This manual describes how to use the FN110 Field Wireless Communication Module (hereinafter simply referred to as FN110). FN110 enables various sensors with digital communication interface to be operated in field wireless networks by converting input/output of sensor to wireless transmission based on the wireless communication standard ISA100.11a.

1. Introduction

• This product is equipped with a wireless module which is designated as a certification of construction type as a wireless facility for a 2.4 GHz band low-power communication system of the RadioAct.

• For more information regarding this product and the standard, refer to “5. Regulatory Compliance Statements” for detail.

• Due to the designated certification of construction type, users may be subject to legal punishment in case of disassembly or modifying this product.

• RF Transmitter power (ERP):

(a) The maximum settings of RF transmitter power is 12dBm (current consumption 50mA or less).

(b) The maximum settings of RF transmitter power is 14dBm (current consumption 60mA or less).

• Microwave oven and other industrial, scientific and medical equipment, and wireless local area networks (hereinafter referred to as local wireless stations) (license required) and specific low-power wireless stations (license required for mobile objects used in the production line of a factory), use the same frequency band as this product. Prevent interference with these wireless stations.

• Check that local wireless stations and specific low-power wireless stations are not being used in the vicinity before using this product.

1.1 Description of this Manual

• This manual should be provided to the end user.

• This manual and the identification tag attached on parking box are essential parts of the product; keep them in a safe place for future reference.

• The contents of this manual are subject to change without prior notice.

• Yokogawa makes no warranty of any kind with regard to this manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.

• If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.

• The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made instruments. Products whose suffix code or optional codes contain code “Z” or “PD” or “P” or “CL” or “PO” or “AO” or “PN” are not covered.

1.2 Radio Wave

• Modulation of the product is strictly prohibited.

• Notes

• Please note that changes in the specifications, construction, or component parts of the instrument may not necessarily be reflected in this manual at the time of manufacture. Therefore, additional revisions to the content of this document may not cause difficulty to the user from a functional or performance standpoint.

2. Safety, Protection, and Modification of this Product

• This product is designed to be used by a person with specialized knowledge.

• In order to protect the operator, product, and system controlled by the product, observe the safety precautions described in this manual. If users handle contrary to these instructions, we cannot guarantee the safety.

• The following safety symbols are used in this manual:

1.3 Warranty

• The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurring during the warranty period shall basically be repaired or replaced at no charge.

• If any problems are experienced with this product, the customer should contact the Yokogawa representative from which this product was purchased or the nearest Yokogawa office.

• If a problem arises with this product, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagram, data and other information you can include in your communication will also be helpful.

• The party responsible for the cost of fitting the problem shall be determined by Yokogawa following an investigation conducted by Yokogawa.

• The purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:

• Improper and/or inadequate maintenance by the purchaser.

• Malfunction or damage due to a failure to handle, use, or store this product in accordance with the design specifications.

• Use of this product in question in a location not conforming to the standards specified by Yokogawa, or due to improper maintenance of the installation location.

• Malfunction or damage due to improper relocation of this product in question after delivery.

• Reason of force majeure such as fires, earthquakes, storms/floods, thunder/lightning, or other natural disasters, as well as local wireless stations (license required) and specific low-power wireless stations (license required for mobile objects used in the production line of a factory).

2.1 Transport

• To prevent damage while in transit, leave the FN110 in the original shipping container until it reaches the installation site.

2.2 Location

• The installation location of this product must meet the following conditions:

• Always direct the product to be in the upright position.

• Install this product at least 1.5m above the ground floor.

• Ensure that there are no obstacles such as walls or pipes within a 30-cm radius of this product.

• Confirm that each field wireless equipment compliant with ISA100.11a can see the antennas of other devices which locate within its own communication range.

3. Installation

• IP65, IP67, and Type 4X apply when the connector is properly tightened.

• For additional information on the ambient conditions allowed at the installation location, refer to “5.1 Specifications”.

• No minimum distance is required between this product and any other apparatus, except as noted in the installation manual.

3.2 Precautions

• Before installing, refer to the User’s Manual of the device to be connected to the FN110.
3.2 Mounting
The installation procedure is as follows:
1. Check the orientation of the pins, insert FN110 into the connector on the device.
2. Tighten the lock nut to a torque of 1.2 N·m. Remover is the reverse of the above.
3.1 FN110 Removal is the reverse of the above.

The installation procedure is as follows.

