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 also, 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 unit control 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.

(P20)

Start condition	Start Standby Display Code	Condition
Refrigerant pressure equalization (between high and low pressure areas)	P20	Pressure equalizing display (max. 2 min.)
Compressor outlet temperature	P03	Waiting for the temperature to drop to below 115°C (If the temperature does not go down within 10 minutes, the engine is abnormal.)
Completely run out of gas	P15	Waiting for the compressor inlet pressure to exceed 0.1 MPa. (If the pressure is not restored within 10 minutes, the engine is abnormal.)
Cooling water temperature	A20	Waiting for the temperature to drop to below 80°C (If the temperature does not go down within 10 minutes, the engine is abnormal.)
Cooling water level	A21	If the cooling water level is not restored within 3 minutes, the engine is abnormal.
Engine oil level	A11	If the engine oil level is not restored within 60 minutes, the engine is forced to shut down.

The unit display example shown above is for the outdoor unit in standby mode at equal pressure.

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?

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. 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 cooling water pump, current leakage or short circuit in electrical parts

③ Poor cooling

❶ 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.
- Shut-off valve not completely open

❷ Small fan capacity
- Clogged air filter, foreign matter in air inlet, outlet

❸ Other
- Insufficient refrigerant piping insulation

④ Poor heating

❶ 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.
- Shut-off valve not completely open

❷ Other
- Insufficient refrigerant piping 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 unit control board

⑥ Auto-flap does not move well

❶ The flaps swing, but wind direction cannot be set
- Auto-flap limit switch is faulty or has a bad connection

❷ Does not move (swing, air direction setting)
- Auto-flap is faulty, indoor unit control board is failed, remote controller is faulty

⑦ Loud operation noise or vibration noise

❶ Noise or vibration when fan operates
- Fan is unbalanced, worn motor axis bearing, loose fan securing screw

❷ Loud operation noise or vibration noise when compressor operates
- Something is coming into contact with the refrigerant piping or compressor

⑧ Water leakage

❶ Drain water leakage
- Clogged drain pipe, mistake in drainpipe construction, insufficient drainpipe insulation

❷ Condensation on refrigerant piping
- Insufficient piping insulation

❸ Condensation at duct outlet
- Insufficient wind capacity, gap between duct connections

⑨ Does not stop

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

⑩ No display on the remote controller

- Remote controller wiring disconnected
- Remote controller wiring shorted

(2) Remote Controller Display and Abnormality Location

① List of remote controller warnings (when an indoor unit is connected)

☼ : Flickering ○ : Lit ● : Off

	Description Item		Warning Display	Wireless Remote Controller Lamp Display	Faulty Device
Serial communication abnormality, incorrect setting	Remote controller detects an abnormal signal from an indoor unit	Remote controller receive failure	E01	Operation lamp flickers Operating ☼ Timer ● Preparing for heating ●	Remote controller
		Remote controller sending failure	E02		
	Indoor unit failed to receive signal from remote controller (central)		E03		Indoor unit
	Defective settings	Duplicated indoor unit address	E08		
		Multiple units set as master remote controller	E09		
	Indoor board failed to receive signal from signal output board		E11		Indoor unit
	Automatic address setting is in progress: automatic address setting start is prohibited		E12		Outdoor unit
	Indoor unit failed to send signal to remote controller		E13		Indoor unit
	Group control cable communication failure		E18		
	Indoor unit failed to receive signal from outdoor unit		E04	Preparing for heating lamp flickers Operating ● Timer ● Preparing for heating ☼	Indoor unit
	Indoor unit failed to send signal to outdoor unit		E05		
	Outdoor unit failed to receive signal from indoor unit		E06		Outdoor unit
	Outdoor unit failed to send signal to indoor unit		E07		
	Automatic address warning	(Too few units)	E15		
		(Too many units)	E16		
	No indoor unit		E20		
	Outdoor communication unit communication failure		E24		
	Mismatch of outdoor unit count		E26		
	Unit internal communications failure		E31		
Incorrect setting, unset settings	Mismatch of indoor/outdoor unit types (Non-GHP device present)		L02	Operating lamp and preparing for heating lamp flicker at the same time Operating ☼ Timer ● Preparing for heating ☼ Flicker at the same time	Indoor unit
	Multiple master units set for group control		L03		
	Duplicate indoor unit priority setting	(priority indoor unit)	L05		Outdoor unit
		(other than priority indoor unit)	L06		
	Group control cable present for individual-control indoor unit		L07		Indoor unit
	Indoor unit capacity not set		L09		
	Duplicate system (outdoor unit) address settings		L04	Operating lamp and preparing for heating lamp flicker at the same time Operating ☼ Timer ○ Preparing for heating ☼ Lit Flicker at the same time	Outdoor unit
	Outdoor unit capacity not set		L10		
	Indoor unit type setting failure		L13		
	Indoor unit paring trouble		L15		
	Mismatch of indoor/outdoor unit types		L17		
	Gas type setting failure		L21		
Sensor abnormality	Sensor system abnormality on indoor unit side	Indoor heat exchanger inlet temp. sensor trouble	F01	Operating lamp and timer lamp flicker alternatively Operating ☼ Timer ☼ Preparing for heating ● Flicker alternatively	Indoor unit
		Indoor heat exchanger outlet temp. sensor trouble	F03		
		Indoor unit intake air temp. sensor trouble	F10		
		Indoor unit discharge air temp. sensor trouble	F11		
	Sensor system abnormality on outdoor unit side	Compressor outlet temp. sensor trouble	F04	Operating lamp and timer lamp flicker alternatively Operating ☼ Timer ☼ Preparing for heating ○ Lit Flicker alternatively	Outdoor unit
		Outdoor heat exchanger inlet temp. sensor trouble	F06		
		Outdoor temp. sensor trouble	F08		
		Compressor inlet temp. sensor trouble	F12		
		Cooling water temp. sensor trouble	F13		
		Compressor inlet/outlet pressure sensor trouble	F16		
		Warm water outlet temperature sensor trouble	F17		
		Exhaust gas temp. sensor trouble	F18		
		Clutch coil temp. sensor trouble	F20		

: Flickering ○ : Lit ● : Off

Description Item			Warning Display	Wireless Remote Controller Lamp Display	Faulty Device
Indoor nonvolatile memory (EEPROM) trouble *1			F29	Operation lamp and timer lamp flicker at the same time Operating ☼ Timer ☼ Preparing for heating ● Flicker at the same time	Indoor unit
Clock function (RTC) trouble			F30	Operation lamp and timer lamp flicker at the same time Operating ☼ Timer ☼ Preparing for heating ○ Flicker at the same time Lit	Outdoor unit
Outdoor nonvolatile memory (EEPROM) trouble			F31		
Engine protection device operation	Abnormality in the engine system	Engine oil pressure trouble	A01	Timer lamp and preparing for heating lamp flicker at the same time Operating ● Timer ☼ Preparing for heating ☼ Flicker at the same time	Outdoor unit
		Engine oil trouble	A02		
		Engine speed too high	A03		
		Engine speed too low	A04		
		Ignition power trouble	A05		
		Engine start failure	A06		
		Engine stall	A08		
		Exhaust gas temp. high	A10		
		Engine oil level trouble	A11		
		Engine oil pressure switch failure	A14		
		Crank angle sensor trouble	A23		
		Cam angle sensor trouble	A24		
		Misfire	A26		
	Starter trouble	Starter power output short circuit	A15		
		Starter locked	A16		
		CT trouble (Starter current detection failure)	A17		
	Cooling water trouble	Wax 3 way valve trouble	A19		
		Cooling water temp. high	A20		
		Cooling water level trouble	A21		
		Cooling water pump trouble	A22		
	Clutch trouble		A25		
	Catalyst temp. trouble		A27		
	Generator trouble		A28		
	Converter trouble		A29		
Indoor unit ceiling panel connector connection failure			P09	Timer lamp and preparing for heating lamp flicker alternately Operating ● Timer ☼ Preparing for heating ☼ Flicker alternatively	Indoor unit
Protection device operation	Indoor protection device	Indoor unit fan trouble/Indoor unit fan operation trouble	P01		
		Indoor unit front switch trouble	P10		
		Indoor unit DC fan trouble	P12		
	Outdoor protection device	Compressor discharge temp. high	P03	Operating lamp and preparing for heating lamp flickers alternately Operating ☼ Timer ● Preparing for heating ☼ Flicker alternatively	Outdoor unit
		Refrigerant high pressure switch activated	P04		
		Power phase reversed (open phase)	P05		
		O_2 sensor activated	P14		
		Refrigerant gas completely absent	P15		
		Bypass valve trouble	P18		
		4 way valve rock trouble	P19		
		Refrigerant pressure too high	P20		
		Outdoor fan trouble	P22		
Group control trouble (Warning)			P31		Indoor unit
Engine oil change time (Warning) (displayed on remote controller/system controller) Outdoor unit display: oil			Oil check		Outdoor unit

Note: Not all models provide a warning.

*1 : When an indoor non-volatile memory (EEPROM) abnormality occurs when turning the power on, warning code F29 is not displayed, but the power source LED on the indoor board starts to flicker.

② List of remote controller warnings (when a water heat exchanger unit is connected)

Description Item			Warning Display	Remote Control Switch Display	Water Heat Exchanger Unit Board Display	Faulty Device
Serial communication abnormality, incorrect settings	Remote controller detects abnormal signals from indoor unit	Remote controller receive failure	E01	"Abnormal" lit up	LE8 flickering LE23 lit	Remote controller
		Remote controller sending failure	E02			
	Water heat exchanger unit failed to receive signal from remote controller		E03			Water heat exchanger unit
	Water heat exchanger unit failed to receive signal from outdoor unit		E04			
	Water heat exchanger unit failed to send signal to outdoor unit		E05			
	Outdoor unit failed to receive signal from water heat exchanger unit		E06			Outdoor unit
	Outdoor unit failed to send signal to water heat exchanger unit		E07			
	Defective settings	Duplicated water heat exchanger unit address	E08			Outdoor unit and Water heat exchanger unit
	Water heat exchanger unit failed to send signal to remote controller		E13			Water heat exchanger unit
	Defective setting of the number of water heat exchangers at the outdoor unit	(Too few units)	E15		LE23 lit	Outdoor unit
		(Too many units)	E16			
	Unit internal communications failure		E31			
Incorrect setting, unset setting	Mismatch of indoor/outdoor unit types		L02	"Abnormal" lit up	LE23 lit	Outdoor unit
	Duplicate system (outdoor unit) address settings (wire-linked)		L04			
	No outdoor unit capacity setting		L10			
	Water heat exchanger unit setting failure		L16		LE11 flickering LE23 lit	Water heat exchanger unit
	Water heat exchanger unit duplicate parallel address		L19		LE8 flickering LE23 lit	
	Gas type setting failure		L21			
Sensor abnormality	Sensor system abnormality on water heat exchanger unit side	Water heat exchanger unit refrigerant inlet temp. sensor trouble	F01	"Abnormal" lit up	LE9 flickering LE23 lit	Water heat exchanger unit
		Water heat exchanger unit freezing sensor trouble	F02			
		Water heat exchanger unit outlet temp. sensor trouble	F03			
		Cold/hot water inlet sensor trouble	F10			
		Cold/hot water outlet sensor trouble	F11			
	Sensor system abnormality on outdoor unit side	Compressor outlet temp. sensor trouble	F04		LE23 lit	Outdoor unit
		Outdoor heat exchanger unit inlet temp. sensor trouble	F06			
		Outdoor temp. sensor trouble	F08			
		Compressor inlet temp. sensor trouble	F12			
		Cooling water temp. sensor trouble	F13			
		Compressor inlet/outlet pressure sensor trouble	F16			
		Exhaust gas temp. sensor trouble	F18			
		Clutch coil temp. sensor trouble	F20			
Water heat exchanger unit nonvolatile memory (EEPROM) trouble			F29	"Abnormal" lit up	LE23 lit	Water heat exchanger unit
Clock function (RTC) trouble			F30			Outdoor unit
Outdoor nonvolatile memory (EEPROM) trouble			F31			

