Electromagnetic Flowmeter
FB100 series

The Installation and commissioning Manual

FTI Technology Inc.
2017/KA 0018CH

1. Converter wiring

1.1 Signal line processing and labeling

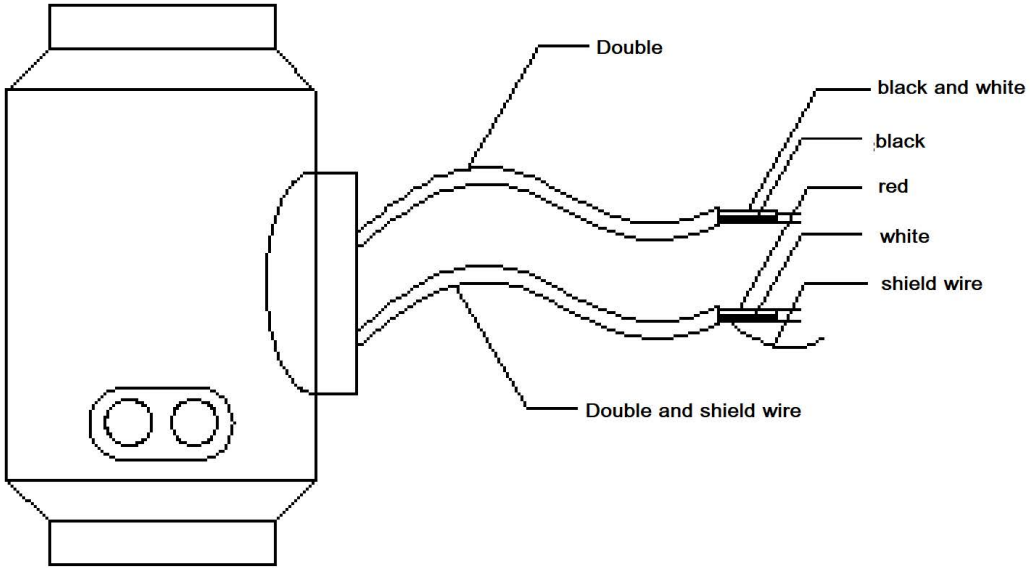


Figure 1.1. Signal line processing

The signal lines are marked as follows:

Black 12-

Double-stock line: black and white 12-core line
black 12-core line
} Connecting excitation current

Gray double strands cover line: red 10-core wire connected to "signal 1"

White 13-core wire is connected to "Signal 2"

The shield wire is connected to the "signal ground"

1.2 Terminal wiring and labeling

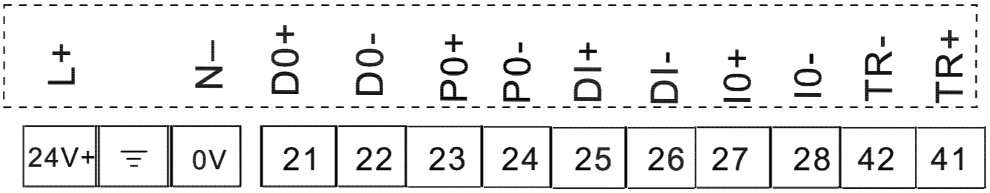


Figure 1.2 Terminal terminal diagram

The marking meaning of each terminal is as follows (Table 1):

TR +/TR -:	Communication Input (RS485-A / B)
I0-:	4-20mA-
I0+:	4-20mA+
DI-/DI+:	continue to have
PO -:	pulse output -
PO +:	pulse output +
D 0-:	Alarm output
D 0+:	Alarm output
N /24V -:	220V/ DC24V-
L /24V+:	220V/DC24V+

1.3 Characteristics and requirements of connecting wires and cables

1.3.1, Flow signal line

When the split type converter is used with the sensor, for the measured fluid conductivity is greater than 50S/cm, the flow signal transmission cable can use the type of PVVP2*0.2mm2 PVC sheathed metal mesh shielded signal cable. The length of the signal cable should be no more than 100 m. The signal cable is shipped with the sensor.

This converter is provided with equipotential excitation shielded signal output voltage to reduce the effect of distributed capacitance of cable transmission on flow signal measurement. When the measured conductivity is less than $50\mu S/cm$ or for 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.

1.3.2. Excitation current line

The excitation current wire can be two-core insulated rubber flexible cable, the recommended model is RVVP2*0.3mm^2. The length of the excitation current line matches the length of the signal cable. When the STT 3200 special cable is used, the excitation cable and the signal power The cable was combined into one piece.

1.3.3 Ground requirements for converter installation

The ground terminal of the converter housing shall be not less than 1.6mm^{2}Ground copper wire connects to the earth. From the converter housing to the earth The ground resistance of shall be less than 10 Ω.

First, the Φ 20 copper pipe, cut into 1700mm long (can be extended as needed) to nail buried 1500mm (note: when burying the nail, sprinkle a layer of broken wood carbon on the tip of the nail, and then water salt water);

Secondly, 4mm will be used^{2}Copper wire is welded to the ground nail, and finally, the ground wire is connected to the sensor flange, grounding ring, and pipe flange, see Figure 1.3.

Note: fixed wire screws, elastic pads and flat pads should be made of stainless steel.

2. Introduction of instrument parameters

2.1 Setting of flow parameters

2.1.1 Flow unit Select the flow display unit in the parameters, and 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 according to process requirements and usage habits.

