Chapter 6
TROUBLESHOOOTING

This chapter describes troubleshooting procedures to be followed when the inverter malfunctions or detects an alarm or a light alarm condition.

Contents

6.1 Protective Functions

In order to prevent the system going down or to shorten recovery time, FRENIC-MEGA is equipped with various protective functions shown in Table 6.1-1 below. The protective functions marked with an asterisk (*) in the table are disabled by factory default.
Enable them according to your needs.

The protective functions include, for example, the “heavy alarm” detection function which, upon detection of an abnormal state, displays the alarm code on the LED monitor and causes the inverter to trip, the “light alarm” detection function which displays the alarm code but lets the inverter continue the current operation, and other warning signal output functions.

If any problem arises, understand the protective functions listed below and follow the procedures given in sections 6.2 and onwards for troubleshooting.

Table 6.1-1 Abnormal state detection (heavy alarms/light alarms)

Protective function	Description	Related function code
“Heavy alarm” detection	This function detects an abnormal state, displays the corresponding alarm code on the keypad, and causes the inverter to trip. Refer to “6.3.1 Alarm code list” for alarm codes, and refer to “6.3.2 Causes, checks and measures of alarms” for details on the alarm content. The inverter retains the last four alarm codes and their factors together with their running information applied when the alarm occurred, so it can display them.	H98
“Light alarm” detection*	All abnormal conditions are detected, and if a minor abnormality is detected, a light alarm code is displayed, and operation continues without tripping the inverter. The light alarm display operation can be selected with the light alarm selection (function codes H81, H82, H83).	H81 H82 H83
Stall prevention	When the output current exceeds the current limiter level (function code F44) during acceleration/ deceleration or constant speed running, this function decreases the output frequency to avoid an overcurrent trip.	F44
Overload prevention control*	Before the inverter trips due to a cooling fin overheat (OH1) or inverter overload (OLU), this function decreases the output frequency of the inverter to reduce the load.	H70
Anti-regenerative control*	If regenerative energy returned exceeds the inverter's braking capability, this function automatically increases the deceleration time or controls the output frequency to avoid an overvoltage trip.	H69
Deceleration characteristics* (Improvement of braking performance)	During deceleration, this function increases the motor energy loss and decreases the regenerative energy returned to avoid an overvoltage trip.	H71
Reference loss detection*	This function detects a frequency reference loss (due to a broken wire, etc.), issues the alarm, and continues the inverter operation at the specified frequency.	E65
Automatic lowering of carrier frequency	Before the inverter trips due to an abnormal surrounding temperature or output current, this function automatically lowers the carrier frequency to avoid a trip.	H98
Motor overload early warning*	When the inverter output current has exceeded the specified level, this function issues the “Motor overload early warning” signal before the thermal overload protection function causes the inverter to trip for motor protection (only for the 1st motor).	E34 E35
Retry*	When the inverter has stopped because of a trip, this function allows the inverter to automatically reset and restart itself. The number of retries and the latency between stop and reset can be specified.	H04 H05

Table 6.1-1 Cont.

Protective function	Description	Related function code
Forced stop*	Upon receipt of the “Force to stop” terminal command STOP, this function interrupts the run and other commands currently applied in order to forcedly decelerate the inverter to a stop state.	H56
Surge protection	This function protects the inverter from a surge voltage between main circuit power lines and the ground.	-
Momentary power failure protection*	• If a momentary power failure for 15 ms or longer occurs, a protective operation (inverter stop) is activated. • When momentary power failure restart is selected, the inverter restarts automatically after voltage restoration within a set-up time (momentary power failure permissible time).	F14

6.2 Before Proceeding with Troubleshooting

⚠WARNING⚠

- 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 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 output to inverter output terminals U, V and W.
- Carry out an inspection after first waiting for at least 5 minutes for units of 22 kW or lower, or 10 minutes for units of 30 kW or higher after turning off the power, 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 and N has dropped to a safe level (+25 VDC or less).

Failure to observe this could result in electric shock.

Follow the procedure below to solve problems.

(1) Is wire connection correct?

See Chapter 2 “2.2.1 Basic connection diagram”.

(2) Check whether an alarm code or light alarm code is displayed on the LED monitor.

- If an Alarm Code Appears on the LED Monitor — To section 6.3
- If a Light Alarm Code is Displayed — To section 6.4
- Other Errors

Abnormal motor operation — To section 6.5.1

6.5.1 [1] The motor does not rotate
6.5.1 [2] The motor rotates, but the speed does not increase
6.5.1 [3] The motor runs in the opposite direction to the command
6.5.1 [4] Speed fluctuation or current oscillation (e.g., hunting) occurs during running at constant speed
6.5.1 [5] Unpleasant noises are emitted from motor or noises fluctuate
6.5.1 [6] Motor is not accelerated or decelerated according to set-up acceleration or deceleration times
6.5.1 [7] The motor does not restart even after the power recovers from a momentary power failure
6.5.1 [8] Motor generates heat abnormally
6.5.1 [9] The motor does not run as expected
6.5.1 [10] Motor stalls during acceleration

Problems with inverter settings — To section 6.5.2

6.5.2 [1] Nothing appears on the keypad
6.5.2 [2] The desired menu is not displayed
6.5.2 [3] Display of under bars (_ _ _ _)
6.5.2 [4] Display of center bars (- - - -)
6.5.2 [5] [ ] Display of parenthesis
6.5.2 [6] Data of function codes cannot be changed
6.5.2 [7] Function code data are not changeable (change from link functions)

If any problems persist after the above recovery procedure, contact your Fuji Electric representative.

6.3 If an Alarm Code Appears on the LED Monitor

6.3.1 Alarm code list

When an alarm is detected, check the alarm code displayed on the keypad 7-segment LED. Refer to "6.3.2 Causes, checks and measures of alarms" and take the appropriate countermeasures.

When one alarm code has more than one cause, alarm subcodes are provided to make it easy to identify the cause. When there is only one cause, the alarm subcode is displayed as “-” and described as “-.”

Furthermore, certain types of alarms can be changed to light alarms, allowing inverter operation to be continued. (Refer to “Light alarm selection possible” in Table 6.3-1 below.)

Note Continuing operation while a light alarm is occurring may cause damage to devices, and therefore the inverter should be stopped promptly from an external source.

To enter Programming mode while an alarm is occurring, press the PRG/RESET key while holding down the STOP key.

See (Chapter 3 “3.4.6 Reading alarm information”) for the method of checking the alarm codes.

Table 6.3-1 Alarm code and subcode list

Alarm code	Alarm code name	Light alarm selection possible	Retry	Alarm subcode	Alarm subcode name	Ref. page
CA1 to CA5	User-defined alarm	Y	-	0	-	6-8
coF	Current input terminals [C1], [C2]* signal line break	Y	-	1	Terminal [C1] wire break	6-8
				2	Terminal [C2] wire break	
				3	Terminal [C1], [C2] wire break	
dbA	Braking transistor broken	-	-	0	-	6-8
dbh	Braking transistor broken	Y	Y	0	-	6-8
ECF	EN circuit failure	-	-	0	-	6-9
ECL	Customizable logic failure	-	-	0	-	6-9
EF	Ground fault protection (5.5 kW or higher)	-	-	0	-	6-9
Er1	Memory error	-	-	1-16	For investigation by manufacturer	6-10
Er2	Keypad communication error	-	-	1-2	For investigation by manufacturer	6-11
Er3	CPU error	-	-	1-9000	For investigation by manufacturer	6-11
Er4	Option communication error	Y	-	1	Communication error at option A	6-11
				2	Communication error at option B	
				3	Communication error at option C	
				10	Communication error due to multiple causes	
Er5	Option error	Y	-	0	Timeout	6-11
				1-10	For investigation by manufacturer	

Table 6.3-1 cont.

Alarm code	Alarm code name	Light alarm selection possible	Retry	Alarm subcode	Alarm subcode name	Ref. page
Er6	Operation error	-	-	1	STOP key priority/forced stop (STOP terminal)	6-12
				2	Start check function	
				3	Start check function (when operation is permitted)	
				4	Start check function (when reset is turned on)	
				5	Start check function (when the power recovers in powering on)	
				6	Start check function (keypad connection)	
				8	Brake signal error	
				9-14	For investigation by manufacturer	
Er7	Tuning error	-	-	7	Operation command OFF during motor tuning	6-13
				8	Forced stop during motor tuning	
				9	BX command during motor tuning	
				10	Hardware current limit during motor tuning	
				11	Occurrence of low voltage (LV) during motor tuning	
				12	Failure due to prevention of reverse rotation during motor tuning	
				13	Over upper limit frequency during motor tuning	
				14	Switching to commercial power during motor tuning	
				15	Occurrence of alarm during motor tuning	
				16	Change of run command source during motor tuning	
				18	Over acceleration time during motor tuning	
				24	Terminal [EN1], [EN2] error during motor tuning	
				5000 or higher	Refer to Chapter 4 “4.7.2 [3], ■ Tuning errors”.	
				Other than above	For investigation by manufacturer	
Er8	RS-485 communication error (Communication port 1)	Y	-	0	-	6-13
Erd	Step-out detection	-	-	5001-5010	For investigation by manufacturer	6-15
ErC	Magnetic pole position detection error	-	-	5002-5008	For investigation by manufacturer	6-16
ErE	Speed inconsistency/ excessive speed deviation	Y	-	1	Signs of speed command and speed detection are inconsistent.	6-17
				3	In the case of excessive speed deviation (|detected speed|>|speed command|)	
				5	Detected speed remains 0Hz irrespective of speed command.	
				7	In the case of excessive speed deviation (|detected speed|<|speed command|)	
ErF	Data saving error during undervoltage	-	-	0	-	6-18

Table 6.3-1 cont.

