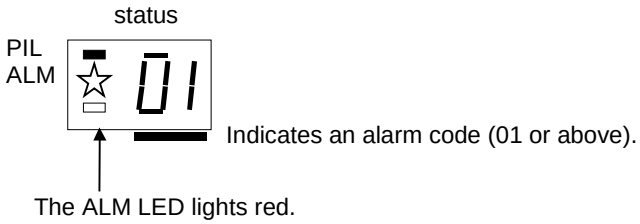
3 TROUBLESHOOTING AND ACTION

3.1 POWER SUPPLY MODULE

3.1.1 Power Supply Module (PSM, PSM-HV)

If an alarm occurs, in the STATUS display, the ALM LED lights red, and the two-digit 7-segment display indicates an alarm code.



3.1.1.1 Alarm code 01

For the PSM-5.5 to PSM-11

(1) Meaning
The main circuit power module (IPM) has detected an overload, overcurrent, or control supply voltage decrease.

(2) Cause and troubleshooting
(a) Cooling fan failure
Check whether the cooling fan rotates normally.
→ Replace the cooling fan.
(b) Dust buildup
→ Clean the cooling system with a vacuum cleaner or compressed air.
(c) Overload
→ Examine the operating conditions.
(d) Input supply voltage imbalance
→ Check the input power supply specification.
(e) The specification of the AC reactor does not match the PSM in use.
→ Check the PSM and the specification of the AC reactor.
(f) IPM failure, or control supply voltage decrease of the power module (IPM)
→ Replace the unit or IPM.

For PSM-15 to PSM-55, PSM-18HV to PSM-75HV

(1) Meaning
Overcurrent flowed into the input of the main circuit.

(2) Cause and troubleshooting
(a) Input supply voltage imbalance
→ Check the input power supply specification.
(b) The specification of the AC reactor does not match the PSM in use.
→ Check the PSM and the specification of the AC reactor.
(c) IGBT defective
→ Replace IGBT.

3.1.1.2 Alarm code 02

(1) Meaning
(a) A cooling fan for the control circuit has stopped.
(b) The control supply voltage has dropped.

(2) Cause and troubleshooting
(a) Cooling fan broken
Check whether the cooling fan rotates normally.
→ Replace it.
(b) Input voltage decrease
→ Check the power supply.

3.1.1.3 Alarm code 03

(1) Meaning
The temperature of the main circuit heat sink has risen abnormally.

(2) Cause and troubleshooting
(a) Cooling fan for the main circuit broken
Check whether the cooling fan for the main circuit rotates normally.
→ Replace it.
(b) Dust accumulation
→ Clean the cooling system with a vacuum cleaner or the factory air blower.
(c) Overload
→ Examine the operating conditions.

3.1.1.4 Alarm code 04

(1) Meaning
In the main circuit, the DC voltage (DC link) has dropped.

(2) Cause and troubleshooting
(a) A small power dip has occurred.
→ Check the power supply.
(b) Low input power supply voltage
→ Check the power supply specification.
(c) The main circuit power supply may have been switched off with an emergency stop state released.
→ Check the sequence.

3.1.1.5 Alarm code 05

(1) Meaning
(a) The input power supply is abnormal (open phase).
(b) The main circuit capacitor was not recharged within the specified time.

(2) Cause and troubleshooting
(a) The input power supply has an open phase.
→ Check the connection.
(b) Too many SVM and/or SPM units are connected.
→ Check the specification of the PSM.
(c) The DC link is short-circuited.
→ Check the connection.
(d) The recharge current limiting resistor is defective.
→ Replace the unit.

3.1.1.6 Alarm code 06

(1) Meaning
The input power supply is abnormal (open phase).

(2) Cause and troubleshooting
(a) The input power supply has an open phase.
→ Check the connection.

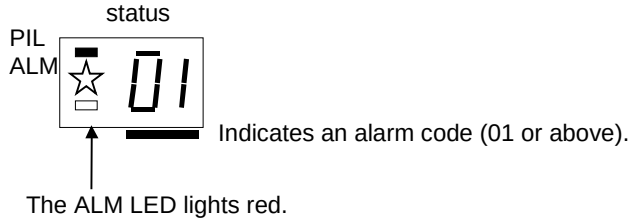
3.1.1.7 Alarm code 07

(1) Meaning
In the main circuit, the DC voltage at the DC link is abnormally high.

