# General Specifications

FN110
Field Wireless
Communication Module

**GS 01W03B01-01EN**

## ■ GENERAL

*This General Specification (GS) describes the specifications for Field Wireless Communication Module. This product is based on the industrial automation wireless communication standard ISA100.11a of the International Society of Automation (ISA). ISA100.11a is approved as an International Standards (IEC 62734) by International Electrotechnical Commission (IEC). Wireless functions defined by ISA100.11a are equipped with this product. This product supports 2 device role; a field wireless device and a field wireless gateway.*
*When utilizing with "Field Wireless Multi-Protocol Module FN310" or "Field Wireless Multi-Function Module FN510", this product is connectable with a field wireless network as a field wireless device. When utilzing with "Interface Adapter LN90", this product acts as a field wireless gateway.*
*For more details, refer to the General Specifications of "Field Wireless Multi-Protocol Module FN310" , "Field Wireless Multi-Function Module FN510" or "Interface Adapter LN90".*

## ■ FEATURES

● **Built-in high-performance wireless communication function**
The high-performance built-in wireless communication module has excellent radio sensitivity and low power consumption, provides a stable wireless communication platform with excellent power saving capabilities.

● **Compact and light weight**
This product has been made compact and extremely lightweight as an explosion proof antenna with a built-in wireless communication module. As a result, flexible installation in the industrial environment is possible.

● **ISA100 Wireless protocol stack**
Inter module communication code -A1 is specified, this product is supplied with an ISA100 Wireless certified protocol stack with excellent reliability and scalability. ISA100 Wireless is an international, industrial wireless networking standard engineered to serve the needs of process industries.

● **Built-in wireless gateway**
Inter module communication code -R1 is specified, this product acts as system manager, security manager, gateway, and backbone router based on ISA100.11a. Easy to construct small scale field wireless network with combining Remote Terminal Unit (RTU) or other controller.

## ■ STANDARD SPECIFICATIONS

### □ WIRELESS SPECIFICATIONS

**Communication protocol:**
ISA100 Wireless (IEEE802.15.4)

**Data rate:**
250 kbps

**Frequency:**
2400 – 2483.5 MHz license free ISM band

**Radio security:**
AES 128 bit

**RF Transmitter power:**
12 dBm (eirp)

**Antenna:**
2 dBi (Omni directional)

### □ POWER SUPPLY SPECIFICATIONS

**Power Supply Voltage:**
2.9 - 4.8 V
See also "OPTIONAL SPECIFICATIONS (For Explosion Protected Types)"

**Consumption current:**
Max. 60 mA

## □ PERFORMANCE SPECIFICATIONS

**[Inter module communication code: -A1]**

**Update Period:**
1 to 3600 s*
    * Depends on module to connect this product. Refer to the general specifications of the products that are connected to this product.

**Digital Communication for FN series**
Communication Mode: Half-duplex communication
        (RS485 compliant)
Communication Speed: 9600 bps
Communication Distance: Max 20 m
        (dedicated cable)

**Diagnostic Functions:**
Power failures, wired communication failures, firmware internal errors, memory errors, abnormal temperature

**Software Download Function:**
Software download function permits to update wireless field device software via ISA100 Wireless communication.

**[Inter module communication code: -R1]**

**Field Wireless Subnet:**
1 subnet

**Field Wireless Device:**
Max. 20 devices (update rate: 2 to 3600 s)
Max. 10 devices (update rate: 1 s)

**Modbus communication for PLC/RTU:**
Communication Mode: Half-duplex communication
        (RS485 compliant)
Communication Speed: Max. 38400 bps
Communication Distance: Max. 20 m
        (dedicated cable)

**Diagnostic Functions:**
Power failures, wired communication failures, firmware internal errors, memory errors, abnormal temperature

## □ INSTALLATION ENVIRONMENT

**Ambient Temperature Limits:**
Operating: –40 to 85°C (altitude up to 3000 m)
Storage: –40 to 85°C

**Ambient Humidity Limits:**
Operating: 0 to 100%RH (non-condensation)
Storage: 0 to 100%RH (non-condensation)

**Ambient Temperature Gradient:**
Operating: ±10°C/h or less
Storage: ±20°C/h or less

**Vibration Resistance:**
0.21 mm P-P (10 – 60 Hz), 3 G (60 - 2 kHz)

**Shock Resistance:**
50 G 11 ms

**Grounding:**
Ground through the mating of the metal shell. Please ensure that the ground terminal is connected to an appropriate ground.

