Datasheet

Compact Electromagnetic Flowmeter

SUP-FMX240

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Datasheet

Compact Electromagnetic Flowmeter
SUP-FMX240

The compact electromagnetic flowmeter integrates the sensor and transmitter of a traditional electromagnetic flowmeter into a single unit. Featuring a small footprint and flexible installation, it supports convenient commissioning and operation via an infrared remote control. Widely used across various industries, it is designed for measuring the volumetric flow of conductive liquids with a conductivity greater than 2 μS/cm. As an induction-based instrument, it provides reliable and accurate measurement of conductive media.

Standard Compliance:JB/T 9248-2015 Electromagnetic Flow Sensors

Features

- Unaffected by fluid density, viscosity, temperature, pressure, or conductivity changes.
- Built-in temperature measurement and output.
- One-piece molded electrodes and PEEK liner for stability and reliability.
- Fully digital processing with strong anti-interference and wide measurement range.
- Ultra-low EMI power supply with wide voltage tolerance.
- Equipped with a 32-bit ARM Cortex-M4 processor and 24-bit ADC for fast, precise, and energy-efficient processing; programmable low-frequency rectangular excitation enhances measurement stability.
- Uses SMD components and SMT (Surface Mount Technology) for high circuit reliability.
- Measurement range can be modified on-site to meet actual application needs.
- High-contrast OLED display with both Chinese and English menus for intuitive and user-friendly operation.
- Built-in self-check and self-diagnosis functions.
- Three internal totalizers independently display forward cumulative flow, reverse cumulative flow, and total cumulative flow.
- PEEK-lined sensor operates reliably even under negative pressure conditions.
- Infrared handheld operator with 38 kHz communication rate enables long-distance, non-contact operation.

Principle

The electromagnetic flowmeter adopts an advanced low-frequency square wave excitation design, and its operating principle is based on Faraday's law of electromagnetic induction.The two electromagnetic coils at the upper and lower ends as shown in Figure 3 generate a constant or alternating magnetic field. When the conductive medium flows through the electromagnetic flowmeter, the induced electromotive force can be detected between the left and right electrodes on the wall of the flowmeter tube. The magnitude of the induced electromotive force is proportional to the electrically conductive medium flow rate, the magnetic induction density of the magnetic field, and the width of the conductor (the inner diameter of the flowmeter measuring tube), and the flow rate of the medium can be obtained by calculation. The induced electromotive force equation is as follows:

$$E=K\times B\times V\times D$$

Where:

E—Induced electromotive force

K—Meter constant

B—Magnetic induction density

V—Average flow speed in cross-section of measuring tube

D—Inner diameter of measuring tube

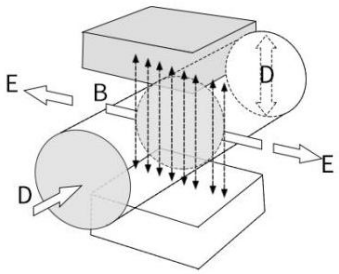


Figure 1

During flow measurement, the fluid passes through a magnetic field perpendicular to the flow direction. As the conductive liquid flows, it generates an induced voltage proportional to the average flow velocity. Therefore, the conductivity of the measured liquid must exceed the minimum conductivity required by the instrument.The induced voltage signal is detected by a pair of electrodes and transmitted via cable to the transmitter. After a series of analog and digital signal processing steps, the instantaneous flow rate and totalized flow are displayed on a backlit dot-matrix LCD screen.

