

FACTORY AUTOMATION

MELSEC iQ-F Series iQ Platform-compatible PLC

Cloud Utilization

**Digitalization for Improved Data
Management and Operation Efficiency**



MELSEC iQ-F
series

From Onsite IoT to Data Utilization MELSEC iQ-F Advantages

Standard features



Onsite operations can be inefficient and time-consuming... The simple-setup MELSEC iQ-F Series solves such problems through a smooth transition to onsite IoT capabilities.

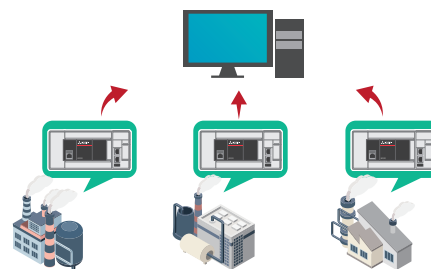
Improved connectivity

Data collection

Data visualization

Requested applications

- Centralized management of devices in multiple locations
- Effective utilization of collected data
- Remote monitoring with error notification functionality



Advanced features

Collecting data in **the cloud** over time makes it easy to solve even fundamental onsite problems!

Improved productivity

Predictive maintenance

Simplified troubleshooting

Enhanced performance!

Take advantage of cloud-based data collection with the advanced FX5-ENET!

Ethernet module **FX5-ENET**

Firmware version: 1.200 or later* Serial number: 234*** or later



Benefits of the FX5-ENET

- ☑ Start saving data in the cloud even with standalone devices!
- ☑ Easily incorporate existing cloud systems with simple setup!

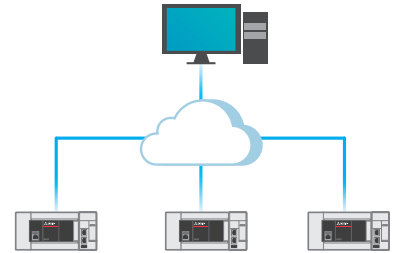
*: Updating from current firmware versions to Ver. 1.2** is not possible.

MQTT Protocol Support for Direct Cloud Connectivity

New feature MQTT communication specifications

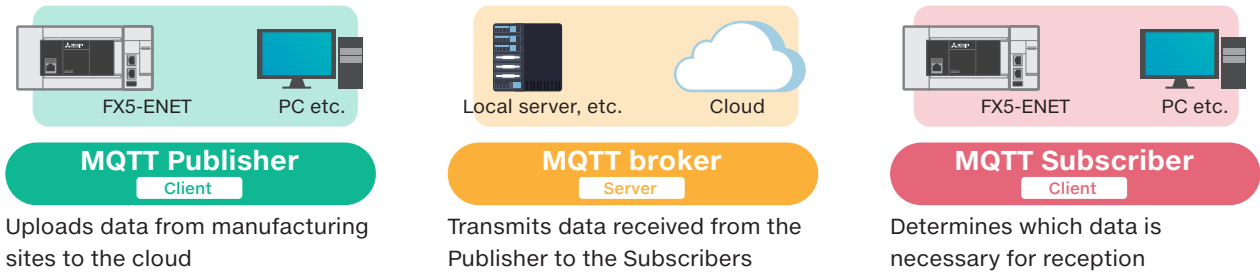
MQTT introduction

MQTT is a lightweight and simple communication protocol optimized for use with IoT devices and used mainly for cloud connectivity. It includes security features such as retransmission if a message is not received, TLS encryption, and client authentication. Data transmission and reception are only performed as needed, helping to reduce the load on communication circuits.

