Setting Procedures for Linking FBR-100AN and Patlite AirGRID®

silex technology

🛜 When it **Absolutely Must** Connect

Contents

1. Outline

This document describes how to link FBR-100AN, a protocol converter for CNC machine tools, with Patlite AirGRID®.

2. Structure

1. Device Structure

This document describes how to link the following communication devices.

(1) AirGRID® WDT (Transmitter)

- A ZigBee wireless transmitter to be used for Patlite signal tower lights.
- Collects the data of signal tower lights and transmits them to AirGRID® WDR (receiver).

(2) AirGRID® WDR (receiver)

- A ZigBee wireless receiver to collect data of Patlite signal tower lights from AirGRID® WDT.
- Supports up to 30 AirGRID transmitters' connection [*1] (WDT).

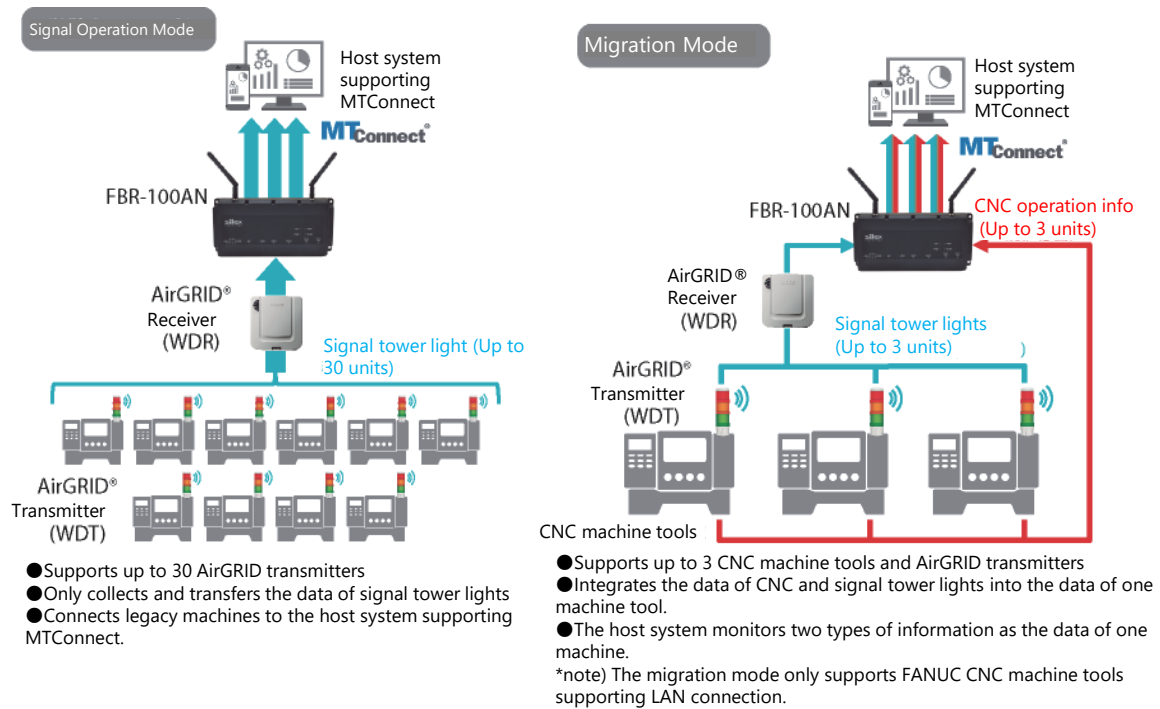 *1 The maximum number of connections depends on models.

(3) FBR-100AN

- silex protocol converter supporting MTConnect/Wireless LAN.
- Collects the data of signal tower lights via CNC machine tools and AirGRID® receivers.
- Transmits the data of CNC machine tools and signal tower lights to the host system (monitoring software) supporting MTConnect.

