aobo

instrument

2023
PRODUCT
INTRODUCTION

ELECTRO MAGNETIC FLOWMETER

CONTENTS

I. Product Characteristics, Use and Scope of Application..... 3
1.1 Overview.....3
1.2 Characteristics.....3
1.3 Use environmental conditions..... 4
1.4 Working conditions.....4
II. Product Composition and Type..... 5
2.1 Product composition..... 5
2.2 Product type..... 5
III. Technical Performance Indicators of the Product..... 5
IV. Product Appearance Size and Installation Size..... 7
V. Converter Menu Structure and Parameter Settings..... 10
5.1 Key form..... 10
5.2 Key functions..... 10
5.3 Parameter setting function and operation password..... 11
5.4 List of parameter setting menu..... 12
5.5 Parameter setting menu description..... 17
5.6 Power cut length recording function 25
5.7 Accumulative records in hour..... 26
VI. Flowmeter Installation Diagram (shows as Figure 6).....26
VII. Electrical Wiring.....28
7.1 See the grounding for flowmeter and pipeline in Figure 7..... 28
7.2 Converter terminals and signs, see Figure 8 and 9..... 30
7.3 Separated type wiring..... 31
7.4 Wiring diagram of output signal..... 32
VIII. Self-diagnostic Information and Fault Processing..... 34
IX. Supply in Full Sets.....37
X. Transportation and Storage..... 37
XI. Operation..... 37

I. Product Characteristics, Use and Scope of Application

1.1 Overview

AOBO-LD series intelligent electromagnetic flowmeter is a relatively mature liquid measurement instrument for measuring the volume flow of conductivity liquid (conductivity ≥ 5 μs/cm) and slurry in the closed pipelines, suitable for the flow measurement of various acid and alkali solutions, clear water, sea water and food grade liquid. It is widely used in industrial production process control, energy measurement, environmental protection and sewage treatment. It can output (4~20) mA current signal, pulse signal, etc.. It is coupled with the display, recording instrument, accumulation operator or regulator for flow detection, product calculation, adjustment and control.

1.2 Characteristics

AOBO-LD series electromagnetic flowmeter has the following characteristics:

● It is not affected by changes in fluid density, viscosity, temperature, pressure and electrical conductivity. The linear measurement principles can achieve high precision measurements;

● No flow parts in measuring pipe, small pressure loss and low straight pipe section requirement;

● The nominal diameter DN15-DN600 covers a wide range,lining and electrodes that meet the requirements of measuring a variety of conductive fluids;

● The converter adopts programmable low frequency rectangular wave excitation, which improves the stability of flow measurement and small power loss;

● The converter adopts a 16-bit embedded microprocessor with full digital processing,

fast operation speed, strong interference resistance, reliable measurement, high accuracy and flow measurement range up to 1500:1;

● High definition backlight LCD display, full Chinese character menu operation, easy to use, easy operation, easy to learn and easy to understand;

● RS485 or RS232 digital communication signal output;

● It has the conductivity measurement function, which can determine whether the pipe of the sensor is fully filled, and has the self-inspection and self-diagnosis function;

● It uses SMD devices and surface mounting (SMT) technology with high circuit reliability;

● It can be used for the corresponding explosion-proof occasions.

1.3 Use environmental conditions

Ambient temperature: sensor (-25~+60) ℃; converter (-10~+ 60) ℃

Relative temperature: (5~85)%RH

1.4 Working conditions

Maximum fluid temperature: integrated type ≤ 70℃;

Separated type: PTFE lining ≤ 80℃

Polyneoprene lining ≤ 65℃

High temperature rubber ≤ 120℃

Polyurethane rubber lining ≤ 60℃

PFA lining ≤ 150℃

F46 lining ≤ 110℃

Fluid conductivity ≥ 5uS/cm

II. Product Composition and Type

2.1 Product composition

The electromagnetic flowmeter consists of two parts: electromagnetic flow converter and electromagnetic flow sensor. The separated type also requires a special two-layer shielded cable to connect the converter and sensor.

2.2 Product type

The AOBO-LD series electromagnetic flowmeter is divided into two structural forms: integrated type and separated type. It can be used in the specified explosion-proof places.

The sensor is available with electrodes of seven different materials and a lining of six different materials.

III. Technical Performance Indicators of the Product

3.1 Execution standard: JB/T9248-2015

3.2 Maximum flow speed: 15m/s

3.3 Nominal general diameter: DN15, 20, 25, 32, 40, 50, 65, 80, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600

3.4 Precision: 0.5%, 0.2%

3.5 Nominal pressure: (1.0, 1.6, 2.5, 4.0) MPa, Other specifications and standards may be subject to the user requirements.

3.6 Materials: electrode form and material

Electrode form can be divided into standard type, scraper type, removable type and the grounding electrode.

The electrode and grounding electrode materials are 7 kinds of 316L stainless steel, harden alloy B, harden alloy C, titanium, tantalum, platinum alloy, stainless steel coated with tungsten carbide.

Flange material: carbon steel, stainless steel (optional)

Grounding ring material: stainless steel

Door protection ring material: stainless steel, carbon steel.

3.7 Shell protection

IP65

IP68 is limited to the separated type sensors and excluding explosion proof structures.

3.8 Explosion-proof standards:

Explosion-proof grade: ExdmbIIC T6 Gb

3.9 Connection cable: Split type electromagnetic flowmeter, sensor and converter are connected by signal cable and the longest cable length should be less than 100m. The company provides free 10m cable with the meter.Insufficient parts shall be ordered.

3.10 Converter performance

Power supply: single-phase AC power (85-265) V, (45-63)Hz, power is less than 20W; DC power supply (11-40) VDC.

Converter display and programming operation: 4 film keys can set all parameters and can also program the converter by using foreign receiver or PC machine (RS485, RS232), high definition backlight LCD display, empty pipe detection and self-diagnosis function.

Digital communication: RS485, RS232, MODBUS and REMOTE, with lightning protection.

Output signal

Current output: two-way circuit, full isolation (0-10) mA/(4-20)mA; load resistance: (0-10) mA, (0-1.5) KΩ; (4-20)mA , (0-750) Ω.

Frequency output: forward and reverse flow output, the upper limit of output frequency can be set in the range of (1-5000) HZ. Transistor collector is with photoelectric isolation output in both directions. The external power supply is not more than 35V, and the maximum collector current is 250mA when it is turned on.

Pulse output: forward and reverse flow output, output pulse up to 5000cp/s. Pulse equivalents are 0.001L-1.0m^3/cP. Pulse width is automatically set to 20ms or square wave. Open collector output of transistor with photoelectric isolation. The external power supply is not more than 35V, and the maximum collector current is 250mA when it is turned on.

Flow direction indication output: this flowmeter can measure fluid flow in positive and negative direction. The direction of the fluid flow can also be judged.High level of output + 10V for displaying forward flow, and low level of 0V for reverse fluid flow output.

Alarm output: two transistor collector open circuit alarm output with photoelectric isolation. The external power supply is not more than 35V, and the maximum collector current is 250mA when it is turned on. Alarm state: fluid air pipe, excitation line break, flow over limit.

