

Thank you for purchasing our FRENIC-MEGA series of inverters.
The purpose of this instruction manual is to provide handling 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 Instruction Manual (Detailed Version) and Related documents.

[Related Documents]
Instruction Manual (Detailed Version) INR-SI47-2392b-E
User's Manual 2447-E-0162
RS-485 Communication User's Manual 2447-E-0082
This manuals can be downloaded in PDF form from QR code in right figure.

Instruction manual QR code



https://www.fujielectric.com/products/inverter/frenic-mega2/download_pr/

Fuji Electric Co., Ltd.

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.

CAUTION

Thank you for purchasing our FRENIC-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 optional components, refer to the instruction and installation manuals for that optional device.
- Drawings in this manual may 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.

WARNING

Application

- 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.
- 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 may result in a serious accident or loss of life.
- Failure to observe this could result in an accident or injury.**

Installation

- Install on noncombustibles such as metal.
- Do not install near combustibles.
- Failure to observe this could result in fire.**
- If using an optional DC reactor, there is a possibility of users coming into contact with main circuit terminal block parts (live parts). In such cases, take measures 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.**

Wiring

- If no zero-phase current (earth leakage current) detection 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 unnecessary 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 wiring for multiple combinations.
- Do not install a surge suppressor to the inverter output side (secondary side).
- Be sure to connect an optional 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 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 fire or an accident.**
- Always carry out wiring after installing the unit.
- Failure to observe this could result in electric shock or injury.**
- Ensure that the number and phase 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.
- 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 so 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.**
- Switch all switches after first waiting for at least 5 minutes for FRN0115G2S-2G / FRN0060G2□-4G or lower inverters, or 10 minutes for FRN0146G2S-2G / FRN0075G2□-4G or higher inverters after 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 and N has dropped to a safe level (<25 VDC or less).

Operation

- Be sure to attach the inverter surface before turning the power ON. Do not remove the surface cover while the power is ON.
- Do not operate the unit with wet hands.
- Failure to observe this could result in electric shock.**
- Set function codes after understanding of this instruction manual. If operation is performed after recklessly changing function code data, the motor will rotate at a motor 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 inverter cuts off the supply of power to the motor, if voltage is being applied to main power supply input terminals L1/R, L2/S, and L3/T, voltage may be applied to inverter output terminals U, V and W.
- Even if the motor is stopped by DC braking operation or pre-acceleration operation, voltage will be applied 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 after sufficiently checking the motor and machine specification.
- Failure to observe this could result in an accident or injury.**

Maintenance and inspection, part replacement

- Carry out inspection after waiting at least 5 minutes for FRN0115G2S-2G / FRN0060G2□-4G or lower inverters, or 10 minutes for FRN0146G2S-2G / FRN0075G2□-4G or higher inverters after 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 or injury.**
- Be sure to perform the daily inspection and periodic inspection described in the instruction manual. Lengthy use of the product without inspection could result in inverter failure, damage, or accident and fire.
- A periodic inspection cycle of 1 to 2 years is recommended, however, the cycle may be shortened depending on the usage conditions.
- It is recommended that parts for periodic replacement be replaced after the standard number of years indicated in the instruction manual. Lengthy use of the product without replacing parts could result in inverter failure, damage, or accident and fire.
- Contact outputs [30A/B/C] and [YSA/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 the 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 insulated tools.
- Never modify the product.
- Failure to observe this could result in electric shock or injury.**

CAUTION

Installation

- 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 materials such as dust, water vapor, 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 connect with conductors with damaged or internal parts.
- Failure to observe this could result in fire, an accident, or injury.**

Wiring

- The inverter, motor and wiring generate electric noise, which may cause nearby sensors and devices to malfunction. Employ noise countermeasures to prevent malfunction.
- Failure to observe this could result in an accident.**

Operation

- 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 an accident.**
- 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 the digital input terminals. 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", "H2Hz1", "H2PID", "TVS", "LE", etc.) used to change the operation procedure for operation commands or command procedure for inverter control can be assigned. Depending on the conditions, changes to these signals may result in operation being started suddenly or 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 customized logic" terminal command C.L.C. Depending upon the settings, such modification or cancellation of the customizable logic may change the operation sequence to cause a 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.**

Disposal

- If disposing of the FRENIC-MEGA, handle as industrial waste.
- Failure to observe this could result in injury.**