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2.2 Connection Structure

FBR-100AN supports two modes: one is the signal operation mode to only collect the data of signal tower lights. The other is the migration mode to collect the data of CNC machine tools and signal tower lights as a set. Both modes can be selected and set exclusively.

Signal Operation Mode

Host system supporting MTConnect

FBR-100AN

AirGRID® Receiver (WDR)

Signal tower light (Up to 30 units)

AirGRID® Transmitter (WDT)

●Supports up to 30 AirGRID transmitters
●Only collects and transfers the data of signal tower lights
●Connects legacy machines to the host system supporting MTConnect.

Migration Mode

Host system supporting MTConnect

FBR-100AN

CNC operation info (Up to 3 units)

AirGRID® Receiver (WDR)

Signal tower lights (Up to 3 units)

AirGRID® Transmitter (WDT)

CNC machine tools

●Supports up to 3 CNC machine tools and AirGRID transmitters
●Integrates the data of CNC and signal tower lights into the data of one machine tool.
●The host system monitors two types of information as the data of one machine.
*note) The migration mode only supports FANUC CNC machine tools supporting LAN connection.

3. Settings

### 1.   FBR-100AN Single Operation Mode Setting

In this mode, FBR-100 collects data on up to 30 signal tower lights with WDT (transmitter) mounted, and transfers the data to the host system supporting MTConnect.

3.1.1   Setting Steps

(1) Connect FBR-100AN to WDR (receiver) with a LAN cable.

(2) Set WDR's IP address in FBR-100AN.

(3) Set WDT's MAC address[2] in FBR-100AN.

(4) Access FBR-100AN from MTConnect client software [3]
How to connect: http://<FBR IP address>:port number/current

*2 You can do searching and auto settings on FBR-100AN configuration page.

*3 Each WDT connection is identified by the port number set in the FBR.

Client software supporting MTConnect

FBR-100AN

Wired LAN cable

AirGRID® WDT
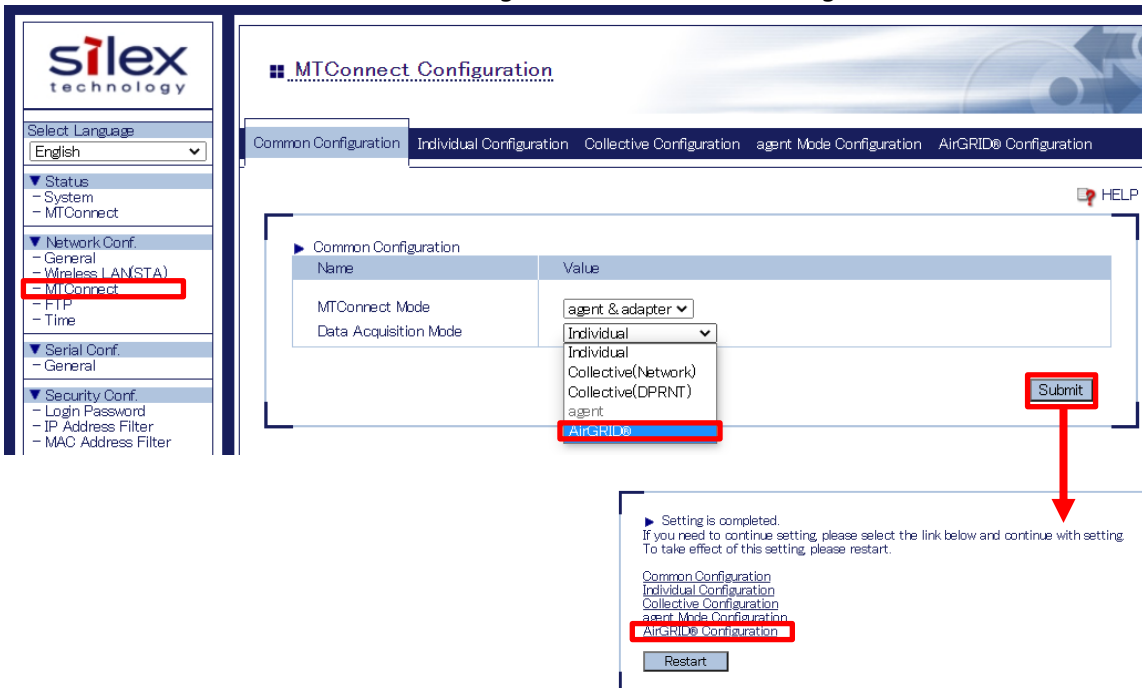
When it **Absolutely Must** Connect
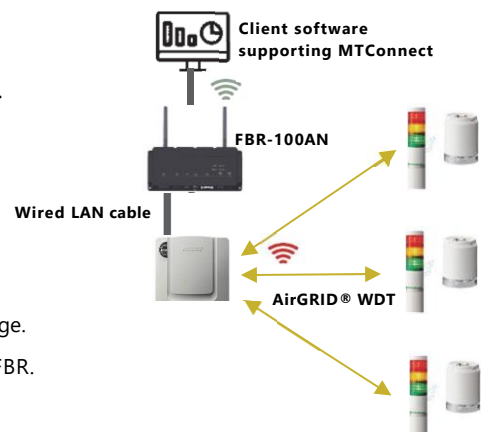
3.1.2　FBR-100AN Setting

