Electromagnetic flowmeter converter user's manual

L-magU series

(partially filled pipes)

Catalog

1. Converter wiring

1.1 Terminal wiring and marking

1.1.1 Terminal wiring and marking

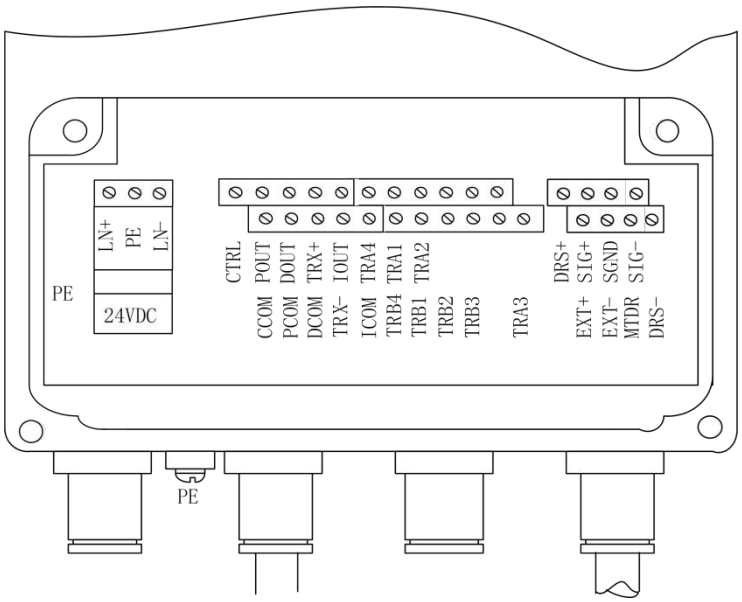


Figure 1.1.1 Square meter wiring terminal diagram

The meaning of each terminal label is as follows:

CTRL :	reserved
CCOM :	reserved
PCOM :	Pulse / frequency output ground
POUT :	Pulse / frequency output positive
DCOM :	Alarm output place
DOUT :	Alarm output positive
TRX+ :	Communication input (RS485 - A)
TRX- :	Communication input (RS485 - B)
IOUT :	Current output positive

ICOM :	Current output ground
TRA4	24V Signal output
TRB4	reserved
TRA1	4-20mA input
TRB1	reserved
TRA2	reserved
TRB2	reserved
TRB3	reserved
TRA3	COM
EXT+ :	Excitation current is positive
EXT- :	Excitation current negative
SIG+ :	Signal 1
SGND :	signal ground
SIG- :	Signal 2
DRS+ :	Incentive shield positive
MTDR	Excitation shielding ground
DRS+ :	Excitation shielding negative

1.2 Characteristics and connection requirements of connecting wires and cables

1.2.1 Flow signal line

This converter provides an equipotential excitation shielding signal output voltage to reduce the impact of cable transmission distributed capacitance on flow signal measurement. When the measured conductivity is less than or long-distance transmission, a two-core double-shielded signal cable with equipotential shielding can be used. For example STT3200 special cable or BTS type triple shielded signal cable.

1.2.2 Excitation current line

The excitation current wire can be a two-core insulated rubber flexible cable, and the recommended model is RVVP2* $0.3mm^2$ · The length of the excitation current wire is consistent with the length of the signal cable. When using the STT3200 dedicated cable, the excitation cable and signal cable are combined into one.

1.2.3 Converter installation grounding requirements

Ground terminal of the converter shell should be no less than $1.6mm^2$. The grounded copper wire is connected to the earth. The ground resistance from the converter case to the earth should be less than 10Ω .

First, cut the Φ20 copper tube into 1700mm length (can be lengthened as needed) to make ground nails buried 1500mm in the ground (Note: When burying nails in the ground, sprinkle a layer of broken wood charcoal on the tips of the nails, and then pour salt water);

Secondly, weld the $4mm^2$ copper wire to the ground nail, and finally connect the ground wire to the sensor flange, grounding ring, and pipe flange , see Figure 1.3.

Note: The fixed ground wire screws, elastic washers, and flat washers must be made of stainless steel.

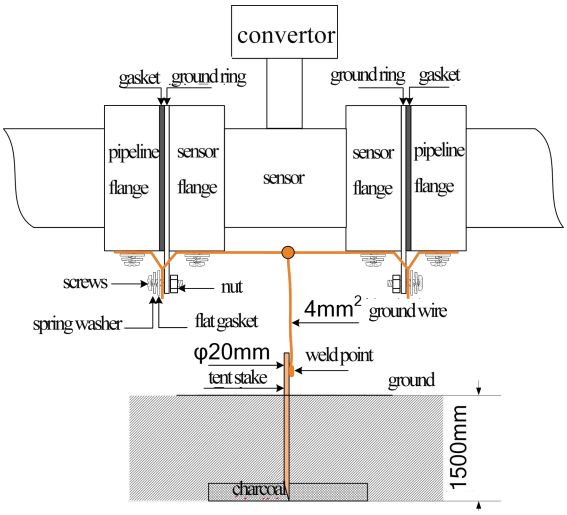


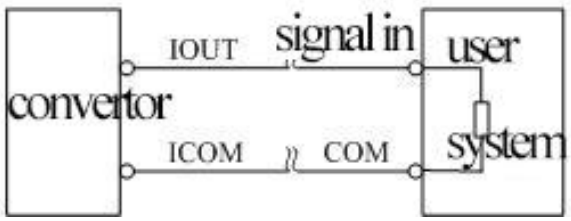
Figure 1.3 Converter grounding diagram

1.3 Output and power cord

All output and power cords are prepared by users according to actual conditions. But please pay attention to meet the load current requirements.

The external power supply and load for pulse, current and alarm output are shown in Figure 1.4.1- Figure 1.4.3. When using an inductive load, a freewheeling diode should be added as shown.

1.3.1 Current output wiring:



Picture 1.4.1 4～20mA Internal power supply connection

1.3.2 Pulse output wiring:

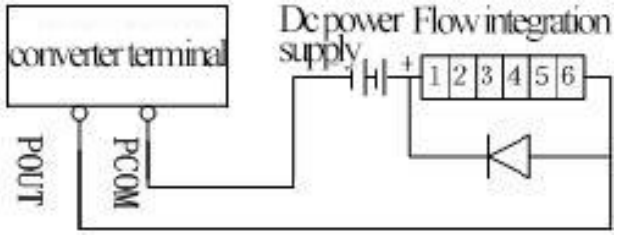
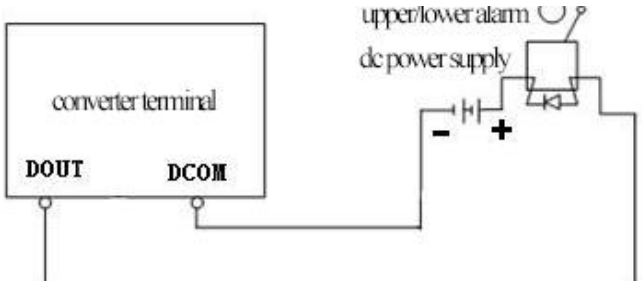


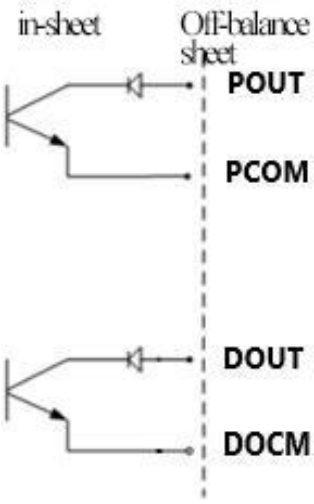
Figure 1.4.2a External power supply connected to electronic counter

1.3.3 Alarm output wiring



Picture 1.4.3 Alarm output wiring

1.3.4 OC door connection method in meter

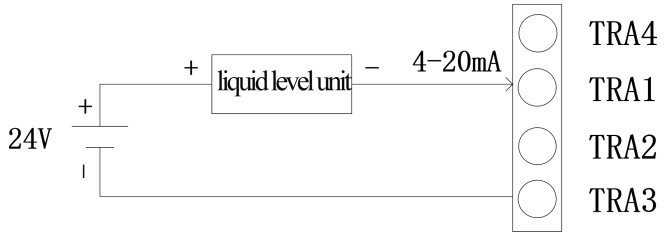


Picture 1.4.4 OC door connection method in meter

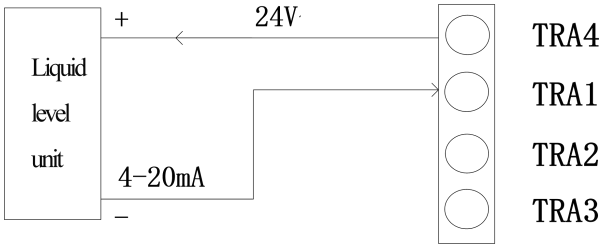
1.4 Level unit connection

Liquid level measurement unit of non-full pipe electromagnetic flowmeter, output 4-20mA The current corresponds to the level of the liquid level. The liquid level measuring unit is powered by an external 24VDC supply. The power supply can also be supplied by the electromagnetic flowmeter internally with 24VDC. power supply.

