MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-F series

MELSEC iQ-F FX5 BACnet Reference Manual

-FX5-ENET
-FX5-ENET/IP

SAFETY PRECAUTIONS

(Read these precautions before use.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety in order to handle the product correctly.

This manual classifies the safety precautions into two categories: [⚠WARNING] and [⚠CAUTION].

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Depending on the circumstances, procedures indicated by [⚠CAUTION] may also cause severe injury.

It is important to follow all precautions for personal safety.

Store this manual in a safe place so that it can be read whenever necessary. Always forward it to the end user.

[Design Precautions]

⚠WARNING

- Make sure to set up the following safety circuits outside the programmable controller to ensure safe system operation even during external power supply problems or programmable controller failure. Otherwise, malfunctions may cause serious accidents.
  - Most importantly, set up the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
  - Note that when the CPU module detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the CPU module occurs in an input/output control block, output control may be disabled. External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
  - Note that when an error occurs in a relay or transistor of an output circuit, the output might stay on or off. For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- For the operating status of each station after a communication failure, refer to manuals relevant to the network. Incorrect output or malfunction due to a communication failure may result in an accident.
- Construct an interlock circuit in the program so that the whole system always operates on the safe side before executing the control (for data change) of the programmable controller in operation. Read the manual thoroughly and ensure complete safety before executing other controls (for program change, parameter change, forcible output and operation status change) of the programmable controller in operation.
  Otherwise, the machine may be damaged and accidents may occur due to erroneous operations.
- Especially, in the case of a control from an external device to a remote programmable controller, immediate action cannot be taken for a problem on the programmable controller due to a communication failure. Determine the handling method as a system when communication failure occurs along with configuration of interlock circuit on a program, by considering the external equipment and CPU module.

[Design Precautions]

⚠WARNING

- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the intelligent function module. Executing data writing to the "system area" or "write-protect area" may cause malfunction of the programmable controller alarm. For the "system area" or "write-protect area", refer to ☞ Page 79 Buffer Memory.
- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Construct an interlock circuit in the program so that the system always operates on the safe side even if communications fail. Incorrect output or malfunction may result in an accident.

[Design Precautions]

⚠CAUTION

- Do not bundle the control line and communication cables together with or lay them close to the main circuit or power line. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- When an inductive load such as lamp, heater, or solenoid valve is controlled, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Take proper measures so that the flowing current does not exceed the value corresponding to the maximum load specification of the resistive load.
- Do not power off the CPU module or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM undefined. The values need to be set in the buffer memory and written to the flash ROM again. Doing so also may cause malfunction or failure of the module.

[Security Precautions]

⚠WARNING

- To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from unreliable networks and devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

[Installation Precautions]

⚠WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
- Use the product within the generic environment specifications described in the User's Manual (Hardware) of the CPU module used.
  Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl_2, H_2S, SO_2 or NO_2), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind.
  If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.

[Installation Precautions]

⚠CAUTION

- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.
- When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits of the programmable controller. Failure to do so may cause fire, equipment failures or malfunctions.
- For the product supplied together with a dust proof sheet, the sheet should be affixed to the ventilation slits before the installation and wiring work to prevent foreign objects such as cutting and wiring debris.
  However, when the installation work is completed, make sure to remove the sheet to provide adequate ventilation. Failure to do so may cause fire, equipment failures or malfunctions.
- Install the product on a flat surface. If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.
- Install the product securely using a DIN rail or mounting screws.
- Work carefully when using a screwdriver such as installation of the product. Failure to do so may cause damage to the product or accidents.
- Connect the extension cables, peripheral device cables, input/output cables and battery connecting cable securely to their designated connectors. Loose connections may cause malfunctions.
- Turn off the power to the programmable controller before attaching or detaching the following devices. Failure to do so may cause device failures or malfunctions.
  - Peripheral devices, expansion board, expansion adapter, and connector conversion adapter
  - Extension modules, bus conversion module, and connector conversion module
  - Battery

[Wiring Precautions]

⚠WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
- Make sure to attach the terminal cover, provided as an accessory, before turning on the power or initiating operation after installation or wiring work. Failure to do so may cause electric shock.
- The temperature rating of the cable should be 80℃ or more.
- Make sure to wire the screw terminal block in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
  - The disposal size of the cable end should follow the dimensions described in the User's Manual (Hardware) of the CPU module used.
  - Twist the ends of standard wires and make sure that there are no loose wires.
  - Do not solder-plate the electric wire ends.
  - Do not connect more than the specified number of wires or electric wires of unspecified size.
  - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.

[Wiring Precautions]

⚠CAUTION

- Perform class D grounding (grounding resistance: 100Ω or less) of the grounding terminal on the CPU module and extension modules with a wire 2㎟ or thicker.
  Do not use common grounding with heavy electrical systems (refer to the User's Manual (Hardware) for the CPU module used).
- Individually ground the FG terminal of the programmable controller with a ground resistance of 100Ω or less. Failure to do so may result in electric shock or malfunction.
- Install module so that excessive force will not be applied to terminal blocks, or communication cables. Failure to do so may result in wire damage/breakage or programmable controller failure.
- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to malfunction of the programmable controller caused by abnormal data written to the programmable controller due to the effects of noise:
  - Do not bundle the power line, control line and communication cables together with or lay them close to the main circuit, high-voltage line, load line or power line. As a guideline, lay the power line, control line and connection cables at least 100 mm away from the main circuit, high-voltage line, load line or power line.
  - Ground the shield of the shielded wire or shield cable at one point on the programmable controller. However, do not use common grounding with heavy electrical systems.
- For Ethernet cables to be used in the system, select the ones that meet the specifications described in the user's manual for the module used. If not, normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while the programmable controller's power is on. Doing so may cause electric shock or malfunctions.
- Before cleaning or retightening terminals, cut off all phases of the power supply externally. Failure to do so in the power ON status may cause electric shock.
- Before modifying the program in operation, forcible output, running or stopping the programmable controller, read through this manual carefully, and ensure complete safety. An operation error may damage the machinery or cause accidents.
- Do not change the program in the programmable controller from two or more peripheral equipment devices at the same time. (i. e. from an engineering tool and a GOT) Doing so may cause destruction or malfunction of the programmable controller program.

[Startup and Maintenance Precautions]

⚠CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not disassemble or modify the programmable controller. Doing so may cause fire, equipment failures, or malfunctions.
  For repair, consult your local Mitsubishi Electric representative.
- Turn off the power to the programmable controller before attaching or detaching the following devices. Failure to do so may cause device failures or malfunctions.
  - Peripheral devices, expansion board, expansion adapter, and connector conversion adapter
  - Extension modules, bus conversion module, and connector conversion module
  - Battery
- Read relevant manuals carefully and ensure the safety before performing online operations (operation status change) with peripheral devices connected to the CPU modules of other stations. Improper operation may damage machines or cause accidents.

[Operating Precautions]

⚠CAUTION

- Construct an interlock circuit in the program so that the whole system always operates on the safe side before executing the control (for data change) of the programmable controller in operation. Read the manual thoroughly and ensure complete safety before executing other controls (for program change, parameter change, forcible output and operation status change) of the programmable controller in operation. Otherwise, the machine may be damaged and accidents may occur due to erroneous operations.
- Do not power off the CPU module or reset the CPU module while the setting values in the buffer memory are being written to the flash ROM in the intelligent function module. Doing so will make the data in the flash ROM undefined. The values need to be set in the buffer memory and written to the flash ROM again. Doing so can cause malfunction or failure of the module.
- Note that the whole system may not be reset by the RUN/STOP/RESET switch when the CPU module or intelligent function module detects an error, such as a watchdog timer error, during self-diagnosis. In this case, turn the power off and on again.

[Disposal Precautions]

⚠CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

[Transportation Precautions]

⚠CAUTION

- The programmable controller is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications of the User's Manual (Hardware) of the CPU module used by using dedicated packaging boxes and shock-absorbing palettes. Failure to do so may cause failures in the programmable controller. After transportation, verify operation of the programmable controller and check for damage of the mounting part, etc.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-F series programmable controllers.
This manual describes the BACnet functions of the FX5-ENET Ethernet module and the FX5-ENET/IP Ethernet module.
It should be read and understood before attempting to install or use the module.
Always forward it to the end user.

Regarding use of this product

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Note

- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained in the local and national standards. If in doubt about the operation or use, please consult the nearest Mitsubishi Electric representative.
- Since the examples indicated by this manual, technical bulletin, catalog, etc. are used as a reference, please use it after confirming the function and safety of the equipment and system. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- This manual content, specification etc. may be changed, without a notice, for improvement.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you notice a doubtful point, an error, etc., please consult your local Mitsubishi Electric representative. When doing so, please provide the manual number given at the end of this manual.

CONTENTS

RELEVANT MANUALS

Manual name (manual number)	Description
MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware) <SH082452ENG>	Describes the details of hardware of the FX5S/FX5UJ/FX5U/FX5UC CPU module, including performance specifications, wiring, installation, and maintenance.
MELSEC iQ-F FX5 User's Manual (Application) <JY997D55401>	Basic knowledge about programming, functions of the CPU module, devices/ labels, and parameter settings
MELSEC iQ-F FX5 Programming Manual (Program Design) <JY997D55701>	Program specifications, such as ladder diagrams, ST, and FBD/LD programs, and labels
MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/ Function Blocks) <JY997D55801>	Specifications of the instructions and functions that can be used in programs
MELSEC iQ-F FX5 User's Manual (Communication) <SH-082625ENG>	Describes the communication function of the built-in CPU module and the Ethernet module.
MELSEC iQ-F FX5 Ethernet Module User's Manual <SH-082026ENG>	Description of the FX5-ENET
MELSEC iQ-F FX5 EtherNet/IP Module User's Manual <SH-082027ENG>	Description of the FX5-ENET/IP
MELSEC iQ-F FX5 BACnet Reference Manual <SH-082218ENG> (This manual)	Description of the BACnet functions of the Ethernet module
GX Works3 Operating Manual <SH-081215ENG>	Explanation of system configuration, parameter settings, and online operations of GX Works3

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Available profile	Devices that implement specific function specified by the BACnet standard. The available devices are as follows. B-OWS, B-BC, B-AAC, B-ASC, B-SA, and B-SS
B-ASC	A control device for more limited resources than a B-AAC
B-OWS	An operator interface in a BACnet system
BACnet	A communication standard for building networks established by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) in 1995. It also represents a system built on BACnet.
BACnet controller	A controller that provides input and output for the BACnet system as the lower level of the BACnet system
BACnet device	A connection device for the BACnet system
BACnet workstation	A central monitoring device to manage and monitor the status of the BACnet system as the upper level of the BACnet system
Broadcast	To send data to an unspecified number of devices in a network
Buffer memory	Memory in an intelligent module and SLMP-compatible device to store data such as setting values and monitor values
Device restart	A function that specifies devices (communication target) to which whether the own station has joined or left BACnet is notified
Engineering tool	The software package for the MELSEC series programmable controllers
External device	A BACnet device that has a different IP subnet address from the IP subnet address of the BACnet/IP network to which intends to join
Index number	A number that identifies the element of the property that is an array
Instance number	A number assigned to each BACnet device and object type. The BACnet system uses this number to provide various BACnet services to each other.
Join	To notify the BACnet workstation and other BACnet controllers of its existence as a BACnet controller and to enter the BACnet system. The joining processing methods and procedures vary depending on the BACnet standard.
Leave	To leave from the BACnet system
Object	Information about the input, output, and internal state of the BACnet device. It also represents a BACnet object.
Object type number	A number assigned to ObjectType
ObjectIdentifier	An object identifier consisting of the object type and the instance number of the object
Priority	Indicates priority.

Term	Description
Properties	Detailed information and attributes of each object. An object consists of properties, and depending on the status of the properties, it may affect other properties and change control.
Service	A function that BACnet devices provide to each other with external BACnet devices. It also represents the BACnet service.

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
BBMD	An abbreviation for BACnet/IP broadcast management device. The device is used for BACnet/IP communications, and handles communications with BACnet devices on different segments. It receives a parameter called TTL (Time to Live) from an external device and forwards packets to an external device during TTL seconds.
Ethernet module	A generic term for the following modules when the Ethernet communication function is used: • FX5-ENET • FX5-ENET/IP
FX5 CPU module	A generic term for the FX5UJ CPU module, FX5U CPU module, and FX5UC CPU module

1 OVERVIEW

- BACnet is a building network.
- The FX5-ENET Ethernet module and FX5-ENET/IP Ethernet module (hereinafter referred to as Ethernet module) can be connected to BACnet/IP using the BACnet functions. Ethernet modules operate as a BACnet device in a BACnet system.
- The Ethernet modules support B-ASC profile.

Point

The BACnet functions can be used with other general-purpose Ethernet protocols.

MEMO

2 SPECIFICATIONS

This chapter describes the specifications of BACnet for the Ethernet module.

For other specifications, refer to the following.

MELSEC iQ-F FX5 Ethernet Module User's Manual

MELSEC iQ-F FX5 EtherNet/IP Module User's Manual

2.1 Performance Specifications

The following table lists the performance specifications of BACnet for the Ethernet module.

Item		Description
Transmission specifications	Data transmission speed	100Mbps/10Mbps
	Communication mode	Full-duplex/half-duplex
	Transmission method	Base band
	Interface	RJ45 connector
	Maximum segment length	100m (length between switching hub and node)*1
Number of registrable input/output objects		92 instances
Protocol type		BACnet/IP
Number of connections		1*2
Hub		Hubs with ports*3 that comply with the IEEE802.3 100BASE-TX or IEEE802.3 10BASE-T standard can be used.
Connection cable*4	100BASE-TX	Ethernet cable category 5 or higher (STP cable)
	10BASE-T	Ethernet cable category 3 or higher (STP/UTP cable)
CPU module		• FX5UJ CPU module (Ver.1.010 or later) • FX5U CPU module (Ver.1.240 or later) • FX5UC CPU module (Ver.1.240 or later)
Profile		B-ASC
Engineering tool (BACnet function supported version)		GX Works3 (Ver.1.075D or later)

*1 For maximum segment length (length between hubs), consult the manufacturer of the hub used.

*2 Number of simultaneously accepted commands: 8 commands maximum (excluding broadcasts from other devices)

*3 The ports must comply with the IEEE802.3 100BASE-TX or IEEE802.3 10BASE-T standard.

*4 Straight/crossover cables can be used.

2.2 BACnet Specifications

BACnet standards

BACnet complies with the following BACnet standards.

- ANSI/ASHRAE Standard 135-2016
- ANSI/ASHRAE Standard 135-2012
- ANSI/ASHRAE Standard 135-2010
- ANSI/ASHRAE Standard 135-2004
- IEIEJ-G-0006:2006 Addendum-a

Object

The following table lists the objects supported by the Ethernet module.

○: Supported, —: Not supported

Object name	Object type number	Number of instances	ANSI/ASHRAE Standard				IEIEJ-G-0006:2006 Addendum-a
			135-2016	135-2012	135-2010	135-2004	
Accumulator	23	4	○	○	○	○	○
AnalogInput	0	8	○	○	○	○	○
AnalogOutput	1	8	○	○	○	○	○
AnalogValue	2	8	○	○	○	○	○
BinaryInput	3	16	○	○	○	○	○
BinaryOutput	4	16	○	○	○	○	○
BinaryValue	5	16	○	○	○	○	○
Multi-state Input	13	8	○	○	○	○	○
Multi-state Output	14	8	○	○	○	○	○
NetworkPort	56	1	○	—	—	—	—
Device	8	1	○	○	○	○	○

BIBB

The following table lists the BACnet Interoperability Building Block (BIBB) supported by the Ethernet module.
BIBB is a set of BACnet services that are executed between the client and server of a BACnet device.
For details on BIBB, refer to the BACnet standards.
○: Supported, —: Not supported

BIBB category	Description	BACnet Service	Description	Initiate	Execute
Data Sharing	ReadProperty-B (DS-RP-B)	ReadProperty	Reads one property value in one object.	—	○
	ReadPropertyMultiple-B (DS-RPM-B)	ReadPropertyMultiple	Reads multiple property values in multiple objects.	—	○
	WriteProperty-B (DS-WP-B)	WriteProperty	Changes one property value in one object.	—	○
	WritePropertyMultiple-B (DS-WPM-B)	WritePropertyMultiple	Changes multiple property values in multiple objects.	—	○
Device Management	Dynamic Device Binding-B (DM-DDB-B)	Who-Is	Used for determining the object IDs and network addresses of other BACnet devices.	—	○
		I-Am	Sends the own object ID.	○	—
	Dynamic Object Binding-B (DM-DOB-B)	Who-Has	Used for identifying the object with the specified object ID or object name.	—	○
		I-Have	Sends the own object ID and object name.	○	—
	DeviceCommunicationControl-B (DM-DCC-B)	DeviceCommunicationControl	Prohibits sending requests and responses for a specified period of time.	—	○
	TimeSynchronization-B (DM-TS-B)	TimeSynchronization	Synchronizes time.	—	○
	Restart-B (DM-R-B)	UnconfirmedCOVNotification	Notifies changes in the setting values.	○	—
	ReinitializeDevice-B (DM-RD-B)	ReinitializeDevice	Restarts the device.	—	○

3 PROCEDURES BEFORE OPERATION

This chapter describes the procedures before operation.

1. Checking the specifications of the Ethernet module

Check the specifications of the Ethernet module. (☞ Page 14 SPECIFICATIONS)

2. Mounting the Ethernet module

Mount the Ethernet module to the FX5 CPU module.

3. Configuring a network

Configure the system and set the parameters which are required for startup.

- Parameter setting (☞ Page 53 PARAMETER SETTINGS)

4. Network diagnostics

Check the network status with the Ethernet diagnostics.

5. Programming

Create a program. (☞ Page 65 PROGRAMMING)

6. Checking the communication status

Check the communication status of the Ethernet module.

Point

For the specifications and wiring of the Ethernet module, Ethernet diagnostics, and communication status check, refer to the following.

📖 MELSEC iQ-F FX5 Ethernet Module User's Manual
📖 MELSEC iQ-F FX5 EtherNet/IP Module User's Manual

MEMO

4 FUNCTIONS

This chapter describes the BACnet functions of the Ethernet module.

4.1 Function List

The following table lists the BACnet functions of the Ethernet module.

Function	Description	Reference
BACnet object function	Registers a BACnet object and provides input/output to a BACnet system.	Page 20 BACnet Object Function
Joining/leaving function	Performs joining/leaving processing to/from BACnet with buffer memory.	Page 47 Joining/Leaving Function
Time synchronization function	Programmatically reflects the clock data of the TimeSynchronization service sent from the BACnet workstation or BACnet controllers to the FX5 CPU module.	Page 48 Time Synchronization Function

4.2 BACnet Object Function

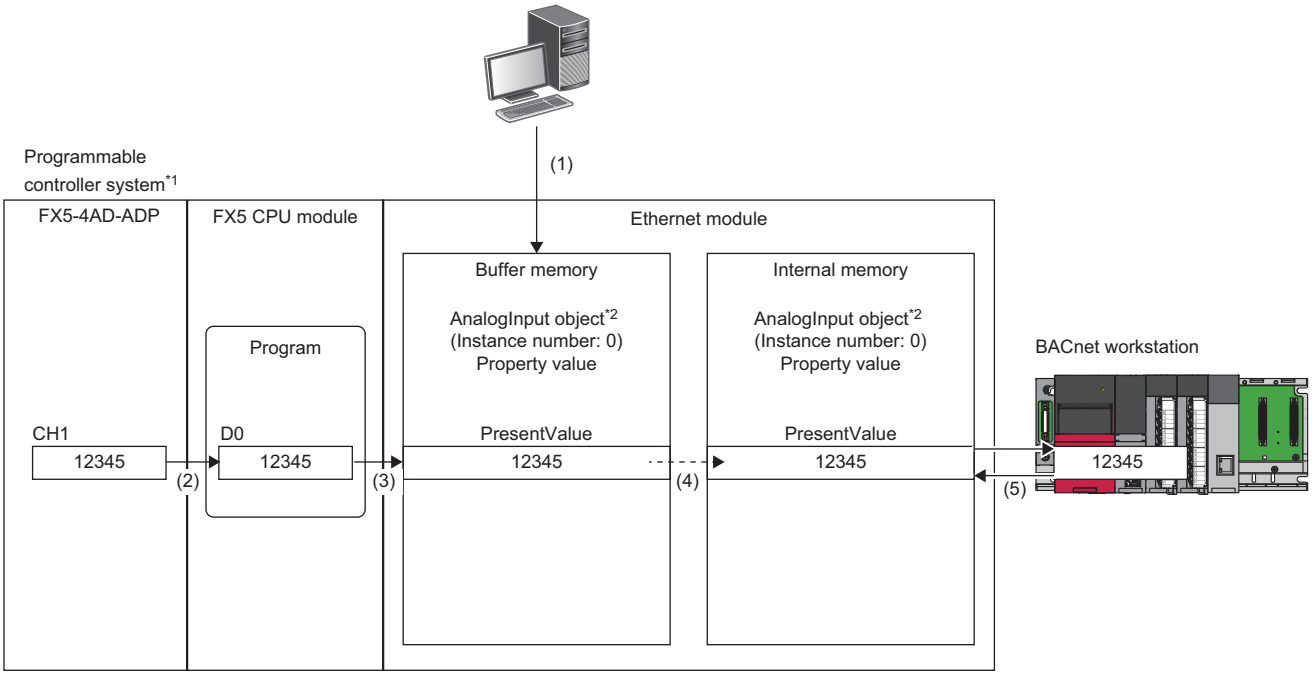
This function is used for using a programmable controller system as a BACnet device.

By registering objects to the Ethernet module, various services can be sent to/received from a BACnet workstation and BACnet controllers.

Some of the properties of an object are assigned to the data assignment area in the buffer memory and can be accessed from a program.

Objects are registered with GX Works3. (☞ Page 55 BACnet function setting)

The following figure shows how a BACnet workstation reads an analog value from the AnalogInput object (instance number: 0) of the Ethernet module.



*1 The programmable controller system communicates as a BACnet device.

*2 AnalogInput object is an object that reads analog values from a programmable controller to a BACnet workstation.

(1) Connect a personal computer to the Ethernet module and register the AnalogInput object (instance number: 0) with GX Works3.

(2) Read an analog value from the FX5-4AD-ADP using the program of the FX5 CPU module.

(3) Write the analog value read using the program to the PresentValue property of the AnalogInput object registered in (1).

(4) The value of the PresentValue property in the buffer memory of the Ethernet module is reflected in the PresentValue property in the internal memory.

(5) The BACnet workstation sends a service to read the PresentValue property of the AnalogInput object in the Ethernet module.

Object list

Refer to the following for the objects, object type numbers, and the BACnet standards that can be registered to the Ethernet module.

☞ Page 15 Object

List of data types

The following tables list the basic data types and data ranges mainly used in the Ethernet module.

For the data types not listed in the following tables, refer to the standard with which the Ethernet module complies. (☞ Page 15 BACnet standards)

Data type	Data range
NULL	None
BOOLEAN	0: False 1: True
Unsigned	0 to 4294967295 (32-bit unsigned integer)
Signed	-2147483648 to +2147483647 (32-bit signed integer)
REAL	(Within all ranges of the 32-bit floating-point data type real number) Minimum change value: 0.000001
CharacterString	0 to 128 bytes
Date	1900/1/1 to 2153/12/31 (32 bits)
Time	0:0:0.0 to 23.59.59.99 (32 bits)
ObjectIdentifier	0 to 4294967295 Object type number: 0 to 1023 Instance number: 0 to 4194303 (32 bits)

• LIST type and ARRAY type

Data type	Number of elements
LIST type	0 to 32*1
ARRAY type	0 to 32

*1 The data range is different for the following properties.

Object	Property	Data range
Multi-State Input	StateText	Number of elements for LIST type: 0 to 4294967295 Multi-State Output CharacterString: 0 to 4294967295 bytes
Multi-State Output		

Point

• Calculation method for ObjectIdentifier

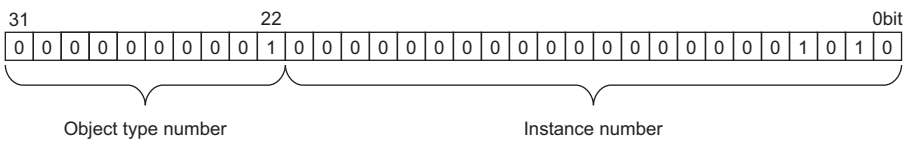
ObjectIdentifier is a 32-bit unsigned integer.

Of the 32 bits, the upper 10 bits are calculated as the object type number and the lower 22 bits as the instance number.

