



DeviceXPlorer OPC Server
User's Guide
(PLC Communication Edition)



Revision 032

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1 Introduction

This User's Guide explains how to connect DeviceXPlorer OPC Server (hereafter referred to as DeviceXPlorer) to the PLC made by various manufacturers.

[Cautions]

With regard to setting tags for DeviceXPlorer, material covered in the Server Edition is not included in this manual. Please refer to the Server Edition.

For details on how to install DeviceXPlorer and its license, refer to "User's Guide (Setup Edition)".

For details of unit settings and error codes, etc., please refer to the instructions for the CPUs and units you are using.

2 [Mitsubishi] MELSEC Ethernet Connection

This chapter explains communication with MELSEC Series equipment using an Ethernet unit.

An overview of MELSEC Ethernet connection is shown below.

Overview	
Link	SLMP communication
Data code	Binary
Protocol	TCP / IP, UDP / IP

2.1 PLC Systems

2.1.1 Applicable Units

The CPU units and Ethernet units that can be connected to MELSEC Ethernet equipment are shown below.

Category	Applicable CPU units	Applicable Ethernet units
iQ-R Series	R04 / R08(P) / R16(P) / R32(P) / R120(P)CPU	RJ71EN71 CPU Built-in Ethernet Port*1
iQ-R Series Motion Controller	R16MTCPU, R32MTCPU, R64MTCPU	RJ71EN71
iQ-F Series	FX5U(C / J)CPU	CPU Built-in Ethernet Port*1
Q Series	Q00(U)(J)CPU, Q01(U)CPU Q02(U / H / PH)CPU Q03UD(E)CPU, Q04UD(E)HCPU Q06(P)HCPU, Q06UD(E)HCPU Q12(P / PR)HCPU, Q25(P / PR)HCPU Q13UD(E)HCPU, Q26UD(E)HCPU Q10UD(E)HCPU, Q20UD(E)HCPU Q50UDEHCPU, Q100UDEHCPU Q03UDVCP, Q04UD(P)VCP Q06UD(P)VCP, Q13UD(P)VCP Q26UD(P)VCP	QJ71E71-100, QJ71E71(-B2 / B5) QnUDE(H) CPU Built-in Ethernet Port*1
Q Series Motion Controller	Q170MCP Q172CPU, Q172D(S)CPU(-S1) Q173CPU, Q173D(S)CPU(-S1)	
C Controller Module	Q24DHCCPU	CPU Built-in Ethernet Port*1
L Series	L02(S)CPU-(P) , L26CPU-(BT)(PBT) L06CPU-(P)	CPU Built-in Ethernet Port*1 LJ71QE71
FX Series	FX3(S)(G)(U)(GC)(UC)CPU	FX3U-ENET(-L)
QnA Series	Q2A(S)(H)CPU(-S1) Q3ACPU Q4A(R)CPU	A1SJ71QE71-B2 / B5 A1SJ71QE71N(3)-B2 / B5 / T AJ71QE71, AJ71QE71N(3)-B2 / B5 / T
A Series	A1FXCPU, A1S(J)HCPU A2C(J)CPU(-S3) A2(U)S(H)CPU(-S1), A0J2HCPU A1NCP, A2(N / A / U)CPU(-S1) A3(N / A / U)CPU, A4UCPU	AJ71E71-S3 AJ71E71N(3)-B2 / B5 / T A1SJ71E71N-B2 / B5 / T

*1 CPU Built-in Ethernet port has several restrictions in comparison with the Ethernet Unit (QJ71E71).

- You cannot use the automatic open UDP port (No.5000).
- You cannot use Q4E frame and A1E frame.
- You cannot use block access.
- You cannot access CPU on another station in a multiple CPU system.
- You cannot access CPU on another station via a network (MELSECNET).
- You cannot access Random access buffer.
- You cannot access buffer memory of the intelligent function module.
- In using TCP/IP, Existence Confirmation will be done 9 times for 5 seconds.

2.2 List of Devices

The MELSEC devices that can be set are as shown below.

The range of devices varies with the CPU and parameter settings. For details, refer to your CPU instructions.

[List of Devices]

Device name	Device symbol	Device range					Category	Format
		iQ-R Series	iQ-F Series	Q / L / QnA Series	A Series *1 (AnU / AnA)	FX Series		
Input relay	X	0 - 2FFF	0-1777 (oct)	0 - 1FFF	0 - 7FF	0 - 377 (oct)	Bit	Hex
Output relay	Y	0 - 2FFF	0-1777 (oct)	0 - 1FFF	0 - 7FF	0 - 377 (oct)		Hex
Direct input	DX	0 - 2FFF	N / A	0 - FFF	N / A	N / A		Hex
Direct output	DY	0 - 2FFF	N / A	0 - FFF	N / A	N / A		Hex
Internal relay	M	0 - 12287	0-32767	0 - 28672	0 - 8191	0 - 8511		Dec
Latch relay	L	0 - 8191	0-32767	0 - 8191	N / A *5	N / A		Dec
Step relay	S	N / A	0-4095	0 - 8191 *9	N / A *5	N / A		Dec
Special relay	SM	0 - 4096	0-9999	0 - 2047	9000 - 9255 *2	N / A		Dec
Link relay	B	0 - 1FFF	0-7FFF	0 - 1FFF	0 - FFF	N / A		Hex
Annunciator	F	0 - 2047	0-32767	0 - 2047	0 - 2047	N / A		Dec
Edge relay	V	0 - 2047	N / A	0 - 2047	N / A	N / A		Dec
Timer coil	TC	0 - 1023	0-1023	0 - 2047	0 - 2047	N / A		Dec
Timer contact	TS	0 - 1023	0-1023	0 - 2047	0 - 2047	0 - 511		Dec
Retentive Timer coil	SC	0 - 1023	0-1023	0 - 2047	N / A	N / A		Dec
Retentive Timer contact	SS	0 - 1023	0-1023	0-2047	N / A	N / A		Dec
Counter coil	CC	0 - 1023	0-1023	0 - 1023	0 - 1023	N / A		Dec
Counter contact	CS	0 - 1023	0-1023	0 - 1023	0 - 1023	0 - 255		Dec
Link special relay	SB	0 - 7FF	0-7FFF	0 - 7FF	N / A	N / A		Hex
State	ST	N / A	N / A	N / A	N / A	0 - 4095		Dec
Long timer coil *14*15*16	LTC	0 - 1023	N / A	N / A	N / A	N / A		Dec
Long timer contact *14*15*16	LTS	0 - 1023	N / A	N / A	N / A	N / A		Dec
Long retentive Timer coil *14*15*16	LSTC	0 - 1023	N / A	N / A	N / A	N / A		Dec
Long retentive Timer contact *14*15*16	TSTS	0 - 1023	N / A	N / A	N / A	N / A		Dec
Long counter coil *14	LCC	0 - 511	N / A	N / A	N / A	N / A		Dec
Long counter contact *14	LCS	0 - 511	N / A	N / A	N / A	N / A		Dec
Data register	D	0 - 18431	0-7999	0 - 41983	0 - 6143	0 - 8511	Word	Dec
Special register	SD	0 - 4095	0-11999	0 - 2047	9000 - 9255 *2	N / A		Dec
Link register	W	0 - 1FFF	0-7FFF	0 - 1FFF	0 - FFF	N / A		Hex

Current timer value	TN	0-1023	0-1023	0 - 2047	0 - 2047	0 - 511		Dec
Current retentive timer value	SN	0 - 1023	0-1023	0-2047	N / A	N / A		Dec
Current counter value	CN	0 - 511	0-1023	0 - 1023	0 - 1023	0 - 199 *7		Dec
File register	R	0 - 32767	0-32767	0 - 32767	0 - 8191	0 - 32767		Dec
Extended file register *3	ER	0 - 32767	N / A	0 - 32767	0 - 8191	N / A		Dec
Random access buffer *10	BM	N / A	N / A	0 - 17FF	0 - 17FF	N / A		Hex
Link special register	SW	0 - 7FF	0-7FFF	0 - 7FF	N / A	N / A		Hex
Index register	Z	0 - 23	0-23	0 - 19	N / A	N / A		Dec
Extended file register (serial nos.) *3	ZR	0 - 4184063	N / A	0 - 4184063	N / A	N / A		Dec
Intelligent Function Module Buffer Memory	G	N / A	N / A	0 -	0 -	N / A		Dec
Extended data Register	D	N / A	N / A	0 - 4184064 *6	N / A	N / A		Dec
Extended link Register	W	N / A	N / A	0 - 3FD7FF *6	N / A	N / A		Hex
Motion register *8	#	N / A	N / A	0 - 65535	N / A	N / A		Dec
iQ-R series CPU Buffer Memory *11	UG	0~	N / A	N / A	N / A	N / A	Double Word	Dec
iQ-R series CPU Buffer Memory (Fixed-Cycle Area) *12	HG	0~	N / A	N / A	N / A	N / A		Dec
iQ-R series Intelligent Function Module Buffer Memory (Module Access Device) *13	UG	0~	N / A	N / A	N / A	N / A		Dec
Long timer current value *14*15*16	LTN	0-1023	N / A	N / A	N / A	N / A		Dec
Long retentive timer current value *14*15*16	LSTN	0 - 1023	N / A	N / A	N / A	N / A		Dec
Long counter current value *14	LCN	0 - 511	N / A	N / A	N / A	N / A		Dec
Long Index register *14*15	LZ	0 - 12	N / A	N / A	N / A	N / A		Dec

- *1 When an AnUCPU is used, only the device range of an AnACPU can be accessed, due to the constraints of the Ethernet unit.
- *2 In tag registration, specify the address minus 9000.
Example: Special relay M9000 -> "SM0", Special register D9000 -> "SD0"
- *3 Extended file register "ER" is accessed by specifying a block number. The extended file register (serial numbers) "ZR" is accessed by using serial numbers.
Example: To access number 65636 in file register "R", specify "ER02:100" or "ZR65636".
- *4 Intelligent Function Module Buffer memory "G" can only be accessed under group setting for which the intelligent function module access is enabled.
- *5 When you access Latch relay "L" and Step relay "S" at A Series CPU through the own port, you should appoint Internal Relay "M" and when you access at Q Series CPU through the other port, you should distinguish Latch relay "L" and Step relay "S".
- *6 Extended data register "D" and Extended link register "W" can be accessed only by Universal model QCPU.
- *7 FXCPU has CN255 from CN200 of Current counter value, but you cannot access this area.
- *8 Motion register exist only in Motion CPU. This register can be accessed by only Ethernet. And in order to access, you must not use "Q4E Protocol" and "Block Access Command". Furthermore, supporting to access to Motion register in Q series only (not supported for iQ-R series).
- *9 If the QnUDVCPU, For SFC program-only device, it can not be used as a substitute for internal relay in the program.
- *10 iQ-RCPU can not be used Random access buffer "BM".
- *11 For iQ-R series CPU Buffer Memory "UG", specify the target CPU machine number (Unit 1: 3E0-4: 3E3) as the block number. The device symbol is "UG", but the location symbol is "G". For dynamic access, specify in the format of "U3Ex: Gxxx".
Example) U3E0:G1234 Unit 1 CPU buffer memory address 1234
- *12 For iQ-R series CPU Buffer Memory (Fixed-Cycle Area) "HG", specify the target CPU unit number (Unit 1: 3E0-4: 3E3) as the block number. For dynamic access, specify in the format of "U3Ex: HGxxx".
Example) U3E2:HG1234 Unit 3 CPU buffer memory (fixed cycle) address 1234
- *13 For iQ-R series Intelligent Function Module Buffer Memory (Unit Access Device) "UG", specify the 10 digits of the unit start I / O number as the block number. The device symbol is "UG", but the location symbol is "G". For dynamic access, specify in the "Ux: Gxxx" format.
Example) U2:G1234 Unit start I / O number 020, buffer memory 1234
- *14 Block access command is not supported.
- *15 Read-only device.
- *16 Array type is not supported.

Note

- The random access buffer "BM" is a device that can read from and write to any other device freely without the need to permanently specify the other device. It is specified as BM1FF, for example.

Cautions regarding random access buffers

- (1) When the random access buffer BM is used, the automatic open UDP port (5000) cannot be used.
- (2) Because the buffer only supports batch write of word device, if you use it to write large volumes to discontinuous areas, response will deteriorate.
- (3) The buffer can access a maximum of 1017 points.
- (4) Built-in Ethernet port of LCPU and QnUDE(H)CPU doesn't have random access buffer.
- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.
Example: R100, D1234, etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

2.2.1 Accessing to more than one PLC register by dynamic tags

In MELSEC connections, only the case of accessing by the dynamic tags from client application, the more than one PLC register can be collectively read and written as comma-delimited string of a single tag.

A slash-delimited address of PLC registers as "Device1.D0/D10/D20" and specified ItemID can make accessing of the registers "D0", "D10" and "D20" on PLCs defined by the device "Device1" in a group.

Example, when values for each register are "1234", "5555", "6789", a character string value as "1234,5555,6789" moves to client. While when a character string value "1111,2222,3333" is written into a register from client, "1111", "2222" and "3333" are written on each register.

Therefore, to access with a PLC register group of non-serial numbers from InTouch and DDE application, this new feature is recommended. To access with a PLC register group of serial numbers, an array type tag is functional.

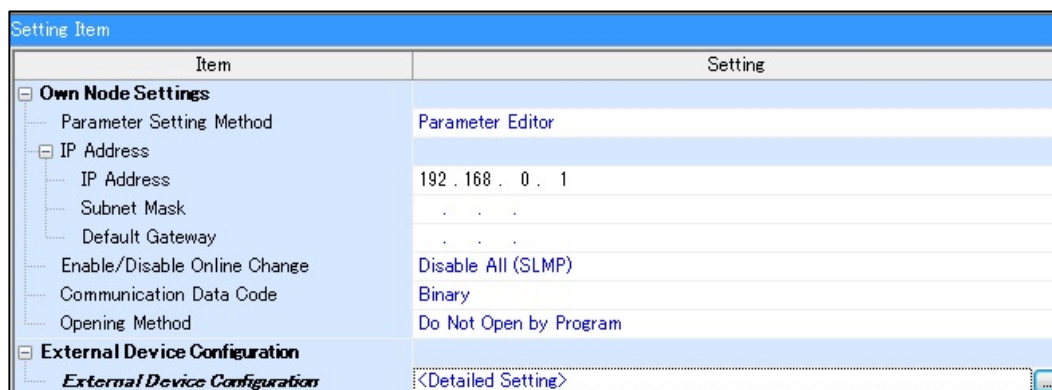
Note

- If it is connecting with DDE or Suite Link, please be sure that the maximum of text size is 250 bytes.
- The extended specification of tag name like "D0:D/D10:R" is possible. However, the specification of string type and array type is impossible.
- An uncertain value is returned in case of simulation mode.

2.3 iQ-R/F CPU Built-in Ethernet Port Settings

Please use software “GX Works3” to make communication setting for iQ-R CPU Built-in Ethernet port.

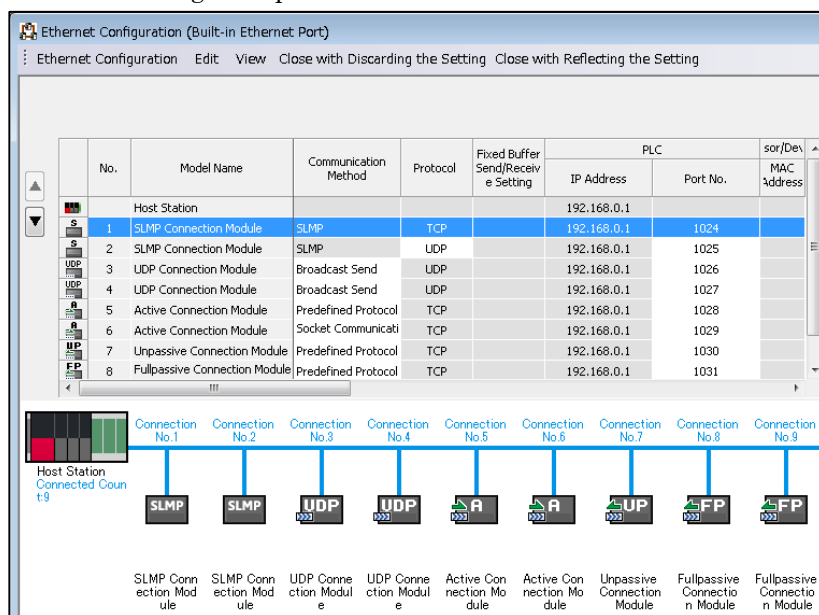
1. Make setting of the “Unit Parameter” in “Parameter” from Navigation Window of “GX Works3”.
(iQ-F: Make setting of the “EthernetPort” in “Unit Parameter”)



Please set the IP address and the Subnet mask pattern etc.

For communication with DeviceXPlorer, set “Enable online change” and “Binary code” in Communication data code.

2. Make setting for Open Port



For communication with DeviceXPlorer, please set the port where you can select the “Ethernet Device (General)” - “SLMP connected Module” from “Unit List” of External Device configuration.

	No.	Model Name	Sensor/Device			Existence Confirmation
			Port No.	Subnet Mask	Default Gateway	
		Host Station				
S	1	SLMP Connection Module				KeepAlive
S	2	SLMP Connection Module				UDP

Important

When using the TCP protocol, it is recommended that you perform the survival checked using the KeepAlive function.

2.4 LCPU / QnUDE(H) CPU Built-in Ethernet Port Settings

Please use software “GX Works2” to make communication setting for LCPU / QnUDE(H) CPU Built-in Ethernet port.

1. Make setting of the built-in Ethernet port in “Built-in Ethernet port” from PC parameters of “GX Works2”.

Q parameter setting

PLC name | PLC system | PLC file | PLC RAS | Device | Program | Boot file | SFC | I/O assignment | Built-in Ethernet port

IP address

Input format: DEC

IP address: 192 168 3 39

Subnet mask pattern:

Default router IP address:

Open settings

FTP settings

Time settings

Set if it is needed(Default / Changed)

Communication data code

☒ Binary code

☐ ASCII code

☒ Enable online change (FTP, MC protocol)

☐ Disable direct connection to MELSOFT

☐ Do not respond to search for CPU (Built-in Ethernet port) on network

Acknowledge XY assignment | Multiple CPU settings | Default | Check | End | Cancel

Please set the IP address and the Subnet mask pattern etc. For communication with DeviceXPlorer, set “Binary code” in Communication data code and check “Enable online change”.

- ## 2. Make setting for Open Port

Build-in Ethernet port open settings

	Protocol	Open system	TCP connection	Host station port No.	Transmission target device IP address	Transmission target device port No.
1	UDP	MELSOFT connection				
2	TCP	MC Protocol		0401		
3	UDP	MC Protocol		0402		
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

Host station port No, transmission target device port No: Please input in HEX.

End Cancel

For communication with DeviceXPlorer, set "MC protocol" in Open system. Please input Host station port No. by hex digit format. (Input the port no. setting of DeviceXPlorer by decimal digit format).

2.5 iQ-R Series Ethernet Unit Settings

Please use software “GX Works3” to make communication setting for the iQ-R Series Ethernet unit. (RJ71EN71)

Please check “2.3 iQ-R/F CPU Built-in Ethernet Port Settings” to learn how to do this.

Important

In order to perform the setting of the port of RJ71EN71, must be added RJ71EN71 unit to “Module configuration” in GX Works3.

2.6 Q Series Ethernet Unit Settings

Please use software “GX Works2” to make communication setting for the Q Series Ethernet unit (QJ71E71).

2.6.1 Network Parameter Settings

The below is an example of settings where the Ethernet unit Starting I/O No. is “0” and the Network No. is “2”.

	Module 1	Module 2	Module 3
Network type	Ethernet	None	None
Starting I/O No.	0000		
Network No.	2		
Total stations			
Group No.	0		
Station No.	2		
Mode	On line		
	Operational settings		
	Initial settings		
	Open settings		
	Router relay parameter		
	Station No.<->IP information		
	FTP Parameters		
	E-mail settings		
	Interrupt settings		

2.6.2 Operation Settings

Ethernet operations

Communication data code
☒ Binary code
☐ ASCII code

Initial timing
☐ Do not wait for OPEN (Communications impossible at STOP time)
☒ Always wait for OPEN (Communication possible at STOP time)

IP address
 Input format: DEC.
 IP address: 192 168 1 1

Send frame setting
☒ Ethernet(V2.0)
☐ IEEE802.3

☒ Enable Write at RUN time

TCP Existence confirmation setting
☒ Use the KeepAlive
☐ Use the Ping

End Cancel

The above is an example of settings for PLC side IP address “192.168.0.4”, “Binary code”, and “Always wait for OPEN”. Set “Binary code” for the communication data code setting. To perform writing while running, place a check next to “Enable Write at RUN time”. The KeepAlive function checks the existence of devices with which there has not been communication for a set period of time, by sending an ACK message and checking if a response is received.

Important

The use of the Keep Alive function to perform existence checks is recommended when the Q Series is used. Ethernet units that have serial numbers with 05051 or later as the upper five digits and function version B or later can use this function. For other models, use Ping.

2.6.3 Initial Settings for Network Parameters

When using TCP / IP, it is necessary to set appropriate existence confirmation parameters. If the existence confirmation parameters are inappropriate, it may take time to reestablish connections when a network failure such as a severed cable occurs, and reconnection may be impossible.

Timer setting

Module will operate with default values if setting is left blank

	Setting value	Default value	In units
TCP ULP timer		60	×500ms
TCP zero window timer		20	×500ms
TCP resend timer		20	×500ms
TCP end timer		40	×500ms
IP assembly timer		10	×500ms
Response monitoring timer		60	×500ms
Destination existence conformation starting interval	6	1200	×500ms
Destination existence conformation interval timer	4	20	×500ms
Destination existence conformation resend	3	3	Times

In the settings example above, existence confirmation processing will be performed 3 times at 2 seconds intervals after communication has been stopped for 3 seconds.

2.6.4 Open Settings Screen

	Protocol	Open system	Fixed buffer	Fixed buffer communication procedure	Pairing open	Existence confirmation	Host station Port No.	Transmission target device IP address	Transmission target device Port No.
1	UDP		Send	Procedure exist	Disable	Confirm	0401	Simultan	FFFF
2	TCP	Unpassive	Send	Procedure exist	Disable	Confirm	0402		
3	TCP	Fullpassive	Send	Procedure exist	Disable	Confirm	0403	192.168. 1. 2	FFFF
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

The above is an example of setting UDP / IP open for port 1025, TCP / IP (Unpassive) for port 1026, and TCP / IP (Fullpassive) for port 1027.

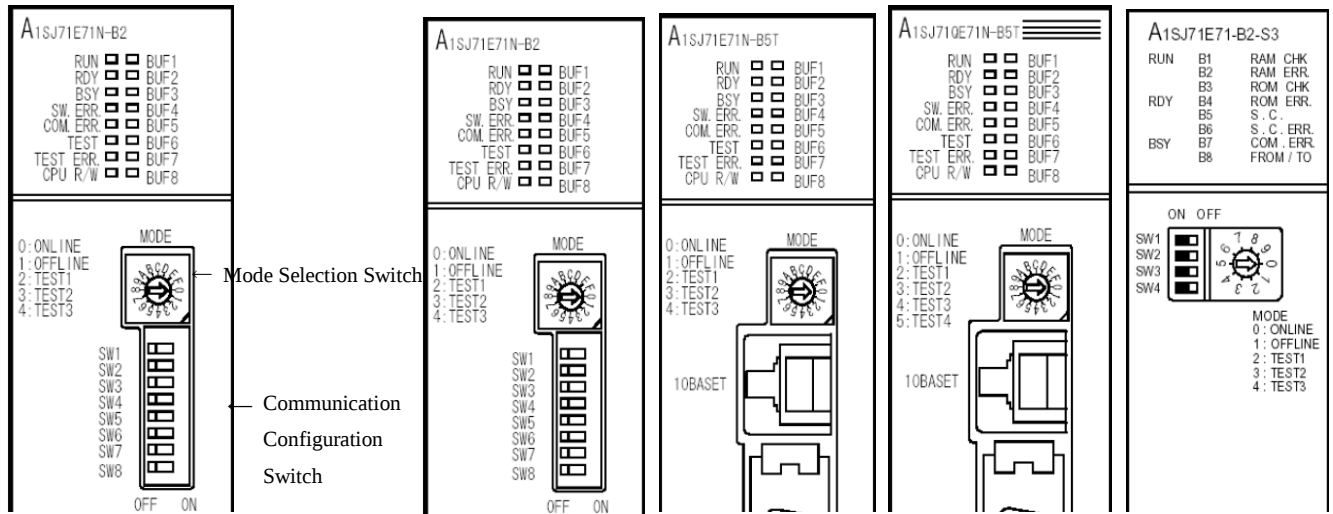
Note

- Set "Procedure exist" for "Fixed buffer communication procedure".
- Enter the own station port number and communication partner port number in hexadecimal notation.
- Where UDP / IP is selected as the protocol, broadcast communication is possible if you set "255.255.255.255" as the communication partner IP address and "FFFF" as the communication partner port number. (You can communicate with more than one partner using a single port.)
- The Q Series allows use of an automatic open UDP / IP port (default 5000). The automatic open UDP / IP port can be changed using address number 20 (14H) in the Ethernet unit buffer memory.
- In TCP / IP Fullpassive communication, immediately after the session closes, the port that was being used by Windows is locked. Therefore, it may not be possible to reconnect for a period of time.

2.7 QnA / A Series Ethernet Unit Settings

The QnA / A Series Ethernet unit requires hardware switch settings and initial processing programming.

2.7.1 Unit Settings



[Mode Selection Switch]

Set the Mode Selection Switch (rotary switch “MODE”) to online “0.”

[Communication Configuration Switch]

Switch	Setting Item	ON	OFF	Factory Default
SW1	Selection of process when TCP timeout error occurs	Line does not close when timeout occurs.	Line closes when timeout occurs.	OFF
SW2	Data code setting (type of data communication with other nodes)	ASCII code	Binary mode	OFF
SW3	Auto-start setting	With switching on, after power on or resetting CPU, read out parameter of EEPROM to buffer memory regardless of Y19 (signal of Intial process) and run Initial process with the data.		OFF
SW4~6	Not for use			OFF
SW7 [SW3]	CPU Communication timing setting (Enable/disable data write from another node while PLC CPU is in RUN mode.)	Allows data write from another node while PLC is in RUN mode.	Does not allow data write from another node while PLC is in RUN mode.	OFF
SW8 [SW4]	Initial timing setting (Initial process timing)	Normal start (Starts after 20-second delay.)	Quick start (Starts immediately.)	OFF

Note: [****] indicates A1SJ71E72-B2/B5(-S3).

Use data code setting (SW2) in binary code (OFF).

Use CPU communication timing (SW7) with “allow writing from other node when PLC is running” (ON).

About other Setting Item , match setting with setting of DeviceXPlorer.

Note

When you use AJ71QE71(-B5) / A1SJ7QE71 and switch Auto-start setting “SW3” On, you need not Initial Process and Connection Programs.

[Setting Network Parameter]

You can configure the IP address for QnA Series from the “Network Parameters” page of GX-Works2.

	Module No.1	Module No.2	Module No.3
Network type	Ethernet ▼	None ▼	None ▼
Start I/O No.	0000		
Network No.	1		
Total stations			
Group No.	1		
Station No.	1		
IP addressDEC	192.168. 1. 1		
	Station No.<->IP information		
	FTP Parameters		
	Router relay parameter		

Note

When you use Automatic port (default 5000), you can configure the communication without a program.

[Initial Processing]

You need the initial processing program in order to use QnA Series/A Series Ethernet Unit. The initial processing program handles IP address configuration and initialization request, for example. Generally, it handles a series of processes from setting the IP address of the PLC to buffer memory and turning on the initial request flag (Ynnn) to when initial complete flag (Xnnn) turns on.

< Ethernet Unit I/O Signal >

X0	Con. 1	Fixed buffer send receive completed normally	Y0	Con.1 Send request / receive complete confirmation
X1		Fixed buffer send receive error detected	Y1	Con.2 Send request / receive complete confirmation
X2	Con. 2	Fixed buffer send receive completed normally	Y2	Con.3 Send request / receive complete confirmation
X3		Fixed buffer send receive error detected	Y3	Con.4 Send request / receive complete confirmation
X4	Con. 3	Fixed buffer send receive completed normally	Y4	Con.5 Send request / receive complete confirmation
X5		Fixed buffer send receive error detected	Y5	Con.6 Send request / receive complete confirmation
X6	Con. 4	Fixed buffer send receive completed normally	Y6	Con.7 Send request / receive complete confirmation
X7		Fixed buffer send receive error detected	Y7	Con.8 Send request / receive complete confirmation
X8	Con. 5	Fixed buffer send receive completed normally	Y8	Connection 1 open request
X9		Fixed buffer send receive error detected	Y9	Connection 2 open request
XA	Con. 6	Fixed buffer send receive completed normally	YA	Connection 3 open request
XB		Fixed buffer send receive error detected	YB	Connection 4 open request
XC	Con. 7	Fixed buffer send receive completed normally	YC	Connection 5 open request
XD		Fixed buffer send receive error detected	YD	Connection 6 open request
XE	Con. 8	Fixed buffer send receive completed normally	YE	Connection 7 open request
XF		Fixed buffer send receive error detected	YF	Connection 8 open request
X10	Connection 1 open completed normally		Y10	(EEPROM read request)
X11	Connection 2 open completed normally		Y11	(EEPROM write request)
X12	Connection 3 open completed normally		Y12	——
X13	Connection 4 open completed normally		Y13	——
X14	Connection 5 open completed normally		Y14	——
X15	Connection 6 open completed normally		Y15	——
X16	Connection 7 open completed normally		Y16	——
X17	Connection 8 open completed normally		Y17	COM.ERR off request
X18	Open error detected		Y18	——
X19	Initial completed normally		Y19	Initial request
X1A	Initial error detected		Y1A	——
X1B	——		Y1B	——
X1C	COM.ERR on		Y1C	(Buffer memory channel switch)
X1D	(EEPROM read completed)		Y1D	——
X1E	(EEPROM write completed)		Y1E	——
X1F	Watchdog timer error detected		Y1F	——

* Functions between parentheses indicate functions of either MELSEC-QnA Series or MELSEC-A Series.

* Refer to each PLC's manual for more details on each item.

< Ethernet Unit Buffer Memory Details >

Item	QnA Series		A Series	
	Address	Default	Address	Default
Local Ethernet Unit IP Address	0-1	0xC00001FE	0-1	0
Special Function Configuration	4	256	2	0
Timer Setting Time Unit	---	---	3	2000
System Area	2-3	---	4-6	---
System Area	5-A	---	---	---
Target Unit Existence Confirmation Start Interval Timer Value	11	1200	7	300
Target Unit Existence Confirmation Interval Timer Value	12	20	8	5
Target Unit Existence Confirmation Number of Resends	13	3	9	3
TCP ULP Timeout Value	B	60	A	15
TCP Zero Window Timeout Value	C	20	B	5
TCP Resend Timer Value	D	20	C	5
TCP Complete Timer Value	E	40	D	10
IP Build Timer Value	F	10	E	3
Response Monitoring Timer	10	60	F	15
Automatic Open UDP Port Number	14	5000	---	---
System Area	15-1D	---	---	---
TCP Maximum Segment Separate Send Configuration	1E	0x8000	---	---

* Buffer memory address is a hexadecimal value.

* Default value of buffer memory is a decimal value. Values with "0x" indicate hexadecimal values.

* Refer to each PLC's manual for more details on each item.

Note

When you use QnA Series CPU, you can use Automatic Open UDP/ IP port (default 5000).

If you want to use other port as Automatic Open UDP / IP port, set buffer memory "20 (14H)" of Ethernet Unit or Network parameter of GX Works2.

[Port Open Processing]

You need a program that controls specific ports in order to use QnA Series/A Series Ethernet Unit. Generally, the program configures the protocol (TCP/IP or UDP/IP) and port number and handles the port open/close processes. It can communicate simultaneously with a maximum of 8 other nodes.

< PLC Buffer Memory Details >

Item			QnA Series		A Series	
			Address	Default	Address	Default
Application Configuration Area	Connection No.1		20	0	10	0
	Connection No.2		21	0	11	0
	Connection No.3		22	0	12	0
	Connection No.4		23	0	13	0
	Connection No.5		24	0	14	0
	Connection No.6		25	0	15	0
	Connection No.7		26	0	16	0
	Connection No.8		27	0	17	0
Communication Address Configuration Area	Con.No.1	Local Port	28	0	18	0
		Other IP Address	29-2A	0	19-1A	0
		Other Port	2B	0	1B	0
		Other ARP Functions	2C-2E	0xFFFFFFFF	1C-1E	0xFFFFFFFF
	Con.No.2	Local Port	2F	0	1F	0
		Other IP Address	30-31	0	20-21	0
		Other Port	32	0	22	0
		Other ARP Functions	33-35	0xFFFFFFFF	23-25	0xFFFFFFFF
	Con.No.3	Local Port	36	0	26	0
		Other IP Address	37-38	0	27-28	0
		Other Port	39	0	29	0
		Other ARP Functions	3A-3C	0xFFFFFFFF	2A-2C	0xFFFFFFFF
	Con.No.4	Local Port	3D	0	2D	0
		Other IP Address	3E-3F	0	2E-2F	0
		Other Port	40	0	30	0
		Other ARP Functions	41-43	0xFFFFFFFF	31-33	0xFFFFFFFF
	Con.No.5	Local Port	44	0	34	0
		Other IP Address	45-46	0	35-36	0
		Other Port	47	0	37	0
		Other ARP Functions	48-4A	0xFFFFFFFF	38-3A	0xFFFFFFFF
	Con.No.6	Local Port	4B	0	3B	0
		Other IP Address	4C-4D	0	3C-3D	0
		Other Port	4E	0	3E	0
		Other ARP Functions	4F-51	0xFFFFFFFF	3F-41	0xFFFFFFFF
	Con.No.7	Local Port	52	0	42	0
		Other IP Address	53-54	0	43-44	0
		Other Port	55	0	45	0
		Other ARP Functions	56-58	0xFFFFFFFF	46-48	0xFFFFFFFF

	Con.No.8	Local Port	59	0	49	0
		Other IP Address	5A-5B	0	4A-4B	0
		Other Port	5C	0	4C	0
		Other ARP Functions	5D-5F	0xFFFFFFFF	4D-4F	0xFFFFFFFF
Communication Instruction During STOP Area			67	0	1F0	0

* Buffer memory address is a hexadecimal value.

* Default value of buffer memory is a decimal value. Values with “0x” indicate hexadecimal values.

< Application Configuration Area >

Configure the communication protocol, execution of existence confirmation, etc. for each port in this area. Application configuration area (1 word) has the following structure:

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
[6]	0					[5]	[4]	[3]	0					[2]	[1]

[1] Fixed Buffer Application Configuration (bit 0)

This is the parameter used for the fixed buffer communication function of the PLC. Set this to “0”.

[2] Existence Confirmation Configuration (bit 1)

Set whether the Ethernet checks the other node if communication with the other node whose connection open process has been completed does not occur for a specific period of time. Generally, this bit is set to “1” for TCP/IP communication to execute existence confirmation and not for UDP/IP communication.

[3] Paring Open Configuration (bit 7)

This is the parameter used for the fixed buffer communication function of the PLC. Set this to “0”.

[4] Communication Protocol Configuration (bit 8)

Configure the communication protocol for each port. Set this to “0” for TCP/IP communication and “1” for UDP/IP communication.

[5] Fixed Buffer Communication Configuration (bit 9)

Select “with procedure” or “without procedure” for the fixed buffer communication function of the PLC. Set it to “0 (with procedure)” when using DeviceXPlorer. If you set it to “1 (without procedure),” DeviceXPlorer cannot talk to the PLC.

[6] Open Method (bits 14-15)

Set them to “11 (full passive)” to communicate by specifying the other port and “10 (unpassive)” to communicate without specifying the other port when using TCP/IP communication. Set them to “00” when using UDP/IP.

For example, if you wish to execute Existence Confirmation using TCP/IP unpassive communication, the application configuration area will be “0x8002.” It will be “0x100” when using UDP/IP communication.

< Communication Address Configuration Area >

Set the port number that the PLC opens in “local port #,” IP address of the other PC in “other IP address,” and PC port # of the PC you wish to communicate with in “other port .” Set “other IP address” and “other port ” to “0” when using TCP/IP unpassive communication. When using UDP/IP communication, you may specify the other PC’s IP address and port and enable a 1:1 communication as well as broadcast communication. In that case, set the IP Address to “255.255.255.255” and port # to “0xFFFF.” Leave “Other ARP Functions” as default when using DeviceXPlorer.

< Communication Instruction During STOP Area >

Set the bit that corresponds to the connection to “1” if you wish to continue the communication with DeviceXPlorer even when the CPU of the PLC is stopped.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
-	-	-	-	-	-	-	-	[8]	[7]	[6]	[5]	[4]	[3]	[2]	[1]

[1] ~[8]: Communication instruction during STOP for connections No. 1 through No. 8.

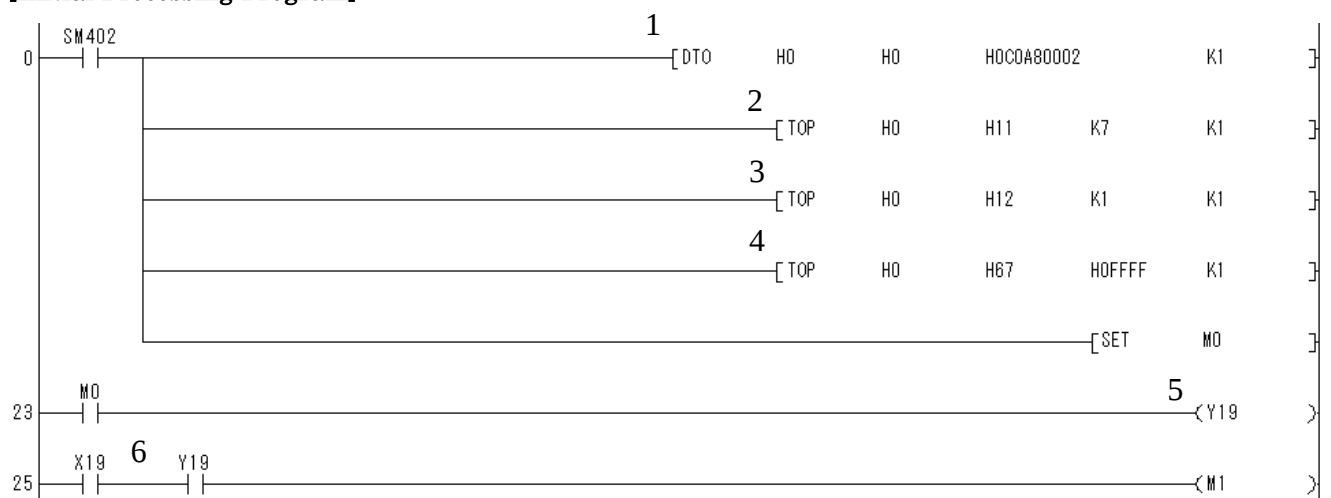
2.7.2 Sample Ladder Program (QnA Series)

You need initial processing and port processing programs to use Ethernet with QnA Series. See below for a sample program of when the Ethernet unit is installed in slot 0. For error processing of the Ethernet unit, refer to the manual of the PLC.

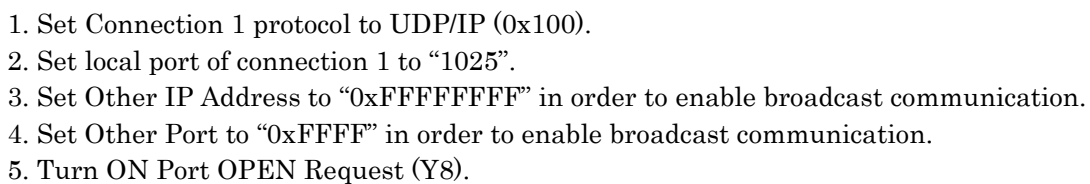
[Sample Program Overview]

Item	Protocol	Local Port	Other IP Address	Other Port
Connection 1	UDP/IP	1025	255.255.255.255	0xFFFF
Connection 2	TCP/IP Unpassive	1026	N/A	N/A
Connection 3	TCP/IP Full Passive	1027	192.168.0.1	1027
IP Address	192.168.0.2			
Existence Confirmation	Sends ICMP packets three times every 2 seconds after 14 seconds.			
Unit Address	Ethernet unit is installed in I/O address 0.			
H/W Switch Setting	SW1-OFF/ SW2-OFF/ SW3-OFF/ SW4-OFF/ SW5-OFF/ SW6-OFF/ SW7-ON/ SW8-OFF			

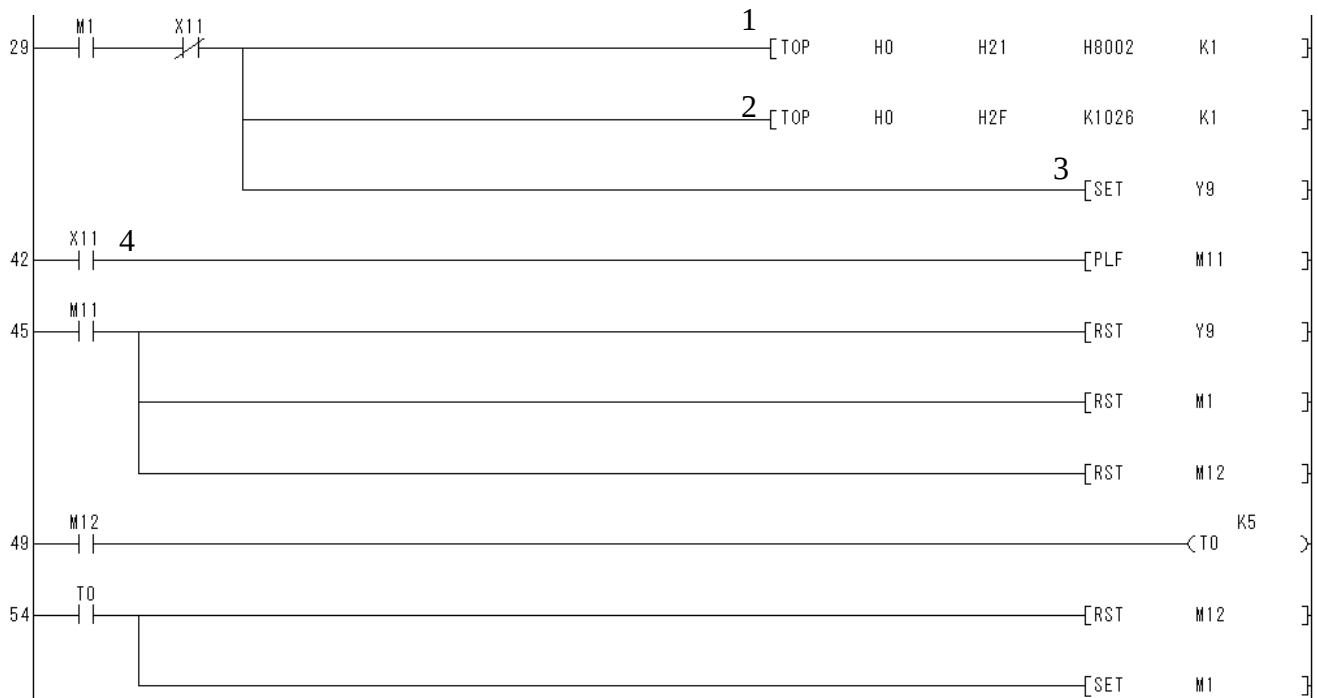
[Initial Processing Program]



1. Set the local IP Address to “192.168.0.2.”
2. Set Existence Confirmation Start Interval timer to 14 seconds (7×2 seconds).
3. Set Existence Confirmation Interval Timer to 2 seconds (1×2 seconds).
4. Set Communication Instruction during STOP to “enabled” (0xFFFF) for all connections.
5. Turn on Initial Request signal (Y19).
6. After Initial Complete signal (X19) turned on, it will move into the Opening Process.



- UDP/IP does not require connection processing. Y8 reset circuit is not required. Port remains open.
- If you do not specify the other PC, set Other IP Address to "0xFFFFFFFF" and Other Port # to "0xFFFF" in order to enable broadcast communication.

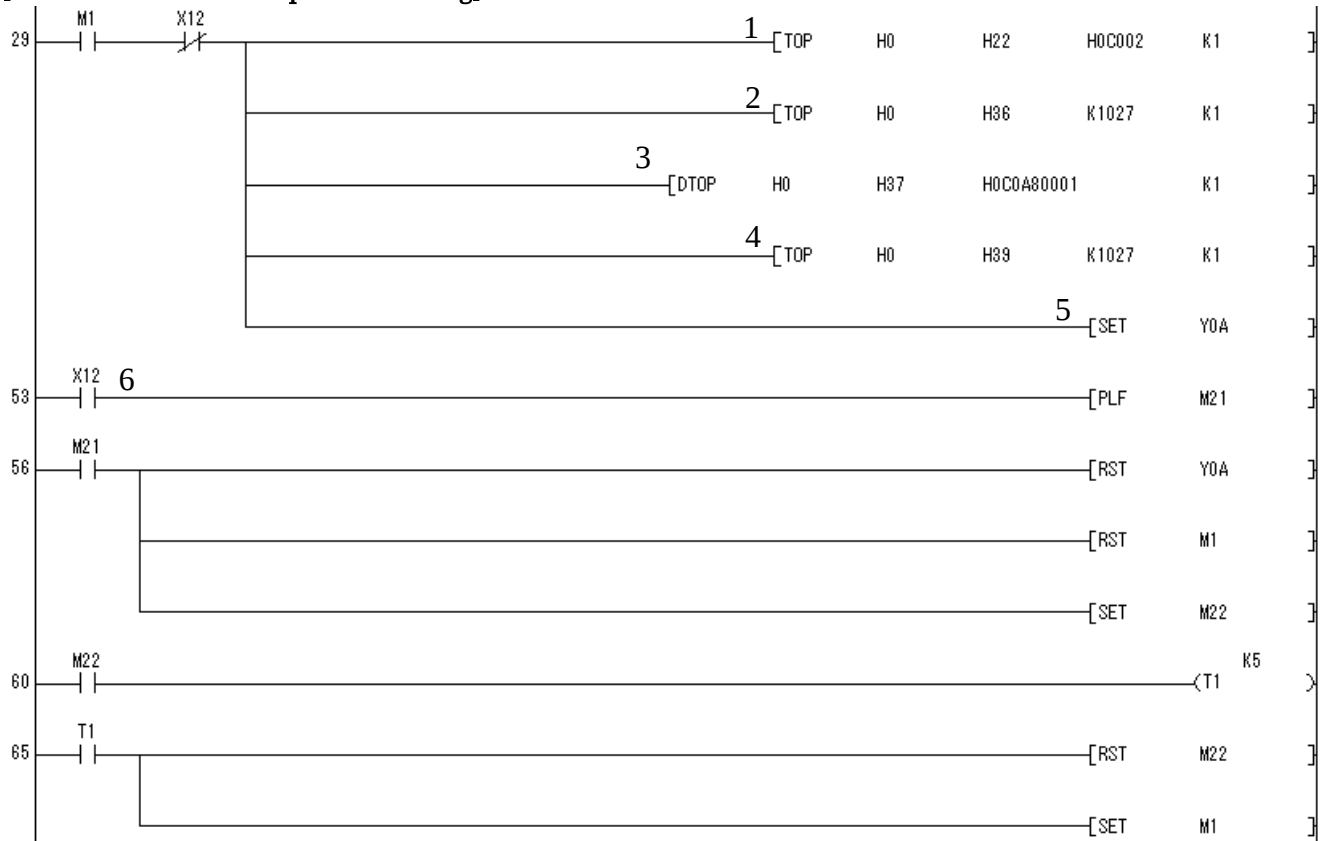
[TCP/IP Unpassive Open Processing]

1. Set Connection 2 protocol to TCP/IP unpassive (0x8002).
2. Set "1026" to the local port of connection 2.
3. Turn on Open Request (Y9) by default (this enables access from DeviceXPlorer).
4. When Open Complete signal (X11) turns off, turn Open Request off once and repeat step [3] again after 0.5 seconds.

Note

Configure Existence Confirmation properly when using TCP/IP.

In order to return to wait OPEN state after the session is disconnected, make sure you wait a sufficient amount of time before attempting again.

[TCP/IP Full Passive Open Processing]

1. Set Connection 3 protocol to TCP/IP full passive (0xC002).
2. Set "1027" to the local port of Connection 3.
3. Set "192.168.0.1" to Other IP of Connection 3.
4. Set "1027" to Other Port of Connection 3.
5. Turn on Open Request (YA) by default (this enables access from DeviceXPlorer).
6. When Open Complete signal (X12) turns off, turn Open Request off once and repeat step [5] again after 0.5 seconds.

Note

Configure Existence Confirmation properly when using TCP/IP.

In order to return to wait OPEN state after the session is disconnected, make sure you wait a sufficient amount of time before attempting.

When using TCP/IP full passive communication, the port used by Windows will be locked after the session is closed. You may not be able to establish connection again for some time as a result.

2.7.3 Sample Ladder Program (A Series)

See below for a sample program of when the Ethernet unit is installed in slot 0 of the A Series. For error processing of the Ethernet unit, refer to the manual of the PLC.

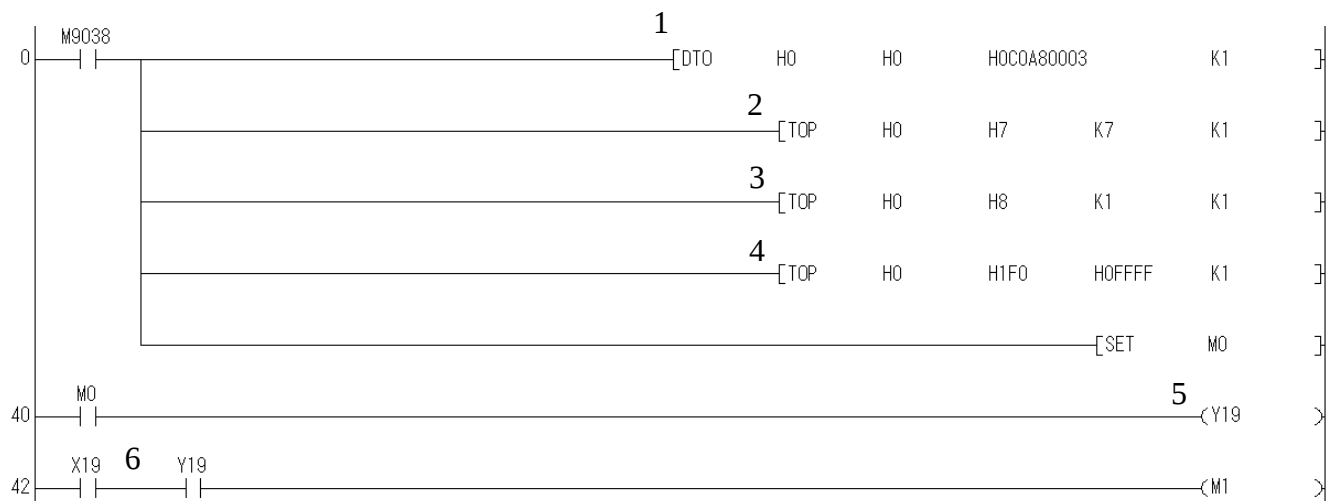
Note

The only difference between MELSEC-A Series and MELSEC-QnA Series is the buffer memory address.

[Sample Program Overview]

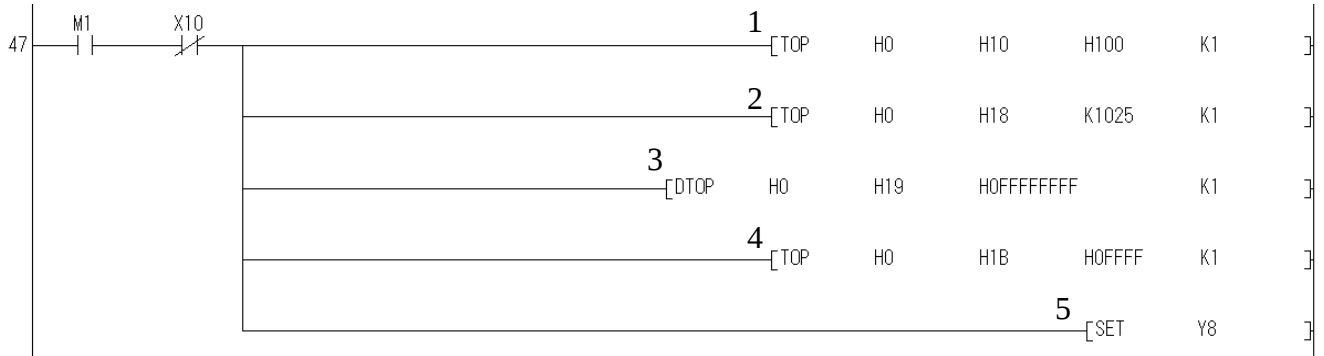
Item	Protocol	Local Port	Other IP Address	Other Port
Connection 1	UDP/IP	1025	255.255.255.255	0xFFFF
Connection 2	TCP/IP Unpassive	1026	N/A	N/A
Connection 3	TCP/IP Full Passive	1027	192.168.0.1	1027
IP Address	192.168.0.3			
Existence Confirmation	Sends ICMP packets three times every 2 seconds after 14 seconds.			
Unit Address	Ethernet unit is installed in I/O address 0.			
H/W Switch Setting	SW1-OFF/ SW2-OFF/ SW3-OFF/ SW4-OFF/ SW5-OFF/ SW6-OFF/ SW7-ON/ SW8-OFF			

[Initial Processing Program]



1. Set the local IP Address to “192.168.0.3.”
2. Set Existence Confirmation Start Interval timer to 14 seconds (7×2 seconds).
3. Set Existence Confirmation Interval Timer to 2 seconds (1×2 seconds).
4. Set Communication Instruction during STOP to “enabled” (0xFFFF) for all connections.
5. Turn on Initial Request signal (Y19).
6. After Initial Complete signal (X19) turned on, it will move into the Opening Process.

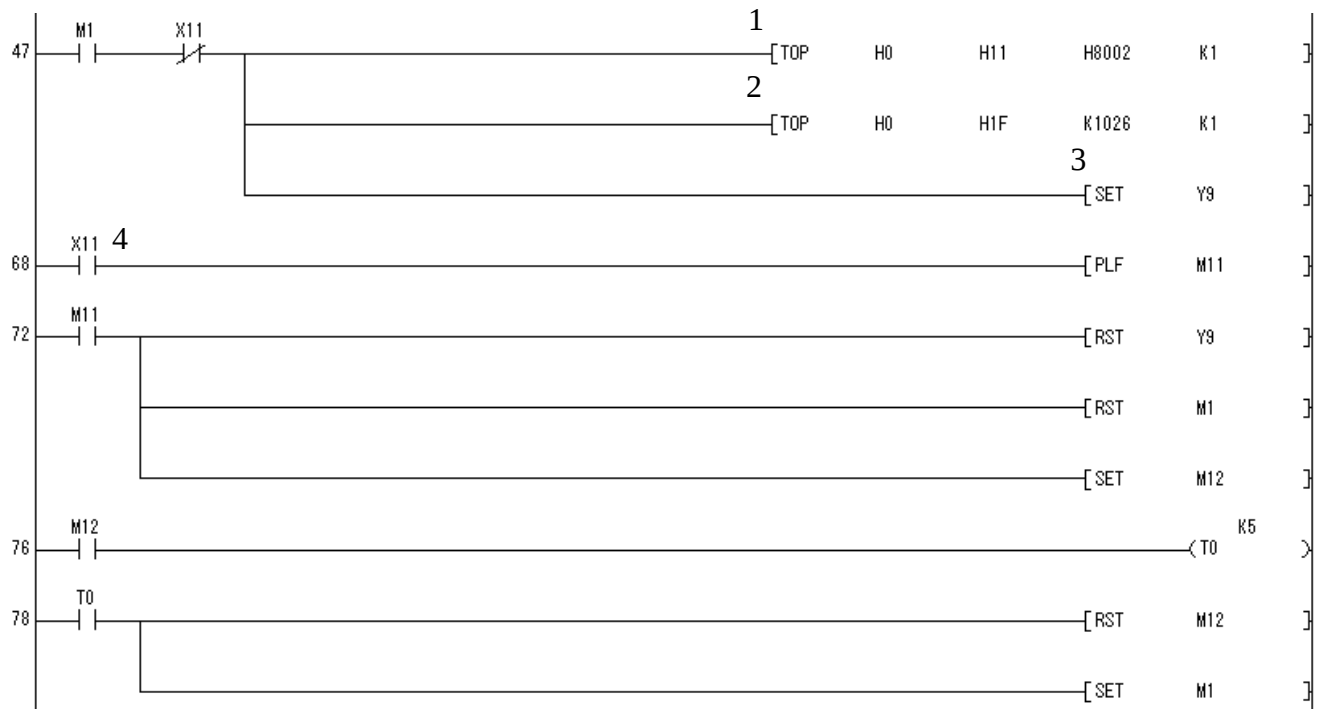
[UDP/IP Open Processing]



1. Set Connection 1 protocol to UDP/IP (0x100).
2. Set local port of connection 1 to “1025”.
3. Set Other IP Address to “0xFFFFFFFF” in order to enable broadcast communication.
4. Set Other Port # to “0xFFFF” in order to enable broadcast communication.
5. Turn ON Port OPEN Request (Y8).

Note

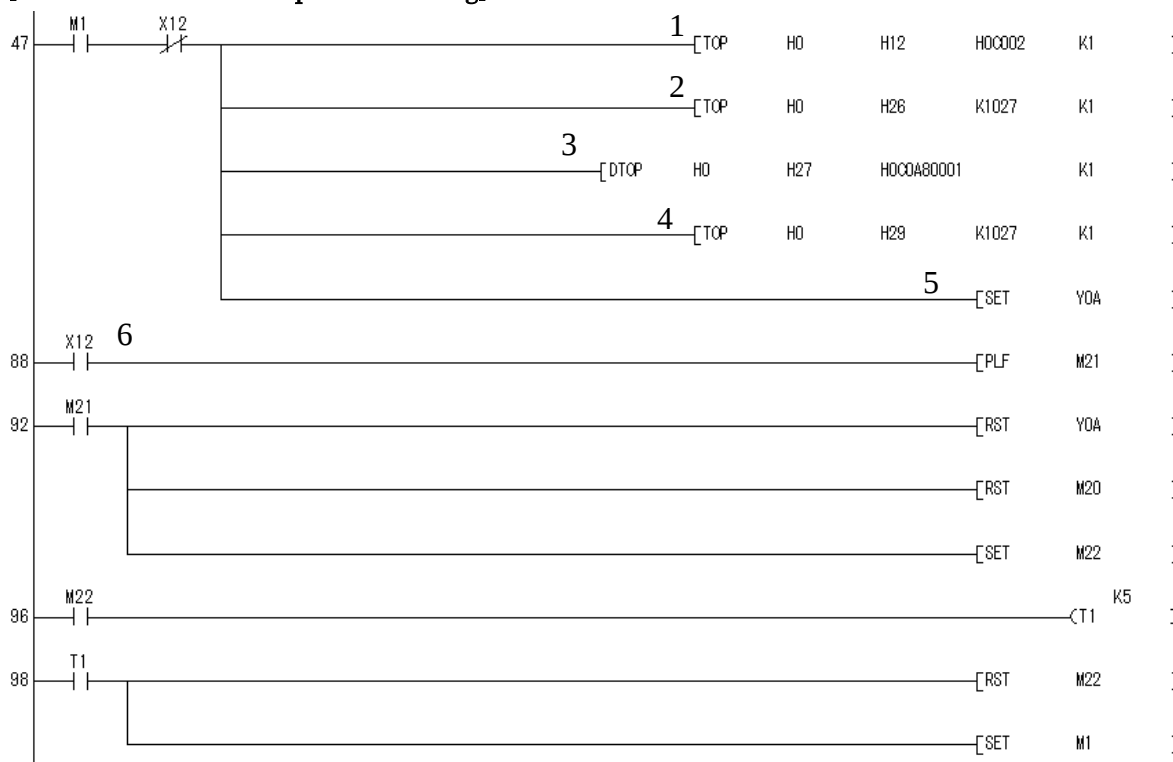
- UDP/IP does not require connection processing. Y8 reset circuit is not required. Port remains open.
- If you do not specify the other PC, set Other IP Address to “0xFFFFFFFF” and Other Port # to ”0xFFFF” in order to enable broadcast communication.

[TCP/IP Unpassive Open Processing]

1. Set Connection 2 protocol to TCP/IP unpassive (0x8002).
2. Set "1026" to the local port of Connection 2.
3. Turn on Open Request (Y9) by default (this enables access from DeviceXPlorer).
4. When Open Complete signal (X11) turns off, turn Open Request off once and repeat step [3] again after 0.5 seconds.

Note

- Configure Existence Confirmation properly when using TCP/IP.
- In order to return to wait OPEN state after the session is disconnected, make sure you wait a sufficient amount of time before attempting again.

[TCP/IP Full Passive Open Processing]

1. Set Connection 3 protocol to TCP/IP full passive (0xC002).
2. Set "1027" to the local port of Connection 3.
3. Set "192.168.0.1" to Other IP of Connection 3.
4. Set "1027" to Other Port of Connection 3.
5. Turn on Open Request (YA) by default (this enables access from DeviceXplorer).
6. When Open Complete signal (X12) turns off, turn Open Request off once and repeat step [5] again after 0.5 seconds.

Note

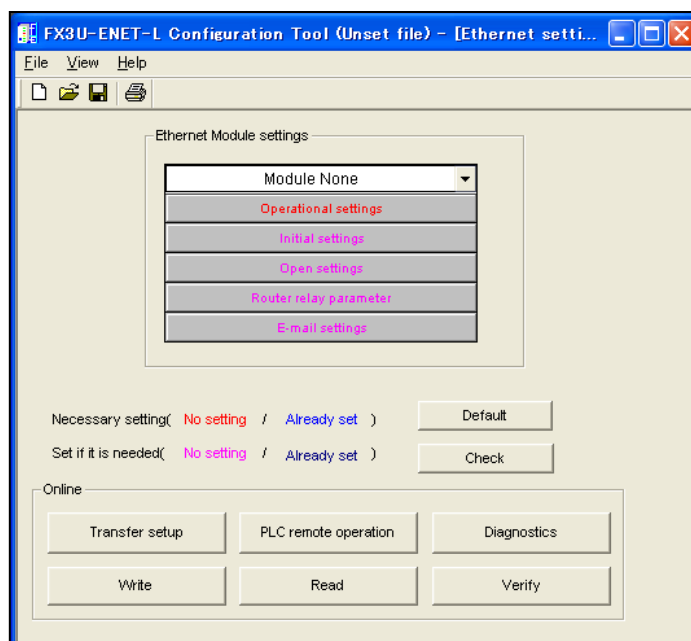
- Configure Existence Confirmation properly when using TCP/IP.
- In order to return to wait OPEN state after the session is disconnected, make sure you wait a sufficient amount of time before attempting.
- When using TCP/IP full passive communication, the port used by Windows will be locked after the session is closed. You may not be able to establish connection again for some time as a result.

2.8 FX Ethernet Settings

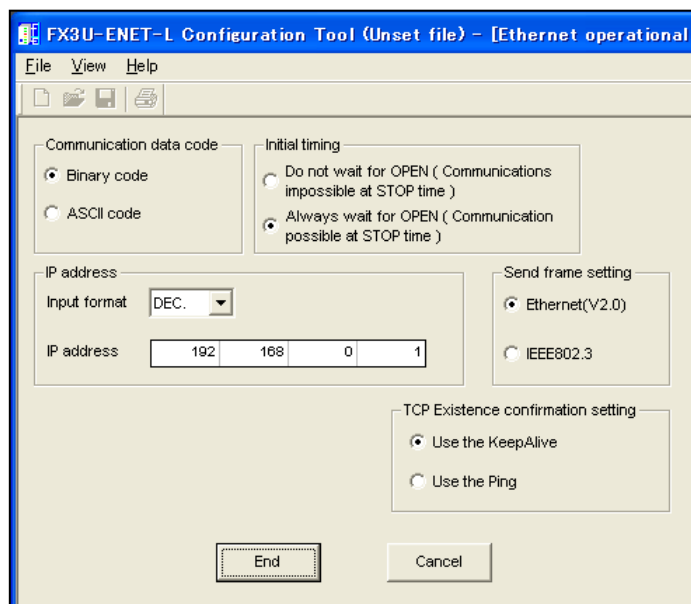
2.8.1 FX3U-ENET-L Configuration Tool Settings

To perform Ethernet communication using an FX Series Ethernet unit (FX3U-ENET-L), you need to make Ethernet settings using FX3U-ENET-L Configuration Tool.

Select the number of the Ethernet module to be set, and set parameter of Operational settings, Initial settings, Open settings, Router relay parameter, E-mail settings.



[Operational settings]



The above is an example of settings for PLC side IP address “192.168.0.1”, “Binary code”, and “Always wait for OPEN”. Set “Binary code” for the communication data code setting. The KeepAlive function checks the existence of devices with which there has not been communication for a set period of time, by sending an ACK message and checking if a response is received.

[Initial settings]

When using TCP / IP, it is necessary to set appropriate existence confirmation parameters. If the existence confirmation parameters are inappropriate, it may take time to reestablish connections when a network failure such as a severed cable occurs, and reconnection may be impossible.

FX3U-ENET-L Configuration Tool (Unset file) - [Ethernet initial settings]

File View Help

Timer setting

Module will operate with default values if setting is left blank

	Setting value	Default value	In units
TCP ULP timer		60	X500ms
TCP zero window timer		20	X500ms
TCP resend timer		20	X500ms
TCP end timer		40	X500ms
IP assembly timer		10	X500ms
Response monitoring timer		60	X500ms
Destination existence confirmation starting interval	6	1200	X500ms
Destination existence confirmation interval timer	4	20	X500ms
Destination existence confirmation resend	3	3	Times

DNS setting

Input format: DEC.

IP address of DNS server 1				
IP address of DNS server 2				
IP address of DNS server 3				
IP address of DNS server 4				

End Cancel

Ready FX3U-ENET-L NUM

In the settings example above, existence confirmation processing will be performed 3 times at 2 seconds intervals after communication has been stopped for 3 seconds.

[Open settings]

Connection No. 1 and No. 2 are dedicated to the Fixed buffer communication, and connection No.3 and No. 4 are dedicated to MC Protocol communication.

The below setting is an example of setting UDP / IP open for port 1025 and TCP / IP (Unpassive) for port 1026.

	Protocol	Open system	Fixed buffer	Fixed buffer communication procedure	Pairing open	Existence confirmation	Host station Port No. (DEC.)	Transmission target device IP address	Transmission target device Port No. (DEC.)
1									
2									
3	UDP	MC Protocol				Confirm	1025	255.255.255.255	65535
4	TCP	Unpassive(MC)				Confirm	1026		

Note

- Enter the own station port number and communication partner port number in decimal notation.
- Because FX3U-ENET-L unit has only two ports for communication port of upper application such as DeviceXPlorer, be careful.
- Where UDP / IP is selected as the protocol, broadcast communication is possible if you set “255.255.255.255” as the communication partner IP address and “65535” as the communication partner port number. (You can communicate with more than one partner using a single port.)
- In TCP / IP Fullpassive communication, immediately after the session closes, the port that was being used by Windows is locked. Therefore, it may not be possible to reconnect for a period of time.

2.8.2 FX3U-ENET Settings (Sample Ladder Program)

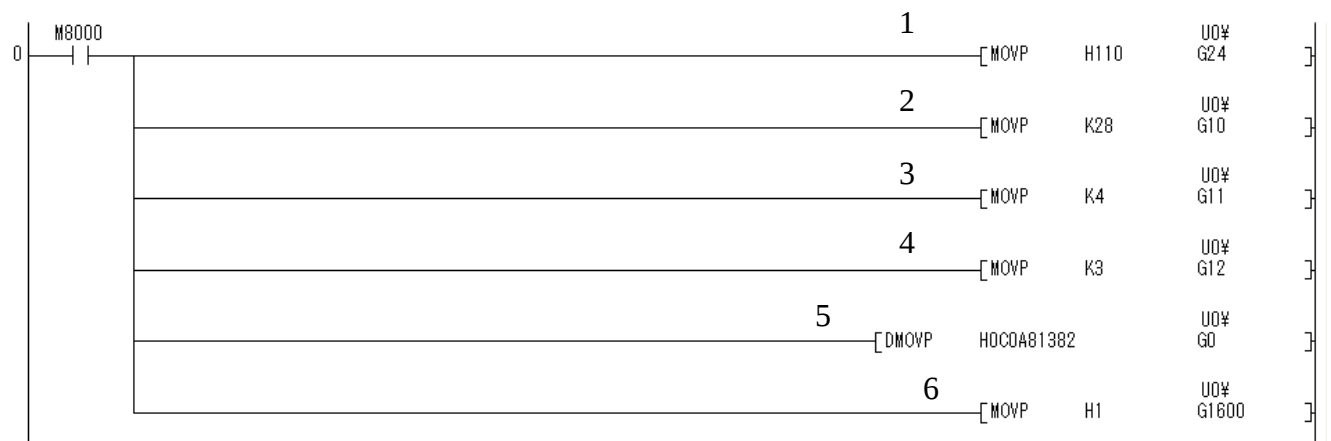
To perform Ethernet communication using an FX Series Ethernet unit (FX3U-ENET), you need to make Ethernet settings using FX Configurator-EN or using an initial processing program and port processing settings. The following explains initial processing programs and port processing.

The table below outlines a sample program for an Ethernet unit installed in slot 0.

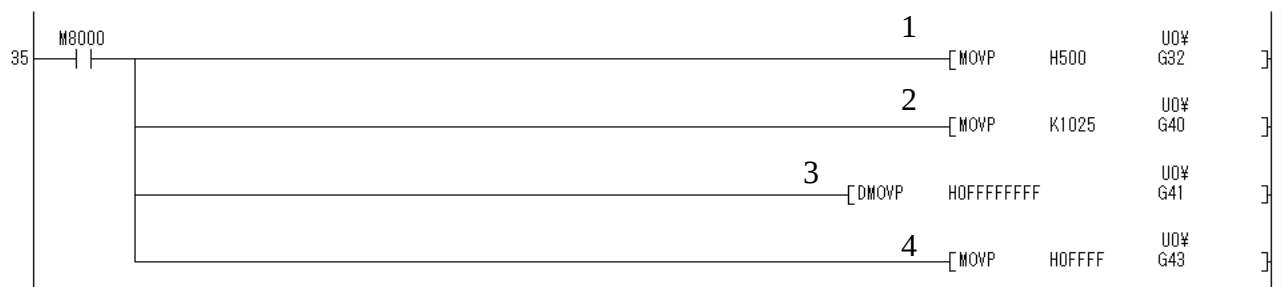
[Sample Program Overview]

Item	Protocol	Own port	Other IP address	Other port
Connection 1	UDP / IP	1025	255.255.255.255	0xFFFF
Connection 2	TCP / IP Unpassive	1026	N / A	N / A
Connection 3	TCP / IP Fullpassive	1027	192.168.0.1	1027
IP address	192.168.0.4			
Existence check	Sends ICMP packets three times at 2-second intervals after 14 seconds.			

[Initial Processing Program]



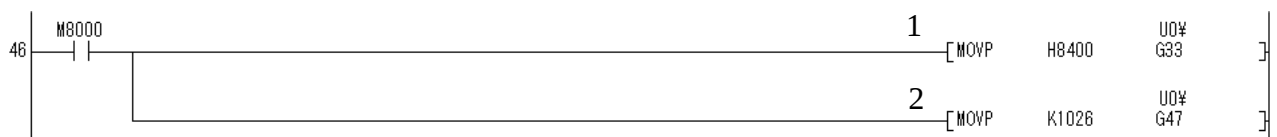
1. Set H0110 for buffer memory 24 (communication settings).
2. Set 14 seconds (28 x 500 msec) for buffer memory 10 (existence check start interval timer).
3. Set 2 seconds (4 x 500 msec) for buffer memory 11 (existence check interval timer).
4. Set three times for buffer memory 12 (existence check number of times).
5. Set "192.168.0.4" for buffer memories 0 and 1 (own IP address).
6. Write 1 to buffer memory 1600 (error LED OFF) and reinitialize.

[UDP / IP Open Processing]

1. Set H0500 for buffer memory 32 (protocol settings memory for connection 1).
2. Set 1025 for buffer memory 40 (own port number for connection 1).
3. Set "255.255.255.255" for buffer memories 41 and 42 (communication partner IP address for connection 1).
4. Set 0xFFFF for buffer memory 43 (connection partner port for connection 1).

Note

Where a particular communication partner is not specified, it is possible to perform broadcast communication by specifying "0xFFFFFFFF" as the communication partner IP port and "0xFFFF" as the communication partner port number.

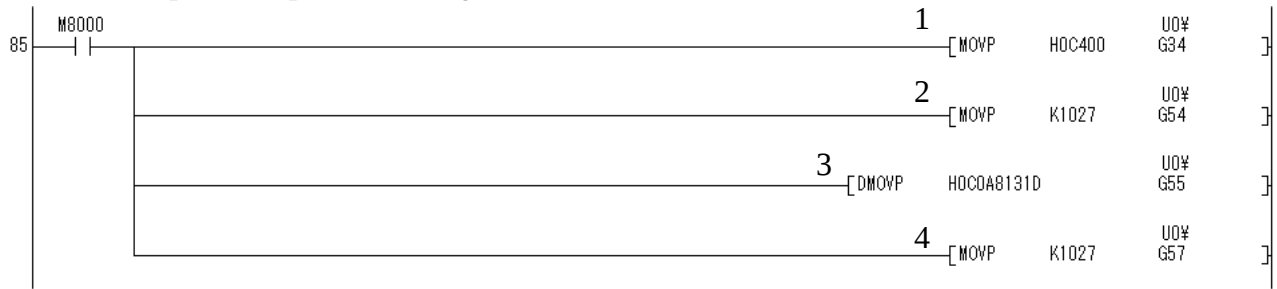
[TCP/IP Unpassive Open Processing]

1. Set H8400 for buffer memory 33 (protocol settings memory for connection 2).
2. Set 1026 for buffer memory 47 (own port number for connection 2).

Note

- When using TCP / IP, set the existence checking function appropriately.
- Allow plenty of time if you are setting the port to wait to reopen after a session has ended.

[TCP / IP Fullpassive Open Processing]



1. Set HC400 for buffer memory 34 (protocol settings memory for connection 3).
2. Set 1027 for buffer memory 54 (own port number for connection 3).
3. Set "192.168.0.1" for buffer memories 55 and 56 (communication partner IP address for connection 3).
4. Set 1027 for buffer memory 57 (communication partner port number for connection 1).

Note

- When using TCP / IP, set the existence checking function appropriately.
- Allow plenty of time if you are setting the port to wait to reopen after a session has ended.
- In TCP / IP Fullpassive communication, immediately after the session closes, the port that was being used by Windows is locked. Therefore, it may not be possible to reconnect for a period of time.

2.9 DeviceXPlorer Settings

2.9.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

The screenshot shows the 'Connection Test' dialog box in DeviceXPlorer. It contains the following settings:

- Connection Test** (tab selected)
- CPU TYPE**:
 - ☒ Q
 - ☐ Qn
 - ☐ L
 - ☐ QnA
 - ☐ A
 - ☐ FX
 - ☐ Use Q4E Protocol
 - ☐ Use Block Access Command
- NETWORK**:
 - Network No.: 0
 - PC No.: 255
 - Unit Station No.: 0
 - Multiple CPU System:
 - ☒ None
 - ☐ 1
 - ☐ 2
 - ☐ 3
 - ☐ 4
 - Redundancy CPU System:
 - ☒ None
 - ☐ Control
 - ☐ Standby
- Communication**:
 - CPU monitoring timer: 10 sec
 - Remote Password: (empty)
- ACCESS POINTS**:
 - Bit R/W: 188
 - Word R/W: 160

Item		Description
CPU TYPE	CPU TYPE	Select access CPU type.
	Use Q4E Protocol	If Q Series is selected as the CPU type, by checking this box you can use the Q4E frame protocol (Q4E Protocol). The Q4E frame is a protocol in which the messages sent and received include the sequence number, which helps to prevent the false reception of message that can be caused by communication failures. Please use Q4E Protocol if the Ethernet unit supports Q4E Protocol.
	Use Block Access Command	Use block access commands for read / write. For details of the access method, see section 2.6.5.
NETWORK	Network No.	When accessing the PLC of another station, specify a number between 0 and 255 as the network No. of the last network system passed through. To access host PLC, specify "0".
	PC No.	When accessing the PLC of another station, specify the station number on the relevant system. To access host PLC, specify "255".
	Unit station No.	When accessing the PLC of another station, passing through a network system and also through CPU of PLC connected the multi-drop line, specify the station No. to be accessed, between 0 and 31. To access host PLC, specify "0".
	Multiple CPU System (Unit I/O No.)	When using multiple CPU system, specify the CPU number to be accessed.
	Redundancy CPU System	When using a redundancy CPU system, specify the CPU (control system / standby system) to be accessed.

Communication	CPU timer monitoring	Specify the timeout(sec) of response from CPU of own or other network by Ethernet unit which received request from DeviceXPlorer. Specify the timeout between 0 and 60. When you specify 0, Ethernet unit waits unlimited. Please specify less than the timeout of port of DeviceXPlorer. If you specifies under 10 for own station or specifies under 60 for other network (CC-Link IE, MELSECNET/H etc), the Ethernet unit will detect abnormality appropriately.
ACCESS POINTS	Bit R / W	Batch read / write of a bit scale is not performed.
	Word R / W	Specify the maximum access points of batch read / write of word scale.
	Bit Poke	Specify the maximum access points of random write of bit scale.
	Word Poke	Specify the maximum access points of random write of word scale.

For more on the number of access points, see Numbers of Access Points (section 2.9.4).

Important

The Q4E protocol can be used with Ethernet units with serial numbers in which the first five digits are 07082 or later and that have functions version D or later. Units whose serial numbers begin with the five digits 07081 or earlier do not support the Q4E protocol.

LCPU / QnUDE (H) CPU built-in Ethernet Port doesn't support the Q4E protocol.

Important

You can access another station if you set Network Item "Network No" or "PC No." etc...

But because of affect by the length of the cable used and the CPU scanning speed, the access speed will be several times slower than the speed for access own station.

2.9.2 Group Settings

This section explains how to make group settings. Make group settings when accessing the buffer memory of an intelligent functions module or when managing tags in a hierarchical structure.

Item	Description
Group Name	Specify the group name.

2.9.2.1 Accessing to Intelligent Function Module

If you check “Accessing to Intelligent Function Module”, you can access the Buffer memory “G”. Please refer 2.9.8 about Unit type, the I/O offset and Buffer offset.

Item	Description
Accessing to Intelligent Function Module	Place a check in this box to access the buffer memory of the intelligent function module.
Unit No.	Specify a hexadecimal starting address for the unit. Where 30h - 4Fh is allocated as the I/O number, specify “3”.
Unit Type	Select the unit to be accessed. The I/O offset and buffer offset vary with the unit. This value is used in communication between DeviceXPlorer and MELSEC. For details, see section 2.9.8.

2.9.2.2 Import tags from PX Works2

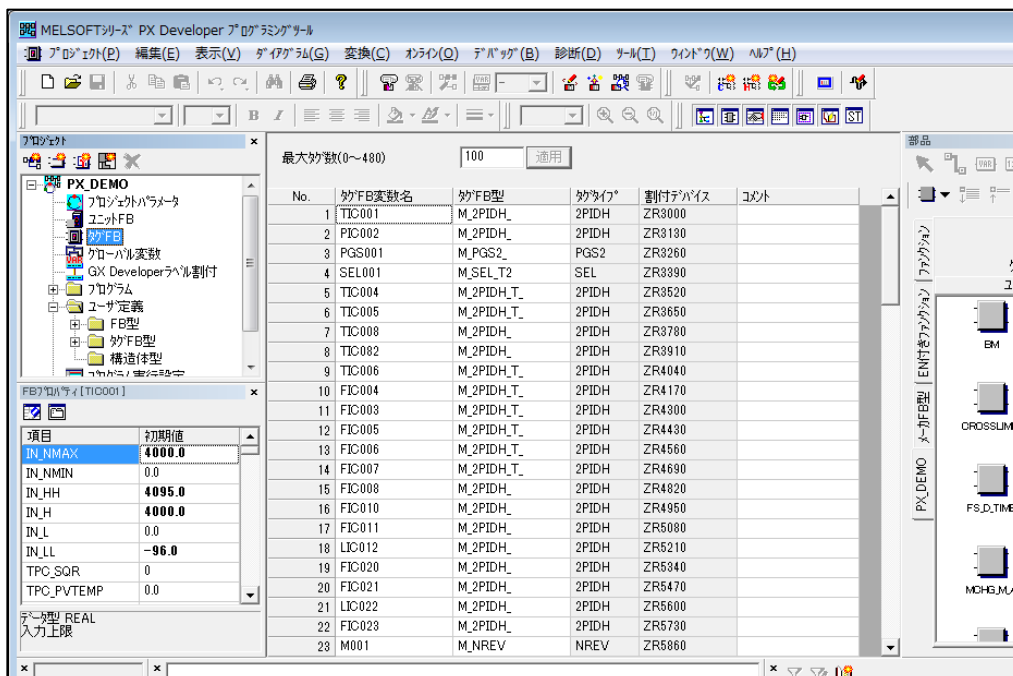
You can import the process tags (TagFB) from the project file of PX Works2

Item	Description
Import tags from PX Works2	Place a check and input project file path(*.fpj) of PX Works2. You can import the process tags when you make group.
Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.

Important

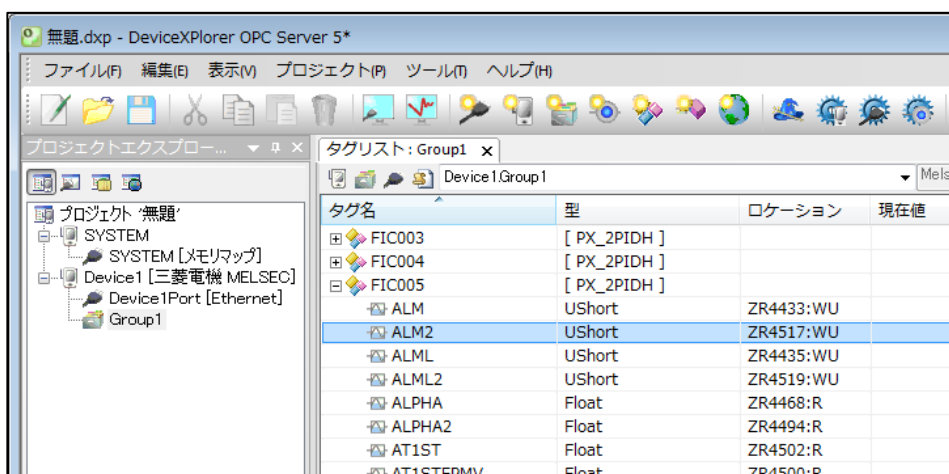
- Import processing is skipped when some tags which exist in a group are communicating.
- The imported process tags are TagFB
- To import from PX Works2 database, DSN [MS Access Database] is required. Please check ODBC data source administrator of administrators tool on Control Panel, Name = [MS Access Database] and Driver = [Microsoft Access Driver (*.mdb)].

TagFB configured by PX Works2



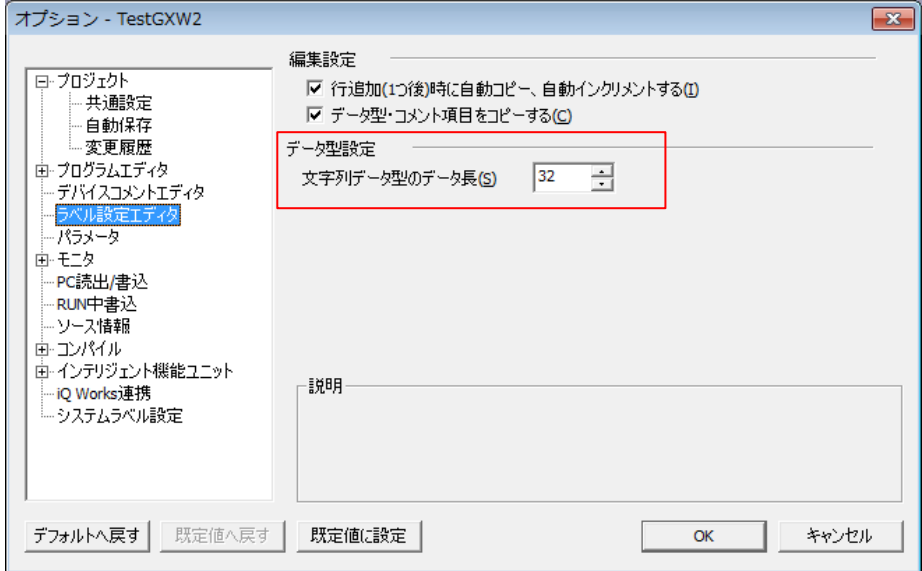
If you import, the tagFB will be imported as a structure tag as follows.

Refer to the "various lists of a tag type / tag data" of a PX Works2 programming manual for being imported.



2.9.2.3 Import tags from iQ Works System Label

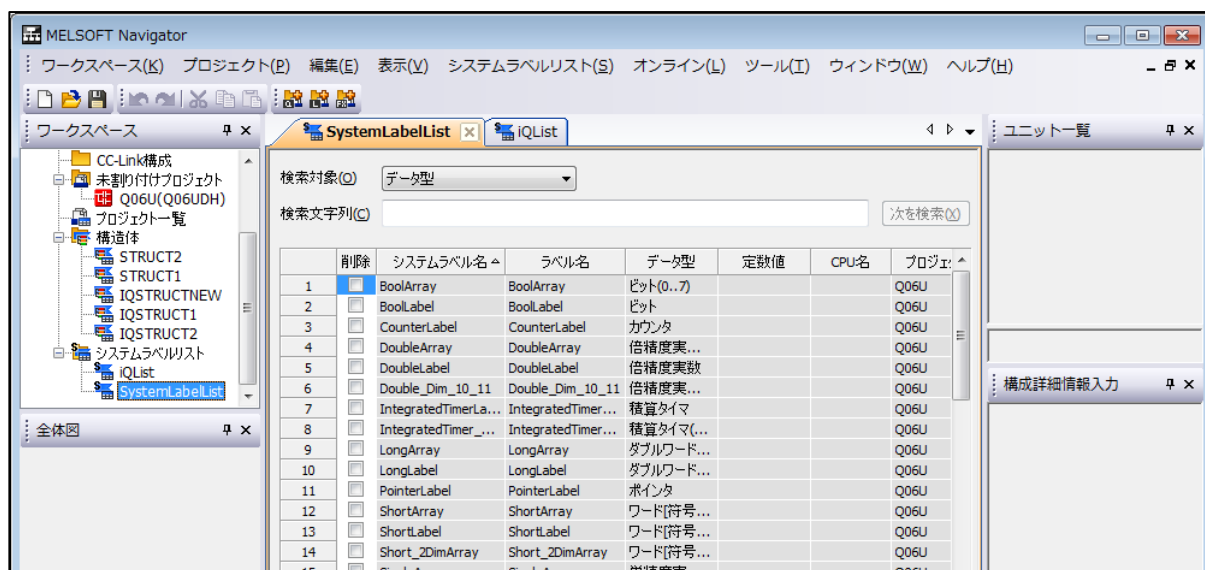
You can import the tags from the project file of iQ Works.

Item	Description
Import tags from iQ Works System Label	Place a check and input project file path(*.nvw) of iQ Works. You can import the System Labels when you make group.
Size of string type	Input size of string type defined in System Label. In MELSOFT application, default value is 32. You can confirm this value in Option menu [ラベル設定エディタ]-[文字列データ型のデータ長]. 
Include the System Label name in tag name	A check is put in when putting the name of System Label list into the name of the tag to import. Since System Label name may overlap when there are some System Label lists, please put in a check.
Generate a system label for device assignment as a label usage tag	Check this box if you want to generate a system label assigned other than GV (global label) as a label usage tag. * This function can only be used with Melsec EZSocket Connection.

Important

- Import processing is skipped when some tags which exist in a group are communicating.
- To import System Label, you must need to install iQ Works.
- Import processing of iQ Works System Label is effective only to the project file which exists in the directory on local PC. You cannot import from the project file which exists in a network disk etc.

System Labels defined by iQ Works



If you import, the System Label will be imported as follows.

タグリスト: Group1			
Device1.Group1			
タグ名	型	ロケーション	現在
BoolArray[0]	Bool	X2A	
BoolArray[1]	Bool	X2B	
BoolArray[2]	Bool	X2C	
BoolArray[3]	Bool	X2D	
BoolArray[4]	Bool	X2E	
BoolArray[5]	Bool	X2F	
BoolArray[6]	Bool	X30	
BoolArray[7]	Bool	X31	
BoolLabel	Bool	X1A	
CounterLabel	Short	CN12	
Double_Dim_10_11[10]	Double	W1FF:DR	
Double_Dim_10_11[11]	Double	W203:DR	
DoubleArray[0]	Double	W4FF:DR	
DoubleArray[1]	Double	W503:DR	
DoubleArray[2]	Double	W507:DR	
DoubleArray[3]	Double	W50B:DR	
DoubleArray[4]	Double	W50F:DR	

The data type of DeviceXPlorer corresponding to the System Label imported is as follows.

System Label data type	DeviceXPlorer data type
Bit	VT_BOOL
Word[Signed]	VT_I2
Double Word[Signed]	VT_I4
Word[Unsigned]/Bit array[16bit]	VT_UI2
Double Word[Unsigned]/Bit array[32bit]	VT_UI4
Float	VT_R4
Double	VT_R8
String	VT_BSTR
Timer	This is imported as Current value "TN" (VT_I2).
Counter	This is imported as Current value "CN" (VT_I2).
Retentive timer	This is imported as Current value "SN" (VT_I2).
User structure	Created as structure tag
Time/Pointer	Not supported

2.9.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [D0]

General Scale Simulation Alarm

Tag Name Tag D0

☐ Auto Format

Description

Device Type D Data Register

Device No. 0 Block No. 0

Data Type SHORT Byte Position Lower Byte

Length 1 Bit Position 0

☐ Byte Swap

☐ Array

Attribute ReadWrite

Calculation NONE

New Save << >> OK Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 2.2 for devices that can be specified.
Device No.	Specify the device number. It depends on the device type whether it is in decimal format or hexadecimal format. About format, please refer to 2.2.
Block No.	When Extended File Register "ER" is selected, specify block number. When iQ-R series CPU Buffer Memory "UG" and "HG" are specified, specify the CPU unit number (3E0~3E3). When iQ-R series Intelligent Function Module Buffer Memory (Unit Access Device) "UG", specify the 10 digits of the unit start I/O number.

Note

If you specify the bit device in a format other than BOOL, set the leading device number as a multiple of 16.

Example: M16:W is OK, but M17:W is not OK.

2.9.4 Combination of Access Points

The table below shows the number of access points that can be set for each MELSEC connection if a PC is connected to MELSEC in a 1:1 connection.

Access method	Connection	L / Q	QnA	A / FX
Word R / W (Batch read / write of word scale)	Serial (RS232C)	960	480	64
	Ethernet	960	480	256
	MELSEC interface board	1024		
	EZSocket GX Simulator	1024		
Bit Poke (Random writing)	Serial (RS232C)	188	94	20
	Ethernet	188	94	80
	MELSEC interface board	128		
	EZSocket GX Simulator	128		
Word Poke (Random writing)	Serial (RS232C)	160	80	10
	Ethernet	160	80	40
	MELSEC interface board	128		
	EZSocket GX Simulator	128		

*DeviceXPlorer does not use a command for read / write of bit scale.

Note

- DeviceXPlorer reads batches in the range set for Word R / W.
- Batch write is used to write character strings and arrays. The random write command is used for the BOOL, BYTE, SHORT, LONG, LONGLONG, FLOAT or DOUBLE formats.
- Some restrictions apply to specifying access to another station via MELSECNET; refer to the instructions of the unit you are using.
- There are no restrictions on the number of access points for reading and writing if an interface board is used, but 128 is set on the DeviceXPlorer side.

2.9.5 Block Access

To ensure the efficiency of communication processing, the normal access method batch-reads as many word devices as the specified maximum points. This method is effective for reading large volumes of continuous data, but it is not suited for accessing devices that are not continuous.

For example, if 480 is set as the number of Word R / W points for the QnA Series and data is to be read from D0, D100, D1000, and W0, the read command is sent to MELSEC three times, for D0 - D100, for D1000, and for W0. The use of block access makes it possible to process fewer read commands, even if the device access range is dispersed. Reading from D0, D100, D1000 and W0 can be processed with a single read command. Make block access settings to suit your system.

Refer to the table below to make the settings, as some CPUs do not support block read commands.

< Combinations for block access >

Connection	iQ-R	Q	QnA	A / FX
Serial (RS232C)	-*3	√*2	√*1,2	N / A
Ethernet	√*2	√*2	√*1,2	N / A
MELSEC interface board	-	√	√	√

*1 CPUs whose date of manufacture is 9707B or later can be used.

*2 Up to 120 blocks can be read from or written to as a batch.

*3 DeviceXPlorer do not support MELSEC Serial communication protocol for iQ-R Series.

Note

- Bit devices and word devices are read from separately.
- If the data type is BYTE, SHORT, LONG, LONGLONG, FLOAT or DOUBLE, block reading and writing is performed, but if the data type is BOOL, writing is random.

Important

LCPU / QnUDE (H) CPU built-in Ethernet Port doesn't support block access.

2.9.6 Remote password

If remote password is set for built-in Ethernet unit or Ethernet unit, Device XPlorer unlock with the password which you entered in a setting window on start of communication. While correct password is entering, remote password is unlocked and can communicate with PLC.

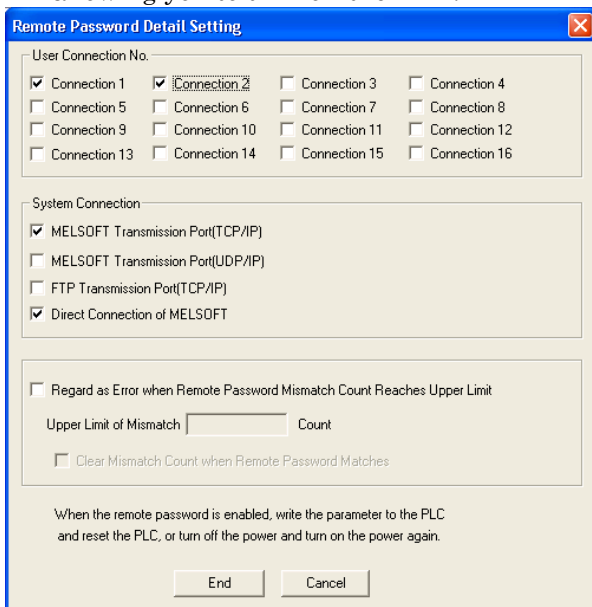
[Sample Settings for Remote password details setting]

When unlock of remote password is completed irregularly, following situation may be caused by function of QJ71E71.*¹

- * When incorrect password is entered more than limitation, communication is disconnected.
- * When the number of incorrect remote password is reached more than the setting for in the buffer memory, COM.ERR. LED is turned on.
- * C200H is stored at error log area in buffer memory (227(227H) ~ 372(174H)) and exit code area.

Please set up as follows to avoid these situations.

1. If you use GX Works2, uncheck “Regard as Error when Remote Password Mismatch Count Reaches Upper Limit” in the remote password settings.
2. When lighting of COM.ERR.LED, write to a value of 0 for the error log area of the buffer memory, allowing you to turn off the LED.



- * When COM.ERR. LED is turned on, it can be turned off if you enter value 0 at error log area in buffer memory.

Important

- Connecting UDP/IP, remote password can not be unlocked.
- Using iQ-R series, enter password (6-32 characters). For Q series, enter fixed 4 characters of half-width alphanumeric or special characters.
- Communication is disconnected with rewritten incorrect password in device option screen, even if remote password is unlocked successfully and communicating with PLC.
- Make one device for one port of valid remote password. If more than one devices are created for one port, unlock of remote password may affect communication for other devices.
- Do not enter password in option screen for devices which remote password is not valid. It may cause unexpected error for PLC and COM.ERR. LED will be turned.
- When it is disconnected, PLC locked remote password.

2.9.7 Cautions for Using TCP/IP

If a communication error occurs in TCP/IP communication due to a severed cable or the effects of a collision, etc., DeviceXPlorer waits a set time for a response from the PLC, and returns a timeout error if a response message is not returned in the set time. It will wait for a response message for the set number of retries, but if it still does not receive a response message it disconnects the connection and tries to reconnect. At that time, if the PLC side is not in LISN status, reconnection is not possible. Therefore, if you make Ethernet unit settings by means of ladder programs, make sure to install a reconnection process. Note that it is also necessary to set an appropriate “existence confirmation function” for the Ethernet unit.

[Sample Settings for an Existence Confirmation Function]

Timer setting			
Module will operate with default values if setting is left blank			
	Setting value	Default value	In units
TCP ULP timer		60	×500ms
TCP zero window timer		20	×500ms
TCP resend timer		20	×500ms
TCP end timer		40	×500ms
IP assembly timer		10	×500ms
Response monitoring timer		60	×500ms
Destination existence conformation starting interval	20	1200	×500ms
Destination existence conformation interval timer	10	20	×500ms
Destination existence conformation resend	3	3	Times

The default “existence confirmation function” of MELSEC is to use a PING command (ICMP packet) to check the existence of the upper-tier computer after a certain amount of time has elapsed since communication from the upper-tier ceased. If the upper-tier computer is not found, the connected port is closed and goes into LISN status.

- * In the settings example above, existence confirmation processing will be performed three times at 5-second intervals after communication has been stopped for 10 seconds. In other words, if communication stops for 10 seconds due to a power cut or a severed cable, etc., an ICMP packet is sent from the PLC to confirm that communication with the upper-tier computer is intact. If no response is received after 3 tries, the port is temporarily closed and goes into LISN status.
- * The Q Series default is to perform an existence check at 10-second intervals after communication has been stopped for 10 minutes. Note that, in the worst case, reconnection may not be possible for 10 minutes after the connection is cut.
- * If the line is restored after DeviceXPlorer has closed the port, the ICMP packet will arrive and the PLC side will not be able to go to LISN status; consequently, reconnection will not be possible until the PLC is reset. The existence checks use ICMP packets, so it is necessary for the PLC to go to LISN status before DeviceXPlorer closes the port. Make sure to set (DeviceXPlorer timeout value x retries) > PLC existence check start timer + existence check interval x existence check retransmissions).

Note

The use of the KeepAlive function to perform existence checks is recommended. Whereas existence checks using Ping send ICMP packets to an IP address, the KeepAlive function performs existence checks by sending ACK packets, so the aforementioned problem with timing does not occur.

Important

- In TCP / IP connection, TCP Maximum Segment Separate Sending function is supported for dividing messages if the received message size is greater than 1460 bytes size.

[Ethernet Unit for TCP Maximum Segment Separate Sending function]

Q Series Ethernet units with serial numbers in which the first five digits are 05051 or later.

QnA / A Series Ethernet units which have functions version E.

2.9.8 Unit Settings Files

Buffer offset and unit I/O offset are acquired from unit setting file when OPC Server accesses to intelligent unit. File formats are showed below. All offset value is hexadecimal format.

Device setting: Q /QnA Series

Unit Name	Buffer Offset	Unit I/O Offset
Q64AD Analog-Digital Conversion Module	1008	0
Q68ADV/ADI Analog-Digital Conversion Module	1008	0
Q62DA/Q64DA Digital-Analogue Conversion Module	1008	0
Q68DAV/DAI Digital - Analogue Conversion Module	1008	0
Q64TCTT/Q64TCRT Temperature Control Module	1000	0
Q64TCTTBW/Q64TCRTBW Temperature Control Module	1000	1
Q64TD/Q64RD Thermocouple Input Module	2008	0
QD51 (-R24) Intelligent Communication Module	10000	0
QD62/QD62E/QD62D High speed counter Module	3C	0
QD70P4/P8 Positioning Module	5000	0
QD75P1/P2/P4, QD75D1/D2/D4, QD75M1/M2/M4 Positioning Module	10000	0
QJ61BT11 CC-Link System Master/Local Module	10000	0
QJ71C24 (-R2) Serial Communication Module	10000	0
QJ71CMO Modem interface Module	10000	0
QJ71DN91 DeviceNet Master-Slave Module	10000	0
QJ71E71 (-B2/-100) Ethernet interface Module	10000	0
QJ71FL71 (-B2) FL-net (OPCN-2) Interface Module	10000	0
QJ71PB92D PROFIBUS-DP Interface Module	10000	0
QJ71GF11-T2 CC-Link IE Field System Master/Local Module	10000	0
AD61 (S1) High-speed Counter Module	80	0
A616AD Analog-Digital Conversion Module	10	0
A616DAI/DAV Digital-Analogue Conversion Module	10	0
A616TD Temperature-Digital Conversion Module	10	0
A62DA(S1) Digital-Analogue Conversion Module	10	0
A68AD(S2) Analog-Digital Conversion Module	80	0
A68ADN Analog-Digital Conversion Module	80	0
A68DAV/DAI Digital-Analogue Conversion Module	10	0
A68RD3/4 Temperature-Digital Conversion Module	10	0
A84AD Analog-Digital Conversion Module	10	1
A81CPU PID Control Module	200	0
A61LS Position Detection Module	80	0
A62LS (S5) Position Detection Module	80	1
AJ71PT32 (S3) /AJ71T32-S3 MELSECNET/MINI (-S3) Master Module	20	0
AJ61BT11 CC-Link System Master/Local Module	2000	0
AJ71C22 (S1) Multidrop Link Module	1000	0
AJ71C24 (S3/S6/S8) Computer Link Module	1000	0
AJ71UC24 Computer Link Module	400	0
AD51 (S3) Intelligent Communication Module	800	1
AD51H (S3) Intelligent Communication Module	800	1
AJ71C21 (S1) Terminal Interface Module	400	0
AJ71B62 B/NET Interface Module	20	0

Unit Name	Buffer Offset	Unit Offset	I/O
AJ71P41 SUMINET Interface Module	400	0	
AJ71E71 (S3) Ethernet Interface Module	400	0	
AD51FD (S3) External Problem Diagnostic Module	280	1	
AD57G (S3) Graphic Controller Module	280	1	
AS25VS Vision Sensor Module	100	1	
AS50VS Vision Sensor Module	100	1	
AS50VS - GN Vision Sensor Module	80	1	
AD59 (S1) Memory Card Interface Module	1800	0	
AD70 (D) (S2) Positioning Module	80	0	
AD71 (S1/S2/S7) Positioning Module	200	0	
AD72 Positioning Module	200	1	
AD75P1/P2/P3 (S3)/AD75M1/M2/M3 Positioning Module	800	0	
AJ61QBT11 CC-Link System Master/Local Module	2000	0	
AJ71QC24(N) (R2, R4) Serial Communication Module	4000	0	
AJ71QE71 (B5) Ethernet Interface Module	4000	0	
A1SD61/A1SD62 (E/D) High-Speed Counter Module	10	0	
A1S62DA Digital-Analog Conversion Module	10	0	
A1S62RD3/4 Temperature-Digital Conversion Module	10	0	
A1S64AD Analog-Digital Conversion Module	10	0	
A1SJ71 (U) C24-R2 Computer Link Module	400	0	
A1SJ71 (U) C24-PRF Computer Link Module	400	0	
A1SJ71 (U) C24-R4 Computer Link Module	400	0	
A1SJ71E71 (S3) Ethernet Interface Module	400	0	
A1SD70 Single Axis Positioning Module	80	0	
A1SD71-S2/S7 Positioning Module	200	1	
A1SD75P1/P2/P3 (S3)/A1SD75M1/M2/M3 Positioning Module	800	0	
A1S63ADA Analog I/O Module	10	0	
A1S64TCTT (BW)-S1 Temperature Controller Module	20	0	
A1S64TCRT (BW)-S1 Temperature Controller Module	20	0	
A1S62TCTT (BW)-S2 Temperature Controller Module	20	0	
A1S62TCRT (BW)-S2 Temperature Controller Module	20	0	
A1SJ71PT32-S3 MELSECNET/MINI-S3 Master Module	20	0	
A1SJ61BT11 CC-Link System Master/Local Module	2000	0	
A1SJ71QC24(N) (R2) Serial Communication Module	4000	0	
A1SJ71QE71-B2/B5 Ethernet Interface Module	4000	0	
A1SJ61QBT11 CC-Link System Master/Local Module	2000	0	

Device setting: A Series (SPUNITA.INI)

Unit Name	Buffer Offset	Unit Offset	I/O
AD61(S1) high speed counter module	80	1	
A616AD analog-digital conversion module	10	1	
A616DAI analog-digital conversion module	10	1	
A616DAV analog-digital conversion module	10	1	
A616TD temperature-digital conversion module	10	1	
A62DA(S1) analog-digital conversion module	10	1	
A68AD(S2) analog-digital conversion module	80	1	
A68ADN analog-digital conversion module	80	1	
A68DAV/DAI(S1) analog-digital conversion module	10	1	
A68RD3/4 temperature-digital conversion module	10	1	
A84AD analog-digital conversion module	10	2	
A81CPU PID controller module	200	3	
A61LS position detection module	80	1	
A62LS(S5) position detection module	80	2	
AJ71(P)T32(S3) MELSECNET/MINI master module	20	1	
AJ61BT11 CC-Link system master-local module	2000	1	
AJ71C22(S1) multiple drop link module	1000	1	
AJ71C24(S3/S6/S8) computer link module	1000	1	
AJ71UC24 computer link module	400	1	
AD51(S3) intelligent communication module	800	2	
AD51H(S3) intelligent communication module	800	2	
AJ71C21(S1) terminal interface module	400	1	
AJ71B62(S3) B/NET interface module	20	1	
AJ71P41 SUMINET interface module	400	1	
AJ71E71(S3) Ethernet interface module	400	1	
AD51FD(S3) external problem diagnosis module	280	2	
AD57G(S3) graphic controller module	280	2	
AS25VS vision sensor module	100	2	
AS50VS vision sensor module	100	2	
AS50VS-GN vision sensor module	80	2	
AD59(S1) memory card interface module	1800	1	
AJ71ID1(2)-R4 ID interface module	280	1	
AD70(D)(S2) positioning module	80	1	
AD71(S1/S2/S7) positioning module	200	1	
AD72 positioning module	200	2	
AD75P1(P2/P3)(S3) positioning module	800	1	
AD75M1(M2/M3) positioning module	800	1	
A1SD61 high speed counter module	10	1	
A1SD62(E/D(S1)) high speed counter module	10	1	
A1S62DA digital-analog conversion module	10	1	

Unit Name	Buffer Offset	Unit I/O Offset
A1S62RD3/4 temperature-digital conversion module	10	1
A1S64AD analog-digital conversion module	10	1
A1SJ71(U)C24-R2(R4/PRF) computer link module	400	1
A1SD51S intelligent communication module	800	1
A1SJ71ID1(2)-R4 ID interface module	280	1
A1SJ71E71-B2/B5(S3) Ethernet interface module	400	1
A1SD70 single axis positioning module	80	1
A1SD71-S2/S7 positioning module	200	2
A1SD75P1(P2/P3)(S3) positioning module	800	1
A1SD75M1(M2/M3) positioning module	800	1
A1S63ADA analog-digital conversion module	10	1
A1S64TCTT(BW)-S1 temperature adjustment module	20	1
A1S64TCRT(BW)-S1 temperature adjustment module	20	1
A1S62TCTT(BW)-S2 temperature adjustment module	20	1
A1S62TCRT(BW)-S2 temperature adjustment module	20	1
A1S68DAV/A1S68DAI digital-analog conversion module	20	1
A1S68AD analog-digital conversion module	20	1
A1S68TD temperature-digital conversion module	20	1
A1SJ71PT32-S3 MELSECNET/MINI master module	20	1
A1SJ61BT11 CC-Link system master-local module	2000	1

2.10 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

2.10.1 List of Devices

Show the list of convertible devices.

KEPServerEX		⇒	DeviceXPlorer	
Type	Symbol		Type	Symbol
Inputs	X	⇒	Input relay	X
Outputs	Y	⇒	Output relay	Y
Direct Inputs	DX	⇒	Direct input	DX
Direct Outputs	DY	⇒	Direct output	DY
Internal Relays	M	⇒	Internal relay	M
Latch Relays	L	⇒	Latch relay	L
Step Relays	S	⇒	Step relay	S
Special Int. Relays	SM	⇒	Special relay	SM
Link Relays	B	⇒	Link relay	B
Annunciator Relays	F	⇒	Annunciator	F
Edge Relays	V	⇒	Edge relay	V
Timer Coils	TC	⇒	Timer coil	TC
Timer Contacts	TS	⇒	Timer contact	TS
Integrating Timer Coils	SC	⇒	Retentive Timer coil	SC
Integrating Timer Contacts	SS	⇒	Retentive Timer contact	SS
Retentive Timer Contacts	STS	⇒	Retentive Timer contact	SS
Counter Coils	CC	⇒	Counter coil	CC
Counter Contacts	CS	⇒	Counter contact	CS
Special Link Relays	SB	⇒	Link special relay	SB
Data Registers	D	⇒	Data register	D
Special Data Registers	SD	⇒	Special register	SD
Link Registers	W	⇒	Link register	W
Timer Value	TN	⇒	Current timer value	TN
Retentive Timer Value	SN	⇒	Current Retentive timer value	SN
Retentive Timer Value	STN	⇒	Current Retentive timer value	SN
Counter Value	CN	⇒	Current counter value	CN
File Register	R	⇒	File register	R
Special Link Registers	SW	⇒	Link special register	SW
Index Registers	Z	⇒	Index register	Z
File Register	ZR	⇒	Extended file register	ZR

2.10.2 Device Range

Please refer “List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

2.10.3 Optional Specification

Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
[space]L	Set 'LONG' to the data type.
.x (x is a number)	Set x to the bit position if the data type is 'BOOL'. Set x/2 to the size if the data type is 'STRING'.
:x (x is a number)	Set x to the bit position if the data type is 'BOOL'. Set x/2 to the size if the data type is 'STRING'.
[x] [1][x] (x is a number)	Enable the array. Set x to the size.
SH	Set 'STRING' to the data type.
SL	Set 'STRING' to the data type. Enable the byte swap.

Important

Two dimensional array is not supported.

2.11 Errors

This section explains the details of the PLC errors (response errors) included in the error messages.

Code	Error	Description
0x55	Writing prohibited	An attempt was made to write to an A Series Ethernet unit to which writing is prohibited.
0x56	Invalid device	An inappropriate device accessed the A / FX Series.
0x58	Out of range	When using the A / FX Series, a device outside the set range was accessed.
0x7167	Writing prohibited	An attempt was made to write to iQ-R / Q / QnA Series Ethernet unit to which writing is prohibited.
0x4031	Out of range	When using the iQ-R / Q / QnA Series, a device outside the set range was accessed.
0x4B00	Station number error	An inappropriate station number was specified.
0xC051	Outside range of access points	The number of read points or write points is outside the allowed range.
0xC05F	Invalid Request	Invalid request was sent to target PLC. Please modify setting value about 'Network No' or 'PC No'. You need to set default value(Network No: 0, PC No: 255, Unit Station No: 0) to access the host PLC which is accessed via Ethernet.
0xE1A0	Random access buffer error	In communication using the random access buffer, a port was specified that cannot be used. When using a UDP automatic open port, communication using the random access buffer is not possible.
0xE151	Random access buffer error	In communication using the random access buffer, a device was specified that was outside the allowed range. Access a device between 0 and 0x17FF.
0xFF	Serial Number error	When using Q4E Protocol, Serial Number of sending message is different from Serial Number of receiving message.

* For other errors and further details, see the instructions for the CPU and the unit.

3 [Mitsubishi] MELSEC Serial Connection

This chapter explains communication with MELSEC series equipment using a serial communication (computer link) unit.

An overview of communication via MELSEC serial connection is shown below.

Overview		
Link name	Serial communication (computer link)	
Protocol	MS Protocol “format 1” (ASCII), “format 4” (ASCII), “format 5” (binary)	
	L / Q / QnA series	“format 5” (binary)
	A / FX series	Default is “format 1” (ASCII). “format 4” (ASCII) is also supported. Select in Device settings of DeviceXPlorer.

3.1 PLC Systems

3.1.1 Applicable Units

The table below shows the CPU units and serial communication (computer link) units applicable to MELSEC serial connection.

Category	Applicable CPU units	Applicable serial communication units (computer link units)
Q Series	Q00(J)CPU, Q01CPU, Q02(H / PH)CPU Q06(P)HCPU, Q12(P / PR)HCPU Q25(P / PR)HCPU Q172 / Q173CPU Q02UCPU, Q03UD(E)CPU Q04UD(E)HCPU, Q06UD(E)HCPU Q13UD(E)HCPU, Q26UD(E)HCPU Q10UD(E)HCPU, Q20UD(E)HCPU Q50UDEHCPU, Q100UDEHCPU Q03UDVCP, Q04UD(P)VCP Q06UD(P)VCP, Q13UD(P)VCP Q26UD(P)VCP	QJ71C24N(-R2 / R4)
L Series	L02(S)CPU-(P) , L26CPU-(BT)(PBT) L06CPU-(P)	LJ21C24(-R2)
FX Series	FX0NCP FX1(S)(N)(NC)CPU FX2N(C)CPU FX3(S)(G)(U)(GC)(UC)CPU	FX0N-232ADP / 485ADP FX1N-232BD / 485BD FX2N(C)-232ADP / 485ADP FX2N-232BD / 485BD FX3U-232ADP(-MB) / 485ADP(-MB) FX3U-232BD / 485BD FX3G-232BD / 485BD
QnA Series	Q2A(S)(H)CPU(-S1) Q3ACPU, Q4A(R)CPU	A1SJ71QC24(N)-R2 / R4 AJ71QC24(N)-R2 / R4
A Series	A1FXCPU, A1S(J)HCPU A2C(J)CPU(-S3) A2(U)S(H)CPU(-S1), A0J2HCPU A1NCP, A2(N / A / U)CPU(-S1) A3(N / A / U)CPU, A4UCPU	A1SJ71UC24-R2 / R4 AJ71UC24 AJ71C24-S8

* Communication at a baud rate of 38400 or more can be used with units supporting L / Q / QnA / Fx3U.

3.2 List of Devices

See the list of devices for MELSEC Ethernet connection (section 2.2).

But Random Access Buffer "BM" is not supported with Serial Communication because BM is Ethernet Unit Internal Device.

Also Timer contact "TS" and Counter contact "CS" of MELSEC-FX are not supported in MELSEC Serial connection.

3.2.1 Accessing to more than one PLC register by dynamic tags

In MELSEC connections, only the case of accessing by the dynamic tags from client application, the more than one PLC register can be collectively read and written as comma-delimited string of a single tag.

For details of the access method, see section 2.2.1.

3.3 Setting up Q / L Series Serial Communication Unit

Use software configuration (GX Works2) for configuration of MELSEC-Q / L Series. MELSEC-Q / L Series does not have hardware configuration switches.

< QJ71C24 I/O Assignment >

Slot	Type	Model name	Points	StartXY
0	PLC			
1	Intelli.	QJ71C24	32points	0000
2				
3				
4				
5				
6				
7				

Assigning the I/O address is not necessary as the CPU does it automatically.
Leaving this setting blank will not cause an error to occur.

< QJ71C24 I/O Switch Setting >

Slot	Type	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5
0	PLC						
1	Intelli.	QJ71C24	07E6	0005			0000
2							
3							
4							
5							
6							

Software configuration is required on each special unit after I/O allocation with MELSEC-Q Series. For a serial communication unit, each switch will be set as follows:

Switch number	Description	
Switch1	b15 to b8	b7 to b0
	CH1 Communication rate setting	CH1 Transmission setting
Switch2	CH1 Communication protocol setting	
Switch3	b15 to b8	b7 to b0
	CH2 Communication rate setting	CH2 Transmission setting
Switch4	CH2 Communication protocol setting	
Switch5	Station number setting	

Refer to next page for information on the setting of each switch.

< Communication Setting : Switch1 / Switch 3 >

Bit	Description	OFF(0)	ON(1)	Remark
b0	Operation setting	Independent	Link	Must be set to OFF on CH1
b1	Data bit	7	8	ON when you use "format5" (binary).
b2	Parity bit	No	Yes	
b3	Even/Odd Parity	Odd	Even	
b4	Stop bit	1	2	
b5	Sum check	No	Yes	Depend on setting of DeviceXPlorer.
b6	Write during RUN	Prohibited	Allowed	ON to write data externally
b7	Setting modifications	Prohibited	Allowed	

Please match Switch Setting with DeviceXPlorer's network setting.

< Communication Rate Setting : Switch1 / Switch 3 >

Communication rate (bps)	Bit position b15 to b8	Communication rate (bps)	Bit position b15 to b8
300	00H	14400	06H
600	01H	19200	07H
1200	02H	28800	08H
2400	03H	38400	09H
4800	04H	57600	0AH
9600	05H	115200	0BH

< Communication Protocol Setting : Switch2 / Switch 4 >

Setting	Description	Remark
0H	GX Works2 connection	GX Works2 communication rate and transmission specifications are automatically set.
1H	Mode1	A-Series compatible protocol (ASCII)
2H	Mode2	
3H	Mode3	
4H	Mode4	
5H	Mode5	Binary mode
6H	Non procedure protocol	
7H	Bidirectional protocol	
8H	For linked operation setting	CH1 and CH2 link
9H ~ DH	Setting prohibited	
EH	ROM/RAM/switch test	
FH	Individual station loop back test	

Select Mode 5 (Binary Mode) when using DeviceXPlorer.

< Channel Setting : Switch 5 >

Set communication objects as channels between 0 and 31 when multi-drop connection is selected.
When 1:1 connection is selected, set it to 0.

3.4 Setting up QnA / A Series Computer Link Unit

For connection with QnA Series, you should use "Mode 5" protocol.

For connection with A Series (AnN / AnA / AnU), you can use "Mode 1" protocol or "Mode 4" protocol.

Refer to the following table for system configuration.

Some Serial Link units cannot connect in 1:N.

Unit Name	Connect in	Mode Setting Switch
AJ71QC24 (N)(-R2/R4)	1:1	5
A1SJ71QC24 (-R2)	1:N (RS232C->RS422/485)	5
AJ71C24-S8	1:1	1 or 4
AJ71UC24	1:N (RS232C->RS422/485)	A or D
A1SJ71UC24-R2/R4		

You should set channels so that they correspond with the station numbers in Device Properties of DeviceXPlorer.

Channels should be between numbers 0 and 31.

Communication switch setting is showed below.

< QnA Series >

Switch No.	Item	Contents				Description
		OFF		ON		
SW01	Operation Setting	Independent operation		Linked operation		
SW02	Data bits setting	7 bits		8 bits		
SW03	Parity	Disable		Enable		
SW04	Odd / Even	Odd		Even		Effective only when Parity Bit Enable is selected.
SW05	Stop bit setting	1 bit		2 bits		
SW06	Sum check enable / disable setting	Disable		Enable		
SW07	Write during RUN	Disable		Enable		
SW08	Setting change	Disable		Enable		
----	Baud Rate	9600	19200	38400	115K	
SW09		ON	OFF	ON	ON	
SW10		OFF	ON	ON	ON	
SW11		ON	ON	ON	OFF	
SW12		OFF	OFF	OFF	ON	

*Set "Independent operation" to "OFF" for SW01 operation setting.

*Set "Data bits setting" to 8 : ON because OPC Server communicates in binary.

*Match Sum check Switch"SW06" with DeviceXPlorer setting.

*Set "Write during RUN" to "ON"

*Baud Rate (28800bps or more) is available only when AJ71QC24N is used.

*Refer to manuals of each units for more detail.

< A Series >

Switch No.		Item	Contents				Description
			OFF		ON		
SW11(---)		Main Channel	RS232C		RS232C/485		
SW12(SW08)		Data Bit	7 bits		8 bits		
----		Baud Rate	2400	4800	9600	19200	
SW13(SW05)			ON	OFF	ON	OFF	
SW14(SW06)			ON	OFF	OFF	ON	
SW15(SW07)			OFF	ON	ON	ON	
SW16(SW09)		Parity	Exist		Not exist		
SW17(SW10)		Even / Odd	Even		Odd		Effective only when Parity Bit Enable is selected.
SW18(SW11)		Stop Bit	1 bit		2 bits		
SW21(SW12)		Sum Check	Disable		Enable		
SW22(SW04)		Write during RUN	Not allowed		Allowed		
SW23(----)		Serial Link / Multiple Drop	Multiple Drop		Serial Link		
SW24(----)		Master / Local station setting	Local Station		Master Station		Effective only when multiple drop Enable is selected.

*Switch number between parentheses indicates switch number for A1SJ71UC24.

*Set "Write during RUN" to "ON"

*Match Sum check Switch"SW06" with DeviceXPlorer setting.

*Set "Serial Link" to "ON" for serial / multiple drop.

*Refer to manuals of each unit for more detail.

3.5 Setting up an FX Series Computer Link Unit

Use GX Works2 to configure FX Series' Serial Link.

You may configure it to special register D8120 also.

Please refer to FX Communication User's Manual for more details (section on RS-232C/RS-485 communication).

Please match PLC parameter with Port settings and Device settings of DeviceXPlorer.

FX parameter

Memory capacity | **Device** | PLC name | I/O assignment | **PLC system(1)** | PLC system(2) | Positioning

CH1 If the box is not checked, the parameters will be cleared.
(When the program is transferred to the communication board, parameters and D8120 values in the PLC must be cleared upon program transfer.)

☒ Operate communication setting

Protocol: Dedicated protocol ☐ Control line

Data length: 7bit H/W type: Regular/RS-232C

Parity: Odd Control mode: Invalid

Stop bit: 1bit ☒ Sum check

Transmission speed: 9600 (bps) Transmission control procedure: Form1(without CR,LF)

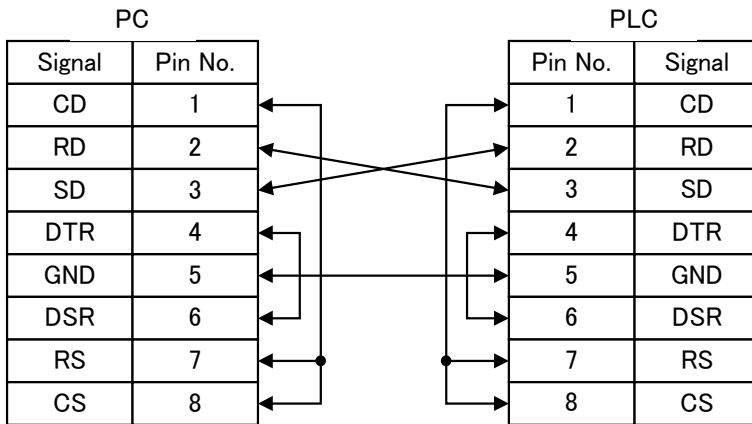
☐ Header Station number setting: 00 H (00H--0FH)

☐ Terminator Time out judge time: 1 x10ms (1--255)

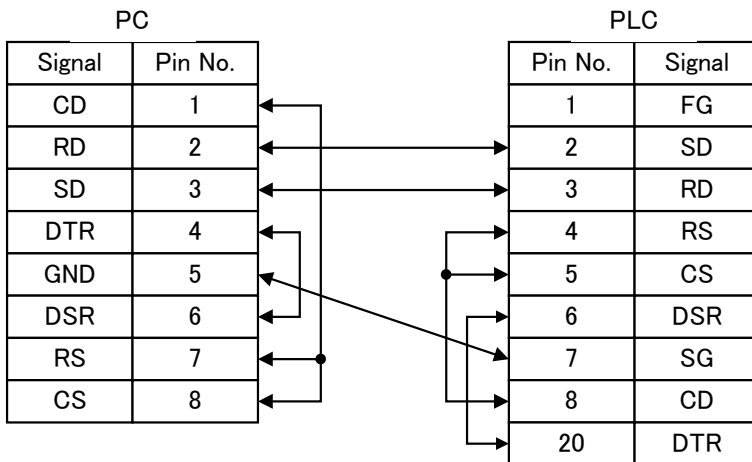
3.6 RS232C Cable Connection Diagram

The figures show examples of the connection between a PC and a PLC.

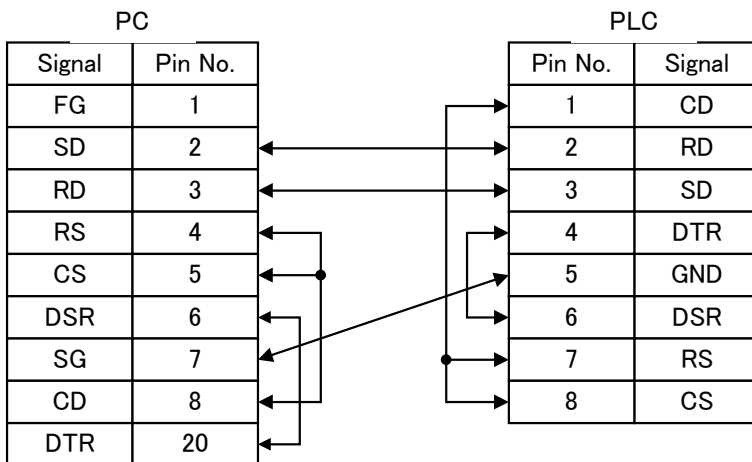
[PC: 9-pin <-> PLC: 9-pin]



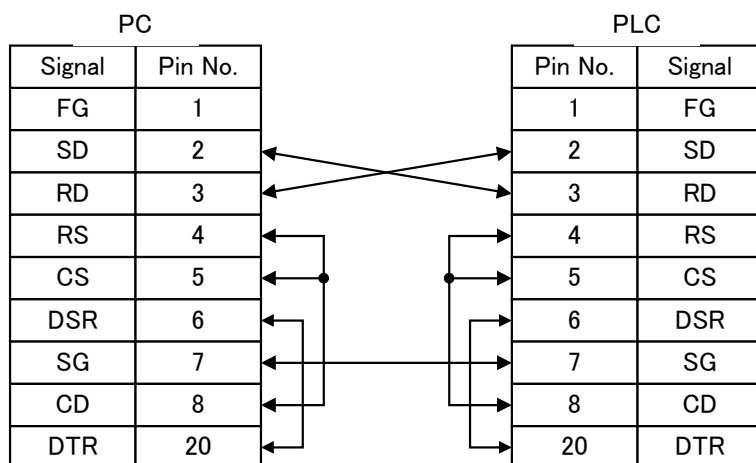
[PC: 9-pin <-> PLC: 25-pin]



[PC: 25-pin <-> PLC: 9-pin]



[PC: 25-pin <-> PLC: 25-pin]

**Note**

For the Q / L / QnA Series, an off-the-shelf RS232C crossover cable can be used.

For the A Series computer link unit, create the cable mentioned above. If you are using an off-the-shelf RS232C crossover cable, set “No CD pin check” in the sequence program.

[No CD Pin Check Setting]

Unit	Buffer address	0	1	Default
QJ71C24 LJ21C24	97H(137H)	Check	Not check	Not check
AJ71QC24	97H(137H)	Check	Not check	Not check
AJ71UC24	10BH	Check	Not check	Check

* The address in parentheses is the CH2 address.

3.7 DeviceXPlorer Settings

3.7.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Item		Description
CPU TYPE		Select the CPU type of PLC to be accessed.
	Use Block Access Command	Use block access commands for read / write. For details of the access method, see section 2.6.5.
NETWORK	Network No.	When accessing the PLC of another station, specify the network No. of the last network system passed through. Set a number between 0 and 255. To access your own PC, specify "0".
	PC No.	When accessing the PLC of another station, specify the station No. on the relevant system. To access your own PC, specify "255".
	Unit station No.	When accessing the PLC of another station, passing through a network system and also through a PLC CPU connected to a multi-drop, specify the station No. to be accessed. Set a number between 0 and 31. To access your own PC, specify "0".
	Multiple CPU System(Unit I/O No.)	When using multiple CPU system, specify the CPU number to be accessed. A unit I/O number corresponding to the multi-CPU system number is automatically set.
	Station No.	Specify the station number of the serial communication unit.
COMMUNICATION	Sum Check	Check this box to turn on "Sum check" and remove the check to turn it off.
	Format 4	In the A / FX Series CPU, communication is normally established using the "format 1" protocol, but if this option is checked communication is established using the "format 4" protocol.
ACCESS POINTS	Bit R / W	Batch read / write of bit scale is not performed.
	Word R / W	Specify the maximum access points of batch read / write of word scale.
	Bit Poke	Specify the maximum access points of random write of bit scale.
	Word Poke	Specify the maximum access points of random write of word scale.

For more on the number of access points, see Numbers of Access Points (section 2.6.4).

Note

If Q / L / QnA CPU are selected, communication is established using the “format 5” protocol (binary communication). To communicate using “format 1” or “format 4” (ASCII communication) when using Q / L / QnA CPU, select the A series CPU as the CPU type.

Important

You can access another station if you set Network Item “Network No.” or “PC No.” etc...
But because of affect by the length of the cable used and the CPU scanning speed, the access speed will be several times slower than the speed for access my station.

3.7.2 Group Settings

Refer to the MELSEC Ethernet group settings (section 2.9.2).

3.7.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 2.2 for devices that can be specified.
Device No.	Specify the device number. Specify X / Y / DX / DY / B / W / WW / WR / SB / SW in hexadecimal notation, and specify all other device numbers in decimal notation.
Block No.	Specify a block number if you have specified extended file register “ER” as the device type.

Note

If you specify the bit device in a format other than BOOL, set the leading device number as a multiple of 16.

Example : M16:W is OK, but M17:W is not OK.

3.8 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

For the detail about convertible device and etc., please refer “Import Tags” at MELSEC Ethernet Connection (section 2.11).

3.9 Errors

See the explanation of errors for MELSEC Ethernet connection (section 2.11).

4 [Mitsubishi] MELSEC EZSocket Connection

This chapter explains communication with MELSEC series equipment using EZSocket.

An overview of communication via a MELSEC EZSocket connection is shown below.

Overview	
Link	EZSocket connection
Connection type	Supports a redundant system (QnPRHCPU), CPU port connection, GX Simulator/GX Simulator2, and NC Trainer plus.

Important

- EZSocket doesn't support on DeviceXPlorer 64 bit edition. Please use 32bit edition with WOW64 on 64bitOS.
- EZSocket supports only Windows 8 / 7 / Vista.
- EZSocket doesn't support running as service.
- On EZSocket port setting, if you select [GX Works2] style, GX Works2 Ver1.497T or later is required.

4.1 PLC Systems

The table below shows units applicable to MELSEC EZSocket connection.

< Connectable units from serial port >

Type	Unit Name	Description
iQ-R Series	Serial Communication Unit (*1)	RJ71C24, RJ71C24-R2
QnU / Q Series	CPU Unit	Q00J, Q00, Q01, Q02(H), Q06H, Q12H, Q25H, Q02U, Q03UD, Q04UDH, Q06UDH, Q13UDH, Q26UDH, Q10UDH, Q20UDH, Q00H, Q00UJ, Q01U Q03UDVCP, Q04UDVCP, Q06UDVCP, Q13UDVCP, Q26UDVCP Q02(H)-A, Q06H-A
	Process CPU Unit	Q02PH, Q06PH, Q12PH, Q25PH
	Redundant CPU Unit	Q12PRH, Q25PRH
	Serial Communication Unit (*1)	QJ71C24, QJ71C24-R2, QJ71C24N, QJ71C24N-R2, QJ71C24N-R4
	MELSECNET/H Network Remote I/O Unit	QJ72LP25, QJ72BR15
	G4-S3 Unit	AJ65BT-G4-S3
QnA Series	CPU Unit	Q2A, Q2AS(H), Q2AS1, Q2AS(H)S1, Q3A, Q4A, Q4AR
	Serial Communication Unit (*1)	AJ71QC24, AJ71QC24N, AJ71QC24-R2, AJ71QC24N-R2, AJ71QC24-R4, AJ71QC24N-R4, A1SJ71QC24, A1SJ71QC24N, A1SJ71QC24-R2, A1SJ71QC24N-R2
	MELSECNET/10 Network Remote I/O Unit	AJ72QLP25, AJ72QBR15, A1SJ72QLP25, A1SJ72QBR15
	G4 Unit	AJ65BT-G4, AJ65BT-G4-S3

A Series	CPU Unit	A0J2H, A1FX, A1S, A1SJ, A1SH, A1SJH, A1N, A2C, A2CJ, A2N(S1), A2S, A2SH, A3N, A2A(S1), A3A, A2U(S1), A2US(S1), A2USH-S1, A3U, A4U
	Serial Link Unit (*1)	AJ71UC24, A1SJ71UC24-R2, A1SJ71UC24-PRF, A1SJ71C24-R2, A1SJ71C24-PRF, AJ71C24-S6, AJ71C24-S8, A1SCPUC24-R2, A2CCPUC24, A2CCPUC24-PRF, A1SJ71UC24-R4
	MELSECNET(2) Data Link Remote I/O Unit	AJ72P25, AJ72R25
	MELSECNET/10 Network Remote I/O Unit	AJ72LP25, AJ72BR15
	G4 Unit	AJ65BT-G4, AJ65BT-G4-S3
FX Series	CPU Unit	FX0(S), FX0N, FX1, FX1S, FX1N(C), FX2(C), FX2N(C), FX3UC, FX3U
Motion Controller (SCPU)	CPU Unit	A171SH, A172SH, A173UH(S1), A273UH(S3)

< Connectable to PC via GOT in transparent mode >

Type	Unit Name
GOT-A900 Series	A985GOT(-V), A975GOT, A970GOT, A960GOT, A956WGOT, A956GOT(-M3), A953GOT, A951GOT, A950GOT
GOT-F900 Series	F920GOT-K, F920 Handy GOT RH Type, F93*GOT, F930GOT-K, F94*GOT, F940WGOT, F94* Handy GOT, F94* Handy GOT RH Type
GOT-1000 Series	GT1150, GT1155, GT1550, GT1555, GT1565, GT1575, GT1585
GOT-2000 Series	GT2103, GT2508, GT2510, GT2512, GT2708, GT2710, GT2712, GT2715

*iQ-R Series doesn't support GOT transparent mode.

< Connectable units from USB port of PC >

Type	Unit Name	Description
iQ-R Series	CPU Unit	R04 / R08(P) / R16(P) / R32(P) / R120(P)CPU
QnU / Q Series	CPU Unit	Q02H, Q06H, Q12H, Q25H, Q02U, Q03UD(E), Q04UD(E)H, Q06UD(E)H, Q13UD(E)H, Q26UD(E)H, Q10UD(E)H, Q20UD(E)H, Q00H, Q00UJ, Q01U Q03UDVCP, Q04UDVCP, Q06UDVCP, Q13UDVCP, Q26UDVCP
	Process CPU Unit	Q02PH, Q06PH, Q12PH, Q25PH
	Redundant CPU Unit	Q12PRH, Q25PRH
L Series	CPU Unit	L02CPU, L26CPU-BT

< Connectable to PC via GOT in transparent mode >

Type	Unit Name
GOT-1000 Series	GT1150, GT1155, GT1550, GT1555, GT1565, GT1575, GT1585
GOT-2000 Series	GT2103, GT2508, GT2510, GT2512, GT2708, GT2710, GT2712, GT2715

*iQ-R Series doesn't support GOT transparent mode.

