Technical Information

TI 01W01A55-01EN

YFGW710 Field Wireless Integrated Gateway Startup Guide
(From Device Configuration and Wireless Network Connection to Process Data Monitoring)

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Introduction

This startup guide provides basic guidelines for the minimum ISA100 wireless system with YFGW710 Field Wireless Integrated Gateway. It does not provide physical Installation, online device configuration, maintenance, service, or troubleshooting procedure. Refer to the Instruction Manual (IM 01W01F01) for more information and instructions. The manual is available on www.yokogawa.com.

The target system of this document consists of Field Wireless Integrated Gateway YFGW710(GW: R2.5.7v2, BBR:p4.02.24) with Temperature Transmitter YTA510(R2.01.01) and ISA100 wireless network using Yokogawa configuration tools, Field Wireless Configurator (FWC R1.02.00), Field Wireless Management Tool (FWMT R1.02.01) and FieldMate (R2.05).

Notes

- This startup guide may be revised periodically to incorporate updated information.
- Please use a computer's administrator account to install or update the software.
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1. Overview

This document describes one example of Field Wireless System configuration procedure, which consists of one Field Wireless Integrated Gateway (YFGW710) and one Field Wireless Device (Temperature Transmitter YTA510). These are connected via the ISA100.11a Field Wireless Network. The Gateway provides several communication interfaces such as Modbus /TCP for Host System and proprietary interface for system configuration. The process data is acquired by the Host System via Field Network. The system configuration parameters are modified by Field Wireless Configurator (FWC) and Field Wireless Management Tools (FWMT) which are individual software and are used on Configuration & Monitoring PC.

System Architecture

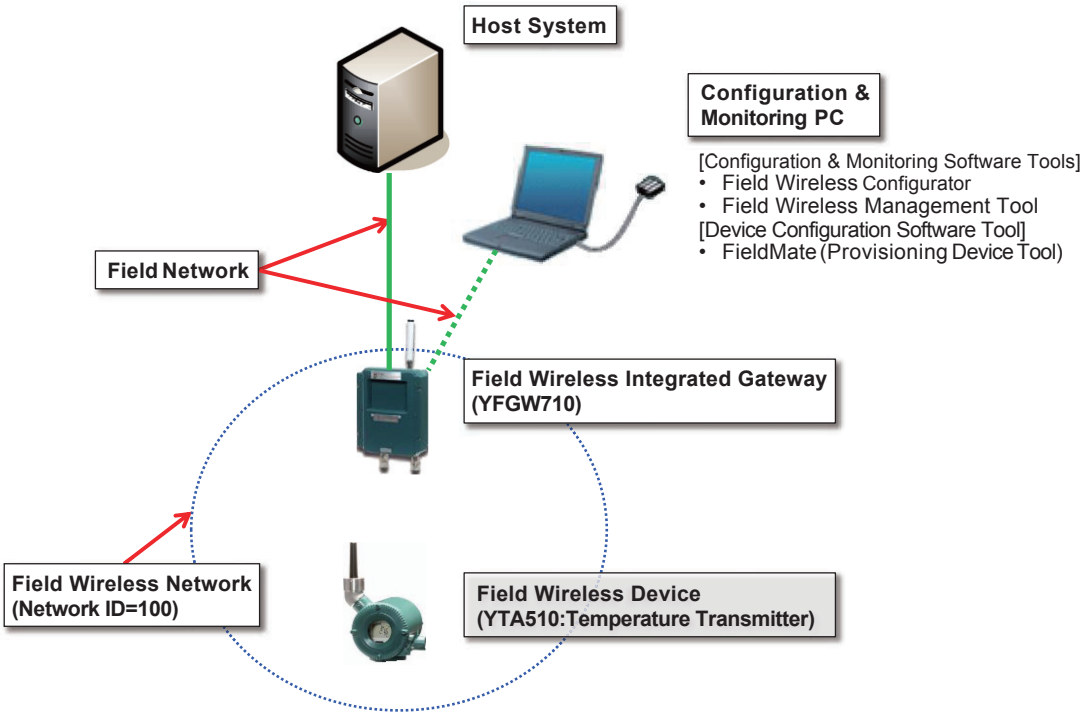


Fig.1 System Architecture

Work flow

[Installation]

Step 1

Preparation (Chapter 2)

- Planning Configuration Items
- Installing Software and CF/DD File
- Connecting Cable
- Mounting Antenna

Step 2

Configuration (Chapter 3)

- PC Network Configuration
- Wireless System Configuration
- Device Provisioning
- Provisioning File Registration
- Download New Configuration

Step 3

Confirmation (Chapter 4)

- Wireless System Confirmation
- Backup Files Confirmation

[Operation & Maintenance]

Monitoring Network Status (Chapter 5)

2. Preparation

2.1 Planning Configuration Items

2.1.1 Planning Device Provisioning Parameters

Before provisioning the Field Wireless Device, decide target Network ID and the Device Tag.

Table. 1 Device Provisioning

Item	Settings	Chap
Network ID	***100***	3.3
Device Tag	***YTA510_1***	

2.1.2 Planning Network Information

Before configuring the Field Wireless System, decide the Network ID and Network information (Topology etc.) for the Field Wireless Network and the network between Gateway and Configuration & Monitoring PC.

This setup example uses the settings shown in Table. 2 to configure the network in following chapter.

(See Appendix.2 [Blank Form] for additional information about each parameters.)

Table. 2 Network Information

Item			Settings	Chap
Network Information			-	3.2.1
↳	Network Information	Network ID	***100***	
		Description	Not used in this configuration	
IPv4 Settings			-	
↳	IP Address		***192.168.0.101***	
	Subnet Mask		***255.255.255.0***	
	Default Gateway		***192.168.0.1***	
	NTP Server IP Address		***192.168.0.1***	
Gateway			-	
↳	Device Tag		Use default setting [YFGW-GW001]	
System Manager / Security Manager			-	
↳	Device Tag		Use default setting [YFGW-SM001]	
	Channels		Use default setting [0-14]	
	Topology		***Star***	
	Max Nodes		Use default setting [50]	
	Max Latency (%)		Use default setting [0]	
	Max Device Timeout (sec)		Use default setting [120]	
	Advertise Period (sec)		Use default setting [7]	
	Join Links Period (sec)		Use default setting [4]	
	Packet Error Rate (%)		Use default setting [15]	
Backbone Router			-	
↳	Device Tag		Use default setting [YFGW-BBR001]	
	Filter Bit Mask (hex)		Use default setting [FFFF]	
	Filter Target ID (Subnet ID)		Use default setting [100]	

Field Network (PC)	IP Address	***192.168.0.102***	3.1
	Subnet Mask	***255.255.255.0***	

2.1.3 Planning Field Wireless Device Parameters

Before operating the Wireless System, sensor configuration parameters should be defined. This setup example uses the settings shown in Table. 3. (See Appendix.2 [Blank Form] for additional information about each parameter.)

Table. 3 Field Wireless Device setting

Item			Settings	Chap
Device information			-	3.2.2
↳	Device Tag		***YTA510_1***	
↳	Device Role		***IO***	
↳	Alarms configuration		-	
↳	CF /DD	CF File Name	***00010202.cff***	
Sampling data			-	
↳	Sampling Parameters	Update Policy	***Periodic***	
↳		Publication Period (sec)	***5***	
↳		Stale Limit (Times)	***50***	

2.1.4 Planning Modbus Register Mapping

When using Modbus communication between the Gateway and the control system in order to communicate process value and diagnostic information, this task needs to be performed. In this setup example, configure the Modbus register as shown below. (See Appendix.1 for additional information about Modbus function.)

Table. 4 Modbus setting

Absolute Address	Input Register Number	Allocation	Data Type (words)
30001	0	***Status***	***Unsigned16 (x 1)***
30002~30003	1~2	***DIAG_STATUS***	***Unsigned32 (x 2)***
30004	3	***Data Status***	***Unsigned16 (x 1)***
30005~30006	4~5	***PV***	***Float (x 2)***

2.2 Installing Software and CF/DD File

Table. 5 shows the software that is required for system configuration.

Install these software tools, Device Files, and the infrared adapter driver on Configuration & Monitoring PC.

For the installation procedure, refer to the instruction manual of the respective software.

Table. 5 PC and Software

No.	Software	Usage	Required steps	Installation	Operation	Maintenance
1	Field Wireless Configurator	Wireless network Configuration	Install the software from YFGW710 accessory DVD	✓	-	✓
2	Field Wireless Management Tool	Wireless network Monitoring	Install the software from YFGW710 accessory DVD	✓	(✓)	✓
3	FieldMate Basic / Advance and Device Files	Device Provisioning Sensor configuration	Install the software from FieldMate DVD. (Need to purchase)	✓	-	✓
4	Infrared adapter driver	Device Provisioning	Install the driver from Infrared adapter accessory DVD. (ACTiSYS Infrared Adapter[ACT-IR224UN 9600bps])	✓	-	✓
5	CF/DD File	Field Wireless Device Registration (CF files contain the vendor names, model names, revisions etc.)	(1)Confirm the appropriate revision on the website .[*1] <http://www.field-wireless.com/en/download/index.html> ->“Support for Field Wireless Devices and FieldMate /PRM” (2)Save the CF/DD files to the recommended folder below. <C:/Yokogawa/FieldWireless/CFDD/59543/**** [*2]>.	✓	✓	✓

[*1] The second bit positioned character on a Main name plate [SUFFIX column] of Field Wireless Device indicates “Amplifier housing basic specification code”.
[*2] “0005” for Temperature Transmitter YTA510,
“000c” for Pressure Transmitter EJX series
“1802” for Multi-Input Temperature Transmitter YTMX580.

