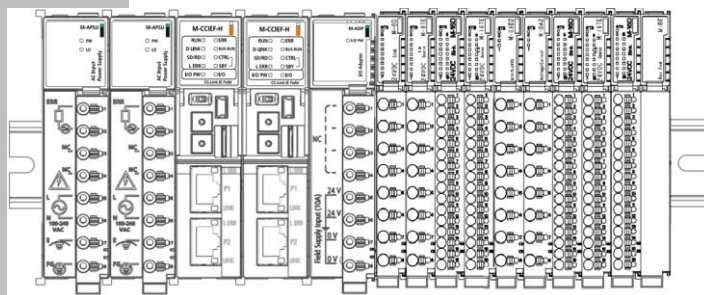


Modular IO User Manual
Redundancy Operation with CC-Link IE Field Header Module (M-CCIEF-H)

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Revision:

Version	Date	Revised Contents
1.0	Nov. 2025	First release. Manual covers information for M-CCIEF-H redundancy modes

Intended audience of this manual

Thank you for choosing the Mitsubishi Electric India product.

Do not use this product until you have full knowledge of the equipment. Please forward this manual to end user.

This manual is intended to the following personnel,

- Managing in charge.
- Designing or developing personnel.
- Commissioning and maintaining personnel.
- Supervising personnel.
- Operating personnel.

Scope of manual

This user manual provides the following details of Modular IO product.

- List of Header modules, IO modules, system modules and special function modules.
- Guidelines for installation and wiring.
- Features and specifications of all types of modules.
- Configuration details.
- Status and diagnostic information.
- Maintenance and troubleshooting.

Important information for user

Read and understand the manual carefully before using Modular IO product, to avoid any damages to persons, properties or environment. Ensure safe and proper usage of this Modular IO product.

Do not modify, dismantle, re-construct and repair the electronic modules. For repair, contact nearest authorized sales office or technical support team.

Qualified and properly trained personnel should only install the Modular IO product. The personnel should be aware of all the safety aspects of automated products and completely familiar with all associated documentation for the said Modular IO product.

Protect Modular IO product from conductive dust, corrosive gases, wire debris, flammable gases, rain and fluid entering into the Modular IO product through ventilation slits, this may cause malfunctioning, damage, fire, electric shock and deterioration.

List of Symbols

	This symbol indicates that the specified operation/s is/are mandatory or must to do or the precautions are mandatory.
	This symbol indicates warnings, specifically related to the electric shocks and hazards.
	This symbol indicates cautions for critical situations, which may cause accidents or serious injury or may be severe property damage. This covers general warnings as well as cautions.
	This symbol indicates or covers operations that user must to avoid. This is specifically related to disassembly of product.
NOTE	This symbol indicates points to note or to consider during usage of said product. Also, indicates summary of individual sections covered in this manual.

Terms and Conditions

- Mitsubishi Electric India Pvt. Ltd. shall have no responsibility or liability for any personnel injury or death, or loss or damage to the property caused by said product, if used or operated in applications which are not intended or excluded by instructions, precautions or warnings provided in this document for the said product.
- Specifications are subject to change without prior notice.
- The reproduction or transmission of this document or its contents in full or part is not allowed without written permission from the authority.

Precautions for safe use of product

- Disconnect all power supplies before performing installation and wiring work.
- For mains power supply connections, confirm suitable fuse is used.
- Do not touch the conductive part directly. This may cause malfunctioning of product or electric shock.
- Do not bundle IO wires, 24 Vdc wires with main control panel wiring together.
- Consider maximum rated current and inrush current of power supply module while selecting 24 Vdc power supply source. Ensure that external breaker or fuse used in series with 24 Vdc.
- Confirm that the source of voltages and currents are within specified ranges.
- Connect functional earth terminal properly. If not, product may be susceptible to the noise.
- Connect protective earth terminal to a good quality earth. If not, it may result in electric shock or erroneous operation.
- If this product emits smoke or an unusual odor or unusual sound or unusual operation, immediately switch OFF the power to the product. This may result in fire and damage the product. In such cases, contact the nearest authorized sales or service support team.

Disposal precaution

- This product should be treated as industrial electronic waste at the end of its life.
- Dispose it in accordance with applicable local, regional, and national regulations. Improper disposal may harm the environment.

Recommendations for safe use of product

- It is always recommended to route cables carrying low level signals e.g. analog IO signals, serial communication signals, Ethernet communication cables separately and away from cables carrying high voltage and large current signals.
- It is recommended to connect cable shield to the ground terminal at the IO module end and leave it unconnected at the device (sensor/actuator) end.

Replacement Cycle

- Although it depends on the status of use, 10 years is the guideline for renewal.

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Introduction

CC-Link IE Field Header module 'M-CCIEF-H' can be used in a CC-Link IE Field Network in various network configurations, supporting non-redundant and redundant operation as described below:

1. Non-redundant station
2. Redundant master station
3. Redundant line configuration
4. Active-Active configuration

The table below illustrates the header assemblies used to achieve various network configurations with Modular IO station.

Network	Header Assembly	Modules used
Non-redundant station, Redundant master station	M-B2: Assembly base with 2 slots	M-CCIEF-H (1 no.), M-DPSU (1 no.)
	M-B3: Assembly base with 3 slots	M-APSU (1 no.), M-CCIEF (1 no.), M-ADP (1 no.)
	M-B5: Assembly base with 5 slots	M-APSU (1 no.), M-CCIEF (1 no.), M-ADP (1 no.), M-BC (2 nos.)
Redundant line	M-B5: Assembly base with 5 slots	M-APSU (1 no.), M-CCIEF (2 nos.), M-ADP (1 no.), M-BC (1 no.)
Active-Active configuration		

NOTE

In addition to redundancy modes mentioned above, Header assembly with M-B5 also supports power supply redundancy using two AC power supply modules (M-APSU) installed in P1 and P2 slots.
Refer section '[Power Supply Redundancy](#)' for more details.

NOTE

Modular IO station does not support 'Single line Redundant Slave' redundancy mode supported by MELSEC iQ-R series PLC.

NOTE

Ensure following versions of M-CCIEF-H, Modular IO Configurator tool and GX Works 3 while using different redundancy modes.

Network	M-CCIEF-H Version	Modular IO configurator tool Version	GX Works3 version
Non-redundant station	V01.00.00.00	2.0.0.0 or later	1.080J or later
Active-Active configuration			
Redundant master station	V01.03.00.00	2.5.0.0 or later	1.120A or later
Redundant line			

Subsequent sections describe the supported redundant operations in detail.

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Power Supply Redundancy

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Overview

Redundant power supply system can be built by mounting two 'M-APSU' modules on 'M-B5' base unit.

Power supply redundancy ensures continuous operation of Modular IO station even if one power supply fails or the power supply source connected to the power supply module fails.

This feature is critical for maintaining system availability and minimizing downtime in critical applications.

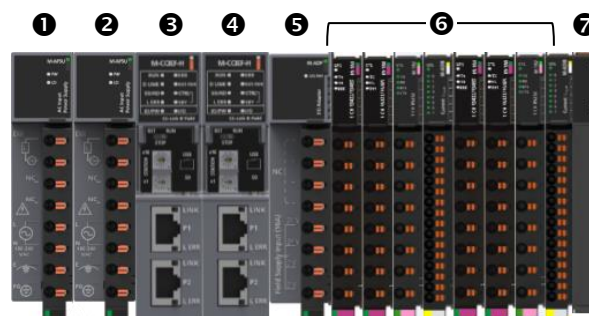
System Configuration

Two AC power supply modules (M-APSU) are installed in slots P1 and P2 of the M-B5 header assembly. When both modules and their input power sources are healthy, they share the system load and supply current to the I/O modules.

If one power supply module fails, the system automatically switches to the other module without interrupting the operation of the Modular I/O station.

Redundant power supply can be configured in non-redundant as well as redundant system configuration, i.e. users can use the redundant power supply modules with one header or with two headers.

