SANYO

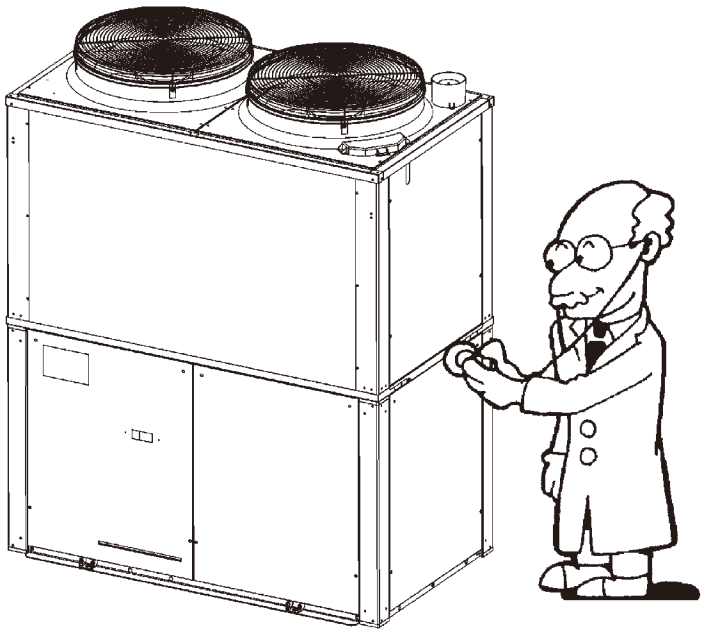
TECHNICAL & SERVICE MANUAL

Gas Heat Pump Air Conditioner

Type M2 Series

TROUBLESHOOTING

March 2008



Applicable Models : W MULTI
: 3WAY MULTI
: G POWER W MULTI

Reference No.SM7110015

◆◇◆ Applicable models ◆◇◆

< W MULTI >

SGP-EW120M2G2W

SGP-EW150M2G2W

SGP-EW190M2G2W

SGP-EW240M2G2W

< 3WAY MULTI >

SGP-EZ150M2G2

SGP-EZ190M2G2

SGP-EZ240M2G2

< G POWER W MULTI >

SGP-EGW190M2G2W

◆◇◆ Table of Contents ◆◇◆

1. Symptoms that are not malfunctions

The following symptoms are characteristic operating conditions of this system and do not indicate malfunctions:

① The fan flaps on the indoor unit operate when the unit is stopped

If the compressor outlet pressure exceeds 3.5 MPa during heating operation, the flaps on the stopped unit move to horizontal and the fan rotates in the breeze.
When this happens, it may indicate a clogged air filter.
Inspect and clean if necessary.

② Refrigerant noise is occasionally heard from the stopped indoor unit

During cooling operation of the outdoor unit, if the indoor unit is stopped for a period of time that equals the total oil recovery time period while cooling (four hours), refrigerant will circulate in the stopped unit for four minutes, so that refrigerant and oil can be recovered.
During heating operation of the outdoor unit, refrigerant will also flow in the stopped indoor unit, allowing recovery of refrigerant and oil.

③ The fan in the outdoor unit rotates slowly

The outdoor unit fan can be completely stopped or rotated at various speeds by the control system, and will be fast or slow as required. The fan is especially likely to stop or run slowly during cooling or heating operation when outside temperatures are low.
During winter, the outdoor unit fan may rotate even when the engine is stopped.

④ The unit will not switch from cooling (dry) to heating, or from heating to cooling (dry)

- If “Being controlled by operation mode” is displayed
  (When already being operated by another remote controller, the selectable operation modes are limited.)

⑤ When the following are displayed on the remote controller:

- If “Being controlled by operation mode” is displayed
  (When already being operated by another remote controller, the selectable operation modes are limited.)
- If “Operation standby” is displayed
  (In priority operation standby)
- If “Central control in progress” is displayed
  (Operation is limited by the central control unit.)
- A display appears but then vanishes
  (“Valve open” or “water circulation” has been set with the outdoor main board menu item No. 4, test operation forced setting.)"

⑥ When the engine is started, an alarm displays on the 7 segment LED display.

Engine start standby is displayed during menu item No. 0, normal display.
If the unit is in start standby and each start condition is not accomplished when the engine is started, the uncompleted start condition is displayed on the 7 segment LED. There are 5 types of start conditions, some that start automatically after a set time, and some that become abnormal."
* See Ⅳ -1 4.-(3) for a list of startup conditions.

⑦ The outdoor unit does not operate at all

- The temperature controller is operating (thermo-off)."

⑧ Cooling is poor/heating is poor

- Is the temperature controller (remote controller temperature) properly set?
  Is there too much load on the air conditioner?
- During demand control, because the unit operates at below the set fuel gas flow control value, cooling may be slightly bad (heating may be slightly bad).

⑨ “Inspect oil” flashes on the remote controller.

When the operating hours for the gas engine reach a designated time, “Inspect oil” flashes.
Change the engine oil.
If the engine oil is not changed within 200 operating hours after flashing, warning A02 will be displayed and operation will stop.

2. Before troubleshooting (W MULTI series)

(1) W MULTI series system overview

W MULTI series is a system that can join up to two outdoor units to the same refrigerant tube, and control each outdoor unit while performing air conditioning according to the operation load of the indoor unit.
Figure 1 gives an overview of the system.
In the example, the W MULTI series (refrigerant system 1) connecting to two outdoor units and 3WAY MULTI (refrigerant system 2) are linkwired by using an operation cable for the indoor - outdoor units.
(This is an example of a dual system consisting of two refrigerant systems.)

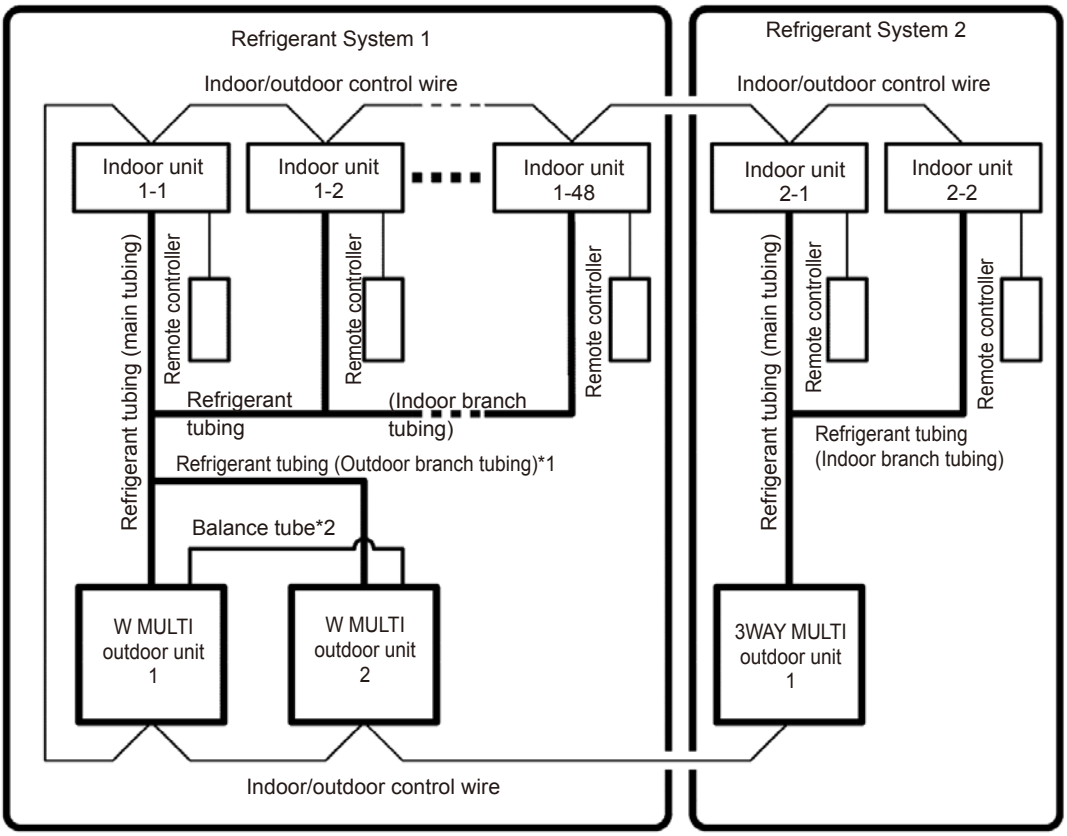


Fig. 1 GHP System Configuration Example

*1 Refrigerant tube

Figure 1 is a simplified diagram. Actually, two refrigerant tubes consisting of a gas tube (thick tube) and a liquid tube (thin tube) are used. Each W Multi outdoor unit is connected to an outdoor branch tube, and then connected to the main tube. For the indoor unit, the refrigerant tubes branched from the main tube are connected to the gas tube and liquid tube of each indoor unit.

*2 Balance tube

The W Multi outdoor unit is connected to the refrigerant gas tube and liquid tube, as well as the balance tube. The balance tube is required so as to keep the balance of the refrigerant and cooling oil between outdoor units connected to the same refrigerant system. When a certain outdoor unit is cut off from the system, it is necessary that valve of the balance tube is closed, together with the refrigerant gas tube and liquid tube.

(2) About backup operation during maintenance work

- What is backup operation?
  In the W MULTI series, multiple outdoor units are connected to the same refrigerant tube as shown in Figure 1. Therefore, even during maintenance work of an outdoor unit, the other outdoor unit not required in maintenance work can be used to keep the indoor operating conditions. This is called a backup operation.
- Backup operation procedure
  To perform backup operation, the outdoor unit for maintenance work (hereafter referred to as "target outdoor unit") must be cut off from the system using the following procedure. Review content of the maintenance work and then select the most suitable method.
  Also, after the maintenance work is finished, always refer to [System recovery procedure] and then return the system to its normal state.

[Backup operation procedure]

To turn off power of target outdoor unit and then perform maintenance work (basic operation during inspection of outdoor unit)

<<Important>>

This is the basic operation performed during inspection work. If this operation is not performed and the power of the outdoor unit is turned off, this will cause system fault and prevent backup operation to be carried out, and serious malfunction will occur. If this happens, see [System recovery procedure] to recover the system, and then once again use the following procedure to perform setup. Automatic backup operation will kick in.

<<Step 1>>

On the outdoor main board of the target outdoor unit, set the STOP switch (S001) to "STOP". *1

<<Step 2>>

(After confirming that the engine of the target outdoor unit is stopped) close the valves of refrigerant gas tube, refrigerant gas liquid tube, and balance tube.

<<Step 3>>

On the outdoor main board of the target outdoor unit, set the STOP switch (S001) to "STOP". Wait for three minutes or more and then turn off the circuit breaker of the target outdoor unit. *2

Start maintenance work.

*1)Sometimes all outdoor units may stop. If there is operation input, outdoor units other than the target one will start operation again after approximately five minutes. (For details on the settings, see the next item.)

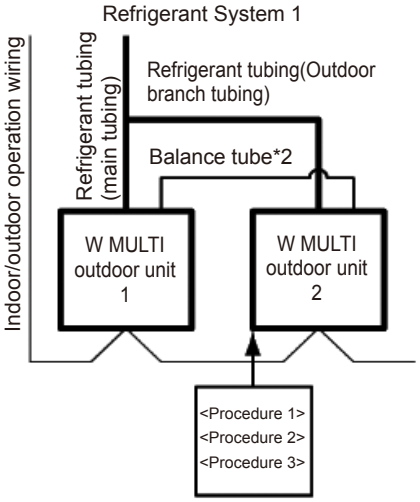
*2)Always carry out the following three tasks.

① Check to make sure <<Step 2>> is finished. If the shutoff valve is opened, refrigerant will flow from the other outdoor unit to the target outdoor unit, causing serious malfunction.

② After three minutes has elapsed from completion of <<Step 1>>, check to make sure the outdoor main board displays " P F F " and then perform this operation. If you turn off the power immediately after performing "STOP" setting, the entire system will stop. (Backup operation cannot be performed.) If this happens, see [System recovery procedure], recover the system, and then start over again starting from <<Step 1>>.

③ There will not be any problem whether the circuit breaker of the outdoor unit in <<Step 3>> is ON or OFF. Select one of them according to the work required.

[Work example] Perform maintenance on W MULTI outdoor unit 2 in refrigerant system 1 in Figure 1.



a) For the W MULTI outdoor unit 2 indicated in the left diagram, perform <<Step 1>> to <<Step 3>> in [Backup operation procedure] in that order. Then, perform maintenance work on W MULTI outdoor unit 2.
b) When <<Step 3>> is finished, W MULTI outdoor unit 1 is reset.It'll stop even if it is operating.)
c) After approximately five minutes, if there is operation input (indoor remote controller is "Run" or test run setting on outdoor main board), W Multi outdoor unit 1 starts up. (Backup operation starts.)
d) If test run is set from outdoor main board, W MULTI outdoor unit 1 continues to run. However, if normal operation is started by the indoor remote controller, depending on the load, all outdoor units may stop due to thermostat off.

[System recovery procedure]

If backup operation has been performed, by all means check the following items after the maintenance work, and then perform settings again to return the system to its normal state.

① Check to make sure all shutoff valves of refrigerant gas tube, refrigerant liquid tube, and balance tube of the outdoor unit are opened.
② Check to make sure the STOP switch (S001) on the outdoor main board is set to "NORM".
③ If the power of the outdoor unit has been turned off, turn on the circuit breaker.
④ If "Test run" (No.4 Test- Cool/Heat) is set, cancel it.

* When adjusting to No.4 Test-Cool or Heat, if TEST/WARNING LED (D052) lights, this means "Test run" is being set. In this state, press the SET (S007) key for one second or more. The setting will be canceled (TEST/WARNING LED (D052) goes off.)

3. Malfunctions and Displays

(1) Malfunctions without any display

① **The circuit breaker trips when power is turned on**

- Short circuit or ground fault of the crankcase heater, current leakage in electrical parts

② **Circuit breaker trips when operated**

- Current leakage or short circuit in fan or coolant pump, current leakage or short circuit in electrical parts

③ **Poor cooling**

1)Problem in refrigeration circuit

- Clog in refrigeration circuit, faulty 4-way valve, faulty electric valve in indoor/outdoor unit, compression failure, or shortage of refrigerant.
- Shutoff valve not completely open

2)Small fan capacity

- Clogged air filter, foreign matter in air inlet, outlet

3)Other

- Insufficient refrigerant tubing insulation

④ **Poor heating**

1)Problem in refrigeration circuit

- Clog in refrigeration circuit, faulty 4-way valve, faulty electric valve in indoor/outdoor unit, compression failure, or shortage of refrigerant.
- Shutoff valve not completely open

2)Other

- Insufficient refrigerant tubing insulation

⑤ **Heating on standby does not clear**

- Warm air is striking the room temperature sensor, temperature around room temperature sensor is high, faulty indoor control board

⑥ **Auto-flap does not move well**

1)The flaps swing, but wind direction cannot be set

- Auto-flap limit switch is faulty or has a bad connection

2)Does not move (swing, air direction setting)

- Auto-flap is faulty, indoor control board is failed, remote controller is faulty

⑦ **Loud operation noise or vibration noise**

1)Noise or vibration when fan operates

- Fan is unbalanced, worn motor axis bearing, loose fan securing screw

2)Loud operation noise or vibration noise when compressor operates

- Something is coming into contact with the refrigerant tubing or compressor

⑧ **Water leakage**

1)Drain water leakage

- Clogged drain tube, mistake in draintube construction, insufficient draintube insulation

2)Condensation on refrigerant tubing

- Insufficient tubing insulation

3)Condensation at duct outlet

- Insufficient wind capacity, gap between duct connections

⑨ **Does not stop**

- Fused magnetic contactors, faulty indoor/outdoor control board, faulty remote controller

⑩ **No display on the remote controller**

- Remote controller wiring disconnected
- Remote controller wiring shorted

(2) Remote Controller alarm display

☼: Flashing ○: Lit ●: Off

	Detection Item		Warning Display	Wireless Remote Control Lamp Display	Device Checked
Engine protective device operation	Engine system error	Engine oil pressure error	A01	Operating ● Timer ☼ Wait... ☼ Simult. flashing	Outdoor unit
		Engine oil error	A02		
		Engine high-revolution error	A03		
		Engine low-revolution error	A04		
		Ignition power source error	A05		
		Engine start failure	A06		
		Fuel gas valve error	A07		
		Engine stall	A08		
		High exhaust gas temperature	A10		
		Engine oil level error	A11		
		Throttle error	A12		
		Engine oil presure switch error	A14		
		Crankshaft angle sensor error	A23		
		Camshaft angle sensor error	A24		
		Flameout error	A26		
	Starter system error	Starter power source output short circuit	A15		
		Starter lock	A16		
		CT error (starter current detection failure)	A17		
	Coolant system error	Low coolant temperature	A19		
		High coolant temperature	A20		
		Coolant level error	A21		
		Coolant pump error	A22		
	Clutch error		A25		
	Catalyst temperature error (for only models with catalyst option)		A27		
	Generator error (for only G POWER W MULTI)		A28		
	Converter error (for only G POWER W MULTI)		A29		
	Low fuel gas pressure error		A30		
	Remote controller detected an abnormal signal from an indoor unit	Remote controller receive failure	E01	Operating ☼ Timer ● Wait... ● Flashing	Remote controller
		Remote controller transmission failure	E02		
	Indoor unit receive failure from remote controller (central)		E03		Indoor unit
Communication errors, mis-setting	Invalid setting	Duplicate indoor unit address setting	E08		Remote controller
		Multiple main remote controller units set	E09		
	Indoor unit receive failure from signal output board		E11		Indoor unit
	Automatic address setting is in progress, automatic address setting start is prohibited		E12		Outdoor unit
	Indoor unit transmission failure to remote controller		E13		Indoor unit
	Group control wiring communication failure		E18		
	Indoor unit receive failure from outdoor unit		E04	Operating ● Timer ● Wait... ☼ Flashing	Indoor unit
	Indoor unit transmission failure to outdoor unit		E05		
	Outdoor unit receive failure from indoor unit		E06		Outdoor unit
	Outdoor unit transmission failure to indoor unit		E07		
	Automatic address alarm	Too few units	E15		
		Too many units	E16		
	No indoor unit in automatic address setting		E20		
	Outdoor main board error		E21		
	Outdoor main board sensor error		E22		
	Communication failure between outdoor units (for only W MULTI)		E24		
	Inconsistencies in number of outdoor units (for only W MULTI)		E26		
	Incorrect outdoor unit tube connection (for only W MULTI)		E28		
	Communication failure between units		E31		

When the water heat exchanger unit is connected in the table above, please replace indoor unit with water heat exchanger unit for the alarm.

Note: Some items are not indicated, depending model.

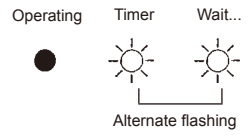
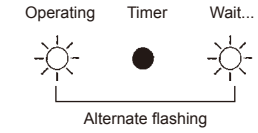
☼: Flashing ○: Lit ●: Off

		Detection Item	Warning Display	Wireless Remote Control Lamp Display	Device Checked
Sensor errors	Indoor unit sensor errors	Indoor heat exchanger inlet temperature sensor error (E1)	F01	Operating Timer Wait... ☼ ☼ ● Alternate flashing	Indoor unit
		Water heat exchanger unit anti-icing sensor error	F02		
		Indoor heat exchanger outlet temperature sensor error (E3)	F03		
		Indoor unit intake temperature sensor error	F10		
		Indoor unit discharge temperature sensor error	F11		
	Outdoor unit sensor errors	Compressor outlet temperature sensor error	F04	Operating Timer Wait... ☼ ☼ ○ Alternate flashing Lit	Outdoor unit
		Outdoor heat exchanger inlet temperature sensor error	F06		
		Outdoor heat exchanger outlet temperature sensor error	F07		
		Outside air temperature sensor error	F08		
		Compressor inlet temperature sensor error	F12		
		Coolant temperature sensor error	F13		
		Compressor inlet/outlet pressure sensor error	F16		
		Hot water outlet temperature sensor error (for only models that discharge hot water)	F17		
		Exhaust gas temperature sensor error	F18		
		Clutch coil temperature sensor error	F20	Operating Timer Wait... ● ☼ ● Flashing	
		Clutch 2 coil temperature sensor error	F21		
		Temperature sensor error for oil level measurement (for only W MULTI)	H08		
Compressor oil depletion error (for only W MULTI)			H07		
Indoor nonvolatile memory (EEPROM) error (*1)			F29	Operating Timer Wait... ☼ ☼ ● Simult. flashing	Indoor unit
Real time clock (RTC) function			F30	Operating Timer Wait... ☼ ☼ ○ Simult. flashing Lit	Outdoor unit
Outdoor nonvolatile memory (EEPROM) error			F31		
Invalid or missing setting	Inconsistencies in indoor/outdoor unit models (non-GHP equipment connected)		L02	Operating Timer Wait... ☼ ● ☼ Simult. flashing	Indoor unit
	Multiple main units set for group control		L03		
	Duplicate indoor unit priority setting	(priority indoor unit)	L05		Outdoor unit
		(excluding priority indoor unit)	L06		
	Group control wire present for individual-control indoor unit		L07		Indoor unit
	Indoor unit address not set		L08		
	Indoor unit capacity not set		L09		
	Duplicate system (outdoor unit) address setting		L04	Operating Timer Wait... ☼ ○ ☼ Lit Simult. flashing	Outdoor unit
	Outdoor unit capacity not set		L10		
	Indoor unit model setting failure		L13		
	Indoor unit pairing failure		L15		
	Gas type setting failure		L21		

When the water heat exchanger unit is connected in the table above, please replace indoor unit with water heat exchanger unit for the alarm.

Note: Some items are not indicated, depending in model.

☼: Flashing ○: Lit ●: Off

Detection Item			Warning Display	Wireless Remote Control Lamp Display	Device Checked
Indoor unit ceiling panel connector connection failure			P09		Indoor unit
Protective device operation	Indoor protection devices	Indoor fan error / indoor fan rpm error	P01		
		Indoor unit float switch operation	P10		
		Indoor DC fan error	P12		
	Outdoor protection devices	High compressor discharge temperature	P03		Outdoor unit
		Refrigerant high-pressure switch operation	P04		
		Power source error	P05		
		Water heat exchanger unit anti-icing sensor error (for only water heat exchanger unit)	P11		
		Refrigerant circuit error (for only W MULTI and 3WAY MULTI)	P13		
		O_2 sensor operation	P14		
		Complete refrigerant gas depletion	P15		
		Bypass valve error	P18		
		4-way valve lock error (not detected 3WAY MULTI)	P19		
		Refrigerant high-pressure error	P20		
		Outdoor fan error	P22		
		Water heat exchanger unit interlock error (for only water heat exchanger unit)	P23		
		Clutch connection error	P26		
Group control's sub unit error (system controller)			P30		System controller
Group control error (alarm)			P31		Indoor unit
Oil change time (level) alarm Outdoor display: oiL			Oil check		Outdoor unit
Automatic backup operation (*2)			check		
Backup operating display without power generation when the converter is abnomal			GE		

When the water heat exchanger unit is connected in the table above, please replace indoor unit with water heat exchanger unit for the alarm.

Note: Some items are not indicated, depending in model.

*1: If the indoor nonvolatile memory (EEPROM) is faulty when the power supply is turned on, Alarm code F29 is not indicated, but the power source LED on the indoor board starts to flicker.

*2: In this case, operation of the system is possible, but one of the outdoor units is detected to have stopped abnormally.

● Alarm P30 (group controlled device fault) is sometimes displayed at the system controller.

4. Error Display and Troubleshooting

The description of each error display begins on a new page. Descriptions of some troubleshooting procedures span several pages. When you refer to an error display, be sure to first check whether the description of the troubleshooting procedure spans several pages.

(1) Precautions before Troubleshooting

In order to ensure correct diagnosis and prevent accidents (electric shock, equipment malfunction, measuring instrument damage, etc.), be sure to observe the following precautions.

① Be sure to use a digital tester for voltage measurement
Avoid using a tester with an indicator needle to prevent large measurement errors or operation failure.

② Unless otherwise specified, perform voltage measurement with the terminal (terminal plate and connector) connected
In some cases, measurement is also performed with the terminal disconnected.

③ Perform continuity measurement (resistance measurement) after disconnecting the terminals on both ends
Performing continuity measurement while the terminals are connected will cause a short circuit or damage to the tester.

④ If instructed to disconnect wires before performing continuity or voltage measurement, be sure to do so, then reconnect the wires before proceeding to the next step (item)

⑤ Be sure to turn off the power before connecting or disconnecting wires

⑥ Be careful not to touch any live parts (energized components) with a hand or tool while performing voltage measurement

⑦ For DC voltage measurement, the polarity is indicated by + or - after the terminal name (symbol) to prevent confusion
Connect the red lead of the tester to the + side and the black lead to - side.

(2) About the Error Detection Procedure

Some abnormal occurrences are determined as abnormalities the first time they are detected and some are not determined to be abnormalities until they are detected multiple times.

In the latter case, the engine is not forced to shut down the first time an abnormal occurrence happens. Instead, data on the abnormal occurrence is stored in nonvolatile memory, the engine is force stopped for a period of 3 minutes, and then the engine enters the restart sequence.

In the error detection procedures described on the subsequent pages, abnormal occurrences that are determined as abnormalities after being detected multiple times (e.g. 5 times) are taken to mean abnormal occurrences that are continually detected multiple times (e.g. 5 times) within 1 hour of engine operation. Regardless of continual occurrence and engine operation time, the cumulative number of occurrences (e.g. 5 times) may force the engine to shut down.

(3) Engine Start Standby

- When the engine is in standby mode waiting for the startup conditions to be met, the conditions that have not yet been met are displayed on the 7-segment LED display.
- There are 6 startup conditions. Some conditions start the engine automatically after a specified time period, while others cause it to stop with a warning.
- Display Method
  The startup conditions (see table below) light at engine start up (No. 0 normal display only)
- Startup Conditions Displayed in Engine Start Standby Mode

Start condition	Start Standby Display Code	Condition
Refrigerant pressure equalization (between high and low pressure areas)	P 2 0	Pressure equalizing display (max. 2 min.)
Compressor outlet temperature	P 0 3	Waiting for the temperature to drop to below 115°C (If the temperature does not go down within 10 minutes, the engine is malfunction error.)
Completely run out of gas	P 1 5	Waiting for the compressor inlet pressure to exceed 0.1 MPa. (If the pressure is not restored within 10 minutes, the engine is malfunction error.)
Coolant temperature	A 2 0	Waiting for the temperature to drop to below 80°C (If the temperature does not go down within 10 minutes, the engine is malfunction error.)
Coolant level	A 2 1	If the coolant level is not restored within 3 minutes, the engine is malfunction error.
Coolant circuit	A 2 2	Waiting for the coolant pump to exceed a minimum -1 of 2500 rpm (If not restored within 3 minutes, the engine is malfunction error.)
Engine oil level	A 1 1	If the engine oil level is not restored within 60 minutes, the engine is forced to shut down.
No condenser (3WAY model only)	n o C o u d	Waiting for 3WAY solenoid valve in indoor or outdoor unit to complete switching and system is able to capture the condenser
No evaporator (3WAY model only)	n o E u A	Waiting for the 3WAY solenoid valve in indoor or outdoor unit to complete switching and the system is able to capture the evaporator

(4) Troubleshooting

A01 Engine Oil Pressure Error

① Error detection method

- When the engine oil pressure switch is OFF continuously for 3 second during engine operation (complete combustion), the engine is shut down momentarily and an error flag is set. An Engine Oil Pressure Trouble condition is assumed when the error flag has stopped the engine 5 consecutive times in 1 hour.

* At engine startup, code A06 reports an engine pressure trouble occurring within 15 seconds of detecting the opening of gas valve 1. (It is not reported by A01.)

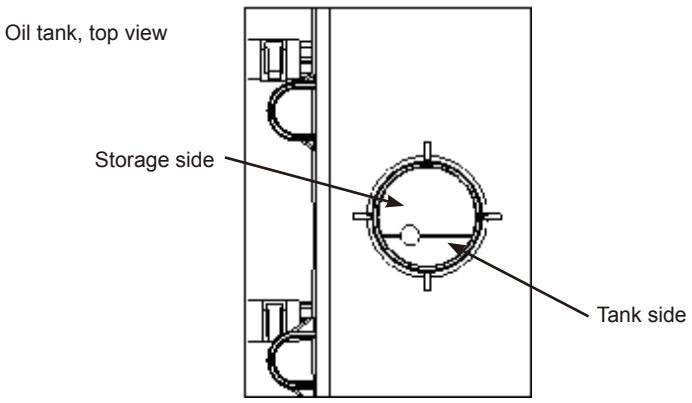
- Engine oil pressure switch: Setting value 49kPa (0.5kg/cm^2)
  Contact ON with oil pressure (common ground with engine)

② Troubleshooting

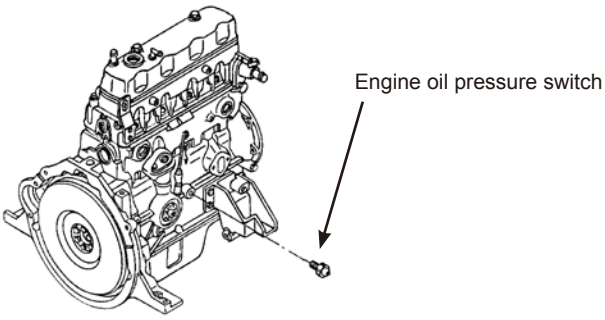
1 Oil level	1-1	Is there oil in the storage side of the oil tank?	Yes	2-1
			No	1-2
	1-2	Any oil leaks or dirty oil?	Yes	Repair
			No	1-3
	1-3	Is the tank side of the oil tank empty?	Yes	Add oil
			No	1-4
	1-4	Does the oil fill pump operate properly?	Yes	Check for pinched or clogged hose
			No	1-5
	1-5	Any oil fill pump wiring broken or disconnected?	Yes	Repair wiring
			No	Replace pump
2 Oil pressure switch	2-1	After engine operation (complete combustion), does the voltage between the oil pressure switch terminal (+) and body ground (–) measure DC 0V?	Yes	3-1
			No	2-2
	2-2	At engine start, does the oil pressure measure 49kPa (0.5kg/cm^2) or more?	Yes	Oil pressure switch defective
			No	2-3
	2-3	Is the oil filter clogged?	Yes	Replace oil filter
			No	Engine is defective
3 Wiring	3-1	Does any of the wiring below contain broken wires or suffer from poor connection, contact or crimping? • Wiring from outdoor main board connector 2P(red) CN012 No. 1 to oil pressure • Wiring from outdoor main board connector 2P (red) CN021 No. 1 to power board connector 2P (red) CN038 No. 1 Wiring between switches • Wiring from outdoor main board connector FG CN075 to (-) terminal on starter power supply	Yes	Repair wiring
			No	Replace outdoor main board

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 1-1



• 2-1



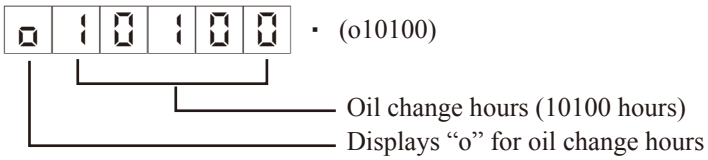
120/150/190/240 models

• 3-1
With oil pressure: DC0V
No oil pressure: DC12V

A02 Engine Oil Error

① Error detection method
When the oil change hours exceed the oil change hours (EEPROM setting), or, after error is reset for said status, when the oil change error hours (EEPROM setting: However, after 6th reset this is 4 hours) have passed. Engine is stopped when error occurs.
Note : • When the gas type setting is "1", no engine oil error is detected.
• After changing engine oil, use the procedure describe in (2) below to reset the oil change hours timer.

② Method for resetting oil change hours timer
1) Select Menu No. 2 "Oil change hours display". The oil change hours are displayed as shown below.



2) By holding down the set key while displaying the oil change hours, the display changes to the following. Also, if an operation error results in this display, simply wait for about one second to return to the previous oil change hours display.

3) When the CLr display appears, release the set key momentarily, then quickly press and hold down the set key again.
When the following display appears, the oil change hours are reset to 0 hours.
When this display does not appear, and the previous oil change hours are displayed, repeat the process as described above.

A03 Engine High-Revolution Error

① Error detection method
Engine revolution speed is,
• Engine revolution speed is more than 2,300min^{-1} continuously for 30 seconds
• Engine revolution speed is more than 2,400min^{-1} continuously for 10 seconds
• Engine revolution speed is more than 2,500min^{-1} continuously for 1 second
If any of above conditions occur, the engine stops momentarily and an error flag is set. An Engine Speed Too High trouble is assumed when the error flag has stopped the engine 5 consecutive times in 1 hour. "

② Troubleshooting

1 Check revolution speed	1-1	Measure actual revolution speed using a revolution meter. Was there high revolution when the error occurred?	Yes	2-1
			No	4-1
2 Mixer	2-1	Is the throttle valve locked or sticking?	Yes	Repair
			No	3-1
3 Compressor	3-1	Does the compressor have any reason for abnormally low load?	OK	5-1
			NG	Restore
4 Ignition pulse	4-1	Ignition coil, cam angle sensor, and crank angle sensor		
5 Wiring	5-1	• Any poor connections, poor contact or broken wires between throttle (step motor) wiring and connector? (Wiring from outdoor main board connector 6P (black) CN066 to throttle (step motor)) • In the relay part, is the wiring for the throttle (step motor) and fuel regulating valve crossed?	Yes	Reset the power after repair wiring
			No	6-1
6 Mixer	6-1	Does the throttle (step motor) coil resistance measure about 120Ω? (Disconnect relay connector 6P-1, and measure between No. 1 (red) and No. 2/No. 3, and between No. 4 (orange) and No. 5/No. 6.)	Yes	6-2
			No	Replace mixer
	6-2	Is 4 V DC applied between control board connector 6P (black) CN066 No. 1 (+) and No. 2 (-)/No. 3 (-) as well as between No. 4 (+) and No. 5 (-)/No. 6 (-) when turning the power ON (during positioning)?	Yes	Replace mixer
			No	Replace outdoor main board

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

A04 Engine Low-Revolution Error

① Error detection method

- When engine revolution speed drops to 700min^{-1} or less continuously for 3 seconds during engine operation (complete combustion), an abnormal flag is set and the engine stops. An Engine Speed Too Low condition is assumed when the error flag has stopped the engine 5 consecutive times in 1 hour.

② Troubleshooting

1 Fuel	1-1	Has the fuel gas pressure dropped? Is the fuel empty?	OK	2-1
			NG	Restore
2 Check revolution speed	2-1	Measure actual revolution speed using a revolution meter. Is the revolution actually low?	Yes	3-1
			No	4-1
3 Mixer	3-1	Is the throttle valve operating?	Yes	6-1
			No	5-1
4 Ignition pulse	4-1	Check ignition coil, cam angle sensor, and crank angle sensor.		
5 Wiring	5-1	Any poor connections, poor contact or broken wires between throttle (step motor) wiring and connector?(Wiring from outdoor main board connector 6P (black) CN066 to throttle (step motor))	Yes	Repair wiring
			No	8-1
6 Engine	6-1	Measure compression (See A06 5-1).	OK	6-3
			NG	6-2
	6-2	Wash valve and adjust valve clearance. If still NG, replace engine head.		
	6-3	Are sparks emitted properly?	Yes	6-6
			No	6-4
	6-4	Inspect ignition plug.	OK	6-5
			NG	Replace
	6-5	Ignition coil, cam angle sensor, and crank angle sensor	OK	Replace high tension cord
			NG	Repair
	6-6	Inspect zero governor (see A06 3-1).	OK	6-7
			NG	Restore
	6-7	Ignition timing? (see A06 5-4)	OK	7-1
			NG	Adjustment
7 Fuel gas regulating valve	7-1	Does the fuel regulating valve (step motor) coil resistance measure about 120Ω? (Disconnect relay connector 6P-6 and measure between No. 1 (red) and No. 2/No. 3, and between No. 4 (orange) and No. 5/No. 6.)	OK	7-2
			NG	Replace mixer
	7-2	Is 4 V DC applied between outdoor main board connector 6P (red) CN065 No. 5 and No. 1/No. 2 as well as between No. 3/No. 4 when turning the power ON (during positioning)?	Yes	Replace mixer
			No	8-1
8 Mixer	8-1	Does the throttle (step motor) coil resistance measure about 120Ω? (Disconnect relay connector 6P-2, and measure between No. 1 (red) and No. 2/No. 3, and between No. 4 (orange) and No. 5/No. 6.)	Yes	8-2
			No	Replace mixer
	8-2	Is 4 V DC applied between outdoor main board connector 6P (black) CN066 No. 1 (+) and No. 2 (-)/No. 3 (-) as well as between No. 4 (+) and No. 5 (-)/No. 6 (-) when turning the power ON (during positioning)?	Yes	Replace mixer
			No	Replace outdoor main board

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
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A05 Ignition Source Error

① Error detection method

When the starter power output meets the following conditions, an error is detected upon 5 consecutive occurrences in one hour.

- When an ignition voltage decrease is detected for 2.5 seconds or more.
- During cranking, when I<3.8A is detected for 4 seconds, with no revolution pulse.

Note) The starter power source magnet switch (52S) operation is as follows.

- When power is turned on, 52S turns ON upon operation signal input. If no abnormalities occur thereafter (A15,A16, A17), this stays ON, and turns OFF upon stop signal input.
- Turns OFF when error occurs.

② Troubleshooting

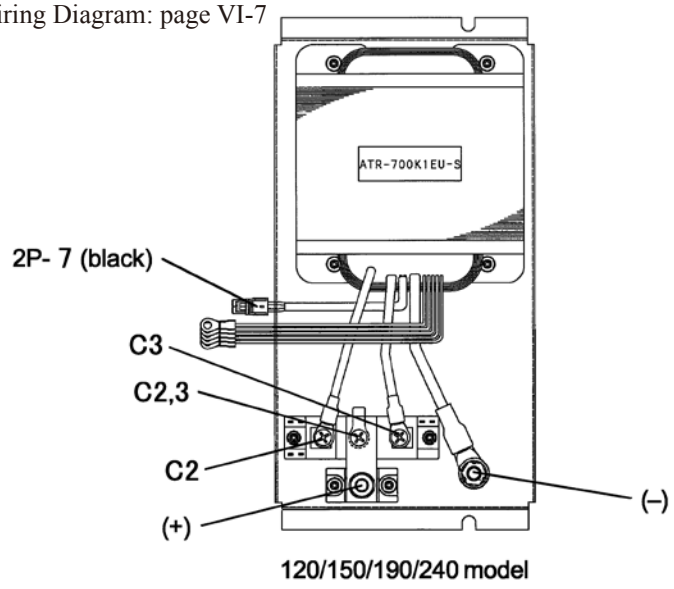
Try operating the outdoor unit.

- When the starter power source magnet switch (52S) does not turn ON: Go to 1-1
- When the starter power source magnet switch (52S) turns ON, and then turns OFF after 3 seconds: Go to 2-1
- When the starter power source magnet switch (52S) turns ON but the starter does not turn ON: Go to 4-1

1 Starter power source magnet switch (52S)	1-1	At magnet switch ON timing, is there AC200V between magnet switch A1 and A2?	Yes	Replace magnet switch
			No	1-2
	1-2	At magnet switch ON timing, is there AC200V between power board connector 3P (yellow)/CN028 No. 1 and No.3?	Yes	1-3
			No	1-4
	1-3	Wiring connection/contact poor between power board connector 3P (red)/CN028 and magnet switch A1-A2 → Repair wiring		
	1-4	Is there AC200V between power board connector 5P (yellow)/CN002 No. 1 and No. 2 ?	Yes	Replace Power board
			No	2-1
2 Ignition coils	2-1	At magnet switch ON, is there DC11V or more between outdoor main board connector 2P (black) CN006 No. 1 (+) and No. 2 (–)?	Yes	Replace control board
			No	2-2
	2-2	With outdoor main board connectors 6P (white) CN010 and 6P (black) CN011 disconnected, at magnet switch ON, is there DC11V or more between outdoor main board connector 2P (black) CN006 No. 1 (+) and No. 2 (–)?	Yes	2-3
			No	2-4
	2-3	Check for wiring ground fault or short-circuit from outdoor main board connector 6P (white) CN010 and 6P (black) CN011 to each ignition coil.	OK	Replace ignition coil
			NG	Repair wiring
	2-4	At magnet switch ON, is there AC11V or more between power board connector 2P (white) CN022 No. 1 and No. 2?	Yes	2-5
			No	3-1
	2-5	Wiring connection/contact poor, or wire broken, between power board connector 2P (black) CN025 and outdoor main board connector 2P (black) CN006?	Yes	Repair wiring
			No	Replace power board
3 Ignition (starter) power source	3-1	At magnet switch ON, is there about AC11V between starter power source relay connector 2P-18 (black) No. 1 and No. 2?	Yes	
			No	
	3-2	Wiring connection/contact poor, or broken wire, between power board connector 2P (white)/ CN022 and starter power source relay connector 2P-7 (black) → Repair wiring		
	3-3	At magnet switch ON, is there AC200V between starter power source relay connector 2P-4 (white) No. 1 and No. 2 ?	Yes	Replace starter power source
			No	
	3-4	At magnet switch ON, is there about AC200V between magnet switch No. 2 and No. 6?	Yes	
			No	
	3-5	Wiring connection/contact poor, or broken wire with wiring between magnet switch and starter power source relay connector 2P-4 (white) → Repair wiring		

	3-6	Is there about AC200V between magnet switch No. 1 and No. 5?	Yes	3-7
			No	Check primary wiring → Repair
	3-7	At magnet switch ON, is there about AC200V between magnet switch A1 and A2?	Yes	Replace magnet switch
			No	3-8
	3-8	Wiring connection/contact poor, or wire broken, between power board connector 3P (yellow) CN028 and magnet switch?	Yes	Repair wiring
			No	3-9
	3-9	Is there about AC200V between power board connector 5P (yellow)/ CN002 No. 1 and No. 3?	Yes	Replace power board
			No	Check relevant wiring filter board
4 Starter/ starter relay (Outdoor main board)	4-1	At magnet switch ON, is there DC10V or more between starter B terminal (+) and engine ground (–)?	Yes	4-2
			No	4-3
	4-2	At cranking timing, is there DC10V or more between starter S terminal (+) and engine ground (–)?	Yes	Replace starter
			No	4-5
	4-3	At magnet switch ON, is there DC10V or more between starter power source positive (+) and negative (–)?	Yes	4-4
			No	3-3
	4-4	Wiring connection/contact poor between starter power source positive terminal and starter B terminal, or between starter power source negative terminal and engine ground → Repair wiring		
	4-5	At cranking timing, is there DC10V or more between power board connector CN084 (+) and outdoor main board connector FG CN075 (–)?	Yes	4-6
			No	4-7
	4-6	Wiring connection/contact poor from power board connector CN084 (+) to starter S terminal → Repair wiring		
	4-7	At magnet switch ON, is there DC10V or more between power board connector CN084 (+) and outdoor main board connector FG CN075 (–)?	Yes	Replace outdoor main board
			No	4-8
	4-8	Wiring connection/contact poor from power board connector CN085 (+) to starter power source positive terminal → Repair wiring		

- For work procedure for replacing outdoor main board, see "5. Reference Document".
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- 3-1~3-5,4-3,4-4,4-6,4-8



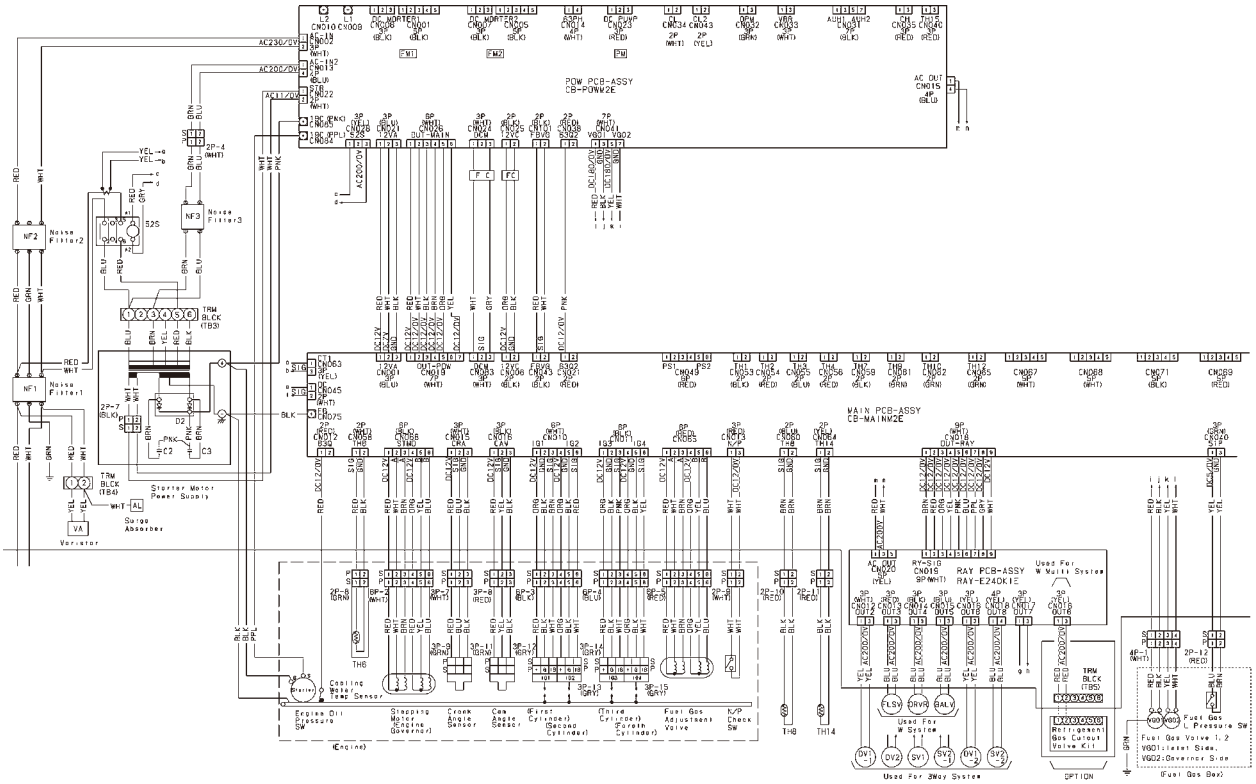
120/150/190/240 model

A06 Engine Start Failure

① Error detection method

1. When startup cannot be confirmed (but revolution speed is detected) 6 seconds after detecting the opening of gas valve 1 at startup.
2. At engine startup when there is no oil pressure switch input 15 seconds after detecting the opening of gas valve 1.

