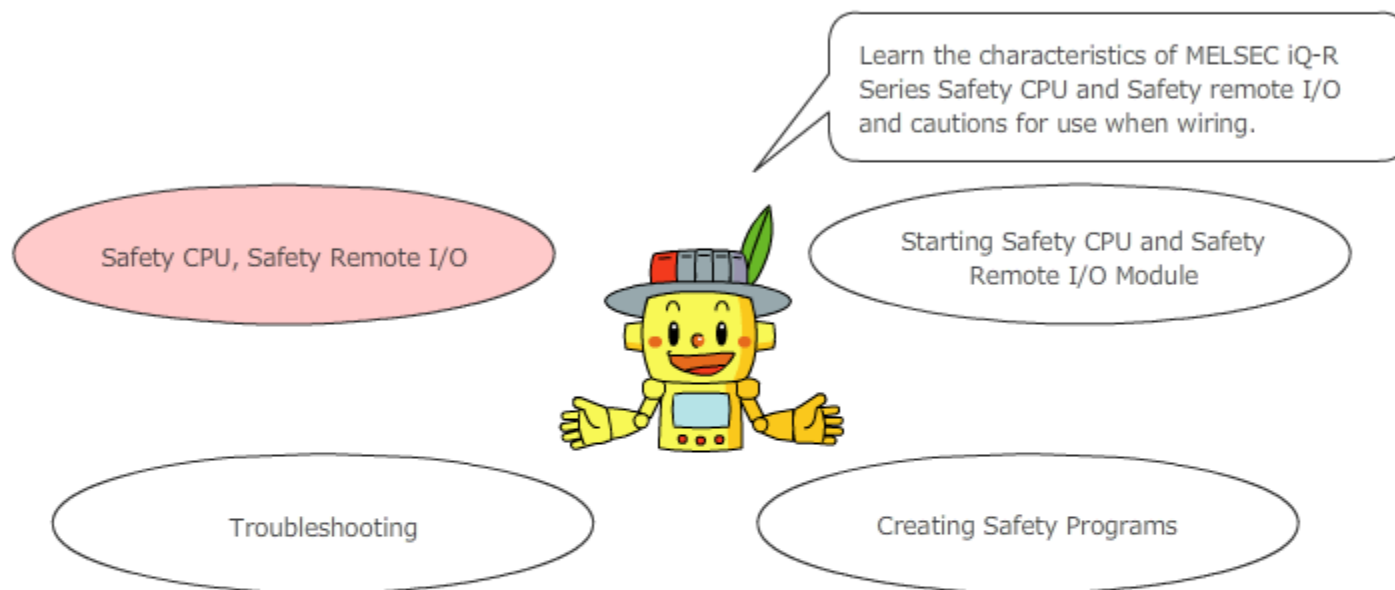**MITSUBISHI ELECTRIC**
Changes for the Better

PLC

MELSEC iQ-R Series Safety CPU, Safety Remote I/O

This training course is intended for people who have an understanding of safety fundamentals and are using the MELSEC iQ-R Series Safety CPU/Safety remote I/O for the first time.

Introduction Purpose of the Course

This course provides instruction in startup methods, basic programming methods, and troubleshooting, and is intended for those who are configuring systems using MELSEC iQ-R Series Safety CPU/Safety remote I/O for the first time.

Learn the characteristics of MELSEC iQ-R Series Safety CPU and Safety remote I/O and cautions for use when wiring.

Safety CPU, Safety Remote I/O

Starting Safety CPU and Safety Remote I/O Module

Troubleshooting

Creating Safety Programs

The training in this course requires basic knowledge of safety measures for use when using machine systems and of MELSEC iQ-R Series PLCs.

For beginners, taking the following courses is recommended.
・"Beginning Machinery Safety" course
・"MELSEC iQ-R Series Fundamental" course

Introduction Course Structure

The contents of this course are as follows.
We recommend that you start from Chapter 1.

Chapter 1 - Safety CPU, Safety Remote I/O

Learn the characteristics of MELSEC iQ-R Series Safety CPU and Safety remote I/O and cautions for use when wiring.

Chapter 2 - Starting Safety CPU and Safety Remote I/O Module

Learn MELSEC iQ-R Series Safety CPU and Safety remote I/O starting methods.

Chapter 3 - Creating Safety Programs

Learn how to create a safety program.

Chapter 4 - Troubleshooting

Learn troubleshooting for the MELSEC iQ-R Series Safety CPU module.

Final Test

5 sections in total (6 questions)   Passing grade: 60% or higher

Go to the next page	▶❙	Go to the next page.
Back to the previous page	❙◀	Back to the previous page.
Move to the desired page	TOC	"Table of Contents" will be displayed, enabling you to navigate to the desired page.
Exit the learning	✕	Exit the learning. Window such as "Contents" screen and the learning will be closed.

Introduction | Cautions for Use

Safety precautions

When you learn by using actual products, please fully read the safety precautions in the corresponding manuals and use them correctly.

Precautions in this course

- The displayed screens of the software version that you use may differ from those in this course.

  The following shows the software used in this course and each software version.

  For the latest version of each software, check the Mitsubishi Electric FA Website.

    - MELSOFT GX Works3   Ver.1.023Z

Reference materials

Below is a list of references related to the topics in this course. (Please note that these reference materials are not absolutely necessary as you can still complete this course without using them.)
Click the name of the reference file to download.

Name of reference	File format	File size
Recording paper	Compressed file	6.61 kB

Chapter 1 Safety CPU, Safety Remote I/O

This chapter introduces the MELSEC iQ-R Series Safety CPU, Safety remote I/O.

1.1 Safety CPU

Safety CPUs that comply with international safety standards can control standard systems and safety systems simultaneously. Systems that combine standard controls and safety controls can be constructed by connecting safety switches and safety light curtains via CC-Link IE Field Networks to systems using Safety CPUs. Additionally, GX Works3, an engineering software package that offers intuitive operation, can be used for unified programming of standard controls and safety controls.

Safety CPU

SD memory card slot

RUN/STOP switch

USB port
USB2.0 High Speed (miniB)

Ethernet port
100BASE-TX/10BASE-T

Safety function module

The Safety CPU is used with a safety function module.
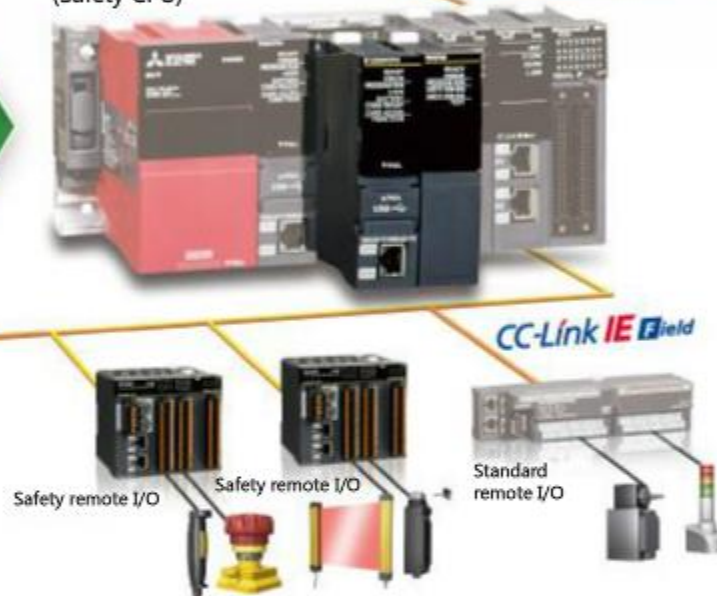
1.2 Safety Remote I/O

A safety remote I/O is a remote I/O module compatible with CC-Link IE Field Network safety communication functions. Safety control is performed in combination with MELSEC iQ-R Series Safety CPUs.

MELSEC iQ-R Series (Safety CPU)

CC-Link IE Field

- Certified by TÜV Rheinland®
- Space/wire-saving
- Design efficiency
- Multilingualization

CC-Link IE Field

Safety remote I/O

Safety remote I/O

Standard remote I/O

Safety remote I/O (input module)
An input module with safety function.
For double wiring, 16 safety inputs can be connected.

Safety remote I/O (extension output module)
An extension output module with safety function.
This can be linked with main input modules for additional safety output.
For double wiring, 4 safety outputs can be connected.

1.3 Precautions on Wiring Safety Remote I/O Modules

Supply power to the proper ports, shown below, of the safety remote I/O module.

