PİKSEL ELECTROMAGNETİC FLOWMETER

Mounting Manual

PİKSEL ÖLÇÜ AKIŞKAN KONTROL OTOMASYON SİSTEMLERİ SAN. VE TİC. LTD.
ŞTİ. MERİÇ MAH. 5746/3 SOK. NO:22 BORNOVA İZMİR
TEL : +90 232 433 88 80 - www.pikselotomasyon.com

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Overview

Electromagnetic flowmeter is a new generation product independently developed by our company with independent intellectual property rights. It consists of two parts: sensor and converter. It is based on the principle of Faraday's law of electromagnetic induction to measure the volume flow of conductive liquids with a conductivity greater than 5μS/cm. It is an inductive instrument for measuring the volume flow of conductive media.

Features

Standard Configuration

★ Low frequency square wave excitation, excitation frequency: 1/8 power frequency, excitation current: 125mA;
★ Adopts multi-line simplified Chinese display with backlight;
★ Three totals can be recorded separately: forward total, reverse total, and sum total;
★ Flow upper and lower limit alarms, empty pipe alarms and other fault alarms;
★ The converter adopts a novel excitation method with low power consumption, stable zero point and high measurement accuracy;
★ There is a four-level password setting function to prevent data from being modified at will;
★ Communication: RS485 bus, Modbus protocol, other protocols (need to be customized);
★ 4～20mA current output;
★ Pulse/frequency output;
★ Reverse flow output (when the pulse/frequency end outputs a high level, it indicates the output of reverse flow; at this time, there is no pulse/frequency output

Advanced Configuration

★ The host computer calibrates and queries various data of the electromagnetic flowmeter. Function, other output methods should be selected);
★ Display mode: Chinese, English (other languages can be customized).

Technical Parameters

★ Implementation standard: JB/T 9248-2015 "Electromagnetic Flowmeter";
★ Housing protection grade: IP65/68;
★ Environmental level: Class B;
★ Ambient temperature: -10℃～50℃;
★ Relative humidity: 5%～90%;
★ Power consumption: less than 6W;
★ 220V power supply: AC220V±10%; frequency 50Hz or 60Hz, tolerance ±5%; harmonic content less than 5%; 24V power supply: DC15V～DC28V; ripple voltage less than 5%. The standard supports two power supply modes (two power supplies cannot be connected at the same time)

Installation

Selection of installation location

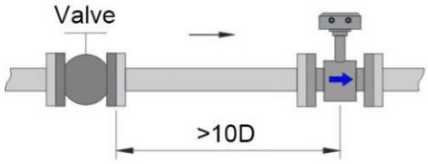
★ The installation location should be far away from high-power motors or inverters, generally more than 20 meters ;
★ The installation location should be kept away from places that are prone to impact or rain.
★ Try to choose an installation location where the pipeline has no vibration or the vibration is small;
★ The installation location should avoid places prone to lightning strikes;
★ The electromagnetic flowmeter should be installed in a place that is always filled with the spray of the measured medium;

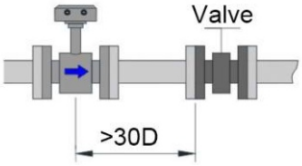
Connection flange welding requirements

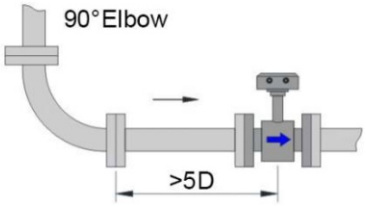
The connecting flange on the pipeline should be welded before the electromagnetic flowmeter is installed. Electric welding is prohibited after installation, otherwise it will easily cause irreversible damage to the electromagnetic flowmeter.

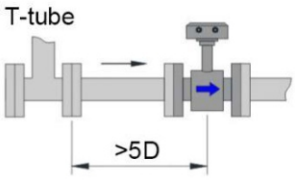
Pipeline Design

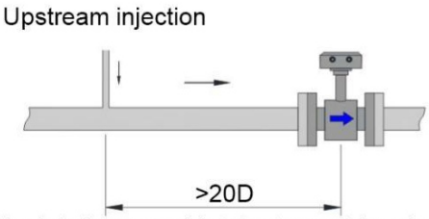
In order to ensure the measurement accuracy of the electromagnetic flowmeter, the upstream and downstream of the electromagnetic flowmeter installation location should meet the pipeline conditions shown in the figure below.



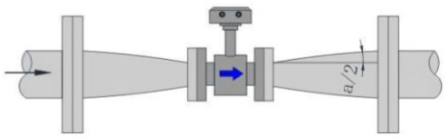








Chemical substances are injected upstream, which may lead to uneven conductivity. The flow meter should be far away from the injection port.



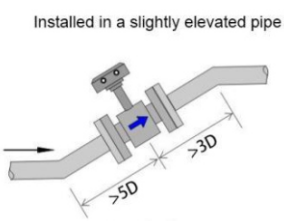
The upstream and downstream are special-shaped pipes, and the center cone angle of the special shaped pipe should be α<15°

Note 1: Do not insert or install anything upstream of the measuring pipeline that may affect the flow velocity distribution.

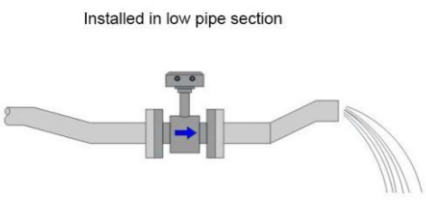
Note 2: A downstream straight pipe section may be unnecessary. However, if the downstream valve or other joints affect the upstream flow pattern, it is necessary to set a 2D to 3D straight pipe section downstream.

Installation Method

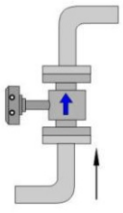
1. The pipeline structure should ensure that the measuring tube of the electromagnetic flowmeter is always filled with the measured medium.
2. For liquids or slurries containing solid particles, it is recommended to install the electromagnetic flowmeter vertically with the flow direction from bottom to top to avoid solid particles settling in the measuring tube of the electromagnetic flowmeter.