Damping time: 0s-100s, optional

IV. Product Appearance Size and Installation Size

4.1 Converter appearance size, see Figure 3 (a) and (b) in mm

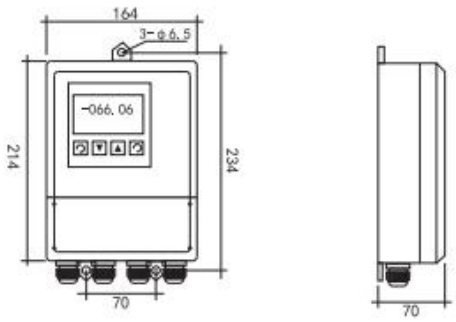


Figure 3 (a). Square Converter Shape

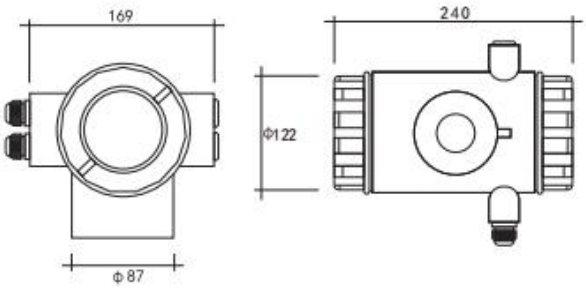


Figure 3 (b). Circular Converter Shape

4.2 Appearance and installation size of the sensor, see Figure 4

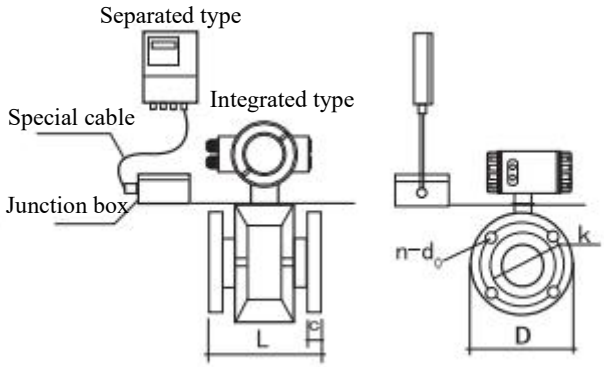


Figure 4

Nominal diameter	L	Flange dimensions (GB/T9119-2010)					
		D	K	d_0	N	C	PN
15	200	95	65	14	4	14	4.0MP

20	200	105	75	14	4	16	
25	200	115	85	14	4	16	
32	200	140	100	18	4	18	
40	200	150	110	18	4	18	
50	200	165	125	18	4	20	
65	200	185	145	18	8	20	1.6MP
80	200	200	160	18	8	20	
100	250	220	180	18	8	22	
125	250	250	210	18	8	22	
150	300	285	240	22	8	24	
200	350	340	295	22	12	26	
250	450	405	355	26	12	29	
300	500	445	400	22	12	26	1.0MP
350	500	505	460	22	16	30	
400	600	565	515	26	16	32	
450	600	615	656	26	20	36	
500	600	670	620	26	20	38	
600	600	780	725	30	20	42	

Note(s):

When installing a ground flange, size L increases 6mm; When installing an imported flange, size L increases 6mm; When installing a lining protection flange, size L increases 12mm.

V. Converter Menu Structure and Parameter Settings

5.1 Key form, see Figure 5 (a) and (b)

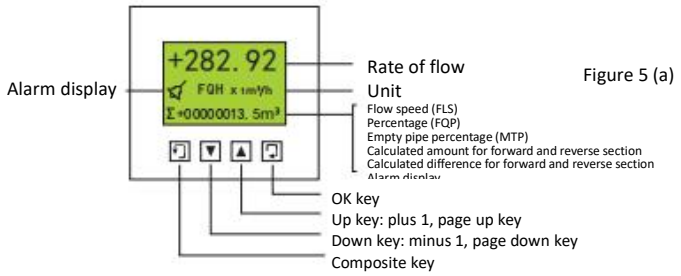


Figure 5 (a)

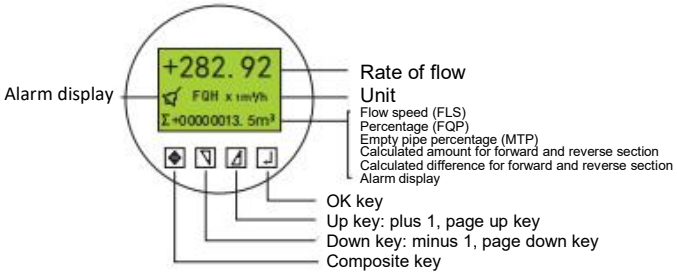


Figure 5 (b)

5.2 Key (including converter body keys and infrared remote control keys, as well as the magnetic pen operation keys) functions

1. Key functions in the auto measurement state:

   Down key: select screen downward display content in circulation.

   Up key: select screen upward display content in circulation.

   Composite key + OK key: enter the parameter setting state.

2. Key functions in the parameter state:

   Down key: minus 1 at the cursor position

   Up key: plus 1 at the cursor position

   Composite key + Down key: cursor moves left

Composite key + Up key: cursor moves right

OK key: in any state, press for two seconds to return to the automatic measurement state.

Note:

(1) When using the Composite Key, press the Composite Key first, and then hold down the Up Key or the Down Key.

(2) Under the parameter setting state, there is no key operation in 3 minutes, and the instrument automatically returns to the measurement state.

(3) Flow selection of flow zero correction, move the cursor under "+" or "-" on the far left, and switch with "Up Key" or "Down Key" to make the opposite to the actual flow.

(4) Select the unit of flow and you can move the cursor under the original flow unit of the "Flow Range Settings" menu, and then switch with "Up Key" or "Down Key" to meet the needs.

(5) Press long "OK Key" for 5 seconds to exit the parameter setting status.

5.3 Parameter setting function and operation password

To modify the instrument parameter setting, the instrument must enter the parameter set state from the measurement state. Under the measurement form, press the "Composite Key + OK Key" for state conversion password (00000), according to the password provided by the factory, and then press the "Composite Key + OK Key", then enter the required parameter set state.

View password (factory value 00521)

5.4 List of parameter setting menu

Parameter No.	Parameter text	Setting method	Password level	Parameter range	Note
1	Language	Select	2	Chinese, English	Users can set it according to the site flow and use requirements
2	Instrument communication address	Number-setting	2	0-99	
3	Instrument communication speed	Select	2	300-38400	
4	Measured pipe caliber	Select	2	3-3000	
5	Flow unit	Select	2	L/h, L/m, L/s	
6	Measurement range setting	Number-setting	2	0-99999	
7	Measured damping time	Select	2	0-50	
8	Flow direction selection	Select	2	Forward and reverse	
9	Flow zero correction	Number-setting	2	0-±9999	
10	Small signal cutting point	Number-setting	2	0-599.99%	

11	Cutting display allowed	Select	2	Enable/disable	Users can set it according to the site flow and use requirements
12	Flow accumulation unit	Select	2	0.001-3.999T/㎡	
13	Fluid density	Select	2	0.0000T/㎡	
14	Reverse measurement allowed	Select	2	Enable/disable	
15	Current output type	Select	2	0-10mA/4-20mA	
16	Pulse output mode	Select	2	Frequency / pulse	
17	Pulse unit equivalent	Select	2	0．0000L-1m³	
18	Frequency output range	Select	2	1-5999Hz	
19	Empty pipe alarm allowed	Select	2	Enable/disable	
20	Empty pipe alarm threshold	Number-setting	2	59999%	
21	HIAL allowed	Select	2	Enable/disable	
22	HIAL value	Number-setting		000.0-599.99%	
23	LOAL allowed	Select	2	Enable/disable	
24	LOAL value	Number-setting	2	000．0-599．9%	

