

6. Protective Operations

6.1 List of Protective Functions

In the event of an abnormality in the inverter's operation, the protective function will activate immediately to trip the inverter and display the alarm name on the LED monitor while the motor coasts to a stop. A list of the alarms with their explanations is included in the table below, and troubleshooting charts in Section 7.

Table 6.1.1 List of Alarms and Causes

Alarm Name	Keypad Panel Display		Cause of Activation
	LED	LCD	
Overcurrent	OC1	OC DURING ACC	During acceleration
	OC2	OC DURING DEC	During deceleration
	OC3	OC AT SET SPD	Running at constant speed
Ground fault	EF	GROUND FAULT	If a ground fault in the inverter output circuit is detected, the protective function is activated (for 40 Hp or more only). If a ground fault occurs in an inverter rated at 30 Hp or less, the inverter is protected by the overcurrent protection. If protection against personal injury or property damage is required, install a separate ground-fault protective relay or ground leakage circuit breaker.
Overvoltage	OU1	OV DURING ACC	During acceleration
	OU2	OV DURING DEC	During deceleration
	OU3	OV AT SET SPD	Running at constant speed
Undervoltage	LU	UNDERVOLTAGE	If the DC link voltage in the main circuit falls below the undervoltage detection level (230V series: 400V DC, 460V series: 800V DC) due to a lowered power supply, the output is shut down. If function F14 Restart after momentary power failure was selected, an alarm is not displayed. In addition, if the supply voltage falls to a level unable to maintain control power, an alarm may not be displayed.
Input phase loss	Lin	PHASE LOSS	If input power L1/R, L2/S and L3/T has any phase of the 3 phase power "OPEN" or if there is a significant disparity between the phases, the rectifying diodes or smoothing capacitors may be damaged. An Alarm is displayed and the protective function is activated during heavy load.
Overheating of heat sink	OH1	FIN OVERHEAT	If the temperature of the heat sink rises due to a cooling fan failure, or the temperature of the heatsink is too low, the protective function is activated during heavy load.
External alarm	OH2	EXT ALARM	If the external alarm contacts on the braking unit, braking resistor, or external thermal O/L relay are connected to the control circuit terminals (THR), the contacts will be actuated according to contact signals.
Overheating internally	OH3	HIGH AMB TEMP	If the temperature inside the inverter rises due to poor ventilation, etc., the protective function is activated.
Overheating of braking resistor	dbH	DBR OVERHEAT	If electronic thermal O/L relay (for braking resistor) function F13 is selected, the protective function is activated to prevent the resistor from burning due to overheating caused by frequent use of the braking resistor.
Motor 1 overload	OL1	MOTOR1 OL	The protective function is activated if the motor current exceeds the preset level, provided that electronic thermal O/L relay 1 function F10 has been selected.
Motor 2 overload	OL2	MOTOR2 OL	If the second motor current exceeds the preset level when the operation is switched to drive the second motor, the protective function is activated, provided that electronic thermal O/L relay 2 of function A04 was selected.
Drive overload	OLU	INVERTER OL	If the output current exceeds the rated overload current, the protective function is activated to provide thermal protection against overheating of the semiconductor elements in the inverter's main circuit.
Blown fuse	FUS	DC FUSE OPEN	If the fuse in the inverter is blown out following a short-circuit or damage to the internal circuit, the protective function is activated (for 40 Hp or more only).
Memory error	Er1	MEMORY ERROR	If a memory error occurs, such as missing or invalid data, the protective function is activated.
Keypad panel communication error	Er2	KEYPD COM ERR	If a communication error or interrupt between the keypad panel and control circuit is detected, the protective function is activated.
CPU error	Er3	CPU ERROR	If a CPU error occurs due to noise, etc., the protective function is activated.
Option error	Er4	OPTN COM ERR	Error occurred while using an optional unit.
	Er5	OPTION ERROR	
Operating error	Er6	OPR PROCD ERR	Detects drive operating procedure error during drive startup. FWD or REV connected to terminal CM when Main power is applied to drive (F02 setting 3 or 4). Stop key on keypad is pressed in terminal operation (F02 setting 1 or 3). Detected timed alarm stop command.
Output wiring error	Er7	TUNING ERROR	If there is an open circuit or connection error in the inverter output wiring during an auto-tuning procedure, the protective function is activated.
Modbus RTU error	Er8	RS485 COM ERR	If an error occurs while using Modbus-RTU, the protective function is activated.

Note: Number in front of Alarm Code indicates multiple alarms. See page 4-15.