Chapter 6 TROUBLESHOOTING

6.1 Before Proceeding with Troubleshooting

⚠WARNING

If any of the protective functions have been activated, first remove the cause. Then, after checking that the all run commands are set to off, reset the alarm. Note that if the alarm is reset while any run commands are set to on, the inverter may supply the power to the motor which may cause the motor to rotate.

Injury may occur.

- Even though the inverter has interrupted power to the motor, if the voltage is applied to the main circuit power input terminals L1/R, L2/S and L3/T, voltage may be output to inverter output terminals U, V, and W.
- Turn OFF the power and wait more than five minutes for models of 30HP for 208V, 40HP for 460V or below, or ten minutes for models of 40HP for 208V, 50HP for 460V or above. Make sure that the LED monitor and charging lamp (on models of 40HP for 208V, 50HP for 460V or above) are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P (+) and N (-) has dropped below the safe voltage (+25 VDC).

Electric shock may occur.

Follow the procedure below to solve problems.

(1) First, check that the inverter is correctly wired, referring to Chapter 2 Section 2.3.6 "Wiring for main circuit terminals and grounding terminals."

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

- No alarm code appears on the LED monitor
  - Abnormal motor operation → Go to Section 6.2.1
    - [1] The motor does not rotate.
    - [2] The motor rotates, but the speed does not increase.
    - [3] The motor runs in the opposite direction to the command.
    - [4] If the speed variation and current vibration (such as hunting) occur at the constant speed
    - [5] If grating sound can be heard
    - [6] The motor does not accelerate and decelerate at the set time.
    - [7] Even if the power recovers after an instantaneous power failure, the motor does not restart.
  - Problems with inverter settings → Go to Section 6.2.2
    - [1] Nothing appears on the LED monitor.
    - [2] The desired menu is not displayed.
    - [3] Data of function codes cannot be changed
- If an alarm code appears on the LED monitor → Go to Section 6.3
- If an abnormal pattern appears on the LED monitor while no alarm code is displayed → Go to Section 6.4

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

6.2 If No Alarm Code Appears on the LED Monitor

6.2.1 Motor is running abnormally

[1] The motor does not rotate.

Possible Causes	What to Check and Suggested Measures
(1) No power supplied to the inverter.	Check the input voltage, output voltage and interphase voltage unbalance. ➔ Turn ON a molded case circuit breaker, a ground fault circuit interrupter (with overcurrent protection) or a magnetic contactor. ➔ Check for voltage drop, phase loss, poor connections, or poor contacts, and fix them if necessary. ➔ If only auxiliary control power is supplied, turn ON the main power.
(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 #4 "I/O Checking" using the keypad. ➔ Input a run command. ➔ Set either the forward or reverse operation command to off if both commands are being inputted. ➔ Correct the assignment of commands (FWD) and (REV) to function codes E98 and E99. ➔ Connect the external circuit wires to control circuit terminals [FWD] and [REV] correctly. ➔ Make sure that the sink/source slide switch on the printed circuit board is properly configured.
(3) No indication of rotation direction (keypad operation).	Check the input status of the forward/reverse rotation direction command with Menu #4 "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.	While referring to the block diagram of the drive command generator*, check the higher priority run command with Menu #2 "Data Checking" and Menu #4 "I/O Checking" using the keypad. *Refer to the FRENIC-Eco User's Manual, Chapter 4. ➔ Correct any incorrect function code data settings (in H30, y98, etc.) or cancel the higher priority run command.
(6) The frequency command was set below the starting or stop frequency.	Check that a frequency command has been entered, with Menu #4 "I/O Checking" using the keypad. ➔ Set the value of the frequency command to the same or higher than that of the starting or stop frequency (F23 or F25). ➔ Reconsider the starting and stop frequencies (F23 and F25), and if necessary, change them to lower values. ➔ Inspect the frequency command, signal converters, switches, or relay contacts. Replace any ones that are faulty. ➔ Connect the external circuit wires correctly to terminals [13], [12], [11], [C1], and [V2].
(7) A frequency command with higher priority than the one attempted was active.	Check the higher priority run command with Menu #2 "Data Checking" and Menu #4 "I/O Checking" using the keypad, referring to the block diagram of the drive command generator*. *Refer to the FRENIC-Eco User's Manual, Chapter 4. ➔ Correct any incorrect function code data settings (e.g. cancel the higher priority run command).
(8) 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.

Possible Causes	What to Check and Suggested Measures
(9) The coast-to-stop command was effective.	Check the data of function codes E01, E02, E03, E04, E05, E98 and E99 and the input signal status with Menu #4 "I/O Checking" using the keypad. ➔ Release the coast-to-stop command setting.
(10) Broken wire, incorrect connection or poor contact with the motor.	Check the cabling and wiring (Measure the output current). ➔ Repair the wires to the motor, or replace them.
(11) Overload	Measure the output current. ➔ Lighten the load (In winter, the load tends to increase.)
	Check that a mechanical brake is in effect. ➔ Release the mechanical brake, if any.
(12) Torque generated by the motor was insufficient.	Check that the motor starts running if the value of torque boost (F09) is increased. ➔ Increase the value of torque boost (F09) and try to run the motor.
	Check the data of function codes F04, F05, H50, and H51. ➔ Change the V/f pattern to match the motor's characteristics.
	Check whether the frequency command signal is below the slip-compensated frequency of the motor. ➔ Change the frequency command signal so that it becomes higher than the slip-compensated frequency of the motor.
(13) Miss-/weak-connection of the DC reactor (DCR)	Check the wiring connection. A DC reactor is equipped for 75HP for 208V, 100HP for 460V or above models. FRENIC-Eco inverter cannot run without a DC rector. ➔ Connect the DC reactor correctly. Repair or replace wires for the DC reactor.

