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 (L1/L and L2/N for single-phase voltage input), voltage may be output to inverter output terminals U, V, and W.
- Some electric charge may remain in the DC link bus capacitor even after the power is turned off. Therefore, it may take some time until the DC link bus voltage reaches a safe level. Before touching the circuit, wait for at least five minutes after the power has been turned off and check that the DC voltage between main circuit terminals P (+) and N (-) is less than +25 VDC using a multimeter.

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 2.3.5 "Wiring for Main Circuit Terminals and Grounding Terminals."

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

If no alarm code appears on the LED monitor

- Motor is running abnormally → Go to Section 6.2.1.
- Problems with inverter settings → Go to Section 6.2.2.

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.

■ Quick reference table of alarm codes

Alarm code	Name	Refer to	Alarm code	Name	Refer to
OC1	Overcurrent protection	p.6-9	OH4	PTC thermistor for motor protection	p.6-13
OC2			dbH	Overheat protection for braking resistor	p.6-14
OC3			OL1	Electronic thermal overload relay	p.6-14
OU1	Overvoltage protection	p.6-10	OLU	Overload protection	p.6-15
OU2			Er1	Memory error	p.6-15
OU3			Er2	Remote keypad communications error	p.6-16
LU	Undervoltage protection	p.6-10	Er3	CPU error	p.6-16
Lin	Input phase loss protection	p.6-11	Er6	Operation protection	p.6-17
OPL	Output phase loss protection	p.6-12	Er8	RS-485 communications error	p.6-17
OH1	Overheat protection for heat sink	p.6-12	ErF	Data save error during undervoltage	p.6-18
OH2	External alarm input	p.6-13			

(Note) An under bar (_ _ _ _) will be displayed when an undervoltage condition is detected and a run command is present while the setting of F14 (Restart mode after momentary power failure (function selection)) is not “0.”

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.
(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.
(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-Mini User's Manual, Chapter 4. ➔ Correct any incorrect function code data settings (e.g., cancel the higher priority run command).
(6) The reference frequency 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 devices, signal converters, switches, or relay contacts. Replace any ones that are faulty. ➔ Connect the external circuit wires correctly to terminals [13], [12], [11] and [C1].

Possible Causes	What to Check and Suggested Measures
(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 the FRENIC-Mini User's Manual, Chapter 4. ➔ Correct any incorrect function code data settings (e.g. cancel the higher priority run command).
(8) The peak and bottom 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.
(9) The coast-to-stop command was effective.	Check the data of function codes E01, E02, E03, 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.
	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.

[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 the maximum frequency (F03).
(2) The data of frequency limiter currently specified was too low.	Check the data of function code F15 (Frequency limiter (high)). ➔ Readjust the setting 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" using the keypad. ➔ Increase the 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], and [C1] correctly.

Possible Causes	What to Check and Suggested Measures
(4) A frequency command with higher priority than the one attempted (e.g., multi-frequency, communications or jogging operation, etc.) was active and the reference frequency was set to too low a value.	Check the settings (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," using the remote keypad and referring to the block diagram of the frequency setting circuit. *Refer to the FRENIC-Mini User's Manual, Chapter 4. ➔ Correct any incorrect function code data settings (e.g. cancel higher priority run commands, etc.).
(5) The acceleration/ deceleration time was too long.	Check the data of function codes F07, F08, E10, E11 and H54. ➔ Change the acceleration/deceleration time to match the load.
(6) Overload	Measure the output current. ➔ Lighten the load (e.g., operate the mechanical brake correctly). Check if mechanical brake is working. ➔ Release the mechanical brake.
(7) 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)). ➔ Readjust the setting of F44, or disable the function of current limiting in F43.
	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.
(8) Bias and gain set incorrectly.	Check the data of function codes F18, C50, C32, C34, C37 and C39. ➔ 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 (Operation method). ➔ Change the data of function code F02 to 2 (forward rotation) or 3 (reverse rotation).