Recommended System Requirements

• Field Wireless Configurator, Field Wireless Management Tool

[Supported Operating System]

Windows 7 Professional Edition (32bit/64bit)

Windows Vista Business Edition Service Pack 2 or later (32bit)

Windows XP Professional Service Pack 3 or later (32bit)

Windows Server 2008 Enterprise Service Pack 2 or later (32bit/64bit)

Windows Server 2008 Enterprise R2 (64bit)

Language: Japanese or English

[Hardware Requirements]

Item	Windows 7/2008R2	Windows Vista/2008	Windows XP
Processor	Intel Core2Duo 2.66GHz or more		Intel Pentium4 2.8GHz or more
Memory	2GB or more		1GB or more
Hard Disk Drive	Minimum free space of 32GB or more	40GB or more (15GB or more)	20GB or more (minimum free space: 15GB or more)
Display	1024 x 768 High color, 32bit		
Network port	Ethernet Network port		

• FieldMate Basic/Advance

[Operating System]

Windows 7 Professional, Home Premium 32bit/64bit SP1 or later

Language: Japanese , English , Chinese (simplified), German, French, Russian

Windows Vista Business 32bit SP2 or later

Language: Japanese , English , Chinese (simplified)

[Hardware Requirements]

Item	Windows 7	Windows Vista
Processor	Intel ® Core™2 Duo T7100 or similar specification CPU	
Memory	2GB or more	1GB or more (2GB or more recommended)
Hard Disk Drive	8GB or more	
DVD-ROM Drive	Windows 7 compatible	Windows Vista compatible
Display	1024×768 or better resolution recommended Windows 7 compatible	1024×768 or better resolution recommended Windows Vista compatible

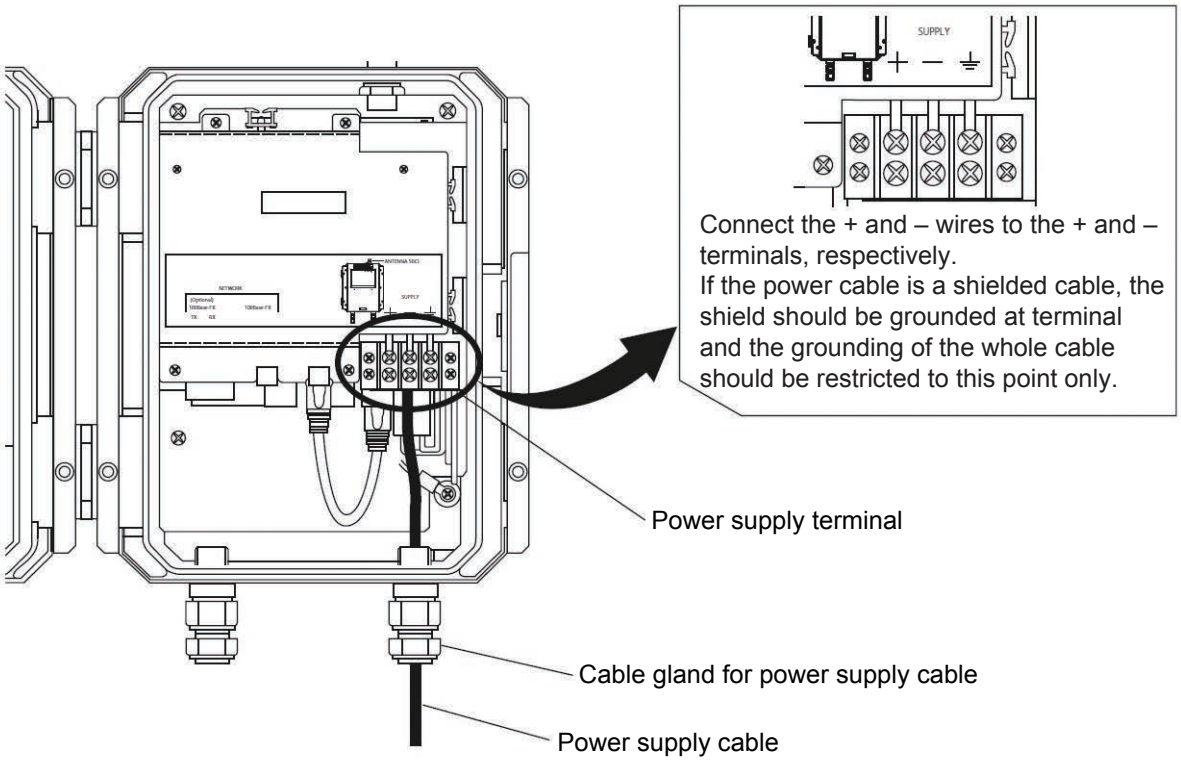
2.3 Connecting Cable

This chapter describes the connection of the power supply cable, grounding cable and network cable and also the mounting of the antenna.

2.3.1 Connecting Power Supply Cable

Pull the power supply cable into the gateway.

Connect the power supply cable to the power supply terminal in the gateway.



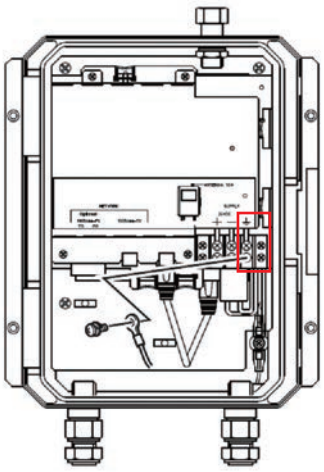
1. Pull the power cable into the housing of Gateway.
2. Connect + lead wire to + terminal and – lead wire to – terminal.

2.3.2 Connecting Ground Cable

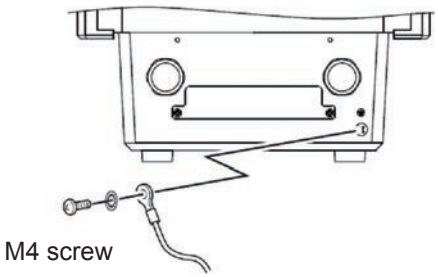
To connect the grounding cable to YFGW710 directly, use the grounding terminal on the right bottom of the main body. Do not share the ground wiring with other devices. (Grounding resistance of 100 Ω or less is necessary.)

1. Internal grounding terminal

   If the power cable is a shielded cable, the shield should be grounded at the terminal marked.



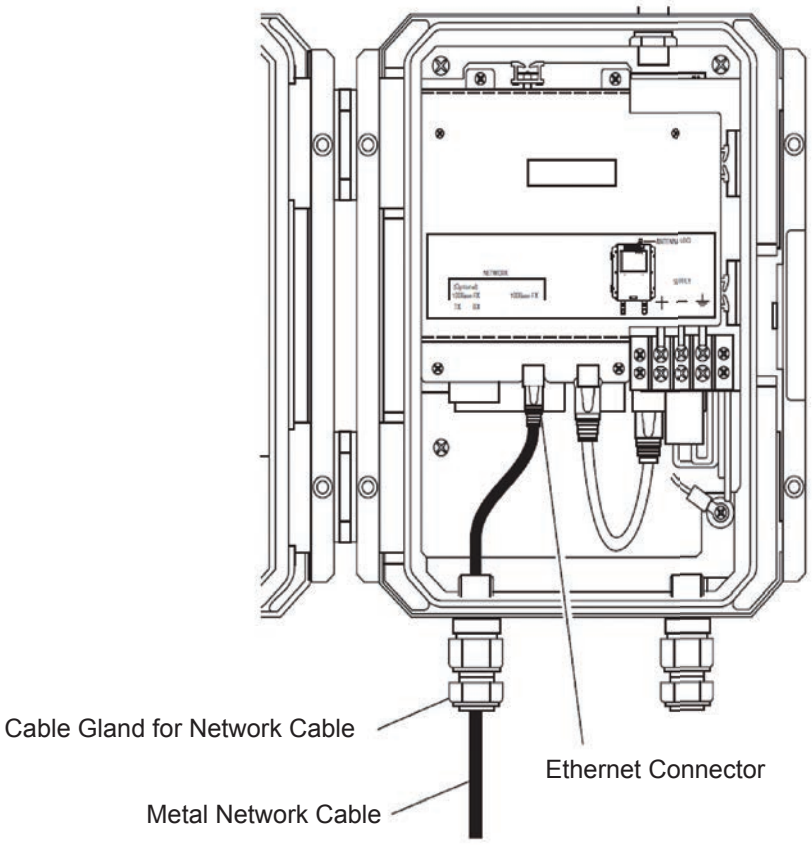
2. External grounding terminal



(Bottom of the enclosure)

2.3.3 Connecting Network Cable

Connect the metal network cable according to the following procedure.



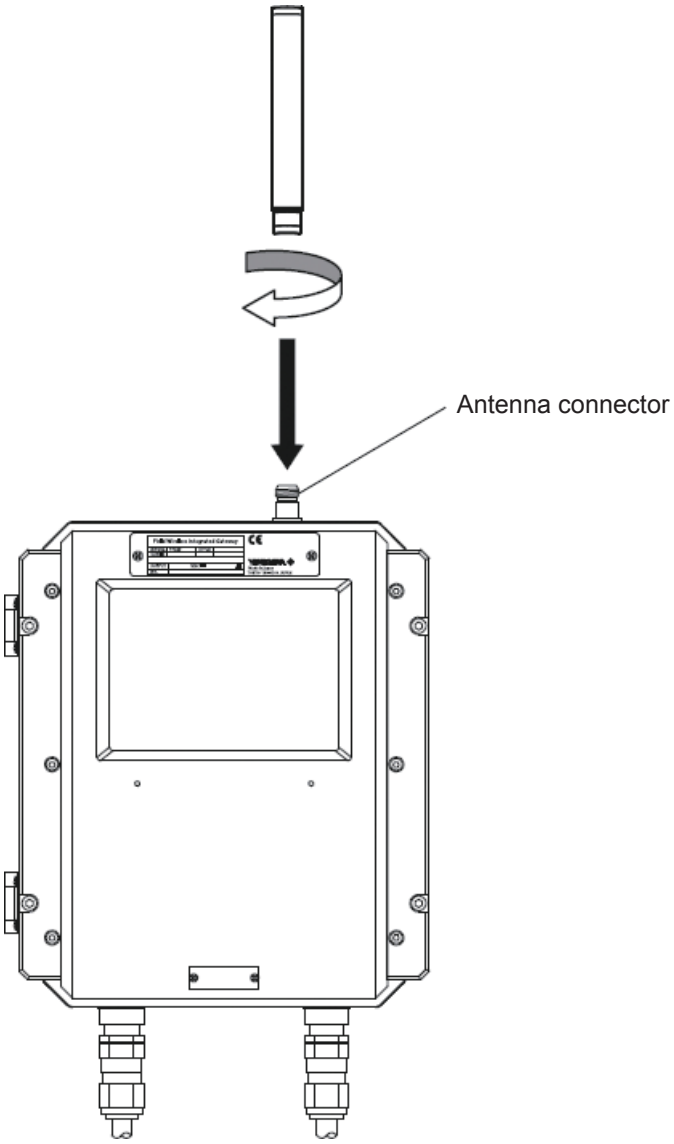
1. Pull the metal network cable into YFGW710.
2. Connect the metal network cable to the network connector.

NOTE

Use the metal cable conforming to the standard of 100BASE-TX.

2.4 Mounting Antenna

Screw the provided antenna into the connector on the top of the body.



1. Unscrew the antenna connector cap on the antenna connector.
2. Screw the provided antenna into the antenna connector.
   Tighten the antenna connector with a torque of 2 to 3 N·m.

3. Configuration

3.1 PC Network Configuration

Configure the network settings (IP address of PC) as shown in Table. 2.

