MITSUBISHI ELECTRIC

TECHNICAL BULLETIN

FA-A-0362-B

Precautions for Using Safety Products

■Date of Issue

December 2021 (Ver.B: December 2021)

■Relevant Models

R08SFCPU-SET, R16SFCPU-SET, R32SFCPU-SET, R120SFCPU-SET, R08PSFCPU-SET, R16PSFCPU-SET, R32PSFCPU-SET, R120PSFCPU-SET, RX40NC6B, RY40PT5B, R60AD8-G, R60DA8-G, RY40PT5B-AS, NZ2GFSS2-32D, NZ2GFSS2-16DTE, NZ2GFSS2-8D, NZ2GFSS2-8TE, NZ2GFS12A2-16DTE, NZ2GFS12A2-14DT, MR-D30, QS001CPU, QS001CPU-K

Thank you for your continued support of Mitsubishi Electric FA products.
We are informing you of the precautions for using the safety products.

1 OVERVIEW

In a safety system using the safety products, there are cases where the required performance of SIL3/SIL2[*1] cannot be satisfied depending on the combination of system configuration and communication settings.
Therefore, check the usage conditions of your system according to the RESTRICTIONS ON USE in this technical bulletin and take the measures if your system does not satisfy the conditions described in the RESTRICTIONS ON USE. (☞ Page 2 RESTRICTIONS ON USE, Page 3 MEASURES)

*1 SIL3 requires the residual error rate (probability that a communication error (bit error) due to noise remains undetected) to be less than 10^{-9}, and SIL2 requires the rate to be less than 10^{-8}. If the condition described in RESTRICTIONS ON USE is not satisfied, the probability becomes 10^{-7} maximum.

2 RELEVANT PRODUCTS

The following table lists the relevant products.

No.	Product		Model	Relevant firmware version
1	MELSEC iQ-R series	Safety CPU, Safety function module (four models)	R08SFCPU-SET, R16SFCPU-SET, R32SFCPU-SET, R120SFCPU-SET	All versions
2		SIL2 Process CPU, SIL2 function module (four models)	R08PSFCPU-SET, R16PSFCPU-SET, R32PSFCPU-SET, R120PSFCPU-SET	All versions
3		DC input module with diagnostic functions, transistor output module with diagnostic functions (two models)	RX40NC6B, RY40PT5B	RX40NC6B: 02 or later RY40PT5B: 02 or later
4		Channel isolated analog-digital converter module, channel isolated digital-analog converter module (two models)	R60AD8-G, R60DA8-G	R60AD8-G: 02 or later R60DA8-G: 03 or later
5		SIL2 analog control output module (one model)	RY40PT5B-AS	All versions

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No.	Product		Model	Relevant firmware version
6	CC-Link IE Field Network remote I/O (with safety functions)	CC-Link IE Field Network remote I/O module (with safety functions) (four models)	NZ2GFSS2-32D, NZ2GFSS2-16DTE, NZ2GFSS2-8D, NZ2GFSS2-8TE	All versions
7		CC-Link IE Field Network waterproof/dustproof remote I/O module (with safety functions) (two models)	NZ2GFS12A2-16DTE, NZ2GFS12A2-14DT	All versions
8	MELSERVO-J4 series	Functional safety unit (one model)	MR-D30	A2 or later
9	MELSEC-QS series	Safety CPU (To be discontinued in September 2023) (two models)	QS001CPU, QS001CPU-K	QS001CPU: Serial number 13042 or later QS001CPU-K: Serial number 18042 or later

3 RESTRICTIONS ON USE

To satisfy the required performance of SIL3/SIL2, the following conditions need to be satisfied on your system.

