General Specifications

FN310
Field Wireless
Multi-Protocol Module

GS 01W03D01-01EN

ISA 100 WIRELESS COMPLIANT

■ GENERAL

This General Specification (GS) describes the specifications for Field Wireless Multi-Protocol Module. Combined with "Field Wireless Communication Module FN110", this product is connectable with a field wireless network as a field wireless device. This product acquires sensor data from a connected sensor and transmits it to a field wireless network through FN110.

Refer to General Specifications of "Field Wireless Communication Module FN110" for an overview and detailed information.

■ FEATURES

● Protocol conversion
This product can convert a wired communication protocol to the ISA100 Wireless protocol, and transmit it to a field wireless network. ISA100 Wireless is an international, industrial wireless networking standard engineered to serve the needs of process industries.

● Multi-protocol support
HART or Modbus* communication protocol can be selected. Various wired legacy device required by plant operation can be converted into a wireless device as required.

> * Future release

● Installation flexibility
With built-in batteries, this product can supply power to the connected field device, eliminating the need for cables.

Cable elimination allows installing a device at locations where it was previously either inaccessible or cost-prohibitive because of cable management and cost.

● Small and lightweight housing with LCD
This product has a small and lightweight housing with a built-in LCD that displays the process data and communication status.

■ STANDARD SPECIFICATIONS

□ POWER SUPPLY SPECIFICATIONS

Battery:
　Dedicated battery pack.
　Rated voltage: 7.2 V
　Rated capacity: 19 Ah

Battery Pack:
　2x primary lithium-thionyl chloride batteries
　With battery case (batteries sold separately)

□ PERFORMANCE SPECIFICATIONS

Update Period:
　[Protocol code: J]
　　5 to 3600 s selectable
　[Protocol code: M, Connection Device Type: DT2]
　　8 to 3600 s selectable

Battery Characteristics:
　[Protocol code: J]
　　At one-to-one connection, the typical battery life is 4 years when BootStrapTime[1][2] of the HART device is 10 seconds or 1 year when BootStrapTime[1][2] is 60 seconds, under the following conditions[3]:
　　• Ambient temperature: 23 ±2°C
　　• Device role: IO mode
　　• Update period: 10 minutes
　　• LCD display: off

　[1]: BootStrapTime is defined as the time from the power-on of the HART device until the reliable data is available.
　[2]: For BootStrapTime, please contact the manufacturer of the connected HART device.
　[3]: Environmental condition such as vibration and the type of connected HART device may affect the battery life.

　　At 4-20 mA loop connection, the typical battery life is 8 years at 10 seconds update time or 5 years at 5 seconds update time in the following conditions.[1]
　　• Ambient temperature: 23 ±2°C
　　• Device role: IO mode
　　• LCD display: off
　[1]: Environmental condition such as vibration may affect the battery life.

　[Protocol code: M, Connection Device Type: DT2]
　　The typical battery life is 8 years under the flowing conditions[1]:
　　• Ambient temperature: 23 ±2°C
　　• Device role: IO mode
　　• Update period: 10 minutes
　　• LCD display: off

　[1]: Environmental condition such as vibration and the type of connected Modbus device may affect the battery life.

YOKOGAWA ◆

□ FUNCTIONAL SPECIFICATIONS

Input:
[Protocol code: J]
This product has HART master function and enables setting primary and secondary. Communication specifications between this product and HART devices are below.
Protocol revision: HART 7*
Communication mode:
HART multidrop connection 4 mA fixed
HART point-to-point connection 4-20 mA
Number of HART devices: 1 device
Cable: Max 20 m (AWG14 to 22 with shield)

* The HART protocol ensures backward compatibility with the previous revisions.

