

[Related Documents]

User's Manual

Application

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

FRENIC-MEGA(G2)Series "UL Enclosed - Type 12 ready (Heatsink out)"

This manuals can be downloaded in PDF form from QR code in right figure.

Multi-function Keypad (TP-A2SW) Instruction Manual

· Alternative parts list for UL Standards and Canadian

Standards (cUL Certification) Compatibility IN • UL Enclosed - Type 1 Kit for FRENIC-MEGA(G2)Series

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

may result in a serious accident or loss in the event of failure.

Failure to observe this could result in fire. Ground the inverter in compliance with the national or local electric code. Be sure to ground the inverter ground terminal (@G) grounding wire. Failure to observe this could result in electric shock or fire.

Wiring work should be carried out by qualified professionals. Carry out wiring work after ensuring that the power has been turned OFF Failure to observe this could result in electric shock. Always carry out wiring after installing the unit. Failure to observe this could result in electric shock or injury.

Failure to observe this could result in an accident.

tallation Install on noncombustibles such as metal.

Do not operate the unit with wet hands

Failure to observe this could result in electric shock.

Failure to observe this could result in an accident

values. Design machines in such a way that safety is ensured even at such times.

install near comb

· RS-485 Communication User's Manual

Fuji Electric Co., Ltd.

The purpose of this instruction manual is to provide handing information in handling, setting up and operating of the FRENIC-MEGA series of inverters. Do not use this product until you have full knowledge of the product, safety information and instructions from User's Manual and Related documents.

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.

nank you for purchasing our FHENIC-MEGA series of inverters.
This product is designed to drive a three-phase induction motor and three-phase permanent magnet synchronous motor. Read through this instruction manual and be familiar with the handling procedure for 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 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.
Drawings in this manual to the many be illustrated without covers or safety shields for explanation of detail parts. Restore the covers and shields in the original state and observe the description in the manual before starting operation.

The Previous share a piece on equipment used to the interprint and the previous in carning be used to its single-printies motions or owner applications. Failure to observe this could result in fire or an accident. The FRENIC-MEGA cannot be used as is for applications which may have a direct effect on the human body such as life support machines. Strict quality control has been observed in the manufacture of this product, however, safety devices should be installed when the product is used for equipment which

Do not install near combustibles. Failure to observe this could result in fire. When using the DC reactor (DCR), there is a possibility of users coming into contact with main circuit terminal block parts (live parts). In such cases, take measure such as installing the product in a location where it will not easily come into contact with people. Failure to observe this could result in electric shock or injury.

Viring
• If no zero-phase current (earth leakage current) detective device such as a ground-fault relay is installed in the upstream power supply line in order to avoid the entire power supply system's shutdown undesirable to factory operation, install a residual-current-operated protective device (RCD) / earth leakage circuit breaker (ELCB) individually to inverters to break the individual inverter power supply lines only.
• Connect to the power supply via a molded case circuit breaker or earth leakage circuit breaker (with overcurrent protection function) for each inverter. Use the recommended molded case circuit breaker or earth leakage circuit breaker, and do not use devices that exceed the recommended capacity.
• Be sure to use the specified wire size.

Tighten terminals with the prescribed tightening torque. If there are multiple inverter and motor combinations, do not use multi-core cables for the purpose of bundling and storing wiring for multiple combinations. Do not install a surge suppressor to the inverter output side (secondary side). Be sure to connect the DC reactor (DCR) when the capacity of the power supply transformer exceeds 500 kVA, and is at least 10 times the inverter rated capacity.

Failure to observe this could result in electric shock or injury. Ensure that the number of phases and rated voltage of the product input power supply matches that for the connected power supply. Do not connect the power lines to the inverter output terminals ([U], [V], [W]). When connecting a DC braking resistor (DBR), never connect it to terminals other than terminals [P(+)] and [DB]. Failure to observe this could result in fife or an accident. Control signal lines generally do not have a reinforced insulation coating, and therefore if control signal lines come into contact with live parts of the main circuit, the insulation coating may be damaged for some reason. In such a case, there is a danger that high voltage from the main circuit will be applied to the control signal lines, and therefore care should be taken to ensure that they do not come into contact with live parts of the main circuit. Failure to observe this could result in an accident or electric shock.

Failure to observe this could result in an accident or electric shock. Switch all switches after first waiting for at least 5 minutes for FRN003 to 011562□-2GU / FRN002 to 006062□-4GU, or 10 minutes for FRN0146 to 043262□ -2GU / FRN0085 to 148062□-4GU, ensuring that the LED monitor and charge lamp are off, and using a device such as a tester to ensure that the DC intermediate circuit voltage across main circuit terminals [P(+i)] and [N(-i)] has dropped to a safe level (+25 VDC or less). Failure to observe this could result in electric shock.

If the product stops after being tripped when the retry function is selected, depending on the cause of the trip, the product will restart automatically, and the motor will rotate. Design the machinery so that human body and peripheral equipment safety is ensured even when the auto-resetting succeeds. Design machines in such a way as to ensure the safety of the human body and surrounding area even when operation is resumed. There may be times when the stall prevention function (torque limiting) causes the product to run at an acceleration / deceleration time or speed different from the set

The keypad (m) key is enabled only when keypad operation is selected with function code F02. Please prepare a separate EMERGENCY STOP button. When

function code H96 has been set to "0" or "2", the 💮 key will be disabled if the operation command method is changed from operation command with the keypad by

Be sure to attach the inverter surface cover before turning the power ON. Do not remove the surface cover while the power is ON.

The FRENIC-MEGA is a piece of equipment used to run three-phase motors. It cannot be used for single-phase motors or other applications

24A7-E-0162

24A7-E-0082

. INR-SI47-2442□-E

INR-SI47-2592 -JE

INR-SI47-2587 -JEC

INR-SI47-2433 -JE

INR-SI47-2599-E 1st Edition, April 2024

FRN G G2 G2 GU

Instruction Manual

https://americas.fujielectric.com/products/vfd-inverters-ac-drives/frenic-mega-g2-start-up/

Instruction manual QR cod

FRENIC-MEGA series

Chapter 1 BEFORE USE

TYPE: Type of inverter

1.1 Acceptance Inspection (Nameplate and Inverter Type)

Unpack the package and check the following: (1) Ensure that the package contains both the inverter unit and instruction manual (this manual), and that the product has suffered no damage (breakage, dents, parts that have fallen off) during transport. (2) The (a) Main Nameplate and (b) Sub Nameplate shown in Figure 1-1 are affixed to the inverter. Ensure that the product is the same as the one ordered.

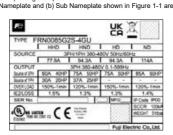


Figure 1-1 (a) Main Nameplate

FRN0085G2S-4GU (b) Sub Nameplat

3-phase 230V 3-phase 460V

Enclosure

2

High performance

multifunctional type



Insulation leve





AWG AW

# \_\_\_\_\_



function code H96 has been set to "0" or "2", the resp. key will be disabled if the operation command method is changed from operation command with the keypad by selecting link operation "LE". If any of the protective functions has been activated, first remove the cause. Then, after checking that all run commands are set to OFF, release the alarm. If the alarm is released while any run command is set to ON, the inverter may supply the power to the motor, running the motor. Failure to observe this could result in an accident. Set function codes after ensuring a sufficient understanding of this Instruction Manual. If operation is performed after recklessly changing function code data, the motor may rotate at a torque and speed at which the machine is unable to tolerate. When auto tuning is started, the motor rotates. Conduct a sufficient check to ensure that there is no danger even when the motor rotates. Failure to observe this could result in an accident or injury. Even if the motor is stopped by DC braking operation or pre-excitation operation, voltage will be output to the inverter output terminals [L1/R], [L2/S] and [L3/T], voltage may be output to inverter output terminals [U], [V] and [W]. Even if the motor is stopped by DC braking operation or pre-excitation operation, voltage will be output to the inverter output t[U], [V] and [W]. Even if the motor is stopped by DC braking operation or pre-excitation operation, voltage will be output to the inverter output [U], [V] and [W] terminals. Failure to observe this could result in electric shock. Inverter high-speed operation settings can be specified easily. If settings are changed, use the product afficiently checking the motor and machine specification. Failure to observe this could result in nights. Failure to observe this could result in injury. Having the product and the support of the support o 2.2.1 Installation Surface

 Initenance and inspection, part replacement
 Carry out inspection after waiting at least 5 minutes for FRN0003 to 0115G2 -2GU / FRN0002 to 0060G2 -4GU, or 10 minutes for FRN0146 to 0432G2 -2GU / FRN0085 to 1480G2 -4GU at the unit of the power. Furthermore, ensure that the LED monitor and charge lamp are OFF, and use a device such as a tester to ensure that the DC intermediate circuit voltage across main circuit terminals [P(+)] and [N(-)] has dropped to a safe level (+25 VDC or less).
 Failure to observe this could result in electric shock. Besure to perform the daily inspection and periodic inspection described in the instruction manual. Lengthy use of the product without inspection could result in

be start to perform the same projection and provide independent accentice in the interference in the interference of the product which interference in the interference of the product which interference of the product which is product which interference of the product which is p

Contact outputs [30A/B/C] and [Y5A/C] use relays, and may remain ON or OFF, or in an indefinite state when the life is reached. In the interests of safety, equip I product with an external protection function. Failure to observe this could result in fire or an accident.