< Connectable units from Ethernet board that is attached to PC >

Type	Description	
CPU Built-in Ethernet port	iQ-R Series	R04 / R08(P) / R16(P)(MT) / R32(P)(MT) / R64MT / R120(P)CPU
	iQ-F Series	FX5U
	Q Series	Q03UDE, Q04UDEH, Q06UDEH, Q13UDEH, Q26UDEH, Q10UDEH, Q20UDEH, Q03UDV, Q04UDV, Q06UDV, Q13UDV, Q26UDV
	L Series	L02(S)CPU-(P) , L26CPU-(BT)(PBT)
iQ-R Series	RJ71EN71	
QnU / Q Series	QJ71E71, QJ71E71-B2, QJ71E71-100, QJ71E71-B5	
C Controller Module	Q12DCCPU-V, Q06CCPU-V	
QnA Series	AJ71QE71, AJ71QE71-B5, A1SJ71QE71-B2, A1SJ71QE71-B5, AJ71QE71N-T, A1SJ71QE71N-T, AJ71QE71N-B5, A1SJ71QE71N-B5, AJ71QE71N-B2, A1SJ71QE71N-B2, AJ71QE71N-B5T, A1SJ71QE71N-B5T, AJ71QE71N3-T, A1SJ71QE71N3-T	
A Series	AJ71E71-S3, A1SJ71E71-B2-S3, A1SJ71E71-B5-S3, A1SJ71E71-B2, A1SJ71E71-B5, AJ71E71N-B2, AJ71E71N-B5T, A1SJ71E71N-B2, A1SJ71E71N-B5N, AJ71E71N-T, A1SJ71E71N-T, AJ71E71N-B5, A1SJ71E71N-B5, AJ71E71N3-T, A1SJ71E71N3-T	
FX Series	FX3U-ENET-L	
CNC(Computerized Numerical Controller)*2	C6, C64, M750, M730, M720, M70, FCA720, FCA730, FCA750	

< Connectable units from CC-Link IE board that is attached to PC >

Type	Description
QnU Series	QJ71GP21-SX, QJ71GP21S-SX

< Connectable units from MELSECNET/H board that is attached to PC >

Type	Description
QnU / Q Series	QJ71LP21, QJ71LP21G, QJ71BR11, QJ71LP21-25, QJ71LP21S-25

< Connectable units from MELSECNET/10 and MELSECNET/H (MELSECNET/10 Mode) board that is attached to PC >

Type	Description
QnU / Q Series	QJ71LP21, QJ71LP21G, QJ71BR11, QJ71LP21-25, QJ71LP21S-25
QnA Series	AJ71QLP21, AJ71QBR11, A1SJ71QLP21, A1SJ71QBR11
A Series	AJ71LP21, AJ71BR11, A1SJ71LP21, A1SJ71BR11

< Connectable units from MELSECNET/2 board that is attached to PC >

Type	Description
A Series	AJ71AP21, AJ71AR11

< Connectable units from CC-Link board that is attached to PC >

Type	Description
QnU / Q Series	QJ61BT11, QJ61BT11N
QnA Series	AJ61QBT11, A1SJ61QBT11
A Series	AJ61BT11, A1SJ61BT11

< Connection for I/F board that is attached to PC >

I/F Board	Description
-----------	-------------

CPU Board	A80BD-A2USH-S1
-----------	----------------

< Connection with Q bus of CPU unit in PC >

Unit Name	Description
CPU Unit	PPC-CPU852(CONTEC), PPC-CPU686(CONTEC)

< Connection using GX Simulator >

Category	Unit name
GX Simulator	SWnD5C-LLT-J / E
GX Works2	GX Simulator2 contained in GX Works2

< Connection using NC Trainer plus>

Category	Unit name
NC Trainer plus	NC Trainer plus

(*1) In case of accessing to CPU of PLC through Serial Communication Unit (QnU / Q / QnA Series) and Serial Link Unit (A Series) from PC, some units are not available. Even if direct access to PC is not possible, it might be able to access when connected in a 1:n configuration (multi-drop connection) (external device : serial communication unit)

Type	Unit name	Interface	1:1	Multi-drop connection	
				First	n
iQ-R Series	RJ71C24 RJ71C24-R2	RS-232	✓	-	-
QnU / Q Series	QJ71C24	RS-232	✓	✓	-
		RS-422/485	-	-	✓
	QJ71C24-R2	RS-232	✓	-	-
		RS-232	-	-	-
	QJ71C24-R4	RS-422/485	-	-	✓
QnA Series	AJ71QC24(N)	RS-232	✓	✓	-
		RS-422/485	-	-	✓
	AJ71QC24(N)-R2	RS-232	✓	-	-
		RS-232	-	-	-
	AJ71QC24(N)-R4	RS-422	-	-	-
		RS-422/485	-	-	✓
	A1SJ71QC24(N)	RS-232	✓	✓	-
		RS-422/485	-	-	✓
	A1SJ71QC24(N)-R2	RS-232	✓	-	-
		RS-232	-	-	-
A Series	AJ71UC24	RS-232	✓	✓	-
		RS-422/485	-	-	✓
	AJ71C24-S6 / S8	RS-232	✓	✓	-
		RS-422	-	-	✓
	A1SJ71(U)C24-R2	RS-232	✓	-	-
	A1SJ71(U)C24-PRF	RS-232	✓	-	-
	A1SJ71UC24-R4	RS-422/485	-	-	✓
	A1SCPUC24-R2	RS-232	✓	-	-
		RS-232	✓	✓	-
	A2CCPUC24(-PRF)	RS-422	-	-	-
		RS-422/485	-	-	✓

(*2)When connecting to the CNC, set CPU type to “Q4A” in EZSocket Setting.

With Q4A CPU, it is possible to select other ways of connection than Ethernet. But only Ethernet enables the connection to the actual equipment CNC.

4.2 List of Devices

See the list of devices for MELSEC Ethernet connection (section 2.2). When connect to iQ-R Series, you can access the follow device.

But State “ST”, Random Access Buffer ”BM”, Buffer Memory “G”, Extended data register ”D” and Extended link register “W” are not supported with EZSocket Communication.

When use GX Simulator, you can use Devices which GX Simulator supports. Offline Monitor Index “OMI” is only accessible for offline monitor connection.

[List of iQ-R Devices]

Device name	Device symbol	Device range	Category	Format
		iQ-R Series		
Long counter coil	LCC	0 - 511	Bit	Dec
Long counter contact	LCS	0 - 511		Dec
Refresh register	RD	0 - 524288	Word	Dec
Current long timer value	LTN	0 - 4096	Double Word	Dec
Current long retentive timer value	LSTN	0 - 8191		Dec
Current long counter value	LCN	0 - 511		Dec
Long index register	LZ	0 - 1		Dec
Offline Monitor Index	OMI	0		Dec

4.2.1 Global label access

When connect to iQ-R Series, you can access the global labels configured by software “GX Works3”.

Important

- Supported data type is Bit, Word, Double Word, FLOAT [Single Precision], FLOAT [Double Precision].
String, Timer, Counter, Pointer, Structure, Array of Data, Structer member, Array index are not supported.

[Settings Step]

1. Configure the label by ”Label”-“Global Label” of Navigation windows in GX Works3.
Please check “Access from Extend Device”.

	Label Name	Data Type	Comment	Access from External Device
1	bLabel1	Bit	...	☒
2	uLabel2	Word [Unsigned]/Bit String [16-bit]	...	☒
3	udLabel3	Double Word [Unsigned]/Bit String [32-bit]	...	☒
4	eLabel4	FLOAT [Single Precision]	...	☒
5	leLabel5	FLOAT [Double Precision]	...	☒
6				☐

2. Write Grobal Label to PLC after checking “Global Label Setting” and “Global Label Assignment Information”.

Module Name/Data Name				Detail	Title
Untitled Project	☐	☐			
Parameter	☒	☐			
System Parameter/CPU Parame...	☒	☐			
Module Parameter	☒	☐			
Memory Card Parameter		☐			
Remote Password	☒	☐			
Global Label	☐	☐			
Global Label Setting	☒	☐			
Global Label Assignment Inform...	☒	☐			
Device Memory	☐				
MAIN	☐			Detail	
File Register	☐				

4.2.2 Accessing to more than one PLC register by dynamic tags

In MELSEC connections, only the case of accessing by the dynamic tags from client application, the more than one PLC register can be collectively read and written as comma-delimited string of a single tag.

For details of the access method, see section 2.2.1.

4.3 Setting EZSocket Connection Targets

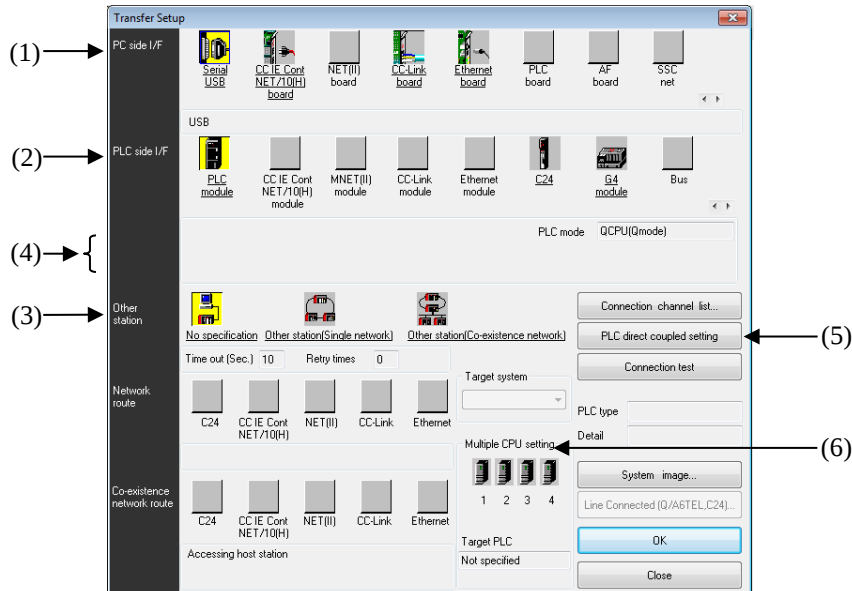
This section explains how to specify connection targets using the EZSocket connection target specification screen.

For details, see the instructions for specifying connection targets in the GX Works2 manual.

4.3.1 Own Station Access

The following is an example of the setting to make to access your own station.

[Connection Target Specification Screen]

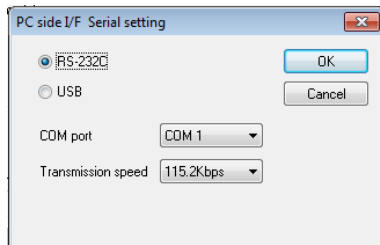


[Description]

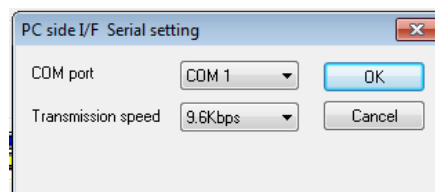
(1) PC side I / F

Specify the interface for connecting the PC and PLC.

Q Series



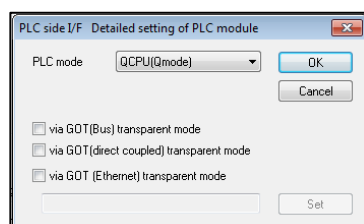
QnA / A / Series



- * The USB can only be set when QCPU (Q mode) is selected.
- * The transfer speed that can be selected varies with the CPU type.
- * In the QnA Series, the CPUs that can communicate at 38.4 kbps are those with the QnA CPU version B or later.
- * In the A Series, select a transfer speed of 9.6 kbps.

(2) PLC side I / F

Specify the CPU type of the PLC to be connected.



(3) Other station specification

If you have selected your own station, select “no other station specification”.

(4) Detailed settings field

Show the settings status.

(5) PC direct link setting button

This is convenient to use when switching from specifying another station to specifying your own station.

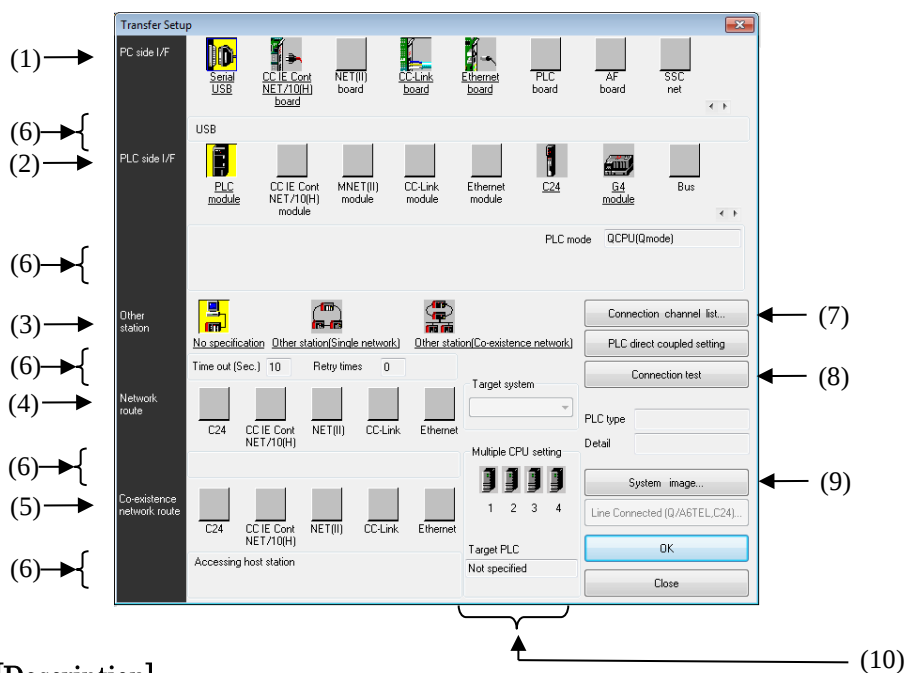
(6) Multi-CPU specification setting

Make a specification if multiple CPUs are to be accessed. See section 4.3.3.

4.3.2 Other Station Access

Specify when making access to the other station.

[Connection Target Specification Screen]



[Description]

(1) PC side I / F

Specify the interface for connecting the PC and PLC.

(2) PLC side I / F

Specify the CPU type of the PLC to be connected.

(3) Other station

<What is Single network?>

It indicates a system which is configured by a single network and a multilevel system only MELSECNET/10 or only Ethernet.(Since Ethernet is regarded as the MELSECNET/10,specify Single network for a MELSECNET/10 and Ethernet mixed system.)

< What is Coexistence network? >

Set this network when making access which is made up to of different network from MELSECNET/10 to CC-Link unit or from Q-compatible C24/QC24 to MELSECNET/10.

This network cannot be chosen for the A series.

(4) Network route

When Single network is selected

Choose the network type, network No., station number and first I/O No. to be accessed. The setting items depend on the network type that has been set.

When Coexistence network is selected

Choose this when making access to the network different from the one where the personal computer is connected.

(5) Co-existence network route

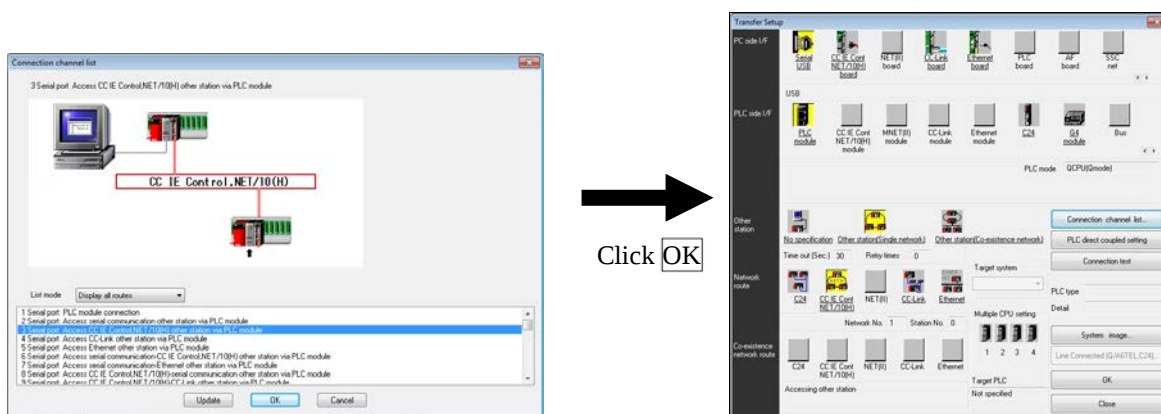
Choose the network type, network No., station number and first I/O No. to be accessed. The setting items depend on the network type that has been set.

(6) Detailed settings display column

Show the setting status.

(7) Connection channel list

You can set the connection target while looking at the Connection channel list. As clicking OK automatically sets the connection channel on the Connection Setup screen, settings can be made easily if a complicated system is configured. Set the network number, station number and others as desired according to the access target.



Clicking the OK button automatically sets the connection channel of the Connection Setup screen.

< Convenient usage of Display selected routes >

When display selected route are selected by specifying the PC side I/F and PLC side I/F on the Connection Setup screen, only the routes in the accessible range are displayed from among the other station, network route and coexistence network route.

(8) Connection test

Test whether proper access can be made to the PLC set as the access target on the Connection Setup screen. If proper access can be made, the model name of the PLC as the access target appears in the CPU type field.

(9) System image

Illustrate the preset connection channel.

(10) Multiple PLC setting

Specify when the access target is multiple CPUs.

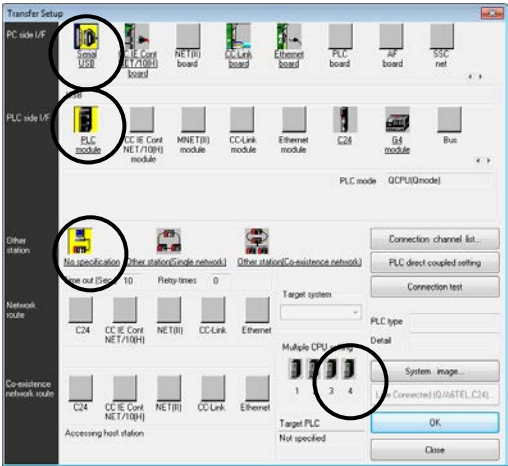
For details, refer to 4.3.3.

4.3.3 Accessing Multiple CPUs

The following is an example of the setting to make to access multiple CPUs.

[Connection Target Specification Screen]

The setting example shown below is for connecting a PC to CPU1 and accessing CPU4.



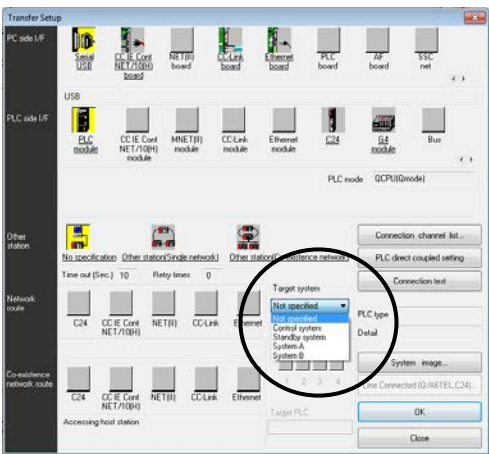
[Description]

To access CPUs other than that of the PLC to which the PC is connected, always specify the CPU number to be accessed in the multi-CPU settings. Note that if you do not specify a multi-CPU setting (no CPU number specification), the CPU of the connected PLC will be accessed. For more on accessing a network via multiple CPUs, see the GX Works2 manual.

4.3.4 Accessing Redundant CPUs

The following is an example of the setting to make to access redundant CPUs.

[Connection Target Specification Screen]



[Description]

Specify the connection under “Redundant CPU specification”.

Options	Connection target
No system specification	CPU direct link: PLC CPU directly linked to the PC Network: PLC CPU of the station in which the network unit having the station number specified in the network communication route.
Control system	PLC CPU for which the system status is the control system
Standby system	PLC CPU for which the system status is the standby system

Options	Connection target
System A	PLC CPU to which side A connector of the tracking cable is attached.
System B	PLC CPU to which the side B connector of the tracking cable is attached.

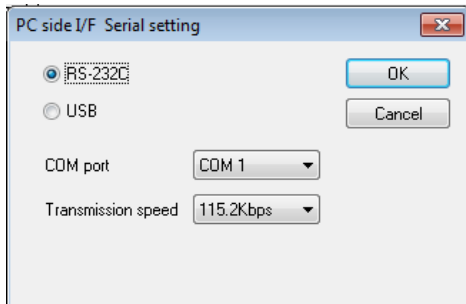
4.3.5 Settings for Using GOT (Support for GOT Transparent Function)

This section explains the connection specifications to make if you are using the GOT transparent function.

[Connection to QnU / Q / QnA / A CPU]

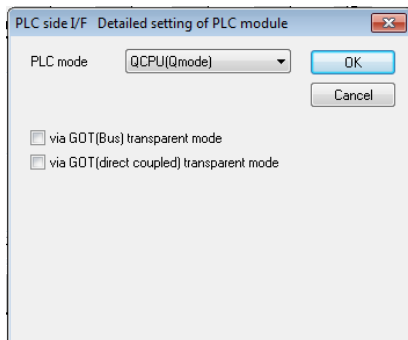
(1) “PC side I / F serial detailed settings”

If you are using an RS-232C cable to connect the PC to the GOT, make appropriate settings for the COM port and the transfer speed. If you are using a USB cable to connect the PC to the GOT, select USB.



(2) “PC side I / F CPU unit detailed settings”

Select the CPU to connect to, and if you are using a bus to connect the GOT and the PLC, place a check beside “via GOT transparent function (bus connection)”. To directly link the GOT and the PLC, place a check beside “Use GOT transparent function (direct link)”.



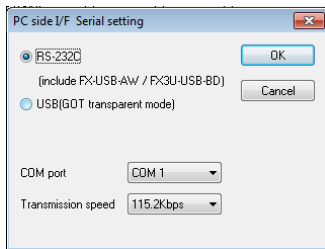
Note

To connect to a QnACPU or ACPU, you need to select the CPU mode in advance, as shown above in (2). Note that if this setting is not made, you will not be able to select USB.

[Connection to an FXCPU]**(1) “PC side I/F serial detailed settings”**

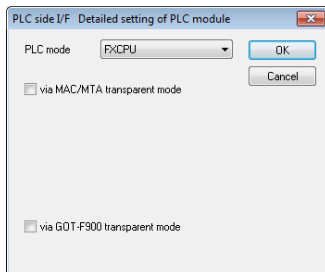
To use an RS-232C cable to connect the PC with the GOT, select “RS-232C (include FX-USB-AW / FX3U-USB-BD)”.

If you are using a USB cable to connect the PC to the GOT, select “USB (GOT transparent mode)”.

**(2) “PC side I / F CPU unit detailed settings”**

(This setting is necessary only when FX3UC CPU is selected and the GOT-F900 transparent function is used. If a CPU other than FX3U or FX3UC is selected, this setting is unnecessary.)

Place a check beside “via GOT-F900 transparent function”.



4.3.6 Connection to iQ-R

This section explains the connection specifications to make if you are connecting to iQ-R Series.

Important

- Does not support the connection below.

[Not Supported]

- (1) Ethernet direct access
- (2) Other station access and multi-drop connection by Serial.
- (3) Coexistence network

This network is made up to of different network from MELSECNET/10 to CC-Link unit etc.

- (4) GOT Transparent Function

Configuration

PC Side

Interface: Ethernet Connection

Protocol: TCP/IP

Network No.: 1

Station No.(C): 1

PLC Side

Interface: Ethernet Module

Host name: 127.0.0.1

Network No.: 0

Station No.(L): 255

Multiple CPU: None

Serial Communication

Com Port: 1

Baud Rate: 115.2kbps

Data Bit: 8Bit

Parity: Odd

Stop Bit: 1Bit

SumCheck: ON

Timeout: 10 sec

OK Cancel

Item	Description
PC Side	This is configuration of PC side.
Interface	Ethernet connection Connect by Ethernet. USB connection Connect by USB. Serial connection Connect by RS-232C.
Protocol	Select TCP/IP or UDP/IP. This is available when you select "Ethernet connection".
Network No	Specify the Network No of PC. This is available when you select "Ethernet connection".
Station No	Specify the Station No of PC. This is available when you select "Ethernet connection".

Item	Description
PLC Side	This is configuration of PLC side.
Interface	Select PLC Module. Ethernet Module --- Connect to Ethernet module. CPU Module --- Connect to CPU module. Serial Module --- Connect to Serial module.
Host name	Specify IP address of PLC.
Network No	When accessing the PLC of another station, specify a number between 0 and 255 as the network No. of the last network system passed through. To access host PLC, specify "0".
Station No	When accessing the PLC of another station, specify the station number on the relevant system. To access host PLC, specify "255".
Multiple CPU	When using multiple CPU system, specify the CPU number to be accessed.
Serial Communication	This is configuration of Serial.
Port No	Specify the COM port number.
Baud rate	Specify the Baud rate.
Databit	Specify Data bit.
Parity	Specify Parity.
Stop bit	Specify Stop bit.
Sum check	Specify Sum check.

4.3.7 Ethernet Connection to QCPU (A mode) and AnUCPU

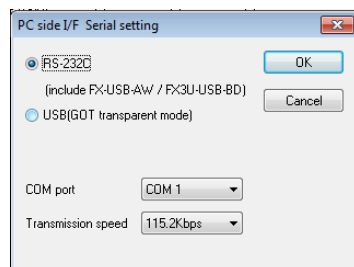
To connect to QCPU (A mode) and AnUCPU via Ethernet, set the PLC CPU type as AnACPU.

Access is possible within the range handled by the AnACPU, such as the sequence program and the device memory. Accordingly, it is not possible to access devices and network parameters extended by the subprogram 2 / 3, the QCPU (A mode), and the AnUCPU.

To access the AnUCPU via QJ71E71, there is no need to change the PLC CPU to AnACPU. Devices in the range handled by the AnUCPU can be accessed.

4.3.8 Connection to FXCPU Port

To connect to FXCPU via CPU port, set Transmission speed properly.



FXCPU Type	Transmission speed
FX0(S), FX0N, FX1, FX1S, FX2(C)	9.6K
FX1N(C), FX2N(C)	9.6K - 19.2K
FX3U(C)	9.6K - 115.2K

4.4 DeviceXPlorer Settings

4.4.1 EZSocket Port Settings

To use EZSocket, install the EZSocket component during setup.

Important

The folder "OptionFiles" is made for the same route as project file (*.dpx) preservation ahead when the EzSocket port is made when the project file is preserved, and the configuration file for EZSocket is stored from Ver4.2 in the device Explorer of the previous version.

Port properties

☐ GX-Simulator Connect(G)

☒ GX Works3 System No: 1 CPU No(U): 1

☐ GX Works2 No 1(A) ▼

☐ GX Developer

☐ Offline Monitor Connect

☒ GX Works3

Target Project File Path: []

CPU TYPE

CPU: QCPU (Q Mode) ▼

MODEL: Q02UCPU ▼

SCREEN FORMAT

☐ GX Works2 ☒ GX Developer Configuration

REDUNDANT SYSTEM

☒ Auto Change Route

POKE MODE

☐ Both ☐ Force ☒ Either

Timeout: 3 sec

Retry count: 3 times

Item	Description
GX-Simulator Connect	Place a check beside this option to connect to Simulator.
GX Works3	Select if you use GX Works3.And select System No and CPU No.
GX Works2	Select if you use GX Works2.And select communicationroute from No1(A) to No4(D).
GX Developer	Select if you use GX Simulator.
CPU TYPE	Specify the CPU to be connected to.
CPU	Select the CPU type of the PLC to be connected to.
MODEL	Select the CPU model, in using GX-Simulator and selecting QnU Type.
SCREEN FORMAT*	Select the format of the communication setting screen.
GX Works2	Use the Screen format of GX Works2 style. GX Works2 Ver1.497T or later is required.
GX Developer	Use the Screen format of GX Developer style.

Item	Description
Configuration	Specify the MELSEC connection point. If you have created a new port or changed the CPU type, be sure to specify the connection point. For details, see the EZSocket connection point specifications (section 4.3).
Offline Monitor Connect	Place a check beside this option to connect to Offline Monitor.
GX Works3	Select if you use GX Works3.
Target Project File Path	Specify the project file path at the destination of the offline monitor.
REDUNDANT SYSTEM	Specify the communications route and write settings if QCPU (redundant system) is selected.
Auto Change Route	Check this option to automatically switch the communication route.
POKE MODE	Both: Writes to both of the redundant CPU systems. If the targeted CPU is in backup mode, writing is performed to a system other than the specified system. (If the target CPU is in the separate mode or the debug mode, writing is only to the specified system.) Both Force: Writes to both of the redundant CPU systems. Writes to both systems regardless of the operating mode of the target CPU. Either: Writes to the specified system only. Writing is performed regardless of the operating mode of the target CPU. The system specification is made in the redundant CPU specification of the connection point specifications.
Timeout	Specify the waiting time between sending a request message and receiving a response message. If a response cannot be returned within the specified time, it results in a timeout error. Set a number between 0 and 60.
Retry Times	Specify the number of times to retry when a timeout error occurs. If TCP / IP is used, the connection is cut if a response is not received even after the set number of retries, and an attempt is made to reconnect. Set a number between 0 and 10.

*Setting screen that can be used by the CPU type is different.Support of the CPU configuration screen is as follows.

CPU \ SCREEN FORMAT	GX Works2	GX Developer
iQ-RCPU	-	-
QnUDVCPU	✓	-
QnUCPU	✓	✓
QCPU(Q Mode)	✓	✓
LCPU	✓	✓
Q(A Mode)	-	✓
QCPU(Redundant System)	✓	✓
QnACPU	-	✓
ACPU	-	✓
Motion Controller(SCPU)	-	✓
FXCPU	✓	✓
MELDAS-CNC(M6/M7)	-	✓

✓: Enable -: Disable

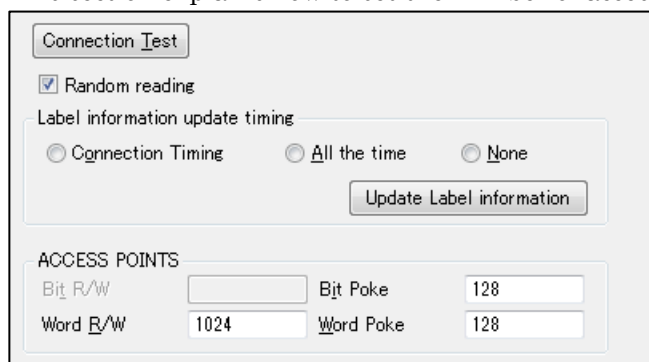
Important

Communication configuration is created in the configuration screen for each.EZSocket will not be able to read the configuration screen of the Format different.If you created a new communication settings for the existing configuration information is reset, please note.

On previous Ver5.0, DeveceXPlorer is using the setting screen of GX Works2. So if you open previous dxp project file, please select [GX Works2] style.

4.4.2 Device Settings

This section explains how to set the number of access points for PLC to be accessed.



Item		Description
Random reading		By default, reading method is Batch Reading. Batch Reading is suitable for reading continuation address area of register. If this check is validated, reading method becomes Random Reading. Random Reading is suitable for reading scattering address area of register.
Label information update timing		Configure timing to update Label information. This setting is only for iQ-R CPU. Connection Timing --- Update information when connecting to PLC. All the time --- Update information every time communicate with PLC. None --- Not update.
Update Label information		Update the device information of tags that are set label name.
Access points	Bit R / W	Batch read / write of bit scale is not performed.
	Word R / W	Specify the maximum access points of batch read / write of word scale.
	Bit Poke	Specify the maximum access points of random write of bit scale.
	Word Poke	Specify the maximum access points of random write of word scale.

For more on the number of access points, see Numbers of Access Points (section 2.9.4).

4.4.3 Group Settings

This section explains how to set group dialog.

Make group settings when managing tags in a hierarchical structure or follows.

- To access Intelligent Function Module.
- To import tags from PX Works2.
- To import tags from iQ Works.

When intelligent function module access is enabled, the buffer memory(G) of the intelligent function module can be accessed. However, only MELSEC-Q/QnACPU is supported.

Group properties

Group Name:

☐ Accessing to Intelligent Function Module

Unit No. (Hexadec)

☐ Import tags from PX Developer

☒ Import tags from iQWorks System Label

Size to String type.

☐ Include the System Label name in Tag name.

☐ Generate a system label for device assignment as a label usage tag

☐ Delete existing tags

Item	Description
Accessing to Intelligent Function Module	Place check in this option to access Buffer memory “G” of intelligent function module.
Unit No.	Specify the intelligent unit no. to be accessed. Access Format :U[]¥G*** []:Unit No.

About importing tags from PX Developer or iQ Works, please refer to 2.9.2.2 and 2.9.2.3.

4.4.4 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [D0]

GeneralScaleSimulationAlarm

Tag Name

Tag

D0

☐ Auto Format

Description

☐ Use Label name

Get Info

Device Type

D

Data Register

Device No.

0

Block No.

0

Data Type

SHORT

Byte Position

Lower Byte

Length

1

Bit Position

0

☐ Byte Swap

Attribute

ReadWrite

☐ Array

Calculation

NONE

New

Save

<<

>>

OK

Cancel

Item	Description
Label name	Input label name when check “Use Label Name”. This is available when connecting to iQ-R Series.
Get Info	Get Label information based on Label name.
Device Type	Specify the PLC device to be accessed. Refer to the list in section 2.2 for devices that can be specified.
Device No.	Specify the device number. Specify X / Y/ DX / DY / B / W / WW / WR / SB / SW in hexadecimal notation, and specify all other device numbers in decimal notation.
Block No.	Specify a block number if you have specified extended file register (ER) as the device type.

Note

If you specify the bit device in a format other than BOOL, set the leading device number as a multiple of 16.
Example: M16:W is OK, but M17:W is not OK.

4.5 Errors

When EZSocket is used, PLC errors (response errors) that are included in the error messages are shown in 32 bits, classified into target CPU or unit errors and EZSocket errors.

I.	No	Date	Time	Item/Class	Message
	00033	6/19/2007	10:51:25.1...	Port1	EZSocket port open complete.
	00034	6/19/2007	10:51:25.1...	Device1	Read D20000-D20000 point=1
	00035	6/19/2007	10:51:25.1...	Port1	Send receive error (Code = 0x1802002)
	00036	6/19/2007	10:51:25.4...	Device1	Read D20000-D20000 point=1
	00037	6/19/2007	10:51:25.4...	Port1	Send receive error (Code = 0x1802002)
	00038	6/19/2007	10:51:25.7...	Device1	Read D20000-D20000 point=1
	00039	6/19/2007	10:51:25.7...	Port1	Send receive error (Code = 0x1802002)

The error code format is shown below.

(Bits)

31	30	23	15	0
01h fixed		(1) Error unit information		(2) Error content

(1) Error unit information is shown below.

(1)	Error unit information	(2) Error content
00h	Use prohibited	
01h	A Series	See section 4.5.1.
02h	QnA Series	
03h	C24 computer link unit	
04h	QC24 serial communication unit	
05h	E71 Ethernet unit	
06h	QE71 Ethernet unit	
07h	Network board	
08h	LM	
09h	FX Series	
0Ah	Q Series	
0Bh	QC24 serial communication unit for Q Series	
0Ch	E71 Ethernet unit for Q Series	
80h	EZSocket error	See section 4.5.2.

4.5.1 Errors Other Than EZSocket Errors

The table below shows the error codes for when the error unit is not EZSocket.

About error description for error code, refer to manual of units.

Error unit information	(2) Error content
A Series CPU (01h) E71 Ethernet Units (05h)	00h – 03h : Error of A Series CPU
	B000h – BFFFh : Error of CC-Link Unit
	F000h – FFFFh : Error of MELSECNET / 10 Unit
QnA Series CPU (02h) QC24 Serial Communication Unit (04h) QE71 Ethernet Units (06h)	4000h – 4FFFh : Error of QnA Series CPU
	5000h – 5FFFh : Error of QnA Intelligent Unit
	B000h – BFFFh : Error of CC-Link Unit
	F000h – FFFFh : Error of MELSECNET / 10 Unit
C24 Serial Link Unit (03h)	00h – FFh : Error of UC24 unit
Network Board (07h)	0000h – 0FFFh : Error of driver
	00h – 03h : Error of A Series CPU
	4000h – 4FFFh : Error of QnA Series CPU
	5000h – 5FFFh : Error of QnA Intelligent Unit
	B000h – BFFFh : Error of CC-Link Unit
	F000h – FFFFh : Error of MELSECNET / 10 Unit
LM (08h)	0000h – 0FFFh : Error of LM
FX Series (09h)	00h – FFh : Error of FX Series CPU
Q Series CPU (0Ah) QC24 for Q Series Serial Communication Unit (0Bh) QE71 for Q Series Ethernet Units (0Ch)	00h – 03h : Error of A Series CPU
	B000h – BFFFh : Error of CC-Link Unit
	F000h – FFFFh : Error of MELSECNET / 10 Unit
	00h – 03h : Error of A Series CPU
	B000h – BFFFh : Error of CC-Link Unit

4.5.2 EZSocket Errors

The table below shows the error codes for when the error unit is EZSocket.

Error code (HEX)	Error	Description
01801005	Specified port error	The specified port does not exist. Specify a correct port.
01801006	Specified unit error	The specified unit does not exist. Specify a correct unit.
01801007	Specified CPU error	The specified CPU does not exist. Specify a correct CPU.
01801008	Access error	Access to the specified CPU is not permitted.
01802001	Device error	The specified device does not exist in the specified CPU type. Specify a correct device.
01802002	Device number error	Out of the specified device range. Specify a correct device number.
01802004	Sum check error	A sum check error occurred during communication. Check the communication line.
01802005	Excessive number of points error	The specified number of points exceeds the range. Specify a correct number of access points.
01802006	Block no. error	The specified block number does not exist. Specify a correct block number.
01802007	Received data error	There is a problem with the received data. Retry.
01802008	CPU write protect error	The CPU's write-protect switch is on. Turn it off.
01802016	Station number setting error	The specified station number does not exist. Specify the correct station number.
01802023	SFC block no. error	The specified SFC block number does not exist. Specify a correct SFC block number.
01802024	SFC step no. error	The specified SFC step number does not exist. Specify a correct SFC step number.
01808001	Duplicate open error	An attempt was made to open the port when it was already open.
01808002	Channel number specification error	Incorrect channel number setting. Specify the correct value.
01808003	Driver not activated error	The driver is not activated. Activate the driver.
01808009	COM open error	The handle of the COM port cannot be opened. Specify a correct COM port.
01808101	Duplicate close error	An attempt was made to close the port when it was not open.
01808201	Send error	Data transmission failed.
01808301	Receive error	Data reception failed.
01808406	Baud rate specification error	Incorrect baud rate setting. Specify the correct value.
01808407	Data length specification error	Incorrect data length setting. Specify the correct value.
01808408	Parity specification error	Incorrect parity setting. Specify the correct value.
01808409	Stop bit specification error	Incorrect stop bit setting. Specify the correct value.
0180840A	Communication control specification error	Incorrect communication control setting. Specify the correct value.
0180840B	Timeout error	Data sending or receiving could not occur within the specified time. Specify a longer timeout value.
FFFFFFFF	Connect error (GX Simulator2)	The specified GX Simulator2 does not exist. Specify a correct GX Simulator2 parameter.

5 [Mitsubishi] MELSEC Interface Board Connection

This chapter explains communication with MELSEC series equipment using an interface board.

An overview of communication via a MELSEC interface board connection is shown below.

Overview	
Link	Interface board connection
Support Board	CC-Link board, MELSECNET board, and PC unit supported.
Note	Please use 1 Interface board with 1 port, because Interface board is not supported for Multi - thread connection.

Important

- Support OS for MELSEC interface board connection depends on MELSEC interface board supporting OS.
- MELSEC interface board doesn't support running as service.

5.1 PLC Systems

5.1.1 Applicable CPU Units

The applicable CPU units for MELSEC interface board connection are shown below.

Category	Applicable CPU units
Q Series	Q00(J)CPU, Q01CPU, Q02(H / PH)CPU, Q06(P)HCPU Q12(P / PR)HCPU, Q25(P / PR)HCPU, Q172 / Q173CPU Q02UCPU, Q03UD(E)CPU, Q04UD(E)HCPU, Q06UD(E)HCPU Q13UD(E)HCPU, Q26UD(E)HCPU, Q10UD(E)HCPU, Q20UD(E)HCPU, Q50UDEHCPU, Q100UDEHCPU Q03UDVCPU, Q04UD(P)VCPU, Q06UD(P)VCPU, Q13UD(P)VCPU, Q26UD(P)VCPU
L Series	L02(S)CPU-(P) , L26CPU-(BT)(PBT)
QnA Series	Q2A(S)(H)CPU(-S1), Q3ACPU, Q4A(R)CPU
A Series	A1FXCPU, A1S(J)HCPU, A2C(J)CPU(-S3), A2(U)S(H)CPU(-S1) A0J2HCPU, A1NCP, A2(N / A / U)CPU(-S1), A3(N / A / U)CPU, A4UCPU
FX Series	FX0NCP, FX1N(C)CPU, FX2N(C)CPU, FX1SCP, FX3U(C)CPU

5.1.2 Applicable Units

The applicable units for MELSEC interface board connection are shown below.

Category	Unit	Note
Interface board	Q81BD-J71GP21-SX Q80BD-J71GP21-SX	CC-Link IE (MELSECNET / G)
	Q81BD-J71GF11-T2 Q80BD-J71GF11-T2	CC-Link IE Field
	Q81BD-J71LP21-25(PCI Express Edition) Q80BD-J71LP21-25	MELSECNET / H(10) optic
	Q80BD-J71LP21G	MELSECNET / H(10) optic
	Q80BD-J71BR11	MELSECNET / H(10) coaxial bus
	A70(98)BD(E)-J71QLP23(G / GE)	MELSECNET / 10 optic
	A70BD(E)-QLR23	MELSECNET / 10 coaxial loop
	A70(98)BD-J71QBR11 / 13	MELSECNET / 10 coaxial bus

	A70BD-J71AP23	MELSECNET / 2
	A80BD-A2USH-S1	PLC CPU
	A70BD-AF	A bus interface
	Q81BD-J61BT11(PCI Express Edition) Q80BD-J61BT11N	CC-Link master-local shared board
	A80BD-J61BT13	CC-Link local board
	A80BD-J61BT11	CC-Link master board
Intelligent unit	AJ65BT-G4-S3	CC-Link G4 unit
PC unit	Q10WCPU-W1-J(E)	Embedded SSD memory
	Q10WCPU-W1-CFJ(CFE)	Compact flash memory
	PPC-100-DC5511(551A)	Embedded SSD memory, Made by CONTEC
	PPC-100-DC5311(531A)	Compact flash memory, Made by CONTEC

5.2 List of Devices

The table below shows a list of devices that can be accessed via MELSEC interface board connection. The range of devices varies with the interface board type and method of access. For details, refer to your interface board instructions.

If you access another station, see the list of devices for MELSEC Ethernet connection (section 2.2).

But Random Access Buffer "BM", Buffer Memory "G" and Extended data register(D) are not supported.

[List of Devices for Accessing Own Station (PC No. 255)]

Device name	Device symbol	Device range					Category	Format
		NET/2	NET/10 NET/H	CC-Link IE	CC-Link IE Field	CC-Link		
Input relay	X	0-7FF	0-1FFF	0-1FFF	0-3FF	0-1FFF	Bit	Hex
Output relay	Y	0-7FF	0-1FFF	0-1FFF	0-3FF	0-7FF		Hex
Link relay	B	0-FFF	0-3FFF	0-7FFF	N/A	N/A		Hex
Link special relay	SM(SB)	9208-9255 *1	0-511	0-511	0-32	0-511		Decimal
Link special relay	SB	N/A	0-1FF	0-1FF	0-1F	0-1FF		Hex
Link register	W	0-FFF	0-3FFF	0-1FFFF	N/A	N/A	Word	Hex
Remote register (read) *3	WR	N/A	N/A	N/A	0-1FFF	0-7FF		Hex
Remote register (write) *3	WW	N/A	N/A	N/A	0-1FFF	0-7FF		Hex
Link special register	SD(SW)	9200– 9255*2	0-511	0-511	0-511	0-511		Decimal
Link special register	SW	N/A	0-1FF	0-1FF	0-1FF	0-1FF		Hex

The device symbols in the parentheses () are the specification to be made if the NET/2 board is used.

*1 SM9200 - 9207 cannot be accessed.

*2 For access SM / SD9200 onward of the MELSECNET/2 board, specify the address minus 9000 in tag registration.

Example: For SD9200, specify SD200.

*3 Remote register "WR / WW" is CC-Link and CC-Link IE Filed dedicated device.

Important

In Interface Board Connection to Mitsubishi MELSEC, accessible device varies with the interface board type.

If inaccessible device tag is registered, DeviceXPlorer shows icon as below. Please re-set the tag.

Example : Data register "D" is not accessible device at MELSECNET / H interface board.

Name	Data Type	Loca...	Value	Quality
Tag1	Short	D0		
Tag2	Short	D1		
Tag3	Short	D2		
Tag4	Short	D3		
Tag5	Short	W1		

5.2.1 Accessing to more than one PLC register by dynamic tags

In MELSEC connections, only the case of accessing by the dynamic tags from client application, the more than one PLC register can be collectively read and written as comma-delimited string of a single tag.

For details of the access method, see section 2.2.1.

5.3 DeviceXPlorer Settings

5.3.1 MELSEC Interface Board Settings

To make the MELSEC interface board settings, first install the driver software (SWnDNF-xxxx) that came with the board.

Port properties

Board Type

☒ CC-Link IE Board

☐ CC-Link IE Field Board

☐ MELSECNET/H/10 Board

☐ MELSECNET/2 Board

☐ A-BUS Board

☐ ACPU Board

☐ CC-Link Board

☐ CC-Link G4 Unit

☐ WinCPU/CONTEC PC Unit

Board No

☐ Channel No

Timeout sec

Retry count times

Item	Description
Board Type	Select the MELSEC interface board to be used from those listed below.
Board No.	If one board is installed, set "1"; if more than one board is installed, specify the number. The maximum number that can be installed varies with the type of board used.
Channel No	By putting in a check, you can specify a channel no explicitly.
Timeout	Specify the waiting time between sending a request message and receiving a response message. If a response cannot be returned within the specified time, it results in a timeout error. Set a number between 0 and 60.
Retry count	Specify the number of times to retry when a timeout error occurs. If TCP / IP is used, the connection is cut if a response is not received even after the set number of retries, and an attempt is made to reconnect. Set a number between 0 and 10.

Board type	Board	Max. installed
CC-Link IE Board (MELSECNET / G)	Q81BD-J71GP21-SX Q80BD-J71GP21-SX	4
CC-Link IE Field Board	Q81BD-J71GF-T2	4
MELSECNET / H Board MELSECNET / 10 Board	Q81BD-J71LP21-25, Q80BD-J71LP21-25, QD80BD-J71LP21G, Q80BD-J71BR11, A70(98)BD(E)-J71QLP23(G / GE) A70BD(E)-QLR23, A70(98)BD-J71QBR11 / 13	4
MELSECNET / 2 Board	A70BD-J71AP23	2
A-Bus Board	A70BD-AF	1
ACPU Board	A80BD-A2USH-S1	10
CC-Link Board	Q81BD-J61BT11, Q80BD(E)-J61BT11N / A80BD-J61BT11 / 13	4
CC-Link G4 Unit	AJ65BT-G4-S3	10
WinCPU / CONTEC PC Unit	Q10WCPU-W1-J(E), Q10WCPU-W1-CFJ(CFE) PPC-100-DC5511(551A), PPC-100-DC5311(531A)	1

5.3.2 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

NETWORK

Network No. 0

PC No. 255

ACCESS POINTS

Bit R/W Bit Poke 128

Word R/W 1024 Word Poke 128

Item		Description
NETWORK	Network No.	When accessing the PLC of another station, specify the network number of the last network system passed through. Set a number between 0 and 255. To access your own PC, specify "0".
	PC No.	When accessing the PLC of another station, specify the station number on the relevant system. To access your own PC specify "255". If you are using a CC-Link board, set the CC-Link station number. If you are using a PC unit, set the CPU number (1-4) to be accessed. If you are using a CONTEC/WinCPU PC unit, set the logical code which was configured at configuration utility of PC unit*1. Also you remove the check of "Multiple CPU Synchronous Startup Setting" in Multiple CPU Setting tab at GX Works2*2.
ACCESS POINTS	Bit R / W	Batch read / write of bit scale is not performed.
	Word R / W	Specify the maximum access points of batch read / write of word scale.
	Bit Poke	Specify the maximum access points of random write of bit scale.
	Word Poke	Specify the maximum access points of random write of word scale.

For more on the number of access points, see Numbers of Access Points (section 2.9.4).

*1 Into PC No., you enter the logical code which configured at "Target Setting" in Configuration utility of WinCPU.
ex.) logical code : 1 → PC No. : 1

WinCPU設定ユーティリティ

ユニット情報 | ユニットモニタ | オンライン操作 | システム設定 | I/O割付設定 | マルチCPU設定 | 相手先設定 | 通信診断

論理局番 1

設定(C)

対象CPU 1

相手先一覧

論理局番	対象CPU
1	1

変更(G) 削除(D)

デバイスモニタ(D) ファイル読み出し(L) ファイル保存(S) ヘルプ(H) 閉じる(C)

新規作成

- *2 You remove the check of “Multiple CPU Synchronous Startup Setting” in .Multiple CPU Setting tab at Parameter Setting at GX Works2.

Q Parameter Setting

PLC Name | PLC System | PLC File | PLC RAS | Boot File | Program | SFC | Device | I/O Assignment | Multiple CPU Setting | Built-in Ethernet Port Setting

No. of PLC (*1) Count

Online Module Change(*1)
☐ Enable Online Module Change with Another PLC.
 When the online module change is enabled with another PLC, I/O status outside the group cannot be taken.

Host Station

I/O Sharing When Using Multiple CPUs (*1)
☐ All CPUs Can Read All Inputs
☐ All CPUs Can Read All Outputs

Operation Mode (*1)
 Error Operation Mode at the Stop of PLC.
☒ All station stop by stop error of PLC1
☒ All station stop by stop error of PLC2
☒ All station stop by stop error of PLC3
☒ All station stop by stop error of PLC4

Multiple CPU Synchronous Startup Setting(*1)
 Target PLC
☐ No.1
☐ No.2
☒ No.3
☒ No.4

Multiple CPU High Speed Transmission Area Setting | Communication Area Setting (Refresh Setting)
☐ Use Multiple CPU High Speed Transmission

PLC	CPU Specific Send Range (*1)					
	Points(Q)	I/O No.	User Setting Area		Auto Refresh	
			Points	Start	End	Points
PLC No.1						
PLC No.2						
PLC No.3						
PLC No.4						

Total Points ☐ Set auto refresh setting if it is needed(No Setting / Already Set)

☐ Advanced Setting(*1) | Assignment Confirmation

(*1)Setting should be set as same when using multiple CPU.

Print Window... | Print Window Preview | Acknowledge XY Assignment | Default | Check | End | Cancel

Important

You can access another station if you set Network Item “Network No.” or “PC No.”.

But because of affect by the length of the cable used and the CPU scanning speed, the access speed will be several times slower than the speed for access my station.

5.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [W0]

General Scale Simulation Alarm

Tag Name

☐ Auto Format

Description

Device Type Link Register

Device No. Block No.

Data Type Byte Position

Length Bit Position

☐ Byte Swap

☐ Array

Attribute

Calculation

New Save << >> OK Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 5.2 for devices that can be specified.
Device No.	Specify the device number. Specify X / Y / DX / DY / B / W / WW / WR / SB / SW in hexadecimal notation, and specify all other device numbers in decimal notation.
Block No.	Specify a block number if you have specified extended file register (ER) as the device type.

Note

If you specify the bit device in a format other than BOOL, set the leading device number as a multiple of 16.

Example : M16:W is OK, but M17:W is not OK.

5.4 Errors

For details on PLC errors (response errors) included in the error messages, refer to the manual of the CPU unit or interface board.

6 [Mitsubishi] GOT EZSocket Connection

This chapter explains communication with GOT series equipment using EZSocket.

An overview of communication via a GOT connection is shown below.

Overview	
Link	EZSocket connection
Connection type	Ethernet

Important

- EZSocketGOT doesn't support on DeviceXPlorer 64 bit edition. Please use 32bit edition with WOW64 on 64bitOS.
- EZSocketGOT doesn't support running as service.

6.1 PLC Systems

The table below shows units applicable to GOT connection.

< Connectable units from serial port >

Type	Unit Name	Description
GOT2000 Series	GT25 Model GT27 Model	Built in Ethernet port
GOT1000 Series	GT16 Model GT15 Model GT14 Model Handy GOT	Built in Ethernet port Extended Ethernet unit
A900 Series	A900 Series	Extended Ethernet unit

6.2 List of Devices

The GOT devices that can be set are as shown below.

The range of devices varies with the CPU and parameter settings. For details, refer to your CPU instructions.

[List of Devices]

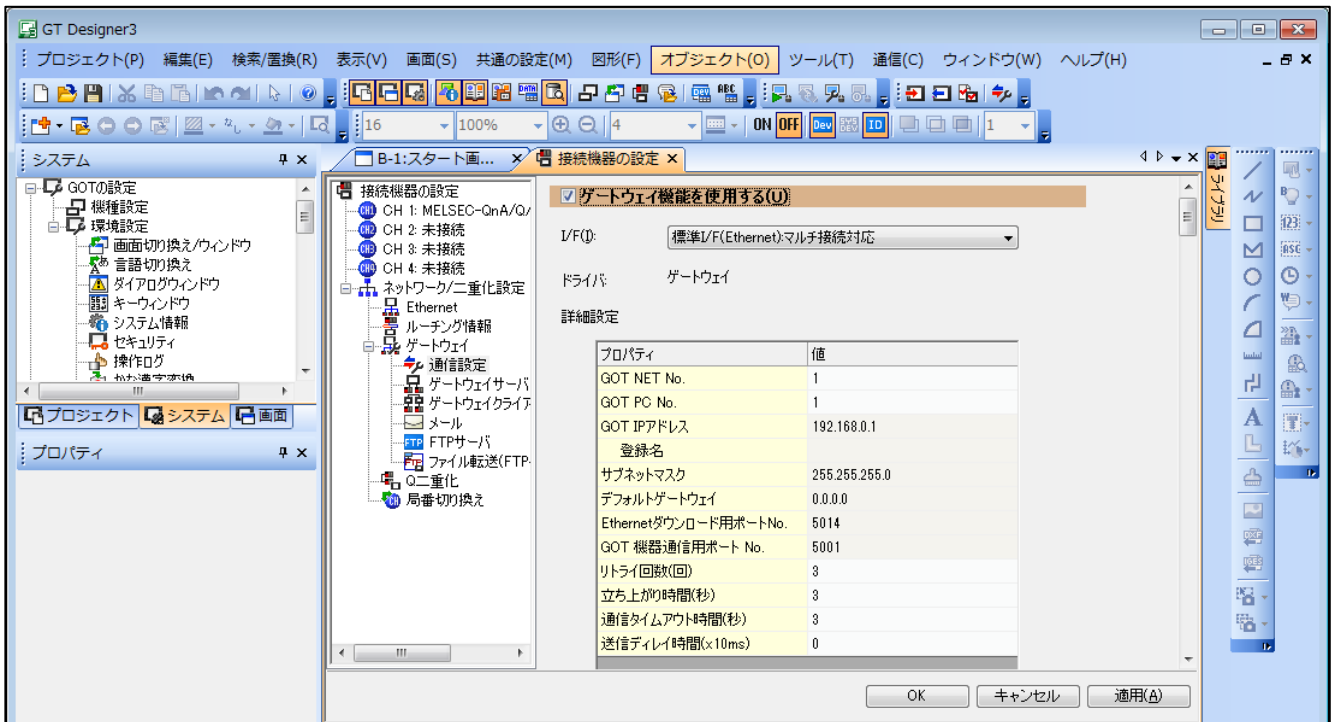
Device name	Device symbol	Device range	Category	Format
Gateway device	EG	0 - 65535	Word	Decimal

Note

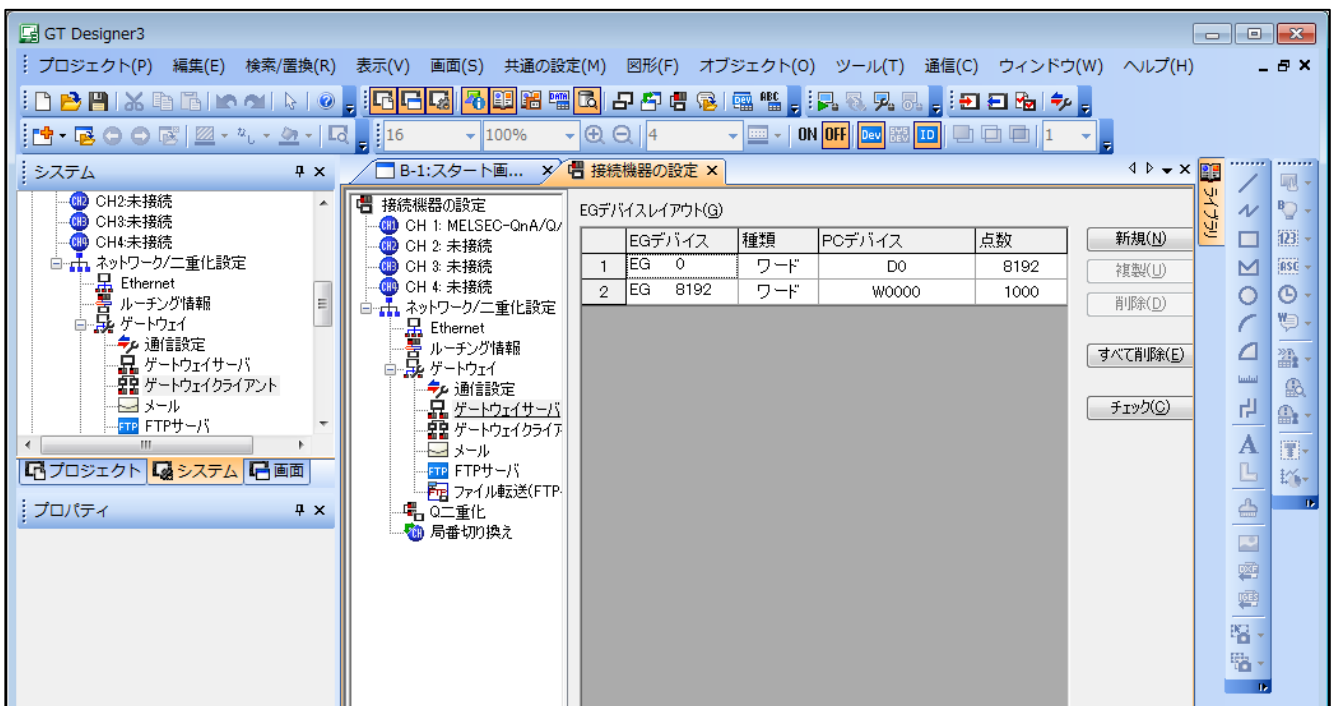
- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number. Example: EG100,EG1234, etc.
For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.
- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

6.3 GOT Settings

To perform Ethernet communication with GOT, you need to specify GOT IP Address in Ethernet gateway in System Configuration.



Please specify EG Device layout in Gateway server. Please refer to GOT manual for details.



6.4 DeviceXPlorer Setting

6.4.1 Port Settings

This section explains how to make the port settings for connection.

Port properties

PC Port No.	0
GOT Address	127.0.0.1
Timeout	3 sec
Retry count	3 times

Item	Description
PC Port No.	Specify the port number of the PC. If you specify port number "0", the OS will automatically assign an available port.
GOT Address	Select the GOT IP address.
Timeout	Specify the connection timeout.
Retry count	Specify the number of retry when time-out error is occurred.

6.4.2 Device Settings

This section explains how to set the number of access points for PLC to be accessed.

Device properties

ACCESS POINTS

Bit R/W		Bit Poke	128
Word R/W	1024	Word Poke	128

Item	Description
Word R / W	Specify the maximum access points of batch read / write of word scale.
Bit Poke	Specify the maximum access points of random write of bit scale.
Word Poke	Specify the maximum access points of random write of word scale.

6.4.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [EG0]

General | Scale | Simulation | Alarm

Tag Name: Tag EG0

☐ Auto Format

Description:

Device Type: EG Gateway register:

Device No.: 0 Block No.: 0

Data Type: SHORT Byte Position: Lower Byte

Length: 1 Bit Position: 0

☐ Byte Swap

☐ Array

Attribute: ReadWrite

Calculation: NONE

New Save << >> OK Cancel

Item	Description
Device Type	Specify the GOT device to be accessed.
Device No.	Specify the device number.

7 [Mitsubishi] MC AppBuilder cooperation function

This chapter explains a cooperation function with MC AppBuilder for Mitsubishi Electric SCADA MC Works64.

Important

To use this function, following systems are required. Please install system beforehand.

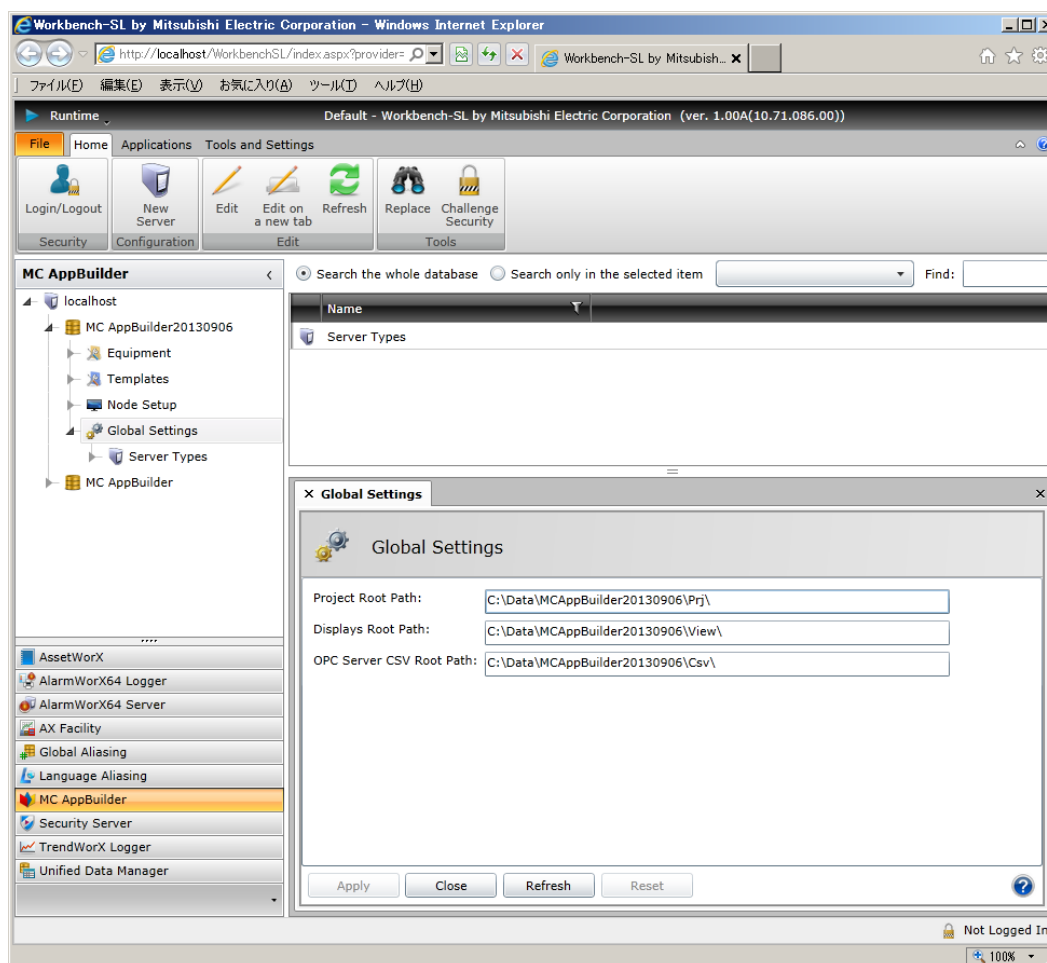
7.1 PLC Systems

The Mitsubishi Electric MC AppBuilder cooperation function can be used with PC in which the following software was installed.

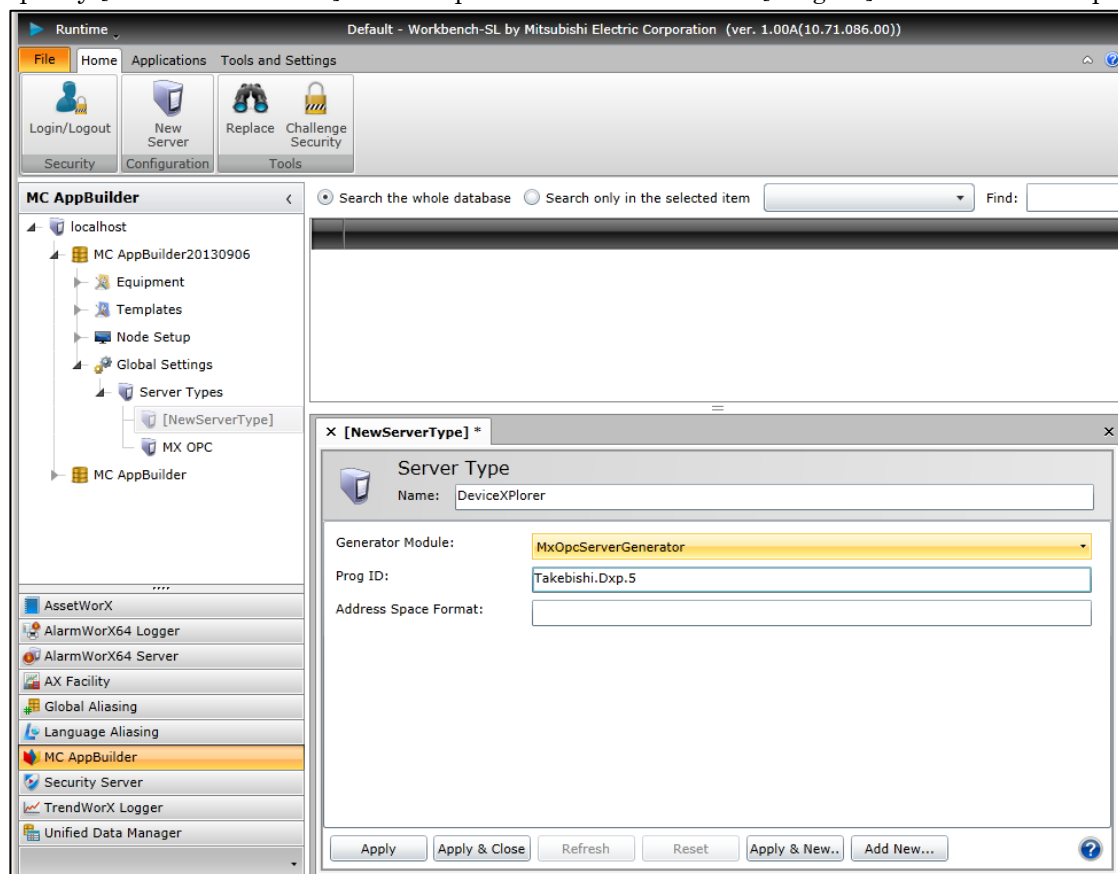
Type	Description
MC Works64	Mitsubishi Electric SCADA software.
MC AppBuilder	Automatic generation software for MC Works64. This software generates MC Works64 views, GX Works2 projects and OPC tag settings.
GX Works2 (Ver1.497T or later)	Engineering software for Mitsubishi MELSEC series.

7.2 How to use

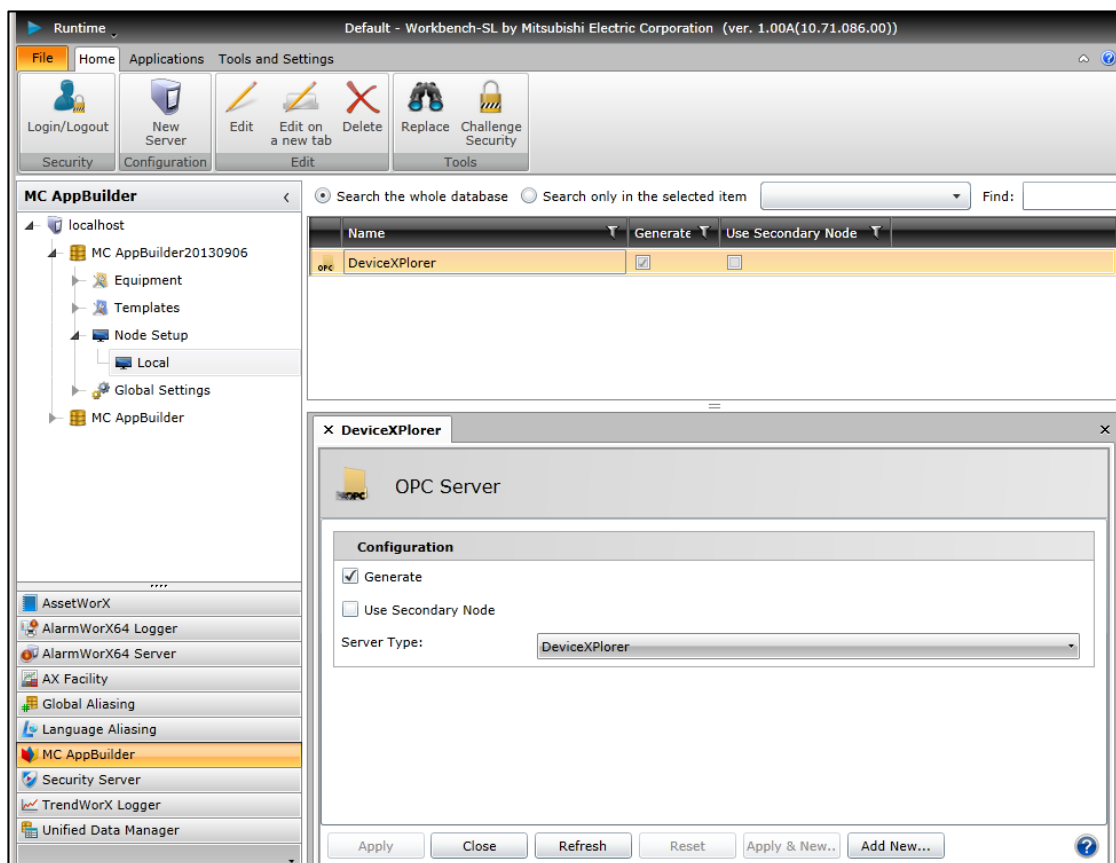
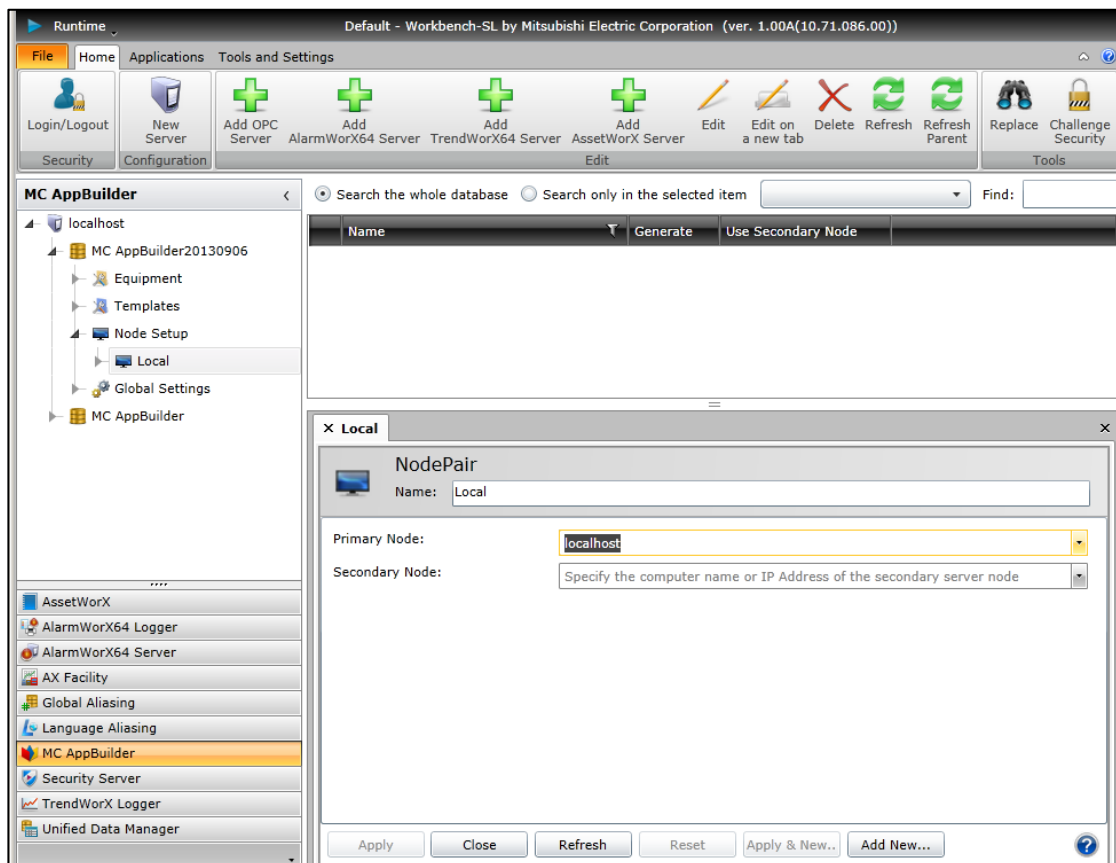
1. Please specify the output place of the file generated by [Global Settings] of MC AppBuilder. The mxcsv file which DeviceXPlorer imports is outputted to the folder specified as [OPC Server CSV Root Path].

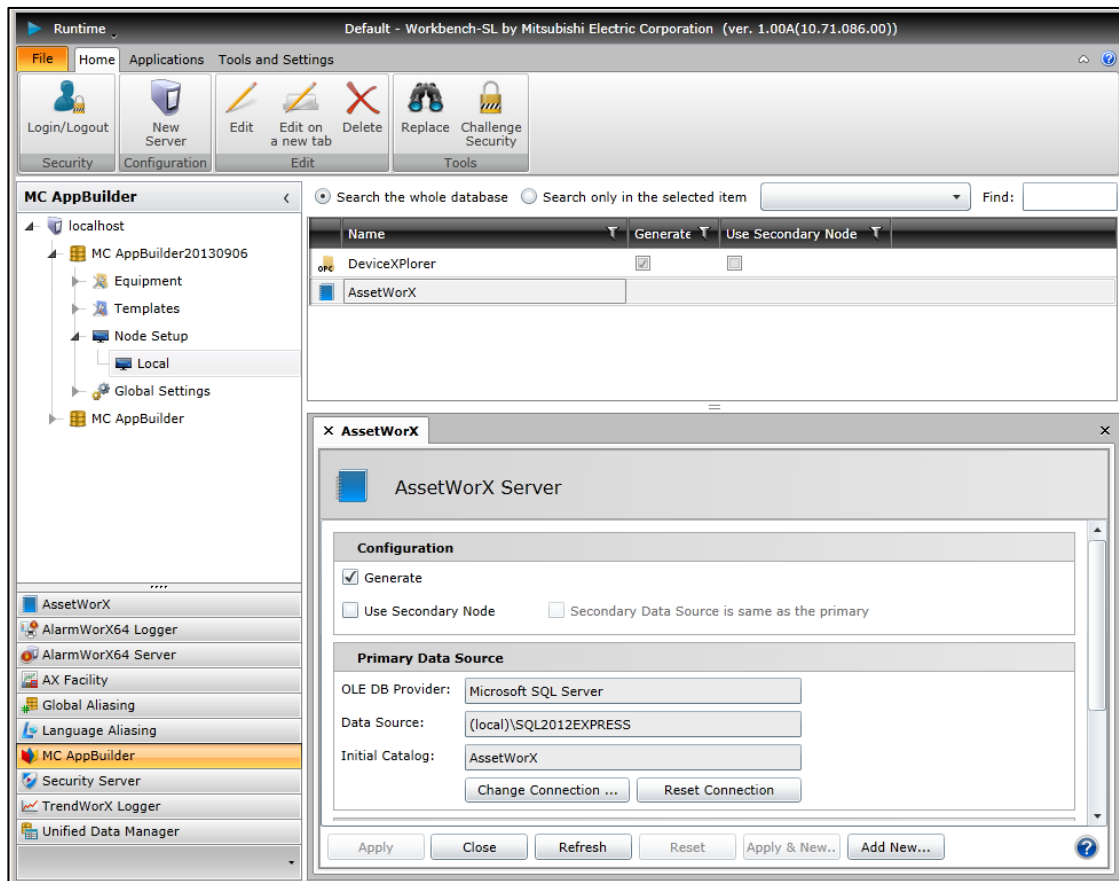


2. Please register the server type for DeviceXPlorer in [Server Types] setting of [Global Settings]. Please specify [Generator Module] as "MxOpcServerGenerator" and [Prog ID] as "Takebishi.Dxp.5."

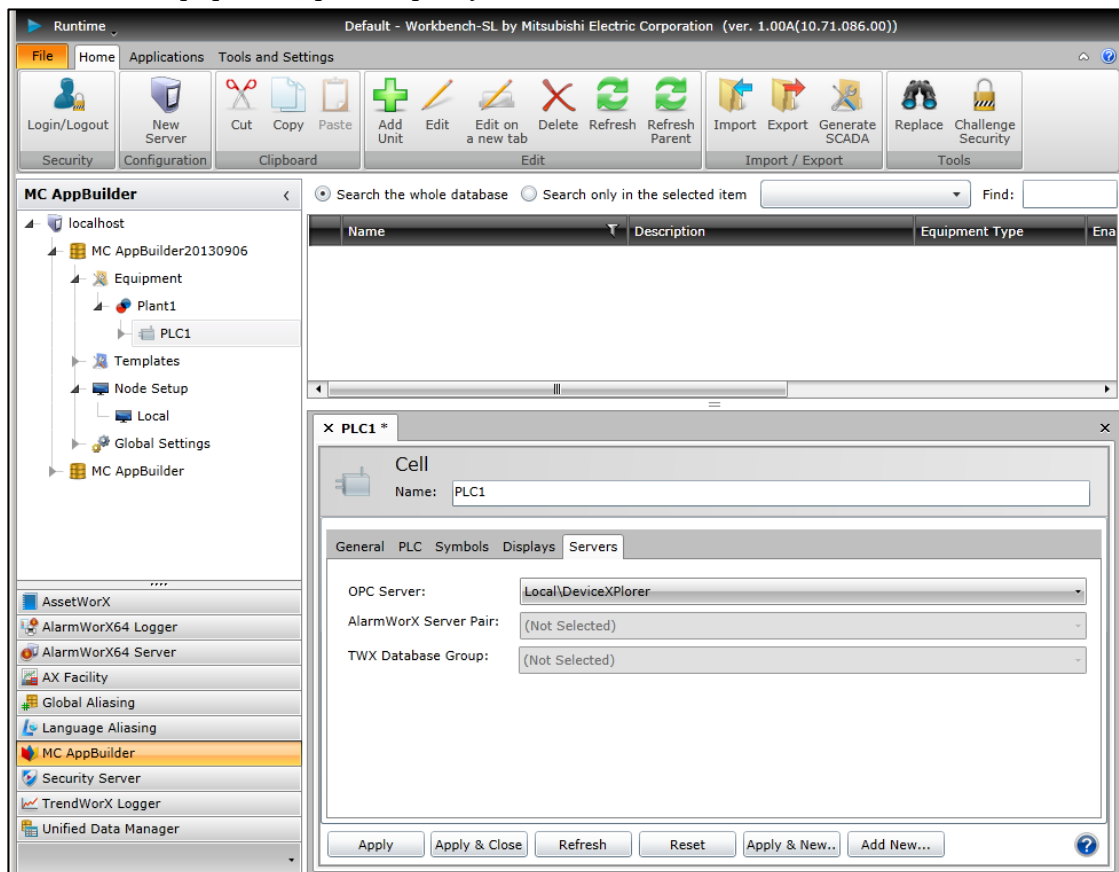


3. In [Node Setup], please add NodePair and setup node setting. And register OPC Server which created, and the server AssetWorX Server for performing OPC communication on the NodePair.

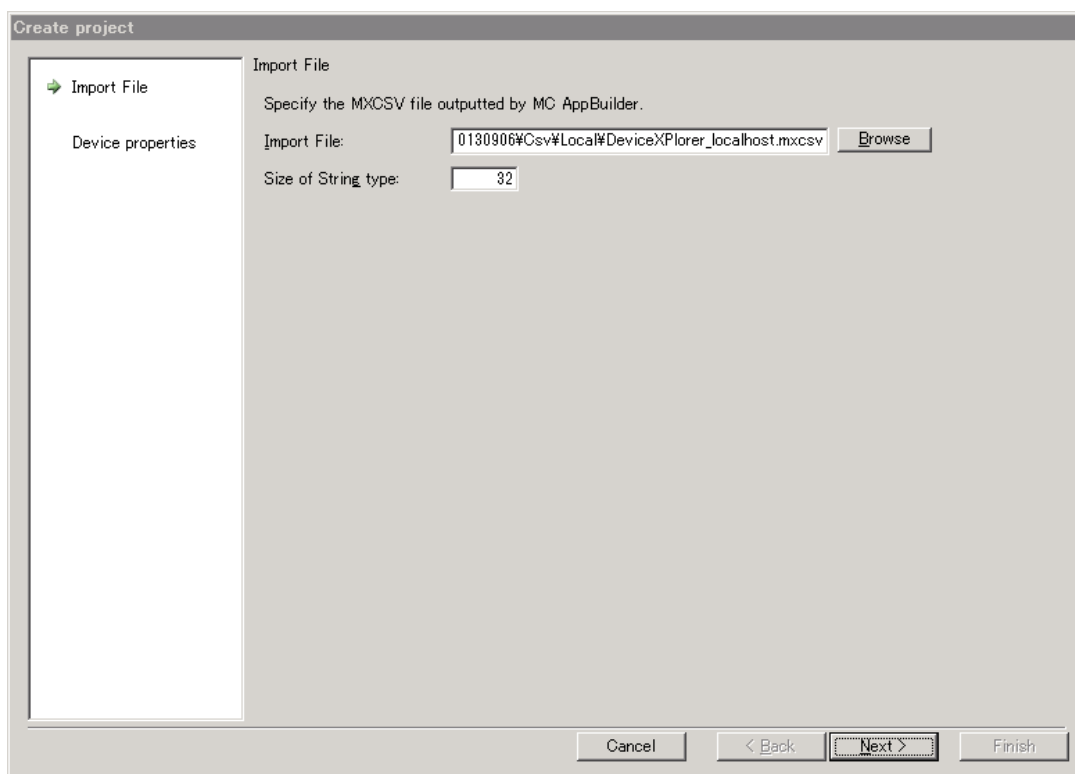
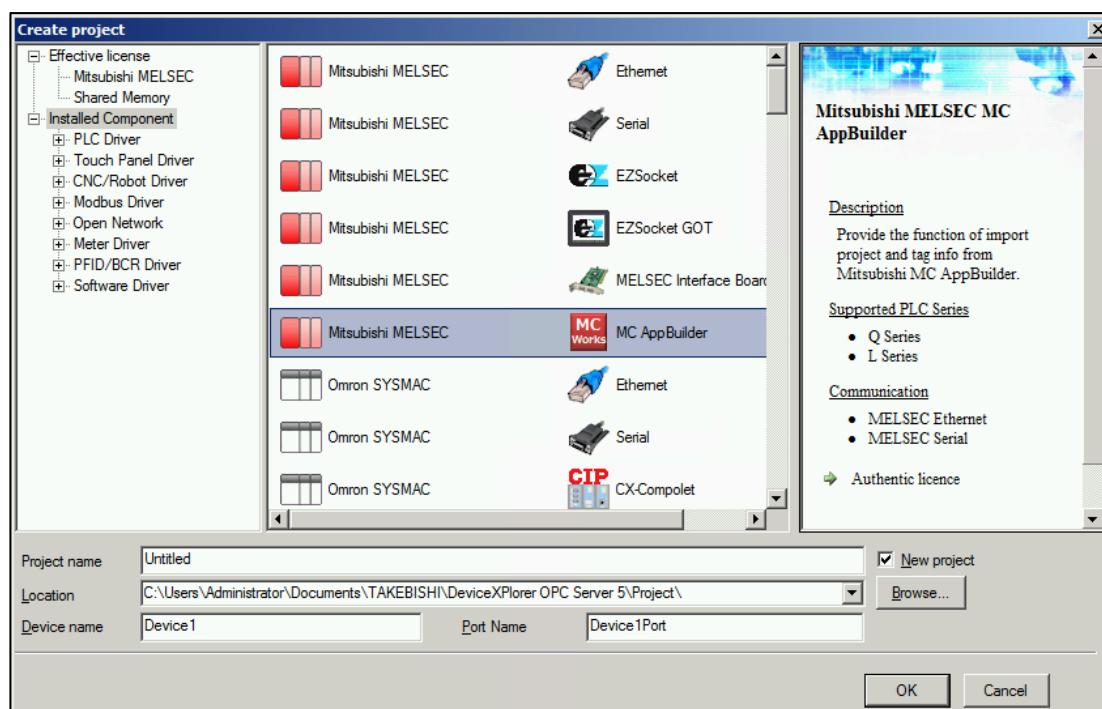




4. In [Cell] of [Equipment], please specify "NodePair¥ServerName" on [Servers] tabs.



5. After work of series in MC AppBuilder such as Equipment Registration is completed, please operate [Generate SCADA]. The project file of GX Works2, the view settings of MC Works64 and OPC servers settings are outputted to the output place folder of [Global Settings].
6. Please open outputted GX Works2 project and perform "compile and all build" and save GX Works2 project.
7. In DeviceXPlorer, please select "MC AppBuilder" on the project wizard, and specify the outputted mxcsv file.

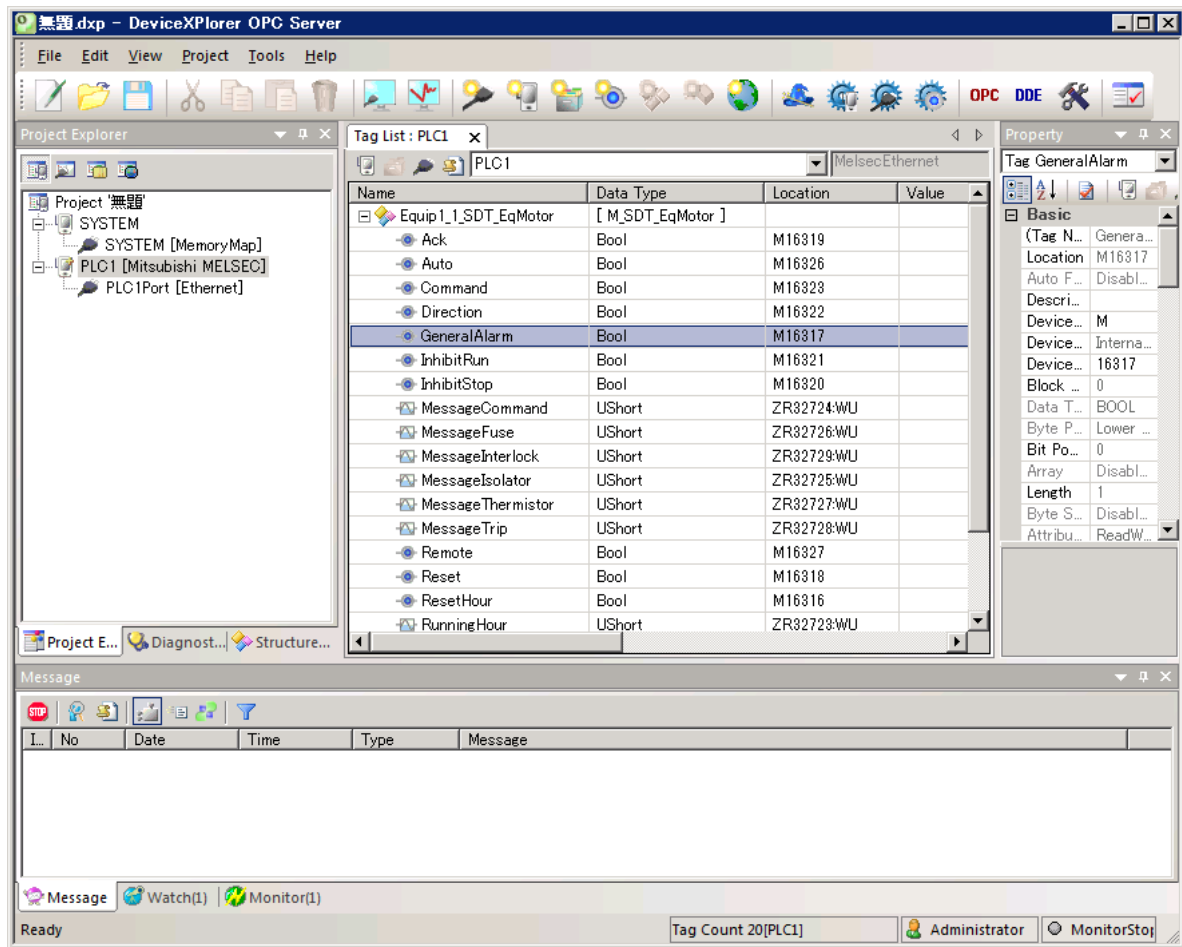


8. Device setup is imported as the set-up Cell setting. Please set up appropriately [Device Setting], [Port Type], and [Port Setting].

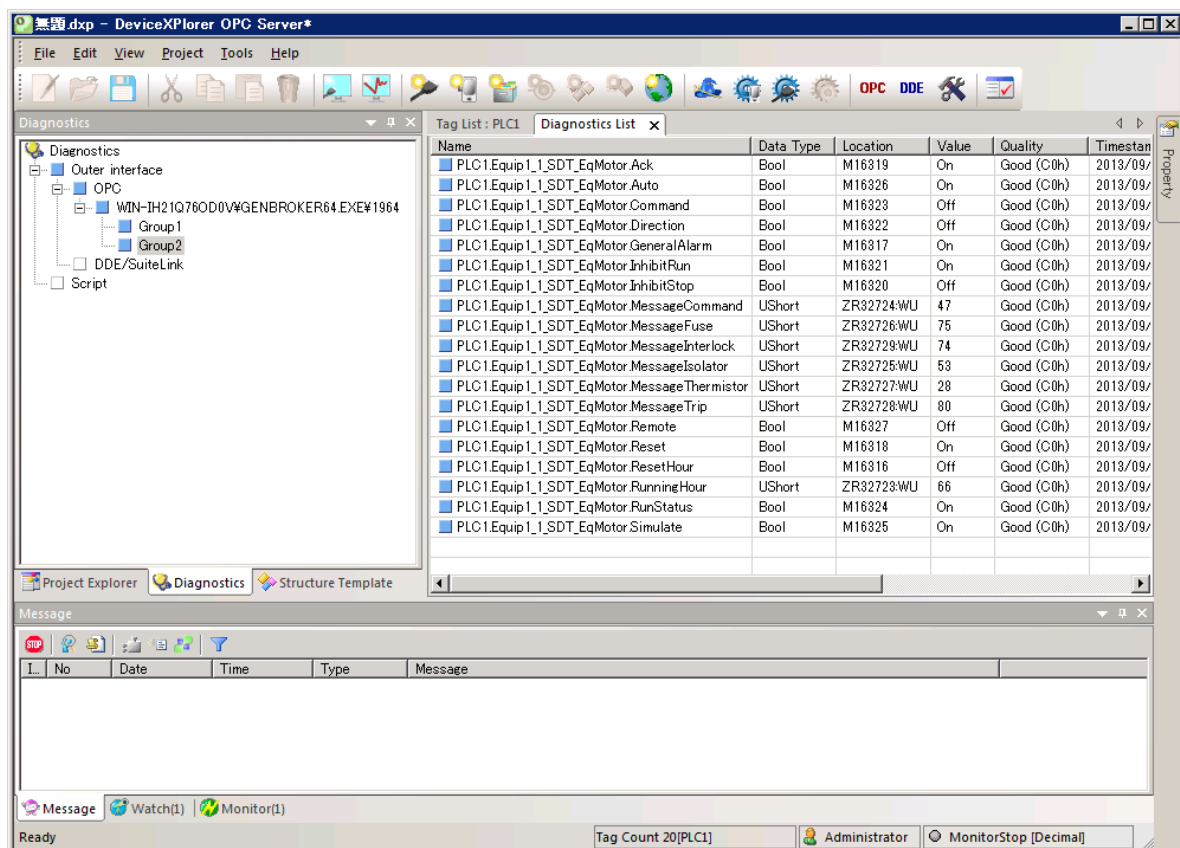
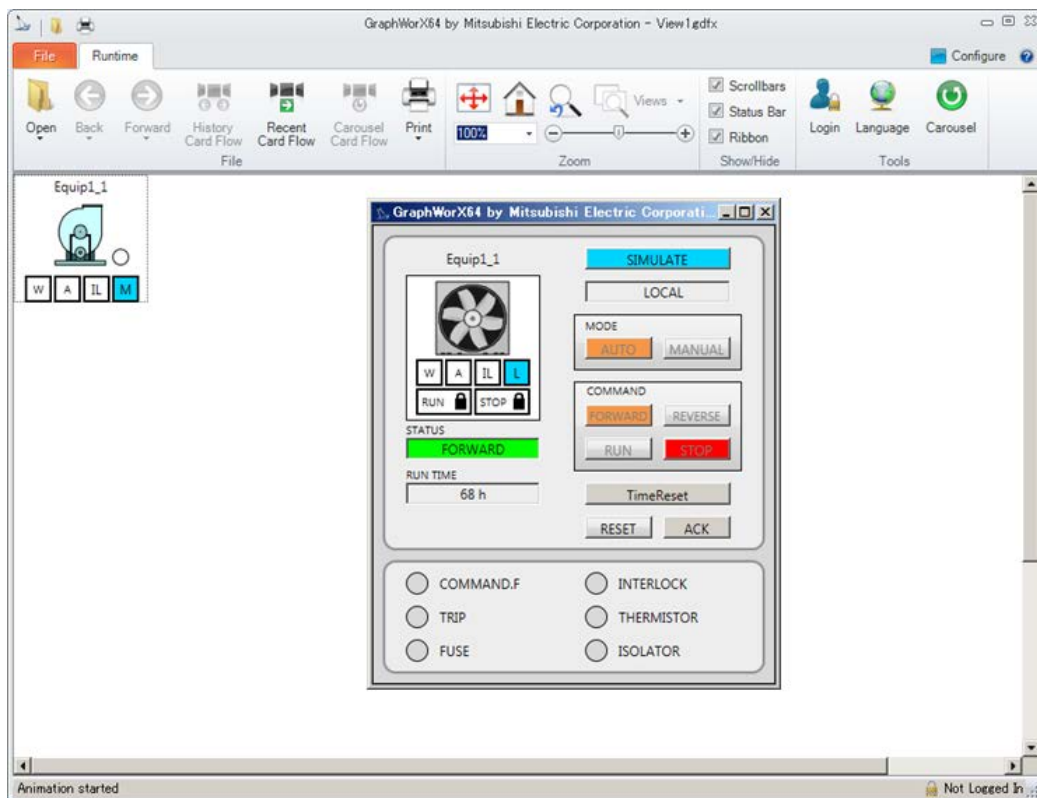
Device name	Device Setting	Port Name	Port type	Port Setting	Generate
PLC1	Setting	PLC1Port	Ethernet	Setting	☒ Enable
			Ethernet		
			Serial		
			EZFunc		
			EZGOTFunc		
			MdFunc		

Item	Description
Device Name	The device name as Cell setting is displayed. This cannot be changed.
Device Setting	Please specify device setting. Since this setting changes according to Port Type, please set up Port Type first.
Port Name	Please specify port name.
Port Type	Please specify communication type.
Port Setting	Please specify port setting. This setting changes according to Port Type.
Generate	When importing the device, please validate this check box. In basic use case, please validate all check.

9. When you push [Finish] button, DeviceXPlorer imports OPC server's tag settings as set-up Equipment of MC AppBuilder.



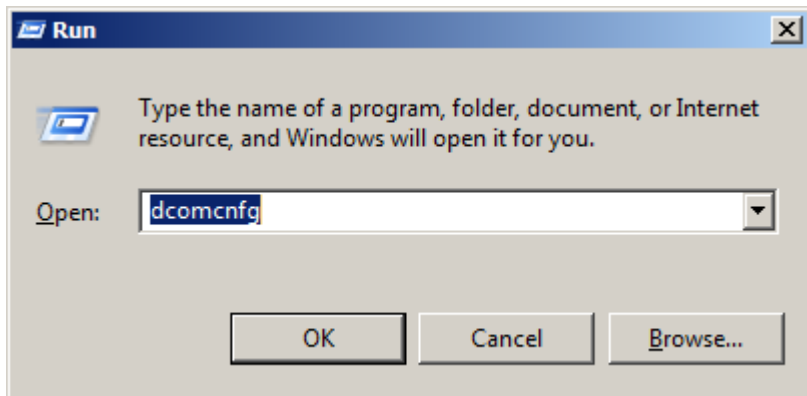
10. DeviceXPlorer setup is completion above. When launching GraphWorX64 of MC Works64, you can check communicating with DeviceXPlorer.



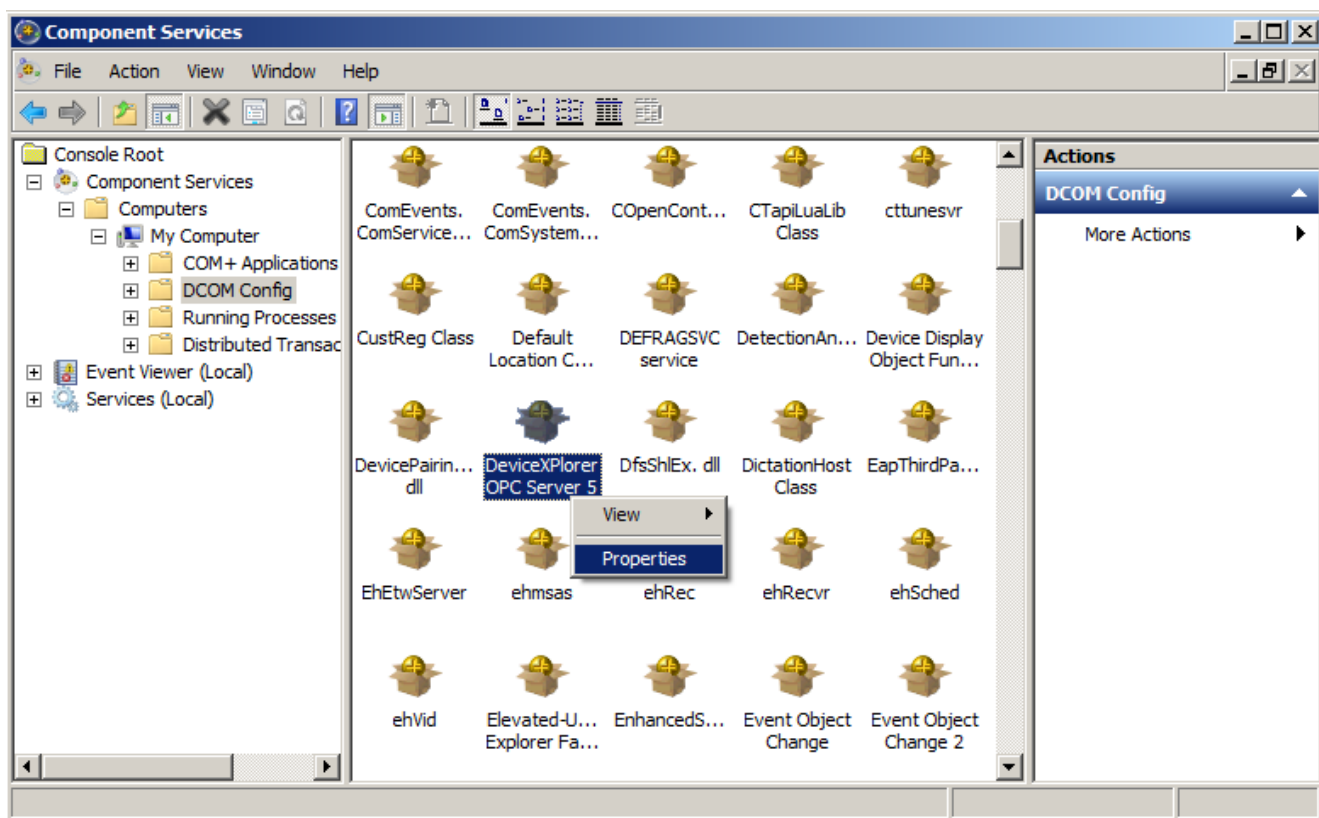
7.3 Notes at the time of connecting from MC Works64

To connect DeviceXPlorer with MC Works64, in DCOM Config of DeviceXPlorer, it is necessary to change the item of "Identity" into "The interactive user." (The case which DeviceXPlorer runs as service program is excluded.)

Please input "dcomcnfg" by "Run program", and Component Services screen is displayed.



And select Properties of [DeviceXPlorer OPC Server 5] in "DCOM Config".



In [Identity] tab,if [The launching user] is selected, please change into [The interactive user].

The screenshot shows the 'DeviceExplorer OPC Server 5 Properties' dialog box with the 'Identity' tab selected. The dialog has a title bar with a question mark and a close button. Below the title bar are tabs for 'General', 'Location', 'Security', 'Endpoints', and 'Identity'. The 'Identity' tab contains the text 'Which user account do you want to use to run this application?'. There are four radio button options: 'The interactive user.' (which is selected), 'The launching user.', 'This user.', and 'The system account (services only)'. Below 'This user.' are three text input fields labeled 'User:', 'Password:', and 'Confirm password:', followed by a 'Browse...' button. At the bottom of the dialog are 'OK', 'Cancel', and 'Apply' buttons. A link 'Learn more about [setting these properties.](#)' is located at the bottom left of the main content area.

8 [Omron] SYSMAC Ethernet Connection

This chapter explains communication with SYSMAC series equipment using an Ethernet unit.

An overview of SYSMAC Ethernet communication is shown below.

Overview	
Protocol	FINS command (Fins/TCP, Fins/UDP)
Data code	Binary
Protocol	TCP / IP, UDP / IP TCP / IP communication is only supported by the SYSMAC-CJ Series.

Important

- Please use 1 device setting with 1 port setting in SYSMAC Ethernet connection with TCP/IP(which uses Fins/TCP)

If access same PLC with multi device settings, please create multi port settings with same PLC.

8.1 PLC Systems

8.1.1 Applicable Units

The CPU units and Ethernet units that can be connected to SYSMAC Ethernet equipment are shown below.

Category	Applicable CPU units *1	Applicable Ethernet units
SYSMAC-CJ Series	CJ1G, CJ1H, CJ1M, CJ2H, CJ2M	CJ2H-CPU**-EIP (Built-in) CJ2M-CPU** (Built-in) CJ1W-ETN21, CJ1W-ETN11 CJ1M-CPU13-ETN, CJ1M-CPU12-ETN, CJ1M-CPU11-ETN CJ1W-EIP21
SYSMAC-CS Series	CS1G, CS1H, CS1D	CS1W-ETN21D, CS1W-ETN21 CS1W-ETN11, CS1W-ETN 01 CS1W-EIP21
SYSMAC-CP Series	CP2E	CPU Built-in Ethernet Port
	CP1H	CP1W-CIF41*2, CJ1W-ETN21, CJ1W-ETN11
	CP1L	CPU Built-in Ethernet Port*2 CS1W-EIP21*2, NSJW-ETN21*2
SYSMAC One NSJ Series	SYSMAC One NSJ	CPU Built-in Ethernet Port CS1W-EIP21 NSJW-ETN21
SYSMAC-CV Series	CVM1(D), CV500, CV1000, CV2000	CV500-ETN01
SYSMAC-C Series	C200HE, C200HG, C200HX, CQM1H CPM1A, CPM2A, CPM2C C1000H, C2000H	

*1 For CPUs without Ethernet units, when accessing Controller Link via the Ethernet connection station, it is only possible to access as another network station.

*2 There is limited by the specifications of the unit., refer to 8.4.2.

8.2 List of Devices

The SYSMAC devices that can be set in DeviceXPlorer are as shown below.

The devices and device ranges that can be used vary with the CPU. For details, refer to your CPU instructions.

[List of Devices] (The device ranges are all specified in decimal format.)

Device name	Device symbol	Device range			Category
		CJ / CS Series	CV Series	C Series	
Timer contacts* ¹	TC	0 - 4095	0 - 1023	0 - 511	Bit
Counter contacts* ¹	CC	0 - 4095	0 - 1023	0 - 511	
I / O relay	CIO	0 - 6143	0 - 2555	0 - 255	
Internal auxiliary relay	WR	0 - 511	N / A	N / A	Word
Holding relay	HR	0 - 511	N / A	0 - 99	
Special auxiliary relay	AR	0 - 959	0 - 511	0 - 27	
Link relay	LR	N / A	N / A	0 - 63	
Current timer value	T	0 - 4095	0 - 1023	0 - 511	
Current counter value	C	0 - 4095	0 - 1023	0 - 511	
Data memory	DM	0 - 32767	0 - 24575	0 - 9999	
Extended data memory* ²	EM	0 - 32767	0 - 32767	N / A	

*1 The timer and counter contacts (TC and CC) are read-only devices.
They cannot be accessed as word devices.

*2 Specify a bank number and device number for the extended data memory (EM).

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: CIOD1, AR100, C123, etc.

For the extended data memory (EM), specify as “EM bank number: device number”.

Example: For bank number 1, device number 123: Specify EM1:123.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

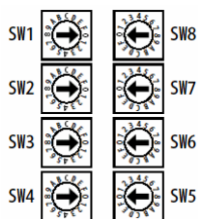
8.3 Ethernet Unit Settings

This chapter describes the configuration of SYSMAC Ethernet Unit. Refer to the PLC manual for Serial Link, Controller Link, and the other communication unit.

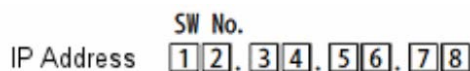
8.3.1 Hardware Settings

8.3.1.1 IP Address Settings

The function of IP Address is to identify nodes on Ethernet. The older types of SYSMAC Ethernet Unit than CS1W-ETN21 and CJ1W-ETN21 have 8 switches on the back. Configure each digit of IP address within ranges from 00 to FF with the switches. If you use CS1W-ETN21 and CJ1W-ETN21, refer to Software configuration in following pages.



The following figure shows correspondence of rotary switches to each digit of IP address.



8.3.1.2 Node No. Settings

The function of Node No. is to identify each Ethernet Unit when multiple Ethernet Units are connected in the same LAN. Configure the Node No. switches on the back within ranges from 01 to FE in hexadecimal (1 ~ 254 in decimal). Be careful not to overlap with Node No. of other Ethernet Unit in the same LAN.



Note

As to an address translation, when using automatic generation of address, set Node No. to the same value as the last value of IP address of Ethernet Unit. If you set Node No. to the different value, you have to use "IP Address Table System" or "Combination System".

8.3.1.3 Unit Settings

The function of Unit No. is to identify the CPU Advanced Unit attached to the CPU Unit. Set the rotary switch "Unit No." on the front of the Ethernet Unit within the range from 0 to F. Be careful not to overlap with Unit No. of other CPU Advanced Unit attached to the same CPU Unit.



8.3.1.4 Software Settings (CX - Programmer)

You need to configure I/O Table and PC Routing Table for Ethernet communication. This section describes how to configure SYSMAC-CJ1 Series. Refer to the users guide for other types of PLC.

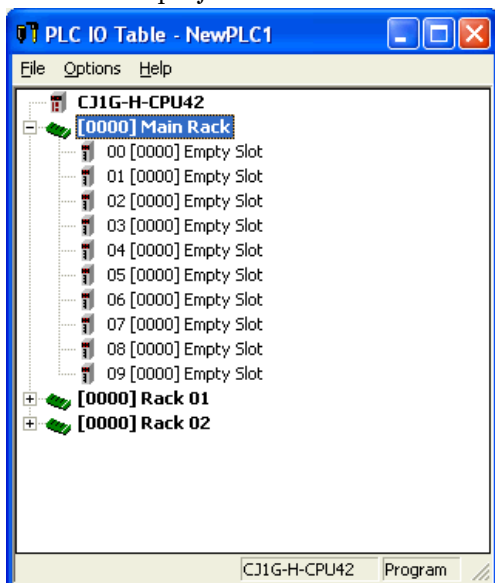
[I / O Table (Setting IP Address and Port No.)]

First, make online connection from CX-Programmer to the PLC. (If I/O Table has not configured yet, connect to the port of the CPU by serial communication. Or if the I/O Table is configured, connect by Ethernet)

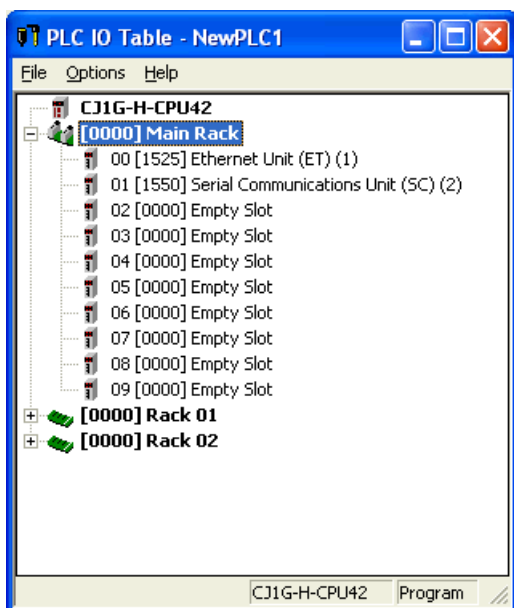
Note

When using CS1W-ETN21 and CJ1W-ETN21, Set the IP address to “192.168.250.Node address” by default.

1. From the project screen double-click on “IO Table” to display the I/O table dialog.



2. From “Option” menu select “Transfer from the PLC” to read the communication Unit of PLC.



3. Right-click on “Ethernet Unit” in I/O Table, and from the popup menu select “Unit Setup.” Then following dialog is shown. Configure IP address, subnet mask, Port No. etc. of Ethernet Unit here.

Note

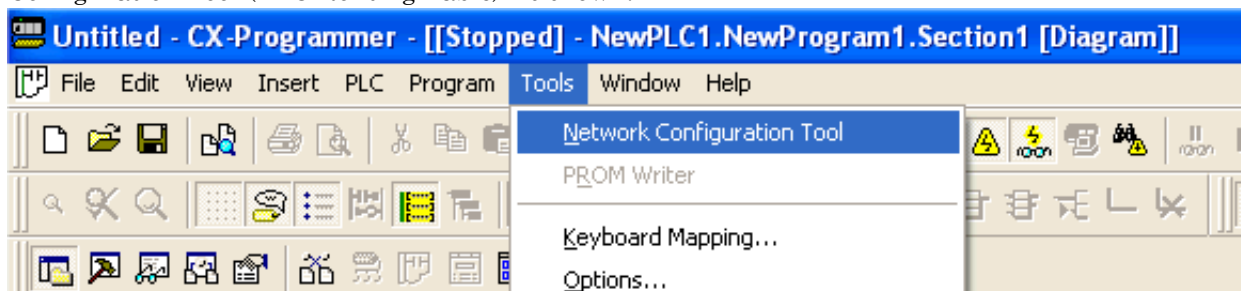
Port No. of both TCP and UDP are set to “9600” by default. Change the Port No. as needed.

4. Transfer the Ethernet Unit configuration to the PLC. And reset the Ethernet Unit to enable the new configuration.

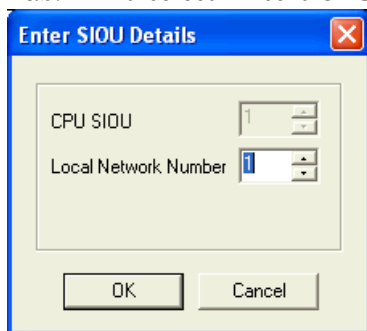
[Routing Table (Definition of Network No.)]

Routing Table is the table to select the communication path for FINS message when using FINS communication service. Configure Network No. according to the following directions.

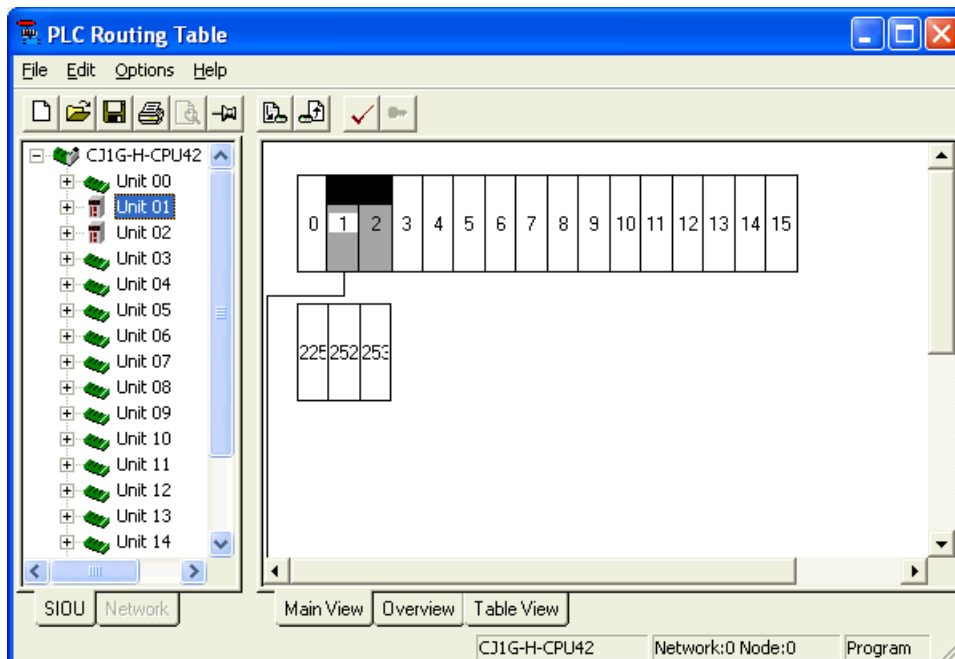
1. Start CX-Programmer, and from “Tool” menu select “Network configuration Tool”. Then “PC Network Configuration Tool (PLC Routing Table)” is shown.



2. To connect to PC, select “NewPLC1” shown as Project Devices in the dialog. And from “PLC” menu select “Open”. After that, from “Routing Table” menu, select “Setup.” Then “Routing Table” is shown. Right-click on Unit No. of the interface unit (which is set with the rotary switches on the front) in “SIOU” Tab. And select “Insert CPU SIOU”. On following dialog, enter Local Network Number.



3. In this way the operation is complete to register Unit No.4 of Ethernet Unit as Network No. ”1”.



8.4 DeviceXPlorer Settings

8.4.1 Ethernet Port Settings

If you use CV500-ETN1 unit, you need specify adapter port number which is same as PLC port number. Please refer to the manual of the unit for the details.

Protocol	☐ ICP/IP	☒ UDP/IP
	☐ Non-Blocking Mode	
Adapter IP Address	192.168.1.1	
Adapter Port No.	9600	
PLC IP Address	192.168.1.2	
PLC Port No.	9600	
Send Delay	0	msec
Timeout	3	sec
Retry Count	3	times
Open Timeout	3	sec

8.4.2 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

CPU TYPE

☒ SYSMAC-CJ/CS/CP ☐ SYSMAC-CV ☐ SYSMAC-C

PLC

Network No.

Node No.

Unit No.

PC

Network No.

Node No.

Unit No.

ACCESS POINTS

Bit R/W Bit Poke

Word R/W Word Poke

Item		Description
CPU TYPE		Select the CPU type of the PLC to be connected to.
PLC	Network No.	Specify the network address set at the Ethernet unit.
	Node No.	Specify the node address set at the Ethernet unit. For TCP / IP communication, this does not need to be set because the automatically allocated Fins node address is used.
	Unit No.	Normally "0" is specified.
PC	Network No.	Specify the same network address as the SYSMAC to be accessed.
	Node No.	Specify your own node address. (Set the lower three digits of your own station IP address or refer to the routing table set in SYSMAC.) For TCP / IP communication, this does not need to be set because the automatically allocated Fins node address is used.
	Unit No.	Normally "0" is specified.
ACCESS POINTS *2	Bit R / W*1	Specify the maximum access points of batch read / write of bit scale. Up to 1992 points can be set.
	Word R / W	Specify the maximum access points of batch read / write of word scale. Up to 996 points can be set.
	Bit Poke	Only batch write of bit scale is supported.
	Word Poke	Only batch write of word scale is supported.

*1 Only SYSMAC-CJ / CS / CP Series supports writing of bit device.

*2 CP1L Series / CP1W-CIF41 has limit to access points. Please specify Bit R/W is 538, Word R/W 269.

8.4.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [DM0]

General | Scale | Simulation | Alarm

Tag Name: Tag DM0

☐ Auto Format

Description:

Device Type: DM Data Memory:

Device No.: 0 Bank No.: 0

Data Type: SHORT Byte Position: Lower Byte

Length: 1 Bit Position: 0

☐ Byte Swap ☐ Array

Attribute: ReadWrite

Calculation: NONE

New Save << >> OK Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 8.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.
Bank No.	Specify a bank number if you have specified extended data memory (EM) as the device type. Set a number between 0 and 31.

8.5 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

8.5.1 List of Devices

Show the list of convertible devices.

KEPServerEX			DeviceXPlorer	
Type	Symbol		Type	Symbol
Timer Status	TS	⇒	Timer contacts	TC
Counter Status	CS	⇒	Counter contacts	CC
CIO	CIO	⇒	I/O relay	CIO
Index Register	IR	⇒		
Working Relay	W	⇒	Internal auxiliary relay	WR
Holding Relay	H	⇒	Holding relay	HR
Holding Relay	HR	⇒		
Auxiliary Relay	A	⇒	Special auxiliary relay	AR
Auxiliary Relay	AR	⇒		
Link Relay	LR	⇒	Link relay	LR
Timer	T	⇒	Current timer value	TN
Counter	C	⇒	Current counter value	CN
Data Memory	D	⇒	Data memory	DM
Data Memory	DM	⇒		
Expansion Data Memory	E	⇒	Extended data memory	EM
Expansion Data Memory (Current Bank)		⇒		
Expansion Data Memory	EM	⇒		
Expansion Data Memory (Current Bank)		⇒		
Timer/Counter	TC	⇒	Not Supported	
Action Flag	AC	⇒		
Data Register	DR	⇒		
Index Register	IR	⇒		
Temporary Relay	TR	⇒		
CPU Bus Link	G	⇒		
Step Timer	ST	⇒		
Step Timer Status	STS	⇒		
Transition Flag	TN	⇒		
Task Flag	TK	⇒		

Important

KEPServerEX supports Ethernet communication with SYSMAC-C, but DeviceXPlorer does not (only Serial supported). Note that there are some differences device specification method between SYSMAC-C and others at KEPServerEX.

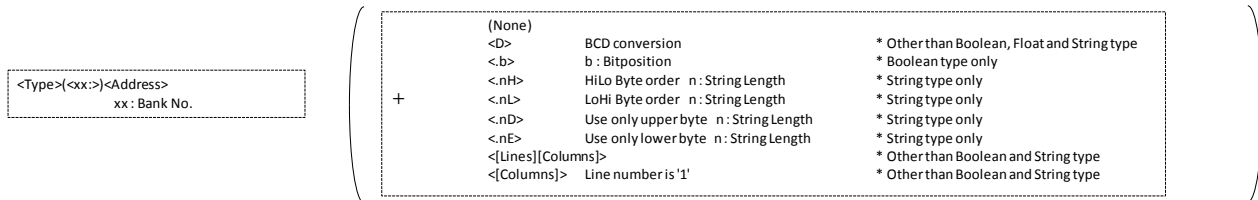
8.5.2 Device Range

Please refer “8.2 List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

8.5.3 Optional Specification

The address format of KEPServerEX is as follows.



Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
D	Set BCD calculation to the System calculation.
.x (x is a number)	Set x to the bit position if the data type is 'BOOL'. Set x/2 to the size if the data type is 'STRING'.
[x] [1][x] (x is a number)	Enable the array. Set x to the size.
.nH	Set 'STRING' to the data type. Enable the byte swap.
.nL	Set 'STRING' to the data type.
.nD .nE	Fail to import, because impossible to specify bite position for STRING tag at DeviceXPlorer.

Important

Two dimensional array is not supported.

8.6 Errors

PLC errors (response errors) included in the error messages are comprised of a main response code and a sub response code. The main errors are shown below.

Main response code	Sub response code	Error	Description
01	01	Own node not added to network	Add your own node to the network.
	05	Node address setting range error	Check the setting of the node address.
	06	Node address duplicate setting error	Change the duplicated node address.
02	00	Target node not added to network	Add the target node to the network.
	04	Target node busy	The target node is busy.
	05	Response timeout	A response timeout occurred.
03	01	Communication controller problem	A problem occurred with the communication unit.
	02	PC problem	A problem occurred in the PC.
	03	Controller error	Reboot the board.
	04	Unit number setting error	Set the correct unit number.
04	01	Undefined command	Check the command code.
	02	Unsupported version	Check the model and the version.
05	*1	Routing problem	There is a problem with the routing table.
10	*1	Command format error	The command format is incorrect.
11	*1	Parameter error	A parameter setting is incorrect.
20	*1	Cannot read	Could not read normally.
21	*1	Cannot write	Could not write normally.
22	*1	Operating mode error	The operating modes do not match.
23	*1	No unit	The relevant unit is not present.
24	01	Cannot start / stop	Set the data link table.
25	*1	Unit error	A problem occurred with the unit.
26	*1	Command error	A problem occurred with the command.
30	01	No access rights	Access rights are not released.
FF	FF	Serial Number error	When selecting SYSMAC-CJ/CS/CP and TCP/IP protocol, Serial Number (Service ID) of sending message is different from it of receiving message.

*1 The sub response code varies depending on the cause of the error.

For details of the main response codes and sub response codes, and for errors that do not appear above, refer to the manuals for the CPU and unit you are using.

9 [Omron] SYSMAC Serial Connection

This chapter explains communication with SYSMAC series equipment using a serial unit.
An overview of communication via a SYSMAC serial connection is shown below.

Overview	
Protocol	FINS commands, C mode commands (1:N mode)
Data code	ASCII

Note
DeviceExplorer does not support '1:1 mode'.

9.1 PLC Systems

9.1.1 Applicable Units

The applicable CPU units and serial units for SYSMAC serial communication are shown below.

Category	Applicable CPU Units	Applicable serial units
SYSMAC-CJ Series	CJ1G, CJ1H, CJ1M, CJ2H CJ2M	CJ1W-SCU21/31/41(-V1) CP1W-CIF01 / 11 / 12
SYSMAC-CS Series	CS1G, CS1H, CS1D	CS1W-SCU21(-V1), CS1W-SCB21 / 41
SYSMAC-CP Series	CP1L, CP1H, CP1E	CP1W-CIF01 / 11 / 12
SYSMAC One NSJ Series	SYSMAC One NSJ	CPU Serial Port
SYSMAC-CV Series	CVM1(D), CV500, CV1000 CV2000	CV500-LK201
SYSMAC-C Series	C200HE, C200HG, C200HX, C200HS, CQM1H, CPM1A, CPM2A C1000H, C2000H, SRM1	C120-LK101 / 201 / 202 C200H-LK101 / 201 / 202 C500-LK101 / 103 / 201 / 203

9.2 List of Devices

See the list of devices for SYSMAC Ethernet connection (section 8.2).

9.3 Communication Commands

The relation between CPU Type and communication command when using RS232C (serial link unit, connecting CPU) is as followed. C mode command will be used when CPU Type is C series. Fins command will be used when CPU Type is CVM1 / CV or CJ / CS / CP. OPC Server changes the command automatically.

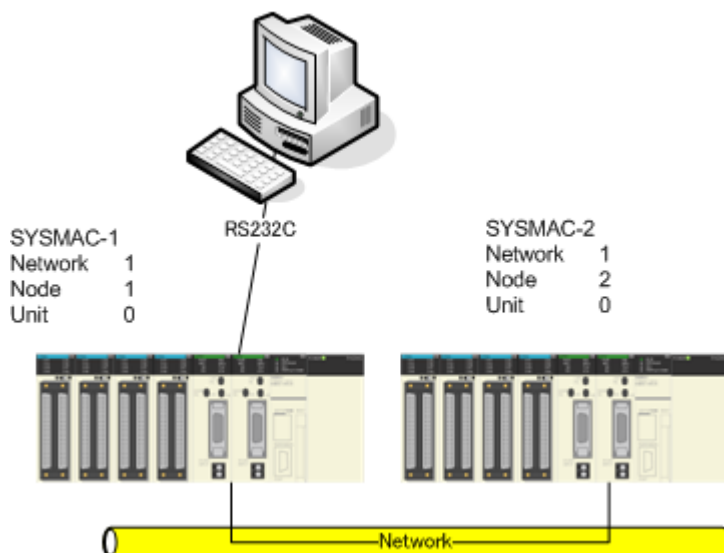
To access SYSMAC connecting computer directly, network and node should be set as 0. To access the other node through network, configure destination network and node number.

CPU Type	Communication command	Other node access
SYSMAC-CJ/CS/CP	Fins	Possible
SYSMAC-CV	Fins	Possible
SYSMAC-C	C mode command	Impossible

Example :

To access SYSMAC-1, network and node should be set 0 because of direct connection.

To access SYSMAC-2, network should be set 1 and node should be 2.



9.4 DeviceXPlorer Settings

9.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Item		Description
CPU TYPE		Select the CPU type of the PLC to be connected to.
PLC	Network No.	Specify the other network address. Set "0" for direct linking.
	Node No.	Specify the other node address. Set "0" for direct linking.
	Unit No.	Normally "0" is specified.
PLC	Network No.	Normally "0" is specified.
	Node No.	Normally "0" is specified.
	Unit No.	Normally "0" is specified.
COMPUTER LINK	Unit No.	When CPU Type is SYSMAC-C Series, specify the unit number of computer link
ACCESS POINTS	Bit R / W	Specify the maximum access points of batch read / write of bit scale.
	Word R / W	Specify the maximum access points of batch read / write of word scale.
	Bit Poke	Only batch writing is supported.
	Word Poke	Only batch writing is supported.

* Only SYSMAC-CJ / CS / CP Series supports batch read / write of bit device.

< Access Points >

Access method	Bit R / W	Word R / W
Other than SYSMAC-C Series (Fins)	512 points(CV series doesn't support)	256 points
SYSMAC-C Series (C mode)	Writing of bit scale is not supported	30 points

9.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [DM0]

GeneralScaleSimulationAlarm

Tag Name

Tag

DM0

☐ Auto Format

Description

Device Type

DM

Data Memory

Device No.

0

Bank No.

0

Data Type

SHORT

Byte Position

Lower Byte

Length

1

Bit Position

0

☐ Byte Swap

Attribute

ReadWrite

☐ Array

Calculation

NONE

New

Save

<<

>>

OK

Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 6.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.
Bank No.	Specify a bank number if you have specified extended data memory (EM) as the device type. Set a number between 0 and 28.

9.5 Errors

See the explanation of errors for SYSMAC Ethernet connection (section 8.6).

10 [Omron] SYSMAC FinsGateway Connection

This chapter explains communication with SYSMAC series equipment using FinsGateway.
An overview of communication via a SYSMAC FinsGateway connection is shown below.

Overview	
Link	FinsGateway
Communication method	Ethernet, Serial Link, Ethernet, Controller Link, SYSMAC Link etc...

Important

- FinsGateway ver.2003 is required for this communication.
- Because FinsGateway does not support 64 bit OS, SYSMAC FinsGateway connection cannot be used in 64 bit edition. Please use 32bit edition with WOW64 on 64bitOS.

10.1 PLC Systems

10.1.1 Conditions of using FinsGateway

The conditions that can be connected to SYSMAC FinsGateway are shown below.

Communication	Description
Sysmac Link	Requires an SYSMAC LINK Support Board (i.e., 3G8F5-SLK21). Only one SYSMAC LINK Support Board can be installed in one computer. The software included with the Board cannot be used with FinsGateway. The network gateway function cannot run.
SLK (PCI)	Requires an SYSMAC LINK Support Board (i.e., 3G8F7-SLK21). Up to four SYSMAC LINK Support Boards can be installed in one computer.
Controller Link	Requires an SYSMAC Controller Link Support Board (i.e., 3G8F5-CLK21). Only one Controller Link Support Board can be installed in one computer. The software included with the Board cannot be used with FinsGateway.
CLK (PCI)	Requires an SYSMAC Controller Link Support Board (i.e., 3G8F7-CLK21). Up to four Controller Link support boards can be installed in one computer.
Ethernet	Requires an Ethernet board and an OS supported by FinsGateway. TCP/IP must be installed.
Serial Link	Requires a PC 95-compliant COM port and an OS supported by FinsGateway. The above COM port must be available for exclusive use by FinsGateway. Other applications not using FinsGateway cannot use the COM port simultaneously.
Sysmac Board	Requires an SYSMAC Board (C200PC-ISA-01-DRM). The software included with the board cannot be used with FinsGateway.
Cs1Bus Interface	Requires an SYSMAC CS1BUS Interface Board (ITBC-CST01). Up to four CS1BUS Interface boards can be installed in one computer.
Cs1Sys Board	Requires an SYSMAC CS1 Board (CS1PC-PCI01-DRM). Up to four SYSMAC CS1 Boards can be installed in one computer.

10.2 List of Devices

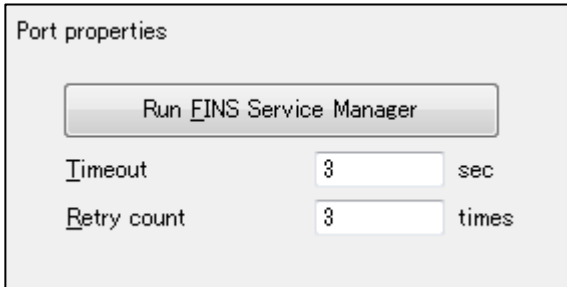
See the list of devices for SYSMAC Ethernet connection (section 8.2).

10.3 DeviceXPlorer Settings

10.3.1 FinsGateway Port Settings

10.3.1.1 FinsGateway Port Settings Screen

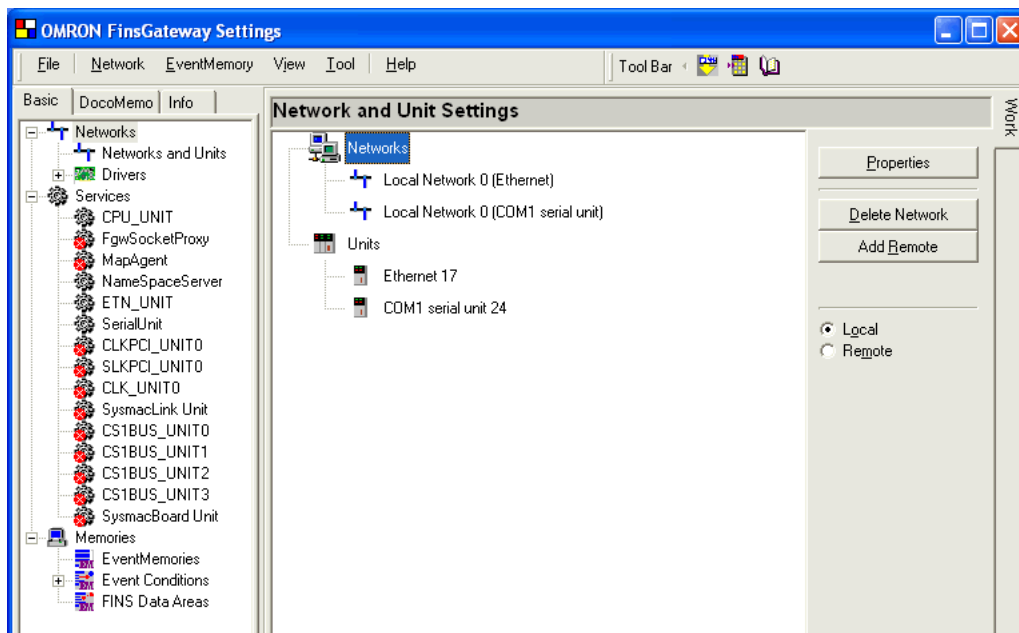
Where FinsGateway is specified as the communication port, it is necessary to set FinsGateway.



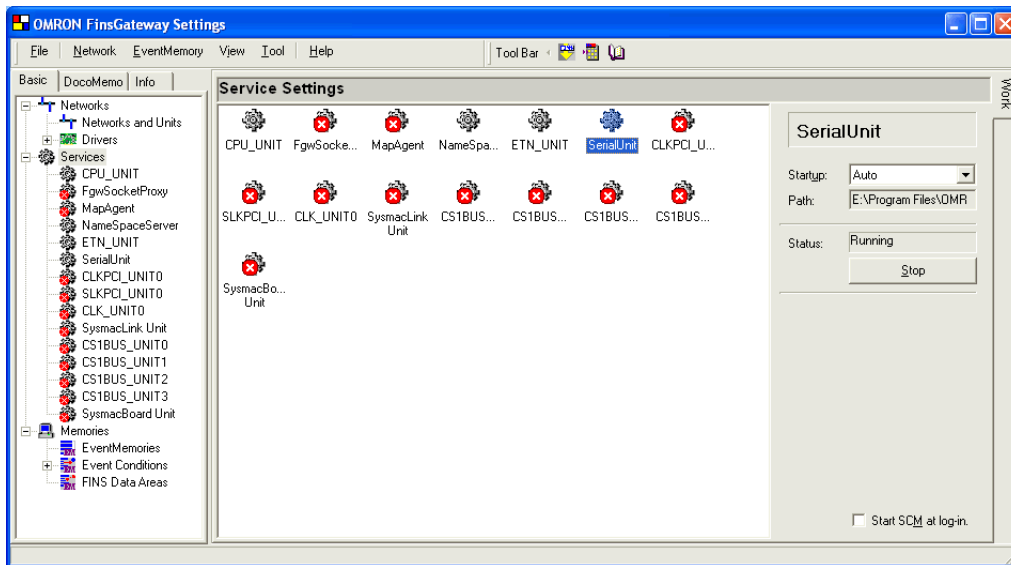
Item	Description
Run FINS Service manager	Run the FINS service manager. It is necessary to make appropriate FINS service manager settings. For details, see section 10.3.1.2.
Timeout	Specify the waiting time between sending a request message and receiving a response message. If a response cannot be returned within the specified time, it results in a timeout error. Set a number between 0 and 60.
Retry Times	Specify the number of times to retry when a timeout error occurs. If TCP / IP is used, the connection is cut if a response is not received even after the set number of retries, and an attempt is made to reconnect. Set a number between 0 and 10.

10.3.1.2 Setting up FINS Service Manager

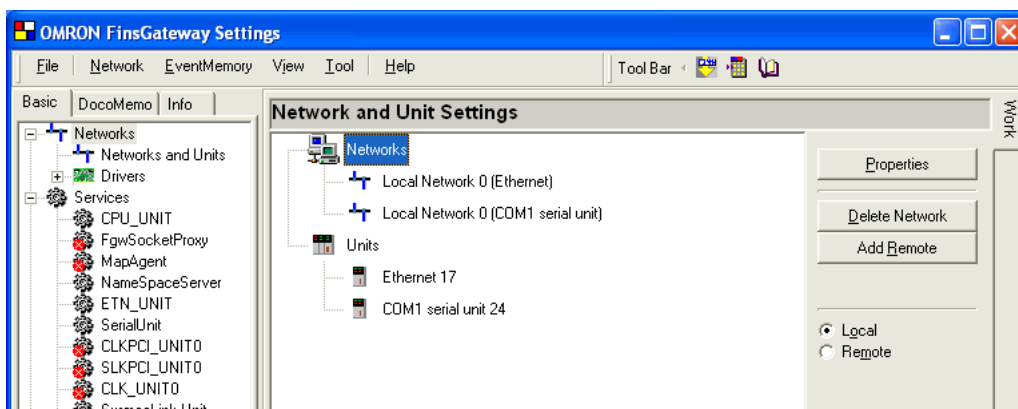
If you click the startup button for the FINS service manager, the FinsGateway settings screen starts.



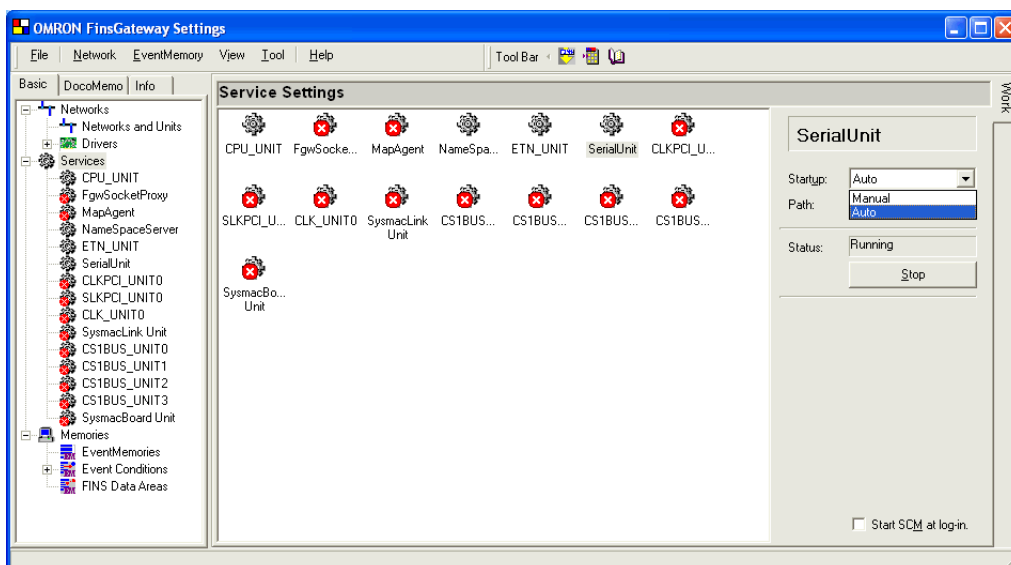
Start the connection method you will use from the services. The connection method selected at installation will appear under Services.



When the service is started, the relevant connection method for the network is shown.

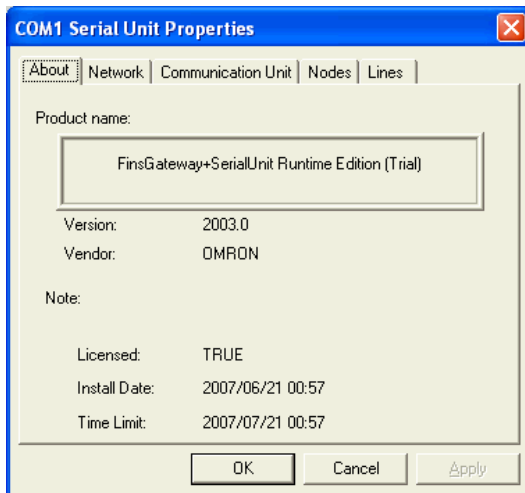


To automatically start the service, select “Automatic start” for the startup type.



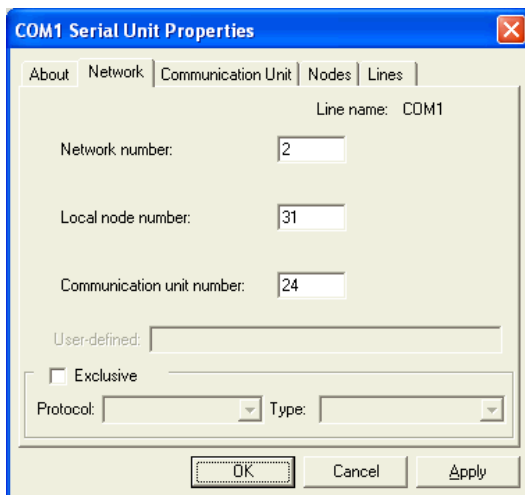
[Serial Link Communication Settings]

Select Serial Unit and click the Properties button.



Information such as the version and the installation date is shown.