When only an input module is used: Two locations in the diagram below (A and B)

When both an input module and extension output module are used: Three locations in the diagram below (A, B, and C)

Input module

Extension output module

1.4 Summary of This Chapter
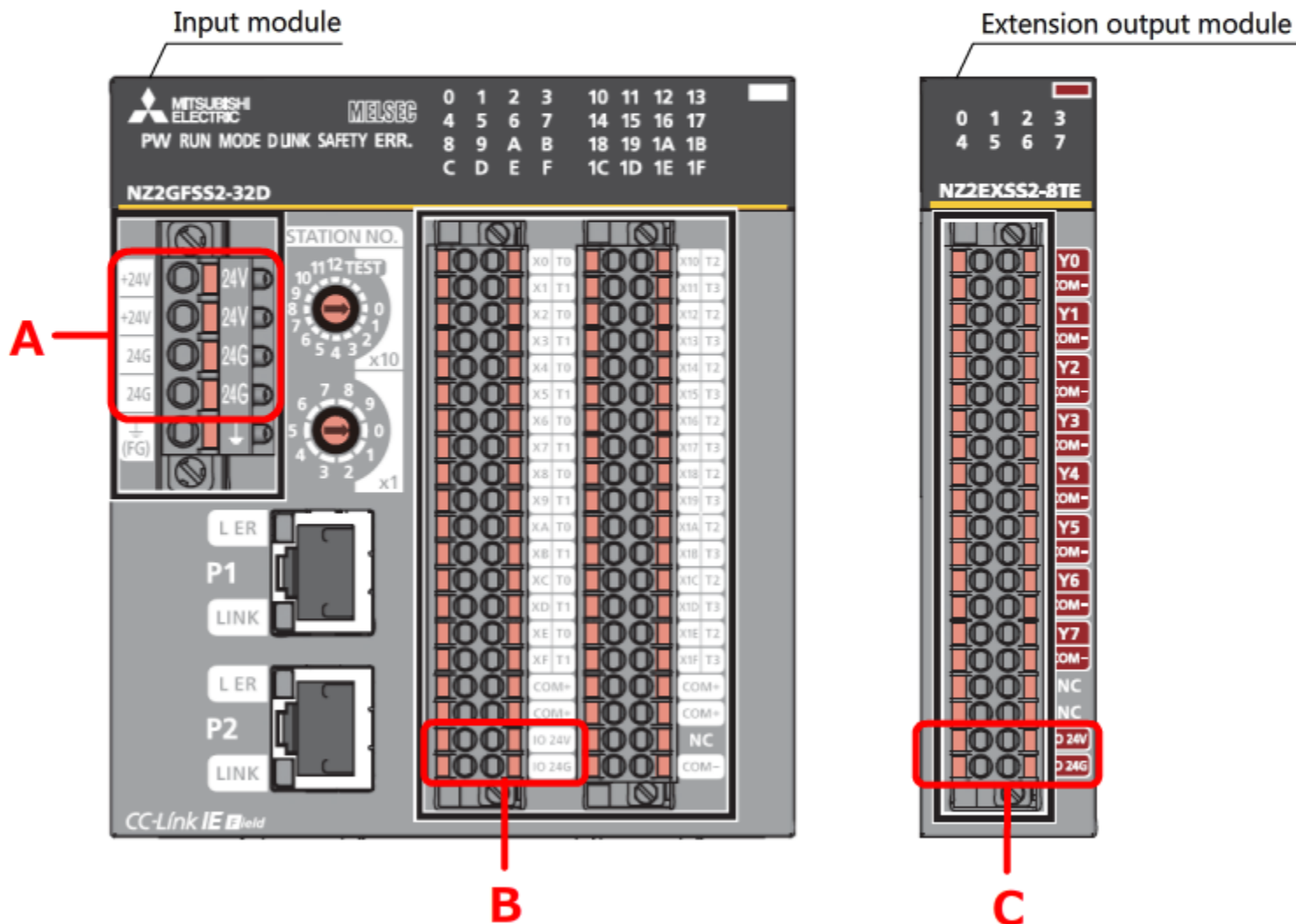
In this chapter, you have learned:

- Safety CPU

- Safety Remote I/O

- Precautions on Wiring Safety Remote I/O Modules

Important points

Safety CPU	• Safety CPUs that comply with international safety standards can control standard systems and safety systems simultaneously.
Safety remote I/O	• A safety remote I/O is a remote I/O module compatible with CC-Link IE Field Network safety communication functions.
Precautions on wiring safety remote I/O modules	• When using a safety remote I/O module, it is necessary to supply power correctly to the designated ports.

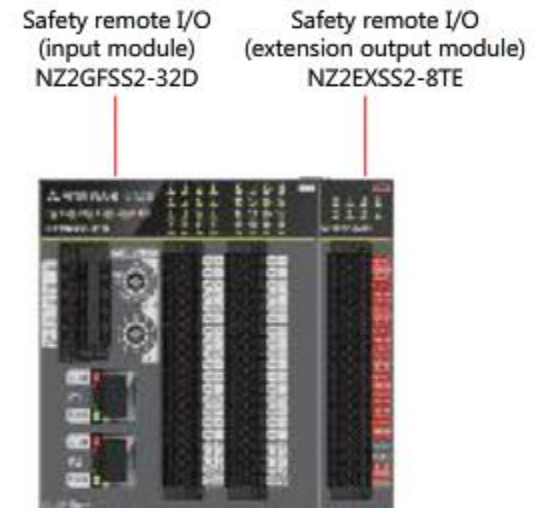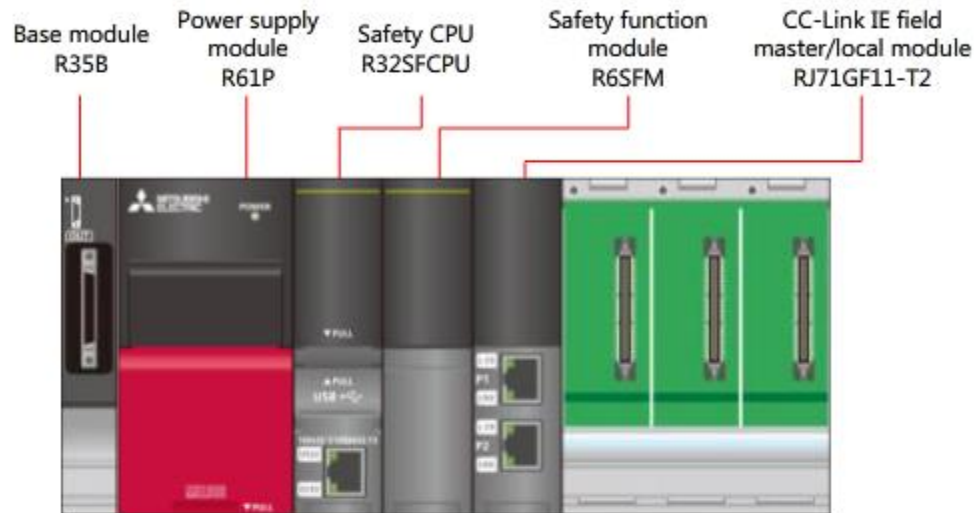# Chapter 2 | Starting Safety CPU and Safety Remote I/O Modules

This chapter introduces startup methods for the MELSEC iQ-R Series Safety CPU and Safety remote I/O.

2.1 Environment Anticipated for This Course

2.2 Creating Projects

2.3 Module Configuration Definition

2.4 Initialization of All PLC Data

2.5 Safety Remote I/O and Safety Communication Settings

2.6 Checking Safety Remote I/O LED

2.7 Summary of This Chapter

2.1 Environment Anticipated for This Course

The following environment is anticipated for this course.

Base module
R35B

Power supply
module
R61P

Safety CPU
R32SFCPU

Safety function
module
R6SFM

CC-Link IE field
master/local module
RJ71GF11-T2

Safety remote I/O
(input module)
NZ2GFSS2-32D

Safety remote I/O
(extension output module)
NZ2EXSS2-8TE

2.2   Creating Projects

Use MELSOFT GX Works3 to create projects and sequence programs.
When using MELSEC iQ-R Series Safety CPU/Safety remote I/O, version 1.015R or higher of MELSOFT GX Works3 is required.

Checking the MELSOFT GX Works3 version
After starting MELSOFT GX Works3, select [Help] - [Version Information] from the menu.

