2-Wire Electromagnetic Flowmeter Converter

Operating Manual

HART COMMUNICATION PROTOCOL

SMERI

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1. Converter Wiring

1.1Signal lines representation

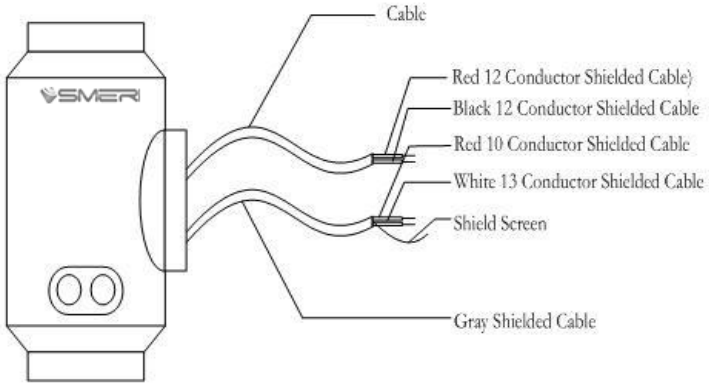


Fig1.1. Signal line processing

Signal lines labels in circinal model:

twisted-pair cable (for exciting current): 12 Conductors (Red)

12 Conductors (Black)

Gray shielded twisted-pair cable: 10 Conductors (Red) connected to “Signals 1”

13 Conductors (white) connected to “Signals 2”

1.2 Signal lines and labels

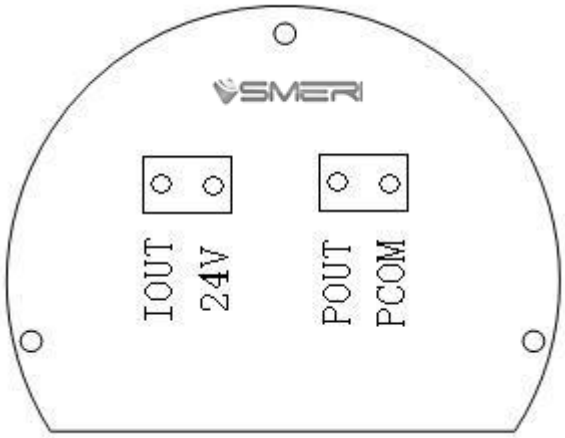


Fig1.2.FSignal lines and labels

The terminals are marked as follows

IOUT：	Current Output -
24V：	24VPower Supply
POUT	Pulse Output +
PCOM	Pulse Output Ground

1.3 Characteristic and connection of cable

1.3.1 1.3.1 Flux signal line

The converter can output equivalent level of shielded exciting signal voltage so that interference to flow measurement signals can reduced by means of lowering the distributed capacitance of communication cable. When measured conductivity is less than 50μS/cm or signals are transferred in remote distances, double-conductor and double-shielded signal cable at equivalent level of voltage can be used. For example, special STT3200 cable or BTS model signal cable (triple-shielded) can be used for signal communication.

1.3.2 Exciting current cable

Two conductor and insulating rubber- covered cables can be used as exciting current

cables. Suggested model is RVVP2*0.3mm2 . Length of exciting current cable should be equal to that of signal cable. When the model STT3200 cables are used for exciting current and signals, two cables can be put together as one cable.

1.3.3 The grounding requirements when installing convert

Contact area of copper Connector PE on Converter Cabinet for grounding should be larger than 1.6mm2.Contact resistance should be less than 10Ω.

First, purple copper tube should be cut into 1700 mm long (the copper tube can be lengthened according to the need) to make the nail buried 1500 mm into the ground(Note : when burying nail, sprinkling a layer of broken charcoal at the top of nail, and then saline irrigation).

Then, 4mm2 purple copper wire should be welded to the nail. At last, connecting ground wire to convert's flange, ground ring and pipeline's flange. It is shown in figure 1.3.

Note: Stainless steel must be used when fixing ground screws, spring washers and flat washers.

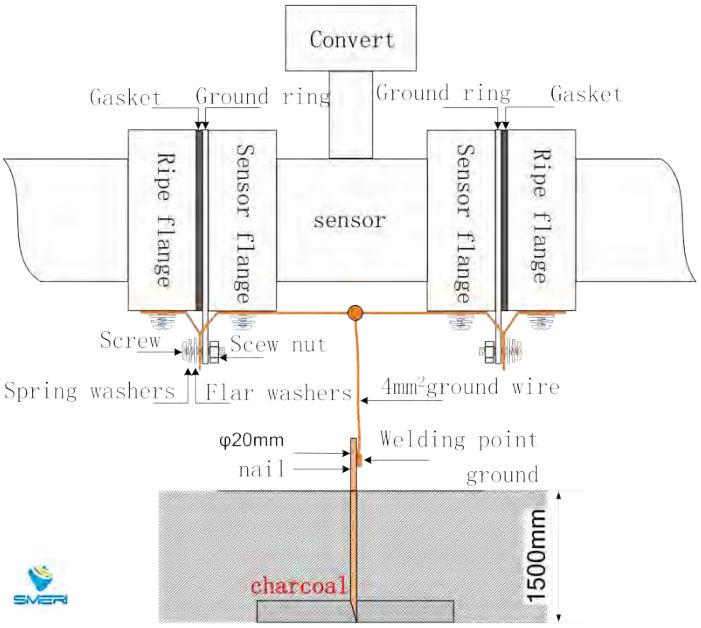


Fig.1.3 Grounding

1.4 Output and power line

All cables for signals transferring and power supply have to be prepared by users. However, it should be careful to choose the cables that meet the upper limit load of consuming current.

Pulse, current and alarm output external power supply and load can be seen in Fig.1.4.1 to Fig 1.4.3. When inductive load is connected to converter, diode should be used as in Figure.