(Example) For AO-10

AnalogOutput object type number: 1

Instance number: 10



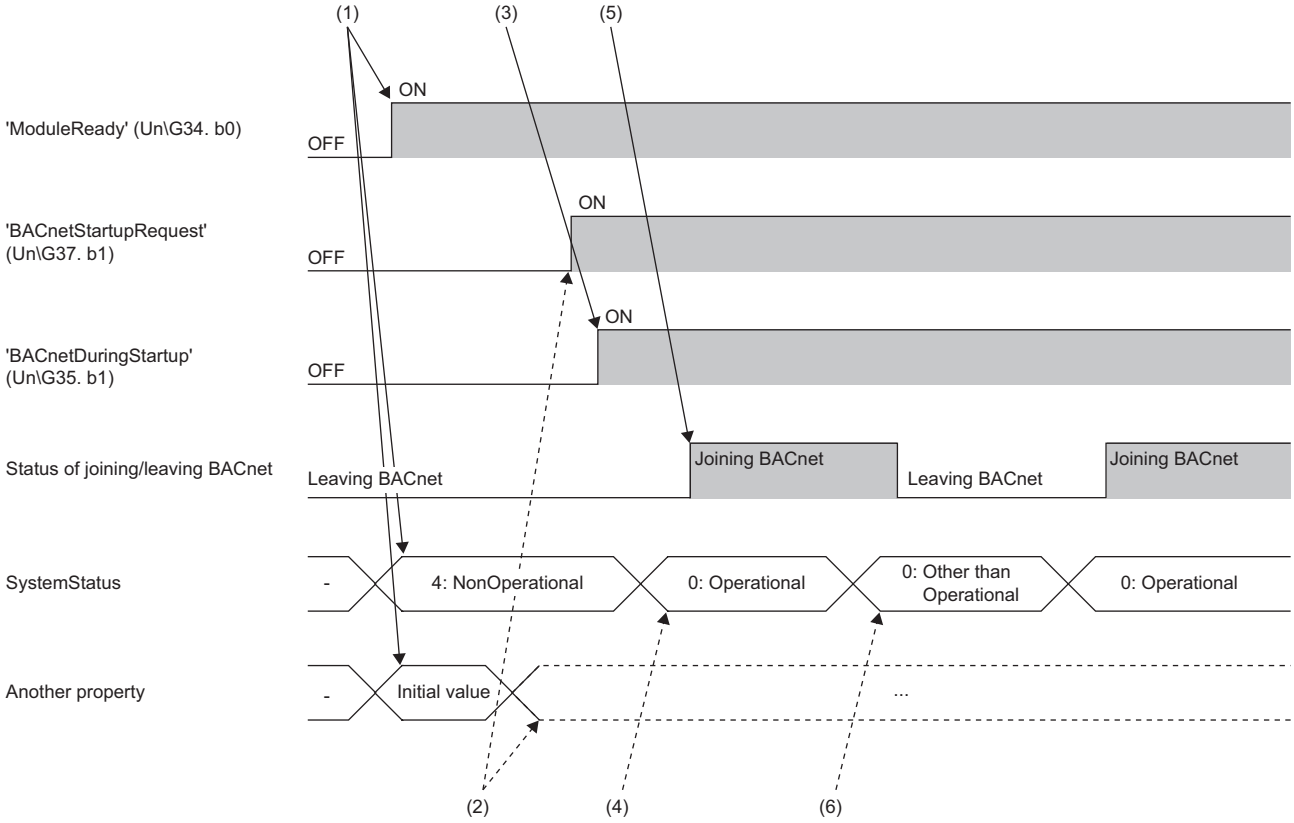
ObjectIdentifier is 40000A in hexadecimal (4194314 in decimal).

Common item

The following figure shows the common operations, other operations, and program settings of the Ethernet module when the BACnet object function is used.

Ethernet module operation

■Operation at startup



(1) When the programmable controller system is powered on or is reset, the Ethernet module writes 4: NonOperational to 'SystemStatus' (Un\G8500), and initializes the buffer memory. After that, 'ModuleREADY' (Un\G34, b0) is turned on.
(2) When 'ModuleREADY' (Un\G34, b0) is detected to be on, the property value set with GX Works3 is written to the buffer memory, and 'BACnetStartupRequest' (Un\G37, b1) is turned on.
(3) The Ethernet module turns on 'BACnetDuringStartup' (Un\G35, b1) and starts the module operation and BACnet communications.
(4) The program writes 0: Operational to 'SystemStatus' (Un\G8500).
(5) When 'SystemStatus' (Un\G8500) is set to 0: Operational, the Ethernet module sets 1: Joining to 'Module status' (Un\G8501).
(6) When 0: 'SystemStatus' (Un\G8500) is not set to Operational, the Ethernet module sets 0: Leaving to 'Module status' (Un\G8501).

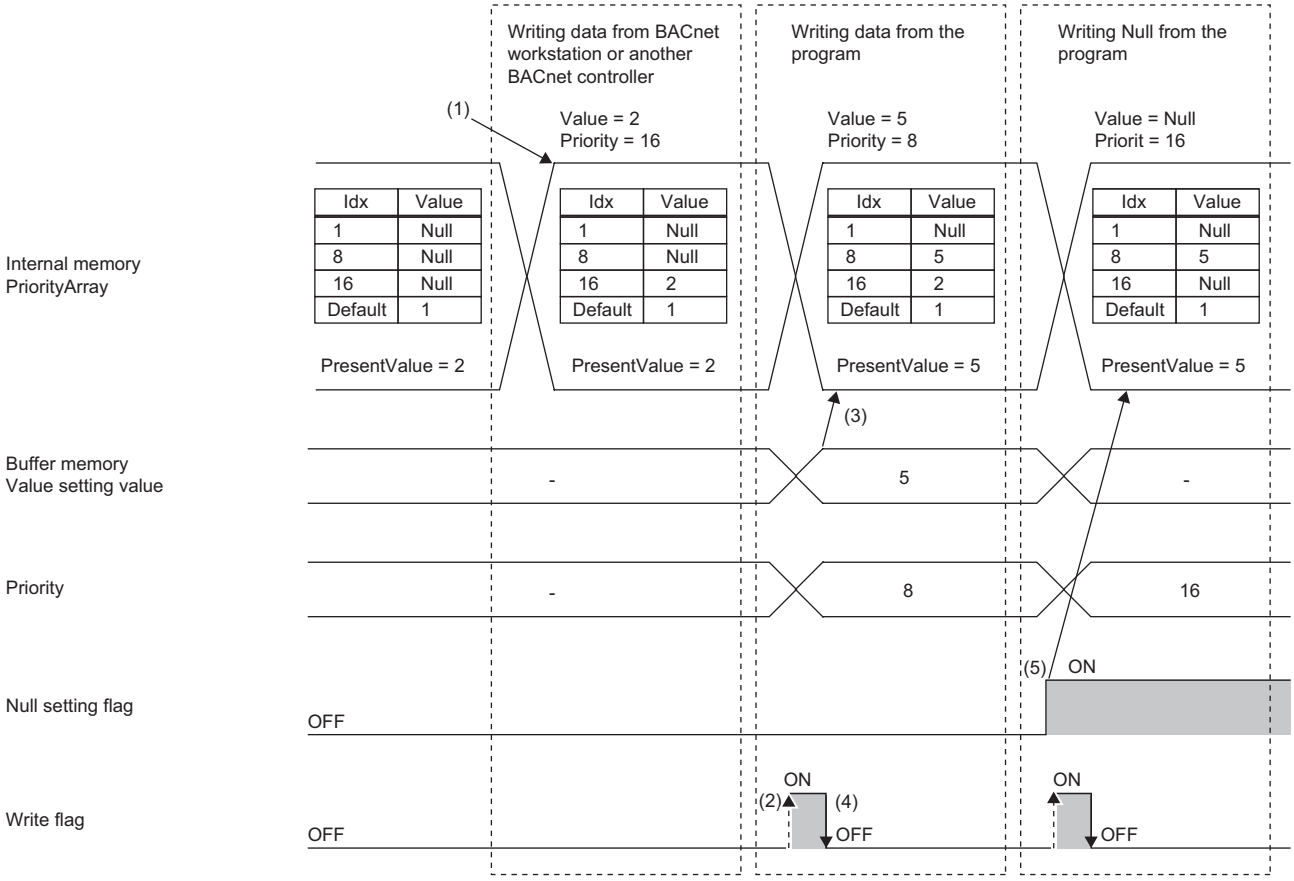
The CPU module must be in the RUN state to start the module mentioned above.
When the CPU module status is changed from RUN to STOP after the module is started, the BACnet joining/leaving status is turned off by the Ethernet module.
When the CPU module status is changed from STOP to RUN after the module is started, the BACnet joining/leaving status is turned on by the Ethernet module.
When the CPU module status is changed to STOP after the module is started, the system status is 4: NonOperational regardless of the value in the buffer memory 'SystemStatus' (Un\G8500).
When the Ethernet module receives ReinitializeDevice Service from a BACnet device, such as a central monitoring device, the Ethernet module clears its own error status and switches the BACnet joining/leaving status from on to off and off to on. The module will not be restarted, while the BACnet functions will be virtually restarted.
A BBMD is re-registered when the module re-joins the BACnet system.

Point

Since the Ethernet module is in the process of leaving the BACnet system at startup, it needs to join the BACnet system. (☞ Page 47 Joining/Leaving Function)

PresentValue for the output/value object

■Writing



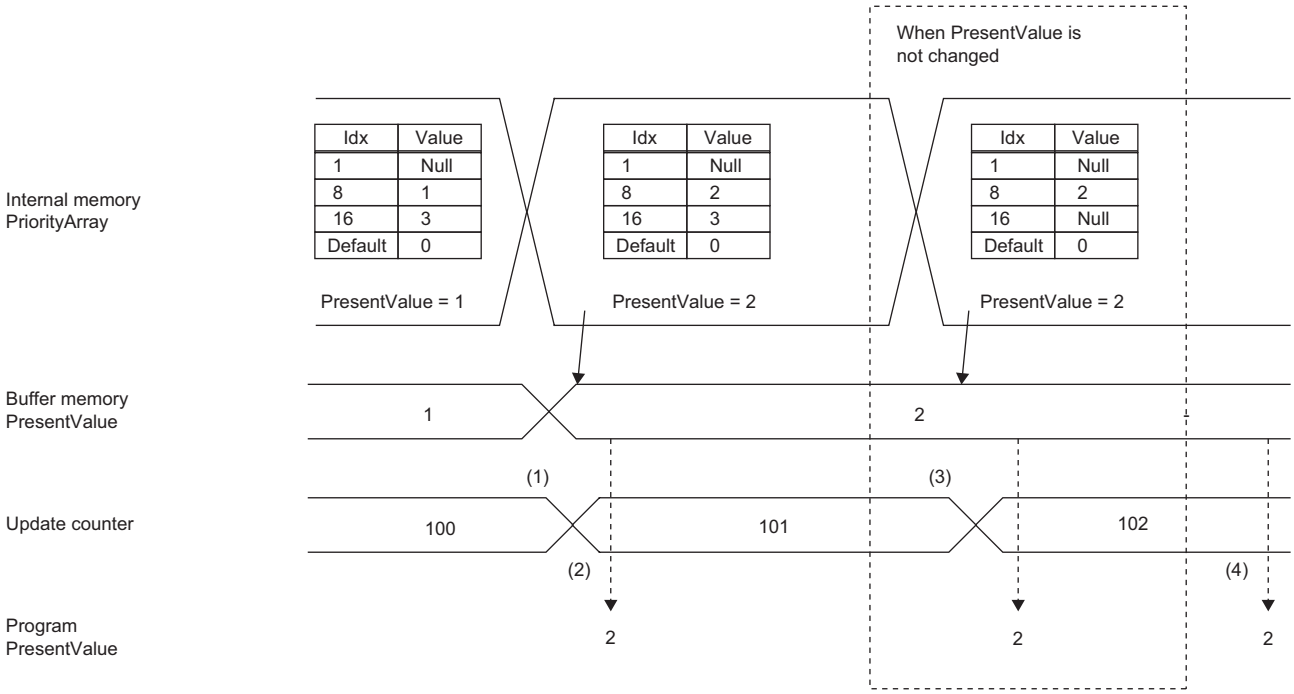
(1) When a value is written from a BACnet workstation or BACnet controllers, the Ethernet module reflects the write value in the PriorityArray in the internal memory and calculates the PresentValue in the internal memory.
(2) After the program writes the Value setting value, Priority setting value, and Null setting flag, the write flag is turned on.
(3) When the Ethernet module detects that the write flag is on, it reads the Value setting value, Priority setting value, and Null setting flag from the buffer memory.
The Ethernet module reflects the write value in the PriorityArray in the internal memory, and calculates the PresentValue in the internal memory.
(4) The Ethernet module turns off the write flag.
(5) When the Null setting flag is on, Null is written to PriorityArray.

Point

Write control is an alternative to WriteProperty and a value can be written even during OutOfService. However, the written value is not reflected in the buffer memory, and the write counter is not incremented. When OutOfService changes from TRUE to FALSE, the written value is reflected in the buffer memory. Even if the value is written multiple times during OutOfService, the update flag is incremented by 1.

Object	Value setting value	Priority setting value	Null setting flag	Operation
AnalogOutput	Normal 32-bit floating-point data	1 to 16	OFF	Sets the Value setting value to the Priority setting value position of PriorityArray.
			ON	Sets Null to the Priority setting value position of PriorityArray.
	-0, subnormal number, NaN (not a number), or ±∞		OFF	Reflects the value to the current value as it is.
			ON	Sets Null to the Priority setting value position of PriorityArray.
BinaryOutput	0 or 1		OFF	Sets the Value setting value to the Priority setting value position of PriorityArray.
			ON	Sets Null to the Priority setting value position of PriorityArray.
Multi-State Output	1 to NumberOfStates		OFF	Sets the Value setting value to the Priority setting value position of PriorityArray.
			ON	Sets Null to the Priority setting value position of PriorityArray.
	Out of the range of 1 to NumberOfStates		OFF	Error (Setting value out of range error)
			ON	Sets Null to the Priority setting value position of PriorityArray.
Any	Any	0 or 17 or more	Any	Error (Setting value out of range error)

■Reading



Update counter: The Ethernet module increments the counter every time a value is written to PriorityArray.
Range of the value: 0→1→ to →65534→65535→0→1→ are repeatedly set.

(1) When the Ethernet module writes a value to the PriorityArray in the internal memory and calculates PresentValue, it updates the PresentValue in the buffer memory, and increments the update counter.

(2) After the update counter has changed, the program reads the PresentValue in the buffer memory.

(3) Even when the value of PresentValue or the content of PriorityArray does not change, the Ethernet module increments the update counter when a value is written to PriorityArray.

Therefore, it can be detected that there has been an update.

(4) Even when the program reads the PresentValue in the buffer memory at any timing, the value is the latest value.

Setting using a program

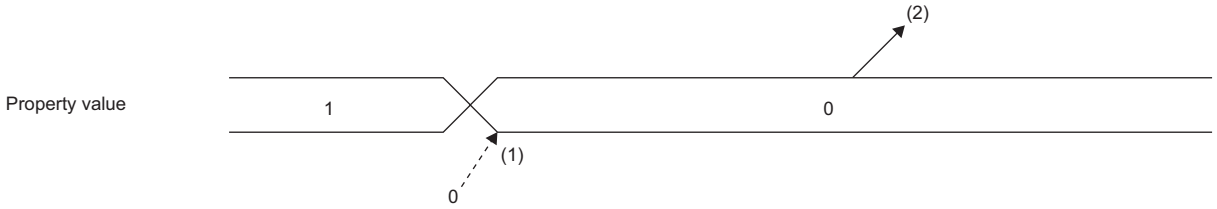
This section describes the program settings for each object.

Writing values to the buffer memory using a program changes the property value of the Ethernet module.

For the program settings for the Accumulator object, refer to the following.

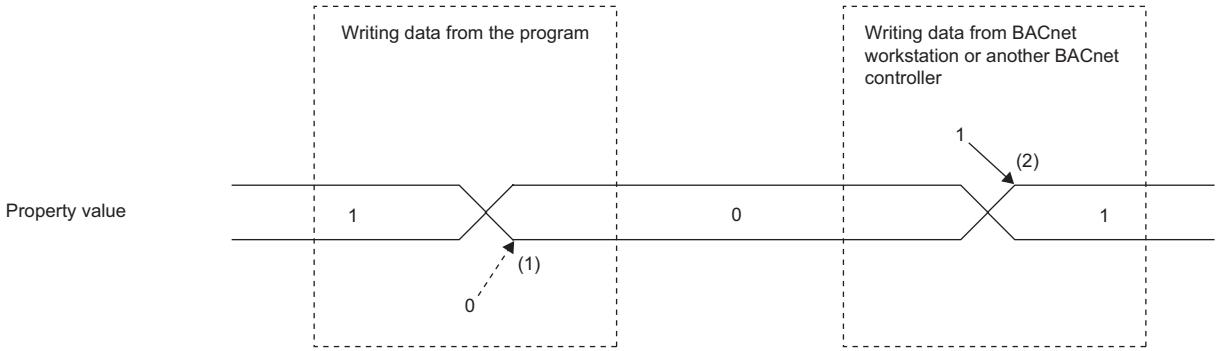
☞ Page 32 Setting using a program

■Writing from the program and reading from a BACnet workstation or BACnet controllers



(1) Write a value to the buffer memory using the program.
(2) The Ethernet module uses the value in the buffer memory as a property value.

■Writing from the program and a BACnet workstation or BACnet controllers



(1) When a value is written from the program, the program writes the value to the buffer memory.
(2) When a value is written from a BACnet workstation or BACnet controllers, the Ethernet module writes the value to the buffer memory.

Precautions

When values are written from the program and the Ethernet module at almost the same time, the value written later is set as the property value.

Property operation

■EventState, Reliability, OutOfService, StatusFlags

The following describes the relationship between EventState, Reliability, OutOfService, and StatusFlags.

Property		How to determine the value
EventState		Fixed to NORMAL (0)
Reliability		Buffer memory (A value written from the program)
OutOfService*1		• Buffer memory (A value written from the program) • A value written from a BACnet workstation or BACnet controllers
StatusFlags	IN_ALARM	Fixed to FALSE
	FAULT	FALSE when the value of the Reliability property is NO_FAULT_DETECTED (0) TRUE for other cases
	OVERRIDDEN	Fixed to FALSE
	OUT_OF_SERVICE	TRUE when the value of the OutOfService property is TRUE FALSE for other cases

*1 The OutOfService property indicates that the object is disconnected from physical input and output.
When the value of the OutOfService property is TRUE, PresentValue, Reliability, and FeedbackValue cannot be written to or read from the buffer memory. (The same applies to the update counter of the output/value object and the pulse setting value of Accumulator.)
When OutOfService changes from TRUE to FALSE, a value is written to or read from the buffer memory.
When OutOfService changes from TRUE to FALSE, the output update counter is incremented so that changes in the buffer memory can be detected.

■PriorityArray, RelinquishDefault, CurrentCommandPriority

The value with the highest priority (the lower array element) is set as PresentValue. When all the array elements are NULL, the value of RelinquishDefault is set as PresentValue.

Set RelinquishDefault in the parameter setting of the engineering tool.

■Scale

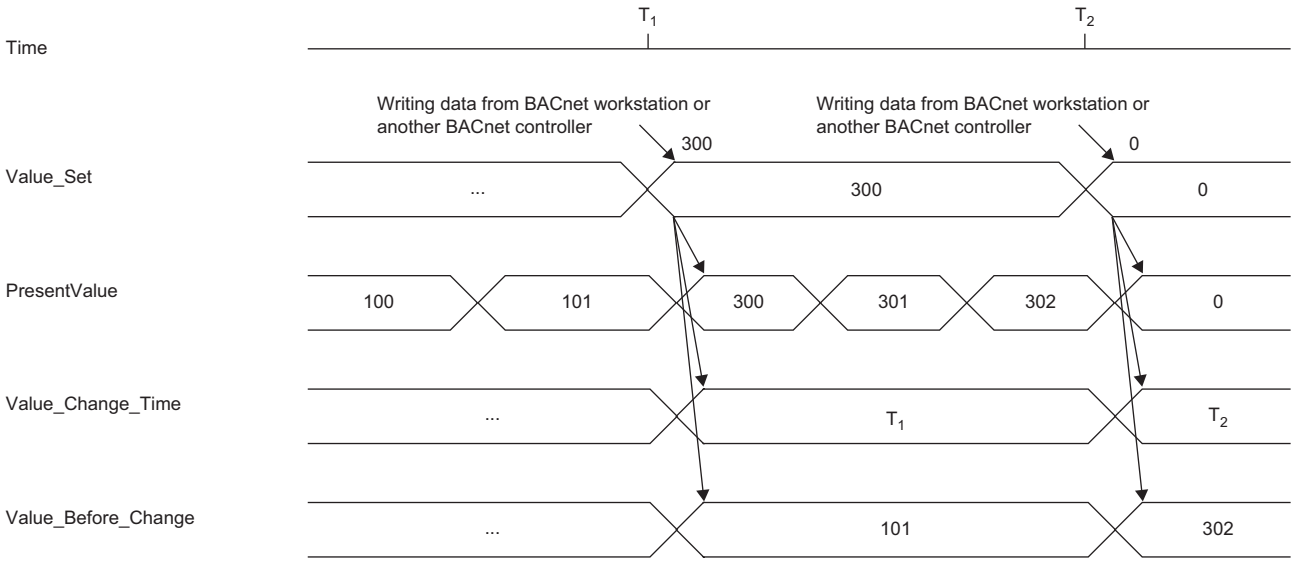
Scale is the ratio by which PresentValue is multiplied.

To set the unit shown in Units, perform the following operation after PresentValue is read.

• Value when converted into units [Units] = PresentValue × Scale

■Value_Change_Time, Value_Before_Change, Value_Set

The following figure shows the operation of Value_Change_Time (the date and time when PresentValue was changed by writing a value to Value_Set), Value_Before_Change (the value of PresentValue immediately before the PresentValue was changed by writing a value to Value_Set), and Value_Set (writing a value to PresentValue).



Since the Ethernet module does not have a clock, the time set in Value_Change_Time is the time of the FX5 CPU module. The same applies to other properties where time is set.

Writing the pulse setting value or directly rewriting the current value in the buffer memory using the program does not change Value_Change_Time and Value_Before_Change.

■Polarity

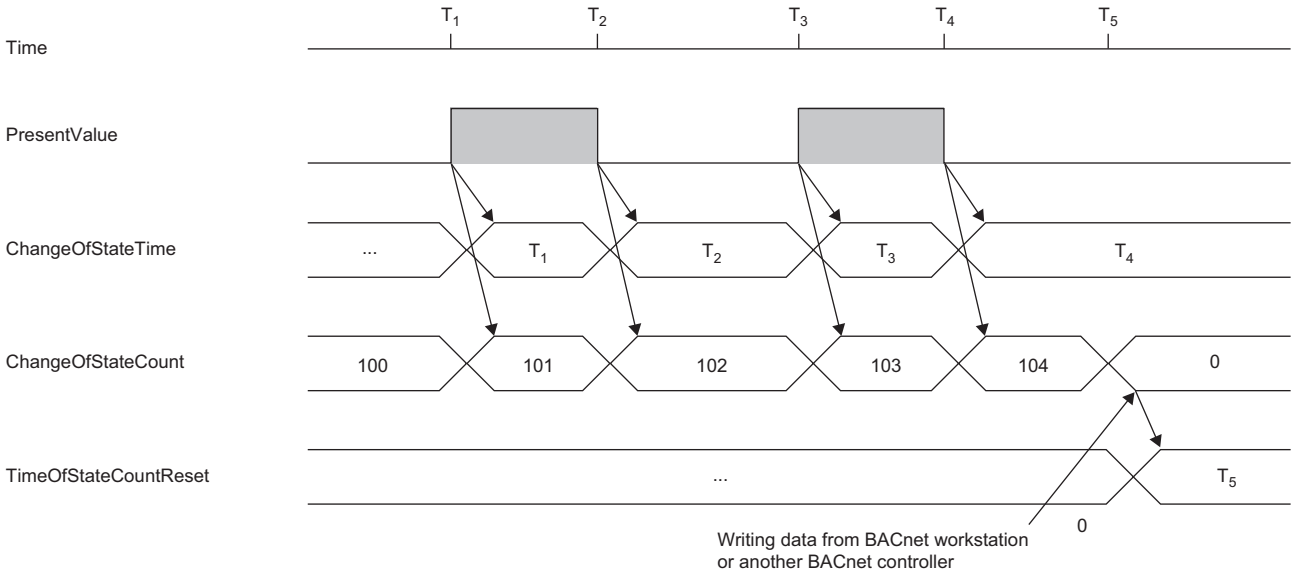
This property is included in the binary input/output object and indicates the input/output polarity.

PresentValue of BACnet	Polarity	Current value in the buffer memory
INACTIVE	NORMAL	0
ACTIVE	NORMAL	1
INACTIVE	REVERSE	1
ACTIVE	REVERSE	0

When the value of OutOfService is TRUE, the PresentValue property does not change even if Polarity changes.

■ChangeOfStateTime, ChangeOfStateCount, TimeOfStateCountReset

The following figure shows the operation of ChangeOfStateTime (the date and time when the status change has occurred), ChangeOfStateCount (the number of times the status change has occurred), and TimeOfStateCountReset (the date and time when ChangeOfStateCount is set to 0).