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

Possible Causes	What to Check and Suggested Measures
(1) The maximum frequency currently specified was too low.	Check the data of function code F03 (Maximum frequency). ➔ Readjust the data of F03.
(2) The data of frequency limiter currently specified was too low.	Check the data of function code F15 (Frequency limiter (high)). ➔ Readjust the data of F15.
(3) The reference frequency currently specified was too low.	Check the signals for the frequency command from the control circuit terminals with Menu #4 "I/O Checking" on the keypad. ➔ Increase frequency of the command. ➔ If an external potentiometer for frequency command, signal converter, switches, or relay contacts are malfunctioning, replace them. ➔ Connect the external circuit wires to terminals [13], [12], [11], [C1], and [V2] correctly.
(4) A frequency command (e.g., multistep frequency or via communications) with higher priority than the one expected was active and its reference frequency was too low.	Check the data of the relevant function codes and what frequency commands are being received, through Menu #1 "Data Setting," Menu #2 "Data Checking" and Menu #4 "I/O Checking," on the keypad by referring to the block diagram of the frequency command*. *Refer to the FRENIC-Eco User's Manual, Chapter 4. ➔ Correct any incorrect data of function code (e.g. The higher priority run command is mistakenly canceled, etc.).
(5) The acceleration time was too long.	Check the data of function code F07 (Acceleration time 1) ➔ Change the acceleration/deceleration time to match the load.

Possible Causes	What to Check and Suggested Measures
(6) Overload	Measure the output current. ➔ Lighten the load. (Adjust the damper of the fan or the value of the pump). (In winter, the load tend to increase.)
	Check if mechanical brake is working. ➔ Release the mechanical brake.
(7) Mismatch with the characteristics of the motor	In case auto-torque boost or auto-energy saving operation is under way, check whether P02, P03, P06, P07, and P08 agree with the parameters of the motor. ➔ Set P02, P03, and P06 properly and perform auto-tuning in accordance with P04.
(8) The current limiting operation did not increase the output frequency.	Make sure that F43 (Current limiter (mode selection)) is set to "2" and check the setting of F44 (Current limiter (level)). ➔ If the current limiting operation is not needed, set F43 to "0" (disabled).
	Decrease the value of torque boost (F09), then turn the power OFF and back on again and check if the speed increases. ➔ Adjust the value of the torque boost (F09).
	Check the data of function codes F04, F05, H50, and H51 to ensure that the V/f pattern is right. ➔ Match the V/f pattern values with the motor ratings.
(9) Bias and grain set incorrectly.	Check the data of function codes F18, C50, C32, C34, C37, C39, C42, and C44. ➔ Readjust the bias and gain to appropriate values.

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

Possible Causes	What to Check and Suggested Measures
(1) Wiring has been connected to the motor incorrectly.	Check the wiring to the motor. ➔ Connect terminals U, V, and W of the inverter to the respective U, V, and W terminals of the motor.
(2) Incorrect connection and settings for run commands and rotation direction command (FWD) and (REV)	Check the data of function codes E98 and E99 and the connection to terminals [FWD] and [REV]. ➔ Correct the data of the function codes and the connection.
(3) The setting for the rotation direction via keypad operation is incorrect.	Check the data of function code F02 (Run command). ➔ Change the data of function code F02 to "2: Enable FWD / STOP keys on keypad (forward)" or "3: Enable REV / STOP keys on keypad (reverse)."

[4] If the speed variation and current vibration (such as hunting) occur at the constant speed

Possible Causes	What to Check and Suggested Measures
(1) The frequency command fluctuated.	Check the signals for the frequency command with Menu #4 "I/O Checking" using the keypad. ➔ Increase the filter constants (C33, C38, and C43) for the frequency command.

Possible Causes	What to Check and Suggested Measures
(2) The external frequency command source device was used.	Check that there is no noise in the control signal wires from external sources. ➔ Isolate the control signal wires from the main circuit wires as far as possible. ➔ Use shielded or twisted wires for the control signal.
	Check whether the frequency command source has not failed because of noise from the inverter. ➔ Connect a capacitor to the output terminal of the frequency command source or insert a ferrite core in the signal wire. (Refer to Chapter 2 Section 2.3.7 "Wiring for control circuit terminals.")
(3) Frequency switching or multistep frequency command was enabled.	Check whether the relay signal for switching the frequency command is chattering. ➔ If the relay has a contact problem, replace the relay.
(4) The connection between the inverter and the motor was too long.	Check whether auto-torque boost or auto-energy saving operation is enabled. ➔ Set P02, P03, and P06 properly and perform auto-tuning in accordance with P04. ➔ Enable load selection for higher startup torque (F37 = 1) and check for any vibration. ➔ Make the output wire as short as possible.
(5) The inverter output is hunting due to vibration caused by low stiffness of the load. Or the current is irregularly oscillating due to special motor parameters.	Cancel the automatic control system--automatic torque boost and energy saving operation (F37), overload prevention control (H70), and current limiter (F43), then check that the motor vibration is suppressed. ➔ Cancel the functions causing the vibration. ➔ Readjust the data of the oscillation suppression gain (H80) currently set to appropriate values.
	Check that the motor vibration is suppressed if you decrease the level 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).