NOTE

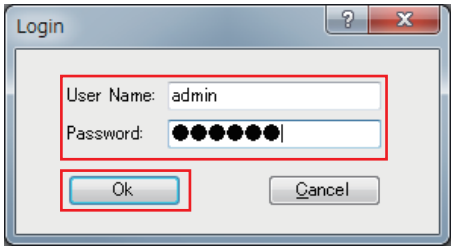
Before starting configuration tools, “Automatically detect Proxy” setting of internet browser needs to be disabled.

3.2 Wireless System Configuration

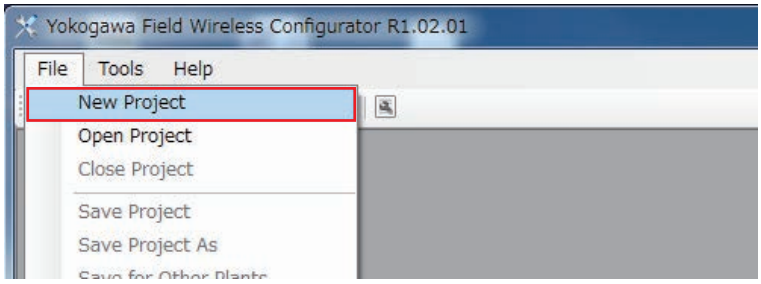
3.2.1 Network Configuration

1. Start [Field Wireless Configurator] from the Start menu of Configuration & Monitoring PC.

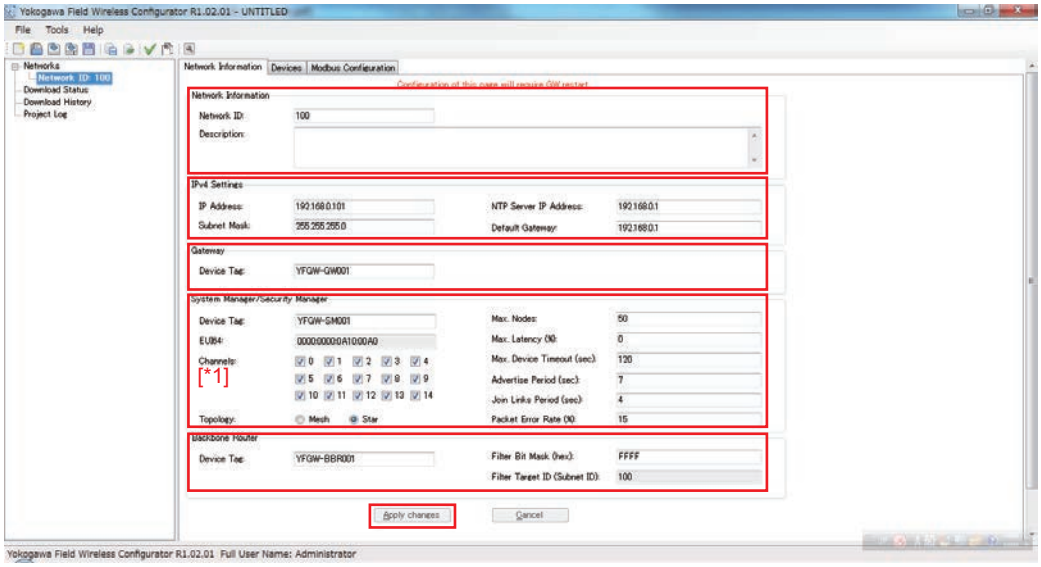
2. Enter “admin” in Login Name and Password, and click [OK].
   • Default Login user is “**admin**” and password is “**!admin**”.



3. Select [New Project] from the File menu.



4. Refer the Table. 2 (Chapter 2) and configure the gateway network settings such as Network information, IPv4 Settings, Gateway System Manager/Security Manager and Backbone Router.



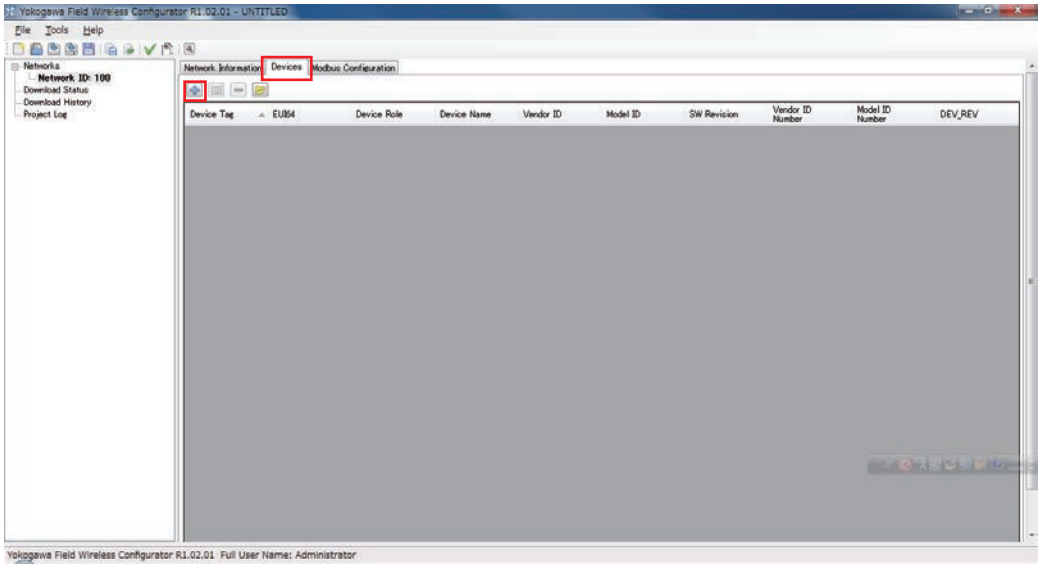
[*1] The ISA100.11a field wireless network uses the wireless frequency bandwidths for the respective channels defined in the IEEE 802.15.4. Clear the check boxes for the channels whose use is prohibited by the law of your country.

5. When the configuration of the parameters has been completed, select [Apply changes] and click [OK] to complete the configuration.

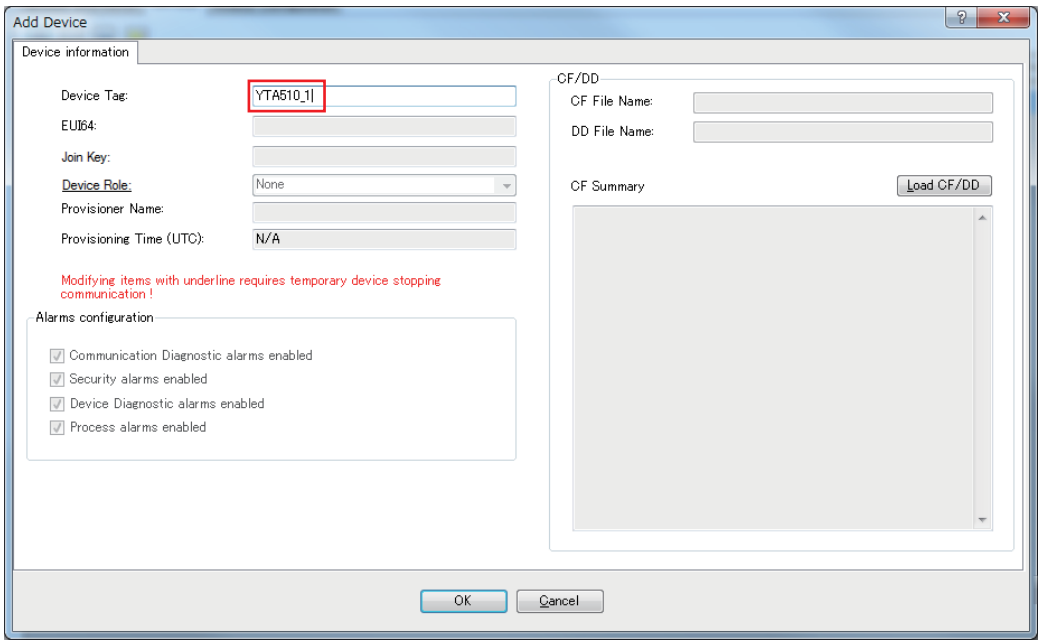
3.2.2 Field Wireless Device Configuration

■ Register Field Wireless Device (Offline)

1. Select [Devices] tab and click [+] icon to register Field Wireless Device.



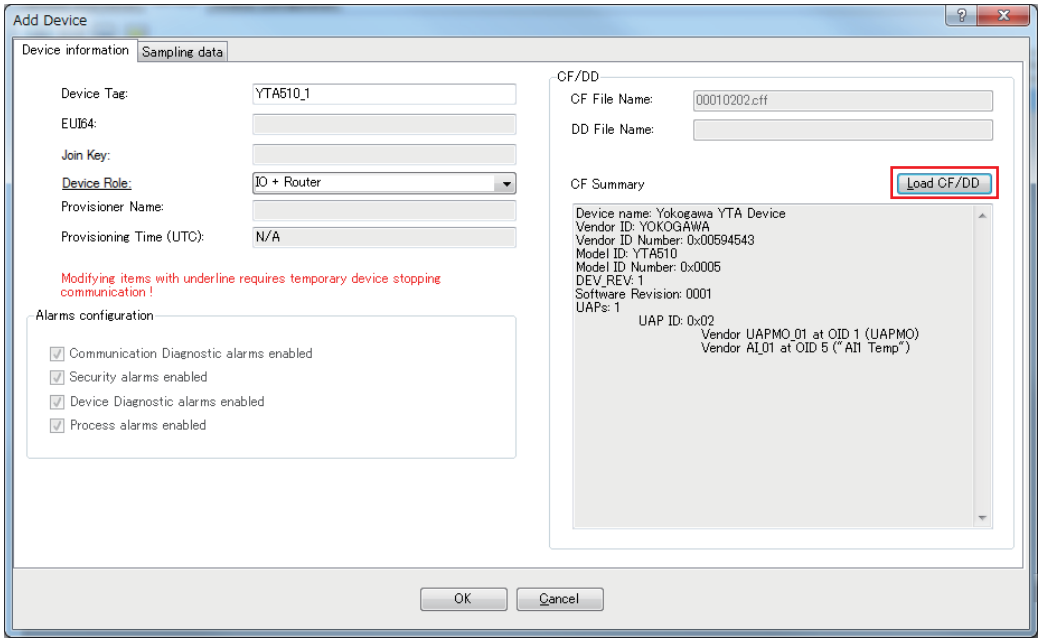
2. Enter [YTA510_1] in Device Tag.
   - Device Tag needs to match name entered in Provisioning Device Tool in the following procedure.