1.4.1 Current Output Connection

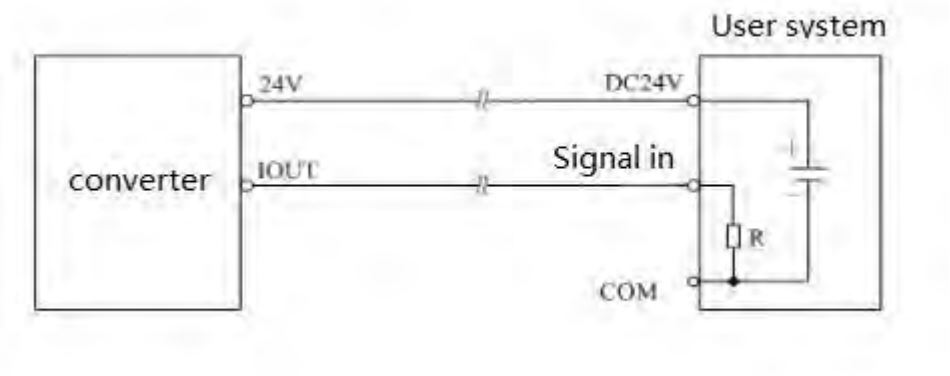


Fig1.4.1 4～20mA Internal power supply connection

1.4.2 Pulse Output Connection：

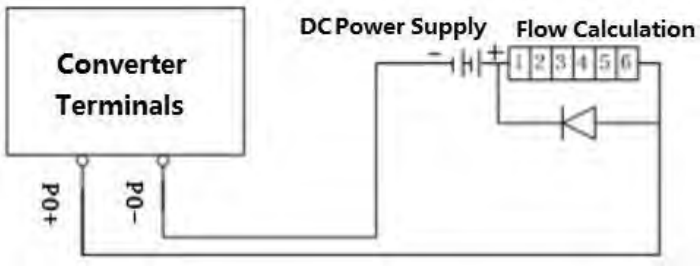


Fig1.4.2a External power supply connected electronic counter

Pulse Output low leve effectivel，Lineary correct：**2.5ms**，Pulse upper：**200HZ/S**

2. Meter Parameter

2.1 Flow Parameter Setting

2.1.1 Flow units are L/s、L/m、L/h、m3/s、m3/m、m3/h、uk/s、uk/m、uk/h、us/s、us/m、us/h User can select the unit according to actual status

2.1.2 9 bit calculator is applied and the upper limit is 999999999.

Flow Integrating Units are: L、m3、kg, t. This unit is consistent with the unit of flow unit. For example :when the flow unit is L/h、L/m、L/s，the total unit is L; the flow unit is m3/h、m3/m、m3/s，the total unit is m3; the flow unit is uk/h、uk/m、uk/s，the total unit is ukg; the flow unit is us/h、us/m、us/s，the total unit is usg;

Flow Integrating Units are：0.001L、 0.010L、 0.100L、 1.000L

0.001m3、 0.010m3、 0.100m3、 1.000m3

0.001ukg、 0.010ukg、 0.100ukg、 1.000ukg

0.001usg、 0.010usg、 0.100usg、 1.000usg

2.1.3 Reverse Flow Enable

When “Reverse Flow En” is “disable”, if the fluid flows, the sensor will export pulse and current,and the terminal “DO+ and DO-” output high level。

When it is “enable”, the sensor will export pulse as “0” and current as “0”(4mA or 0mA) for the fluid flows reversals and the terminal “DO+ and DO-” output high level.

When it is “output enable ”, the sensor will export pulse as “0” and current as “0”(4mA or 0mA) for the fluid flows reversals and the terminal “DO+ and DO-” output low level.

2.1.4 Flow Range

Flow range setting means upper limit flow value setting, and lower limit flow value is set “0” automatically.

So, it makes the range, and makes the relation of percent display, frequency output and current output with flow:

percent display = (flow measure / measure range) * 100 %;

fcurrent output = (flow measure / measure range) * current full + base point;

pulse output will not affect.

2.1.5 Flow Rspns

Flow Rspns is filter Time. The long damping time can improve the stability of instrument flow display and output signal, which is suitable for the measurement of total accumulative pulsating flow. The short damping time can be used to measure the response speed quickly and is suitable for production process control. The Flow Rspns is: 51S、2S、3S、4S、6S、8S、10S、15S、30S、60S, which can be set by choice.

2.1.6 Peak limited range

This parameter has two functions: 1) When the "Peak suppression allowed" parameter is set to allow, this value confirms the peak suppression starting value, and is used to set the flow rate fluctuation value of the spike spurious signal to be suppressed. If the current flow rate fluctuation is higher than this initial value, it is considered that this change is caused by a spike spurious signal, and the system cuts it off and displays a PSM alarm. When the flow rate fluctuation is lower than this initial value, it is considered that the change is caused by the real flow rate change, and the system recognizes that the flow rate change is measured.

2) When the “spike suppression allowed” parameter is set to prohibit, this value determines the sensitivity test to noise. ※If the “FST” display frequently appears, it is recommended to increase the value of “Peak Suppression Range”.