[5] If grating sound can be heard from motor

Possible Causes	What to Check and Suggested Measures
(1) The carrier frequency was set too low.	Check the data of function codes F26 (Motor sound (carrier frequency)) and F27 (Motor sound (tone)). ➔ Increase the carrier frequency (F26). ➔ Readjust the setting of F27 to appropriate value.
(2) The ambient temperature of the inverter was too high (when automatic lowering of the carrier frequency was enabled by H98).	Measure the temperature inside the enclosure of the inverter. ➔ If it is over 40℃(104°F), lower it by improving the ventilation. ➔ Lower the temperature of the inverter by reducing the load. (In the case of a fan or a pump, lower the setting data of the frequency limiter (F15).) **Note:** If you disable H98, an *OH1*, *OH3* or *OLU* alarm may occur.
(3) Resonance with the load	Check the precision of the mounting of the load or check whether there is resonance with the enclosure or likes. ➔ Disconnect the motor and run it without the inverter, and determine where the resonance comes from. Upon locating the cause, improve the characteristics of the source of the resonance. ➔ Adjust the settings of C01 (Jump frequency 1) to C04 (Jump frequency (band)) so as to avoid continuous running in the frequency range causing resonance.

[6] The motor does not accelerate and decelerate at the set time.

Possible Causes	What to Check and Suggested Measures
(1) The inverter ran the motor by S-curve or curvilinear pattern.	Check the data of function code H07 (Acceleration/deceleration pattern). ➔ Select the linear pattern (H07 = 0). ➔ Shorten the acceleration/deceleration time (F07, F08).
(2) The current limiting prevented the output frequency from increasing (during acceleration).	Make sure that F43 (Current limiter (mode selection)) is set to "2: Enable during acceleration and at constant speed," 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 in F43. ➔ Increase the acceleration/deceleration time (F07/F08).
(3) The automatic regenerative braking was active.	Check the data of function code H69 (Automatic deceleration). ➔ Increase the deceleration time (F08).
(4) Overload	Measure the output current. ➔ Lighten the load (In the case of a fan or a pump load, lower the setting data of the F15 (Frequency limiter (high)). (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 is being used.	Check that there is no noise in the external signal wires. ➔ Isolate the control signal wires from the main circuit wires as far as possible. ➔ Use shielded wire or twisted wire for the control signal wires. ➔ Connect a capacitor to the output terminal of the frequency command or insert a ferrite core in the signal wire. (Refer to Chapter 2 Section 2.3.7 "Wiring for control circuit terminals.")
(7) The V2/PTC switch was turned to PTC (when V2 was being used).	Check whether control terminal [V2] is not set to the PTC thermistor input mode. ➔ Turn the V2/PTC switch on the printed circuit board to V2.

[7] Even if the power recovers after a momentary power failure, the motor does not restart.

Possible Causes	What to Check and Suggested Measures
(1) The data of function code F14 is either 0 or 1.	Check if an undervoltage trip 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 stayed off even after power has been restored.	Check the input signal with Menu #4 "I/O Checking" using the keypad. ➔ Check the power recovery sequence with an external circuit. If necessary, consider the use of a relay that can keep the run command on.
	While in 3-wire operation, the power source to the inverter's control circuit went down because of a long momentary power failure; or, the (HOLD) signal was turned OFF once. ➔ Change the design or the setting so that a run command can be issued again within 2 seconds after power has been restored.

6.2.2 Problems with inverter settings

[1] Nothing appears on the LED monitor.

Possible Causes	What to Check and Suggested Measures
(1) No power supplied to the inverter (main circuit power, auxiliary power for control circuit).	Check the input voltage, output voltage and interphase voltage unbalance. ➔ Connect a molded case circuit breaker, a ground fault circuit interrupter (with overcurrent protection) 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 circuit did not reach a high enough level.	Check if the short bar has been removed between terminals P1 and P (+) or if there is poor contact between the short bar and the terminals. ➔ Connect the short bar or DC reactor between terminals P1 and P (+) or retighten the screws.
(3) The keypad was not properly connected to the inverter.	Check whether the keypad is properly connected to the inverter. ➔ Remove the keypad, put it back, and see whether the problem persists. ➔ Replace the keypad with another one and check whether the problem persists.
	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 persists. ➔ Replace the keypad with another one and check whether the problem persists.

[2] The desired menu is not displayed.

Causes	Check and Measures
(1) The limiting menus function was not selected appropriately.	Check the data of function code E52 (Keypad (menu display mode)). ➔ Change the data of function code E52 so that the desired menu can be displayed.

[3] Data of function codes cannot be changed

Possible Causes	What to Check and Suggested 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 #3 "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 the motor then change the data of the function codes.
(2) The data of the function codes is protected.	Check the data of function code F00 (Data protection). ➔ Change the setting of F00 from "1" to "0."
(3) The WE-KP command ("Enable editing of function code data from keypad") is not input though it has been assigned to a digital input terminal.	Check the data of function codes E01, E02, E03, E04, E05, E98 and E99 and the input signals with Menu #4 "I/O Checking" using the keypad. ➔ Change the setting of F00 from "1" to "0," or input a WE-KP command through a digital input terminal.
(4) The (FUNC/DATA) key was not pressed.	Check whether you have pressed the (FUNC/DATA) key after changing the function code data. ➔ Press the (FUNC/DATA) key after changing the function code data.
(5) The setting data of function code F02 could not be changed.	The inputs to the terminals of (FWD) and (REV) commands are concurrently turned ON. ➔ Turn OFF both (FWD) and (REV).