Maintenance and inspection, and part replacement should only be carried out by the authorized personnel. Remove all metal objects (watches, rings, etc.) before beginning work. Be sure to use invelted to the

Be sure to use insulated tools.

Never modify the product. Failure to observe this could result in electric shock or injury.

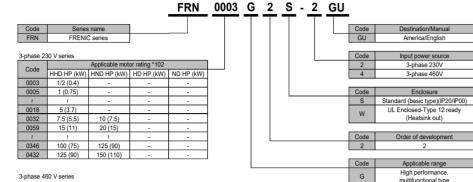
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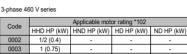
# nstallation

- stallation Do not hold the surface cover when transporting the product. Failure to observe this could result in injury if the product is dropped. Take measures to prevent foreign material such as lint, wastepaper, wood shavings, dust, or metal scraps getting into the inverter, or adhering to the cooling fan. Use the specified screws for changing the mounting base. Failure to observe this could result in fire or an accident.
- Do not install or run inverters with damaged external or internal parts Failure to observe this could result in fire, an accident, or injury
- nng The inverter, motor and wiring generate electric noise, which may cause nearby sensors and devices to malfunction. Employ noise countermeasures to prever

## Failure to observe this could result in an accident.

- Peration
  The cooling fans and braking resistors become very hot. Do not touch.
  Failure to observe this could result in burns.
  Mechanical holding is not possible with the inverter brake function.
  Failure to observe this could result in injury.
  The digital input terminals are equipped with a function used to start and stop operation or change the speed command with the "FWD" operation command or "BX"
  free-run command and so on. Depending on the digital input terminal status, operation may start suddenly, or the speed may change significantly simply by changing
  the function code settings. Make changes to function code settings after sufficiently ensuring safety.
  With digital input, functions ("SS1, SS2, SS4, SS8", "Hz2/Hz1", "Hz/PID", "IVS", "LE", etc.) used to change the operation procedure for operation commands or
  command procedure for speed commands can be assigned. Depending on the conditions, changes to these signals may result in operation being started suddenly or
  the speed changing suddenly.
- command procedure for speed commands can be assigned. Depending on the containons, changes to these signals that result in operation being started sourcempt of the speed changing suddenly. Ensure safety before modifying customizable logic related function code settings (U codes and related function codes) or turning ON the "Cancel customizable logic" Ensure safety before modifying customizable logic related function code settings (U codes and related unknown codes) or turning UN the Cancer customizable logi terminal command CLC. Depending upon the settings, such modification or cancellation of the customizable logic may change the operation sequence to cause sudden motor start or an unexpected motor operation. Carry out a sufficient safety check beforehand. Failure to observe this could result in an accident or injury.
- If disposing of the FRENIC-MEGA, handle as industrial waste Failure to observe this could result in injury.





148

02	1/2 (0.4)	-			
03	1 (0.75)	-	-		
	2		-		
09	5 (3.7)		-		
18	7.5 (5.5)	10 (7.5)	-		*102 HD and ND specification inverters are supported with ROM0600 or later.
	2	2	-		
60	30 (22)	40 (30)	-		
85	40 (30)	50 (37)	50 (37)	60 (45)	
1	2	2	2	2	
80	900 (630)	1200 (710)	1200 (710)	1300 (800)	

### SER.No.: Product numbe Production year and week T31A123A0579E A4

- Production week: This indicates the week number that is numbered from 1st week of January. The 1st week of January is indicated as '0' - Production year: Last digit of year - Product versio

If you suspect the product is not working properly or if you have any questions about your product, contact your Fuji Electric representative Chapter 2 INSTALLATION AND WIRING

2.1 Operating Environment

Install the inverter in an environment that satisfies the requirements listed in Table 2-1. Table 2-1 Operating environment

Item	Specifications					
Site location	Indoors Environmental condition	ions: IEC60721-3-3:3C2				
Ambient temperature	HHD/HND 14 to 131°F (-10 to +55 °C) (Current derating is necessary in the 122 to 131°F (+50 to +55 °C) range.) When installed closely side-by-side (FRN0003 to 0115G2□-2GU / FRN0002 to 0060G2□-4GU): 14 to 104°F (-10 to +40 °C) HD/ND *102 14 to 131°F (-10 to +55 °C) (Current derating is necessary in the 104 to 131°F (+40 to +55 °C) range.)					
Relative humidity	5 to 95% RH (there should be	no condensation)				
Atmosphere	The inverter must not be exposed to dust, direct sunlight, corrosive gases, flammable gases, oil mist, vapor or water droplets. (Pollution degree 2 (IEC60664-1)) (Note 1) The atmosphere can contain a small amount of salt (0.01 mg/cm <sup>2</sup> or less per year). The inverter must not be subjected to sudden changes in temperature that will cause condensation to form.					
Altitude	3,300 ft (1,000 m) max. (Note 2)					
Atmospheric pressure	86 to 106 kPa					
Vibration	Type of inverter	2 to less than 9 Hz	9 to less than 20 Hz	20 to less than 55 Hz	55 to less than 200 Hz	
	FRN0003 to 0115G2□-2GU, FRN0002 to 0060G2□-4GU		1G (9.8 m/s²)	0.6G (5.9 m/s <sup>2</sup> )		
	FRN0146 to 0288G2 2GU, FRN0085 to 0217G2 -4GU	0.12inch (3 mm) (max. amplitude)	IG (9.6 m/s <sup>-</sup> )	0.2G (2 m/s <sup>2</sup> )	0.1G (1 m/s <sup>2</sup> )	
	FRN0346, 0432G2□-2GU, FRN0261 to 1480G2□-4GU		0.2G (2 m/s <sup>2</sup> )	0.20 (2 11/5-)		

(Note 1) Do not install the inverter in an environment where it may be exposed to lint, cotton waste or moist dust or dirt which will clog the heat sink of the inverter. If the inverter is to be used in such an environment, install it in cabinet to prevent lint, etc. getting in. (Note 2) If you use the inverter in an altitude above 3,300 ft (1,000 m), you should apply an output current derating factor as listed in Table 2-2.

\*102 HD and ND specification inverters are supported with ROM0600 or later.

Table 2-2 Output Current Derating Factor in Relation to Attitude					
Altitude	Output current derating factor				
3,300 ft (1,000 m) or less	1.00				
3,300 to 4,900 ft (1,000 to 1500 m)	0.97				
4,900 to 6,500 ft (1,500 to 2,000 m)	0.95				
6 = 600  to  8 = 200  ft (2 = 000  to  2 = 600  m)	0.91				

Fuji Electric strongly recommends installing inverters in a panel for safety reasons, in particular, when installing the ones whose enclosure rating is IP00. When installing the inverter in a place out of the specified environmental requirements, it is necessary to derate the inverter or consider the panel engineering design suitable for the special environment or the panel installation location.

## 2.2 Installation

Please install the inverter on noncombustibles such as metal. Also, do not mount it upside down or horizontally.

2.2.2 Surrounding Space

8,200 to 9,800 ft (2,500 to 3,000 m)

Secure the surrounding space shown in Figure 2-1 and Table 2-3. If enclosing the product in a cabinet and so on, be sure to provide adequate ventilation to the cabinet, as the ambient temperature may rise. Do not contain it in small enclosures with low heat dissipation capacity.

■ Installation of Multiple Inverters If installing two or more units inside the same equipment or cabinet, they must be installed side by side as a rule. If vertical installation is unavoidable, install partitions to prevent heat dissipation from inverters below affecting those above.

th FRN0003 to 011562—2GU / FRN0002 to 0060G2—4GU, only in the case of an ambient nperature of 104°F (40°C) or below is it possible to install inverters and converters closely ether horizontally.						
	Та	ble 2-3 Surrounding	space inch (mr	n)		
	Type of	Inverter	А	в	с	
	FRN****G2□-2GU	FRN****G2□-4GU	^	U	Ŭ	
	0003 to 0008	0002 to 0004	1.97 (50)		0 (0)	
	0011 to 0115	0006 to 0060	0.39 (10)	3.9 (100)	0(0)	
	0146 to 0432	0085 to 0610	1.07 (50)		3.9 (100)	
- 0840 to 1480 1.97 (50) 5.9 (150) 5.9 (150)						
		C: Space in front of	the inverter unit			

Installation with External Cooling
The external cooling installation reduces the generated heat inside the panel by dissipating approximately 70% of the total heat generated (total heat loss) by mounting the cooling fins protruding outside the equipment or cabinet. The external cooling unit body for the FRN0146 to 0432G2\_-2GU / FRN0085 to 1480G2\_-4GU has a protective external equipment or cabinet. construction of IP55 to installation with external cooling is possible for inverters FRN0032 to 0115G2 -2GU / FRN0018 to 0060G2 -4GU with the addition of an external cooling attachment (option), and for FRN0032 to 0115G2 -2GU / FRN0018 to 0060G2 -4GU by moving the mounting base. (For external cooling attachment (option) external drawings, refer to "Chapter 11 section 11.16" in the User's Manual, and for details on the installation method for FRN0146 to 0432G2 -2GU / FRN0085 to 1480G2 -4GU, refer to

"Chapter 2 section 2.1" in the same manual.) Take measures to prevent foreign material such as lint, wastepaper, wood shavings, dust, or metal scraps getting into the inverter, or adhering to the cooling fan

(Note) Refer to the Additional Instruction Manual "INR-SI47-2592 -JE" provided when installing the FRN\*\*\*\*G2W- GU.



