



Safety Guidelines

NZ2GFSS2-32D
NZ2EXSS2-8TE

Thank you for purchasing the Mitsubishi programmable controller.
Prior to use, please read this and relevant manuals thoroughly to fully understand the product.

MODEL	CCIEF-SFIO-U-HW
MODEL CODE	13J299
IB(NA)-0800542-A(1507)MEE	

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".



WARNING

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



CAUTION

Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

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

[Design Precautions]



WARNING

- When the safety remote I/O module detects an error in an external power supply or a failure in the module, it turns off the outputs. Create an external circuit to securely stop the power of hazard by turning off the outputs of the safety remote I/O module. Incorrect configuration of the circuit may result in an accident due to an incorrect output or malfunction.
 - When a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows in the safety remote I/O module, the module defines it as a fault and turns off the outputs. However, if overcurrent flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
 - At the start-up of the system, if a short-circuit has occurred at the output wiring of the external power supply, a load may turn on just after the power-on. Configure an interlock circuit to ensure that the entire system will always operate safely.
 - When a communication failure occurs in the network, the failed station becomes the following status.
 - (1) All inputs from remote I/O station turn off.
 - (2) All outputs from remote I/O station turn off.Check the communication status information and configure an interlock circuit in the program to ensure that the entire system will operate safely. Failure to do so may result in an accident due to an incorrect output or malfunction.
 - Do not use any "use prohibited" signals as safety remote I/O signals or remote control/monitor signals because these signals are used for the system. If any of the signals are used (turned on/off), correct operation of the module cannot be guaranteed.
 - Do not read or write any data from/to the remote register because all areas of the remote register are "use prohibited" areas. If data is read or written from/to the remote register, correct operation of the module cannot be guaranteed.
-

[Design Precautions]

CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- Select the external devices to be connected to the module by referring to the performance specifications in the user's manual and considering the maximum inrush current.

[Installation Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may result in electric shock or cause the module to fail or malfunction.

[Installation Precautions]

CAUTION

- Use the module in an environment that meets the general specifications in the user's manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- Securely fix the module with a DIN rail.
- Do not directly touch any conductive parts and electronic components of the module. Doing so can cause malfunction or failure of the module.
- After the first use of the extension module, the number of connections/disconnections is limited to 50 times. (IEC 61131-2 compliant)
- To connect an extension module to a main module, engage the respective connectors and securely lock the module joint levers. Incorrect interconnection may cause malfunction, failure, or drop of the module.
- After the first use of the connector, number of connections/disconnections is limited to 50 times. (IEC 61131-2 compliant)
- Connect each connection cable to the connector securely. Poor contact may cause malfunction.

[Wiring Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
-

[Wiring Precautions]

CAUTION

- Individually ground the FG terminal of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range.
- Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Tighten the terminal block mounting screw within the specified torque range. Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal block screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- When an overcurrent caused by an error of an external device or a failure of the module flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.

[Startup and Maintenance Precautions]

WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
 - Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal block mounting screw. Failure to do so may result in electric shock. Tighten the terminal block mounting screw within the specified torque range. Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
-

[Startup and Maintenance Precautions]

CAUTION

- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the module.
- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.
- Do not drop or apply strong shock to the module. Doing so may damage the module.
- Shut off the external power supply (all phases) used in the system before installing or removing a module in/from the control panel. Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

CAUTION

- When disposing of this product, treat it as industrial waste.

[Transportation Precautions]

CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to the MELSEC iQ-R Module Configuration Manual.
- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.

SAFETY PRECAUTIONS

(Lire ces précautions avant toute utilisation du produit.)

Avant d'utiliser ce produit, lire attentivement ce manuel ainsi que les manuels auxquels il renvoie, et toujours considérer la sécurité comme de la plus haute importance en manipulant le produit correctement.

Dans ce manuel, les précautions de sécurité sont classées en deux niveaux, à savoir :

"⚠AVERTISSEMENT" and "⚠ATTENTION".



AVERTISSEMENT

Attire l'attention sur le fait qu'une négligence peut créer une situation de danger avec risque de mort ou de blessures graves.



ATTENTION

Attire l'attention sur le fait qu'une négligence peut créer une situation de danger avec risque de blessures légères ou de gravité moyennes ou risque de dégâts matériels.

Dans certaines circonstances, le non-respect d'une précaution de sécurité introduite sous le titre "ATTENTION" peut avoir des conséquences graves.

Les précautions de ces deux niveaux doivent être observées dans leur intégralité car elles ont trait à la sécurité des personnes et aussi du système.

Veiller à ce que les utilisateurs finaux lisent ce manuel qui doit être conservé soigneusement à portée de main pour s'y référer autant que de besoin.

[Précautions lors de la conception]



AVERTISSEMENT

- *Quand un module E/S distant de sécurité détecte une erreur dans une alimentation externe, il désactive les sorties. Pour se prémunir contre les risques d'alimentation, créer un circuit externe désactivant les sorties du module E/S distant de sécurité. Une configuration incorrecte de ce circuit peut être à l'origine d'un accident par suite des sorties erronées ou de dysfonctionnements.*
 - *Si un courant de charge excédant le courant nominal circule dans le module E/S distant de sécurité ou en cas de surintensité suite à une court-circuit à la charge, le module détecte l'anomalie et désactive les sorties. Si l'intensité excessive du courant dure longtemps, il peut y avoir dégagement de fumée et feu. Pour éviter cela, prévoir un circuit de sécurité externe, avec par exemple un fusible.*
 - *Lors du démarrage du système, s'il survient un court-circuit dans le câblage de sortie de l'alimentation externe, il peut y avoir application d'une charge dès la mise sous tension. Configurer un circuit d'interverrouillage permettant de garantir la sécurité de fonctionnement de l'ensemble du système en tous temps.*
 - *À la survenance d'une panne de communication dans le réseau, la station défaillante se trouve dans l'état suivant :*
 - (1) *Toutes les entrées en provenance de la station E/S distante sont désactivées.*
 - (2) *Toutes les sorties de la station E/S distante sont désactivées.**Sur la base des infos d'état de communication, configurer dans le programme un circuit d'interverrouillage pour garantir la sécurité de fonctionnement de l'ensemble du système. Faute de quoi, il y a risque d'accident par suite de sortie erronée ou de dysfonctionnement.*
-

[Précautions lors de la conception]

! AVERTISSEMENT

- Comme signaux E/S distants de sécurité ou signaux de surveillance/commande distants, n'utiliser aucun des signaux à "usage interdit", car ces signaux sont utilisés par le système. Si un quelconque de ces signaux est utilisé (mis à l'état ON ou OFF), on ne peut pas garantir le fonctionnement correct du module.
 - Aucune donnée ne doit être lue ou écrite de/vers le registre distant car toutes les zones du registre distant sont des zones à "usage interdit". Si on lit ou écrit des données de/vers le registre distant, on ne peut pas garantir le fonctionnement correct du module.
-

[Précautions lors de la conception]

