

**0.1** Nm/s

Low measurement limit  
1:2500 Turndown ratio



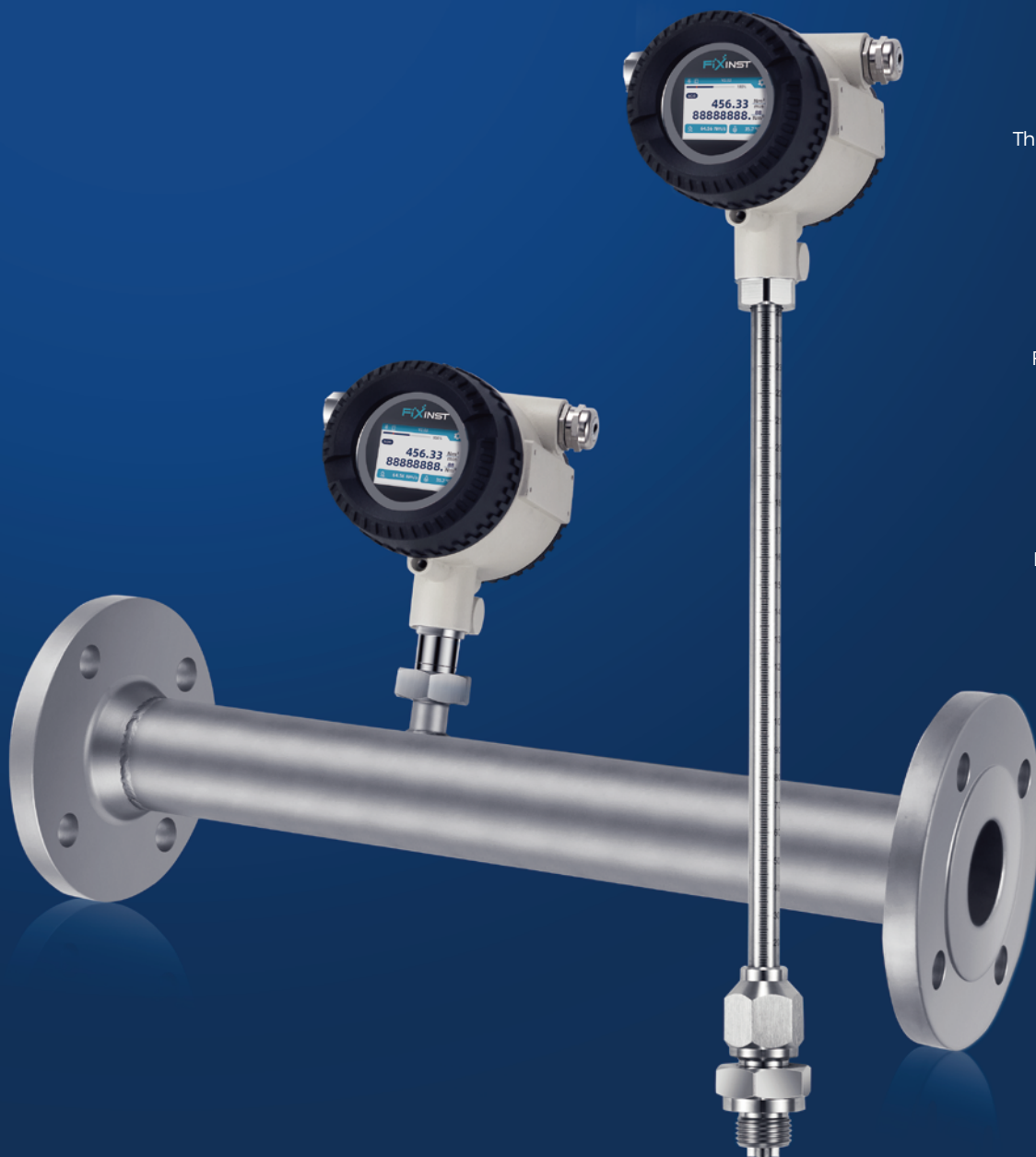
The Explosion-proof Certification  
applicable to various harsh  
working conditions



Full-digital Signal Processing  
Eliminates zero point drift



Intelligent diagnosis prevent  
the sensor from being  
polluted and damaged



# F211x-Ex & F212x-Ex Series Thermal Mass Flow Meter

Explosion-proof Thermal Mass Flow Meter



# THERMAL MASS FLOW METER

## Product Overview

F211x-Ex & F212x-Ex flow meter is based on thermal measurement technology. It can measure the standard flow, mass flow, consumption, and gas temperature directly.