## □ REGULATORY COMPLIANCE STATEMENTS

This device satisfies the following standards.
    * Please confirm that an installation region fulfills an applicable standard. If additional regulatory information and approvals are required, contact a Yokogawa representative.

**Telecommunication Compliance:**
MIC Identification (Japan),
FCC Approval (United States), IC Approval (Canada),
RE Directive (EU Countries)

**CE Conformity:**
RoHS Directive:
  EN IEC 63000
ATEX Directive:
  See "OPTIONAL SPECIFICATIONS (For Explosion Protected Types)"
RE Directive:
  Safety: EN61010-1 (Indoor/Outdoor use), EN62479
  EMC: EN 301 489-1, EN 301 489-17,
      EN61326-1 Class A Table 2, EN55011 Class A
  Radio Spectrum: EN 300 328

**Canadian Safety Standards:**
CAN/CSA-C22.2 No.61010-1
CAN/CSA-C22.2 No.94.1, CAN/CSA-C22.2 No.94.2
IEC 60529

**Degrees of Protection:**
IP66, IP67 and Type 4X apply when the connector is properly tightened.

## □ PHYSICAL SPECIFICATIONS

**Connector:**
5-pin round connector dedicated

**Housing Material:**
Brass

**Weight:**
100 g

# ■ MODEL AND SUFFIX CODES

| Model | Suffix Codes | | | | | | Description |
|---|---|---|---|---|---|---|---|
| **FN110** | .................................................................... | | | | | | Field Wireless Communication Module |
| General Specifications | Inter module communication | **-A1**........................ | | | | | Digital communication for FN series |
| | | **-R1**........................ | | | | | Modbus communication for PLC/RTU |
| | Output signal | | **-L**................................ | | | | ISA100 Wireless |
| | Housing Material | | | **0** ............................. | | | Brass |
| | Antenna | | | | **0** ........................ | | Integral antenna 2 dBi (2.4 GHz) |
| | --- | | | | | **A**.................... | Always A |
| | --- | | | | | **-A**............. | Always A |
| | --- | | | | | | **A**..........  Always A |
| Option codes | | | | | | | /□ Optional specifications |

## ■ OPTIONAL SPECIFICATIONS (For Explosion Protected Types)

Please select appropriate equipment in accordance with the laws and regulations of the relevant country/region, when it is used in a location where explosive atmospheres may be present.

