FIXINST

F231x-V Series

New-generation Anti-vibration Vortex Flow Meter

· Instruction Manual ·

Version: 1.02

Experts In Compressed Air & Fluid Measurement

Fast · Accurate · Management

Preface

- Dear customer, thank you for choosing our products.
- This manual is a description of the use range, functions, installation and operation methods, troubleshooting, and maintenance of the product.
- The user must read this operation manual completely before using the device to properly use the product.
- After you read it, keep it in an accessible place for the next operational reference.

Notice

- Fix Instruments is not responsible for damage caused by unauthorized changes to the equipment without reviewing the operation manual or violating the provisions of this operation manual, and the instrument guarantee will be automatically voided.
- Fix Instruments is not responsible for incidental damage caused by transportation, equipment performance, or mishandling.
- Fix Instruments do not promise the suitability of this equipment for any application not described herein.
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1. Safety Instructions

1.1 General safety instructions

Warning!

Compressed Air!

Any contact with rapid air leaks or pressurized parts of the compressed air system can lead to significant injury or even death!

- Consider all electrical installation-related regulations.
- Avoid personal contact with rapid air leaks or parts of the instrument with pressure.
- You must ensure that the system is not under pressure when performing maintenance operations.

Warning!

Power Voltage!

Any contact with the electrical parts of the product can lead to significant injury or even death.

- Consider all electrical installation-related regulations.
- Do not remove the meter housing in an explosive atmosphere when the circuit is energized.
- Any power connections must be disconnected when performing repair and maintenance operations.
- Any electrical work on the system is to be performed by authorized personnel only.

Attention!

The permissible range of operating conditions

Please check the permitted operating conditions. Any operation outside these permits may cause equipment failure or even damage to the instrument or the entire system.

- Please check the national regulations, and remarks during the preparation, installation, and use.
- Use of the product is prohibited in explosive areas.
- Make sure the product is operated within the allowable operating conditions.
- Do not exceed or fall below the permissible storage/operating temperatures and pressures.
- Do not disassemble the product without permission.
- Use the correct and appropriate tools in the working condition.

Attention!

Instrument malfunctions can affect the measured values!

The product must be installed correctly and maintained regularly, otherwise it will lead to incorrect measurement data and therefore incorrect measurement results.

- Please contact the relevant technician for any malfunction.

1.2 Storage and transport safety

- Ensure that the product is transported at a temperature of -30 ... +70 °C.
- It is recommended to use the product's original packaging for storage and transport.
- Make sure that the product is stored at a temperature of 0 ... +40 °C.
- Avoid exposure to sunlight and UV rays.
- The storage humidity must be < 70% and free of condensation.

2. Product Overview

2.1 Product Overview

The F231x-V vortex flow meter is based on the Karman vortex principle to measure gas, steam, or liquid volume flow. It is widely used for industrial measurement because of its anti-pollution ability, simplified structure, and high reliability.

Due to the built-in ultra-high sensitivity dual vortex sensor, the flowmeter can simultaneously detect the flow signal and disturbance signal, through the algorithm can automatically identify the flow signal and vibration, electromagnetic disturbance signal.

High Performance DSP. The newly developed DSA (Digital Spectrum Analysis) technology greatly improves the low measuring limit, turndown ratio, anti-vibration, and anti-disturbance performance of flow meters, providing users with high accuracy and long-term stability.

Explosion-proof structure design, applicable to harsh environments:

Explosion-proof class: Ex db IIC T6 Gb / Ex tb IIIC T80°C Db

Protection code: IP67

2.2 Functions and features

- ✓ **Wide measurement range, the low measuring limit can reach 1.5m/s (Actual Flow)**
- ✓ **Suitable for measuring dirty and wet compressed air, oxygen, natural gas and other industrial gases, steam, and etc.**
- ✓ **Utral-sensitive dual vortex sensor, provides a wider range ratio**
- ✓ **The explosion-proof certification: Ex db IIC T6 Gb / Ex tb IIIC T80°C Db Protection code: IP67**
- ✓ **High Performance DSP. Combining with DSA (digital full spectrum analysis technology), the flowmeter can accurately identify flow, vibration, and electromagnetic disturbance signals, greatly improving the anti-vibration ability of the flowmeter**
- ✓ **The fully isolated electrical structure completely filters out on-site interference.**
- ✓ **Integrates pressure and temperature sensors to monitor online gas pressure and temperature**
- ✓ **No moving parts, low pressure drop**
- ✓ **Standard Modbus RTU (RS485) interface, 4 to 20 mA current and pulse output**
- ✓ **Bluetooth function for wireless flowmeter configuration and data transmission**

- ✓ **The capacitive touch 2.0" IPS LCD with an ultra-wide viewing angle, user-friendly and multi-functional HMI**
- ✓ **The fully welded structure has better corrosion and high pressure and temperature resistance**