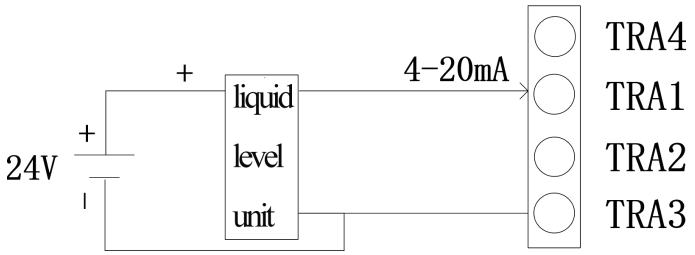
1.4.1 Two-wire external power supply wiring diagram:

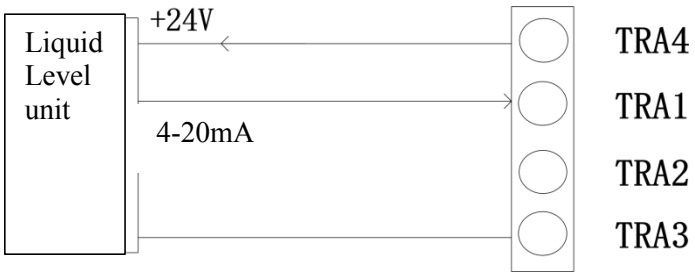


1.4.2 Two-wire internal power supply wiring diagram



1.4.3 Three-wire external power supply wiring diagram





1.4.4 Three-wire internal power supply wiring diagram

2. Introduction of instrument parameters

2.1 Flow parameter settings

2.1.1 Flow unit

Select the flow display unit in the parameters. The instrument flow display units are: L/s , L/m , L/h , m 3 /s , m 3 /m , m 3 /h Users can select a suitable flow display unit based on process requirements and usage habits.

2.1.2 Flow accumulation unit

The converter display is 9 Bit counter, the maximum allowed count value is 999999999 .

The cumulative units used are L and m 3 (liters, cubic meters) .

The flow accumulation equivalent is:

0.001L , 0.010L , 0.100L , 1.000L; 0.001m 3 , 0.010m 3 , 0.100m 3, 1.000m 3

2.1.3 Reverse output allowed

When the reverse output permission parameter is set to the "disabled" state, as long as the fluid flows, the converter will output pulses and current according to the flow value.

When the reverse output permission parameter is set to "Allow", if the fluid flows in the reverse direction, the converter flow rate displays normal, the output pulse is "0", the current output is signal "0" (4mA), and the instantaneous flow rate is displayed as 0.

2.1.4 Instrument range setting

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 meter range setting determines the meter range, and also determines the meter percentage display, meter frequency The corresponding relationship between rate output, instrument current output and flow rate:

Meter percentage display value = (Flow value measured value / Instrument range) * 100 % ;

Instrument frequency output value = (flow value measurement value / meter range) * Frequency full range value;

Instrument current output value = (flow value measurement value / meter range) * Current full range value + base point;

The instrument pulse output value is not affected by the instrument range setting.

2.1.5 Measure damping time

That is, filtering time , long measurement damping time can improve the stability of the instrument flow display and the stability of the output signal. It is suitable for measuring the total amount of pulsating flow. Short measurement damping time shows fast measurement response speed, suitable for in production process control. The measured damping time is divided into 1S , 2S , 3S , 4S , 6S , 8S , 10S , 15S , 30S , 60S , optional setting method can be used.

2.1.6 Analog output damping

That is, current filtering time , long analog output damping can increase 4-20mA output signal stability. Short analog output damping manifests as fast measurement 4-20mA response speed. Analog output damping: 5S , 10S , 20S , 50S , 80S , 150S , 250S , selectable setting mode available.

2.1.7 Spike suppression option

For flow measurement of pulp, mud and other slurries, solid particles in the fluid rub or impact the measuring electrode, Will cause "peak false signals". In order to overcome such false signals, the converter is designed with a peak suppression function. The user sets the peak fluctuation flow value and peak width time. The converter will suppress the peak false signals that meet the set values. Suppress to minimize flow fluctuations.

This parameter is "Spike Suppression Allowed" and has two functions:

1) Set this parameter to "Allow" to start the spike suppression function.

2) Set this parameter to "Disabled", turn off the spike suppression function and turn on the noise sensitivity test.

2.1.8 Spike suppression range

This parameter has two functions:

1) When the "Spike Suppression Allow" parameter is set to Allow, this value confirms the spike Suppression starting value, used to set the flow rate fluctuation value to suppress spike spurious signals. If the current flow rate fluctuation is higher than this.

If the starting value is set, it is considered that this change is caused by spike spurious signals, and the system will cut it and display it. PSM Call the police. When the flow rate fluctuation is lower than this starting value, it is considered that this change is caused by the real flow rate change, and the system Recognition is measured by changes in flow rate.

2) When the "Spike Suppression Allowed" parameter is set to disabled, this value determines the response to noise. Sound sensitivity test. ※If the " FST " display appears frequently, it is recommended to increase the "Spike Suppression Range" value.

2.1.9 spike suppression time

This parameter selects the spike width time to suppress spike artifacts, in seconds.

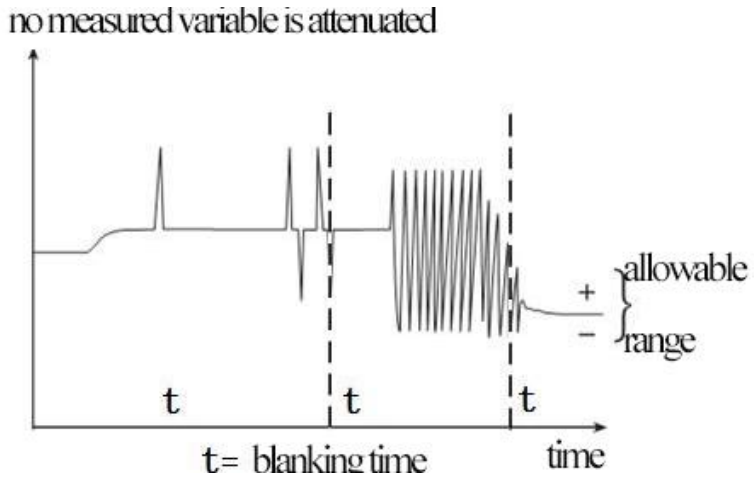
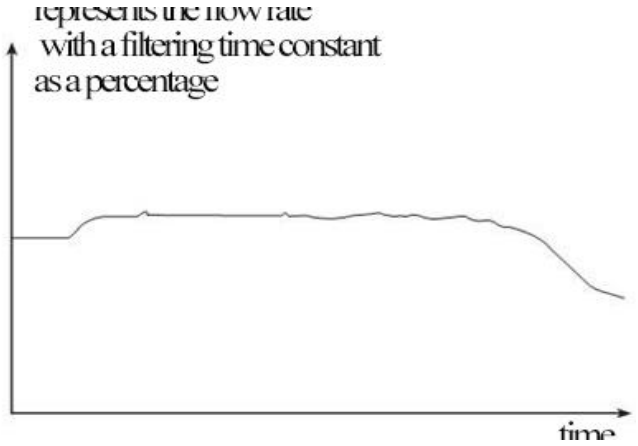


Figure 2.1.6 Eliminate coarse error noise using spike suppression range technology



2.1.10 Abnormal suppression time

For abnormal situations such as bubbles in the water, in order to prevent the flow from returning to "zero", the converter is designed with an exception suppression function in the software and hardware. When the converter detects an abnormal situation, the converter will display an " ABN " abnormal alarm.

Suppress abnormal traffic within a period of time to prevent the traffic from returning to "zero" and suppress traffic fluctuations to a minimum. This parameter is used for the abnormal suppression time length, which can be from 0 to 99s . Within selection, when selecting 0s When this function is closure.

2.1.11 Flow direction selection

If the user thinks that the fluid direction during debugging is inconsistent with the design, the user does not need to change the excitation line or signal line connection. Method, just use the flow direction setting parameters to change.

2.1.12 signal cutoff allowed

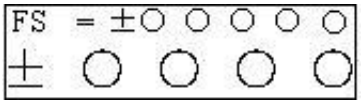
When the signal cutoff permission parameter is set to "disabled", as long as the fluid flows, the converter will output a pulse according to the flow value. rush and current.