[Protocol code: M]
Communication specifications between this product and Modbus devices are below.
Communication Mode: Half-duplex communication (RS-485 compliant)
Protocol: Modbus RTU
Communication Speed: 9600 bps
Number of Modbus devices: 1 device
Cable: Max 20 m (AWG14 to 22 with shield)

Connection Devices:
Connecting a HART device enables to acquire PV, SV, TV and QV.
Connecting a SENCOM (FU20F-NPT) enables to acquire pH, ORP, rH and temperature. To perform the calibration of SENCOM (FU20F-NPT), use SPS24 SENCOM PC Software.

Output:
Communication specifications between this product and FN110 are below.
Communication Mode: Half-duplex communication (RS485 compliant)
Communication Speed: 9600 bps
Connector: 5-pin round connector dedicated
Cable: Max 20 m (dedicated cable)

Power Supply:
Power supply to the FN110
Supply voltage: 3.5 V
Supply current: 50 mA
[Protocol code: J]
Power supply to the HART device*1*2*3
Maximum supply voltage: 18 V (steady-state)
Maximum supply current: 12 mA (steady-state)

*1: HART devices operate at 4 mA current-fixed mode.

*2: Before using, make sure the minimum operating voltage of the HART device is 16.5V or less with 0 ohm load.

*3: Supplys power when using VOUT terminal.

[Protocol code: M]
Power supply to the Modbus device
Supply voltage: 3.5 V
Supply current: 10 mA

Integral Indicator (LCD display):
5-digit numerical and status display. Display contents and display on/off can be controlled with a magnet (not included).
The indicator displays the following information:
Wireless communication status, device status, write protection, sensor data and alarm message

Diagnosis Functions:
Power failures, inter module communication failures, sensor communication failures, memory errors, battery alarm, abnormal temperature

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

□ INSTALLATION ENVIRONMENT

Ambient Temperature Limits:
Operating: -40 to 85°C (attitude up to 3000 m)
-30 to 80°C (LCD visible range)
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

□ REGULATORY COMPLIANCE STATEMENTS

This product 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.

CE Conformity: CE
EMC: EN61326-1 Class A Table 2 (For use in industrial locations), EN55011 Class A
Safety: EN61010-1 (Indoor/Outdoor use)

Degrees of Protection:
IP66
IP66 rating applies when the connector is properly tightened.

Explosion-Proof Types
TIIS, FM (United States or Canada), ATEX, IECEx (approvals under pending)

□ PHYSICAL SPECIFICATIONS

Connections:
Refer to "MODEL AND SUFFIX CODES".

Housing Material:
Plastic (Polycarbonate)

Weight:
500 g (without mounting bracket, clamp, and battery)

Mounting:
Refer to "MODEL AND SUFFIX CODES".

■ MODEL AND SUFFIX CODES

Model	Suffix Code						Descriptions
FN310	....						Field Wireless Multi-Protocol Module
General Specifica-tion	Inter module communication	**-A1**............					Digital communication for FN series
	Protocol		**-J**				Digital communication (HART 7 *1)
			-M				Digital communication (RS485 Modbus Protocol)
	Housing Material		**0**				Plastic (Polycarbonate)
	Electrical connection			**0**			Horizontal connection: blind plug, Vertical connection: G 1/2 female *2
				1			Horizontal connection: blind plug, Vertical connection: 1/2 NPT female *2
				2			Horizontal connection: blind plug, Vertical connection: M20 female *2
				3			Horizontal connection: G 1/2 male with clamp, Vertical connection: blind plug *3 *4
				4			Horizontal connection: 1/2 NPT male with clamp, Vertical connection: blind plug *3 *4
				5			Horizontal connection: M20 male with clamp, Vertical connection: blind plug *3 *4
				6			Horizontal connection: blind plug, Vertical connection: blind plug *5
	---				**A**........		Always A
	Integral indicator			**-D**........			Digital indicator
	Mounting bracket				**J**........		316 SST 2-inch pipe mounting (for horizontal piping)
					K........		316 SST 2-inch pipe mounting (for vertical piping)
					N........		None
	---					**A**........	Always A
	---					**A**........	Always A
	---					**-A**........	Always A
	---					**A**........	Always A
Option codes							/□ Optional specifications

*1: The HART protocol is backward-compatible with previous versions.
*2: Cable gland is not included. Prepare the cable gland with a flat gasket.
*3: Select when directly attached to the electrical connection port of HART devices.(Protocol code J only)
*4: Make sure before use that the vibration characteristics and the strength of the connection port of the HART device are fulfilled. (Protocol code J only)
*5: Select when intended to use as a routing device.