Example Modular IO station configuration with redundant power supply is shown below.



- | | |
|---|-------------------------|
| ❶ Power supply module (M-APSU) fixed in P1 slot | ❷ IO modules |
| ❸ Power supply module (M-APSU) fixed in P2 slot | ❹ Bus end module (M-BE) |
| ❺ Header modules (M-CCIEF-H) fixed in H1 slot | |
| ❻ Header modules (M-CCIEF-H) fixed in H2 slot | |
| ❼ I/O adapter module (M-ADP) | |

Redundant Power Supply Diagnostics

Header diagnostic of M-CCIEF-H module also consists of diagnostics of power supply modules as described in the table below.

Diagnostics	Data type	Description
Power supply summary	WORD	Power supply status summary bitwise
P1 – AC/DC DOWN detected	Bit 0	0: No AC/DC input down 1: AC/DC input down
P1 – Power-off/ power supply voltage drop detected	Bit 1	0: No input power supply voltage drop detected 1: Input power supply voltage drop detected
P1 – Power supply failure detection	Bit 2	0: No failure detected 1: PSU failure detected
P2 – AC/DC DOWN detected	Bit 3	0: No AC/DC input down 1: AC/DC input down
P2 – Power-off/ power supply voltage drop detected	Bit 4	0: No input power supply voltage drop detected 1: Input power supply voltage drop detected
P2 – Power supply failure detection	Bit 5	0: No failure detected 1: PSU failure detected
Number of AC/DC down detections (P1)	WORD	Number of AC/DC down detections (P1)
Number of AC/DC down detections (P2)	WORD	Number of AC/DC down detections (P2)

Status and diagnostic information can be monitored in header diagnostic area using Modular IO Configurator tool.

This information can also be read by CPU from Master station using transient communication (SLMP).

For MELSEC iQ-R PLC, use command 'JP_SLMPREQ' to read diagnostic information using transient communication. For more details, refer Master PLC user manual.

Refer 'Modular IO User Manual (N16001AAMH, Rev 2.08 or later)' (Section Header modules → M-CCIEF-H (CC-Link IE Field header module) → Header diagnostics for head address to be used for reading diagnostic information.

Error status of power supply modules is also shared with fieldbus master via SB memory (SB1.2) with cyclic communication. PSU error detected (P1/P2) is set to TRUE if any of the power supply module or its power supply source is unhealthy.

NOTE

To maintain reliable operation, ensure to keep the current consumption of the Modular IO station within the rated output current of one redundant power supply module.

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Non-redundant Station

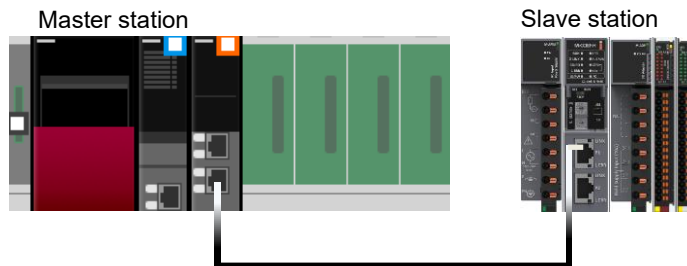
[Overview](#)

[System Configuration](#)

Overview

In non-redundant network, Modular IO station is connected to a single master station. Neither Modular IO station nor network Master station provides redundancy. However, power supply redundancy at Modular IO station can be achieved when M-B5 header assembly with single header module and two AC power supply modules (M-APSU) are used.

System Configuration



To configure M-CCIEF-H header in non-redundant network, M-B2 or M-B3 or M-B5 (with single header) header assembly can be used based on the power supply requirement.

Use M-CCIEF-H header profile (0x2071_M-CCIEF-H_1_en_CCLinkIEField.CSPP) in GX Works3 Engineering tool for CC-Link IE Field network configuration.

Refer “UD02-A001EN-A Quick Start Guide Interfacing Modular IO Header M-CCIEF-H with MELSEC iQ-R PLC on CC-Link IE Field Network” for more details.

Refer ‘Modular IO User Manual (N16001AAMH, Rev 2.08 or later)’ for the details of CC-Link IE Field Header module.

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Redundant Master Station

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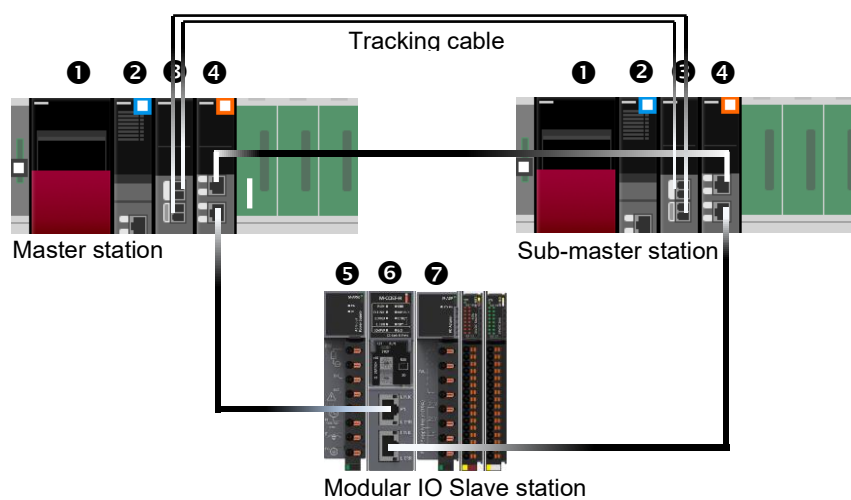
Overview

For the redundant master station, the master station and the submaster station are connected with a tracking cable. When an error occurs in the control system master station, the control is switched to the standby system submaster station to control the slave stations and continue data link.

System Configuration

System configuration when iQ-R master station is used is as shown below.

- The redundant master station setup consists of two master stations; both connected to each other via a pair of fiber optic tracking cables.
- Modular IO station is connected to two master stations with its two Ethernet ports P1 and P2 as shown in the image below.



- | | |
|---------------------------------------|--------------------------------|
| ① iQ-R Power supply module | ⑤ Power supply module (M-APSU) |
| ② Process CPU module (Redundant mode) | ⑥ Header module (M-CCIEF-H) |
| ③ Redundant function module (R6RFM) | ⑦ IO module adapter (M-ADP) |
| ④ Network module (RJ71GF11-T2 (MR)) | |

NOTE

It is recommended to configure network in RING topology when using Redundant master configuration.

NOTE

Ensure that the network master supports the Redundant Master function.

Setting Method

Master station side: Refer fieldbus master PLC user's manual.

Modular IO station side:

Use Modular IO Configurator tool for configuration.

Set Header (M-CCIEF-H) parameter 'Redundancy Mode' to 'Redundant Master'.

Behaviour of Modular IO Station During Control Switching

In case of successful switch-over, the new control master keeps on updating the IO data of Modular IO station.

When switching failure occurs due to unavailability of standby system, Modular IO station output behaviour depends on 'Output Hold/Clear' parameter set for M-CCIEF-H header as explained below.

1. When Output Hold/Clear = Clear.
Output is cleared on control switching failure.
2. When Output Hold/Clear = Clear after timeout.
Output is cleared after set timeout in ms on switching failure. Default timeout value is 1700 ms. User can set value within range of 1700 sec to 5000 ms.
3. When Output Hold/Clear = Hold.
Output is hold to last updated state on switching failure.

Redundant Master Diagnostic Summary

When Modular IO station is configured in redundant master network, the status information can be monitored in 'Header diagnostic' of M-CCIEF-H module from Modular IO Configurator tool.