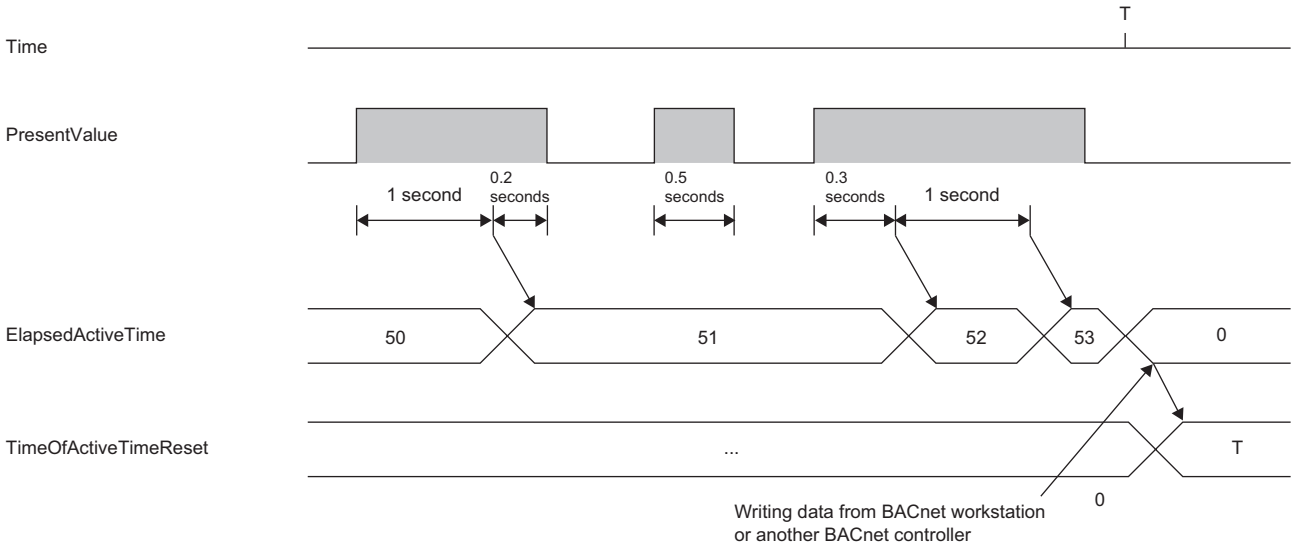


Even when OutOfService is TRUE, the ChangeOfStateTime, ChangeOfStateCount, and TimeOfStateCountReset properties change.

When the value of ChangeOfStateCount is other than 0, the TimeOfStateCountReset property does not change.

■ElapsedActiveTime, TimeOfActiveTimeReset

The following figure shows the operations of ElapsedActiveTime (integrated time when the value of PresentValue is ACTIVE) and TimeOfActiveTimeReset (date and time when ElapsedActiveTime is set to 0).



When the value of PresentValue status is ACTIVE, the value is integrated in the unit of the cycle (usually 50ms) in which the BACnet function task is called from an operating system, and ElapsedActiveTime is incremented by 1 every one second.
When the value of ElapsedActiveTime exceeds the maximum value of the 32-bit unsigned integral data (FFFFFFFFH), ElapsedActiveTime returns to 0.
Even when OutOfService is TRUE, the ElapsedActiveTime and TimeOfActiveTimeReset properties change.
When the value of ElapsedActiveTime is other than 0, the TimeOfActiveTimeReset property does not change.

■MinimumOffTime, MinimumOnTime

MinimumOffTime is the minimum time that PresentValue remains INACTIVE.
MinimumOnTime is the minimum time that PresentValue remains ACTIVE.
These settings are realized by writing the value of PresentValue to priority 6 of PriorityArray during the minimum time of INACTIVE or ACTIVE when PresentValue changes. Therefore, when the value is written with a priority higher than 6, it will change to that value.

Precautions

Writing to priority 6 of PresentValue of the Binary Output object and Binary Value object cannot be performed because it causes an error (write-access-denied).

Accumulator (AC) object

This object handles the total amount of electrical energy.

Property list

The following table lists available properties for the AnalogOutput object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
36	EventState	Enumerated	R	Indicates the event status.
65	MaxPresValue	Unsigned	R	Indicates the maximum value of PresentValue.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether the device is disconnected from the physical input.
85	PresentValue*1	Unsigned	W	Indicates the number of count of input pulses.
103	Reliability	Enumerated	R	Indicates reliability.
111	StatusFlags	BitString	R	Indicates the object status.
117	Units	Enumerated	R	Indicates the unit.
187	Scale	BACnetScale	R	Indicates the coefficient for conversion to the value indicated by the unit.
190	Value_Before_Change	Unsigned	R	Indicates the value of the previous PresentValue when the PresentValue was changed by writing a value to Value_Set.
191	Value_Set	Unsigned	W	PresentValue can be changed by writing a value.
192	Value_Change_Time	BACnetDateTime	R	Indicates the date and time when the PresentValue is changed by writing a value to Value_Set.
371	PropertyList*2	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.

*1 The PresentValue property cannot be set to a value greater than the value of the MaxPresValue property (PropertyID: 65). Change the value of the MaxPresValue property according to the maximum value to be set for the PresentValue property.
Reliability=2(OverRange) if Reliability is 0 when PresentValue changes from within the range of MaxPresValue to out of the range of MaxPresValue.
Reliability=0(NoFaultDetected) if Reliability is 2 when PresentValue changes from out of the range of MaxPresValue to within the range of MaxPresValue.
When Reliability is other than the above, the value of Reliability does not change. The same applies when OutOfService changes from TRUE to FALSE and the buffer memory is updated.
(Reliability=1 remains if Reliability is 1 when PresentValue changes from within the range of MaxPresValue to out of the range of MaxPresValue (or reverse order).)

*2 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

Buffer memory format of the Accumulator object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 88 BACnet communication Accumulator

Ethernet module operation

■Operation at startup

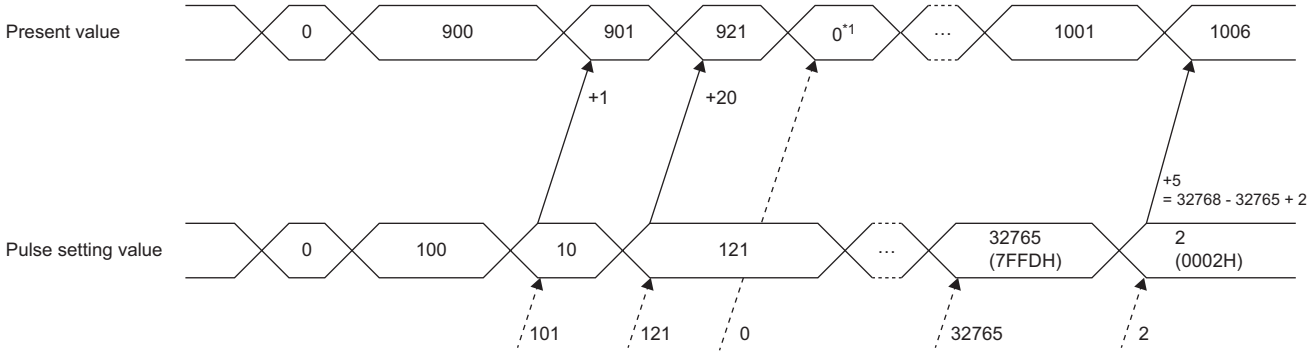
For the startup operation, refer to the following.

☞ Page 32 Writing from the program

For the Accumulator object, the integration count starts when the BACnet communications start. (☞ Page 31 Integration count operation)

■Integration count operation

The current value changes when a value is written to the pulse setting value.



1. Write a value to the pulse setting value.

2. The difference of the pulse setting value from the previous value is reflected in the current value.

The following table lists the values reflected by the difference condition.

Difference condition	Value to be reflected
Previous pulse setting value = Current pulse setting value	0 (Not reflected to the current value)
Previous pulse setting value < Current pulse setting value	Current pulse setting value - Previous pulse setting value
Previous pulse setting value > Current pulse setting value	32768 (8000h) - Previous pulse setting value + Current pulse setting value

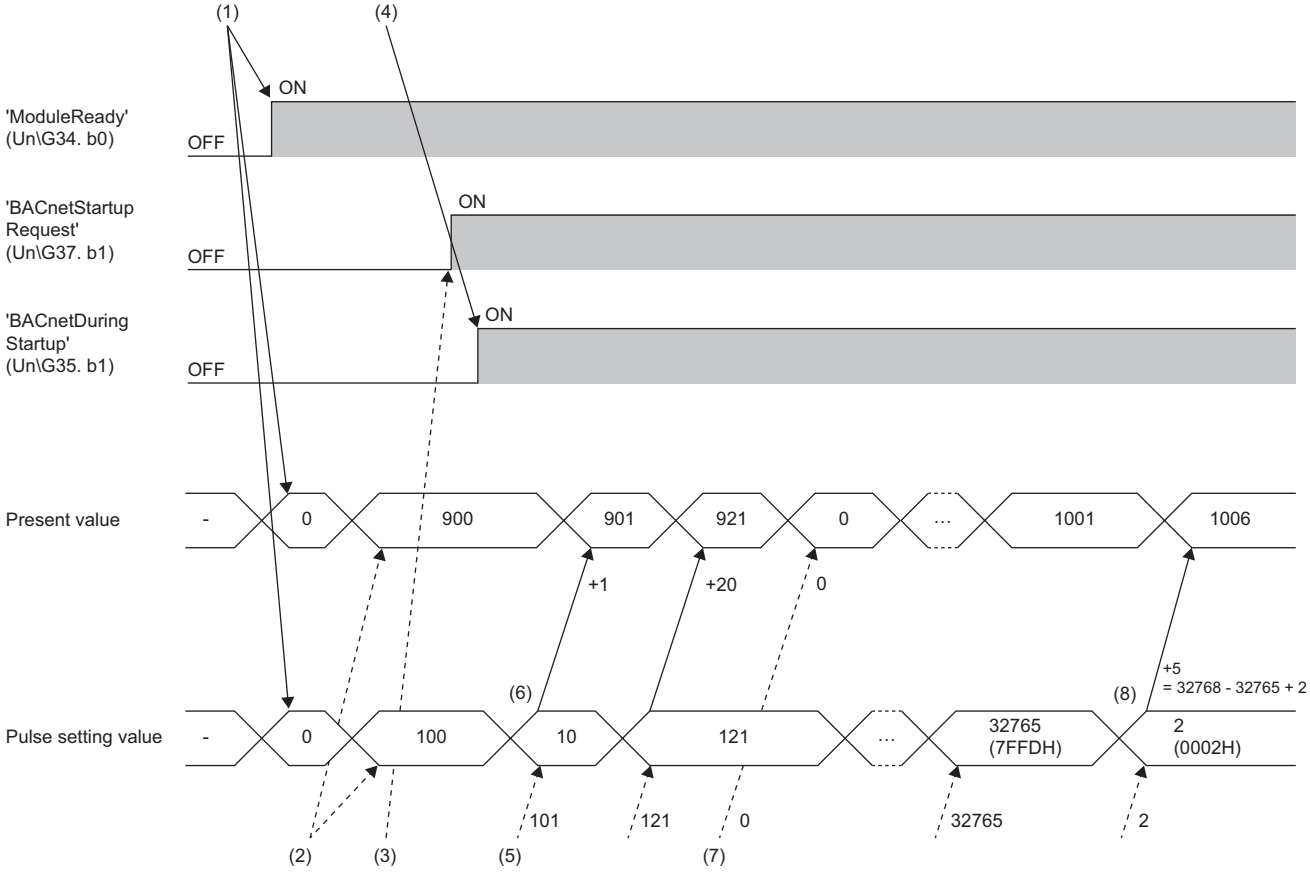
*1 The current value can be set to any value by directly rewriting the value in the buffer memory.

Setting using a program

■Writing from the program

The Ethernet module monitors the pulse setting value in the buffer memory, and when a change is detected, the difference from the previous pulse setting value is reflected in the current value.

The current value in the buffer memory can be rewritten using the program.



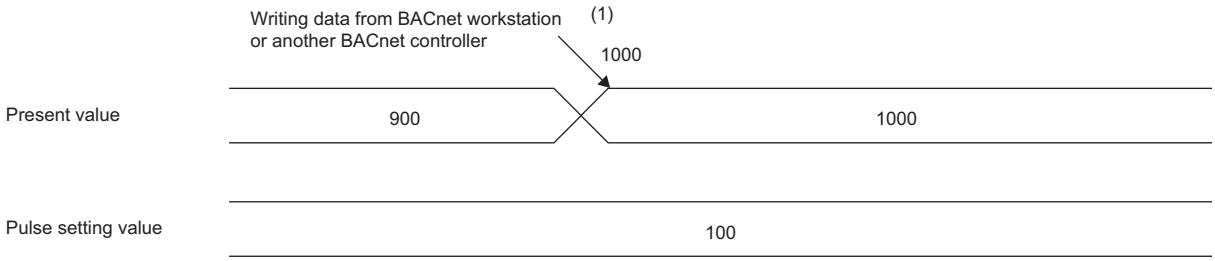
(1) After the programmable controller system is powered on or is reset, the Ethernet module clears the current value in the buffer memory and the pulse setting value to 0, and turns on 'ModuleREADY' (Un\G34, b0).

(2) When it is necessary to restore the operating status before power-off or reset, the program writes the saved current value and pulse setting value when it detects that 'ModuleREADY' (Un\G34, b0) is on.

(3) The program turns on 'BACnetStartupRequest' (Un\G37, b1).

(4) The Ethernet module turns on 'BACnetDuringStartup' (Un\G35, b1) and starts the integration count operation.

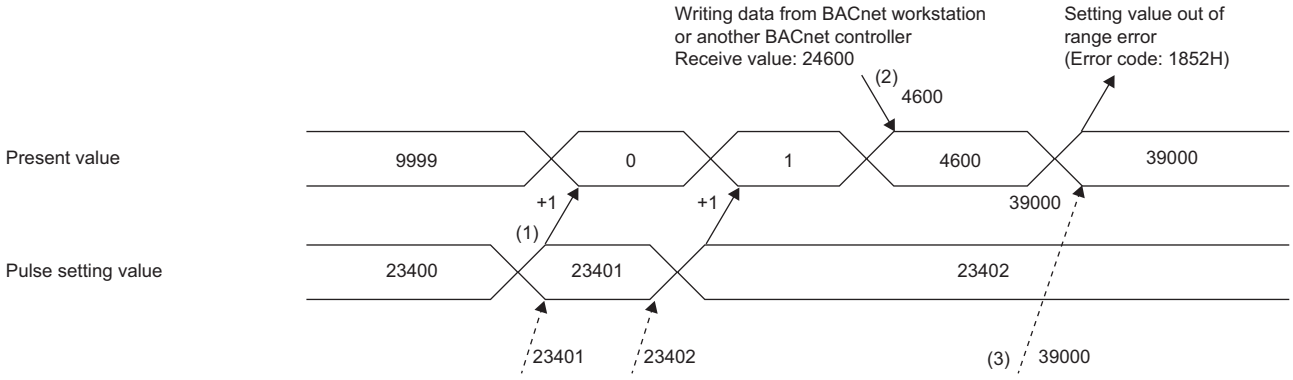
■Writing from a BACnet workstation or BACnet controllers



(1) When a value is written from a BACnet workstation or BACnet controllers, the Ethernet module writes the value to the buffer memory.

Operation performed when MaxPresValue is exceeded

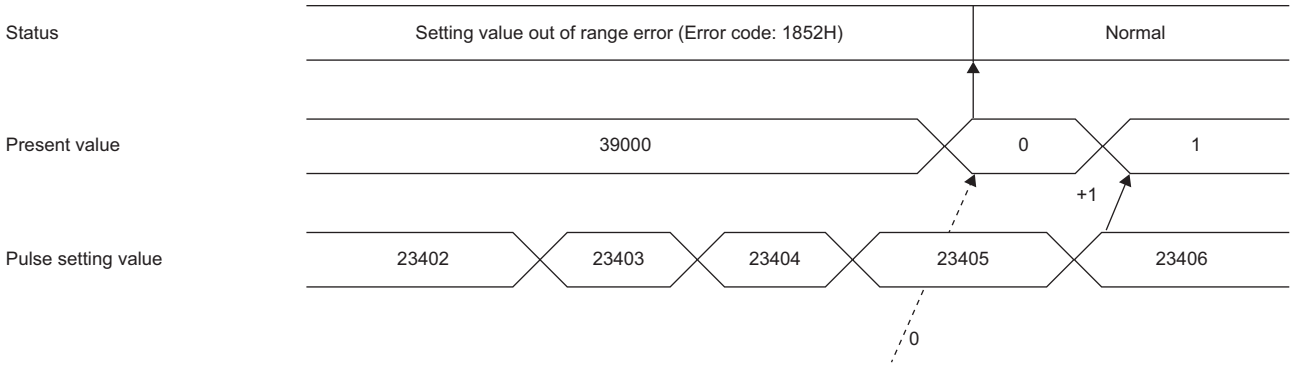
The following figure shows the case of MaxPresValue=9999.



(1) When the difference is reflected, the current value is limited to the integer operation of MaxPresValue + 1.
(2) When a value is written from a BACnet workstation or BACnet controllers, the current value is limited to the integer operation of MaxPresValue + 1.
(3) When the current value in the buffer memory is directly rewritten using the program and the value exceeds MaxPresValue, the setting value out of range error (error code: 1852H) occurs.

Precautions

During the occurrence of the setting value out of range error (error code: 1852H), the difference in pulse setting values is not reflected in the current value.
The difference value is reflected after the current value becomes within the range from 0 to MaxPresValue. Therefore, pulses received during the occurrence of the setting value out of range error (error code: 1852H) are not integrated when the error is cleared.



When other than Reliability=0(NoFaultDetected), the difference in pulse setting values is not reflected in the current value.

AnalogInput (AI) object

This object handles analog input.

Property list

The following table lists available properties for the AnalogInput object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
36	EventState	Enumerated	R	Indicates the event status.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether the device is disconnected from the physical input.
85	PresentValue	REAL	W	Indicates the current value of the input being measured.
103	Reliability	Enumerated	R	Indicates reliability.
111	StatusFlags	BitString	R	Indicates the object status.
117	Units	Enumerated	R	Indicates the unit.
371	PropertyList*1	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.

*1 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

Buffer memory format of the AnalogInput object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 89 BACnet communication AnalogInput

Ethernet module operation

■Operation at startup

For the startup operation, refer to the following.

☞ Page 22 Ethernet module operation

Setting using a program

For the setting using the program, refer to the following.

☞ Page 26 Setting using a program

AnalogOutput (AO) object

This object handles analog output.

Property list

The following table lists available properties for the AnalogOutput object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
36	EventState	Enumerated	R	Indicates the event status.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether the device is disconnected from the physical output.
85	PresentValue	REAL	W	Indicates the current value of the output.
87	PriorityArray	BACnetPriorityArray	R	Indicates an array of priority values for determining the output value.
103	Reliability	Enumerated	R	Indicates reliability.
104	RelinquishDefault	REAL	W	Indicates the default value to be used when all values of PriorityArray are NULL.
111	StatusFlags	BitString	R	Indicates the object status.
117	Units	Enumerated	R	Indicates the unit.
371	PropertyList*1	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.
431	CurrentCommandPriority*2	BACnetOptionalUnsigned	R	Indicates the PriorityArray array number used for PresentValue.

*1 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

*2 Only ANSI/ASHRAE Standard 135-2016 is supported.

Buffer memory format of the AnalogOutput object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 90 BACnet communication AnalogOutput

Ethernet module operation

■Operation at startup

For the startup operation, refer to the following.

☞ Page 22 Ethernet module operation

■Operation of PresentValue for the output/value object

For the operation of PresentValue for the output/value object, refer to the following.

☞ Page 23 PresentValue for the output/value object

Setting using a program

For the setting using the program, refer to the following.

☞ Page 26 Setting using a program

AnalogValue (AV) object

This object handles values such as analog setting values.

Property list

The following table lists available properties for the AnalogValue object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
36	EventState	Enumerated	R	Indicates the event status.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether to change inside the device.
85	PresentValue	REAL	W	Indicates the current analog value.
87	PriorityArray	BACnetPriorityArray	R	Indicates an array of priority values for determining the output value.
103	Reliability	Enumerated	R	Indicates reliability.
104	RelinquishDefault	REAL	W	Indicates the default value to be used when all values of PriorityArray are NULL.
111	StatusFlags	BitString	R	Indicates the object status.
117	Units	Enumerated	R	Indicates the unit.
371	PropertyList*1	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.
431	CurrentCommandPriority*2	BACnetOptionalUnsigned	R	Indicates the PriorityArray array number used for PresentValue.

*1 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

*2 Only ANSI/ASHRAE Standard 135-2016 is supported.

Buffer memory format of the AnalogValue object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 92 BACnet communication AnalogValue

BinaryInput (BI) object

This object handles binary input.

Property list

The following table lists available properties for the BinaryInput object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
4	ActiveText	CharacterString	R	Indicates the text when the value of PresentValue is ACTIVE.
15	ChangeOfStateCount	Unsigned	W	Indicates the number of status changes that have occurred.
16	ChangeOfStateTime	BACnetDateTime	R	Indicates the date and time when a status change has occurred.
33	ElapsedActiveTime	Unsigned32	W	Indicates the integrated time when the value of PresentValue is ACTIVE.
36	EventState	Enumerated	R	Indicates the event status.
46	InactiveText	CharacterString	R	Indicates the text when the value of PresentValue is INACTIVE.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether the device is disconnected from the physical input.
84	Polarity	Enumerated	W	Indicates polarity.
85	PresentValue	REAL	W	Indicates the logical state of the binary input.
103	Reliability	Enumerated	R	Indicates reliability.
111	StatusFlags	BitString	R	Indicates the object status.
114	TimeOfActiveTimeReset	BACnetDateTime	W	Indicates the date and time when ElapsedActiveTime is set to 0.
115	TimeOfStateCountReset	BACnetDateTime	W	Indicates the date and time when ChangeOfStateCount is set to 0.
371	PropertyList*1	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.

*1 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

Buffer memory format of the BinaryInput object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 94 BACnet communication BinaryInput

Ethernet module operation

■Operation at startup

For the startup operation, refer to the following.

☞ Page 22 Ethernet module operation

Setting using a program

For the setting using the program, refer to the following.

☞ Page 26 Setting using a program

BinaryOutput (BO) object

This object handles binary output.

Property list

The following table lists available properties for the BinaryOutput object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
4	ActiveText	CharacterString	R	Indicates the text when the value of PresentValue is ACTIVE.
15	ChangeOfStateCount	Unsigned	W	Indicates the number of status changes that have occurred.
16	ChangeOfStateTime	BACnetDateTime	R	Indicates the date and time when a status change has occurred.
33	ElapsedActiveTime	Unsigned32	W	Indicates the integrated time when the value of PresentValue is ACTIVE.
36	EventState	Enumerated	R	Indicates the event status.
40	FeedbackValue	Enumerated	R	Indicates the feedback value.
46	InactiveText	CharacterString	R	Indicates the text when the value of PresentValue is INACTIVE.
66	MinimumOffTime	Unsigned32	W	Indicates the minimum time that PresentValue remains INACTIVE.
67	MinimumOnTime	Unsigned32	W	Indicates the minimum time that PresentValue remains ACTIVE.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether the device is disconnected from the physical output.
84	Polarity	Enumerated	W	Indicates polarity.
85	PresentValue	REAL	W	Indicates the logical state of the binary input.
87	PriorityArray	BACnetPriorityArray	R	Indicates an array of priority values for determining the output value.
103	Reliability	Enumerated	R	Indicates reliability.
104	RelinquishDefault	REAL	W	Indicates the default value to be used when all values of PriorityArray are NULL.
111	StatusFlags	BitString	R	Indicates the object status.
114	TimeOfActiveTimeReset	BACnetDateTime	W	Indicates the date and time when ElapsedActiveTime is set to 0.
115	TimeOfStateCountReset	BACnetDateTime	W	Indicates the date and time when ChangeOfStateCount is set to 0.
371	PropertyList*1	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.
431	CurrentCommandPriority*2	BACnetOptionalUnsigned	R	Indicates the PriorityArray array number used for PresentValue.

*1 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

*2 Only ANSI/ASHRAE Standard 135-2016 is supported.

Buffer memory format of the BinaryOutput object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 95 BACnet communication BinaryOutput

Ethernet module operation

■Operation at startup

For the startup operation, refer to the following.

☞ Page 22 Ethernet module operation

■Operation of PresentValue for the output/value object

For the operation of PresentValue for the output/value object, refer to the following.

☞ Page 23 PresentValue for the output/value object

Setting using a program

For the setting using the program, refer to the following.

☞ Page 26 Setting using a program

BinaryValue (BV) object

This object handles values such as binary setting values.

Property list

The following table lists available properties for the BinaryValue object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
4	ActiveText	CharacterString	R	Indicates the text when the value of PresentValue is ACTIVE.
15	ChangeOfStateCount	Unsigned	W	Indicates the number of status changes that have occurred.
16	ChangeOfStateTime	BACnetDateTime	R	Indicates the date and time when a status change has occurred.
33	ElapsedActiveTime	Unsigned32	W	Indicates the integrated time when the value of PresentValue is ACTIVE.
36	EventState	Enumerated	R	Indicates the event status.
46	InactiveText	CharacterString	R	Indicates the text when the value of PresentValue is INACTIVE.
66	MinimumOffTime	Unsigned32	W	Indicates the minimum time that PresentValue remains INACTIVE.
67	MinimumOnTime	Unsigned32	W	Indicates the minimum time that PresentValue remains ACTIVE.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether to change inside the device.
85	PresentValue	REAL	W	Indicates the logical state of the binary input.
87	PriorityArray	BACnetPriorityArray	R	Indicates an array of priority values for determining the output value.
103	Reliability	Enumerated	R	Indicates reliability.
104	RelinquishDefault	REAL	W	Indicates the default value to be used when all values of PriorityArray are NULL.
111	StatusFlags	BitString	R	Indicates the object status.
114	TimeOfActiveTimeReset	BACnetDateTime	W	Indicates the date and time when ElapsedActiveTime is set to 0.
115	TimeOfStateCountReset	BACnetDateTime	W	Indicates the date and time when ChangeOfStateCount is set to 0.
371	PropertyList*1	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.
431	CurrentCommandPriority*2	BACnetOptionalUnsigned	R	Indicates the PriorityArray array number used for PresentValue.