2.1.2 Flow product, calculation unit

The converter display is a 9-bit counter with a maximum allowable count value of 999999999.

The product calculation units of L and m are used^3(L, cubic meters).

This unit is automatically set to be the same as the flow unit, the flow unit is L/h, L / m, L/s when the product calculation unit is L, the flow unit is m^3/h、m^3/m、m^3Unit of / sFor m^3。

The flow equivalent is: 0.001L, 0.010L, 0.100L and 1.000L

$0.001m^3$、 $0.010m^3$、 $0.100m^3$、 $1.000m^3$;

2.1.3 Reverse transmission, allowed

When the reverse output allowed parameters are set in the "allowed" state, the converter output pulses and current at the flow value as long as the flow flows. When the reverse output allows the parameters to be forbidden, if the fluid flow backwards, the converter flow rate is displayed

Normal, the output pulse is "0", the current output is the signal "0" (4mA), and the instantaneous flow rate is displayed as 0.

2.1.4 Instrument quantity and program setting

Instrument range setting is to determine the upper flow value, and the lower flow value of the meter is automatically set to "0".

Therefore, the instrument range setting determines the instrument range range, also determines the instrument percentage display, instrument frequency

Corresponding relation between rate output, instrument current output and flow rate:

Instrument percentage display value = (flow value measurement value / instrument range range) * 100%;

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

Instrument current output value = (flow value measurement value / meter range range range)

* current full range value + basis point;

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

2.1.5 Measure resistance and damping time

That is, the filter time, the long measurement damping time can improve the stability of the instrument flow display stability and the output signal stability, suitable for the total cumulative pulsation flow measurement. The short measurement damping time is a fast measurement of the response speed, which is suitable for the production process control. The measurement damping time is divided into 1S, 2S, 3S, 4S, 6S, 8S, 10S, 15S, 30S, 60S,

It can be selected for the setup mode.

2.1.6 Flow party, to selection

If the user thinks that the fluid direction during debugging is inconsistent with the design, the user does not have to change the excitation line or the signal line connection method, but can change the flow direction to set the parameters.

2.1.7 Small signal, excision point

The small-signal excision point setting is represented by the flow rate. When the small signal resection, only show the flow rate, resection flow rate, hundred Rate display and signal output.

2.1.8 Zero flow rate, point correction

The zero-point correction shall ensure that the sensor tube is filled with fluid and that the fluid is stationary. The flow zero is indicated by a flow rate in mm / s. The converter flow zero-point correction is shown as follows:

Upword display: FS represents the instrument zero measurement value; downcharacters display: flow speed zero correction value;

When FS is not "0", the correction value should be adjusted to make FS = 0. Note: If the downlink correction value is changed and the FS value increases, the positive and negative signs of the downlink value should be changed so that the FS can be corrected to zero.

The corrected value of the flow zero is the matching constant value of the sensor, and shall be recorded in the sensor record ticket and the sensor label plate. The sensor zero point value is a flow rate value in mm / s, whose symbol is the opposite to that of the corrected value.

2.1.9 Factory standard and determination coefficient

This coefficient is the special coefficient of converter manufacturer, which uses to electromagnetic convert FB 100

The measurement circuitry is normalized to ensure all FB 100 electromagnetic conversion with interchangeability of 0. 1%.

2.1.10 Total amount of zero clearance password

Users can set the password using one above the third level, and then set the password within the total reset.

2.1.11 Flow noise amplitude

The spike suppression coefficient is filtered for burr disturbance, and this design is filtered according to the flow rate. When the flow

velocity fluctuation is greater than the set flow velocity, the instrument considers it a normal fluctuation and is not filtered. When the flow velocity fluctuation is less than the set flow velocity, The instrument is considered abnormal fluctuations and will be filtered.

2.1.12 Spiking noise filtering

For pulp, mud and other slurry flow measurement, solid particles in the fluid friction or shock measurement electrode, will

Form a "sharp interference," and the FB100 converter is designed to overcome such interference.

Set the parameter as Allow, to start the spike filtering function; turn off the spike filtering function when the parameter is forbidden.

2.2 Alarm parameter setting

2.2.1 Upper limit reporting, police permission

User chooses to allow or prohibit.

2.2.2 Upper limit alarm, alarm value

The upper limit alarm value is calculated as the flow rate. This parameter is set by the numerical value, and the user sets one in this parameter

Appropriate flow value. After the instantaneous flow of the meter in operation is above this value, the meter will output the alarm signal.

2.2.3 Lower-limit alarm

With the upper limit alarm

2.2.4 Excitation alarm

Select allowed, with excitation alarm function, select prohibit, cancel excitation alarm function.

2.2.5 Air traffic control report, police permission

The FB 100 has an air control detection function without additional electrodes. If the user chooses to allow the air traffic control alarm, then

When the fluid in a pipe is below the measuring electrode, the instrument detects an air control state. After the air tube control state is detected, the instrument

Table analog output and digital output are placed as signal zero, and the instrument flow is displayed as zero.

2.2.6 Air traffic control report, alarm threshold value

In the case of full fluid pipe (with any flow rate), the atC alarm

threshold parameters display the measured conductivity upward, and the

air control alarm threshold is set downward. When setting the air control

alarm threshold, it can be set according to the measured conductivity,

Let it be 3~5 times of the measured electrical conductivity.