| Item | | Description | Code |
|---|---|---|---|
| Factory Mutual (FM)[1][2] | United States | FM Intrinsically safe Approval (United States)<br>Applicable Standards: FM Class 3600, FM Class 3610, FM Class 3810,<br>　　　　　　　　ANSI/ISA 60079-0, ANSI/ISA 60079-11,<br>　　　　　　　　ANSI/IEC 60529, NEMA 250<br>Certificate No: FM17US0107X<br>Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F & G,<br>Class I, Zone 0, in Hazardous Locations, AEx ia IIC<br>Enclosure: IP66 and Type 4X, Temperature Class: T4,<br>Amb. Temp.: −40 to 70 °C (−40 to 158°F)<br>Electrical Parameters: $U_i$ = 5.88 V, $I_i$ = 0.62 A, $P_i$ = 0.92 W, $C_i$ = 5.8 µF, $L_i$ = 7µH<br>Dielectric Strength: 500 V a.c. r.m.s., 1 minute | **FS17** |
| | Canada | FM Intrinsically safe Approval (Canada)<br>Applicable Standards: CSA-C22.2 No. 60079-0, CSA-C22.2 No. 60079-11,<br>　　　　　　　　CSA-C22.2 No. 61010-1, CSA-C22.2 No. 94.1,<br>　　　　　　　　CSA-C22.2 No. 94.2, CSA-C22.2 No. 60529<br>Certificate No: FM17CA0054X<br>Ex ia IIC T4 Ga<br>Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F & G<br>Enclosure: IP66 and Type 4X, Temperature Class: T4,<br>Amb. Temp.: −40 to 70 °C (−40 to 158°F)<br>Electrical Parameters: $U_i$ = 5.88 V, $I_i$ = 0.62 A, $P_i$ = 0.92 W, $C_i$ = 5.8 µF, $L_i$ = 7µH<br>Dielectric Strength: 500 V a.c. r.m.s., 1 minute | **CS17** |
| ATEX[1][2] | | ATEX Intrinsically safe Approval<br>Applicable Standards: EN IEC 60079-0, EN 60079-11<br>Certificate: Presafe 15 ATEX 6309X<br>II 1 G Ex ia IIC T4 Ga<br>Degree of protection: IP66 in accordance with IEC 60529<br>Amb. Temp. (Tamb): −40 to 70°C (−40 to 158°F)<br>Electrical Parameters: $U_i$ = 5.88 V, $I_i$ = 0.62 A, $P_i$ = 0.92 W, $C_i$ = 5.8 µF, $L_i$ = 7µH<br>Dielectric Strength: 500 V a.c. r.m.s., 1 minute | **KS27** |
| IECEx | | IECEx Intrinsically safe Approval[1][2]<br>Applicable Standards: IEC 60079-0, IEC 60079-11<br>Certificate: IECEx PRE 15.0015X<br>Ex ia IIC T4 Ga　Degree of protection: IP66 in accordance with IEC 60529<br>Amb. Temp. (Tamb): −40 to 70°C (−40 to 158°F)<br>Electrical Parameters: $U_i$ = 5.88 V, $I_i$ = 0.62 A, $P_i$ = 0.92 W, $C_i$ = 5.8 µF, $L_i$ = 7µH<br>Dielectric Strength: 500 V a.c. r.m.s., 1 minute | **SS27** |
| | | IECEx Type n Approval[3]<br>Applicable Standards: IEC 60079-0, IEC 60079-15<br>Certificate: IECEx PRE 16.0052X<br>Ex nA IIC T4 Gc, Degree of protection: IP66/IP67 according to IEC 60079-15<br>Amb. Temp. (Tamb): −40 to 70°C (−40 to 158°F)<br>Power supply: 2.9 to 4.3 V | **SN27** |

[1]: Remote antenna cables of F9092ED, F9092EE, F9092EG and F9092EH are available when the item is specified.
[2]: When inter module communication code -R1 is specified, this option is not available.
[3]: Only available when inter module communication code -R1 is specified. When optional code SN27 is selected, specify the protection cap CP.

## ■ OPTIONAL SPECIFICATIONS

| Item | Description | Code |
|---|---|---|
| Protection cap* | Metal waterproof cap | **CP** |

*: When protection cap is not specified, dust-cap is attached.

## ■ OPTIONAL ACCESSORIES

| Item | Parts Number | Description |
|---|---|---|
| Remote antenna cable for [Inter module communication code: -A1] * | F9092ED | 3 m with mounting bracket and metal waterproof cap |
| | F9092EE | 10 m with mounting bracket and metal waterproof cap |
| | F9092EF | 20 m with mounting bracket and metal waterproof cap |
| | F9092EG | 3 m with mounting bracket |
| | F9092EH | 10 m with mounting bracket |
| | F9092EJ | 20 m with mounting bracket |

* Remote antenna cable for [Inter module communication code: -R1] is bundled with Interface Adapter LN90 (Refer to GS 01W03L01-01EN).
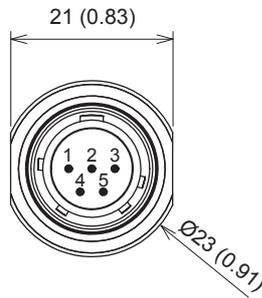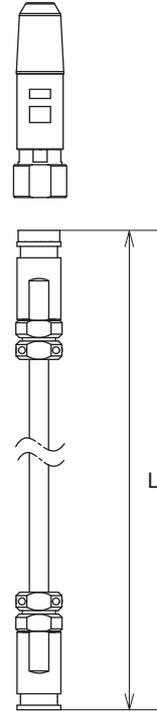
# ■ EXTERNAL DIMENSIONS

