Electromagnetic Flowmeter

Installation and Instruction Manual

CATALOG

Installation and Use Instructions

When submitting the instrument for inspection, the following points should be noted:

1. After the instrument is installed, it should be powered on for more than half an hour to warm up, and then start the verification;
2. Recommended flow velocity range for verification: 0.5m/s~5m/s;

The following requirements must be observed when selecting the installation location on the pipe:

1. Requirements for the front and rear straight pipe sections: the front end of the flowmeter is ≥10DN, and the rear end is ≥5DN. It is forbidden to install in connection with the valve.
2. The installation position must ensure that the medium flows in the full tube to avoid the dissatisfied tube and the gas adhering to the electrode.
3. The sensor can be installed on horizontal, vertical or inclined pipes. The vertical or inclined pipes ensure that the medium flows from bottom to top, and the signal electrode should be in a horizontal state.
4. When the medium at the installation position of the flowmeter is not full, the method of raising the back-end pipeline of the flowmeter can be adopted to make it full. It is strictly forbidden to install the flowmeter at the highest point of the pipeline and the water outlet.
5. The flowmeter cannot be installed on the suction side of the pump (to prevent vacuum).
6. It should be kept away from equipment with strong magnetic field. Avoid places with strong vibration and strong corrosiveness. For pipelines where the process does not allow flow interruption, a stop valve and a bypass pipeline should be added when installing the flowmeter.
7. The measuring tube of the sensor, the outer casing, the shielded wire of the lead wire, and the pipes at both ends of the sensor must be grounded reliably, and must not be shared with the grounding of other electrical equipment. This is a special installation requirement for electromagnetic flowmeters.
8. It is not recommended to install the sensor behind the control valve. Please refer to Figure 6 before installation.

Ⅰ. OVERVIEW

1.1 Instrument Features and Uses

- The measurement is not affected by changes in fluid density, viscosity, temperature, pressure and electrical rate;
- There are no blocking parts in the measuring pipe, no pressure loss, low requirements for straight pipe sections, and unique adaptability to slurry measurement.
- Nominal diameter DN6-DN3000 covers a wide range, there are various options for lining and electrodes, it can be suitable for various measurement media, and has good corrosion resistance and wear resistance;
- The converter adopts programmable frequency low-frequency rectangular wave excitation, which improves the stability of flow measurement and reduces power loss;
- The converter adopts 32-bit embedded microprocessor, all-digital processing, fast calculation speed, strong anti-interference ability, reliable measurement, high accuracy, the flow measurement range can reach 1500:1, and the range can be modified online according to the actual needs of users;
- High-definition backlight LCD display, optional Chinese and English menu operation, easy to use, simple to operate, easy to learn and understand;
- With digital communication signal output such as RS485-MODBUS, RS232, Hart and Profibus (optional);
- With conductivity measurement function, it can judge whether the sensor is empty or not, with self-test and self-diagnosis functions;
- Adopt SMD devices and surface mount (SMT) technology, with high circuit reliability;
- Infrared hand terminal operation, 115KHZ communication rate, long-distance non-contact operation of all functions of the converter (optional);
- There are three internal meters that can display the forward cumulative amount, the reverse cumulative amount and the difference cumulative amount respectively. There is a power-down clock inside, which can record the power-down time (optional);
- Can be used in corresponding explosion-proof occasions.

1.2 Application

Electromagnetic flowmeters can be used to measure the volume flow of conductive fluids in closed pipes, and can also be used to measure the volume flow of corrosive liquids such as strong acid and alkali, and uniform liquid-solid mixed liquids such as mud, pulp, and pulp. It is widely used in flow measurement and control in industrial and agricultural production processes such as petrochemical industry, iron and steel metallurgy, water supply and drainage, water conservancy irrigation, water treatment, environmental protection sewage measurement and control, papermaking, medicine, food and other industrial and agricultural production processes.

Ⅱ. WORKING PRINCIPLE

The working principle of electromagnetic flowmeter is based on Faraday's law of electromagnetic induction, as shown in Figure 1. When a conductor moves in the magnetic field, an induced electromotive force **(E)** will be generated at both ends of the conductor in the direction perpendicular to the direction of the magnetic field and the moving direction. is

proportional to the magnetic induction intensity, its value is: **E=B.V.D.K**

In the formula:

K-coefficient related to magnetic field distribution and axial length

B-magnetic induction

V-average flow rate of conductive liquid

D-electrode spacing (inner diameter of measuring tube)

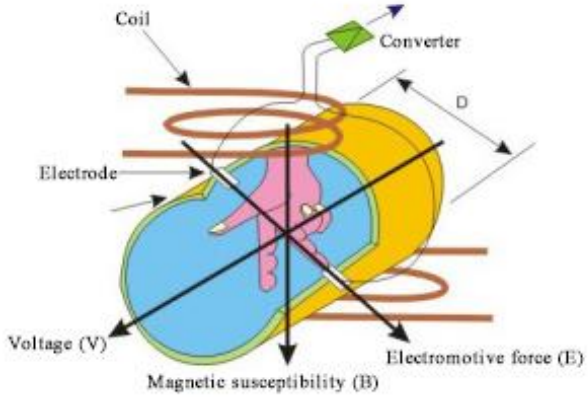


Figure 1 Schematic diagram of pipeline electromagnetic flowmeter

The working principle of the insertion electromagnetic flowmeter is the same as that of the pipeline electromagnetic flowmeter, which is also based on Faraday's law of electromagnetic induction, as shown in Figure 2. When the conductive liquid passes through two electrodes with a distance L at an average flow velocity V and perpendicular to the direction of the magnetic field of force B, a corresponding induced electromotive force (E) is generated between the electrodes, and the formula is: **E=B×L×V**

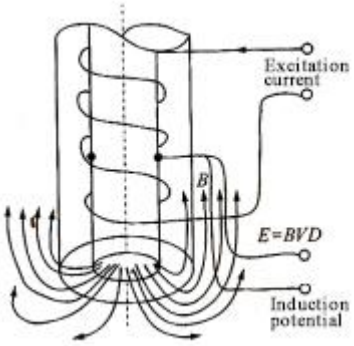


Figure 2 Schematic diagram

In the formula:

B: the magnetic induction intensity of the excitation coil

V: Average flow velocity

L: The distance between the two electrodes (this machine is 24mm)

QV: The volume flow of the fluid to be measured

The electromagnetic flowmeter converter provides stable excitation current to the electromagnetic flow sensor excitation coil, and the preamplifier amplifies and converts the electromotive force induced by the sensor into a standard current signal or frequency signal, which is convenient for flow display, control and adjustment. Figure 2 below shows the converter circuit structure.

