9.3 If an Alarm Code Appears on the Monitor

9.3.1 Alarm Codes

Table 9.1 Abnormal States Detectable ("Heavy Alarm" and "Light Alarm" Objects)

Code	Name	"Heavy alarm" objects	Retry registration objects	"Light alarm" objects	Remarks	Ref. page
OC1, OC2, OC3	Instantaneous overcurrent	√	√	--		9-5
EF	Earth fault	√	--	--	200 V class series of 22 kW or above 400 V class series of 45 kW or above	9-5
OV1, OV2, OV3	Overvoltage	√	√	--		9-6
LV	Undervoltage	√	√	--		9-6
LiN	Input phase loss	√	--	--		9-7
OPL	Output phase loss	√	--	--		9-8
OH1	Heat sink overheat	√	√	--		9-8
OH2	External alarm	√	√	√		9-9
OH3	Inverter internal overheat	√	√	√		9-9
OH4	Motor protection (PTC thermistor)	√	√	--		9-9
FUS	Fuse blown	√	--	--	200 V class series of 90 kW 400 V class series of 110 kW or above	9-10
PbF	Charger circuit fault	√	--	--	200 V class series of 22 kW or above 400 V class series of 45 kW or above	9-10
OL1	Overload of motors 1	√	√	√		9-11
OLU	Inverter overload	√	√	--		9-11
Er1	Memory error	√	--	--		9-12
Er2	Keypad communications error	√	--	--		9-12
Er3	CPU error	√	--	--		9-13
Er4	Option communications error	√	--	√		9-13
Er5	Option error	√	--	√		9-13
Er6	Operation protection	√	--	--		9-13
Er7	Tuning error	√	--	--		9-14
Er8 ErP	RS-485 communications error (COM port 1) RS-485 communications error (COM port 2)	√	--	√		9-15
ErF	Data saving error during undervoltage	√	--	--		9-16
ErH	Hardware error	√	--	--		9-16
CoF	Power input disconnect detection	√	--	√		9-16
ECL	Customizable logic error	√	--	--		9-17
ECF	Enable circuit error	√	--	--		9-17
PV1, PV2	PID control 1, 2 feedback error detection	√	--	√		9-17
PVA, PVb, PVC	External PID control 1, 2, 3 feedback error detection	√	--	√		9-18
Pdr	Drought protection	√	--	√	Not supported by the FRENIC-HVAC.	9-18
roC	Control of maximum starts per hour	√	--	√		9-19
PoL	End of curve protection	√	--	√		9-19
rLo	Anti jam	√	--	--		9-20
FoL	Filter clogging error	√	--	√		9-20

Table 9.1 Abnormal States Detectable ("Heavy Alarm" and "Light Alarm" Objects) (continued)

Code	Name	"Heavy alarm" objects	Retry registration objects	"Light alarm" objects	Remarks	Ref. page
LoK	Password protection	√	--	--		9-21
Err	Mock alarm	√	--	--		9-21
FAL	DC fan locked	--	--	√	200 V class series IP00: 55 kW or above IP21: 22 kW or above IP55: 5.5 kW or above 400 V class series P00: 110 kW or above IP21: 45 kW or above IP55: 11 kW or above	--
OL	Motor overload early warning	--	--	√		--
OH	Heat sink overheat early warning	--	--	√		--
LiF	Lifetime alarm	--	--	√		--
rEF	Reference command loss detected	--	--	√		--
UTL	Low torque output	--	--	√		--
PTC	PTC thermistor activated	--	--	√		--
rTE	Inverter life (Cumulative motor run time)	--	--	√		--
CnT	Inverter life (Number of startups)	--	--	√		--
PA1, PA2	PID control 1, 2 warning output	--	--	√		--
PAA, PAb, PAC	External PID control 1, 2, 3 warning output	--	--	√		--
SLA	Mutual operation slave inverter alarm	--	--	√	Not supported by the FRENIC-HVAC.	--
Lob	Low battery	--	--	√		9-21
dtL	Data information loss	--	--	√		9-21
Fod	Forced operation	--	--	--		--

[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 during running at a constant speed.

Possible Causes	What to Check and Suggested Measures
(1) The inverter output lines were short-circuited.	Disconnect the wiring from the inverter output terminals ([U], [V] and [W]) and measure the interphase resistance of the motor wiring. Check if the resistance is too low. ➔ Remove the short-circuited part (including replacement of the wires, relay terminals and motor).
(2) Ground faults have occurred at the inverter output lines.	Disconnect the wiring from the output terminals ([U], [V] and [W]) and perform a Megger test. ➔ Remove the grounded parts (including replacement of the wires, relay terminals and motor).
(3) Overload.	Measure the motor current with a measuring device to trace the current trend. Then, use this data to judge if the trend is over the calculated load value for your system design. ➔If the load is too heavy, reduce it or increase the inverter capacity.
	Trace the current trend and check if there are any sudden changes in the current. ➔ If there are any sudden changes, make the load fluctuation smaller or increase the inverter capacity. ➔ Enable instantaneous overcurrent limiting (H12 = 1).
(4) Excessive torque boost specified. (when F37 = 0, 1, 3, or 4)	Check whether decreasing the torque boost (F09) decreases the output current but does not stall the motor. ➔ If no stall occurs, decrease the torque boost (F09).
(5) The 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 through E15, and H56). ➔ Enable the current limiter (F43) and torque limiter (F40, F41, E16, and E17). ➔ Increase 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. ➔ Enable the Auto-reset (H04). ➔ Connect a surge absorber to magnetic contactor's coils or other solenoids (if any) causing noise.