(2) Cause and troubleshooting
(a) Excessive regenerated power
Regeneration is impossible. The PSM does not have a sufficient capacity.
→ Check the specification of the PSM.
(b) The output impedance of the AC power source is too high.
→ Check the power source output impedance.
(Normal if the voltage variation at maximum output time is within 7%)
(c) Regeneration circuit failure
→ Replace the unit.
(d) The main circuit power supply may have been switched off with an emergency stop state released.
→ Check the sequence.

3.1.2 Power Supply Module (PSMV)

If an alarm occurs, in the STATUS display, the ALM LED lights red, and the two-digit 7-segment display indicates an alarm code.



3.1.2.1 Alarm code 01

(1) Meaning
Overcurrent flowed into the DC link of the main circuit.

(2) Cause and troubleshooting
(a) Thyristor or IGBT failure
→ Replace the thyristor or IGBT.
(b) DC link short-circuit
→ Check the connection.
(c) The specification of the AC reactor does not match the PSMV in use.
→ Check the PSMV and the specification of the AC reactor.

3.1.2.2 Alarm code 02

(1) Meaning
A cooling fan for the control circuit has stopped.

(2) Cause and troubleshooting
(a) Cooling fan for the control circuit broken
Check whether the cooling fan for the control circuit rotates normally.
→ Replace it.

3.1.2.3 Alarm code 03

(1) Meaning
The temperature of the main circuit heat sink has risen abnormally.

(2) Cause and troubleshooting
(a) Cooling fan for the main circuit broken
Check whether the cooling fan for the main circuit rotates normally.
→ Replace it.
(b) Dust accumulation
→ Clean the cooling system with a vacuum cleaner or the factory air blower.
(c) Overload
→ Examine the operating conditions.

3.1.2.4 Alarm code 04

(1) Meaning
In the main circuit, the DC voltage (DC link) has dropped.

(2) Cause and troubleshooting
(a) Low input power supply voltage
→ Check the power supply.

3.1.2.5 Alarm code 05

(1) Meaning
The main circuit capacitor was not recharged within the specified time.

(2) Cause and troubleshooting
(a) Too many SVM and/or SPM units are connected.
→ Check the specification of the PSMV.

3.1.2.6 Alarm code 06

(1) Meaning
(a) The main circuit supply voltage is not fed.
(b) Two or more input fuses of the AC reactor unit have blown.
Note) This alarm is also output when a momentary power failure occurs.

(2) Cause and troubleshooting
(a) The input supply voltage is not fed to the main circuit.
→ Check the connection.
(b) Two or more input fuses of the AC reactor unit have blown.
→ Replace the fuses.

3.1.2.7 Alarm code 16

(1) Meaning
(a) The main circuit power supply has an open phase.
(b) One input fuse of the AC reactor unit has blown.

(2) Cause and troubleshooting
(a) The main circuit power supply has an open phase.
→ Check the connection.
(b) One input fuse of the AC reactor unit has blown.
→ Replace the fuse.

3.1.2.8 Alarm code 26

(1) Meaning
The frequency of the main circuit input power supply is abnormal.

(2) Cause and troubleshooting
(a) Input power supply frequency error
→ Check the input power supply specification (50/60 Hz ±1 Hz).

3.1.2.9 Alarm code 36

(1) Meaning
The input power supply of the main circuit has an imbalance.

(2) Cause and troubleshooting
(a) The input supply voltage has an imbalance of 5% or more.
→ Check the input power supply specification.

3.1.2.10 Alarm code 46

(1) Meaning
When the magnetic contactor is turned on, the phase sequence of the power supply cannot be determined.

(2) Cause and troubleshooting
(a) Input power supply error
→ Check the input power supply specification.

3.1.2.11 Alarm code 07

(1) Meaning
In the main circuit, the DC voltage at the DC link is abnormally high.

(2) Cause and troubleshooting
(a) Excessive regenerated power
The PSMV does not have a sufficient capacity.
→ Check the specification of the PSMV.
(b) The output impedance of the AC power source is too high.
→ Check the power source output impedance.
(Normal if the voltage variation at maximum output time is within 7%)
(c) Regeneration circuit failure
→ Replace the unit.