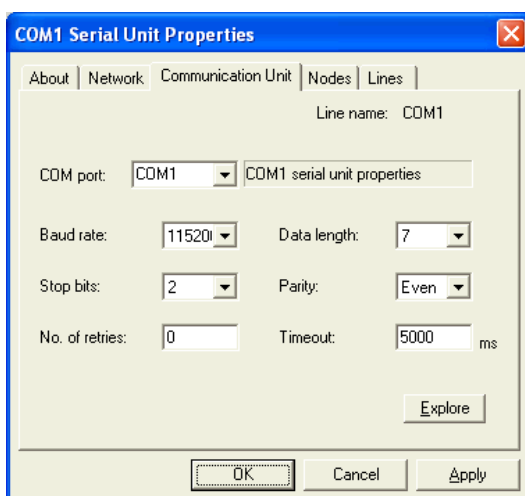
Select the Network tab.



Specify the network address. In this example, “2” is specified.

The own node address and the communication unit address are the own station (PC side) node and the unit setting.

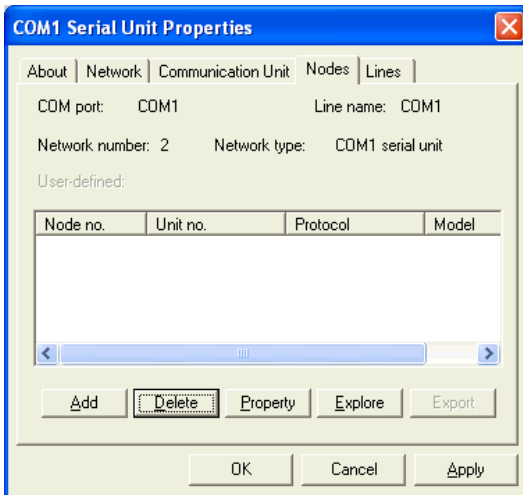
Select the Communication Unit tab.



Specify the communication port and the communication settings of the connection target.

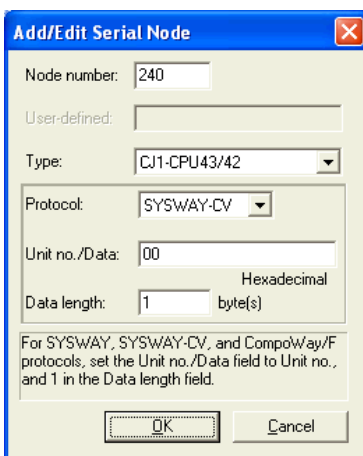
If you do not know the settings, you can use the Search button to search communication conditions.

Select the Node List tab.



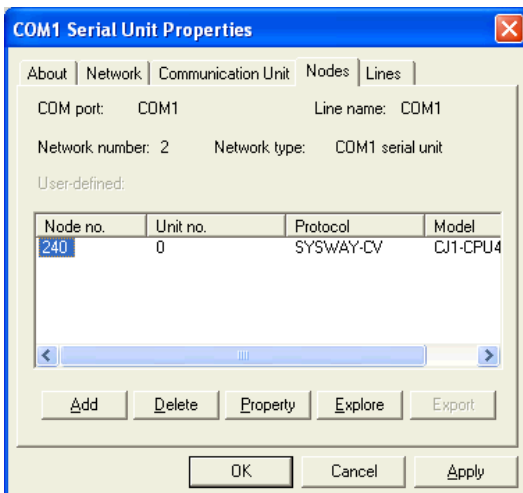
Click the Add button and add the node to the SYSMAC node list.

If you do not know the node, you can use the Search button to search for the node.



Specify the node address, model, protocol and unit number. Set 240 for the node address.

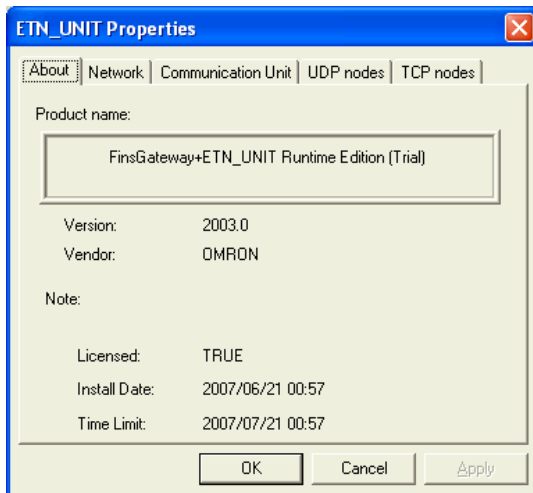
For the SYSMAC-C series, select SYSWAY. For the SYSMAC-CV / CS1 series, select SYSWAY-CV.



Specify the node address and unit number you set here as the “node address and unit address” in the PLC side network settings in the DeviceXPlorer device settings.

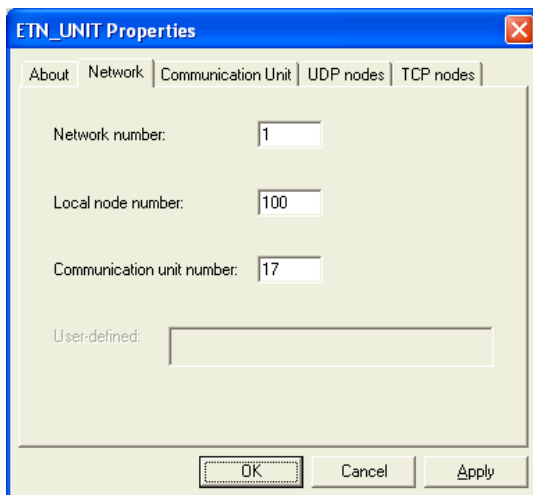
[Ethernet Communication Settings]

Select Ethernet Unit and click the Properties button.



Information such as the version and the installation date are shown.

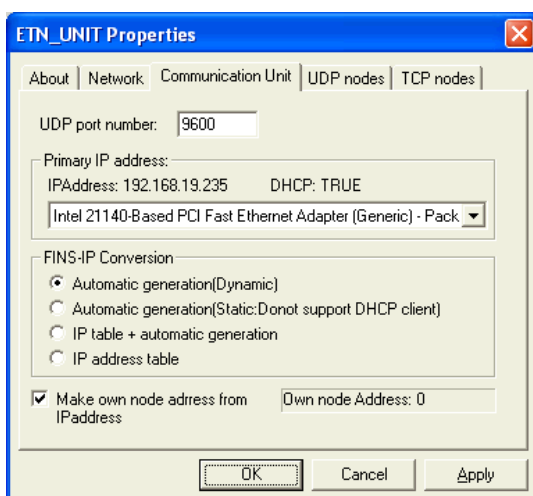
Select the Network tab.



Specify the network address. Specify a number other than 0 for the network address. In this example, "1" is specified.

Generally, the final digits of the IP address of the own station (PC side) is specified as the own node address. For example, if the IP address is 192.168.1.100, "100" is specified. Specify the own unit number (PC side) as the communication unit address. Default value is 17.

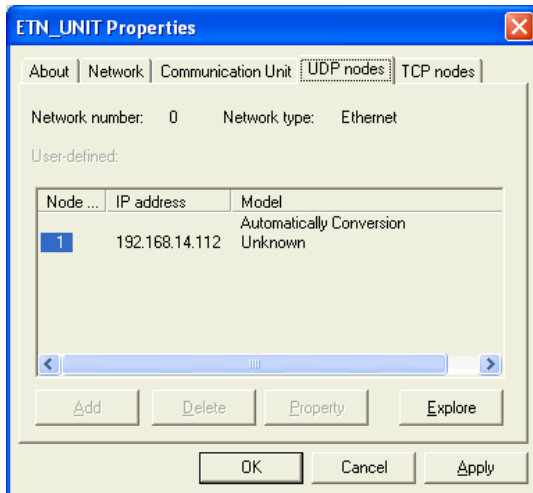
Select the Communication Unit tab.



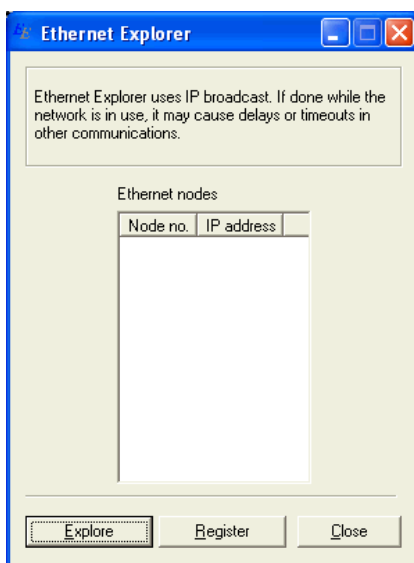
Specify the UDP port number and the IP address of the Ethernet board used by the PC side.

If you select the IP address table conversion method, the final three digits of the IP address become the node address. For details, see the FinsGateway manual.

To perform UDP / IP communication, select the UDP node tab.

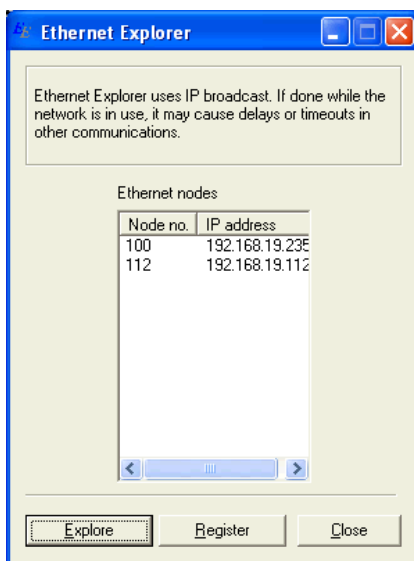


To search for the node on the network, use the Search button.



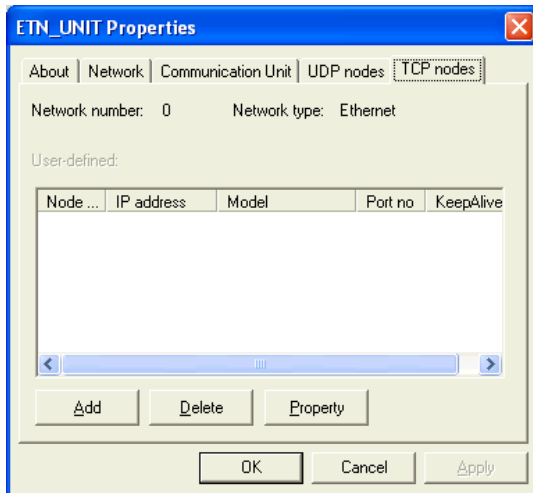
Click the Start search button.

Search results are displayed.

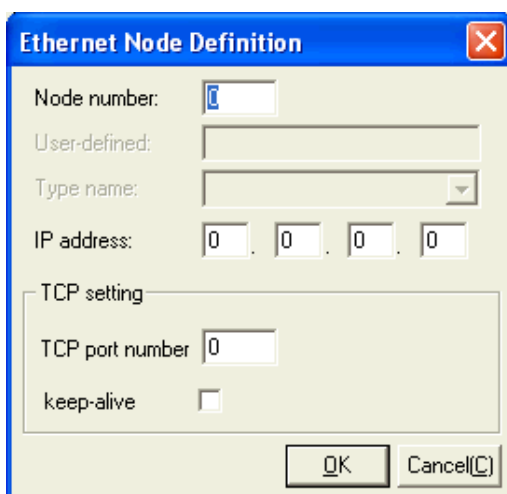


The search results are shown.
Click the “Set in system” button to register the node.

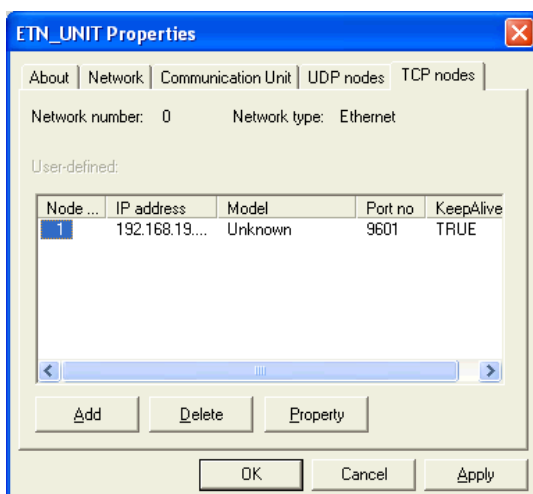
For TCP / IP communication, select the “TCP nodes” tab.



Click the Add button to add the selected node.

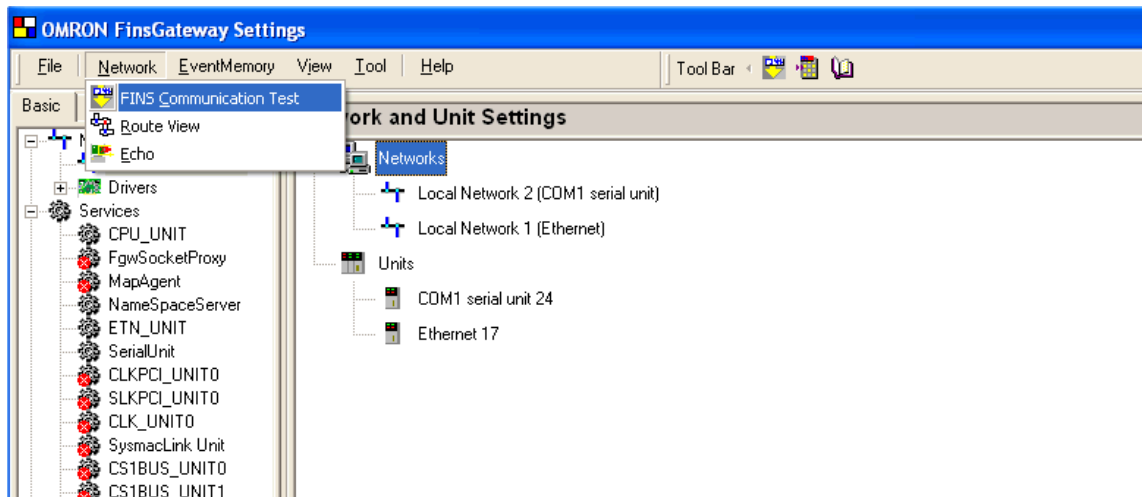


When adding a node, set the node number and IP address and make the TCP settings.

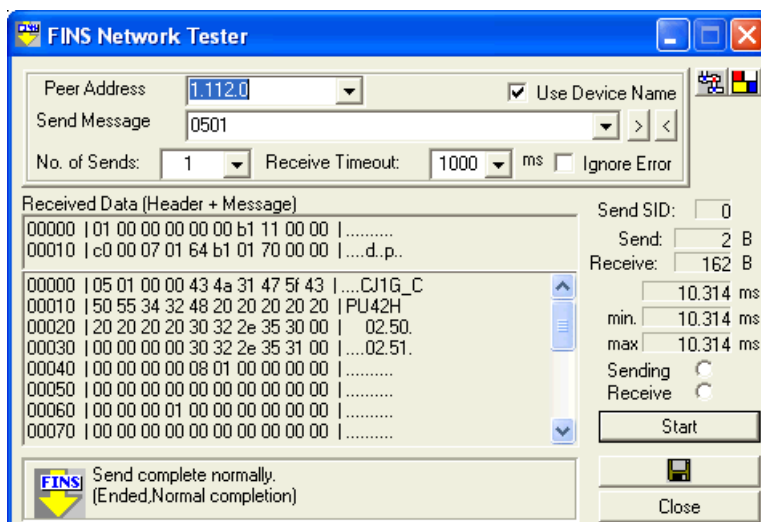


[Communication Check]

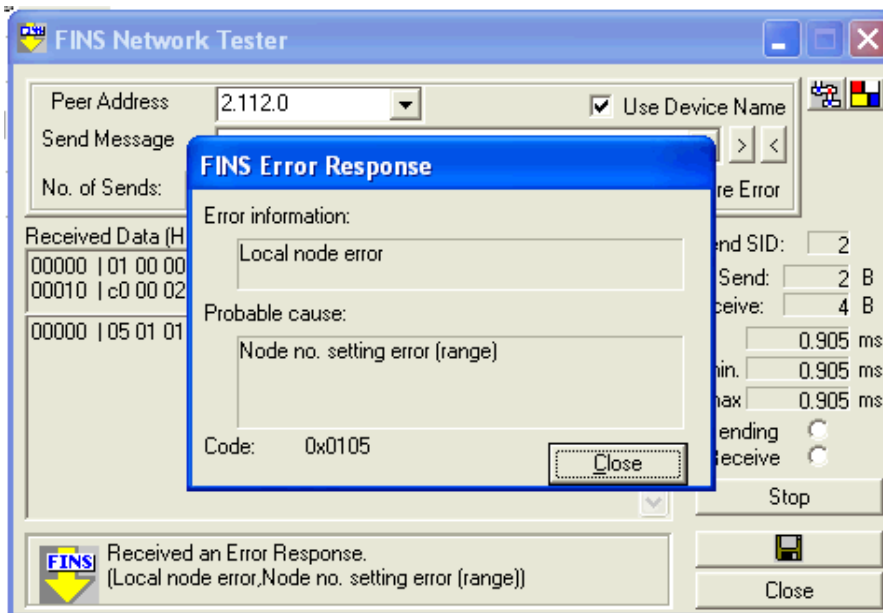
In FinsGateway setting program, execute FINS communication test in network menu.



Set the network, node, unit number which is registered in FinsGateway to the receiver. Transmit the message 0501 which means read out command of controller information. The CPU type is returned from node when it works well.



Routing error or timeout error are returned, when the setting is not correct. You should check the FinsGateway setting and the node. You can see the error description with input the Main Code and Sub Code in FINS response guide.



[Serial Link Communication Check]

Confirm if it can communicate with the following operation.

Set "(Network number), (Node number), (Unit number)" in target device.

(1) Send read type command (0501) to CPU_UNIT(0.0.0) of FinsGateway in own node (PC).

-> If you can read, it means CPU_UNIT of FinsGateway works successfully.

(2) Send read type command (0501) to SERIAL_UNIT (0.0.24) in own node (PC).

If you set unit number of SERIAL_UNIT as '24', it will be (0.0.24).

-> If you can read, it means SERIAL_UNIT of FinsGateway works successfully.

(3) Send read type command (0501) with network number to SERIAL UNIT (2.0.24) in own node (PC).

-> If you can read, routing table of FinsGateway works successfully.

(4) Send read type command (0501) to CPU unit (2.240.0) in target node (PLC).

Set network number and node number depending on your circumstance. (2.240.0) is an example, if you set network number '2' and node number '240'.

Unit number should be set '0' that indicates communication unit of target.

-> If you can read, it means communication of CPU in PLC of target works successfully.

If you can do all, it indicates FinsGateway communicates with PLC successfully.

[Ethernet Communication Check]

Confirm if it can communicate with the following operation. Set '(Network number), (Node number), (Unit number)' in target device.

(1) Send read type command (0501) to CPU_UNIT(0.0.0) of FinsGateway in own node (PC).

->If you can read, it means CPU_UNIT of FinsGateway works successfully.

(2) Send read type command (0501) to ETN_UNIT(0.0.17) in own node (PC).

If you set unit number of ETN_UNIT as '17', it will be (0.0.17).

->If you can read, it means ETN_UNIT of FinsGateway works successfully.

(3) Send read type command (0501) with network number to ETN_UNIT(1.0.17) in own node (PC).

->If you can read, routing table of FinsGateway works successfully.

(4) Send read type command (0501) to Ethernet unit(1.103.254) in target node (PLC).

Set network number and node number depending on your circumstance. (1.103.254) is an example, if you set network number '1' and node number '103(162.168.1.103)'.

Unit number should be set '254' that indicates CPU of target.

->If you can read, it means communication of Ethernet unit in PLC of target works successfully.

(5) Send read type command (0501) to CPU unit (1.103.0) in target node (PLC).

Set network number and node number depending on your circumstance. (1.103.0) is an example, if you set network number '1' and node number '103'.

Unit number should be set '0' that indicates communication unit of target.

->If you can read, it means communication of CPU in PLC of target works successfully.

If you can do all, it indicates FinsGateway communicates with PLC successfully.

10.3.2 Device Settings

This section explains how to make the settings for the access PLC.

Device properties

Connection Test

CPU TYPE

☒ SYSMAC-CJ/CS/CP ☐ SYSMAC-CV ☐ SYSMAC-C

PLC

Network No.

Node No.

Unit No.

ACCESS POINTS

Bit R/W Bit Poke

Word R/W Word Poke

Item		Description
CPU TYPE		Select the CPU type of the PLC to be connected to.
PLC	Network No.	Specify the network address set in FinsGateway.
	Node No.	Specify the node address set in FinsGateway.
	Unit No.	Normally "0" is specified.
ACCESS POINTS	Bit R / W*	Specify the maximum access points of batch read / write of bit scale. Up to 1992 points can be set.
	Word R / W	Specify the maximum access points of batch read / write of word scale. Up to 996 points can be set.
	Bit Poke	Only batch writing is supported.
	Word Poke	Only batch writing is supported.

* Only SYSMAC-CJ / CS / CP Series supports access of bit device.

10.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [DM0]

General | Scale | Simulation | Alarm

Tag Name: Tag DM0

☐ Auto Format

Description:

Device Type: DM Data Memory

Device No.: 0 Bank No.: 0

Data Type: SHORT Byte Position: Lower Byte

Length: 1 Bit Position: 0

☐ Byte Swap ☐ Array

Attribute: ReadWrite

Calculation: NONE

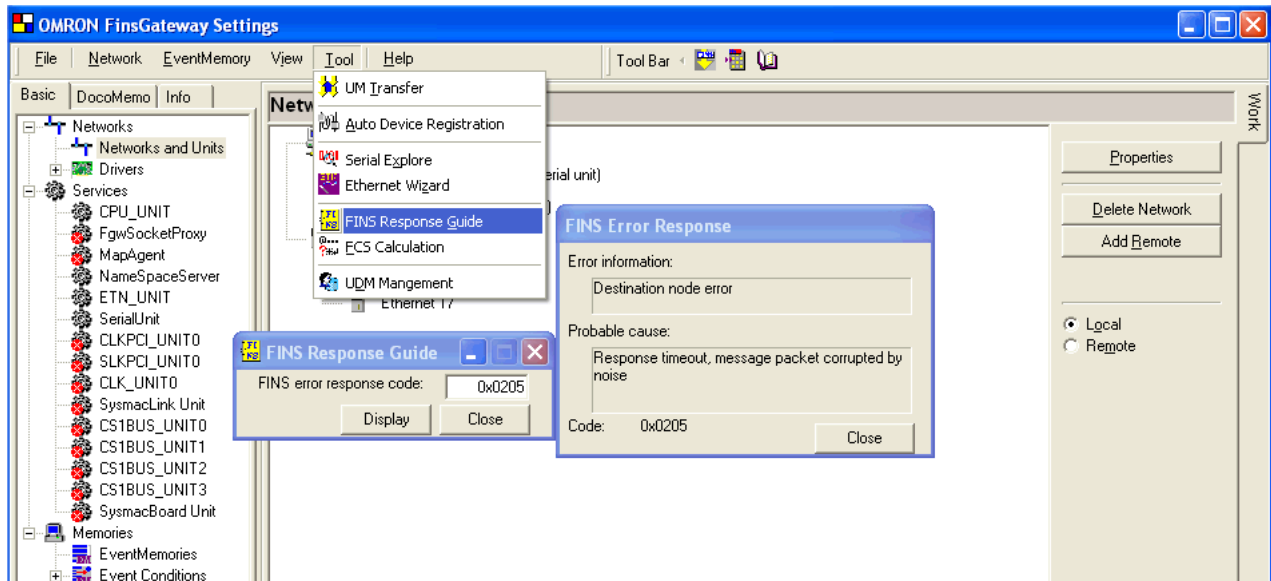
New Save << >> OK Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 6.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.
Bank No.	Specify a bank number if you have specified extended data memory (EM) as the device type. Set a number between 0 and 28.

10.4 Errors

When you are using FinsGateway, you can check the content of errors by entering the main response code and sub response code included in the error message to the FINS response guide.

Example: If the main code is “5” and the sub code is “2”, enter “0x0502” and click the Show button to show the error content.



In FinsGateway communication, once a communication timeout error occurs, the disagreement of the message serial number (service ID) contained in message will occur, the following messages will be outputted, and communication will go wrong.

Error Message	Description
ERROR : FinsReceiveData SID ERROR(SID=xxx, RCV=yyy, Code=FF)	Send SID : xxx Receive SID : yyy

11 [Omron] SYSMAC SysmacGateway Connection

This chapter explains communication with SYSMAC series equipment using SysmacGateway.

An overview of communication via a SYSMAC SysmacGateway connection is shown below.

Overview	
Link	SysmacGateway
Communication method	EtherNet/IP(CIP), USB

Important

- SysmacGateway runtime ver.2003 is required for this communication.
- You can use in version 1.31 or less of SysmacGateway.
- Because SysmacGateway does not support 64 bit OS, SYSMAC SysmacGateway connection cannot be used in 64 bit edition. Please use 32bit edition with WOW64 on 64bitOS.

11.1 Systems

11.1.1 Conditions of using SysmacGateway

The conditions that can be connected to SysmacGateway are shown below.

Communication	Description
EtherNet/IP	CIP Command
USB	This supports to access via CPU port by using USB.

11.1.2 PLC system

Category	Applicable CPU units	Applicable Ethernet units	USB
SYSMAC-CJ Series	CJ2H CJ2M	CJ2H-CPU*-EIP(Built-in) CJ2M-CPU*(Built-in) CJ1W-EIP21	(Built-in)
SYSMAC-CS Series	CS1G,CS1H,CS1D	CS1W-EIP21	
SYSMAC-CP Series	CP1H	CJ1W-EIP21	
SYSMAC-One NSJ Series	NSJ		

11.2 List of Devices

The devices that can be set in DeviceXPlorer are as shown below.

The devices and device ranges that can be used vary with the CPU. For details, refer to your CPU instructions.

[List of Devices] (The device ranges are all specified in decimal format.)

Device name	Device symbol	Device range	Category
I / O relay	CIO	0 - 6143	Word
Internal auxiliary relay	WR	0 - 511	
Holding relay	HR	0 - 511	
Data memory	DM	0 - 32767	
Extended data memory*2	EM	0 - 32767	

*1 Specify a bank number and device number for the extended data memory (EM).

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: CIOD1, AR100, C123, etc.

For the extended data memory (EM), specify as “EM bank number: device number”.

Example: For bank number 1, device number 123: Specify EM1:123.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

Important

- SysmacGateway Connection doesn't support to access bit unit.

11.3 DeviceXPlorer Settings

11.3.1 SysmacGateway Port Settings

11.3.1.1 SysmacGateway Port Settings Screen

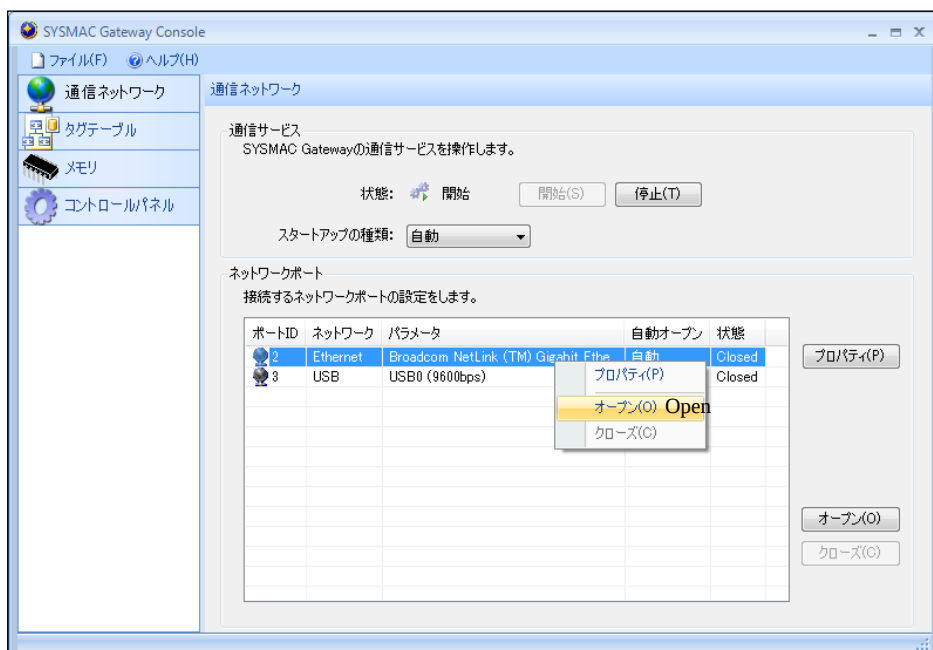
Where SysmacGateway is specified as the communication port, it is necessary to set SysmacGateway.

Item	Description
Start SYSMAC Gateway Console	Run the SYSMAC Gateway Console. It is necessary to make appropriate settings in SYSMAC Gateway Console. For details, see section 10.3.1.2.
Interface Type	Select access type, Ethernet or USB
CIP Setting	Specify CIP setting of EtherNet/IP.
IP Address	Specify IP Address of Target.
Node ID	Specify the node ID. This is used in USB connection. Set a number between 0 and 255.
Segments	Specify segment number until it reaches to target.
Message Type	Select UCMM(Connection-less-type) or CLASS3(Connection-type). UCMM is fit for setting tool connection. (Timeout error detection is impossible) CLASS3 is fit for monitor tool connection. Please select CLASS3 in DeviceXPlorer.
Timeout	Specify the waiting time between sending a request message and receiving a response message. If a response cannot be returned within the specified time, it results in a timeout error. Set a number between 0 and 60.
Retry Times	Specify the number of times to retry when a timeout error occurs. If TCP / IP is used, the connection is cut if a response is not received even after the set number of retries, and an attempt is made to reconnect. Set a number between 0 and 10.

11.3.1.2 Setting up SYSMAC Gateway Console

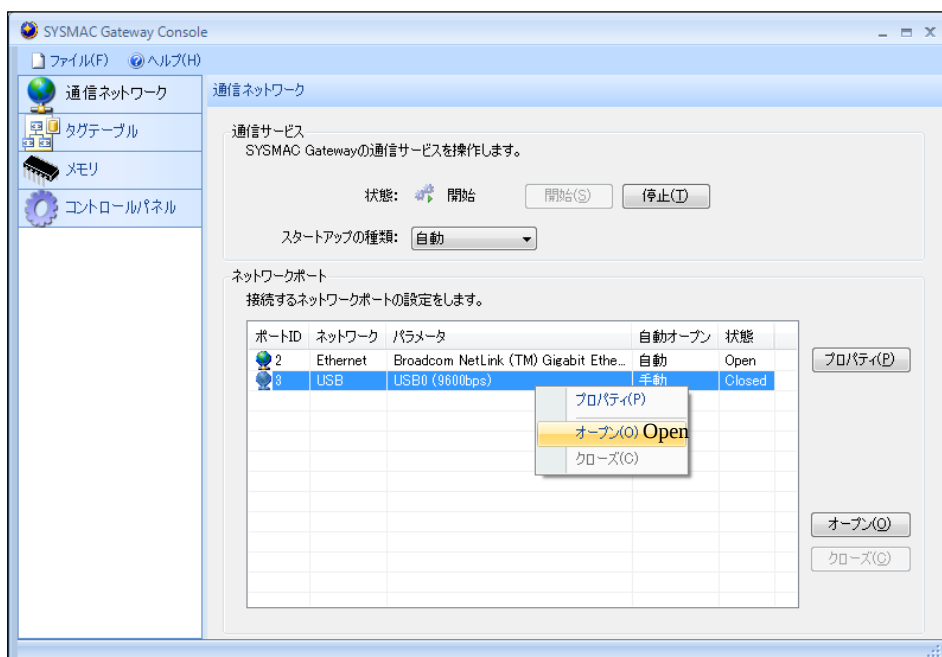
<Ethernet Interface>

You connect target PLC by Ethernet, and select “Ethernet” and click the “Open” in SYSMAC Gateway Console.



<USB Interface>

You connect target PLC by USB, and select “USB” and click the “Open” in SYSMAC Gateway Console.



11.3.2 Device Settings

This section explains how to make the settings for the access PLC.

Device properties

Connection Test

Unit Version

☒ Ver.2.0
☐ Ver.1.0

ACCESS POINTS

Bit R/W

Word R/W

Bit Poke

Word Poke

Item		Description
Unit Version		Select the version of CPU of the PLC. Please check the EIP version of the unit side.
ACCESS POINTS	Bit R / W	Not supported.
	Word R / W	Specify the maximum access points of batch read / write of word scale. Up to 100 points can be set.
	Bit Poke	Only batch writing is supported.
	Word Poke	Only batch writing is supported.

11.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 10.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.
Bank No.	Specify a bank number if you have specified extended data memory (EM) as the device type. Set a number between 0 and 31.

11.4 Errors

When you are using SysmacGateway, you can check the content of errors.

Error Message	Description
SysmacGateway Error	Failed to connect. Please check the port setting. Please confirm whether the selected interface opens or not.
Resource Error	DeviceXPlorer recives error from SysmacGateway. Please check port,device and tag settings.

12 [Omron] SYSMAC CX-Compolet Connection

This chapter explains communication with SYSMAC series equipment using CX-Compolet.

An overview of communication via a SYSMAC SysmacGateway connection is shown below.

Overview	
Link	SysmacGateway
Communication method	EtherNet/IP(CIP), USB

Important

- SysmacGateway runtime ver.1.31 is required for this communication.
- You can use in version 1.7 or less of SysmacGateway.
- You can use in version 1.7 or less of CX-Compolet.
- Because SysmacGateway does not correspond to 64 bit OS, SYSMAC CX-Compolet connection cannot be used in 64 bit edition. Please use 32bit edition with WOW64 on 64bitOS.
- .NET Framework 4.0 runtime is required for this communication.

12.1 PLC Systems

12.1.1 Conditions of using SysmacGateway

The conditions that can be connected to SysmacGateway are shown below.

Communication	Description
EtherNet/IP	CIP Command
USB	This supports to access via CPU port by using USB.

12.1.2 Applicable Units

Category	Applicable CPU units	Applicable EtherNet/IP units	USB
SYSMAC-NX Series	NX701	(Built-in)	
SYSMAC-NJ Series	NJ501 NJ301 NJ101	(Built-in) CJ1W-EIP21	
SYSMAC-CJ2 Series	CJ2H CJ2M	CJ2H-CPU□-EIP(Built-in) CJ2M-CPU□(Built-in) CJ1W-EIP21	(Built-in)
SYSMAC NE1S	NE1S-CPU01	(Built-in)	
SYSMAC Gateway	SYSMAC Gateway Remote Console		
CIP Common	EtherNet/IP Supported General Machine	General EtherNet/IP Unit	EtherNet/IP Supported General USB Port

12.2 NX/NJ Series Built-in Ethernet Port Settings

The built-in Ethernet port of Sysmac NX/NJ is set in the software settings(using SysmacStudio).

Configure and set the port used for EtherNet/IP communication in “Built-in EtherNet/IP port setting” in “Configuration” of SysmacStudio.



Set the IP address and subnet mask.

12.3 List of DataType

You access the DataType in the DeviceXPlorer replaced by the DataType of the CX-Compolet.

Here are the DataType that are supported by the DeviceXPlorer.

CX-Compolet DataType	DeviceXPlorer DataType
BOOL	BOOL: Logical
SINT	BYTE: 8-bit signed integers
INT	SHORT: 16-bit signed integers
DINT	LONG: 32-bit signed integers
LINT	LONGLONG: 64-bit signed integers
USINT	UBYTE: 8-bit unsigned integers
UINT	USHORT: 16-bit unsigned integers
UDINT	ULONG: 32-bit unsigned integers
ULINT	ULONGLONG: 64-bit unsigned integers
REAL	FLOAT: 32-bit real numbers
LREAL	DOUBLE: 64-bit real numbers
STRING	STRING: Character string
BYTE	UBYTE: 8-bit unsigned integers
WORD	USHORT: 16-bit unsigned integers
DWORD	ULONG: 32-bit unsigned integers
LWORD	ULONGLONG: 64-bit unsigned integers
TIMER	SHORT: 16-bit signed integers
COUNTER	SHORT: 16-bit signed integers
CHANNEL	USHORT: 16-bit unsigned integers
UINT_BCD	USHORT: 16-bit unsigned integers
UDINT_BCD	ULONG: 32-bit unsigned integers
ULINT_BCD	ULONGLONG: 64-bit unsigned integers
ENUM	LONG: 32-bit signed integers

When type UNION, of type STRUCT, DeviceXPlorer can access the member variables of the data type described above.

(Direct access does not supported to a variable of type UNION, of the type STRUCT)

12.4 List of Devices

If the data type that DeviceXPlorer have supported, DeviceXPlorer can access all variables this defined in machine.

DeviceXPlorer supported data type see section12.3.

12.5 DeviceXPlorer Settings

12.5.1 SysmacGateway Port Settings

12.5.1.1 SysmacGateway Port Settings Screen

Where SysmacGateway is specified as the communication port, it is necessary to set SysmacGateway.

Item	Description
Start SYSMAC Gateway Console	Run the SYSMAC Gateway Console. It is necessary to make appropriate settings in SYSMAC Gateway Console. For details, see section 10.3.1.2.
Communication stting	Connection setting
Access type	Select access type.
Message type	Select UCMM(Connection-less-type) or CLASS3(Connection-type). UCMM is fit for setting tool connection. (Timeout error detection is impossible) CLASS3 is fit for monitor tool connection. Please select CLASS3 in DeviceXPlorer.
Connection designation	Select Connection designation to Target, IP address or Route path.
Port ID	Setting for connecting the Port ID
Interface type	Select interfacetype, Ethernet or USB.
Port ID	Specify Port ID of SYSMAC Gateway Console.
IP address	Specify IP Address of Target.
Route path	Specify Route Path of Target.
Timeout	Specify the waiting time between sending a request message and receiving a response message. If a response cannot be returned within the specified time, it results in a timeout error. Set a number between 0 and 60.
Retry count	Specify the number of times to retry when a timeout error occurs. If TCP / IP is used, the connection is cut if a response is not received even after the set number of retries, and an attempt is made to reconnect. Set a number between 0 and 10.

[Root path specification method]

The route path notation connects the data called “segment” to indicate the final destination. One segment is expressed by “Port ID” and “Link Address”

Example root path:

When connecting via EtherNet/IP to PLC2 CPU unit via PLC1.

<Constitution>

PLC1:IP address = 192.168.250.1, EtherNet/IP unit number =6.

PLC2:IP address = 10.14.145.82

<Root path>

“2%192.168.250.1¥1%22¥2%10.14.145.82¥1%0”

<Root path element description>

- ”2% 192.168.250.1”: Port ID = PC port ID, Link Address = PLC1 IP address
- ”1% 22”: Port ID = PLC1 backplane(base unit) port, Link Address = EtherNet/IP unit number + 10 hex
- ”2% 10.14.145.82”: Port ID = EtherNet/IP unit port ID, Link Address = PLC2 IP address
- ”1% 0”: Port ID = PLC2 backplane(base unit)port, Link Address = CPU unit

12.5.1.2 Setting up SYSMAC Gateway Console

See the list of devices for SYSMAC SysmacGateway connection (section11.3.1.2).

12.5.2 Device Settings

This section explains how to make the settings for the access PLC.

Item	Description
Data attribute	Select "Basic data type" in the dynamic tag. This data type is used when the dynamic tag is not the extended tag name.
Import of tags	You can import the main process tags
Flat	You can import the main process tags in device.
Group hierarchy	The group generated by the tag hierarchy. it is need to check in "Structure to be used as the name of the group" for access.
Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.
Structure to be used as the name of the group	A group name is used as a structure name tag address when having this checkbox on. If a group is "STRUCT1" and the tag address "BOOL1" is defined in the group, it will be accessing tag address "STRUCT1.BOOL1". To define an abbreviated structure name in a tag address, set this configuration effective.
Delimiter of the structure	Specify delimiter of structure.
Maximum number of items read	Specify the maximum number of item read. Up to 8192 points can be set. The maximum number of item write is 1.

s

12.5.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Item	Check this option to use tag address as tag name.
Array	Specify the address to access the PLC tag.
Length	Check this option to use this tag as 1 tag name.
Calculation	Specify the element number of array tag.

12.6 Errors

The main errors are shown below.

Error message	Description
Path destination is unknown.	Item name is incorrect.
The array index is not valid.	Number of array elements is incorrect.
Receive timeout error.	The wait response was received for longer than the specified time.

13 [Omron] SYSMAC EtherNet/IP Connect

This chapter describes communication with the SYSMAC-NX / NJ series using an Ethernet unit. SYSMAC (NX / NJ series) The communication outline of Ethernet connection is shown.v

Overview	
Link	EtherNet/IP (CIP)
Datacode	Binary
Protocol	TCP / IP

13.1 PLC System

13.1.1 Applicable unit

SYSMAC (NX / NJ series) Indicates the applicable CPU module and applicable Ethernet / IP module of Ethernet connection.

Series name	Applicable CPU unit	Applicable EtherNet / IP unit
SYSMAC-NX Series	NX701	Built-in Ethernet port
SYSMAC-NJ Series	NJ501 NJ301 NJ101	Built-in Ethernet port CJ1W-EIP21

13.2 Data type list

Data types in the NJ / NX series are replaced with data types in the Device Explorer for access. Write down the data types supported by Device Explorer.

13.3 List of Devices

Any data type supported by the device crawler can access all variables defined in the connected device. See Section 12.3 for a list of supported data types.

13.4 DeviceXPlorer Settings

13.4.1 Port Settings

Configure EtherNet / IP port settings.

Port

PING Test

Machine: TAKEBISHI05

☒ Adapter(L)

Adapter name: (Automatic)

Explanation:

Status: ☐ DHCP ☒

IPv4 address: IPv6 address:

Network: ☒ IPv4 ☐ IPv6

Protocol: ☒ TCP/IP ☐ UDP/IP

Adapter IP Address: localhost

Adapter Port No.: 0

PLC Address: 169.254.138.232

PLC Port No.: 44818

Send Delay: 0 msec

Timeout: 3 sec

Retry count: 3 times

CIP Setting

CIP Port No.: 1 CIP Link Address: 0

Item	Description
PLC Port No.	Specify "44818" (EtherNet / IP TCP / IP port number).
Send Deley	Specify the waiting time until sending the next command after receiving a response from the external device in milliseconds. It can be set in the range of 0 to 65535.
Timeout	Specifies the wait time for sending a request message and for receiving a response message. If you can not respond within the set time, a timeout error will occur. It can be set in the range of 0 to 60.
Retry count	Specify the number of retries when a timeout occurs. It can be set in the range of 0 to 10.
CIPPort No.	Specify the CIP port number on the PLC side. It can be set in the range of 1 to 15. Normally "1" (backplane port) is specified.
CIP Link Address	Specify the CIP link address on the PLC side. It can be set in the range of 0 to 255. Usually specify "0".

13.4.2 Device Settings

Set the access target PLC.

Property [Device1]

Device Option Publisher

Connection Test

CPU TYPE

☒ NJ ☐ NX

DATA ATTRIBUTE

Base Data Type: SHORT

OpenType

OpenType: Forward Open

Parameter

Connection Timeout Multiplier: x4

Requested Packet Interval: 10000 ms

Item		Description
CPU TYPE		Select the CPU type to access.
Base Data Type		Select the basic data type of the dynamic tag. This data type applies when there is no extension specification. 64-bit integer / real type, string type, and array type can not be selected.
OpenType	Large Forward Open	Use Large Forward Open when communicating.
Parameter	Connection Timeout Multiplier	Select a value for Connection Timeout Multiplier.
	Requested Packet Interval: RPI	Requested Packet Interval: Specify the RPI value.

In NX or NJ, all data addresses in the PLC are identified not by device name or device number but by tag address. Tag definition is done on the NX or NJ side, and set along with data attributes such as data type and size. Device Explorer can also access the elements of NX or NJ structures. When accessing the element tag address "Struct1.INT1" of the structure of NX or NJ in the device "Device1," specify the ItemID of OPC as "Device1.Struct1.INT1".

Also, when using dynamic tags to access data types other than basic data types, specify tag name expansion. For example, to access the tag address "DINT100" of NX or NJ with device "Device1" in REAL type, specify "Device1.DINT100: R".

Important

- In the connection test, the tag "Tag" is accessed to check the communication. If the tag "Tag" does not exist on the CPU side,

NAK Receive (Code = 1Eh)
Result:
Connect Error /quality=Comm Failure[0x18]

There is an error, but if NAK can be received, communication with the other CPU is successful, so there is no communication problem.

- In the connection test, the message "Send UnregisterSession" may be followed by the message "Receive error (Code = 10054)", but there is no communication problem.

13.4.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [Tag:W]

General			
Tag Name	Tag		
	Tag:W		
	☐ Auto Format		
Tag Address	Tag		
Description			
Data Type	SHORT	Attribute	ReadWrite
Length	1	Calculation	NONE
☐ Byte Swap			
☐ Array			

Item	Description
Tag Name	If you want to use the same tag name as the tag address, select the check box.
Tag Address	Specify the address to access the PLC tag.
Data Type	To access with the basic data type of device settings, select the check box. To set data attributes explicitly, turn off the check box.
Attribute	Select an attribute.
Length	Specifies the number of elements of array type.
Calculation	It supports BCD operation.

Describe the symbolic segment name of NX or NJ in the tag address.

The description rule is as follows.

TAG Name	Access the specified tag
TAG Name.x	Access x bit of specified tag
TAG Name[y]	Access element [y] of specified array tag
STRUCTName.TAG Name	Access element tag of specified structure

For example, when an array tag "DATA [10]" of 10 elements with DINT type is defined on NX or NJ, specifying "DATA [5]" as the tag address directly accesses the specified array element. Specifying only "DATA" accesses "DATA [0]". Access can not be made in units of structures. In addition, the character size of the tag name and the structure name included in the tag address is up to 40 bytes each. There is no limitation on the character size of the entire tag address.

Also, NX or NJ logical array tags are accessed in units of 32 bits per data size.

Important

- You can access the global tag (controller tag) of NX or NJ, but you can not access the local tag (program tag).
- You can not access an array of two or more dimensions with an array type tag of NX or NJ.

13.5 Errors

This section explains the PLC errors (response errors) included in the error messages.

Error code (HEX)	Status	Description
1E	Embedded Service Error	Specified tag name may not exist. Please check tag name.
FE	Access point Error	Access point of sending message is different from Access point of receiving message.
FF	Sequence Number Error	Sequence Number of sending message is different from Serial Number of receiving message.

14 [Jtekt] TOYOPUC Ethernet Connection

This chapter explains communication with TOYOPUC series equipment using an Ethernet unit. An overview of communication via a TOYOPUC Ethernet connection is shown below.

Overview	
Link	Computer link
Data code	Binary
Protocol	TCP / IP, UDP / IP

14.1 PLC Systems

14.1.1 Applicable CPU Modules

The applicable CPU modules for TOYOPUC Ethernet connection are shown below.

Category	Applicable CPU modules
TOYOPUC Plus Series	Plus CPU
TOYOPUC Nano Series	10GX
PC10 Series	PC10G(E)-CPU, PC10P-CPU
PC3JG Series	PC3JG (- P)-CPU, PC3JB-F / E, PC3JB-G(P)
PC3J Series	PC3J(L)-CPU, PC3JD-CPU, PC3JM-CPU PC3JNM-CPU, PC3JNF-CPU, MULTI-GW
PC2J Series	PC2J-CPU, PC2JC-CPU, PC2JS-CPU, PC2JR-CPU, PC2J16-CPU PC2J16R-CPU, PC2J16P-CPU, PC2J16H-CPU, PC2J16PR-CPU PC2J16HR-CPU

* PC2S1-CPU and MX-CPU cannot be used, and Ethernet connection is not possible with PC2F-48 / 80,56 / 72,64 / 64,72 / 56,80 / 48,PC2FS, PC2FS-3D, PC2FK, PC2FK50, PC3JB, PC2JN, PC2JM, or PC2JNF.

14.1.2 Applicable Ethernet Modules

The applicable Ethernet modules for TOYOPUC Ethernet connection are shown below.

Module type	Applicable Ethernet module	Remarks
Communication module	Nano 2ET	TOYOPUC Nano Series
Extra communication board	Plus EX(2)	TOYOPUC Plus Series
Ethernet module	EN-I / F	10BASE-5
	EN-I / F-T	10BASE-T
FL-net / Ethernet module	FL / ET-net-5	10BASE-5 (Ethernet)
	FL / ET-T-V2(H)	10BASE-T (Ethernet)
	2PORT-EFR	10BASE-T / 100BASE-TX (Ethernet)

14.2 List of Devices

The TOYOPUC devices that can be set in DeviceXPlorer are as shown below.

The addresses that can be used vary with the parameter settings. For details, refer to your CPU instructions.

[Device List for PC10 Series] (All address ranges in hexadecimal notation)

Device name	Device symbol	Address range		Category
		Word address	Bit address	
Edge detection	P	00 - 1F 100 - 17F	000 - 1FF 1000 - 17FF	Bit
Keep relay	K	00 - 2F	000 - 2FF	
Special relay	V	0 - F 100 - 17F	0 - FF 1000 - 17FF	
Timer	T	0 - 1F 100 - 17F	0 - 1FF 1000 - 17FF	
Counter	C	0 - 1F 100 - 17F	0 - 1FF 1000 - 17FF	
Link relay	L	0 - 7F 100 - 2FF	0 - 7FF 1000 - 2FFF	
Input relay	X	0 - 7F	0 - 7FF	
Output relay	Y	0 - 7F	0 - 7FF	
Internal relay	M	0 - 7F 100 - 17F	0 - 7FF 1000 - 17FF	
Special register	S	0 - 3FF 1000 - 13FF		Word
Current timer / counter value	N	0 - 1FF 1000 - 17FF		
Link register	R	0 - 7FF		
Data register	D	0 - 2FFF		
Extended edge detection	EP	0 - FF	0 - FFF	Bit
Extended keep relay	EK	0 - FF	0 - FFF	
Extended special relay	EV	0 - FF	0 - FFF	
Extended timer	ET	0 - 7F	0 - 7FF	
Extended counter	EC	0 - 7F	0 - 7FF	
Extended link relay	EL	0 - 1FF	0 - 1FFF	
Extended input relay	EX	0 - 7F	0 - 7FF	
Extended output relay	EY	0 - 7F	0 - 7FF	
Extended internal relay	EM	0 - 1FF	0 - 1FFF	
Special register	ES	0 - 7FF		Word
Extended current value register	EN	0 - 7FF		
Extended set value register	H	0 - 7FF		
Extended data register	U	0 - 1FFFF		
Extended input relay	GX	0 - FFF	0 - FFFF	Bit
Extended output relay	GY	0 - FFF	0 - FFFF	
Extended internal relay	GM	0 - FFF	0 - FFFF	
Extended buffer register*1	EB	0 - 7FFFF		Word
Flash register	FR	0 - 1FFFFF		

[Device List for PC3JG, PC3J, and PC2J Series] (All address ranges in hexadecimal notation)

Device name	Device symbol	PC3JG address range		PC3J address range	PC2J address range	Category	
		Word address	Bit address				
Edge detection	P	00 - 1F	000 - 1FF	Same as left	Same as left	Bit	
Keep relay	K	00 - 2F	000 - 2FF				
Special relay	V	0 - F	0 - FF				
Timer	T	0 - 1F	0 - 1FF				
Counter	C	0 - 1F	0 - 1FF				
Link relay	L	0 - 7F	0 - 7FF				
Input relay	X	0 - 7F	0 - 7FF				
Output relay	Y	0 - 7F	0 - 7FF				
Internal relay	M	0 - 7F	0 - 7FF				
Special register	S	0 - 3FF					
Current timer / counter value	N	0 - 1FF					
Link register	R	0 - 7FF					
Data register	D	0 - 2FFF					
File register	B	0 - 1FFF					
Extended edge detection	EP	0 - FF	0 - FFF		Same as left	Not supported	Bit
Extended keep relay	EK	0 - FF	0 - FFF				
Extended special relay	EV	0 - FF	0 - FFF				
Extended timer	ET	0 - 7F	0 - 7FF				
Extended counter	EC	0 - 7F	0 - 7FF				
Extended link relay	EL	0 - 1FF	0 - 1FFF				
Extended input relay	EX	0 - 7F	0 - 7FF				
Extended output relay	EY	0 - 7F	0 - 7FF				
Extended internal relay	EM	0 - 1FF	0 - 1FFF				
Special register	ES	0 - 7FF					
Extended current value register	EN	0 - 7FF					
Extended set value register	H	0 - 7FF					
Extended data register	U	0 - 7FFF					
Extended input relay	GX	0 - FFF	0 - FFFF	Not supported			Not supported
Extended output relay	GY	0 - FFF	0 - FFFF				
Extended internal relay	GM	0 - FFF	0 - FFFF				
Extended buffer register*1	EB	0 - 1FFFF				Word	

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the program number, device symbol and the address.

[Specifying the program number]

Specify the program number to be accessed by adding “Pn-” before the device symbol. It is possible to specify a program number between P1 and P3. Where using a device other than a program sharing device and the program number is not specified, program number 1 is set as the default.

Example: To access address 123 for the edge detection relay of program 1, specify P1-P123.

To access address 120 of the extended special register using the signed 32-bit integer format, specify ES0120:D.

To access data register address 0, bit position F of program number 1, specify P1-D000-F

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition. Tag generation over multiple program numbers is not possible.

- In TOYOPUC Ethernet connection, the address range is checked according to the CPU type.

It is not possible to access a device outside the address range for the CPU you are using.

14.3 Ethernet Module Settings

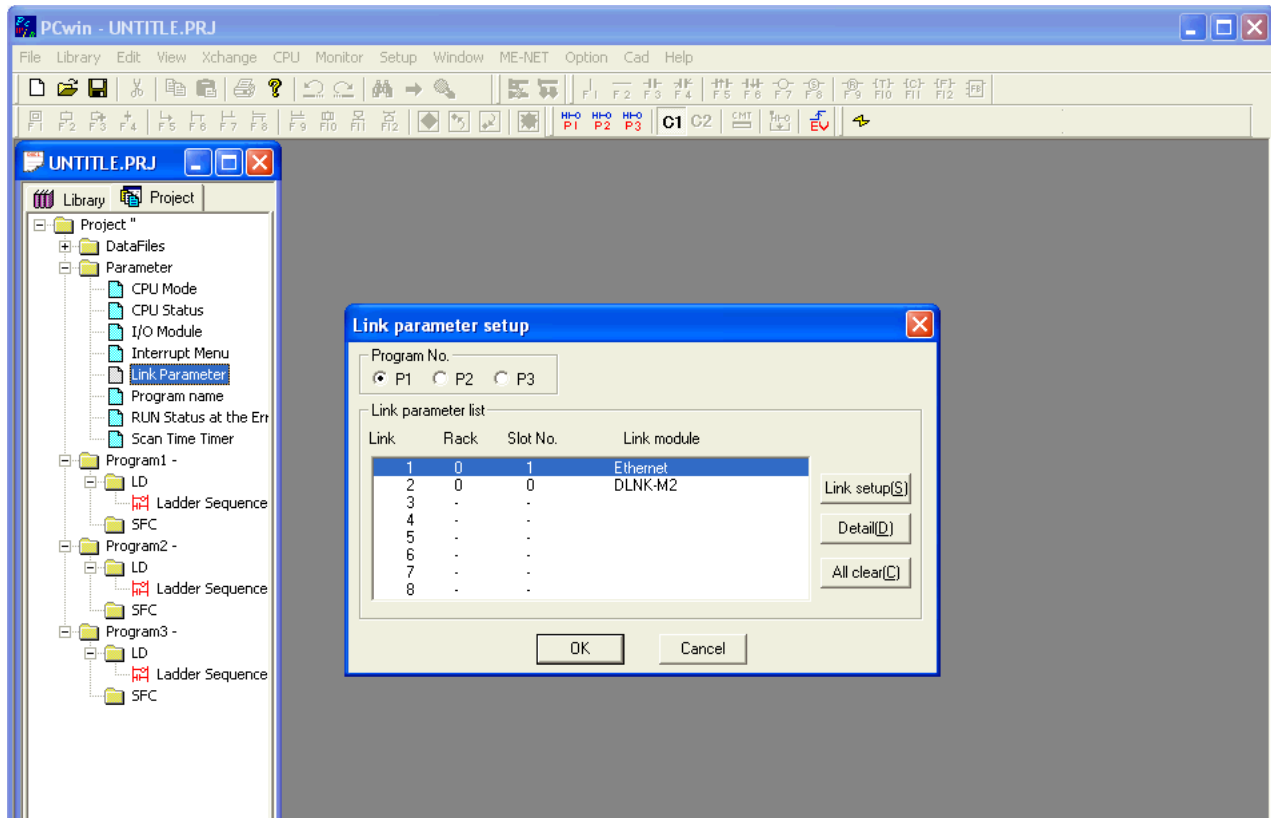
It is described about a setup of a network of the PLC in this chapter. Refer to the manual of a communication unit for the details.

For communication with Ethernet unit, you should set the communication parameter in PLC. There is two ways below.

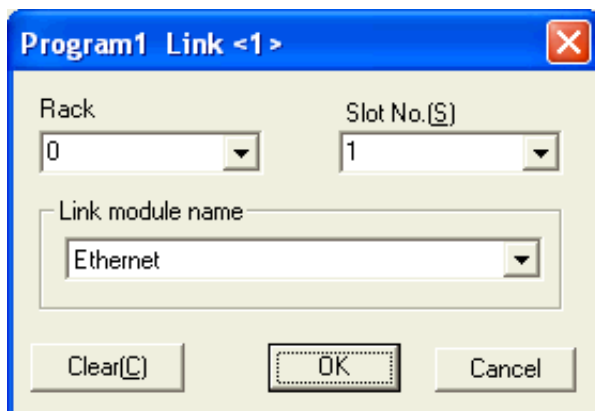
- Set in Programming tools : refer to below.
- Set in PLC program : For details, refer to Users' Manual for Ethernet interface unit that you use.

[The way of using Programming tools (PCwin)]

(1) Select Link Parameter setup in PCwin.



(2) Select Link setup and select Ethernet.



(3) Set up IP address and connection in the detail setup screen.

Ethernet P1 L1 R0 S1

Own Node IP Address: 192 . 168 . 1 . 1

OK Cancel

Set

	Use	Open Protocol	Own Node Port No.	Other Node Table No.
Connection1 :	☒	TCP Destination Non-Specified Passive	1025	0
Connection2 :	☒	TCP Active Open	1026	1
Connection3 :	☒	UDP	4000	2
Connection4 :	☐	TCP Active Open	0	0
Connection5 :	☐	TCP Active Open	0	0
Connection6 :	☐	TCP Active Open	0	0
Connection7 :	☐	TCP Active Open	0	0
Connection8 :	☐	TCP Active Open	0	0

Other Node Table... Timers... Sub-Net Mask and Gateway IP Address...

Initialize

☐ Initialization based on Link Parameter
☒ initialized based on Initial Sequence Program
 (Programming of Initial Sequence is necessary)

Correspond to the setting specified by a communication port of the OPC Server.

Specify the IP address and Port number in other node table when it selected UDP/IP protocol.

Other Node Table

Set

	Use	Other Node IP Address	Other Node Port No.
Table1 :	☒	192 . 168 . 1 . 2	1026
Table2 :	☒	192 . 168 . 1 . 3	4000
Table3 :	☐	0 . 0 . 0 . 0	0
Table4 :	☐	0 . 0 . 0 . 0	0
Table5 :	☐	0 . 0 . 0 . 0	0
Table6 :	☐	0 . 0 . 0 . 0	0
Table7 :	☐	0 . 0 . 0 . 0	0
Table8 :	☐	0 . 0 . 0 . 0	0
Table9 :	☐	0 . 0 . 0 . 0	0
Table10 :	☐	0 . 0 . 0 . 0	0
Table11 :	☐	0 . 0 . 0 . 0	0
Table12 :	☐	0 . 0 . 0 . 0	0
Table13 :	☐	0 . 0 . 0 . 0	0
Table14 :	☐	0 . 0 . 0 . 0	0
Table15 :	☐	0 . 0 . 0 . 0	0
Table16 :	☐	0 . 0 . 0 . 0	0

OK Cancel

14.4 DeviceXPlorer Settings

14.4.1 Device Settings

This section explains how to make the settings for the access CPU of PLC.

Item	Description	
NETWOR K	CPU TYPE	Select the access CPU type.
	Use Random Read Command	Check this option to use the random read command. It is effective for accessing non-continuous devices.
	Number of Layers	Select a number of layers, between 2 and 4, for access via link.
	Program No.	Specify the program number of the relay station. Access is via the link module with the program number allocated to the Ethernet module. Where the relay station program number is PC2 compatible mode, specify "PC2 compatible". For PC10, PC3JG, and PC3J (except in PC2 compatible mode), specify the program number.
	Link No.	Specify the link number to be used for each layer. Set a number between 1 and 8.
ACCESS POINTS	Station No.	Specify the target station number. Set a number between 0 and 249. Please set it to 64, when you want to communicate with master station (station number 00).
	Bit R / W	The maximum number of access points of batch read / write of bit scale is fixed at 1.
	Word R / W	Specify the maximum number of access points of batch read / write of word scale.
	Bit Poke	Specify the maximum number of multi-point write of bit scale.
	Word Poke	Specify the maximum number of multi-point write of word scale.

[Access Points]

The maximum number of access points that can be set varies with the CPU type.

Setting item	PC10	PC3JG / PC3J	PC2J
Word R / W (batch reading / writing)	512 points	512 points	512 points
Bit Poke (multi-point writing)	127 points	176 points	128 points
Word Poke (multi-point writing)	127 points	64 points	128 points

The possible number of batch access points varies depending on the CPU module type and whether access is via a link. Refer to the table below when setting the number of access points for word R / W.

CPU module	Direct access	Access via link
PC3J-CPU, PC3JNM-CPU PC3JD -CPU Ver1.10 or earlier	256 points	256 points
CPU modules other than the above	512 points	256 points

14.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Program No.	Specify the program number. If the CPU type is PC2J, only program 1 (P1) can be selected. For PC10, PC3JG, and PC3J, it is possible to select shared, program 1 (P1), program 2 (P2) or program 3 (P3).
Device Type	Specify the access device for the specified program number. Refer to the list in section 14.2 for devices that can be selected.
Device No.	Specify the device number in hexadecimal notation. If BOOL is specified as the data type, specify a bit address. In all other cases, specify a word address.

14.5 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

14.5.1 List of Devices

Show the list of convertible devices.

KEPServerEX		⇒	DeviceXPlorer	
Type	Symbol		Type	Symbol
Edge Relay	P	⇒	Edge detection	P
Keeping Relay	K	⇒	Keep relay	K
Specific Relay	V	⇒	Special relay	V
Timer Bits	T	⇒	Timer	T
Count Bits	C	⇒	Counter	C
Link Relay	L	⇒	Link relay	L
I/O Relay	X	⇒	Input relay	X
I/O Relay	Y	⇒	Output relay	Y
Internal Relay	M	⇒	Internal relay	M
Specific Register	S	⇒	Special register	S
Present Value Register	N	⇒	Current timer / counter value	N
Link Register	R	⇒	Link register	R
Data Register	D	⇒	Data register	D
File Register	B	⇒	File register	B
FB Escape Area	JL	⇒	Not Supported	
SFC	JS			
Extended Edge Direction	EP	⇒	Extended edge detection	EP
Extended Keep Relay	EK	⇒	Extended keep relay	EK
Extended Special Relay	EV	⇒	Extended special relay	EV
Extended Timer Bits	ET	⇒	Extended timer	ET
Extended Counter Bits	EC	⇒	Extended counter	EC
Extended Link Relay	EL	⇒	Extended link relay	EL
Extended I/O Relay	EX	⇒	Extended input relay	EX
Extended I/O Relay	EY	⇒	Extended output relay	EY
Extended Internal Relay	EM	⇒	Extended internal relay	EM
Extended Special Register	ES	⇒	Special register	ES
Extended Timer/Counter Value	EN	⇒	Extended current value register	EN
Extended Setup Value Register	H	⇒	Extended set value register	H
Extended Data Register	U	⇒	Extended data register	U
Extended Input Relay	GX	⇒	Extended input relay	GX
Extended Output Relay	GY	⇒	Extended output relay	GY
Extended Internal Relay	GM	⇒	Extended internal relay	GM
Extended Buffer Register	EB	⇒	Extended buffer register	EB
Extended Flash Register	FR	⇒	Flash register	FR

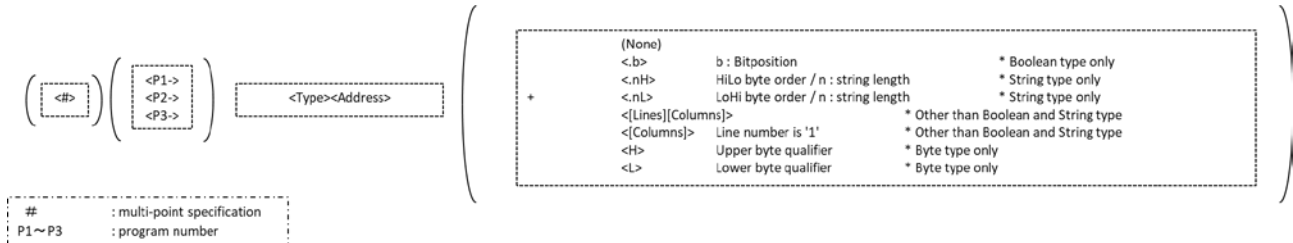
14.5.2 Device Range

Please refer “14.2 List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

14.5.3 Optional Specification

The address format of KEPServerEX is as follows.



Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
.x (x is a number)	Set x to the bit position if the data type is 'BOOL'.
.nH	Set n/2 to the string length if the data type is 'STRING'
.nL	Set n/2 to the string length if the data type is 'STRING' Enable the Byteswap.
[x] [1][x] (x is a number)	Enable the array. Set x to the size.
H	Set upper byte to the byte position if the data type is 'BYTE'
L	Set lower byte to the byte position if the data type is 'BYTE'

Important

Two dimensional array is not supported.

14.6 Errors

Error codes of receiving error response are listed below.

Code	Description
17	Inability to process data because of faulty CPU Module Hardware
32	Fixed Data (ENQ) within relay command is not "05."
33	Faulty transfer number (there is erroneous transfer byte number within the relay command.)
35	Erroneous command code
36	Erroneous subcommand code
37	Erroneous command-format data byte
38	Erroneous function-call operand number
49	Attempting to write data into the field where any writing is prohibited during a sequence operation or to use the function call which is protected from any execution during a sequence operation.
50	A command that is defeated during a stop continuity is activated during a stop continuity.
51	Attempting to execute a debug function call despite non-debug mode.
52	Access prohibited owing to access-prohibited configuration.
53	Non-executable owing to execution-priority limiting configuration
54	Non-executable owing to execution-priority limiting configuration by another device
57	Attempting to start scanning without any reset after writing I/O point-number parameters or I/O allocation point-number parameters
60	During a fatal failure, a command has issued that is not executable during a fatal failure.
61	Non-executable due to competing process while a different-factor command is executed.
62	Non-executable command due to reset existence.
63	Non-executable command due to stop duration.
64	Address of a reading/writing command or of "address + data number" of a command is out of range.
65	Word/byte number is out of range.
66	Non-designated data is sent.
67	Erroneous function-call operand
82	Though any timer or counter is employed, a command for reading/writing the set/recent values is issued.
102	No reply is sent from link module with the link exchange No. specified by a relay command (Owing to no existence of specified link module, power OFF, or faulty circuit, etc.)
112	Non-executable module with the link exchange No. specified by a relay command (Owing to erroneous link No. designation or faulty link module)
114	No reply is sent from link module with the link exchange No. specified by a relay command (Owing to no existence of specified link module, power OFF, or faulty circuit, etc.)
115	Multiple relay commands were issued to the same link module from the CPU module and the link module could not process the commands. (Send commands again.)

15 [Jtekt] TOYOPUC Communication DLL Connection

This chapter explains communication with TOYOPUC series equipment using a communication DLL. An overview of communication via a TOYOPUC DLL connection is shown below.

Overview	
Link	Communication DLL connection using a JTEKT communication DLL.
Serial port settings	The transfer method for communication with DeviceXPlorer is as follows: no parity, no flow control, data length 7 bits, and stop bit 1 bit fixed.

Important

Because communication DLL does not support 64 bit OS, TOYOPUC communication DLL connection cannot be used in 64 bit edition. Please use 32bit edition with WOW64 on 64bitOS.

15.1 PLC Systems

The applicable CPU modules for communication DLL connection are the PC3JG series, the PC3J series, and the PC2J series (PC2 compatible mode). However the version 1 CPU unit in the PC2J series cannot be connected.

Note

Connection to a CPU port requires the separate procurement of a PC connection cable (TXY-6071) and a JTEKT communication DLL (TJA-2067).

< Installation >

- File: VbHwincomm.dll, cmlplcomm.dll, ethrcomm.dll, hwincomm.dll, toyocomm.dll
- Destination: <Installation folder of DeviceXPlorer>\¥Bin¥
Example) C:\¥Program Files¥TAKEBISHI¥DeviceXPlorer OPC Server¥Bin

15.2 List of Devices

The TOYOPUC devices that can be set in DeviceXPlorer are as shown below.

The addresses that can be used vary with the parameter settings. For details, refer to your CPU instructions.

[List of Devices] (The device ranges are all specified in hexadecimal format.)

Device name	Device symbol	PC3JG address range		PC3J address range	PC2J address range	Category		
		Word address	Bit address					
Edge detection	P	00 - 1F	000 - 1FF	Same as left	Same as left	Bit		
Keep relay	K	00 - 2F	000 - 2FF					
Special relay	V	0 - F	0 - FF					
Timer	T	0 - 1F	0 - 1FF					
Counter	C	0 - 1F	0 - 1FF					
Link relay	L	0 - 7F	0 - 7FF					
Input relay	X	0 - 7F	0 - 7FF					
Output relay	Y	0 - 7F	0 - 7FF					
Internal relay	M	0 - 7F	0 - 7FF					
Special register	S	0 - 3FF			Same as left	N / A	Word	
Current timer / counter value	N	0 - 1FF						
Link register	R	0 - 7FF						
Data register	D	0 - 2FFF						
File register	B	0 - 1FFF						
Extended edge detection	EP	0 - FF	0 - FFF	Same as left			N / A	Bit
Extended keep relay	EK	0 - FF	0 - FFF					
Extended special relay	EV	0 - FF	0 - FFF					
Extended timer	ET	0 - 7F	0 - 7FF					
Extended counter	EC	0 - 7F	0 - 7FF					
Extended link relay	EL	0 - 1FF	0 - 1FFF					
Extended input relay	EX	0 - 7F	0 - 7FF					
Extended output relay	EY	0 - 7F	0 - 7FF					
Extended internal relay	EM	0 - 1FF	0 - 1FFF					
Special register	ES	0 - 7FF			N / A	Word		
Extended current value register	EN	0 - 7FF						
Extended set value register	H	0 - 7FF						
Extended data register	U	0 - 7FFF						
Extended input relay	GX	0 - FFF	0 - FFFF					N / A
Extended output relay	GY	0 - FFF	0 - FFFF					
Extended internal relay	GM	0 - FFF	0 - FFFF					
Extended buffer register*1	EB	0 - 1FFFF		Word				

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the program number, device symbol and the address.

[Specifying the program number]

Specify the program number to be accessed by adding “Pn-” before the device symbol. It is possible to specify a program number between P1 and P3. Where using a device other than a program sharing device and the program number is not specified, program number 1 is set as the default.

Example: To access address 123 for the edge detection relay of program 1, specify P1-P123.

To access address 120 of the extended special register using the signed 32-bit integer format, specify ES0120:D.

To access data register address 0, bit position F of program number 1, specify P1-D000-F

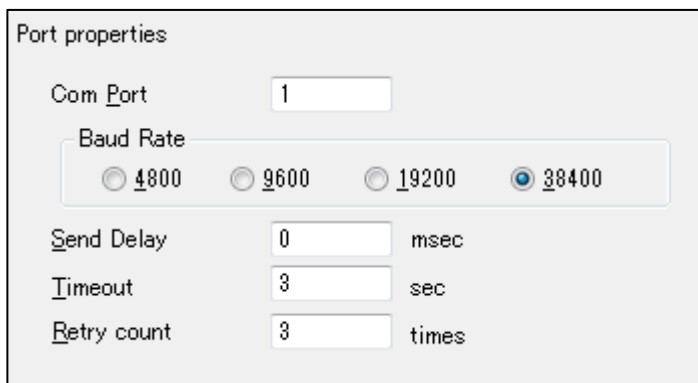
For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition. Tag generation over multiple program numbers is not possible.

- In TOYOPUC communication DLL connection, the address range is checked according to the CPU type. It is not possible to access a device outside the address range for the CPU you are using.

15.3 DeviceXPlorer Settings

15.3.1 CPU Port Settings

This section explains how to make the CPU port settings for connections using JTEKT communication DLL.



Port properties

Com Port: 1

Baud Rate: 4800, 9600, 19200, 38400 (selected)

Send Delay: 0 msec

Timeout: 3 sec

Retry count: 3 times

Item	Description
Com Port	1:COM1, 2:COM2, 3:COM3 . . . Set a number between 1 and 256.
Baud Rate	Select from 4800 / 9600 / 19200 / 38400. Select 38400 when using PC3JG / PC3J, and when using PC2J select a communication speed supported by the CPU.
Send delay	Specify the delay time before sending the next command after a response is received from the other equipment. Set a number between 0 and 65535.
Timeout	Specify the waiting time between sending a request message and receiving a response message. If a response cannot be returned within the specified time, it results in a timeout error. Set a number between 0 and 60.
Retry Times	Specify the number of times to retry when a timeout error occurs. If TCP / IP is used, the connection is cut if a response is not received even after the set number of retries, and an attempt is made to reconnect. Set a number between 0 and 10.

15.3.2 Device Settings

This section explains how to make the settings for the access CPU of PLC.

Device properties

Connection Test

CPU TYPE

☒ PC3JG ☐ PC3J ☐ PC2J

☐ Use Random Read Command

NETWORK

Layer Link Access

Number of Layers

☒ None ☐ 2 ☐ 3 ☐ 4

Link Settings

	Link Module	Program No.	Link No.	Station No
2:	ME-NET	PC2 Compatible	1	0
3:	ME-NET	PC2 Compatible	1	0
4:	ME-NET	PC2 Compatible	1	0

ACCESS POINTS

Bit R/W: 1 Bit Poke: 128

Word R/W: 256 Word Poke: 64

Item	Description
CPU TYPE	Select the access CPU type.
Use Random Read Command	Check this option to use the random read command. It is effective for accessing non-continuous devices.
Number of Layers	Specify a number of layers, between 2 and 4, for access via link.
Link Module	Select the link module from among ME-NET, HPC link, and FL-net.
Program No.	Specify the program number of the relay station. Where the relay station program number is PC2 compatible mode, specify "PC2 compatible". For PC10, PC3JG, and PC3J (except in PC2 compatible mode), specify the program number.
Link No.	Specify the link number to be used for each layer. Set a number between 1 and 8.
Station No.	Specify the target station number. ME-NET: 0 - 63 HPC link: 0 - 31 FL-net: 1 - 249
Bit R / W	The maximum number of access points of batch read / write of bit scale is fixed at 1.
Word R / W	Specify the maximum number of access points of batch read / write of word scale. Up to 256 points can be set.
Bit Poke	Specify the maximum number of multi-point write of bit scale. Up to 128 points can be set.
Word Poke	Specify the maximum number of multi-point write of word scale. If PC2J is selected, you can set up to 128 points. If PC3JG or PC3J is selected, you can set up to 64 points.

15.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [P1-D0]

General | Scale | Simulation | Alarm

Tag Name: Tag P1-D0

☐ Auto Format

Description:

Program No.: P1

Device Type: D Data Register

Device No.: 0 Byte Position: Lower Byte

Data Type: USHORT Bit Position: 0

Length: 1 Attribute: ReadWrite

☐ Byte Swap Calculation: NONE

☐ Array

New Save << >> OK Cancel

Item	Description
Program No.	Specify the program number. If the CPU type is PC2J, only program 1 (P1) can be selected. For PC10, PC3JG, and PC3J, it is possible to select shared, program 1 (P1), program 2 (P2) or program 3 (P3).
Device Type	Specify the access device for the specified program number. Refer to the list in section 12.2 for devices that can be specified.
Device No.	Specify the device number in hexadecimal notation. For a bit register, specify a bit address, and for a word register specify a word address.

15.4 Errors

15.4.1 Communication Port Error Codes

The table below shows the main error codes that appear when using a communication DLL.

Code	Error name	Description
1	Transmission time over (cannot transmit)	An attempt was made to send a command to the PLC, but transmission is not possible, even though a specified time has elapsed.
2	Transmission time over (transmission interrupted)	An attempt was made to send a command to the PLC, but transmission of all the data is not possible, even though a specified time has elapsed.
3	Response receipt error	The wait response was received for longer than the specified time.
4	Reception timeout (cannot receive)	An attempt was made to receive a command from the PLC, but reception is not possible, even though a specified time has elapsed.
5	Reception timeout (reception interrupted)	An attempt was made to receive a command from the PLC, but all the data cannot be received, even though a specified time has elapsed.
6	Response receipt error	No ACK / NAK response.
7	Response receipt error	A framing error occurred.
8	Response receipt error	An overrun error occurred.
9	Response receipt error	A parity error occurred.
10	Response receipt error	A sum check error occurred.
11	PLC response error	The error code is set from the PLC side. For details of response errors, see section 15.4.2.
12	Open error	The specified COM port cannot be used.
13	COM port initialization error	The communication port cannot be set.
14	COM port initialization error	The communication buffer cannot be set.

15.4.2 Response Error Details

Error codes of receiving error response are listed below.

Code	Description
17	Inability to process data because of faulty CPU Module Hardware
32	Fixed Data (ENQ) within relay command is not "05."
33	Faulty transfer number (there is erroneous transfer byte number within the relay command.)
35	Erroneous command code
36	Erroneous subcommand code
37	Erroneous command-format data byte
38	Erroneous function-call operand number
49	Attempting to write data into the field where any writing is prohibited during a sequence operation or to use the function call which is protected from any execution during a sequence operation.
50	A command that is defeated during a stop continuity is activated during a stop continuity.
51	Attempting to execute a debug function call despite non-debug mode.
52	Access prohibited owing to access-prohibited configuration.
53	Non-executable owing to execution-priority limiting configuration
54	Non-executable owing to execution-priority limiting configuration by another device
57	Attempting to start scanning without any reset after writing I/O point-number parameters or I/O allocation point-number parameters
60	During a fatal failure, a command has issued that is not executable during a fatal failure.
61	Non-executable due to competing process while a different-factor command is executed.
62	Non-executable command due to reset existence.
63	Non-executable command due to stop duration.
64	Address of a reading/writing command or of "address + data number" of a command is out of range.
65	Word/byte number is out of range.
66	Non-designated data is sent.
67	Erroneous function-call operand
82	Though any timer or counter is employed, a command for reading/writing the set/recent values is issued.
102	No reply is sent from link module with the link exchange No. specified by a relay command (Owing to no existence of specified link module, power OFF, or faulty circuit, etc.)
112	Non-executable module with the link exchange No. specified by a relay command (Owing to erroneous link No. designation or faulty link module)
114	No reply is sent from link module with the link exchange No. specified by a relay command (Owing to no existence of specified link module, power OFF, or faulty circuit, etc.)
115	Multiple relay commands were issued to the same link module from the CPU module and the link module could not process the commands. (Send commands again.)

16 [Yokogawa] FA-M3 Ethernet Connection

This chapter explains communication with FA-M3 (R) series equipment using an Ethernet module.

An overview of the FA-M3 Ethernet connection is shown below.

Overview	
Link	PC link
Data code	ASCII / binary Supports asynchronous commands
Protocol	TCP / IP, UDP / IP

16.1 PLC Systems

16.1.1 Applicable CPU Modules

The applicable CPU modules for FA-M3 Ethernet connection are shown below.

Category	Applicable CPU modules
e-RT3	RP71-R
FA-M3V series	F3SP71-4S/N F3SP76-7S/N
FA-M3(R) series	F3SP05-0P, F3SP08-0P, F3SP21-0N, F3SP22-0S, F3SP25-2N, F3SP28-3S, F3SP28-3N F3SP35-5N, F3SP38-6N/S, F3SP53-4H/S, F3SP58-6H/S, F3SP59-7S, F3SP66-4S, F3SP67-6S

16.1.2 Applicable Ethernet Modules

The applicable Ethernet modules for FA-M3 Ethernet connection are shown below.

Applicable Ethernet module	Remarks
LE12-1T	-
F3LE01-1T / F3LE01-5T	10BASE-5 / 10BASE-T
F3LE11-1T / F3LE01 /F3LE11-0T	100BASE-T / 100BASE-TX
F3LE12-1T / F3LE12-0T	100BASE-TX / 10BASE-T
CPU Built-in Ethernet Port	-

Important

To access the buffer memory (special module data) in binary communication, use an Ethernet module of version Rev.03:00 or later.

16.2 List of Devices

The FA-M3 devices that can be set in DeviceXPlorer are as shown below.

The range of devices varies with the CPU. For details, refer to your CPU instructions.

[List of Devices] (The device ranges are all specified in decimal format.)

Device name	Device symbol	Device range	Category
Input relay	X	00101 - 71664 ^{*1}	Bit
Output relay	Y	00101 - 71664 ^{*1}	
Internal relay	I	1 - 65535	
Shared relay	E	1 - 4096	
Link relay	L	00001 - 78192 ^{*2}	
Special relay	M	1 - 9984	
Timer ^{*5}	TU	1 - 3072	
Counter ^{*5}	CU	1 - 3072	
Data register	D	1 - 65535	Word
File register	B	1 - 262144	
Shared register	R	1 - 4096	
Link register	W	00001 - 78192 ^{*2}	
Index register	V	1 - 256	
Special register	Z	1 - 1024	
Timer setting ^{*3} ^{*5}	TS	1 - 3072	
Current timer value (countdown type) ^{*5}	TP	1 - 3072	
Current timer value (count up type) ^{*5}	T	1 - 3072	
Counter setting ^{*3} ^{*5}	CS	1 - 3072	
Current counter value (countdown type) ^{*5}	CP	1 - 3072	
Current counter value (count up type) ^{*5}	C	1 - 3072	
Buffer memory ^{*5}	G	1 - ^{*4}	
Cache register ^{*6}	F	1-999999	

- ^{*1} Specify X / Y as follows: unit number (1 digit), slot position (2 digits), and I / O number (2 digits).
Unit number 0: Main 1 - 7: Sub module
Slot number Positions from the right side of the power supply module to the right edge of the accessed slots (01 - 16).
I / O number 01 - 64 (in units of 64 points even if an actual I / O is not installed)
- ^{*2} L / W are not continuous. L / W 00001 - 08192 is followed by L / W 10001 - 18192.
- ^{*3} Read-only device.
- ^{*4} The number of the buffer memory (special module data) becomes the data position number.
- ^{*5} Device only supported in synchronous communication.
- ^{*6} Cache register exists in only FA-M3V series.

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.
Example: D1, M123, etc.
For further details on extended specification, refer to the instructions for extended tag name specification

in the Server Edition.

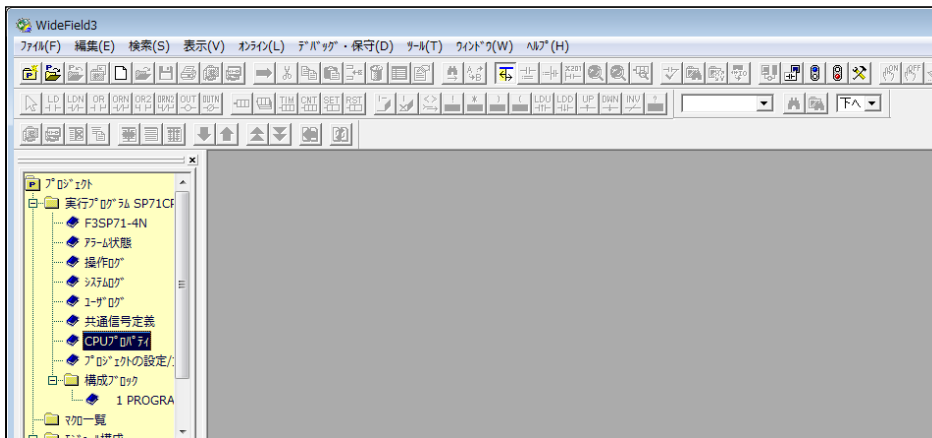
- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

16.3 Ethernet Module Settings

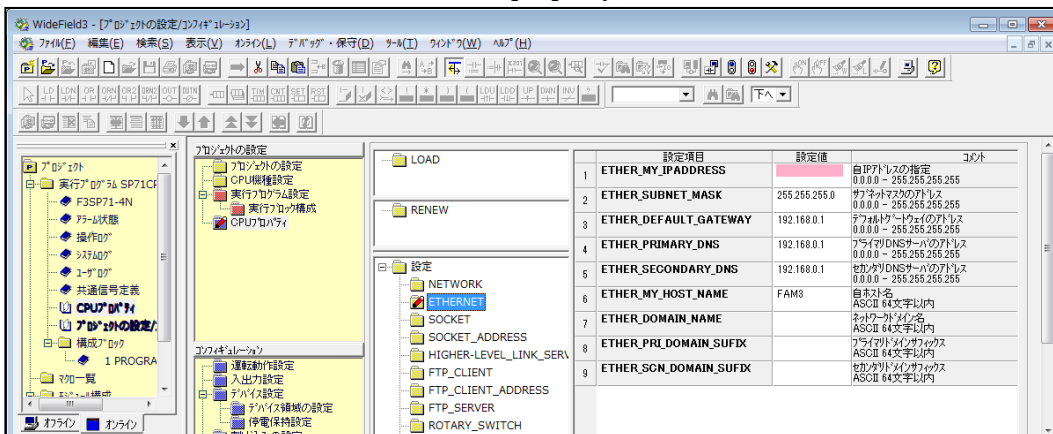
16.3.1 CPU Built-In Ethernet Settings

Please use WideField3 made by YOKOGAWA for setting of CPU built-in Ethernet port.

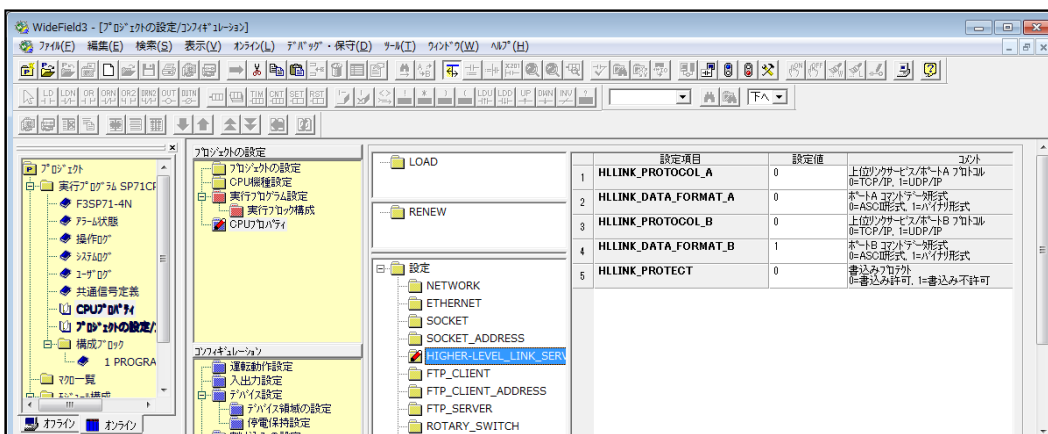
1. Connect with CPU using WideField3.



2. Please select ETHERNET from CPU property, and set ETHER_MY_IPADDRESS.



3. Please select HIGHER_LEVEL_LINK_SERVICE, and set parameter of PORT A (port number : 12289) and PORT B (port number : 12291).



16.3.2 Ethernet Module Settings

16.3.2.1 Ethernet Module Settings

The settings for an FA-M3 Ethernet module are made using a dip switch in the Ethernet module. Make the settings in accordance with the DeviceXPlorer settings.

Switch	Function	OFF	ON	Default
1	Data code setting	ASCII	Binary	OFF
2	Write protect	Permitted	Not allowed	OFF
3 - 6	Always used OFF			OFF
7*	Line processing in TCP timeout	Close	Do not close	OFF
8	Self return test	Normal operation	Test mode	OFF

* Always used OFF in the F3LE12-OT.

For details of the above and for instructions on setting up an IP address, see the manual for the Ethernet Interface module you are using.

16.3.2.2 Ethernet Module Port Number

The FA-M3 port number for Ethernet communication is shown below.

Ethernet module	Port no.	Maximum TCP connections
F3LE01-5T	12289	8
F3LE11-0T / F3LE12-0T	12289 or 12291*	9

* Depending on the setting of switch 1 (data code setting) of the Ethernet module, the applicable port is 12289 or 12291. Therefore, DeviceXPlorer can only connect to one of the ports. Below is a chart showing communication port and data code correspondences.

Communication port	Data code	
	OFF	ON
12289	ASCII	Binary
12291	Binary	ASCII

Note

Both TCP / IP and UDP / IP use same port number.

16.4 DeviceXPlorer Settings

16.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Item		Description
CPU Type		Select access CPU type.
Communication Format	ASCII, BIN	Select ASCII (ASCII communication) or BIN (binary communication) as the communication format. Ensure that the settings are the same as that of the Ethernet module.
	Mass access	Enables mass access command. For details, see the cautions for asynchronous access.
Network	CPU No.	Specify which CPU to access, from the CPU module and add-on CPU modules. Set a number between 1 and 4. 1 : CPU module 2 - 4 : Add-on CPU modules 1 - 3
Access Points*	Bit R / W	Batch read / write of bit scale is not performed.
	Word R / W	Specify the maximum access points of batch read / write of word scale. Up to 64 points can be set.
	Bit Poke	Specify the maximum access points of random write of bit scale. Up to 32 points can be set.
	Word Poke	Specify the maximum access points of random write of word scale. Up to 32 points can be set.

* For asynchronous access, refer to the cautions for mass access.

Note

Set an appropriate CPU number for reading and writing for the input relay (X) and output relay (Y). Note that if the number is not set appropriately, normal values will not be read but a response error will not occur.

Note**Cautions for Mass Access**

Mass access is not affected by the CPU scan time, so high-speed and high-volume data access is possible. However, the following restrictions apply.

- Where double words (32-bit data) are used for processing, it is possible that the data may be accessed during processing, so the integrity of the upper and lower words is not guaranteed. Data simultaneity is guaranteed for units of 1 word only.
- The final 15 bits of the device range of each bit device cannot be accessed.
- Mass access (binary communication format) cannot be used in F3LE12.
- Please use latest firmware version for mass access.
- It is not possible to access the timer, counter, or buffer memory.

The table below shows the maximum access points for asynchronous access. Asynchronous access only supports batch reading and writing of word. When using random write command, DeviceXPlorer use sync access command.

Item	ASCII communication	Binary communication
Word R / W	251 points*1	502 points*2

*1 The maximum access points of batch writing of word scale is 247 points. If you set Word R/W 251 points, access points of batch reading is 251 points and access points of batch writing is 247 points.

If you set Word R/W 240 points, both access points of batch reading and access points of batch writing is 240 points.

*2 The maximum access points of batch writing of word scale is 242 points. Access point behave same as *1.

16.4.2 Group Settings

This section explains how to make group settings. Make group settings when accessing the buffer memory or when managing tags in a hierarchical structure.

Group properties
Group Name:
☐ Buffer Memory Access

Unit No.
Slot No.

Item	Description
Group Name	Specify the group name.
Buffer Memory Access	Check this option to enable specified data access to the special module (analog input / output module, temperature adjustment, PID control, high speed counter, etc.).
Unit No.	If buffer memory access is enabled, specify the module unit number to be accessed. Set a number between 0 and 7.
Slot No.	If buffer memory access is enabled, specify the module slot number to be accessed. Set a number between 1 and 16.

16.4.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [D1]

GeneralScaleSimulationAlarm

Tag Name

TagD1

☐ Auto Format

Description

Device Type

D

Data Register

Device No.

1

Byte Position

Lower Byte

Data Type

SHORT

Bit Position

0

Length

1

Attribute

ReadWrite

☐ Byte Swap

Calculation

NONE

☐ Array

NewSave<<>>OKCancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 16.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

Note

In asynchronous access, when specifying a data format other than BOOL for a bit device, specify the device number as a multiple of 16, plus 1.

16.5 Errors

This section explains the details of the PLC errors (response errors) included in the error messages.

Error code	Detail code	Error	Description
01	00	CPU Number Specification error	Specify the CPU number between 1 and 4.
02	00	Command error	A command that cannot be executed was received.
03	00	Device specification error	The specified device does not exist.
04	00	Outside range	Check the setting range.
05	00	Outside number of data range	The specification for the number of bits or words exceeds the range of the specifications. Check the specified number of data and the number of parameters for the device.
06	00	Monitor error	Monitoring was executed without monitoring being specified.
08	00	Parameter error	A parameter error other than the above.
51	00	CPU error	The processing complete confirmation was not returned from the specified CPU. (Timeout)
52	1□	Self-diagnosis error	Self-diagnosis error.
	2□	Program error	A program error including a parameter error.
	4□	Communication error between CPUs	An error occurred in communication between CPUs.
	8□	Device access error	An error occurred when accessing the device.
	9□	Command error	There is a mistake in the communication procedure.
	A□	Parameter error	A parameter error.
	B□	Operating mode error	Either protected or being used for dedicated access.
	C□	Parameter error	A device specification or block specification error.
	F□	System internal error	An internal system error.

* For further details, see the manuals for the CPU and communication module you are using.

17 [Yokogawa] FA-M3 Serial Connection

This chapter explains communication with FA-M3 (R) series equipment using a serial module.

An overview of the FA-M3 serial connection is shown below.

Overview	
Link	PC link
Data code	ASCII

17.1 PLC Systems

17.1.1 Applicable CPU Modules

The applicable CPU modules for FA-M3 serial connection are shown below.

Category	Applicable CPU modules
FA-M3V series	F3SP71-4S/N F3SP76-7S/N
FA-M3(R) series	F3SP05-0P, F3SP08-0P, F3SP21-0N, F3SP22-0S, F3SP25-2N, F3SP28-3S, F3SP28-3N F3SP35-5N, F3SP38-6N/S, F3SP53-4H/S, F3SP58-6H/S, F3SP59-7S, F3SP66-4S, F3SP67-6S

17.1.2 Applicable Serial Modules

The applicable serial modules for FA-M3 serial connection are shown below.

Category	Applicable serial modules	Remarks
CPU communication module	F3SP05-0P	
	F3SP08-0P	
	F3SP21-0N	
	F3SP22-0S	
	F3SP25-2N	
	F3SP28-3S / 3N	
	F3SP35-5N	
	F3SP38-6N / 6S	
	F3SP53-4H / 4S	
	F3SP58-6H / 6S	
	F3SP59-7S	
	F3SP66-4S	
	F3SP67-6S	
PC link module	F3LC11-1F / 1N	RS-232-C
	F3LC11-2F / 2N	RS-422-A / RS-485
	F3LC12-1F	RS-232-C

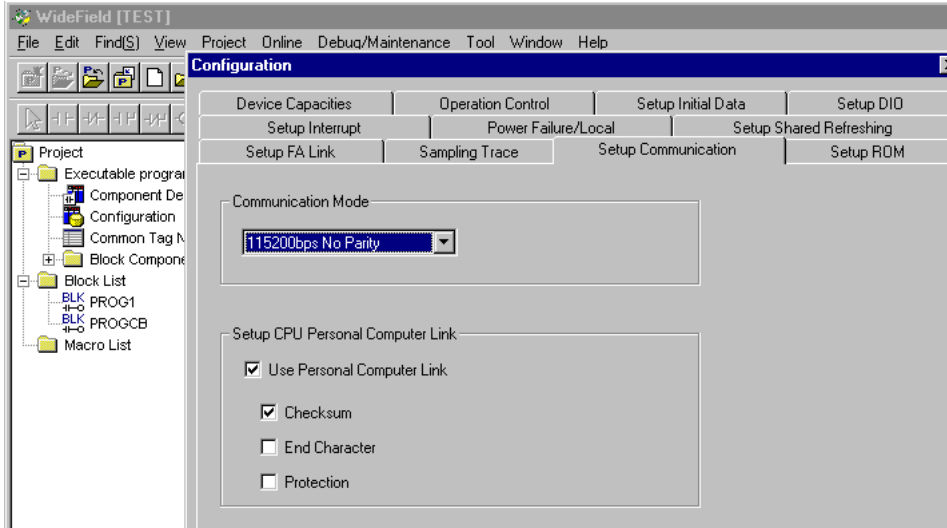
17.2 List of Devices

See the list of devices for FA-M3 Ethernet connection (section 16.2).

17.3 Serial Module Settings

17.3.1 CPU Module Settings

To use the communication port of a CPU module, enable the PC link function and make the connection using a dedicated cable. Set the sum check and termination character as follows.



Item	Status
Use Personal Computer Link	ON
Checksum	ON
End Character	OFF

17.3.2 PC Link Module Settings

To use the PC link module, make the settings for the rotary and dip switches of the PC link module as shown below.

< Switch1 >

BIT	Setting item	OFF	ON	Setting
1	Data length	7 bits	8 bits	Match the DeviceXPlorer setting.
2	Parity	No	Yes	Match the DeviceXPlorer setting.
3	Parity type	Odd	Even	Match the DeviceXPlorer setting.
4	Stop bit	1 bit	2 bits	Match the DeviceXPlorer setting.
5	Sum check	No	Yes	ON
6	Termination character	No	Yes	OFF
7	Protect function	No	Yes	OFF* ¹
8	Security function* ²	No	Yes	OFF

*1 When it is ON, writing is not possible.

*2 The 8th bit prohibits user settings (OFF) for modules other than F3LC11-1F and F3LC12-1F.

< Switch2 (Baudrate setting) >

Match the serial port setting of DeviceXPlorer.

Important

When using the communication port of CPU, set flow control off in the serial port settings.

17.4 DeviceXPlorer Settings

17.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

CPU TYPE

☒ FA-M3V ☐ FA-M3

Network

CPU No. 1

STATION No. 1

Access Point

Bit R/W 64 Bit Poke 32

Word R/W 64 Word Poke 32

Item		Description
CPU Type		Select access CPU type.
Network	CPU No.	Specify which CPU to access, from the CPU module and add-on CPU modules. Set a number between 1 and 4. 1 : CPU module 2 - 4 : Add-on CPU modules 1 - 3
	Station No.	Specify the PLC number. When connecting to a CPU and RS232C type PC link module, specify "1". Set a number between 1 and 32.
Access Points	Bit R / W	Batch read / write of bit scale is not performed.
	Word R / W	Specify the maximum access points of batch read / write of word scale. Up to 64 points can be set.
	Bit Poke	Specify the maximum access points of random write of bit scale. Up to 32 points can be set.
	Word Poke	Specify the maximum access points of random write of word scale. Up to 32 points can be set.

Note

Set an appropriate CPU number for reading and writing for the input relay (X) and output relay (Y). Note that if the number is not set appropriately, normal values will not be read but a response error will not occur.

17.4.2 Group Settings

See the group settings for FA-M3 Ethernet connection (section 16.4.2).

17.4.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [D1]

GeneralScaleSimulationAlarm

Tag Name

Tag

D1

☐ Auto Format

Description

Device Type

D

Data Register

Device No.

1

Byte Position

Lower Byte

Data Type

SHORT

Bit Position

0

Length

1

Attribute

ReadWrite

☐ Byte Swap

Calculation

NONE

☐ Array

New

Save

<<

>>

OK

Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 9.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

17.5 Errors

See the errors for FA-M3 Ethernet connection (section 16.5).

18 [Hitachi] HIDIC Ethernet Connection

This chapter explains communication with HIDIC series equipment using an Ethernet unit.

An overview of communication via a HIDIC Ethernet connection is shown below.

Overview	
Link	Task code communication
Data code	Binary
Protocol	TCP / IP, UDP / IP

18.1 PLC Systems

18.1.1 Applicable Units

The CPU units and Ethernet units that can be used for Ethernet connections are shown below.

Category	Applicable CPU units	Applicable Ethernet units
EHV (EH150-EHV) series	EHV-CPU 16 / 32 / 64 / 128	CPU Built-in Ethernet Port EH-ETH(2)
EH (EH150)series	EH-CPU 104A / 208A / 316A / 516 / 548	
H series	H-4010 H-302 / 702 / 1002 / 2002 H-250 / 252 H-300 / 700 / 2000 / 20 / 28 / 40 / 64 MICRO-EH	LAN-ETH(2)

18.2 List of Devices

The HIDIC devices that can be set in DeviceXPlorer are as shown below.

The range of devices varies with the CPU. For details, refer to your CPU instructions.

[List of Devices] (The device ranges are all specified in hexadecimal format.)

Device name	Device symbol	Device range	Category
Input relay* ³	X	0 - 4FF95	Bit
Output relay* ³	Y	0 - 4FF95	
Internal relay	R	0 - 7BF	
Special relay		7C0 - FFF	
Link relay 1	L	0 - 3FFF	
Link relay 2		10000 - 13FFF	
Link relay 3* ¹		20000 - 23FFF	
Link relay 4* ¹		30000 - 33FFF	
Link relay 5* ¹		40000 - 43FFF	
Link relay 6* ¹		50000 - 53FFF	
Link relay 7* ¹		60000 - 63FFF	
Link relay 8* ¹		70000 - 73FFF	
Internal relay (shared)	M	0 - 7FFFF	
Edge relay (leading)	DIF	0 - 1FF	
Edge relay (trailing)	DFN	0 - 1FF	
On delay timer	TD	0 - 9FF	
Off delay timer	TDN	0 - 9FF	
Single shot timer	SS	0 - 9FF	
Watchdog timer	WDT	0 - 9FF	
Monostable timer	MS	0 - 9FF	
Totalizing timer	TMR	0 - 9FF	
Up counter	CU	0 - 1FF	
Ring counter	RCU	0 - 1FF	
Up down counter (up input)	CTU	0 - 1FF	
Up down counter (down input)	CTD	0 - 1FF	
Up down counter (down output)	CT	0 - 1FF	
Passage value clear relay	CL	0 - 9FF	
Extended input relay* ¹ * ⁴	EX	0 - 5A7FF	
Extended output relay* ¹ * ⁴	EY	0 - 5A7FF	
Extended timer* ²	TM	0 - 7FF	

Device name	Device symbol	Device range	Category
Input register* ³	WX	0 - 4FF9	Word
Output register* ³	WY	0 - 4FF9	
Internal register	WR	0 - EFFF	
Special register		F000 - FFFF	
Link register 1	WL	0 - 3FF	
Link register 2		1000 - 13FF	
Link register 3* ¹		2000 - 23FF	
Link register 4* ¹		3000 - 33FF	
Link register 5* ¹		4000 - 43FF	
Link register 6* ¹		5000 - 53FF	
Link register 7* ¹		6000 - 63FF	
Link register 8* ¹		7000 - 73FF	
Internal register (shared)	WM	0 - 7FFF	
Timer / counter current value	TC	0 - 9FF	
Internal output* ¹	WN	0 - 1FFFF	
Extended timer passage value* ²	TV	0 - 7FF	
Extended input register* ¹ * ⁴	WEX	0 - 5A7F	
Extended output register* ¹ * ⁴	WEY	0 - 5A7F	

*1 This device only compatible with EH150-EHV CPUs.

*2 This device can only be used if the EH150 system software version is 520 - 599.

*3 Specify X / Y as follows: remote number (1 digit), unit number (1 digit), slot position (1 digit), and bit number in module (2 digits). Specify WX / WY as follows: remote number (1 digit), unit number (1 digit), slot position (1 digit), and word number in module (1 digit).

Remote number 0 - 4

Unit number 0 - F

Slot number 0 - F

Bit number in module 00 - 5F

Word number in module 0 - 9

*4 Specify EX / EY as follows: remote number (1 digit), unit number (1 digit), slot position (1 digit), and bit number in module (2 digits). Specify WEX / WEY as follows: remote number (1 digit), unit number (1 digit), slot position (1 digit), and word number in module (1 digit).

Remote number 0 - 5

Unit number 0 - A

Slot number 0 - 7

Bit number in module 00 - FF

Word number in module 0 - F

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: WR0, M123, WX2FF9, etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

18.3 Ethernet Unit Settings

This chapter describes how to configure Ethernet Unit EH-ETH of programmable controller EH-150 Series. There are two ways to configure Ethernet parameters: configuration with a Web browser and a ladder program. This chapter describes the configuration with a Web browser.

Refer to Users Guide of EH-150 Series when configuring with a ladder program.

18.3.1 Setting a temporary IP address (Dip switches)

When using EH-ETH for the first time and when a configured IP address is unknown, it is possible to set a temporary IP address to “192.168.0.1” with the dip switches on the front of the Ethernet Unit (Set both SW1 and SW8 of the dip switches to ON, and SW2 to OFF).

And it is also possible to set the last digit of the IP address to “1”~“63” using 6 bits (SW3~SW8) of the dip switches.

1	2	3	4	5	6	7	8
ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
FIXED		Lower byte of IP address (1-64)					



192.168.0.1

1	2	3	4	5	6	7	8
ON	OFF	ON	ON	ON	ON	ON	ON
FIXED		Lower byte of IP address (1-64)					

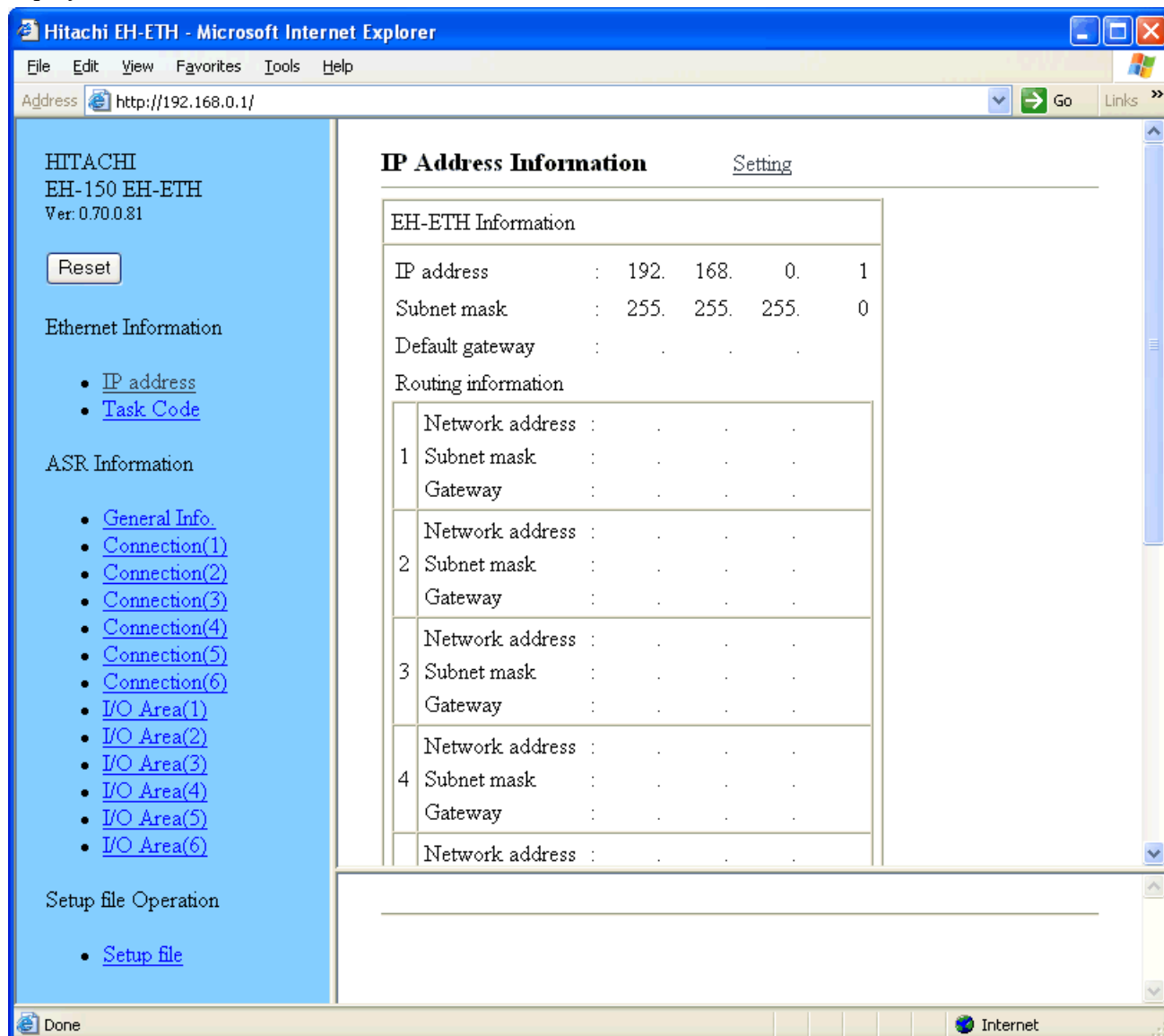


192.168.0.63

*The Operation above is not needed if the configured IP address is known.

18.3.2 Launch Setup Page in your web browser

Start up a Web browser and specify the IP address of the Ethernet Unit. Then the following page is displayed.



* This is the example of setting a temporary IP address to “192.168.0.1” with the dip switches of the Ethernet Unit.

18.3.3 Setting IP address

Click on “Setting” in “IP Address Information” page, and “IP Address Information Setup” page below is displayed to configure the IP address and subnet mask.

The screenshot shows a web browser window titled "Hitachi EH-ETH - Microsoft Internet Explorer". The address bar shows "http://192.168.0.1/". The page content is divided into a left sidebar and a main content area.

Left Sidebar:

- HITACHI
EH-150 EH-ETH
Ver: 0.70.0.81
-
- Ethernet Information
 - [IP address](#)
 - [Task Code](#)
- ASR Information
 - [General Info.](#)
 - [Connection\(1\)](#)
 - [Connection\(2\)](#)
 - [Connection\(3\)](#)
 - [Connection\(4\)](#)
 - [Connection\(5\)](#)
 - [Connection\(6\)](#)
 - [I/O Area\(1\)](#)
 - [I/O Area\(2\)](#)
 - [I/O Area\(3\)](#)
 - [I/O Area\(4\)](#)
 - [I/O Area\(5\)](#)
 - [I/O Area\(6\)](#)
- Setup file Operation
 - [Setup file](#)

Main Content Area:

IP Address Information Setup

EH-ETH Information

IP address :

Subnet mask :

Default gateway :

Routing information

1	Network address :				
	Subnet mask :				
	Gateway :				
2	Network address :				
	Subnet mask :				
	Gateway :				

Other station for Diagnosis

IP address :

Port No. :

Enter the IP address and Subnet mask into dialog boxes, and press “Set” to save the configuration into the Setup file in the Ethernet Unit. If an error occurs, it will be displayed in the error frame at the foot of the page.

18.3.4 Configuration for Task Code communication

Click on “Task Code” in the left menu frame, then “Task Code Information” page is displayed. And click on “Setting”, then “Task Code Information Setup” page below is displayed.

HITACHI
EH-150 EH-ETH
Ver: 0.70.0.81

Reset

Ethernet Information

- [IP address](#)
- [Task Code](#)

ASR Information

- [General Info.](#)
- [Connection\(1\)](#)
- [Connection\(2\)](#)
- [Connection\(3\)](#)
- [Connection\(4\)](#)
- [Connection\(5\)](#)
- [Connection\(6\)](#)
- [I/O Area\(1\)](#)
- [I/O Area\(2\)](#)
- [I/O Area\(3\)](#)
- [I/O Area\(4\)](#)
- [I/O Area\(5\)](#)
- [I/O Area\(6\)](#)

Setup file Operation

- [Setup file](#)

Task Code Information Setup

Task code port general information

Task code port timeout:

☐ Disable

☒ Enable

Timeout value : 10 s

Task code port 1

Protocol : ☒ TCP/IP ☐ UDP/IP

Port No. : 1025

Task code port 2

Protocol : ☒ TCP/IP ☐ UDP/IP

Port No. : 1026

Set Clear

[Task code port general information]

Set whether to do time-out monitoring or not while in Task Cord communication. Normally about 15 seconds is recommended.

If a cable disconnection or communication error occurs during Task Code communication, the OPC Server will close a Port and open it again. At this time, the OPC Server will automatically increment a logical Port number. On the other hand EH-ETH will go into the wait status for reception with the previous logical Port number. So the communication may stop because of non-response, which is avoidable with time-out monitoring (Task code port timeout) enabled.

[Task Code port 1~4]

Configure the Protocol and Port No.(Decimal number) used for Task Code communication by Ethernet Units. The Protocol and Port No. configured here must be the same as those configured in Adapter configuration view of the OPC Server. It is possible to configure a maximum of 4 Ports for EH-150.

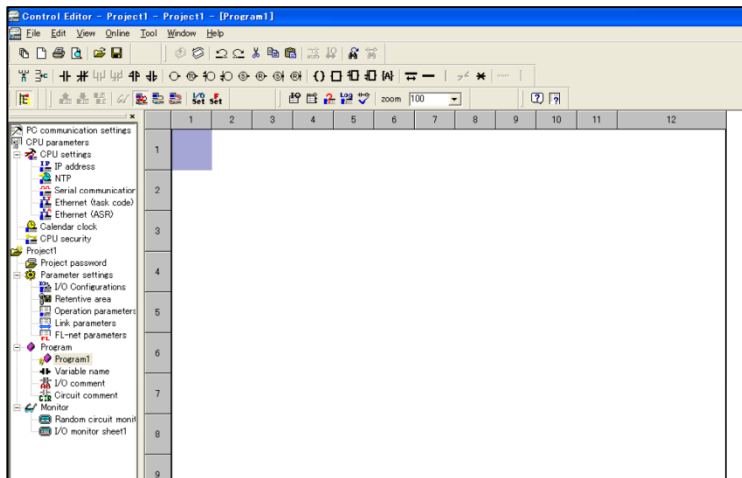
Press “Set” to save the configuration into a Setup file in the Ethernet Unit. If an error occurs, it will be displayed in the error frame at the foot of the page.

*Refer to the Users Guide of Ethernet Units for more details about the configuration.

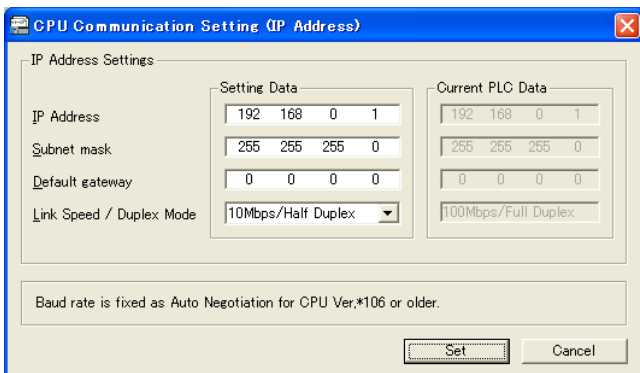
*After the configuration is completed, set all of the dip switches on the front of the Ethernet Unit back to all OFF.

18.4 CPU Built-in Ethernet Port Settings

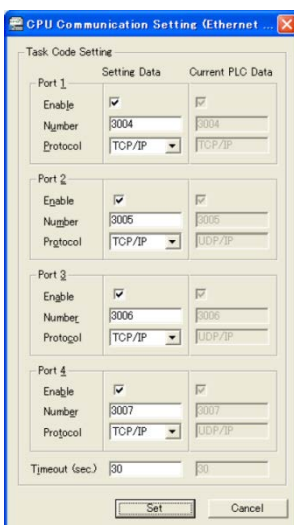
Please setup of the built-in Ethernet port of EHV series by Ladder Programming Software “Control Editor” for EHV CPU.



Please set IP address of CPU from [Tool] – [CPU Settings] – [IP Address].



Please set port setting of CPU for OPC Server communication from [Tool] – [CPU Settings] – [Ethernet (Task code)].



Please download these setting to CPU.

That's all of communication settings for OPC Server communication.

18.5 DeviceXPlorer Settings

18.5.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

CPU TYPE

☒ EHV ☐ EH ☐ H

NETWORK

Loop No. 255

Unit No. 255

Module No. 0

Port No. 0

ACCESS POINTS

Bit R/W 255 Bit Poke 100

Word R/W 255 Word Poke 100

Item		Description
CPU Type		Select the CPU type of the PLC to be connected to. EHV: EH150-EHV series EH: EH150 series and enhanced CPUs supporting “Task Code Version 5” or later, such as the H-4010 / H-302 / 702 / 1002 / 2002 in the H series. H: CPUs in the H series that do not support “Task Code Version 5” or later, such as H-300 / 700 / 2000
Network	Loop No.	To access another station using a CPU link, set the loop number of the target system (1, 2, or 255). To access your own station, specify “255”.
	Unit No.	To access another station using a CPU link, set the unit number of the target station (0 - 63, or 255). To access your own station, specify “255”.
	Module No.	Normally “0” is specified.
	Port No.	Normally “0” is specified.
Access Points*	Bit R / W	Specify the maximum access points of batch read / write of bit scale.
	Word R / W	Specify the maximum number of access points of batch read / write of word scale.
	Bit Poke	Specify the maximum access points of random write of bit scale.
	Word Poke	Specify the maximum access points of random write of word scale.

* The maximum number of access points that can be set varies with the CPU type. For details, refer to next page.

Setting item	EHV	EH	H
Bit R / W (Reading / batch writing of bit scale)	255 points	200 points	200 points
Word R / W (Reading / batch writing of word scale)	255 points	100 points	100 points
Bit write (Random writing of bit scale)	100 points	40 points	40 points
Word write (Random writing of word scale)	100 points	40 points	40 points

18.5.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [WR0]

General Scale Simulation Alarm

Tag Name

☐ Auto Format

Description

Device Type Internal Register

Device No. Byte Position

Data Type Bit Position

Length Attribute

☐ Byte Swap Calculation

☐ Array

New Save << >> OK Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 15.2 for devices that can be specified.
Device No.	Specify the device number in hexadecimal notation.

18.6 Errors

PLC errors (response errors) included in the error messages are comprised of a response task code and a return code.

The main errors are shown below.

Response task code	Return code	Description
01 (Task code error)	04	Address error
	05	Number of steps / words error
	06	I / O code error
	07	I / O number error
02 (warning)	00	In monitoring, the CPU is not occupied.
03 (Not executable)	03 / 04	Occupying code does not match
	05	The other station is being debugged.
	06	READ occupation is over the registration limit.
	07	The CPU is not occupied
	08	Other stations are occupied now
05 (BUSY)	00	The requested task code could not be executed because another task code was running.
08 (network error)	00	Network error
99	00	Serial Number of sending message is different from it of receiving message.

19 [Hitachi] HIDIC-S10 Series Ethernt Connection

This chapter describes the communication with the S10 series.

The following is a communication overview of the Hitachi Ethernet connection.

Overview	
Link	H-7338
Protocol	TCP / IP

19.1 PLC Systems

19.1.1 Applicable Module

Applicable Series	Applicable Ethernet units
S10VE Series	CPU Built-in Ethernet Port ET.NET Unit
S10V Series	
S10 / 2 α / mini Series	

Note

Set the device port number to 4301 for the S10/2 α /mini series, 4302 to 4305 for the S10V series, and 4312 to 4315 for the S10VE series.

19.2 List of Devices

The following is a list of HIDIC-S10 series devices that can be configured in DeviceXPlorer.

The address range differs depending on the CPU. Refer to your CPU manual for details.

[List of Devices] (The device ranges are all specified in hexadecimal format.)

Device name	Device symbol	Device Range (S10/2 α /mini)	Device Range (S10V)	Device Range (S10VE)	Bit length	Category
Addressing (S10/2 α /mini)	AWD	60000~FFFFFF	—	—	16 bit	Word
Addressing (S10V、S10VE)	ABW	—	0~FFFFFFFF	0~FFFFFFFF	16 bit	
External input	X	0~FFF	0~FFF	0~FFFF	16 bit	Bit
External output	Y	0~FFF	0~FFF	0~FFFF	16 bit	
Internal registers	R	0~FFF	0~FFF	0~FFF	16 bit	
Extended Internal Register	M	0~FFF	0~FFF	0~FFFF	16 bit	
Extended Internal Register	A	0~FFF	0~FFF	0~FFF	16 bit	
Keep relay	K	0~FFF	0~FFF	0~FFF	16 bit	
On-delay timer (contact)	T	0~3FF	0~7FF	0~7FF	16 bit	
On-delay timer (coil)	TK	0~3FF	0~7FF	0~7FF	16 bit	
One-shot timer (contact)	U	0~0FF	0~0FF	0~0FF	16 bit	
One-shot timer (coil)	UK	0~0FF	0~0FF	0~0FF	16 bit	

Counter (Up Coil)	CU	0~0FF	0~0FF	0~0FF	16 bit	Bit
Counter (Down Coil)	CD	0~0FF	0~0FF	0~0FF	16 bit	
Counter (Reset Coil)	CR	0~0FF	0~0FF	0~0FF	16 bit	
Counter (Contact)	C	0~0FF	0~0FF	0~0FF	16 bit	
Global link register	G	0~FFF	0~FFF	0~FFF	16 bit	
Nesting coil	N	0~FF	0~FF	0~FF	16 bit	
Process coil	P	1~7D	1~7D	1~7D	16 bit	
Event register	E	0~FFF	0~FFF	0~FFFF	16 bit	
Edge contact	V	0~FFF	0~FFF	0~FFF	16 bit	
Z register	Z	0~FFF	0~3FF	—	16 bit	
System registers	S	0~BFF	0~BFF	0~BFFF	16 bit	
Transfer register	J	0~FFF	0~FFF	0~FFF	16 bit	
Receive register	Q	0~FFF	0~FFF	0~FFFF	16 bit	
Extended Internal Register	LB	—	0~FFFF	0~FFFF	16 bit	
Internal register dedicated to converter	LR	—	0~0FFF	0~0FFF	16 bit	
Edge contact register for converter	LV	—	0~0FFF	0~0FFF	16 bit	
External input	XW	0~FF0	0~FF0	0~FFF0	16 bit	Word
External output	YW	0~FF0	0~FF0	0~FFF0	16 bit	
Internal registers	RW	0~FF0	0~FF0	0~FF0	16 bit	
Extended Internal Register	MW	0~FF0	0~FF0	0~FFF0	16 bit	
Extended Internal Register	AW	0~FF0	000~FF0	000~FF0	16 bit	
Keep relay	KW	0~FF0	000~FF0	000~FF0	16 bit	
On-delay timer	TW	0~3F0	000~7F0	000~7F0	16 bit	
On-delay timer (set value)	TS	0~1FF	0~1FF 200~7FF	0~1FF 200~7FF	16 bit	
On-delay timer (calculated value)	TC	0~1FF	0~1FF 200~7FF	0~1FF 200~7FF	16 bit	
One-shot timer	UW	0~F0	0~F0	0~F0	16 bit	
One-shot timer (set value)	US	0~0FF	0~0FF	0~0FF	16 bit	
One-shot timer (calculated value)	UC	0~0FF	0~0FF	0~0FF	16 bit	
up-down counter	CW	0~0F0	0~0F0	0~0F0	16 bit	
Counter (Set Value)	CS	0~0FF	0~0FF	0~0FF	16 bit	
Counter (Calculated Value)	CC	0~07F	0~0FF	0~0FF	16 bit	

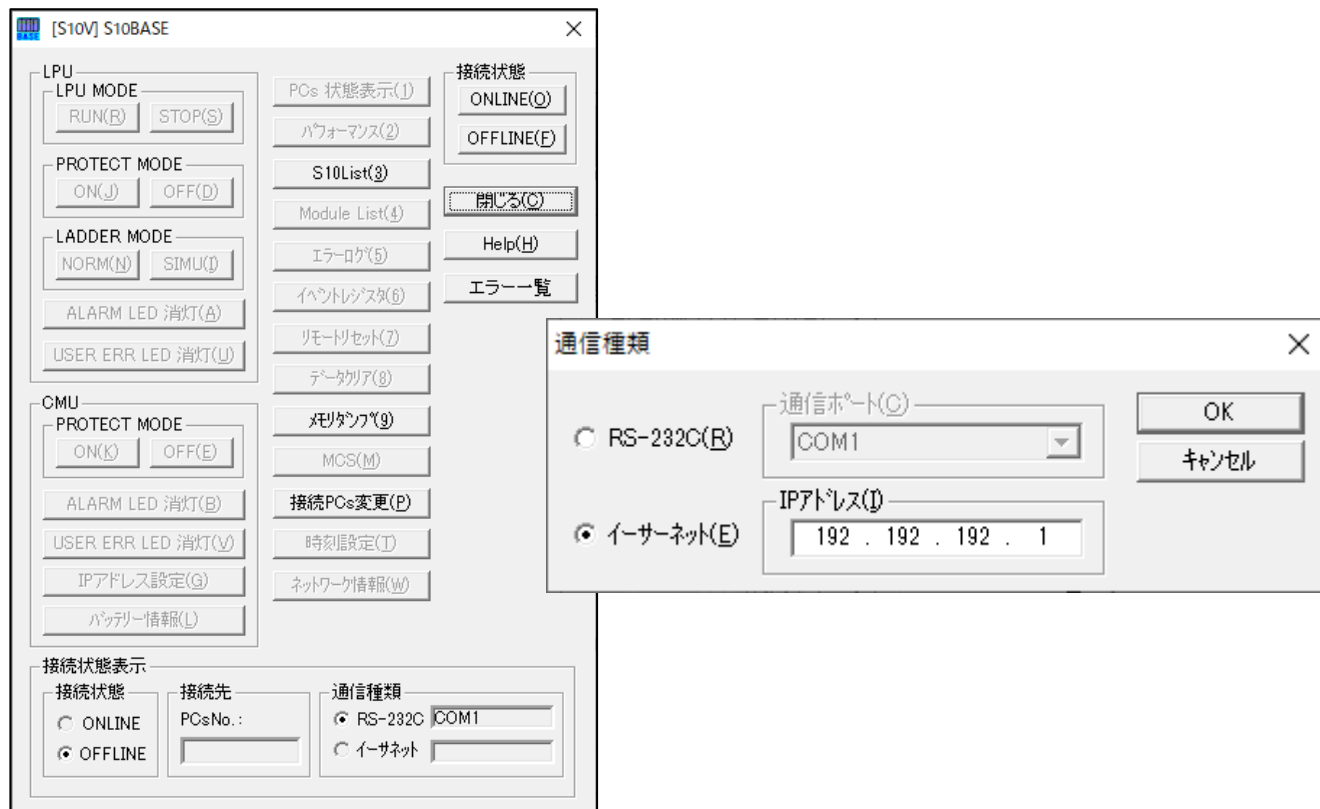
Global link register	GW	0~FF0	0~FF0	0~FF0	16 bit	
Global link register	NW	0~0F0	0~0F0	0~0F0	16 bit	
Nesting coil	PW	0~7F0	0~7F0	0~7F0	16 bit	Word
Process coil	EW	0~FF0	0~FF0	0~FFF0	16 bit	
Event register	VW	0~FF0	0~FF0	0~FF0	16 bit	
Edge contact	ZW	0~3F0	0~3F0	0~3F0	16 bit	
Z register	SW	0~BF0	0~BF0	0~BFF0	16 bit	
System registers	JW	0~FF0	0~FF0	0~FF0	16 bit	
Transfer register	QW	0~FF0	0~FF0	0~FFF0	16 bit	
Extended Internal Register	LBW	—	0~FFF0	0~FFF0	16 bit	
Internal register dedicated to converter	LRW	—	0~0FF0	0~0FF0	16 bit	
Edge contact register for converter	LVW	—	0~0FF0	0~0FF0	16 bit	
Extended external input	IW	0~FFF	0~FFF	0~FFF	16 bit	
Extended external output	OW	0~FFF	0~FFF	0~FFF	16 bit	
Data registers	DW	0~FFF	0~FFF	0~FFF	16 bit	
Work register	FW	0~BFF	0~BFF	0~BFF	16 bit	
Extended function work register	LWW	—	0~FFFF	0~FFFF	16 bit	
Backup word work register	LXW	—	0~3FFF	0~3FFF	16 bit	
Internal registers	BD	000~1FF	0~1FE	0~1FE	32 bit	Double Word
Longword register	LLL	—	0~1FFF	0~1FFF	32 bit	
Backup longword work register	LML	—	0~1FFF	0~1FFF	32 bit	
Floating-point work registers	LF	—	0~1FFF	0~1FFF	32 bit	
Backup floating-point work register	LG	—	0~1FFF	0~1FFF	32 bit	

19.3 Ethernet Unit Settings

19.3.1 S10V Series Built-in Ethernet Unit Configuration Method

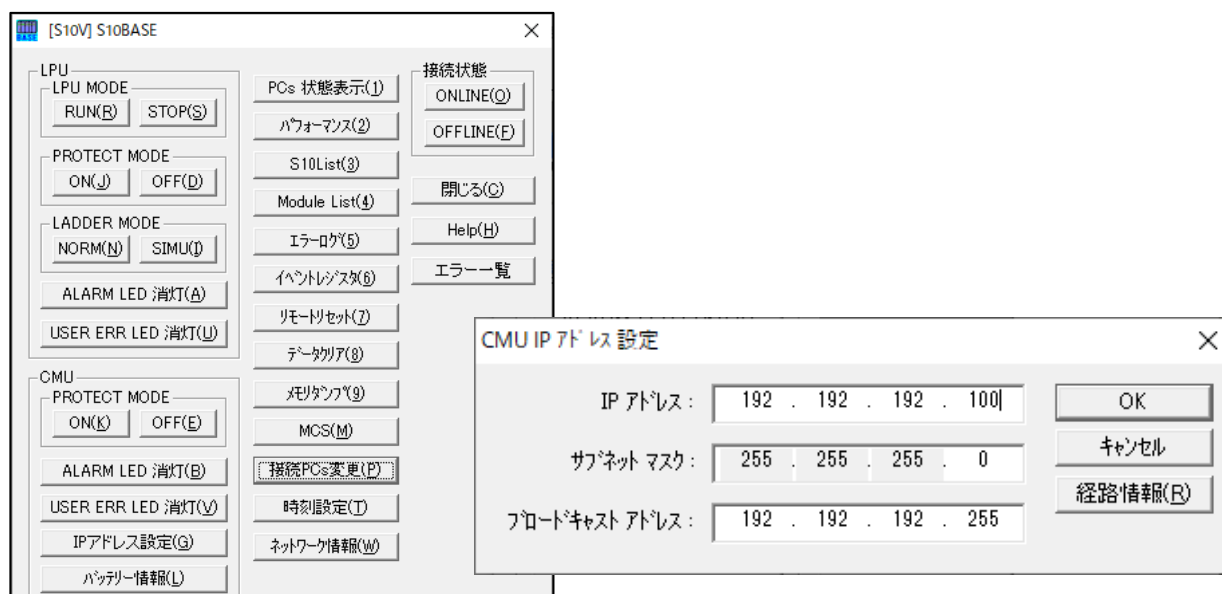
(1) The following shows how to configure communication settings for the built-in Ethernet module in the S10V basic system.

Select Ethernet (E) from Change Connected PCs and enter the initial address.



(2) Select ONLINE (O) to connect to the PLC.

Once connected, IP address setting (G) becomes available.



19.3.2 S10V Series Ethernet Unit Configuration Method

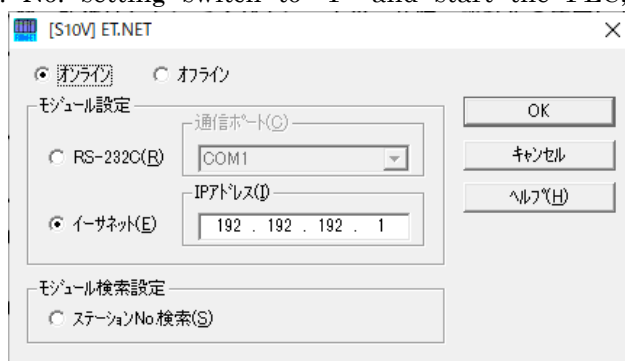
The following shows how to configure the communication settings for the Ethernet module in the S10V ET.NET system. (Configuration online)

Important

The S10V Basic System is required to run the S10V ET.NET system.

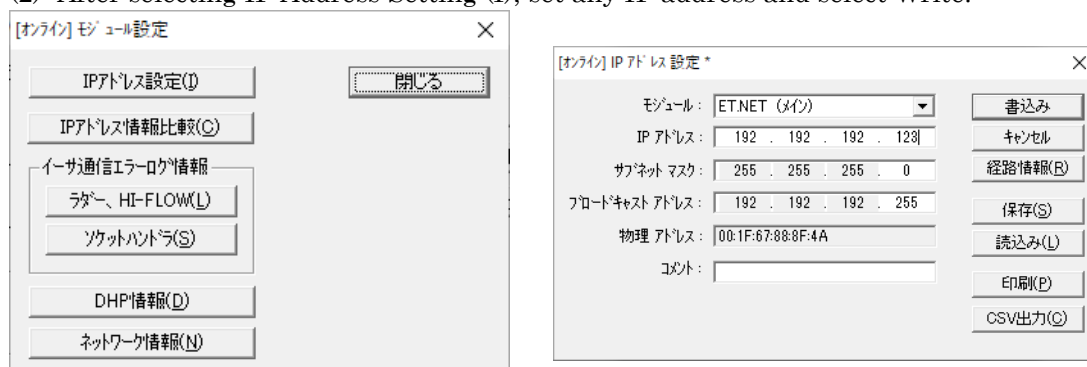
(1) After selecting Ethernet (E) in online mode, set the initial address and select OK.

Set U and L of the ST. No. setting switch to "F" and start the PLC, then the initial IP address



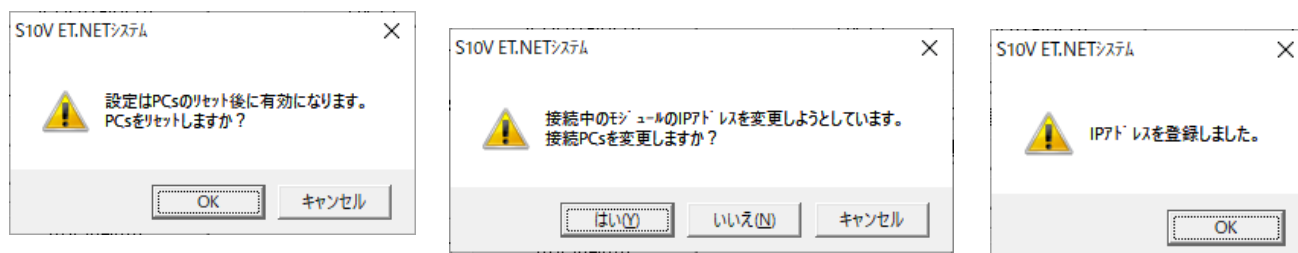
(192.192.192.1) will be set.

(2) After selecting IP Address Setting (I), set any IP address and select Write.



After selecting write, as shown in the figure below, select "OK" and "Yes" for the pop-up asking for confirmation of PLC reset and IP address change, and then "IP address is registered. is displayed, the IP address setting is complete.

Set U and L of the ST.No. setting switch to "0" and start the PLC to operate with the set IP address.



19.4 DeviceXPlorer Settings

19.4.1 Device Settings

Set the PLC to be accessed.

Property [Device1]

Device

Option

User authority

Connection Test

CPU TYPE

S10V

Bit R/W

256

Bit write

Word R/W

256

Word write

Item		Description
CPU Type		Select CPU type from S10/2a/mini series, S10V series, or S10VE series.
Access Point	Bit R / W	Specify the maximum number of batch read and write points in bit units. Up to 256 points can be set.
	Word R / W	Specify the maximum number of batch read and write points in word units. Up to 256 points can be set.

19.4.2 Tag Settings

Configure tags to be managed in Device Explorer.

Property of Tag [DW0]

GeneralScaleSimulationAlarmHistorical

Tag Name

Tag

DW0

☐ Auto Format

Description

Device Type

DW

Data register

Device No

0

Byte Position

Lower Byte

Data Type

SHORT

Bit Position

0

Length

1

Attribute

ReadWrite

☐ Byte Swap

Calculation

NONE

☐ Array

Item	Description
Device Type	Specify the PLC device (register) to be accessed. See Section 19.2 for a list of devices that can be specified.
Device No.	Specify the address of the device in hexadecimal.
Bit Position	When the data type is BOOL and the data length per word is 16 bits, specify 0 to 15; when the data length is 32 bits, specify 0 to 31.

Important

When a word device is read/written with a data type larger than LONG, it is read/written in word swapped state.

20 [Sharp] SATELLITE Ethernet Connection

This chapter explains communication with JW series equipment using an Ethernet unit.
An overview of communication via a Satellite Ethernet connection is shown below.

Overview	
Link	Computer link
Data code	Binary
Protocol	TCP / IP, UDP / IP

20.1 PLC Systems

20.1.1 Applicable CPU units

The CPU units and Ethernet units that can be used for Satellite Ethernet connections are shown below.

Category	Applicable CPU units	Applicable Ethernet units
JW300 series	JW-311CU, JW-312CU, JW-321CU JW-322CU, JW-331CU, JW-332CU JW-341CU, JW-342CU, JW-352CU JW-362CU	JW-300CM JW-255CM JW-25TCM
JW30H series	JW-31CUH / H1, JW-32CUH / H1 JW-33CUH / H1, JW-33CUH2 JW-33CUH3	
JW20H series	JW-21CU, JW-22CU	
JW100H series	JW100 / 100H / 100CUH	JW-51CM JW-50CM
JW70H series	JW70 / 70H	
JW50H series	JW50 / 50H	
J-board Z-500 series	Z-511J, Z-512J	Z-339J
J-board Z-300 series	Z-311J, Z-312J	

20.2 List of Devices

The Satellite devices that can be set in DeviceXPlorer are as shown below.

The device range varies with the CPU. For details, refer to your CPU instructions.

[List of Devices] (The device ranges are all specified in octal format.)