0.88

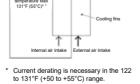


Figure 2-1 Installation Figure 2-2 External cooling installation

Cooling far



2.2.3 Removal and Attachment of the Front Cover and the Wiring Guide

Carry out wiring work in the following order (The descriptions assume that the inverter has already been installed). If using the RS-485 communication cable for such purposes as remotely operating the keypad, always remove the RS-485 communication cable from the RJ-45 connector before removing the front cover.

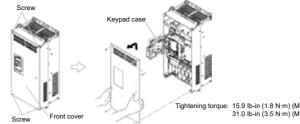
(1) FRN0003 to 0115G2 -2GU / FRN0002 to 0060G2 -4GU Loosen the screws of the front cover. Hold both sides of the front cover with the hands, slide the cover downward, and pull. Then remove it to the upward direction

Push the wiring guide upward and pull. Let the wiring guide slide and remove it. After routing the wires, attach the wiring guide and the front cover reversing the steps above. Front cover attachment screw

## (2) FRN0146 to 0432G2 -2GU / FRN0085 to 1480G2 -4GU

Loosen the screws of the front cover. Hold both sides of the front cover by hand, and slide the cover upward to remove. After carrying out wiring work, align the top of the front cover with the hole on the cover, and reattach using the opposite procedure to that in Figure 2-4. Open the keypad case to expose the control PCB.

Figure 2-3 Removal of front cover and wiring guide (for FRN0059G2S-2GU)



## Figure 2-4 Removal of the front cover (for FRN0217G2W-4GU)

2.2.4 Terminal Layout and Screw Specifications

Exercise caution as the terminal position varies depending on inverter capacity. The two ground terminals (🖨 G) are not differentiated for the input side (primary side) and the output side (secondary side). Also, use crimped terminals with insulating sleeves compatible for main circuit or terminals with insulating tubes. The recommended wire sizes are shown depending on cabinet temperature and wire type.

## 2.2.4.1 Screw Specifications (Main Circuit Terminals)

Refer to "Chapter 2 section 2.2.5 [1]" in the User's Manual for the specifications for the screws used in the main circuit terminals. For the inverter type, refer to "Table 2-4 Inverter type conversion table".

Three-	phase 230 V	Three-phase 460 V		
Inverter type	Inverter type in User's Manual	Inverter type	Inverter type in User's Manual	
FRN0003G2S-2GU	FRN0003G2S-2G	FRN0002G2S-4GU	FRN0002G2 -4G	
FRN0005G2S-2GU	FRN0005G2S-2G	FRN0003G2S-4GU	FRN0003G2 -4G	
FRN0008G2S-2GU	FRN0008G2S-2G	FRN0004G2S-4GU	FRN0004G2 -4G	
FRN0011G2S-2GU	FRN0011G2S-2G	FRN0006G2S-4GU	FRN0006G2□-4G	
FRN0018G2S-2GU	FRN0018G2S-2G	FRN0009G2S-4GU	FRN0009G2 -4G	
FRN0032G2S-2GU	FRN0032G2S-2G	FRN0018G2S-4GU	FRN0018G2 -4G	
FRN0046G2S-2GU	FRN0046G2S-2G	FRN0023G2S-4GU	FRN0023G2 -4G	
FRN0059G2S-2GU	FRN0059G2S-2G	FRN0031G2S-4GU	FRN0031G2 -4G	
FRN0075G2S-2GU	FRN0075G2S-2G	FRN0041G2S-4GU	FRN0041G2□-4G	
FRN0088G2S-2GU	FRN0088G2S-2G	FRN0045G2S-4GU	FRN0045G2 -4G	
FRN0115G2S-2GU	FRN0115G2S-2G	FRN0060G2S-4GU	FRN0060G2□-4G	
FRN0146G2S-2GU	FRN0146G2S-2G	FRN0085G2S-4GU	FRN0085G2 -4G	
FRN0180G2S-2GU	FRN0180G2S-2G	FRN0105G2S-4GU	FRN0105G2 -4G	
FRN0215G2S-2GU	FRN0215G2S-2G	FRN0139G2S-4GU	FRN0139G2 -4G	
FRN0288G2W-2GU	FRN0288G2S-2G	FRN0179G2W-4GU	FRN0179G2 -4G	
FRN0346G2W-2GU	FRN0346G2S-2G	FRN0217G2W-4GU	FRN0217G2 -4G	
FRN0432G2W-2GU	FRN0432G2S-2G	FRN0261G2W-4GU	FRN0261G2□-4G	
		FRN0376G2W-4GU	FRN0376G2 -4G	
		FRN0431G2W-4GU	FRN0431G2□-4G	
		FRN0547G2W-4GU	FRN0547G2 -4G	
		FRN0610G2W-4GU	FRN0610G2□-4G	
		FRN0840G2W-4GU	FRN0840G2□-4G	
		FRN1039G2W-4GU	FRN1039G2 -4G	
		FRN1169G2W-4GU	FRN1169G2□-4G	
		FRN1480G2W-4GU	FRN1480G2 -4G	

## 2.2.4.2 Terminal Layout Diagrams (Main Circuit Terminals)

Refer to "Chapter 2 section 2.2.5 [2]" in the User's Manual for the main circuit terminal layout. For the inverter type, refer to "Table 2-4 Inverter type conversion table". The following terminals will have high voltage when power is ON. Failure to observe this could result in electric shock.

Main circuit: [L1/R], [L2/S], [L3/T], [P1], [P(+)], [N(-)], [DB], [U], [V], [W], [R0], [T0], AUX-contact ([30A], [30B], [30C], [Y5A], [Y5C])

Main circuit - casing : Basic insulation (overvoltage category III, pollution degree 2) Main circuit - control circuit : Reinforced insulation (overvoltage category III, pollution degree 2) Contact output - control circuit : Reinforced insulation (overvoltage category II, pollution degree 2)

2.2.5 Recommended Wire Size

Refer to "Chapter 2 section 2.2.5 [3]" in the User's Manual for the Recommended wire size (main circuit terminals) For the inverter type, refer to "Table 2-4 Inverter type conversion table

## 2.2.5.1 Screw Specifications and Recommended Wire Size (Control Circuit Terminals)

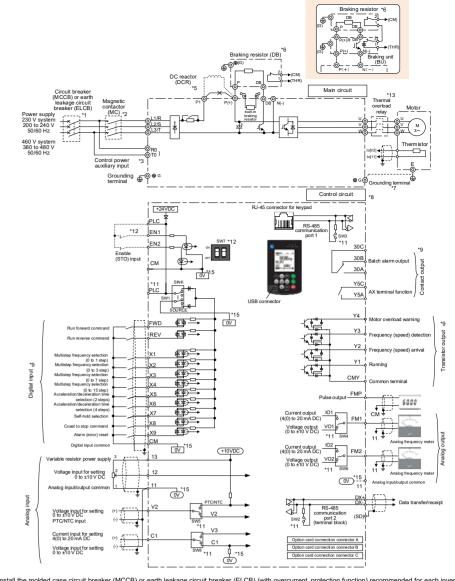
The specifications for the screws used in the control circuit wiring and the wire sizes are shown below. Table 2-5 Screw specifications and recomm

	Table 2-0 Oclew specifications and recommended wire sizes							
	Screw specification						Rod terminal *1	
non nal	Size	Tightening torque Ib-in (N·m)	Permissible wire size AWG (mm²)	Recommended wire size AWG (mm²)	Driver (shape of tip)	Wire coating removal size	Terminal block opening dimension	
circuit nal	М3	4.43 to 5.31 (0.5 to 0.6)	26 to 16 (0.14 to 1.5)	22 to 18 (0.3 to 0.75)	Minus (0.02 in × 0.14 in) (0.6 mm × 3.5 mm)	0.24 in (6 mm)	A1 *2 (0.11 in × 0.08 in) (2.75mm ×1.95mm)	

\*1 Recommended rod terminal: Phoenix Contact. Refer to "Table 2-6" for more information. \*2 Based on IEC/EN 60947-1.