Chapter 1 BEFORE USE

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

Code	Series name	Code	Destination/Manual
FRN	FRENIC series	G	Global/English

Figure 1-1 (b) Sub Nameplate

Code	Input power source	Code	Enclosure
2	3-phase 200V	S	Standard (basic type)(P20/P30)
4	3-phase 400V	E	EMC filter built-in type

TYPE: Type of inverter

FRN 0003 G 2 S - 2 G

Code	Applicable motor rating	Code	Applicable range
0003	0.4 (1/2)	G	High performance multifunction type
0005	0.75 (1)		
0018	3.7 (5)		
0032	5.5 (7.5)		
0059	11 (15)		
0346	75 (100)		
0432	90 (125)		

3-phase 200 V series

Code	Applicable motor rating	Code	Applicable range
0002	0.4 (1/2)	G	High performance multifunction type
0003	0.75 (1)		
0009	3.7 (5)		
0018	5.5 (7.5)		
0031	11 (15)		
1170	500 (800)		
1386	630 (900)		

3-phase 400 V series

Product number: T31A123A0579E AA

Production year and week: 3 0 1

Production week: This indicates the week number that is numbered from 1st week of January.

Production year: Last digit of year

Product version

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	Indoors	Environmental conditions: IEC60721-3-3/C22
Ambient temperature	-10 to +55 °C (14 to 131°F) (Current derating is necessary in a 10 to +55 °C (122 to 131°F) range.) When installed closely side-by-side (FRN0115G2S-2G / FRN0060G2□-4G or lower): -10 to +40 °C (14 to 104°F)	
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 (0.1 mg/cm ³ or less per year). The inverter must not be subjected to sudden changes in temperature that will cause condensation to form.	
Altitude	1,000 m (3,300 ft) max. (Note 2)	
Atmospheric pressure	86 to 106 kPa	
Vibration	Type of inverter	2 to less than 5 Hz
	FRN0115G2S-2G or lower, FRN0060G2□-4G or lower	9 to less than 20 Hz
	FRN0288G2S-2G or lower, FRN0180G2□-4G or lower	20 to less than 55 Hz
	FRN0146G2S-2G or higher, FRN0075G2□-4G or higher	55 to less than 200 Hz
	(max. amplitude)	5.9 m/s ²
		9.8 m/s ²
		2 m/s ²
		1 m/s ²

(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 a cabinet to prevent lint, etc. getting in.
(Note 2) If you use the inverter in an altitude above 1,000 m (3,300 ft), you should apply an output current derating factor as listed in Table 2-2

Table 2-2 Output Current Derating Factor in Relation to Altitude

Altitude	Output current derating factor
1,000 m (3,300 ft) or less	1.00
1,000 to 1,500 m (3,300 to 4,900 ft)	0.97
1,500 to 2,000 m (4,900 to 6,500 ft)	0.95
2,000 to 2,500 m (6,500 to 8,200 ft)	0.91
2,500 to 3,000 m (8,200 to 9,800 ft)	0.88

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.

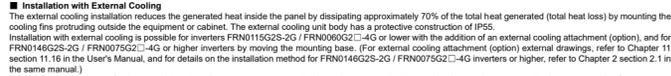
2.2 Installation
2.2.1 Installation Surface
Please install the inverter on noncombustibles such as metal. Also, do not mount it upside down or horizontally.

2.2.2 Surrounding Space
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.
With FRN0115G2S-2G / FRN0060G2□-4G or lower inverters, only in the case of an ambient temperature of 40°C (104°F) or below is it possible to install inverters and converters closely together horizontally.

Table 2-3 Surrounding space mm (inch)

Type of inverter	A	B	C
FRN□□□□G2□-□G			
G2S-2G	200 (7.87)	100 (3.94)	0 (0)
G2□-4G	50 (1.97)	100 (3.94)	0 (0)
0003 to 0008	0006 to 0004	50 (1.97)	0 (0)
0011 to 0115	0006 to 0004	10 (0.39)	100 (3.9)
0146 to 0432	0075 to 0250		100 (3.9)
0550 to 1386	0050 to 1386	50 (1.97)	150 (5.9)
	150 (5.9)	150 (5.9)	150 (5.9)