2.2.7 Air traffic control zero, point correction

When the full pipe value on site is large, the user can make the air traffic control

zero point correction. Ensure sensor sensor be during during during zero correction

The tube is filled with fluid, and the air tube zero point correction is shown as follows:

Upink display: MZ represents the zero point value of instrument air control;

Downlink display: the air traffic control zero-point correction

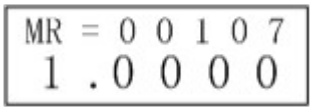
value; firstly, adjust the correction value to make MZ =5-10 according to the value of the measured conductivity MT (note:, if the downlink repair is added

Positive value, and the MZ value decreases).

2.2.8 Air traffic control volume, program correction

When the MT value of tube tube conductivity measured by the instrument is small, the user can correct the tube control range. Air traffic control range correction

Ensure that there is no fluid in the sensor tube, and the air control range correction is as follows:



Upink display: MR represents the instrument traffic range measurement;

Downlink display: air traffic control range correction value;

Increase downside correction value, increase MR value, decrease downlink correction value, and decrease MR value. The user can adjust the MR to the appropriate value according to the actual needs (it is recommended to adjust to about MR=500), then the measured air conductivity value is basically the actual corrected MR value.

2.3 Output parameter setting

2.3.1 Pulse transmission, outgoing mode

There are two types of pulse output methods: frequency output and pulse output.

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

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

* Pulse output mode: The pulse output is a rectangular waveform pulse train, each pulse represents a flow rate through the pipe. The pulse equivalent is set by the following two parameters "Pulse Equivalent Unit" and "Pulse Equivalent". The pulse output method is mostly used for total accumulation and is usually connected to the totalizer.

The frequency and pulse outputs are usually in the form of OC gates, so they should be connected to an external DC power supply and load. See section 1.4 for details.

2.3.2 Pulse units

The FB 100 electromagnetic converter has two pulse equivalents: m3 and L

2.3.3 Pulse equivalent

The pulse equivalent refers to the flow rate represented by one pulse. The pulse equivalent of the meter is set by the parameters "Pulse Equivalent Unit" and "Pulse Equivalent" in the range of 00.001 L to 59.999 m3.

At the same flow rate, if the pulse equivalent is small, the frequency of the output pulse is high and the cumulative flow error is small.

2.3.4 Pulse width

Pulse output is low level effective, pulse width: 1- -9999ms

Pulse width — maximum number of output pulses (Table 2)

Number	Pulse width (ms)	Maximum number of output pulses per hour (p/h)
1	1	1800000
2	5	360000
3	10	180000
4	50	36000
5	100	18000
6	200	9000
7	500	3600

2.3.5 Digital loss, out the upper limit

The instrument frequency output range corresponds to the upper flow measurement limit, or 100% of the percent flow rate. Frequency output upper limit

Values can be set arbitrarily in the range of 1 to 10,000 H z.

2.3.6 Current transmission, outgoing mode

At present, users can only choose 4~20 mA current output.

2.3.7 Zero current, point correction

The converter factory current output zero adjustment, so that the current output is accurately 4mA.

2.3.8 Full current, degree correction

The factory current output of the converter is adjusted fully enough, so that the current output is exactly 20mA.

2.3.8 Current transmission, and test out

After adjusting the current output zero and full degree, the user can test the output current linearity of the converter with this parameter. Users can respectively set the output current with 0,0.2,0.5,0.7,1.0, to check the linearity characteristics of the output current.

2.4, Sensor parameters

2.4.1 Measurement pipe, channel diameter

FB100 electromagnetic flowmeter converter supporting sensor diameter range: 3 ~ 3000 mm.

3、4、5、6、8、10、15、20、25、32、40、50、65、80、100、125、150、200、250、300、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 Excitation frequency, rate selection

FB 100 electromagnetic converter provides four excitation frequency options (instrument factory default setting is 6.25Hz): 3.125Hz, 4.167Hz, 6.25Hz, 12.5Hz, small diameter sensor excitation system with small inductance, should choose 6.25Hz. Large-caliber sensor excitation system with large inductance, users can only choose 3.12Hz and 4.16Hz. In use, select the low excitation frequency first. If the instrument flow rate is too high, then the low excitation frequency in turn. Note: At which excitation frequency the calibration is made, it must operate at which excitation frequency. If using high frequency excitation, select 12.5 Hz excitation.

2.4.3 Sensor, frame value

Sensor coefficient: that is, the electromagnetic flowmeter calibration coefficient of the whole machine. The coefficient is obtained from the actual calibration, and steel stamped on the sensor plate. The user must place this coefficient in the FB100 converter parameter table.

2.4.4 Flow correction

See Appendix for details.

2.4.5 Sensor encoding

The sensor coding can be used to mark the matching sensor factory time and number to jointly set the sensor coefficient

2.5 Setting of communication parameters

2.5.1 Instrument communication and communication mode

The meter provides three communication modes: MODBUS, HART and PROFIBUS. The corresponding communication mode should be set when the meter is equipped with different communication modes.

2.5.2 Instrument communication, communication address

Refers to the data communication, the mailing address of this table, the optional range: 01 ~250 address, 0 address is reserved.