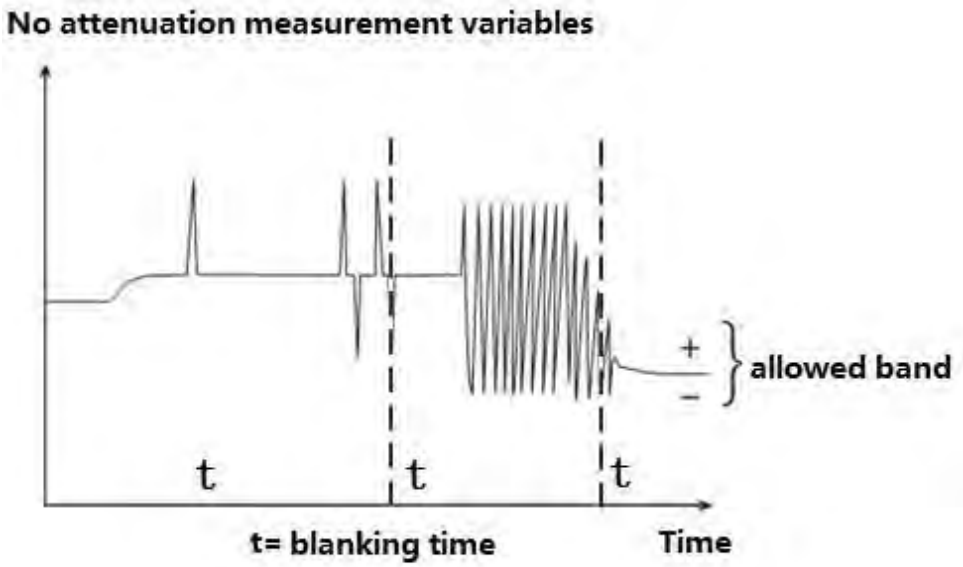
2.1.8 Peak limited time value

Sometimes a few noise is not eliminated through the damping. The parameters-“Peak Limit Value” and “Peak Limit Time” can resolve this problem. They are able to distinguish the noise from the true flow signals. The noise has two sources: caused by the stepped signal and sharp seriflux. The verdict is based on the limited range and duration.The fig2.1.6 shows the theory which it uses the peak limited range to eliminate the rough error.

When the flow data is higher or lower than the range and time ,the system will cut the

change caused by noise.When the data is higher or lower than the range and the change is beyond the noise limited time, the system will deem the change is caused by flow.

“Peak Limit Value” can be set between 0 and 30 percent.And “Peak Limit Time” can be set between 0 and 20 second. If one of them is set 0, the function is invalid.



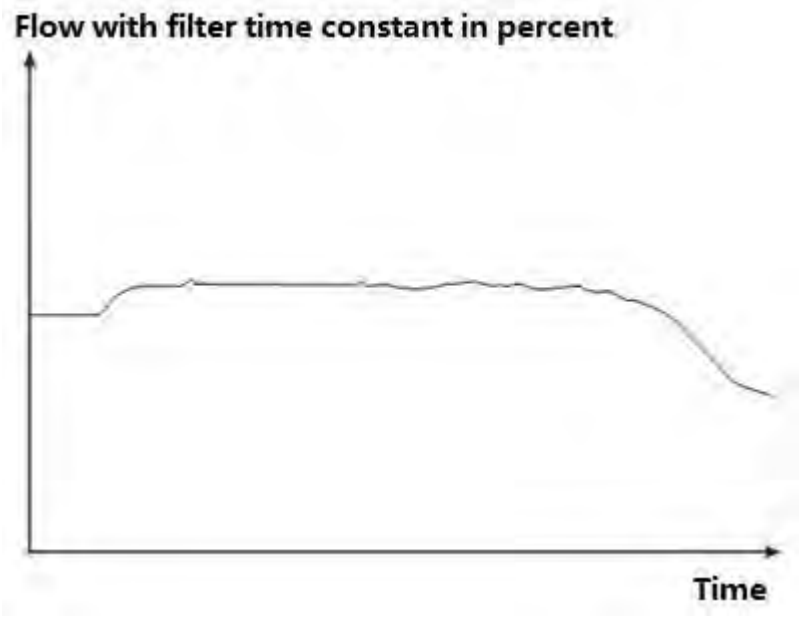


Fig 2.1.6 Eliminating big noise error with Peak Limit Value

2.1.9 Peak limited time

For abnormal conditions such as bubbles in the water, in order to prevent the flow from returning to "zero", the converter has designed an abnormal suppression function on the software and hardware. When the converter finds an abnormal situation, the converter will display an "ABN" abnormal alarm

Suppress abnormal flow within a period of time, prevent the flow from returning to "zero" and suppress flow fluctuations to a minimum.

This parameter is used for the length of abnormal suppression time, which can be selected from 0 to 99s. When 0s is selected, this function is turned off.

2.1.7 Flow Direction

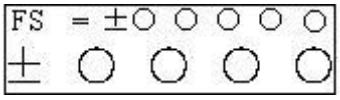
When doing debugging, if the flow direction is not consistent, users do not have to change the excitation line or signal line connection, and just reset the flow direction parameters.

2.1.8 Low flow cutoff

The flow cutoff is set by flow. This parameter is allowed in conjunction with “Cutoff Enable”.

2.1.9 Flow Zero CRC

Make sure the senior is full and the fluid is in stationary state when doing the flow zero-point correction. Flow zero-point is shown as velocity of flow, mm/s. Zero-point correction displayed as below:



Upper small characters: FS means measured zero-point,

Lower large characters: corrected flow zero-point.

When FS display is not “0”, do correction to make FS display to “0”. Note: if correct lower line character and FS increases, change the “+, -” in lower line to make sure FS display to be zero.

The corrected flow zero-point is the compound value of sensor, and shall be recorded in sensor list and label. The unit is mm/s, and the sign is in opposite with corrected value.

2.1.10 Meter Factor

Factory calibration factor the special factor of sensor-made-factory and the factory use this factor to unite L_magF converters to make sure all the Meters can interchange by 0.1%.

2.1.11 Clr Total Key

The password can be set by the user with more than third levels of password, and then the password is set in the total key.

2.2 Alarm Set Up

2.2.1 High alarm Enable.

Users can select disallow as needed

2.2.2 High alarm value

High alarm value based on flow, and the parameter is set by numerical method, in which the user sets an appropriate flow value. When the instantaneous flow rate is higher than that of this value, the upper limit alarm is used to allow the corresponding output and display.

2.2.3 Low alarm

The same as the high alarm.

2.2.4 System Alarm Ena.

When the “System Alarm Enable” is set “disable”, cancel the system alarm function.

When the “System Alarm Enable” is set “enable”, if the excitation coil fails, the converter display “SYS”,and the terminal “DO+”and “DO-”output high level.