Description Item			Warning Display	Remote Control Switch Display	Water Heat Exchanger Unit Board Display	Faulty Device
Engine protection device operation	Engine system abnormality	Engine oil pressure trouble	A01	"Abnormal" lit up	LE23 lit	Outdoor unit
		Engine oil trouble	A02	'Oil warning' "Abnormal" lit up	LE20 lit LE23 lit	
		Engine speed too high	A03	"Abnormal" lit up	LE23 lit	
		Engine speed too low	A04			
		Ignition power trouble	A05			
		Engine start failure	A06			
		Engine stall	A08			
		Exhaust gas temp. high	A10			
		Engine oil level trouble	A11			
		Engine oil pressure switch failure	A14			
		Crankshaft angle sensor trouble	A23			
		Crankshaft angle sensor trouble	A24			
		Clutch trouble	A25			
		Misfire	A26			
	Starter system abnormality	Starter power output short circuit	A15			
		Starter locked	A16			
		CT trouble (Starter current detection failure)	A17			
	Cooling water system trouble	Wax 3 way valve trouble	A19			
		Cooling water temp. high	A20			
		Cooling water level trouble	A21			
		Cooling water pump trouble	A22			
Protection device operation	Outdoor protection device	Compressor discharge temp. high	P03	"Abnormal" lit up	LE23 lit	Outdoor unit
		Refrigerant high pressure switch activated	P04			
		Power trouble	P05			
		Water heat exchanger unit freezing trouble	P11		LE10 lit LE23 lit	Water heat exchanger unit
		O_2 sensor activated	P14		LE23 lit	Outdoor unit
		Refrigerant gas completely absent	P15			
		Bypass valve trouble	P18			
		4 way valve rock trouble	P19			
		Refrigerant pressure too high	P20			
		Outdoor unit fan (inverter) trouble	P22			
		Water heat exchanger unit interlock trouble	P23			Water heat exchanger unit
Engine oil change time (displayed on TECS610/RCS-SW15GX) Outdoor display: oiL			Engine oil		LE20 lit	Outdoor unit

3. Abnormality Display and Troubleshooting

The description of each abnormality display begins on a new page. Descriptions of some troubleshooting procedures span several pages. When you refer to an abnormality 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 Abnormality 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.
For abnormality detection procedures described on subsequent pages, abnormal occurrences that are determined as abnormalities after being detected multiple times (e.g. 5 times) mean abnormal occurrences that are continually detected multiple times (e.g. 5 times) within 1 hour of engine operation.

(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 force the engine to shut down if they are not met within a specified period of time, while some wait until their specified requirements are met and all 6 conditions are met before allowing the engine to automatically start.
- Display Method
  If you set menu No. 0 for normal display in engine start standby mode, the following display lights up when the engine starts. This display appears immediately prior to the engine operating time display.
- The following display appears while waiting for the compressor outlet to reach a specified temperature before the engine is able to start.

(P03)

- Startup Conditions Displayed in Engine Start Standby Mode

Start condition	Start Standby Display Code	Condition
Refrigerant pressure equalization (between high and low pressure areas)	P20	Pressure equalizing display (max. 2 min.)
Compressor outlet temperature	P03	Waiting for the temperature to drop to below 115°C (If the temperature does not go down within 10 minutes, the engine is abnormal.)
Completely run out of gas	P15	Waiting for the compressor inlet pressure to exceed 0.1 MPa. (If the pressure is not restored within 10 minutes, the engine is abnormal.)
Cooling water temperature	A20	Waiting for the temperature to drop to below 80°C (If the temperature does not go down within 10 minutes, the engine is abnormal.)
Cooling water level	A21	If the cooling water level is not restored within 3 minutes, the engine is abnormal.
Engine oil level	A11	If the engine oil level is not restored within 60 minutes, the engine is forced to shut down.

(4) Abnormality Data Display

Abnormality data on three past occurrences, including pre-trip alarm data, is stored in nonvolatile memory.
If 4 or more abnormalities occur, the oldest abnormality data is erased and the new data is added so that the three most recent data are stored in order from most recent to least recent.
The following gives an outline of abnormality data.

- Abnormality code
- Abnormality occurrence time and date
- Outdoor unit operation data captured when the abnormality occurs
- Indoor unit operation data captured when the abnormality occurs
- Outdoor unit warning data captured 5 seconds before the abnormality occurs
- Outdoor unit warning data captured 10 seconds before the abnormality occurs
- Outdoor unit warning data captured 15 seconds before the abnormality occurs

① Display method and operating procedure

❶ Display of current abnormality code

(1) When you press the HOME (S004) key, a menu item number (‘No. 00’) is displayed.
(2) Next, when you press the UP (S007) or DOWN (S006) key, a menu item number is displayed. Select ‘No. 01.’
(3) When ‘No. 01’ is selected, the abnormality code at the current time (current abnormality code) is displayed.

- When there is no abnormality
  The following code is displayed.

- When an abnormality occurs
  The current abnormality code is displayed.

❷ Procedure for resetting abnormality

To reset an outdoor unit abnormality, press the SET (S005) key for at least 1 second while the current abnormality code is displayed. If the cause of the abnormality has not been removed, the abnormality will reoccur immediately after the reset is performed.
The following cannot be reset:

- An indoor unit abnormality. You need to shut down the indoor unit before resetting an indoor unit abnormality.
- An oil change time. You need to reset the oil change time while the Oil Change Time Display code is displayed.

❸ Display of abnormality code and temporary stop cause code

When you press the SET (S005) key, regardless of whether an abnormality occurs or not, the abnormality code and temporary stop cause code are displayed.

Use the DOWN (S006) and UP (S007) keys to select and display data.

	Data Code	Data Name	Description	Remarks
↑ DOWN	0	Current abnormality code	0.0.A00	No abnormality
	1	Most recent abnormality log code	1. P15	P15
	2	Second most recent abnormality log code	2. A20	A20
UP ↓	3	Third most recent abnormality log code	3. A00	No abnormality
	4. 1	Most recent temporary stop cause code	4.1 1	Cause 1*1
	4. 2	Second most recent temporary stop cause code	4.2 2	Cause 2*1
	5	Abnormality log clear	5.ALCLr	Abnormality log clear

Note ∗1 : The cause codes are as described below.

1: ————————

2: Although the discharge temperature is high enough, the liquid valve is not yet open.

3: Although the discharge temperature is high enough, the engine speed is still too high.

4: Although the high-pressure area is high enough, the fan output is still too low.

5: Although the high-pressure area is high enough, the engine speed is still too high.

6: Although the high-pressure area is high enough, the unit is in Advantage mode

7: Although the high-pressure area is high enough, it is less than 3 minutes since the engine started.

8: Engine temporary stop

❹ Abnormality data display

When you press the SET (S005) key for at least 1 second while the abnormality log code is displayed, the corresponding abnormality data is displayed.

When you press the SET (S005) key for at least 1 second while the abnormality log code is displayed, the corresponding abnormality data is displayed.

Example: 1. P15 -Press the SET (S005) key → 1.12345

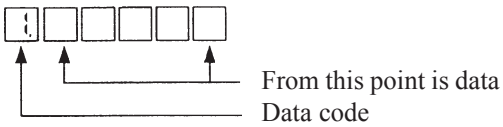
If you press the SET (S005) key again for at least 1 second or there is no operation within 10 minutes, normal display reappears.

Example: 1.12345 -Press the SET (S005) key for at least 1 second → U01120

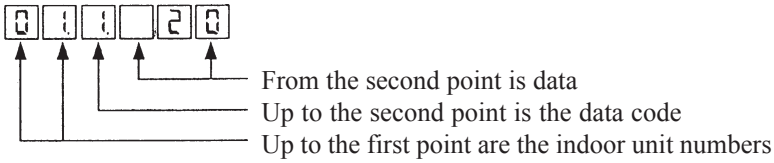
Use the DOWN (S006) and UP (S007) keys to select and display data.

Data display example

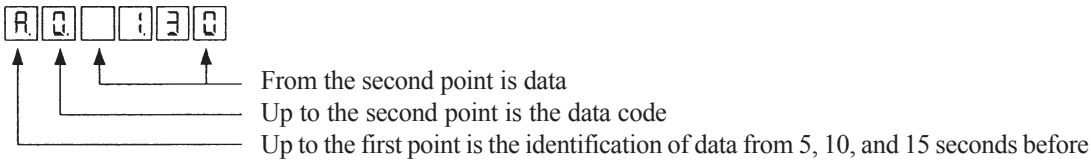
Outdoor unit data



Indoor unit data



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



The following data is displayed.

	Indoor/ Outdoor	Data code	Data name	Display Example	Remarks
		None	Abnormality occurrence date	03:09	October 9, 2003
		None	Abnormality occurrence time	08:94:	8 hours, 49 min., 41 sec.
	Outdoor unit	1	Engine operation time	:2345	12345 hours
		2	Engine operation count	2.2345	2345 times
		3	Starter operation time	3.234	234 seconds
		4	Starter operation count	4.1234	1234 times
		5	Current warning	50.0800	No outdoor unit warning
		6	Clutch-on time	6.2000	2000 hours
		7	Clutch-on count	7.200	200 times
		8	Set engine rpm	8.2200	2200 rpm setting
		9	Engine rpm	9.2200	2200 rpm
		10	Compressor inlet pressure	:0.10	0.10 Mpa
		11	Compressor outlet pressure	:1.00	1.00 Mpa
		12	Compressor inlet temperature	:2.35.0	35.0 °C
		13	Compressor outlet temperature	:3.110.0	110.0 °C
		14	Outdoor heat exchanger 1 inlet temperature	:4.45.0	45.0 °C (at inlet, using evaporator standard)
		15		:5.-35.0	Unused
		16		:6.-35.0	Unused
		17		:7.-35.0	Unused
		18	Outdoor heat exchanger outlet temperature	:8.45.0	45.0 °C (before accumulator)
		19	Outdoor air temperature	:9.32.0	32.0 °C
		20	Exhaust gas temperature	20.65.0	65.0 °C
		21	Cooling water temperature	21:65.0	65.0 °C
		22	Starter current	22.0.0	0.0A
		23	Clutch coil temperature	23.32.0	32.0 °C
		24	Hot water outlet temperature (option)	24.-35.0	-35.0 °C (hot water dispensing use)
		25		25.-35.0	Unused
		26		26.33.0	Unused
		27		27.33.0	Unused
		28		28.:	Unused
		29		29.:0.0	Unused
		30		30.:0.0	Unused
		31	Outdoor fan output	3:20.0	20%
		32	Throttle output	32.330	330 step
		33	Fuel gas regulating valve output	33.330	330 step
		34	Outdoor electric valve output	34.330	330 step
		35		35.330	Unused
		36	Liquid valve output	36.220	220 step
		37	Bypass valve output	37.:0.0	100 step
		38	Cooling water 3-way electric valve output	38.:0.0	1000step
		39	Hot water dispensing 3-way electric valve output	39.:0.0	1000step (hot water dispensing use)
		40	Engine load factor	40.20	20%
		41	Engine ignition timing	4:.:0	10 degrees
		42	Engine speed fluctuation (F-rpm)	42.0.0	0.0
		43	Thermostat-on unit count	43.20	20 units
		44	Thermostat-on average intake temperature	44.:9.4	19.4 °C
		45	Thermostat-on average discharge temperature	45.:5.0	15.0 °C
		46	Thermostat-on average E1 temperature	46.5.0	5.0 °C
		47	Thermostat-on average E2 temperature	47.6.0	6.0 °C
		48	Thermostat-on average E3 temperature	48.7.0	7.0 °C
	Indoor unit	1	Indoor No. 1 unit electric valve opening	0:::80	No. 1 unit 180 step (data received from indoor unit)
		2	Indoor No. 1 unit intake temperature	0:229.0	No. 1 unit 29.0 °C
		3	Indoor No. 1 unit discharge temperature	0:3:15.0	No. 1 unit 15.0 °C
		4	Indoor No. 1 unit heat exchanger inlet temperature	0:4.3.5	No. 1 unit 3.5 °C
		5	Indoor No. 1 unit heat exchanger intermediate temperature	0:535.0	No. 1 unit 35.0 °C
		6	Indoor No. 1 unit heat exchanger outlet temperature (Display of connected indoor units)	0:6.4.5	No. 1 unit 4.5 °C

Down →

← Up

	Indoor/ Outdoor	Data code	Data name	Display Example	Remarks
↓ Up Down ↑	Outdoor unit data 5 sec. before	1	Compressor inlet pressure	A1 :00:0	0.10MPa
		2	Compressor outlet pressure	A2 : 00	1.00MPa
		3	Compressor inlet temperature	A3 : 34	34.0 °C
		4	Compressor outlet temperature	A4 : : 00	110.0 °C
		5	Throttle output	A5 : 330	330 step
		6	Fuel gas regulating valve output	A6 : 220	220 step
		7	Outdoor electric valve 1 output	A7 : : 00	100 step
		8	Outdoor electric valve 2 output	A8 : : 00	100 step
		9	Liquid valve output	A9 : : 20	20 step
		A	Bypass valve output	AA : : 20	20 step
		B	Set engine rpm	Ab2200	2200 rpm set
		C	Engine rpm	AC2200	2200 rpm
		D	Engine load factor	Ad : : 20	20%
		E	Engine speed fluctuation (F-rpm)	AE : : 0.0	0.0
	Outdoor unit data 10 sec. before	1 - E	Data name is the same as that of an outdoor unit 5 sec. before	b1 :00:0 ~ bE : : 00	Same as 5 sec. before outdoor unit remarks
	Outdoor unit data 15 sec. before	1 - E	Data name is the same as that of an outdoor unit 5 sec. before	C1 :00:0 ~ CE : : 00	Same as 5 sec. before outdoor unit remarks

*1 : Data displayed here is from the indoor units that are connected while the most recent abnormality log data is displayed. No other data is displayed (after initial communication is completed).