[2] EF Earth fault

Problem An earth fault current flowed from the output terminal of the inverter.

Possible Causes	What to Check and Suggested Measures
(1) An earth fault occurred at the inverter output terminal(s).	Disconnect the wiring from the output terminals ([U], [V], and [W]) and perform a Megger test. ➔ Remove the earthed parts (including replacement of the wires, relay terminals and motor).

[3] OVn Overvoltage

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

OV1 Overvoltage occurred during acceleration.
OV2 Overvoltage occurred during deceleration.
OV3 Overvoltage occurred during running at constant speed.

Possible Causes	What to Check and Suggested Measures
(1) The power supply voltage exceeded the inverter's specification range.	Measure the input voltage. ➔ Decrease the voltage to within the specified range.
(2) A surge current entered the input power supply.	In the same power line, if a phase-advancing capacitor is turned ON/OFF or a thyristor converter is activated, a surge (momentary large increase in the voltage or current) may be caused in the input power. ➔ Install an AC reactor.
(3) The deceleration time was too short for the moment of inertia for load.	Recalculate the deceleration torque based on the moment of inertia for the load and the deceleration time. ➔ Increase the deceleration time (F08, E11, E13, E15, and H56). ➔ Enable the automatic deceleration (anti-regenerative control) (H69), or deceleration characteristics (H71). ➔ Enable torque limiter (F40, F41, E16, E17, and H73). ➔ Set the rated voltage (at base frequency) (F05) to "0" to improve the braking capability.
(4) The acceleration time was too short.	Check if the overvoltage alarm occurs after rapid acceleration. ➔ Increase the acceleration time (F07, E10, E12, and E14). ➔ Select the S-curve pattern (H07).
(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 the braking capability.
(6) Malfunction caused by noise.	Check if the DC link bus voltage was below the protective level when the overvoltage alarm occurred. ➔ Implement noise control measures. For details, refer to Appendix A. ➔ Enable the auto-reset (H04). ➔ Connect a surge absorber to magnetic contactor's coils or other solenoids (if any) causing noise.
(7) Excessive high-frequency current from outside (Occurred during stoppage after turning ON main power.)	Prevent the inflow of high-frequency current. ➔ Apply control measures at the high-frequency current side. ➔ In some instances, this can be improved by removing the E1 and E2 screws. In this case, the EMC filter will no longer function, and the inverter will no longer conform to EMC standards. Please contact Fuji Electric if these screws are removed.

[4] LV Undervoltage

Problem DC link bus voltage has dropped below the undervoltage detection level.

Possible Causes	What to Check and Suggested Measures
(1) A momentary power failure occurred.	➔ Release the alarm. ➔ If you want to restart running the motor without treating this condition as an alarm, set F14 to "3," "4," or "5," depending on the load type.
(2) The power to the inverter was switched back to ON too soon (when F14 = 1).	Check if the power to the inverter was switched back to ON while the control power was still alive. (Check whether the LEDs on the keypad light.) ➔ Turn the power ON again after all LEDs on the keypad go off.

Possible Causes	What to Check and Suggested Measures
(3) The power supply voltage did not reach the inverter's specification range.	Measure the input voltage. ➔ Increase the voltage to within the specified range.
(4) Peripheral equipment for the power circuit malfunctioned, or the connection was incorrect.	Measure the input voltage to find which peripheral equipment malfunctioned or which connection is incorrect. ➔ Replace any faulty peripheral equipment, or correct any incorrect connections.
(5) Any other loads connected to the same power supply have required a large starting current, causing a temporary voltage drop.	Measure the input voltage and check the voltage fluctuation. ➔ Reconsider the power supply system configuration.
(6) Inverter's inrush current caused the power voltage drop because the power supply transformer capacity was insufficient.	Check if the alarm occurs when a molded case circuit breaker (MCCB), residual-current-operated protective device (RCD)/earth leakage circuit breaker (ELCB) (with overcurrent protection) or magnetic contactor (MC) is turned ON. ➔Reconsider the capacity of the power supply 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) Breaks in wiring to the main power input terminals.	Measure the input voltage. ➔ Repair or replace the main circuit power input wires or input devices (MCCB, MC, etc.).
(2) The screws on the main power input terminals are loosely tightened.	Check if the screws on the main power input terminals have become loose. ➔ Tighten the terminal screws to the recommended torque.
(3) Interphase voltage unbalance between three phases was too large.	Measure the input voltage. ➔ Connect an AC reactor (ACR) to lower the voltage unbalance between input phases. ➔ Increase the inverter capacity.
(4) Overload cyclically occurred.	Measure the ripple wave of the DC link bus voltage. ➔ If the ripple is large, increase the inverter capacity.
(5) Single-phase voltage was input to the three-phase input inverter.	Check the inverter type. ➔ Apply three-phase power. The FRENIC-HVAC/AQUA of three-phase input cannot be driven by single-phase power.

