

TECHNICAL BULLETIN

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FA-A-0401-A

Differences Between MELSEC iQ-R EtherNet/IP Network Interface Modules and MELSEC iQ-R CC-Link IE TSN Plus Master/Local Modules

■Date of Issue

April 2023

■Relevant Models

RJ71EIP91, RJ71GN11-EIP

Thank you for your continued support of Mitsubishi Electric programmable controllers.

We have just released the CC-Link IE TSN Plus master/local module that supports two networks, CC-Link IE TSN and EtherNet/IP.

This technical bulletin describes the differences between the EtherNet/IP network interface modules and the CC-Link IE TSN Plus master/local modules.

1 RELEVANT MODELS

Product	Model
EtherNet/IP Network interface module	RJ71EIP91
CC-Link IE TSN Plus master/local module	RJ71GN11-EIP

Before using those models, read the manuals to confirm the functions, specifications, setting method, and how to use. (Figure 14 RELEVANT MANUALS)

2 COMPARISON OF SPECIFICATIONS

2.1 Current Consumption

The following shows the difference in current consumption between the RJ71EIP91 and the RJ71GN11-EIP.

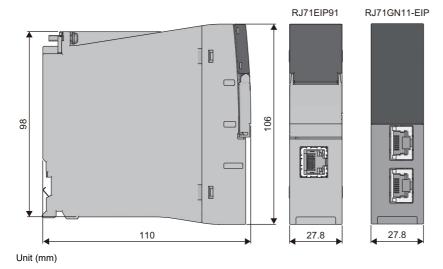
RJ71EIP91	RJ71GN11-EIP
1.09A	1.54A

2.2 External Dimensions

There is no difference in external dimensions between the RJ71EIP91 and the RJ71GN11-EIP.

RJ71EIP91			RJ71GN11-EIP			
Depth Width Height ^{*1}			Depth	Width Height ^{*1}		
110mm	27.8mm	106 (98)mm	110mm	27.8mm	106 (98)mm	

^{*1} The value in parentheses indicates the height of the base unit mounting side.



2.3 Weight

The following shows the difference in weight between the RJ71EIP91 and the RJ71GN11-EIP.

RJ71EIP91	RJ71GN11-EIP
0.24kg	0.26kg

2.4 Communication Specifications

This section describes the differences in communication specifications between the RJ71EIP91 and the RJ71GN11-EIP.

○: Supported, ×: Not supported

Network	Item	Description	RJ71EIP91	RJ71GN11-EIP
EtherNet/IP	Class1 communications	Instance communications	○*1	0
	(Cyclic transmission)	Tag communications	0	0
		Data size of all connections	64K bytes	361K bytes
		RPI (communication cycle)	0.5ms to 60000ms	0.5ms to 60000ms
		PPS (communication processing performance)*2	12000PPS	12000PPS
	Class3 communications (Message	Instance communications (only for the server)	0	0
	communications)	Tag communications	×	0
	UCMM communications	Instance communications	0	0
	(Message communications)	Tag communications	×	0

^{*1} Only the originator is supported.

For other communication specifications, refer to the manuals of each module. (Page 14 RELEVANT MANUALS)

^{*2} Use the model so that the total number of transmitting packets and receiving packets is 12000PPS or less.

When the RJ71EIP91 is an originator

The following table lists the application types that can be used when the RJ71EIP91 is an originator.

O: Requests from the EtherNet/IP device can be accepted, ×: Requests from the EtherNet/IP device cannot be accepted

Communication	Connection settings								
method	Application type	Trigger t	Trigger type			Input type (T → O)		Output type (O → T)	
		Cyclic	Application Trigger	Change of State	Fixed	Variable	Fixed	Variable	
Class1 communications	Exclusive Owner	0	0	0	0	0	0	0	
(instance communications)	Input Only	0	0	0	0	0	0	0	
communications)	Listen Only	0	0	0	0	0	0	0	
	Redundant Owner	×	×	×	×	×	×	×	
Class1 communications (Tag communications)	Input Only	0	0	0	0	0	0	0	

When the RJ71GN11-EIP is an originator

The following table lists the application types that can be used when the RJ71GN11-EIP is an originator.

