



## Malfunction Indications and Countermeasures

### 1. Manual reset inoperative malfunctions

INDICATION	CONTENT	POSSIBLE CAUSE	COUNTERMEASURE
<b>CPF</b>	Program error	Outside noise interference	Place a RC surge absorber in parallel with the noise generating magnetic contact
<b>EPR</b>	EEPROM error	EEPROM defective	Replace EEPROM
<b>OV</b>	Voltage too high while not operating	1.Power source voltage too high. 2.Detection circuitry defective	1. Examine the power supply 2.Return the inverter for repair
<b>LV</b>	Voltage too low while not operating	1.Power source voltage too low. 2.Detection circuitry defective.	1.Examining the power supply 2.Return the inverter for repair
<b>OH</b>	Inverter over heat while not operating	1.Detection circuit defective. 2.Environment over-heat or poor ventilation	1.Return the inverter for repair 2. Improve ventilation

### 2. Manual reset operative malfunctions (Auto-Reset inoperative)

INDICATION	CONTENT	POSSIBLE CAUSE	COUNTERMEASURE
<b>OC</b>	Over-current at stop condition	Detection circuit malfunction	Return the inverter for repair
<b>OL1</b>	Motor over-load	1. Loading too large 2. Improper V/F model setting 3. Improper F_18 setting	1. Increase capacity of motor 2. Adjust to use a proper V/F curve setting 3. Adjust F_18 according to instruction
<b>OL2</b>	Inverter over-load	1. Loading too large 2. Improper V/F model setting	1. Increase capacity of inverter 2. Adjust to use a proper V/F curve setting

### 3.Manual Reset and Auto-Reset Operative Malfunction

INDICATION	CONTENT	POSSIBLE CAUSE	COUNTERMEASURE
<b>OCS</b>	Transient over-current starting machine	<ol style="list-style-type: none"> <li>1.Motor coil short-circuit with external casing</li> <li>2.Motor connection wire short-circuit with grounding</li> <li>3.Transistor module damaged</li> </ol>	<ol style="list-style-type: none"> <li>1.Examining motor</li> <li>2.Examining wiring</li> <li>3.Replace transistor module</li> </ol>
<b>OCA</b>	Over-current at acceleration	<ol style="list-style-type: none"> <li>1.Acceleration time setting too short</li> <li>2.Improper V/F feature selection</li> <li>3.Applied motor capacity exceeds inverter capacity</li> </ol>	<ol style="list-style-type: none"> <li>1.Adjust acceleration time to longer setting</li> <li>2.Adjust to a proper V/F curve</li> <li>3.Replace and install another inverter with appropriate capacity</li> </ol>
<b>OCC</b>	Over-current at steady speed	<ol style="list-style-type: none"> <li>1.Transient alteration of the loading</li> <li>2.Transient alteration of the power supply</li> </ol>	<ol style="list-style-type: none"> <li>1.Examining the loading configuration</li> <li>2.Install inductor on the power supply input side</li> </ol>
<b>OCd</b>	Over-current at deceleration	Deceleration setting too short	Adjust to use a longer acceleration time
<b>OCb</b>	Over-current at breaking	DC Breaking frequency, breaking voltage, or breaking time setting too long	Adjust to reduce settings of F_15, F_16, or F_17
<b>OVC</b>	Over-voltage at operation/deceleration	<ol style="list-style-type: none"> <li>1.Deceleration time setting too short or inertial loading too large</li> <li>2.Power supply voltage variation too large</li> </ol>	<ol style="list-style-type: none"> <li>1.Adjust to use a longer deceleration time</li> <li>2.Install a inductor on the power supply input side</li> <li>3.Increase the capacity of inverter</li> </ol>
<b>LVC</b>	Insufficient voltage level at operation	<ol style="list-style-type: none"> <li>1.Power supply voltage too low</li> <li>2.Power supply voltage variation too large</li> </ol>	<ol style="list-style-type: none"> <li>1.Improve power source quality</li> <li>2.Adjust to use a longer acceleration time</li> <li>3.Increase capacity of inverter</li> <li>4.Install a reactor on the power supply input side</li> </ol>
<b>OHC</b>	Heat-sink over heated at operation	<ol style="list-style-type: none"> <li>1.Loading too heavy</li> <li>2.Ambient temperature too high or poor ventilation</li> </ol>	<ol style="list-style-type: none"> <li>1.Examining the loading</li> <li>2.Increase capacity of inverter</li> <li>3.Improve ventilation</li> </ol>