When the signal cutoff allowable parameter is set to " Allow " , if the fluid flow rate is lower than the flow rate set by the small signal cutoff point When, the converter flow rate display is normal, the converter displays small signal cutoff (CUT) , the output pulse is " 0 ", the current output signal is " 0 " (4 mA) , and the instantaneous flow rate is displayed as " 0 " .

2.1.13 Small signal cutoff point

The small signal cutoff point setting is expressed in terms of flow. This parameter is allowed in conjunction with signal cutoff.

2.1.14 Flow zero point correction



When performing zero point correction, ensure that the sensor tube is filled with fluid and the fluid is at rest. The flow zero point is the flow Speed is expressed in mm/s. The converter flow zero point correction is displayed as follows:

The upper small characters display: FS Represents the zero point measurement value of the instrument; the large characters below display: flow velocity zero point correction value; When FS When the display is not "0" , the correction value should be adjusted to make FS = 0 . Note: If you change the downward

correction value, FS value increase, it is necessary to change the positive and negative signs of the downward value so that FS Can be corrected to zero.

The correction value of the flow zero point is the matching constant value of the sensor and should be recorded in the sensor record sheet and sensor label. Card. When recorded, the sensor zero point value is the flow velocity value in mm/s , and its sign is opposite to that of the correction value.

2.1.15 Factory calibration coefficient

This coefficient is a dedicated coefficient for the converter manufacturer. The converter manufacturer uses this coefficient to convert L-magU electromagnetic converter

The measurement circuit system is normalized to ensure that all L-magU The interchangeability between electromagnetic converters reaches 0.1% .

2.1.16 Total reset password

Users who use passwords of the third level or above can set the password, and then set the password within the total reset.

2.2 Alarm parameter settings

2.2.1 Alarm output selection

The converter alarm output has a total of 9 Options: prohibit alarm output, flow upper limit alarm, flow lower limit alarm, flow empty pipe alarm, flow reverse alarm, flow cutoff alarm, excitation system alarm, liquid level upper limit alarm, liquid level Lower limit alarm.

Example "Upper Limit Alarm": The upper limit alarm allowable parameter is set to "Allow" and the alarm output selection is set to "Flow Up". "Limit alarm". At this time , if the fluid flow reaches the upper limit alarm value, the converter displays the upper limit alarm (HIG) , and the terminals DO+ and DO- output low level.

2.2.2 Upper limit alarm allowed

When the upper limit alarm permission parameter is set to "disabled", the upper limit alarm function is cancelled. When the upper limit alarm allows parameters reaches the upper limit alarm value, the converter displays the upper limit alarm (HIG) .

2.2.3 Upper limit alarm value

The upper limit alarm value is calculated based on flow rate. This parameter adopts numerical setting method. The user sets a Appropriate flow value. When the instantaneous flow rate is higher than this value during operation of the instrument, the upper limit alarm allowable parameters and alarm output parameters The numbers are output and displayed accordingly.

2.2.4 Lower limit alarm

Same upper limit alarm

2.2.5 Excitation alarm

When the excitation alarm parameter is set to "disabled", the excitation alarm function is cancelled.

When the excitation alarm parameter is set to "Allow", if the excitation coil fails, the converter displays Sys .

2.2.6 Air flow control alarm allowed

L-magU It has empty pipe detection function and does not require additional electrodes. If the user selects the empty pipe alarm permission parameter as "Disabled", the empty pipe alarm function is cancelled.

If the user selects the empty pipe alarm permission parameter as "Allow", the empty pipe alarm function will be enabled. When the fluid in the pipeline When it is lower than the measuring electrode, the instrument can detect an empty pipe state, the converter displays MTP , and the output pulse is "0" .

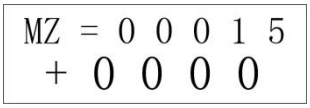
The current output is signal " 0 " (4 mA) The instantaneous flow and flow rate are displayed as 0 .

2.2.7 Empty pipe alarm threshold

When the pipe is full of fluid (with or without flow rate) , the upper line of the empty pipe alarm threshold parameter displays the measured conductivity. Set the empty pipe alarm threshold in the downstream direction. When setting the empty pipe alarm threshold, it can be set based on the measured conductivity. 3-5 times the measured conductivity .

2.2.8 Empty pipe zero point correction

When the on-site full pipe value is large, the user can perform empty pipe zero point correction. When correcting the zero point of the empty pipe, ensure that the sensor The tube is filled with fluid, and the empty tube zero point correction is displayed as follows:

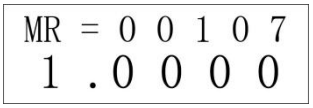


The upper line displays: MZ represents the empty pipe zero point measurement value of the instrument; The lower line displays: Empty pipe zero point correction value;

First, according to the measured value of conductivity MT , adjust the correction value so that MZ =5-10 or so (note: if you add downward practice Positive value, MZ value decreases).

2.2.9 Empty pipe range correction

When the empty pipe conductivity MT value measured by the instrument is too small, the user can correct the empty pipe range. When correcting the empty pipe range, ensure that there is no fluid in the sensor tube. The empty pipe range correction is displayed as follows:



The upper line displays: MR represents the measured value of the empty pipe range of the instrument; The lower line displays: Empty pipe range correction value;

Increase the downward correction value, MR value increases, decrease the downward correction value, MR value decreases. The user can adjust MR to an appropriate value according to actual needs (it is recommended to adjust it to around MR=500), then the conductivity value of the measured empty pipe is basically the actual repaired value. MR value after positive

2.2.10 Tube damping time

A long empty pipe damping time results in slower empty pipe alarm response. Short measurement damping time, empty pipe alarm response speed is faster, empty pipe damping time: 10SEC , 15 SEC , 20 SEC , 25 SEC , 30 SEC , 35 SEC , 40 SEC45 SEC , 50 SEC , 60 SEC A selection setting method is available.

2.3 Output parameter settings

2.3.1 Pulse output mode

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

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

Frequency output value = (flow value measurement value / meter range) * Frequency range + frequency lower limit;

- PO _ 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 set by the following two parameters: " Pulse Equivalent Unit " and "Pulse Equivalent". Set. The pulse output mode is mostly used for total accumulation, and is generally connected to an integrating instrument.

Frequency and pulse output are generally OC Gate form, therefore, an external DC power supply and load should be connected. See 5.14 for details Festival.

2.3.2 Pulse unit

L-magU The electromagnetic converter has four pulse equivalents : m3 , L.

2.3.3 Pulse equivalent

The pulse equivalent refers to the flow value represented by a pulse. The pulse equivalent of the instrument needs to be determined by the "pulse equivalent unit" and "pulse equivalent unit". The two parameters "Impact Equivalent" are set together, ranging from 0.001 to 59.999m3 , 0.001 ~ 59.999L .

Under the same flow rate, if the pulse equivalent is small, the frequency of output pulses will be high and the cumulative flow error will be small.

2.3.4 Pulse Width

Pulse output is active at low level, pulse width: 0.5---1999ms

Pulse width-maximum number of output pulses correspondence table (Table 2)

serial number	Pulse width (ms)	Maximum number of output pulses per hour (p/h)
1	0.5	3600000
2	1	1800000
3	5	360000
4	10	180000
5	50	36000
6	100	18000
7	500	3600
8	999	1800
9	1999	900

2.3.5 Frequency output lower limit

The frequency output range of the instrument corresponds to the zero point of flow measurement

2.3.6 Frequency output range

The frequency output range of the instrument corresponds to the upper limit of flow measurement.

2.3.7 Current output mode

Currently users can only choose 4 ~ 20 mA current output.

2.3.8 Current zero point correction

The current output zero point of the converter is adjusted at the factory to make the current output accurate. 4mA .

2.3.9 Current full scale correction

The current output full-scale adjustment of the converter leaves the factory so that the current output is accurate to 20mA .

2.3.10 Output current test

After adjusting the current output zero point and full scale, the user can use this parameter to test the output current linearity of the converter. Users can set 0 , 20.00 , 50.00 , 70.00 , 99.99 respectively to check the output current linearity characteristics.