[Loading CF/DD File]

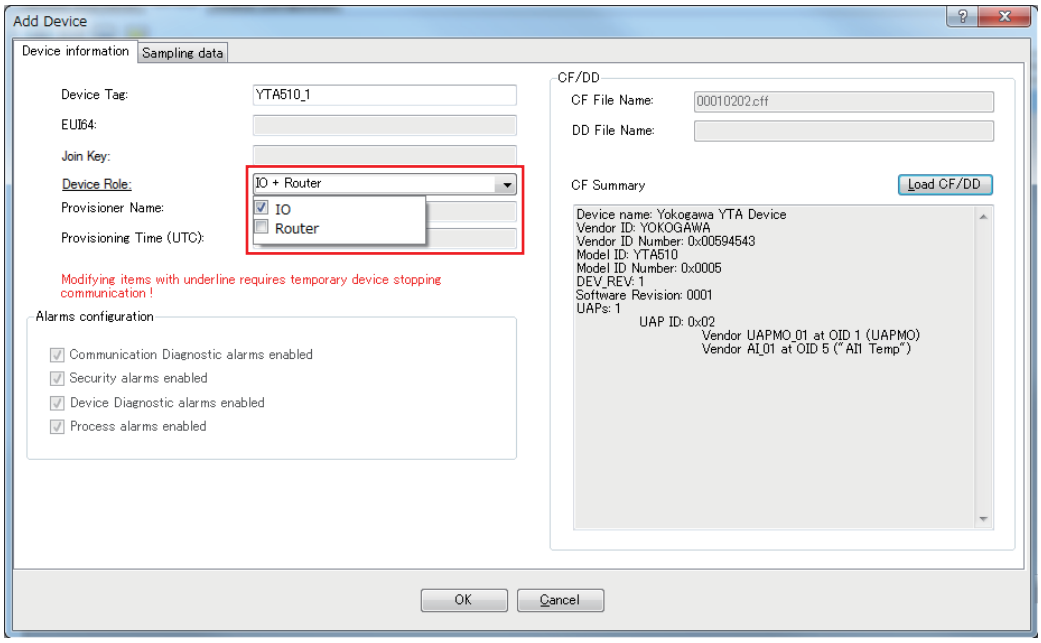
3. Refer the Table. 3 (Chapter 2) and click [Load CF/DD] and select the CF file for Temperature Transmitter YTA510 from recommended folder.

   <C: /Yokogawa/FieldWireless/FieldWirelessConfigurator/CFDD/59543/0005>



[Setting Device Role]

4. Select [IO] in [Device Role] and uncheck the [Router].



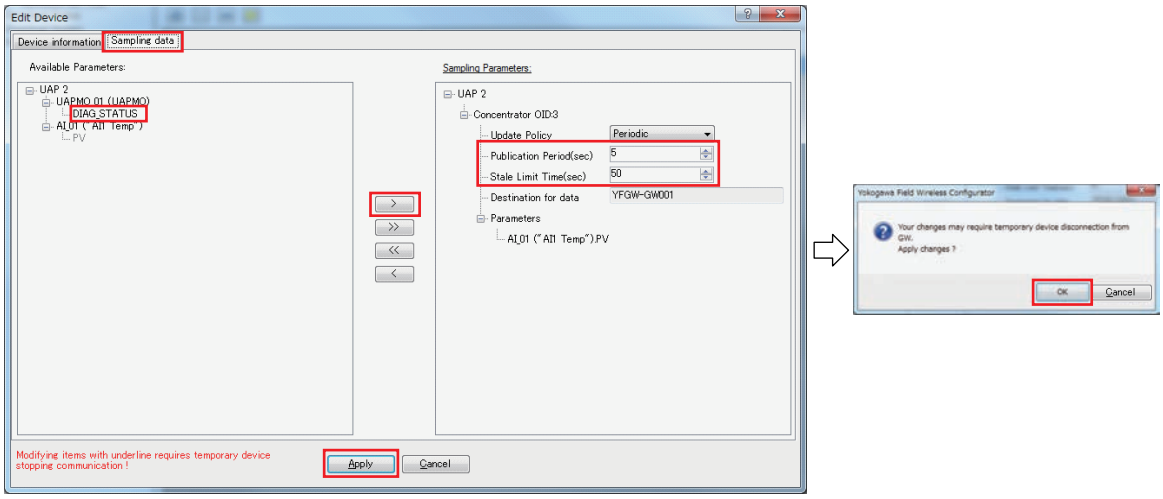
[Setting Publication Period]

5. Select [Sampling Data] tab.

   Click [DIAG_STATUS] in Available Parameter window, and select [>] button.

   Enter 5 (sec) in Publication Period and 50 (sec) in Stale limit.

   When the configuration of the parameters is completed, select [Apply] and click [OK] to apply the configuration.

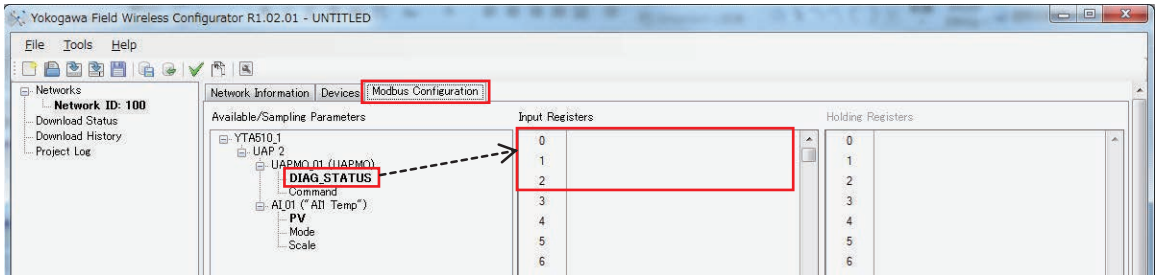


Setting Modbus Resisters

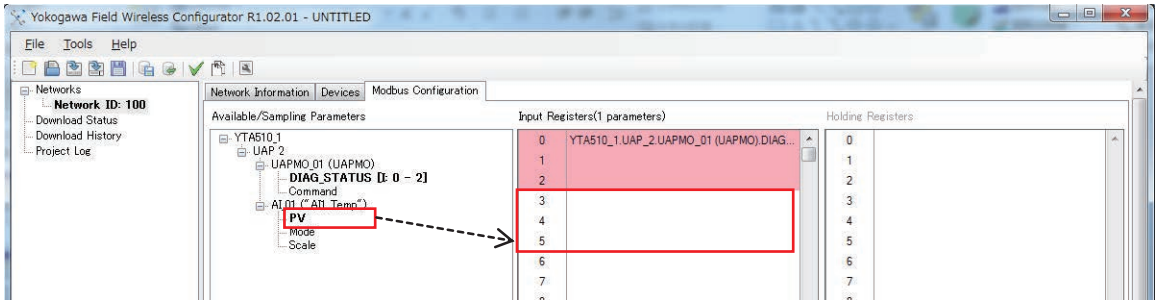
Refer the Table. 4 (Chapter 2) and map the process data (parameters) to the gateway register.

1. Click [Modbus Configuration] tab.

   Drag and drop [DIAG_STATUS] to the Input Register Number 0-2.



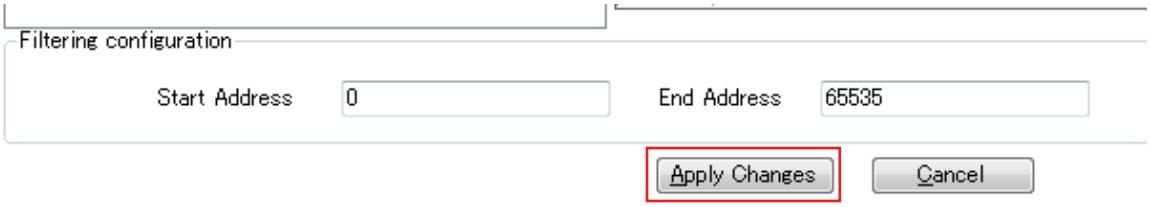
2. Drag and drop [PV] to the Input Register Number 3-5.



NOTE

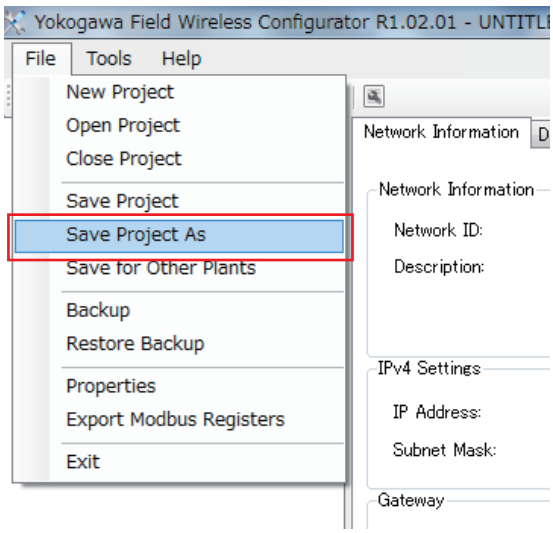
To remove the Inputted Register, click the registered data from the [Input Registers] area and press delete key.

3. When the data mapping has been completed, select [Apply Changes] to apply the configuration.



Save Project File

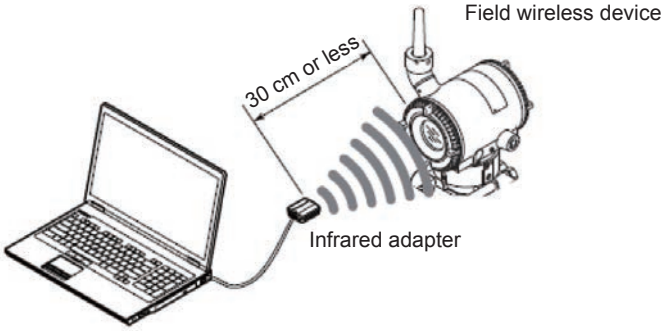
1. Select [Save Project As] from the File menu and save project file to the folder below.
   <C:/Yokogawa/FieldWireless/FieldWirelessConfigurator/Project>



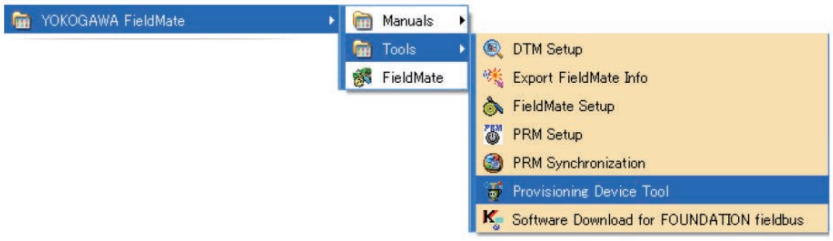
3.3 Device Provisioning

Device provisioning creates Join Key. The Join Key is a unique key for each Field Wireless Device and needs to be exported to the provisioning file. Exported provisioning file will be imported to the Gateway and it allows a Field Wireless Device to join a specific network.

1. Connect the infrared adapter to Configuration & Monitoring PC.
   - Make sure that the distance between infrared adapter and infrared communication port on the front of the Field Wireless Device is less than 30 cm.