When the “System Alarm Enable” is set “output enable”, if the excitation coil fails, the converter display “SYS”,and the terminal “DO+”and “DO-”output low level.

2.2.5 Snsr measure Ena.

It has the function of empty pipe detection without additional electrodes. If the “Snsr measure Ena.” is set “disable”,cancel the empty pipe alarm function.

When the “Snsr measure Ena.” is set “Enable”, if the fluid is lower than electrodes,the converter display “MTP”, the pulse output is “0”, the current output is “0”(4mA), the flow and the velocity is0, the terminal of DO+ between DO- is high level.

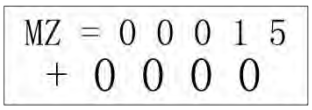
When the “Snsr measure Ena.” is set “Enable & Output”, if the fluid is lower than electrodes,the converter display “MTP”, the pulse output is “0”, the current output is “0”(4mA), the flow and the velocity is0, the terminal of DO+ between DO- is low level.

2.2.6 Snsr MT Alarm

When the pipe is full of liquid (whether flowing or not), the parameter could be modified more easily. The parameter displayed upper line is real MTP, and the parameter displayed bellow is the “Empty Pipe Value” that should be set. When setting “Empty Pipe Value”, you could be according to the real MTP, the value that should be set is usually three to five times of real MTP.

2.2.7 nsr MT zero

User can do empty pipe zero-point correction. When doing the calibration, make sure the senior is full. Empty pipe zero-point correction displayed as below:



Upper large characters:MZ means measured zero-point;

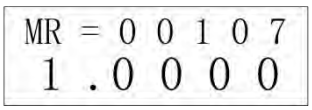
Lower small characters: calibrated empty pipe zero-point.

According to the actual measured conductivity R%, do correction to make MZ=5 – 10.

Note: if increase lower line character and MZ decreases.

2.2.8 Snsr MT range

User can do full pipe zero-point correction when the conductivity R% is small. When doing the calibration, make sure the senior is empty. Full pipe zero-point correction displayed as below:



Upper large characters: MR means measured zero-point.

Lower small characters:calibrated full pipe zero-point ;

Increase lower line character and MR decreases. Decrease lower line character and MR increases. User can correct MR to proper value based on actual needs (it is suggested that MR is around 500), the conductivity obtained in empty pipe is actual corrected MR.

2.3 Output Set Up

2.3.1 Digital Output

There are three kinds of mode to choose:PO Frequency Output、PO Pulse Output and DO Pulse Output:

- PO Pulse Output：The pulse output is a rectangular pulse string. Each pulse represents a flow equivalent through the pipe. The pulse equivalent is set by the following two parameters: "pulse equivalent unit" and "pulse equivalent". In general,connect with integrating instrument.

2.3.2 Pulse Unit

This converter has six units: m3, L, ukg, usg

2.3.3 Pulse Factor

Pulse factor refers to the flow value by a pulse. The instrument pulse factor should be set by two parameters: "pulse unit" and "pulse factor". The range of pulse factor is :

0.001～59.999m3 、0.001～59.999L、0.001～59.999ukg、0.001～59.999usg

Pulse Output low leve effectivel，Lineary correct：**2.5ms**，Pulse upper：**200HZ/S**

Under the same flow, the smaller pulse, the higher frequency output, and the smaller error will be.

2.3.4 nalog Zero CRC

When the converters are made in the factory, output current has been calibrated to zero scale, that is, accurate 0mA or 4mA output.。

2.3.5 Analog Range CRC

When the converters is made in the factory, output current have been calibrated to full scale, that is, accurate 10mA or 20mA output.

2.4 Sensor Set Up

2.4. 1 Measuring pipe diameter

The sensor size scope of S-mag F **Sensor Size** converter is 3 ～ 3000mm.

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；

2.4.2 Excit. Frequency

This converter has six kinds of excitation frequency(the instrument is set to 4.54Hz power supply mode by default when it leaves factory, excitation frequency is 6.25Hz).Users can set as scene:

50Hz power supply：4.54Hz，5.0 Hz，5.55 Hz，6.25 Hz；

60Hz power supply：4.54Hz，5.0 Hz，5.55 Hz，6.25 Hz；

Small size sensor excitation system inductance small, high excitation frequency.Large

size sensor excitation system inductance is large, users can only choose low excitation frequency。In use, select the low excitation frequency first, if the zero point of the meter velocity is too high, then select the low excitation frequency in turn.

Note: you must work at which excitation frequency is calibrated. If you use high frequency excitation, order a high frequency excitation converter and select the appropriate excitation frequency value according to this principle.

2.4.3 Sensor Factor

Sensor factor is electromagnetic flow meter calibration factor. The factor obtained from the actual calibration, and stenciled onto the sensor plate. Users shall input the factor factor into the converter parameter table.

2.4.4 Lineary Correct.

Details refer to Annex

2.4.5 Sensor Code

Sensor code is used by the factory to record the sensor.

2.5 Communication Set Up

2.5.1 Communic. address

Communication address means address range when doing data communication. The address range is from 01 to 250 and address 0 is reserved.

2.6 Meter parameters

2.6.1 User's password 1～4

Users use the fifth level password to correct.

2.6.2 Meter Code 1/2

Converter coder records the time the converter leaves the factory and the number.