2.4 Sensor parameters

2.4.1 Measure pipe diameter

L-magU electromagnetic flowmeter converter matching sensor diameter range: 3 ~ 65000 mm.
3 , 4 , 5 , 6 , 8 , 10 , 15 , 20 , 25 , 32 , 40 , 50 , 65 , 80 , 100 , 125 , 150 , 200 , 250 , 300 , 320 , 350 , 400 , 450 , 500 , 600 , 700 , 800 , 900 , 1000 , 1100 , 1200 , 1300 ,1400 ,1500 ,1600 ,1700 ,1800 ,1900 ,2000 ,2100 ,2200, 2300 , 2400 ,2500 , 2600 , 2700 , 2800 , 2900 , 3000...65000

2.4.2 Excitation frequency selection

L-magU electromagnetic converter provides six excitation frequency selections (the instrument is default set to 50Hz power mode when leaving the factory, excitation frequency 6.2 5 Hz) , the user can set it according to the actual situation:

50Hz power mode: 12.5 Hz ,6.250 Hz, 5.000 Hz, 4.167 Hz,;

60Hz power mode: 10.000 Hz, 5.000 Hz, 3.333 Hz, 2.500;

The small-diameter sensor excitation system has small inductance and high excitation frequency. The excitation system of a large-diameter sensor has a large inductance, so the user can only choose a low excitation frequency. During use, select a low excitation frequency first. If the zero point of the flow rate of the instrument is too high, Then select low excitation frequency. Note: At which excitation frequency it is calibrated, it must work

at which excitation frequency.

If high-frequency excitation is used, please order a high-frequency excitation converter and select the appropriate excitation frequency value according to this principle.

2.4.3 Sensor coefficient value

Sensor coefficient: that is, the calibration coefficient of the electromagnetic flowmeter. This coefficient is obtained from the real standard and stamped to the sensor

on the sign. The user must place this coefficient in L-magU in the converter parameter table.

2.4.4 Flow rate correction

See Appendix 1 for details.

2.4.5 Sensor coding

Sensor coding can be used to mark the factory date and number of the matching sensor to coordinate the setting of the sensor coefficient.

2.5 Communication parameter settings

2.5.1 Instrument communication mode

This watch provides one communication mode: MODBUS When the instrument is equipped with different communication methods, the corresponding communication settings should be set message mode.

2.5.2 Instrument communication address

Refers to the communication address of this watch during data communication, optional range: 01 ~250 No. address, 0 The address is reserved.

2.5.3 Instrument communication speed

Instrument communication baud rate selection range: 300 , 600 , 1200 , 2400 , 4800 , 9600 , 19200 , 38400 .

2.5.4 Instrument calibration mode

The converter comes standard with MODBUS Communication a stop bit 8 Bit no parity mode, the user can select a stop bit 8 as needed Odd bit parity, one stop bit 8 -bit even parity mode, two stop bits 8 -bit no parity mode, two stop bits 8 Odd bit parity, two stop bits 8 Bit oddity check.

2.6 Instrument factory parameters

2.6.1 User password 1 ~ 4

User use 5 Level password entry, this password can be modified;

2.6.2 Instrument code 1 and 2

The converter code records the factory date and serial number of the converter

2.6.3 Positive total high and low

The total high and low bit settings can change the values of forward cumulative total and reverse cumulative total, which are mainly used for instrument maintenance. and instrument replacement.

User use 5 Enter the level password to modify the forward accumulation amount (Σ +) . Generally, the accumulation amount cannot exceed the calculated amount.

The maximum value counted by the counter (999 9 999 9 9) .

2.6.4 Reverse total high and low

User use 5 Enter the level password to modify the reverse accumulation amount (Σ -) . Generally, the accumulated amount cannot exceed the maximum value counted by the counter (999 9 999 9 9) .

2.7 Liquid level parameters

Liquid level measuring unit, output 4-20mA Current signal, corresponding to the range of liquid level, 4mA Corresponding to zero liquid level, 20mA Corresponds to the full liquid level.

2.7.1 Liquid level zero point correction

Input 4mA Liquid level signal, adjust the liquid level zero correction parameter so that the instrument displays 0% liquid level.

2.7.2 Liquid level range correction

Input 20mA Liquid level signal, adjust the liquid level full scale correction so that the instrument displays 100.0% liquid level.

2.7.3 Liquid level alarm allowed

When the liquid level alarm permission parameter is set to "disabled", the liquid level upper limit and lower limit alarm functions are cancelled. When the liquid level reports When the alarm permission parameter is set to "Allow", if the liquid level reaches the upper limit of the liquid level or the liquid level

is lower than the lower limit of the liquid level value, the converter displays the upper limit alarm of liquid level (L I H) or the lower limit alarm of liquid level (L I L) .

2.7.4 Liquid level upper limit alarm

The liquid level upper limit alarm is calculated based on the liquid level height. This parameter adopts numerical setting method. The user sets it in this parameter.
An appropriate liquid level height value. When the liquid level is higher than this value during operation of the instrument, the parameters will be adjusted in conjunction with the liquid level alarm. should be output and displayed.

2.7.5 The liquid level lower limit alarm is the same as the liquid level upper limit alarm.

2.7.6 Pipe type

The converter has two pipe types: full flow pipe and non-full flow pipe.

Full flow pipe: used for circular full flow pipe. The liquid level measurement function does not participate in the calculation, that is, an ordinary converter. Partially full pipe: used for measurement of circular partial full pipe. 4mA Corresponds to zero liquid level, 20mA Corresponds to the full liquid level.

2.7.7 Liquid level height

This parameter is used to set the height of the liquid level in the pipe at full scale, in mm . as unit.

2.7.8 Test mode allows

This function can check whether the converter hardware is working properly under special circumstances. Different flow rates and liquid levels can be set. bit, check the displayed traffic.

When set to "Allow", the flow rate value and liquid level value are calculated based on the test values. When set to "Disable " , the flow rate value and liquid level value will not be calculated effect.

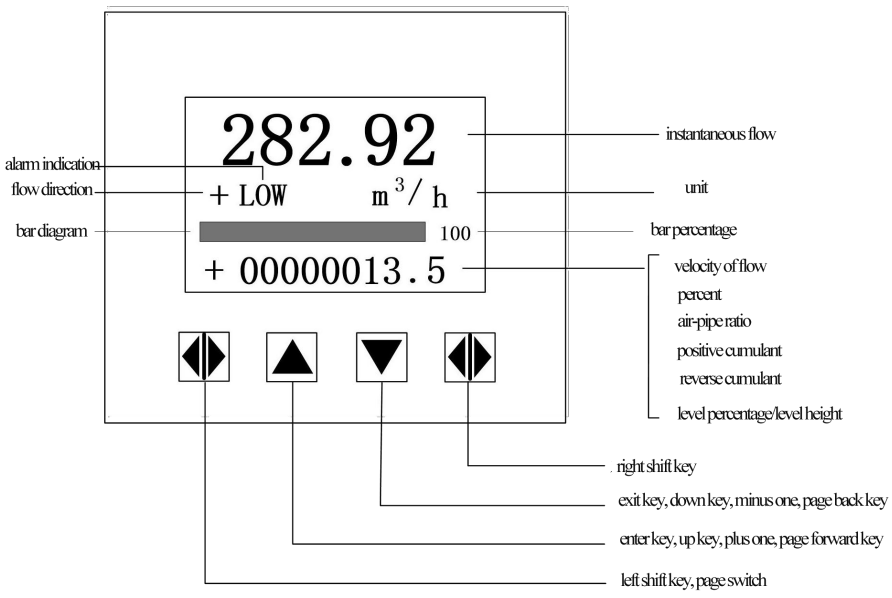
2.7.9 Test fluid value

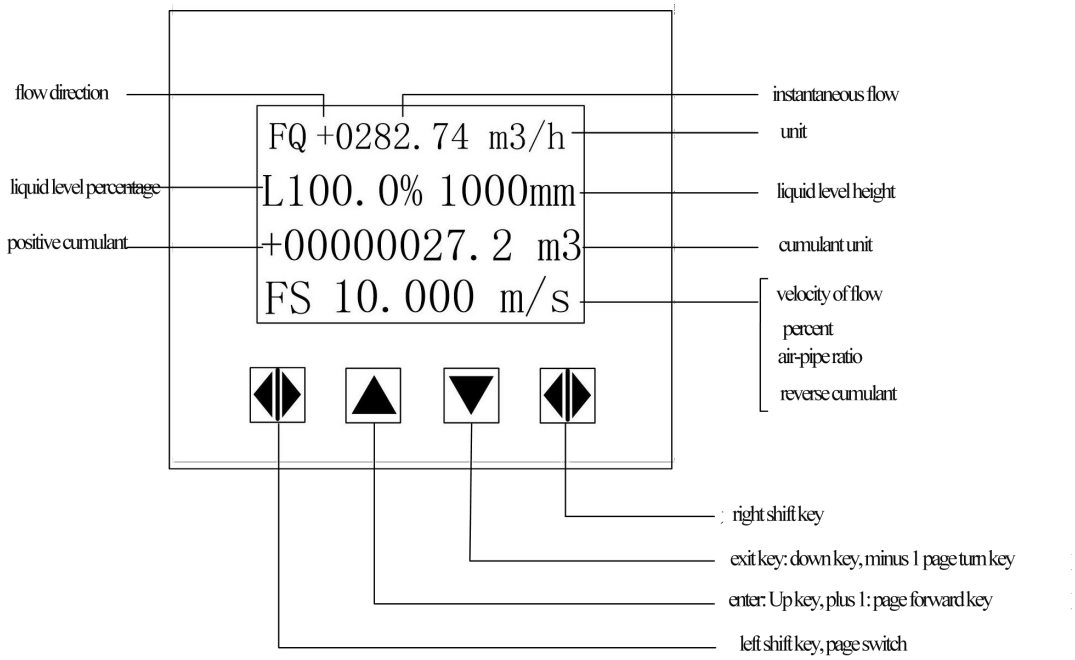
This parameter only takes effect when enabled in the "Test Mode Allowed" menu. User-set flow rate value (0 . 0 0 0 --- 10 . 00 0 m / s) .