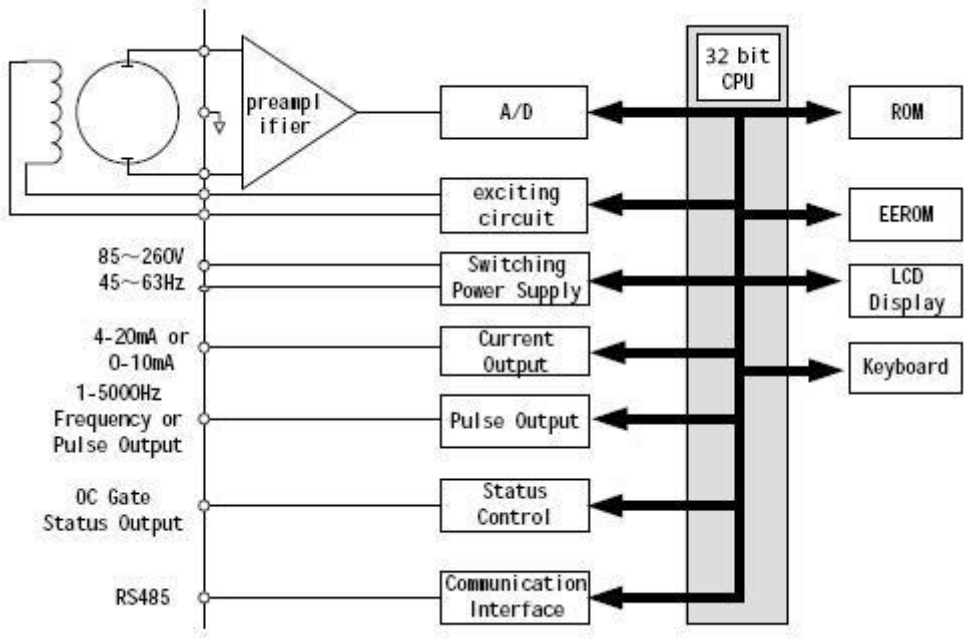


Figure 3 Converter circuit diagram

Ⅲ. WORKING PRINCIPLE

3.1 Sensor Technical Parameters

- Measuring medium: water, acid, alkali, seawater and other strong corrosive or conductive liquid containing impurities;
- Dielectric conductivity: ≥20uS/cm;
- Nominal diameter: DN6-DN3000mm;
- Execution standard and verification basis: JB/T9248-2015, JJG1033-2007;
- Lining material: polychloroprene rubber, PTFE, polyurethane rubber, F46, PFA;
  Electrode material: molybdenum-containing stainless steel, Hastelloy B, Hastelloy C, titanium, tantalum, platinum alloy, tungsten carbide;
- Nominal pressure: 0.6MPa-42MPa;
- Accuracy grade: 0.2, 0.5, 1.0;
- Velocity range: 0.1m/s-15m/s;
- Ambient temperature: sensor -25℃～+60℃, converter -10℃～+60℃;
- Relative temperature: 5%-95%

3.2 Measuring Range

Velocity - Flow Chart							
Flow rate m/s / Flow m^3/h / Caliber mm	**0.5 (Min)**	**1**	**2**	**3**	**4**	**5**	**15 (Max)**
6	0.05	0.1017	0.2034	0.3051	0.4068	0.5085	1.5255
10	0.141	0.2826	0.5652	0.8478	1.1304	1.4130	4.2390
15	0.318	0.6362	1.2723	1.9085	2.5447	3.1809	9.5426
20	0.565	1.1310	2.2619	3.3929	4.5239	5.6549	16.9646
25	0.884	1.7671	3.5343	5.3014	7.0686	8.8357	26.5072
32	1.447	2.8938	5.7876	8.6814	11.5752	14.469	43.4070
40	2.262	4.5239	9.0478	13.5717	18.0956	22.6195	67.8584
50	3.534	7.0686	14.1372	21.2058	28.2743	35.3429	106.0288
65	5.973	11.9459	23.8918	35.8377	47.7836	59.7295	179.1886
80	9.048	18.0956	36.1911	54.2867	72.3823	90.4779	271.4336
100	14.137	28.2743	56.5487	84.8230	113.0973	141.3717	424.1150
125	22.078	44.1563	88.3126	132.4689	176.6252	220.7815	662.3445
150	31.809	63.6173	127.2345	190.8518	254.4690	318.0863	954.2588
200	56.549	113.0973	226.1947	339.2920	452.3893	565.4867	1696.4600
250	88.357	176.7146	353.4292	530.1438	706.8583	883.5729	2650.7188
300	127.235	254.4690	508.9380	763.4070	1017.8760	1272.3450	3817.0351
350	173.180	346.3606	692.7212	1039.0818	1385.4424	1731.8030	5195.4089
400	226.195	452.3893	904.7787	1357.1680	1809.5574	2261.9467	6785.8401
450	286.278	572.5553	1145.1105	1717.6658	2290.2210	2862.7763	8588.3289
500	353.429	706.8583	1413.7167	2120.5750	2827.4334	3534.2917	10602.8752
600	508.938	1017.8760	2035.7520	3053.6281	4071.5041	5089.3801	15268.1403
700	692.721	1385.4424	2770.8847	4156.3271	5541.7694	6927.2118	20781.6354
800	904.779	1809.5574	3619.1147	5428.6721	7238.2295	9047.7868	27143.3605
900	1145.111	2290.2210	4580.4421	6870.6631	9160.8842	11451.1052	34353.3157
1000	1413.717	2827.4334	5654.8668	8482.3002	11309.7336	14137.1669	42411.5008
1200	2035.752	4071.5041	8143.0082	12214.5122	16286.0163	20357.5204	61072.5612
1400	2770.885	5541.7694	11083.5389	16625.3083	22167.0778	27708.8472	83126.5416
1600	3619.115	7238.2295	14476.4589	21714.6884	28952.9179	36191.1474	108573.4421
1800	4580.442	9160.8842	18321.7684	27482.6525	36643.5367	45804.4209	137413.2627
2000	5654.867	11309.7336	22619.4671	33929.2007	45238.9342	56548.6678	169646.0033

Note: The above table lists the flow rates corresponding to several representative flow rates. The flow rate corresponding to any flow rate can also be calculated using this table: if the flow rate value Q (m3/h) is known, and then the flow rate value Q1 corresponding to the 1m/s flow rate under the corresponding caliber is found out from the table, then for the flow rate V=Q/Q1 (m /s)

3.3 External and Installation Dimensions

3.3.1 Dimensions of the converter, check Fig.

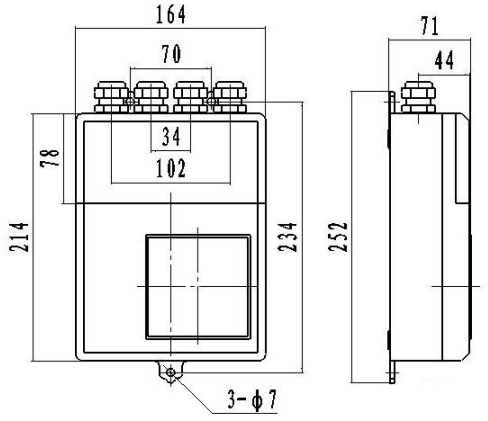
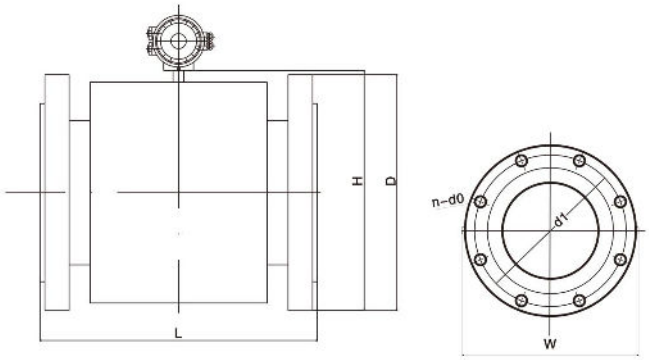


