9 Troubleshooting

[1] Check Code List

1. Error Code and Preliminary Error Code List

BU: PWFY-P100VM-E-BU
AU: PWFY-P100, 200VM-E-AU

Error Code	Preliminary error code	Error (preliminary) detail code	Error code definition	Searched unit		Notes
				BU	AU	
0403	4300	-	Serial communication error	O		
1102	1202	-	Discharge temperature fault	O		
1301	1202	-	Low pressure fault	O		
1302	-	-	High pressure fault 1	O		
1302	1402	-	High pressure fault 2	O		
2000	2100	-	Pump interlock error	O	O	
2134	2234	-	Abnormal water temperature	O	O	
2135	2235	-	Water-source heat exchanger freezing	O	O	
4102	4152	-	Open phase	O		
4115	4165	-	Power supply signal sync error	O		
4220 (Note)	4320 (Note)	[01]	Bus voltage error (PAM damage)	O		
		[108]	Abnormal bus voltage drop	O		
		[109]	Abnormal bus voltage rise	O		
		[121]	Converter Fo error	O		
4230	4330	-	Heatsink overheat protection	O		
4250 (Note)	4350 (Note)	[101]	IPM error	O		
		[102]	ACCT overcurrent (H/W detection)	O		
5102	1210	-	Temperature sensor fault (TH22)	O	O	
5103	1209	-	Temperature sensor fault (TH23,TH13)	O	O	
5104	1202	-	Temperature sensor fault (TH11)	O		
5106	2237	-	Temperature sensor fault (TH6)	O	O	
5108	2238	-	Temperature sensor fault (TH8)	O	O	
5110	1214	-	Temperature sensor fault (THHS)	O		
5201	1402	-	High-pressure sensor fault	O		
5202	1401	-	Low-pressure sensor fault	O		
5301	4300	-	ACCT sensor Shor circuit/open circuit	O		
		[115]	ACCT sensor fault	O		

[2] Responding to Error Display on the Remote Controller

1. Error Code

0403

Serial communication error

2. Error definition and error detection method

Serial communication error between the control board and the INV board on the compressor, and between the control board and the Fan board

Detail code 01: Between the control board and the INV board
Detail code 05: Between the control board and the Fan board

3. Cause, check method and remedy

(1) Faulty wiring

Check the following wiring connections.

1) Between Control board and INV board

Control board	INV board
CN2	CN2
CN4	CN4

(2) INV board failure and Control board failure

Replace the INV board or control board when the power turns on automatically, even if the power source is reset.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

1. **Error Code**

1102

Abnormal discharge air temperature

2. **Error definition and error detection method**

1) If a discharge temperature of 115 ℃ [239℉] or higher is detected (first detection), units will stop, go into the 3-minute restart delay mode, and automatically restart after three minutes.
2) If a discharge temperature of 115℃ [239℉] or higher is detected again (second detection) within 30 minutes of the first stoppage of the units as described above, units will stop, go into the 3 minute restart delay mode, and automatically restart after three minutes.
3) If a discharge temperature of 115℃ [239℉] or higher is detected again (third detection) within 30 minutes of the second stoppage of the units as described above, the units will come to an abnormal stop, and the error code "1102" will appear.
4) If a discharge temperature of 115℃ [239℉] or higher is detected after 30 minutes have elapsed after a stoppage (first or second) of the unit as described above, it is regarded as the first detection and the sequence as described above will be followed.
5) The period of 30 minutes after a stoppage of the units is considered a preliminary error, and a preliminary error code will appear on the LED.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Gas leak, gas shortage	Refer to the page on refrigerant amount evaluation.(page 37)
(2) Overload operation	Check the operating conditions and operational status.
(3) LEV actuation failure	Refer to the section on troubleshooting the LEV.(page 59)
(4) Thermistor failure (TH11)	Check the thermistor resistor.(page 50)
(5) Input circuit failure on the controller board thermistor	Check the inlet air temperature on the LED monitor.
(6) Shortage of circulating water	Check that the pump meets the required specifications. 0.6m^3/h~2.15m^3/h
(7) Clogged heat vent outlet	Check that the heat vent outlet (located on the left side of the unit) is not clogged.

1. **Error Code**

1301

Abnormal low pressure

2. **Error definition and error detection method**

When starting the compressor from Stop Mode for the first time if low pressure reads 0.098MPa [14psi] immediately before start-up, the operation immediately stops.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Inner pressure drop due to a leakage (2) Low pressure sensor failure (3) Short-circuited pressure sensor cable due to torn outer rubber (4) A pin on the male connector is missing. (5) Disconnected wire (6) Failure of the low pressure input circuit on the controller board	Refer to the section on troubleshooting the low pressure sensor.(page 57)
(7) Shortage of circulating water	Check that the pump meets the required specifications. 0.6m^3/h~2.15m^3/h

1. **Error Code**

1302

Abnormal high pressure 1

2. **Error definition and error detection method**

1) If a pressure of 3.23MPa [468 psi] or higher is detected during operation, units will stop, go into the 3 minute restart delay mode, and automatically restart after three minutes.
2) If a pressure of 3.23MPa [468 psi] or higher is detected again (second detection) within 30 minutes of the first stoppage of the units, units will stop, go into the 3 minute restart delay mode, and automatically restart after three minutes.
3) If a pressure of 3.23 MPa [468 psi] or higher is detected again (third detection) within 30 minutes of the second stoppage of the units, the unit will come to an abnormal stop, and the check code "1302" will appear on the display.
4) If a pressure of 3.23MPa [468 psi] or higher is detected after 30 minutes have elapsed after a stoppage of the units, it is regarded as the first detection, and the sequence as described in section 1) above is followed.
5) Preliminary error code will remain on the LED for 30 minutes after the stoppage of the uinit.
6) The outdoor unit makes an error stop immediately when not only the pressure sensor but also the pressure switch detects $3.60^{+0,-0.15}$ MPa [$522^{+0,-22}$ psi]

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) LEV actuation failure	Refer to the section on troubleshooting the LEV.(page 59)
(2) Pressure sensor failure	Refer to the page on the troubleshooting of the high pressure sensor. (page 56)
(3) Failure of the thermistor input circuit and pressure sensor input circuit on the controller board	Check the temperature and the pressure of the sensor with LED monitor.
(4) Disconnected male connector on the pressure switch (63HS) or disconnected wire	Check the temperature and the pressure of the sensor with LED monitor.
(5) Shortage of circulating water	Check that the pump meets the required specifications. $0.6m^3/h$~$2.15m^3/h$

1. **Error Code**

1302

Abnormal high pressure 2 (outdoor unit)

2. **Error definition and error detection method**

If the pressure of 0.098MPa [14psi] or lower is registered on the pressure sensor immediately before start-up, it will trigger an abnormal stop, and error code "1302" will be displayed.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Inner pressure drop due to a leakage. (2) Pressure sensor failure (3) Shorted-circuited pressure sensor cable due to torn outer rubber (4) A pin on the male connector on the pressure sensor is missing or contact failure (5) Disconnected pressure sensor cable (6) Failure of the pressure sensor input circuit on the controller board	Refer to the page on the troubleshooting of the high pressure sensor.(page 56)

1. **Error Code**

2000

Pump interlock error

2. **Error definition and error detection method**

- Preliminary pump interlock error is detected when the pump interlock circuit becomes open while the units are stopped during Thermo-ON.
- While in the preliminary error state, if the units come to a stop due to Thermo-OFF, they will remain in the restart delay mode for 9 minutes and 59 seconds, and during that period they will not be permitted to restart.