Note: Although the digit display is the same as when showing data in normal display, the data may not be as accurate.

❺ Temporary stop data display

Temporary stop cause code is displayed.

Example: 41 : : : : 1

If you press the HOME (S4) again for at least 1 second or there is no operation within 10 minutes, normal display reappears.

Example: 41 : : : : 1 -Press the HOME (S004) key for at least 1 second → U01-24

Note *1 : The cause codes are as described below.

1: ————————

2: Although the discharge temperature is high enough, the liquid valve is not yet open.

3: Although the discharge temperature is high enough, the engine speed is still too high.

4: Although the high-pressure area is high enough, the fan output is still too low.

5: Although the high-pressure area is high enough, the engine speed is still too high.

6: Although the high-pressure area is high enough, the unit is in Advantage mode.

7: Although the high-pressure area is high enough, it is less than 3 minutes since the engine started.

8: Engine temporary stop

(5) Troubleshooting

A01 Engine Oil Pressure Trouble

① Abnormality detection method

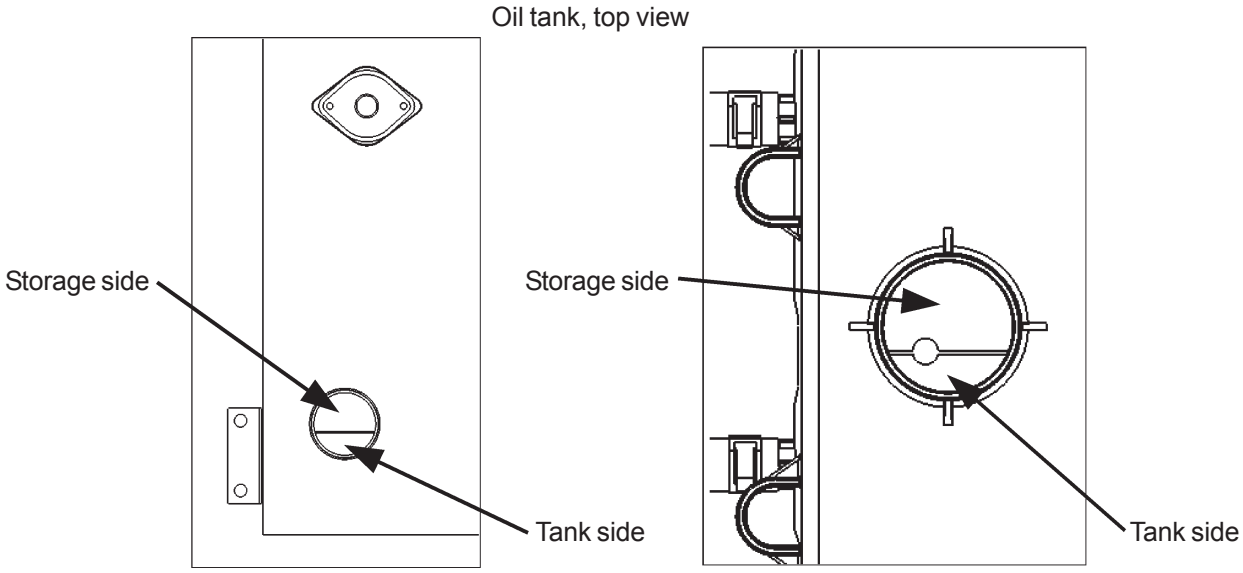
- When the engine oil pressure switch is OFF continuously for 3 second during engine operation (complete combustion), the engine is shut down momentarily and an abnormality flag is set. When the reason for engine shutdown is this abnormality flag, occurring 5 times consecutively in 1 hour.
  * The engine oil pressure switch is not detected for 10 seconds after engine start (complete combustion).
- An abnormality is detected when the engine oil pressure switch is ON for 3 seconds during engine incomplete combustion (stopped or starting).
  * This can only be reset from the outdoor control board.
- Engine oil pressure switch: Setting value 49kPa (0.58kg/cm^2) Contact ON with oil pressure (common ground with engine)

② Troubleshooting

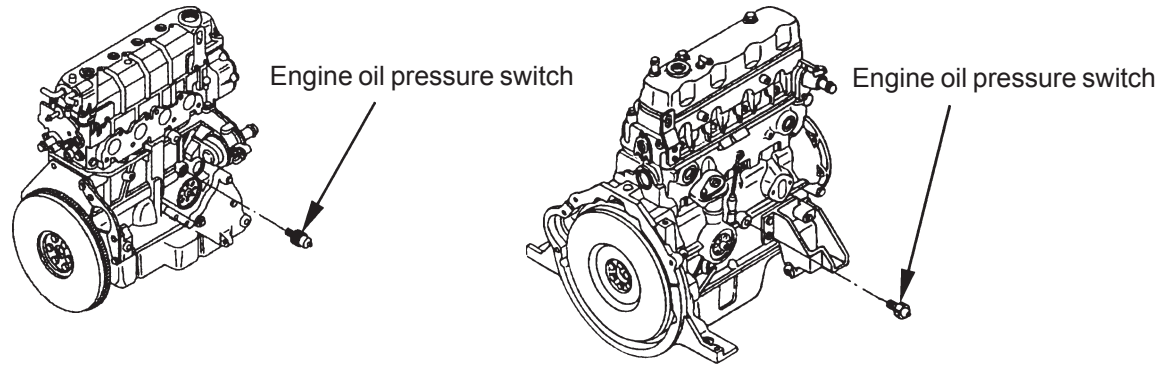
1 Oil level	1-1	Is there oil in the storage side of the oil tank?	Yes	2-1
			No	1-2
	1-2	Any oil leaks or dirty oil?	Yes	Repair
			No	1-3
	1-3	Is the tank side of the oil tank empty?	Yes	Add oil
			No	1-4
	1-4	Does the oil fill pump operate properly?	Yes	Check for pinched or clogged hose
			No	1-5
	1-5	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	Oil filter clogged/relief valve locked/internal strainer clogged/oil pump defective → repair/replace		
3 Wiring	3-1	Any wiring below with poor connection/contact/crimping or broken? • Wiring from control board connector 2P (red) CN012 No.1 to oil pressure switch • Wiring from control board connector FG/CN075 to (–) terminal of starter power source device	Yes	Repair wiring
			No	Replace control board or power board

● For work procedure for replacing outdoor control board, see “4. Reference Material”.

• 1-1

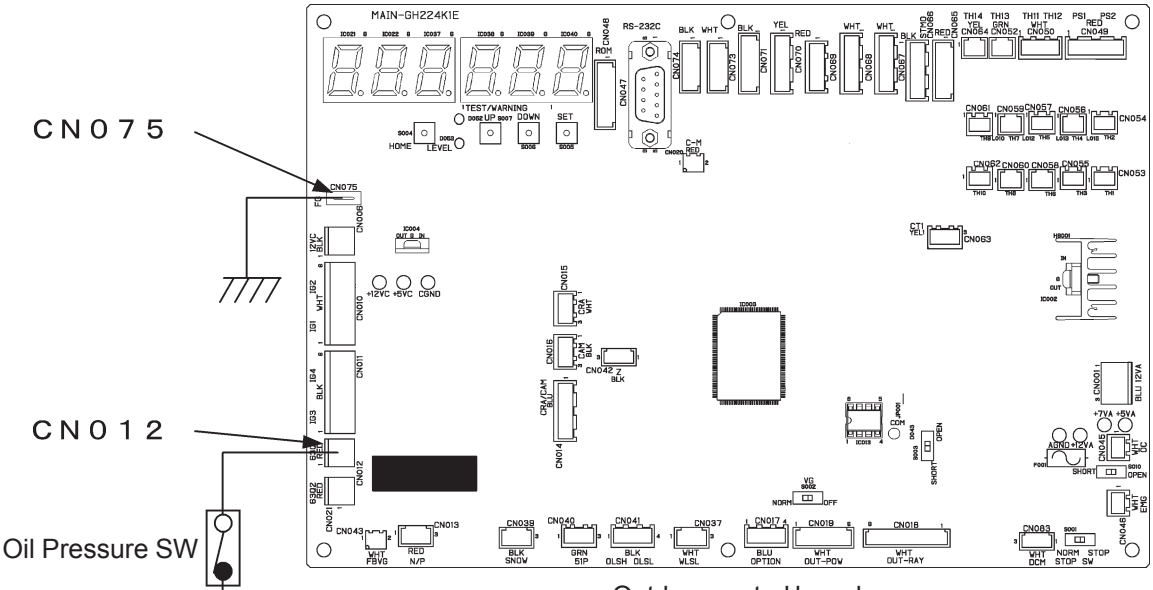


SGP-E70/90 models　　SGP-E120/150/190/240 models



SGP-E70/90 models　　SGP-E120/150/190/240 models

• 3-1



Outdoor control board

* With oil pressure: DC0V
No oil pressure: DC12V

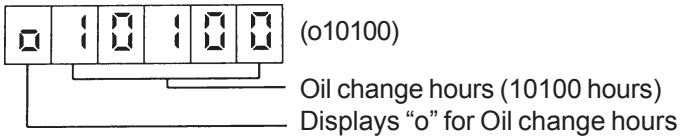
A02 Engine Oil Trouble

① Abnormality detection method

❶ When the oil change hours exceed the oil change hours (EEPROM setting), or, after abnormality is reset for said status, when the oil change abnormality hours (EEPROM setting: However, after 6th reset this is 4 hours) have passed. Engine is stopped when abnormality occurs.

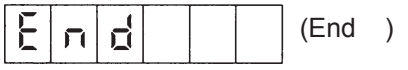
Note: • When the gas type setting is "1", no engine oil abnormality is detected.

• After changing engine oil, reset the oil change hours timer.
Select Menu No. 2 "Oil change hours display". The oil change hours are displayed as shown below.



• 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.

• 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 Speed Too High

① Abnormality detection method

Engine revolution speed during engine operation (complete combustion):

- "Maximum revolution speed (2200min^{-1})" + (101 - 200) continuously for 30 seconds
- "Maximum revolution speed (2200min^{-1})" + (201 - 300) continuously for 10 seconds
- "Maximum revolution speed (2200min^{-1})" + 301 or more continuously for 1 second

Upon any of the above, the engine is stopped momentarily and an abnormality flag is set. When the reason for engine shutdown is this abnormality flag, occurring 5 times consecutively in 1 hour.