25	Excitation alarm allowed	Select	2	Enable/disable	
26	Password for zero clearing	Number-setting	3	0-99999	
27	Sensor code 1	User setting	4	Date of production	
28	Sensor code 2	User setting	4	Product number	
29	Excitation mode selection	Select	4	Modes 1, 2 and 3	
30	Sensor coefficient values	Number-setting	4	0．0000-5．9999	
31	Flow correction allowed	Select	4	Enable/disable	
32	Flow correction point1	User setting	4	Set according to the flow speed	
33	Flow correction number 1	User setting	4	0.0000-1.9999	
34	Flow correction point 2	User setting	4	Set according to the flow speed	
35	Flow correction number 2	User setting	4	0.0000-1.9999	
36	Flow correction point 3	User setting	4	Set according to the flow speed	

37	Flow correction number 3	User setting	4	0.0000-1.9999	Users can only view it.
38	Flow correction point 4	User setting	4	Set according to the flow speed	
39	Flow correction number 4	User setting	4	0.0000-1.9999	
40	The minimum forward and total flow	Can be modified	5	00000-99999	
41	The maximum forward and total flow	Can be modified	5	0000-9999	
42	The minimum reverse and total flow	Can be modified	5	00000-49999	
43	The maximum reverse and total flow	Can be modified by the user	5	0000-9999	
44	Time unit: year	Can be modified by the user	5	00-99	
45	Time unit: month	Can be modified by the user	5	00-99	
46	Time unit: day	Can be modified by the user	5	00-99	

47	Time unit: hour	Can be modified by the user	5	00-99	
48	Time unit: minute	Can be modified by the user	5	00-99	
49	Time unit: second	Can be modified by the user	5	00-99	
50	Peak suppression allowed	Select	3	Enable/Disable	
51	Peak suppression allowed coefficient	Select	3	(0.010-0.800)m/s	
52	Peak suppression time	Select	3	400-2500ms	
53	Password 1	Can be modified by the user	5	00000-99999	
54	Password 2	Can be modified by the user	5	00000-99999	
55	Password 3	Can be modified by the user	5	00000-99999	
56	Password 4	Can be modified by the user	5	00000-99999	
57	Current zero correction	Number-setting	5	0.0000～1.9999	

58	Current full scale correction	Number-setting	5	0.0000～3.9999	
59	Factory calibration coefficient	Number-setting	5	0.0000～5.9999	
60	Instrument number 1	Manufacturer setting	6	Date of production	
61	Instrument number 2	Manufacturer setting	6	Product number	

Note(s):

1. Number 4 parameter is Modbus communication, and the parameter is not used for the converter without Modbus communication function.

2. Parameters from 42 to 47 are the power loss time recording function, and which are not used for the converter without power loss function.

5.5 Parameter setting menu description

5.5.1 Language

This flow meter has Chinese and English languages, so users can choose to operate.

5.5.2 Instrument communication address

When it is multiple communication, different communication address can be set.

5.5.3 Instrument communication speed

There are over 600, 1200, 2400, 4800, 9600, 14400 baud rates available.

5.5.4 Instrument communication mode

The communication mode 1 is the RS485 communication signal mode, which is the Modbus communication signal output.

5.5.5 Measured pipe diameter

Select nominal diameter of the instrument

5.5.6 Measurement range setting

The measurement range refers to the upper limit flow value for flow measurement (full range). The upper limit flow value is shown for the percentage of the output signal. It corresponds to the current output and frequency output upper limit and the 100% display value. It is also associated with small signal cutting and over limit alarm indicated by percentage flow.

Select the flow display unit in the meter range setting as: L/s, L/min, L/h, m^3/s, m^3/min, m^3/h, users can select an appropriate flow display unit according to the process requirements and usage habits.

Note: The instrument displays the flow value with 5 valid digits and the flow unit behind the last number. The microprocessor can provide the operator with “Overflow” or “Underflow” prompt due to the error code set, when the inappropriate flow unit is selected (example: DN200, select L/h as the flow display unit, when the flow speed is 1m/s, the flow is 113,097 L/h and it exceeds 5 digits, causing "Overflow". The flow unit should select m^3/s, m^3/min and m^3/h. For DN3, choose m^3/s. Flow is 0.000000707 m^3/s. Only five numbers can be displayed, so no valid number can be displayed, then “Underflow” is caused. Now, L/s, L/min or L/h should be selected as the flow unit).

5.5.7 Damping time

Long measurement damping time can improve the stability of instrument flow display and output signal, suitable for use with flow adjustment; short measurement damping time can accelerate the measurement reaction speed, suitable for the total cumulative pulsation flow measurement. The measurement damping time is set by selection mode and the user can choose a damping time value.

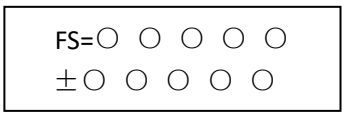
5.5.8 Flow direction selection

If the user thinks the fluid direction when debugging is positive and the meter appears negative, set the flow direction in reverse and vice versa.

5.5.9 Zero-point correction

Zero-point correction shall ensure that the sensor tube is filled with liquid and stationary. Flow zero-point is expressed by the flow speed in mm/s.

Converter flow zero-point correction is shown as follows:



Display: Up side FS represents the zero measurement of the instrument, and the downside display is the flow zero correction value. When the FS display is not "0", the correction value should be adjusted to make FS=0. Note: If the downside correction value is changed and the FS value increases, the positive and negative numbers of the downside value need to be changed, so that the FS can be corrected to zero. Again, the flow zero-point correction must be carried out when the measuring tube of the electromagnetic flow sensor is filled with conductive fluid and the fluid is stationary.

The flow zero-point correction is for the calibration constant value of the sensor, and which has been recorded in the record list and sign of the sensor. The sensor zero-point value is a flow speed value in mm/s, which is contrary to the sign of the corrected value.

5.5.10 Small signal cutting point

The small signal cutting point setting is indicated by the percentage flow of the measurement range. When the small signal is cut, the user can choose to cut both the display and signal output of flow rate and percentage, or to cut only the current output signal and frequency (pulse) output signal to maintain the display of flow rate and percentage.

5.5.11 Flow accumulation unit

The converter display is a 9-bit counter and the maximum allowable count value is 9999999999. Use integration units of L and M3, with 0.001L, 0.01L, 0.1L, 1L and 0.001 M3, 0.01 M3, 0. 1 M3, 1 M3. The converter can automatically determine whether the applied flow integration unit and multiplier rate overflow.

5.5.12 Reverse measurement allowed

The “Reverse Measurement Allowed” parameter is set in the Allowed state, and the converter will output the pulse and current at the reverse flow value, and the reverse total amount is accumulated. The reverse measurement allows the parameters to be set at "Forbidden", and when the fluid flows reverse, the converter output pulse is "0" and the current output signal is "0" (4mA or 0mA), but the reverse total still accumulates.

5.5.13 Current output type

The user can select either (0-10) mA or (4-20) mA current output in the Current Output Type.

5.5.14 Output Mode

The pulse output mode has two kinds of the frequency output and the pulse output, collectively known as the digital quantity output and the frequency output is a continuous square wave; the pulse output is a rectangular wave pulse string. The frequency output is mostly used for digital instantaneous flow measurement and short time total accumulation. By selecting pulse output, the volume value of cumulative flow can be read out, mostly for the total accumulation of direct volume units for long time. Frequency output and pulse output are generally OC gate, so DC power and load shall be external.