3. **Cause, check method, and remedy**

Cause	Check method and remedy
(1) Pump is not connected properly.	Check the pump for proper connection. Check the pump interlock circuit.

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1. **Error Code**

2134

Abnormal water temperature

2. **Error definition and error detection method**

- In the case of BU and WH, if the value of TH6 becomes equal to or greater than 85°C, units will stop and go into the 3 minute restart delay mode.
- For a period of thirty minutes after units came to a stop is considered a preliminary error.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Pump is not connected properly.	Check the pump for proper connection.
(2) Thermistor fault	Replace thermistor TH6.
(3) Disconnected thermistor connector	Check the thermistor connector.

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1. **Error Code**

2135

Water heat exchanger freeze up

2. **Error definition and error detection method**

- If a water inlet temperature (TH6) or a water outlet temperature (TH8) of 2 ℃ or lower is detected during operation, units will stop and go into the 3 minute restart delay mode.
- For a period of sixty minutes after the units came to a stop is considered a preliminary error.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Pump is not connected properly. Shortage of circulating water	Check the pump for proper connection. Check the amount of circulating refrigerant.
(2) Thermistor fault	Replace thermistor TH6, TH8.
(3) Disconnected thermistor connector	Check the thermistor connector.

1. Error Code

4102

Open phase

2. Error definition and error detection method

- An open phase of the power supply (L phase, N phase) was detected at power on.
- The N phase current is outside of the specified range.

Note

The open phase of the power supply may not always be detected if a power voltage from another circuit is applied.

3. Cause, check method and remedy

Cause	Check method and remedy
(1) Power supply problem • Open phase voltage of the power supply • Power supply voltage drop	Check the input voltage to the power supply terminal block TB2.
(2) Noise filter problem •Coils (L1 to L3) problem •Circuit board failure	•Check the coil connections. •Check for coil burnout. •Check that the voltage at CNAC2 connector is 198V or above.
(3) Wiring failure	Confirm that the voltage at the control board connector CNAC is 198 V or above. If the voltage is below 180V, check the wiring between CNAC2 on the noise filter board and CNAC on the control board. Check the wiring between the power supply terminal block (TB2) and the tab terminals LI and NI on the noise filter board. Check the wiring between the tab terminals LO and NO on the noise filter board and the ACL. Check the wiring between the ACL and the tab terminals R and S on the INV board. Check the wiring between CN5 on the noise filter board and CN5 on the INV board.
(4) Blown fuse	Check for a blown fuse (F01) on the control board. →If a blown fuse is found, check for a short-circuiting or earth fault of the actuator.
(5) INV board failure	Replace the inverter if this problem is detected after the compressor has gone into operation.
(6) Control board failure	Replace the control board if none of the above is causing the problem.

1. **Error Code**

4115

Power supply signal sync error

2. **Error definition and error detection method**

The frequency cannot be determined when the power is switched on.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Power supply error	Check the voltage of the power supply terminal block (TB2).
(2) Noise filter problem • Coils (L1 to L3) problem • Circuit board failure	• Check the coil connections. • Check for coil burnout. • Confirm that the voltage at the CNAC2 connector is 198 V or above.
(3) Faulty wiring	Check fuse F01 on the control board.
(4) Wiring fault Between CNAC2 on the noise filter board and CNAC on the control board	Confirm that the voltage at the control board connector CNAC is 198 V or above. Check the wiring between the power supply terminal block (TB2) and the tab terminals Ll and Nl on the noise filter board.
(5) Control board failure	If none of the items described above is applicable, and if the trouble reappears even after the power is switched on again, replace the control board.

1. **Error Code**

4220

Abnormal bus voltage drop (Detail code 108)

2. **Error definition and error detection method**

If Vdc 200V or less is detected during Inverter operation. (S/W detection)

3. **Cause, check method and remedy**

(1) Power supply environment.

Check whether the unit makes an instantaneous stop when the detection result is abnormal or a power failure occurs.
Check that the interphase power supply voltage is 198V or above.

(2) Voltage drop detected.

♦If the bus voltage that appears on the LED monitor is 200V or below during inverter operation, check the following.

1) Replace the control board if the voltage across pins 1-3 of CN631 on the control board is 200V or above during inverter operation.
2) Checking the wiring connections
   ① Check the wiring between the INV board and CN631 on the control board.
   ② Check the wiring between the ACL and the tab terminals R and S on the INV board.
   ③ Check the wiring between the tab terminals LO and NO on the noise filter board and the ACL.
   ④ Check the wiring between the power supply terminal block (TB2) and the tab terminals LI and NI on the noise filter board.
3) Noise filter board fault
   ① Check for broken coils (L1-L3).
   ② Check the RS value $\rightarrow 20\Omega \pm 5\%$.
4) Replace the INV board if no problems are found with the above items.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

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1. **Error Code**

4220

Bus voltage error (PAM damage) (Detail code 01)

2. **Error definition and error detection method**

PWM circuit error on the INV board is detected.

3. **Cause, check method and remedy**

(1) INV board failure

Replace the INV board.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

1. **Error Code**

4220

Abnormal bus voltage rise (Detail code 109)

2. **Error definition and error detection method**

If Vdc ≥ 380V is detected during inverter operation.

3. **Cause, check method and remedy**

(1) Different voltage connection.

Check the power supply voltage on the power supply terminal block (TB2).

(2) INV board failure.

Replace the INV board if no problems are found with the power supply.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

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1. **Error Code**

4220

Converter Fo error (Detail code 121)

2. **Error definition and error detection method**

INV board converter circuit error is detected.

3. **Cause, check method and remedy**

(1) INV board failure

Replace the INV board.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

1. **Error Code**

4230

Heat sink overheat protection

2. **Error definition and error detection method**

When the heat sink temperature (THHS) remains at or above 85˚C is detected.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Checking the fan wiring.	Check connectors CN506A and CN506B on the control board. Check the fan wiring for breakage and damage.
(2) Checking the control board output voltage	Check the output voltage at CN506A and CN506B on the control board during inverter operation. Criteria : Output voltage ≥ 22V Replace the control board if no voltage is output during inverter operation. Replace the fan if voltage is output from the control board but the fan does not operate.
(3) Checking the air passage for blockage	Check the heatsink cooling air passage for blockage.
(4) THHS fault	1) Check INV board IGBT for proper connection. Check that heatsink on IGBT is installed properly. 2) Check the THHS wiring for damage. Replace the THHS sensor if problems are found. 3) Check the THHS sensor value on the LED monitor. Replace the THHS sensor if the values are abnormal.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

1. **Error Code**

   4250

   IPM error (Detail code 101)

2. **Error definition and error detection method**

   Overcurrent is detected while power module error detection signal is output.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Check the inverter output wiring for proper connection.	Check the fan wiring for breakage and damage. Check that the wiring is connected with correct polarity.
(2) Compressor failure	Check the compressor for earth fault and short circuit. Replace the INV board if no problems are found with the above items.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

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1. **Error Code**

   4250

   ACCT overcurrent (H/W detection) (Detail code 102)

2. **Error definition and error detection method**

   Overcurrent 34.5Apeak or 16Arm and above is detected

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Check the inverter output wiring for proper connection.	Check the fan wiring for breakage and damage. Check that the wiring is connected with correct polarity.
(2) Compressor failure	Check the compressor for earth fault and short circuit. Replace the INV board if no problems are found with the above items.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

1. Error Code

5102

TH22 temperature sensor failure (BU, AU)

5103

TH13, TH23 temperature sensor failure (BU, AU)

5104

TH11 temperature sensor failure (BU)

5106

TH6 temperature sensor failure (BU, AU)

5108

TH8 temperature sensor failure (BU, AU)

2. Error definition and error detection method

- When a short (high temperature intake) or an open (low temperature intake) of the thermistor is detected (the first detection), the outdoor unit stops, turns to anti-restart mode for 3 minutes, and restarts when the detected temperature of the thermistor.
- When a short or an open is detected again (the second detection) after the first restart of the outdoor unit, the outdoor unit stops, turns to anti-restart mode for 3 minutes, and restarts in 3 minutes when the detected temperature is within the normal range.
- When a short or an open is detected again (the third detection) after the previous restart of the outdoor unit, the outdoor unit makes an error stop.
- When a short or an open of the thermistor is detected just before the restart of the outdoor unit, the outdoor unit makes an error stop, and the error code "5102", "5103", 5104", "5105", "5106"or "5108" will appear.
- During 3-minute antirestart mode, preliminary errors will be displayed on the LED display.
- A short or an open described above is not detected for 10 minutes after the compressor start, during defrost mode, or for 3 minutes after defrost mode.