! ATTENTION

- Ne pas installer les lignes de commande ou câbles de communication avec les lignes des circuits principaux ou câbles d'alimentation. Maintenir entre eux une distance de 100mm au minimum. Faute de quoi, il y a risque de dysfonctionnement ou de bruit.
 - Choisir les dispositifs externes à raccorder au module en se référant aux caractéristiques de performance dans le manuel de l'utilisateur et en tenant compte du courant d'appel maximum.
-

[Précautions d'installation]

! AVERTISSEMENT

- Couper l'alimentation externe utilisée par le système (sur toutes les phases) avant la mise en place ou le retrait du module. Faute de quoi, il y a risque de choc électrique et de dysfonctionnement ou panne du module.
-

[Précautions d'installation]

! ATTENTION

- Utiliser le module dans un environnement conforme aux spécifications générales du manuel de l'utilisateur. Faute de quoi, il y a risque de choc électrique, de feu, de dysfonctionnement ou d'endommagement et de détérioration du produit.
 - Fixer fermement le module sur un rail DIN.
 - Ne pas toucher directement les parties conductrices ou composants électroniques du module. Ceci pourrait être à l'origine de dysfonctionnement ou panne du module.
 - Après la première mise en service du module d'extension, le nombre maximum admissible d'opérations de connexion/déconnexion est de 50 (selon IEC 61131-2).
 - Pour raccorder un module d'extension au module principal, enficher les connecteurs respectifs et engager les loquets de module jusqu'à encliquètement. Une mauvaise interconnexion peut être à l'origine de dysfonctionnements ou pannes et de chute du module.
 - Après la première mise en service du connecteur, le nombre maximum admissible d'opérations de connexion/déconnexion est de 50 (selon IEC 61131-2).
 - Raccorder fermement les connecteurs des câbles. Tout mauvais contact peut être source de dysfonctionnements.
-

[Précautions de câblage]

⚠ AVERTISSEMENT

- Couper l'alimentation externe utilisée par le système (sur toutes les phases) avant l'installation et le câblage. Faute de quoi, il y a risque de choc électrique et de dysfonctionnement ou panne du module.

[Précautions de câblage]

⚠ ATTENTION

- Mettre séparément à la terre la borne FG de l'automate programmable avec une résistance de terre de moins de 100 ohms. Faute de quoi, il y a risque de choc électrique ou de dysfonctionnement.
- Utiliser des bornes sans soudure de type approprié et serrer au couple de serrage prescrit.
- Vérifier la tension nominale et l'affectation des bornes avant le câblage du module, et raccorder les câbles correctement. Tout raccordement de câble d'alimentation de tension incorrecte ou toute erreur de câblage peut être à l'origine d'un feu ou d'une panne.
- Serrer les vis de fixation du borniers dans les limites du couple de serrage prescrit. Un serrage insuffisant peut être à l'origine d'un court-circuit, feu ou dysfonctionnement. Un serrage excessif peut endommager la vis et/ou le module avec risque de chute, court-circuit ou dysfonctionnement.
- Veiller à ne pas laisser la poussière, les copeaux métalliques ou d'autres corps étrangers pénétrer dans le module. De telles corps étrangers peuvent être à l'origine d'un départ de feu, d'une panne ou d'un dysfonctionnement.
- Le haut du module est recouvert d'un film protecteur pour éviter toute pénétration de corps étrangers comme des copeaux métalliques pendant le câblage du module. Ne pas retirer le film protecteur avant de terminer le câblage. Il doit cependant être retiré avant la mise en service du système pour une meilleure dispersion de la chaleur.
- Les câbles doivent être placés dans un conduit ou doivent être attachés. Faute de quoi, un ballonnement de câble ou une traction sur un câble peut endommager le module ou les câbles ou entraîner des dysfonctionnements par mauvais contact.
- Pour débrancher un câble du module, ne jamais tirer sur le câble proprement dit. Pour un câble à connecteur, saisir le câble par son connecteur. Pour un câble raccordé au bornier, commencer par desserrer la vis de borne. Tout effort de traction sur un câble raccordé au module peut être à l'origine de dysfonctionnements ou peut endommager le module ou le câble.
- Ne pas installer les lignes de commande ou câbles de communication avec les lignes des circuits principaux ou câbles d'alimentation. Maintenir entre eux une distance de 100mm au minimum. Faute de quoi, il y a risque de dysfonctionnement ou de bruit.
- Si une surintensité produite par une erreur dans un dispositif externe ou suite à une panne du module circule pendant longtemps, il y a risque de dégagement de fumée et de feu. Pour éviter cela, prévoir un circuit de sécurité externe, avec par exemple un fusible.

[Précautions de mise en service et de maintenance]

⚠ AVERTISSEMENT

- Ne toucher à aucune borne quand l'appareil est sous tension. Il y a risque de choc électrique ou de dysfonctionnement.
- Couper l'alimentation externe utilisée par le système (sur toutes les phases) avant de nettoyer le module ou de resserrer les vis de fixation du bornier. Faute de quoi, il y a risque de choc électrique. Serrer les vis de fixation du borniers dans les limites du couple de serrage prescrit. Un serrage insuffisant peut être à l'origine d'un court-circuit, feu ou dysfonctionnement. Un serrage excessif peut endommager la vis et/ou le module avec risque de chute, court-circuit ou dysfonctionnement.

[Précautions de mise en service et de maintenance]

⚠ ATTENTION

- Ne pas démonter ou modifier le module. Cela créerait un risque de panne, dysfonctionnement, blessure ou départ de feu.
- Tout type d'appareil de communication radio, y compris les téléphones portables et les appareils PHS (Personal handy-phone system), doit être tenus éloignés de plus de 25 cm du module, dans tous les sens.
- Couper l'alimentation externe utilisée par le système (sur toutes les phases) avant la mise en place ou le retrait du module. Faute de quoi, il y a risque de dysfonctionnement ou panne du module.
- Avant de toucher le module, éliminer l'électricité statique dont le corps humain est porteur en touchant un objet métallique relié à la terre. Faute de quoi, il y a risque de panne ou de dysfonctionnement du module.
- Ne pas faire tomber ou exposer le module à des chocs. Cela pourrait endommager le module.
- Couper l'alimentation externe utilisée par le système (sur toutes les phases) avant la mise en place ou le retrait du module dans l'armoire de commande. Faute de quoi, il y a risque de dysfonctionnement ou panne du module.

[Précautions de mise au rebut]

⚠ ATTENTION

- Lors de sa mise au rebut, ce produit doit être traité comme un déchet industriel.

[Précautions de transport]

⚠ ATTENTION

- Pour le transport des piles au lithium, respecter la réglementation afférente à ce transport. Pour le détail des modèles soumis à une réglementation, voir le MELSEC iQ-R Module Configuration Manual (Manuel de configuration du module MELSEC iQ-R).
- Les halogènes (comme le fluore, le chlore, le brome ou l'iode) contenus dans certains fumigènes de désinfection et de traitement antiparasite des emballage en bois peuvent endommager le produit. Protéger le produit contre la pénétration des résidus de fumigènes ou envisager d'autres méthodes de traitement que la fumigation (traitement thermique par exemple). Une désinfection et un traitement antiparasite doivent être appliqués sur le bois brut avant façonnage.