Horizontal Pipe

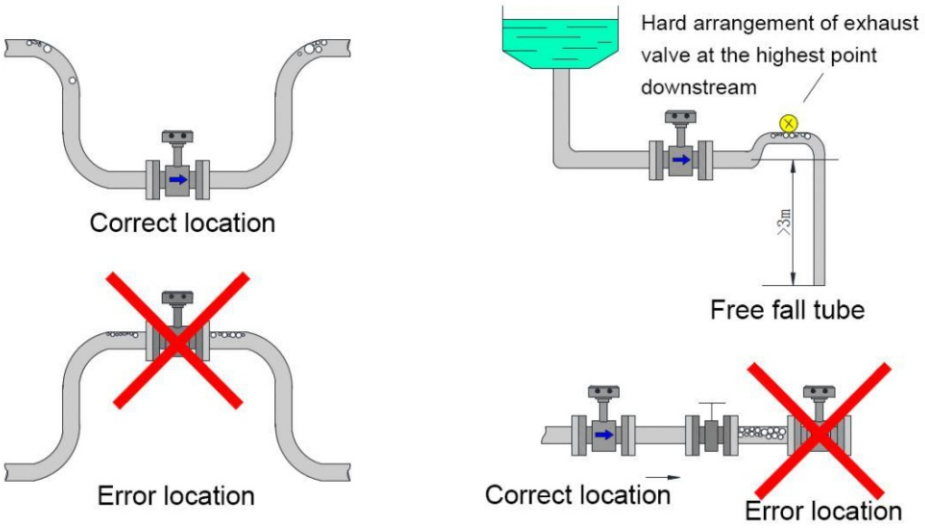


Open filling or discharge pipe



Vertical pipe section

3. Make sure that the measuring tube does not accumulate or generate bubbles



Other cable standards

1. Connection, wiring and grounding with metal pipes The flow signal is a differential signal with the measured liquid medium as the reference point (0V). The sensor has connected the signal reference point (0V) to the metal measuring pipe.

When the insulation coating is applied, although the signal reference point (0V) can generally be obtained through the connecting bolts between the pipe flange and the instrument flange , the formal connection method should be to add an electrical connection

As shown in the figure, ensure that the measured liquid medium is the real reference point of the signal (0V). To prevent external interference, the sensor should be grounded and connected from the electromagnetic flowmeter housing to the large

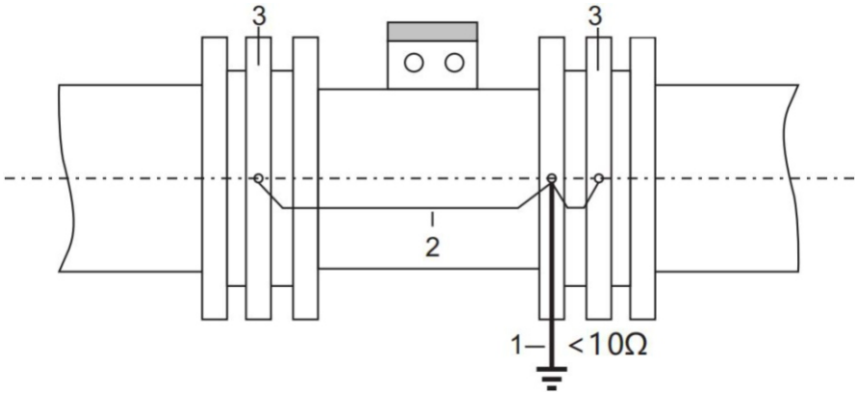
The grounding resistance of the ground should be less than 10Ω. The grounding end of the electromagnetic flowmeter shell should be no less than 1.6mm2 grounding copper wire connected to the shell of the metal pipe section, and it should be noted that it is a single-point grounding.

2. Connection, wiring and grounding with non-metallic pipes

is installed on a plastic pipe such as PVC (such as a plastic pipe and a metal pipe with an insulating lining), a grounding ring must be installed to keep the electromagnetic flowmeter and the medium insulated.

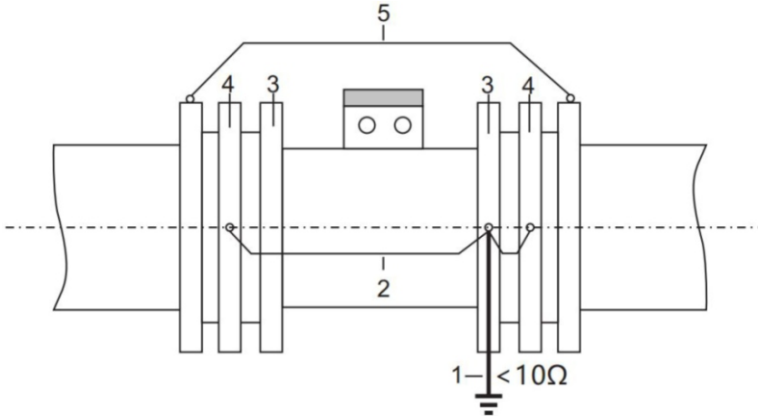
Maintain zero potential.

Standard for grounding installations on metal pipes



1- Measurement grounding; 2- grounding wire; 3- grounding ring. Note: The connecting wire should be copper wire with a diameter of 2.0 mm2 or above.