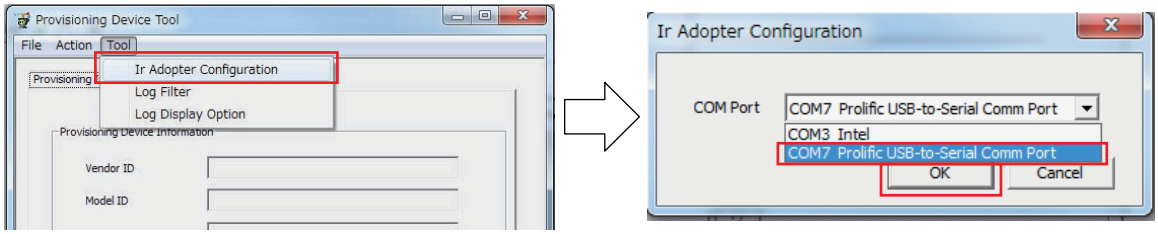


2. Start [Provisioning Device Tool] from the Start menu.

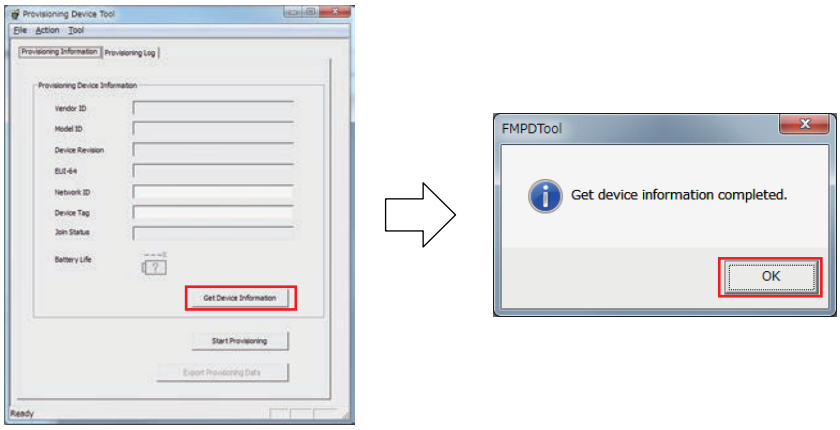


3. Select [Ir Adapter Configuration] from the Tool menu.

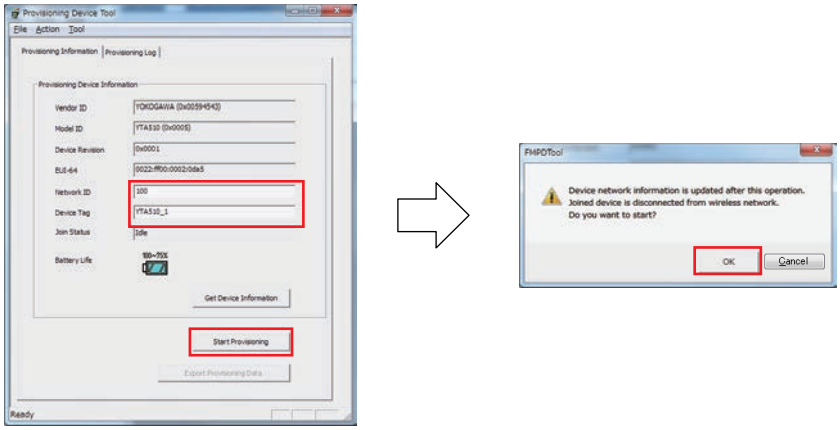
   Select COM Port that is assigned to “Prolific USB-to-Serial COM Port” for the infrared adapter from the pull down menu and click [OK].



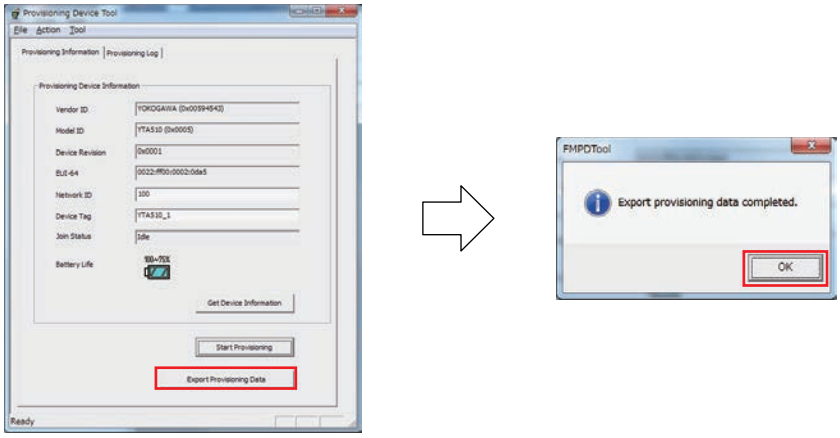
4. Select [Get Device Information] and then the information acquisition will start.
   Click [OK] when the dialog appears.
   • This step requires pointing IR adapter at Field Wireless Device.



5. Refer the Table. 1 (Chapter 2) and enter [100] in Network ID and [YTA510_1] in Device Tag, and select [Start Provisioning].
   • This step requires pointing IR adapter at Field Wireless Device.



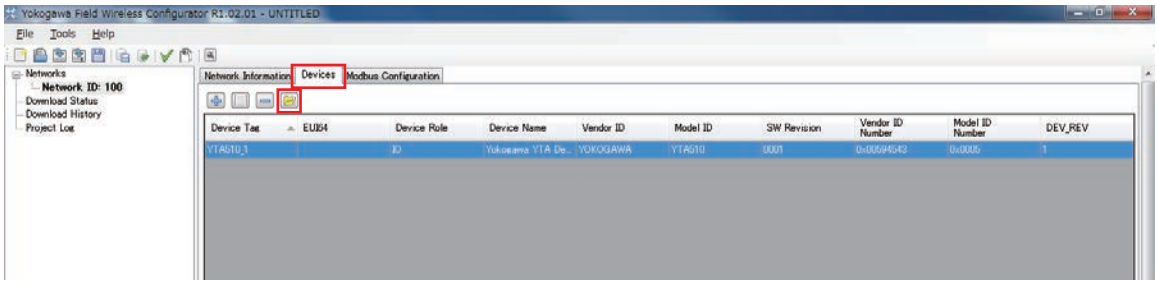
6. Select “Export Provisioning Data” to save result to a file (example: “YTA510_1_100.ypif”).
   • The file includes security key information and it is encrypted.
   • Export the provisioning data to the recommended export folder.
   <C:/Yokogawa/Field Wireless/PD>.



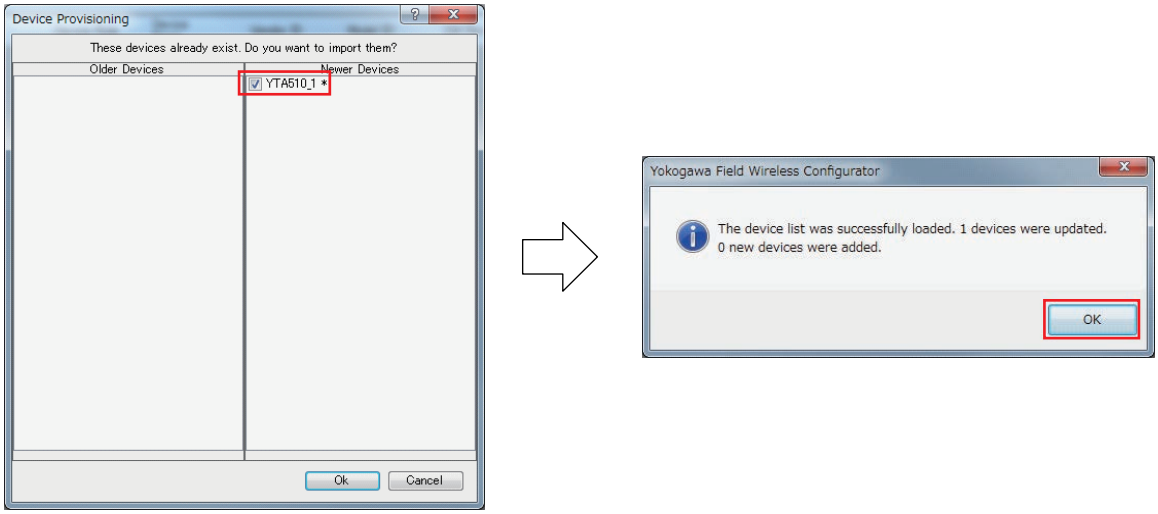
3.4 Provisioning File Registration

1. Select [Devices] tab and click [Open File] icon to import provisioned Field Wireless Device. Select the provisioning file [YTA510_1_100.ypif] from recommended export folder <C:/Yokogawa/Field Wireless/PD> and click [Open].

   * Field Wireless Configurator automatically filters out the Field Wireless Devices by Network ID when it imports the Provisioning File (.ypif).



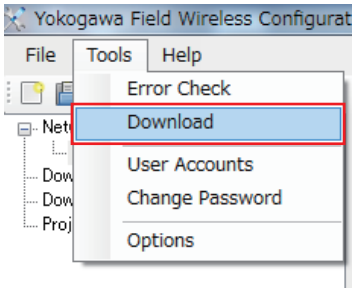
2. Select the device and click [OK].



3.5 Download New Configuration

1. Select [Download] from the Tools menu.

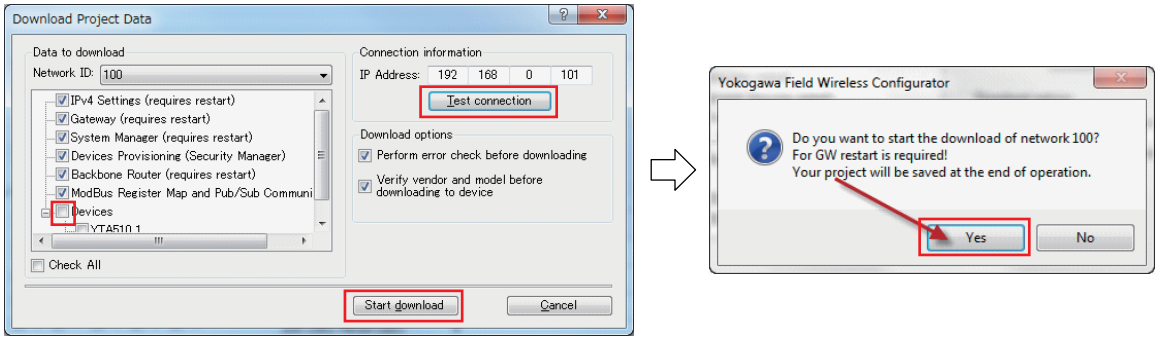
   • Need to save project file again to download new setting.