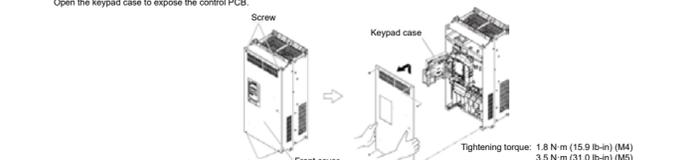


2.2.3 Removal and Attachment of the Front Cover and the Wiring Guide
Carry out wiring work in the following order (The descriptions assume that the inverter has already been installed). If using the RS-485 communication cable for such purposes as remotely operating the keypad, always remove the RS-485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

(1) FRN0115G2S-2G / FRN0060G2□-4G or lower inverters
1) 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.
2) Push the wiring guide upward and pull. Let the wiring guide slide up and remove it.
3) After routing the wires, attach the wiring guide and the front cover reversing the steps above.



(2) FRN0146G2S-2G / FRN0075G2□-4G or higher inverters
1) Loosen the screws of the front cover. Hold both sides of the front cover by hand, and slide the cover upward to remove.
2) 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.



2.2.4 Terminal Layout and Screw Specifications

2.2.4.1 Screw Specifications and Recommended Wire Size (Main Circuit Terminals)
The specifications for the screws used in the main circuit wiring and the wire sizes are shown below. 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.

Table 2-4 Screw specifications

Inverter type	Main circuit		Grounding		Control power auxiliary input	
	Screw size (driver size)	Tightening torque N·m (lbf·in)	Screw size (driver size)	Tightening torque N·m (lbf·in)	Screw size (ISO, TO)	Tightening torque N·m (lbf·in)
Three-phase 200 V						
FRN003G2S-2G	FRN003G2□-4G	M3.5	M3.5	M3.5		
FRN0008G2S-2G	FRN0008G2□-4G	M4	M4	M4		
FRN011G2S-2G	FRN011G2□-4G	M4	M4	M4		
FRN018G2S-2G	FRN018G2□-4G	M5	M5	M5		
FRN032G2S-2G	FRN032G2□-4G	M5	M5	M5		
FRN046G2S-2G	FRN046G2□-4G	M5	M5	M5		
FRN059G2S-2G	FRN059G2□-4G	M6	M6 (No.3)	M6 (No.3)		
FRN075G2S-2G	FRN075G2□-4G	M6 (No.3)	M6 (No.3)	M6 (No.3)		
FRN115G2S-2G	FRN115G2□-4G	M8	M8	M8		
FRN146G2S-2G	FRN146G2□-4G	M8	M8	M8		
FRN180G2S-2G	FRN180G2□-4G	M10	M10	M10		
FRN215G2S-2G	FRN215G2□-4G	M10	M10	M10		
FRN288G2S-2G	FRN288G2□-4G	M12	M12	M12		
FRN346G2S-2G	FRN346G2□-4G	M12	M12	M12		
FRN432G2S-2G	FRN432G2□-4G	M12	M12	M12		

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.
The 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(+), N(-), DB, U, V, W, R, D, AUX-contact (30A, 30C, 30D, YSA, YSC)
Insulation level: Main circuit - casing: Basic insulation (overvoltage category II, pollution degree 2)
Main circuit - control circuit: Reinforced insulation (overvoltage category II, pollution degree 2)
Contact output - control circuit: Reinforced insulation (overvoltage category II, pollution degree 2)

2.2.5 Recommended Wire Size
Table 2-5 shows recommended wire sizes. The examples of recommended wire sizes for main circuit terminals are based on the use of single HV wires at ambient temperature of 50°C (122°F).

Refer to Chapter 2 in the User's Manual for conditions other than these.

Table 2-5 Recommended wire sizes (panel internal temperature: 50°C (122°F) or less, wire type: 75°C (167°F) wire)