Explosion-proof structure design, having certificate issued by the state:  
**Explosion-proof class:** Ex db IIC T6 Gb / Ex tb IIIC T80°C Db **Protection code:** IP67

No moving parts, stable signal, vibration proof, high reliability, long-term measuring accuracy

Full-digital signal processing is used instead of the conventional analog bridge design, resulting in a wider range and more accurate measurement.

The low measuring limit can reach 0.1Nm/s, and the turndown ratio can reach 1:2500. It has a wider measuring range than common flow meters on the market, making it suitable for measuring extremely volatile flow, low-flow bypass, and the gas consumption of single equipment.

With the innovative, intelligent diagnosis technology, it can sense the sensor pollution online and protect the sensor from overheating

## Product Advantages

0.1  
Nm/s

### Low Measuring Lower Limit

The low measuring limit can reach 0.1 Nm/s



### Full-digital Signal Processing

Eliminates zero point drift and provides highly accurate measurements



### The Explosion-proof Certification

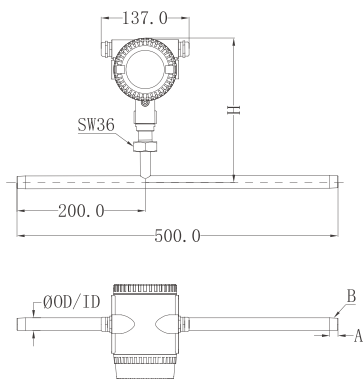
Ex db IIC T6 Gb  
Ex tb IIIC T80°C Db



### Protection Code IP67

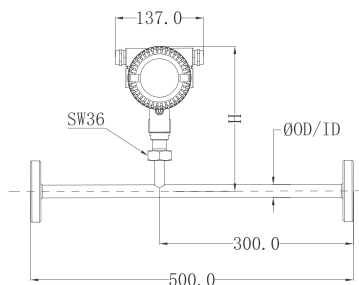
- Full-digital signal processing, higher accuracy, long-term stability
- Based on the thermal flow measurement principle, it's not required to compensate gas pressure and temperature, integrated temperature measurement
- With an ultra-wide 1:2500 turndown ratio, the measuring range is from 0.1 Nm/s to 250 Nm/s
- Explosion-proof class: Ex db IIC T6 Gb / Ex tb IIIC T80°C Db Protection code: IP67
- The capacitive touch 2.0" IPS LCD with an ultra-wide view
- Bluetooth function for wireless flowmeter configuration and data transmission
- Standard Modbus RTU (RS485) interface, 4 to 20 mA current and pulse output
- **Insert type F211x-Ex:** Suitable for pipes with diameters from DN20 to DN1000, and can be installed under pressure via a 1/2" ball valve.
- **Pipe type F212x-Ex:**  
Pipe size: DN15, DN20, DN32, DN40, DN50, DN65, DN80  
The process for connection: R-type thread, Flange EN1092-1, ANSI / B16.5

# Product Dimensions



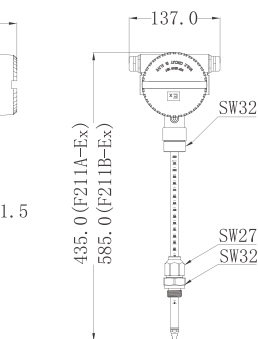
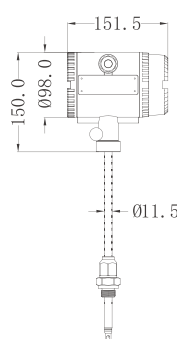
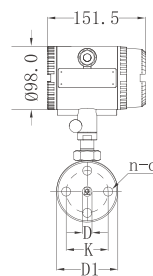
**F212x-Ex**