1. Horizontal Mounting Bracket
Connect the FN110 and the device with dedicated remote antenna cable. Tighten the lock nut to a torque of 1.2 N·m. The minimum bending radius for fixing in the static maintained for a long period should be more than 100 mm.
2. Vertical Pipe Mounting Bracket
To install FN110 with remote antenna cable, follow the procedure below.
1. Assemble the mounting bracket and fix it on a 3SA (2-inch) pipe.
2. Connect the FN110 and the device with the dedicated remote antenna cable. Tighten the connector of the remote antenna cable with a torque of 1.2 N·m. The minimum bending radius for fixing in the static maintained for a long period should be more than 100 mm.
3. Protect the connectors of the FN110 and remote antenna cable as necessary.
4. Fasten the remote antenna cable to an appropriate structure to protect the cable from the vibration, wind, and so on. The minimum bending radius for fixing in the static maintained for a long period should be more than 100 mm.
5. For FN110 in the mounting bracket, the connector should be inserted facing the connector of the device

3.2 FN110 Mounting Figure 1

3.3 Installation of an Explosion Protected Instrument
Refer to "6. Explosion Protected Instrument" for the latest information.

4. Operation
FN110 is used with FN series product (e.g., FN310 Field Wireless Multi-Protocol Module) or LAN900 interface Adapter. For the usage of FN110, refer to the User’s Manual of the device to be connected to FN110.

When inter module communication code -R1 as specified, refer to FN100 Modbus communication for PLC/RTU User’s Manual (5011W30001-01EN) also.

5. General Specifications
Please refer to GS 01W03B01-01EN for the latest information.

5.1 Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Field Wireless Subnet:</td>
<td>1 subnet</td>
</tr>
<tr>
<td>Field Wireless Device:</td>
<td>Max. 20 devices (update rate: 2 to 3600 s) Max. 10 devices (update</td>
</tr>
<tr>
<td>Modbus communication for PLC/RTU:</td>
<td>Communication Mode: Half-duplex communication (RS485 compliant)</td>
</tr>
<tr>
<td></td>
<td>Communication Speed: Max. 38400 bps</td>
</tr>
<tr>
<td></td>
<td>Communication Distance: Max. 20 m (dedicated cable)</td>
</tr>
<tr>
<td>Diagnosis Functions:</td>
<td>Power failures, wired communication failures, firmware internal errors,</td>
</tr>
<tr>
<td></td>
<td>memory errors, abnormal temperature</td>
</tr>
<tr>
<td>Ambient Temperature Limits:</td>
<td>Operating: -40 to 85°C (altitude: up to 3000 m)</td>
</tr>
<tr>
<td></td>
<td>Storage: 0 to 100% RH (non-condition)</td>
</tr>
<tr>
<td></td>
<td>Storage: 0 to 100% RH (non-condition)</td>
</tr>
<tr>
<td></td>
<td>Shock Resistance: 0.2 mm (P-P): 1010 kN·m</td>
</tr>
<tr>
<td></td>
<td>Vibration Resistance: 0.2 mm (P-P): 1010 kN·m</td>
</tr>
<tr>
<td></td>
<td>Gf/8 ms (60 Hz)</td>
</tr>
<tr>
<td></td>
<td>Gf/11 ms (60 Hz)</td>
</tr>
</tbody>
</table>

NOTE
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation in subject to following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

IC Approval (Canada) (RSS-Gen)
This device complies with Industry Canada licence-exempt RSS standard(s).
The equipment is subject to the following two conditions: (1) this device may cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

French
Le présent équipement est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence.
L’exploitation est autorisée aux deux conditions suivantes: (1) l’appareil ne doit pas produire de brouillage, et (2) l’utilisateur de l’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’empêcher le fonctionnement.

(RSS-102)
This equipment complies with IC radiation exposure limits set forth for an uncontrollable environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment should be installed and operated keeping the radiator at least 20 cm or more away from person’s body (excluding extremities: hands, wrists, feet and ankles).

EN Directive (EU Countries)
Herby, Yokogawa Electric Corporation declare that the radio equipment type FN110 is in compliance with Directive 2014/35/EU.

The full text of the EU declaration of conformity is available at the following internet address:
http://www.yokogawa.com/fr/ce/

The Authorized Representative for this product in the EEA is:
Yokogawa Europe B.V. 2, 3825 HM Amersfoort, THE NETHERLANDS.