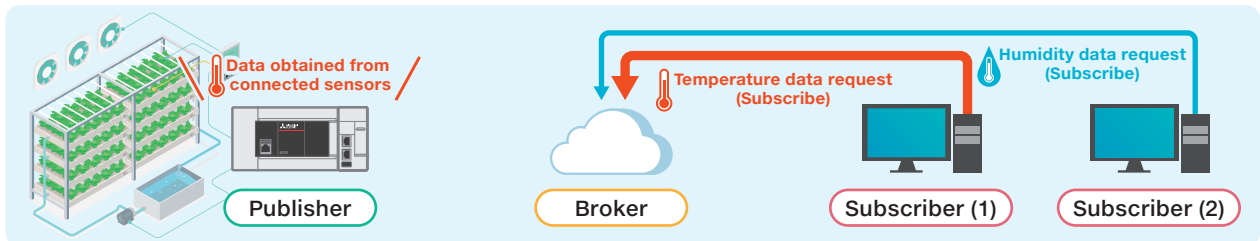


Construction

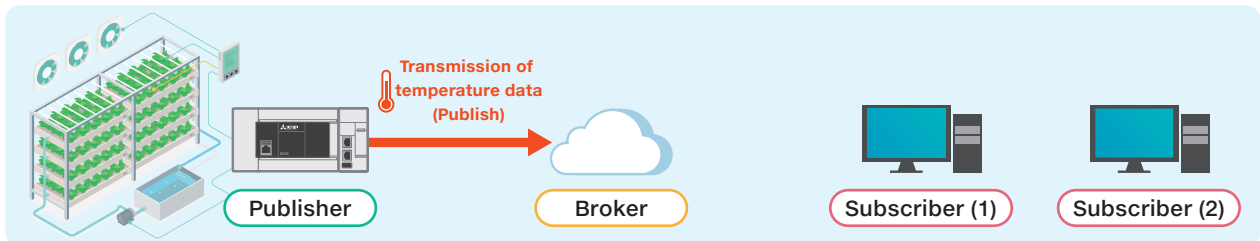
The MQTT protocol adopts the Publish-Subscribe model. When an FX5-ENET device submits a Publish request to an MQTT broker, the MQTT broker transmits the information to all Subscribe request reception devices.



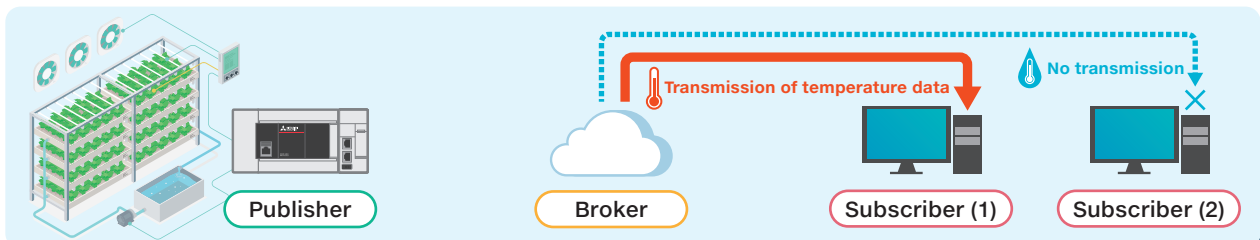
STEP 1 The Subscribers specify the data (topics) to be received by the broker and request delivery of the necessary data.



STEP 2 The broker receives data transmitted from the Publisher.



STEP 3 The broker delivers the specified data to the Subscribers.



What do I need to do?

Equipment Setup and Installation



Setup

- GX Works3
- Certificate Configuration Tool for FX5-ENET*



MQTT communication setup and programming



Mainly for equipment program designers

GX Works3

Ver. 1.095Z or later

Item	Setting
MQTT Connection Setting	
MQTT Server Specification Method	Host name
MQTT Server Host Name	
MQTT Server IP Address	
MQTT Server Port No.	1
Client ID	
User Name	
Password	
MQTT Certificate Setting	
Verify Server Certificate	Verify

- ✓ Easy-to-configure communication settings with intuitive parameters
- ✓ Dedicated FB with a wide variety of programs for easy, clean configuration

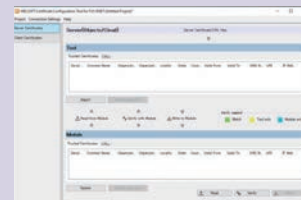
Client authentication and server verification



Mainly for IT system integrators

Certificate Configuration Tool for FX5-ENET

Ver. 1.00A or later



- ✓ Configurable certificates when connecting to an MQTT broker
- ✓ Custom client certificates and support for server certificate management

Setup complete

Cloud setup

- Device registration
- Client authentication
- Device authorization



Installation

Add to existing cloud systems

or

What can I do after installation?