	Table 2-6 Recommended rod term	H	
Wire size	Тур		
wire size	With insulating collar	Without insulating collar	Н
AWG22 (0.34 mm <sup>2</sup> )	AI 0.34-6 TQ	A 0.34-7	0.14 in
AWG20 (0.5 mm <sup>2</sup> )	AI 0.5-6 WH	A 0.5-6	
AWG18 (0.75 mm <sup>2</sup> )	AI 0.75-6 GY	A 0.75-6	Tip thickness: 0.02 in
AWG16 (1.25 mm <sup>2</sup> )	AI 1.5-6-BK	A 1.5-7	Driver tip shape

Note) Depending on the wire type, coil diameter, and number of wires, the inverter cover may be pushed up, and the keypad may not function properly. If this happens, it ssary to change the wire type or coil diameter,



(\*1) Install the molded case circuit breaker (MCCB) or earth leakage circuit breaker (ELCB) (with overcurrent protection function) recommended for each inverter on the inverter input side (primary side) to protect wiring. Do not use a circuit breaker that exceeds the recommended rated current.
(\*2) An MCCB or ELCB is also used if isolating the inverter from the power supply, and therefore the magnetic contactor (MC) recommended for each inverter should be installed if required. Please note that if installing a coil such as an MC or solenoid near the inverter, connect a surge absorber in parallel.
(\*3) If wishing to retain the integrated alarm signal issued if the protective function is triggered even when the inverter main power supply, is cut off, or to constantly display the keypad, connect these terminals to the power supply to these terminals.
(\*5) Remove the shorting bar between the inverter main circuit terminals. [P1] and [P(+)] before connecting the DC reactor (DCR). Be sure to connect if using a motor with output of 75 KW or higher. Use a DC reactor (DCR) when the capacity of the power supply transformer is 500 kVA or more and is 10 times or more the inverter rated capacity, or when there are "thyristor-driven" loads.

output of 75 kW or higher. Use a DC reactor (DCR) when the capacity of the power supply transformer is 500 kVA or more and is 10 times or more the inverter rated capacity, or when there are "thyristor-driver" loads.
(6) FRN00001 to 02862C2I-2CU / FRN0002 to 02762[-4GU are equipped with a built-in braking transistor, allowing direct connection of braking resistors between [P(+)] and [DB]. If connecting a braking resistor (DB) (option) to FRN0346, 043262[-2GU / FRN0261 to 148062[-4GU, a braking unit (BU) (option) is necessary. A built-in braking resistor is connected between terminals [P(+)] and [DB] on FRN0003 to 02862[-2GU / FRN0202 to 0203262[-4GU. f connecting a braking resistor (DB), be sure to disconnect the built-in braking resistor.
(\*7) This terminal is used for grounding the motor. Connect if required.
(\*8) Use twisted wire or shielded wire for control signal lines.
(\*8) Use twisted wire or shielded wire for control signal lines from the main circuit wiring as best as possible, to suppress the effect of the noise by connecting wires to [CM]. Isolate control signal lines from the main circuit wiring as best as possible, and do not run inside the same duct (a distance of 10 cm or greater is recommended.) If lines intersect, ensure that they do so almost perpendicularly to the main circuit wiring.
(\*9) Each of the functions described for terminals [FWD] and [REV], terminals [X11] to [X2] (digital input), terminals [Y14] (Y24] (transistor output), terminal [Y5A/C], and terminal [30A/B/C] (contact output) indicate functions assigned by factory default.
(\*11) These are the switches on control PCBs, and are used to specify settings for inverter operation. Refer to the User's Manual, "2.2.7 Switching switches" for details.
(\*12)Safety function terminals [EN1] and [EN2] are disabled with SW7 (2-pole switch) on the control PCB by factory default. If using this terminal function, be sure to change the respective SW7 switches to the OFF positio

## 2.2.7 Terminal Function Description 2.2.7.1 Main Circuit Terminal

2.2.6 Basic Connection Diagram

Table 2-7 Description of main circuit terminal functions

Classification	Terminal symbol	Terminal command	Detailed specification
	L1/R, L2/S, L3/T	Main power supply input	Connect a three-phase power supply.
	U, V, W	Inverter output	Terminals to connect three-phase motors.
	P1, P(+)	For DC reactor connection	Connect a DC reactor (DCR). Be sure to connect if using motors with output of 75 kW or higher.
	P(+), N(-)	For direct current bus connection	Used for connection to direct current intermediate circuits of other inverters and PWM converters.
Main circuit	P(+), DB	For direct current bus connection	Connect braking resistor (DB) (option) terminal [P(+)] and [DB] (wiring length: 16.4 ft (5 meters) or shorter).
	<b>4</b> G	For inverter chassis (case) grounding	This is the grounding terminal for the inverter chassis (casing) and motor. Ground to the earth at one end, and connect to the motor grounding terminal at the other end. Two of these terminals have been provided.
	R0, T0	Control power auxiliary input	If wishing to retain the integrated alarm signal issued if the protective function is triggered even when the inverter main power supply is cut off, or to constantly display the keypad, connect this terminal to the power supply (FRN0008 to 0432522—250 / FRN0004 to 1480522—460).

## 2.2.7.2 Control Circuit Termina A description of control circuit terminal functions is shown in Table 2-8. The control circuit terminal connection method differs based on function code settings to suit the

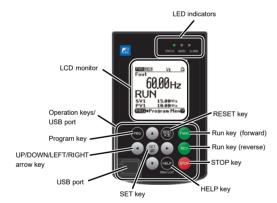
ourpose for which the inverter is used Wire appropriately to minimize the effect of noise from main circuit wiring.

Table 2-8 Description of control circuit terminal functions

Classifi- cation	Terminal symbol	Terminal command	Function description
	[13] Power supply for variable resistor		The terminal is used for the power supply (+10 VDC) for the external frequency setter (variable resistor: 1 to 5 k $\Omega$ ). Connect variable resistors larger than 1/2 W.
	[12]	Analog setting voltage input	<ul> <li>(1) Frequency is set up according to the external analog voltage input command value.</li> <li>• to to ±10 VDC / 0 to ±100(%) (normal operation),</li> <li>• +10 to 0 VDC / 0 to 100(%) (inverse operation)</li> <li>(2) Other than frequency settings, this terminal can be assigned to PID commands, PID control feedback signals, frequency auxiliary settings, trait estings, torque settings, torque command values / torque current command values, speed limit values, and analog input monitors with analog input.</li> <li>(3) Hardware specification</li> <li>* Input impedance: 22 (kΩ)</li> <li>* Up to ±15 VDC can be input. However, input exceeding ±10 VDC will be recognized as ±10 VDC.</li> <li>* To input biplora (0 to ±10 VDC) nanlog setting voltage at terminal [12], set function code C35 to '0'.</li> </ul>
	[C1]	Analog setting current input (C1 function)	<ul> <li>(1) Frequency is set up according to the external analog current input command value.</li> <li>4 to 20 mA DC / 0 to 100(%), 0 to 20 mA DC / 0 to 100(%) (normal operation)</li> <li>20 to 4 mA DC / 0 to 100(%), 20 to 0 mA DC / 0 to 100(%) (inverse operation)</li> <li>(2) Other than frequency settings, this terminal can be assigned to PID commands, PID control feedback signals, frequency auxiliary settings, tratio settings, torque limit value settings, torque command values / torque current command values, speed limit values, and analog input monitors with analog input.</li> <li>(3) Hardware specifications</li> <li>Input impedance: 250 (Ω)</li> <li>Up to 30 mA DC can be input. However, input exceeding 20 mA DC will be recognized as 20 mA DC.</li> </ul>
Analog input		Analog setting voltage input (V3 function)	<ol> <li>Frequency is set up according to the external analog voltage input command value.         <ul> <li>0 to ±10 VDC / 0 to ±100(%) (normal operation)</li> <li>10 to ±0 VDC / 0 to ±100(%) (inverse operation)</li> <li>20 to ±0 VDC / 0 to ±100(%) (inverse operation)</li> <li>20 ther than frequency settings, this terminal can be assigned to PID commands, PID control feedback signals, frequency auxiliary settings, trato settings, torque settings, torque command values / torque current command values, speed limit values, and analog input monitors with analog input.</li> <li>20 Hardware specifications</li> <li>Input impedance: 22 (kG)</li> <li>Up to ±15 VDC can be input. However, input exceeding ±10 VDC will be recognized as ±10 VDC.</li> <li>To input bipolar (0 to ±10 VDC) analog setting voltage at terminal [V3], set function code C78 to "0".</li> </ul> </li> </ol>
	[V2]	Analog setting voltage input (V2 function)	<ol> <li>(1) Frequency is set up according to the external analog voltage input command value.         <ul> <li>0 to ±10 VDC / 0 to ±100(%) (normal operation)</li> <li>10 to ±0 VDC / 0 to ±100(%) (inverse operation)</li> </ul> </li> <li>(2) Other than frequency settings, this terminal can be assigned to PID commands, PID control feedback signals, frequency auxiliary settings, ratio settings, torque limit value settings, torque command values / torque current command values, speed limit values, and analog input monitors with analog input.</li> <li>(3) Hardware specifications         <ul> <li>Input impedance: 22 (kΩ)</li> <li>Up to ±10 VDC analog setting voltage at terminal [V2], set function code C45 to "0".</li> </ul> </li> </ol>
		PTC / NTC thermistor input (PTC / NTC function)	PTC (Positive Temperature Coefficient) / NTC (Negative Temperature Coefficient) thermistors for motor protection can be connected. SW5 on the PCB must be switched to the PTC / NTC side.
	[11]	Analog common	The terminal is the common terminal for analog input signals (terminals [13], [12], [C1], [V2], [FM1], and [FM2]). The terminal is insulated from terminals [CM], [CMY].