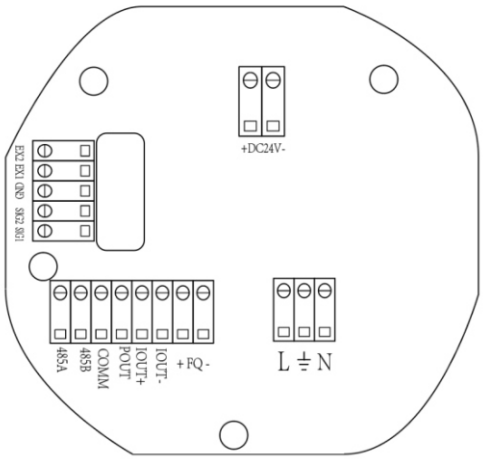
Standard for Grounding Installations on Non-metallic



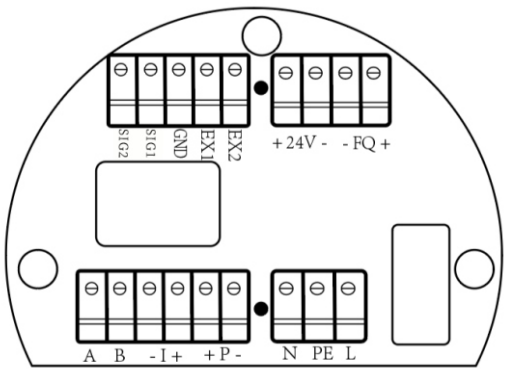
1 - Measurement ground; 2 - Grounding wire; 3 - Bolt (insulated); 4 - Grounding ring; 5 - Connecting wire. Note: The connecting wire should be copper wire with a diameter of 2.0 mm2 or above.

Instrument Wiring Instructions

The flow meter has a variety of matching converters.



A Type



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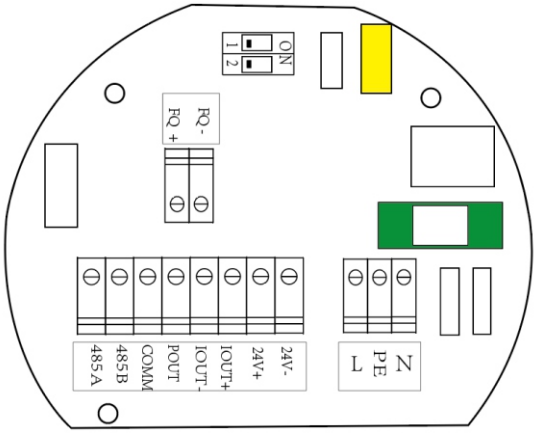


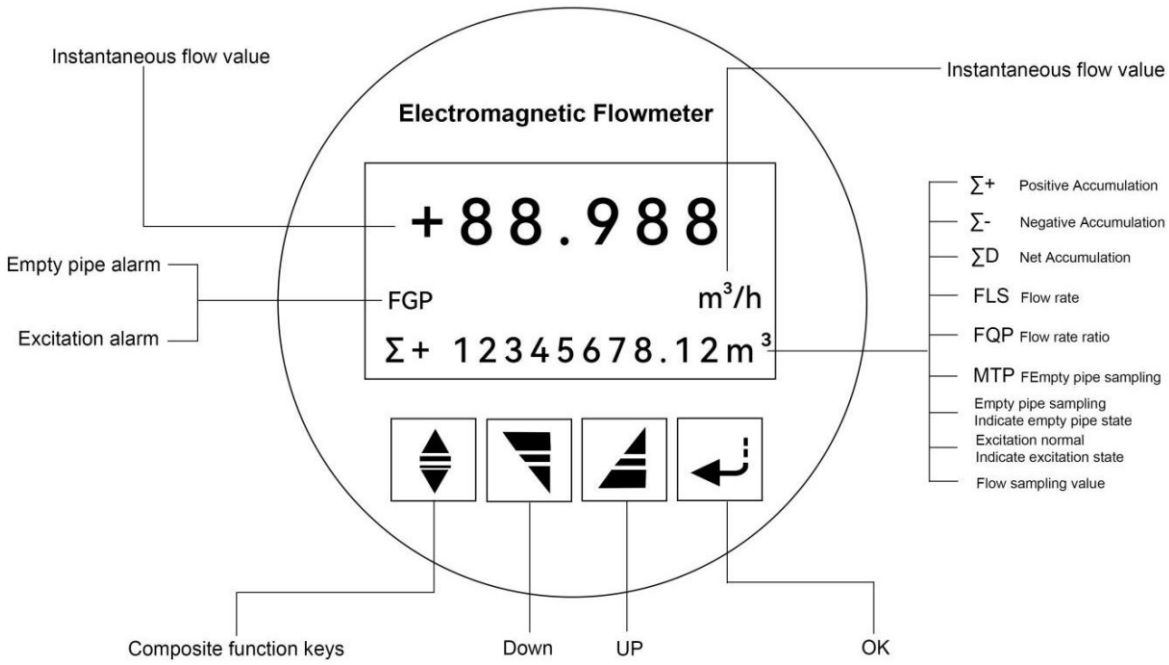
Type C (the excitation signal line of this model is connected by wiring and is reflected on the wiring terminal)

Logo	Functional Description
L	220 V power supply live wire
N	220 V Power supply neutral line
FQ-	Alarm output terminal negative pole (this version is not available yet)
FQ +	Alarm output terminal positive pole (this version is not available yet)
IOUT -	4-20 mA current output negative
IOUT +	4-20 mA current output positive
POUT	Pulse output positive (active pulse output, pulse output voltage 23.2 V)
COMM	Pulse output negative
485 B	RS485 communication B (negative)
485 A	RS485 communication A (positive)
SIG1	Sensor access signal line 1 (electrode line)
EX1	Sensor excitation connection
EX2	Sensor excitation connection

SIG2	Sensor access signal line 2 (electrode line)
GND	The sensor is connected to the bottom of the signal line (ground electrode)
DC24V+	DC power supply DC24V positive
DC24V-	DC power supply DC24V negative

Instrument Interface And Operation

Interface Description



Key Description

Confirm key : Confirm the current interface parameter settings and view the current interface parameters

Select key: Parameter viewing and setting

Composite Function Keys: Press and hold the above function keys to switch their functions.

When the instrument is powered on, it automatically enters the measurement state:

1. In the automatic measurement state, the instrument automatically completes each measurement function and displays the corresponding measurement data.