Error input is structured as shown below.



② Troubleshooting

1 Engine	1-1	Has the fuel gas pressure dropped? Is the fuel empty? Measure the pressure at the gas pressure measuring port during cranking.	OK	2-1
			NG	1-2
	1-2	Is the gas solenoid valve SW (S002 on outdoor main board) on the NORMAL side?	Yes	4-1
			No	Switch to NORMAL
2 Plug	2-1	Are sparks emitted properly? (Remove plug and check independently. Or, check with timing light.)	Yes	3-1
			No	2-2
	2-2	Any poor connections, poor contact, poor crimping or broken wires between ignition wiring and outdoor main board connector 6P (white)/ CN010 and 6P (black)/CN011?	Yes	Repair wiring
			No	2-3
	2-3	Inspect ignition plug.	OK	7-1
			NG	Replace plug
3 Zero governor	3-1	Inspect zero governor.	OK	5-1
			NG	Restore
4 Gas solenoid valve/Gas adjustment valve	4-1	During cranking, is there DC180V between fuel gas solenoid valve relay connector 4P-1 (white) No. 1 (+) and No. 2 (–), and No. 3 (+) and No. 4 (–)?	Yes	4-2
			No	6-1
	4-2	During cranking, is a voltage of DC180V or more applied across terminals of fuel gas solenoid valve coil? For gas-type C models, go to 4-4.	Yes	4-4
			No	4-3
	4-3	Poor wiring connection/crimping, or broken wire, between fuel gas solenoid valve relay connector 4P-1 (white) and solenoid valve → Repair wiring		
	4-4	Poor fuel gas solenoid valve operation (Replace after checking for any foreign matter blocking the fuel gas passage, etc. No abnormalities: go to 4-5)		
	4-5	Throttle (step motor) and fuel gas regulating valve operating properly?		

5 Engine	5-1	Measure compression.	OK	5-3
			NG	5-2
	5-2	Wash valve and adjust valve clearance. If still NG, replace engine head.		
	5-3	Air cleaner? (visual inspection)	OK	5-4
			NG	Clean/replace
	5-4	Ignition timing?	OK	Keep under observation
			NG	Adjustment
6 Solenoid valve wiring/ board	6-1	During cranking, is there 180 V DC between power board connector 7P (white) CN041 pin 1 (+) and pin 3 (–)? And between pin 5 (+) and pin 7 (–)?	Yes	6-2
			No	6-3
	6-2	Poor connection/contact/crimping or broken wire for wiring from power board connector 7P (white)/CN041 to fuel gas solenoid valve relay connector 4P-1 (white) → repair		
	6-3	Is 200 V AC applied between power board connector 3P (white) and CN002 No. 1 - No. 2?	Yes	Replace power board
			No	7-1
7 Crank/cam angle sensor	7-1	Any poor connections, poor contact, poor crimping or broken wires in the wiring below? • Wiring from outdoor main board connector 3P (white) CN015 to crank angle sensor connector • Wiring from outdoor main board connector 3P (black) CN016 to cam angle sensor connector	Yes	Repair wiring
			No	8-1
8 Ignition Coil	8-1	Inspect ignition coil (coil, igniter), and ignition wiring.	Yes	Repair wiring
			No	A01 Troubleshoot engine oil pressure trouble

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
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  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 3-1
  1) Remove front cover and diaphragm.
  2) Remove valve and valve lever assembly.
  3) Inspect for diaphragm damage or tears, and valve operation conditions.

- 5-1
  1) After warming the engine, remove all spark plugs.
  2) Force the fuel gas solenoid valve off (trial operation and outdoor unit forced setting> force fuel gas solenoid valve off)
  * When the gas solenoid valve force switch (S002) is used to close the gas solenoid valve, an A07 is issued before cranking.
  3) Set compression gauge in spark plug hole.
  4) Crank engine for 4 to 5 seconds (operation signal/trial operation, etc.).
  5) Repeat three times to confirm that gauge value exceeds limit value.

	Gas type	Limit value
For G POWER engine	G	1.62MPa

- 5-4
  For procedures, see Chapter 5 “Inspection and Adjustment of Ignition Timing.”

A07 Fuel Gas Valve Error

① Error detection method

- An error is determined when either or both of the following gas valves do not open: fuel gas valve 1 controlled by the outdoor main board and fuel gas valve 2 controlled by the outdoor power board.
- When the fuel gas valve is open but the feedback signal has ceased.

② Troubleshooting

1 Gas solenoid valve	1-1	Is 180 V DC being applied between the fuel gas solenoid valve relay connector No. 1 (+) and No. 2 (-) as well as between No. 3 (+) and No. 4 (-) during cranking?	Yes	1-2
			No	1-3
	1-2	Is 180 V DC being applied between terminals of the fuel gas solenoid coil during cranking?	Yes	1-4
			No	1-3
	1-3	Repair poor connection, poor crimping, broken wires in wiring between the fuel gas solenoid valve relay connector and the solenoid valve or replace it.		
	1-4	Poor fuel gas solenoid valve operation (Replace after checking for any foreign matter blocking the fuel gas passage, etc.)		
2 Engine	2-1	Is 180 V DC applied between the power board connector 7P (white) CN041 pin 1 (+) and pin 3 (-) as well as between pin 5 (+) and pin 7 (-) during cranking?	Yes	2-2
			No	Power board
	2-2	Poor connection, contact, crimping or broken wires in wiring between the power board connector 7P (white) CN041 and fuel gas solenoid valve relay connector. Repair or replace.		
3 Gas solenoid valve Feedback	3-1	Check gas valve feedback wiring for poor connection and broken wires.	Yes	Repair/replace wiring
			No	3-2
	3-2	Repair the outdoor power board. Did this solve the problem?	Yes	Defective power board
			No	3-3
	3-3	Replace outdoor main board.		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
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  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

A08 Engine Stall

① Error detection method
During engine operation (complete combustion), when engine revolution speed ≤ 100min-1 continuously for 3 seconds, the engine is stopped momentarily and an error flag is set.
An Engine Stall condition is assumed when the error flag has stopped the engine 5 consecutive times in 1 hour.

② Troubleshooting

1 Fuel	1-1	Has the fuel gas pressure dropped? Is the fuel empty?	OK	2-1
			NG	Restore
2 Engine	2-1	Measure compression (See A06 5-1).	OK	2-3
			NG	2-2
	2-2	Wash valve and adjust valve clearance. If still NG, replace engine head.		
	2-3	Are sparks emitted properly?	Yes	2-6
			No	2-4
	2-4	Inspect ignition plug.	OK	2-5
			NG	Replace
	2-5	Ignition coil, cam angle sensor, and crank angle sensor	OK	Replace high tension cord
			NG	Repair
	2-6	Inspect zero governor (see A06 3-1).	OK	2-7
			NG	Restore
	2-7	Ignition timing? (see Chapter 5 (9)).	OK	2-8
			NG	Adjustment
	2-8	"Air intake occurring? Check rubber plug on intake manifold."	OK	2-9
			NG	Replace
	2-9	Fuel gas regulating valve operating properly?	Yes	2-10
			No	Repair/replace
	2-10	Is about 4 V DC applied between outdoor main board connector 6P (black) CN066 No. 1 (+) and No. 2 (-)/No. 3 (-) as well as between No. 4 (+) and No. 5 (-)/No. 6 (-) when turning the power ON (during positioning)?	Yes	Replace mixer
			No	2-11
	2-11	Is DC voltage applied between outdoor main board connector 6P (red) CN065 No. 5 and No. 1/No. 2 as well as between No. 3/No. 4 when turning the power ON (during positioning)?	Yes	Replace mixer
			No	Replace outdoor main board

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
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  - Outdoor Unit Electrical Wiring Diagram: page VI-7

A10 Exhaust Gas Temperature High

① Error detection method
During engine operation (complete combustion), when the exhaust gas temperature ≥ 130°C continuously for 10 seconds, the engine is stopped momentarily and an error flag is set.
An Exhaust Gas Temp. High error is assumed when this flag has shut down the engine once.

② Troubleshooting

1 Exhaust gas temperature	1-1	Measure actual exhaust gas temperature. Is it high?	Yes	1-2
			No	Replace exhaust gas heat exchanger
2 Check wiring and thermistor	2-1	Measure exhaust gas temperature sensor resistance. (See “5. Reference Document” for thermistor characteristics.)		
3 Check coolant amount	3-1	Check for any disconnected hose. Disconnected?	Yes	Repair
			No	1-1

- For board and Electrical Wiring Diagram, see Chapter 6.
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  - Outdoor power board: page VI-3
  - Converter board: VI-4
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  - Indoor control board for AC motor models: page VI-6
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A11 Engine Oil Level Error

① Error detection method

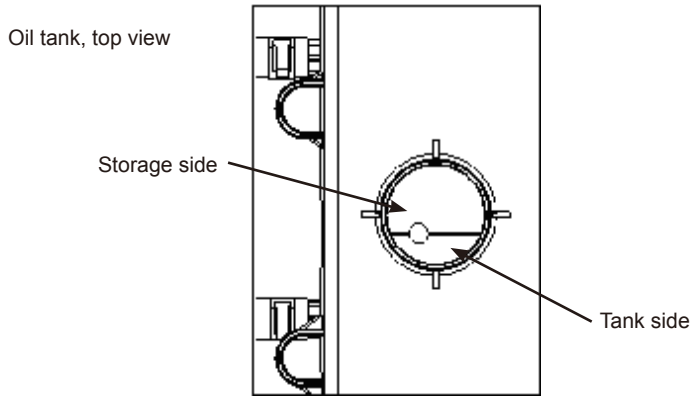
- An Engine Oil Level Error has occurred when the oil level switch does not go on after 60 minutes of oil pump operation with the oil level L switch in Off position (low level) and the engine is off.

② Troubleshooting

1 Sub oil pan	1-1	Proper oil level?	Yes	3-1
			No	2-1
2 Communication hose/Equalizer hose	2-1	Pinched/clogged/trapped communication hose or equalizer hose?	Yes	3-1
			No	Repair
3 Oil level low float switch (OLSL)	3-1	Operating properly? Remove float switch (OLSL) and check conduction when raising and lowering on tester. * Oil level low when float is down (conducting)	Yes	Replace float switch.
			No	4-1
4 Check wiring	4-1	Any broken wires or poor connections between the outdoor main board connector 4P (black) CN029 No. 3/4 to OLSL?	Yes	Repair
			No	Replace outdoor main board

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 * Reference (Electrical Wiring Diagram C - D-6)

- 1-1



A12 Throttle (Step Motor) Error

① Error detection method

- When performing forced self-diagnosis mode 2 in the self-diagnosis mode, when the throttle is not operating properly, the engine is stopped and an error flag is set.
  When the reason for engine shutdown is this error flag, occurring one time.
- An error is determined when, during engine complete combustion, the set revolution speed and actual revolution speed differ widely for 5 consecutive times in 1 hour. (Difference of ±100 revolutions during stablerevolution)

* This can only be reset from the outdoor main board.

② Troubleshooting

1 Wiring	1-1	Any poor connection/contact or broken wires for step motor (throttle) wiring and connector? (Wiring from control board connector 6P (black) CN066 to relay connector 6P-2 (white))	Yes	Repair wiring
			No	2-1
2 Mixer	2-1	Does the step motor (throttle) coil resistance measure about 120Ω? (Disconnect relay connector 6P-2, and measure between No. 1 (red) and No. 2/No. 3, and between No. 4 (orange) and No. 5/No. 6.)	Yes	2-2
			No	Replace mixer
	2-2	When turning power ON (during positioning), is about DC4V applied respectively across control board connector 6P (black) CN066 No. 1 (+) and No. 2 (–)/No. 3 (–), and across No. 4 (+) and No. 5 (–)/No. 6 (–)?	Yes	Replace mixer
			No	Replace control board

- For board and Electrical Wiring Diagram, see Chapter 6.
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  - Outdoor power board: page VI-3
  - Converter board: VI-4
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  - Outdoor Unit Electrical Wiring Diagram: page VI-7

A14 Engine Oil Pressure Switch Error

① Error detection method

- When starting the engine, if the oil pressure switch is ON for 6 seconds or more (contact closed) before complete combustion, an error flag is set. An abnormal stop results on the first occurrence. However, if turned OFF, the error flag is automatically reset and the starting sequence continues.

② Troubleshooting

1 Engine internal pressure	1-1	Does the error clear when removing the engine head cover oil cap or the sub oil pan cap?	Yes	2-1
			No	3-1
2 Hose	2-1	Check for pinched or clogged hoses: Engine to sub oil pan connection hose, blowby hose, and equalizer hose.		
3 Wiring	3-1	Does this recur even when disconnecting the wiring connected to the oil pressure switch? (Note: Never allow the disconnected wiring to touch the frame or engine.)	Yes	3-2
			No	Replace oil pressure switch
	3-2	Is there a ground fault in wiring between the outdoor main board connector 2P (red) CN012 and the oil pressure switch? (Remove the wiring between the connector and the oil pressure switch and measure resistance between wiring and the engine.	Yes	Repair wiring
			No	Replace outdoor main board

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 3-2
  With oil pressure: DC0V
  No oil pressure: DC12V

A15 Starter Power Source Output Short Circuit

① Error detection method
When the starter power primary current meets the following conditions, an error is determined upon 5 consecutive
occurrences in 1 hour.
- Not during cranking: When 40A or more is detected for 0.1 second or more
- Not during cranking: When 26A or more is detected for 0.2 second or more
- Not during cranking: When 3.8A or more is detected for 5.0 second or more

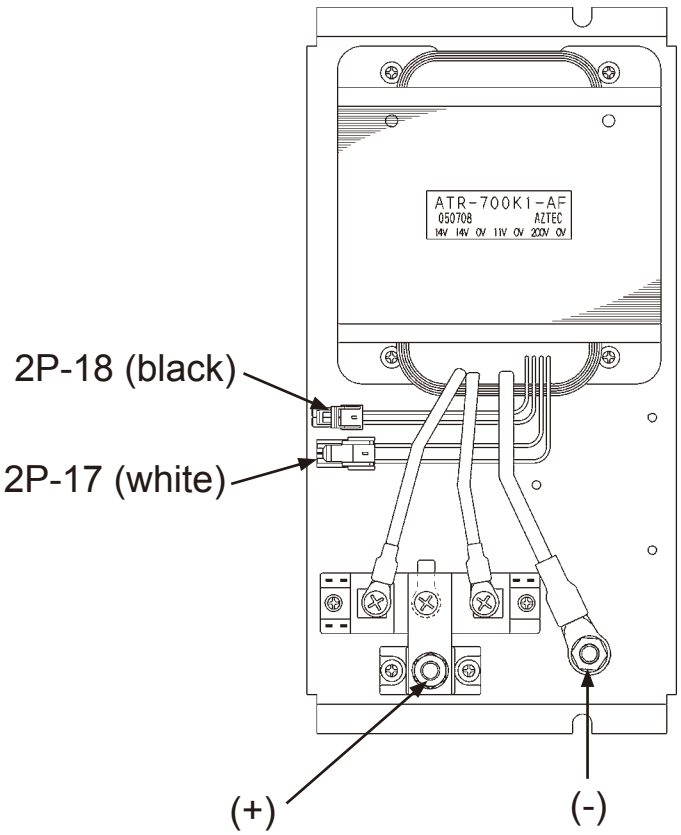
Note 1) The starter power source magnet switch (52S) operation is as follows.
- 52S turns ON upon operation signal input. If no abnormalities occur thereafter (A15, A16, A17), this stays ON,and turns OFF upon stop signal input.
- Turns OFF when error occurs.

② Troubleshooting

1 Starter power source (DC current)	1-1	Reoccurs even when disconnecting the two wires from the starter power source ⊕ terminals?	Yes	1-2
			No	2-1
	1-2	Reoccurs even after disconnecting control board connector 3P (yellow) CN063 (Ignore abnormality A17 if it occurs.)	Yes	Replace control board
			No	Replace starter power source
2 Starter	2-1	Is either of the two wires from the starter power source ⊕ terminal to the starter short-circuited, ground faulted, or misrouted?	Yes	Repair/replace wiring
			No	Replace starter

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 *Reference (Electrical Wiring Diagram C-D-1-2)

- 1-1,2-1



A16 Starter Lock

① Error detection method

- During cranking, a Starter Locked error is assumed when any of the following conditions occur 5 times in 1 hour: the starter power primary current meets the following condition, no revolution pulse is detected, no input from the crank angle sensor, no input from the ?cam? angle sensor.
- When 32A or more is detected for 1.0 second or more

② Troubleshooting

1) Check starter

1 Starter	1-1	Check for starter lock (If there is no starter lock (includes engine and compressor) replace the outdoor main board)		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.

2) Temporarily remove the compressor drive belt, and check the following rotating parts for locking.
(See Periodic Inspection and Parts Replacement Manual for installing and removing compressor drive belt)

2 Compressor	2-1	Rotates by hand with some resistance?	Yes	3-1
			No	Replace compressor
3 Engine	3-1	Temporarily remove ignition plugs from all cylinders. Can the engine crank be rotated? (To rotate the crankshaft, follow the procedure in the Periodic Inspection and Parts Replacement Manual.) Replace engine if the engine crankshaft does not rotate.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

A17 CT Error (Starter Current Detection Failure)

① Error detection method

When the starter power primary current meets the following conditions, an error is determined upon 5 occurrences in 1 hour.

- During cranking: With no detection of starter current, and with revolution speed pulse detected, when 5 seconds pass during cranking or when engine attains complete combustion.

② Troubleshooting

1 CT1 (Current sensor 1)	1-1	Does the wiring from the starter power source magnet switch (52S) terminal No. 1 pass through CT1 (current sensor)?	Yes	1-2
			No	Repair wiring
	1-2	Use a clamp meter on the R-phase wiring of the starter power source to measure the current during cranking. Was the current 5A or more?	Yes	1-3
			No	2-1
	1-3	Is there a voltage of AC 0.5V or more between outdoor main board connector 3P (yellow) CN063 No. 1 and No. 3 during cranking?	Yes	Replace outdoor main board
			No	Replace current sensor 1
2 Starter power source	2-1	Broken wire or poor contact in wiring for R and T phases of starter power source?	Yes	Repair wiring
			No	Replace starter power source

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7* Reference (Electrical Wiring Diagram C - D-1 - 2)

A19 Low Coolant Temperature

① Error detection method

- When the coolant temperature does not exceed 60 C during engine operation (complete combustion) , the engine stops momentarily. (The time varies between 30 to 60 minutes depending on temperature.)
  An emergency shutdown occurs when the engine has stopped twice due to this error.
  The cumulative number of times is reset when the coolant maintains a temperature of 60 C or more or exceeds 85 C.

② Troubleshooting

1 Main unit	1-1	Remove the electric cooler three-way valve and check whether it is locked. Check power initialization, current output and actual valve operation. → Repair or replace the three-way valve.

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

A20 High Coolant Temperature

① Error detection method
When the coolant temperature ≥ 100°C continuously for 2 seconds during engine operation (complete combustion), the engine is shut down and an error flag is set.
A Coolant Temp. High error is assumed when this flag has shut down the engine 5 consecutive times.

② Troubleshooting

1 Pump rotation	1-1	Is the coolant pump rotating during operation?	Yes	2-1
			No	See A22
2 Coolant circuit	2-1	Are the three-way electric coolant valve and the electric cooler three-way valve at the engine outlet operating properly?	Yes	2-2
			No	Repair or replace the three-way valve.
	2-2	Any signs of coolant discharge from the reserve tank?	Yes	2-4
			No	2-3
	2-3	Is there air in the coolant?	Yes	Discharge air
			No	3-1
	2-4	Is coolant leaking or seeping from the coolant hose?	Yes	Repair, then discharge air
			No	Discharge air
4 Check sensor	3-1	Disconnect the coolant temperature sensor relay connector 2P-12 (green) and measure the resistance value. Measure the surface temperature and compare. (See “5. Reference Document” for thermistor characteristics.)	OK	3-2
			NG	Replace coolant temperature sensor
	3-2	After resetting the error and operating again, measure the surface temperature of the coolant circuit. Does the temperature increase?	Yes	Reinvestigate
			No	3-3
	3-3	Is there water etc. on relay connector 2P-8 (green)?	Yes	Repair
			No	3-4
	3-4	If A20 recurs , replace the outdoor main board.		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

  * Reference(Electrical Wiring Diagrams A - B-3: coolant pump)
  (Electrical Wiring Diagrams D - E: sensor)

- 2-1
- Three-way electric coolant valve and electric cooler three-way valve inspection
  1) Operate engine, and measure the surface temperature of tubing flowing to the 2F outdoor heat exchanger.
  2) Confirm that coolant temperature is rising, and that coolant is flowing toward 2F.

- 2-3
- First opened: 70°C Fully open: 80°C
  Air discharge hose should not emit large amounts of bubbles.
  "Engine discharge part (coolant sensor attachment)
  Air bleed cock: E120 and 150 types"
  Tubing after engine outlet (before wax valve) Air bleed cock: 190 and 240 types

- 3-1
- Coolant temperature sensor resistance value (See thermistor characteristics chart for details.)
  40°C:1.2kΩ 50°C:879Ω 60°C:642Ω 70°C:477Ω
  80°C:361Ω 90°C:227Ω 100°C:216Ω

A21 Coolant Level Error

① Error detection method

- The start-up sequence or engine operation is halted and an error flag thrown if the coolant level switch is off for a 5-second interval during engine start-up (maximum of 3 minutes) or engine operation (complete combustion).
  A Coolant Level Trouble is assumed when the error flag has stopped the engine 5 consecutive times in 1 hour (at startup 1 time).
- Coolant level (float) switch turns off when the remainder in the reserve tank reaches 0.5 liters.

② Troubleshooting

1 Check coolant level	1-1	Is there coolant in the reserve tank?	Yes	3-1
			No	2-1
2 Check for coolant leaks	2-1	Any external signs of coolant leaks? Check visually.	Yes	Repair
			No	2-2
	2-2	Any coolant in the oil pan?	Yes	Replace engine head or gasket
			No	2-3
	2-3	Remove drain hose for exhaust gas heat exchanger, and operate pump → Does the drain emit coolant?	Yes	Replace exhaust gas heat exchanger
			No	Refill coolant
3 Check float switch	3-1	Is the voltage between outdoor main board connector 3P (white) CN037 No. 1 and No. 3 0 V DC?	Yes	Replace outdoor main board
			No	3-2
	3-2	Poor connection/contact/crimping or broken wires in wiring between outdoor main board connector 3P (white) CN037 and relay connector 3P-5 (white)?	Yes	Repair wiring
			No	Replace float switch

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
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  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 2-1
  Visually inspect all portions of the coolant system while stopped
  Any coolant leaks, or evidence of coolant leaks? Also, any water leaks or hose leaks when circulating water and activating pump?
  Use “water circulation” on No. 4 trial operation/forced settings menu. Press the set key, which lights and operates the coolant pump. Press again to stop the pump and turn off the key light. (Displays “ Pump”)
  1) Hoses and connections
  2) Flange connections
  3) Threaded connections
  4) Tubing/welds

- 2-2
  Collect oil from oil pan
  Emulsification → Mixed
  No emulsification → Not mixed

- 3-1
  With float switch ON: DC0V
  With float switch OFF: DC5V

A22 Coolant Pump Error

① Error detection method
When the coolant pump rotation and drive meet the following conditions, an error is determined on the first occurrence.
- When coolant pump rotation is not detected upon startup.
- When coolant pump rotation does not increase.
- When coolant pump rotation is too high.
- When overcurrent is detected in the coolant pump circuit.

② Troubleshooting

1 Coolant pump	1-1	Any coolant pump locking, broken wires, poor contact, or short circuits? (coil resistance should be around 14-18Ω for each phase.)	Yes	Replace coolant pump
			No	1-2
	1-2	Replace power board and keep under observation. If A22 reoccurs, replace coolant pump.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 *Reference (Electrical Wiring Diagram A-B-3)

A23 Crankshaft Angle Sensor Error
A24 Camshaft Angle Sensor Error

① Error detection method
When input from the sensor meets the following conditions, an error is determined upon 5 consecutive occurrences in 1 hour.
- When starter current was detected during cranking, but crank angle sensor input is not detected for 2 continuous seconds.
- When starter current was detected during cranking, but cam angle sensor input is not detected for 3 continuous seconds.

② Troubleshooting

1 Crank angle sensor trouble	1-1	Does the starter operate?	Yes	1-3
			No	1-2
	1-2	Check starter S terminal for short circuit or ground fault, and starter B terminal for broken wire.	OK	Replace starter
			NG	Repair wiring
	1-3	Poor connection or broken wire in crank angle sensor wiring?	Yes	Repair wiring
			No	1-4
	1-4	Replace outdoor main board. If NG, replace sensor.		
2 Cam angle sensor trouble	2-1	Poor connection or broken wire in cam angle sensor wiring?	Yes	Repair wiring
			No	2-2
	2-2	Replace outdoor main board. If NG, replace sensor.		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 * Reference (Electrical Wiring Diagram B - F-1 - 2)

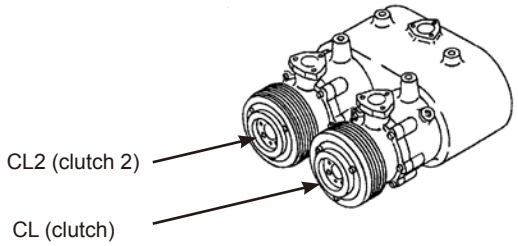
A25 Clutch Error

① Error detection method
A Clutch Error fault is detected when clutch coil temperature or clutch 2 coil temperature is 110 C or more for up to 1 minute.
Error is detected with one occurrence.

② Troubleshooting
*The compressor uses a twin clutch specification. Inspect both clutch 1 and clutch 2.

1 Compressor lock	1-1	Rotate the compressor pulley by hand while stopped, to check for compressor lock. Locked? (Both clutch 1 and clutch 2 are off, so be sure to turn the center of the pulley and not just the perimeter.)	Yes	Replace compressor
			No	2-1
2 Clutch coil sensor	2-1	Use a contact thermometer to measure the temperature of the back of the pulley. Is this temperature nearly identical (within 10 C) to that of clutch 1 and clutch 2 coil of the outdoor main board?	OK	Investigate further
			NG	2-2
	2-2	Is there a ground fault or short circuit in wiring between outdoor main board connector 2P (blue) CN060 and 2P (yellow) CN064 and their respective clutch coil sensors.	Yes	Repair wiring
			No	Replace clutch coil sensor

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7



- 2-1
  See Chapter 5 for procedure to view clutch and clutch 2 coil temperature on the outdoor main board.

A26 Flameout Error

① Error detection method

- An error is determined when the engine revolution speed fluctuates widely during engine operation. The engine is stopped and an error flag is set.
  A flameout error is assumed when this flag has shut down the engine 5 consecutive times in 1 hour.

② Troubleshooting

1 Ignition system error	1-1	Are sparks emitted properly?	Yes	1-2
			No	1-3
	1-2	Proper ignition timing?	OK	2-1
			NG	Adjust timing
	1-3	Any poor connection/contact/crimping and broken wires in wiring between the outdoor main board connector 6P (white) CN010, 6P (black) CN011 and each IG coil (igniter)?	Yes	Repair wiring
			No	1-4
	1-4	Ignition plug working properly?	Yes	1-5
			No	Replace ignition plug
	1-5	Try replacing the IG coil (igniter). If fault persists after replacement, replace the outdoor main board.		
2 Engine unit error	2-1	Measure compression (See A06 5-1).	OK	3-1
			NG	2-2
	2-2	Wash valve and adjust valve clearance. If still NG, replace engine head.		
3 Fuel regulating system error	3-1	Check operation of fuel gas regulating valve and throttle (step motor). Operating properly?	Yes	3-2
			No	Replace
	3-2	Inspect zero governor. Operating properly?	Yes	3-3
			No	Restore
	3-3	Air intake occurring? Check rubber plug on intake manifold, etc.		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 1-2
  1-2 See Chapter 5 for timing adjustment.

A27 Catalyst Temperature Error (for only models with catalyst option)

① Error detection method

- When a catalyst temperature exceeding 700°C is detected continuously for 10 seconds during engine operation, the engine is stopped and an error flag is set.
  A Catalyst Temp. Trouble is assumed when this flag has shut down the engine 5 consecutive times in 1 hour.

② Troubleshooting

1 Unit error	1-1	Check the wiring and connectors. Everything OK?	Yes	1-2
			No	Repair wiring
	1-2	Thermistor operating properly?	OK	1-3
			NG	Replace thermistor
	1-3	Inspect ignition timing. Everything OK?	Yes	Replace outdoor main board
			No	Adjust

- For work procedure for replacing outdoor main board, see "5. Reference Document".
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
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  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 1-2 Thermistor resistor values

100°C	96.0KΩ
200°C	13.5KΩ
300°C	3.3KΩ
400°C	1.15KΩ
500°C	514Ω
600°C	268Ω
650°C	198Ω
700°C	151Ω
750°C	122Ω
800°C	98Ω

- 1-3 See Chapter 5 for timing adjustment.

A28 Generator Error (for only G POWER W MULTI)

① Error detection method

Generator Error is assumed when an error occurs in the generator.

- When broken wires in generator wiring has resulted in an open phase.
- When a short-circuit has occurred in generator wiring or inside it.
- When a converter circuit is damaged.

② Troubleshooting

1 Generator	1-1	Any locking, broken wires, poor contact, short circuits (rare short-circuit) in the generator? (OK if coil resistance between wires is about 0.1 - 0.5 Ω)	Yes	Replace the generator.
			No	2-1
2 Converter board	2-1	Do LED5 and LED6 flash on converter 1 or 2?	OK	Replace converter 1.
			NG	Replace converter 2.

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

A29 Converter Error (for only G POWER W MULTI)

① Error detection method

Converter Error is assumed when an error occurs in the converter.

- When wires are broken or short-circuit has occurred in converter elements.
- When a converter circuit is damaged.
- When the TR temperature sensor and generator temperature sensor connectors are not connected to the converter board.

② Troubleshooting

1 Check converter	1-1	Do LED5 and LED6 flash on converter 1 or 2?		
2 Check connectors of flashing converter	2-1	• Are the TR temperature sensor and generator temperature sensor connectors connected to the converter board?	Yes	Replace converter
			No	Connect connectors

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

A30 Low Fuel Gas Pressure Error

① Error detection method
An error is determined when the fuel gas supply pressure is less than the setting value during fuel gas valve operation (open) continuously for 3 seconds.
- Pressure setting: P 0.4KPa (gas low pressure switch contact ON)

② Troubleshooting

1 Check gas supply pressure	1-1	Check fuel gas supply pressure. Is the supply pressure low?	Yes	Check gas pressure and tubing diameter
			No	1-2
	1-2	When the gas supply pressure is proper, disconnect 3P (green) CN040 on the control board, and check conduction of the gas low pressure switch. Conducting?	Yes	1-3
			No	1-4
	1-3	Check for short-circuiting (or pinching) of fuel gas low pressure switch wiring. Any short-circuited wiring (from board to fuel gas low pressure switch)?	Yes	Repair/replace wiring
			No	Replace gas low pressure switch
	1-4	If the supply pressure is normal and A30 occurs, replace the control board.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
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  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E01 Remote Controller Receive Failure

① Error detection method

An error is determined when no incoming communication is received for 3 minutes.

- When 9 or more indoor units are wired into the remoto controller group.
- When inspection (inspection pin) or TEST (test pin) on the indoor control board is short-circuited.
- When the non-volatile memory (EEPROM) is not inserted or has failed upon turning power ON.
- Indoor control board failure

② Troubleshooting

1 Auto-address	1-1	Is auto-addressing complete?	Yes	1-2
			No	1-3
	1-2	Has auto-addressing failed (warning displayed on outdoor unit)?	OK	1-3
			NG	2-1
	1-3	Perform pre-check before auto-addressing. (See “5. Reference Document”)		
2 Group control wiring	2-1	Is this indoor unit group-controlled?	Yes	2-2
			No	3-1
	2-2	Are any indoor units wired into the remoto controller group turned OFF?	Yes	Turn power ON
			No	2-3
	2-3	Are 9 or more indoor units connected to one remoto controller group wiring?	Yes	Repair wiring
			No	2-4
	2-4	Was the remoto controller group wiring modified after autoaddressing was complete? Or, were group settings changed using the remoto controller properties setting mode?	Yes	2-5
			No	3-1
	2-5	No main unit present in remoto controller group wiring --> Repeat auto-addressing.		
3 Indoor control board	3-1	Is the inspection pin (CN062/CN071) or TEST pin (CN064) on the indoor control board short-circuited?	Yes	Eliminate short-circuit
			No	3-2
	3-2	Is an option board (CN060) or wireless remoto controller (CN041) connected to the indoor control board?	Yes	3-3
			No	3-5
	3-3	Does E01 disappear several minutes after disconnecting said connector on the indoor control board? (When controlling with two remoto controllers and the wireless remoto controller is the main, set the other remoto controller as the main).	Yes	3-4
			No	3-5
	3-4	Replace the removed option board or wireless remoto controller operating unit, wiring and all.		
	3-5	Is the LED (D002) blinking on the indoor control board?	Yes	3-6
			No	3-7
	3-6	Nonvolatile memory (EEPROM) on the outdoor main unit is not inserted, is incorrectly inserted or is defective --> Correct or replace nonvolatile memory and program it in the remoto controller properties setting mode.		
	3-7	Short-circuit or misrouting in indoor unit remoto controller wiring?	Yes	Repair wiring
			No	Replace indoor control board

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See “5. Reference Document” for checking remoto controller.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
- Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM) and replacing indoor control board.

E02 Remote Controller Transmission Failure

① Error detection method
When the remoto controller (controller) itself cannot transmit. Or, when a self-transmitted signal cannot be self-received or changes, an error is determined.
- Breakdown of remoto controller itself

② Troubleshooting

1 Remoto controller group wiring	1-1	Is this indoor unit group-controlled?	Yes	1-2
			No	2-1
	1-2	Any short-circuit or broken wires for remoto controller group link wiring 1 (white) and 2 (black)?	Yes	Repair wiring
			No	2-1
2 Indoor control board	2-1	Is an option board (CN060) or wireless remoto controller (CN041) connected to the indoor control board?	Yes	2-2
			No	2-4
	2-2	Does E02 disappear several minutes after disconnecting said connector on the indoor control board? (When controlling with two remoto controllers and the wireless remoto controller is the main, set the other remoto controller as the main).	Yes	2-3
			No	2-4
	2-3	Replace the removed option board or wireless remoto controller operating unit, wiring and all.		
	2-4	Short-circuit or misrouting in indoor unit remoto controller wiring?	Yes	Repair wiring
			No	Replace indoor control board

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See “5. Reference Document” for checking remoto controller.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
- Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

E03 Indoor Unit Receive Failure from Remote Controller (Central)

① Error detection method

1) With indoor unit connected

An error is determined when no transmission is received from the remote controller (central) for 3 minutes, or when no transmission is received from the central equipment for 15 minutes.

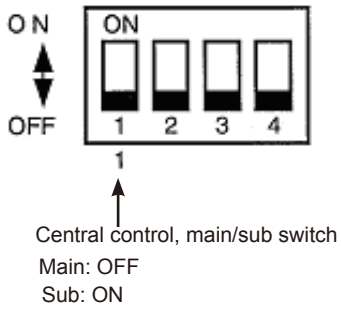
- When transmission had been normal but the remoto controller wiring became broken or misrouted.
- Broken indoor and outdoor operating wiring to central control equipment.
- Only sub remoto controller is set.
- No remoto controller, with central control equipment power OFF.
- No remoto controller, and only sub remoto controller is set.

② Troubleshooting

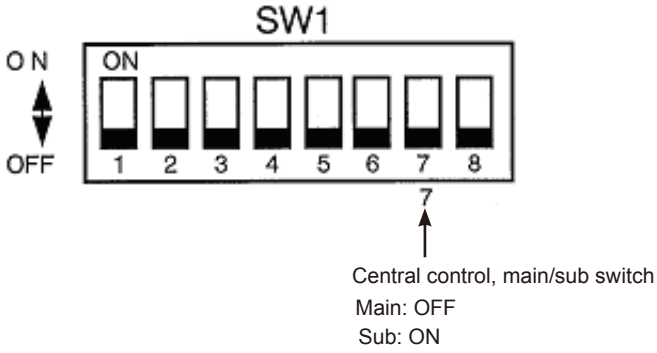
1 Central control equipment	1-1	Is central control equipment connected?	Yes	1-2
			No	2-1
	1-2	Is the central control equipment power OFF?	Yes	Turn power ON
			No	1-3
	1-3	Are all the central control main-sub switches on the connected central control equipment set to “sub”?	Yes	1-4
			No	1-5
	1-4	Of the connected central control equipment, set only the highest-ranking central control unit to “main”, and set the remaining units to “sub”. Ranking order from high to low: AMY adapter → intelligent controller → system controller → multi-controller.		
	1-5	Are any broken indoor and outdoor operating wires connected to central control equipment? (See “5. Reference Document”)	Yes	Repair wiring
			No	2-1
2 Remoto controller	2-1	Is this indoor unit group-controlled?	Yes	2-2
			No	3-1
	2-2	Any broken wires for remoto controller group link wiring 1 (white) and 2 (black)?	Yes	Repair wiring
			No	3-1
3 Indoor control board	3-1	Is an option board (CN060) or wireless remoto controller (CN041) connected to the indoor control board?	Yes	3-2
			No	3-4
	3-2	Does E03 disappear several minutes after disconnecting said connector on the indoor control board? (When controlling with two remoto controllers and the wireless remoto controller is the main, set the other remoto controller as the main).	Yes	3-3
			No	3-4
	3-3	Replace the removed option board or wireless remoto controller operating unit, wiring and all.		
	3-4	Short-circuit, misrouting, or broken wires in indoor unit remoto controller wiring?	Yes	Repair wiring
			No	Replace indoor control board

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See “5. Reference Document” for checking remoto controller.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

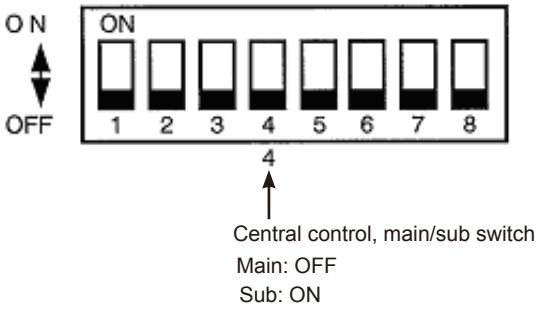
• 1-4



Intelligent Controller



System Controller



Multi-Controller

E04 Indoor Unit Receive Failure from Outdoor Unit

① Error detection method

After turning power ON, with no transmission from outdoor unit for 3 minutes. Or, an error is determined when the outdoor unit does not respond.

- Outdoor unit power is OFF.
- With link wiring, when outdoor main board terminal resistor switch (S7) is set to “ON” for several units.
- When turning power ON after completing auto-addressing, when the number of indoor units has changed.
- When indoor unit power is not ON.
- Inspection pin (CN062/CN071) or TEST pin (CN064) on the indoor control board is short-circuited.
- Non-volatile memory (EEPROM) is not inserted when changing indoor board.
- In the remoto controller detailed settings mode, the indoor address is “undetermined”.
- Indoor unit addresses duplicated
- Indoor/outdoor operation wiring is short-circuited or broken.
- Error in the reception circuit on the signal output board (option board)
- Breakdown of outdoor unit
- High voltage (AC200V, etc) applied across indoor/outdoor operation wire circuit

② Troubleshooting

1 Power supply	1-1	Is/was the outdoor unit power OFF?	Yes	Turn power ON and wait 3 minutes
			No	1-2
	1-2	Is the indoor unit power OFF?	Yes	Turn power ON
			No	2-1
2 Indoor/ outdoor operation wiring	2-1	Indoor/outdoor operation wiring broken or short-circuited? (See “5. Reference Document”)	Yes	Repair wiring
			No	2-2
	2-2	With link wiring, is the outdoor main board terminal resistor switch (S010) set to “ON” for several units?	Yes	Set only one unit to “ON”
			No	2-3
	2-3	High voltage (AC200V, etc) applied across indoor/outdoor operation wire circuit?	Yes	3-2
			No	3-1
3 Indoor unit count	3-1	Did the number of indoor units increase or decrease after auto-addressing?	Yes	3-2
			No	3-3
	3-2	Perform pre-check before auto-addressing. (See “5. Reference Document”)		
	3-3	In the remoto controller detailed settings mode, check the indoor unit address (item code 13). Any undetermined (99) or duplicated addresses for indoor units?	Yes	3-2
			No	4-1
4 Indoor control board	4-1	Is the inspection pin (CN062/CN071) or TEST pin (CN064) on the indoor control board short-circuited?	Yes	Eliminate short-circuit
			No	4-2
	4-2	Is an option board (CN060) or wireless remoto controller (CN041) connected to the indoor control board?	Yes	4-3
			No	4-5
	4-3	Does E04 disappear several minutes after disconnecting said connector on the indoor control board? (When controlling with two remoto controllers and the wireless remoto controller is the main, set the other remoto controller as the main).	Yes	4-4
			No	4-5
	4-4	Replace the removed option board or wireless remoto controller operating unit, wiring and all.		
	4-5	Is the LED (D002) blinking on the indoor control board?	Yes	4-6
			No	4-7
	4-6	Nonvolatile memory (EEPROM) on the outdoor main unit is not inserted, is incorrectly inserted or is defective --> Correct or replace nonvolatile memory and program it in the remoto controller properties setting mode.		
	4-7	Is E4 displayed on all remoto controllers for other indoor units connected to this outdoor unit?	Yes	Replace outdoor main board
			No	Replace indoor control board

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM) and replacing indoor control board.
- See “5. Reference Document” for checking remoto controller.

E05 Indoor UnitTransmission Faiure to Outdoor Unit

① Error detection method

When a self-transmitted signal cannot be self-received, an error is determined.

- Indoor (water heat exchanger unit) control board is defective.
- Outdoor main board terminal resistor switch setting is incorrect.

② Troubleshooting

1 Indoor control board	1-1	Is the indoor/outdoor operation wiring connected to multiple outdoor units? (Link wiring?)	Yes	1-2
			No	1-3
	1-2	Is the S010 (terminal resistor) switch on one outdoor main board set to “ON” and the remainder to “OFF”?	Yes	1-4
			No	Set only one unit to “ON”
	1-3	Is the outdoor main board S010 (terminal resistor) switch set to “OFF”?	Yes	Set to “ON”
			No	1-4
	1-4	Indoor/outdoor operation wiring broken or short-circuited?	Yes	Repair wiring
			No	1-5
	1-5	Replace indoor (water heat exchanger unit) control board		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

E06 Outdoor Unit Receive Failure from Indoor Unit

① Error detection method

An error is determined when no indoor unit transmission (response) is received for 3 minutes.

- Indoor unit power is OFF.
- Indoor unit DISP pin (CN063/CN072) is short-circuited.
- Indoor/outdoor operation wiring is short-circuited or broken.
- Indoor unit signal output board (option board) is defective.

② Troubleshooting

1 Indoor power source	1-1	Is the indoor unit power OFF?	Yes	Turn power ON
			No	2-1
2 Indoor/ outdoor operation wiring	2-1	Indoor/outdoor operation wiring broken or short-circuited? (See “5. Reference Document”)	Yes	Repair wiring
			No	3-1
3 Indoor control board	3-1	Is the DISP pin (CN063/CN071) or inspection pin (CN062/ CN071) on the indoor control board short-circuited?	Yes	Eliminate short-circuit
			No	3-2
	3-2	Is an option board (CN060) or wireless remoto controller (CN041) connected to the indoor control board?	Yes	3-3
			No	3-5
	3-3	Does E06 disappear several minutes after disconnecting said connector on the indoor control board? (When controlling with two remoto controllers and the wireless remoto controller is the main, set the other remoto controller as the main).	Yes	3-4
			No	3-5
	3-4	Replace the removed option board or wireless remoto controller operating unit, wiring and all.		
	3-5	Indoor control board failure → Replace board		

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

E07 Outdoor Unit Transmission Failure to Indoor Unit

① Error detection method

When a self-transmitted signal cannot be self-received (is mismatched) for 3 minutes, an error is determined.

- Outdoor main board is defective
- Outdoor main board terminal resistor switch setting is incorrect.

② Troubleshooting

1 Outdoor main board	1-1	"Is the indoor/outdoor operation wiring connected to multiple outdoor units? (Link wiring?) * Link wiring not available when water heat exchanger unit is connected."	Yes	1-2
			No	1-3
	1-2	Is the S010 (terminal resistor) switch on one outdoor main board set to “ON” and the remainder to “OFF”?	Yes	1-4
			No	Set only one unit to “ON”
	1-3	Is the outdoor main board S010 (terminal resistor) switch set to “OFF”?	Yes	Set to “ON”
			No	1-4
	1-4	Indoor/outdoor operation wiring broken or short-circuited? (See “5. Reference Document”)	Yes	Repair wiring
			No	1-5
	1-5	Replace outdoor main board		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E08 Duplicated Indoor Unit Address Setting

① Error detection method

An error is determined when the Indoor unit address is duplicated.