[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 and C38) for the frequency command.
(2) The external frequency command 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.
(3) The slip compensation gain was too large.	Check that the motor vibration is absorbed if the slip compensation (P09) is cancelled. ➔ Readjust the slip compensation value (P09) or deactivate slip compensation altogether.
(4) The vibration system having low stiffness in a load caused hunting or the current is irregular due to special motor constants.	Cancel the automatic control system (automatic torque boost, slip compensation, energy saving operation, overload prevention control, current limiting) and check that the motor vibration is suppressed (F37, P09, H70, and F43). ➔ 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 the motor sound (carrier frequency) (F26) or set the motor sound (tone) to "0" (F27 = 0). ➔ Decrease the carrier frequency (F26) or set the sound 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.

[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).
(2) The current limiting prevented the output frequency from increasing.	Make sure that F43 (Current limiter (mode selection)) is set to "2", and 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 limiting in F43. ➔ Increase the acceleration/deceleration time (F07, F08, E10, and E11).

Possible Causes	What to Check and Suggested Measures
(3) The automatic deceleration was active.	Check the data of function code H69 (Automatic deceleration (mode selection)). ➔ Consider the use of a braking resistor. ➔ Increase the deceleration time (F08 and E11).
(4) Overload	Measure the output current. ➔ Lighten the load.
(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 device 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.

[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 setting 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 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.

[8] The inverter does not run as expected

Possible Causes	What to Check and Suggested Measures
(1) Wrong configuration of function codes	Check that all function codes are correctly configured. ➔ Correct the configuration of the function codes.
	Make a note of function code data currently configured and initialize all function code data (H03). ➔ After initialization, reconfigure the necessary function codes one by one, checking the running status of the inverter.

6.2.2 Problems with inverter settings

[1] 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 codes 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, 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) DC link bus voltage was below the undervoltage detection level.	Check the DC link bus voltage with Menu #5 "Maintenance information" and measure the input voltage using the keypad. ➔ Connect the inverter to a power supply that matches its input rating.

[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 (Menu display mode). ➔ Change the data of function code E52 so that the desired menu can be displayed.

[3] Nothing appears on the LED monitor.

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. ➔ 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 jumper bar has been removed between terminals P1 and P (+) or if there is poor contact between the jumper bar and the terminals. ➔ Connect the jumper bar to terminals P1 and P (+) or tighten the screws. Or connect a DC reactor. ➔ Replace the inverter if it is malfunctioning.

6.3 If an Alarm Code Appears on the LED Monitor

[1] 0Cn Overcurrent protection

Problem The inverter output current momentarily exceeded the overcurrent level.

0C1 Overcurrent occurred during acceleration.

0C2 Overcurrent occurred during deceleration.

0C3 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. 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).
(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, F08, E10, E11, and H54). ➔ Enable current limiting (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-Mini User's Manual. ➔ Enable the retry function (H04).

[2] OUn Overvoltage protection

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

$\mathit{OU1}$ Overvoltage occurs during the acceleration.
$\mathit{OU2}$ Overvoltage occurs during the deceleration.
$\mathit{OU3}$ 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) The acceleration time was too short.	Check if the overvoltage alarm occurs after sudden acceleration. ➔ Increase the acceleration time (F07, E10, and H54). ➔ Select the S-curve pattern (H07). ➔ Consider the use of a braking resistor.
(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, E11, and H54). ➔ Enable automatic deceleration (H69=1) so that when the DC link bus voltage exceeds the overvoltage suppression level, the inverter changes the deceleration time to three times longer than the set value. ➔ Set the rated voltage (at base frequency) (F05) to 0 to improve braking ability. ➔ Consider the use of a braking resistor.
(4) Loads were suddenly removed.	- Check if the alarm occurs when loads are suddenly removed. - Check if the inverter operation suddenly changes from driving operation to braking operation. ➔ Consider the use of a braking resistor.
(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. ➔ Consider the use of a braking resistor.
(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-Mini User's Manual. ➔ Enable the retry function (H04).

[3] LU Undervoltage protection

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 "4" or "5," depending on the load.

Possible Causes	What to Check and Suggested Measures
(2) The power to the inverter was switched back on too soon (with F14 = 1)	Check with LED monitor if the power to the inverter was switched back on although its control circuit was still operating. ➔ Make the interval longer for re-power on.
(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 system 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 transformer.

