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.

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module (RCPSFCPU and RIPSFSM)</td>
<td>1 each</td>
</tr>
<tr>
<td>Before Using the Product (this manual)</td>
<td>1</td>
</tr>
</tbody>
</table>

### 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 (Manual of configuration of 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®.

- **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 systems using the SIL2 Process CPU obtained safety approval (IEC 61511: 2015 SIL 2 and IEC 61508: 2010 SIL 2). 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.

\[ \text{PFDavg/PFH} = (\text{PFDavg/PFH of A}) + (\text{PFDavg/PFH of B}) + (\text{PFDavg/PFH of C}) \]

\[ \text{PFDavg/PFH of D} + (\text{PFDavg/PFH of E}) \]

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</tr>
<tr>
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</tr>
<tr>
<td>C</td>
<td>Module set to operate in SIL2 mode connected to safety output devices</td>
</tr>
<tr>
<td>D</td>
<td>Safety input device</td>
</tr>
<tr>
<td>E</td>
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</tr>
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*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 (\( \alpha \)) and the number of output points (\( \beta \)) for the calculation.

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

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The following formulas show calculation examples of PFDavg/PFH for a SIL2 application with multiple inputs.

\[ \text{PFDavg/PFH} = (\text{PFDavg/PFH of A}) + (\text{PFDavg/PFH of B}) + (\text{PFDavg/PFH of C}) \]

\[ + (\text{PFDavg/PFH of D}) + (\text{PFDavg/PFH of E}) \]

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