



Compact Inverter

# ***FRENIC-Mini***

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Three-phase 200 V series: FRN0001 to 0020C2S-2U

Three-phase 400 V series: FRN0002 to 0011C2S-4U

Single-phase 200 V series: FRN0001 to 0012C2S-7U

## **CAUTION**

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

- This manual is a supplement to the FRENIC-Mini Instruction Manual (INR-SI47-1729-E), contains descriptions complying with UL standard. For other descriptions, refer to the original manual.
- Improper handling might result in incorrect operation, a short life, or even a failure of this product as well as the motor.
- Deliver this manual to the end user of this product. Keep this manual 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.

## Chapter 2 MOUNTING AND WIRING OF THE INVERTER

### 2.3.5 Wiring for main circuit terminals and grounding terminals

#### ② Inverter output terminals, U, V, W and grounding terminal (⊕G)

- 1) Connect the three wires of the three-phase motor to terminals U, V, and W, aligning phases each other.
- 2) Connect the grounding wire of terminals U, V, and W to the grounding terminal (⊕G).
- 3) If the cable from the inverter to the motor is very long, a high-frequency current may be generated by stray capacitance between the cables and result in an overcurrent trip of the inverter, an increase in leakage current, or a reduction in current indication precision.

When a motor is driven by a PWM-type inverter, the motor terminals may be subject to surge voltage generated by inverter element switching. If the motor cable (with 460 V series motors, in particular) is particularly long, surge voltage will deteriorate motor insulation. To prevent this, use the following guidelines:

Inverters of 7.5 HP or above			
Motor Insulation Level	1000 V	1300 V	1600 V
460 VAC Input Voltage	66 ft (20 m)	328 ft (100 m)	1312 ft (400 m)*
230 VAC Input Voltage	1312 ft (400 m)*	1312 ft (400 m)*	1312 ft (400 m)*

Inverters of 5 HP or below			
Motor Insulation Level	1000 V	1300 V	1600 V
460 VAC Input Voltage	66 ft (20 m)	165 ft (50 m)	165 ft (50 m)*
230 VAC Input Voltage	328 ft (400 m)*	328 ft (100 m)*	328 ft (100 m)*

\* For this case the cable length is determined by secondary effects and not voltage spiking.



When a motor protective thermal O/L relay is inserted between the inverter and the motor, the thermal O/L relay may malfunction (particularly in the 460 V series), even when the cable length is 165 ft (50 m) or less. To correct, insert a filter or reduce the carrier frequency. (Use function code F26(Motor sound).)

## Chapter 5 FUNCTION CODES

### 5.1 Function Code Tables

In the ROM version 0800 or later, the factory default of function code H27 (Thermistor for motor, Level) is changed from 0.16 to 1.6.

## **Chapter 11 COMPLIANCE WITH STANDARDS**

### **11.5 Compliance with UL Standards and Canadian Standards (cUL certification)**

#### **11.5.1 General**

Originally, the UL standards were established by Underwriters Laboratories, Inc. as private criteria for inspections/investigations pertaining to fire/accident insurance in the USA. Later, these standards were authorized as the official standards to protect operators, service personnel and the general populace from fires and other accidents in the USA.

cUL certification means that UL has given certification for products to clear CSA Standards. cUL certified products are equivalent to those compliant with CSA Standards.

#### **11.5.2 Considerations when using FRENIC-Mini in systems to be certified by UL and cUL**

To use the FRENIC-Mini series of inverters as a part of UL Standards or CSA Standards (cUL certified) certified product, refer to the guidelines given below.

**Conformity to UL standards and Canadian standards (cUL certification)**

If installed according to the guidelines given below, inverters marked with UL/cUL are considered as compliant with the UL and CSA (cUL certified) standards

**⚠ CAUTION**

Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

1. Solid state motor overload protection (motor protection by electronic thermal overload relay) is provided in each model.  
Adjust function codes F10 to F12 and H89 to set the protection level.
2. Connect the power supply satisfying the characteristics shown in the table below as an input power supply of the inverter. (Short circuit rating)
3. Use 75°C Cu wire only.
4. Use Class 1 wire only for control circuits.