2.3 Technical Data

Measuring medium	
Measuring medium	Gas / Steam / Liquid
Flow	
Measuring Range (DN65)	1.5 m/s ... 80 m/s (Gas & Steam) 0.15 m/s ... 8 m/s (Liquid)
Accuracy	Class 1.0
Repeatability	±0.2 %RD
Reference Condition	20 °C, 1 bar(a) - ISO 1217 (Configurable)
Pressure	
Measuring Range	0 ... 1.7MPa(a) (6.3MPa Option)
Accuracy	±0.5 %FS
Temperature	
Medium Temperature	-40 ... +160 °C (Standard)
Accuracy	±0.5 °C (±1.0 %FS @ > 100 °C)
Power	
Power	18 ... 30 VDC，10 W @ 24 VDC
Display	
Display	2.0" IPS LCD with capacitive touch
Output	
4~20 mA Output (Standard)	Flow rate / Temperature / Pressure (Configurable)

Frequency Output (Standard)	Actual flow rate
Pulse (Standard)	Consumption / Alarm
Digital Output (Standard)	Modbus RTU (RS485) HART (Option)
Wirless Communication	Bluetooth Wi-SUN (Option) IOT-4G (Option)
Connector	Wiring terminal
Operating Environment	
Environment Temperature	-40 ... +85 °C
Environment Humidity	0 ... 95 %RH
Explosion-proof Class & Protection Code	
Explosion-proof Class	Ex db IIC T6 Gb / Ex tb IIIC T80°C Db
Protection Code	IP67
Other	
Process Connection	Wafer-type / Flange-type
Product Material	Main Body : 304 / 316L Vortex Snesor : 316L Meter Housing : Aluminum / Stainless steel
EMC	Compliant with IEC 61326-1

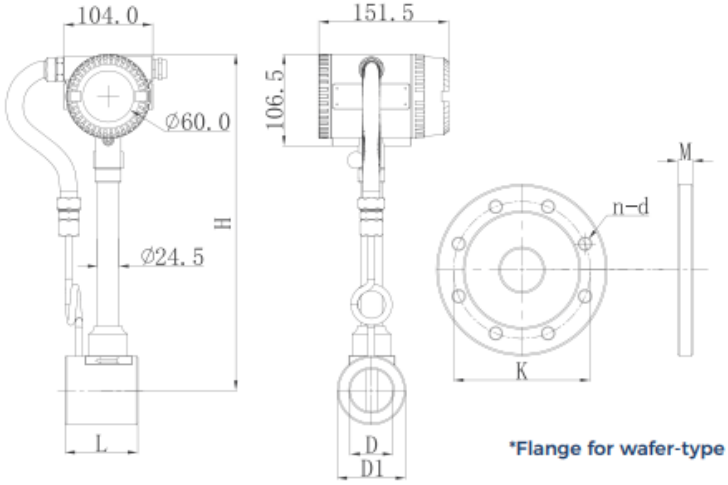
2.4 Measuring Range

Inch	DN	ID (mm)	Flow Velocity (m/s)	Flow Rate (m3/h)
1/2	15	15	5.5 ... 80	3.5 ... 50.9
3/4	20	20	5.0 ... 80	5.7 ... 90.4
1	25	25	4.0 ... 80	7.1 ... 141.3
$1^{1/4}$	32	32	3.0 ... 80	8.7 ... 231.5
$1^{1/2}$	40	40	2.0 ... 80	9.0 ... 361.7
2	50	50	1.5 ... 80	10.6 ... 565.2
$2^{1/2}$	65	65	1.5 ... 80	17.9 ... 955.2
3	80	80	1.5 ... 80	27.1 ... 1446.9
4	100	100	1.5 ... 80	42.4 ... 2260.8
5	125	125	1.5 ... 80	66.2 ... 3532.5
6	150	150	1.5 ... 80	95.4 ... 5086.8
8	200	200	1.5 ... 80	169.6 ... 9043.2
10	250	250	1.5 ... 80	265.1 ... 14130.0
12	300	300	1.5 ... 80	381.7 ... 20347.2

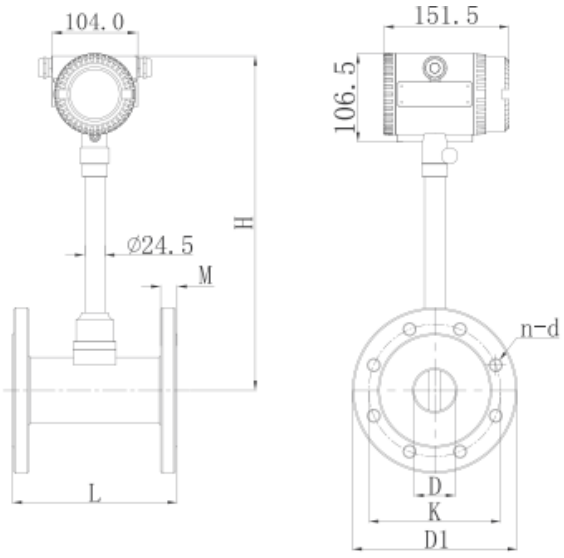
* The above is the gas flow range. Steam, liquid and other medium flow range, please consult the sale staff.