2. Select [Test connection] to confirm the connectivity between Gateway and Configuration & Monitoring PC.

   Uncheck the [Devices] from the download list and Select [Start download].

   Click [Yes] to start downloading.

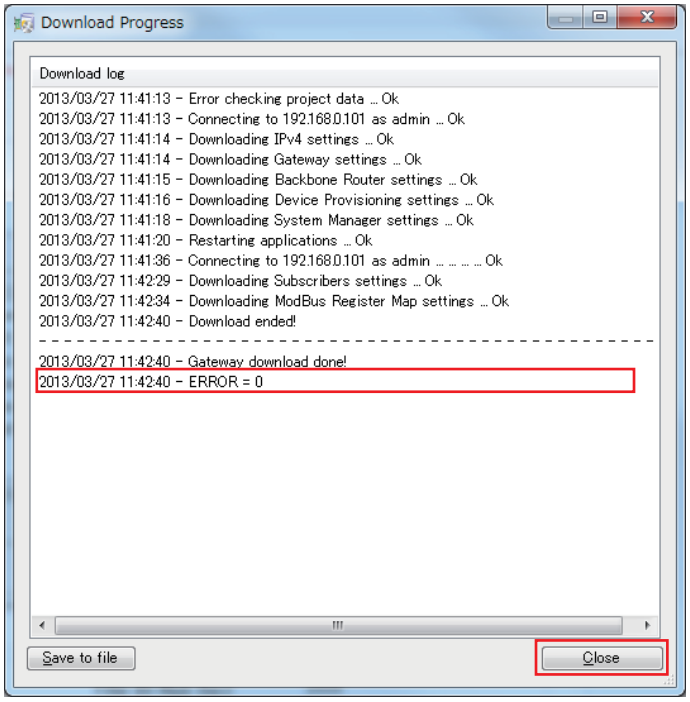


NOTE

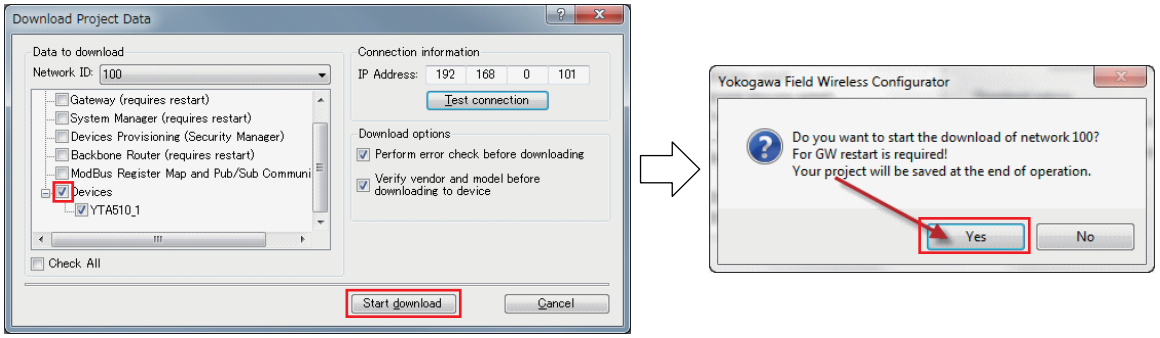
Field Wireless Device needs to be joined before downloading configuration.

Therefore download all the other configurations before downloading Field Wireless Device configuration.

3. Ensure that there is no error and click [Close].



4. Check the “Devices” from the download list and Select [Start download].
Click [Yes] to start downloading.

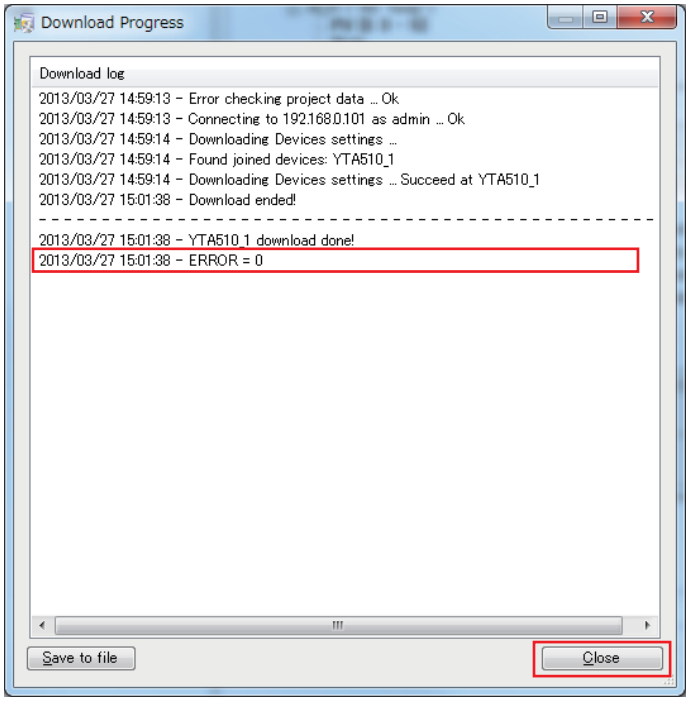


5. Ensure that there is no error and click [Close].

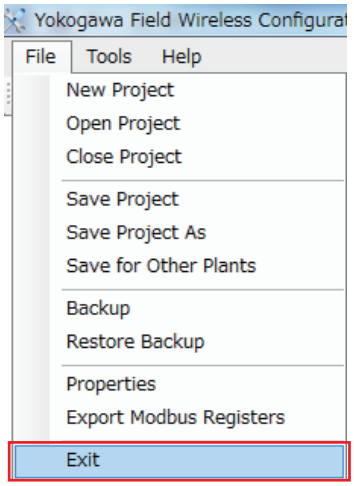
   • If you get a following error message, wait for 3 minutes and then click [Start download] again.

   Error message

   “[Device Tag] download failed due to EUI64 read IDENT_NUMBER configured NG due to timeout !!”



6. Select [Close] in the Download Project Data dialog box and click [Exit] from the File menu to exit Field Wireless Configurator.



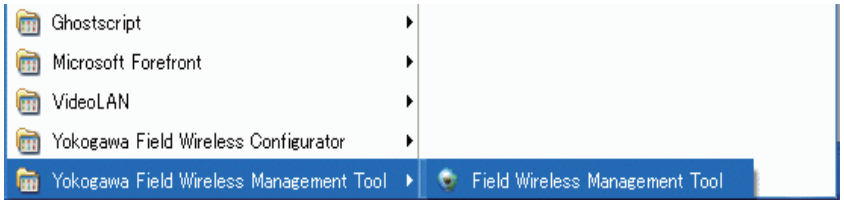
4. Confirmation

4.1 Wireless System Confirmation

Confirm the join status, publish status and device role after Field Wireless System configuration.

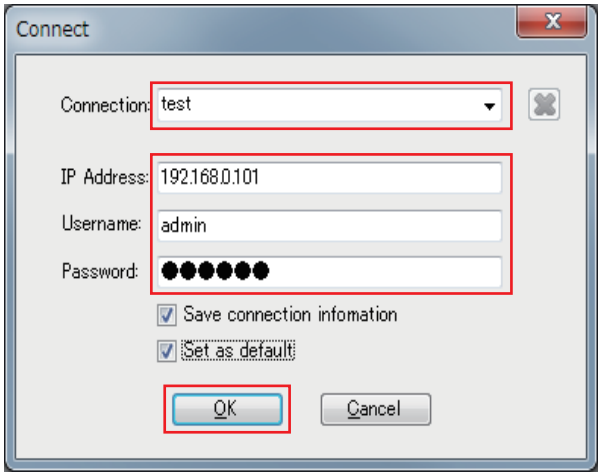
Start Field Wireless Management Tool

1. Start Field Wireless Management Tool from the Start menu of Configuration & Monitoring PC.



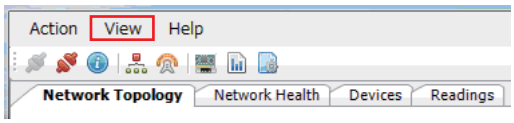
2. Enter a new connection name in the Connection drop-down list and enter the IP Address of the Gateway to be connected.

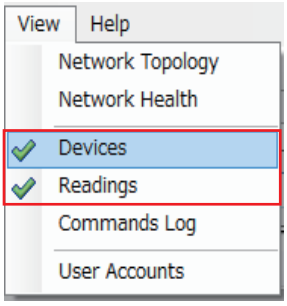
   The default authentication information is as follows. (Username: "**admin**", Password: "**!admin**")



Set View Menu

1. Select [View] from the Main menu and enable the View option [Devices] and [Readings].





- **Devices**

  The Devices tab page features a list of the devices in the network.

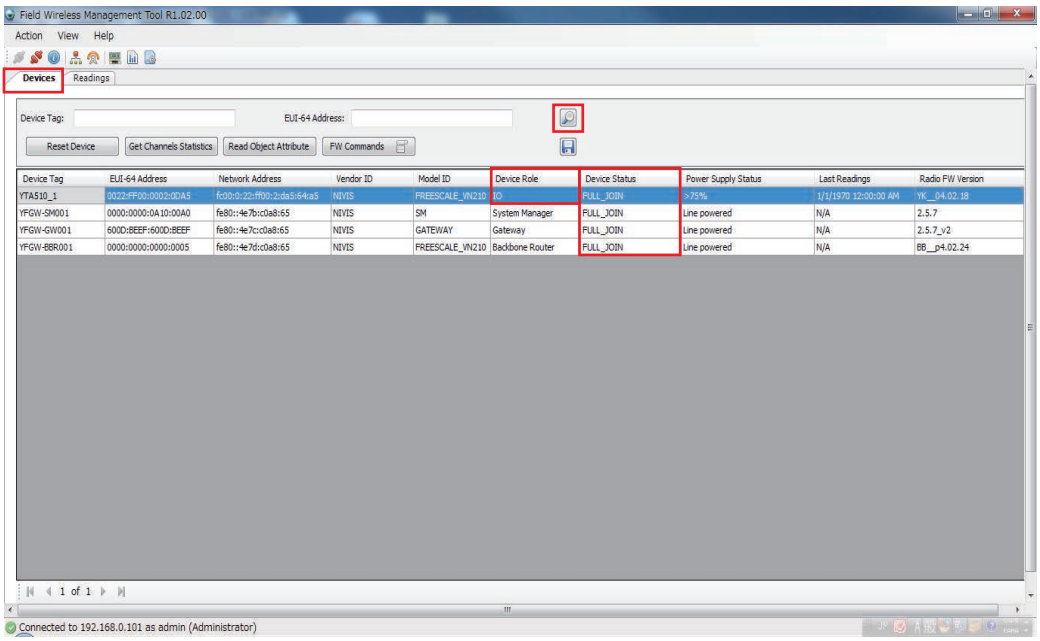
  It allows you to search devices based on their device tag and EUI-64 address using the search function, and execute several device commands.