Classifi- cation	Terminal symbol	Terminal command	Function description
	[X1] [X2] [X3] [X4] [X5] [X6] [X7] [X8] [X9]	Digital input 1 to 9	<ol> <li>Various signals (coast to stop command, external alarm, multi-speed selection, etc.) can be set with function codes E01 to E09, E98, E99. Refer to the User's Manual, Chapter 5 "FUNCTION CODES" for details.</li> <li>The input mode and SINK / SOURCE can be switched using SV1.</li> <li>The operating mode between each digital input terminal and terminal [CM] can be switched to "ON when shorted (active ON)" or "OFF when shorted (active OFF)".</li> <li>Digital input terminals [X6] and [X7] can be set up as a pulse train input terminal by changing the function code Maximum wire length: 20 m Maximum input pulse: 30 kHz: When connected to open collector output pulse generator (A pull-up resistor and pull-down resistor are required.) 100 kHz: When connected to complementary output pulse generator</li> </ol>
	[FWD]	Forward rotation run/stop command input	Refer to the User's Manual, Chapter 5 "FUNCTION CODES" for details on function code settings. Refer to the User's Manual, Chapter 2 section "2.2.6 Control circuit terminals" for details on digital input circuit
al input	[REV]	Reverse rotation run / stop command input	specifications.
Digital	[EN1] [EN2]	Enable input	<ol> <li>When terminals [EN1]-{PLC] or terminals [EN2]-{PLC] are OFF, the inverter output transistors stop switching (safe torque off: STO).</li> <li>Be sure to operate terminals [EN1] and [EN2] simultaneously; otherwise an ECF alarm is issued and the operation of the inverter will be disabled.</li> <li>The input mode for terminals [EN1] and [EN2] is fixed to source. The mode cannot be switched to sink.</li> <li>This function can be enabled and disabled with SW7. If using this function, set the respective SW7 switches to the OFF side.</li> <li>Refer to the User's Manual, Chapter 2 section "2.2.6 Control circuit terminals" for details on terminal [EN1] and [EN2] circuit specifications.</li> </ol>
	[PLC]	Programmable controller signal power supply	<ol> <li>Connect the output signal power supply for the programmable controller. (Rated voltage +24 VDC (power supply voltage fluctuation range: 20 to +27 VDC), maximum 100 mA)</li> <li>The terminal can also be used as the power supply for loads connected to transistor outputs. Refer to the "Transistor output" section for details.</li> </ol>
	[CM]	Digital common	This is a common terminal for digital input signals. The terminal is insulated from terminals [11], [CMY].
Analog output	[FM1] [FM2]	Analog monitor (FMA function)	These terminals output analog DC voltage of 0 to ±10 VDC, and analog DC voltage current of 4 to 20 mA DC monitor signals. The [FM1] output form (VO1 / IO1) can be switched using SW4 on the PCB and function code F29. The signal content is selected from the following by setting function code F31 data. The [FM2] output form (VO2 / IO2) can be switched using SW6 on the PCB and function code F32. The signal content is selected from the following by setting function code F61 data. * Allowable impedance for connection: Min.5 KQ (with output of 0 to ±10 VDC) (up to two analog voltmeters (0 to 10 VDC, input impedance 10 kQ) can be connected.) * Allowable impedance for connection: Max. S00 Ω (with output of 4 to 20 mA DC) * Gain adjustable range: 0 to 300%
	[11]	Analog common	This is a common terminal for analog input / output signals. The terminal is insulated from terminals [CM], [CMY].
Pulse output	[FMP]	Pulse monitor (FMP function)	This terminal outputs a pulse signal. The signal content is selected in the same way as that as for the FM1 / 2 function by setting function code F35 data. Allowable impedance for connection: Min. 5 k $\Omega$ (up to two analog voltmeters (0 to 10 VDC, input impedance 10 k $\Omega$ ) can be connected.) (Set F34 to between 1 and 300% if using as average voltage output.) Pulse duty: Approx. 50%, pulse rate: 25 to 6000 p/s (at full scale)
а.	[CM]	Digital common	This is a common terminal for digital input signals and terminal [FMP]. The terminal is insulated from terminals [11], [CMY]. This is the same terminal as terminal [CM] for digital input.
Transistor output	[Y1] [Y2] [Y3] [Y4]	Transistor output 1to 4	<ol> <li>Various signals (running signal, frequency reached signal, overload forecast signal, etc.) set up by function code E20 to E24 can be output. Refer to the User's Manual, "Chapter 5 FUNCTION CODES" for details.</li> <li>The operating mode between transistor output terminals [Y1] to [Y4] and terminal [CMY] can be switched to "ON when signal output (active ONI)" or "OFF when signal output (active OFF)".</li> <li>Maximum voltage for pull-up power supply: 48 V, maximum load current when ON: 50 mA</li> </ol>
Trar	[CMY]	Transistor output common	This is a common terminal for transistor output signals. The terminal is insulated from terminals [CM], [11].
output	[Y5A] [Y5C]	General-purpose relay output	<ol> <li>The same signals as those of terminals [Y1] to [Y4] can be selected and output as multi-purpose relay outputs. Contact capacity: 250 VAC 0.3 A cosep = 0.3, 48 VDC 0.5 A</li> <li>It is possible to switch between a "short circuit between terminals [Y5A] to [Y5C] when an ON signal is output (excitation: active ON)" or an "open circuit between terminals [Y5A] and [Y5C] when an ON signal is output (non-excitation: active OFF)".</li> </ol>
Contact output	[30A] [30B] [30C]	Integrated alarm output	<ol> <li>When the inverter stops with an alarm, an integrated alarm is output at the relay contact (1C). Contact capacity: 250 VAC 0.3 A cosp = 0.3, 48 VDC 0.5 A</li> <li>The same signals as those of terminals [Y1] to [Y4] can be selected and output.</li> <li>It is possible to switch between a "short circuit between terminals [30A] and [30C] when an ON signal is output (excitation: active ON)" or an "open circuit between terminals [30A] and [30C] when an ON signal is output (non-excitation: active OFF)".</li> </ol>
	[DX+] [DX-] [SD]	Via RS-485 communications link port 2	This is an input / output terminal used to connect a computer or programmable controller, etc. by RS-485 communication. (Refer to the User's Manual Chapter 2, "2.2.7 Switching switches" for details on terminating resistance). With a multi-drop (cross-wire) connection, use the recommended rod terminal. (Refer to "Table 2-6 Recommended rod terminals" in section "2.2.5.1 Screw Specifications and Recommended Wire Size (Control Circuit Terminals)" for details on recommended rod terminals).
Communication	RJ-45 connector for keypad connection	RS-485 communication port 1 (for keypad connection)	<ol> <li>This is used as a connector for connecting the keypad. The keypad power is supplied from the inverter via an extension cable for remote operation. If using an extension cable, turn ON the SW3 terminating resistor.</li> <li>This is used to connect a computer or programmable controller, etc. by RS-485 communication after disconnecting the keypad. (Refer to the User's Manual Chapter 2, "2.2.7 Switching switches" for details on terminating resistance).</li> <li>Pins 1, 2, 7, and 8 are assigned as the power supply source for the keypad. When connecting this RJ-45 connector to other devices, do not use these pins.</li> <li>Do not connect the PC LAN ports, Ethernet hubs, or telephone lines to the RJ-45 connector. The inverter and the connected device may be damaged.</li> </ol>
	USB connector	USB port (keypad)	This is a USB connector (miniB specification) for connecting to a computer. Function codes can be edited, transferred, and verified, an inverter test run can be performed, and all states can be monitored using the inverter support loader (FRENIC Loader)*. *: Refer to the User's Manual, Chapter 9 '9.2 FRENIC Loader Overview' for details.

Chapter 3 OPERATION USING THE KEYPAD Refer to the Multi-function Keypad (TP-A2SW) Instruction Manual



## 3.1 Destination Setting

For inverter type FRN\*\*\*\*G2 -- GU, the destination must be set first after the initial power supply. Without setting the destination, the function code cannot be changed.