3. Dimension & Installation

3.1 Dimension (in mm)



—— F231A-V dimension schematic ——



—— F231B-V dimension schematic ——

F231A-V (Aluminum housing) detailed dimension of wafer-type

DN	Inch	D Pipe inner diameter (mm)	D1 Pipe outer diameter (mm)	H Pipe center to top of housing (mm)	L Total length (mm)	M Flange thickness (mm)	n Number of flange holes	K Screw hole center distance (mm)	d Screw hole diameter (mm)
32	$1^{1/4}$	32	63	375	100	18	4	100	18
40	$1^{1/2}$	40	78	380	100	18	4	110	18
50	2	50	81	380	100	19	4	125	18
65	$2^{1/2}$	65	97	390	100	20	4	145	18
80	3	80	113	395	100	20	8	160	18
100	4	100	131	405	101	22	8	180	18
125	5	125	158	420	103	22	8	210	18
150	6	150	184	430	103	24	8	240	22
200	8	200	232	455	135	26	12	295	22

250	10	250	282	480	145	28	12	355	26

F231B-V (Aluminum housing) detailed dimension of flange-type

DN	Inch	D Pipe inner diameter (mm)	D1 Pipe outer diameter (mm)	H Pipe center to top of housing (mm)	L Total length (mm)	M Flange thickness (mm)	n Number of flange holes	K Screw hole center distance (mm)	d Screw hole diameter (mm)
32	$1^{1/4}$	32	140	405	200	18	4	100	18
40	$1^{1/2}$	40	150	410	200	18	4	110	18
50	2	50	165	420	200	19	4	125	18
65	$2^{1/2}$	65	185	430	200	20	4	145	18
80	3	80	200	440	200	20	8	160	18
100	4	100	220	450	200	22	8	180	18
125	5	125	250	460	200	22	8	210	18
150	6	150	285	480	200	24	8	240	22
200	8	200	340	505	200	26	12	295	22
250	10	250	405	530	250	28	12	355	26

3.2 Installation

- **Selection of installation location and environment**

1. Try to avoid strong electrical equipment, high-frequency variable frequency devices, and powerful power switch equipment.
2. Try to avoid high-temperature heat sources and radiant heat sources. For outdoor installations, ensure proper sunshade and rain protection.
3. Try to avoid locations with vibrations and highly corrosive environments, while also considering ease of installation and maintenance.

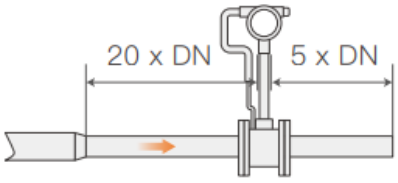
- **Proper and reasonable installation location**

1. Avoid choosing the pipeline with strong vibration as much as possible in the installation location, otherwise vibration-reducing measures must be taken, such as installing vibration-damping joints.
2. The flow meter can be installed horizontally, vertically and inclined, please do not install the flow meter upside down.

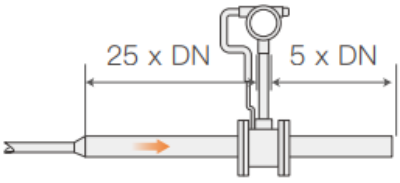
- **Recommended straight section**

For accurate measurement, there must be sufficient straight pipe sections upstream and downstream of the flow meter. There should be no components upstream that affect the fluid flow velocity distribution. Figure 3-1 shows the minimum required lengths of straight pipe sections before and after the flow meter under various pipeline conditions.

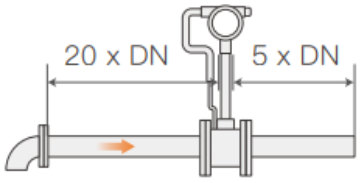
* DN : Pipe inner diameter



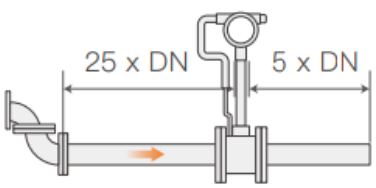
Pipe reduction



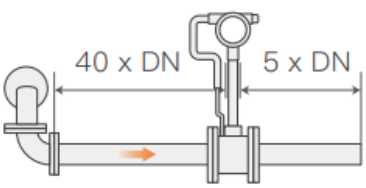
Pipe expansion



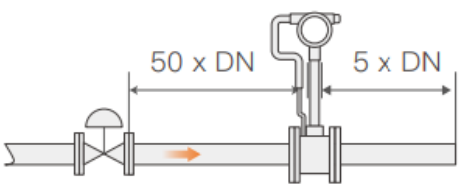
One 90° elbow



Two 90° elbows in one plane



Two 90° elbows in 3D



Control valve / Filter

Figure 3-1 Recommended inlet and outlet straight section

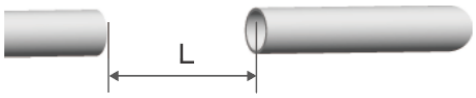
- **Grounding requirements**

When installing the flow meter, the body should be reliably grounded. If the on-site pipeline does not have grounding conditions, a separate reliable grounding wire should be connected to the grounding terminal of the instrument's outer shell.

- **Installation methods and welding of the flow meter**

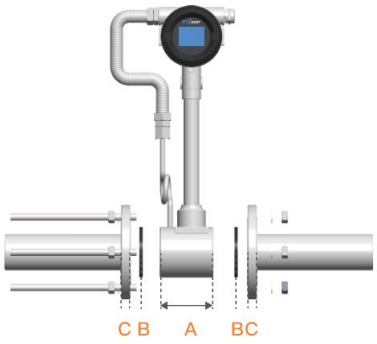
(1) F231A-V Wafer-Style

Note: Please use the supporting pipe flange of the product



Step 01

Before installation, please confirm that the pipe reservation length L is consistent with the flow meter installation specifications.