*1 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

*2 Only ANSI/ASHRAE Standard 135-2016 is supported.

Buffer memory format of the BinaryValue object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 97 BACnet communication BinaryValue

Multi-State Input (MI) object

This object handles multiple-state input.

Property list

The following table lists available properties for the Multi-State Input object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
36	EventState	Enumerated	R	Indicates the event status.
74	NumberOfStates	Unsigned	R	Indicates the number of states that can be obtained by PresentValue.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether the device is disconnected from the physical input.
85	PresentValue*1	Unsigned	W	Indicates the logical state of one of the multiple states of the input.
103	Reliability	Enumerated	R	Indicates reliability.
110	StateText	BACnetARRAY[N]ofCharacterString	R	Indicates the text for the state.
111	StatusFlags	BitString	R	Indicates the object status.
371	PropertyList*2	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.

*1 Reliability=2(OverRange) if Reliability is 0 when PresentValue changes from within the range of NumberOfStates to out of the range of NumberOfStates.
Reliability=0(NoFaultDetected) if Reliability is 2 when PresentValue changes from out of the range of NumberOfStates to within the range of NumberOfStates.
Reliability=3(UnderRange) if Reliability is 0 when PresentValue changes from within the range of NumberOfStates to 0.
Reliability=0(NoFaultDetected) if Reliability is 3 when PresentValue changes from 0 to within the range of NumberOfStates.
When Reliability is other than the above, the value of Reliability does not change. The same applies when OutOfService changes from TRUE to FALSE and the buffer memory is updated.
(Reliability=1 remains if Reliability is 1 when PresentValue changes from within the range of MaxPresValue to out of the range of MaxPresValue (or 0)).
(Reliability=1 remains if Reliability is 1 when PresentValue changes from out of the range of MaxPresValue (or 0)) to within the range of MaxPresValue.

*2 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

Buffer memory format of the Multi-State Input object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 99 BACnet communication Multi-state Input

Ethernet module operation

■Operation at startup

For the startup operation, refer to the following.

☞ Page 22 Ethernet module operation

Setting using a program

For the setting using the program, refer to the following.

☞ Page 26 Setting using a program

Multi-State Output (MO) object

This object handles multiple-state output.

Property list

The following table lists available properties for the Multi-State Output object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property	Data type	R/W	Description
36	EventState	Enumerated	R	Indicates the event status.
40	FeedbackValue	Unsigned	R	Indicates the feedback value.
74	NumberOfStates	Unsigned	R	Indicates the number of states that can be obtained by PresentValue.
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	W	Indicates whether the device is disconnected from the physical output.
85	PresentValue	REAL	W	Indicates the logical state of one of the multiple states of the output.
87	PriorityArray	BACnetPriorityArray	R	Indicates an array of priority values for determining the output value.
103	Reliability	Enumerated	R	Indicates reliability.
104	RelinquishDefault	REAL	W	Indicates the default value to be used when all values of PriorityArray are NULL.
110	StateText	BACnetARRAY[N]ofCharacterString	R	Indicates the text for the state.
111	StatusFlags	BitString	R	Indicates the object status.
371	PropertyList*1	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.
431	CurrentCommandPriority*2	BACnetOptionalUnsigned	R	Indicates the PriorityArray array number used for PresentValue.

*1 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

*2 Only ANSI/ASHRAE Standard 135-2016 is supported.

Buffer memory format of the Multi-State Output object

For the format of the properties assigned to the buffer memory, refer to the following.

☞ Page 100 BACnet communication Multi-state Output

Ethernet module operation

■Operation at startup

For the startup operation, refer to the following.

☞ Page 22 Ethernet module operation

Setting using a program

For the setting using the program, refer to the following.

☞ Page 26 Setting using a program

NetworkPort (NP) object

This object handles the communication port.

Property list

The following table lists available properties for the NetworkPort object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

PropertyID	Property*1	Data type	R/W	Description
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
81	OutOfService	BOOLEAN	R	Indicates whether the device is disconnected from the physical input.
103	Reliability	Enumerated	R	Indicates reliability.
111	StatusFlags	BitString	R	Indicates the object status.
371	PropertyList	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.
399	APDULength	Unsigned	R	Indicates the maximum number of octets contained in a single non-splittable application protocol data module sent or received on this port. The Ethernet module is 1024.
400	IPAddress	OCTET STRING	R	Indicates the IP address.
401	IPDefaultGateway	OCTET STRING	R	Indicates the default gateway.
406	IPDNSServer	BACnetARRAY[N] of OCTET STRING	R	Indicates the DNS server. The Ethernet module does not support it.
408	BACnetIPMode	ENUMERATED	R	Indicates the BACnet/IP mode of the network port. When the Ethernet module operates as an external device, it is ForeignDevice. If not, it will be NormalDevice.
411	IPSubnetMask	OCTET STRING	R	Indicates the subnet mask.
412	BACnetIPUDPPort	Unsigned16	R	Indicates the UDP port number.
416	ChangesPending	BOOLEAN	R	Indicates whether the configuration settings of the network port object are mapped to the current configuration settings. When the value is FALSE, the current port configuration information is reflected in the configuration settings. When the value is TRUE, it indicates that the configuration setting has been changed but not activated on the port. The Ethernet module is fixed to FALSE.
418	FDBBMDAddress	BACnetHostNPort	W	Indicates the IP address and port number of a BBMD.
419	FDSubscriptionLifetime	Unsigned16	W	Indicates the TTL (Time to Live) which is the connection period with a BBMD. Used when registering a BBMD. The BBMD will forward broadcasts for the set number of seconds.
420	LinkSpeed	REAL	R	Indicates the network communication speed in bits per second. When the value is 0, it indicates an unknown communication speed. The Ethernet module is fixed to 0.
423	MACAddress	OCTET STRING	R	Indicates a 6-octet combination of IPAddress and BACnetIPUDPPort.
425	NetworkNumber	Unsigned16	R	Indicates the network number.

PropertyID	Property*1	Data type	R/W	Description
426	NetworkNumberQuality	ENUMERATED	R	When NetworkNumber is 0, it indicates UNKNOWN. When NetworkNumber is not 0, it indicates CONFIGURED.
427	NetworkType	ENUMERATED	R	Indicates the network type (IPv4).
482	ProtocolLevel	ENUMERATED	R	Indicates the protocol used (BACNETAPPLICATION).

*1 Only ANSI/ASHRAE Standard 135-2016 is supported.

Device (DV) object

This object indicates the Ethernet module.

Property list

The following table lists available properties for the Device object.

Additionally, the availability of reading/writing data from/to a BACnet device is shown in the following table.

R: Read-only, W: Read/Write

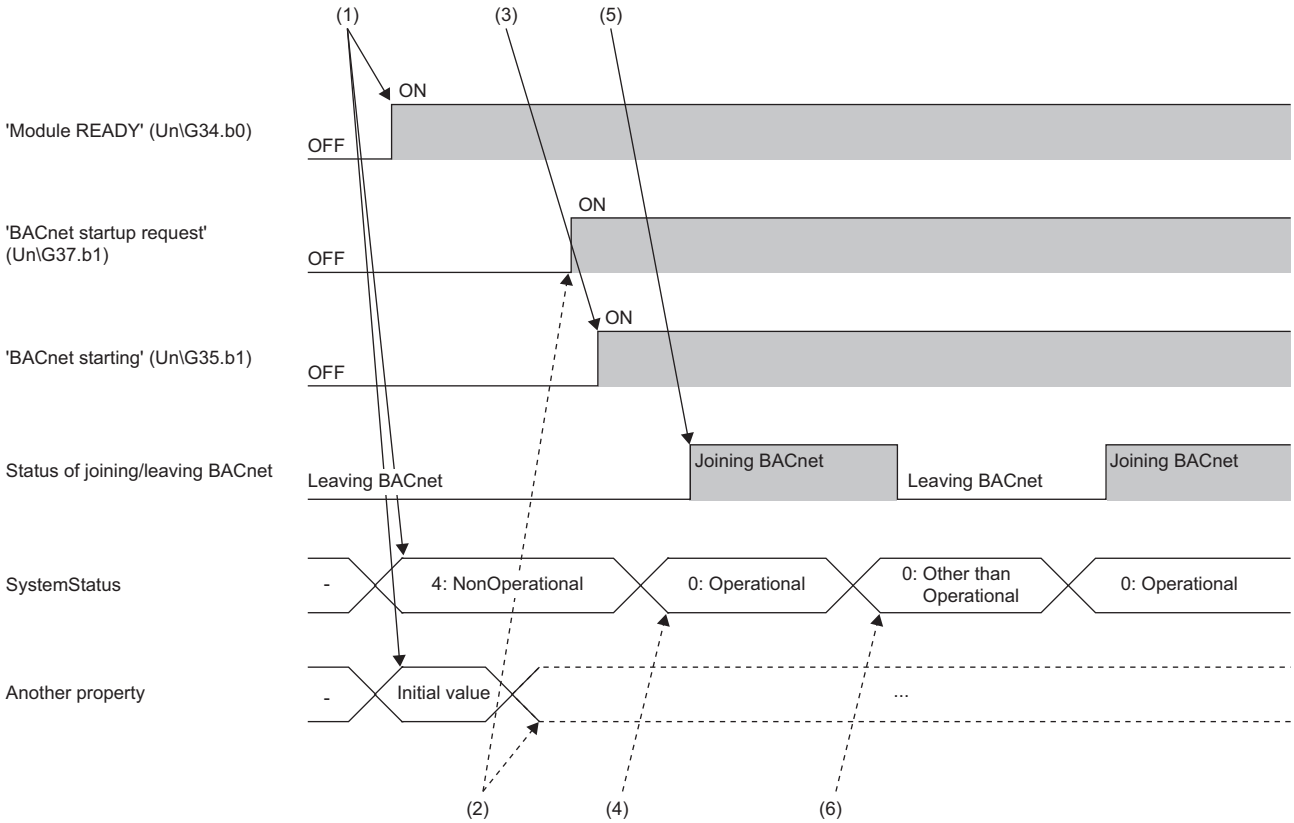
PropertyID	Property	Data type	R/W	Description
11	ApduTimeout	Unsigned	R	Indicates the resending time interval. The Ethernet module is 0 (Retry, Timeout)
12	ApplicationSoftwareVersion	CharacterString	R	Indicates the application software version. The Ethernet module is 0.
30	DeviceAddressBinding	ListofBACnetAddressBinding	R	Indicates the list of device IDs and addresses of other devices.
44	FirmwareRevision	CharacterString	R	Indicates a character string indicating the version. In the case of Ver.1.100, it will be 1100.
56	LocalDate	Date	R	Indicates the date of the device.
57	LocalTime	Time	R	Indicates the time of the device.
62	MaxApduLengthAccepted	Unsigned	R	Indicates the maximum length of the APDU to be accepted. The Ethernet module is 1024.
70	ModelName	CharacterString	R	Indicates the character string for a 12-character and left-justified model name. The Ethernet module is FX5-ENET.
73	NumberOfAPDURetries	Unsigned	R	Indicates the maximum number of resends. The Ethernet module is 0 (Retry, Timeout)
75	ObjectIdentifier	BACnetObjectIdentifier	R	Indicates the ID to identify the object.
76	ObjectList	BACnetARRAY[N]ofBACnetObjectIdentifier	R	Indicates the list of objects in the device.
77	ObjectName	CharacterString	R	Indicates the object name.
79	ObjectType	Enumerated	R	Indicates the object type.
96	ProtocolObjectTypesSupported	BitString	R	Indicates the objects supported.
97	ProtocolServicesSupported	BitString	R	Indicates the services supported.
98	ProtocolVersion	Unsigned	R	Indicates the version of the BACnet protocol supported. The Ethernet module is 1.
107	SegmentationSupported	Enumerated	R	Indicates whether or not message segmentation is supported. The Ethernet module does not support it.
112	SystemStatus	Enumerated	R	Indicates the device status.
120	VendorIdentifier	Unsigned16	R	Indicates the vendor identifier code assigned by ASHRAE. The Ethernet module is 434.
121	VendorName	CharacterString	R	Indicates the manufacturer of the device. The Ethernet module is Mitsubishi Electric Corporation Nagoya Works.
139	ProtocolRevision	Unsigned	R	Indicates the revision level to be supported. The level varies depending on the standard set with the engineering tool. The standards for the Ethernet module are as follows. • ANSI/ASHRAE Standard 135-2016: 20 • ANSI/ASHRAE Standard 135-2012: 14 • ANSI/ASHRAE Standard 135-2010: 12 • ANSI/ASHRAE Standard 135-2004: 4 • IEIEJ-G-0006:2006 Addendum-a

PropertyID	Property	Data type	R/W	Description
155	DatabaseRevision	Unsigned	R	Indicates the revision number for object registration and change in the device. 0 (fixed)
196	Last_Restart_Reason	Unsigned	R	Indicates the factors that cause the device to restart.
202	Restart_Notification_Recipients	ListofBACnetRecipient	R	Indicates the destination to which restart notifications are sent.
203	Time_of_Device_Restart	BACnetTimeStamp	R	Indicates the date and time the device was restarted.
371	PropertyList*1	BACnetARRAY[N]ofBACnetPropertyIdentifier	R	Indicates the property list.

*1 Only ANSI/ASHRAE Standard 135-2016 and ANSI/ASHRAE Standard 135-2012 are supported.

4.3 Joining/Leaving Function

This function switches joining/leaving processing of the module during BACnet communications.

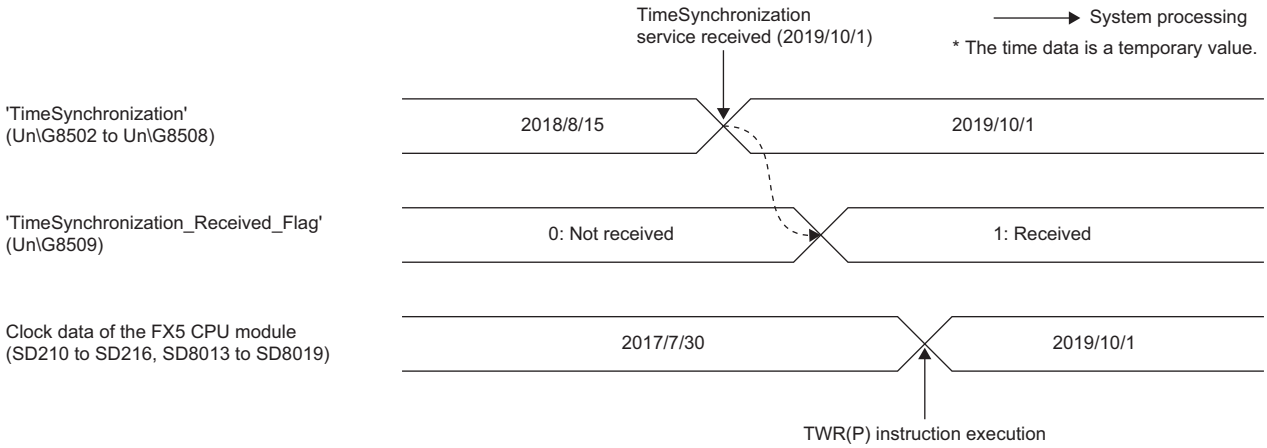


(1) When the programmable controller system is powered on or is reset, the Ethernet module writes 4: NonOperational to 'SystemStatus' (Un\G8500), and initializes the buffer memory. After that, 'ModuleREADY' (Un\G34, b0) is turned on.
(2) When 'ModuleREADY' (Un\G34, b0) is detected to be on, the property value set with GX Works3 is written to the buffer memory, and 'BACnetStartupRequest' (Un\G37, b1) is turned on.
(3) The Ethernet module turns on 'BACnetDuringStartup' (Un\G35, b1) and starts the module operation and BACnet communications.
(4) The program writes 0: Operational to 'SystemStatus' (Un\G8500).
(5) When 'SystemStatus' (Un\G8500) is set to 0: Operational, the Ethernet module sets 1: Joining to 'Module status' (Un\G8501).
(6) When 0: 'SystemStatus' (Un\G8500) is not set to Operational, the Ethernet module sets 0: Leaving to 'Module status' (Un\G8501).

4.4 Time Synchronization Function

This function programmatically reflects the clock data of the TimeSynchronization service sent from the BACnet workstation or BACnet controllers to the FX5 CPU module.

The clock data of the TimeSynchronization service sent from the BACnet workstation or BACnet controllers can be programmatically reflected to the FX5 CPU module. The following figure shows the procedure of the time synchronization function.



1. When the Ethernet module receives the TimeSynchronization service while 'TimeSynchronization_Received_Flag' (Un\G8509) is set to 0: Not received, the clock data is stored in 'TimeSynchronization' (Un\G8502 to Un\G8508).
2. When the clock data is stored in 'TimeSynchronization' (Un\G8502 to Un\G8508), 1: Received is stored in 'TimeSynchronization_Received_Flag' (Un\G8509).
3. Use the TWR(P) instruction to write the clock data of 'TimeSynchronization' (Un\G8502 to Un\G8508) to the clock data (SD210 to SD216, SD8013 to SD8019) of the FX5 CPU module.

MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

4. When newly receiving the TimeSynchronization service, write 0: Not received to 'TimeSynchronization_Received_Flag' (Un\G8509).

Precautions

When the Ethernet module receives the TimeSynchronization service while 'TimeSynchronization_Received_Flag' (Un\G8509) is set to 1: Received, the clock data of the TimeSynchronization service will be discarded. (The clock data is not stored in 'TimeSynchronization' (Un\G8502 to Un\G8508).)

Clock data

The following table lists the clock data that can be received by the TimeSynchronization service.

Item	Settings for receiving wild card	
	Discarded	Output to the buffer memory
Year	1900 to 2153 (4-digit year)	1900 to 2153 (4-digit year), FFFFH
Month	1 to 12	1 to 12, FFFFH
Day	1 to 31	1 to 31, FFFFH
Time	0 to 23	0 to 23, FFFFH
Minute	0 to 59	0 to 59, FFFFH
Second	0 to 59	0 to 59, FFFFH
Day of week	0 (Sunday) to 6 (Saturday)	0 (Sunday) to 6 (Saturday), FFFFH

For the clock data that can be received by the TimeSynchronization service, refer to the following:

☞ Page 87 Time synchronization (Un\G8502 to Un\G8508)

Precautions

Since there is a difference between the clock data of the TimeSynchronization service and that of the FX5 CPU module (SD210 to SD216, SD8013 to SD8019) as shown below, it is necessary to process the clock data of the TimeSynchronization service to keep it within the range of the TWR(P) instruction.

- When the time synchronization setting is set to "Output to the buffer memory", the clock data of the item that received 255 (wild card) in the TimeSynchronization service will be FFFFH. (☞ Page 55 BACnet device setting)
- The range that can be written to the year (SD210, SD8018) of the FX5 CPU module by the TWR(P) instruction is 1980 to 2079 (4-digit year).

Even if the day of the week does not match the date of the TimeSynchronization service data, the day of the week of the received data will be reflected in the day of the week in the buffer memory.

4.5 Operation as External Device

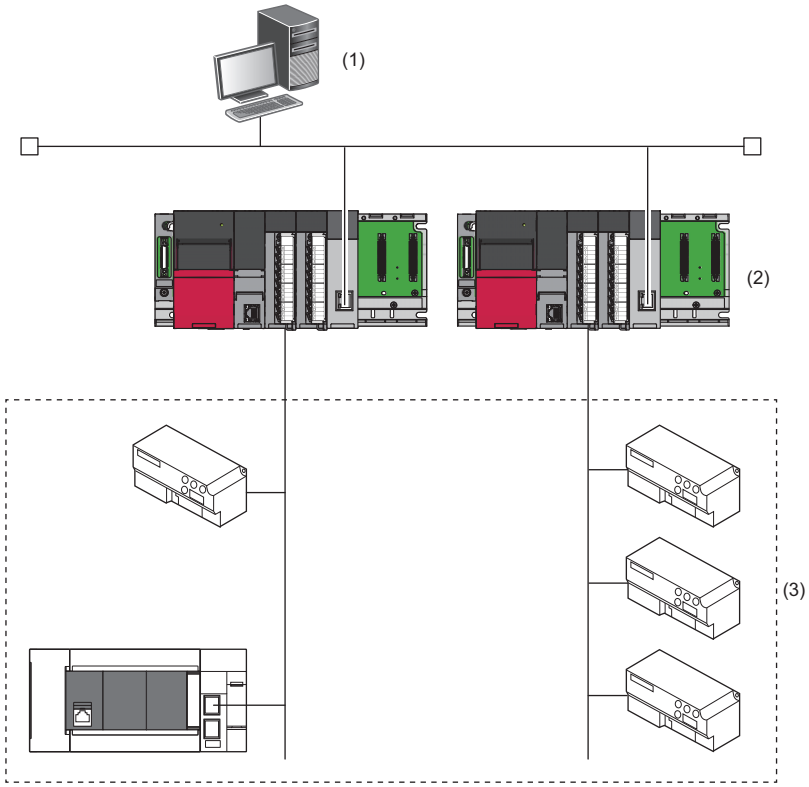
When the module joins the BACnet system, if the BBMD IP address is not 0, this will be considered that the IP address of the BBMD exists.
When the IP address exists and a segment different from a own node address is set, an Ethernet module will operate as an external device.
When the Ethernet module operates as an external device, it sends a request to register the IP address, port number, and TTL indicating the connection period of the configured BBMD as parameters.
If there is no response to the registration request, the registration request is sent every five seconds.
When the IP address, port number, and TTL are not registered, broadcast transmission is not performed, while unicast response is performed.
After the IP address, port number, and TTL are successfully registered, a data transfer request notification to the BBMD is sent when broadcast (such as I-AM) transmission is performed.
However, when the addresses of the own node and BBMD are on the same segment, the broadcast transmission is performed as usual without requesting data transfer the BBMD.

Property value in each state	Values in buffer memory, Un\G8511 and Un\G8512		
	No value (0)	Same segment as BBMD	Different segment from BBMD
BACnet_IP_Mode	Normal	Normal	Foreign
FD_BBMD_Address	NULL	IP address and port number of BBMD	IP address and port number of BBMD
FD_Subscription_Lifetime	0	TTL value	TTL value

For reconnecting, TTL is re-registered in half the time of the TTL set. If this request fails, the registration will be requested again when the TTL expires.
When the BBMD IP address, port number, and TTL are written from the BBMD or B-OWS, they are overwritten to a BBMD IP address, port number, and TTL stored in the buffer memory. The values are hold using a separate ladder program when the power is turned off.
When the module joins the BACnet system, the IP address in the buffer memory is used. While Operational is being executed, even if the IP address is newly rewritten, the IP address before the rewrite is used. However, a new IP address is used when leaving/re-joining from/to BACnet after the IP address is rewritten.

5 SYSTEM CONFIGURATION

This chapter describes the BACnet system configuration using the Ethernet module.
The Ethernet module can be used as a BACnet device. Analog and digital values are provided as inputs and outputs to the BACnet workstations and BACnet controllers.



(1) BACnet workstation
(2) BACnet controllers
(3) BACnet devices (such as Ethernet modules, lighting, and air conditioners)

MEMO

6 PARAMETER SETTINGS

This chapter describes the parameter settings required to perform BACnet communications using the Ethernet module.

6.1 Setting Parameters

1. Add the "Information Module (FX5-ENET, FX5-ENET/IP)" to the engineering tool.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]

2. The required settings, basic settings, and application settings are included in the parameter settings. Select one of the settings from the tree on the following window.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module

3. After setting the parameters, click the [Apply] button.
4. Write the parameter settings to the FX5 CPU module with the engineering tool.