Use a Web browser from a PC to access FBR-100AN setting page. See the Setup Guide that came with FBR-100AN for more information.

3.1.3　MTConnect Setting

・Select Common Configuration under MTConnect on FBR-100AN setting page.

・Select "AirGRID®" for Data Acquisition Mode.

・Click "Submit" and select "AirGRID Configuration" link on the message box.

3.1.4 AirGRID® Single Operation Mode Setting

・Set WDR's IP address on AirGRID® Configuration for Single Operation.

・Set WDT's MAC address which can be monitored by FBR and set port numbers to identify WDT.
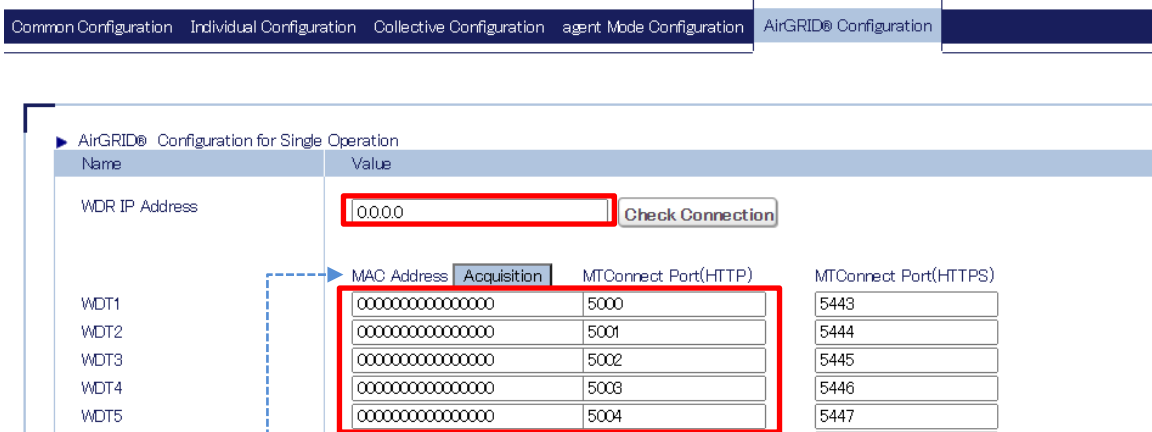
*4 A MAC address can not to be registered on more than one WDT.