2.5.3 Instrument communication and communication speed

Selection range of wave rate of meter communication:
300,600,1200,2400,4800,9600,19200,38400.

2.5.4 Instrument calibration and inspection mode

The standard MODBUS communication calibration mode of FB100 electromagnetic converter is no verification, and users can choose the parity calibration mode according to their needs.

2.6 Instrument modification mark

2.6.1 Instrument codes 1 and 2

The LCD display direction of the FB 100 electromagnetic converter is optional, and the default is the vertical direction. If the user needs to adjust the LCD display direction, it can be set by itself according to the direction displayed in this menu.

2.6.2 User Password 1~4

Users use the level 5 password to enter, and you can modify this password;

2.6.3 Instrument codes 1 and 2

The converter code records the factory time and number of the converter.

2.6.4 Positive high and low total volume

The high and low total settings can change the value of the forward total and reverse total, mainly for meter maintenance and meter replacement. and meter replacement.

Users use the level 5 password to enter, can modify the positive cumulant (Σ +), generally set the cumulant can not exceed the meter The maximum value calculated by the number device (999999999).

2.6.5 Reverse total volume is high and low

Users use the level 5 password to enter, can modify the reverse cumulant (Σ -), generally, the set cumulant can not exceed the counter Maximum value calculated (999999999).

3. Instrument display and operation

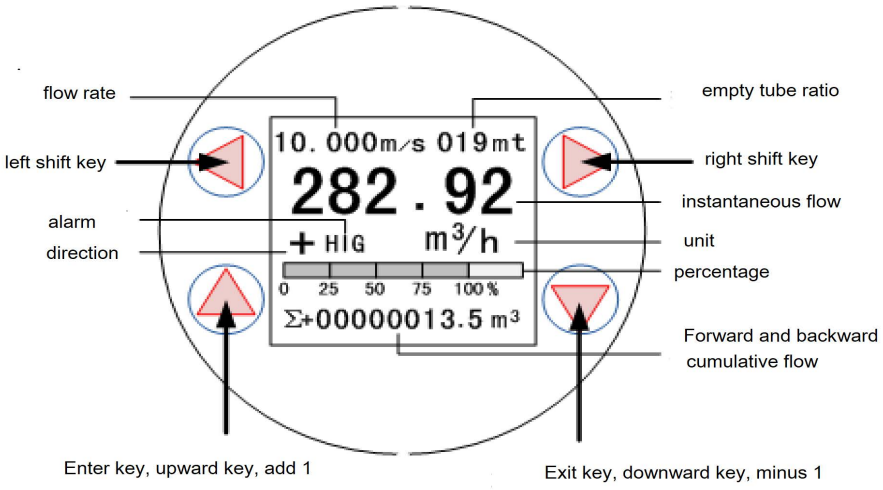


Figure 3. Keyboard definition and LCD display

When the instrument is powered on, the measurement state enters automatically. Under the automatic measurement state, the instrument automatically completes each measurement function and displays the corresponding measurement data. To set or modify the instrument parameters, the instrument must be moved from the measurement state to the parameter setting state. In the parameter setting state, the user uses the panel key to complete the instrument parameter setting.

3.1 Key function

1.13. Key function under automatic measurement state

Left shift key: press the right shift key to leave within 2 seconds, and then press this key, the instrument enters the password screen, enter the password can enter the parameter setting state;

Right shift key: cycle select the downlink positive and negative product calculation content;

As the function key when the instrument enters the version number;

3.1.2 Function of each key under the parameter setting state

Top key: number at the cursor, turn the page before;

Next key: the number at the cursor minus 1, then turn to 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 upper key, press the upper key to enter the submenu.

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

3.2 Function selection screen and parameter setting operation

Table 3

Parameter number	Functional content	explain
1	parameter setting	Select this function to enter the parameter setting screen
2	Total zero	Select this function to perform the total instrument zero clearance operation

3.2.1 Parameter setting

Press "right shift key" first, press "left shift key" within 2 seconds, the instrument to enter input password "19818" state, move the cursor to "enter key", press "enter" key ", appear function selection screen" parameter setting ", then press shift key to move the cursor to" enter key ", press" enter key ", enter the main menu, parameter setting..

3.2.2 Total zero

Press "right shift key" first, press the "left shift key" within 2 seconds, the instrument to enter the input password "00000" state, enter the corresponding password to move the cursor to "enter key", press "enter key", the function selection screen "parameter setting", then press "key" or "down key" page to "total zero", enter the total zero password (this password is set in the parameter menu "total reset password"), press "shift key", press "enter key", when the total zero password automatically

After "00000", the zeroing function of the meter is completed and the total amount inside the meter is 0.