## Special Condition Description

INDICATION	CONTENT	DESCRIPTION
<b>SP0</b>	Zero Speed Stopping	When F_11 = 0, F_7= 0 and frequency setting < 1 Hz When F_11 = 1, F_7<(F_6/100), and frequency setting <(F_6/100)
<b>SP1</b>	Fail to start directly	1. If the inverter is set to external operation (F_10 = 1) and direct start is disabled (F_28 =1), the inverter cannot be started and will flash SP1 when operation switch turned to ON before applying power (see descriptions of F_28). 2. Direct start is possible when F_28 = 0.
<b>SP2</b>	Keypad emergency stop	The inverter setup to external operation (F_10=1). If the STOP key in the keypad is pressed at the middle of operation, the inverter stops according the setting in F_14 and flash SP2 after stop. The RUN switch must be turned OFF than ON to restart the machine.
<b>E.S.</b>	External emergency stop	When the external emergency stop signal is activated through the multi-function input terminal, the inverter decelerates and stops. Inverter flashes E.S. after stops. (Refer to instruction for F_19 for detail).
<b>b.b.</b>	External BASE BLOCK	When the external BASE BLOCK signal is activated through the multifunction terminal, the inverter stop output immediately and flash b.b. for indication. (Refer to instruction for F_19 for detail)

## Keypad Operation Error Instruction

INDICATION	CONTENT	POSSIBLE CAUSE	COUNTERMEASURE
<b>LOC</b>	Motor direction locked	1. Attempt to reverse direction when F_22 = 1 2. Attempt to set F_22 to 1 when F_04 = 1	1. Adjust F_22 to 0 2. Adjust F_04 to 0
<b>Er1</b>	Keypad operation error	1. Press ▲ or ▼ keys when F_11=1 or under sp1 operation 2. Attempt to modify F_29 3. Attempt to modify parameter that is not allowed to be modified during operation (refer to parameter list)	1. Use ▲ or ▼ keys to adjust frequency setting only after F_11=0 2. Do not modify F_29 3. Modify in stop mode
<b>Er2</b>	Parameter setting error	1. $F_6 \leq F_7$	1. $F_6 > F_7$