Alarm code	Alarm code name	Light alarm selection possible	Retry	Alarm subcode	Alarm subcode name	Ref. page
ErH	Hardware error	-	-	11	Option board (A port) connection defect	6-18
				12	Option board (B port) connection defect	
				13	Option board (C port) connection defect	
				Other than above	For investigation by manufacturer	
Ero	Positioning control error	Y	-	1 to 5	For investigation by manufacturer	6-18
ErP	RS-485 communication error (Communication port 2)	Y	-	0	-	-
Err	Simulated failure	-	-	0	-	6-18
FUS	Blown fuse	-	-	0	75 kW or higher (200V series) 90 kW or higher (400V series)	6-18
FAL	DC fan lock	Y	-	0	45 kW or higher (200V series) 75 kW or higher (400V series)	
Lin	Input phase loss	-	-	1-2	For investigation by manufacturer	6-19
LoP	Password protection	-	-	1	Password 1 protection	6-20
				2	Password 2 protection	
LU	Undervoltage	-	-	1	Occurrence of low voltage during gate ON (F14=0)	6-20
				2	Run command ON during low voltage (F14=0, 2)	
				3	LV trip on power recovery from a momentary power failure (F14=1)	
				4 to 5	For investigation by manufacturer	
nrb	NTC wire break error	-	-	0	-	6-20
OC1	Instantaneous overcurrent	-	Y	1 to 13 5001	For investigation by manufacturer	6-20
OC2						
OC3						
OH1	Cooling fin overheat	Y	Y	1 to 14	For investigation by manufacturer	6-22
OH2	External alarm	Y	-	0	-	6-22
OH3	Inverter internal overheat	Y	Y	0	Internal air overheat	6-22
				1	Charging resistor overheat	
				Other than above	For investigation by manufacturer	
OH4	Motor protection (PTC/NTC thermistor)	-	Y	0	-	6-23
OH6	Charging resistor overheat	Y	Y	0	-	6-23
OL1 to OL4	Motor overload 1 to 4	Y	Y	0	-	6-23
OLU	Inverter overload	-	Y	1	IGBT protection	6-25
				2	Inverter overload	
				10	For investigation by manufacturer	
OPL	Output phase-failure detection	-	-	1-10	For investigation by manufacturer	6-26

Table 6.3-1 cont.

Alarm code	Alarm code name	Light alarm selection possible	Retry	Alarm subcode	Alarm subcode name	Ref. page
05	Overspeed protection	-	-	0	-	6-26
OU1	Overvoltage	-	Y	1 to 12	For investigation by manufacturer	6-27
OU2						
OU3						
PbF	Charger circuit error (1.5 kW or higher)	-	-	0 to 2	For investigation by manufacturer	6-27
PG	PG wire break	-	-	10 to 20	For investigation by manufacturer	6-28
dO	Excessive positioning deviation	-	-	0	-	6-28

Note) • All protective functions are automatically reset if the control power voltage drops to a level at which inverter control circuit operation can no longer be sustained.

• The protection stop condition can be canceled by pressing the keypad PRG/RESET key, or turning between the X (assigned to RST) and CM terminals OFF to ON. However, the reset operation will not be valid until the cause of the alarm has been eliminated.

• If multiple alarms have occurred, the reset operation will not be valid until the cause of all alarms has been eliminated. (The cause of uncleared alarms can be checked at the keypad.)

• When assigned to light alarms, terminals [30A/B/C] do not work.

6.3.2 Causes, checks and measures of alarms

[1] CA1 to CA5 User-defined alarm

Phenomenon: An alarm defined with customizable logic occurred.

Possible cause	Check and measures
An error is displayed if the alarm conditions defined by the user with customizable logic are met. (This is not an error at the inverter itself.)	Check the input/output status in accordance with the alarm conditions set with customizable logic.

[2] CoF **Current input terminals [C1], [C2] signal line break**

Phenomenon: A current input signal line break occurred.

Possible cause	Check and measures
(1) Current input command wire break [Subcodes: 1, 2, 3]	Check whether current is flowing to current input terminals [C1] and [C2]*. ➔ Terminal [C1] wire break detection [Subcode: 1] Terminal [C2]* wire break detection [Subcode: 2] Terminal [C1], [C2]* wire break detection [Subcode: 3] *: When equipped with OPC-AIO (option).
(2) The inverter was affected by strong electrical noise.	Check noise countermeasures (grounding condition, signal line and communication cable/main circuit wiring installation method, etc.) ➔ Enhance noise countermeasures. ➔ Keep the main circuit wiring and control circuit wiring as far apart as possible.

[3] dbA **Braking transistor broken**

Phenomenon: Faulty operation of the braking transistor was detected.

Possible cause	Check and measures
Braking resistor connection terminal miswiring	Check whether the braking resistor has been correctly wired between main circuit terminals [P+] and [DB]. Check whether the motor wiring has been mistakenly connected to terminal [DB]. ➔ Ask for inverter repair to be carried out if wiring work has been carried out incorrectly.
The braking transistor is broken.	Check whether resistance of the braking resistor is correct or there is a misconnection of the resistor. ➔ Consult your Fuji Electric representative for repair.

[4] dbH Braking resistor overheat

Phenomenon: The electronic thermal protection for the braking resistor has been activated.

Possible cause	Check and measures
(1) Braking load is too heavy. [Subcode: 0]	Reconsider the relationship between the braking load estimated and the real load. ➔ Lower the real braking load. ➔ Review the selection of the braking resistor and increase the braking capability. Modification of related function codes data (F50, F51, and F52) may be also required.
(2) Specified deceleration time is too short. [Subcode: 0]	Recalculate the deceleration torque and time needed for the load currently applied, based on a moment of inertia for the load and the deceleration time. ➔ Increase the deceleration time (function codes F08, E11, E13, E15, and H56). ➔ Review the selection of the braking resistor and increase the braking capability. Modification of related function codes data (F50, F51, and F52) may be also required.
(3) Incorrect setting of function code data F50, F51, and F52. [Subcode: 0]	Recheck the modes of the braking resistor. If using a braking resistor (option) on a model (7.5 kW or lower) with built-in braking resistor, check whether the braking resistor electronic thermal overload relay setting been changed. ➔ Review data of function codes F50, F51, and F52, then modify them if required.

Note The inverter issues an overheat alarm of the braking resistor by monitoring the magnitude of the braking load, not by measuring its surface temperature.

When the braking resistor is used so frequently as to exceed the settings made by function codes F50, F51, and F52, therefore, the inverter issues an overheat alarm even if the surface temperature of the braking resistor does not rise. To obtain full performance of the braking resistor, configure function codes F50, F51, and F52 while actually measuring the surface temperature of the braking resistor.

[5] ECF EN circuit failure

Phenomenon: Enable circuit state was diagnosed and a circuit failure was detected.

Possible cause	Check and measures
(1) Control terminal block board contact defect	Confirm that the control terminal block board has been firmly mounted in the inverter. ➔ Alarm is released by turning on again.
(2) Enable circuit logic failure	Confirm that outputs from safety switch etc. are inputted by the same logic (High/High or Low/Low) with terminals [EN1] and [EN2]. Ensure that the 2 poles for the SW7 switch on the control board are both ON/ON or OFF/OFF. ➔ The alarm is cleared by pressing the RESET key, or by turning the power OFF and ON again.
(3) A failure (single failure) of enable circuit (safety stop circuit) was detected.	If the circuit failure is not removable by the procedures above, the inverter is out of order. ➔ Contact your Fuji Electric representative.

[6] ECL Customizable logic error

Phenomenon: A customizable logic setting error was detected.

Possible cause	Check and measures
(1) Setting of the selection of customizable logic operation was changed during operation.	Check whether the selection (Function code U00) of customizable logic operation is changed during operation. ➔ Do not change the selection of customizable logic operation during operation to prevent a danger.

[7] EF Ground fault protection

Phenomenon: Ground-fault current flowed from the inverter output terminals.

Possible cause	Check and measures
(1) Ground faults have occurred at the inverter output terminals.	• Disconnect the wiring from the output terminals (U, V, and W) and perform a Megger test. ➔ Remove the grounded parts (including replacement of the wires, relay terminals and motor). • If ground fault protection is displayed when the inverter is run with the wiring disconnected from the inverter output terminals (U, V, and W). ➔ The inverter may be faulty. Contact your Fuji Electric representative.

Note The purpose of this ground fault protection is to protect the inverter. If used to prevent accidents involving the human body, or to prevent fire, connect a separate earth leakage protective relay or earth leakage circuit breaker.

[8] Er1 Memory error

Phenomenon: Error occurred in writing the data to the memory in the inverter.

Possible cause	Check and measures
(1) When writing data (especially initializing or copying data), the inverter was shut down so that the voltage to the control PCB has dropped.	Initialize data by data initialization (H03), and check whether an alarm can be released by PRG/RESET key after finishing the initialization. ➔ Revert the initialized function code data to their previous settings, then restart the operation.
(2) The inverter was affected by strong electrical noise when writing data (especially initializing).	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). Also, perform the same check as described in (1) above. ➔ Implement noise control measures. Revert the initialized function code data to their previous settings, then restart the operation.
(3) The control PCB failed.	Initialize data by data initialization (H03), and check whether an alarm continues even when the release of the alarm is attempted by PRG/RESET key after finishing the initialization. ➔ The control PCB (on which the CPU is mounted) is defective. Contact your Fuji Electric representative.
(4) The power was cut and the control power supply dropped while saving user setting values with function code H193.	Save the user setting values with function code H193, and confirm whether the alarm persists even after canceling the alarm with the PRG/RESET key when saving is complete. ➔ The control PCB (on which the CPU is mounted) is defective. Contact your Fuji Electric representative.
(5) The inverter was affected by external noise while saving user setting values with function code H193.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). Also, perform the same check as described in (4) above. ➔ The control PCB (on which the CPU is mounted) is defective. Contact your Fuji Electric representative.

[9] Er2 Keypad communication error

Phenomenon: A communication error occurred between the keypad and the inverter.

Possible cause	Check and measures
(1) Broken communication cable or poor contact.	Check continuity of the cable, contacts and connections. ➔ Re-insert the connector firmly. ➔ Replace the cable.
(2) Connecting many control wires hinders the front cover from being mounted, lifting the keypad.	Check the mounting condition of the front cover. ➔ Reduce the wire size. (Recommended wire size (0.3 to 0.75 mm^2) ➔ Change the wiring layout inside the unit so that the front cover can be mounted firmly.
(3) The inverter was affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of communication cables and main circuit wires). ➔ Take noise countermeasures. For details, refer to Appendix A .
(4) A keypad fault occurred.	Replace the keypad with another one and check whether the Er2 error occurs. ➔ Replace the keypad.

[10] Er3 CPU error

Phenomenon: A CPU error (e.g. erratic CPU operation) occurred.

Possible cause	Check and measures
(1) The inverter was affected by strong electrical noise.	Check noise countermeasures (grounding condition, signal line and communication cable/main circuit wiring installation method, etc.) ➔ Implement noise control measures.