Customer-based cloud application development

Create new cloud systems



*: Please contact your local Mitsubishi Electric sales office or representative.

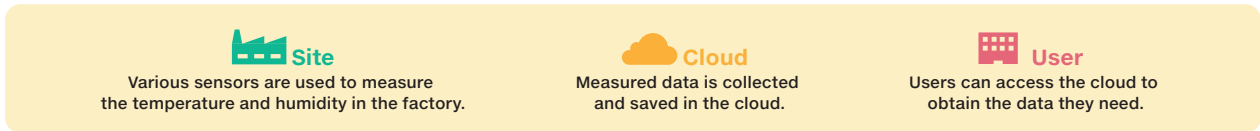
What can I do after installation?

Application Examples

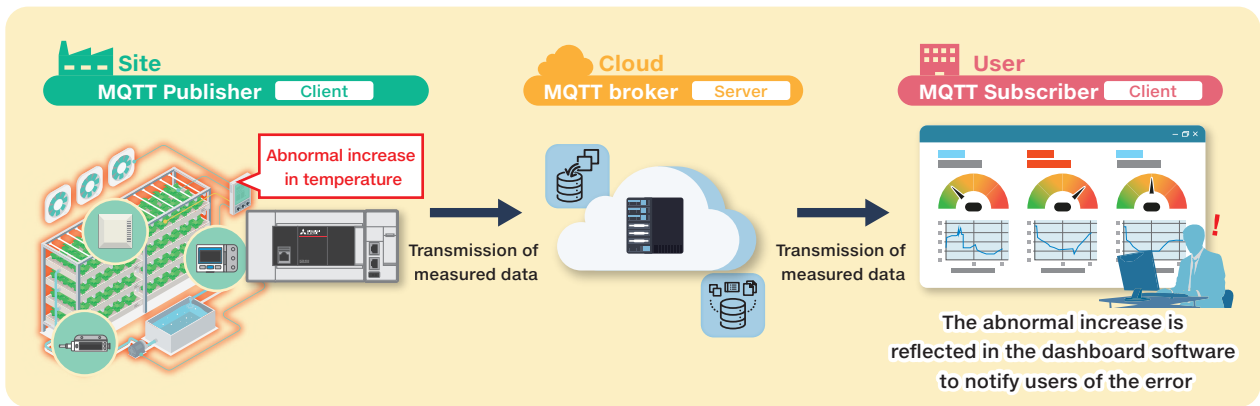


- ✔ Collection and monitoring of temperature, humidity, and other control device data as well as error notification