Diagnostics	Value	Description
Redundancy mode	3	0: Non-redundant 1: Active-Active configuration 2: Redundant Line (LR) 3: Redundant Master (MR)

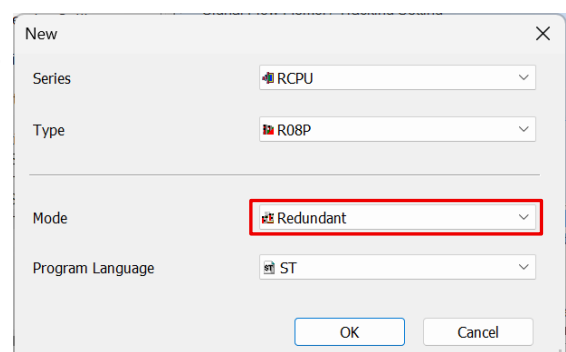
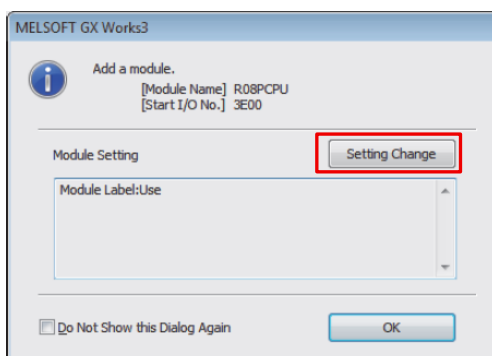
This information can also be read by CPU from Master station using transient communication (SLMP).

Setting Example

This section describes the setting example for the MELSEC iQ-R PLC as master station and Modular IO slave station in Redundant Master station configuration.

Setting in the Master station

1. Open Master PLC Engineering tool 'GX Works3 (Version 1.120A)'. Connect the Engineering tool to the CPU module on the control system and set the parameters.
2. Set the CPU module as [Project] ⇒ [New]



3. Click the [Setting Change] button in the following window and set the item to use module labels.
4. Click the [OK] button to add the module labels of the CPU module.

- In the I/O assignment setting, set the Redundant Function module for slot No.0.

[Navigation window] ⇒ [Parameter] ⇒ [System Parameter] ⇒ [I/O Assignment] tab ⇒ [I/O Assignment Setting]

Add New Module

FIND FIND

Module Selection

Module Type CPU Extension

Module Name R6RFM

Station Type

Advanced Settings

Mounting Position

Mounting Base Main Base

Mounting Slot No. 0

Start I/O No. Specification Not Set

Start I/O No. 0000 H

Number of Occupied Points per 1 SI 32Point

Module Name

Select module name.

OK Cancel

- Set the RJ71GF11-T2 for slot No.1.

Add New Module

FIND FIND

Module Selection

Module Type Network Module

Module Name RJ71GF11-T2(MR)

Station Type Master Station

Advanced Settings

Mounting Position

Mounting Base Main Base

Mounting Slot No. 1

Start I/O No. Specification Not Set

Start I/O No. 0020 H

Number of Occupied Points per 1 SI 32 Points

Module Name

Select module name.

OK Cancel

- Click the [OK] button to add a module label of the RJ71GF11-T2.

MELSOFT GX Works3

Add a module.

[Module Name] RJ71GF11-T2(MR)

[Start I/O No.] 0020

Module Setting

Module Label: Not use

Setting Change

☐ Do Not Show this Dialog Again

OK

8. Keep 'Required settings' of module to default as shown below.

Setting Item	Item	Setting
Station Type		
Station Type		Master Station
Network No.		
Network No.		1
Station No.		
Setting Method		Parameter Editor
Station No.		0
Parameter Setting Method		
Setting Method of Basic/Application Settings		Parameter Editor

Explanation
Set the station type.

Check Restore the Default Settings

Apply

9. Set the network topology as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2 (MR)] ⇒ [Basic Settings] ⇒ [Network Topology]

Required Settings	Refresh Settings	Refresh Settings	<Detailed Setting>
Basic Settings	Network Configuration Settings	Network Topology	Ring
Refresh Setting	Network Topology	Operation of Master Station after Reconnection	
Operation of Master Station after Reconnection		Operation of Master Station after Reconnection	Return as Submaster Operation Station

10. Set the network configuration as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2 (MR)] ⇒ [Basic Settings] ⇒ [Network Configuration Settings]

CC IE Field Configuration (Start I/O: 0000)

CC IE Field Configuration Edit View Tool Close with Discarding the Setting Close with Reflecting the Setting

Detect Now

Mode Setting: Online (Standard Mode) Assignment Method: Start/End Link Scan Time (Approx.): 0.76 ms

No.	Model Name	STA#	Station Type	RX/RX Setting			RWw/RWw Setting		
				Points	Start	End	Points	Start	End
0	Host Station	0	Master Station						
1	Host Station	1	Sub-Master Station						
2	M-CCIEF-H	2	Intelligent Device Station	16	0000	000F	8	0000	0007

Host Station STA#1 STA#2

Host Station M-CCIEF-H

STA#0 Master
Total STA#2
Ring

11. Set the Refresh Setting as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2 (MR)] ⇒ [Basic Settings] ⇒ [Refresh Settings]

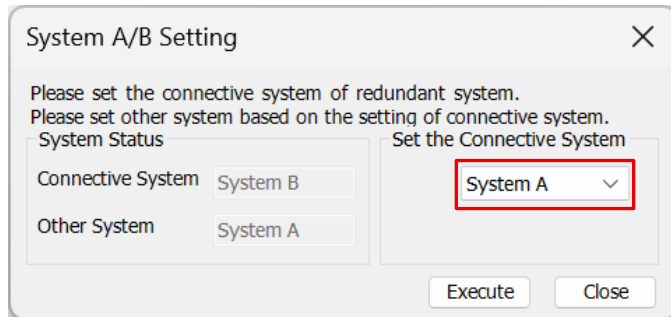
0000:RJ71GF11-T2(MR) Module...

Setting Item List		Setting Item	
Input the Setting Item to Search			
Required Settings			
Basic Settings			
Network Configuration Settings			
Refresh Setting			
Network Topology			
Operation of Master Station			
Application Settings			

No.	Link Side					CPU Side			
	Device Name	Points	Start	End		Target	Device Name	Points	Start
-	SB	512	0000	001FF	Specify Device	SB	512	0000	001FF
-	SW	512	0000	001FF	Specify Device	SW	512	0000	001FF
1	RX	1024	0000	003FF	Specify Device	X	1024	0100	013FF
2	RY	1024	0000	003FF	Specify Device	Y	1024	0100	013FF
3	RWr	1024	0000	003FF	Specify Device	W	1024	0000	003FF
4	RWw	1024	0000	003FF	Specify Device	W	1024	0100	013FF

12. Set the Redundant Function module of the own system as the system A in the "System A/B Setting" window and reset the CPU modules of both systems or power off and on both systems.

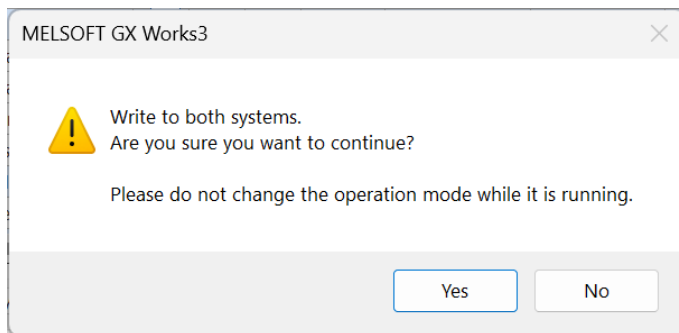
[Online] ⇒ [Redundant PLC Operation] ⇒ [System A/B Setting]



13. Write the set parameters to the system A CPU module.

[Online] ⇒ [Write to PLC]

14. Click the [Yes] button to write to the CPU modules of both systems.



15. Either reset the CPU modules of both systems or power off and on both systems.

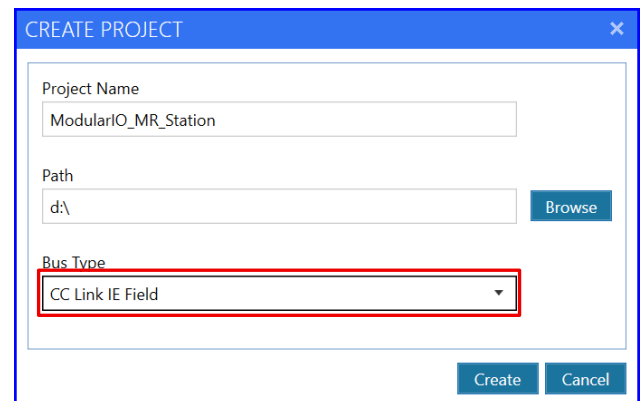
NOTE

To use Redundant Master function with Modular IO station, use GX Works3 Engineering tool version 1.120A or later for redundant network configuration.