Thread-type dimension schematic



**F212x-Ex**

Flange-type dimension schematic



**F211x-Ex**

Dimension diagram

## F212x-Ex Detailed dimension of thread-type

| DN | Inch  | A<br>Thread length<br>(mm) | B<br>Male thread<br>(mm) | H<br>Pipe center to<br>top of housing<br>(mm) |
|----|-------|----------------------------|--------------------------|-----------------------------------------------|
| 15 | 1/2   | ≥13.2                      | R1/2"                    | 226                                           |
| 20 | 3/4   | ≥14.5                      | R3/4"                    | 225                                           |
| 25 | 1     | ≥16.8                      | R1"                      | 224                                           |
| 32 | 1 1/4 | ≥19.1                      | R1 1/4"                  | 226                                           |
| 40 | 1 1/2 | ≥19.1                      | R1 1/2"                  | 226                                           |
| 50 | 2     | ≥23.4                      | R2"                      | 226                                           |

## F212x-Ex Detailed dimension of flange-type

| DN | (Inch) | D<br>Pipe inner<br>diameter<br>(mm) | D1<br>Flange<br>outer diameter<br>(mm) | K<br>Screw hole<br>center distance<br>(mm) | H<br>Pipe center to<br>top of housing<br>(mm) | n<br>Number of<br>flange holes | d<br>Screw hole<br>diameter<br>(mm) |
|----|--------|-------------------------------------|----------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|-------------------------------------|
| 15 | 1/2    | 15                                  | 95                                     | 65                                         | 226                                           | 4                              | 14                                  |
| 20 | 3/4    | 20                                  | 105                                    | 75                                         | 225                                           | 4                              | 14                                  |
| 25 | 1      | 25                                  | 115                                    | 85                                         | 224                                           | 4                              | 14                                  |
| 32 | 1 1/4  | 32                                  | 140                                    | 100                                        | 226                                           | 4                              | 18                                  |
| 40 | 1 1/2  | 40                                  | 150                                    | 110                                        | 226                                           | 4                              | 18                                  |
| 50 | 2      | 50                                  | 165                                    | 125                                        | 226                                           | 4                              | 18                                  |

# Measuring Range

## F211x-Ex Measuring Range

| (Inch) | DN  | ID (mm) | Min Flow (Nm <sup>3</sup> /h) | Max Flow -Std (Nm <sup>3</sup> /h) | Max Flow -High (Nm <sup>3</sup> /h) |
|--------|-----|---------|-------------------------------|------------------------------------|-------------------------------------|
| 3/4    | 20  | 20      | 0.1                           | 135                                | 282                                 |
| 1      | 25  | 25      | 0.2                           | 212                                | 441                                 |
| 1 1/4  | 32  | 32      | 0.3                           | 347                                | 723                                 |
| 1 1/2  | 40  | 40      | 0.5                           | 542                                | 1131                                |
| 2      | 50  | 50      | 0.7                           | 848                                | 1767                                |
| 2 1/2  | 65  | 65      | 1.2                           | 1433                               | 2986                                |
| 3      | 80  | 80      | 1.8                           | 2171                               | 4523                                |
| 4      | 100 | 100     | 2.8                           | 3392                               | 7068                                |
| 5      | 125 | 125     | 4.4                           | 5301                               | 11044                               |
| 6      | 150 | 150     | 6.4                           | 7634                               | 15904                               |
| 8      | 200 | 200     | 11.3                          | 13571                              | 28274                               |
| 10     | 250 | 250     | 17.7                          | 21205                              | 44178                               |
| 12     | 300 | 300     | 25.4                          | 30536                              | 63617                               |