Tip The input phase loss protection can be disabled with the function code H98 (Protection/Maintenance Function).

[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) The motor winding is 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-HVAC/AQUA only drives three-phase induction motors.

[7] OH1 Heat sink overheat

Problem Temperature around heat sink has risen abnormally.

Possible Causes	What to Check and Suggested Measures
(1) Temperature around the inverter exceeded the inverter's specification range.	Measure the temperature around the inverter. ➔ Lower the temperature around the inverter (e.g., ventilate the panel where the inverter is mounted).
(2) Ventilation path is blocked.	Check if there is sufficient clearance around the inverter. ➔ Change the mounting place to ensure the clearance.
	Check if the heat sink is not clogged. ➔ Clean the heat sink.
(3) Cooling fan's airflow volume decreased due to the service life expired or failure.	Check the cumulative run time of the cooling fan. (See Chapter 5, Section “5.6.4.4 Viewing Maintenance Information”.) ➔ Replace the cooling fan.
	Visually check whether the cooling fan rotates normally. ➔ Replace the cooling fan.
(4) Overload.	Measure the output current. ➔ Reduce the load (e.g. Use the heat sink overheat early warning (E20 through E27) or the overload early warning (E34) and reduce the load before the overload protection is activated.). ➔ Decease the motor sound (carrier frequency) (F26). ➔ Enable the overload prevention control (H70).

[8] OH2 External alarm

Problem External alarm was inputted (***THR***).
(when the "Enable external alarm trip" ***THR*** has been assigned to any of digital input terminals)

Possible Causes	What to Check and Suggested Measures
(1) An alarm function of external equipment was activated.	Check the operation of external equipment. ➔ Remove the cause of the alarm that occurred.
(2) Wrong connection or poor contact in external alarm signal wiring.	Check if the external alarm signal wiring is correctly connected to the terminal to which the "Enable external alarm trip" terminal command ***THR*** has been assigned (Any of E01 through E07, E98, and E99 should be set to "9."). ➔ Connect the external alarm signal wire correctly.
(3) Incorrect setting of function code data.	Check whether the "Enable external alarm trip" terminal command ***THR*** has been assigned to an unavailable terminal (with E01 through E07, E98, or E99). ➔ Correct the assignment.
	Check whether the normal/negative logic of the external signal matches that of the ***THR*** command specified by any of E01 through E07, E98, and E99. ➔ Ensure the matching of the normal/negative logic.

[9] OH3 Inverter internal overheat

Problem Temperature inside the inverter has exceeded the allowable limit.

Possible Causes	What to Check and Suggested Measures
(1) The ambient temperature exceeded the inverter's specification limit.	Measure the ambient temperature. ➔ Lower the temperature around the inverter (e.g., ventilate the panel where the inverter is mounted).
(2) The airflow generated by the internal fan has dropped because the fan lifetime has been reached or because a fault has occurred.	Visually check whether the internal fan is functioning normally. ➔ Replace the internal fan.
(3) The power is turned ON too often	Reduce the number of times the power is turned ON/OFF (guide: 1/hour or less)

[10] OH4 Motor protection (PTC thermistor)

Problem Temperature of the motor has risen abnormally.

Possible Causes	What to Check and Suggested Measures
(1) The temperature around the motor exceeded the motor's specification range.	Measure the temperature around the motor. ➔ Lower the temperature.
(2) Cooling system for the motor defective.	Check if the cooling system of the motor is operating normally. ➔ Repair or replace the cooling system of the motor.
(3) Overload.	Measure the output current. ➔ Reduce the load (e.g. Use the heat sink overheat early warning (E01 through E09) or the overload early warning (E34) and reduce the load before the overload protection is activated.). (In winter, the load tends to increase.) ➔ Lower the temperature around the motor.

Possible Causes	What to Check and Suggested Measures
(4) The activation level (H27) of the PTC thermistor for motor overheat protection was set inadequately.	Check the PTC thermistor specifications and recalculate the detection voltage. ➔ Modify the data of function code H27.
(5) Settings for the PTC thermistor are improper.	Check the setting of the thermistor mode selection (H26) and the slider position of the terminal [C1] property switch SW5. ➔ Change the H26 data in accordance with the thermistor used and set the SW5 to the PTC position.
(6) Excessive torque boost specified. (F09)	Check whether decreasing the torque boost (F09) does not stall the motor. ➔ If no stall occurs, decrease the F09 data.
(7) The V/f pattern did not match the motor.	Check if the base frequency (F04) and the rated voltage at base frequency (F05) match the values on the motor's nameplate. ➔ Match the function code data with the values on the motor's nameplate.
(8) Incorrect setting of function code data.	Although no PTC thermistor is used, the thermistor mode is enabled (H26). ➔ Set the H26 data to "0" (Disable).

[11] FUS Fuse blown

Problem The fuse inside the inverter blew.

Possible Causes	What to Check and Suggested Measures
(1) The fuse blew due to 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

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

Possible Causes	What to Check and Suggested Measures
(1) The control power was not supplied to the magnetic contactor intended for short-circuiting the charging resistor.	Check that, in normal connection of the main circuit (not a connection via the DC link bus), the connector (CN R) on the power printed circuit board (power PCB) is not inserted to NC. ➔ Insert the connector (CN R) to FAN.
	Check whether you 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 release the current alarm. After that, 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 the 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] OL1 Overload of motor 1

Problem Electronic thermal protection for motor activated.