6.3 If an Alarm Code Appears on the LED Monitor

■ Quick reference table of alarm codes

Alarm code	Name	Refer to	Alarm code	Name	Refer to
OC1	Instantaneous overcurrent	6-8	FUS	Fuse blown	6-13
OC2			PbF	Charger circuit fault	6-13
OC3			OL1	Electronic thermal overload relay	6-14
EF	Ground fault	6-9	OLU	Overload	6-14
OU1	Overvoltage	6-9	Er1	Memory error	6-15
OU2			Er2	Keypad communications error	6-15
OU3			Er3	CPU error	6-15
LU	Undervoltage	6-10	Er4	Option card communications error	6-16
Lin	Input phase loss	6-10	Er5	Option card error	6-16
OPL	Output phase loss	6-11	Er6	Incorrect operation error	6-16
OH1	Heat sink overheat	6-11	Er7	Tuning error	6-17
OH2	Alarm issued by an external device	6-12	Er8	RS-485 communications error	6-17
OH3	Inside of the inverter overheat	6-12	ErF	Data saving error during undervoltage	6-18
OH4	Motor protection (PTC thermistor)	6-12	ErP	RS-485 communications error (Option card)	6-18
			ErH	LSI error (Power PCB)	6-19

[1] OCn Instantaneous overcurrent

Problem The inverter momentary output current exceeded the overcurrent level.

- OC1 Overcurrent occurred during acceleration.
- OC2 Overcurrent occurred during deceleration.
- OC3 Overcurrent occurred when running at a constant speed.

Possible Causes	What to Check and Suggested Measures
(1) The inverter output terminals were short-circuited.	Remove the wires connected to the inverter output terminals (U, V, and W) and measure the interphase resistance of the wires. Check if the resistance is too low. ➔ Remove the part that short-circuited (including replacement of the wires, relay terminals and motor).
(2) Ground faults occurred at the inverter output terminals.	Remove the wires connected to the inverter output terminals (U, V, and W) and perform a Megger test. ➔ Remove the part that short-circuited (including replacement of the wires, relay terminals and motor).
(3) Loads were too heavy.	Measure the motor current with a measuring device, and to trace the current trend. Therefore, use this information to judge if the trend is over the calculated load value for your system design. ➔ If the load is too heavy, decrease it or raise 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 variation smaller or raise the inverter capacity. ➔ Enable instantaneous overcurrent limiting (H12 = 1).

Possible Causes	What to Check and Suggested Measures
(4) The value set for torque boost (F09) was too large. (F37 = 0, 1, 3, or 4)	Check that the output current decreases and the motor does not come to stall if you set a lower value than the current one for F09. ➔ Lower the value for torque boost (F09) if the motor is not going to stall.
(5) The 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 for the load and the acceleration/deceleration time. ➔ Increase the acceleration/deceleration time (F07 and F08). ➔ Enable current limitig (F43). ➔ Raise the inverter capacity.
(6) Malfunction caused by noise	Check if noise control measures are appropriate (e.g., correct grounding and routing of control and main circuit wires). ➔ Implement noise control measures. For details, refer to "Appendix A" of the FRENIC-Eco User's Manual. ➔ Enable the auto-resetting (H04). ➔ Connect a surge absorber to the coil or solenoid of the magnetic contactor causing the noise.

[2] EF Ground fault (125 HP or above)

Problem A ground fault current flew from the output terminal of the inverter.

Possible Causes	What to Check and Suggested Measures
(1) The output terminal of the inverter is short-circuited to the ground (ground fault, or earthed).	Disconnect the wires from the output terminals ([U], [V], and [W]) and perform a megger test. ➔ Remove the earthed path (including the replacement of the wires, the terminals, or the motor as necessary).

[3] OUn Overvoltage

Problem The DC link bus voltage was over the detection level of overvoltage.

OU1 Overvoltage occurs during the acceleration.

OU2 Overvoltage occurs during the deceleration.

OU3 Overvoltage occurs during running at constant speed.

Possible Causes	What to Check and Suggested Measures
(1) The power supply voltage was over the range of the inverter's specifications.	Measure the input voltage. ➔ Decrease the voltage to within that of the specifications.
(2) A surge current entered the input power source.	If within the same power source a phase-advancing capacitor is turned ON or OFF or a thyristor converter is activated, a surge (temporary precipitous rise in 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 for load.	Recalculate the deceleration torque from the moment of inertia for load and the deceleration time. ➔ Increase the deceleration time (F08). ➔ Enable the regenerative braking (H69 = 3), or automatic deceleration (H71 = 1). ➔ Set the rated voltage (at base frequency) (F05) to "0" to improve braking ability.
(4) The acceleration time was too short.	Check if the overvoltage alarm occurs after rapid acceleration. ➔ Increase the acceleration time (F07). ➔ Select the S-curve pattern (H07).

Possible Causes	What to Check and Suggested Measures
(5) Braking load was 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 braking ability.
(6) Malfunction caused by noise.	Check if the DC link bus voltage was below the protective level when the alarm occurred. ➔ Improve noise control. For details, refer to "Appendix A" of the FRENIC-Eco User's Manual. ➔ Enable the auto-resetting (H04). ➔ Connect a surge absorber to the coil or solenoid of the magnetic contactor causing the noise.

[4] LU Undervoltage

Problem DC link bus voltage was below the undervoltage detection level.