■ OPTIONAL SPECIFICATIONS (For Explosion Protected Types)

Item		Description	Code
Factory Mutual (FM)	United States	Intrinsically Safe	–
	Canada	Intrinsically Safe	–
ATEX		Intrinsically Safe	–
IECEx		Intrinsically Safe	–

■ OPTIONAL SPECIFICATIONS (Connection Device Types)

Item	Description	Code
Connection device type*	SENCOM (FU20F-NPT)	**DT2**

*: When protocol code M is selected, specify the connection device.

■ OPTIONAL SPECIFICATIONS

Item	Description	Code
Protection cap*	Metal waterproof cap	**CP**
Wired tag plate	316 SST tag plate wired onto module	**N4**

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

GS 01W03D01-01EN   Dec. 1, 2014-00

■ OPTIONAL ACCESSORIES

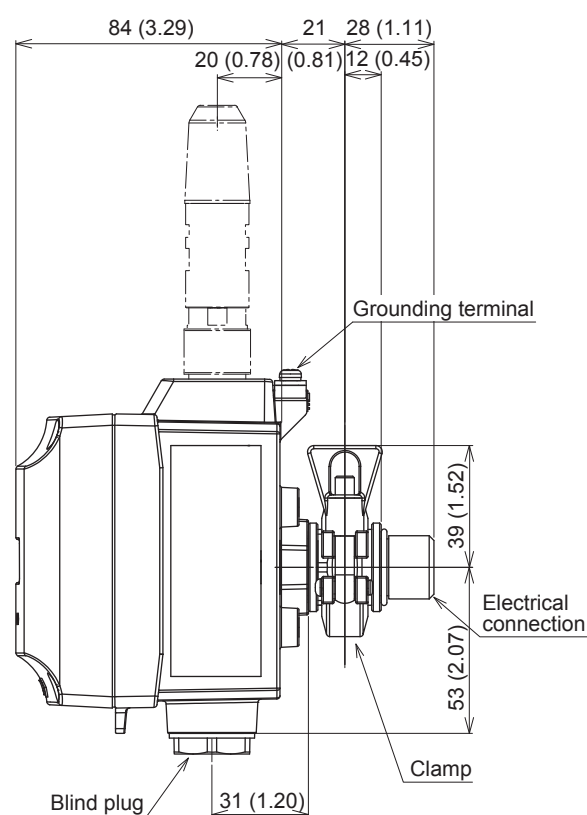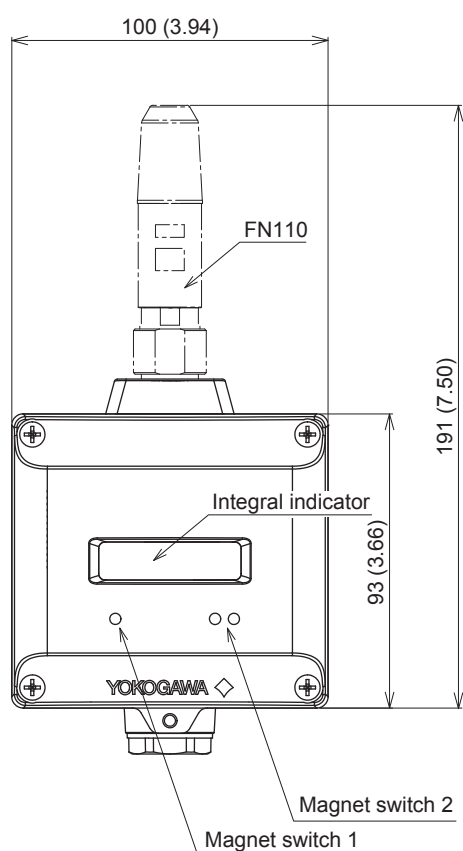| Item	Parts Number	Description
Battery pack assembly	F9090FD	Battery case, Lithium-thionyl chloride batteries[1] 2 pieces
Batteries	F9915NR	Lithium-thionyl chloride batteries[1], 2pieces
Battery case[2]	F9090GD	Battery case only
Magnet	F9840PA	For magnet switch operation