## □ Body

## □ Remote antenna cable
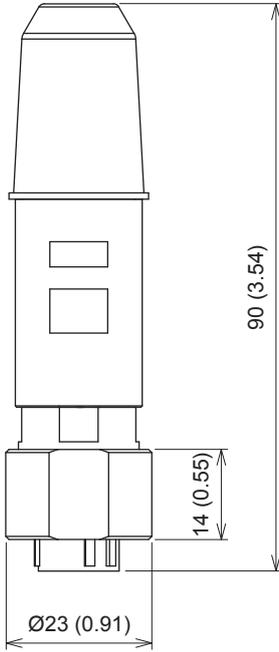
Unit: mm (approx. inch)

| Pin | Signal |
|-----|--------|
| 1 | Not Connected |
| 2 | Signal Ground |
| 3 | Power Supply |
| 4 | Transmit/Receive Data positive |
| 5 | Transmit/Receive Data negative |

90 (3.54)

14 (0.55)

Ø23 (0.91)

21 (0.83)

Ø23 (0.91)

1 2 3
4 5

F01.ai

Length 3 m, 10 m, 20 m

F02.ai

## □ 2-inch pipe mounting (for horizontal piping)

Unit: mm (approx. inch)

FN110

88 (3.46)

40 (1.57)

191 (7.52)

148 (5.83)

Remote antenna cable

Mounting bracket

2-inch pipe

80 (3.15)

56 (2.20)

20 (0.79)

47 (1.85)

93 (3.66)
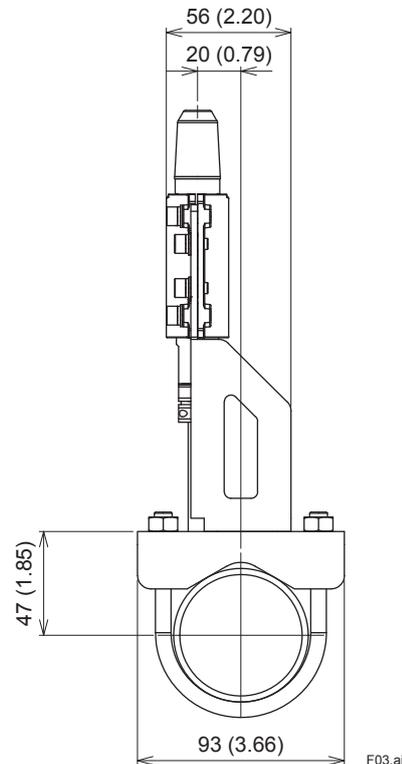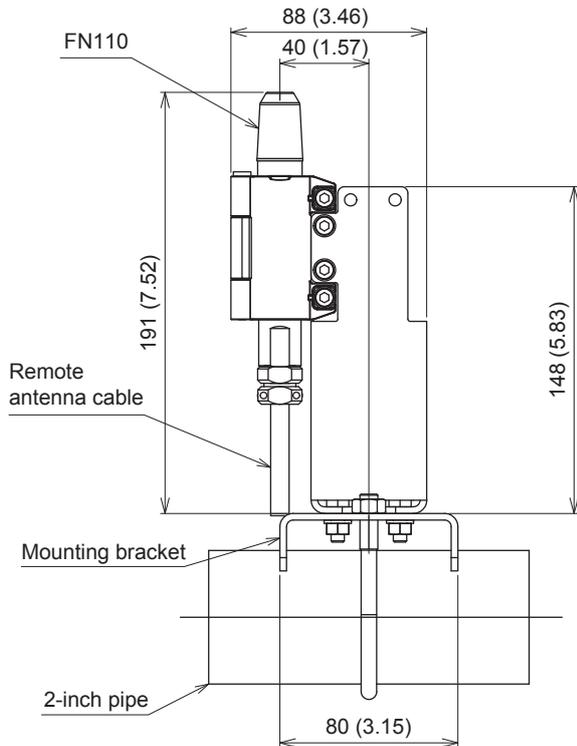
F03.ai