2. In the automatic measurement state, switch the display content.

★ up key″ or ″down key″ on the main interface , and the parameters such as forward accumulation (Σ+), reverse accumulation (Σ-), net accumulation

(ΣD), flow rate (FLS), flow range ratio (FQP), empty pipe sampling value (MTP), empty pipe normal/alarm, flow signal sampling value (Samp), excitation current sampling value (Coil), excitation normal/alarm, upper and lower limits normal/lower limit alarm/upper limit alarm will be displayed cyclically;

★ On the main interface, press and hold the "OK" while pressing the "OK" to enter, press the "OK" again to enter the "Enter password" interface, then press and hold the "OK" while pressing the "Composite Function Keys" to move the cursor and use the "Composite Function Keys" to select a number (user password: 01000), enter the password and press the "OK" to enter the parameter setting option.

Parameter Setting Instructions

Menu List:

No.	Parameter name	Setting method	Parameter range
1	language	choose	Chinese, English
2	Commaddress	Number	0～99
3	Baud Rate	choose	300～38400
4	Snsr Size	choose	3～3000
5	Flow Unit	choose	L/h, L/m, L/s, m3/h, m3/m, m3/s
6	Flow Range	Number	0～99999
7	Damp	choose	1～64
8	Flow Direct	choose	Forward, Reverse
9	Flow Zero	Number	0～±9999
10	Flow Cutoff	Number	0～599.99%
11	Cutoff Ena	choose	Allow/Disallow
12	Total Unit	choose	0.001m3～1m3, 0.001L～1L,
13	SegmaN Ena	choose	Allow, prohibit
14	Analog Type	choose	0～10mA /4～20mA
15	Pulse Type	choose	Pulse/Frequency
16	Pulse Fact	choose	0.001m3～1m3, 0.001L～1L,
17	Freque Max	choose	1～ 5999 Hz
18	Mtsnsr Ena	choose	Allow/Disallow
19	Mtsnsr Trip	Number	59999
20	Alm Ena	choose	Pulse/Upper limit alarm/Lower limit alarm
21	Alm Hi Val	Number	Default 1 00%
22	Alm Low Val	Number	Default 0.01%
23	Coil Alm Ena	choose	Allow/Disallow

24	Coil Alm Val	Number	0 -9999 Default 1 300
25	Clr Sum Key	Number	0-99999
26	Field Type	choose	Method 1 / Method 2 / Method 3
27	Linear correction	Number	0 -999 , default 1 00
28	Sensor Fact	Number	0.0000～5.9999
29	Correct Fact 0	Number	0.0000～2.0000
30	Correct Valu 0	Number	00.0~10.0 (flow rate)
31	Correct Fact 1	Number	0.0000～2.0000
32	Correct ValU 1	Number	00.0~10.0 (flow rate)
33	Correct Fact 2	Number	0.0000～2.0000
34	Correct Valu 2	Number	00.0~10.0 (flow rate)
35	Correct Fact 3	Number	0.0000～2.0000
36	Correct Valu 3	Number	00.0~10.0 (flow rate)
37	Correct Fact 4	Number	0.0000～2.0000
38	Fwd Total	Can be modified	0～999999999
39	Rev Total	Can be modified	0～999999999
40	Analog Zero	Number	0.0000～5.9999
41	Analog Range	Number	0.0000～5.9999
42	Meter Fact	Number	0.0000～5.9999
43	Flow Amp	choose	1x / 2x / 4x / 8x
44	Measuring Mode	choose	Fast/Stable
45	Set Density	Number	0～59999
46	Remote Enable	choose	Enable/Disable
47	Remote IP	set up	
48	Remote Interval	choose	Enable/Disable
49	Contrast	Number	0 ~ 25 , default 5

language

The electromagnetic flowmeter has multiple languages, and users can choose the operation by themselves.

Commaddress

Refers to the communication address of this table when multiple machines are communicating. The optional range is: 01 to 254 addresses, 0 and 255 addresses are reserved

Baud Rate

Instrument communication baud rate selection range: 1200, 2400, 4800, 9600,

19200, 38400.

Snsr Size

The diameter range of electromagnetic flowmeter pipeline: 10～3000mm.

Flow Range

The instrument range setting refers to determining the upper flow value, and the lower flow value of the instrument is automatically set to ″ 0″. Setting the instrument range too small or too large does not affect the actual measurement accuracy, but it will affect the output of current and frequency, small signal cut-off ratio, upper and lower limit alarms, etc., which are calculated based on the flow range ratio . Therefore, the instrument range setting determines the instrument range, and also determines the percentage display of the instrument:

Instrument percentage display value = flow measurement value/instrument range value × 100%

Flow Unit

Select the flow display unit in the parameters. The flow display units of the instrument are: L/h, L/m, L/s, m3/h, m3/m, m3/s. Users can select a suitable flow display unit according to process requirements and usage habits .

Damp

Long measurement filter time can improve the stability of flow display and output signal of the instrument, and is suitable for measuring pulsating flow with total accumulation. Short measurement filter time shows fast measurement response speed, and is suitable for production process control. The setting of measurement filter time adopts selection mode, generally between 4 and 16

Flow Direct

If the user believes that the fluid direction during debugging is inconsistent with the design, the user does not need to change the connection method of the excitation line or signal line, but can change the flow direction setting parameter.

Flow Zero

When correcting the zero point, ensure that the sensor tube is full of fluid and the fluid is at rest. The flow zero point is represented by the internal sampling value and has no unit.

Flow Cutoff

The small signal cut-off point setting is expressed as a percentage of the range flow rate. When the small signal is cut off, the user can choose to cut off the display and signal output of the flow rate and flow velocity at the same time; or choose to only cut off the current output signal and frequency (pulse) output signal and keep the display of the flow rate and flow velocity.