*1: Tadiran TL-5930/S
*2: Alternatively, Tadiran SL-2780/S, TL-5930/S or VITZROCELL SB-D02 batteries can be purchased from your local distributor.

■ DIMENSIONS

□ Direct mounting to electrical connection port (Protocol code: J)

Unit: mm (approx. inch)

FN110

Integral indicator

Magnet switch 2

Magnet switch 1

100 (3.94)

191 (7.50)

93 (3.66)

YOKOGAWA

84 (3.29) 21 28 (1.11)
20 (0.78) (0.81) 12 (0.45)

Grounding terminal

Electrical connection

Clamp

Blind plug
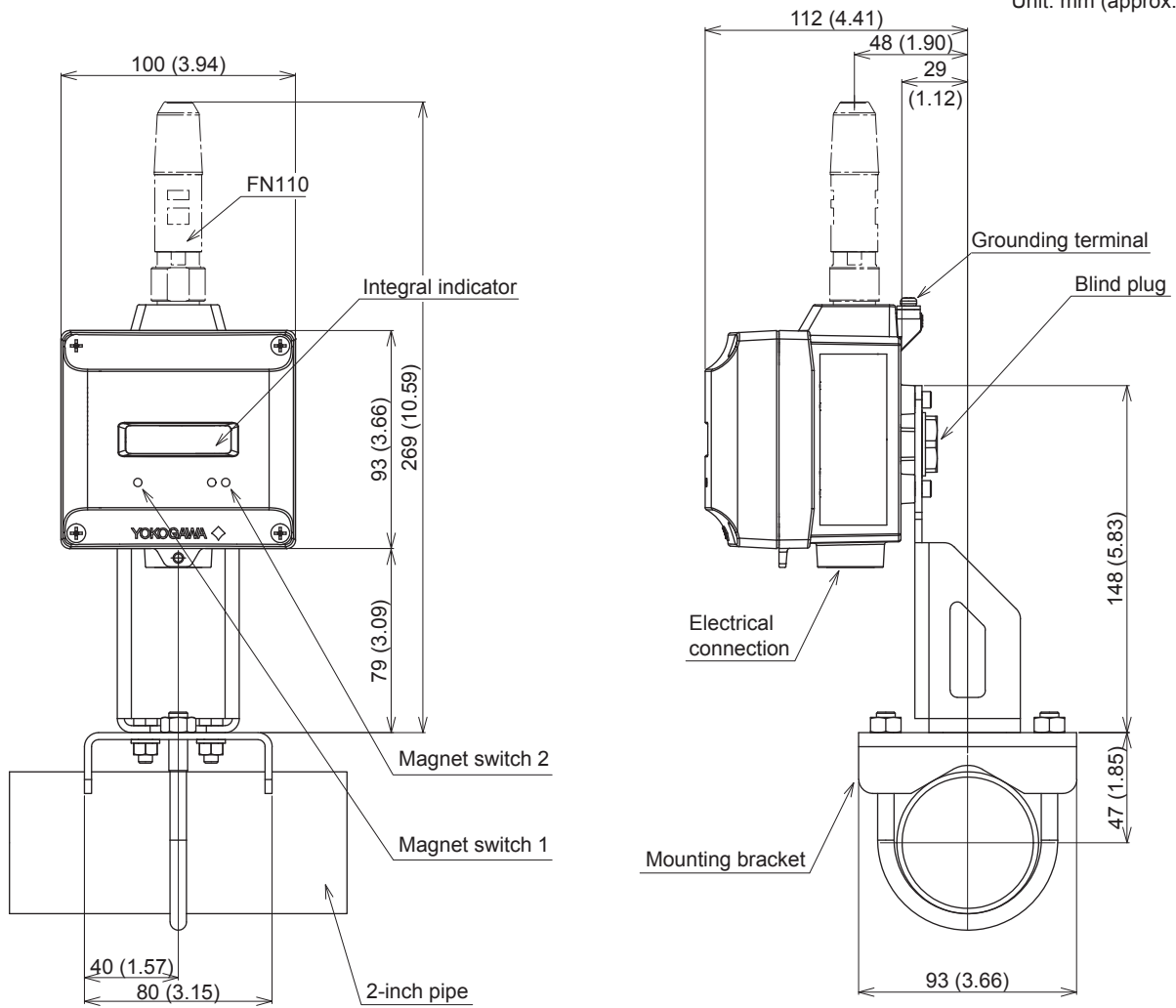
31 (1.20)