3. Cause, check method and remedy

Cause		Check method and remedy
(1)	Thermistor failure	Check thermistor resistance.
(2)	Pinched lead wire	Check for pinched lead wire.
(3)	Torn wire coating	Check for wire coating.
(4)	A pin on the male connector is missing or contact failure	Check connector.
(5)	Disconnected wire	Check for wire.
(6)	Thermistor input circuit failure on the control board	Check the intake temperature of the sensor with the LED monitor. When the temperature is far different from the actual temperature, replace the control board.

<Reference>

	Short detection	Open detection
TH22	70 ˚C [158 ˚F] and above (0.4 k Ω)	-40 ˚C [-40 ˚F] and below (130 k Ω)
TH13,TH23	110 ˚C [230 ˚F] and above (0.4 k Ω)	-40 ˚C [-40 ˚F] and below (130 k Ω)
TH11	240 ˚C [464 ˚F] and above (0.57 k Ω)	0 ˚C [32 ˚F] and below (698 k Ω)
TH6	70 ˚C [158 ˚F] and above (0.4 k Ω)	-40 ˚C [-40 ˚F] and below (130 k Ω)
TH8	70 ˚C [158 F] and above (1.14 k Ω)	-40 ˚C [-40 ˚F] and below (130 k Ω)

1. **Error Code**

5110

Heat sink failure

2. **Error definition and error detection method**

When a short or an open of THHS is detected just before or during the inverter operation.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) INV board failure	If the problem recurs when the unit is put into operation, replace the INV board.

Note

Refer to section - 5 - "Inverter" under part [3] "Trouble shooting principal parts" for error codes related to the inverter.(page 65)

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1. **Error Code**

5201

High pressure sensor failure (63HS)

2. **Error definition and error detection method**

- If the high pressure sensor detects 0.098MPa [14psi] or less during the operation, the outdoor unit stops once, turns to antirestart mode for 3 minutes, and restarts after 3 minutes when the detected high pressure sensor is 0.098MPa [14psi] or more.
- If the high pressure sensor detects 0.098MPa [14psi] or less just before the restart, the outdoor unit makes an error stop, and the error code "5201" will appear.
- During 3-minute antirestart mode, preliminary errors will be displayed on the LED display.
- A error is not detected for 3 minutes after the compressor start, during defrost operation, or 3 minutes after defrost operation.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) High pressure sensor failure	Refer to the page on the troubleshooting of the high pressure sensor. (9 [3] -1-(page 56))
(2) Pressure drop due to refrigerant leak	
(3) Torn wire coating	
(4) A pin on the male connector is missing or contact failure	
(5) Disconnected wire	
(6) High pressure sensor input circuit failure on the control board	

1. **Error Code**

   5202

   Low-pressure sensor fault

2. **Error definition and error detection method**
   When a pressure sensor reading of 4.06 MPa [589 psi] or above is detected, error code "5202" will appear.
   The unit will continue its operation by using other sensors as a backup.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Low pressure sensor failure	Refer to the page on the troubleshooting of the high pressure sensor. (9 [3] -1-(page 56))
(2) Pressure drop due to refrigerant leak	
(3) Torn wire coating	
(4) A pin on the male connector is missing or contact failure	
(5) Disconnected wire	
(6) Low pressure sensor input circuit failure on the control board	

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1. **Error Code**

   5301

   ACCT sensor short circuit/open circuit

2. **Error definition and error detection method**
   Abnormal value is detected by the ACCT sensor detection circuit immediately before inverter startup.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) INV board failure	Replace the INV board if compressor failure (see below) is ruled out.
(2) Compressor failure	Check the compressor for earth fault and short circuit.

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1. **Error Code**

   5301

   ACCT sensor fault (Detail code 115)

2. **Error definition and error detection method**
   When the formula "output current < 1.5 Arms" remains satisfied for 10 seconds while the inverter is in operation.

3. **Cause, check method and remedy**

Cause	Check method and remedy
(1) Inverter open output phase	Check the output wiring connections.
(2) Compressor failure	Check the compressor for earth fault and short circuit.
(3) INV board failure	If no problems are found with the above items, replace the INV board.

-1- Troubleshooting according to the remote controller malfunction or the external input error

1. Phenomena

Even if the operation button on the remote controller is pressed, the display remains unlit and the unit does not start running.(Power indicator ◎ does not appear on the screen.)

2. Cause

1) Power is not supplied to the unit.
   - The main power to the unit is not turned on.
   - Connectors on the circuit board are disconnected.
   - The fuse on the circuit board is blown.
   - Transformer fault or broken wiring
2) Incorrect wiring for the MA remote controller
   - Disconnected wire for the MA remote controller or disconnected line to the terminal block.
   - Short-circuited MA remote controller wiring
   - Incorrect wiring of the MA remote controller cables
   - Incorrect connection of the MA remote wiring to the terminal block for transmission line (TB5) on the indoor unit
   - Wiring mixup between the MA remote controller cable and 200 VAC power supply cable
3) The number of the MA remote controllers that are connected to an indoor unit exceeds the allowable range (2 units).
4) The length or the diameter of the wire for the MA remote controller are out of specification.
5) Short circuit of the wire for the remote display output of the outdoor unit or reversed polarity connection of the relay.
6) Circuit board fault
7) MA remote controller failure

3. Check method and remedy

1) Measure voltages of the MA remote controller terminal (among 1 to 3).
   - If the voltage is between DC 9 and 12V, the remote controller is a failure.
   - If no voltage is applied, check the causes 1) and 3) and if the cause is found, correct it.
     If no cause is found, refer to 2).
2) Remove the wire for the remote controller from the terminal block (TB15) on the MA remote controller for the indoor unit, and check voltage among 1 to 3.
   - If the voltage is between DC 9 and 12 V, check the causes 2) and 4) and if the cause is found, correct it.
   - If no voltage is applied, check the cause 1) and if the cause is found, correct it.
     If no cause is found, check the wire for the remote display output (relay polarity).
     If no further cause is found, replace the indoor unit board.

1. Phenomena

When the remote controller operation SW is turned on, the operation status briefly appears on the display, then it goes off, and the display lights out immediately, and the unit stops.