4. Instrumentation pictures

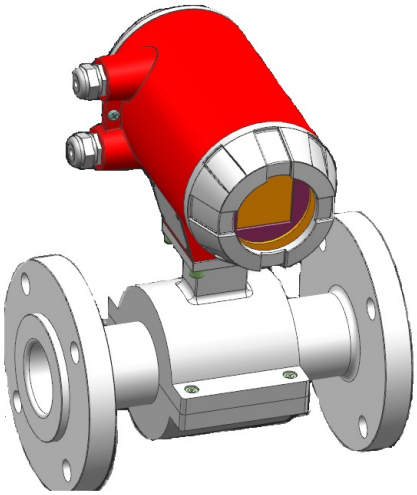


Figure 4.1 Circular Converter Drawing

5. Product performance and indicators

5.1 Basic functions

■ Low frequency square wave excitation and high frequency excitation are optional, excitation frequency: 3.12Hz,4.16Hz,6.25Hz,12.5Hz;

■ The excitation current is 125 mA (which must be selected for high-frequency excitation), 187mA, and 250mA;

■ does not need additional electrode air control measurement function, continuous measurement, fixed value alarm;

■ flow rate measurement range: 0. 1- -15 m / s, flow rate resolution: 0.5 mm / s;

■ AC high-frequency switching power supply, voltage applicable range: 185VAC- - -250VAC;

■ DC 24V switch power supply, voltage applicable range: 20VDC- - -36VDC;

■ network functions (optional): MODBUS, HART, GPRS, PROFIBUS;

■ Chinese and English display mode, (or other languages);

■ There are three total amounts of integrators inside, which can be recorded respectively: forward total, reverse total, and total difference total.

5.2 Special functions

■ Infrared handheld operated keyboard, remote non-contact operating converter for all functions.

Ambient temperature: 10~ + 60℃;

Relative humidity: 5%~90%;

5.3 Normal working conditions

Power supply: single-phase AC power is 85~250V, 45~63Hz;

Dispersed power: less than 20W (after connecting the sensor to match).

5.4 Connecting type to the sensor

* Round shell integrated: round shell, the shell is directly connected to the sensor flange;

5.5 Sensor supporting requirements

Sensor signal sensitivity: at 1 meter / second flow rate, the sensor is output from 150 μ V ~200 μ V;

For the FB 100 electromagnetic flowmeter converter, four 62.5mA currents are used in the excitation circuit to constitute 250 mA, each with 62.5mA current controlled by a 20 Ω precision resistance, so that the user can select the excitation current of different sizes by changing the number of precision resistors.

The converter is set at 250 mA current, similarly, if there are three precision resistors, 187.5 mA, and if two precision resistors, 125 mA.

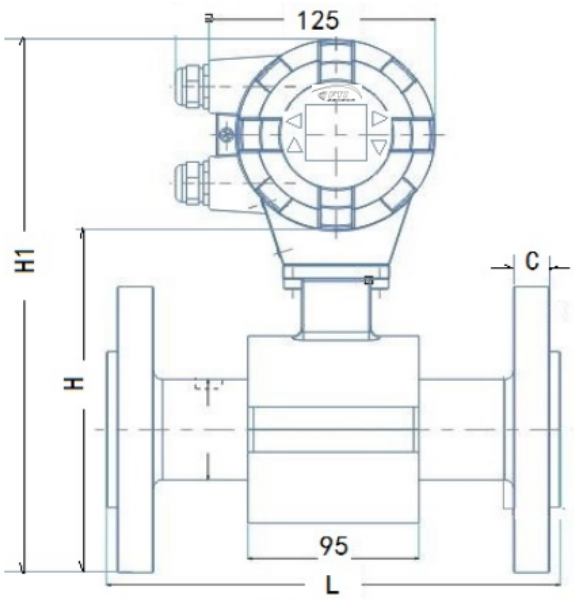
Sensor excitation coil resistance: 250mA excitation current: 50 ~ 60 Ω;

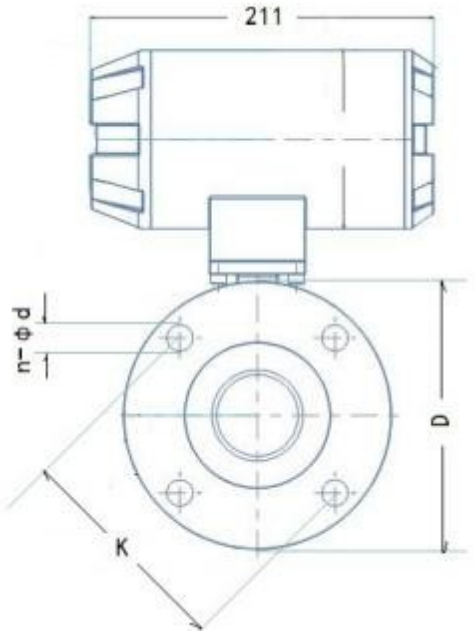
187mA excitation current: 60 ~ 80 Ω;

125mA excitation current: 100 ~ 120 Ω;