② Troubleshooting

1 Check revolution speed	1-1	Measure actual revolution speed using a revolution meter. Was there excessive revolution when the abnormality 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	Check ignition coil, cam angle sensor, crank angle sensor, and igniter.		
5 Wiring	5-1	• Any disconnections/poor contacts or broken wire between throttle (step motor) wiring and connector? (Wiring from control 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	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 work procedure for replacing outdoor control board, see "4. Reference Material".

A04 Engine Speed Too Low

① Abnormality detection method

- During engine operation (complete combustion), when $100min^{-1} \leq$ engine revolution speed $\leq 700min^{-1}$ continuously for 1.5 second, the engine is stopped momentarily and an abnormality flag is set. When the reason for engine shutdown is this abnormality flag, occurring 5 times consecutively 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 disconnections/poor contacts or broken wire between throttle (step motor) wiring and connector? (Wiring from control 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	Check ignition coil, cam angle sensor, crank angle sensor, and igniter	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	6-8
			NG	Adjustment
	6-8	Air intake occurring? Check rubber plug on intake manifold. If OK, proceed to 7-1.		
7 Fuel gas regulating valve	7-1	Does the throttle (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.)		
	7-2	When turning power ON (during positioning), is about DC 4 V applied respectively across control board connector 6P (red) CN065 No. 5 and No. 1/No. 2, and across No. 6 and No. 3/No. 4?		
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	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

* Sections 7-1 and 7-2 apply only to gas-type G models.

● For work procedure for replacing outdoor control board, see "4. Reference Material".

A05 Ignition Power Trouble

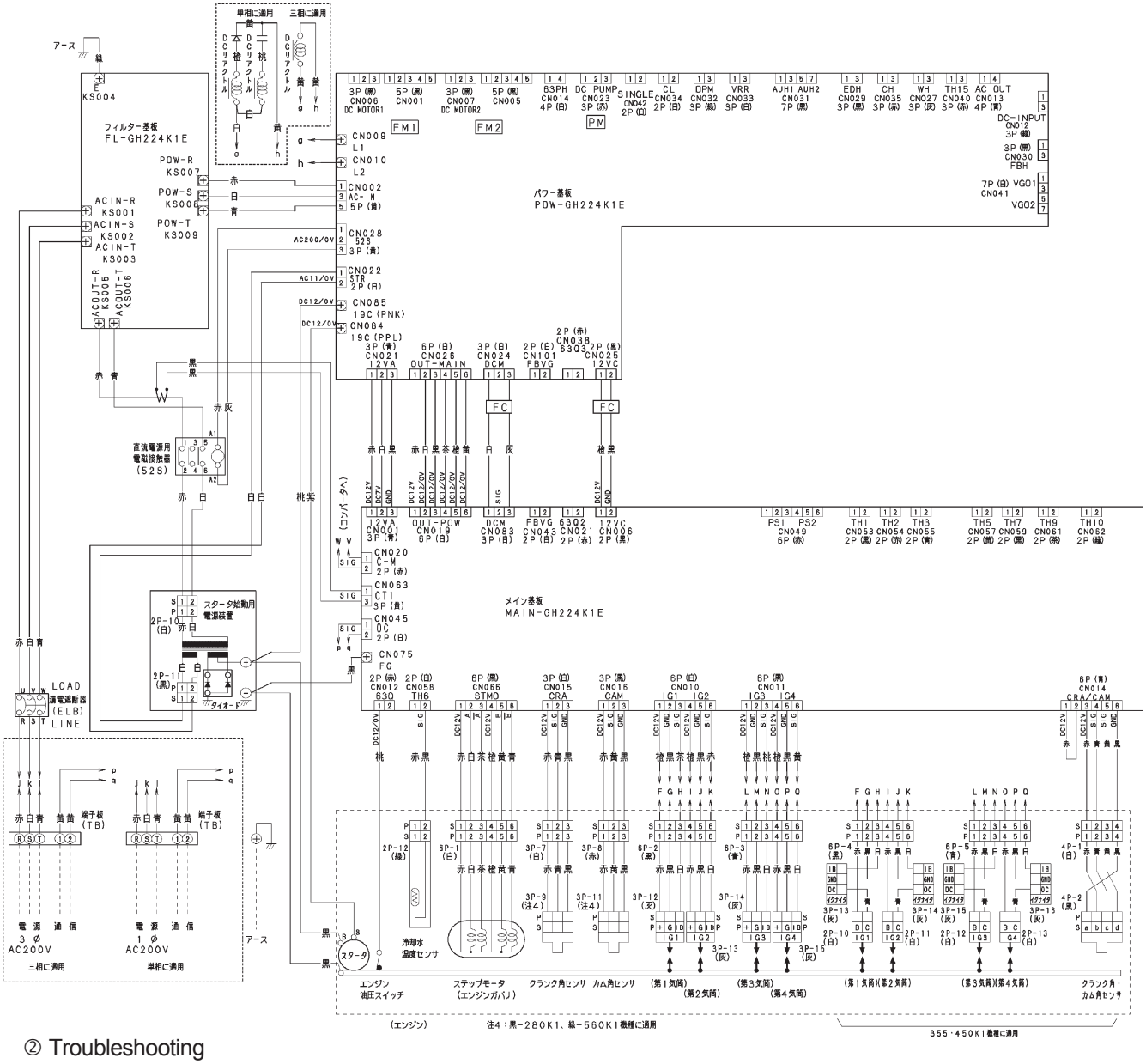
① Abnormality detection method

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

- When an ignition voltage decrease is detected for 2 seconds or more.
- During cranking, when I<3.8A is detected for 5 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 abnormality occurs.



② Troubleshooting

Try operating the outdoor unit.

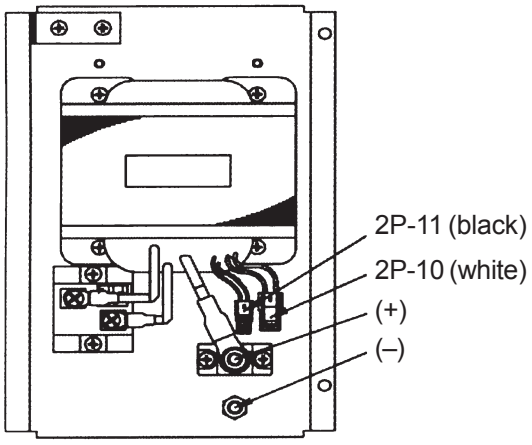
- When the starter power source magnet switch (52S) does not turn ON: Go to 1-1
- When the starter power source magnet switch (52S) turns ON, and then turns OFF after 3 seconds: Go to 2-1
- When the starter power source magnet switch (52S) turns ON but the starter does not turn ON: Go to 4-1

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. 5?	Yes	Replace control board
			No	1-5
	1-5	Is there AC200V on filter board connector (KS007/ KS009)?	Yes	1-6
			No	Replace filter board
	1-6	Wiring connection/contact poor between power board connector 5P (yellow)/CN002 and filter board connector (KS007/KS009) → Repair wiring		
2 Ignition coils	2-1	At magnet switch ON, is there DC11V or more between control board connector 2P (black) CN006 No. 1 (+) and No. 2 (–)?	Yes	Replace control board
			No	2-2
	2-2	With control board connectors 6P (white) CN010 and 6P (black) CN011 disconnected, at magnet switch ON, is there DC11V or more between control 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 control 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 control 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-11 (black) No. 1 and No. 2?	Yes	3-2
			No	3-3
	3-2	Wiring connection/contact poor, or broken wire, between power board connector 2P (white)/CN022 and starter power source relay connector 2P-11 (black) → Repair wiring		
	3-3	At magnet switch ON, is there AC200V between starter power source relay connector 2P-10 (white) No. 1 and No. 2?	Yes	Replace starter power source
			No	3-4
	3-4	At magnet switch ON, is there about AC200V between magnet switch No. 2 and No. 6?	Yes	3-5
			No	3-6
	3-5	Wiring connection/contact poor, or broken wire with wiring between magnet switch and starter power source relay connector 2P-10 (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

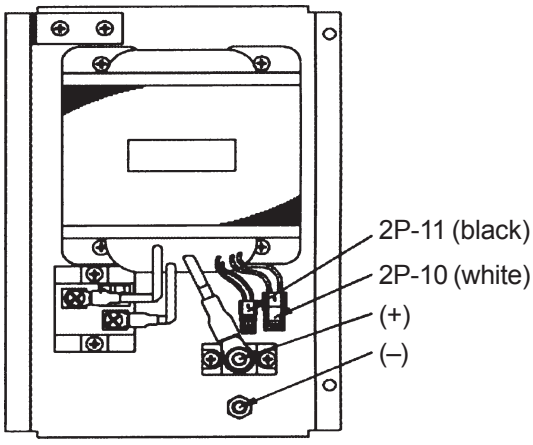
	3-9	Is there about AC200V between power board connector 5P (yellow)/CN002 No. 1 and No. 3?	Yes	Replace power board
			No	Check relevant wiring and filter board
4 Starter/starter relay (control board)	4-1	At magnet switch ON, is there DC10V or more between starter B terminal (+) and engine ground (–)?	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 power 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 control board connector FG CN075 (–)?	Yes	Replace control 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 control board, see "4. Reference Material"
- When replacing the power board on single-phase models, be sure to move the 2P (white) CN042 jumper wire from the old board.