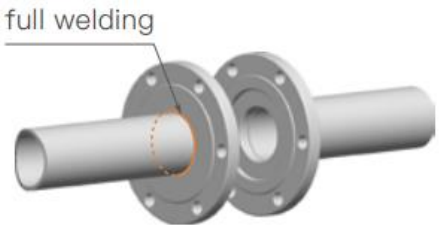
Pipe reservation length **L= A+2B+2C**

A: Product Length B: Gaskets Thickness

C: Flange Thickness

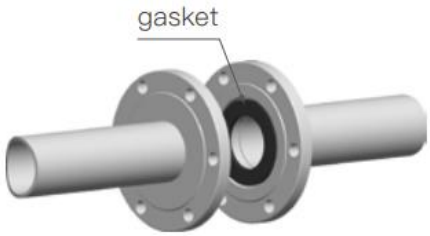
Step 02

Place the gaskets in the flange groove respectively, clamp the vortex flowmeter, and fix the flowmeter with bolts. Spot weld the flange at the cutout to make sure the flange is firmly installed.



Step 03

Remove flow meter and gasket, full welding Flange.



Step 04

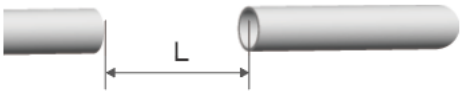
After the weld has cooled, insert a gasket on each side of the flange, noting that the gasket must be centered and not extend out of the pipe's inner wall.

Step 05

Installed into the flow meter (note the direction of the logo on the flowmeter, and the flowmeter body and the pipe must be aligned). Use bolts to fix the flowmeter. Installation complete.

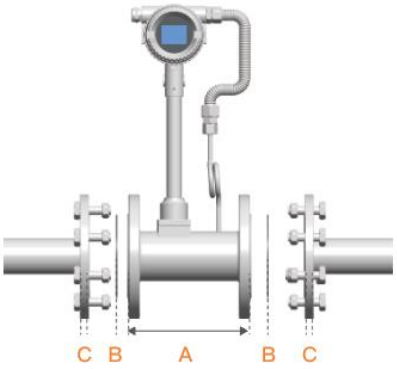
(2) F231B-V Flange-Style

Note: Flange-Style requires gaskets and pipe flanges supplied by the customer



Step 01

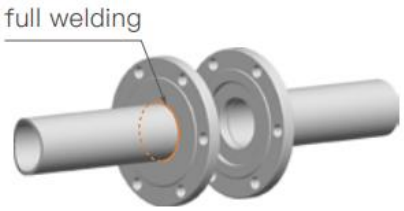
Before installation, please confirm that the pipe reservation length L is consistent with the flow meter installation specifications



Pipe reservation length **L= A+2B+2C**

A: Product Length B: Gaskets Thickness

C: Flange Thickness

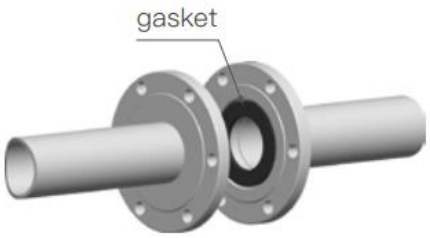


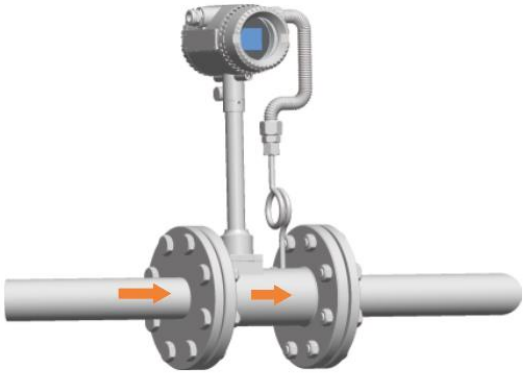
Step 02

Place the gaskets in the flange groove respectively, clamp the vortex flowmeter, and fix the flowmeter with bolts. Spot weld the flange at the cutout to make sure the flange is firmly installed.

Step 03

Remove flow meter and gasket, full welding Flange.





Step 04

After the weld has cooled, insert a gasket on each side of the flange, noting that the gasket must be centered and not extend out of the pipe's inner wall.

Step 05

Installed into the flow meter (note the direction of the logo on the flowmeter, and the flowmeter body and the pipe must be aligned). Use bolts to fix the flowmeter. Installation complete.

3.3 Electrical Connection

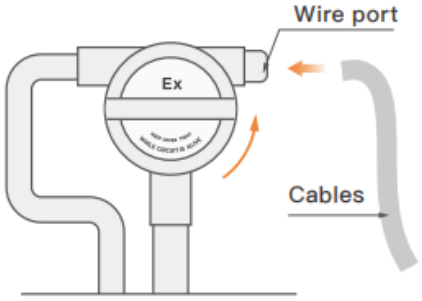


Figure 3-2 Schematic of Wire port

Unscrew the back cover anticlockwise to view the terminal block.