Device name	Device symbol	Device range	Category
Relay	R	0 - 15777 20000 - 75777 100000 - 543777	Bit
Timer contact *1	TS	0 - 17777	
Counter contact *1	CS	0 - 17777	
D register*2	D	009000 - 389777	Byte
File register*3	F	0 - 177777	
System memory	SM	0 - 2777	
E register	E	0 - 7777	
Z register	Z	0 - 377	Word
Timer current value*4	TN	0 - 37777	
Counter current value*4	CN	0 - 37777	
MD current value*4	MD	0 - 37777	

*1 Timer contact TS and Counter contact CS can only be written to if the data type is BOOL.

*2 The address of the D register is specified as follows: upper 2 digits of the device number (decimal), fixed value 9, lower 3 digits of device number (octal).

Example: If the upper two digits of the device number is 12 and the lower three digits of the device number is 3456, specify D1293456.

*3 Accessing to extended data area (larger than 200000) of File register F is not supported.

*4 Read-only device. You cannot write value to these devices.

Important

Memory area of D register of 99777 and 109000 is not consecutive. So you can not access from 99777 of D register to 109000 of D register. Also about Timer relay "TS" and Counter relay "CS", you can not access from 777 to 1000 and from 1777 to 2000. Also about Timer current value "TN" and Counter current value "CN", MD current value "MD", you can not access from 1777 to 2000 and from 3777 to 4000.

Example : D99776:A2 can be accessed, but D99777:A2 can not be accessed.

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: R100, D9000, etc.

Specifying file register F:

Specify the file register as the file number and the device number.

Example: If the file number is 1 and the device number is 123, specify F01:123.

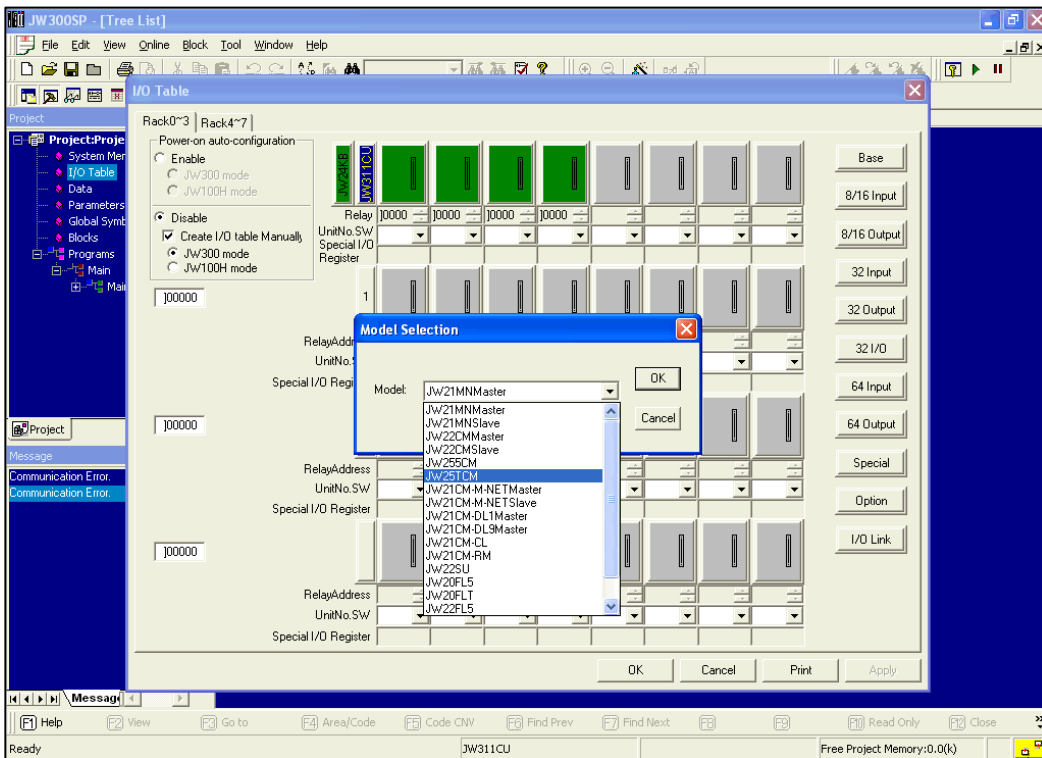
For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

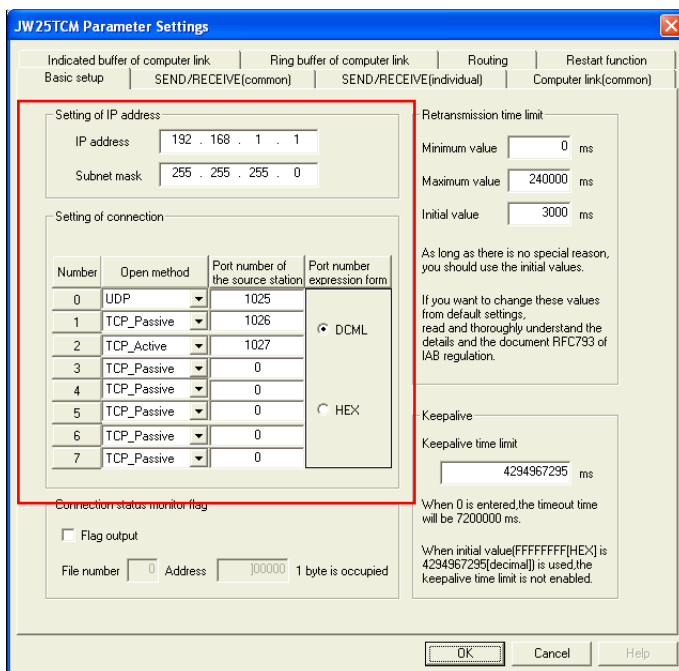
20.3 Ethernet Unit Settings

This section explains the settings to be made in the maintenance tool (JW300SP).

1. Add an option unit in the unit configuration. Select the Ethernet unit you will be using.



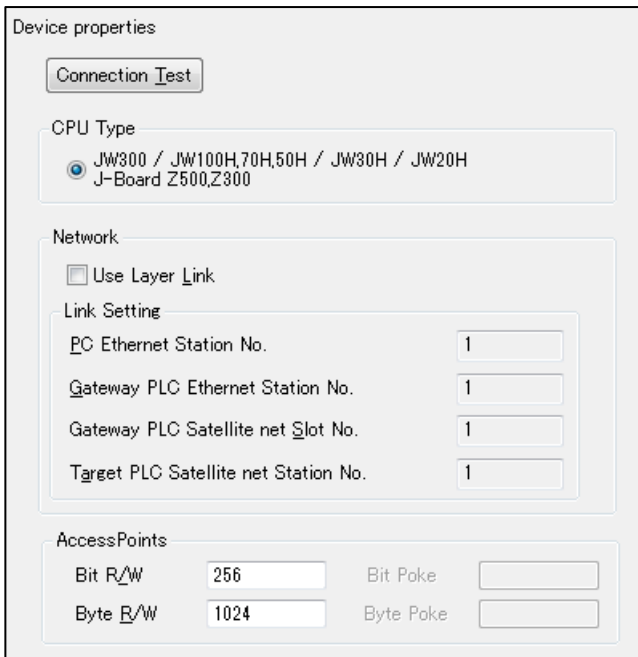
2. Set the parameters for the added unit. Make IP address and connection settings suited to the environment, and write the settings to the Ethernet unit. Match the network parameters you set here to the settings on the DeviceXPlorer side.



20.4 DeviceXPlorer Settings

20.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.



Item		Description
CPU Type		Select access CPU type.
Network	Use Layer Link	Check this option if you will access other station on the Satellite net.
	PC Ethernet Station No	Specify the Ethernet station number originating the transmission when accessing other station on the Satellite net. Set a number between 1 and 64.
	Gateway PLC Ethernet Station No.	Specify the Ethernet station number of the gateway PLC when accessing other station on the Satellite net. Set a number between 1 and 64.
	Gateway PLC Satellite net Slot No.	Specify the slot number of the gateway PLC when accessing other station on the Satellite net. Set a number between 1 and 7.
	Target Satellite net Station No.	Specify the connection target station number when accessing other station on the Satellite net. Set a number between 1 and 64.
Access Points*	Bit R / W	Specify the maximum access points of batch read / write of bit scale. Up to 256 points can be set.
	Byte R / W	Specify the maximum number of access points of batch read / write of byte scale. Up to 1024 points can be set.
	Bit Poke	Only batch writing is supported.
	Byte Poke	Only batch writing is supported.

* Bit R / W is only reflected for bit device reading. The number of access point for bit device writing is fixed at 1.

Byte reading and writing is performed for the Z register, but for other word devices (TN, CN, and MD), reading is

by word units(writing is not possible), and the command is created at 256 points, which is fixed as the maximum number of word reading points.

20.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 20.2 for devices that can be specified.
Device number	Specify the device number in octal notation. (The address specification for the D register is a combination of decimal and octal notation.)
Length	Specify the length of character strings or arrays. This becomes effective if either character string or array is checked as the data type. <u>Character strings</u> For bit and byte devices, if you specify “1”, the space for 1 byte is occupied. This is the space for 1 character in ASCII single-byte characters. Set “2” to store one ASCII double-byte character. For word devices, if you specify “1”, the space of 1 word (2 bytes) is occupied, or 2 characters in ASCII single-byte / 1 character in double-byte notation. <u>Arrays</u> BOOL: If “1” is specified, the space for one byte (8 bits) is occupied. BYTE: If “1” is specified, the space for 1 byte is occupied. SHORT: If “1” is specified, the space for 2 bytes is occupied. LONG or FLOAT: If “1” is specified, the space for 4 bytes is occupied. LONGLONG or DOUBLE: If “1” is specified, the space for 8 bytes is occupied.
Byte Swap	Byte swapping is only possible if the data type is SHORT, LONG, LONGLONG, FLOAT or DOUBLE.
File No.	When the file register (F) is specified, specify a file number (0 - 44).
Bit Position	When a byte or word device is specified and BOOL is specified as the data type, specify a bit position between 0 and 7, between 0 and 15, respectively.

Note

- If you specify the bit device in a format other than BOOL, set the leading device number as a multiple of 8.
- For a word device, if the data type is BOOL or BYTE, an array cannot be specified.
- The timer contact TS, counter contact CS can only be written to if the data type is BOOL.

20.5 Errors

This section explains the PLC errors (response errors) included in the error messages.

Error code	Description
01	Format error. Check the access device.
06	The PLC is not stopped.
07	Write command matching error.
0F	Memory access timeout.
10	Writing permission mode matching error.
13	An attempt was made to set or reset the TMR / CNT when the PLC was stopped.

21 [Fuji] MICREX Ethernet Connection

This chapter explains communication with MICREX - SX / F series equipment using an Ethernet module. An overview of communication via a MICREX Ethernet connection is shown below.

Overview	MICREX-SX	MICREX-F
Protocol	Loader Command	Read/Write command by Command setting type communication mode
Data code	Binary	Binary
Ethernet Protocol	TCP/IP	TCP/IP, UDP/IP

21.1 PLC Systems

21.1.1 Applicable Modules

The CPU modules and Ethernet modules that can be used for MICREX Ethernet connection are shown below.

Series	Type	Applicable CPU modules	Applicable Ethernet modules
MICREX-SX Series	SPH5000	NP1PU1-512H	Built-in Ethernet port
	SPH3000(MM)	NP1PU-48E / 256E NP1PU2-048E	NP1L-ET1 NP1L-ET2
	SPH2000	NP1PM-48R / 48E NP1PM-256E / 256H	
	SPH300EX	NP1PS-74D	
	SPH300	NP1PS-32, NP1PS-32R NP1PS-74, NP1PS-74R NP1PS-117, NP1PS-117R NP1PS-245	
	SPH200	NP1PH-08, NP1PH-16	
MICREX-F Series	F70	F70, F70S	NC1L-ET1
	F120	FPU120S	FFU170B
	F140	FPU140S	
	F150	FPU150S, FPU152S, FPU154S	

21.2 List of Devices

21.2.1 MICREX-SX Devices

The MICREX-SX devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

[List of Devices] (The device ranges are all specified in decimal format.)

Device name	Device symbol	Address range*1	Category
Standard memory	WM	0 - 1703935	Word
Retain memory	WL	0 - 262143	
System memory	WSM	0 - 511	
PE Link module broadcast area*2	PE	0 - 25087	
P Link module broadcast area*3	P	0 - 7807	
FL - Net module common memory etc...	FL	0 - 11667	

*1 This device range is default device address of NP1PM-256E. Address range varies with system parameter of CPU module.

*2 Below is a chart showing PE Link module broadcast area and address.

Area	address
High speed 1 area (High speed bit area)	0 - 511
High speed 2 area	512 - 8703
Low speed 1 area	8704 - 12799
Low speed 2 area	12800 - 25087

*3 Below is a chart showing P Link module broadcast area and address.

Area	address
High speed 1 area (High speed bit area)	0 - 511
High speed 2 area	512 - 1663
Low speed 1 area	1664 - 4735
Low speed 2 area	4736 - 7807

Important

- Memory of High speed 2 area of “P” and Low speed 1 area of “P” is not consecutive. So you can not access from High speed 2 area of “P” to Low speed 1 area of “P”. Eg : P1662:A2 can be accessed, but P1663:A2 can not be accessed.
- It is necessary to set the P/PE link module to access “P/PE” Devices, and to set CPU No. appropriately (8 or 9). To Similarly, set the FL-net module to access “FL” Devices, and set CPU number to appropriateness (8-15).

Note

- Input / output memory area cannot be accessed by limit of loader command.
- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number (Eg:WM100, P123, etc.). For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.
- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

21.2.2 MICREX-F Devices

The MICREX-F devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

[List of Devices]

Device name	Device symbol	Bit Size of 1 word	Category
Input/Output Relay (Word)	WB	16	Word
Auxiliary Relay (Word)	WM	16	
Keep Relay (Word)	WK	16	
Special Relay (Word)	WF	16	
Announcement Relay (Word)	WA	16	
Differential Relay (Word)	WD	16	
Step Control	WS	8	
0.1sec Timer Value	W9	32	
Timer Set Value	TS	32	
Timer Value	TR	32	
Counter Set Value	CS	32	
Counter Value	CR	32	
Data Memory	BD	32	
P Link 0 memory the 1st block	WL	16	
P Link 0 memory the 2nd block	W21	16	
P Link 0 memory the 3rd block	W22	16	
P Link 0 memory the 4th block	W23	16	
Direct Input/Output	W24	16	
Analog Work Field	W25	32	
Announcement Relay Previous Time Value	W26	16	
File Memory	W30 - W109*1	16 (32 depending on tag setting)	
P Link 1 memory the 1st block	W120	16	
P Link 1 memory the 2nd block	W121	16	
P Link 1 memory the 3rd block	W122	16	
P Link 1 memory the 4th block	W123	16	
Calendar	W125	16	

*1 File Memory W30-W109 is specified with File Memory No.

Note

- It is not possible to access the device which doesn't exist in CPU.
- It is not possible to access the P Link device when the CPU doesn't have P Link modules.
- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: WM100, BD123, W120_1, etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

* In using dynamic access for device which have symbol which ends with number(such as W21 and W122), please put under bar sign ('_') between device address.

* As for file memory W30 - W109, the bit size per 1 word usually is 16 bits, but you can access the file memory with 32 bit size when extended symbol "D" is set.

Example:

When you access address 123 of file memory W30 of 32 bits size, you can access with "W30_123D".

When you access address 123 of file memory W30 of 16 bits size, you can access with “W30_123”.

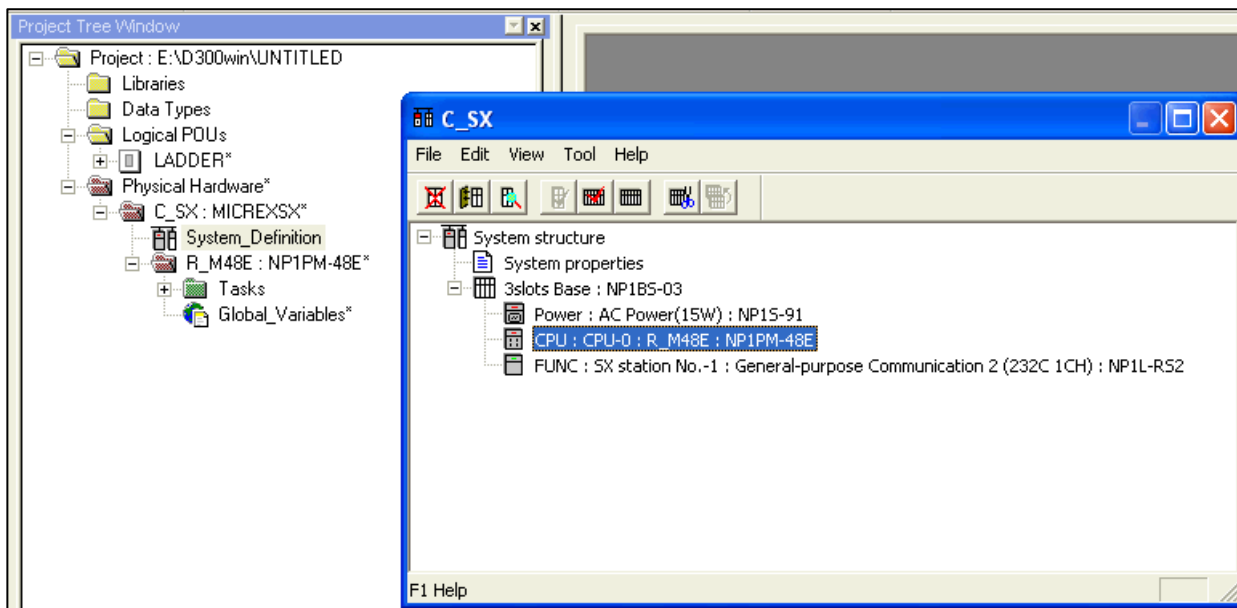
- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

21.3 Ethernet Module (CPU module) Settings

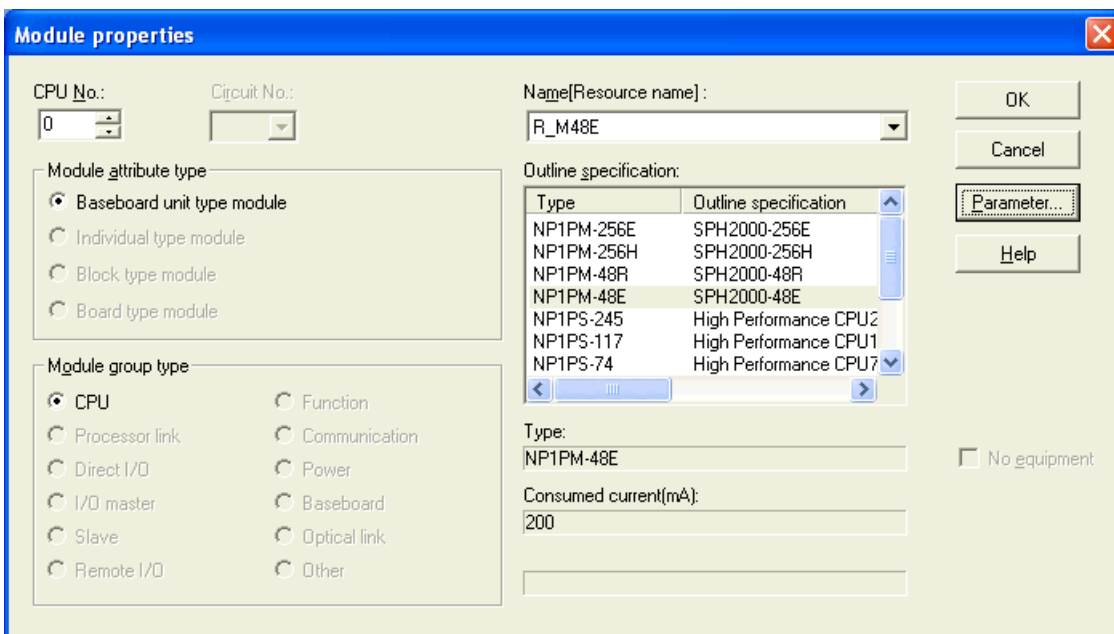
21.3.1 MICREX-SX Ethernet Module (CPU module) Settings

This section explains how to make the Ethernet module (CPU module) communication settings using “SX-Programmer” (“D300win”).

1. Set System composition at “System_Definition” in SX-Programmer.

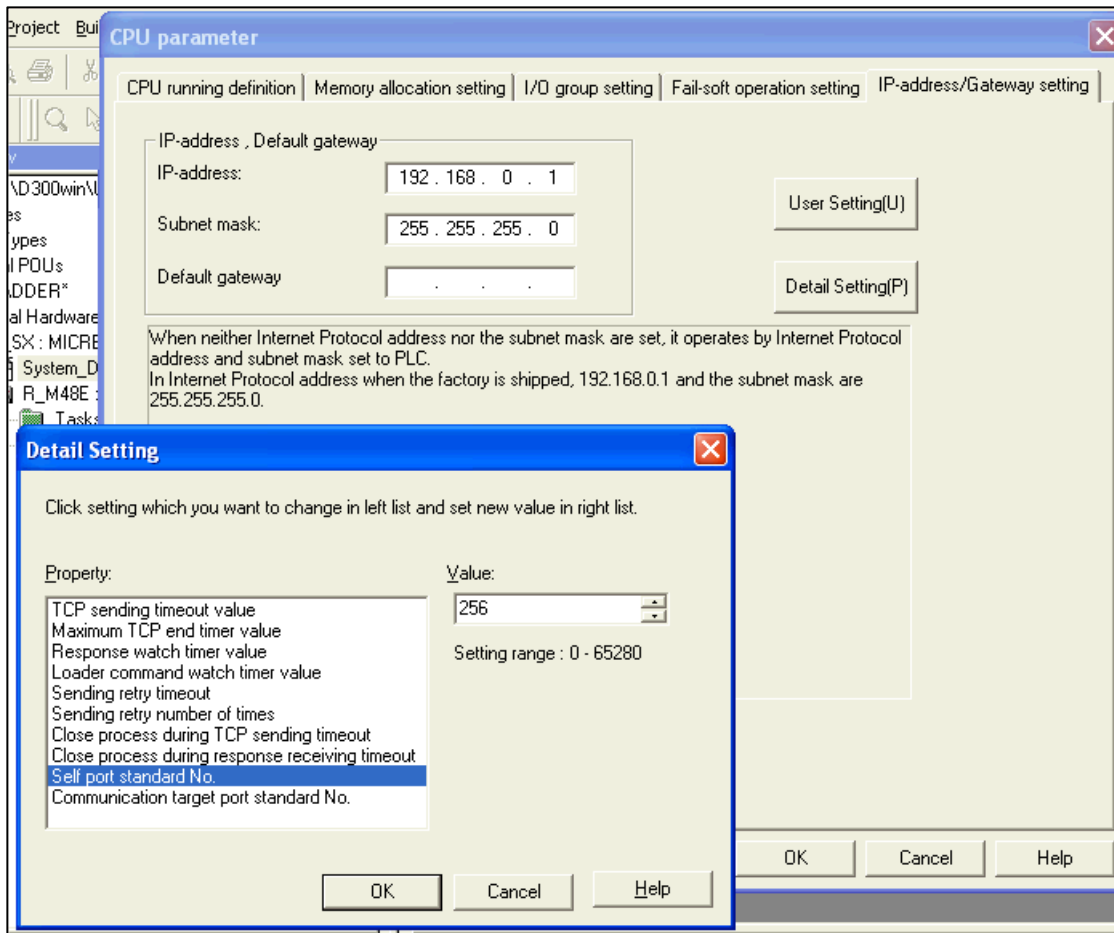


2. Set parameter setting at property of Ethernet module (CPU module).



3. Set IP Address and Default Gateway at IP Address / Gateway setting tab and set Port No. at Detailed setting, and download setting parameter to PLC. Self Standard Port No. plus 251 (or 253) is port No. of Ethernet modules.

Example : When Self Standard Port No is 256, port No. of Ethernet modules is 507 (or 509).



21.3.2 MICREX-F Ethernet Module Settings

It is necessary for ladder programming by Fuji MICREX-F PLC Programmer to make the communication setting of the Ethernet module for MICREX-F Ethernet communication. About the method of the ladder programming, please refer to the manual of the Ethernet module.

The communication settings of DeviceXPlorer for MICREX-F Ethernet communication is shown below.

Item	Settings	Note
Mode	Command setting type communication mode	
Transmission Cord	Binary	ASCII is not supported.
Data swap	None	
IP Address	Option	Please set following contents in the range that Ethernet port of DeviceXPlorer supports
Port No.	Option	
Protocol	TCP/IP or UDP/IP	
Communication Mode Setting sample	TCP Unpassive : 8004H UDP : 0084H	

21.4 DeviceXPlorer Settings

21.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

CPU TYPE

☒ MICREX-SX
☐ MICREX-F

NETWORK

CPU No.

ACCESS POINTS

Byte R/W

Bit Poke

Word R/W

Word Poke

Item		Description
CPU Type		Select the CPU type of the PLC to be connected to.
Network	CPU No.	MICREX-SX Series : Specify CPU No. to be accessed. Set a number between 0 and 15. 0 - 7 : CPU module 8 - 15 : Communication module
Access Points	Bit R / W	Batch read / write of a bit scale is not performed.
	Word R / W (Byte R/W)	MICREX-SX Series : Specify the maximum number of access points of batch read / write of word scale. Up to 243 points can be set. MICREX-F Series : Specify the maximum number of access points of batch read / write of byte scale. Up to 212 points can be set.
	Bit Poke	MICREX-SX Series : Specify the maximum access points of random write of bit scale. Up to 48 points can be set.
	Byte Poke	MICREX-SX Series : Specify the maximum access points of random write of word scale. Up to 48 points can be set.

21.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 21.2 for devices that can be specified.
Device No.	Specify the device number in decimal format.
File Memory No.	When CPU type is MICREX-F, File memory 'W' is specified with file memory number. Specify number between 30 and 109.
32bit data	When CPU type is MICREX-F, file memory 'W' can be accessed as 32 bit size device. If this is no check, file memory 'W' is accessed as 16 bit size device.
Bit Position	Bit position is used for access with BOOL data type. Specify number between 0 and 7 for 8 bit size device. Specify number between 0 and 15 for 16 bit size device. Specify number between 0 and 31 for 32 bit size device.

Important

In MICREX-F series, DeviceXPlorer supports writing of bit unit (one point) for word device. If the data type of word device is BOOL type, the attribute can be Read/Write. But because "Command setting type communication mode" doesn't support writing of bit unit, at the time of writing, DeviceXPlorer reads by one word unit before, and masks the writing value with reading value and writes by one word unit.

So, if the device value is always changed by ladder program, the writing value may be different from the PLC value depending on a timing. Please be careful.

21.5 Errors

21.5.1 MICREX-SX Errors

This section explains the PLC errors (response errors) included in the error messages.

Error code (HEX)	Status	Description
10	CPU error	Command cannot be executed because a problem occurs in the CPU.
11	CPU running	Command cannot be executed because the CPU is running
12	Non-executable command	Command cannot be executed because of CPU key switch.
20	Unknown command	A command that cannot be executed was received.
22	Parameter error	There is a error at a part of command header.
23	In communication interlock	Communication is interlocked by other module's command.
28	In command processing	Command cannot be executed because of process of other command.
2B	In other loader processing	Command cannot be executed because of loader processing.
2F	Initial processing uncompleted	Command cannot be executed because of system initializing.
40	Data specify error	Unknown data type or data number. Check the data.
41	Specified data doesn't exist	Specified data doesn't exist. Check the data.
44	Memory address specification error	Specified data address is over effective range.
45	Memory size over	Memory size is over.
A0	Access module Error	Module doesn't exist at specified access station number.
A2	No response	No response from access modules.
A4	SX Bus sending error	Cannot communicate because of SX Bus error.
A5	SX Bus sending NAK	Cannot communicate because of NAK occurred in SX Bus sending.
FE	Transaction ID error	Transaction ID of send message is different from Transaction ID of receive message.
FF	Demand command appointment	When demand command is issued, set process status "FF".

21.5.2 MICREX-F Errors

This section explains the PLC errors (response errors) included in the error messages.

Error code (HEX)	Status	Description
12	Memory write error	Can not write the system memory. >> Please check the device.
20	Unknown command	A command that cannot be executed was received. >> Please check the using module.
21	Parameter error	Access data is invalid >> Please check the access device.
22	Interlocking error	PLC status is status which only the operation from loader program is effective, and the operation from PC is not effective. >> Please unlock the interlock.
24	Access device error	Access device doesn't exist on the PLC. >> Please check the access device.
32	Memory size over	Access address is out of memory size. >> Please check the access device and address.

22 [Fuji] MICREX Serial Connection

This chapter explains communication with MICREX-SX/F series equipment using a general purpose communication module.

An overview of communication via a MICREX Serial connection is shown below.

Overview	MICREX-SX	MICREX-F
Link	Loader Command	Command setting type synchronization-style free transmission order
Data code	Binary	ASCII (JIS)

22.1 PLC Systems

22.1.1 Applicable Modules

The CPU modules and Ethernet modules that can be used for MICREX Serial connection are shown below.

Series	Type	Applicable CPU modules	Applicable communication modules
MICREX-SX Series	SPH3000	NP1PU-48E / 256E	NP1L-RS1 (RS-232C : 1channel, RS485:1channel) NP1L-RS2(RS-232C : 1channel) NP1L-RS3(RS-232C : 2channel) NP1L-RS4(RS-485 : 1channel) NP1L-RS5(RS-485 : 2channel)
	SPH2000	NP1PM-48R / 48E NP1PM-256E / 256H	
	SPH300EX	NP1PS-74D	
	SPH300	NP1PS-32, NP1PS-32R NP1PS-74, NP1PS-74R NP1PS-117, NP1PS-117R NP1PS-245	
	SPH200	NP1PH-08, NP1PH-16	
MICREX-F Series	F50	F50(Built-in Serial Port)	
	F55	F55	NC1L-RS2
	F70	F70 F70S	NC1L-RS2 NC1L-RS4
	F80	FPU80H	FFU120B
	F120	FPU120H, FPU120S	
	F140	FPU140S	
	F150	FPU150S, FPU152S, FPU154S	

22.2 List of Devices

In MICREX-SX series, see the list of devices for MICREX-SX Devices of MICREX Ethernet connection (section 18.2).

The MICREX-F devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

[List of Devices]

Device name	Device symbol	Bit Size of 1 word	Category
Input/Output Relay (Word)	WB	16	Word
Auxiliary Relay (Word)	WM	16	
Keep Relay (Word)	WK	16	
Special Relay (Word)	WF	16	
Announcement Relay (Word)	WA	16	
Differential Relay (Word)	WD	16	
0.1sec Timer Value	W9	32	
Timer Set Value	TS	32	
Timer Value	TR	32	
Counter Set Value	CS	32	
Counter Value	CR	32	
Data Memory	BD	32	
P Link 0 memory the 1st block	WL	16	
P Link 0 memory the 2nd block	W21	16	
P Link 0 memory the 3rd block	W22	16	
P Link 0 memory the 4th block	W23	16	
Direct Input/Output	W24	16	
File Memory	W30 - W109*1	16 (32 depending on tag setting)	
P Link 1 memory the 1st block	W120	16	
P Link 1 memory the 2nd block	W121	16	
P Link 1 memory the 3rd block	W122	16	
P Link 1 memory the 4th block	W123	16	

*1 File Memory W30-W109 is specified with File Memory No.

Note

- It is not possible to access the device which doesn't exist in CPU.
- It is not possible to access the P Link device when the CPU doesn't have P Link modules.
- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: WM100, BD123, W120_1, etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

* In using dynamic access for device which have symbol which ends with number (such as W21 and W122), please put under bar sign ('_') between device address.

* As for file memory W30 - W109, the bit size per 1 word usually is 16 bits, but you can access the file memory with 32 bit size when extended symbol "D" is set.

Example:

When you access address 123 of file memory W30 of 32 bits size, you can access with "W30_123D".

When you access address 123 of file memory W30 of 16 bits size, you can access with "W30_123".

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

22.3 Communication Module Settings

22.3.1 MICREX-SX NP1L Module Settings

To communicate with DeviceXPlorer, Settings of dip switches of general purpose communication modules is required.

Communication program for application programs in the CPU is not required.

[Dip switches setting]

Communication module	Switches	Describes
NP1L-RS1 NP1L-RS4 NP1L-RS5	Station No. Setting Switches	Specify station No. for RS-485 between 0 and F. When you don't use RS-485 port, you don't need this settings.
	Mode Setting Switches*	Specify module setting and mode for connect RS-232C port.
	RS-485 Terminal resistance ON / OFF Switch	Switch ON to use Terminal resistance
NP1L-RS2 NP1L-RS3	Mode Setting Switches*	Specify module setting and mode for connect RS-232C port.

* Correspondence list of mode setting switches and mode shows below.

Below is a chart showing mode setting switches and mode.

Switch No.	Mode			Note
	RS-232C Port	RS-485 Port	RS-232C↔ RS-485 Signal conversion	
0	General purpose modules	General purpose modules	None	
1	Loader	General purpose modules	None	
2	General purpose modules	Loader	None	
3	Loader	Loader	None	Later version of V2535
4	General purpose modules	General purpose modules	conversion	
5	Not use			
6	Modem Loader 19200bps	General purpose modules	None	Later version of V1031
7	Self check Mode 1			
8	Self check Mode 2			
9	Modem Loader 19200bps	Loader	None	Later version of V1031
A	Modem Loader 9600bps	General purpose modules	None	
B	Modem Loader 9600bps	Loader	None	Later version of V2535
C	Modem Loader 38400bps	General purpose modules	None	
D	Modem Loader 38400bps	Loader	None	

E	Modem Loader 76800bps	General purpose modules	None	Later version of V2535
F	Modem Loader 115200bps	Modem Loader 115200bps	N / A	

Please set mode to “Loader” to communicate with DeviceXPlorer.

Example : If you use RS-232C port, please set switch “1” or “3”.

[Communication Format](Fixed)

Baud rate : 38400 bps , Data Bit : 8bit , Stop Bit : 1 , Parity : Even

22.3.2 MICREX-F Interface Module Settings

To communicate with DeviceXPlorer, communication settings of interface module are required.

Please refer module manual to make the communication setting for the module.

Item	Setting	Note
Mode	Command setting type synchronization-style free transmission order	NC1L-RS2: Mode1 NC1L-RS4: Mode3 FFU120B : Mode1 – 3 (Depending on communication mode)
Transmission Code	JIS	
Header Code	:	
Footer cord	CR/LF	
Baud rate	4800, 9600, 19200	Please set the setting in the following setting range that serial port of DeviceXPlorer supports.
Data Length (Data bit)	7, 8	
Parity	None, Odd, Even	
Stop bit	1, 2	

22.4 DeviceXPlorer Settings

22.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

CPU TYPE

☒ MICREX-SX
☐ MICREX-E

NETWORK

CPU No.
0

ACCESS POINTS

Byte R/W
0

Bit Poke
48

Word R/W
243

Word Poke
48

Item		Description
CPU Type		Select the CPU type of the PLC to be connected to.
Network	CPU No.	MICREX-SX Series : Specify CPU No. to be accessed. Set a number between 0 and 15. 0 - 7 : CPU module 8 - 15 : Communication module
Access Points	Bit R / W	Batch read / write of a bit scale is not performed.
	Word R / W (Byte R/W)	MICREX-SX Series : Specify the maximum number of access points of batch read / write of word scale. Up to 243 points can be set. MICREX-F Series : Specify the maximum number of access points of batch read / write of byte scale. Up to 212 points can be set.
	Bit Poke	MICREX-SX Series : Specify the maximum access points of random write of bit scale. Up to 48 points can be set.
	Byte Poke	MICREX-SX Series : Specify the maximum access points of random write of word scale. Up to 48 points can be set.

22.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 22.2 for devices that can be specified.
Device No.	Specify the device number in decimal format.
File Memory No.	When CPU type is MICREX-F, File memory 'W' is specified with file memory number. Specify number between 30 and 109.
32bit data	When CPU type is MICREX-F, file memory 'W' can be accessed as 32 bit size device. If this is no check, file memory 'W' is accessed as 16 bit size device.
Bit Position	Bit position is used for access with BOOL data type. Specify number between 0 and 7 for 8 bit size device. Specify number between 0 and 15 for 16 bit size device. Specify number between 0 and 31 for 32 bit size device.

Important

In MICREX-F series, DeviceXPlorer supports writing of bit unit (one point) for word device. If the data type of word device is BOOL type, the attribute can be Read/Write. But because "Command setting type communication mode" doesn't support writing of bit unit, at the time of writing, DeviceXPlorer reads by one word unit before, and masks the writing value with reading value and writes by one word unit.

So, if the device value is always changed by ladder program, the writing value may be different from the PLC value depending on timing. Please be careful.

22.5 Errors

See the errors for MICREX Ethernet connection (section 21.5).

23 [Panasonic] FP Ethernet Connection

This chapter explains communication with FP-X/FP2(SH) series equipment using an Ethernet unit. An overview of communication via a FP Ethernet connection is shown below.

Overview	
Link	MEWTOCOL-COM (Ethernet Connection)
Data code	ASCII In FP2 series, Binary Code is used partly.
Protocol	TCP / IP, UDP / IP

23.1 PLC Systems

23.1.1 Applicable Units

The CPU unit and Ethernet unit that can be used for FP Ethernet connection are shown below.

Series	Type	Applicable CPU unit	Applicable Ethernet unit
FP-X Series	FP-X	FP-X C14R, FP-X C14RD FP-X C14T, FP-X C14TD FP-X C14P, FP-X C14PD FP-X C30R, FP-X C30RD FP-X C30T, FP-X C30TD FP-X C30P, FP-X C30PD FP-X C60R, FP-X C60RD FP-X C60T, FP-X C60TD FP-X C60P, FP-X C60PD	FP-X COM5
FP2(FP2SH) Series	FP2	FP2	FP2 ET-LAN
	FP2SH	FP2SH	FP2 ET-LAN2
FP7 Series	FP7	AFP7CPS4E, AFP7CPS3E	CPU Built-in Ethernet Port
FP0H Series	FP0H	FP0H	CPU Built-in Ethernet Port
Energy saving controller	Web Datalogger Unit	AFL1200	CPU Built-in Ethernet Port

Note

When accessing Web Datalogger Unit (DLU), please set port number "9094(TCP)" or "9095(TCP)", and specify the unit number "EE". These numbers might be varied to unit's setting.

23.2 List of Devices

The FP devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

[List of Devices] (The device ranges are all specified in decimal format.)

Device name	Device symbol	Address range			Category	Category
		FP-X	FP2/FP2SH	FP7		
Input Relay	X	0 - 109F	0 - 511F	0 - 511F	Bit	Decimal*2
Output Relay	Y	0 - 109F	0 - 511F	0 - 511F		Decimal*2
Internal Relay	R	0 - 255F 9000 - 911F	0 - 866F 9000 - 910F	0 - 2047F		Decimal*2
Link Relay	L	0 - 127F	0 - 639F	0 - 1023F		Decimal*2
Timer Contact*1	T	0 - 1023	0 - 3071	0 - 4095		Decimal
Counter Contact*1	C			0 - 1023		Decimal
Pulse Relay	P	N/A	N/A	0 - 255F	Word	Decimal*2
Error Alarm Relay	E	N/A	N/A	0 - 4095		Decimal
System Relay	SR	N/A	N/A	0 - 223F		Decimal*2
Data Register	DT	0 - 32764 90000~90373	0 - 10239 90000 - 90511	0 - 999424		Decimal
Link Register	LD	0 - 255	0 - 8447	0 - 16383		Decimal
Timer / Counter Set Point	SV	0 - 1023	0 - 3071	N/A		Decimal
Timer / Counter Progress Value	EV	0 - 1023	0 - 3071	N/A		Decimal
File Register	FL	N/A	0 - 32764 (3bank)*3	N/A		Decimal
Index Register	I	0 - D*3	0 - D (16bank)*3	0 - E		Hexadecimal
System Register	SD	0 - 999	0 - 999	0 - 999		Decimal
Timer Set Point	TS	N/A	N/A	0 - 4095	LONG	Decimal
Timer Progress Value	TE	N/A	N/A	0 - 4095		
Counter Set Point	CS	N/A	N/A	0 - 1023		
Counter Progress Value	CE	N/A	N/A	0 - 1023		

*1 Read-only device.

*2 The address is specified as follows: lower 1 digit of the device number is written in hexadecimal.

*3 This device is accessed by specifying a bank number. If there is no bank, please specify bank No. "0".
The collective access to the different bank is not supported

Example: To access File Register "100" of bank "1", specify "FL1:100".

To access Index Register "A" of bank "3", specify "I3:A".

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: R100, DT100, etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- In FP Ethernet connection, the address range is checked according to the CPU type.

It is not possible to access a device outside the address range for the CPU you are using.

23.3 Ethernet Unit Settings

23.3.1 FP-X COM5 Unit Settings

This section explains how to make the FP-X COM5 Ethernet unit communication settings using the FPWIN GR (Programming Tools) and Control Configurator WD (IP Address Searching Tool).

< FP-X CPU Setting >

Set COM1 Port setting (such as Unit No. and Communication Format) at “PLC Configuration” of “Option” menu in FPWIN GR.

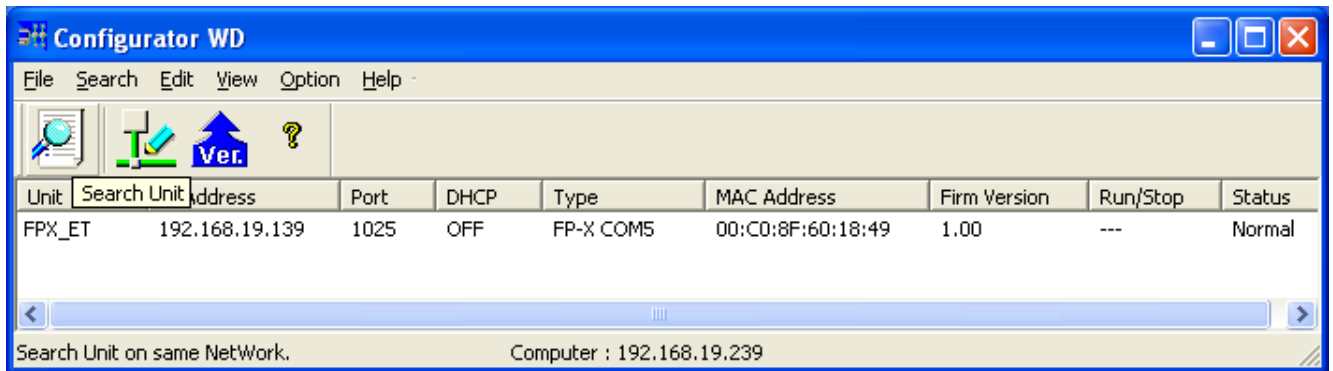
< COM1 Port Setting >

No.	Setting Item	Set Value
No.410	Unit No.	1 - 99
No.411	Comm. Mode	Computer Link
No.413	Communication Format	Char Bit : 8Bits Parity :Odd Stop Bit : 1 Terminator : CR Header : STX not exist
No.415	Baudrate	115200bps / 9600bps

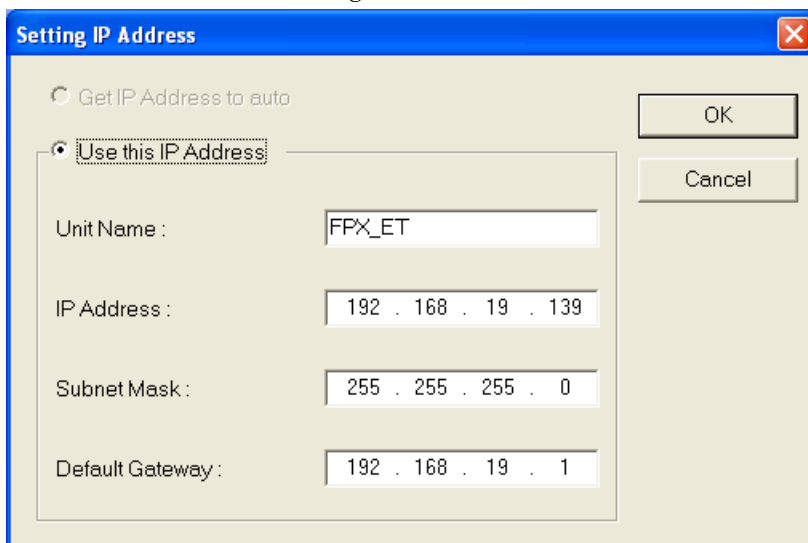
< FP-X COM5 Unit Setting >

Use Configurator WD for searching FP-X COM5.

From “Search Unit”, you can search FP-X COM5 unit by broadcast.



Set IP Address from “Setting IP Address” menu.



23.3.2 FP2 ET-LAN Unit Settings

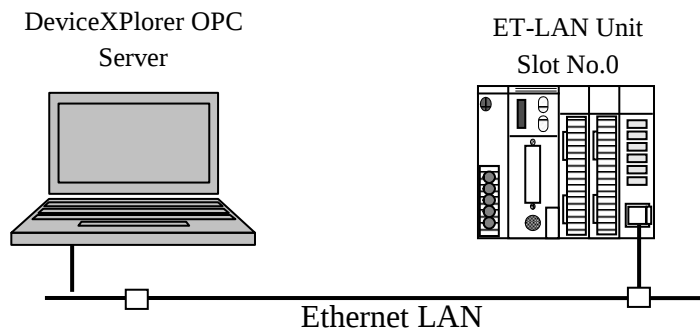
For communicating with FP2/FP2SH via Ethernet using Computer Link protocol(MEWTOCOL-COM communication), connection open setting for Ethernet will be needed.

This section explains how to make the FP2 ET-LAN Ethernet unit communication settings using the FPWIN GR (Programming Tools). You can make the FP2 ET-LAN Ethernet unit communication settings using Configurator ET. In detail, please see Configurator ET manual.

This section shows setting example with the ladder of FPWIN GR (a programming tool) to realize the following system constitution.

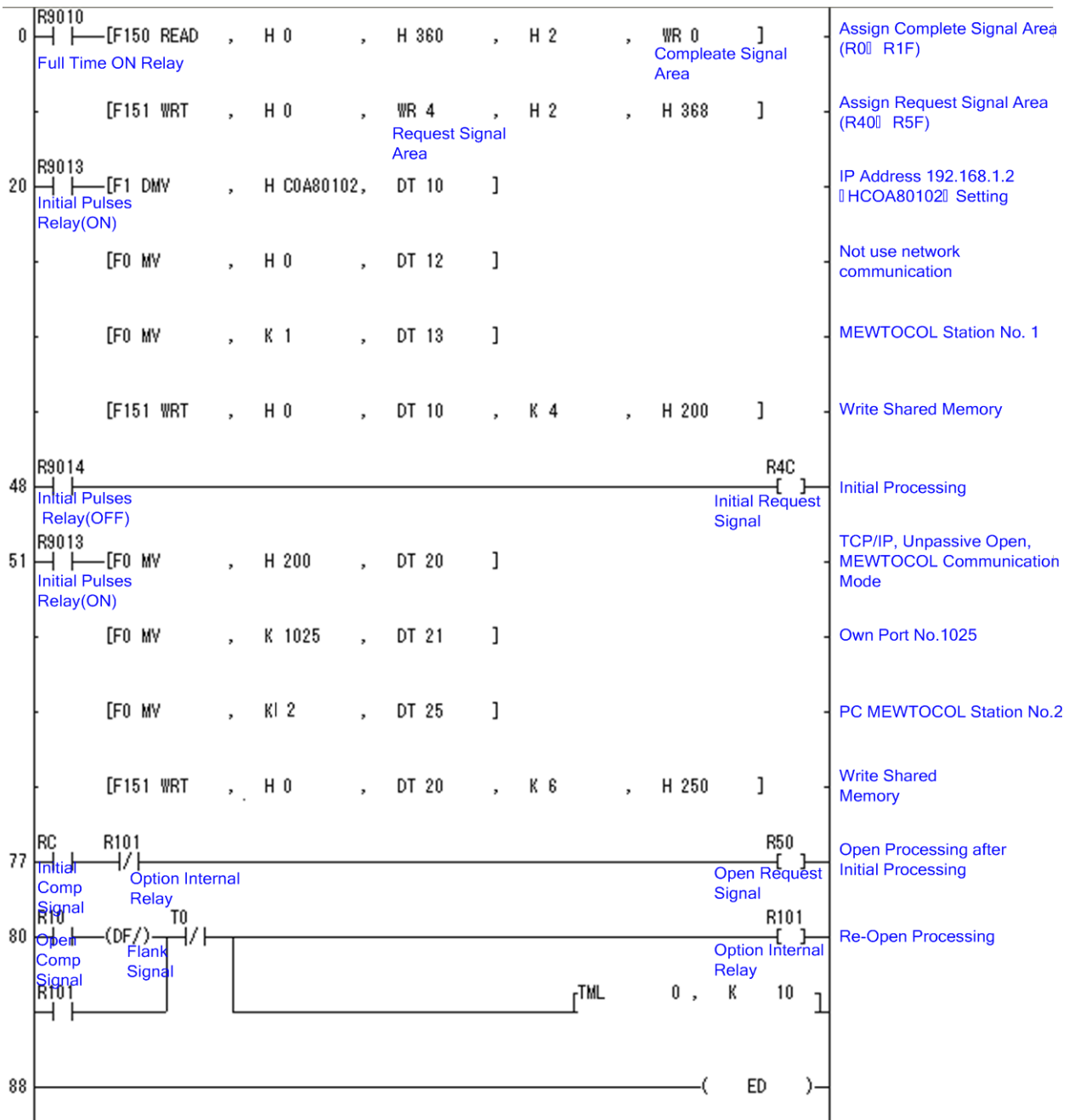
Depending on system constitution, please set it. Please refer to the manual of the ET-LAN unit for the details.

[System Constitution]



Item	PC side	PLC side
IP Address	192.168.1.1	192.168.1.2
Port No.	option	1025
MEWTOCOL Station No.	2	1
Communication Mode	MEWTOCOL Communication	
Protocol	TCP/IP	
Connection	Unpassive Open	

[Sample ladder program]



23.3.3 Ethernet port setting for FP7 CPU

In order to perform Ethernet communication with FP7 and CPU, it is necessary to set the communication environment of FP7 main unit using FPWIN GR7S(programming tool).

[Communication environment setting of FP7 main unit]

Use FPWIN GR7S, a programming tool, to set the IP address, communication, method, etc.

Select [FP7 Configuration] → [Built-in ET-LAN Settings] in the project tree, and perform the following settings in [Basic Communication Information] and [System Connection Information Settings].

[Basic communication information]

Set the PLC's own station IP address, subnet mask, and default gateway.

設定項目	設定内容
通信基本情報	
IPv4/IPv6指定	IPv4のみ
IPv4アドレス自動取得	しない
IPv6アドレス自動取得	しない
自局IPアドレス(IPv4)	192 . 168 . 1 . 5
サブネットマスク(IPv4)	255 . 255 . 255 . 0
デフォルトゲートウェイ(IPv4)	192 . 168 . 1 . 1
サブネットプレフィックス長(IPv6)	64
自局IPアドレス(IPv6)	fe80:1234:5678:1234:5678
デフォルトゲートウェイ(IPv6)	fe80:1
TCP ULPタイムアウト	5
TCPゼロウィンドウタイム	5
TCPリセットタイム	5
IP組立タイム	3
TCPリセットタイム	20
DNSサーバーのIPアドレス	手動で設定する
DNSサーバー指定	IPv4
優先DNSサーバー	0 . 0 . 0 . 0
代替DNSサーバー	0 . 0 . 0 . 0
拡張機能	
拡張機能	使用しない
WEBサーバー機能	使用しない
EtherNet/IP機能	使用しない
ユーザーコネクション数	16
ルーティング設定	
ルーティング設定	使用しない
ルート1宛先ネットワーク1	0 . 0 . 0 . 0
宛先サブネットマスク1	0 . 0 . 0 . 0

[System connection information setting]

Set the communication method, operation mode setting, and local station port number.

Select MEWTOCOL7-COM for the operation mode setting.

設定項目	設定内容
システムコネクション情報設定1	
コネクション使用指定	使用する
通信方式	TCP/IP
オープン方式(サーバー)	サーバー接続(相手局注意)
オープン方式(自動/手動)	自動OPENする
動作モード設定	MEWTOCOL7-COM
MEWTOCOL通信タイプ	EP7(ET-LAN)接続しない
自局ポート番号	1025
相手局設定方法	IPv4を使用する
相手局IPアドレス	0 . 0 . 0 . 0
相手局ポート番号	0
未使用コネクション切断時間	6000
自局ポート番号	
自局(送り元)のポート番号を指定します。	

23.4 DeviceXPlorer Settings

23.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

CPU Type

☒ FP-X ☐ FP2SH ☐ EP2 ☐ FP7

☐ Use FP2 ET-LAN(T)

Network

Unit No.

Layer Link

Number of Layers ☒ None ☐ 2 ☐ 3 ☐ 4

Link Settings

	Station		Station	Route No.
PC side:	1	Broadcast1:	1	1
PLC	1	Broadcast2:	1	1
		Broadcast3:	1	1

ACCESS POINTS

Header ☐ BCC

ACCESS POINTS

Bit R/W	8	Bit Poke	
Word R/W	500	Word Poke	

Item		Description
CPU Type	CPU Type	Select the CPU type of the PLC to be connected to.
	Use FP2 ET-LAN	When CPU type is P7 , check this option to use the FP2 ET-LAN.
Layer Link	Unit No.	Specify the CPU unit number. Set a number between 1 and FF. When accessing Web Datalogger Unit (DLU), specify the station number "EE".
	Number of Layers	Specify a number of layers, between 2 and 4, for access via link for Layer Link access.
	Station No. PC Side:	Specify the Station No. of PC side. Set a number between 1 and 64.
	Station No. PLC Side:	Specify the Station No. of PLC side. Set a number between 1 and 64.
	Station No.	Specify the link Station No. to be used for each layer. Set a number between 1 and 64.
	Route No.	Specify the link Route No. to be used for each layer. Set a number between 1 and 8.
Protocol	Header	Specify the Header of protocol. Set "<" or "%".
	BCC	Specify the use BCC(Block check sum).Check if BCC is used.
Access Points	Bit R / W	Specify the maximum access points of batch read / write of bit scale. Up to 8 points can be set.
	Word R / W	Specify the maximum number of access points of batch read / write of word scale. Up to 500 points can be set.
	Bit Poke	Only batch writing is supported.
	Word Poke	Only batch writing is supported.

If you access with Layer Link, please balance access points because of the reason that accessible points are limited by Layer Link communication.

23.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXplorer.

The screenshot shows the 'Property of Tag [DT0]' dialog box with the 'General' tab active. The 'Tag Name' field contains 'Tag' and 'DT0'. The 'Auto Format' checkbox is unchecked. The 'Description' field is empty. The 'Device Type' is set to 'DT' and 'Data Register' is empty. 'Device No.' is '0' and 'Bank No.' is '0'. 'Data Type' is 'SHORT', 'Byte Position' is 'Lower Byte', and 'Length' is '1'. 'Bit Position' is '0'. The 'Byte Swap' checkbox is unchecked. 'Attribute' is 'ReadWrite' and 'Calculation' is 'NONE'. The 'Array' checkbox is unchecked. At the bottom, there are buttons for 'New', 'Save', navigation arrows, 'OK', and 'Cancel'.

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 23.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.
Bank No.	Specify a bank number if you have specified File Register (FL) or Index Register (I) as the device type. Set a number between 0 and 2 in the case of File Register (FL) and set a number between 0 and 15 in the case of Index Register (I).

23.5 Errors

This section explains the PLC errors (response errors) included in the error messages.

Error code (HEX)	Status	Description
23	MEWTOCOL Unit No. Repetition	Check MEWTOCOL Unit No.
24	ET-LAN Unit Hardware Error	Communication Unit Error
26	MEWTOCOL Unit No. Error	Check MEWTOCOL Unit No.
27	Not Support Error	Not supported command was used.
41	Format Error	Not supported format was used.
42	Not Support Error	Not supported command was used.
60	Parameter Error	Check communication parameter
61	Data Error	Check device settings and tag settings
63	Mode Error	Check PLC operating mode
65	Protect Error	You cannot do write operation because of Protect status.
66	Address Error	Check device settings and tag settings

24 [Yaskawa] MP Ethernet Connection

This chapter explains communication with MP series equipment using an Ethernet module.

An overview of communication via a MP Ethernet connection is shown below.

Overview	
Link	MEMOBUS, Extended MEMOBUS
Data code	Binary, ASCII
Protocol	TCP / IP

24.1 PLC Systems

24.1.1 Applicable Modules

The CPU unit and Ethernet unit that can be used for MP Ethernet connection are shown below.

Series	Model	Applicable CPU unit	Applicable Ethernet module
MP3000 Series	MP3300	CPU-301(JEPMC-CP3301-1/2-E) CPU-302(JEPMC-CP3302-1/2-E)	CPU Built-in Ethernet 218IF-01(JAPMC-CM2300) 218IF-02(JAPMC-CM2302-E)
	MP3200	CPU-201(JEPMC-CP3201-E) CPU-202(JEPMC-CP3202-E)	
MP2000 Series	MP2400	MP2400	
	MP2300	MP2300 MP2310 MP2300S	
	MP2200	CPU-01(JAPMC-CP2200) CPU-02(JAPMC-CP2210) CPU-03(JAPMC-CP2220) CPU-04(JAPMC-CP2230)	
MP900 Series	MP920	CPU-01(JEPMC-CP200) CPU-02(JEPMC-CP210)	218IFA(JEPMC-CM210A)

24.2 List of Devices

The MP devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

Device name	Device symbol	Address range	Format	Category
Input Relay*1	IB	IB000000 - IB00FFFF	HEX	Bit
Coil	MB	MB000000 - MB04095F*2	DEC	
Input Register*1	IW	IW000000 - IW07FFF	HEX	Word
Holding Register	MW	MW000000 - MW65534	DEC	

*1 Input Relay and Input Register cannot be written because of attribute of Read Only.

*2 The lowest place of Coil's address shows as Hexadecimal format.

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: IB100, MW9000, etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- In FP Ethernet connection, the address range is checked according to the CPU type.

It is not possible to access a device outside the address range for the CPU you are using.

24.3 Ethernet Module Settings

DeviceXPlorer supports 4 MEMOBUS command which are MEMOBUS ASCII / BIN and Extended MEMOBUS ASCII / BIN.

Because there is following relation to DeviceXPlorer Device Setting (Communication Format) between connection parameter settings of MP Ethernet module, please be careful.

Combination	DeviceXPlorer Device Setting (Communication Format)		Ethernet Module Connection Parameter Settings	
			Protocol Type	Code
1	MEMOBUS	ASCII	MEMOBUS	ASCII
2	MEMOBUS	BIN	MEMOBUS	RTU
3	Extended MEMOBUS	ASCII	Extended MEMOBUS	ASCII
4	Extended MEMOBUS	BIN	Extended MEMOBUS	BIN

24.4 DeviceXPlorer Settings

24.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Item		Description
CPU Type		Select access CPU type.
Communication Format*	ASCII / BIN	Select either ASCII format or Binary format as the communication format.
	Extended MEMOBUS Command	Check this option to use extended MEMOBUS command.
Word Swap		Check this option to swap the high and low words when accessing LONG, LONGLONG, FLOAT or DOUBLE data.
Unit ID		Specify the slave ID of the MP Ethernet module in accordance with the connection target. Normally “255” is specified. Set a number between 1 and 255.
Access Points	Bit R / W	Specify the maximum access points of batch read / write of Input Relay and Coil. Up to 2000 points can be set.
	Word R / W	Specify the maximum number of access points of batch read / write of Input Register and Holding Register. Up to 508 points can be set.
	Bit Poke	Only batch writing is supported.
	Word Poke	Specify the maximum number of access points of random write of Holding Register. Up to 254 points can be set.

* About the setting contents of the Communication Format and the relations of the Connection parameter setting of the Ethernet module, please refer to 24.3.

Note

Extended MEMOBUS command

Ethernet module of MP series corresponds to extended MEMOBUS command.

Extended MEMOBUS command has bigger points of its maximum accessing point of the batch read/write, comparing with normal MEMOBUS command. Additionally it also enables to write holding registers.

To activate the extended MEMOBUS command, select “Extended MEMOBUS” in the access setting of Ethernet module.

Device Type	Access type	The maximum access points			
		MEMOBUS		Extended MEMOBUS	
		RTU (BIN)	ASCII	RTU (BIN)	ASCII
Input Relay	Batch reading	2000 bits	976 bits	2000 bits	
Coil	Batch reading	2000 bits	976 bits	2000 bits	
	Batch writing	800 bits			
	Random writing	N / A			
Input Register	Batch reading	125words	61 words	508 words	
Holding Register	Batch reading	125 words	61 words	508 words	
	Batch writing	100words	59 words	507 words	
	Random writing	N / A		254 words	

24.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [MW00000]

General | Scale | Simulation | Alarm

Tag Name: Tag MW00000

☐ Auto Format

Description:

Device Type: MW Holding Register

Address No.: 0 Byte Position: Lower Byte

Data Type: SHORT Bit Position: 0

Length: 1 Attribute: ReadWrite

☐ Byte Swap Calculation: NONE

☐ Array

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 24.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

24.5 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

24.5.1 List of Devices

Show the list of convertible devices.

KEPServerEX		⇒	DeviceXPlorer	
Type	Symbol		Type	Symbol
Input bits	IB	⇒	Input Relay	IB
	%IX	⇒	Not Supported	
Output bits	MB	⇒	Coil	MB
	%QX	⇒	Not Supported	
Input Registers	IW	⇒	Input Register	IW
	IL			
	IF			
	%IW	⇒	Not Supported	
	%ID			
	%IL			
Output Registers	MW	⇒	Holding Register	MW
	ML			
	MF			
	MSH			
	MSL			
	%QW	⇒	Not Supported	
	%QD			
%QL				

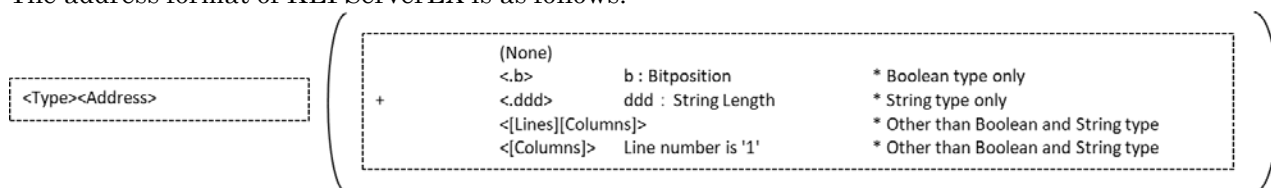
24.5.2 Device Range

Please refer “24.2 List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

24.5.3 Optional Specification

The address format of KEPServerEX is as follows.



Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
.x (x is a number)	Set x to the bit position if the data type is 'BOOL'.
.xxx (x is a number)	Set to the string length if the data type is 'STRING'
[x] (x is a number)	Enable the array. Set x to the size.

Important

Two dimensional array is not supported.

24.5.4 Conversion rule of IB and MB

When importing IB, MB tags, their Address information with bit position will be converted to DeviceXPlorer.

Device Type: IB

ex.1)	KEPServer's Address :	IB0FFF.F
	↓	
	DeviceXPlorer's Address :	IB00FFFF
ex. 2)	KEPServer's Address :	IBF123.F
	↓	
	DeviceXPlorer's Address :	IB0F123F
	* 0F123F is out of range(000000-00FFFF).	

Device Type: MB

ex.1)	KEPServer's Address :	MB04095.F
	↓	
	DeviceXPlorer's Address :	MB04095F
ex. 2)	KEPServer's Address :	MB04096.F
	↓	
	DeviceXPlorer's Address :	MB04096F
	* 0F123F is out of range(000000-00FFFF).	

25 [Yaskawa] MP Serial Connection

This chapter explains communication with MP series equipment using a Serial module.

An overview of communication via a MP Serial connection is shown below.

Overview	
Link	MEMOBUS
Data code	Binary, ASCII

25.1 PLC Systems

25.1.1 Applicable Modules

The CPU unit and Serial unit that can be used for MP Serial connection are shown below.

Series	Model	Applicable CPU unit	Applicable Ethernet module
MP3000 Series	MP3200	CPU-201 CPU-202	CPU Built-In Serial 217IF-01 218IF-01 218IF-02
MP2000 Series	MP2300	MP2300S MP2310	
		MP2300	
	MP2200	CPU-01	
		CPU-02	
	MP2100	MP2101T	
		MP2101TM	
MP900 Series	MP940	MP940	CPU Built-in Serial
	MP930	MP930	
	MP920	CPU-01 CPU-02	217IF

25.2 List of Devices

The MP devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

Device name	Device symbol	Address range	Format	Category
Input Relay*1	IB	IB000000 - IB00FFFF	HEX	Bit
Coil	MB	MB000000 - MB04095F*2	DEC	
Input Register*1	IW	IW000000 - IW0FFFE	HEX	Word
Holding Register	MW	MW000000 - MW65534	DEC	

*1 Input Relay and Input Register cannot be written because of attribute of Read Only.

*2 The lowest place of Coil's address shows as Hexadecimal format.

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: IB100, MW9000, etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- In FP Ethernet connection, the address range is checked according to the CPU type.

It is not possible to access a device outside the address range for the CPU you are using.

25.3 Serial Module Settings

DeviceXPlorer supports 2 MEMOBUS command which are MEMOBUS ASCII / RTU.

Because there is following relation to DeviceXPlorer Device Setting (Communication Format) between connection parameter settings of MP Serial module, please be careful.

Combination	DeviceXPlorer Device Setting (Communication Format)		Serial Module Connection Parameter Settings		
			Protocol Type	Code	Master/Slave
1	MEMOBUS	ASCII	MEMOBUS	ASCII	Slave
2	MEMOBUS	RTU	MEMOBUS	RTU	Slave

25.4 DeviceXPlorer Settings

25.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Item		Description
CPU Type		Select access CPU type.
Communication Format*	ASCII / RTU	Select either ASCII format or RTU format as the communication format.
Word Swap		Check this option to swap the high and low words when accessing LONG, LONGLONG, FLOAT or DOUBLE data.
Slave Address		Specify the Slave ID of the MP Serial module in accordance with the connection target. Set a number between 1 and 63.
Access Points	Bit R / W	Specify the maximum access points of batch read / write of Input Relay and Coil. Up to 2000 points can be set for RTU. Up to 976 points can be set for ASCII.
	Word R / W	Specify the maximum number of access points of batch read / write of Input Register and Holding Register. Up to 508 points can be set for RTU. Up to 61 points can be set for ASCII.

*About the setting contents of the Communication Format and the relations of the Connection parameter setting of the Ethernet module, please refer to 24.3.

25.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [MW00000]

General Scale Simulation Alarm

Tag Name Tag MW00000

☐ Auto Format

Description

Device Type MW Holding Register

Address No. 0

Data Type SHORT Byte Position Lower Byte

Length 1 Bit Position 0

☐ Byte Swap

☐ Array

Attribute ReadWrite

Calculation NONE

New Save << >> OK Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 24.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

25.5 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

25.5.1 List of Devices

Show the list of convertible devices.

KEPServerEX		⇒	DeviceXPlorer	
Type	Symbol		Type	Symbol
Input bits	IB	⇒	Input Relay	IB
Output bits	MB	⇒	Coil	MB
Input Registers	IW	⇒	Input Register	IW
	IL			
	IF			
Output Registers	MW	⇒	Holding Register	MW
	ML			
	MF			
	MSH			
	MSL			

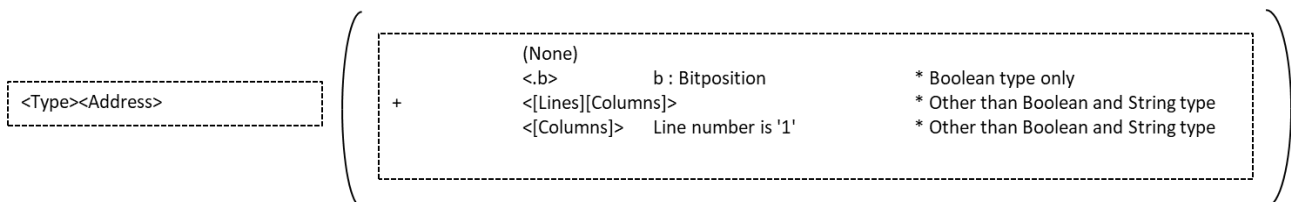
25.5.2 Device Range

Please refer “24.2 List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

25.5.3 Optional Specification

The address format of KEPServerEX is as follows.



Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
.x (x is a number)	Set x to the bit position if the data type is 'BOOL'.
[x] (x is a number)	Enable the array. Set x to the size.

Important

Two dimensional array is not supported.

For conversion rule of Input bits IB and Output bits MB, refer to 24.5.4 Conversion rule of IB and MB.

26 [Keyence] KV Ethernet Connection

This chapter explains communication with KV series equipment using an Ethernet unit.

An overview of communication via a KV Ethernet connection is shown below.

Overview	
Link	Ethernet upper-layer link
Data code	ASCII
Protocol	TCP / IP, UDP / IP

26.1 PLC Systems

26.1.1 Applicable Units

The CPU units and Ethernet units that can be used for KV Ethernet connection are shown below.

Category	Applicable CPU units	Applicable Ethernet units
KV-8000/7000/5000/3000 series	KV-8000 KV-7500 KV-7300 KV-5500 KV-5000 KV-3000	KV-XLE02 KV-LE21V KV-LE20V KE-EP21V Built-in Ethernet Port (KV-8000/7500/7300/5500/5000)
KV-1000 series	KV-1000	KV-LE20A
KV-700 series	KV-700	KV-LE20 KV-EP21V
KV Nano series	KV Nano (over CPU version 2)	KV-NC1EP

26.2 List of Devices

The KV devices that can be set in DeviceXPlorer are as shown below.

The devices, and device ranges that can be used vary with the CPU. For details, refer to your CPU instructions.

[List of Devices]

Device name	Device symbol	Device range						Cate- Gory	Format	
		KV-800 0	KV-750 0	KV-5000 KV-3000	KV-100 0	KV-700	KV Nano			
Relay* ¹	R	0-19991 5	0-99915		0-59915			Bit	Decimal	
Control relay* ¹	CR	0-7915		0-3915			0-8915		Decimal	
Timer contact* ²	TS	0-3999				0-511			Decimal	
Counter contact* ²	CS	0-3999				0-511	0-255		Decimal	
High-speed counter comparator contact* ^{2*3}	HS	N / A		0-3					Decimal	
Control memory	CM	0-5999			0-11998	0-3999	0-8999	Word	Decimal	
Data memory	DM	0-65534				0-19999 (up to 39999 by increasing memory)	0-32767		Decimal	
Temporary data memory	TM	0-511							Decimal	
Digital trimmer* ³	AT	0-7					N/A		Decimal	
Timer current value* ²	TN	0-3999				0-511			Decimal	
Counter current value* ²	CN	0-3999				0-511	0-255		Decimal	
High-speed counter current value* ²	HN	N / A		0-1			0-3		Decimal	
Timer setting* ²	TC	0-3999				0-511	0-255		Decimal	
Counter setting* ²	CC	0-3999				0-511	0-255		Decimal	

High-speed counter comparator setting*2	HC	N / A		0-3			0-7		Decimal
Internal auxiliary relay*1	MR	0-399915		0-99915	0-59915	N / A	0-59915	Bit	Decimal
Latch relay*1	LR	0-99915				N / A	0-19915		Decimal
Extended data memory	EM	0-65534				N / A		Word	Decimal
	FM	0-32767				N / A			Decimal
Index register	Z	1-12				N / A	1-12		Decimal
Link relay	B	0-7FFF		0-3FFF	N / A		0-1FFF	Bit	Hexadecimal
Work relay	VB	0-3FFF			N / A		0-1FFF		Hexadecimal
File register	ZF	0-524287	0-32767	N / A				Word	Decimal
Link register	W	0-7FFF		N / A			0-3FFF		Hexadecimal
Work register	VM	0-59999			N / A		0-9999		Decimal

*1 Specify the relay number as the channel number (3 digits) and the contact number (2 digits).

Channel number : 000-599

Contact number : 00-15

*2 It is not possible to access any timer, counter, or high-speed counter not used by the program.

*3 Read-only device. Cannot be written to.

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: R100, D9000, etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

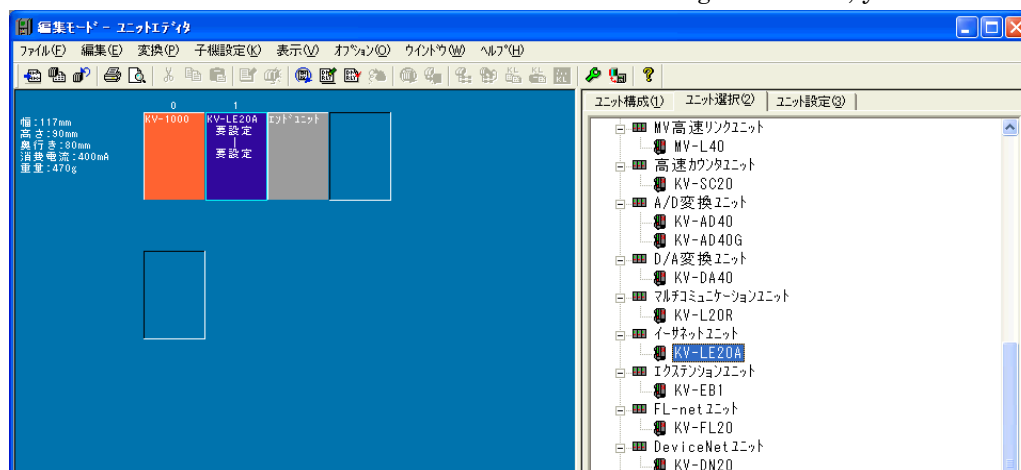
- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

26.3 Ethernet Unit Settings

This section explains how to make the Ethernet unit communication settings using the KV STUDIO unit editor.

- Using the KV STUDIO unit editor, go to the unit selection tab of the unit installation area and select and add “KV-LE20A” or “KV-LE20V”.

When Ethernet interface of the KV-5000 internal organs is used, you don't need to add Ethernet unit.



* This Image of KV STUDIO is Japanese version.

- Make the following unit settings for the “KV-LE20A”.

When Ethernet interface of the KV-5000 internal organs is used, make the following unit settings for the CPU unit,

Item	Setting	Default
Operating mode	Ethernet	Ethernet
Communication speed	Set the speed to match that of the network you are using.	100 / 10 Mbps automatic
IP address	Set the IP address of the PLC side.	192.168.0.10
Subnet mask	Set the subnet mask of the PLC side.	255.255.255.0
Default gateway	Set the default gateway of the PLC side.	Not used
Port number (KVB, DB)	No need to change.	8500
Port number (upper-layer link)	Set the port number of the PLC side.	8501
Reception timeout (sec)	Set the time after which to cut the connection.	10
Keep alive (sec)	When using TCP / IP, set the time interval for checking that the communication with the other device is still alive. Set “0” to disable.	600
Routing setting	Set “Yes” if the other device is in a different network that is accessed via a different router than the default gateway.	No
Destination IP address 1 - 6	If you set the routing setting to “yes”, set an appropriate destination IP address as necessary.	Not used
Destination subnet masks 1 - 6	If you set the routing setting to “yes”, set an appropriate destination subnet mask as necessary.	Not used
Router IP address 1 - 6	If you set the routing setting to “yes”, set an appropriate router IP address as necessary.	Not used

For details, see the KV STUDIO manual.

26.4 DeviceXPlorer Settings

26.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

The screenshot shows the 'Device properties' dialog box. At the top is a 'Connection Test' button. Below it is the 'Module configuration' section, which contains two dropdown menus: 'CPU TYPE' (set to 'KV-5500/5000/3000') and 'UNIT TYPE' (set to 'KV-LE20V/LE21V/EP21V'). Below this is the 'ACCESS POINTS' section, which contains four input fields: 'Bit R/W' (set to '1000'), 'Word R/W' (set to '1000'), 'Bit Poke' (empty), and 'Word Poke' (empty).

Item		Description
CPU TYPE		Select the CPU type of the PLC to be connected to.
UNIT TYPE		Select the Unit type of Ethernet unit to be connected to.
ACCESS POINTS	Bit R / W	Specify the maximum number of access points of batch read / write of bit scale. When using KV-LE20A or KV-LE20, the number of access point of batch write of bit scale is fixed at 1.
	Word R / W*	Specify the maximum number of access points of batch read / write of word scale. When using KV-LE20V, up to 1000 points can be set. When using KV-NC1P, up to 256 points can be set. When using KV-LE20A, up to 120 points can be set. When using KV-LE20, up to 8 points can be set.
	Bit Poke	Only batch writing is supported.
	Word Poke	Only batch writing is supported.

*When using KV-LE20A or KV-LE20, if you set Word R/W over 8 points, the number of access points of batch read / write of word scale is fixed at 8 for the timer current value TN, the counter current value CN, the high-speed counter current value HN, the timer setting value TC, the counter setting value CC, the high-speed counter comparator setting value HC, and the digital trimmer AT.

When using KV-LE20V, if you set Word R / W over 120 points, the number of access points of batch read / write of word scale is fixed at 120.

26.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

The screenshot shows the 'Property of Tag [DM0]' dialog box with the 'General' tab active. The 'Tag Name' field contains 'Tag'. The 'Auto Format' checkbox is unchecked. The 'Description' field is empty. The 'Device Type' is set to 'DM' and 'Data memory' is empty. 'Device No.' is '0', 'Byte Position' is 'Lower Byte', 'Data Type' is 'SHORT', 'Bit Position' is '0', 'Length' is '1', 'Attribute' is 'ReadWrite', and 'Calculation' is 'NONE'. The 'Byte Swap' and 'Array' checkboxes are unchecked. At the bottom, there are buttons for 'New', 'Save', navigation arrows, 'OK', and 'Cancel'.

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 16.2 for devices that can be specified.
Device No.	Specify the device number in decimal notation or hexadecimal notation.

Note

- When using KV-LE20V / A, command of word scale is used for reading and writing of relay. So if the relay R, control relay CR, internal auxiliary relay MR, and latch relay LR are specified in a data format other than BOOL, set a multiple of 100 as the leading device number.
- When using KV-LE20V, if link relay B, and work relay B are specified in a data format other than BOOL, set a multiple of 16 (= multiple of 0x10) as the leading device number.
- When using KV-LE20, command of bit scale is used for reading and writing of relay. So if the relay R, control relay CR, internal auxiliary relay MR, and latch relay LR are specified, only BOOL data type can be specified. Also the array format cannot be specified.
- Only BOOL data type can be specified for the timer contact TS, the counter contact CS, and the high-speed comparator contact HS. Also the array format cannot be specified.

26.5 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

26.5.1 List of Devices

Show the list of convertible devices.

KEPServerEX			DeviceXPlorer	
Type	Symbol		Type	Symbol
Input/Output Relay	R	⇒	Relay	R
Control Relay	CR	⇒	Control relay	CR
Latch Relay	LR	⇒	Latch relay	LR
Internal Auxiliary Relay	MR	⇒	Internal auxiliary relay	MR
Link Relay	B	⇒	Link relay	B
Work Relay	VB	⇒	Work relay	VB
Work Relay	CM	⇒	Control memory	CM
Data Memory	DM	⇒	Data memory	DM
Extended Data Memory	EM	⇒	Extended data memory	EM
Temporary Memory	TM	⇒	Temporary data memory	TM
Work Memory	VM	⇒	Work memory	VM
Timer	T	⇒	Timer contact	TS
Timer Current Value	TC	⇒	Timer current value	TN
Timer Setting Value	TS	⇒	Timer setting	TC
Counter	C	⇒	Counter contact	CS
Counter Current Value	CC	⇒	Counter current value	CN
Counter Setting Value	CS	⇒	Counter setting	CC
High-Speed Counter	CTH	⇒	High-speed counter current value	HN
High-Speed Counter Comparator	CTC	⇒	High-speed counter comparator setting	HC
File Register Current Bank	FM	⇒	Extended data memory	FM
File Register Consecutive Mode	ZF	⇒	File register	ZF
Link Register	W	⇒	Link register	W
Index Register	Z	⇒	Index register	Z
Digital Trimmer	AT	⇒	Digital trimmer	AT

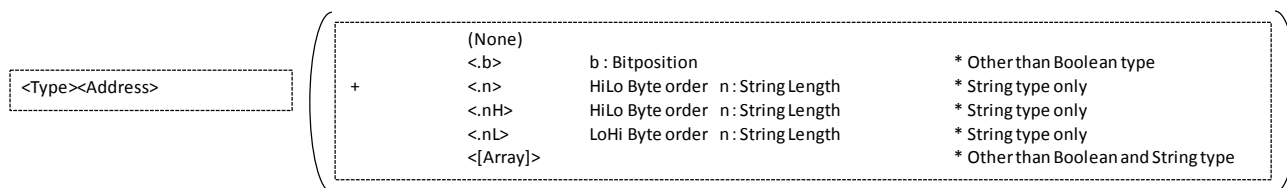
26.5.2 Device Range

Please refer “26.2 List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

26.5.3 Optional Specification

The address format of KEPServerEX is as follows.



Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
<code>.x</code> (x is a number)	Set x to the bit position if the data type is 'BOOL'.
<code>[x]</code> (x is a number)	Enable the array. Set x to the size.
<code>.nH</code>	Set 'STRING' to the data type. Enable the byte swap.
<code>.nL</code>	Set 'STRING' to the data type.

Important

Two dimensional array is not supported.

26.6 Errors

This section explains the PLC errors (response errors) included in the error messages.

Error code	Error	Description
E0	Device number error	- The specified device number exceeds the range. Specify a number in the prescribed range. - Monitor reading was performed without registering the monitor first. Register the monitor before reading it. - It is not possible to specify any timer, counter, or high-speed counter not used by the program. Check the program and specify a device used by the program.
E1	Command error	- A command was sent that is not supported by the CPU. Check the command and send a correct command. - The method for specifying the command is wrong. - A command other than CR was sent before communication was established. Send CR to establish the communication and then resend the command.
E3	Program not registered	- The “M1 (switch to RUN mode)” command was sent without the program being registered to the CPU. Register the program to the CPU and then resend the command. - The “M1 (switch to RUN mode)” command was sent with the RUN / PROG switch on the CPU unit set to PROG. Set the RUN / PROG switch on the CPU to RUN.
E4	Writing prohibited	An attempt was made to change the timer, counter, or high-speed counter setting to a write-prohibited program. Release the write prohibition and resend the command.
E5	Main unit error	The “M1 (switch to RUN mode)” command was sent without the error being reset on the CPU. Reset the error on the CPU unit, remove the cause of the error and resend the command.
E6	No comment	No comment is registered for the device selected by the comment reading “RDC” command. If necessary, register a comment to the device.

27 [Toshiba] PLC Ethernet Connection

This chapter explains communication with nv / V / PROSEC T Series equipment using an Ethernet unit. An overview of TOSHIBA Ethernet connection is shown below.

Overview	
Communication protocol	Dedicated protocol
Internet protocol	UDP/IP

27.1 PLC Systems

27.1.1 Applicable Units

The CPU units and Ethernet units that can be connected to TOSHIBA Ethernet equipment are shown below.

Category		Applicable CPU units	Applicable Ethernet units
nv Series	type1	PU811	EN811 EN821
	type1 light	PUM11 PUM12 PUM14	EN651A
VSeries	S3	S3PU65A S3PU55A S3PU45A	EN711, EN721, EN731 EN741, EN751, EN761 EN751A
	S2	S2PU82 S2PU72A S2PU72D	EN611, EN621, EN631 EN641, EN651, EN661 EN651A
	S2T / S2E	PU672T PU662T	EN611, EN631, EN651A
PROSEC Series	T3H	PU325H PU326H	EN311
	T2N	PU235N PU245N	CPU Ethernet Port

27.2 List of Devices

The TOSHIBA devices that can be set are as shown below.

The range of devices varies with the CPU and parameter settings. For details, refer to your CPU instructions.

[List of Devices]

Device name	Device symbol	Device range				Category
		nvSeries	V Series		PROSEC T	
			S3 / S2	S2T		
I/O Variable input	IX	0~16383F*1	0~8191F*1			Bit
I/O Variable output	QX	0~16383F*1	0~8191F*1			
Data Register	D	0~8191F*1	0~4095F*1			
System Register	S	0~1023F*1	0~511F*1			
User Global	FB	0~262143F*1	0~131071F*1			
Input Device	X			0~511F*1	0~511F*1	
Output Device	Y			0~511F*1	0~511F*1	
Link Register Relay	Z			0~999F*1	0~999F*1	
Link Relay	L			0~255F*1	0~255F*1	
Auxiliary Relay	R			0~999F*1	0~999F*1	
Special Relay	S			0~255F*1	0~255F*1	
Timer Relay	TB			0~999	0~999	
Counter Relay	CB			0~511	0~511	
I/O Variable input	IW	0~16383	0~8191			word
I/O Variable output	QW	0~16383	0~8191			
Data Register	DW	0~8191	0~4095			
System Register	SW	0~1023	0~511			
User Global	F	0~262143	0~131071	0~32767	0~32767	
Input Register	XW			0~511	0~511	
Output Register	YW			0~511	0~511	
Link Register	W			0~2047	0~2047	
Link Relay Register	LW			0~255	0~255	
Auxiliary Register	RW			0~999	0~999	
Special Register	SW			0~255	0~255	
Timer Register	T			0~999	0~999	
Conter Register	C			0~511	0~511	
Data Register	D			0~8191	0~8191	

*1 The lowest place address shows as Hexadecimal format.

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

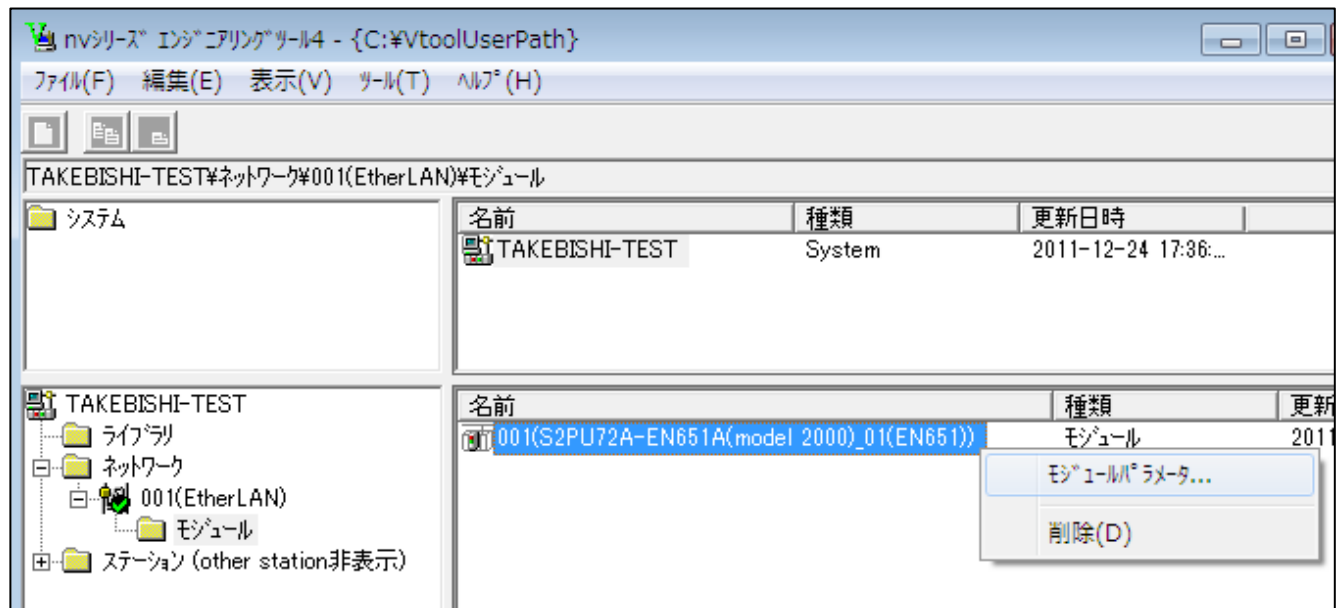
Example: DW100, X10F, F1000, etc.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

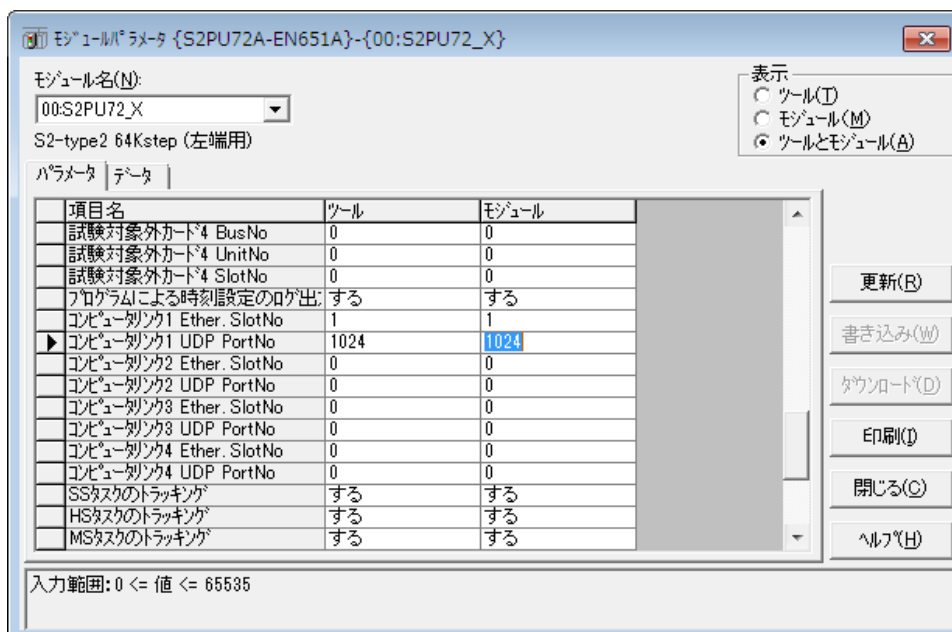
27.3 Ethernet port setting

Setting the Ethernet Port nv series and V series is done in software (using four engineering tools).

- (1) Set the communication parameters in the module parameters of the network.



- (2) Setting port number.



- (3) Setting IP address and port number. For example ip address [192.168.1.1], subnetmask [255.255.255.0].

モジュールパラメータ {S2PU72A-EN651A}-[01:EN651]

モジュール名(N): 01:EN651
Fast Ethernet LANカード シングル

伝送相手
☒ プライマリ(P)
☐ セカンダリ(S)

表示
☐ ツール(T)
☐ モジュール(M)
☒ ツールとモジュール(A)

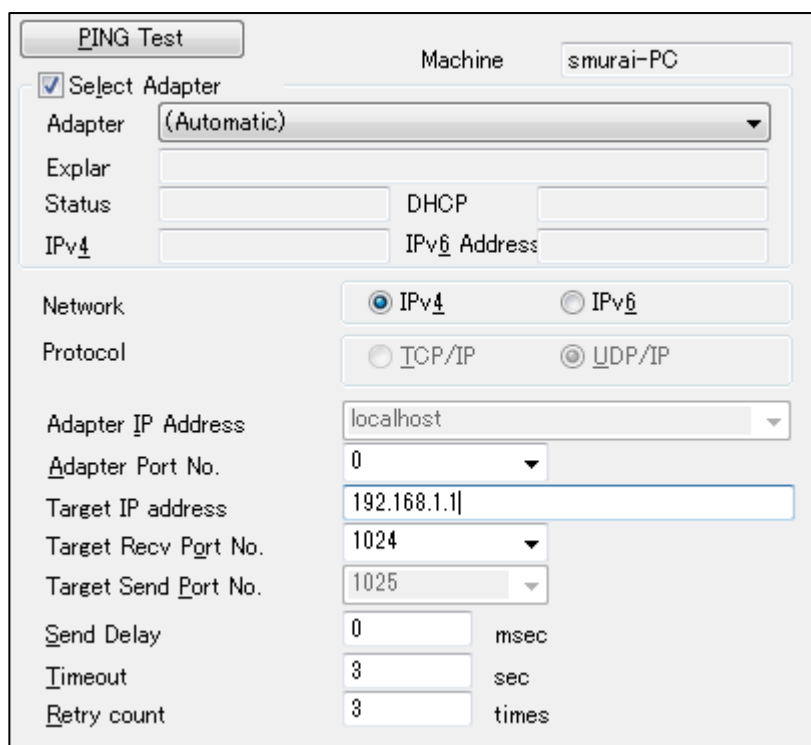
項目名	ツール	モジュール
IPアドレスタイプ	任意	任意
▶ IPアドレスプライマリ	192.168.1.1	192.168.1.1
サブネットマスクプライマリ	255.255.255.0	255.255.255.0
IPアドレスセカンダリ	0.0.0.0	---
サブネットマスクセカンダリ	0.0.0.0	---
マルチキャスト登録数	0	0
マルチキャストIPアドレス1	0.0.0.0	
マルチキャストIPアドレス2	0.0.0.0	
マルチキャストIPアドレス3	0.0.0.0	
マルチキャストIPアドレス4	0.0.0.0	
マルチキャストIPアドレス5	0.0.0.0	
マルチキャストIPアドレス6	0.0.0.0	
マルチキャストIPアドレス7	0.0.0.0	
マルチキャストIPアドレス8	0.0.0.0	
マルチキャストIPアドレス9	0.0.0.0	

更新(R)
書き込み(W)
ダウンロード(D)
印刷(I)
閉じる(C)
ヘルプ(H)

入力範囲: 0 <= 文字長 <= 20

27.4 DeviceXPlorer Settings

27.4.1 Ethernet (Dual port) Port Settings



PING Test Machine: smurai-PC

☒ Select Adapter

Adapter: (Automatic)

Explar:

Status: DHCP

IPv4: IPv6 Address:

Network: ☒ IPv4 ☐ IPv6

Protocol: ☐ TCP/IP ☒ UDP/IP

Adapter IP Address: localhost

Adapter Port No.: 0

Target IP address: 192.168.1.1

Target Recv Port No.: 1024

Target Send Port No.: 1025

Send Delay: 0 msec

Timeout: 3 sec

Retry count: 3 times

Item	Description
Target Recv Port No.	Set the port to send packets of connected equipment.
Target Send Port No.	When a packet is received from the connected device. Set the port number for the device. TOSHIBA Ethernet connection, Target Recv Port No. +1 will be set automatically.

27.4.2 Device Settings

This section explains how to make the settings for the device of the TOSHIBA PLC to be accessed.

Connection Test

CPU TYPE

☒ type I [nv]
 ☐ S3/S2 [V]
 ☐ S2I [V]
 ☐ T3H/T2N [PROSEC T]

☐ Use block read

ACCESS POINTS

Batch R/W

248

Point

Block R/W

32

Point

Item		Description
CPU TYPE		Select access CPU type.
	Use block read	Use block access commands for read. When you access a device that is not continuous, it is effective.
ACCESS POINTS	Batch R/W	Specify the maximum access points of batch read / word of bit / word scale. Up to 248 points can be set.
	Block R/W	Specify the maximum access points of block read / word of bit / word scale. Up to 32 points can be set.

27.4.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the device to be accessed. Refer to the list in section 27.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

27.4.4 Block read

To ensure the efficiency of communication processing, the normal access method batch-reads as many word devices as the specified maximum points. This method is effective for reading large volumes of continuous data, but it is not suited for accessing devices that are not continuous.

For example, if 248 is set as the number of Word R / W points and data is to be read from D0, D100, D1000, and W0, the read command is sent to three times, for D0 - D100, for D1000, and for W0. The use of block access makes it possible to process fewer read commands, even if the device access range is dispersed. Reading from D0, D100, D1000 and W0 can be processed with a single read command. Make block access settings to suit your system.

27.5 Errors

This section explains the details of the PLC errors (response errors) included in the error messages.

Code	Description
0x0B / 0x10 / 0x30 / 0x34 / 0x73	A device outside the set range was accessed.

28 [Rockwell] AB Ethernet Connection

This chapter explains communication with AB Logix series equipment.

An overview of communication via AB Logix Ethernet connection is shown below.

Overview	
Link	EtherNet/IP (CIP)
Data code	Binary
Protocol	TCP / IP

28.1 PLC Systems

28.1.1 Applicable Units

The CPU unit and Ethernet unit that can be used for AB Ethernet connection are shown below.

Series	Applicable CPU unit	Applicable Ethernet unit
GuardLogix	5570	1756-ENBT 1756-EN2T
ControlLogix	5550 / 5553 / 5555 / 5561 / 5562 / 5563 / 5572 / 5573 / 5574 / 5575 / 5580	
CompactLogix	5320 / 5323 / 5330 / 5331 / 5332 / 5335 / 5345 / 5370 / 5380 / 5400	CPU built-in Ethernet Port 1769-L32E / 1769-L33ER 1769-L35E / 1768-ENBT
FlexLogix	5433 / 5434	1788-ENBT
DriveLogix	5720 / 5730	

28.2 List of Devices

It is possible to access to all of global (Controller tags) and program tags in Logix series from DeviceXPlorer. Refer to section 28.4.4 the procedure to access tags defined in Logix.

Data types comparison between Logix and DeviceXPlorer is as follows.

Logix data type	DeviceXPlorer data type
BOOL	BOOL
SINT	BYTE
	UBYTE
INT	SHORT
	USHORT
DINT	LONG
	ULONG
LINT	LONGLONG
	ULONGLONG
Float	REAL
	DOUBLE
DATE	
STRING	STRING

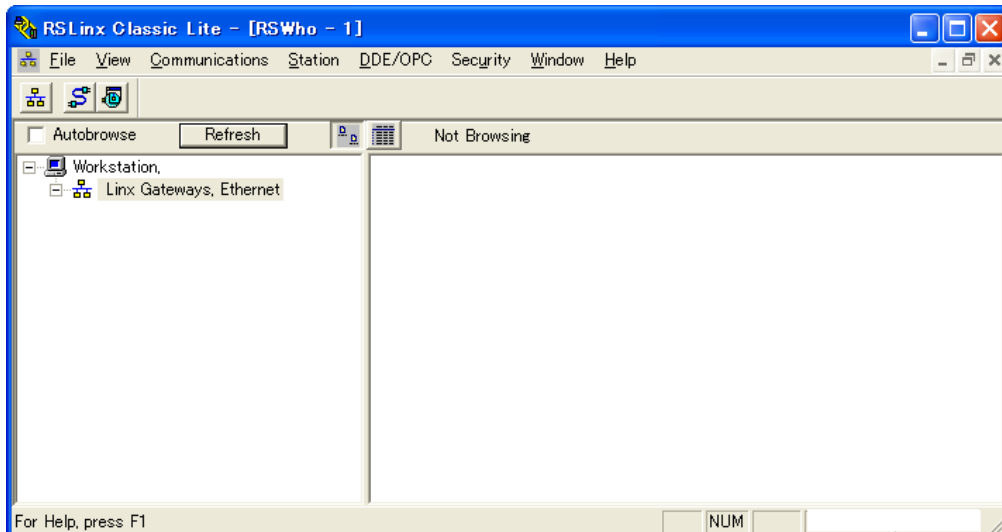
Important

Tag defined with data type other than STRING (BOOL, SINT, etc.) in Logix cannot be accessed as STRING type in DeviceXPlorer.

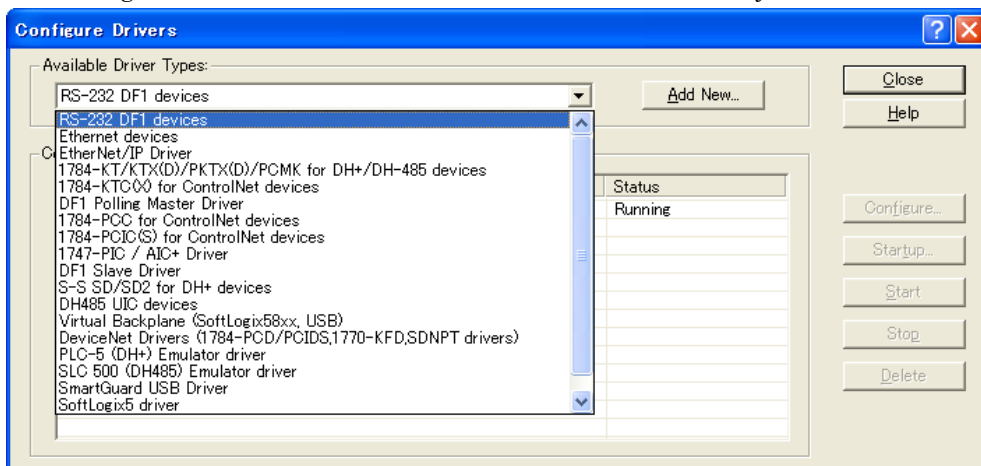
28.3 Logix Ethernet Settings

This section explains how to make the AB ControlLogix Ethernet module communication settings using the RSLogix5000 and RSLinx.

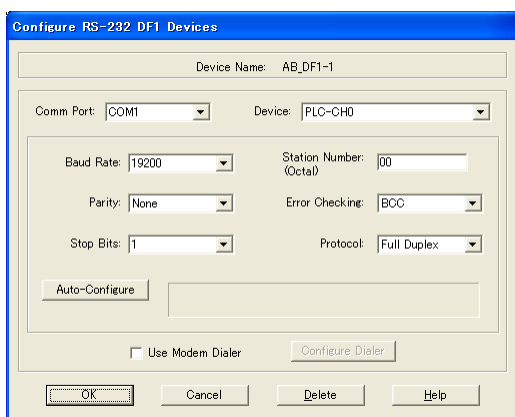
1. Connect with ControlLogix by Allen-Bradley 1765CP3 cable and start RSLinx.



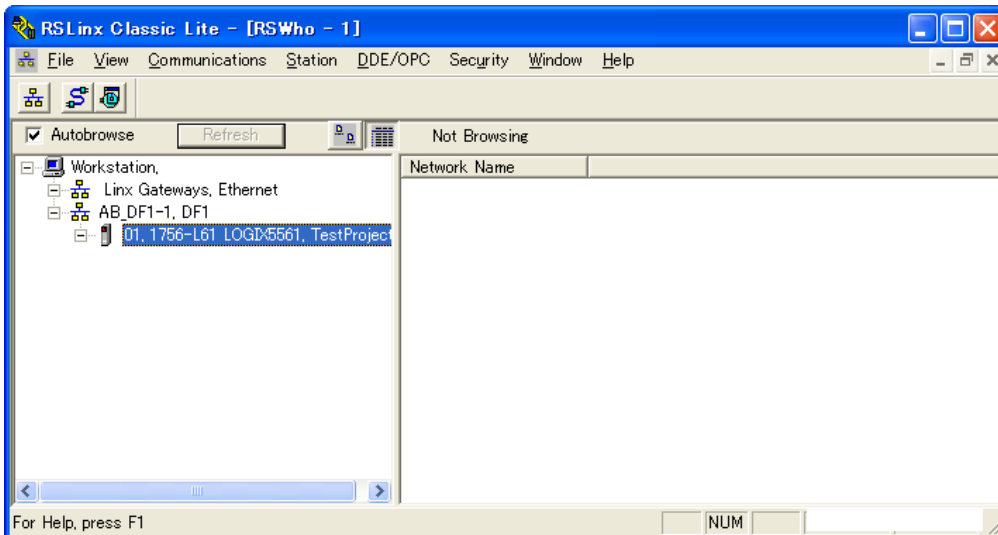
2. Configure RSLinx. Please select "RS-232 DF1 devices" if you use Allen-Bradley 1765CP3 cable.



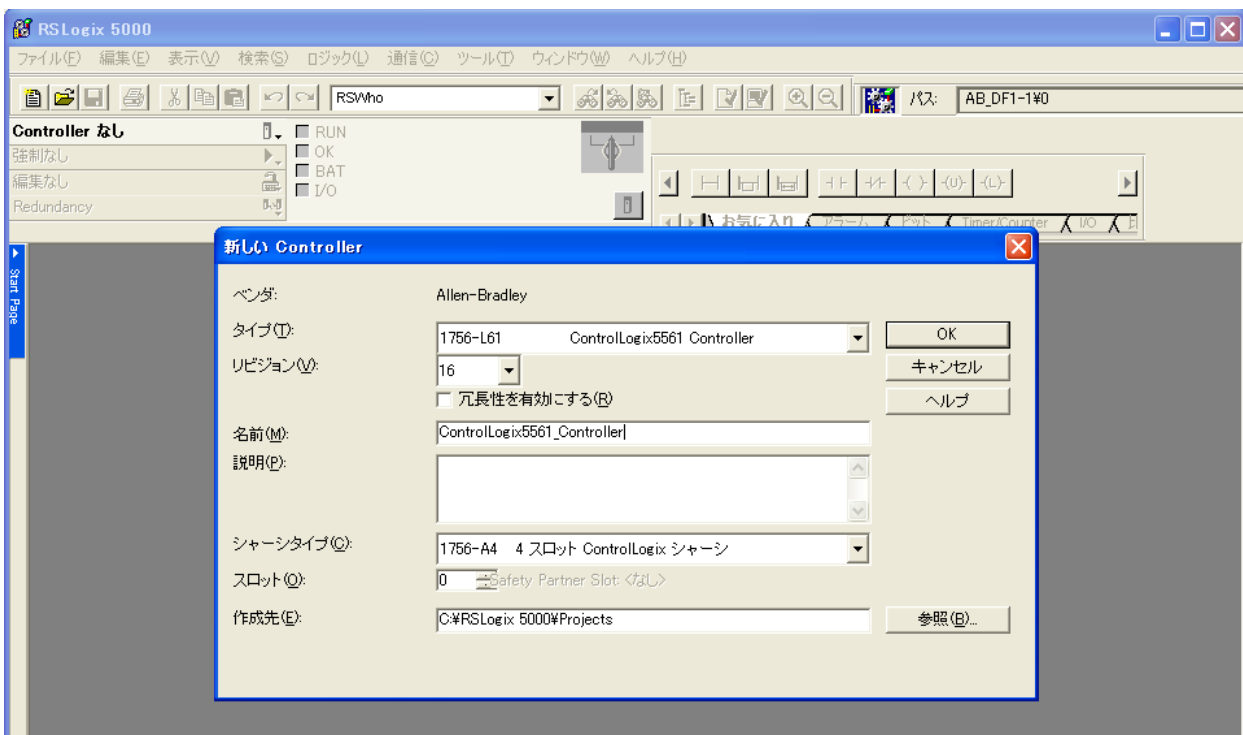
3. Configure communication settings.



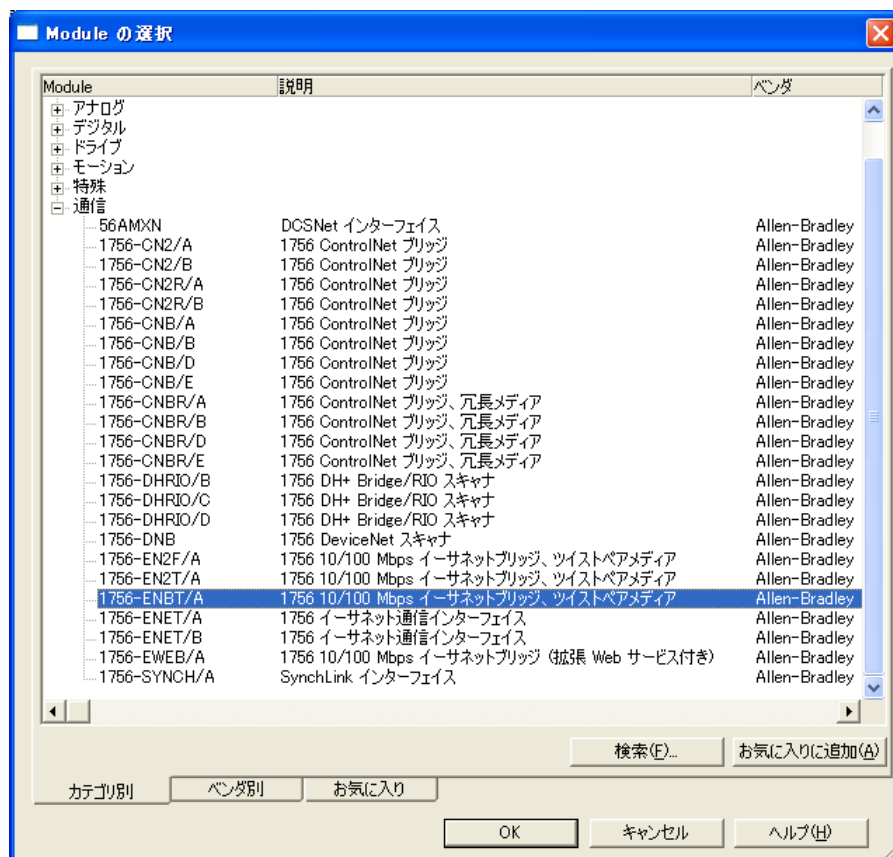
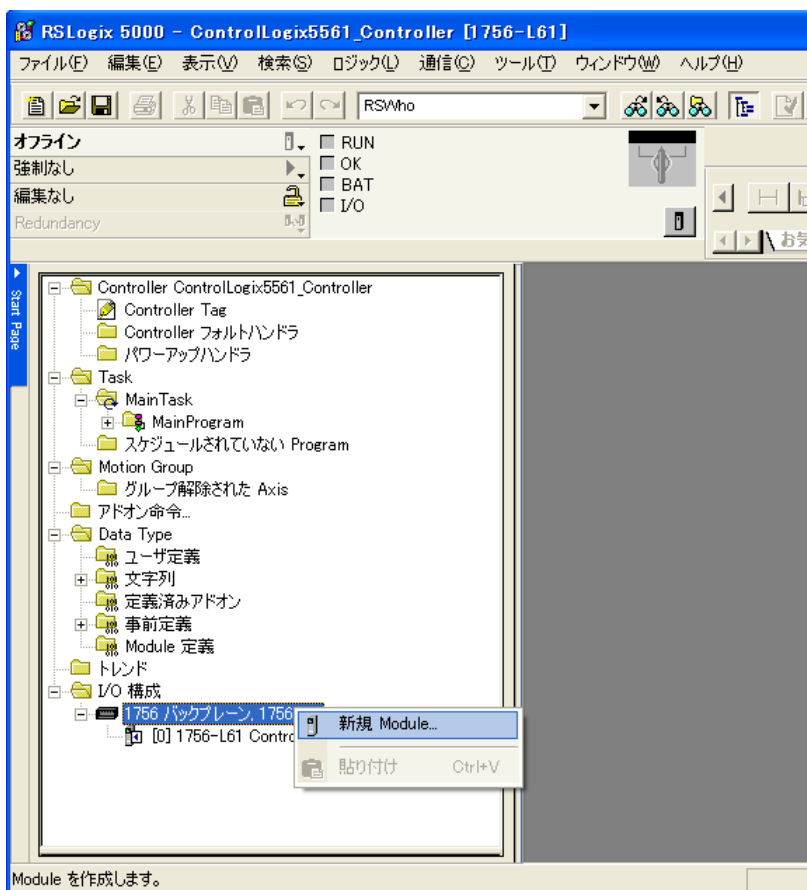
4. If the setting is correct, you can access ControlLogix.



5. Create ControlLogix project for your system.



6. Set Ethernet Module in I / O Configuration.



7. Set IP Address.

新規 Module

タイプ: 1756-ENBT/A 1756 10/100 Mbps イーサネットブリッジ、ツイストペアメデア
 変更: タイプの変更(C)... ←

ベンダ: Allen-Bradley
 親: Local

名前(M): EthernetUnit

説明(P):

アドレス/ホスト名
☒ IP アドレス(A): 192 168 0 1
☐ ホスト名(H):

スロット(S): 1

リビジョン(R): 4 1

電子キーイング(K): 互換キーイング

☒ Module のプロパティを開く(L)

OK キャンセル ヘルプ

8. Download the setting of project and finished.

アクティブなアイテム

☒ Autobrowse Refresh

Workstation, KISHIMOTO
 + Linx Gateways, Ethernet
 + AB_DF1-1, DF1

オンラインに切り替え(S)
 アップロード(U)...
 ダウンロード(D)...
 ファームウェアの更新(F)...
 閉じる(C)
 ヘルプ

パス: AB_DF1-1
 プロジェクトのパス: <なし>

プロジェクトパスの設定(S)
 プロジェクトパスのクリア(L)

28.4 DeviceXPlorer Settings

28.4.1 Port Settings

This section explains how to make the settings for the Port of EtherNet/IP to be accessed.

Item		Description
Ethernet Setting	PING Test	Tests the Ping command communication to Configured PLC IP address. Under Windows UAC system, you might fail to check PING Test. Test. In that case, please use Command Prompt of Windows to check ping connection.
	Machine	Shows the computer name.
	Adapter name	Shows the adapters list on the computer.
	Explanation	Shows Ethernet adapter name.
	Status	Shows “Connect” when a LAN cable is connected.
	DHCP	Shows “Enable” while DHCP is in use.
	IPv4 Address	Shows the IPv4 address of the selected adapter.
	IPv6 Address	Shows the IPv6 address of the selected adapter.
	Network	Select IPv4 or IPv6.
	Protocol	Select “TCP/IP”
	Adapter IP address	Shows the IP address of the selected adapter. When you does not fix adapter, you can specify the IP address of the adapter or machine name that will communicate with the PLC. When you specify ‘localhost’ or ‘0.0.0.0’, DeviceXPlorer chose available adapter automatically.
	Adapter Port No.	Specify the port number of the selected adapter. If you specify port number “0”, the OS will automatically assign an available port. The port number can be specified 0 or any numbers between 1024 and 65535.
	PLC Address	Specify a PLC IP address or a PLC machine name.
	PLC Port No.	Specify “44818”which is TCP/IP port number of EtherNet/IP.

	Send Delay	Specify the waiting time before sending the next command after a response is received from the other equipment on the millisecond time scale. Set a number between 0 and 65535.
	Timeout	Specify the waiting time between sending a request message and receiving a response message. If a response cannot be returned within the specified time, it results in a timeout error. Set a number between 0 and 60.
	Retry count	Specify the number of times to retry when a timeout error occurs. Set a number between 0 and 10.
CIP Setting	CIP port number	Specify a CIP port number of PLC. The numbers from 1 to 15 can be specified, generally "1"-Back plain port.
	CIP linking address	Specify a CIP linking address of PLC. The numbers from 0 to 255 can be specified, generally "0".

28.4.2 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Item	Description
CPU type	Select the target CPU Type.
Basic data type	Select “Basic data type” in the dynamic tag. This data type is used when the dynamic tag is not the extended tag name. Basic data type doesn’t support 64bits integral numbers, actual numbers, character string types, and array types.
Unit Type	Select the target unit type.
Parameter	
Connection Timeout Multiplier	Select the value of Connection Timeout Multiplier.
Requested Packet Interval	Specify the RPI (Requested Packet Interval) value.
Automatic tag generation	Enable this if you want to automatically generate tags all at once.
Data Source	Only “Device” can be selected.
Device Path	Specify the path to be automatically generated when the data source is Device.
Update	Get the device path list from the Logix.
Remove existing tags	When enabled, all existing tags under this device will be deleted.

Important

- Connection Test checks communication status by using ControlLogix tag named “Tag”.
So if ControlLogix tag named “Tag” doesn’t exist, the following error will occur.
Received NAK (Code = 1Eh)
Result:

Connect Error /quality=Comm Failure[0x18]
- Sometimes, Connection Test may show message “Receive error (Code = 10054)”. Please don’t mind about this message.

28.4.3 Group Setting

This section explains how to make group settings.

Group properties

Group Name:

☐ Use Group Name as Structure Name

Item	Description
Use Group Name as Structure Name	A group name is used as a structure name of ControlLogix tag address when having this checkbox on. If a group is “STRUCT1” and the tag address “BOOL1” is defined in the group, it will be accessing tag address “STRUCT1.BOOL1” of ControlLogix. To define an abbreviated structure name in a tag address, set this configuration effective.

28.4.4 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [Tag:W]

General Scale Simulation Alarm Publisher

Tag Name Tag
Tag:W
☐ Auto Format

Tag Address Tag Browse

Description

Data Type SHORT Attribute ReadWrite

Length 1 Calculation NONE

☐ Byte Swap

☐ Array

1-dim array upper bound 0

2-dim array upper bound 0

3-dim array upper bound 0

New Save << >> OK Cancel

Item	Description
Tag Address	Specify the address to access the PLC tag. Refer to section 28.4.4.1 the description about tag address.
Browse	Browse tags defined in Logix series. Refer to section 28.4.4.3 browse function.
Length	Specify the number of elements of array tag.
Calculatin	Possible to apply "BCD Format" calculation.
Byte Swap	Check this option to swap the high and low words when accessing LONG, LONGLONG, FLOAT or DOUBLE data.
Array	Check this option to use this tag as array.
1-dim array upper bound	Specify upper limitation of 1-dim array.
2-dim array upper bound	Specify upper limitation of 2-dim array.
3-dim array upper bound	Specify upper limitation of 3-dim array.

28.4.4.1 About Tag Address

All of the data addresses which PLC has are identified by tag addresses not by names or numbers of devices. Tags are defined at Logix and are specified with the data attribute such as types or sizes. DeviceXPlorer enables to access the elements of the structures in PLC.

<tag name>	It accesses the specified tag
<tag name>.x	It accesses the bit position x of the numeric specified tag.
<tag name>[y]	It accesses the element y of the specified array tag. * 1-dim [y1] 2-dim [y2,y1] 3-dim [y3,y2,y1]
<struct name>.<tag name>	It accesses the element tag of the specified structure.

- DeviceXPlorer directly accesses the fifth element of specified array tag when the tag address is specified as "DATA[5]". And it accesses "DATA[0]" on Logix when the tag address is specified as "DATA".
- For array tag more than 2-dim, if the quantity of dim-element fails, DeviceXPlorer cannot access the tag.

Example: For array tag INT[4,4,4], if specify tag address as follows,
 INT[1,2] or INT[1]

- Boolean array tags in Logix are array in 32 bit units.
- For STRING tag in Logix, the data type in DeviceXPlorer must be selected STRING.
- For any data type except STRING (Example: BOOL or SINT or other) tag in Logix, STRING is not usable in tag setting.
- When accessing with a data type other than the basic data type specified in the device settings using dynamic tags, specify the extended tag name.

If accessing tag address "FLOAT100" in Logix with REAL type, use dynamic tag name as "[Device Name].FLOAT100:R".

28.4.4.2 About Specified Element Access in Array Tag

If access to an element in array tag defined at Logix, the target element is expressed as [x,y,z] format in tag address. Depend on dimension numbers of array tag, need to specify array upper bound of each dimension rightly.

Example: <Logix setting>

- Tag name: INT_DIM3 * 3-dim array tag, INT
- Max element of each dim: 1-dim:4, 2-dim:5, 3-dim:6

<DeviceXPlorer setting>

Property of INT_DIM3[0,0,0]:W [INT_DIM3[0,0,0]:W]

General Scale Simulation Alarm Publisher

Tag Name: INT_DIM3[1,2,3]:W
INT_DIM3[1,2,3]:W

☒ Auto Format

Tag Address: INT_DIM3[1,2,3] [Browse]

Description:

Data Type: SHORT Attribute: ReadWrite

Length: 1 Calculation: NONE

☐ Byte Swap

☐ Array

1-dim array upper bound: 4

2-dim array upper bound: 6

3-dim array upper bound: 8

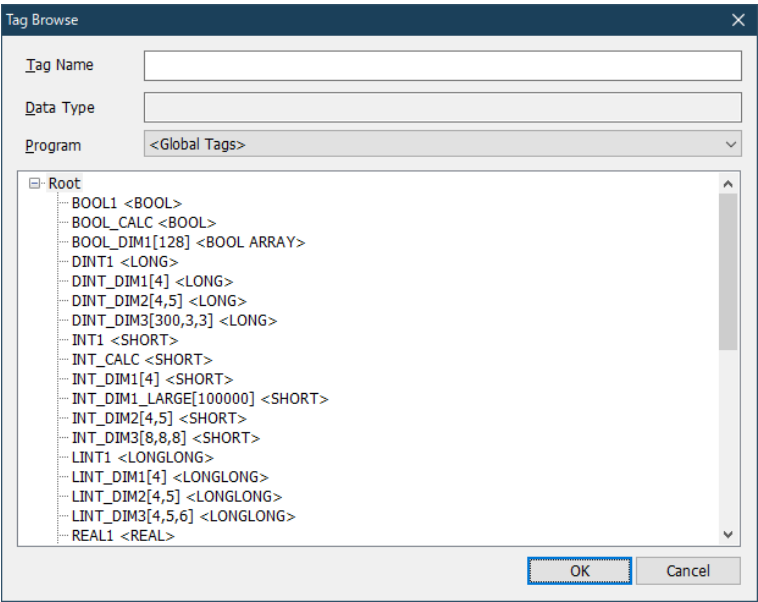
[New] [Save] [←] [→] [OK] [Cancel]

- Tag address: INT_DIM3[x,y,z]
* Input target element to x/y/z by number.
- 1-dim array upper bound: 4
- 2-dim array upper bound: 5
- 3-dim array upper bound: 6

Important

- It is possible to access on the block to following elements of array tag by enabling 'Array' setting.
- If access 1-dim array tag, 3 and 2-dim array upper bound must be '0'.
- If access 2-dim array tag, 3-dim array upper bound must be '0'.

28.4.4.3 Browse Function



Item	Description
Tag Name	Show the name of selected tag at Tag tree.
Date Type	Show the data type of selected tag at Tag tree.
Program	Switch the display of Global tags and Program tags in the Tag tree.
Tag Tree	Show the list of tags in the selected program node.
OK	Close Tag Browse dialog and register the information of selected tag to Tag Property dialog.

Note

- If select array tag at Tag browse dialog and make the configuration to access an element of array tag, modify the element number ([]) in tag name after selecting target array tag.
Example: If access second element of array tag INT_DIM1,
 1. Select INT_DIM1[4]<LONG> from Tag tree.
 2. Modify element number [0] to [2] of tag name

28.5 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

28.5.1 List of Devices

It is possible to access to all of global (Controller tags) and program tags in Logix from DeviceXPlorer.

28.5.2 Optional Specification

Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
.x	Set 'BOOL' to the data type. "[x]" is included as is in the tag address after conversion.
/x	Set 'STRING' to the data type. Set x to the size.
[x]	"[x]" is included as is in the tag address after conversion.
{x}	Enable the array. Set x to the size.

Important

- If the data type of the import source is Default, convert "Base Data Type" to the data type.
- If the data type of the import source is Date, the tag cannot be imported.
- If the data type of the import source is Boolean and Tag address includes [x], accessing for the imported tag may fail.

KEPServerEX: Specify the element of bit array by [x].

DeviceXPlorer: Specify the element of bit array by [x] and .x.

28.6 Errors

This section explains the PLC errors (response errors) included in the error messages.

Error code (HEX)	Status	Description
1E	Embedded Service Error	Specified tag name may not exist. Please check tag name.
FE	Access point Error	Access point of sending message is different from Access point of receiving message.
FF	Sequence Number Error	Sequence Number of sending message is different from Serial Number of receiving message.

29 [Siemens] SIMATIC Ethernet Connection

This chapter explains communication with SIEMENS SIMATIC S7-300 / S7-400 / S7-1200 / S7-1500 series equipment using Ethernet unit. An overview of communication via SIEMENS S7 Ethernet connection is shown below.

Overview	
Protocol	S7 Communication (TCP / IP)
Data code	Binary

29.1 PLC Systems

29.1.1 Applicable Units

The CPU units and Ethernet units that can be used for S7 Ethernet connection are shown below.

Series	Type	Applicable CPU units	Applicable Ethernet units
SIMATIC S7 Series	S7-1500	CPU 1511-1 PN CPU 1515-2 PN CPU 1518(F)-4 PN/DP	CPU 1513-1 PN CPU 1516(F)-3 PN/DP
	S7-1200	CPU 1211C CPU 1214C CPU 1217C	CPU 1212C CPU 1215C
	S7-400	CPU 410 CPU 412-1 CPU 412-5H CPU 414-2 CPU 414-4H CPU 416-2 CPU 416-5H CPU 417-4	CPU 410E CPU 412-2 CPU 412-2PN CPU 414-3 CPU 414-5H CPU 414F-3PN/DP CPU 416-3 CPU 416F-2 CPU 417-5H
	S7-300	CPU 312 CPU 313C CPU 313C-2 DP CPU 314C-2 PtP CPU 315-2 DP CPU 315T-2 DP CPU 315F-2 PN/DP CPU 317-2 PN/DP CPU 317F-2 DP CPU 319-3 PN/DP SIPLUS CPU 312C SIPLUS CPU 313C-2 DP SIPLUS CPU 314C-2 DP SIPLUS CPU 315-2 DP SIPLUS CPU 315-2 PN/DP SIPLUS CPU 317-2 PN/DP	CPU 312C CPU 313C-2 PtP CPU 314 CPU 314C-2 DP CPU 315-2 PN/DP CPU 315F-2 DP CPU 317-2 DP CPU 317T-2 DP CPU 317F-2 PN/DP CPU319F-3 PN/DP SIPLUS CPU 313C SIPLUS CPU 314 SIPLUS CPU 315-2 SIPLUS CPU 315F-2 SIPLUS CPU 317F-2
	S7-200	CPU 222	
	Software PLC	WinAC RTX(WinLC RTX)	
			CP443-1 CPU built-in Ethernet Port
			CP343-1 CPU built-in Ethernet Port
			CP243-1
			built-in Ethernet Adapter

29.2 List of Devices

The SIEMENS S7 devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

[List of Devices]

Device name	Device symbol	Address range			Base Data Type *5	
		S7-1500 S7-1200	S7-400 S7-300	S7-200		
Memory (Flag Memory)	M	0 - 65535	0 - 65535	0 - 65535	UBYTE	
Input	I			N/A		
Output	Q					
Peripheral Input *1	PI					
Peripheral Output	PQ					
Data Block*2	DB					
Counter *3	C	N/A	N/A	0 - 65535	USHORT	
Timer *3	T				UHSORT / LONG *6	
Sequence Control Relay	S				UBYTE	
Special Memory	SM					
Variable	V					
Analog Input *1	AI				USHORT	
Analog Output *4	AQ					
High-speed Counter *1	HC				LONG	

*1 ReadOnly Device.

*2 Data Block is expressed with Data Block Number. Please refer to 29.4.3 for the details.

Example: DB1:0, DB2:100, DB3:990

*3 ReadOnly Device for S7-200.

*4 WriteOnly Device.

*5 Base Data Type is used for access when the tag doesn't have extended specification.

*6 Base Data Type of Timer is USHORT for S7-1500 / S7-1200 / S7-400 / S7-300, and is LONG for S7-200.

Important

Counter "C" and Timer "T" have value range with BCD value.

Please specify the BCD calculation (extended tag name "::B") to access Counter "C" and Timer "T" with BCD value.

Also, Timer "T" supports SIMATIC TIMER type. Please specify the S5T type (extended tag name "::S5T") to access Timer "T" with SIMATIC TIMER type.

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: M100, DB1:123, T100 etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

29.3 Ethernet Unit (CPU unit) Settings

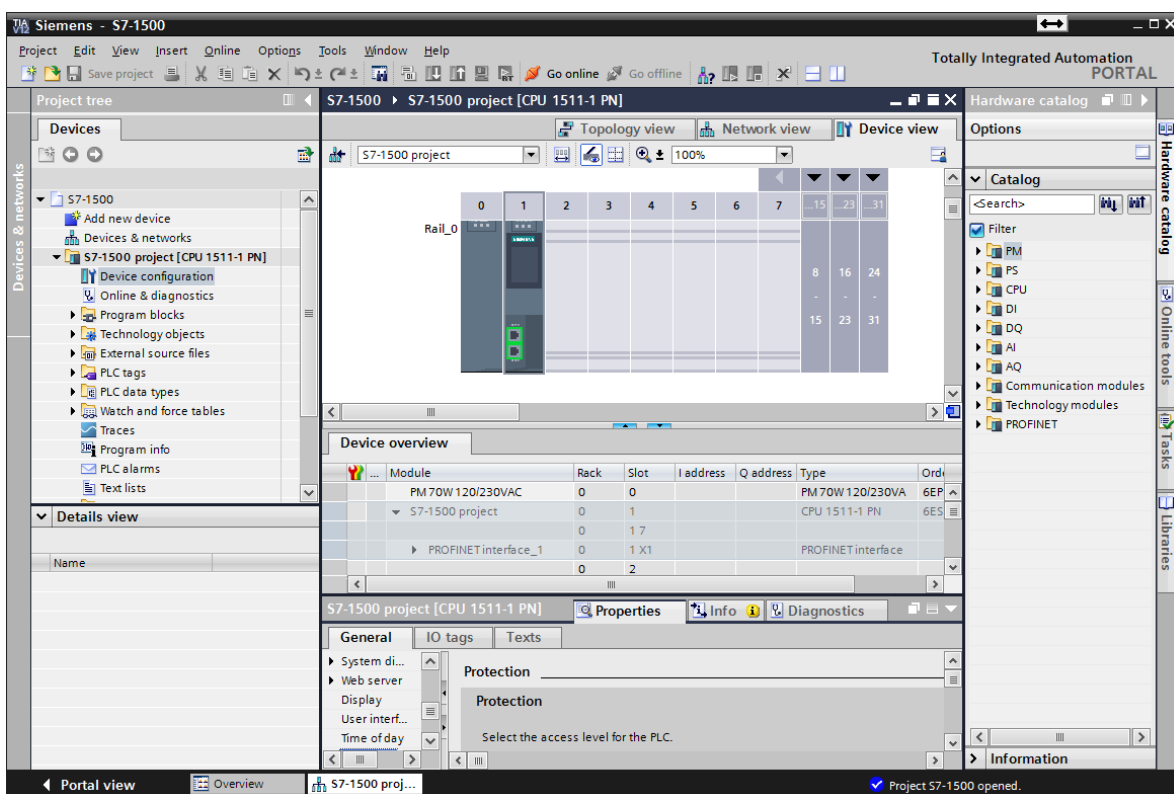
29.3.1 S7-1500 Ethernet Settings

This section explains how to make the S7-1500 Ethernet communication settings using “STEP7 (Totally Integrated Automation Portal V12)”.

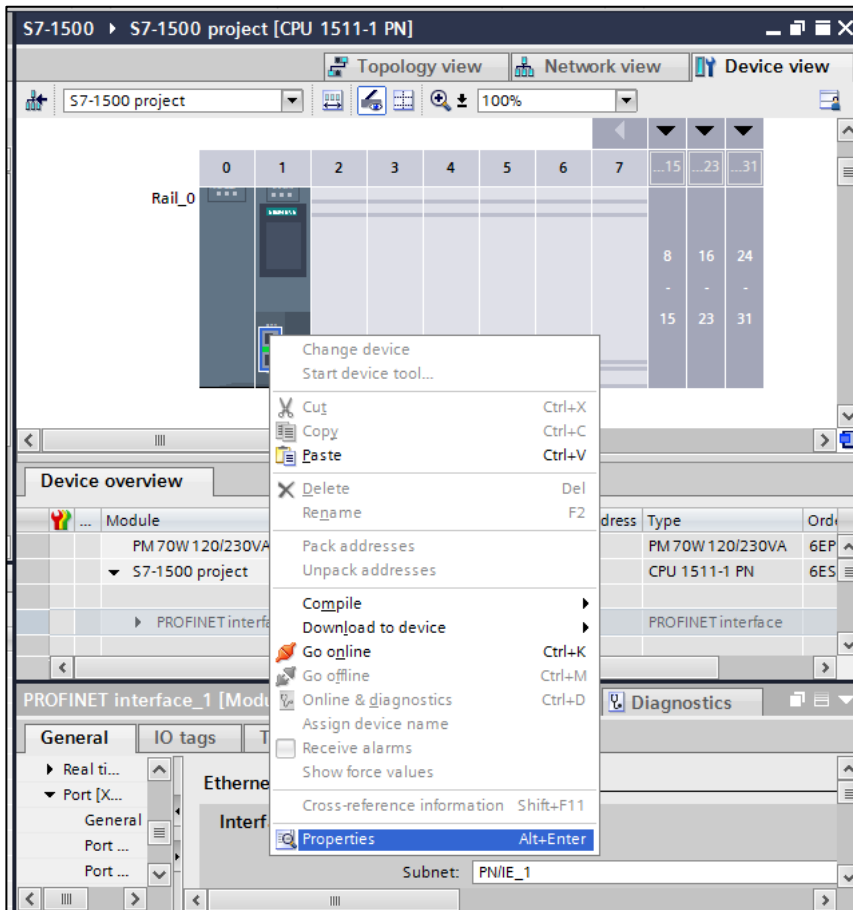
To communicate with the S7-1500 by TCP/IP Ethernet, CPU and Ethernet settings will need to be configured properly.

Please follow the directions below to configure the unit.

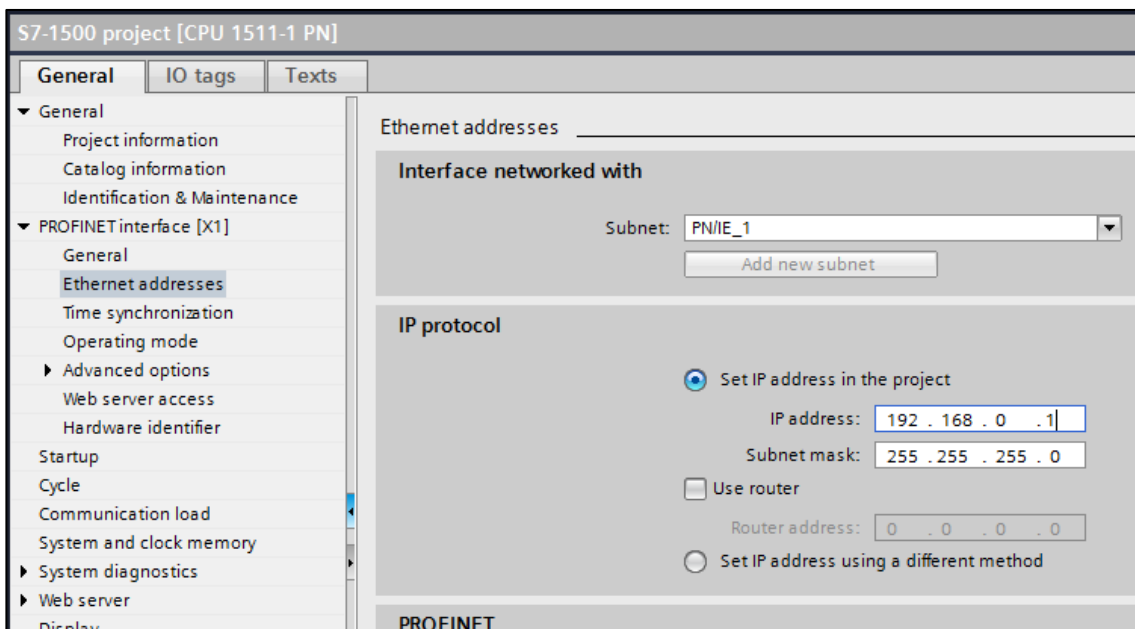
1. In STEP7 (Totally Integrated Automation Portal V12), launch S7-1500 project.
2. If this is a new S7-1500 project, add the necessary units to the Rack in Device configuration and setting the unit.



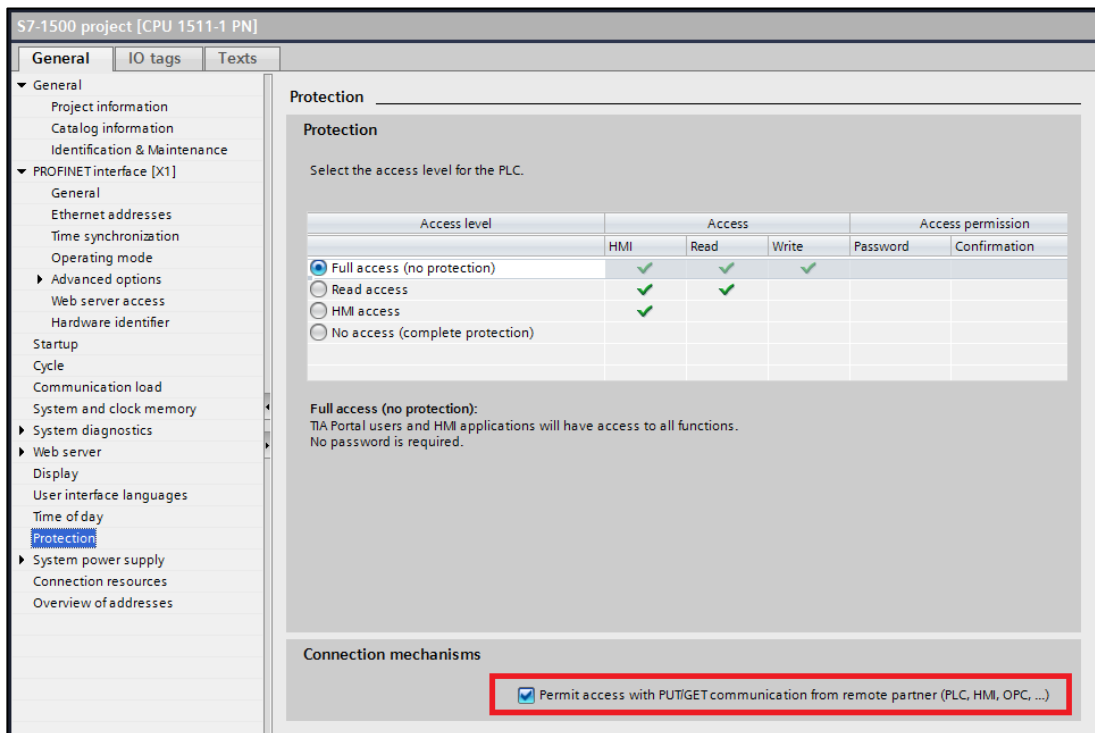
3. Right-click on the Ethernet LAN adapter in the rack and then select Properties.