39 (1.52)

53 (2.07)

F01.ai

* The FN110 is sold separately.

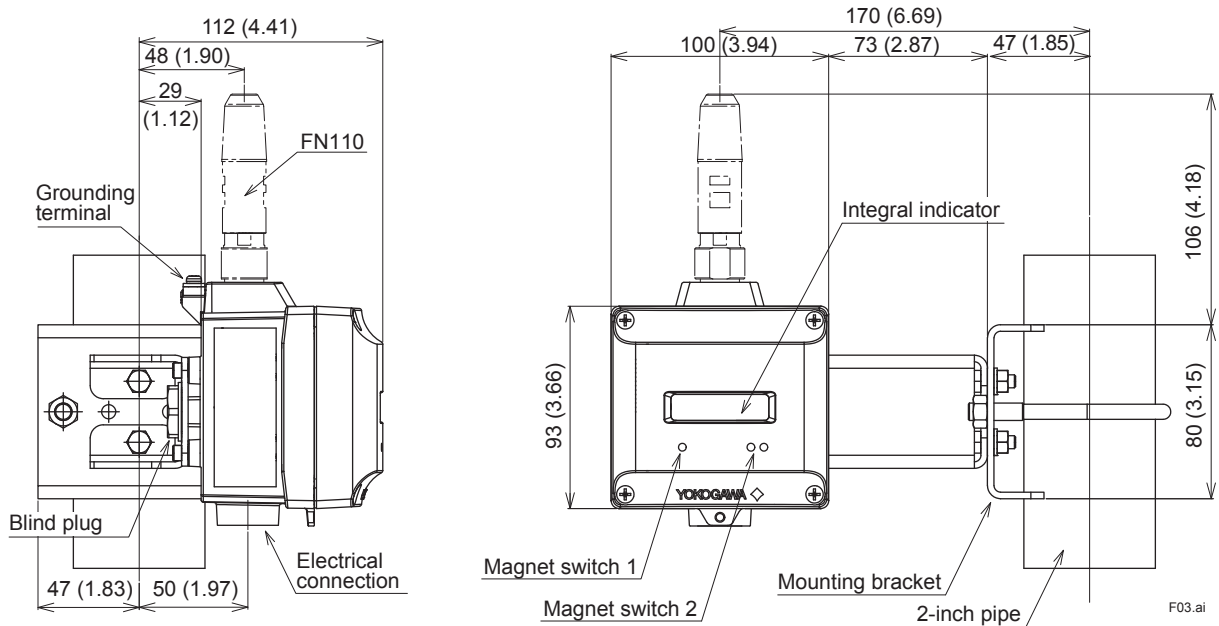□ **2-inch pipe mounting (for horizontal piping) (Protocol code: J, M)**

Unit: mm (approx. inch)