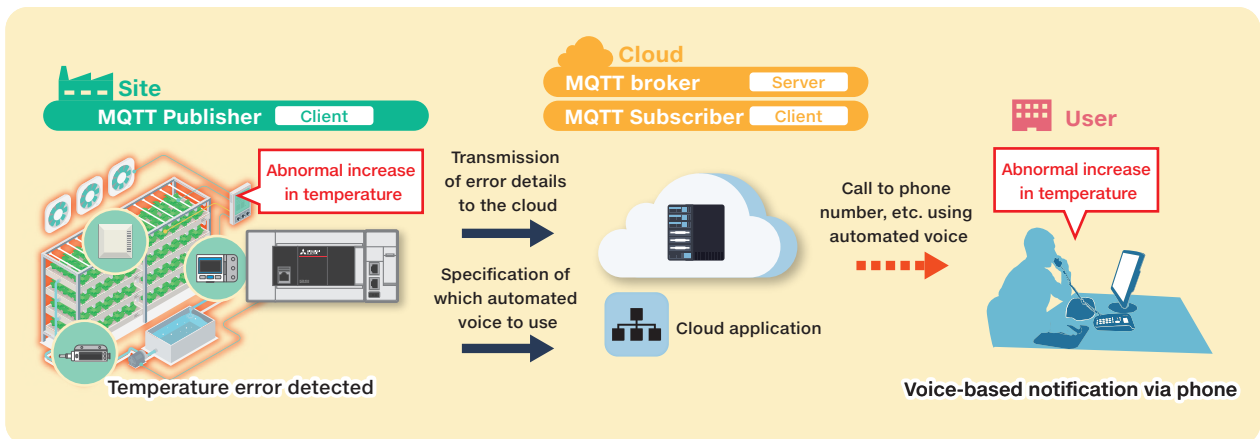
Normal status



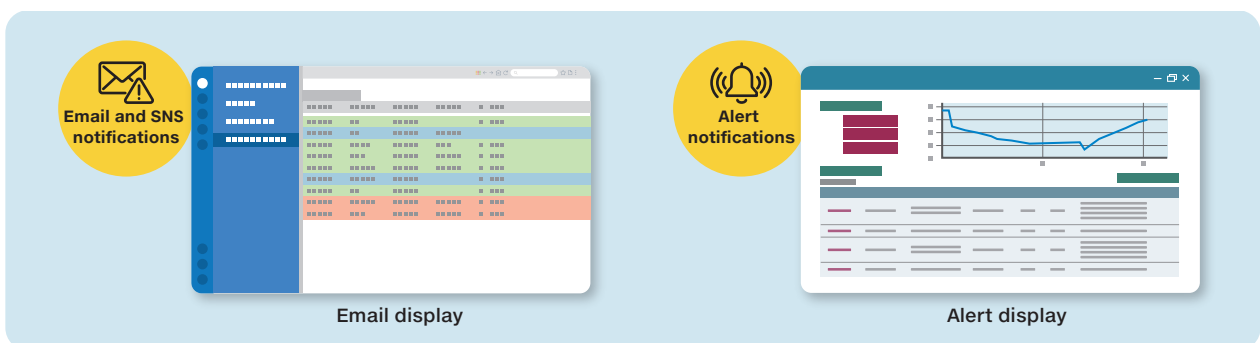
! Temperature threshold exceeded



! Using the cloud application to generate voice message error notifications



Other cloud application features...



Support for major cloud networks

Review the latest trends and applications of each cloud service to determine which cloud network is right for you.



Company Amazon Web Services, Inc.
URL <https://aws.amazon.com/>



Latest information/Customer reference ▶

Discover Cloud for Small and Medium Businesses

1

Reducing IT costs

Find ways to migrate your critical data, backups, and more from costly on-premises infrastructure to the cloud. AWS offers real savings you can see and measure.

<https://aws.amazon.com/smart-business/savings/>



2

Gaining business insights

Unify your data to make strategic decisions quickly. AWS helps make analytics reporting more actionable and affordable.

<https://aws.amazon.com/smart-business/gain-insights/>



3

Securing your business

Get access to software that helps you make security a number one priority. Prevent, detect, respond, and address data security incidents with AWS.

<https://aws.amazon.com/smart-business/security/>





Microsoft Corporation
<https://www.microsoft.com/en-us/>

What's
New ▶



Technical
Information ▶



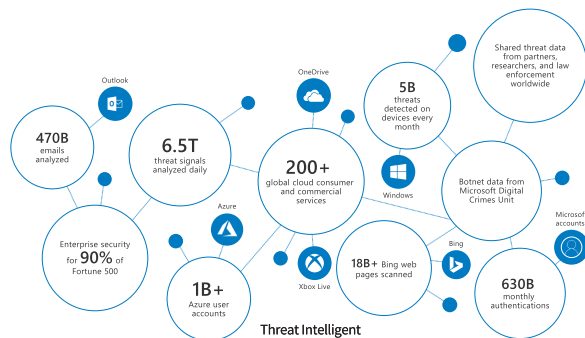
Case
Studies ▶



Benefits of using Azure

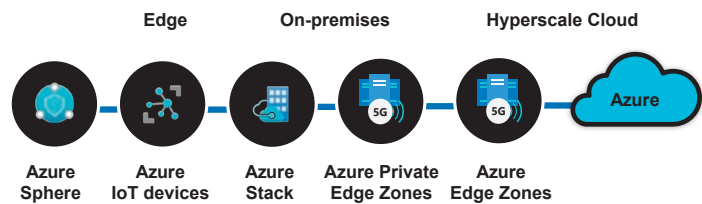
1 Is the cloud secure?