CONDITIONS OF USE FOR THE PRODUCT

- (1) Although MELCO has obtained the certification for Product's compliance to the international safety standards IEC61508, EN954-1/ISO13849-1 from TUV Rheinland, this fact does not guarantee that Product will be free from any malfunction or failure. The user of this Product shall comply with any and all applicable safety standard, regulation or law and take appropriate safety measures for the system in which the Product is installed or used and shall take the second or third safety measures other than the Product. MELCO is not liable for damages that could have been prevented by compliance with any applicable safety standard, regulation or law.
- (2) MELCO prohibits the use of Products with or in any application involving, and MELCO shall not be liable for a default, a liability for defect warranty, a quality assurance, negligence or other tort and a product liability in these applications.
 - (a) power plants,
 - (b) trains, railway systems, airplanes, airline operations, other transportation systems,
 - (c) hospitals, medical care, dialysis and life support facilities or equipment,
 - (d) amusement equipments,
 - (e) incineration and fuel devices,
 - (f) handling of nuclear or hazardous materials or chemicals,
 - (g) mining and drilling,
 - (h) and other applications where the level of risk to human life, health or property are elevated.

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1 RELEVANT MANUALS

The details on this product are described in the following manual, which is sold separately. Please develop familiarity with the functions and performance of the product to handle it correctly.

The following are translated from the original Japanese version. For the Japanese version, please consult your local Mitsubishi representative.

- CC-Link IE Field Network Remote I/O Module (With Safety Functions) User's Manual SH-081449ENG

2 PACKING LIST

Check that the following items are included in the package.

Item	Quantity
Main module	1
This manual	1

3 SPECIFICATIONS

3.1 Operating Ambient Temperature

Température ambiante de fonctionnement

Use this product under the temperature of 0 to 55°C.

Utiliser ce produit avec une température ambiante entre 0 et 55°C.

3.2 Safety Standards

Normes de sécurité

Observe the following safety standards.

Region	Standard
Global	IEC61508, IEC62061, ISO13849 IEC61131-2 IEC61000-6-2, IEC61000-6-4 IEC61784-3 IEC60204-1
Europe	EN ISO13849-1 EN61131-2 EN61000-6-2, EN61000-6-4
North America	UL508

Observer les normes de sécurité suivantes.

Région	Norme
Global	IEC61508, IEC62061, ISO13849 IEC61131-2 IEC61000-6-2, IEC61000-6-4 IEC61784-3 IEC60204-1
Europe	EN ISO13849-1 EN61131-2 EN61000-6-2, EN61000-6-4
Amérique du Nord	UL508

3.3 Module Replacement

Replace the module according to the following module replacement cycle.

Safety remote I/O module	Module replacement cycle
CC-Link IE Field Network remote I/O module with safety functions NZ2GFSS2-32D	5 years
CC-Link IE Field Network remote I/O module with safety functions NZ2EXSS2-8TE (Connect it to the NZ2GFSS2-32D when using it.)	5 years

4 INSTALLATION ENVIRONMENT AND INSTALLATION POSITION

4.1 Installation Environment

Installation location

Do not install the safety remote I/O module to the place where:

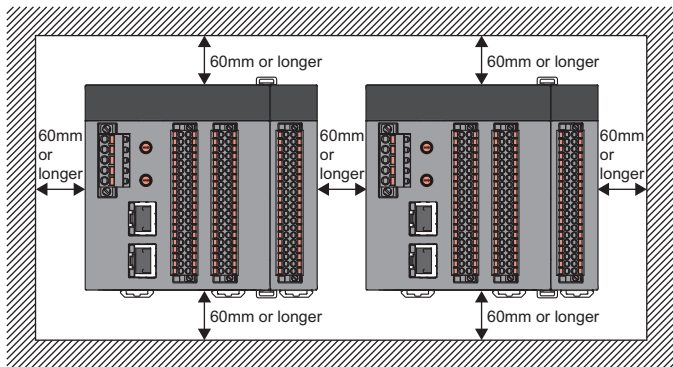
- Ambient temperature is outside the range of 0 to 55°C;
- Ambient humidity is outside the range of 5 to 95%RH;
- Condensation occurs due to rapid temperature change;
- Corrosive gas or combustible gas is present;
- Conductive powder such as dust and iron powder, oil mist, salinity, or organic solvent is filled;
- The safety remote I/O module is exposed to direct sunlight;
- A strong electric field or strong magnetic field is generated; and
- The safety remote I/O module is subject to vibration and shock.

Installation surface

Install the safety remote I/O module on the flat surface. When the installation surface is uneven, excessive force is applied to the printed-circuit board, causing a defect.

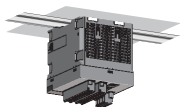
4.2 Installation Position

When installing the safety remote I/O module in a control panel, provide clearance of 60mm or longer between the module and the sides of the control panel or neighboring modules to ensure good ventilation and an easy module change.

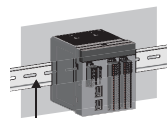


4.3 Installation Direction

The safety remote I/O module can be installed in six directions. Use the DIN rail to install the module.

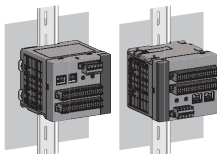


Downward installation

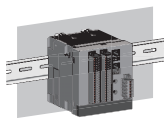


DIN rail

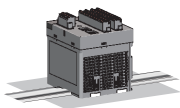
Horizontal installation



Vertical installation



Horizontal installation
(upside down)



Upward installation

Point

When the safety remote I/O module is installed in the direction other than the horizontal installation, the max. number of simultaneous input points and the maximum load current is restricted. For the restriction, refer to the following.

☞ CC-Link IE Field Network Remote I/O Module (With Safety Functions) User's Manual

5 WIRING

5 Câblage

5.1 Wiring Products

Produits pour câblage

CC-Link IE Field Network



The following table shows applicable cables to connect to the CC-Link IE Field Network port. Use the cables that meet the standards of IEEE 802.3 1000BASE-T.

Name	Connector	Cable	Category
1000BASE-T	RJ45	Straight cable (Double shielded/STP)	5e or higher

Réseau de terrain CC-Link IE



Le tableau ci-dessous indique quels câbles peuvent être utilisés pour le raccordement au port du réseau de terrain CC-Link IE. Utiliser des câbles conformes aux normes IEEE 802.3 1000BASE-T.

Nom	Connecteur	Câble	Catégorie
1000BASE-T	RJ45	Câble simple (Double blindé/STP)	5e ou plus

Wiring to an I/O terminal block

The table below shows applicable bar solderless terminals connected to the terminal block. When wiring, use applicable wires and an appropriate tightening torque. Use UL listed bar solderless terminals and, for processing, use a tool recommended by their manufacturer.