Possible Causes	What to Check and Suggested Measures
(1) The electronic thermal characteristics do not match the motor overload characteristics.	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 protection was inadequate.	Check the continuous allowable current of the motor. ➔ Reconsider and change the data of function code F11.
(3) The specified acceleration/ deceleration time was too short.	Recalculate the acceleration/deceleration torque and time needed for the load, based on the moment of inertia for the load and the acceleration/deceleration time. ➔ Increase the acceleration/ deceleration time (F07, F08, E10 through E15, and H56).
(4) Overload.	Measure the output current. ➔ Reduce the load (e.g. Use the overload early warning (E34) and reduce the load before the overload protection is activated.). (In winter, the load tends to increase.)
(5) Excessive torque boost specified (F09)	Check whether decreasing the torque boost (F09) does not stall the motor. ➔ If no stall occurs, decrease the F09 data.

[14] OLU Inverter overload

Problem Temperature inside inverter has risen abnormally.

Possible Causes	What to Check and Suggested Measures
(1) Temperature around the inverter exceeded the inverter's specification range.	Measure the temperature around the inverter. ➔ Lower the temperature (e.g., ventilate the panel where the inverter is mounted).
(2) Excessive torque boost specified (F09)	Check whether decreasing the torque boost (F09) does not stall the motor. ➔ If no stall occurs, decrease the F09 data.
(3) The specified acceleration/ deceleration time was too short.	Recalculate the acceleration/deceleration torque and time needed for the load, based on the moment of inertia for the load and the acceleration/deceleration time. ➔ Increase the acceleration/deceleration time (F07, F08, E10 through E15, and H56).
(4) Overload.	Measure the output current. ➔ Reduce the load (e.g., Use the overload early warning (E34) and reduce the load before the overload protection is activated.). (In winter, the load tends to increase.). ➔ Decrease the motor sound (Carrier frequency) (F26). If the carrier frequency is high, output must be reduced. For details, refer to "2.6 Derating of Rated Output Current." ➔ Enable overload prevention control (H70).
(5) Ventilation paths are blocked.	Check if there is sufficient clearance around the inverter. ➔ Change the mounting place to ensure the clearance.
	Check if the heat sink is not clogged. ➔ Clean the heat sink.

Possible Causes	What to Check and Suggested Measures
(6) Cooling fan's airflow volume decreased due to the service life expired or failure.	Check the cumulative run time of the cooling fan. (See Chapter 5, Section "5.6.4.4 Viewing Maintenance Information".) ➔ 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, causing a large leakage current from them.	Measure the leakage current. ➔ Insert an output circuit filter (OFL).

[15] Er1 Memory error

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

Possible Causes	What to Check and Suggested Measures
(1) When writing data (especially initializing or copying data), the inverter was shut down so that the voltage to the control PCB has dropped.	Initialize the function code data with H03 (= 1). After initialization, check if pressing the RESET key releases the alarm. ➔ Revert the initialized function code data to their previous settings, then restart the operation.
(2) Inverter affected by strong electrical noise when writing data (especially initializing or copying data).	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). Also, perform the same check as described in (1) above. ➔ Implement noise control measures. Revert the initialized function code data to their previous settings, then restart the operation.
(3) The control PCB failed.	Initialize the function code data by setting H03 to "1," then reset the alarm by pressing the RESET key and check that the alarm goes on. ➔ The control PCB (on which the CPU is mounted) is defective. Contact your Fuji Electric representative.

[16] Er2 Keypad communications error

Problem A communications error occurred between the standard keypad or the multi-function keypad and the inverter.

Possible Causes	What to Check and Suggested Measures
(1) Broken communications cable or poor contact.	Check continuity of the cable, contacts and connections. ➔ Re-insert the connector firmly. ➔ Replace the cable.
(2) Connecting many control wires hinders the front cover from being mounted, lifting the keypad.	Check the mounting condition of the front cover. ➔ Use wires of the recommended size (0.75 mm^2) for wiring. ➔ Change the wiring layout inside the unit so that the front cover can be mounted firmly.
(3) Inverter affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of communication cables and main circuit wires). ➔ Implement noise control measures. For details, refer to Appendix A.
(4) A keypad failure occurred.	Replace the keypad with another one and check whether a keypad communications error (Er2) occurs. ➔ 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) Inverter affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g. correct grounding and routing of signal wires, communications cables, and main circuit wires). ➔ Implement noise control measures.

[18] Er4 Option 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 option card and the inverter.	Check whether the connector on the option card is properly engaged with that of the inverter. ➔ Reload the option card into the inverter.
(2) Strong electrical noise.	Check whether appropriate noise control measures have been implemented (e.g. correct grounding and routing of signal wires, communications cables, and main circuit wires). ➔ Implement noise control measures.

[19] Er5 Option error

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

[20] Er6 Operation protection

Problem An incorrect operation was attempted.