5.6 Installation dimension drawing

All-in-one type





DN	L (mm)	H	H 1	H 2	D	K	n - ¢d	C	Pressure (Mpa)	weight (kg)
10	160	120	260	202	90	60	4- ¢ 14	14	4.0	3.6
15	160	125	265	207	95	65	4- ¢ 14	14		4.5
20	160	135	275	217	105	75	4- ¢ 14	16		5.4
25	160	145	285	227	115	85	4- ¢ 14	16		6.2
32	160	165	305	247	140	100	4- ¢ 18	18		7.2
40	200	175	315	257	150	110	4- ¢ 18	18		8.3
50	200	190	330	272	165	125	4- ¢ 18	20		10
65	200	210	350	292	185	145	4- ¢ 18	20	1.6	10.5
80	200	225	365	307	200	160	8- ¢ 18	20		11.4
100	250	252	392	334	235	180	8- ¢ 18	22		14.5
125	250	275	415	357	250	210	8- ¢ 18	22		17.5
150	300	310	450	392	285	240	8- ¢22	24		23
200	350	362	502	444	340	295	12- ¢22	26		32
250	400	420	560	502	395	350	12- ¢22	26	1.0	44
300	500	470	610	552	445	400	12- ¢22	28		56
350	500	525	665	607	500	460	16- ¢22	30		71
400	600	590	730	672	565	515	16- ¢26	32		94
450	600	635	775	717	615	565	20- ¢26	35		106
500	600	690	830	772	670	620	20- ¢26	38		129
600	600	717	937	879	780	725	20- ¢30	42		203
700	700	912	962	994	895	840	24- ¢30	30		320
800	800	995	1045	1077	1010	950	24- ¢34	32		450
900	900	1125	1175	1207	1110	1050	28- ¢34	34		580
1000	1000	1135	1185	1217	1220	1160	28- ¢36	34		700
1200	1200	1417	1467	1499	1405	1340	32- ¢33	60	0.6	900
1400	1400	1640	1690	1722	1630	1560	36- ¢36	68		1150
1600	1600	1840	1890	1922	1830	1760	40- ¢36	76		1450
1800	1800	2055	2105	2137	2045	1970	44- ¢39	84		1780

5.7 Measurement accuracy of the whole machine

VS: Set the measuring range (m / s)

latus rectum mm	range m/s	definition
3~20	Below: 0.3	±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	Below: 0.3	±0.25%FS
	0.3~1	±1.0%R
	1~15	±0.5%R
%FS: Relative range;%R: Relative measurement value.		

5.8 Analog current output

Load resistance: 0-750 Ω.

5.9 Digital Frequency Output

Frequency output range: 1 ~ 10,000 H z;

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

Frequency output drive: FCT 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 、

Output pulse width: 1~500ms adjustable;

Output electrical isolation: photoelectric isolation, isolation voltage:> 1000VD C;

Pulse output drive: FCT output, maximum withstand voltage of 36VDC, maximum load current of 200mA.

5.11 Alarm output

Alarm output contact: DOUT- - -upper and lower limit alarm and air traffic control

alarm public output point; lose as long as the alarm is present

Out of the low level, the output of the high level when there is no alarm.

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

Alarm output drive: Darlington pipe 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;

HART, interface: support the standard HART protocol, configure the

HART handheld device, can display the measurement

values online, and can modify the instrument

parameters;

5.13 Electrical isolation

The insulation voltage between analog input and analog output shall not be less than 500V;

The insulation voltage between analog input and alarm power supply shall not be less than 500V;

The insulation voltage between analog input and AC power supply shall not be less than

500V;

The insulation voltage between analog output and AC power supply shall not be less than 500V;

The insulation voltage between the analog output and the earth shall not be less than 500V;

The insulation voltage between pulse output and AC power supply shall not be less than 500V;

Insulation voltage between pulse output and earth shall not be less than 500V;

The insulation voltage between alarm output and AC power supply shall not be less than 500V;

Insulation voltage between alarm output and earth shall not be less than 500V.

6. Alarm information

The printed circuit board of the electromagnetic flow converter adopts the surface welding technology, which is not repaired for the user. Therefore, the user cannot open the converter housing.

The FB 100 Intelligent Converter has a self-diagnostic function. In addition to power supply and hardware circuit faults, faults in general applications can be correctly given alarm information. This information is prompted on the left side of the display as follows:

SYS- - - -system excitation alarm;

CUT- - - -small signal removal alarm;

HIG- - - -flow upper limit alarm;

MTP- - - - -fluid air traffic control alarm;

REV- - - -reverse flow removal alarm;

L OW- - - -, flow lower limit alarm

7. Trouble Shooting

7.1. Instrument is not displayed

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

7.2. Excitation alarm

* Excitation wiring EX T + and EX T-whether the open circuit;
* Is the total resistance of the sensor excitation coil less than 150 Ω;
* If both a and b are normal, the converter fails.

7.3. Air traffic control alarm

* Whether the measuring fluid is filled with the sensor measuring tube;
* Short-circuit the converter signal to terminals SIG +, SIG-and SGND, if ″ empty Tube ″ prompt undo, indicating that the converter is normal, it may be the measured fluid conductivity is low or the air control threshold and empty

Tube gauge range is set in error;

* Check that the signal connection is correct;

* Check that the sensor electrodes are normal:

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

In the case of flow rate, measuring the resistance of terminals SIG + and SIG-to SGND shall be less than 50k Ω (water measurement for the medium). It is best to measure with a pointer multimeter and see the charge and discharge process elephant).

*The DC voltage between DRS + and DRS-measured with a multimeter should be less than 1V, otherwise, the sensor is indicated

Electrodes are contaminated and should be cleaned.

7.4 The measured flow rate is inaccurate

* Whether the measuring fluid is filled with the sensor measuring tube;

* Whether the signal line connection is normal;

* Check whether the sensor coefficient and the sensor zero point are set according to the sensor sign or the factory check order;

*

8.FB100 packing and storage

8.1FB100 Binning

FB100 electromagnetic converter factory using vacuum packaging mode, with moisture-proof capability.

Random documents include: one copy of the installation instruction manual and one packing list each.