2.2.1 Adding a new user

Start MELSOFT GX Works3 and create a new project.
From the menu, select [Project] - [New], configure as follows, and then click OK.
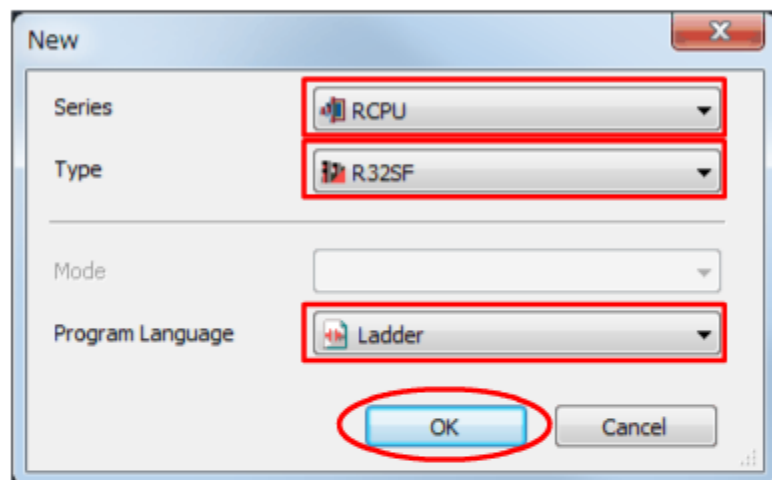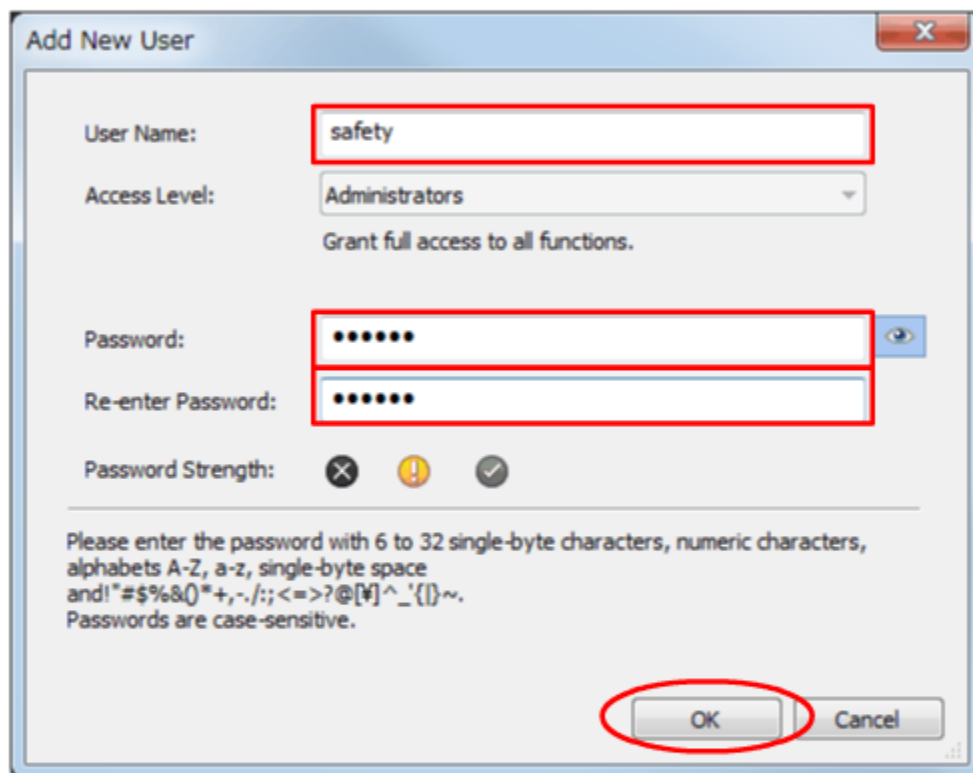
Item	Setting content
Series	RCPU
Type	R32SF
Program Language	Ladder

New

Series	RCPU
Type	R32SF
Mode	
Program Language	Ladder

OK   Cancel

2.2.2   Adding a new user

Add a new user.
Enter a user name, password, and confirmation password, and click OK.

Add New User

|	
User Name:	safety
Access Level:	Administrators
	Grant full access to all functions.
Password:	●●●●●●
Re-enter Password:	●●●●●●
Password Strength:	✖ ⚠ ✓

Please enter the password with 6 to 32 single-byte characters, numeric characters,
alphabets A-Z, a-z, single-byte space
and!"#$%&()*+,-./:;<=>?@[¥]^_'{|}~.
Passwords are case-sensitive.

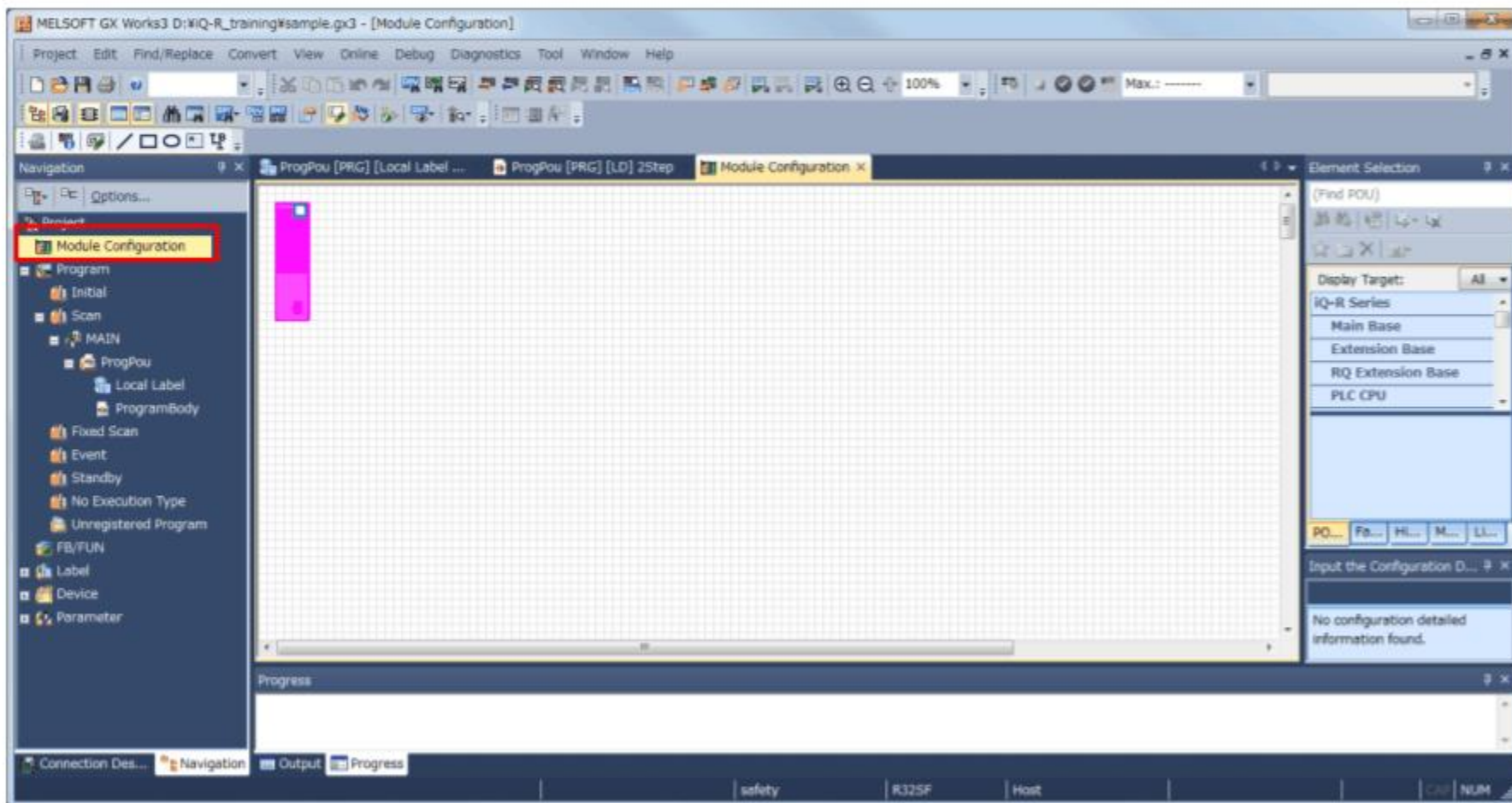**OK**   **Cancel**

2.2.3 Saving a project

When a project is created, the save window starts automatically.
Enter a file name, and then click [Save].
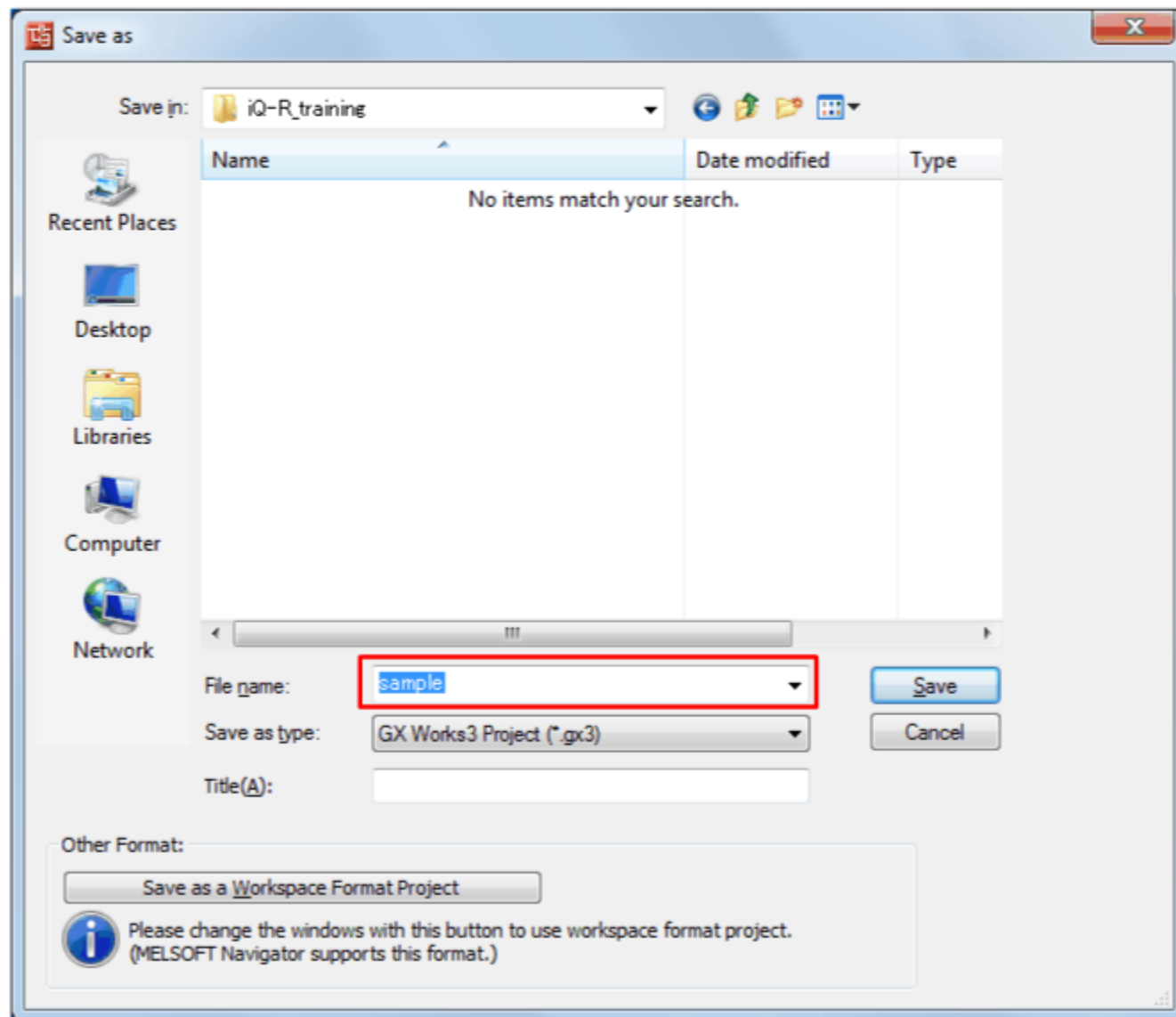
2.3 Module Configuration Definition