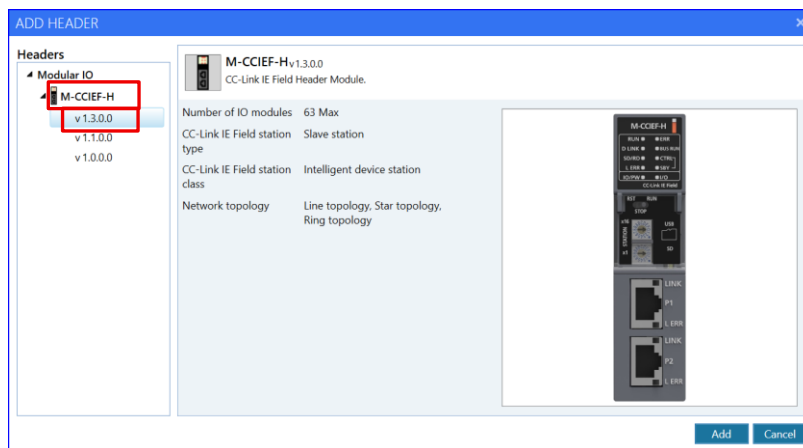
Setting in the Modular IO station

Open Modular IO Configurator tool (V2.5.0.0 or later) → Connect the tool to M-CCIEF-H header and set the parameters

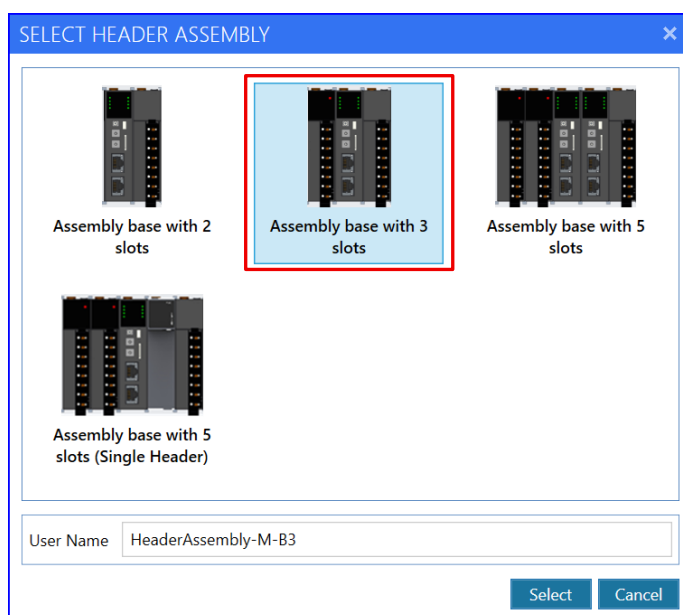
1. Create new project with bus type-
CC-Link IE Field



2. Add M-CCIEF-H header (1.3.0.0 or onward) in project



3. Select header assembly base with 2 slots or 3 slots depending on power supply requirement.



4. Set Header parameters [M-CCIEF-H] ⇒ [Parameters]

- Set network parameters (station number and network number) of M-CCIEF-H header which are configured in network configuration of master station.
- Set 'Redundancy mode' to 'Redundant Master'.

The screenshot shows the 'Parameters' tab in the Modular IO Configurator tool. The left pane shows the project structure with 'SlaveM-CCIEF-H-SLMR-MIOSlave' selected. The right pane shows the 'Parameters' tab with the following table:

Parameter Name	Project Value
General parameters	
Action on fatal error	Continue N/W communication
Share SB to RWr	Disable
Output hold / clear	Clear
Share diagnostics	Enable
Network parameters	
Network No.	1
Station number setting	Rotary switch
Remote reset enable	Disable
Redundancy parameters	
Redundancy mode	Redundant Master

- Write the set parameters to the M-CCIEF-H header module of modular IO station and reset or power cycle Modular IO station.
- Configure the IO modules in modular IO configurator tool as per the requirement.
Refer 'Modular IO user manual' for more details of IO modules configuration.

NOTE

The table below lists the supported versions of the M-CCIEF-H header device version and the Modular IO Configurator tool for each redundancy mode.

Redundancy mode	Device version	Modular IO Configurator tool version
Non-redundant	01.00.00.00	2.0.0.0 or later
Active-Active configuration	01.00.00.00	
Redundant Master	01.03.00.00	2.5.0.0 or later
Redundant Line	01.03.00.00	

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Redundant Line

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Overview

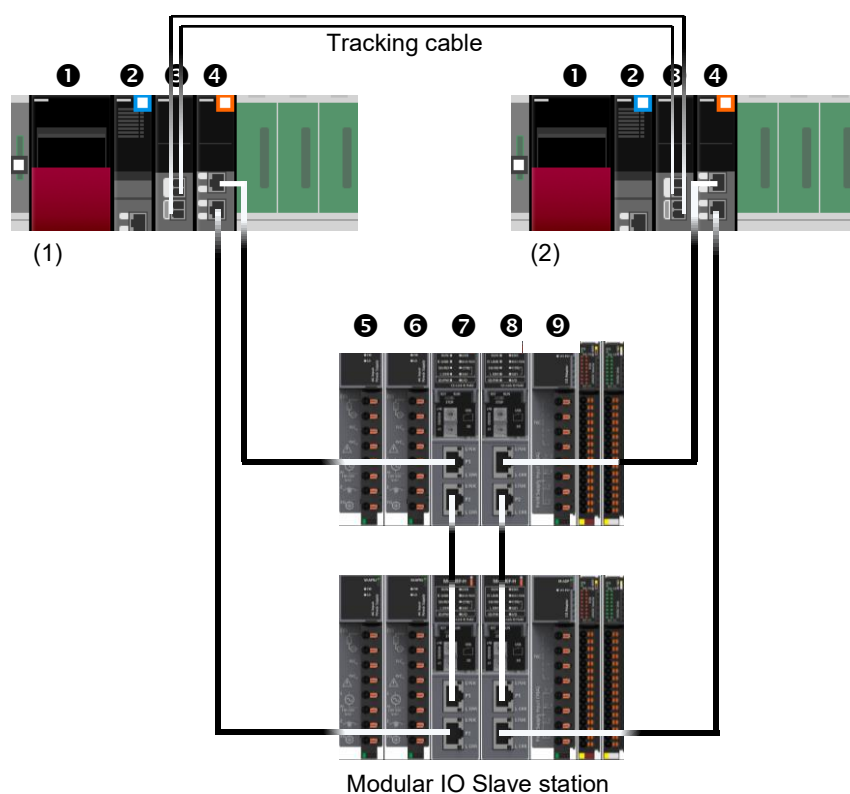
In redundant line configuration, two network lines are prepared and a slave station (Modular IO station) is connected to each network line. If one communication line fails, the system automatically switches to the backup line without interrupting control processes.

System Configuration

The redundant line station setup consists of two master stations; both connected to each other via a pair of Fiber optic tracking cables.

Each master station is equipped with a power supply module, a process CPU module, a redundant function module and a network master module.

Modular IO station with M-B5 assembly is used in redundant line configuration where H1 slot header is connected to System (1) and H2 slot header is connected to system (2).