• 3-1 to 3-5, 4-3, 4-4, 4-6, 4-8

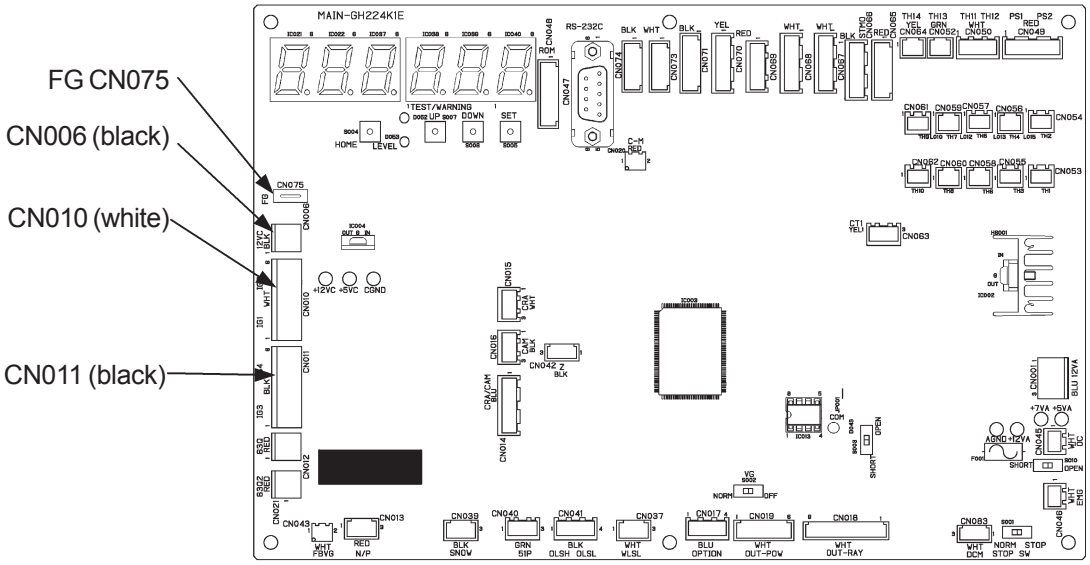


70/90 model

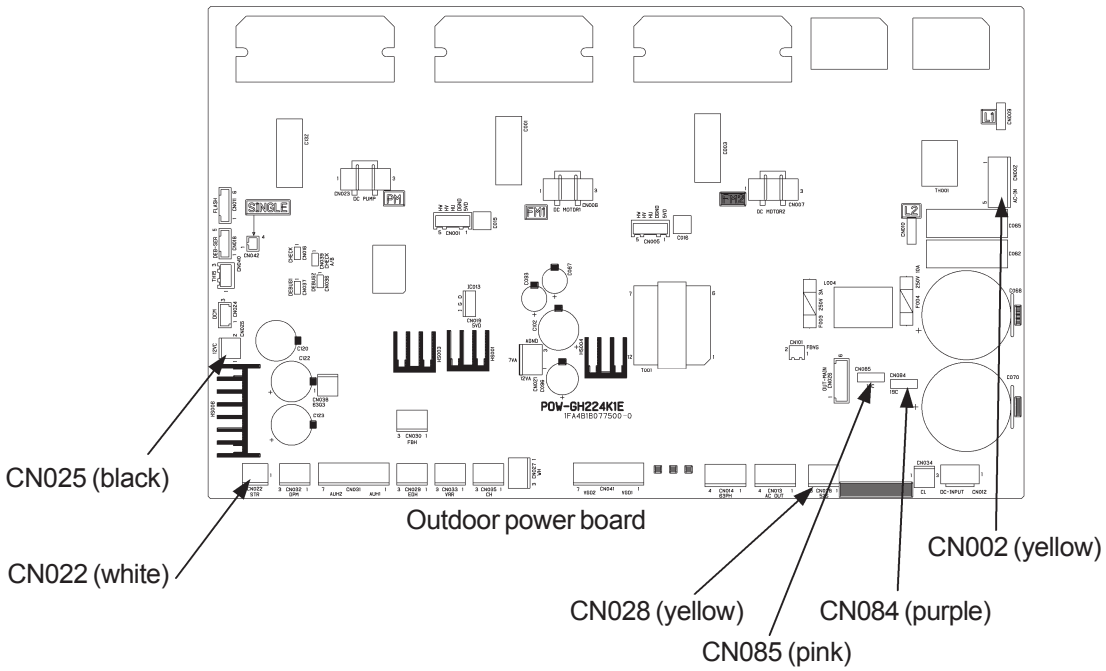


120/150/190/240 model

• 1-2 to 1-5, 2-1 to 2-5, 3-8 to 3-9, 4-6, 4-8



Outdoor control board



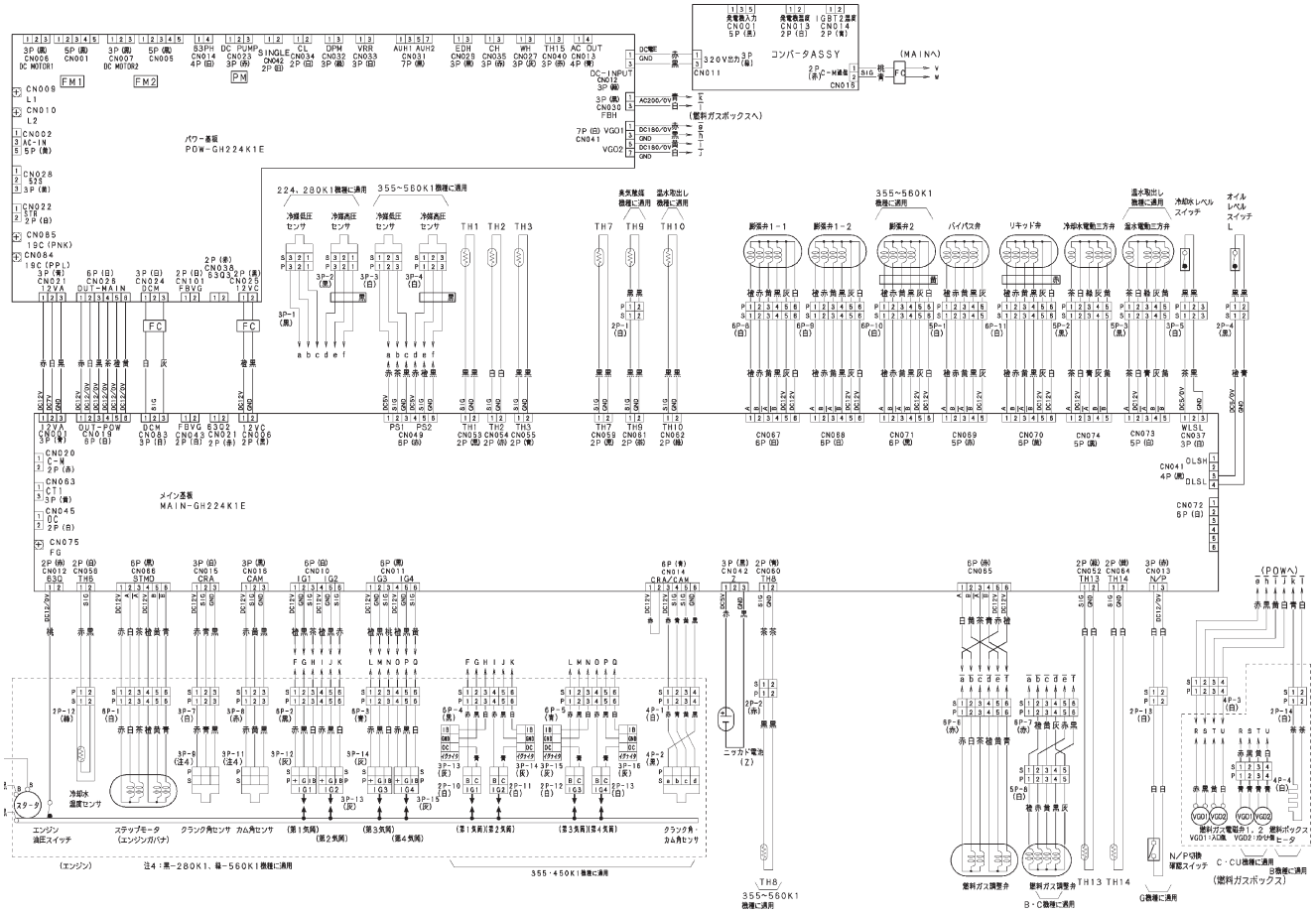
Outdoor power board

A06 Engine Start Failure

① Abnormality detection method

- An abnormality is determined when [(Cranking 5 seconds ON–10 seconds off) × 5 times] upon engine startup, that is, not starting after cranking 5 times (with revolution speed detection).
- Also determines an abnormality when oil pressure has not risen by 15 seconds after opening the fuel gas valve.
  * This can only be reset from the outdoor control board.

Abnormality input is structured as shown below.



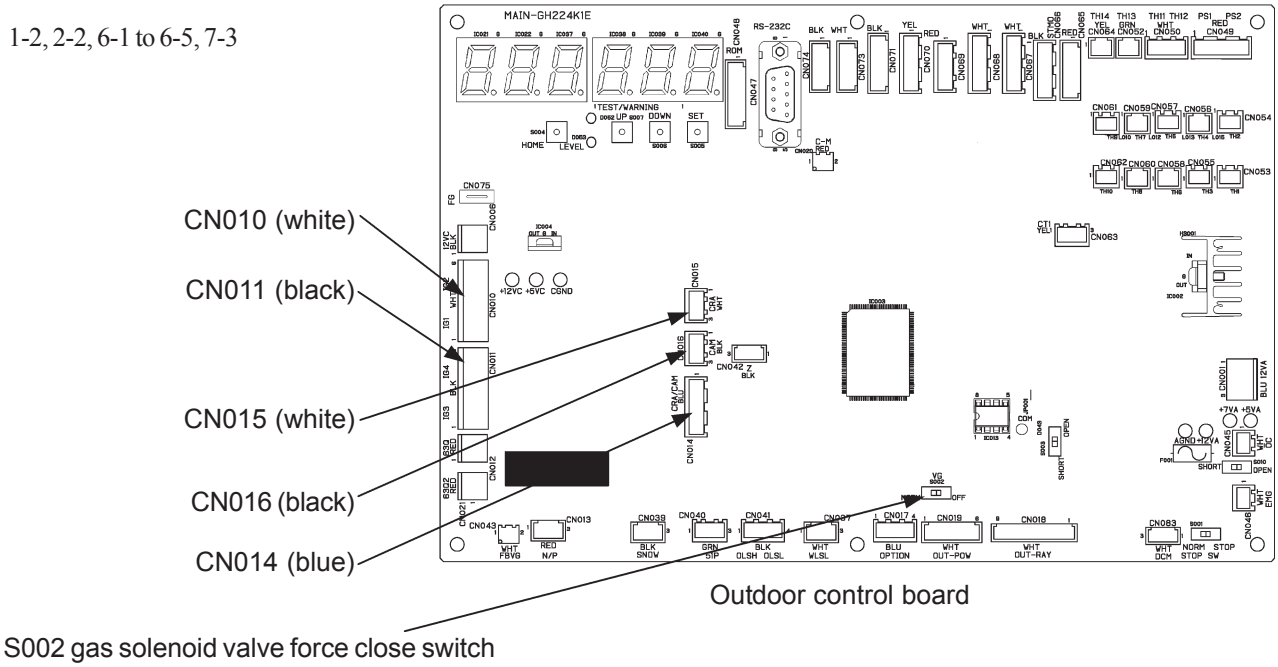
② Troubleshooting

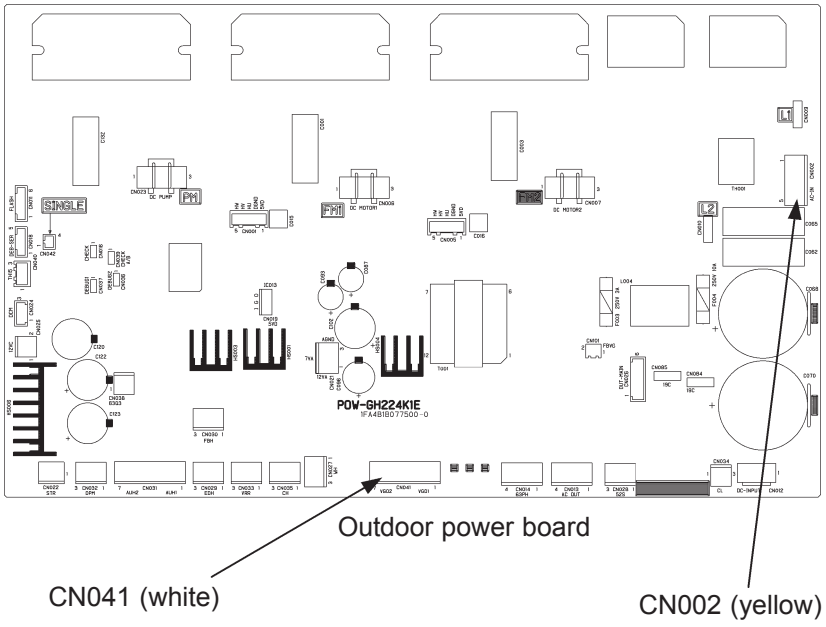
1 Engine	1-1	Has the fuel gas pressure dropped? Is the fuel empty? Measure the pressure at the gas pressure measuring port during cranking.	OK	2-1
			NG	1-2
	1-2	Is the gas solenoid valve SW (S002 on control board) on the NORMAL side?	Yes	4-1
			No	Switch to NORMAL
2 Plug	2-1	Are sparks emitted properly? (Remove plug and check independently. Or, check with timing light.)	Yes	3-1
			No	2-2
	2-2	Are there disconnections/poor contacts/poor crimping or broken wire between ignition wiring and control board connectors 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-3 (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-3 (white) and solenoid valve → Repair wiring		
	4-4	Fuel gas solenoid valve operation is poor (Replace after checking for any foreign matter caught, blocked fuel gas passage, broken coil wire, etc. No abnormalities: go to 4-5.)		
	4-5	Throttle (step motor) and fuel gas regulating valve operating properly? Use self-diagnosis function (No. 4 Forced engine self-diagnosis mode 2) to check.		
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-3 (white) → repair		
	6-3	Is AC200V applied across power board connector 5P (yellow)/CN002 No. 1-No. 5?	Yes	Replace power board
			No	6-4
	6-4	Is 200 V AC applied across the filter board connector (KS008/KS009)?	Yes	6-5
			No	Replace filter board
	6-5	Is the wiring connection or wiring contact poor or broken between connector 5P (yellow) CN002 on the power board and the filter board connector (KS007/KS009)? → If so, repair or replace.		
7 Crank/cam angle sensor	7-1	Check the following for 70 and 90 models only (all other models go to 7-3). Proper gap between crank angle sensor and rotor?	Yes	7-3
			No	7-2
	7-2	Temporarily disconnect cancel pulley, and adjust gap. (See "Main parts replacement manual" for details.)		