\* For more pipe sizes and flow ranges, please consult sales

## F212x-Ex Measuring Range

| (Inch) | DN | ID (mm) | Min Flow (Nm <sup>3</sup> /h) | Max Flow (Nm <sup>3</sup> /h) |
|--------|----|---------|-------------------------------|-------------------------------|
| 1/2    | 15 | 15      | 0.06                          | 76                            |
| 3/4    | 20 | 20      | 0.1                           | 135                           |
| 1      | 25 | 25      | 0.2                           | 212                           |
| 1 1/4  | 32 | 32      | 0.3                           | 347                           |
| 1 1/2  | 40 | 40      | 0.5                           | 542                           |
| 2      | 50 | 50      | 0.7                           | 848                           |
| 2 1/2  | 65 | 65      | 1.2                           | 1433                          |
| 3      | 80 | 80      | 1.8                           | 2171                          |

\* For more pipe sizes and flow ranges, please consult sales

# Technical Data

| Flow                      |                                                                                 |
|---------------------------|---------------------------------------------------------------------------------|
| Measuring Range           | 0(0.1) ... 250 Nm/s                                                             |
| Accuracy                  | ±(1.5% RD + 0.3% FS) [1% RD Option]                                             |
| Sampling Rate             | > 20 Samples/sec                                                                |
| Medium                    | Compressed air, nitrogen, oxygen, carbon dioxide and other non-condensing gases |
| Reference Condition       | 20 °C, 1 bar(a) -ISO 1217 (Configurable)                                        |
| Output                    |                                                                                 |
| 4~20 mA Output (Standard) | Flow rate/Temperature (Configurable)                                            |
| Pulse Output (Standard)   | Consumption/Alarm                                                               |
| Digital Output (Standard) | Modbus RTU (RS485)                                                              |
| Wireless Communication    | Bluetooth (Standard)<br>Wi-SUN / IOT-4G (Option, choose one of two)             |
| Connector                 | Wiring Terminal                                                                 |
| Power                     |                                                                                 |
| Power                     | 18 ... 30VDC 5W @ 24VDC                                                         |

| Display                                 |                                                                                      |
|-----------------------------------------|--------------------------------------------------------------------------------------|
| Display                                 | 2.0" IPS LCD with capacitive touch                                                   |
| Operating Environment                   |                                                                                      |
| Environment Temperature                 | -30 ... +60 °C                                                                       |
| Medium Temperature                      | -40 ... +80 °C                                                                       |
| Operating Pressure                      | F211x-Ex: 0 ... 1.7 MPa(a)<br>F212x-Ex: 0 ... 1.7 MPa(a)<br>(4.0 / 6.3 MPa.a Option) |
| 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                      | G1/2" (ISO 228-1) (F211x-Ex Insert type)                                             |
| EMC                                     | Compliant with IEC 61326-1                                                           |
| Pole / Pipe Section Material            | SUS304 (Standard)<br>SUS316 (Option)                                                 |