Bar solderless terminal	Wire			
Model	Diameter	Type	Material	Temperature rating
A10.5-10WH A10.75-10GY A1.0-10 A1.5-10	24 to 16 AWG	Stranded	Copper	75°C or more

Câblage à un bornier E/S.

La table ci-dessous indique quels types de barrette de bornes sans soudure peuvent être raccordés au bornier. Pour le câblage, utiliser les fils appropriés. Utiliser des barrettes de bornes sans soudure répertoriées par UL et, pour la mise en place, utiliser l'outil recommandé par leur fabricant.

Borne-barre sans soudure	Fil			
Modèle	Diamètre	Type	Matériau	Gamme de température
AI0.5-10WH AI0.75-10GY AI1.0-10 AI1.5-10	24 à 16 AWG	Torsadé	Cuivre	75°C ou plus

Wiring to a module power supply

The table below shows applicable bar solderless terminals connected to the terminal block. When wiring, use applicable wires and an appropriate tightening torque. Use UL listed bar solderless terminals and, for processing, use a tool recommended by their manufacturer.

Bar solderless terminal	Wire			
Model	Diameter	Type	Material	Temperature rating
AI0.5-10WH AI0.75-10GY AI1-10RD AI1.5-10BK AI2.5-10BU	24 to 14 AWG	Stranded	Copper	75°C or more

Câblage à une alimentation de module

La table ci-dessous indique quels types de barrette de bornes sans soudure peuvent être raccordés au bornier. Pour le câblage, utiliser les fils appropriés. Utiliser des barrettes de bornes sans soudure répertoriées par UL et, pour la mise en place, utiliser l'outil recommandé par leur fabricant.

Borne-barre sans soudure	Fil			
Modèle	Diamètre	Type	Matériau	Gamme de température
AI0.5-10WH AI0.75-10GY AI1-10RD AI1.5-10BK AI2.5-10BU	24 à 14 AWG	Torsadé	Cuivre	75°C ou plus

5.2 Precautions for wiring the safety remote I/O module to safety devices

This section describes the precautions for the wiring.

To wire the safety remote I/O module to each safety device according to Category 4, perform both of the following for the safety remote I/O module.

- Double wiring inputs/outputs
- Executing the self-diagnostics function (dark test)

When performing the operations above, observe the precautions below.

When wiring the input part

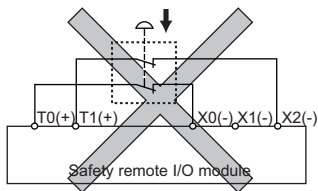
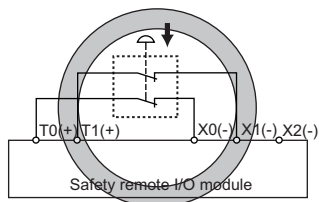
■ Combination of input terminals

The following table lists the applicable combinations of input terminals.

If the combinations other than the below are used, a minor error occurs.

Combination of input terminals

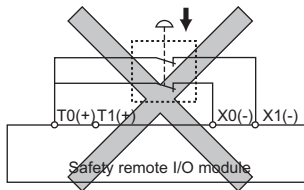
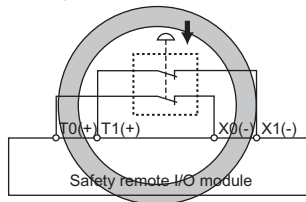
X0, X1	X2, X3	X4, X5	X6, X7	X8, X9	XA, XB	XC, XD	XE, XF
X10, X11	X12, X13	X14, X15	X16, X17	X18, X19	X1A, X1B	X1C, X1D	X1E, X1F



■ Test pulse output terminal combination

The same test pulse cannot be used for the combinations for one device.

If the combinations of the same test pulse are used for one device (X0 and T0, X1 and T0 for instance), a minor error occurs.



5.3 Examples of Wiring to Safety Devices

Exemples de câblage à des dispositifs de sécurité


This section describes wiring of the safety remote I/O module to safety devices.

For how to wire the module to specific safety devices, refer to the following.

 MELSEC iQ-R Safety Application Guide

Cette section décrit le câblage du module E/S distant de sécurité vers les dispositifs de sécurité.

Pour la méthode de câblage entre le module et chacun des dispositifs de sécurité particuliers, voir ce qui suit.

 Guide des application de sécurité MELSEC iQ-R

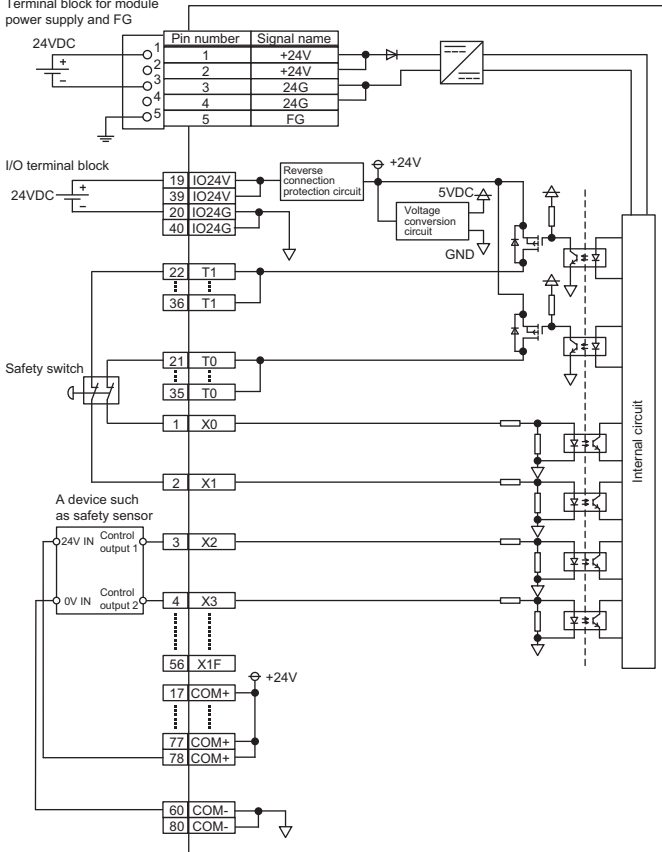
Wiring example of the NZ2GFSS2-32D

Exemple de câblage du NZ2GFSS2-32D

■ Example of wiring to a switch with NC/NC contact and to a safety sensor

■ Exemple de câblage à un commutateur à contact NC/NC et à un capteur de sécurité.