**Short circuit rating**

When protected by class J fuses, suitable for use on a circuit capable of delivering not more than B rms symmetrical amperes, A volts maximum.

Power supply voltage	Inverter type	Power supply max. voltage A (Volts)	Power supply current B (Amperes)
Three-phase 200V	FRN0001C2S-2U	240VAC	100,000 A or less
	FRN0002C2S-2U		
	FRN0004C2S-2U		
	FRN0006C2S-2U		
	FRN0010C2S-2U		
	FRN0012C2S-2U		
	FRN0020C2S-2U		
Three-phase 400V	FRN0002C2S-4U	480VAC	100,000 A or less
	FRN0004C2S-4U		
	FRN0005C2S-4U		
	FRN0007C2S-4U		
	FRN0011C2S-4U		
Single-phase 200V	FRN0001C2S-7U	240VAC	100,000 A or less
	FRN0002C2S-7U		
	FRN0004C2S-7U		
	FRN0006C2S-7U		
	FRN0010C2S-7U		
	FRN0012C2S-7U		

**Conformity to UL standards and Canadian standards (cUL certification) (Continued)**



5. Install UL certified fuses rated 600Vac between the power supply and the inverter, referring to the table below.

Power supply voltage	Inverter type	Required torque lb-in (N·m)			Wire size AWG or kcmil(mm <sup>2</sup> )			Class J fuse current(A)
		Main terminal	Control circuit		Main terminal <sup>*3</sup>	Control circuit		
			<sup>*1</sup> TERM1	<sup>*2</sup> TERM2-1 TERM2-2		<sup>*1</sup> TERM1	<sup>*2</sup> TERM2-1 TERM2-2	
Three-phase 200V	FRN0001C2S-2U	10.6 (1.2)	3.5 (0.4)	1.7 (0.2)	14	20 (0.5)	3	
	FRN0002C2S-2U						6	
	FRN0004C2S-2U						10	
	FRN0006C2S-2U						15	
	FRN0010C2S-2U	15.9 (1.8)	14[12]	20				
	FRN0012C2S-2U			30				
	FRN0020C2S-2U			40				
Three-phase 400V	FRN0002C2S-4U	15.9 (1.8)	3.5 (0.4)	1.7 (0.2)	14	20 (0.5)	3	
	FRN0004C2S-4U						6	
	FRN0005C2S-4U						10	
	FRN0007C2S-4U						15	
	FRN0011C2S-4U				14[12]	20		
Single-phase 200V	FRN0001C2S-7U	10.6 (1.2)	3.5 (0.4)	1.7 (0.2)	14	20 (0.5)	6	
	FRN0002C2S-7U						6	
	FRN0004C2S-7U						10	
	FRN0006C2S-7U						15	
	FRN0010C2S-7U	15.9 (1.8)	14[12]	30				
	FRN0012C2S-7U			10[10]	40			

\*1 Denotes the relay contact terminals for [30A], [30B] and [30C].

\*2 Denotes control terminals except for [30A], [30B] and [30C].

\*3 Values in [ ] mean the size(AWG) of Grounding wire if exist.

6. To comply with CSA for AC200V input models, transient surge suppression shall be installed on the line side of this equipment and shall be rated 240V (phase to ground), 240V (phase to phase), suitable for overvoltage category 3, and shall provide protection for a rated impulse withstand voltage peak of 4kV.

To comply with CSA for AC400V input models, transient surge suppression shall be installed on the line side of this equipment and shall be rated 278V (phase to ground), 480V (phase to phase), suitable for overvoltage category 3, and shall provide protection for a rated impulse withstand voltage peak of 4kV.

7. Maximum surrounding air temperature rating of 50 °C.

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**Instruction Manual**  
**Supplement to Instruction Manual**

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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-Mini 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.

In no event will Fuji Electric Co., Ltd. be liable for any direct or indirect damages resulting from the application of the information in this manual.