Power system Standard input/output (kVA)	Inverter type (Note 1)	Recommended wire size (mm ²)									
		Main power supply input [L1/R, L2/S, L3/T]		DC reactor (DCR)		For DC reactor connection [P1(+), DB]		For inverter grounding [ⓄG]		Inverter output [U, V, W]	
		With	Without	For P1(+)	For DB	HHD	HND	HHD	HND		
0.4	FRN003G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
0.75	FRN0008G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1.5	FRN011G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2.2	FRN018G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3.7	FRN032G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5.5	FRN046G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
7.5	FRN059G2S-2G	FRN059G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
11	FRN075G2S-2G	FRN075G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
15	FRN115G2S-2G	FRN115G2S-2G	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
18.5	FRN146G2S-2G	FRN146G2S-2G	14	22	22	2.0	2.0	8.3	14	14	14.0
22	FRN180G2S-2G	FRN180G2S-2G	22	38	38	2.0	2.0	14	22	22	22.0
30	FRN215G2S-2G	FRN215G2S-2G	38	60	60	2.0	2.0	14	38	38	38.1
37	FRN288G2S-2G	FRN288G2S-2G	38	60	60	2	2	14	38	38	38.1
45	FRN346G2S-2G	FRN346G2S-2G	60	100	100	3.5	3.5	22	60	60	60
55	FRN432G2S-2G</										