[11] Er4 Option communication error

Phenomenon: A communication error occurred between the option card and the inverter.

Possible cause	Check and measures
(1) There was a problem with the connection between the option card and the inverter.	Check whether the connector on the option card is properly engaged with that of the inverter. ➔ Reload the option card into the inverter.
(2) The inverter was affected by strong electrical noise.	Check noise countermeasures (grounding condition, signal line and communication cable/main circuit wiring installation method, etc.) ➔ Implement noise control measures.

[12] Er5 Option error

An error detected by the option card.
Refer to the instruction manual of the option card for details.

[13] Er6 Operation error

Phenomenon: An incorrect operation was attempted.

Possible cause	Check and measures
(1) STOP key was pressed when the STOP key is effective (function code H96=1, 3). [Subcode: 1]	Check whether STOP the key was pressed in a state that a run command is inputted via terminal block or communication. ➔ If this was not intended, check the setting of function code H96.
(2) The start check function was activated when function code H96 = 2 or 3. [Subcode: 2 to 6]	Check that any of the following operations has been performed with a run command being entered. • Power on • Release of alarm • Switching to link operation command ➔ Review the sequence, etc. to avoid input of a run command when this error occurs. If this was not intended, check the setting of function code H96. Turn the run command OFF before releasing the alarm.
(3) The forced stop (digital input terminal) STOP was turned OFF. [Subcode: 1]	Check that the forced stop “STOP” is turned off. ➔ If this was not intended, check the settings of function codes E01 to E09 for terminals [X1] to [X9].
(4) Brake check signal “BRKE” and brake signal “BRKS” mismatch [Subcode: 8]	Check whether the signal input to the X terminal to which the brake check signal “BRKE” is assigned matches the brake signal “BRKS” output from the Y terminal. • Check for a signal line break. • Check whether the logic is correct. • If there is an operation delay, check the function code H180 (brake signal) time.

[14] Er7 Tuning error

Phenomenon: Auto-tuning failed.

Possible cause	Check and measures
(1) A phase was missing in the connection between the inverter and the motor.	➔ Properly connect the motor to the inverter.
(2) V/f or the rated current of the motor was not properly set.	Check whether the data of function codes (F04*, F05*, H50, H51, H52, H53, H65, H66, P02*, P03*) agree with the motor modes.
(3) The wiring length between the inverter and the motor was too long.	Check whether the wiring length between the inverter and the motor exceeds 50 m. Inverters with a small capacity are greatly affected by the wiring length. ➔ Review, and if necessary, change the layout of the inverter and the motor to shorten the connection wire. Alternatively, minimize the wiring length without changing the layout. ➔ Disable both auto-tuning and auto-torque boost (set data of function code F37* to “1”).
(4) The rated capacity of the motor was significantly different from that of the inverter.	Check whether the rated capacity of the motor is three or more ranks lower, or two or more ranks higher than that of the inverter. ➔ Replace the inverter with one with an appropriate capacity. ➔ Set motor constants (function codes P06*, P07*, P08*) manually. ➔ Disable both auto-tuning and auto-torque boost (set data of function code F37* to “1”).
(5) The motor was a special type such as a high-speed motor.	➔ Disable both auto-tuning and auto-torque boost (set data of function code F37* to “1”).
(6) Tuning (function code P04*=2) operation was performed of rotating a motor in a state that brake is applied to the motor.	➔ Specify the tuning that does not involve the motor rotation (function code P04* = 1). ➔ Perform the tuning (function code P04*=2) with the motor brake released.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[15] Er8 RS-485 communication error (Communication port 1)/ ErP RS-485 communication error (Communication port 2)

Phenomenon: A communication error occurred during RS-485 communication.

Possible cause	Check and measures
(1) Communication conditions of the inverter do not match that of the host equipment.	Compare the settings of the function codes (y01 to y10, y11 to y20) with those of the host equipment. ➔ Correct any settings that differ.
(2) Even though no-response error detection time (functoin codes y08, y18) has been set, communication is not performed within the specified cycle.	Check the host equipment. ➔ Change the settings of host equipment software or disable the no-response error detection (function codes y08, y18 = 0).
(3) The host equipment did not operate due to defective software, settings, or defective hardware.	Check the host equipment (e.g., PLCs and personal computers). ➔ Remove the cause of the equipment error.
(4) The RS-485 converter did not operate due to incorrect connections and settings, or defective hardware.	Check the RS-485 converter (e.g., check for poor contact). ➔ Change the various RS-485 converter settings, reconnect the wires, or replace hardware with recommended devices as appropriate.
(5) Broken communication cable or poor contact.	Check the continuity of the cables, contacts and connections. ➔ Replace the cable.
(6) The inverter was affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of communication cables and main circuit wires). ➔ Take noise countermeasures. ➔ Take noise reduction measures at the host side. ➔ Replace the RS-485 converter with a recommended insulated one.
(7) Terminating resistor is not properly configured.	Check that the inverter serves as a terminating device in the network. ➔ Set terminal resistor select switches for RS-485 communication (SW2/SW6) correctly. In other words, turn the switch(es) to ON if required.

[16] Erd Step-out detection/detection failure of magnetic pole position at startup

Phenomenon: Synchronous motor step-out was detected. The magnetic pole position at startup failed to be detected.

Possible cause	Check and measures
(1) Function code settings do not agree with the motor characteristics.	Check whether function codes F04*, F05*, P01*, P02*, P03*, P60*, P61*, P62*, P63*, P64* agree with the motor constants. ➔ Perform auto-tuning.
(2) Magnetic pole position detection method is not appropriate.	Confirm that the magnetic pole position detection mode matches the motor type. ➔ Match the magnetic pole position detection mode selection (function code P30*) to the motor type.
(3) Starting frequency (continuation time) (function code F24) is insufficient.	Check whether a starting frequency (continuation time) (function code F24*) is set optimally, after setting the magnetic pole position detection mode selection (function code P30*) to “0” or “3.” ➔ Set a period of time during which motor can rotate by one or more revolutions. F24* ≥ P01*/2/F23* (P01*: Number of poles, F23*: Starting frequency)
(4) Starting torque is insufficient.	Check the data of acceleration times (function codes F07, E10, E12, E14) and a current command value on a start (function code P74*). ➔ Change the acceleration time to match the load. ➔ Increase the current command value at startup.
(5) Load is small.	Check the data of a reference current at starting (function code P74*). ➔ Decrease the reference current at starting. Set it to 80% or lower when running a motor single unit in a test run etc.
(6) A phase was missing in the connection between the inverter and the motor.	➔ Properly connect the motor to the inverter.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[17] ErC Magnetic pole position detection error

Phenomenon: When performing vector control with sensor (synchronous motors), an error occurred when performing synchronous motor magnetic pole position detection.

Possible cause	Check and measures
(1) The inverter settings are not appropriate.	Check whether the motor being used, the existence and type of the speed/magnetic pole position sensor, the control method (F42*) and feedback pulse input method (d14), and the feedback pulse count (d15) are consistent. ➔ Check the machine configuration (motor speed/magnetic pole position sensor type and specifications), and set F42*, d14, and d15 correctly. Ensure that the magnetic pole position detection method selection (P30*) has been set to either “0” or “3”, and that the magnetic pole position sensor offset (P95*) is not “999 (offset not adjusted)”. ➔ Set P95* correctly. (Auto tuning is also possible. 📖 See “4.7.2 [3] Synchronous motor tuning method”.)
(2) There is a problem with the speed/magnetic pole position sensor connection. (3) The motor rotation direction and sensor output do not match.	Check for speed/magnetic pole position sensor output wiring contact defects, and check the AB phase or UVW phase sequence. ➔ Connect the feedback input option card and speed/magnetic pole position sensor correctly. Check for motor wiring contact defects, and check the phase sequence. ➔ Connect the motor correctly to the inverter.
(4) There is a problem with the option card connection.	Check whether the connector on the option card is properly engaged with that of the inverter. ➔ Reinsert the option card into the inverter.
(5) The inverter was affected by strong electrical noise.	Check noise countermeasures (grounding condition, signal line and communication cable/main circuit wiring installation method, etc.) ➔ Take noise countermeasures.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[18] ErE Speed inconsistency / Excessive speed deviation

Phenomenon: An excessive deviation appears between the speed command and the detected speed.

Possible cause	Check and measures
(1) Incorrect setting of function code data.	Check the motor parameter “Number of poles” (P01*). ➔ Specify the P01* data in accordance with the motor to be used.
(2) Overload	Measure the inverter output current. ➔ Reduce the load.
	Check whether any mechanical brake is applied. ➔ Release the mechanical brake.
(3) The motor speed does not increase due to the current limiter operation.	Check the data of function code F44 (Current limiter (Level)). ➔ Change the F44 data correctly. Or, set the F43 data to “0” (Disable) if the current limiter operation is not needed.
	Check the data of the function codes (F04*, F05*, P01*-P12*) to see if V/f is set correctly. ➔ Match the V/f pattern setting with the motor ratings. ➔ Change the function code data in accordance with the motor parameters.
(4) Function code settings do not match the motor characteristics.	Confirm that P01*, P02*, P03*, P06*, P07*, P08*, P09*, P10*, P12* match the motor constants. ➔ Perform auto-tuning of the inverter, using the function code P04*.
(5) Wiring to the motor is incorrect.	Check the wiring to the motor. ➔ Connect the inverter output terminals U, V, and W to the motor input terminals U, V, and W, respectively.
(6) The motor speed does not increase due to the torque limiter operation.	Check the data of F40 (Torque limiter (Level)). ➔ Change the F40 data correctly. Or, set the F40 data to “999” (Disable) if the torque limiter operation is not needed.
(7) The wire between the pulse generator (PG) and the option card is broken or incorrect.	Check whether the pulse generator (PG) is correctly connected to the option card or any wire is broken. ➔ Check whether the PG is connected correctly. Or, tighten the related terminal screws. ➔ Check whether any contact part bites the wire sheath. ➔ Replace the wiring.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[19] ErF Data saving error during undervoltage

Phenomenon: The inverter failed to save data such as the frequency commands and PID commands (which are specified through the keypad), or the output frequencies modified by the UP/DOWN signal commands when the power was turned OFF.