Create a module configuration diagram and perform network configuration settings.
From the navigation tree, double-click [Module Configuration] and open the module configuration diagram.
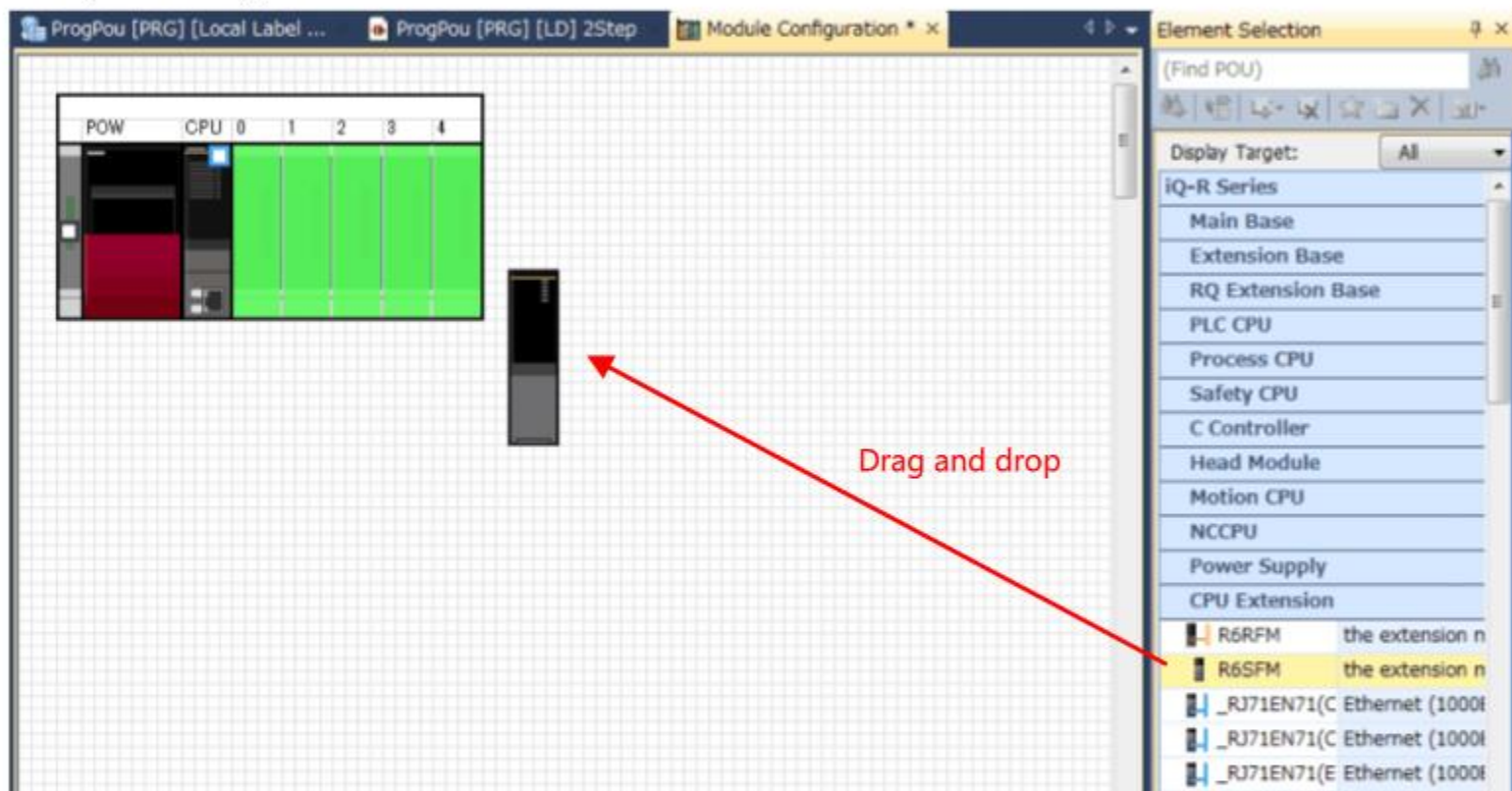
2.3.1 Creating a module configuration diagram

Create a module configuration diagram.
From the Element Selection window, select the required modules, and drag and drop them onto the module configuration diagram.

*The safety function module "R6SFM" is classified in "CPU Extension".
*As of July 2017, the modules that have safety communication functions are the network module "RJ71GF11-T2" (Ver.07 or later) and simple motion module "RD77GF" (Ver.05 or later).

2.3.2 Setting a network configuration

Set a network configuration.

When placing safety remote I/O modules on the network configuration, a safety remote I/O profile must be registered.
Register profiles of safety remote I/O modules in advance if none are registered.

Safety remote I/O module profiles can be downloaded from the Mitsubishi Electric FA website.
(They can also be downloaded here)

To register a profile in GX Works3, select [Tool] - [Profile Management] - [Register] without a project open, select a file on the "Register Profile" window, then click the [Register] button.

*Profiles are compressed files (e.g. *.zip, *.ipar, *.cspp).
  Register the compressed file without decompressing it.

On the next page, follow the messages to perform operations on screen, and try setting a network configuration.

MELSOFT GX Works3 D:¥iQ-R_training¥sample.gx3 - [0010:RJ71GF11-T2 Module Parameter]

Project   Edit   Find/Replace   Convert   View   Online   Debug   Diagnostics   Tool   Window   Help

Navigation

Options...

- Project
  - Module Configuration
  - Program
    - Initial
    - Scan
      - MAIN
        - ProgPou
          - Local Label
          - ProgramBo
    - Fixed Scan
    - Event
    - Standby
    - No Execution Type
    - Unregistered Progi
  - FB/FUN
  - Label
  - Device
  - Parameter

Connection ...   Navigation

Local Label ...   ProgPou [PRG] [LD] 2Step   Module Configuration   0010:RJ71GF11-T2 Module ...

Setting Item List

Setting Item

Item	Setting
Network Configuration Settings	
Network Configuration Settings	‹Detailed Setting›
Refresh Settings	
Refresh Settings	‹Detailed Setting›
Network Topology	
Network Topology	Line/Star
Operation of Master Station after Reconnection	
Operation of Master Station after Reconnection	Return as Master Operation Station

- Required Settings
- Basic Settings
  - ✓ Network Configuration Se
  - Refresh Setting
  - Network Topology
  - Operation of Master Stati
- Application Settings

Explanation

Set parameters of slave stations (the number of points and assignment of link devices) in the master and submaster station.

Item List   Find Result

Check   Rest

Network configuration setting has completed.

Click ▶ to proceed to the next page.

safety   R32SF   Host

2.4 Initialization of All PLC Data

Executing "Initialize all PLC Data" is recommended when the Safety CPU module is started for the first time after purchase.
Select [Online] - [User Authentication] - [Initialize all PLC Data], then click [Yes].

2.5   Safety Remote I/O and Safety Communication Settings

Perform safety remote I/O and safety communication settings.
The setting procedure is shown below. Detailed procedures are explained on the following pages.