Cutoff Ena

When the display parameter of the allowed cut-off is set to "Allow", when the flow rate is less than the small signal cut-off point, the flow rate is displayed as zero, and when it is greater than the small signal cut-off point, the flow rate is displayed normally. When the display parameter of the allowed cut-off is set to "Prohibit", when the flow rate is less than the small signal cut-off point, the flow rate is displayed normally, and when it is greater than the small signal cut-off point, the flow rate is displayed normally.

Total Unit

The electromagnetic flowmeter display is a 9-digit counter, and the maximum allowable count value is 999999.999. The totalizing units used are L, m3 (liter, cubic meter). The flow totalizing equivalents are 0.001L, 0.01L, 0.1L, 1L, 0.001 m3, 0.01 m3, 0.1 m3, 1 m3.

SegmaN Ena

When the reverse output permission parameter is set to the "allowed" state, the measurement interface can measure the forward and reverse flows of the flow. When it is "prohibited", only the forward flow of the flow can be tested.

Pulse Type

There are two pulse output modes to choose from: frequency output and pulse output.

Frequency output mode: The frequency output is a continuous square wave, and the frequency value corresponds to the flow percentage.

Frequency output value = (flow measurement value/meter range) * frequency full scale value.

Pulse output mode: The pulse output is a rectangular wave pulse train. Each pulse represents a flow equivalent flowing through the pipeline. The pulse equivalent is selected by the "Pulse Equivalent Unit" parameter below.

The pulse output method is mostly used for total accumulation and is generally connected to an integrating instrument.

Frequency output and pulse output are generally active, with a voltage between

3.3V and 5V, and no external power supply is required.

Pulse Fact

The pulse unit equivalent refers to the flow value represented by a pulse. Whenever the cumulative flow increases by one pulse equivalent value, a pulse is output. For example, when the pulse output equivalent is set to 001.00L , it means that a pulse is output when the cumulative flow increases by 1L; when the pulse output equivalent is set to 000.10L, it means that a pulse is output when the cumulative flow increases by 0.1L. Under the same flow rate, the smaller the pulse equivalent, the more pulses are output per second. The maximum value is 599.99L and the minimum value is 000.01L. The pulse width emitted is a fixed value (10ms), so the number of pulses emitted per second should not exceed 50, otherwise there will be pulse loss, and the pulses emitted per second are uneven.

Freque Max

The frequency output range of the instrument corresponds to the upper limit of flow measurement, that is, 100% of the percentage flow. The upper limit of the frequency output can be set arbitrarily within the range of 1 to 5000Hz. (The recommended setting frequency is: 5000 4500 4000 3500 3000 2500 2000 1500 1000 500, and it is more accurate to set it in multiples of 500)

Mtsnsr Ena

The electromagnetic flowmeter has an empty pipe detection function without the need for additional electrodes. If the user chooses to allow an empty pipe alarm, the meter can detect an empty pipe state when the fluid in the pipe is lower than the measuring electrode. After detecting the empty pipe state, the meter's analog output and digital output are set to signal zero, and the meter flow display is zero.

Mtsnsr Trip

In the case of full pipe (with or without flow rate), the empty pipe alarm setting has been modified to make it more convenient for users. When setting the empty pipe alarm threshold, it can be set according to the measured conductivity.

Alm Hi Val

The upper limit alarm value is calculated as a percentage of the range. This parameter is set numerically. The user sets a value between 0% and 199.9%. If the alarm condition is met during the operation of the instrument, the

instrument will output an alarm signal.

Alm Low Val

Same as upper limit alarm.

Coil Alm Method

You can choose "Mode 1", "Mode 2" or "Mode 3". The default is "Mode 1". Different modes correspond to different excitation frequencies. Mode 1 corresponds to 1/8 of the power frequency (**note that changing the excitation mode may affect the flow rate**).

Sensor Fact

The sensor coefficient can be used to calibrate the sensor (**Note: it is not recommended for non-manufacturer personnel to adjust it, which will affect the flow rate**).

Nonlinear correction function description (correction point and correction coefficient)

The nonlinear correction function is, in principle, used for linear adjustment of small flow rates (less than 0.5m/s). This function is designed with 5 corrections, divided into 4 flow points and 5 correction coefficients. The flow rate corresponding to the correction point must meet the following conditions: 0＜correction point 0 (0.0m/s)＜correction point 1 (1.0m/s)＜correction point 2 (2.0m/s)＜correction point 3 (5.0m/s). (The default value flow rate point is in brackets), and each correction coefficient defaults to 1.0000.

The correction calculation is performed on the original sensor flow coefficient curve. Therefore, the sensor coefficient should be marked first. According to the marked sensor nonlinearity, the correction coefficient is set and the correction is performed in sections. If the coefficient is set appropriately, there is no need to recalibrate.

When correction point 0 is set to 0 m/s, the correction function is turned off, otherwise it is turned on.

The original flow rate in the formula is the actual standard flow rate, and the corrected flow rate is called the corrected flow rate. The correction calculation formula is as follows:

In the interval of 0< original flow< correction point 0;

Corrected flow rate = correction factor 0 × original flow rate;

In the interval of correction point 0 ＜ original flow ＜ correction point 1;

Corrected flow rate = correction factor 1 × original flow rate;
In the interval of correction point 1 < original flow < correction point 2;
Corrected flow rate = correction factor 2 × original flow rate;
In the interval where correction point 2 < original flow ≥ correction point 3;
Corrected flow rate = correction factor 3 × original flow rate;
In the correction point 3＜original flow interval;
Corrected flow rate = correction factor 4 × original flow rate;
Note: When setting the correction points, the following relationship should be maintained:
0＜Correction point 0 ＜Correction point 1 ＜Correction point 2 ＜Correction point 3. The median value of the correction coefficient is 1.0000. A coefficient greater than 1 will correct the flow rate higher, and a coefficient less than 1 will correct the flow rate lower.
(**Note: Reshuffling parameters affects flow measurement, and it is not recommended for non-manufacturer personnel to adjust, and it is not recommended to make accidental adjustments in the laboratory**)

Analog Zero

The electromagnetic flowmeter is factory-adjusted for current output zero point, so that the current output is accurately 4mA.
(**Note: It is not recommended for non-manufacturer personnel to make adjustments, as this will affect the accuracy of the current signal output**).