Common Configuration	Individual Configuration	Collective Configuration	agent Mode Configuration	AirGRID® Configuration

▶ AirGRID® Configuration for Single Operation

Name	Value
WDR IP Address	0.0.0.0 Check Connection

▶ MAC Address Acquisition   MTConnect Port(HTTP)   MTConnect Port(HTTPS)

	MAC Address	MTConnect Port(HTTP)	MTConnect Port(HTTPS)
WDT1	000000000000000	5000	5443
WDT2	000000000000000	5001	5444
WDT3	000000000000000	5002	5445
WDT4	000000000000000	5003	5446
WDT5	000000000000000	5004	5447

Additional info)

When you click MAC Address's "Acquisition" button, FBR-100AN retrieves WDT's MAC address which is being connected to WDR, and automatically fills in the form. "Acquisition" button becomes enabled only when all WDT's MAC addresses are initial values.

Note) Set WDR's IP address, and then click "Submit" and "Restart" to establish communication between FBR-100AN and WDR.
After FBR restarts, the connection between WDR and WDT will be reestablished. Make sure that the communication between WDR and WDT is ready (WDT status: LED turns on green.) after rebooting and press the "Acquisition" button after waiting for a short time.

3.2 FBR-100AN "Migration Mode" Setting

In this mode, FBR-100AN can collect data of up to three CNC machine tools and up to three signal tower lights with WDT (transmitter) mounted. FBR-100AN can migrate their data for each CNC machine tool and send the data to the host system supporting MTConnect.

In this mode, FBR-100AN can directly collect information of CNC machine tools over wired LAN, and can integrate information of signal tower lights over wireless communication via ® WDR. This mode is only available when you enable "AirGRID mode" under FBR-100A AirGRID's "Individual Configuration" to monitor FUNAC's machine tools supporting LAN connection. When serial/DPRNT communication is used and an activation key for special CNC machine tools and machine tools is used, this mode cannot be used.

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3.2.1　Setting Steps

(1) Connect FBR-100AN to WDR (receiver) with a LAN cable. (2)
Connect FBR-100AN to CNC machine tools with LAN
　cables.

(3) Set WDR's IP address in FBR-100AN.

(4) Set WDT's MAC address [*5] in FBR-100AN.

(5) Access FBR-100AN from MTConnect client software[*6].
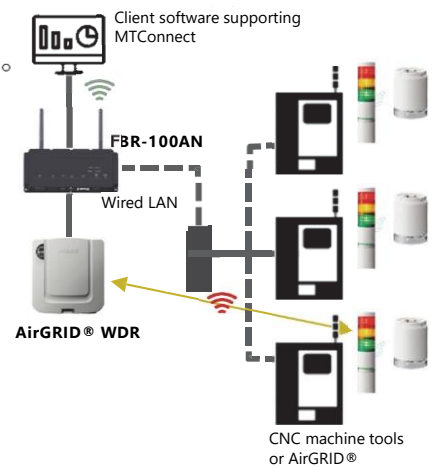
　　How to access) http://<FBR IP address >:Port number/current

*5 You can do searching and auto settings in FBR-100AN configuration page.

*6 Each WDT connection is identified by the port number set in the FBR.

Client software supporting MTConnect

FBR-100AN

Wired LAN

AirGRID® WDR

CNC machine tools or AirGRID®

3.2.2　FBR-100AN Setting

Use a Web browser from a PC to access FBR-100AN setting page. See the Setup Guide