- In the remoto controller detailed settings mode, the indoor address setting is duplicated.
- Several indoor units with no indoor unit address setting have the DISP pin (CN063/CN072) short-circuited.

② Troubleshooting

1 Indoor control board	1-1	Is the DISP pin (CN063/CN072) on the indoor control board short-circuited?	Yes	Eliminate short-circuit
			No	1-2
	1-2	Perform pre-check before auto-addressing. (See “5. Reference Document”) E08 remains after repeating auto-addressing?	Yes	1-3
			No	1-4
	1-3	Non-volatile memory (EEPROM) on indoor board is defective → Replace		
	1-4	To change indoor unit address, instead of the remoto controller detailed settings, use remoto controller address change mode.		

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM).

E09 Multiple Main Remoto Controller Units Set

① Error detection method

An error is determined when multiple main remoto controllers exist within a remoto controller group.

- Forgot to set a remoto controller “sub” when controlling with two remoto controllers.
- Forgot to set a remoto controller “sub” when controlling with a wireless remoto controller and a wired remoto controller

② Troubleshooting

1 Remoto controller	1-1	Set one of the two remoto controllers to “Sub”.

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 1-1

  Sub remote setup procedure (E type)

  ①Hold down the [Change mode] and [Set] buttons for 4 seconds or more.

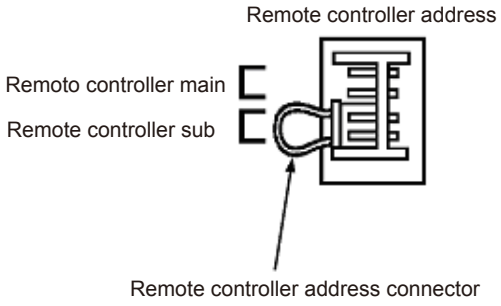
  ②"Setup", an item code " 0 1 " and setup data " 0 0 0 " appears on the remoto controller LCD.

  ③Use the [▼] / [▲] buttons to switch to " 0 0 0 0 " setup data.

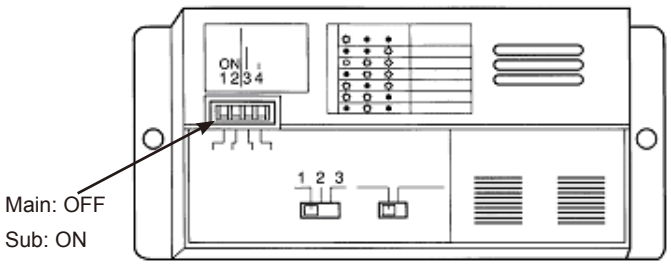
  ④Press the [Set] button (the setting is completed when flashing changes to steady light)

  ⑤Press the [Inspect] button to return to normal remoto controller display.

Wired remoto controller (B type)



Wireless remoto controller



E11 Indoor Unit Receive Failure from Signal Output Board

① Error detection method
After confirming existence of the signal output board, an error is determined upon no reception from the signal output board.
- Signal output board is defective.
- Wiring to signal output board is defective.

② Troubleshooting

1 Signal output board	1-1	Wiring to signal output board (option board) broken or short-circuited?	Yes	Repair wiring
			No	1-2
	1-2	Replace the signal output board (option board) and wiring. Is E11 displayed again?	Yes	Replace indoor control board
			No	Replace signal output board

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

E12 Automatic Address Setting Is in Progress: Automatic Address Setting Start is Prohibited

① Error detection method
An error is determined when an auto-addressing startup command is received from another unit during autoaddressing.
- In a system with multiple outdoor units, with indoor/outdoor operation wiring connected (with link wiring), an autoaddressing startup command was issued by another unit during auto-addressing.

② Troubleshooting

1 Auto-address	1-1	In a system with multiple outdoor units, with indoor/outdoor operation wiring connected (with link wiring), an autoaddressing startup command was issued by another unit during auto-addressing. Wait until current auto-addressing is complete.

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E13 Indoor Unit Transmission Failure to Remoto controller

① Error detection method
When a signal transmitted from the indoor unit (water heat exchanger unit) to the remoto controller cannot be self-received, an error is determined.
- Indoor unit (water heat exchanger unit) control board is defective.
- Short-circuit or broken wires in remoto controller wiring 1 (white) and 2 (black) (with indoor unit connected)

② Troubleshooting

1 Indoor control board	1-1	Any short-circuit or broken wires in remoto controller wiring 1 (white) and 2 (black)?	Yes	Repair wiring
			No	1-2
	1-2	Replace indoor control board.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

E15 Automatic Address Alarm (Too Few Units)

① Error detection method

An error is determined when the indoor unit count responding to transmission is less than the indoor unit count set on the outdoor unit. (Also detected apart from auto-addressing.)

- The actual number of indoor units is less than the number of indoor units set on the outdoor unit.
- Connected indoor unit power is OFF
- An indoor unit has a short-circuited inspection pin (CN062/CN071) or TEST pin (CN064) upon power ON.
- High voltage (AC200V, etc) was applied across indoor/outdoor operation wire circuit.

② Troubleshooting

1 Power supply	1-1	Is the indoor unit power OFF?	Yes	Turn power ON
			No	2-1
2 Indoor/ outdoor operation wiring	2-1	Indoor/outdoor operation wiring broken or short-circuited? (See “5. Reference Document”)	Yes	Repair wiring
			No	2-2
	2-2	High voltage (AC200V, etc) applied across indoor/outdoor operation wire circuit?	Yes	3-2
			No	3-1
3 Indoor unit count	3-1	Did the number of indoor units change after autoaddressing? Or, was the indoor unit count setting changed on the outdoor main board?	Yes	3-2
			No	4-1
	3-2	Perform pre-check before auto-addressing. (See “5. Reference Document”)		
4 Indoor control board	4-1	Is the inspection pin (CN062/CN071) or TEST pin (CN064) on the indoor control board short-circuited?	Yes	Eliminate short-circuit
			No	4-2
	4-2	Is an option board (CN060) or wireless remoto controller (CN041) connected to the indoor control board?	Yes	4-3
			No	4-5
	4-3	Does E15 disappear several minutes after disconnecting said connector on the indoor control board? (When controlling with two remoto controllers and the wireless remoto controller is the main, set the other remoto controller as the main).	Yes	4-4
			No	4-5
	4-4	Replace the removed option board or wireless remoto controller operating unit, wiring and all.		
	4-5	Is the LED blinking on the indoor control board?	Yes	4-6
			No	5-1
	4-6	Nonvolatile memory (EEPROM) on the outdoor main unit is not inserted, is incorrectly inserted or is defective --> Correct or replace nonvolatile memory and program it in the remoto controller properties setting mode.		
5 Outdoor main board	5-1	On the outdoor main board, use setting No. 10 to set the indoor unit count. Then compare the indoor unit connection status using No. 9 (indoor unit check), and investigate the unaccounted indoor unit in detail.		

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See “5. Reference Document” for checking remoto controller.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM) and replacing indoor control board.

* In systems that link wiring systems where a water heat exchanger unit is connected, the state of hot and cold water may output an Automatic Address Setting Warning.
Should this happen, remove link wiring and set a different address.

E16 Automatic Address Alarm (Too Many Units)

① Error detection method
An error is determined when the indoor unit count (water heat exchanger units) responding to transmission exceeds the indoor unit count (water heat exchanger units) set on the outdoor unit. (Also detected apart from autoaddressing.)

- The actual number of indoor units exceeds the number of indoor units set on the outdoor unit (with indoor unit connected).

② Troubleshooting

1 Auto-address	1-1	Perform pre-check before auto-addressing. (See “5. Reference Document”)

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E18 Group Control Wiring Communication Failure

① Error detection method

When remoto controller group control main unit cannot communicate with sub unit. An error is determined when the remoto controller group control sub unit has not communicated with the main unit for 3 minutes.

- An indoor unit within group control is not powered ON.
- Inspection pin (CN062/CN071) or TEST pin (CN064) is short-circuited on an indoor unit within group control.
- Indoor unit DISP pin (CN063/CN072) is short-circuited on a sub indoor unit within group control.
- Remoto controller group wiring is broken.
- Multiple indoor units within group control are set as “main.”
- An indoor unit within group control is set as “independent.”

② Troubleshooting

1 Indoor unit	1-1	Is the indoor unit power OFF?	Yes	Turn power ON
			No	1-2
	1-2	Is the inspection pin (CN062/CN071) or TEST pin (CN064) or DISP pin (CN063/CN072) on the indoor control board short-circuited?	Yes	Eliminate short-circuit
			No	2-1
2 Remoto controller group Wiring	2-1	Remoto controller group wiring broken?	Yes	Repair wiring
			No	2-2
	2-2	In the remoto controller detailed settings mode, check the group settings (item code 14). Multiple main units (1), or any independent (0) settings?	Yes	2-3
			No	3-1
	2-3	Remoto controller group wiring routed as intended?		2-4
				2-5
	2-4	Repeat auto-addressing process.		
	2-5	After repairing remoto controller group wiring, repeat auto-addressing process.		
3 Indoor control board	3-1	Is an option board (CN060) or wireless remoto controller (CN041) connected to the indoor control board?	Yes	3-2
			No	3-4
	3-2	Does E18 disappear several minutes after disconnecting said connector on the indoor control board? (When controlling with two remoto controllers and the wireless remoto controller is the main, set the other remoto controller as the main).	Yes	3-3
			No	3-4
	3-3	Replace the removed option board or wireless remoto controller operating unit, wiring and all.		
	3-4	Replace indoor control board		

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See “5. Reference Document” for checking remoto controller.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

E20 No Indoor Unit in Automatic Address Setting

① Error detection method
An error is determined when an indoor unit is not recognized at auto-addressing start up or upon turning the outdoor unit power ON.
- Indoor unit address is not properly assigned.
- Indoor unit power is OFF.

② Troubleshooting

1 Power supply, wiring	1-1	Indoor unit address properly assigned?	Yes	1-2
			No	Set address
	1-2	Is the indoor unit power ON?	Yes	1-3
			No	Turn power ON
	1-3	The indoor/outdoor control wire may not be connected between the indoor unit and outdoor unit. Check wiring connections on indoor/outdoor control wire.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E21 Outdoor Main Board Error

① Error detection method
External noise may interfere with microprocessor operation.

② Troubleshooting

<table>
<tr><td rowspan="2">1
Outdoor main board</td><td>1-1</td><td colspan="3">This may occur directly after resetting other faults, perform the reset on the outdoor main board.</td></tr>
<tr><td>1-2</td><td colspan="3">This is possibly caused by random noise, turn off the outdoor power supply. Then turn it back on and keep it under observation.
If the fault recurs, replace the outdoor main board and outdoor power board.</td></tr>
<tr><td rowspan="2">2
Noise</td><td rowspan="2">2-1</td><td rowspan="2">Is a noise source near the outdoor unit?</td><td>Yes</td><td>Noise countermeasures</td></tr>
<tr><td>No</td><td>Replace the outdoor main board and outdoor power board.</td></tr>
</table>

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E22 Outdoor Main Board Sensor Error

① Error detection method
The voltage in the input circuits of the outdoor main board sensor is unstable and fluctuates.

② Troubleshooting

1 Outdoor main board	1-1	Turn OFF the outdoor unit, then turn ON and observe. If the error recurs, replace outdoor main board.

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E24 Communication Failure between Outdoor Units (for only W MULTI)

① Error detection method
An Outdoor Communication Unit Failure is assumed when communications between outdoor units in the same refrigerant system are not possible for 2 minutes.
- An outdoor unit address has not been properly assigned.
- Outdoor unit power is OFF.

② Troubleshooting

1 Power supply, wiring	1-1	Have outdoor unit addresses and outdoor unit and number of connected outdoor units been properly entered?	Yes	1-2
			No	Enter the data correctly.
	1-2	Have all outdoor units in the same system been turned on?	Yes	1-3
			No	Turn power ON
	1-3	The indoor/outdoor operation wiring may not be connected between the indoor unit and outdoor unit. Check wiring connections on indoor/outdoor operation wiring.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E26 Inconsistencies in Number of Outdoor Units (for only W MULTI)

① Error detection method

A Mismatch of Outdoor Unit Count is assumed when the number of outdoor units in the same refrigerant system (No. 10 first on) does not match made setting in a W MULTI (*) system.

* A unit with an outdoor unit address (No. 10 First sub) of something other than "0" in an outdoor main board is identified as a W MULTI unit.

② Troubleshooting

1 Check board setting	1-1	Is the outdoor unit a W MULTI unit?	Yes	1-2
			No	1-3
	1-2	Have the system address, outdoor unit address and number of connected outdoor units for the same refrigerant system been properly entered? •System address ... No. 10 First out •Outdoor unit address ...No. 10 First sub •Number of connected outdoor units ...No. 10 First on	Yes	2-1
			No	Enter the data correctly.
	1-3	Is the outdoor unit address set to "0"? * For systems other than W MULTI, be sure to set "0." A system set to something other than "0" is recognized as W MULTI.	Yes	3-3
			No	Set to "0."
2 Check wiring	2-1	Is the wiring (indoor/outdoor operation wiring) between W MULTI outdoor units in the same refrigerant system connected?	Yes	3-1
			No	Repair wiring.
3 Check the power supply and wiring	3-1	Are all W MULTI outdoor units in the same refrigerant system turned on?	Yes	3-2
			No	Turn power ON
	3-2	Is the S010 (terminal resistor) switch on the outdoor main board correctly set? * Regardless of system addresses, 1 outdoor unit in the same link wiring must be set to "Short" (terminal resistor "on").	Yes	3-3
			No	Enter the data correctly.
	3-3	Replace outdoor main board		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

E31 Communication Failure between Units

① Error detection method

A Unit Internal Communication Failure is assumed when internal communications between units is not possible for 3 seconds; for a G POWER W MULTI it is when communications between an outdoor main board and converter ASSY1 and 2 is not possible for 30 seconds.

② Troubleshooting

1 Check board	1-1	Turn outdoor unit power ON again. Does E31 recur in one minute?	Yes	4-3	
			No	1-2	
	1-2	Operate engine for about 5 minutes using trial operation, etc. Does E31 recur?	Yes	2-1	
			No	3-1	
2 Check ground	2-1	Is the outdoor unit grounded?	Yes	2-2	
			No	Connect to ground	
	2-2	Conduction between power control box and ground wire connected to outdoor unit? (Check with tester)	Yes	3-1	
			No	4-2	
3 Check error history	3-1	Check error history. Has E31 occurred frequently in a short span?	Yes	4-3	
			No	4-1	
4 Measures	4-1	Possibly the effect of random noise. Keep using under observation.			
	4-2	Polish contact with wire brush, etc. to attain conduction between electrical box and ground wire connected to outdoor unit.			
	4-3	Any poor connection/contact/crimping or broken wires in wiring between the power board connector 3P (white) CN024 and the outdoor main board connector 3P (white) CN083.	Yes	Repair wiring	
			No	4-4	
	4-4	Is the outdoor unit a G-Power W MULTI?	Yes	4-5	
			No	4-9	
	4-5	Any poor connection/contact/crimping or broken wires in wiring between converter ASSY1 or 2 2P (red) CN016 and outdoor main board connector 2P (red) CNO20.	Yes	Repair wiring	
			No	4-6	
	4-6	Is a short-circuit connector connected to converter ASSY1 2P (black) CN044?			
	4-7	Is LED7 for converter ASSY1 or 2 blinking?	No	Both 1 and 2 are blinking.	4-8
				Neither 1 nor 2 is blinking.	
			Yes	1 or 2 is blinking.	4-9
	4-8	Replace power board and keep under observation. If E31 recurs, replace the outdoor main board and keep the system under observation. If converter ASSY1 and 2 do not blink, replace them and keep the system under observation.			
	4-9	Replace the converter ASSY that is on and keep the system under observation.			

* The converter ASSY cannot be checked if the engine is not running.

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 *Reference (Electrical Wiring Diagram A-D-6)

F01·02·03·10·11 Indoor Unit Temperature Sensor Error

① Error detection method

An indoor unit temperature sensor error constantly detects any broken wires or short circuits, and an error is determined when error conditions are met once.

Error conditions are given below.

1) With indoor unit connected

Display	Sensor name	Broken wire detection resistance	Short-circuit detection resistance
F01	Indoor heat exchanger inlet temperature sensor (E1)	330kΩ or more	Less than 30Ω
F03	Indoor heat exchanger outlet temperature sensor (E3)	330kΩ or more	Less than 30Ω
F10	Indoor unit intake temperature sensor	270kΩ or more	Less than 24Ω
F11	Indoor unit discharge temperature sensor	270kΩ or more	Less than 24Ω

2) With water heat exchanger unit connected

Display	Sensor name	Broken wire detection resistance	Short-circuit detection resistance
F01	Water heat exchanger refrigerant inlet temperature sensor (E1)	330kΩ or more	Less than 30Ω
F02	Water heat exchanger anti-freeze sensor (E2)	330kΩ or more	Less than 30Ω
F03	Water heat exchanger refrigerant outlet temperature sensor (E3)	330kΩ or more	Less than 30Ω
F10	Hot and cold water inlet sensor	270kΩ or more	Less than 24Ω
F11	Hot and cold water outlet sensor	270kΩ or more	Less than 24Ω

② Troubleshooting

1 Check wiring	1-1	Poor connection/contact/crimping or broken wire or pinched wire in sensor connector and wiring?	Yes	Repair wiring
			No	2-1
2 Check temperature sensor	2-1	Disconnect the sensor connector and measure the resistance value. Is the resistance between the broken wire detection value and the short-circuit detection value?	Yes	Replace indoor (water heat exchanger unit) control board
			No	Replace temperature sensor

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See the instructions supplied with the servicing indoor board (water heat exchanger unit) for procedure on replacing the indoor (water heat exchanger unit) control board.

F04·06·08·12·13·17·18/H08 Outdoor Unit Temperature Sensor Error

① Error detection method

An outdoor unit temperature sensor error constantly detects any broken wires or short circuits, and an error is determined when error conditions are met once.

Error conditions are given below.

Display	Sensor name	Broken wire detection resistance	Short-circuit detection resistance
F04	Compressor outlet temperature sensor	(Note 1)	Less than 130Ω
F06	Outdoor heat exchanger inlet temperature sensor	400kΩ or more	Less than 130Ω
F05	Outside air temperature sensor	400kΩ or more	Less than 130Ω
F12	Compressor inlet temperature sensor	400kΩ or more	Less than 130Ω
F13	Coolant temperature sensor	62kΩ or more	Less than 22Ω
F17	Hot water outlet temperature sensor (only models using hot water)	400kΩ or more	Less than 130Ω
F18	Exhaust gas temperature sensor	(Note 2)	Less than 130Ω
H08	Temperature sensor error for oil level measurement (for only W MULTI)	400kΩ or more	Less than 130Ω

Note 1 : Detects broken wire for compressor outlet temperature sensor.
When pressure is more than 1.0 MPa and compressor outlet temperature is less than 6 C continuously for 3 minutes during complete combustion.

Note 2 : Detects broken wire for exhaust temperature sensor.
When the coolant temperature ≥80ºC, the exhaust gas temperature ≤30ºC and exhaust gas temperature does not change for 5 minutes during complete combustion.

② Troubleshooting

1 Check installation	1-1	Is the sensor correctly installed at the prescribed location?	Yes	2-1
			No	Repair
2 Check wiring	2-1	Poor connection/contact/crimping or broken wire or pinched wire in sensor connector and wiring?	Yes	Repair wiring
			No	3-1
3 Check temperature sensor	3-1	Disconnect the sensor connector and measure the resistance value. Is the resistance between the broken wire detection value and the short-circuit detection value?	Yes	Replace the outdoor main board or outdoor power board.
			No	Replace temperature sensor

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

F16 Compressor Inlet/Outlet Pressure Sensor Error

① Error detection method
When pressure in the following chart is detected.

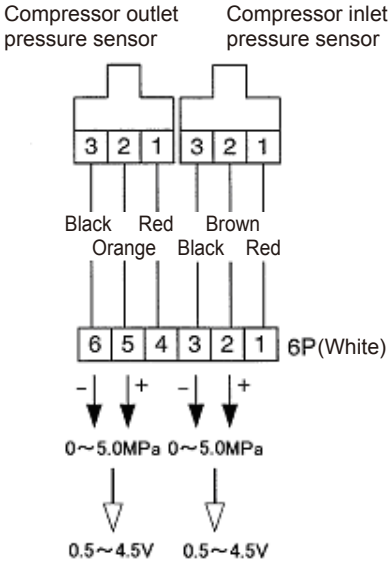
Detect Open	Detect Short Circuit
– 0.5MPa (0V)	5.5MPa (4.9V)

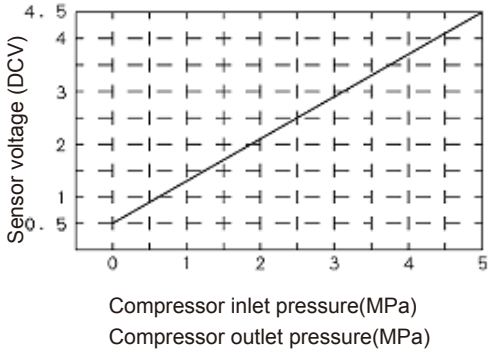
② Troubleshooting

1 Check pressure sensor	1-1	Install gauge on large tube and small tube service port, and open valve (see *1 below for procedure) to equalize pressure within refrigeration circuit. Gauge display nearly identical to outdoor main board display?	Yes	Operate again
			No	2-1
2 Check wiring	2-1	Is there a DC 5V voltage between the following terminals of the outdoor main board connector 6P (red) CN049? No. 1 (+) and No. 3 (-), and No. 4 (+) and No. 6 (-)	Yes	2-2
			No	Replace outdoor main board
	2-2	Is the voltage between the following terminals of the outdoor main board connector 6P (red) CN049 appropriate for the pressure? No. 2 (+) and No. 3 (-), and No. 5 (+) and No. 6 (-)	Yes	Replace outdoor main board
			No	2-3
	2-3	Wiring connection/contact poor, or wire broken, between outdoor main board connector 6P (red) CN049 and compressor inlet/outlet pressure sensors?	Yes	Repair wiring
			No	Replace pressure sensor

- For work procedure for replacing outdoor main board, see "5. Reference Document".
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

*1 Perform from outdoor main board. Issue "V OPEN" command from Maintenance Panel Menu 4, then press the Set key (S005) to light the LED. The valve opens. Press again to turn off the LED, and the valve closes.





F20 Clutch Coil Temperature Sensor Error
F21 Clutch 2 Coil Temperature Sensor Error

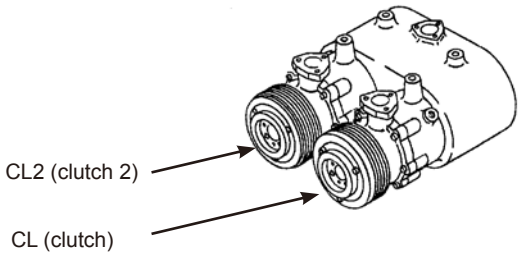
① Error detection method

- Detected in the following situations.
  Broken wire detected: Sensor resistance exceeds 1800kΩ
  Short circuit detected: Less than 850Ω

② Troubleshooting

1 Check sensor	1-1	Disconnect outdoor main board connector 2P (blue) CN060 or 2P (yellow) CN064 and measure resistance between the wires. Is it 1800 kΩ or more?	Yes	Replace sensor
			No	1-2
	1-2	Measure resistance between CN060 wires. Less than 850Ω?	Yes	Replace sensor
			No	Replace outdoor main board

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 * Reference (Electrical Wiring Diagram D - F-3 - 4)



F29 Indoor Nonvolatile Memory (EEPROM) Error

① Error detection method

- An error is determined when the nonvolatile memory (EEPROM) on the indoor (water heat exchanger unit) control board cannot be read or written.

② Troubleshooting

1 Nonvolatile memory	1-1	Is the nonvolatile memory on the indoor (water heat exchanger unit) control board correctly oriented in the IC socket, and inserted firmly?	Yes	1-2
			No	Repair
	1-2	Replace the nonvolatile memory (provided with the servicing board). Does this eliminate the error?	Yes	Defective EEPROM
			No	Replace indoor control board

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See the instructions supplied with the servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM) and the indoor control board.

F30 Real Time Clock (RTC) Function Error

① Error detection method

- An error is determined when the standard pulse (every 1 second) from the outdoor main board clock function (RTC) cannot be read.

② Troubleshooting

1 Clock function	1-1	Turn OFF the outdoor unit, then turn ON and observe. If the error recurs, replace outdoor main board

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

F31 Outdoor Nonvolatile Memory (EEPROM) Error

① Error detection method

- An error is determined when the nonvolatile memory (EEPROM) on the outdoor main board cannot be written.

② Troubleshooting

1 Nonvolatile memory	1-1	Is the nonvolatile memory on the outdoor main board correctly oriented in the IC socket, and inserted firmly?	Yes	1-2
			No	Repair
	1-2	Turn OFF the outdoor unit, then turn ON and observe. If the error recurs, replace nonvolatile memory (provided with service board). Does this eliminate the error?	Yes	Defective EEPROM
			No	Replace indoor control board

- For a procedure on replacing non-volatile memory (EEPROM) and an outdoor main board, see "5 Reference Document."
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

H07 Compressor Oil Depletion Error (for only W MULTI)

① Error detection method

Each outdoor unit is inspected for lack of oil and when the oil level is 0 (insufficient) for 20 minutes, the engine stops.

- An H07 failure is assumed when the engine has stopped due to insufficient oil a total of 8 times.
- This cumulative count clears when the oil level becomes 1 (normal) or 2 (sufficient).

② Troubleshooting

1 Check solenoid coil of solenoid unit	1-1	Reset the outdoor main boards that indicated the failure (H07). → Go to 1-2		
	1-2	Use the address of the minimum outdoor unit to set a forced trial operation. (Cooling or heating) → Go to 1-3 (Wait 5 minutes after starting the outdoor unit.) (* Set all indoor remoto controllers to Off before starting a forced trial operation.)		
	1-3	Set the STOP switch (S001) to "STOP" on the outdoor unit where the failure (H07) occurred. → Go to 1-4 Note: This may momentarily stop all outdoor units, but after 5 minutes all outdoor units resume operation except the unit that was turned off.		
	1-4	Set No. 4 "Forced compressor oil supply" except the outdoor main board where the no oil failure occurred. Check that "BALV" (balance valve) and "FLSV" (flashing valve) solenoid valve units on the outdoor units where "Forced compressor oil supply" was set operate alternately. Do they operate? * Do not cancel the "Forced compressor oil supply" setting before it completes. * The "Forced compressor oil supply" automatically stops after about 15 minutes.	Yes	1-5
			No	2-1
	1-5	Set No. 4 "Forced compressor oil replenish" for the outdoor main board where the no oil failure occurred. Check that the "ORVR" (oil recovery valve) solenoid valve unit of the outdoor unit where "Forced compressor oil replenishment" was set operate. Do they operate?	Yes	5-1
			No	2-1
2 Sensor	2-1	Is the oil level temperature sensor correctly installed? (The sensor must not be disconnected or lifted)	Yes	2-2
			No	Secure or correct sensor installation
	2-2	Is the oil level temperature sensor normal? (Temperature sensor: check TH12 resistance)	Yes	3-1
			No	Replace temperature sensor
3 Relay board	Note: The following solenoid valves are normally powered. Use the following procedure to check these solenoid valves. Balance valve (BALV): Connect a voltmeter and conduct a forced compressor oil supply. Flashing valve (FLSV): Connect a voltmeter and conduct a forced compressor oil supply. The balance valve is turned off after about 10 seconds. The flashing valve goes on. Oil recovery valve (ORVR): Connect a voltmeter and conduct a forced compressor oil supply.			
	3-1	Is a voltage for powering the relay input to the relay board (RAY-GHW280J2E)? (Voltage check during solenoid operation: 12 V DC during operation) Balance valve (BALV): between 9P (white) 9 (+) and 5 Flashing valve (FLSV): 9P (white) 9 (+) and 3 Oil recovery valve (ORVR): between 9P (white) 9 and (+) - 4	Yes	3-3
			No	3-2
	3-2	Any poor connection and broken wires in wiring between the outdoor main board and the relay board?	Yes	Repair wiring
			No	Replace outdoor main board
	3-3	Does the relay board (RAY-GHW280J2E) output a voltage for driving the solenoid valves? (Voltage check during solenoid operation: 200 V AC during operation) Balance valve (BALV): between 3P (blue) 1 and 3 Flashing valve (FLSV): between 3P (red) 1 and -3 Oil recovery valve (ORVR): between 3P (black) 1 and - 3	Yes	4-1
			No	Replace relay board

4 Solenoid valve coil	4-1	Poor connection or broken wires in lead wires of solenoid valves (balance valve, flashing valve and oil return valve)?	Yes	1-4→1-5 1-5→5-1
	4-2	Is the resistance of the solenoid valve coil about 1.1 kΩ? (Balance valve, flashing valve, oil recovery valve)	No	Replace the solenoid valve coil
5 Check the oil circuit of the solenoid valve unit	5-1	Set "Forced compressor oil replenish" for outdoor units where a no oil failure occurred and "Forced compressor oil supply" for other outdoor units. --> Go to 2-2 * Do not perform a "Forced compressor oil replenish" for two outdoor units simultaneously.		
	5-2	Check the temperature of the solenoid valve unit at locations A and B in Figure 1 of outdoor units where "Forced compressor oil supply" was set. Is the temperature rising? * Outdoor temperature and operating conditions may slow down the temperature rise even when the circuit is normal. A single lubrication takes about 15 minutes. If no oil seems to be supplied, perform "Forced compressor oil supply" and check.	Yes	5-3
			No	Replace the solenoid valve unit
	5-3	Check the temperature of the solenoid valve unit at location C in Figure 1 of outdoor units where "Forced compressor oil replenish" was set. Does the temperature rise?	Yes	6-1
			No	Replace the solenoid valve unit
6 Check operation	6-1	Cancel the STOP switch setting and "STOP" where first set to force start all outdoor units. Cancel the "Forced compressor oil supply" and "Forced compressor oil replenish" for all outdoor units.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

Note: The solenoid valve coils and the vicinity can become very hot so check operations should be performed with care.

- 1-4,1-5
- 2-2,2-3

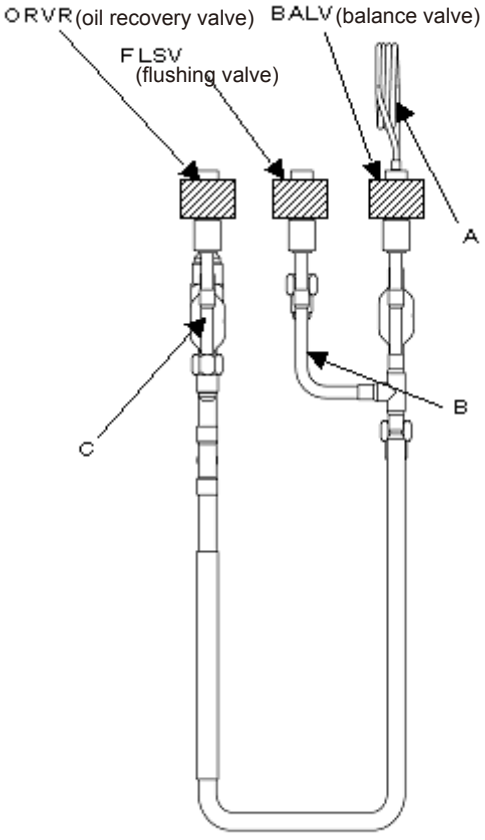


Fig. 1 Solenoid Valve Unit

L02 Inconsistencise in Indoor/Outdoor Unit Models (non-GHP equipment connected)

① Error detection method
- An error is detected when indoor units other than GHP models are connected.
- An error is detected when package type L series indoor units and building multi outdoor units are connected.

② Troubleshooting

1 Indoor unit	1-1	Check the following, and remove or replace all non-GHP models. •Indoor unit model •Indoor control board

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

L03 Multiple Main Units Set for Group Control

① Error detection method

An error is determined when multiple main (master) units exist within a remoto controller group control.

- When remoto controller group wiring is changed after auto-addressing is complete.
- When multiple main units are set in remoto controller detailed settings mode.

② Troubleshooting

1 Remoto controller group wiring	1-1	Remoto controller group wiring routed as intended?	Yes	1-2
			No	1-3
	1-2	In remoto controller detailed settings mode, set one main unit (1) in group settings (item code 14). Then, either manually set all others as sub units (2), or repeat auto-addressing.		
	1-3	After repairing remoto controller group wiring, repeat auto-addressing process.		

- See “5. Reference Document” for detailed remoto controller settings.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

L04 Duplicate System (Outdoor Unit) Address Setting

① Error detection method

An error is determined when identical system (outdoor unit) addresses exist within the same link wiring.

- When system (outdoor unit) address settings were forgotten during link wiring.
- When system (outdoor unit) address settings were accidentally duplicated during link wiring.

② Troubleshooting

1 System address	1-1	"Check that unique system addresses are set for each outdoor unit connected to the same link wiring (indoor/outdoor operating line). Correct any duplicate addresses that are found and perform the autoaddressing process."

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

L05·06 Duplicate Indoor Unit Priority Setting

① Error detection method
An error is determined when multiple indoor units have the operation mode priority setting within the same refrigeration tubing system.
- The indoor unit with the priority setting displays L05.
- The indoor units without the priority setting display L06.
- When multiple units have the operation mode priority setting, set in remoto controller simple settings mode.

② Troubleshooting

1 Operation mode priority setting	1-1	Check operation mode priority (item code 04) in remoto controller simple settings mode, and assign operation mode priority setting (1) to only one indoor unit.

- See "5. Reference Document" for detailed remoto controller settings.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

L07 Group Control Wire Present for Individual-Control Indoor Unit

① Error detection method
An error is determined when remoto controller group wiring includes an indoor unit set for independent operation.
- When remoto controller group wiring is set up after auto-addressing is complete.
- When group settings for an indoor unit wired into a remoto controller group are changed to “Independent” in remoto controller detailed settings mode.

② Troubleshooting

1 Remoto controller group wiring	1-1	Remoto controller group wiring routed as intended?	Yes	1-2
			No	1-3
	1-2	In the remoto controller detailed settings mode, check the group settings (item code 14). If set to Independent (0), correct it or repeat auto-addressing process.		
	1-3	After repairing remoto controller group wiring, repeat auto-addressing process.		

- See “5. Reference Document” for detailed remoto controller settings.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

L08 Indoor Unit Address Not Set

① Error detection method

An error is determined when the indoor unit capacity is not set.

- When the indoor unit address was not set when new non-volatile memory (EEPROM) was installed.
- When indoor unit address in the remoto controller detailed settings mode is "invalid."

② Troubleshooting

1 Indoor unit Set address	1-1	Use the remoto controller detailed settings mode to check indoor unit addresses (item code 13) and set an indoor unit address to replace invalid (0) ones.

- See “5. Reference Document” for detailed remoto controller settings.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

L09 Indoor Unit Capacity Not Set

① Error detection method

An error is determined when the indoor unit capacity is not set.

- When the indoor unit capacity setting was forgotten after installing a new nonvolatile memory (EEPROM).
- In the remoto controller detailed settings mode, the indoor unit capacity is “invalid”.

② Troubleshooting

1 Indoor unit capacity setting	1-1	In the remoto controller detailed settings mode, check the indoor unit capacity setting (item code 11). If set to “Invalid” (0), set the correct indoor unit capacity.

- See “5. Reference Document” for detailed remoto controller settings.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

L10 Outdoor Unit Capacity Not Set

① Error detection method

An error is determined when the outdoor capacity, coolant, generator or engine type is not set.

- When new non-volatile memory (EEPROM) is installed and the outdoor unit settings (capacity, refrigerant, generator and engine type) are not made.
- When the outdoor unit model setting is “Invalid”.

② Troubleshooting

1 Outdoor unit model setting	1-1	On the outdoor main board, use menu item No. 10 to check outdoor unit capacity, refrigerant, generator and engine type and to set them up correctly.

- Display the outdoor unit model using the outdoor main board menu item No. 03.
- For information on model settings and clearing non-volatile memory (EEPROM) (memory clear) using menu item No. 10 on the outdoor main board, see "5 Reference Document."
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 1-1

  After changing the model, the nonvolatile memory (EEPROM) is cleared (memory clear).

  Outdoor unit model display (menu item No. 03)

  - - - - - - Undetermined
  3 3 5 2 120M2 (W MULTI)
  4 5 0 2 150 M2 (W MULTI · 3WAY)
  5 6 0 2 190M2 (W MULTI · 3WAY · G POWER · W-MULTI)
  7 1 0 2 240M2 (W MULTI · 3WAY)

L13 Indoor Unit Model Type Setting Failure

① Error detection method

An error is determined when an incompatible model or capacity is set.

- When the indoor unit model or capacity is set incorrectly in remoto controller detailed settings mode.

② Troubleshooting

1 Indoor unit model setting	1-1	Does the outdoor unit warning display show L02?		
	1-2	Does the model (item code 10) and capacity (item code 11) in remoto controller detailed settings mode match the actual indoor unit?	Yes	1-3
			No	1-4
	1-3	This model cannot be connected. Change to a compatible indoor/outdoor unit.		
	1-4	In the remoto controller detailed settings mode, set the correct model and capacity.		

- See “5. Reference Document” for detailed remoto controller settings.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

L21 Gas Type Setting Failure

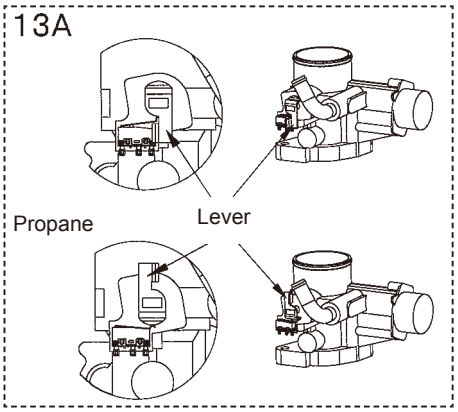
① Error detection method

A Gas Type Setting Failure is assumed on the first occurrence of a mismatch between the gas type setting on the outdoor main board and the fuel change switch setting.

However, a mismatch is not detected after the gas type is confirmed.

* The factory default gas type setting and fuel change switch setting are both "13A."Note: To use E-grade propane as the fuel gas (G-gas compatible model), the fuel flow control value and gas type need to be set.

- Procedure for setting fuel regulating valve
  1. Set the engine mixer P/N select lever to the position shown in the figure.
     Rotate the lever 180º counterclockwise (to the stopper).
     Do not try to force the lever further.
  2. Paste the <Gas type> and <Gas type setting and adjustment completed> labels from the control box at the locations indicated for the PL NAME.



② Troubleshooting

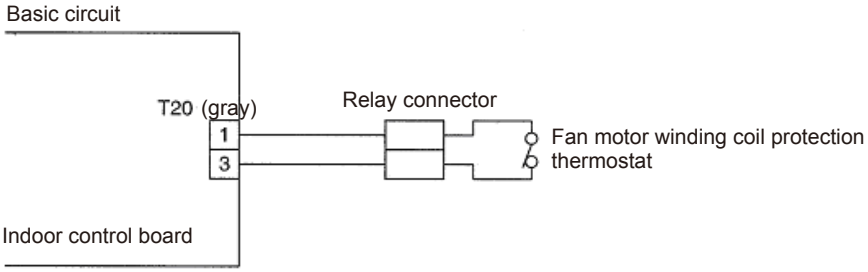
1 Gas type setting Fuel change switch	1-1	Does the gas type setting match the supplied gas type classification? Control board menu 10 (initial settings) gas type setting	Yes	1-2
			No	Change settings
	1-2	Disconnect outdoor main board connector 3P (red) CN013 connector and measure conduction of the N/P change confirmation switch. (Measure between 3P red No.1 and No.3). Gas type 0 : Conduction Gas type 1-5 : No conduction	Yes	Replace outdoor main board
			No	1-3
	1-3	Disconnect N/P change confirmation switch relay connector 2P-13 (white), and measure conduction of the switch. (Measure between 2P white No.1 and No.2). Gas type 0 : Conduction Gas type 1-5 : No conduction	Yes	1-4
			No	Replace N/P change confirmation switch
	1-4	Correct the wiring between the outdoor main board connector 3P (red) CN013 and N/P change confirmation switch. Gas type 0 : Broken wire or poor connection/contact Gas type 1-5 : Short-circuit or pinched wire		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

P01 Indoor Fan Error/Indoor Unit Fan rpm Error
(Not detected when water heat exchanger unit is connected)

① Error detection method

- Detects when indoor control board connector T20 (gray) CN076 1-3 are open and assumes an error has occurred.
- The sensor connected to T20 (gray) CN076 may be an internal thermostat built into the fan motor, or a thermal magnet switch, depending on the model.
- The internal thermostat turns the contact OFF when the fan motor coil temperature rises, and automatically recovers as the coil temperature decreases, turning the contact ON.
- The thermal magnet switch turns the contact OFF when the fan motor operation current becomes excessive, and turns the contact ON when normal or when recovered.
- The wiring method and protective devices differ among indoor units. For details, see the electric diagram diagrams for each indoor unit.



- Models not listed below have one fan motor, with an internal thermostat contact connected between No.1 and No.3 T20 (gray) CN076.
- Models with two fan motors, with the internal thermostat contacts connected in-line between No.1 and No.3 of T20 (gray) CN076.
- If a fan stop signal comes from the indoor unit or data does not come from the indoor unit for three minutes (communication error) even though the outdoor unit forces the indoor fan to stop, a P01 warning will result.

② Troubleshooting

1 Fan motor	1-1	Is there AC 200V between indoor control board connector IN (black) CN067 No.3 and connector T20 (gray) CN076 No.3?	Yes	1-4
			No	1-2
	1-2	Any poor contact or broken wires in wiring between No.1 and No.3 of connector T20 (gray)?	Yes	Repair
			No	1-3
	1-3	The fan motor winding coil protection thermostat has activated. Check for dirty filter, fan motor lock, foreign matter caught in the fan, etc. For a three-phase motor, check for missing phase.		
	1-4	Operate again to check activation. Immediate error upon operation?	Yes	Replace indoor control board
			No	1-3
	1-5	Poor connection or broken wires in communication lines?	Yes	Repair
			No	Replace indoor control board

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor control board for procedure on replacing indoor control board.

P03 High Compressor Discharge Temperature

① Error detection method

- When the compressor discharge temperature ≥ 130°C during engine operation (complete combustion), the engine is stopped and an error flag is set.
  A Compressor Discharge Temp. High fault is assumed when this flag has shut down the engine 5 consecutive times.
- Revolution speed setting > minimum revolution speed is not included in pre-trip.
- Not included in pre-trip when liquid valve opening ≤ 400 step.

② Troubleshooting

1 Sensor	1-1	Disconnect compressor outlet temperature sensor connector 2P (red) CN054 and measure resistance. Appropriate value? (See “5. Reference Document” for thermistor characteristics.)	Yes	2-1
			No	Replace sensor
2 Out of gas	2-1	Out of gas? Determine using compressor outlet pressure, compressor inlet pressure, and indoor/outdoor electric valve opening.	Yes	Repair leak and charge gas.
			No	3-1
3 Tubing	3-1	Any symptoms of pump down? Determine with indoor coil temperature	Yes	Inspect indoor unit tubing
			No	Inspect outdoor unit tubing
4 Inspect outdoor solenoid valves (For three-way device)	4-1	Adjust outdoor solenoid valves. Use trial operation mode to check that the solenoid valves operate normally in each operating mode (cooling/heating) and measure tube temperature around solenoid valves to assess. (For information on solenoid valve operation in each operating mode, see the sections Control functions - Operating control in the "Outdoor unit manual." Does the solenoid valve operate normally?	Yes	Replace outdoor main board
			No	4-2
	4-2	Adjust the power board. Does the power board CN013 output the solenoid power supply voltage (AC 200V)?	Yes	4-3
			No	Replace power board
	4-3	Any poor connection and broken wires in wiring between the power board and the relay board?	Yes	Repair wiring
			No	4-4
	4-4	Adjust the outdoor main board. In No. 4 test mode when "v_open" (valve open), is there a drive output voltage (12 V DC) from discharge valves 1-1, 1-2, discharge valve 2, suction valve 2-1 and 2-2? (9P (white) CN018) Discharge valve 1-1, 1-2: between No. 3 - 9 Discharge valve 2: between No. 4-9 Suction valve 2-1, 2-2: between No. 6 - 9 Does suction valve 1 output a drive voltage (DC 12V) during cooling operation? Suction valve 1: between No. 3 - 9 * Note that suction valve 1 closes when powered (the other valves operate in the opposite way)	Yes	4-5
			No	Replace outdoor main board
	4-5	Any poor connection and broken wires in wiring between the outdoor main board and the relay board?		Repair wiring
				4-6
	4-6	Adjust the relay board. In No. 4 test mode when "v_open" (valve open), is there an output voltage (AC 200V) from discharge valves 1-1, 1-2, discharge valve 2, suction valve 2-1 and 2-2? Does suction valve 1 output a voltage (AC 200V) during cooling operation?	Yes	4-7
			No	Replace relay board
	4-7	Adjust the solenoid valve coil. (Be sure to turn the power off before starting work.) Disconnect the connectors of discharge valve 1-1, 1-2, discharge valve 2, suction valve 1, suction valve 2-1 and 2-2 from the relay board and measure the resistance between No. 1 and 3. Normal value (20C°) discharge valve 1-1, 1-2: 543 ohm discharge valve 2: 1132 ohm Suction valve 1: 1197 ohm suction valve 2-1, 2-2: 543 ohm Is the coil operating normally?	Resistance is normal	Replace solenoid valve
			Abnormal resistance	Replace the solenoid valve coil

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

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30°C→45.0kΩ	40°C→29.6kΩ	50°C→20.0kΩ	60°C→13.8kΩ
70°C→9.7kΩ	80°C→6.9kΩ	90°C→5.1kΩ	100°C→3.8kΩ
110°C→2.8kΩ	120°C→2.15kΩ	130°C→1.66kΩ	

P04 Refrigerant High-Pressure Switch Operation

① Error detection method
- When high pressure switch turns OFF

Setting: 4.15MPa
* Turns ON when contact is not defective (switch automatically resets)

② Troubleshooting

1 Can or cannot operate	1-1	Can engine operate?	Yes	2-1
			No	2-2
2 High pressure switch	2-1	Measure high pressure. Is it actually high? Any malfunctions?	Yes	High pressure switch activation (See P20)
			No	2-2
	2-2	High pressure switch conducting? Conduction in high pressure switch with power supply board connector 63PH 4P (white) CN014 disconnected?	Yes	Replace power board
			No	Replace high pressure switch

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 *Reference (Electrical Wiring Diagram A-B-3)

P05 Power Source Error

① bnormality detection method
An error is determined when the power source status meets the following condition.
- Open phase
- Instant power failure exceeding 100ms (5 times/h)

② Troubleshooting

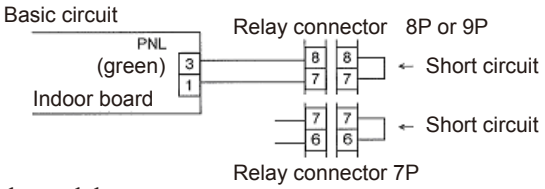
1 Power supply	1-1	Is the power supply voltage AC 200V for each? (Measure between terminal plates R-S, S-T and T-R)	Yes	1-2
			No	Check power supply side
	1-2	Check for poor power supply wiring between terminal plate - NF1 - NF2 and power board and check for defective components. Correct as necessary.		
	1-3	Turn on the power and check for recurrence. Was there a recurrence?	Yes	Replace power board
			No	1-45
	1-4	There may have been many instant power failures. Check power source wiring connections (poor contact). If no error is found, keep under observation.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 *Reference (Electrical Wiring Diagram B-F-1-2)

P09 Indoor Unit Ceiling Panel Connector Connection Failure (Not detected with water heat exchanger unit connected)

① Error detection method

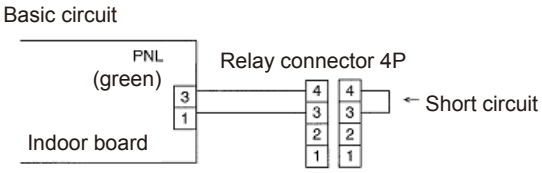
- Detects when indoor control board connector PNL (3P green) CN080 1 and 3 are open, and determines an error.
- The wiring method and connectors differ among indoor units. For details, see the electric wiring diagrams for each indoor unit.
- This input short-circuits on the following models when a ceiling panel or front panel connector is connected, thus detecting a panel connection.



