

**INVERTER**  
**FR-E800**

Addition of safety communication model  
and single-phase 200 V class

Design future  
manufacturing

Open network and functional safety functions  
in a compact size

**E800**



**Addition of safety communication model**

**E800-SCE**

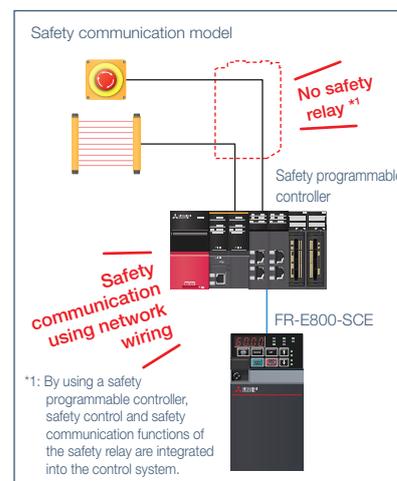
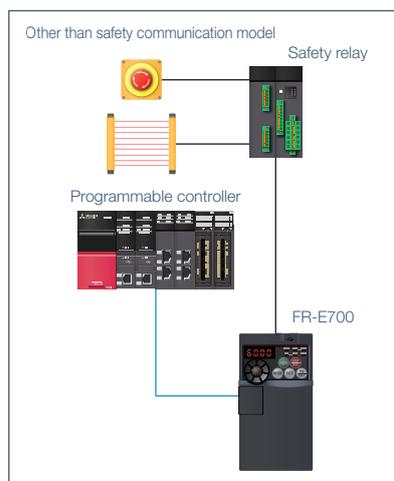
► **Safety communication model**

Safety communication models support Ethernet-based safety communication protocols certified as compliant with international standards.

The safety control system on the existing network can be easily enhanced with less cost.

| Model          | CC-Link IE TSN Safety communication function | PROFIsafe | CIP Safety | FSoE (Safety over EtherCAT) |
|----------------|--|-----------|------------|-----------------------------|
| FR-E800-□SCEPA | ●  | -         | ●          | -                           |
| FR-E800-□SCEPB | ●  | ●         | -          | -                           |
| FR-E800-□SCEPC | -  | -         | -          | ○                           |

●: Supported ○: To be supported soon



**Addition of single-phase 200 V class**

**E800**

**E800-E**

**E800-SCE**

The FR-E820S- 0008 to 0110 models are added.



## Toward smart factory with CC-Link IE TSN

E800-E

E800-SCE

Various Ethernet networks such as CC-Link IE TSN, an open industrial network for the next generation, are supported.

### ► Multi-protocols

Inverter models that support protocols of major global industrial Ethernet networks are available.

FR-E800 inverters support a variety of open networks without using any options, enabling the use of inverters on the existing network and assuring compatibility with various systems. Users can select a protocol group suitable for the intended system. It is possible to switch between protocols only by setting parameters. (Supported protocols differ depending on the model.)

| Model         | CC-Link IE TSN (100 Mbps)*1 | CC-Link IE Field Network Basic | MODBUS <sup>®</sup> /TCP | PROFINET | EtherNet/IP | BACnet/IP | EtherCAT |
|---------------|-----------------------------|--------------------------------|--------------------------|----------|-------------|-----------|----------|
| FR-E800-[]EPA | ●                           | ●                              | ●                        | —        | ●           | ●         | —        |
| FR-E800-[]EPB | ●                           | ●                              | ●                        | ●        | —           | —         | —        |
| FR-E800-[]EPC | —                           | —                              | —                        | —        | —           | —         | ○        |

\*1: 1 Gbps is optional (to be supported).

●: Supported ○: To be supported soon



## Attaining both safety and productivity

E800

E800-E

E800-SCE

### ► Functional safety

The inverter is compliant with safety integrity level (SIL) 2 or 3 of the IEC 61508 standard for functional safety. This will contribute to reduction in the initial safety certification cost. The inverter supports various safety monitoring functions (IEC 61800-5-2), contributing to eliminating external devices or reducing maintenance time. (Note that several conditions must be met to use safety functions.) This will significantly reduce time required for maintenance or tooling and eliminate external devices such as ones used for monitoring the speed.