Condition	Formula	
For the required performance of SIL3 (When the MELSEC iQ-R/MELSEC-QS safety CPU is used)	(1)	$m \leq TM$
For the required performance of SIL2 (When the MELSEC iQ-R SIL2 Process CPU is used)	(2)	$m \leq 10 \times TM$

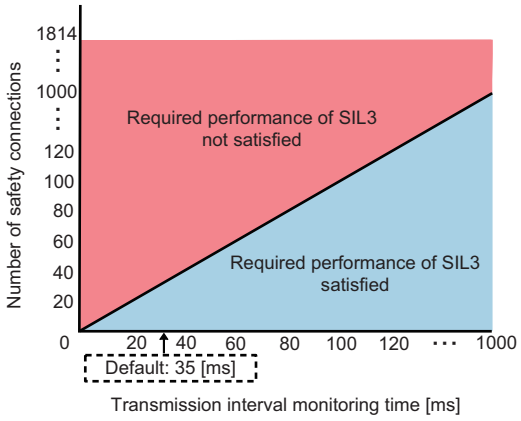
- m: Number of safety connections (number of connections established for safety communication)
- TM: Transmission interval monitoring time (minimum value in the transmission interval monitoring time monitored by the receiving station to detect an error on safety communication in each safety connection [Unit: ms])

4 MEASURES

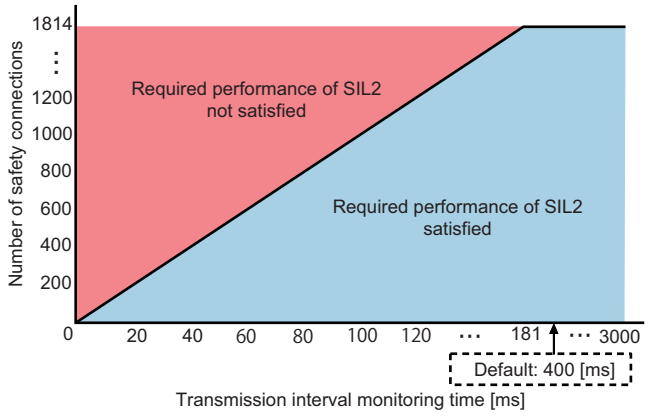
To satisfy Formula (1) for SIL3 or Formula (2) for SIL2, adjust the number of safety connections or/and the transmission interval monitoring time.

If the relationship between the number of safety connections and the transmission interval monitoring time on your system does not fall within the range that satisfies the required performance of SIL3/SIL2, adjust the number of safety connections and the transmission interval monitoring time on your system so that the relationship between them falls within the range.

For SIL3



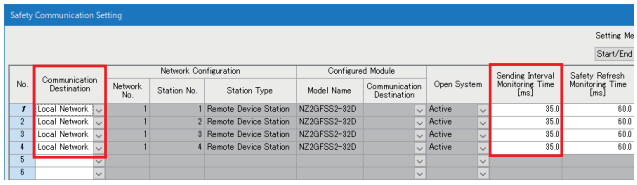
For SIL2



Examples of settings on a system configured using the MELSEC iQ-R series Safety CPU and the safety function module for the master station and the CC-Link IE Field Network remote I/O module (with safety functions) for the remote device stations

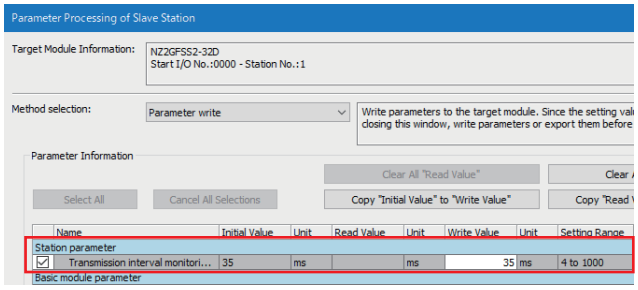
Settings on master station

[Application Settings] ⇨ [Safety Communication Setting]



Settings on slave station (When the CC-Link IE Field Network remote I/O module (with safety functions) is used)

[Basic Settings] ⇨ [Network Configuration Settings] ⇨ Right-click the target remote device station ⇨ [Online] ⇨ [Parameter Processing of Slave Station]



- m: Check the number of communication destinations in the settings on master station. (In the above example, m is 4.)
- TM: Check the minimum value of the transmission interval monitoring time in the settings on both the master station and remote device stations. Substitute the minimum value from "Sending Interval Monitoring Time" in the settings on master station and "Transmission interval monitoring time" in the settings on slave station to the formula described in RESTRICTIONS ON USE. (In the above example, TM is 35.)

In the above examples, the required performance of SIL3 is satisfied because m = 4 ≤ TM = 35.

REVISIONS

Version	Date of Issue	Revision
A	December 2021	First edition
B	December 2021	OVERVIEW and MEASURES are partially modified.

TRADEMARKS