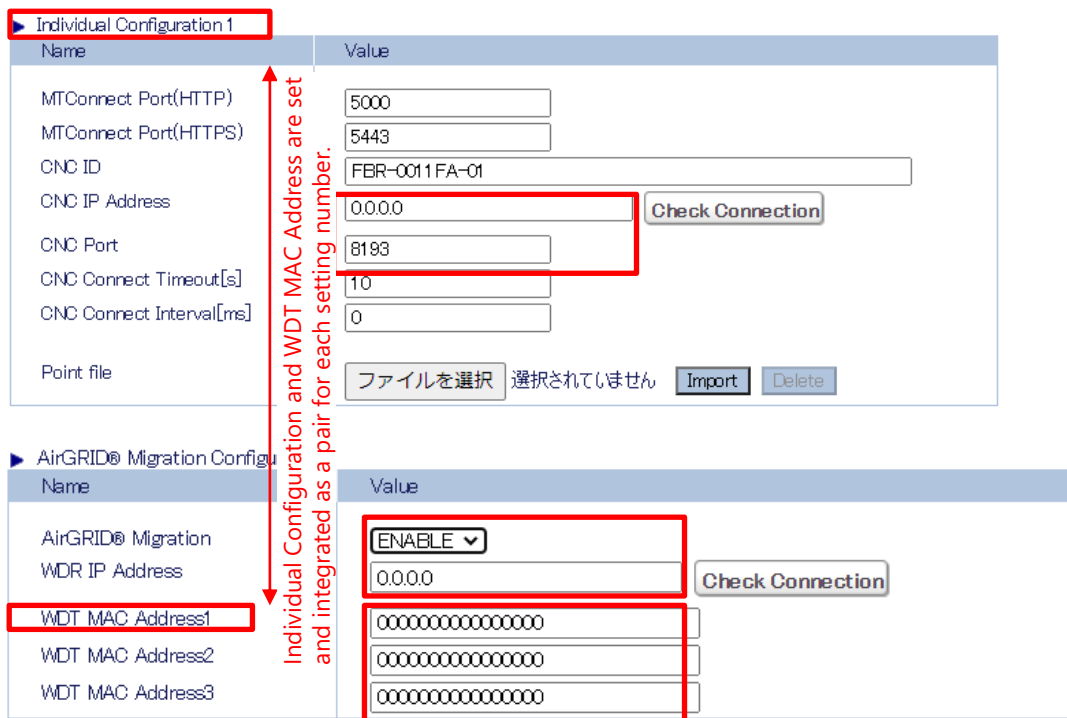that came with the product for more information.

3.2.3　MTConnect Setting

・Select Common Configuration under MTConnect Configuration in FBR-100AN
　setting page.

・Select "Individual" for Data Acquisition Mode.

・Click "Submit"　and select "Individual Configuration" on the message box.

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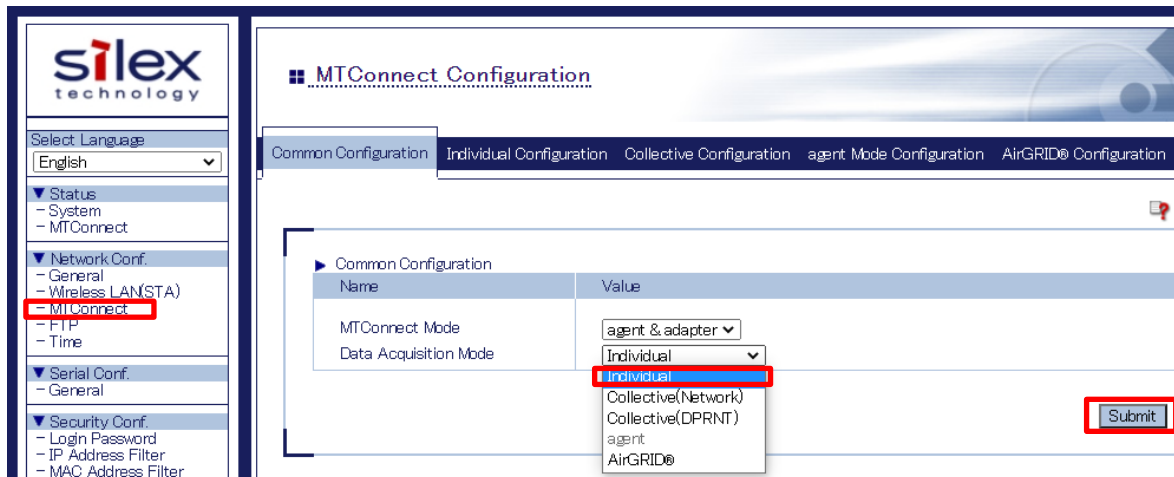
3.2.4　AirGRID® Migration Setting

・Set CNC machine tool's IP address/port number to be monitored in "Individual Configuration" of FBR-100AN.