Analog Range

The electromagnetic flowmeter is factory-adjusted to full scale current output, so that the current output is accurately 20mA.
(**Note: It is not recommended for non-manufacturer personnel to make adjustments, as this will affect the accuracy of the current signal output**).

Meter Fact

This coefficient is a special coefficient for electromagnetic flowmeter manufacturers. Electromagnetic flowmeter manufacturers use this coefficient to normalize the electromagnetic flowmeter measurement circuit system to ensure that the interchangeability of all electromagnetic flowmeters reaches 0.1%.
(**Note: It is not recommended for non-manufacturer personnel to make adjustments as this will affect the flow rate**).

Instrument range setting

The instrument range setting refers to determining the upper limit flow value,

and the lower limit flow value of the instrument is automatically set to "0". Therefore, the instrument range setting determines the instrument range, and also determines the corresponding relationship between the instrument percentage display, instrument frequency output, instrument current output and flow:
Instrument percentage display value = (flow value measurement value / instrument range) * 100%;
Instrument frequency output value = (flow value measurement value / instrument range) * frequency full range value;
Instrument current output value = (flow value measurement value / instrument range) * current full range value + base point;
The meter pulse output value is not affected by the meter range setting;
The unit of the instrument range setting is equivalent to the flow unit and changes with the flow unit.

Flow Amp

The default value is 1, and you can choose 2, 4 , or 8. The adjustment of the flow amplification factor will take effect after restart. The amplification factor will multiply or reduce the flow .
(**Note: It is not recommended for non-manufacturer personnel to make adjustments as this will affect the flow rate**).

Measuring Mode

You can choose between fast mode and stable mode, with fast mode as the default. When traffic fluctuations are large, you can try changing the mode to stable mode.
Used for flow meter working mode selection. In fast mode, the flow meter responds to flow quickly, while in stable mode, the flow meter responds relatively slowly. Fast mode can better reflect real-time flow, but it may also show larger fluctuations. Stable mode can ensure flow stability.

Set Density

Used to set the density of the fluid flowing through the sensor;

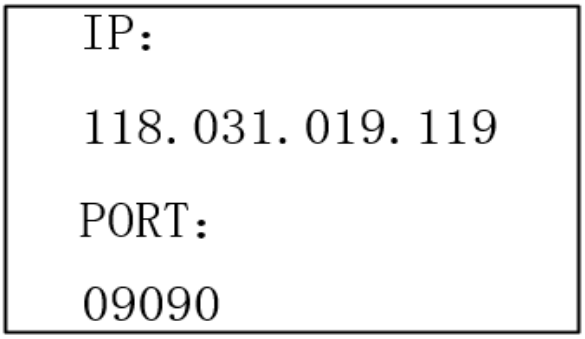
Remote Enable

Used to support the "enable" and "disable" of the remote transmission function. This function requires the installation of a GPRS module and requires power-on after setting.
The use of the GPRS module requires corresponding program support. After GPRS is turned on, the host surface will have "network signal" and networking status indicators.

The communication protocol of the remote transmission function of the device is Modbus protocol. For specific protocol analysis, please refer to the "Communication Protocol" document

Remote IP

In the GPRS function program, you can set the server's IP address and port number. The factory default is the company's server address. Users can modify it to their own service address and port according to their needs.



Port and IP address modification interface

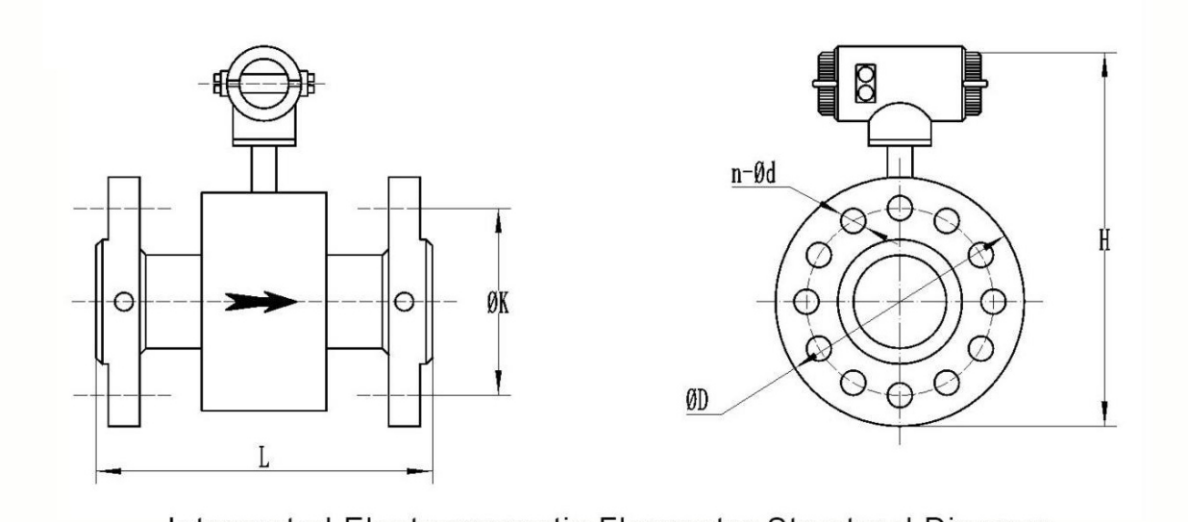
Remote Interval

Set the interval time for flow signal collection in normal working mode. The smaller the value, the faster the flow collection and the faster the response to flow changes, but it will increase power consumption. The smaller the value, the slower the flow collection and the lower the power consumption. The factory default is 15 seconds and it takes effect in working mode. Once this parameter is set in calibration mode, it will immediately exit calibration mode.