5.5.15 Pulse unit equivalent

Pulse unit equivalent refers to the flow value represented by a pulse and the instrument pulse equivalent selection range is:

Impulse equivalent	Flow value	Impulse equivalent	Flow value
1	0.001L/cp	5	0.001m³/cp
2	0.01L/cp	6	0.01m³/cp
3	0.1L/cp	7	0.1m³/cp
4	1.0L/cp	8	1.0m³/cp

At the same flow rate, if the pulse equivalent is small, the output pulse frequency is high and the cumulative flow error is small. The instrument can output a maximum pulse frequency of 5,000 cp/s. The maximum frequency is 25 times/second.

The maximum pulse vacancy of the pulse output is automatically converted to square wave.

For volume flow, the formula is as follows:

QL=0.0007854×D2×V(L/s) or Qm=0.0007854×D2×V×10-3(m3/h)

Where: D — tube diameter (mm); V — flow speed (m/s)

Special note, pulse output is different from frequency output and pulse output is the accumulation of a pulse equivalent. It can output a pulse, therefore, the pulse output is not very uniform. The general measurement pulse output should be used counter instrument, rather than frequency meter instrument.

5.5.16 Frequency output range

The instrument frequency output range corresponds to the upper limit of the flow measurement, namely 100% of the percent flow.The frequency output upper limit can be set arbitrarily in the range of (1-5000) Hz.The frequency output corresponds to the percentage of the flow.

F=Measured value / Full range value x Full range frequency value

5.5.17 Empty pipe alarm allowed

The instrument has the function of empty pipe detection.If the user chooses "Empty Pipe Alarm Allowed",when the instrument detects the empty pipe state,the instrument analog output and digital output will be placed as zero signal,and the instrument flow will be displayed as zero.

5.5.18 Empty pipe alarm threshold

Under the condition of the fluid filled pipe (with any flow rate), modify Empty Pipe Alarm settings for each user to use more convenient. Empty pipe upward shows the measured conductivity alarm threshold parameters and the descending set Empty Pipe Alarm threshold.

When making Empty Pipe Alarm threshold setting, it can be set according to the measured conductivity, the value of the measured conductivity (3~5) times.

5.5.19 HIAL allowed.

The user chooses to allow or prohibit it.

5.5.20 HIAL value

The HIAL value is calculated as a percentage of scale. The parameter is numerical set and the user sets a value between 0% and 199.9%. When the meter is running, the meter will output an alarm signal when the flow percentage is greater than the value.

5.5.21 LOAL allowed

The user chooses to allow or prohibit it.

5.5.22 LOAL value

The LOAL value is calculated as a percentage of the range, the parameter is set numerically and the user sets a value between 0-199.9%. When the instrument is running, the instrument will output an alarm signal when the percent flow rate is less than that value.

5.5.23 Total accumulation clearing

The user can set the password by using or above the third level and then set it within the total zero.

5.5.24 Sensor coefficient value

The flowmeter verifies the flow coefficient on the standard real flow verification device, that is, the sensor "coefficient K" value marked on the verification sheet or the product sign. It has been set at the factory, which is the key coefficient to ensure the accurate measurement of the flow meter, and it is not allowed to change.

5.5.25 Excitation mode selection

The electromagnetic converter provides three choices of excitation frequency: 1 / 16 working frequency (mode 1), 1 / 20 working frequency (mode 2), and 1 / 25 working frequency (mode 3).The sensor excitation system of small caliber has a small inductance, and 1 / 16 working frequency should be selected.Large-caliber sensor excitation system with large inductance, the user can only choose 1 / 20 or 1 / 25 working frequency.In use, please select excitation mode 1 first. If the instrument flow rate is too high, then select mode 2 or mode 3. Note: under which excitation mode is calibration, which excitation mode must be operated.

5.5.26 Flow calibration coefficient

This coefficient is the calibration coefficient of the converter. The user shall calibrate the converter by using a uniform standard calibrator. Set this coefficient to align all converters to ensure interchangeability with the sensor.

5.5.27 Instrument calculation coefficient

This coefficient is the artificially set coefficient.When calculated within the converter, the total flow is the measured flow multiplied by the value of the system. For example, it is applied to open channel measurement diving electromagnetic flowmeters with simulation sensors.

5.5.28 Current full scale correction

The out-of-factory current output of the converter is adjusted so that the current output is exactly 10mA or 20mA.

5.5.29 Factory calibration coefficient

The factory calibration coefficient of the converter standardizes the instrument excitation

current and signal amplifier specification.

5.5.30 Sensor code

The sensor encodes the supporting sensor delivery time and number to ensure that the set sensor coefficient is accurate.

5.5.31 Converter code

The converter encodes the out-of-factory time and number of the converter.

5.5.32 Maximum and minimum forward and total flow

Using level 5 password entry to modify the forward cumulant (ε +), generally set the cumulants not to exceed the maximum value calculated by the counter (9999999999).

5.5.33 Maximum and minimum reverse and total flow

Using level 5 password entry can modify reverse cumulants (-), generally set cumulants not to exceed the maximum value calculated by the counter (9999999999).

5.5.34 Time units, such as year, month, day, hour, minute and second (with clock function) Use the level 5 password to enter and you can change the year, month, day, hour, minute and second.

5.5.35 Password levels 1-5

Use the level 5 password to enter and change this password.

5.6 Power cut length recording function (with power cut function)

The meter has an internal design clock to prevent power cut, which can store 256 power cut records. power cut record time format: power cut record **** month ** day **hour **minute stop to **month **day **hour** minute; When 256 power cut records are used up, new power cut records are cyclically recorded.

5.6.1 It shows power cut record (host with power cut record requires special customization).

Press the “OK” to enter the power cut record display mode.Display the next record with Add and display the previous record with Reduce, and then press the” OK “to return to the flow display mode.

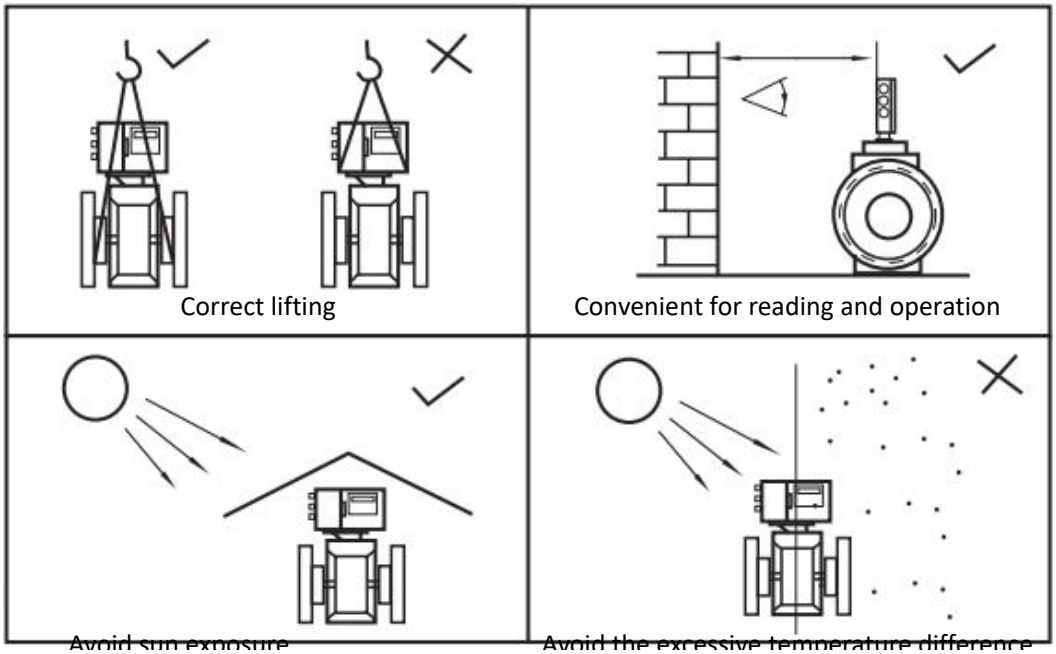
5.6.2 Clearing power cut records

Press "Composite" key first, then press the "OK" key, enter the password input mode, number: password 4 + 11, then press the"Composite" key, then press the "OK" key to clear the power cut length record.