* The display direction can be rotated, please do not determine the front and back by the direction of the metal threaded pipe (the side with the LCD display is the front side).

Notice : If the installation scene requires rotation of display direction, please contact FixInst service team

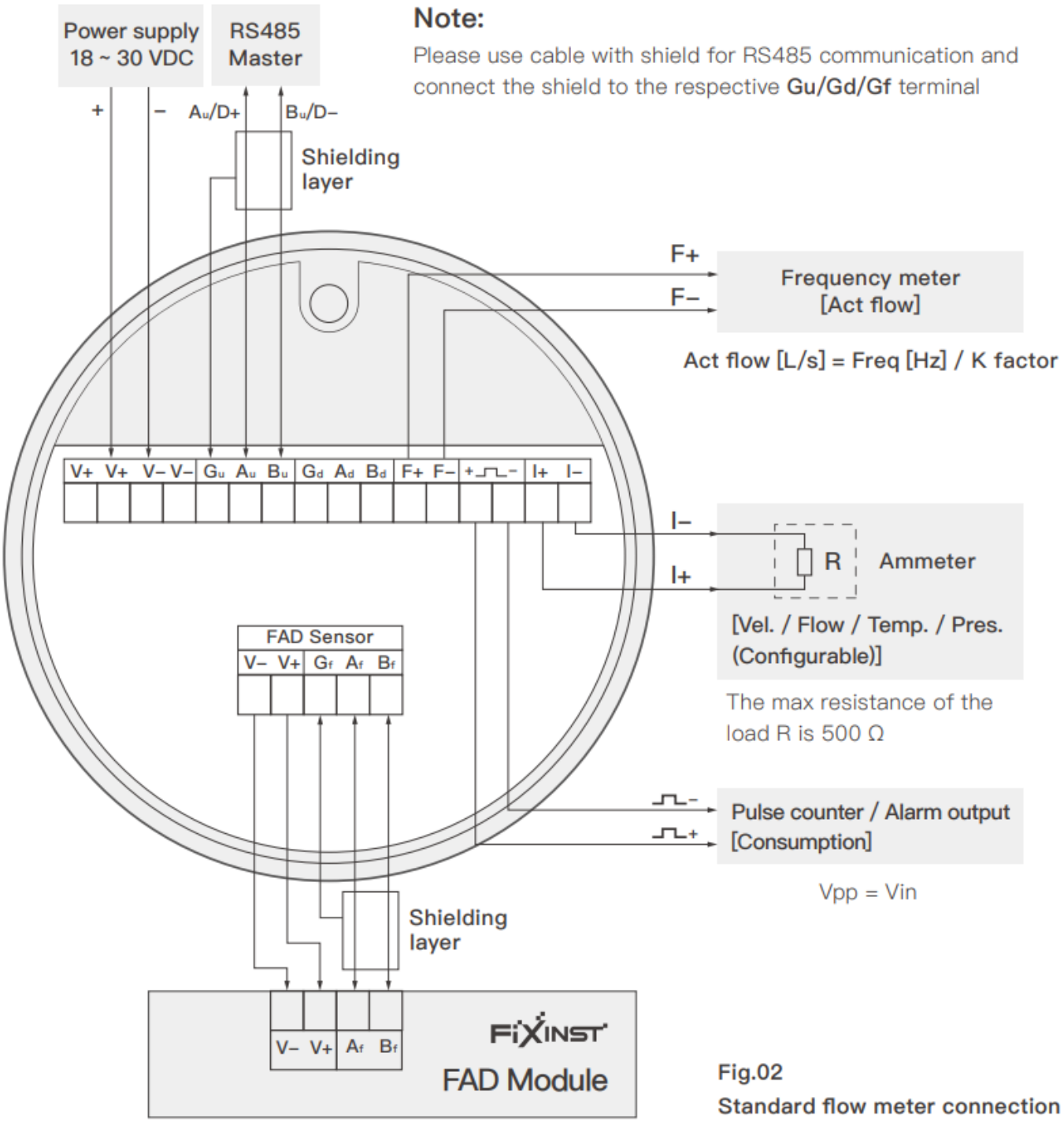


Fig.02
Standard flow meter connection

Figure 3-3 Standard flow meter connection

4. Setting

When the meter is powered on, it starts to operate automatically based on the memorized settings.