Terminal block for module power supply and FG



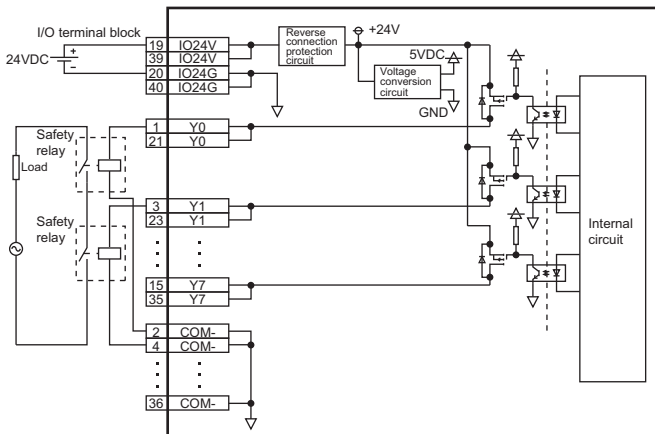
English	French
Terminal block for module power supply and FG	<i>Bornier pour alimentation du module et FG</i>
Pin number	<i>Broche N°</i>
Signal name	<i>Nom de signal</i>
I/O terminal block	<i>Bornier E/S</i>
Safety switch	<i>Commutateur de sécurité</i>
A device such as safety sensor	<i>Dispositif du genre capteur de sécurité</i>
Control output 1	<i>Sortie de commande 1</i>
Control output 2	<i>Sortie de commande 2</i>
Reverse connection protection circuit	<i>Circuit de protection contre la connexion inverse</i>
Voltage conversion circuit	<i>Circuit de conversion de tension</i>
Internal circuit	<i>Circuit interne</i>

Wiring example of the NZ2EXSS2-8TE

Exemple de câblage du NZ2EXSS2-8TE

■ Example of wiring to a safety relay

■ Exemple de câblage d'un relais de sécurité



English	French
I/O terminal block	Bornier E/S
Safety relay	Relais de sécurité
Load	Charge
Reverse connection protection circuit	Circuit de protection contre la connexion inverse
Voltage conversion circuit	Circuit de conversion de tension
Internal circuit	Circuit interne

6 MODULE STATUS AFTER POWER-ON AND LED STATUS

The safety remote I/O module performs initial processing (such as self-diagnostics) after the power-on or reset. The operating status of the safety remote I/O module after initial processing can be checked with LEDs of each module.

No.	Name	Description
(1)	PW LED	Indicates the power supply status. On: Power supply ON Off: Power supply OFF
(2)	RUN LED	Indicates the operating status. On: Operating normally, in initial processing Off: A major error has occurred.
(3)	MODE LED	Indicates the mode status. On: In online mode, in initial processing Flashing: In unit test mode Off: The unit test is completed.
(4)	D LINK LED	Indicates the data link status. On: Data link (cyclic transmission being performed), in initial processing Flashing: Data link (cyclic transmission stopped) ^{*1} Off: Data link not in operation (disconnected)
(5)	SAFETY LED	Indicates the safety communication connection status. On: In safety communication connection, in initial processing Flashing: Checking the position of the setting target module Off: Safety communications being disconnected
(6)	ERR. LED	Indicates the error status. On: An error has occurred, in initial processing Flashing: A minor error has occurred. ^{*2} Off: Operating normally

*1 If cyclic transmission stops only at the master station, the D LINK LED is on because the safety remote I/O module continues cyclic transmission.

*2 After a minor error has been eliminated, the LED flashes for 5 seconds or longer and turns off.

7 EMC, LOW VOLTAGE, AND MACHINERY DIRECTIVES

Compliance with the Machinery Directive, which is one of the EU directives, has been mandatory for the products sold within EU member states since 1995, as well as compliance with the EMC Directive since 1996 and compliance with the Low Voltage Directive since 1997. Based on the certification by a third-party certifier, compliance with the EMC, Low Voltage, and Machinery Directives was declared on this module, and a "CE mark" is displayed on it.

The authorized representative in EU member states is shown below.

Company: Mitsubishi Electric Europe BV

Address: Gothaer Strasse 8, 40880 Ratingen, Germany

7.1 Measures to Comply with the EMC Directive

The EMC Directive sets requirements for emission (conducted and radiated electromagnetic interference emitted by a product) and immunity (the ability of a product not to be influenced by externally generated electromagnetic interference).

This section describes the precautions for machinery constructed with the MELSEC iQ-R series modules to comply with the EMC Directive.

These precautions are based on the requirements of the EMC Directive and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC Directive.

The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the EMC Directive.

EMC Directive related standards

■ Emission requirements

Standard: EN61131-2:2007

Test item	Test details	Standard value
CISPR16-2-3 Radiated emission ^{*2}	Radio waves from the product are measured.	<ul style="list-style-type: none">• 30 to 230MHzQP: 40dBμV/m (measured at 10m distance)^{*1}• 230 to 1000MHzQP: 47dBμV/m (measured at 10m distance)
CISPR16-2-1, CISPR16-1-2 Conducted emission ^{*2}	Noise from the product to the power line is measured.	<ul style="list-style-type: none">• 0.15 to 0.5MHzQP: 79dB, Mean: 66dB^{*1}• 0.5 to 30MHzQP: 73dB, Mean: 60dB

*1 QP: Quasi-Peak value, Mean: Average value

*2 The module is an open-type device (a device designed to be housed in other equipment) and must be installed inside a conductive control panel. The tests were conducted with the module installed in a control panel, applying the maximum rated input voltage of the power supply module.

■ Immunity requirements

Standard: EN61131-2:2007

Test item	Test details	Standard value
EN61000-4-2 Electrostatic discharge immunity ^{*1}	Immunity test in which static electricity is applied to the cabinet of the equipment	<ul style="list-style-type: none">• 8kV Air discharge• 4kV Contact discharge
EN61000-4-3 Radiated, radio-frequency, electromagnetic field immunity ^{*1}	Immunity test in which electric fields are irradiated to the product	80% AM modulation @1kHz <ul style="list-style-type: none">• 80 to 1000MHz: 10V/m• 1.4 to 2.0GHz: 3V/m• 2.0 to 2.7GHz: 1V/m

Test item	Test details	Standard value
EN61000-4-4 Fast transient burst immunity ^{*1}	Immunity test in which burst noise is applied to the power supply line and signal line	<ul style="list-style-type: none"> • AC/DC power, I/O power, and AC I/O (unshielded) lines: 2kV • DC I/O, analog, and communication lines: 1kV
EN61000-4-5 Surge immunity ^{*1}	Immunity test in which lightning surge is applied to the power supply line and signal line	<ul style="list-style-type: none"> • AC power, AC I/O power, and AC I/O (unshielded) lines: 2kV CM, 1kV DM • DC power and DC I/O power lines: 0.5kV CM, 0.5kV DM • DC I/O, AC I/O (shielded), analog^{*2}, and communication lines: 1kV CM
EN61000-4-6 Conducted RF immunity ^{*1}	Immunity test in which high frequency noise is applied to the power supply line and signal line	0.15 to 80MHz 80% AM modulation @1kHz, 10Vrms
EN61000-4-8 Power-frequency magnetic field immunity ^{*1}	Immunity test in which the product is installed in the inductive magnetic field	50/60Hz, 30A/m
EN61000-4-11 Voltage dips and interruption immunity ^{*1}	Immunity test in which power supply voltage is momentarily interrupted	<ul style="list-style-type: none"> • 0%, 0.5 period, starting at zero crossing • 0%, 250/300 period (50/60Hz) • 40%, 10/12 period (50/60Hz) • 70%, 25/30 period (50/60Hz)

*1 The module is an open-type device (a device designed to be housed in other equipment) and must be installed inside a conductive control panel. The tests were conducted with the module installed in a control panel.