(1) Writing the user information	· · · · · · · · · 2.5.1

↓

(2) Applying the network configuration to the module	· · · · · · · · · 2.5.2

↓

(3) Logging on to the PLC	· · · · · · · · · 2.5.3

↓

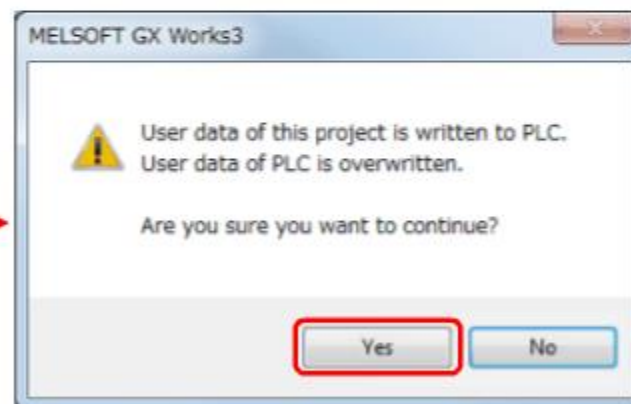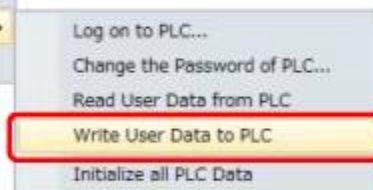|	
(4) Setting the safety remote I/O module	· · · · · · · · · 2.5.4

↓

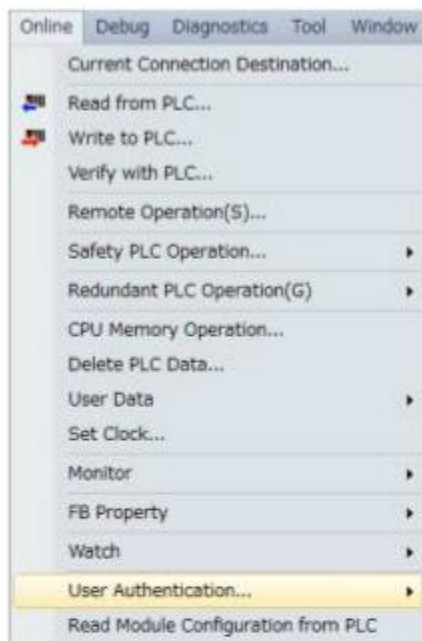|	
(5) Setting safety communication	· · · · · · · · · 2.5.5

2.5.1 Writing the user information

To write the project into the module, write the user information.
Select [Online] - [User Authentication] - [Write User Data to PLC], then click [Yes].

2.5.2 Applying the network configuration to the module

Apply the network configuration to the module.
Select [Online] - [Write to PLC] from the menu to display the "Online Data Operation" window.
Select "System Parameter/CPU Parameter" and "Module Parameter (Standard/Safety)", then click [Execute].
When writing to the PLC completes, the confirmation screen is displayed. Check the confirmation items and click [Close].

2.5.2 Applying the network configuration to the module

MELSOFT GX Works3

Safety program and parameters were written. Please confirm the followings before switching to safety mode.

[Confirmation 1] ☑ Test the program thoroughly under the appropriate application environment.

[Confirmation 2] ☑ Please follow the instruction manual to read the safety program and parameters from the target module to write, visually check whether they are consistent with the ones of setting contents.

Close

*e-Manual Viewer starts every time data is written to a Safety CPU module.

<Caution>
After overwriting parameters, Safety CPU reset operation must be performed.

2.5.3 Logging on to the PLC

To perform safety remote I/O and safety communication settings, you must log in to the PLC.
Select [Online] - [User Authentication] - [Log on to PLC], enter a password, then click [OK].
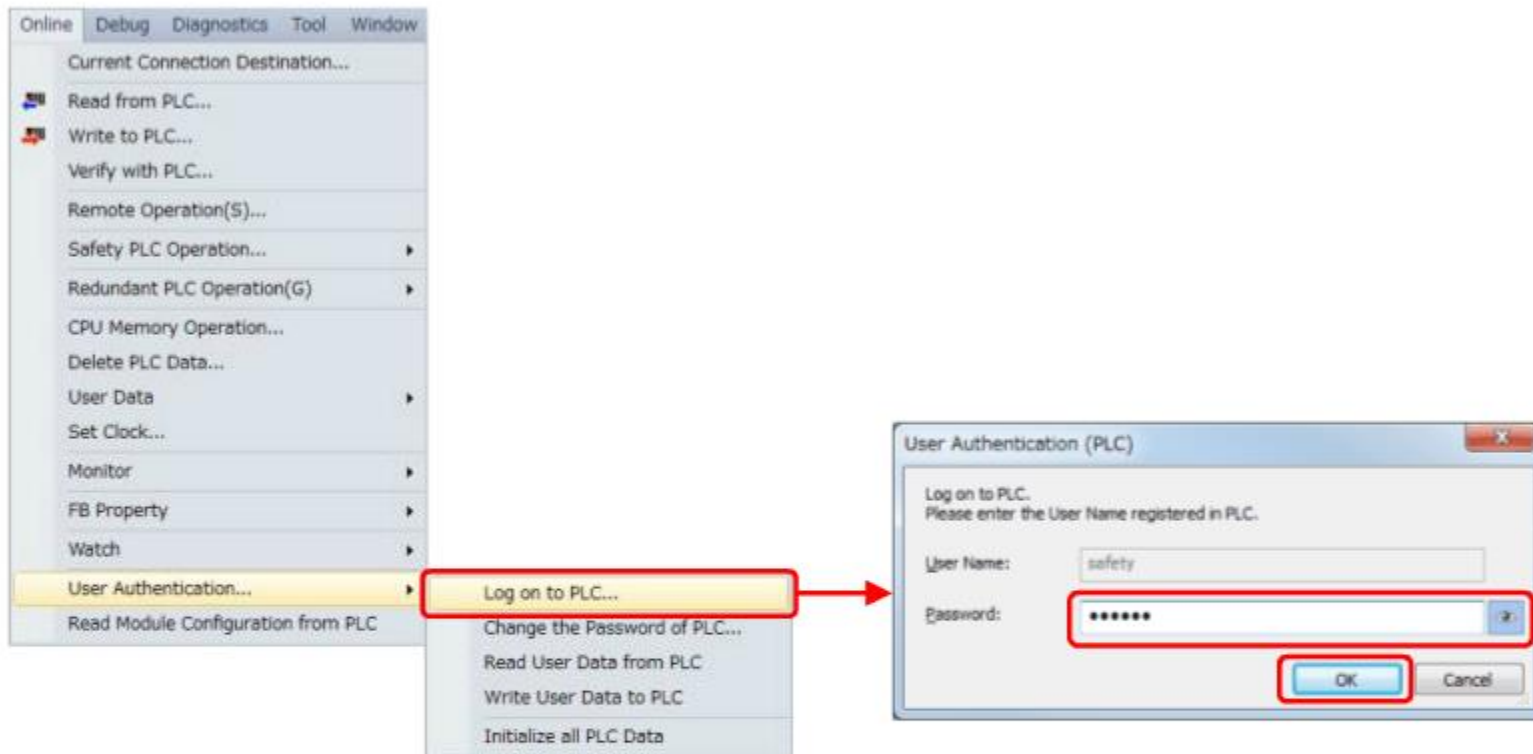
<Caution>
If the logon status is canceled, any operations for the Safety CPU are rejected. In this case, log on to the PLC again.

2.5.4 Setting the safety remote I/O module

Perform safety remote I/O settings.
On the next page, follow the messages to perform operations on screen, and try a safety remote I/O setting.

MELSOFT GX Works3 D:¥iQ-R_training¥sample.gx3 - [0010:RJ71GF11-T2 Module Parameter]

Project Edit Find/Replace Convert View Online Debug Diagnostics Tool Window Help

Navigation

Options...

- Project
  - Module Configuration
  - Program
  - FB/FUN
  - Label
  - Device
  - Parameter
    - System Paramete
    - R32SFCPU
    - Module Informatio
      - 0000:R6SFM
      - 0010:RJ71GF11-
        - Module Param
        - Module POU (
    - Remote Password

Setting Item List

Input the Setting Item to Search

- Required Settings
- Basic Settings
  - ✅ Network Configuration Se
  - Refresh Setting
  - Network Topology
  - Operation of Master Stati
- Application Settings

Item List | Find Result

Setting Item

Item	Setting
Network Configuration Settings	
Network Configuration Settings	‹Detailed Setting›
Refresh Settings	
Refresh Settings	‹Detailed Setting›
Network Topology	
Network Topology	Line/Star
Operation of Master Station after Reconnection	
Operation of Master Station after Reconnection	Return as Master Operation Station

Explanation

Set parameters of slave stations (the number of points and assignment of link devices) in the master and submaster station.

Check

The safety remote I/O module setting is complete.

Click ▶ to proceed to the next page.

Connection ... | Navigation

safety | R32SF | Host

2.5.5 Setting safety communication

Perform safety communication setting.
On the next page, follow the messages to perform operations on screen, and try a safety communication setting.

2.5.5 Setting safety communication

| | CPU Built-in Memory | | SD Memory Card | | Intelligent Function Module |

Open/Close All(T)   Deselect All(N)

Module Name/Data Name	◆	▯	▣	Detail	Title	Last Change	Size (Byte)
⊟ sample	☐						
⊟ Parameter	☑						
System Parameter/CPU Parameter	☑					2017/03/14 12:49:42	Not Calculated
Module Parameter (Standard/Safety)	☑					2017/03/27 15:47:42	Not Calculated
Memory Card Parameter						2017/03/14 12:46:12	Not Calculated
Remote Password	☑					2017/03/14 12:49:41	Not Calculated
⊟ Global Label	☑						
Global Label Setting	☑					2016/12/06 13:32:17	Not Calculated
⊟ Program	☑			Detail			
MAIN	☑					2017/03/14 12:49:44	Not Calculated
⊟ Device Memory	☐						
MAIN	☐			Detail		2017/03/14 12:49:47	-

Display Memory Capacity

Memory Capacity

Size Calculation

Legend
- ■ Used
- ■ Increased
- ■ Decreased
- ■ 5% or Less

Program Memory — Free 1278/1280KB

Data Memory — Free 20240/20488KB

Device/Label Memory (File Storage Area) — Free 1938/1938KB

SD Memory Card —

Safety communication setting is complete.