2.7.10 Test liquid level value

This parameter only takes effect when enabled in the "Test Mode Allowed" menu. , the liquid level value set by the user (000.0 --- 100.0 _ _ _ %) .

3 Instrument display and operation





When the instrument is powered on, it automatically enters the measurement state. In the automatic measurement state, the instrument automatically completes each measurement function and displays the corresponding measurement data. To set or modify instrument parameters, the instrument must enter from the measurement state. Parameter setting status. In the parameter setting state, the user uses the panel keys to complete the instrument parameter setting.

3.1 Button functions and remote control functions

3.1.1 Key functions in automatic measurement state

Down key: cycle through the displayed content on the lower row of the screen;

Right shift key: Press the right shift key once, and the instrument enters the instrument function selection screen; Left shift key: Press the left shift key to switch the main interface page;

Left shift key + up key: the contrast in the measurement state gradually becomes darker; Left shift key + down key: the contrast in the measurement state gradually brightens;

3.1.2 Functions of each key in parameter setting state

Down Key: Decrease the number at the cursor by 1, turn the page forward; Up key: Add 1 to the number at the cursor and turn the page;

Press the right shift key to move the cursor clockwise, and press the left shift key to move the cursor counterclockwise;

When the cursor moves under the up key, press the up key to enter the submenu.

When the cursor moves under the down key, press the key to return to the previous menu.

3.1.3 Remote control operation

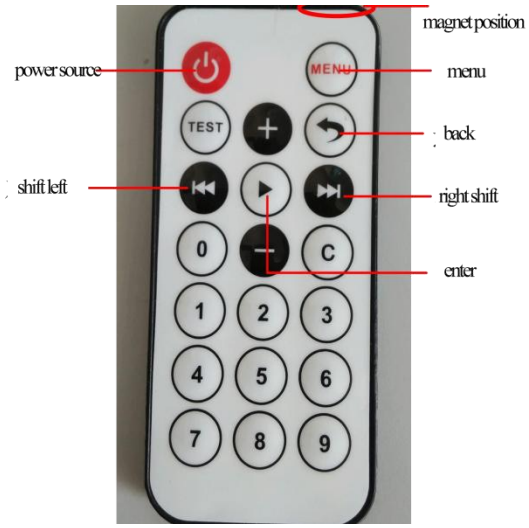


Figure 3.1.3 Infrared remote control button definition and operation

Enter key: Press this key in the measurement state to enter the password screen. After entering the password, you can enter the parameter setting state; When setting parameters, press this key to enter menus at all levels;

Return key: Return to the previous menu when setting parameters;

Left shift key: The contrast in the measurement state gradually becomes darker, and the cursor moves to the left in the parameter setting state; Right move key: The contrast gradually brightens in the measurement state, and the cursor moves to the right in the parameter setting state;

add Key: In the measurement state, the bottom line of the screen is displayed in a loop. In the parameter setting state, the number at the cursor is incremented by 1, and then the page is turned;

reduce Key: In the parameter setting state, the number at the cursor decreases by 1 and turns the page forward; Numeric keys: input numbers at the cursor;

3.2 Function selection screen and parameter setting operation

Parameter number	Function content	illustrate
1	parameter settings	Select this function to enter the parameter setting screen
2	Total amount cleared	Select this function to clear the total amount of the instrument.

3.2.1 Parameter settings

Press the "right shift key", and the instrument will enter the password "00000" state. After entering the corresponding password, move the cursor under the "Enter key", press the "Enter key", and the function selection screen "Parameter Settings" will appear, and then Then press the shift key to move the cursor below the "Enter key", and press the "Enter key" to enter the main menu and make parameters. number settings.

3.2.2 Total amount cleared

Press the "Confirm Key" once, and the instrument will enter the password "00000" state. After entering the corresponding password, move the cursor under the "Enter Key", press the "Enter Key", and the function selection screen "Parameter Settings" will appear.

, and then press the "Up Key" or "Down Key" to turn the page to "Total Clearance" and enter the Total Clearance password (this password requires The user first sets it in the parameter menu "Total reset password") , press the "Confirm key" to move the cursor under the "Enter key", press the "Enter key", when the total reset password automatically changes to "00000 ", the instrument's clearing function Completed, the total amount inside the meter is 0.

4 Instrument pictures

5 Product performance and indicators

5.1 Basic functions

- Low frequency excitation and high frequency excitation are optional:

  50Hz power mode: 12.5 Hz ,6.250 Hz, 5.000 Hz, 4.167 Hz,;

  60Hz power mode: 10.000 Hz, 5.000 Hz, 3.333 Hz, 2.500;

- The excitation current is 125 mA (must be selected during high-frequency excitation) , 187mA , and 250mA ;
- Empty pipe measurement function without additional electrodes, continuous measurement, fixed value alarm;
- Flow velocity measurement range: 0.1 --- 10 m / s, flow velocity resolution: 0.5 mm / sec;
- AC high-frequency switching power supply, voltage applicable range: 85VAC --- 250VAC ;
- DC 24V Switching power supply, voltage range: 20VDC --- 36VDC ;

■ Network function (optional) : M O D B US

■ Chinese, English, Traditional Chinese display mode , (other languages can be customized) ;

■ There are two total totalizers inside, which can be recorded respectively: forward total and reverse total.

5.2 special function

■ **Infrared remote control operates the keyboard and operates all functions of the converter remotely and non-contactly.**

5.3 normal working conditions

Ambient temperature: split type –10 ~ +50 ℃; Relative humidity: 5% ~ 90% ;

Power supply: single-phase AC 85 ~ 250V , 50Hz/60Hzz ; Power dissipation: less than 20W (after connecting the sensor) .

5.4 Connection type with sensor

Square housing split type: wall-mounted square housing, the converter is connected with the sensor cable;

5.5 Sensor matching requirements

Sensor signal sensitivity: in 1 At meter / second flow rate, the sensor output is 150μV ~200μV ;

For the electromagnetic flowmeter converter, four 62.5 mA current, making up 250 mA, 62.5 each mA The current is controlled by a 20Ω precision resistor, so the user can select different sizes of excitation current by changing the number of precision resistors .

The converter is factory set to 250 mA Current, in the same way, if there are three precision resistors, it corresponds to 187.5 mA ,

If it is two precision resistors, it corresponds to 125 mA .

Sensor excitation coil resistance: 250mA Excitation current: 50 ~ 60Ω ;
187mA Excitation current: 60 ~ 80Ω ;
125mA Excitation current: 80 ~ 120Ω ;

5.6 Installation dimension drawing

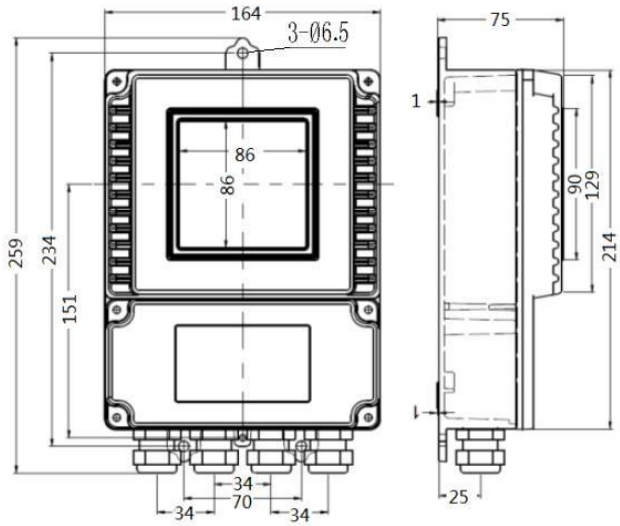


Figure 4.6 Split appearance dimension diagram

5.7 Overall machine measurement accuracy

VS : Setting range (m/s)

Diameter mm	Measuring rangem /s	Accuracy
3 ～ 20	0.3 the following	±0.25%FS
	0.3 ～ 1	±1.0%R
	1 ～ 15	±0.5%R
25 ～ 600	0.1 ～ 0.3	±0.2 5 %FS
	0.3 ～ 1	±0.5%R
	1 ～ 15	±0.3%R
700 ～ 3000	0.3 the following	±0.25%FS
	0.3 ～ 1	±1.0%R
	1 ～ 15	±0.5%R
%FS : Relative to the range; %R : Relative to the measured value.		