Figure 4 Split type 211 series

3.3.2 Flowmeter installation dimensions, flange standard JB/T81-1994



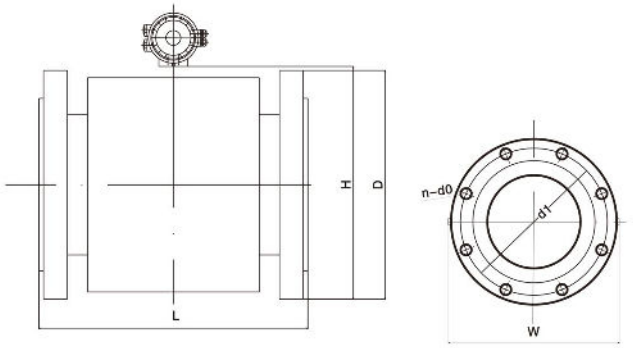
DN150~DN150, 1.6，4.0MPa Sensor and Outline Drawings

Dimensions and weight

Nominal diameter DN	L	W	H	Approx weight	
				Integrated	Sensor
15	200	140	147	10	7
20	200	140	154	12	9
25	200	140	156	14	11
32	200	168	166	15	12
40	200	176	172	16	13
50	200	176	191	17	14
65	250	214	200	25	22
80	250	214	218	29	26
100	250	230	242	31	28
125	250	281	277	36	33
150	300	281	302	41	38

Flange size (standard: GB/T9119)

Nominal diameter DN	Presssure 1.6MPa					Presssure 4.0MPa				
	D	d_1	d_0	n	b	D	d_1	d_2	n	b
15	95	65	14	4	16	95	65	14	4	16
20	105	75	14	4	18	105	75	14	4	18
25	115	85	14	4	18	115	85	14	4	18
32	140	100	18	4	18	140	100	18	4	18
40	150	110	18	4	20	150	110	18	4	20
50	165	125	18	4	20	165	125	18	4	20
65	185	145	18	4	20	185	145	18	4	22
80	200	160	18	8	22	200	160	18	8	22
100	220	180	18	8	22	235	190	22	8	26
125	250	210	18	8	22	270	220	26	8	26
150	285	240	22	8	24	300	250	26	8	28



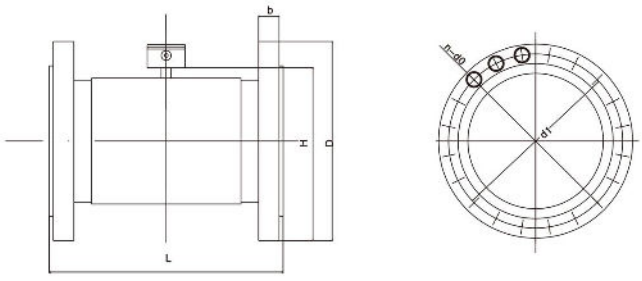
DN200~DN600, 1.0，1.6MPa Sensor and Outline Drawings

Dimensions and weight

Nominal diameter DN	L	H ϕ ~	Approx weigh KG
200	350	362	45
250	450	412	50
300	500	472	60
350	500	522	145
400	500	572	180
450	550	626	215
500	550	676	245
600	600	776	335

Flange size (standard: GB/T9119)

Nominal diameter DN	Pressure1.6MPa					Presssure1.0MPa				
	D	d_1	d_0	n	b	D	d_1	d_2	n	b
200	340	295	22	12	26	340	295	22	8	24
250	405	355	26	12	28	395	350	22	12	26
300	460	410	26	12	32	445	400	22	12	28
350	520	470	26	16	36	505	460	22	16	30
400	580	525	30	16	38	565	515	26	16	32
450	640	585	30	20	42	615	565	26	20	35
500	715	650	33	20	46	670	620	26	20	38
600	840	770	36	20	52	780	725	30	20	42



DN700~DN3000, 0.6，1.0MPa Sensor Outline Drawing

Dimensions and weight

Nominal diameter DN	L	H ϕ ~	Approx weigh KG
700	700	866	435
800	800	966	545
900	900	1076	655
1000	1000	1200	810
1200	1200	1406	875
1400	1400	1632	1235
1600	1600	1832	1555
1800	1800	2036	2085
2000	2000	2236	2610
2200	2200	2436	3210
2400	2400	2636	3910
2600	2600	2836	4280
2800	2800	3036	5000
3000	3000	3236	5600

Flange size (standard: GB/T9119)

Nominal diameter DN	Pressure MPa	D	d_1	d_2	n	b
700	1.0	895	840	30	24	30
800		1015	950	33	24	32
900		1115	1050	33	28	34
1000		1230	1160	36	28	34
700	0.6	860	810	26	24	26
800		975	920	30	24	26
900		1075	1020	30	24	26
1000		1175	1120	30	28	26
1200		1405	1340	33	32	28
1400		1630	1560	36	36	32
1600		1830	1760	36	40	34
1800		2045	1970	39	44	36
2000		2265	2180	42	48	38
2200		2475	2390	42	52	42
2400		2685	2600	42	56	44
2600		2905	2810	48	60	46
2800		3115	3020	48	64	48
3000		3315	3220	48	68	50