The inverter cannot be operated either. Destination setting method

- (1) Install the multi-function keypad and turn ON the power.
- (2) "Destination 1:Japan" is displayed. Press the 🐨 key and 🌢 key simultaneously to select "5:Americas", and press the 📳 key. (3) The keypad display will turn OFF briefly, and then "STOP 0.00Hz" will appear for the run mod

## Chapter 4 FUNCTION CODES

The PDF manual can be downloaded from below QR code tion of Function codes list



The PDF manual can be downloaded from below QR code on of Alarm codes list For more in re information of Alarm co c-megag2/download/\_pr1/

Chapter 5 ALARM CODES

## Chapter 6 MAINTENANCE AND INSPECTION

- 6.1.1 When Making an Inquiry Upon breakage of the product, uncertainties, failure or inquiries, inform your Fuji Electric representative of the following information.
- Inverter type. Refer to Chapter 1 "1.1 Acceptance Inspection (Nameplates and Inverter Type)"
- SER No. (serial number of equipment). Refer to Chapter 1 \*1.1 Acceptance Inspection (Nameplates and Inverter Type). SER No. (serial number of equipment). Refer to Chapter 1 \*1.1 Acceptance Inspection (Nameplates and Inverter Type)". Function codes and their data that you changed. Refer to the Multi-function Keypad Instruction Manual, Chapter 3 \*3.4.4.3 Checking changed data". PRG>2-3 (Changed Data) ROM version. Refer to the the Multi-function Keypad Instruction Manual, Chapter 3 \*3.4.5 Inverter information". PRG>3-5 (Unit Info)
- Date of purchase
   Inquiries (for example, point and extent of breakage, uncertainties, failure phenomena, and other circumstances)

## 6.1.2 Product Warranty

To all our customers who purchase Fuji Electric products included in this documentation:

Please take the following items into consideration when placing your order.

Trease take the informing terms into consideration when pacing your orders. When requesting an estimate and placing your orders for the products included in these materials, please be aware that any items such as specifications which are not specifically mentioned in the contract, catalog, specifications or other materials will be as mentioned below. In addition, the products included in these materials are limited in the use they are put to and the place where they can be used, etc., and may require periodic inspection. Please confirm these points with your sales representative or directly with this company. Furthermore, regarding purchased products and delivered products, we request that you take adequate consideration of the necessity of rapid receiving inspections and of product management and maintenance even before receiving your products.

6.1.2.1 Free of Charge Warranty Period and Warranty Range

(1) Free of charge warranty period 1) The product warranty period is "1 year from the date of purchase" or 24 months from the manufacturing date imprinted on the name place, whichever date is earlier. 2) However, in cases where the use environment, conditions of use, use frequency and times used, etc., have an effect on product life, this warranty period may not apply. 3) Furthermore, the warranty period for parts restored by Fuji Electric's Service Department is "6 months from the date that repairs are completed."

- (2) Warranty range 1) In the event that breakdown occurs during the product's warranty period which is the responsibility of Fuji Electric, Fuji Electric will replace or repair the part of the product that has broken down free of charge at the place where the product was purchased or where it was delivered. However, if the following cases are applicable, the terms of this warranty may not apply.
- The breakdown was caused by inappropriate conditions, environment, handling or use methods, etc, which are not specified in the catalog, operation manual, specifications or other relevant documents. 2 The breakdown was caused by the product other than the purchased or delivered Fuji's product.
- The breakdown was caused by the product other than Fuji's product, such as the customer's equipment or software design, etc.
   Concerning the Fuji's programmable products, the breakdown was caused by a program other than a program supplied by this company, or the results from using
- such a program
- ⑤ The breakdown was caused by disassembly, modifications or repairs affected by a party other than Fuji Electric. In the breakdown was caused by improper maintenance or replacement using consumables, etc. specified in the operation manual or catalog, etc.
  The breakdown was caused by a science or technical problem that was not foreseen when making practical application of the product at the time it was purchased or
- It is product was not used in the manner the product was originally intended to be used.
  The breakdown was caused by a reason which is not this company's responsibility, such as lightning or other disaster.

# 2) Furthermore, the warranty specified herein shall be limited to the purchased or delivered product alone. 3) The upper limit for the warranty range shall be as specified in item (1) above and any damages (damage to or loss of machinery or equipment, or lost profits from the same, etc.) consequent to or resulting from breakdown of the purchased or delivered product shall be excluded from coverage by this warranty.

(3) Trouble diagnosis As a rule, the customer is requested to carry out a preliminary trouble diagnosis. However, at the customer's request, this company or its service network can perform the trouble diagnosis on a chargeable basis. In this case, the customer is asked to assume the burden for charges levied in accordance with this company's fee schedule. 6.1.2.2 Exclusion of Liability for Loss of opportunity, etc.

Regardless of whether a breakdown occurs during or after the free of charge warranty period, this company shall not be liable for any loss of opportunity, loss of profits, or damages arising from special circumstances, secondary damages, accident compensation to another company, or damages to products other than this company's products, whether foreseen or not by this company, which this company is not be responsible for causing.

6.1.2.3 Repair Period after Production Stop, Spare Parts Supply Period (Holding Period)

Concerning models (products) which have gone out of production, this company will perform repairs for a period of 7 years after production stop, counting from the month and year when the productos not poccurs. In addition, we will continue to supply the spare parts required for repairs for a period of 7 years, counting from the month and year when the productos not poccurs. However, if it is estimated that the life cycle of certain electronic and other parts is short and it will be difficult to procure or produce those parts, there may be cases where it is difficult to provide repairs or supply spare parts even within this 7-year period. For details, please confirm at our company's business office or our service office.

6.1.2.4 Transfer Rights In the case of standard products which do not include settings or adjustments in an application program, the products shall be transported to and transferred to the customer and this company shall not be responsible for local adjustments or trial operation. 6.1.2.5 Service Contents

The cost of purchased and delivered products does not include the cost of dispatching engineers or service costs. Depending on the request, these can be discussed separately.

6.1.2.6 Applicable Scope of Service Above contents shall be assumed to apply to transactions and use of the country where you purchased the products. Consult the local supplier or Fuji Electric for details separately.

# Chapter 7 CONFORMITY WITH STANDARDS

7.1 Compliance with European Standards (

The CE marking on Fuji products indicates that they comply with the essential requirements of the Electromagnetic Compatibility (EMC) Directive, Low Voltage Directive, and Machinery Directive issued by the Council of the European Communities. CAUTION: Ensure an ambient temperature of 122 °F (50 °C) or less to comply with European Standards. Products with no standards indicated do not comply with European Standards.

Table 7-1	Compliance standards

EMC Directive Note1	EN61800-3 Immunity : Second environment (Industrial) Emission : Category C2 or C3 (Refer to the User's Manual "APPENDIX G" Table G.1-2. Applicable only when an optional EMC-compliant filter is attached.)			
Low Voltage Directive	Adjustable speed electrical power drive systems.			
	Part 5-1: Safety requirements. Electrical, thermal and energy EN61800-5-1			
Machine Directives Note 2	EN ISO 13849-1 : Cat.3 / PL : e			
	EN60204-1 : Stop Category 0			
	EN61800-5-2 : SIL3(Functional Safety : STO)			
	EN62061 : SIL3			

Note 1: A basic type inverter (FRN\*\*\*\*G2\_--GU) that does not have a built-in EMC filter complies with the EMC Directive by combining it with an external filter dedicated to Fuji. Category C2 : In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required. Category C3 : This type of PDS is not intended to be used on a low-voltage public network which supplies domestic premises ; radio frequency interference is environment.

- Category C3 : This type of PDS is not intended to be used on a low-voltage public network which supplies domestic premises ; radio frequency interretence is expected if used on such a network. Category C2 and C3 : It has a risk about other equipment malfunction or breakdown by radiated electric field strength out of frequency range that is defined EN 61800-3: 2018 2nd Environment. Note 2: Refer to the User's Manual, "APPENDIX G' for details on the Machinery Directive. Note 3: Compatibility with revised EMC Directive and Low Voltage Directive (2014/35/EU), it is necessary to clearly state the name and the address of manufacturers and importers to enhance traceability. Importers shall be indicated as follows when exporting products from Fuji Electric to Europe.

Manufacturer	Importer in Europe
Fuji Electric Co., Ltd. 5520, Minami Tamagaki-cho, Suzuka-city, Mie 513-8633, Japan	Fuji Electric Europe GmbH Goethering 58 , 63067 Offenbach am Main, Germany

<Precaution when exporting to Europe>
• Not all Fuji Electric products in Europe are necessarily imported by the above importer. If any Fuji Electric products are exported to Europe via another importer, please ensure that the importer is clearly stated by the customer.