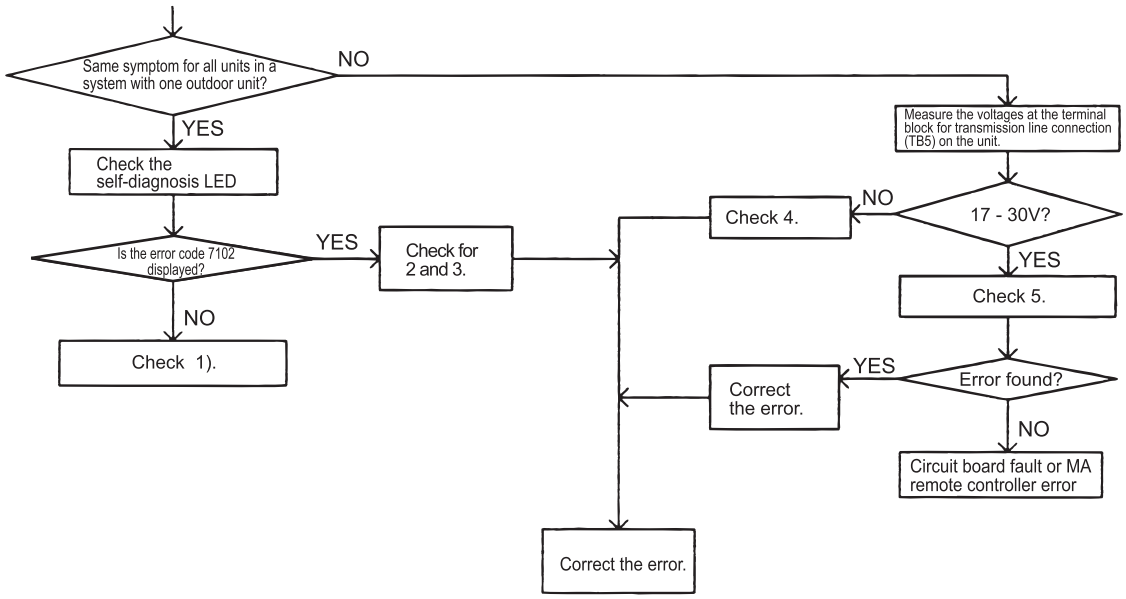
2. Cause

1) The power for the M-NET transmission line is not supplied from the outdoor unit.
2) Short circuit of the transmission line.
3) Incorrect wiring of the M-NETtransmission line on the outdoorunit.
   - Disconnected wire for the MA remote controller or disconnected line to the terminal block.
   - The male power supply connectors on the multiple outdoor units are connected to the female power supply switch connector (CN40).

   In the system to which the power supply unit for transmission lines is connected, the male power supply connector is connected to the female power supply switch connector (CN40) on the outdoor unit.
4) Broken M-NET transmission line on the unit side
5) Faulty wiring or loose connector between the terminal block for M-NET transmission line connection (TB5) on the unit and CM2M on the indoor unit circuit board

3. Check method and remedy

1) **When 2) and 3) above apply, check code 7102 will be displayed on the self-diagnosis LED.**



1. Phenomena

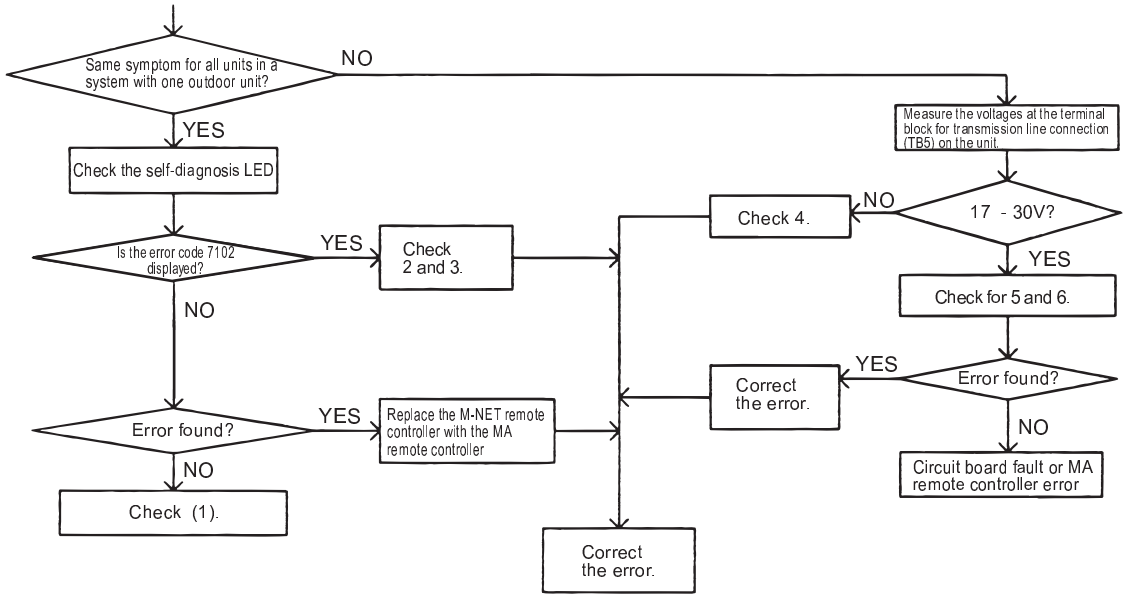
"HO" or "PLEASE WAIT" display on the remote controller does not disappear, and no operation is performed even if the button is pressed. ("HO" or "PLEASE WAIT" display will normally turn off 5 minutes later after the power on.)

2. Cause

1) The power for the M-NET transmission line is not supplied from the outdoor unit.
2) Short-circuited transmission line
3) Incorrect wiring of the M-NET transmission line on the outdoor unit.
   - Disconnected wire for the MA remote controller or disconnected line to the terminal block.
   - The male power supply connectors on the multiple outdoor units are connected to the female power supply switch connector (CN40).
     In the system to which the power supply unit for transmission lines is connected, the male power supply connector is connected to the female power supply switch connector (CN40) on the outdoor unit
4) Broken M-NET transmission line on the unit side
5) Faulty wiring or loose connector between the terminal block for M-NET transmission line connection (TB5) on the unit and CM2M on the indoor unit circuit board
6) Incorrect wiring for the MA remote controller
   - Short-circuited wire for the MA remote controller
   - Disconnected wire for the MA remote controller (No.2) and disconnected line to the terminal block.
   - Reversed daisy-chain connection between groups
   - Incorrect wiring for the MA remote controller to the terminal block for transmission line connection (TB5) on the indoor unit
   - The M-NET transmission line is connected incorrectly to the terminal block (TB13) for the MA remote controller.
7) The sub/main setting of the MA remote controller is set to sub.
8) 2 or more main MA remote controllers are connected.
9) Circuit board fault (MA remote controller communication circuit)
10) Remote controller failure
11) Outdoor unit failure

3. Check method and remedy

1) **When 2) and 3) above apply, check code 7102 will be displayed on the self-diagnosis LED.**

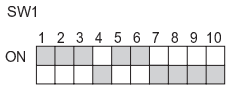


[3] Troubleshooting Principal Parts

-1- High-Pressure Sensor (63HS)

1. Compare the pressure that is detected by the high pressure sensor, and the high-pressure gauge pressure to check for failure.

By configuring the digital display setting switch (SW1) as shown in the figure below, the pressure as measured by the high-pressure sensor appears on the LED1 on the control board.



(1) While the sensor is stopped, compare the gauge pressure and the pressure displayed on self-diagnosis LED1.

1) When the gauge pressure is between 0 and 0.098MPa [14psi], internal pressure is caused due to gas leak.
2) When the pressure displayed on self-diagnosis LED1 is between 0 and 0.098MPa [14psi], the connector may be defective or be disconnected. Check the connector and go to (4).
3) When the pressure displayed on self-diagnosis LED1 exceeds 3.60MPa [522psi], go to (3).
4) If other than 1), 2) or 3), compare the pressures while the sensor is running. Go to (2).