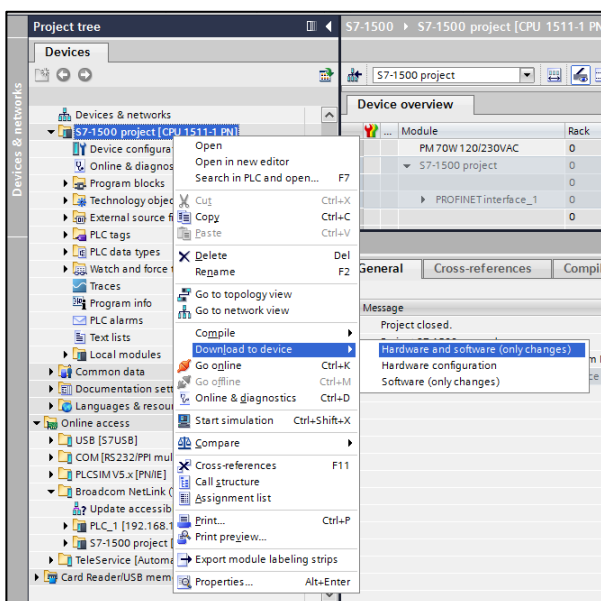
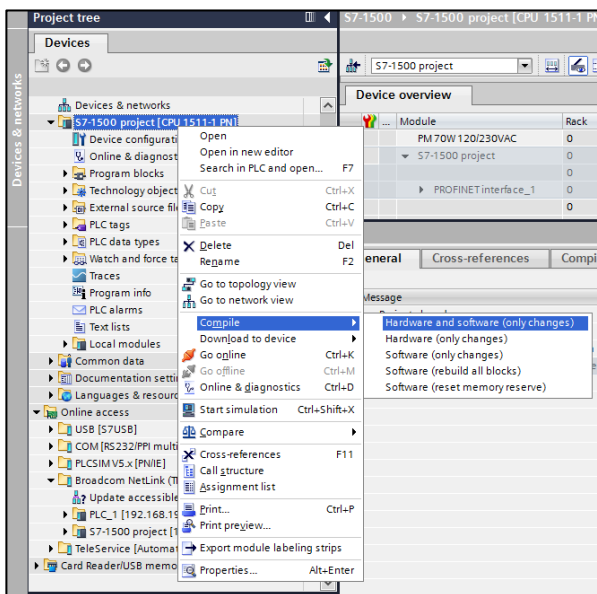
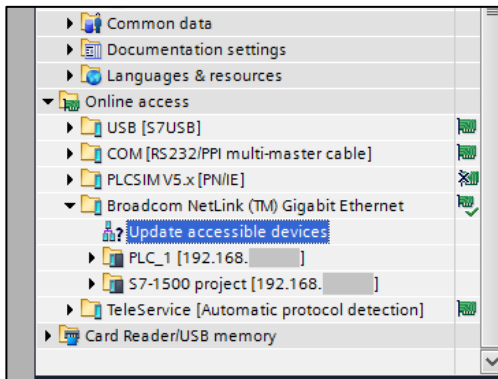
4. Specify the IP Address and Subnet mask.



5. In Protection setting, please select “full access” and check on in “Permit access with PUT/GET communication from remote partner (PLC, HMI, OPC, ...)” of Connection mechanisms.
- If this check doesn't enter, you cannot access CPU register from DeviceXPlorer.



6. After settings, compile all settings and download to device. The connection with PLC by Online access is necessary for downloading to the device. If you don't download to the CPU device, the settings will not be reflected.



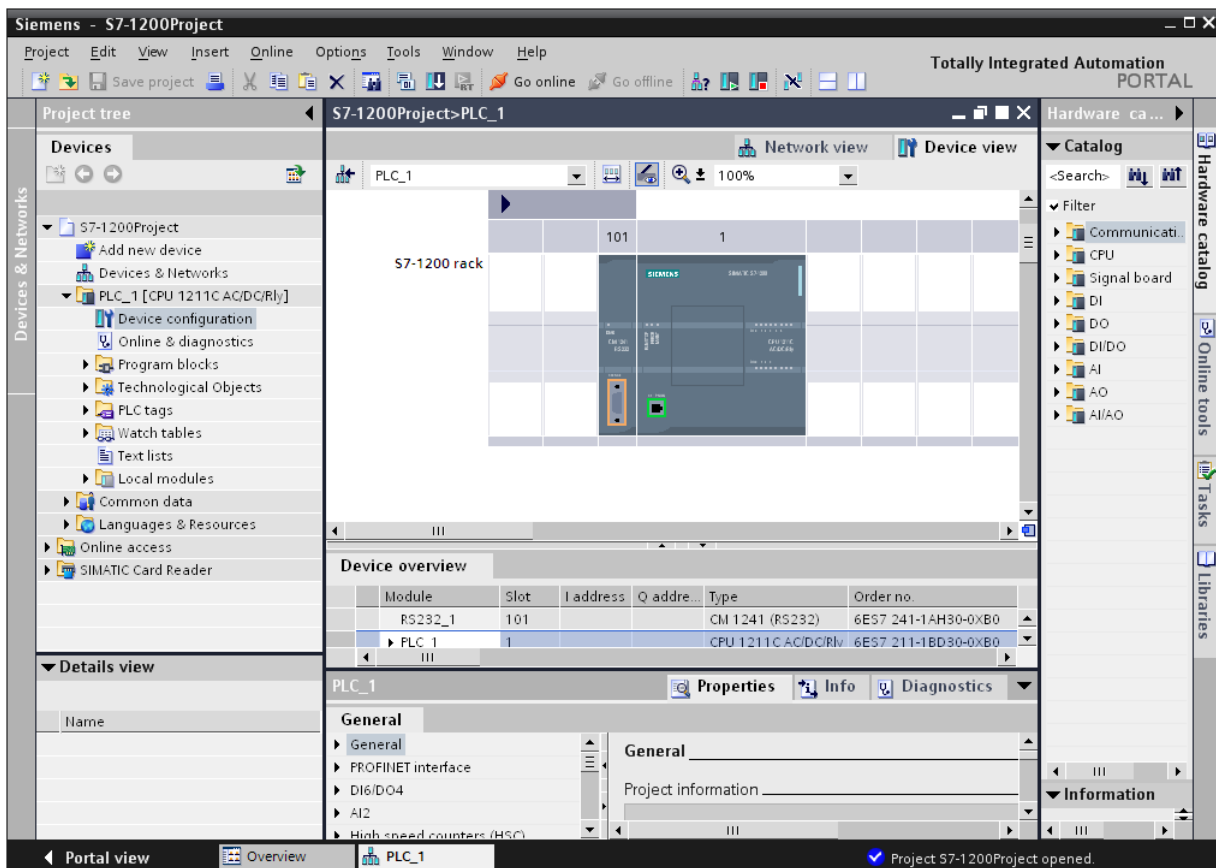
7. The Ethernet settings are finished.

29.3.2 S7-1200 Ethernet Settings

This section explains how to make the S7-1200 Ethernet communication settings using “STEP7 Basic (Totally Integrated Automation Portal V10)”.

To communicate with the S7-1200 by TCP/IP Ethernet, CPU and Ethernet settings will need to be configured properly. Please follow the directions below to configure the unit.

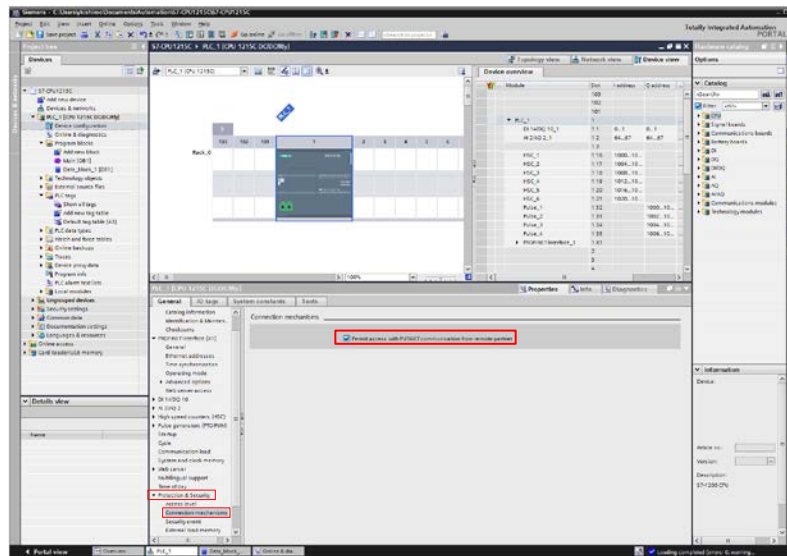
1. In STEP7 Basic (Totally Integrated Automation Portal V10), launch S7-1200 project.
2. If this is a new S7-1200 project, add the necessary units to the Rack in Device configuration and setting the unit.



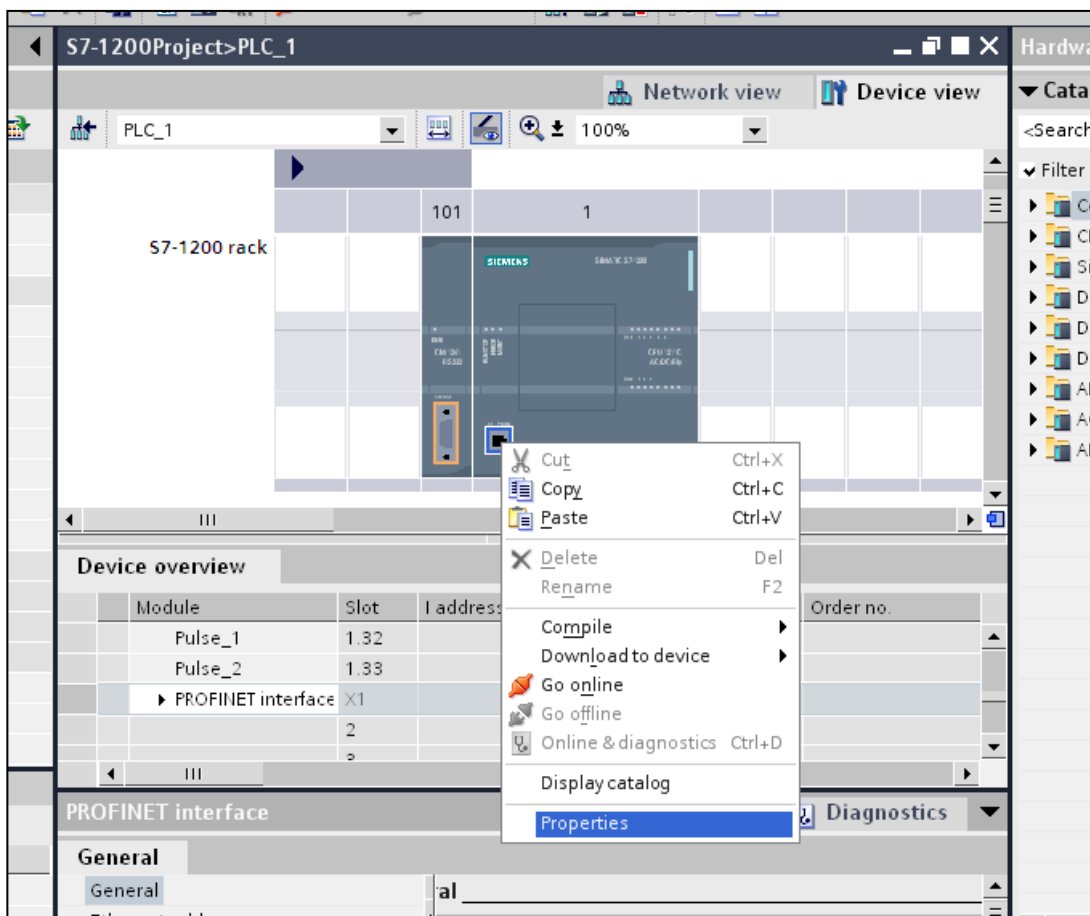
Important

In firmware version 4 or later of S7-1200, please check on in “Permit access with PUT/GET communication from remote partner” of Connection mechanisms.

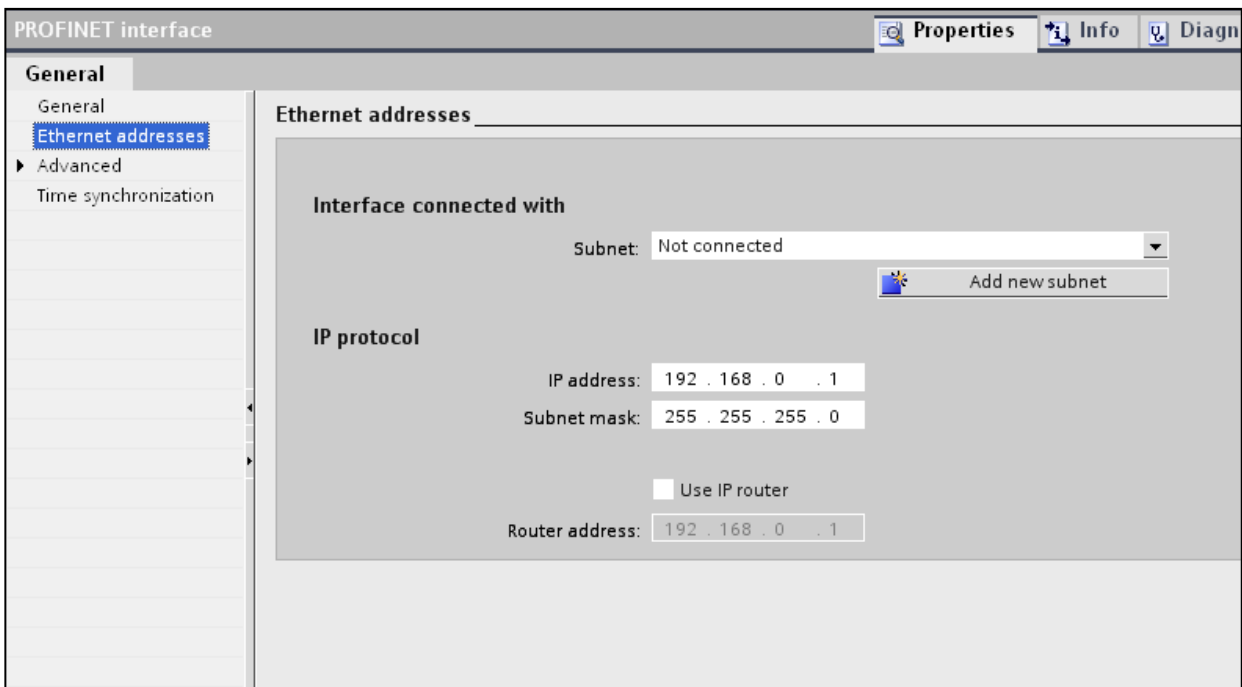
If this check doesn't enter, you cannot access CPU register from DeviceXPlorer.



3. Right-click on the Ethernet LAN adapter in the rack and then select Properties.



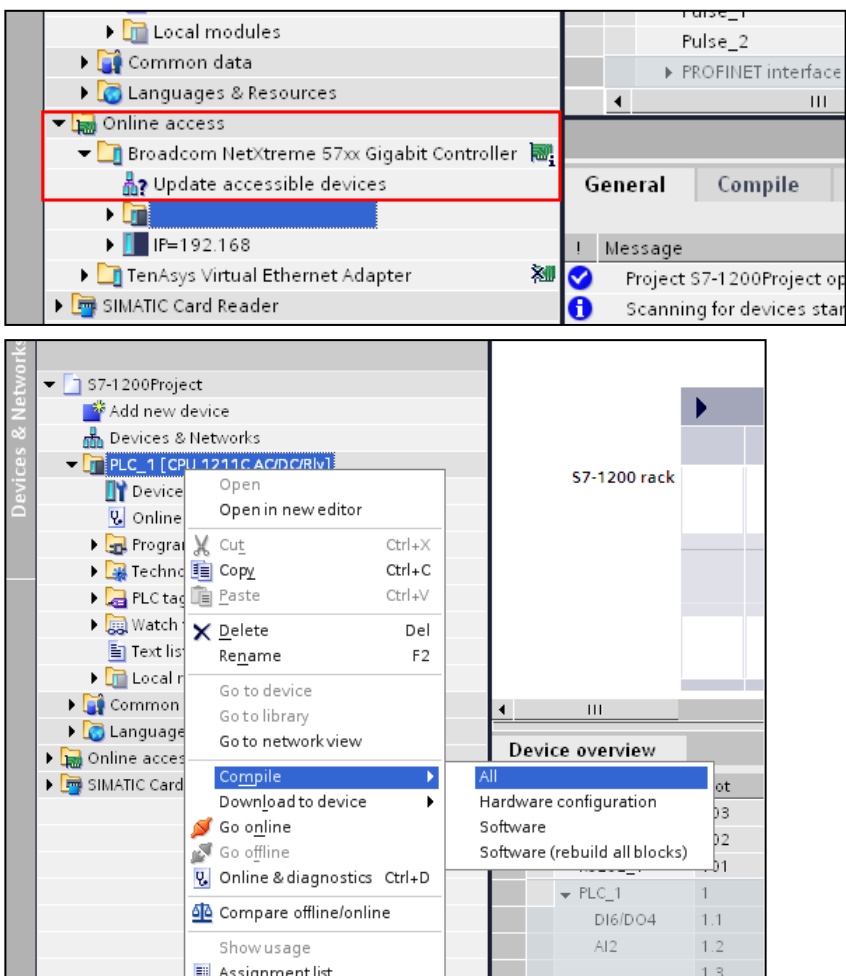
4. Specify the IP Address and Subnet mask.

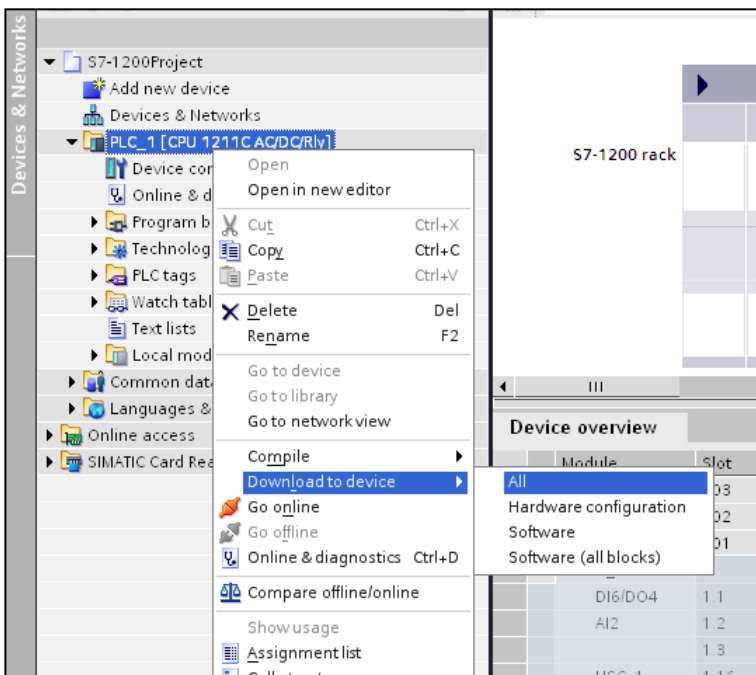


5. After settings, compile all settings and download to device.

The connection with PLC by Online access is necessary for downloading to the device.

If you don't download to the CPU device, the settings will not be reflected.





6. The Ethernet settings are finished.

Note

In S7-1200, the maximum number of PC connections for the CPU is 3 connections including SIMATIC HMI.

The PC connection is the access by device of DeviceExplorer which is set the Resource No. of Remote TSAP "03" in device settings.

At the maximum, you can access the same PLC with 3 devices of DeviceExplorer. So please be careful about the device count of DeviceExplorer.

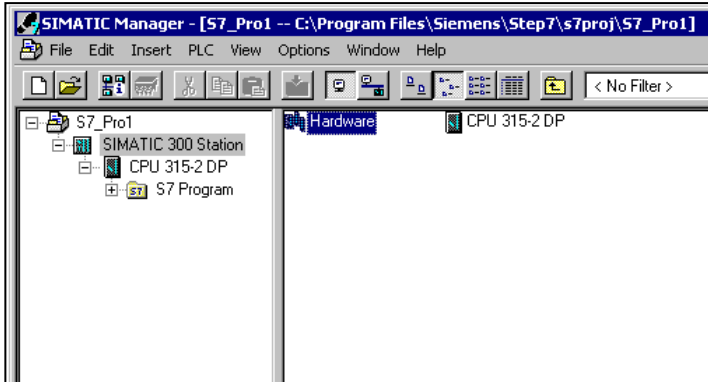
If you use SIMATIC HMI which is connecting with the PLC, please set within 3 connections including SIMATIC HMI connecting.

29.3.3 S7-300 / S7-400 Ethernet Settings

This section explains how to make the Ethernet unit (CPU unit) communication settings using “SIMATIC Manager”.

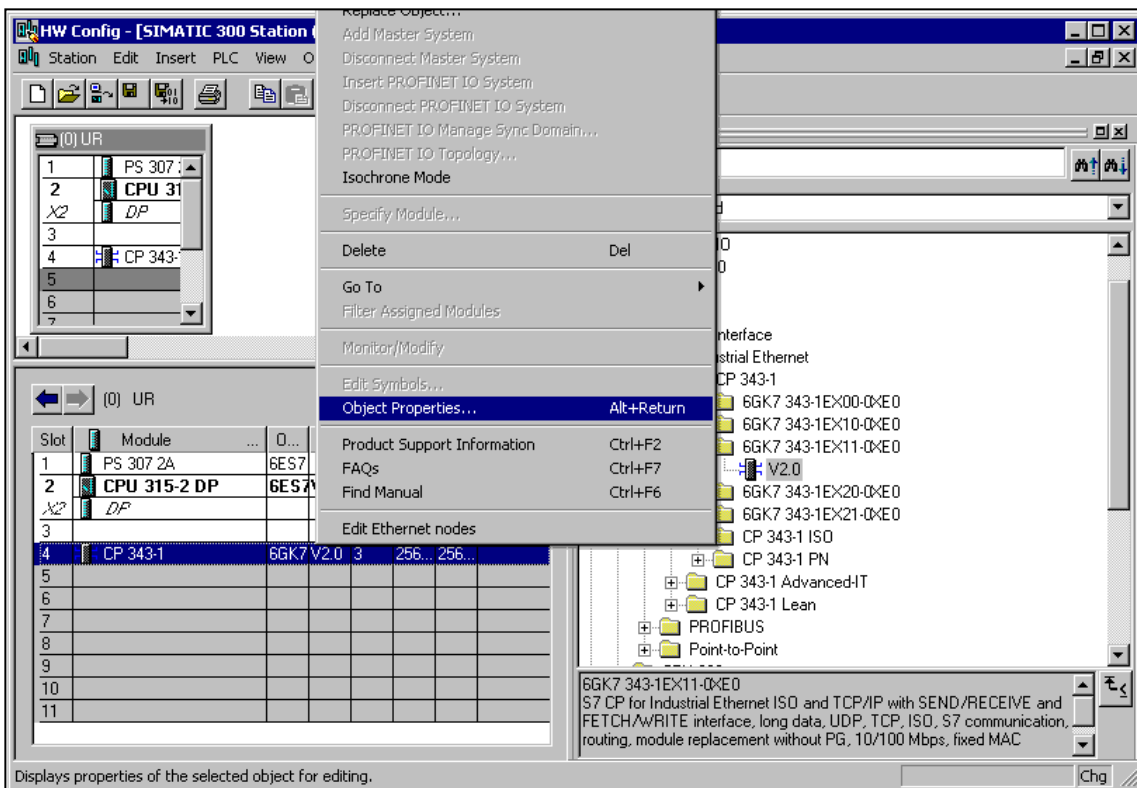
To communicate with the S7-300 / S7-400 CPU by TCP/IP Ethernet, CPU and Ethernet settings will need to be configured properly. Please follow the directions below to configure the unit.

1. In SIMATIC Manager, launch HW Configuration from the SIMATIC Station.

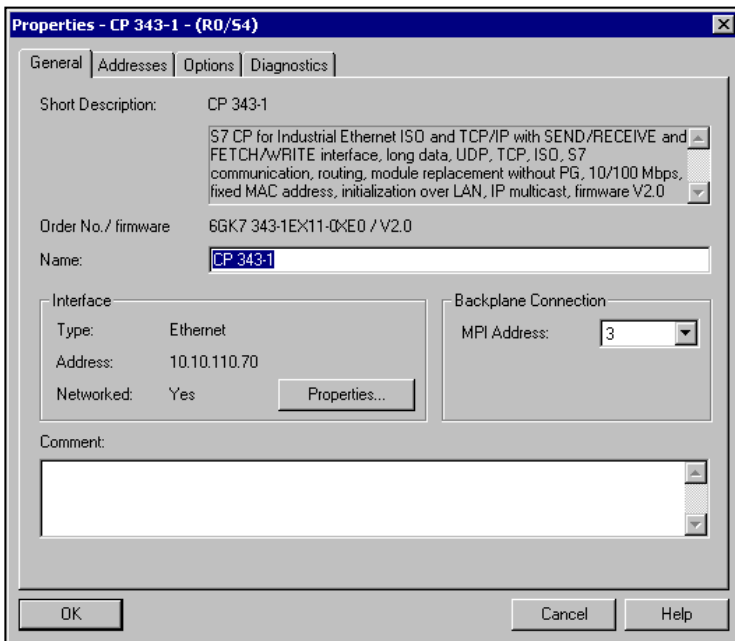


2. If this is a new SIMATIC project, add the necessary units to the Rack in HW Configuration. For the Siemens TCP/IP Ethernet communication with the CPU, 1 Ethernet unit capable of S7 Communications is necessary at least. (This includes built-in Ethernet CPU.)

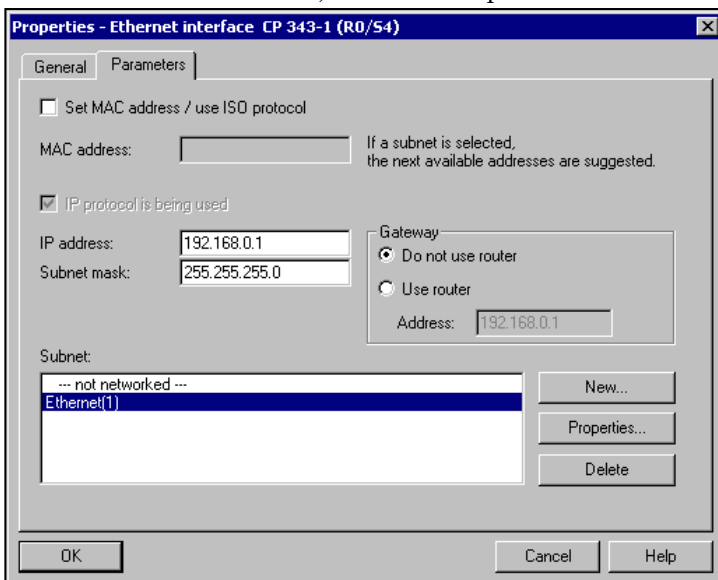
3. Right-click on the Ethernet unit in the rack and then select Object Properties.



4. The dialog should appear as shown below.

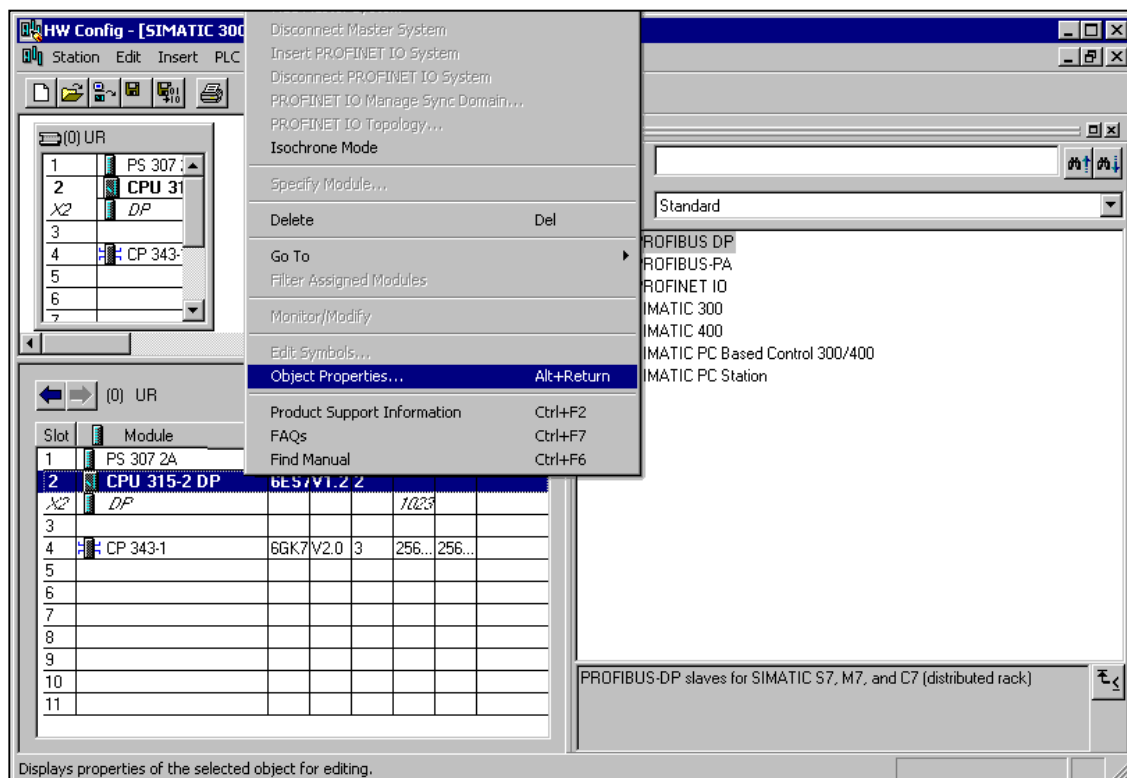


5. From the General tab, click the Properties button and the dialog appear as shown below.

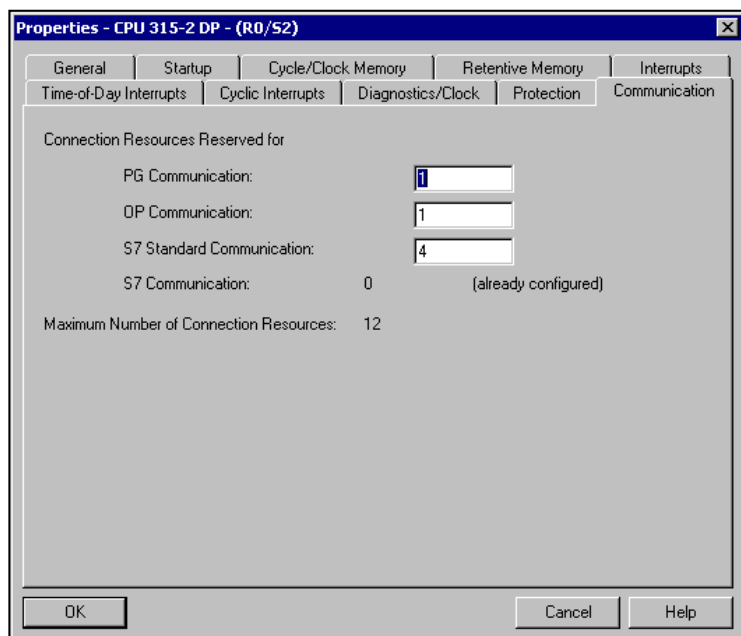


6. Specify the IP Address and Subnet mask.
7. To network this unit, click “New” from Subnet menu and create the network subnet.
8. Return the HW Configuration main window.

9. Right-click on the CPU unit in the rack and select Object Properties.



10. The dialog show and select Communication tab.



11. Configure the desired number of PG/OP and PC (S7 Communication) connections.

Type	Description
PG Communication	Used for program loading, diagnostics
OP Communication	Used for operator control and monitoring
S7 Standard Communication	Communication connections not configured, MPI communications with PUT/GET
S7 Communication (PC)	Configured connections, data communications

Note

In S7-300 and S7-400 series, the maximum number of PC connections for the CPU equals the Maximum Number of Connection Resources minus the S7 Standard Communication resources minus the OP Communication resources minus the PG Communication resources. Note that the Maximum Number of Connection Resources is based on the CPU/version/ firmware.

In the example shown above, there are six S7 Communication (PC) connections available ($12-4-1-1=6$). Likewise, the number of PG and OP connections can be increased using the same concept.

The PC connection is the access by device of DeviceExplorer which is set the Resource No. of Remote TSAP "03" in device settings.

This maximum number of PC connections is equal with the maximum accessible device count of DeviceExplorer which connect the same Ethernet port. (Please specify the Device settings by Resource No "03" of Remote TSAP.)

Depending of the system, please balance with the number of these resources.

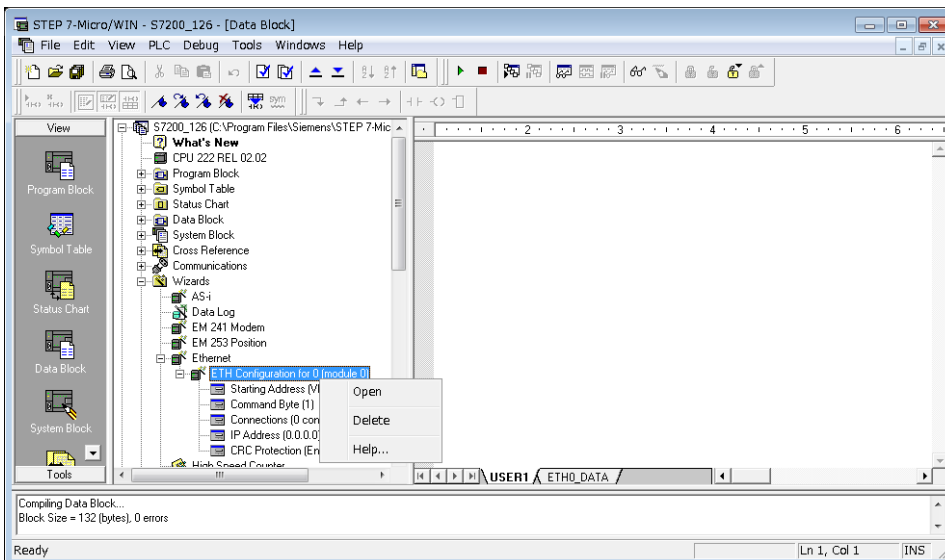
12. After the connections have been configured, click OK. Next, in the main HW Config window click Station | Save and Compile.
13. Click PLC | Download to commit to the changes.

29.3.4 S7-200 Ethernet Settings

This section explains how to configure the Ethernet unit communication settings using "STEP7 – Micro/WIN".

To communicate with the S7-200 CPU by TCP/IP Ethernet, CPU and Ethernet settings will need to be configured properly. Please follow as follows.

1. Launch STEP7 – Micro/WIN.
2. Right-click Ethernet unit in Wizard, and show property wizard.



3. Progress the wizard by clicking “Next” button, a following dialog is displayed. Specify IP Address and Subnet Mask.

Ethernet Wizard (ETH Configuration for 0)

Module Address
If your network provides a BOOTP or DHCP server (a service that will automatically assign IP addresses at startup), you may choose to have an IP address automatically assigned.

IP Address:

Subnet Mask:

Gateway Address:

☐ Allow automatic IP address assignment.

Module Connection Type
Specify the communications connection type for this module.

<Prev Next> Cancel

4. Specify number of “connection”s from “Number of connections to configure for this module”. This number means the number of communicatable modules (includes OPC Server) with Ethernet unit.

Ethernet Wizard (ETH Configuration for 0)

Module Command Byte
Determine the Q-address by counting the output bytes used by any I/O modules attached to the PLC before the CP 243-1 module.

QB

Peer-to-Peer Connections
The CP 243-1 module will support a maximum of 8 asynchronous, concurrent connections. Select how many connections you wish to configure for this module.

Number of connections to configure for this module:
 (0-8)

Click 'Next' to edit the connections for this configuration.

<Prev Next> Cancel

5. Configure LocalTSAP and RemoteTSAP for each “connection”s.

Configure Connections

You have requested 4 connection(s). For each connection, specify whether the connection should act as a client or server, and configure its associated properties.

Connection 0 (4 connections requested)

☐ This is a Client Connection: Client connections request data transfers between the local PLC and a remote server.

☒ This is a Server Connection: Servers respond to connection requests from remote clients.

Local Properties (Server)

TSAP

☐ This server will connect with an Operator Panel (OP).

☒ Accept all connection requests.

Accept connection requests from the following client only:

☒ Enable the Keep Alive function for this connection.

Please specify a symbolic name for this client connection. Your program can reference this connection symbolically when initiating data transfers with the remote server.

< Prev Connection Next Connection >

OK Cancel

29.4 DeviceXPlorer Settings

29.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

CPU Type

☒ S7-1500
☐ S7-1200
☐ S7-400 / S7-300
☐ S7-200

Network

Local TSAP(PC Side) (Hex)

Remote TSAP(PLC Side) (Hex)

Resource No. [0 - FF]

CPU Rack No. [0 - 7]

CPU Slot No. [0 - 31]

Access Points

Max Message Size Bytes

Read Block Count

Write Block Count

Item		Description
CPU Type		Select the CPU type of the PLC to be connected to. If you click the CPU type, the default settings are reflected.
Network	Local TSAP(PC Side) *1	Specify TSAP (Transport Service Access Point) of the PC side with hexadecimal four digits. Please specify as "0100" usually.
	Remote TSAP(PLC Side) *2*3	Specify TSAP (Transport Service Access Point) of the PLC side with hexadecimal four digits. Remote TSAP consists of the following rule.
	Resource No.	Specify the Resource No. of this connection. 01:PG(Programming Device), 02:OP(Operator Panel), 03:PC Connection (Application) In DeviceXPlorer, please specify as 03 usually.
	CPU Rack No. *3	Specify the Rack No. of access CPU. Set a number between 0 and 7.
	CPU Slot No. *3	Specify the Slot No. of access CPU. Set a number between 0 and 31.
Access Points*1	Max Message Size	Specify the maximum message size of S7 communication. The range that can be set differs depending on the CPU type.
	Read Block Count	Specify the maximum readable block count of S7 communication. The range that can be set differs depending on the CPU type.
	Write Block Count	Specify the maximum writable block count of S7 communication. The range that can be set differs depending on the CPU type.

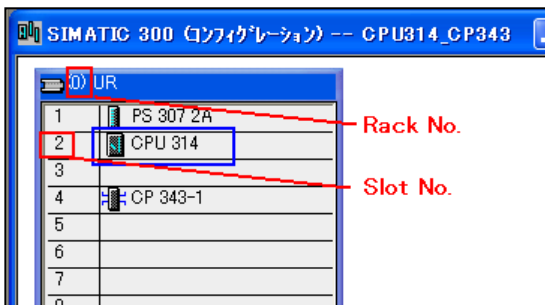
*1 It is not usually necessary to change this item.

*2 If S7-200 is selected as the CPU type, enter Remote TSAP directly.

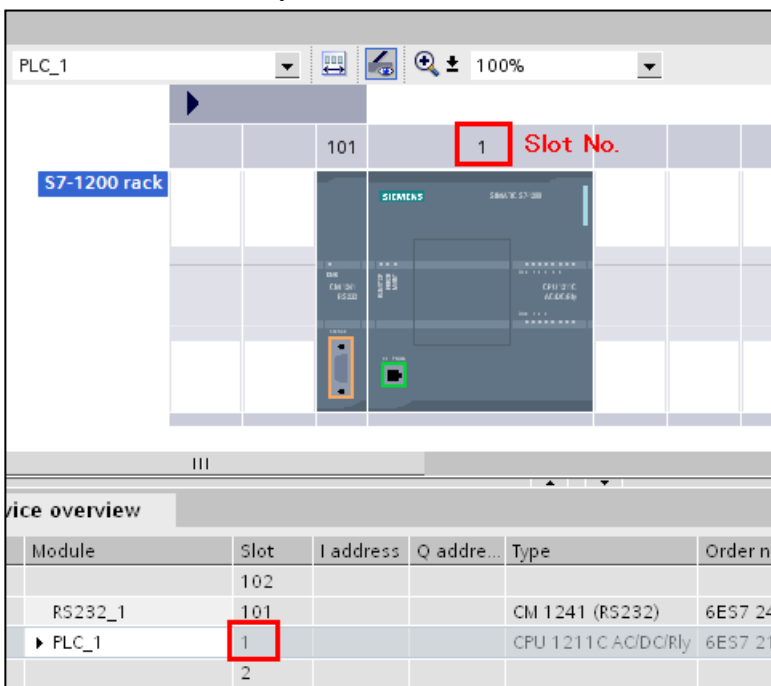
*3 Please check 29.4.1.1 about CPU Rack No. and CPU Slot No.

29.4.1.1 About CPU Rack No. and CPU Slot No.

In S7-300 / S7-400, CPU Rack No. and CPU Slot No. point at the following values with HW Configuration.



In S7-1200, CPU Rack No. is "0", and CPU Slot No. points at the following values with Device configuration. CPU Slot No. is usually "1".



29.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 29.2 for devices that can be specified.
Device No.	Specify the address as decimal number between 0 and 65535.
Data Type	With the S7 CPU, base data type of device is unsigned data type. So, please specify unsigned data type to access the device of S7 CPU such as UBYTE and USHORT.
DB Block No.	When access device is Data Block "DB", specify the access DB Block No. between 1 and 65535 in decimal number. Please refer to 29.4.3 for the details.
S5Timer	When access device is Timer "T", you can access Timer "T" with SIMATIC TIMER type. The SIMATIC TIMER type doesn't support array access. Data type of S5Timer tag is STRING("VT_BSTR"). SIMATIC TIMER type consists of the following rule. BCD value 0 - 999 : 0.01sec * Time value in BCD (0.010sec – 9.990sec) BCD value 1000 - 1999 : 0.1sec * Time value in BCD (0.100sec – 99.900sec) BCD value 2000 - 2999 : 1sec * Time value in BCD (1.000sec – 999.000sec) BCD value 3000 – 3999 : 10sec * Time value in BCD (10.000sec – 9990.000sec) Time base "00" is 10msec, "01" is 100msec, "10" is 1sec, "11" is 10sec. Example:

	If the value of "T10:B" is 1123, the value of "T10:S5T" is "12.300".This means 12sec300msec.
Calculation	When access device is Timer "T" or Counter "C", specify the BCD Calculation.

29.4.3 Data Block settings

Data block DB is memory area which user can assign and use freely.

When you access DB by DeviceXPlorer, please refer to the following examples.

If you access DB, please use DB address or offset.

For example, if you access Static_3 of Data_block_1 (Offset: 4.0, data type: DWord), please set tag setting of DeviceXPlorer like below.

	Name	Data type	Offset	Initial value	Retain	Co
1	▼ Static					
2	Static_1	Byte	0.0	0	☐	
3	Static_2	Word	2.0	0	☐	
4	Static_3	DWord	4.0	0	☐	
5	► Static_4	Array [0 .. 1999] of Byte	8.0		☐	
6	Static_5	UInt	2008.0	0	☐	
7					☐	

[Tag setting of DeviceXPlorer]

Property of Tag [DB1:0]

General | Scale | Simulation | Alarm

Tag Name: Tag DB1:4:DU

☐ Auto Format

Description:

Device Type: DB Data Block

Device No: 4 DB Block No.: 1

Data Type: ULONG Byte Position: Lower Byte

Length: 1 Bit Position: 0

☐ Byte Swap Attribute: ReadWrite

☐ Array Calculation: NONE

☐ S5Timer

[Monitor with Watch table of Step7 Basic]

	Name	Address	Display for..	Monitor value	Modify value
1	"Data_block_1".Static_3	%DB1.DBD4	Hex	1234_5678	

[Monitor with DeviceXplorer]

Path Device1						
Tags Device Port Device Option						
Name	Data Type	Location	Value	Quality	Timestamp	P
Tag1	ULong	DB1:4:DU	12345678	Good (COh)	2010/02/12 ...	

If you access Static_4 of Data_block_1 (Offset: 8.0, data type: Array[0...1999] of Byte), please set tag setting of DeviceXplorer like below.

Property of Tag [DB1:0]

General Scale Simulation Alarm

Tag Name Tag DB1:8:L:A2000

☐ Auto Format

Description

Device Type DB Data Block

Device No. 8 DB Block No. 1

Data Type BYTE Byte Position Lower Byte

Length 2000 Bit Position 0

☐ Byte Swap Attribute ReadWrite

☒ Array Calculation NONE

☐ S5Timer

[Monitor with Watch table of Step7 Basic]

S7-1200Project > PLC_1 > Watch tables > Watch table_1						
	Name	Address	Display for..	Monitor value	Monitor with trig	
1	"Data_block_1".Static_3	%DB1.DBD4	Hex	1234_5678	Permanent	
2	"Data_block_1".Static_4[0]	%DB1.DBB8	Hex	12	Permanent	
3	"Data_block_1".Static_4[1]	%DB1.DBB9	Hex	34	Permanent	
4	"Data_block_1".Static_4[2]	%DB1.DBB10	Hex	56	Permanent	
5	"Data_block_1".Static_4[3]	%DB1.DBB11	Hex	78	Permanent	
6	"Data_block_1".Static_4[4]	%DB1.DBB12	Hex	90	Permanent	
7	"Data_block_1".Static_4[5]	%DB1.DBB13	Hex	AB	Permanent	
8	"Data_block_1".Static_4[6]	%DB1.DBB14	Hex	CD	Permanent	
9	"Data_block_1".Static_4[7]	%DB1.DBB15	Hex	EF	Permanent	
10	"Data_block_1".Static_4[8]	%DB1.DBB16	Hex	00	Permanent	
11	"Data_block_1".Static_4[9]	%DB1.DBB17	Hex	12	Permanent	
12	"Data_block_1".Static_4[10]	%DB1.DBB18	Hex	34	Permanent	
13	"Data_block_1".Static_4[11]	%DB1.DBB19	Hex	56	Permanent	
14	"Data_block_1".Static_4[12]	%DB1.DBB20	Hex	00	Permanent	
15						

[Monitor with DeviceXplorer]

Path Device1			
Tags Device Port Device Option			
Name	Data Type	Location	Value
Tag1	Array of Bytes	DB1:8:L:A2000	12, 34, 56, 78, 90, AB, CD, EF, 0, 12, 34, 56, 0, 0, 0, 0

The access to the element of the arrangement is possible by addressing it directly. The following examples access Static_4[7] (address 15).

Path Device1							
Tags	Device	Port	Device Option				
Name	Data Type	Location	Value	Quality	Timestamp	Pro	
Tag1	Byte	DB1:15:L	EF	Good (C0h)	2010/02/12 ...		

Important

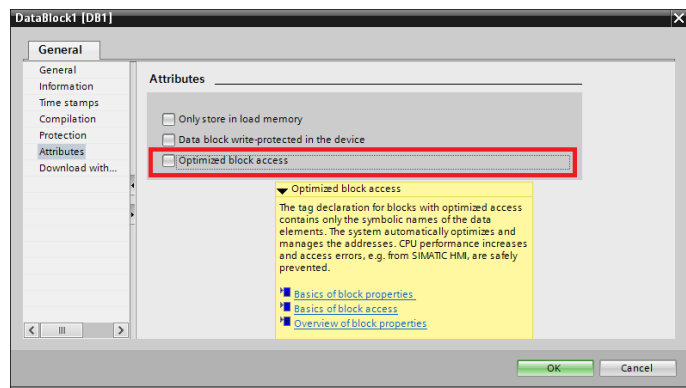
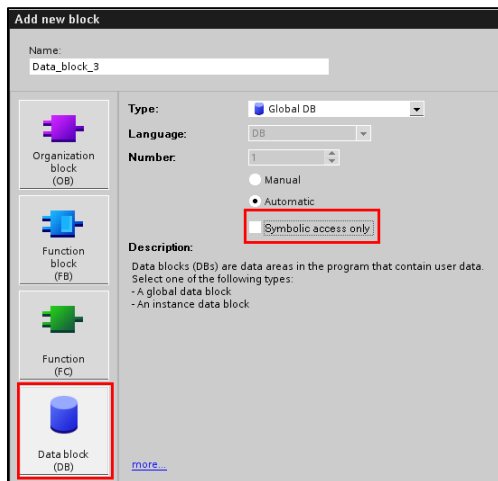
In S7-1200 / S7-1500, when you access DB from DeviceExplorer, please remove the check shown in the following.

This check enters by default, so please be careful.

If this check enters, you cannot access DB from DeviceExplorer.

S7-1200: In Add new block dialog, please remove the check of [Symbolic access only].

S7-1500: In properties of DB, please remove the check of [Optimized block access].



29.5 Import tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

29.5.1 List of Devices

Show the list of convertible devices.

[S7-1500 / S7-1200 / S7-400 / S7-300]

KEPServerEX	
Type	Symbol
Flag Memory	M
Flag Memory	F
Inputs	I
Inputs	E
Outputs	Q
Outputs	A
Peripheral Inputs	PI
Peripheral Inputs	PE
Peripheral Outputs	PQ
Peripheral Outputs	PA
Data Block	DB
Counters	C
Counters	Z
Timers	T

DeviceXPlorer		
	Type	Symbol
⇒	Memory (Flag Memory)	M
⇒		
⇒	Input	I
⇒		
⇒	Output	Q
⇒		
⇒	Peripheral Input	PI
⇒		
⇒	Peripheral Output	PQ
⇒		
⇒	Data Block	DB
⇒	Counter	C
⇒		
⇒	Timer	T

[S7-200]

KEPServerEX	
Type	Symbol
Internal Memory	M
Discrete Inputs (IEC)	I
Discrete Inputs (SIMATIC)	E
Discrete Outputs (IEC)	Q
Discrete Outputs (SIMATIC)	A
Counter Current Values (IEC)	C
Counter Current Values (SIMATIC)	Z
Timer Current Values	T
Sequence Control Relay (SCR)	S
Special Memory	SM
Variable Memory	V
Analog Inputs (IEC)	AI
Analog Inputs (SIMATIC)	AE
Analog Outputs (IEC)	AQ
Analog Outputs (SIMATIC)	AA
High-Speed Counter	HC

DeviceXPlorer		
	Tttttype	Symbol
⇒	Memory (Flag Memory)	M
⇒	Input	I
⇒		
⇒	Output	Q
⇒		
⇒	Counter	C
⇒		
⇒	Timer	T
⇒	Sequence Control Relay	S
⇒	Special Memory	SM
⇒	Variable	V
⇒	Analog Input	AI
⇒		
⇒	Analog Output	AQ
⇒		
⇒	High-speed Counter	HC

29.5.2 Device Range

Please refer to "List of Devices".

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

29.5.3 Optional Specification

The address format of KEPServerEX is as follows.

```
<Type><Address>

<Type><S7 data type><Address>

DBn.<S7 data type><Address>

DBn.<S7 data type><Address>

DBn.<S7 data type><Address>

DBnX<Address>    X:1 to 3 characters
                  See table below
```

```
(None)
<.Bit>           ※Boolean type only
<.Bit>           ※Boolean type only
<.String length> ※String type only
<.String length> ※String type only
<[Line number][Column number]>
<.Line number.Column number>
<.Line number.Column number>
+ <_Line number.Column number>
<[Column number]>  ※1 line.
<.Column number>  ※1 line. Data type except Boolean and String type.
<.Column number>  ※1 line. Data type except Boolean and String type.
<_Column number>  ※1 line.
<Data type suffix>
<Byte exchange suffix>
<Data type suffix><Byte exchange suffix>
```

EX) DB001X00.5
MD00:DWORD_X1

Show optional specifications of Address in the tag definition file of KEPServerEX.

[Common]

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
.x ,x (x is a number)	Set x to the bit position when the data type is 'BOOL'. Set x to the size when the data type is 'STRING'.
[x] _x [1][x] .1.x ,1,x _1_x (x is a number)	Enable the array. Set x to the size.
_X1	Enable byte swap.
_X2	Enable byte swap when the data type is 'SHORT' or 'USHORT'.
_X3	When the data type is any other, output an error.

[DB suffix] (n : 1 - 65535)

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
DBn:KM	Set 'BOOL' to the data type.
DBnDBX	
DBnD	
DBnKL	Set 'BYTE' to the data type.
DBnDBB	
DBnDL	
DBn:KR	Set 'BYTE' to the data type.
DBnDR	Increments the device number by 1.
DBn:KH	Set 'USHORT' to the data type.
DBn:KF	Set 'SHORT' to the data type.
DBnDBW	
DBnDW	
DBn:KD	
DBnDBD	
DBnDD	
DBn:KG	Set 'FLOAT' to the data type.
DBnS	Set 'STRING' to the data type.

[S7 data type]

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
X	Set 'BOOL' to the data type.
B	Set 'UBYTE' to the data type.
BYTE	
C	Set 'BYTE' to the data type.
CHAR	
W	Set 'USHORT' to the data type.
WORD	
I	Set 'SHORT' to the data type.
INT	
D	Set 'ULONG' to the data type.
DWORD	
DI	Set 'LONG' to the data type.
DINT	
R	Set 'FLOAT' to the data type.
REAL	
STRING	Set 'STRING' to the data type.
G	Increments the device number by 2. Note) This means a variable length in KEPServerEX.
T	N/A
TIME	
TOD	
DT	
DATE	

[Data type suffix]

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
KF	Set 'BYTE' or 'SHORT' or 'LONG' to the data type. Depend on the data type in KEPServerEX.
:Byte	Set 'UBYTE' to the data type.
:Char	Set 'BYTE' to the data type.
:Word	Set 'USHORT' to the data type.
:INT	Set 'SHORT' to the data type.
:DWORD	Set 'ULONG' to the data type.
:DINT	Set 'LONG' to the data type.
F	Set 'FLOAT' to the data type.
IEEE	
:REAL	
:String	Set 'STRING' to the data type. Increments the device number by 2. Note) This means a variable length in KEPServerEX.
BCD or :BCD	Set BCD Format to the calculation.
:KC	
:KT	N/A

Important

- Two dimensional array is not supported.
- The Timer of DeviceXPlorer and KEPServerEX is vary in style.
DeviceXPlorer converts the read value from Timer, to BCD converted value.

29.6 Errors

This section explains the PLC errors (response errors) included in the error messages.

Error Code (HEX)	Status	Description
0001	Hardware fault	Hardware (CPU) error occurred. Please confirm hardware (CPU).
0003	Illegal object access	Accessed illegal object. Please confirm access device.
0005	Invalid address (Incorrect variable address)	Accessed invalid address. Please confirm access device address.
0006	Data Type is not supported	Specified data type is not supported. Please confirm access data type.
0007	Invalid data size / too much data	The access data size is too big. Please confirm data size.
000A	Object does not exist or length error	Access object doesn't exist. Please confirm the device and device address.
FFFF	Serial Number error	Serial Number (Transaction ID) of sending message is different from it of receiving message. Please check communication status.

30 [Saia] S-BUS Ethernet Connection

This chapter explains communication with KV series equipment using an Ethernet unit.
An overview of communication via a S-BUS Ethernet connection is shown below.

Overview	
Link	S-BUS Ethernet
Data code	Binary
Protocol	UDP / IP

30.1 S-BUS Systems

30.1.1 Applicable Units

Applies to CPU units and Ethernet units that support S-BUS communication.
Indicates applicable modules for SAIA S-BUS connection.

Category	Applicable CPU units	Applicable Ethernet units
PCD series	PCD1、PCD2、PCD3	Built-in Ethernet Port Ethernet Interface

30.1.2 Used Command

The commands used in DeviceXPlorer are shown below.

Function command type	Function code	Description
Read Counter	00	Read counter device
Read Display Register	01	Read display register device
Read Flag	02	Read flag device
Read Input	03	Read input device
Read Real Time Clock	04	Read time device
Read Output	05	Read output device
Read Register	06	Read register device
Read Timer	07	Read timer device
Write Counter	10	Write to counter device
Write Flag	11	Write to flag device
Write Real Time Clock	12	Write to time device
Write Output	13	Write to output device
Write Register	14	Write to register device
Write Timer	15	Write to timer device
Read PCD Status	20 - 27	Read PCD status information
Read Data Block	150	Read data block
Write Data Block	151	Write data block

30.2 List of Devices

The S-BUS devices that can be set in DeviceXPlorer are as shown below.

The devices, and device ranges that can be used vary with the CPU. For details, refer to your CPU instructions.

Device name	Device symbol	Device range		Cate- Gory
		PCD1	PCD2 PCD3	
Input* ¹	I	0 - 8191		Bit
Output	O	0 - 8191		
flag	F	0 - 16383		
Register	R	0 - 4095	0 - 16383	Long
Counter	C	0 - 1599		
Timer	T	0 - 1599		
Data block* ²	DB	DB address 0 - 8191 device address 0 - 16383		
Real Time Clock	RTC	—		Long Long
Status* ¹	STATUS	7		Byte

*¹ Read-only device. Cannot be written to.

*² DB address 0 – 3999 are read-only device. Cannot be written to.

30.3 S-BUS Ethernet Settings

It shows how to set S-BUS Ethernet in PG5 device setting.

1. Select "Ethernet" from PG5 device settings and set "Ether-S-bus Enabled" to "Yes".

The screenshot shows the 'Properties' window for 'Onboard : Ethernet'. The 'Ether-S-Bus' section is expanded, showing the following settings:

Property	Value
Channel Number	9
Ether-S-Bus Enabled	Yes
IP Node	0
PGU Port	Yes
Slave	Yes
Network Groups	(Default)

Below the settings, there is a section titled 'Ether-S-Bus Enabled' with the text: 'Set to 'Yes' to enable the Ether-S-Bus communication in this Ethernet interface.'

2. Select a device from the PG5 device settings and set the station number to "S-bus".

The screenshot shows the 'Properties' window for 'Device : PCD3.H5360'. The 'S-Bus' section is expanded, showing the following settings:

Property	Value
S-Bus Support	Yes
S-Bus Station Number	30

Below the settings, there is a section titled 'S-Bus Station Number' with the text: 'Station number of S-Bus network, range 0..253. Each station must have a unique number.'

30.4 DeviceXPlorer Settings

30.4.1 Device Settings

Set the S-BUS device to access.

Property [Device1]

Device Option User authority

Connection Test

Module configuration

☒ PCD3/2 ☐ PCD1

Network

S-BUS Station

ACCESS POINTS

Bit R/W

Word R/W

OK

Cancel

Apply

Item		Description
Module configuration		Select the CPU type of the PLC to be connected to.
Network	S-BUS Station	Specify the station number of the S-BUS device according to the connection destination. It can be set in the range of 0 to 253.
ACCESS POINTS	Bit R / W	Specify the maximum number of access points of batch read / write of bit scale. Up to 128 points can be set
	Word R / W	Specify the maximum number of access points of batch read / write of word scale. Up to 32 points can be set

30.4.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [R0]

General Scale Simulation Alarm Historical

OPC Tag

Tag Name Tag R0

☐ Auto Format

Description

S-Bus Data Item

Type R Register

Address 0 Index 0

Format LONG Bit Position 0

Length 1 Attribute ReadWrite

☐ Array Calculation NONE

New Save << >> OK Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 30.2 for devices that can be specified.
Device No.	Specify the device number.
Index	Specify the element index. Enabled only when the device type is Data Block.

Important

Please note that when selecting a bit device, the data type is only BOOL.

31 [Lsis] XGT Ethernet Connection

This chapter explains communication with XGT Series using an Ethernet module.

An overview of XGT Ethernet connection is shown below.

Overview	
Data code	Binary
Protocol	TCP / IP,UDP / IP

31.1 PLC Systems

31.1.1 Applicable CPU modules

The CPU modules that can be connected to XGT Ethernet are shown below.

Category	Applicable CPU modules
XGK	XGK-CPUH,XGK-CPUA,XGK-CPUS,XGK-CPUE,XGK-CPUU
XGI	XGI-CPUU,XGI-CPUH,XGI-CPUS
XGR	XGR-CPUH

31.1.2 Applicable Ethernet modules

The Ethernet modules are shown below.

Ethernet modules	Comment
XGL-EFMT	10/100BASE-TX(over CAT5))
XGL-EFMF	100BASE-FX
XGL-EH5T	10/100BASE-TX

Important

For XGR Ethernet module can be installed on only main base.

31.2 List of Devices

The XGT devices that can be set in DeviceXPlorer are shown.

The range of devices area varies with CPU and parameter settings. For details, refer to you CPU instructions.

Device name	Device symbol	Device range			Cate gory	Format
		XGK	XGI	XGR		
IO Relay	P	0~2047F	N/A	N/A	Bit	Hexadecimal
Internal Relay	M	0~2047F				Hexadecimal
Link Relay	L	0~11263F				Hexadecimal
Keep Relay	K	0~2047F				Hexadecimal
System Relay	F	0~1023F				Hexadecimal
Internal Relay	MX	N/A	0~2097151	0~2097151		Decimal
Link Relay	LX		0~180223	0~180223		Decimal
Keep Relay	KX		0~134399	0~134399		Decimal
System Relay	FX		0~32767	0~32767		Decimal
File Relay	RX		0~524287	0~524287		Decimal
A Relay	AX		0~4194303	0~4194303		Decimal
W Relay	WX		0~1048575	0~1048575		Decimal
Communication Relay	NX		0~401407	0~401407		Decimal
IO Register	PW	0~2047	N/A	N/A	Word	Decimal
Internal Register	MW	0~65534	0~131071	0~131071		Decimal
Link Register	LW	0~11263	0~11263	0~11263		Decimal
Keep Register	KW	0~511	0~8399	0~8399		Decimal
System Register	FW	0~2047	0~2047	0~2047		Decimal
File Register	R	0~32767	N/A	N/A		Decimal
	RW	N/A	0~32767	0~32767		Decimal
	ZR	0~65535	N / A	N / A		Decimal
A Register	AW	N/A	0~262143	0~262143		Decimal
W Register	WW		0~65535	0~65535		Decimal
P2P Register	N	0~21503	N/A	N/A		Decimal
	NW	N/A	0~25087	0~25087		Decimal
Data Register	D	0~32767	N/A	N/A		Decimal
Timer	T	0~2047				Decimal
Counter	C	0~2047				Decimal
Index Register	Z	0~127				Decimal

Important

- DeviceXPlorer does not support the device specified in bytes / double word of XGI / XGI. Please use the extended specification, if you want to access in bytes / double word. For further details on extended specification, refer to the instructions for extend tagname specification in the Server Edition.
- DeviceXPlorer does not support Input variables (I), Output variable (Q), Analog data(U) in XGI/XGR, and Analog data(U), Step Controller(S) in XGK.
- DeviceXPlorer does not support writing in bytes.

Note

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number. Example: R100, D9000, etc.

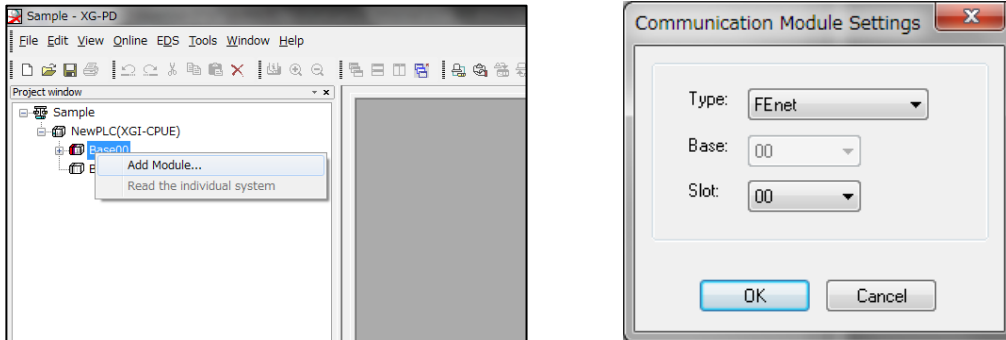
- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the CPU being accessed.

31.3 Ethernet Module Settings

31.3.1 Settings Step

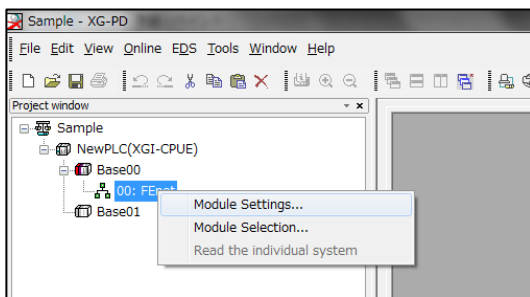
Ethernet module settings is configured by LSIS development tool XG-PD.

- (1) Specify Ethernet module position.

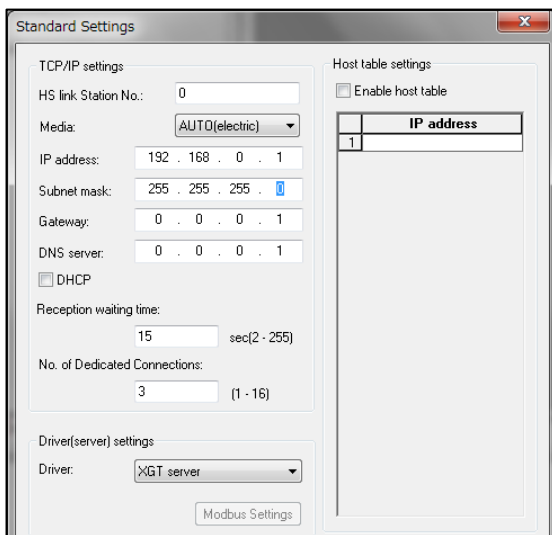


Select Type as "FEnet", Specify Slot position.

- (2) Select "Module Settings..." on the added Ethernet module.



- (3) Set the IP address and subnet mask of Ethernet module. Set the Driver as a "XGT Server"



31.3.2 Port No

Ethernet port no will be shown in the table below.

Protocol	Port no
TCP/IP	2004
UDP/IP	2005

31.4 DeviceXPlorer Settings

31.4.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

CPU TYPE

☒ XGK ☐ XGI ☐ XGR

Network

Base No 0

Slot No 0

Access Points

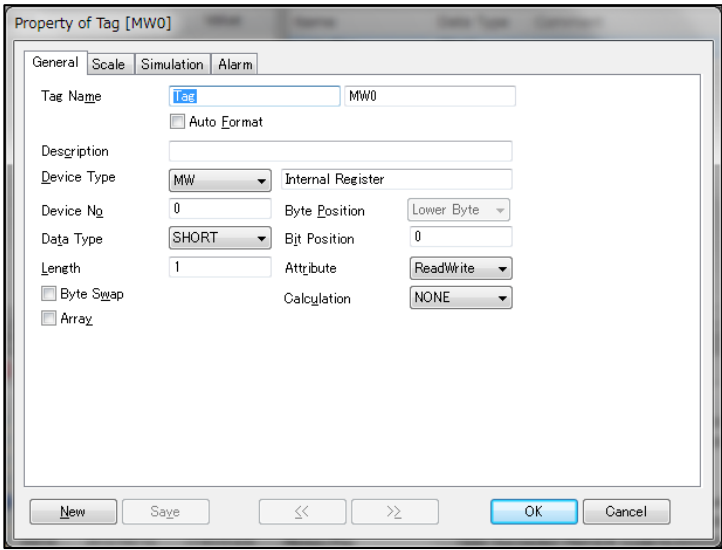
Bit R/W Bit Poke 16

Word R/W 700 Word Poke 16

Item		Description
CPU TYPE		Select access CPU type
Network	Base No	Specify mounting position of the Ethernet module (Base No).
	Slot No	Specify mounting position of the Ethernet module (Slot No).
Access Point	Bit R/W	Batch read / write of bit scale is not performed.
	Word R / W	Specify the maximum access points of batch read / write of word scale. Up to 700 points can be set.
	Bit Poke	Specify the maximum access points of random write of bit scale. Up to 16 points can be set.
	Word Poke	Specify the maximum access points of random write of word scale. Up to 16 points can be set.

31.4.2 Tag Settings

This section explains how to set the tag managed by DeviceXPlorer.



Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 31.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

Note

In asynchronous access, when specifying a data format other than BOOL for a bit device, specify the device number as a multiple of 16.

31.5 Errors

This section explains the details of the PLC errors (response errors) included in the error messages.

ErrorCode (Hex)	Description
03	Device not serviced is requested(XGK:P,M,L,K,R, ,XGI:I,Q,M)
04	Exceed the device area
06	It can read or write maximum 1400 bytes at once.
12	Input parameter setting error.
13	Variable length error
50	Disconnection Error
52	Not Received Frame(Defined frame is not received)
5B	Socket Error
5C	Channel Disconnected.
5D	Standard parameter and frame is not set.
5E	Channel establishment error.
60	Channel is already established.
68	There is no IP address set as partner station.
69	Partner station doesn't open PASSIVE port.
6A	Channel disconnected by STANDBY time.
6B	Exceed the number of established channel.
76	Length of frame header is wrong at dedicated service.
77	Checksum of frame header is wrong at dedicated service.
78	Instruction is wrong at dedicated service.

*For other errors and further details, see the instructions for the CPU and the unit.

32 [GE] PLC Serial Connection

This chapter explains communication with GE PLC Series via Serial interface.

An overview of GE PLC serial connection is shown below.

Overview	
Interface	Serial communication(SNP), RS422/485(4-wire system)
Data Code	ASCII

32.1 PLC Systems

The CPU modules that can be connected are shown below.

Type	Applicable CPU modules		Available port
Series 90-30	IC693CPU311, IC693CPU321, IC693CPU331, IC693CPU341, IC693CPU351, IC693CPU360, IC693CPU364, IC693CSE311, IC693CSE323, IC693CSE340	IC693CPU313, IC693CPU323, IC693CPU340, IC693CPU350, IC693CPU352, IC693CPU363, IC693CPU374, IC693CSE313, IC693CSE331,	Serial port on the power supply module

32.2 List of Devices

The GE PLC devices that can be set in DeviceXPlorer are shown.

The range of devices area varies with CPU and parameter settings. For details, refer to you CPU instructions.

Device name	Device symbol	Address range		Category
		Bit address	Word address *1	
Discrete Inputs	I	1-12288	1-12273	Bit
Discrete Outputs	Q			
Discrete Internals	M			
Genius Global Data	G			
Discrete Temporaries	T	1-256	1-241	
System Status *2	S	1-128	1-113	
Registers	R	1-32640		Word
Analog Inputs	AI			
Analog Outputs	AQ			

*1 When accessing a device whose basic data type is BOOL by specifying a type other than BOOL, it is necessary to

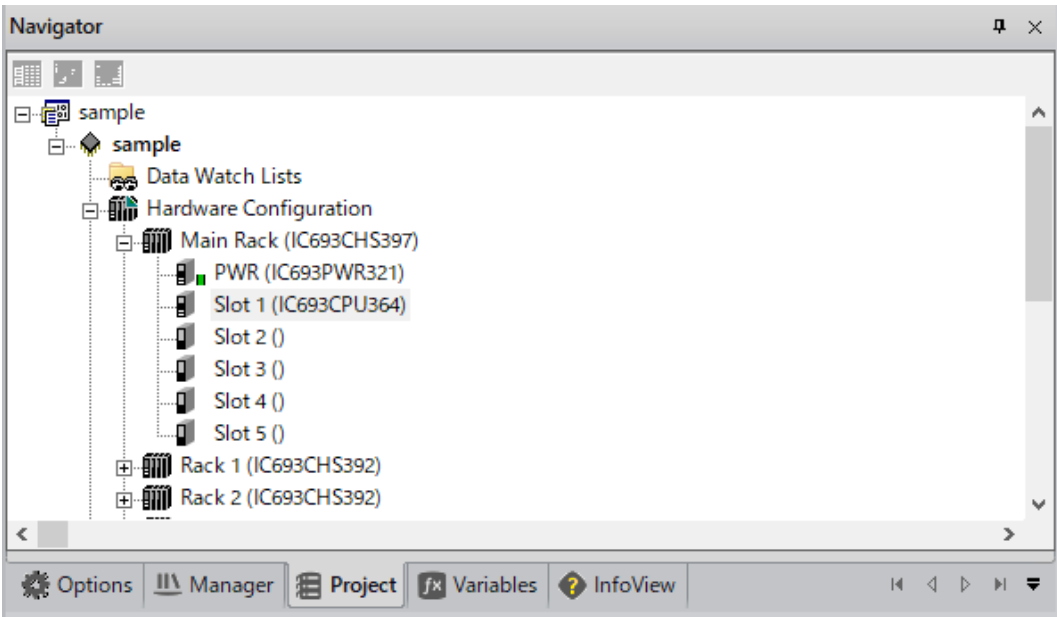
access in 16-bit units, so specify the address with "multiple of 16 + 1".

*2 Read Only device.

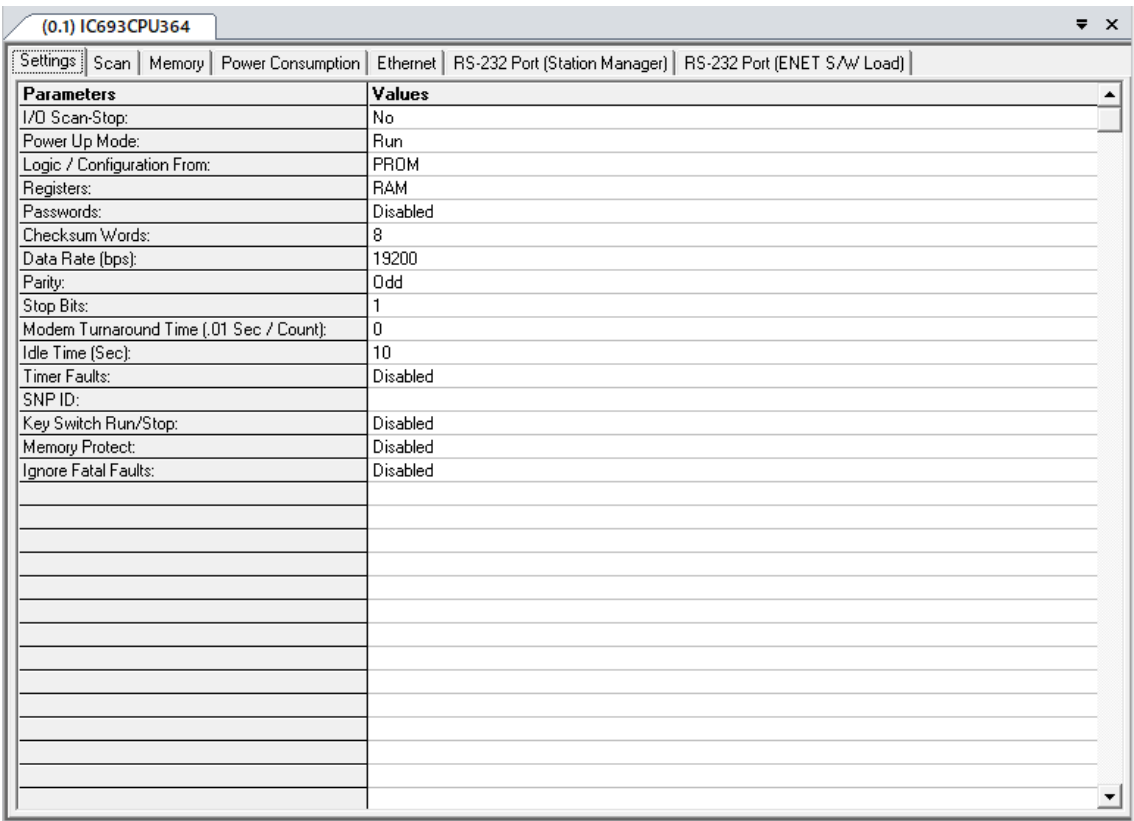
32.3 Serial Module Settings

Serial module settings are configured by GE development tool PAC machine Edition. An example of configuration is as follows.

(1) Specify the slot of target serial module.



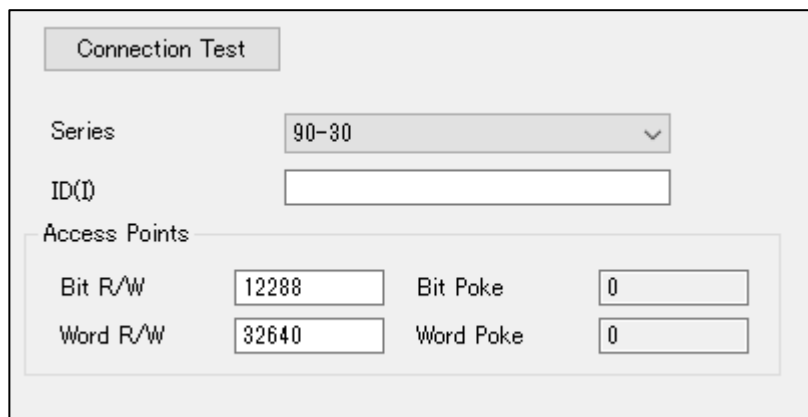
(2) Specify the parameters (Data Rate / Chcksum Words / etc.) of target module.



32.4 DeviceXPlorer Settings

32.4.1 Device Settings

This section explains how to configure the settings for the CPU of PLC to be accessed.



Connection Test

Series: 90-30

ID(I):

Access Points:

Bit R/W: 12288 Bit Poke: 0

Word R/W: 32640 Word Poke: 0

Item		Description
Series		Select the series of access CPU of PLC
ID		Specify a station or node in 6-digit hexadecimal number. When accessing local CPU, specify blank.
Access Point	Bit R/W	Batch read / write of bit scale is not performed.
	Word R / W	Specify the maximum access points of batch read / write of word scale. Up to 700 points can be set.
	Bit Poke	Specify the maximum access points of random write of bit scale. Up to 16 points can be set.
	Word Poke	Specify the maximum access points of random write of word scale. Up to 16 points can be set.

32.4.2 Tag Settings

This section explains how to set the tag managed by DeviceXPlorer.

Property of Tag [M1]

GeneralScaleSimulationAlarmPublisher

Tag Name

TagM1

☐ Auto Format

Description

Device Type

MInternal Coils

Address No.

1

Data Type

BOOL

Byte Position

Lower Byte

Length

1

Bit Position

0

☐ Byte Swap

Attribute

ReadWrite

☐ Array

Calculation

NONE

NewSave<<>>OKCancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 32.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation. Specify a value of 1 or more.

Note

When accessing a device whose basic data type is BOOL by specifying a type other than BOOL, it is necessary to access in 16-bit units, so specify the address with "multiple of 16 + 1".

32.5 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “Import the tag definition file of KEPServerEX” for operating procedure.

32.5.1 List of Devices

Show the list of convertible devices.

KEPServerEX			DeviceXPlorer	
Type	Symbol		Type	Symbol
Discrete Inputs	I	⇒	Discrete Inputs	I
Discrete Outputs	Q	⇒	Discrete Outputs	Q
Discrete Globals	G	⇒	Discrete Internals	M
Internal Coils	M	⇒	Genius Global Data	G
Temporary Coils	T	⇒	Discrete Temporaries	T
Status References	S	⇒	System Status	S
Status References	SA	⇒	Not Supported	
	SB	⇒		
	SC	⇒		
Register References	R	⇒	Registers	R
Analog Inputs	AI	⇒	Analog Inputs	AI
Analog Outputs	AQ	⇒	Analog Outputs	AQ

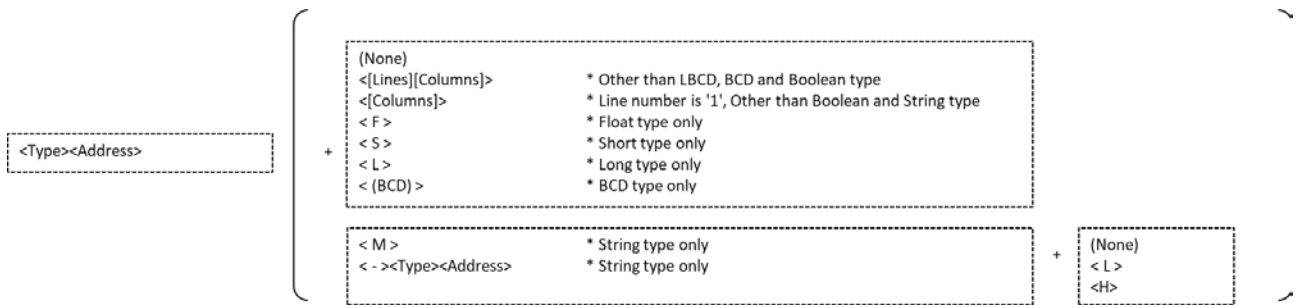
32.5.2 Device Range

Please refer “32.2 List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

32.5.3 Optional Specification

The address format of KEPServerEX is as follows.



Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
[x] [x][1] (x s a number)	Enable the array. Set x to the size.
F	Set 'FLOAT' to the data type.
S	Set 'SHORT' to the data type.
L	Set 'LONG' to the data type.
(BCD)	Set 'BCD Calculation' to the System Caluculation.
ML	Set 'STRING' to the data type.
MH	Set 'STRING' to the data type. Enable byte swap.

Important

Two dimensional array is not supported.

32.6 Errors

This section explains the details of the PLC errors (response errors) included in the error messages.

ErrorCode (Hex)	Description
01	Illegal Service Request: either not defined or not supported.
02	Insufficient Privilege: the minor status field contains the privilege level required for the service request.
04	Protocol Sequence Error: the CPU has received a message that is out of order.
05	Service Request Error: Minor status field contains the request specific error code. See table of Minor Error Status Codes.
06	The PLC CPUs Service Request Queue is full. You should retry later. It is recommended that you wait a minimum of 10 milliseconds before sending another service request.
07	SNP Driver Error: Minor status field contains the request specific error code. See table of Minor Error Status Codes.

*For other errors and further details, see the instructions for the CPU and the unit.

33 MTConnect Connection

This section provides an explanation of communications with a MTConnect compatible devices (e.g. Machine Tools) via Ethernet. The following table describes an overview of communication over MTConnect connections.

Overview	
Communication Method	HTTP communications
Function Type	MTConnect Client
MT Connect version	1.3

33.1 Applicable Units

You can communicate with devices that support MT Connect communication (MTConnect Agent).

Manufacturer	Name
Yamazaki Mazak	INTEGREX Series
Mitsubishi	MV D-CUBES Series
silex technology	Protocol Convertor for CNC Machine Tools “FBR-100AN”
Other	Various MTConnect compatible machine tools

33.2 Used Commands

The following table lists request type that are used with the DeviceXPlorer.

Request Type	Supported	Description
Probe	x	
Current	o	Gets data (latest value) from the device from MTConnect agents.
Sample	x	
Asset	x	

33.3 DeviceXPlorer Settings

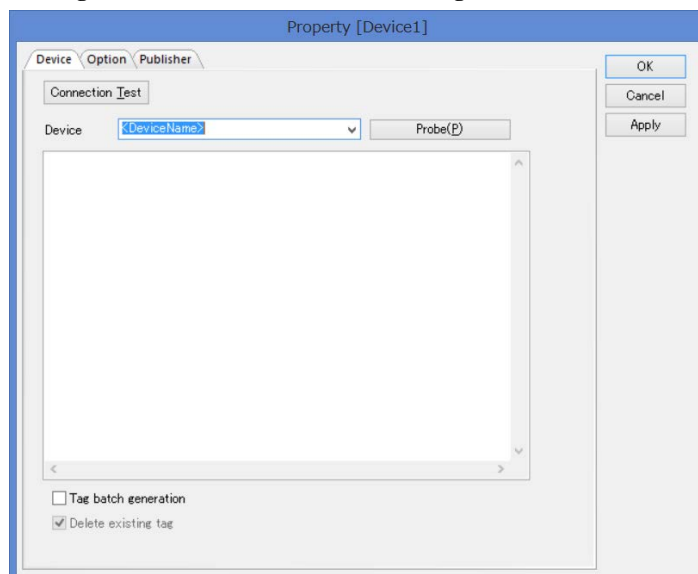
33.3.1 Port Settings

This section explains how to make the settings for the Port of MTConnect to be accessed.

Item	Description
AgentURL	Specify host name or IP address of MT Connect agent.
Port No	Specify Port No. Normally MTConnect uses 5000.
Timeout(sec)	Specify timeout for communicating with MTConnect Agent.
Retry Count	Specify retry count.

33.3.2 Device Settings

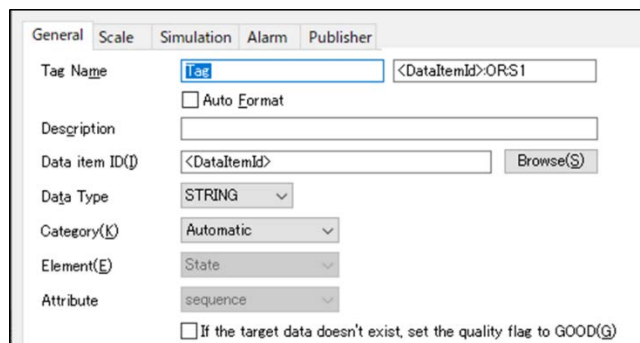
Configure the communication settings for the MTConnect device.



Item	Description
Device	Specify the device name in the MTConnect Agent. You need to pick up the name at the probe XML data which was returned by the target MTConnect Agent.
Tag batch generation	You can generate the tags when you make device.
Delete existing tag	the existing tags are all removed and new tags are imported.

33.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.



Item	Description
Data Item ID	Specify Data Item ID. You need to pick up Data Item ID at the probe XML data which was returned by the target MTConnect Agent.
Data Type	Select data type for this tag.
Category	Specify category of the Data Item.
Element	Specify element name in the specified XML element of the Data Item.
Attribute	Specify attribute in the specified XML element for the Data Item.
If the target data doesn't exist, set the quality flag to GOOD	When this setting is enabled, the quality flag is set to GOOD even if the target data does not exist. * When the communication errors occur, the quality flag is set to "Comm Failure".

34 DPRNT(Serial) Connection

This chapter explains communication with DPRNT(Serial) Connection.

概要	
Link	DPRNT (Serial) communication
Datacode	ASCII

34.1 Applicable equipment

Equipment that can output character strings in the format specified by our company via serial communication.

34.2 List of Devices

Shows a list of devices that can be configured in Device Explorer.

DeviceName	Device symbol	Format	Device range	Category
Relay	EB	Dec	0~128 *1	Bool
Int32 Register	EI	Dec	0~128 *1	Long
Double Register	ED	Dec	0~128 *1	Double
String Register*2	ES	Dec	0~128 *1	String
Queue Register*2	EQ	Dec	10	String

*1 The number of points secured by the port setting is the upper limit of the available address range.

*2 It becomes an array non-compliant device.

34.2.1 EQ Specifications

When the value of EQ is obtained from DPRNT from CNC, the value is stored in the buffer that exists for each device number (0 to 9). The EQ will display the oldest value in the buffer. The buffer can store up to 8192 values, and when the storage size exceeds 8192, the oldest value is deleted from the buffer. By writing to the system tag "\$CNC_Dequeue", it is possible to delete the oldest value in the buffer from the buffer and update the value of the EQ.

34.3 List of system tags

Shows a list of system tags that can be set in DPRNT device.

Tag Name	Type	Description
\$CNC_Clear	Short	It is a system tag for EQ buffer initialization. Write the device number to initialize the EQ buffer of the written device number. For example, if 1 is written, it initializes the buffer of EQ1.
\$CNC_Dequeue	Short	This is a system tag for updating the EQ buffer. Writing the device number deletes the oldest value from the EQ buffer of the written device number. For example, when 1 is written, the oldest value is deleted from the buffer of EQ1.
\$EQ0_Size	Short	Displays the size stored in the EQ0 buffer.
\$EQ1_Size	Short	Displays the size stored in the EQ1 buffer.
\$EQ2_Size	Short	Displays the size stored in the EQ2 buffer.
\$EQ3_Size	Short	Displays the size stored in the EQ3 buffer.
\$EQ4_Size	Short	Displays the size stored in the EQ4 buffer.
\$EQ5_Size	Short	Displays the size stored in the EQ5 buffer.
\$EQ6_Size	Short	Displays the size stored in the EQ6 buffer.
\$EQ7_Size	Short	Displays the size stored in the EQ7 buffer.

\$EQ8_Size	Short	Displays the size stored in the EQ8 buffer.
\$EQ9_Size	Short	Displays the size stored in the EQ9 buffer.

34.4 Communication format

The OPC server uses the code that was shut down between DC2 (12h) and DC4 (14h) of the code sent by DPRNT as data.

In addition, it is possible to update the value of the device linked to DPRNT device in the OPC server.

The storage destination address is from the start code or line feed code of received data to the next space, and data from space to line feed code is stored. When multiple points are requested, it recognizes from the line feed code to the space as the next storage destination address, and stores the data from the space following it to the line feed code. From the NC side, the value can be changed even if the tag name is specified directly.

<Example of communication>

Requirement	
•Store 1234 in tag defined as TAG •Store 12.34 in ED0 •Store 123456789 in EI0 •Store ABC in ES0 •Queuing 1111 to EQ 0	
Machining program	Code sent from CNC
#1=12.34;	
#100=-123456789.;	
POPEN;	<DC2>%
DPRNT[TAG*1234];	TAG 1234<LF>
DPRNT[ED0*#1[44]];	ED0 12.34<LF>
DPRNT[EI0*#100];	EI0 123456789<LF>
DPRNT[ES0*ABC];	ES0 ABC<LF>
DPRNT[EQ0*1111];	EQ0 1111<LF>
PCLOS;	%<DC4>
M30;	
%	

34.5 DeviceXPlorer Settings

34.5.1 Device Settings

Set the access NC.

Property [Device3]

Device Option Publisher

Connection Test

POINTS

POINTS[× 128]

EB 1

EI 1

ED 1

ES 1

Line feed code

☒ LF ☐ CRLF

Delimiter of Group(G) .

OK Cancel Apply

item	Description
EB	Set the upper limit of the address range of relays that can be used in DPRNT communication. The number of usable points is set value times 128 points. The valid range is 1 to 128.
EI	Set the upper limit of the Int32 register address range that can be used for DPRNT communication. The number of usable points is set value times 128 points. The valid range is 1 to 128.
ED	Set the upper limit of the Double register address range that can be used for DPRNT communication. The number of usable points is set value times 128 points. The valid range is 1 to 128.
ES	Set the upper limit of the String register address range that can be used for DPRNT communication. The number of usable points is set value times 128 points. The valid range is 1 to 128.
Line feed code	Specify a line feed code.
Delimiter of Group(G)	Select the delimiter character to be used when specifying the tag in the OPC server group via CNC to DPRNT communication. If this settings is "." And Tag 1 of Group 1 is specified, specify Group1. Tag from CNC.

34.5.2 Tag Settings

Set tags managed by DeviceXPlorer.

Property of Tag [ES0:OR]

General Scale Simulation Alarm Publisher

Tag Name Tag ES0:OR

☐ Auto Format

Description

Device Type ES String Register

Device No 0

Data Type STRING Attribute ReadOnly

Length 1 Calculation NONE

☐ Array

item	Description
Device Type	Select device type.
Device No	Specify device number. Effective range varies from device to device.
Data Type	Specifiles the tag data type.
Length	Specify the size for string type and array type. The data size od one size depends on the basic data type.
Array	Check to define as an array type.
Attribute	Select the tag attributes. Only ReadOnly can be selected.
Calculation	Select from BCD operation, binary/octal /decimal/hexadecimal text type.

35 [Mitsubishi] MITSUBISHI CNC DPRNT Connection

This chapter explains communication with Mitsubishi CNC DPRNT Connection.

The communication outline of Mitsubishi CNC DPRNT connection is shown below.

概要	
Link	Serial communication (DPRNT)
Datacode	ASCII

35.1 Applicable CNC

Series	Applicable port
M800/M80/E80 Series	Built-in Serial port
M700V/M70V/E70 Series	
M700/M70 Series	
C80 Series	
C70 Series	
M600 Series	
M60/60S Series	
E60/E68 Series	
C6/C64/C64T	

*Communication with a CNC that does not have a serial I/F is not possible. Contact us for communication with M5 generations and earlier.

35.2 List of Devices

Shows a list of devices that can be configured in Device Explorer.

DeviceName	Device symbol	Format	Device range	Category
Relay	EB	Dec	0~128 *1	Bool
Int32 Register	EI	Dec	0~128 *1	Long
Double Register	ED	Dec	0~128 *1	Double
String Register*2	ES	Dec	0~128 *1	String
Queue Register*2	EQ	Dec	10	String

*1 The number of points secured by the port setting is the upper limit of the available address range.

*2 It becomes an array non-compliant device.

35.2.1 EQ Specifications

When the value of EQ is obtained from DPRNT from CNC, the value is stored in the buffer that exists for each device number (0 to 9). The EQ will display the oldest value in the buffer. The buffer can store up to 8192 values, and when the storage size exceeds 8192, the oldest value is deleted from the buffer. By writing to the system tag "\$ CNC_Dequeue", it is possible to delete the oldest value in the buffer from the buffer and update the value of the EQ.

35.3 List of system tags

Shows a list of system tags that can be set in Mitsubishi DPRNT.

Tag Name	Type	Description
\$CNC_Clear	Short	It is a system tag for EQ buffer initialization. Write the device number to initialize the EQ buffer of the written device number. For example, if 1 is written, it initializes the buffer of EQ1.
\$CNC_Dequeue	Short	This is a system tag for updating the EQ buffer. Writing the device number deletes the oldest value from the EQ buffer of the written device number. For example, when 1 is written, the oldest value is deleted from the buffer of EQ1.
\$EQ0_Size	Short	Displays the size stored in the EQ0 buffer.
\$EQ1_Size	Short	Displays the size stored in the EQ1 buffer.
\$EQ2_Size	Short	Displays the size stored in the EQ2 buffer.
\$EQ3_Size	Short	Displays the size stored in the EQ3 buffer.
\$EQ4_Size	Short	Displays the size stored in the EQ4 buffer.
\$EQ5_Size	Short	Displays the size stored in the EQ5 buffer.
\$EQ6_Size	Short	Displays the size stored in the EQ6 buffer.
\$EQ7_Size	Short	Displays the size stored in the EQ7 buffer.
\$EQ8_Size	Short	Displays the size stored in the EQ8 buffer.
\$EQ9_Size	Short	Displays the size stored in the EQ9 buffer.

35.4 Communication format

The OPC server uses the code that was shut down between DC2 (12h) and DC4 (14h) of the code sent by DPRNT as data.

In addition, it is possible to update the value of the device linked to Mitsubishi CNC (DPRNT) in the OPC server.

The storage destination address is from the start code or line feed code of received data to the next space, and data from space to line feed code is stored. When multiple points are requested, it recognizes from the line feed code to the space as the next storage destination address, and stores the data from the space following it to the line feed code. From the NC side, the value can be changed even if the tag name is specified directly.

<Example of communication>

Requirement	
•Store 1234 in tag defined as TAG •Store 12.34 in ED0 •Store 123456789 in EI0 •Store ABC in ES0 •Queuing 1111 to EQ 0	
Machining program	Code sent from CNC
#1=12.34;	
#100=-123456789.;	
POPEN;	<DC2>%
DPRNT[TAG*1234];	TAG 1234<LF>
DPRNT[ED0*#1[44]];	ED0 12.34<LF>
DPRNT[EI0*#100];	EI0 123456789<LF>
DPRNT[ES0*ABC];	ES0 ABC<LF>
DPRNT[EQ0*1111];	EQ0 1111<LF>
PCLOS;	%<DC4>
M30;	
%	

35.5 DeviceXPlorer Settings

35.5.1 Device Settings

Set the access NC.

Property [Device3]

Device Option Publisher

Connection Test

POINTS

POINTS[× 128]

EB 1

EI 1

ED 1

ES 1

Line feed code

☒ LF ☐ CRLF

Delimiter of Group(G) .

OK Cancel Apply

item	Description
EB	Set the upper limit of the address range of relays that can be used in DPRNT communication. The number of usable points is set value times 128 points. The valid range is 1 to 128.
EI	Set the upper limit of the Int32 register address range that can be used for DPRNT communication. The number of usable points is set value times 128 points. The valid range is 1 to 128.
ED	Set the upper limit of the Double register address range that can be used for DPRNT communication. The number of usable points is set value times 128 points. The valid range is 1 to 128.
ES	Set the upper limit of the String register address range that can be used for DPRNT communication. The number of usable points is set value times 128 points. The valid range is 1 to 128.
Line feed code	Specify a line feed code.
Delimiter of Group(G)	Select the delimiter character to be used when specifying the tag in the OPC server group via CNC to DPRNT communication. If this settings is "." And Tag 1 of Group 1 is specified, specify Group1. Tag from CNC.

35.5.2 Tag Settings

Set tags managed by DeviceXPlorer.

Property of Tag [ES0:OR]

General Scale Simulation Alarm Publisher

Tag Name Tag ES0:OR

☐ Auto Format

Description

Device Type ES String Register

Device No 0

Data Type STRING Attribute ReadOnly

Length 1 Calculation NONE

☐ Array

item	Description
Device type	Select device type.
Device No	Specify device number. Effective range varies from device to device.
Data type	Specifies the tag data type.
Length	Specify the size for string type and array type. The data size of one size depends on the basic data type.
Array	Check to define as an array type.
Attribute	Select the tag attributes. Only ReadOnly can be selected.
Calculation	Select from BCD operation, binary/octal /decimal/hexadecimal text type.

36 [Mitsubishi] MITSUBISHI CNC EZSocketNc Connection

This chapter explains communication with MITSUBISHI CNC EZSocketNc Connection.

An overview of communication via a MITSUBISHI CNC EZSocketNc connection is shown below.

Overview	
Link	EZSocketNc

Important

- EZSocket doesn't support on DeviceXPlorer 64bit edition. Please use 32bit edition with WOW64 on 64bitOS.
- EZSocket supports only Windows 10 / 7 / Vista.
- EZSocket doesn't support running as service.

36.1 CNC Systems

The table below shows model applicable to MELSEC EZSocketNc connection.

Series	Model
M800	M850W, M830W
M700	M720, M730, M750
M700V	M720VS/VW, M730VS/VW, M750VS/VW
M70	M70 TypeA / TypeB
M70V	M70V TypeA / TypeB
C6/C64	MELDAS C6/C64
C70	C70
NC Trainer plus	NC Trainer2 plus

* If it is customized by the machine vendor, it may not be possible to connect even with the above models.

*Supports machining center and lathe machines.

36.2 List of Devices

The Mitsubishi CNC EZSocketNc devices that can be set in DeviceXPlorer are as shown below.

Device		Parameter		Base Data Type	Attribute	Type			
Device Symbol	Device name	Parameter Symbol	Parameter name			C6 C64	C70	M700 (V) M70 (V)	M800
Alarm	Alarm	NCArm	NC alarm	STRING	R				
		StopCode	Stop code	STRING	R				
		PLCArm Message	PLC alarm message	STRING	R				
		Operator Message	Operator message	STRING	R	✓	✓	✓	✓
		NoAlarmType	No distinction between alarm types	STRING	R				
ToolCompensationNo	Tool compensation number	D-command-ShapeCompensationNo	D command value of shape correction	LONG	R	✓	✓	✓	✓

			number						
		D-command-WearCompensationNo	D command value of wear correction number	LONG	R				
		H-command-LengthCompensationNo	H command value of long correction number	LONG	R	✓	✓	✓	✓
ProgramBlock	Currently program block	Program	program	STRING	R	✓	✓	✓	✓
		BlockNo	Block number	LONG	R				
ProgramNo	Program number	MainProgram	Main program	STRING	R	✓	✓	✓	✓
		SubProgram	Subprogram	STRING	R				
SequenceNo	Sequence number	MainProgram	Main program	LONG	R	✓	✓	✓	✓
		SubProgram	Subprogram	LONG	R				
BlockNo	Block number	MainProgram	Main program	LONG	R	✓	✓	✓	✓
		SubProgram	Subprogram	LONG	R				
SubProgramCallLevel.	Subprogram read level	-	-	LONG	R	✓	✓	✓	✓
UserMachiningProgramInformation	User processing program information	PRG-MAXNUM	Maximum number that can be registered	LONG	R	✓	✓	✓	✓
		PRG-CURNUM	Number currently registered	LONG	R				
		PRG-RESTNUM	Remaining number that can be registered	LONG	R				
		PRG-CHARNUM	Number of registered characters	LONG	R				
		PRG-RESTCHARNUM	Number of remaining characters that can be registered (in units of 250 characters)	LONG	R				
BlockByByte	Number of bytes from the beginning of the program	-	-	LONG	R	-	-	✓	✓
Date	Date Time	Year-Month-Day	Date	LONG	R/W	✓	✓	✓	✓
		Hour-Minute-Second	Times of Day			✓	✓	✓	✓
TotalPower-On Time	Power-on time	-	-	LONG	R/W	✓	✓	✓	✓

TotalProcessing Time	Autonomous driving time	-	-	LONG	R/W	✓	✓	✓	✓
TotalAutomatic OperationTime	Auto start time	-	-	LONG	R/W	✓	✓	✓	✓
ExternalIntegration Time	External integration time	Y234/Y704	Count with Y234 / Y704 ON	LONG	R/W	✓	✓	✓	✓
		Y235/Y705	Count with Y235 / Y705 ON						
InvalidStatus	Invalid state	DisablesSingleBlockStop	Single block stop disabled	BOOL	R	✓	✓	✓	✓
		MSTCommandCompletion	Waiting for MST command completion signal	BOOL	R				
		DisablesFeedHold	Feed hold disabled	BOOL	R				
		DisablesCutting Override	Cutting override disabled	BOOL	R				
		DisablesG09BlockDecelerationCheck	Exact G09 block deceleration check disabled	BOOL	R				
CommandStatus	Operation command status	-	-	LONG	R	✓	✓	✓	✓
CuttingMode	Cutting mode state	-	-	LONG	R	✓	✓	✓	✓
AxisStatus	Servo axis state	1stReferencePositionReturnCompletion.	Axis for which the return to the first reference point of the axis is completed	LONG	R	✓	✓	✓	✓
		2ndReferencePositionReturnCompletion.	Axis for which the return to the second reference point of the axis is complete	LONG	R				
		3rdReferencePositionReturnCompletion.	Axis for which the third	LONG	R				

			reference point return of the axis is completed						
		4thReferencePositionReturnCompletion.	Axis for which the return to the 4th reference point of the axis is completed	LONG	R				
		AxisBeingRemoved	Shaft condition (while removing shaft)	LONG	R				
		ServoOff	Axis state (servo off)	LONG	R				
		MirrorImage	Axis state (mirror image)	LONG	R				
RunStatus	Operating condition	ToolLengthMeasurement.	Tool length is being measured	BOOL	R	✓	✓	✓	✓
		RunAutomaticOperation	During automatic operation	BOOL	R				
		StartAutomaticOperation	During automatic operation startup	BOOL	R				
		PauseAutomaticOperation	During automatic operation suspension	BOOL	R				
ToolSetSize	Number of tool offset sets	-	-	LONG	R	✓	✓	✓	✓
ToolOffsetType	Tool offset type	-	-	LONG	R	✓	✓	✓	✓
ToolOffsetData	Tool offset data	Type1-ToolOffset ^{*2}	Type I: Tool offset amount	DOUBLE	R	✓	✓	✓	✓
		Type2-ToolLengthCompensation-Dimensions ^{*2}	Type II: Tool length correction amount (dimensions)	DOUBLE	R				
		Type2-ToolLengthCompensation-Wear ^{*2}	Type II: Tool length compensation amount (wear)	DOUBLE	R				
		Type2-ToolRadius	Type II: Tool	DOUBLE	R				

		sCompensation- Dimensions*2	diameter correction amount (dimensions)	E					
		Type2-ToolRadiusCompensation- Wear*2	Type II: Tool diameter compensation amount (wear)	DOUBL E	R				
		ToolLengthCompensation-X*2	Cutting edge wear X	DOUBL E	R				
		ToolLengthCompensation-Z*2	Cutting edge wear amount Z	DOUBL E	R				
		ToolLengthCompensation-Y*2	Amount of wear on the cutting edge C (Y)	DOUBL E	R				
		ToolLengthOffset-X*2	Tool length X	DOUBL E	R				
		ToolLengthOffset-Z*2	Tool length Z	DOUBL E	R				
		ToolLengthOffset-Y*2	Tool length C (Y)	DOUBL E	R				
		ToolRadius*2	Cutting edge radius R	LONG	R				
		ToolRadiusWear*2	Cutting edge radius wear amount r	LONG	R				
		HypotheticalToolNosePointNo*2	Virtual cutting edge point number P	LONG	R				
ToolWorkOffset	Work coordinate offset	G54	G54	DOUBL E	R				
		G55	G55	DOUBL E	R				
		G56	G56	DOUBL E	R				
		G57	G57	DOUBL E	R	✓	✓	✓	✓
		G58	G58	DOUBL E	R				
		G59	G59	DOUBL E	R				
		EXTOffset	EXT offset	DOUBL E	R				
ToolLifeManagementType	Tool life management method	-	-	LONG	R/ W	✓	✓	✓	✓
ToolLifeManagementData*1	Tool life management	ToolNo	Tool number	STRING	R	✓	✓	✓	✓
		Status	Status	STRING	R				

	data	Method	Method	STRING	R				
		LengthDimension	Long correction	STRING	R				
		RadiusDimension	Diameter correction	STRING	R				
		Life	Lifespan	STRING	R				
		Used	Use	STRING	R				
		Auxiliary	Auxiliary	STRING	R				
		LengthWear	Long wear	STRING	R				
		RadiusWear	Diameter wear	STRING	R				
		Group	Group	STRING	R				
		TimeManagement	Time management use	STRING	R				
		NumberOfTimesManagement	Number management use	STRING	R				
		StatusA	Status A	STRING	R				
		LifeOfTimeManagement	Time management life	STRING	R				
		LifeOfCountManagement	Number of times management life	STRING	R				
		StatusB	Status B	STRING	R				
		CompensationNumber	Correction number	STRING	R				
		ST	ST	STRING	R				
Parameter	Parameter	-	-	STRING	R	✓	✓	✓	✓
Device	Device	B	Counter	BOOL	R	-	-	✓	✓
		C	Counter coil	BOOL	R			✓	✓
		D	Data register	SHORT	R			✓	✓
		E	Special relay	BOOL	R			✓	✓
		F	Alarm message interface	BOOL	R			✓	✓
		L	Latch relay	BOOL	R			✓	✓
		M	Temporary memory	BOOL	R			✓	✓
		Q	Q device	BOOL	R			✓	✓
		R	File register	SHORT	R			✓	✓
		SM	Special relay	BOOL	R			✓	✓
		SB	Special relay for link	BOOL	R			✓	✓
		SD	Special register	SHORT	R			✓	✓
		ST	Accumulation timer	BOOL	R			✓	✓
		SW	Special	SHORT	R			✓	✓

			register for link						
		TI	Timer coil	BOOL	R			✓	✓
		V	V device	BOOL	R			✓	✓
		W	For 2 output signals to PLC	SHORT	R			✓	✓
		X	Input signal to PLC	BOOL	R			✓	✓
		Y	Output signal to PLC	BOOL	R			✓	✓
		ZR	File register	SHORT	R			-	✓
WorkPosition	Work coordinate position	WorkPosition	Work coordinate position	DOUBLE	R	✓	✓	✓	✓
		WorkPositionWithSkip	Work coordinate position (skip on)	DOUBLE	R				
MachinePosition	Machine position	MachinePosition	Machine position	DOUBLE	R	✓	✓	✓	✓
		MachinePositionWithSkip	Machine position (skip on)	DOUBLE	R				
CurrentPosition	Get current coordinate position	-	-	DOUBLE	R	✓	✓	✓	✓
RemainingCommand	Remaining directive	RemainingCommand	Remaining directive	DOUBLE	R	✓	✓	✓	✓
		RemainingCommandWithSkip	Remaining command (skip on)	DOUBLE	R				
FeedSpeed	Feed speed	FA	F command feed rate	DOUBLE	R	✓	✓	✓	✓
		FM	Manual execution feed rate	DOUBLE	R				
		FS	Synchronous feed rate	DOUBLE	R				
		FC	Autorun feed rate	DOUBLE	R				
		FE	Screw lead	DOUBLE	R				
ProgramPosition	Program position	-	-	DOUBLE	R	✓	✓	✓	✓
GCodeCommand	G-code modal command value	G00-G03G33	G00-G03, G33 Directive modal	DOUBLE	R	✓	✓	✓	✓
		G17-G19	G17-G19 directive modal	DOUBLE	R				

		G90G91	G90, G91 directive modal	DOUBL E	R							
		G22G23	G22, G23 directive modal	DOUBL E	R							
		G94G95	G94, G95 directive modal	DOUBL E	R							
		G20G21	G20, G21 directive modal	DOUBL E	R							
		G40-G42	G40-G42 Directive Modal	DOUBL E	R							
		G43-G44G49	G43, G44, G49 Directive modal	DOUBL E	R							
		G70-G89	G70-G89 Directive Modal	DOUBL E	R							
		G98G99	G98, G99 directive modal	DOUBL E	R							
		G502G512	G50.2, G51.2 directive modal	DOUBL E	R	-	✓					
		G54G541G55-G59	G54, G54.1, G55, G56, G57, G58, G59 Directive modal	DOUBL E	R							
		G61G0611G62G63G631G632G64	G61, G061.1, G62, G63, G63.1, G63.2, G64 directive modal	DOUBL E	R							
		G66G661G67	G66, G66.1, G67 directive modal	DOUBL E	R							
		G401G411G421	G40.1,G41.1, G42.1 directive modal	DOUBL E	R	-	-					
		G68G69	G68,G69 directive modal	DOUBL E	R	✓	✓					
		G96G97	G96,G97 directive modal	DOUBL E	R							
		G14-G16	G14-G16 directive	DOUBL E	R							

			modal						
		G501G511	G50.1,G51.1 directive modal	DOUBL E	R				
		G431G441G471	G43.1,G44.1, G47.1 directive modal	DOUBL E	R				
		G701G107G121 G112G131G113	G70.1,G107, G12.1,G112, G13.1,G113 directive modal	DOUBL E	R	-	-		
FeedCommand	Feed speed correction number	FA	F command feed rate	DOUBL E	R	✓	✓	✓	✓
		FM	Manual execution feed rate	DOUBL E	R				
		FS	Synchronous feed rate	DOUBL E	R				
		FC	Autorun feed rate	DOUBL E	R				
		FE	Screw lead	DOUBL E	R				
		TCP	Tip speed	DOUBL E	R	-	-	✓	✓
M/S/T/BFunction Command	M / S / T / B function command modal value	M-command	M directive	LONG	R/ W	✓	✓	✓	✓
		S-command	S directive	LONG	R/ W				
		T-command	T directive	LONG	R/ W				
		B-command	B directive	LONG	R				
ServoMonitor	Servo monitor	Gain	GAIN	LONG	R	✓	✓	✓	✓
		Droop	Follow-up delay	LONG	R				
		Speed	Actual motor speed	LONG	R				
		Current	Load current	LONG	R				
		MAXCUR1	MAX current 1	LONG	R				
		MAXCUR2	MAX current 2	LONG	R				
		OverLoad	Overload	LONG	R				
		OverReg	Regenerative load	LONG	R				
		CYCCNT	Cycle counter	LONG	R				
		GRIDSP	Grid spacing	LONG/ STRING	R				
		GRID	Grid amount	LONG/ R	R				

				STRING					
		MACPOS	Machine position	LONG/STRING	R				
		MATPOS	Motor end FB	LONG/STRING	R				
		SCAPOS	Machine end FB	LONG/STRING	R				
		FBERROR	FB error	LONG	R				
		DFBCOMP	DFB correction amount	LONG	R				
		RemainCommand	Remaining directive	LONG/STRING	R				
		CurrentPosition.	Present value	LONG/STRING	R				
		ManualInterruptAmount	Manual interrupt amount	LONG/STRING	R				
		AMPDISP	Amplifier display	STRING	R				
		Alarm1	Alarm 1	STRING	R				
		Alarm2	Alarm 2	STRING	R				
		Alarm3	Alarm 3	STRING	R				
		Alarm4	Alarm 4	STRING	R				
ServoDiagnosis	Servo diagnostic information	WorkTime	Cumulative ready-on time	LONG	R	✓	✓	✓	✓
		AlarmHistory1-AlarmNo	Alarm history 1 (number)	LONG	R				
		AlarmHistory2-AlarmNo	Alarm history 2 (number)	LONG	R				
		AlarmHistory3-AlarmNo	Alarm history 3 (number)	LONG	R				
		AlarmHistory4-AlarmNo	Alarm history 4 (number)	LONG	R				
		AlarmHistory5-AlarmNo	Alarm history 5 (number)	LONG	R				
		AlarmHistory6-AlarmNo	Alarm history 6 (number)	LONG	R				
		AlarmHistory7-AlarmNo	Alarm history 7 (number)	LONG	R				
		AlarmHistory8-AlarmNo	Alarm history 8 (number)	LONG	R				
		AlarmHistory1-Time	Alarm history 1 (hours)	LONG	R				
		AlarmHistory2-Time	Alarm history 2 (hours)	LONG	R				
		AlarmHistory3-Time	Alarm history 3 (hours)	LONG	R				
		AlarmHistory4-Time	Alarm history 4 (hours)	LONG	R				
		AlarmHistory5-	Alarm history	LONG	R				

		Time	5 (hours)						
		AlarmHistory6-Time	Alarm history 6 (hours)	LONG	R				
		AlarmHistory7-Time	Alarm history 7 (hours)	LONG	R				
		AlarmHistory8-Time	Alarm history 8 (hours)	LONG	R				
		MNT1	MNT(1)	STRING	R				
		MNT2	MNT(2)	STRING	R				
		MNT3	MNT(3)	STRING	R				
		MNT4	MNT(4)	STRING	R				
		SYS	SYS	STRING	R				
PowerDiagnosis	Power supply diagnostic information	WorkTime	Cumulative ready-on time	LONG	R	✓	✓	✓	✓
		AlarmHistory1-AlarmNo	Alarm history 1 (number)	LONG	R				
		AlarmHistory2-AlarmNo	Alarm history 2 (number)	LONG	R				
		AlarmHistory3-AlarmNo	Alarm history 3 (number)	LONG	R				
		AlarmHistory4-AlarmNo	Alarm history 4 (number)	LONG	R				
		AlarmHistory5-AlarmNo	Alarm history 5 (number)	LONG	R				
		AlarmHistory6-AlarmNo	Alarm history 6 (number)	LONG	R				
		AlarmHistory7-AlarmNo	Alarm history 7 (number)	LONG	R				
		AlarmHistory8-AlarmNo	Alarm history 8 (number)	LONG	R				
		AlarmHistory1-Time	Alarm history 1 (hours)	LONG	R				
		AlarmHistory2-Time	Alarm history 2 (hours)	LONG	R				
		AlarmHistory3-Time	Alarm history 3 (hours)	LONG	R				
		AlarmHistory4-Time	Alarm history 4 (hours)	LONG	R				
		AlarmHistory5-Time	Alarm history 5 (hours)	LONG	R				
		AlarmHistory6-Time	Alarm history 6 (hours)	LONG	R				
		AlarmHistory7-Time	Alarm history 7 (hours)	LONG	R				
		AlarmHistory8-Time	Alarm history 8 (hours)	LONG	R				
		MNT1	MNT(1)	STRING	R				
		MNT2	MNT(2)	STRING	R				
		MNT3	MNT(3)	STRING	R				
		MNT4	MNT(4)	STRING	R				
		SYS	SYS	STRING	R				

SpindleMonitor	Main axis monitor	Gain	Spindle position loop gain	LONG	R	✓	✓	✓	✓
		Droop	Position deviation amount	LONG	R				
		SpindleRotation Speed	Effective rotation speed of the motor	LONG	R				
		Load	Main shaft motor load	LONG	R				
		LEDDisplay	Amplifier display	STRING	R				
		Alarm1	Alarm 1	STRING	R				
		Alarm2	Alarm 2	STRING	R				
		Alarm3	Alarm 3	STRING	R				
		Alarm4	Alarm 4	STRING	R	-	-	✓	✓
		CycleCount	CYC CNT	LONG	R	✓	✓	✓	✓
		ControlInput1	Control input 1	LONG	R				
		ControlInput2	Control input 2	LONG	R				
		ControlInput3	Control input 3	LONG	R				
		ControlInput4	Control input 4	LONG	R				
		ControlOutput1	Control output 1	LONG	R				
		ControlOutput2	Control output 2	LONG	R				
		ControlOutput3	Control output 3	LONG	R				
		ControlOutput4	Control output 4	LONG	R				
SpindleDiagnosiss	Axis diagnostic information	WorkTime	Cumulative ready-on time	LONG	R	✓	✓	✓	✓
		AlarmHistory1-AlarmNo	Alarm history 1 (number)	LONG	R				
		AlarmHistory2-AlarmNo	Alarm history 2 (number)	LONG	R				
		AlarmHistory3-AlarmNo	Alarm history 3 (number)	LONG	R				
		AlarmHistory4-AlarmNo	Alarm history 4 (number)	LONG	R				
		AlarmHistory5-AlarmNo	Alarm history 5 (number)	LONG	R				
		AlarmHistory6-AlarmNo	Alarm history 6 (number)	LONG	R				
		AlarmHistory7-AlarmNo	Alarm history 7 (number)	LONG	R				

		AlarmHistory8-AlarmNo	Alarm history 8 (number)	LONG	R				
		AlarmHistory1-Time	Alarm history 1 (hours)	LONG	R				
		AlarmHistory2-Time	Alarm history 2 (hours)	LONG	R				
		AlarmHistory3-Time	Alarm history 3 (hours)	LONG	R				
		AlarmHistory4-Time	Alarm history 4 (hours)	LONG	R				
		AlarmHistory5-Time	Alarm history 5 (hours)	LONG	R				
		AlarmHistory6-Time	Alarm history 6 (hours)	LONG	R				
		AlarmHistory7-Time	Alarm history 7 (hours)	LONG	R				
		AlarmHistory8-Time	Alarm history 8 (hours)	LONG	R				
		MNT1	MNT(1)	STRING	R				
		MNT2	MNT(2)	STRING	R				
		MNT3	MNT(3)	STRING	R				
		MNT4	MNT(4)	STRING	R				
		SYS	SYS	STRING	R				
AbsPositionMonitor	Absolute position monitor information	ABSSYS	Detection system	STRING	R	✓	✓	✓	✓
		POFPOS	Power off position	LONG/STRING	R				
		PONPOS	Power-on position	LONG/STRING	R				
		MACPOS	Present location	LONG/STRING	R				
		R0	R0	LONG	R				
		P0	P0	LONG	R				
		E0	E0	LONG	R				
		Rn	Rn	LONG	R				
		Pn	Pn	LONG	R				
		En	En	LONG	R				
		ABSn	ABSn	LONG	R				
		ABS0	ABS0	LONG	R				
PowerConsumption	Power consumption	PresentConsumption	Currently total power consumption	DOUBLE	R	-	-	-	✓
		PresentPowerConsumption-Servo Axis	Drive unit servo shaft Current power consumption	DOUBLE	R				
		PresentPowerConsumption-Spindle	Drive unit spindle Current power	DOUBLE	R				

			consumption						
IntegralPower	Integrated power	AccumulatedConsumption	Cumulative total power consumption	DOUBLE	R				
		FixedConsumptionCorrection	Integrated fixed power consumption correction amount	DOUBLE	R				
		AccumulatedConsumption-Servo Axis	Drive unit servo shaft integrated power consumption (fluctuation)	DOUBLE	R				
		AccumulatedRegeneration-Servo Axis	Drive unit Servo shaft integrated regenerative power (variable amount)	DOUBLE	R	-	-	-	✓
		AccumulatedConsumption-Spindle	Drive unit spindle integrated power consumption (fluctuation)	DOUBLE	R				
		AccumulatedRegeneration-Spindle	Drive unit spindle integrated regenerative power (variable amount)	DOUBLE	R				

*1 The Selectability of parameters depends on the combination of the machining center system, lathe system, and tool life management method.

36.3 DeviceXPlorer Settings

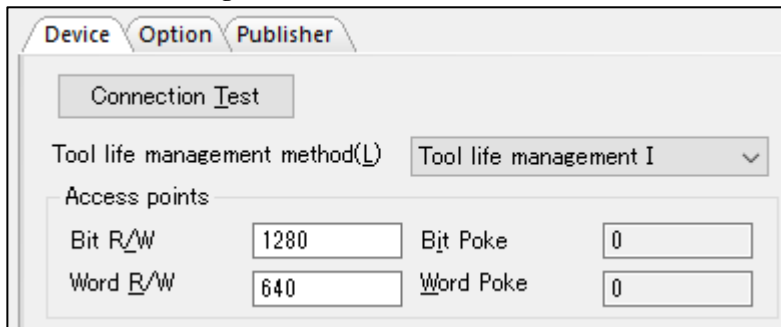
36.3.1 Port Setting

Set the access target Port.

Item	Description
Series	Please select the NC series.
Classification	Please select the Classification.
NC card number	Please specify the NC card number.
C6/C64/M70(V)/M700(V)/M800 connection settings	
Device address	Please specify the Device address.
C70 connection settings	
PC seide	
Protocol	Please select the Protocol.
Network No.	Please specify the Network No.
Area code	Please specify the Area code.
PLC side	
Interface	Please select the Interface.
Device address	Please specify the Device address.
Network No.	Please specify the Network No.
Area code	Please specify the Area code.
Multi CPU	Please select the Multi CPU.
System	Please specify the System.

36.3.2 Device Settings

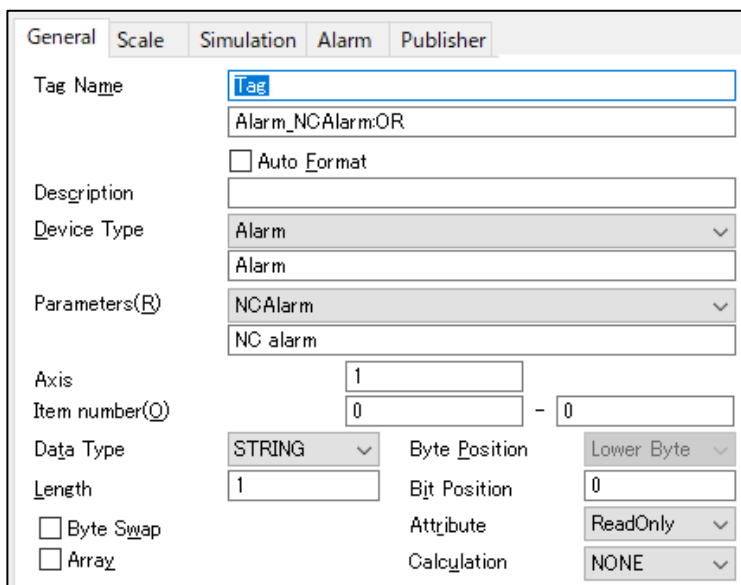
Set the access target Device.



Item	Description
Tool life management method	Please select the Tool life management method.

36.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.



Item	Description
Device Type	Please specify the Device Type.
Parameters	Please specify the address No. Parameters vary depending on the group.
Axis	Please specify the Axis.
Item number	Please specify the Item number, Address, Tool set number or Group number – Tool number. Level vary depending on Device Type and Parameters.

37 [Mitsubishi] EDM Ethernet Connection

This chapter explains communication with Mitsubishi CNC DPRNT Connection.

概要	
Link	DNC
Datacode	Shift-JIS

37.1 Applicable EDM

Type	Series	Applicable port
Wire EDM	MV Series	Built-in Ethernet port
	MP Series	
	MX Series	
	NA Series	
	BA Series	
	PA Series	
	FA Series	
	QA Series	
Die-sinker EDM	SV-P Series	
	EA Series	
	MA2000	
	VA Series	
Fine hole EDM	SH Series	
	VH Series	

37.2 List of Device

Shows a list of devices that can be configured in Device Explorer.

Item		Device	Parameter	Attribute	Base Data Type	Type	
						Wire	Die-sinker*
Variable		H	-	R/W	DOUBLE	✓	✓
Status	Preparation	Status	Preparation Start	R	BOOL	✓	✓
	Alarm		Alarm	R	BOOL	✓	✓
	Start		Start	R	BOOL	✓	✓
	Stop		Stop	R	BOOL	✓	✓
	Program end		ProgramEnd	R	BOOL	✓	✓
	Program stop		ProgramStop	R	BOOL	✓	✓
	Machining		Machining	R	BOOL	✓	✓
	Goto		Goto	R	BOOL	✓	-
	Program operation		Program Operating	R	BOOL	✓	✓
	SettingUp		SettingUp	R	BOOL	-	✓
	L number		L-No	R	ULONG	✓	✓
	N number		N-No	R	ULONG	✓	✓
	B number		B-No	R	ULONG	✓	✓
	Program error		Program Error	R	ULONG	✓	✓
	Operation error		Operation Error	R	ULONG	✓	✓
	Sequence Error		Sequence Error	R	ULONG	✓	✓
	Stop number		StopNo	R	ULONG	✓	✓
	Starting time (hours)		Starting Time_Hour	R	USHORT	-	✓
	Starting time (min)		Starting Time_Minute	R	USHORT	-	✓
	Starting time (seconds)		Starting Time_Second	R	USHORT	-	✓
	Processing remaining time (hours))		WireRemaining TimeHour	R	USHORT	✓	-
	Processing remaining time (Minute)		WireRemaining TimeMinute	R	USHORT	✓	-
	Processing remaining time (second)		WireRemaining TimeSecond	R	USHORT	✓	-
	0.1M mode		01μMode	R	BOOL	✓	-
	Manual Mode		ManualMode	R	BOOL	✓	-
	Automatic Mode		AutomaticMode	R	BOOL	✓	-

	DielectricFluid on		DielectricFluidON	R	BOOL	✓	-
	Wire on		WireON	R	BOOL	✓	-
	Processing condition (E-pack) number		E-PackNo	R	ULONG	-	✓
Remote*2	Reset	Remote	Reset	W	BOOL	✓	✓
	Manual mode		ManualMode	W	BOOL	✓	✓
	With machining fluid		DielectricFluidON	W	BOOL	✓	✓
	Wire on		WireON	W	BOOL	✓	-
	MachiningON		MachiningON	W	BOOL	✓	✓
	Discharge on		DischargeON	W	BOOL	-	✓
	RapidFill off		RapidFillON	W	BOOL	-	✓
	Stop		Stop	W	BOOL	✓	✓
	Start		Start	W	BOOL	✓	✓
	DielectricFluid Off		DielectricFluidOFF	W	BOOL	✓	✓
	Wire off		WireOFF	W	BOOL	✓	-
	Machining off		MachiningOFF	W	BOOL	✓	✓
	Discharge off		DischargeOFF	W	BOOL	-	✓
	RapidFill off		RapidFillOFF	W	BOOL	-	✓
Program Download	Execute*2	Program Download	Execute	W	BOOL	✓	✓
	Program number		ProgramNo	R /W	ULONG	✓	✓
	NC program*3		NCProgram	R /W	STRING	✓	✓
	Result		Result	R /W	ULONG	✓	✓
Program Upload	Execute*2	Program Upload	Execute	W	BOOL	✓	✓
	Program number		ProgramNo	R /W	ULONG	✓	✓
	Result		Result	R /W	ULONG	✓	✓
Program Search	Execute*2	Program Search	Execute	W	BOOL	✓	✓
	Program number		ProgramNo	R /W	ULONG	✓	✓
	Sequence number		Sequence No	R /W	ULONG	✓	✓
	Block number		BlockNo	R /W	ULONG	✓	✓
	Result		Result	R /W	ULONG	✓	✓
Erase	Execute*2	Erase	Execute	W	BOOL	✓	✓
	Program number		ProgramNo	R /W	ULONG	✓	✓

	Result		Result	R /W	ULONG	✓	✓
SYN ^{*3}		SYN	-	W	BOOL	✓	✓

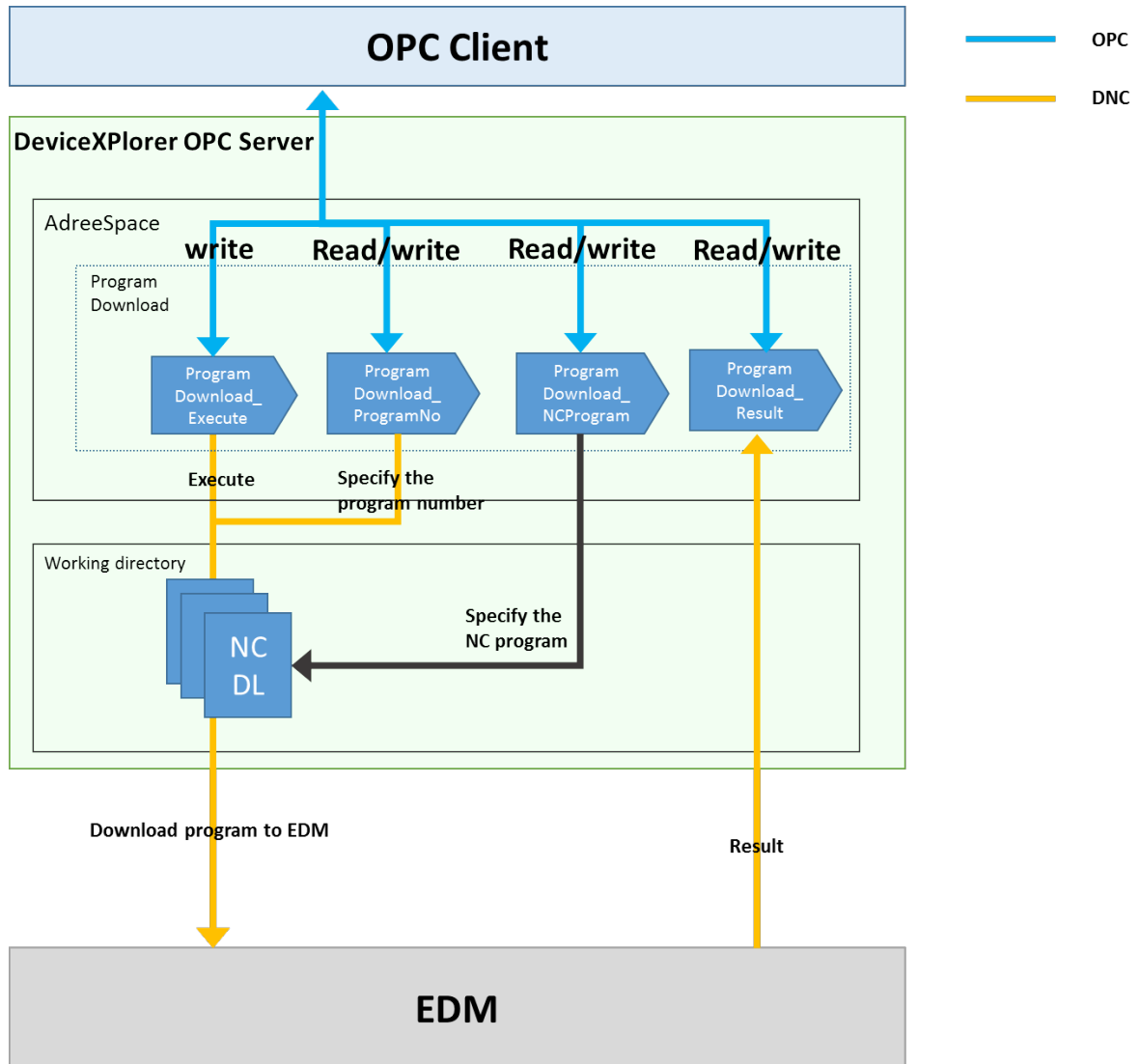
*1 Die-sinker EDM is include Fine hole EDM.

*2 Excute, when the Tag was writed.

*3 Specify the file name that was described NC program.

37.2.1 ProgramDownload

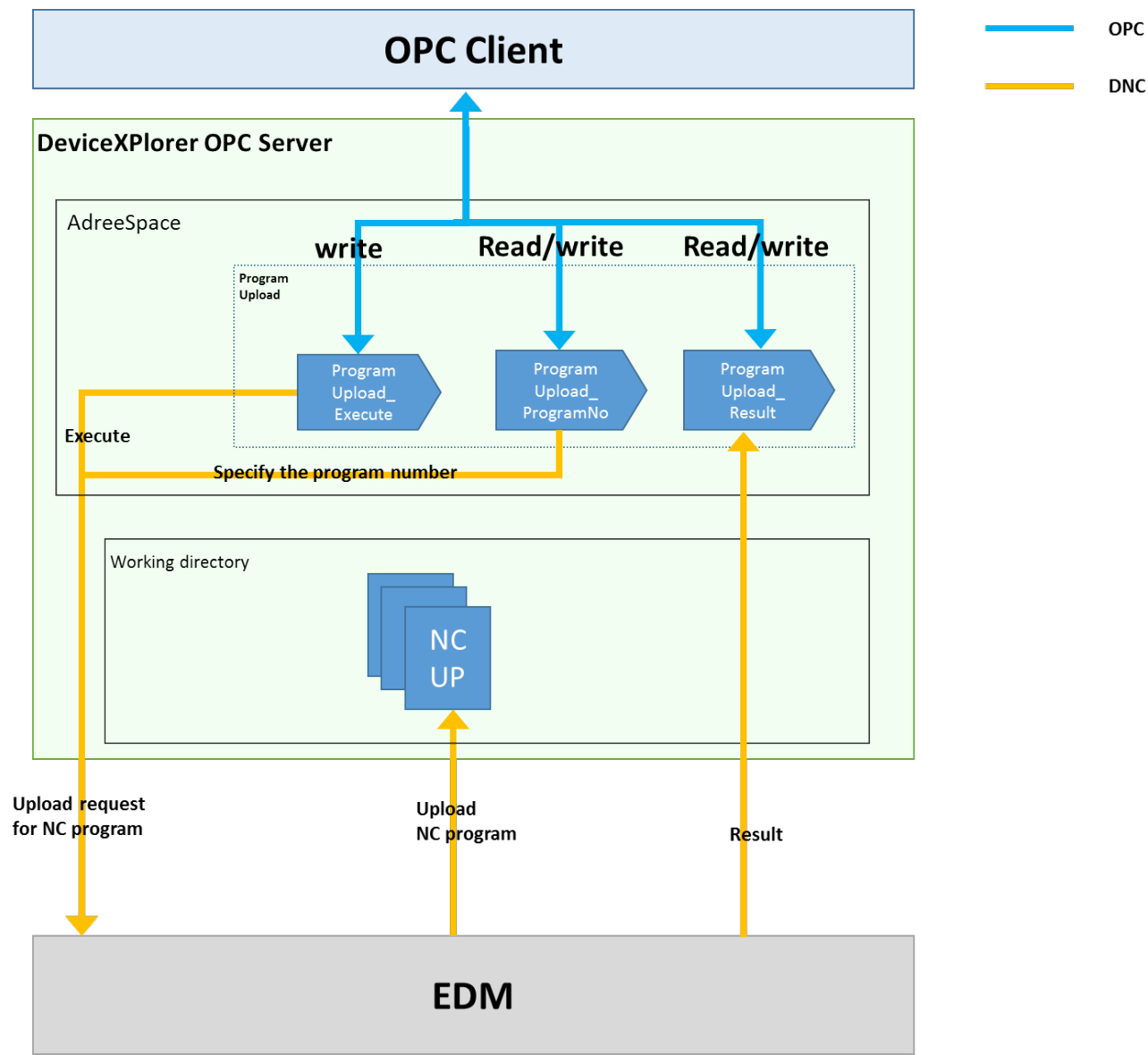
When write to Tag as set to “ProgramDownload_Execute”,
Transfers the contents of the NC program file saved in the work directory specified by
“ProgramDownload_NCProgram”
to the EDM as the program number specified by “ProgramDownload_ProgramNo”.
The result is stored in “ProgramDownload_Result”.



Parameter	Tag	Description
Execute	ProgramDownload_Execute	When write the tag, the program download is executed.
ProgramNo	ProgramDownload_ProgramNo	Stores the program number used for program download
NCProgram	ProgramDownload_NCProgram	Stores the file name used for program download
Result	ProgramDownload_Result	The result is stored.

37.2.2 ProgramUpload

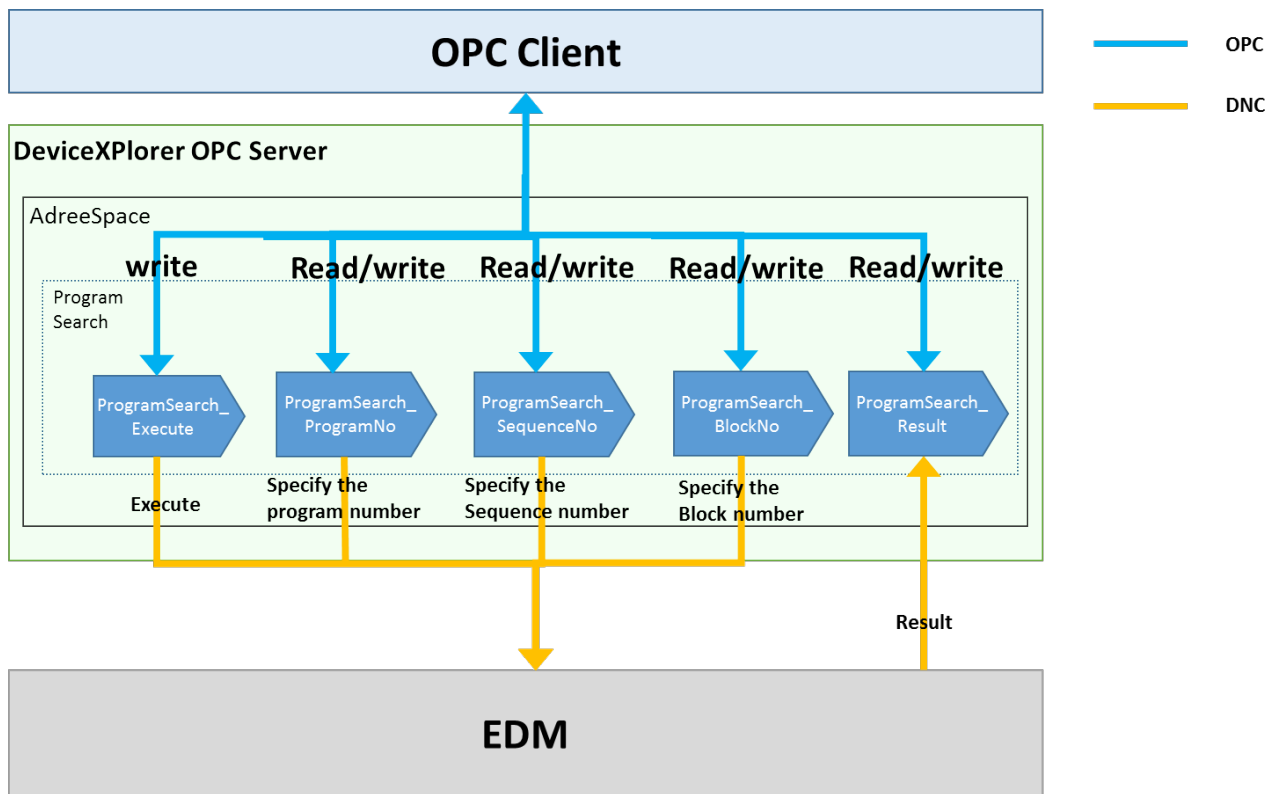
When write to Tag as set to “ProgramUpload_Execute”,
get NC program with the program number specified in “ProgramUpload_ProgramNo” from EDM
and save it in the working directory specified by the Device property.
The result is stored in “ProgramUpload_Result”.