Possible cause	Check and measures
(1) During data saving performed when the power was turned OFF, the voltage fed to the control PCB dropped in an abnormally short period due to the rapid discharge of the DC intermediate circuit.	Check how long it takes for the DC intermediate circuit voltage to drop to the preset voltage when the power is turned OFF. ➔ Remove whatever is causing the rapid discharge of the DC intermediate circuit voltage. After pressing the PRG/RESET key and releasing the alarm, return the data of the relevant function codes (such as the frequency commands and PID commands (specified with the keypad) or the output frequencies modified by the UP/DOWN signal commands) back to the original values and then restart the operation.
(2) The inverter operation was affected by strong electrical noise during data saving performed when the power was turned OFF.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). ➔ Take noise countermeasures. After pressing the PRG/RESET key and releasing the alarm, return the data of the relevant function codes (such as the frequency commands and PID commands (specified with the keypad) or the output frequencies modified by the UP/DOWN signal commands) back to the original values and then restart the operation.
(3) The control circuit failed.	Check if ErF occurs each time the power is turned ON. ➔ The control PCB (on which the CPU is mounted) is defective. Contact your Fuji Electric representative.

[20] ErH Hardware error

Phenomenon: The combination between PCBs is abnormal.

Possible cause	Check and measures
(1) Control PCB and power supply PCB combination abnormality	It is necessary to replace the control PCB or power supply PCB. ➔ Contact your Fuji Electric representative.
(2) Option PCB connection defect [Subcodes: 11, 12, 13]	Is the option PCB correctly connected to the connection port (A, B, or C) on the control board? ➔ A port connection defect [subcode 11] B port connection defect [subcode 12] C port connection defect [subcode 13]

[21] Erp Positioning control error

Phenomenon: Excessive position deviation occurred on servo lock / position control.

Possible cause	Check and measures
(1) Insufficient gain in positioning control system (servo lock)	Readjust the settings of J97 (Servo lock (Gain)) and d03 (Speed control 1 P (Gain)).
(2) Incorrect control completion width (servo lock)	Check whether the setting of J99 (Servo lock (Completion range)) is correct. ➔ Correct the setting of J99.
(3) Position deviation is excessive. (servo lock)	Check whether the excessive error detection level (d78) is set up properly.
(4) Position deviation is excessive. (position control)	The position feedback pulses are not received. ➔ Check whether the PG is connected correctly. Or, tighten the related terminal screws. ➔ Check whether any contact part bites the wire sheath. ➔ Replace the wiring / pulse generator.

[22] Err Simulated failure

Phenomenon: The LED displays the alarm err.

Possible cause	Check and measures
(1) Keep STOP key + FUNC DATA key pressed for five seconds or longer.	➔ To escape from this alarm state, press the PRG RESET key.
(2) Set function code H45 (simulation fault) to “1”.	

[23] FUS Blown fuse

Phenomenon: The fuse inside the inverter is blown.

Possible cause	Check and measures
(1) The fuse blew due to shorting of the inverter internal circuits.	Check whether excessive external surge or noise has occurred. ➔ Take surge and noise countermeasures. ➔ Consult your Fuji Electric representative for repair.

[24] FAL DC fan lock

Phenomenon: An inverter internal DC fan lock was detected.

Possible cause	Check and measures
(1) Inverter internal cooling fan error	Failure of the air circulation fan inside the inverter (200V series: 45 kW or higher, 400V series: 75 kW or higher) ➔ Replace the cooling fan.

[25] Lin Input phase loss

Phenomenon: Input phase loss occurred, or interphase voltage unbalance rate was large.

Possible cause	Check and measures
(1) Breaks in wiring to the main power input terminals.	Measure the input voltage. ➔ Repair or replace the main circuit power input wires or input devices (MCCB, MC, etc.).
(2) The screws on the main power input terminals are loosely tightened.	Check if the screws on the main power input terminals have become loose. ➔ Tighten the terminal screws to the recommended torque.
(3) Interphase voltage unbalance among three phases was too large.	Measure the input voltage. ➔ Connect an AC reactor (ACR) to lower the voltage unbalance between input phases. ➔ Increase the inverter capacity.
(4) Overload cyclically occurred.	Measure the ripple wave of the DC intermediate circuit voltage. ➔ If the ripple is large, increase the inverter capacity.
(5) Single-phase voltage was input to the three-phase input inverter.	Check the inverter type. ➔ Apply three-phase power.

Note The purpose of this function is to protect the inverter. Even with open phase input, if the motor load is light, the motor may continue to run without being detected.

The input phase loss protection can be disabled with the function code H98.

[26] LoPY Password protection

Phenomenon: The wrong user password was entered more than the prescribed number of times.

Possible cause	Check and measures
Phenomenon: User password 1 or 2 was entered incorrectly more than the prescribed number of times.	Clear the alarm. ➔ Turn OFF the inverter power, and then turn it back ON again. If you have forgotten your password: ➔ Contact the distributer or machine set manufacturer.

[27] LU Undervoltage

Phenomenon: DC intermediate circuit voltage has dropped below the undervoltage detection level.

Possible cause	Check and measures
(1) A momentary power failure occurred. [Subcode: 1] [Subcode: 3]	➔ Release the alarm. ➔ If you want to restart running the motor without treating this condition as an alarm, set F14 to “3,” “4,” or “5,” depending on the load type.
(2) The power to the inverter was switched back to ON too soon (when F14 = 1). [Subcode: 2]	Check if the power to the inverter was switched back to ON while the control power was still alive. Check whether the LEDs on the keypad are lit. ➔ Turn the power ON again after all LEDs on the keypad turn OFF.
(3) The power supply voltage did not reach the inverter's type correct range.	Measure the input voltage. ➔ Increase the voltage to within the specified range.
(4) Peripheral equipment for the power circuit malfunctioned, or the connection was incorrect.	Measure the input voltage to find which peripheral equipment malfunctioned or which connection is incorrect. ➔ Reconsider the power supply system configuration.
(5) Any other loads connected to the same power supply has required a large starting current, causing a temporary voltage drop.	Measure the input voltage and check the voltage fluctuation. ➔ Reconsider the power supply system configuration.
(6) Inverter's inrush current caused the power voltage drop because the power supply transformer capacity was insufficient.	Check if the alarm occurs when a molded case circuit breaker (MCCB), earth leakage circuit breaker (ELCB) (with overcurrent protection) or magnetic contactor (MC) is turned ON. ➔ Reconsider the capacity of the power supply transformer.

[28] nrb NTC wire break error

Phenomenon: A wire break was detected on the NTC thermistor detection circuit.

Possible cause	Check and measures
(1) The motor thermistor cable is broken.	Check whether the motor cable is broken. ➔ Replace the cable.
(2) The motor ambient temperature is low (30 °C or below).	Measure the surrounding temperature. ➔ Review the operating environment.
(3) The motor thermistor is damaged.	Measure the motor thermistor resistance. ➔ Replace the motor.

[29] 0Cn Instantaneous overcurrent

Phenomenon: The inverter momentary output current exceeded the overcurrent level.

0C1 Overcurrent occurred during acceleration.
0C2 Overcurrent occurred during deceleration.
0C3 Overcurrent occurred immediately or at a fixed time after starting operation or at

Possible cause	Check and measures
(1) The inverter output lines were short-circuited.	Disconnect the wiring from the inverter output terminals (U, V and W) and measure the interphase resistance of the motor wiring. Check if the resistance is too low. ➔ Remove the short-circuited part (including replacement of the wires, relay terminals and motor). If overcurrent is displayed when the inverter is run with the wiring disconnected from the inverter output terminals (U, V, and W). ➔ The inverter may be faulty. Contact your Fuji Electric representative.
(2) Ground faults have occurred at the inverter output lines.	Disconnect the wiring from the output terminals (U, V, and W) and perform a Megger test. ➔ Remove the grounded parts (including replacement of the wires, relay terminals and motor). If overcurrent is displayed when the inverter is run with the wiring disconnected from the inverter output terminals (U, V, and W). ➔ The inverter may be faulty. Contact your Fuji Electric representative.
(3) Overload	Measure the motor current with a measuring device to trace the current trend. Then, use this data to judge if the trend is over the calculated load value for your system design. ➔ If the load is too heavy, reduce it or increase the inverter capacity.
	Trace the current trend and check if there are any sudden changes in the current. ➔ If there are any sudden changes, make the load fluctuation smaller or increase the inverter capacity. ➔ Enable instantaneous overcurrent limiting (H12 = 1).
(4) Excessive torque boost specified. The manual torque boost is set if F37* = 0, 1, 3, or 4.	Check whether decreasing the torque boost (F09*) decreases the output current but does not stall the motor. ➔ If no stall occurs, decrease the torque boost (F09*).
(5) The specified acceleration/ deceleration time was too short.	Check that the motor generates enough torque required during acceleration/deceleration. That torque is calculated from the moment of inertia of the load and the acceleration/deceleration times. ➔ Increase the acceleration/deceleration times (F07, F08, E10 through E15, and H56). ➔ Enable the current limiter (F43) and torque limiter (F40, F41, E16, and E17). ➔ Increase the inverter capacity.
(6) Built-in braking transistor short circuit detection activates: (0.4 to 55 kW: 200V series) (0.4 to 75 kW: 400V series)	Check whether the braking resistor connection terminals (P+, DB) have shorted. Check whether the resistance of the connected braking resistance is excessively low. ➔ Connect an appropriate braking resistor.
(7) Malfunction caused by noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). ➔ Take noise countermeasures. For details, refer to Appendix A. ➔ Enable the retry function (H04). ➔ Connect a surge absorber to magnetic contactor's coils or other solenoids (if any) causing noise.

The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[30] 0H1 Cooling fin overheat

Phenomenon: Temperature around heat sink has risen abnormally.