(2) Compare the gauge pressure and the pressure displayed on self-diagnosis LED1 while the sensor is running. (Com-pare them by MPa [psi] unit.)

1) When the difference between both pressures is within 0.098MPa [14psi], both the high pressure sensor and the control board are normal.
2) When the difference between both pressures exceeds 0.098MPa [14psi], the high pressure sensor has a problem. (performance deterioration)
3) When the pressure displayed on self-diagnosis LED1 does not change, the high pressure sensor has a problem.

(3) Remove the high pressure sensor from the control board to check the pressure on the self-diagnosis LED1.

1) When the pressure displayed on self-diagnosis LED1 is between 0 and 0.098MPa [14psi], the high pressure sensor has a problem.
2) When the pressure displayed on self-diagnosis LED1 is approximately 3.60MPa [522psi], the control board has a problem.

(4) Remove the high pressure sensor from the control board, and short-circuit between the No.2 and 3 connectors (63HS) to check the pressure with self-diagnosis LED1.

1) When the pressure displayed on the self-diagnosis LED1 exceeds 3.60MPa [522psi], the high pressure sensor has a problem.
2) If other than 1), the control board has a problem.

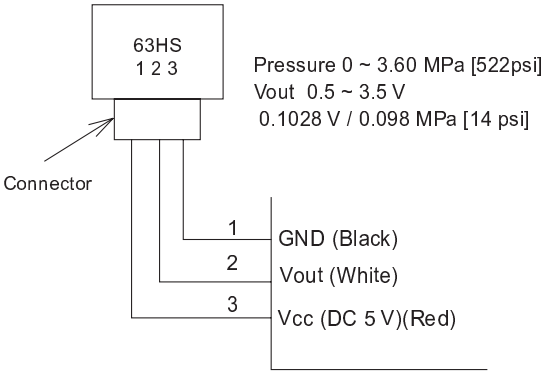
2. Pressure sensor configuration

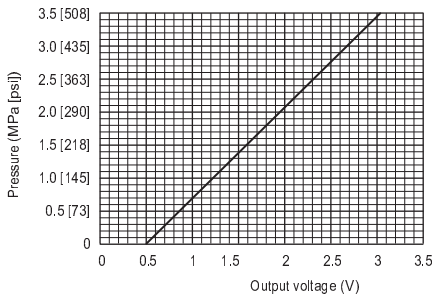
The high pressure sensor consists of the circuit shown in the figure below. If DC 5V is applied between the red and the black wires, voltage corresponding to the pressure between the white and the black wires will be output, and the value of this voltage will be converted by the microcomputer. The output voltage is 0.1028V per 0.098MPa [14psi].

Note

The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

	Body side	Control board side
Vcc	Pin 1	Pin 3
Vout	Pin 2	Pin 2
GND	Pin 3	Pin 1

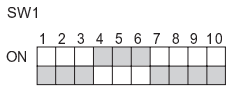




-2- Low-Pressure Sensor (63LS)

1. Compare the pressure that is detected by the low pressure sensor, and the low pressure gauge pressure to check for failure.

By configuring the digital display setting switch (SW1) as shown in the figure below, the pressure as measured by the low-pressure sensor appears on the LED1 on the control board.



(1) While the sensor is stopped, compare the gauge pressure and the pressure displayed on self-diagnosis LED1.

1) When the gauge pressure is between 0 and 0.098MPa [14psi], internal pressure is caused due to gas leak.
2) When the pressure displayed on self-diagnosis LED1 is between 0 and 0.098MPa [14psi], the connector may be defective or be disconnected. Check the connector and go to (4).
3) When the pressure displayed on self-diagnosis LED1 exceeds 1.7MPa [247psi], go to (3).
4) If other than 1), 2) or 3), compare the pressures while the sensor is running. Go to (2).

(2) Compare the gauge pressure and the pressure displayed on self-diagnosis LED1 while the sensor is running. (Compare them by MPa [psi] unit.)

1) When the difference between both pressures is within 0.03MPa [4psi], both the low pressure sensor and the control board are normal
2) When the difference between both pressures exceeds 0.03MPa [4psi], the low pressure sensor has a problem. (performance deterioration)
3) When the pressure displayed on the self-diagnosis LED1 does not change, the low pressure sensor has a problem.

(3) Remove the low pressure sensor from the control board to check the pressure with the self-diagnosis LED1 display.

1) When the pressure displayed on the self-diagnosis LED1 is between 0 and 0.098MPa [14psi], the low pressure sensor has a problem.
2) When the pressure displayed on self-diagnosis LED1 is approximately 1.7MPa [247psi], the control board has a problem.
   - ♦When the outdoor temperature is 30℃ [86℉] or less, the control board has a problem.
   - ♦When the outdoor temperature exceeds 30℃ [86℉], go to (5).

(4) Remove the low pressure sensor from the control board, and short-circuit between the No.2 and 3 connectors (63LS:CN63LS) to check the pressure with the self-diagnosis LED1.

1) When the pressure displayed on the self-diagnosis LED1 exceeds 1.7MPa [247psi], the low pressure sensor has a problem.
2) If other than 1), the control board has a problem.

(5) Remove the high pressure sensor (63HS) from the control board, and insert it into the connector for the low pressure sensor (63LS) to check the pressure with the self-diagnosis LED1.

1) When the pressure displayed on the self-diagnosis LED1 exceeds 1.7MPa [247psi], the control board has a problem.
2) If other than 1), the control board has a problem.

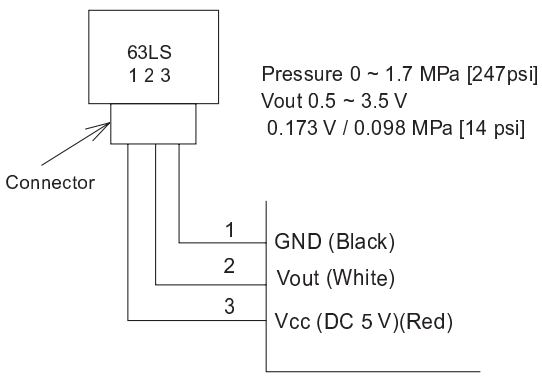
2. Low-pressure configuration

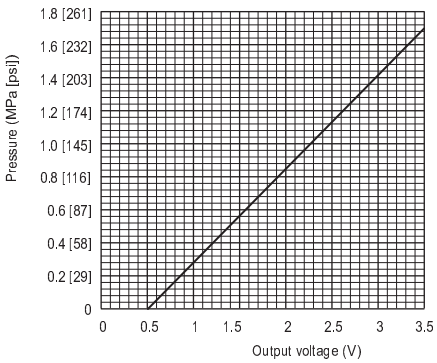
The low pressure sensor consists of the circuit shown in the figure below. If DC5V is applied between the red and the black wires, voltage corresponding to the pressure between the white and the black wires will be output, and the value of this voltage will be converted by the microcomputer. The output voltage is 0.173V per 0.098MPa [14psi].

Note

The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

	Body side	Control board side
Vcc	Pin 1	Pin 3
Vout	Pin 2	Pin 2
GND	Pin 3	Pin 1

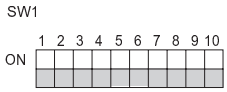




-3- Solenoid Valve

Check whether the output signal from the control board and the operation of the solenoid valve match.
Setting the self-diagnosis switch (SW1) as shown in the figure below causes the ON signal of each relay to be output to the LED's.
Each LED shows whether the relays for the following parts are ON or OFF. LEDs light up when relays are ON.