Device	Parameter	Tag	Description
Program Upload	Execute	ProgramUpload_Execute	When write the tag, the program upload is executed.
	ProgramNo	ProgramUpload_ProgramNo	Stores the program number used for program upload.
	Result	ProgramUpload_Result	The result is stored.

37.2.3 ProgramSeach

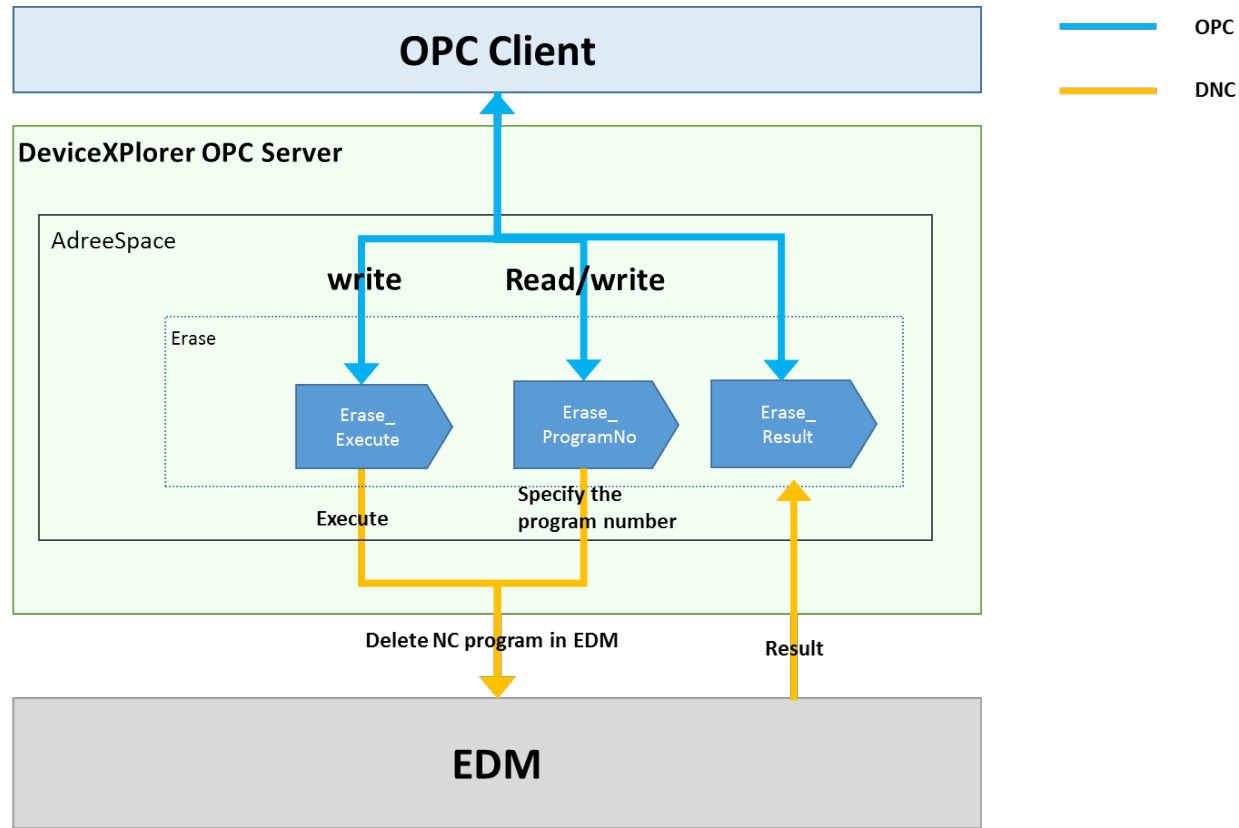
When write to Tag as set to “ProgramSearch_Execute”,
Program number specified by ProgramSearch_ProgramNo,
Sequence number specified by ProgramSearch_SequenceNo,
and Specify the block number specified in ProgramSearch_BlockNo
are used to execute the remote control.



Device	Parameter	Tag	Description
Program Search	Execute	ProgramSearch_Execute	When write the tag, the program search is executed.
	ProgramNo	ProgramSearch_ProgramNo	Stores the program number used for program search.
	SequenceNo	ProgramSearch_SequenceNo	Stores the sequence number used for program search.
	BlockNo	ProgramSearch_BlockNo	Stores the block number used for program search.
	Result	ProgramSearch_Result	The result is stored.

37.2.4 Erase

When write to Tag as set to “Erase _Execute”,
Deletes the program in the EDM with the program number specified by “Erase_ProgramNo”.
The result is stored in Erase _Result.



Device	Parameter	Tag	Description
Erase	Excute	Erase_ Execute	When write the tag, the erase is executed.
	Program No	Erase_ ProgramNo	Stores the program number used for erase.
	Result	Erase_ Result	The result is stored.

37.3 DeviceXPlorer Settings

37.3.1 Device Settings

Set the access EDM.

EDM type: Wire EDM

Program transfer function

Working directory: C:\Users\kawabat\Documents\TAKEBIE

☐ Importing of tags

☐ Delete existing tags

Item	Description
EDM type	Select the type of EDM.
Working directory	Specify the folder to store the NC program.
Importing of tags	Generat the tags automatically.
Delete existing tags	Delete existing tags.

37.3.2 Tag Settings

Set the access Tag.

The screenshot shows a 'Tag Settings' dialog box with the 'General' tab active. The fields are as follows:

- Tag Name:** Two input fields containing 'Tag' and 'H1'.
- Auto Format:** An unchecked checkbox.
- Description:** A single-line text input field.
- Device Type:** A dropdown menu showing 'H' and a text input field containing 'Variable'.
- Parameter(P):** A dropdown menu and a text input field.
- Device No:** A text input field containing '1'.
- Attribute:** A dropdown menu showing 'ReadWrite'.
- Data Type:** A dropdown menu showing 'DOUBLE'.
- Calculation:** A dropdown menu showing 'NONE'.
- Length:** A text input field containing '1'.
- Array:** An unchecked checkbox.

Item	Description
DeviceType	Select the Devicetype.
Parameter	Select the parameter. It can select ,when Devicetype is not “H” or “SYN”.
Device o	Select the Device Number. It can select ,when Devicetype is “H”.

37.4 Errors

This section explains the details of the PLC errors (response errors) included in the error messages.

ErrorNo.	Content	Details
1	Illegal command format	The NC cannot recognize the command.
2	Incorrect parameter value	The parameter sent to the NC together with the command is incorrect or the parameter scope is wrong.
3	Transmission error	Communication error
4	Execution not possible	NC cannot execute the received command
5	File access not possible	Machining condition, variable or program is locked and cannot be edited
7	Program name duplicated	An existing program in NC is designated
8	Stored files	Exceeding the storage capacity of NC
9	No program name	Designated program does not exist in NC
11	Search cannot be started	The NC side cannot receive the search command
12	Link not possible	“Remote Ctrl” switch of NC set to OFF
13	Remote control failure	The NC side cannot receive the remote control information
15	Illegal address	An illegal address was designated
16	During program operation	When system variable downloading is tried during program operation
17	No keyword field	No keyword field was designated in the field line
18	Field definition error	An illegal field name was designated in the field line
19	Field line error	Other field line errors
20~	Others	Errors occurred during processing

38 [Fanuc] CNC DPRNT Serial connection

This chapter describes communication with FANUC CNCs.

The communication outline of the FANUC DPRNT connection is shown.

概要	
Interface	Serial connection (DPRNT)
Datacode	ASCII,ISO,EIA

38.1 Applicable CNC

Series name	Model	Operation port
FANUC i Series CNC	FANUC Series 0i FANUC Series 15i FANUC Series 16i/18i/21i FANUC Series 30i/21i/32i/35i FANUC Power Mate i FANUC Series Motion i	RS-232C
FANUC Series CNC	FANUC Series 0 FANUC Series 15 FANUC Series 16/18/20/21 FANUC Series Mate-D/F/H	

*The machine may not be compatible with the DPRNT function, please contact the machine vendor regarding the availability of connection.

38.2 List of Device

The following system tags are available for FANUC DPRNT communication.

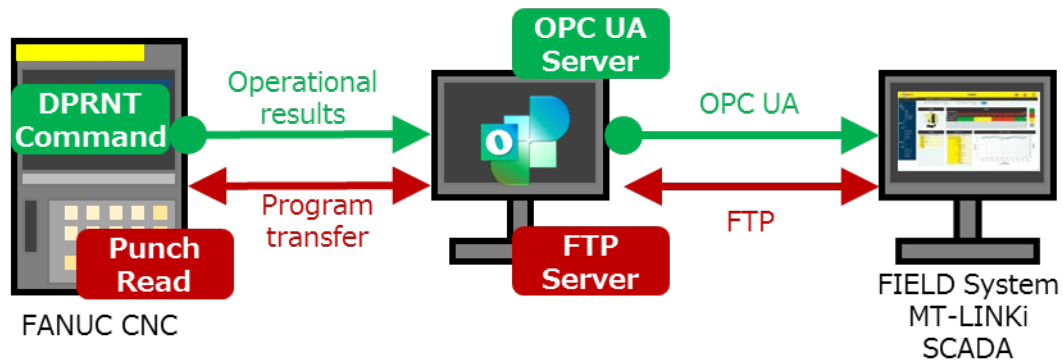
Tag name	Type	Description
ProductName	String	Machined part name acquired from NC
ProductResultNumber	Int32	Total number of machined parts acquired from NC
value01~value10	Double	Numerical data (10 pieces) acquired from NC
string01~string10	String	Character string type data acquired from NC (10)
PrintOutput	String	DPRINT command obtained from NC
PrintOutputQueueSize	UInt32	Number of unprocessed data of DPRINT command acquired from NC
PrintOutputQueueText	String	Raw data of DPRINT command acquired from NC
Refresh	Boolean	Processing instruction of DPRINT command acquired from NC
RefreshSize	UInt32	Number of DPRINT commands processed by one processing instruction
SerialPort	UInt32	Communication serial port number

Important

- Up to 4096 received messages from NC can be queued (PrintOutputQueueSize, PrintOutputQueueText).

38.3 Function Overview

38.3.1 Configuration Diagram (FIELD system / MT LINKi)



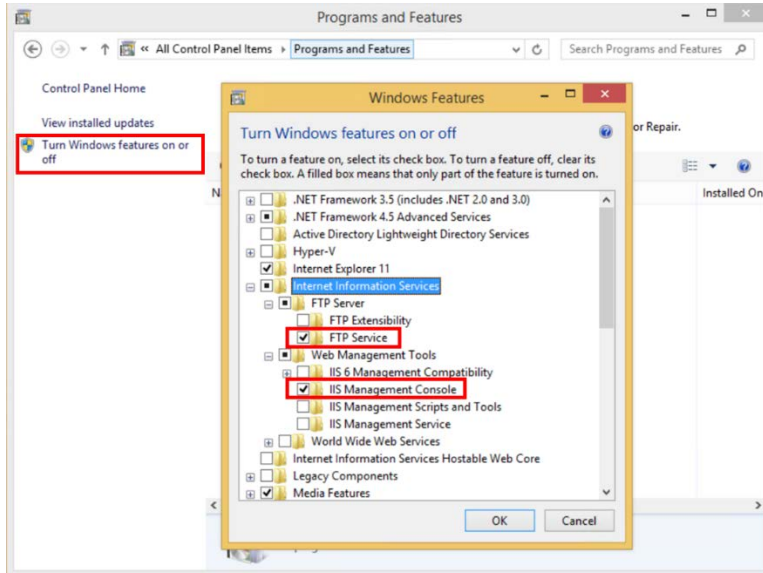
Function	Description
Operation results collection function	Arbitrary information can be sent to Device Explorer by executing the DPRNT command in the NC program. The DPRNT instruction can store a value in the system tag of Device Explorer by describing a simple identifier command with FANUC designation. The latest value stored in the system tag is referenced by OPC UA communication from FIELD system or MT-LINKi. If you output an arbitrary message that does not correspond to the identifier with the DPRNT command, you can queue the message in the system tag "PrintOutput" or output the contents to a file.
Program function transfer	The CNC program can be uploaded by performing punching operation with CNC. The NC program uploaded from CNC to Device Explorer is created as a file in a pre-specified directory in the PC where Device Explorer is installed. The NC program can be downloaded by performing a lead operation with CNC. Transfer the contents of files in a pre-specified directory in the PC where Device Explorer is installed to CNC. Upload and download files in Device Explorer are managed by FIELD system or MT-LINKi using FTP communication.

38.4 FTP server construction

Describes the procedure for building an FTP server without SSL.

38.4.1 Enabling FTP server function

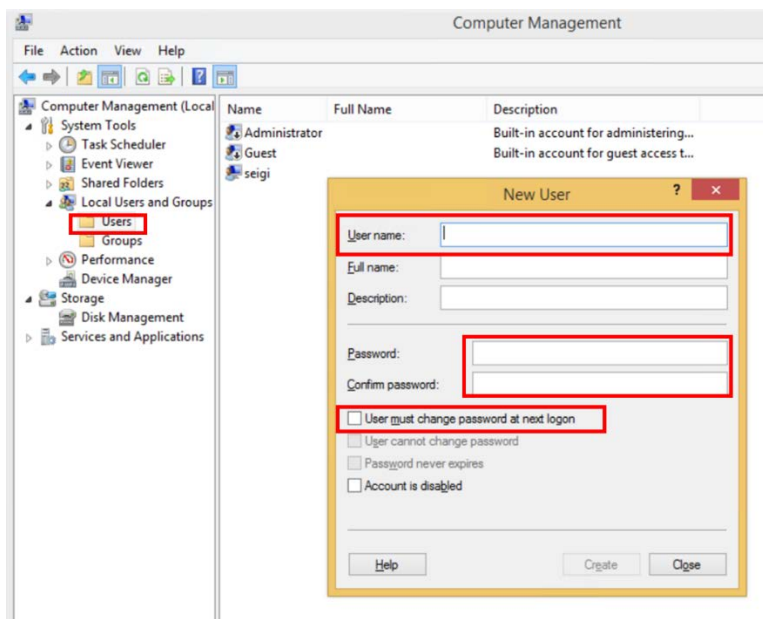
Enable FTP server function(“FTP Service and IIS Management Console”) from Control Panel → Program → Enable / Disable Windows function



38.4.2 FTP user creation

Control Panel>Administrative Tools>Computer Management
Local Users and Groups>Users>New User

Input the “User name”, “Password”, “Confirm password”.
And create with unchecked “User must change password next login”.



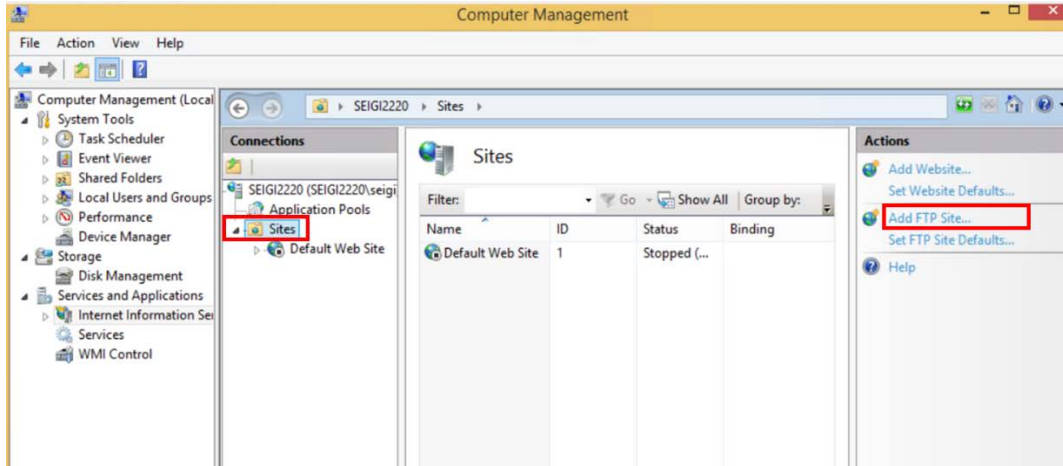
38.4.3 Creating an FTP site

Add FTP site

Control Panel>Administrative Tools

Select “Internet Information Service(IIS) Manager”>“Sites”.

And click “Add FTP Site”.

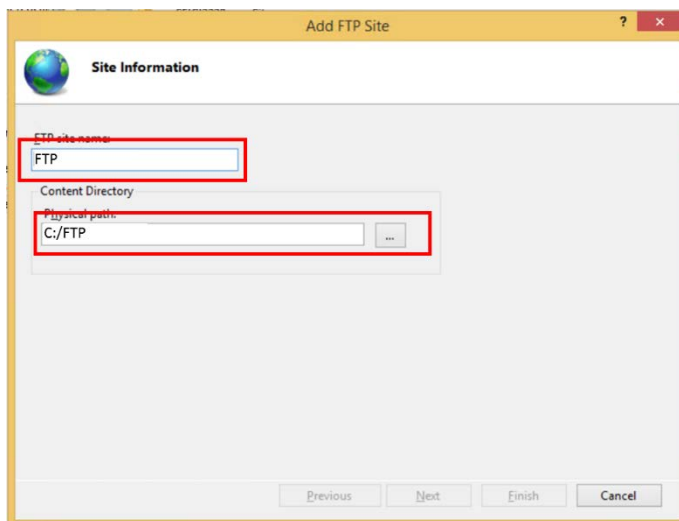


Enter site information

FTPsite name → Any

Content Directory → Physical path

(Specify C: ¥ FTP in the image below)



Bind and SSL settings

Check “No SSL”.

The screenshot shows the 'Add FTP Site' dialog box with the 'Binding and SSL Settings' tab selected. The 'Binding' section has 'IP Address' set to 'All Unassigned' and 'Port' set to '21'. The 'Enable Virtual Host Names' checkbox is unchecked. The 'Start FTP site automatically' checkbox is checked. In the 'SSL' section, the 'No SSL' radio button is selected and highlighted with a red box. The 'Allow SSL' and 'Require SSL' radio buttons are unselected. The 'SSL Certificate' dropdown is set to 'Not Selected'. At the bottom, there are 'Previous', 'Next', 'Finish', and 'Cancel' buttons.

Authentication and authorization information

Authentication

Check “Basic”

authorization

Select “Specified users”, and Input the user name created in (34.3.2) above.

Check “Permission” for both reading and writing.

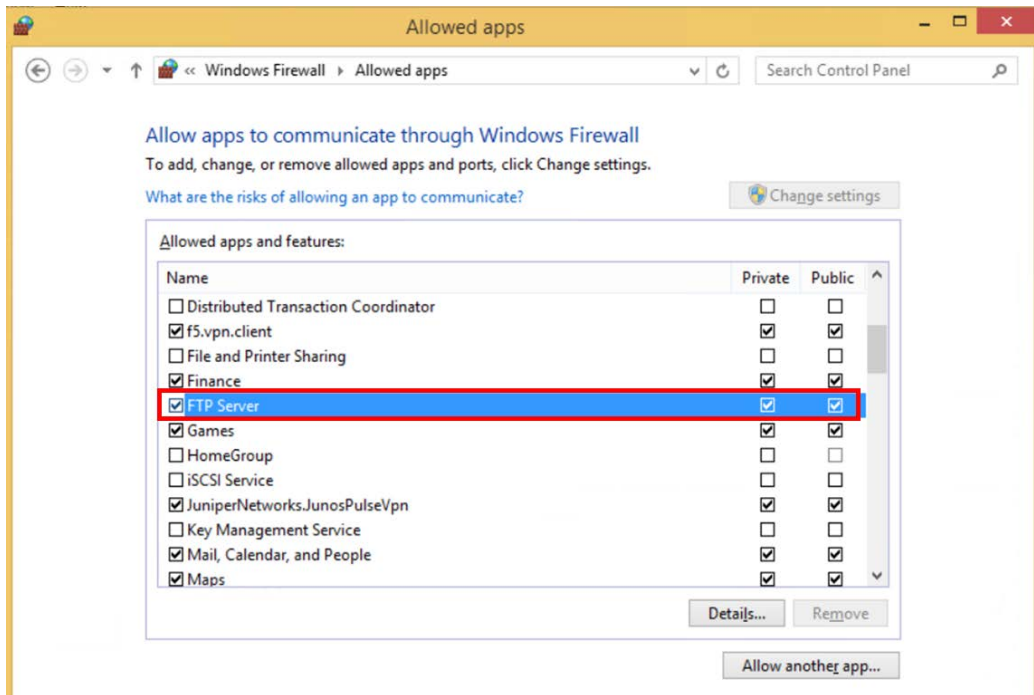
The screenshot shows the 'Add FTP Site' dialog box with the 'Authentication and Authorization Information' tab selected. In the 'Authentication' section, the 'Basic' checkbox is checked and highlighted with a red box. In the 'Authorization' section, the 'Allow access to:' dropdown is set to 'Specified users' and the text box below it contains 'FTPUser', both highlighted with a red box. In the 'Permissions' section, both the 'Read' and 'Write' checkboxes are checked and highlighted with a red box. At the bottom, there are 'Previous', 'Next', 'Finish', and 'Cancel' buttons.

38.4.4 Firewall settings

Set up the firewall so that it can be accessed via FTP.

Control Panel>Windows Firewall>Allowed apps

Check "Private" and "Public" on "FTP Server".



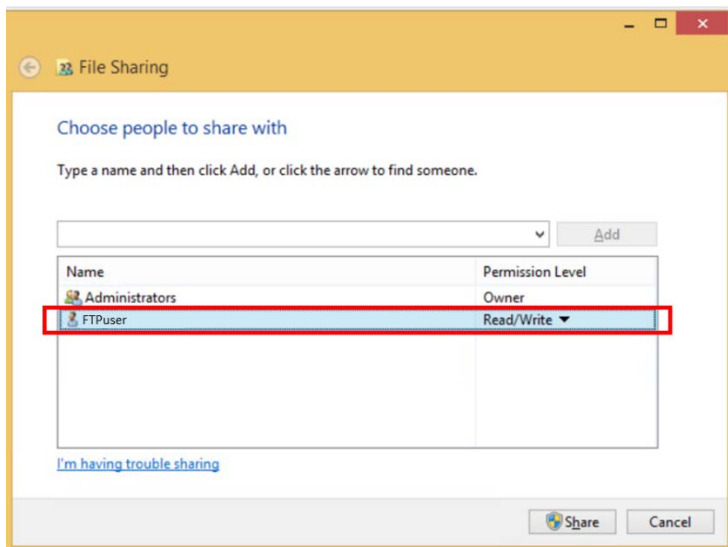
38.4.5 Directory sharing settings

Start Explorer and select the directory you want to share via FTP.

right click>Share with→Specific people...

Select the user to share (the user added in 34.3.2 above) from the pull-down menu, and press "Add".

Change the permission level to "Read / Write" and share with "Share".



38.4.6 FTP timeout setting

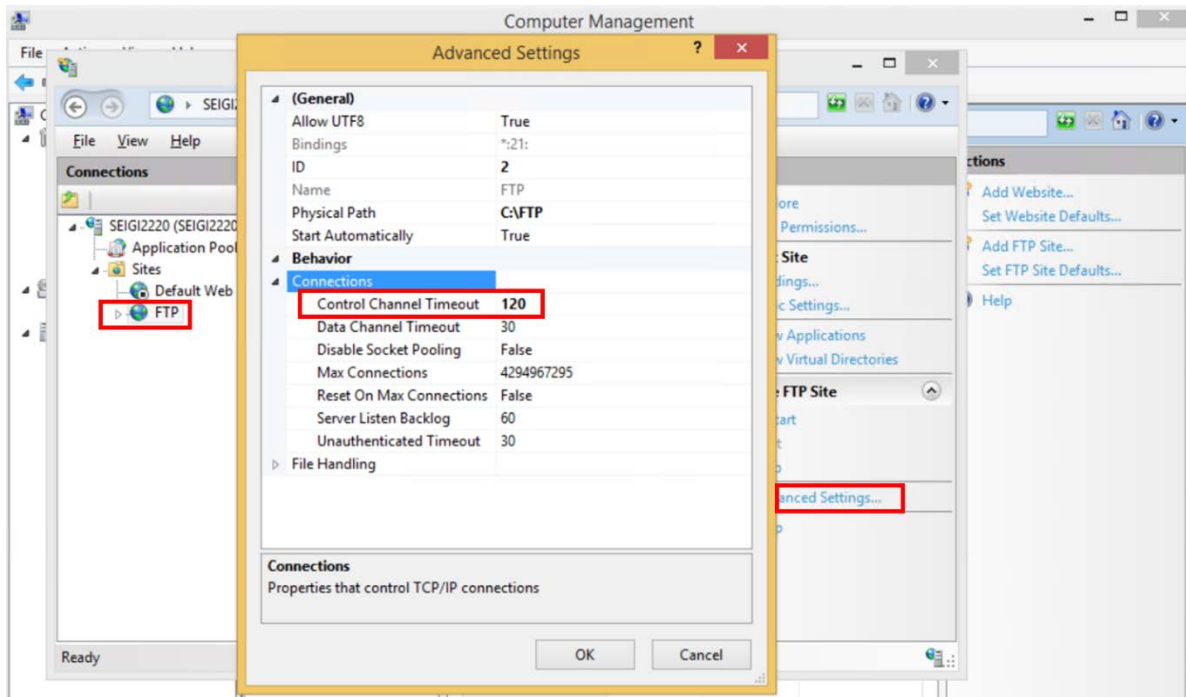
The following procedure to change the timeout period.

Control Panel> Administrative Tools>Internet Information Service(IIS) Manager”

Select the FTP site you created above and Advanced Settings.”Control Channel Timeout”.

Input the arbitrary value in "Control channel timeout". (Default value is 120)

After that, restart the FTP server.



38.5 DeviceXPlorer Settings

38.5.1 Device Settings

This section explains how to make the settings for the access PMC.

Connection Test

Operation mode: PrintOutput mode

Character: ISO ☐ Allow all character

EIA character code

(*) 0 (=) 0 (#) 0

([) 0 (]) 0 () 0

TV check: Not Use

Send timeout: 3000 ☐ Ignore serial controlling sig

Receive timeout: 3000

Collecting Operation Result

PrintOutput updating: Read Cycle: 500

PrintOutput Refresh Size (line): 100

PrintOutput target command(K): All

Transferring Program

Uploading work directory: ...

Downloading work directory: ...

Uploading file extension: upld ☒ Use ASC & II code for :

Downloading file extension: dwnld

Wait for sending: 10 Micro sec

Item	Description
Operation mode	Specify mode depending on your operation. "PrintOutput mode" does not use file, and stores Operation Results Data into PrintOutput tag. "File mode" does not use PrintOutput tag, and stores all received data into the storage. "Mixed mode" stores Operation Result Data into PrintOutput tag, and stores NC Programming Data into the storage. Range: PrintOutput mode, File mode, Mixed mode
Character	Specify same character code as the value was set in CNC. Range: ISO, EIA, ASCII
EIA character code (* [] = # _)	Specify each character as EIA code. Please set value into this setting as same value which was set in CNC. Range: 00 - FF
Allow all character	Allows using all characters in using ISO code. If this setting was enabled, it becomes that ERR03 will not occur.
TV check	Enable for communicating with CNC by using TV check. If using this setting, you should enable TV check in CNC too. Range: Not use, Use, Use in only transferring program
Send timeout(msec)	Specify timeout which waits Xon after receiving Xoff for flow control, in downloading NC program. Range: 10 - 60000
Receive timeout(msec)	Specify timeout which monitors the none receiving time while

	processing from POPEN(DC2) to PCLOS(DC4), in uploading Operation Result or NC program. Range: 1 - 60000
Reading cycle (msec)	Specify the cycle to update value of nodes in address space. Range: 10 -
Collecting Operation Result	-
PrintOutput update method	Set "Read" to acquire values from the receive buffer when the PrintOutput node is read from an OPC UA client, such as MT-LINKi. Set "Cycle" to acquire values from the receive buffer according to the internal cycle of the DeviceGateway. Set "Write" to acquire values from the receive buffer when values are written to the Refresh node. The acquired values are stored in the PrintOutput node and also returned to the client. Range: Read, Cycle, Write
PrintOutput Refresh Cycle (msec)	This item can be set only when "PrintOutput Update Method" is set to "Cycle". Set the internal cycle time to acquire PrintOutput values from the receive buffer. Range: 10 -
PrintOutput Refresh Size (lines)	Specify lines to analyze at one time when value of PrintOutput is got from Receive-Buffer. Range: 1 - 999
PrintOutput target command	Specify the kind of command which you want to put into PrintOutput node. Specific identifier command means PN, PC etc which has specific node. POPEN and PCLOSE always is put into PrintOutput regardless of this setting. Range: All, Specific identifier command, Not specific identifier command
Transferring Program	-
Uploading work directory	Specify work directory in Document directory for Program Uploading process.
Downloading work directory	Specify work directory in Document directory for Program Downloading process.
Upload file extention	Specify the upload file extention.
Download file extention	Specify the download file extention.
Wait for sending (micro sec)	Adjust the wait for sending in transferring NC program. Please increase this wait if alarm 87(buffer overflow) was shown in doing 'Read' by old type NC. Range: 0 -

38.5.2 Tag Settings

Set the access Tag.

Property of Tag [VA1:OR:S1]

General Scale Simulation Alarm Publisher

Tag Name

☐ Auto Format

Description

Device Type

Device No.

Data Type Attribute

Length

☐ Array

New Save << >> OK Cancel

Item	Description
Device Type	Specify the PMC device to be accessed. Refer to the list in section 38.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

39 [Fanuc] CNC FOCAS Connection

This chapter explains communication with FANUC PMC and CNC series by using FANUC PMC/CNC data window library (FOCAS1/2).

An overview of communication via a FANUC FOCAS connection is shown below.

Overview	
Interface	Ethernet
Protocol	TCP / IP
Data Code	Binary

Important

FANUC FOCAS connection support only 32bit FOCAS1/2 library. Please use 32bit edition with WOW64 on 64bitOS.

39.1 PLC Systems

39.1.1 Applicable PMC

The PMC and CNC unit which can be accessed with FANUC FOCAS communication are shown below.

Series	Abbreviated name	
FANUC Series 0i-MODEL B FANUC Series 0i-MODEL C	0i-B/C	Series 0i-B Series 0i-C
FANUC Series 0i-MODEL D FANUC Series 0i Mate-MODEL D	0i-D	Series 0i-D
FANUC Series 0i-MODEL F	0i-F	Series 0i-F
FANUC Series 0i-PD	0i-PD	Series 0i-PD
FANUC Series 15i/150i-MODEL A FANUC Series 15i/150i-MODEL B	15i	Series 15i
FANUC Series 16i/160i-MODEL A FANUC Series 18i/180i-MODEL A FANUC Series 21i/210i-MODEL A	16i-A 18i-A 21i-A	Series 16i/(18i/21i)-A
FANUC Series 16i/160i-MODEL B FANUC Series 18i/180i-MODEL B FANUC Series 21i/210i-MODEL B	16i-B 18i-B 21i-B	Series 16i/(18i/21i)-B
FANUC Series 16i/160i-P FANUC Series 18i/180i-P	16i-P 18i-P	Series 16i/(18i)-P
FANUC Series 16i/160i-L	16i-L	Series 16i-L
FANUC Series 16i/160i-W FANUC Series 18i/180i-W	16i-W 18i-W	Series 16i-W/(18i-W)
FANUC Series 30i-MODEL A FANUC Series 31i-MODEL A FANUC Series 32i-MODEL A	30i-A 31i-A 32i-A	Series 30i/(31i/32i)-A
FANUC Series 30i-MODEL B FANUC Series 31i-MODEL B FANUC Series 32i-MODEL B FANUC Series 35i-MODEL B	30i-B 31i-B 32i-B 35i-B	Series 30i/(31i/32i/35i)-B
FANUC Series 30i-P MODEL B FANUC Series 31i-P MODEL B	30i-P 31i-P	Series 30i/(31i)-P
FANUC Series 30i-L MODEL B FANUC Series 31i-L MODEL B	30i-L 31i-L	Series 30i/(31i)-L

FANUC Series 31i-W MODEL A	31i-WA	Series 31i-WA
FANUC Power Mate i-MODEL H	PMi-H	Power Mate i-H
FANUC Power Mate i-MODEL D	PMi-D	Power Mate i-D
FANUC Power Motion i-MODEL A	PMi-A	Power Motion i-A

*The machine may not be compatible with the FOCAS communication, please contact the machine vendor regarding the availability of connection.

39.1.2 Applicable Ethernet Interface

The Ethernet interfaces which can be accessed with FANUC FOCAS communication are shown below.

Applicable Ethernet Interface	Description
CPU Built-in Ethernet Port	FOCAS1 / 2 is necessary.
PCMCIA Ethernet Card	

Important

Please purchase FOCAS1/2 from FANUC CORPORATION.

Please copy following file to 'Bin' folder of DeviceXPlorer.

< Installation >

- File: fwlib1.dll
- Destination: <Installation folder of DeviceXPlorer>\Bin¥
Example) C:\¥Program Files¥TAKEBISHI¥DeviceXPlorer OPC Server¥Bin

39.2 List of Devices

39.2.1 PMC Devices

The FANUC PMC devices that can be accessed in DeviceXPlorer are as shown below.

The addresses that can be used vary with PMC type and parameter settings. For details, refer to your PMC instructions.

[List of Devices] (The device ranges are all specified in decimal format.)

PMC series	Device symbol	Device range	Category
NB6	G (Signal from PMC to CNC)	0000-0511, 1000-1511	
	F (Signal from CNC to PMC)	0000-0511, 1000-1511	
	Y (Signal from PMC to machine)	0000-0127, 0200-0327	
	X (Signal from machine to PMC)	0000-0127, 0200-0327	
	A (Message)	0000-0124	
	R (Internal Relay)	0000-2999, 9000-9199	
	T (Timer)	0000-0299	
	K (Keep Relay)	0000-0039, 0900-0909	
	C (Counter)	0000-0199	
	D (Data Table)	0000-7999	
SA1	G (Signal from PMC to CNC)	0000-0255, 1000-1255	Byte
	F (Signal from CNC to PMC)	0000-0255, 1000-1255	
	Y (Signal from PMC to machine)	0000-0127, 1000-1014, 1020-1034	
	X (Signal from machine to PMC)	0000-0127, 1000-1019, 1020-1039	
	A (Message)	0000-0024	
	R (Internal Relay)	0000-0999, 9000-9099	
	T (Timer)	0000-0079	
	K (Keep Relay)	0000-0019	
	C (Counter)	0000-0079	
	D (Data Table)	0000-1859	
SA5	G (Signal from PMC to CNC)	0000-0255, 1000-1255	
	F (Signal from CNC to PMC)	0000-0255, 1000-1255	
	Y (Signal from PMC to machine)	0000-0127	
	X (Signal from machine to PMC)	0000-0127	
	A (Message)	0000-0024	
	R (Internal Relay)	0000-0999, 9000-9117	
	T (Timer)	0000-0079	
	K (Keep Relay)	0000-0019	
	C (Counter)	0000-0079	
	D (Data Table)	0000-1859	

PMC series	Device symbol	Device range	Category
SB5	G (Signal from PMC to CNC)	0000-0255, 1000-1255	
	F (Signal from CNC to PMC)	0000-0255, 1000-1255	
	Y (Signal from PMC to machine)	0000-0127, 1000-1014, 1020-1051	
	X (Signal from machine to PMC)	0000-0127, 1000-1019, 1020-1051	
	A (Message)	0000-0024	
	R (Internal Relay)	0000-1499, 9000-9117	
	T (Timer)	0000-0079	
	K (Keep Relay)	0000-0019	
	C (Counter)	0000-0079	
	D (Data Table)	0000-2999	
SB6	G (Signal from PMC to CNC)	0000-0511, 1000-1511, 2000-2511	
	F (Signal from CNC to PMC)	0000-0511, 1000-1511, 2000-2511	
	Y (Signal from PMC to machine)	0000-0127, 0200-0327, 1000-1014, 1020-1051	
	X (Signal from machine to PMC)	0000-0127, 0200-0327, 1000-1019, 1020-1051	
	A (Message)	0000-0124	
	R (Internal Relay)	0000-2999, 9000-9199	
	T (Timer)	0000-0299	
	K (Keep Relay)	0000-0039, 0900-0909	
	C (Counter)	0000-0199	
	D (Data Table)	0000-7999	
SB7	G (Signal from PMC to CNC)	0000-0767, 1000-1767, 2000-2767	
	F (Signal from CNC to PMC)	0000-0767, 1000-1767, 2000-2767	
	Y (Signal from PMC to machine)	0000-0127, 0200-0327	
	X (Signal from machine to PMC)	0000-0127, 0200-0327	
	A (Message)	0000-0249, 9000-9249	
	R (Internal Relay)	0000-7999, 9000-9499	
	T (Timer)	0000-0499, 9000-9499	
	K (Keep Relay)	0000-0099, 0900-0919	
	C (Counter)	0000-0399, 5000-5199	
	D (Data Table)	0000-9999	
	E (Extended Relay)	0000-7999	

PMC series	Device symbol	Device range	Category
30i / 31i / 32i – A 1~3-PMC (MemoryA)	G (Signal from PMC to CNC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	Byte
	F (Signal from CNC to PMC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	Y (Signal from PMC to machine)	0-127, 200-327, 400-527 600-727, 1000-1127	
	X (Signal from machine to PMC)	0-127, 200-327, 400-527 600-727, 1000-1127	
	A (Message)	0-249, 9000-9249	
	R (Internal Relay)	0-1499, 9000-9499	
	T (Timer)	0-79, 9000-9079	
	K (Keep Relay)	0-19, 900-999	
	C (Counter)	0-79, 5000-5039	
	D (Data Table)	0-2999	
	M (Input signal from the other PMC line)	0-767	
	N (Output signal to the other PMC line)	0-767	
	E (Extended Relay)	0-9999	
30i / 31i / 32i – A 1~3-PMC (MemoryB)	G (Signal from PMC to CNC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	F (Signal from CNC to PMC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	Y (Signal from PMC to machine)	0-127, 200-327, 400-527 600-727, 1000-1127	
	X (Signal from machine to PMC)	0-127, 200-327, 400-527 600-727, 1000-1127	
	A (Message)	0-249, 9000-9249	
	R (Internal Relay)	0-7999, 9000-9499	
	T (Timer)	0-499, 9000-9499	
	K (Keep Relay)	0-99, 900-999	
	C (Counter)	0-399, 5000-5199	
	D (Data Table)	0-9999	
	M (Input signal from the other PMC line)	0-767	
	N (Output signal to the other PMC line)	0-767	
	E (Extended Relay)	0-9999	

PMC series	Device symbol	Device range	Category
30i / 31i / 32i – A 1~3-PMC (MemoryC)	G (Signal from PMC to CNC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	Byte
	F (Signal from CNC to PMC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	Y (Signal from PMC to machine)	0-127, 200-327, 400-527 600-727, 1000-1127	
	X (Signal from machine to PMC)	0-127, 200-327, 400-527 600-727, 1000-1127	
	A (Message)	0-749, 9000-9749	
	R (Internal Relay)	0-32767	
	T (Timer)	0-999, 9000-9999	
	K (Keep Relay)	0-299, 900-999	
	C (Counter)	0-1199, 5000-5599	
	D (Data Table)	0-32767	
	M (Input signal from the other PMC line)	0-767	
	N (Output signal to the other PMC line)	0-767	
	E (Extended Relay)	0-9999	
	Z (System Relay)	0-499	
30i / 31i / 32i – A (DSC PMC)	G (Signal from PMC to CNC)	0-767	
	F (Signal from CNC to PMC)	0-767	
	Y (Signal from PMC to machine)	0-127	
	X (Signal from machine to PMC)	0-127	
	A (Message)	0-249, 9000-9249	
	R (Internal Relay)	0-1499, 9000-9499	
	T (Timer)	0-79, 9000-9079	
	K (Keep Relay)	0-19, 900-999	
	C (Counter)	0-79, 5000-5039	
	D (Data Table)	0-2999	
32i – A PMC/L	G (Signal from PMC to CNC)	0-767, 1000-1767	
	F (Signal from CNC to PMC)	0-767, 1000-1767	
	Y (Signal from PMC to machine)	0-127	
	X (Signal from machine to PMC)	0-127	
	A (Message)	0-249, 9000-9249	
	R (Internal Relay)	0-1499, 9000-9499	
	T (Timer)	0-79, 9000-9079	
	K (Keep Relay)	0-19, 900-999	
	C (Counter)	0-79, 5000-5039	
	D (Data Table)	0-2999	
	E (Extended Relay)	0-9999	

PMC series	Device symbol	Device range	Category
0i-D PMC	G (Signal from PMC to CNC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767 8000-8767, 9000-9767	Byte
	F (Signal from CNC to PMC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	Y (Signal from PMC to machine)	0-127, 200-327, 400-527 600-727, 1000-1127	
	X (Signal from machine to PMC)	0-127, 200-327, 400-527 600-727, 1000-1127	
	A (Message)	0-249, 9000-9249	
	R (Internal Relay)	0-7999, 9000-9499	
	T (Timer)	0-449, 9000-9499	
	K (Keep Relay)	0-99, 900-999	
	C (Counter)	0-399, 5000-5199	
	D (Data Table)	0-9999	
	E (Extended Relay)	0-9999	
0i-D / Oi Mate-D PMC/L	G (Signal from PMC to CNC)	0-767, 1000-1767	
	F (Signal from CNC to PMC)	0-767, 1000-1767	
	Y (Signal from PMC to machine)	0-127	
	X (Signal from machine to PMC)	0-127	
	A (Message)	0-249, 9000-9249	
	R (Internal Relay)	0-1499, 9000-9499	
	T (Timer)	0-79, 9000-9079	
	K (Keep Relay)	0-19, 900-999	
	C (Counter)	0-79, 5000-5039	
	D (Data Table)	0-2999	
	E (Extended Relay)	0-9999	
0i-D DCS PMC	G (Signal from PMC to CNC)	0-767	
	F (Signal from CNC to PMC)	0-767	
	Y (Signal from PMC to machine)	0-127	
	X (Signal from machine to PMC)	0-127	
	R (Internal Relay)	0-1499, 9000-9499	
	T (Timer)	0-79, 9000-9079	
	K (Keep Relay)	0-19, 900-999	
	C (Counter)	0-79, 5000-5039	
	D (Data Table)	0-2999	

PMC series	Device symbol	Device range	Category
0i-F 30i / 31i / 32i / 35i – B PMi – A 1~5 – PMC (MemoryA)	G (Signal from PMC to CNC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	Byte
	F (Signal from CNC to PMC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	Y (Signal from PMC to machine)	0-127, 200-327, 400-527 600-727, 1000-1127	
	X (Signal from machine to PMC)	0-127, 200-327, 400-527 600-727, 1000-1127	
	A (Message)	0-249, 9000-9249	
	R (Internal Relay)	0-1499, 9000-9499	
	T (Timer)	0-79, 9000-9079	
	K (Keep Relay)	0-19, 900-999	
	C (Counter)	0-79, 5000-5039	
	D (Data Table)	0-2999	
	M (Input signal from the other PMC line)	0-767	
	N (Output signal to the other PMC line)	0-767	
	E (Extended Relay)	0-9999	
0i-F 30i / 31i / 32i / 35i – B PMi – A 1~5 – PMC (MemoryB)	G (Signal from PMC to CNC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	F (Signal from CNC to PMC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	Y (Signal from PMC to machine)	0-127, 200-327, 400-527 600-727, 1000-1127	
	X (Signal from machine to PMC)	0-127, 200-327, 400-527 600-727, 1000-1127	
	A (Message)	0-249, 9000-9249	
	R (Internal Relay)	0-7999, 9000-9499	
	T (Timer)	0-499, 9000-9499	
	K (Keep Relay)	0-99, 900-999	
	C (Counter)	0-399, 5000-5199	
	D (Data Table)	0-9999	
	M (Input signal from the other PMC line)	0-767	
	N (Output signal to the other PMC line)	0-767	
	E (Extended Relay)	0-9999	

PMC series	Device symbol	Device range	Category
0i-F 30i / 31i / 32i / 35i – B PMi – A 1~5 – PMC (MemoryC)	G (Signal from PMC to CNC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	F (Signal from CNC to PMC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	Y (Signal from PMC to machine)	0-127, 200-327, 400-527 600-727, 1000-1127	
	X (Signal from machine to PMC)	0-127, 200-327, 400-527 600-727, 1000-1127	
	A (Message)	0-499, 9000-9499	
	R (Internal Relay)	0-15999	
	T (Timer)	0-999, 9000-9999	
	K (Keep Relay)	0-199, 900-999	
	C (Counter)	0-799, 5000-5399	
	D (Data Table)	0-19999	
	M (Input signal from the other PMC line)	0-767	
	N (Output signal to the other PMC line)	0-767	
	E (Extended Relay)	0-9999	
	Z (System Relay)	0-499	
0i-F 30i / 31i / 32i / 35i – B PMi – A 1~5 – PMC (MemoryD)	G (Signal from PMC to CNC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	F (Signal from CNC to PMC)	0-767, 1000-1767, 2000-2767, 3000-3767 4000-4767, 5000-5767, 6000-6767 7000-7767, 8000-8767, 9000-9767	
	Y (Signal from PMC to machine)	0-127, 200-327, 400-527 600-727, 1000-1127	
	X (Signal from machine to PMC)	0-127, 200-327, 400-527 600-727, 1000-1127	
	A (Message)	0-749, 9000-9749	
	R (Internal Relay)	0-32767	
	T (Timer)	0-999, 9000-9999	
	K (Keep Relay)	0-299, 900-999	
	C (Counter)	0-1199, 5000-5599	
	D (Data Table)	0-32767	
	M (Input signal from the other PMC line)	0-767	
	N (Output signal to the other PMC line)	0-767	
	E (Extended Relay)	0-9999	
	Z (System Relay)	0-499	
0i-F	G (Signal from PMC to CNC)	0-767	
30i / 31i / 32i /	F (Signal from CNC to PMC)	0-767	

35i – B PMi – A (DSC PMC)	Y (Signal from PMC to machine)	0-127	
	X (Signal from machine to PMC)	0-127	
	R (Internal Relay)	0-249, 9000-9249	
	T (Timer)	0-1499, 9000-9499	
	K (Keep Relay)	0-79, 9000-9079	
	C (Counter)	0-19, 900-999	
	D (Data Table)	0-79, 5000-5039	

Remark

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: G100, D123 etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the access PMC.

39.2.2 CNC Devices

The FANUC CNC devices that can be accessed in DeviceXPlorer are as shown below.

The addresses that can be used vary with PMC type and parameter settings. For details, refer to your CNC instructions.

Device symbol	Description	Device range	Attribute	Category
CML	Custom Macro Variable (Local)	1-33	R	DOUBLE
CMC	Custom Macro Variable (Common)	100-999、 98000-98499	R/W	
CMS	Custom Macro Variable (System)	1000- (Excluding 98000-98499)	R/W	
STAT_AUT	AUTOMATIC mode selection		R	WORD
STAT_MAN	MANUAL mode selection		R	
STAT_RUN	Status of automatic operation		R	
STAT_EDT	Status of program editing		R	
STAT_MOT	Status of axis movement/dwell		R	
STAT_MST	Status of M/S/T/B function		R	
STAT_EMG	Status of emergency		R	
STAT_WRI	Status of writing backed memory		R	
STAT_LSK	Status of label skip		R	
STAT_ALM	Alarm status		R	
STAT_WRN	Status of warning		R	
STAT_BAT	Status of battery		R	
STAT_HDC	Status of manual handle re-trace		R	
STAT_TMM	T/M mode selection		R	
TOFS	Tool offset	0~999	R/W	DWORD
ZOFS	Work zero offset	0~306	R/W	DWORD
PARM	Parameter	0~32767	R/W	*
ALRM	Alarm status		R	DWORD
DIAG	Diagnosis	0~32767	R	*
PATH	Path		R/W	WORD
AXIS_POS_ABS	Absolute position		R	DWORD
AXIS_POS_MCN	Machine position		R	
AXIS_POS_REL	Relative position		R	
AXIS_POS_DTG	Distance to go		R	
AXIS_POS_HII	Handle interruption (Input unit)		R	
AXIS_POS_HIO	Handle interruption (Output unit)		R	
AXIS_POS_SPP	Start point of program restart		R	
AXIS_POS_DGP	Distance to go of program restart		R	
AXIS_POS_SPB	Start point of block restart		R	
AXIS_POS_DGB	Distance to go of block restart		R	
AXIS_POS_FLG	Position class flags		R	
AXIS_SRV_SLM	Servo load meter		R	
AXIS_SRV_LCU	Load current (% unit)		R	
AXIS_SRV_LCA	Load current (Ampere unit)		R	
AXIS_SPN_SLM	Spindle load meter		R	
AXIS_SPN_SMP	Spindle motor speed		R	
AXIS_SPN_SSP	Spindle speed (got from parameter)		R	

AXIS_SPN_SSS	Spindle speed (got from motor speed)		R	
AXIS_SPN_SLA	Spindle load meter (average)		R	
AXIS_SSP_SLM	Selected spindle load meter		R	
AXIS_SSP_SMP	Selected spindle motor speed		R	
AXIS_SSP_SSP	Selected spindle speed (got from parameter)		R	
AXIS_SSP_SSS	Selected spindle speed (got from motor speed)		R	
AXIS_SSP_SLA	Selected spindle load meter (average)		R	
AXIS_SPD_FRF	Feed rate (F/min)		R	
AXIS_SPD_SPS	Spindle speed (S)		R	
AXIS_SPD_JDS	Jog speed/Dry run speed		R	
AXIS_SPD_TTP	Tool tip speed		R	
AXIS_SPD_RSS	Rotation speed of servo motor		R	
AXIS_SPD_FRU	Feed rate (F/S)		R	
AXIS_SPD_FLG	Speed class flags		R	
PRGNO_MAN	Main program number		R	WORD
PRGNO_CUR	Running program number		R	
PRGNAME_MAN	Main program name		R	STRING
PRGNAME_CUR	Running program name		R	
ALMDTL_NUM	Alarm number		R	WORD
ALMDTL_TYP	Alarm type		R	
ALMDTL_AXS	Alarm Axis number		R	
ALMDTL_MSG	Alarm message		R	STRING

Important

- Base data type of custom macro variable is double (64-bit floating-point type).
- If you specify other data type except DOUBLE, the value will be cast to the data type.
e.x.) If the double value is 123.456000, the SHORT value will be 123.
- If you specify STRING data type, the value will be string value.
e.x.) If the double value is 123.456000, the string value will be "123.456000".
- Byte swap of macro variable is not supported.
- In macro variable, the value of an undefined variable is called "vacant". If the access variable value is "vacant", the tag's quality will be OPC_QUALITY_UNCERTAIN (40h). And the error message "Get blank data [Tag name = xxx]" will be output.
- If you select "Binary Format Floating-Point Type", Attribute of CNS macro variables will be Read Only.
- Parameters and Diagnoses are accessed using the data type and byte size set in the tag; in the case of the STRING type, they are accessed using the real number type.
- CMC98000 to CMC98499 and CMS10000 or later can be accessed only when "Macro Variable Type" is set to "Double Precision Floating Point Type".

Remark

- When accessing a dynamic tag from a client, access is achieved by a combination of the device symbol and the device number.

Example: CML10, CMC123 etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform device range checks for requested tags, so attempts to access inappropriate device numbers will result in errors. Check the device range of the access CNC.

39.3 FANUC PMC Settings

This chapter describes the Ethernet configuration of FANUC PMC.

Refer to the FANUC PMC manual for detail information.

Remark

- Maximum number of FOCAS1/2 Ethernet application which access FANUC PMC is five at the same time.
- If plural applications are connecting PMC at the same time, the communication load of PMC will be increased. Please be careful.

[Setting procedure]

1. Please set FANUC PMC to MDI mode.
2. Select functionkey “SYSTEM”.
3. Select continuation menu key of the right side of softkey.
4. When selecting “ETHPRM”, the Ethernet parameter dialog will show. The Ethernet parameter screen displays current Ethernet settings.



In upper section, device of Ethernet function will be displayed. This will be “Built-in port” or “PCMCIA card”.

In lower section, Ethernet option board will be displayed. If the option board is not set, nothing is displayed.

5. When selecting “Built-in”, parameter settings of built-in Ethernet port can be set. When selecting “PCMCIA”, parameter settings of PCMCIA Ethernet card can be set.

6. Next, set input data and update data with MDI key and softkey. set below item.

- IP Address
- Subnet mask
- Router IP Address (omissible)
- Port No. for TCP/IP
- Port No. for UDP/IP
- Time span

7. Switch the screen by using Page-Key. If the parameter is already set, the parameter displays.

画面タイトル: 設定画面 (FANUC FOCAS 内部)

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MAC アドレス	080019020014
<共通パラメータ>	
IP アドレス	192.168.1.1
サブネットマスク	255.255.255.0
ルーターIPアドレス	192.168.1.254

MDI 実行中 10:00:00

ソフトキー: スtring, 小文字, 入力, 戻る, +

画面タイトル: 設定画面 (FANUC FOCAS 内部)

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<FOCAS1/ETHERNET>	
TCP用ポート番号	8193
UDP用ポート番号	8192
時間間隔	100

MDI 実行中 10:00:00

ソフトキー: スtring, 小文字, 入力, 戻る, +

39.4 DeviceXPlorer Settings

39.4.1 FOCAS Port Settings

This section explains how to make the settings Ethernet port for Fanuc Focas connecting.

PING Test

FANUC CNC IP Address

FANUC CNC Port No.

CNC Path No.

PMC Unit

unspecified
▼

Timeout

sec

Retry count

times

Item	Description
FANUC CNC IP Address	Specify IP Address of FANUC CNC. Host name can be used.
FANUC CNC Port No.	Specify Port No. of FANUC CNC.
CNC Path No.	Specify CNC Path No.
PMC Unit	Specify the PMC Unit to connect to.
Timeout	Specify the waiting time between sending a request message and receiving the response message. If the response cannot be returned within the specified time, it results in a timeout error. Set a number between 0 and 60.
Retry Count	Specify the number of times to retry when a timeout error occurs. If TCP / IP is used, the connection is cut if a response is not received even after the set number of retries, and an attempt is made to reconnect. Set a number between 0 and 10.

39.4.2 Device Settings

This section explains how to make the settings for the access PMC.

The screenshot shows a 'Connection Test' window with three main sections: PMC, CNC, and Access Points. The PMC section has a 'PMC Type' dropdown menu set to 'NA'. The CNC section has a 'Macro Variable Type' dropdown menu set to 'Decimal Format Floating-Point Type'. The Access Points section contains four input fields: 'Bit R/W' (empty), 'Byte R/W' (set to '4000'), 'Bit Poke' (empty), and 'Byte Poke' (empty).

Item		Description
PMC		Specify access PMC type.
	PMC Type	Following PMC type, access range is different. (Please refer 39.2.1)
CNC		If you access CNC macro variables, please specify macro variable type “Decimal Format Floating-Point Type” or “Binary Format Floating-Point Type”. If you select “No Use”, you can not access CNC macro variables. If you select “Binary Format Floating-Point Type”, you can not write to CNS macro variables.
Access Points	Bit R / W	Batch read / write of bit scale is not performed.
	Byte R / W	Specify the maximum access points of batch read / write of Byte scale. Up to 4000 points can be set.
	Bit Poke	Only batch writing is supported.
	Byte Poke	Only batch writing is supported.

Important

- If you specify macro variable type “Decimal Format Floating-Point Type”, call of set macro variable function on timing of connection with CNC. If you don’t need to access macro variables, please specify “No Use”.
- If device settings are changed, the communication session will be re-connected.
- Access point of custom macro variable (System) CMS is 1 point.
- Access point of custom macro variable (Local) CML /custom macro variable (Common) CMC is 32 points.

39.4.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [VA1:OR:S1]

General Scale Simulation Alarm Publisher

Tag Name

☐ Auto Format

Description

Device Type

Device No.

Data Type Attribute

Length

☐ Array

New Save << >> OK Cancel

Item	Description
Device Type	Specify the PMC device to be accessed. Refer to the list in section 39.2 for devices that can be selected.
Device No.	Specify the device number in decimal notation.
Length	Specify length of STRING or ARRAY. [PMC Devices] This item is valid when the data type is STRING or ARRAY. <u>STRING</u> When the length is “1”, the tag occupies 1 byte. <u>ARRAY</u> BOOL: When the length is “1”, the tag occupies 1 byte. BYTE: When the length is “1”, the tag occupies 1 byte. SHORT: When the length is “1”, the tag occupies 2 byte. LONG, FLOAT: When the length is “1”, the tag occupies 4 byte. LONGLONG, DOUBLE: When the length is “1”, the tag occupies 8 byte. [CNC Devices] This item is valid when the data type is ARRAY. <u>ARRAY</u> In depends not on data type, please specify access size of the macro variable.
Byte Swap	In PMC devices, support Byte swap if the data type is “SHORT”, “LONG”, “LONGLONG”, “FLOAT”, “DOUBLE”.

The following table shows the settings for the Device No and Axis number/Type when selecting a CNC device.

Device	Description	Device No	Axis number/Type
STAT	Status information	-	-
TOFS	Tool offset	Offset Number	Type
ZOFS	Work zero offset	Offset Number	Axis number
PARM	Parameter	Parameter Number	Axis number
ALRM	Alarm status	-	-
DIAG	Diagnosis	Data number	Axis number
PATH	Path	-	-
AXIS	Axis data	-	Axis number

39.5 Import Tags

Import the tag definition file exported by KEPSEServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPSEServerEX” for operating procedure.

39.5.1 List of Devices

Show the list of convertible devices.

KEPSEServerEX		⇒	DeviceXPlorer	
Type	Symbol		Type	Symbol
Signal to PMC->CNC	G	⇒	Signal from PMC to CNC	G
Signal to CNC->PMC	F	⇒	Signal from CNC to PMC	F
Signal to PMC->machine	Y	⇒	Signal from PMC to machine	Y
Signal to machine->PMC	X	⇒	Signal from machine to PMC	X
Message demand	A	⇒	Message	A
Internal relay	R	⇒	Internal Relay	R
Changeable timer	T	⇒	Timer	T
Keep relay	K	⇒	Keep Relay	K
Counter	C	⇒	Counter	C
Data table	D	⇒	Data Table	D
Input signal from other devices	M	⇒	Input signal from the other PMC line	M
Output signal from other devices	N	⇒	Output signal to the other PMC line	N
Extended relay	E	⇒	Extended Relay	E
Custom Macro Value (local range)	#	⇒	Custom Macro Variable (Local)	CML
		⇒	Custom Macro Variable (Common)	CMC
		⇒	Custom Macro Variable (System)	CMS
CNC Status	statinfo_alarm statinfo_aut statinfo_battery statinfo_edit statinfo_emergency statinfo_labelskip statinfo_manual statinfo_motion statinfo_mstb statinfo_run statinfo_warning statinfo_write statinfo_hdek statinfo_tmmode	⇒		STAT_ALM STAT_AUT STAT_BAT STAT_EDT STAT_EMG STAT_LSK STAT_MAN STAT_MOT STAT_MST STAT_RUN STAT_WRN STAT_WRI STAT_HDC STAT_TMM
Tool offset	TOFS	⇒	Tool offset	TOFS
Work zero offset	ZOFS	⇒	Work zero offset	ZOFS
Parameter	cnc_rdpam	⇒	Parameter	PARM

Alarm status	cnc_alarm2	⇒	Alarm status	ALRM
Diagnosis	cnc_diagnoss	⇒	Diagnosis	DIAG
Path	target_path	⇒	Path	PATH

KEPServerEX		⇒	DeviceXPlorer	
Type	Symbol		Type	Symbol
Axis data	cnc_rdaxisdata	⇒	Axis data	AXIS_POS_ABS AXIS_POS_MCN AXIS_POS_REL AXIS_POS_DTG AXIS_POS_HII AXIS_POS_HIO AXIS_POS_SPP AXIS_POS_DGP AXIS_POS_SPB AXIS_POS_DGB AXIS_POS_FLG AXIS_SRV_SLM AXIS_SRV_LCU AXIS_SRV_LCA AXIS_SPN_SLM AXIS_SPN_SMP AXIS_SPN_SSP AXIS_SPN_SSS AXIS_SPN_SLA AXIS_SSP_SLM AXIS_SSP_SMP AXIS_SSP_SSP AXIS_SSP_SSS AXIS_SSP_SLA AXIS_SPD_FRF AXIS_SPD_SPS AXIS_SPD_JDS AXIS_SPD_TTP AXIS_SPD_RSS AXIS_SPD_FRU AXIS_SPD_FLG

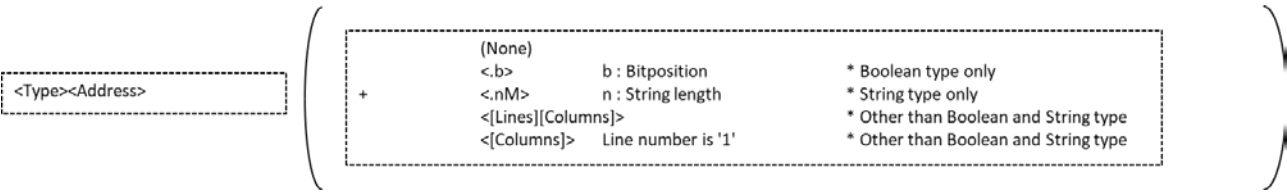
39.5.2 Device Range

Please refer “39.2 List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

39.5.3 Optional Specification

The address format of KEPServerEX is as follows.



Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
.x (x is a number)	Set x to the bit position if the data type is 'BOOL'.
.nM	Set n to the size if the data type is 'STRING'
[x] [1][x] (x is a number)	Enable the array. Set x to the size.

Important

Two dimensional array is not supported.

39.6 Errors

Error message are listed below.

Error Message	Description
Communication library (fwlibe1.dll) can not be found.	FOCAS1/2 Ethernet Communication library (fwlibe1.dll) can not be found. Please put the library in “Bin” folder of DeviceXPlorer install folder.
Open error (Code = nnn)	Open error occurred. Please check port settings.
Send receive error (Code = %d)	Message error occurred in communicating with PMC.
Response timeout error	Time-out error occurred.
Size error of received message	Received message size is incorrect.
Header error of received message	Received message header is incorrect.
Response error (Code = nnn)	Receive response error from FANUC PMC.
Communication error	Other error occurred.
Bad message	Error occurred when creating message. Please check tag settings.

Error codes of receiving error response are listed below.

Code	Description
-17	Data from Ethernet port is incorrect.
-16	Socket communication error occurred. Please check status of FANUC PMC and Ethernet cable, interface board.
-8	Handle number of communication library is incorrect.
-7	The version of PMC and communication library is non-conformity. Please change PMC software or communication library.
1	PMC does not exist.
10	Buffer is empty or full. Please wait till PMC process is over or retry.
17	Access data is protected by NC data protects function.

When accessing macro variable of CNC, error codes of receiving error response are listed below.

Code	Description
2	Data block length error Message size (length) is wrong.
3	Data number error Custom macro variable number is wrong.
5	Data error Value of custom macro variable (mcr_val, dec_val) is out of available range.
6	No option This function needs the custom macro option.
7	Protection error (30i/31i/32i, 0i-D/F, PMi-A only) The variable is read-only.
-99	Multi access error Custom macro variable number is out of range in multi access command.

40 [ShibauraMachine] TOSNUC Ethernet Connection

This chapter explains communication with TOSNUC series equipment using an Ethernet module.

An overview of communication via a TOSNUC Ethernet connection is shown below.

Overview	
Interface	Ethernet
Protocol	TCP / IP

40.1 PLC Systems

40.1.1 Applicable unit

The CPU unit and Serial unit that can be used for TOSNUC Serial connection are shown below.

Series	Unit
TOSNUC Series*	T-PX200, T-PX100, T-999

* Please contact Shibaura Machine if you want to connect, it does not have Function of communicate via Ethernet as standard equipment.

40.2 List of Devices

The TOSNUC devices that can be set in DeviceXPlorer are as shown below.

Device name	Device symbol	Address range	Attribute	DataType
V variable (Words)	VW	0-99999	R/W	LONG
V variable (Doubles)	VD	0-99999	R/W	DOUBLE
V variable (String)	VS	0-99999	R/W	STRING

*The user has 0 to 499 freely available space. After 500, it is the vender's area.

40.3 DeviceXPlorer Settings

40.3.1 Device Settings

Set the access target Device.

Item	Description
Series	Select the series to access.
Importing of tags	Check this to enable automatic tag importing.
Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.

40.3.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the TOSNUC device to be accessed.
Address No	Specify the address No.
Data Type	Specifies the data type of the tag.
Attribute	Select an attribute.

41 [ShibauraMachine] PLC Serial Connection

This chapter explains communication with PLC equipment using a Serial module.

An overview of communication via a PLC Serial connection is shown below.

Overview	
Link	Serial
Data code	ASCII

41.1 PLC System

41.1.1 Applicable unit

The CPU unit and Serial unit that can be used for PLC Serial connection are shown below.

Series	Unit
TOSNUC Series*1	T-PX200*2, T-PX100, T-999, T-888.2, T-888
TC200 Series	-
TCmini Series	TC9-00, TC7-00 / 01 / 02, TC6-00, TC5-02 / 03, TC3-00 / 01, TC3-P01, TC3-P02

*1 Please contact Shibaura Machine if you want to connect to some older models. Its may not have RS-232C interface.

*2 Please contact Shibaura Machine if you want to connect T-PX200, it does not have RS-232C as standard equipment.

41.2 List of Devices

The TOSNUC devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

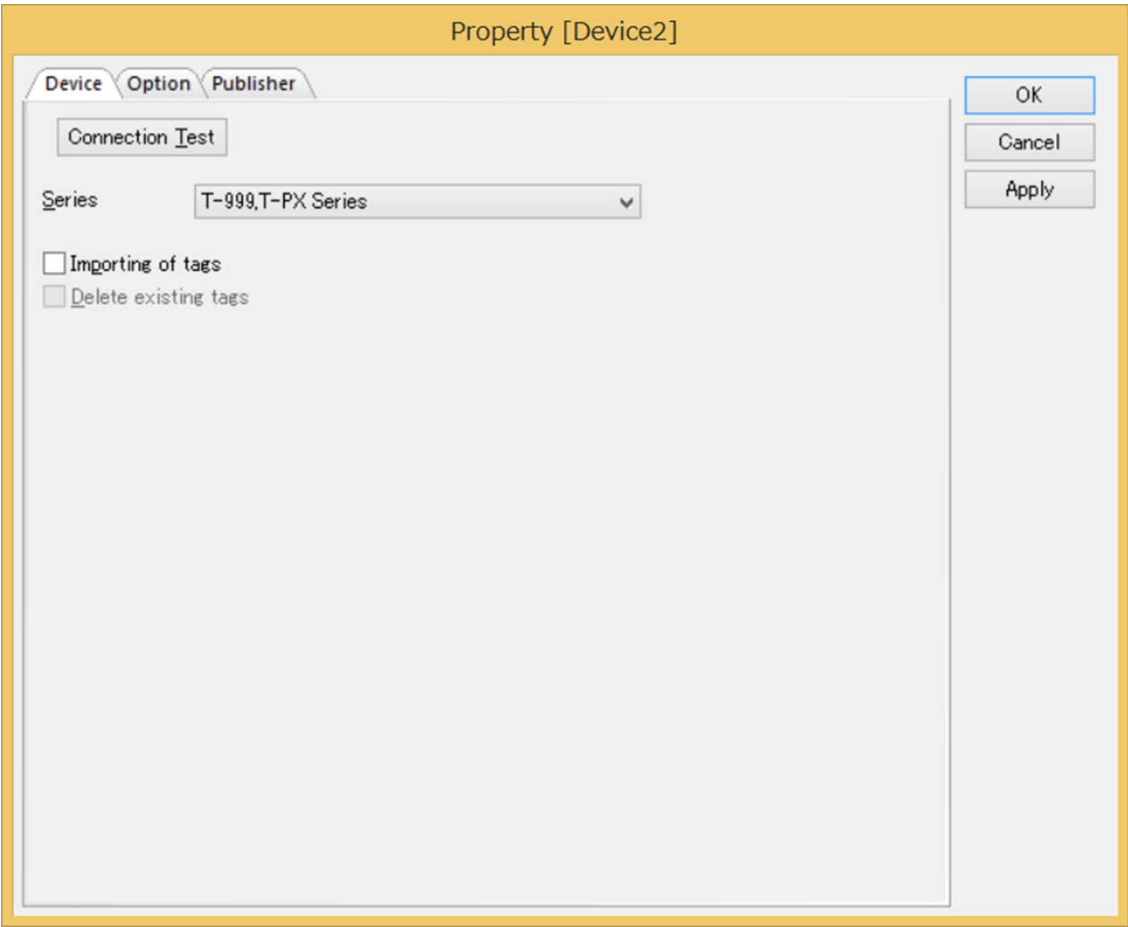
Device name	Device symbol	Address range	Attribute	Category
Input Relay	X	0-F7F	R/W	Bit
Output relay	Y	0-F7F	R/W	
General-purpose relay R	R	0-77F	R/W	
General-purpose relay G	G	0-F7F	R/W	
General-purpose relay H	H	0-F7F	R/W	
Latch relay	L	0-07F	R/W	
Shift relay	S	0-07F	R/W	
Edge relay	E	0-77F	R/W	
General data register D	D	0-F7F	R/W	Word
General data register B	B	0-F7F	R/W	
Timer current location register	P	0-77F	R/W	
Timer setting value register	V	0-77F	R/W	
Special relay	A	0-16F	R	Bit

* Address range formatt is sepecticed 1st digit:HEX, 2nd digit:OCT, 3rd:HEX.

41.3 DeviceXPlorer Settings

41.3.1 Device Settings

Set the access target Device.



Item	Description
Series	Select the series to access.
Importing of tags	Check this to enable automatic tag importing.
Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.

41.3.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [H000:W:OR]

General

Scale

Simulation

Alarm

Publisher

Tag Name

Tag

H000:W:OR

☐ Auto Format

Description

Device Type

H

General-purpose relay H

Address No

000

Byte Position

Lower Byte

Data Type

SHORT

Bit Position

0

Length

1

Attribute

ReadOnly

☐ Byte Swap

Calculation

NONE

☐ Array

New

Save

<<

>>

OK

Cancel

Item	Description
Device Type	Specify the TOSNUC device to be accessed.
Address No	Specify the address No. Address range formatt is sepecticed 1st digit:HEX, 2nd digit:OCT, 3rd:HEX.
Data Type	Specifies the data type of the tag.
Attribute	Select an attribute.

42 [Kawasaki] Robot Connection

This chapter describes communication using the KAWASAKI robot controller. An overview of Ethernet communications with RCC Communication Library is provided below.

Overview	
Link	RCC Communication Library
Data code	ASCII communication / Ethernet (TCP / IP)
Communication command	Monitor instructions using the AS language (dedicated robot language system) Support Language: English, Japanese, Italian

42.1 Robot Controller System

42.1.1 Applied units

Communication with the robot controller supports Ethernet communication (TCP/IP).

The table below lists applied controllers and connection types when using Ethernet.

Controller type	Multi Robot Support	Option
C Controller	N/A	Standard / Servo Gun / Arc Welding / Explosion-proof
D/D+ Controller	Compatible with Units 1-8	Standard / Servo Gun / Arc Welding
E Controller	N/A	Standard / Servo Gun / Arc Welding / Explosion-proof
F Controller	N/A	Standard / Servo Gun / Arc Welding / Explosion-proof
S/S+ Controller	Compatible with Units 1-8	Standard / Servo Gun / Explosion-proof
T Controller	Compatible with Units 1-8	Standard / Servo Gun / Arc Welding / Explosion-proof
duAro D Controller	Unit 1 or 2	Standard
duAro F Controller	Unit 1 or 2	Standard

* Connection with a port that is used for interference prediction is not supported.

42.2 Item List

"Real-time monitor items" and "Command items" are supported.

42.2.1 Real-time monitor items

The real-time monitor commands used in the system are listed in table shown below.

The attribute R indicates that the corresponding item is only readable, W indicates the item is only writable, and R/W indicates the item is both readable and writable.

No	Item		Item name	Data type	Attribute
1	Variable	Pose Variable [Joint Displacement]	JOINT_	VT_R4 VT_ARRAY	R/W
2		Pose Variable [Transformation]	TRANS_	VT_R4 VT_ARRAY	R/W
3		Real Variable	REAL_	VT_R4	R/W
4		Integer Variable	INT_	VT_I4	R/W
5		String Variable	STRING_	VT_BSTR	R/W
6	Joint Angle Value		W1	VT_R4 VT_ARRAY	R
7	Transformation Value		W2	VT_R4 VT_ARRAY	R
8	Joint Instruction Value		W3	VT_R4 VT_ARRAY	R
9	Joint Deviation		W4	VT_R4 VT_ARRAY	R
10	Encoder Value		W5	VT_R4 VT_ARRAY	R
11	Joint Speed		W6	VT_R4 VT_ARRAY	R
12	Motor Current Value		W10	VT_R4 VT_ARRAY	R
13	Motor Current Instruction Value		W14	VT_R4 VT_ARRAY	R
14	Conveyor Sync Joint Angle Value		W21	VT_R4 VT_ARRAY	R
15	Conveyor Sync Transformation Value		W22	VT_R4 VT_ARRAY	R
16	Conveyor Sync Joint Instruction Value		W23	VT_R4 VT_ARRAY	R
17	Conveyor Sync Joint Deviation		W24	VT_R4 VT_ARRAY	R
18	Conveyor Sync Encoder Value		W25	VT_R4 VT_ARRAY	R
19	Conveyor Sync Joint Speed		W26	VT_R4 VT_ARRAY	R
20	IO/Internal Signal		IO	VT_BOOL	R/W
21	Error Message Display		ERRLOG	VT_BSTR	R
22	Error Status		ErrorStatus	VT_I2	R
23	Operating Mode		OperatingMode	VT_I2	R
24	Motor Power State		MotorPowerState	VT_I2	R
25	Monitor Speed		MonitorSpeed	VT_R4	R
26	Program Speed_ALWAYS		ProgramAlwaysSpeed	VT_R4	R
27	Program Speed		ProgramSpeed	VT_R4	R
28	Program Accuracy		ProgramAccuracy	VT_R4	R
29	Step State		ProgramExecutionState	VT_I2	R
30	Completed Program Cycles		ProgramCompletedCycles	VT_I2	R
31	Remaining Program Cycles		ProgramRemainingCycles	VT_I2	R
32	Program Name in Execution		ExecutionProgram	VT_BSTR	R
33	Step in Execution		ExecutionStepNo	VT_I2	R
34	PC Program Status		PcStatus	VT_I2	R
35	PC Program Completed Program Cycles		PcStatus_Complete	VT_I2	R
36	PC Program Remaining Program Cycles		PcStatus_Remain	VT_I2	R
37	PC Program Info		PcStatus_Program	VT_BSTR	R

Notes on variables

When accessing an array variable, make sure to specify appropriate elements. Attempting access by specifying only a leading variable name without any elements is not allowed.

Example: If you access an array variable "a" comprising a[0] –a[9], you need to specify a specific element, such as "a[0]" or "a[3]" rather than just specifying "a."

Number of access points

The number of items accessible with a single command is indicated below.

Note that a limit value representing the number of bytes per command specified in the Device Settings dialog box applies and must be followed.

(For example, if 30 real variable items need to be read and the number of bytes per command is limited so that only 20 items can be stored in one command, the read operation is divided into and performed in two separate commands: one read command for 20 items and another read command for 10 items.)

Number of accessible items per command

Target item		Read operation	Write operation
Variable	Pose Variable [Joint Displacement Value], Pose Variable [Transformation Value]	20 items	1 item
	Real Variable	35 items	
	Integer Variable	35 items	
	String Variable	25 items	
IO/Internal Signal		1 block *	1 item
Other items		1 item	Not allowed

* A read operation for an IO/Internal Signal item is performed on a block basis as shown below. Any read operation spanning more than one block is divided into separate commands.

Block	IO address	Block	IO address
1st block	1–32, 1001–1032, 2001–2032	16th block	481–512, 1481–1512, 2481–2512
2nd block	33–64, 1033–1064, 2033–2064	17th block	513–544, 1513–1544, 2513–2544
3rd block	65–96, 1065–1096, 2065–2096	18th block	545–576, 1545–1576, 2545–2576
4th block	97–128, 1097–1128, 2097–2128	19th block	577–608, 1577–1608, 2577–2608
5th block	129–160, 1129–1160, 2129–2160	20th block	609–640, 1609–1640, 2609–2640
6th block	161–192, 1161–1192, 2161–2192	21st block	641–672, 1641–1672, 2641–2672
7th block	193–224, 1193–1224, 2193–2224	22nd block	673–704, 1673–1704, 2673–2704
8th block	225–256, 1225–1256, 2225–2256	23rd block	705–736, 1705–1736, 2705–2736
9th block	257–288, 1257–1288, 2257–2288	24th block	737–768, 1737–1768, 2737–2768
10th block	289–320, 1289–1320, 2289–2320	25th block	769–800, 1769–1800, 2769–2800
11th block	321–352, 1321–1352, 2321–2352	26th block	801–832, 1801–1832, 2801–2832
12th block	353–384, 1353–1384, 2353–2384	27th block	833–864, 1833–1864, 2833–2864
13th block	385–416, 1385–1416, 2385–2416	28th block	865–896, 1865–1896, 2865–2896
14th block	417–448, 1417–1448, 2417–2448	29th block	897–928, 1897–1928, 2897–2928
15th block	449–480, 1449–1480, 2449–2480	30th block	929–960, 1929–1960, 2929–2960

42.2.1.1 Pose Variable [Joint Displacement Value]

Read and/or write operation of Pose Variable [Joint Displacement Value] is performed.

Pose Variable [Joint Displacement Value]

Item name	JOINT_
Data type	VT_R4 VT_ARRAY
Attribute	Read-Write
AS language command used	Read: LIST/L command; Write: POINT command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.2 Pose Variable [Transformation Value]

Read and/or write operation of Pose Variable [Transformation Value] is performed.

Pose Variable [Transformation Value]

Item name	TRANS_
Data type	VT_R4 VT_ARRAY
Attribute	Read-Write
AS language command used	Read: LIST/L command; Write: POINT command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.3 Real Variable

Read and/or write operation of real variables is performed.

Real Variable

Item name	REAL_
Data type	VT_R4
Attribute	Read-Write
AS language command used	Read: LIST/R command; Write: assignment

42.2.1.4 Integer Variable

Read and/or write operation of integer variables is performed.

Integer Variable

Item name	INT_
Data type	VT_I4
Attribute	Read-Write
AS language command used	Read: LIST/INT command; Write: assignment

42.2.1.5 String Variable

Read and/or write operation of string variables is performed.

String Variable

Item name	STRING_
Data type	VT_BSTR
Attribute	Read-Write
AS language command used	Read: LIST/S command; Write: assignment

42.2.1.6 Joint Angle Value

The current value for joints is displayed.

Joint Angle Value

Item name	W1
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 1 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.7 Transformation Value

A Transformation value is displayed.

Transformation Value

Item name	W2
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 2 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.8 Joint Instruction Value

The instruction value for joints is displayed.

Joint Instruction Value

Item name	W3
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 3 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.9 Joint Deviation Value

The deviation value for joints is displayed.

Joint Deviation Value

Item name	W4
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 4 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.10 Encoder Value

An encoder value is displayed.

Encoder Value

Item name	W5
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 5 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.11 Joint Speed Value

The speed value for joints is displayed.

Joint Speed Value

Item name	W6
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 6 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.12 Motor Current Value

A motor current value is displayed.

Motor Current Value

Item name	W10
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 10 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.13 Motor Current Instruction Value

The instruction value for the motor current is displayed.

Motor Current Instruction Value

Item name	W14
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 14 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements.

42.2.1.14 Conveyor Sync Joint Angle Value

The Conveyor-synchronized angle value for joints is displayed.

Conveyor Sync Joint Angle Value

Item name	W21
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 21 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements. This command is valid only when the Conveyor Sync option is enabled for the controller.

42.2.1.15 Conveyor Sync Transformation Value

A Conveyor-synchronized Transformation value is displayed.

Conveyor Sync Transformation Value

Item name	W22
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 22 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements. This command is valid only when the Conveyor Sync option is enabled for the controller.

42.2.1.16 Conveyor Sync Joint Instruction Value

The Conveyor-synchronized instruction value for individual joints is displayed.

Conveyor Sync Joint Instruction Value

Item name	W23
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 23 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements. This command is valid only when the Conveyor Sync option is enabled for the controller.

42.2.1.17 Conveyor Sync Joint Deviation Value

The Conveyor-synchronized deviation value for joints is displayed.

Conveyor Sync Joint Deviation Value

Item name	W24
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 24 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements. This command is valid only when the Conveyor Sync option is enabled for the controller.

42.2.1.18 Conveyor Sync Encoder Value

A Conveyor-synchronized encoder value is displayed.

Conveyor Sync Encoder Value

Item name	W25
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 25 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements. This command is valid only when the Conveyor Sync option is enabled for the controller.

42.2.1.19 Conveyor Sync Joint Speed Value

The Conveyor-synchronized speed value for joints is displayed.

Conveyor Sync Joint Speed Value

Item name	W26
Data type	VT_R4 VT_ARRAY
Attribute	Read-Only
AS language command used	WHERE 26 command
Notes	The “Number of Joints” specified in Device setting is used as an initial value for the number of array elements. This command is valid only when the Conveyor Sync option is enabled for the controller.

42.2.1.20 IO/Internal Signal

The state of an IO / Internal signal is displayed.

IO / Internal Signal

Item name	IO	
Data type	VT_BOOL	
Attribute	Read-Write	
AS language commands used	Read : A different command is used depending on the target address.	
	Addresses 1–32: IO 1 Addresses 481–512: IO 16	
	Addresses 33–64: IO 2 Addresses 513–544: IO 17	
	Addresses 65–96: IO 3 Addresses 545–576: IO 18	
	Addresses 97–128: IO 4 Addresses 577–608: IO 19	
	Addresses 129–160: IO 5 Addresses 609–640: IO 20	
	Addresses 161–192: IO 6 Addresses 641–672: IO 21	
	Addresses 193–224: IO 7 Addresses 673–704: IO 22	
	Addresses 225–256: IO 8 Addresses 705–736: IO 23	
	Addresses 257–288: IO 9 Addresses 737–768: IO 24	
	Addresses 289–320: IO 10 Addresses 769–800: IO 25	
	Addresses 321–352: IO 11 Addresses 801–832: IO 26	
	Addresses 353–384: IO 12 Addresses 833–864: IO 27	
	Addresses 385–416: IO 13 Addresses 865–896: IO 28	
	Addresses 417–448: IO 14 Addresses 897–928: IO 29	
	Addresses 449–480: IO 15 Addresses 929–960: IO 30	
	(Similar commands as listed above are used for address ranges 1001–1960 and 2001–2960.)	
	ON Write : SIGNAL (Address)	
	OFF Write : SIGNAL –(Address)	
	Notes	The signal has different meanings depending on the specific address.
		1–960: output signal
		1001–1960: input signal
		2001–2960: internal signal.
		Note that the input signal cannot be written because it is in a write-protected area. (The writing result will be an error response.)

42.2.1.21 Error Message Display

An error message is displayed.

Error Message Display

Item name	ERRLOG
Data type	VT_BSTR
Attribute	Read-Only
AS language command used	GetAsError() function

42.2.1.22 Error Status

An error status is displayed.

Error Status

Item name	ErrorStatus
Data type	VT_I2
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: "1" if the value "During error condition" (English) or "Ora in errore" (Italian) is contained, "0" if it is not contained.

42.2.1.23 Operating Mode

The operating mode is displayed.

Operating Mode

Item name	OperatingMode
Data type	VT_I2
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: "0" if "TEACH mode"(English) or "Modalità di PROGRAMMAZIONE " (Italian) is contained, "1" if "REPEAT mode"(English) or "Modalità di RIPETIZIONE " (Italian) is contained, "2" if "REPEAT mode CYCLE START ON"(English) or " Modalità di RIPETIZIONE Avvio ciclo su ON " (Italian) is contained, or "-1" if none of the above is contained.

42.2.1.24 Motor Power State

The state of the motor power supply is displayed.

Motor Power State Display

Item name	MotorPowerOFFState
Data type	VT_I2
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: "0" if "Motor power OFF"(English) or " Alimentazione ai motori OFF " (Italian) is contained, "0" if it is not contained.

42.2.1.25 Monitor Speed

The monitor speed is displayed.

Monitor Speed

Item name	MonitorSpeed
Data type	VT_R4
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: the value of “xxx” found in "Monitor speed (%) = xxx"(English) or " Velocità di monitoraggio(%) = xxx " (Italian) , using "VT_R4" format.

42.2.1.26 Program Speed_ALWAYS

The Program Speed_ALWAYS is displayed.

Program Speed_ALWAYS

Item name	ProgramAlwaysSpeed
Data type	VT_R4
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: the value of “xxx” found in "Program speed (%) ALWAYS = xxx yyy"(English) or " ALWAYS velocità del programma (%)= xxx yyy " (Italian), using "VT_R4" format.

42.2.1.27 Program Speed

The programmed speed is displayed.

Program Speed

Item name	ProgramSpeed
Data type	VT_R4
Attribute	Read-Only
AS language command used	TYPE command
Reply message	When executing TYPE SYSDATA(P.SPEED, RobotNo) command, the reply message: the value in "VT_R4" format.

42.2.1.28 Program Accuracy

The programmed accuracy is displayed.

Program Accuracy

Item name	ProgramAccuracy
Data type	VT_R4
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: the value of "xxx" found in "ALWAYS Accu. [mm] = xxx"(English) or " ALWAYS Precisione[mm] = xxx " (Italian), using "VT_R4" format.

42.2.1.29 Step State

The program execution (step) state is displayed.

Step State

Item name	ProgramExecutionState
Data type	VT_I2
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: "0" if "Program is not running"(English) or " Programma non è in corso " (Italian) is contained, "1" if "Program running"(English) or " Programma attualmente in corso..." (Italian) is contained, "-1" if neither of the above is contained.

42.2.1.30 Completed Program Cycles

The number of completed program cycles is displayed.

Completed Program Cycles

Item name	ProgramCompletedCycles
Data type	VT_I2
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: the value of "xxx" found in "Completed cycles: xxx"(English) or " Cicli completati: xxx " (Italian), using "VT_I2" format.

42.2.1.31 Remaining Program Cycles

The number of remaining program cycles to be performed is displayed.

Remaining Program Cycles

Item name	ProgramRemainingCycles
Data type	VT_I2
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: the value of “xxx” found in "Remaining cycles: xxx"(English) or " Cicli rimanenti : xxx " (Italian), using "VT_I2" format. “-1” is stored if “xxx” is "Infinite".

42.2.1.32 Program Name in Execution

The name of the program being executed is displayed.

Program Name in Execution

Item name	ExecutionProgram
Data type	VT_BSTR
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: a text string in the “Func” portion of "Func pp yyy step description"(English, Japanese, Italian), using "VT_BSTR" format.

42.2.1.33 Step in Execution

The step currently being executed is displayed.

Step in Execution

Item name	ExecutionStepNo
Data type	VT_I2
Attribute	Read-Only
AS language command used	STATUS command
Reply message	When executing STATUS command, the reply message: the value of “yyy” in "Func pp yyy step description"(English, Japanese, Italian), using " VT_I2" format.

42.2.1.34 PC Program Status

PC Program status is displayed.

PC Program Status

Item name	PcStatus
Data type	VT_I2
Attribute	Read-Only
AS language command used	PCSTATUS command
Reply message	When executing PCSTATUS command, the reply message: "0" if "Program is not running"(English) or " Programma non è in corso " (Italian) is contained, "1" if "Program running"(English) or " Programma attualmente in corso..." (Italian) is contained, "-1" if neither of the above is contained.
Notes	The IO address specified in the tag settings is used as the PC program number (1 to 8) of PCSTATUS.

42.2.1.35 PC Program Completed Program Cycles

The number of completed program cycles of PC Program is displayed.

PC Program Completed Program Cycles

Item name	PcStatus_Complete
Data type	VT_I2
Attribute	Read-Only
AS language command used	PCSTATUS command
Reply message	When executing PCSTATUS command, the reply message: the value of "xxx" found in "Completed cycles: xxx"(English) or " Cicli completati: xxx " (Italian), using "VT_I2" format.
Notes	The IO address specified in the tag settings is used as the PC program number (1 to 8) of PCSTATUS.

42.2.1.36 PC Program Remaining Program Cycles

The number of remaining program cycles to be performed of PC Program is displayed.

PC Program Remaining Program Cycles

Item name	PcStatus_Remain
Data type	VT_I2
Attribute	Read-Only
AS language command used	PCSTATUS command
Reply message	When executing PCSTATUS command, the reply message: the value of "xxx" found in "Remaining cycles: xxx"(English) or " Cicli rimanenti : xxx " (Italian), using "VT_I2" format. "-1" is stored if "xxx" is "Infinite".
Notes	The IO address specified in the tag settings is used as the PC program number (1 to 8) of PCSTATUS.

42.2.1.37 PC Program Info

PC Program information is displayed.

PC Program Info

Item name	PcStatus_Program
Data type	VT_BSTR
Attribute	Read-Only
AS language command used	PCSTATUS command
Reply message	When executing PCSTATUS command, the reply message: the string value following "Program name Priority Step No."(English) or "Nome del programma Priorit Numero del passo " (Italian) in "VT_BSTR" format.
Notes	The IO address specified in the tag settings is used as the PC program number (1 to 8) of PCSTATUS.

42.2.2 Command items

Command target items are items executed by a corresponding command in one shot in response to a request from the OPC client. These are listed in table shown below. Command target items are divided into two categories: target items for "execution commands" and target items for "special commands". For more information on these categories, refer to 42.2.

Execution commands and special commands are performed using device system tags specifically designed for the robot controller as indicated below.

Robot controller-specific device system tags

Category		Item	Device system tag name	Data type	Attr	Reference section
Execution command		Command Request Flag	\$RCP_Req	VT_BOOL	W	42.2.3
		Command Complete Flag	\$RCP_Comp	VT_BOOL	R	
		Command	\$RCP_Cmd	VT_BSTR	W	
		Command Return Value	\$RCP_Return	VT_I2	R	
		Command Reply Message	\$RCP_Reply	VT_BSTR	R	
Special command	FREE	FREE Command Request Flag	\$RCF_Req	VT_BOOL	W	42.2.4.1
		FREE Command Complete Flag	\$RCF_Comp	VT_BOOL	R	
		FREE Command Return Value	\$RCF_Return	VT_I2	R	
		Remaining Memory Capacity	\$RCF_Memory	VT_I2	R	
	ID	ID Command Request Flag	\$RCI_Req	VT_BOOL	W	42.2.4.2
		ID Command Complete Flag	\$RCI_Comp	VT_BOOL	R	
		ID Command Return Value	\$RCI_Return	VT_I2	R	
		ID Command Reply Message	\$RCI_Reply	VT_BSTR	R	
		AS Version	\$RCI_ASVersion	VT_BSTR	R	
		Robot Name	\$RCI_RobotName	VT_BSTR	R	
		Number of Joints	\$RCI_NumOfJoints	VT_I2	R	
		Max. Number of Output Signals	\$RCI_NumOfOutputSignals	VT_I2	R	
		Max. Number of Input Signals	\$RCI_NumOfInputSignals	VT_I2	R	
		Max. Number of Internal Signals	\$RCI_NumOfInternalSignals	VT_I2	R	
		Device Serial Number	\$RCI_SerialNo	VT_I2	R	
		Language	\$RCI_Language	VT_BSTR	R	
	SAVE	SAVE Command Request Flag	\$RCS_Req	VT_BOOL	W	42.2.4.3

		SAVE Command Complete Flag	\$RCS_Comp	VT_BOOL	R	
		SAVE Command Return Value	\$RCS_Return	VT_I2	R	
		SAVE Command Target Parameter	\$RCS_Parameter	VT_BSTR	W	
		SAVE Command Reply Message	\$RCS_Reply	VT_BSTR	R	
	LOAD	LOAD Command Request Flag	\$RCL_Req	VT_BOOL	W	42.2.4.4
		LOAD Command Complete Flag	\$RCL_Comp	VT_BOOL	R	
		LOAD Command Return Value	\$RCL_Return	VT_I2	R	
		LOAD Command Target Parameter	\$RCL_Parameter	VT_BSTR	W	
		LOAD Command Reply Message	\$RCL_Reply	VT_BSTR	R	
	LIST/P	LIST/P Command Request Flag	\$RC_ListP_Req	VT_BOOL	W	42.2.4.5
		LIST/P Command Complete Flag	\$RC_ListP_Comp	VT_BOOL	R	
		LIST/P Command Return Value	\$RC_ListP_Return	VT_I2	R	
		LIST/P Command Reply Message	\$RC_ListP_Reply	VT_BSTR	R	
		Program List	\$RC_ListP_Program	VT_BSTR	R	
	SWITCH	SWITCH Command Request Flag	\$RC_Switch_Req	VT_BOOL	W	42.2.4.6
		SWITCH Command Complete Flag	\$RC_Switch_Comp	VT_BOOL	R	
		SWITCH Command Return Value	\$RC_Switch_Return	VT_I2	R	
		SWITCH Command Reply Message	\$RC_Switch_Reply	VT_BSTR	R	
		AUTOSTART.PC	\$RC_Switch_AUTOSTART_PC \$RC_Switch_AUTOSTART_PC2 \$RC_Switch_AUTOSTART_PC3 \$RC_Switch_AUTOSTART_PC4 \$RC_Switch_AUTOSTART_PC5 \$RC_Switch_AUTOSTART_PC6 \$RC_Switch_AUTOSTART_PC7 \$RC_Switch_AUTOSTART_PC8	VT_BOOL	R	
		CS	\$RC_Switch_CS	VT_BOOL	R	
		POWER	\$RC_Switch_POWER	VT_BOOL	R	
		TEACH_LOCK	\$RC_Switch_TEACH_LOCK	VT_BOOL	R	
		ERROR	\$RC_Switch_ERROR	VT_BOOL	R	

		REPEAT	\$RC_Switch_REPEAT	VT_BOOL	R	
		RUN	\$RC_Switch_RUN	VT_BOOL	R	
		ABS.SPEED	\$RC_Switch_ABS_SPEED	VT_BOOL	R	
	TYPE	TYPE Command Request Flag	\$RC_Type_Req	VT_BOOL	W	42.2.4.7
		TYPE Command Complete Flag	\$RC_Type_Comp	VT_BOOL	R	
		TYPE Command Return Value	\$RC_Type_Return	VT_I2	R	
		TYPE Command Target Parameter	\$RC_Type_Parameter	VT_BSTR	W	
		TYPE Command Reply Message	\$RC_Type_Reply	VT_BSTR	R	
	SPEED	SPEED command	\$RC_Exe_SPEED	VT_BSTR	W	42.2.4.8
	PRIME	PRIME command	\$RC_Exe_PRIME	VT_BSTR	W	42.2.4.9
	EXECUTE	EXECUTE command	\$RC_Exe_EXECUTE	VT_BSTR	W	42.2.4.10
	ABORT	ABORT command	\$RC_Exe_ABORT	VT_BSTR	W	42.2.4.11
	HOLD	HOLD command	\$RC_Exe_HOLD	VT_BSTR	W	42.2.4.12
	CONTINUE	CONTINUE command	\$RC_Exe_CONTINUE	VT_BSTR	W	42.2.4.13
		CONTINUE NEXT command	\$RC_Exe_CONTINUE_NEXT	VT_BSTR	W	
	DO	DO command	\$RC_Exe_DO	VT_BSTR	W	42.2.4.14
	ERESET	ERESET command	\$RC_Exe_ERESET	VT_BSTR	W	42.2.4.15
	R/C Information	Robot Controller Information	\$RC_Info	VT_BSTR	R	42.2.5

42.2.3 Execution commands

Execution commands are used to specify an execution command function of the AS language and return a corresponding reply message after execution.

42.2.3.1 List of execution commands

Supported execution commands are listed in Table shown below. Specific commands and command reply messages for device system tags are also indicated below. Description on how to use these device system tags are provided in section 42.2.3.2.

List of execution commands

No.	Execution command	Device system tag	
		Command	Command reply message
1	Program List Display	DIR/P	Program List
2	Pose Variable List Display	DIR/L	Pose Variable List
3	Real Variable List Display	DIR/R	Real Variable List
4	String Variable List Display	DIR/S	String Variable List
5	User-Defined Joint Upper Limit	ULIMIT	User-Defined Joint Upper Limit Setting
6	User-Defined Joint Lower Limit	LLIMIT	User-Defined Joint Lower Limit Setting
7	Mechanical Joint Upper Limit	ZULIMIT	Mechanical Joint Upper Limit Setting
8	Mechanical Joint Lower Limit	ZLLIMIT	Mechanical Joint Lower Limit Setting
9	Tool Conversion Value	TOOL	Current Tool Conversion Value Setting
10	Home Position	SETHOME	Current Home Position Setting
11	Operational Log Display	OPLOG	Operational Log

List of execution commands when the Conveyor Sync option is enabled

12	Line Travel Direction	CVDIRECT	Conveyor Travel Direction Setting
13	Encoder Resolution	CVSCALE	Conveyor Resolution Setting
14	Encoder Increment Direction	CVENCSIGN	Line Travel Direction Setting
15	Max. Conveyor Speed	CVMAXSPD	Max. Conveyor Speed Setting
16	Actual Max. Conveyor Value	CVFMAX	Actual Max. Conveyor Value Setting
17	Simulated Max. Conveyor Value	CVSMAX	Simulated Max. Conveyor Value Setting
18	Simulated Conveyor Speed	CVSPEED	Simulated Conveyor Speed Setting
19	Simulated/Actual Pulse Selection	CVSIMU	Simulated/Actual Pulse Selection Setting
20	Simulated Pulse Termination	CVSWITC	Simulated Pulse Termination Setting
21	Simulated Limit Distance Setting	CVFLS2	Simulated Limit Distance Setting
22	Simulated Phototube Distance Setting	CVFPH2	Simulated Phototube Distance Setting
23	Conveyor Pitch Setting	CVPITCH	Working Pitch Setting
24	Conveyor Invalid Pitch Setting	CVFNONPITCH	Invalid Pitch Setting
25	Conveyor Speed Gain Setting	CVGAIN	Conveyor Speed Bias Gain Setting
26	Conveyor Wait Enabled/Disabled	INS_CVWAIT	Conveyor Wait Setting
27	Conveyor Position Setting	CVSET	Conveyor Position Setting
28	Current Conveyor Position Reset	CVRESET	Current Conveyor Position Reset Setting

[Important Notes]

Some execution commands require that a corresponding reply message be sent back after execution. When

executing such a command, make sure to create a port (device) for the execution command and use it separately from other ports (devices) that are under constant monitoring.

Example: If executing a TOOL command by simply specifying "TOOL" without any argument, you will be asked about changes to be made to the XYZOAT values through the message "Are you sure you want to change this? (enter RETURN if you exit)" and any other operations (e.g., real-time monitor, communication with the robot controller such as browsing) are suspended until you enter a new value or enter RETURN. For this reason, ports (devices) used for the real-time monitor that are placed under constant monitoring and ports (devices) used for execution commands should be managed so that they are used separately.

42.2.3.2 How to use

Execution commands are executed using the device system tags listed below.

Device system tags used with execution commands

Item	Device system tag name	Data type	Attribute
Command Request Flag	\$RCP_Req	VT_BOOL	W
Command Complete Flag	\$RCP_Comp	VT_BOOL	R
Command	\$RCP_Cmd	VT_BSTR	W
Command Return Value	\$RCP_Return	VT_I2	R
Command Reply Message	\$RCP_Reply	VT_BSTR	R

Description of each of these device system tag items is provided below.

Description of device system tags used with execution commands

Device system tag	Description
Command Request Flag	A command is executed when this flag is ON. After Command Complete Flag is turned ON, it returns to OFF. This flag handshake with Command Complete Flag.
Command Complete Flag	Turns ON after a command is completed and turns OFF when Command Request Flag is OFF. This flag handshake with Command Request Flag.
Command	Stores a command string with arguments.
Command Return Value	Stores the return code when executing a command. Normal completion: 0; Timeout error: -1
Command Reply Message	Stores the reply message for a command.

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Check "Command Complete Flag" is OFF.	
2	Store command (including arguments) to be executed in "Command".	
3	Turn "Command Request Flag" into ON.	
4		The command is executed on the robot controller using "Command" value.
5		After command completes, the reply message is analyzed. "Command Reply Message" and "Command Return Value" are stored. "Command Complete Flag" is turned ON.
6	After "Command Complete Flag" is turned ON, turn "Command Request Flag" into OFF.	
7		"Command Complete Flag" is turned OFF.

42.2.4 Special commands

Special commands provide replies different from those of execution commands, described above.

Special commands are used to execute predefined command functions, analyze the corresponding reply message after the command has executed, and obtain necessary information. Supported special commands are listed in table shown below. Starting from section 42.2.4.1, description is provided of devices in which replies for individual commands are stored.

List of special commands

No.	Supported command	Description
1	FREE command	Displays the memory capacity remaining in the robot controller.
2	ID command	Displays information about the robot controller.
3	SAVE command	Performs a save operation on a file.
4	LOAD command	Performs a read operation on a file.
5	LIST/P command	Displays all program steps.
6	SWITCH command	Display the system switch setting
7	TYPE command	Display data.
8	SPEED command	Set the monitor speed.
9	PRIME command	Prepares the program for execution.
10	EXECUTE command	Executes the program.
11	ABORT command	Stop execution after the current step is completed.
12	HOLD command	Stops execution.
13	CONTINUE command	Resumes execution of the program.
14	DO command	Executes a single program instruction.
15	ERESET command	Resets the error condition.

42.2.4.1 FREE command

The FREE command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
FREE Command Request Flag	\$RCF_Req	VT_BOOL	W
FREE Command Complete Flag	\$RCF_Comp	VT_BOOL	R
FREE Command Return Value	\$RCF_Return	VT_I2	R
Remaining Memory Capacity	\$RCF_Memory	VT_I2	R

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Check "FREE Command Complete Flag" is OFF.	
2	Turn "FREE Command Request Flag" into ON.	
3		FREE command is executed on the robot controller.
4		After command completes, the reply message is analyzed. "Remaining Memory Capacity", "FREE Command Return Value" are stored. "FREE Command Complete Flag" is turned ON.
5	After "FREE Command Complete Flag" is turned ON, turn "FREE Command Request Flag" into OFF.	
6		"FREE Command Complete Flag" is turned OFF.

Item	Reply message (English)	Reply message (Italian)
Remaining Memory Capacity	Available memory size nnn bytes. (xxx %)	Grandezza memoria disponibile nnn byte. (xxx %)
	Value of "xxx" is stored in "VT_I2" format.	

42.2.4.2 ID command

The ID command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
ID Command Request Flag	\$RCI_Req	VT_BOOL	W
ID Command Complete Flag	\$RCI_Comp	VT_BOOL	R
ID Command Return Value	\$RCI_Return	VT_I2	R
ID Command Reply Message	\$RCI_Reply	VT_BSTR	R
AS Version	\$RCI_ASVersion	VT_BSTR	R
Robot Name	\$RCI_RobotName	VT_BSTR	R
Number of Joints	\$RCI_NumOfJoints	VT_I2	R
Max. Number of Output Signals	\$RCI_NumOfOutputSignals	VT_I2	R
Max. Number of Input Signals	\$RCI_NumOfInputSignals	VT_I2	R
Max. Number of Internal Signals	\$RCI_NumOfInternalSignals	VT_I2	R
Device Serial Number	\$RCI_SerialNo	VT_I2	R
Language	\$RCI_Language	VT_BSTR	R

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Check "ID Command Complete Flag" is OFF.	
2	Turn "ID Command Request Flag" into ON.	
3		ID command is executed on the robot controller.
4		After command completes, the reply message is analyzed. "ID Command Reply Message", "AS Version", "Robot Name", "Number of Joints", "Max. Number of Output Signals", "Max. Number of Input Signals", "Max. Number of Internal Signals", "Device Serial Number", "Language" and "ID Command Return Value" are stored. "ID Command Complete Flag" is turned ON.
5	After "ID Command Complete Flag" is turned ON, turn "ID Command Request Flag" into OFF.	
6		"ID Command Complete Flag" is turned OFF.

Item	Reply message (English)	Reply message (Italian)
AS Version	[C Controller] Software version: version xxx [Controllers other than C] USER IF AS : xxx	AS IF utente: xxx
	Value of "xxx" is stored in " VT_BSTR" format.	
Robot Name	Robot Name: xxx	Nome del robot:xxx
	Value of "xxx" is stored in " VT_BSTR" format.	

Number of Joints	Num of axes: xxx	No.degli assi xxx
	Value of "xxx" is stored in "VT_I2" format.	
Max. Number of Output Signals	Output = xxx	Segnale d'output= xxx
	Value of "xxx" is stored in "VT_I2" format.	
Max. Number of Input Signals	Input = xxx	Segnale d'input= xxx
	Value of "xxx" is stored in "VT_I2" format.	
Max. Number of Internal Signals	Internal = xxx	interno = xxx
	Value of "xxx" is stored in "VT_I2" format.	
Device Serial Number	Serial No.: xxx	No. di serie. xxx
	Value of "xxx" is stored in "VT_I2" format.	
Language	Starting text string	Starting text string
	Robot Name	Nome del robot
	Values in English are stored in "VT_BSTR" format.	

42.2.4.3 SAVE command

The SAVE command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
SAVE Command Request Flag	\$RCS_Req	VT_BOOL	W
SAVE Command Complete Flag	\$RCS_Comp	VT_BOOL	R
SAVE Command Return Value	\$RCS_Return	VT_I2	R
SAVE Command Target Parameter	\$RCS_Parameter	VT_BSTR	W
SAVE Command Reply Message	\$RCS_Reply	VT_BSTR	R

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Check "SAVE Command Complete Flag" is OFF.	
2	Store option string for the SAVE command in "SAVE Command Target Parameter".	
3	Turn "SAVE Command Request Flag" into ON.	
4		SAVE command is executed on the robot controller using "SAVE Command Target Parameter" as its argument.
5		After command completes, the reply message is analyzed. "SAVE Command Reply Message" and "SAVE Command Return Value" are stored. "SAVE Command Complete Flag" is turned ON.
6	After "SAVE Command Complete Flag" is turned ON, turn "SAVE Command Request Flag" into OFF.	
7		"SAVE Command Complete Flag" is turned OFF.

Option string example:

Request	SAVE Command Target Parameter
SAVE/FULL	/FULL xxx
SAVE/P	/P xxx
SAVE/L	/L xxx
SAVE/R	/R xxx
SAVE/S	/S xxx
SAVE/ELOG	/ELOG xxx

* “xxx” represents the file name (including its path).

42.2.4.4 LOAD command

The LOAD command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
LOAD Command Request Flag	\$RCL_Req	VT_BOOL	W
LOAD Command Complete Flag	\$RCL_Comp	VT_BOOL	R
LOAD Command Return Value	\$RCL_Return	VT_I2	R
LOAD Command Target Parameter	\$RCL_Parameter	VT_BSTR	W
LOAD Command Reply Message	\$RCL_Reply	VT_BSTR	R

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Check "LOAD Command Complete Flag" is OFF.	
2	Store target file name (including its path) for the LOAD command in "LOAD Command Target Parameter".	
3	Turn "LOAD Command Request Flag" into ON.	
4		LOAD command is executed on the robot controller using "LOAD Command Target Parameter" as its argument.
5		After command completes, the reply message is analyzed. "LOAD Command Reply Message" and "LOAD Command Return Value" are stored. "LOAD Command Complete Flag" is turned ON.
6	After "LOAD Command Complete Flag" is turned ON, turn "LOAD Command Request Flag" into OFF.	
7		"LOAD Command Complete Flag" is turned OFF.

42.2.4.5 LIST/P command

The LIST/P command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
LIST/P Command Request Flag	\$RC_ListP_Req	VT_BOOL	W
LIST/P Command Complete Flag	\$RC_ListP_Comp	VT_BOOL	R
LIST/P Command Return Value	\$RC_ListP_Return	VT_I2	R
LIST/P Command Reply Message	\$RC_ListP_Reply	VT_BSTR	R
Program List	\$RC_ListP_Program	VT_BSTR	R

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Check "LIST/P Command Complete Flag" is OFF.	
2	Turn "LIST/P Command Request Flag" into ON.	
3		LIST/P command is executed on the robot controller.
4		After command completes, the reply message is analyzed. "LIST/P Command Reply Message", "Program List" and "LIST/P Command Return Value" are stored. "LIST/P Command Complete Flag" is turned ON.
5	After "LIST/P Command Complete Flag" is turned ON, turn "LIST/P Command Request Flag" into OFF.	
6		"LIST/P Command Complete Flag" is turned OFF.

Item	Reply message
Program List	.PROGRAM xxx() : : .END
	Store the values of xxx () in the format of "VT_BSTR" separated by commas.

42.2.4.6 SWITCH command

The SWITCH command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
SWITCH Command Request Flag	\$RC_Switch_Req	VT_BOOL	W
SWITCH Command Complete Flag	\$RC_Switch_Comp	VT_BOOL	R
SWITCH Command Return Value	\$RC_Switch_Return	VT_I2	R
SWITCH Command Reply Message	\$RC_Switch_Reply	VT_BSTR	R
AUTOSTART.PC	\$RC_Switch_AUTOSTART_PC \$RC_Switch_AUTOSTART_PC2 \$RC_Switch_AUTOSTART_PC3 \$RC_Switch_AUTOSTART_PC4 \$RC_Switch_AUTOSTART_PC5 \$RC_Switch_AUTOSTART_PC6 \$RC_Switch_AUTOSTART_PC7 \$RC_Switch_AUTOSTART_PC8	VT_BOOL	R
CS	\$RC_Switch_CS	VT_BOOL	R
POWER	\$RC_Switch_POWER	VT_BOOL	R
TEACH_LOCK	\$RC_Switch_TEACH_LOCK	VT_BOOL	R
ERROR	\$RC_Switch_ERROR	VT_BOOL	R
REPEAT	\$RC_Switch_REPEAT	VT_BOOL	R
RUN	\$RC_Switch_RUN	VT_BOOL	R
ABS.SPEED	\$RC_Switch_ABS_SPEED	VT_BOOL	R

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Check "SWITCH Command Complete Flag" is OFF.	
2	Turn "SWITCH Command Request Flag" into ON.	
3		SWITCH command is executed on the robot controller.
4		After command completes, the reply message is analyzed. "SWITCH Command Reply Message", "AUTOSTART.PC", "CS", "POWER", "TEACH_LOCK", "ERROR", "REPEAT", "RUN", "ABS.SPEED" and "SWITCH Command Return Value" are stored. "SWITCH Command Complete Flag" is turned ON.
5	After "SWITCH Command Complete Flag" is turned ON, turn "SWITCH Command Request Flag" into OFF.	
6		"SWITCH Command Complete Flag" is turned OFF.

42.2.4.7 TYPE command

The TYPE command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
TYPE Command Request Flag	\$RC_Type_Req	VT_BOOL	W
TYPE Command Complete Flag	\$RC_Type_Comp	VT_BOOL	R
TYPE Command Return Value	\$RC_Type_Return	VT_I2	R
TYPE Command Target Parameter	\$RC_Type_Parameter	VT_BSTR	W
TYPE Command Reply Message	\$RC_Type_Reply	VT_BSTR	R

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Check "TYPE Command Complete Flag" is OFF.	
2	Store target argument for the TYPE command in "TYPE Command Target Parameter".	
3	Turn "TYPE Command Request Flag" into ON.	
4		TYPE command is executed on the robot controller using "TYPE Command Target Parameter" as its argument.
5		After command completes, the reply message is analyzed. "TYPE Command Reply Message" and "TYPE Command Return Value" are stored. "TYPE Command Complete Flag" is turned ON.
6	After "TYPE Command Complete Flag" is turned ON, turn "TYPE Command Request Flag" into OFF.	
7		"TYPE Command Complete Flag" is turned OFF.

42.2.4.8 SPEED command

The SPEED command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
SPEED command	\$RC_Exe_SPEED	VT_BSTR	W

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Write argument character string (monitor speed 0 to 100) to "SPEED command".	
2		SPEED command is executed on the robot controller using written value as its argument.
3		After the processing is completed, the following values are set for the quality flag of "SPEED command" Success: OPC_QUALITY_GOOD(0xC0) Failure: OPC_QUALITY_COMM_FAILURE(0x18)

42.2.4.9 PRIME command

The PRIME command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
PRIME command	\$RC_Exe_PRIME	VT_BSTR	W

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Write argument character string (program name, execution cycles, step number) to "PRIME command".	
2		PRIME command is executed on the robot controller using written value as its argument.
3		After the processing is completed, the following values are set for the quality flag of "PRIME command" Success: OPC_QUALITY_GOOD(0xC0) Failure: OPC_QUALITY_COMM_FAILURE(0x18)

42.2.4.10 EXECUTE command

The EXECUTE command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
EXECUTE command	\$RC_Exe_EXECUTE	VT_BSTR	W

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Write argument character string (program name, execution cycles, step number) to "EXECUTE command".	
2		EXECUTE command is executed on the robot controller using written value as its argument.
3		After the processing is completed, the following values are set for the quality flag of "EXECUTE command" Success: OPC_QUALITY_GOOD(0xC0) Failure: OPC_QUALITY_COMM_FAILURE(0x18)

42.2.4.11 ABORT command

The ABORT command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
ABORT command	\$RC_Exe_ABORT	VT_BSTR	W

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Write arbitrary string to "ABORT command".	
2		ABORT command is executed on the robot controller.

3		After the processing is completed, the following values are set for the quality flag of "ABORT command" Success: OPC_QUALITY_GOOD(0xC0) Failure: OPC_QUALITY_COMM_FAILURE(0x18)
---	--	--

42.2.4.12 HOLD command

The HOLD command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
HOLD command	\$RC_Exe_HOLD	VT_BSTR	W

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Write arbitrary string to "HOLD command".	
2		ABORT command is executed on the robot controller.
3		After the processing is completed, the following values are set for the quality flag of "HOLD command" Success: OPC_QUALITY_GOOD(0xC0) Failure: OPC_QUALITY_COMM_FAILURE(0x18)

42.2.4.13 CONTINUE command

The CONTINUE command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
CONTINUE command	\$RC_Exe_CONTINUE	VT_BSTR	W
CONTINUE NEXT command	\$RC_Exe_CONTINUE_NEXT	VT_BSTR	W

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Write arbitrary string to "CONTINUE (NEXT) command".	
2		CONTINUE (NEXT) command is executed on the robot controller.
3		After the processing is completed, the following values are set for the quality flag of "CONTINUE (NEXT) command" Success: OPC_QUALITY_GOOD(0xC0) Failure: OPC_QUALITY_COMM_FAILURE(0x18)

42.2.4.14 DO command

The DO command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
DO command	\$RC_Exe_DO	VT_BSTR	W

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Write argument character string (program instruction) to "DO command".	
2		DO command is executed on the robot controller using written value as its argument.
3		After the processing is completed, the following values are set for the quality flag of " DO command" Success: OPC_QUALITY_GOOD(0xC0) Failure: OPC_QUALITY_COMM_FAILURE(0x18)

42.2.4.15 ERESET command

The ERESET command is executed using the device system tags listed below.

Item	Device system tag name	Data type	Attribute
ERESET command	\$RC_Exe_ERESET	VT_BSTR	W

Process flow:

No.	OPC Client	OPC Server (Auto Process)
1	Write arbitrary string to "ERESET command".	
2		ERESET command is executed on the robot controller.
3		After the processing is completed, the following values are set for the quality flag of "ERESET command" Success: OPC_QUALITY_GOOD(0xC0) Failure: OPC_QUALITY_COMM_FAILURE(0x18)

42.2.5 Robot controller information Acquisition feature

This feature enables you to temporarily connect to a robot controller when configuring a device in the system so that relevant robot controller information can be obtained and reflected in the device configuration. Using this feature with preconfigured port connection settings enables you to reduce the number of steps necessary to be performed in the Device Settings dialog box.

This feature is executed by clicking the Get button in the Device Settings dialog box. Refer to section 42.3.2 for instructions on the associated operational procedures.

Information extracted from the information obtainable by the ID command is listed below.

List of obtainable information

R/C Information	Description
AS Version	Extracted from the AS Version information obtainable by the ID command
Robot Controller Type	Extracted from AS Version
Multi-robot Enabled/Disabled	Extracted from AS Version
Applied Option	Extracted from AS Version
Number of Joints	Extracted from The number of joints information obtainable by the ID command

Any settings defined in the Device Settings dialog box are stored in a robot controller-specific device system tag indicated below so they can be referenced by OPC clients. For the specific format of text strings stored in "R/C Information", refer to 42.3.2.

Device system tag used to store robot controller information

System tag	Device system tag name	Data type	Attribute
Robot Controller Information	\$RC_Info	VT_BSTR	R

42.2.6 Variable import feature

This feature enables you to obtain information on variables (Pose Variables, real variables, integer variables and string variables) from a robot controller or an AS file to automatically generate tags based on the obtained information. Actual importing of a variable is performed when any setting made in the Group Settings dialog box is saved. Refer to section 42.3.3 for instructions on operational procedures associated with the variable import feature. The variable information is formatted in an AS file (text file) as described in the table below.

From the variable information obtained, a tag with the specified item type and variable name is automatically generated.

Variable information format in AS file

Item type	Format	Item type	Format
Pose Variable [Joint Displacement]	.JOINTS Variable name ValueEND	Real Variable	.REALS Variable name = ValueEND
Pose Variable [Transformation]	.TRANS Variable name ValueEND	Integer Variable	.INTEGER Variable name = ValueEND

		String Variable	.STRIGS Variable name = ValueEND
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42.2.7 Variable browse feature

This feature enables you to temporarily connect to a robot controller in the system during tag configuration to obtain a list of variables available in the robot controller. The variable list obtained is displayed in the Browse Variable dialog box.

Updating for the variable browse feature takes place when the Browse button is clicked for the first time in the Tag Properties dialog box for each device, and when the Refresh button is clicked. Refer to section 42.3.2 for instructions on the associated operational procedures.

Processes associated with the variable browse feature are described below.

42.2.8 Connection error

In case of a communication failure with a robot controller, different error processing is applied depending on the function.

Specific descriptions of the error processing for each function are provided below.

[Real-time monitor]

OPC Quality Flag for the relevant tag is set to OPC_QUALITY_COMM_FAILURE (0x18).

[Execution commands]

The device system tag for the command return value (\$RCP_Return) for the execution command is set to -1, indicating a timeout error. Additionally, the Quality Flag in the device system tag for reply message "\$RCP_Reply" is set to OPC_QUALITY_COMM_FAILURE (0x18).

[Special commands]

The device system tag for the command return value for each of the special commands is set to -1, indicating a timeout error. Additionally, the Quality Flag in the device system tag for information storage is set to OPC_QUALITY_COMM_FAILURE (0x18).

["Variable Import" in the Group Settings dialog box]

The variable import destination is set to "Robot Controller". Variable information is not obtained when the Group Settings dialog box is saved, so automatic tag generation is not performed.

[Robot controller information acquisition using "Get" in the Device Settings dialog box]

Robot controller information can neither be obtained nor reflected in the associated configuration.

["Connection Test" in the Device Settings dialog box]

A message indicating a connection test failure is displayed.

["Browse Variable" in the Tag Properties dialog box]

A message box indicating a connection failure is displayed.

42.2.9 Handshake failure between Request and Complete Flags

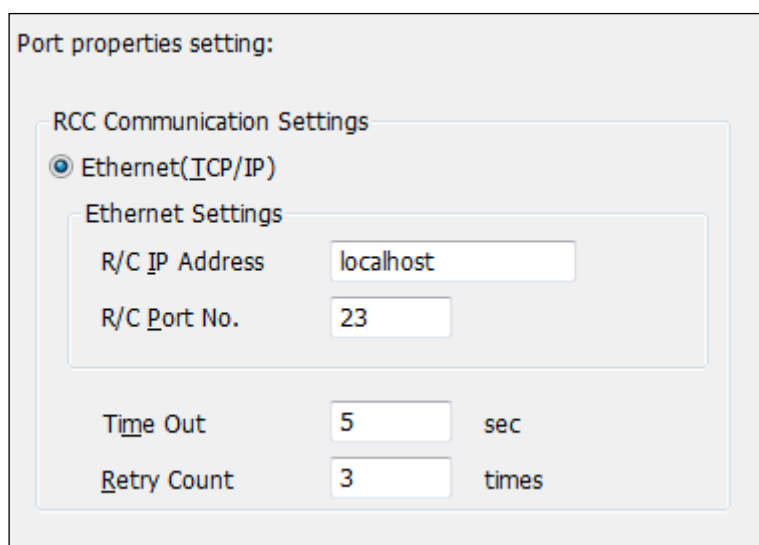
The execution commands and special commands are executed with a handshake performed between the respective Request and Complete Flags.

If a handshake operation does not complete successfully (for example, if the Request Flag is turned ON while the Complete Flag is still in an ON state), the value "-32768" is stored in the device system tag used on the OPC client for the command return value.

42.3 DeviceXPlorer Settings

42.3.1 Port Settings

In the Port Settings dialog box, shown below, you can configure the connection with a robot controller.



Port properties setting:

RCC Communication Settings

☒ Ethernet(TCP/IP)

Ethernet Settings

R/C IP Address: localhost

R/C Port No.: 23

Time Out: 5 sec

Retry Count: 3 times

Each of the items in the above dialog box is described in the following table.

Configuration items in the Port Settings dialog box

Item	Description	Initial setting
Ethernet (TCP/IP)	Ethernet TCP/IP protocol is used in communication.	Selected
R/C IP Address	Specifies the IP address of the destination robot controller to be connected.	localhost
R/C Port No.	Specifies the port number of the destination robot controller to be connected.	23
Time Out	Specifies a time period in seconds to wait for a corresponding reply message after a request message is transmitted. A timeout error occurs if no reply message is received during the specified time period. The time period specified here is used as a timeout setting during RCC command function execution. This can be specified in the range of 0–60.	5
Retry Count	Specifies the number of retries to attempt when a timeout error occurs. This can be specified in the range of 0–10.	3

42.3.2 Device Settings

In the Device Settings dialog box, shown below, you can configure the hardware information for the robot controller.

Each of the items in the above dialog box is described in the following table.

Configuration items in the Device Settings dialog box

Item	Description	Initial setting
Connection Test	Temporarily connects to the robot controller to verify whether the configuration is valid in a test communication.	
Robot Controller Type	The type of the destination robot controller in communication is selected here.	C Con
Multi-Robot	Selected when communication with a multi-robot controller is implemented.	Deselected
Robot No.	Specifies the robot number when communication with a multi-robot controller is implemented. The robot number can be specified when the "Multi Robot" check box is selected.	1
Application	The appropriate robot controller application is selected here. Available options are "Standard", "Servo Gun", "Arc Welding", and "Explosion-proof".	Standard
Number of Joints	Specifies The number of joints for the robot controller. This can be specified in the range of 1–14. The number of joints specified here is used as the default value for the number of array elements, such as for Pose Variables.	6
Conveyor Option	This check box should be selected when a Conveyor option for the robot controller is enabled.If selected, additional item types are provided in the Tag Properties dialog box for selection. Refer to section 42.3.2 for more information.	Deselected

Get	This button allows you to temporarily connect to the robot controller so that relevant robot controller information is obtained and reflected in the associated configuration. The robot controller information acquisition feature described in section 5.6 is executed when any settings made here is saved. The information items obtainable by this feature are: "AS Version", "Robot Controller Type", "Multi" robot option, "Application", "Number of Joints". "Robot No." and "Conveyor Option" cannot be obtained.	
Command Length	Specifies in bytes the command length per command executed on the robot controller. This can be specified in the range of 80–1024.	80

Display area for robot controller information

Robot controller information specified in the device configuration is displayed in the display area using the format shown below. The AS Version field is initially blank when a device is created. A text string representing the AS Version information is stored in the field only when it is obtained from the associated robot controller.

These pieces of information are stored in the device system tag "\$RC_Info" as listed in 42.2.5.

Robot controller information format

AS Version: AS version text string Robot Controller Type: C, D/D+, E, F, S/S+, T, duAro D, duAro F Multi: Enable/Disable Robot No.: 1 – 8 Application: Standard, Servo Gun, Arc Welding, Explosion-proof Number of Joints: 1 – 32 Conveyor Option: Enable, Disable
--

42.3.3 Group Settings

In the Group Settings dialog box, shown below, you can configure group tasks for the robot controller tag settings.

Group properties

Group Name:

☒ Variable Import

Import Setting

☒ Robot Controller

☐ AS File

☐ Delete existing tags

Configuration items in the Group Settings dialog box

Item	Description	Initial setting
Variable Import	This check box enables you to configure the variable import feature and then perform automatic tag generation. Tags to be imported by this feature are variables (Pose Variable, real variable, integer variable and string variable).	Deselected
Robot Controller	When this option button is selected, connection is made directly to a robot controller with the assigned port information, available variable information is obtained from the controller, and tags are generated.	Selected
AS File	Tags are generated from the AS file containing tag definitions.	Deselected
Delete existing tags	When this check box is selected, all existing tags are deleted before new tags are generated.	Deselected

The variable import feature as described in section 42.2.6 is executed when any user settings made in this dialog box are saved. Please pay special attention when changing any of the existing configuration in the Group Settings dialog box and then saving it, since this will trigger a variable import operation.

42.3.4 Tag Settings

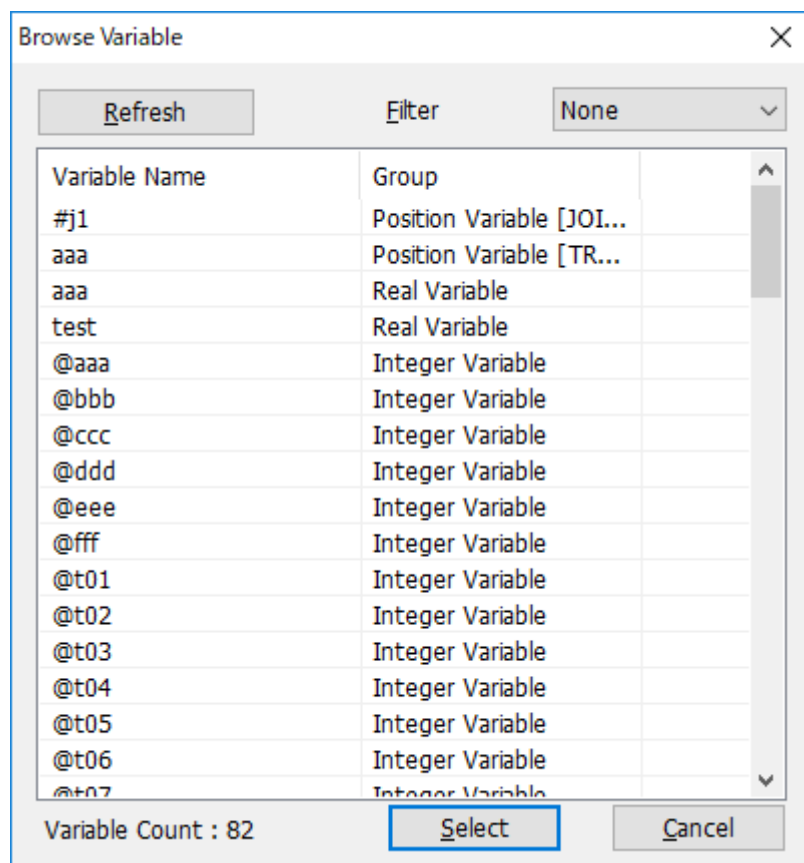
In the Tag Properties dialog box, shown below, you can define tag specifications for real-time monitor items such as robot controller variables.

Below are descriptions on how to specify items available on the General tab. Specifications of the Scale Settings and Simulation tabs correspond with DeviceXPlorer basic functions.

Item	Description	Initial setting
Tag Name	An alias for the item is specified here. Note that device system tag names (with or without "\$") cannot be used as a tag name. Also, the double quotation mark (") and delimiters (initial setting is a dot mark) cannot be used in a tag name.	Tag
Auto Format	Select this check box to automatically format the tag name.	Deselected
Comment	Here you can enter any comment you want.	
Item Type	Select an item type here.	IO
Variable Name	Specifies the robot controller variable name. This field is enabled when the item type is variable (Pose Variable, real variable, integer variable, string variable). Up to 31 characters (15 characters for variable name + 16 characters for array elements) can be used to specify the name. For array variables, make sure to specify appropriate elements. (Refer to "Notes on variables" described in section 5.4.4. for more information.)	
Browse	This button displays the Browse Variable dialog box. The Browse Variable dialog box allows you to temporarily connect to a robot controller to create a list of variables available in the controller where you can then select a desired variable name. Once a variable name is selected from the list, the corresponding item type is defined and the variable name is stored in the R/C item. Browsing the variables may take some time depending on the particular robot controller or communication environment in use.	
IO Address	Specifies the IO/Internal Signal number. This field is enabled when the item type is "IO/Internal Signal". This number can be specified in the range of 1–960, 1001–1960, and 2001–2960.	1

	This IO Address is also used to specify the PC program number (1 to 8) of PcStatus.	
Data Type	Specifies the data type of the tag. Values read from R/C are cast in the data type specified here. BOOL: Boolean type BYTE: 8-bit signed integer type UBYTE: 8-bit unsigned integer type SHORT: 16-bit signed integer type USHORT: 16-bit unsigned integer type LONG: 32-bit signed integer type ULONG: 32-bit unsigned integer type LONGLONG: 64-bit signed integer type ULONGLONG: 64-bit unsigned integer type FLOAT: 32-bit signed real type DOUBLE: 64-bit signed real type STRING: String type Available options differ depending on the particular Item Type specified.	BOOL
Length	Specifies the size applicable for the string type and array type.	
Byte Swap	When this check box is selected, upper bytes and lower bytes are inverted to each other. This check box is enabled for selection when the corresponding Data Type is "SHORT", "LONG", or "LONGLONG".	
Array	Select this check box when defining an array type.	Deselected
Byte Position	Select an appropriate byte position here when Data Type is "BYTE". Select either "Lower Byte" (bits 1–8) or "Upper Byte" (bits 9–16).	
Bit Position	Select an appropriate bit position here when Data Type is "BOOL". Selection can be made from 1–16 when the basic data type is "SHORT". Selection can be made from 1–32 when the basic data type is "FLOAT".	
Attribute	Specifies the attribute of the tag. Read-Write: Both read and write operations are possible; Read-Only: Only read operation is possible; Write-Only: Only write operation is possible Available options differ depending on the particular Item Type specified. Refer to Table 1.3.4.3 for details.	Read-Only
Calculation	[BCD calculation] BCD calculation can be performed when Data Type is "BYTE", "SHORT", "LONG", or "LONGLONG". [Binary / Octal / Decimal / Hexadecimal text type] Selection can be made from the available formats when the data type is character type.	None

The Browse Variable dialog box appears when the Browse button is clicked in the Tag Properties dialog box.



Item	Description	Initial setting
Refresh	Clicking this button updates the list of variables. A list of variables is obtained from a robot controller only when you initially perform the browsing. For this reason, you need to use the Refresh button to update the list. Make sure to use the Refresh button each time you have made changes to existing settings such as the port settings.	
Filter	This feature enables the variable list to be filtered. Available options are "None", "Pose Variables", "Real Variables", "Integer Variables" and "String Variables".	None

Supported item types are listed below.

List of supported item types

No	Item name	Item type		Basic data type	Data type restriction	Array restriction	Attr			
1	JOINT_	Variable	Pose Variable [Joint Displacement Value]	FLOAT Array*1	None	Array only	R/W			
2	TRANS_		Pose Variable [Transformation Value]				R/W			
3	REAL_		Real Variable	FLOAT		Array not allowed	R/W			
4	INT_		Integer Variable	LONG			R/W			
5	STRING_		String Variable	STRING	STRING		R/W			
6	W1	Joint Angle Value		FLOAT Array*1	None	Array only	R			
7	W2	Transformation Value					R			
8	W3	Joint Instruction Value					R			
9	W4	Joint Deviation					R			
10	W5	Encoder Value					R			
11	W6	Joint Speed					R			
12	W10	Motor Current Value					R			
13	W14	Motor Current Instruction Value					R			
14	W21*4	Conveyor Sync Joint Angle Value		FLOAT Array*1	None	Array only	R			
15	W22*4	Conveyor Sync Transformation Value					R			
16	W23*4	Conveyor Sync Joint Instruction Value					FLOAT Array*1	None	Array only	R
17	W24*4	Conveyor Sync Joint Deviation								R
18	W25*4	Conveyor Sync Encoder Value		R						
19	W26*4	Conveyor Sync Joint Speed					R			
20	IO	IO/Internal Signal		BOOL	Restricted *2	Restricted *3	R/W			
21	ERRLOG	Error Message Display		STRING	STRING	Array not allowed	R			
22	ErrorStatus	Error Status		SHORT	None		R			
23	OperatingMode	Operating Mode		SHORT			R			
24	MotorPowerState	Motor Power State		SHORT			R			
25	MonitorSpeed	Monitor Speed		FLOAT			R			
26	ProgramAlwaysSpeed	Program Speed_ALWAYS		FLOAT			R			
27	ProgramSpeed	Program Speed		FLOAT			R			
28	ProgramAccuracy	Program Accuracy		FLOAT			R			
29	ProgramExecutionState	Step State		SHORT			R			

30	ProgramCompletedCycles	Completed Program Cycles	SHORT		R
31	ProgramRemainingCycles	Remaining Program Cycles	SHORT		R
32	ExecutionProgram	Program Name in Execution	STRING	STRING only	R
33	ExecutionStepNo	Step in Execution	SHORT	None	R
34	PcStatus	PC Program Status	SHORT	None	R
35	PcStatus_Complete	PC Program Completed Program Cycles	SHORT	None	R
36	PcStatus_Remain	PC Program Remaining Program Cycles	SHORT	None	R
37	PcStatus_Program	PC Program Info	STRING	STRING only	R

- *1 The number of joints specified for an associated device configuration is used as an initial value for the number of array elements.
- *2 When a data type other than BOOL (including arrays) is specified, the format is required to address in multiples of 1 / 1001 / 2001 + 32.
- *3 Array of 32 bits per unit applies. Specifying an array outside the scope of a specific signal type is not allowed. (Example: Specifying from output signal 929 to input signal 1032 is not allowed.)
- *4 Can be selected only when Conveyor Option is selected in the Device

43 [Yaskawa] Robot Connection

This chapter describes communication using the Yaskawa robot interface.

43.1 Robot Controller System

43.1.1 Applied units

Controller type	Ethernet connection
Robot Simulator	MotoSimEG COM is required.

43.2 List of Devices

Device name	Device symbol	Device range	Category	Attribute
RobotCount	RobotCount	-	DWORD	ReadOnly
ServoStatus	ServoStatus	1	BOOL	Read/Write
ModeStatus	ModeStatus	1	BOOL	Read/Write
Playback status.	PlaybackStatus	1	BOOL	Read/Write
Get an alarm.	Alarm	-	DWORD	ReadOnly
Reset an alarm.	ResetAlarm	1	BOOL	WriteOnly
B	B	0-99	BYTE	Read/Write
I	I	0-99	WORD	Read/Write
D	D	0-99	DWORD	Read/Write
R	R	0-99	FLOAT	Read/Write
I/O	I/O	20010 ~25127, 30010 ~35127	BOOL	Read/Write
Angle	Angle	-	DOUBLE ARRAY	Read/Write

Remark

If you set a datatype that differs from the original, the data type is set ReadOnly.

43.3 DeviceXPlorer Settings

43.3.1 Port Settings

In the Port Settings dialog box, shown below, you can configure the connection with a robot controller.

Item			Description	Initial setting
Communication Setting	Simulator	Path of CellFile	Specifies the path of the cell file to start the robot simulator. If left blank, connect to the robot simulator currently running.	
Robot controller info	Controller No.		Specify No. of the connection destination robot	0
	Retry Count		Specifies the number of retries to attempt when a timeout error occurs. This can be specified in the range of 0–10.	3

43.3.2 Device Settings

Settings for the hardware information of the robot controller

Item	Description
Connection Test	Temporarily connects to the robot controller to verify whether the configuration is valid in a test communication.
Access Point	Specify the number of items read in bulk between 1-100

43.3.3 Tag Settings

Set the robot controller of the variable as a tag.

The screenshot shows the 'Create project' dialog box with the 'Tag properties' tab selected. The 'Tag Name' is 'Tag' and 'RobotCount:OR' is entered in the adjacent field. The 'Auto Format' checkbox is unchecked. The 'Description' field is empty. The 'Item Type' is set to 'RobotCount'. The 'Address(A)' is '0' and 'Robot No(N)' is '0'. The 'Data Type' is 'LONG' and 'Byte Position' is 'Lower Byte'. The 'Length' is '1'. The 'Byte Swap' and 'Array' checkboxes are unchecked. The 'Bit Position' is '0'. The 'Attribute' is 'ReadOnly' and the 'Calculation' is 'NONE'. At the bottom, there are buttons for 'Cancel', '< Back', 'Next >', and 'Finish'.

