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INVERTER

FACTORY AUTOMATION

**New Product RELEASE** No.23-5E

# Release of the Safety Communication Option Compatible Inverter FR-A800-G and Plug-in Option FR-A8NCG-S


FR-A820-00023-G2-60

FR-A8NCG-S

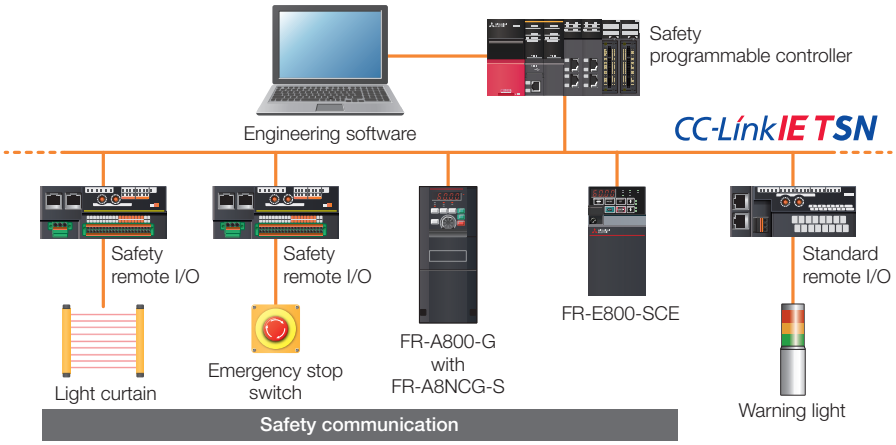
## ■ CC-Link IE TSN safety communication functions

**Release schedule** November 2023

## Features

### ■ Supporting safety communication functions

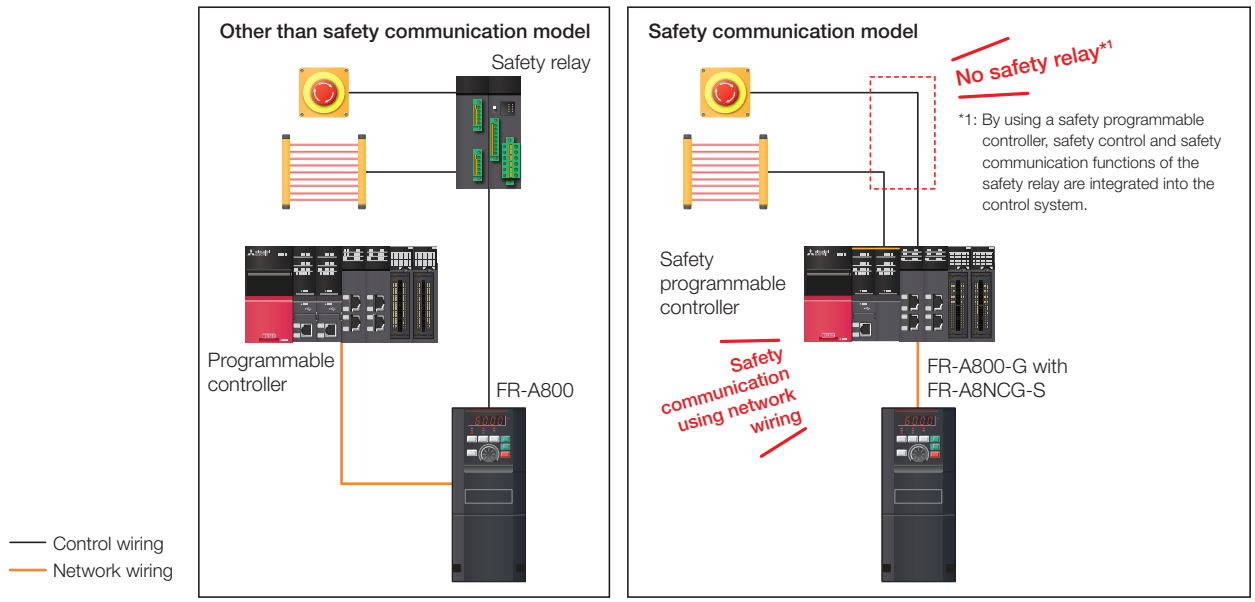
CC-Link IE TSN safety communication functions are available by installing the plug-in option FR-A8NCG-S in the FR-A800-G inverter. Safety sub-functions can be used throughout network since safety driving devices can be connected. You can flexibly configure a system using both standard communication and safety communication.
The inverter complies with the following functional safety standards: IEC 61800-5-2, IEC 61508 (SIL3), and EN ISO 13849-1 (Cat.3/PLe).