3.4 Insertion Type Electromagnetic Section, check Figure 5

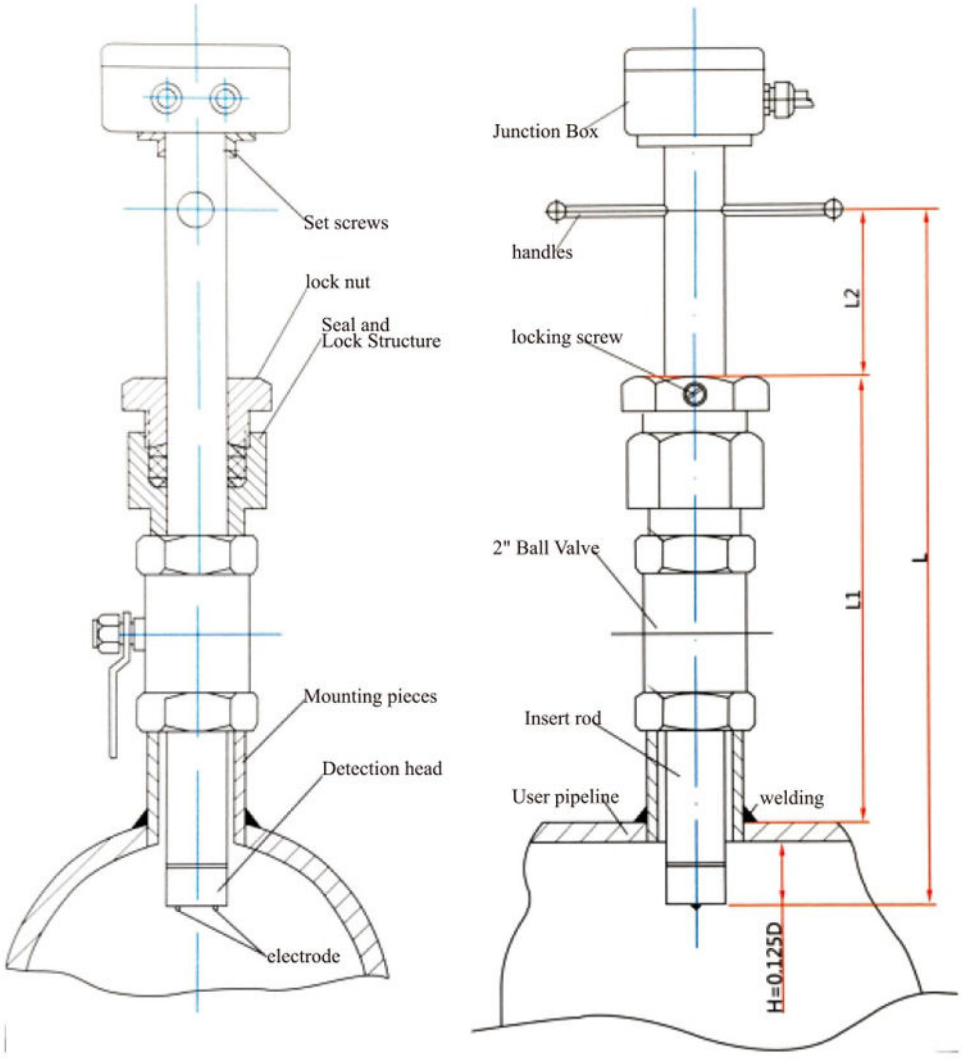


Figure 5 Structural diagram of insertion type with ball valve

As can be seen from the figure, the sensor consists of the following main parts or components:

1. Detection head: including electrode, excitation coil, iron core and lead wire, the outer shell is PVC or F4.

2. Insert rod: connecting the detection head and the converter, made of 304 or 316 stainless steel.

3. Installation parts: (Φ60×3) 304 or 316 stainless steel pipe, welded on the user's pipeline during installation.

4. Valve or (sub): 2″ stainless steel ball valve or (sub) for removing or installing the sensor without flow.

5. Sealing and locking mechanism: including transition piece, compression nut, special sealing rubber ring.

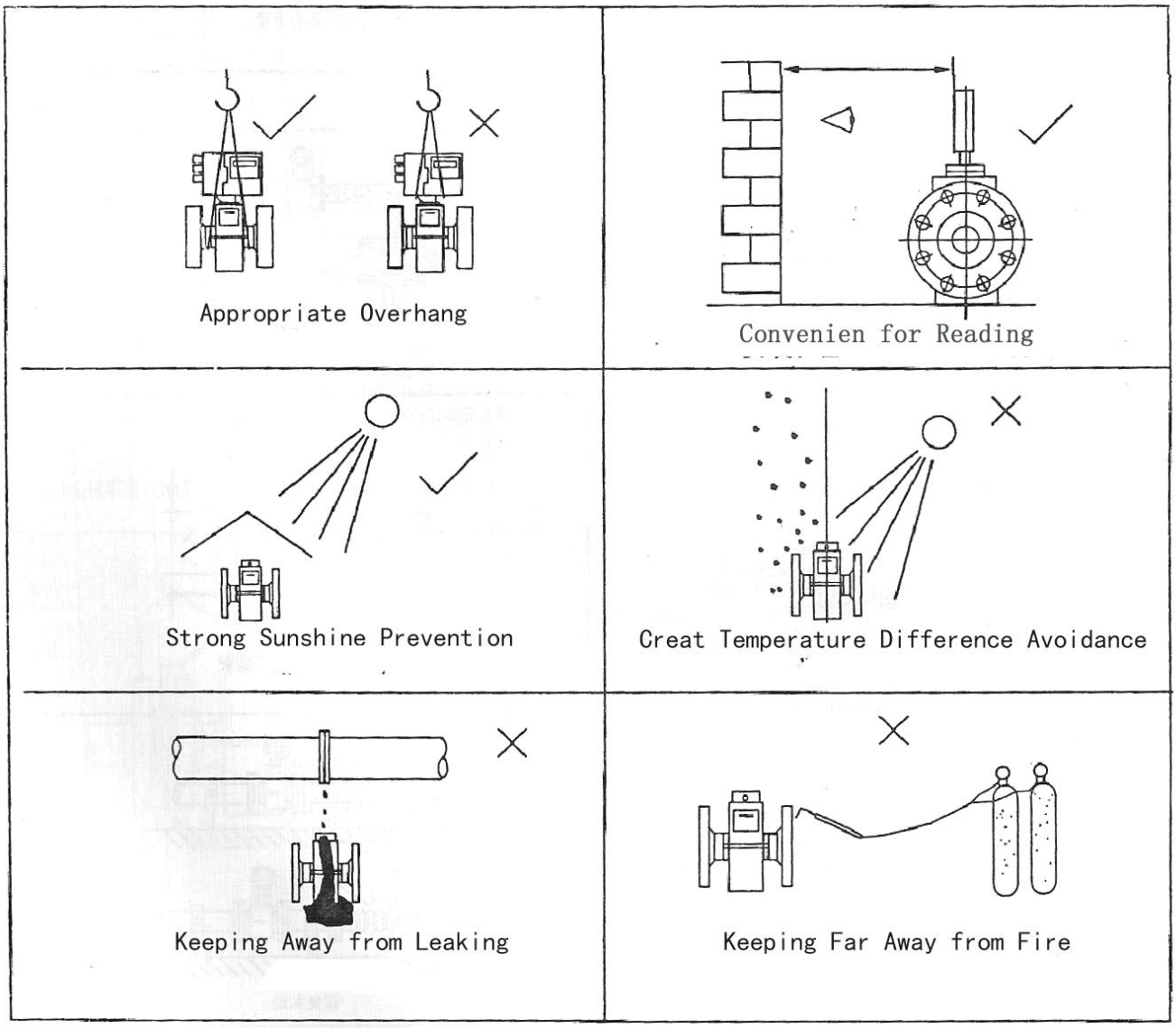
6. Junction box (integrated direct connection converter): The excitation current and signal of the sensor and the converter are connected to each other here.

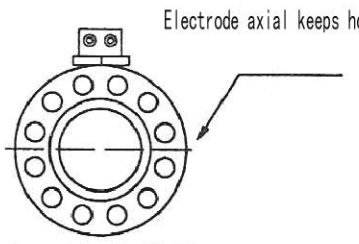
Tip and Note: Since the pressure in the pipe has an outward push on the detection rod, so

*For the sake of safety, it is best to stop the installation, that is, under the condition of no pressure in the pipeline.