F02.ai
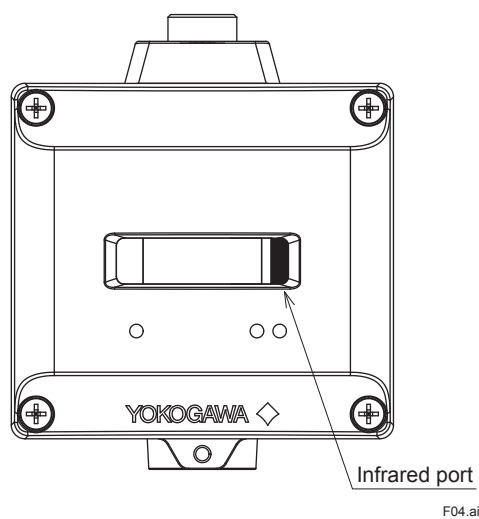
□ **2-inch pipe mounting (for vertical piping) (Protocol code: J, M)**
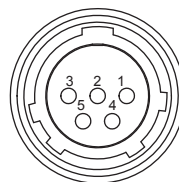
Unit: mm (approx. inch)

F03.ai

GS 01W03D01-01EN   Dec. 1, 2014-00

● **Infrared Configuration**

Infrared port

F04.ai

● **Pin Assignment of FN110 Connection Terminal**

F05.ai

| Pin	Signal
1	Frame Ground*
2	Signal Ground
3	Power Supply
4	Transmit/Receive Data positive
5	Transmit/Receive Data negative

* Wired to the grounding terminal inside the FN310 housing.

● **Input Terminal Configurations**

[Protocol code: J]

F06.ai
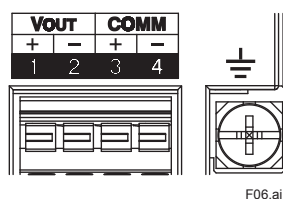
Terminal	Signal			
	One-to-one Connection			4-20 mA Loop Connection
	2-wire	4-wire (Active)	4-wire (Passive)	
1	Power Supply and Input Signal +	No Connection	Loop Power and Input Signal +	No Connection
2	Power Supply and Input Signal -	No Connection	Loop Power and Input Signal -	No Connection
3	No Connection	Input Signal +	No Connection	Input Signal +
4	No Connection	Input Signal -	No Connection	Input Signal -
⏚	Frame Ground			

[Protocol code: M]

F07.ai
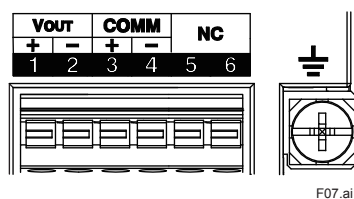
Terminal	Signal
1	Power Supply +
2	Power Supply Gnd
3	Data +
4	Data -
5	No Connection
6	No Connection
⏚	Frame Ground

● **Input Wiring**

[Protocol code: J]
One-to-one Connection

2-wire	4-wire (Active)	4-wire (Passive)

F08.ai / F09.ai / F10.ai
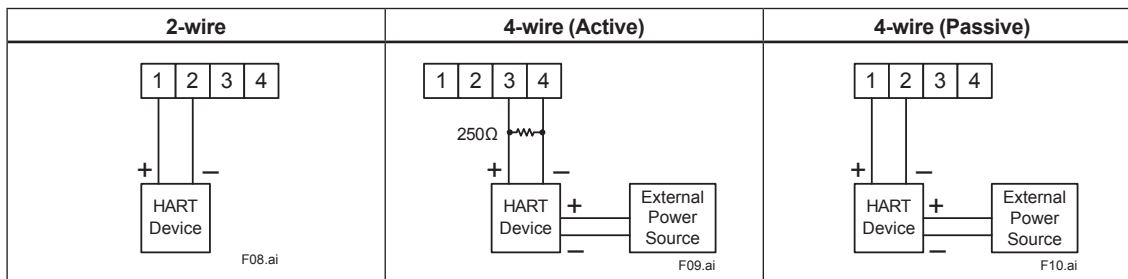
* Connect the FN310 and HART devices directly.