Applicable models

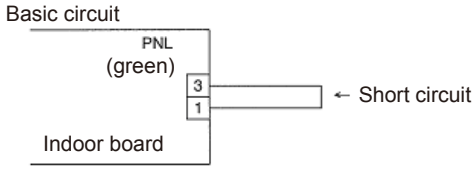
SR7/9/12/16/18/25/36/48/60	8P (ceiling panel)
LDR9/12/16/18/25	7P (ceiling panel)
XDR4/9/12/16/18/25/36/48/60	7P (ceiling panel)
XM7/9/12/16/18	

- The following models short-circuit this input upon shipping, to prevent this error.



Applicable models

FR7/9/12/16/18/25	(front panel)
TDR12/16/18/25/36/48	(ceiling panel)



Applicable models All indoor units not listed above

② Troubleshooting

1	1-1	Is a ceiling panel connection relay connector 7P (red) or 8P (red) or 9P (red) connected? Or, is a short-circuiting connector 4P (white) connected?	Yes	1-2
			No	Connect
	1-2	Disconnect the indoor board connector PNL (green) CN080. Conduction between No.1 and No.3 in socket?	Yes	Replace indoor control board
			No	1-3
	1-3	Poor connection between connector PNL (green) CN080 and ceiling panel, or poor connection/ broken wire between connector PNL (green) CN080 and short-circuit connector → Repair		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

P10 Indoor Unit Float Switch Operation (Not detected with water heat exchanger unit connected)

① Error detection method

- Detects when indoor control board connector FS (red) CN034/CN030 1-3 are open, and determines an error.
- The sensor connected between No.1 and No.3 of connector FS (red) CN034/CN030 is normally a drain float switch. However, some models do not have a drain float switch. These models have No.1 and No.3 of connector FS (red) CN034/CN030 short-circuited with a wire.
- The drain float switch turns the contact OFF when the drain water overflows, and the contact turns ON when the water level falls.
- The connection method and protective devices differ among indoor units. For details, see the electric circuit diagrams for each indoor unit.
- Models with built-in drain float switch

SR7/12/16/18/25/36/48/60	LDR9/12/16/18/25
DR25/36/48/76/96	UR7/9/12/16/18/25/30/36/48/60
XDR7/9/12/16/18/25/36/48/60	XM7/9/12/16/18
ADR7/9/12	US7/9/12/16/18

- Models shipped with connector FS (red) CN034/CN030 No.1 and No.3 short-circuited with a wire
  Models not listed above

② Troubleshooting

1	1-1	Model with drain float switch built in?	Yes	1-3
			No	1-2
	1-2	Check for poor contact or broken wire in Indoor control board connector FS (red) CN034/CN030 1-3 wiring (connector) → Repair		
	1-3	Drain water overflowed?	Yes	1-4
			No	1-8
	1-4	Drain pump operating?	Yes	1-10
			No	1-5
	1-5	Is AC200V applied to drain pump?	Yes	Replace drain pump
			No	1-6
	1-6	Is AC200V applied across indoor control board connector DP (blue) CN068 No. 1-No. 3?	Yes	1-7
			No	Replace indoor control board
	1-7	Check for poor contact or broken wire in Indoor control board connector DP (blue) CN068 1-3 wiring → Repair		
	1-8	Conduction in drain float switch? Unplug connector and check.	Yes	1-9
			No	Replace drain float switch
	1-9	Repair any poor connections, broken wires, etc. in the drain float switch connector and between No. 1 and No. 3 indoor control board connectors FS (red) CN034/CN030.		
	1-10	Check draining of drain hose/tubes and repair as necessary (clean or replace filter for UH)		

- The designation (/) is used in the table to indicate indoor boards for DC and AC motor models.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

P11 Water Heat Exchanger Unit Anti-icing Sensor Error (for only water heat exchanger unit)

① Error detection method

An error is detected as follows:

- When anti-freeze temperature is detected, and recovery temperature is not reached within 3 minutes.

* Anti-freeze temperatures (When any one of the following conditions is reached.)

	Water chiller
Hot and cold water outlet temperature	Less than +2°C
Anti-freeze temperature	Less than +2°C
	Less than 0°C

* Recovery temperature (when all conditions below are met)

	Water chiller
Hot and cold water outlet temperature	+4°C or more
Anti-freeze temperature	+4°C or more

② Troubleshooting

1 Check water heat exchanger unit	1-1	Is the hot and cold water pump stopped?	Yes	Operate hot and cold water pump
			No	1-2
	1-2	Is the flow volume too small?	Yes	Secure flow volume
			No	1-3
	1-3	Are sensors correctly installed in correct positions?	Yes	Replace water heat exchanger unit control board
			No	Repair

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- For details on procedure to replace the water heat exchanger unit control board, see the instructions supplied with the service water heat exchanger control board.

P12 Indoor DC Fan Error (DC fan motor model only)

① Error detection method

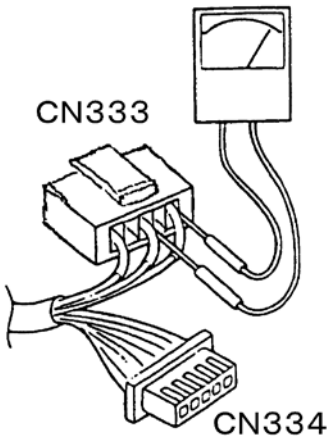
- Open circuits and short-circuits in the indoor control board connector CN333 (red) and CN334 (red) on the motor side are detected and assessed as faults.

② Troubleshooting

1 Fan motor	1-1	Any poor connections or broken wires in indoor control board connector CN333 (red) and CN334 (red)?	Yes	Repair
			No	1-2
	1-2	Disconnect indoor control board connectors CN333 (red) and CN334 (red). Turn the fan by hand to check if it turns smoothly?	Yes	1-3
			No	Replace the fan motor.
	1-3	Check if the resistance between No. 1-2, 2-3 and 3-1 on the motor side of indoor control board connectors CN333 (red) is correct? 28 - 90 model: about 70 - 100 Ω 112 - 160 model: about 35 - 50 Ω Any ground faults between the cabinet and No. 1, 2 and 3? 10 MΩ or more	Yes	1-4
			No	Replace the fan motor.
	1-4	Check if the resistance between No. 1-4 on the motor side of indoor control board connectors CN334 (red) is correct? 5k to 20kΩ	Yes	1-5
			No	Replace the fan motor.
	1-5	Connect CN333 (red) and CN334 (red), turn on the power and use a tester to measure the voltages between indoor control board connector CN334 (red) No. 2-3, No. 2-4 and No. 2-5. Is the pin voltage between 0 and 5 V when the fan is slowly turned? Is the voltage between No. 1-2 5 V?	Yes	1-6
			No	Replace the fan motor.
	1-6	Check the indoor control board and replace if defective.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

- 1-3,1-4



P13 Refrigerant circuit Error (W MULTI) *Please note that 3WAY models use a different troubleshooting procedure.

① Error detection method

- The indoor unit outputs this warning when it determines that a compressor inspection is required.
- The system stops and there is no automatic reset when this warning is output.

When there is no difference between compressor outlet and inlet pressure (≤0.2 MPa *) 3 minutes after the engine was turned on, the engine stops and an error flag is set. An Cooling Circuit Fault is assumed when the error flag has stopped the engine 5 consecutive times in 1 hour.

* This indicates that the difference in initial pressure and after 3 minutes is 0.2 Mpa or less.

② Troubleshooting

1 Inspect the compressor.	1-1	Turn off the outdoor unit (be sure to do this before work)		
	1-2	Use the instructions in A25 Clutch Trouble to adjust the compressor lock. Does it lock? (Adjust both clutch 1 and 2.)	Yes	2-1
			No	1-3
	1-3	Use the instructions in P26 Clutch Connection Fault, to adjust operation and wiring of clutch 1 and 2. Any problems?	Yes	See section on page 26.
			No	Keep under observation
2 Replace compressor	2-1	Replace a compressor that is locked. Measure the amount of chiller oil in the compressor when it is removed. Fill the new compressor with an equal amount of chiller oil (new oil) before attaching it to the outdoor unit.	Yes	3-1
3 Clean the cooling tubes. (Cleaning using liquid normally handled by a device)	3-1	Use our "Replacement material" as a guide to cleaning the system using liquids that are normally present in the system.	No	Process completed

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

P13 Refrigerant Circuit Error (3WAY)

① Error detection method

- The indoor unit outputs this warning when it determines that a compressor, outdoor solenoid valves, system refrigerant should be inspected.
- For detailed inspection procedure, see P13 Refrigerant Circuit Fault (W MULTI).
- The system stops and there is no automatic reset when this warning is output.

② Troubleshooting

1 Pressure sensor inspection	1-1	For adjustment of the pressure sensor, see (adjustment procedure section F16).	OK	2-1
			NG	Repair
2 Inspect system refrigerant	2-1	Use the No. 4 test mode "v_open" (valve open) to equalize the pressure to assess whether amount of refrigerant is extremely low when it is lower in pressure than saturated pressure at ambient temperature.(Assessed as out of gas when extremely low) Out of refrigerant gas?	Yes	Check for refrigerant leaks and repair.
			No	3-1
3 Inspect the compressor.	3-1	Turn off the outdoor unit (be sure to do this before work)		
	3-2	Use the instructions in P26 Clutch Connection Fault, to adjust operation and wiring of clutch 1 and 2. Any problems?	Yes	4-1
			No	7-1
4 Inspect refrigerant oil.	4-1	Replace the compressor and check the refrigerant oil in the replaced compressor for contamination.	Not contaminated	5-1
			Contaminated	6-1
5 Replace compressor (1)	5-1	After replacing the compressor, perform a trial operation and check the equipment. Check completed if OK.		
6 Replace compressor (2)	6-1	Perform a flashing cleaning to clean the inside of the refrigerant tubes.		
7 Inspect outdoor solenoid valves	7-1	Adjust outdoor solenoid valves. Use trial operation mode to check that the solenoid valves operate normally in each operating mode (cooling/heating) and measure tube temperature around solenoid valves to assess. (For information on solenoid valve operation in each operating mode, see the sections Control functions - Operating control in the "Outdoor unit manual." Does the solenoid valve operate normally?	Yes	Replace outdoor main board
			No	7-2
	7-2	Adjust the power board. Does the power board CN013 output the solenoid power supply voltage (AC 200V)?	Yes	7-3
			No	Replace power board
	7-3	Any poor connection and broken wires in wiring between the power board and the relay board?	Yes	Repair wiring
			No	7-4
	7-4	Adjust the outdoor main board. In No. 4 test mode when "v_open" (valve open), is there a drive output voltage (DC 12V) from discharge valves 1-1, 1-2, discharge valve 2, suction valve 2-1 and 2-2? (9P (white) CN018) Discharge valve 1-1, 1-2: between No. 3 - 9 Discharge valve 2: between No. 4-9 Suction valve 2-1, 2-2: between No. 6 - 9 Does suction valve 1 output a drive voltage (DC 12V) during cooling operation? Suction valve 1: between No. 3 - 9 * Note that suction valve 1 closes when powered (the other valves operate in the opposite way)	Yes	7-5
			No	Replace outdoor main board
	7-5	Any poor connection and broken wires in wiring between the outdoor main board and the relay board?	Yes	Repair wiring
			No	7-6

	7-6	Adjust the relay board. In No. 4 test mode when "v_open" (valve open), is there an output voltage (AC 200V) from discharge valves 1-1, 1-2, discharge valve 2, suction valve 2-1 and 2-2? Does suction valve 1 output a voltage (AC 200V) during cooling operation?	Yes	7-7	
			No	Replace relay board	
	7-7	Adjust the solenoid valve coil. (Be sure to turn the power off before starting work.) Disconnect the connectors of discharge valve 1-1, 1-2, discharge valve 2, suction valve 1, suction valve 2-1 and 2-2 from the relay board and measure the resistance between No. 1 and 3. Normal value (20°C) discharge valve 1-1, 1-2: 543 Ω discharge valve 2: 1132 Ω Suction valve 1: 1197 Ω suction valve 2-1, 2-2: 543 Ω Is the coil operating normally?	Resistance is normal		Replace solenoid valve
			Abnormal resistance		Replace the solenoid valve coil

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

P15 Complete Refrigerant Gas Depletion

① Error detection method

- Engine startup is delayed when compressor inlet pressure ≤0.1 Mpa. A delay that lasts 10 minutes is counted as a fault.
- During engine operation (complete combustion) when (compressor inlet pressure ≤ 0.1 MPa) or (outdoor heat exchanger outlet temperature - saturation temperature) ≥ 30deg) *1 continues for 3 minutes, the engine is stopped and an error flag is set. A Refrigerant Gas Completely Absent fault is assumed when this flag has shut down the engine 5 consecutive times.

*1 Only during cooling (heat exchange outlet temperature is the outdoor heat exchanger outlet during cooling)

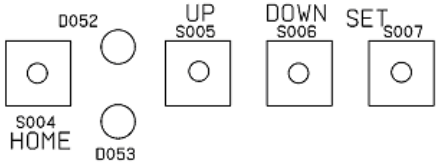
- Not detected for 7 minutes from complete combustion. If the compressor inlet pressure ≤ 0.01 MPa for a 3 minute interval, an error will be detected even within seven minutes of complete combustion.

② Troubleshooting

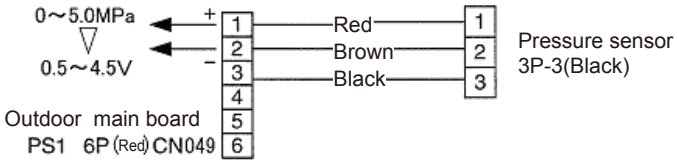
1 Check pressure sensor	1-1	Install a gauge on a large tube and small tube service port, open the valve (open valve using outdoor main board No. 4 trial operation forced setting) to equalize pressure in the refrigerant circuit. The values on the outdoor main board display and the gauge should be roughly identical. Is it 0.1 MPa or less?	Yes	3-1
			No	2-1
2 Check wiring	2-1	Check compressor inlet pressure sensor wiring. OK?	Yes	Replace pressure sensor
			No	Repair wiring
3 Check compressor relief valve	3-1	Check the compressor relief valve. Are there any leaks or signs of leaks?	Yes	Repair leak and charge gas.
			No	3-2
	3-2	Is the tubing clogged?	Yes	Unclog tubing Charge gas.
			No	3-3
	3-3	Are there any other places with leakage?	Yes	Repair leak and charge gas.
			No	Replace compressor

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 1-1
  Use outdoor main board menu item No. 04 to open valve using trial operation/forced settings. Press the SET key, the LED lights as the valve opens. Press the key again to turn off the TEST/WARNING LED and close the valve.



- 2-1



P18 Bypass Valve Error

① Error detection method

- A warning is output if it is determined that the outdoor unit needs a bypass valve inspection.
- In practical terms, what happens is that each time there is a small difference ($\Delta P \leq 0.1$ MPa) between the high and low pressure (ΔP = high pressure - low pressure) 90 seconds after stopping the engine stops, a suspected error counter increments, and the data is recorded as "pre-trip" warning history data. After the counter reaches 5, a warning is output on the next complete combustion startup.

② Understanding the warning history

The latest P18 data in the warning history is issued immediately after a complete combustion startup. It is not the data used for detecting the error. If a pre-trip error was detected (when the suspected error counter reaches 5), that data is the next more recent P18 data.

③ Troubleshooting

1 Bypass valve inspection	1-1	●Bypass valve inspection ① During operation, use the No. 4 test mode "v_close" (close valve) to close the bypass valve (step 0). Check whether refrigerant is not leaking on entering the bypass.	OK	1-2
			NG	Replace the bypass valve unit
	1-2	●Bypass valve inspection ② After completing the above inspections, stop the engine and use No. 4 test mode "v_open" (open valve) to open the bypass to check that the bypass valve operates normally despite the fluctuations in tube temperature around the bypass valve.	OK	2-1
			NG	1-3
	1-3	●Outdoor main board inspection Is there approximately 12 V of pressure at bypass valve output ports 5 (+) and 1 to 4 (-) when the power is on?	Yes	1-4
			No	Replace outdoor main board
	1-4	●Electric valve coil inspection Are the resistance values for electric valve connectors 5 and 1 to 4 about 40 Ω?	Yes	Replace the bypass valve unit
			No	Replace the bypass valve coil
2 Four-way valve Inspect outdoor solenoid valves	2-1	Is the outdoor unit a 3-WAY MULTI-device?	Yes	2-3
			No	2-2
	2-2	Is the four-way valve free from leakage?	OK	3-1
			NG	Replace the four-way valve
	2-3	Are the outdoor solenoid valves (discharge valves 1 and 2, and suction valves 1 and 2) free from leakage? * Suction valve 1 closes when current flows through it (other solenoid valve remain open)	OK	3-1
			NG	Replace the solenoid valve.
3 Liquid valve inspection	3-1	●Liquid valve inspection ① Any refrigerant leaks past the liquid valve when the liquid valve is completely closed (step 0)?	OK	4-1
			NG	Replace the liquid valve unit
4 Expansion valve inspection	4-1	Is the operation mode heating? * Note: If you are operating with a 3WAY MULTI, try 4-2 and 4-3 before shutting down the engine as this might be due to cooling and heating mixed operation.	Yes	4-2
			No	4-3
	4-2	●Outdoor expansion valve inspection Check that there are no refrigerant leaks past the outdoor expansion valve when the engine is stopped in heating mode.	OK	5-1
			NG	Replace the outdoor expansion valve unit
	4-3	●Indoor electric valve inspection Stop the indoor unit during cooling operation (multiple indoor unit operation, indoor electric valve opening = 20 steps) and check to make sure there is no coolant leakage beyond the indoor electric valve.	OK	5-1
			NG	Replace indoor electric valve unit
5 Pressure sensor inspection	5-1	Pressure sensor inspection (refer to the section on F16 for the inspection procedure)	OK	Replace outdoor main board
			NG	Repair

- For work procedure for replacing outdoor main board, see "5. Reference Document".
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

P19 Four-way Valve Lock Error (not detected 3WAY MULTI)

① Error detection method

- Determined after 6 minutes of complete combustion time has passed during heating operation.
- An error is determined in thermostat ON indoor units, when the highest indoor heat exchanger outlet (E3) temperature is detected to be lower than the outdoor heat exchanger inlet for 5 minutes continuously.
- (W MULTI only) Handled as a fault only when four-way valve control (performed at first startup following a power supply reset or heating/cooling switch) fails.
- (W MULTI only) when a pressure differential fault (the high pressure of an outdoor unit working at full combustion in proximity with an another outdoor unit working at low pressure) detected between W MULTI outdoor units is assessed as a fault.

② Troubleshooting (common)

1 Check four-way valve	1-1	Check the 4 way valve temperature during heater operation. Switched to heater side?	Yes	2-1
			No	1-2
	1-2	During heater operation, is the control board VRR connector (CN033) voltage about AC0V?	Yes	2-2
			No	1-3
	1-3	"After stopped, turn OFF outdoor unit. Disconnect control board VRR connector (CN033) and measure wiring resistance. (Normal value: about 1kΩ) Short-circuited or broken wire?"	Yes	2-3
			No	2-4
2 Actions	2-1	Check wiring and thermistor for indoor units with no temperature increase. (Any broken wires or short-circuits?)		
	2-2	Replace power board.		
	2-3	Replace four-way valve coil and wiring		
	2-4	Replace 4 way valve.		

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

③ Troubleshooting (W MULTI only)

1 Pressure sensor inspection	1-1	(Check all W MULTI outdoor units) Is the actual difference between compressor inlet pressure displayed on the outdoor main board and output pressure (gauge data, etc.) 0.1 MPa or less?	Yes	2-1
			No	Replace pressure sensor
2 Check outdoor unit operation	2-1	Use a collective stop setting to temporarily stop the outdoor unit and perform four-way valve adjustment control according to one of the procedures described below. After resetting the power supply on all W MULTI outdoor units, use the remoto controller or the outdoor main board to start desired mode. Use the trial operation setting from the outdoor main board or the remoto controller to switch between cooling and heating to start operation.	2-2	
	2-2	Do all the W MULTI outdoor units start and continue running for 5 minutes?	Yes	2-4
			No	2-3
	2-3	Check why operation does not continue and remedy the problem. When the device stops immediately after startup → Check error history and use the code to find troubleshooting information. When the system does not start up → IV - 1 (3) see section on engine start standby	2-1	
	2-4	Use a different mode (cooling or heating) to restart from 1-1. If no error is found, keep under observation.		

P20 Refrigerant High-Pressure Error

① Error detection method

- When the high pressure sensor value ≥ 3.75 MPa during engine operation, the engine stops and an error flag is set. A Refrigerant Pressure Too High fault is assumed when this flag has stopped the engine 5 consecutive times in 1 hour.
- When revolution speed setting is more than minimum revolution speed and fan frequency is less than 50% of maximum frequency, an error is not generated. (The engine stops momentarily.)

② Troubleshooting

1 Cooling/ Heating mode	1-1	Cooling mode? Heating mode?	Cooling	2-1
			Heating	3-1
2 Check outdoor heat exchanger	2-1	Visually, any debris etc. clogging heat exchanger?	Yes	Remove
			No	2-2
	2-2	Any air shortage?	Yes	Change installation
			No	2-3
	2-3	Does the outdoor fan turn?	Yes	12-1
			No	See P22
3 Tubing	3-1	Any crushed tubes, torn strainers, closed servicing valves, etc.? Check at indoor coil temperature.	Yes	Repair
			No	4-1
4 Check unit	4-1	Which is connected, an indoor unit or water heat exchanger unit?	Indoor unit connected: Go to 5-1	
			Water heat exchanger unit connected: Go to 8-1	
5 Check indoor heat exchange	5-1	Indoor air filter clogged?	Yes	Clean filter
			No	5-2
	5-2	Does the indoor fan turn?	Yes	6-1
			No	Repair
6 Check indoor electric valve	6-1	Check indoor electric valve. Does electric valve open? (Check indoor coil temperature during eater operation)	Yes	7-1
			No	6-2
	6-2	Check indoor control board (When turning power ON, is there voltage between indoor control board PMV 6P (white) CN082 No. 5(+) and No. 1-4(-)?)	Yes	6-3
			No	Replace indoor control board
	6-3	Solenoid valve check (Is the resistance between solenoid valve connector 6P (white) No. 5 and 1-4 about 46 Ω?)	Yes	Replace valve unit
			No	Replace valve coil
7 Indoor coil sensor	7-1	Are indoor coil sensors E1, E2, and E3 detached from their measurement points? Determine by displaying the indoor coil temperature on the outdoor unit.	Yes	Repair
			No	11-1
8 Check hot and cold water	8-1	Is coolant flow volume maintained?	Yes	Secure required flow volume
			No	8-2
	8-2	Is the coolant pump turning?	Yes	6-1
			No	Repair

9 Check water heat exchanger unit electric valve	9-1	Check water heat exchanger unit electric valve.	OK	10-1
			NG	Repair
10 High pressure sensor	10-1	Check high pressure sensor.	OK	11-1
			NG	Repair
11 Bypass valve	11-1	Bypass valve activating properly? (wiring and coil unit)	Yes	12-1
			No	Repair
12 Engine	12-1	Engine throttle sticking?	Yes	Repair
			No	Investigate further
13 Inspect outdoor solenoid valves (For 3WAY device)	13-1	Adjust outdoor solenoid valves. Use trial operation mode to check that the solenoid valves operate normally in each operating mode (cooling/heating) and measure tube temperature around solenoid valves to assess. (For information on solenoid valve operation in each operating mode, see the sections Control functions - Operating control in the "Outdoor unit manual." Does the solenoid valve operate normally?	Yes	Replace outdoor main board
			No	13-2
	13-2	Adjust the power board. Does the power board CN013 output the solenoid power supply voltage (AC 200V)?	Yes	13-3
			No	Replace power board
	13-3	Any poor connections and broken wires in wiring between the power board and the relay board?	Yes	Repair wiring
			No	13-4
	13-4	Adjust the outdoor main board. In No. 4 test mode when "v_open" (valve open), is there a drive output voltage (DC 12V) from discharge valves 1-1, 1-2, discharge valve 2, suction valve 2-1 and 2-2? (9P (white) CN018) Discharge valve 1-1, 1-2: between No. 3 - 9 Discharge valve 2: between No. 4-9 Suction valve 2-1, 2-2: between No. 6 - 9 Does suction valve 1 output a drive voltage (DC 12V) during cooling operation? Suction valve 1: between No. 3 - 9 * Note that suction valve 1 closes when powered (the other valves operate in the opposite way)	Yes	13-5
			No	Replace outdoor main board
	13-5	Any poor connections and broken wires in wiring between the outdoor main board and the relay board?	Yes	Repair wiring
			No	13-6
	13-6	Adjust the relay board. In No. 4 test mode when "v_open" (valve open), is there an output voltage (AC 200V) from discharge valves 1-1, 1-2, discharge valve 2, suction valve 2-1 and 2-2? Does suction valve 1 output a voltage (AC 200V) during cooling operation?	Yes	13-7
			No	Replace relay board
	13-7	Adjust the solenoid valve coil. (Be sure to turn the power off before starting work.) Disconnect the connectors of discharge valve 1-1, 1-2, discharge valve 2, suction valve 1, suction valve 2-1 and 2-2 from the relay board and measure the resistance between No. 1 and 3. Normal value (20°C) discharge valve 1-1, 1-2: 543 Ω discharge valve 2: 1132 Ω	Resistance is normal	Replace solenoid valve
			Abnormal resistance	Replace the solenoid valve coil

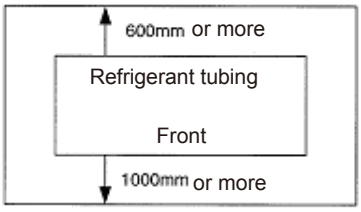
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

● 2-2

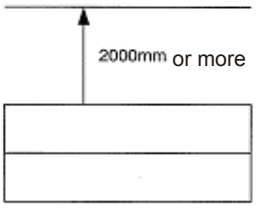
Any air shortage?

An air shortage is likely if the installation conditions pictured below are not met.

Unit perimeter



Unit top



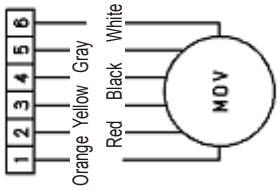
● 6-1

Indoor electric valve check

Electric valve opening determination standards:

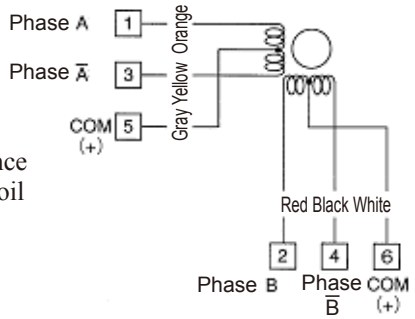
During heating operation, after 30 minutes have passed in complete combustion, the indoor coil outlet temperature must exceed 40°C.

Check using No.0 Operation data display.



● 6-2

Normal if a pulse voltage is applied across indoor control board connector PMV 6P (white) CN082 No. 5 and No. 1-4 after turning power ON. (About DC4V measured on tester)



● 6-3

Unplug indoor electric valve connector 6P (white), and measure resistance of electric valve coil between No.5 and No.1-4 using a tester. Replace coil if 0Ω or ∞ (46Ω is normal).

● 9-1

Check outdoor electric valve and backup stop valve

Check by using the following procedure to display the P20 stop data (nonvolatile memory) on the 7-segment LED.

a. In No.1 Error data display, lightly press the set key once.
b. Select data code 1-3 using the up and down keys, and press set key for 1 second or more.
c. Use the up and down keys to change the display data to compare outdoor heat exchanger inlet temperature (data code 16) with compressor inlet temperature (data code 14). If the outlet temperature is lower, the outdoor solenoid valve may be locked.

● 10-1

Check high pressure sensor

Compare control board display and gauge display.

① Confirm pressure while stopped	Install gauge on high pressure side, and display the outdoor main board compressor outlet pressure. Use No.0 Operation data display (data code 11). Is the difference between display value and gauge pressure within 0.1MPa?	Yes	To ②
		No	To ③
② Confirm pressure while operating	Operate heater or cooler, and check the outdoor main board compressor outlet pressure display. Is the difference between the display value and gauge pressure within 0.1MPa?	Yes	Pressure sensor is normal
		No	To ③
③ Check outdoor main board voltage	a. Is there a DC 5V voltage between the outdoor main board connector 6P (red) CN049 No. 4 and No. 6?	Yes	To b
		No	Replace outdoor main board
	b. Is there a voltage equivalent to gauge pressure between the outdoor main board connector 6P (red) CN049 No. 5 and No. 6?	Yes	Replace outdoor main board
		No	To c
	c. Wiring connection/contact poor, or wire broken, between control board connector 6P (red) CN049 and compressor outlet pressure sensor?	Yes	Repair wiring
		No	Replace pressure sensor

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor main board: page VI-3
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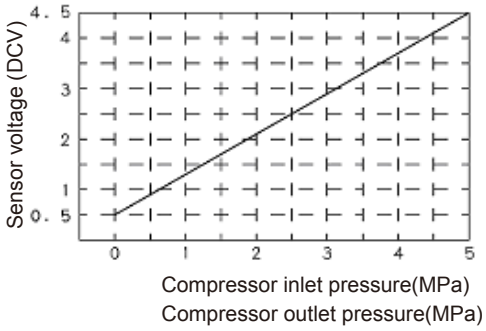


● 11-1

Check bypass valve	Operate for several minutes, then stop with a difference in compressor inlet pressure and outlet pressure, and open the valve using outdoor main board menu item No. 04. Is the pressure equalized?	Yes	Bypass valve is normal
		No	Bypass valve is defective (does not open)

P22 Outdoor Unit Fan Error

① Error detection method

- An Outdoor Unit Fan Trouble is assumed when outdoor fan (fan motor) rpm and drive has exceeded the following conditions 5 consecutive times in 1 hour.
  - When outdoor fan (fan motor) revolution is not detected.
  - When an overcurrent is detected in the outdoor fan circuit.
- When the power board has been incorrectly installed.
  - POW-GH850M2E

② Troubleshooting

1 Power board	1-1	Is the power board correctly installed? POW-GH850M2E	Yes	2-1
			No	Replace it with the correct board.
2 Outdoor fan motor	2-1	Any outdoor fan motor locking, broken wires, poor contact, or short circuits? (Coil resistance should be around 2-6Ω for each phase.)	Yes	Replace outdoor fan motor
			No	2-2
	2-2	Is the fan motor connection position correct on the power supply board? Is FM1 connected to FM1, and FM2 to FM2? (Confirm that 3P black and 5P black connectors are paired together.)	OK	2-3
			NG	Correct the connection
	2-3	Replace power board and keep under observation. If P22 reoccurs, replace outdoor fan motor.		

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 *Reference (Electrical Circuit Diagram A-B-2-3)

P23 Water Heat Exchanger Unit Interlock Error (for only water heat exchanger unit)

① Error detection method

An error is detected when the following conditions are met:

- After a hot and cold water pump operation command, when the hot and cold water pump interlock signal (no voltage, a contact) is not ON within 5 minutes.
- When the hot and cold water pump interlock signal turned ON once, but turned OFF again while the hot and cold water pump operation signal continued.

② Troubleshooting

1 Water heat exchanger unit electrical box	1-1	Is the coolant pump operating?	Yes	1-6
			No	1-2
	1-2	Is the hot and cold water pump operation command wiring connected to the auxiliary equipment hot and cold water pump relay? (Note 1)	Yes	1-3
			No	Request equipment wiring
	1-3	Is the auxiliary equipment control board off?	Yes	Turn power ON
			No	1-4
	1-4	Any signal line broken, with poor contact, or short-circuited?	Yes	Repair
			No	1-5
	1-5	Any chattering in the coolant pump relay of the auxiliary equipment?	Yes	Request equipment repair
			No	1-6
	1-6	Any broken wires or poor contact in coolant flow switch wiring?	Yes	Repair
			No	1-7
	1-7	Any chattering in the coolant flow switch?	Yes	Replace float switch
			No	Replace water heat exchange unit board

Note 1) Hot and cold water pump operation order.....TB2: Between No.1 and No.2 (No voltage, “a” contact output)

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7
- For details on procedure to replace the water heat exchanger unit control board, see the instructions supplied with the service water heat exchanger control board.

P26 Clutch Connection Error

① Error detection method

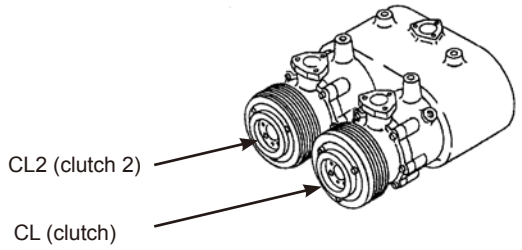
A Clutch Contact Failure is assumed when the following factors have occurred 5 times.

- When compressor vane assessment (60 seconds) failed during startup.
- When revolution speed did not slow down and there was no change in pressure after 3 minutes of clutch operation during complete engine combustion.

② Troubleshooting

1 Clutch	1-1	Does each clutch operate normally after starting the engine?	Yes	5-1
			No	2-1
2 Wiring	2-1	Check conductivity of wiring in clutch that became defective.	Yes	2-2
			No	Repair wiring
	2-2	Poor contact in wiring of clutch that became defective.	Yes	3-1
			No	Repair wiring
3 Board	3-1	If the defective clutch is clutch 2, check if DC voltage is applied to outdoor main board connector 4P (blue) CN017.	Yes	4-1
			No	Replace outdoor main board
4 Electric component	4-1	Does the relay (RY1) in clutch 2 operate normally?	Yes	5-1
			No	Replace relay
5 Compressor	5-1	Is compression defective?	Yes	Compressor Replace
			No	Keep under observation

- For work procedure for replacing outdoor main board, see “5. Reference Document”.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7 * Reference (Electric Circuit Diagram A - B-3)



P30 Group Control's Sub Unit Error (* warning displayed only on system controller)

① Error detection method
When an error occurs on a group control sub unit (for all abnormalities), the system controller displays P30.

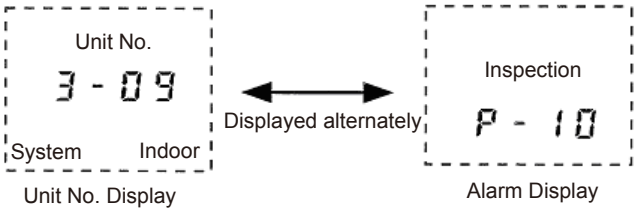
② Troubleshooting

1	1-1	Confirm error details using one of the following methods. ①Check warning display on wired remoto controller. ②Check warning history in system controller servicing check mode.
	1-2	Troubleshoot the warning found in 1-1.

- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

- 1-1②
  System controller service check mode (warning history)

  Indoor unit/outdoor unit warning history monitoring mode (also clears warning history)
  ① Press the [Inspect] icon and [Set] button continuously for 4 seconds or more.
  ② Service Check lights, and the item code " 0 1 " lights.
  ③ When the group number is selected (when [1] is flashing), when any warning history exists, the newest warning history is displayed alternately with the unit number.
  * Temperature settings are not available.



  ④ To check older warning history, press the temperature setting [▲] button or [▼] button, and select the item code (01~04).
  ⑤ To check warnings for other groups, press the Switch Group [◀] button or [▶] button, and select the group number.
  ⑥ To clear the warnings, press the [cancel] button.
  (This deletes the entire warning history for the currently selected group.)
  ⑦ To end the servicing check, press the [Inspect] button.

P31 Group Control Error

① Error detection method
Under the following conditions, all non-master units in the remoto controller group display this error and stop.
- When remoto controller linking wiring is connected to an indoor unit independently controlled by a remoto controller (L07)
- When multiple master units exist within remoto controller group wiring (L03).
- When indoor unit fails to receive from remoto controller (central) (E03).

② Troubleshooting

1 Remoto controller group wiring	1-1	Is this indoor unit independently controlled by remoto controller?	Yes	1-2
			No	1-3
	1-2	In the remoto controller detailed settings mode, confirm independent control, then disconnect the remoto controller group link wiring.		
	1-3	In the remoto controller detailed settings mode, check the group settings. If set to “Independent”, correct settings.		

- See “5. Reference Document” for detailed remoto controller settings.
- For board and Electrical Wiring Diagram, see Chapter 6.
  - Outdoor main board: page VI-2
  - Outdoor power board: page VI-3
  - Converter board: VI-4
  - Indoor control board for DC motor models: page VI-5
  - Indoor control board for AC motor models: page VI-6
  - Outdoor Unit Electrical Wiring Diagram: page VI-7

oiL Oil Change Time Alarm

① Error detection method
When the oil change time exceeds the EEPROM setting-200 hours. (A02 warning is issued when EEPROM time setting is exceeded.)

Note:
- Engine does not stop with warning.
- No warning detection when the gas type setting is “1.”
- When warning is issued, “Check Oil” flashes on remoto controller display.

② Troubleshooting
It is time to change the engine oil. After changing the oil, reset the oil change time on the outdoor main board.

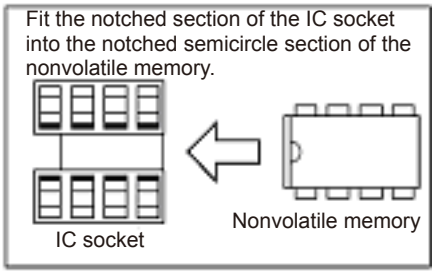
5. Reference Document

(1) Outdoor Main Board Replacement Sequence and Remote Controller Service Function

① Outdoor Main Board Replacement Sequence

To replace the outdoor main board, perform the work through the following sequence.

1) Turn off the power supply, and replace the outdoor main board.
2) Transfer the nonvolatile memory (EEPROM) from the old board to the new board.
   - Because engine operation time, oil check time and other data, as well as the various setting values are stored in the nonvolatile memory (EEPROM) inside the outdoor main board, when replacing the outdoor main board the nonvolatile memory needs to be removed from the old board and transferred to the new board.
   - The operation data, setting values and other information will be carried over into the new board.
   - Handle the nonvolatile memory with care.
     Because the nonvolatile memory needs to be installed in a certain direction (see diagram below), be carefulto correctly connect it to the designated sockets. Faulty directional installation will cause the memory to break.

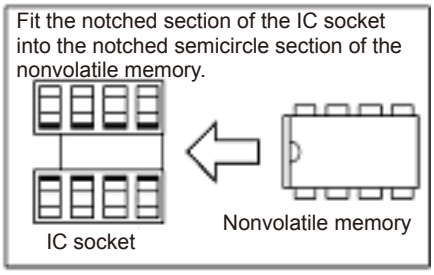


   - Because the legs are easily bent, be careful when removing or plugging in the memory.
3) Turn on the power supply, and confirm operation.

② Outdoor Nonvolatile Memory (EEPROM) Replacement Sequence

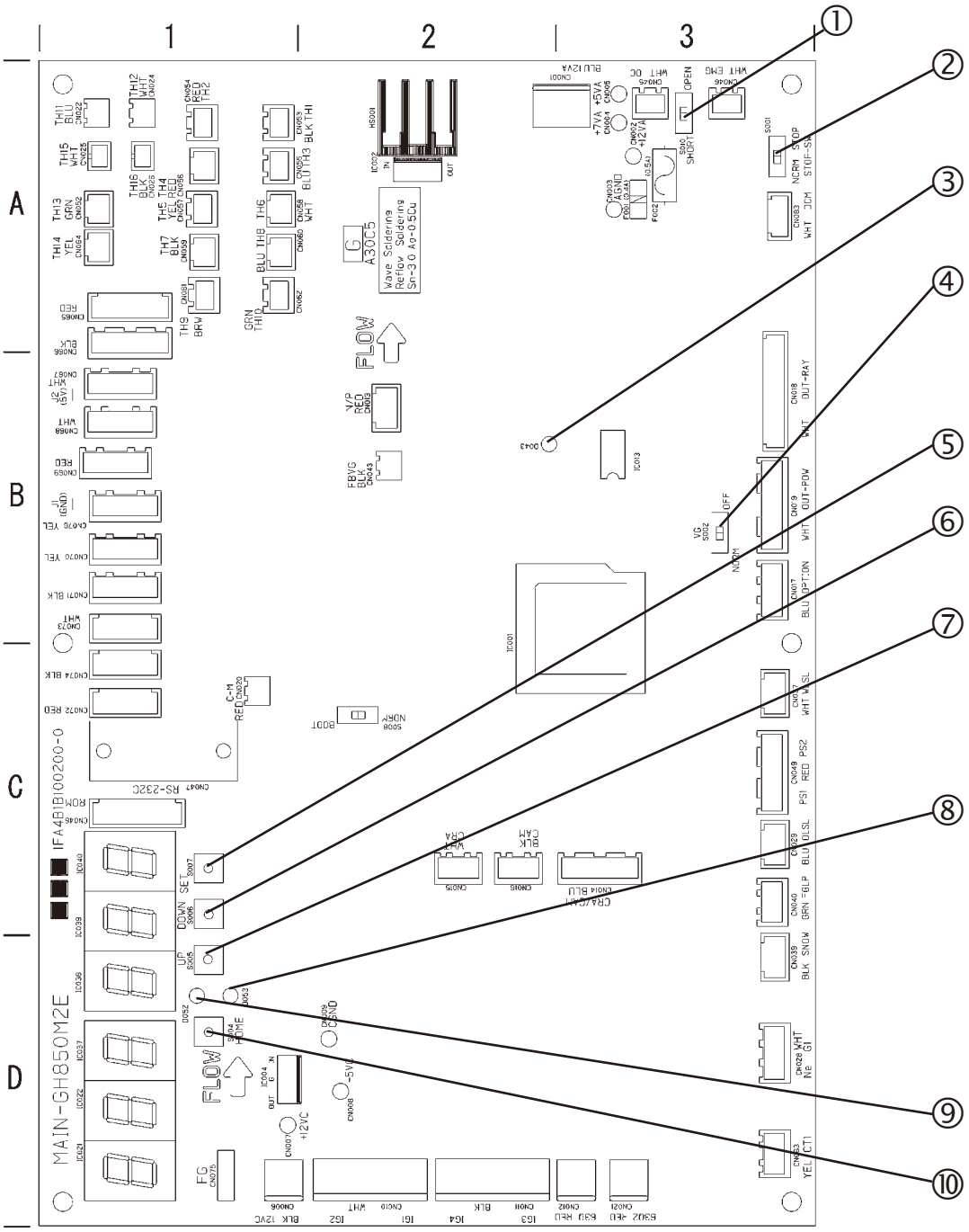
- When replacing the outdoor main board, in the event of nonvolatile memory breakage or F31 error, the work of replacing the outdoor nonvolatile memory should be conducted in the following sequence.
- A nonvolatile memory is also used in the indoor unit, but be aware that there is no compatibility between the memories.

1) To ensure reproduction of the nonvolatile memory contents, before removing the nonvolatile memory make notes of the various judgment values in the parameter setting mode, as well as operation monitor data code numbers 1 to 4, 6 to 9, and oil change time.
2) Install the nonvolatile memory package in the service board in the outdoor main board.
   - Handle the nonvolatile memory with care.
   - Because the nonvolatile memory needs to be installed in a certain direction (see diagram below), be careful to correctly connect it to the designated sockets. Faulty directional installation will cause the memory to break.