Parameters

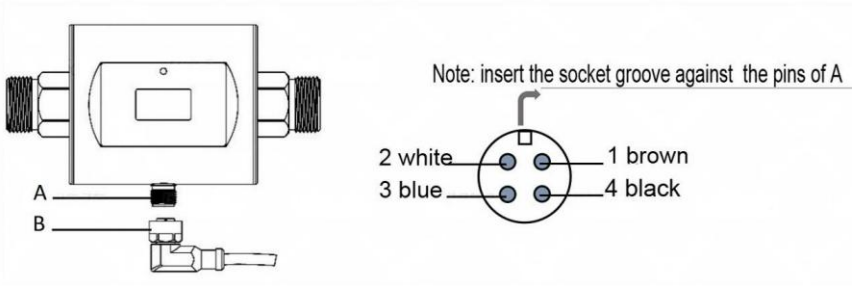
Table 1 Technical Parameters

Input		
Measured variables	Direct measurement variable: flow rate Calculated value of measured variable: volumetric flow	
Nominal diameter	DN6 ~ DN65	
Measurement range	See Table 2	
Output		
Transmitter output	(4 ~ 20) mA, output load ≤ 500Ω	
Communication output	RS485 interface	MODBUS-RTU communication protocol
Power supply		
Power supply	(18-36) VDC	
Power consumption	< 5W	
Electrical interface	M12-4 core connector	
Performance parameters		
Accuracy	±0.5%	
Repeatability	≤0.1%	
Process conditions		
Medium temperature	0℃~80℃	
Process pressure	-0.1MPa～6.3MPa	
Electrical conductivity	≥2μS/cm	
Environmental conditions		
Ambient temperature	-20℃~60℃	
Storage temperature	-25℃～85℃	
Relative humidity	5%～95%	
Level of protection	IP67	

Table 2 Flow Range

Nominal diameter	Flow Range
DN6	0.03m³/h～0.6m³/h
DN10	0.05m³/h～1m³/h
DN15	0.1m³/h～2m³/h
DN20	0.4m³/h～5m³/h
DN25	0.6m³/h～12m³/h
DN32	1m³/h～15m³/h
DN40	1m³/h～20m³/h
DN50	1.5m³/h～30m³/h
DN65	1.5m³/h～30m³/h

Wiring



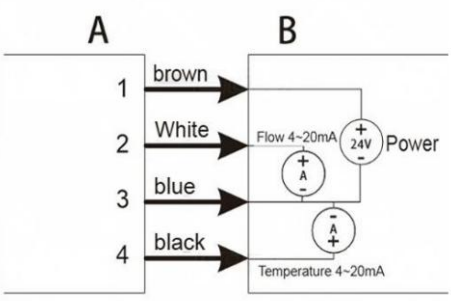
A: M12 Electrical Connector

B: User Terminal

Figure 2 Flowmeter Wiring Diagram

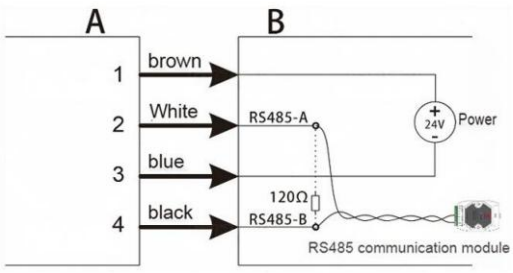
Current output wiring

Pin Number	Color	Description
1	Brown	Connect +24V Power Supply
2	White	Flow（4～20）mA
3	Blue	GND/Connect -24V Power Supply
4	Black	Temperature（4～20）mA
Outer Shield Layer		Grounding wire



RS485 Communication Wiring

Pin Number	Color	Description
1	Brown	Connect +24V Power Supply
2	White	RS485-A
3	Blue	GND/Connect -24V Power Supply
4	Black	RS485-B
Outer Shield Layer		Grounding wire



Dimension

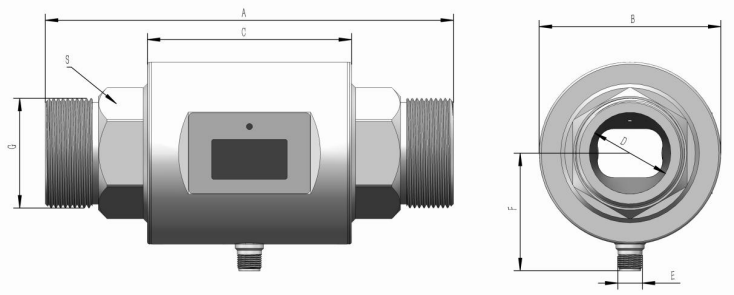


Figure 3 Threaded Connection Type

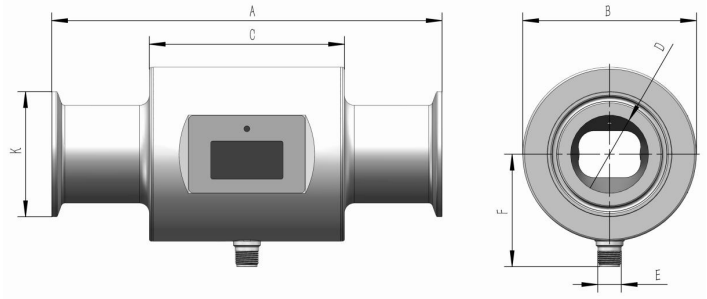


Figure 4 Clamp Connection Type (ISO 2852 Clamp)