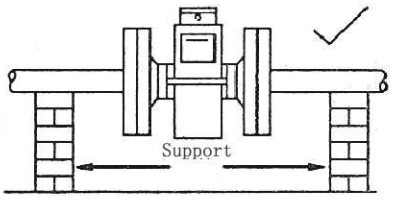
*If shutdown is not allowed, it is best to temporarily reduce the pipeline pressure to ≤ 0.2MPa during installation.

3.5 Installation Precautions, check Figure 6

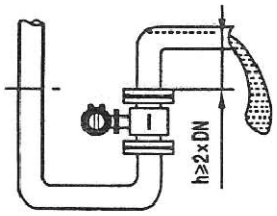




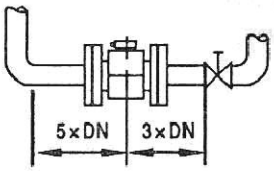
Level Installation



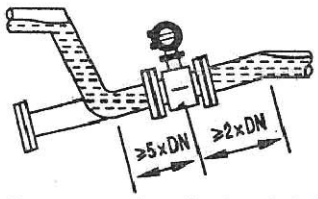
Reasonable Support



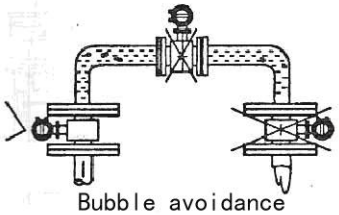
Full of Pipe



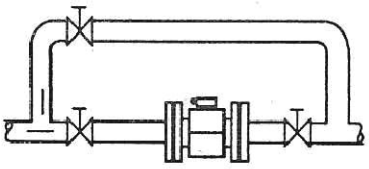
Ensure. the Requir. of the Straight Pipe section