*2 The accuracy of an analog-digital converter module may temporarily vary within $\pm 10\%$.

Installation in a control panel

The module is an open-type device and must be installed inside a control panel. Remote modules on each network must be also installed inside the control panel. Waterproof type remote modules can be installed outside the control panel.

Installing the module inside the control panel ensures safety as well as effective shielding of electromagnetic noise emitted from the module.

■ Control panel

- Use a conductive control panel.
- When securing the top or bottom plate using bolts, cover the grounding part on the control panel so that the part will not be painted.
- To ensure electrical contact between inner plates and the control panel, mask off the bolt installation areas of each inner plate so that conductivity can be ensured in the largest area.
- Ground the control panel with a thick ground cable so that low impedance can be ensured even at high frequencies.
- Keep the diameter of the holes on the control panel to 10cm or shorter. If the diameter is longer than 10cm, radio waves may leak. In addition, because radio waves leak through a clearance between the control panel and its door, reduce the clearance as much as possible. The leakage of radio waves can be suppressed by directly applying an EMI gasket on the paint surface.

The tests were conducted by Mitsubishi Electric Corporation using a control panel having damping characteristics of 37dB (maximum) and 30dB (average) (measured at 3m distance, 30 to 300MHz).

■ Power cable and ground cable

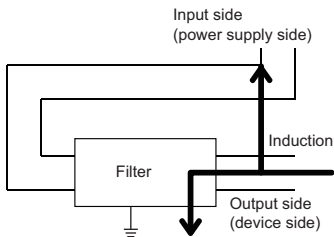
Near the power supply part, provide a grounding point to the control panel. Ground the FG terminal with the thickest and shortest possible ground cable (2mm², 30cm or shorter).

■ Noise filter (power supply line filter)

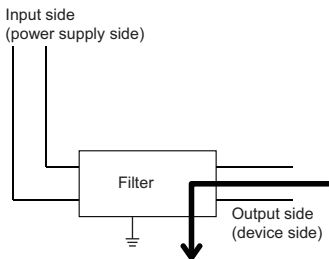
A noise filter is a component which has an effect on conducted noise. Using the noise filter can suppress more noise. The noise filter has the effect of reducing conducted noise of 10MHz or less.

The precautions for attaching a noise filter are described below.

- Do not bundle the cables on the input side and output side of the noise filter. If bundled, the output side noise will be induced into the input side cables from which the noise was filtered.



- Problematic example
Noise is induced when the input and output cables are bundled.



- Modification example
Install the input and output cables separately.

- Ground the ground terminal of the noise filter to the ground point of the control panel with the shortest possible cable (approximately 10cm).

Cables extended out of the control panel

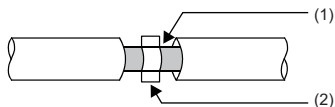
Use a shielded cable for a cable extended out of the control panel such as an I/O signal line (including a common line) and cable for communications.

If a shielded cable is not used or not grounded properly, the noise immunity will not meet the requirement.

■ Cables for the CC-Link IE Field Network

The precautions for using CC-Link IE Field Network cables are described below.

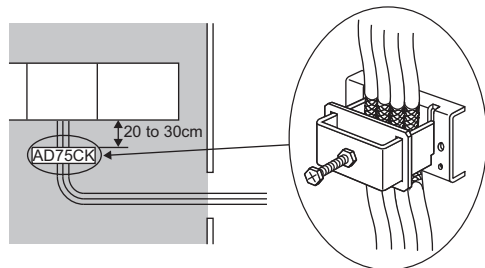
- Shielded cables should be used for the CC-Link IE Field Network. Strip a part of the jacket as shown below and ground the exposed shield in the largest possible area.



- (1) Shield
(2) Clamp fitting

■ Grounding the cable clamp

Use shielded cables for external wiring and ground the shields of the shielded cables to the control panel with an AD75CK cable clamp (manufactured by Mitsubishi). Ground the shields within 20 to 30cm from the module.



For details on the AD75CK, refer to the following.

- AD75CK-type Cable Clamping Instruction Manual

■ Ferrite core

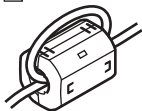
A ferrite core is effective for reducing radiated noise in the 30MHz to 100MHz frequency band. It is recommended to install a ferrite core if a shield cable extended out of the control panel does not provide sufficient shielding effects.

Note that the ferrite core must be attached at the position closest to the cable hole inside the control panel. If attached at an improper position, the ferrite core will not produce any effect.

Install a ferrite core to each power cable as shown below.

- Ferrite core used for the tests conducted by Mitsubishi: ESD-SR-250 (manufactured by NEC TOKIN Corporation), ZCAT3035-1330 (manufactured by TDK Corporation)

Ex.



External power supply

- Use an AC/DC power supply adapter for a module power supply or an external power supply.
- Use a CE-marked product for an external power supply and always ground the FG terminal.
(External power supply used for the tests conducted by Mitsubishi: TDK-Lambda DLP-120-24-1, IDEC PS5R-SF24, PS5R-F24)
- Use a power cable of 10m or shorter when connecting it to the module power supply terminal.
- Use a power cable of 30m or shorter when connecting it to the external power supply terminal.

7.2 Requirements for Low Voltage Directive Compliance

Module

The module operates at the rated voltage of 24VDC. The Low Voltage Directive is not applied to the modules that operate at the rated voltage of less than 50VAC and less than 75VDC.

External wiring

■ 24VDC external power supply

For the module, connect an external power supply of which insulation between the 24VDC circuit section and the dangerous voltage (50VAC or more, 75VDC or more) section is reinforced.

■ External devices

For external devices connected to a module, use the device of which insulation between the interface circuit section to the module and the dangerous voltage circuit section is reinforced (if the device internally has a dangerous voltage circuit section).

■ Reinforced insulation

The reinforced insulation covers the withstand voltages shown in the table below.

Rated voltage of dangerous voltage section	Surge voltage withstand (1.2/50 μ s)
150VAC or less	2500V
300VAC or less	4000V

7.3 Requirements to Comply with the Machinery Directive

The Machinery Directive (2006/42/EC) requires that machinery satisfy the three pillars of safety: mechanical safety, electrical safety, and worker safety.

This product complies with the Machinery Directive. Before using this product, please read this manual, the relevant manuals, the manuals for standard programmable controller, and the safety standards carefully and pay full attention to safety to handle the product correctly.

The descriptions are based on the requirements of the Machinery Directive and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the Machinery Directive. The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the Machinery Directive.

8 PRECAUTIONS FOR USING A SAFETY PROGRAMMABLE CONTROLLER

Users must prove that their entire safety system complies with the safety standards and the Machinery Directive. The third-party certification organization will validate the safety of product for the entire safety system, including a safety programmable controller and safety components. To establish a safety system, calculate the target failure measure (PFD/PFH) for each safety application (safety function) based on the PFD/PFH values of the safety programmable controller and connected safety components. The target failure measure (PFD/PFH) is the reliability target value for each Safety Integrity Level (SIL) defined in IEC61508 and can be calculated by the following formula.