3.1.2.12 Alarm code 17

(1) Meaning
In the main circuit, the voltage at the DC link is abnormally high. A fuse of the AC reactor unit may have blown.

(2) Cause and troubleshooting
(a) An input fuse of the AC reactor unit has blown.
→ Replace the fuse.
(b) Regeneration circuit failure
→ Replace the unit.

3.1.2.13 Alarm code 08

(1) Meaning
The offset of the current detection circuit of the main circuit DC link is excessive.

(2) Cause and troubleshooting
(a) The current detection circuit of the main circuit DC link malfunctions.
→ Replace the power printed wiring board.
(b) The control printed circuit board or A/D converter is faulty.
→ Replace the control printed circuit board.

3.1.2.14 Alarm code 18

(1) Meaning
An error occurred in internal parameter data transfer processing.

(2) Cause and troubleshooting
(a) The control printed circuit board is faulty.
→ Replace the control printed circuit board.

3.1.2.15 Alarm code A0

(1) Meaning
  (a) No ROM is installed.
  (b) The ROM is faulty.

(2) Cause and troubleshooting
  (a) The ROM is not installed correctly, or no ROM is installed.
  Check if the ROM is removed from the socket or if a bent lead has caused a bad contact.
  → Install the ROM correctly.
  (b) ROM specification error
  Check the software version stamped on the ROM.
  → Install a specified ROM correctly.
  (c) Control printed circuit board failure
  → Replace the control printed circuit board.

3.1.2.16 Alarm code A1

(1) Meaning
  The RAM is faulty.

(2) Cause and troubleshooting
  (a) The control printed circuit board is faulty.
  → Replace the control printed circuit board.

3.1.2.17 Alarm code A2

(1) Meaning
  A program is not operating normally.

(2) Cause and troubleshooting
  (a) The control printed circuit board is faulty.
  → Replace the control printed circuit board.

3.1.3 Power Supply Module (PSMR)

When an alarm is issued, the one-digit 7-segment LED indicates an alarm code.


Indicates an alarm code (02 or above).

3.1.3.1 Alarm code 2

(1) Meaning
A cooling fan for the control circuit has stopped.

(2) Cause and troubleshooting
(a) Cooling fan for the control circuit broken
Check whether the cooling fan for the control circuit rotates normally.
→ Replace it.

3.1.3.2 Alarm code 4

(1) Meaning
In the main circuit, the DC voltage (DC link) has dropped.

(2) Cause and troubleshooting
(a) A small power dip has occurred.
→ Check the power supply.
(b) Low input power supply voltage
→ Check the power supply specification.
(c) The main circuit power supply may have been switched off with an emergency stop state released.
→ Check the sequence.

3.1.3.3 Alarm code 5

(1) Meaning
  (a) The input power supply is abnormal (open phase).
  (b) The main circuit capacitor was not recharged within the specified time.

(2) Cause and troubleshooting
  (a) The input power supply has an open phase.
    → Check the connection.
  (b) Too many SVM and/or SPM units are connected.
    → Check the specification of the PSM.
  (c) The DC link is short-circuited.
    → Check the connection.
  (d) The recharge current limiting resistor is defective.
    → Replace the unit.

3.1.3.4 Alarm code 6

(1) Meaning
The control supply voltage has dropped.

(2) Cause and troubleshooting
  (a) Input voltage decrease
    → Check the power supply.

3.1.3.5 Alarm code 7

(1) Meaning
In the main circuit, the DC voltage at the DC link is abnormally high.

(2) Cause and troubleshooting
  (a) Excessive regenerated power
    The PSMR does not have a sufficient capacity.
    → Check the specification of the PSMR.
  (b) Regeneration circuit failure
    → Replace the unit.

3.1.3.6 Alarm code 8

(1) Meaning
  (a) The regenerative discharge unit is heated.
  (b) Regenerated power is excessive.

(2) Cause and troubleshooting
  (a) The regenerative resistance capacity is insufficient.
    → Check the specification of the regenerative resistance.
  (b) Excessive regenerated power
    → Decrease the frequency of acceleration/deceleration during operation.
  (c) The cooling fan of the regenerative discharge unit is faulty.
    → Check the rotation state of the cooling fan.