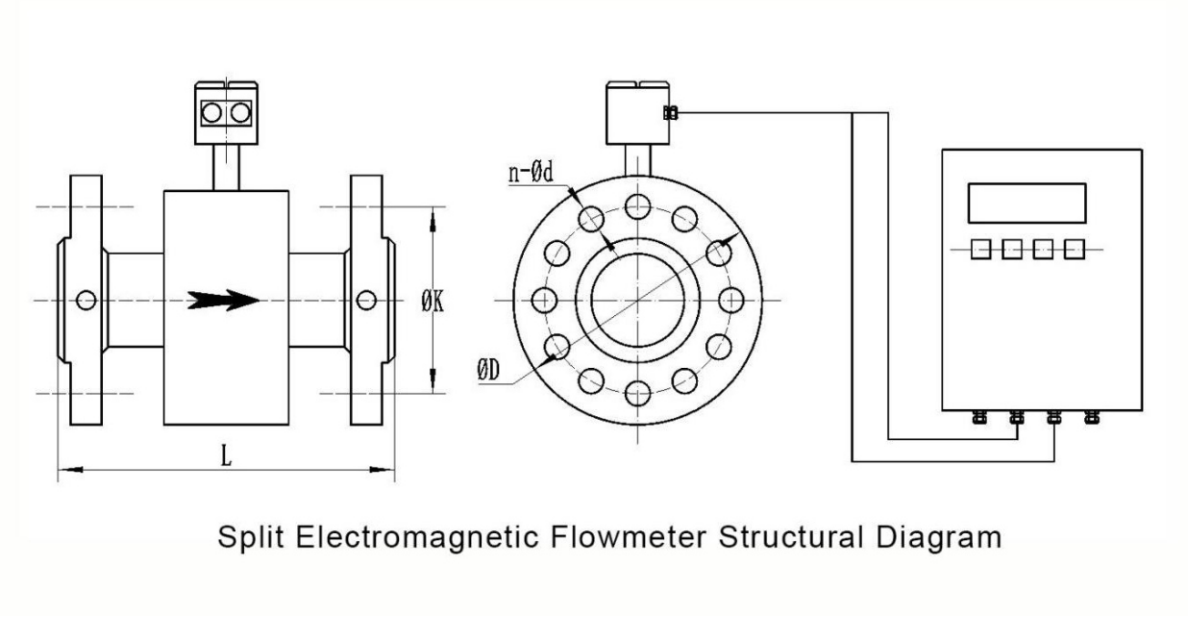
Contrast

Adjust the color density of the fonts displayed on the screen

External Structure Diagram



Intergrated Electromagnetic Flowmeter Structural Diagram



Split Electromagnetic Flowmeter Structural Diagram

Appearance And Installation Dimensions

Appearance and installation dimensions						
Diameter (mm)	Nominal pressure (Mpa)	External dimensions			Connection dimensions	
		L	H	D	K	n-Ø
		Total length (including grounding ring)	Total height (including header)	Flange outer diameter	Distance between flange holes	Holes number/Bolt Diameter
15	4	200	279	Ø95	65	4×Ø14
20	4	200	284	Ø105	75	4×Ø14
25	4	200	303	Ø115	85	4×Ø14
32	4	200	327	Ø140	100	4×Ø18
40	4	200	335	Ø150	110	4×Ø18
50	4	200	342	Ø165	125	4×Ø18
65	1.6	200	365	Ø185	145	8×Ø18
80	1.6	200	383	Ø200	160	8×Ø18
100	1.6	250	398	Ø220	180	8×Ø18
125	1.6	250	438	Ø250	210	8×Ø18
150	1.6	300	478	Ø285	240	8×Ø22
200	1.6	350	532	Ø340	295	12×Ø22
	1.0					8×Ø22
250	1.6	400	566	Ø405	355	12×Ø26
	1.0			Ø395	350	12×Ø22
300	1.6	500	618	Ø460	410	12×Ø26
	1.0			Ø445	400	12×Ø22
350	1.0	500	665	Ø505	460	16×Ø22
400	1.0	600	720	Ø565	515	16×Ø26
450	1.0	600	775	Ø615	565	20×Ø26
500	1.0	600	843	Ø670	620	20×Ø26
600	1.0	600	955	Ø780	725	20×Ø30
700	1.0	700	1040	Ø895	840	24×Ø30
800	1.0	800	1148	Ø1015	950	24×Ø33
900	1.0	900	1248	Ø1115	1050	28×Ø33
1000	1.0	1000	1363	Ø1230	1150	28×Ø36

Flow Rate

Size	Flow Range & Velocity Table							
(mm)	0.1m/s	0.2m/s	0.5m/s	1m/s	4m/s	10m/s	12m/s	15m/s
3	0.003	0.005	0.013	0.025	0.102	0.254	0.305	0.382
6	0.01	0.020	0.051	0.102	0.407	1.017	1.221	1.526
10	0.028	0.057	0.141	0.283	1.130	2.826	3.391	4.239
15	0.064	0.127	0.318	0.636	2.543	6.359	7.630	9.538
20	0.113	0.226	0.565	1.130	4.522	11.304	13.56	16.956
25	0.177	0.353	0.883	1.766	7.065	17.663	21.2	26.494
32	0.289	0.579	1.447	2.894	11.575	28.938	34.73	43.407
40	0.452	0.904	2.261	4.522	18.086	45.216	54.26	67.824
50	0.707	1.413	3.533	7.065	28.260	70.650	84.78	105.98
65	1.19	2.39	5.97	11.94	47.76	119.40	143.3	179.10
80	1.81	3.62	9.04	18.09	72.35	180.86	217.0	271.30
100	2.83	5.65	14.13	28.26	113.04	282.60	339.1	423.90
125	4.42	8.83	22.08	44.16	176.63	441.56	529.9	662.34
150	6.36	12.72	31.79	63.59	254.34	635.85	763.0	953.78
200	11.3	22.61	56.52	113.04	452.16	1130.40	1356	1696
250	17.66	35.33	88.31	176.53	706.50	1766.25	2120	2649
300	25.43	50.87	127.2	254.34	1017	2543.40	3052	3815
350	34.62	69.24	173.1	346.19	1385	3461.85	4154	5193
400	45	90	226.1	452	1809	4522	5426	6782
450	57	114	286.1	572	2289	5723	6867	8584
500	71	141	353.3	707	2826	7065	8478	10598
600	102	203	508.7	1017	4069	10174	12208	15260
700	138	277	692.4	1385	5539	13847	16617	20771
800	181	362	904.3	1809	7235	18086	21704	27130
900	229	458	1145	2289	9156	22891	27469	34336
1000	283	565	1413	2826	11304	28260	33912	42390
1200	407	814	2035	4069	16278	40694	48833	61042
1400	554	1108	2769	5539	22156	55390	66468	83084
1600	723	1447	3617	7235	28938	72346	86815	108518
1800	916	1831	4578	9156	36625	91562	109875	137344
2000	1130	2261	5652	11304	45216	113040	135648	169560
2200	1368	2736	6839	13678	54711	136778	164134	205168
2400	1628	3256	8139	16278	65111	162778	195333	244166
2600	1910	3821	9552	19104	76415	191038	229245	286556
2800	2216	4431	11078	22156	88623	221558	265870	332338
3000	2543	5087	12717	25434	101736	254340	305208	381510