5.7 Accumulative records in hour

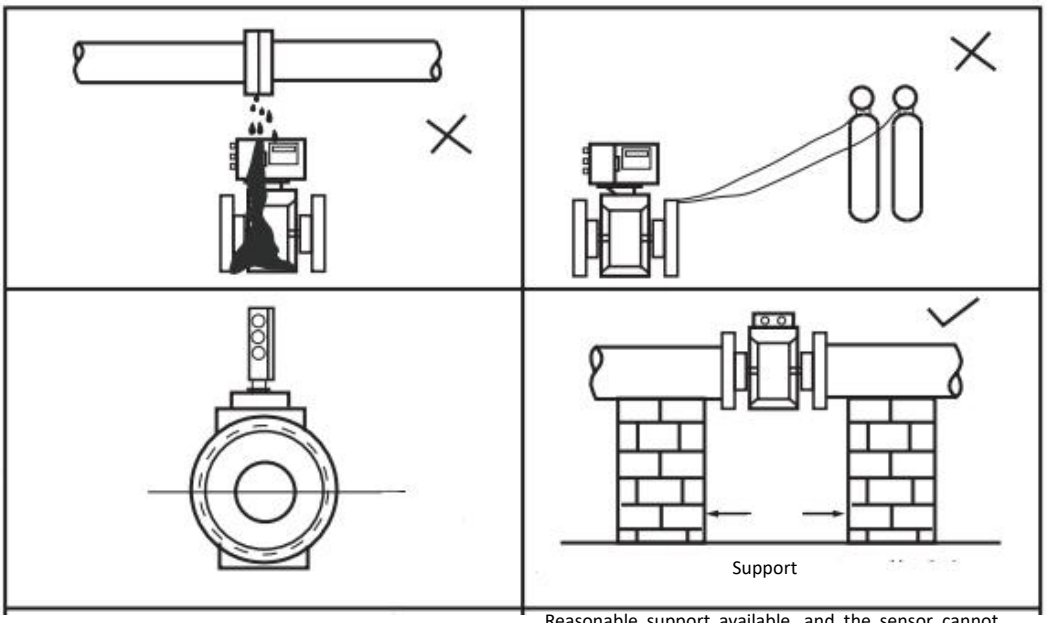
Press ▲ to display the hourly cumulative record and display the next record with the Add key, the previous record with the Reduce key, and then press OK to return to the flow display mode.Clear hourly cumulative records after clearing within the parameters.

VI. Flowmeter Installation Diagram (shows as Figure 6)



Prevent leaks

Keep away from flames

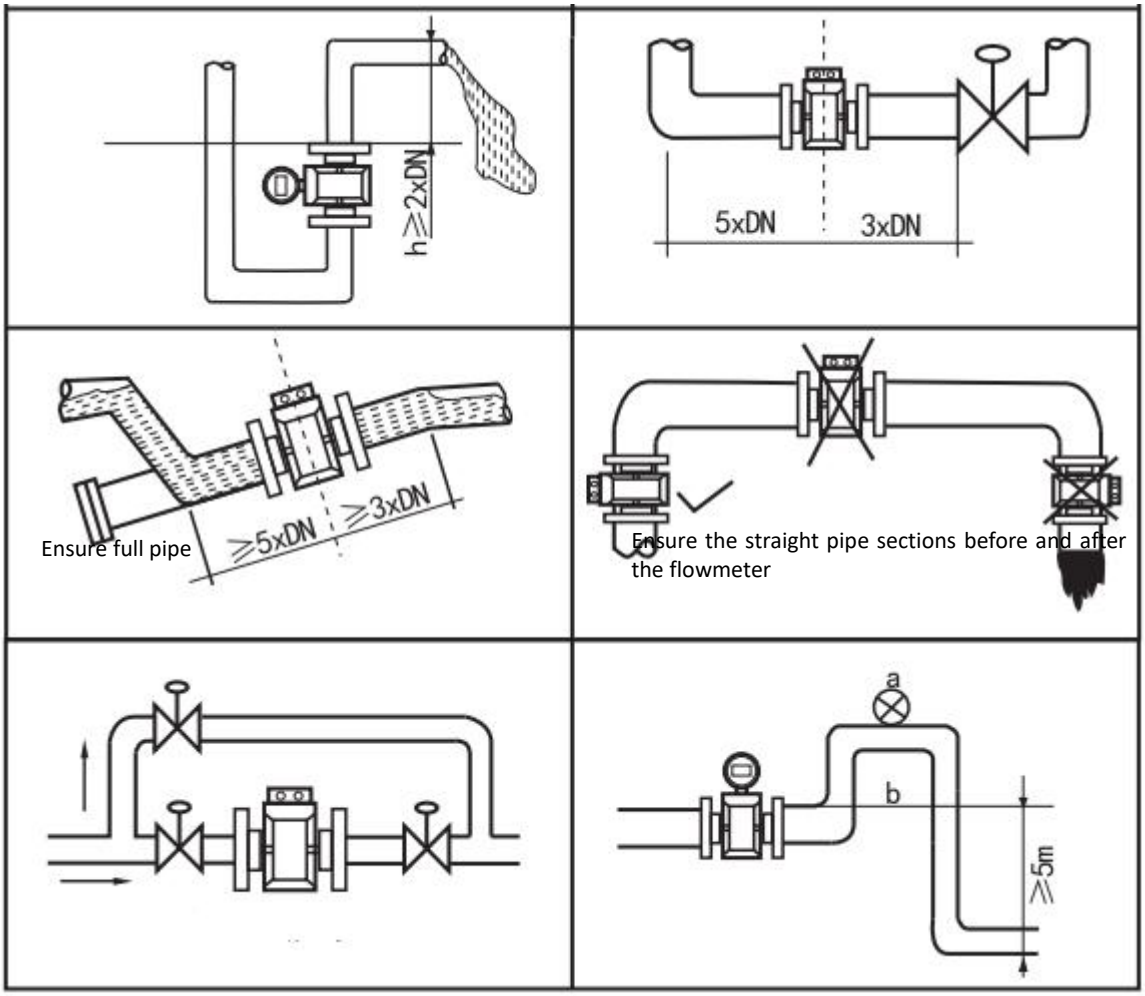


Support

Horizontal installation

Nearly horizontal electrode axis

Reasonable support available, and the sensor cannot be used as a load support point.