Possible Causes	What to Check and Suggested Measures
(1) A momentary power failure occurred.	➔ Reset the alarm. ➔ If you want to restart running the motor by not treating this condition as an alarm, set F14 to "3," "4" or "5," depending on the load.
(2) The power to the inverter was switched back on too soon (with F14 = 1).	Check if the power to the inverter was switched back on although its control circuit was still operating. ➔ Switch ON the power again after the display on the keypad has disappeared.
(3) The power supply voltage did not reach the range of the inverter's specifications.	Measure the input voltage. ➔ Increase the voltage to within that of the specifications.
(4) Peripheral equipment for the power circuit malfunctioned, or the connection was incorrect.	Measure the input voltage to find where the peripheral equipment malfunctioned or which connection is incorrect. ➔ Replace any faulty peripheral equipment, or correct any incorrect connections.
(5) Other loads were connected to the same power source and required a large current to start running to the extent that it caused a temporary voltage drop on the supply side.	Measure the input voltage and check the voltage variation. ➔ Reconsider the power system configuration.
(6) Inverter's inrush current caused the power voltage drop because power transformer capacity was insufficient.	Check if the alarm occurs when you switch on a molded case circuit breaker, a ground fault circuit interrupter (with overcurrent protection) or a magnetic contactor. ➔Reconsider the capacity of the power source transformer.

[5] Lin Input phase loss

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

Possible Causes	What to Check and Suggested Measures
(1) Main circuit power input wires broken.	Measure the input voltage. ➔ Repair or replace the wires.
(2) The terminal screws for the main circuit power input of the inverter were not tight enough.	Check if the screws on the inverter input terminals have become loose. ➔ Tighten the terminal screws to the recommended torque.

Possible Causes	What to Check and Suggested Measures
(3) Interphase unbalance rate of three-phase voltage was too large.	Measure the input voltage. ➔ Connect an AC reactor (ACR) to lower the voltage unbalance between input phases. ➔ Raise the inverter capacity.
(4) Overload cyclically occurred.	Measure ripple wave of DC link bus voltage. ➔ If the ripple is large, raise the inverter capacity
(5) Single-phase voltage was input to the inverter instead of three-phase voltage input.	Check the inverter type. ➔ Apply three-phase power. FRENIC-Eco cannot be driven by single-phase power source.

Note You can disable input phase loss protection using the function code H98.

[6] OPL Output phase loss

Problem Output phase loss occurred.

Possible Causes	What to Check and Suggested Measures
(1) Inverter output wires are broken.	Measure the output current. ➔ Replace the output wires.
(2) Wires for motor winding are broken.	Measure the 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.	➔ Single-phase motors cannot be used. Note that the FRENIC-Eco only drives three-phase induction motors.

[7] OH / Heat sink overheat

Problem Temperature around heat sink rose.

Possible Causes	What to Check and Suggested Measures
(1) Temperature around the inverter exceeded that of inverter specifications.	Measure the temperature around the inverter. ➔ Lower the temperature around the inverter (e.g., ventilate the enclosure well).
(2) Air vent is blocked.	Check if there is sufficient clearance around the inverter. ➔ Increase the clearance.
	Check if the heat sink is not clogged. ➔ Clean the heat sink.
(3) Accumulated running time of the cooling fan exceeded the standard period for replacement, or the cooling fan malfunctioned.	Check the cumulative running time of the cooling fan. Refer to Chapter 3, Section 3.4.6 "Reading maintenance information – "MAINTENANC"." ➔ Replace the cooling fan.
	Visually check whether the cooling fan rotates abnormally. ➔ Replace the cooling fan.
(4) Load was too heavy.	Measure the output current. ➔ Lighten the load (e.g. lighten the load before the overload protection occurs using the overload early warning (E34). (In winter, the load tends to increase.) ➔ Decease the motor sound (carrier frequency) (F26). ➔ Enable the overload protection control (H70).

Note The 208V inverters with a capacity of 50HP or above and the 460V inverters with a capacity of 75HP or above each have a cooling fan/fans for heat sinks and a DC fan for internal air circulation (dispersing the heat generated inside the inverter). For their locations, refer to Chapter 1, Section 1.2 “External View and Terminal Blocks.”

[8] OH2 Alarm issued by an external device

Problem External alarm was inputted (THR).
(in case external alarm (THR) is assigned to one of digital input terminals [X1] through [X5], [FWD], or [REV])

Possible Causes	What to Check and Suggested Measures
(1) An alarm function of the external equipment was activated.	Inspect external equipment operation. ➔ Remove the cause of the alarm that occurred.
(2) Connection has been performed incorrectly.	Check if the wire for the external alarm signal is correctly connected to the terminal to which the "Alarm from external equipment" has been assigned (Any of E01, E02, E03, E04, E05, E98, and E99 is set to "9."). ➔ Connect the wire for the alarm signal correctly.
(3) Incorrect settings.	Check if the "Alarm from external equipment" has not been assigned to an unassigned terminal assigned (E01, E02, E03, E04, E05, E98, or E99). ➔ Correct the assignment.
	Check whether the assignment (normal/negative logic) of the external signal agrees with that of thermal command (THR) set by E01, E02, E03, E04, E05, E98, and E99. ➔ Ensure that the polarity matches.

[9] OH3 Inside of the inverter overheat

Problem The temperature inside the inverter exceeded the allowable limit.

Possible Causes	What to Check and Suggested Measures
(1) The ambient temperature exceeded the allowable limit specified for the inverter.	Measure the ambient temperature. ➔ Lower the ambient temperature by improving the ventilation.

[10] OH4 Motor protection (PTC thermistor)

Problem Temperature of the motor rose abnormally.