4-20 mA Loop Connection

2-wire	4-wire (Active)	4-wire (Passive)

F11.ai / F12.ai / F13.ai

[Protocol code: M]

Connection Device Type	Wiring Diagram
DT2	WU11 SENCOM cable SENCOM FU20F Digital pH/ORP-sensor F14.ai
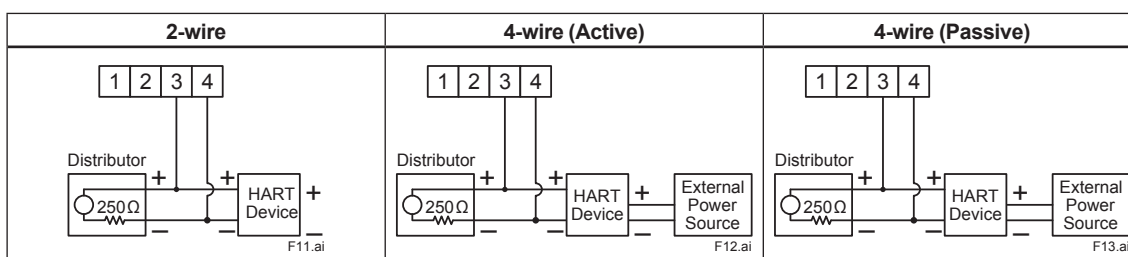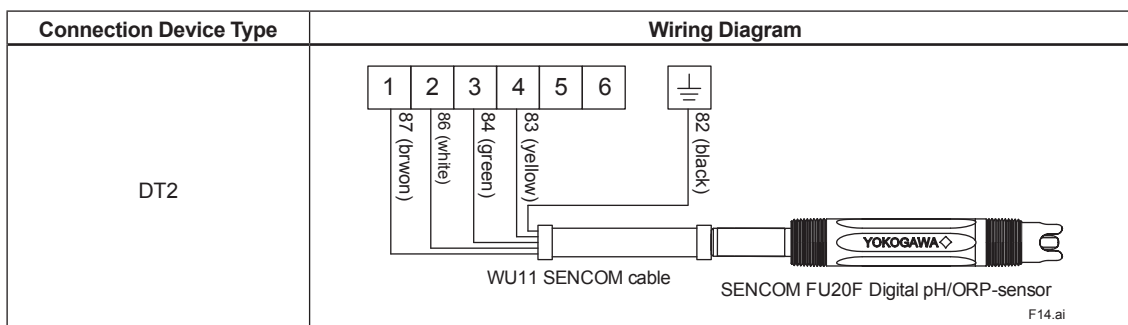
< **Ordering Information** >
Specify the following when ordering.
1. Model, suffix codes, and option codes.
2. Tag Number (if required)
   Specify Tag number (up to 16 letters) to be printed on the nameplate and tag plate.

< **Related Products General Specifications** >
Field Wireless System Overview:
    Refer to GS 01W01A01-01EN
Field Wireless Communication Module FN110:
    Refer to GS 01W03B01-01EN
Field Wireless Management Station YFGW410:
    Refer to GS 01W02D01-01EN
Field Wireless Access Point YFGW510:
    Refer to GS 01W02E01-01EN
Field Wireless Integrated Gateway YFGW710:
    Refer to GS 01W01F01-01EN

FieldMate Versatile Device Management Wizard:
    Refer to GS 01R01A01-01E
Plant Resource Manager (PRM):
    Refer to GS 33Y05Q10-32E
SENCOM FU20F Digital/ORP-sensor:
    Refer to GS 12B06J03-04E-E

< **Trademark** >

All brand or product names of Yokogawa Electric Corporation in this document are trademarks or registered trademarks of Yokogawa Electric Corporation.
All other company brand or product names in this document are trademarks or registered trademarks of their respective holders.
In this document, trademarks or registered trademarks are not marked with "™" or "®".