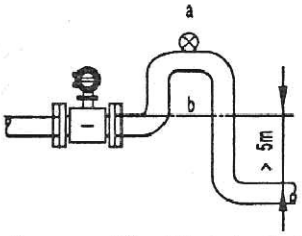
Measurement for the Precipitable



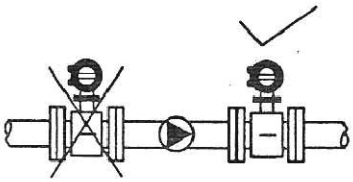
Bubble avoidance



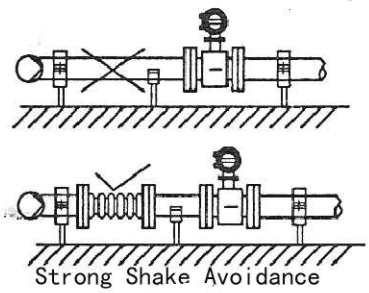
Easy to Maintenance and Clean-up



Negative Pressure and Non-filled pipe Avoidance

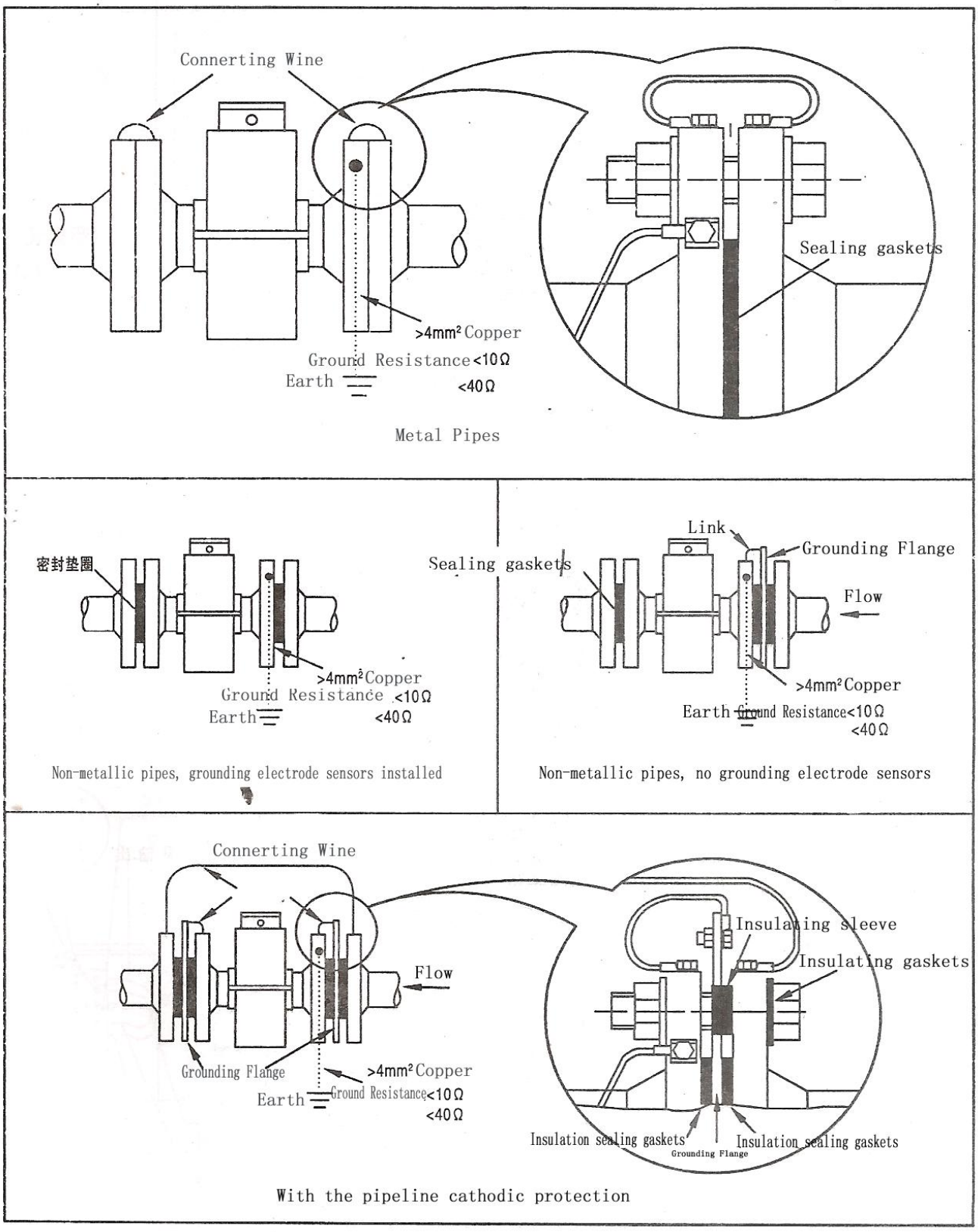


Not Installed in Front of the Inlet of Pump



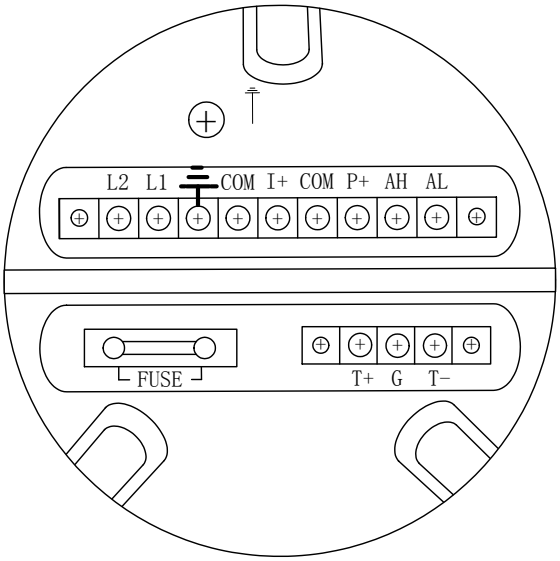
Strong Shake Avoidance

3.6 Grounding of Flowmeter and Pipe, check Figure 6



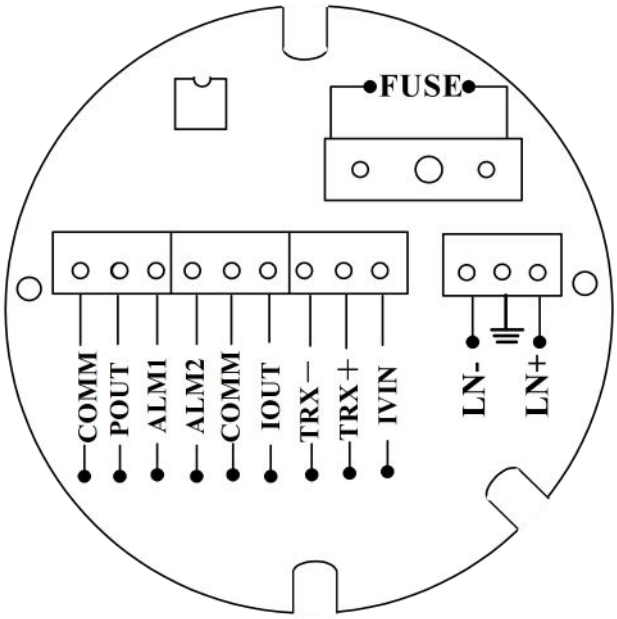
3.7 Electrical Wiring

3.7.1 Integrated converter 411 series wiring terminal description



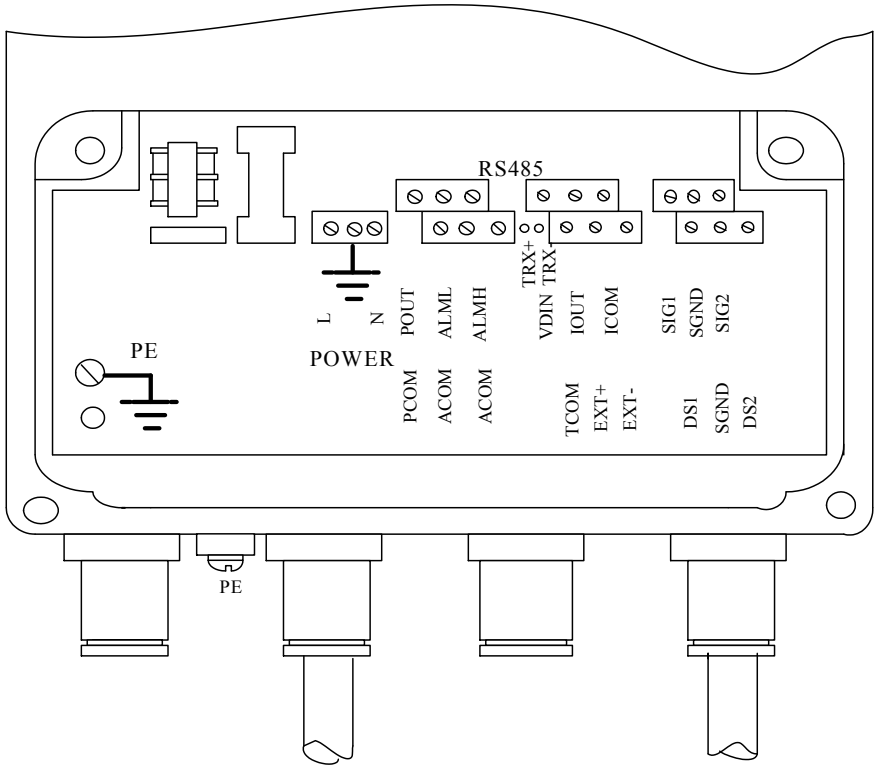
I+：	Discharge current output
COM：	Current output
P+：	Bidirectional flow frequency (pulse) output
COM：	Frequency (pulse) output
AL：	Lower limit alarm output
AH：	Upper limit alarm output
COM：	Alarm output
FUSE：	Input power fuse
T＋：	Communication input (RS485-A)
T－：	Communication input (RS485-B)
G：	RS232 Communications
L_1：	220V(24V) power input
L_2：	220V(24V) power input

3.7.2 Integral converter 511 series wiring terminal description



POUT：	Bidirectional flow frequency (pulse) output
ALM1：	Upper limit alarm output
ALM2：	Lower limit alarm output
COMM：	Frequency, pulse, current common terminal (ground wire)
COMM：	Frequency, pulse, current common terminal (ground wire)
IOUT：	Flow current output (two-wire current output)
IVIN	Two-wire 24V voltage input
TRX+	Communication input
TRX-：	Communication input
LN+：	220V(24V) power input
LN-：	220V (24V) power input

3.7.3 Split type converter 211 series wiring terminal description



SIG1 Signal1
SGND Signal Ground
SIG2 Signal2
DS1 Shielded Exciting1
DS2 Shielded Exciting2
EXT+ Exciting Current+
EXT- Exciting Current-

→ Connected to the split sensor

VDIN Current Two lines 24V Spots
ICOUT Analog Current Output
ICCOM Analog Current Output Ground

→ Analog Current Output

POUT Flow Frequency (Pulse) Output
PCOM Frequency (Pulse) Output Ground

→ Frequency or pulse output

ALMH Upper Limit Alarm Output
ALML Low Limit Alarm Output
ALCOM Alarm Output Ground

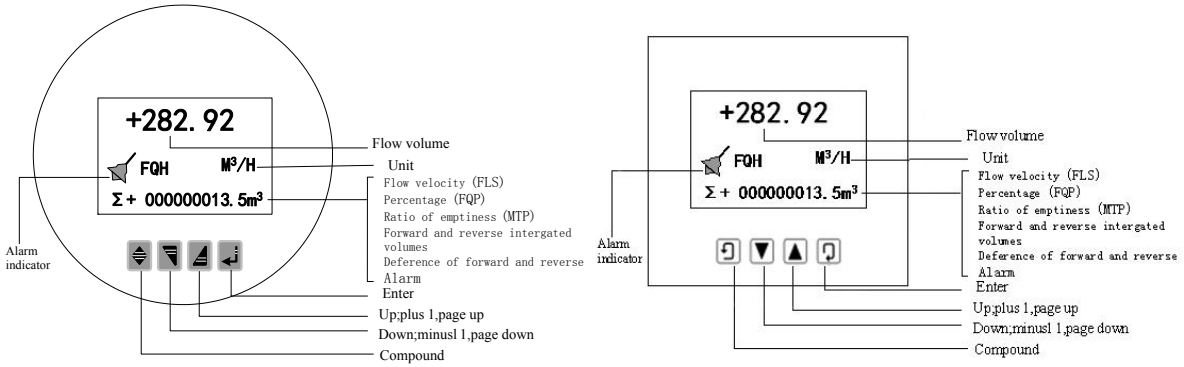
→ Two-way alarm output

TRX+ Communication Input
TRX- Communication Input
TCOM 232 Communication Ground

→ Communication Input

Ⅳ. CONVERTER MENU STRUCTURE AND PARAMETER SETTINGS

4.1 Display interface and key functions

<table>
<tr><td>Model</td><td colspan="2">Operating Instructions</td></tr>
<tr><td>Display interface</td><td colspan="2"> 