Possible Causes	What to Check and Suggested Measures
(1) The (STOP) key was pressed when H96 = 1 or 3.	Check that the (STOP) key was pressed when a run command had been entered from the input terminal or through the communications port. ➔ If this was not intended, check the setting of H96.
(2) The start check function was activated when H96 = 2 or 3.	Check that any of the following operations has been performed with a run command being entered. - 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. (Turn the run command OFF before releasing the alarm.)
(3) The forced stop digital input ***STOP*** was turned OFF.	Check that turning the ***STOP*** OFF decelerated the inverter to stop. ➔ If this was not intended, check the settings of E01 through E07 for terminals [X1] through [X7].

[21] Er7 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 through H53, P02, and P03) matches the motor specifications.
(3) The wiring length between the inverter and the motor was too long.	Check whether the wiring length between the inverter and the motor exceeds 50 m. (Inverters with a small capacity are greatly affected by the wiring length.) ➔ Review, and if necessary, change the layout of the inverter and the motor to shorten the connection wire. Alternatively, minimize the wiring length without changing the layout. ➔ Disable both auto-tuning and auto-torque boost (set data of F37 to "1").
(4) The rated capacity of the motor was significantly different from that of the inverter.	Check whether the rated capacity of the motor is three or more ranks lower, or two or more ranks higher than that of the inverter. ➔ Replace the inverter with one with an appropriate capacity. ➔ Manually specify the values for the motor parameters P06, P07, and P08. ➔ Disable both auto-tuning and auto-torque boost (set data of F37 to "1").
(5) The motor was a special type such as a high-speed motor.	➔ Disable both auto-tuning and auto-torque boost (set data of F37 to "1").
(6) A tuning operation involving motor rotation (P04 = 2 or 3) was attempted while the brake was applied to the motor.	➔ Specify the tuning that does not involve the motor rotation (P04 = 1). ➔ Release the brake before tuning that involves the motor rotation (P04 = 2 or 3).

For details of tuning errors, refer to Chapter 5, Section 5.7.9 "Function code basic settings and tuning < 2 >, ■ Tuning errors."

Preparation before running the motor for a test – Setting function code data."

[22] Er8 RS-485 communications error (COM port 1)
ErP RS-485 communications error (COM port 2)

Problem A communications error occurred during RS-485 communications.

Possible Causes	What to Check and Suggested Measures
(1) Communications conditions of the inverter do not match that of the host equipment.	Compare the settings of the y codes (y01 to y10, y11 to y20) with those of the host equipment. ➔ Correct any settings that differ.
(2) Even though no-response error detection time (y08, y18) has been set, communications is not performed within the specified cycle.	Check the host equipment. ➔ Change the settings of host equipment software or disable the no-response error detection (y08, y18 = 0).
(3) The host equipment did not operate due to defective software, settings, or defective hardware.	Check the host equipment (e.g., PLCs and personal computers). ➔ Remove the cause of the equipment error.
(4) The RS-485 converter did not operate due to incorrect connections and settings, or defective hardware.	Check the RS-485 converter (e.g., check for poor contact). ➔ Change the various RS-485 converter settings, reconnect the wires, or replace hardware with recommended devices as appropriate.
(5) Broken communications cable or poor contact.	Check the continuity of the cables, contacts and connections. ➔ Replace the cable.
(6) Inverter affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of communications cables and main circuit wires). ➔ Implement noise control measures. ➔ Implement noise reduction measures on the host side. ➔ Replace the RS-485 converter with a recommended insulated one.
(7) Terminating resistor not properly configured.	Check that the inverter serves as a terminating device in the network. ➔ Configure the terminating resistor switch(es) (SW2/SW3) for RS-485 communication correctly. (That is, turn the switch(es) to ON.)

[23] ErF Data saving error during undervoltage

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

Possible Causes	What to Check and Suggested Measures
(1) During data saving performed when the power was turned OFF, the voltage fed to the control PCB dropped in an abnormally short period due to the rapid discharge of the DC link bus.	Check how long it takes for the DC link bus voltage to drop to the preset voltage when the power is turned OFF. ➔ Remove whatever is causing the rapid discharge of the DC link bus voltage. After pressing the (RESET) key and releasing the alarm, return the data of the relevant function codes (such as the frequency commands and PID commands (specified through the keypad) or the output frequencies modified by the ***UP***/***DOWN*** terminal commands) back to the original values and then restart the operation.
(2) Inverter operation affected by strong electrical noise 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). ➔ Implement noise control measures. After pressing the (RESET) key and releasing the alarm, return the data of the relevant function codes (such as the frequency commands and PID commands (specified through the keypad) or the output frequencies modified by the ***UP***/***DOWN*** terminal commands) back to the original values and then restart the operation.
(3) The control circuit failed.	Check if ErF occurs each time the power is turned ON. ➔ The control PCB (on which the CPU is mounted) is defective. Contact your Fuji Electric representative.

[24] ErH Hardware error

Problem The LSI on the power printed circuit board malfunctions.

Possible Causes	What to Check and Suggested Measures
(1) The inverter capacity setting on the control printed circuit board is wrong.	It is necessary to set the inverter capacity correctly. ➔ Contact your Fuji Electric representative.
(2) Data stored in the power printed circuit board memory is corrupted.	It is necessary to replace the power printed circuit board. ➔ Contact your Fuji Electric representative.
(3) The control printed circuit board is misconnected to the power printed circuit board.	It is necessary to replace the power or control printed circuit board. ➔ Contact your Fuji Electric representative.