Microsoft invests more than \$110 billion annually in cybersecurity and has one of the largest threat intelligence databases (Database of cyber attack methods) in the world. It is also used for Azure security services.



2 More than just the cloud

We provide IoT services that can connect more than 1 million devices at low cost. Azure provides services including the edge, such as Azure Stack Edge, which can run cloud services in Edge.



3 More than 60 data centers worldwide at your disposal

Data centers in more than 60 regions around the world. Using Terabit's high-speed backbone, it can be placed in a data center where you want to use not only IaaS but also various PaaS services, and you can combine them at low cost.



MELSEC iQ-F Series

iQ Platform-compatible PLC

General Specifications

Items	Specifications	
Dielectric withstand voltage	500 V AC for 1 minute	Between all terminals and ground terminal
Insulation resistance	10 MΩ or higher by 500 V DC insulation resistance tester	

Power Supply Specifications

Items	Specifications	
Internal power supply	Power supply voltage	24 V DC
	Current consumption	110 mA

Performance Specifications

Items	Specifications			
CC-Link IE Field Network Basic	Station type	Master station		
	Maximum number of connectable stations*1	32		
	Number of stations occupied by a remote station	1 to 4		
	Maximum number of link points per network	RX	2048 points	
		RY	2048 points	
		RWr	1024 points	
		RWw	1024 points	
	Maximum number of link points per station	Master station	RX	2048 points
			RY	2048 points
			RWr	1024 points
			RWw	1024 points
		Remote station*2	RX	64/128/192/256 points
			RY	64/128/192/256 points
			RWr	32/64/96/128 points
			RWw	32/64/96/128 points
	UDP port number used in the cyclic transmission	61450		
	UDP port number used in automatic detection of connected devices	Master station: An unused port number is assigned automatically. Remote station: 61451		
	Transmission specifications	Data transmission speed	100 Mbps	
		Interface	RJ45 connector	
		Maximum station-to-station distance	100 m	
Overall cable distance		Depends on the system configuration		
Number of cascade connections		100BASE-TX	When using a switching hub, check the number of cascaded stages with the manufacturer of the hub to be used.	
Network topology	Star topology, line topology			
Hub*3	Hubs with 100BASE-TX ports*4 can be used.			
Connection cable*5	100BASE-TX	Ethernet cable of category 5 or higher (STP cable)		
Generalpurpose Ethernet communication	Transmission specifications	Data transfer speed	100/10 Mbps	
		Communication mode	Full-duplex or half-duplex*3	
		Transmission method	Base band	
		Interface	RJ45 connector	
		Maximum segment length	100 m (length between hub and node)*6	
	Number of cascade connections	100BASE-TX	2 levels maximum*7	
		10BASE-T	4 levels maximum*7	
	Protocol type*8	MELSOFT connection, SLMP server (3E/1E frame), socket communication, simple CPU communication, BACnet/IP, MQTT communication, Email notification		
	Number of connections	Total of 32 connections*9 (Up to 32 external devices can access one FX5-ENET module at the same time.)		
	Hub*3	Hubs with 100BASE-TX or 10BASE-T ports*10 can be used.		
Connection cable*5	100BASE-TX	Ethernet cable of category 5 or higher (STP cable)		
	10BASE-T	Ethernet cable of category 3 or higher (STP/UTP cable)		
Number of ports	2*11			
Number of occupied I/O points	8 points			
Applicable CPU module	<ul style="list-style-type: none"> FX5UJ CPU module (From the first) FX5U CPU module (Ver. 1.110 or later) FX5UC CPU module*12 (Ver. 1.110 or later) 			
Applicable engineering tool	GX Works3	<ul style="list-style-type: none"> FX5UJ CPU module (Ver. 1.060N or later) FX5UJ/FX5UC CPU module (Ver. 1.050C or later) 		
	Certificate Configuration Tool for FX5-ENET	Ver. 1.00A or later		
Number of connectable units	1 module			