## General Malfunction Examination Method

ABNORMALITY	CHECK POINT	COUNTERMEASURE
<b>Motor Inoperative</b>	Is the power source voltage delivered to L1, L2 terminal (is the charging indicator illuminated)?	<ul style="list-style-type: none"> <li>● Check if the power source on.</li> <li>● Turn power source OFF and then ON again.</li> <li>● Reconfirm the power voltage level.</li> </ul>
	Is there voltage output from output terminal T1, T2 and T3?	<ul style="list-style-type: none"> <li>● Turn power source OFF and then ON again.</li> </ul>
	Is the motor wired correctly?	<ul style="list-style-type: none"> <li>● Check motor wiring.</li> </ul>
	Is there any abnormal condition of the inverter?	<ul style="list-style-type: none"> <li>● Refer to malfunction handling instructions to examine and correct wiring.</li> </ul>
	Is the forward or reverse instruction loaded?	
<b>Motor Inoperative</b>	Is the analog frequency setting loaded?	<ul style="list-style-type: none"> <li>● Check to see if wiring for analog frequency input signal is correct?</li> </ul>
	If the operation mode setting correct?	<ul style="list-style-type: none"> <li>● Check if the frequency input setting voltage is correct?</li> </ul>
<b>Motor operate in opposite direction</b>	Is wiring on the output terminals T1, T2 and T3 correct?	<ul style="list-style-type: none"> <li>● Operate by digital?</li> </ul>
	Is the wiring for the forward and reverse signals correct?	<ul style="list-style-type: none"> <li>● Wiring should be in accordance with the U, V, W terminals of motor.</li> </ul>
<b>Motor operation speed fixed</b>	Is the wiring for analog frequency input correct?	<ul style="list-style-type: none"> <li>● Examining the wiring and correct it.</li> </ul>
	Is the operation mode setting correct?	<ul style="list-style-type: none"> <li>● Examining the wiring and correct it.</li> </ul>
	Is the loading too heavy?	<ul style="list-style-type: none"> <li>● Check the Operation panel</li> </ul>
<b>Motor operation at speed too high or too low</b>	Is the specification of motor (poles, voltage) correct?	<ul style="list-style-type: none"> <li>● Reduce loading</li> </ul>
	Is the gear ratio correct?	<ul style="list-style-type: none"> <li>● Reconfirm motor specification.</li> </ul>
	Is the highest output frequency setting correct?	<ul style="list-style-type: none"> <li>● Reconfirm gear ratio</li> </ul>
	Is the voltage on motor side reduced extremely?	<ul style="list-style-type: none"> <li>● Reconfirm highest output frequency</li> </ul>
<b>Abnormal speed variation at operation</b>	Is the loading too heavy?	<ul style="list-style-type: none"> <li>● Reduce loading variation</li> </ul>
	Is the loading variation too large?	<ul style="list-style-type: none"> <li>● Increase inverter and motor capacity</li> </ul>
	Is the input power source steady and stable?	<ul style="list-style-type: none"> <li>● Install AC reactor on the power supply input side</li> </ul>

## Routine examination and periodical examination

Inverter requires routine and periodical examination and maintenance

Carry out the examination only after the “ Power LED ” indicator goes off for at least 5 minutes

Maintenance item	Maintenance description	Examination period		Examination method	Criterion	Countermeasure
		Routine	1 Year			
Installation site environment	Reconfirm environment temperature and humidity	○		Refer to installation instructions and measure with thermometer and hygrometer	Temperature: -10~40 OC Humidity: under 95% without condensing	Improve installation site environment
	Check and remove any flammable material nearby	○		Visual inspection	No foreign object	
Inverter Installation and Grounding	Is there any abnormal vibration on the installation site?	○		Visual and audio Inspection	No foreign object	Tighten loose screw
	Is the grounding resistance within acceptable range?		○	Measure resistance by multi-meter	200V class under 100 ohm	Improve grounding
Input power source voltage	Is the voltage of the primary circuitry normal?	○		Measure voltage by multi-meter	Voltage level conforming specification	Improve input power source
Inverter external terminal mounting screw	Is the tighten parts secured?		○	Visual inspection. Use screwdriver to verify screw tightness	No abnormality	Tighten loose screw or return for repair
	Is there any sign of breakage on the terminal panel?		○			
	Is there any obvious rusty condition?		○			
Internal wiring of inverter	Is it deformed or skewed?		○	Visual inspection	No abnormality	Replace or return for repair
	Is the insulation of wire broken?		○			
Heat-sink	Is it accumulating dust or dirt?	○		Visual inspection	No abnormality	Clean up dust or dirt
PCB	Is it accumulating conductive metal or oil stain?		○	Visual inspection	No abnormality	Clean up or replace PCB
	Is there any over-heated or burnt component?		○			
Cooling fan	Is there any abnormal vibration or noise?		○	Visual and audio inspection	No abnormality	Replace cooling fan
	Is it accumulating dust or dirt?	○		Visual inspection		Clean up
Power component	Is it accumulating dust or dirt?		○	Visual inspection	No abnormality	Clean up
Capacitor	Is there any sign of strange order or leakage?	○		Visual inspection	No abnormality	Replace capacitor or inverter
	Is there any sign of swelling or bulging?	○				