# 6. Protective Operation

## 6-1 List of Protective Operations

In the event of an abnormality in the inverter, the protective function will activate immediately to trip the inverter, display the alarm name on the LED monitor, and the motor coasts-to-a stop. For alarm contents, see Section 6.1.1.

Table 6.6.1 List of alarm displays and protective functions

| Alarm Name | Keypad panel display | | Contents of operation | |
|---|---|---|---|---|
| | LED | LCD | | |
| Over current | 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 a ground fault in the output circuit, the protective function is activated. |
| | 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 40HP or more only). If a ground fault occurs in an inverter rated at 30HP or less, the inverter is protected by the overcurrent protection. If protection against personal injury or property damage is required, install a ground-fault protective relay or earth-leakage circuit breaker separately. | |
| Overvoltage | OU1 | OV DURING ACC | During acceleration | If the DC link circuit voltage of the main circuit exceeds the overvoltage detection level (230V series: 400V DC,460V series: 800V DC) due to an increase in the regenerating current from the motor, the output is shut down. However, protection against inadvertent overvoltage apply (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 circuit voltage of the main circuit falls below the undervoltage detection level (230V series: 200V DC,460V series: 400V DC) due to a lowered power supply, the output is shut down. If function code F14 (Restart after momentary power failure) is 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 open-phase | Lin | PHASE LOSS | If the inverter is driven with any one of the three phases connected to L1/R, L2/S and L3/T of the main circuit power supply "open", the rectifying diodes or smoothing capacitors may be damaged, at such time an alarm is issued and the inverter is tripped. | |
| Overheating of heat sink | OH1 | FIN OVERHEAT | If the temperature of the heat sink rises due to a cooling fan failure, etc., the protective function is activated. | |
| External alarm | OH2 | EXT ALARM | If the external alarm contacts of the braking unit, braking resistor or external thermal O/L relay are connected to the control circuit terminals (THR), this alarm will be actuated according to contact off signal.<br>When the PCT thermal protection is activated(H26:1), it operates when the detected temperature is increased. | |
| Inverter internal overheating | OH3 | HIGH AMB TEMP | If the temperature inside the inverter rises due to poor ventilation, etc., the protective function is activated.<br>Overcurrent of the terminal 13(20mA or more) due to the short circuit between the terminal 13 and 11, etc., the protective function is activated. | |
| Overheating of braking resistor | dbH | DBR OVERHEAT | If electronic thermal O/L relay (for braking resistor) function code F13 is selected, the protective function is activated to prevent the resistor from burning due to overheating following 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 code 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 code A04 is 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 semiconductor element overheating in the inverter 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 40HP 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 an CPU error occurs due to noise, etc., the protective function is activated. | |
| Option error | Er4 | OPTN COM ERR | Error when using an optional unit | |
| | Er5 | OPTION ERROR | | |
| Forced stop | Er6 | OPR PROCD ERR | Error when using the forced stop command | |
| Output wiring error | Er7 | TUNING ERROR | If there is an open circuit or a connection error in the inverter output wiring during performing auto-tuning, the protective function is activated. | |
| RS-485 communication error | Er8 | RS-485 COM ERR | If an error occurs when using RS-485, the protective function is activated. | |

## 6-2 Alarm Reset

To release the trip status, enter the reset command by pressing the **RESET** key on the keypad panel or inputting signal from the terminal (RST) of the control terminals after removing the cause of the trip. Since the reset command is an edge operation, input a command such as !!OFF-ON-OFF!! as shown in Fig.6-2-1.

When releasing the trip status, set the operation command to OFF. If the operation command is set to ON, inverter will start operation after resetting.

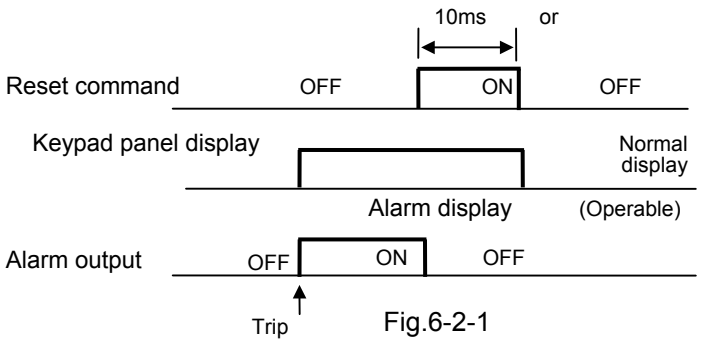


Fig.6-2-1

| | |
|---|---|
| ⚠ **WARNING** | If the alarm reset is activated with the operation signal ON, the inverter will restart suddenly, which may be dangerous. To ensure safety, disable the operating signal when releasing the trip status. **as accident may result.** |