Fault Query And Troubleshooting

The electromagnetic flowmeter has a self-diagnosis function. In the automatic measurement state, the alarm information can be queried by pressing a button.

■ **No display on the instrument**

* Check whether the power is on;
* Check whether the power fuse is intact;
* Check whether the power supply voltage meets the requirements;
* Check if the LCD panel is turned on.

■ **Air traffic control alarm**

* Whether the measuring fluid fills the sensor measuring tube;
* Use wires to short-circuit the electromagnetic flowmeter signal input terminals SIG1, SIG2 and ground. If the "empty pipe" turns into a "full pipe", it means that the electromagnetic flowmeter is normal. It may be that the conductivity of the measured fluid is low or the empty pipe threshold is set incorrectly.
* Check whether the signal connection is correct; check whether there is a ground wire (the ground here refers to the ground of the liquid being measured);
* Check whether the electromagnetic flowmeter electrodes are normal: set the

flow rate to zero, and observe that the displayed conductivity ratio should be less than 100%; when there is flow, measure the resistance of terminals SIG1 and SIG2 to SIGGND respectively, which should be less than 50kΩ (measured value for water as the medium. It is best to use a pointer multimeter to measure, and you can see that there is charging and discharging during the measurement process);

* The DC voltage between DS1 and DS2 measured with a multimeter should be less than 1V, otherwise it means the sensor electrodes are contaminated and should be cleaned.

■ **The measured flow rate is not accurate**

* Whether the measuring fluid fills the sensor measuring tube;
* Whether the signal line connection is normal;
* Whether the connection between the meter and the metal measuring tube is secure (refer to the grounding requirements for electromagnetic flowmeter installation);
* Check whether the sensor coefficient and sensor zero point are set according to the electromagnetic flowmeter nameplate or factory calibration sheet.

Transportation, Storage And Maintenance

To prevent the electromagnetic flowmeter from being damaged during transportation, the electromagnetic flowmeter should be placed according to the signs during transportation, and should not be directly affected by rain, frost, fog, and should not be damaged by squeezing, impact, etc. Before arriving at the installation site, please keep the packaging status when shipped by the manufacturer.

When storing, the height of the product pad from the ground should not be less than 0.3m, the distance from the four walls should not be less than 1m, and the distance from the heating equipment should not be less than 2m. The product should be stored in a ventilated room with a temperature of 0℃～40℃ and a relative humidity of no more than 85%. The indoor air should not contain corrosive harmful media. It should be protected from strong electromagnetic fields and direct sunlight.

Before storing used sensors, the dirt and measured media attached to the lining and electrode surfaces must be removed. Clean and descale the electrodes and lining regularly.

Lightning Protection Guide

Electromagnetic flowmeters installed outdoors basically use agricultural electricity. Due to the small capacity of agricultural electricity, large voltage fluctuations, and inadequate protection, it is particularly susceptible to interference, especially in mountainous areas and open fields, where lightning strikes are a high probability event. The measurement principle of the

electromagnetic flowmeter determines that its ground wire must be in reliable contact with the measuring medium. For this reason, the ground wire of the electromagnetic flowmeter should be in good contact with the measuring pipeline (conductive pipeline), or a grounding ring (non-conductive pipeline) should be installed. Since the pipeline is in direct contact with the earth, once the overhead wire is struck by lightning, the instantaneous current will pass through the electromagnetic flowmeter on the pipeline and eventually return to the earth, causing the electromagnetic flowmeter equipment to burn out.

Although our products have passed the 4000V surge test, the damage caused by lightning is immeasurable and unpredictable. It is recommended to install a surge protector on the power cord (you need to buy regular brand products, such as Chint, OPPLE, etc.). The surge protector must be reliably grounded, otherwise it will not only fail to play a protective role, but will more easily burn out the electromagnetic flowmeter. Similarly, the communication line (485 or 4-20mA) may also be struck by lightning, damaging the electromagnetic flowmeter. It is recommended to do lightning protection where conditions permit.

Pay special attention to the use of electromagnetic flowmeters in rural sewage systems. If they are not properly protected, damage during the thunderstorm season is a high probability event, which will not only cause damage to the electromagnetic flowmeter, but also damage other equipment!

Special Reminder

In actual use, there may be slight differences due to individual differences in products, software versions, usage conditions and environmental factors. Please refer to the actual use situation. In order to provide the most accurate product information, specifications and product features, We may adjust and revise the text descriptions, picture effects and other contents on the above pages in real time to match the actual product performance, specifications, parameters, parts and other information. Due to the real-time changes in product batches and production supply factors, if there is a need for the above modifications and adjustments, no special notice will be given.