7 Crank/cam angle sensor	7-3	Any wiring below with poor connection/contact/crimping or broken wire? (E70/90/190/240) • Wiring from control board connector 3P (white) CN015 to crank angle sensor connector • Wiring from control board connector 3P (black) CN016 to cam angle sensor connector (E120/150)	Yes	Repair wiring
			No	8-1
8 Ignition Coil	8-1	Inspect ignition coil (coil, igniter), and ignition wiring. If OK, replace control board.		

- For work procedure for replacing outdoor control board, see "4. Reference Material".
- When replacing the power board on single-phase models, be sure to move the 2P (white) CN042 jumper wire from the old board.

• 1-2, 2-2, 6-1 to 6-5, 7-3





• 3-1
❶ Remove front cover and diaphragm.
❷ Remove valve and valve lever assembly.
❸ Inspect for diaphragm damage or tears, and valve operation conditions.

• 5-1
❶ After warming the engine, remove all spark plugs.
❷ Close fuel cock, or force the gas solenoid valve SW OFF.
❸ Set compression gauge in spark plug hole.
❹ Crank engine for 4 to 5 seconds (operation signal/trial operation, etc.).
❺ Repeat three times to confirm that gauge value exceeds limit value.

	Gas type	Limit value
For 70/90 model engine	G	1.13MPa
	C/B	1.13MPa
For 120/150 model engine	G	1.06MPa
	C/B	0.79MPa
For 190/240 model engine	G	1.62MPa
	C/B	1.36MPa

• 5-4
For procedures, see Chapter 4 (8) “Inspection and Adjustment of Ignition Timing.”

A07 Fuel Gas Valve Failure

① Abnormality detection method

An abnormality is determined when, on the relay (RAY) board receiving signals from the control (CR) board and power source (POW) board, the directive signal and feedback signal differ for outputs from each fuel gas solenoid valve (VGO1, 2) for more than 3 seconds.

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

② Troubleshooting

1 Occurrence status	1-1	Abnormality occurring before cranking?	Yes	2-1
			No	3-1
2 Confirm while stopped	2-1	Confirm that voltage is not output to fuel gas solenoid valve (VG0) while stopped. Measure voltage across the following connector terminals. Is each about DC0V? • VGO1: Between 1 (+) and 3 (–) of CR board 7P (white) CN036 • VGO2: Between 1 (+) and 3 (–) of RAY board 3P (white) CN005	Yes	2-4
			No	VGO1=NG To 2-2 VGO2=NG To 2-3
	2-2	Replace CR board		
	2-3	Confirm that no relay drive signal is input while stopped. Measure voltage across the following connector terminals. About DC0V? • VGO2: Between 1 (+) and 3 (–) of RAY board 3P (white) CN004	Yes	Replace RAY board
			No	Replace POW board
	2-4	Confirm that no feedback signal is input while stopped. Measure voltage across the following connector terminals. Is each about DC5V? • VGO1: Between 1 (+) and 2 (–) of POW board 2P (white) CN039 • VGO2: Between 1 (+) and 2 (–) of CR board 2P (red) CN087	Yes	2-5
			No	VGO1=NG To 2-6 VGO2=NG To 2-7
	2-5	After rechecking, keep under observation. If reoccurrence, replace CR board and POW board.		
	2-6	Disconnect the CR board 2P (white) CN100 connector, and measure VGO1 again as stated in 2-4. About DC5V?	Yes	Replace CR board
			No	Replace POW board
	2-7	Disconnect the RAY board 2P (red) CN008 connector, and measure VGO2 again as stated in 2-4. About DC5V?	Yes	Replace RAY board
			No	Replace CR board

3 Confirm while operating (starting)	3-1	Check fuel gas valve (VGO) output power source (AC200V). Measure voltage across the following connector terminals. Are all about AC200V? ① POW board: Between 5 and 3 of 5P (yellow) CN015 ② RAY board: Between 5 and 3 of 5P (yellow) CN006 ③ CR board: Between 5 and 3 of 5P (yellow) CN034	Yes	3-5
			No	3-2
	3-2	Was AC200V applied for ① in 3-1 above?	Yes	3-3
			No	3-4
	3-3	Wire broken or connection/contact poor between POW board 5P (yellow) CN015 and CR board 5P (yellow) CN034 → Repair		
	3-4	See High pressure switch activation (P04).		
	3-5	Confirm that voltage is applied across fuel gas solenoid valve (VG0) while cranking. Measure voltage across the following connector terminals. Is each about DC180V? • VGO1: Between 1 (+) and 3 (–) of CR board 7P (white) CN036 • VGO1: Between 1 (+) and 3 (–) of RAY board 3P (white) CN005	Yes	3-9
			No	VGO1=NG To 3-6 VGO2=NG To 3-7
	3-6	Replace CR board.		
	3-7	Confirm that relay drive signal is input while cranking. Measure voltage across the following connector terminals. About DC12V? • VGO2: Between 1 (+) and 3 (–) of RAY board 3P (white) CN004	Yes	Replace RAY board
			No	3-8
	3-8	Check the following wiring for broken wire or poor contact. Any defects? • Between POW board and RAY board 3P (white) POW (CN027)~RAY (CN004)	Yes	Repair/replace wiring
			No	Replace POW board
	3-9	Check the following wiring (feedback signal) for broken wire, poor contact, or short-circuit or ground fault. Any defects? • VGO1: 2P (white) CR (CN100)~POW (CN039) • VGO2: 2P (red) RAY (CN008)~CR (CN087)	Yes	Repair/replace wiring
			No	3-10
	3-10	Confirm that feedback signal is input while cranking. Measure voltage across the following connector terminals. Is each about DC0V? • VGO1: Between 1 (+) and 2 (–) of POW board 2P (white) CN039 • VGO2: Between 1 (+) and 2 (–) of CR board 2P (red) CN087	Yes	2-5
			No	VGO1=NG To 3-11 VGO2=NG To 3-12
	3-11	Replace CR board.		
	3-12	Replace RAY board.		

A08 Engine Stall

① Abnormality detection method

During engine operation (complete combustion), when engine revolution speed ≤ 100min^{-1} continuously for 3 seconds, the engine is stopped momentarily and an abnormality flag is set.

When the reason for engine shutdown is this abnormality flag, occurring 5 times consecutively 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	Check ignition coil, cam angle sensor, crank angle sensor, and igniter.	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 4 (8)).	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	When turning power ON (during positioning), is DC voltage (about 4V) 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	2-11
	2-11	When turning power ON (during positioning), is DC voltage applied respectively across control board connector 6P (red) CN065 No. 5 and No. 1/No. 2, and across No. 6 and No. 3/No. 4?	Yes	Replace mixer
			No	Replace control board

A10 Exhaust Gas Temp. High

① Abnormality 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 abnormality flag is set.
When the reason for engine shutdown is this abnormality flag, occurring once.

② Troubleshooting

1 Exhaust gas temperature	1-1	Measure actual exhaust gas temperature. Is it high?	Yes	Replace exhaust gas heat exchanger
			No	2-1
2 Check wiring and thermistor	2-1	Measure exhaust gas temperature sensor resistance. (See “4. Reference Material” for thermistor characteristics.)		
3 Check cooling water amount	3-1	Check for any disconnected hose. Disconnected?	Yes	Repair
			No	1-1

A11 Engine Oil Level Trouble

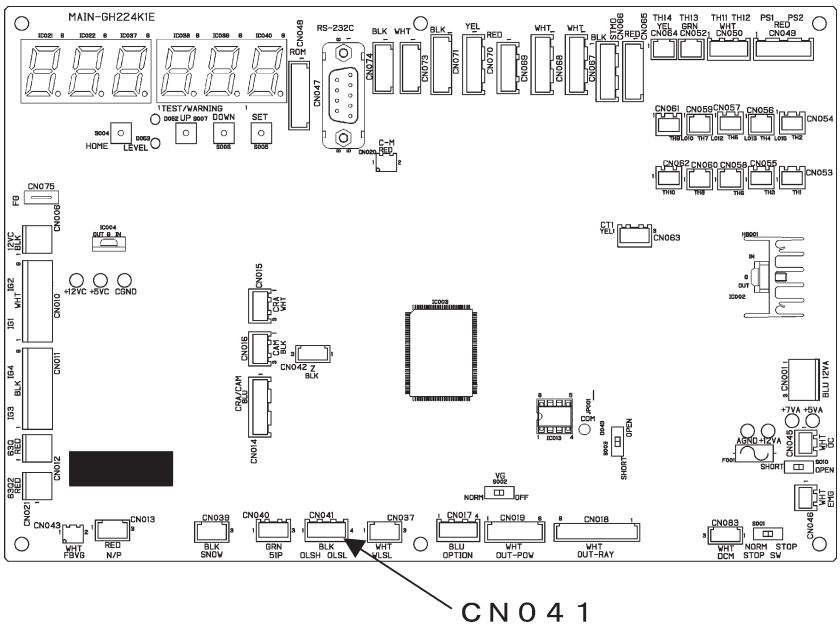
① Abnormality detection method

- With the engine off, turn the oil level L switch on to low to run the oil pump for 60 minutes. If working correctly, the switch should turn off during that interval.

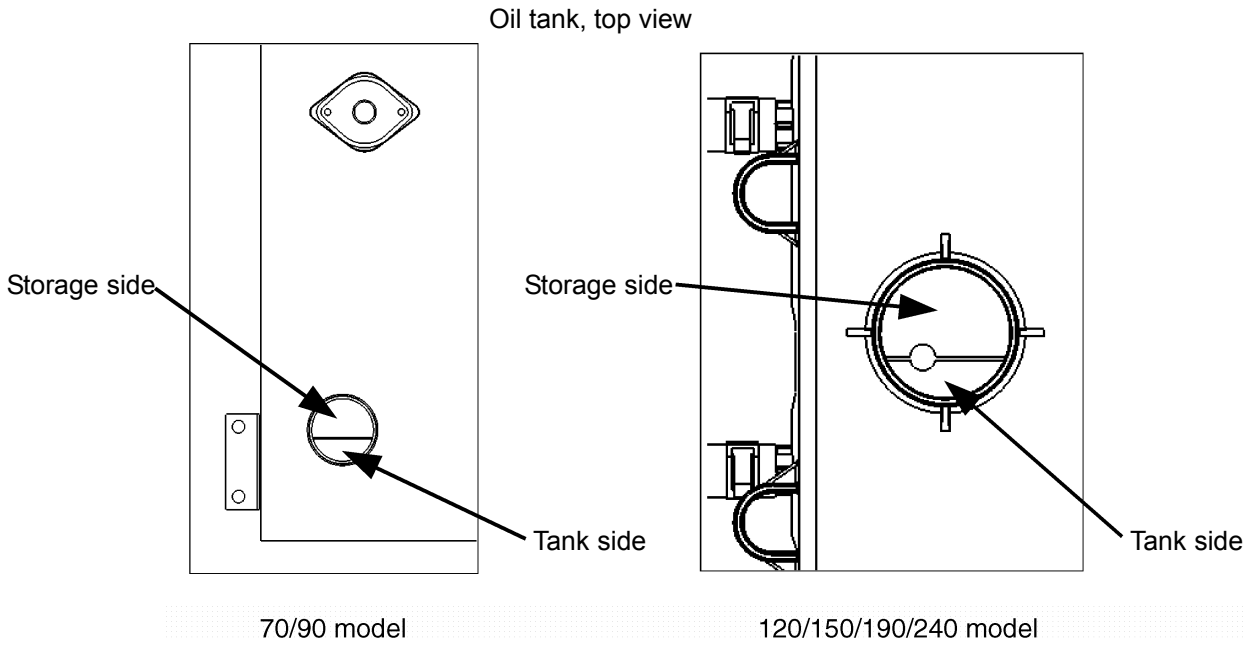
② Troubleshooting

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?	No	3-1
			Yes	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	Caused by debris caught in oil solenoid valve. Replace
			No	4-1
4 Check wiring	4-1	Any broken wire or poor connection in wiring from control board connector 4P (black) CN041 No.3/4 to OLSH?	Yes	Repair
			No	Replace control board

- For work procedure for replacing outdoor control board, see "4. Reference Material".