[Online] ⇨ [Write to PLC]

5. The parameter settings are applied by resetting the FX5 CPU module or powering off and on the system.

6.2 Required Settings

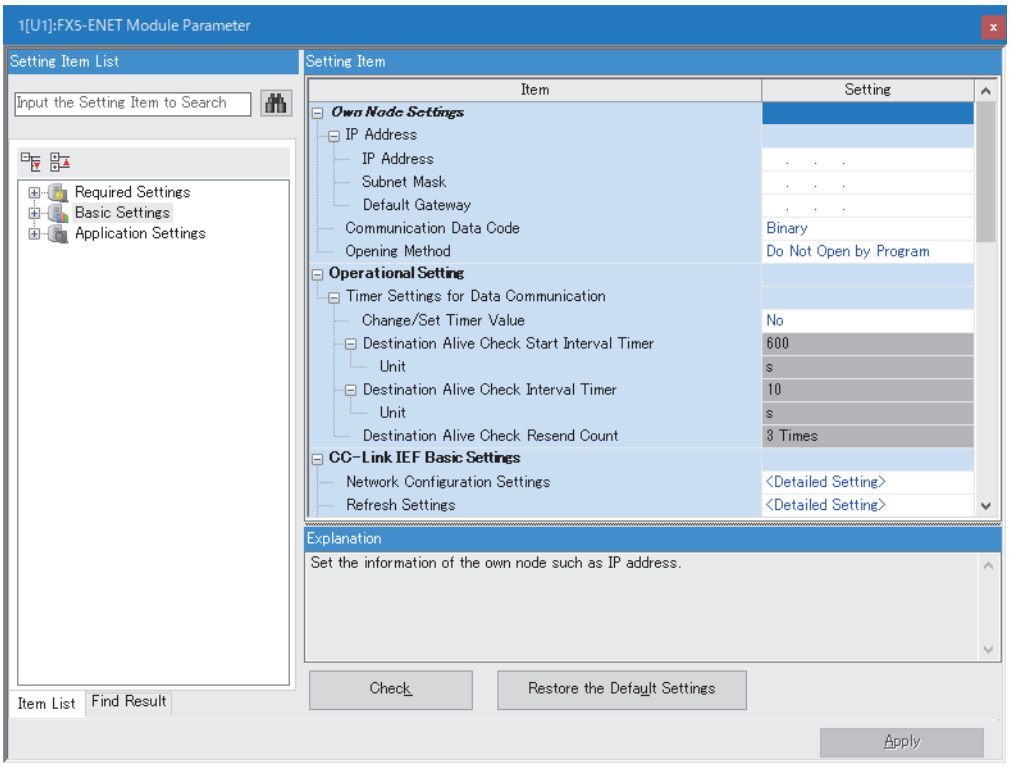
Set the operation mode of the Ethernet module.

For details, refer to the following.

MELSEC iQ-F FX5 Ethernet Module User's Manual
MELSEC iQ-F FX5 EtherNet/IP Module User's Manual

6.3 Basic Settings

Set the IP address and functions of the Ethernet module.



Item	Description	Reference
Own Node Settings	Set the IP address of the Ethernet module.	MELSEC iQ-F FX5 Ethernet Module User's Manual MELSEC iQ-F FX5 EtherNet/IP Module User's Manual
Operational Setting	Not used for BACnet communications	MELSEC iQ-F FX5 Ethernet Module User's Manual MELSEC iQ-F FX5 EtherNet/IP Module User's Manual
CC-Link IEF Basic Settings	Not used for BACnet communications	MELSEC iQ-F FX5 Ethernet Module User's Manual
BACnet Function Setting	Set the BACnet functions.	Page 55 BACnet function setting
External Device Configuration	Set the parameters for external devices communicating with the BACnet functions.	Page 63 External device configuration

BACnet function setting

Set the BACnet functions.

Item		Description	Setting range
Whether the BACnet functions are used or not		Indicates the usage status of the BACnet/IP connection modules in the external device configuration. (This setting is automatically configured according to the setting details in the external device configuration.)	• Not used • Used (Default: Not used)
Network information setting	Network number	Set a BACnet network number.	0 to 65534 (Default: 0)
BACnet device setting		☞ Page 55 BACnet device setting	—
Accumulator object setting		☞ Page 57 Accumulator object setting	—
AnalogInput object setting		☞ Page 58 AnalogInput object setting	—
AnalogOutput object setting		☞ Page 58 AnalogOutput object setting	—
AnalogValue object setting		☞ Page 59 AnalogValue object setting	—
BinaryInput object setting		☞ Page 59 BinaryInput object setting	—
BinaryOutput object setting		☞ Page 60 BinaryOutput object setting	—
BinaryValue object setting		☞ Page 61 BinaryValue object setting	—
Multi-state Input object setting		☞ Page 62 Multi-state Input object setting	—
Multi-state Output object setting		☞ Page 62 Multi-state Output object setting	—

BACnet device setting

Set a BACnet device.

Item	Description	Setting range
Instance No.	Set a BACnet instance number.	0 to 4194302 (Default: 0)
Object Name	Set a device name. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
BACnet standards	Set the BACnet standards.	• ANSI/ASHRAE Standard 135-2016 • ANSI/ASHRAE Standard 135-2012 • ANSI/ASHRAE Standard 135-2010 • ANSI/ASHRAE Standard 135-2004 • IEIEJ-G-0006:2006 Addendum-a (Default: ANSI/ASHRAE Standard 135-2016)

Item		Description	Setting range
I-Am send setting	Send control	Set whether or not to send I-Am only when the device is set to Operational.	• Send I-Am only at the Operational status. • Send I-Am even at other statuses than Operational. (Default: Send I-Am only at the Operational status.)
	Send I-Am when the status changes to Operational.	Set whether or not to send I-Am when the device status changes to Operational.	• Send • Do not send (Default: Send)
	Enable/disable fixed-cycle send	Set whether or not to send I-Am at a fixed-cycle.	• Disable • Enable (Default: Disable)
	Fixed-cycle send interval (second)	Set the interval (second) for sending I-Am. (Available when the enable/disable fixed-cycle send is set to Enable)	1 to 4095 (Default: 60)
	I-Am response setting	Set how to send I-Am and I-Have for Who-Is and Who-Has.	• RemoteBroadcast • GlobalBroadcast • LocalBroadcast • Unicast (Default: LocalBroadcast)
	I-Am send setting	Set how to send the spontaneous I-Am.	• LocalBroadcast • GlobalBroadcast (Default: LocalBroadcast)
Device restart procedure setting	Device restart procedure	Set the device restart procedure.	• Do not support • Support (Default: Do not support)
	Notification destination network number	Set a network number to which notification is sent at device restart. (Available when device restart is set to "Support")	0 to 65534 (Default: 0)
	Notification destination IP address	Set the IPv4 address to which notification is sent at device restart. (Available when device restart is set to "Support") Set a broadcast address of own segment to perform broadcast notification via a BBMD.	0.0.0.1 to 223.255.255.254 (Default: 192.168.0.254)
	Notification destination port number	Set a port number to which notification is sent at device restart. (Available when device restart is set to "Support")	0 to 65535 (Default: 47808)
Time synchronization setting		Set the response for receiving wild card.	• Ignore • Output to the buffer memory (Default: Ignore)

Object setting

Set values such as an instance number for each object.

Values can be set for the number of instances available for each object. (☞ Page 15 Object)

■Accumulator object setting

Setting No.	Instance No.	Object Name	Scale	Units		Max_Pres_Value
				Units (Select)	Units (Input)	
1						
2						
3						
4						

Item	Description	Setting range
Instance No.	Set an instance number for the Accumulator object. (The same value cannot be set in the Accumulator object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the Accumulator object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Scale	Set a value for scale conversion. (in increments of 0.001)	0 to 4294967295 (Default: 1000)
Units (Select)	Set a unit. (The value can be set only when "Other" is selected in the drop-down menu.)	• 0: square-meters • 1: square-feet • 2: milliamperes • 3: amperes • 4: ohms • 5: volts • 6: kilovolts • 7: megavolts • 8: volt-amperes • 9: kilovolt-amperes • Others (Default: 0: square-meters)
Units (Input)	Input a setting value when Units (Select) is set to "Other".	10 to 65535 (Default: Empty)
Max_Pres_Value	Set the maximum value for counter reset.	0 to 4294967295 (Default: 999999)

■AnalogInput object setting

Setting No.	Instance No.	Object Name	Units	
			Units (Select)	Units (Input)
1				
2				
3				
4				
5				
6				
7				
8				

Item	Description	Setting range
Instance No.	Set an instance number for the AnalogInput object. (The same value cannot be set in the AnalogInput object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the AnalogInput object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Units (Select)	Set a unit. (The value can be set only when "Other" is selected in the drop-down menu.)	• 0: square-meters • 1: square-feet • 2: milliamperes • 3: amperes • 4: ohms • 5: volts • 6: kilovolts • 7: megavolts • 8: volt-amperes • 9: kilovolt-amperes • Others (Default: 0: square-meters)
Units (Input)	Input a setting value when Units (Select) is set to "Other".	10 to 65535 (Default: Empty)

■AnalogOutput object setting

Setting No.	Instance No.	Object Name	Units		Relinquish_Default
			Units (Select)	Units (Input)	
1					
2					
3					
4					
5					
6					
7					
8					

Item	Description	Setting range
Instance No.	Set an instance number for the AnalogOutput object. (The same value cannot be set in the AnalogOutput object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the AnalogOutput object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Units (Select)	Set a unit. (The value can be set only when "Other" is selected in the drop-down menu.)	• 0: square-meters • 1: square-feet • 2: milliamperes • 3: amperes • 4: ohms • 5: volts • 6: kilovolts • 7: megavolts • 8: volt-amperes • 9: kilovolt-amperes • Others (Default: 0: square-meters)
Units (Input)	Input a setting value when Units (Select) is set to "Other".	10 to 65535 (Default: Empty)
Relinquish_Default	Set the value that will be set when PriorityArray is all NULL.	32-bit floating point 1.18×10^{-38} to 3.4×10^{38} (Default: 0)

■AnalogValue object setting

Setting No.	Instance No.	Object Name	Units		Relinquish_Default
			Units (Select)	Units (Input)	
1					
2					
3					
4					
5					
6					
7					
8					

Item	Description	Setting range
Instance No.	Set an instance number for the AnalogValue object. (The same value cannot be set in the AnalogValue object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the AnalogValue object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Units (Select)	Set a unit. (The value can be set only when "Other" is selected in the drop-down menu.)	• 0: square-meters • 1: square-feet • 2: milliamperes • 3: amperes • 4: ohms • 5: volts • 6: kilovolts • 7: megavolts • 8: volt-amperes • 9: kilovolt-amperes • Others (Default: 0: square-meters)
Units (Input)	Input a setting value when Units (Select) is set to "Other".	10 to 65535 (Default: Empty)
Relinquish_Default	Set the value that will be set when PriorityArray is all NULL.	32-bit floating point 1.18×10^{-38} to 3.4×10^{38} (Default: 0)

■BinaryInput object setting

Setting No.	Instance No.	Object Name	Polarity	Inactive_Text	Active_Text
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Item	Description	Setting range
Instance No.	Set an instance number for the BinaryInput object. (The same value cannot be set in the BinaryInput object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the BinaryInput object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Polarity	Set a polarity.	• Positive polarity • Negative polarity (Default: Positive polarity)
Inactive_Text	Set the text to be displayed at Inactive.	16 one-byte alphanumeric characters maximum (Default: Empty)

Item	Description	Setting range
Active_Text	Set the text to be displayed at Active.	16 one-byte alphanumeric characters maximum (Default: Empty)

■BinaryOutput object setting

Setting No.	Instance No.	Object Name	Polarity	Inactive_Text	Active_Text	Minimum_Off_Time	Minimum_On_Time	Relinquish_Default
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

Item	Description	Setting range
Instance No.	Set an instance number for the BinaryOutput object. (The same value cannot be set in the BinaryOutput object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the BinaryOutput object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Polarity	Set a polarity.	• Positive polarity • Negative polarity (Default: Positive polarity)
Inactive_Text	Set the text to be displayed at Inactive.	16 one-byte alphanumeric characters maximum (Default: Empty)
Active_Text	Set the text to be displayed at Active.	16 one-byte alphanumeric characters maximum (Default: Empty)
Minimum_Off_Time	Set the minimum time that PresentValue remains Inactive.	0 to 4294967295 seconds (Default: 0)
Minimum_On_Time	Set the minimum time that PresentValue remains Active.	0 to 4294967295 seconds (Default: 0)
Relinquish_Default	Set the value that will be set when PriorityArray is all NULL.	• Inactive • Active (Default: Inactive)

■BinaryValue object setting

Setting No.	Instance No.	Object Name	Inactive_Text	Active_Text	Minimum_Off_Time	Minimum_On_Time	Relinquish_Default
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

Item	Description	Setting range
Instance No.	Set an instance number for the BinaryValue object. (The same value cannot be set in the BinaryValue object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the BinaryValue object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Inactive_Text	Set the text to be displayed at Inactive.	16 one-byte alphanumeric characters maximum (Default: Empty)
Active_Text	Set the text to be displayed at Active.	16 one-byte alphanumeric characters maximum (Default: Empty)
Minimum_Off_Time	Set the minimum time that PresentValue remains Inactive.	0 to 4294967295 seconds (Default: 0)
Minimum_On_Time	Set the minimum time that PresentValue remains Active.	0 to 4294967295 seconds (Default: 0)
Relinquish_Default	Set the value that will be set when PriorityArray is all NULL.	• Inactive • Active (Default: Inactive)

■Multi-state Input object setting

Setting No.	Instance No.	Object Name	Number_Of_States	State_Text
1				
2				
3				
4				
5				
6				
7				
8				

Item	Description	Setting range
Instance No.	Set an instance number for the Multi-state Input object. (The same value cannot be set in the Multi-state Input object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the Multi-state Input object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Number_Of_States	Set the state size.	1 to 4294967295 (Default: 1)
State_Text	Set the text for the state, separated by semicolons (;).	Within 256 characters (Default: Empty)

■Multi-state Output object setting

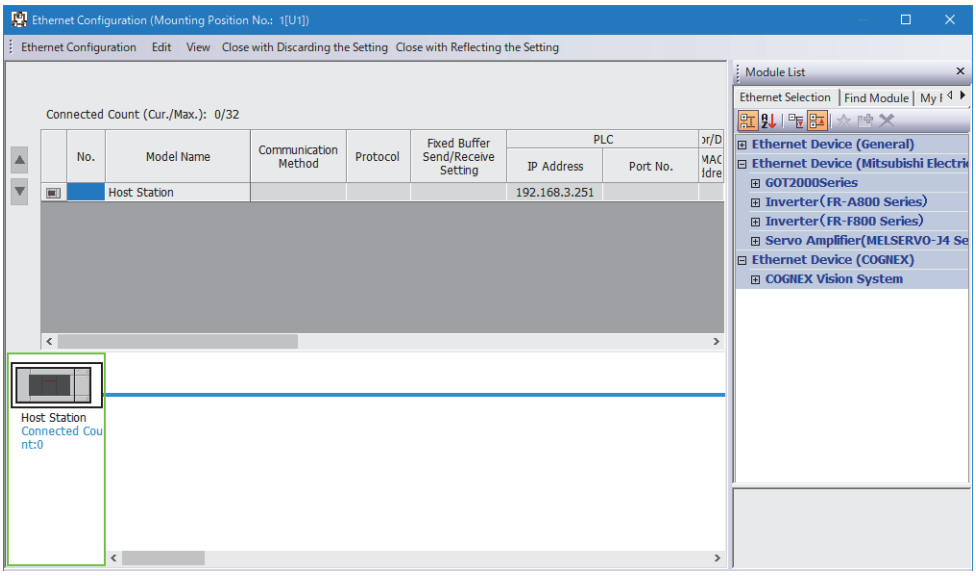
Setting No.	Instance No.	Object Name	Number_Of_States	State_Text	Relinquish_Default
1					
2					
3					
4					
5					
6					
7					
8					

Item	Description	Setting range
Instance No.	Set an instance number for the Multi-state Output object. (The same value cannot be set in the Multi-state Output object.)	0 to 4194303 (Default: Empty)
Object Name	Set an object name for the Multi-state Output object. (The same value cannot be set in a module.)	16 one-byte alphanumeric characters maximum (Default: Empty)
Number_Of_States	Set the state size.	1 to 4294967295 (Default: 1)
State_Text	Set the text for the state, separated by semicolons (;).	Within 256 characters (Default: Empty)
Relinquish_Default	Set the value that will be set when PriorityArray is all NULL.	1 to the value set to Number_Of_States (Default: 1)

External device configuration

Set the parameters for external devices communicating with the BACnet functions.

Double-click <Detailed Setting> of the "External Device Configuration".



Drag and drop "BACnet/IP Connection Module" from "Ethernet Device" in "Module List" to the left side of the window, and set the following items.

Item		Description	Setting range
No.		Connection number for distinguishing settings for each user connection	—
Model Name		The name of the external device is displayed.	—
Communication Method		Set the method for communications with the external device.*1	BACnet/IP
Protocol		Set the communication protocol for the external device.*1	UDP
Fixed Buffer Send/Receive Setting		Not supported	—
PLC	IP Address	The IP address of the own station (Ethernet module) is displayed.	—
	Port No.	The port No. of the own station (Ethernet module) is displayed.	1 to 5548, 5570 to 65534*2 (Default: 47808)
Sensor/Device	MAC Address	Not supported	—
	Host Name	Not supported	—
	IP Address	Not used for BACnet communications	—
	Port No.	Not used for BACnet communications	—
	Subnet Mask	Not used for BACnet communications	—
	Default Gateway	Not used for BACnet communications	—
Existence Confirmation		Not used for BACnet communications	—

*1 Automatically set by “Ethernet Device”.

*2 Do not specify 5549 to 5569 because they are used by the system.

6.4 Application Settings

Application settings are not used for BACnet communications.

For details on the application settings, refer to the following.

📖 MELSEC iQ-F FX5 Ethernet Module User's Manual

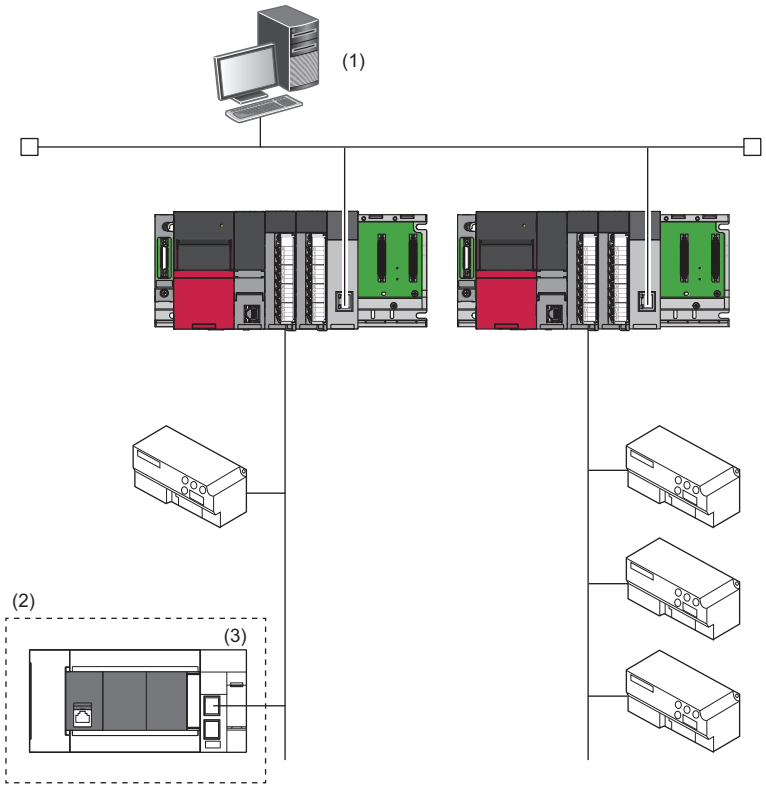
📖 MELSEC iQ-F FX5 EtherNet/IP Module User's Manual

7 PROGRAMMING

This chapter describes program examples of the Ethernet module.

7.1 System Configuration

The following figure shows the system configuration.



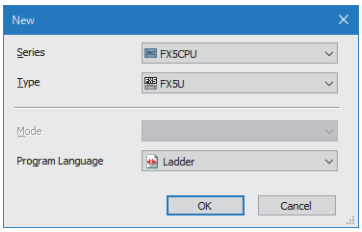
(1) BACnet workstation
(2) FX5 CPU module
(3) Ethernet module (Device instance No.: 10)

7.2 Parameter Settings

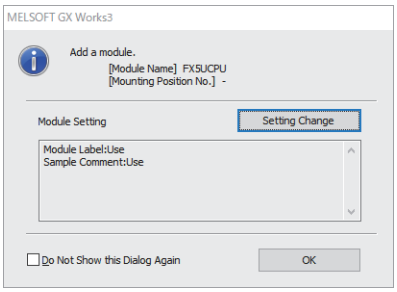
Connect the engineering tool to the FX5 CPU module and set parameters.

1. Set the FX5 CPU module as follows.

[Project] ⇨ [New]

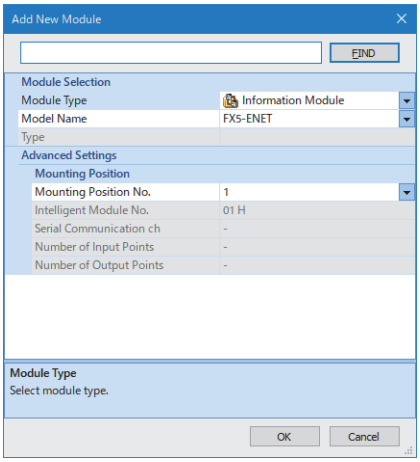


2. Click the [Setting Change] button to use the module label.

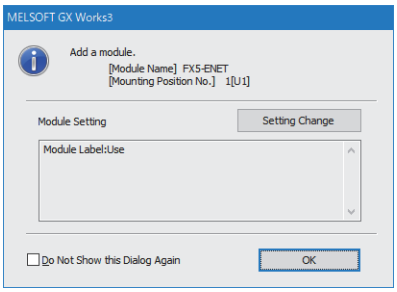


3. Set the Ethernet module as follows.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]

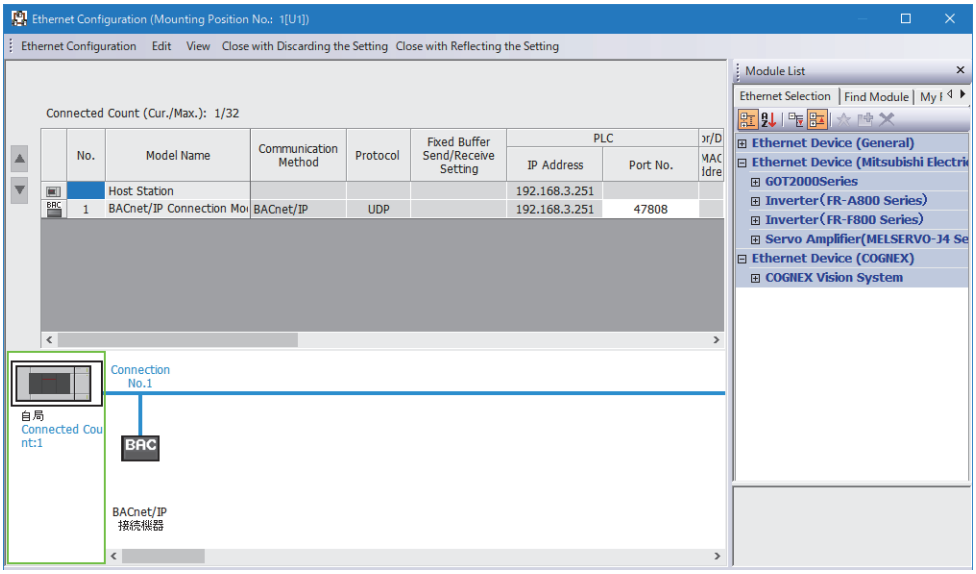


4. Click the [OK] button to add a module label of the Ethernet module.



5. Set the network configuration settings as follows.

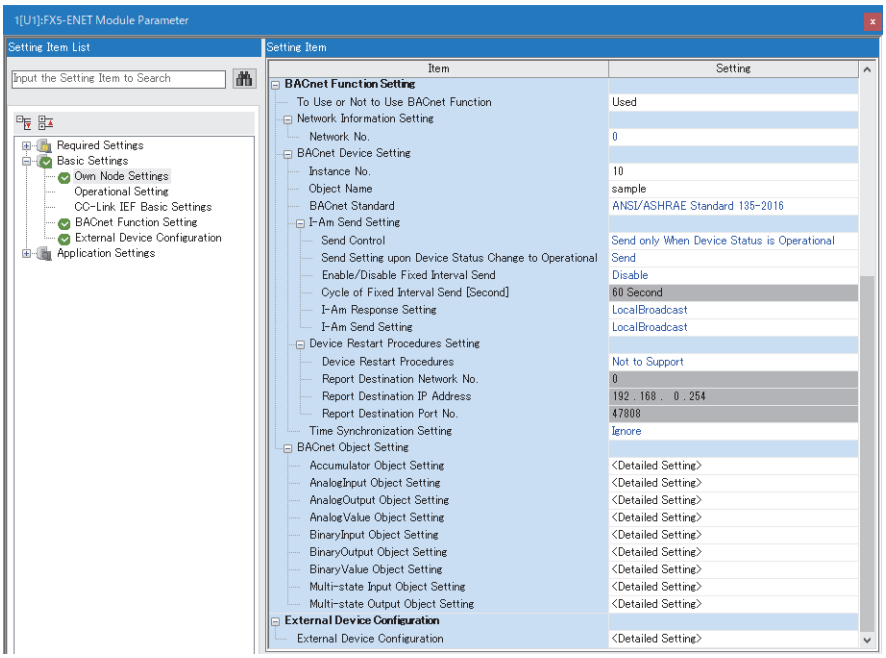
Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ [FX5-ENET] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



6. Click the [Close with Reflecting the Setting] button to close the "Ethernet Configuration" window.

7. Set the items in "Basic Settings" as follows.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ [FX5-ENET] ⇨ [Basic Settings]



- Accumulator Object Setting

Setting No.	Instance No.	Object Name	Scale	Units		Max_Pres_Value
				Units (Select)	Units (Input)	
1	0		1000	others	70	999999
2						
3						
4						

- AnalogInput Object Setting

Setting No.	Instance No.	Object Name	Units	
			Units (Select)	Units (Input)
1	0		5:volts	
2				
3				
4				
5				
6				
7				
8				

- AnalogOutput Object Setting

Setting No.	Instance No.	Object Name	Units		Relinquish_Default
			Units (Select)	Units (Input)	
1	0		5:volts		0.000000
2					
3					
4					
5					
6					
7					
8					

- AnalogValue Object Setting

Setting No.	Instance No.	Object Name	Units		Relinquish_Default
			Units (Select)	Units (Input)	
1	0		others	70	0.000000
2					
3					
4					
5					
6					
7					
8					

- BinaryInput Object Setting

Setting No.	Instance No.	Object Name	Polarity	Inactive_Text	Active_Text
1	0		NORMAL		
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

• BinaryOutput Object Setting

Setting No.	Instance No.	Object Name	Polarity	Inactive_Text	Active_Text	Minimum_Off_Time	Minimum_On_Time	Relinquish_Default
1	0		NORMAL			0	0	Inactive
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

• BinaryValue Object Setting

Setting No.	Instance No.	Object Name	Inactive_Text	Active_Text	Minimum_Off_Time	Minimum_On_Time	Relinquish_Default
1	0				0	0	Inactive
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

• Multi-state Input Object Setting

Setting No.	Instance No.	Object Name	Number_Of_States	State_Text
1	0		10	
2				
3				
4				
5				
6				
7				
8				

• Multi-state Output Object Setting

Setting No.	Instance No.	Object Name	Number_Of_States	State_Text	Relinquish_Default
1	0		999999		1
2					
3					
4					
5					
6					
7					
8					

8. Click the [Apply] button.

9. Write the set parameters to the FX5 CPU module. Then, reset the FX5 CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In the program example, default values are used for the parameters that are not shown above. For the parameters, refer to the following.