・Enable "AirGRID® Migration" in the lower part of "Individual Configuration", and specify WDR's IP address.

・Register each number of "Individual Configuration" (CNC) as a pair with the setting number of WDT's MAC address. [7]

[7] The WDT's MAC address 2 is paired with the Individual Configuration 2, and the WDT's MAC address 3 is paired with the Individual Configuration 3.

4. MTConnect Status Checking

The FBR-100AN's "MTConnect Status" page allows users to check the communication status with monitored WDT or CNC machine tools. If no operational data is available in the host system, check the status of communication with FBR-100AN, WDR, WDT and CNC machine tools in this page. The status checking page depends on the acquisition mode.

・When AirGRID® Single Operation Mode is Selected

　　・Only WDR connection status and connected WDT's MAC address are shown.
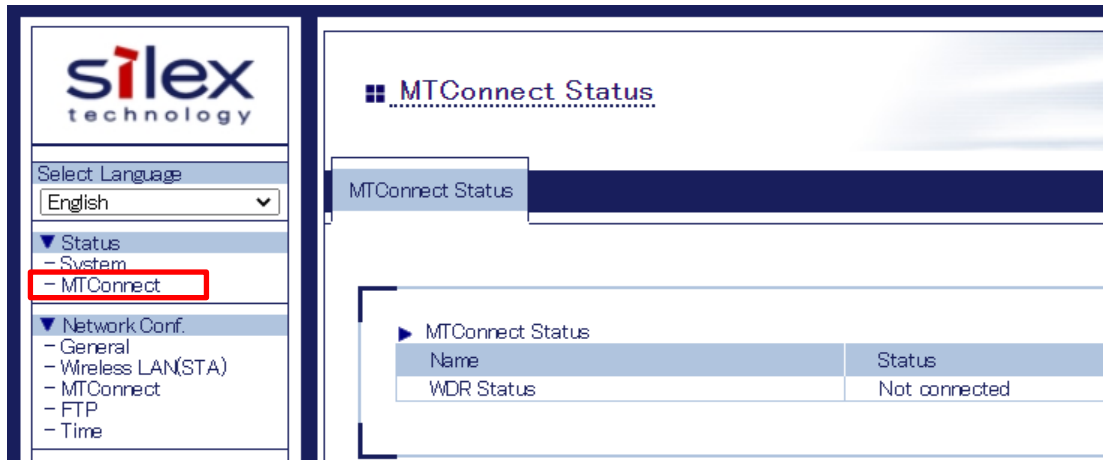
・When AirGRID® Migration Mode is Selected

　　・CNC machine tool's status, WDR connection status and connected WDT's MAC address are shown.