CE Conformity:

<table>
<thead>
<tr>
<th>Relevant Standards:</th>
<th>EN 301 489-1, EN 301 489-17, EN61326-1 Class A, EN50511 (A)</th>
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<tbody>
<tr>
<td>RE Directive:</td>
<td>&quot;6.3 ATEX Certification&quot;</td>
</tr>
<tr>
<td>RE Directive: Safety:</td>
<td>EN61010-1 (Indoor/Outdoor), EN61247</td>
</tr>
<tr>
<td>(1) Pollution Degree 2</td>
<td>&quot;Pollution degree&quot; describes the degree to which a solid,</td>
</tr>
<tr>
<td></td>
<td>liquid, or gas which deteriorates dielectric strength or</td>
</tr>
<tr>
<td></td>
<td>surface resistivity is adhering. &quot;2&quot; applies to normal</td>
</tr>
<tr>
<td></td>
<td>indoor atmospheres. Normally only non-conductive pollution</td>
</tr>
<tr>
<td></td>
<td>occurs. Occasionally, however, conductivity change caused</td>
</tr>
<tr>
<td></td>
<td>by contamination must be expected.</td>
</tr>
<tr>
<td>(2) Installation Category</td>
<td>&quot;Installation category (installation category)&quot; describes a</td>
</tr>
<tr>
<td></td>
<td>number which defines a transit overvoltage condition. It</td>
</tr>
<tr>
<td></td>
<td>applies the regulation for impulse voltage which is applied</td>
</tr>
<tr>
<td></td>
<td>to the equipment which is supplied from the circuit when</td>
</tr>
<tr>
<td></td>
<td>appropriate transient overvoltage control means (interfaces)</td>
</tr>
<tr>
<td></td>
<td>are provided.</td>
</tr>
<tr>
<td></td>
<td>EN61010-1 (Indoor/Outdoor), EN61247</td>
</tr>
<tr>
<td>Safety:</td>
<td>EN61326-1 Class A, EN50511 (A)</td>
</tr>
<tr>
<td>EN Directive: Electronic:</td>
<td>EN301 489-1, EN301 489-17</td>
</tr>
<tr>
<td>Safety:</td>
<td>EN61326-1 Class A, EN50511 (A)</td>
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<tr>
<td>EN954-9</td>
<td>EN60309</td>
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<td>Degree of Protection:</td>
<td>EN61800-5-1, EN61800-5-2, EN61800-5-3, EN61800-5-4,</td>
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<td>EN61800-5-5, EN61800-5-7</td>
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NOTE
This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

CAUTION
This instrument is a Class A product, and it is designed for use in the industrial environment.

Critical circuit:
This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.
RF Exposure Compliance:
This equipment complies with FCC radiation exposure limits set forth for an uncontrollable environment and meets the FCC radio frequency (RF) Exposure Guidelines.
This equipment should be installed and operated keeping the radiator at least 20 cm or more away from person’s body.

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

IMPORTANT
The connector is shipped with a dust cap. Keep the cap attached until the installation to protect the connector. The cap should be attached so that you can use it again when you detach FN110. In an extremely wet condition, use the optional water-proof cap.
5.3 Model and Suffix Codes
Refer to the General Specification “DS 01W005B01-01EN”.

5.4 External Dimensions and Pin Assignment

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Unit: mm (approx. inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not Connected</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Signal Ground</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Power Supply</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Transmit/Receive Data positive</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Transmit/Receive Data negative</td>
<td></td>
</tr>
</tbody>
</table>

[Plugs type of FN110-13WP-SF (connector mating with type of JR13WRI-5S or JR13WRI-5P)]

5.6. Explosion Protected Instrument
6.1. FM Approval (United States)

Caution for FM intrinsically safe type (United States).

(1) Technical Data
Model FN110 Field Wireless Communication Module with optional code /CS17 for potentially explosive atmospheres:
- Certificate No: FM110A00064
- Intrinsically safe for Class I, II, Division 1, Groups A, B, C, D, E, E, F, and G
- Class I, Zone II, in Hazardous Locations, ATEX ia IC
- Enclosure: IP66 and Type 4X
- Temperature Class: T4
- Ambient Temperature: –40 to 70 °C (–40 to 158°F)

(2) Electrical Parameters
Refer to Control Drawing (FM402-A72).

(3) Installation
Refer to Control Drawing (FM402-A72).

(4) Maintenance and Repair

6.2. FM Approval (Canada)

Caution for FM intrinsically safe type (Canada).