Compact type converter Split type converter</td></tr>
<tr><td>Key</td><td colspan="2">The four keys are compound key, down key, up key and confirm key from left to right.</td></tr>
<tr><td rowspan="3">Functional content</td><td>Parameter setting</td><td>Select this function to enter the parameter setting screen, there are 5 levels of passwords, press the compound key + confirm key at the same time to enter</td></tr>
<tr><td>Total reset</td><td>When this function is selected, the total amount of the instrument can be cleared, and the password is 10000. Press the compound key + confirm key at the same time to clear it.</td></tr>
<tr><td>Coefficient change record</td><td>Select this function to view the flow coefficient modification record</td></tr>
<tr><td rowspan="5">Password level</td><td>Level 1</td><td>00521 ： The user can only view the instrument parameters</td></tr>
<tr><td>Level 2</td><td>03210 ： The user can only change 1-24 instrument parameters</td></tr>
<tr><td>Level 3</td><td>06108 ： The user can only change 1-25 instrument parameters</td></tr>
<tr><td>Level 4</td><td>07206 ： The user can only change 1-29 instrument parameters</td></tr>
<tr><td>Level 5</td><td>The fixed value manufacturers are: the user can change 1-52 instrument parameters</td></tr>
<tr><td rowspan="10">Button Basic Function</td><td rowspan="4">Button function in automatic measurement state</td><td>Up key: cyclically select the content displayed in the lower part of the screen</td></tr>
<tr><td>Compound key + Confirm key: enter the parameter setting state</td></tr>
<tr><td>Confirm key: return to automatic measurement state</td></tr>
<tr><td>Brightness adjustment: increase the brightness by "composite key + up key", decrease the brightness by "composite key + down key"</td></tr>
<tr><td rowspan="6">Button function in parameter setting state</td><td>Down key: the number at the cursor minus 1</td></tr>
<tr><td>Up key: the number at the cursor add 1</td></tr>
<tr><td>Composite key + down key: move the cursor to the left</td></tr>
<tr><td>Composite key + up key: move the cursor to the right</td></tr>
<tr><td>Confirm key: enter/exit submenu; in any state, press and hold for a few seconds to return</td></tr>
</table>

		to the main page of measurement state

Parameter setting method: To set or modify the parameters of the instrument, the instrument must enter the parameter setting state from the measurement state. In the measurement state, press the "composite key + confirm key", the instrument enters the function selection screen "parameter setting", then press the confirm key to enter the password input state "00000", enter the password and press the "composite key + confirm key" Enter the parameter setting screen.

4.2 Parameter setting menu list

Parameter number	Parameter literal	Setting mode	Parameter range	Password level
1	Language	Option	Chinese, English	2
2	Instrument communication address	set number	0～99	2
3	Instrument communication speed	Option	300～38400	2
4	Measuring pipe diameter	Option	3～3000	2
5	Flow unit	Option	L/h、L/m、L/s、m^3/h、m^3/m、m^3/s 、T/h、T/m、T/s	2
6	Meter range setting	set number	0～99999	2
7	Measuring damping time	Option	1～50	2
8	Flow direction options	Option	Forward and reverse	2
9	Flow Zero Correction	set number	0～±9999	2
10	small signal cutoff point	set number	0～599.99%	2
11	Allow cut-off display	Option	Allow/forbid	2
12	Flow Accumulation Unit	Option	0.001m^3～1m^3 、0.001L～1L、0.001T～1T	2
13	Fluid density	set number	0-3.999T/m3	2
14	Reverse output permit	Option	Allow/forbid	2
16	Current output type	Option	0～10mA /4～20mA	2
16	Pulse output mode	Option	Frequency/pulse	2

17	Pulse unit equivalent	Option	0.001m^3～1m^3 、0.001L～1L、0.001T～1T	2
18	Frequency output range	Option	1～ 5999 Hz	2
19	Empty Flow Alarm Allowed	Option	Allow/forbid	2
20	Empty pipe alarm threshold	set number	59999 %	2
21	Upper alarm allowance	Option	Allow/forbid	2
22	Upper alarm value	set number	000.0～ 599.99 %	2
23	Lower limit alarm allowance	Option	Allow/forbid	2
24	Lower limit alarm value	set number	000.0～599.99 %	2
25	Excitation alarm allowed	Option	Allow/forbid	2
26	Total reset password	set number	0-99999	3
27	Sensor coding 1	User settings	Factory year, month（0-99999）	4
28	Sensor coding 2	User settings	Product number（0-99999）	4
29	Excitation mode selection	Option	Type 1、2、3	4
30	Sensor coefficient value	set number	0.0000～5.9999	4
31	Flow correction allowance	Option	Allow/forbid	2
32	Flow correction point 1	User settings	Set by flow rate	4
33	Flow correction number 1	User settings	0.0000～1.9999	4
34	Flow correction point 2	User settings	Set by flow rate	4
35	Flow correction number 2	User settings	0.0000～1.9999	4
36	Flow correction point 3	User settings	Set by flow rate	4
37	Flow correction number 3	User settings	0.0000～1.9999	4
38	Flow correction point 4	User settings	Set by flow rate	4
39	Flow correction number 4	User settings	0.0000～1.9999	4
40	Positive total low	Modifiable	00000～99999	5

41	Positive total high	Modifiable	0000～9999	5
42	Reverse total low	Modifiable	00000～99999	5
43	Reverse total high	Modifiable	0000～9999	5
44	Spike Suppression Allows	Option	Allow/forbid	3
45	Spike Suppression Coefficient	Option	0.010～0.800m/s	3
46	Spike Suppression Time	Option	400～2500ms	3
47	Security Code 1	Modifiable	00000～99999	5
48	Security Code 2	Modifiable	00000～99999	5
49	Security Code 3	Modifiable	00000～99999	5
50	Security Code 4	Modifiable	00000～99999	5
51	Current zero correction	set number	0.0000～1.9999	5
52	Current full scale correction	set number	0.0000～3.9999	5
53	Factory-calibration coefficient	set number	0.0000～5.9999	5
54	Instrument code 1	Factory settings	Factory year, month（0-99999）	6
55	Instrument code 2	Factory settings	Product number（0-99999）	6
56	Communication verification mode	Factory settings	No Parity、Odd Parity、Even Parity	2

4.3 Alarm information

The printed circuit board of the electromagnetic flow converter adopts surface welding technology, which is not repairable to the user. Therefore, the user cannot open the converter case.