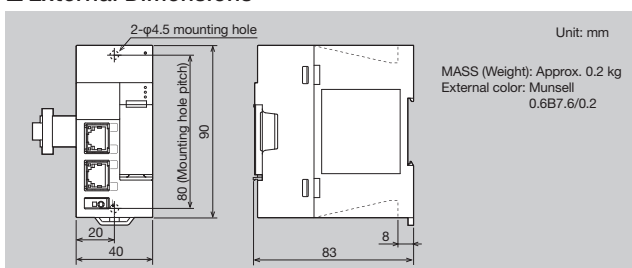
- *1 : Maximum number of connected remote stations that FX5-ENET (master station) can manage.
- *2 : Value for 1-station occupation, 2-station occupation, 3-station occupation, or 4-station occupation.
- *3 : IEEE802.3x flow control is not supported.
- *4 : The ports must comply with the IEEE802.3 100BASE-TX standards.
- *5 : A straight/cross cable can be used.
- *6 : For maximum segment length (length between hubs), consult the manufacturer of the hub used.
- *7 : This number applies when a repeater hub is used. When using a switching hub, check the number of cascaded stages with the manufacturer of the hub to be used.
- *8 : For a compatible version of each protocol, refer to the following manual.
→ MELSEC iQ-F FX5-ENET User's Manual
- *9 : The first device for MELSOFT connection is not included in the number of connections. (The second and the following devices are included.)
The CC-Link IE Field Network Basic communication is not included in the number of connections.
- *10 : The ports must comply with the IEEE802.3 100BASE-TX or IEEE802.3 10BASE-T standards.
- *11 : Since the IP address is shared by two ports, only one address can be set.
- *12 : FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect to the FX5UC CPU module.

MQTT communication specifications

Items	Specifications
MQTT function	<ul style="list-style-type: none"> Connecting to the MQTT server (broker) Sending messages to the MQTT server as a Publisher Receiving messages from the MQTT server as a Subscriber
MQTT protocol version	V3.1.1
Number of connections	Maximum of 1 connection
Encrypted communication	TLS1.3 and TLS1.2 supported
Key length (client certificate)	<ul style="list-style-type: none"> 1024 bits 2048 bits
Maximum size of Topic	<ul style="list-style-type: none"> 511 characters (ASCII, excluding NULL characters) 255 characters (Unicode strings, excluding NULL characters)*1
Maximum message size of Publish	<ul style="list-style-type: none"> 32768 bytes (binary) 32767 characters (ASCII (excluding NULL characters)) 16383 characters (Unicode strings (excluding NULL characters))*1
MQTT server address	IP address or host name (ASCII) can be specified. Number of characters: 1 character or more*2
MQTT server port number	1 to 65534
Client ID	Set with Unicode strings.*1 Number of characters: 1 character or more*2
User name	Set with Unicode strings.*1 Number of characters: 0 characters or more*2
Password	Set with ASCII strings. Number of characters: 0 characters or more*2
Applicable CPU module	<ul style="list-style-type: none"> FX5UJ CPU module (From the first, Ver. 1.040 or later) FX5UJ/FX5UC*14 CPU module (Serial number 17X*** or later, Ver. 1.280 or later)
Applicable Ethernet module	FX5-ENET (Serial number 234*** or later, Ver. 1.200 or later)
Applicable engineering tool	<ul style="list-style-type: none"> GX Works3 Certificate Configuration Tool for FX5-ENET
	Ver. 1.00A or later

- *1 : Unicode text (UTF-16) is converted to UTF-8 by the FX5-ENET for communication with the MQTT broker.
- *2 : A string that satisfies the following conditions.
A+(B+C)×2+D≤984
A: Number of characters in MQTT server host name C: Number of characters in user name
B: Number of characters in client ID D: Number of characters in password
- *3 : Connection with FX5UC CPU module requires connector conversion module (FX5-CNV-IFC) or extension power supply module (FX5-C1PS-5V).
- *4 : Supported by serial number 178*** or later for FX5UC-32MT/DS-TS and FX5UC-32MT/DSS-TS.

External Dimensions



Product list

Model	Specifications
FX5-ENET	Ethernet module
FX5-U-HW-E	MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware) Model code: 09R584
FX5-U-ENET-E	MELSEC iQ-F FX5-ENET User's Manual Model code: 09R736
GXW3-O-E	GX Works3 Operating Manual

Safety Warning

To ensure proper use of the products in this document, please be sure to read the instruction manual prior to use.

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