Possible cause	Check and measures
(1) The surrounding temperature exceeded the inverter's mode limit.	Measure the surrounding temperature. ➔ Lower the temperature (e.g., ventilate the panel where the inverter is mounted).
(2) Ventilation paths are blocked.	Check if there is sufficient clearance around the inverter. ➔ Change the mounting place to ensure the clearance.
	Check if the fin is not clogged. ➔ Clean the fins.
(3) Cooling fan's airflow volume decreased due to the service life expired or failure.	Check the cumulative run time of the cooling fan. (See Chapter 3 “3.4.5 Reading maintenance information.”) ➔ Replace the cooling fan.
	Measure the inverter output current. ➔ Replace the cooling fan.
(4) Overload	Measure the inverter output current. ➔ Reduce the load. Reduce the load before reaching an overload using cooling fin overheat forecast (E01-E05)/overload forecast (E34). ➔ Decrease the motor sound (Carrier frequency (F26)). ➔ Enable overload prevention control (H70)。

[31] 0H2 External alarm

Phenomenon: External alarm was inputted (THR).
(when the “Enable external alarm” signal THR has been assigned to any of digital input terminals)

Possible cause	Check and measures
(1) An alarm function of external equipment was activated.	Check the operation of external equipment. ➔ Remove the cause of the alarm that occurred.
(2) Wrong connection or poor contact in external alarm signal wiring.	Check if the external alarm signal wiring is correctly connected to the terminal to which the “external alarm” has been assigned (Any of E01 to E09, E98, and E99 should be set to “9.”). ➔ Connect the external alarm signal wire correctly.
(3) Incorrect setting of function code data.	Check whether an “external alarm” is assigned to a terminal not used yet among E01 to E09, E98, E99. ➔ Correct the assignment.
	Check whether the logic of [THR] set up at E01 to E09, E98, E99 agrees with that (positive/negative) of external signals. ➔ Set the logic correctly.

[32] 0H3 Inverter internal overheat

Phenomenon: Temperature inside the inverter has exceeded the allowable limit.

Possible cause	Check and measures
(1) The surrounding temperature exceeded the inverter's mode limit. [Subcode: 0]	Measure the surrounding temperature. ➔ Lower the temperature around the inverter (e.g., ventilate the panel where the inverter is mounted).

[33] 0H4 Motor protection (PTC thermistor)

Phenomenon: Temperature of the motor has risen abnormally.

Possible cause	Check and measures
(1) The temperature around the motor exceeded the motor's mode range.	Measure the surrounding temperature. ➔ Lower the temperature around the motor.
(2) Cooling system for the motor is defective.	Check if the cooling system of the motor is operating normally. ➔ Repair or replace the cooling system of the motor.
(3) Overload	Measure the inverter output current. ➔ Reduce the load (e.g., Use the overload early warning (E34) and reduce the load before the overload protection is activated.) In winter, the load tends to increase. ➔ Lower the temperature around the motor. ➔ Increase the Carrier frequency (function code F26).
(4) The activation level (H27) of the PTC thermistor for motor overheat protection was set inadequately.	Check the PTC thermistor modes and recalculate the detection voltage. ➔ Modify the data of function code H27.
(5) The setting of the PTC/NTC thermistor is not adequate.	Check thermistor Mode selection (H26*) and the select switches (SW5) of terminal [V2]. ➔ Set an appropriate value for H26* for the thermistor being used, and set SW5 to the PTC/NTC side.
(6) Excessive torque boost specified (F09*)	Check whether decreasing the torque boost (F09*) does not stall the motor. ➔ If no stall occurs, decrease the F09* data.
(7) The V/f pattern did not match the motor.	Check if the base frequency (F04*) and the rated voltage at base frequency (F05*) match the rated values on the motor's nameplate. ➔ Match the function code data with the values on the motor's nameplate.
(8) Incorrect setting of function code data.	Although PTC/NTC thermistor is not used, the thermistor Mode selection (H26*) is set to the operation state. ➔ Set the H26* data to “0” (Disable).

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[34] 0H6 Charging resistor overheat

Phenomenon: Temperature of the charging resistor inside the inverter has risen abnormally.

Possible cause	Check and measures
(1) The inverter power is turned ON and OFF frequently.	Suppress the inverter power ON/OFF cycles. ➔ Turn ON and OFF the inverter power once or less per 30 min.
(2) The inverter power is not turned ON and OFF frequently.	Check that this alarm always occurs when the inverter power is turned ON. ➔ The charging circuit of the inverter is faulty. Consult your Fuji Electric representative for repair.

[35] 0Ln Motor overloads 1 to 4

Phenomenon: Electronic thermal function for motor overload detection of motors 1-4 worked.

0L 1 Motor 1 overload
0L2 Motor 2 overload
0L3 Motor 3 overload
0L4 Motor 4 overload

Possible cause	Check and measures
(1) The electronic thermal characteristics do not match the motor overload characteristics.	Check the motor characteristics. ➔ Review the data of related function codes P99*, F10*, F12*. ➔ Use an external thermal relay.
(2) Activation level for the electronic thermal protection was inadequate.	Check the continuous allowable current of the motor. ➔ Reconsider and change the data of function code F11*.
(3) The specified acceleration/ deceleration time was too short.	Recalculate the acceleration/deceleration torque and time needed for the load, based on the moment of inertia of the load and the acceleration/deceleration times. ➔ Increase the acceleration/deceleration times (F07, F08, E10 to E15, and H56).
(4) Overload	Measure the inverter output current. ➔ Reduce the load (e.g., Use the overload early warning (E34) and reduce the load before the overload protection is activated.) In winter, the load tends to increase.
(5) Excessive torque boost specified (F09*)	Check whether decreasing the torque boost (F09*) does not stall the motor. ➔ If no stall occurs, decrease the F09* data.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[36] 0LU Inverter overload

Phenomenon: Temperature inside inverter has risen abnormally.

Possible cause	Check and measures
(1) The surrounding temperature exceeded the inverter's mode limit.	Measure the surrounding temperature. ➔ Lower the temperature (e.g., ventilate the panel where the inverter is mounted).
(2) Excessive torque boost specified (F09*)	Check whether decreasing the torque boost (F09*) does not stall the motor. ➔ If no stall occurs, decrease the F09* data.
(3) The specified acceleration/ deceleration time was too short.	Recalculate the acceleration/deceleration torque and time needed for the load, based on the moment of inertia of the load and the acceleration/deceleration times. ➔ Increase the acceleration/deceleration times (F07, F08, E10 to E15, and H56).
(4) Overload	Measure the inverter output current. ➔ Reduce the load (e.g. Use the overload early warning (E34) and reduce the load before the overload protection is activated.) In winter, the load tends to increase. ➔ Decrease the Carrier frequency (function code F26). ➔ Enable overload prevention control (H70).。
(5) Ventilation paths are blocked.	Check if there is sufficient clearance around the inverter. ➔ Change the mounting place to ensure the clearance.
	Check if the fin is not clogged. ➔ Clean the fins.
(6) Cooling fan's airflow volume decreased due to the service life expired or failure.	Check the cumulative run time of the cooling fan. (See Chapter 3 “3.4.5 Reading maintenance information”.) ➔ Replace the cooling fan.
	Measure the inverter output current. ➔ Replace the cooling fan.
(7) The wires to the motor are too long, causing a large leakage current from them.	Measure the leakage current. ➔ Insert an output circuit filter (OFL).

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[37] 0PL Output phase-failure detection

Phenomenon: Output phase loss occurred.

Possible cause	Check and measures
(1) Inverter output wires are broken.	Measure the inverter output current. ➔ Replace the output wires.
(2) The motor winding is broken.	Measure the inverter output current. ➔ Replace the motor.
(3) The terminal screws for inverter output were not tight enough.	Check if any screws on the inverter output terminals have become loose. ➔ Tighten the terminal screws to the recommended torque.
(4) A single-phase motor has been connected.	➔ The inverter cannot be used. FRENIC-MEGA has been designed for driving three-phase induction motors and synchronous motors.

[38] 05 Overspeed protection

Phenomenon: Motor rotated at excessive speed (When motor speed ≥ (F03 x 1.2))

Possible cause	Check and measures
(1) Incorrect setting of function code data.	Check the motor parameter “Number of poles” (P01*). ➔ Specify the P01* data in accordance with the motor to be used.
	Check the maximum frequency setting (F03*). ➔ Specify the F03* data in accordance with the output frequency.
	Check the speed limiting function (d32, d33) setting. ➔ Disable the speed limiting function (d32, d33).
	Check the overspeed detection level (d35) setting. ➔ Set the overspeed detection level (d35) to 120%.
(2) The speed regulator gain is insufficient.	Check whether the speed has overshot when performing high-speed operation. ➔ Increase the speed regulator gain (d03*). (Depending on the situation, it may be necessary to change the filters or adjust the integral time.)
(3) Noise is superimposed on the PG signal.	Check the PG signal input monitor, and check noise countermeasures (grounding condition, signal line/main circuit wiring installation method, etc.) ➔ Take noise countermeasures. For details, refer to Appendix A.
(4) The output frequency and motor rotation speed exceeded 600 Hz.	If running the motor near 600 Hz, check whether the acceleration time is too short, whether there are any load fluctuations. and whether the speed regulator gain (d03*) and integral time (d04*) are appropriate. ➔ Reduce the operating frequency.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[39] 0Un Overvoltage

Phenomenon: The DC intermediate circuit voltage was over the detection level of overvoltage.

0U1 Overvoltage occurred during acceleration.
0U2 Overvoltage occurred during deceleration.
0U3 Overvoltage occurred during running at constant speed.

Possible cause	Check and measures
(1) The power supply voltage exceeded the inverter's mode range.	Measure the input voltage. ➔ Decrease the voltage to within the specified range. ➔ If the power supply voltage is within the specification range, the inverter may be faulty. Contact your Fuji Electric representative.
(2) A surge current entered the input power supply.	In the same power line, if a phase-advancing capacitor is turned ON/OFF or a thyristor converter is activated, a surge (momentary large increase in the voltage or current) may be caused in the input power. ➔ Install a DC reactor.
(3) The deceleration time was too short for the moment of inertia of the load.	Recalculate the deceleration torque based on the moment of inertia of the load and the deceleration time. ➔ Increase the deceleration time (F08, E11, E13, E15, and H56). ➔ Enable the anti-regenerative control (H69), or deceleration characteristics (H71). ➔ Set torque limit (F40, F41, E16, E17) to become effective. ➔ Set the rated voltage at base frequency (F05*) to “0” to improve the braking capability. ➔ Consider the use of a braking resistor.
(4) The acceleration time was too short.	Check if the overvoltage alarm occurs after rapid acceleration. ➔ Increase the acceleration time (F07, E10, E12, and E14). ➔ Select the Curve acceleration/ deceleration (H07). ➔ Consider the use of a braking resistor.
(5) Braking load is too heavy.	Compare the braking torque of the load with that of the inverter. ➔ Set the rated voltage at base frequency (F05*) to “0” to improve the braking capability. ➔ Consider the use of a braking resistor.
(6) A ground fault occurred at the output side.	If the motor runs normally with the wiring disconnected from the inverter output terminals (U, V, W). ➔ Check whether a ground fault has occurred at the output wiring or motor. If overvoltage is displayed when the inverter is run with the wiring disconnected from the inverter output terminals (U, V, and W). ➔The inverter may be faulty. Contact your Fuji Electric representative.
(7) Malfunction caused by noise.	Check if the DC intermediate circuit voltage was below the protective level when the overvoltage alarm occurred. ➔ Take noise countermeasures. For details, refer to Appendix A. ➔ Enable the retry function (H04). ➔ Connect a surge absorber to magnetic contactor's coils or other solenoids (if any) causing noise.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[40] PbF Charge circuit fault

Phenomenon: The magnetic contactor for short-circuiting the charging resistor failed to work.