The converter has a self-diagnostic function. In addition to power supply and hardware circuit failures, the failures in general applications can correctly give alarm information. These messages are indicated with "  " on the left side of the display. In the measurement state, the instrument automatically displays the fault content as follows:

FQH ---- Flow upper limit alarm; FQL ---- Flow lower limit alarm;

FGP ---- fluid empty pipe alarm; SYS ---- system excitation alarm;

L_MagB-4-key intelligent converter has self-diagnosis function. In addition to power supply and hardware circuit failures, the failures in general applications can correctly give alarm information. These messages are indicated with "  " on the left side of the display. In the measurement state, the instrument automatically displays the fault content as follows:

FQH ---- Flow upper limit alarm; FQL ---- Flow lower limit alarm;

FGP ---- fluid empty pipe alarm; SYS ---- system excitation alarm;

UPPER ALARM ---- Upper flow limit alarm; LOWER ALARM ---- Flow lower limit alarm;

LIQUID ALARM ---- Fluid empty pipe alarm; SYSTEM ALARM ---- System excitation alarm

4.4 Troubleshooting

1. The instrument has no display

* Check whether the power supply is connected;

* Check whether the power fuse is in good condition;

* Check whether the power supply voltage meets the requirements;

2. Excitation alarm

* Whether the excitation wiring EX1 and EX2 are open circuit;

* Whether the total resistance of the sensor excitation coil is less than 150Ω;

* If both a and b are normal, the converter is faulty.

3. Empty Traffic Alarm

* Measure whether the fluid fills the sensor measuring tube;

* Use wires to short-circuit the signal input terminals SIG1, SIG2 and SGND of the converter. If the "empty pipe" prompt is canceled, it means that the converter is normal. It may be that the conductivity of the measured fluid is low or the empty pipe threshold is incorrectly set;

* Check whether the signal connection is correct;

* Check whether the sensor electrode is normal.

Make the flow rate zero, and observe that the conductance ratio should be less than 100%;

In the case of flow, the resistance of the terminals SIG1 and SIG2 to SGND should be less than 50kΩ (the

measured value for the medium is water. It is best to use a pointer multimeter to measure, and it can be seen that there is charge and discharge during the measurement process).

* Use a multimeter to measure the DC voltage between DS1 and DS2 should be less than 1V, otherwise the sensor electrode is contaminated and should be cleaned.

4. measured flow is inaccurate

* Measure whether the fluid fills the sensor measuring tube;

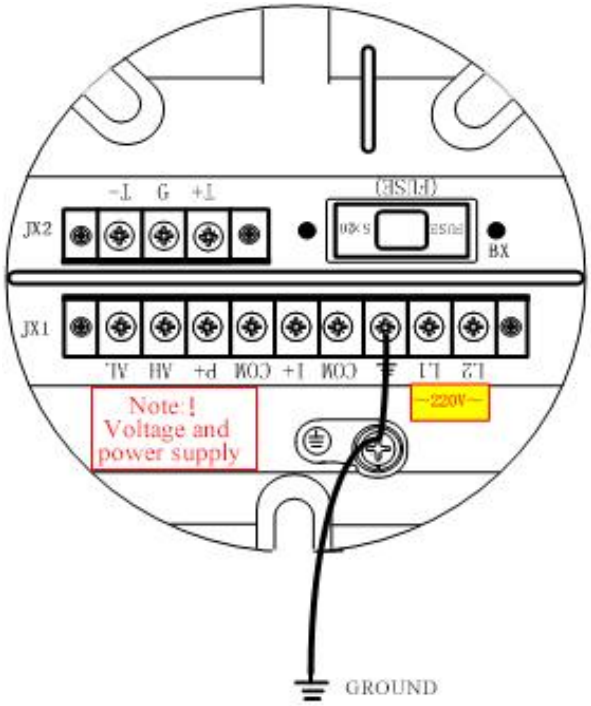
* Whether the signal line connection is normal;

* Check whether the sensor coefficient and sensor zero point are set according to the sensor label or the factory calibration sheet

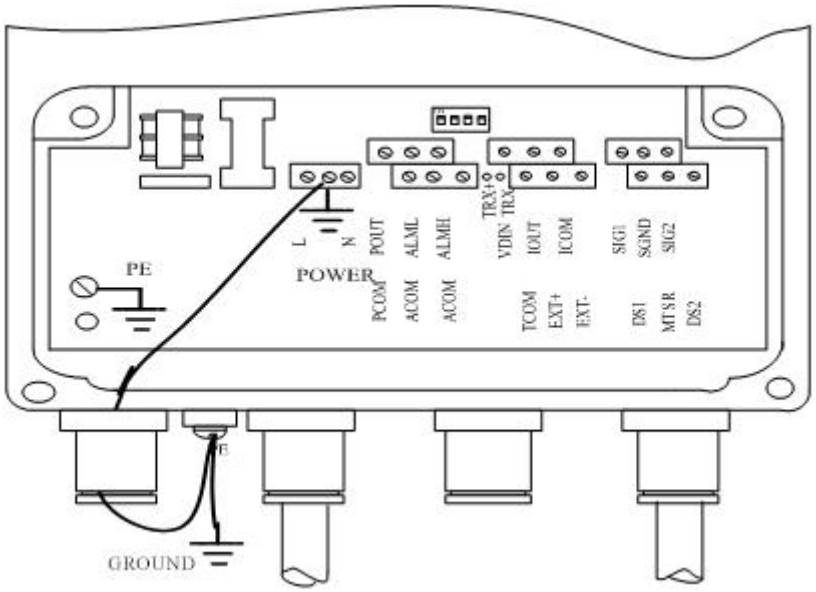
4.5 Lightning protection function description

When installing, the user must connect the grounding point of the converter terminal to the casing and then reliably ground it, because the lightning protection gas arrester guides the lightning current into the ground through the casing. It may cause personal accident, please refer to the connection diagram for details:

1、Circular converter



2、Square converter



Ⅴ. SUPPLY COMPLENTENESS

The electromagnetic flowmeter is supplied according to the order contract.

Random documents include: instruction manual, product qualification certificate, calibration certificate.

Ⅵ. TRANSPORTATION AND STORAGE

In order to prevent the instrument from being damaged during operation, please keep the packing condition as shipped by the manufacturer before arriving at the installation site. During storage, the storage location should be indoors with the following conditions:

A. Rain and moisture proof;

b. Mechanical vibration is small, and shock is avoided;

c. The temperature range is -20+60℃, and the humidity is not more than 80%.

Ⅶ. OPERATION

Check the following before the flowmeter is put into operation:

A. Whether the flowmeter is damaged during transportation and installation;

B. Whether the power supply voltage is consistent with the nameplate voltage;

C. The meter is wired correctly.

After inspection, open the pipeline valve to fill the pipeline with liquid, and pay attention to eliminate leakage and residual gas in the system. Then turn on the power of the meter, generally the flowmeter can work normally after 10 minutes of power-on preheating.

If there is any problem during operation, you can troubleshoot according to the self-diagnosis results of the flowmeter converter in Section 9. If the meter still does not work well, you can contact our company.