O: Requests from the EtherNet/IP device can be accepted, ×: Requests from the EtherNet/IP device cannot be accepted, —: No combination

Communication	Connection settings								
method	Application type	Trigger t	Trigger type			Input type (T → O)		Output type (O \rightarrow T)	
		Cyclic	Application Trigger	Change of State	Fixed	Variable	Fixed	Variable	
Class1 communications	Exclusive Owner	0	×	0	0	0	0	0	
(instance communications)	Input Only	0	×	0	0	0	0	*1	
communications)	Listen Only	0	×	0	0	0	0	*1	
	Redundant Owner	×	×	×	×	×	×	×	
Class1 communications (Tag communications)	Input Only	0	×	0	0	0	0	*1	

^{*1} Heartbeat (packet for checking the communication status) that is used for the output type (O → T) of Input Only and Listen Only is 0 bytes, so Fixed must be selected.



Application Trigger is not supported by the RJ71GN11-EIP, however, Change of State can be used as an alternative.

When the RJ71EIP91 is a target

The following table lists the application types that can be used when the RJ71EIP91 is a target.

O: Requests from the EtherNet/IP device can be accepted, X: Requests from the EtherNet/IP device cannot be accepted

Communication	Connection settings								
method	Application type	Trigger t	Trigger type			Input type (T → O)		Output type (O → T)	
		Cyclic	Application Trigger	Change of State	Fixed	Variable	Fixed	Variable	
Class1 communications	Exclusive Owner	×	×	×	×	×	×	×	
(instance communications)	Input Only	×	×	×	×	×	×	×	
communications)	Listen Only	×	×	×	×	×	×	×	
	Redundant Owner	×	×	×	×	×	×	×	
Class1 communications (Tag communications)	Input Only	0	0	0	0	×	0	×	

When the RJ71GN11-EIP is a target

The following table lists the application types that can be used when the RJ71GN11-EIP is a target.

O: Requests from the EtherNet/IP device can be accepted, ×: Requests from the EtherNet/IP device cannot be accepted, —: No combination

Communication	Connection settings									
method	Application type	Trigger t	Trigger type			Input type (T → O)		Output type (O → T)		
		Cyclic	Application Trigger	Change of State	Fixed	Variable	Fixed	Variable		
Class1 communications	Exclusive Owner	×	×	×	×	×	×	×		
(instance	Input Only	0	×	O*1	0	×	0	*2		
communications)	Listen Only	×	×	×	×	×	×	*2		
	Redundant Owner	×	×	×	×	×	×	×		
Class1 communications (Tag communications)	Input Only	0	×	O*1	0	×	0	*2		

^{*1} When the RJ71GN11-EIP is a target and Change of State is used, the EDS file Ver.1.2 should be used. The EDS file Ver.1.2 is included in the EtherNet/IP Configuration Tool (1.03D).

^{*2} Heartbeat (packet for checking the communication status) that is used for the output type (O → T) of Input Only and Listen Only is 0 bytes, so Fixed must be selected.



Application Trigger is not supported by the RJ71GN11-EIP, however, Change of State can be used as an alternative.

2.5 Differences In Functions

For more details, refer to the manuals of each module. (Page 14 RELEVANT MANUALS)

For the differences in communication specifications between the RJ71EIP91 and the RJ71GN11-EIP, refer to Page 3 Communication Specifications.

Differences between the RJ71EIP91 and the RJ71GN11-EIP (P1)

○: Supported, ×: Not supported

Item	Functions	Description	RJ71EIP91	RJ71GN11-EIP (P1: CC-Link IE TSN)
Ethernet connection	Connection with MELSOFT products	Programming and monitoring the programmable controller are performed from the engineering tool via Ethernet. Monitoring and testing the programmable controller are performed from the GOT via Ethernet.	×	0
	Connection with SLMP- compatible devices	Connects SLMP-compatible devices (such as a personal computer or a vision sensor) to the CC-Link IE TSN Plus module.	×	0
	Socket communications	Using dedicated instructions, arbitrary data can be exchanged with an external device connected by Ethernet over TCP/IP or UDP/IP.	×	0
Security	IP filter	Identifies the IP address of the access source, and prevents unauthorized access.	×	0
	Remote password	Permits or prohibits access from the external device to the CPU module via the CC-Link IE TSN Plus module.	×	0

Differences between the RJ71EIP91 and the RJ71GN11-EIP (P2)