7.2 Compliance with UL Standards and Canadian Standards (cUL certification)

7.2.1 General comments

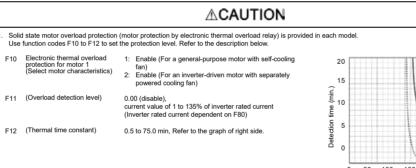
UL Standards (Underwriters Laboratories Inc. standards) are North American safety standards used to prevent fire and other such accidents, and offer protection to users, service technicians, and the general public. cUL indicates that products which comply with CSA standards are certified by UL. cUL certified products are as effective as those certified as complying with CSA

7.2.2 UL Standards and Canadian Standards (cUL Certification) Compatibility Compatibility with UL Standards and Canadian Standards (cUL certification) is ensured by installing inverters with UL / cUL marking in accordance with the following. (Products with no standards indicated do not comply with UL Standards and Canadian Standards.)

## UL Standards and Canadian Standards (cUL Certification) Compatibility

# A WARNING

High available fault current – damage warning: The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electric shock current-carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.



### 0 50 100 150 200 (Output curre / Detection level current) x 100 (%

Power supply

B MC Fuse Li/R

Changed with F

F10

Use Cu wire only. Use Class 1 wire only for control circuits. Short circuit current rating 230 volts class models are suitable for use on a circuit of delivering not more than 100,000 ms symmetrical amperes, 240 volts maximum when protected by appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 ms symmetrical amperes, 240 volts appropriate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) appropriate protection device (refer to the below tables of 0.7 having the short of an 100,000 rms symmetrical amperes, 480 volts maximum when protected by 460 volts class models are suitable for use on a circuit of delivering not more than 100,000 rms symmetrical amperes, 480 volts maximum when protected by accountate protection device (refer to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 rms symmetrical amperes, 480 Volts All of voits class inclusion are sourced to the below tables of 8.) having the short circuit current rating (SCCR) not less than 100,000 rms symmetrical amperes, 480 voits Maximum. If the branch circuit protection devices with less than the short circuit current rating 100,000 A is used, the short circuit current rating will be limited to the short circuit rurent rating of the protection device. Integral solid state short circuit protection devices with less than the short circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes. Field wring connections must be made by a UL Listed and CSA Certified closed-loop terminal connector sized for the wire gauge involved. Connector must be fixed using the crimp tool specified by the connector manufacturer. All circuits with terminals [LVTR], [LZ]S, [L37], [R0], [L37], [R0], [R0] must have a common disconnect and be connected to the same pole of the disconnect if the terminals are connected to the power supply.

Environmental Requirements

Surrounding/ambient temperature: Maximum temperature shall be lower than 122°F (50°C).
 Atmosphere: For use in pollution degree 2 environments (for Open-Type models).

Install UL certified protection devices between the power supply and the inverter, referring to the table below Inverter CR 100 kA Class CC,J,T,I Inverse time circuit bi fuse Inverter type Manufacturer: Manufacturer Maximum Curren Maximum Current Mersen Bussmann (Eaton) i9V50∎ 
 N0008G2S-2GU
 HHD
 PC30UD69V80

 N0011G2S-2GU
 HHD
 PC30UD69V125

 N0018G2S-2GU
 HHD
 PC30UD69V125
 170M3462 HHD PC30UD69V160 170M3464 RN0032G2S-2GU 170M3464 170M3465 RN0046G2S-2GU HND PC30UD69V200 HHD PC30UD69V200 170M3465 FRN0059G2S-2GU RN0075G2S-2GU 0UD69V250 170M3466 70M3466 FRN0088G2S-2GU 170M3466 HHD PC30UD69V315 170M3467 FRN0115G2S-2GU IND PC30UD69V315 170M3467 RN0146G2S-2GU √450∎ 250 170M3469 170M3469 0UD69V450 FRN0180G2S-2GU PC30UD69V550 70M3472 RN0215G2S-2G D PC30UD69V550 170M3472 500 170M3473 500 FRN0288G2W-2GU N0346G2W-2GU 550∎ 600 170M4467 600 FRN0432G2W-2GU HND P -4gu HHD PC: -4gu HHD PC: V50∎ HHD PC30UD69V63 70M3461 HHD PC30U HND PC30U FRN0018G2S-4GU FRN0023G2S-4GU

		_										
ply		à	SCCR 100 kA Class CC, J, T, L									
Power supply voltage	Inverter type	HHD/HND HD/ND mode	Semiconde Manufacturer:	uctor fuse *1 Manufacturer:	fuse	Inverse time circuit breaker						
NO <sup>0</sup>		Ξ <u></u>	Mersen	Bussmann (Eaton)	Maximum current	Maximum current						
ш			Catalog Number	Catalog Number	(A)	(A)						
	FRN0035G2S-4GU	HHD HND	PC30UD69V125 PC30UD69V125	170M3463 170M3463	60 70							
	EDN0044020 4011	HHD	PC30UD69V160	170M3464	70							
	FRN0041G2S-4GU	HND	PC30UD69V160	170M3464	90	1						
	FRN0045G2S-4GU	HHD HND	PC30UD69V160 PC30UD69V160	170M3464 170M3464	90 100	1 1						
	ED10000000 (011	HHD	PC30UD69V200	170M3465	100	10						
	FRN0060G2S-4GU	HND	PC30UD69V200	170M3465	125	11						
		HHD	PC30UD69V315	170M3467	125	12						
	FRN0085G2S-4GU	HND HD	PC30UD69V315 PC30UD69V315	170M3467 170M3467	175 175	1						
		ND	PC30UD69V315	170M3467	200	1						
		HHD	PC30UD69V315	170M3468	175	1						
	FRN0105G2S-4GU	HND HD	PC30UD69V315	170M3468	200	1						
		ND	PC30UD69V315 PC30UD69V315	170M3468 170M3468	200 250	2						
		HHD	PC30UD69V350	170M3469	200	1						
	FRN0139G2S-4GU	HND	PC30UD69V350	170M3469	250	2						
		HD ND	PC30UD69V350 PC30UD69V350	170M3469 170M3469	250 250	22						
		HHD	PC30UD69V400	170M3469	250	2						
	FRN0179G2W-4GU	HND	PC30UD69V400	170M3469	250	2						
	1101/06201-400	HD	PC30UD69V400	170M3469	250	2						
		ND HHD	PC30UD69V400 PC30UD69V350	170M3469 170M3469	300 250	2						
	ED100470014 4011	HND	PC30UD69V350	170M3469	350	4						
	FRN0217G2W-4GU	HD	PC30UD69V350	170M3469	300	2						
		ND	PC30UD69V350	170M3469	350	4						
		HHD HND	PC30UD69V350 PC30UD69V350	170M3469 170M3469	300 400	2:						
≥	FRN0261G2W-4GU	HD	PC30UD69V350	170M3469	350	4						
460		ND	PC30UD69V350	170M3469	400	4						
Three-phase 460V		HHD	PC30UD69V500 PC30UD69V500	170M3472 170M3472	400	4						
-ph	FRN0376G2W-4GU	HD	PC30UD69V500	170M3472	500	5						
ree		ND	PC30UD69V500	170M3472	600	6						
f		HHD	PC30UD69V550	170M3473	500	5						
	FRN0431G2W-4GU	HND HD	PC30UD69V630 PC30UD69V630	170M3473 170M3473	700 600	6						
		ND	PC30UD69V630	170M3473	700	6						
		HHD	PC31UD69V700	170M4467	600	6						
	FRN0547G2W-4GU	HND	PC31UD69V700	170M4467	1000	8						
		HD ND	PC31UD69V700 PC31UD69V700	170M4467 170M4467	700	6						
		HHD	PC31UD69V800	170M4468	700	6						
	FRN0610G2W-4GU	HND	PC31UD69V800	170M4468	1000	10						
		HD ND	PC31UD69V800 PC31UD69V800	170M4468 170M4468	800 1000	8						
		HHD	PC32UD60V1100	170M4468	1000	10						
	FRN0840G2W-4GU	HND	PC32UD60V1100	170M5467	1200	12						
	FRI00406277-460	HD	PC32UD60V1100	170M5467	1200	10						
		ND HHD	PC32UD60V1100 PC33UD69V1250	170M5467 170M5468	1600 1200	12						
		HND	PC33UD69V1250	-	1600	16						
	FRN1039G2W-4GU	HD	PC33UD69V1250	170M5468	1200	12						
		ND	PC33UD69V1400	=	1800	16						
		HHD	PC33UD60V1500	170M5468	1200	12						
		HND	PC33UD60V1500	-	1800	16						
	FRN1169G2W-4GU	HD	PC33UD60V1500	170M5468	1400	12						
		ND	PC33UD60V1600	-	2000	20						
		HHD	PC33UD55V2000	-	2000	20						
		HND	PC33UD55V2000	-	2200	20						
	FRN1480G2W-4GU	HD	PC33UD55V2000	_	2200	20						
		ND	PC33UD55V2000	-	2200	25						

