General Specifications

GS 01W03D01-01EN

FN310
Field Wireless
Multi-Protocol Module

■ GENERAL

This General Specification (GS) describes the specifications for Field Wireless Multi-Protocol Module. Combined with "Field Wireless Communication Module FN120", 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 FN120.

Refer to General Specifications of "Field Wireless Communication Module FN120" 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 communication protocol device can be converted into a wireless device as required.

• 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



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.

YOKOGAWA

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□ 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.

Connection Devices:
Connecting a HART device enables to acquire PV, SV, TV and QV.

Output:
Communication specifications between this product and FN120 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 FN120
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: Supplies power when using VOUT terminal.

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 status, 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
–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

Altitube:
Up to 3000 m

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:
EMC Directive:
EN61326-1 Class A Table 2, EN55011 Class A
RoHS Directive:
EN IEC 63000
ATEX Directive:
See “OPTIONAL SPECIFICATIONS (For Explosion Protected Types)”
Other Normative Standards:
Safety: EN61010-1 (Indoor/Outdoor use)

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

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”.

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■ MODEL AND SUFFIX CODES

Model	Suffix Code	Descriptions
FN310	.....	Field Wireless Multi-Protocol Module
General Specification	Inter module communication **-A1**	Digital communication for FN series
	Protocol **-J**	Digital communication (HART 7 *1)
	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.

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■ 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.

- **Protocol code: J**

Item		Description	Code
Factory Mutual (FM)	United States	FM Intrinsically safe Approval (United States) Applicable Standards: FM 3600, FM 3610, FM 3810, ANSI/UL 61010-1, ANSI/UL 60079-0, ANSI/UL 60079-11, NEMA 250, ANSI/IEC 60529 Certificate number: FM21US0034X Specific Ex marking: IS CL I/II/III DIV 1 GP ABCDEFG T4 CL I ZN 0 AEx ia IIC T4 Enclosure: IP66, Type 4X Ambient Temperature: −40°C ≤ Ta ≤ +70°C (–40°F ≤ Ta ≤ +158°F) Electrical Parameters: Wireless Communication (Connector) Uo = 5.88 V, Io = 613 mA, Po = 907 mW, Co = 5.82 µF, Lo = 25 µH VOUT (Terminal 1, 2) Uo = 23.1V, Io = 87 mA, Po = 450 mW, Co = 100 nF, Lo = 3 mH COMM (Terminal 3, 4) Ui = 30 V, Ii = 300 mA, Pi = 1 W (linear source), Ci = 20 nF, Li = 0 µH Dielectric Strength: 500 V a.c. r.m.s., 1 minute	**FS17**
	Canada	FM Intrinsically safe Approval (Canada) Applicable Standards: CAN/CSA-C22.2 No. 0, C22.2 No. 60079-0, CAN/CSA-C22.2 No. 60079-11, CAN/CSA-C22.2 No. 61010-1, CAN/CSA-C22.2 No. 94.1, CAN/CSA-C22.2 No. 94.2, CAN/CSA-C22.2 No. 60529 Certificate number: FM21CA0023X Specific Ex marking: Ex ia IIC T4 Ga IS CL I/II/III DIV 1 GP ABCDEFG T4 Enclosure: IP66, Type 4X Ambient Temperature: −40°C ≤ Ta ≤ +70°C (–40°F ≤ Ta ≤ +158°F) Electrical Parameters: Wireless Communication (Connector) Uo = 5.88 V, Io = 613 mA, Po = 907 mW, Co = 5.82 µF, Lo = 25 µH VOUT (Terminal 1, 2) Uo = 23.1V, Io = 87 mA, Po = 450 mW, Co = 100 nF, Lo = 3 mH COMM (Terminal 3, 4) Ui = 30 V, Ii = 300 mA, Pi = 1 W (linear source), Ci = 20 nF, Li = 0 µH Dielectric Strength: 500 V a.c. r.m.s., 1 minute	**CS17**
ATEX		ATEX Intrinsically safe Approval Applicable Standards: EN IEC 60079-0, EN 60079-11, EN 60079-28 Certificate number: FM15ATEX0069X Specific Ex marking: II 1 G Ex ia op is IIC T4 Ga Enclosure: IP66 in accordance with only EN 60529 Ambient Temperature: −40°C ≤ Ta ≤ +70°C (–40°F ≤ Ta ≤ +158°F) Electrical Parameters: Wireless Communication (Connector) Uo = 5.88 V, Io = 613 mA, Po = 907 mW, Co = 5.82 µF, Lo = 25 µH VOUT (Terminal 1, 2) Uo = 23.1V, Io = 87 mA, Po = 450 mW, Co = 100 nF, Lo = 3 mH COMM (Terminal 3, 4) Ui = 30 V, Ii = 300 mA, Pi = 1 W (linear source), Ci = 20 nF, Li = 0 µH Dielectric Strength: 500 V a.c. r.m.s., 1 minute	**KS27**
IECEx		IECEx Intrinsically safe Approval Applicable Standards: IEC 60079-0, IEC 60079-11, IEC 60079-28 Certificate number: IECEx FMG 15.0039X Specific Ex marking: Ex ia op is IIC T4 Ga Enclosure: IP66 in accordance with only IEC 60529 Ambient Temperature: −40°C ≤ Ta ≤ +70°C (–40°F ≤ Ta ≤ +158°F) Electrical Parameters: Wireless Communication (Connector) Uo = 5.88 V, Io = 613 mA, Po = 907 mW, Co = 5.82 µF, Lo = 25 µH VOUT (Terminal 1, 2) Uo = 23.1V, Io = 87 mA, Po = 450 mW, Co = 100 nF, Lo = 3 mH COMM (Terminal 3, 4) Ui = 30 V, Ii = 300 mA, Pi = 1 W (linear source), Ci = 20 nF, Li = 0 µH Dielectric Strength: 500 V a.c. r.m.s., 1 minute	**SS27**