5.8 Analog current output

Load resistance: 0 ~ 750Ω .

Basic error: 0.1%±10μA .

5.9 Digital frequency output

Frequency output range: 1 ~ 5000Hz ;

Output electrical isolation: photoelectric isolation. Isolation voltage: > 1000VDC ;

Frequency output driver: FET output, maximum withstand voltage 36VDC , maximum load current 250mA .

5.10 Digital pulse output

Output pulse equivalent: 0.001 ~ 59.999 m 3 / cp , 0.001 ~ 59.999 Ltr / cp , 0.001 ~ 59.999 ukg/ cp , 0.001 ~ 59.999 usg /cp ,

Output pulse width: 0.5 ~ 1999ms adjustable;

Output electrical isolation: photoelectric isolation, isolation voltage: > 1000VDC ;

Pulse output driver: field effect transistor output, maximum withstand voltage 36VDC , maximum load current 250mA .

5.11 Alarm Output

Alarm output contact: DOUT--- alarm public output point is positive, DCOM--- alarm public output point is ground; there is alarm Alarm and select the alarm output when DOUT and DCOM If there is no alarm or the alarm is not selected, the output will be high level.

Output electrical isolation: photoelectric isolation. Isolation voltage: > 1000VDC ;

Alarm output driver: Darlington tube output, maximum withstand voltage 36VDC , maximum load current 250mA .

5.12 Digital communication interface and communication protocol

MODBUS Interface: RTU Format, physical interface RS-485 , electrical isolation 1000V ;

Current loop communication interface: supports standard current loop communication protocol, equipped with current loop communication handheld device, which can display online Display measured values and modify instrument parameters;

5.13 electrical isolation

The insulation voltage between analog input and analog output is not less than 500V ; The insulation voltage between analog input and alarm power supply is not less than 500V ; The insulation voltage between the analog input and the AC power supply is not less than 500V ; The insulation voltage between the analog output and the AC power supply is not less than 500V ; The insulation voltage between the analog output and the ground is not less than 500V ; The insulation voltage between the pulse output and the AC power supply is not less than 500V ; The insulation voltage between the pulse output and the earth is not less than 500V ;

The insulation voltage between the alarm output and the AC power supply is not less than 500V ; The insulation voltage between the alarm output and the earth is not less than 500V .

5.14 Digital output and calculation

Digital output refers to frequency output and pulse output. Frequency output and pulse output use the same wiring output point, therefore, the user cannot select frequency output and pulse output at the same time , but can only select one of them.

5.14.1 Frequency output:

The frequency output range is 0 ~ 5000HZ, the frequency output corresponds to the flow rate percentage.

$$F = \frac{\text{measured value}}{\text{full scale value}} \bullet \text{output range} + \text{output lower limit}$$

Frequency output range is adjustable. User selectable 0 ～ 50 0 0 H Z , you can also choose a lower frequency: such as 20 0 ~ 10 0 0 H Z

Frequency output mode is generally used for control applications because it reflects the percentage flow. If the user uses it for metering applications, Then the pulse output mode should be selected.

5.14.2 Pulse output mode:

The pulse output mode is mainly used for metering. A pulse is output, which represents an equivalent amount of fluid flowing through the pipeline. For example, one pulse represents 1L or represents 1m 3 wait.

The pulse equivalent can be set to: 0.001 ~ 59.999 . When selecting the pulse equivalent, the user should pay attention to the flow range of the flow meter. range and pulse equivalent. For volume flow, the

calculation formula is as follows:

Example: $Q_L = 0.0007854 \times D^2 \times V$ (L/S)

$Q_M = 0.0007854 \times D^2 \times V \times 10^{-3}$ (M^3/S)

Here: D- Pipe diameter (mm) V- Flow velocity (m/s)

If the pipeline flow rate is too large and the pulse equivalent is selected too small, the pulse output will exceed the upper limit. Therefore, the pulse Output frequency should be limited to 500Hz Below (pulse width 1ms time) . If the pipeline flow is small and the pulse equivalent is selected too large, it will take a long time for the instrument to output a pulse. For specific settings, please refer to "Pulse Width—Maximum Output Pulses" Number correspondence table".

In addition, it must be noted that pulse output is different from frequency output. Pulse output is when one pulse is accumulated. A pulse can be output based on the amount, so the pulse output is not very uniform. Generally, counting should be used for measuring pulse output. frequency meter instead of a frequency meter.

5.14.3 Digital output wiring

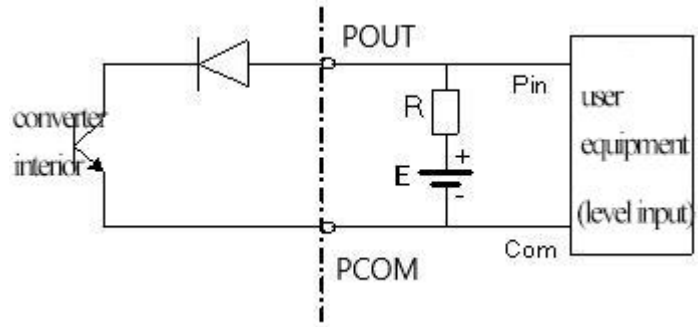
The digital output has two contacts: digital output contact and digital ground contact. The symbols are as follows:

POUT———— Digital output contact;

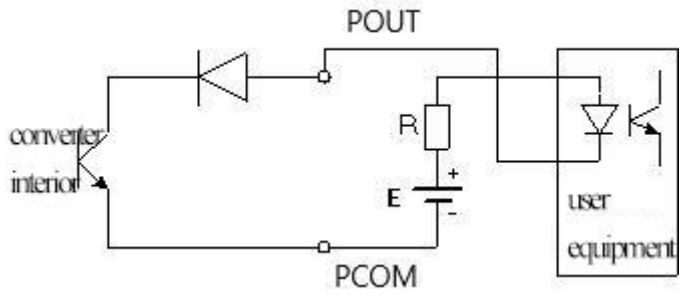
PCOM ——digital ground contact;

The digital output is an open-collector output. Users can refer to the following circuit when wiring:

5.14.4 Digital level output connection method

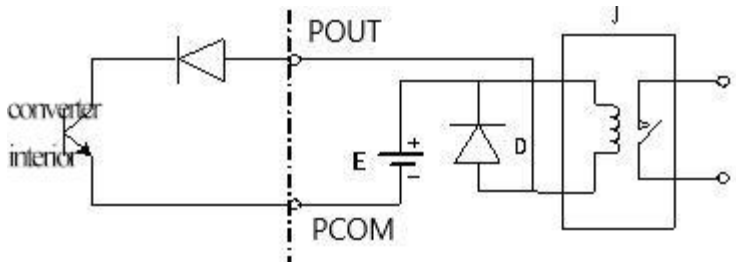


5.14.5 Digital output is connected to an optocoupler (such as PLC , etc.)



Generally, the user's optocoupler requires 10mA left and right current, therefore, E/R=10mA about. E=5 ～ 24V .

5.14.6 Digital output connected to relay



E required by general intermediate relays to 12V or 24V . D For freewheeling diodes, currently most of the intermediate

There is this diode inside the relay. If the intermediate relay itself does not contain this diode, the user should connect an external indivual.

The digital output parameter table is as follows :

POUT parameter

parameter	Test Conditions	minimum value	Typical value	maximum value	unit
Operating Voltage	IC=100 mA	5	twenty four	36	V
Working current	Vol≤1.4V	0	300	350	mA
working frequency	IC=100mA Vcc=24V	0	5000	7500	HZ
high level	IC=100mA	Vcc	Vcc	Vcc	V
low level	IC=100mA	0.9	1.0	1.4	V

5.15 Analog output and calculation

5.15.1 Analog output

Analog output refers to 4 ~ 20mA Signal system.

The analog current output is internally 24V Power supply, can drive 750Ω load resistance. The analog current output corresponds to the percentage flow rate of the flow rate, that is:

$$I\,0 = \frac{\text{Measured value}}{\text{full scale value}} \bullet \text{Current range} + \text{current zero point}$$

For 4 ~ 20mA Signal system, current zero point is 4mA .

Therefore, in order to improve the resolution of the output analog current, the user should appropriately select the range of the flow meter.