• 1-1


Oil tank, top view
Storage side
Tank side
Storage side
Tank side
70/90 model
120/150/190/240 model

A12 Throttle (Stepping Motor) Failure

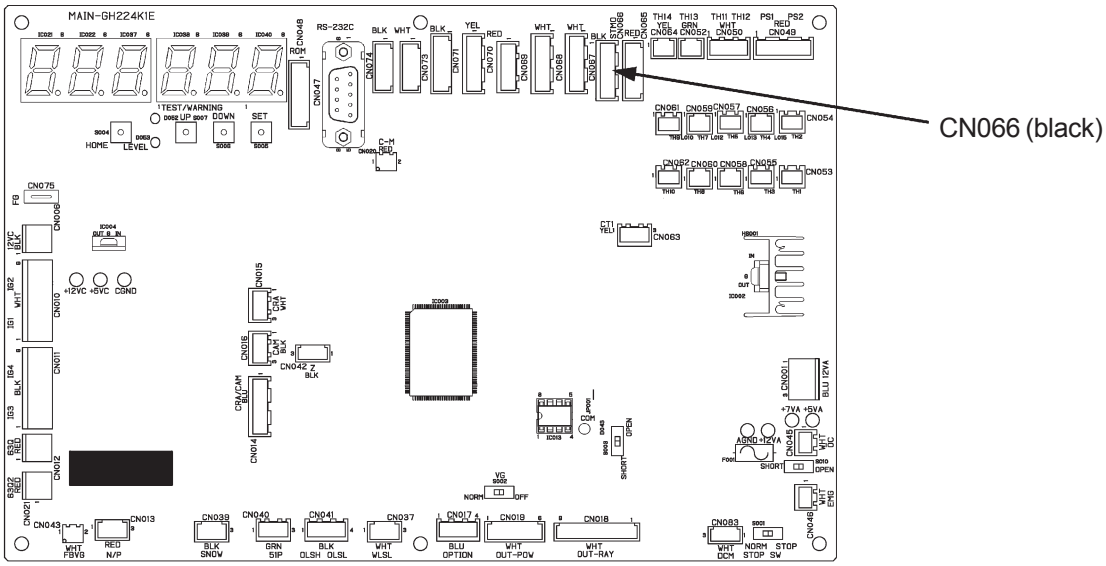
① Abnormality detection method

- 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 abnormality flag is set.
  When the reason for engine shutdown is this abnormality flag, occurring one time.
- An abnormality 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 stable revolution)
  * This can only be reset from the outdoor control 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

• 1-1, 2-1



A13 Fuel Gas Adjustment Valve Failure

① Abnormality detection method

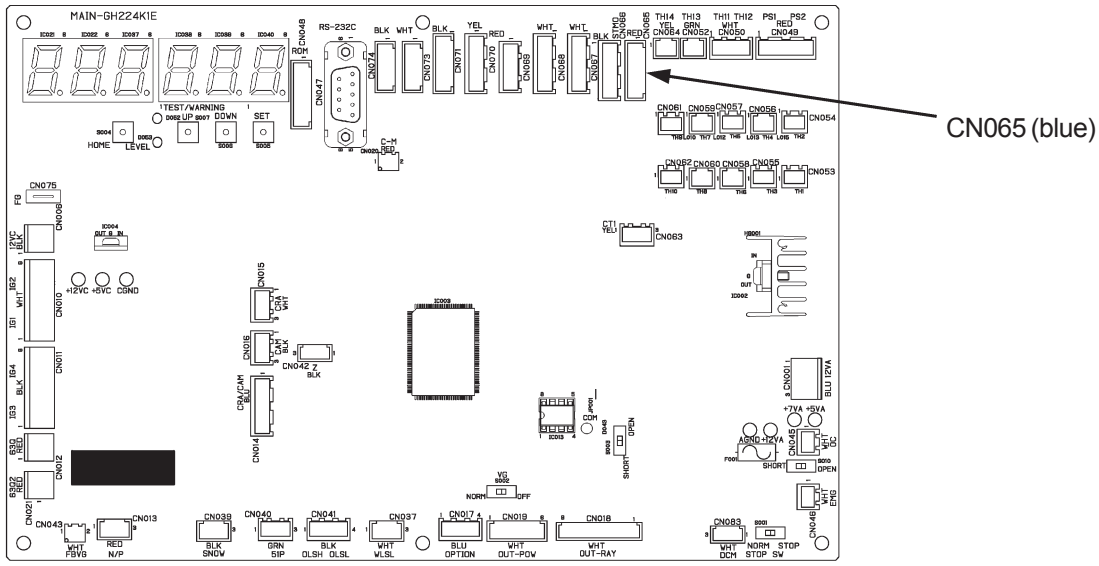
- When performing forced self-diagnosis mode 2 in the self-diagnosis mode, when the fuel gas adjustment valve is not operating properly, the engine is stopped and an abnormality flag is set.
  When the reason for engine shutdown is this abnormality flag, occurring one time.

② Troubleshooting

1 Wiring	1-1	Any poor connection/contact or broken wires for fuel gas adjustment valve wiring and connector? (Wiring from control board connector 5P (blue) CN065 to relay connector 5P-6 (white))	Yes	Repair wiring
			No	2-1
2 Fuel gas adjustment valve	2-1	Does the fuel gas adjustment valve coil resistance measure about 46Ω? (Disconnect relay connector 5P-6, and measure between No. 5 (gray) and No. 1, 2, 3, 4)	Yes	2-2
			No	Replace coil
	2-2	When turning power ON (during positioning), is DC voltage (about 4V) applied respectively across control board connector 5P (blue) CN065 5 (+) and 1 (–), 2 (–), 3 (–), and 4 (–)?	Yes	Replace fuel gas adjustment valve
			No	Replace control board

Note) Cannot run a self-diagnosis with gas types other than those for low NOx compatible models (gas type setting of 0, 1, or 2).
Even when A13 lights after running a self-diagnosis , it is not always an abnormality.

- 1-1, 2-1



A14 Engine Oil Pressure Switch Failure

① Abnormality detection method

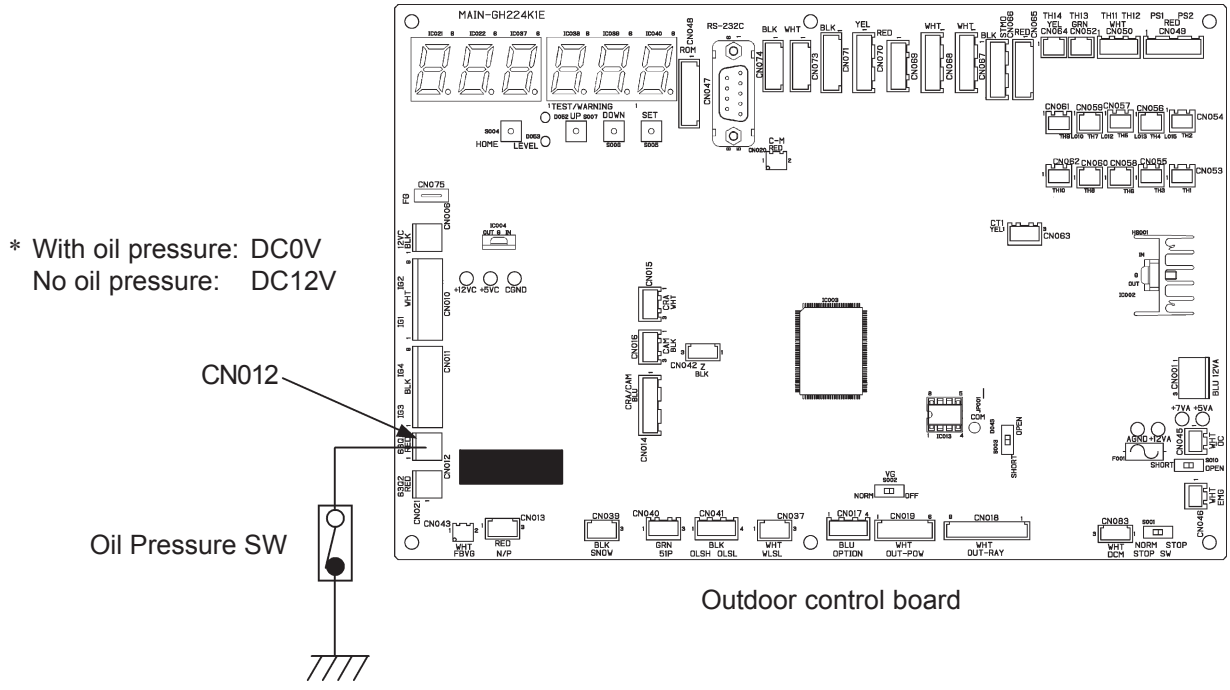
- When starting the engine, if the oil pressure switch is ON for 6 seconds or more (contact closed) before complete combustion, an abnormality flag is set.
  An abnormal stop results on the first occurrence. However, if turned OFF, the abnormality flag is automatically reset and the starting sequence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

② Troubleshooting

1 Engine internal pressure	1-1	Does the abnormality 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, blow-by 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	Ground fault in wiring between the control board connector 2P (red) CN012 and the oil pressure switch? (Disconnect wiring between said connector and oil pressure switch, and measure resistance between wiring and engine.	Yes	Repair wiring
			No	Replace control board

- For work procedure for replacing outdoor control board, see "4. Reference Material."

• 3-2



A15 Starter Power Output Short Circuit

① Abnormality detection method

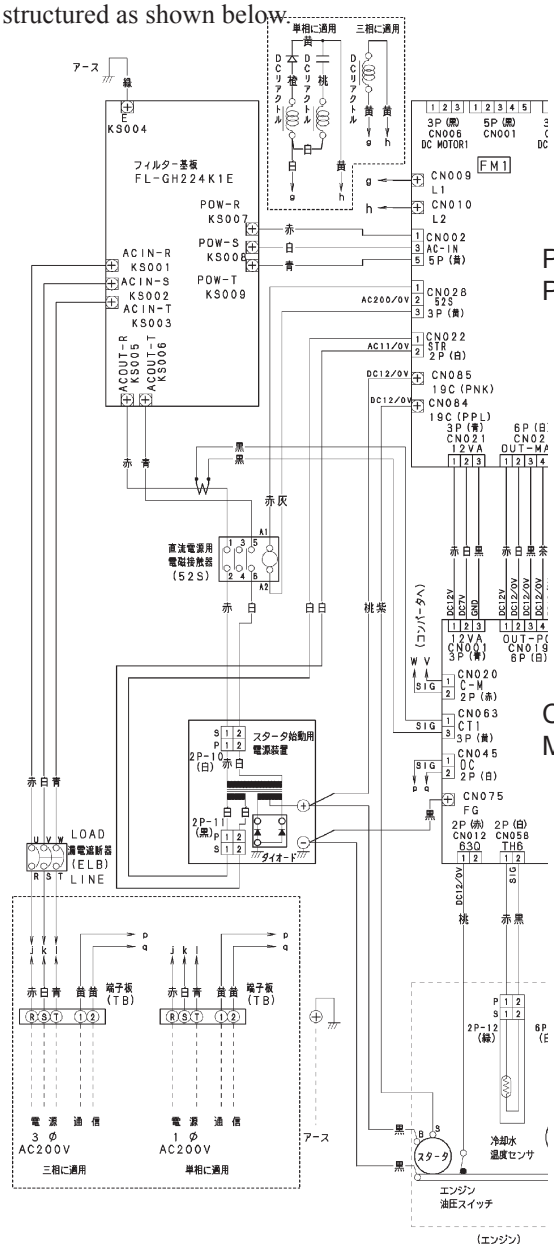
When the starter power primary current meets the following conditions, an abnormality is determined upon 5 consecutive occurrences in 1 hour.

- 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 abnormality occurs.

Abnormality input is structured as shown below.