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■ 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.

■ OPTIONAL ACCESSORIES

Item	Parts Number	Description
Battery pack assembly	F9090FD*1	Battery case, Lithium-thionyl chloride batteries*2 2 pieces
Batteries*3	F9915NR	Lithium-thionyl chloride batteries*2, 2 pieces
Battery case	F9090GD*4	Battery case only
Magnet	F9840PA	For magnet switch operation

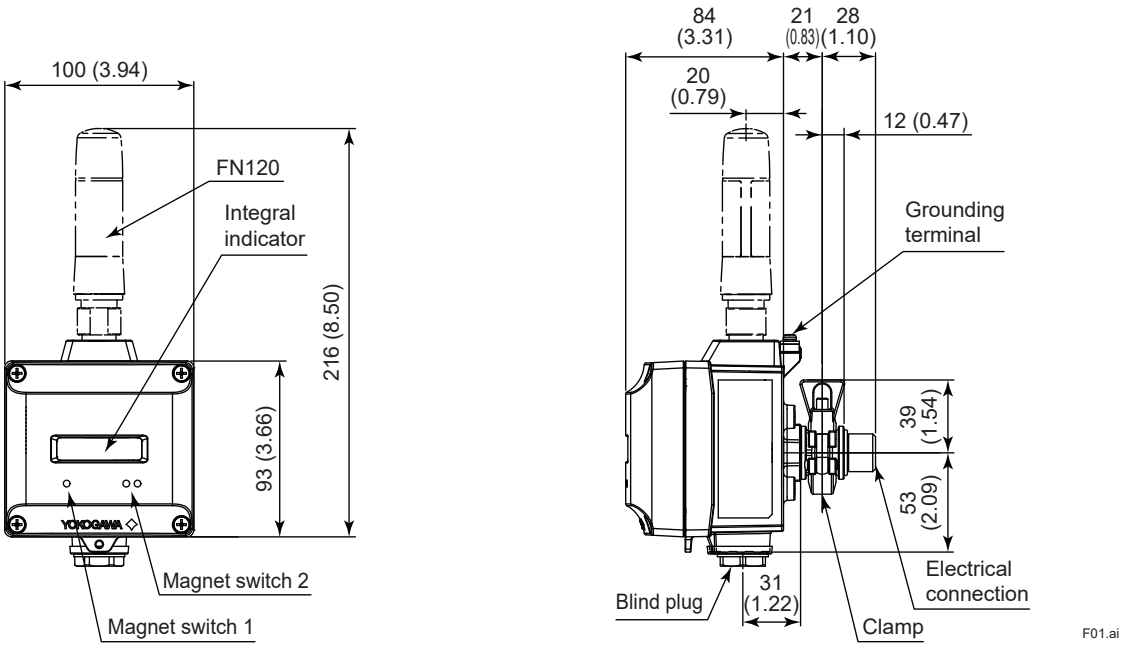
*1: If you need F9090FC, please purchase F9090FD. F9090FD is a set of F9090FC and instruction manual.
*2: Tadiran TL-5930/S
*3: Alternatively, Tadiran SL-2780/S, TL-5930/S or VITZROCELL SB-D02 batteries can be purchased from your local distributor.
*4: If you need F9090GC, please purchase F9090GD. F9090GD is a set of F9090GC and instruction manual.