 \bigcirc : Supported, \times : Not supported

Item	Functions	Description	RJ71EIP91	RJ71GN11-EIP (P2: EtherNet/IP)
EtherNet/IP communications	Cyclic transmission stop and restart	Stop or restart of cyclic transmission is enabled individually for each connection by using buffer memory areas.	×	0
	Communication status setting function at the occurrence of a CPU stop error	Sets whether to stop or continue EtherNet/IP communications when RUN state is changed to STOP state or a stop error occurs on a CPU module on which the CC-Link IE TSN Plus module is mounted.	0	0
	EtherNet/IP communication automatic start function	With this function, EtherNet/IP communications can be started without any program when the programmable controller is powered off and on.	×	0
	Auto refresh	Data is automatically transferred to the device of the CPU module without programs.	×	0
Ethernet connection	Connection with SLMP- compatible devices	Connects SLMP-compatible devices (such as a personal computer or a vision sensor) to the CC-Link IE TSN Plus module.	×	0
	Socket communications	Using dedicated instructions, arbitrary data can be exchanged with an external device connected by Ethernet over TCP/IP or UDP/IP.	×	0
Security	IP filter	Identifies the IP address of the access source, and prevents unauthorized access.	×	0
	Remote password	Permits or prohibits access from the external device to the CPU module via the CC-Link IE TSN Plus module.	×	0
RAS	IP address duplication detection	If one network has stations with the same IP address, duplication is detected.	×	0

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Differences in EtherNet/IP functions of the engineering tool

The following table lists the differences in EtherNet/IP functions of the engineering tool.

○: Supported, ×: Not supported

Item	Functions	Description	RJ71EIP91	RJ71GN11-EIP
Module setting	Module setting using GX Works3	By using GX Works3, settings including the station number and IP address of the module are configured.	0	0
	EtherNet/IP communication setting	By using GX Works3, settings related to EtherNet/IP communications are configured.	○*1	0
Network detection	Network detection	EtherNet/IP devices on the network are detected and EtherNet/IP communication settings are configured online.	O*1	O*2
Parameter write	Writing to the CPU module	The parameters set in GX Works3 are written to the CPU module.	0	0
	Writing to a network module	The EtherNet/IP communication settings are written to the network module.	○*1	○*3
Troubleshooting	Diagnostics using buffer memory	By using GX Works3, the EtherNet/IP network status is checked on buffer memory areas.	0	0
	Network diagnostics	By using the EtherNet/IP configuration tool, the connection status of EtherNet/IP devices can be checked.	O*1	O*4

^{*1} To configure settings, start the EtherNet/IP Configuration Tool by using GX Works3.

^{*2} To use the function, the RJ71GN11-EIP with the firmware version "04" or later and the EtherNet/IP configuration tool version 1.03D or later should be required.

^{*3} These settings are written to the network module all at once when they are written to the CPU module.

^{*4} It is checked by using the intelligent function module monitor of GX Works3 version 1.090U or later.

2.6 Differences in Processing Time

The following table lists the difference of processing time between the RJ71EIP91 and the RJ71GN11-EIP. For more details, refer to the manuals of each module. (Page 14 RELEVANT MANUALS)

Model	Calculation value	Calculation formula (unit: ms)
RJ71EIP91	Normal value	0.573 + (Sequence scan ÷ 2) + Module processing time *1 + (RPI ÷ 2)
	Maximum value	0.725 + Sequence scan time + Module processing time*1 + RPI
RJ71GN11-EIP	Normal value	0.573 + (Sequence scan \div 2) + Module processing time *1 + (RPI \div 2)
	Maximum value	0.725 + Sequence scan time + Module processing time*1 + RPI

^{*1} The module processing time of the RJ71EIP91 and the RJ71GN11-EIP is calculated as follows. Module processing time [ms] = $0.0001 \times \text{Total}$ data size [byte] + $0.007 \times \text{Number}$ of connections



When the RJ71GN11-EIP with the firmware version "02" or earlier is used, the performance value and module processing time are calculated as follows.

- Normal value: 0.573 + (Sequence scan ÷ 2) + Module processing time + RPI
- Maximum value: 0.725 + Sequence scan time + Module processing time + (RPI \times 1.5) Module processing time [ms] = $0.0006 \times$ Total data size [byte] + $0.007 \times$ Number of connections

2.7 Differences in FBs

The following table lists the differences in FBs between the RJ71EIP91 and the RJ71GN11-EIP. For more details, refer to the manuals of each module. (Page 14 RELEVANT MANUALS)