2.6.3 FWD Total High/Low

Forward total high and low bit setting can change the flow total value which is used in meter maintenance and replacement. User use fifth level password to change the forward flow total value and generally can't exceed the maximum value of counter (999999999)

2.6.4 REV Total High/Low

User use fifth level password to change the reverse flow total value and generally can't exceed the maximum value of counter (999999999)

3 Display and Operation

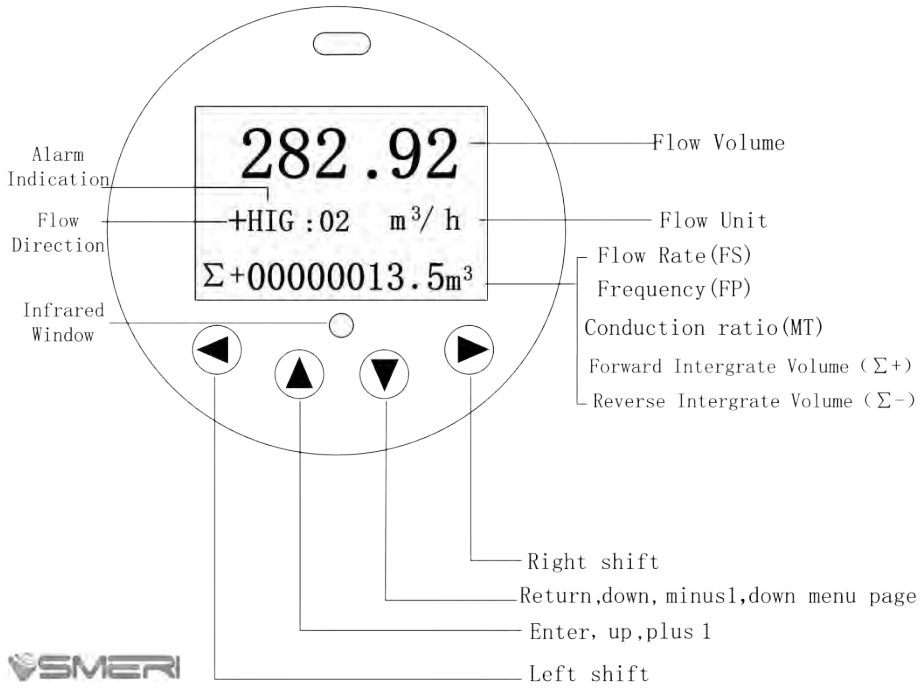


Fig 3Keyboard definition and display

When the instrument is electrified, it automatically enters the measurement state. In the state of automatic measurement, the instrument automatically completes the measuring functions and displays the corresponding measurement data.To set or modify the instrument parameters, we must make the instrument enter the parameter setting state from the measurement state. Under the parameter setting condition, the user uses the panel key to complete the instrument parameter setting.

3.1 Function of Keys

3. 1. 1 Key function in state of automatic measurement

Down key:loop select downlink content on screen;

Right key: press right key, the instrument enter password screen,enter the parameter setting after import password.

3. 1. 2 Key function in state of parameter Setting

Down key:Cursor number minus 1, page up;

Up key：cursor number plus 1, page down;

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

When the cursor moves below the top key, press the button to enter the submenu.

When the cursor moves below the next key, press the key

3.2 Function Selection Display and parameter setting operation

Table3

Parameter number	Function	Comment
1	Parameters set	Select the function to enter parameters setting
2	Clr Total Re	Select the function to clear total record

3. 2. 1 Parameter Set

Click "right shift key", the instrument enters the input password "00000" state, enter the corresponding password and move the cursor under "enter key", Click "enter key", function select screen "parameter setting", then press shift key to move cursor to "enter key", click "enter key", enter main menu, parameter setting.

3. 2. 2Clr Total Re

Click "right shift key", the instrument enters the input password "00000" state， enter the corresponding password and move the cursor under "enter key", Click "enter key", function select screen "parameter setting",then press the “up key” or “down key” to “Clr Total Re”,enter the clear total password (this password needs to be set first in the parameter menu < Clear Total Password >) ,press “shift key”to “Enter”,when Clr Total Re

automatically changed to “00000”,the instrument's zero clearing function is completed, and the total amount inside the instrument is 0.

4 Converter Picture

Fig4.1 Round shape converter

5 Product performance and index

5.1 Basic Function

- Low-frequency square-wave excitation optional:4. 545 Hz，5. 000Hz，5. 555Hz，6. 25Hz
- Matching sensor coil resistance120-150 Ω
- No need to add empty pipeline measurement, and can measure continuously, alarm by fixed value;
- Current speed range：0.1 --- 15m/s，current speed resolution：0.5mm/s；
- DC 24V switching power，range of voltage：20VDC --- 36VDC；
- Network function ： Analog Loop Communication interface；
- English (other languages can be set)；
- Two integrator gross inside, separately recorder: Forward gross, reverse gross

5.2 Normal operating conditions

Ambient Temperature Ranges：Split type –10～+50℃;

Relative Humidity：5%～90%;

5.3 Type of connection to sensor

- The integrated round shells: round shells, shells connect with the flange directly;