Ensure full pipe

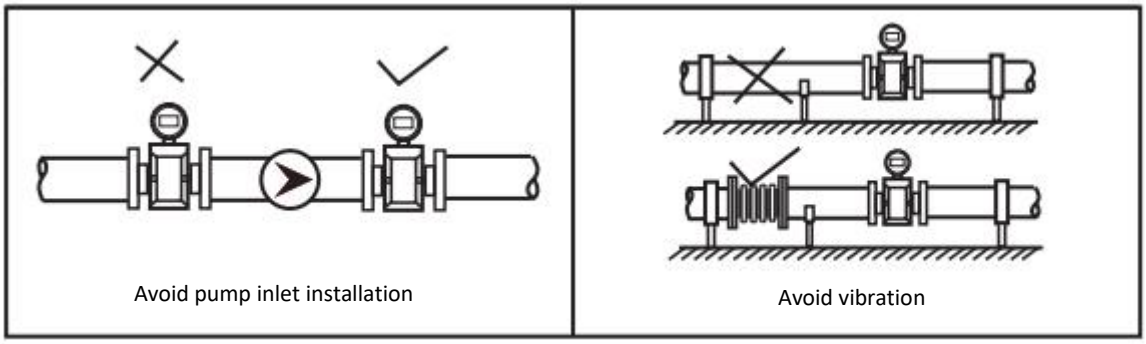
Ensure the straight pipe sections before and after the flowmeter

Measuring the precipitates easily created

Prevent bubbles and downward opening

Convenient for maintenance and cleaning

Avoid negative pressure and part-filled

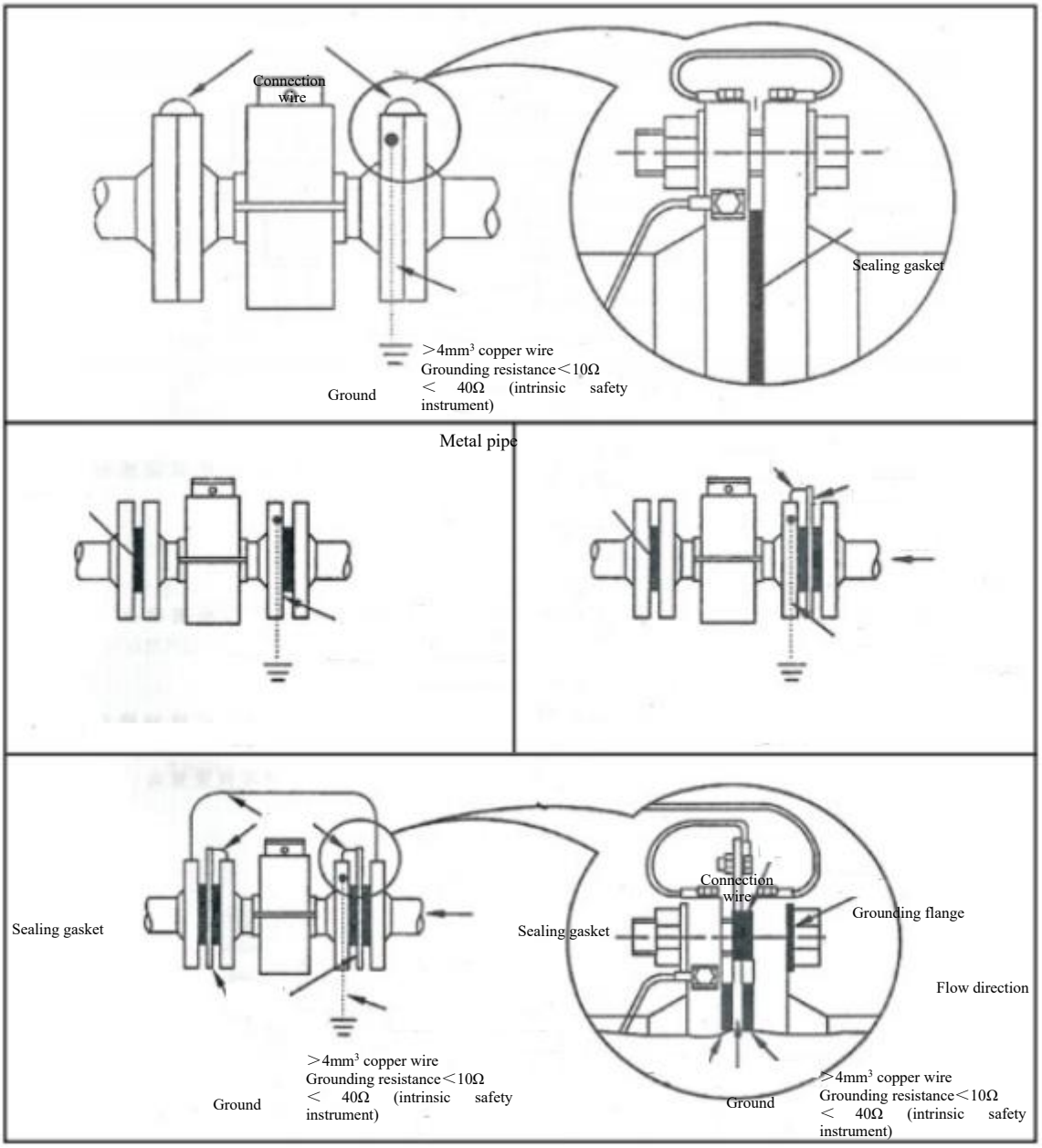


Avoid pump inlet installation

Avoid vibration

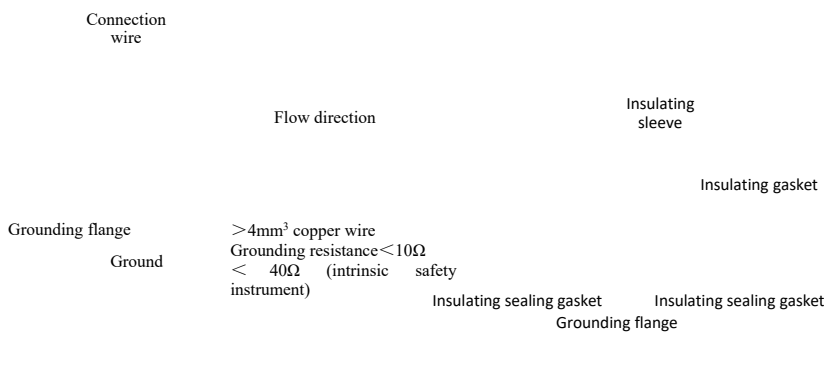
VII. Electrical Wiring

7.1 See the grounding for flowmeter and pipeline in Figure 7



Non-metal pipe, sensor with the grounding electrode

Non-metal pipe, sensor without the grounding electrode



Pipe with cathode

7.2 Converter terminals and signs, see Figure 8 and 9

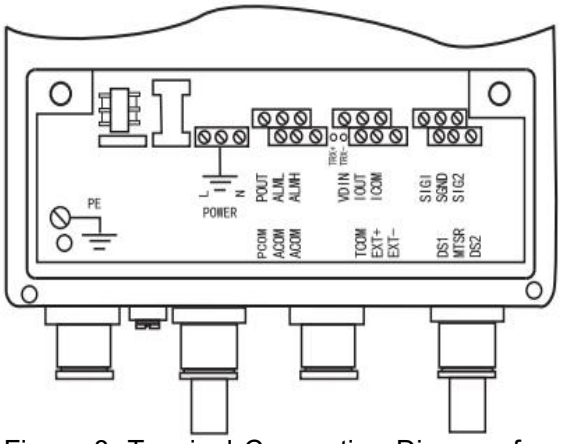


Figure 8. Terminal Connection Diagram for Square Flowmeter

SIG 1	Signal 1	Connected to separated sensor
SGND	Signal ground	
SIG 2	Signal 2	
DS 1	Excitation shielding 1	
DS 2	Excitation shielding 2	
EXT+	Excitation current +	
EXT-	Excitation current -	
VDIN	Current two-wire 24V	Simulation current output
IOUT	contact	
ICOM	Simulation current output	
POUT	Simulation current output ground	Frequency and pulse output
PCOM		
ALMH	Flow frequency (pulse) output	
ALML		
ALCOM		
TRX+		
TRX-		
TCOM		