Possible cause	Check and measures
(1) The charging circuit is faulty.	Inverter repair is necessary. ➔ Contact your Fuji Electric representative.

[41] PG PG wire break

Phenomenon: The pulse generator (PG) wire has been broken somewhere in the circuit.

Possible cause	Check and measures
(1) PG(Z phase) wire break under master-follower operation.	Check whether the pulse generator (PG) is correctly connected to the option card or any wire is broken. ➔ Check whether the PG is connected correctly. Or, tighten the related terminal screws. ➔ Check whether the coating is trapped in the connecting part. ➔ Replace the wire(s).
(2) The inverter was affected by strong electrical noise.	Check noise countermeasures (grounding condition, signal line and communication cable/main circuit wiring installation method, etc.) ➔ Take noise countermeasures. ➔ Keep the main circuit wiring and control circuit wiring as far apart as possible.

[42] dO Excessive positioning deviation

Phenomenon: The position deviation during position control was excessive.

Possible cause	Check and measures
(1) Encoder wire break	Check whether an encoder wire break has occurred.
(2) Encoder rotation direction (wiring phase sequence), motor rotation direction (inverter output wiring phase sequence) mismatch	Connect and set so that all directions match. Review the setting values for d14 to d17 and H190.
(3) The deviation overflow setting value is too small.	Review the setting values for d223 and d224. Increase the setting value if too small.
(4) The position control gain is too small.	Review the setting values for d203 and d204. Increase the setting value if too small.
(5) The speed control gain is too small.	Review the setting values for d03 (A45, b45, r45). Increase the setting value if too small.
(6) Torque limiting has been applied.	If torque limiting is triggered, it will not be possible to perform position control or speed control correctly. Take the following countermeasures to prevent torque limiting being applied. · Reduce the load. · Review the acceleration/deceleration time. · Review the machine configuration such as the reduction ratio and motor capacity to reduce the load.

6.4 If a Light Alarm Code is Displayed

6.4.1 Light alarm code list

It is possible to display a light alarm cause code while the inverter continues to run, and output a light alarm signal from the Y terminal. To display the light alarm, select with function codes H81, H82, or H83. (See Chapter 5 “FUNCTION CODES”.)

If outputting light alarm signals from the Y terminal, set 98 “L-ALM” for the function codes corresponding to E20 to E24.

Table 6.4-1 Light alarm code list

Light alarm code	Light alarm name	Mode selection Function code	Setting method	Ref. page
CnT	Machine life (Number of startups)	H82 Bit 13	Refer to Chapter 5 “FUNCTION CODES” - “5.4.5 H codes”.	6-24
iGb	IGBT lifetime alarm	H83 Bit 13		
L iF	Lifetime alarm	H82 Bit 7		
OH	Cooling fin overheat early warning	H82 Bit 6		
OL	Motor overload early warning	H82 Bit 5		
P id	PID alarm output	H82 Bit 9		
PrC	PTC thermistor activated	H82 Bit 11		
rAF	Cooling capability drop	H83 Bit 14		
rEF	Reference loss	H82 Bit 8		
rrE	Machine life (Cumulative motor running hours)	H82 Bit 12		
UrL	Low torque detection	H82 Bit 10		

6.4.2 Light alarm cause and check

[1] CnT Machine life (Number of startups)

Possible cause	Check and measures
(1) Inverter life (Number of startups)	This is displayed when the number of times that the motor is started reaches the number of times set with function code H79 (maintenance setting startup count). Furthermore, the current startup count can be checked at function code H44 (startup count), and therefore the H44 data should be set to “0000” to reset the count.

[2] iGb IGBT lifetime alarm

Possible cause	Check and measures
(1) IGBT power cycle life	The element temperature power cycle life for the main circuit semiconductor IGBT due to frequent acceleration and deceleration stoppages is estimated, and this is displayed before the design life is reached.

[3] L iF Lifetime alarm

Possible cause	Check and measures
(1) Lifetime alarm	It is judged that the service life of any one of the capacitors (DC link bus capacitors or electrolytic capacitors on PCBs), the cooling fan, or the IGBT has expired.

[4] 0H Cooling fin overheat early warning

Possible cause	Check and measures
(1) Cooling fin overheat early warning	This is displayed as a warning before cooling fin overheating trip 0H1 occurs. Refer to "[30] 0H1 Cooling fin overheat" for details on countermeasures.

[5] 0L Motor overload early warning

Possible cause	Check and measures
(1) Motor overload early warning	This is displayed as a warning before the motor overload 0L1 alarm occurs. Set the current at which this is triggered at overload warning operation level (E34). Check whether the actual motor current is greater than the current set at E34.

[6] P1d PID alarm output

Possible cause	Check and measures
(1) P1d alarm output	This is displayed if a P1d control warning (absolute value warning, deviation warning) occurs. Refer to "Function codes" J11 to J13 (PID control warning output selection) in Chapter 5 for details.

[7] PTC PTC thermistor activated

Possible cause	Check and measures
(1) Thermistor detection (PTC)	This warning is displayed when the temperature detected with the motor PTC thermistor exceeds the operation level (H27) threshold value. Refer to "[33] 0H4 Motor protection (PTC thermistor)" for details on countermeasures.

[8] rAF Cooling capability drop

Possible cause	Check and measures
(1) Cooling capability drop	Drops in cooling capability due to the clogging of cooling fins with dust, etc., or drops in cooling fan air flow are detected and displayed. Clean the cooling fins or replace the cooling fan as necessary.

Note Depending on the usage conditions, cooling fin overheating protection 0H1 may occur first. By using cooling fin overheating early warning 0H, an overheating early warning can be detected before cooling fin overheating protection 0H1 occurs.

[9] rEF Reference loss

Possible cause	Check and measures
(1) Command loss	If the analog frequency setting (terminals [12], [C1], [V2]) command drops rapidly to 10% or lower, a wire break is determined, and "rEF" is displayed. Check the wiring.

[10] rTE Machine life (Cumulative motor running hours)

Possible cause	Check and measures
(1) Inverter life (Cumulative run time)	This is displayed when the motor cumulative running time reaches the time set with function code H78 (maintenance setting time). The motor cumulative running time can be checked at H94* (motor cumulative running time). Furthermore, the time can be reset by setting the H94* value to "0".

[11] UrL Low torque detection

Possible cause	Check and measures
(1) Low torque detection	This is displayed when the output torque drops to the low torque detection level (E80) or below, and persists for the timer (E81) time or longer.

6.5 Other Errors

6.5.1 Abnormal motor operation

[1] The motor does not rotate

Possible cause	Check and measures
(1) The main power supply is not being input correctly.	Check the input voltage and interphase voltage unbalance. ➔ Switch on the molded-case circuit breaker, an earth-leakage circuit breaker (with overcurrent protective function) or a magnetic contactor. ➔ Check for voltage drop, phase loss, poor connections, or poor contacts, and fix them if necessary. ➔ If only the auxiliary control power input is supplied, also supply the main power to the inverter.
(2) No forward/reverse operation command was inputted, or both the commands were inputted simultaneously (external signal operation).	Check the input status of the forward/reverse command with Menu “I/O Checking” using the keypad. ➔ Input a run command. ➔ Set either the forward or reverse operation command to OFF. ➔ Correct the run command source. Set F02 data to “1.” ➔ Correct the assignment error of terminals [FWD], [REV]. (E98, E99) ➔ Connect the external circuit wires to control circuit terminals [FWD] and [REV] correctly. ➔ Make sure that the sink/source slide switch (SW1) on the control printed circuit board (control PCB) is properly configured.
(3) No rotational direction is instructed. (Keypad operation)	Check the forward/reverse rotation direction command with Menu “I/O Checking” using the keypad. ➔ Input the rotation direction (F02 = 0), or select the keypad operation with which the rotation direction is fixed (F02 = 2 or 3).
(4) The inverter could not accept any run commands from the keypad since it was in Programming mode.	Check which operation mode the inverter is in using the keypad. ➔ Shift the operation mode to Running mode and enter a run command.
(5) A run command with higher priority than the one attempted was active, and the run command was stopped.	Based on the run command block diagram (See Chapter 8), check a higher priority run command by function code data check and I/O checking from Menu using the keypad. ➔ Correct any incorrect function code data settings such as link function (Mode selection) (H30) and bus link function (Mode selection) (y98) or cancel the higher priority run command.
(6) No analog frequency command input.	Check that a reference frequency has been entered correctly, using Menu “I/O Checking” on the keypad. ➔ Connect external circuit wirings of terminals [13], [12], [11], [C1], and [C2] correctly. ➔ If using terminal [V2], check the terminal [V2] function select switch (SW5) select switch, and the thermistor (operation selection) (H26) setting.