- Start-up screen

Figure 4-1 F231x-V Power-on Interface

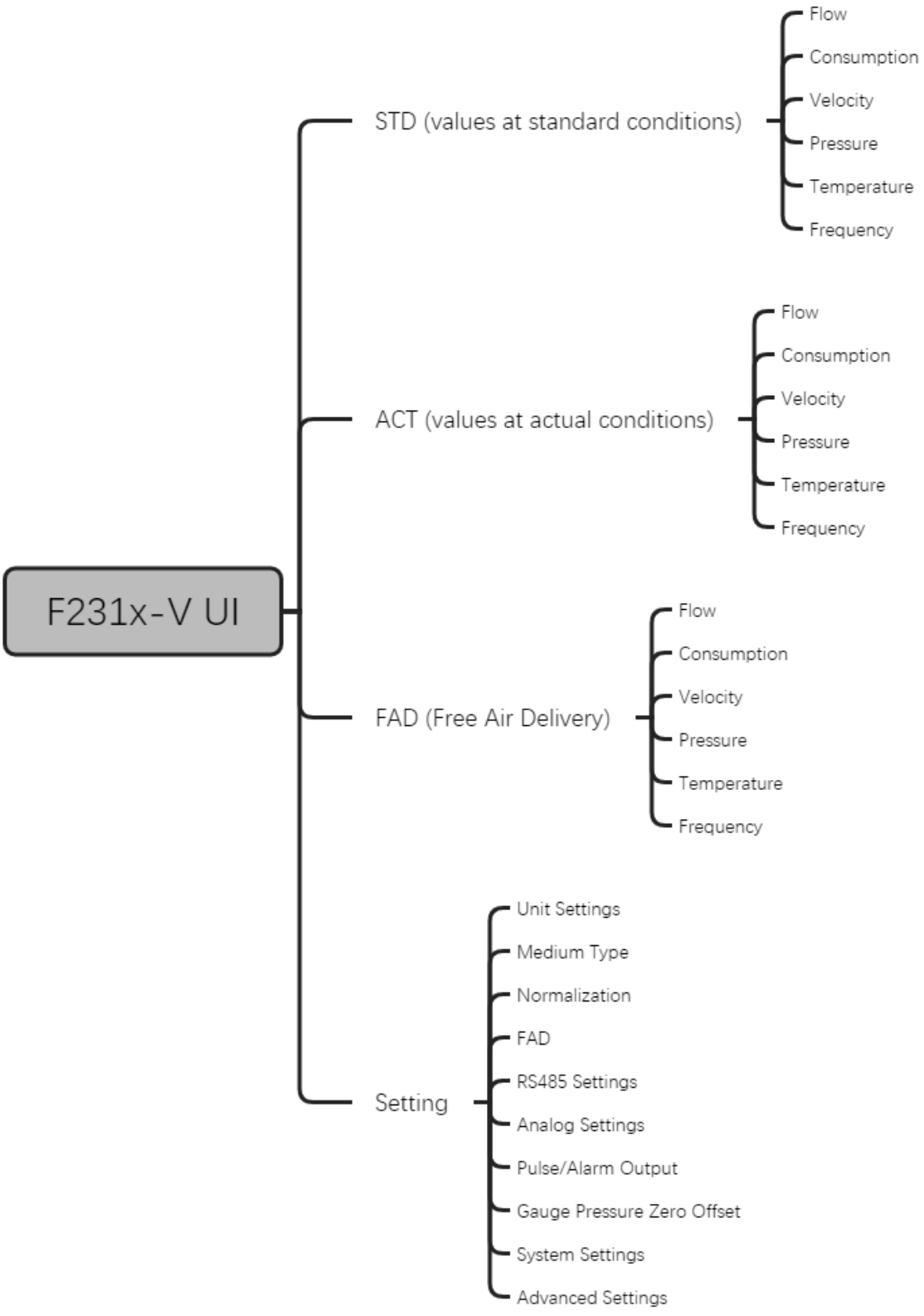
- Display interface

The default page of the display interface shows the flow values at standard conditions, which are standard instantaneous flow, standard consumption, standard instantaneous velocity, pressure, temperature and vortex frequency. By sliding the touch screen to the right, you can switch to show the flow values at actual conditions, which are actual instantaneous flow, actual instantaneous velocity and actual consumption.

Figure 4-2 F231x-V Main Interaction Interface

FixInst vortex flowmeter uses IPS touch screen and WYSIWYG (what you see is what you get) operation mode, which is simple and easy to understand. During operation, you can click the setting button at any time to enter the setting interface, and the setting data will take effect immediately. After the setting is completed, you can click the Home button in the upper right corner of the screen to return to the display interface, or wait for it to return automatically.

- Setting menu



5. Signal Output

- Digital output

F231x-V Vortex Flow Meter supports Modbus RTU (RS485) communication, see Chapter 6 for protocol details.

- Analog output

F231x-V Vortex Flow Meter comes with a 4~20 mA output corresponding to standard instantaneous flow. 4 mA corresponds to 0 Nm^3/h, 20 mA corresponds to the maximum flow of the model. Please refer to the CALIBRATION CERTIFICATE which comes along with the flow meter.

Other output channel (standard instantaneous velocity, temperature, pressure and etc.) can be selected via meter display, or Service Kit, or RS485. The upper and lower limit of the channel could be modified as well.

- Pulse output

F231x-V Vortex Flow Meter outputs a pulse signal equal to the amplitude of the input voltage for every unit of consumption (1 m^3 or 10 m^3 configurable, standard condition or actual condition selectable). The pulse width is dependent on the flow, minimum width is 10 ms.