Possible Causes	What to Check and Suggested Measures
(1) Temperature around the motor exceeded that of motor specifications.	Measure the temperature around the motor. ➔ Lower the temperature.
(2) Cooling system for the motor malfunctioned.	Check if the cooling system of the motor is operating normally. ➔ Repair or replace the cooling system of the motor.
(3) Load was too heavy.	Measure the output current. ➔ Lighten the load (e.g., lighten the load before overload occurs using the overload early warning (E34) function) (In winter, the load tends to increase.). ➔ Lower the temperature around the motor. ➔ Increase the motor sound (carrier frequency) (F26).

Possible Causes	What to Check and Suggested Measures
(4) The set activation level (H27) of the PTC thermistor for motor overheat protection was inadequate.	Check the thermistor specifications and recalculate the detection voltage. ➔ Reconsider the data of function code H27.
(5) A PTC thermistor and pull-up resistor were connected incorrectly or the resistance was inadequate.	Check the connection and the resistance of the pull-up resistor. ➔ Correct the connections and replace the resistor with one with an appropriate resistance.
(6) The value set for the torque boost (F09) was too high.	Check the data of function code F09 and readjust the data so that the motor does not stall even if you set the data to a lower value. ➔ Readjust the data of the function code F09.
(7) The V/f pattern did not match the motor.	Check if the base frequency (F04) and rated voltage at base frequency (F05) match the values on the nameplate on the motor. ➔ Match the function code data to the values on the nameplate of the motor.
(8) Wrong settings	Although no PTC thermistor is used, the V2/PTC switch is turned to PTC, which means that the thermistor input is active on the PTC (H26). ➔ Set H26 (PTC thermistor Input) to "0" (inactive).

[11] FUS Fuse blown (125HP or above)

Problem The fuse inside the inverter blew.

Possible Causes	What to Check and Suggested Measures
(1) The fuse blew because of a short-circuiting inside the inverter.	Check whether there has been any excess surge or noise coming from outside. ➔ Take measures against surges and noise. ➔ Have the inverter repaired.

[12] PbF Charger circuit fault
(50HP or above (208 V), 75HP or above (460 V))

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

Possible Causes	What to Check and Suggested Measures
(1) Control power was not supplied to the magnetic contactor intended for short-circuiting the charging resistor.	Check whether, in normal connection of the main circuit (not connection via the DC link bus), the connector (CN) on the power supply printed circuit board is not inserted to NC. ➔ Insert the connector to FAN.
	Check whether you have quickly turned the circuit breaker ON and OFF to confirm safety after cabling/wiring. ➔ Wait until the DC link bus voltage has dropped to a sufficiently low level and then reset the current alarm, and turn ON the power again. (Do not turn the circuit breaker ON and OFF quickly.) (Turning ON the circuit breaker supplies power to the control circuit to the operation level (lighting LEDs on the keypad) in a short period. Immediately turning it OFF even retains the control circuit power for a time, while it shuts down the power to the magnetic contactor intended for short-circuiting the charging resistor since the contactor is directly powered from the main power. Under such conditions, the control circuit can issue a turn-on command to the magnetic contactor, but the contactor not powered can produce nothing. This state is regarded as abnormal, causing an alarm.)

[13] OL / Electronic thermal overload relay

Problem Electronic thermal function for motor overload detection was activated.

Possible Causes	What to Check and Suggested Measures
(1) The characteristics of electronic thermal did not match those of the motor overload.	Check the motor characteristics. ➔ Reconsider the data of function codes P99, F10 and F12. ➔ Use an external thermal relay.
(2) Activation level for the electronic thermal relay was inadequate.	Check the continuous allowable current of the motor. ➔ Reconsider and change the data of function code F11.
(3) The acceleration/ deceleration time was too short.	Check that the motor generates enough torque for acceleration/ deceleration. This torque is calculated from the moment of inertia for the load and the acceleration/ deceleration time. ➔ Increase the acceleration/ deceleration time (F07 and F08).
(4) Load was too heavy.	Measure the output current. ➔ Lighten the load (e.g., lighten the load before overload occurs using the overload early warning (E34)). (In winter, the load tends to increase.)

[14] OLU Overload

Problem Temperature inside inverter rose abnormally.

Possible Causes	What to Check and Suggested Measures
(1) Temperature around the inverter exceeded that of inverter specifications.	Measure the temperature around the inverter. ➔ Lower the temperature (e.g., ventilate the enclosure well).
(2) The torque boost setting (F09) was too high.	Check the setting of F09 (torque boost) and make sure that lowering it would not cause the motor to stall. ➔ Adjust the setting of F09.
(3) The acceleration/ deceleration time was too short.	Recalculate the required acceleration/deceleration torque and time from the moment of inertia for the load and the deceleration time. ➔ Increase the acceleration/deceleration time (F07 and F08).
(4) Load was too heavy.	Measure the output current. ➔ Lighten the load (e.g., lighten the load before overload occurs using the overload early warning (E34)). (In winter, the load tends to increase.) ➔ Decrease the motor sound (carrier frequency) (F26). ➔ Enable overload protection control (H70).
(5) Air vent is blocked.	Check if there is sufficient clearance around the inverter. ➔ Increase the clearance.
	Check if the heat sink is not clogged. ➔ Clean the heat sink.
(6) The service life of the cooling fan has expired or the cooling fan malfunctioned.	Check the cumulative running time of cooling fan. Refer to Chapter 3, Section 3.4.6 " Reading maintenance information – "MAINTENANC"." ➔ Replace the cooling fan.
	Visually check that the cooling fan rotates normally. ➔ Replace the cooling fan.
(7) The wires to the motor are too long and caused a large amount of current to leak from them.	Measure the leakage current. ➔ Insert an output circuit filter (OFL).

[15] Er 1 Memory error

Problem Error occurred in writing the data to the memory in the inverter.

