts Materials		PPS / FKM / Bronze (CAC804)		
Accessory		Body-connection connector cable: 3 m		
Optional Parts		Installation bracket		

Note 1. Please read and understand the product specifications before using the product.

Note 2. In case of consideration to arrange plural pieces of the products by the side of a flow rate type filling apparatus in Japan, please refer to Japanese Patent No. 3916032 before deciding to install them.

*1 Please select either analog output or switch input.

VN Compact Electromagnetic Flow Sensor

- No moving parts, No pressure loss, Excellent durability
- Compact design, Easy to install
- No straight pipe required

Possible to measure, even though there are foreign materials in fluid, and even though there is no straight pipe portion. Also possible to measure flow of disinfection fluids. Therefore, it is the most suitable for measurement of installation at various factory production lines and built-in machines.

Accuracy

Flow rate range

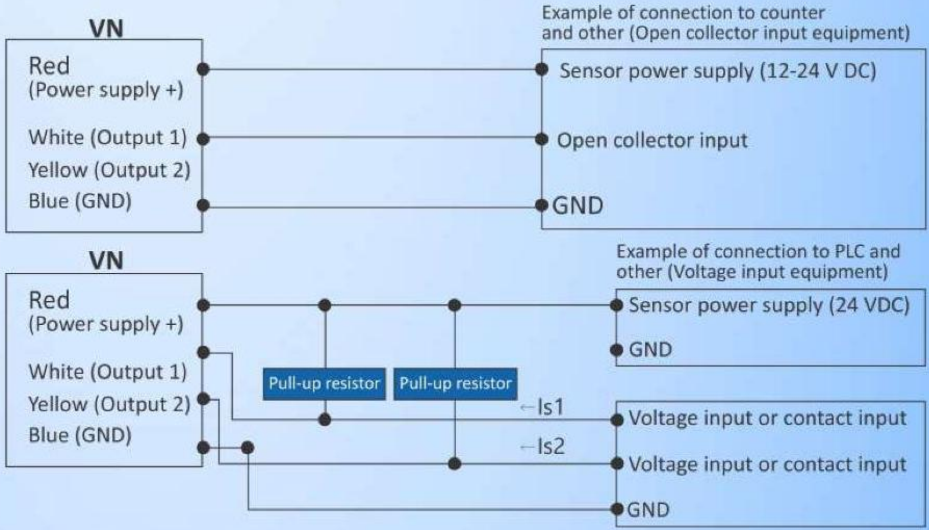
Wiring diagram (As to the wiring technique of attached cord)

Please set the sink current for open collector output of output 1 and output 2 to 20mA or less. For your reference, the recommendation for pull-up resistor becomes [10 to 20kΩ]

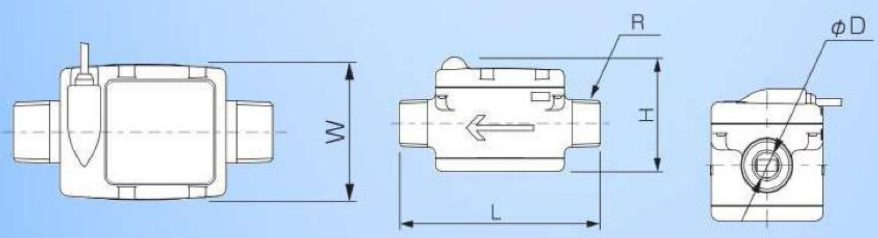
Sink current calculation formula

$$Is = \frac{V}{R} \leqq 20\ [mA]$$

V: Power supply (V)
R: Pull-up resistor (Ω)



External Dimensions



Unit: mm

Model	VN05	VN10	VN20
L	85	95	110
W	47	47	49
H	49	52	62
øD	5.2	10	20
R	1/4	1 /2	1

Specifications In addition, for the special specification, please contact us.

Model			VN05	VN10	VN20
Guarantee-flow rate accuracy range (Minimum flow rate to Maximum flow rate)			0.05~1L/min	0.5~10L/min	3.0~60L/min
Maximum operating flow rate			3L/min	25L/min	100L/min
Low flow cutoff			0.025L/min	0.25L/min	1.5L/min
Accuracy (Liquid temperature at 25°C)	Frequency pulse		±2.5RS% (100 to 20% of maximum flow rate) ±0.5FS% (20 to 5% of maximum flow rate)		
	Unit pulse		±2.0RS% (100 to 20% of maximum flow rate) ±0.4FS% (20 to 5% of maximum flow rate)		
Piping connection (Thread size)			R1/4	R1/2	R1
Fluid temperature range			0 to 60°C (No freezing)		
Fluid conductivity rate			50μ S/cm or more		
Type of liquid			Conductive liquid that dose not corrode the material contacting to liquid		
Working pressure			1 MPa or less		
Pressure loss			0.02MPa or less		
Ambient temperature/humidity			Temperature: -20°C to 60°C Humidity: 35% to 85%RH (No condensation)		
Responsiveness			63% response Damping time: 2s (Standard)		
Signal cable			Length: 0.5m 4core Red: Power supply + wire White: Output 1 Blue: GND Yellow: Output 2		
LED display			One LED display in the main body Green: Flow rate display Display in three-step speed Red: NG status is displayed with number of blinks		
Installation position			Free (Vertical piping is recommended)		
Common specification of output			NPN Open collector Current capacity; 20mA or less Voltage: 30VDC or less Residual voltage at turning ON: 1 V or less		
Output 1 *2	Frequency pulse *1	Duty ratio: 50%	Standard 200Hz (settable in steps of 0.1Hz between 20 and 400Hz)		
	Unit pulse		0.001L/P(Standard)	0.01L/P(Standard)	0.1L/P(Standard)
	Alarm *3		Selectable between Normal Open (Standard) and Normal Close Details of alarm (Low source voltage/Meter error/Dry moisture/ Excessive flow rate/Excessive liquid noise/Reverse-flow)		
	Switch *4		Selectable between Normal Open (Standard) and Normal Close Level judgment value: settable in steps of 1% from 0 to 100%. (Convert the maximum flow rate 100%)		
Output 2 *2	Unit pulse		The same as output 1		
	Alarm *3		The same as output 1		
	Switch *4		The same as output 1		
Protection level			IPX4 (Equivalent to IP64)		
Consumption current			100mA or less		
Power supply			12-24 VDC (± 10%) We recommend the power supply is supplied with isolated power supply and 1 unit of power supply is connected to one unit of VN		
Wetted materials			Main body: PPS resin Electrode: SUS316L O-ring: FKM Earth ring: SUS316		

*1: Frequency at maximum flow rate
*2: For the set value and choice of Output 1 and Output 2, all are factory setting, and setting change after installation is not available.
*3: Alarm is selectable only either one of Output 1 or Output 2.
*4: For the window judgment, Output 1 and Output 2 are used.
(Note) CE mark certification for lightening surge has not obtained.

VNS Compact Electromagnetic Flow Sensor

- Measurement of pulsating flow
- Measurement of Sodium Hypochlorite and Caustic Soda
- Detection of gas lock of a constant volume pump

This is the most suitable for water treatment facilities, etc. Also usable for steady flow besides pulsating flow.

Feature

Capable of detecting the gas lock of sodium hypochlorite

Gas lock detection is possible through the interlocking with actuating signal of pump. Gas lock is a phenomenon under which gas accumulates in a certain chamber of diaphragm of the metering pump and sodium hypochlorite is not transferred.

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