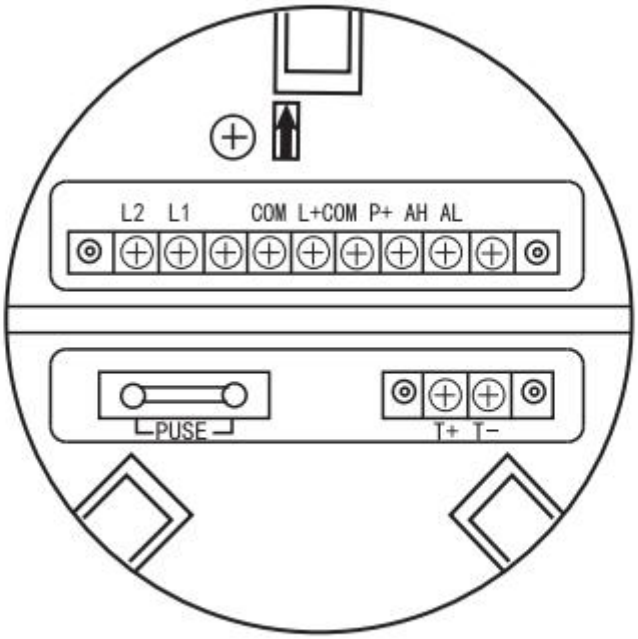


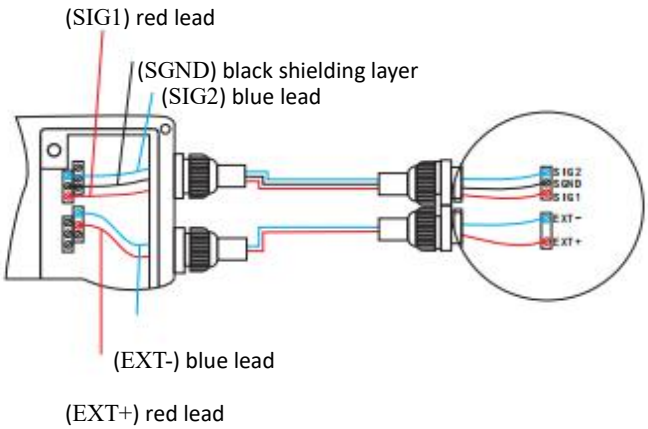
Figure 9. Terminal Connection Diagram for Circular Flowmeter

The signs for terminals of circular flowmeter are as follows:

I+:	Flow current output
COM:	Current output ground
P+:	Bidirectional flow frequency
COM:	(pulse) output
AL:	Frequency (pulse) output ground
AH:	LOAL output
COM:	HIAL output
FUSE:	Alarm output ground
T-:	Input power fuse
T+:	Communication input
L1:	Communication input
L2:	220V(24V) power input
	220V(24V) power input

7.3 Separated type wiring

7.3.1 STT3200 connection cable



7.4 Wiring diagram of output signal

When the "1" of the DIP switch next to the terminal is dialed to the "ON" position, the converter provides +28V power and 10 KΩ pull-down resistance to the isolated OC door frequency output (POUT+, PCOM-), alarm output (ALMH+, ALML-) and state control (1NSW). Therefore, when using the frequency output, dial the DIP switch "1" to "ON", "for the frequency signal from" POUT+ "and" PCOM" wiring. "2" and "3" of DIP switch to "RS485 communication terminal resistance when ON", "OFF" is not connected.

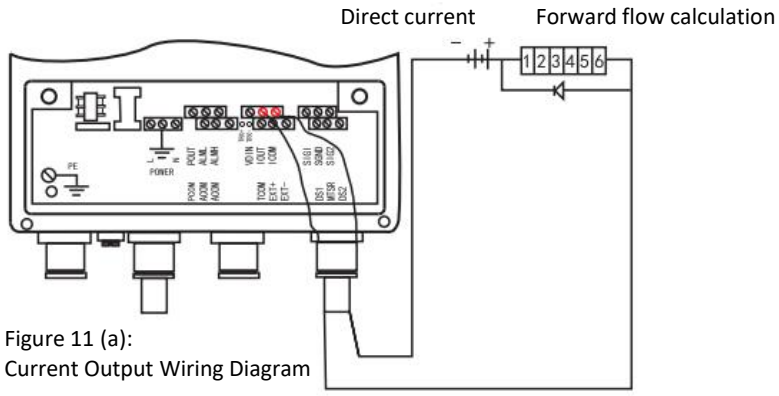


Figure 11 (a):
Current Output Wiring Diagram

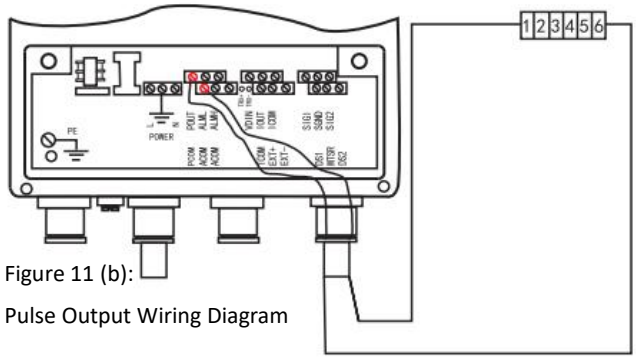


Figure 11 (b):

Pulse Output Wiring Diagram

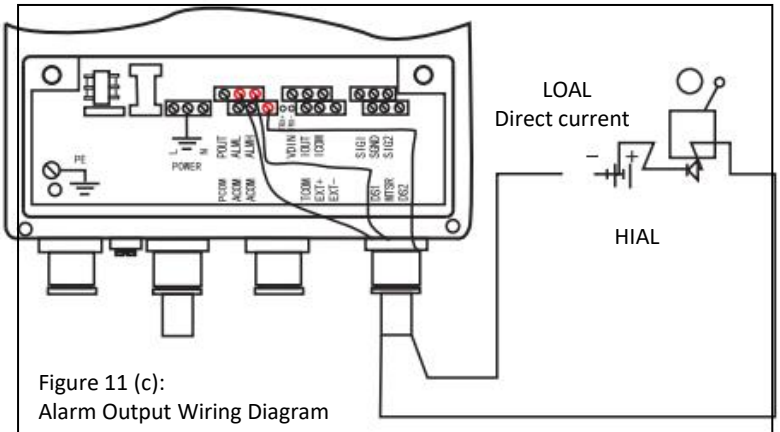
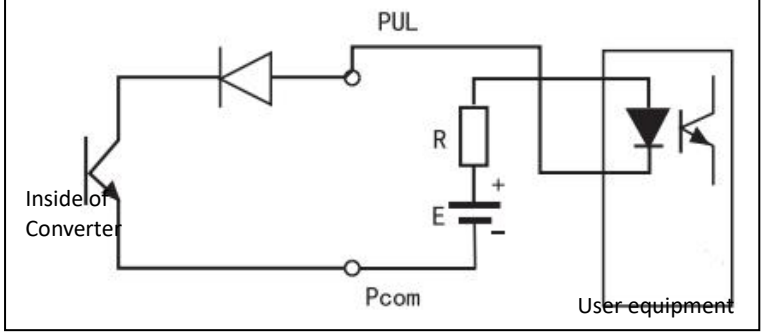


Figure 11 (c):
Alarm Output Wiring Diagram



Generally, the user optical coupling requires about 10mA current, therefore, E/R=10mA.