## Merits

### ■ Reducing the initial cost

The initial safety certification cost can be reduced for the machinery or equipment by using the safety sub-functions compliant with the functional safety standards. External devices can be eliminated, contributing to reduction in the device cost and maintenance time.
Using safety communication eliminates the need of control wiring, enabling simple system configuration using network wiring.

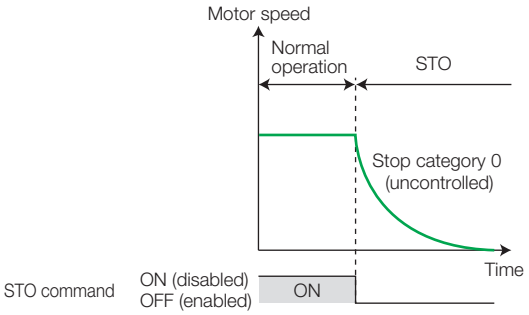


## Safety sub-functions

The following two functions defined in the functional safety standard IEC 61800-5-2 are available by installing the FR-A8NCG-S in the FR-A800-G inverter.

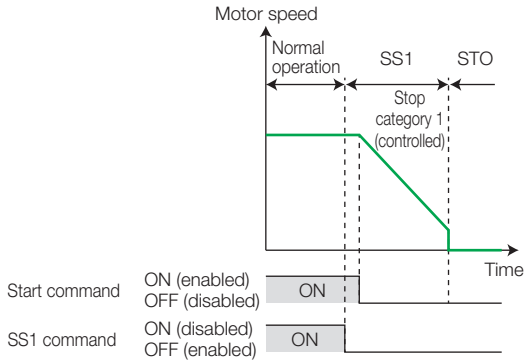
### ● STO (Safe torque off)

Driving power to the motor is electronically shut off by responding to the input signal from the safety controller.




### ● SS1-t (Safe stop 1 (time controlled))

Responding to the input signal from the safety controller, the STO function is activated after the specified time to confirm the stop state elapses.

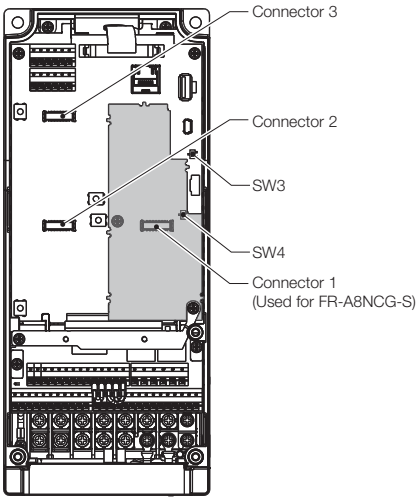



## Major differences from the FR-A800

CC-Link IE TSN safety communication functions are available by installing the plug-in option FR-A8NCG-S in the FR-A800-G inverter.
The FR-A8NCG-S is an option made for the FR-A800-G inverter.

| Item | FR-A800-G (with FR-A8NCG-S installed*1) | FR-A800-E | FR-A800-GN*2 |
|---|---|---|---|
| | Ethernet model | Ethernet model | CC-Link IE TSN functionality |
| Safety communication | CC-Link IE TSN safety communication functions | Not supported | CC-Link IE TSN |
| Safety performance | PLe SIL3 | PLe SIL3/PLd SIL2 (depending on the SERIAL) | |
| Functional safety | STO, SS1-t | STO only | |
| Fault display without safety communication option installed | E.SAF | Not supported | |
| Communication option fault | E.SAF | E.OP1 to 3 | |
| Terminal SO output | Disabled (always OFF) | Enabled | |
| Plug-in option connector | Number of empty slots:2*3*4 | Number of empty slots:2*4 | Number of empty slots:2 |
| Control terminal option | Available (FR-A8TP) | Available (FR-A8TP) | Available (FR-A8TP, FR-A8TR) |
| SW3/SW4 (initial state) | ON/ON*5 | OFF/OFF | |

*1: The FR-A8NCG-S is compatible with protocol version 2.0 for the CC-Link IE TSN authentication class A and class B.
*2: The FR-A800-GN inverters manufactured in August 2022 or later are compatible with protocol version 2.0 for the CC-Link IE TSN authentication class A and class B.
*3: Connect the FR-A8NCG-S to connector 1. Otherwise an error will occur.
*4: The FR-A8ETH is connected to connector 2. To install a plug-in option to the option connector 2, remove the Ethernet board. (However, Ethernet communication is disabled in that case.)
*5: SW3 and SW4 are switches for safety sub-functions.