   - Because the legs are easily bent, be careful when removing or plugging in the memory.
3) Turn on the power supply.
4) At the initial setting, match outdoor unit capacity (models, etc.) to the outdoor models.
5) For subsequent outdoor unit settings, set the other parameters to the best of your knowledge.
6) Confirm operation.
7) Always be sure to readjust engine ignition timing.

(2)Outdoor Main Board Switch/LED Configuration Diagram

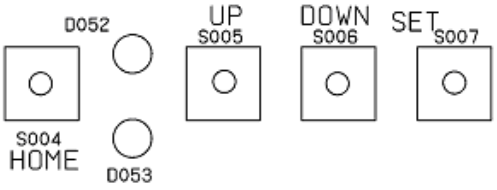


No	Name
①	Terminal register ON/OFF switch (S010)
②	STOP SW (S001)
③	Communications between indoor and outdoor units (D043)
④	Gas solenoid valve forced off switch (S002)
⑤	SET (S007) key
⑥	DOWN key (S006)
⑦	UP (S005) key
⑧	LEVEL LED (D053)
⑨	TEST/WARNING LED (D052)
⑩	HOME key (S004)

(3)Switch and LED

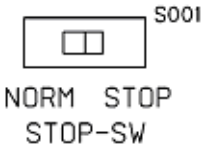
① S004, S005, S006, S007 (HOME, UP, DOWN, SET)

- These switches are used to perform7-segment LED service display changes and type settings.
- These key switches are used to determine (maintain operation of) various items, raise and lower items being displayed, etc.



② S001 (All stop switch)

- This switch is used to terminate all the units at the same time.
- Moving this switch to the “Stop” side executes all units to stop, and is thus used during maintenance and other occasions when it is necessary to have the units not operate.
- The switch is set to “STOP” at the factory before shipment, and thus needs to be switched to the “NORM” side for test run.



- For W MULTI system
  For W MULTI system, total off can be set to each outdoor unit individually. (Outdoor units without total off set operate as outdoor units with CCU function.)

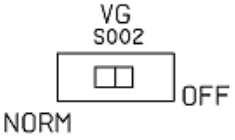
  Caution:
  Because outdoor units set to total off have their valves opened, if other outdoor units are operated this way, refrigerant will flow to the outdoor units with total off set, causing malfunction. Therefore, be sure to close the valves of refrigerant gas tube, refrigerant liquid tube, and balance tube of the outdoor units set to total off. If all outdoor units of the system are set to total off, then there is no need to close the shutoff valves.

Use the following procedure to turn off circuit breaker of one or more outdoor units and perform maintenance.

1. For one unit, set the STOP switch the "STOP" side. (" P R ␣ S E ␣ " appears.)
2. After approximately 3 minutes, " ␣ P ␣ ␣ F F " appears. (*2) Then, turn off the circuit breaker of the outdoor unit.
3. Close the valves of refrigerant gas tube, refrigerant liquid tube, and balance tube.
4. After the work is finished, open the closed valves of refrigerant gas tube, refrigerant liquid tube, and balance tube.
5. Set the STOP switch to the "NORM" side, and then turn on the circuit breaker.
6. When all outdoor units are in complete combustion state and until vane comes out (about the time when all outdoor units simultaneously continue operation for one minute or more)
7. For the next targeted outdoor unit, perform the procedure starting from step 1.

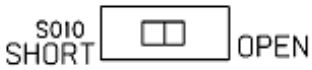
③ S002 (Fuel gas solenoid forced off switch)

- This switch is provided for the forced shutdown of the gas solenoid valve.
- Moving this switch to the "OFF" side causes the forced shutdown of the gas solenoid valve. However, when cranking is carried out with the gas valve closed, it immediately stops at "A07". Therefore, when measuring engine compression or for other purposes, use "GASOFF" (fuel gas solenoid valve forced closing setting) of test run and forced setting function "No. 4 TEST".



④ S010 (Terminal resistor On/Off switch)

- This switch is used for matching on communication lines.
- When only one outdoor unit is connected to a single communication line, confirm that the setting is on the "SHORT" side.
- The factory setting is “SHORT”
- When more than one outdoor unit is connected to a single communication line, always set one unit to the "SHORT” side and the rest of the outdoor units to the “OPEN” side.

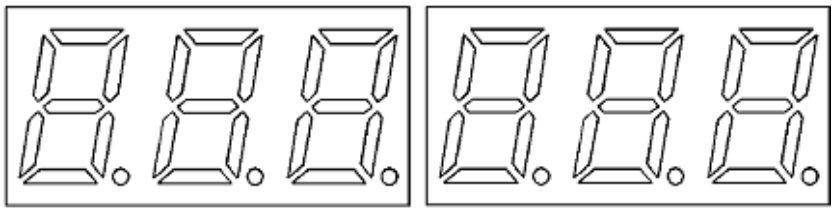


Caution:

Setting the terminal resistor switch for multiple outdoor units to the “SHORT” side can cause communication flaws.

⑤ The 7-segment LED

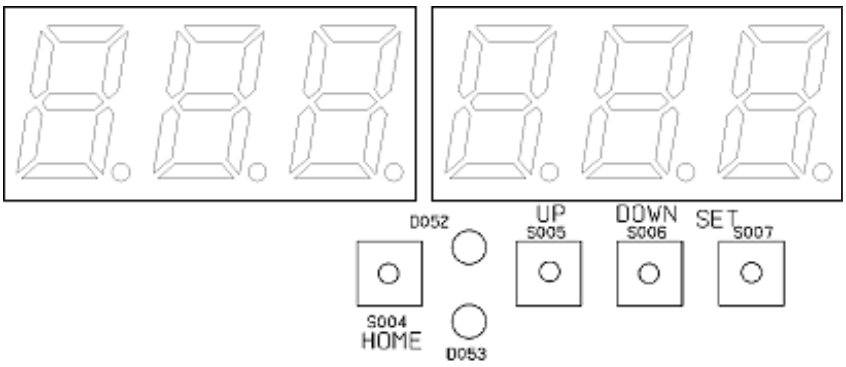
- This LED indicates the operating status of indoor and outdoor units, changes in set values and various other displays using switches S004 to S007.
- The 7-segment LED has 6 digits.



⑥ Indoor/Outdoor communications LED (D043)

- The communications monitor LED for use between outdoor and indoor units.

(4) Display Component Specifications



① Warning display (red)
During warnings, TEST/WARNING LED (D052) flashes.

② Forced setting display (red)
Upon forced settings during normal display, the TEST/WARNING LED (D052) lights.
During display of forced settings on the menu item display, the TEST/WARNING LED (D052) lights. (This may be used to search for forced setting items during setting.)

③ Level LED display (green)
The Level LED (D053) displays the setting menu stage level and other information.
Level 0 is unlit, Level 1 is light, Level 2 is flashing.

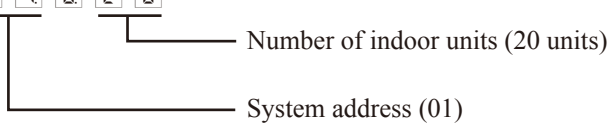
④ Displays immediately after power is turned ON
When the power supply is turned on, the following displays appear.
- 7-segment LED, TEST/WARNING LED (D052), Level LED (D053) light up (5 seconds)
- Model name display (1 second)
- Version display (1 second)

Example: 8.8.8.8.8.8. (All segments light)
Example: 3552 (Model name display)
Example: U 100 (Version display)

When the power supply is turned on while pressing the SET (S007) key, the contents of the nonvolatile memory can be cleared.

•Memory clear procedure
1. Turn on the power supply while pressing the SET (S007) key. After 1 second or more, "CLr" will be displayed.
2. Press the SET (S007) key again. Activating the nonvolatile memory erase function at this time will display "End".
3. Check for power on display
"(If the End display fails to appear, repeat the aforementioned operation until it does appear.)"
When the memory is cleared at this time, all the contents of the nonvolatile memory are reset to the initial state.

⑤ Outdoor unit normal display
Example: u. 0 1. 0. 2 0



(5) Operation Unit Specifications

① Operation

Three keys DOWN (S006), UP (S005) and SET (S007) are basically used to perform all display and setting operations.

Pressing the HOME (S004) for one second activates return to the normal display at any time (this key is installed in a slightly separated position).

② Unified operation sequence

Category selection is performed with the UP (S005) and DOWN (S006) keys, and then set with the SET (S007) key.

Setting changes are performed with the UP (S005) and DOWN (S006) keys, and confirmed with the SET (S007) key.

The HOME (S004) key is used to display the normal display (the contents of any settings in progress will be canceled).

Simultaneously pushing the HOME key (S004) and DOWN (S006) key for 1 second displays the version.

Pressing the SET (S007) key for one second while operation data is displayed (No. 0) cancels all forced settings.

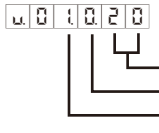
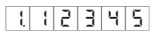
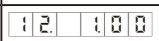
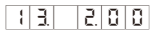
* The times appearing for flashing cycles, operation key depressed period and other indications are approximate values, and not necessarily the accurate times."

(6) Normal Display (Level 0)

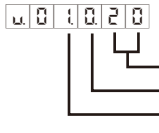
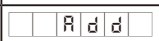
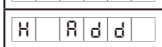
The normal display appears after passing through the display subsequent to turning the power supply ON, when selecting menu No. 0, or when no key operation occurs for 10 minutes.

① Normal Display (Level 0)

On this outdoor unit system, the following data displays are repeated at 10-second intervals.

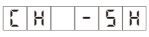
Display sequence	Display contents	Display examples	Remarks
1	Number of indoor units Outdoor unit address System address		Indoor units - 20 units It is always 0. System 01
2	Engine operation time		12345 hours
3	Compressor inlet pressure		
4	Compressor outlet pressure		

When conducting automatic addressing, in place of engine operation time, the display will indicate that automatic addressing is in progress.

Display sequence	Display contents	Display examples	Remarks
1	Number of indoor units Outdoor unit address System address		Indoor units - 20 units It is always 0. System 01
2	Automatic addressing		Mode 1
			Mode 2 Heating
			Mode 3 Cooling

② Heater Remaining Power-on Time Display (Level 0)

Conditions : 5 hours yet to elapse since turning on outdoor unit power supply.
Engine yet to be operated since turning on outdoor unit power supply.
Compressor outlet temperature is 60.0 °C or below.

Display : 

Remarks : This display indicates that crank case heater remaining power-on time is 5 hours.
This figure (5) decreases by one for the passage of each hour (4, 3…), returning to the normal display after 5 hours.

③ 3-Minute Off Display (Level 0)

Conditions : Engine startup forcibly delayed by 3 minutes.

Display : 7-segment display flashes at 1-second cycles.
Excluded when the No. 9 indoor unit status is displayed.

④ Warning Display (Level 0)

Conditions : Warning being issued

Display : TEST/WARNING LED flashing. Warning contents displayed on 7-segment LED.
ex)  : Oil check warning

⑤ Error Display (Level 0)

Conditions : Error being issued

Display : TEST/WARNING LED flashing. Warning contents displayed on 7-segment LED.
"When a multiple number of error occur, each error will be displayed in approx. 1-second cycles, in
the sequence of: Outdoor error → Outdoor warning → Indoor error."
Example: " 0.0.0.A.0.1 ": Outdoor unit fault

⑥ Forced Setting Activated Display (Level 0)

Conditions : Forced setting effective.

Display : TEST/WARNING LED flashing.
(Under these conditions during the normal display, pressing the SET (S007) key for 1 second cancels all forced settings.)

⑦ Startup Wait Display (Level 0)

Displayed when waiting for startup.

Display examples

P.0.3	High compressor outlet temperature
P.1.5	Complete gas depletion check underway
A.2.0	High coolant temperature
A.2.1	Low coolant level
A.2.2	During coolant circuitry check
P.2.0	Depending on unequalized pressure
A.1.1	Low engine oil level

⑧ Total OFF Display (Level 0)

Setting the STOP switch (S001) to "STOP" activates total off.
The normal display at this time is “PAuSE”

examples

PAuSE	During total OFF display (when STOP switch input is set to "STOP").
P oFF	*In the case of W MULTI, this display appears after 3 minutes.

⑨ System OFF Display (Level 0)

The following display appears during stopped system after system stop command is received.
However, this does not apply during automatic addressing.
When the system is off, all key operations are invalidated other than the Version Display.

StoP

⑩ Version Display (Level 0)

During a simultaneous long press of the SET (S007) key and DOWN key (S006), the following display appears every 1 second.

0. U.100	Main microcomputer version
0. U.101	DC microcomputer version
0. U.102	Option version

⑪ Other displays

During a simultaneous long press of the SET (S007) key and UP (S005) key, the following display appears every 1 second.

Display contents	Display examples	Remarks
Communication collision rate and usage rate (item names)	Col.USE	*This is only an item name (collision rate and usage rate)
(Value)	7 12	Communication collision rate= 7/ communication usage rate= 12

Caution:
Items other than those described above may appear on this display, but they are not related to this model.

(7) Menu Display

Press the UP (S005) or DOWN (S006) key to select menu items.
During and after item changes, the menu number display appears for about 1 second (0.7 seconds), followed by the letter display.
Selecting an item and then pressing the SET (S007) key selects that item.
The HOME (S004) key always displays " n o 0 0. " (contents will not change during setting).
When no operations occur for 10 minutes in areas other than item " n o 0 0. ", item " n o 0 0. " will be displayed (contents will not change during setting).

	Menu item	Letter display	Description
↓DOWN	n o 0 0.	u 0 1. 0. 2 0.	Operation data display (forced setting release, data setting)
	n o 0 1.	0. 0 0. R 0 0	Error data display (Error reset, log display)
	n o 0 2.	n 1 0 0 0 0	Oil change time display (change time clear)
	n o 0 3.	3 5 5. 2	Model type display (double-speed setting)
	n o 0 4.	t E S t	Test run/outdoor unit forced setting
	n o 0 5.	S E t o u t	Outdoor unit setting
	n o 0 6.	S E t ı n	Indoor unit setting
	n o 0 7.	S E t G E	Generator setting
	n o 0 8.	S E t r P n.	Forced engine rpm setting
	n o 0 9.	ı n S t S	Indoor unit status display
	n o 1 0.	F ı r S t	Initial setting
↑UP	n o 1 1.	0 7. 1 0. 0 1.	Date display

① Operation Data Display: No. 00 (n o 0 0)

The normal (or special) display usually appears, with key operation used to display current data.

1) Normal display (Level 0)

On this outdoor unit system, the following data displays are repeated at 10-second intervals.

Display sequence	Display contents	Display examples	Remarks
0	Address display	u 0 1 1 2 0	System 01, 20 indoor units
1	Engine operation time (hours)	1 1 2 3 4 5	12345 hours
2	Compressor inlet pressure [MPa]	1 2. 1 0 0	
3	Compressor outlet pressure [MPa]	1 3. 2. 0 0	

2) Total OFF Setting Display (Level 0)

In normal display state, moving the outdoor board STOP switch (S001) to the “STOP” side causes a shutdown of all units. In the normal display state, Total OFF is normally displayed as P A u S E "PAuSE".

As usual, pressing the SET (S007) key (changing to Level 1) activates the display of operation data.

3) Operation Data Display (Level 1)

In status 1 or 2, pressing the SET (S007) key activates the display of the system data.

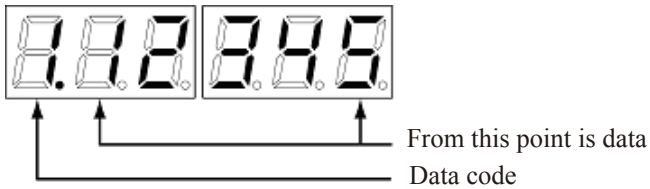
Example: u 0 1 0 2 0 - Pressing the SET (S007) key -> 0 d A t A

Pushing the HOME (S004) key for 1 second or more, or with no operation for 10 minutes, activates the normal display.

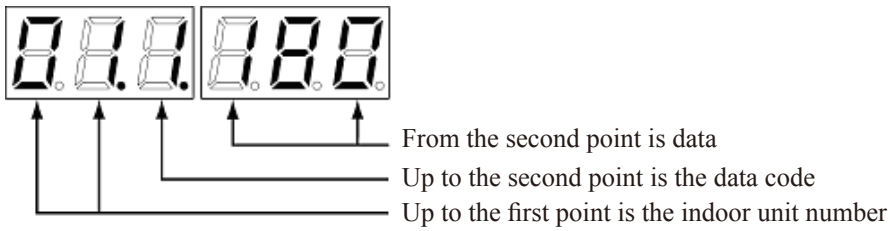
Data is displayed by selecting with the UP (S005) and DOWN (S006) keys.

Data display example

Outdoor unit data



Indoor unit data



4) Forced Setting Release

Pressing the SET (S007) key in the normally displayed status for one second causes all forced set items to be canceled.

5) Data setting operation (Level 2)

Setting start operation method : Press the SET (S007) key for one second in the setting data code select mode.
This activates the forced setting in progress display. (TEST/WARNING LED light)

Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys make it possible to change the setting details of the selected setting categories.

Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second.
This cancels the forced setting in progress display, making it possible to once again enter setting item selection operation mode. (TEST/WARNING LED off)

Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
This returns operation to normal. (TEST/WARNING LED off)

The setting details will not change when pressing the HOME (S004) key for one second during setting item select operation.)
Data setting operation is possible from items No. 0 to No. 8.

The following data is displayed.

		Data code	Measurement item		Display · examples	Standard operation data	
			Data name	Units		During cooling operation	During heating operation
Outdoor Unit	↓DOWN	1	Engine operation time	Hr	1.12345		
		2	Engine operating revolutions	Times	2.2345		
		3	Starter operation time	Seconds	3.234		
		4	Starter operating revolutions	Times	4.1345		
		5	Current oil change time	Hr	1.12345		
		c	Number of compressor oil refills	Times	C.--123		
		d	Number of times oil supplied	Times	d.--123		
		E	Clutch 1 on time	Hr	E.1500		
		F	Number of clutch 1 on operations	Times	F.150		
		G	Clutch 2 on time	Hr	G.1500		
	↑UP	h	Number of clutch 2 on operations	Times	H.150		
		P	Oil error time	Hr	P.00000		

Outdoor Unit	↓DOWN	10	Set engine rpm	min^{-1}	10.2200	800~2200	
		11	Engine rpm	min^{-1}	11.2200	800~2200	
		12	Compressor inlet pressure	MPa	12. 0.10	0.60~0.90	0.30~1.10
		13	Compressor outlet pressure	MPa	13. 1.00	2.30~3.20	2.40~3.30
		14	Compressor inlet temperature	℃	14. 35.0	5~30	0~30
		15	Compressor outlet temperature	℃	15.110.0	70~110	80~110
		16	Outdoor heat exchanger 1 inlet temperature	℃	16. 45.0	30~50	-5~10
		17	Outdoor heat exchanger 2 inlet temperature	℃	17. 45.0	30~50	-5~10
		18	Outdoor heat exchanger outlet temperature	℃	18. 45.0	30~50	-5~10
		20	Coolant temperature	℃	20. 65.0	60~83	55~83
		21	Outside air temperature	℃	21. 28.0		
		22	Clutch 1 coil temperature	℃	22. 50.0		
		23	Catalyst temperature (option)	℃	23.- 35.0		
		24	Hot water outlet temperature (option)	℃	24.- 35.0		
		26	Oil level mesurement temperature	℃	26. 82.0		
		31	Clutch 2 coil temperature	℃	31. 50.0	30~90	30~90
		34	Exhaust gas temperature	℃	34. 65.0	45~90	40~80
	↑UP	38	Outdoor fan 1	%	38.1000	0~108	0~90
		39	Outdoor fan 2	%	39.1000	0~108	0~90
		41	Outdoor fan revolutions 1	min^{-1}	41. 650	0~700	0~580
		42	Outdoor fan revolutions 2	min^{-1}	42. 650	0~700	0~580
		44	Set coolant pump	min^{-1}	44.3000	3700	3700
		45	Coolant pump revolutions	min^{-1}	45.3000	3700	3700
		46	Throttle	Step	46. 330		
		47	Fuel gas adjustment valve	Step	47. 330		
		48	Liquid valve	Step	48. 220	0~100	0~480
		49	Bypass valve	Step	49. 100	20	20
		50	Outdoor electric valve 1	Step	50. 480	480	0~480
		51	Outdoor electric valve 2	Step	51. 480	480	0~480
		52	Coolant 3-way valve	Step	52. 100	50	50~1950
		53	Electric cooler valve	Step	53. 100	50~1950	50~1950
		54	Hot water discharge 3-way valve	Step	54. 100	50~1950	50~1950
		55	Rotation speed variable value (F_rpm)		55.0000		

Outdoor Unit	↓DOWN						
		59	Engine load ratio		59 30	0~6	0~6
		60	Engine ignition timing	Degrees	60 10	8~40	8~40
		61	Cylinder number when flameout		61 1		
		65	Gas demand regulation value	%	65 000		
		66	Gas demand input value	%	66 000		
		70	Number of units with thermostat on	Units	70 20		
	↑UP	71	Thermostat-on average intake temperature	℃	71 19.4		
		72	Thermostat-on average blow out temperature	℃	72 15.0		
		73	Thermostat-on average E1 temperature	℃	73 5.0		
		74	Thermostat-on average E2 temperature	℃	74 6.0	•	•
		75	Thermostat-on average E3 temperature	℃	75 7.0	•	•
Indoor unit	↓DOWN	01	Indoor No. 1 unit electric valve opening	Step	01 180	64~350	300~480
		02	Indoor No. 1 unit intake temperature	℃	012 29.0		
		03	Indoor No. 1 unit blow out temperature	℃	013 15.0		
		04	Indoor No. 1 unit E1 temperature	℃	014 10.0		
		05	Indoor No. 1 unit E2 temperature	℃	015 10.0		
		06	Indoor No. 1 unit E3 temperature	℃	016 10.0		
	↑UP	01	Indoor No. 2 unit electric valve opening	Step	021 180		
		≈	*1				
		06	Indoor No. 32 unit E3 temperature	℃	326 10.0		

*1 Indoor unit data displays show the data of number (maximum 32 units) of connected indoor units, in the same order.

② Error Data Display: No. 1 (Level 0) < n o 0 1 >
Error data displays and error resets are conducted.
Error data, including pretrips, are stored in the nonvolatile memory for the 3 most recent incidents.
When an error occurs for the 4 time and beyond, the oldest error data is erased and the 3 most recent incidents are stored.
A profile of error data is as follows.

- Error code
- Outdoor unit operation data at occurrence of error
- Outdoor unit operation data at occurrence of error
- Outdoor unit warning data 5 seconds before occurrence of error
- Outdoor unit warning data 10 seconds before occurrence of error
- Outdoor unit warning data 15 seconds before occurrence of error

1) Display at time of no error (Level 0)
The following display appears.
0.0.0.A.0.0

2) Display at occurrence of error (Level 0)
Displays current error code.
0.0.0.A.0.2 (Example of engine oil error)

3) Error reset operation sequence
During display of current error code, pressing the SET (S007) key for 1 second activates the outdoor unit error reset.
When the cause of the error has yet to be removed, an error will occur again immediately after reset.
Resetting cannot be performed under the following circumstances.

Reset cannot be conducted under the following situations:

- Indoor unit error: Indoor unit error reset requires that the indoor unit be turned off.
- Oil use time: Oil use time reset must be conducted with the “Oil Use Time Display.”
- A11 (Engine oil level fault) cannot be reset. (Error continue until the oil level returns to normal).

4) Error code, temporary stop cause code display (Level 1)
During displays with no error and displays when error incidents occur, pressing the SET (S007) key causes the error code and temporary stop cause code to be displayed.
Data is displayed by selecting with the UP (S005) and DOWN (S006) keys.

	Data code	Data name	Display examples	Remarks
↓DOWN	0.	Current error code	0.00A00	No error
	1.	Most recent error log code	1. P15	P15
	2.	Second most recent error log code	2. A20	A20
	3.	Third most recent error log code	3. A04	A04
	4.1.	Stop log 1	4.1. 12	Temporary stop cause code *2 12
			12345	Engine operation time when it occurs *1
	4.2.	Stop log 2	4.2. P20	P20
			12340	
	~	~	~	
	4.9.	Stop log 9	4.9. 11	Temporary stop cause code 11
			12335	
	4.A.	Stop log 10	4.A. 2	Temporary stop cause code 2
			12330	
	4.B.	Stop log 11	4.B. P03	P03
			12325	
	4.C.	Stop log 12	4.C. A20	A20
			12320	
↑UP	5.	error log clear	5. CLr	error log clear

Note:
*1: Stop cause (or fault code) and stopped engine's operation time are displayed alternatively.
*2: Cause code are listed below.

No.	Stop cause	No.	Stop cause
1	Temporary stop due to insufficient differential pressure of refrigerant during startup	16	Engine failure during clutch control
2	Although the discharge temperature is high enough, the liquid valve is not yet open.	17	Stop once due to 24-hour continuous operation
3	Although the discharge temperature is high enough, the engine speed is still too high.	18	Stop once due to gas type determination control
4	Although the high-pressure area is high enough, the fan output is still too low.	19	Coolant temperature is high but electric cooler's 3-way electric valve is not completely opened.
5	Although the high-pressure area is high enough, the engine speed is still too high.	20	Over rotation during advantage
6	Although the high-pressure area is high enough, the unit is in Advantage mode	21	Stop once due to compressor oil return control of renewal machine
7	Although the high-pressure area is high enough, it is less than 3 minutes since the engine started.	22	Stop once due for electric 3-way valve's position put out control
8	Stop once during heating high load learning control 2	23	Stop once due to suspicion of flameout
9	Pause due to no compressor oil (W MULTI only)	24	Stop once due to suspicion of lack of outdoor gas
10	When compressor intake temperature is high but pressure is also high	25	Stop once due to suspicion of clutch connection fault
11	When discharge temperature is high but indoor exhaust is coming out (3WAY only)	26	Stop once due to high pressure sudden increase
12	Pressure is high, but within 4 minutes from outdoor refrigerant outlet control	27	Stop once due to continuous state of high coolant temperature
13	Pressure is high, but during heating automatic addressing	28	Stop once during to outdoor mode switching (3WAY only)
14	Pressure is high, but during automatic addressing	29	Stop once due to failure to adjust to 4-way valve of other units (W MULTI only)
15	Stop once during heating high load learning control	30	–

5) Error Data Display (Level 2)

During error log code display, pressing the SET (S007) key for one second or more activates the error data display at that time.

Example: [ ][ ][ ][P][1][5] — Pressing the SET (S007) key → [ ][1][2][3][4][5]

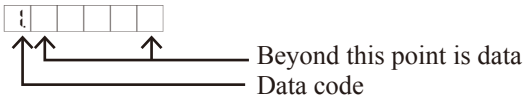
Pressing the SET (S007) key again for one second or more, or when there are no operations for 10 minutes, returns to the normal display.

Example: [ ][1][2][3][4][5] — Pressing the SET (S007) key → [ ][0][1][0.][2][0]

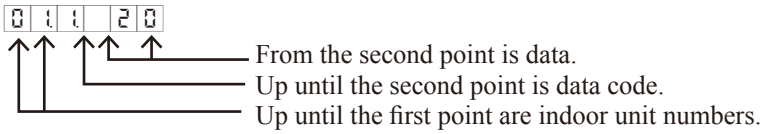
Data is displayed by selecting with the UP (S005) and DOWN (S006) keys.

Data display example

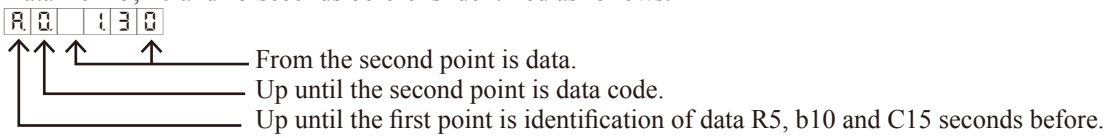
Outdoor unit data



Indoor unit data



Data from 5, 10 and 15 seconds before is identified as follows.



6) Error log data

No.	Data	Display examples
0	Error occurrence date	07.05.15
1	Error incident time	14.25.10
2	Abnormality code	0. A15
3	Engine operation time [hours]	1.99999
4	Number of engine operations [times]	2. 9999
5	Starter operation time [sec.]	3. 999
6	Number of starter operations [times]	4. 999
7		5. ———
8		6. ———
9		7. ———
10		8. ———
11		9. ———
12		A. ———
13		b. ———
14		c. ———
15		d. ———
16		E. ———
17		F. ———
18		G. ———
19		h. ———
20		i. ———
21		j. ———
22		k. ———
23		L. ———
24		n. ———
25		o. ———
26		p. ———
27		q. ———
28	Set engine rpm [min $^{-1}$]	10.1234
29	Engine rpm [min $^{-1}$]	11.1234
30	Compressor inlet pressure [MPa]	12. 1.00
31	Compressor outlet pressure [MPa]	13. 2.00
32	Compressor inlet temperature [℃]	14. 10.0
33	Compressor outlet temperature [℃]	15. 60.0
34	Outdoor heat exchanger inlet 1 temperature [℃]	16. 30.0
35	Outdoor heat exchanger inlet 2 temperature [℃]	17. 30.0
36	Outdoor heat exchanger outlet temperature [℃]	18. 50.0
37		19. ———
38	Coolant temperature [℃]	20. 70.0
39	Outside air temperature [℃]	21. 38.0
40	Clutch 1 coil temperature [℃]	22. 50.0
41	Catalyzer temperature [℃]	23.100.0
42	Hot water outlet temperature [℃]	24. 50.0
43		25. ———
44	Oil surface measured temperature [℃]	26. 10.0
45		27. ———
46		28. ———
47		29. ———
48		30. ———
49	Clutch 2 coil temperature [℃]	31. 50.0
50	Clutch 3 coil temperature [℃]	32. 50.0
51	Starter electric current [A]	33. 3.3
52	Exhaust gas temperature [℃]	34. 80.0
53		35. ———
54		36. ———
55		37. ———
56		38. ———
57		39. ———
58		40. ———
59		41. ———
60		42. ———
61		43. ———
62		44. ———
63		45. ———
64	Throttle [step]	46. 100
65	Fuel gas adjustment valve output [step]	47. 300
66	Liquid valve [step]	48. 20

No.	Data	Display examples
67	Bypass valve [step]	49. 20
68	Outdoor electric valve 1 [step]	50. 480
69	Outdoor electric valve 2 [step]	51. 480
70	Coolant 3-way electric valve [step]	52. 100
71	Electric cooler valve [step]	53. 100
72	Hot water dispensing 3-way electric valve [step]	54. 100
73	Rotation speed variable value (F_rpm)	55. 0
74		56. ———
75		57. ———
76		58. ———
77		59. ———
78	Engine ignition timing [degree]	60. 10
79		61. ———
80		62. ———
81		63. ———
82		64. ———
83		65. ———
84		66. ———
85		67. ———
86		68. ———
87		69. ———
88	Thermostat-on units	70. 24
89	Thermostat-on average intake temperature	71. 32
90	Thermostat-on average discharge temperature	72. 16
91	Thermostat-on average E1 temperature	73. 10
92	Thermostat-on average E2 temperature	74. 10
93	Thermostat-on average E3 temperature	75. 10
	(Continue at indoor unit data)	
94	Indoor No. 1 unit electric valve opening [step]	01.1.100
...	Indoor No. 1 unit intake temperature	01.2.32.0
	Indoor No. 1 unit discharge temperature	01.3.16.0
	Indoor No. 1 unit E1 temperature [℃]	01.4.10.0
	Indoor No. 1 unit E2 temperature [℃]	01.5.10.0
	Indoor No. 1 unit E3 temperature [℃]	01.6.10.0
	Indoor No. 2 unit electric valve opening [step]	02.1.100
	(Displays for connected indoor units)	
	Indoor No. 48 unit E3 temperature [℃]	48.6.10.0
Before 5	Set engine rpm [min $^{-1}$]	A.1.1234
	Engine rpm [min $^{-1}$]	A.2.1234
	Compressor inlet pressure [MPa]	A.3. 1.00
	Compressor outlet pressure [MPa]	A.4. 2.00
	Compressor inlet temperature [℃]	A.5. 10.0
	Compressor outlet temperature [℃]	A.6. 60.0
		A.7. ———
		A.8. ———
		A.9. ———
	Throttle [step]	A.A. 100
	Fuel gas adjustment valve output [step]	A.b. 300
	Liquid valve [step]	A.c. 20
	Bypass valve [step]	A.d. 20
	Outdoor electric valve 1 [step]	A.E. 480
	Outdoor electric valve 2 [step]	A.F. 480
		A.G. ———
		A.H. ———
		A.i. ———
		A.j. ———
		A.k. ———
		A.L. ———
10s	(Same as 5 seconds before)	B.1.1234
	...	
15s	(Same as 10 seconds before)	C.1.1234
	...	

*1: Data from the connected indoor units is shown when the most recent error log data is displayed. Nothing else will appear. (However, after completion of initial communications)

Note: Although digit displays are presented in the same way as during the normal display, there may be declines in precision.

6) Error log clear
Clears all of the error log and temporary stop causes for this outdoor unit.
Operation method: Press the SET (S007) key for one second.

SAtCLr → S-CLr- → SAtCLr
(clearing) (complete)

7) Error (alarm) code list

Error Code	Error (alarm) contents
A00	No error occurred
	(System A: Engine system protective device operation)
A01	Engine oil pressure error
A02	Engine oil error
A03	Engine high-revolution error
A04	Engine low-revolution error
A05	Ignition power source error
A06	Engine start failure
A07	Fuel gas valve error
A08	Engine stall
A10	High exhaust gas temperature
A11	Engine oil level error
A12	Throttle error
A14	Engine oil presure switch error
A15	Starter power source output short circuit
A16	Starter lock
A17	CT error (starter current detection failure)
A19	Low coolant temperature
A20	High coolant temperature
A21	Coolant level error
A22	Coolant pump error
A23	Crankshaft angle sensor error
A24	Camshaft angle sensor error
A25	Clutch error
A26	Flameout error
A27	Catalyst temperature error (for only models with catalyst option)
A28	Generator error (for only G POWER W MULTI)
A29	Converter error (for only G POWER W MULTI)
A30	Low fuel gas pressure error
	(System E: Communication system errors)
E01	Remote controller receive failure
E02	Remote controller transmission failure
E03	Indoor unit receive failure from remote controller (central)
E04	Indoor unit receive failure from outdoor unit
E05	Indoor unit transmission failure to outdoor unit
E06	Outdoor unit receive failure from indoor unit
E07	Outdoor unit transmission failure to indoor unit
E08	Duplicate indoor unit address setting
E09	Multiple main remote controller units set
E11	Indoor unit receive failure from signal output board
E12	Automatic address setting is in progress, automatic address setting start is prohibited
E13	Indoor unit transmission failure to remote controller
E15	Automatic address alarm (too few units)
E16	Automatic address alarm (too many units)
E18	Group control wiring communication failure
E20	No indoor unit in automatic address setting
E21	Outdoor main board error
E22	Outdoor main board sensor error
E24	Communication failure between outdoor units (for only W MULTI)
E26	Inconsistencies in number of outdoor units (for only W MULTI)
E28	Incorrect outdoor unit tube connection (for only W MULTI)
E31	Communication failure between units

Error Code	Error (alarm) contents
	(System F: Failure of sensor, memory, and other parts)
F01	Indoor heat exchanger inlet temperature sensor error
F02	Water heat exchanger unit anti-icing sensor error
F03	Indoor heat exchanger outlet temerature sensor error
F04	Compressor outlet temperature sensor error
F06	Outdoor heat exchanger inlet temperature sensor error
F08	Outside air temperature sensor error
F10	Indoor unit intake temperature sensor error
F11	Indoor unit discharge temperature sensor error
F12	Compressor inlet temperature sensor error
F13	Coolant temperature sensor error
F16	Compressor inlet/outlet pressure sensor error
F17	Hot water outlet temperature sensor error (for only models that discharge hot water)
F18	Exhaust gas temperature sensor error
F20	Clutch coil temperature sensor error
F21	Clutch 2 coil temperature sensor error
F29	Indoor nonvolatile memory (EEPROM) error
F30	Real time clock (RTC) function
F31	Outdoor nonvolatile memory (EEPROM) error
	(System L: Duplicate address and other setting defects)
L02	Inconsistencies in indoor/outdoor unit models (non-GHP equipment connected)
L03	Multiple main units set for group control
L04	Duplicate system (outdoor unit) address setting
L05	Duplicate indoor unit priority setting (priority indoor unit)
L06	Duplicate indoor unit priority setting (excluding priority indoor unit)
L07	Group control wire present for individual-control indoor unit
L08	Indoor unit address not set
L09	Indoor unit capacity not set
L10	Outdoor unit capacity not set
L13	Indoor unit model setting failure
L21	Gas type setting failure
	(System P: Indoor/outdoor protective device operation)
P01	Indoor fan error / indoor fan rpm error
P03	High compressor discharge temperature
P04	Refrigerant high-pressure switch operation
P05	Power source error
P09	Indoor unit ceiling panel connector connection failure
P10	Indoor unit float switch operation
P11	Water heat exchanger unit anti-icing sensor error (for only water heat exchanger unit)
P12	Indoor DC fan error
P13	Refrigerant circuit error
P14	O_2 sensor operation
P15	Complete refrigerant gas depletion
P18	Bypass valve error
P19	4-way valve lock error (not detected 3WAY MULTI)
P20	Refrigerant high-pressure error

Error Code	Error (alarm) contents
P22	Outdoor fan error
P23	Water heat exchanger unit interlock error (for only water heat exchanger unit)
P26	Clutch connection error
P30	Group control's sub unit error (system controller)
P31	Group control error
	(Others)
H07	Compressor oil depletion error (for only W MULTI)
H08	Temperature sensor error for oil level measurement (for only W MULTI)
oiL	Oil change time (level) alarm
GE	Backup operating display without power generation when the converter is abnomal

Note: Depending on the model, some items are not displayed.

③ Oil Change Time Display: No. 02 (Level 0) < n o 0 2. >
This function displays oil change time.
Key operation is used to perform oil change time clear setting

1) Oil change time display (Level 0)
This display indicates current oil change time.
Example: 0 1 2 3 4 (Example: 1,234 hours)

2) Oil change time display/clear setting (Level 0)
Pressing the SET (S007) key for one second or more in the oil change time display mode activates the following display.
0 1 2 3 4 - Pressing the SET (S007) key for one second or more -> C L r
When the C L r display appears, temporarily release the SET (S007) key, and then quickly continue to press the same SET (S007) key.
When the following display appears, oil change time will be 0.
C L r Quickly press the SET (S007) key for one second or more E n d
After the E n d display appears, oil change time will be displayed.
o 0 (0 hours)
Repeat the procedure if the change time does not return to 0.

④ Model Type Display: No. 03 (Level 0) < n o 0 3 >
This function is used to display the outdoor unit model type.
It may also be used for the double-speed setting (fast-forwarding the forced 3-minute off timer).
Operating the UP (S005) and DOWN (S006) keys causes the menu to change.

1) Model type display (Level 0)
Outdoor unit model types are displayed in the following way.

Model Name	Display
Not set	- - - - - 2
120	3 5 5 2
150	4 5 0 2
190	5 6 0 2
240	7 1 0 2

2) Double-speed setting (Level 0)

Operating method : Pressing the SET (S007) key for one second in the model type display mode moves to the double-speed setting display. (TEST/WARNING LED light)

Releasing method : Press the SET (S007) key for one second in the double-speed setting mode. (TEST/WARNING LED off)

Operation : The 3-minute off time timer counts at 10 times or greater speed than normal. The forced setting in progress display appears during the double-speed setting. (TEST/WARNING LED light)

⑤ Test Run and Outdoor Unit Forced Settings: No. 4 (Level 0) < n o 0 4 >
Key operation is used to determine the settings for forced test run, forced bypass valve closing, forced water circuit and forced valve opening.

1) Test run and forced setting display (Level 0)
Displays of the test run and forced settings selected with the menu.
TEST

2) Forced setting selection operation (Level 1)
Pressing the SET (S007) key in the test run/forced setting display mode causes the following display to appear.
Operating the UP (S005) and DOWN (S006) keys in this mode makes it possible to select the settings for forced cooling test run, forced heating test run, forced valve opening, forced water circuit, forced bypass valve closing, forced engine distributor mode, forced engine feedback, and forced engine adjustment valve closing.

	Display	Function
↑DOWN ↓UP	COOL	Forced cooling test run setting
	HEAT	Forced heating test run setting
	UOPEN	Forced valve opening setting
	PUMP	Forced water circuit setting
	UCLOSE	Forced bypass valve closing
	SA.r	Coolant air discharge mode
	ESPAr	Forced engine distributor mode
	EFEEd	Forced engine feedback
	ECLOSE	Forced engine adjustment valve position
	o.rGET	Forced compressor oil replenishment (W MULTI)
	o.rG.U	Forced compressor oil supplyment (W MULTI)
	oUrdEF	Forced outdoor defrost operation
	d.S PS	Pressure sensor ignored
	GASoFF	Forced fuel gas solenoid valve closing

3) Forced cooling test run setting (Level 2)
Display : COOL
Rejection conditions : Heating test run in progress, valve open, all stop operation in progress, automatic addressing in progress, indoor unit operation in progress.
Operating method : Press the SET (S007) key for one second while forced cooling test run is not in progress. (TEST/WARNING LED light)
Operation details : Cooling test run is activated.
Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method : Press the SET (S007) key for one second during forced cooling test run.
The forced-setting used in forced cooling test run will be canceled at this time.
(TEST/WARNING LED off)

4) Forced heating test run setting (Level 2)
Display : HEAT
Rejection conditions : Cooling test run underway, valve open, all stop operation in progress, automatic addressing in progress, indoor unit operation in progress.
Operating method : Press the SET (S007) key for one second while forced heating test run is not set. (TEST/WARNING LED light)
Operation details : Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method : Push the SET (S007) key for 1 second during forced cooling heating operation.
The forced setting used in forced heating test run will be canceled at this time.
(TEST/WARNING LED off)

5) Force valve opening setting (Level 2)... Used for evacuation, etc.

Display	:	U oPEn
Rejection conditions	:	Forced cooling test run in progress, forced heating test run in progress, bypass valve being closed
Operating method	:	Press the SET (S007) key for one second while forced valve opening is not set. (TEST/WARNING LED light)
Operation details	:	Indoor unit electric valve, outdoor unit electric valve 1, outdoor unit electric valve 2, liquid valve and bypass valve fully open. Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method	:	Press the SET (S007) key for one second in forced valve open setting mode. The forced setting in progress display will be canceled at this time, returning to forced setting select operation. (TEST/WARNING LED off)

6) Force water circuit setting (Level 2)... Used for cooling water system air discharging, etc.

Display	:	PuMP
Rejection conditions	:	None
Operating method	:	Press the SET (S007) key for one second when the forced water circuit is not set. (TEST/WARNING LED light)
Operation details	:	Coolant pump operating. The coolant electric 3-way valve repeats a cycle of 50 steps for 3 minutes and then 1950 steps for 1 minute and 16 seconds. The hot water electric 3-way valve repeats a cycle of 1950 steps for 30 seconds, 50 steps for 3 minutes, and 1950 steps for 46 seconds. Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method	:	Press the SET (S007) key for one second in forced water circuit mode. The forced setting in progress display will be canceled at this time, returning to forced setting select operation. (TEST/WARNING LED off)

7) Forced bypass valve closing setting (Level 2)... Used for pump down, etc.

Display	:	CLoSE
Rejection conditions	:	Valve is open
Operating method	:	Press the SET (S007) key for one second while forced bypass valve closing is not set.
Operation details	:	Fully close bypass valve. Perform necessary operation on others: liquid valve, indoor and indoor expansion valve, and outdoor fan pump down. Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method	:	Press the SET (S007) key for one second while forced bypass valve is closed. The forced setting in progress display will be canceled at this time, returning to forced setting select operation. (TEST/WARNING LED off)

8) Coolant air discharge mode (level 2)... Used for coolant air discharge.
* Be sure to set up the air discharge tool. If the air discharge is not enough, perform this control operation again and then check to make sure the air has been discharged.

Display : 5 A r
Rejection conditions : Test run in progress, automatic addressing in progress, stopping due to abnormality
Operating method : When the coolant air discharge mode is not set, press the SET (S007) key for one second. (TEST/WARNING LED light)
Operation details : Operate the coolant pump, coolant 3-way electric valve, and hot water 3-way electric valve to discharge air.
* During operation in air discharge mode, coolant pump, coolant 3-way electric valve, and hot water 3-way electric valve are controlled automatically to discharge air.

Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method : Automatic operation is canceled.
The forced setting in progress display will be canceled. (TEST/WARNING LED off)

9) Forced engine distributor mode (Level 2) ... Used when fixing ignition timing.

Display : E 5 P A r
Rejection conditions : None
Operating method : Press the SET (S007) key for one second while forced engine distributor mode is not set. (TEST/WARNING LED light)
Operation details : Activates forced engine distributor mode.
Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method : Press the SET (S007) key for one second while in forced engine distributor mode.
The forced setting in progress display will be canceled at this time, returning to forced setting select operation. (TEST/WARNING LED off)

10) Forced engine feedback (Level 2)

Display : E F E E d
Rejection conditions : None
Operating method : Press the SET (S007) key for one second while forced engine feedback is not set. (TEST/WARNING LED light)
Operation details : Activates feedback control.
Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method : Press the SET (S007) key for one second during forced engine feedback.
The forced setting in progress display will be canceled at this time, returning to forced setting select operation. (TEST/WARNING LED off)

11) Forced engine adjustment valve position (Level 2)

Display : E C L o 5 E
Rejection conditions : Indoor unit operation in progress.
Operating method : Press the SET (S007) key for one second while the forced engine adjustment valve closing is not set. (TEST/WARNING LED light)
Operation details : Set fuel gas adjustment valve at full closing position.
Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method : Press the SET (S007) key for one second when forced engine adjustment valve is being closed.
Forced setting in progress display is canceled (TEST/WARNING LED off) and forced setting selection operation returns. (After positioning, forced engine adjustment valve closing position is canceled automatically.)