- | | |
|---------------------------------------|---|
| ① iQ-R Power supply module | ⑤, ⑥ Power supply module (M-APSU) in P1 and P2 slot |
| ② Process CPU module (Redundant mode) | ⑦, ⑧ Header module (M-CCIEF-H) in H1 and H2 slot |
| ③ Redundant function module (R6RFM) | ⑨ IO module adapter (M-ADP) in ADP slot |
| ④ Network module (RJ71GF11-T2 (LR)) | |

NOTE

- It is recommended to configure network in RING topology when using redundant line configuration.
- When the M-CCIEF-H header module of H1 slot is not mounted or has failed, the redundant system will not start.
- When the M-CCIEF-H header module of H1 slot has failed and systems have been switched, replace the header module immediately.
The redundant system does not start if the system is power cycled or reset while header module of H1 slot is in the state of failure.

Configuration Transfer

The new configuration must be downloaded only to the H1 slot header of the Modular IO station. H2 slot header does not support configuration download.

At power on, H1 slot header will transfer the configuration to H2 slot header. If H2 slot header is inserted after power on, configuration transfer will be executed by H1 slot header. Configuration transfer will be executed only when configuration of H2 slot header is different.

When H1 slot header is control and configuration is downloaded,

- After successful configuration download, H1 slot header will start its operation as control header with new configuration.
- H2 slot header will indicate configuration mismatch error. To transfer new configuration to H2 slot header,
 - Reset H2 slot header or
 - Power cycle the Modular IO station.

When H1 slot header is standby and configuration is downloaded,

- After successful configuration download, H1 slot header will start its operation as standby header, and it will show configuration mismatch error.
- To apply new configuration,
 - Power cycle the Modular IO station.

Determining Control Header and Standby Header

In redundant line configuration, the control header and standby header of the Modular IO station are determined by tracking the Master station.

When the system starts by turning the power on.

The control system and standby system are determined by tracking the Master station.

NOTE

- In the interval after the Modular IO station starts by power-on till the Master stations are powered ON, H1 slot header will be the control header and H2 slot header will be standby header.
- When H2 slot header is the control header and power is turned OFF and ON, H1 slot header becomes control header and H2 slot header becomes standby header.
- When only H2 slot header is mounted and H1 slot header is not mounted or has failed, the redundant system will not start. To start the system, header module must be mounted in H1 slot.

When the system starts by resetting the header module of the control system

If the header module of the control system is reset, system switching occurs. After reset, the reset header module will become standby.

NOTE

- When only H1 slot header is mounted (or H2 slot header has failed) and reset of control header, the Modular IO station is reset.
- When H2 slot header is reset and H1 slot header has failed, the Modular IO station is reset. However, after reset clear, the system does not start. To start the system, H1 slot header must be replaced, or H2 slot header must be mounted in the H1 slot.

When the system starts by resetting the header module of the standby system.

Only the header module of the standby system is reset. After reset, the reset header module will become standby by tracking the system status of the master station.

NOTE

Control header shares following data periodically with standby header

- Input data (IX, IW and SB) received from IO modules.
- IO module status and diagnostics data

System Switching Operation

When an error occurs in the control system, the control switches to the standby system to continue the system operation. In redundant line network, Modular IO headers always track the system state of the connected Master stations and follows the connected Master for Control /Standby state. This means that when the Master switches between control and standby state, connected headers of the Modular IO station transitions accordingly.

Before system switching operation

The header module of the control system performs IO refresh with the IO modules in Modular IO station.

The standby header module receives input data of connected IO modules. However, it does not send data to the Master station also it does not send output data to IO modules of Modular IO station.

After system switching operation

The new control system performs IO refresh with IO modules of Modular IO station.

Method And Conditions of System Switching

By tracking the system switching of the Master stations, state of the header modules are switched.

For conditions of system switching of the Master station, refer to Network Masters User Manual.

Behaviour of Modular IO Station During Control Switchover

Control system master station updates the output data of Modular IO station. Input data from Modular IO station is updated to control master.

In case of successful control switching, the new control master keeps on updating the IO data of Modular IO station as mentioned above.

When control switching fails due to unavailability of standby system, Modular IO station output behaviour depends on 'Output Hold/Clear' parameter set in M-CCIEF-H header as explained below

1. When Output Hold/Clear = Clear
Output is cleared on control switching failure.
2. When Output Hold/Clear = Clear after timeout
Output is cleared after set timeout in ms on control switching failure. Default timeout value is 1700 ms. User can adjust value within range of 1700 sec to 5000 ms.
3. When Output Hold/Clear = Hold
Output is hold to last updated state on unsuccessful control switching.

Redundant Line Diagnostic Summary

When modular IO station is configured in redundant line, below diagnostic information can be monitored in Header diagnostic of M-CCIEF-H module from Modular IO configurator tool:

Diagnostics	Value	Description
Redundancy mode	2	0: Non-redundant 1: Active-Active configuration 2: Redundant Line (LR) 3: Redundant Master (MR)
Control system identification (When system A is control system)	1	0: Not connected / Host is not identified 1: System A, 2: System B
Control system identification (When system B is control system)	2	0: Not connected / Host is not identified 1: System Ax, 2: System B
Control system identification (When both the systems are disconnected)	0	0: Not connected / Host is not identified 1: System A, 2: System B

NOTE

Header diagnostic information can be read in Master using SLMP communication.
Refer Modular IO User Manual for more details.

Setting Example

This section describes the setting example for the MELSEC iQ-R PLC as Master station and Modular IO slave station in Redundant line configuration.

Setting in the master station

Open GX Works3 Engineering tool → Connect the Engineering tool to the CPU module on the control system and set the parameters.

1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those for the redundant master station.
2. Set the redundant function module. The setting method for the redundant function module is the same as the one for the redundant master station.
3. In the I/O assignment setting, set the RJ71GF11-T2 for slot No.1.

4. Set the network topology as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2 (LR)] ⇒ [Basic Settings] ⇒ [Network Topology]

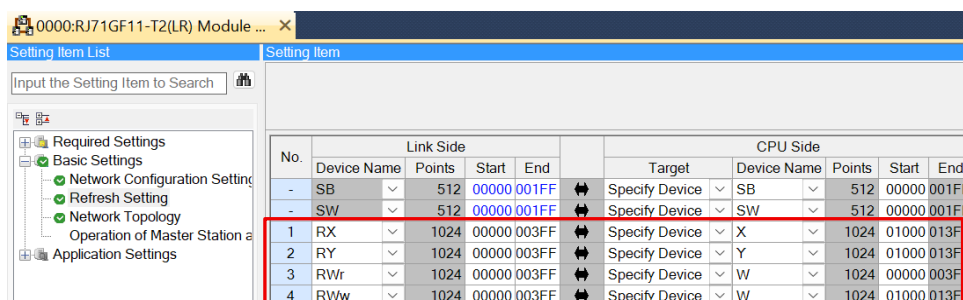
5. Set the network configuration as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2 (LR)] ⇒ [Basic Settings] ⇒ [Network Configuration Settings]

No.	Model Name	STA#	Station Type	RX/RX Setting			RWw/RWv Setting		
				Points	Start	End	Points	Start	End
0	Host Station	0	Master Station (Redundant Line)						
1	M-CCIEF-H(LR)	1	Intelligent Device Station	16	0000	000F	8	0000	0007

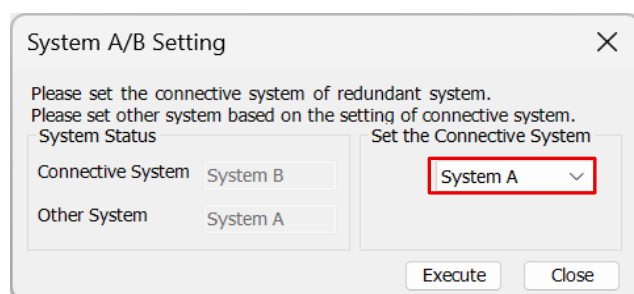
6. Set the refresh settings as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2 (LR)] ⇒ [Basic Settings] ⇒ [Refresh Settings]

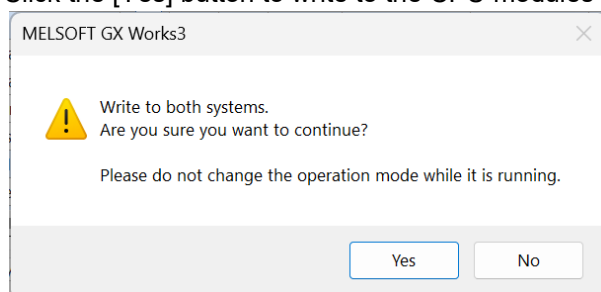


7. Set the redundant function module of the own system as the system A in the "System A/B Setting" window and reset the CPU modules of both systems or power off and on both systems.