- **Readings**

  The Readings tab page allows you to view the last readings received from devices, which are generated by automatic Publish/Subscribe commands.

Devices

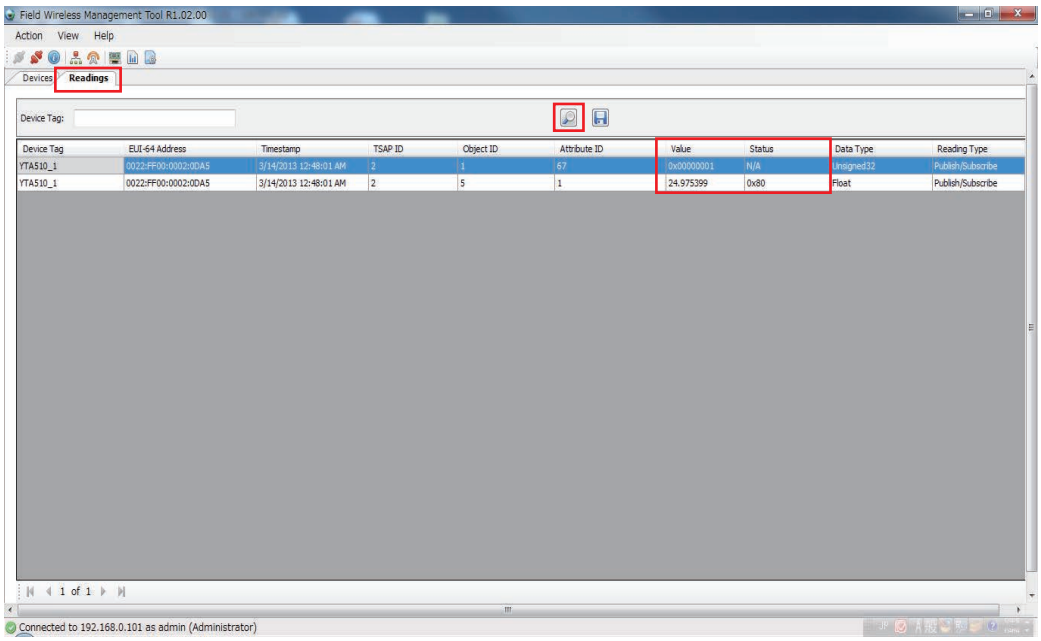
The Devices tab page shows a list of the joined devices in the network.



1. Click [Devices] from the Tab menu.
2. Ensure that [Device Role] indicate “IO” and [Device Status] indicates “Full Join”
   • Click [Search] to refresh the Field Wireless Devices information.

Readings

The Readings tab page shows the last transferred values from devices.



1. Select [Readings] from the Tab menu or [Readings] icon on the toolbar.
2. Ensure that [Value] and [Status] are below.
   - [Value] : Received value from the Field Wireless Device.
   - [Status] : Normal operation (PV Status =0x80 and DIAG_STATUS =0x1)

NOTE

- It takes approximately 15 to 30[min] to publish the data after Field Wireless Device has joined the network.
- Click [Search] to refresh the Field Wireless Devices information.

4.2 Backup Files Confirmation

Ensure that all files below have been saved to recommended folder after the system configuration.

- **Provisioning File**
  - Extension : ".ypif"
  - Recommended folder :<C:/Yokogawa/FieldWireless/PD>
- **Field Wireless Configurator setting info**
  - Extension : ".yep"
  - Recommended folder :<C:/Yokogawa/FieldWireless/FieldWirelessConfigurator/Project>.

5. Monitoring Network Status

In addition, three view menu options below enable monitoring the network status of ISA100.11a Field Wireless Netwrok.

- Network Topology
- Network Health
- Neighbors Health

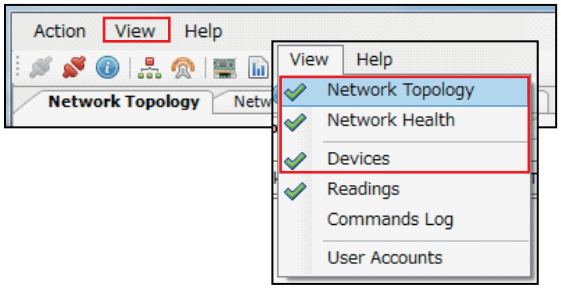
Set View Menu

1. Select [View] from the Main menu and enable following View options.

   [Network Topology]

   [Network Health]

   [Devices]

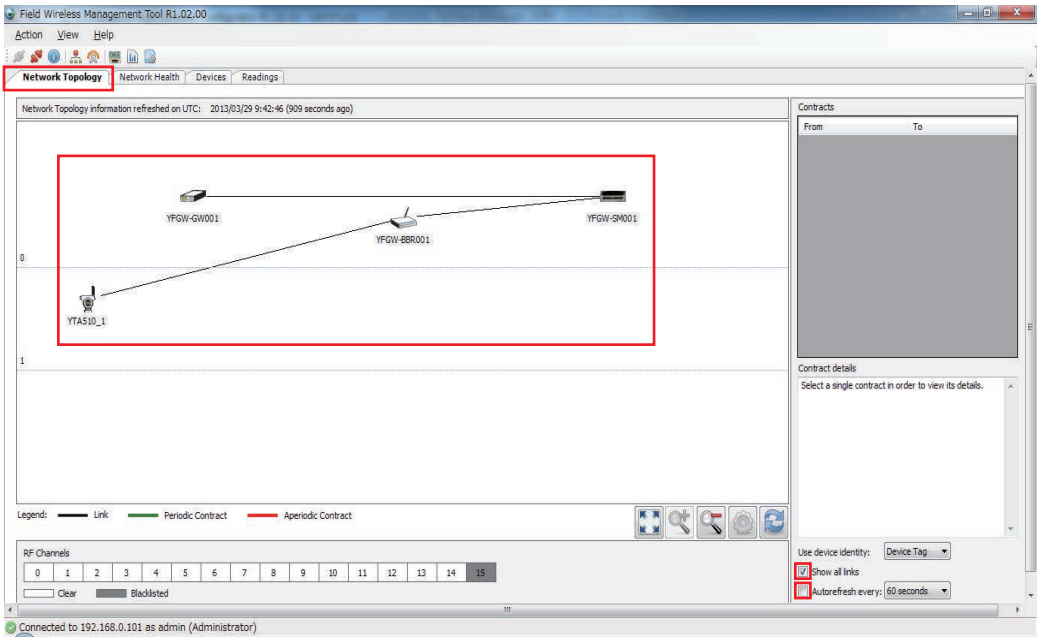


Network Topology

The Network Topology graphically displays the current network topology information including number of hops.

The topology graph displays the devices on multiple layers delimited by horizontal lines, the layers being numbered from 0 to n. The layer number indicates a number of hops.

Field Wireless Integrated Gateway YFGW710 has four functions, Gateway(YFGW-GW001), System Manager / Security Manager(YFGW-SM001), and Backbone Router(YFGW-BBR001). These functions are found on layer 0 and device (YTA510_1) is located on layer 1 in this example.



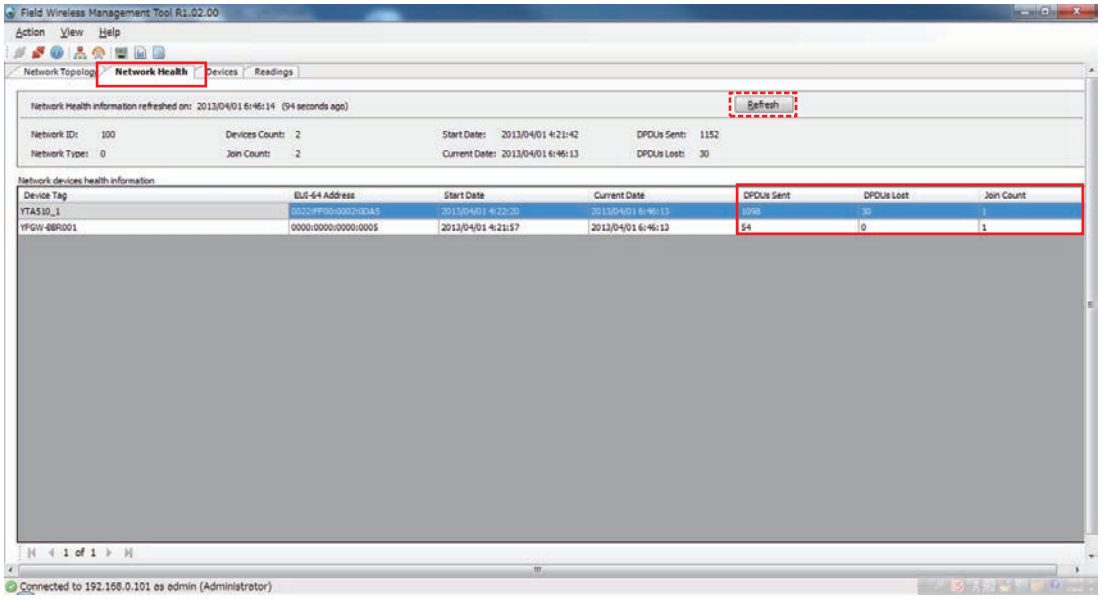
1. Select [Network Topology] from the Tab menu.
2. To view all the links among devices, enable the [Show all links] and [Autorefresh every] option at the bottom right corner.

NOTE

It takes 15 to 30[min] to display the network topology after Field Wireless Device joined the network.

Network Health

The Network Health provides communication health reports such as number of transmission packets, number of lost packets and device join count. The number of lost packets is equal to the number of retransmission, which is one of the network quality indicators.



1. Select [Network Health] from the Tab menu.
2. Confirm the [DPDUs Sent], [DPDUs Lost] and [Join Count] column.

   [DPDUs Sent] shows summary information of total number of transmissions and

   [DPDUs Lost] shows the total number of packets which failed to reach destination per device.

   PER(packet error rate) is calculated by dividing [DPDUs Lost] by [DPDUs Sent].

