Electromagnetic flow meter catalogue

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Electromagnetic flow meter for liquid flow measurement

NIS-EMF-DNXX flow meter

1.1 Features:

- Electromagnetic flow meter does not contain any moving parts, rotating gears or turbines, or bearings. Instead, it relies on two electrodes to measure the density of the induced magnetic field that results from an electrically conductive fluid, such as water, flowing through a pipe. So, there is no susceptibility to bearing wear or other mechanical wear-and-tear issues.
- As for the electrodes and the liner used in electromagnetic flow meter, these components can be fabricated from a variety of materials to make the mag meter compatible with virtually various electrically conductive fluid, including aggressive acids.
- The only limitation of the electromagnetic flow meter is that the measured fluid media must be electrically conductive (> 5μS/cm). Non-conductive fluids, such as oil and other petroleum-based fluids, cannot be measured with mag meter technology.
- Measurements are not affected by the variation of flow density, viscosity, temperature, pressure and conductivity. High accuracy measurement is guaranteed according to the linear measurement principle.
- No obstacle in the pipe, no pressure-loss and lower requirement for straight pipeline.
- DN6 to DN2800 covers a wide range of pipe size. A variety of liners and electrodes are available to satisfy different flow characteristics.
- Programmable low frequency square wave field excitation, improving measurement stability and reducing power consumption.
- Implementing 16 bits MCU, providing high integration and accuracy; Full-digital processing, high noise resistance and reliable measurement; Flow measurement range up to 1500:1.
- High-definition LCD display with backlight.
- RS485 or RS232 interface supports digital communication.
- Intelligent empty pipe detection and electrodes resistance measurement diagnosing empty pipe and electrodes contamination accurately.

1.2 Main Applications:

- EMF series electromagnetic flow meter can be used to measure the volume flow of conductive fluid in a closed pipeline. It is widely applied in the flow measurement and control in the fields of chemical and petroleum industry, metallurgy industry, water and wastewater, agriculture and irrigation, paper making, food and beverage industry and pharmaceutical industry.

1.3 Ambient conditions:
Ambient temperature: sensor: -25°C to +60 °C, Convertor: -25 °C to +60 °C
Relative Humidity: 5% to 90%

1.4 Working Conditions:

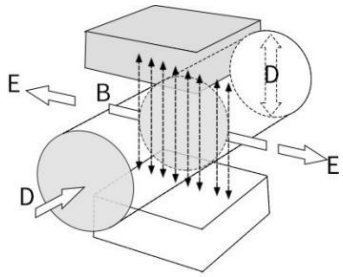
Maximum Fluid Temperature:
Compact type: 60 °C,
Remote type: Teflon 150 °C
Neoprene 80 °C; 120 °C
Polyurethane 70 °C
Fluid Conductivity: 5 ≥ μS/cm

Working Principle

2.1 Measuring Principle:

The measurement principle of magnetic flowmeters can be described as follows: when the liquid goes through the pipe at the flow rate of v with a diameter D, within which a magnetic flux density of B is created by an exciting coil, the following electromotive E is generated in proportion to flow speed v:

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



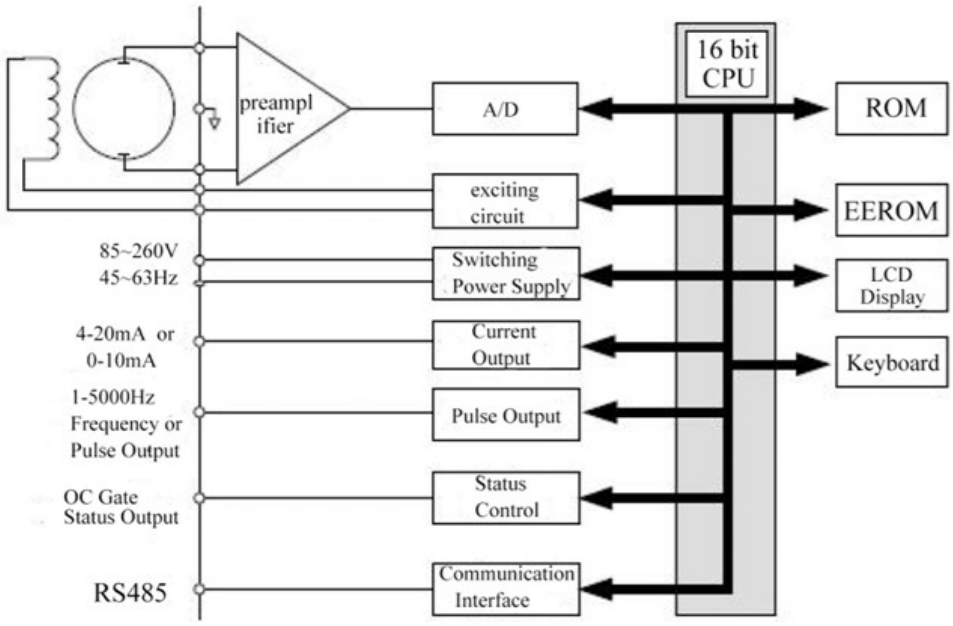
Where:

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

The induced voltage signal is detected by two electrodes and transmitted to the converter via a cable. After a series of analog and digital signal processing, the accumulated flow and instant flow are displayed on the display of the converter.