# Order Information

| Model    | Process Conn. | Digital Output | Analog Output | Wireless Comm. | Flow range | Gas type | Accuracy | Monitor     | Description                                                                                                       |
|----------|---------------|----------------|---------------|----------------|------------|----------|----------|-------------|-------------------------------------------------------------------------------------------------------------------|
| F211A-Ex |               |                |               |                |            |          |          |             | Explosion-proof Thermal Mass FlowMeter, Insert type, 250 mm pole length (Suitable for pipe diameter up to DN250)  |
| F211B-Ex |               |                |               |                |            |          |          |             | Explosion-proof Thermal Mass FlowMeter, Insert type, 400 mm pole length (Suitable for pipe diameter up to DN600)  |
| F211C-Ex |               |                |               |                |            |          |          |             | Explosion-proof Thermal Mass FlowMeter, Insert type, 600 mm pole length (Suitable for pipe diameter up to DN1000) |
|          | 1             |                |               |                |            |          |          |             | ISO G1/2" Screw                                                                                                   |
|          |               | 1              |               |                |            |          |          |             | Modbus RTU (RS485)                                                                                                |
|          |               |                | 1             |                |            |          |          |             | 4 ... 20 mA + Pulse Output                                                                                        |
|          |               |                |               | V0013 0001     |            |          |          |             | None (Default)                                                                                                    |
|          |               |                |               | S1701 0010     |            |          |          |             | IOT-4G Module                                                                                                     |
|          |               |                |               | S1701 0023     |            |          |          |             | Built-in Wi-SUN Sub-module, 470 frequency band, mainly suitable for China                                         |
|          |               |                |               | S1701 0024     |            |          |          |             | Built-in Wi-SUN Sub-module, 915 frequency band, mainly suitable for Asia, America and Australia                   |
|          |               |                |               | S1701 0025     |            |          |          |             | Built- in Wi-SUN Sub-module, 868 frequency band, mainly suitable for Europe and the Middle East                   |
|          |               |                |               | V0205 0002     |            |          |          |             | Standard Range (0~120 Nm/s)                                                                                       |
|          |               |                |               | V0205 0003     |            |          |          |             | Extended Range (0~250 Nm/s)                                                                                       |
|          |               |                |               | V0202 0001     |            |          |          |             | Air                                                                                                               |
|          |               |                |               | V0202 0002     |            |          |          |             | Oxygen (O <sub>2</sub> )                                                                                          |
|          |               |                |               | V0202 0003     |            |          |          |             | Nitrogen (N <sub>2</sub> )                                                                                        |
|          |               |                |               | V0202 0004     |            |          |          |             | Hydrogen (H <sub>2</sub> ), Real Gas Calibration                                                                  |
|          |               |                |               | V0202 0005     |            |          |          |             | Nitroous Oxide (N <sub>2</sub> O)                                                                                 |
|          |               |                |               | V0202 0006     |            |          |          |             | Carbon Dioxide (CO <sub>2</sub> )                                                                                 |
|          |               |                |               | V0202 0007     |            |          |          |             | Natural Gas (NG)                                                                                                  |
|          |               |                |               | V0202 0008     |            |          |          |             | Argon (Ar)                                                                                                        |
|          |               |                |               | V0202 0009     |            |          |          |             | Helium (He), Real Gas Calibration                                                                                 |
|          |               |                |               | V0202 0010     |            |          |          |             | Other Specified Gases (Specify Gas or Gas Mix)                                                                    |
|          |               |                |               | V0204 0001     |            |          |          |             | Standard Accuracy Calibration<br>±(1.5% RD + 0.3% FS)                                                             |
|          |               |                |               | V0204 0002     |            |          |          |             | High Accuracy Calibration<br>±(1% RD + 0.3% FS)                                                                   |
|          |               |                |               |                |            |          |          | S0105 0003  | Integrated display. The capacitive touch 2.0" IPS LCD with an ultra-wide view                                     |
|          |               |                |               |                |            |          |          | S0105 0003A | Split display. The capacitive touch 2.0" IPS LCD with an ultra-wide view                                          |

\* For more pole length, please consult sales

\* Portable protective case is available as an option. Please consult sales staff for details

\* Built-in 4G or Wi-SUN module, not compatible with explosion-proof function

\* There are difference in regulations and standards between countuntries and regions. Please select according to the local Wi-SUN frequency band