Use FR Configurator2 to set parameters related to the safety monitoring functions.

| Functional safety category (ISO 13849-1, IEC 61508) |                                     | SIL2, PLd, Cat.3   | SIL3, PLe, Cat.3 | SIL2, PLd, Cat.3 |
|---|-------------------------------------|--------------------|------------------|------------------|
|   |                                     | FR-E800, FR-E800-E | FR-E800-SCE      | FR-E700-SC       |
| STO   | Safety torque off, coasting to stop | ●                  | ●                | ●                |
| SS1   | Safe stop 1, deceleration stop      | —                  | ●                | —                |
| SLS   | Safely-limited speed                | —                  | ●                | —                |
| SBC   | Safe brake control                  | —                  | ●                | —                |
| SSM   | Safe speed monitor                  | —                  | ●                | —                |

●: Supported —: Not supported

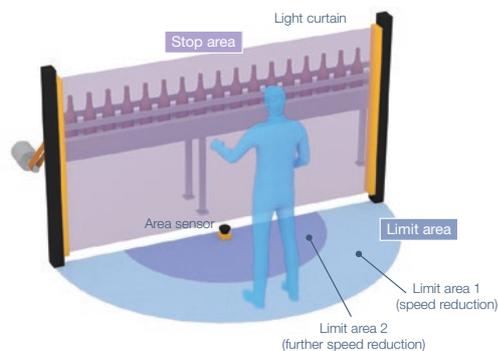
### SLS (safely-limited speed) function

When an operator enters the limit area while a system is operating, operation of the system is not stopped and continues with a reduced speed.

The motor speed is calculated without using an encoder. This will contribute to wire and cost savings.

Several conditions must be met to use this function.

For details of operating conditions and risk assessment, refer to the Instruction Manual (Functional Safety).



E800-SCE



## Predictive and preventive maintenance of the system

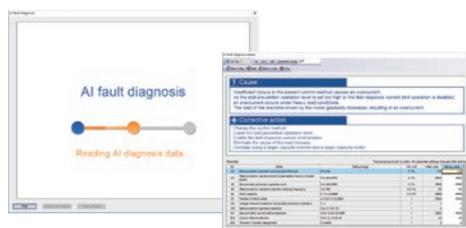
E800

E800-E

E800-SCE

AI technology of FR Configurator2 helps analyze and identify the cause of a fault when the inverter output is shut off.

Diagnosable faults: Overcurrent trip and overvoltage trip (other faults will be supported in the future.)



By integrating a new circuit to detect corrosive gas environment in the inverter for the first time in the world\*, damage caused by corrosive gas around inverters can be predicted, urging operators to improve the environment.



\* As of September 2019 (according to our investigation)



## Option List

By fitting the following options to the inverter, the inverter is provided with more functions.