5.4 Request of relative sensor

Sensitivity of sensor signal：under 1m/s,(12.5mAExcitation current) output 50μV

5.5 Installation dimension drawing

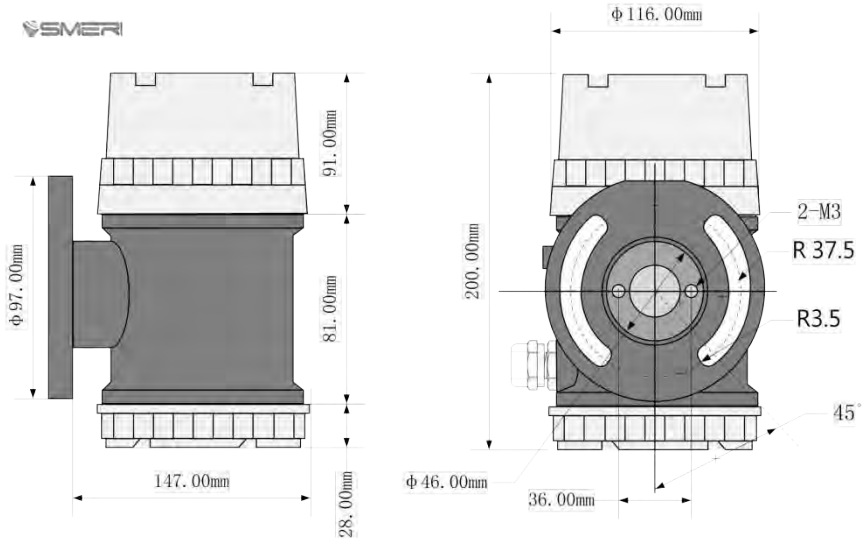


fig5.6a Body size

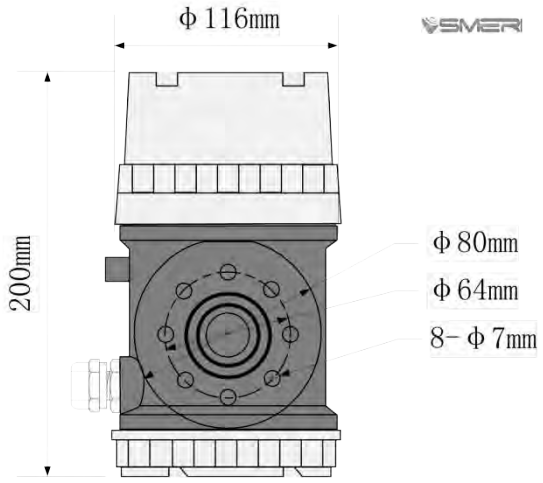


Fig5.6b Body size(511C case)

5.6 Digital communication port and protocol

Analog Loop Communication interface: support standard Analog Loop Communication , if you choose our hand held unit , you can display the measure value on line,and setting the parameters.

5.7 Simulation signal output and calculate

5. 7. 1 simulation signal output

Simulation signal output inner is 24V under4~20mA, it can drive 750Ω resistance.

The percent flux of simulation signal output:

$$I_0 = \frac{\text{Measure value}}{\text{Full scale value}} \bullet \text{the scale of current} + \text{the zero point of current}$$

The current zero is 4mA for 4~20mA.

It can be advanced simulation signal output distinguish. User can select the range of measure.

The manufacture's parameter have been adjusted, it can't need adjust. If have abnormity, it can consult as follows.

※Remarks：Electromagnetic flowmeter, After connecting to the fluid pipe（regardless Calibrations or use), The following work should be carried out first：

- Tighten the pipes before and after the sensor with copper wires.
- Ground the sensor well
- Ensure that the fluid in the pipeline is static when adjusting the zero point of the instrument.
- Ensure the stable formation of the oxide film of the sensor electrode (the electrode is in continuous contact with the fluid for 48 hours)。

6 Alarm Information

PCB of electromagnetic flowmeters converters uses SMT, so for user, it is unable to

service, and cannot open the shell of converter.

This intelligent converter has self-diagnosis function. Except for power and hardware circuit faults,the alarm information can be given correctly when faults occur in general applications.This information displays on the left of LCD. The trouble is like this:

SYS ---- System exciting alarm MTP --- Flow empty pipe alarm

CUT --- Flow cutoff alarm REV --- Flow reverse Alarm

HIG ---- Flow high limit alarm; LOW ---- Flow low limit alarm;

7 Trouble shooting

7.1 No display:

a) Check the power supply connection;

b) Check the power fuse to see for OK;

c) Check the contrast of LCD and regulate it to working state;

7.2 Exciting alarm

a) Check if the exciting cables EX1 and EX2 did not connected;

b) Check if the total resistance of sensor's exciting coil resistances less than 150Ω;

c) If a) and b) are OK, the converter is failed.

7.3 Empty pipe alarm

* If measured fluid full of testing pipe of sensor;

* When shorting circuit three connectors SIG 1, SIG 2, SGND of converter, and no "Empty Alarm" displayed then the converter works OK. In this case, it is possible that conductivity of measured fluid may be small or empty threshold of empty pipe and range of empty pipe are set wrongly.

* Check if the signal cable is OK;

* Check if the electro-poles are OK or not.

Let the flow is zero, then the displayed conductivity should be less than 100%. Resistances of SIG1 to SGND and SIG2 to SGND are all less than 50kΩ (conductivity of water) during measurement operation. (It is better to test the resistances by means of multimeter with pointer to see the charging process well.)

* The DC voltage should be less than 1V between DS1 and DS2 testing the voltage by means of multimeter. If DC voltage is larger than 1V, the electro poles of sensor were polluted that have to be cleaned

7.4 Measure flow disallow

* If measured fluid full of testing pipe of sensor;

* Check if the signal cable is OK;

* Check the sensor modulus and sensor zero whether set as the sensor escutcheon or leave factory checkout.

8. Encasement and reserve

Shipping and storage

To prevent the product from damage during shipping, keep the original package of manufacturer. The products should be stored in storehouse that meets following conditions:

a) Keep off raining and moisture;

b) Keep off heavy vibration, and strike;

c) Ambient temperature -20～+60℃;

d) Humidity less than 80%.

Solemn statement: this specification is suitable for our company's general software, if there are some differences between the actual converter and the content, please take the material object as reference.

Annex 1 Function of Nonlinear Correction

L-magBP electromagnetic converter has update the nonlinear correction calculation method.The new calculation method is convenient to set up, the meaning is clear, and the correction result is accurate.

Parameter definition:

Qpn -- Selecting the Real Velocity value of the Correction Point(correction point Qp1--Qp5)

Qcn -- Hoping the revised velocity at this point(correction value Qc1--Qc5)

S-mag F electromagnetic converter design five velocity correction points and four velocity correction values.The fifth velocity correction point is the fifth correction value,their correspondence is:

Velocity correct point 1------Velocity correct value 1

Velocity correct point 2------Velocity correct value 2

Velocity correct point 3------Velocity correct value 3

Velocity correct point 4------Velocity correct value 4

Velocity correct point 5------Velocity correct value 5

Users must follow the principle of setting correction points from small velocity to large velocity

Correct point 5 > Correct point 4 > Correct point 3 > Correct point 2 > Correct

point 1 > 0

Velocity correction formula:

$$K = \frac{Q_{c1}}{Q_{p1}} + \frac{Q_X - Q_{P1}}{Q_{p2} - Q_{P1}} \times \left(\frac{Q_{c2}}{Q_{p2}} - \frac{Q_{c1}}{Q_{p1}} \right)$$

$$Qcx = K \times Qx$$

Qcx ---revised flow Qx ---revised before discharge K---intermediate variable

Note: if the user only needs a part of the correction point, the remaining correction point and the correction number can be set to the maximum point flow speed. Example: the user only needs the correction point 1-correction point 3, then the correction point 4 = correction number 4 = correction point 5 can be set.