2.2 Converter Circuit Schematic:

The Converters supplies a stable exciting current to the coil in the sensor of electromagnetic flowmeters to get B constant and amplifies the electromotive force and convert it into standard signals of current or frequency so that the signals can be used for displaying, controlling and processing. The schematic of converter circuit is shown in Fig. 2.1:



Product Technical Parameters

3.1 Measuring fluid: conductive fluid

3.2 Accuracy: +/- 0.5% (Special grade: +/-0.2%)

3.3 Repeatability: 0.25%

3.4 Fluid temperature: -25 °C~180°C~250°C

3.5 Medium velocity range: 0.3~12 m/s

3.6 Conductivity: ≥ 5 μS/cm

3.7 Electrode Material: Stainless Steel, Tantalum, Titanium, Hastelloy Alloy B, Hastelloy C, Platinum Iridium Alloy, Stainless Steel coating, Tungsten Carbide, Ni.

3.8 Lining Material: Chloroprene Rubber CR, Fluoroplastic (F4, F46, PFA), Polyurethane, Alumina Ceramic

3.9 Body Flange ad Shell Material: Stainless Steel, Carbon Steel, others (special order)

3.10 Installation form: flange connection, clamp type, thread connection, clamp, oil connection, plug-in type, etc.

3.11 Protection: IP65, IP66 and IP67

3.12 Converter Power Supply: 85-265 VAC, 11-40 VDC, Lithium Battery

3.13 Output Signal: Current, Pulse, Frequency, HART Agreement, RS232/RS485, GPRS

3.14 Structure Type: Split type, Integral type, Plug-in type

3.15 Working Environment: Environmental temperature: -25°C to 60°C

3.16 Explosion Proof grade: No explosion proof and Explosion proof Ex de ib mb IIC T3-T6

3.17 Converter display interface: English LCD display, can display instantaneous flow, cumulative flow, there are a variety of flow units for selection

3.18 Categories: sanitary, diving, high pressure, scraper type, high temperature type.

Caliber Selection

According to diagram of the maximum flow, minimum flow and bore diameter, the inner diameter of flowmeter and the velocity of flow, the caliber of electromagnetic flowmeter can be chosen economically. Maximum Flow and Minimum Flow must correspond to the number in the following table:

Flow Calculation Formula: $Q=V(\pi D^2/4) = 0.002826VD^2$

Internal Diameter	10	15	20	25	32	40	50	65
Qmin(m3/h)	0.0848	0.1908	0.3391	0.5299	0.8681	1.3565	2.1198	3.5820
Qmax(m3/h)	3.39	7.63	13.56	21.20	34.73	54.26	84.78	143.28
Internal Diameter	80	100	125	150	200	250	300	350
Qmin(m3/h)	5.4259	8.478	13.2469	19.0755	33.912	52.9875	76.302	103.8555
Qmax(m3/h)	217.04	339.12	529.88	763.02	1356.48	2119.5	3052.08	4154.22
Internal Diameter	400	450	500	600	700	800	900	1000
Qmin(m3/h)	135.648	171.680	211.95	305.208	415.22	542.592	686.718	847.80
Qmax(m3/h)	5425.95	6867.18	8478	12208.22	166.16.9	21703.68	27468.82	33912
Internal Diameter	1200	1400	1600	1800	2000	2200	2400	2600
Qmin(m3/h)	1220.83	1661.69	2170.37	2746.872	3391.20	4103.352	4883.32	5731.12
Qmax(m3/h)	48833.3	66467.5	86814.7	109874.9	135648	164134.1	195333.1	229245.12

In the formula: Q-m3/h, V-m/s, D-mm
Velocity range: 0.3~12 m/s (Extended range 0.1~15 m/s)

When measuring clean water, the economic flow rate is 1.5~3 m/s; when measuring the crystallization solution, 3~4 m/s is suitable for cleaning and preventing adhesion and deposition; When measuring the abrasive fluid such as ore pulp, 1~2 m/s is appropriate to reduce the wear of lining and electrode.

Order Code for NIS-EMF Series Electromagnetic flowmeter

For Example: NIS-EMF-025-Y16F1BL2H for DN25 size Electromagnetic Flow meter.

Nominal Diameter (mm)	015	DN15	125	DN125	601	DN600	202	DN2000
	020	DN20	151	DN150	701	DN700	222	DN2200
	025	DN25	201	DN200	801	DN800	242	DN2400
	032	DN32	251	DN250	901	DN900	262	DN2600
	040	DN40	301	DN300	102	DN1000	282	DN2800
	050	DN50	351	DN350	122	DN1200	302	DN3000
	065	DN65	401	DN400	142	DN1400	322	DN3200
	080	DN80	451	DN450	162	DN1600		
	101	DN100	501	DN500	182	DN1800		

Structure Type	F	Split Type
	Y	Integral Type
	C	Plug-in Type
Nominal Pressure（MPa）	16	PN16
	XX	Special Pressure Customization
Lining Material	R	Chloroprene Rubber (Maximum Temperature 80 Degrees), Silicone Rubber (Maximum Temperature 250 Degrees)
	F	Fluoroplastic F4、F46、PFA
	P	Polyurethane
	C	Alumina Ceramic
Electrode Material	1	Stainless Steel
	2	Tantalum
	3	Titanium
	4	Hastelloy Alloy B
	5	Hastelloy Alloy C
	6	Platinum Iridium Alloy
	7	Stainless Steel Coating Tungsten Carbide
Body Flange And Shell Material	A	Stainless Steel
	B	Carbon Steel
Shell Protection Grade	L	IP65
	M	IP67
	H	IP68
Power Supply	1	85~265V 45~400Hz
	2	11~40V D.C
	3	Lithium Battery
Output Signal	A	Current, Pulse, frequency
	H	HART Agreement
	R	RS232/RS485
	G	GPRS