[4] L n Input phase loss protection

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.
(3) Interphase unbalance rate of three-phase voltage was too large.	Measure the input voltage. ➔ Connect an AC reactor (ACR) or a DC reactor (DCR) to lower the rate. ➔ 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 inputted to the inverter instead of three-phase voltage input.	Check the inverter type. ➔ Obtain a new inverter that meets the power supply specifications.

[5] OPL Output phase loss protection

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) Wire 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 screw on the inverter output terminals has 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-Mini only drives three-phase induction motors.

[6] OH1 Overheat protection for heat sink

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 panel well). ➔ Lighten the load.
(2) 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 3.2.2 [5], "Reading Maintenance Information." ➔ Replace the cooling fan.
	Visually check that the cooling fan rotates normally. ➔ Replace the cooling fan.
(3) 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.
(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). ➔ Decease the motor sound (carrier frequency) (F26). ➔ Enable the overload protection control (H70).

[7] 0H2 External alarm input

Problem External alarm was inputted (THR).

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. ➔ 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. ➔ Correct the assignment.

[8] 0H4 PTC thermistor for motor protection

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. ➔ Decrease the temperature. ➔ Lighten the load.
(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). ➔ Decrease the temperature around the motor. ➔ Increase the motor sound (carrier frequency) (F26).
(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.

[9] dbH Overheat protection for braking resistor

Problem Thermal protection for braking resistor activated.

Possible Causes	What to Check and Suggested Measures
(1) Braking load was too heavy.	Recalculate the relation between the braking load and braking capacity. ➔ Lighten the braking load. ➔ Reconsider the choice of the braking resistor in order to improve braking ability. Resetting the data of function codes F50 and F51 is also required.
(2) The deceleration time was too short.	Recalculate the required deceleration torque and time from the moment of inertia for the load and the deceleration time. ➔ Increase the deceleration time (F08, E11, and H54). ➔ Reconsider the choice of the braking resistor in order to improve the braking ability. Resetting the data of function codes F50 and F51 is also required.
(3) Incorrect values have been set for the data of function codes F50 and F51.	Check the braking resistor specifications. ➔ Reconsider and change the data of function codes F50 and F51.

Note: The inverter does not detect the overheating alarm of a braking resistor by monitoring its surface temperature, but by monitoring its load magnitude.

Therefore, even if the surface temperature itself does not rise, the alarm may be detected if the resistor is used more frequently than the set data of function codes F50 and F51. If you use the resistor to the limit of its capacity, you must adjust the data of function codes F50 and F51 while checking the surface temperature of the resistor.

[10] OL / Electronic thermal overload relay

Problem Electronic thermal function for motor overload detection was activated.

Possible Causes	What to Check and Suggested Measures
(1) 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)).
(2) 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, F08, E10, E11 and H54).
(3) 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.
(4) 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.

[11] OLU Overload protection

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 panel well). ➔ Lighten the load.
(2) 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 3.2.2 [5], "Reading Maintenance Information." ➔ Replace the cooling fan.
	Visually check that the cooling fan rotates normally. ➔ Replace the cooling fan.
(3) 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.
(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)). ➔ Decrease the motor sound (carrier frequency) (F26). ➔ Enable overload prevention control (H70).
(5) 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, F08, E10, E11 and H54).
(6) The wires to the motor are too long and caused a large amount of current to leak from them.	Measure the leak current. ➔ Insert an output circuit filter (OFL).

[12] 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), 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.

Possible Causes	What to Check and Suggested Measures
(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.

[13] Er2 Remote 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. ➔ 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-Mini User's Manual.
(3) The remote keypad malfunctioned.	Check that alarm Er2 does not occur if you connect another remote keypad to the inverter. ➔ Replace the remote keypad.
(4) The RS-485 communications card malfunctioned.	Check that alarm Er2 occurs even if you connect another remote keypad to the inverter. ➔ Replace the card.

[14] 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). ➔ Improve noise control.

[15] Er6 Operation protection

Problem An error occurred due to incorrect operation of the motor.