12)Forced outdoor defrost operation (Level 2)

Display	:	oUrdEF
Rejection conditions	:	When there is some sort of defrost control (automatic, scheduled, forced) has begun * Current mode can also be set in cooling
Operating method	:	Press the SET (S007) key for one second when forced outdoor defrost is not set (TEST/WARNING LED light)
Operation details	:	Switch 4-way valve to cooling mode and perform operation. At this moment, fans of all indoor units are stopped Forced setting in progress display (TEST/WARNING LED light) is shown during this time. * If there is no operating signal, (all indoor units stop), the actual defrost control is delayed. When the next operating signal enters, defrost control (forced cooling mode) operates.
Releasing method	:	Press the SET (S007) key for one second or more when forced outdoor defrost is being set. The forced setting in progress display will be canceled at this time, returning to forced setting select operation. (TEST/WARNING LED off)

13)Pressure sensor ignored (Level 2)

Display	:	d.SPS
Rejection conditions	:	None
Operating method	:	Press the SET (S007) key for one second. (TEST/WARNING LED light)
Operation details	:	Fix the value of pressure sensor. Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method	:	Press the SET (S007) key for one second when pressure sensor is being ignored. The forced setting in progress display will be canceled at this time, returning to forced setting select operation. (TEST/WARNING LED off)

14)Forced fuel gas solenoid valve closing (Level 2)

Display	:	GASoFF
Rejection conditions	:	None
Operating method	:	Press the SET (S007) key for one second when forced fuel gas electric valve closing is not being set. (TEST/WARNING LED light)
Operation details	:	Fuel gas electric valve1 is blocked. Forced setting in progress display (TEST/WARNING LED light) is shown during this time.
Releasing method	:	Press the SET (S007) key for one second or more when forced fuel gas electric valve closing is being set. The forced setting in progress display will be canceled at this time, returning to forced setting select operation. (TEST/WARNING LED off)

⑥ Outdoor Unit Setting: No. 5 (Level 0) < n o 0 5 >
Key operation is used to perform the outdoor unit setting.

1) Outdoor unit setting display (Level 0)
Displays selection of outdoor unit setting mode at the menu.
5 E t o u t

2) Outdoor unit setting item select operation (Level 1)
Pressing the SET (S007) key while in the outdoor unit setting display mode activates the following display.
Example : 1 1 2 3 4 (Example: Data code 1, engine operation time 1234 hours)
Pressing the UP (S005) and DOWN (S006) keys in this mode makes it possible to select the date code.

3) Outdoor unit setting operation (Level 2)

Setting start operation method	:	Press the SET (S007) key for one second in the setting data code select mode. This activates the forced setting in progress display. (TEST/ WARNING LED light)
Setting change operation method	:	After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys make it possible to change the setting details of the selected setting categories.
Setting confirm operation method	:	After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. This cancels the forced setting in progress display, making it possible to once again enter the outdoor unit setting item selection operation mode. (TEST/WARNING LED off)
Setting cancel operation method	:	Press the HOME (S004) key for one second before confirming setting. This returns operation to normal. (TEST/WARNING LED off)

The setting details will not change when pressing the HOME (S004) key for 1 second during outdoor unit setting item select operation

4) Outdoor Unit Setting List (1)

No.	Data	Remarks	No.	Data	Remarks
00	Outdoor unit setting 00		30	Outdoor unit setting 30	
01	Outdoor unit setting 01		31	(ditto)	
02	Outdoor unit setting 02		32		
03	Outdoor unit setting 03		33		
04	Outdoor unit setting 04		34		
05	Outdoor unit setting 05		35		
06	Outdoor unit setting 06		36		
07	Outdoor unit setting 07		37		
08	Outdoor unit setting 08		38		
09	Outdoor unit setting 09		39		
0A	Outdoor unit setting 0A		3A		
0B	Outdoor unit setting 0b		3B		
0C	Outdoor unit setting 0C		3C		
0D	Outdoor unit setting 0D		3D		
0E	Outdoor unit setting 0E		3E		
0F	Outdoor unit setting 0F		3F		
10	Outdoor unit setting 10		40		Number of indoor unit connections
11	(ditto)		41		Gas type
12			42		Minimum setting rotation speed
13			43		Maximum setting rotation speed
14			44		Oil change display switching
15			45		Oil change setting [100h]
16			46		Cooling/heating automatic mode
17			47		Outdoor unit capacity
18			48		3-phase Single phase setting
19			49		Outdoor unit type
1A			4A		Model type setting 1
1B			4B		Model type setting 2
1C			4C		System address
1D			4D		Outdoor unit address
1E			4E		Number of outdoor unit connections
1F			4F		
20			50		α 1 (Cooling high pressure offset)
21			51		α 2 (Heating high pressure offset)
22			52		α 3 (Cooling low pressure offset)
23			53		α 4 (Heating low pressure offset)
24			54		α 5 (Cooling low pressure offset 2)
25			55		α 6 (Heating low pressure offset 2)
26			56		Fuel gas adjustment valve offset
27			57		Silent mode
28			58		Silent start time
29			59		Silent end time
2A			5A		Flameout detection
2B			5B		Antifreeze temperature
2C			5C		
2D			5D		
2E			5E		
2F			5F		

Outdoor Unit Setting List (2)

No.	Data	Remarks	No.	Data	Remarks
60	Outdoor unit	Thermostat-off diff	90	Outdoor unit	
61	setting 60	Thermostat-on diff	91	setting 90	Pressure sensor ignored
62	(ditto)	Cooling/heating select diff	92	(ditto)	
63		GUF thermostat-off diff	93		
64		GUF thermostat-off diff	94		
65		GUF cooling/heating select diff	95		
66			96		
67			97		Indoor electric valve opening and closing
68					
69			98		Indoor drain pump on/off
6A			99		
6B			9A		
6C			9B		
6D			9C		
6E			9D		
6F		Antifreeze timer	9E		
70			9F		
71			A0		
72			A1		
73			A2		
74			A3		
75			A4		
76			A5		
77			A6		
78			A7		
79			A8		
7A			A9		
7B			AA		
7C			AB		
7D			AC		
7E			AD		
7F			AE		
80			AF		
81			B0		
82			B1		
83			B2		
84			B3		
85		Cooling/heating automatic mode	B4		
86		Rotation speed reference	B5		
87			B6		
88		Ignition timing offset	B7		
89			B8		Snowfall control
8A			B9		
8B			BA		
8C			BB		
8D			BC		
8E			BD		
8F			BE		
			BF		

Outdoor Unit Setting List (3)

No.	Data	Remarks	No.	Data	Remarks
C0	Outdoor unit setting C0		E0	Outdoor unit setting E0	
C1	(ditto)		E1	(ditto)	
C2			E2		
C3			E3		
C4			E4		
C5			E5		
C6			E6		
C7			E7		
C8			E8		
C9			E9		
CA			EA		
CB			EB		
CC			EC		
CD			ED		
CE			EE		
CF			EF		
D0			F0		Refrigerant type
D1			F1		
D2			F2		Engine type
D3			F3		
D4			F4		
D5			F5		
D6			F6		
D7			F7		
D8			F8		
D9			F9		
DA			FA		
DB			FB		
DC			FC		
DD			FD		
DE			FE		
DF			FF		

⑦ Indoor Unit Setting: No. 6 (Level 0) < n o 0 6 >
Key operation is used for indoor unit settings (operation impossible when connecting the water heat exchanger).

1) Indoor unit setting display (Level 0)
Shows menu selected indoor unit status display.
S E t ı n

2) Outdoor unit setting item select operation (Level 1)
Pressing the SET (S007) key in the indoor unit setting display mode activates the following display.
(Occurs only upon completion of initial communication)
Example : 1 1 1 (Example: Indoor No. 1 unit, data code 1, with gas tube valve)
Operating the UP (S005) and DOWN (S006) keys in this mode makes it possible to select setting categories.
Pressing the HOME (S004) key or conducting no operations for 10 minutes activates a return to the HOME display.

3) Outdoor unit setting operation (Level 2)

Setting start operation method	:	Press the SET (S007) key for one second in the setting data code select mode. This activates the forced setting in progress display. (TEST/ WARNING LED light)
Setting change operation method	:	After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys make it possible to change the setting details of the selected setting categories.
Setting confirm operation method	:	After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. This cancels the forced setting in progress display, returning to indoor unit setting item select operation. (TEST/WARNING LED off)
Setting cancel operation method	:	"Pushing the HOME (S004) key for 1 second before setting confirm operation returns operation to normal."

(Setting details will not be cancelled when pushing the HOME (S004) key for more than 1 second during indoor unit setting item select operation.)

4) Outdoor Unit Setting List

No.	Data	Display examples	Remarks
0	Indoor unit setting 1 (indoor unit 1)	0 1 . 1 . 0	0/1 (Gas tube valve present/absent)
1	Indoor unit setting 2	0 1 . 2 . 0	0= Lowest priority to 4= Highest priority
2	Indoor unit setting 3	0 1 . 3 . 0	0/1 (Normal/Drain pump intermittent control)
3	Indoor unit setting 4	0 1 . 4 . 0	0/1 (Normal/Drain pump continuous control)
4	Indoor unit setting 5	0 1 . 5 . 0	0/1 (Normal/No cool air prevention control with heater thermostat-off)
5	Indoor unit setting 6	0 1 . 6 . 0	0/1 (Normal/No air speed control with heater thermostat-off)
6	Indoor unit setting 7	0 1 . 7 . 0	0/1 (Normal/No heater high-pressure avoidance control)
7	Indoor unit setting 8	0 1 . 8 . 0	0/1 (Normal/Heater stop indoor frost prevention control)
8	Indoor unit setting 9	0 1 . 9 . 0	0/1 (Normal/No refrigerant discharge control with heater thermostat-off)
9	Indoor unit setting A	0 1 . A . 0	0/1 (Normal/Air speed lower limit with heater thermostat-on LL)
10	Indoor unit setting B	0 1 . B . 0	0 to 8 (Cooling indoor fan odor compensation)
11	Indoor unit setting C	0 1 . C . 0	0/1 (Normal/Air speed select when dry thermostat off LL ↔ stop)
12	Indoor unit setting D	0 1 . d . 0	0 to 120 (Heating thermostat on upper limit:0,4,…480step)
13	Indoor unit setting E	0 1 . E . 0	0 to 120 (Heating thermostat on lower limit:0,4,…480step)
14	Indoor unit setting F	0 1 . F . 0	0 to 120 (Initial heating discharge:0,4,…480step)
15	Indoor unit setting G	0 1 . G . 0	0 to 120 (Initial cooling thermostat on:0,4,…480step)
16	Indoor unit setting H	0 1 . H . 0	0 to 120 (Heating high pressure avoidance:0,4,…480step)
17	Indoor unit setting I	0 1 . i . 0	0 to 120 (Cooling thermostat on lower limit:0,4,…480step)
18	Indoor unit setting J	0 1 . J . 0	0 to 120 (Heating thermostat off:0,4,…480step)
19	Indoor unit setting K	0 1 . K . 0	0 to 120 (Cooling thermostat off oil recovery:0,4,…480step)
20	Indoor unit setting L	0 1 . L . 0	-35 to 92 (Cooling discharge temperature:0= depending on model type, -35 to 92℃)
21	Indoor unit setting N	0 1 . n . 0	-35 to 92 (Heating discharge temperature:0= depending on model type, -35 to 92℃)
22	Indoor unit setting O	0 1 . o . 0	
23	Indoor unit setting P	0 1 . P . 0	
24	Indoor unit setting Q	0 1 . q . 0	
25	Indoor unit setting R	0 1 . r . 0	
26	Indoor unit setting S	0 1 . S . 0	
27	Indoor unit setting T	0 1 . t . 0	
28	Indoor unit setting U	0 1 . u . 0	
29	Indoor unit setting V	0 1 . V . 0	
30	Indoor unit setting 1 (indoor unit 2)	0 2 . 1 . 0	
	• • •		(Only existing indoor units are shown.)
14	Indoor unit setting V (indoor unit 48)	4 8 . 1 . 0	
40			

⑧ Generator setting No. 07 (Level 0) < n o 0 7 >
• This setting is not used.

⑨ Forced engine rpm setting No. 08 (Level 0) < n o 0 8 >
Forced setting of setting engine rpm is possible.

1) Forced engine rpm setting display (Level 0)
Displays selection of the forced engine rpm setting at the menu.
S E t r P n

2) forced engine rpm setting (Level 1)
Pressing the SET (S007) key in the forced engine rpm setting display mode activates the following display cycle, which is repeated at 1-second intervals.
1 0. 1 4 0 0 (Example: forced engine rpm= 1400min^{-1})
1 1. 1 4 0 0 (Example: Engine rpm= 1400min^{-1})
1 2. 0. 5 6 (Example: Compressor inlet pressure=0.56MPa)
1 3. 0. 5 6 (Example: Compressor outlet pressure= 0.56MPa)
1 5. 8 5. 0 (Example: Compressor outlet temperature = 85.0℃)

3) Forced engine rpm setting operation (Level 2)

Start operation method	:	Press the SET (S007) key for one second when forced engine rpm has not been set. This will fix the set engine rpm at the forced engine rpm. The forced setting in progress display appears during this time. (TEST/WARNING LED light)
Change operation method	:	Operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values.
End operation method	:	Press the SET (S007) key for one second when the forced engine rpm is set. This cancels the forced setting in progress display, returning to forced setting select operation. (TEST/WARNING LED off)

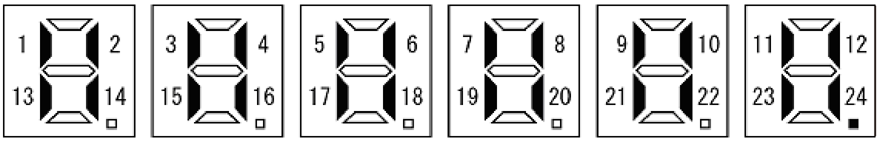
4) Other

Setting range	:	From the lowest to the highest rpm in that machine's control status, measured in 100 rpm units.
Clutch	:	Moves to clutch engaged rpm during clutch work, conducting clutch engaged operation.
Rotation restriction	:	To protect the compressor, if the compressor inlet pressure is below 0.05MPa, setting rotation's upper limit is set to 1400min^{-1}.

⑩ Indoor Unit Status Display: No. 9 (Level 0) <  >
Displays of connected indoor unit status.
Also possible to activate forced thermostat-off settings for specific indoor units.

1) Indoor unit status display (Level 0)
Shows menu selected indoor unit status display.

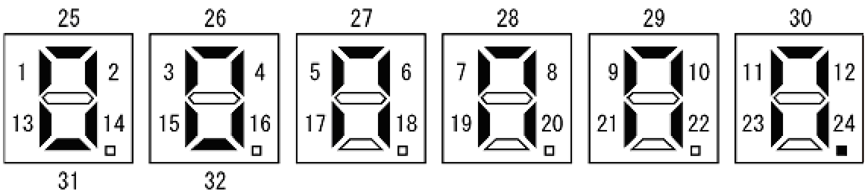

2) Indoor unit thermostat status display (Level 1)
In the indoor unit display mode, pressing the SET (S007) key displays the indoor unit thermostat status.



(Example: No. 1 - 24 units connected) Note: 1 dot at lower right

Lit :Thermostat on unit
Flashing :● 1-sec. cycle flashing indicates thermostat-off unit numbers
● 0.5-sec. cycle flashing indicates forced thermostat-off status unit numbers

Display examples
No. 1 to 32 units connected

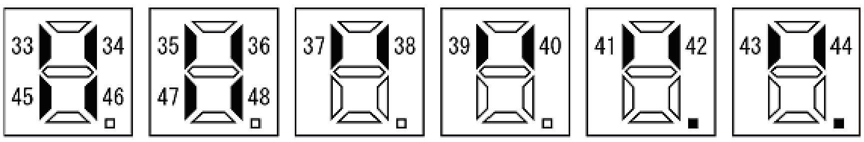


Note: 1 dot at lower right

1 to 12 units from upper left to upper right of vertical line
13 to 24 units from lower left to lower right of vertical line
25 to 30 units from top left to top right of horizontal line
31 units, 32 units from bottom left horizontal line

Operate the UP (S005) and DOWN (S006) keys.

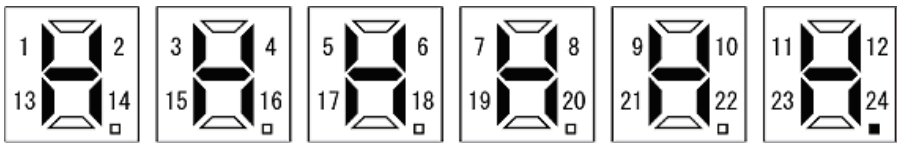
No. 33 to 48 units connected



Note: 2 dots at lower right

33 to 44 units from upper left to upper right of vertical line
45 to 48 units from lower left to lower right of vertical line

3) Indoor unit forced thermostat off setting (Level 2)
Press the SET (S007) key during indoor unit thermostat status display.



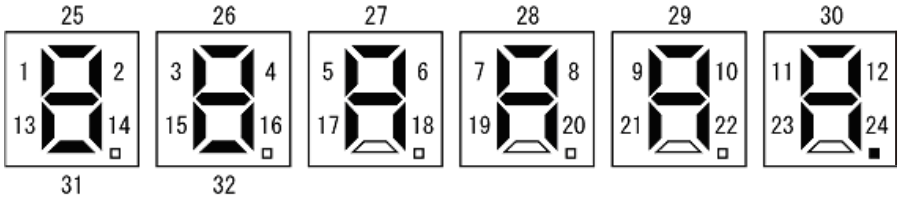
(Example: No. 1 - 24 units connected) Note: 1 dot at lower right

Lit :Normal status unit
Flashing :● 1-sec. cycle flashing indicates thermostat-off unit numbers
● 0.5-sec. cycle flashing indicates forced thermostat-off status unit numbers
● High speed flashing indicates selected unit to perform setting

Setting unit

Forced thermostat-off setting method	:	Press the SET (S007) key for one second when forced thermostat-off is not set. (TEST/WARNING LED light)
Forced thermostat-off release method	:	Press the SET (S007) key for one second when forced thermostat-off is set. (TEST/WARNING LED off)

Display examples
No. 1 to 32 units connected

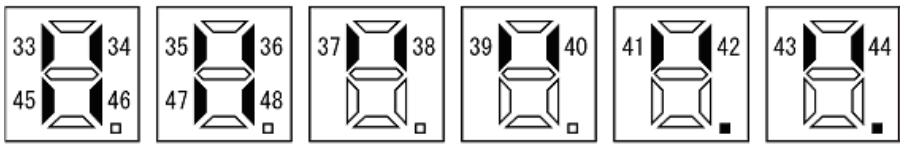


Note: 1 dot at lower right

1 to 12 units from upper left to upper right of vertical line
13 to 24 units from lower left to lower right of vertical line
25 to 30 units from top left to top right of horizontal line
31 units, 32 units from bottom left horizontal line

Operate the UP (S005) and DOWN (S006) keys.
If the number exceeds 32 units, automatically No. 33 to 48 units are displayed.

No. 33 to 48 units connected



Note: 2 dots at lower right

33 to 44 units from upper left to upper right of vertical line
45 to 48 units from lower left to lower right of vertical line

Note: The example above displays up to 48 units, but the number of indoor units that can be connected is restricted separately by each model.

⑪ Initial Setting: No. 10 (Level 0) < n o 1 0 >
Key operation is used to perform the initial setting.
Initial setting details are as follows.

1) Initial setting display (Level 0)
Displays selection of the initial setting at the menu.
F , r S t

2) Initial setting item select operation (Level 1)
Pressing the SET (S007) key in the initial setting display mode activates the following display.
Example: o u t 1 (Example: With system address 1)
Operating the UP (S005) and DOWN (S006) keys in this mode makes it possible to select the settings for system address, outdoor unit address, number of outdoor unit connected, number of indoor unit connected, format, gas type, old refrigerant indoor unit compliance, engine, heating automatic address, and cooling automatic address.

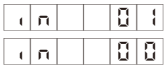
	Display	Function
↑DOWN ↓UP	o u t 0 1	System address setting
	S u b 0 0	Outdoor units address setting (Do not change it when not installing multiple W MULTI model outdoor units.)
	o n 0 1	Number of connected outdoor units setting (Do not change it when not installing multiple W MULTI model outdoor units.)
	, n 0 1	Number of indoor unit connected setting
	2 4 0	Capacity setting (cannot be set)
	G A S 0 2	Gas type setting
	r E F 0 1	Refrigerant setting (Do not change the setting.)
	G E n 0 1	Generator setting
	E n G 0 4	Engine type setting
	L - C 0 0	Model 1 setting
	2 - 3 0 0	Model 2 setting
	F o r 0 0	Region setting
	n P 0 1	N/P determination setting
	o y u 0 0	Hot water setting
	o , r 0 0	oil change display setting
	S o u 0 0	Single phase setting
	C P 0 0	Compressor setting
	P , P E	Tube connection confirmation
	H A d 0	Heat automatic address setting
	C A d 0	Cool automatic address setting

During change operation of each setting, TEST/WARNING LED lights.

3) System address setting (Level 2)

Rejection conditions	:	Not accepted during indoor operation
Setting start operation method	:	Press the SET (S007) key for one second.
Setting change operation method	:	After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example: 	:	When pressing the UP (S005) key
	:	When pressing the DOWN (S006) key
Setting confirm operation method	:	After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method	:	Press the HOME (S004) key for one second before confirming setting.
Setting range	:	01 to 31

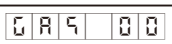
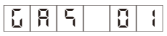
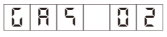
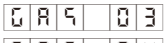
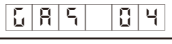
4) Number of connecting indoor units setting (Level 2)

Rejection conditions	:	Not accepted during indoor operation
Setting start operation method	:	Press the SET (S007) key for one second.
Setting change operation method	:	After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example: 	:	When pressing the UP (S005) key
	:	When pressing the DOWN (S006) key
Setting confirm operation method	:	After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method	:	Press the HOME (S004) key for one second before confirming setting.
Setting range	:	00 Not set 01 to 48 Number of indoor unit connected in same system 1 to 48 units*

(*) The number of indoor units that can be connected is restricted separately by each model.

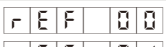
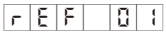
5) Gas type setting (Level 2)

Rejection conditions	:	Not accepted during indoor operation
Setting start operation method	:	Press the SET (S007) key for one second.
Setting change operation method	:	After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example: 	:	When pressing the UP (S005) key
	:	When pressing the DOWN (S006) key
Setting confirm operation method	:	After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method	:	Press the HOME (S004) key for one second before confirming setting.
Setting range	:	00 to 0F

0	Propane G31	
1	—	
2	Natural gas G20	
3	Natural gas G25	
4	—	

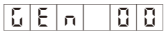
6) Refrigerant setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 02

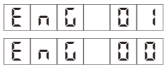
0	Not set	
1	Normal	
2	•	•

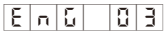
7) Generator setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 03

0	Not set	
1	•	•
2	•	•
3	No generator	

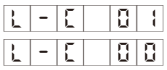
8) Engine setting (Level 2)

Rejection conditions	:	Not accepted during indoor operation
Setting start operation method	:	Press the SET (S007) key for one second.
Setting change operation method	:	After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example: 	:	When pressing the UP (S005) key
	:	When pressing the DOWN (S006) key
Setting confirm operation method	:	After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/ WARNING LED off)
Setting cancel operation method	:	Press the HOME (S004) key for one second before confirming setting.
Setting range	:	00 to 04

0	Not set	
1	•	•
2	•	•
3	K25	
4	•	•

Note: False setting will cause a serious malfunction to the device.
Retain the default setting in principle. If a setting change is necessary due to the exchange of the Outdoor main board or nonvolatile memory, etc., confirm the engine type and make sure not to make a false setting.

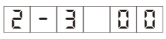
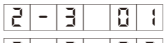
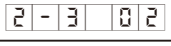
9) Model type 1 setting (Level 2)

Rejection conditions	:	Not accepted during indoor operation
Setting start operation method	:	Press the SET (S007) key for one second.
Setting change operation method	:	After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example: 	:	When pressing the UP (S005) key
	:	When pressing the DOWN (S006) key
Setting confirm operation method	:	After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/ WARNING LED off)
Setting cancel operation method	:	Press the HOME (S004) key for one second before confirming setting.
Setting range	:	00 to 02

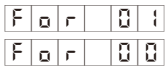
0	3WAY MULTI	
1	•	•
2	•	•

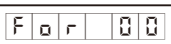
10) Model 2 setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 02

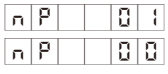
0	Standard	
1	W MULTI	
2	3WAY MILTI	

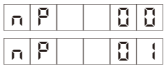
11) Region setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 02

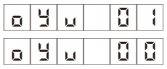
0	Europe	

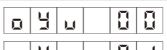
12) N/P determination setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 01

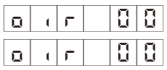
0	Not set	
1	Set	

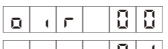
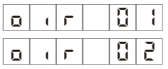
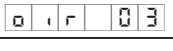
13) Hot water setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 99

0	No discharge	
1	Hot water discharge thermostat off temperature	
~	to	~
99	•	•

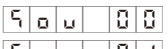
14) Oil change display setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 03

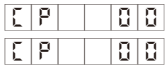
0	Inspection and error	
1	None	
2	Error only	
3	Inspection only	

15) Single phase setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 01

0	•	
1	Single phase	

16) Compressor setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second.
Setting change operation method : After entering the setting start operation mode, operating the UP (S005) and DOWN (S006) keys makes it possible to change the setting values. (TEST/WARNING LED light)
Example:  : When pressing the UP (S005) key
: When pressing the DOWN (S006) key
Setting confirm operation method : After entering the setting start operation or setting change operation completed, press the SET (S007) key for one second. (TEST/WARNING LED off)
Setting cancel operation method : Press the HOME (S004) key for one second before confirming setting.
Setting range : 00 to 05

0	Not set	
1	•	•
2	•	•
3	•	•
4	•	•
5	Multi compressor and 2 clutch different capacities	

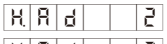
17) Tube connection confirmation (Level 2) <Cannot be set if not W MULTI>

Rejection conditions : Indoor unit operation in progress, cooling automatic addressing in progress
Setting start operation method : Push the SET (S005) key for 1 second. (Forced / error LED light)
Setting change operation method : Automatic completion. Press the SET (S005) key for one second when turning off. (Forced / error LED off)

18) Heating automatic address setting (Level 2)

Rejection conditions : Not accepted during indoor operation
Setting start operation method : Press the SET (S007) key for one second. (TEST/WARNING LED light)
Setting change operation method : Automatic completion. Press the SET (S007) key for one second when turning off. (TEST/WARNING LED off)

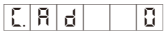
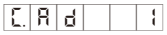
Automatic address setting status is successively displayed as shown below.
The meaning of the numbers is as follows.

0: Automatic address start setup 
1: Indoor unit automatic address setup wait 
2: Engine operation in progress 
3: Indoor unit checking in progress 
4: Address setting in progress 
5: Setting complete 

19) Cooling automatic address setting (Level 2)

Rejection conditions	:	Not accepted during indoor operation
Setting start operation method	:	Press the SET (S007) key for one second. (TEST/WARNING LED light)
Setting change operation method	:	Automatic completion. Press the SET (S007) key for one second when turning off. (TEST/WARNING LED off)

Automatic address setting status is successively displayed as shown below.
The meaning of the numbers is as follows.

0: Automatic address start setup 
1: Indoor unit automatic address setup wait 
2: Engine operation in progress 
3: Indoor unit checking in progress 
4: Address setting in progress 
5: Setting complete 

⑫ Date Display: No. 11 (Level 0) < n o 1 1 >
Display of the current date
Key operation is used to display the time and set the date.

1) Date display (Level 0)
Displays the date.
Example: 0 8. 0 4 0 1 (Example: April 1, 2008)

2) Date display (Level 1)
In the date display mode, pressing the SET (S007) key activates the next display.
Example: 0 8. 0 4 0 1 (Example: April 1, 2008)
In this state, pressing the UP (S005) and DOWN (S006) keys toggles between the dates and time displays.

	Display	Function
↑DOWN ↓UP	0 8. 0 4 0 1	Date display
	1 1 0 6. 2 5	Time display

3) Clock setting (Level 2)
In the date display or time display mode, pressing the SET (S007) key for one second or more activates the clock setting function.
Example: 0 8. 0 4 0 1 (Example: Year 2008)

Item	Data name	Display examples	Remarks
1	Year	1. 0 8	2008
2	Month	2. 0 4	April
3	Day	3. 0 1	1
4	Hour	4. 1 1	11:00 a.m.
5	Minutes	5. 0 6	6 min.

Each time the SET (S007) key is pressed, the set items is confirmed, and the set item moves to the next one in the order shown. The set item returns to Item 1 after Item 5.
As each item is displayed, operating the UP (S005) and DOWN (S006) keys makes it possible to change the value settings.
When clock is set, the clock stops and the number of seconds is set to 0.
When completing the clock setting, push the HOME (S004) key for 1 second.
This clock may be set for up to year 2099 (with adjustments for leap years, it may be set for beyond that year as well).

When the power supply is turned on, detecting a halt in RTC oscillation causes the clock to be set at the initial value.
(February 1, 2003 - 12:00:00)

(8) Ignition Timing Check and Adjustment

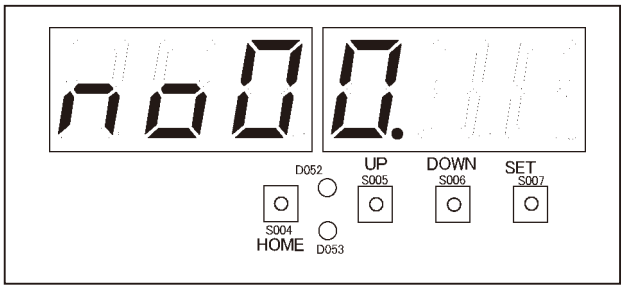
① Preparation for work

Turn off remote controllers for all indoor units. Confirm outdoor units have stopped.

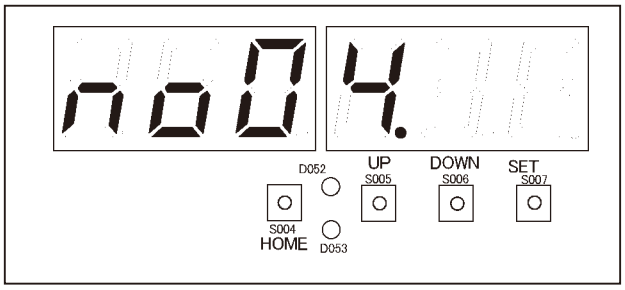
② Distributor mode setting

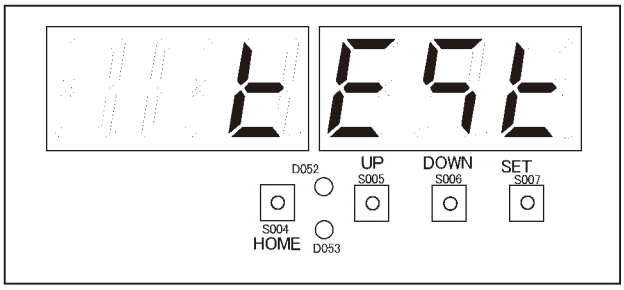
Set the distributor mode by selecting " E SPAr " from the " no04 " test run forced setting display.

1) Press the HOME key (S004) for one second or more.
Menu item number " no00 "(right figure) will be displayed.

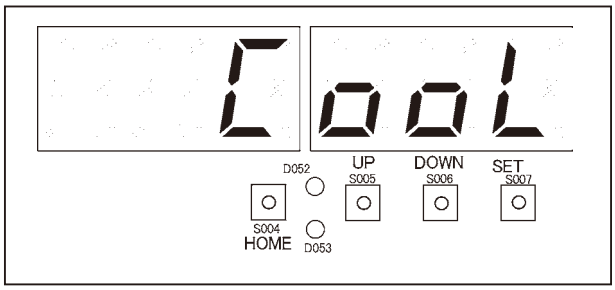


2) Press the UP (S005) or DOWN (S006) key, displaying the menu item numbers. Select menu item " no04 " in the figure below. The display " tEST " (figure below) will appear.

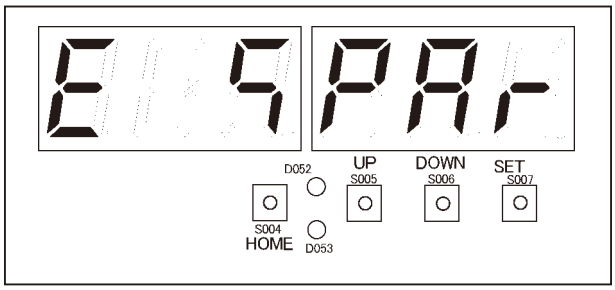




3) Press the SET key (S007). " CoolL " (right figure) will bedisplayed. The LEVEL LED (D053) will light.



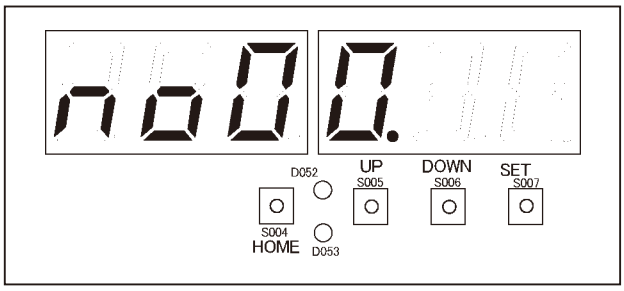
4) Press the UP (S005) or DOWN (S006) key to display " E SPAr " (right figure). Press the SET key (S007) for one second or more.
The TEST/WARNING LED (D052) will light, and the distributor mode will be set.



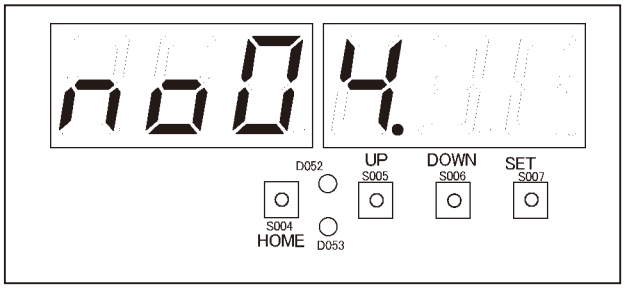
③ Start test run and set engine rotational speed
Start test run, and select “ n o 0 8 ” forced engine rpm setting, and set 800 [min^{-1}].

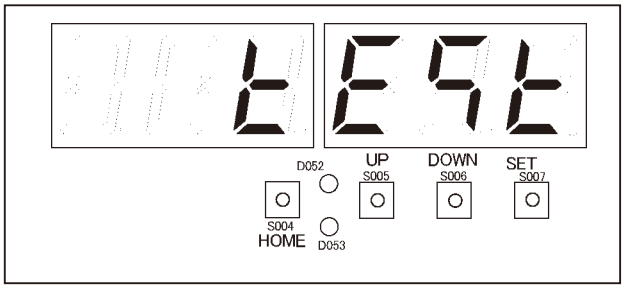
Start test run.

1) Press the HOME key (S004) for one second or more. Menu item number “ n o 0 0 ”(right figure) will be displayed.

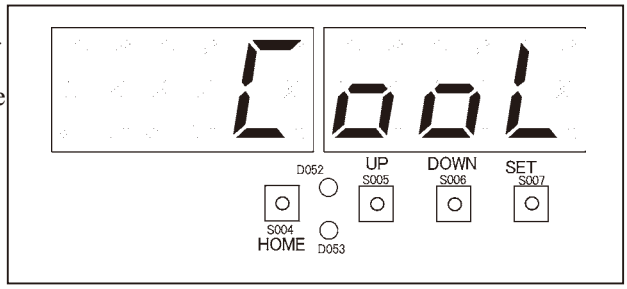


2) Press the UP (S005) or DOWN (S006) key, displaying the menu item numbers. Select menu item " n o 0 4 " in the figure below. The display “ t E S t ” (figure below) will appear.



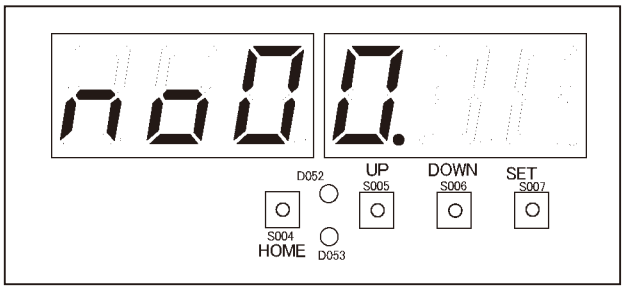


3) Press the SET key (S007). “ C o o L ” (right figure) will be displayed. The LEVEL LED (D053) will light. Press the SET key (S007) for one second or more. The TEST/WARNING LED (D052) will light, and the test run will start.

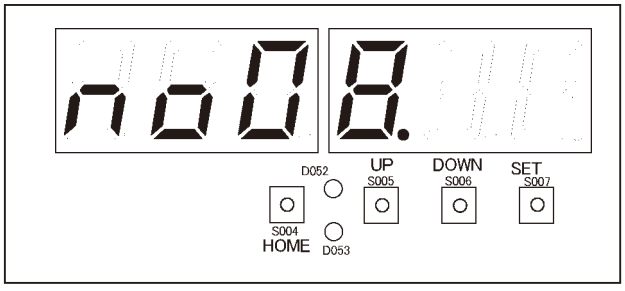


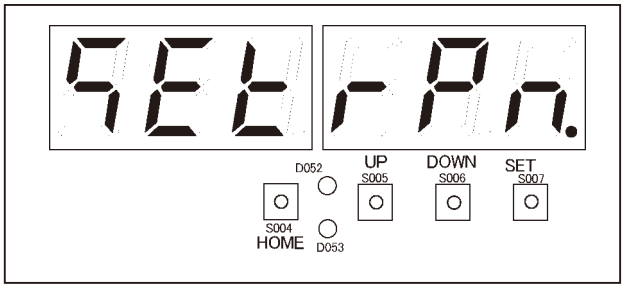
Set the engine rotational speed to 800 [min^{-1}].

4) Press the HOME key (S004) for one second or more. Menu item number “ n o 0 0 ” (right figure) will be displayed.



5) Press the UP (S005) or DOWN (S006) key, displaying the menu item numbers. Select menu item " n o 0 8 " in the figure below. The display " S E t r P n " (figure below) will appear.





6) Press the SET key (S007). The LEVEL LED (D053) will light, and the status with the engine rotating at the forced (set) speed will be displayed at one-second intervals, as shown below.

Display	Item
10.1400 (10.1400)	Forced engine rotational speed (example: 1400 min^{-1})
11.1400 (11.1400)	Engine rotational speed (example: 1400 min^{-1})
12. 0.56 (12.0.56)	Compressor inlet pressure (Example: 0.56MPa)
13. 0.56 (13.0.56)	Compressor outlet pressure (Example: 0.56MPa)
15. 85.6 (15.85.0)	Compressor outlet temperature (Example: 85.0℃)

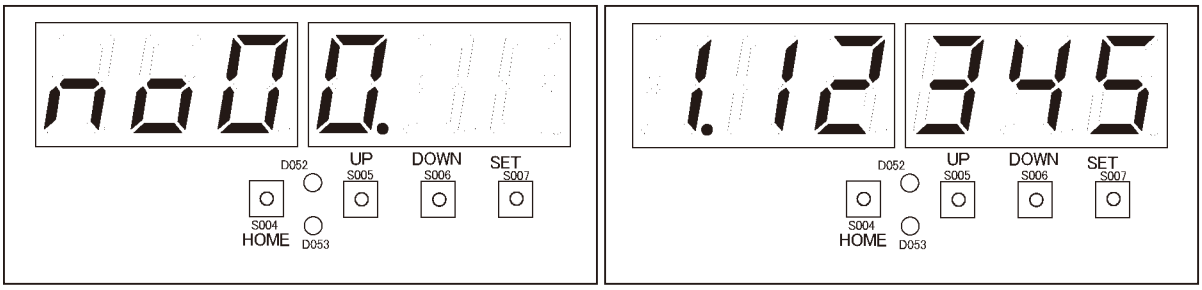
7) In this state, press the UP (S005) or DOWN (S006) key to set the engine rotational speed to 800 [min^{-1}]. Press the SET key (S007) for one second or more, to confirm the set engine rotational speed. The TEST/WARNING LED (D052) will light.

Caution: The forced engine rpm can be set within the range from the minimum speed to the maximum speed governed by the engine, in units of 100 revolutions.

④ Ignition timing check

When the operation conditions stabilize, select " no 00 " operation data display, and display " 60 " (engine ignition timing). Check that this value is the value shown in table 1.

1) Press the HOME (S004) key for one second or more. Menu item number " no 00 " (figure below) will be displayed. The TEST/WARNING LED (D052) will light. After that, " 11 2345 " (as in the example below where the engine has 12345 operating hours) will be displayed. The TEST/WARNING LED (D052) will light. In this state, press the SET (S007) key.
The LEVEL LED (D053) will light.



2) Press the UP (S005) or DOWN (S006) key to display " 60 " (engine ignition timing). Check that this value is the one shown in table 1 below.
Table 1 Ignition timing adjustment value: at 800 [min^{-1}] (K25, F2, 4Y).
at 1400 [min^{-1}] (950P)

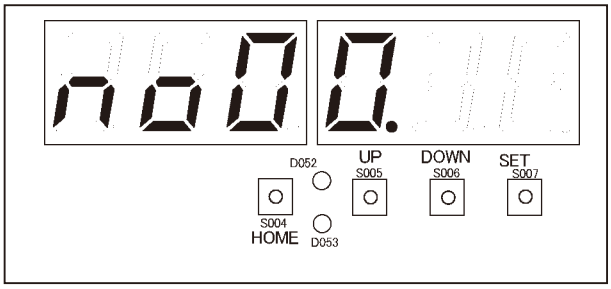
	G (propane)	G(13A•12A)
F2 engine	10˚BTDC	10˚BTDC
K25 engine	10˚BTDC	10˚BTDC
950P engine	20˚BTDC	20˚BTDC
4Y engine	10˚BTDC	10˚BTDC

3) Attach the timing light on the high-tension wire for the no. 1 cylinder of the engine, and check the ignition timing (refer to table 1 above). Compare it to the " 60 " (engine ignition timing) value displayed in 2) above.

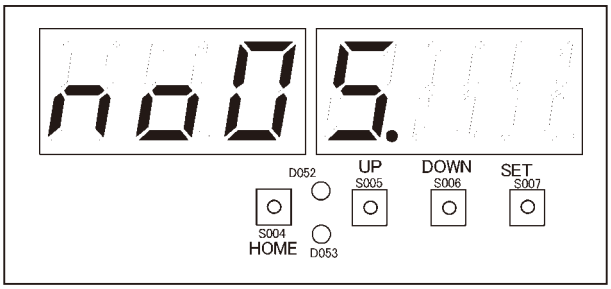
⑤ Correction for distorted amount

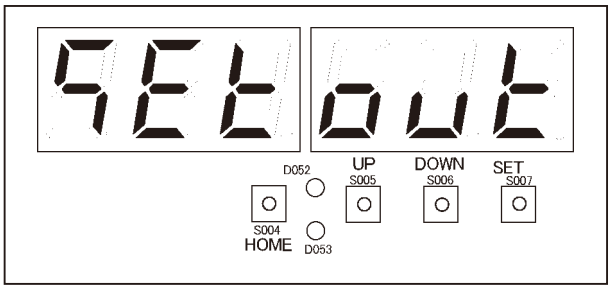
If the value is different than that displayed by “ ６０ ” (engine ignition timing) set in item (④) above, select “ ８８ .” (ignition timing offset) in “ ｎｏ０５ ” engine settings, and correct for the distorted amount.

1) Press the HOME key (S004) for one second or more. Menu item number “ ｎｏ００ ”(right figure) will be displayed.

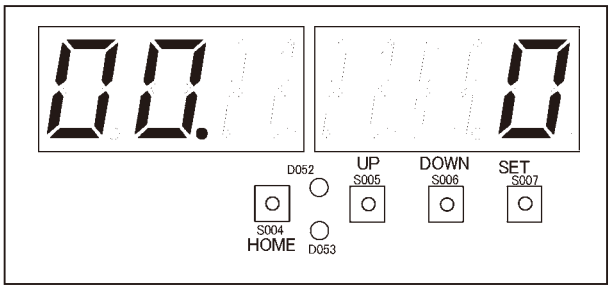


2) Press the UP (S005) or DOWN (S006) key, displaying the menu item numbers. Select menu item " ｎｏ０５ " in the figure below. The display “ ５ＥＴ ｏｕＴ ” (figure below) will appear.





3) In this state, press the SET key (S007). The display will change to “ ００ ０ ” (right figure) and the LEVEL LED (D053) will light.



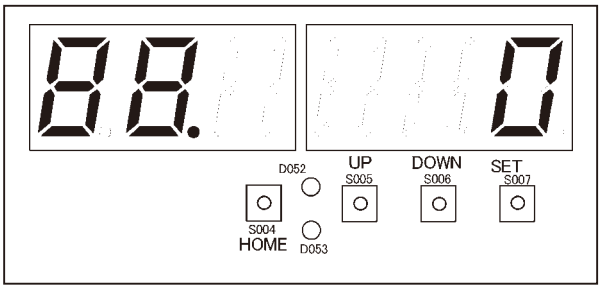
4) Next, press the UP (S005) or DOWN (S006) key, to display " ８８ " (ignition timing offset).