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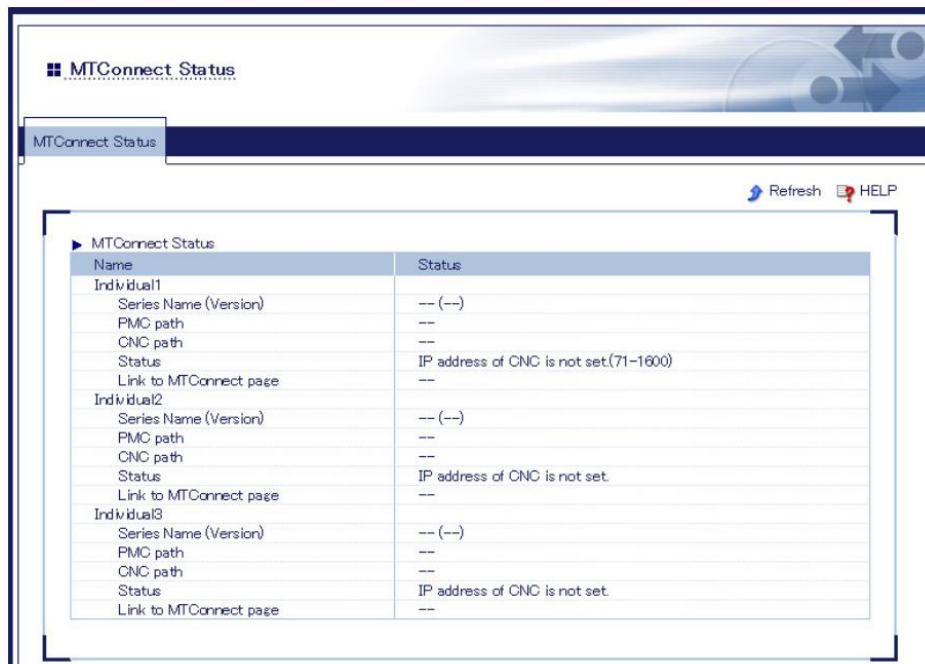
5. Information of Signal Tower Light Collected/Transferred by FBR-100AN over MTConnect Communication

Here are the items of signal tower light information collected by FBR-100AN and transferred over MTConnect.
All AirGRID statuses are handled as category="EVENT" and type="MESSAGE" on MTConnect.

Item	id	name	nativeCode	value
WDT's MAC address	nWDTMacAddress	n.WDTMacAddress	Web WDT #	MAC address
Buzzer	nBuzzer	n.Buzzer-	0: Off	Off
			1: On	On
			-: Not obtain	UNAVAILABLE
Green	nGreenLamp	n.GreenLamp-	0: Off	Off
Red	nRedLamp	n.RedLamp-	1: On	On
Blue	nBlueLamp	n.BlueLamp-	2: Blinking	Blinking
Yellow	nYellowLamp	n.YellowLamp-	9: Not register, Unused	Unused
White	nWhiteLamp	n.WhiteLamp-	-: Not obtain	UNAVAILABLE

6. MTConnect Client Software Monitoring Example

Connect MTConnect client to FBR-100AN (operate as MTConnect server) using MTConnect client software. Select information that you want to monitor from the list of available id and names on the client software. The following is an example of the selection window.
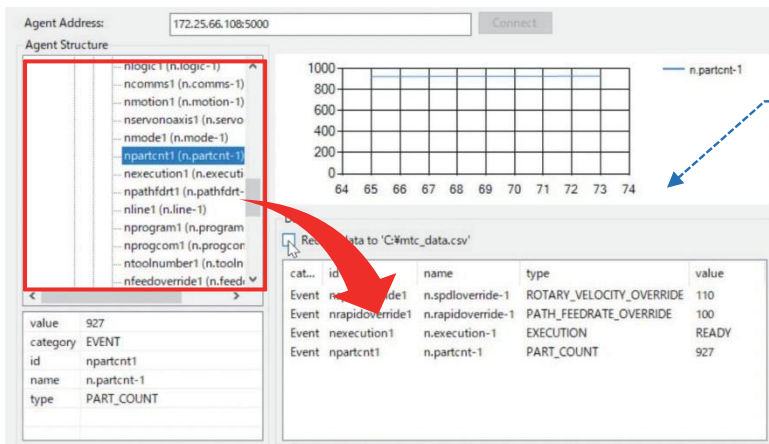
MTConnect Sample Client distributed at silex's website. Select items by dragging and dropping items you want to monitor from "Agent Structure" on the left side of the window to the lower right area.
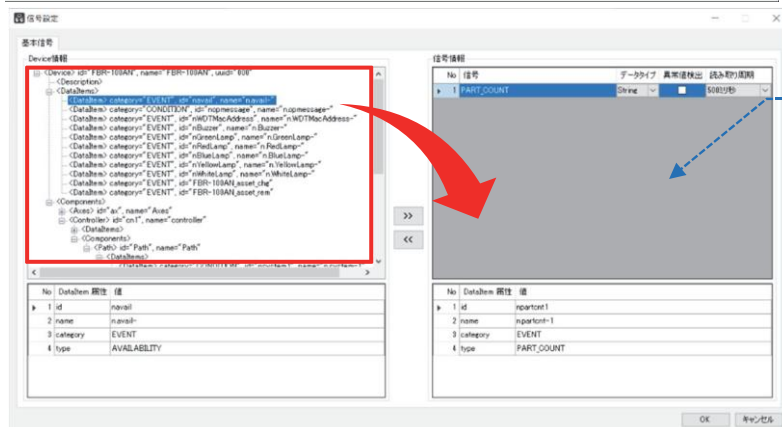
FANUC MT-LINKi
Select items you want to monitor from <Dataitems> on the left side of the window and put them in the right area