☞ Page 53 PARAMETER SETTINGS

7.3 Program Examples

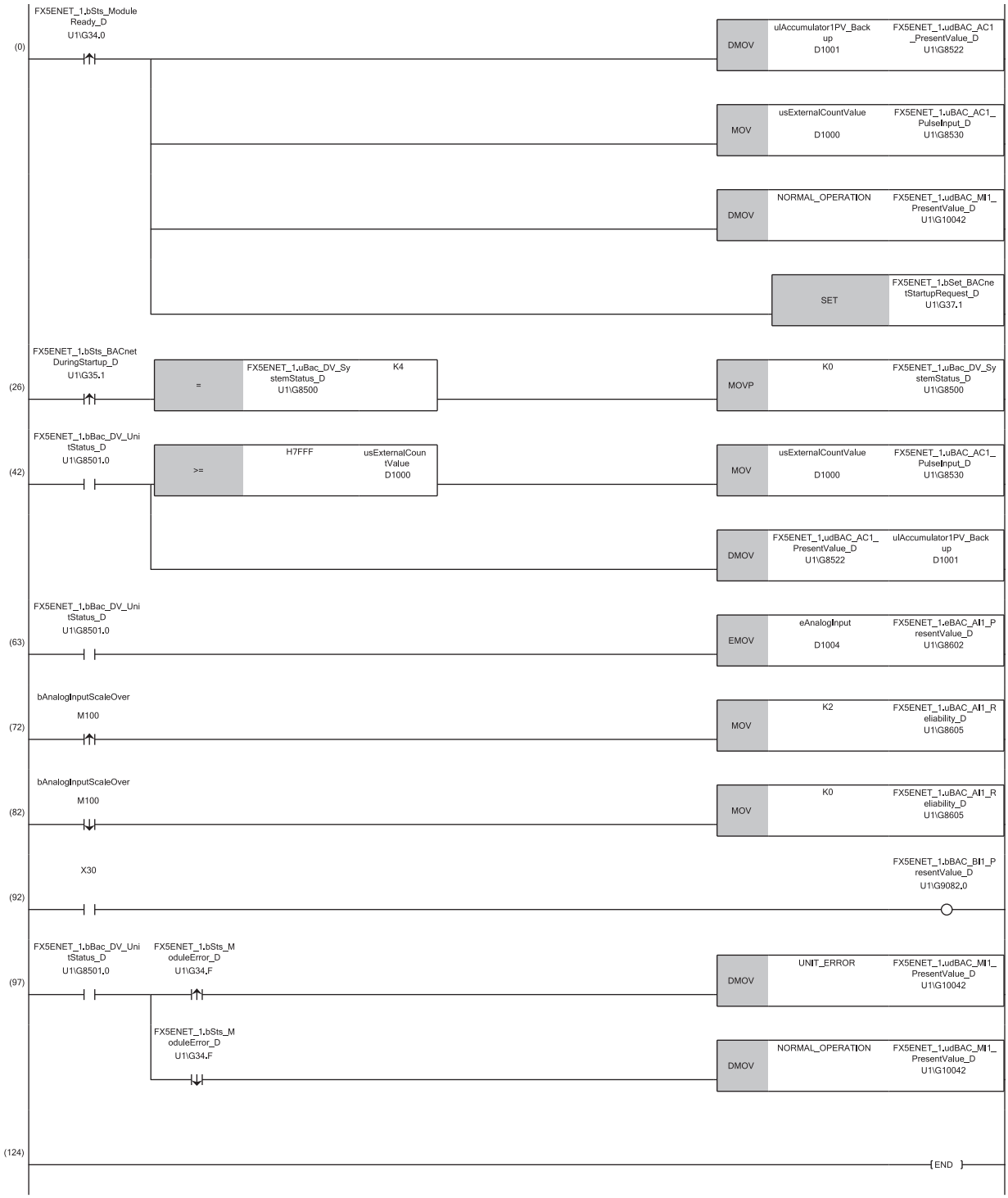
Program that stores information collected at a BACnet workstation or BACnet controllers

The following describes an example of a program that stores information collected at a BACnet workstation or BACnet controllers.

Classification	Label name	Description	Device
Module label	M+FX5-ENET.bSts_ModuleReady_D	Module READY	Un\G34.0
	M+FX5-ENET.bSts_ModuleError_D	Module error status	Un\G34.F
	M+FX5-ENET.uBAC_DV_SystemStatus_D	SystemStatus	Un\G8500
	M+FX5-ENET.udBAC_AC1_PresentValue_D	Accumulator1 PresentValue	Un\G8522
	M+FX5-ENET.uBAC_AC1_PulseInput_D	Accumulator1 Pulse setting value	Un\G8530
	M+FX5-ENET.eBAC_AI1_PresentValue_D	AnalogInput PresentValue	Un\G8602
	M+FX5-ENET.uBAC_AI1_Reliability_D	AnalogInput1 Reliability	Un\G8605
	M+FX5-ENET.bBAC_BI1_PresentValue_D	BinaryInput PresentValue	Un\G9082.0
	M+FX5-ENET.udBAC_MO1_PresentValue_D	Multi-stateInput1 PresentValue	Un\G10042
Label to be defined	Define global labels as shown below.		

	Label Name	Data Type		Class	Assign (Device/Label)
1	NORMAL_OPERATION	Double Word [Unsigned]/Bit String [32-bit]	...	VAR_GLOBAL_CONSTANT	
2	UNIT_ERROR	Double Word [Unsigned]/Bit String [32-bit]	...	VAR_GLOBAL_CONSTANT	
3	usExternalCountValue	Word [Signed]	...	VAR_GLOBAL	D1000
4	ulAccumulator1PV_Backup	Double Word [Signed]	...	VAR_GLOBAL_RETAIN	D1001
5	eAnalogInput	FLOAT [Single Precision]	...	VAR_GLOBAL	D1004
6	bAnalogInputScaleOver	Bit	...	VAR_GLOBAL	M100

Program



(0) After 'ModuleREADY' (Un\G34, b0) is detected to be on, the initial value is set to each object, and 'BACnetStartupRequest' (Un\G37, b1) is turned on.
(26)The program writes 0: Operational to 'SystemStatus' (Un\G8500).
(42)The value of the counter is stored in the Accumulator object.
(63)The value of the analog input is stored in the AnalogInput object.
(72)Set the Reliability property to 2: OverRange when the analog input is out of the setting range.
(92)The ON/OFF information of the input X30 of the actual I/O is stored in the BinaryInput object.
(97)The operating status of the module is stored in the Multi-stateInput object.

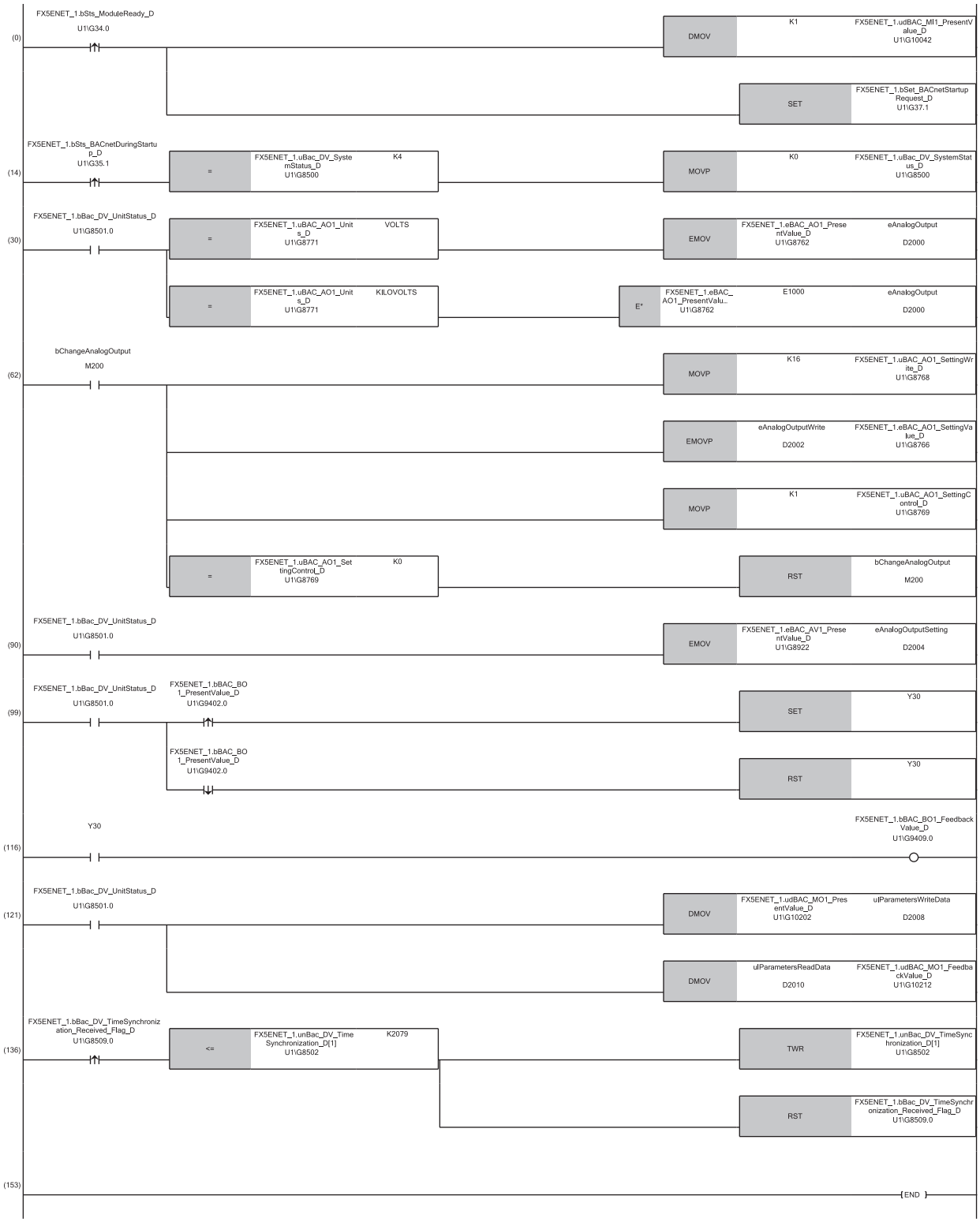
Program that outputs information stored at a BACnet workstation or BACnet controllers

The following describes an example of a program that outputs information stored at a BACnet workstation or BACnet controllers.

Classification	Label name	Description	Device
Module label	M+FX5-ENET.bSts_ModuleReady_D	Module READY	Un\G34.0
	M+FX5-ENET.uBac_DV_SystemStatus_D	SystemStatus	Un\G8500
	M+FX5-ENET.unBac_DV_TimeSynchronization_D[1]	Time synchronization (year)	Un\G8502
	M+FX5-ENET.bBac_DV_TimeSynchronization_Received_Flag_D	Time synchronization received flag	Un\G8509.0
	M+FX5-ENET.eBAC_AO1_PresentValue_D	AnalogOutput1 PresentValue	Un\G8762
	M+FX5-ENET.eBAC_AO1_SettingValue_D	AnalogOutput1: Value setting value	Un\G8766
	M+FX5-ENET.uBAC_AO1_SettingWrite_D	AnalogOutput1 PriorityArray	Un\G8768
	M+FX5-ENET.uBAC_AO1_SettingControl_D	AnalogOutput1: Write control	Un\G8769
	M+FX5-ENET.uBAC_AO1_Units_D	AnalogOutput1 Units	Un\G8771
	M+FX5-ENET.eBAC_AV1_PresentValue_D	AnalogValue1 PresentValue	Un\G8922
	M+FX5-ENET.bBAC_BO1_PresentValue_D	BinaryOutput PresentValue	Un\G9402.0
	M+FX5-ENET.bBAC_BO1_FeedbackValue_D	BinaryOutput1 FeedbackValue	Un\G9409.0
	M+FX5-ENET.udBAC_MO1_PresentValue_D	Multi-stateOutput1 PresentValue	Un\G10202
	M+FX5-ENET.udBAC_MO1_FeedbackValue_D	Multi-stateOutput1 FeedbackValue	Un\G10212
Label to be defined	Define global labels as shown below.		

	Label Name	Data Type		Class	Assign (Device/Label)
1	eAnalogOutput	FLOAT [Single Precision]	...	VAR_GLOBAL	D2000
2	VOLTS	Word [Signed]	...	VAR_GLOBAL_CONSTANT	
3	KILOVOLTS	Word [Signed]	...	VAR_GLOBAL_CONSTANT	
4	bChangeAnalogOutput	Bit	...	VAR_GLOBAL	M200
5	eAnalogOutputWrite	FLOAT [Single Precision]	...	VAR_GLOBAL	D2002
6	eAnalogOutputSetting	FLOAT [Single Precision]	...	VAR_GLOBAL	D2004
7	uiParametersWriteData	Double Word [Unsigned]/Bit String [32-bit]	...	VAR_GLOBAL	D2008
8	uiParametersReadData	Double Word [Unsigned]/Bit String [32-bit]	...	VAR_GLOBAL	D2010

Program



(0) After 'ModuleREADY' (Un\G34, b0) is detected to be on, the initial value is set to the MI object, and 'BACnetStartupRequest' (Un\G37, b1) is turned on.
(14) The program writes 0: Operational to 'SystemStatus' (Un\G8500).
(30) The value for the analog output is read from the AnalogOutput object and the read value is set to the required setting value in "Units".
(62) The value for the analog output is written to PresentValue of the AnalogOutput object.
(90) The setting value related to the analog output is read from the AnalogValue object.
(99) The ON/OFF status is read from the BinaryOutput object and the read status is output. Then, the output result is stored in FeedbackValue.
(121) The parameter data is read from the Multi-state Output object and the read data is set to an external device. Then, the setting result is read and stored in FeedbackValue.

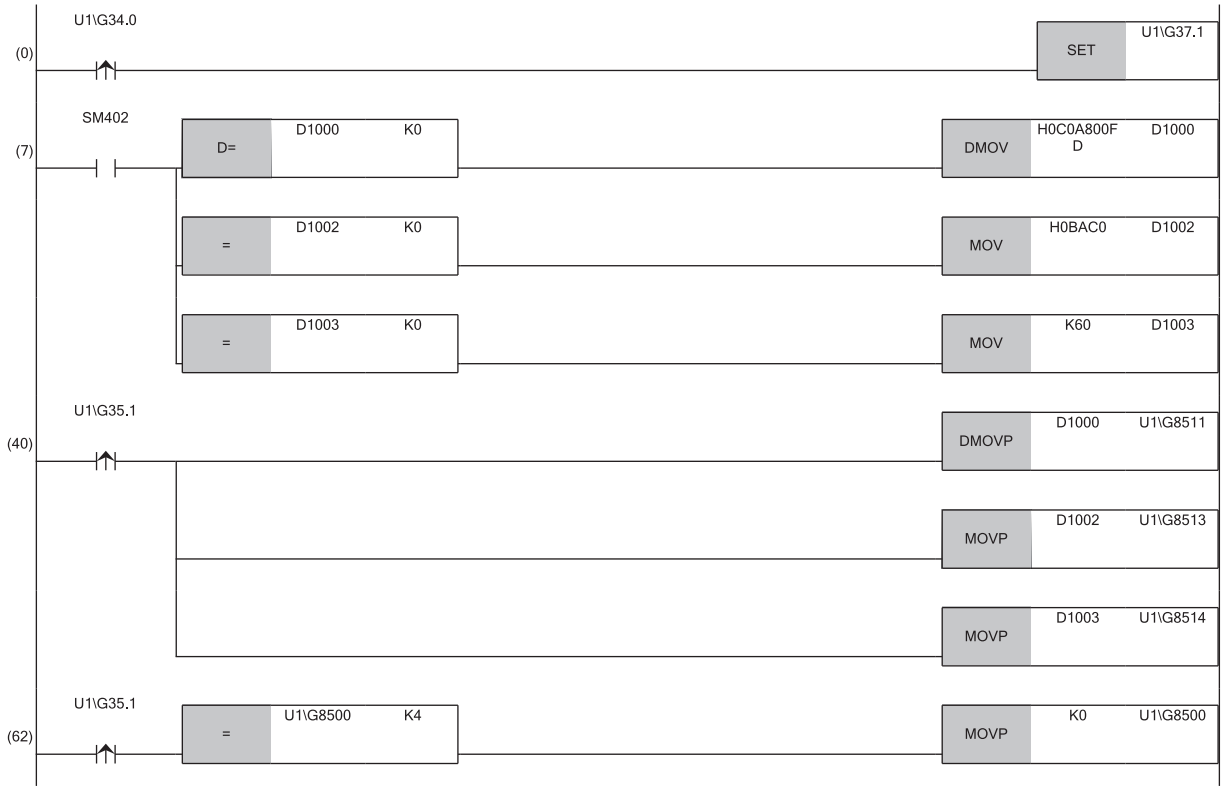
Program that requests own registration to a BBMD

The following describes an example of a program that requests own registration to a BBMD.

Set the latch devices in the CPU parameter in advance to hold the values in D1000 to D1003.

Classification	Label name	Description	Device
Module label	M+FX5-ENET.bSts_ModuleReady_D	Module READY	Un\G34.0
	M+FX5-ENET.uBac_DV_SystemStatus_D	SystemStatus	Un\G8500
	M+FX5-ENET.udBac_DV_BbmdIpAddr_IPv4_D	IP address of a connection destination BBMD	Un\G8511, Un\G8512
	M+FX5-ENET.uBac_DV_BbmdPortNo_D	Port number of a connection destination BBMD	Un\G8513
	M+FX5-ENET.uBac_DV_BbmdTtl_D	Period indicating that a connection destination BBMD is being connected	Un\G8514

Program



(0) After 'ModuleREADY' (Un\G34.b0) is detected to be on, 'BACnetStartupRequest' (Un\G37.b1) is turned on.

(7) When no value is input in the latch devices, the initial values are set.*1

(40) The IP address, port number, and TTL of the BBMD are written to 'BACnetDuringStartup' (Un\G35.b1).

(62) The program writes 0: Operational to 'SystemStatus' (Un\G8500).

*1 In this program, 192.168.0.253 for IP address, 0xBAC0 for port number, and 60 (seconds) for TTL are set.

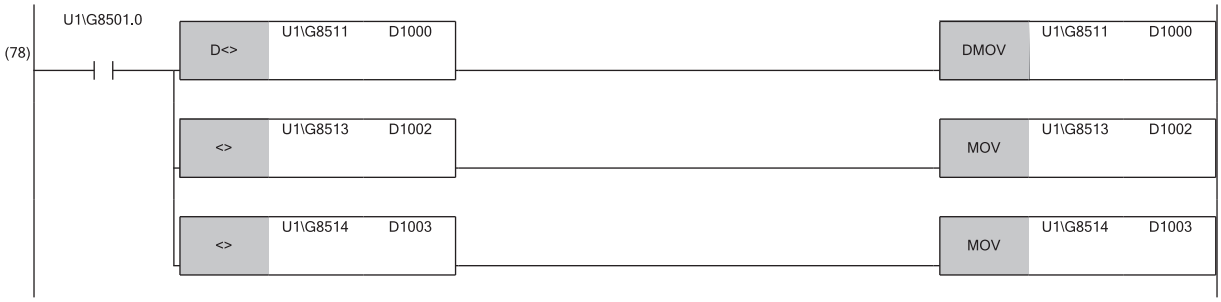
Program that holds values of a BBMD

The following describes an example of a program that holds the values of a BBMD.

Set the latch devices in the CPU parameter in advance to hold the values in D1000 to D1003.

Classification	Label name	Description	Device
Module label	M+FX5-ENET.bSts_ModuleReady_D	Module READY	Un\G34.0
	M+FX5-ENET.uBac_DV_SystemStatus_D	SystemStatus	Un\G8500
	M+FX5-ENET.udBac_DV_BbmdIpAddr_IPv4_D	IP address of a connection destination BBMD	Un\G8511, Un\G8512
	M+FX5-ENET.uBac_DV_BbmdPortNo_D	Port number of a connection destination BBMD	Un\G8513
	M+FX5-ENET.uBac_DV_BbmdTtl_D	Period indicating that a connection destination BBMD is being connected	Un\G8514

Program



(78) If the IP address of the BBMD set in the latch device is different from the IP address in the buffer memory, the value is substituted to the latch device.

(78) If the port number of the BBMD set in the latch device is different from the port number in the buffer memory, the value is substituted to the latch device.

(78) If the TTL of the BBMD set in the latch device is different from the TTL in the buffer memory, the value is substituted to the latch device.

8 TROUBLESHOOTING

This chapter describes troubleshooting for BACnet communications.

8.1 Troubleshooting by Symptom

The following describes troubleshooting by symptom for BACnet communications. If an error has occurred in the Ethernet module, identify the error cause with the engineering tool. (📖 MELSEC iQ-F FX5 Ethernet Module User's Manual, 📖 MELSEC iQ-F FX5 EtherNet/IP Module User's Manual)

Unable to communicate with another BACnet device.

When communications with another BACnet device cannot be performed, check the following items.

Check item	Action
Is the IP address duplicated?	Correct the specified IP address.
Is the instance number of the device duplicated?	Correct the specified instance number of the device.
Is another BACnet device ready to communicate?	Check another BACnet device.
Is the Ethernet module not in operation?	Restart the operation of the Ethernet module.
Is the packet sent to the correct destination?	Check the destination using an Ethernet packet monitor or other means.

Unable to synchronize the time with another BACnet device.

When the time cannot be synchronized with another BACnet device, check the following items.

Check item	Action
Has the program been created to change the time of the FX5 CPU module at the received time?	Create the program again.
Is the Ethernet module configured as a destination for another BACnet device?	Configure the Ethernet module as a destination for another BACnet device.

Unable to set some properties.

If there are properties that cannot be set, check the following items.

Check item	Action
Is it a property that cannot be changed?	Check that the BACnet standard does not define the property as unchangeable or unwritable.

8.2 List of Error Codes

The following table lists the error codes, error definitions and causes, and actions for errors that occur in in the processing for BACnet communications between the Ethernet module and BACnet devices.
Error codes are displayed in the [Error Information] tab in the "Module Diagnostics" window of the Ethernet module. (📖 MELSEC iQ-F FX5 Ethernet Module User's Manual, 📖 MELSEC iQ-F FX5 EtherNet/IP Module User's Manual)
Error codes can be classified into the following two types.

Classification	Description
Moderate error	Indicates that the module operation is abnormal and cannot be continued. When a parameter error occurs, change the parameter settings and restart the Ethernet module.
Minor error	Indicates that the module operation is abnormal but can be continued.

