



## High Performance Inverter

# FRENIC-Ace

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Please read the following pages of the instruction manual (INR-SI47-1733g-□) as described in this manual.

| Target page   |
|---|
| G.3 Compliance with UL Standards and Canadian Standards (cUL certification)<br>Appendix-16~20 |

### CAUTION

Thank you for purchasing our FRENIC-Ace series of inverters.

- This product is designed to drive a three-phase induction motor. Read through this supplement in conjunction with the instruction manual (INR-SI47-1733g-□) to become familiar with proper handling and correct use.
- Improper handling might result in incorrect operation, a short life, or even a failure of this product as well as the motor.
- Deliver this supplement to the end user of this product.
- Keep this supplement in a safe place until this product is discarded.
- For instructions on how to use an optional device, refer to the instruction and installation manuals for that optional device.



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## ⚠ CAUTION

### 7. Environmental Requirements

#### 7.1 Type FRN0001E2■-2□/FRN0002E2■-4□ or above,

Other than FRN0012E2■-2□/FRN0020E2■-2□/FRN0007E2■-4□/FRN0012E2■-4□

- Maximum Surrounding Air Temperature / Maximum ambient temperature  
The temperatures shall be equal or lower than the values in the table below.

| Enclosure Type | ND/HD    | HND/HHD  |
|----------------|----------|----------|
| Open Type      | 40 deg C | 50 deg C |
| Enclosed Type  | 30 deg C | 40 deg C |

- Atmosphere  
For use in pollution degree 2 environments.

#### 7.2 Type FRN0012E2■-2□/FRN0020E2■-2□/FRN0007E2■-4□/FRN0012E2■-4□

- Maximum Surrounding Air Temperature / Maximum ambient temperature  
The temperatures shall be equal or lower than the values in the table below.

| Enclosure Type | ND/HD    | HND/HHD                          |
|----------------|----------|----------------------------------|
| Open Type      | 40 deg C | 50 deg C (HHD)<br>40 deg C (HND) |
| Enclosed Type  | 30 deg C | 40 deg C (HHD)<br>30 deg C (HND) |

- Atmosphere  
For use in pollution degree 2 environments.

### 8. UL Enclosure Type

UL Enclosed Type formats are shown in the table below.

| Variation  | Enclosed Type1                                 |
|------------|--|
| Standard   | FRN0001 to 0115E2U-2□<br>FRN0002 to 0590E2U-4□ |
| EMC Filter | FRN0088 to 0115E2F-2□<br>FRN0059 to 0590E2F-4□ |

The other models of above table are excluded.

### 9. Functional Description of Control Circuit Terminals

A power source for connection to the Integrated alarm output (30A, 30B, 30C) should be limited to overvoltage category II such as control circuit or secondary winding of power transformer.

| Classification | Terminal Symbol | Terminal Name           | Functional description   |
|----------------|-----------------|-------------------------|--|
| Contact output | [30A/B/C]       | Integrated alarm output | When the inverter stops with an alarm, output is generated on the relay contact (1C).<br>Contact capacity: AC250 V 0.3A cosφ=1, DC30 V 0.5 A |