○: Supported, ×: Not supported

FB name	Overview	RJ71EIP91	RJ71GN11-EIP
M+Model_Class1GetInputData	Acquires the input data of the specified connection number by using Class1 communications.	0	O*1
M+Model_Class1SetOutputData	Sets the output data of the specified connection number by using Class1 communications.	0	O*1
M+Model_UCMMOriginator_ReadTagData	Acquires data from the tag of the specified external device by using UCMM tag communications.	×	0
M+Model_UCMMOriginator_WriteTagData	Sets data to the tag of the specified external device by using UCMM tag communications.	×	0
M+Model_Class3Originator_ReadTagData	Acquires data from the tag of the specified external device by using Class3 tag communications.	×	0
M+Model_Class3Originator_WriteTagData	Sets data to the tag of the specified external device by using Class3 tag communications.	×	0
M+Model_UCMMOriginator_MessageSend	Sends a message to the specified external device by using UCMM message communications.	×	0
M+Model_Class3Originator_MessageSend	Sends a message to the specified external device by using Class3 message communications.	×	0

^{*1} There is no functional difference in the processing executed in each FB. In FBs of the RJ71GN11-EIP, however, output data related to connection communication errors tends to increase.

3 DIFFERENCES IN SOFTWARE

Item	RJ71EIP91	RJ71GN11-EIP
Supported version of GX Works3	1.065T or later	1.082L or later*1
EtherNet/IP setting	EtherNet/IP Configuration Tool for RJ71EIP91	EtherNet/IP configuration tool*2

- *1 Available versions differ depending on the firmware version of the module used. For the latest combination of the module firmware version and the EtherNet/IP configuration tool version, refer to the following.
 - MELSEC iQ-R CC-Link IE TSN Plus Master/Local Module User's Manual (SH-082472ENG)
- *2 The EtherNet/IP configuration tool is included in GX Works3 version 1.090U or later and is automatically installed. When the version of GX Works3 used is earlier than 1.090U, the EtherNet/IP configuration tool should be installed. For how to install the EtherNet/IP configuration tool, refer to the following.
 - EtherNet/IP Configuration Tool Installation Instructions (BCN-P5999-1530)

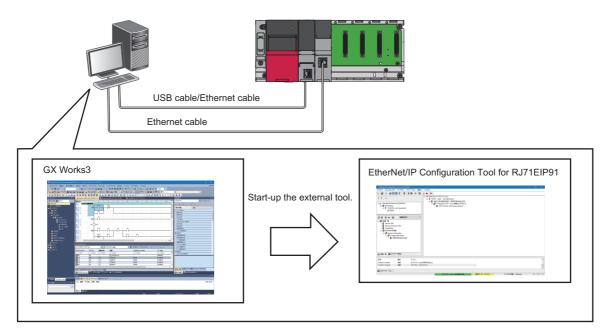
3.1 Parameter Setting Method

The parameter setting method differs between the RJ71EIP91 and the RJ71GN11-EIP.

Set module	Module parameters	Parameters for the EIP communications
RJ71EIP91	 Use GX Works3. The parameters are written directly to the CPU module.*1 	Use the EtherNet/IP Configuration Tool for RJ71EIP91. The parameters are written to the RJ71EIP91 via network.
RJ71GN11-EIP	Use GX Works3. The parameters are written directly to the CPU module.*1	Use the EtherNet/IP configuration tool. The parameters are written directly to the CPU module.*1

^{*1} The parameters are written by connecting an Ethernet cable or USB cable to the CPU module.

Parameter setting method for the RJ71EIP91



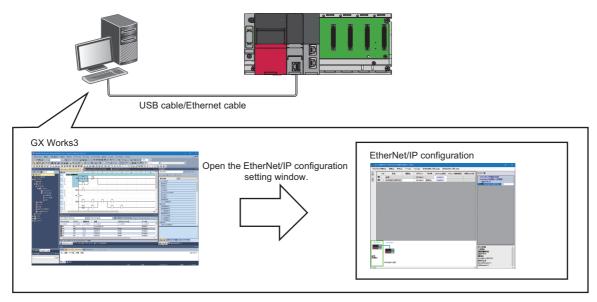
Parameters that are written directly to the CPU module by using GX Works3 $\,$

- IP address setting
- Refresh setting (ladder diagram setting)
- EtherNet/IP communication start request

Parameters that are written to the RJ71EIP91 by using the EtherNet/IP Configuration Tool for RJ71EIP91 via network

- · Originator setting
- · Target setting

Parameter setting method for the RJ71GN11-EIP



Parameters that are written directly to the CPU module by using GX Works3

- IP address setting
- Refresh setting (ladder diagram setting)
- EtherNet/IP communication start request
- Originator setting*1
- Target setting*1
- *1 Setting is performed by using the EtherNet/IP configuration tool.