- $PFD/PFH = A + B + C + D$ Calculation formula of PFD/PFH

Variable	Definition
A ^{*1}	PFD/PFH of the safety CPU set (Example: Total PFD/PFH ^{*2} of the Safety CPU and the safety function module)
B	PFD/PFH of the safety remote I/O module (1) When safety input device(s) and safety output device(s) are connected to the same safety remote I/O module: B = B1 (2) When safety input device(s) and safety output device(s) are connected to different safety remote I/O modules: B = B1 + B2
B1	PFD/PFH of the safety remote I/O module to which safety input device(s) is connected
B2	PFD/PFH of the safety remote I/O module to which safety output device(s) is connected
C ^{*3}	PFD/PFH of safety input device(s)
D ^{*3}	PFD/PFH of safety output device(s)

*1 For the PFD/PFH value of A, refer to the manual for the safety CPU set used.

*2 For the total PFD/PFH value, refer to the following.

□□JMESEC iQ-R Safety Application Guide

*3 For the PFD/PFH value of C or D, refer to the manual for the safety component used.

The following table shows the PFD/PFH values for the safety remote I/O module.

Module	PFD	PFH (/h)
PFD/PFH ^{*4} of the NZ2GFSS2-32D	3.54×10^{-5}	3.55×10^{-9}
Total PFD/PFH ^{*4} of the NZ2GFSS2-32D and the NZ2EXSS2-8TE	4.66×10^{-5}	4.78×10^{-9}

*4 The proof test interval is five years (module replacement cycle).

9 EC DECLARATION OF CONFORMITY FOR MACHINERY DIRECTIVE




EU DECLARATION OF CONFORMITY

We,

Manufacturer : MITSUBISHI ELECTRIC CORPORATION

Address : TOKYO 100-8310, JAPAN
(Place of Declare)

Brand Name :  MITSUBISHI ELECTRIC

declare under our sole responsibility that the product

Description : Programmable Controller

Type of Model : Remote I/O modules

Notice : Refer to next page about each type name

to which this declaration relates is in conformity with the following standard and directive.

Directive		Harmonized Standard	Notified Body
EMC Directive	2004/108/EC	EN61131-2:2007	—
Machinery Directive	2006/42/EC	EN ISO 13849-1:2008 + AC:2009	1

This declaration is based on the conformity assessment of following Notified Body

No.	Name and Address	Identification Number
1	TÜV RHEINLAND INDUSTRIE SERVICE GMBH, Alboinstr. 56, 12103 Berlin, Germany	0035

Authorized representative in Europe

(The person authorized to compile the Technical file or relevant Technical documentation)

Hartmut Pütz

FA Product Marketing, Director, MITSUBISHI ELECTRIC EUROPE B.V., German Branch

Gothaer Str. 8, 40880 Ratingen, Germany

Issue Date (Date of Declaration): 17 Jul. 2015

Signed for and on behalf of

(Signature) Mitsushiro Fujishima

[Mitsushiro Fujishima]

Senior Manager, Safety Control Systems Development Section

FA System Dept.2

MITSUBISHI ELECTRIC CORPORATION

Appendix List of type name to declare

NZ2EXSS2-8TE
NZ2GFSS2-32D

REVISIONS

*The manual number is given on the bottom left of the front cover.

Print date	*Manual number	Revision
July 2015	IB(NA)-0800542-A	First edition

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WARRANTY

Please confirm the following product warranty details before using this product.

1. Limited Warranty and Product Support.

- a. Mitsubishi Electric Company ("MELCO") warrants that for a period of eighteen (18) months after date of delivery from the point of manufacture or one year from date of Customer's purchase, whichever is less, Mitsubishi MELSEC Safety programmable logic controllers (the "Products") will be free from defects in material and workmanship.
- b. At MELCO's option, for those Products MELCO determines are not as warranted, MELCO shall either repair or replace them or issue a credit or return the purchase price paid for them.
- c. For this warranty to apply:
 - (1) Customer shall give MELCO (i) notice of a warranty claim to MELCO and the authorized dealer or distributor from whom the Products were purchased, (ii) the notice shall describe in reasonable details the warranty problem, (iii) the notice shall be provided promptly and in no event later than thirty (30) days after the Customer knows or has reason to believe that Products are not as warranted, and (iv) in any event, the notice must be given within the warranty period;
 - (2) Customer shall cooperate with MELCO and MELCO's representatives in MELCO's investigation of the warranty claim, including preserving evidence of the claim and its causes, meaningfully responding to MELCO's questions and investigation of the problem, grant MELCO access to witnesses, personnel, documents, physical evidence and records concerning the warranty problem, and allow MELCO to examine and test the Products in question offsite or at the premises where they are installed or used; and
 - (3) If MELCO requests, Customer shall remove Products it claims are defective and ship them to MELCO or MELCO's authorized representative for examination and, if found defective, for repair or replacement. The costs of removal, shipment to and from MELCO's designated examination point, and reinstallation of repaired or replaced Products shall be at Customer's expense.
 - (4) If Customer requests and MELCO agrees to effect repairs onsite at any domestic or overseas location, the Customer will pay for the costs of sending repair personnel and shipping parts. MELCO is not responsible for any re-commissioning, maintenance, or testing on-site that involves repairs or replacing of the Products.
- d. Repairs of Products located outside of Japan are accepted by MELCO's local authorized service facility centers ("FA Centers"). Terms and conditions on which each FA Center offers repair services for Products that are out of warranty or not covered by MELCO's limited warranty may vary.
- e. Subject to availability of spare parts, MELCO will offer Product repair services for (7) years after each Product model or line is discontinued, at MELCO's or its FA Centers' rates and charges and standard terms in effect at the time of repair. MELCO usually produces and retains sufficient spare parts for repairs of its Products for a period of seven (7) years after production is discontinued.
- f. MELCO generally announces discontinuation of Products through MELCO's Technical Bulletins. Products discontinued and repair parts for them may not be available after their production is discontinued.