[25] CoF Power input disconnect detection

Problem Power input disconnect is detected.

Possible Causes	What to Check and Suggested Measures
(1) The current signal input to [C1] has fallen to 2 mA or less.	Check the main inverter unit connection and wiring and transmission-side equipment. Review function code (H91) data.

[26] ECL Customizable logic error

Problem An ECL occurred due to a customizable logic setting error.

Possible Causes	What to Check and Suggested Measures
(1) The customizable logic operation selection setting was changed during operation.	Check whether the customizable logic operation selection (function code U00) was changed during operation. ➔ Do avoid potential hazards, do not change the customizable logic operation selection during operation.

[27] ECF Enable circuit error

Problem A circuit error was detected when diagnosing the enable circuit status.

Possible Causes	What to Check and Suggested Measures
(1) Interface board contact defect	Check whether the interface board is securely attached to the unit. ➔ The alarm will be cleared by turning ON the power again.
(2) Enable circuit logic error	Check whether outputs from safety switches and so on are input to both terminals EN1 and EN2 with the same logic (High/High or Low/Low). ➔ The alarm will be cleared by turning ON the power again.
(3) An enable circuit (safety stop circuit) fault (single fault) was detected.	If unable to clear the error with the above procedures, the inverter condition is abnormal. ➔ Contact Fuji Electric.

[28] PVn PID feedback wire break

Problem: The PID feedback wire is broken.

PV1 PID control 1 feedback error

PV2 PID control 2 feedback error

Possible Causes	What to Check and Suggested Measures
(1) The PID feedback signal wire is broken.	Check whether the PID feedback signal wires are connected correctly. ➔ Check whether the PID feedback signal wires are connected correctly. Or, tighten up the related terminal screws. ➔ Check whether any contact part bites the wire sheath.
(2) PID feedback related circuit affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of signal wires, communication cables, and main circuit wires). ➔ Implement noise control measures. ➔ Separate the signal wires from the main power wires as far as possible.
(3) The function code setting is not appropriate.	The PID control feedback error upper limit (J129, J229) settings are too high. ➔ Review the set feedback value.
	The PID control feedback error lower limit (J130, J230) settings are too low. ➔ Review the set feedback value.

[29] PVn External PID feedback wire break

Problem: The PID feedback wire is broken.

PVA External PID control 1 feedback error

PVB External PID control 2 feedback error

PVC External PID control 3 feedback error

Possible Causes	What to Check and Suggested Measures
(1) The PID feedback signal wire is broken.	Check whether the PID feedback signal wires are connected correctly. ➔ Check whether the PID feedback signal wires are connected correctly. Or, tighten up the related terminal screws. ➔ Check whether any contact part bites the wire sheath.
(2) PID feedback related circuit affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of signal wires, communication cables, and main circuit wires). ➔ Implement noise control measures. ➔ Separate the signal wires from the main power wires as far as possible.
(3) The function code setting is not appropriate.	The external PID control feedback error upper limit (J529, J629, J679) settings are too high. ➔ Review the set feedback value.
	The external PID control feedback error lower limit (J530, J630, J680) settings are too low. ➔ Review the set feedback value.

[30] Pdr Dry pump protection

Problem Drought conditions were detected during PID control.

Possible Causes	What to Check and Suggested Measures
(1) The water level in the water tank has dropped to the drought position.	Check whether the water level in the water tank is sufficient. ➔ Check whether the correct amount of water is being supplied to the water tank. ➔ Check whether the motor-operated value is closed.
(2) Water is leaking from the pipes or pump system.	Check whether water is leaking from the pump system or from around the pipes. ➔ Check whether water is leaking from the pump itself. ➔ Check for cracks in the pipes and so on, and check whether water is leaking from the connections between pipes. Increase the tightening at the pipe connections.
(3) The function code setting is not appropriate.	Check whether the drought protection (detection current) (J177, J277) setting is too high. ➔ Review the set current value.
	Check whether the drought protection (deviation) (J178, J278) setting is too small. ➔ Review the set amount of deviation.

Possible Causes	What to Check and Suggested Measures
(4) The function code setting for the flow sensor is not appropriate. (This applies only when drought protection (flow sensor) (J179, J279) is set to "1: Operate".)	A flow sensor has not been assigned to digital input or analog input. ➔ If inputting a flow sensor signal by digital input, assign a "flow sensor" to E01 through E07, E98, and E99. ➔ If inputting a flow sensor signal by analog input, assign a "flow sensor" to E61 through E63.
	If inputting a flow sensor signal by digital input, check whether the ***FS*** logic and external signal logic (positive and negative) set at E01 through E07, E98, and E99 matches. ➔ Set the logic correctly.
	If inputting a flow sensor signal by analog input, the flow sensor OFF level (J165) is too high. ➔ Review the set OFF level setting.
(5) The flow sensor signal wiring is damaged.	Check whether the flow sensor signal wire is connected properly. ➔ Check whether the flow sensor signal wire is connected properly. Or alternatively, tighten the screws. ➔ Check whether the connection coating is caught.