Item	Description	Initial setting
Tag Name	An alias for the item is specified here. Note that device system tag names (with or without "\$") cannot be used as a tag name. Also, the double quotation mark (") and delimiters (initial setting is a dot mark) cannot be used in a tag name.	Tag
Auto Format	Select this check box to automatically format the tag name.	Deselected
Comment	Here you can enter any comment you want.	
Item Type	Select the Item type. Please refer to 43.2.	RobotCount
Address	Specify the device number in decimal notation. This field is enabled when the item type is "B/I/D/R/IO".	1
Data Type	Specifies the data type of the tag.	BOOL
Length	Specifies the size applicable for the string type and array type.	1
Byte Swap	When this check box is selected, upper bytes and lower bytes are inverted to each other. This check box is enabled for selection when the corresponding Data Type is "SHORT", "LONG", or "LONGLONG".	
Array	Select this check box when defining an array type.	Deselected
Robot No.	Select an appropriate Robot Number. It can be specified when Item Type is "Angle".	
Byte Position	Select an appropriate byte position here when Data Type is "BYTE". Select either "Lower Byte" (bits 1–8) or "Upper Byte" (bits 9–16).	
Bit Position	Due to the specifications of the YASKAWA robot controller, bit positions can not be specified.	
Attribute	Specifies the attribute of the tag. Read-Write: Both read and write operations are possible; Read-Only: Only read operation is possible; Write-Only: Only	Read-Only

	write operation is possible Available options differ depending on the particular Item Type specified. Refer to Table 1.3.4.3 for details.	
Calculation	[BCD calculation] BCD calculation can be performed when Data Type is “BYTE”, “SHORT”, “LONG”, or “LONGLONG”. [Binary / Octal / Decimal / Hexadecimal text type] Selection can be made from the available formats when the data type is character type.	None

Important

Please purchase MotoSimEG COM from YASKAWA CORPORATION.

44 [Yamaha] Robot Controller Ethernet Connection

This chapter explains communication with Yamaha robot controller.

An overview of Yamaha Robot connection is shown below.

Overview	
Communication protocol	Telnet
Data code	Shift_JIS
Internet protocol	TCP/IP

44.1 Robot Controller System

44.1.1 Applicable Units

The Controller and Emulator that can be connected to Yamaha Robot equipment are shown below.

[Robot Controller]

Series	Applicable Ethernet
RCX	RCX340

[Emulator]

Series	Applicable Ethernet
RCX-Studio	RCX-Studio(RCX340)

44.2 List of Devices

The Yamaha devices that can be set are as shown below.

[List of Devices]

Device name	Device symbol	Device range	Category	Format
Parallel input variable* ¹	DI	0-27	UBYTE	Oct
Parallel output variable* ⁴	DO	0-27		
Internal output variable	MO	0-37		
Arm lock output variable	LO	0-1		Dec
Timer output variable	TO	0-1		
Serial input variable* ¹	SI	0-27		Oct
Serial output variable* ⁴	SO	0-27		
Serial word input* ^{1,*2}	SIW	2-15	USHORT	Dec
Serial double word input* ^{1, *3, *4}	SID	2,4,6,8,10,12,14	LONG	
Serial word output* ^{2, *4}	SOW	2-15	USHORT	
Serial double word output* ^{3, *4}	SOD	2,4,6,8,10,12,14	LONG	
Arm current position (pulse coordinate) * ⁵	WHERE	1-6		
Arm current position (Cartesian coordinates) * ⁵	WHRXY	1-9	1-6: FLOAT 7-9: BYTE	

*¹ It is possible to write only when the connection destination is the emulator

*² The access range is 0 to 15 only when the connection destination is the emulator

*³ The access ranges are 0, 2, 4, 6, 8, 10, 12, and 14 only when the connection destination is the emulator.

*⁴ It can not write to DO 0-1, SO 0-1, SOW 0-1, SOD 0

*⁵ Arm current position (pulse coordinate) WHERE, arm current position (Cartesian coordinate) WHRXY can not be specified as an array

44.3 DeviceXPlorer Settings

44.3.1 Device Settings

This section explains how to make the settings for the device of the Yamaha to be accessed.

Item	Description
Controller Type	Select the controller type of the connection destination.
Emulator Communication	Select this check box to connect with the emulator.

44.3.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Device Type	Specify the device to be accessed.
Device No.	Specify the device number in decimal notation.
Robot Number	Enter the robot number (1 to 4) to be connected. Valid when WHERE / WHRXY.
Bit Position	If BOOL type is specified for the data type, specify the bit position. When the basic data type is UBYTE type, 0 to 7 can be specified. When the basic data type is USHORT type, 0 to 15 can be specified. When the basic data type is FLOAT / LONG type, 0 to 31 can be specified.

45 [Iai] Program Controller Serial Connection

This chapter explains communication with IAI program controller.

An overview of IAI program controller connection is shown below.

Overview	
Communication protocol	X-SEL Serial
Data code	ASCII

45.1 Program Controller System

45.1.1 Applicable Units

The Controller and Emulator that can be connected to IAI program controller equipment are shown below.

[Program Controller]

Series	model
RSE	G
X-SEL	P/Q/PCT/QCT/PX/QX/R/S/RX/SX/RXD/SXD/RA/SA/RAX/SAX/RAXD/SAXD
TT	TTA
SSEL	SSEL
ASEL	ASEL
PSEL	PSEL
MSEL	PC/PG/PCF/PGF/PCX/PGX

45.2 List of Devices

The IAI devices that can be set are as shown below.

[List of Devices]

Device			Device range	Attribute	Category
Input Port			000-299 1000-3999	R/W	BOOL
Output Port			300-599 4000-6999	R	BOOL
Global Flag			600-899	R	BOOL
Local Flag			900-999		
Global Integer			200-299 1200-1299 2000-2799	R	LONG
Local Integer			1-99 1001-1099		
Global Real			300-399 1300-1399	R	DOUBLE
Local Real			100-199 1100-1199		
Axis Status *1	Axis Status	Servo Axis in Use	1-8	R	BOOL
		Home Return			UBYTE

		Servo			BOOL
		Motion Completion			BOOL
		Push Force Not Encountered			BOOL
	Axis Sensor Status	Creep Sensor		R	BOOL
		Overrun Sensor			BOOL
		Home Sensor			BOOL
	Axis Related Errorcode			R	ULONG
	Encoder Status(when restarting)	Over Speed(OS))		R	BOOL
		Full Abs. Status(FS)			BOOL
		Count Error(CE)			BOOL
		Counter Overflow(OF)			BOOL
		Multi Rotation Error(ME)			BOOL
		Battery Error(BE)			BOOL
		Battery Alarm(BA)			BOOL
	Current Position			R	FLOAT
Program Status	Status		1-255 (Program No)	R	BOOL
	Running Program Step No.			R	ULONG
	Program Dependent Errorcode			R	ULONG
	Error Occurred Step No.			R	ULONG
System Status	System Mode			R	UBYTE
	Most Serious Level System Error No.			R	ULONG
	Latest System Error No.			R	ULONG
	System Status 1	Drive Mode SW Status		R	BOOL
		TP Deadman AW Status			BOOL
		Safety Gate Status			BOOL
		Emergency Stop SW Status			BOOL
		Power Abnormality Status			BOOL
		Battery Voltage Low Warning Status			BOOL
		Battery Voltage Abnormality Status			BOOL
	System Status 2	Status of Flash ROM AP Data written		R	BOOL
		Status of Writing Slave Parameters			BOOL
		Servo Interlock Status			BOOL
		I/O Interlock Status			BOOL
		Wait Status for Restart			BOOL
		Program Execution Status			BOOL
	System Status 3	Power Cutoff Status		R	BOOL
		System Drive Status		R	BOOL
		System Ready Status		R	BOOL
		Status of Positioner Mode		R	BOOL

*1 Some models (X-SEL-*X(D), MSEL-*X) cannot be accessed. Please check the device specifications for details.

45.3 DeviceXPlorer Settings

45.3.1 Device Settings

This section explains how to make the settings for the device of the Yamaha to be accessed.

The screenshot shows the 'Device' tab of the DeviceXPlorer interface. It features a 'Connection Test' button. Below it, the 'Station No.' is set to 153. Under the 'Access Points' section, 'Bit R/W' is set to 3000 and 'Word R/W' is set to 125. There are also fields for 'Bit Poke' and 'Word Poke', which are currently empty.

Item	Description	
Connection test	Temporarily connect to the program controller and perform test communication to confirm that the settings are correct. The connection test reads from input port 00.	
Station No	Specify the Station No. Specify the station code specified in I / O parameter 81. Usually specify at 153.	
Access Points	Bit R/W	Specify the number of access points for batch read in bit units.
	Word R/W	Specify the number of access points for batch read in word units.

45.3.2 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

The screenshot shows the 'General' tab of the DeviceXPlorer interface for tag settings. The 'Tag Name' is 'I153'. Below it is 'Input Port0' and an 'Auto Format' checkbox. The 'Description' field is empty. 'Device Type' is set to 'Input Port'. 'Status Details' is a dropdown menu. Below that, 'Device No.' is 0, 'Program No.' is 1, 'Data Type' is 'BOOL', 'Axis No.' is 1, 'Length' is 1, 'Bit Position' is 0, 'Attribute' is 'ReadWrite', and 'Calculation' is 'NONE'. There are also checkboxes for 'Byte Swap' and 'Array'.

Item	Description
Device Type	Specify the device type.
Status Details	Specify detailed information for the status variable. Valid only when Axis Status / Program Status / System Status is selected as the device type.
Device No.	Specify the device number in decimal notation.
Axis No	Specify the Axis No. Editing is not possible in states other than axes status. Available range: 1-8

46 [Sumitomo Heavy Industries] Molding Machine Ethernet Connection

This chapter explains communication with a Sumitomo Heavy Industries Molding Machine via an Ethernet.

An overview of communication is shown below.

Overview	
Link	PC communication
Data code	ASCII
Network	TCP/IP
Ethernet port number	33333

46.1 Applicable Units

The table below shows model applicable to Sumitomo Heavy Industries Molding Machine connection.

Category	model
All-electric Small-sized Injection Molding Machine	SEEV-A
All-electric Injection Molding Machine	SE-DUZ
All-electric Middle-sized Injection Molding Machine	SEEV-A-HD
All-electric Injection Molding Machine	SE-HSZ
Super High-speed All-electric Injection Molding Machine	SE-HP
All-electric Large-sized Injection Molding Machine	CL7000

* Molding Machine must have the option of PC communication function.

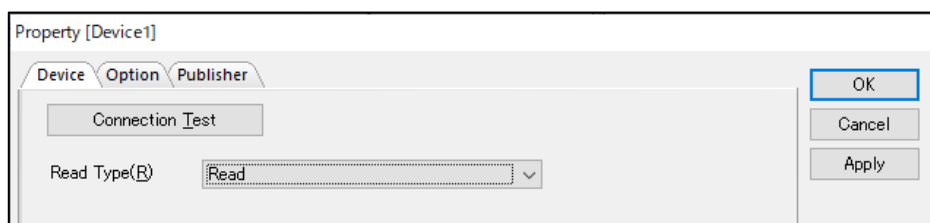
46.2 Access ID

Access the ID that is specified by the user.

46.3 DeviceXPlorer Settings

46.3.1 Device Settings

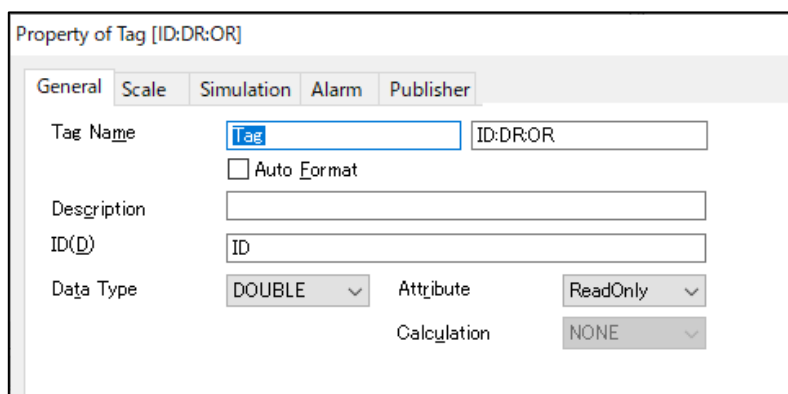
This section explains how to make the settings for the device of the Yamaha to be accessed.



Item	Description
Read Type	Please specify the Read Type 'Read' or 'Data_Change'.

*String data does not support to the Read Type "Data_Change".

46.3.2 Tag Settings



Item	Description
ID	Please specify the ID.

46.3.3 Errors

The error messages are shown below.

Code (HEX)	Error	Content
0x15	NAK	The molding machine returned a NAK response.
0xFD	Invalid ID	The ID in the response from the molding machine is different from the requested ID.
0xFE	BCC Error	There was an error in the BCC of the response from the molding machine.
0xFF	Other Error	An error other than the above occurred.

47 [Japan Steel Works] Molding Machine Net100 Connection

This chapter explains communication with JSW molding machine.

An overview of communication via a Net100 is shown below.

Overview	
Link	Net100 web API
Network	HTTP
PortNo.	80

47.1 Applicable unit

The CPU unit and Serial unit that can be used for PLC Serial connection are shown below.

Series	Unit
J-ADS	-
J-AD	-
J-EL3	-
J-E3	-

Important

NET100 is required to communicate with the molding machine of Japan Steel Works.

Check with Japan Steel Works to see if it can be connected.

The "machine number" to identify the molding machine is required in order to check connectability.

47.2 List of Data

The list of data that can be acquired is shown below.

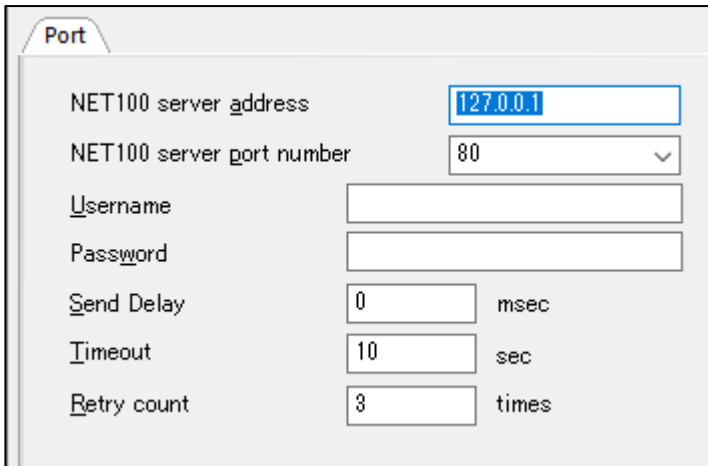
Data		Attribute	Data type
Status	IP address	R	STRING (Fixed)
	Molding condition name		STRING (Fixed)
	Status		STRING (Fixed)
	Alarm status		BOOL
	Message		STRING(Fixed)
	Shot number		SHORT
	Last updated time of machine status information		STRING (Fixed)
	Last update time of alarm history update information		STRING (Fixed)
	Last updated time of event history information		STRING (Fixed)
	Last update time of setting value change history information		STRING (Fixed)
Variable		R	STRING
Shot information *1		R	STRING

*1 J-EL3 / E3 shipped before February 2003 requires a software update in the controller.

47.3 DeviceXPlorer Settings

47.3.1 Port Settings

Set the access target Port



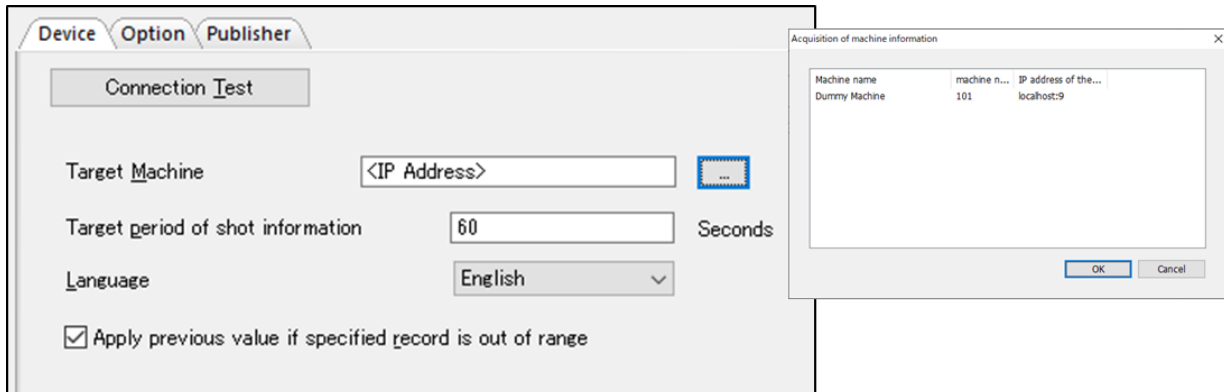
The screenshot shows a 'Port' settings window with the following fields and values:

- NET100 server address: 127.0.0.1
- NET100 server port number: 80
- Username: (empty)
- Password: (empty)
- Send Delay: 0 msec
- Timeout: 10 sec
- Retry count: 3 times

Item	Description
NET100 server address	Specify the IP address of the PC running NET100.
NET100 server port number	Specify the port number of communication with NET100.
Username	Specify the username used for Basic authentication of communication with NET100.
Password	Specify the password used for Basic authentication of communication with NET100.
Send Delay	Specify the waiting time before sending next command after receiving response from the other equipment on the millisecond time scale. Normally set 0.
Timeout	Specify timeout to connect. Specifies the waiting time before receiving a response message after sending a request message. If unable to respond within the set time, a timeout error occur.
Retry count	Specify number of retries when timeout occurs.

47.3.2 Device Settings

Set the access target Device.



Item	Description
Target Machine	Specify the IP address of the machine to access. Click the button to get a list of accessible machines.
Target period of shot information	Specify the period from the current time when get the shot information. It can get the shot information included in the target period.
Language	Specify the language to use. If the machine does not support the specified language, it will be output in English.
Apply previous value if specified record is out of range	When shot information is read, NET100 returns the data within "Target period of shot information" in CSV format. Set or keep the previous value if the specified record does not exist when reading the shot information. If invalid, the quality flag will be 'Uncertain'. [Example: Response from NET100] "Shot #","Date","Time","Quality Code","Cycle Time [s]",*,*,* 1,"2021/06/16","16:14:09",0,10.30,*,*,* 2,"2021/06/16","16:14:21",0,10.30,*,*,* 3,"2021/06/16","16:14:34",0,10.30,*,*,* 4,"2021/06/16","16:14:44",0,10.30,*,*,* 5,"2021/06/16","16:14:54",0,10.30,*,*,*

47.3.3 Tag Settings

Set the access target data.

The screenshot shows a 'Tag Settings' dialog box with the following fields and values:

- General Tab:**
 - Tag Name: Tag
 - MachineStatus_StatusORS1
 - Auto Format: ☐
 - Description:
 - Type: MachineStatus
 - Status
 - Detail: Status
 - Status
 - Data:
 - Record Number: 1
 - Data Type: STRING
 - Attribute: ReadOnly

Item	Description
Type	Specify the type of access destination data.
Detail	Specify the details of the access destination data. Valid only if the Status is set to type.
Data	Specify the data name of the access destination. Valid only if the shot information or variable is set in type. Click the button to display the proposed data list, which acquired as follows; list the variables if the “Type” is set variable / item list if the “Type” is set shot information,
Record Number	Specify the record number when reading the shot information. Specify 1 to get the latest value. Valid only if the shot information is specified in ”Type”.

47.4 Errors

Code	Error	Description
400	Bad Request	The format of Request body is invalid.
401	Unauthorized	Basic authentication failed. Check the user name and password of port settings.
404	Not Found	Failed to find a machine with applicable IP address.
503	Service Unavailable	Failed to communicate a machine controller.
4xx, 5xx Other than above	-	Status code defect

48 Modbus Ethernet Connection

This chapter explains communication with a Modbus TCP-compatible unit using an Ethernet unit. An overview of communication via a Modbus Ethernet connection is shown below.

Overview	
Protocol	Modbus / TCP communication
Data code	Binary

48.1 Modbus Systems

48.1.1 Applicable Units

CPU units and Ethernet units supporting Modbus TCP communication can be used.

48.1.1.1 azbil(Yamatake)

The applicable modules for azbil Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Instrumentation Network Module	NX-S01 NX-S11/12/21 NX-DX1/DX2 NX-DY1/DY2 NX-D15/25/35	NX-CB1 NX-CL1/NX-CR1 NX-TL1/NX-TR1
Digital Controller	DMC50	Built-in Ethernet port

48.1.1.2 M-System

The applicable modules for M-System Modbus Ethernet connection are shown below.

Category	Series	Applicable modules	Applicable Ethernet port
Remote I/O	R3	R3	R3-NE1
	R5	R5(H)	R5-NE1
	R6	R6	R6-NE1,R6-NE2
	R7E	R7E-DA16,R7E-16A,R7E-16B R7E-SV4,R7E-TS4,R7E-RS4,R7E-MS4 R7E-CT4E,R7E-YV2,R7E-YS2	Built-in Ethernet port
Tower Light	IT60	IT60W1,IT60RE	Built-in Ethernet port
Paperless Recoder	TR30	TR30-G	Built-in Ethernet port
Web Data Logger	DL8	DL8-A, DL8-B, DL8-C, DL8-D	Built-in Ethernet port

48.1.1.3 IDEC MICROSmart

The applicable modules for IDEC MICROSmart Modbus Ethernet connection are shown below.

Category	Series	Applicable modules	Applicable Ethernet port
MICROSmart	FC5A	FC5A-D12K1E FC5A-D12S1E	Built-in Ethernet port

48.1.1.4 Koyo

The applicable modules for Koyo Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
DirectLOGIC 05	DL05	H0-ECOM100
DirectLOGIC 06	DL06	
DirectLOGIC 205	D2-240 / 250 / 260	Built-in Ethernet port H2-ECOM100 H2-EBC100
KOSTAC SJ	SJ-30DD1-D,SJ-00DD1-D SJ-00DD2-D,SJ-00DR-D SJ-00AR-D,SJ-02DD1-D SJ-02DD2-D,SJ-02DR-D	Built-in Ethernet port

48.1.1.5 WAGO

The applicable modules for WAGO Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
I/O System	750-341 / 342 / 841 / 842 / 843 / 873 / 881 / 352	Built-in Ethernet port

48.1.1.6 Hakko MONITOUCH

The applicable modules for Hakko MONITOUCH Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
V8	V815iX,V812 iS / S,V810 iS / S V810 iT / T,V810 iC / C,V808 iS / S V808 iC / C,V808 iCH / CH,V806 iT / T V806 iC / C,V806 iM / M	Built-in Ethernet port
V7	V715,V712 iS / S,V710 is / S V710 iT / T,V710C,V708 iS / S V708C,V706T,V706C,V706M	
V6	V606eC,V606eM,V608CH	

48.1.1.7 Anywire DB A40

The applicable modules for Anywire DB A40 Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Ethernet Gate server	AG428-ES	Built-in Ethernet port
Ethernet Gate I/O	AG428-EC	
Ethernet Gateway	AG428-I1	

48.1.1.8 Eurotherm

The applicable modules for Eurotherm Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
2500	2500C	Built-in Ethernet port
Controller	nanodac	

48.1.1.9 Cognex In-Sight

The applicable modules for Cognex In-Sight Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
In-Sight	ISM1020-00,ISM1050-00,ISM1100-00 ISM1100-10,ISM1400-00,ISM1400-10 ISM1403-00,ISM1403-10,ISM1100-C00 ISM1100-C10,ISM1400-C00,ISM1400-C10 ISM1403-C00,ISM1403-C10,IS5000-00 IS5100-00,IS5100-10,IS5400-00,IS5400-10 IS5401-00,IS5401-10,IS5403-00,IS5403-10 IS5600-00,IS5600-10,IS5603-00,IS5603-10 IS5605-00,IS5605-10,IS5100-C00,IS5100-C10 IS5400-C00,IS5400-C10,IS5400-S00,IS5400-S10 IS5400-CS00,IS5400-CS10,IS5403-S00 IS5403-S10,IS5604-00,IS5604-10 ISM1110-11,IS1410-11,ISM1413-11 IS5110-00,IS5410-00,IS5410-R00,IS5410-S00 IS5411-00,IS5413-00,IS5610-00,IS5613-00	Built-in Ethernet port
In-SightEZ	EZ-100,EZ-110,EZ-140,EZ-143	

48.1.1.10 HIOKI SMART SITE

The applicable modules for HIOKI SMART SITE Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
SMART SITE	2300	2353,2301,2302,2303 2304,2305,2332,2343 2341,2342

*You can create tags automatically by selecting HIOKI modules on Group dialog.

48.1.1.11 Yokogawa STARDOM

The applicable modules for Yokogawa STARDOM Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
FCN	NFCP100	Built-in Ethernet port
FCJ	NFJT100	

48.1.1.12 Yokogawa Recorder

The applicable modules for Yokogawa Recorder Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
SMARTDAC+	GX10 / 20 / 60 / 90, GP10/20	Built-in Ethernet port
DXAdvanced	DX1012 / 1006 / 1004 / 1002 (N/T) DX2048 / 2040 / 2030 / 2020 / 2010 DX2008 / DX2004 (T)	Built-in Ethernet port
MVAdvanced	MV1024 / 1012 / 1008 / 1006 / 1004 MV2048 / 2040 / 2030 / 2020 / 2010 / 2008	Built-in Ethernet port

48.1.1.13 Yokogawa Control and Measurement Station

The applicable modules for Yokogawa Control and Measurement Station Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
DAQSATION	CX2620 / 2610 / 2420 / 2410 / 2220 CX2210 / 2200 / 2020 / 2010 / 2000 CX1206 / 1200 / 1006 / 1000	Built-in Ethernet port

48.1.1.14 DELTA

The applicable modules for DELTA Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
DVP	DVP-EH3, DVP-EH2, DVP-SV2, DVP-SV	DVPENE01-SL
	DVP-SE, DVP-MC	Built-in Ethernet port
AH	AH500	AH10EN-5A

48.1.1.15 Mitsubishi MELSEC

The applicable modules for Mitsubishi Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
MELSEC	MELSEC Q Series	QJ71MT91

48.1.1.16 Panasonic

The applicable modules for Panasonic Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
FP7 Series	AFP7CPS4E, AFP7CPS3E	Built-in Ethernet port

48.1.1.17 3S CoDeSys

The applicable modules for 3S CoDeSysModbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Soft PLC	CoDeSys	Built-in Ethernet port

48.1.1.18 MOXA Switching Hub

The applicable modules for MOXA Switching Hub Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Switching Hub	EDS-828 / 728, EDS-518 / 516 (A) EDS-P510A / 506, EDS-G509/500 EDS-508 / 505 / 408 / 405 (A)	Built-in Ethernet port

48.1.1.19 PHOENIX CONTACT

The applicable modules for PHOENIX CONTACT I/O System Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
I/O System	AXL F BK ETH	Built-in Ethernet port
	GW PL ETH/UNI-BUS 2702233	

48.1.1.20 Hitachi Industrial Equipment Systems

The applicable modules for Hitachi Industrial Equipment PLC Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
PLC	HX(C)-CP1S08/CP1S08M/CP1H16/CP1H16 M /CP1H16	Built-in Ethernet port

48.1.1.21 OMRON

The applicable modules for OMRON Modbus/TCP connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Condition Monitoring Devices	K6CM-CI2MA-EIP K6CM-CI2MD-EIP K6CM-CIMA-EIP K6CM-CIMD-EIP K6CM-VBMA-EIP K6CM-VBMD-EIP K6CM-ISMA-EIP K6CM-ISMD-EIP K6PM-THMD-EIP	Built-in Ethernet port
Power Supply	S8VK-X	Built-in Ethernet port

48.1.1.22 MTT

The applicable modules for MTT Modbus/TCP connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Remote I/O	Alchis series	MRH-T-NMT1

48.1.1.23 GRAPHTEC

The applicable modules for GRAPHTEC Modbus/TCP connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Data Logging Device	GLT400 series	Built-in Ethernet port

48.1.1.24 PATLITE

The applicable modules for PATLITE Modbus/TCP connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Stack light	LA6 series	Built-in Ethernet port
Stack light Reciever	AirGRID WD PRO Series	Built-in Ethernet port

48.1.2 Usable Commands

DeviceXPlorer uses those following command.

Function	Function Code	Description
Read Coil	01	Read command for output coil
Read Input Discrete	02	Read command for input status
Read Multiple Registers	03	Read command for Multiple Registers
Read Input Registers	04	Read command for Input Registers
Write Coil	05	Write command for output coil

Write Single Register	06	Write command for single register
Write Multiple Coils	15	Write command for multiple coils
Write Multiple Registers	16	Write command for multiple registers
Read File Record	20	Read command for file records
Write File Record	21	Write command for file records

48.2 List of Devices

The Modbus devices that can be set in DeviceXPlorer are as shown below.

The address range that can be accessed varies with the CPU. For details, refer to your CPU instructions.

The address range that can be set and the address notation vary with the address range of the device settings of DeviceXPlorer.

[Devices for Address Range 1 - 9999] (All address ranges are in decimal notation))

Device name	Device symbol	Address range*3	Device notation	Category
Input status*1	DI(1)	1 - 9999	10001 - 19999	Bit
Output coil	DO(0)	1 - 9999	00001 - 09999	
Input register*1	AI(3)	1 - 9999	30001 - 39999	Word
Holding register	AO(4)	1 - 9999	40001 - 49999	
Extended register*2	EX(6)	0 - 9999	600000 - 69999999	

[Devices for Address Range 1 - 65535] (All address ranges are in decimal notation))

Device name	Device symbol	Address range*3	Device notation	Category
Input status*1	DI(1)	1 - 65535	100001 - 165535	Bit
Output coil	DO(0)	1 - 65535	000001 - 065535	
Input register*1	AI(3)	1 - 65535	300001 - 365535	Word
Holding register	AO(4)	1 - 65535	400001 - 465535	
Extended register*2	EX(6)	0 - 9999	600000 - 69999999	

*1 Read-only device. Cannot be written to.

*2 The extended register address is specified as follows: device type (1 digit), file no. (3 digits), and address no. (4 digits).

Device type 6 (fixed)

File no. 0 - 999

Address no. 0000 - 9999

*3 This address is applied in case of cardinal number 1. (As for extended register “EX”, cardinal number 0 is fixed)

Note

-When accessing a dynamic tag from a client, access is achieved in a format expressed by the device notation.

Example: 10012, 30005, 61234 (address 234 of file number 1 of the extended register), etc.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform address range checks for requested tags, so attempts to access inappropriate addresses will result in errors. Check the address range of the CPU being accessed.

48.3 DeviceXPlorer Settings

48.3.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

The screenshot shows the 'Device' tab of the DeviceXPlorer settings. It includes a 'Connection Test' button and three main sections: 'Communication Format' with checkboxes for 'Word Swap', 'Cardinal numeral 0', and 'Use one point write'; 'Network' with a 'Unit ID' field set to 255 and 'Address Area' radio buttons for '1~9999' (selected) and '1~65535'; and 'Access Points' with input fields for 'Bit R/W' (1968), 'Word R/W' (119), 'Bit Poke', and 'Word Poke'.

Item		Description
Communication Format	Word Swap	Check this option to swap the high and low words when accessing LONG, LONGLONG, FLOAT or DOUBLE data.
	Cardinal numeral 0	Check this option to set DeviceXPlorer's address cardinal numeral to 0 when accessing modbus slave whose cardinal address of device is 0. (As for extended register EX, cardinal number 0 is fixed) Default cardinal numeral of DeviceXPlorer is 1.
	Use one point write	Enable to write a single point to the output coil and holding register.(Use the Write Coil, Write Single Register command.)
Network	Unit ID	Specify the slave ID of the Modbus device in accordance with the connection target. Normally "255" is specified. Set a number between 1 and 255.
	Address Area	Select the address area for the Modbus device. To use the normal address area, specify "1 - 9999". Specify "1 - 65535" to access an extended area from 10000 upward.
Access Points	Bit R / W	Specify the maximum number of access points of batch read/write of bit scale. Up to 1968 points can be set.
	Word R / W	Specify the maximum number of access points of batch read / write of word scale. Up to 119 points can be set.
	Bit Poke	Only batch writing is supported.
	Word Poke	Only batch writing is supported.

Important

In Modbus connection, the 1st holding register is used for connection test, and when Modbus controller returns reply message, the Connection test succeeds.(no check for reply message contents)

48.3.2 Group Settings

This section explains how to make group settings.

Group properties

Group Name:

☒ Importing of tags

Module ID

Unit type
2304-01 Plus(Logging Value:instant)

☐ Delete existing tags

In HIOKI connection, if you enable the Importing of tags, the tags are automatically added in the hierarchy of this group.

Item	Description
Group Name	Specify the group name.
Importing of tags	Check this to enable automatic tag importing.
Module ID	A tag is created by adding 100 times the value set as the module ID to the address of the tag to be imported. For example, if the address of the tag to be imported is 23 and the module ID is 10, the address after importing will be 1023.
Unit type	The type corresponding to each type of unit in the HIOKI 2300 series is shown.
Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.

Note

Only HIOKI connection is supported for tag auto import.

48.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [40001]

General Scale Simulation Alarm

Tag Name: Tag 30001:OR

☐ Auto Format

Description:

Device Type: AI(3) Input Register:

Device No.: 1 File No.: 0

Data Type: SHORT Byte Position: Lower Byte

Length: 1 Bit Position: 0

☐ Byte Swap Attribute: ReadOnly

☐ Array Calculation: NONE

New Save < > OK Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 48.2 for devices that can be specified.
Address No.	Specify the address as decimal number. When cardinal numeral is 1 as default, please input number between 1 and 65535. When cardinal numeral is 0, please input number between 0 and 65535.
File No.	When the extended register "EX" is selected, specify the file number of the extended register. Set a number between 0 and 999.

Important

Note that if a bit device is selected (input status / output coil), the data type will be BOOL.

48.4 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

48.4.1 List of Devices

Show the list of convertible devices.

KEPServerEX			DeviceXPlorer	
Type	Symbol		Type	Symbol
Output Coil	0	⇒	Output Coil	DO(0)
	H0	⇒		
	W0	⇒		
	WH0	⇒		
	B	⇒		
	%MX	⇒		
	%M	⇒		
Input Coil	1	⇒	Input Status	DI(1)
	H1	⇒		
	BI	⇒		
Internal Register	3	⇒	Input Register	AI(3)
	H3	⇒		
	WI	⇒		
	DI	⇒		
	FI	⇒		
	M_WI	⇒		
	D3	⇒		
	F3	⇒		
	M_3	⇒		
Holding Register	4	⇒	Holding Register	AO(4)
	H4	⇒		
	W4	⇒		
	WH4	⇒		
	D	⇒		
	F	⇒		
	M_W	⇒		
	D4	⇒		
	F4	⇒		
	M_4	⇒		
	%MW	⇒		
	%DW	⇒		
	%MD	⇒		
	%FW	⇒		
	%MF	⇒		
	M_%MW	⇒		

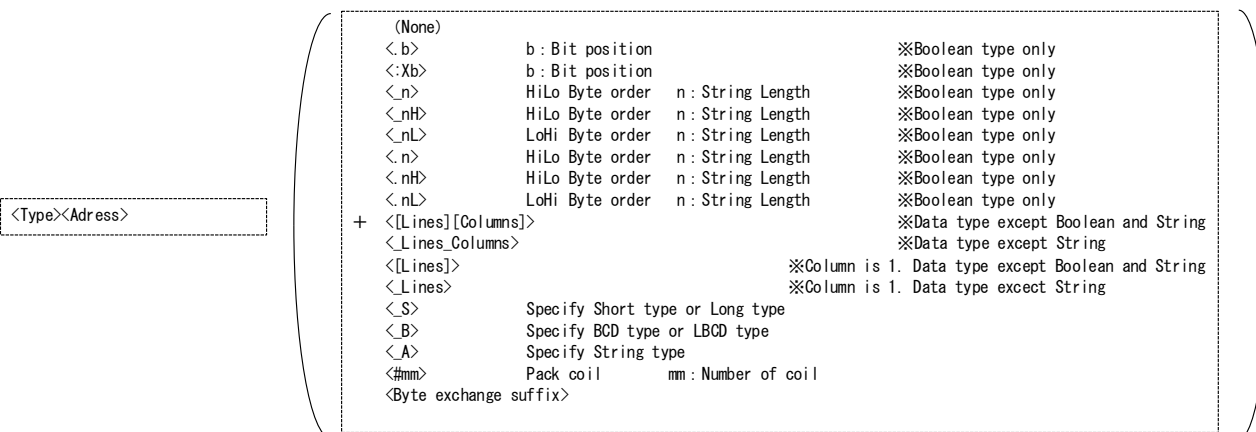
48.4.2 Device Range

Please refer “List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

48.4.3 Optional Specification

The address format of KEPServerEX is as follows.



ex) 400001.15
M_%MW00001_2

Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
_S	Set 'SHORT' or 'LONG' to the data type. Depend on the data type in KEPServerEX.
_B	Set BCD Format to the calculation.
_A	Set 'STRING' to the data type. Enable byte swap.
.x :Xx (x is Number)	Set 'BOOL' to the data type. Set x to the bit position.
_x _xL (x is Number)	Set 'STRING' to the data type. Set x to the size. Enable byte swap.
_xH (x is Number)	Set 'STRING' to the data type. Set x to the size.
.x _xL (x is Number)	Set 'STRING' to the data type. Set x/2 to the size. Enable byte swap.
.xH (x is Number)	Set 'STRING' to the data type. Set x/2 to the size.
[x] _x [1][x] _1_x (x is Number)	Enable array. Set x to the size.
_X1	Enable byte swap.
_X2	Enable byte swap if the data type is 'SHORT' or 'USHORT'.
_X3	When the data type is any other, output an error.

Important

- Two dimensional array is not supported.
- If "W" is included in the device type, set WriteOnly to the attribute. (Expect only "ReadOnly" devices.)
When importing "W" as a holding register, it is necessary that rewrite the file directly. (Change from W to 4)
ex) W00001 → 400001
- The setting of "Base 0" in DeviceXPlorer is invalid for "Specify Zero base address".

48.5 Errors

This section explains the Modbus errors (response errors) included in the error messages.

Exceptional code	Error	Description
01	Function error	An incorrect function code was received.
02	Data address error	The specified data address does not exist. (Outside of address range)
03	Data error	The specified data is incorrect.
04	Slave device error	The slave unit did not accept the command.
06	Slave device busy	The unit is busy.
08	Memory parity error	There is a problem with the memory parity.
0B	Gateway path error	Could not verify the specified target. Please check whether the unit ID is correct.
FE	Function Code inconsistency error	Function code of sending message is different from function code of receiving message.
FF	Serial Number error	Serial number (Transaction ID) of sending message is different from serial number of receiving message.

49 Modbus Serial Connection

This chapter explains communication with a Modbus/ASCII or Modbus/RTU communication compatible unit using a serial unit. An overview of communication via a Modbus serial connection is shown below.

Overview	
Protocol	Modbus/ASCII or Modbus/RTU
Data code	ASCII or Binary

49.1 Modbus Systems

49.1.1 Applicable Units

CPU units and serial units that support either Modbus/ASCII or Modbus/RTU communication can be used.

49.1.1.1 azbil(Yamatake)

The applicable modules for azbil Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
Instrumentation Network Module	NX-S01, NX-S11/12/21 NX-DX1 / DX2, NX-DY1 / DY2 NX-D15 / 25 / 35	Built-in Serial port
Digital Controller	DMC50, DMC10	
Digital Indicator Controllers	SDC15, SDC25 / 26 SDC35 / 36, SDC45 / 46	
Digital Recorders	SRF101 / 102 / 103 / 106 SRF201 / 202 / 203 SRF206 / 212 / 224	
Mass Flow Meters	CMS, CMF, CMQ-V CML, MPC, MVF MQV, CMF015	
Sensors	PBC201 / 203	
Flame Safeguard Controls	AUR350C / 450C RX	
Converters	CMC15G, CMC10B	
Programable Controllers	DCP31 / 32 DCP551 / 552	

49.1.1.2 M-System

The applicable modules for M-System Modbus Serial connection are shown below.

Category	Series	Applicable modules	Applicable Serial port
Remote I/O	R1	R1	RZMS-U9, R1MS-GH3, R1M-GH, R1M-J3, R1M-A1, R1M-D1, R1M-P4
	R3	R3	R3-NM1, R3-NM3
	R5	R5(H)	R5-NM1
	R6	R6	R6-NM1, R6-NM2
	R8	R8	R8-NM1
Small-channel compact integrated Remote I/O	R7M	R7M-DA16,R7M-DC16A R7M-DC16B,R7M-DC8C,R7M-SV4 R7M-TS4,R7M-RS4,R7M-MS4 R7M-CT4E,R7M-YV2,R7M-YS2	Built-in Serial port
Temperature Controller	TC10	TC10	TC10EM-A-M2, TC10NM-A-M2

49.1.1.3 IDEC MICROSmart

The applicable modules for IDEC MICROSmart Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
MICROSmart	FC5A-D16RK1,FC5A-D16RS1 FC5A-D32K3,FC5A-D32S3 FC5A-C10R2,FC5A-C10R2D,FC5A-C10R2C FC5A-C16R2,FC5A-C16R2D,FC5A-C16R2C FC5A-C24R2,FC5A-C24R2D,FC5A-C24R2C	Built-in Serial port

49.1.1.4 Koyo

The applicable modules for Koyo Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
DirectLOGIC 05	DL05	D0-DCM
DirectLOGIC 06	DL06	
DirectLOGIC 205	D2-240 / 250 / 260	Built-in Serial port
DirectLOGIC 305	D3-340 / 350	Built-in Serial port
DirectLOGIC 405	D4-450	
SU	SU-5 / 5E / 6B / 5M / 6M / 6H	Built-in Serial port U-01DM
KOSTAC SZ	SZ-4 / 4M	
KOSTAC S	SG-8B	U-01DM
KOSTAC PZ	PZ3	Built-in Serial port
KOSTAC SJ	SJ-30DD1-D,SJ-00DD1-D,SJ-00DD2-D SJ-00DR-D,SJ-00AR-D,SJ-02DD1-D SJ-02DD2-D,SJ-02DR-D	Built-in Serial port
T1K	T1K-Modbus	Built-in Serial port T1H-CTRIO

49.1.1.5 WAGO

The applicable modules for WAGO Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
I/O System	750-312/314/315/316/812/814/815/816	Built-in Serial port

49.1.1.6 Hakko MONITOUCH

The applicable modules for Hakko MONITOUCH Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
V8	V815iX,V812 iS / S,V810 iS / S,V810 iT / T V810 iC / C,V808 iS / S,V808 iC / C V808 iCH / CH,V806 iT / T V806 iC / C,V806 iM/M	Built-in Serial port
V7	V715,V712 iS / S,V710 is / S V710 iT / T,V710C,V708 iS / S V708C,V706T,V706C,V706M	

49.1.1.7 RKC

The applicable modules for RKC Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
Programmable Controller	PF900,PF901	Built-in Serial port
Digital Indicator Controllers FB	FB100,FB400,FB900	
Digital Indicator Controllers HA	HA430,HA930	
Digital Indicator Controllers SA	SA100,SA200,SA201	
Digital Indicator Controllers RB	RB	
Module Controller	SRV,SRX,H-PCP-J	

49.1.1.8 CHINO

The applicable modules for CHINO Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
Recorder	LE5000 / 5100 / 5200 / 5300 AH3000 AL3000 KR5100 / 5200/5300 BR1000 KR2000 / 3000	Built-in Serial port
Controller	DP1000G / 3000G LT230 / 300 / 350 / 370 / 400 / 830 DB1000 / 2000 KP1000 / 2000 / 3000	

49.1.1.9 Yokogawa STARDOM

The applicable modules for Yokogawa STARDOM Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
FCN	NFCP100	NFLR111, NFLR121 Built-in Ethernet port
FCJ	NFJT100	Built-in Serial port

49.1.1.10 Yokogawa Recorder

The applicable modules for Yokogawa Recorder Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
SMARTDAC+	GX10 / 20 / 60 / 90, GP10/20	Built-in Ethernet port
DXAdvanced	DX1012 / 1006 / 1004 / 1002 (N/T) DX2048 / 2040 / 2030 / 2020 / 2010 DX2008 / DX2004 (T)	Built-in Ethernet port
MVAdvanced	MV1024 / 1012 / 1008 / 1006 / 1004 MV2048 / 2040 / 2030 / 2020 / 2010 / 2008	Built-in Ethernet port

49.1.1.11 Yokogawa Control and Measurement Station

The applicable modules for Yokogawa Control and Measurement Station Modbus Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
DAQSATION	CX2620 / 2610 / 2420 / 2410 / 2220 CX2210 / 2200 / 2020 / 2010 / 2000 CX1206 / 1200 / 1006 / 1000	Built-in Ethernet port

49.1.1.12 DELTA

The applicable modules for DELTA Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
DVP	DVP-EH3, DVP-EH2, DVP-SX2 DVP-SX, DVP-PM, DVP-SV2 DVP-SV, DVP-ES2/EX2, DVP-SA2 DVP-SA, DVP-SS2, DVP-SS DVP-EC3, DVP-ES, DVP-EX, DVP-SC, DVP-MC	Built-in Serial port
AH	AH500	

49.1.1.13 Mitsubishi MELSEC

The applicable modules for Mitsubishi Modbus Serial connection are shown below.

Category		Applicable modules	Applicable Serial port
MELSEC		MELSEC Q Series	QJ71MB91
		FX3(S)(G)(U)(GC)(UC)	FX3U-232ADP-MB FX3U-485ADP-MB
Electronic controller	New-S	ME110NSR-MB	Built-in Serial port
	Super-S	ME110SSR-MB	
	S	ME110SR-MB	
Energy recorder	EcoMonitorLight	EMU4-BD1-MB, EMU4-HD1-MB	
DC watt-hour meters	SmartMeter	M5CM-RAL, M5CM-RL	

49.1.1.14 Panasonic

The applicable modules for Panasonic Modbus Serial connection are shown below.

Category		Applicable modules	Applicable Serial port
FP Series		FP-e	Built-in Serial port
		FP-0R	
		FP-X	FP-X COM1, FP-X COM2 FP-X COM3, FP-X COM4 FP-X COM5, FP-X COM6
		FP-Σ	AFPG801, AFPG802, AFPG806
		FP-7	AFP7CCS1, AFP7CCS2 AFP7CCM1, AFP7CCM2 AFP7CCS1M1
KT Series		KT2, KT4, KT7, KT8 KT9, KT4H, KT4B	Built-in Serial port
KW Series		KW2G, KW2G-H, KW1M KW1M-H, KW1M-R, KW7M KW4M, KW8M, KW9M	Built-in Serial port

49.1.1.15 3S CoDeSys

The applicable modules for 3S CoDeSys Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
Soft PLC	CoDeSys	Built-in Serial port

49.1.1.16 IAI

The applicable modules for IAI Modbus Serial connection are shown below.

Category	Applicable modules	Applicable Serial port
Controller	ACON-CB/CGB/CYB/PLB/POB/ CA/C/CG/PL/PO/SE/CY DCON-CB/CGB/CYB/PLB/POB/ CA PCON-CA/CFA/CB/CGB/CFB/C GFB/CYB/PLB/POB/C/CG/CF/P	Built-in Serial port

	L/ PO/SE/CY SCON-CB/CGB/CB-F/CA/CAL/C GAL/C	
--	--	--

49.1.2 Usable Commands

DeviceXPlorer uses those following command.

Function	Function Code	Description
Read Coil	01	Read command for output coil
Read Input Discrete	02	Read command for input status
Read Multiple Registers	03	Read command for Multiple Registers
Read Input Registers	04	Read command for Input Registers
Write Coil	05	Write command for output coil
Write Single Register	06	Write command for single register
Write Multiple Coils	15	Write command for multiple coils
Write Multiple Registers	16	Write command for multiple registers
Read File Record	20	Read command for file records
Write File Record	21	Write command for file records

49.2 List of Devices

See the list of devices for Modbus Ethernet connection (section 48.2).

49.3 DeviceXPlorer Settings

49.3.1 Device Settings

This section explains how to make the settings for the CPU of PLC to be accessed.

Device properties

Connection Test

Communication format

☒ ASCII ☐ RTU

☐ Word Swap

☐ Cardinal numeral 0

Network

Unit ID

Address Area ☒ 1-9999 ☐ 1-65535

ACCESS POINTS

Bit R/W Bit R/W

Word R/W Word R/W

Item		Description
Communication Format	ASCII, RTU	Select either Modbus / ASCII or Modbus / RTU as the communication format.
	Word Swap	Check this option to swap the high and low words when accessing LONG, LONGLONG, FLOAT or DOUBLE data.
	Cardinal numeral 0	Check this option to set DeviceXPlorer's address cardinal numeral to 0 when accessing modbus slave whose cardinal address of device is 0. (As for extended register EX, cardinal number 0 is fixed) Default cardinal numeral of DeviceXPlorer is 1.
Network	Unit ID	Specify the slave ID of the Modbus device in accordance with the connection target. Set a number between 1 and 255.
	Address Area	Select the address area for the Modbus device (coil register). To use the normal address area, specify "1 - 9999". Specify "1 - 65535" to access an extension area from 10000 upward.
Access Points	Bit R / W	Specify the maximum access points of batch read / write of bit scale. Up to 1968 points can be set.
	Word R / W	Specify the maximum number of access points of batch read / write of word scale. Up to 119 points can be set.
	Bit Poke	Only batch write of bit scale is supported.
	Word Poke	Only batch write of word scale is supported.

Important

In Modbus connection, the 1st holding register is used for connection test, and when Modbus controller returns reply message, the Connection test succeeds.(no check for reply message contents)

49.3.2 Group Settings

Refer to the Modbus Ethernet group settings (section 48.3.2).

49.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [40001]

GeneralScaleSimulationAlarm

Tag Name

Tag

30001:OR

☐ Auto Format

Description

Device Type

AI(3)

Input Register

Device No

1

File No

0

Data Type

SHORT

Byte Position

Lower Byte

Length

1

Bit Position

0

☐ Byte Swap

Attribute

ReadOnly

☐ Array

Calculation

NONE

New

Save

<<

>>

OK

Cancel

Item	Description
Device Type	Specify the PLC device to be accessed. Refer to the list in section 14.2 for devices that can be specified.
Address No.	Specify the address as decimal number. When cardinal numeral is 1 as default, please input number between 1 and 65535. When cardinal numeral is 0, please input number between 0 and 65535.
File No.	When the extended register "EX" is selected, specify the file number of the extended register. Set a number between 0 and 999.

Important

Note that if a bit device is selected (input status / output coil), the data type will be BOOL.

49.4 Import Tags

Import the tag definition file exported by KEPServerEX from Kepware.

Please refer Server Edition “5.15.5.1 Import the tag definition file of KEPServerEX” for operating procedure.

49.4.1 List of Devices

Show the list of convertible devices.

KEPServerEX		⇒	DeviceXPlorer	
Type	Symbol		Type	Symbol
Output Coil	0	⇒	Output Coil	DO(0)
	H0	⇒		
	W0	⇒		
	WH0	⇒		
Input Coil	1	⇒	Input Status	DI(1)
	H1	⇒		
Internal Register	3	⇒	Input Register	AI(3)
	H3	⇒		
Holding Register	4	⇒	Holding Register	AO(4)
	H4	⇒		
	W4	⇒		
	WH4	⇒		

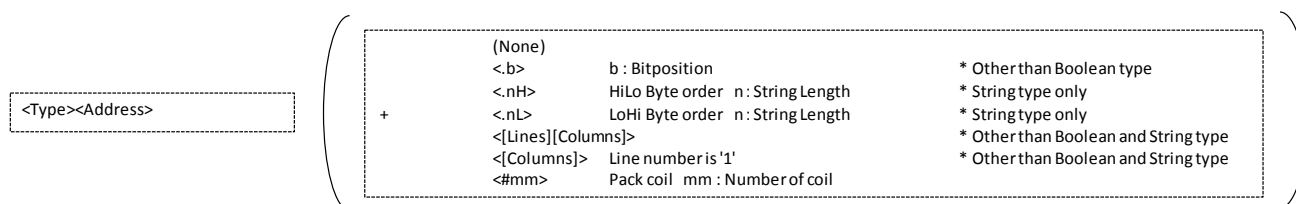
49.4.2 Device Range

Please refer “49.2 List of Devices”.

If a tag that refers out of range will be converted, DeviceXPlorer output an error and doesn't import the tag.

49.4.3 Optional Specification

The address format of KEPServerEX is as follows.



Show optional specifications of Address in the tag definition file of KEPServerEX.

Optional Specification in KEPServerEX	Conversion details for DeviceXPlorer
.x (x is Number)	Set 'BOOL' to the data type. Set x to the bit position.
.nH	Set 'STRING' to the data type. Enable byte swap.
.nL	Set 'STRING' to the data type.
[x] [1][x] (x is Number)	Enable array. Set x to the size.

Important

- Two dimensional array is not supported.
- If "W" is included in the device type, set WriteOnly to the attribute. (Expect only "ReadOnly" devices.)
When importing "W" as a holding register, it is necessary that rewrite the file directly. (Change from W to 4)
ex) W00001 → 400001
- The setting of "Base 0" in DeviceXPlorer is invalid for "Specify Zero base address".

49.5 Errors

This section explains the Modbus errors (response errors) included in the error messages.

Exceptional code	Error	Description
01	Function error	An incorrect function code was received.
02	Data address error	The specified data address does not exist. (Outside of address range)
03	Data error	The specified data is incorrect.
04	Slave device error	The slave unit did not accept the command.
06	Slave device busy	The unit is busy.
08	Memory parity error	There is a problem with the memory parity.
0B	Gateway path error	Could not verify the specified target. Please check whether the unit ID is correct.
FE	Function Code inconsistency error	Function code of sending message is different from function code of receiving message.
FF	Serial Number error	Serial number (Transaction ID) of sending message is different from serial number of receiving message.

50 Modbus/TCP Server Function

This chapter explains Modbus/TCP Server Function.

An overview of communication is shown below.

Overview	
Protocol	Modbus/TCP
Data code	Binary

50.1 Applicable Modules

It can communicate with units and software that support Modbus/TCP client function.

50.1.1.1 GRAPHTEC

The applicable modules for GRAPHTEC Modbus/TCP connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Paperless recorder	MT1000 series	Built-in Ethernet port

50.2 Supported Function Code

DeviceXPlorer uses those following command.

Function	Function Code	Description
Read Coil	01	Read command for output coil
Read Multiple Registers	03	Read command for Multiple Registers
Write Coil	05	Write command for output coil
Write Single Register	06	Write command for single register
Write Multiple Coils	15	Write command for multiple coils
Write Multiple Registers	16	Write command for multiple registers

50.3 List of Devices

The Modbus devices that can be set in DeviceXPlorer are as shown below.

The address range that can be accessed varies with the CPU. For details, refer to your CPU instructions.

The address range that can be set and the address notation vary with the address range of the device settings of DeviceXPlorer.

Device name	Device symbol	Address range*1*2	Device notation	Category
Output coil	DO(0)	1 – 65536	000001 – 065536	Bit
Holding register	AO(4)	1 - 65536	400001 – 465536	Word

*1 The maximum address range is the number of points reserved in the port settings.

*2 This address is applied in case of cardinal number 1.

50.4 List of system tags

Shows a list of system tags that can be set in Modbus TCP Server.

Tag Name	Type	Attribute	Description
\$ModbusSessionCount	USHORT		Returns the number of sessions with Modbus/Client.
\$ModbusRequestReceiveCount	ULONG	R	Returns the number of request receive count.
\$ModbusResponseSendCount	ULONG	R	Returns the number of response send count.

50.5 DeviceXPlorer Settings

50.5.1 Port Setting

This section explains how to make the settings for the port of shared memory to be accessed.

Property [Device1Port]

Port

SHARE

Share Name:

LATCH SETTINGS

☐ Latch to files

CHARACTER CODE

☒ Multibyte ☐ Unicode

POINTS

	Points [K]	Status
DQ	64	Assigned (64K Points)
AQ	1	Assigned (1K Points)

☐ Specify the UnitID(S)

UnitID(P):

☐ Cardinal num

Port No(P):

Timeout: sec

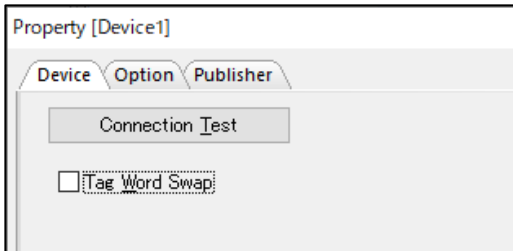
Retry count: times

Item		Description
SHARE	Share Name	The shared name is set. When the shared name is changed, it is reconnected to the shared memory.
LATCH SETTINGS	Latch to files	The memory mapped file is made, and the value of the device is left for the file now. The paging file is made and the value is maintained temporarily now when the check is not put. In this case, the value is lost by the reconnection to the shared memory now.
CHARACTER CODE		Specify the character code for the memory mapped file.
POINTS	Points [K]	The secured point is set. When the point is changed, it is reconnected to the shared memory. It is possible to set it within the range in 1 to 1024 kilo point.
	Status	The state with the crack to the file is displayed. The point of the settlement with the crack is displayed to the file for the end with the crack.
UnitID	Sepecify the UnitID	Enable to identify the unit ID included in the request. If invalid, the unit ID included it will be ignored.
	UnitID	Specify the Unit ID. Set a number between 1 and 255.
Cardinal numeral 0		Check this option to set DeviceXPlorer's address cardinal numeral to 0 when accessing modbus slave whose cardinal address of device is 0. Default cardinal numeral of DeviceXPlorer is 1.
Timeout		Specify the waiting time before receiving a responding message after sending a requiring message. A time-out error will occur if unable to get a response in that waiting time. The numbers from 0 to 60 can be specified.
Retry		Specify the number of retry when time-out error is occurred. The numbers from 0 to 10 can be specified.

Important

DeviceXPlorer is connected from point for which the port setting is made with the Modbus/TCP Server Port. When the change to the setting with the necessity of the reconnection is fixed, it is reconnected to the Modbus/TCP Server Port.

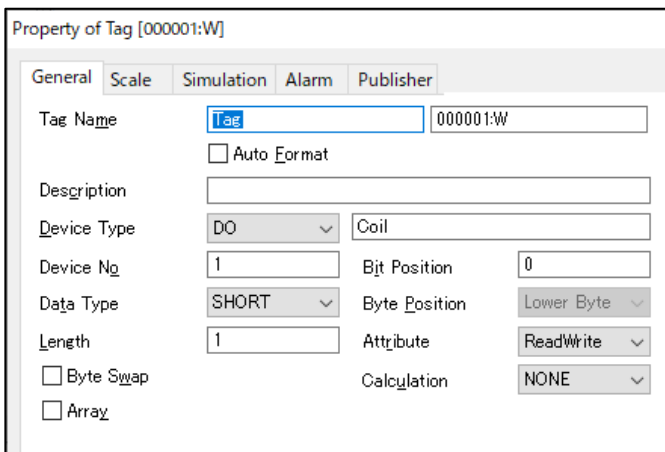
The value is lost by the reconnection to the Modbus/TCP Server Port by the file now at a non-latching setting. Please put the check in the setting that does the latch to the file to prevent the value being lost now by the change in reactivation, the shared name of the application, and the secured number of devices.

50.5.2 Device Setting

Item	Description
Tag Word Swap	The access to the internal memory is reversed for the upper and lower words, when the data type of the tag is set to LONG type, LONGLONG type, FLOAT type, DOUBLE type.

50.5.3 Tag Setting

This section explains how to set the tags managed by DeviceXPlorer.



Item	Description
Device Type	Specify the device to be accessed. Refer to the list in section 72.1 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

50.6 Errors

The error messages are shown below.

Exceptional code	Error	Description
01	Function error	An incorrect function code was received.
02	Data address error	The specified data address does not exist. (Outside of address range)
03	Data error	The specified data is incorrect.
04	Slave device error	The slave unit did not accept the command.
06	Slave device busy	The unit is busy.
08	Memory parity error	There is a problem with the memory parity.
0B	Gateway path error	Could not verify the specified target. Please check whether the unit ID is correct.
FE	Function Code inconsistency error	Function code of sending message is different from function code of receiving message.
FF	Serial Number error	Serial number (Transaction ID) of sending message is different from serial number of receiving message.

51 EtherNet/IP Connection

This chapter describes communication using EtherNet/IP.

The communication outline of EtherNet/IP connection is shown.

Overview	
Link	EtherNet/IP (CIP)
Datacode	Binary
Protocol	TCP/IP

51.1 EtherNet/IP System

51.1.1 Applicable unit

Indicates the applicable equipment for general Ethernet connection.

Maker	Classification	Model	Port
Omron	Sensor	K6CM-CI2MA-EIP K6CM-CI2MD-EIP K6CM-VBMA-EIP K6CM-VBMD-EIP	Built-in Ethernet port
PHOENIX CONTACT	Remote-IO	AXL E EIP AXL F BK EIP IOL MA8 EIP DI8	Built-in Ethernet port
Keyence	PLC	KV-8000	Built-in Ethernet port
SANYO DENKI	Controller	SMC100*1	Built-in Ethernet port

*1 Support only UCMM connection

51.1.2 Usable Commands

Indicates commands used in DeviceExplorer.

Command	Code(Hex)	Description
Get Attribute All*1	01	Read by Get Attribute All.
Set Attribute All*1	02	Write by Set Attribute All.
Get Attribute Single	0E	Read by Get Attribute Single.
Set Attribute Single	10	Write by Set Attribute Single.

*1 Use only applicable unit.

51.2 List of Device

Please refer to the device manual to be connected.

51.3 DeviceXPlorer Settings

51.3.1 Port Settings

Configure EtherNet / IP port settings.

Port

PING Test

Machine: rkawabat

☒ Adapter Selection(L)

Adapter Name: (Auto Selection)

Description:

Status: ☐ DHCP ☒

IPv4 Address: IPv6 Address:

Network: ☒ IPv4 ☐ IPv6

Protocol: ☒ TCP/IP ☐ UDP/IP

Adapter IP Address: localhost

Adapter Port Number: 0

Device Address: 169.254.10.112

Device Port No (Q): 44818

Connection Type: ☒ Class3 ☐ UCMM

Open Setting

Open Method: ☒ Forward Open ☐ Large Forward Open

CIP_Port Number: 1 CIP Link Address: 0

Connection Timeout Multiplier:CTM(E): x4

Requested Packet Interval:RPI(Q): 10000 ms

Item		Description
Connection Type		Select the EtherNet / IP communication connection type.
Open Setting	Open Method	Select the session open method when EtherNet / IP communication starts.
	CIP Port No	Specify the CIP port number.
	CIP Link Address	Specify the CIP link address.
	Connection Timeout Multiplier:CTM	Select from x4 / x8 / x16 / x32 / x64 / x128 / x256 / x512.
	Requested packet Interval:EPI	Specify in milliseconds.

51.3.2 Device Settings

Set the access target PLC.

DeviceOptionPublisher

Connection Test

Maker(M)

OMRON

Class(C)

Measurement Sensor

Model(D)

K6CM-VBM

☐

Importing of tags

Item	Description
Maker	Select a manufacturer.
Class	Choose a classification.
Model	Select the model.
Importing of tags*1	If the checkbox is enabled, automatically import the tag.

*1 when not selected the General Device, editable.

51.3.3 Tag Settings

Configure settings for tags managed by Device Explorer.

GeneralScaleSimulationAlarmPublisher

Tag Name

Tag

1_1_1_INT:W

☐

Auto Format

Description

Class ID(L)

1

Object Name(O)

Instance ID(I)

1

Param Name(P)

Attribute ID(A)

1

Attribute

ReadWrite

Acq Data Type(D)

INT

Data Type

SHORT

Calculation

NONE

Length

1

☐

Byte Swap

☐

Array

Item	Description
Class ID	Sspecify the Class ID. Specify in hexadecimal
Object Name*1	Specifies the object name of the connected device.
Instance ID	Specify the instance ID of connected device. Specify a decimal number
Attribute ID	Sspecify the Attribute ID. Specify in hexadecimal
Param Name*1	Select the parameter name of the target object of connected device.
Acq Data Type	Select the target attribute data type of the connected device.

*1 when not selected the General Device, editable.

52 [azbil(Yamatake)] CPL Ethernet Connection

This chapter explains communication with azbil CPL series equipment using an Ethernet module. An overview of communication via a azbil Ethernet connection is shown below.

Overview	
Link	CPL
Data code	Ascii

52.1 CPL Systems

52.1.1 Applicable Modules

The CPU unit and Ethernet unit that can be used for CPL Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Instrumentation Network Module	NX-S01 NX-S11/12/21 NX-DX1/DX2 NX-DY1/DY2 NX-D15/25/35	NX-CB1 NX-CL1/NX-CR1 NX-TL1/NX-TR1
Digital Controller	DMC50	Built-in Ethernet port

52.2 Communication data.

Major communication data tags can be automatically generated.

For details, refer to the device manual.

52.3 NX Ethernet unit Settings

This section explains how to make the Ethernet module communication settings using the SLP-NX.

The below is an example of settings where the IP address is “192.168.1.1” and Node ID. is “1”.

No: 1

ノード: 1

一覧

チェーンID: 1 チェーン名: チェーン1

モジュール一覧:

対象	No	タイプ	名前	ワークグループID	IPアドレス	ノードID	変更
☒	1	D25	D25_2	1	192.168.1.1	1	

52.4 DeviceXPlorer Settings

52.4.1 Device Settings

Device properties

Connection Test

Module configuration

Category: Mass Flow Measurement and Cont ▼

Module: MQV ▼

☐ Use Random Read Command

☒ Importing of tags ☐ Delete existing tags

Network

Machine address: 1

Sub address: 0

Address type

☒ Decimal ☐ Hex

ACCESS POINTS

Bit R/W: 0 Bit Poke: 0

Word R/W: 10 Word Poke: 0

	Item	Description
Module configuration	Category	Select category of the target module.
	Module	Select module of the target module.
	Use Random Read Command	If you place a check, DeviceXPlorer uses Random Read Command. But a target module needs to support Random Read Command.
	Importing of tags	Place a check and select “Category” and “Module”. You can import the main process tags when you make device.
	Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.
Network	Machine address	Specify Machine address between 0 and 127.
	Sub address	Specify sub address between 0 and 127.
Address Type	Decimal / Hex	Select the address format of tags.
ACCESS POINTS	Bit R/W	Not supported
	Word R/W	Specify the maximum access points of batch read / write of word scale.
	Bit Poke	Specify the maximum access points of random write of bit scale.
	Word Poke	Specify the maximum access points of random write of word scale.

52.4.2 Tag Settings

Property of Tag [0]

General Scale Simulation Alarm

Tag Name

☐ Auto Format

Description

Device No Byte Position

Data Type Bit Position

Length Attribute

☐ Byte Swap Calculation

☐ Array

New Save << >> OK Cancel

Item	Description
Device No	Specify address of a target module. If you select "Hex" in Address Type of Device dialog , you can indicate Hexadecimal.

52.5 Errors

Error message are listed below.

Code	Description
21	Data address error.
22	Data range error.

53 [azbil(Yamatake)] CPL Serial Connection

This chapter explains communication with azbil CPL series equipment using an Serial module.

An overview of communication via a azbil Serial connection is shown below.

Overview	
Link	CPL
Data code	Ascii

53.1 CPL Systems

53.1.1 Applicable Modules

The CPU unit and Ethernet unit that can be used for CPL Serial connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Instrumentation Network Module	NX-S01 NX-S11/12/21 NX-DX1 / DX2 NX-DY1 / DY2 NX-D15 / 25 / 35	Built-in Serial port
Digital Controller	DMC50, DMC10	
Digital Indicator Digital Controllers	SDC15, SDC25 / 26 SDC35 / 36, SDC45 / 46	
Digital Recorders	SRF101 / 102 / 103 / 106 SRF201 / 202 / 203 SRF206 / 212 / 224	
Mass Flow Meters	CMS, CMF, CMQ-V CML, MPC, MVF MQV, CMF015	
Sensors	PBC201 / 203	
Flame Safeguard Controls	AUR350C / 450C RX	
Converters	CMC15G, CMC10B	
Programable Controllers	DCP31 / 32 DCP551 / 552	

53.2 Communication data

Major communication data tags can be automatically generated.

For details, refer to the device manual.

53.3 DeviceXPlorer Settings

53.3.1 Device Settings

Device properties

Connection Test

Module configuration

Category: Mass Flow Measurement and Cont

Module: MQV

☐ Use Random Read Command

☒ Importing of tags ☐ Delete existing tags

Network

Machine address: 1

Sub address: 0

Address type

☒ Decimal ☐ Hex

ACCESS POINTS

Bit R/W: 0 Bit Poke: 0

Word R/W: 10 Word Poke: 0

	Item	Description
Module configuration	Category	Select category of the target module.
	Module	Select module of the target module.
	Use Random Read Command	If you place a check, DeviceXPlorer uses Random Read Command. But a target module needs to support Random Read Command.
	Importing of tags	Place a check and select “Category” and “Module”. You can import the main process tags when you make device.
	Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.
Network	Machine address	Specify Machine address between 0 and 127.
	Sub address	Specify sub address between 0 and 127.
Address Type	Decimal / Hex	Select the address format of tags.
ACCESS POINTS	Bit R/W	Not supported
	Word R/W	Specify the maximum access points of batch read / write of word scale.
	Bit Poke	Specify the maximum access points of random write of bit scale.
	Word Poke	Specify the maximum access points of random write of word scale.

53.3.2 Tag Settings

Property of Tag [0]

General | Scale | Simulation | Alarm

Tag Name:

☐ Auto Format

Description:

Device No: Byte Position:

Data Type: Bit Position:

Length: Attribute:

☐ Byte Swap Calculation:

☐ Array

New Save << >> OK Cancel

Item	Description
Device No	Specify address of a target module. If you select "Hex" in Address Type of Device dialog , you can indicate Hexadecimal.

53.4 Errors

Error message are listed below.

Code	Description
21	Data address error.
22	Data range error.

54 [JCC] Early Observer MEL-E Ethernet Connection

This chapter explains communication with JCC Early Observer series.

An overview of communication is shown below.

overview	
Link	UDP/IP

54.1 Applicable Models

Indicates the applicable model.

Series	Model
Early Observer MEL-E	Uno

54.2 List of Data

The list of data that can be acquired is shown below.

Data	Description	Attribute	Data Type
Amplitude	Amplitude 0~5,000(mV)	R	USHORT
Energy	Energy		ULONG
RMS	root mean square		USHORT
Amplitude_dB	Amplitude(dB) 0~100(dB)		USHORT
Counts	Counts		ULONG
Disconnection/Short circuit	0x00: No disconnection/short circuit detected 0x01 Disconnection detected 0x02: Short circuit detected		UBYTE
Abnormal internal power supply voltage	0x00: Voltage abnormality not detected 0x01: Overvoltage detection 0x02: Voltage drop detection		UBYTE
PeakAmplitude	Maximum amplitude value per unit time specified in device settings.		USHORT
AverageAmplitude	Maximum amplitude value per unit time specified in device settings.		DOUBLE

54.3 DeviceXPlorer

54.3.1 Port Setting

Property [Device2Port1]

Port

PING Test Machine

☒ Select Adapter

Adapter

説明

Status DHCP

IPv4 Address IPv6 Address

Network ☒ IPv4 ☐ IPv6

Protocol ☐ TCP/IP ☒ UDP/IP

Adapter IP Address

Adapter Port No.

Target IP Address

Target Port No.

Communication mode

Measurement value notification

Transmission interval

Threshold

GAIN setting

High pass filter

Counts mode

Item	Description
Communication mode	Specify the Communication mode. Candidate: Measurement value, Sensor history value
Transmission interval	Specify the transmission interval from sensor. Candidate: 10ms, 20ms, 50ms, 100ms
Threshold	Specify the threshold when use threshold intersection mode.
GAIN setting	Specify GAIN. Candidate: 0, 10, 20, 30, 40, 50dB
High pass filter	Specify the High pass filter. Candidate: THRU, 30, 50, 100, 150kHz
Counts mode	Specify the Threshold mode for counts. Candidate: 0V intersection mode, Threshold intersection mode

54.3.2 Device Setting

Property [Device2]

Device Option User authority

Connection Test

Sensor exchange Adjustment measurement ▼

Statistics period 1000 millise

Item	Description
Sensor exchange	Specify the Sensor exchange. Candidate : Adjustment measurement, Exchange measurement * If the Communication mode is Sensor history value , enabled.
Statistics period	Specify the statistics period for PeakAmplitude and AverageAmplitude.

54.3.3 Tag setting

Property of Tag [Amplitude:OR]

General Scale Simulation Alarm Historical

Tag Name Tag

Amplitude:OR

☐ Auto Format

Description |

Device Type Amplitude ▼

Amplitude information data

History number 1

Data Type USHORT ▼

Length 1 Attribute ReadOnly ▼

☐ Array Calculation NONE ▼

項目	内容
Device Type	Specify the Device Type
History number	Specify the History number. * If the Communication mode is Sensor history value and Device Type is Amplitude_Historical, enabled.

55 [Mitsubishi] RFID Ethernet Connection

This chapter explains communication with Mitsubishi RFID series equipment using an Ethernet module. An overview of communication via a Mitsubishi RFID Ethernet connection is shown below.

Overview	
Link	Original Protocol
Data code	ASCII

55.1 RFID Systems

The modules that can be used for Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
UHF range RFID	RF-RW003 /004	Built-in Ethernet port
	RF-RW103 /104	

55.2 List of Bank

The Mitsubishi RFID devices that can be accessed in DeviceXPlorer are as shown below.

The offset(addresses) that can be used vary with RFID tag. For details, refer to your RFID tag instructions.

[List of Bank] (The device ranges are all specified in decimal format.)

Bank name	Usage	Bank Symbol	Offset range	Category
Reserved Area	Password etc	RES	0 - 65535	Word
EPC Area	Individual ID number	EPC	0 - 65535	
TID Area	Tag specific information	TID	0 - 65535	
User Area	Option	USER	0 - 65535	

55.3 Mitsubishi RFID original System Tag

The Mitsubishi RFID original System Tags are as shown below.

System Tag name	Data Type	Attribution	Name	Contents	Tag Type
\$RF_Req	BOOL	R/W	Command Request Flag	When you turns ON, DeviceXPlorer runs the Command(\$RF_Cmd).	Connection System Tag
\$RF_Comp	BOOL	R	Command Complete Flag	After Comanndis complete, DeviceXPlorer turns ON.	
\$RF_Cmd	STRING	R/W	Comannd	Stores a command string.	
\$RF_Return	SHORT	R	Comannd Error code	After Comanndis complete, DeviceXPlorer stores result (0:Success)	
\$RF_Reply	STRING	R	Command Reply Result	After Comanndis complete, DeviceXPlorer stores return code of Command.	
\$MRT_TagID (001 - 512)	STRING	R/W	Detected TagID	DeviceXPlorer stores detected TagIDs by ReadTagID Command. The number of these tags is changed by setting "Managed TagID" of device dialog.	Device Ssystem Tag
\$MRT_Write_Target_TagID (001 - 512)	STRING	R/W	Target TagID Of writing	You indicate write target TagID. This tag is available when you check "Use Write Target TagID" of device dialog.	
\$MRT_TagIDs	STRING	R	Detected TagIDs. (CSV format)	DeviceXPlorer stores all detected TagIDs(CSV format) by ReadTagID Command.	
\$MRT_TagID_Count	SHORT	R	Detected TagID number	Number of detected TagIDs	
\$MRF_Russi	LONG	R	Receiving Signal intensity	DeviceXPlorer stores signal intensity average.	
\$MRF_Input1 - \$MRF_Input4	BOOL	R	Input signal	Input status of RFID ReadWriter.	
\$MRF_Output1 - &MRF_Output4	BOOL	R/W	Output signal	Output signal from ReadWriter when turn ON.	

\$MRF_SendStartAutoMode	BOOL	R/W	Start Monitoring Contactor	When you turn ON, DeviceXPlorer send “Start AutoMode”Command.	
\$MRF_SendStopAutoMode	BOOL	R/W	End Monitoring Contactor	When you turn ON, DeviceXPlorer send “Stop AutoMode”Command.	

55.3.1.1 Using execution commands

Execution commands are executed using the device system tags listed below.

Device system tags used with execution commands

Item	Device system tag name	Data type	Attribute
Command Request Flag	\$RF_Req	VT_BOOL	W
Command Complete Flag	\$RF_Comp	VT_BOOL	R
Command	\$RF_Cmd	VT_BSTR	W
Command Return Value	\$RF_Return	VT_I2	R
Command Reply Message	\$RF_Reply	VT_BSTR	R

Description of each of these device system tag items is provided below.

Description of device system tags used with execution commands

Device system tag	Description
Command Request Flag	A command is executed when this flag is ON. After Command Complete Flag is turned ON, it returns to OFF. This flag handshake with Command Complete Flag.
Command Complete Flag	Turns ON after a command is completed and turns OFF when Command Request Flag is OFF. This flag handshake with Command Request Flag.
Command	Stores a command string with arguments.
Command Return Value	Stores the return code when executing a command. Normal completion: 0; Timeout error: -1
Command Reply Message	Stores the reply message for a command.

Process flow for an execution command:

1. [OPC client] Check is made to ensure "Command Complete Flag" is OFF.
2. [OPC client] A command (including arguments) to be executed is stored in "Command" as a text string.
3. [OPC client] "Command Request Flag" is turned ON.
4. [OPC server] The command is executed on the robot controller using the text string stored in "Command".
5. [OPC server] After the command execution completes, the corresponding reply message is stored in "Command Reply Message" and a command return value is stored in "Command Return Value", and "Command Complete Flag" is turned ON.
6. [OPC client] Once "Command Complete Flag" is turned ON, "Command Request Flag" is turned OFF.
7. [OPC server] "Command Complete Flag" is turned OFF.

55.3.1.2 Using System tags related TagID

To access TagID, you should use \$MRT_TagID_xxx and \$MRT_WriteTargetTagID_xxx.

Device system tags related TagID

Item	Device system tag name	Data type	Attribute
Detected TagIDs	\$MRT_TagID_(001~512)	VT_BSTR	R/W
Target TagID Of writing	\$MRT_Write_Target_TagID_(001~512)	VT_BSTR	R/W

Description of each of these device system tag items is provided below.

Description of device system tags used with execution commands

Device system tag	Description
Detected TagIDs	DeviceXPlorer stores detected TagIDs by ReadTagID Command.
Target TagID Of writing	You indicate write target TagID.

Process flow for changing(writing) TagID:

1. [OPC client] Write a target TagID to \$MRT_WriteTargetTagID_001.
2. [OPC client] Write a new TagID to \$MRT_TagID_001.
3. [OPC server] Write value of "\$MRT_TagID_001" to RFID Tag selected by \$MRT_Write_TargetTagID_001.

55.4 DeviceXPlorer Settings

55.4.1 Port Settings

Port properties

PING Test Machine

☒ Select Adapter

Adapter

Explar

Status DHCP

IPv4 IPv6 Address

Network ☒ IPv4 ☐ IPv6

Protocol ☐ TCP/IP ☒ UDP/IP

☐ Non-Blocking Mode

Adapter IP Address

Adapter Port No. ☐ Use contact monitor

Target IP address

Target Port No.

Send Delay msec

Timeout sec

Retry count times

Open Timeout sec

Item	Description
Use contact monitor	If you check, DeviceXPlorer start monitoring contact automatically, when client connects. Please make correspond “Adapter Port No” and “Target Port No of monitoring contact” of ReadWriter.

55.4.2 Device Settings

Device properties

Connection Test

Module Configuration

☒ RF-RW(F) Antenna No

Tag Configuration

☒ 96bit EPC(E) ☐ 512bit EPC(P)

Managed TagID

Reading

☒ Update TagID when reading TagMemory

Write

☒ Refresh TagID when writing TagMemory

☐ Use WriteTargetTagID

ACCESS POINTS

Bit R/W Bit Poke

Word R/W Word Poke

Item		Description
Machine Configuration	Antenna No	Specify Antenna No to communicate with RFID Tags.
Tag Configuration	Tag size	Specify EPC Area size of RFID Tag.
	Managed TagID	Specify the number of TagIDs managed as System Tag. Set a number between 1 and 512.
Reading	Update TagID when reading TagMemory	Refresh TagID(\$MRT_TagID) just before reading TagMemory. DeviceXplorer executes ReadTagID Command just before executing ReadTagMemory Command.
Write	Refresh TagID when writing TagMemory	Refresh TagID(\$MRT_TagID) just before writing TagMemory. DeviceXplorer executes ReadTagID Command just before executing WriteTagMemory Command.
	Use Write Target TagID	Indicate write target TagID by using \$MRT_Write_Target_TagID (System Tag).
ACCESS POINTS	Bit R/W	Not supported
	Word R/W	Specify the maximum access points of batch read / write of word scale. Up to 64 points can be set.
	Bit Poke	Specify the maximum access points of random write of bit scale.
	Word Poke	Specify the maximum access points of random write of word scale.

55.4.3 Tag Settings

The dialog box titled "Property of Tag [TID1:0]" contains several tabs: General, Scale, Simulation, and Alarm. The General tab is active. It includes the following fields and controls:

- Tag Name:** A text box containing "Tag" and a label "TID1:0".
- Auto Format:** A checkbox that is currently unchecked.
- Description:** A text box.
- Bank:** A dropdown menu set to "TID".
- TID Area:** A text box containing "Tag specific information".
- Offset:** A text box set to "0".
- Specify TagID:** A dropdown menu set to "1".
- Data Type:** A dropdown menu set to "SHORT".
- Byte Position:** A dropdown menu set to "Lower Byte".
- Length:** A text box set to "1".
- Bit Position:** A text box set to "0".
- Attribute:** A dropdown menu set to "ReadWrite".
- Byte Swap:** An unchecked checkbox.
- Array:** An unchecked checkbox.
- Calculation:** A dropdown menu set to "NONE".

At the bottom, there are buttons for "New", "Save", "<<", ">>", "OK", and "Cancel".

Item	Description
Bank	Specify Bank type of RFID Tag.
Offset	Specify head offset of TagMemory.
Specify TagID	Specify number of access TagID. This is index of \$MRT_TagID_(001~512). Set a number between 1 and value of "Managed TagID" of device dialog. * Attribute is set to "ReadWrite" only when specification Tag ID is "1." Otherwise Attribute is "ReadOnly".

55.5 Errors

Error message are listed below.

Code	Description
101	Failed to lock exclusive. For example, you execute ReadTagID command in executing ReadDIO command.
202	No response from RFID Tag.
205	Failed to find target TagID.
208	Failed to write data to RFID TagID.
209	Failed to read TID.

56 [Omron] RFID Serial Connection

This chapter explains communication with Omron RFID series equipment using a Serial module.
An overview of communication via a Omron RFID Serial connection is shown below.

Overview	
Link	V680 Command
Data code	ASCII

56.1 RFID Systems

The modules that can be used for Ethernet connection are shown below.

Category	Applicable modules	Applicable Serial port
HF range RFID	V680-CA5D01-V2 V680-CA5D02-V2	Built-in Serial port

56.2 Serial communication settings

Configure the communication settings using the hardware switch.

56.2.1 Unit Settings

[Mode Selection Switch (SW1,SW2)]

SW1	SW2	Contoroller No.
High	Low	
0	0	0
0	1	1
0	2	2
0	3	3
:	:	:
2	9	29
3	0	30
3	1	31
3	2	Not for use
3	3	Not for use
:	:	:
9	9	Not for use

[Communication Switch (SW3)]

(Change SW)

SW3-1	Description
OFF	Enable DIP Switch.
ON	Enable Internal configuration. (Ignore setting of DIPSwitch)

(TagMemory)

SW3-2	Description
OFF	Normal Mode
ON	CA1D Mode

(Baud Rate)

SW3-3	SW3-4	Description
OFF	OFF	9600 bps
	ON	19200 bps
ON	OFF	38400 bps
	ON	115200 bps

(Data Bit)

SW3-5	Description
OFF	7bit
ON	8bit

(Parity)

SW3-6	SW3-7	Description
OFF	OFF	Even
	ON	None
ON	OFF	Odd
	ON	Even

(Stop bit)

SW3-5	Description
OFF	2bit
ON	1bit

(Communication pattern)

SW3-9	Description
OFF	1:1
ON	1:N

(Command)

SW3-10	Description
OFF	V680 Command format
ON	V600 Command format

* Use Command (SW3-10) in V680 Command format (OFF).

56.3 Omron RFID original System Tag

The Omron RFID original System Tags are as shown below.

System Tag name	Data Type	Attribution	Name	Contents	Tag Type
\$RF_Req	BOOL	R/W	Command Request Flag	When you turns ON, DeviceXPlorer runs the Command(\$RF_Cmd).	Connection System Tag
\$RF_Comp	BOOL	R	Command Complete Flag	After Comanndis complete, DeviceXPlorer turns ON.	
\$RF_Cmd	STRING	R/W	Comannd	Stores a command string.	
\$RF_Return	SHORT	R	Comannd Error code	After Comanndis complete, DeviceXPlorer stores result (0:Success)	
\$RF_Reply	STRING	R	Command Reply Result	After Comanndis complete, DeviceXPlorer stores return code of Command.	
\$ORT_TagUID	STRING	R/W	Read UID	DeviceXPlorer stores UID by ReadUID.	Device Ssystem Tag
\$ORT_Write_Target_TagUID	STRING	R/W	Target TagID Of writing	You indicate write target UID.	
\$ORF_UseUidCmd	BOOL	R/W	Send Enable UID Command	When you turn ON, DeviceXPlorer send "EnableUID" Command.	
\$ORF_NotUseUidCmd	BOOL	R/W	Send Disalbe UID Command	When you turn ON, DeviceXPlorer send "DisableUID" Command.	

56.3.1.1 Using execution commands

Execution commands are executed using the device system tags listed below.

Device system tags used with execution commands

Item	Device system tag name	Data type	Attribute
Command Request Flag	\$RF_Req	VT_BOOL	W
Command Complete Flag	\$RF_Comp	VT_BOOL	R
Command	\$RF_Cmd	VT_BSTR	W
Command Return Value	\$RF_Return	VT_I2	R
Command Reply Message	\$RF_Reply	VT_BSTR	R

Description of each of these device system tag items is provided below.

Description of device system tags used with execution commands

Device system tag	Description
Command Request Flag	A command is executed when this flag is ON. After Command Complete Flag is turned ON, it returns to OFF. This flag handshake with Command Complete Flag.
Command Complete Flag	Turns ON after a command is completed and turns OFF when Command Request Flag is OFF. This flag handshake with Command Request Flag.
Command	Stores a command string with arguments.
Command Return Value	Stores the return code when executing a command. Normal completion: 0; Timeout error: -1
Command Reply Message	Stores the reply message for a command.

Process flow for an execution command:

1. [OPC client] Check is made to ensure "Command Complete Flag" is OFF.
2. [OPC client] A command (including arguments) to be executed is stored in "Command" as a text string.
3. [OPC client] "Command Request Flag" is turned ON.
4. [OPC server] The command is executed on the robot controller using the text string stored in "Command".
5. [OPC server] After the command execution completes, the corresponding reply message is stored in "Command Reply Message" and a command return value is stored in "Command Return Value", and "Command Complete Flag" is turned ON.
6. [OPC client] Once "Command Complete Flag" is turned ON, "Command Request Flag" is turned OFF.
7. [OPC server] "Command Complete Flag" is turned OFF.

56.4 DeviceXPlorer Settings

56.4.1 Device Settings

Device properties

Connection Test

Module configuration

☒ V680

Antenna No

☐ Use V680-D1KP

Communication

☐ Use Large-capacity command

☐ Use UID

Network

Controller No.

ACCESS POINTS

Bit R/W Bit Poke

Byte R/W Byte Poke(W)

Item		Description
Module Configuration	Antenna No	Specify Antenna No to communicate with RFID Tags.
	Use V680-D1KP	Check when communicating with V680-D1KP Tag.
	Communication	Select communication designation.
	Use Large-capacity command	Use Large-capacity command.
	Use UID	Check when communicating with RFID tag by indicating UID.
Network	Controller No.	Specify the controller no of ReadWriter.
ACCESS POINTS	Bit R / W	Not supported.
	Byte R / W	Specify the maximum access points of batch read / write of byte scale. Up to 2000 points can be set.
	Bit Poke	Not supported.
	Byte Poke	Not supported.

56.4.2 Tag Settings

The image shows a 'Property of Tag [0:4:S]' dialog box with the 'General' tab selected. The settings are as follows:

- Tag Name:** Tag
- Auto Format:** ☐
- Description:** (empty text box)
- Offset:** 0
- Character size(D):** 4
- Attribute:** ReadWrite
- Data Type:** STRING
- Calculation:** NONE
- Element:** 1
- Array:** ☐

At the bottom, there are buttons for 'New', 'Save', '<<', '>>', 'OK', and 'Cancel'.

Item	Description
Offset	Specify head offset of RFID Tag memory.
Character size	Specify the number of accessing size of Offset.
Element	Specify the element number of array.

56.5 Errors

Error message are listed below.

Code	Description
70	Failed to communicate with RFID Tag.
72	Failed to find RFID Tag.

57 [Cognex] DataMan Ethernet Connection

This chapter explains communication with Cognex DataMan series equipment using an Ethernet module. An overview of communication via a Cognex DataMan Ethernet connection is shown below.

Overview	
Link	Original Protocol
Data code	ASCII

57.1 Systems

The modules that can be used for Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
Fixed	200(S)(Q)(X) 300(L)(X)/302(L)(X) 500(X)(QL)	Built-in Ethernet port
Handheld	8000 8100 8500 8600	DMCM-ENETM-00

57.2 BCR original System Tag

The BCR original System Tags are as shown below.

System Tag name	Data Type	Attribute	Name	Contents	Tag Type
\$BCR_Req	BOOL	R/W	Command Request Flag	When you turn ON, DeviceXPlorer runs this Command(\$RF_Cmd).	Connection System Tag
\$BCR_Comp	BOOL	R	Command Complete Flag	After Command is complete, DeviceXPlorer turns ON.	
\$BCR_Cmd	STRING	R/W	Command	Stores a command string.	
\$BCR_Return	SHORT	R	Command Error code	After Command is complete, DeviceXPlorer stores result (0:Success)	
\$BCR_Reply	STRING	R	Command Reply Result	After Command is complete, DeviceXPlorer stores return code of Command.	
\$BCR_RecvData	STRING	R/W	Read UID	DeviceXPlorer stores Reading Data.	Device System Tag

57.2.1.1 Using execution commands

Execution commands are executed using the device system tags listed below.

Device system tags used with execution commands

Item	Device system tag name	Data type	Attribute
Command Request Flag	\$BCR_Req	VT_BOOL	W
Command Complete Flag	\$BCR_Comp	VT_BOOL	R
Command	\$BCR_Cmd	VT_BSTR	W
Command Return Value	\$BCR_Return	VT_I2	R
Command Reply Message	\$BCR_Reply	VT_BSTR	R

Description of each of these device system tag items is provided below.

Description of device system tags used with execution commands

Device system tag	Description
Command Request Flag	A command is executed when this flag is ON. After Command Complete Flag is turned ON, it returns to OFF. This flag handshake with Command Complete Flag.
Command Complete Flag	Turns ON after a command is completed and turns OFF when Command Request Flag is OFF. This flag handshake with Command Request Flag.
Command	Stores a command string with arguments.
Command Return Value	Stores the return code when executing a command. Normal completion: 0; Timeout error: -1
Command Reply Message	Stores the reply message for a command.

Process flow for an execution command:

1. [OPC client] Check is made to ensure "Command Complete Flag" is OFF.
2. [OPC client] A command (including arguments) to be executed is stored in "Command" as a text string.
3. [OPC client] "Command Request Flag" is turned ON.
4. [OPC server] The command is executed on the robot controller using the text string stored in "Command".
5. [OPC server] After the command execution completes, the corresponding reply message is stored in "Command Reply Message" and a command return value is stored in "Command Return Value", and "Command Complete Flag" is turned ON.
6. [OPC client] Once "Command Complete Flag" is turned ON, "Command Request Flag" is turned OFF.
7. [OPC server] "Command Complete Flag" is turned OFF.

57.3 Device XPlorer Settings

57.3.1 Device Settings

Device properties

Connection Test

Module Type

☒ DM100/200 ☐ DM700

Module configuration

Mode Single

Serial Trigger +

☒ Command Check

Header (NONE)

Terminate (CR+LF)

Item		Description
Module Type		Select target module type.(DM100/200 or DM700)
Module Configuration	Mode	Select Manual mode(Single / Manual / Continue) or Auto mode(Auto Reading / Self Trigger). Please correspond to configuration of target module.
	Serial Trigger	In case “Single/Manual/Continue”, Specify Serial Trigger. Please correspond to configuration of target module.
Command Check		By checking this box, DeviceXPlorer checks receive packet.
	Header	Specify Header of recive packet. Please correspond to configuration of target module.
	Terminate	Specify Terminate of recive packet. Please correspond to configuration of target module.

57.3.2 Tag Settings

Property of Tag [0:4:OR:S]

GeneralScaleSimulationAlarm

Tag Name

Tag0:4:OR:S

☐ Auto Format

Description

Offset0

Character size(D)4

Data TypeSTRINGAttributeReadOnly

Elements1CalculationNONE

☐ Array

NewSave<<>>OKCancel

Item	Description
Offset	Specify head offset of receive data.
Character size	Specify the number of accessing size of Offset.
Element	Specify the element number of array.

58 [Keyence] BCR Ethernet Connection

This chapter explains communication with Keyence BCR equipment using an Ethernet module.
An overview of communication via a Keyence BCR Ethernet connection is shown below.

Overview	
Link	Original Protocol
Data code	ASCII

58.1 Systems

The modules that can be used for Ethernet connection are shown below.

Category	Series	Applicable modules	Applicable Ethernet port
Fixed	BL-1300	BL-1300 / BL-1301 (HA) BL-1350HA / BL-1351HA BL-1370 / 1371	N-L1
	SR-D100	SR-D100(HA)(H) / 110	Built-in Ethernet Port N-L1
	SR-600	SR-650(HA) / 651 / 652 SR-610 SR-600(HA)	

58.2 BCR original System Tag

The BCR original System Tags are as shown below.

System Tag name	Data Type	Attribute	Name	Contents	Tag Type
\$BCR_Req	BOOL	R/W	Command Request Flag	When you turn ON, DeviceXPlorer runs this Command(\$RF_Cmd).	Connection System Tag
\$BCR_Comp	BOOL	R	Command Complete Flag	After Command is complete, DeviceXPlorer turns ON.	
\$BCR_Cmd	STRING	R/W	Command	Stores a command string.	
\$BCR_Return	SHORT	R	Command Error code	After Comanndis complete, DeviceXPlorer stores result (0:Success)	
\$BCR_Reply	STRING	R	Command Reply Result	After Comannd is complete, DeviceXPlorer stores return code of Command.	
\$BCR_RecvData	STRING	R/W	Read UID	DeviceXPlorer stores Reading Data.	Device System Tag

58.2.1.1 Using execution commands

Execution commands are executed using the device system tags listed below.

Device system tags used with execution commands

Item	Device system tag name	Data type	Attribute
Command Request Flag	\$BCR_Req	VT_BOOL	W
Command Complete Flag	\$BCR_Comp	VT_BOOL	R
Command	\$BCR_Cmd	VT_BSTR	W
Command Return Value	\$BCR_Return	VT_I2	R
Command Reply Message	\$BCR_Reply	VT_BSTR	R

Description of each of these device system tag items is provided below.

Description of device system tags used with execution commands

Device system tag	Description
Command Request Flag	A command is executed when this flag is ON. After Command Complete Flag is turned ON, it returns to OFF. This flag handshake with Command Complete Flag.
Command Complete Flag	Turns ON after a command is completed and turns OFF when Command Request Flag is OFF. This flag handshake with Command Request Flag.
Command	Stores a command string with arguments.
Command Return Value	Stores the return code when executing a command. Normal completion: 0; Timeout error: -1
Command Reply Message	Stores the reply message for a command.

Process flow for an execution command:

1. [OPC client] Check is made to ensure "Command Complete Flag" is OFF.
2. [OPC client] A command (including arguments) to be executed is stored in "Command" as a text string.
3. [OPC client] "Command Request Flag" is turned ON.
4. [OPC server] The command is executed on the robot controller using the text string stored in "Command".
5. [OPC server] After the command execution completes, the corresponding reply message is stored in "Command Reply Message" and a command return value is stored in "Command Return Value", and "Command Complete Flag" is turned ON.
6. [OPC client] Once "Command Complete Flag" is turned ON, "Command Request Flag" is turned OFF.
7. [OPC server] "Command Complete Flag" is turned OFF.

58.3 Device XPlorer Settings

58.3.1 Device Settings

Device properties

Connection Test

Module type

☒ SR-D100 / 600 / 650(D) ☐ BL-1300

Module Configuration

Timing Mode

☒ One-shot trigger ☐ Auto Trigger

Soft Trigger

☐ Command Check

Header

Terminate

Item		Description
Module Type		Select target module type.(SR-D100/SR-600 or BV-1300)
Module Configuration	Timing Mode	Select One-shot trigger that gets data by Soft Triger or Auto Trigger that gets data automatically.Please correspond to configuration of target module.
	Soft Trigger	Specify Soft Trigger Command. Please correspond to configuration of target module.
Command Check		By checking this box, DeviceXPlorer checks receive packet.
	Header	Specify Header of recive packet. Please correspond to configuration of target module.
	Terminate	Specify Terminate of recive packet. Please correspond to configuration of target module.

58.3.2 Tag Settings

Property of Tag [0:4:OR:S]

GeneralScaleSimulationAlarm

Tag Name

Tag0:4:OR:S

☐ Auto Format

Description

Offset0

Character size(D)4

Data TypeSTRINGAttributeReadOnly

Elements1CalculationNONE

☐ Array

NewSave<<>>OKCancel

Item	Description
Offset	Specify head offset of receive data.
Character size	Specify the number of accessing size of Offset.
Element	Specify the element number of array.

59 [Mars Tohken Solution] BCR Ethernet Connection

This chapter explains communication with Mars Tohken Solution BCR equipment using an Ethernet module.

An overview of communication via a Mars Tohken Solution BCR Ethernet connection is shown below.

Overview	
Link	Original Protocol
Data code	ASCII

59.1 Systems

The modules that can be used for Ethernet connection are shown below.

Category	Applicable modules	Applicable Ethernet port
TFIR	TFIR-3172(H)	Built-in Ethernet Port

59.2 BCR original System Tag

The BCR original System Tags are as shown below.

System Tag name	Data Type	Attribute	Name	Contents	Tag Type
\$BCR_Req	BOOL	R/W	Command Request Flag	When you turn ON, DeviceXPlorer runs this Command(\$RF_Cmd).	Connection System Tag
\$BCR_Comp	BOOL	R	Command Complete Flag	After Command is complete, DeviceXPlorer turns ON.	
\$BCR_Cmd	STRING	R/W	Command	Stores a command string.	
\$BCR_Return	SHORT	R	Command Error code	After Comanndis complete, DeviceXPlorer stores result (0:Success)	
\$BCR_Reply	STRING	R	Command Reply Result	After Comannd is complete, DeviceXPlorer stores return code of Command.	
\$BCR_RecvData	STRING	R/W	Read UID	DeviceXPlorer stores Reading Data.	Device System Tag

59.2.1.1 Using execution commands

Execution commands are executed using the device system tags listed below.

Device system tags used with execution commands

Item	Device system tag name	Data type	Attribute
Command Request Flag	\$BCR_Req	VT_BOOL	W
Command Complete Flag	\$BCR_Comp	VT_BOOL	R
Command	\$BCR_Cmd	VT_BSTR	W
Command Return Value	\$BCR_Return	VT_I2	R
Command Reply Message	\$BCR_Reply	VT_BSTR	R

Description of each of these device system tag items is provided below.

Description of device system tags used with execution commands

Device system tag	Description
Command Request Flag	A command is executed when this flag is ON. After Command Complete Flag is turned ON, it returns to OFF. This flag handshake with Command Complete Flag.
Command Complete Flag	Turns ON after a command is completed and turns OFF when Command Request Flag is OFF. This flag handshake with Command Request Flag.
Command	Stores a command string with arguments.
Command Return Value	Stores the return code when executing a command. Normal completion: 0; Timeout error: -1
Command Reply Message	Stores the reply message for a command.

Process flow for an execution command:

1. [OPC client] Check is made to ensure "Command Complete Flag" is OFF.
2. [OPC client] A command (including arguments) to be executed is stored in "Command" as a text string.
3. [OPC client] "Command Request Flag" is turned ON.
4. [OPC server] The command is executed on the robot controller using the text string stored in "Command".
5. [OPC server] After the command execution completes, the corresponding reply message is stored in "Command Reply Message" and a command return value is stored in "Command Return Value", and "Command Complete Flag" is turned ON.
6. [OPC client] Once "Command Complete Flag" is turned ON, "Command Request Flag" is turned OFF.
7. [OPC server] "Command Complete Flag" is turned OFF.

59.3 DeviceXPlorer Settings

59.3.1 Device Settings

Device properties

Connection Test

Mode

☒ Single Reading/External Triggering ☐ Reading timeout/Autosense

☐ Command Check

Header (NONE)

Terminate CR + LF

Item		Description
Mode		Select “Single Reading / External Triggerring” or “Reading timeout / Autosense “. Please correspond to configuration of target module.
Command Check		By checking this box, DeviceXPlorer checks receive packet.
	Header	Specify Header of recive packet. Please correspond to configuration of target module.
	Terminate	Specify Terminate of recive packet. Please correspond to configuration of target module.

59.3.2 Tag Settings

Property of Tag [0:4:OR:S]

General

Scale

Simulation

Alarm

Tag Name

Tag

0:4:OR:S

☐ Auto Format

Description

Offset

0

Character size(D)

4

Data Type

STRING

Attribute

ReadOnly

Elements

1

Calculation

NONE

☐ Array

New

Save

<<

>>

OK

Cancel

Item	Description
Offset	Specify head offset of receive data.
Character size	Specify the number of accessing size of Offset.
Element	Specify the element number of array.

60 [Mitsubishi] EcoServer3 HTTP Connection

This chapter explains communication with Mitsubishi EcoServer3.

An overview of communication via a Mitsubishi EcoServer3 connection is shown below.

Overview	
Link	Ethernet(HTTP)
Data code	ASCII

60.1 Applicable module

The modules that can be used for Ethernet connection are shown below.

Category	Applicable module	Applicable Ethernet Port
EcoServer3	MES3-255B MES3-255C	Built-in Ethernet port

Important

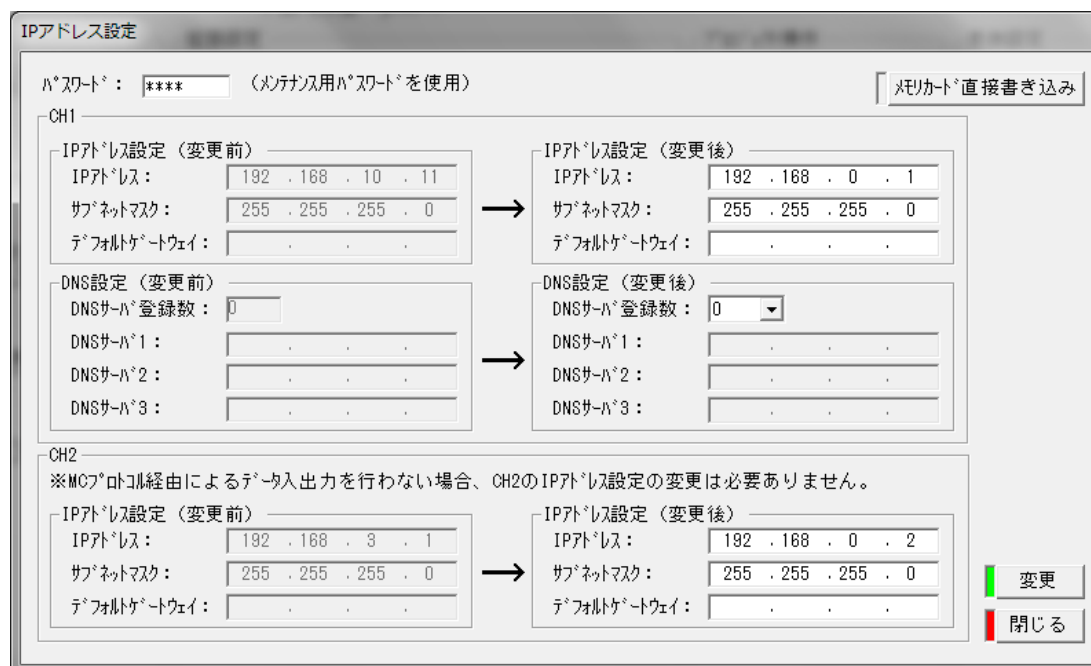
EcoServer3 can be connected five sessions at once.

60.2 EcoServer3 Settings

Please use Setting software (MES3-255B configuration soft)



Setting “IP address settings” and perform “Write Project”.



60.3 DeviceXPlorer Settings

60.3.1 Port Settings

Port properties

Server IP Address	127.0.0.1
Server Port No.	80
Send Delay	0 msec
Timeout	3 sec
Retry count	3 times

Item	Description
Server IP Address	Specify IP address of the target Server.
Server Port No.	Specify Port No address of the target Server.
Send Delay	Specify the waiting time before sending the next command after a response is received from the other equipment on the millisecond time scale. Normally set 0.
Timeout	Specify timeout to connect.
Retry count	Specify retry count to connect.

60.3.2 Device Settings

This section explains how to make the settings for the EcoServer3 to be accessed.

Device properties

DATA ATTRIBUTE

Base Data Type

☐ Import TAG information

Project File

☐ Delete existing tags

Item	Description
Base data type	Select "Base data type" in the dynamic tag. This data type is used when the dynamic tag is not the extended tag name.
Import TAG information	Place a check and select the project file (eecodata.dat) of EcoServer3. You can import the main tags when you make device.
Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.

60.3.3 Tag Settings

Property of Tag3 [ID1:R:OR]

General Scale Simulation Alarm

Tag Name: Tag1 ID1:R:OR

☐ Auto Format

Description:

ID: 1

Data Type: FLOAT Byte Position: Lower Byte

Element nums: 1 Bit Position: 0

☐ Byte Swap Attribute: ReadOnly

☐ Array Calculation: NONE

New Save << >> OK Cancel

Item	Description
ID	Specify the measurement point of EcoServer3 to access.

60.4 Errors

This section explains the details of the errors.

Error code	Description
-1701	Initial Error
-1702	Reset Error

61 [Mitsubishi] E-Energy HTTP Connection

This chapter explains communication with Mitsubishi E-Energy.

An overview of communication via a Mitsubishi E-Energy connection is shown below.

Overview	
Link	Ethernet(HTTP)
Data code	ASCII

61.1 Applicatable module

The modules that can be used for Ethernet connection are shown below.

Category	Applicable Unit	Applicable Ethernet unit
E-Energy	MES-DM500 MES-DM500E5 MES-DM1000	Built-in Ethernet port

Important

E-Energy can be connected five sessions at once.

61.2 List of DataID

The E-Energy Data IDs that can be set are as shown below.

Data ID	Contents	Unit	Note
1	Integral power consumption	kWh	Update per 10 seconds
128	Last timed demand (peak value)	kW	Update per 10 seconds
129	Current demand	kW	Update per 10 seconds
130	Remaining time	Sec	Update per 10 seconds
131	Forecast demand	kW	Update per 10 seconds
132	Regulated power	kW	Update per 10 seconds
133	Allowable power	kW	Update per 10 seconds
160	Alarm output(1)		Update per 10 seconds
161	Alarm output(2)		Update per 10 seconds
162	Alarm output(Peek)		Update per 10 seconds
163	Alarm output(System)		Update per 10 seconds
164	Control output(Circuit A)		Update per 10 seconds
165	Control output(Circuit B)		Update per 10 seconds
166	Control output(Circuit C)		Update per 10 seconds
167	Control output(Circuit D)		Update per 10 seconds
168	Control output(Circuit E)		Update per 10 seconds
169	Control output(Circuit F)		Update per 10 seconds
170	Control output(Circuit G)		Update per 10 seconds
171	Control output(Circuit H)		Update per 10 seconds
172	Control output(Circuit I)		Update per 10 seconds
173	Control output(Circuit J)		Update per 10 seconds
174	Control output(Circuit K)		Update per 10 seconds
175	Control output(Circuit L)		Update per 10 seconds
176	Date(Year,Month,Day)	yymmdd	
177	Time(Hour,Minute,Second)	Hhmmss	
183	Target demand	kW	
184	Alarm Type		1:Alarm limit, 2:Fixed alarm
186	Fixed Alarm Value		

Remark

- DeviceXPlorer reads the ID registered in the measurement point setting and ID129 (current demand) and ID1 (integral power consumption) in DM-E500E5.

61.3 E-Energy Settings

Set by using the (MES-MT1-A) maintenance tool.

You connect a serial cable with COM2 of E-Energy.

You do set by MS-DOS(the command Pronto screen).

- 1) Enter the (COM port) serial port No you are using on the computer side.

```
C:\temp>setsys2a.exe

-----
* Copyright(C) 2002 MITSUBISHI ELECTRIC CORPORATION      *
* SetSys2A v1.0                                           *
-----

使用する COM ポートを選択してください。(1:COM1~10:COM10):_
```

- 2) Configure the settings on the IP address and subnet mask, and writes it to the E-Energy.

```
使用する COM ポートを選択してください。(1:COM1~10:COM10):1

<<--- バージョン表示 --->>
SH4 F/W = 1.0
H8S F/W = 1.0
BSP F/W = 1.2/0
VxWorks F/W = 5.4
IP アドレスに関する設定を行いますか？(Y/N):y
現在の IP アドレス          = 192.168.10.1
IP アドレス(リターンで現在値) = 10.162.34.111
現在の サブネット マスク    = 255.255.0.0
サブネット マスク(リターンで現在値) = _
```

61.4 DeviceXPlorer Settings

61.4.1 Device Settings

Device properties

Connection Test

CPU TYPE

☒ DM500
 ☐ DM500E5
 ☐ DM1000

☐ Importing of tags
☐ Delete existing tags

DATA ATTRIBUTE

Base Data Type FLOAT

Item		Description
CPU TYPE	Type	Select access CPU type.
	Importing of tags	If you'd like to import default tags, please check.
	Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.
Base data type		Select "Base data type" in the dynamic tag. This data type is used when the dynamic tag is not the extended tag name;

61.4.2 Tag Settings

Property of Tag3 [ID1:R:OR]

General

Scale

Simulation

Alarm

Tag Name

Tag1

ID1:R:OR

☐ Auto Format

Description

ID

1

Data Type

FLOAT

Byte Position

Lower Byte

Element nums

1

Bit Position

0

☐ Byte Swap

Attribute

ReadOnly

☐ Array

Calculation

NONE

New

Save

<<

>>

OK

Cancel

Item	Description
ID	Specify the measurement point of E-Energy to access.

61.5 Errors

This section explains the details of the errors.

Error code	Description
1000	Busy error(Initializing, Reset, Change time etc)

62 BACnet Connection

This chapter explains communication with BACnet Protocol.

An overview of communication via BACnet Protocol connection is shown below.

Overview	
Link	BACnet/IP
DataCode	ANSI/ASHRAE Standard 135-2012 IEIEJ-G-0006:2006

62.1 System

CPU units and Ethernet units supporting BACnet communication can be used.

62.2 BACnet system

The BACnet data that can be set in DeviceXPlorer are as shown below.

62.2.1 Supported Commands

DeviceXPlorer uses those following command.

Service	Service code	Description
ReadProperty	0x0C	One point reading of the property
ReadPropertyMultiple	0X0E	Read multiple properties.
WriteProptery	0x0F	One point writing of the property
WritePropertyMultiple	0x10	Write multiple properties.

* DeviceXPlorer supports only unicast communication.

62.2.2 Supported Object

The BACnet object that can be set in DeviceXPlorer are as shown below.

Object name	Object Code	Reference
AccessCredential	32	62.2.3.1
AccessDoor	30	62.2.3.2
AccessPoint	33	62.2.3.3
AccessRights	34	62.2.3.4
AccessUser	35	62.2.3.5
AccessZone	36	62.2.3.6
Accumulator	23	62.2.3.7
AlertEnrollment	52	62.2.3.8
AnalogInput	0	62.2.3.9
AnalogOutput	1	62.2.3.10
AnalogValue	2	62.2.3.11
Averaging	18	62.2.3.12
BinaryInput	3	62.2.3.13
BinaryOutput	4	62.2.3.14
BinaryValue	5	62.2.3.15
BitstringValue	39	62.2.3.16
Calendar	6	62.2.3.17
Channel	53	62.2.3.18
CharacterStringValue	40	62.2.3.19
Command	7	62.2.3.20
CredentialDataInput	37	62.2.3.21
DatePatternValue	41	62.2.3.22
DateTimePatternValue	43	62.2.3.23
DateTimeValue	44	62.2.3.24
DateValue	42	62.2.3.25
Device	8	62.2.3.26
ElectricDemandControl	131	62.2.3.27
ElectricDemandMonitoring	130	62.2.3.28
EventEnrollment	9	62.2.3.29

Object name	Object Code	Reference
EventLog	25	62.2.3.30
File	10	62.2.3.31
GeneratorLoadControl	132	62.2.3.32
GlovalGroup	26	62.2.3.33
Group	11	62.2.3.34
IntegerValue	45	62.2.3.35
LargeAnalogValue	46	62.2.3.36
LifeSafetyPoint	21	62.2.3.37
LifeSafetyZone	22	62.2.3.38
LightingOutput	54	62.2.3.39
LoadControl	28	62.2.3.40
Loop	12	62.2.3.41
MultiStateInput	13	62.2.3.42
MultiStateOutput	14	62.2.3.43
MultiStateValue	19	62.2.3.44
NetworkSecurity	38	62.2.3.45
NotificationClass	15	62.2.3.46
NotificationForwarder	51	62.2.3.47
OctetstringValue	47	62.2.3.48
PositiveIntegerValue	48	62.2.3.49
Program	16	62.2.3.50
PulseConverter	24	62.2.3.51
Schedule	17	62.2.3.52
StructuredView	29	62.2.3.53
TimePatternValue	49	62.2.3.54
TimeValue	50	62.2.3.55
TrendLog	20	62.2.3.56
TrendLogMultiple	27	62.2.3.57

62.2.3 Support Property

The BACnet property and data type, attribute that can be set in DeviceXPlorer are as shown below.

62.2.3.1 AccessCredential

Properties of AccessCredential supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AbsenteeLimit	244	ULONG	Read / Write
CredentialStatus	264	BOOL	Read Only
DaysRemaining	267	LONG	Read / Write
Description	28	STRING	Read / Write
ExtendedTimeEnable	271	BOOL	Read / Write
GlobalIdentifier	323	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TraceFlag	308	BOOL	Read / Write
UsesRemaining	319	LONG	Read / Write

62.2.3.2 AccessDoor

Properties of AccessDoor supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
Description	28	STRING	Read / Write
DoorExtendedPulseTime	227	ULONG	Read Only
DoorOpenTooLongTime	229	ULONG	Read Only
DoorPulseTime	230	ULONG	Read Only
DoorUnlockDelayTime	232	ULONG	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.3 AccessPoint

Properties of AccessPoint supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AccessEventTag	322	ULONG	Read Only
AccessEventTime	253	ULONG	Read Only
AckedTransitions	0	USHORT	Read / Write
ActiveAuthenticationPolicy	255	ULONG	Read Only
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
FailedAttempts	273	ULONG	Read / Write
FailedAttemptsTime	274	ULONG	Read / Write
Lockout	282	BOOL	Read / Write
LockoutRelinquishTime	283	ULONG	Read / Write
MaxFailedAttempts	285	ULONG	Read / Write
MusterPoint	287	BOOL	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
NumberOfAuthenticationPolicies	289	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OccupancyCountAdjust	291	BOOL	Read / Write
OccupancyLowerLimitEnforced	295	BOOL	Read / Write
OccupancyUpperLimitEnforced	298	BOOL	Read / Write
OutOfService	81	BOOL	Read Only
PriorityForWriting	88	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TransactionNotificationClass	309	ULONG	Read / Write
VerificationTime	326	ULONG	Read / Write

62.2.3.4 AccessRights

Properties of AccessRights supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
Enable	133	BOOL	Read Only
GlobalIdentifier	323	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.5 AccessUser

Properties of AccessUser supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
GlobalIdentifier	323	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
UserExternalIdentifier	310	STRING	Read / Write
UserInfoReference	311	STRING	Read / Write
UserName	317	STRING	Read / Write

62.2.3.6 AccessZone

Properties of AccessZone supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
AdjustValue	176	LONG	Read / Write
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
GlobalIdentifier	323	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OccupancyCount	290	ULONG	Read / Write
OccupancyCountEnable	292	BOOL	Read / Write
OccupancyLowerLimit	294	ULONG	Read / Write
OccupancyUpperLimit	297	ULONG	Read / Write
OutOfService	81	BOOL	Read Only
PassbackTimeout	301	ULONG	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.7 Accumulator

Properties of Accumulator supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
HighLimit	45	ULONG	Read / Write
LimitEnable	52	USHORT	Read / Write
LimitMonitoringInterval	182	ULONG	Read / Write
LoggingObject	183	STRING	Read / Write
LowLimit	59	ULONG	Read / Write
MaxPresValue	65	ULONG	Read Only
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
PulseRate	186	ULONG	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
Units	117	ULONG	Read Only
ValueBeforeChange	190	ULONG	Read / Write
ValueSet	191	ULONG	Read / Write

62.2.3.8 AlertEnrollment

Properties of AlertEnrollment supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read Only
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read Only
EventEnable	35	USHORT	Read Only
EventState	36	ULONG	Read Only
NotificationClass	17	ULONG	Read Only
NotifyType	72	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
PresentValue	85	STRING	Read Only
ProfileName	168	STRING	Read / Write

62.2.3.9 AnalogInput

Properties of AnalogInput supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
CovIncrement	22	FLOAT	Read / Write
Deadband	25	FLOAT	Read / Write
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
HighLimit	45	FLOAT	Read / Write
LimitEnable	52	USHORT	Read / Write
LowLimit	59	FLOAT	Read / Write
MaxPresValue	65	FLOAT	Read / Write
MinPresValue	69	FLOAT	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	FLOAT	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
Resolution	106	FLOAT	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write

TimeDelayNormal	356	ULONG	Read / Write
Units	117	ULONG	Read Only
UpdateInterval	118	ULONG	Read / Write

62.2.3.10 AnalogOutput

Properties of AnalogOutput supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
CovIncrement	22	FLOAT	Read / Write
Deadband	25	FLOAT	Read / Write
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
HighLimit	45	FLOAT	Read / Write
LimitEnable	52	USHORT	Read / Write
LowLimit	59	FLOAT	Read / Write
MaxPresValue	65	FLOAT	Read / Write
MinPresValue	69	FLOAT	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	FLOAT	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	FLOAT	Read / Write
Resolution	106	FLOAT	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
Units	117	ULONG	Read Only

62.2.3.11 AnalogValue

Properties of AnalogValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
CovIncrement	22	FLOAT	Read / Write
Deadband	25	FLOAT	Read / Write
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
HighLimit	45	FLOAT	Read / Write
LimitEnable	52	USHORT	Read / Write
LowLimit	59	FLOAT	Read / Write
MaxPresValue	65	FLOAT	Read / Write
MinPresValue	69	FLOAT	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	FLOAT	Read Only
OutOfService	81	BOOL	Read Only
PresentValue	85	FLOAT	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	FLOAT	Read / Write
Resolution	106	FLOAT	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
Units	117	ULONG	Read Only

62.2.3.12 Averaging

Properties of Averaging supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AttemptedSamples	124	ULONG	Read Only
AverageValue	125	FLOAT	Read Only
Description	28	STRING	Read Only
MaximumValue	135	FLOAT	Read Only
MinimumValue	136	FLOAT	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read Only
ValidSamples	146	ULONG	Read Only
VarianceValue	151	FLOAT	Read Only
WindowInterval	147	ULONG	Read / Write
WindowSamples	148	ULONG	Read / Write

62.2.3.13 BinaryInput

Properties of BinaryInput supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
ActiveText	4	STRING	Read / Write
AlarmValue	6	BOOL	Read / Write
ChangeOfStateCount	15	ULONG	Read / Write
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
ElapsedActiveTime	33	ULONG	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
InactiveText	46	STRING	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
Polarity	84	BOOL	Read Only
PresentValue	85	BOOL	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.14 BinaryOutput

Properties of BinaryOutput supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
ActiveText	4	STRING	Read / Write
ChangeOfStateCount	15	ULONG	Read / Write
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
ElapsedActiveTime	33	ULONG	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
FeedbackValue	40	BOOL	Read / Write
InactiveText	46	STRING	Read / Write
MinimumOffTime	66	ULONG	Read / Write
MinimumOnTime	67	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
Polarity	84	BOOL	Read Only
PresentValue	85	BOOL	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	BOOL	Read Only
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.15 BinaryValue

Properties of BinaryValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	USHORT	Read / Write
ActiveText	4	STRING	Read / Write
AlarmValue	6	BOOL	Read / Write
ChangeOfStateCount	15	ULONG	Read / Write
Description	28	STRING	Read / Write
ElapsedActiveTime	33	ULONG	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	USHORT	Read / Write
EventState	36	ULONG	Read Only
InactiveText	46	STRING	Read / Write
MinimumOffTime	66	ULONG	Read / Write
MinimumOnTime	67	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
PresentValue	85	BOOL	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.16 BitstringValue

Properties of BitstringValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
ProfileName	168	STRING	Read / Write

Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.17 Calendar

Properties of Calendar supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
DateList	23	STRING	Read / Write
Description	28	STRING	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
PresentValue	85	BOOL	Read Only
ProfileName	168	STRING	Read / Write

62.2.3.18 Channel

Properties of Channel supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read / Write
AllowGroupDelayInhibit	365	BOOL	Read / Write
ChannelNumber	366	USHORT	Read / Write
Description	28	STRING	Read / Write
EventDetectionEnable	353	BOOL	Read Only
EventEnable	35	UBYTE	Read / Write
EventState	36	ULONG	Read Only
LastPriority	369	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read / Write
OutOfService	81	BOOL	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read Only
StatusFlags	111	UBYTE	Read Only

62.2.3.19 CharacterStringValue

Properties of CharacterStringValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	STRING	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	STRING	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.20 Command

Properties of Command supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AllWritesSuccessful	9	STRING	Read / Write
Description	28	STRING	Read Only
InProcess	47	BOOL	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read / Write
ObjectType	79	ULONG	Read Only
PresentValue	85	ULONG	Read / Write
ProfileName	168	ULONG	Read / Write

62.2.3.21 CredentialDataInput

Properties of CredentialDataInput supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read / Write
Description	28	STRING	Read / Write
EventDetectionEnable	353	BOOL	Read Only
EventEnable	35	UBYTE	Read / Write
EventState	36	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
ProfileName	168	STRING	Read Only
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.22 DatePatternValue

Properties of DatePatternValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
EventState	36	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	ULONG	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.23 DateTimePatternValue

Properties of DateTimePatternValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
EventState	36	ULONG	Read / Write
IsUtc	344	BOOL	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only

OutOfService	81	BOOL	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.24 DateTimeValue

Properties of DateTimeValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
EventState	36	ULONG	Read / Write
IsUtc	344	BOOL	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.25 DateValue

Properties of DateValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
EventState	36	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	ULONG	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.26 Device

Properties of Device supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AlignIntervals	193	BOOL	Read / Write
ApduSegmentTimeout	10	ULONG	Read / Write
ApduTimeout	11	ULONG	Read / Write
ApplicationSoftwareVersion	12	STRING	Read Only
BackupFailureTimeout	153	USHORT	Read / Write
BackupPreparationTime	339	USHORT	Read / Write
DatabaseRevision	155	ULONG	Read Only
DaylightSavingsStatus	24	BOOL	Read / Write
Description	28	STRING	Read / Write
FirmwareRevision	44	STRING	Read Only
IntervalOffset	195	ULONG	Read / Write
LocalDate	56	ULONG	Read / Write
LocalTime	57	ULONG	Read / Write
Location	58	STRING	Read / Write
MaxApduLengthAccepted	62	ULONG	Read Only
MaxInfoFrames	63	ULONG	Read / Write
MaxMaster	64	ULONG	Read / Write
MaxSegmentsAccepted	167	ULONG	Read / Write
ModelName	70	STRING	Read Only
NumberOfApduRetries	73	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
ProtocolRevision	139	ULONG	Read Only
ProtocolVersion	98	ULONG	Read Only
RestoreCompletionTime	340	USHORT	Read / Write
RestorePreparationTime	341	USHORT	Read / Write
SegmentationSupported	107	ULONG	Read Only
SerialNumber	372	STRING	Read / Write
SystemStatus	112	ULONG	Read Only
TimeSynchronizationInterval	204	ULONG	Read / Write
UtcOffset	119	LONG	Read / Write
VendorIdentifier	120	USHORT	Read Only
VendorName	121	STRING	Read Only

62.2.3.27 ElectricDemandControl

Properties of ElectricDemandControl supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
PresentValue	85	ULONG	Read Only
PriorityForWriting	88	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write

62.2.3.28 ElectricDemandMonitoring

Properties of ElectricDemandMonitoring supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
AdjustPower	568	FLOAT	Read Only
AlarmValueOfPower	564	FLOAT	Read / Write
ContractReceivingPower	562	FLOAT	Read / Write
Description	28	STRING	Read / Write
ElapsedTime	565	ULONG	Read Only
EstimatedPower	567	FLOAT	Read Only
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
StartTimeOfMonitoring	560	ULONG	Read Only
StatusFlags	111	UBYTE	Read Only
TargetValueOfPower	563	FLOAT	Read / Write
TimeDelay	113	ULONG	Read / Write
Units	117	ULONG	Read Only

62.2.3.29 EventEnrollment

Properties of EventEnrollment supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read Only
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
EventType	37	ULONG	Read Only
NotificationClass	17	ULONG	Read Only
NotifyType	72	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.30 EventLog

Properties of EventLog supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
BufferSize	126	ULONG	Read Only
Description	28	STRING	Read / Write
Enable	133	BOOL	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
LastNotifyRecord	173	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotificationThreshold	137	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
RecordCount	141	ULONG	Read / Write
RecordsSinceNotification	140	ULONG	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
StopWhenFull	144	BOOL	Read Only
TotalRecordCount	145	ULONG	Read Only

62.2.3.31 File

Properties of File supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Archive	13	BOOL	Read / Write
Description	28	STRING	Read / Write
FileAccessMethod	41	ULONG	Read / Write
FileSize	42	ULONG	Read Only
FileType	43	STRING	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
ReadOnly	99	BOOL	Read Only
RecordCount	141	ULONG	Read / Write

62.2.3.32 GeneratorLoadControl

Properties of GeneratorLoadControl supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
AdjustValueOfLoad	577	FLOAT	Read Only
Description	28	STRING	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
PresentValue	85	ULONG	Read Only
PriorityForWriting	88	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
StatusFlags	111	UBYTE	Read Only
TargetValueToSupply	576	FLOAT	Read Only
TimeDelay	113	ULONG	Read / Write

62.2.3.33 GlovalGroup

Properties of GlovalGroup supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
CovResubscriptionInterval	128	ULONG	Read / Write
CovuPeriod	349	ULONG	Read / Write
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
MemberStatusFlags	347	UBYTE	Read Only
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RequestedUpdateInterval	348	ULONG	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
UpdateInterval	118	ULONG	Read / Write

62.2.3.34 Group

Properties of Group supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write

62.2.3.35 IntegerValue

Properties of IntegerValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
CovIncrement	22	ULONG	Read / Write
Deadband	25	ULONG	Read / Write
Description	28	STRING	Read / Write

EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read / Write
HighLimit	45	LONG	Read / Write
LimitEnable	52	UBYTE	Read Only
LowLimit	59	LONG	Read / Write
MaxPresValue	65	LONG	Read / Write
MinPresValue	69	LONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	LONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	LONG	Read / Write
Resolution	106	LONG	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
Units	117	ULONG	Read Only

62.2.3.36 LargeAnalogValue

Properties of LargeAnalogValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
CovIncrement	22	DOUBLE	Read / Write
Deadband	25	DOUBLE	Read / Write
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read / Write
HighLimit	45	DOUBLE	Read / Write
LimitEnable	52	UBYTE	Read Only
LowLimit	59	DOUBLE	Read / Write
MaxPresValue	65	DOUBLE	Read / Write
MinPresValue	69	DOUBLE	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only

OutOfService	81	BOOL	Read / Write
PresentValue	85	DOUBLE	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	DOUBLE	Read / Write
Resolution	106	DOUBLE	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
Units	117	ULONG	Read Only

62.2.3.37 LifeSafetyPoint

Properties of LifeSafetyPoint supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
DirectReading	156	FLOAT	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
MaintenanceRequired	158	ULONG	Read / Write
Mode	160	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OperationExpected	161	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
Setting	162	ULONG	Read / Write
Silenced	163	ULONG	Read Only
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
TrackingValue	164	ULONG	Read Only
Units	117	ULONG	Read / Write

62.2.3.38 LifeSafetyZone

Properties of LifeSafetyZone supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
MaintenanceRequired	158	BOOL	Read / Write
Mode	160	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
Silenced	163	ULONG	Read Only
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
TrackingValue	164	ULONG	Read Only

62.2.3.39 LightingOutput

Properties of LightingOutput supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
BlinkWarnEnable	373	BOOL	Read Only
CovIncrement	22	FLOAT	Read / Write
DefaultFadeTime	374	ULONG	Read Only
DefaultRampRate	375	FLOAT	Read Only
DefaultStepIncrement	376	FLOAT	Read Only
Description	28	STRING	Read / Write
EgressActive	386	BOOL	Read Only
EgressTime	377	ULONG	Read Only
FeedbackValue	40	FLOAT	Read / Write
InstantaneousPower	379	FLOAT	Read / Write
LightingCommandDefaultPriority	381	ULONG	Read Only
MaxActualValue	382	FLOAT	Read / Write
MinActualValue	383	FLOAT	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only

ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
Power	384	FLOAT	Read / Write
PresentValue	85	FLOAT	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	FLOAT	Read Only
StatusFlags	111	UBYTE	Read Only
TrackingValue	164	FLOAT	Read Only

62.2.3.40 LoadControl

Properties of LoadControl supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
DutyWindow	213	ULONG	Read / Write
Enable	133	BOOL	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
FullDutyBaseline	215	FLOAT	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
ShedDuration	219	ULONG	Read / Write
StateDescription	222	STRING	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.41 Loop

Properties of Loop supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Action	2	ULONG	Read Only
Bias	14	FLOAT	Read / Write
ControlledVariableUnits	20	ULONG	Read Only
ControlledVariableValue	21	FLOAT	Read Only
CovIncrement	22	FLOAT	Read Only
Deadband	25	FLOAT	Read / Write
DerivativeConstant	26	FLOAT	Read / Write
DerivativeConstantUnits	27	ULONG	Read / Write
Description	28	STRING	Read / Write
ErrorLimit	34	FLOAT	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
IntegralConstant	49	FLOAT	Read / Write
IntegralConstantUnits	50	ULONG	Read / Write
MaximumOutput	61	FLOAT	Read / Write
MinimumOutput	68	FLOAT	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
OutputUnits	82	ULONG	Read Only
PresentValue	85	FLOAT	Read Only
PriorityForWriting	88	ULONG	Read / Write
ProfileName	168	STRING	Read / Write
ProportionalConstant	93	FLOAT	Read / Write
ProportionalConstantUnits	94	ULONG	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
Setpoint	108	FLOAT	Read Only
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
UpdateInterval	118	ULONG	Read / Write

62.2.3.42 MultiStateInput

Properties of MultiStateInput supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
NumberOfStates	74	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.43 MultiStateOutput

Properties of MultiStateOutput supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
DeviceType	31	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
FeedbackValue	40	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
NumberOfStates	74	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
PresentValue	85	ULONG	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write

RelinquishDefault	104	ULONG	Read Only
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.44 MultiStateValue

Properties of MultiStateValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
NumberOfStates	74	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
PresentValue	85	ULONG	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	ULONG	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write

62.2.3.45 NetworkSecurity

Properties of NetworkSecurity supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
DistributionKeyRevision	328	UBYTE	Read Only
DoNotHide	329	BOOL	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
PacketReorderTime	333	ULONG	Read / Write
ProfileName	168	STRING	Read / Write
SecurityPduTimeout	334	USHORT	Read / Write
SecurityTimeWindow	335	ULONG	Read / Write
UpdateKeySetTimeout	337	USHORT	Read Only

62.2.3.46 NotificationClass

Properties of NotificationClass supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckRequired	1	UBYTE	Read Only
Description	28	STRING	Read / Write
NotificationClass	17	ULONG	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write

62.2.3.47 NotificationForwarder

Properties of NotificationForwarder supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
LocalForwardingOnly	360	BOOL	Read Only
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.48 OctetstringValue

Properties of OctetstringValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
EventState	36	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.49 PositiveIntegerValue

Properties of PositiveIntegerValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
CovIncrement	22	ULONG	Read / Write
Deadband	25	ULONG	Read / Write
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read / Write
HighLimit	45	ULONG	Read / Write
LimitEnable	52	UBYTE	Read Only
LowLimit	59	ULONG	Read / Write
MaxPresValue	65	ULONG	Read / Write
MinPresValue	69	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	ULONG	Read / Write
Resolution	106	ULONG	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
Units	117	ULONG	Read Only

62.2.3.50 Program

Properties of Program supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
DescriptionOfHalt	29	STRING	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read / Write
InstanceOf	48	STRING	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only

OutOfService	81	BOOL	Read Only
ProfileName	168	STRING	Read / Write
ProgramChange	90	ULONG	Read / Write
ProgramLocation	91	STRING	Read / Write
ProgramState	92	ULONG	Read Only
ReasonForHalt	100	ULONG	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.51 PulseConverter

Properties of PulseConverter supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
AdjustValue	176	FLOAT	Read / Write
Count	177	ULONG	Read Only
CountBeforeChange	178	ULONG	Read Only
CovIncrement	22	FLOAT	Read / Write
CovPeriod	180	ULONG	Read / Write
Deadband	25	FLOAT	Read / Write
Description	28	STRING	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
HighLimit	45	FLOAT	Read / Write
LimitEnable	52	UBYTE	Read Only
LowLimit	59	FLOAT	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	FLOAT	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
ScaleFactor	188	FLOAT	Read / Write
StatusFlags	111	UBYTE	Read Only
TimeDelay	113	ULONG	Read / Write
TimeDelayNormal	356	ULONG	Read / Write
Units	117	ULONG	Read Only

62.2.3.52 Schedule

Properties of Schedule supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
Description	28	STRING	Read / Write
EffectivePeriod	32	STRING	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read / Write
ExceptionSchedule	38	STRING	Read / Write
ListOfObjectPropertyReferences	54	STRING	Read / Write
NotificationClass	17	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	FLOAT	Read Only
PriorityForWriting	88	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read Only
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
ScheduleDefault	174	FLOAT	Read Only
StatusFlags	111	UBYTE	Read Only
WeeklySchedule	123	STRING	Read / Write

62.2.3.53 StructuredView

Properties of StructuredView supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
NodeSubtype	207	STRING	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write

62.2.3.54 TimePatternValue

Properties of TimePatternValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
EventState	36	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only

ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.55 TimeValue

Properties of TimeValue supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
Description	28	STRING	Read / Write
EventState	36	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
OutOfService	81	BOOL	Read / Write
PresentValue	85	ULONG	Read Only
ProfileName	168	STRING	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
RelinquishDefault	104	ULONG	Read / Write
StatusFlags	111	UBYTE	Read Only

62.2.3.56 TrendLog

Properties of TrendLog supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
AlignIntervals	193	BOOL	Read / Write
BufferSize	126	ULONG	Read Only
CovResubscriptionInterval	128	ULONG	Read / Write
Description	28	STRING	Read / Write
Enable	133	BOOL	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
IntervalOffset	195	ULONG	Read / Write
LastNotifyRecord	173	ULONG	Read / Write
LogInterval	134	ULONG	Read / Write
NotificationClass	17	ULONG	Read / Write
NotificationThreshold	137	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only

ProfileName	168	STRING	Read / Write
RecordCount	141	ULONG	Read / Write
RecordsSinceNotification	140	ULONG	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
StopWhenFull	144	BOOL	Read / Write
TotalRecordCount	145	ULONG	Read Only
Trigger	205	BOOL	Read / Write

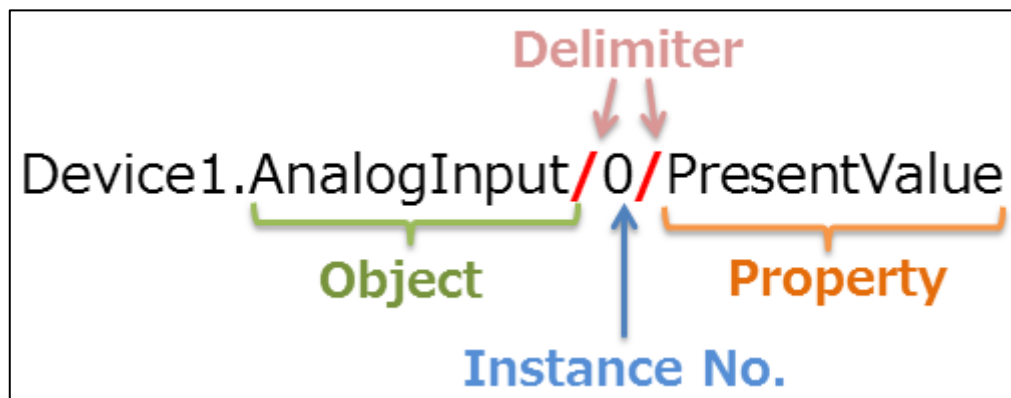
62.2.3.57 TrendLogMultiple

Properties of TrendLogMultiple supported by DeviceXPlorer are as shown below.