**CAUTION**

| Power supply voltage | Nominal applied motor(kW)[HP] | Inverter type | H/HD/HND/ND mode | Class J or Class CC fuse size (A) *4 | Circuit breaker trip size (A) *5 | Required torque lb-in (N · m) |                      |                           |                       | Wire size AWG (mm <sup>2</sup> ) |              |         |              |              |                      |                           |                       |                      |         |
|----------------------|-------------------------------|---------------|------------------|--------------------------------------|----------------------------------|-------------------------------|----------------------|---------------------------|-----------------------|----------------------------------|--------------|---------|--------------|--------------|----------------------|---------------------------|-----------------------|----------------------|---------|
|                      |                               |               |                  |                                      |                                  | Main terminal                 | Inverter's grounding | Aux. control power supply | Aux. Fan power supply | Main terminal Cu Wire            |              |         |              |              | Inverter's grounding | Aux. control power supply | Aux. fan power supply |                      |         |
|                      |                               |               |                  |                                      |                                  |                               |                      |                           |                       | L1/R,L2/S,L3/T                   |              |         | U, V, W      |              |                      |                           |                       | Inverter's grounding |         |
|                      |                               |               |                  |                                      |                                  |                               |                      |                           |                       | 60°C Cu wire                     | 75°C Cu wire | Remarks | 60°C Cu wire | 75°C Cu wire |                      |                           |                       |                      | Remarks |
| Three-phase 400V     | 110 [150]                     | FRN0240E2■-4□ | HD/HND           | 350                                  | 250                              | 238.9 (27)                    | 119.4 (13.5)         |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0290E2■-4□ | HHD              |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | 132 [200]                     | FRN0240E2■-4□ | ND               | 400                                  | 300                              | 424.7 (27)                    | 238.9 (27)           |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0290E2■-4□ | HD/HND           |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0361E2■-4□ | HHD              |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | 160 [250]                     | FRN0290E2■-4□ | ND               | 500                                  | 350                              | 238.9 (27)                    | 119.4 (13.5)         |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0361E2■-4□ | HD/HND           |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0415E2■-4□ | HHD              |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | 200 [300]                     | FRN0361E2■-4□ | ND               | 600                                  | 350                              | 424.7 (48)                    | 238.9 (27)           |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0415E2■-4□ | HD/HND           |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0520E2■-4□ | HHD              |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | 220 [350]                     | FRN0415E2■-4□ | ND               | 700                                  | 500                              |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0520E2■-4□ | HD/HND           |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0590E2■-4□ | HHD              |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | 250 [400]                     | FRN0590E2■-4□ | HD               | 800                                  | 600                              |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | 280 [450]                     | FRN0520E2■-4□ | ND               |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | 315 [500]                     | FRN0590E2■-4□ | HND              | 1000                                 | 800                              |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      |                               | FRN0590E2■-4□ | ND               |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
| 5.5 [7.5]            | FRN0022E2E-4□                 | HHD           | 30               | 30                                   | input 15.9 (1.8)                 | 27 (3.0)                      |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
| 7.5 [10]             | FRN0022E2E-4□                 | HD/HND        | 40               | 40                                   |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
| 11 [15]              | FRN0029E2E-4□                 | HHD           | 60               | 50                                   | other 27 (3.0)                   |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | FRN0022E2E-4□                 | ND            |                  |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | FRN0037E2E-4□                 | HD/HND        |                  |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
| 15 [20]              | FRN0029E2E-4□                 | ND            | 70               | 60                                   | input 15.9 (1.8)                 | 51.3 (5.8)                    |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | FRN0037E2E-4□                 | HD/HND        |                  |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | FRN0044E2E-4□                 | HHD           |                  |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
| 18.5 [25]            | FRN0037E2E-4□                 | ND            | 90               | 75                                   | other 51.3 (5.8)                 |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |
|                      | FRN0044E2E-4□                 | HD/HND        |                  |                                      |                                  |                               |                      |                           |                       |                                  |              |         |              |              |                      |                           |                       |                      |         |

Note: A box (■) in the above table replaces S (Basic type) or E (EMC filter built-in type) or U (UL Enclosed type of Basic type) or F (UL Enclosed type of EMC filter built-in type) depending on the enclosure. A box (□) in the above table replaces GA, GB, A, E, U, K or C depending on the model.