## □ 2-inch pipe mounting (for vertical piping)



93 (3.66)
20 (0.79)
22 (0.87)
209 (8.23)
184 (7.24)
Unit: mm (approx. inch)

FN110

80 (3.15)

56 (2.20)

Remote antenna cable

2-inch pipe

Mounting bracket
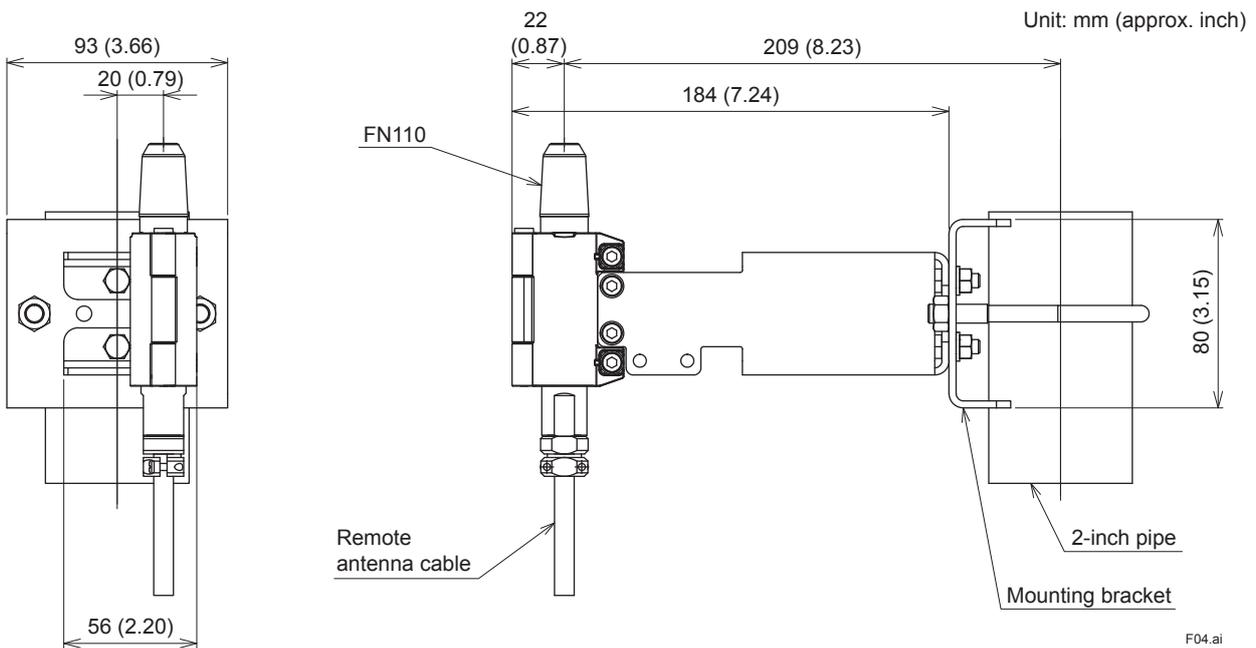
F04.ai

### < Ordering Information >

Specify the following when ordering.

1. Model, suffix codes, and option codes.
2. Tag Number (if required)[1]
   Engraving on the tag plate can be specified by a combination of uppercase letters, lowercase letters, numbers, "- (hyphen)", "_ (underscore)". Factory setting is blank unless otherwise specified.
3. Software tag (if required)[1]
   Specify this software tag when tag number which is different from the tag number specified in the "TAG NUMBER" is required. The tag number specified in "SOFTWARE TAG" will be entered on "DEVICE TAG" (up to 16 letters) in the memory.
4. Network ID (if required)[1]
   Specify the number from 2 to 65535. When not specified, it will be 1.

[1]: When the intermodule communication code is -R1, specifying Tag Number, Software tag and Network ID is not available.

### < Related Products General Specifications >

Field Wireless System Overview:
Refer to GS 01W01A01-01EN
Field Wireless Multi-Protocol Module FN310:
Refer to GS 01W03D01-01EN
Field Wireless Multi-Function Module FN510:
Refer to GS 01W03E01-01EN
Interface Adapter LN90:
Refer to GS 01W03L01-01EN

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