The semiconductor fuses listed are rep	resentative parts. R	lefer to additional ma	aterial "INR-SI47-2	587□-JEC" for th	e alternative pa

	table beit	w for fiel	d wiring				-						
age		l applied r [HP]		node	Bequired torque Ib-in (N • m)		Wire size AWG (mm <sup>2</sup> )						
volt				Ŋ	111-01		Main terminal Cu Wire						
hpdy	ase wer	ase wer	Inverter type	/DH	linal	power	L1/R,	L2/S, L3/T			U, V, W		tro
Power supply voltage	Three-phase Input power supply	Single-phase Input power supply		HHD/HND/HD/ND mode	Main terminal	Aux. control ; supply	140 °F (60 °C) wire	167 °F (75 °C) wire	Remarks	140 °F (60 °C) wire	167 °F (75 °C) wire	Remarks	Aux. control
	1/2	1/4	FRN0003G2S-2GU		10.6	_							
	1	1/2	FRN0005G2S-2GU	_	(1.2)		14	14		14	14		
	2	1 1.5	FRN0008G2S-2GU FRN0011G2S-2GU	HHD	15.9		(2.1)	(2.1)	*1	(2.1)	(2.1)	*1	
		1.5		-	(1.8)		10	10		12	12		
	5	3	FRN0018G2S-2GU				(5.3)	(5.3)		(3.3)	(3.3)		
	7.5		FRN0032G2S-2GU	HHD HND				8	*1 *2				
	10	5		HHD				(8.4)	*3		8	*1	
			FRN0046G2S-2GU	HND	30.9 (3.5)		-	6		-	(8.4)	*2 *3	
	15	7.5		HHD				(13.3)	*2 *3				
	<u> </u>		FRN0059G2S-2GU	HND					Ŭ				
	20	10		HHD		1	3	4 (21.2)		4	6 (13.3)	*2 *3	
≥	<u> </u>		FRN0075G2S-2GU	HND			(26.7)	3	*3	(21.2)	4	-	
230	25	10		HHD	51.3		(42.4)	(26.7)		(26.7)	(21.2)		
lase	30	15	FRN0088G2S-2GU	HND	(5.8)			2		2	3	*3	14
Three-phase 230V	30	15	55510445000 0011	HHD		10.6 (1.2)		(33.6)		(33.6)	(26.7)		(2.1
Thre			FRN0115G2S-2GU	HND		()		2/0			2 (33.6)	*2 *3	*2
	40	20		HHD	110.4	1		(67.4)			1		
			FRN0146G2S-2GU	HND	119.4 (13.5) 238.9 (27)			0.10			(42.4)		
	50	25		HHD			-	3/0 (85)	*2 *3		1/0 (53.5)		
			FRN0180G2S-2GU	HND				4/0			3/0		
	60	30	FRN0215G2S-2GU	HHD				(107.2)			(85)		
	75	30	11110210020-200	HND				2/0×2		-	4/0		
			FRN0288G2W-2GU	HHD				(67.4×2)			(107.2)		
	100	30 40	+	HND HHD				3/0×2 (85×2)			3/0×2 (85×2)		
			FRN0346G2W-2GU	HND	424.7 (48)			4/0×2			4/0×2		
	125	40		HHD				(107.2×2)			(107.2×2)		
	150	50	FRN0432G2W-2GU	HND				300×2			300×2		
	1/2	1/4	FRN0002G2S-4GU		10.6			(152×2)			(152×2)		- 1
	1	1/2	FRN0003G2S-4GU	-	(1.2)	-							
	2	1	FRN0004G2S-4GU	HHD	()		14	14 (2.1)	*1	14	14 (2.1)	*1	
	3	1.5	FRN0006G2S-4GU	-	15.9		(2.1)		·	(2.1)			
	5	3	FRN0009G2S-4GU	1	(1.8)								
						1		12				+	1
	7.5	3	FRN0018G2S-4GU	HHD				(3.3)			12		
		-		HND				10 (5.3)	1		(3.3)		14 (2.1)
>	10	5	ED10000000 4011	HHD	30.9		_		*1 *2	_		*1 *2	
460	45	7.5	FRN0023G2S-4GU	HND	(3.5)				*3		10	*3	
Three-phase 460 V	15	7.5		HHD				8			(5.3)		
ie-pl		10	FRN0035G2S-4GU	HND		10.6		(8.4)			8		(2.
Thre	20			+		(1.2)					(8.4)		*2
1	<u> </u>	10	FRN0041G2S-4GU	HHD			6						1
1	25	10		HND			(13.3)	6		6			1
	<u> </u>	10	FRN0045G2S-4GU	HHD	51.3			(13.3)		(13.3)	6		1
	30	30 15		HND	(5.8)		4		*2		(13.3)	*3	
	15	FRN0060G2S-4GU	HHD			(21.2)		*3	<u> </u>		3		
1	40	20		HND			3 (26.7)	4 (21.2)		4 (21.2)			
	40	20											
	40	20 25	FRN0085G2S-4GU	HHD HND	119.4		2	3	1	3	4		

				1	∆CA	UII	JN									
oltage	Nominal motor			D mode	B B B B B B-in (N · m)		Wire size AWG (mm²) Main terminal Cu Wire									
v vld	er e	er	Inverter type	N/Q	nal	ower	L1/R,	Main t L2/S, L3/T	ermina		U, V, W		이 스			
Power supply voltage	Three-phase Input power supply	Single-phase Input power supply		HHD/HND/HD/ND mode	Main terminal	Aux. control power supply	140 °F (60 °C) wire	167 °F (75 °C) wire	Remarks	140 °F (60 °C) wire	167 °F (75 °C) wire	Remarks	Aux. control power supply			
	50	25	FRN0105G2S-4GU	HHD			2 (33.6)	3 (26.7)	*3	3 (26.7)	4 (21.2)					
		30	110103023400	HND HD						2 (33.6)	3 (26.7)					
	60	_	FRN0085G2S-4GU	ND				2 (33.6)		3 (26.7)	4 (21.2)	*3				
		30 30	FRN0139G2S-4GU	HHD HND	119.4 (13.5)					2 (33.6) —	3 (26.7)		-			
	75	-	FRN0105G2S-4GU	HD ND						1 (42.4)	2 (33.6)					
		30 40	FRN0179G2W-4GU	HHD HND				1/0 (53.5)								
	100	-	EDN0400000 1011	HD							1/0		1			
		- 40	FRN0139G2S-4GU	ND HHD	238.9						(53.5)					
	150	-	FRN0217G2W-4GU	HD	(27) 119.4			2/0			3/0					
	125	-	FRN0179G2W-4GU	ND	(13.5)			(67.4)			(85)					
		50 — FR	FRN0261G2W-4GU	HHD HD												
	150	50 —	FRN0217G2W-4GU	HND	238.9 (27)				4/0 (107.2)	*2 *3		4/0 (107.2)				
	200	50 —	FRN0261G2W-4GU	HND ND				1/0×2			2/0×2	*2				
		60	FRN0376G2W-4GU	HHD						(53.5×2) 3/0×2			(67.4×2) 4/0×2	*3		
460 V	250 300	75	FRN0431G2W-4GU	HHD				(85×2)			(107.2×2)		14			
Three-phase 460		-	FRN0431G2W-4GU	HD		10.6 (1.2)	_	4/0×2			250×2 (127×2) 4/0×2		(2.1) *1 *2			
Three		75 —	FRN0376G2W-4GU	HND ND				(107.2×2)			(107.2×2) 250×2					
		100	FRN0547G2W-4GU	HHD HD							(127×2)					
	350		FRN0431G2W-4GU	HD HND ND				250×2 (127×2)		-	300×2 (152×2)					
	400	100 —	FRN0610G2W-4GU	HHD HD				300×2 (152×2)			350×2 (177×2)					
	450	100	FRN0547G2W-4GU	HND				400×2 (203×2)			500×2 (253×2)					
	500	125	FRN0610G2W-4GU	HND				500×2 (253×2)			600×2 (304×2)					
	450	 	FRN0840G2W-4GU	HHD	424.7 (48)			300×2 (152×2)			350×2 (177×2)					
	500	 150 	FRN1039G2W-4GU	HD HHD HD				400×2 (203×2)			400×2 (203×2)					
	600	200	FRN0840G2W-4GU	HND HHD				500×2 (253×2)			500×2 (253×2)					
	700	-	FRN1169G2W-4GU FRN0840G2W-4GU	HD ND				600×2 (304×2)			600×2 (304×2)					
	800	200	FRN1039G2W-4GU	HND				350×3 (177×3)	*2 *4		400×3 (203×3)	*2 *4				
		-	FRN1039G2W-4GU	ND				400×3	1		500×3					
	900	250	FRN1169G2W-4GU	HND ND				(203×3)			(253×3)					
		300		HHD HD				500×3 (253×3)			600×3 (304×3)					
	1200	400	FRN1480G2W-4GU	HND				600×3 (304×3)			500×4					
	1300	-		ND			ND				500×4 (253×4)			(253×4)		

No terminal end treatment is required for connection

Use 167 °F (75 °C) Cu wire only.

The wire size of UL Open Type and Enclosed Type are common. Please contact your Fuji Electric representative if UL Open Type exclusive wire is necessary. It is showing the wire size for UL Open Type. See additional material "INR-SI47-2433 -JE" for UL Enclosed Type (Pack with Type 1 Kit).