Table 3 Dimensions of Electromagnetic Flowmeters with Threaded and Clamp Connections

DN	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (Threaded Type) (mm)	K (Clamp Type) (mm)	S (mm)
6	150	70	90	6	M12×1	38.5	G 1/2 or NPT 1/4	50.5	14
10	150	70	90	10	M12×1	38.5	G 1/2 or NPT 3/8	50.5	17
15	150	70	90	15	M12×1	38.5	G 3/4	50.5	27
20	150	70	90	20	M12×1	45	G 3/4	50.5	27
25	150	76	90	25	M12×1	45	G 1	50.5	36
32	150	76	100	32	M12×1	57.5	G 1-1/4	50.5	42
40	200	89	100	40	M12×1	57.5	G 1-3/4	64	56
50	200	95	100	50	M12×1	57.5	G 2	77.5	60
65	200	95	100	65	M12×1	57.5	G 2-3/4	91	80

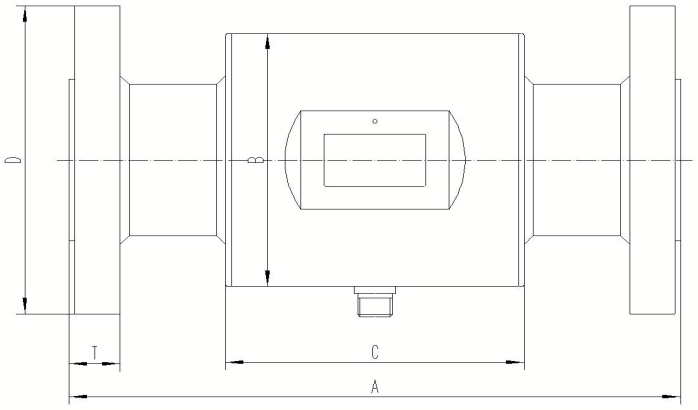


Figure 5　Flange Connection Type（HG/T20592）

Table 4　Dimensions of Electromagnetic Flowmeters with Flange Connections

DN	A (mm)	B (mm)	C (mm)	D (mm)	T (mm)
6	200	φ70	90	φ90	14
10	200	φ70	90	φ90	14
15	200	φ70	90	φ95	14
20	200	φ70	90	φ105	16
25	200	φ76	90	φ115	16
32	200	φ76	90	φ140	18
40	200	φ89	100	φ150	18
50	200	φ95	100	φ165	19
65	200	φ95	100	φ185	20

Ordering code

SUP-FMX240 -06-I-C-M1-K-S9-M3-NZ-3-02											Description
SUP-FMX240	-	-	-	-	-	-	-	-	-	-	
Nominal Diameter	06										DN6(1/8")
	10										DN10(3/8")
	15										DN15(1/2")
	20										DN20(3/4")
	25										DN25(1")
	32										DN32(1.25")
	40										DN40(1.5")
	50										DN50(2")
	65										DN65(2.5")
	XX										Other
Process Connection Standard		I									ISO2852 Clamp Connection
		B									G-type Internal Thread (BSPP)
		U									NPT Thread (National Pipe Thread)
		D									GB/T9124 Flange
		H									HG/T 20592 Flange
		X									Other
Nominal Pressure			C								PN16
			D								PN25
			X								Other
Process Connection and Body Material				M1							304SS
				XX							Other
Accuracy					K						0.5 Class
Output and Power Supply						S9					4-20mA/RS485，24VDC
Electrode Material							M3				316LSS
Lining Material								NZ			Polyether Ether Ketone (PEEK)
Housing Material and Protection Rating									3		304SS，IP65
Cable Length										02	2m
										10	10m
										20	20m
										XX	Other