Possible cause	Check and measures
(7) The reference frequency was below the starting or stop frequency.	Check that a reference frequency has been entered correctly, using Menu “I/O Checking” on the keypad. ➔ Set the reference frequency at the same or higher value than that of the starting and stop frequencies (F23* and F25*). ➔ Reconsider the starting and stop frequencies (F23* and F25*), and if necessary, change them to lower values. ➔ Inspect the external frequency command potentiometers, signal converters, switches, and relay contacts. Replace any ones that are faulty. ➔ Connect external circuit wirings of terminals [13], [12], [11], [C1], and [C2] correctly.
(8) A frequency command with higher priority than the one attempted was active.	Based on the frequency setting block diagram (See Chapter 8 “BLOCK DIAGRAMS FOR CONTROL LOGIC”), check the data by function code data check and I/O checking from Menu using the keypad. ➔ Correct any incorrect function code data (e.g. cancel the higher priority run command).
(9) The upper and lower frequencies for the frequency limiters were set incorrectly.	Check the data of function codes F15 (Frequency limiter (High)) and F16 (Frequency limiter (Low)). ➔ Change the settings of F15 and F16 to the correct ones.
(10) The coast-to-stop command was effective.	Check the data of the function codes (E01 to E09, E98, E99), and check the input state by using “I/O Checking” from the Menu on the keypad. ➔ Release the coast-to-stop command setting.
(11) Broken wires, incorrect connection or poor contact with the motor.	Check the wiring (Measure the output current). ➔ Repair the wires to the motor, or replace them.
(12) Overload	Measure the inverter output current. ➔ Reduce the load (In winter, the load tends to increase.)
	Check whether any mechanical brake is applied. ➔ Release the mechanical brake.
(13) Torque generated by the motor was insufficient.	Check that the motor starts running if the value of the torque boost (F09*) is increased. ➔ Increase the value of torque boost (F09*).
	Check the data of function codes (F04*, F05*, H50, H51, H52, H53, H65, and H66). ➔ Change the V/f pattern to match the motor's characteristics.
	Check that the motor switching signal (selecting motor 1 - 4) is correct and the data of function codes matches each motor. ➔ Correct the motor switching signal. ➔ Modify the function code data to match the connected motor.
	Check whether the reference frequency is below the slip frequency of the motor. ➔ Change the reference frequency so that it becomes higher than the slip frequency of the motor.
(14) Wrong connection or poor contact of DC reactor.	Check the wiring. A DC reactor must be connected for HND specification inverters and inverters of 75 kW or higher. ➔ Connect the DCR correctly. Repair or replace DCR wires.

🕮 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[2] The motor rotates, but the speed does not increase

Possible cause	Check and measures
(1) The maximum frequency currently specified was too low.	Check the data of function code F03* (Maximum frequency). ➔ Correct the F03* data.
(2) The data of frequency limiter (Upper limit) currently specified was too low.	Check the data of function code F15 (Frequency limiter (Upper limit)). ➔ Correct the F15 data.
(3) The reference frequency is too low.	Check that the reference frequency has been entered properly using Menu “I/O Checking” on the keypad. ➔ Increase the reference frequency. ➔ Inspect the external frequency command potentiometers, signal converters, switches, and relay contacts. Replace any ones that are faulty. ➔ Connect external circuit wirings of terminals [13], [12], [11], [C1], and [C2] correctly.
(4) A frequency command (e.g., multi-frequency or via communication) with higher priority than the one attempted was active and its reference frequency was too low.	Based on the frequency setting block diagram (See Chapter 8), check the function code data from the Menu using the keypad, and perform an I/O check to check the input frequency command. ➔ Correct any incorrect data of function codes (e.g. cancel the higher priority frequency command).
(5) The acceleration time was too long or too short.	Check the data of acceleration times (F07, E10, E12, E14). ➔ Change the acceleration time to match the load.
(6) Overload	Measure the inverter output current. ➔ Reduce the load.
	Check whether any mechanical brake is applied. ➔ Release the mechanical brake.
(7) Function code settings do not agree with the motor characteristics.	When automatic torque boost and automatic energy-saving operations are performed, confirm that P02*, P03*, P06*, P07*, P08* agree with motor constants. ➔ Perform auto-tuning of the inverter for every motor to be used.
(8) The output frequency does not increase due to the current limiter operation.	Make sure that F43 (Current limiter (Mode selection)) is set to “2” and check the data of F44 (Current limiter (Level)). ➔ Change the F44 data correctly. Or, set the F43 data to “0” (Disable) if the current limiter operation is not needed.
	Decrease the value of torque boost (F09*), then run the motor again and check if the speed increases. ➔ If no stall occurs, decrease the F09* data.
	Check the data of function codes (F04*, F05*, H50, H51, H52, H53, H65, and H66) to ensure that the V/f pattern setting is right. ➔ Match the V/f pattern setting with the motor ratings.
(9) The output frequency does not increase due to the torque limiter operation.	Check whether the data of torque control levels (F40, F41, E16, E17) are set to appropriate values. Also, check whether torque limit 2/1 switching signal [TL2/TL1] is correct. ➔ Correct the data of F40, F41, E16 and E17 or reset them to the factory defaults. ➔ Set the TL2/TL1 correctly.

(10) Bias and gain incorrectly specified.	Check the data of function codes (F18, C50, C32, C34, C37, C39, C42, and C44). ➔ Readjust the bias and gain to appropriate values.
(11) When performing vector control with speed sensor, the motor rotates slowly, and is unable to run at the specified speed.	Check whether the encoder wiring and rotation direction, and motor wiring and rotation direction match the function code settings. ➔ Wire the encoder and motor correctly, and set the correct rotation direction.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[3] The motor runs in the opposite direction to the command

Possible cause	Check and measures
(1) Wiring to the motor is incorrect.	Check the wiring to the motor. ➔ Connect terminals U, V, and W of the inverter to the U, V, and W terminals of the motor, respectively.
(2) Incorrect connection and settings for run commands and rotation direction commands (FWD and REV).	Check the data of function codes (E98 and E99) and the connection. ➔ Correct the data of the function codes and the connection.
(3) A run command (with fixed rotational direction) from the keypad is active, but the rotational direction setting is incorrect.	Check the data of function code F02 (Operation method). ➔ Change the data of function code F02 to “2: / Keypad operation (forward rotation)” or “3: / Keypad operation (Reverse rotation)”.
(4) The rotation direction mode of the motor is opposite to that of the inverter.	The rotation direction of IEC-compliant motors is opposite to that of non-compliant motors. ➔ Switch the FWD/REV signal setting.
(5) The function code data related to the speed command are incorrect.	Check the function code data. See Chapter 8 “BLOCK DIAGRAMS FOR CONTROL LOGIC.” ➔ Set correct data.

[4] Speed fluctuation or current oscillation (e.g., hunting) occurs during running at constant speed

Possible cause	Check and measures
(1) The frequency setting is fluctuating.	Check the signals for the frequency command with Menu “I/O Checking” using the keypad. ➔ Increase the filter constants (C33, C38, and C43) in the frequency settings.
(2) An external frequency command potentiometer is used for frequency setting.	Check that there is no noise in the control signal wires from external sources. ➔ Keep the main circuit wiring and control circuit wiring as far apart as possible. ➔ Use shielded or twisted wires for control signals.
	Check whether the external frequency command potentiometer is malfunctioning due to noise from the inverter. ➔ Connect a capacitor to the output terminal of the potentiometer or insert a ferrite core on the signal wire. (See Chapter 2.)
(3) Frequency switching or multi-frequency command was enabled.	Check whether the relay signal for switching the frequency command is chattering. ➔ If the relay contact is defective, replace the relay.
(4) The wiring length between the inverter and the motor is too long.	Check whether auto-torque boost, auto-energy saving operation, or dynamic torque vector control is enabled. ➔Perform auto-tuning of the inverter for every motor to be used. ➔ Disable the automatic control systems by setting F37* to “1” (Constant torque load) and F42* to “0” (V/f control), then check that the motor vibration stops. ➔ Make the output wires as short as possible.
(5) The machinery is hunting due to vibration caused by low rigidity of the load. Or the current is irregularly oscillating due to special motor parameters.	After disabling all the automatic control systems such as auto torque boost, auto energy saving operation, overload prevention control, current limiter, torque limiter, anti-regenerative control, auto search for idling motor speed, slip compensation, dynamic torque vector control, droop control, overload stop function, speed control, online tuning, notch filter, and observer, check that the motor vibration disappears. ➔ Disable the functions causing the vibration. ➔ Readjust the output current fluctuation damping gain (H80*). ➔ Readjust the speed control system. (d01* to d06*)
	Check that the motor vibration is suppressed if you decrease the value of F26 (Motor sound (Carrier frequency)) or set F27 (Motor sound (Tone)) to “0.” ➔ Decrease the carrier frequency (F26) or set the tone to “0” (F27 = 0).

🕮 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[5] Unpleasant noises are emitted from motor or noises fluctuate

Possible cause	Check and measures
(1) The specified carrier frequency is too low.	Check the data of motor operation noise (Carrier frequency) (F26) and motor operation noise (Tone) (F27). ➔ Increase the carrier frequency (F26). ➔ Correct the F27 data.
(2) Ambient temperature of inverter is high. (In the selection of carrier frequency automatic reduction function (H98))	Measure the temperature inside the panel where the inverter is mounted. ➔ If it is over 40 °C, lower it by improving the ventilation. ➔ Reduce the load to lower the inverter temperature (for fans or pumps, decrease the frequency limiter upper limit (F15)). Note) By canceling H98, alarm 0H1, 0H3, or OLU may occur.
(3) Resonance with the load.	Check the machinery mounting accuracy or check whether there is resonance with the mounting base. ➔ Sort out the resonance cause by running the motor independently. ➔ Avoid continuous running at the frequency range where the resonance occurs by setting the jump frequency (C01-C04) ➔ Set speed control (notch filter) (d07*, d08*) and observer (d18, d19, d20) to suppress vibrations. (Depending on the load characteristics, this may not be effective.)

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[6] Motor is not accelerated or decelerated according to set-up acceleration or deceleration times

Possible cause	Check and measures
(1) The inverter runs the motor with S-curve or curvilinear pattern.	Check the data of function code H07 (Curve acceleration/ deceleration). ➔ Set linear acceleration/deceleration. (H07=0) ➔ Shorten the acceleration/deceleration times (F07, F08, E10 through E15).
(2) The current limiting operation prevented the output frequency from increasing (during acceleration).	Make sure that F43 (Current limiter (Mode selection)) is set to 2, then check that the setting of F44 (Current limiter (Level)) is reasonable. ➔ Readjust the setting of F44 to appropriate value, or disable the function of current limiter with F43. ➔ Increase the acceleration/deceleration times (F07, F08, E10 through E15).
(3) The anti-regenerative control is enabled (during deceleration).	Check the data of function code H69 (Anti-regenerative control (Mode selection)). ➔ Increase the deceleration time (F08, E11, E13, and E15).
(4) Overload	Measure the inverter output current. ➔ Reduce the load. For fans or pumps, decrease the frequency limiter Upper limit (F15). In winter, the load tends to increase. In winter, the load tends to increase.
(5) Torque generated by the motor was insufficient.	Check that the motor starts running if the value of the torque boost (F09*) is increased. ➔ Increase the value of the torque boost (F09*).
(6) An external frequency command potentiometer is used for frequency setting.	Check that there is no noise in the control signal wires from external sources. ➔ Keep the main circuit wiring and control circuit wiring as far apart as possible. ➔ Use shielded or twisted wires for control signals. ➔ Connect a capacitor to the output terminal of the potentiometer or insert a ferrite core on the signal wire. (See Chapter 2.)
(7) The output frequency is limited by the torque limiter.	Check whether the data of torque control levels (F40, F41, E16, E17) are set to appropriate values. Also, check whether torque limit 2/1 switching signal [TL2/TL1] is correct. ➔ Correct the data of F40, F41, E16 and E17 or reset them to the factory defaults. ➔ Set the TL2/TL1 correctly. ➔ Increase the acceleration/deceleration times (F07, F08, E10 through E15).
(8) The specified acceleration or deceleration time was incorrect.	Check the terminal commands RT1 and RT2 for acceleration/ deceleration times. ➔ Correct the RT1 and RT2 settings.