## ⚠ CAUTION

| Power supply voltage | Nominal applied motor(kW)[HP] | Inverter type | HHD/HD/HND/ND mode | Class J or Class CC fuse size (A) *4 | Circuit breaker trip size (A) *5 | Required torque lb-in (N · m) |                      |                           |                       | Wire size AWG (mm <sup>2</sup> ) |              |         |              |              |         |                      |                           |                       |          |    |     |
|----------------------|-------------------------------|---------------|--------------------|--------------------------------------|----------------------------------|-------------------------------|----------------------|---------------------------|-----------------------|----------------------------------|--------------|---------|--------------|--------------|---------|----------------------|---------------------------|-----------------------|----------|----|-----|
|                      |                               |               |                    |                                      |                                  | Main terminal                 | Inverter's grounding | Aux. control power supply | Aux. Fan power supply | Main terminal Cu Wire            |              |         |              |              |         | Inverter's grounding | Aux. control power supply | Aux. fan power supply |          |    |     |
|                      |                               |               |                    |                                      |                                  |                               |                      |                           |                       | L1/R,L2/S,L3/T                   |              |         | U, V, W      |              |         |                      |                           |                       | G        |    |     |
|                      |                               |               |                    |                                      |                                  |                               |                      |                           |                       | 60°C Cu wire                     | 75°C Cu wire | Remarks | 60°C Cu wire | 75°C Cu wire | Remarks |                      |                           |                       |          |    |     |
| Single-phase 200V    | 0.1 [1/8]                     | FRN0001E2■-7□ | HHD                | 6                                    | 5                                | 7.1 (0.8)                     | 10.6 (1.2)           | -                         | -                     | -                                | 14 (2.1)     | *6      | -            | 14 (2.1)     | *6      | 14 (2.1)             | -                         | -                     |          |    |     |
|                      | 0.2 [1/4]                     | FRN0002E2■-7□ | HHD                | 6                                    | 5                                |                               |                      |                           |                       |                                  |              |         |              |              |         |                      |                           |                       | 12 (3.3) | 10 | 5.3 |
|                      | 0.4 [1/2]                     | FRN0003E2■-7□ | HHD                | 10                                   | 10                               |                               |                      |                           |                       |                                  |              |         |              |              |         |                      |                           |                       |          |    |     |
|                      | 0.75 [1]                      | FRN0005E2■-7□ | HHD                | 20                                   | 15                               | 10.6 (1.2)                    | 15.9 (1.8)           | -                         | -                     | -                                | 12 (3.3)     | 10      | 5.3          |              |         |                      |                           |                       |          |    |     |
|                      | 1.5 [2]                       | FRN0008E2■-7□ | HHD                | 30                                   | *7                               |                               |                      |                           |                       |                                  |              |         |              |              |         |                      |                           |                       |          |    |     |
|                      | 2.2 [3]                       | FRN0011E2■-7□ | HHD                | 50                                   | *7                               |                               |                      |                           |                       |                                  |              |         |              |              |         |                      |                           |                       |          |    |     |

Note: Control circuit terminals M2 tightening torque: 1.7 lb-in (0.19 N·m) ±10%  
 Recommended wire size: AWG26 to 18 (0.14 to 1 mm<sup>2</sup>)  
 M3 tightening torque: 4.4 to 5.3 lb-in (0.5 to 0.6 N·m), recommended wire size: AWG26 to 16 (0.14 to 1.5 mm<sup>2</sup>)

Note: A box (■) in the above table replaces S (Basic type) or E (EMC filter built-in type) or U (UL Enclosed type of Basic type) or F (UL Enclosed type of EMC filter built-in type) depending on the enclosure.  
 A box (□) in the above table replaces GA, GB, A, E, U, K or C depending on the model.

- \*1 No terminal end treatment is required for connection.
- \*2 Use 75°C (167°F) Cu wire only.
- \*3 The wire size of UL Open Type and Enclosed Type are common. Please contact us if UL Open Type exclusive wire is necessary.
- \*4 6 rms Amperes for aux. control power supply. There is no aux. control power supply in FRN0069E2■-2□/FRN0044E2■-4□/FRN0011E2■-7□ or below.
- \*5 5 rms Amperes for aux. control power supply. There is no aux. control power supply in FRN0069E2■-2□/FRN0044E2■-4□/FRN0011E2■-7□ or below.
- \*6 Only S (Basic type) or E (EMC filter built-in type) or U (UL Enclosed type of Basic type).
- \*7 For this capacity, please install UL certified fuses between the power supply and the inverter.

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**High Performance Inverter**

**FRENIC-Ace**

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**Instruction Manual (Supplement)**

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Fuji Electric Co., Ltd.

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The purpose of this instruction manual is to provide accurate information in handling, setting up and operating of the FRENIC-Ace series of inverters. Please feel free to send your comments regarding any errors or omissions you may have found, or any suggestions you may have for generally improving the manual.