Note
The circuits on some parts are closed when the relays are ON. Refer to the following instructions.

SW1		Display							
		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8
	Upper			SV1					
	Lower								

When there is a problem with a solenoid valve, first check for loose solenoid valve coil, broken lead wire, incorrect connecter connections on the circuit board, and broken wire at the connectors.

(1) In case of SV1 (Bypass valve)

This solenoid valve opens when powered (Relay ON).

1) This valve turns on during defrost, and its operation can be verified on the LED or by the operation sound it makes when it closes.
2) The open or closed status of the valve can be verified by measuring the temperature of the pipe at the downstream of SV1. When the valve is closed, pipes will be hot. Do not touch the pipe to check its temperature.

-4- LEV

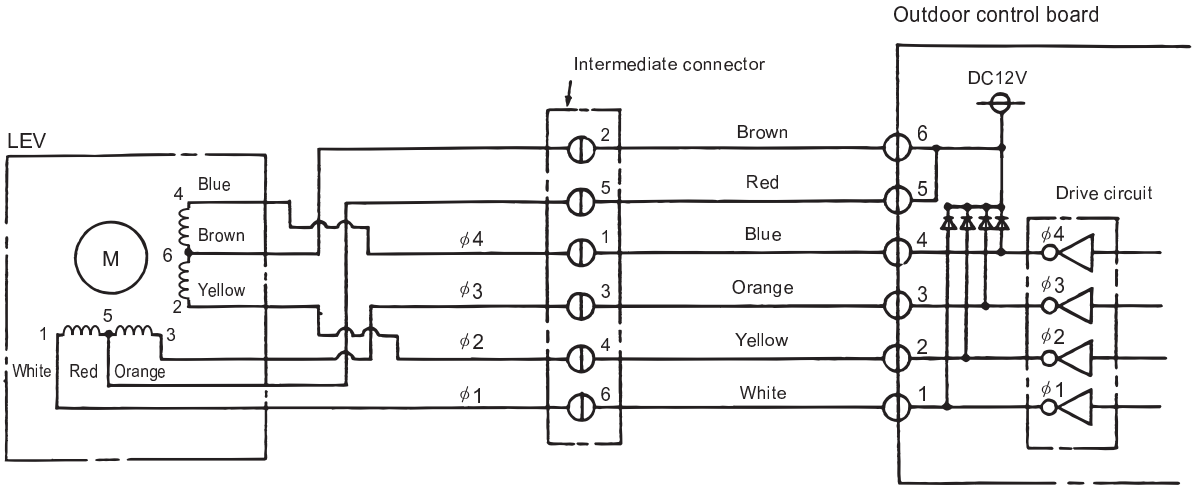
LEV operation

LEV (Indoor unit: Linear expansion valve), LEV2a, and LEV2b (Outdoor unit: Linear expansion valve) are stepping-motor -driven valves that operate by receiving the pulse signals from the indoor and outdoor unit control boards.

(1) LEV

The valve opening changes according to the number of pulses.

1) Indoor and outdoor unit control boards and the LEV (Indoor unit: Linear expansion valve)



Note. The connector numbers on the intermediate connector and the connector on the control board differ. Check the color of the lead wire to judge the number.

2) Pulse signal output and valve operation

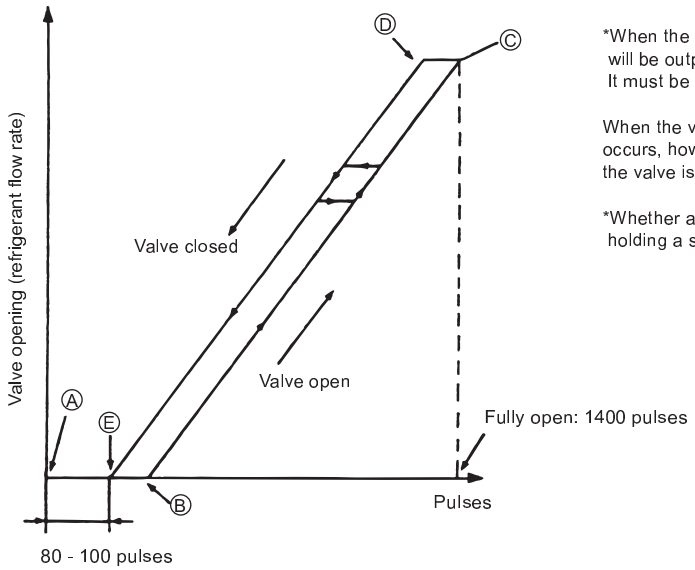
Output (phase) number	Output state			
	1	2	3	4
φ1	ON	OFF	OFF	ON
φ2	ON	ON	OFF	OFF
φ3	OFF	ON	ON	OFF
φ4	OFF	OFF	ON	ON

Output pulses change in the following orders when the
Valve is closed; 1 →2 →3 →4 → 1
Valve is open; 4 →3 →2 → 1 → 4

*1. When the LEV opening angle does not change, all the output phases will be off.

*2. When the output is open phase or remains ON, the motor cannot run smoothly, and rattles and vibrates.

3) LEV valve closing and opening operation

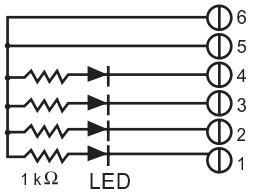
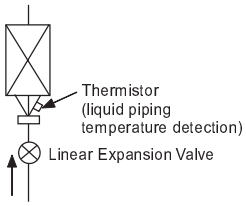


*When the power is turned on, the valve closing signal of 2200 pulses will be output from the indoor board to LEV to fix the valve position. It must be fixed at point Ⓐ.

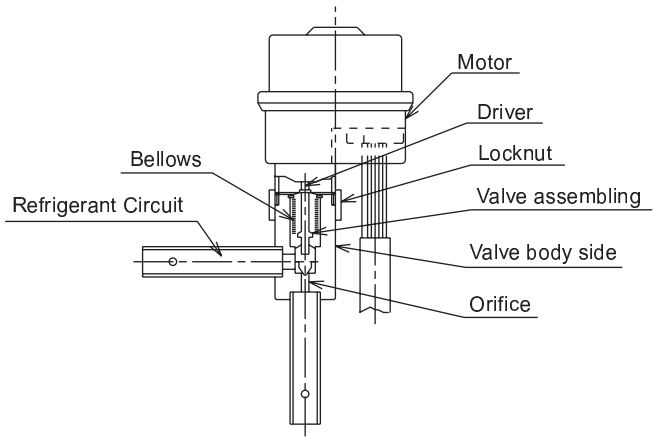
When the valve operates smoothly, no sound from LEV or no vibration occurs, however, when the pulses change from Ⓔ to Ⓐ in the chart or the valve is locked, a big sound occurs.

*Whether a sound is generated or not can be determined by holding a screwdriver against it, then placing your ear against the handle.