E=5~24V

Figure 11 (d): Digital Output Connected to Photocoupler (e.g., PLC)

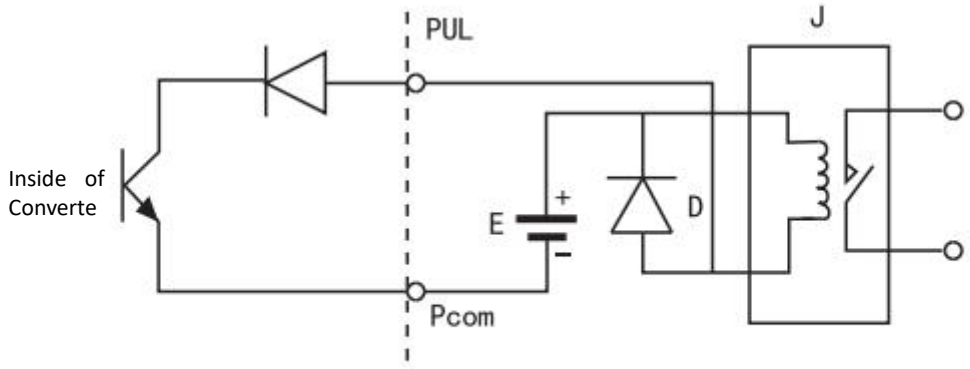


Figure 11 (e). Digital Output Link Relay

diode and most of the intermediate relays currently have diodes inside. If the intermediate relay does not contain a diode itself, the user shall connect one on the outside.

VIII. Self-diagnostic Information and Fault Processing

8.1 Self-diagnostic information

The printed circuit board of the electromagnetic flow converter adopts surface welding technology, which is not serviceable for the user, so the user cannot open the converter shell.

The intelligent converter has a self-diagnostic function. In addition to power and hardware circuit failures, faults in general applications can correctly give alarm information. This information prompts at the top right of the display that the "!" Identification, in the measurement state, turn over the page, and show the fault content is as follows:

Flow Normal.

Excitation Alarm

Empty Pipe Alarm

8.2 Fault processing

8.2.1 No display of the flowmeter

A. Check if the power supply is turned on;

B. Check that the power fuse is intact;

C. Check whether the power supply voltage meets the requirements;

D.Check whether the display contrast can be adjusted and whether the adjusted value is appropriate;

E. If the first 3 items (A, B and C) above are normal and the item D display contrast can not be adjusted, please return to the converter for repair.

8.2.2 Excitation alarm (SYS)

A. Whether the excitation wiring EXT+ and EXT-are open.

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

C. If both of A and B are normal, the converter fails.

8.2.3 Empty Pipe Alarm(FGP)

A. Check fluid is full of sensor measuring tubes or not;

B. Input the converter signal to terminals SIC1, SIC2 and SICCND at a short point. If the "Empty Pipe Alarm" prompt is removed, the normal converter is possible. The measured fluid conductivity is low or the empty pipe threshold and the empty pipe range are not set correctly;

C. Check if the signal connection is correct;

D.Check the sensor electrodes for normal conditions.

① Bring the flow to zero and the observation shows that the conductance ratio should be

less than 100%.

② In the case of flow rate, the measurement resistance of terminals SIG1 and SIG2 to SIG GND shall be less than 20K (for the medium as the water measurement value. It is best to measure with a pointer multimeter and see charge and discharge in the measurement process).

E. Measure the DC voltage between DS1 and DS2 with a multimeter and it shall be less than 1V, otherwise the sensor electrodes are contaminated and shall be cleaned.

8.2.4 HIAL (FQH)

The HIAL indicates that both the output current and the output frequency (or pulse) are over the limit. Changing the flow range can cancel the HIAL.

8.2.5 LOAL (FQL)

The LOAL indicates that both the output current and the output frequency (or pulse) are over the limit. Reducing the flow range can remove the LOAL.

8.2.6 Incorrect system settings

Intelligent judgment has been made and prompted in the flow range setting, flow product calculation unit setting and pulse equivalent setting, so as to easily modify the setting.

8.2.7 Inaccurate flow measured

A. Whether the measured fluid is full of sensor measuring tubes;

B. Whether the signal cable is connected normally;

C. Check whether the sensor coefficient is set normally according to the sensor sign and the factory verification certificate.

IX. Supply in Full Sets

The electromagnetic flowmeter shall be supplied according to the order contract. The documents include: one instruction manual, one product certificate and one packing list.

X. Transportation and Storage

To prevent damage to the instrument during operation, keep the manufacturer packing before arriving at the installation site. During storage, the storage site shall meet the following conditions:

A. Rain-proof and moisture-proof;

B. Mechanical vibration is small and avoid shock;

C. Temperature range -20~+ 60℃, with humidity not greater than 80%.

XI. Operation

The following inspections shall be carried out before commissioning:

A. Check whether the flowmeter has damage during transportation and installation;

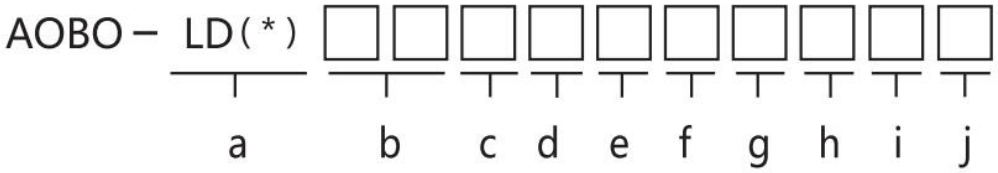
B. Whether the supply voltage is consistent with the nameplate voltage;

C. Check whether the instrument is connected correctly.

Open the pipe valve after inspection to fill the liquid, and attention should be paid to eliminate leakage and residual gas in the system. Then turn on the instrument power supply, and the general flowmeter can warm up for 10 minutes.

If there is any problem in operation, you can handle the fault according to the self-diagnosis results of flowmeter converter in No.9. If the instrument cannot work well, please contact our company in time.

Product Code for Type Selection



a. Instrument type	LD（*）	* means the caliber of flowmeter. For example, LD50 indicates the caliber of 50mm.
b. Nominal pressure (MPa)	10	1.0MPa
	16	1.6MPa
	25	2.5MPa
	40	4.0MPa
c. Lining material	1	PTEF
	2	Neoprene
	3	Polyurethane rubber
	4	F46
	5	Screened PFA
d. Electrode material	1	316L
	2	Hastelloy B
	3	Hastelloy C
	4	Titanium
	5	Platinum/iridium alloy
	6	Tantalum
	7	Tungsten carbide

e. Shell protection	1	IP65
	2	Sensor IP68 + converter IP65
f. Explosion-proof mark	0	None
	1	Exdmbll CT6 Gb (without acetylene), integrated type
	2	Exdmb llCT6 Gb (without acetylene), separated type
g. Accessories	0	None
	1	Grounding electrode
	2	Grounding flange
	3	Flange for inlet protection
	4	Electrode scraper
h. Structure	Er	Separated type
	Eh	Integrated type
i. Power supply	1	Ac 220V±10%
	2	DC 24v
	3	Dc 3.6v
J Converter type	1	Normal type
	2	Low conductivity type(Integrated)
	3	Slurry type
	4	Filling type
	5	Dual power supply type(Split type)