Click ▶ to proceed to the next page.

2.6 Checking Safety Remote I/O LED

When safety remote I/O and safety communication settings are complete, reset the Safety CPU and safety remote I/O modules, and check that the "SAFETY" LED of the safety remote I/O module is on.

2.7 Summary of This Chapter
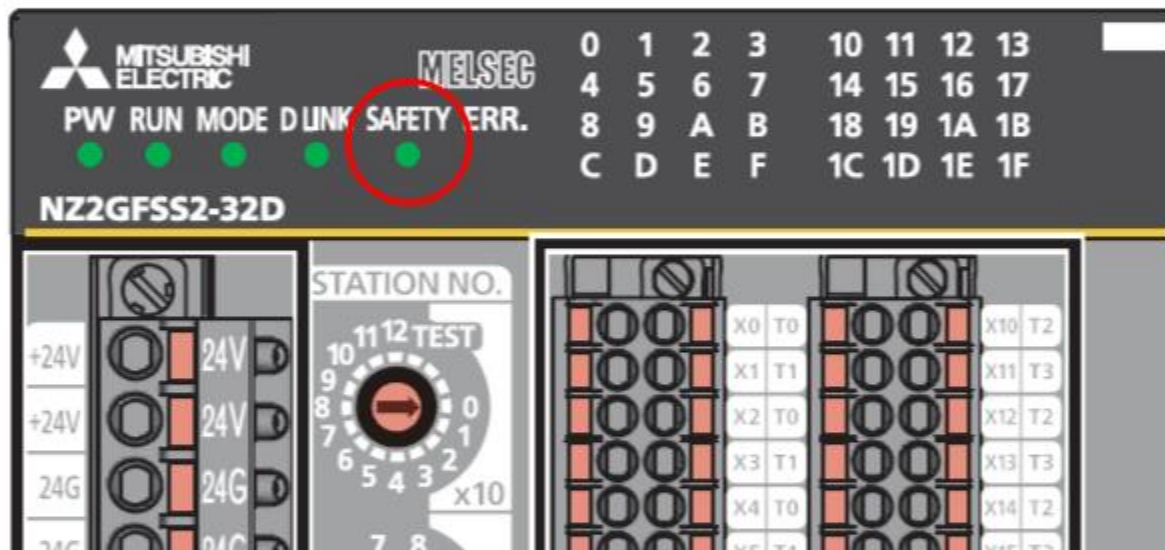
In this chapter, you have learned:

- Creating projects
- Module configuration definition
- Initialization of all PLC data
- Writing the user information
- Setting a network configuration
- Checking safety remote I/O LED

Important points

Creating projects	• Use MELSOFT GX Works3 to create projects and sequence programs. • When using MELSEC iQ-R Series Safety CPU/Safety remote I/O, version 1.015R or higher of MELSOFT GX Works3 is required.
Module configuration definition	• For module configuration diagram, select the required modules from the Element Selection window, and drag and drop them onto the module configuration diagram. • When placing safety remote I/O modules on the network configuration, a safety remote I/O profile must be registered.
Initialization of all PLC data	• Executing "Initialize all PLC Data" is recommended when the Safety CPU module is started for the first time after purchase.
Writing the user information	• To write the project into the module, it is necessary to write the user information.
Setting a network configuration	• Safety remote I/O and safety communication settings are performed through procedures referred to as network configuration application to the module, safety remote I/O setting, and safety communication setting.
Checking safety remote I/O LED	• When safety remote I/O and safety communication settings are complete, reset the Safety CPU and safety remote I/O modules, and check that the "SAFETY" LED of the safety remote I/O module is on.

Chapter 3 | Creating Safety Programs

This chapter introduces how to create safety programs.

3.1 Creating New Data

This section introduces how to create new data for safety programs.
Right-click [Fixed Scan] in [Program] in the navigation window, and click [Add New Data].
Select "Safety" in [Category] on the "New Data" window and then click [OK].
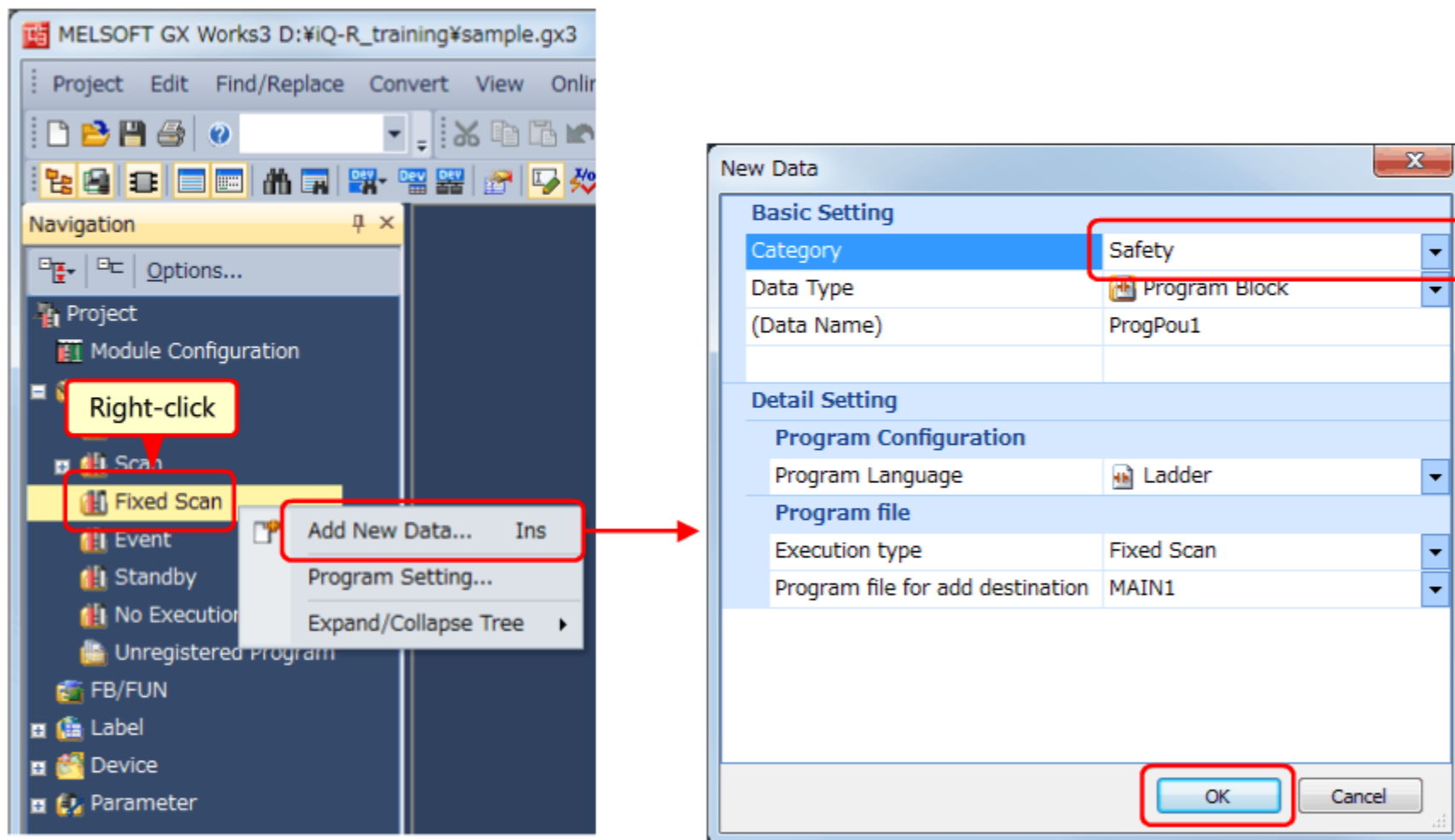
<Caution>
The available program type for safety programs is "Fixed Scan" of "Execution type" only.

3.2   Safety Programs

Safety programs can be edited in the same way as standard programs.
Safety programs can be written in "Write to PLC" with the same method as that for standard programs.

3.3 Differences Between "Safety Programs" and "Standard Programs"

The below table displays the differences between "safety programs" and "standard programs".