[Online] ⇒ [Redundant PLC Operation] ⇒ [System A/B Setting]



8. Write the set parameters to the system A CPU module.
[Online] ⇒ [Write to PLC]
9. Click the [Yes] button to write to the CPU modules of both systems.



10. Either reset the CPU modules of both systems or power off and on both systems.

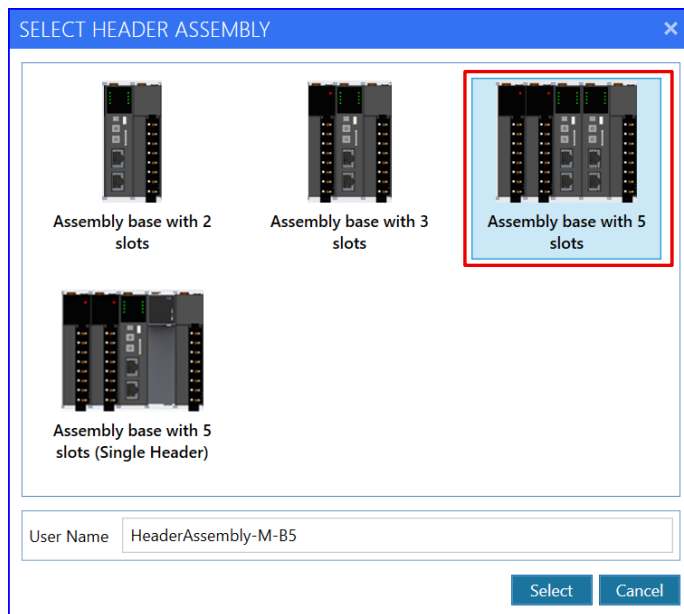
NOTE

It is recommended to use GX Works3 Engineering tool version 1.120A or higher for redundant network configuration.

Setting in the slave station

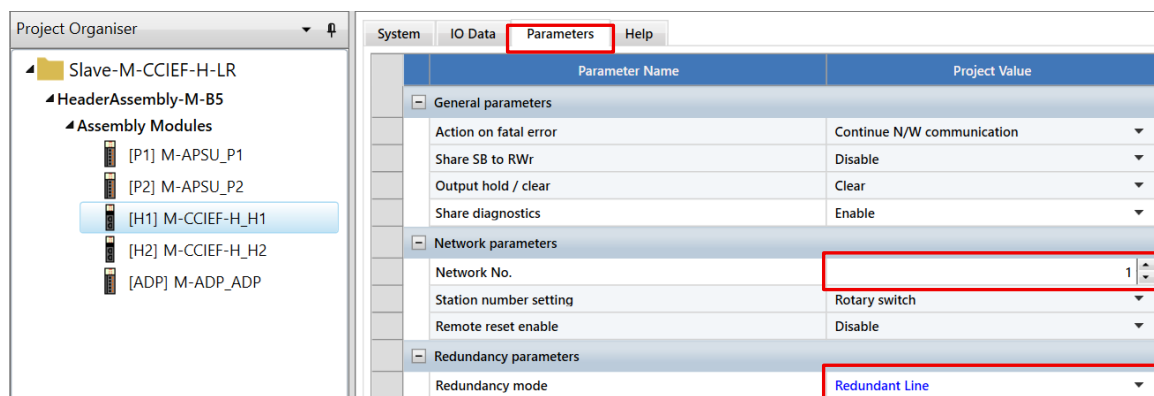
Open Modular IO configurator tool → Connect the configurator tool to M-CCIEF-H header and set the parameters

1. Create new project with bus type- CC-Link IE Field. New project creation method is same as that for the redundant master station.
2. Add M-CCIEF-H header in project. Adding new header in project is same as that for the redundant master station.
3. Select header assembly base with 5 slots



4. Set Header parameters

[M-CCIEF-H] ⇒ [Parameters]



- Set network parameters (station number and network number) of M-CCIEF-H header which are configured in network configuration of master station.
 - Set 'Redundancy mode' to 'Redundant Line'.
5. Write the set parameters to the M-CCIEF-H header module of modular IO station and reset or power cycle modular IO station.
 6. Configure the IO modules in modular IO configurator tool as per the requirement.
Refer 'Modular IO user manual' for more details of IO modules configuration.

NOTE

Download the configuration in H1 slot header. Configuration download in H2 slot header is not allowed. Configuration is transferred to H2 slot header on event of power cycle or reset of H2 slot standby header.

NOTE

The table below lists the supported versions of the M-CCIEF-H header device version and the Modular IO Configurator tool for each redundancy mode.

Redundancy mode	Device version	Modular IO Configurator tool version
Non-redundant	01.00.00.00	2.0.0.0 or later
Active-Active configuration	01.00.00.00	
Redundant Master	01.03.00.00	2.5.0.0 or later
Redundant Line	01.03.00.00	

Active-Active Configuration

[Overview](#)

[System Configuration](#)

[Configuration Transfer](#)

[Determining Control Header and Standby Header](#)

[Operation in Active-Active Configuration](#)

[Control Switching Operation](#)

[Control Switching Causes](#)

[Execution Availability of Control Switching](#)

[Active-Active Configuration Diagnostic Summary](#)

[Setting Example](#)

Overview

Active-Active configuration enables the Modular IO station to simultaneously share IO data with two independent Master stations.

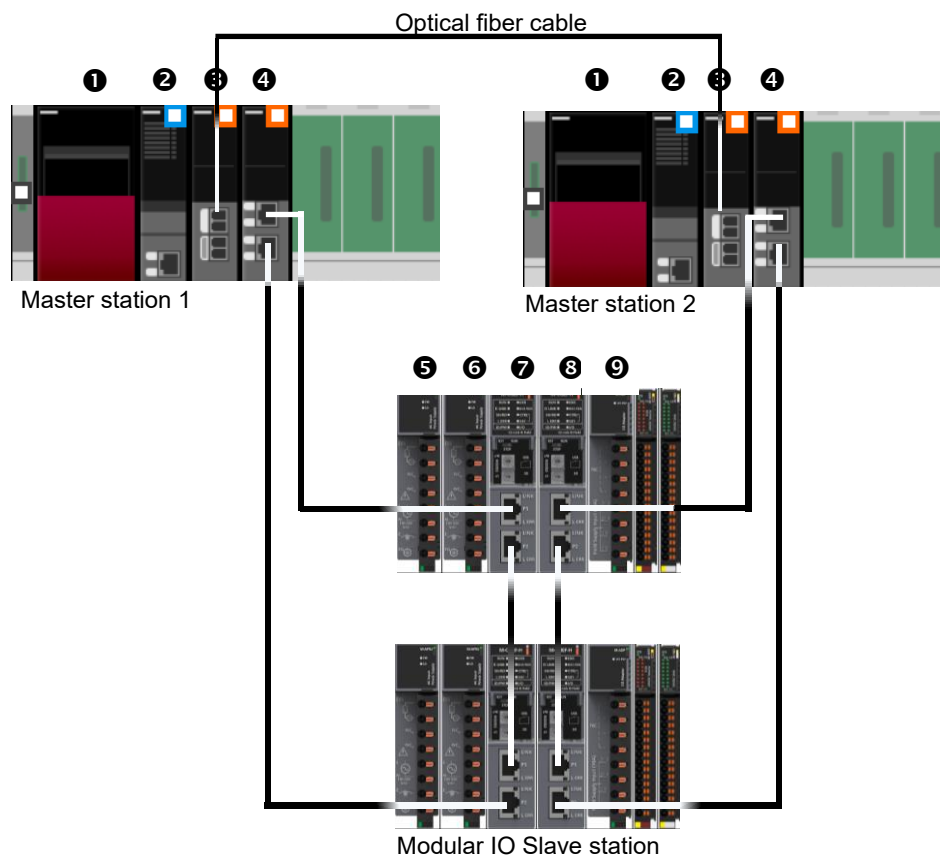
This setup is ideal for applications where critical input data from field devices must be accessible to two Masters always, ensuring no data loss in the event of a Master failure or a network link interruption.