- Frequency output

F231x-V Vortex Flow Meter can output the current vortex frequency signal, and the signal amplitude is equal to the input voltage amplitude. This signal can be used to calculate the instantaneous flow. The calculation formula is as follows:

$$\text{Instantaneous actual flow } (\text{L}/s) = \frac{\text{Vortex frequency (Hz)}}{\text{Instrument factor K}}$$

6. Communication Protocols

6.1 Communication parameters

The factory setting parameters are as follows.
Address: 1
Baud rate: 9600
Data length: 8, Parity bit: None, Stop bit: 1
Response timeout: 1 second
Response delay: 0 ms
Frame interval: 7 characters

6.2 Storage Register Definitions

Logical Channels, Data and Holding Registers

- Holding register data can be read with Modbus instruction 0x03
- Available Modbus Instruction 0x06 Write Single Holding Register, 0x10 Sequential Write Multiple Holding Registers
- Available Modbus Instruction 0x05 Write Coil Registers

6.3 Process Data Format

- Supports two data types: IEEE 754 floating point and unsigned integer.

floating point format

Number (with decimals)	IEEE 754 Floating Point	Register N		Register N + 1	
		High	Low	High	Low
123.4	0x42F6CCCD	0xCC	0xCD	0x42	0xF6

unsigned integer

Number (decimal system)	IEEE 754 Floating Point	Register N		Register N + 1	
		High	Low	High	Low
123456789	0x075BCD15	0xCD	0x15	0x07	0x5B

6.4 Byte order

- The format of the data is little-endian, with the least significant bit transmitted first.

32 bit: CD AB

64 bit: GH EF CD AB

6.5 Holding register: process data address table

Register Address	Data Type	Byte Length	Data	Unit	Read/Write	Applicable Flow Meter Model
0	FLOAT_L	4	nominal flow rate		R	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
2	FLOAT_L	4	nominal flow rate		R	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
4	DOUBLE_L	8	Cumulative nominal flow rate		R W: Write "0" to clear value	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
8	FLOAT_L	4	temperature		R	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
10	FLOAT_L	4	gauge pressure		R	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
12	FLOAT_L	4	working flow rate		R	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
14	FLOAT_L	4	working flow rate		R	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
16	DOUBLE_L	8	Cumulative working Flow rate		R W: Write "0" to clear value	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
20	FLOAT_L	4	Medium Density		R	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
22	UNSIGNED LONG	4	Cumulative nominal flow (4 bytes)		R W: Write "0" to clear value	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter

Register Address	Data Type	Byte Length	Data	Unit	Read/Write	Applicable Flow Meter Model
24	UNSIGNED LONG	4	Cumulative Conditional Flow Rate (4-Bit Byte)		R W: Write "0" to clear value	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
26	UNSIGNED INT	2	Gas Medium Types		R/W: 0: Air (defaul) 1: O_2 2: N_2 3: H_2 4: CO 5: CO_2 6: SF_6 7: Ar 8: He 9: N_2O 10: CH_4 11: C_2H_6 12: C_3H_8 13: C_4H_{10}	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
27	UNSIGNED INT	2	Flow Unit		R/W: 0: m^3/h (Nm^3/h) 1: m^3/min (Nm^3/min) (default) 2: m^3/s (Nm^3/s) 3: l/min (Nl/min) 4: l/s (Nl/s) 5: cfm (Ncfm) 6: kg/h 7: kg/min 8: kg/s	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter

Register Address	Data Type	Byte Length	Data	Unit	Read/Write	Applicable Flow Meter Model
28	UNSIGNED INT	2	Flow Rate Unit		R/W: 0: m/s (Nm/s)(default) 1: ft/s(Nft/s)	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
29	UNSIGNED INT	2	Cumulative Flow Units		R/W: 0: m^3 (Nm^3) (default) 1: ft^3 (Nft^3) 2: kg	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
30	UNSIGNED INT	2	Temperature Unit		R/W: 0: ℃ (default) 1: ℉	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
31	UNSIGNED INT	2	Pressure Unit		R/W: 0: Pa 1: hPa 2: kPa (default) 3: MPa 4: mbar 5: bar 6: psi	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
32	FLOAT_L	4	Pipe Inner Diameter	mm	R/W	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
34	FLOAT_L	4	Standard Temperature	℃	R/W: Default value 20 °C	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
36	FLOAT_L	4	Standard Pressure	kPa	R/W: Default value 100 kPa	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter

Register Address	Data Type	Byte Length	Data	Unit	Read/Write	Applicable Flow Meter Model
38	UNSIGNED INT	2	Filter Level		R/W: (Default value 5) F20x / F21x / F22x:1~255, F23X-V: 1 ~ 32	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
39	FLOAT_L	4	① Flow Factor		R/W: The flow factor cannot be set to a value less than 0. The default value 1.	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
41	FLOAT_L	4	Current atmospheric pressure	kPa	R/W: Default value 101.325 kPa For correction of gauge pressure	F20x Pitot Tube Flow Meter F231x-V Vortex Flow Meter
43	UNSIGNED INT	2	Automatic drainage		R/W: 0: close 1: turn on (default)	F20x Pitot Tube Flow Meter
56	DOUBLE_L	8	Reverse cumulative nominal flow		R W: Write "0" to clear the accumulated flow	F20x Pitot Tube Flow Meter
60	DOUBLE_L	8	Reverse cumulative condition flow		R W: Write "0" to clear the accumulated flow	F20x Pitot Tube Flow Meter
64	UNSIGNED LONG	4	Reverse Cumulative nominal Flow (4-byte data type)		R W: Write "0" to clear the accumulated flow	F20x Pitot Tube Flow Meter