4 DIFFERENCES IN ASSIGNMENT

Assignment differs between the RJ71EIP91 and the RJ71GN11-EIP.

4.1 I/O Signals

This section describes the I/O signal assignment when the start I/O number is 0.

The I/O signals should be set manually.

Differences in input signals (when the start I/O number is 0)

Device	RJ71EIP91		RJ71GN11-EIP		
No.	Signal name	Label name	Signal name	Label name	Usage
X00	Module Ready	bSts_ModuleReady	Module failure	bln_ModuleFailure	Common for modules
X01	Use prohibited	(Reserved)	Own Data Link	bln_DataLink	For the CC-Link IE TSN
X02	Use prohibited	(Reserved)	Use prohibited	(Reserved)	_
X03	Use prohibited	(Reserved)	Other Data Link (use prohibited in a local station)	bln_NotDataLink_Other	For the CC-Link IE TSN
X04 to X0D	Use prohibited	(Reserved)	Use prohibited	(Reserved)	_
X0E	Use prohibited	(Reserved)	Module Error	bln_ModuleError	Common for modules
X0F	Module Error	bSts_ModuleError	Module Ready	bln_ModuleReady	Common for modules
X10	EtherNet/IP communication in process	bSts_CommunicationDuring Setup	EtherNet/IP communication in process	bSts_CommunicationDuring Startup	For the EtherNet/IP
X11	Use prohibited	(Reserved)	Use prohibited	(Reserved)	_
X12	PING test completion	bSts_PingTestComplete	PING test completion	bSts_PingTestComplete	For the EtherNet/IP
X13	Use prohibited	(Reserved)	Use prohibited	(Reserved)	
X14	Connection information read completion	bSts_ConnectionInfoRead Complete	Use prohibited	(Reserved)	For the EtherNet/IP
X15	Connection information read error	bSts_ConnectionInfoRead Error	Use prohibited	(Reserved)	For the EtherNet/IP
X16 to X1E	Use prohibited	(Reserved)	Use prohibited	(Reserved)	_
X1F	Communication Ready	bSts_CommunicationReady	Communication Ready	bSts_CommunicationReady	For the EtherNet/IP

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Differences in output signals (when the start I/O number is 0)

Device	Device RJ71EIP91		RJ71GN11-EIP		
No.	Signal name	Label name	Signal name	Label name	Usage
Y00 to Y0D	Use prohibited	(Reserved)	Use prohibited	(Reserved)	_
Y0E	Use prohibited	(Reserved)	Module error clear request	bOut_ModuleErrorClear Request	Common for modules
Y0F	Module error clear request	bSet_ModuleErrorClear Request	Use prohibited	(Reserved)	_
Y10	EtherNet/IP communication start request	bSet_CommunicationStartup Request	Use prohibited	(Reserved)	_
Y11	Use prohibited	(Reserved)	Use prohibited	(Reserved)	_
Y12	PING test execution request	bSet_PingTestRequest	PING test execution request	bSet_PingTestRequest	For the EtherNet/IP
Y13	Use prohibited	(Reserved)	Use prohibited	(Reserved)	_
Y14	Connection information read request	bSet_ConnectionInfoRequest	Use prohibited	(Reserved)	_
Y15 to Y1F	Use prohibited	(Reserved)	Use prohibited	(Reserved)	_

4.2 Buffer Memory

The following table lists the differences in buffer memory areas between the RJ71EIP91 and the RJ71GN11-EIP.