Characteristic	Terminal symbol	Terminal command	Function description
Analog input	[V2]	Analog setting voltage input (V2 function)	(1) Frequency is set up according to the external analog voltage input command value. <ul style="list-style-type: none"> ±10 to ±10 VDC (0 to ±100%) (normal operation) ±10 to ±10 VDC (0 to ±100%) (inverse operation) (2) Other than frequency settings, this terminal can be assigned to PID commands, PID control feedback signals, and other functions. In this case, the terminal voltage settings, torque limit values, torque command values / torque current command values, speed limit values, and analog input motors with analog input. (3) Hardware specifications <ul style="list-style-type: none"> Input impedance: 22 kΩ Up to ±15 VDC can be input. However, input exceeding ±10 VDC will be recognized as ±10 VDC. (4) Digital input terminals [X0] and [X1] can be set up as a pulse train input terminal by changing the function code. <ul style="list-style-type: none"> 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 Refer to the User's Manual, Chapter 5 "FUNCTION CODES" for details on function code settings.
	[PTC]	PTC / NTC thermistor input (PTC / NTC function)	The terminal is insulated from terminals [CM]. [CMY].
Digital input	[I1]	Analog common	The terminal is the common terminal for analog input signals (terminals [I3], [I2], [I1], [I2], [FM1], and [FM2]). The terminal is insulated from terminals [CM]. [CMY].
	[X1]	Digital input 1 to 9	(1) 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. (2) The input mode and SINK / SOURCE can be switched using SW1. (3) The operating mode between digital input terminal and terminal [CM] can be switched to "ON when shorted (active ON)" or "OFF when shorted (active OFF)".
	[X2]	Digital input 10 to 19	(1) Various signals (running signal, frequency reached signal, overload forecast signal, etc.) can be set with function codes E10 to E19. Refer to the User's Manual, Chapter 5 "FUNCTION CODES" for details. (2) The input mode for terminals [EN1] and [EN2] is fixed to source. The mode cannot be switched to sink. (3) This function can be enabled and disabled with SW7. If using this function, set the respective SW7 switches to the OFF side. Refer to the User's Manual, Chapter 2 section "2.6 Control circuit terminals" for details on terminal [EN1] and [EN2] circuit specifications.
	[X3]	Digital input 20 to 29	(1) Connect the output signal supply for the programmable controller. (Rated voltage: +24 VDC (power supply voltage fluctuation range: 20 to +2 VDC), maximum 100 mA) (2) The terminal can also be used as the power supply for loads connected to transistor outputs. Refer to the "Transistor output" section for details. Gain adjustable range: 0 to 300%.
	[X4]	Digital input 30 to 39	(1) This is a common terminal for digital input signals. The terminal is insulated from terminals [I1]. [CMY].
	[X5]	Digital input 40 to 49	(1) This is a common terminal for digital input signals. The terminal is insulated from terminals [I1]. [CMY].
	[X6]	Digital input 50 to 59	(1) This is a common terminal for digital input signals. The terminal is insulated from terminals [I1]. [CMY].
	[X7]	Digital input 60 to 69	(1) This is a common terminal for digital input signals. The terminal is insulated from terminals [I1]. [CMY].
	[X8]	Digital input 70 to 79	(1) This is a common terminal for digital input signals. The terminal is insulated from terminals [I1]. [CMY].
	[X9]	Digital input 80 to 89	(1) This is a common terminal for digital input signals. The terminal is insulated from terminals [I1]. [CMY].
Forward control	[FWD]	Forward control run/stop command input	Refer to the User's Manual, Chapter 2 section "2.6 Control circuit terminals" for details on digital input circuit specifications.
	[REV]	Reverse rotation run / stop command input	Refer to the User's Manual, Chapter 2 section "2.6 Control circuit terminals" for details on digital input circuit specifications.
Enable input	[EN1]	Enable input	(1) When terminals [EN1]-[PLC] or terminals [EN2]-[PLC] are OFF, the inverter output transistors stop switching (safe torque off: STO). Be sure to operate terminals [EN1] and [EN2] simultaneously; otherwise an \overline{C} F alarm is issued and the operation of the inverter will be disabled. (2) The input mode for terminals [EN1] and [EN2] is fixed to source. The mode cannot be switched to sink. (3) This function can be enabled and disabled with SW7. If using this function, set the respective SW7 switches to the OFF side. Refer to the User's Manual, Chapter 2 section "2.6 Control circuit terminals" for details on terminal [EN1] and [EN2] circuit specifications.
	[EN2]	Enable input	(1) When terminals [EN1]-[PLC] or terminals [EN2]-[PLC] are OFF, the inverter output transistors stop switching (safe torque off: STO). Be sure to operate terminals [EN1] and [EN2] simultaneously; otherwise an \overline{C} F alarm is issued and the operation of the inverter will be disabled. (2) The input mode for terminals [EN1] and [EN2] is fixed to source. The mode cannot be switched to sink. (3) This function can be enabled and disabled with SW7. If using this function, set the respective SW7 switches to the OFF side. Refer to the User's Manual, Chapter 2 section "2.6 Control circuit terminals" for details on terminal [EN1] and [EN2] circuit specifications.
Programmable controller power supply	[PLC]	Programmable controller power supply	(1) Connect the output signal supply for the programmable controller. (Rated voltage: +24 VDC (power supply voltage fluctuation range: 20 to +2 VDC), maximum 100 mA) (2) The terminal can also be used as the power supply for loads connected to transistor outputs. Refer to the "Transistor output" section for details. Gain adjustable range: 0 to 300%.
	[CM]	Digital common	This is a common terminal for digital input signals. The terminal is insulated from terminals [I1]. [CMY].
Analog output	[FM1]	Analog monitor (FMA function)	These terminals output analog DC voltage of 0 to ±10 VDC, and analog DC voltage current of 0 to 20 mA DC or 0 to 20 mA DC monitor signals. The [FM1] output form (VO1 / IO1) can be switched using SW6 on the PCB and function code F29. The signal current 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 current is selected from the following by setting function code F61 data. * Allowable impedance for connection: Min. 5 kΩ (with output of 0 to ±10 VDC) (up to two analog voltmeters (0 to 10 VDC, input impedance 10 kΩ) can be connected.) * Allowable impedance for connection: Max. 500 Ω (with output of 4 to 20 mA DC) Gain adjustable range: 0 to 300%.
	[FM2]	Analog monitor (FMA function)	These terminals output analog DC voltage of 0 to ±10 VDC, and analog DC voltage current of 0 to 20 mA DC or 0 to 20 mA DC monitor signals. The [FM1] output form (VO1 / IO1) can be switched using SW6 on the PCB and function code F29. The signal current 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 current is selected from the following by setting function code F61 data. * Allowable impedance for connection: Min. 5 kΩ (with output of 0 to ±10 VDC) (up to two analog voltmeters (0 to 10 VDC, input impedance 10 kΩ) can be connected.) * Allowable impedance for connection: Max. 500 Ω (with output of 4 to 20 mA DC) Gain adjustable range: 0 to 300%.
Pulse output	[I1]	Analog common	This is a common terminal for analog input / output signals. The terminal is insulated from terminals [CM]. [CMY].
	[FMP]	Pulse monitor (FMP function)	This terminal outputs a pulse signal. The signal current 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 kΩ (up to two analog voltmeters (0 to 10 VDC, input impedance 10 kΩ) can be connected.) * Pulse rate: Approx. 50%; pulse rate: 25 to 6000 ps (at full scale) (Set F34 to between 1 and 300% if using as average voltage output.) * Pulse delay: Approx. 50%; pulse rate: 25 to 6000 ps (at full scale)
Digital common	[CM]	Digital common	This is a common terminal for digital input signals and terminal [FMP]. The terminal is insulated from terminals [I1]. [CMY]. This is the same terminal as terminal [CM] for digital input.
	[Y1]	Transistor output 1 to 4	(1) Various signals (running signal, frequency reached signal, overload forecast signal, etc.) can be set with function code E20 to E24 can be output. Refer to the User's Manual, Chapter 5 "FUNCTION CODES" for details. (2) The operating mode between transistor output terminal [Y1] to [Y4] and terminal [CM] can be switched to "ON when signal output (active ON)" or "OFF when signal output (active OFF)". * Maximum voltage for pull-up power supply: 48 V, maximum load current when ON: 50 mA
General-purpose relay output	[Y5A]	General-purpose relay output	(1) This is a common terminal for transistor output signals. The terminal is insulated from terminals [CM]. [I1].
	[Y5C]	General-purpose relay output	(1) 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 $\cos\phi = 0.3$, 48 VDC 0.5 A (2) 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)".
Integrated alarm output	[30A]	Integrated alarm output	(1) When the inverter stops with an alarm, an integrated alarm is output at the relay contact (1C). Contact capacity: 250 VAC 0.3 A $\cos\phi = 0.3$, 48 VDC 0.5 A (2) The same signals as those of terminals [Y1] to [Y4] can be selected and output. (3) 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)".
	[30C]	Integrated alarm output	(1) When the inverter stops with an alarm, an integrated alarm is output at the relay contact (1C). Contact capacity: 250 VAC 0.3 A $\cos\phi = 0.3$, 48 VDC 0.5 A (2) The same signals as those of terminals [Y1] to [Y4] can be selected and output. (3) 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)".
Communication	[DX+]	Via RS-485 communication 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 Switching switches" for details on terminating resistance). When a multi-stop (cross-wire) connection, use the recommended rod terminal. (Refer to "Table 2-7 Recommended rod terminals" in section "2.2.1 Screw Specifications and Recommended Wire Size" (Control Circuit Terminals)" for details on recommended rod terminals).
	[RJ-45]	RS-485 communication port 1 (for keypad connection)	(1) 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. (2) 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 Switching switches" for details on terminating resistance). * 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. Do not connect the PLC LAN network, Ethernet hubs, or telephone lines to the RJ-45 connector. The inverter and the connected device may be damaged. Failure to observe this could result in fire.
USB connector	USB port (keypad)	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 (FRENC Loader). * Refer to the User's Manual, Chapter 9 "9.2 FRENC Loader Overview" for details.