Item	Safety program	Standard program
Icon	⊟ MAIN1 ⊟ ProgPou1 Local Label ProgramBody	⊟ MAIN2 ⊟ ProgPou2 Local Label ProgramBody
Programming language	Ladder	Ladder, ST, FBD/LD
Program operation	Fixed scan execution type	Initial execution type Scan execution type Fixed scan execution type Event execution type Standby type
No. of executed programs	32 programs	252 programs (including safety programs)
Available user device	Safety input (SA\X) Safety output (SA\Y) Safety internal relay (SA\M) Safety link relay (SA\B) Safety timer (SA\T) Safety retentive timer (SA\ST) Safety counter (SA\C) Safety data register (SA\D) Safety link register (SA\W)	Input (X) Output (Y) Internal relay (M) Latch relay (L) Link relay (B) Link special relay (SB) Annunciator (F) Edge relay (V) Timer (T) Long timer (LT) Retentive timer (ST) Long retentive timer (LST) Counter (C)

Available user device	Safety input (SA\X) Safety output (SA\Y) Safety internal relay (SA\M) Safety link relay (SA\B) Safety timer (SA\T) Safety retentive timer (SA\ST) Safety counter (SA\C) Safety data register (SA\D) Safety link register (SA\W)	Input (X) Output (Y) Internal relay (M) Latch relay (L) Link relay (B) Link special relay (SB) Annunciator (F) Edge relay (V) Timer (T) Long timer (LT) Retentive timer (ST) Long retentive timer (LST) Counter (C) Long counter (LC) Data register (D) Link register (W) Link special register (SW)
Available system device	Safety special relay (SA\SM) Safety special register (SA\SD)	Special relay (SM) Special register (SD) Function input (FX) Function output (FY) Function register (FD)

3.4 Standard/Safety Shared Labels

Use the "standard/safety shared label" to transfer data between safety programs and standard programs.

Standard controls | Safety controls

<Program B>

<Program A>

FB

FB

Transfer data through standard/safety shared labels.

Standard program files

Safety program files

| Standard devices |
| Safety devices |
| Safety labels |
| Standard/safety shared labels |
| Standard labels |
| Standard latch devices, standard latch labels |
| File register |

Device/label memory
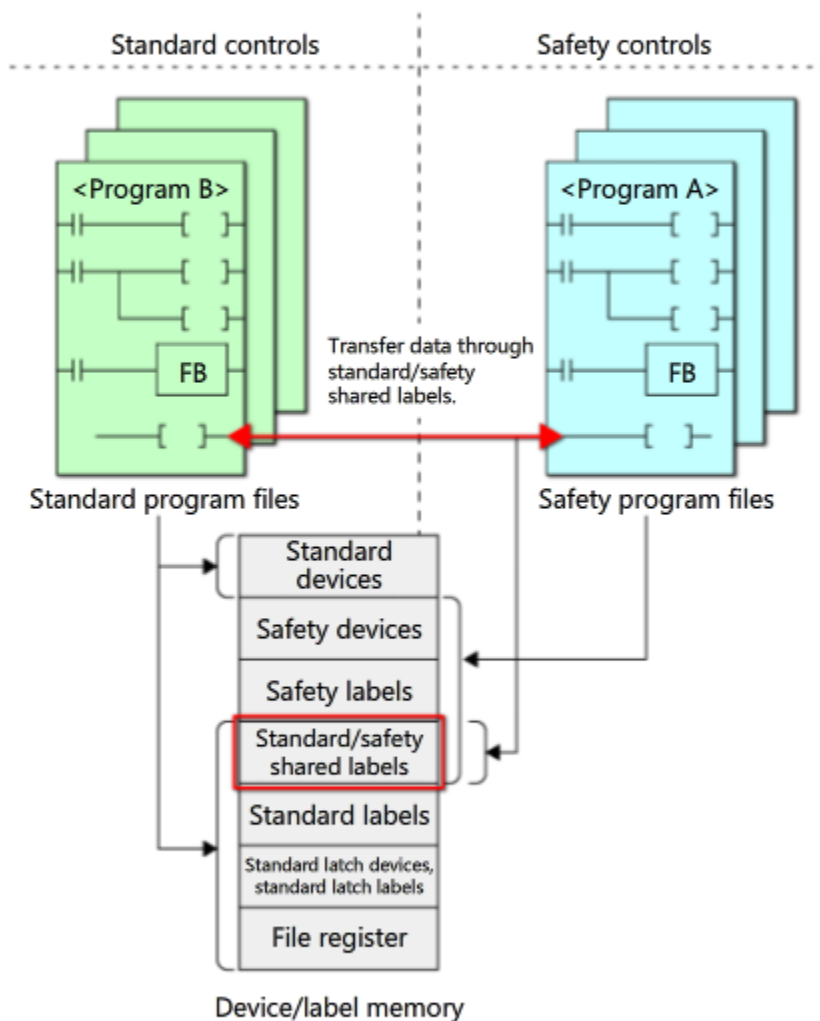
3.5   Creating Standard/Safety Shared Labels

This section introduces how to create a standard/safety shared label.
Right-click [Label] in the navigation window, and select [Add New data].
Select "Standard/Safety Shared" in [Category] on the "New Data" window, enter a name of your choice in [(Data Name)], then click [OK].
If a label name to assign to the label is entered and the data type is selected, the program can refer to the label.

3.6 Safety Operation Mode

The Safety CPU module has the following two operation modes.
Switch the operation modes between operation and start-up or maintenance.

Safety operation mode	Description
Safety mode	This mode is for operating a safety system controlled by a Safety CPU module. In this mode, safety programs or safety parameters of the Safety CPU module cannot be changed. Only device data values in safety programs can be changed.
Test mode	This mode is for start-up and maintenance (such as setting changes and tests) of a safety system controlled by a Safety CPU module. In this mode, safety programs or safety parameters of the Safety CPU module can be changed. Device data can be changed with a device test.

*For details, refer to "MELSEC iQ-R CPU Module User's Manual (Application)".

3.7 Switching the Safety Operation Mode

This section introduces how to switch the safety operation mode.
Switch the safety operation mode by selecting [Online] - [Safety PLC Operation] - [Switch Safety Operation Mode].

MELSOFT GX Works3 D:¥iQ-R_training¥sample.gx3

Project Edit Find/Replace Convert View **Online** Debug Diagnostics Tool Window Help

Online menu
Current Connection Destination...
Read from PLC...
Write to PLC...
Verify with PLC...
Remote Operation(S)...
Safety PLC Operation... ▶
Redundant PLC Operation(G) ▶
CPU Memory Operation...
Delete PLC Data...
User Data ▶
Set Clock...
Monitor ▶
FB Property ▶
Watch ▶
User Authentication... ▶

Safety PLC Operation submenu:
- Check Safety Data Identity...
- **Switch Safety Operation Mode...**

Navigation

Options...

- Project
  - Module Configuration
  - Program
    - Initial
    - Scan
    - Fixed Scan
    - Event
    - Standby
    - No Execution Type
    - Unregistered Program
  - FB/FUN
  - Label
  - Device

<Caution>
To switch the operation mode from the test mode to the safety mode, the Safety CPU module needs to be stopped.

3.8   Summary of This Chapter

In this chapter, you have learned:

- Safety programs
- Standard/safety shared labels
- Safety operation mode

Important points

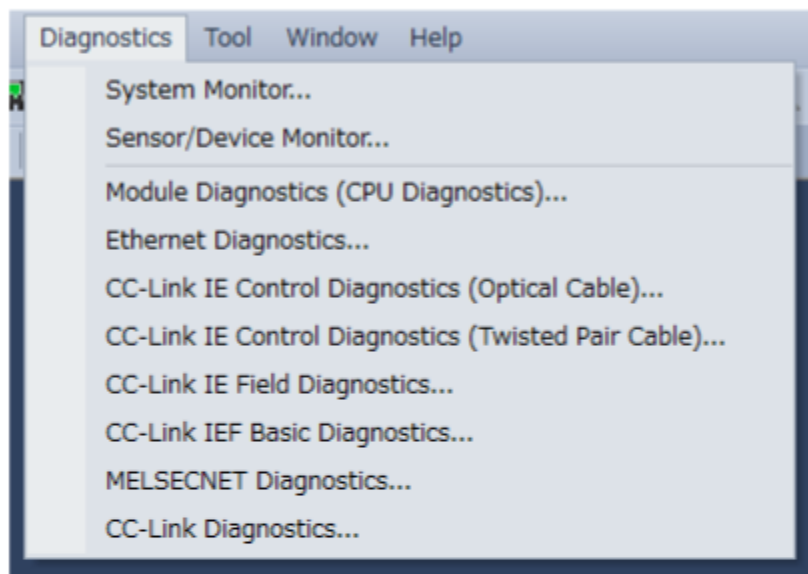| Safety programs	• When creating a safety program, select "Safety" in [Category] on the "New Data" window. • The available program type for safety programs is "Fixed Scan" of "Execution type" only. • Safety programs can be edited in the same way as standard programs. • Safety programs can be written in "Write to PLC" with the same method as that for standard programs.
Standard/safety shared labels	• Use the "standard/safety shared label" to transfer data between safety programs and standard programs. • When creating a standard/safety shared label, select "Standard/Safety Shared" in [Category] on the "New Data" window.
Safety operation mode	• Safety CPU operation mode features a "Safety mode" for operation of safety systems, and a "Test mode" for performing maintenance (changing settings or testing) of safety systems.

Chapter 4 Troubleshooting

This chapter introduces troubleshooting.