[31] roC Control of maximum starts per hour

Problem A PID control insufficient water stoppage occurred frequently.

Possible Causes	What to Check and Suggested Measures
(1) PID feedback signal wire contact defect	Check whether the PID feedback signal wire is connected properly. ➔ Check whether the PID feedback signal wire is connected properly. Or alternatively, tighten the screws. ➔ Check whether the connection coating is caught.
(2) An accumulator (hydraulic regeneration) fault occurred due to such reasons as the lifetime being reached.	Check the accumulator parts. ➔ Replace the accumulator.

[32] PoL End of curve protection

Problem A large water quantity condition was detected during PID control.

Possible Causes	What to Check and Suggested Measures
(1) The PID feedback signal wiring is damaged.	Check whether the PID feedback signal wire is connected properly. ➔ Check whether the PID feedback signal wire is connected properly. Or alternatively, tighten the screws. ➔ Check whether the connection coating is caught.
(2) There is insufficient pump capacity or there are not enough pumps.	Check whether the required amount of supply water is being supplied properly. ➔ Increase the number of pumps. ➔ Increase the pump capacity.
(3) The function code setting is not appropriate.	Check whether the large water quantity protection (detection current) (J183) setting is too low. ➔ Review the set current value.
	Check whether the large water quantity protection (deviation) (J184) setting is too small. ➔ Review the set amount of deviation.

Possible Causes	What to Check and Suggested Measures
(4) The function code setting for the flow sensor is not appropriate. (This applies only when drought protection (flow sensor) (J179, J279) is set to "1: Operate".)	If inputting a flow sensor signal by digital input, check whether the ***FS*** logic and external signal logic (positive and negative) set at E01 through E07, E98, and E99 matches. ➔ Set the logic correctly.
	If inputting a flow sensor signal by analog input, the flow sensor ON level (J165) is too low. ➔ Review the set ON level setting.

[33] rLo Anti jam

Problem Impurities became trapped in the pump impeller, and an overcurrent was detected.

Possible Causes	What to Check and Suggested Measures
(1) Impurities are trapped in the pump impeller.	Check for any impurities in the suction side water tank or well. ➔ Check for any impurities inside the pump. ➔ Eliminate any impurities from the water tank or well as best as possible.
(2) A pump fault occurred due to such reasons as the lifetime being reached.	Check the pump parts. ➔ Check whether an abnormal noise is being emitted by the pump. ➔ Check whether the pump bearings are overheating.

[34] FoL Filter clogging error

Problem An overload condition was detected during PID control.

Possible Causes	What to Check and Suggested Measures
(1) The filter of the fan being driven by the inverter is clogged with dust.	Check whether the fan filter is clogged with dust. ➔ Check whether the filter is clogged with dust. ➔ Clean or replace the filter.
(2) A fault occurred in the fan being driven by the inverter due to the fan's service life expired, etc.	Check the fan parts. ➔ Check whether an abnormal noise is being emitted by the fan. ➔ Check whether the fan bearings are overheating.
(3) The function code setting is not appropriate.	Check whether the filter clogging (load resistance current) (J190) setting is too low. ➔ Check the set current value.
	Check whether the filter clogging (load resistance PV signal) (J191) setting is too low. ➔ Check the set feedback value.

[35] LoK Password protection (inverter lock)

Problem An incorrect user password was entered more than the specified number of times.

Possible Causes	What to Check and Suggested Measures
(1) User password 1 or 2 was entered incorrectly more than the specified number of times.	Delete the password setting. ➔ Delete the password with the all clear command (PRG >5 > 2 >10). When doing so, all inverter settings will also be initialized simultaneously. Reset the password. ➔ To clear the Lok alarm while retaining the inverter settings, notify Fuji Electric and append the clear application number (PRG > 5 > 8). We will ensure that no illegal operations have been performed, and then issue an alarm clear code.

[36] Err Mock alarm

Problem The LCD displays the alarm *err*.

Possible Causes	What to Check and Suggested Measures
(1) The STOP + SET keys were held down for more than 5 seconds.	➔ To escape from this alarm state, press the RESET key.
(2) H45 was set to "1".	➔ Press the RESET key to reset

[37] Lob Low battery

Problem The voltage in the battery used to protect date information is low.

Possible Causes	What to Check and Suggested Measures
(1) Battery connector contact defect	Check whether the battery is securely attached to the connector on the unit board. ➔ If normal battery voltage is detected, the cause of the problem will be cleared, and resetting will be possible.
(2) Battery degradation, battery defect	Check whether the battery is degraded. ➔ Replace the battery with a new one.

[38] dtL Date information loss

Problem Date information set in the inverter was lost.

Possible Causes	What to Check and Suggested Measures
(1) It was not possible to protect the date information when the inverter power was turned OFF.	Check whether the date information protection battery is properly connected. ➔ Check the battery connection, and then reset the date.
(2) The date information is abnormal.	The clock function in this product is programmed to run until 23:59:59 on December 31, 2099. The date count will be stopped if this date is exceeded. ➔ Set the correct date again.

Tip To stop using the clock function (realtime clock), perform "Realtime clock initialization (H03=10)".