Error code	Classification	Error name	Error definition and cause	Action
1852H	Minor	Setting value out of range error	The property value set in the buffer memory is invalid.	Check if an invalid value is stored.
1853H	Minor	BBMD IP address error	The BBMD IP address set in the buffer memory is out of range.	Check if an invalid value is stored.
1854H	Minor	BBMD port number error	The BBMD port number set in the buffer memory is out of range.	Check if an invalid value is stored.
1855H	Minor	BBMD TTL error	The TTL set in the buffer memory is out of range.	Check that the value input is 2 to 43200.
1861H	Minor	Send packet size exceeded error	The packet sent from the Ethernet module exceeded the packet size that can be sent in one packet.	• Check the setting of the BACnet device (communication target). • Check the factors that cause the packet size to increase.
1862H	Minor	BBMD send error	Broadcast transmission is not performed because the registration with a BBMD has not completed successfully.	Check the specifications of the BBMD (communication target). Check the communication packet.
1870H	Minor	Receive protocol version error	The protocol version of NPDU is not set to 1.	• Check the specifications of the BACnet device (communication target). • Check the communication packet.
1871H	Minor	Receive BVLL (BVLC type) error	An unsupported BVLL (BVLC type) was received.	• Check the communication packet. • Check with the manufacturer of the BACnet device (communication target).
1872H	Minor	Receive BVLL (BVLC function) error	An unsupported BVLL (BVLC function) was received.	• Check the communication packet. • Check with the manufacturer of the BACnet device (communication target).
1873H	Minor	Receive DNET error	0 is specified for DNET in the received packet.	• Check the specifications of the BACnet device (communication target). • Check the communication packet.
1874H	Minor	Receive SNET error	0 or 65535 is specified for SNET in the received packet.	• Check the specifications of the BACnet device (communication target). • Check the communication packet.
1875H	Minor	Receive SLEN error	0 is specified for SLEN of the received packet.	• Check the specifications of the BACnet device (communication target). • Check the communication packet.
1876H	Minor	Packet decode error	An error has occurred during packet decode.	• Check the communication packet. • Check with the manufacturer of the BACnet device (communication target).
1877H	Minor	Received a message that should not have been received.	SimpleAck, ComplexAck, SegmentAck, Error response, Reject response, or Abort response has been received.	• Check the communication packet. • Check with the manufacturer of the BACnet device (communication target).

APPENDICES

Appendix 1 Buffer Memory

This chapter describes the buffer memory related to the BACnet functions.

For other types of buffer memory, refer to the following.

📖 MELSEC iQ-F FX5 Ethernet Module User's Manual

📖 MELSEC iQ-F FX5 EtherNet/IP Module User's Manual

List of buffer memory

Buffer memory address		Name		Initial value	Read, write
Decimal	Hexadecimal				
29	001DH	Latest error code		0	Read
31	001FH	Firmware version		0	Read
34, 35	0022H, 0023H	Input signal		0	Read, write
36, 37	0024H, 0025H	Output signal		0	Read, write
8500	2134H	BACnet communication device	SystemStatus	0	Read, write
8501	2135H		Module status	0	Read
8502 to 8508	2136H to 213CH		Time synchronization	0	Read
8509	213DH		Time synchronization received flag	0	Read, write
8510	213EH		I-Am send	0	Read, write
8511, 8512	213FH, 2140H		BBMD IP address	0	Read, write
8513	2141H		BBMD port number	0	Read, write
8514	2142H		BBMD TTL	0	Read, write
8520, 8521	2148H, 2149H	BACnet communication Accumulator 1	Object ID	0	Read
8522, 8523	214AH, 214BH		PresentValue	0	Read, write
8524	214CH		OutOfService	0	Read, write
8525	214DH		Reliability	0	Read, write
8526, 8527	214EH, 214FH		Scale	0	Read
8528, 8529	2150H, 2151H		MaxPresValue	0	Read
8530	2152H		Pulse setting value	0	Read, write
8531	2153H		Units	0	Read
8540 to 8551	21C5H to 2167H	BACnet communication Accumulator 2	Same as BACnet communication Accumulator 1	—	—
8560 to 8571	2170H to 217BH	BACnet communication Accumulator 3	Same as BACnet communication Accumulator 1	—	—
8580 to 8591	2184H to 218FH	BACnet communication Accumulator 4	Same as BACnet communication Accumulator 1	—	—
8600, 8601	2198H, 2199H	BACnet communication AnalogInput 1	Object ID	0	Read
8602, 8603	219AH, 219BH		PresentValue	0	Read, write
8604	219CH		OutOfService	0	Read, write
8605	219DH		Reliability	0	Read, write
8606	219EH		Units	0	Read
8620 to 8626	21ACH to 21B2H	BACnet communication AnalogInput 2	Same as BACnet communication AnalogInput 1	—	—
8640 to 8646	21C0H to 21C6H	BACnet communication AnalogInput 3	Same as BACnet communication AnalogInput 1	—	—

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Buffer memory address		Name		Initial value	Read, write
Decimal	Hexadecimal				
8660 to 8666	21D4H to 21DAH	BACnet communication AnalogInput 4	Same as BACnet communication AnalogInput 1	—	—
8680 to 8686	21E8H to 21EEH	BACnet communication AnalogInput 5	Same as BACnet communication AnalogInput 1	—	—
8700 to 8706	21FCH to 2202H	BACnet communication AnalogInput 6	Same as BACnet communication AnalogInput 1	—	—
8720 to 8726	2210H to 2216H	BACnet communication AnalogInput 7	Same as BACnet communication AnalogInput 1	—	—
8740 to 8746	2224H to 222AH	BACnet communication AnalogInput 8	Same as BACnet communication AnalogInput 1	—	—
8760, 8761	2238H, 2239H	BACnet communication AnalogOutput 1	Object ID	0	Read
8762, 8763	223AH, 223BH		PresentValue	0	Read
8764	223CH		OutOfService	0	Read, write
8765	223DH		Reliability	0	Read, write
8766, 8767	223EH, 223FH		Value setting value	0	Read, write
8768	2240H		Write setting	0	Read, write
8769	2241H		Write control	0	Read, write
8770	2242H		Update counter	0	Read
8771	2243H		Units	0	Read
8780 to 8791	224CH to 2257H	BACnet communication AnalogOutput 2	Same as BACnet communication AnalogOutput 1	—	—
8800 to 8811	2260H to 226BH	BACnet communication AnalogOutput 3	Same as BACnet communication AnalogOutput 1	—	—
8820 to 8831	2274H to 227FH	BACnet communication AnalogOutput 4	Same as BACnet communication AnalogOutput 1	—	—
8840 to 8851	2288H to 2293H	BACnet communication AnalogOutput 5	Same as BACnet communication AnalogOutput 1	—	—
8860 to 8871	229CH to 22A7H	BACnet communication AnalogOutput 6	Same as BACnet communication AnalogOutput 1	—	—
8880 to 8891	22B0H to 22BBH	BACnet communication AnalogOutput 7	Same as BACnet communication AnalogOutput 1	—	—
8900 to 8911	22C4H to 22CFH	BACnet communication AnalogOutput 8	Same as BACnet communication AnalogOutput 1	—	—
8920, 8921	22D8H, 22D9H	BACnet communication AnalogValue 1	Object ID	0	Read
8922, 8923	22DAH, 22DBH		PresentValue	0	Read
8924	22DCH		OutOfService	0	Read, write
8925	22DDH		Reliability	0	Read, write
8926, 8927	22DEH, 22DFH		Value setting value	0	Read, write
8928	22E0H		Write setting	0	Read, write
8929	22E1H		Write control	0	Read, write
8930	22E2H		Update counter	0	Read
8931	22E3H		Units	0	Read
8940 to 8951	22ECH to 22F7H	BACnet communication AnalogValue 2	Same as BACnet communication AnalogValue 1	—	—

Buffer memory address		Name		Initial value	Read, write
Decimal	Hexadecimal				
8960 to 8971	2300H to 230BH	BACnet communication AnalogValue 3	Same as BACnet communication AnalogValue 1	—	—
8980 to 8991	2314H to 231FH	BACnet communication AnalogValue 4	Same as BACnet communication AnalogValue 1	—	—
9000 to 9011	2328H to 2333H	BACnet communication AnalogValue 5	Same as BACnet communication AnalogValue 1	—	—
9020 to 9031	233CH to 2347H	BACnet communication AnalogValue 6	Same as BACnet communication AnalogValue 1	—	—
9040 to 9051	2350H to 235BH	BACnet communication AnalogValue 7	Same as BACnet communication AnalogValue 1	—	—
9060 to 9071	2364H to 236FH	BACnet communication AnalogValue 8	Same as BACnet communication AnalogValue 1	—	—
9080, 9081	2378H, 2379H	BACnet communication BinaryInput 1	Object ID	0	Read
9082	237AH		PresentValue	0	Read, write
9083	237BH		OutOfService	0	Read, write
9084	237CH		Reliability	0	Read, write
9100 to 9104	238CH to 2390H	BACnet communication BinaryInput 2	Same as BACnet communication BinaryInput 1	—	—
9120 to 9124	23A0H to 23A4H	BACnet communication BinaryInput 3	Same as BACnet communication BinaryInput 1	—	—
9140 to 9144	23B4H to 23B8H	BACnet communication BinaryInput 4	Same as BACnet communication BinaryInput 1	—	—
9160 to 9164	23C8H to 23CCH	BACnet communication BinaryInput 5	Same as BACnet communication BinaryInput 1	—	—
9180 to 9184	23DCH to 23E0H	BACnet communication BinaryInput 6	Same as BACnet communication BinaryInput 1	—	—
9200 to 9204	23F0H to 23F4H	BACnet communication BinaryInput 7	Same as BACnet communication BinaryInput 1	—	—
9220 to 9224	2404H to 2408H	BACnet communication BinaryInput 8	Same as BACnet communication BinaryInput 1	—	—
9240 to 9244	2418H to 241CH	BACnet communication BinaryInput 9	Same as BACnet communication BinaryInput 1	—	—
9260 to 9264	242CH to 2430H	BACnet communication BinaryInput 10	Same as BACnet communication BinaryInput 1	—	—
9280 to 9284	2440H to 2444H	BACnet communication BinaryInput 11	Same as BACnet communication BinaryInput 1	—	—
9300 to 9304	2454H to 2458H	BACnet communication BinaryInput 12	Same as BACnet communication BinaryInput 1	—	—
9320 to 9324	2468H to 246CH	BACnet communication BinaryInput 13	Same as BACnet communication BinaryInput 1	—	—
9340 to 9344	247CH to 2480H	BACnet communication BinaryInput 14	Same as BACnet communication BinaryInput 1	—	—

Buffer memory address		Name		Initial value	Read, write
Decimal	Hexadecimal				
9360 to 9364	2490H to 2494H	BACnet communication BinaryInput 15	Same as BACnet communication BinaryInput 1	—	—
9380 to 9384	24A4H to 24A8H	BACnet communication BinaryInput 16	Same as BACnet communication BinaryInput 1	—	—
9400, 9401	24B8H, 24B9H	BACnet communication BinaryOutput 1	Object ID	0	Read
9402	24BAH		PresentValue	0	Read
9403	24BBH		OutOfService	0	Read, write
9404	24BCH		Reliability	0	Read, write
9405	24BDH		Value setting value	0	Read, write
9406	24BEH		Write setting	0	Read, write
9407	24BFH		Write control	0	Read, write
9408	24A0H		Update counter	0	Read
9409	24A1H		FeedbackValue	0	Read, write
9420 to 9429	24CCH to 24D5H	BACnet communication BinaryOutput 2	Same as BACnet communication BinaryOutput 1	—	—
9440 to 9449	24E0H to 24E9H	BACnet communication BinaryOutput 3	Same as BACnet communication BinaryOutput 1	—	—
9460 to 9469	24F4H to 24FDH	BACnet communication BinaryOutput 4	Same as BACnet communication BinaryOutput 1	—	—
9480 to 9489	2508H to 2511H	BACnet communication BinaryOutput 5	Same as BACnet communication BinaryOutput 1	—	—
9500 to 9509	251CH to 2525H	BACnet communication BinaryOutput 6	Same as BACnet communication BinaryOutput 1	—	—
9520 to 9529	2530H to 2539H	BACnet communication BinaryOutput 7	Same as BACnet communication BinaryOutput 1	—	—
9540 to 9549	2544H to 254DH	BACnet communication BinaryOutput 8	Same as BACnet communication BinaryOutput 1	—	—
9560 to 9569	2558H to 2561H	BACnet communication BinaryOutput 9	Same as BACnet communication BinaryOutput 1	—	—
9580 to 9589	256CH to 2575H	BACnet communication BinaryOutput 10	Same as BACnet communication BinaryOutput 1	—	—
9600 to 9609	2580H to 2589H	BACnet communication BinaryOutput 11	Same as BACnet communication BinaryOutput 1	—	—
9620 to 9629	2594H to 259DH	BACnet communication BinaryOutput 12	Same as BACnet communication BinaryOutput 1	—	—
9640 to 9649	25A8H to 25B1H	BACnet communication BinaryOutput 13	Same as BACnet communication BinaryOutput 1	—	—
9660 to 9669	25BCH to 25C5H	BACnet communication BinaryOutput 14	Same as BACnet communication BinaryOutput 1	—	—
9680 to 9689	25D0H to 25D9H	BACnet communication BinaryOutput 15	Same as BACnet communication BinaryOutput 1	—	—
9700 to 9709	25E4H to 25EDH	BACnet communication BinaryOutput 16	Same as BACnet communication BinaryOutput 1	—	—

Buffer memory address		Name		Initial value	Read, write
Decimal	Hexadecimal				
9720, 9721	25F8H, 25F9H	BACnet communication BinaryValue 1	Object ID	0	Read
9722	25FAH		PresentValue	0	Read
9723	25FBH		OutOfService	0	Read, write
9724	25FCH		Reliability	0	Read, write
9725	25FDH		Value setting value	0	Read, write
9726	25FEH		Write setting	0	Read, write
9727	25FFH		Write control	0	Read, write
9728	2600H		Update counter	0	Read
9740 to 9748	260CH to 2614H	BACnet communication BinaryValue 2	Same as BACnet communication BinaryValue 1	—	—
9760 to 9768	2620H to 2628H	BACnet communication BinaryValue 3	Same as BACnet communication BinaryValue 1	—	—
9780 to 9788	2634H to 263CH	BACnet communication BinaryValue 4	Same as BACnet communication BinaryValue 1	—	—
9800 to 9808	2648H to 2650H	BACnet communication BinaryValue 5	Same as BACnet communication BinaryValue 1	—	—
9820 to 9828	265CH to 2664H	BACnet communication BinaryValue 6	Same as BACnet communication BinaryValue 1	—	—
9840 to 9848	2670H to 2678H	BACnet communication BinaryValue 7	Same as BACnet communication BinaryValue 1	—	—
9860 to 9868	2684H to 268CH	BACnet communication BinaryValue 8	Same as BACnet communication BinaryValue 1	—	—
9880 to 9888	2698H to 26A0H	BACnet communication BinaryValue 9	Same as BACnet communication BinaryValue 1	—	—
9900 to 9908	26ACH to 26B4H	BACnet communication BinaryValue 10	Same as BACnet communication BinaryValue 1	—	—
9920 to 9928	26C0H to 26C8H	BACnet communication BinaryValue 11	Same as BACnet communication BinaryValue 1	—	—
9940 to 9948	26D4H to 26DCH	BACnet communication BinaryValue 12	Same as BACnet communication BinaryValue 1	—	—
9960 to 9968	26E8H to 26F0H	BACnet communication BinaryValue 13	Same as BACnet communication BinaryValue 1	—	—
9980 to 9988	26FCH to 2704H	BACnet communication BinaryValue 14	Same as BACnet communication BinaryValue 1	—	—
10000 to 10008	2710H to 2718H	BACnet communication BinaryValue 15	Same as BACnet communication BinaryValue 1	—	—
10020 to 10028	2724H to 272CH	BACnet communication BinaryValue 16	Same as BACnet communication BinaryValue 1	—	—
10040, 10041	2738H, 2739H	BACnet communication Multi-state Input 1	Object ID	0	Read
10042, 10043	273AH, 273BH		PresentValue	0	Read, write
10044	273CH		OutOfService	0	Read, write
10045	273DH		Reliability	0	Read, write
10046, 10047	273EH, 273FH		NumberOfStates	0	Read

Buffer memory address		Name		Initial value	Read, write
Decimal	Hexadecimal				
10060 to 10067	274CH to 2753H	BACnet communication Multi-state Input 2	Same as BACnet communication Multi-state Input 1	—	—
10080 to 10087	2760H to 2767H	BACnet communication Multi-state Input 3	Same as BACnet communication Multi-state Input 1	—	—
10100 to 10107	2774H to 277BH	BACnet communication Multi-state Input 4	Same as BACnet communication Multi-state Input 1	—	—
10120 to 10127	2788H to 278FH	BACnet communication Multi-state Input 5	Same as BACnet communication Multi-state Input 1	—	—
10140 to 10147	279CH to 27A3H	BACnet communication Multi-state Input 6	Same as BACnet communication Multi-state Input 1	—	—
10160 to 10167	27B0H to 27B7H	BACnet communication Multi-state Input 7	Same as BACnet communication Multi-state Input 1	—	—
10180 to 10187	27C4H to 27CBH	BACnet communication Multi-state Input 8	Same as BACnet communication Multi-state Input 1	—	—
10200, 10201	27D8H, 27D9H	BACnet communication Multi-state Output 1	Object ID	0	Read
10202, 10203	27DAH, 27DBH		PresentValue	0	Read
10204	27DCH		OutOfService	0	Read, write
10205	27DDH		Reliability	0	Read, write
10206, 10207	27DEH, 27DFH		Value setting value	0	Read, write
10208	27E0H		Write setting	0	Read, write
10209	27E1H		Write control	0	Read, write
10210	27E2H		Update counter	0	Read
10212, 10213	27E4H, 27E5H		FeedbackValue	0	Read, write
10214, 10215	27E6H, 27E7H		NumberOfStates	0	Read
10220 to 10230, 10232 to 10235	27ECH to 27F6H, 27F8H to 27FBH	BACnet communication Multi-state Output 2	Same as BACnet communication Multi-state Output 1	—	—
10240 to 10250, 10252 to 10255	2800H to 280AH, 280CH to 280FH	BACnet communication Multi-state Output 3	Same as BACnet communication Multi-state Output 1	—	—
10260 to 10270, 10272 to 10275	2814H to 281EH, 2820H to 2823H	BACnet communication Multi-state Output 4	Same as BACnet communication Multi-state Output 1	—	—
10280 to 10290, 10292 to 10295	2828H to 2832H, 2834H to 2837H	BACnet communication Multi-state Output 5	Same as BACnet communication Multi-state Output 1	—	—
10300 to 10310, 10312 to 10315	283CH to 2846H, 2848H to 284BH	BACnet communication Multi-state Output 6	Same as BACnet communication Multi-state Output 1	—	—
10320 to 10330, 10332 to 10335	2850H to 285AH, 285CH to 285FH	BACnet communication Multi-state Output 7	Same as BACnet communication Multi-state Output 1	—	—
10340 to 10350, 10352 to 10355	2864H to 286EH, 2870H to 2873H	BACnet communication Multi-state Output 8	Same as BACnet communication Multi-state Output 1	—	—

Details of buffer memory

Latest error code

■Latest error code (Un\G29)

The error code for the latest error that occurred in the Ethernet module is stored. (0 is stored in normal condition.)

For details on error codes, refer to the following.

☞ Page 78 List of Error Codes

Firmware version

■Firmware version (Un\G31)

The firmware version of the Ethernet module is stored.

Ex.

When the firmware version of the Ethernet module is Ver.1.000: K1000

Input signal

■Input signal (Un\G34, Un\G35)

This signal is used for checking the status of the Ethernet module.

Address	bit	Signal name	Description
Un\G34	b0	Module READY	A signal for checking the status of completion of preparation for operation of the Ethernet module • ON: The module is operable. • OFF: The module is not operable (in preparation).
	b15	Module error status	A signal for checking the occurrence of error (minor/moderate/major) of the Ethernet module • ON: An error has occurred (minor/moderate/major). • OFF: No error When the signal is turned on (an error occurs), remove the cause of the error, and turn on 'Module error clear request' (Un\G36.b15). Then, the signal will be turned off.
Un\G35	b1	BACnet during startup	The start status of the BACnet communications is stored. • 0: Stopping • 1: Starting

A

Output signal

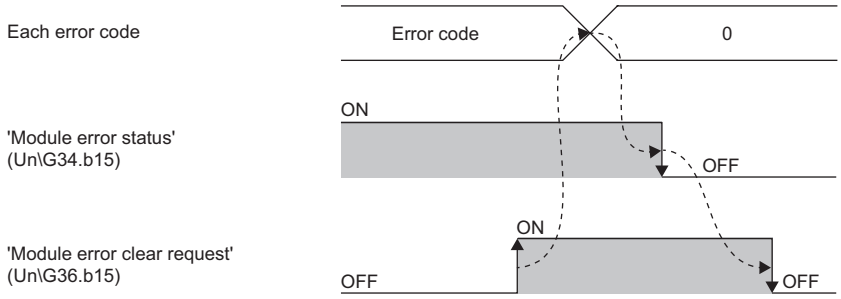
■Output signal (Un\G36, Un\G37)

This signal is used for controlling the Ethernet module.

Address	bit	Signal name	Description
Un\G36	b15	Module error clear request	Requests to clear an error that has occurred in the Ethernet module. To request to clear the module error, turn off, on and off the signal. Issuing the request after the cause of the error is removed will clear the following items. • 'Module error status' (Un\G34.b15) is turned on and off. • The ERROR LED is turned off. • The following buffer memory 'Latest error code' (Un\G29) 'IP address storage area write error code' (Un\G61) 'IP address storage area clear error code' (Un\G62) 'Error code' (Un\G108 to Un\G139) 'Same IP address state storage area' (Un\G201) 'MAC address of the already connected station' (Un\G202 to Un\G204) 'MAC address of the station connected later' (Un\G205 to Un\G207)
Un\G37	b1	BACnet startup request	Requests to start or stop BACnet communications. • Startup request: OFF→ON • Stop request: ON→OFF

Point

Turn on and off 'Module error clear request' (Un\G36, b15) using `Module error status' (Un\G34, b15) as the interlock condition at the following timing.



BACnet communication device

■SystemStatus (Un\G8500)

SystemStatus of the Ethernet module (BACnet device) is set.

- 0: Operational
- 1: OperationalReadOnly
- 2: DownloadRequired
- 3: DownloadInProgress
- 4: NonOperational
- 5: BackupInProgress

■Module status (Un\G8501)

BACnet joining/leaving status is stored.

- 0: Leaving
- 1: Joining

■Time synchronization (Un\G8502 to Un\G8508)

The clock data of the TimeSynchronization service sent from the BACnet workstation or BACnet controllers is stored.

Address	Name	Description
Un\G8502	Year	Stores four-digit year data. (1900 to 2153)
Un\G8503	Month	Stores month data from 01 to 12.
Un\G8504	Day	Stores date data from 01 to 31.
Un\G8505	Time	Stores time data from 00 to 23.
Un\G8506	Minute	Stores minute data from 00 to 59.
Un\G8507	Second	Stores second data from 00 to 59.
Un\G8508	Day of week	Stores day of the week. • 0: Sunday • 1: Monday • 2: Tuesday • 3: Wednesday • 4: Thursday • 5: Friday • 6. Saturday

■Time synchronization received flag (Un\G8509)

The receiving status of the TimeSynchronization service of the time synchronization function is stored.

- 0: Not received
- 1: Received

Precautions

When the TimeSynchronization service is received while the time synchronization received flag is set to 1, the receive data is not reflected in `Time synchronization` (Un\G8502 to Un\G8508).

■I-Am send (Un\G8510)

Parameters related to I-Am send are set. The initial value is the one set in parameter setting.

Address	bit	Name	Description
Un\G8510	b0 to b11	Fixed-cycle send	Sets the interval (second) for sending I-Am. • 0: Do not send • 1 to 4095 (seconds)
	b14	Send control	Sets whether or not to send I-Am only when the device is set to Operational. • OFF: Send I-Am only at the Operational status. • ON: Send I-Am even at other statuses than Operational.
	b15	Send I-Am when the status changes to Operational.	Sets whether or not to send I-Am when the device status changes to Operational. • OFF: Do not send I-Am when the status changes to Operational. • ON: Send I-Am when the status changes to Operational.

■BBMD IP address (Un\G8511 and Un\G8512)

The IP address of a connection destination BBMD is stored.

23-bit integer (Refer to IP address setting value.)

■BBMD port number (Un\G8513)

The port number of a connection destination BBMD is stored.

16-bit integer (1 to 65534)

■BBMD TTL (Un\G8514)

The period indicating that a connection destination BBMD is being connected is stored.

16-bit integer (2 to 43200) seconds

BACnet communication Accumulator

■BACnet communication Accumulator (Un\G8520 to Un\G8591)

This buffer memory area is used for the Accumulator object.

Address	Description
Un\G8520 to Un\G8531	BACnet communication Accumulator 1
Un\G8540 to Un\G8551	BACnet communication Accumulator 2
Un\G8560 to Un\G8571	BACnet communication Accumulator 3
Un\G8580 to Un\G8591	BACnet communication Accumulator 4

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the Accumulator object settings are reflected. (☞ Page 57 Accumulator object setting)

The following table lists the buffer memory area format (BACnet communication Accumulator 1) of the Accumulator object.

Address	Name		Description
Un\G8520, Un\G8521	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 23)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G8522, Un\G8523	PresentValue		Stores the integrated value (the current value of the pulse counter). (0 to MaxPresValue)
Un\G8524	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G8525	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError
Un\G8526, Un\G8527	Scale		Stores the value (in increments of 0.001) for scale conversion. (0 to 4294967295)*1
Un\G8528, Un\G8529	MaxPresValue		Sets the maximum value (maximum value of PresentValue) for counter reset. (0 to 4294967295)*1
Un\G8530	Pulse setting value		Sets the value to calculate the difference value*2 to be reflected in PresentValue. (0 to 32767)
Un\G8531	Units		Stores the unit.*1 • 0: square-meters • 1: square-feet • 2: milliamperes • 3: amperes • 4: ohms • 5: volts • 6: kilovolts • 7: megavolts • 8: volt-amperes • 9: kilovolt-amperes • 10 to 65535: Unit other than the above

*1 Stores the setting value of Accumulator object setting No.1.