# Order Information

| Model    | Digital Output | Analog output | Wireless Comm. | Process Connection | Gas type | Accuracy | Monitor     | Description                                                                                     |
|----------|----------------|---------------|----------------|--------------------|----------|----------|-------------|-------------------------------------------------------------------------------------------------|
| F212A-Ex |                |               |                |                    |          |          |             | Explosion-proof Thermal Mass Flow Meter, Inline type, Max pressure: 1.7 MPa(a)                  |
| F212B-Ex |                |               |                |                    |          |          |             | Explosion-proof Thermal Mass Flow Meter, Inline type, Max pressure: 4.0 MPa(a)                  |
| F212C-Ex |                |               |                |                    |          |          |             | Explosion-proof Thermal Mass Flow Meter, Inline type, Max pressure: 6.3 MPa(a)                  |
|          | 1              |               |                |                    |          |          |             | Modbus RTU (RS485)                                                                              |
|          |                | 1             |                |                    |          |          |             | 4 ... 20 mA + Pulse output                                                                      |
|          |                |               | V0013 0001     |                    |          |          |             | None (Default)                                                                                  |
|          |                |               | S1701 0010     |                    |          |          |             | IOT-4G Module                                                                                   |
|          |                |               | S1701 0023     |                    |          |          |             | Built-in Wi-SUN Sub-module, 470 frequency band, mainly applicable to China                      |
|          |                |               | S1701 0024     |                    |          |          |             | Built-in Wi-SUN Sub-module, 915 frequency band, mainly suitable for Asia, America and Australia |
|          |                |               | S1701 0025     |                    |          |          |             | Built- in Wi-SUN Sub-module, 868 frequency band, mainly suitable for Europe and the Middle East |
|          |                |               |                | V0207 0001         |          |          |             | R thread (ISO-7-1), DN15, 1/2"                                                                  |
|          |                |               |                | V0207 0002         |          |          |             | R thread (ISO-7-1) , DN20, 3/4"                                                                 |
|          |                |               |                | V0207 0003         |          |          |             | R thread (ISO-7-1), DN25, 1"                                                                    |
|          |                |               |                | V0207 0004         |          |          |             | R thread (ISO-7-1), DN32, 1.25"                                                                 |
|          |                |               |                | V0207 0005         |          |          |             | R thread (ISO-7-1), DN40, 1.5"                                                                  |
|          |                |               |                | V0207 0006         |          |          |             | R thread (ISO-7-1), DN50, 2"                                                                    |
|          |                |               |                | V0207 0023         |          |          |             | R thread (ISO-7-1), DN65, 2.5"                                                                  |
|          |                |               |                | FLG-15             |          |          |             | Flange (EN 1092-1), DN15, 1/2"                                                                  |
|          |                |               |                | FLG-20             |          |          |             | Flange (EN 1092-1), DN20, 3/4"                                                                  |
|          |                |               |                | FLG-25             |          |          |             | Flange (EN 1092-1), DN25, 1"                                                                    |
|          |                |               |                | FLG-32             |          |          |             | Flange (EN 1092-1), DN32, 1.25"                                                                 |
|          |                |               |                | FLG-40             |          |          |             | Flange (EN 1092-1), DN40, 1.5"                                                                  |
|          |                |               |                | FLG-50             |          |          |             | Flange (EN 1092-1), DN50, 2"                                                                    |
|          |                |               |                | FLG-65             |          |          |             | Flange (EN 1092-1), DN65, 2.5"                                                                  |
|          |                |               |                | FLG-80             |          |          |             | Flange (EN 1092-1), DN80, 3"                                                                    |
|          |                |               |                | V0202 0001         |          |          |             | Air                                                                                             |
|          |                |               |                | V0202 0002         |          |          |             | Oxygen (O <sub>2</sub> )                                                                        |
|          |                |               |                | V0202 0003         |          |          |             | Nitrogen (N <sub>2</sub> )                                                                      |
|          |                |               |                | V0202 0004         |          |          |             | Hydrogen (H <sub>2</sub> ), Real Gas Calibration                                                |
|          |                |               |                | V0202 0005         |          |          |             | Nitroous Oxide (N <sub>2</sub> O)                                                               |
|          |                |               |                | V0202 0006         |          |          |             | Carbon Dioxide (CO <sub>2</sub> )                                                               |
|          |                |               |                | V0202 0007         |          |          |             | Natural Gas (NG)                                                                                |
|          |                |               |                | V0202 0008         |          |          |             | Argon (Ar)                                                                                      |
|          |                |               |                | V0202 0009         |          |          |             | Helium (He), Real Gas Calibration                                                               |
|          |                |               |                | V0202 0010         |          |          |             | Other Specified Gases (Specify Gas or Gas Mix)                                                  |
|          |                |               |                | V0204 0001         |          |          |             | Standard Accuracy Calibration ±(1.5% RD + 0.3% FS)                                              |
|          |                |               |                | V0204 0002         |          |          |             | High Accuracy Calibration ±(1% RD + 0.3% FS)                                                    |
|          |                |               |                |                    |          |          | S0105 0003  | Integrated display. The capacitive touch 2.0" IPS LCD with an ultra-wide view                   |
|          |                |               |                |                    |          |          | S0105 0003A | Split display. The capacitive touch 2.0" IPS LCD with an ultra-wide view                        |

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