The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[7] The motor does not restart even after the power recovers from a momentary power failure

Possible cause	Check and measures
(1) The data of function code F14 is either “0,” “1,” or “2.”	Check if an undervoltage trip ⟨ U ⟩ occurs. ➔ Change the data of function code F14 (Restart mode after momentary power failure (Mode selection)) to “3,” “4,” or “5.”
(2) The run command remains OFF even after the power has been restored.	Check the input status with Menu “I/O Checking” using the keypad. (See Chapter 3 “3.4.4 Checking I/O signal status”.) ➔ Check the power recovery sequence with an external circuit. If necessary, consider the use of a relay that can keep the run command ON.
	In a 3-wire operation, momentary power failure duration is long so that control circuit power source of inverter is shut off once. Therefore, “select 3-wire operation” signal [HLD] is switched OFF once. ➔ Change the design or the setting so that a run command can be issued again within 2 seconds after the power has been restored.

[8] Motor generates heat abnormally

Possible cause	Check and measures
(1) Excessive torque boost specified.	Check whether decreasing the torque boost (F09*) decreases the output current but does not stall the motor. ➔ If no stall occurs, decrease the torque boost (F09*).
(2) Continuous running in extremely slow speed.	Check the running speed of the inverter. ➔ Change the speed setting or replace the motor with a motor exclusively designed for inverters.
(3) Overload	Measure the inverter output current. ➔ Reduce the load. In the case of fans/pumps, lower the setting value of F15 (Frequency limiter (Upper limit)). In winter, the load tends to increase.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

[9] The motor does not run as expected

Possible cause	Check and measures
(1) Incorrect setting of function code data.	Check that function codes are correctly configured and no unnecessary configuration has been done. ➔ Configure all the function codes correctly.
	Make a note of function code data currently configured and then initialize all function code data using H03. ➔ After the above process, reconfigure function codes one by one, checking the running status of the motor.

[10] Motor stalls during acceleration

Possible cause	Check and measures
(1) The acceleration time was too short.	Check the data of acceleration time (F07, E10, E12, E14, H57, H58). ➔ Extend the acceleration time.
(2) Moment of inertia of load is large.	Measure the inverter output current. ➔ Reduce the moment of inertia of the load. ➔ Increase the inverter capacity.
(3) Voltage drop of wiring is large.	Check the terminal voltage of motor. ➔ Increase the diameter or shorten the distance of wirings between the inverter and motor.
(4) Load torque of load is large.	Measure the inverter output current. ➔ Reduce the load torque of load. ➔ Increase the inverter capacity.
(5) Torque generated by the motor was insufficient.	Check whether the motor starts when torque boost (F09*, F37*, H51) is increased. ➔ Increase F09, F37, and H51.

📖 The explanations for function codes with an asterisk (*) are limited to motor 1. If using motor 2 to 4, replace with the relevant function codes in Chapter 5 "Table 5.x-xx Function codes to be switched".

6.5.2 Problems with inverter settings

[1] Nothing appears on the keypad

Possible cause	Check and measures
(1) No power (neither main power nor auxiliary control power) is supplied to the inverter.	Check the input voltage and interphase voltage unbalance. ➔ Switch on the molded-case circuit breaker, an earth-leakage circuit breaker (with overcurrent protective function) or a magnetic contactor. ➔ Check for voltage drop, phase loss, poor connections, or poor contacts and fix them if necessary.
(2) The power for the control PCB did not reach a sufficiently high level.	Check if the shorting bar has been removed between terminals P1 and P(+) or if there is a poor contact between the shorting bar and those terminals. ➔ Mount a shorting bar or a DC reactor between terminals P1 and P(+). In case of poor contact, tighten the screws.
(3) The keypad was not properly connected to the inverter.	Check whether the keypad is properly connected to the inverter. ➔ Remove and then reattach the keypad. ➔ Replace the keypad with another one and check whether the problem recurs.
	When running the inverter remotely, ensure that the extension cable is securely connected both to the keypad and to the inverter. ➔ Disconnect the cable, reconnect it, and see whether the problem recurs. ➔ Replace the keypad with another one and check whether the problem recurs.

[2] The desired menu is not displayed

Possible cause	Check and measures
(1) The menu display mode is not selected appropriately.	Check the data of function code E52 (keypad (Menu display mode)). ➔ Change the E52 data so that the desired menu appears.

[3] Display of under bars (_ _ _ _)

Phenomenon: Although (FWD) key, run forward command [FWD], or (REV) key, run reverse command [REV], was pressed, the motor did not rotate and under bars were displayed.

Possible cause	Check and measures
(1) The voltage of the DC intermediate circuit was low.	Select 5_01 from menu item 5 "Maintenance Information" in keypad program mode. (Three-phase 200 V: 200 VDC or less, three-phase 400 V: 400 VDC or less) ➔ Connect the inverter to a power supply that meets its voltage supply range.
(2) The main power is not ON, while the auxiliary input power to the control circuit is supplied.	Check whether the main power is turned ON. ➔ Turn on the main power. Check if the shorting bar has been removed between terminals P1 and P(+) or if there is a poor contact between the shorting bar and those terminals. ➔ Mount a shorting bar or a DC reactor between terminals P1 and P(+). In case of poor contact, tighten the screws.
(3) AC power source is not connected due to the connection of DC power supply, but the detection of main power interruption is activated (H72=1).	Check the connection to the main power and check if the H72 data is set to “1” (factory default). ➔ Review the data of H72.
(4) Breaks in wiring to the main power input terminals.	Measure the input voltage. ➔ Repair or replace the main circuit power input wires or input devices (MCCB, MC, etc.).

[4] Display of center bars (- - - -)

Phenomenon: A center bar (- - - -) appeared on the LED monitor.

Possible cause	Check and measures
(1) When PID control had been disabled (J01 = 0), E43 (LED Monitor (Item selection)) is set to 10 or 12. PID control has been disabled (J01 = 0) when the LED monitor had been set to display the PID command or PID feedback amount by pressing the FUNC DATA key.	Make sure that when you wish to view other monitor items, E43 is not set to “10: PID command” or “12: PID feedback value.” ➔ Set E43 to a value other than “10” or “12.” Make sure that when you wish to view a PID command or a PID feedback value, J01 (PID control) is not set to “0: Disable.” ➔ Set J01 to “1: Enable (Process control normal operation),” “2: Enable (Process control inverse operation),” or “3: Enable (Dancer control).”
(2) The keypad was poorly connected.	Prior check: Even when FUNC DATA key is pressed, the display is not switched. Check continuity of the extension cable used in remote operation. ➔ Replace the cable.

[5] [ ] Display of parenthesis

Phenomenon: [ ] was displayed during speed monitoring by keypad.

Possible cause	Check and measures
(1) The display data overflows the LED monitor.	Check whether the product of the output frequency and the display coefficient (E50) exceeds 99,999. ➔ Review the data of E50.

[6] Data of function codes cannot be changed

Possible cause	Check and measures
1) An attempt was made to change function code data that cannot be changed when the inverter is running.	Check if the inverter is running with Menu “Drive Monitoring” using the keypad and then confirm whether the data of the function codes can be changed when the motor is running by referring to the function code tables. ➔ Stop operation, and then change the function code data.
(2) The data of the function codes is protected.	Check the data of function code F00 (Data protection). ➔ Change the data of F00 from a data protection state (F00=1 or 3) to a data changeable state (F00=0 or 2).
(3) The WE-KP terminal command (“Enable data change with keypad”) is not entered, though it has been assigned to a digital input terminal.	Check the data of the function codes (E01 to E09, E98, E99), and check the input state by using “I/O Checking” from the Menu on the keypad. ➔ Input a WE-KP command through a digital input terminal.
(4) The FUNC DATA key was not pressed.	Check whether the FUNC DATA key was pressed after changing the function code data. ➔ Press the FUNC DATA key after changing data. Ensure that “saue” is displayed.
(5) The data of the function codes F02, E01-E05, E98, E99 are not changeable.	Either one of the FWD and REV terminal commands is turned ON. ➔ Turn OFF both FWD and REV.
(6) The function code(s) to be changed does not appear.	If Menu #0 “Quick Setup” (0.Func) is selected, only the particular function codes appear. ➔ Call the menu of 1.F_ _ to 1.y_ _ by pressing ▲ key from the quick setup (0.Func) state on the Menu to display the intended function code and to change the value. (See Chapter 3, section 3.4 “Table 3.4-1 Menus available in programming mode” for details.)

[7] Function code data are not changeable (change from link functions)

Possible cause	Check and measures
1) An attempt was made to change function code data that cannot be changed when the inverter is running.	Check if the inverter is running with Menu “Drive Monitoring” using the keypad and then confirm whether the data of the function codes can be changed when the motor is running by referring to the function code tables. ➔ Stop operation, and then change the function code data.
(2) The data of the function code F02 is not changeable.	Either one of the FWD and REV terminal commands is turned ON. ➔ Turn OFF both FWD and REV.

[8] En.OFF appears

Phenomenon: Even when keys and FWD/REV signals are input, the motor did not rotate, and En.OFF was displayed.

Possible cause	Check and measures
(1) EN terminals are OFF.	Check whether terminals [EN1] and [EN2] are ON. ➔ Turn those terminals ON. (1) When the EN terminal function is not used: Check whether the 2 poles on the SW7 switch on the control board are both ON (factory default). (2) To enable the EN terminal function: Check whether the safety relay EMERGENCY STOP button is open (OFF) (turn terminals [EN1] and [EN2] ON). ➔ When the FWD/REV signals are ON, turn them OFF and then ON again. En.OFF will disappear, and the inverter will be ready to run.