4.1 Troubleshooting for the Safety CPU Module

4.2 Reading Error History Data of the Safety Remote I/O Module

4.3 Summary of This Chapter

4.1 Troubleshooting for the Safety CPU Module

The troubleshooting for standard CPU modules (RnCPU) can be basically applied to Safety CPU modules (RnSFCPU). Collect error information by using the GX Works3 functions such as "System Monitor" and "Module Diagnostics (CPU Diagnostics)", and identify an error cause.

Diagnostics	Tool	Window	Help

System Monitor...

Sensor/Device Monitor...

Module Diagnostics (CPU Diagnostics)...

Ethernet Diagnostics...

CC-Link IE Control Diagnostics (Optical Cable)...

CC-Link IE Control Diagnostics (Twisted Pair Cable)...

CC-Link IE Field Diagnostics...

CC-Link IEF Basic Diagnostics...

MELSECNET Diagnostics...

CC-Link Diagnostics...

<Caution>
The "Error history read" operation for safety remote I/O modules is slightly different from that for standard CPU modules. Section 4.2 describes the details.

4.2 Reading Error History Data of the Safety Remote I/O Module

Read the error history data of the safety remote I/O module.
On the next page, follow the messages to perform operations on screen, and try to read safety remote I/O error history data.

4.2 Reading Error History Data of the Safety Remote I/O Module

CC IE Field

CC IE Field

Mode Set

Host Station

STA#0 Mas
Total STA#
Line/Star

Output

Command Execution of Slave Station

Target Module Information:

NZ2GFSS2-32D,NZ2EXSS2-8TE
Start I/O No.:0010 - Station No.:1

Method selection:

Error history read

The error history is read from the target module.

Command Setting

There is no command setting in the selected process.

Execution Result

Name	Read Value	Unit	Description
Error history 1 read			
Error and Solution	020AH Safety module validati...		
Error classification	450		
Error item number	0x020A		
[Error time] First two digits of the year/Last two digits of the year	2000		
[Error time] Month/Day	421		
[Error time] Hour/Minute	111		
[Error time] Second/No Use	5700		
Error code details 1	0x0000		
Error code details 2	0x0000		

-The refreshed device values of remote I/O or remote registers may be overwritten.
-Accesses the PLC CPU by using the current connection destination. Please check if there is any problem with the connection destination.
-Process is executed according to the parameters written in the PLC CPU.
-For information on items not displayed on the screen, please refer to the Operating Manual.

The error history data reading of the safety remote I/O module is complete.

Click ▶ to proceed to the next page.

Close

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4.3 Summary of This Chapter

In this chapter, you have learned:

- Troubleshooting for the Safety CPU Module
- Reading Error History Data of the Safety Remote I/O Module

Important points

Troubleshooting for the Safety CPU Module	• The troubleshooting for standard CPU modules (RnCPU) can be basically applied to Safety CPU modules (RnSFCPU). • Collect error information by using the GX Works3 functions such as "System Monitor" and "Module Diagnostics (CPU Diagnostics)", and identify an error cause.
Reading Error History Data of the Safety Remote I/O Module	• The "Error history read" operation of the safety remote I/O module is executed by selecting "Command Execution of Slave Station".

Test | Final Test

Now that you have completed all of the lessons of the MELSEC iQ-R Series Safety CPU, Safety Remote I/O Course, you are ready to take the final test.
If you are unclear on any of the topics covered, please take this opportunity to review those topics.
There are a total of 5 questions (6 items) in this Final Test.
You can take the final test as many times as you like.

How to score the test
After selecting the answer, make sure to click the **Answer** button. Your answer will be lost if you proceed without clicking the Answer button. (Regarded as unanswered question.)

Score results
The number of correct answers, the number of questions, the percentage of correct answers, and the pass/fail result will appear on the score page.

Correct answers :   5

Total questions :   5

Percentage :   100%

> To pass the test, you have to answer **60%** of the questions correct.

[Proceed]   [Review]

- Click the **Proceed** button to exit the test.
- Click the **Review** button to review the test. (Correct answer check)
- Click the **Retry** button to retake the test again.

Choose the correct software required when using the MELSEC iQ-R Series Safety CPU module.

○ MELSOFT GX Works2

○ MELSOFT GX Works3

○ MELSOFT MT Works2

○ MELSOFT GT Works3

○ RT ToolBox2

[Answer]   [Back]

Test | Final Test 2

Choose the locations to which power must be supplied for safety remote I/O wiring.
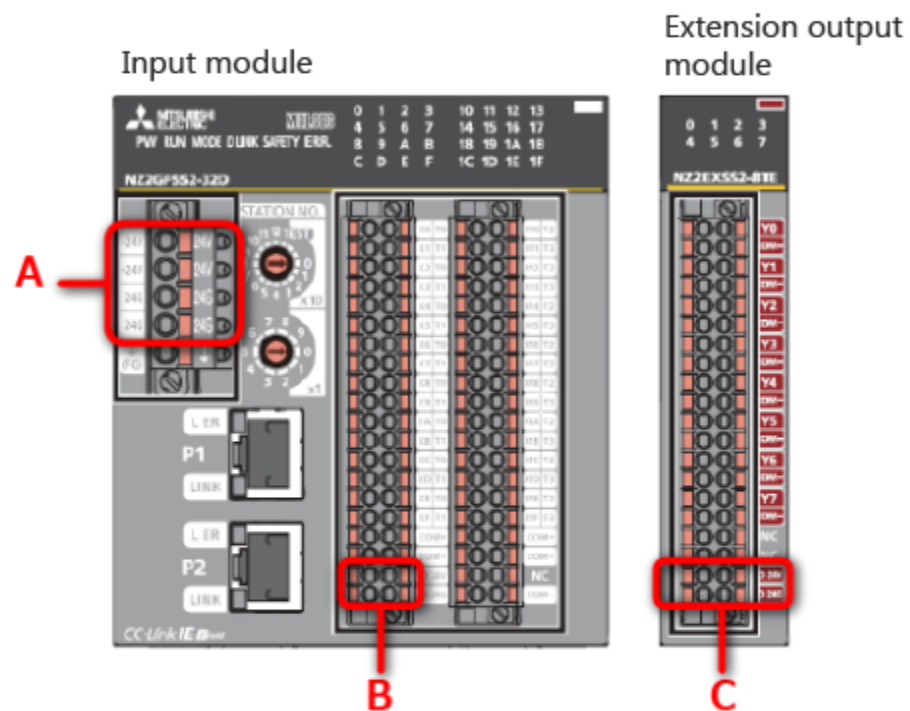
Q1 When only an input module is used

☐ A

☐ B

☐ C

Q2 When both an input module and extension output module are used

☐ A

☐ B

☐ C

[Answer]　[Back]

Input module

Extension output module
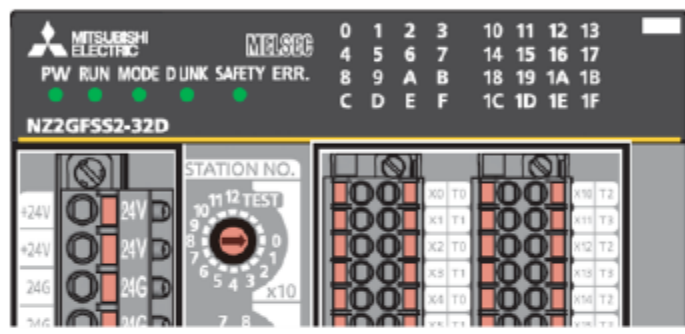
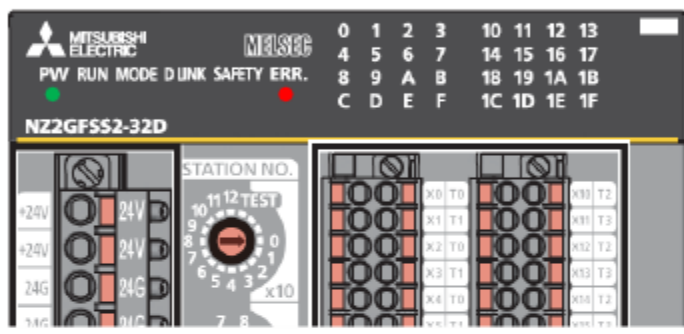A

B

C

Test | Final Test 3

Select the correct LED status of safety remote I/O which is operating normally according to the settings.

Answer   Back

Choose all of the program operation execution types that can create safety programs.

☐ Initial execution type

☐ Scan execution type

☐ Fixed scan execution type

☐ Event execution type

☐ Standby type

| Answer | Back |

Test

Final Test 5

Choose the appropriate description for troubleshooting of Safety CPUs and safety remote I/Os.

○ The troubleshooting for standard CPU modules (RnCPU) can be basically applied to Safety CPU modules (RnSFCPU).

○ The "Error history read" operation for safety remote I/O modules is the same as that for standard CPU modules.

Answer   Back

Test | Test Score

You have completed the Final Test. Your results are as follows.
To end the Final Test, proceed to the next page.

Correct answers :   **5**

Total questions :   **5**

Percentage :   **100%**

[Proceed]   [Review]

Congratulations. You passed the test.

You have completed the MELSEC iQ-R Series Safety CPU, Safety Remote I/O Course.

Thank you for taking this course.

We hope you enjoyed the lessons and the information you acquired in this course will be useful in the future.

You can review the course as many times as you want.

Review   Close