Note) Data selection or display settings on MTConnect Client depends on software.

7. FAQ

Q1: Are there any precautions when BR-100AN and AirGRID® are used together?
A1: FBR-100AN linkage function is available only when "Operation in the Immediate Transmission Mode" is selected in WDT settings. In addition, the TCP port used for communication between FBR-100AN and WDR is fixed at 10001.

Q2: The communication between FBR-100AN and WDR is successful, but WDT is not visible.
 A2: There may be multiple WDRs around. When WDR and WDT are used with the factory default settings, WDT may be connected to other WDRs wirelessly. Please configure the group settings at AirGRID®.

Q3: We are going to use wireless LAN to establish a communication between FBR-100AN and client software supporting MTConnect. Will this affect the wireless communication of AirGRID®?
A3: Like wireless LAN, ZigBee communication using 2.4 GHz band is used to establish a communication between AirGRID® WDR and AirGRID®WDT. However, ZigBee is a standard that allows for channels not used by wireless LAN, so that wireless LAN and ZigBee can coexist. Since FBR-100AN supports wireless LAN of 5GHz band, FBR-100AN can operate on separate frequencies.

Q4: When LAN communication between FBR-100AN and WDR, or between FBR-100AN and MTConnect Client software is temporarily interrupted, how will the operation data of the signal tower light be dealt with?
A4: It depends on interrupted paths, and also depends on MTConnect Client communication specifications and settings.
(1) When there is no communication between FBR-100AN (MTConnect server) and MTConnect Client.
MTConnect communication has two ways. One is that MTConnect Client retrieves the latest data called "current" from MTConnect server. The other is that MTConnect Client retrieves data accumulated in MTConnect server, which is called "sample", after you specify a data item, a sequence number and a count number. In the former case, only the latest information is retrieved when the communication is restored, while in the latter case, all data, including past information, is retrieved.

(2) When there is no communication between FBR-100AN and WDR.
FBR-100AN linkage function only supports "Operating in the Immediate Transmission Mode" in the WDT mode setting. Therefore, when the communication between FBR-100AN and WDR is restored, FBR-100AN will retrieve WDT status information at the time of recovery if WDT (Signal Tower Light) remains unchanged after the communication is interrupted.

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About silex technology, Inc. (Silex)

Silex (headquarters：Seika-cho, Kyoto) is a research and development company with a focus on hardware and software technology that connects devices to networks with or without cables. Silex offers products by leveraging the know-how of networking and wireless connectivity to equipment that requires absolute connectivity, such as industrial machinery, medical devices, and display devices, resulting in expansion of the business range. In order to maintain quality standards strictly, the company consolidates a series of processes such as designing, development, manufacturing and quality assurance in the Keihanna Headquarters. For global business development, Silex has offices in North America, Europe, China, and India to collaborate with overseas partners, explore new markets, and acquire the information of new technologies to develop.

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