8.2. Transportation and storage

To prevent damage to the instrument during operation, keep the packing at the installation site. During storage, the storage site should meet the following conditions of indoor, rainproof, moisture-proof, small mechanical vibration, and avoid impact; temperature range-20~ + 60℃; humidity is not more than 80%.

Solemnly declare: this instruction is suitable for our general software, if part of the content and the actual converter difference, please refer to the object.

Appendix 1 Excitation Frequency Selection (Reference)

FB 100 electromagnetic converter provides four excitation frequency options (instrument factory default setting is 6.25Hz): 3.125Hz, 4.167Hz, 6.25Hz, 12.5Hz, small diameter sensor excitation system with small inductance, should choose 6.25Hz. Large-caliber sensor excitation system with large inductance, users can only choose 3.12Hz and 4.16Hz. In use, select the low excitation frequency first. If the instrument flow rate is too high, then the low excitation frequency in turn. Note: at which excitation frequency calibration, you must work at which excitation frequency. If a high-frequency excitation is used, select the 12.5Hz excitation.

The FB 100 electromagnetic converter and the user sensor matching, often appear the user sensor excitation coil resistance does not meet the requirements of the FB 100 electromagnetic converter, at this time,according to the specific situation, can do the following processing:
(1) the excitation coil resistance is small
If the excitation coil resistance is less than the resistance value required by the converter, it can be solved in series resistance in the excitation coil circuit, so that the total resistance value meets the requirements of the converter. The power of the series resistance should be greater than twice the actual generated power consumption,
(2) Large excitation coil resistance If the excitation coil resistance is greater than the resistance value required by the converter, the coilconnection
method can be changed. For example, the total resistance of the excitation coil can be 200 Ω, then the resistance of each excitation coil is 100 Ω, using thetwo
excitation coils in parallel, and the resistance value of the coil in parallelcan
meet the requirements. If the resistance value in parallel is too small, it canbe
solved by series resistance method.
According to the above analysis, change the sensor excitation coil wiring method, measure from both ends of the excitation coil,
Make the total resistance = (R1+ RL 1) Parallel connection (R 2 + RL 2) ⩽ 120Ω ;
(as shown in the figure:R1、R2—— plus electrical resistance; RL1、RL2 —— excitation coil resistance)

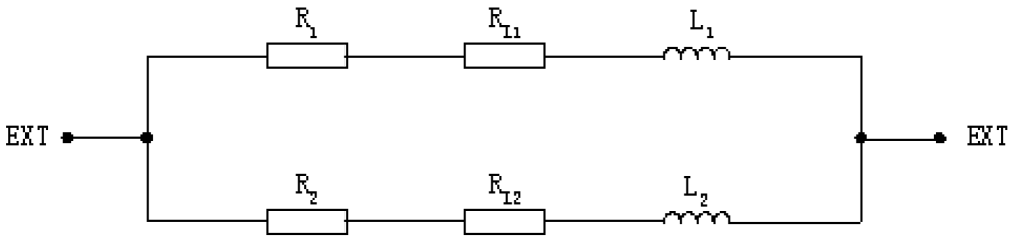
(3) Stability time of the excitation current of the sensor is too long (excessive inductance)
For the problem of the excitation current stability time is too long, the first way to choose to change the excitation method to solve it, choose 1 / 10 power frequency to 1 / 16 power frequency.
If the method of changing the excitation mode can not meet the use requirements, the changing coil connection method can still be used.

Excitation current crossing time τ = L / R

Where: L —— excitation coil inductance; R —— excitation coil resistance.

Thus, both decreasing L or increasing R will decrease τ.

According to the above analysis, change the excitation coil wiring method of the sensor, as shown below:



R_1、R_2—— plus electrical resistance; R_{L1}、R_{L2}The —— excitation coil resistance.

series resistor R_1、R_2After that, make the total resistance (R_1+ R_{L1}) Parallel connection (R_2 + R_{L2}) ≤ 120Ω ;

Appendix 2 Nonlinear correction functional description

Non-linear correction function, in principle, is used for linear adjustment of small flow rates (0.5m/s) or less, and the function is designed with 4 correction segments, divided into 4 flow points and 4 correction coefficients. Correction points corresponding to the flow rate must meet: correction point 1 〉 correction point 2 〉 correction point 3 〉 correction point 4 〉 0.

The correction calculation is made on the original sensor flow coefficient curve, so the nonlinear correction function should be turned off to mark the sensor coefficient. The nonlinear correction function is then allowed, setting the correction coefficient according to the nonlinearity of the sensor, and segment correction. If the coefficient is set properly, no not calibration calibrcalibration.

Where the **original flow rate** is the actual standard flow rate, the corrected flow rate is called the **corrected flow rate**, the correction formula is as follows:

In the correction point 1> the original flow correction point 2 interval;

Correction flow rate = correction coefficient 1 original flow;

In the correction point 2> the original flow correction point 3 interval;

Correction flow rate = correction coefficient 2 original flow;

In the correction point 3> the original flow correction point 4 interval;

Correction flow rate = correction coefficient 3 original flow;

At the correction point 4> 0 original flow interval;

Correction flow rate = correction coefficient 4 original flow;

Note: When setting the correction point:

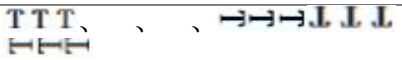
Correction point 1> correction point 2> correction point 3> correction point 4> 0

The intermediate value of the correction coefficient is 1.0000, and the coefficient higher than 1 corrects flow high, and the coefficient less than 1 corrects flow low.