(1) Technical Data
Model FN110 Field Wireless Communication Module with optional code /CS17 for potentially explosive atmospheres:
- Certificate No: F110CA00064
- Ex ia IIC T4
- Intrinsically safe for Class I, II, Division 1, Groups A, B, C, D, E, F, and G
- Enclosure: IP66 and Type 4X
- Temperature Class: T4
- Ambient Temperature: –40 to 70 °C (–40 to 158°F)

(2) Electrical Parameters
Refer to Control Drawing (FM402-A72).

(3) Installation
Refer to Control Drawing (FM402-A72).

(4) Maintenance and Repair

WARNING
The instrument modification or parts replacement by other than an authorized representative of Yokogawa Electric Corporation is prohibited and will void FM Approval.

[Please refer to the instruction manual for installation and maintenance of the equipment.]
6.3. ATEX Certification

6.3.1. ATEX Documentation

This is only applicable to the countries in European Union.

Documentation

6.3.1. ATEX

6.3. ATEX

GB
DK
NL
D
S
E
F
I
SLO
EST
RO
BG
SK
CZ
PL
LV
M
H

Note 5.
Note 4.
Note 3.
Note 2.
Note 1.

(3) Maintenance
(2) Operation

Control Drawing (ATEX)

Figure 6.1 Control Drawing, IIE023-A71 for ATEX Certification

 WARNING

Potential explosive charging hazard - Electrostatic charge may cause an explosion hazard.

• Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on the product.

(4) Nameplate

Please refer to "Figure 2.1 Nameplate" for ATEX Certification.

MODEL: Specified model code.
SUFFIX: Specified suffix code.
S/N: Serial number.
EUI64: EUI64 address.
SUPPLY: Supply voltage.
TAG NO.: Tag number.

Figure 6.1 Control Drawing, IIE023-A71 for ATEX Certification

Note 4. Field Wireless Field Wireless Communication Module is connected to 15 Apparatus (or Associated Apparatus) and/or Non-Hazardous Area.

Note 5. Special conditions for Safe Use

Maintenance and Repair

The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void the ATEX Intrinsically Safe Type Certification.

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Note 5. Special conditions for Safe Use

Maintenance and Repair

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6.4.2. IECEx Type n

Caution for IECEx type of protection "n".

Note 1. Model FN110 Field Wireless Communication Module with optional code ISN27 for potentially explosive atmospheres.

- No.: IECEx PRE 16.0052X
- Applicable Standards:
  - Type of Protection and Marking code: Ex nA IIC T4 Gc
- Ambient Temperature: –40 to 70 °C (–40 to 158°F)
- Enclosure: PM91 IP67 according to IEC 60079-15

Note 2. Power supply

- Voltage range: 2.9 V to 4.3 V d.c.
- Current: 60mA max

Note 3. Installation

- The equipment must be installed in accordance with IEC60079-14 and local electrical codes.
- The equipment must be installed in accordance with the user’s manual.
- Protection cap (Metal waterproof cap) shall be used, when FN110 is not installed.
- Fixture specified by manufacturer (such as mounting bracket with holder) shall be used, when FN110 is installed.
- The metallic enclosure of FN110 is connected to the screen of the external cable, and earthed with the frame ground of the connected equipment. In order to avoid multi-point earthing, potential equalization is required between the metallic enclosure of FN110 and the frame ground of the connected equipment.
- Locknut of plug for field wiring connections shall be tightened with specified torque values.

WARNING

Do not separate FN110 and remote antenna cable when energized.

Note 4. Maintenance and Repair

The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void IECEx Type of protection "n" Certification.

WARNING

Note 5. Special conditions of Use

- FN110 satisfies the requirements for IP66/IP67, only when it is connected to cable specified by manufacturer.

Revision Record

Title: FN110 Field Wireless Communication Module

<table>
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<td>—</td>
<td>New Publication</td>
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<tr>
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<td>Dec. 2014</td>
<td>1</td>
<td>Add Bundled items</td>
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<td>3E</td>
<td>Dec. 2015</td>
<td>5</td>
<td>Add CSA Safety Requirements</td>
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<td>May 2016</td>
<td>2</td>
<td>Add ATEX and IECEx Certification</td>
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<td>Add Canadian Safety Standards</td>
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<td>June 2017</td>
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<td>Add Approval for RE Directive</td>
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<tr>
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<td>8</td>
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