Inverter with the FR-A8NCG-S installed in the shaded area (■)

## Application examples

### ● Automotive assembly line

Safety is ensured in a large-scale line or distributed system on which many robots work. When an operator enters the maintenance and inspection area, the safety communication functions stop the line safely while servos and robots are ON. As the line can be restarted quickly, both productivity and safety are ensured.

## Outline dimensions

Outline dimensions are the same as those of FR-A800 inverters.

## Lineup

### Standard model

**F R - A 8 2 0 - 00023 - G 2 -60**

| Symbol | Voltage class |
|---|---|
| 2 | 200 V class |
| 4 | 400 V class |

| Symbol | Structure, functionality |
|---|---|
| 0 | Standard model |

| Symbol*1 | Description |
|---|---|
| 00023 to 06830 | Inverter SLD rated current (A) |

| Symbol | Function*2 |
|---|---|
| G | Safety communication model (Ethernet model*3) |

| Symbol | Type*4 |
|---|---|
| 2 | CA |

| Symbol | Circuit board coating (IEC60721-3-3: 1994 3C2/3S2 compatible) | Plated conductor |
|---|---|---|
| -60 | With | Without |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Three-phase 200V class FR-A820-[]*5 | 00046 | 00077 | 00105 | 00167 | 00250 | 00340 | 00490 | 00630 | 00770 | 00930 | 01250 | 01540 | 01870 | 02330 | 03160 | 03800 | 04750 |
| | 0.4K | 0.75K | 1.5K | 2.2K | 3.7K | 5.5K | 7.5K | 11K | 15K | 18.5K | 22K | 30K | 37K | 45K | 55K | 75K | 90K |
| | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Three-phase 400V class FR-A840-[]*5 | 00023 | 00038 | 00052 | 00083 | 00126 | 00170 | 00250 | 00310 | 00380 | 00470 | 00620 | 00770 | 00930 | 01160 | 01800 | 02160 | 02600 |
| | 0.4K | 0.75K | 1.5K | 2.2K | 3.7K | 5.5K | 7.5K | 11K | 15K | 18.5K | 22K | 30K | 37K | 45K | 55K | 75K | 90K |
| | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | 03250 | 03610 | 04320 | 04810 | 05470 | 06100 | 06830 | | | | | | | | | | |
| | 110K | 132K | 160K | 185K | 220K | 250K | 280K | | | | | | | | | | |
| | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | |

●: Model to be released in November 2023

### Separated converter type

**F R - A 8 4 2 - 07700 - G 2 □**

| Symbol | Voltage class |
|---|---|
| 4 | 400 V class |

| Symbol | Structure, functionality |
|---|---|
| 2 | Separated converter type |

| Symbol*1 | Description |
|---|---|
| 07700 to 12120 | Inverter SLD rated current (A) |

| Symbol | Function*2 |
|---|---|
| G | Safety communication model (Ethernet model*3) |

| Symbol | Type*4 |
|---|---|
| 2 | CA |

| Symbol | Circuit board coating | Plated conductor |
|---|---|---|
| None | Without | Without |

| | | | | | |
|---|---|---|---|---|---|
| Three-phase 400V class FR-A842-[] | 07700 | 08660 | 09620 | 10940 | 12120 |
| | 315K | 355K | 400K | 450K | 500K |
| | ● | ● | ● | ● | ● |

●: Model to be released in November 2023

*1: Models can be alternatively indicated with the motor capacity (ND rating).
*2: Install the FR-A8NCG-S.
*3: Inverter equipped with a built-in Ethernet board (FR-A8ETH).
*4: The specifications are shown in the following table.

| Type | Motor output | Initial setting | | |
|---|---|---|---|---|
| | | Control logic | Rated frequency | Base frequency voltage (Pr.19) |
| CA (terminal CA equipped model) | Terminal CA: analog current output (0 to 20 mADC)<br>Terminal AM: analog voltage output (0 to ±10 VDC) | Source logic | 50 Hz | 8888 (95% of the power supply voltage) |

*5: For using the 75K or higher inverter and a 75 kW or higher motor, always install a DC reactor (FR-HEL), which is available as an option.

### Plug-in Option

**F R - A 8 N C G - S □**

| Symbol | Circuit board coating (IEC60721-3-3: 1994 3C2/3S2 compatible) |
|---|---|
| None | Without |
| 60 | With |

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