

Before Using the Product

Before using the product, please read this manual. Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

■ Relevant manuals

Before using the product, please read the Safety Guidelines included with the base unit used, especially the following sections.

- SAFETY PRECAUTIONS
- CONDITIONS OF USE FOR THE PRODUCT
- EMC AND LOW VOLTAGE DIRECTIVES
- WARRANTY

For the product information, refer to the following.

Description	Manual name [manual number]
Common information on MELSEC iQ-R series programmable controllers*1	MELSEC iQ-R Module Configuration Manual [SH-081262ENG]
Detailed information on the product	MELSEC iQ-R CPU Module User's Manual (Startup) [SH-081263ENG] MELSEC iQ-R CPU Module User's Manual (Application) [SH-081264ENG]

*1 The information includes the system configuration, specifications, installation, wiring, maintenance, and inspection.

Please develop familiarity with the functions and performance of the product to handle the product correctly.

■ Manuels correspondants

Avant d'utiliser ce produit, prière de lire les "Safety Guidelines" (directive de sécurité) fournies avec l'unité de base, en particulier dans les sections suivantes.

- PRÉCAUTIONS DE SÉCURITÉ
- CONDITIONS D'UTILISATION DE PRODUIT
- DIRECTIVES CEM ET BASSE TENSION
- DIRECTIVES SUR LES MACHINES
- GARANTIE

■ Packing list

Check that the following items are included in the package of the product.

Item	Quantity
Module (R0PSFCPU and R6PSFM)	1 each
Before Using the Product (this manual)	1

■ Mounting modules

When installing the programmable controller in a control panel, fully consider its operability, maintainability, and environmental resistance.

Securely mount all the MELSEC iQ-R series modules used on the base unit.

For details on the mounting method, refer to the MELSEC iQ-R Module Configuration Manual.

■ Montage des modules

Pour installer l'automate programmable dans un tableau de commande, prendre en compte tous les aspects d'opérabilité, de maintenabilité et de résistance à l'environnement.

Monter fermement sur l'unité de base tous les modules de la série MELSEC iQ-R à utiliser.

Pour le détail de la méthode de montage, voir le MELSEC iQ-R Module Configuration Manual (Manuel de configuration du module MELSEC iQ-R).

■ Operating ambient temperature

Use the product within the following range.

- 0 to 55°C (when an extended temperature range base unit is not used)
- 0 to 60°C (when an extended temperature range base unit is used)

■ Température ambiante de fonctionnement

Ce produit doit être utilisé dans les conditions suivantes.

- 0 et 55°C (quand une unité de base à gamme de température élargie n'est pas utilisée)
- 0 et 60°C (quand une unité de base à gamme de température élargie est utilisée)

■ Safety standards

- For UL listed

UL evaluation was performed only to UL508.

Functional safety evaluation was performed by TÜV Rheinland®.*1

*1 TÜV Rheinland is a registered trademark.

- For IEC 61508 SIL 2

The SIL2 Process CPU can be used to configure safety functions of general industrial machinery.

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

■ Calculation of the target failure measure (PFDavg/PFH)

The target failure measure (PFDavg/PFH) is a target value of reliability for each SIL level defined in IEC 61508: 2010 and IEC 61511: 2015.

When a system using the SIL2 Process CPU is configured, a SIL2 application shall configure a safety path, including safety input devices through safety output devices.

Calculate the PFDavg/PFH for each safety application using the following formula. If the safety path goes through the module set to operate in SIL2 mode multiple times, add the PFDavg/PFH for that module multiple times.

$$\text{PFDavg/PFH} = (\text{PFDavg/PFH of A}) + (\text{PFDavg/PFH of B}) \times \alpha^{*5} + (\text{PFDavg/PFH of C}) \times \beta^{*5} + (\text{PFDavg/PFH of D}) + (\text{PFDavg/PFH of E})$$

Symbol	Definition
A ^{*1}	SIL2 Process CPU
B ^{*2,4}	Module set to operate in SIL2 mode connected to safety input devices
C ^{*2,4}	Module set to operate in SIL2 mode connected to safety output devices
D ^{*3,4}	Safety input device
E ^{*3,4}	Safety output device

*1 When performing safety communications between SIL2 Process CPUs on the safety path, add the PFDavg/PFH for SIL2 Process CPUs performing safety communications on the safety path. Add no PFDavg/PFH for SIL2 Process CPUs not performing safety communications on the safety path, even if they are on the same network.

*2 Calculate the PFDavg/PFH using the PFDavg/PFH for the modules, that are set to operate in SIL2 mode, used.

*3 For PFDavg/PFH of D and E, refer to manuals for the safety devices used.

*4 When the SIL2 application includes multiple safety input devices or safety output devices, perform the calculation by adding all PFDavg/PFH for the safety input devices, safety output devices, and modules, that are set to operate in SIL2 mode, connected to the devices.

*5 For SIL2-mode modules used in a SIL2 application configured with multiple inputs and outputs, multiply the PFDavg/PFH of these modules by the number of input points (α) and the number of output points (β) for the calculation.

The following table lists the total PFDavg/PFH of the SIL2 Process CPU and the SIL2 function module.

PFDavg ^{*6}		
2 years	5 years	10 years
5.83×10^{-6}	2.08×10^{-5}	6.23×10^{-5}
PFH ^{*6}		
2 years	5 years	10 years
7.61×10^{-10}	1.19×10^{-9}	1.90×10^{-9}

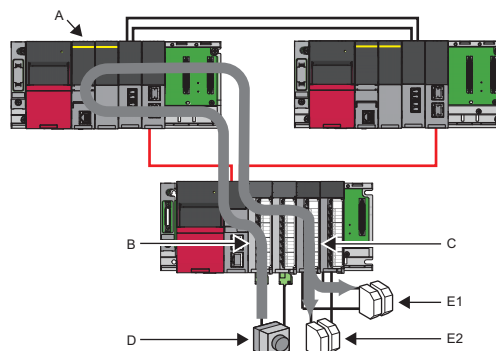
*6 The PFDavg/PFH values of each proof test interval

The following formulas show calculation examples of PFDavg/PFH for a SIL2 application with multiple outputs where SIL2 Process CPUs and an I/O module with diagnostic functions are used.

Connect an emergency stop switch to the input module with diagnostic functions. Connect multiple safety relays to the output module with diagnostic functions.

A SIL2 Process CPU controls ON/OFF of the safety relays according to the input from the emergency stop switch.

- $\text{PFDavg} = (\text{PFDavg of A}) + (\text{PFDavg of B}) + (\text{PFDavg of C}) \times 2 + (\text{PFDavg of D}) + (\text{PFDavg of E1}) + (\text{PFDavg of E2})$
- $\text{PFH} = (\text{PFH of A}) + (\text{PFH of B}) + (\text{PFH of C}) \times 2 + (\text{PFH of D}) + (\text{PFH of E1}) + (\text{PFH of E2})$



■ Information and services

For further information and services, please consult your local Mitsubishi representative.