|                                  | Name   | Type                               | Applicable Inverter |        |   | Remarks  |   |
|----------------------------------|--|------------------------------------|---------------------|--------|---|--|---|
|                                  |  |                                    | E800                | E800-E | E800-SCE  |  |   |
| Plug-in Type                     | Vector control<br>Orientation control<br>Encoder feedback control          | FR-A8AP E kit                      | ○                   | ○      | ○   | Applicable for all models  |   |
|                                  | 16-bit digital input   | FR-A8AX E kit                      | ●                   | ●      | ●   |  |   |
|                                  | Digital output   | FR-A8AY E kit                      | ●                   | ●      | ●   |  |   |
|                                  | Extension analog output  | FR-A8AR E kit                      | ●                   | ●      | ●   |  |   |
|                                  | Relay output   | FR-A8AR E kit                      | ●                   | ●      | ●   |  |   |
|                                  | CC-Link communication  | FR-A8NC E kit                      | ●                   | ●      | ●   |  |   |
|                                  | DeviceNet communication  | FR-A8ND E kit <b>NEW</b>           | ●                   | ●      | ●   |  | Applicable for all models   |
|                                  | PROFIBUS-DP communication  | FR-A8NP E kit <b>NEW</b>           | ●                   | ●      | ●   |  | (from May 2020 onwards)   |
| Stand-alone type                 | LCD operation panel  | FR-LU08(-01)                       | ●                   | -      | -   | Standard model<br>(from May 2020 onwards)  |   |
|                                  | Parameter unit   | FR-PU07                            | ○                   | -      | -   | Standard model   |   |
|                                  | Parameter unit with battery pack   | FR-PU07BB(-L)                      | ○                   | -      | -   |  |   |
|                                  | Enclosure surface operation panel  | FR-PA07                            | ●                   | -      | -   |  |   |
|                                  | Parameter unit connection cable  | FR-CB20[]                          | ●                   | -      | -   |  |   |
|                                  | Encoder cable Mitsubishi Electric vector control dedicated motor (SF-V5RU) | FR-V7CBL[]                         | ○                   | ○      | ○   |  | Applicable for all models   |
|                                  | USB cable  | MR-J3USBCBL3M<br>Cable length: 3 m | ●                   | ●      | ●   | 3.7K or lower.<br>The option's model varies with the inverter's model.                                       |   |
|                                  |  | FR-E7AT01/02/03                    | ●                   | ●      | ●   |  |   |
|                                  |  | FR-E8AT03                          | ●                   | ●      | ●   |  | FR-E820-3.7K  |
|                                  | Intercompatibility attachment  | FR-E8AT04                          | ○                   | ○      | ○   | FR-E820S-2.2K  |   |
|                                  |  | DIN rail attachment                | FR-UDA01 to 03      | ○      | ○   | ○  | 3.7K or lower.<br>The option's model varies with the inverter's model.  |
|                                  |  | Panel through attachment           | FR-E8CN01 to 06     | ○      | ○   | ○  | All capacities.<br>The option's model varies with the inverter's model. |
|                                  | Totally enclosed structure specification attachment (IP40)                 | FR-E8CV01 to 04                    | ○                   | ○      | ○   |  |   |
|                                  | AC reactor   | FR-HAL                             | ●                   | ●      | ●   |  |   |
|                                  | DC reactor   | FR-HEL                             | ●                   | ●      | ●   |  |   |
|                                  | EMC Directive compliant noise filter                                       | SF, FR-E5NF, FR-S5NFSA             | ●                   | ●      | ●   |  |   |
|                                  | EMC compliant EMC filter installation attachment                           | FR-A5AT03, FR-AAT02, FR-E5T(-02)   | ●                   | ●      | ●   |  |   |
|                                  | Radio noise filter   | FR-BIF(H)                          | ●                   | ●      | ●   | Applicable for all models  |   |
|                                  | Line noise filter  | FR-BSF01, FR-BLF                   | ●                   | ●      | ●   | 0.4K or higher of the three-phase power input model.<br>The option's model varies with the inverter's model. |   |
|                                  | Filterpack   | FR-BFP2                            | ●                   | ●      | ●   |  |   |
|                                  | Brake resistor   | MRS type, MYS type                 | ●                   | ●      | ●   | 0.4K or higher.<br>The option's model varies with the inverter's model.                                      |   |
|                                  | High-duty brake resistor   | FR-ABR                             | ●                   | ●      | ●   |  |   |
|                                  | Brake unit, Resistor unit, Discharging resistor                            | FR-BU2, FR-BR, GZG, GRZG type      | ●                   | ●      | ●   |  |   |
|                                  | Multifunction regeneration converter                                       | FR-XC                              | ●                   | ●      | ●   |  | All capacities.<br>The option's model varies with the inverter's model. |
|                                  | Dedicated stand-alone reactor  | FR-XCL/FR-XCG                      | ●                   | ●      | ●   |  |   |
|                                  | Dedicated box-type reactor   | FR-XCB                             | ●                   | ●      | ●   |  |   |
|                                  | High power factor converter  | FR-HC2                             | ●                   | ●      | -   | 400V: All capacities.<br>The option's model varies with the inverter's model.                                |   |
| Surge voltage suppression filter | FR-ASF   | ●                                  | ●                   | ●      |   |  |   |
|                                  | FR-BMF   | ●                                  | ●                   | ●      | 400V: 5.5K or higher.<br>The option's model varies with the inverter's model. |  |   |
| Others                           | Pilot generator  | QVAH-10                            | ●                   | ●      | ●   | Applicable for all models  |   |
|                                  | Deviation sensor   | YVGC-500WNS                        | ●                   | ●      | ●   |  |   |
|                                  | Analog frequency meter (64mm × 60mm)                                       | YM-206NRI 1mA                      | ●                   | -      | -   |  | Standard model  |
|                                  | Calibration resistor   | RV24YN 10kΩ                        | ●                   | ●      | ●   | Applicable for all models  |   |
|                                  | FR Configurator2 (Inverter setup software)                                 | SW1DND-FRC2                        | ●                   | ●      | ●   |  |   |
|                                  | FR Configurator Mobile (Mobile App for Inverters)                          | -                                  | ○                   | ○      | ○   |  |   |

●: Supported ○: To be supported soon -: Not supported

# MITSUBISHI ELECTRIC CORPORATION

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