Example 1：Use all correction point parameter settings

NO.	fact(fix)point	Target point	Correction value range
1	0.100 m/s	0.110 m/s	0--- 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
end	0.300 m/s		0.250 m/s -- 0.300 m/s

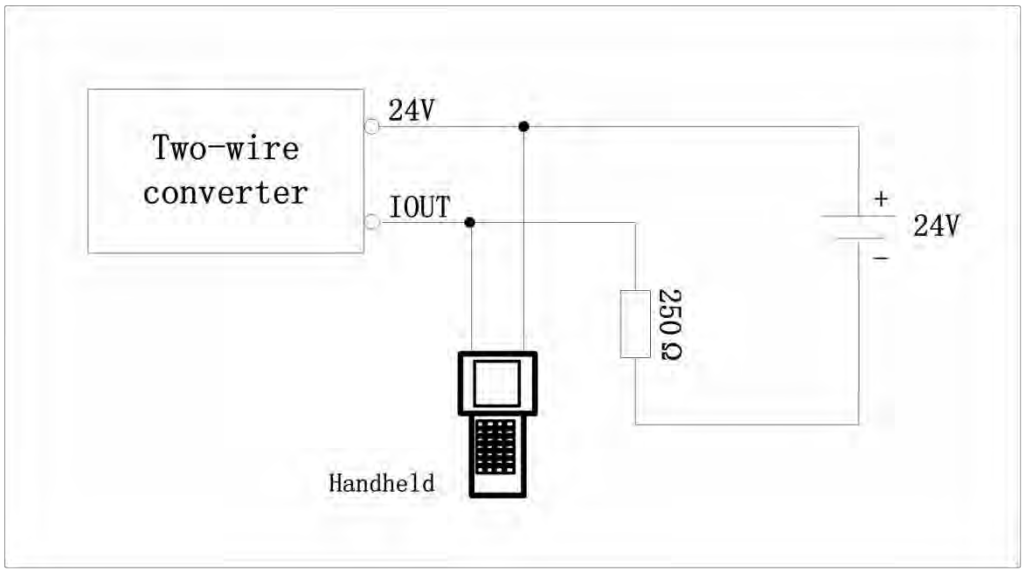
Example 2：Use sectionl correction point parameter settings

NO.	fact(fix)point	Target point	Correction value range
1	0.100 m/s	0.110 m/s	0-- 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 correct
4	0.162 m/s	0.162 m/s	No correct
end	0.163 m/s		No correct

Attention：Users should set all the correcting points,if you set not enough,the screen will “bug”,than the correcting won’t be work.

Annex 2 HART Communication instructions

Wiring



Note： Two-wire electromagnetic flowmeter 4-20m,A， Current resistance load capacity is less than 430Ω

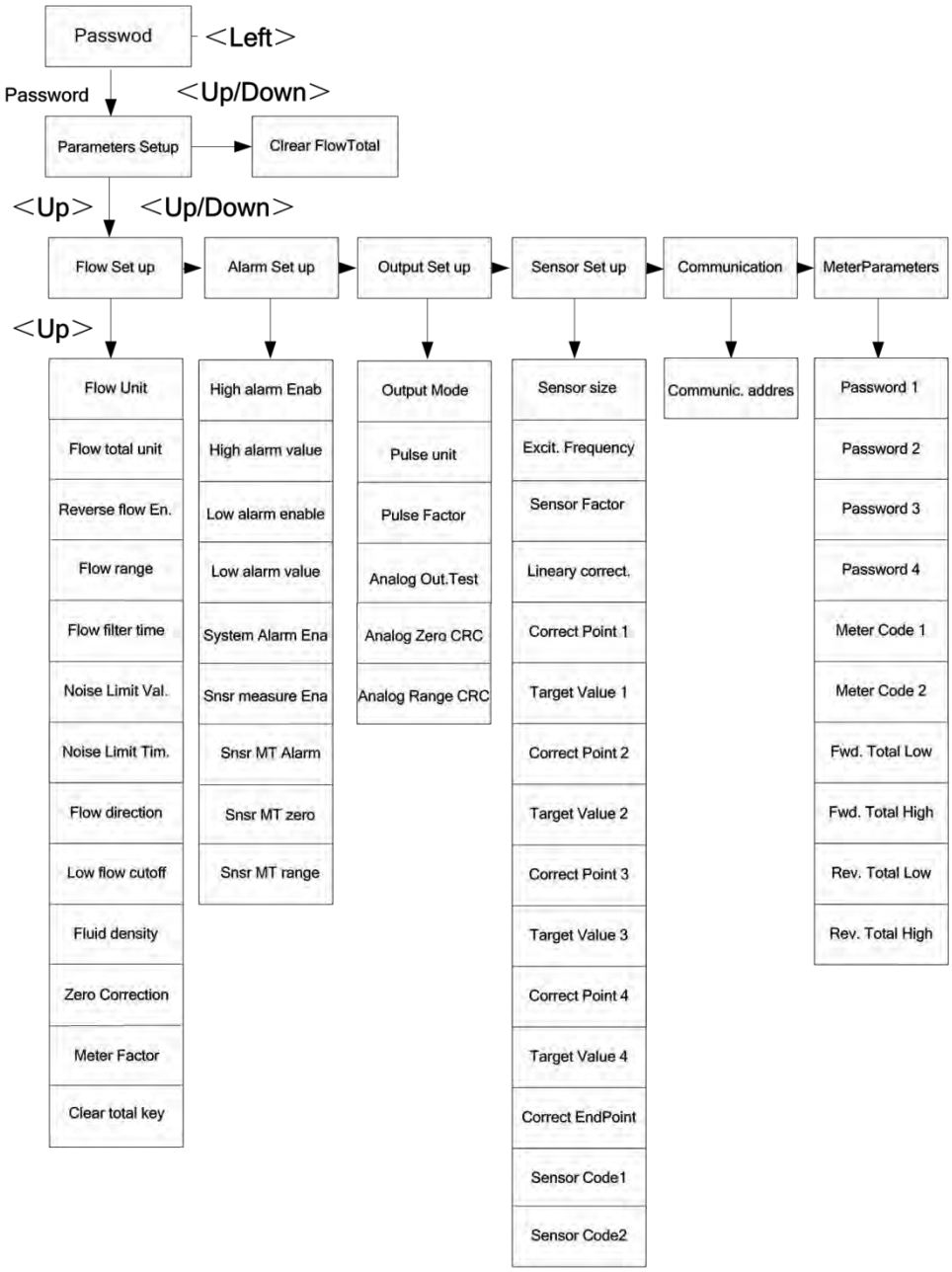
a) Current loop communication
b) Support 475 Emerson handheld
c) If the handheld is not used DD, the three data in the electromagnetic flowmeter can be read by default：The three data are instantaneous flow value, flow percentage, and current output value.
d) If using DDA total of eight data can be read: instantaneous