Register Address	Data Type	Byte Length	Data	Unit	Read/Write	Applicable Flow Meter Model
66	UNSIGNED LONG	4	Reverse Cumulative condition Flow (4-byte data type)		R W: Write "0" to clear the accumulated flow	F20x Pitot Tube Flow Meter
70	FLOAT_L	4	Cutoff Flow Rate	m/s Nm/s	R/W: (Default value 0) The cut-off flow rate cannot be set to a negative value F23x-V: working flow rate F20x / F21x / F22x: nominal flow rate	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
72	FLOAT_L	4	② Vortex Instrumentation Coefficients	P/L	R/W	F231x-V Vortex Flow Meter
74	FLOAT_L	4	② Vortex Frequency	Hz	R	F231x-V Vortex Flow Meter
101	UNSIGNED INT	2	software version		R	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
102	UNSIGNED INT	2	hardware version		R	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter
103	DOUBLE_L	8	Product Serial Number		R	F20x Pitot Tube Flow Meter F21x / F22x Thermal Mass Flow Meter F231x-V Vortex Flow Meter

Note：

① **Flow factors** are used to correct the flow indication：

$$\text{Flow value} = \text{Flow measurement} \times \text{Flow factor}$$

e.g.: $\text{Flow measurement} = 50\ Nm^3/min$

$\text{Flow factor} = 0.8$

SO $\text{Flow value} = 50 \times 0.8 = 40\ Nm^3/min$

② Vortex Frequency Output/Meter Factor = Operating Flow Rate (L/s)

An example write command is as follows：

Floating point number v=123.4 its corresponding hex 0x42F6 CCCD. write this value to device address 1, holding register address 36 (pressure single point calibration offset)

Send Modbus commands：01 10 0024 0002 04 CCCD 42F6 EE0D

01: Device Address

10: Function code 16 in hexadecimal

0024: Keep register address 36 in hexadecimal

0002: Number of holding registers to be written

04: Number of holding register bytes (0x42F6 CCCD total 4 bytes)

CCCD: Floating point low 16 bits

42F6: Floating point high 16 bits

EE0D: CRC

Device Response：01 10 0024 0002 01C3

01: device address

10: Function code 16 in hexadecimal

0024: Keep register address 36 in hexadecimal

0002: Number of holding registers already written

01C3: CRC

6.6 Holding register: Address table for communication settings

Register Address	Data Type	Byte Length	Unit	Details	Default	Read/Write
50	UNSIGNED INT	2		Device Restart (write 1 to restart the device)		Write
51	UNSIGNED INT	2		device address（1…247）	1	Read/Write
52	UNSIGNED INT	2	bps	baud： 12 = 1200 bits/s 24 = 2400 bits/s 48 = 4800 bits/s 96 = 9600 bits/s 144 = 14400 bits/s 192 = 19200 bits/s 384 = 38400 bits/s 560 = 56000 bits/s 576 = 57600 bits/s 1152 = 115200 bits/s	96	Read/Write
53	UNSIGNED INT	2		parity bit 0 = none 1 = Odd Checksum 2 = Even checksum	0	Read/Write
54	UNSIGNED INT	2		stop bit 1：1 bit 2：2 bit	1	Read/Write
55	UNSIGNED INT	2	ms	Response timeout： 0…255 ms 1 ms/step Range of values：0…255	0	Read/Write

Note:
These settings only take effect when a 1 is written to register 50, and then the Modbus master has to change its own communication settings to communicate with the slave.

6.7 Coil Register Address Table

Coil Address	Data Type	Byte Length	Unit	Details	Default	Read/Write
0	UNSIGNED INT	2		Restart Modbus communication Write: 0x0000 = no effect 0xff00 = Restart Read: always 0	0	Read/Write

7. Warranty Terms

Dear Customer：

Thank you for choosing FixInst products. We have always been committed to providing our customers with high-quality, high-performance instrumentation products to meet your needs in a variety of application scenarios.

In order to ensure your satisfaction after purchasing the product, please read the following after-sales terms and conditions carefully, so that you can correctly and efficiently apply for the warranty service when needed.

7.1 Warranty Period

12 months from product shipment.

7.2 Warranty Coverage

1、Warranty period due to the product's own problems caused by performance failures, confirmed by the seller's test, will provide free maintenance services; human misuse or due to the site of the product working conditions and the product type does not match the damage caused by the exceptions.

The following are not covered by warranty：

① Product damage caused by force majeure factors (such as natural disasters, etc.).

② Products due to natural wear and tear, rough handling caused by the appearance of damage, scratches or wear (such as impact caused by the loss of paint, surface bumps, etc.).

③ Damage caused by disassembling the product without the Company's consent or unauthorized changes in the use of the product.

④ Damage to the product caused by repair or modification not authorized by the company.

⑤ Damage caused by improper use of the product by the user or operation in violation of the instructions.

⑥ Products purchased from unauthorized sources.

2、For non-warranty or non-warranty product failure, we will provide paid repair services, the specific cost depends on the actual situation.

7.3 Warranty Certificate

Users are required to provide valid proof of purchase (e.g., invoice, receipt, etc.) and product serial number when applying for warranty service.

7.4 Warranty Channels

Users can apply for after-sales warranty service by filling out our after-sales treasure system or contacting customer service personnel.

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