Unlike Redundant line configuration, where the Master stations operate in a redundant pair, both the Masters in Active-Active configuration communicate independently with their respective header modules in the Modular IO station.

The header modules in the H1 and H2 slots can be assigned different network numbers and station numbers, allowing communication with Master stations on separate networks.

System Configuration

The Active-Active configuration consists of two master stations. Each master station is equipped with a power supply module, a CPU module, network modules RJ71GP21-SX and RJ71GF11-T2.



- | | |
|--------------------------------|---|
| ① iQ-R Power supply module | ⑤, ⑥ Power supply module (M-APSU) in P1 and P2 slot |
| ② CPU module | ⑦, ⑧ Header module (M-CCIEF-H) in H1 and H2 slot |
| ③ Network module (RJ71GP21-SX) | ⑨ IO module adapter (M-ADP) |
| ④ Network module (RJ71GF11-T2) | |

Modular IO station with M-B5 header assembly is used in Active-Active configuration where H1 and H2 slot headers are connected to Master station 1 and 2 respectively. At power ON, H1 slot header becomes control header and H2 slot header becomes standby header.

NOTE

When the M-CCIEF-H header module of H1 slot is not mounted or failed, Modular IO station will remain idle.

When the M-CCIEF-H header module of H1 slot has failed and control has been switched to H2 header, replace the H1 header module immediately. The Modular IO station does not start and H2 slot header remain idle if the station is power cycled or reset while header module of H1 slot is in the state of failure.

Configuration Transfer

The new configuration must be downloaded only to the H1 slot header of the Modular IO station. H2 slot header does not support configuration download.

At power on, H1 slot header will transfer the configuration to H2 slot header. If H2 header is inserted after power on, configuration transfer will be executed by H1 header. Configuration transfer will be executed only when configuration of H2 slot header is different.

When H1 slot header is control and configuration is downloaded,

- As configuration download to H1 slot header, control switches to H2 slot header and IO update is continued without interruption.
If H2 slot header is not present or switching is not successful, then IO update will be stopped during configuration download.
- After successful configuration download, H1 slot header will start its operation as standby header and indicate configuration mismatch error.
- To transfer new configuration to H2 slot header,
 - Power cycle the Modular IO station

When H1 slot header is standby and configuration is downloaded,

- After successful configuration download H1 slot header will start its operation as standby header and it will show configuration mismatch error.
- To apply new configuration,
 - Power cycle the Modular IO station

Determining Control Header and Standby Header

When the system starts by turning the power on.

H1 slot header is identified as control header and H2 slot header becomes standby header.

NOTE

- If the configuration of both header modules is not matching, configuration is transferred from H1 slot header to H2 slot header.
- When H2 slot header is the control header and power is turned OFF and ON, H1 slot header becomes control header and H2 slot header becomes standby header.
- When only H2 slot header is mounted and H1 slot header is not mounted or has failed, the redundant system will not start. To start the system, header module must be mounted in H1 slot.

When the system starts by resetting the control header module

If the control header module is reset, system switching occurs. After reset, the reset header module will become standby.

NOTE

- When only H1 slot header is mounted (or H2 slot header has failed) and reset of control header, the Modular IO station is reset.
- When H2 slot header is reset and H1 slot header has failed, the entire system is reset. However, after reset clear, the system does not start. To start the system, H1 slot header must be replaced, or H2 slot header must be mounted in the H1 slot.

When the system starts by resetting the standby header

Only the header module of the standby system is reset. After reset, the reset header module will become standby.

Operation in Active-Active Configuration

In an Active–Active configuration, the two header modules of the Modular IO station operate independently to communicate with two separate Master stations. IO data update in Modular IO station is as below.

Input data:

- The control header receives all input data (IX, IW, and SB) from the IO modules of the Modular IO station.
- This input data is then shared to the standby header.
- Both headers subsequently transmit the updated input data to their respective Master stations.

Output data:

- Each header module receives output data (QX and QW) from its own master station.
- Only the control header writes the output data to the IO modules of the Modular IO station.

Output handling after control Switchover

- After switchover, new control header will start updating output data to IO modules in Modular IO station.
- In order to maintain consistency in output data, the application program in Master station must ensure that same output data is written to both the control and standby headers.
- In the example system configuration shown in System configuration section, a CC-Link IE Control modules (RJ71GP21-SX) is used to exchange output data and application data from Master connected to control header to the master connected to the standby header. This ensures that, in the event of control switchover, the standby-side Master has the latest output data and can seamlessly continue output updates.
- When control switchover fails due to unavailability of standby header, modular IO output data behaviour depends on the 'Output Hold/Clear' setting set in M-CCIEF-H header parameter from modular IO configurator tool.
 - When Output Hold/Clear = Clear:
Output is cleared at control switching trigger.
 - When Output Hold/Clear = Clear after timeout:
Output is cleared after set timeout when control switching is triggered.
 - When Output Hold/Clear = Hold:
Output is hold to previous state.
- In case of successful control switchover, the new control header keeps on updating the IO data of Modular IO station.

NOTE

Control switchover between headers takes approximately 700 ms.
To prevent outputs from clearing during this transition period, set "Output Hold/Clear" to "Clear after timeout."

Control Switching Operation

When an error occurs in the control header, the control switches to the standby header to continue the system operations. Control switching is limited to Modular IO station only that means control switching of Modular IO station headers does not trigger system switching at Master stations. Master stations are not identified as control and standby master.

Control Switching Causes

Below are the causes for the control switchover in Modular IO station

Switching type	Switching Causes
Automatic control switching	Power-off, reset, hardware failure of the control header
	Fatal error at control header
	Network error at control header
	Configuration download in control header (H1 slot only)
Manual control switching	System switching request from Modular IO Configurator tool

Execution Availability of Control Switching

When switching condition is triggered in control header, in few cases control switching may fail due to operation status of standby header.

Below table illustrates the possible switchover cases considering the status of standby header module.

✓: Switchover possible X: Switchover not possible

Standby header status	Switching condition at control header					
	Automatic switching					Manual switching
	Power- off or reset	Hardware failure	Fatal error	Network error	Configuration download	Control switching request from Modular IO configurator tool
Normal operation	✓	✓	✓	✓	✓	✓
Power-off, reset, hardware failure	X	X	X	X	X	X
Fatal error	✓	✓	X	X	✓	X
RUN/STOP toggle switch is switched to STOP position	✓	✓	X	X	✓	X
Network error	✓	✓	✓	X	✓	X
Non-fatal error	✓	✓	✓	✓	✓	✓

NOTE

When control switching is not possible i.e. when standby header is in error state, CTRL LED of control header module will flash.

Refer the '*Modular IO User Manual*' for detailed LED indications.

Active-Active Network Diagnostic Summary

When modular IO station is configured in Active-Active network, below redundant system information can be monitored in Header diagnostic of M-CCIEF-H module from Modular IO Configurator tool:

Diagnostics	Value	Description
Redundancy mode	1	0: Non-redundant 1: Active-Active configuration 2: Redundant Line (LR) 3: Redundant Master (MR)
Control system identification	0	0: Not connected / Host is not identified 1: System A 2: System B

Status and diagnostic information can be monitored in header diagnostic area using Modular IO Configurator tool.

This information can also be read by CPU from Master station using transient communication (SLMP).