flow value, total cumulative value, forward cumulative value, reverse cumulative value, instantaneous flow rate, flow percentage, output current value and fluid conductance ratio.

e) Handheld is not used DD Under the circumstances, three parameters in the electromagnetic flowmeter can be modified. The three parameters are flow unit, measurement damping time, and flow range setting.

f) Using DD The sensor diameter, flow direction, flow range, flow unit, damping time, small signal removal, pulse equivalent, upper limit alarm value, lower limit alarm value, sensor coefficient value, sensor code, instrument code and other parameters can be modified.

Annex 3: Setting Parameters in Menu



Menu List

Code	Parameters	Set	Content	Password Level
1	Flow Set up	**Select**		
1	Flow Unit	Select	L/h、L/m、L/s、m^3/h、m^3/m、m^3/s UK/h、UK/m、UK/s、US/h、US/m、US/s	2
2	Flow total unit	Select	0.001、0.01、0.1、1	2
3	Reverse flow En.	Select	Enable、Disable	2
4	Flow range	Set Count	0～99999	2
5	Flow filter time	Select	1～60S	2
6	Noise Limit Val.	Select	0%～30%	3
7	Noise Limit Tim.	Select	0s～20s	3
8	Flow direction	Select	Forward、Reverse	2
9	Low flow cutoff	Set Count	According to flow	2
10	Fluid density	User Set	0～±9999	2
11	Zero Correction	User Set	0.0000～5.9999	5
12	Meter Factor	User Set	0～99999	2
13	Clear total key	User Set	0～99999	2
2	**Alarm Set up**	**Select**		
1	High alarm Enab	Select	Enable/Disable	2
2	High alarm value	User Set	According to flow	2
3	Low alarm enable	Select	Enable/Disable	2
4	Low alarm value	User Set	According to flow	2
5	System Alarm Ena	Select	Enable/Disable	2
6	Snsr measure Ena	Select	Enable/Disable	2
7	Snsr MT Alarm	User Set	0～59999	2
8	Snsr MT zero	User Set	0～59999	5
9	Snsr MT range	User Set	0～5.9999	5
3	**Output Set up**	**Select**		
1	Output Mode	Select	Current Mode、Pulse Mode	3
2	Pulse unit	Select	M3、L、UKG、USG	3
3	Pulse Factor	User Set	0～59.999	3
4	Analog Out.Test	User Set	0～29.999	2
5	Analog Zero CRC	User Set	0.0000～1.9999	5
6	Analog Range CRC	User Set	0.0000～3.9999	5
4	**Sensor Set up**	**Select**		
1	Sensor size	Select	3～3000	2
2	Excit. Frequency	Select	2.500Hz～6.250Hz	4

3	Sensor Factor	User Set	0.0000～5.9999	4
4	Lineary correct.	Select	Enable/Disable	2
5	Correct Point 1	User Set	According to speed	4
6	Target Value 1	User Set	According to speed	4
7	Correct Point 2	User Set	According to speed	4
8	Target Value 2	User Set	According to speed	4
9	Correct Point 3	User Set	According to speed	4
10	Target Value 3	User Set	According to speed	4
11	Correct Point 4	User Set	According to speed	4
12	Target Value 4	User Set	According to speed	4
13	Correct EndPoint	User Set	According to speed	4
14	Sensor Code1	User Set	Factory year、month（0-99999）	4
15	Sensor Code2	User Set	Product number（0-99999）	4
5	**Communication**	**Select**		
1	Communic. addres	Set Count	0～250	2
6	**Meter Parameters**	**Select**		
1	Password 1	User Set	0～59999	5
2	Password 2	User Set	0～59999	5
3	Password 3	User Set	0～59999	5
4	Password 4	User Set	0～59999	5
5	Meter Code 1	Factory Set	Finish Y、M（0-99999）	5
6	Meter Code 2	Factory Set	Finish Y、M（0-99999）	5
7	Fwd. Total Low	User Set	0～99999	5
8	Fwd. Total High	User Set	0～9999	5
9	Rev. Total Low	User Set	0～99999	5
10	Rev. Total High	User Set	0～9999	5

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

No matter which level the password is used, users can look at the instrument parameters.But if the user wants to change the instrument parameters, a different level of password is used.

The fist level (factory value is 00522): only look at, the second level (factory value is 03210), the third level (factory value is 06108),the forth level (factory value is 07206),the fifth level (fixed value).The scope of the password level is detailed in the above table.

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