*2 Previous pulse setting value = Current pulse setting value: 0 (Not reflected in the current value)
Previous pulse setting value < Current pulse setting value: Current pulse setting value - Previous pulse setting value
Previous pulse setting value > Current pulse setting value: 32768 - Previous pulse setting value + Current pulse setting value

BACnet communication AnalogInput

■BACnet communication AnalogInput (Un\G8600 to Un\G8746)

This buffer memory area is used for the AnalogInput object.

Address	Description
Un\G8600 to Un\G8606	BACnet communication AnalogInput 1
Un\G8620 to Un\G8626	BACnet communication AnalogInput 2
Un\G8640 to Un\G8646	BACnet communication AnalogInput 3
Un\G8660 to Un\G8666	BACnet communication AnalogInput 4
Un\G8680 to Un\G8686	BACnet communication AnalogInput 5
Un\G8700 to Un\G8706	BACnet communication AnalogInput 6
Un\G8720 to Un\G8726	BACnet communication AnalogInput 7
Un\G8740 to Un\G8746	BACnet communication AnalogInput 8

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the AnalogInput object settings are reflected. (☞ Page 58 AnalogInput object setting)

The following table lists the buffer memory area format (BACnet communication AnalogInput 1) of the AnalogInput object.

Address	Name		Description
Un\G8600, Un\G8601	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 0)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G8602, Un\G8603	PresentValue		Stores the current analog value. (Within the 32-bit floating-point data type real number)
Un\G8604	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G8605	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError
Un\G8606	Units		Stores the unit.*1 • 0: square-meters • 1: square-feet • 2: milliamperes • 3: amperes • 4: ohms • 5: volts • 6: kilovolts • 7: megavolts • 8: volt-amperes • 9: kilovolt-amperes • 10 to 65535: Unit other than the above

*1 Stores the setting value of AnalogInput object setting No.1.

BACnet communication AnalogOutput

■BACnet communication AnalogOutput (Un\G8760 to Un\G8911)

This buffer memory area is used for the AnalogOutput object.

Address	Description
Un\G8760 to Un\G8771	BACnet communication AnalogOutput 1
Un\G8780 to Un\G8791	BACnet communication AnalogOutput 2
Un\G8800 to Un\G8811	BACnet communication AnalogOutput 3
Un\G8820 to Un\G8831	BACnet communication AnalogOutput 4
Un\G8840 to Un\G8851	BACnet communication AnalogOutput 5
Un\G8860 to Un\G8871	BACnet communication AnalogOutput 6
Un\G8880 to Un\G8891	BACnet communication AnalogOutput 7
Un\G8900 to Un\G8911	BACnet communication AnalogOutput 8

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the AnalogOutput object settings are reflected. (☞ Page 58 AnalogOutput object setting)

The following table lists the buffer memory area format (BACnet communication AnalogOutput 1) of the AnalogOutput object.

Address	Name		Description
Un\G8760, Un\G8761	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 1)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G8762, Un\G8763	PresentValue		Stores the current analog value. (Within the 32-bit floating-point data type real number)
Un\G8764	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G8765	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError
Un\G8766, Un\G8767	Value setting value		Sets the analog value to be written to PriorityArray. (Within the 32-bit floating-point data type real number)
Un\G8768	Write setting	b0: Null setting flag	Sets whether or not to write Null to PriorityArray. • ON: Write • OFF: Do not write
		b1 to 5: Priority	Sets the priority for writing to PriorityArray. (1 to 16)
Un\G8769	Write control	b0: Write flag	Sets whether or not to write the Value setting value to PriorityArray.*2 The write flag is enabled when OutOfService is set to OFF (FALSE). • ON: Write • OFF: Do not write
Un\G8771	Update counter		Stores the number of times PresentValue was updated. (0 to 32767)

Address	Name	Description
Un\G8772	Units	Stores the unit.*1 • 0: square-meters • 1: square-feet • 2: milliamperes • 3: amperes • 4: ohms • 5: volts • 6: kilovolts • 7: megavolts • 8: volt-amperes • 9: kilovolt-amperes • 10 to 65535: Unit other than the above

*1 Stores the setting value of AnalogOutput object setting No.1.

*2 Null is written when the Null setting flag is on.

BACnet communication AnalogValue

■BACnet communication AnalogValue (Un\G8920 to Un\G9071)

This buffer memory area is used for the AnalogValue object.

Address	Description
Un\G8920 to Un\G8931	BACnet communication AnalogValue 1
Un\G8940 to Un\G8951	BACnet communication AnalogValue 2
Un\G8960 to Un\G8971	BACnet communication AnalogValue 3
Un\G8980 to Un\G8991	BACnet communication AnalogValue 4
Un\G9000 to Un\G9011	BACnet communication AnalogValue 5
Un\G9020 to Un\G9031	BACnet communication AnalogValue 6
Un\G9040 to Un\G9051	BACnet communication AnalogValue 7
Un\G9060 to Un\G9071	BACnet communication AnalogValue 8

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the AnalogValue object settings are reflected. (☞ Page 59 AnalogValue object setting)

The following table lists the buffer memory area format (BACnet communication AnalogValue 1) of the AnalogValue object.

Address	Name		Description
Un\G8920, Un\G8921	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 2)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G8922, Un\G8923	PresentValue		Stores the current analog value. (Within the 32-bit floating-point data type real number)
Un\G8924	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G8925	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError
Un\G8926, Un\G8927	Value setting value		Sets the analog value to be written to PriorityArray. (Within the 32-bit floating-point data type real number)
Un\G8928	Write setting	b0: Null setting flag	Sets whether or not to write Null to PriorityArray. • ON: Write • OFF: Do not write
		b1 to 5: Priority	Sets the priority for writing to PriorityArray. (1 to 16)
Un\G8929	Write control	b0: Write flag	Sets whether or not to write the Value setting value to PriorityArray.*2 The write flag is enabled when OutOfService is set to OFF (FALSE). • ON: Write • OFF: Do not write
Un\G8930	Update counter		Stores the number of times PresentValue was updated. (0 to 32767)

Address	Name	Description
Un\G8931	Units	Stores the unit.*1 • 0: square-meters • 1: square-feet • 2: milliamperes • 3: amperes • 4: ohms • 5: volts • 6: kilovolts • 7: megavolts • 8: volt-amperes • 9: kilovolt-amperes • 10 to 65535: Unit other than the above

*1 Stores the setting value of AnalogValue object setting No.1.

*2 Null is written when the Null setting flag is on.

BACnet communication BinaryInput

■BACnet communication BinaryInput (Un\G9080 to Un\G9384)

This buffer memory area is used for the BinaryInput object.

Address	Description
Un\G9080 to Un\G9084	BACnet communication BinaryInput 1
Un\G9100 to Un\G9104	BACnet communication BinaryInput 2
Un\G9120 to Un\G9124	BACnet communication BinaryInput 3
Un\G9140 to Un\G9144	BACnet communication BinaryInput 4
Un\G9160 to Un\G9164	BACnet communication BinaryInput 5
Un\G9180 to Un\G9184	BACnet communication BinaryInput 6
Un\G9200 to Un\G9204	BACnet communication BinaryInput 7
Un\G9220 to Un\G9224	BACnet communication BinaryInput 8
Un\G9240 to Un\G9244	BACnet communication BinaryInput 9
Un\G9260 to Un\G9264	BACnet communication BinaryInput 10
Un\G9280 to Un\G9284	BACnet communication BinaryInput 11
Un\G9300 to Un\G9304	BACnet communication BinaryInput 12
Un\G9320 to Un\G9324	BACnet communication BinaryInput 13
Un\G9340 to Un\G9344	BACnet communication BinaryInput 14
Un\G9360 to Un\G9364	BACnet communication BinaryInput 15
Un\G9380 to Un\G9384	BACnet communication BinaryInput 16

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the BinaryInput object settings are reflected. (☞ Page 59 BinaryInput object setting)

The following table lists the buffer memory area format (BACnet communication BinaryInput 1) of the BinaryInput object.

Address	Name		Description
Un\G9080, Un\G9081	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 3)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G9082	PresentValue	b0: PresentValue	Stores the current binary value. • ON: Active • OFF: Inactive
Un\G9083	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G9084	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError

*1 Stores the setting value of BinaryInput object setting No.1.

BACnet communication BinaryOutput

■BACnet communication BinaryOutput (Un\G9400 to Un\G9709)

This buffer memory area is used for the BinaryOutput object.

Address	Description
Un\G9400 to Un\G9409	BACnet communication BinaryOutput 1
Un\G9420 to Un\G9429	BACnet communication BinaryOutput 2
Un\G9440 to Un\G9449	BACnet communication BinaryOutput 3
Un\G9460 to Un\G9469	BACnet communication BinaryOutput 4
Un\G9480 to Un\G9489	BACnet communication BinaryOutput 5
Un\G9500 to Un\G9509	BACnet communication BinaryOutput 6
Un\G9520 to Un\G9529	BACnet communication BinaryOutput 7
Un\G9540 to Un\G9549	BACnet communication BinaryOutput 8
Un\G9560 to Un\G9569	BACnet communication BinaryOutput 9
Un\G9580 to Un\G9589	BACnet communication BinaryOutput 10
Un\G9600 to Un\G9609	BACnet communication BinaryOutput 11
Un\G9620 to Un\G9629	BACnet communication BinaryOutput 12
Un\G9640 to Un\G9649	BACnet communication BinaryOutput 13
Un\G9660 to Un\G9669	BACnet communication BinaryOutput 14
Un\G9680 to Un\G9689	BACnet communication BinaryOutput 15
Un\G9700 to Un\G9709	BACnet communication BinaryOutput 16

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the BinaryOutput object settings are reflected. (☞ Page 60 BinaryOutput object setting)

The following table lists the buffer memory area format (BACnet communication BinaryOutput 1) of the BinaryOutput object.

Address	Name		Description
Un\G9400, Un\G9401	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 4)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G9402	PresentValue	b0: PresentValue	Stores the current binary value. • ON: Active • OFF: Inactive
Un\G9403	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G9404	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError
Un\G9405	Update counter	b0: Null setting flag	Sets whether or not to write Null to PriorityArray. • ON: Write • OFF: Do not write
		b1 to 5: Priority	Sets the priority for writing to PriorityArray. (1 to 16)
Un\G9406	Value setting value	b0: PresentValue	Sets the binary value to be written to PriorityArray.
Un\G9407	Write control	b0: Write flag	Sets whether or not to write the Value setting value to PriorityArray.*2 The write flag is enabled when OutOfService is set to OFF (FALSE). • ON: Write • OFF: Do not write
Un\G9408	Update counter		Stores the number of times PresentValue was updated. (0 to 32767)

Address	Name		Description
Un\G9409	FeedbackValue	b0: PresentValue	Stores the 32-bit data feedback value.

*1 Stores the setting value of BinaryOutput object setting No.1.
*2 Null is written when the Null setting flag is on.

BACnet communication BinaryValue

■BACnet communication BinaryValue (Un\G9720 to Un\G10028)

This buffer memory area is used for the BinaryValue object.

Address	Description
Un\G9720 to Un\G9728	BACnet communication BinaryValue 1
Un\G9740 to Un\G9748	BACnet communication BinaryValue 2
Un\G9760 to Un\G9768	BACnet communication BinaryValue 3
Un\G9780 to Un\G9788	BACnet communication BinaryValue 4
Un\G9800 to Un\G9808	BACnet communication BinaryValue 5
Un\G9820 to Un\G9828	BACnet communication BinaryValue 6
Un\G9840 to Un\G9848	BACnet communication BinaryValue 7
Un\G9860 to Un\G9868	BACnet communication BinaryValue 8
Un\G9880 to Un\G9888	BACnet communication BinaryValue 9
Un\G9900 to Un\G9908	BACnet communication BinaryValue 10
Un\G9920 to Un\G9928	BACnet communication BinaryValue 11
Un\G9940 to Un\G9948	BACnet communication BinaryValue 12
Un\G9960 to Un\G9968	BACnet communication BinaryValue 13
Un\G9980 to Un\G9988	BACnet communication BinaryValue 14
Un\G10000 to Un\G10008	BACnet communication BinaryValue 15
Un\G10020 to Un\G10028	BACnet communication BinaryValue 16

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the BinaryValue object settings are reflected. (☞ Page 61 BinaryValue object setting)

The following table lists the buffer memory area format (BACnet communication BinaryValue 1) of the BinaryValue object.

Address	Name		Description
Un\G9720, Un\G9721	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 4)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G9722	PresentValue	b0: PresentValue	Stores the current binary value. • ON: Active • OFF: Inactive
Un\G9723	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G9724	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError
Un\G9725	Value setting value	b0: PresentValue	Sets the binary value to be written to PriorityArray.
Un\G9726	Write setting	b0: Null setting flag	Sets whether or not to write Null to PriorityArray. • ON: Write • OFF: Do not write
		b1 to 5: Priority	Sets the priority for writing to PriorityArray. (1 to 16)
Un\G9727	Write control	b0: Write flag	Sets whether or not to write the Value setting value to PriorityArray.*2 The write flag is enabled when OutOfService is set to OFF (FALSE). • ON: Write • OFF: Do not write
Un\G9728	Update counter		Stores the number of times PresentValue was updated. (0 to 32767)

A

*1 Stores the setting value of BinaryValue object setting No.1.
*2 Null is written when the Null setting flag is on.

BACnet communication Multi-state Input

■BACnet communication Multi-state Input (Un\G10040 to Un\G10187)

This buffer memory area is used for the Multi-State Input object.

Address	Description
Un\G10040 to Un\G10047	BACnet communication Multi-state Input 1
Un\G10060 to Un\G10067	BACnet communication Multi-state Input 2
Un\G10080 to Un\G10087	BACnet communication Multi-state Input 3
Un\G10100 to Un\G10107	BACnet communication Multi-state Input 4
Un\G10120 to Un\G10127	BACnet communication Multi-state Input 5
Un\G10140 to Un\G10147	BACnet communication Multi-state Input 6
Un\G10160 to Un\G10167	BACnet communication Multi-state Input 7
Un\G10180 to Un\G10187	BACnet communication Multi-state Input 8

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the Multi-State Input object settings are reflected. (☞ Page 62 Multi-state Input object setting)

The following table lists the buffer memory area format (BACnet communication Multi-state Input 1) of the Multi-State Input object.

Address	Name		Description
Un\G10040, Un\G10041	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 13)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G10042, Un\G10043	PresentValue		Stores the current 16-bit data value. (0 to NumberOfStates)
Un\G10044	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G10045	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError
Un\G10046, Un\G10047	NumberOfStates		Stores the state size (maximum value of PresentValue). (0 to 4294967295)*1

*1 Stores the setting value of Multi-State Input object setting No.1.

A

BACnet communication Multi-state Output

■BACnet communication Multi-state Output (Un\G10200 to Un\G10355)

This buffer memory area is used for the Multi-State Output object.

Address	Description
Un\G10200 to Un\G10210, Un\G10212 to Un\G10215	BACnet communication Multi-state Output 1
Un\G10220 to Un\G10230, Un\G10232 to Un\G10235	BACnet communication Multi-state Output 2
Un\G10240 to Un\G10250, Un\G10252 to Un\G10255	BACnet communication Multi-state Output 3
Un\G10260 to Un\G10270, Un\G10272 to Un\G10275	BACnet communication Multi-state Output 4
Un\G10280 to Un\G10290, Un\G10292 to Un\G10295	BACnet communication Multi-state Output 5
Un\G10300 to Un\G10310, Un\G10312 to Un\G10315	BACnet communication Multi-state Output 6
Un\G10320 to Un\G10330, Un\G10332 to Un\G10335	BACnet communication Multi-state Output 7
Un\G10340 to Un\G10350, Un\G10352 to Un\G10355	BACnet communication Multi-state Output 8

Point

When the value of `Module READY` (Un\G34, b0) was changed from 0 to 1, the Multi-State Output object settings are reflected. (☞ Page 62 Multi-state Output object setting)

The following table lists the buffer memory area format (BACnet communication Multi-state Output 1) of the Multi-State Output object.

Address	Name		Description
Un\G10200, Un\G10201	Object ID	b0 to b9: Object type	Stores the object type. (Fixed at 14)
		b10 to b31: Instance number	Stores the instance number. (0 to 4194303)*1
Un\G10202, Un\G10203	PresentValue		Stores the current 16-bit data value. (0 to NumberOfStates)
Un\G10204	OutOfService	b0: OutOfService	Sets the value of the OutOfService property. • ON: TRUE • OFF: FALSE
Un\G10205	Reliability	b0 to b5: Reliability	Stores the value of the Reliability property. • 0: NoFaultDetected • 1: NoSensor • 2: OverRange • 3: UnderRange • 4: OpenLoop • 5: ShortedLoop • 6: NoOutput • 7: UnreliableOther • 8: ProcessError • 9: MultiStateFault • 10: ConfigurationError
Un\G10206, Un\G10207	Value setting value	b0: PresentValue	Sets the 16-bit data to be written to PriorityArray.
Un\G10208	Write setting	b0: Null setting flag	Sets whether or not to write Null to PriorityArray. • ON: Write • OFF: Do not write
		b1 to 5: Priority	Sets the priority for writing to PriorityArray. (1 to 16)
Un\G10209	Write control	b0: Write flag	Sets whether or not to write the Value setting value to PriorityArray.*2 The write flag is enabled when OutOfService is set to OFF (FALSE). • ON: Write • OFF: Do not write
Un\G10210	Update counter		Stores the number of times PresentValue was updated. (0 to 32767)
Un\G10212, Un\G10213	FeedbackValue	b0: PresentValue	Stores the 32-bit data feedback value.
Un\G10214, Un\G10215	NumberOfStates		Stores the state size (maximum value of PresentValue). (0 to 4294967295)*1

*1 Stores the setting value of Multi-State Output object setting No.1.

*2 Null is written when the Null setting flag is on.

Appendix 2 Details of BACnet Properties

This chapter describes the details on the BACnet properties used for the Ethernet module.
For details on the BACnet properties, refer to the standard that the Ethernet module conforms to.

Properties of Accumulator object

Property name	Description
PresentValue	The total amount of electrical energy is stored.
StatusFlags	The current status of an object is represented. (Alarm/failure/under maintenance) In a configuration function, InAlarm bit, Fault bit, Overridden bit, and OutOfService bit are displayed in order from left to right. • InAlarm bit: Always False. • False bit: False when the value of the Reliability property is NO_FAULT_DETECTED (0). True for other cases. • Overridden bit: Always False. • OutOfService bit: When the value of the OutOfService property is True, this bit is also True. False for other cases.
Reliability	Whether or not the value set to the value of the PresentValue property is reliable is represented. When the value of the Reliability property is NoFaultDetected, it indicates that a proper value is stored in the PresentValue property.
EventState	Always Normal.
OutOfService	When this property is set to True, it means that the device is under maintenance. (The property assigned to an object or buffer memory is deallocated.)

Properties of AnalogInput object, AnalogOutput object, and AnalogValue object

Property name	Description	
	AnalogInput object	**AnalogOutput object** **AnalogValue object**
PresentValue	The value of an actual room temperature or preset temperature is represented.	The preset temperature can be changed by changing the property value of the AnalogOutput object from another BACnet device, such as a central monitoring device.
PriorityArray	—	The value stored to the PriorityArray property whose index number is the smallest among 16 arrays is the value of the PresentValue property.
StatusFlags	The current status of an object is represented. (Alarm/failure/under maintenance) In a configuration function, InAlarm bit, Fault bit, Overridden bit, and OutOfService bit are displayed in order from left to right. • InAlarm bit: Always False. • False bit: False when the value of the Reliability property is NO_FAULT_DETECTED (0). True for other cases. • Overridden bit: Always False. • OutOfService bit: When the value of the OutOfService property is True, this bit is also True. False for other cases.	
Reliability	Whether or not the value set to the value of the PresentValue property is reliable is represented. When the value of the Reliability property is NoFaultDetected, it indicates that a proper value is stored in the PresentValue property.	
EventState	Always Normal.	
OutOfService	When this property is set to True, it means that the device is under maintenance. (The property assigned to an object or buffer memory is deallocated.)	

Properties of BinaryInput object, BinaryOutput object, and BinaryValue object

Property name	Description	
	BinaryInput object	**BinaryOutput object BinaryValue object**
PresentValue	BACnet device operating status, such as ON/OFF or normal/error, is represented.	The operating status of a BACnet device can be changed by changing the property value of the BinaryOutput object from another BACnet device, such as a central monitoring device.
PriorityArray	—	The value stored to the PriorityArray property whose index number is the smallest among 16 arrays is the value of the PresentValue property.
StatusFlags	The current status of an object is represented. (Alarm/failure/under maintenance) In a configuration function, InAlarm bit, Fault bit, Overridden bit, and OutOfService bit are displayed in order from left to right. • InAlarm bit: Always False. • False bit: False when the value of the Reliability property is NO_FAULT_DETECTED (0). True for other cases. • Overridden bit: Always False. • OutOfService bit: When the value of the OutOfService property is True, this bit is also True. False for other cases.	
Reliability	Whether or not the value set to the value of the PresentValue property is reliable is represented. When the value of the Reliability property is NoFaultDetected, it indicates that a proper value is stored in the PresentValue property.	
EventState	Always Normal.	
OutOfService	When this property is set to True, it means that the device is under maintenance. (The property assigned to an object or buffer memory is deallocated.)	

Properties of Multi-State Input object and Multi-State Output object

Property name	Description	
	Multi-State Input object	**Multi-State Output object**
PresentValue	The value for operating mode (cooling, heating, fanning, or dehumidifying mode) or wind speed (weak, medium, or strong) is stored.	
PriorityArray	—	The value stored to the PriorityArray property whose index number is the smallest among 16 arrays is the value of the PresentValue property.
FeedbackValue	—	The status of a BACnet device is stored. If the value set to the PresentValue property and the FeedbackValue property are different, the status will be in alarm state.
NumberOfStates	A maximum value of the PresentValue property is specified. The value of the PresentValue property is changed from 1 to the value specified to a NumberOfStates.	
StatusFlags	The current status of an object is represented. (Alarm/failure/under maintenance) In a configuration function, InAlarm bit, Fault bit, Overridden bit, and OutOfService bit are displayed in order from left to right. • InAlarm bit: Always False. • False bit: False when the value of the Reliability property is NO_FAULT_DETECTED (0). True for other cases. • Overridden bit: Always False. • OutOfService bit: When the value of the OutOfService property is True, this bit is also True. False for other cases.	
Reliability	Whether or not the value set to the value of the PresentValue property is reliable is represented. When the value of the Reliability property is NoFaultDetected, it indicates that a proper value is stored in the PresentValue property.	
EventState	Always Normal.	
OutOfService	When this property is set to True, it means that the device is under maintenance. (The property assigned to an object or buffer memory is deallocated.)	

Properties of NetworkPort object

Property name	Description
StatusFlags	The current status of an object is represented. (Alarm/failure/under maintenance) In a configuration function, InAlarm bit, Fault bit, Overridden bit, and OutOfService bit are displayed in order from left to right. • InAlarm bit: Always False. • False bit: False when the value of the Reliability property is NO_FAULT_DETECTED (0). True for other cases. • Overridden bit: Always False. • OutOfService bit: When the value of the OutOfService property is True, this bit is also True. False for other cases.
Reliability	Always NoFaultDetected.
OutOfService	Always False.

Properties of Device object

Property name	Description
SystemStatus	The status of the Ethernet module is represented. When joining a BACnet, the value is Operational. When leaving a BACnet, the value is NonOperational.
LocalDate	The current date of the Ethernet module is stored.
LocalTime	The current time of the Ethernet module is stored.
ObjectList	A list of all the objects registered in the Ethernet module is stored.

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REVISIONS

Revision date	Revision	Description
April 2021	A	First edition
April 2022	B	■Added or modified parts RELEVANT MANUALS, TERMS, Chapter 3
April 2023	C	■Added or modified parts TERMS, GENERIC TERMS AND ABBREVIATIONS, Section 2.2, 4.2, 4.5, 6.3, 7.3, 8.2, Appendix 1, 2, TRADEMARKS
October 2023	D	■Added or modified parts RELEVANT MANUALS, Chapter 2, 3, Section 6.2, 6.3, 6.4, 8.1, 8.2, Appendix 1

Japanese manual number: SH-082217-D

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company. However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
   1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
   2. Failure caused by unapproved modifications, etc., to the product by the user.
   3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
   4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
   5. Relay failure or output contact failure caused by usage beyond the specified life of contact (cycles).
   6. Failure caused by external irresistible forces such as fires or abnormal voltages, and failure caused by force majeure such as earthquakes, lightning, wind and water damage.
   7. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
   8. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.
Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

(1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.

(2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for railway companies or public service purposes shall be excluded from the programmable controller applications.
In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.
However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the user's discretion.

(3) Mitsubishi shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

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