5) Make the correction

Correction example a)

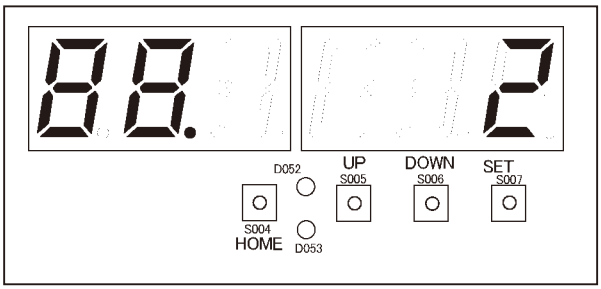
The adjustment value is 10° BTDC, but the observed value was 8° BTDC. Press the UP (S005) or DOWN (S006) key to set a correction of +2 in relation to the current " 8 8 " (ignition timing offset) value.

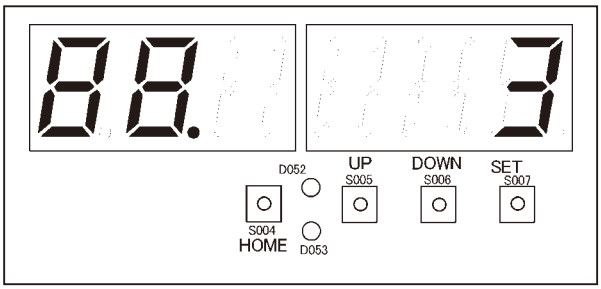
i) Display the current " 8 8 " (ignition timing offset) value, and check it. The current value is zero (0). The display for " 8 8 0 " will be as shown at right.



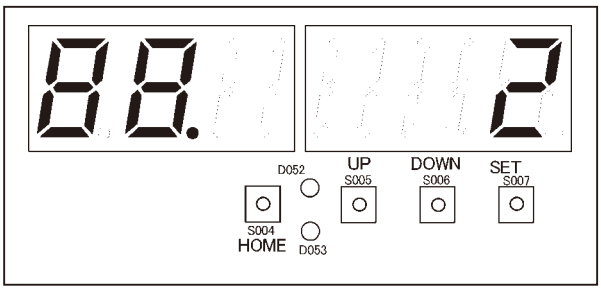
ii) With " 8 8 " (ignition timing offset) displayed, press the SET key (S007) for one second or more. The TEST/WARNING LED (D052) will light, and LEVEL LED (D053) will flash.

iii) Press the UP (S005) or DOWN (S006) key to set a correction of +2 in relation to the current value checked in "ii)."
The display will show " 8 8 2 " (right figure).
Caution: The display example at right is an example for when the current value checked in "i)" is zero (0). If the current value is "1" and a +2 correction is set in relation to that value, the value will become "3" after the setting is made. The display will show " 8 8 3 " (figure below right).



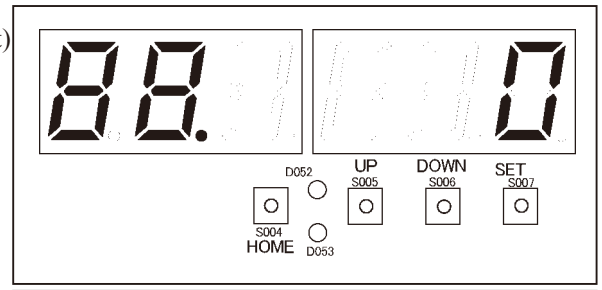


iv) With " 8 8 2 " (right figure) displayed, press the SET key (S007) for one second or more. The TEST/WARNING LED (D052) will go out, and LEVEL LED (D053) will light. The ignition timing offset mode will be cancelled, and the setting process will be ended.



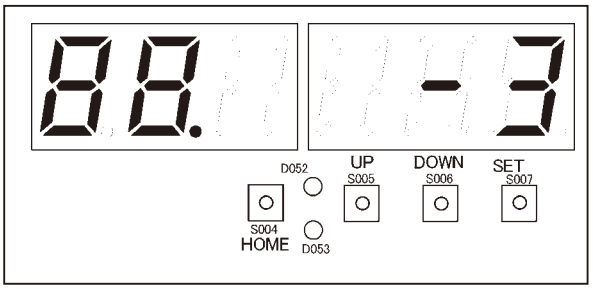
Correction example b)
The adjustment value is 10°BTDC, but the observed value was 13° BTDC. Press the UP (S005) or DOWN (S006) key to set a correction of -3 in relation to the current " 8 8 " (ignition timing offset) value.

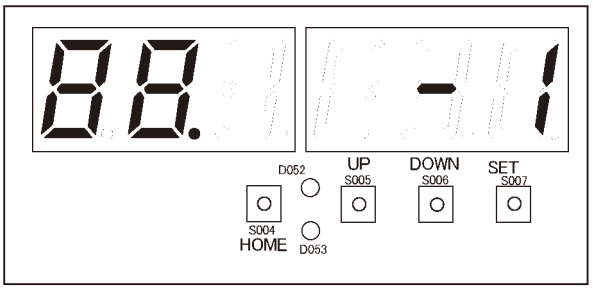
i) Display the current " 8 8 " (ignition timing offset) value, and check it. The current value is zero (0). The display for " 8 8 0 " will be as shown at right.



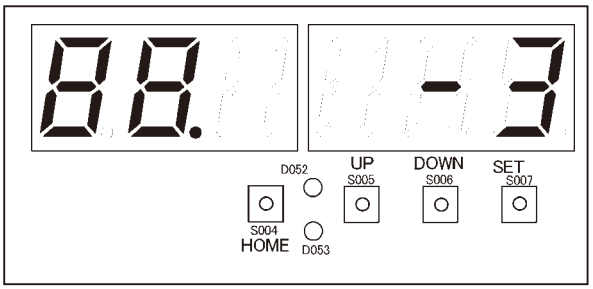
ii) With " 8 8 " (ignition timing offset) displayed, press the SET key (S007) for one second or more. The TEST/WARNING LED (D052) will light, and LEVEL LED (D053) will flash.

iii) Press the UP (S005) or DOWN (S006) key to set a correction of -3 in relation to the current value checked in "ii)."
The display will show " 8 8 - 3 " (right figure).
Caution: The display example at right is an example for when the current value checked in "i)" is zero (0).
If the current value is "2" and a -3 correction is set in relation to that value, the value will become "-1" after the setting is made. The display will show " 8 8 - 1 " (figure below right).





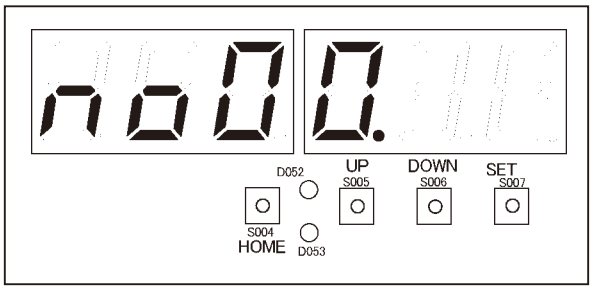
iv) With " 8 8 - 3 " (right figure) displayed, press the SET key (S007) for one second or more. The TEST/WARNING LED (D052) will go out, and LEVEL LED (D053) will light. The ignition timing offset mode will be cancelled, and the setting process will be ended.



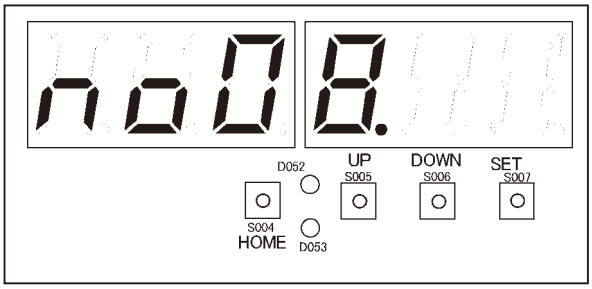
⑥ Cancel settings

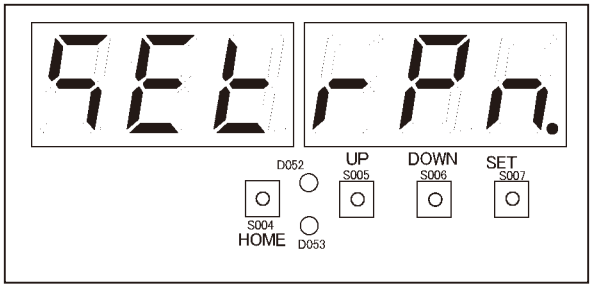
When ignition timing correction is finished, cancel the forced rotational speed setting and the distributor mode. Make sure to do this.

1) Press the HOME key (S004) for one second or more. Menu item number " n o 0 0 " (right figure) will be displayed.



2) Press the UP (S005) or DOWN (S006) key, displaying the menu item numbers. Select menu item " n o 0 8 " in the figure below. The display " S E t r P n " (figure below) will appear.



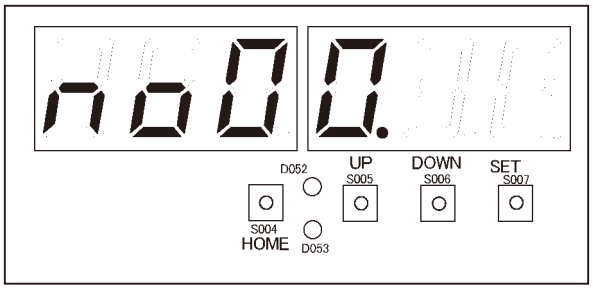


3) Press the SET key (S007). The LEVEL LED (D053) and TEST/WARNING LED (D052) will light, and the status with the engine rotating at the forced (set) speed will be displayed at one-second intervals, as shown below.

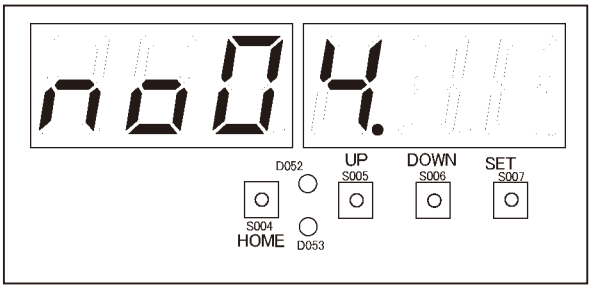
Display	Item
10.1400 (10.1400)	Forced engine rotational speed (example: 1400 min^{-1})
11.1400 (11.1400)	Engine rotational speed (example: 1400 min^{-1})
12. 0.56 (12.0.56)	Compressor inlet pressure (Example: 0.56MPa)
13. 0.56 (13.0.56)	Compressor outlet pressure (Example: 0.56MPa)
15. 85.6 (15.85.0)	Compressor outlet temperature (Example: 85.0℃)

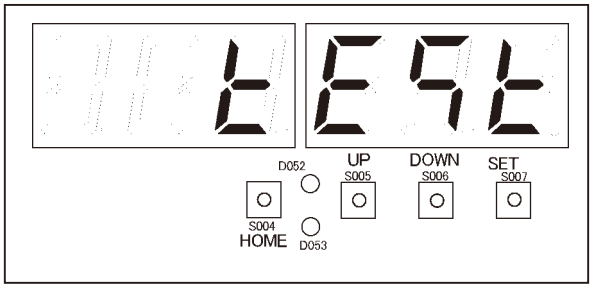
4) Press the SET key (S007) for one second or more. The TEST/WARNING LED (D052) will go out, and the forced rotational speed setting mode will be canceled.

5) Press the HOME key (S004) for one second or more. Menu item number " n o 0 0 " (right figure) will be displayed.

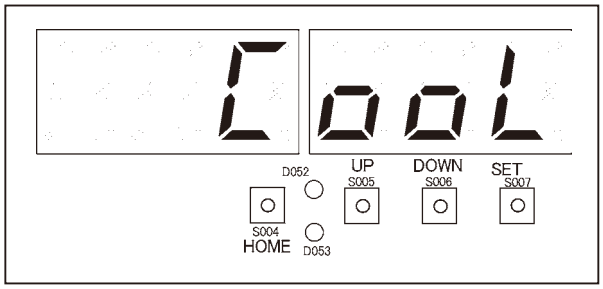


6) Press the UP (S005) or DOWN (S006) key and select menu item number " n o 0 4 " The display " t E S t " (figure below) will appear.

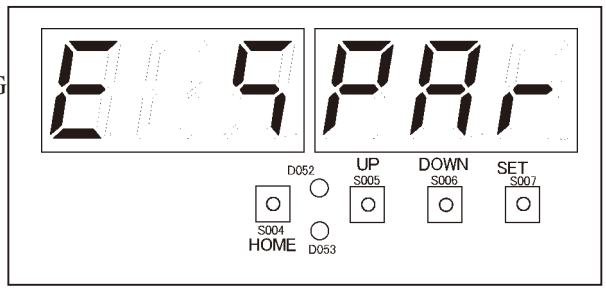




7) Press the SET key (S007). “ C o o L ” (right figure) will be displayed. The LEVEL LED (D053) and TEST/WARNING LED (D052) will light.

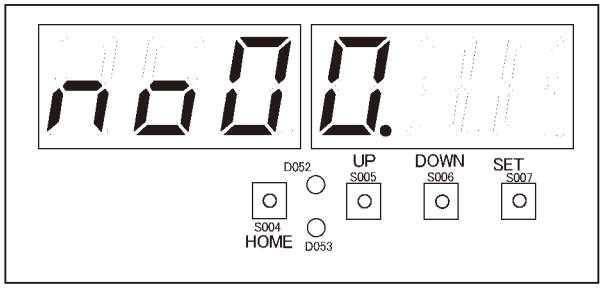


8) Press the UP (S005) or DOWN (S006) key, to display “ E SPAr ” (right figure). Press the SET key (S007) for one second or more. The TEST/WARNING LED (D052) will go out, and distributor mode will be cancelled.

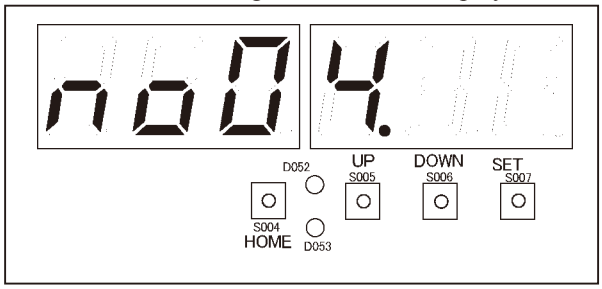


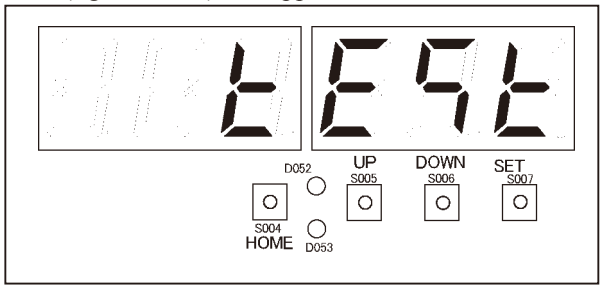
⑦ Stop test run

1) Press the HOME key (S004) for one second or more. Menu item number “ n o 0 0 ” (right figure) will be displayed.



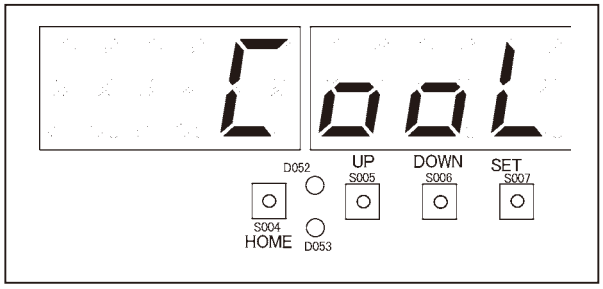
2) Press the UP (S005) or DOWN (S006) key, displaying the menu item numbers. Select menu item " n o 0 4 " in the figure below. The display “ t E S t ” (figure below) will appear.





3) Press the SET key (S007). “ C o o L ” (right figure) will be displayed. The LEVEL LED (D053) and TEST/WARNING LED (D052) will light.

4) Press the SET key (S007) for one second or more. The TEST/WARNING LED (D052) will go out, and the test run will be stopped.

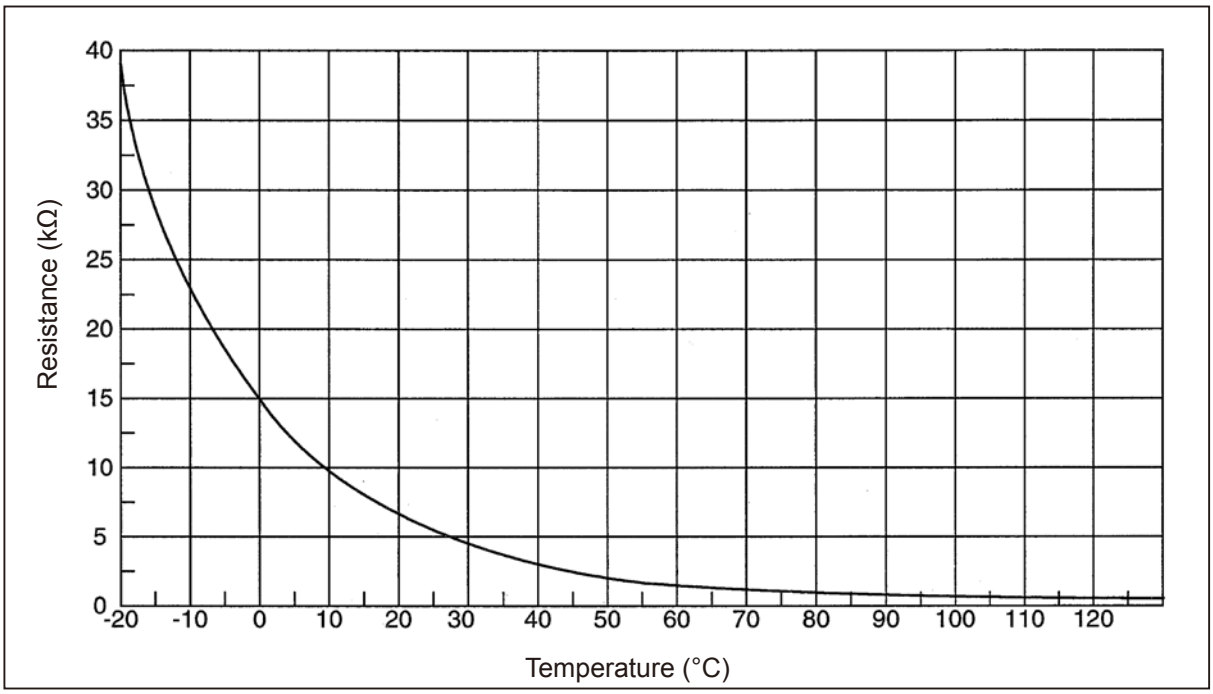


⑧ Running condition check

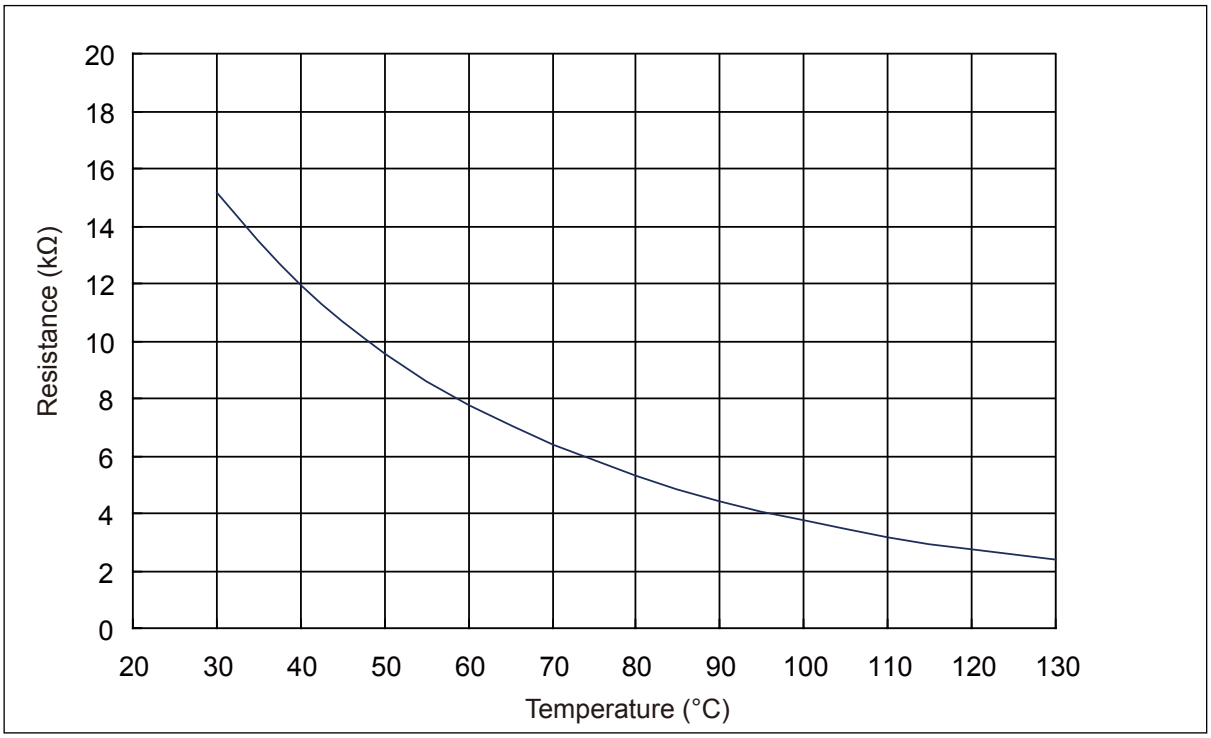
1) Make sure that no abnormal noise or vibration occurs.
2) Make sure there is no looseness in the fastening parts for each unit.

(9) Thermistor characteristic graph

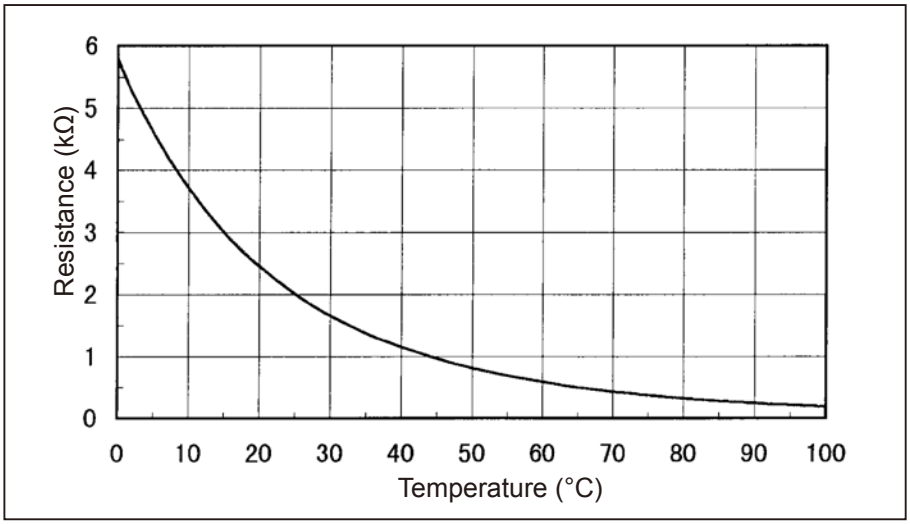
① Indoor unit heat exchanger inlet temperature sensor, indoor unit heat exchanger outlet temperature sensor, outside air temperature sensor, compressor inlet temperature sensor, outdoor unit heat exchanger inlet temperature sensor, hot water outlet temperature sensor



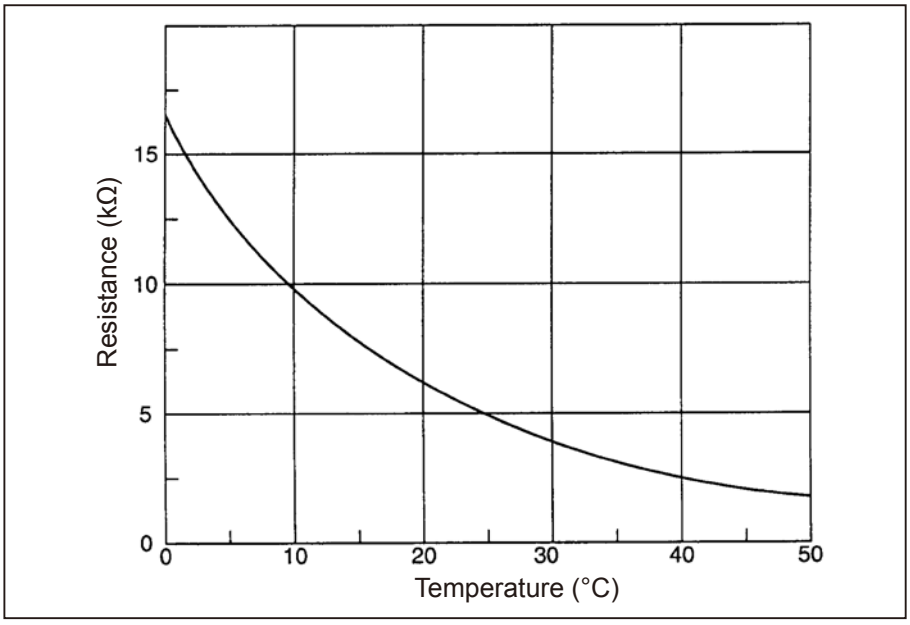
② Compressor outlet temperature sensor, exhaust gas temperature sensor, generator temperature sensor



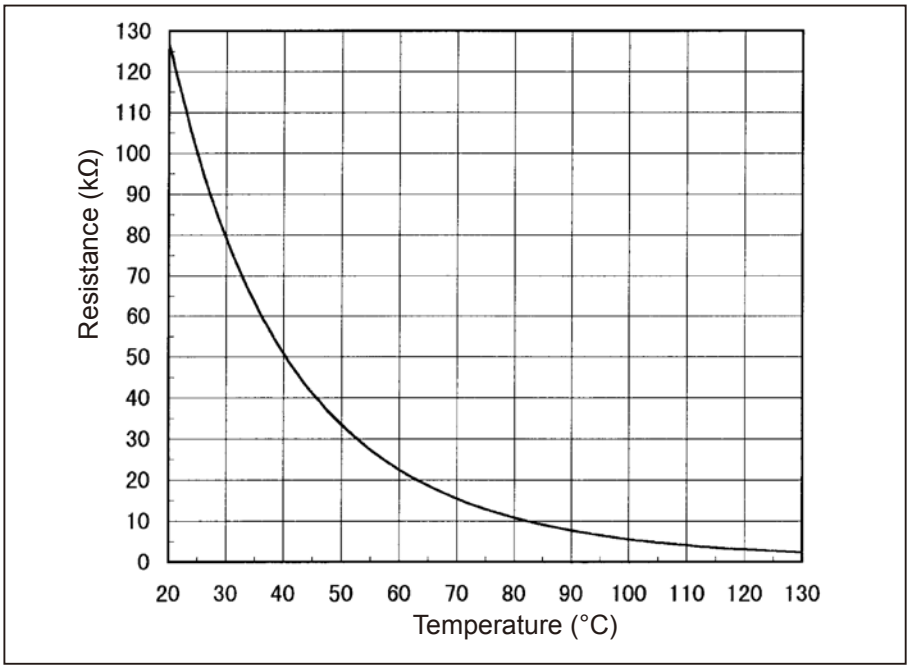
③ Coolant temperature sensor



④ Indoor unit intake temperature sensor, indoor unit discharge temperature sensor



⑤ Clutch coil temperature sensor, clutch-2 coil temperature sensor



(10) Checks Prior to Automatic Addressing

* When an outdoor unit alarm is displayed, perform the following checks after troubleshooting.

1 Indoor/outdoor power source	1-1	Indoor and outdoor units turned on?	Yes	2-1
			No	Turn on the power
2 Indoor/outdoor control wires	2-1	Have the inside/outside control wires been laid? Is there a break or disconnection of wires?	Yes	2-2
			No	Wiring and connection
	2-2	Was a high voltage (200 V AC), etc. applied to the control wire circuit? Has a fuse on the control board blown? [Confirmation of each outdoor and indoor unit]	Yes	2-3
			No	3-1
	2-3	There is a problem with the wiring of the power cable and indoor/outdoor control wires. Turn off the power, check and repair faulty wiring, and then connect all indoor/outdoor control wires to the backup control board and controller.		
3 Outdoor settings	3-1	Does the setting of connected indoor unit count (No. 10) on the outdoor control board match the actual count of connected indoor units?	Yes	3-2
			No	Correct the setting
	3-2	Are the indoor/outdoor control wires connected to multiple outdoor units? (Wire-linked?)	Yes	3-3
			No	3-6
	3-3	Is S010 (terminal resistor ON/OFF switch) on the outdoor main board set to ON for only one outdoor unit and set to OFF for all other outdoor units *1?	Yes	3-4
			No	Correct the setting
	3-4	Are there any duplicate settings for outdoor units?	Yes	3-5
			No	3-6
	3-5	For link wiring, set a system address for each outdoor unit in the order of 1, 2, 3, and then perform automatic addressing.		
	3-6	Perform automatic addressing.		

*1: Terminal resistor is basically "ON(SHORT)" for one unit only, but depending on the installation status can be set to "ON(SHORT)" for up to 3 units.

•2-3

Backup connectors and terminals for indoor/outdoor control wires (for communication)

Equipment	Primary	Backup
Outdoor Unit	CN045 (for communication)	CN046 (EMG)
Indoor unit	CN040(0C)	CN044(EMG)
System controller	Terminal block No. A7 and B7	Terminal plate No. 3 (Indoor/outdoor backup control wire)
Multi-controller	Terminal plate No. 2 (U2)	Terminal block No. 3
Intelligent controller	Terminal block No. 2	Terminal block No. A6 and B6
AMY adapter	JP3-A side	JP3-B side

* For a system linking wiring systems, if the systems are connected to water heat exchange unit, depending on the state of the hot / cold water, automatic address alarm may occur.
If this happens, remove the link wiring and set address individually.

(11) Indoor/outdoor control wire connection confirmation

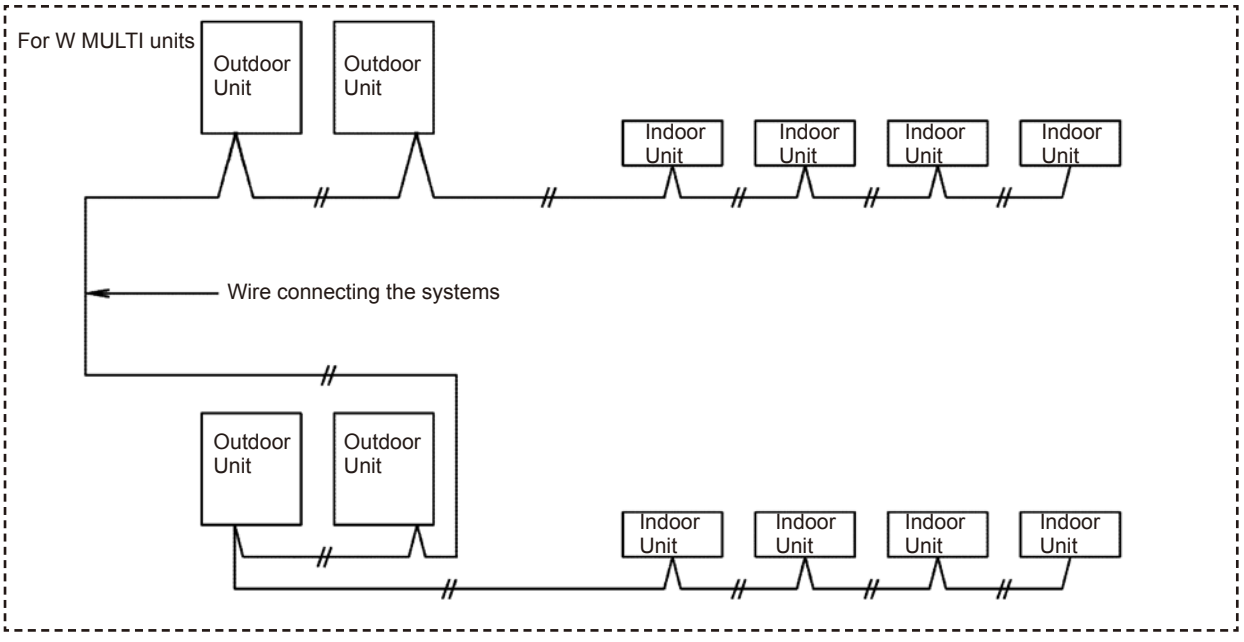
Check the control wire connection regardless of whether there is a warning or not. Before performing the check, turn off the power of all devices (including controllers) that are connected to the indoor/outdoor control wire.

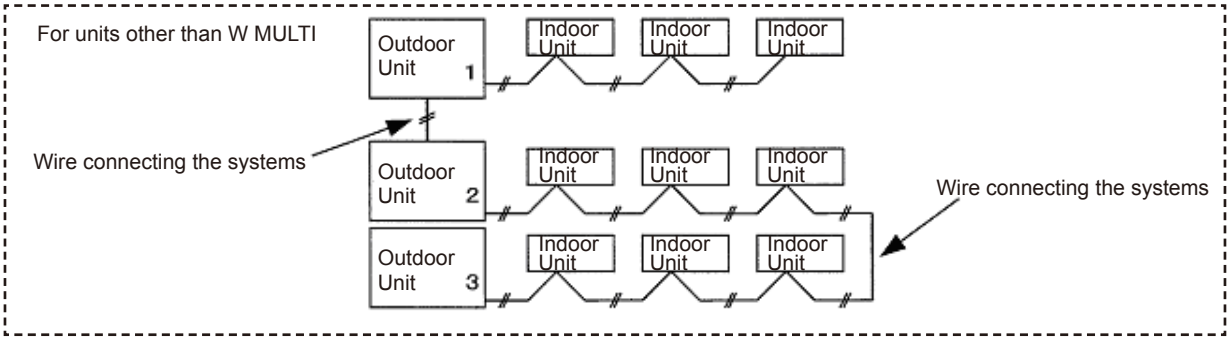
1 Ground fault check	1-1	Measure the resistance between one end of the indoor/outdoor control wire and the point of ground screw, as well as the resistance between the other operating line end and the point of ground screw. Are both measured resistance values in MΩ unit (infinite)?	Yes	2-1
			No	1-2
	1-2	Because the indoor/outdoor control wire has a ground fault, search for the location of the ground fault.		
2 Short circuit check	2-1	Measure the resistance between the indoor/outdoor control wires on the terminal board of the outdoor unit. The measured resistance value is around 75 to 100Ω? When setting multiple "ON (SHORT)" to switches with terminal resistor, the resistance value mentioned above is 1 over number of units. *1	Yes	3-1
			No	2-2
	2-2	If the wiring has a short circuit, search for the location of the short circuit on the indoor/outdoor control wire. If it is open, check the terminal resistor of outdoor board, and check the wiring from outdoor board to outdoor terminal board.		
3 Wire break or disconnection check	3-1	Measure the resistance between the indoor/outdoor control wires on the boards of all devices that are connected to the control wires. Any location with measured resistance values in MΩ units (infinite)?	Yes	3-2
			No	4-1
	3-2	Because the wiring has a break, search for the location of the break.		
4 Shield wire check	4-1	A shield wire is used as an indoor/outdoor control wire?	Yes	4-2
			No	5-1
	4-2	Only one end of the shield wire is grounded?	Yes	5-1
			No	4-3
	4-3	Ground only one end of the shield wire.		
5 Others	5-1	Check total wire length and the number of branch connections and connected units.		

*1: Terminal resistor is basically "ON (SHORT) for one unit only, but depending on the installation status can be set to "ON (SHORT)" for up to 3 units.

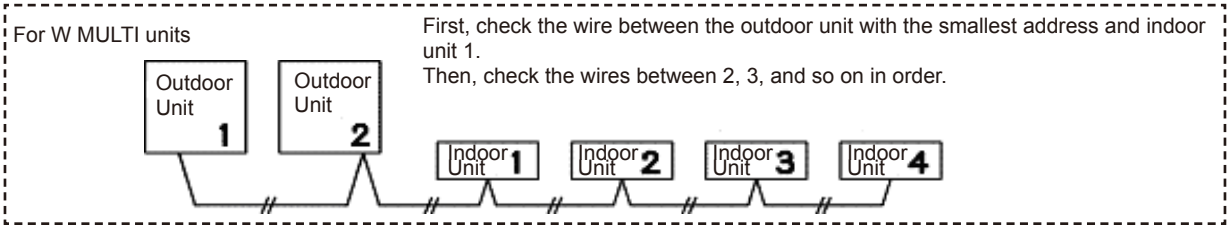
- Device ground check
  Is earth ground securely obtained?

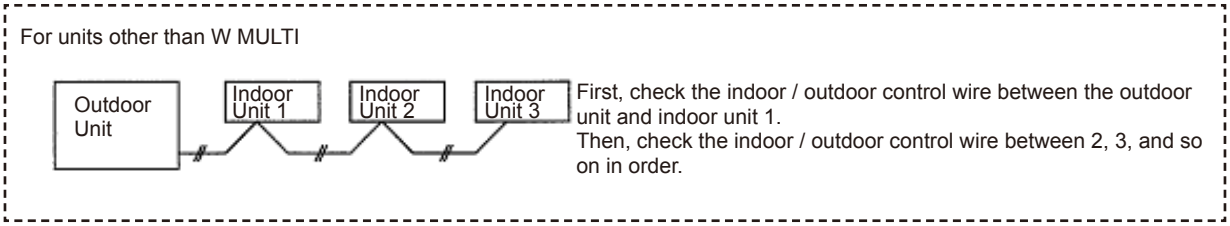
- If an error is found in the wiring connections, the following check procedure allows you to quickly identify the location of the error. When performing the check procedure, it is convenient if you have a drawing showing the layout of devices and wiring routes to refer to.
  - In systems that are comprised of multiple wiring systems linked together, you can quickly identify the location of the error by removing the 'link' and determining whether each individual system is good or not good. A warning in a certain system does not necessarily mean that the cause of the error is in that system. Check the indoor/outdoor control wires of all systems, since the abnormality may be in the wiring of a system other than that where the warning is triggered.



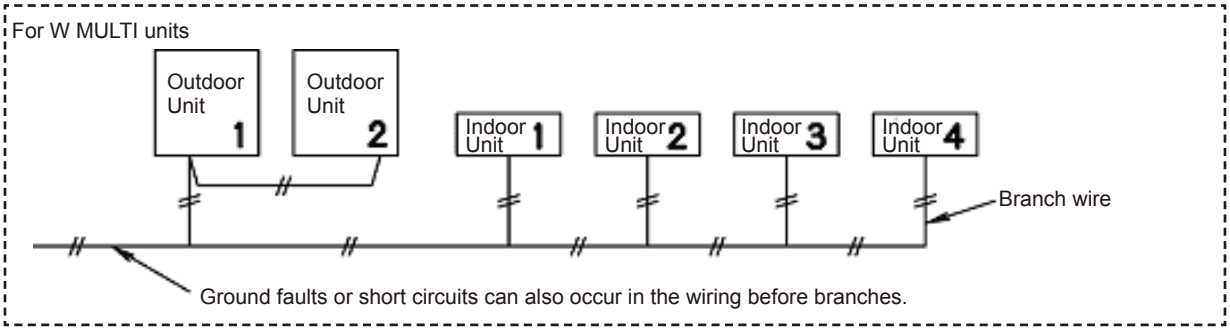


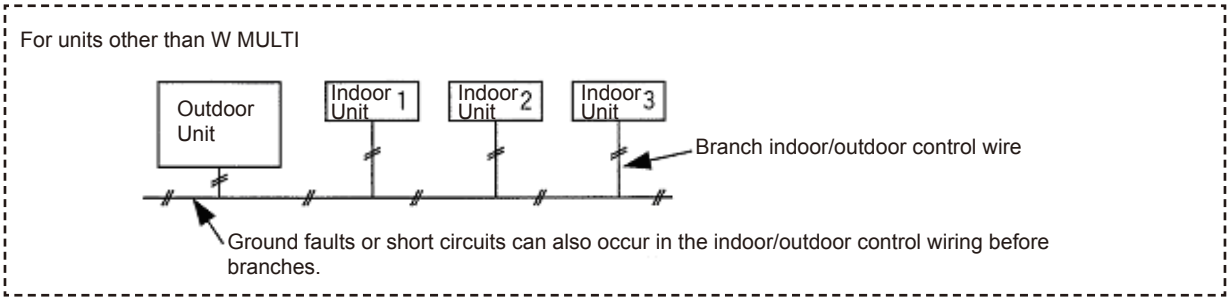
- When the wiring route is divided into segments by the terminal block of each unit, it is advisable to check the wiring connection on a segment by segment basis, starting with the segment between the outdoor unit and indoor unit 1, then the segment between the indoor units 1 and 2, and so on. This allows you to find the location of the connection failure between units.





- If the device contains control wire branched from indoor/outdoor control wire, there may be failure in the indoor/outdoor control wire before branches.

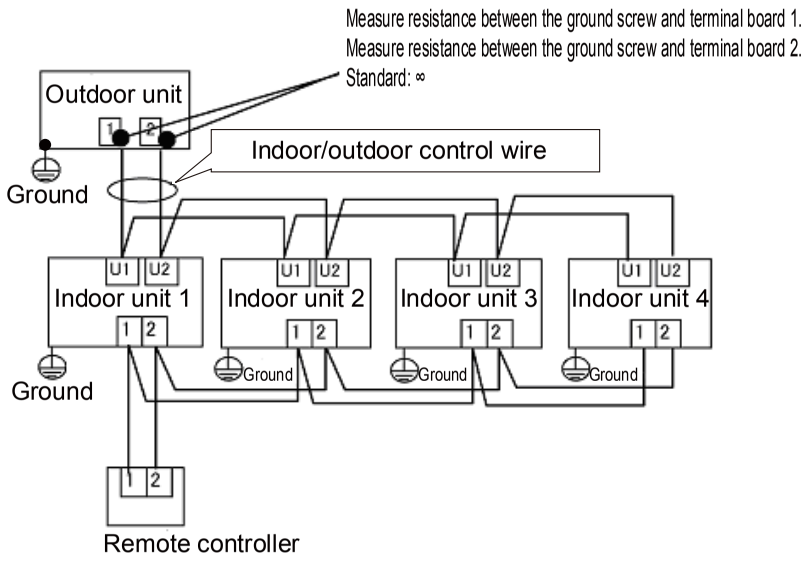




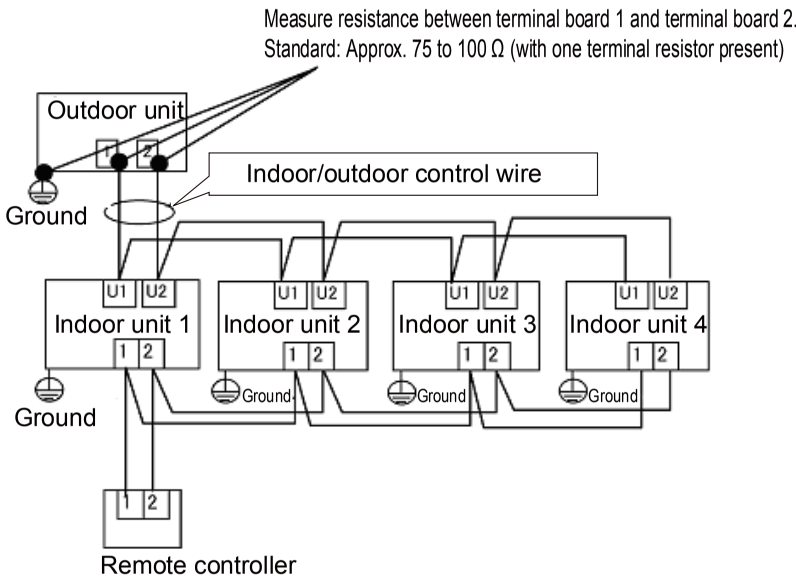
- If communication error occurs, check the sensor's ground fault.
- Check sensors (thermistor) ground fault.
  Before checking, turn off the device and remove target sensor from the board before performing measurement.

6 Ground fault check	6-1	Measure the resistance between one end of the indoor/outdoor control wire and the point of ground screw, as well as the resistance between the other operating line end and the point of the ground screw. Are both measured resistance values in MΩ unit (infinite)?	Yes	Good
			No	6-2
	6-2	Replace thermistor and wiring		

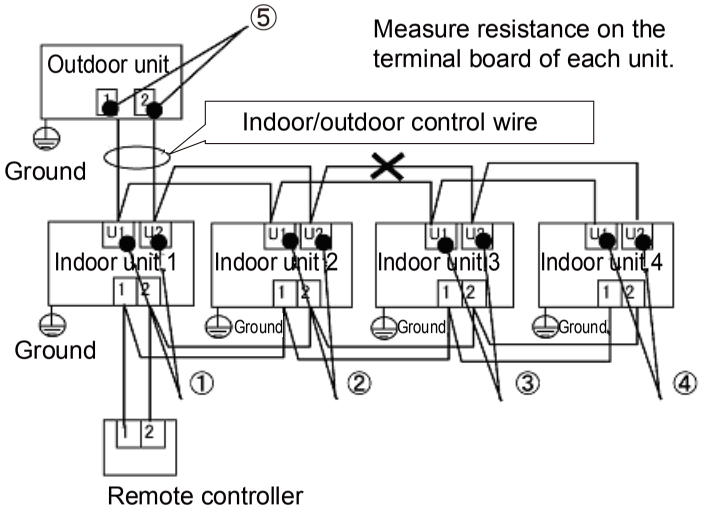
Ground fault check



Short circuit check



Wire break or disconnection check

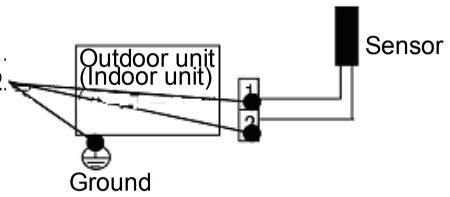


Measure resistance on the terminal board of each unit.