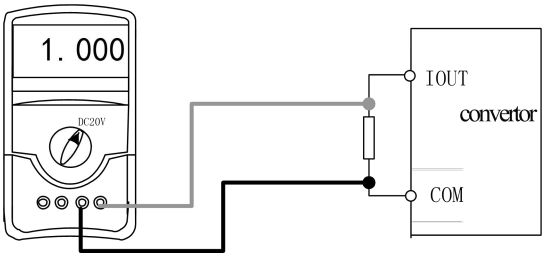
When the flow meter leaves the factory, the manufacturer has calibrated each parameter of the analog output. Normally, no need The user then makes adjustments. If an abnormal situation occurs and the user needs to calibrate the analog output, the user can proceed according to the following operating procedures. OK.

5.15.2 Analog output adjustment

（1） Instrument calibration preparation,

The instrument is powered on and running for 15 seconds minutes to allow the interior of the instrument to reach thermal stability. Prepare a 0.1% level ammeter, or 250Ω

The resistor and 0.1% voltmeter are connected as shown below.



（2） Current "0" point correction:

Set the converter to the parameter setting state, select the " Current Zero Point Correction " item, enter, and set the standard signal source to " 0 " position, adjust the correction coefficient value so that the ammeter indicates exactly 4 mA (± 0.004 mA) . _ _ _ _ _

（3） Current full scale correction

Select the " Current Full Scale Correction " parameter, enter, set the standard signal source to the full scale position, and adjust the converter correction coefficient so that the ammeter indicates exactly 20mA (± 0.004mA) . _ _ _ _ _ _ _ _

adjusting the "0" point and full-scale value of the current, the current function of the converter can ensure accuracy. Convert The current output linearity of the device is within 0.1% .

（4） Current linearity check:

Set the standard signal source to 75% , 50% , 25% , check the linearity of the output current.

※Note: After the electromagnetic flowmeter converter and sensor are connected to the fluid pipeline (whether calibration or use) , the following work should be performed first:

- Connect the pipes before and after the sensor with copper wires.
- Connect the sensor to a good ground.
- When adjusting the zero point of the instrument, ensure that the fluid in the pipe is still.

- Ensure that the sensor electrode oxide film is stably generated (the electrode is in continuous contact with the fluid 48 hours) .

6 Alarm information

The printed circuit board of the electromagnetic flow converter uses surface welding technology and is not repairable to the user. Therefore, the user cannot open the converter housing.

The intelligent converter has self-diagnosis function. In addition to power supply and hardware circuit failures, general application problems

Alarm information can be given correctly in all faults. This information is displayed on the left side of the display as follows:

SYS ---- System excitation alarm; MTP ------- fluid empty pipe alarm;

CUT ---- Small signal cut off alarm; REV ------- reverse flow cutoff alarm;

HIG ---- Flow limit alarm; LOW ------ flow lower limit alarm

LIH ---- Liquid level force upper limit alarm; LIL --------liquid level lower limit alarm

ABN ---- Abnormal suppression alarm; ---------- PSM spike suppression alarm

FST ------- noise sensitivity alarm

7 Troubleshooting

7.1 The instrument has no display

* Check whether the power is on;
* Check whether the power fuse is intact;
* Check whether the power supply voltage meets the requirements;

7.2 Excitation alarm

* Whether the excitation wiring is open circuit;
* Whether the total resistance of the sensor excitation coil matches the converter excitation current;
* If the first two items are normal, the converter is faulty.

7.3 Air traffic control alarm

* Measure whether the fluid fills the sensor measuring tube;
* Short-circuit the converter signal wire (white core wire, red core wire, shielded wire). At this time, if the "empty pipe" "The prompt is cancelled, indicating that the converter is normal. It may be that the conductivity of the fluid being measured is low or the empty pipe threshold and empty pipe range are Setting error;
* Check whether the signal connection is correct;
* Check whether the sensor electrode is normal:

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

When there is flow, measure the resistance of the white core wire and the red core wire of the

terminal to the shielded wire respectively. It should be less than 50kΩ (measured value when the medium is water. It is best to use a pointer multimeter to measure, and you can see that the measurement process has sufficient discharge phenomenon) .

7.4 The measured flow rate 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 factory calibration sheet.

8 Packing and storage

8.1 Packing

The electromagnetic converter is packaged in a vacuum package before leaving the factory and is moisture-proof. The vacuum sealing bag is a special seal for the converter. Bagging, if the vacuum sealed bag is opened, it can be determined that it is not an original product.

Random documents include: installation instructions, product certificate, and packing list.

8.2 Transportation and storage

To prevent the instrument from being damaged during operation, please keep the shipping package from the manufacturer before arriving at the installation site. Installation status. During storage, the storage location should be indoors with the following conditions: rainproof, moisture-proof , small mechanical vibration, and avoid impact; temperature range -20 ~ +60 ℃; humidity not greater than 80% .

Solemn declaration : This manual is suitable for our company's general software . If there is any difference between some contents and the actual converter , please refer to the actual converter.

Appendix 1 Description of nonlinear correction function

The electromagnetic converter has updated the nonlinear correction calculation method. The new calculation method is easy to set up, has clear meaning and accurate correction results.

The basic concept of the nonlinear correction algorithm: within a flow rate interval, correct the measured flow rate value (correction point) to the desired flow rate value (target value).

Parameter definition: Qpn --Select the actual standard flow velocity value of the correction point (correction point: Qp 1 -- Qp 5)

Qcn --The corrected flow rate value of the desired point (correction number: Qc 1 -- Qc 5)

The electromagnetic converter is designed with 5 flow velocity correction points and 4 flow velocity correction numbers. The fifth flow velocity correction point is also the fifth flow velocity correction point.

5 Flow velocity correction numbers, their corresponding relationships are:

Flow rate correction point 1------Flow velocity correction number 1
Flow rate correction point 2------Flow velocity correction number 2

Flow rate correction point 3------Flow velocity correction number 3
Flow rate correction points4 ------flow velocity correction number 4

Linear correction end point (flow velocity correction point 5) Flow velocity correction number 5

ok " will be prompted at the top of the screen in the menu , and the non-linear correction function will take effect at this time. On the contrary, if the settings are incorrect, a " bug " will be prompted and the non-linear function will not work:
Correction point 5 > Correction point 4 > Correction point 3 > Correction point 2 > Correction point 1 >0.

Correction point 5 (number 5) > Correction number 4 > Correction number 3 > Correction number 2 > Correction number 1 >0.

Flow rate correction formula:

$$Q_{cx} = Q_{c1} + \left(\frac{Q_{C2} - Q_{C1}}{Q_{P2} - Q_{P1}}\right) \times \left(Q_x - Q_{p1}\right)$$

Qc ----- Flow rate after correction *Qx* ---- *Flow* rate before correction

E x a m p l e 1 : Example of parameter setting using all correction points

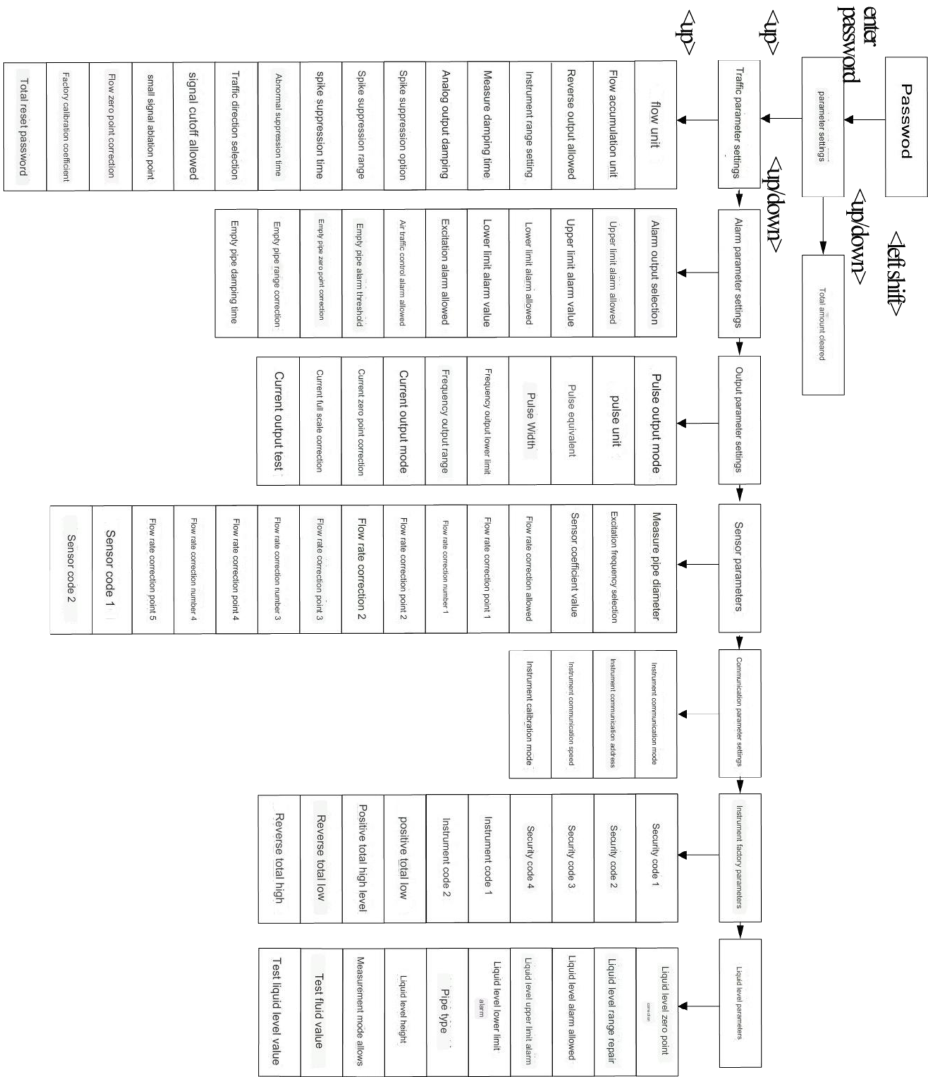
dot number	Actual standard flow rate (correction) point	It is hoped that the flow velocity value at this point	Correction value range
1	0.100 m/s	0.110 m/s	Zero flow rate --- 0.100 m/s
2	0.150 m/s	0.160 m/s	0.100 m/s -- 0.150 m/s
3	0.200 m/s	0.220 m/s	0.150 m/s -- 0.200 m/s
4	0.250 m/s	0.270 m/s	0.200 m/s -- 0.250 m/s
Finish	0.300 m/s		0.250 m/s -- 0.300 m/s