Possible Causes	What to Check and Suggested Measures
(1) The STOP key was pressed when H96 = 1 or 3.	Even though a run command was present at the input terminal or the communication port, the inverter was forced to decelerate to stop and Er6 was displayed. ➔ If this was not intended, check the setting of H96.
(2) The start check function was activated when H96 = 2 or 3.	When one of the following conditions occurred while a run command was present at the input, the inverter did not run and Er6 was displayed: - The power was switched on - An alarm was released - The inverter was switched to link command ***LE*** operation. ➔ Review the running sequence to avoid input of the run command when Er6 has occurred. If this was not intended, check the setting of H96. (To reset the alarm, turn the run command off.)

[16] Er8 RS-485 communications error

Problem A communications error occurred during RS-485 communications.

Possible Causes	What to Check and Suggested Measures
(1) Host controllers (e.g., PLCs and personal computers) did not operate due to incorrect settings and/or defective software/hardware.	Check the controllers. ➔ Remove the cause of the controller error.
(2) RS-485 converter did not operate due to incorrect connections and settings, or hardware defective.	Check the RS-485 converter (e.g., check for poor contact). ➔ Change the various RS-485 converter settings, reconnect the wires, or replace the converter with a recommended device as appropriate.
(3) Broken communications cable or poor contact.	Check continuity of the cable, contacts and connections. ➔ Replace the cable.
(4) Even though no response error detection time (y08) has been set, communications did not occur cyclically.	Check the host controllers. ➔ Change the settings of host controller software, or make the no response error detection time invalid (y08=0).
(5) 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 relay converter with a recommended insulated converter.

Possible Causes	What to Check and Suggested Measures
(6) Conditions for communications differ between the inverter and host controllers.	Compare the settings of the y codes (y01 to y10) with those of the host controllers. ➔ Correct any settings that differ.
(7) The RS-485 communications card malfunctioned.	➔ Replace the card.

[17] Er-F Data save error during undervoltage

Problem The inverter was unable to save data such as the frequency commands, timer operation time, 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 circuit. 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, timer operation time, 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, timer operation time, and PID process command) back to the original values and then restart the operation.
(3) The control circuit failed.	Check if Er-F occurs each time power is switched off. ➔ This problem was caused by a problem of the printed circuit board (PCB) (on which the CPU is mounted). 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 LED monitor.

Possible Causes	What to Check and Suggested Measures
(1) When PID control had been disabled (J01=0), you changed E43 (item 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 amount by pressing the FUNC/DATA key.	Make sure that when you wish to view other monitor items, E43 is not set to "10" or "12." ➔ 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 control command, PID control is still in effect or J01 is not set to 0. ➔ Set J01 to 1 or 2.
(2) While timer operation is disabled (C21=0), E43 (item selection) has been set for 10 or 12. While timer operation is enabled (C21=1), it has been disabled (C21=0) during setting the LED monitor to display the timer value by pressing the FUNC/DATA key.	Make sure that when you wish to view other monitor items, E43 is not set to "13." ➔ Set E43 to a value other than "13." Make sure that when you wish to view the timer (s), timer operation is still in effect or C21 is not set to 0. ➔ Set C21 to 1.
(3) Connection to the remote keypad was broken.	Prior to proceed, check that pressing the FUNC/DATA key does not take effect for the LED display. Check connectivity of the cable for the remote keypad. ➔ Replace the cable. Check whether the connector on the RS-485 Communications Card or on the remote keypad is not broken. ➔ Replace the RS-485 Communications Card or the remote keypad with a new one.

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

Problem An under bar (_ _ _ _) appeared on the LED monitor when you pressed the RUN key or entered a normal start/stop command ***FWD*** or a reverse start/stop 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 (F14 = 4, 5).	Select 5_01 under Menu #5 "Reading 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 three-phase 230 V, single-phase 230 V, and single -phase 115 V; and 400 VDC or below for three-phase 460 V. ➔ Plug the inverter to a power supply that meets its input specifications.

[3] ( ) appears

Problem Parentheses (( )) has appeared on the LED monitor 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.	Check that the product of the output frequency and the display coefficient (E50) does not exceed 9999. ➔ Adjust the setting of E50.