9.3.2 If the "Light Alarm" Indication Appears

When an error is detected and the error is determined to be a light alarm, operation can be continued without tripping the inverter while outputting a warning (display and general purpose output terminal).

If a light alarm occurs, the WARN. LED starts flashing, and the light alarm factor is displayed on the screen.

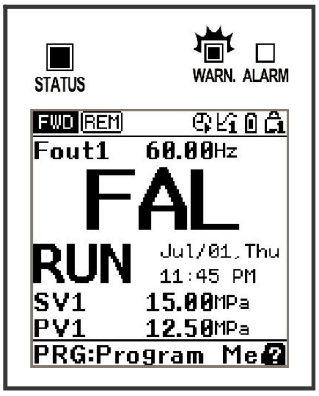


Fig. 9.1 Light alarm display example

If a light alarm occurs, a light alarm “L-ALM” is output to the multi-purpose output terminal (It is necessary to assign a light alarm “L-ALM” (data = 98) to function codes E20 through E24, and E27.)

Light alarm operations can be selected with function codes H181 through H182. The available "light alarm" codes are check-marked in the "Light alarm" object column in Table 9.1.

To display the "light alarm" factor and escape from the light alarm state, follow the instructions below.

■ Checking the light alarm content.

1) Press the PRG key to enter Programming mode.

2) Select program mode (PRG) > 4(Alarm Info) > 2(Warning History) to check the light alarm content. Light alarm codes are displayed in order of new alarms first. Refer to Table 9.1 for details on the codes.

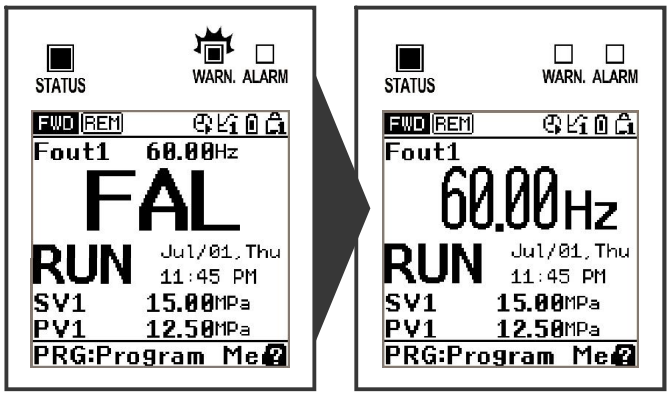
■ Releasing the light alarm

1) Eliminate the cause of the light alarm in accordance with the troubleshooting procedure applicable to the light alarm content (code) checked in the maintenance information. Refer to the “Ref. page” in Table 9.1 for information on troubleshooting and explanations.

2) After confirming the light alarm, clear the alarm display. To return to the normal state, either press the RESET key in the operating mode status similar to the same procedure used to release the alarm, enter multi-purpose input terminal alarm reset command ***RST***, or enter the alarm reset command by communication.
If the light alarm factor is successfully eliminated, the WARN. LED turns OFF, the light alarm code displayed at the screen changes to the normal display, and multi-purpose output ***L-ALM*** also turns off.
If unable to successfully eliminate the light alarm factor (e.g., when a DC fan lock is detected), the WARN. LED turns ON, and the light alarm code displayed on the screen and multi-purpose output ***L-ALM*** remain ON (factor elimination reserved). When the light alarm factor is later eliminated, the WARN. LED turns OFF automatically, the light alarm code displayed on the screen changes to the normal display, and multi-purpose output ***L-ALM*** also turns OFF.

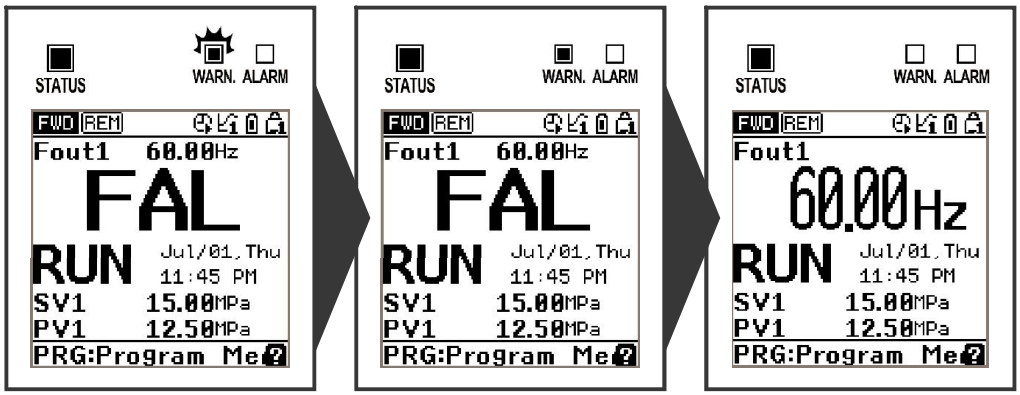
■ Light alarm release operation and LCD display

1) If releasing the light alarm after the factor has been eliminated



Light alarm (no factor) Released (normal display)

2) If the factor is eliminated after first releasing the light alarm



Light alarm (factor exists)Light alarm release reservation (factor exists) Released (normal display)