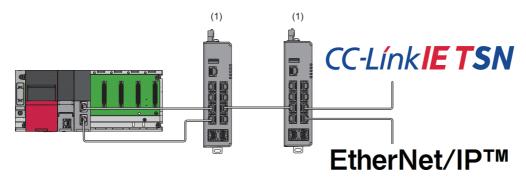
Name	RJ71EIP91 buffer memory		RJ71GN11-EIP buffer memory	
	Address (decimal)	Address (hexadecimal)	Address (decimal)	Address (hexadecimal)
RJ71EIP91: Block assurance specification per connection RJ71GN11-EIP: Intelligent auto refresh status	16629	40F5H	— (Set in GX Works3)*1	— (Set in GX Works3)*1
RJ71EIP91: Block assurance state per connection RJ71GN11-EIP: Intelligent auto refresh status	16630	40F6H	7340033	700001H
PING test request area	27904 to 27907	6D00H to 6D03H	7340048 to 7340051	700010H to 700013H
PING test response area	27908 to 27911	6D04H to 6D07H	7340052 to 7340064	700014H to 700020H
MAC address	25733 to 25735	6485H to 6487H	7340085 to 7340088	700035H to 700037H
EtherNet/IP communication start request	— (Y10)	— (Y10)	7340096	700040H
EtherNet/IP communication in-process status	— (X10)	— (X10)	7340097 (equivalent to X10)	700041H (equivalent to X10)
EtherNet/IP data link continuation specification request	16634	40FAH	7340104	700048H
EtherNet/IP data link continuation specification state	16635	40FBH	7340105	700049H
Class1 Input Area	65536 to 98303	10000H to 17FFFH	7348224 to 7533055	702000H to 72F1FFH
Class1 Output Area	196608 to 229375	30000H to 37FFFH	7536640 to 7721471	730000H to 75D1FFH
Class1 Input data length	16640 to 16895	4100H to 41FFH	7729152 to 7729407	75F000H to 75F0FFH
Class1 Output data length	16896 to 17151	4200H to 42FFH	7729408 to 7729663	75F100H to 75F1FFH
Class1 Start offset address to the input data	25856 to 26111 (1 WORD per connection)	6500H to 65FFH (1 WORD per connection)	7729664 to 7730175 (1 DWORD per connection)	75F200H to 75F3FFH (1 DWORD per connection)
Class1 Start offset address to the output data	26112 to 26367 (1 WORD per connection)	6600H to 66FFH (1 WORD per connection)	7730176 to 7730687 (1 DWORD per connection)	75F400H to 75F5FFH (1 DWORD per connection)
Data link status (Class1)	27136 to 27151	6A00H to 6A0FH	7734272 to 7734287	760400H to 76040FH
Error status (Class1)	27152 to 27167	6A10H to 6A1FH	7734288 to 7734303	760410H to 76041FH
Reserved station (Class1)	27168 to 27183	6A20H to 6A2FH	7734304 to 7734319	760420H to 76042FH
Class1 Connection Behavior Error status (input)	27392 to 27647	6B00H to 6BFFH	7734528 to 7735039	760500H to 7606FFH
Class1 Connection Behavior Error status (output)	(1 WORD per connection for input and output)	(1 WORD per connection for input and output)	7735040 to 7735551	760700H to 7608FFH
Class1 cyclic pause specification	_	_	7735808 to 7735823	760A00H to 760A0FH
Class1 cyclic pause status	_	_	7735824 to 7735839	760A10H to 760A1FH
Class1 Block assurance specification per connection (connection input data update state)	32768 to 33023	8000H to 80FFH	_*1	*1
Class1 Block assurance specification per connection (connection output data update state)	33024 to 33279	8100H to 81FFH	*1	*1
Connection information (Status)	28291 to 28294	6E83H to 6E86H	_	_
Connection information (Counter)	28295 to 28305	6E87H to 6E91H	_	_
Connection information (Diagnostic)	28306 to 28325	6E92H to 6EA5H	7737344 to 7742463 (20 WORD per connection)	761000H to 7623FFH (20 WORD per connection)
Connection information (Send Socket Diagnostic)	28326 to 28333	6EA6H to 6EADH	_	_
Connection information (Receive Socket Diagnostic)	28334 to 28341	6EAEH to 6EB5H	_	_

^{*1} The RJ71GN11-EIP does not support the block assurance per connection which is performed by using buffer memory.

5 PRECAUTIONS WHEN USING TWO NETWORKS IN COMBINATION

To use the CC-Link IE TSN and EtherNet/IP in combination by connecting them to the same switch for the RJ71GN11-EIP, check the precautions on the CC-Link IE TSN system configuration described in the manual and perform the sufficient preoperation check.

When the Port 1 and Port 2 are configured in a loop through a switch for the RJ71GN11-EIP, packets sent from one port of the module by broadcast together may be received on the other port of the module itself. Please configure the system carefully. Example of system configuration described above



(1) Industrial switch (compatible with the CC-Link IE TSN Class A or CC-Link IE TSN Class B)

In the above example, attention must be paid to broadcast packet communication due to the loop configuration.

6 RELEVANT MANUALS

- MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Startup) (SH-081913ENG)
- MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Application) (SH-081915ENG)
- MELSEC iQ-R CC-Link IE TSN Plus Master/Local Module User's Manual (SH-082472ENG)

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REVISIONS

Version	Date of Issue	Revision
A	April 2023	First edition

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