(2) Judgment methods and possible failure mode

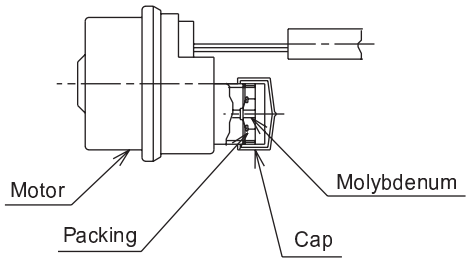
Malfunction mode	Judgment method	Remedy	Target LEV
Microcomputer driver circuit failure	Disconnect the control board connector and connect the check LED as shown in the figure below.  resistance : 0.25W 1kΩ LED : DC15V 20mA or more When the main power is turned on, the indoor unit circuit board outputs pulse signals to the indoor unit LEV for 10 seconds, and the outdoor unit circuit board outputs pulse signals to the outdoor unit LEV for 17 seconds. If any of the LED remains lit or unlit, the drive circuit is faulty.	When the drive circuit has a problem, replace the control board.	BU AU
LEV mechanism is locked	If the LEV is locked, the drive motor runs idle, and makes a small clicking sound. When the valve makes a closing and opening sound, the valve has a problem.	Replace the LEV.	BU AU
Disconnected or short-circuited LEV motor coil	Measure resistance between the coils (red - white, red -orange, brown - yellow, brown - blue) using a tester. They are normal if resistance is 150ohm ± 10%.	Replace the LEV coils.	BU AU
	Measure resistance between the coils (red - white, red -orange, brown - yellow, brown - blue) using a tester. They are normal if resistance is 46ohm ± 3%.	Replace the LEV coils.	BU AU
Incomple sealing (leak from the valve)	To check the LEV for leakage, stop the unit in question, and operate the other units in the cooling mode. Next, check the temperature of the unit liquid pipe (TH22) on the service LED. When the unit is stopped, the LEV is fully closed, so unless there is a leak, the pipe temperature will not go down. If the liquid pipe temperature is considerably lower than the water temperature reading on the remote controller, it indicates a valve closure failure. (The LEV is not sealed properly.) If the amount of leakage is insignificant and does not have negative effects, the valve does not need to be replaced.  	If there is a large amount of leakage, replace the LEV.	AU
Faulty wire connections in the connector or faulty contact	1. Check for loose pins on the connector and check the colors of the lead wires visually 2. Disconnect the control board's connector and conduct a continuity check using a tester.	Check the continuity at the points where an error occurs.	BU AU

(3) LEV coil removal procedure



Notes on the procedure

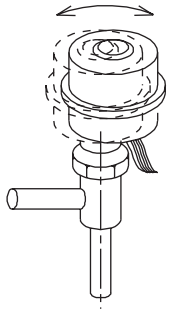
1) Do not put undue pressure on the motor.
2) Do not use motors if dropped.
3) Do not remove the cap until immediately before the procedure.
4) Do not wipe off any molybdenum.
5) Do not remove the packing.
6) Do not apply any other than specified liquid such as screw lock agent, grease and etc.



Replacement procedure

1) Stop all the indoor and outdoor units. Check that all the units are stopped, and turn off the power to the outdoor unit.
2) Prepare two spanners. Hold the valve body with one spanner and loosen the locknut with another one.
   Turning the locknut counter-clockwise from motor side view can loosen it.
   Two spanners must be used.
   Do not hold the motor with one hand and loosen the locknut with only one spanner.
3) Turning the locknut several times. The locknut will come off and then the motor can be removed.
4) Prepare a motor replacement. Use only factory settings, which the head part of the driver does not come out.**Use of other than factory settings may result in malfunction and failure of valve flow rate control.**
5) Keep dust, contaminants, and water out of the space between the motor and the valve body during replacement. (The space is the mechanical section of the valve.) Do not damage the junction with tools.
   After removing the motor, **blow N_2 gas or etc. into bellows in order to blow off water from inside.**
6) Remove the cap of the motor replacement. Joint the axis of the motor and the one of the valve body with the locknut to stick precisely. **Apply screw lock agent to whole part of the screw. Do not introduce screw lock agent into the motor.**
   Use new motors if problems are found on the motor during the replacement.
7) After rotating the locknut 2~3 times by hands, hold the valve body with the spanner, and tighten the locknut with the specified torque with a torque wrench. Apply the tightening torque of 15N · m (150kgf · cm) (administration value 15 ± 1 N · m (150 ± 10kgf · cm)).
   Note that undue tightening may cause breaking a flare nut.
8) When tightening the locknut, hold the motor with hands so that undue rotary torque and load can not be applied.
9) The differences of relative position after assembling the motor and the valve body do not affect the valve control and the switching function.
   Do not relocate the motor and the valve body after tightening the locknut. Even the relative position is different from before and after assembling.

Difference in rotational direction is acceptable.

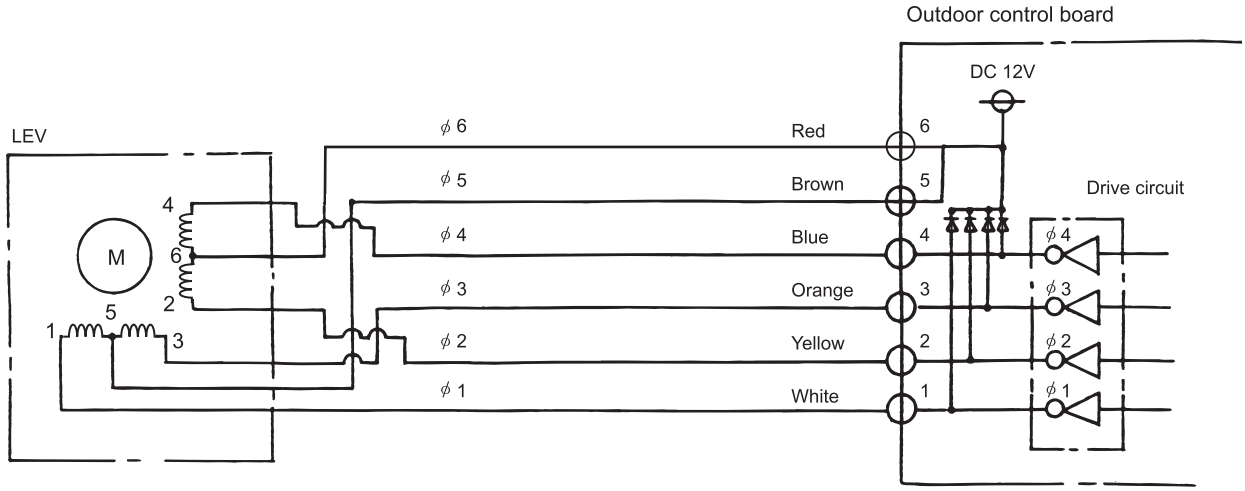


   The motor may not be fixed with clamp because of the changing of the motor configuration. However, the fixing is not necessary due to the pipe fixing.
10) Connect the connector. Do not pull hard on the lead wire. Make sure that the connector is securely inserted into the specified position, and check that the connector does not come off easily.
11) Turn on the indoor unit, and operate the air conditioner. Check that no problems are found.

(4) LEV2

The valve opening changes according to the number of pulses.

1) Connections between the control board and LEV2 (outdoor expansion valve)



2) Pulse signal output and valve operation

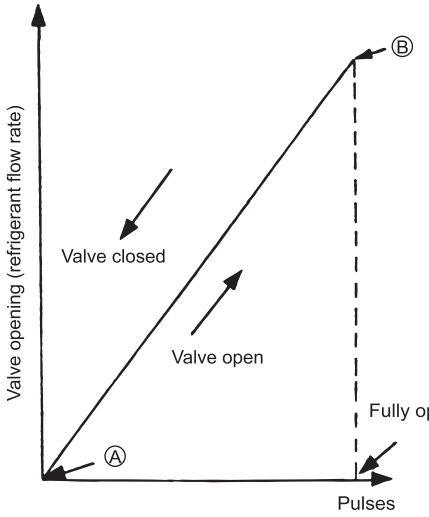
Output (phase) number	Output state							
	1	2	3	4	5	6	7	8
φ1	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
φ2	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
φ3	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
φ4	OFF	OFF	OFF	OFF	ON	ON	ON	OFF

Output pulses change in the following orders when the
Valve is open; 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 1
Valve is closed; 8 → 7 → 6 → 5 → 4 → 3 → 2 → 1 → 8

*1. When the LEV opening angle does not change, all the output phases will be off.

