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	If the inverter output current momentarily exceeds the overcurrent detection level, due to an overcurrent in the motor, or a short-circuit or ground fault in the output circuit, the protective function is activated during heavy load.
	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	If the DC link voltage in the main circuit exceeds the overvoltage detection level (230V series: 460V DC, 400V series: 800V DC), due to an increase in the regenerating current from the motor, the output is shut down. However, protection against inadvertent overvoltage (e.g., high-voltage line) may not be provided
	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 retifying 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.
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.
Inverter 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 fron of Alarm Code indicates multiple alarms. See page 4-15.

Code	Description		Code	Description	
0	No alarm	—-	22	Overheat, DB resistor	dbH
1	Overcurrent, during acceleration (INV output)	OC1	23	Overload, motor 1	OL1
2	Overcurrent, during deceleration (INV output)	OC2	24	Overload, motor 2	OL2
3	Overcurrent, during steady state operation (INV output)	OC3	25	Overload, drive	OLU
5	Ground fault	EF	27	Overspeed	OS
6	Overvoltage, during acceleration	OU1	28	PG wire break	Pg
7	Over voltage, during deceleration	OU2	31	Memory error	Er1
8	Overvoltage, during steady state operation	OU3	32	Keypad error	Er2
10	DC undervoltage	LU	33	CPU error	Er3
11	Power supply open phase	Lin	34	Option comm error	Er4
14	Blown DC fuse	FUS	35	Option error	Er5
16	Output wiring error	Er7	36	PL error	Er6
17	Overheat, heat sink, inverter	OH1	37	Output wiring error	Er7
18	Overheat, outside thermal	OH2	38	RS485 comm error	Er8
19	Overheat, unit inside temp	OH3			