For MELSEC iQ-R PLC, use command 'JP_SLMPREQ' to read diagnostic information using transient communication. For more details, refer Master PLC user manual.

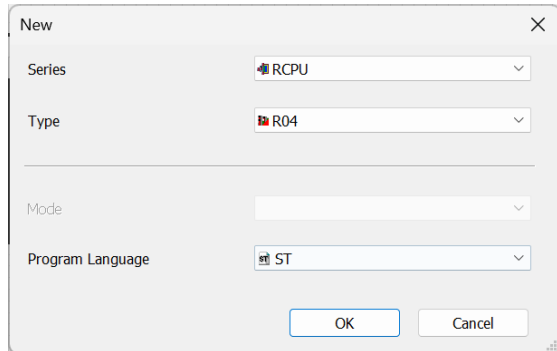
Refer 'Modular IO User Manual (N16001AAMH, Rev 2.08 or later)' (Section Header modules → M-CCIEF-H (CC-Link IE Field header module) → Header diagnostics for head address to be used for reading diagnostic information.

Setting Example

Setting in the Master station

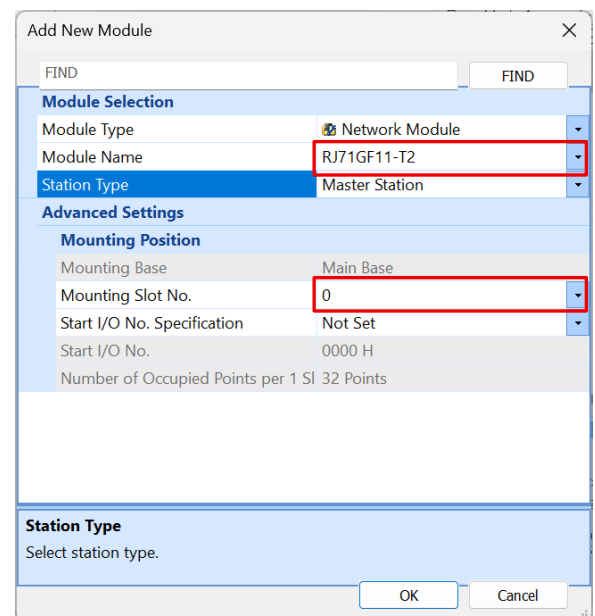
Open GX Works3 engineering tool → Connect the engineering tool to the CPU module of the master station and set the parameters.

1. Set the CPU module as [Project] ⇒ [New]



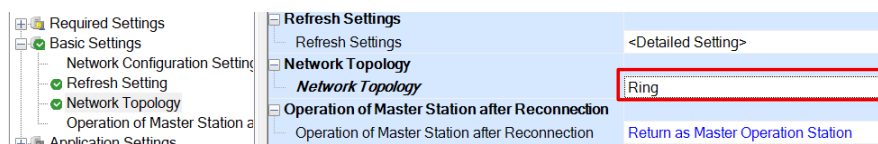
2. Set the master/local module for slot No.0 in the I/O assignment setting.

[Navigation window] ⇒ [Parameter] ⇒ [System Parameter] ⇒ [I/O Assignment] tab ⇒ [I/O Assignment Setting]



3. Set the network topology as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Basic Settings] ⇒ [Network Topology]



4. Set the network configuration as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Basic Settings] ⇒ [Network Configuration Settings]

CC IE Field Configuration (Start I/O: 0000)

CC IE Field Configuration Edit View Tool Close with Discarding the Setting Close with Reflecting the Setting

Detect Now

Mode Setting: Online (Standard Mode) Assignment Method: Start/End Link Scan Time (Approx.): 0.68 ms

No.	Model Name	STA#	Station Type	RX/RX Setting			RWw/RWw Setting		
				Points	Start	End	Points	Start	End
0	Host Station	0	Master Station						
1	M-CCIEF-H	1	Intelligent Device Station	16	0000	000F	8	0000	0007

Host Station

STA#1

STA#0 Master
Total STA#1
Ring

M-CCIEF-H

5. Set the refresh settings as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Basic Settings] ⇒ [Refresh Settings]

0000:RJ71GF11-T2 Module Para... X

Setting Item List Setting Item

Input the Setting Item to S

Required Settings

- Basic Settings
 - Network Configuration
 - Refresh Setting
 - Network Topology
 - Operation of Master S
- Application Settings

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF	↔	Specify Device	SB	512	00000	001FF
-	SW	512	00000	001FF	↔	Specify Device	SW	512	00000	001FF
1	RX	1024	00000	003FF	↔	Specify Device	X	1024	01000	013FF
2	RY	1024	00000	003FF	↔	Specify Device	Y	1024	01000	013FF
3	RWr	1024	00000	003FF	↔	Specify Device	W	1024	00000	003FF
4	RWw	1024	00000	003FF	↔	Specify Device	W	1024	01000	013FF

6. Write the set parameters to the CPU module of master-1 and master-2 station.
7. Either reset the CPU modules of both master stations or power off and on both master stations.

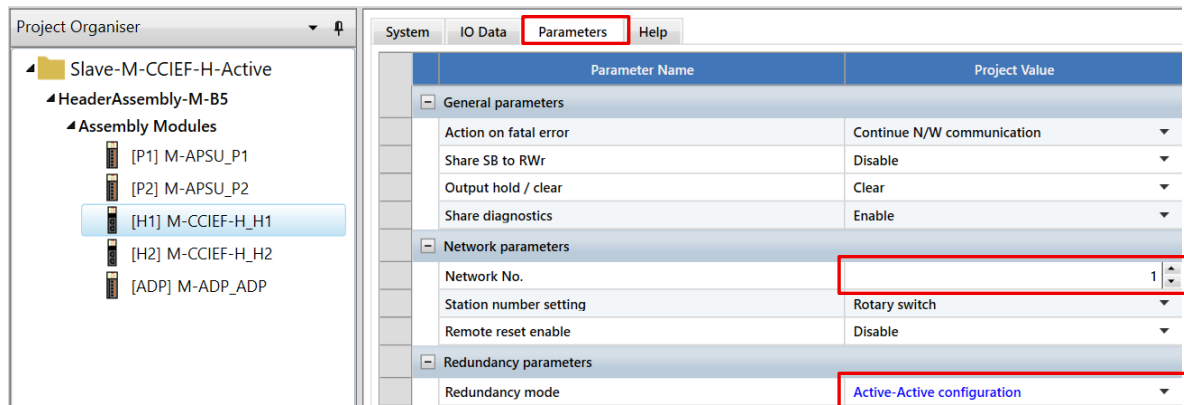
NOTE

Write the configuration to master-1 and master-2 stations separately. Master stations in Active-Active configuration are without Redundant Function. Hence, application program should be developed to transfer application data and output data between two Master stations

Setting in the Slave station

Open Modular IO configurator tool → Connect the configurator tool to M-CCIEF-H header and set the parameters

1. Create new project with bus type- CC-Link IE Field. New project creation method is same as that for the redundant line.
2. Add M-CCIEF-H header in project. Adding new header in project is same as that for the redundant line.
3. Select header assembly base with 5 slots. Selecting header assembly in project is same as that for the redundant line.
4. Set Header parameters [M-CCIEF-H] ⇒ [Parameters]



- Set network parameters (station number and network number) of M-CCIEF-H header which are configured in network configuration of master station.
 - Set 'Redundancy mode' to 'Active-Active' configuration.
5. Write the set parameters to the M-CCIEF-H header module of modular IO station and power cycle modular IO station.

NOTE

The table below lists the supported versions of the M-CCIEF-H header device version and the Modular IO Configurator tool for each redundancy mode.

Redundancy mode	Device version	Modular IO Configurator tool version
Non-redundant	01.00.00.00	2.0.0.0 or later
Active-Active configuration	01.00.00.00	
Redundant Master	01.03.00.00	2.5.0.0 or later
Redundant Line	01.03.00.00	

UD02-A004EN-A Modular IO User Manual
(Redundancy Operation with CC-Link IE Field Header Module (M-CCIEF-H))

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