*2. When the output is open phase or remains ON, the motor cannot run smoothly, and rattles and vibrates.

3) LEV valve closing and opening operation



*When the power is turned on, the valve closing signal of 520 pulses will be output from the indoor board to LEV to fix the valve position. It must be fixed at point Ⓐ.
(Pulse signal is output for approximately 17 seconds.)

When the valve operates smoothly, there is no sound from the LEV and no vibration occurs, but when the valve is locked, noise is generated.

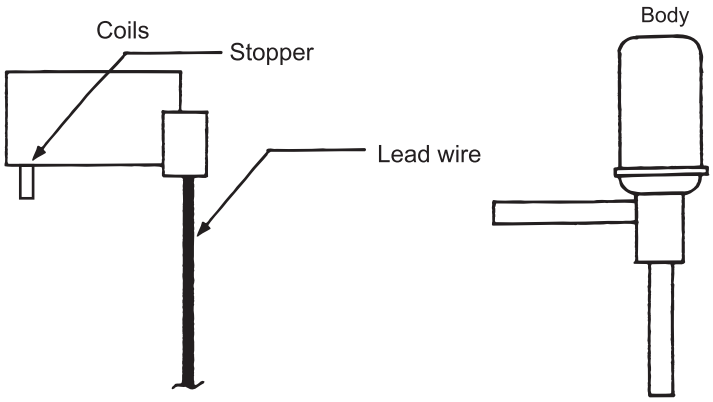
*Whether a sound is generated or not can be determined by holding a screwdriver against it, then placing your ear against the handle.

*If liquid refrigerant flows inside the LEV, the sound may become smaller.

(5) LEV (LEV2) coil removal procedure

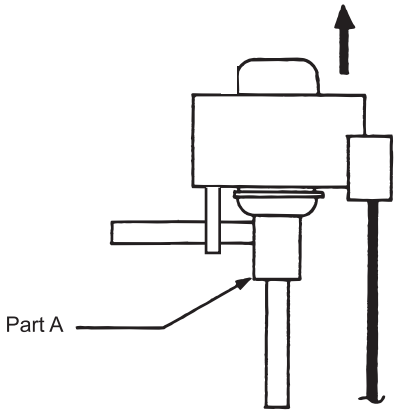
1) LEV component

As shown in the figure, the outdoor LEV is made in such a way that the coils and the body can be separated.



2) Removing the coils

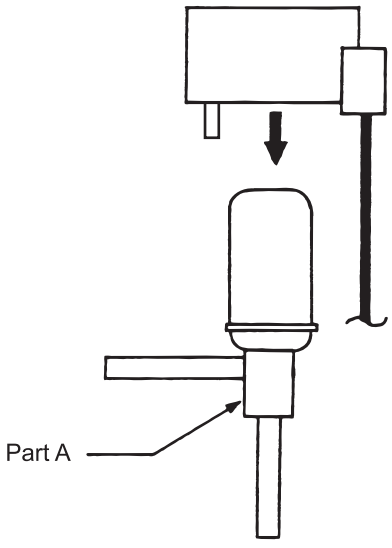
Fasten the body tightly at the bottom (Part A in the figure) so that the body will not move, then pull out the coils toward the top.If the coils are pulled out without the body gripped, undue force will be applied and the pipe will be bent.



3) Installing the coils

Fix the body tightly at the bottom (Part A in the figure) so that the body will not move, then insert the coils from the top, and insert the coil stopper securely in the pipe on the body. Hold the body when pulling out the coils to prevent so that the pipe will not be bent.

If the coils are pushed without the body gripped, undue force will be applied and the pipe will be bent. Hold the body when pulling out the coils to prevent so that the pipe will not be bent.

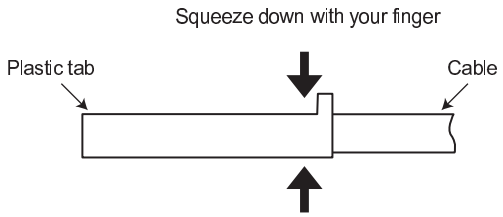


-5- Inverter

- Replace only the compressor if only the compressor is found to be defective.
- Replace the defective components if the inverter is found to be defective.
- If both the compressor and the inverter are found to be defective, replace the defective component(s) of both devices.

(1) Inverter-related problems: Troubleshooting and remedies

1) The inverter board has a large-capacity electrolytic capacitor, in which residual voltage remains even after the main power is turned off, posing a risk of electric shock. Before inspecting the inside of the control box, turn off the power, leave the unit turned off for at least 10 minutes, and check that the voltage between the pins of CN631 has dropped to 20V or less. (It takes about 10 minutes to discharge electricity after the power supply is turn off.)
2) If cables are not inserted properly to the Faston terminals or connectors are not connected properly, inverter parts will be damaged. If a problem occurs after replacing some of the parts, mixed up wiring is often the cause of the problem. Check for proper connection of the wiring, screws, connectors, and Faston terminals.
3) To avoid damage to the circuit board, do not connect or disconnect the inverter-related connectors with the main power turned on.
4) Faston terminals have a locking function. Make sure the terminals are securely locked in place after insertion. Press the tab in the middle of the terminals to remove them.



5) When replacing the INV (inverter) board, apply a thin layer of grease (supplied with the service parts) evenly to the radiation plate. Wipe off any grease that may get on the wiring terminal to avoid terminal contact failure.
6) Faulty wiring to the compressor damages the compressor. Connect the wiring in the correct phase sequence.

	Error display/failure condition	Measure/inspection item
[1]	Inverter related errors 4102, 4115, 4220, 4230, 4250, 5110, 5301, 0403	Check the details of the inverter error in the error log at 10 . [1] LED Monitor Display. Take appropriate measures to the error code and the error details in accordance with 9 . [1] Check Code List
[2]	Main power breaker trip	Refer to "(3) Trouble treatment when the main power breaker is tripped".(page 68)
[3]	Main power earth leakage breaker trip	Refer to "(4) Trouble treatment when the main power earth leakage breaker is tripped".(page 68)
[4]	Only the compressor does not operate.	Check the inverter frequency on the LED monitor and proceed to (2) - [4] if the compressor is in operation.(page 67)
[5]	The compressor vibrates violently at all times or makes an abnormal sound.	See (2)-[4].(page 67)
[6]	Noise is picked up by the peripheral device	<1> Check that power supply wiring of the peripheral device does not run close to the power supply wiring of the outdoor unit.
		<2> Check if the inverter output wiring is not running parallel to the power supply wiring and the transmission lines.
		<3> Check that the shielded wire is used as the transmission line when it is required, and check that the grounding work is performed properly on the shielded wire.
		<4> Meg failure for electrical system other than the inverter
		<5> Attach a ferrite core to the inverter output wiring. (Contact the factory for details of the service part settings.)
		<6> Provide separate power supply to the air conditioner and other electric appliances.
		<7> If the error occurred suddenly, a ground fault of the inverter output can be considered. See (2)-[4].(page 67)
		*Contact the factory for cases other than those listed above.
[7]	Sudden malfunction (as a result of external noise.)	<1> Check that the grounding work is performed properly.
		<2>Check that the shielded wire is used as the transmission line when it is required, and check that the grounding work is performed properly on the shielded wire.
		<3>Check that neither the transmission line nor the external connection wiring does not run close to another power supply system or does not run through the same conduit pipe.
		* Contact the factory for cases other than those listed above.