Appendix 3 List of Instrument Menu

Parameter Number	parameter	Setting method	content	Password level
	parameter setting	select	Enter, return	1
	Total zero	select	Factory setting	1
	Instrument parameters	select	Enter, return	
Ⅰ	**Flow parameter, the number setting**	select	Enter, return	
1	flux unit	select	L /h 、L /m、L/s、m^3/h、m^3/m、m^3/s	2
2	Flow product, calculate the unit	select	0.001m^3~1m^3、0.001L ~1L 、	2
3	Reverse output allows for	select	Allow, prohibit	2
4	Instrument quantity, program setting	Number	0~99999	2
5	Measure the damping time	select	1~60S	2
6	Spiking inhibition range	select	Factory setting	2
7	Spiking inhibition time	Number	Factory setting	2
8	Flow direction selection	Number	Forward, reverse	2
9	Small signal resection point	Number	Set by traffic	2
10	fluid density	Number	0~19.999T /m 3	5
11	Flow rate zero-point correction	Users can change	0~±99999	3
12	Factory calibration factor	Number	0.0000~5.9999	3
13	Total zero password	select	0~99999	3
Ⅱ	**Alarm parameter settings**	select	Enter, return	
1	Upper limit alarm is allowed	select	Allow / prohibit	2
2	Upper limit alarm value	Number	Set by traffic	2
3	Lower limit report, the	select	Allow / prohibit	2

	police allow			
4	Lower limit report, alarm value	Number	Set by traffic	2
5	Excitation alarm permits	select	Allow / prohibit	2
6	Air traffic control alarm allows it	select	Allow / prohibit	2
7	Air traffic control alarm threshold value	Number	0~59999	2
8	Air traffic control zero-point correction	Number	0~59999	5
9	Air traffic control measuring range correction	Number	0~5.9999	5
III	**Output parameter settings**		Enter, return	
1	Pulse transmission, output mode	select	Frequency / pulse	2
2	Pulse unit	select	m^3、L	2
3	pulse equivalency	Number	00.001~ 59.999	2
4	pulse length	select	1~9999ms	2
5	Number lose, upper limit	Number	1~ 10000 Hz	2
6	Current output mode	select	4-20mA	2
7	Current zero-point correction	Number	0.0000~1.9999	5
8	Current full correction	Number	0.0000~3.9999	5
9	Current output test	Number	0.0000~0.9999	2
IV	**Sensor parameters**		Enter, return	
1	Measure the pipe diameter	select	3~3000	2
2	Excitation frequency selection	select	3.125Hz ~12.5Hz	4
3	Sensor system value	Number	0.0000~5.9999	4
4	Flow repair, which is allowed	select	Allow / prohibit	2
5	Flow correction point 1	User Settings	Set by traffic	4

6	Flow correction number: 1	User Settings	0.0000~1.9999	4
7	Flow correction point 2	User Settings	Set by traffic	4
8	Flow correction number: 2	User Settings	0.0000~1.9999	4
9	Flow correction point: 3	User Settings	Set by traffic	4
10	Flow correction number: 3	User Settings	0.0000~1.9999	4
11	Flow correction point 4	User Settings	Set by traffic	4
12	Flow correction number 4	User Settings	0.0000~1.9999	4
13	Sensor encode of 1	User Settings	Factory year and month (0-99999)	4
14	Sensor encode of 2	User Settings	Product Number (0-99999)	4
V	**Communication parameter setting**		Enter, return	
1	Instrument communication mode	select	MODBUS 、HART 、PROFIBUS	2
2	Instrument communication address	Number	0~250	2
3	Instrument communication speed	select	300~38400	2
4	Instrument calibration mode	select	No calibration, odd calibration, parity calibration	2
VI	**Parameter repair and remarking**		Enter, return	
1	Show direction	select		2
2	Guarantee the password number 1	Users can change	0~59999	5
3	Guarantee the password of 2	Users can change	0~59999	5
4	Guarantee the password number 3	Users can change	0~59999	5
5	Guarantee password 4	Users can change	0~59999	5
6	Instrument code: 1	Manufacturer setting	Factory year and month (0-99999)	5

7	Instrument code: 2	Manufacturer setting	Factory year and month (0-99999)	5
8	Low positive total volume	Users can change	0~99999	5
9	Positive total volume is high	Users can change	0~9999	5
10	Reverse total low	Users can change	0~99999	5
11	Reverse total high	Users can change	0~9999	5

Instrument parameters determine the operation state, calculation method, output mode and state of the instrument. Correct select and set the instrument parameters, can make the instrument run in the best state, and get high measurement display accuracy and measurement output accuracy.

Instrument parameter setting function is provided with level 5 password. Among them, level 1~4 is the user password, and level 5 is the manufacturer password. Users can use the Level 5 password to reset the Level 1 to 4 password.

Users can view the instrument parameters regardless of the level of password used. But users who want to change the instrument parameters will use different levels of passwords.

Level 1 password (19818), Level 2 password (factory value), Level 3 password (exit

Plant value), level 4 password (factory value), level 5 password (fixed value): password level can be this reference

The number range is detailed in the table above.

Contact u s

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