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■ DIMENSIONS

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

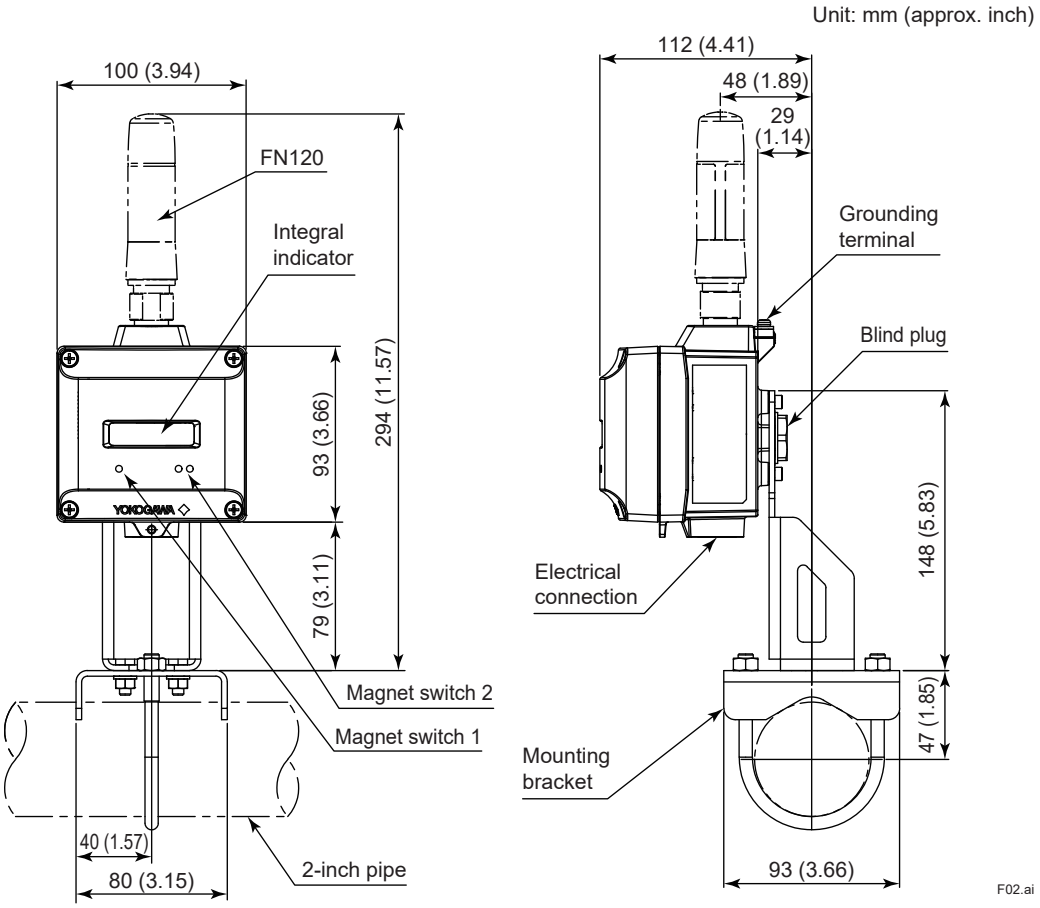
Unit: mm (approx. inch)



* The FN120 is sold separately.

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

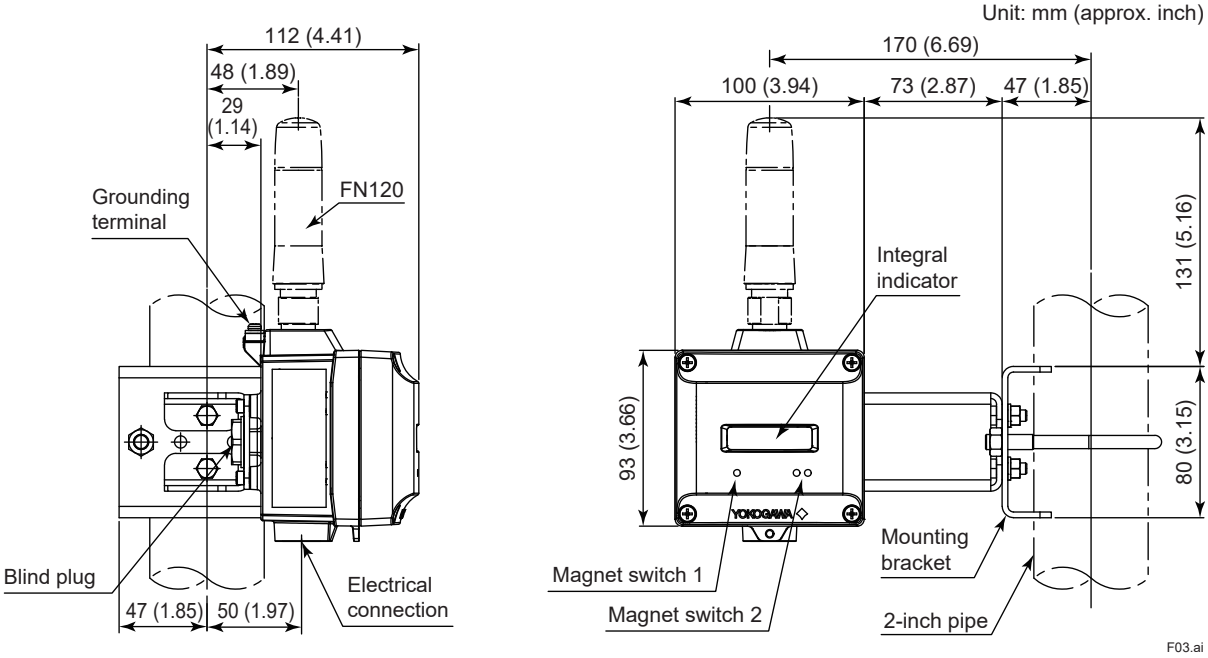
Unit: mm (approx. inch)