E x a m p l e 2 : Example of parameter setting using partial correction points

dot number	Actual standard flow rate (correction) point	It is hoped that the flow velocity value at this point	Correction value range
1	0.100 m/s	0.110 m/s	Zero flow rate --- 0.100 m/s
2	0.150 m/s	0.160 m/s	0.100 m/s -- 0.150 m/s
3	0.161 m/s	0.161 m/s	No correctio n
4	0.162 m/s	0.162 m/s	No correctio n
Finish	0.163 m/s		No correctio n

Note: When using non-linear correction, users need to set all correction points and correction numbers according to the setting principles . If there are unset correction points or correction numbers, a " bug " will be prompted on the screen , and the non-linear function will not work.

Appendix 2 Instrument Menu List



Menu list

compile Number	parameter	Setting method	content	password level
one	Traffic parameter settings			
1	flow unit	choose	L/ h , L/ m , L / s , m3 / h , m3 / m , m3 / s	2
2	Flow accumulation unit	choose	0.0 0 1m ^{3} ~ 1m ^{3} , 0.0 0 1L ~ 1 L	2
3	Reverse output allowed	choose	prohibit, allow	2
4	Instrument range setting	Set number	0～99999	2
5	Measure damping time	choose	1 ～ 60S	2
6	Analog output damping	choose	0 ～ 250S	2
7	Spike suppression option	choose	prohibit, allow	
8	Spike suppression range	Set number	Set by flow rate	3
9	spike suppression time	choose	2 ～ 30s	3
10	Abnormal suppression time	choose	0 ～ 99s	
11	Traffic direction selection	choose	Forward Reverse	2
12	signal cutoff allowed	choose	prohibit, allow	2
13	small signal cutoff point	Set number	Set by traffic	2
14	Flow zero point correction	Set number	0～±9999	2
15	Factory calibration coefficient	Set number	0.0000 ～ 5.9999	5
16	Total reset password	User can change	0 ~ 99999	3
two	Alarm parameter settings			
1	Alarm output selection	choose	9 converter alarm outputs in total Options: prohibit alarm output, flow upper limit alarm, flow lower limit alarm, flow empty pipe alarm, flow reverse alarm, flow cut off alarm, excitation system alarm, liquid level Upper limit alarm, liquid level lower limit alarm	

1	Upper limit alarm allowed	choose	prohibit, allow	2
2	Upper limit alarm value	Set number	Set by traffic	2
3	Lower limit alarm allowed	choose	prohibit, allow	2
4	Lower limit alarm value	Set number	Set by traffic	2
5	Excitation alarm allowed	choose	prohibit, allow	2
6	Air traffic control alarm allowed	choose	prohibit, allow	2
7	Empty pipe alarm threshold	Set number	0 ~ 59999	2
8	Empty pipe zero point correction	Set number	0 ～± 9999	5
9	Empty pipe range correction	Set number	0 ~ 5.9999	5
10	Empty pipe damping time	choose	10 ～ 60SEC	
three	Output parameter settings			
1	Pulse output mode	choose	PO frequency output, PO pulse output	2
2	pulse unit	choose	m^3 , Lt r	2
3	Pulse equivalent	Set number	00.001～ 59.999	2
4	Pulse Width	choose	0.5～1999ms	2
5	Frequency output lower limit	Set number	1~ 5000 Hz	2
6	Frequency output range	Set number	1~ 5000 Hz	2

7	Current output mode	choose	4-20mA , 4mA	2
8	Current zero point correction	Set number	0.0000～0.9999	5
9	Current full scale correction	Set number	0.0000～0.9999	5
10	Current output test	Set number	0.00～99.99	
Four	Sensor-parameters			
1	Measure pipe diameter	choose	3～3000	2
2	Excitation frequency selection	choose	50Hz power mode: 12.5 Hz ,6.250 Hz, 5.000 Hz, 4.167 Hz,; 60Hz power mode: 10.000Hz, 5.000Hz, 3.333 Hz, 2.500;	4
3	Sensor coefficient value	Set number	0.0000～5.9999	4
4	Flow rate correction allowed	choose	allow / disallow	2
5	Flow rate correction point 1	user settings	Set by flow rate	4
6	Flow rate correction number 1	user settings	Set by flow rate	4
7	Flow rate correction point 2	user settings	Set by flow rate	4
8	Flow rate correction number 2	user settings	Set by flow rate	4
9	Flow rate correction point 3	user settings	Set by flow rate	4
10	Flow rate correction number 3	user settings	Set by flow rate	4
11	Flow rate correction point 4	user settings	Set by flow rate	4
12	Flow rate correction number 4	user settings	Set by flow rate	4
13	Flow rate correction point 5	user settings	Set by flow rate	4
14	Sensor code 1	user settings	Factory year and month (0-99999)	4

15	Sensor code 2	user settings	Product number (0-99999)	4
five	Communication parameter settings			
1	Instrument communication mode	choose	MODBUS-A	2
2	Instrument communication address	Set number	0 ～ 250	2
3	Instrument communication speed	choose	300 ～ 38400	2
4	Instrument calibration mode	choose	No Parity,1 stop ,Odd Parity,1 St. Even _ Parity,1 S. , No. Parity,2 stop , OddParity,2 St. Even _ Parity,1 S.	2
six	Instrument factory parameters			
1	Security code 1	User can change	0 ~ 99999	5
2	Security code 2	User can change	0 ~ 99999	5
3	Security code 3	User can change	0 ~ 99999	5
4	Security code 4	User can change	0 ~ 99999	5
5	Instrument code 1	Factory settings	Factory year and month (0-99999)	5
6	Instrument code 2	Factory settings	Factory year and month (0-99999)	5
7	positive total low	User can change	0 ~ 99999	5
8	Positive total high level	User can change	0 ～ 9999	5
9	Reverse total low	User can change	0 ~ 99999	5
seven	Liquid level parameters			

1	Liquid level zero point correction	Set number	0 ~ 59999	5
2	Liquid level range correction	Set number	0 ~ 59999	5
3	Liquid level alarm allowed	choose	prohibit, allow	5
4	Liquid level upper limit alarm	choose	0 ~ 39999	5
5	Liquid level lower limit alarm	choose	0 ~ 39999	5
6	Pipe type	Set number	Full flow pipe, non-full flow pipe	2
7	Liquid level height	set choice	0 ~ 59999	5
8	Test mode allows	choose	prohibit, allow	5
9	Test fluid value	Set number	0 ~ 19.999	5
10	Test level data	Set number	0 ~ 99.99	5

The instrument parameter setting function has 5 level password. Among them, 1 ~ 4 Level is user password, 5th level is the manufacturer's password . Users can use the 5th level password to reset levels 1 to 4 level password.

No matter which level of password is used, the user can view the instrument parameters. But if the user wants to change the instrument parameters, he must Use different levels of passwords.

No. 1 level password (factory value 00 5 2 2) : Can only be viewed, No. 2 level password (factory value 032 1 0) , No. 3 level password (factory value 061 0 8) , No. 4 level password (factory value 07 2 0 6) , No. 5 Level password (fixed value) : The password level can be specified in the table above.