Possible Causes	What to Check and Suggested Measures
(1) While the inverter was writing data (especially initializing data or copying data), power supply was turned OFF and the voltage for the control circuit dropped.	Check if pressing the PRG/RESET key resets the alarm after the function code data are initialized by setting the data of H03 to 1. ➔ Return the initialized function code data to their previous settings, then restart the operation.
(2) A high intensity noise was given to the inverter while data (especially initializing data) was being written.	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. ➔ Improve noise control. Alternatively, return the initialized function code data to their previous settings, then restart the operation.
(3) The control circuit failed.	Initialize the function code data by setting H03 to 1, then reset the alarm by pressing the PRG/RESET key and check that the alarm goes on. ➔ This problem was caused by a problem of the printed circuit board (PCB) (on which the CPU is mounted). Contact your Fuji Electric representative.

[16] Er2 Keypad communications error

Problem A communications error occurred between the remote keypad and the inverter.

Possible Causes	What to Check and Suggested Measures
(1) Break in the communications cable or poor contact.	Check continuity of the cable, contacts and connections. ➔ Re-insert the connector firmly. ➔ Replace the cable.
(2) A high intensity noise was given to the inverter.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). ➔ Improve noise control. For details, refer to "Appendix A" of the FRENIC-Eco User's Manual.
(3) The keypad malfunctioned.	Check that alarm Er2 does not occur if you connect another keypad to the inverter. ➔ Replace the keypad.

[17] Er3 CPU error

Problem A CPU error (e.g. erratic CPU operation) occurred.

Possible Causes	What to Check and Suggested Measures
(1) A high intensity noise was given to the inverter.	Check if appropriate noise control measures have been implemented (e.g. correct grounding and routing of control and main circuit wires and communications cable). ➔ Improve noise control.

[18] Er4 Option card communications error

Problem A communications error occurred between the option card and the inverter.

Possible Causes	What to Check and Suggested Measures
(1) There was a problem with the connection between the bus option card and the inverter.	Check whether the connector on the bus option card is properly mating with the connector of the inverter. ➔ Reload the bus option card into the inverter.
(2) There was a high intensity noise from outside.	Check whether appropriate noise control measures have been implemented (e.g. correct grounding and routing of control and main circuit wires and communications cable). ➔ Reinforce noise control measures.

[19] Er5 Option card error

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

[20] Er6 Incorrect operation error

Problem You incorrectly operated the inverter.

Possible Causes	What to Check and Suggested Measures
(1) The STOP key was pressed when H96 = 1 or 3.	Although a Run command had been inputted from the input terminal or through the communications port, the inverter was forced to decelerate to stop. ➔ If this was not intended, check the setting of H96.
(2) The start check function was activated when H96 = 2 or 3.	With a Run command being inputted, any of the following operations has been performed: - Turning the power ON - Releasing the alarm - Switching the enable communications link (LE) operation ➔ Review the running sequence to avoid input of a Run command when this error occurs. If this was not intended, check the setting of H96. (To reset the alarm, turn the Run command OFF.)
(3) The forced stop digital input (STOP) was turned ON.	Turning ON the forced stop digital input (STOP) decelerated the inverter to stop according to the specified deceleration period (H96). ➔ If this was not intended, check the settings of E01 through E05 on terminals X1 through X5.

[21] Er 7 Tuning error

Problem Auto-tuning failed.

Possible Causes	What to Check and Suggested Measures
(1) A phase was missing (There was a phase loss) 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, P02, and P03 agrees with the specifications of the motor.
(3) The connection between the inverter and the motor was too long.	Check whether the connection length between the inverter and the motor is not exceeding 50m. ➔ Review, and if necessary, change the layout of the inverter and the motor to shorten the connection wire. Alternatively, minimize the connection wire length without changing the layout. ➔ Disable both auto-tuning and auto-torque (set 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 smaller than that of the inverter by three or more orders of class or larger by two or more orders of class. ➔ Check whether it is possible to replace the inverter with one with an appropriate capacity. ➔ Manually specify the values for the motor parameters P06, P07, and P08. ➔ Disable both auto-tuning and auto-torque boost (set 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 F37 to "1").

📖 For details of tuning errors, refer to “Errors during Tuning” in Chapter 4, Section 4.1.3 “Preparation before running the motor for a test – Setting function code data.”

[22] Er8 RS-485 communications error

Problem A communications error occurred during RS-485 communications.

Possible Causes	What to Check and Suggested Measures
(1) Conditions for communications differ between the inverter and host equipment.	Compare the settings of the y codes (y01 to y10) with those of the host equipment. ➔ Correct any settings that differ.
(2) Even though no response error detection time (y08) has been set, communications is not performed within the specified cycle.	Check the host equipment. ➔ Change the settings of host equipment software, or make the no response error detection time be ignored (y08=0).
(3) Host equipment (e.g., PLCs and personal computers) did not operate due to incorrect settings and/or defective software/hardware.	Check the host equipment. ➔ Remove the cause of the equipment error.
(4) Relay converters (e.g., RS-485 relay converter) did not operate due to incorrect connections and settings, or defective hardware.	Check the RS-485 relay converter (e.g., check for poor contact). ➔ Change the various RS-485 converter settings, reconnect the wires, or replace hardware (such as recommended devices) as appropriate.
(5) Broken communications cable or poor contact.	Check continuity of the cable, contacts and connections. ➔ Replace the cable.

Possible Causes	What to Check and Suggested Measures
(6) A high intensity noise was given to the inverter.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). ➔ Improve noise control. ➔ Improve noise reduction measures on the host side. ➔ Replace the RS-485 relay converter with a recommended insulated converter.