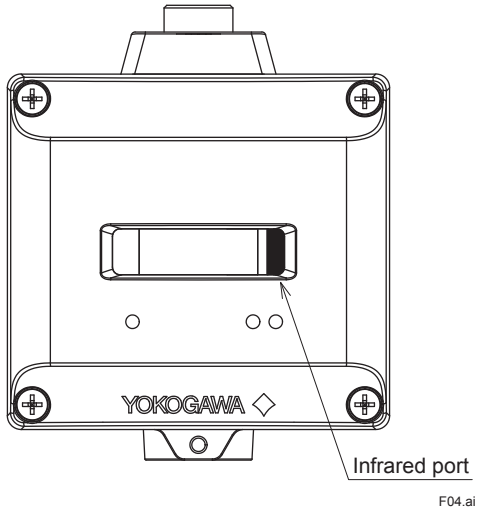
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□ 2-inch pipe mounting (for vertical piping) (Protocol code: J)

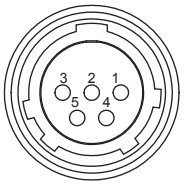
Unit: mm (approx. inch)



● Infrared Configuration



● Pin Assignment of FN120 Connection Terminal



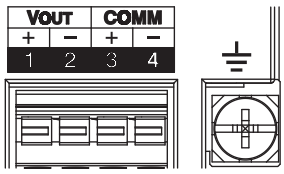
Pin	Signal
1	Frame Ground*
2	Signal Ground
3	Power Supply
4	Transmit/Receive Data positive
5	Transmit/Receive Data negative

* Wired to the grounding terminal inside the FN310 housing.

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● Input Terminal Configurations

[Protocol code: J]

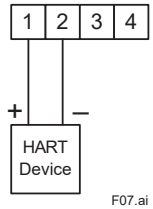
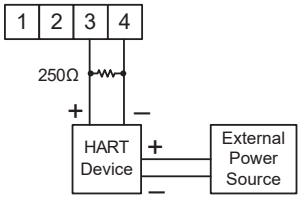
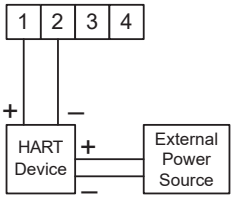


F06.ai

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			

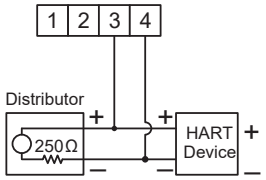
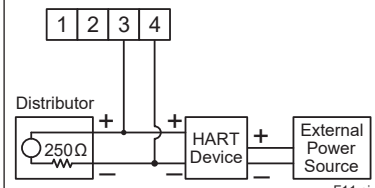
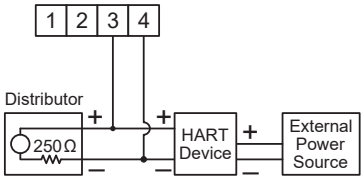
● Input Wiring

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

2-wire	4-wire (Active)	4-wire (Passive)
		
F07.ai	F08.ai	F09.ai

* Connect the FN310 and HART devices directly.

4-20 mA Loop Connection

2-wire	4-wire (Active)	4-wire (Passive)
		
F10.ai	F11.ai	F12.ai

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< Ordering Information >

Specify the following when ordering.

1. Model, suffix codes, and option codes.
2. Tag Number (if required)
   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.

< Related Products General Specifications >

Field Wireless System Overview:
Refer to GS 01W01A01-01EN
Field Wireless Communication Module FN120:
Refer to GS 01W03B02-01EN
Field Wireless Management Station YFGW410:
Refer to GS 01W02D01-01EN
Field Wireless Access Point YFGW520:
Refer to GS 01W02E02-01EN
FieldMate Versatile Device Management Wizard:
Refer to GS 01R01A01-01E
Plant Resource Manager (PRM):
Refer to GS 30B05A10-01EN
SENCOM FU20F/FU24F/SC25F Digital pH/ORP-sensor:
Refer to GS 12B06J03-04E-E

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