Property	Property Code	Data Type	Attribute
AckedTransitions	0	UBYTE	Read Only
AlignIntervals	193	BOOL	Read / Write
BufferSize	126	ULONG	Read Only
Description	28	STRING	Read / Write
Enable	133	BOOL	Read / Write
EventAlgorithmInhibit	354	BOOL	Read / Write
EventDetectionEnable	353	BOOL	Read / Write
EventEnable	35	UBYTE	Read Only
EventState	36	ULONG	Read Only
IntervalOffset	195	ULONG	Read / Write
LastNotifyRecord	173	ULONG	Read / Write
LogInterval	134	ULONG	Read Only
NotificationClass	17	ULONG	Read / Write
NotificationThreshold	137	ULONG	Read / Write
NotifyType	72	ULONG	Read / Write
ObjectIdentifier	75	STRING	Read Only
ObjectName	77	STRING	Read Only
ObjectType	79	ULONG	Read Only
ProfileName	168	STRING	Read / Write
RecordCount	141	ULONG	Read / Write
RecordsSinceNotification	140	ULONG	Read / Write
Reliability	103	ULONG	Read / Write
ReliabilityEvaluationInhibit	357	BOOL	Read / Write
StatusFlags	111	UBYTE	Read Only
StopWhenFull	144	BOOL	Read Only
TotalRecordCount	145	ULONG	Read Only
Trigger	205	BOOL	Read / Write

62.2.4 Dynamic tag Setting

When access a dynamic tag in the BACnet communication, specify an item path in the following format.
The format is as follows.



Format: *"Object <Delimiter> Instance No. <Delimiter> Property"*

The delimiter, set on the device settings.

Property and object are not case-sensitive.

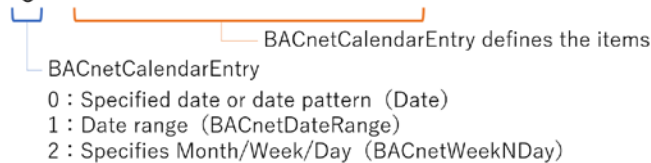
62.2.5 Writing format

62.2.5.1 Calendar Object

•DateList

Structure of the format

0 : ***** : *****



0: Specified date or date pattern (Date)

Format	0	:	*	*	*	*	*	*	*	*	*	*
Description	BACnet CalendarEntry		Day	Date	Month	Year	These items are defined by BACnetCalendarEntry					

Example:

Date	Writing format
2022/6/7(Tuesday)	0:207062022
2022/6/(Tuesday)	0:2**062022

1: Date Range (BACnetDateRange)

1: Date Range (BACnetDateRange)																			
Format	1	:	*	*	*	*	*	*	*	*	:	*	*	*	*	*	*	*	*
Description	BACnet CalendarEntry		Day	Date	Month	Year				Day	Date	Month	Year						
		These items are defined by BACnetCalendarEntry																	

Example:

Date	Writing format
2022/6/7-2022/6/8	1:*07062022:*08062022
2022/6/7-	1:*07062022:*****

2: Specify Month/Week/Day (BACnetWeekNDay)

2.3 Specifying Month/Week/Day (BACnetWeek/Day)									
Format	2	:	*	*	*	*			
Description	BACnet CalendarEntry		Month: 01-12 = 1-12 Month 13 = Odd month 14 = Even month * = Wildcard		Week: 1 = 1-7th 2 = 8-14th 3 = 15-21th 4 = 22-28th 5 = 29-31st 6 = 7days from end of month * = Wildcard		Day: 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday 7 = Sunday * = Wildcard		
			These items are defined by BACnetCalendarEntry						

Example:

Date	Writing format
1st month (January), 8-14th, Wednesday	2:0123
Odd month, Sunday	2:13*7

62.2.5.2 Schedule Object

•EffectivePeriod

Format	*	*	*	*	*	*	*	*	*	:	*	*	*	*	*	*	*	*
Description	Day	Date	Month	Year							Day	Date	Month	Year				

Example:

Date	Writing format
2022/6/7-2022/6/8	*07062022:*08062022
2022/6/7-	*07062022:*****

•WeeklySchedule

Format	*	*	*	*	*	*	*	*	:	*	:	*	:	*
Description	Hour	Min	sec	ms						Data Type 0 = NULL 1 = BOOLEAN 2 = Unsigned 3 = INTEGER 4 = REAL 5 = Double 6 = OCTET STRING 7 = CharacterString 8 = BIT STRING 9 = ENUMERATED 10 = Date 11 = Time 12 = BACnetObjectIdentifier			Number of character	Data Type
	Multiple settings are available													

※Data Type, Number of character, Data can be specified with more than one character.

※WeeklySchedule consists of 7 elements. Monday is 1st element and Sunday is 7th element in sequence.

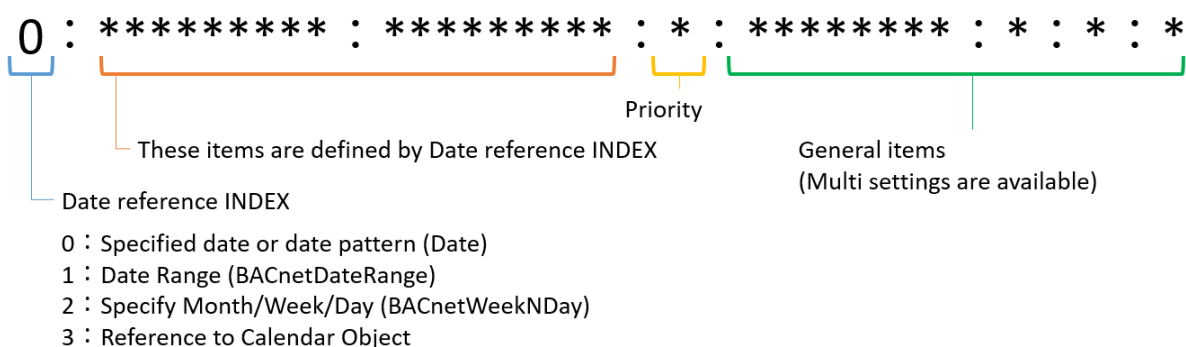
For a tag which is not specified array, the elements are delimited by comma(,).

Example:

Data	Writing format
Monday: 15:50:10.10, Unsigned:123	15501010:2:3:123,,15501010:2:3:123:**10
Wednesday: 15:50:10.10, Unsigned:123, *:10:00.00, Unsigned:123	0000:2:3:123,,,

•ExceptionSchedule

Format Structure



Format for general items

Format for General Items														
Format	*	*	*	*	*	*	*	*	:	*	:	*	:	*
Description	Hour	min	sec	ms		Data Type						Number of Characters	Data Type	
						0 = NULL 1 = BOOLEAN 2 = Unsigned 3 = INTEGER 4 = REAL 5 = Double 6 = OCTET STRING 7 = CharacterString 8 = BIT STRING 9 = ENUMERATED 10 = Date 11 = Time 12 = BACnetObjectIdentifier								
General items														

0:Specified date or date pattern (Date)

Format	0	:	*	*	*	*	*	*	*	*	*	*
Description	Date reference INDEX		Day	Day	Mont h	Year						
			These items are defined by Date reference INDEX									

:	*	:	*	:	*	*	*	*	*	*	*	:	*	:	*	:	*
	Priorit y 1-16		General items														

Example:

Date	Writing format
2022/6/7(Tuesday), Priority:16, 15:50:10.10, BOOL:1	0:207062022:16:15501010:1:1:1
2022/6/*(Tuesday), Priority:1, *:50:00.00, Unsigned:123, 16:00:00.00, Unsigned:123	0:2**062022:1:**500000:2:3:123:16000000:2:3:123

1: Date Range (BACnetDateRange)

Format	1	:	*	*	*	*	*	*	*	*	*	:	*	*	*	*	*	*	*	*	*
Description	Date reference INDEX		Day	Date	Month	Year				Day	Date	Month	Year								
		These items are defined by Date reference INDEX																			

:	*	:	*	:	*	*	*	*	*	*	*	*	:	*	:	*	:	*
	Priorit y 1-16		General items															

Example:

Date	Writing format
2022/6/7-2022/6/8, Priority:16, 15:50:10.10, BOOL:1	1:*07062022:*08062022:16:15501010:1:1:1
2022/6/7-, Priority:1, *:50:00.00, Unsigned:123, 16:00:00.00, Unsigned:123	1:*07062022:*****:1:**500000:2:3:123:16000000:2:3:123

2: Specifies Month/Week/Day (BACnetWeekNDay)

2.5 Specified Month/Week/Day (Different Week/Day)									
Format	2	:	*	*	*	*			
Description	Date reference INDEX		Month: 01-12 = 1-12 month 13 = Odd month 14 = Even month ** = Wildcard	Week: 1 = 1-7th 2 = 8-14th 3 = 15-21th 4 = 22-28th 5 = 29-31st 6 = 7days from end of month * = Wildcard	Day 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday 7 = Sunday * = Wildcard				
			These items are defined by Date reference INDEX						

:	*	:	*	:	*	*	*	*	*	*	*	*	:	*	:	*	:	*
	Priorit y 1-16		General items															

Example:

Date	Writing format
January, 8-14 th, Wednesday, Priority:16, 15:50:10.10, BOOL:1	2:0123:16:15501010:2:3:123
Odd month, Sunday, Priority:1, *:50:00.00, Unsigned:123, 16:00:00.00, Unsigned:123	2:13*7:1:**500000:2:3:123:16000000:3:3:123

3: Reference of Calendar Object

Format	3	:	*
Description	Date reference INDEX		Instance No. of Calendar Object
			These items are defined by Date reference INDEX

:	*	:	*	:	*	*	*	*	*	*	*	*	:	*	:	*	:	*
	Priority 1-16		General items															

Example:

Date	Writing format
Instance No:2, Priority:16, 15:50:10.10, Unsigned:123, 16:00:00.00, Unsigned:1234	3:2:16:15501010:2:3:123:16000000:2:4:1234

•ListOfObjectPropertyReferences

Format	*	:	*	:	*	:	*
Description	ObjectCode		Instance No.		Property Code		Device Instance No.
							Optional

Example:

Date	Writing format
Analog Output, Instance No:2, PresentValue	1:2:85
Analog Output, Instance No:2, PresentValue, Device Instance No:10	1:2:85:10

62.3 DeviceXPlorer Settings

62.3.1 Device Settings

This section explains how to make Device Settings.

Item		Description
Command	Write priority	Select write priority.
Address format	Delimiter	Set the delimiter character used to separate objects, instance number, the property.
Bulk access	Use batch access	Select multiple property access. If enabled, ReadPropertyMultiple and WritePropertyMultiple services are used for access.
	Max APDU Length	Specify the max APDU length which is described in target device manual.
Automatic tag generation	File Name	Specify the file path.
	Property code of the tag to be	Specify the property code of the tag to be imported.
	Automatic tag generation	Enable to automatically generate tags from files.
	Delete existing tag	Enable to delete existing tags when automatically generating tags.

Important

If the selected property code does not correspond to the object of the tag to be automatically generated, no corresponding tag will be generated. Also, if a tag with the same gu name exists in an existing tag or if the tag name is blank, the tag will not be generated. The tag name is the part of the tag name that corresponds to the "object name" in the import file.

62.3.2 Tag Settings

This section explains how to make Tsg Settings.

Property of Tag [AnalogInput/0/AckedTransitions:OR]

General Scale Simulation Alarm Publisher

Tag Name

☐ Auto Format

Description

Object

Instance No.

Property

Data Type Bit Position

Length Attribute

☐ Byte Swap Calculation

☐ Array

Item	Description
Object	Select BACnet Object.
Instance No.	Ser the Instance No. of Object.
Property	Select BACnet Property.
Bit Position	Select the Bit posiotion

62.4 Errors

This section explains the BACnet errors included in the error messages.

Code	Description
0x09	Invalid Data type.
0x1F	Unknown Object.
0x20	Unknown Property.

63 IEC60870-5-104 Client Connection

This chapter explains IEC60870-5-104 Client communication via Ethernet.

An overview of communication via IEC60870-5-104 Ethernet connection is shown below.

Overview	
Link	Ethernet (TCP/IP)
Communication Protocol	IEC60870-5-104 Master Protocol

Note
IEC60870-5-104 Master is called as “IEC60870-5-104 Controlling Station”. And IEC60870-5-104 Slave is called as “IEC60870-5-104 Sub Station”. In this chapter, these units were called Master or Slave.

63.1 System

Communicate with IEC60870-5-104 Slave unit.

63.2 Support Items

63.2.1 KeepAlive Item

DeviceXPlorer checks keep alive by following function.

ID	Function	OPC Item Name	Description
-	U Frame	TESTFR	TESTFR (act)

63.2.2 Monitor Item

Monitor Item received from IEC60870-5-104 Slave unit.

ID	Function	OPC Item Name	Description
1	M_SP_NA_1	M_SP_NA	Single-point information without time tag
3	M_DP_NA_1	M_DP_NA	Double-point information without time tag
5	M_ST_NA_1	M_ST_NA	Step position information without time tag
7	M_BO_NA_1	M_BO_NA	Bitstring of 32 bits
9	M_ME_NA_1	M_ME_NA	Measured value, normalized value
11	M_ME_NB_1	M_ME_NB	Measured value, scaled value
13	M_ME_NC_1	M_ME_NC	Measured value, short floating point number
15	M_IT_NA_1	M_IT_NA	Integrated totals
20	M_PS_NA_1	M_PS_NA	Packed single-point information with status change detection
21	M_ME_ND_1	M_ME_ND	Measured value, normalized value without quality descriptor
30	M_SP_TB_1	M_SP_TB	Single-point information with time tag
31	M_DP_TB_1	M_DP_TB	Double-point information with time tag
32	M_ST_TB_1	M_ST_TB	Step position information with time tag
33	M_BO_TB_1	M_BO_TB	Bitstring of 32bits
34	M_ME_TD_1	M_ME_TD	Measured value, normalized value with time tag
35	M_ME_TE_1	M_ME_TE	Measured value, scaled value with time tag
36	M_ME_TF_1	M_ME_TF	Measured value, short floating point number with time tag
37	M_IT_TB_1	M_IT_TB	Integrated totals with time tag
38	M_EP_TD_1	M_EP_TD	Events of protection equipment with time tag
39	M_EP_TE_1	M_EP_TE	Packed start events of protection equipment with time tag
40	M_EP_TF_1	M_EP_TF	Packed output circuit information of protection equipment with

			time tag
70	M_EI_NA_1	M_EI_NA	End of initialization

63.2.3 Command Item

Command Item to IEC60870-5-104 Slave unit.

ID	Function	OPC Item Name	Description
45	C_SC_NA_1	C_SC_NA	Single command
46	C_DC_NA_1	C_DC_NA	Double command
47	C_RC_NA_1	C_RC_NA	Regulating step command
48	C_SE_NA_1	C_SE_NA	Set point command, normalized value
49	C_SE_NB_1	C_SE_NB	Set point command, scaled value
50	C_SE_NC_1	C_SE_NC	Set point command, short floating point number
51	C_BO_NA_1	C_BO_NA	Bitstring of 32 bits
58	C_SC_TA_1	C_SC_TA	Single command with time tag
59	C_DC_TA_1	C_DC_TA	Double command with time tag
60	C_RC_TA_1	C_RC_TA	Regulating step command with time tag
61	C_SE_TA_1	C_SE_TA	Set point command, normalized value with time tag
62	C_SE_TB_1	C_SE_TB	Set point command, scaled value with time tag
63	C_SE_TC_1	C_SE_TC	Set point command, short floating point number with time tag
64	C_BO_TA_1	C_BO_TA	Bitstring of 32 bits with time tag
100	C_IC_NA_1	C_IC_NA	Interrogation command
101	C_CI_NA_1	C_CI_NA	Counter interrogation command
102	C_RD_NA_1	C_RD_NA	Read command
103	C_CS_NA_1	C_CS_NA	Clock synchronization command
105	C_RP_NA_1	C_RP_NA	Reset process command
107	C_TS_TA_1	C_TS_TA	Test command with time tag
110	P_ME_NA_1	P_ME_NA	Parameter of measured values, normalized value
111	P_ME_NB_1	P_ME_NB	Parameter of measured values, scaled value
112	P_ME_NC_1	P_ME_NC	Parameter of measured values, short floating point number
113	P_AC_NA_1	P_AC_NA	Parameter activation

63.3 List of Items

63.3.1 How to specify Dynamic Tag

Please specify dynamic tag with following rule.

Item Name : VQT : Control Info : Object Address : Extended Tag
NameSpecification

Item	Description
Item Name	Please specify tag's item type.
VQT	By item, item have several value types. If no specification, the default is Value. V : Value Q : Quality T : Timestamp
Control Info	If the item is Command Item, please specify control info. Some Command Items doesn't have control info. Monitor Items don't need to specify control information.
Object Address (IOA)	Please specify information object address which called IOA. Following items were not required to specify IOA. - TESTFR - M_EI_NA - C_IC_NA - C_CI_NA - C_CS_NA - C_RP_NA

Example)

If you monitor U Frame TESTFR, please specify as below.

TESTFR

If you monitor Value of IOA 123 for M_SP_NA_1 event "Single-point information without time tag", please specify as below.

M_SP_NA:123

If you monitor Timestamp of IOA 1234 for M_ST_TB_1 event "Step position information with time tag", please specify as below.

M_ST_TB:T:1234

If you write value to item of IOA 12345 for C_SC_TA_1 command "Single command with time tag" with QOC 4, please specify as below.

C_SC_TA:4:12345

If you write value to item of IOA 12345 for C_CI_NA_1 command "Interrogation command" with QOI 20 (Station Interrogation (global)), please specify as below.

C_IC_NA:20

63.3.2 Keep Alive Item

This item is ReadOnly.

If you monitor this item, checking for keep alive with TESTFR will be done. Please use for communication test.

ID	Function	OPC Item Name	Description	VQT	Base DataType	Att r	Control Info	IOA
	U Frame	TESTFR	TESTFR (act)	V	BOOL	R	N/A	N/A

63.3.3 Monitor Item

These items are ReadOnly.

You don't need to specify control info.

ID	Function	OPC Item Name	Description	VQT	Base DataType	Att r	Quality Meaning	IOA
1	M_SP_NA_1	M_SP_NA	Single-point information without time tag	V	BYTE	R	N/A	
3	M_DP_NA_1	M_DP_NA	Double-point information without time tag	V	BYTE	R	N/A	
5	M_ST_NA_1	M_ST_NA	Step position information without time tag	VQ	BYTE	R	QDS	
7	M_BO_NA_1	M_BO_NA	Bitstring of 32 bits	VQ	STRING	R	QDS	
9	M_ME_NA_1	M_ME_NA	Measured value, normalized value	VQ	SHORT	R	QDS	
11	M_ME_NB_1	M_ME_NB	Measured value, scaled value	VQ	SHORT	R	QDS	
13	M_ME_NC_1	M_ME_NC	Measured value, short floating point number	VQ	FLOAT	R	QDS	
15	M_IT_NA_1	M_IT_NA	Integrated totals	VQ	LONG	R	Sequence No	
20	M_PS_NA_1	M_PS_NA	Packed single-point information with status change detection	VQ	LONG	R	QDS	
21	M_ME_ND_1	M_ME_ND	Measured value, normalized value without quality descriptor	V	LONG	R	N/A	
30	M_SP_TB_1	M_SP_TB	Single-point information with time tag	VT	BYTE	R	N/A	
31	M_DP_TB_1	M_DP_TB	Double-point information with time tag	VT	BYTE	R	N/A	
32	M_ST_TB_1	M_ST_TB	Step position information with time tag	VQT	BYTE	R	QDS	
33	M_BO_TB_1	M_BO_TB	Bitstring of 32bits	VQT	STRING	R	QDS	
34	M_ME_TD_1	M_ME_TD	Measured value, normalized value with time tag	VQT	SHORT	R	QDS	
35	M_ME_TE_1	M_ME_TE	Measured value, scaled value with time tag	VQT	SHORT	R	QDS	
36	M_ME_TF_1	M_ME_TF	Measured value, short floating point number with	VQT	FLOAT	R	QDS	

			time tag					
37	M_IT_TB_1	M_IT_TB	Integrated totals with time tag	VQT	LONG	R	Sequence No	
38	M_EP_TD_1	M_EP_TD	Events of protection equipment with time tag	VQT	BYTE	R	Elapsed	
39	M_EP_TE_1	M_EP_TE	Packed start events of protection equipment with time tag	VQT	SHORT	R	Relay	
40	M_EP_TF_1	M_EP_TF	Packed output circuit information of protection equipment with time tag	VQT	SHORT	R	Relay	
70	M_EI_NA_1	M_EI_NA	End of initialization	V	BYTE	R	COI	N/A

63.3.4 Command Item

These items are WriteOnly.

By item, you need to specify control info.

ID	Function	OPC Item Name	Description	VQT	Base DataType	Att r	Quality Meaning	IOA
45	C_SC_NA_1	C_SC_NA	Single command	V	BOOL	W	QOC	
46	C_DC_NA_1	C_DC_NA	Double command	V	BOOL	W	QOC	
47	C_RC_NA_1	C_RC_NA	Regulating step command	V	BOOL	W	QOC	
48	C_SE_NA_1	C_SE_NA	Set point command, normalized value	V	SHORT	W	QOC	
49	C_SE_NB_1	C_SE_NB	Set point command, scaled value	V	SHORT	W	QOC	
50	C_SE_NC_1	C_SE_NC	Set point command, short floating point number	V	FLOAT	W	QOC	
51	C_BO_NA_1	C_BO_NA	Bitstring of 32 bits	V	STRING	W	N/A	
58	C_SC_TA_1	C_SC_TA	Single command with time tag	V	BOOL	W	QOC	
59	C_DC_TA_1	C_DC_TA	Double command with time tag	V	BOOL	W	QOC	
60	C_RC_TA_1	C_RC_TA	Regulating step command with time tag	V	BOOL	W	QOC	
61	C_SE_TA_1	C_SE_TA	Set point command, normalized value with time tag	V	SHORT	W	QOS	
62	C_SE_TB_1	C_SE_TB	Set point command, scaled value with time tag	V	SHORT	W	QOS	
63	C_SE_TC_1	C_SE_TC	Set point command, short floating point number with time tag	V	FLOAT	W	QOS	
64	C_BO_TA_1	C_BO_TA	Bitstring of 32 bits with time tag	V	STRING	W	N/A	
100	C_IC_NA_1	C_IC_NA	Interrogation command	V	BOOL	W	QOI	N/A
101	C_CI_NA_1	C_CI_NA	Counter interrogation command	V	BOOL	W	QCC	N/A
10	C_RD_NA_1	C_RD_NA	Read command	V	BOOL	W	N/A	

2								
103	C_CS_NA_1	C_CS_NA	Clock synchronization command	V	BOOL	W	N/A	N/A
105	C_RP_NA_1	C_RP_NA	Reset process command	V	BOOL	W	QRP	N/A
107	C_TS_TA_1	C_TS_TA	Test command with time tag	V	SHORT	W	N/A	
110	P_ME_NA_1	P_ME_NA	Parameter of measured values, normalized value	V	SHORT	W	QPM	
111	P_ME_NB_1	P_ME_NB	Parameter of measured values, scaled value	V	SHORT	W	QPM	
112	P_ME_NC_1	P_ME_NC	Parameter of measured values, short floating point number	V	LONG	W	QPM	
113	P_AC_NA_1	P_AC_NA	Parameter activation	V	BOOL	W	QPA	

If you write value to following command item, DeviceXPlorer will run the function. Any write value is OK.

ID	Function	OPC Item Name	Description
100	C_IC_NA_1	C_IC_NA	Interrogation command
101	C_CI_NA_1	C_CI_NA	Counter interrogation command
102	C_RD_NA_1	C_RD_NA	Read command
103	C_CS_NA_1	C_CS_NA	Clock synchronization command
105	C_RP_NA_1	C_RP_NA	Reset process command
113	P_AC_NA_1	P_AC_NA	Parameter activation

63.4 DeviceXPlorer Settings

63.4.1 Port Settings

This section explains how to make the communication settings for the accessing IEC60870-5-104 slave unit.

Port properties

PING Test
Machine

☒ Select Adapter

Adapter
(Automatic)
Explanation
Status
DHCP
IPv4 Address
IPv6 Address

Network
☒ IPv4
☐ IPv6
Protocol
☒ TCP/IP
☐ UDP/IP
Adapter IP Address
localhost
Adapter Port No.
0
Target IP Address
192.168.19.1
Target Port No.
2404
Send Delay
0 msec
Timeout
3 sec
Retry count
3 times

Item	Description
Network	Support only IPv4.
Protocol	Support only TCP/IP.
Adapter Port No.	Please specify 0.
Target IP address	Please specify IP Address of IEC60870-5-104 slave unit.
Target Port No.	Please specify Port number of IEC60870-5-104 slave unit. Default port number is 2404.

Important

Please use 1 device setting with 1 port setting in IEC60870-5-104 Client connection.
If you access same port with multi device settings, communication may be failed.

63.4.2 Device Settings

This section explains how to make the settings for the accessing IEC60870-5-104 slave unit.

Connection Test

Field Size(byte)

Common Address(C)

2

Cause of Transmission(M)

2

Object Address(O)

3

Addresses

Common Address(A)

1

Originator Address(R)

0

☐ Enable Summer Time

K/W Parameter

Max Outstanding Message(K)

12

Max Delayed Ack(W)

8

Timeout(sec)

T0

30

T2

10

T1

15

T3

20

Item	Description
Connection Test	Communication test with IEC60870-5-104 slave unit using the TESTFR command of U Frame.
Field Size(byte)	
Common Address	Please specify filed byte size of "Common Address". You can select 1 or 2.
Cause of Transmission	Please specify filed byte size of "Cause of Transmission". You can select 1 or 2.
Object Address	Please specify filed byte size of "Object Address". You can select between 1 and 3.
Address	
Common Address	Please specify "Common Address". Address area depends on the field byte size of "Common Address" you specified.
Originator Address	Please specify "Originator Address". You can input this setting if the field byte size of "Cause of Transmission" is 2.
Enable Summer Time	Please specify whether time stamp includes summer time or not.
K/W Parameter	
Max Outstanding Message	This parameter is not used at present.
Max Delayed Ack	Acknowledge is transmitted after receiving this setting amount of I Frame (event from slave unit).
Timeout(sec)	
T0	The timeout time at the time of connection start with slave unit.
T1	Test frame transmission is carried out, and if there is no designated hour response from slave unit, connection will be cut.
T2	Ackknowledge will be transmitted, if there is no designated hour data reception from slave unit after event message has been sent from slave unit.

T3	When not communicating with a designated hour and slave unit, the TESTFR command of U Frame is transmitted.
----	---

63.4.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Item Type	Please specify tag's item type.
Value Type	By item, value type can be selected. Value Quality - - - (such as Monitor Item's QDS) Timestamp
Control Info	Please specify control information if the item type is required. (Such as Command Item C_SC_NA_1 "Single Command"s QOS) The meaning of Control information is shown on a lower text box.
Object Address	Please specify information object address (IOA) of the item.

63.5 Errors

The major errors are as follows.

Log	Error Description
Response Error (Code = **h)	Slave unit returns error code. Error code is different by error. 6C :Not supported command 6E :Specified Common Address doesn't exist. 6F : Specified IOA doesn't exist.
Socket is closed by host	Slave unit disconnected ethernet socket with DeviceXPlorer.
Failed to send Ack Message.	Failed to send Acknowledge message to slave unit.
Failed to send KeepAlive Message.	Failed to send message for keep alive U Frame TESTFR to slave unit.
Failed to send KeepAlive Reply Message.	Failed to send reply message for keep alive U Frame TESTFR to slave unit.
Unexpected message! [ReceiveDataFromHost] Unexpected message! [RecvThreadProc] Receive not supported message.	Receive not supported message from slave unit.
Receive Invalid Message.	Receive invalid message from slave unit.

64 IEC61850MMS Client Connection

This chapter explains IEC61850MMS Client communication via Ethernet.

An overview of communication via IEC61850MMS Client connection is shown below.

Item	specification
Link	IEC61850MMS Client
Protocol	TCP
Port	Variable(Default:102)
Suite Category	Open Network

64.1 System

Communicate with IEC61850MMS server unit.

Maker	Series	Port
Mitsubishi Electric	MELPRO-D	Built-in Ethernet port
ABB	REX640 REF620	Built-in Ethernet port
Wago	PFC200	Built-in Ethernet port
Xeras	IEC61850 Simulator	Built-in Ethernet port

64.2 Supported Commands

The services supported by this system are shown below.

Service	Support
status	✓
getNameList	✓
identify	✓
rename	-
read	✓
write	✓
getVariableAccessAttributes	✓
defineNamedVariable	-
defineScatteredAccess	-
getScatteredAccessAttributes	-
deleteVariableAccess	-
defineNamedVariableList	-
getNamedVariableListAttributes	✓
deleteNamedVariableList	-
defineNamedType	-
getNamedTypeAttributes	-
deleteNamedType	-
input	-
output	-
takeControl	-
relinquishControl	-
defineSemaphore	-
deleteSemaphore	-
reportSemaphoreStatus	-
reportPoolSemaphoreStatus	-
reportSemaphoreEntryStatus	-
initiateDownloadSequence	-

downloadSegment	-
terminateDownloadSequence	-
initiateUploadSequence	-
uploadSegment	-
terminateUploadSequence	-
requestDomainDownload	-
requestDomainUpload	-
loadDomainContent	-
storeDomainContent	-
deleteDomain	-
getDomainAttributes	-
createProgramInvocation	-
deleteProgramInvocation	-
start	-
stop	-
reset	-
kill	-
getProgramInvocationAttributes	-
obtainFile	-
defineEventCondition	-
deleteEventCondition	-
getEventConditionAttributes	-
reportEventConditionStatus	-
alterEventConditionMonitoring	-
triggerEvent	-
defineEventAction	-
deleteEventAction	-
getEventActionAttributes	-
reportActionStatus	-
defineEventEnrollment	-
deleteEventEnrollment	-
alterEventEnrollment	-
reportEventEnrollmentStatus	-
getEventEnrollmentAttributes	-
acknowledgeEventNotification	-
getAlarmSummary	-
getAlarmEnrollmentSummary	-
readJournal	-
writeJournal	-
initializeJournal	-
reportJournalStatus	-
createJournal	-
deleteJournal	-
getCapabilityList	✓
fileOpen	-
fileRead	-
fileClose	-
fileRename	-
fileDelete	-
fileDirectory	-

unsolicitedStatus	✓
informationReport	✓
eventNotification	-
attachToEventCondition	-
attachToSemaphore	-
conclude	✓
cancel	✓

64.3 List of Items

64.3.1 List of Function Constraint(FC)

The Function Constraint supported by this system are shown below.

FC	Contents	Attribute
ST	Status Information	Read Only
MX	Measurands (Analog Values)	Read Only
CO	Control	Read/Write
SP	Set Point	Read/Write
SV	Substitution	Read/Write
CF	Configuration	Read/Write
DC	Description	Read/Write
SG	Setting Group	Read Only
SE	Setting Group Editable	Read/Write
EX	Extended Definition	Read Only
BR	Buffered Report	Read/Write
RP	Unbuffered Report	Read/Write
LG	Logging	Read/Write
GO	Goose Control	Read/Write
GS	Gsse Control	Read/Write
MS	Multi-cast Sampled Value Control	Read/Write
US	Uni-cast Sampled Value Control	Read/Write

64.4 List of system tags

Shows a list of system tags that can be set in IEC61850 MMS Client.

Tag Name	Type	Attribute	Description
\$Control_Test	BOOL	R/W	Set Test in Control Setting.
\$AddCause	LONG	R	Display the result of the parameter AddCause contained in the asynchronous message that may be returned when writing to a Control (CO) fails.
\$CntrlObj	STRING	R	Display the result of the parameter CntrlObj contained in the asynchronous message that may be returned when writing to a Control (CO) fails.
\$CtlNum	ULONG	R	Display the result of the parameter CtlNum contained in the asynchronous message that may be returned when writing to a Control (CO) fails.
\$Error	ULONG	R	Display the result of the parameter Error contained in the asynchronous message that may be returned when writing to a Control (CO) fails.
\$orCat	LONG	R	Display the result of the parameter orCat contained in the asynchronous message that may be returned when writing to a Control (CO) fails.
\$orIdnt	STRING	R	Display the result of the parameter orIdnt contained in the asynchronous message that may be returned when writing to a Control (CO) fails.

64.5 DeviceXPlorer Settings

64.5.1 Port Settings

This section shows the communication settings for IEC61850MMC server unit.

Property [Device2Port]

Port

PING Test

Machine Z2104-03

☒ Select Adapter

Adapter (Automatic)

Explanation

Status DHCP

IPv4 Address IPv6 Address

Network ☒ IPv4 ☐ IPv6

Protocol ☒ TCP/IP ☐ UDP/IP

Adapter IP Address localhost

Adapter Port No. 0

Target IP Address 192.168.19.221

Target Port No. 102

☐ Authentication :

Password

Read method UnconfirmedService

Send Delay 0 msec

Timeout 3 sec

Retry count 3 times

OK Cancel Apply

Item	Description
Network	Specify Network. IPv6 is not supported.
Protocol	Specify Protocol. UDP/IP is not supported.
Adapter IP Address	The IP address of the selected adapter is displayed. If an adapter is not selected, the IP address or machine name of the adapter that communicates with the controller can be entered.
Adapter Port No.	Specify the port number of the selected adapter. If "0" is specified for the port number, the OS automatically allocates a free port.
Target IP address	Specify IP Address or Machine name of IEC61850MMS server unit.
Target Port No.	Specify Port number of IEC61850MMS Server unit.
Authentication	Enable when setting up authentication.
Password	Specify Password when enable Authentication.
Read method	Specify Read method. Candidate:ConfirmedService,UnconfirmedService

64.5.2 Device Settings

This section explains the settings for IEC61850MMC server unit.

Item	Description
Connection Test	Perform a communication test with IEC61850MMS server unit.
Playback	Enable when the Playback buffer size should be entered. Can be set only when selected "UnconfirmedService" at Port setting.
Buffer size	Specify Buffer size.
Update cycle	Specify the buffer update cycle.
Automatic tag generation	Enable when the tag should be automatically generated.
Tag generation range setting	Displays the setting to specify the range of tags to be generated when tags are automatically generated. Details are shown in "60.4.2.1 Tag generation range Setting".
Generation method	Specify Generation method (Device/File).
File information acquisition	Get the parameter information from the SCL file.
File	Specify File pass When File is selected as the generation method.
SubNetwork	Specify Subnetwork to get from file When File is selected as the generation method. The selected item is acquired at the time of "File information acquisition". Valid only when File is specified in the generation method.
IED	Specify the IED to be acquired when reading the file. The selected item is acquired at the time of "File information acquisition". Valid only when File is specified in the generation method.
AccessPoint	Specify AccessPoint to be acquired when reading the file. The selected item is acquired at the time of "File information acquisition". Valid only when File is specified in the generation method.
Generate a DataSet group	Enable when grouping by DataSet when automatically generating tags.
Delete existing tags	Enable if you want to delete an existing tag.
Read level	Specify Read level (LogicalNode/FunctionConstraint/DataObject/DataAttribute).
Server/Client Parameters	Display the setting of Server/Client Parameters. Details are shown in "60.4.2.2 Server/Client Parameters Setting".
Control	Display the setting of Control. Details are shown in "60.4.2.3 Control Setting".
Delete communication information	When enabled, the communication information will be deleted and the communication will be restarted from the initial communication.

64.5.2.1 Tag generation range Setting

The settings of the tag generation range are shown below.

Tag generation range setting

Select All Deselect All

☒ ST (Status Information) ☒ EX (Extended Definition)

☒ MX (Measurands (Analog Values)) ☒ BR (Buffered Report)

☒ CO (Control) ☒ RP (Unbuffered Report)

☒ SP (Set Point) ☒ LG (Logging)

☒ SV (Substitution) ☒ GO (Goose Control)

☒ CF (Configuration) ☒ GS (Gsse Control)

☒ DC (Description) ☒ MS (Multi-cast Sampled Value Control)

☒ SG (Setting Group) ☒ US (Uni-cast Sampled Value Control)

☒ SE (Setting Group Editable)

OK Cancel

Item	Description
Select All	Press this button to select all items.
Deselect All	Press this button to deselect all items.
ST(Status Information)	Enable if you include ST when automatically generating tags.
MX(Measurands)	Enable if you include MX when automatically generating tags.
CO(Control)	Enable if you include CO when automatically generating tags.
SP(Set Point)	Enable if you include SP when automatically generating tags.
SV(Substitution)	Enable if you include SV when automatically generating tags.
CF(Configuration)	Enable if you include CF when automatically generating tags.
DC(Description)	Enable if you include DC when automatically generating tags.
SG(Setting Group)	Enable if you include SG when automatically generating tags.
SE(Setting Group Editable)	Enable if you include SE when automatically generating tags.
EX(Extended Definition)	Enable if you include EX when automatically generating tags.
BR(Buffered Report)	Enable if you include BR when automatically generating tags.
RP(Unbuffered Report)	Enable if you include RP when automatically generating tags.
LG(Logging)	Enable if you include LG when automatically generating tags.
GO(Goose Control)	Enable if you include GO when automatically generating tags.
GS(Gsse Control)	Enable if you include GS when automatically generating tags.
MS(Multi-cast Sampled Value Control)	Enable if you include MS when automatically generating tags.
US(Uni-cast Sampled Value Control)	Enable if you include US when automatically generating tags.

64.5.2.2 Server/Client Parameters Setting

The settings of Server / Client Parameters are shown below.

The dialog box titled "Parameter Setting" contains two columns: "Server" and "Client". Each column has seven input fields for the following parameters: AE Invoke ID, AE Qualifier, AP Invoke ID, Application ID, Transport Selector, Session Selector, and Presentation Selector. The values entered in the fields are as follows:

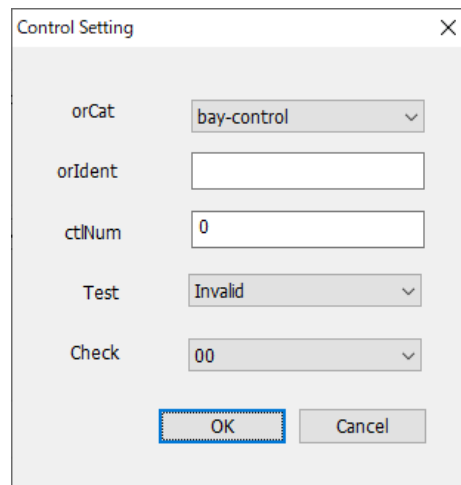
Parameter	Server Value	Client Value
AE Invoke ID	10	1
AE Qualifier	12	12
AP Invoke ID	10	1
Application ID	1,1,999,1,1	1,1,999,1,1
Transport Selector	00 01	00 01
Session Selector	00 01	00 01
Presentation Selector	00 00 00 01	00 00 00 01

At the bottom right of the dialog are "OK" and "Cancel" buttons.

Item	Description
Server AE Invoke ID	Specify Server AE Invoke ID.
Server AE Qualifier	Specify Server AE Qualifier.
Server AP Invoke ID	Specify Server AP Invoke ID.
Server Application ID	Specify Server Application ID. Separate the value with comma character “,”.
Server Transport Selector	Specify Server Transport Selector.
Server Session Selector	Specify Server Session Selector.
Server Presentation Selector	Specify Server Presentation Selector.
Client AE Invoke ID	Specify Client AE Invoke ID.
Client AE Qualifier	Specify Client AE Qualifier.
Client AP Invoke ID	Specify Client AP Invoke ID.
Client Application ID	Specify Client Application ID. Separate the value with comma character “,”.
Client Transport Selector	Specify Client Transport Selector.
Client Session Selector	Specify Client Session Selector.
Client Presentation Selector	Specify Client Presentation Selector.

64.5.2.3 Control Setting

The settings of the Control Setting are shown below.



The image shows a 'Control Setting' dialog box with a close button (X) in the top right corner. It contains five input fields, each with a label to its left: 'orCat' (a dropdown menu showing 'bay-control'), 'orIdent' (an empty text box), 'ctlNum' (a text box containing '0'), 'Test' (a dropdown menu showing 'Invalid'), and 'Check' (a dropdown menu showing '00'). At the bottom of the dialog are two buttons: 'OK' and 'Cancel'. The 'OK' button is highlighted with a blue dashed border.

Item	Description
orCat	Specify orCat.
orIdent	Specify orIdent.
ctlNum	Specify ctlNum.
Test	Specify Test.
Check	Specify Check.

64.5.3 Tag Settings

This section shows the setting of the tags managed by DeviceXPlorer.

Property of IEDSIMControl\$ArcRREC1\$BR\$brcbST\$EntryID [IEDSIMControl\$ArcRREC1\$BR\$brcbST\$EntryID:S1]

General	Scale	Simulation	Alarm	Publisher
Tag Name	IEDSIMControl\$ArcRREC1\$BR\$brcbST\$EntryID			
	IEDSIMControl\$ArcRREC1\$BR\$brcbST\$EntryID:S1			
☐ Auto Format				
Description				
LogicalDevice	IEDSIMControl			
LogicalNode	ArcRREC1			
FunctionConstraint	BR			
DataObject	brcbST			
DataAttribute	EntryID			
SubAttr	Value	Attribute		ReadWrite
Data Type	STRING	Calculation		NONE

New Save << >> OK Cancel

Item	Description
Tag Name	Specify Tag Name.
Location	Specify Location name.
Auto Format	Enable if the location name should to be entered automatically.
Description	Specify a comment.
LogicalDevice	Specify Logical Device (LD) as a character string.
LogicalNode	Specify Logical Node (LN) as a character string.
FunctionConstraint	Select Function Constraint (FC).
DataObject	Specify DataObject as a character string.
DataAttribute	Specify DataAttribute as a character string.
SubAttr	Select Value or Playback.
Data Type	Select Data Type(BOOL/BYTE/...).
Attribute	Select Attribute.
Caluculation	Select Caluculation (None/Bit Inversion /BCD calculation / ...).

SubAttr is shown below.

SubAttr	Description
Value	Use the latest Value of the response packet as the tag value.
Playback	If Playback is specified, the history is kept inside the OPC server and the value is updated each update cycle in Device setting. It can be selected only when PlayBack is enabled in the device settings. The buffer size to be retained is specified from the device settings, and if it is oversized, the data is deleted from the old data. When Playback is set, the attribute is ReadOnly.

64.6 Errors

The major errors are as follows.

Error Code	Error Description	Workaround
10000s	Connection error(CR TPDU)	Check the Transport Selector Setting of Server Parameter.
20000s	Connection error(Initiate-RequestPDU)	Check the following settings of ServerParameter. -Server AE Invoke ID -Server AE Qualifier -Server AP Invoke ID -Server Application ID -Server Session Selector -Server Presentation Selector
30000s	RejectPDU receive error	The tag information of DxpSERVER and the setting contents of the connection destination may be different. Check the tag settings.
40000s	ErrorPDU receive error	The tag information of DxpSERVER and the setting contents of the connection destination may be different. Check the tag settings.
50000s	Disconnection failure error	No action is required as the disconnection process continues.
60000s	Data access error Access failure error (e.g. when writing to an object that cannot be written)	Check if the writing destination is correct.
90000s	Errors that remain when an unexpected response other than the above is received.	The tag information of DxpSERVER and the setting contents of the connection destination may be different. Check the tag settings.

65 DNP3 Master Connection

This chapter explains DNP3 Master communication via Ethernet.

An overview of communication via DNP3 Ethernet connection is shown below.

Overview	
Link	Ethernet (TCP/IP)
Communication Protocol	DNP3 Master Protocol

65.1 System

Communicate with DNP3 Outstation unit.

65.2 Support Items

Group	Valiation	SubAttr	ID	Attribute	Base Data Type
BinaryInput	Default	Value	0-65535	R	BOOL
		Playback			UBYTE
		Flag			
	PackedFormat	Value			BOOL
		Playback			UBYTE
		Flag			
	WithFlags	Value			BOOL
		Playback			UBYTE
		Flag			
Double-bitBinaryInput	Default	Value		R	UBYTE
		Playback			
		Flag			
	PackedFormat	Value			
		Playback			
		Flag			
	WithFlags	Value			
		Playback			
		Flag			
BinaryOutput	Default	Value	RW	BOOL	
		Playback	R	UBYTE	
		Flag			
	PackedFormat	Value	RW	BOOL	
		Playback	R	UBYTE	
		Flag			
	OutputStatusWithFlags	Value	RW	R	UBYTE
		Playback			UBYTE
		Flag			
		Flag			
		Counter	Default	Value	R
	Playback			UBYTE	
Flag					
32bitWithFlag	Value		ULONG		
	Playback		UBYTE		
	Flag				
16bitWithFlag	Value		USHORT		
	Playback				

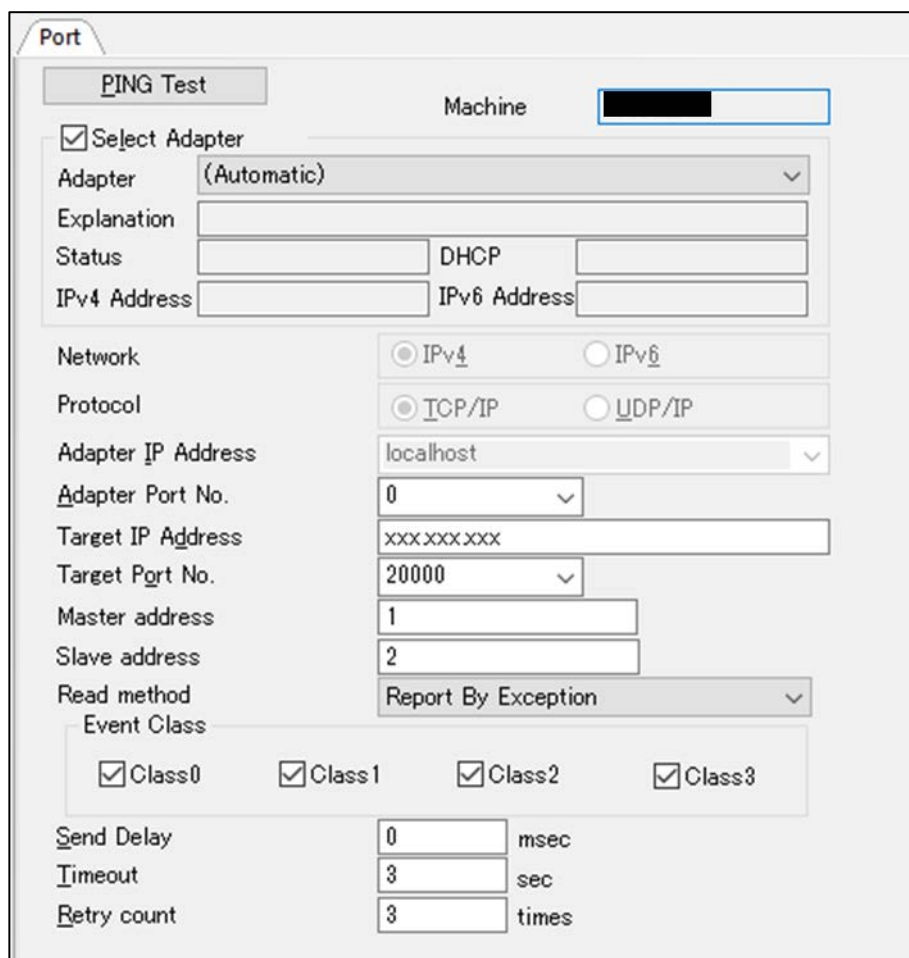
	32bitWithoutFlag	Flag			UBYTE
		Value			ULONG
		Playback			UBYTE
	16bitWithoutFlag	Flag			USHORT
		Value			UBYTE
		Playback			UBYTE
FrozenCounter	Default	Flag		R	UBYTE
		Value			ULONG
		Playback			UBYTE
		Freeze			BOOL
	32bitWithFlag	Flag	0-65535	R	UBYTE
		Value			ULONG
		Playback			UBYTE
		Freeze			BOOL
	16bitWithFlag	Flag	0-65535	R	UBYTE
		Value			USHORT
		Playback			UBYTE
		Freeze			BOOL
	32bitWithFlagAndTime	Flag	0-65535	R	UBYTE
		Value			ULONG
		Playback			UBYTE
		Freeze			BOOL
	16bitWithFlagAndTime	Flag	0-65535	R	UBYTE
		Value			USHORT
		Playback			UBYTE
		Freeze			BOOL
	32bitWithoutFlag	Flag	0-65535	R	UBYTE
		Value			ULONG
		Playback			UBYTE
		Freeze			UBYTE
	16bitWithoutFlag	Flag	0-65535	R	UBYTE
		Value			USHORT
		Playback			UBYTE
		Freeze			BOOL
AnalogInput	32bitWithFlag	Flag	0-65535	R	UBYTE
		Value			ULONG
		Playback			UBYTE
	16bitWithFlag	Flag			UBYTE
		Value			USHORT
		Playback			UBYTE
	32bitWithoutFlag	Flag			UBYTE
		Value			ULONG
		Playback			UBYTE
	16bitWithoutFlag	Flag			UBYTE
		Value			USHORT
		Playback			UBYTE
	SinglePrecFltPtWithFlag	Flag			UBYTE
		Value			FLOAT
		Playback			UBYTE

AnalogOutput	32Bit	Value		RW	ULONG
		Playback		R	
		Flag			UBYTE
	16Bit	Value		RW	USHORT
		Playback		R	
		Flag			UBYTE
	SinglePrecFltPt	Value		RW	FLOAT
		Playback		R	
		Flag			UBYTE

65.3 DeviceXPlorer Settings

65.3.1 Port Settings

This section explains how to make the communication settings for the accessing DNP3 outstation unit.



Item	Description
MasterAddress	Please specify the Master Address.
SlaveAddress	Please specify the Outstation Address.
ReadMethod	Please specify the ReadMethod 'Report By Exception' or 'Unsolisited Report By Exception'.
Event Class	
Class0	Enable if you'll read Class0.
Class1	Enable if you'll read Class1.
Class2	Enable if you'll read Class2.
Class3	Enable if you'll read Class3.

65.3.2 Device Settings

This section explains how to make the settings for the accessing DNP3 outstation unit.

The screenshot shows a software window titled "Connection Test". Inside, there is a checkbox labeled "Playback" which is currently unchecked. Below the checkbox, there are two input fields. The first is labeled "Buffer size" and contains the value "1000". The second is labeled "Update cycle" and contains the value "100", followed by the unit "msec".

Item	Description
Connection Test	Communication test with DNP3 outstation unit.
Playback	Enable if you'll use Playback.
Buffer size	Please specify the buffer size of playback.
Update cycle	Please specify the update cycle of playback.

65.3.2.1 Playback

In DNP3 communication, the outstation unit can include the unread data list in the response data.

When Playback is enabled, temporarily store the unread data list acquired from the outstation unit in the buffer.

The value of the target tag is updated for each Update cycle in Device setting.

65.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [BinaryInput_Default_0_Value:OR]

General Scale Simulation Alarm Publisher			
Tag Name	Tag		
	BinaryInput_Default_0_Value:OR		
	☐ Auto Format		
Description			
Group(G)	BinaryInput		
	BinaryInput		
Variation(B)	Default		
	Default		
ID(D)	0	SubAttr(S)	Value
Data Type	BOOL	Bit Position	0
Length	1	Byte Position	Lower Byte
☐ Byte Swap		Attribute	ReadOnly
☐ Array		Calculation	NONE

Item	Description
Tag Name	Please specify tag's name.
Group	Please specify Group.
Variation	Please specify Variation. Items vary depending on the group.
ID	Please specify ID.
SubAttr	Please specify SubAttr. Items vary depending on the Variation.

65.4 Errors

The major errors are as follows.

65.4.1 StatusCode

The major NAK errors are as follows.

Code	Error Type	Error Description
1	TIMEOUT	Time-out error. Please check the connection status.
4	NOT_SUPPORTED	The outstation unit does not support the requested command.
5	ALREADY_ACTIVE	The request queue of the outstation unit is full and new requests cannot be accepted.
6	HARDWARE_ERROR	The request cannot be accepted due to a hardware problem.
9	NOT_AUTHORIZED	The request cannot be accepted due to insufficient authorization.
12	OUT_OF_RANGE	The request cannot be accepted because the requested value is out of range.
127	UNDEFINED	Requests cannot be accepted for undefined reasons.

65.4.2 IIN

The major NAK errors are as follows.

Bit	Description
IIN1.0	ALL_STATIONS
IIN1.1	CLASS_1_EVENTS
IIN1.2	CLASS_2_EVENTS
IIN1.3	CLASS_3_EVENTS
IIN1.4	NEED_TIME
IIN1.5	LOCAL_CONTROL
IIN1.6	DEVICE_TROUBLE
IIN1.7	DEVICE_RESTART
IIN2.0	NO_FUNC_CODE_SUPPORT
IIN2.1	OBJECT_UNKNOWN
IIN2.2	PARAMETER_ERROR
IIN2.3	EVENT_BUFFER_OVERFLOW
IIN2.4	ALREADY_EXECUTING
IIN2.5	CONFIG_CORRUPT
IIN2.6	RESERVED_1
IIN2.7	RESERVED_2

備考

ByteOrder of IIN are as follows.

IIN1.7	IIN1.6	IIN1.5	IIN1.4	IIN1.3	IIN1.2	IIN1.1	IIN1.0	IIN2.7	IIN2.6	IIN2.5	IIN2.4	IIN2.3	IIN2.2	IIN2.1	IIN2.0
--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

Ex. At IIN=1, only IIN2.0 is true, so it becomes NO_FUNC_CODE_SUPPORT.

66 OPC DA Client Connection

This chapter explains communication with other OPC Server using OPC Data Access interface.

An overview of communication via OPC Data Access interface is shown below.

Overview	
Protocol	OPC DataAccess
Version	Ver2.05A / Ver3.0
Function	DataAccess Client

66.1 Applicable OPC DA Server

OPC Server interfaces which are needed for OPC DA Client Connection are shown below.

Type	Interface	Method	2.05A	3.0
OPC Server Object	IOPCCommon	SetClientName	O	O
	IOPCServer	AddGroup GetStatus RemoveGroup	O	O
	IOPCItemProperties	GetItemProperties LookupItemIDs	O	-
	IOPCBrowseServerAddressSpace	QueryOrganization ChangeBrowsePosition BrowseOPCItemIDs GetItemID	O	-
	IOPCBrowse	GetProperties Browse	-	O
	IOPCItemIO	Read WriteVQT	-	O
	IConnectionPointContainer	EnumConnectionPoint FindConnectionPoint	O	O
	IConnectionPoint	Advise Unadvise	O	O
OPC Group Object	IOPCItemMgt	AddItems RemoveItems	O	O
	IOPCSyncIO	Read Write	O	O
	IOPCSyncIO2	ReadMaxAge	-	O
	IOPCASyncIO2	Read Write	O	O
	IOPCAsyncIO3	ReadMaxAge	-	O
	IOPCItemDeadbandMgt	SetItemDeadband	-	O
	IConnectionPoint	Advise Unadvise	O	O
Client Side Interface	IOPCDataCallback	OnDataChange OnReadComplete OnWriteComplete	O	O
	IOPCShutdown	ShutdownRequest	O	O

66.2 List of Items

The OPC DA Client items that can be set in DeviceXPlorer are as shown below.

Item Type	Variant of value	Description
Bool	VT_BOOL	Logical values
Byte	VT_I1	8-bit signed integers
UByte	VT_UI1	8-bit unsigned integers
Short	VT_I2	16-bit signed integers
UShort	VT_UI2	16-bit unsigned integers
Long	VT_I4	32-bit signed integers
ULong	VT_UI4	32-bit unsigned integers
Float	VT_R4	32-bit real number
LongLong	VT_I8	64-bit signed integers
ULongLong	VT_UI8	64-bit unsigned integers
Double	VT_R8	64-bit real number
String	VT_BSTR	Character string
Array of Bool	VT_ARRAY VT_BOOL	Array of Logical values
Array of Byte	VT_ARRAY VT_I1	Array of 8-bit signed integers
Array of UByte	VT_ARRAY VT_UI1	Array of 8-bit unsigned integers
Array of Short	VT_ARRAY VT_I2	Array of 16-bit signed integers
Array of UShort	VT_ARRAY VT_UI2	Array of 16-bit unsigned integers
Array of Long	VT_ARRAY VT_I4	Array of 32-bit signed integers
Array of ULong	VT_ARRAY VT_UI4	Array of 32-bit unsigned integers
Array of Float	VT_ARRAY VT_R4	Array of 32-bit real number
Array of LongLong	VT_ARRAY VT_I8	Array of 64-bit signed integers
Array of ULongLong	VT_ARRAY VT_UI8	Array of 64-bit unsigned integers
Array of Double	VT_ARRAY VT_R8	Array of 64-bit real number

Important

- You can register the non-array item only as a non-array tag. Also, you can register the array item only as an array tag likewise.
- OPC DA Client connection doesn't support the array of String type.
- Also, it supports items only the above list.
- You cannot use " " for an item name.

66.3 DeviceXPlorer Settings

66.3.1 OPC DA Client Port Settings

This section explains how to make the settings for the OPC Server connection.

Port properties

OPC SERVER

Node

Server Name

Process

☒ Default ☐ In-Proc ☐ Out-Proc

OPC-DA

☒ Ver2 ☐ Ver3

Timeout Sec

Retry count Times

Item		Description
OPC SERVER	Node	Specify IP address or machine name of the connection PC. If you specify blank or "localhost", connect to OPC Server of local PC.
	Server Name	Specify the ProgID of the connection OPC server. It is connected with OPC Enum service by clicking the pull-down button of the combo box and can enumerate ProgID. If you specify node of the remote PC, it enumerates the list from the remote PC. It is necessary for OPC Enum service to be installed in connection PC. If it connects and fails in the OPC Enum service of the remote PC, it uses ProgID information installed in the local PC and connects remote.
	Process	Specify the process of the connection. To the specifications of the connection OPC server, please choose the process.
	OPC-DA	Specify version of the OPC DA interface to use.
Time Out		Specify the waiting time before the completion notice coming after the publication of the Async demand. If time out passes, the time-out error occurs after re-try processing. When an RPC (a Remote Procedure Call)-related error occurred in published by Async demand, time out time is taken advantage of to re-try distance. When time-out waiting time of COM in RPC is longer than current setting time, it becomes time-out waiting time of COM to the re-try distance. When time-out error occurs, it tries to reconnect. Set a number between 0 and 60.
Retry		Set a number between 1 and 10.

66.3.2 Device Settings

This section explains how to make the settings for the OPC Server. You register one OPC Group for one OPC Server which is set in Port Settings. You can register plural OPC Groups for one OPC server by assigning plural devices to one port.

Device properties

Connection Test

ACCESS METHOD

Read I/F: Synchronous Read(Device) ▼

Write I/F: Synchronous Write ▼

OPC GROUP

Update Rate: 500 msec

Deadband: 0 %

Max age: 0 msec

First Read Delay: 0 msec

☒ Use raw quality when communication is good

Item

Path Conversion Method

☒ Tag name is related with ItemID on target server.

☐ Path is related with root on target.

☐ Path is related with node of the same name on target.

Delimiter of target server:

☐ Browse and create tags on target server

ACCESS POINTS

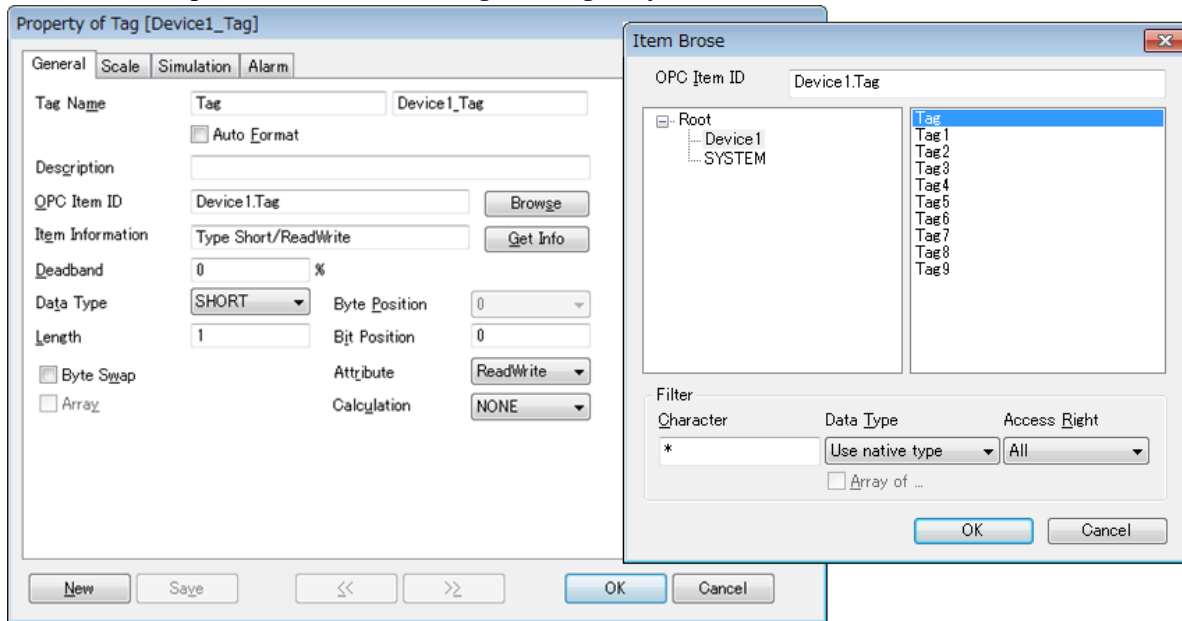
Tag R/W: 32767

Item		Description
ACCESS METHOD	Read I/F	Specify the access method to read data from the connection OPC server. When you choose "Asynchronous Advise", DeviceXPlorer reads actively in first reading. When you choose a "Synchronous Write", DeviceXPlorer uses synchronous reading in first reading. When you choose others, DeviceXPlorer uses asynchronous reading in first reading. * None * Synchronous Read(Device) * Synchronous Read(Cache) * Asynchronous Read * Asynchronous Advise * ItemIO Read
	Write I/F	Specify the access method to write in the connection OPC server. * None * Synchronous Write * Asynchronous Write * ItemIO Read

Item		Description
OPC GROUP	Update Rate	Specify the update rate of the OPC group to register with the connection OPC server. Set a number between 0 and 2147483647.
	Deadband	Specify the deadband of the group. When selecte “Asynchronous Advise” for Read I/F, this setting is used.
	Max Age	Specify the max age. When select OPC DA 3.0 and “Synchronous Read(Device)”, “Asynchronous Read” or “ItemIO Read” for Read I/F, this setting is used.
	First Read Delay	Specify the wait time for the cache value is updated at the server in first reading, When select “Synchronous Read(Cache)” for Read I/F, this setting is used.
	Use raw quality when communication is good	When you set check into this setting and store setting, it sets the quality flag which acquired from an OPC server as a quality flag of the tags of DeviceXPlorer when it succeeded in the reading from the connection OPC server. When you don't set check, it sets Good (0xC0).
ITEM	Path Conversion Method	Specify path conversion method of the item ID of the connection server in dynamic tag. For detail, please refer after “Path conversion method for dynamic tag”.
	Delimiter of target server	Specify the delimiter of the namespace of the connection server when it convert DeviceXPlorer and the item ID of the connection server. When you specify this setting blank , it assumes that it use the same namespace delimiter of DeviceXPlorer and convert it. If you specify “Tag name is related with ItemID on target server” in “Path Conversion Method”, you don't need to specify.
	Browse and create tags on target server	When you set check into this setting and store setting, it browses the tag of the connection ahead server and makes the tag in a one-shot automatically. When it generates tag automatically according to “Path Conversion Method”.
ACCESS POINTS	Tag R/W	Specify the access point of readable point in one access. Multiple accesses will be done if the demand needs to access data over more than this access point. Set a number between 1 and 32767.

66.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.



Item	Description
OPC Item	Please specify item ID in the connection OPC server to connect with a tag.
Item Information	The original type information of an item, [Type] / [Attribute] or [Array Type] / [Size] / [Attribute] is displayed. You can get the latest item information from the OPC Server by "Get Info". If you don't get the item information, this is "Unknown". You can set any kind of contents when this is "Unknown", but the type of item may be different from the original type. (For example, the tag is array type, but the original item is non-array.) You can set the tag without contradiction by acquiring type information. There is no difference in movement at the time of real communication even if you don't acquire the type information by "Get Info".
Auto Format	Tag name is made from an OPC item automatically. When unavailable characters is included in tag name to an OPC item, the unavailable characters is converted into different characters.
Browse	You can browse the list of the item which the OPC server has. An item browse dialogue (the right) appears by clicking a button. In the browse dialogue, you can set the filter to look for the item. When you select the item, the item information is reflected by setting automatically. (Please refer to item of the following "Get Info" sequentially)
Get Info	Connected to the OPC server and acquire the model information of an item appointed in an OPC item and display it in an item information column. When the setting of the tag is different from the acquired item information, the below message box is displayed to confirm whether setting of the tag is reflected by item information or not. In addition, the setting contents of the tag are changed automatically when there is contradiction for setting contents and item information set by a tag.

	For example, the tag is changed setting to a non-array automatically if the acquired item information is non-array even if you set tag for array type.
Deadband	Specify the deadband for the tag.

66.4 Path conversion method for dynamic tag

When a dynamic tag is registered by an OPC client, the DeviceXPlorer solves the path of the item ID. The item ID is hierarchical structure expressed with the path which consisted of a branch and a leaf. There are 3 methods to solve the path of the item ID.

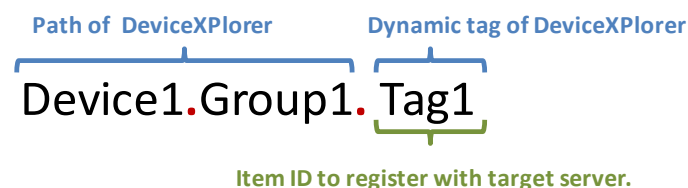
Path conversion method	The part which is used as item ID of the target server	Example
Tag name is related with ItemID on target server.	most bottom node (Tag name)	Path of DeviceXPlorer: Device1.Group1. Dynamic tag of DeviceXPlorer: Tag1 Item ID to register with target server: Tag1
Path is related with root on target.	Besides a top node (Besides device name)	Path of DeviceXPlorer: Device1.Group1. Dynamic tag of DeviceXPlorer: Tag1 Replace with delimiter of target server Item ID to register with target server: Group1/Tag1
Path is related with node of the same name on target.	All	Path of DeviceXPlorer: Device1.Group1. Dynamic tag of DeviceXPlorer: Tag1 Replace with delimiter of target server Item ID to register with target server: Device1/Group1/Tag1

66.4.1 Tag name is related with ItemID on target server.

It is a method to recognize a leaf (tag name) in the item ID registered by an OPC client as item ID of target server.

For example, when item ID "Device1.Group1.Tag1" is registered, dynamic tag "Tag1" is generated automatically by subordinates of "Device1.Group1".

When the value of the tag is read, the DeviceXPlorer does registration and reading of item ID "Tag1" to target server.



If the delimiter of item ID of the target server is "/", when the item ID "Device1.Group1.Branch1/Leaf1" is

registered and read from OPC Client, DeviceXPlorer accesses "Branch1/Leaf1" on target server.

In this case dynamic tag "Branch1/Leaf1" is generated by subordinates of "Device1.Group1".

When the branches of the target server increased later, there is a merit not to have to define a group of DeviceXPlorer.

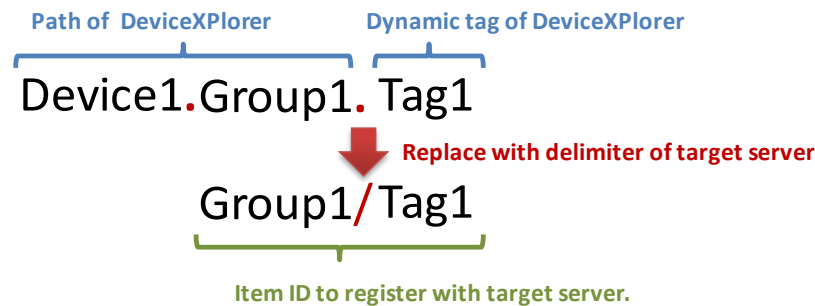
66.4.2 Path is related with root on target.

It is a method to recognize a path except device name from item ID registered by OPC client as item ID of target server.

It is used to lower one level of path for avoiding a collision of a branch name when DeviceXPlorer connects to plural servers. For example, when the item ID "Device1.Group1.Tag1" is registered and read by OPC Client, DeviceXPlorer accesses item ID "Group1.Tag1" to target server.

In addition, in DeviceXPlorer, you must define "Group1" to subordinates of "Device1" beforehand.

In addition, when a delimiter of a target server is different from one of DeviceXPlorer, it is useful to change it of DeviceXPlorer in "a delimiter of connection server" of device setting.



66.4.3 Path is related with node of the same name on target.

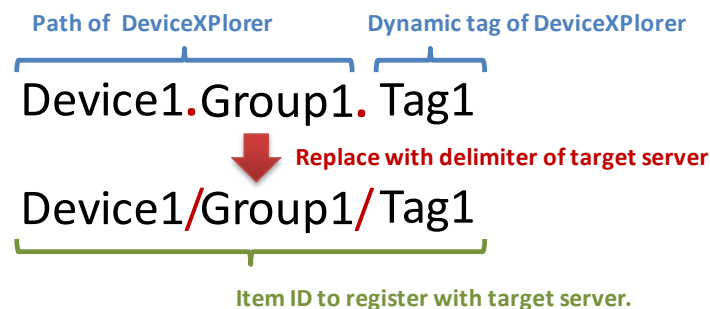
It is a method to recognize the whole path of item ID registered by an OPC client as item ID of the target server.

It is useful to let DeviceXPlorer completely map the path of the target server.

For example, when the item ID "Device1.Group1.Tag1" is registered and read by OPC Client, DeviceXPlorer accesses item ID "Device1.Group1.Tag1" to target server.

In addition, in DeviceXPlorer, you must define "Group1" to subordinates of "Device1" beforehand.

In addition, when a delimiter of a target server is different from one of DeviceXPlorer, it is useful to change it of DeviceXPlorer in "a delimiter of connection server" of device setting.



66.5 Errors

This section explains the major error which OPC server returns.

Please refer to the manual of the connection OPC server and OPC DA 2.05A custom interface specifications about the return code / error code of returned HRESULT from an OPC server included in error message.

Return Code / Error Code	value (HEX)	Description
S_OK	0x00000000	Function succeeded.
S_FALSE	0x00000001	Function succeeded, but a part of function failed.
OPC_S_UNSUPPORTEDRATE	0x0004000D	Demanded Update Rate is not supported. Update Rate is set in available near update rate.
OPC_S_CLAMP	0x0004000E	Succeeded in write function, but the value was rounded out.
E_FAIL	0x80004005	Function failed.
E_OUTOFMEMORY	0x8007000E	Memory is short.
OLE_E_NOCONNECTION	0x80040004	There is not connection.
CONNECT_E_NOCONNECTION	0x80040200	OPC client doesn't register Callback.
CONNECT_E_ADVISELIMIT	0x80040201	Exceeded the maximum number of Async demand.
OPC_E_INVALIDHANDLE	0xC0040001	Invalid handle.
OPC_E_BADRIGHTS	0xC0040006	Violation of Read / Write attribute of the item.
OPC_E_UNKNOWNITEMID	0xC0040007	There is not appointed item ID in the address space of the server.
OPC_E_INVALIDITEMID	0xC0040008	The grammar of item ID is inappropriate.
OPC_E_RANGE	0xC004000B	Value is out of range.
OPC_E_DUPLICATENAME	0xC004000C	The repetition of the name is not admitted.

67 OPC UA Client Connection

This chapter explains communication with other OPC Server using OPC Unified Architecture. An overview of communication via OPC OPC Unified Architecture interface is shown below

概要	
Protocol	OPC Unified Architecture
version	1.03
Function	OPC UA Data Access Client

67.1 Applicable OPC UA Server

The validated OPC UA servers are following.

Type	Applicable Models	
OPC UA Server	Vendor	Product
	TAKEBISHI	DeviceXPlorer OPC Server DeviceGateway FileArk FA Edition
	MITSUBISHI Electric	iQ-R series OPC UA Server Unit iQ-F series OPC UA Server Unit MELSOFT MX OPC Server
	OMRON	NJ/Nxseries controller
	Azbil	ePREXION Harmonas-DEO System
	Toshiba Infrastructure Systems	TOSHIBA OPC UA Server
	Yokogawa Electric	FAST/TOOLS UA Server for CENTUM
	Puerto	PUERTO UA Monitor
	AVEVA	InduSoft Web Studio
	Kepware	KEPServerEX
	Siemens	S7-1200/S7-1500 series controller RF600
	Softing	dataFEED OPC Suite
	Beckhoff	TwinCAT OPC UA Server

67.2 List of Items

The OPC UA Client items that can be set in DeviceXPlorer are as shown below.

Item	Variant	Remarks
Bool	VT_BOOL	Logical values
Byte	VT_I1	8-bit signed integers
UByte	VT_UI1	8-bit unsigned integers
Short	VT_I2	16-bit signed integers
UShort	VT_UI2	16-bit unsigned integers
Long	VT_I4	32-bit signed integers
ULong	VT_UI4	32-bit unsigned integers
Float	VT_R4	32-bit real number
LongLong	VT_I8	64-bit signed integers
ULongLong	VT_UI8	64-bit unsigned integers
Double	VT_R8	64-bit real number
String	VT_BSTR	Character string
Array of Bool	VT_ARRAY VT_BOOL	Array of Logical values
Array of Byte	VT_ARRAY VT_I1	Array of 8-bit signed integers
Array of UByte	VT_ARRAY VT_UI1	Array of 8-bit unsigned integers
Array of Short	VT_ARRAY VT_I2	Array of 16-bit signed integers
Array of UShort	VT_ARRAY VT_UI2	Array of 16-bit unsigned integers
Array of Long	VT_ARRAY VT_I4	Array of 32-bit signed integers
Array of ULong	VT_ARRAY VT_UI4	Array of 32-bit unsigned integers
Array of Float	VT_ARRAY VT_R4	Array of 32-bit real number
Array of LongLong	VT_ARRAY VT_I8	Array of 64-bit signed integers
Array of ULongLong	VT_ARRAY VT_UI8	Array of 64-bit unsigned integers
Array of Double	VT_ARRAY VT_R8	Array of 64-bit real number

Important

- You can register the non-array item only as a non-array tag. Also, you can register the array item only as an array tag likewise.
- OPC UA Client connection doesn't support the array of String type.
- Also, it supports items only the above list.

You cannot use “ ” for an item name.

67.3 DeviceXPlorer Settings

67.3.1 OPC UA Client Port Settings

This section explains how to make the settings for the OPC Server connection.

The screenshot shows the 'Port' tab of the OPC UA Client Port Settings dialog. The 'Endpoint URL' is set to 'opc.tcp://localhost:4840'. Under 'Security Setting', both 'Security Policy' and 'Security Mode' are set to 'None'. Under 'Authentication Method', 'Anonymous' is selected. The 'Ignore Certificate HostName Error' checkbox is unchecked. The 'Namespace URI' section contains a table with 5 rows (Index 0 to 4) and 'Get' and 'Clear' buttons. The 'Connection' section has 'Connect timeout' set to 3 seconds. The 'Timeout' is set to 3 seconds. The 'Retry count' is set to 0 times. A 'Certificate Settings' button is located at the bottom right.

Item		Description
Endpoint URL		Specify the endpoint of the connected OPCUA server.
Security Setting	SecurityPolicy	Set the connection security policy.
	SecurityMode	Set the connection security mode.
Authentication Method	Anonymous	Connect as anonymous user.
	User Name Password	Specify a user name and password to connect.
Ignore Certificate HostName Error		If ignore Certificate HostName Error, checked.
Namespace URI		Get Namespace URI of OPC server.
Connection	Connect timeout	Specify the waiting time until connecting to the OPC server. If connection can not be made within the set time, a connection timeout error will occur. It can be set in the range of 1 to 60.
Timeout		Specifies the wait time for sending a request message and for receiving a response message. If you can not respond within the set time, a timeout error will occur. It can be set in the range of 0 to 60.
Retry count		It can be set in the range of 0 to 10 times.
Certificate Settings		Set the certificate of OPC UA client.

< Certificate Settings >

OPC UA client settings

Trust list: C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\...

Deny list: C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\...

ISSUERS list: C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\...

Own certificate: C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\...

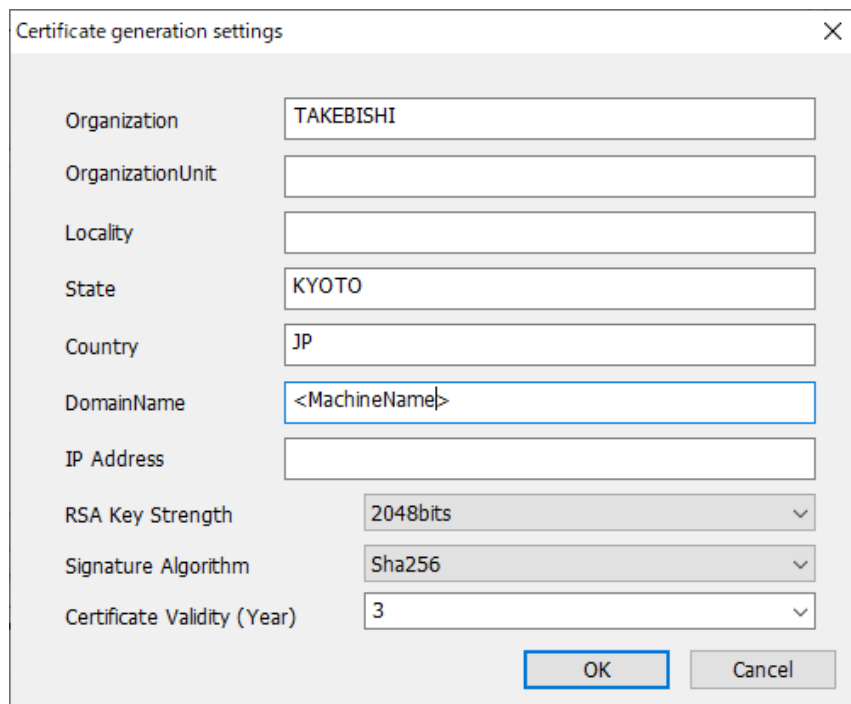
Own private key: C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\...

Certificate generation settings OK Cancel

Item	Default	Description
Trusted List* ¹	C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\6\pkiclient\trusted	Specify the directory where trusted certificates are stored.
Rejected List	C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\6\pkiclient\rejected	Specify the directory for storing rejected certificates. If you want to allow the connection, move it to the trusted directory.
ISSUERS List* ¹	C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\6\pkiclient\issuers\certs	Specify the directory for storing the certificate and revocation list file (CRL).
Own Certificate	C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\6\pkiclient\own\certs\DxpOpcUaClient.der	Specify own certificate path.
Own PrivateKey	C:\ProgramData\TAKEBISHI\DeviceXPlorer OPC Server\6\pkiclient\own\private\DxpOpcUaClient.pem	Specify own private key path.
Generate Certificate	-	Refer to <Generate Certificate>.

*1 Store the certificate file in certs under the specified folder and the revocation list in crl.

<Generate Certificate >



The dialog box titled "Certificate generation settings" contains the following fields and controls:

- Organization: TAKEBISHI
- OrganizationUnit: (empty)
- Locality: (empty)
- State: KYOTO
- Country: JP
- DomainName: <MachineName>
- IP Address: (empty)
- RSA Key Strength: 2048bits (dropdown)
- Signature Algorithm: Sha256 (dropdown)
- Certificate Validity (Year): 3 (dropdown)
- Buttons: OK, Cancel

Item	Description
Organization	Specify the organization.
OrganizationUnit	Specify the organization unit.
Locality	Specify the locality.
State	Specify the state.
Country	Specify the country.
DomainName	Specify the domain name.
IP Address	Specify the IP address.
RSA Key Strength	Select the RSA Key Strength.
Signature Algorithm	Select the Signature Algorithm.
Certificate Validity (Year)	Specify the Certificate Validity.

* A certificate is generated when a certificate does not exist when the client try to connect.

67.3.2 Device Settings

This section explains how to make the settings for the OPC Server. You register one OPC Group for one OPC Server which is set in Port Settings. You can register plural OPC Groups for one OPC server by assigning plural devices to one port.

Device properties

Connection Test

ACCESS METHOD

Read I/F: Synchronous Read

Write I/F: Synchronous Write

OPC GROUP

Update Rate: 500 msec

Max age: 0 msec

☒ Use raw quality when communication is good

☐ Browse and create tags on target server

Parent node of the item to generate

Namespace: 0 NodeType: Numeric

OPC Item ID: Browse

Read level of generated tags: 0

☒ Generate tags with unsupported data types

Data type after: SHORT

ACCESS POINTS

Tag R/W: 32767

Item Browse

OPC Item ID: Device1

Root

- Views
- Objects
- Server
- SYSTEM
- Device1
- Types

\$DeviceUpdateRate

\$Erase

\$EraseMax

\$EraseMin

\$EraseRate

\$ErrorCounts

\$PortName

\$PrimaryStatus

\$ReadRange

\$ReceivedCounts

\$SecondaryStatus

\$SendCounts

\$Simulate

\$SimulationType

\$SlowpollingMode

\$Standby

\$Status

\$WordRWRRange

\$WordWRRange

Tag

Tag1

Tag2

Tag3

Tag4

Tag5

Tag6

Tag7

Tag8

Tag9

OK Cancel

Item		Description
ACCESS METHOD	Read I/F	Select the method to read from the connected OPC server. Even when "data change notification" is selected or synchronous writing is selected for the write I / F, reading is actively performed in the first reading.
	Write I/F	Select the method to write to the connected OPC server.
OPC GROUP	Update Rate	Set the update cycle of the OPC group registered in the connection destination OPC server. It can be set in the range of 0 to 2147483647.
	Max age	Set the max age of reading. This can be set only when "synchronous read" is selected for the Read I / F.
	Use raw quality when communication is good	When reading from the connected OPC server is successful, if this setting is checked, the quality flag acquired from the OPC server will be set as the tag flag of the Device Explorer as it is. If not checked, set Good (0xC0).
Browse and create tags on target server		When you set check into this setting and store setting, it browses the tag of the connection ahead server and makes the tag in a one-shot automatically.
Parent node of the item to generate	Namespace	Specify the namespace of the parent node for which tags are to be generated in a batch.
	NodeType	Specify the node type of the parent node for which tags are to be generated in a batch.
	OPC Item ID	Specify the item ID of the parent node for which tags are to be generated in a batch.
	Browse	Browse the list of the item which the OPC server has.
Read level of generated tags		Specify the number of levels to browse to the target node when generating tags in a batch. If set to 0, all levels will be browsed.
Generate tags with unsupported data types		Import tags with unsupported data types when batch generating tags.

		Data type after conversion	Specify the data type to be set when importing tags of unsupported data types.
ACCESS POINTS		Tag R/W	Set the number of items that can be read and written in one access. If the number of access points exceeds this point, access is divided into multiple times. It can be set in the range of 1 to 32767.

67.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

The screenshot shows the 'Create project' dialog box with the 'Tag properties' tab selected. The 'Tag Name' is 'ITag' and the 'Namespace' is 'ns=0,ns=Item ID>WOR'. The 'Description' is empty. The 'Namespace' is '0' and the 'Nodetype' is 'Numeric'. The 'OPC Item ID' is '<item ID>' and the 'Item Information' is 'Unknown'. The 'Deadband' is '0' and the 'Data Type' is 'SHORT'. The 'Length' is '1'. The 'Byte Position' is '0' and the 'Bit Position' is '0'. The 'Attribute' is 'ReadOnly' and the 'Calculation' is 'NONE'. The 'Item Browse' window is open, showing a tree view of the OPC server structure. The 'OPC Item ID' is 'Device1.Tag1'. The tree view shows 'Root' with 'Views', 'Objects', 'Server', 'SYSTEM', and 'Device1'. 'Device1' has 'Types' and 'Tag1'. 'Tag1' is selected, showing a list of tags: '\$DeviceUpdateRate', '\$ElasticMax', '\$ElasticMin', '\$ElasticRate', '\$ErrorCounts', '\$PortName', '\$PrimaryStatus', '\$ReadRange', '\$ReceivedCounts', '\$SecondaryStatus', '\$SendCounts', '\$Simulate', '\$SimulationType', '\$SlowpollingMode', '\$Standby', '\$Status', '\$WordRWRange', '\$WordWRange', 'Tag', 'Tag1', 'Tag2', 'Tag3', 'Tag4', 'Tag5', 'Tag6', 'Tag7', 'Tag8', 'Tag9'.

Item	Description
Namespace	Set the connection destination OPC server namespace to associate with the tag.
Nodetype	Set the connection destination OPC server node type to be associated with the tag.
OPC Item ID	Please specify item ID in the connection OPC server to connect with a tag.
Item Information	The original type information of an item, [Type] / [Attribute] or [Array Type] / [Size] / [Attribute] is displayed. You can get the latest item information from the OPC Server by "Get Info".
Browse	Browse the list of the item which the OPC server has.
Get Info	Get the Node Information and reflect the settings.
Deadband	Specify the deadband for the tag.

67.4 Errors

This section explains the major error which OPC server returns.

Return Code / Error Code	value (HEX)	Description
S_OK	0x00000000	Function succeeded.
S_FALSE	0x00000001	Function succeeded, but a part of function failed.
OPC_S_UNSUPPORTEDRATE	0x0004000D	Demanded Update Rate is not supported. Update Rate is set in available near update rate.
OPC_S_CLAMP	0x0004000E	Succeeded in write function, but the value was rounded out.
E_FAIL	0x80004005	Function failed.
E_OUTOFMEMORY	0x8007000E	Memory is short.
OLE_E_NOCONNECTION	0x80040004	There is not connection.
CONNECT_E_NOCONNECTION	0x80040200	OPC client doesn't register Callback.
CONNECT_E_ADVISELIMIT	0x80040201	Exceeded the maximum number of Async demand.
OPC_E_INVALIDHANDLE	0xC0040001	Invalid handle.
OPC_E_BADRIGHTS	0xC0040006	Violation of Read / Write attribute of the item.
OPC_E_UNKNOWNITEMID	0xC0040007	There is not appointed item ID in the address space of the server.
OPC_E_INVALIDITEMID	0xC0040008	The grammar of item ID is inappropriate.
OPC_E_RANGE	0xC004000B	Value is out of range.
OPC_E_DUPLICATENAME	0xC004000C	The repetition of the name is not admitted.

68 DxpLink Client Connection

This chapter explains communication with DeviceXPlorer(Above Ver5.0) using DxpLink interface. An overview of communication via DxpLink interface is shown below.

Overview	
Protocol name	DxpLink
Protocol	HTTP1.1

68.1 DxpLink Systems

68.1.1 Applicable DxpLink Server

The DxpLink Server that can be used for DxpLink Client connection are shown below.

Category	Version	Note
DeviceXPlorer	Above Ver5.0	Enable the DxpLink Server function.

68.1.2 LINK TAG

DeviceXPlorer can access the static tags of another DeviceXPlorer and you need to enable “DxpLink” in the target device option.

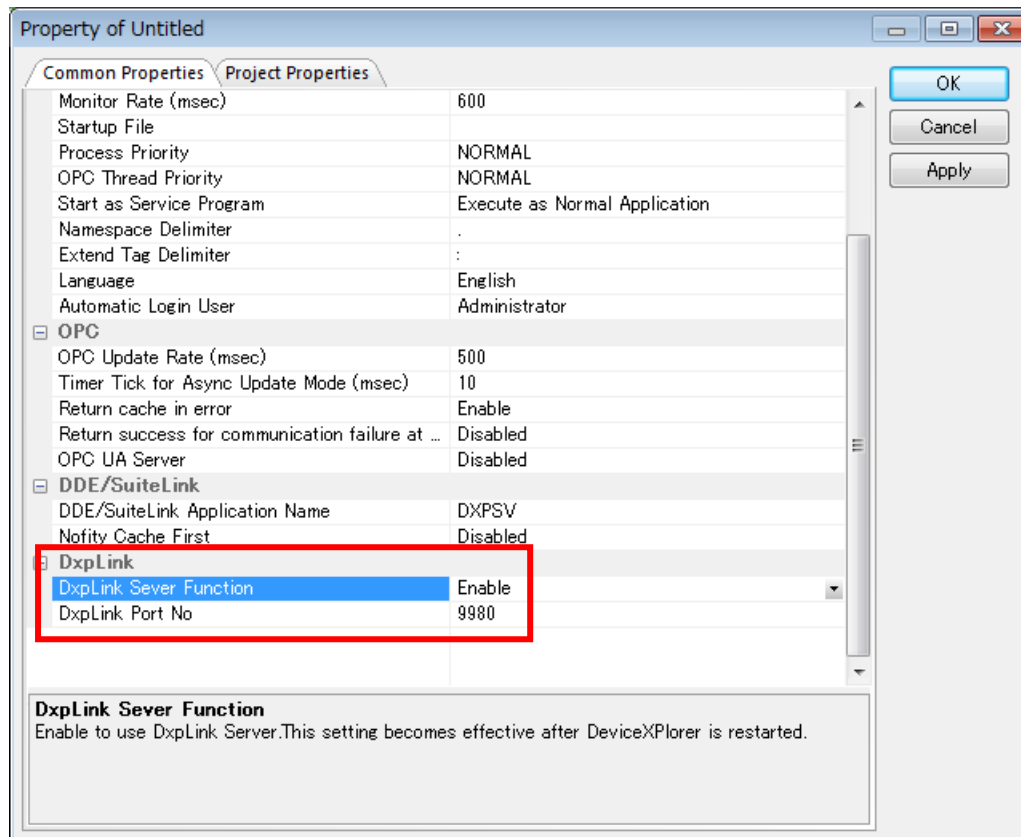
Note

- When accessing a dynamic tag from a client, access is achieved by a tag name .
Example: If target DeviceXPlorer has “Tag1”, “Tag2”, you specify LINK TAG as [target device name].Tag1,
[target device name].Tag2.
For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.
- DeviceXPlorer does not perform LINK TAG checks for requested tags, so attempts to access inappropriate field will result in errors. Check the LINK TAG configuration of target DxpLink Server.

68.2 Target DxpLink Server Settings

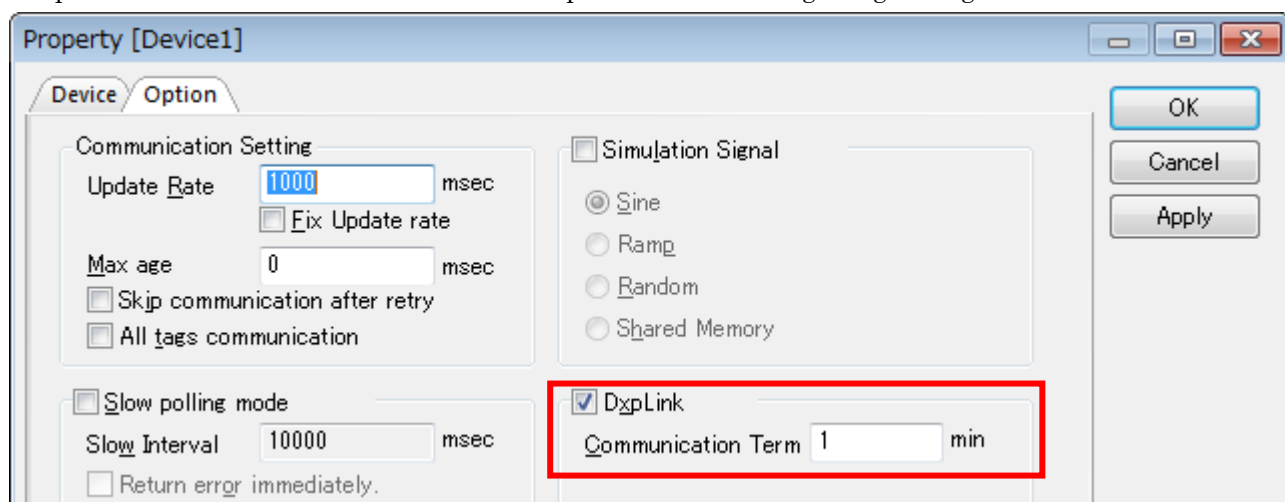
68.2.1 Common property

You need to be available "Server Function" in the common property. You can specify a Port No arbitrarily.



68.2.2 Device Option Settings

"DxpLink" needs to be effective at a Device Option which the target tag belongs.



68.3 DeviceXPlorer Settings

68.3.1 Port Settings

This section explains how to make the settings for the DxpLink Server connection.

Protocol	☒ HTTP
Server IP Address	127.0.0.1
Server Port No.	9980
Send Delay	0 msec
Timeout	3 sec
Retry count	3 times

Item	Description
Protocol	Fixed HTTP
Server IP Address	Specify IP address of the target DxpLink Server.
Server Port No.	Specify Port No address of the target DxpLink Server.
Send Delay	Specify the waiting time before sending the next command after a response is received from the other equipment on the millisecond time scale. Normaly set 0.
Timeout	Specify timeout to connect DxpLink Server.
Retry count	Specify retry count to connect DDE Server.

68.3.2 Device Settings

This is not configuration about section explains how to make the settings for the DxpLink Server connection.

Connection Test

Target

Target device

Device1

...

Protocol

LinkClient

☐ Import TAG information

ACCESS POINTS

TAG R/W

1024

Item	Description
Connection Test	It is verified whether it is connectable with the DxpLink server.
Target device	Specify target device. You can browse the list of the device which the target DxpLink server has. Device Browse LINK Device Device1[LinkClient] Device2[MelsecEthernet] SYSTEM[SystemDevice] OK Cancel

68.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [Tag:S]

GeneralScaleSimulationAlarm

Tag Name

Tag

Tag:S

☐ Auto Format

Description

LINK TAG(L)

Tag

Browse

Data Type

STRING

Byte Position

Lower Byte

Element nums

1

Bit Position

0

☐ Byte Swap

Attribute

ReadWrite

☐ Array

Calculation

NONE

New

Save

<<

>>

OK

Cancel

Item	Description
LINK TAG	Specify target tag name. You can browse the list of the tag which the target DxpLink server has. TAG Browse LINK TAG(L) Device2 \$BitRWRange \$BitWRange \$ConnectionTest \$DeviceUpdateRate \$Elapse \$ElapseMax \$ElapseMin \$ElapseRate \$ErrorCounts \$PortName \$PrimaryStatus \$ReadRange \$ReceivedCounts \$SecondaryStatus \$SendCounts \$Simulate OKCancel

68.4 Errors

Error message are listed below.

Error Message	value (HEX) Description
Send Error:Connection refused(0)	Please confirm whether the DxpLink exists.
Send Error:No address found: ***	Please confirm the IP Address of the target DxpLink Server.
Send Error:Timeout: connect timed out: ***	Timeout to connect.

69 DDE Client Connection

This chapter explains communication with DDE Server using DDE interface.

An overview of communication via DDE interface is shown below.

Overview	
Protocol	DDE
Note	DDEML API

69.1 DDE Systems

The products which has DDE server are connectable.

Important

- DDE Server and DDE Client cannot be used in Service Application. To use DDE, DeviceXPlorer should be normal application.
- NetDDE cannot be available.

69.2 Access Item

DeviceXPlorer can access the arbitrary DDE Item name.

For example, if you use EXCEL DDE Server function, You specify Item name as "R3C5" to access the 3rd row of 5 lines

Note

- When accessing a dynamic tag from a client, access is achieved by an Item name .
Example: "R1C1","R3C5" etc
For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.
- DeviceXPlorer does not perform Item name checks for requested tags, so attempts to access inappropriate field will result in errors. Check the Item configuration of target DDE Server.

69.3 DeviceXPlorer Settings

69.3.1 Port Settings

This section explains how to make the settings for the DDE Server connection.

Port properties

Application

<application name>

Topic

<topic name>

Timeout

3

sec

Item	Description
Application	Specify DDE Server name. In the case of EXCEL, it is specified as "Excel". Although the Application names are listed automatically, Please input manually in other case.
Topic	Specify DDE topic name. In the case of EXCEL, it is specified as "[Book1] Sheet1" etc. Although the topic names are listed automatically, Please input manually in other case.
Timeout	Specify timeout to connect DDE Server.

69.3.2 Device Settings

This is not configuration about section explains how to make the settings for the DDE Server connection.

Device properties

Connection Test

Item	Description
Connection Test	It is verified whether it is connectable with the DDE server which specified in the port.

69.3.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [<item name>:S]

General

Scale

Simulation

Alarm

Tag Name

Tag

RIC1:S

☐ Auto Format

Description

ItemName

RIC1

Data Type

STRING

Attribute

ReadWrite

Element nums

1

Calculation

NONE

☐ Array

New

Save

<<

>>

OK

Cancel

Item	Description
Item Name	Specify a DDE item name. Arbitrary characters can be specified.

Note

- A DDE item is normally treated as a character string type (STRING).

69.4 Errors

Error message are listed below.

Error code	Description
FFFFFFFF0	Fail to initialize DDE connection. Please check in the environment which DDE can use.
FFFFFFFF1	Failed to connect DDE Server. Please check Device Settings(Application or Topic).
FFFFFFFF2	Failed to read data. Please chek DDE Item name.
FFFFFFFF3	Failed to write data. Please check DDE Item name.
FFFFFFFF4	Failed to disconnect DDE Server.
4009	Failed to read data. Please chek DDE Item name.

70 ODBC Client Connection

This chapter explains communication with ODBC Database using ODBC Driver.

An overview of communication via ODBC Client connection is shown below.

Overview	
Link	ODBC
Data code	SQL

Important

ODBC Client Connection doesn't support Structure Tag.

About Structure Tag, please check Users Guide (Server Edition).

70.1 Supported ODBC database specifications

70.1.1 Applicable ODBC database

The ODBC Databases that can be used for ODBC connection are shown below.

ODBC Database	Applicable version	ODBC Driver
Microsoft SQL Server	Microsoft SQL Server 2012 Microsoft SQL Server 2008R2 Microsoft SQL Server 2008 Microsoft SQL Server 2005	SQL Server SQL Server Native Client
Microsoft Access	Microsoft Access 2010 Microsoft Access 2007 Microsoft Access 2003	Microsoft Access Driver
Oracle Database	Oracle Database 11g Oracle Database 10g	Oracle in OraClient11g_home1 Oracle in OraClient10g_home1
MySQL	MySQL 5.6	MySQL Connector/ODBC

70.1.2 List of using SQL

The list of SQL that can be used by DeviceXPlorer is shown below.

SQL	Usage timing
CREATE TABLE	Create table by Table Generator.
DROP TABLE	Delete table by Table Generator.
SELECT	The time for reading procedure.
UPDATE	The time for writing procedure, when writing mode is configured as [UPDATE] by device dialog.
INSERT	The time for writing procedure, when writing mode is configured as [INSERT] by device dialog.

70.1.3 Field

DeviceXPlorer can access the arbitrary fields.

If a tag is is array, this tag is read-only.

Note

- When accessing a dynamic tag from a client, access is achieved by a field name .

Example:

If one table has “Field1” and ”Field2”, please indicate Field1, Field2.

For further details on extended specification, refer to the instructions for extended tag name specification in the Server Edition.

- DeviceXPlorer does not perform field name checks for requested tags, so attempts to access inappropriate field will result in errors. Check the field configuration of target database.

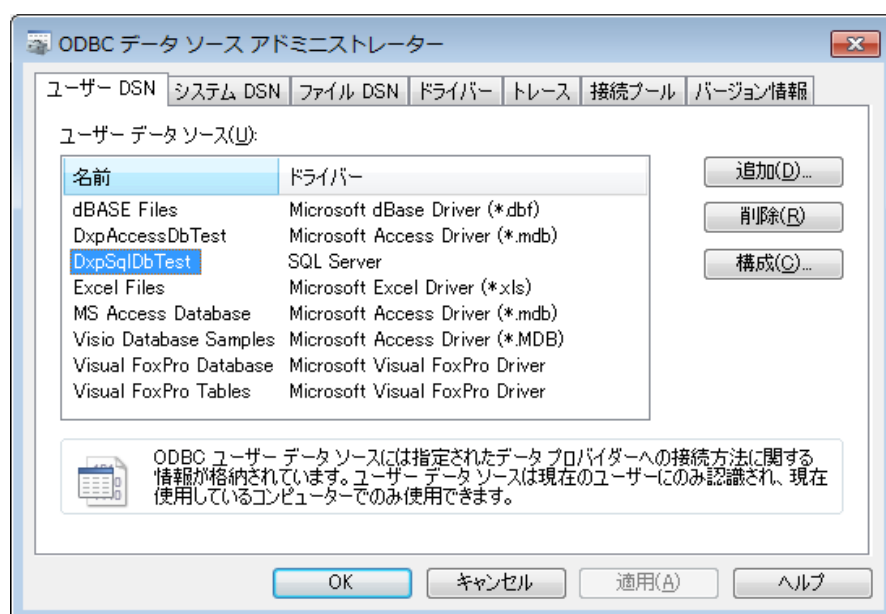
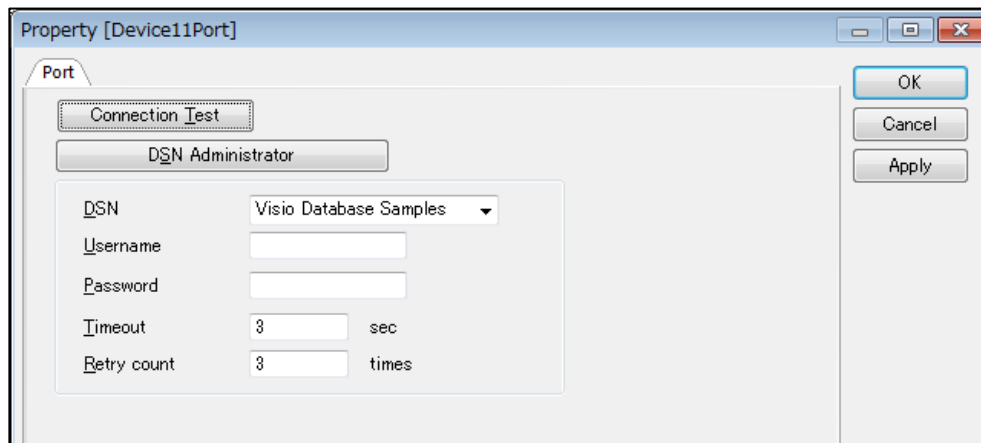
70.2 ODBC Driver Settings

70.2.1 ODBC Data Source Administrator

DeviceXPlorer accesses ODBC database by ODBC driver.

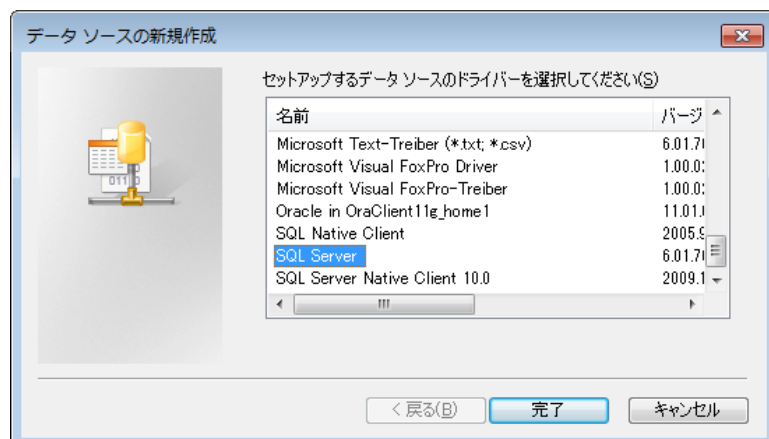
A setup of an ODBC driver is performed on the ODBC data source administrator.

You can call “DSN Administrator” button of device dialog.

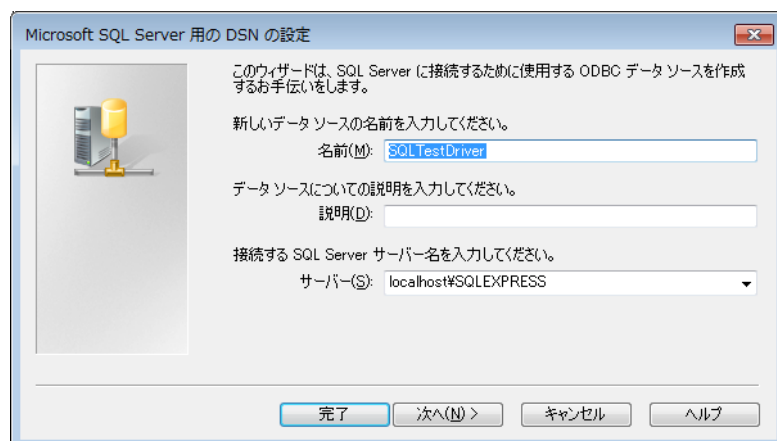


70.2.2 Microsoft SQL Server ODBC Driver Settings

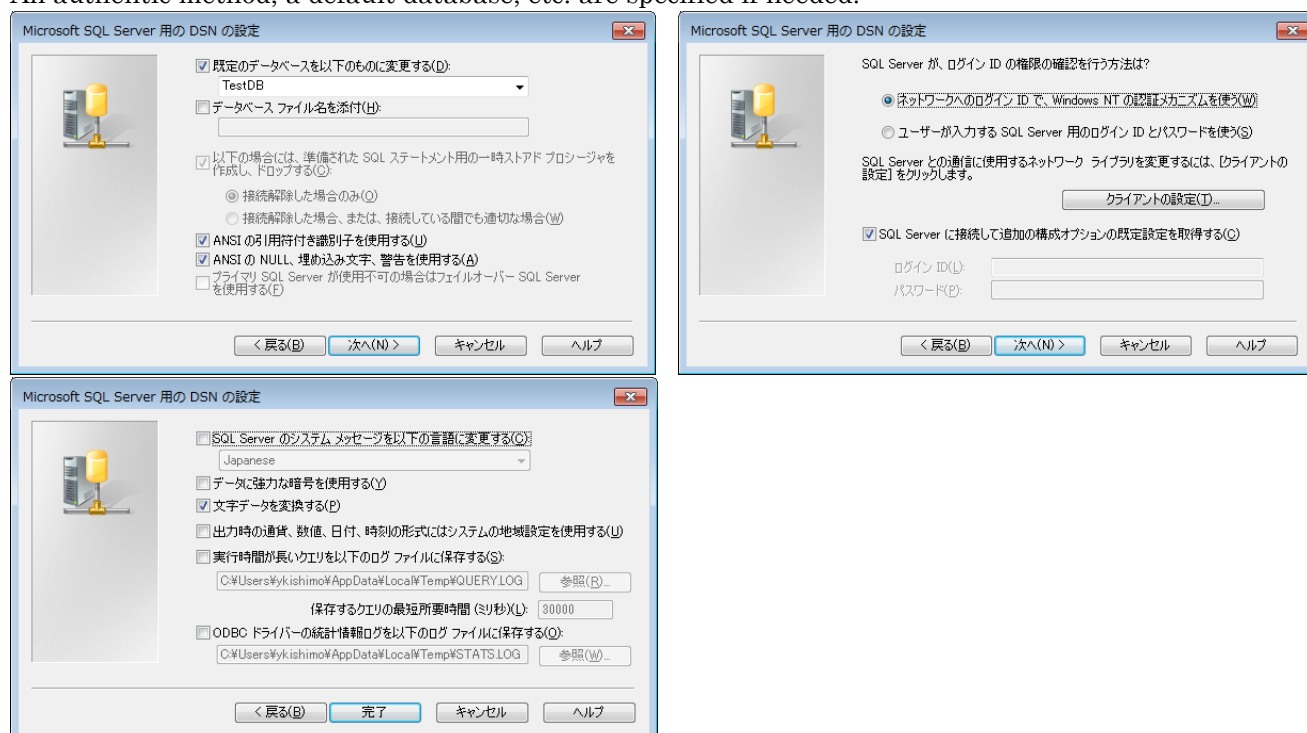
Please select “SQL Server” if you use Microsoft SQL Server.



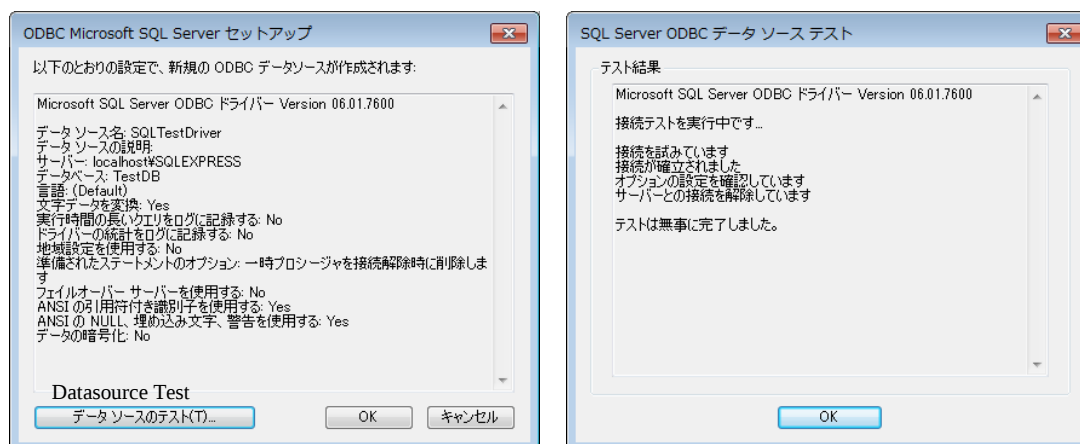
Indicate data source and server name.



An authentic method, a default database, etc. are specified if needed.



Confirm configuration .and Check access to the database by the deta source test.

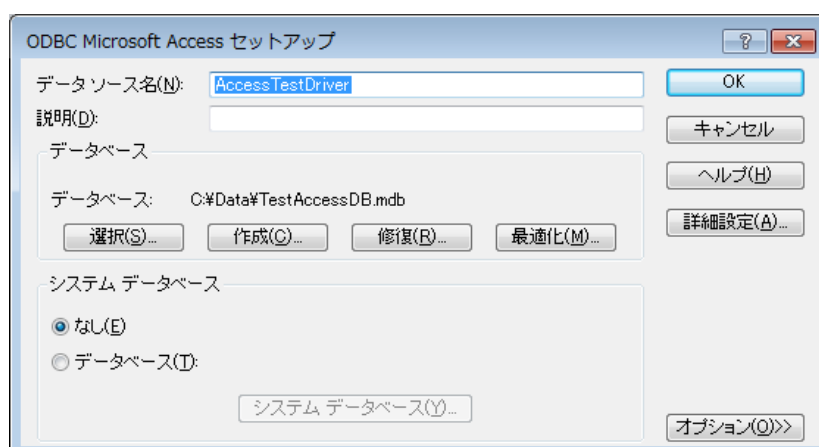


70.2.3 Microsoft Access ODBC Driver Settings

Please select “Microsfot Access Driver” if you use Microsoft Access.

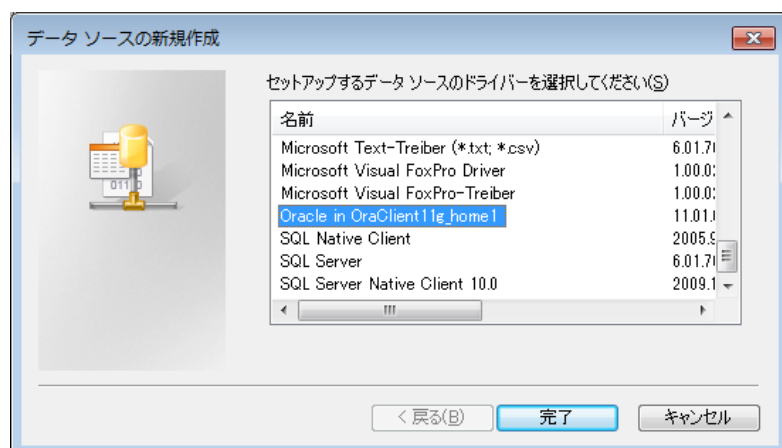


Input data source and database.

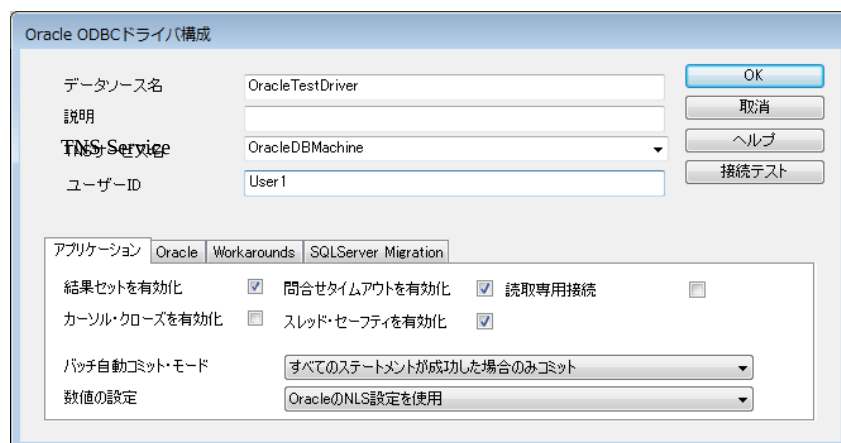


70.2.4 Oracle Database ODBC Driver Settings

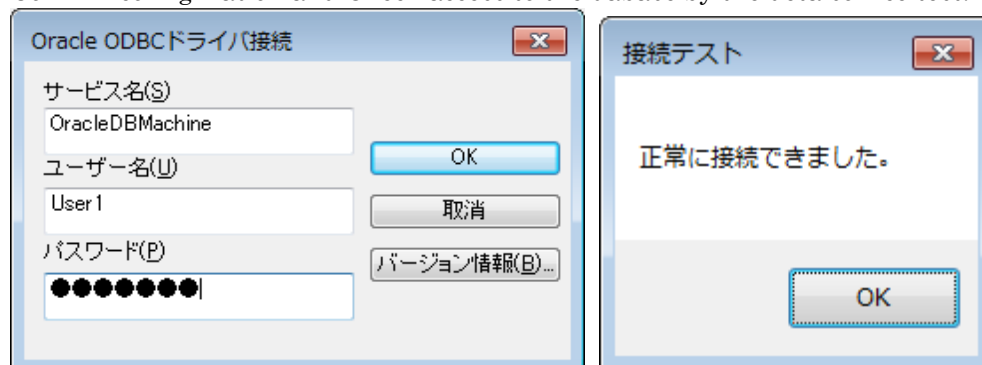
Please select “Oracle in OraClient11g_home1” if you use Oracle Database.



Input data source, TNS Service, and UserID.

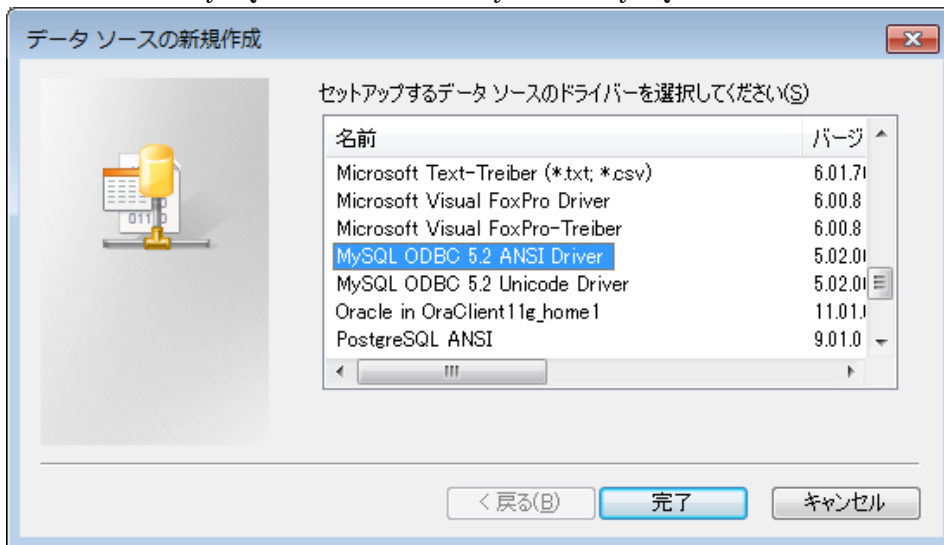


Confirm configuration and Check access to the database by the data source test.

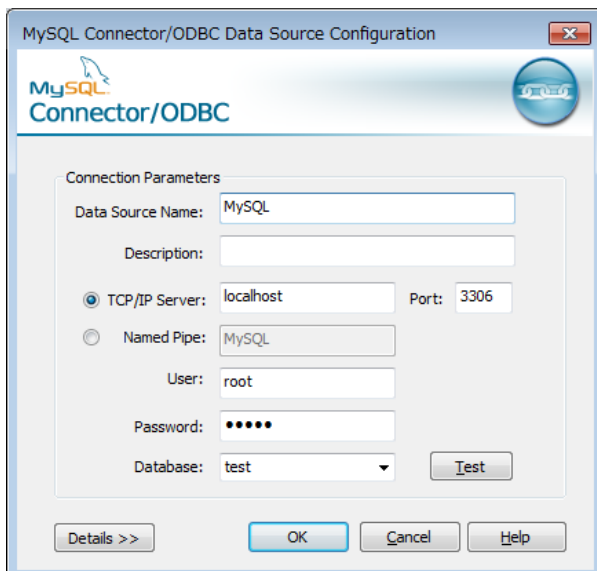


70.2.5 MySQL Database ODBC Driver Settings

Please select “MySQL ODBC Driver” if you use MySQL Database.

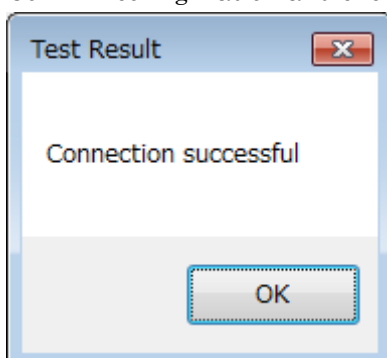


Input Data Source Name, TCP/IP Server, Port, User, Password, Database.



As necessary, please set [Details] settings.

Confirm configuration and check access to the database by the [Test] button.



70.3 DeviceXPlorer Settings

70.3.1 Port Settings

This section explains how to set the database configuration.

Item	Description
Connection Test	Tests the Ping command communication to Configured PLC IP address.
DSN Administrator	Shows the ODBC data source administrator.
DSN	Specify the data source name. The DSN list configured in the data source is displayed.
Username	Specify the username to connect the DSN.
Password	Specify the password to connect the DSN.
Timeout	Specify the timeout to connect to the DSN.
Retry Count	Specify the retry count to connect to the DSN.

70.3.2 Device Settings

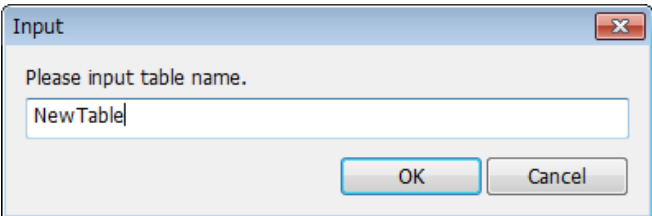
This section explains how to set the target table of database.

Item	Description
Connection Test	Check the connection to access the table.
Table name / View name	Specify Table name or View name. The table list and View list configured in the database are displayed.
SELECT option statement	Specify the condition sentence of SQL in the case of reading data from a table. When a value is taken out from a table, DeviceXPlorer execute following SQL statement. SELECT * FROM [Table name] [SELECT option statement] For example, To get the field value in ascending order :ORDER BY [field name] DESC To get the field value in special condition:WHERE [field name] = 123.
Write Type	Specify the Write Type. READ ONLY: Write-protected UPDATE: Execute “Update” statement when DeviceXPlorer write. INSERT:Execute “Insert” statement when DeviceXPlorer write.
UPDATE option statement	Specify the condition sentence of SQL in the case of reading data from a table, if you select “UPDATE” in Write Type.
Table Generator	The table generator is displayed.

70.3.2.1 Table Generator Settings

This dialog can delete or create the table.

No.	Field name	Data Type	KEY Se...	NULL
000	LogTimeStamp	datetime	☐	☒ Allow
001	OPC1_Tag	int	☐	☒ Allow
002	OPC1_Tag1	int	☐	☒ Allow
003	OPC1_Tag2	int	☐	☒ Allow
004	OPC1_Tag3	int	☐	☒ Allow
005	OPC1_Tag4	int	☐	☒ Allow
006	OPC1_Tag5	int	☐	☒ Allow
007	OPC1_Tag6	int	☐	☒ Allow
008	OPC1_Tag7	int	☐	☒ Allow
009	OPC1_Tag8	int	☐	☒ Allow
010	OPC1_Tag9	int	☐	☒ Allow

Item	Description
Table name	The table name under present operation is displayed.
Import Table Information	Get the Field list from the selected table, and displayed.
Create new table	Create new table by Field configuration. Input the table name, and DeviceXPlorer executes "CREATE TABLE". 
Add field	Add new field.
Remove field	Remove the selected field.
Delete table	Delete the selected table. Please pay attention to clBecause execute "DROP TABLE" Please be careful because the table is removed.
Field Configuration	A Field setup of a table is displayed.
No.	Field No
Field name	Specify the field name.
Data Type	Specify the field data type.
KEY Setting	Specify whether it is considered as primary key.
NULL	Specify whether the NULL character is permitted.

70.3.3 Group Settings

This section explains how to import field information from a table.

Item	Description
Import field information	Place a check and you can import the field information from table.
Array nums	Please specify the array number of the field to import.
Delete existing tags	If any tags exist in the hierarchy of the group, the existing tags are all removed and new tags are imported.

70.3.4 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Item	Description
Field name	Input the field name of target table. A browsing button is pushed, and you can select a field from target table..
Array	If Array is checked, you can input the Element nums.
Element nums	Specified the record nums to get from the table by the SELECT statement. It will become read-only if Array is checked.

70.4 ODBC Client original System Tag

The ODBC Client original System Tags are as shown below.

System Tag name	Data Type	Attribution	Name	Contents	Tag Type
\$SQLRequest_Req	BOOL	R/W	Request Command Request Flag	When you turns ON, DeviceXPlorer executes \$SQLRequest_Cmd.	Connection System Tag
\$SQLRequest_Comp	BOOL	R	Request Command Complete Flag	After Comanndis complete, DeviceXPlorer turns ON.	
\$SQLRequest_Cmd	STRING	R/W	Request Comannd	Stores a SELECT sql.	
\$SQLRequest_Return	LONG	R	Request Comannd Error code	After Comanndis complete, DeviceXPlorer stores result (0:Success)	
\$SQLRequest_Reply	STRING	R	Request Command Reply Result	After Comanndis complete, DeviceXPlorer stores return code of Command.	
\$SQLExecute_Req	BOOL	R/W	Execute Command Request Flag	When you turns ON, DeviceXPlorer executes \$SQLExecute_Cmd.	
\$SQLExecute_Comp	BOOL	R	Execute Command Complete Flag	After Comanndis complete, DeviceXPlorer turns ON.	
\$SQLExecute_Cmd	STRING	R/W	Execute Comannd	Stores a INSERT or UPDATE sql.	
\$SQLExecute_Return	LONG	R	Execute Comannd Error code	After Comanndis complete, DeviceXPlorer stores result (0:Success)	
\$SQLExecute_Reply	STRING	R	Execute Command Reply Result	After Comanndis complete, DeviceXPlorer stores return code of Command.	
\$SQLOption_Select	STRING	R/W	SELECT option	SELECT option statement of device dialog. You can change this tag.	Device Ssystem Tag
\$SQLOption_Update	STRING	R/W	UPDATE Option	UPDATE option statement of device dialog. You can change	

				this tag.	
\$SQLWrite_Method	LONG	R/W	Write Type	Specify the Write Type. 0:READ ONLY 1:UPDATE 2:INSERT	

70.5 Writing by “INSERT”

When you write to a DeviceXPlorer's tag by "INSERT" mode, DeviceXPlorer execute SQL of “INSERT”. If you write only one tag (one Field), One record which only one field is inputted will create in the database table. Other fields are filled with NULL.

If you'd like to insert many fields, please use batch write.

<Example>

Field1	Field2	Field3
1	a	a
2	b	i
3	c	u
4	d	e

If you write “5” to Field1, The Field 2-Field4 is INSERT(ed) with a null character as follows.

Field1	Field2	Field3
1	a	a
2	b	i
3	c	u
4	d	e
5	<NULL>	<NULL>

If you write “6” to Field1, “e” to Field2, and “o” to Field3 by batch write, the table as follows.

Field1	Field2	Field3
1	a	a
2	b	i
3	c	u
4	d	e
5	<NULL>	<NULL>
6	e	o

70.6 Errors

Normal error message that returned from ODBC Driver is shown. Please refer ODBC database manual about these error message.

Error message occurred by DeviceXPlorer are listed below.

Code	Description
10001	Read Command(“SELECT”) Error occurred.
10002	Write Command(“UPDATE” or “INSERT”) Error occurred.
10003	Request Command Error occurred. Please confirm Request Command.
10004	Error occurred during command execution by System Tag. Please confirm command.
10005	A command was requested during command execution by System Tag. Please request after the command is completed.
10099	The unsupported command was executed.

71 Water Standard PF Application I/F

71.1 Applicable Systems

The applicable system of Water Standard PF application I/F is shown below.

System	Version
Water CPS Application I/F	Water supply information utilization system Edition 1.1

71.1.1 Supported Functions

Here is a list of Water Standard PF application I/F used in DeviceXPlorer.

Functions	Description
Application Connect	Use for connection/disconnection with water standard PF.
Application Disconnect	
Master Data Reference	Use for reading measurement items definition.
Immediate Read	Use for reading current value of the measuring point linked to the tag.
Regular Cycle Monitoring	Use for cycle monitoring the measuring point data linked to the tag. (Historical data of measuring points subject to periodic monitoring is accumulated in the Standard PF.)
List ob periodic monitoring	
Stop Regular Cycle Monitoring	
Control Value Setting	Use for writing the value to the measuring point linked to the tag.
Document Registration Operation (Device)	It is used to refer to, register, and delete the historical data of measurering points accumulated in Water Standard PF in response to requests from applications with OPC UA Historical Client function.
Document update Operation (Device)	
Document Delete Operation	

71.2 DeviceXPlorer Settings

71.2.1 Port Settings

This section explains settings of Water Standard PF Application port.

Property [Device1Port]

Port

User information

Company ID: <CompanyID>

Worker ID: <WorkerID>

User ID: <UserID>

Password: ●●●●●●●●

Water platform connection information

Application ID: <ApplicationID>

Water standard PF host name: <Water CPS Host Name>

Auth server host name: <Auth Server Host Name>

Auth realm name: <Auth Realm>

Auth client ID: <Auth ClientID>

Auth secret: <Auth Client Secret>

Client certificate file: <Client Cert File Path>

Private key file: <Private Key File Path>

CA certificate file: <Root CA Cert File Path>

☐ Validate certification

☐ Use a proxy

Server address:

Port number: 443

☐ Use proxy authentication

Proxy username:

Proxy password:

Send receive timeout: 3 Sec

Control timeout: 3 Sec

Reconnection interval: 10 Sec

History Limit Points: 10000

Retry count: 3 Times

Processing timeout: 3 Sec

Reconnection retry count: 5 Times

OK Cancel Apply

Item		Description
User information	Company ID	Specify the entity ID
	Worker ID	Specify the worker's unique ID
	User ID	Specify the user ID
	Password	Specify the Password
Water platform connection information	Application ID	Specify the application ID
	Water standard PF host name	Specify the host name of the water standard PF connection destination.
	Auth server host name	Specify the host name of the authentication server.
	Auth realm name	Specify the authentication realm name.
	Auth client ID	Specify the authentication client ID.
	Auth secret	Specify the authentication secret.
	Client certificate file	Specify the client certificate file.
	Private key file	Specify the private key file.
	CA certificate file	Specify the CA certificate file.
	Validate certificate	Enable it if you want to validate certificate.
	Use a proxy	Enable if you use an HTTP proxy.
	Server address	Specify the proxy server address.
	Port number	Specify the proxy port number
	Use proxy authentication	Enable if you want to use proxy authentication.
	Proxy username	Specify the proxy user name.
	Proxy password	Specify the proxy password.
Send receive timeout		Specifies the HTTP communication timeout period.
Control timeout		Specify the time until the completion notification of the control value setting arrives.
Reconnection interval		Specifies the reconnection interval with the water standard PF
History Limit Points		Specifies the maximum number of historical value accesses.
Retry count		Set Retry count.
Processing timeout		Specifies the timeout period for WebSocket communication with the water standard platform.
Reconnection retry count		Specify the number of reconnection retries with the water standard PF.

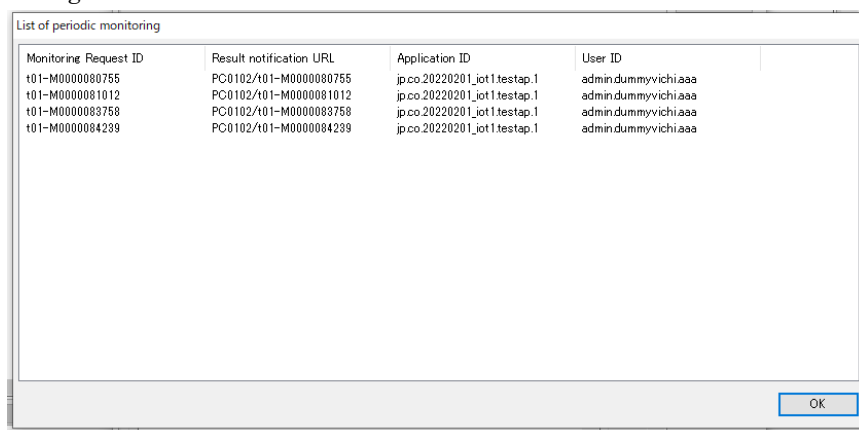
71.2.2 Device Settings

This section explains settings of Water Standard PF Application device.

Item		Description
ACCESS METHOD	Read method	Specify the Read method. Candidates: Immediate Read, Regular Cycle Monitoring
	Order type ID	Select Order type ID Candidates: I01(equipment instructions), I02(measured value indication)
	Monitoring interval	Specify the Monitoring interval (unit is second)
	Monitoring cycle unit	Specify the Monitoring cycle unit Candidates: Seconds, Minutes, Hours, On the minute, On the hour
	Equipment unit access	Enable when communicating on a device-by-equipment basis.
	List of periodic monitoring	Displays the regular cycle monitoring list screen.
	History Read Access Points	Specify the number of points to be read at one time when reading history value.
	History Write Access Points	Specify the number of points to be written at one time in the history value write.
Measurement point definition	Read measurement items definition	Get the measuring point definition.
	Measurement point definition	Display the acquired measuring point definition information.
	Automatic tag generation	Tags are automatically generated based on the information obtained by obtaining the measuring point definition.
	Delete existing tags	Delete all tags directly under the device before tag generation.

71.2.3 Regular Cycle Monitoring List Screen

Displays a list of request IDs registered in the waterworks standard PF. Click the OK button to close the dialog.



71.2.4 Tag Settings

This section explains settings of Water Standard PF Application Tag.

Property of Tag [<FacilityId>/<EquipmentId>/<MachineId>/V1000/<MeasurementNo>:DR:OR]

General Scale Simulation Alarm Historical

Tag Name

☐ Auto Format

Description

Facility ID

EquipmentID

Machine ID

MeasurementCD Measured value

Unit CD Unit

Measurement No

Data Type Attribute

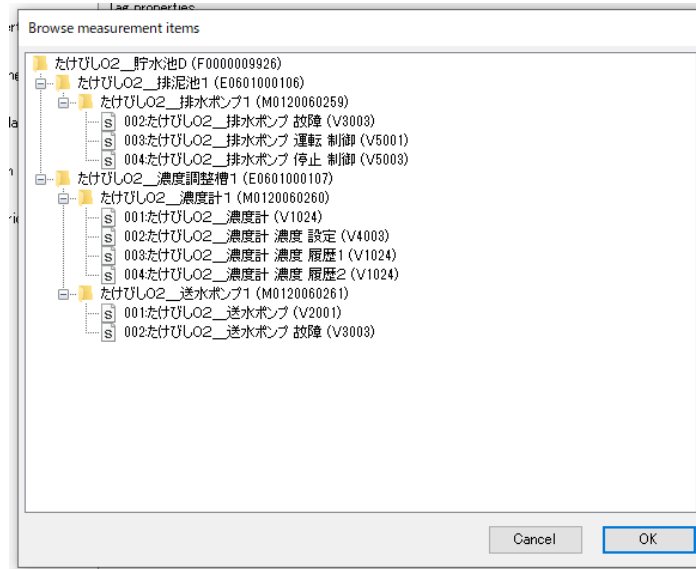
Calculation

Item	Description
Facility ID	Specify the Facility ID
EquipmentID	Specify the EquipmentID
Machine ID	Specify the Machine ID
Browse	Displays the measuring point browse screen.
Measurement CD	Specify the Measurement CD
Measurement value	Specify the Measurement value
Unit CD	Specify the Unit CD
Unit	Specify the Unit
Measurement No	Specify the Measurement No

71.2.5 Measurement Points Browse Screen

Displays facilities/equipment/devices/measuring points in a tree format based on the measuring point definitions in the device settings.

Select the measurement point and click the OK button to reflect the settings on the tag setting screen.



72 Shared Memory

This chapter explains communication with shared memory in DeviceXPlorer.

Overview	
Link	Memory-mapped-file Paging-file
File format	Binary

72.1 List of Devices

The shared memory devices that can be set in DeviceXPlorer are as shown below.

The address range varies with the CPU and parameter setting. For details, refer to your CPU instructions.

Device name	Device symbol	Format	Address range	Category
Internal Relay	GB	DEC	0 – 1048576 *1	Bit
Internal Register	GW	DEC	0 – 1048576 *1	Word

*1 It becomes an upper bound within the range of the address where the point secured by the port setting can be used.

72.2 DeviceXPlorer Settings

72.2.1 Port Settings

This section explains how to make the settings for the port of shared memory to be accessed.

Port properties

SHARE

Share Name

LATCH SETTINGS

☒ Latch to files

C:\Port1

CHARACTER CODE

☒ Multibyte ☐ Unicode

POINTS

	Points [K]	Status
GW	1	Unassigned
GB	1	Unassigned

Timeout sec

Retry count times

Item		Description
SHARE	Share Name	The shared name is set. When the shared name is changed, it is reconnected to the shared memory.
LATCH SETTINGS	Latch to files	The memory mapped file is made, and the value of the device is left for the file now. The paging file is made and the value is maintained temporarily now when the check is not put. In this case, the value is lost by the reconnection to the shared memory now.
CHARACTER CODE		Specify the character code for the memory mapped file.
POINTS	Points [K]	The secured point is set. When the point is changed, it is reconnected to the shared memory. It is possible to set it within the range in 1 to 1024 kilo point.
	Status	The state with the crack to the file is displayed. The point of the settlement with the crack is displayed to the file for the end with the crack.
Timeout		Specify the waiting time before receiving a responding message after sending a requiring message. A time-out error will occur if unable to get a response in that waiting time. The numbers from 0 to 60 can be specified.
Retry		Specify the number of retry when time-out error is occurred. The numbers from 0 to 10 can be specified.

Important

DeviceXPlorer is connected from point for which the port setting is made with the shared memory. When the change to the setting with the necessity of the reconnection is fixed, it is reconnected to the shared memory.

The value is lost by the reconnection to the shared memory by the file now at a non-latching setting.

Please put the check in the setting that does the latch to the file to prevent the value being lost now by the change in reactivation, the shared name of the application, and the secured number of devices.

72.2.2 Device Settings

This section explains how to make the settings for the device of shared memory to be accessed.

Connection Test

☒ Read Only

☒ Stop Tag's Quality Update

Item	Description
Read Only	The access of the shared memory to the register is set to read-only by the batch.
Stop Tag's Quality Update	When checked, the tag's quality flag is retained as "Waiting for Initial data" (20h) which is the initial state.

72.2.3 Tag Settings

This section explains how to set the tags managed by DeviceXPlorer.

Property of Tag [GW0]

General Scale Simulation Alarm

Tag Name Tag GW0

☐ Auto Format

Description

Device Type GW Internal Register

Device No. 0 Bit Position 0

Data Type SHORT Byte Position Lower Byte

Length 1 Attribute ReadWrite

☐ Byte Swap Calculation NONE

☐ Array

New Save << >> OK Cancel

Item	Description
Device Type	Specify the device to be accessed. Refer to the list in section 72.1 for devices that can be selected.
Device No.	Specify the device number in decimal notation.

72.3 Errors

The content of the error of a peculiar shared memory to the device Explorer included in the error messages are shown below.

Error Message	Code (HEX)	Content
OK	0x00000000	Succeed the process.
Contains Error	0x00000001	Succeed the process but a part of the process is failed.
Already Opened	0x00001001	Succeed to open. (Already opened)
Opened exist small size	0x00001003	Succeed open but it is fewer than the demanded point.
Error	0x80004005	Failed the process.
Open is not exist	0x80001104	Failed the process because port was not opened.
Open Error	0x80001105	Failed to open.
Invalid Item	0x80002101	The device of item is invalid.
Item Address Range Over	0x80002102	The range of the device address that can be used is exceeded.
Mutex is not created	0x80002105	Mutex was not made, and it failed in the exclusive operation.
Mutex Timeout	0x80002106	The time-out was generated in the exclusive operation.
Skipped Access because of Mutex	0x80002107	The access was skipped because it had failed in the exclusive operation.
Memory Mapping View Error	0x80011001	It failed in the mapping of the shared memory.
Invalid File Header	0x80011002	The file of the shared memory is improper.

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