3.2 Destination Setting

For inverter type FRN***G2□□□G (Global Model), 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. By setting the destination, basic function codes such as rated voltage, rated frequency, etc. are initialized to general values in each region (Table 3-2). If the destination value setting is changed after the initial destination setting, it can be changed with \overline{B} \overline{D} \overline{E} \overline{S} \overline{E} in the program mode menu or function code \overline{H} \overline{I} \overline{D} . If the destination is reset by \overline{B} \overline{D} \overline{E} \overline{S} \overline{E} , all function codes are initialized to the factory defaults. If the destination is set by \overline{H} \overline{I} \overline{D} , only the function codes in Table 3-2 are initialized to the values in Table 3-2. The destination can be set for the regions of Japan, Asia, China, Europe, Americas, and East Asia. If the function code set including the destination setting function code (\overline{H} \overline{I} \overline{D}) is copied with the data copy function or the FRENC Loader, manual destination setting is not required. Set the initial destination as shown below.

(1) \overline{B} \overline{D} \overline{E} \overline{S} \overline{E} appears when turning ON the power for the first time. If this appears, press the \overline{C} key.
(2) \overline{H} \overline{I} \overline{D} (Asian region) is displayed first. For other regions, Press \overline{C} key or \overline{C} key to select the destination.
(3) After selecting the destination, \overline{S} \overline{R} \overline{I} \overline{E} is displayed by pressing \overline{C} key and the destination setting is completed. Then, \overline{D} \overline{D} is displayed.

Note: If the inverter is not equipped with a keypad, please purchase either TP-E2 or TP-A25W before carrying out the above procedure. (The above description is based on the use of TP-E2.)