2. Limits of Warranties.

- a. MELCO does not warrant or guarantee the design, specify, manufacture, construction or installation of the materials, construction criteria, functionality, use, properties or other characteristics of the equipment, systems, or production lines into which the Products may be incorporated, including any safety, fail-safe and shut down systems using the Products.
- b. MELCO is not responsible for determining the suitability of the Products for their intended purpose and use, including determining if the Products provide appropriate safety margins and redundancies for the applications, equipment or systems into which they are incorporated.
- c. Customer acknowledges that qualified and experienced personnel are required to determine the suitability, application, design, construction and proper installation and integration of the Products. MELCO does not supply such personnel.
- d. MELCO is not responsible for designing and conducting tests to determine that the Product functions appropriately and meets application standards and requirements as installed or incorporated into the end-user's equipment, production lines or systems.
- e. MELCO does not warrant any Product:
 - (1) repaired or altered by persons other than MELCO or its authorized engineers or FA Centers;
 - (2) subjected to negligence, carelessness, accident, misuse, or damage;
 - (3) improperly stored, handled, installed or maintained;
 - (4) integrated or used in connection with improperly designed, incompatible or defective hardware or software;
 - (5) that fails because consumable parts such as batteries, backlights, or fuses were not tested, serviced or replaced;
 - (6) operated or used with equipment, production lines or systems that do not meet applicable and commensurate legal, safety and industry-accepted standards;
 - (7) operated or used in abnormal applications;
 - (8) installed, operated or used in contravention of instructions, precautions or warnings contained in MELCO's user, instruction and/or safety manuals, technical bulletins and guidelines for the Products;
 - (9) used with obsolete technologies or technologies not fully tested and widely accepted and in use at the time of the Product's manufacture;
 - (10) subjected to excessive heat or moisture, abnormal voltages, shock, excessive vibration, physical damage or other improper environment; or
 - (11) damaged or malfunctioning due to Acts of God, fires, acts of vandals, criminals or terrorists, communication or power failures, or any other cause or failure that results from circumstances beyond MELCO's control.
- f. All Product information and specifications contained on MELCO's website and in catalogs, manuals, or technical information materials provided by MELCO are subject to change without prior notice.
- g. The Product information and statements contained on MELCO's website and in catalogs, manuals, technical bulletins or other materials provided by MELCO are provided as a guide for Customer's use. They do not constitute warranties and are not incorporated in the contract of sale for the Products.

- h. These terms and conditions constitute the entire agreement between Customer and MELCO with respect to warranties, remedies and damages and supersede any other understandings, whether written or oral, between the parties. Customer expressly acknowledges that any representations or statements made by MELCO or others concerning the Products outside these terms are not part of the basis of the bargain between the parties and are not factored into the pricing of the Products.
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- j. MELCO DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

3. Limits on Damages.

- a. MELCO'S MAXIMUM CUMULATIVE LIABILITY BASED ON ANY CLAIMS FOR BREACH OF WARRANTY OR CONTRACT, NEGLIGENCE, STRICT TORT LIABILITY OR OTHER THEORIES OF RECOVERY REGARDING THE SALE, REPAIR, REPLACEMENT, DELIVERY, PERFORMANCE, CONDITION, SUITABILITY, COMPLIANCE, OR OTHER ASPECTS OF THE PRODUCTS OR THEIR SALE, INSTALLATION OR USE SHALL BE LIMITED TO THE PRICE PAID FOR PRODUCTS NOT AS WARRANTED.
- b. Although MELCO has obtained the certification for Product's compliance to the international safety standards IEC61508 and EN954-1/ISO13849-1 from TUV Rheinland, this fact does not guarantee that Product will be free from any malfunction or failure. The user of this Product shall comply with any and all applicable safety standard, regulation or law and take appropriate safety measures for the system in which the Product is installed or used and shall take the second or third safety measures other than the Product. MELCO is not liable for damages that could have been prevented by compliance with any applicable safety standard, regulation or law.
- c. MELCO prohibits the use of Products with or in any application involving power plants, trains, railway systems, airplanes, airline operations, other transportation systems, amusement equipments, hospitals, medical care, dialysis and life support facilities or equipment, incineration and fuel devices, handling of nuclear or hazardous materials or chemicals, mining and drilling, and other applications where the level of risk to human life, health or property are elevated.
- d. MELCO SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, INDIRECT OR PUNITIVE DAMAGES, FOR LOSS OF PROFITS, SALES, OR REVENUE, FOR INCREASED LABOR OR OVERHEAD COSTS, FOR DOWNTIME OR LOSS OF PRODUCTION, FOR COST OVERRUNS, OR FOR ENVIRONMENTAL OR POLLUTION DAMAGES OR CLEAN-UP COSTS, WHETHER THE LOSS IS BASED ON CLAIMS FOR BREACH OF CONTRACT OR WARRANTY, VIOLATION OF STATUTE, NEGLIGENCE OR OTHER TORT, STRICT LIABILITY OR OTHERWISE.

- e. In the event that any damages which are asserted against MELCO arising out of or relating to the Products or defects in them, consist of personal injury, wrongful death and/or physical property damages as well as damages of a pecuniary nature, the disclaimers and limitations contained in these terms shall apply to all three types of damages to the fullest extent permitted by law. If, however, the personal injury, wrongful death and/or physical property damages cannot be disclaimed or limited by law or public policy to the extent provided by these terms, then in any such event the disclaimer of and limitations on pecuniary or economic consequential and incidental damages shall nevertheless be enforceable to the fullest extent allowed by law.
- f. In no event shall any cause of action arising out of breach of warranty or otherwise concerning the Products be brought by Customer more than one year after the cause of action accrues.
- g. Each of the limitations on remedies and damages set forth in these terms is separate and independently enforceable, notwithstanding the unenforceability or failure of essential purpose of any warranty, undertaking, damage limitation, other provision of these terms or other terms comprising the contract of sale between Customer and MELCO.

4. Delivery/Force Majeure.

- a. Any delivery date for the Products acknowledged by MELCO is an estimated and not a promised date. MELCO will make all reasonable efforts to meet the delivery schedule set forth in Customer's order or the purchase contract but shall not be liable for failure to do so.
- b. Products stored at the request of Customer or because Customer refuses or delays shipment shall be at the risk and expense of Customer.
- c. MELCO shall not be liable for any damage to or loss of the Products or any delay in or failure to deliver, service, repair or replace the Products arising from shortage of raw materials, failure of suppliers to make timely delivery, labor difficulties of any kind, earthquake, fire, windstorm, flood, theft, criminal or terrorist acts, war, embargoes, governmental acts or rulings, loss or damage or delays in carriage, acts of God, vandals or any other circumstances reasonably beyond MELCO's control.

5. Choice of Law/Jurisdiction.

These terms and any agreement or contract between Customer and MELCO shall be governed by the laws of the State of New York without regard to conflicts of laws. To the extent any action or dispute is not arbitrated, the parties consent to the exclusive jurisdiction and venue of the federal and state courts located in the Southern District of the State of New York. Any judgment there obtained may be enforced in any court of competent jurisdiction.

6. Arbitration.

Any controversy or claim arising out of, or relating to or in connection with the Products, their sale or use or these terms, shall be settled by arbitration conducted in accordance with the Center for Public Resources (CPR) Rules for Non-Administered Arbitration of International Disputes, by a sole arbitrator chosen from the CPR's panels of distinguished neutrals. Judgment upon the award rendered by the Arbitrator shall be final and binding and may be entered by any court having jurisdiction thereof. The place of the arbitration shall be New York City, New York. The language of the arbitration shall be English. The neutral organization designated to perform the functions specified in Rule 6 and Rules 7.7(b), 7.8 and 7.9 shall be the CPR.

Country/Region Sales office/Tel

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