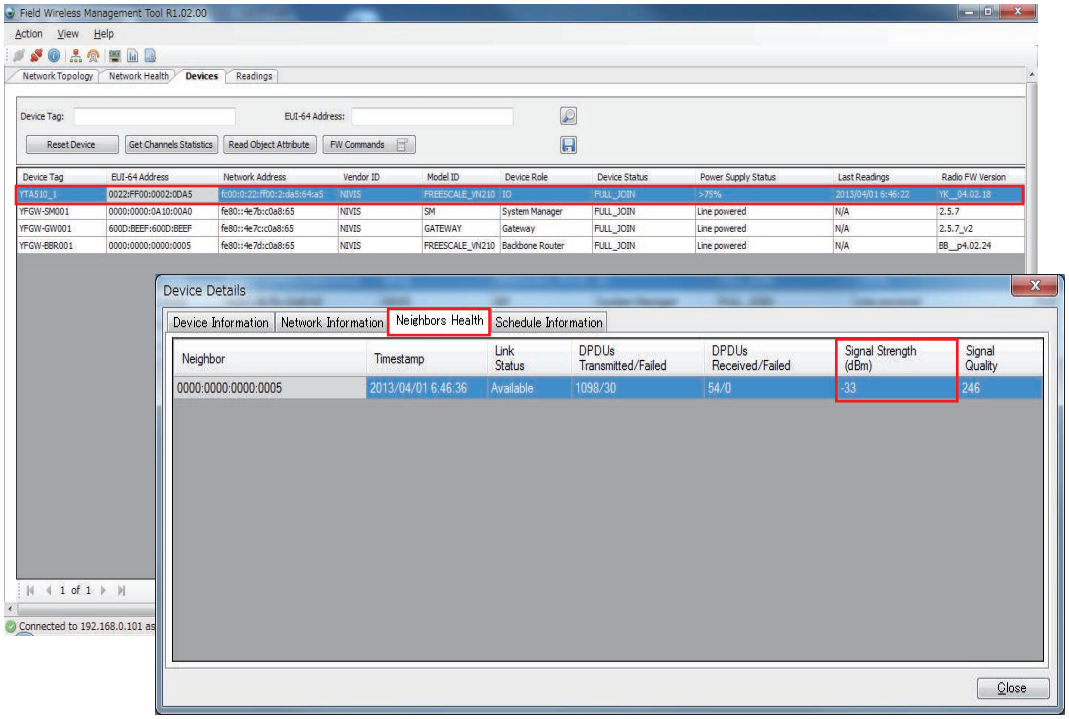
   [Join Count] shows the total number of joins per device.

NOTE

Displayed information will not refresh automatically, Click [Refresh] to update.

Neighbors Health

The Neighbors Health tab page displays communication health reports such as signal strength information on the selected device's neighbors.



1. Select [Devices] from the Tab menu and double click [YTA510_1].
2. Click [Neighbors Health] and confirm the [Signal Strength] column.

   [Signal Strength] shows the signal strength (measured in dBm) between selected device and neighbors.

NOTE

It takes 15 to 30[min] to display the neighbors Health after Field Wireless Device joined the network.

Appendix 1 Modbus Protocol

Overview

Gateway provides Modbus/TCP server (slave) function. During Modbus communication, the Field Wireless Device data is transmitted to the host system. Below are supported Modbus function codes.

• Read Input Register (3X)

Modbus Function Code: 0x04, Address: 0 to 66535

• Write Holding Register (4X)

Modbus Function Code: 0x10, Address: 0 to 66535

Before transmitting data to a host system, it is necessary to map the transmission process value, device status, alert information and other data on registers.

In the host systems, system engineering is required to embed the error detection mechanism using Device Status of each wireless system component, Process Data Status, and self-diagnosis status (DIAG_STATUS) of the field wireless device; error types can be identified.

NOTE

Process Value will hold previous value if the Communication error or Sensor error occurred.

Therefore you need to check the Process Data Status in order to confirm the data quality.

Parameters

[PV]

Below is the Process Value data block. Data block always starts with 8bit “Data Status” information.

Data Status (8bit :Unsigned16)	Value (32bit: Float)

The Modbus registers are all 2 bytes (1 word). Therefore, PV is mapped as below with 8bit reserved space.

16 8	7 0
00000000	Data Status(8bit)
Value (Upper 16bit)	
Value (Lower 16bit)	

Below is an example of 8bit Data Status information for PV. Typically host system checks first bit (Bit7) to determine data quality. (0x80(128): Good condition without error)

Quality	Limit Condition				Contents	Bit strings						
	Not Limited	Low Limited	How Limited	Constant		7	6	5	4	3	2	1
=BAD	0x00	0x01	0x02	0x03	Non-specific	0	0	0	0	0	0	-
	0x04	0x05	0x06	0x07	Configuration Error	0	0	0	0	0	1	-
	0x08	-	-	-	Not Connected	0	0	0	0	1	0	-
	0x0C	0x0D	0x0E	0x0F	Device Failure	0	0	0	0	1	1	-
	0x10	0x11	0x12	0x13	Sensor Failure	0	0	0	1	0	0	-
	0x14	-	-	-	No Communication with Last Usable Value	0	0	0	1	0	1	-
	0x18	-	-	-	No Communication with No Usable Value	0	0	0	1	1	0	
	0x1C	0x1D	0x1E	0x1F	Out of Service	0	0	0	1	1	1	-
Uncertain	0x40	0x41	0x42	0x43	Non -specific	0	1	0	0	0	0	-
	0x50	0x51	0x52	0x53	Sensor Conversion not Accurate	0	1	0	1	0	0	-
	0x54	0x55	0x56	0x57	Range Limits Exceeded	0	1	0	1	0	1	-
=Good	0x80	0x81	0x82	0x83	No Special Conditions Exist	1	0	0	0	0	0	-

(Example of wireless communication status)

Not Join / Leave	: 0x08(8)	: Not Connected
Removing Battery	: 0x14(20)	: No Communication with Last Usable Value. User specific communication timeout based on “stale limit” setting.
Join Phase	: 0x18(24)	: No Communication with No Usable Value.

[DIAG_STATUS]

ISA100.11a Field Wireless Device supports self-diagnostics data block which is called DIAG_ STATUS. Below is the DIAG_STATUS data block. Data block starts with 8bit “Data Status” information.

Status (8bit :Unsigned16)	DIAG_STATUS (32bit: Unsigned32)

DIAG_STATUS is mapped as below with 8bit reserved space.

16 8 7 0

00000000	Status(8bit)
DIAG_STATUS(Upper 16bit)	
DIAG_STATUS(Lower 16bit)	

Below is an example of DIAG_STATUS information. Typically the host system checks the first 4 bits (Bit28 to Bit31) to determine device diagnostics results. Alarm categories, F, C, O, and M are configurable.

Modbus address	Name	Data format	Contents	Detail
Bit31	No name	UINT32	F: Failure status	
Bit30			C: Function check status	
Bit29			O: Out of specification status	
Bit28			M: Maintenance required status	
Bit27			Faults in electronics	AMP Err,MEMORY Err, Firm update Err,ADC Err
Bit26			Faults in sensor or actuator element	Sensor1 Failure Term SNS Falure
Bit25			Installation, calibration problem	Sensor1 Span Adj Err Sensor1 Zero Adj Err
Bit24			Out of service	AI1 O/S MODE
Bit23			Outside sensor limits	
Bit22			Environmental conditions out of device specification	SENSOR1 TEMP HI SENSOR1 TEMP LO AMB TEMP HI AMB TEMP LO
Bit21			Fault prediction: Maintenance required	FIRMWARE CONDITION CHECK
Bit20			Power is critical low: maintenance need short-term	LOWBAT FOR DEEPSLEEP
Bit19			Power is low: maintenance need mid-term	LOWBAT
Bit18			Software update incomplete	
Bit17			Simulation is active	AI1 SIMULATE MODE
Bit16-Bit8			Reserved for Baseline Device Profile	
Bit7-Bit1			Vendor specific area	
Bit0			Detail information available	1: available 0: no available

Bit0 always indicates “1: available”.

Appendix 2 Configuration Items (Blank Form)

Device Provisioning

Item	Settings	Remarks	Chap
Network ID		Numeric identity of a Field Wireless Network. (2 to 65535)	3.3
Device Tag		A name assigned to the Field Wireless Device for identifying the device. (Up to 16 single byte alphanumeric characters, A-Z, 0-9, and special characters, underscore and hyphen)	

Network setting

Item			Settings	Remarks	Chap
Network Information			-	-	3.2.1
↳	Network Information	Network ID	100	Numeric identity of a Field Wireless Network. (2 to 65535)	
		Description	Not used in this configuration	-	
IPv4 Settings			-	-	
↳	IP Address		192.168.0.101	Network parameters necessary to connect Gateway and the PC through Ethernet. Do not use identical IP addresses on the same Ethernet.	
	Subnet Mask		255.255.255.0		
	Default Gateway		192.168.0.1		
	NTP Server IP Address		192.168.0.1	Select the time synchronization method of the system. If the server is not used, set the same IP address as that of Default Gateway.	
Gateway			-	-	
↳	Device Tag		Use default setting [YFGW-GW001]	-	
System Manager / Security Manager			-	-	
↳	Device Tag		Use default setting [YFGW-SM001]	-	
	Channels		Use default setting [0-14]	-	
	Topology		Star	Specify the network topology. The following two types can be selected. Star (default) , Mesh	
	Max Nodes		Use default setting [50]	-	
	Max Latency (%)		Use default setting [0]	-	
	Max Device Timeout (sec)		Use default setting [120]	-	
	Advertise Period (sec)		Use default setting [7]	-	
	Join Links Period (sec)		Use default setting [4]	-	
	Packet Error Rate (%)		Use default setting [15]	-	
Backbone Router			-	-	
↳	Device Tag		Use default setting [YFGW-BBR001]	-	
	Filter Bit Mask (hex)		Use default setting [FFFF]	-	
	Filter Target ID (Subnet ID)		Use default setting [100]	-	

Field Network 1(PC)	IP Address	192.168.0.102	Network parameters necessary to connect Management Station and the Console PC through Ethernet. Do not use identical IP addresses on the same Ethernet.	3.1
	Subnet Mask	255.255.255.0		

Field Wireless Device setting

Item			Settings	Remarks	Chap
Device information			-	-	3.2.2
↳	Device Tag			A name assigned to the Field Wireless Device for identifying the device.	
↳	Device Role			A device role refers to the functional role of the field wireless device. Select from (1) IO, (2) IO+Router, (3) Router.	
↳	Alarms configuration		-	-	
↳	CF /DD	CF File Name		Confirm the appropriate revision on the website.(See Table. 5)	
Sampling data			-	-	
↳	Sampling Parameters	Update Policy		Periodic : Update periodically Change of state : Update with change of state (Always specify Periodic)	
↳	Sampling Parameters	Publication Period (sec)		The setting range is from 0 to 3,600 seconds. When “0” is selected, there is no publication.	
↳	Sampling Parameters	Stale Limit (Times)		When this specified time is exceeded and data cannot be received from the field wireless device, System Manager considers that a communication error has occurred. Communication status bit of Data Status register will indicate the error.	

Modbus setting

Absolute Address	Input Register Number	Allocation	Data Type (words)
30001	0		
30002~30003	1~2		
30004	3		
30005~30006	4~5		

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