Table 3-2 Initial value for each destination

Destination	Asia	China	Europe	Americas	East Asia	Japan
LED display	\overline{B} \overline{S} \overline{I}	\overline{C} \overline{H}	\overline{E} \overline{U}	\overline{R} \overline{I} \overline{E}	\overline{E} \overline{S} \overline{E} \overline{B}	\overline{J} \overline{P} \overline{N}
H101 Destination	2	3	4	5	6	1
Operation method	2	2	2	0	2	2
F03/A011601101: Maximum output frequency 1 to 4	60 Hz (200V)	50 Hz (400V)	50 Hz	60 Hz	60 Hz	60 Hz
F04/A02302102: Base frequency 1 to 4	50 Hz (400V)	50 Hz	50 Hz	60 Hz	60 Hz	50 Hz
F05/A030230103: Rated voltage at base frequency 1 to 4	220/115V	380V	400V	230/460V	200/400V	200/400V
F06/A04040404: Torque boost 1 to 4	HP rating motors	Fuji IE3 motor Standard value	HP rating motors	Fuji IE3 motor Standard value	HP rating motors	Fuji IE3 motor Standard value
F09/A05050505: Torque boost 1 to 4	HP rating motors	Fuji IE3 motor Standard value	HP rating motors	Fuji IE3 motor Standard value	HP rating motors	Fuji IE3 motor Standard value
F11/A07107107: Electronic thermal 1 to 4 (Overload detection level)	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value
F14: Restart mode after momentary power failure (Mode selection)	0	1	0	0	1	1
FB: Switching between HND and HHD drive modes	HND	HND	HND	HND	HND	HND
E31/E36/E54: Frequency detection 1 to 3 (Level)	60 Hz (200V)	50 Hz	50 Hz	60 Hz	60 Hz	60 Hz
E34/E37/E55: Overload early warning / Current detection 1 to 3 (Level)	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value
P02/A16161616: Motor 1 to 4 (Rated capacity)	kW	kW	kW	HP	kW	kW
P03/A17171717: Motor 1 to 4 (Rated current)	kW	kW	kW	HP	kW	kW
P06/A20162016: Motor 1 to 4 (No-load current)	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value
P07/A21162116: Motor 1 to 4 (%R1)	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value
P08/A22162216: Motor 1 to 4 (%X)	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value
P12/A26162616: Motor 1 to 4 (Rated slip frequency)	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value	Fuji IE3 motor Standard value
P15/A35163516: Motor 1 to 4 (Torque current under vector control)	5	5	5	1	5	5
P99/A39163916: Motor 1 to 4 selection	0	0	0	3	0	0
H66: STOP key priority / Start check function	0	0	0	3	0	0
K01: Multifunction keypad TP-A25W (Language selection)	1	6	1	1	1	0

Chapter 4 FUNCTION CODES

The PDF manual can be downloaded from below QR code. For more information of Function codes list.



https://www.fujielectric.com/products/inverter/frency-megag2/download_pr1

Chapter 5 ALARM CODES

The PDF manual can be downloaded from below QR code. For more information of Alarm codes list.



https://www.fujielectric.com/products/inverter/frency-megag2/download_pr2

Function codes (excerpt)