Example: A wire break or disconnection occurs at x (with one outdoor unit terminal resistor present).
The resistance value for (1), (2), and (5) is approx. 75 to 100 Ω.
The resistance value for (3) and (4) is ∞.
* If the resistance for (5) is ∞, check the terminal resistor for the outdoor unit control board, and check wiring between the outdoor unit control board and the outdoor unit terminal board.

Sensor ground fault check (* Sensor ground faults will also result in communication faults.)
· Sensor type (thermistor) ground fault check (turn off power for units)
For each of the indoor/outdoor units connected by the operation cable, measure the resistance between the sensor wiring and ground screw for both of the sensor wires and ground screws.

Measure resistance between the ground screw and terminal board 1.
Measure resistance between the ground screw and terminal board 2.
Standard: ∞
If there is resistance, a sensor ground fault has occurred.



① Number units to connect

1) Number of units to connect

- Number of outdoor units that can be connected …… Max 30
- Number of outdoor units that can be connected …… Max 64 *
- Centralized control devices that can be connected …… Max 10

(* Total number of each type of devices within 1 link wiring is up to 100.)

2) Wires

• Thickness : 0.5 mm^2 to 2 mm^2

• Total length : Total maximum length of up to 1 km

• Precautions

i) To avoid incorrect operation, do not run the signal cable together with the power line cable.

ii) Keep the separation distance of 50 mm or more from the power line cable for Sanyo air conditioning equipment.

iii) Keep the separation distance at 300 mm or more from other power line cables.

iv) If the wires are to be run together within the distances described above, insert one of them in a conduit made of iron.

v) When using a shielded wire, ground either one of the cables.

vi) Do not use the same wire for the signal wires and power supply wires. (Figure 1)

vii) Do not use a multi-core wire for a set of signal wires. (Figure 2)

viii) Wiring

a) A bus system shall basically be used for multiple systems. (Figure 3)
There should be no more than 16 branch locations. (Figure 3)
Make sure wiring between branch locations and branch points is 2 m or more. (Figure 3)
If there are more than 17 branches, reduce the number of branch locations. (Figure 4)
(Putting 2 refrigerant systems to 1 wiring system, etc.)
Not include in branch within 1 m. (Figure 5)
Use up to three wires for a branch. Four or more wires are prohibited. (Figure 6)
A branch after the branching of a wire is prohibited. (Figure 7)
Loop wiring is prohibited. (Figure 8)

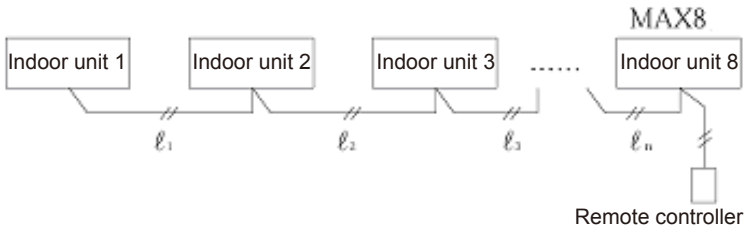
b) A daisy chain system shall basically be used for a single system. (Figure 9)

• Terminal resistor

When linking multiple outdoor units, keep the terminal resistor of two units (SHORT), and set OPEN for the other units. If a communication error occurs, keep the terminal resistor of the three units (SHORT).

3) Remote controller wiring

- Wiring :Between remote controller and indoor unit:non polar 2-line format
  Between indoor units: non polar 2-line format
- Cable thickness :0.5 mm^2 to 2 mm^2
- Cable length :Total wiring length is max 500m.
  (If wireless remote controller exist within group (RCS-BH80BN.WL, SH80BN.WL), cable is up to 400m.)
  Total wiring between indoor units is up to 200m ($\ell_1+\ell_2+\ell_3+... \ell_n$= Max 200m)

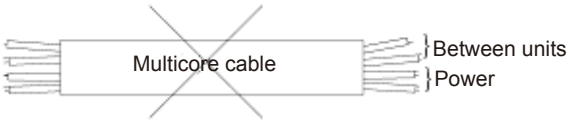


- Cautions

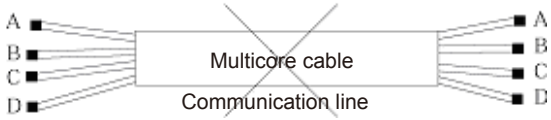
i) To avoid incorrect operation, do not run the signal cable together with the power line cable.
ii) Keep the separation distance of 50 mm or more from the power line cable for Sanyo air conditioning equipment.
iii) Keep the separation distance at 300 mm or more from other power line cables.
iv) If the above cables are run within the separation distance mentioned above, place either one of the cable in a conduit.
v) If shielded wire is used, ground either one of the cables.
vi) For signal cable, do not wire it using the same cable as power cable. (Figure 1)
vii) Do not wire signal cables using multi-wick cable. (Figure 2)
viii) If there is high frequency devices nearby, place the unit at 3 m away from the device.

* Place the remote controller in steel box, and the remote controller wire in in a steel conduit or steel conject tube.

(Figure 1)



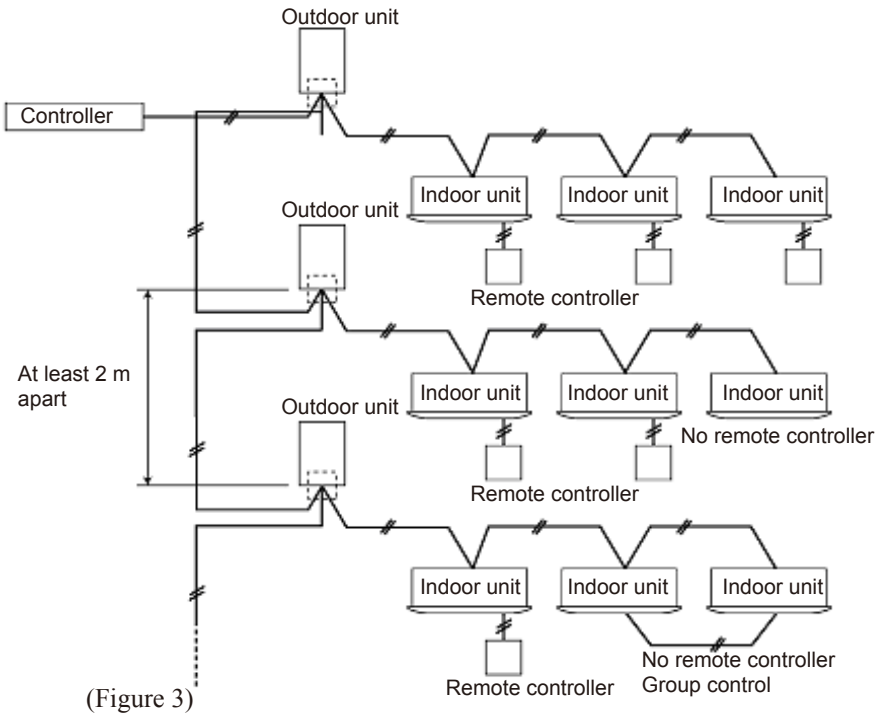
(Figure 2)



② Control wire

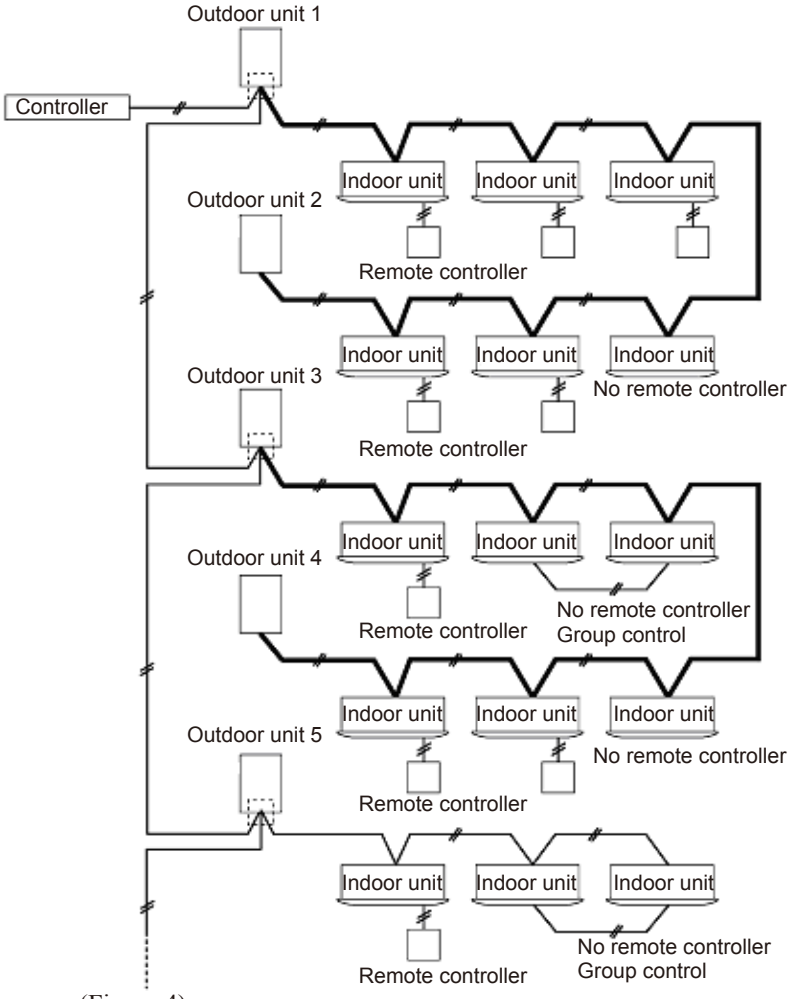
- Indoor/outdoor control wire connection example

1) Bus system (can be branched to max 16 location). Outdoor link is basic. (Figure 3)



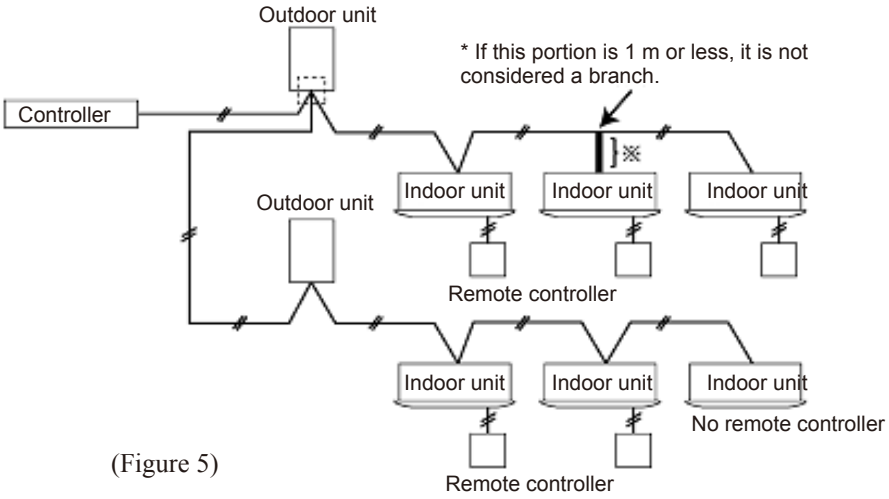
(Figure 3)

2) In 1), if there are more than 17 branches, reduce the number of branch locations. (Figure 4)
<Example>Putting 2 refrigerant systems to 1 wiring system



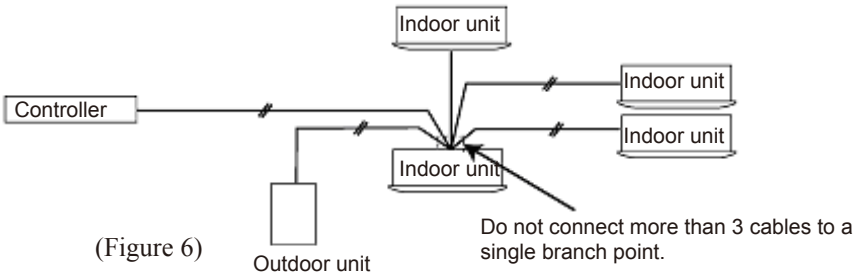
(Figure 4)

3) Wiring without branching (Figure 5)
Column: Part of indoor wiring branches.



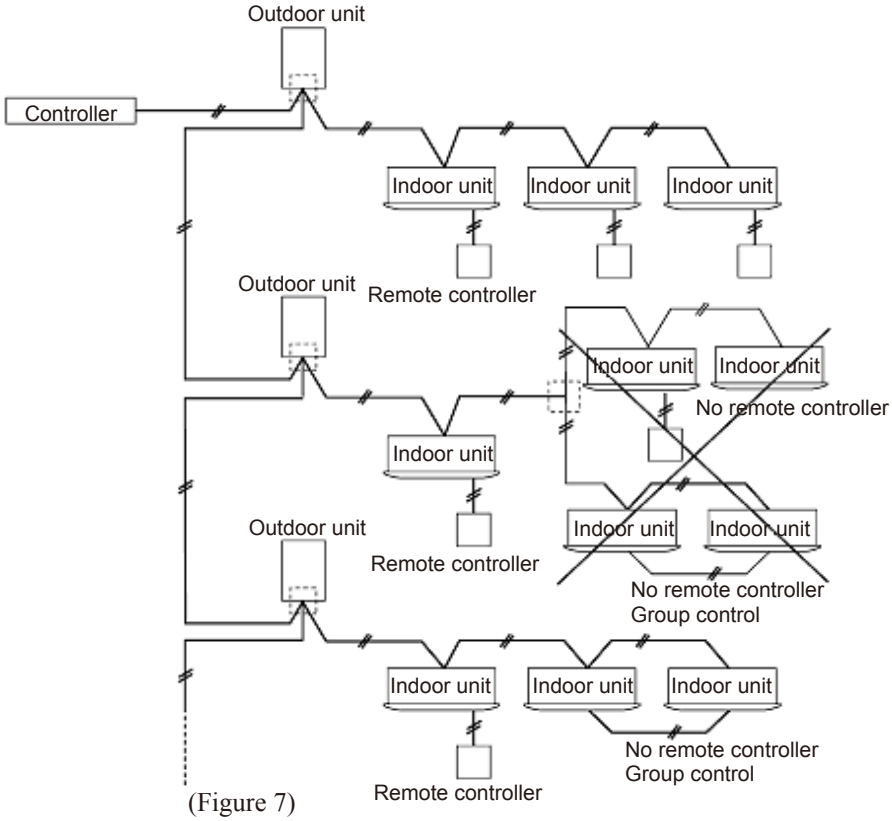
(Figure 5)

4) Star system is prohibited. (Figure 6)



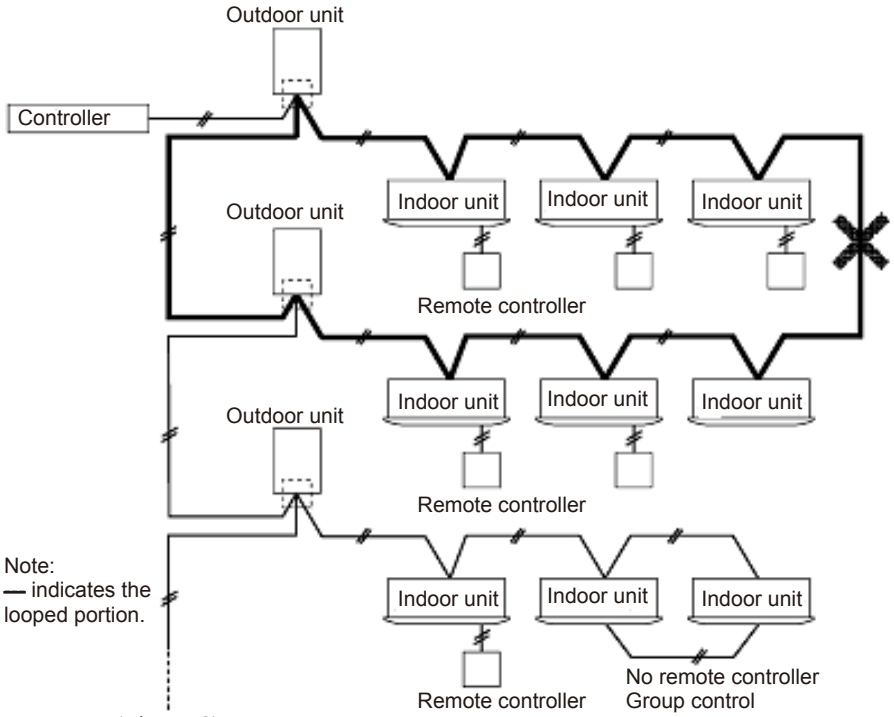
(Figure 6)

5) Branches after branching (branching of location that cannot be branched in a single stroke) are prohibited. (Figure 7)



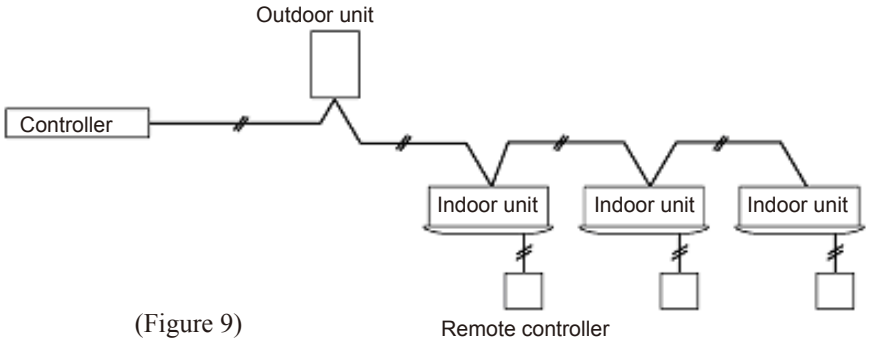
(Figure 7)

6) Loop wiring is prohibited. (Figure 8)
Example: As shown in the figure, do not have wiring where part of it is looped or the entire wiring is looped.



(Figure 8)

7) Daisy chain system (Figure 9)

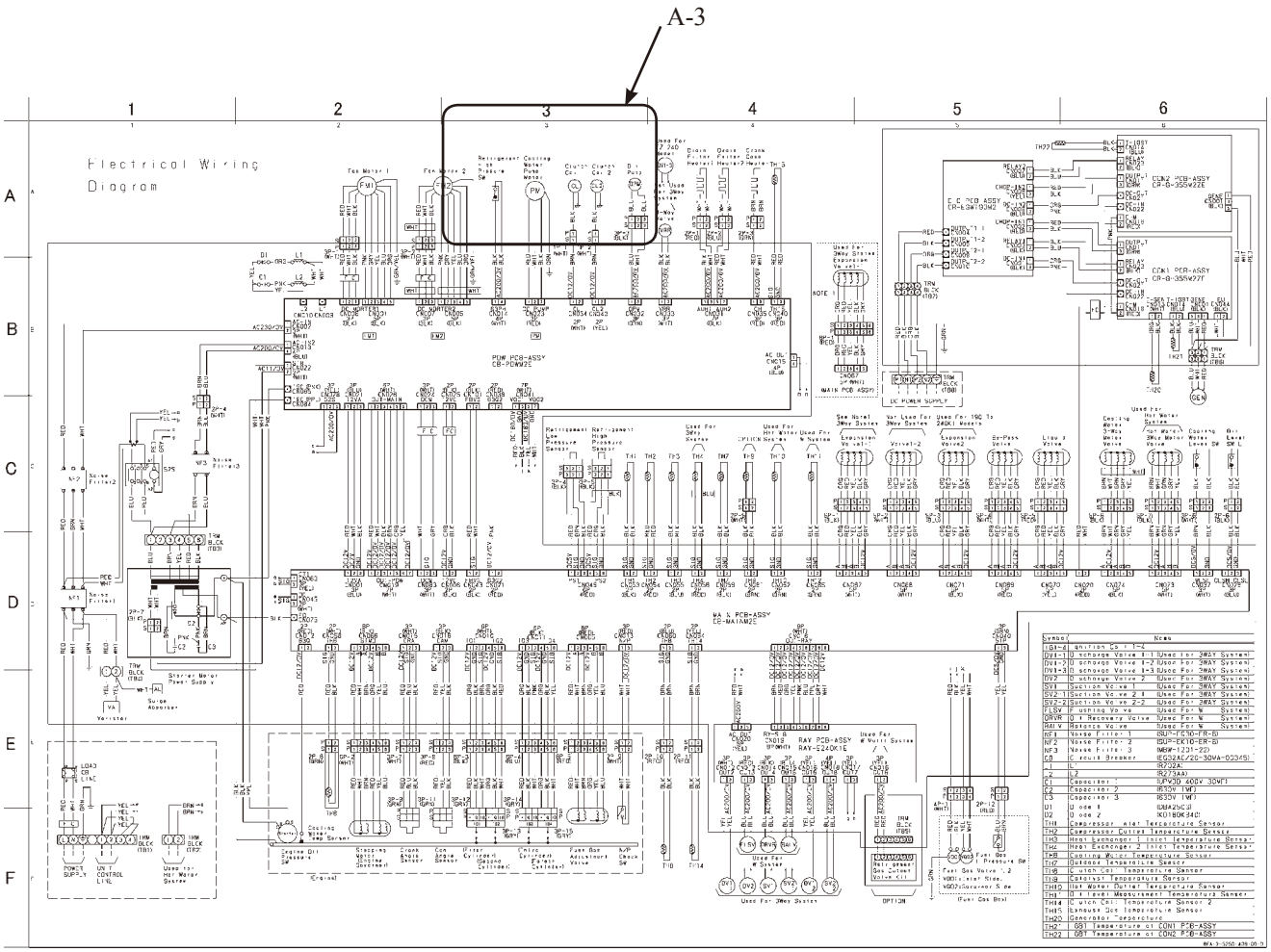


(Figure 9)

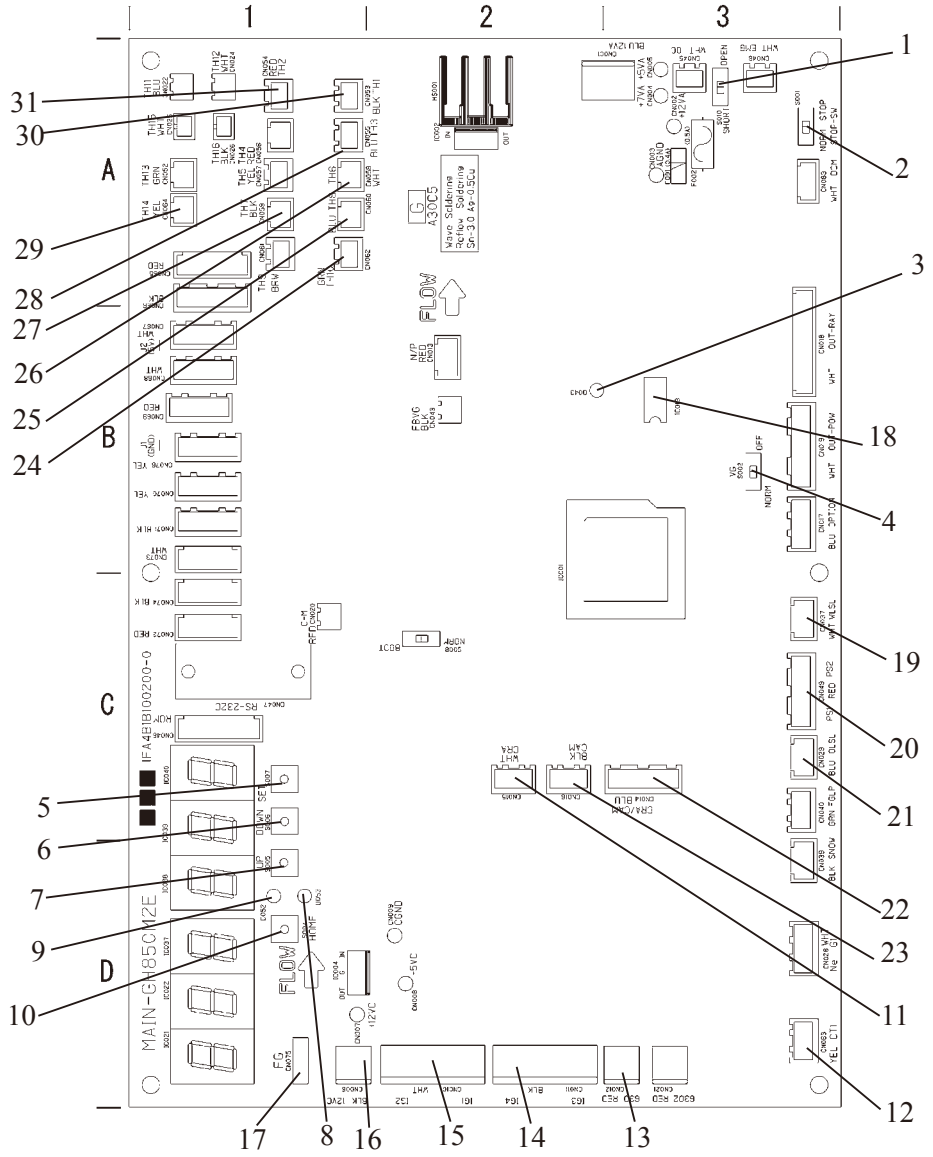
6. Outdoor Unit Electrical Wiring Diagram

<Reading the board and wiring diagram>

Example :When referring to "Electrical wiring diagram A-3", look at the area around the frame in the following diagram.

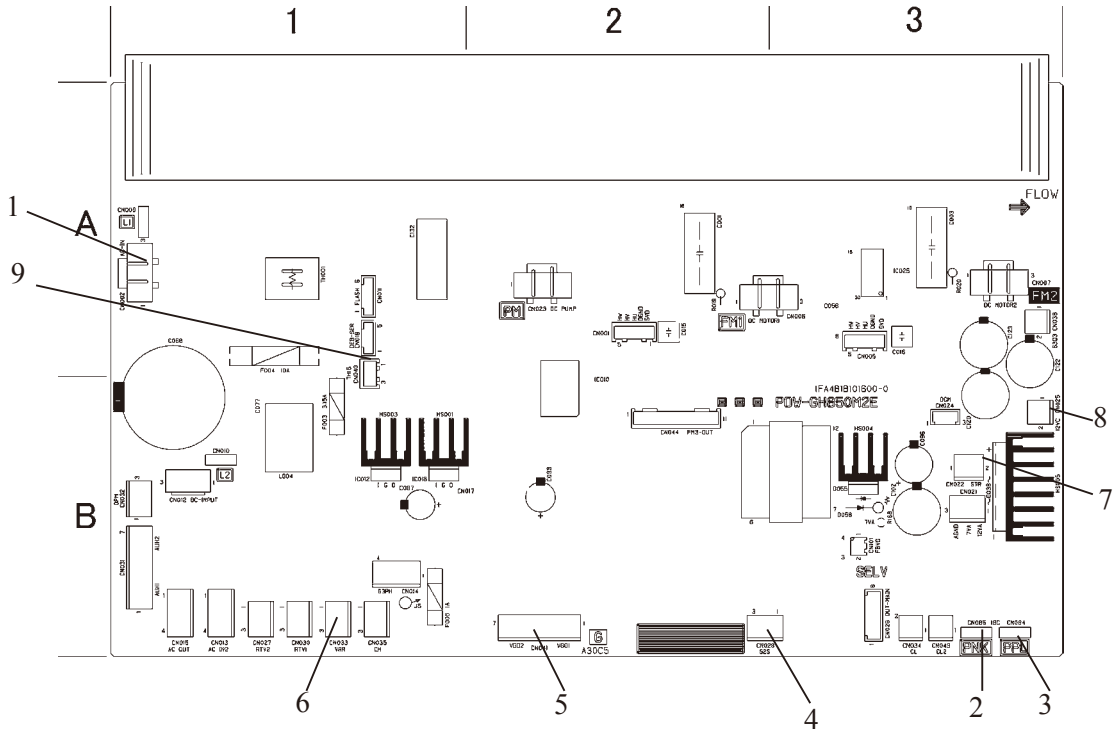


(1)Outdoor main board



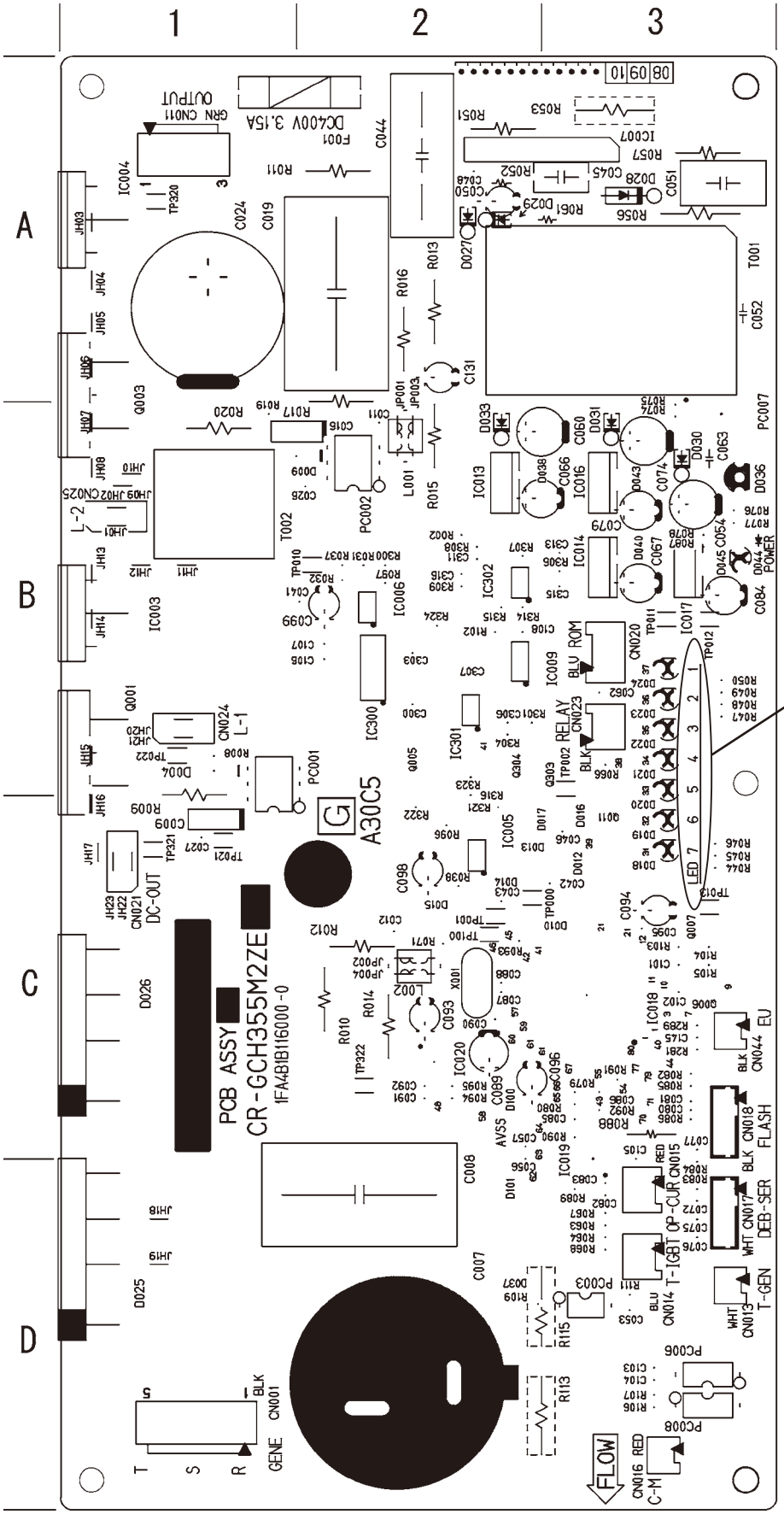
No.	Name	Position in the diagram	No.	Name	Position in the diagram
1	Terminal resistor ON/OFF switch (S010)	A-3	17	CN075	D-1
2	STOP SW (S001)	A-3	18	EEPROM	B-3
3	Indoor/outdoor communications monitor (D043)	B-2	19	CN037(WHITE)	C-3
4	Gas solenoid valve forced off switch (S002)	B-3	20	CN049(RED) Compressor outlet/inlet pressure sensors. PS1: Inlet, PS2: outlet	C-3
5	SET key (S007)	C-1	21	CN029(BLUE)	C-3
6	DOWN key (S006)	C-1	22	CN014(BLUE)	C-3
7	UP key (S005)	D-1	23	CN016(BLACK)	C-2
8	LEVEL LED (D053)	D-1	24	CN062(GREEN) Hot water outlet temperatur	A-1
9	TEST/WARNING LED (D052)	D-1	25	CN060(BLUE) Clutch coil temperature	A-1
10	HOME key (S004)	D-1	26	CN058(WHITE) Coolant temperature	A-1
11	CN015(WHITE)	C-2	27	CN059(BLACK) Outdoor air temperature	A-1
12	CN063(YELLOW)	D-3	28	CN055(BLUE) Heat exchanger inlet temperature	A-1
13	CN012(RED)	D-3	29	CN064(YELLOW) Clutch 2 coil temperature	A-1
14	CN011(BLACK)	D-2	30	CN053(BLACK) Compressor inlet temperature	A-1
15	CN010(WHITE)	D-2	31	CN054(RED) Compressor outlet temperature	A-1
16	CN006(BLACK)	D-1			

(2) Outdoor power board

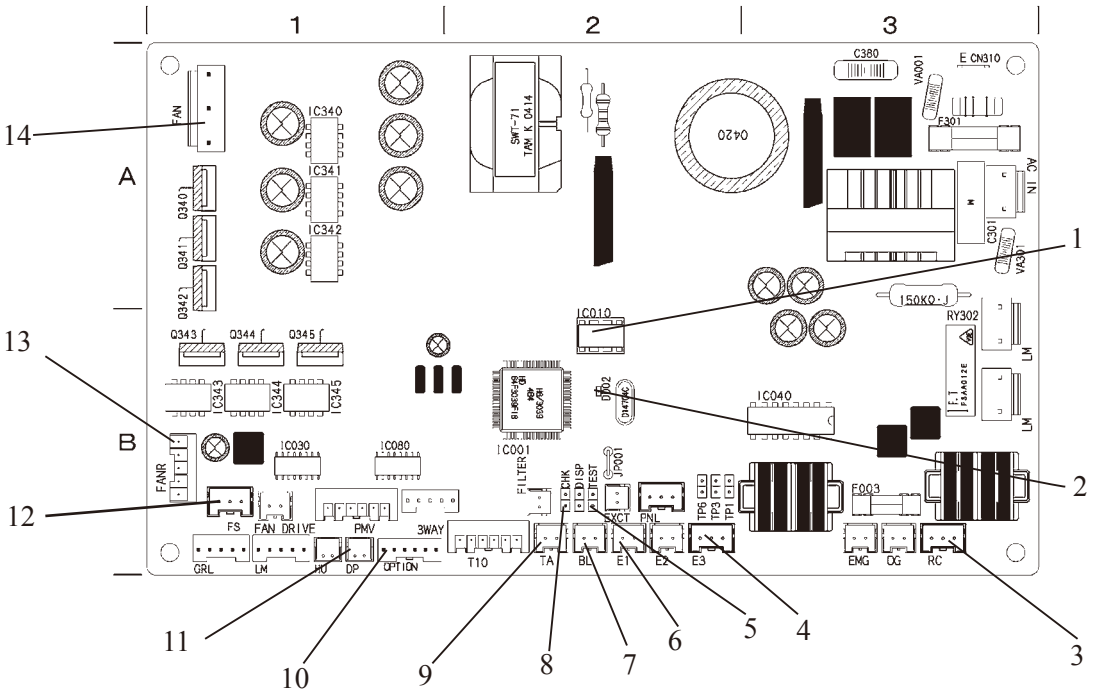


No.	Name	Position in the diagram
1	CN002 (yellow)	A-1
2	CN085 (pink)	B-3
3	CN084 (purple)	B-3
4	CN028 (yellow)	B-2
5	CN041 (white)	B-2
6	CN033 (white) VRR	B-1
7	CN022 (white)	B-3
8	CN025 (black)	B-3
9	CN040 (red) Exhaust temp.	B-1

(3)Converter board

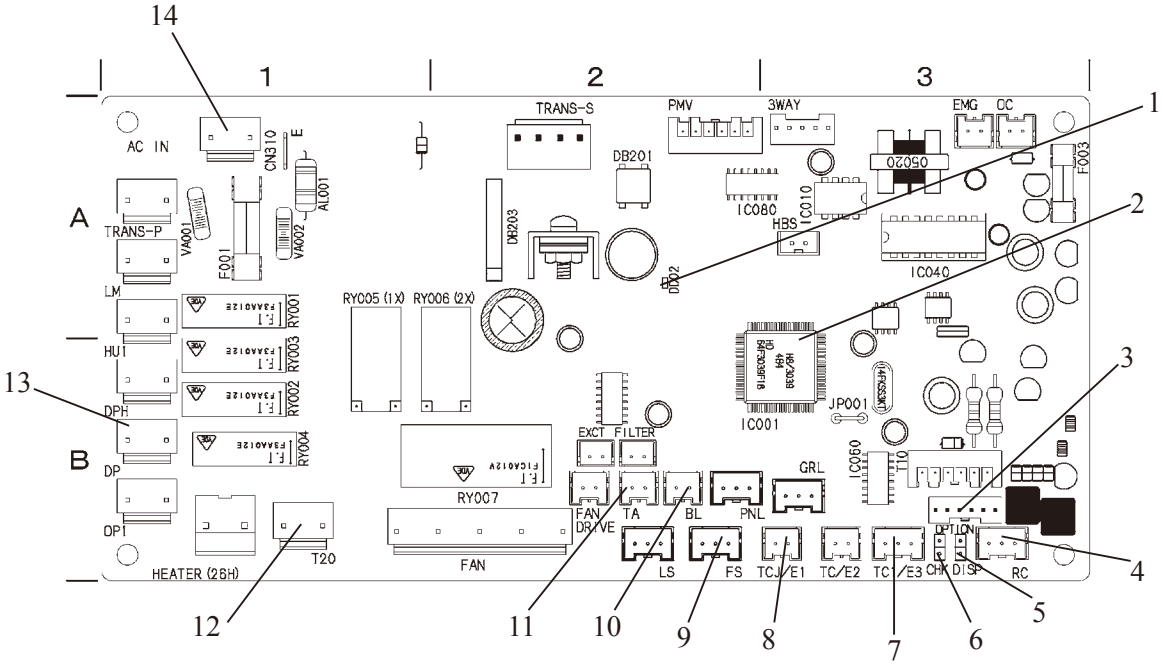


(4)Indoor control board for DC motor models



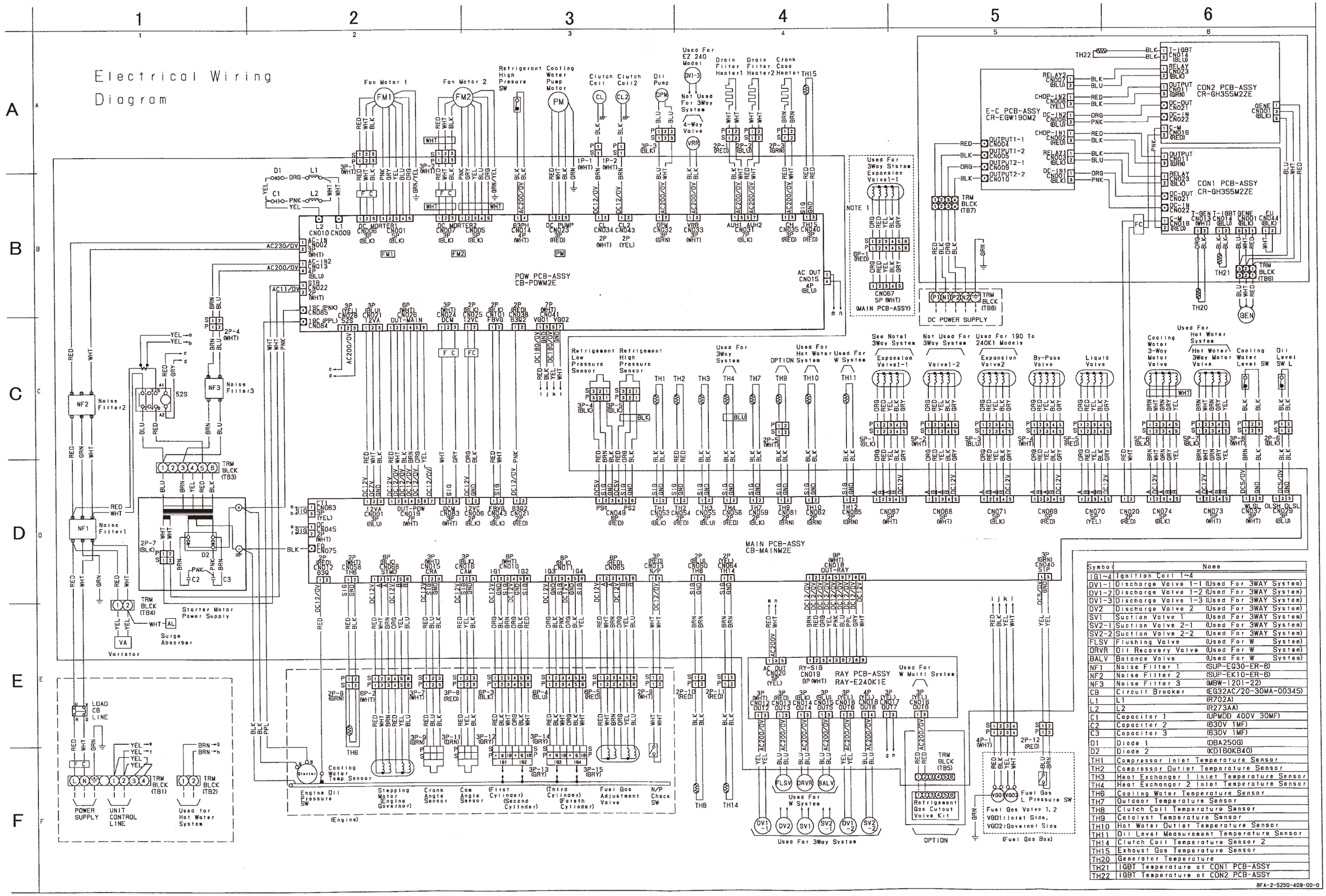
No.	Name	Position in the diagram
1	EEPROM	B-2
2	LED	B-2
3	RC	B-3
4	Heat exchanger outlet E3 (brown)	B-2
5	TEST pin (CN2)	B-2
6	Heat exchanger inlet E1 (red)	B-2
7	Discharge (green) (BL)	B-2
8	CHK pin (CN5)	B-2
9	Room temp (intake) TA (yellow)	B-2
10	OPTION	B-1
11	CN078 DP (red)	B-1
12	CN034 FS (red)	B-1
13	CN334 (red)	B-1
14	CN333 (red)	A-1

(5)Indoor control board for AC motor models



No.	Name	Position in the diagram
1	LED	A-2
2	EEPROM	B-3
3	OPTION	B-3
4	RC	B-3
5	DISP pin	B-3
6	CHK pin (CN5)	B-3
7	Heat exchanger outlet E3 (brown)	B-3
8	Heat exchanger inlet E1 (red)	B-3
9	CN030 FS (red)	B-2
10	Discharge (green) (BL)	B-2
11	Room temp (intake) TA (yellow)	B-2
12	T20 (gray)	B-1
13	CN068 DP (blue)	B-1
14	AC IN (black)	A-1

(6) Outdoor Unit Electrical Wiring Diagram



Symbol	Name
IG1~4	Ignition Coil 1~4
DV1-1	Discharge Valve 1-1 (Used For 3WAY System)
DV1-2	Discharge Valve 1-2 (Used For 3WAY System)
DV1-3	Discharge Valve 1-3 (Used For 3WAY System)
DV2	Discharge Valve 2 (Used For 3WAY System)
SV1	Suction Valve 1 (Used For 3WAY System)
SV2-1	Suction Valve 2-1 (Used For 3WAY System)
SV2-2	Suction Valve 2-2 (Used For 3WAY System)
FLSV	Flushing Valve (Used For W System)
ORVR	Oil Recovery Valve (Used For W System)
BALV	Balance Valve (Used For W System)
NF1	Noise Filter 1 (SUP-EQ30-ER-6)
NF2	Noise Filter 2 (SUP-EK10-ER-6)
NF3	Noise Filter 3 (MBW-1201-22)
CB	Circuit Breaker (EG32AC/20-30MA-00345)
L1	L1 (R702A)
L2	L2 (R273AA)
C1	Capacitor 1 (UPMDD 400V 30MF)
C2	Capacitor 2 (630V 1MF)
C3	Capacitor 3 (630V 1MF)
D1	Diode 1 (DBA250G)
D2	Diode 2 (KD160KB40)
TH1	Compressor Inlet Temperature Sensor
TH2	Compressor Outlet Temperature Sensor
TH3	Heat Exchanger 1 Inlet Temperature Sensor
TH4	Heat Exchanger 2 Inlet Temperature Sensor
TH6	Cooling Water Temperature Sensor
TH7	Outdoor Temperature Sensor
TH8	Clutch Coil Temperature Sensor
TH9	Catalyst Temperature Sensor
TH10	Hot Water Outlet Temperature Sensor
TH11	Oil Level Measurement Temperature Sensor
TH14	Clutch Coil Temperature Sensor 2
TH15	Exhaust Gas Temperature Sensor
TH20	Generator Temperature
TH21	IGBT Temperature of CON1 PCB-ASSY
TH22	IGBT Temperature of CON2 PCB-ASSY

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