[23] $Er\text{-}F$ Data saving error during undervoltage

Problem The inverter was unable to save data such as the frequency commands and PID process command set through the keypad when the power was switched off.

Possible Causes	What to Check and Suggested Measures
(1) The control circuit voltage dropped suddenly while data was being saved when the power was turned OFF, because the DC link bus was rapidly discharged.	Check how long it takes for the DC link bus voltage to drop to the preset voltage when power is turned OFF. ➔ Remove whatever is causing the rapid discharge of the DC link bus electricity. After pressing the (PRG/RESET) key and releasing the alarm, set, using a remote keypad, the data of the relevant function codes (such as the frequency commands and PID process command) back to the original values and then restart the operation.
(2) A high intensity noise affected the operation of the inverter while data was being saved 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). ➔ Improve noise control. After pressing the (PRG/RESET) key and releasing the alarm, set, using a remote keypad, the data of the relevant function codes (such as the frequency commands and PID process command) back to the original values and then restart the operation.
(3) The control circuit failed.	Check if $Er\text{-}F$ occurs each time power is switched on. ➔ This problem was caused by a problem of the printed circuit board (PCB) (on which the CPU is mounted). Contact your Fuji Electric representative.

[24] $Er\text{-}P$ RS-485 communications error

Problem A communications error occurred during RS-485 communications.

Possible Causes	What to Check and Suggested Measures
(1) Conditions for communications differ between the inverter and host equipment.	Compare the settings of the y codes (y01 to y10) with those of the host equipment. ➔ Correct any settings that differ.
(2) Even though no response error detection time (y18) has been set, communications did not occur cyclically.	Check the host equipment. ➔ Change the settings of host equipment software, or make the no response error detection time invalid (y18=0).
(3) Host equipment (e.g., PLCs and personal computers) did not operate due to incorrect settings and/or defective software/hardware.	Check the host equipment. ➔ Remove the cause of the equipment error.
(4) Relay converters (e.g., RS-485 relay converter) did not operate due to incorrect connections and settings, and defective hardware.	Check the RS-485 relay converter (e.g., check for poor contact). ➔ Change the various RS-485 converter settings, reconnect the wires, or replace hardware (such as recommended devices) as appropriate.

Possible Causes	What to Check and Suggested Measures
(5) Broken communications cable or poor contact.	Check continuity of the cable, contacts and connections. ➔ Replace the cable.
(6) A high intensity noise was given to the inverter.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). ➔ Improve noise control. ➔ Improve noise reduction measures on the host side. ➔ Replace the RS-485 relay converter with a recommended insulated converter.
(7) The RS-485 communications card malfunctioned.	➔ Replace the card.

[25] Er-H LSI error (Power PCB) (50HP or above (208 V); 75HP or above (460 V))

Problem An error occurred in the LSI on the power printed circuit board (power PCB).

Possible Causes	What to Check and Suggested Measures
(1) The capacity is not set properly on the control printed circuit board.	The inverter capacity needs to be modified again. ➔ Contact your Fuji Electric representative.
(2) The contents of the memory on the power supply printed circuit board are corrupted.	The power supply printed circuit board needs to be replaced. ➔ Contact your Fuji Electric representative.
(3) Connection problem between the control printed circuit board and the power supply printed circuit board	Either the control printed circuit board or the power supply printed circuit board needs to be replaced. ➔ Contact your Fuji Electric representative.

6.4 If an Abnormal Pattern Appears on the LED Monitor while No Alarm Code is Displayed

[1] – – – – (center bar) appears

Problem A center bar (– – – –) has appeared on the LCD monitor.

Possible Causes	What to Check and Suggested Measures
(1) When PID control had been disabled (J01=0), you changed E43 (display selection) to 10 or 12. You disabled PID control (J01=0) when the LED monitor had been set to display the PID final command value or PID feedback value by pressing the FUNC DATA key.	Make sure that when you wish to view other monitor items, E43 is not set to "10: PID process command (final)" 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 process command or a PID feedback value, PID control is still in effect or J01 is not set to 0. ➔ Set J01 to "1: Enable (normal operation)" or "2: Enable (inverse operation)."
(2) Connection to the keypad was in poor connection.	Prior to proceed, check that pressing the FUNC DATA key does not take effect for the LED display. Check connectivity of the extension cable for the keypad used in remote operation. ➔ Replace the cable.

[2] _ _ _ _ (under bar) appears

Problem An under bar (_ _ _ _) appeared on the LED monitor when you pressed the (RUN) key or entered a run forward command (FWD) or a run reverse command (REV). The motor did not start.

Possible Causes	What to Check and Suggested Measures
(1) The voltage of the DC link bus was low.	Select 5_07 under Menu #5 "Maintenance Information" in Programming mode on the keypad, and check the voltage of the DC link bus, which should be: 200 VDC or below for 3-phase 208V, and 400 VDC or below for 3-phase 460V. ➔ Connect the inverter to a power supply that meets its input specifications.
(2) The main power is not ON, while the auxiliary input power to the control circuit is supplied.	Check that the main power is turned ON. ➔ If it is not ON, turn it ON.

[3] ( ) appears

Problem Parentheses ( ) has appeared on the screen while the keypad displaying the Drive Monitor.

Possible Causes	What to Check and Suggested Measures
(1) The data to be displayed could not fit the LED monitor (e.g. overflown).	Check that the product of the output frequency and the display coefficient (E50) does not exceed 9999. ➔ Adjust the setting of E50.