Function code	Name	Data setting range
F01	Frequency setting 1	0: Keypad key operation (\overline{C} / \overline{C} keys) 1: Analog voltage input (Terminal [I2]) (from 0 to ±10 VDC) 2: Analog current input (Terminal [C1]) (4 to 20 mA DC) 3: Analog voltage input (Terminal [I2]) + analog current input (Terminal [C1]) 4: Analog voltage input (Terminal [V2]) (from 0 to ±10 VDC) 5: Analog voltage input (Terminal [V3]) (from 0 to ±10 VDC) 6: Analog voltage input (Terminal [V3]) (from 0 to ±10 VDC) 7: UP/DOWN control 8: Keypad key operation (\overline{C} / \overline{C} keys) (with balanceless bumpers) 9: Pattern operation 11: Digital input interface card OPC-D (option) 12: Pulse train input
F02	Operation method	0: Keypad operation (Rotation direction input; terminal block) 1: External signal (digital input) 2: Keypad operation (forward rotation) 3: Keypad operation (reverse rotation)
F03	Maximum output frequency 1	5.0 to 599.0 Hz
F04	Base frequency 1	5.0 to 599.0 Hz
F05	Rated voltage at base frequency 1	0: AVR disable (output voltage proportional to power voltage) 80 to 240V / AVR operation (200V series) 160 to 500V / AVR operation (400 V series)
F06	Maximum output voltage 1	80 to 240V / AVR operation (200V series) 160 to 500V / AVR operation (400 V series)
F07	Acceleration time 1	0.0 to 60.00s
F08	Deceleration time 1	0.0 to 60.00s
F09	Torque boost 1	0.0 to 20.0% (% value against base frequency voltage 1)
F10	Electronic thermal overload protection for motor 1 (Operation level)	1: Enable (for a general-purpose motor with self-cooling fan) 2: Enable (for an inverter-driven motor with separately powered cooling fan) 0.0 (disable), current value of 1 to 135% of inverter rated current set with a unit (inverter rated current dependent on F80)
F14	Restart mode after momentary power failure (operation selection)	0: Trip immediately 1: Trip after a recovery from power failure 2: Trip after momentary deceleration is stopped 3: Continue to run (for heavy inertia load or general load) 4: Restart from frequency at power failure (for general load) 5: Restart from starting frequency
F16	Frequency limiter (Lower limit)	HND specification 0.0 to 599.0 Hz
F26	Motor sound (Carrier frequency)	HND specification FRN***G2S-2G FRN***G2□-4G FRN***G2S-2G FRN***G2□-4G 0.75 to 16kHz: 0005 to 0286 0002 to 0150 0032 to 0075 0016 to 0038 0.75 to 10kHz: 0346 to 0432 0180 to 1386 0092 to 0215 0045 to 0150 0.75 to 6kHz: — — 0288 to 0432 0180 to 1386
P02	Motor 1 (Rated capacity)	0.01 to 1000 kW (At P99 = 0 or 2 to 5, 20 to 23) 0.01 to 1000 HP (At P99 = 1)
P03	Motor 1 (Rated current)	0.00 to 2000 A
P04	Motor 1 selection	0: Disable 1: Stop tuning 2: Rotation tuning 4: Synchronous motor magnetic pole position offset tuning 5: Stop tuning (%R1, %X only)
P99	Motor 1 selection	0: Motor characteristics 0 (Fuji standard IM, 8-series) 1: Motor characteristics 1 (HF rating IM) 2: Motor characteristics 2 (Fuji dedicated motors for vector control) 3: Motor characteristics 3 (Refer to replacement material using Fuji standard IM, 6-series) 4: Other IMs 5: Motor characteristics 5 (Fuji premium efficiency motors) 20: Other (synchronous motors) 21: Motor characteristics (Fuji synchronous motor (N82 series)) 22: Motor characteristics (Fuji synchronous motor (GN2 series)) 23: Motor characteristics (Fuji synchronous motor (GN1 series))

Chapter 6 MAINTENANCE AND INSPECTION

6.1 Inquiries about Product and Guarantee

6.1.1 When Making an Inquiry

Upon breakage of the product, uncertainties, failures or inquiries, inform your Fuji Electric representative of the following information.
1) Inverter type, Refer to Chapter 1 "1.1 Acceptance Inspection (Nameplates and Inverter Type)".
2) SER No. (serial number of equipment), Refer to Chapter 1 "1.1 Acceptance Inspection (Nameplates and Inverter Type)".
3) Function codes and their data that you changed. Refer to the FRENC-MEGA User's Manual, Chapter 3 "3.4.2 Checking changed function codes "Data Checking: C/F".
4) Information. Refer to the maintenance item 5, \overline{H} in the FRENC-MEGA User's Manual, Chapter 3 "3.4.5 Reading maintenance information "Maintenance information: S/E".
5) Date of purchase.
6) 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.
When specifying 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 plate, 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 "3 months from the date that repairs are completed".

(2) Warranty range

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 the warranty may not apply.
① 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 product.
③ The breakdown was caused by the product other than Fuji's product, such as the customer's equipment or software design, etc.
④ 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.
⑥ The breakdown was caused by improper maintenance or replacement using consumables, etc. specified in the operation manual or catalog, etc.
⑦ 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 delivered.
⑧ The product was not used in the manner the product was originally intended to be used.
⑨ 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 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 production stop occurs. However, 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 production stop occurs. 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

Overseas 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 (CE)

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.

EMC Directive	EN61800-3 Immunity: Second environment (Industrial)	Emission	Category C2 or C3 (Refer to the User's Manual "APP
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