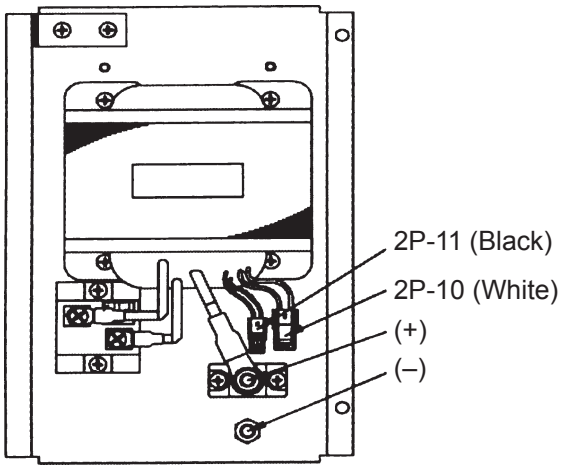


② Troubleshooting

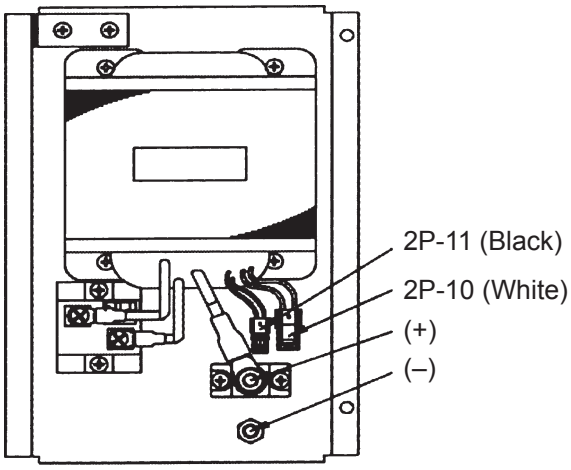
1 Starter power source (DC current)	1-1	Reoccurs even when disconnecting the two wires from the starter power source ⊕ terminals?	Yes	1-2
			No	2-1
	1-2	Reoccurs even after disconnecting control board connector 3P (yellow) CN063? (Ignore abnormality A17 if it occurs.)	Yes	Replace control board
			No	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 control board, see “4. Reference Material”.

• 1-1, 2-1

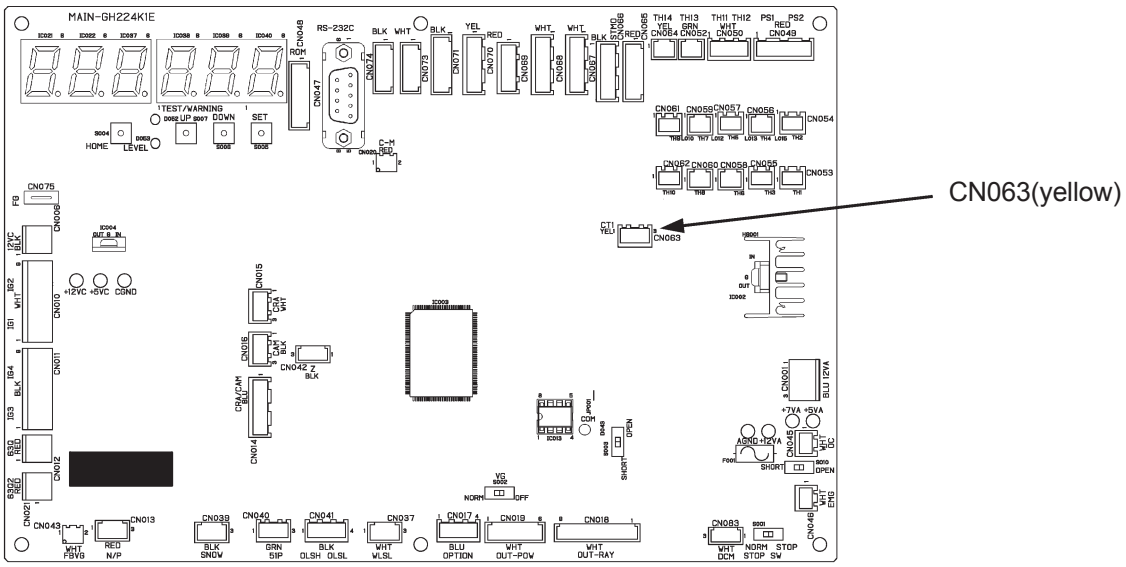


70/90 model



120/150/190/240 model

• 1-2



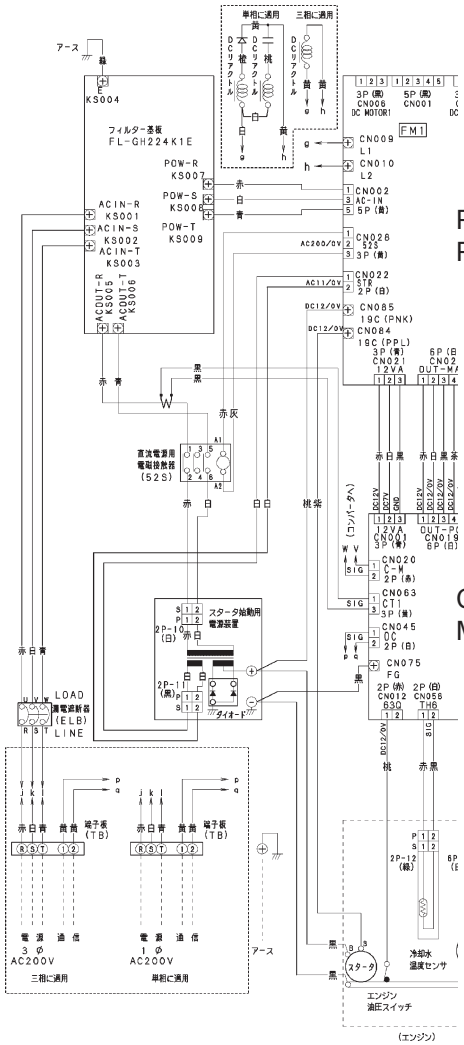
A16 Starter Locked

① Abnormality detection method

When the starter power primary current meets the following conditions, and a revolution speed pulse is not detected, an abnormality is determined upon 5 consecutive occurrences in 1 hour.

- During cranking: When 32A or more is detected for 1.0 second or more (Large models) E120-240 models
- During cranking: When 15A or more is detected for 1.0 second or more (Midsize models) E70/90 models

Abnormality input is structured as shown below.



② Troubleshooting

❶ Check starter

1 Starter	1-1	Check for starter lock (If there is no starter lock (includes engine and compressor), replace control board)		

● For work procedure for replacing outdoor control board, see "4. Reference Material."

❷ 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 Idler pulley (70/90 models only)	2-1	Easily rotates by hand?	Yes	3-1
			No	Replace idler pulley
3 Compressor	3-1	Rotates by hand with some resistance?	Yes	4-1
			No	Replace compressor
4 Cancel pulley (70/90 models only)	4-1	After temporarily removing the cancel belt, does the cancel pulley easily rotate by hand? (See Main Parts Replacement Manual for installing and removing cancel belt)	Yes	Replace cancel pulley
			No	5-1
5 Engine	5-1	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.		

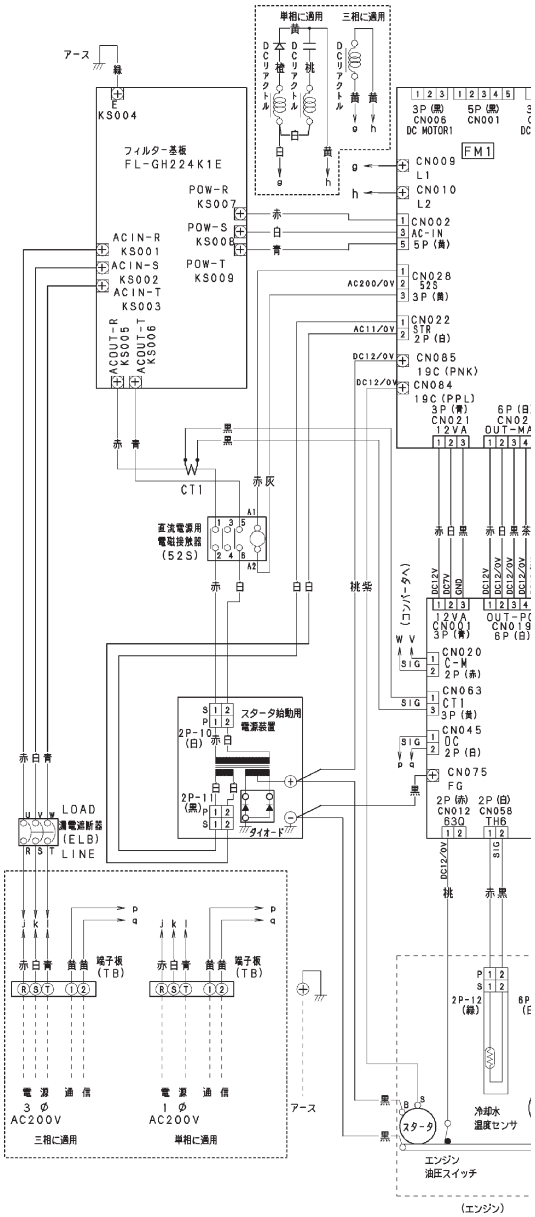
A17 CT Trouble (Starter Current Detection Failure)

① Abnormality detection method

When the starter power primary current meets the following conditions, an abnormality 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.

Abnormality input is structured as shown below.

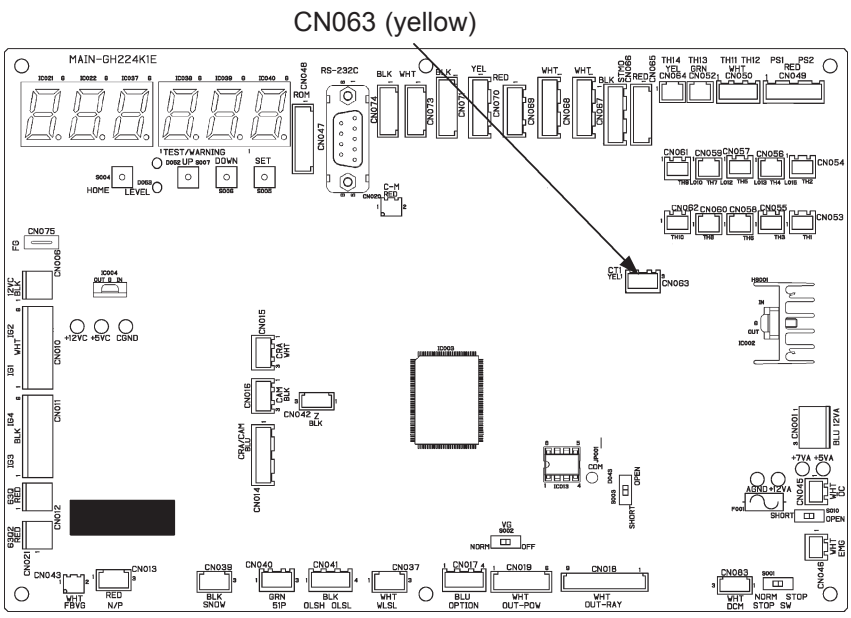


② Troubleshooting

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	During cranking, is there a voltage of AC0.5V or more between control board connector 3P (yellow)/CN063 No. 1 and No. 3?	Yes	Replace control 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 control board, see “4. Reference Material.”

• 1-3



Outdoor control board

A19 Wax 3 Way Valve Failure

① Abnormality detection method

- During engine operation, when the cooling water temperature does not exceed 60°C for 120 minutes, the engine is abnormal.

An abnormal stop results on the first occurrence.

② Troubleshooting

1 Main unit (70/90/120/150/ 190 model)	1-1	Remove the three-way wax valve lid, and check whether the valve has locked. → Repair/replace three-way wax valve.
1 Main unit (240 model)		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 valve as necessary.

A20 Cooling Water Temp. High

① Abnormality detection method

When the cooling water temperature ≥ 100°C continuously for 2 seconds during engine operation (complete combustion), the engine is shut down and an abnormality flag is set.

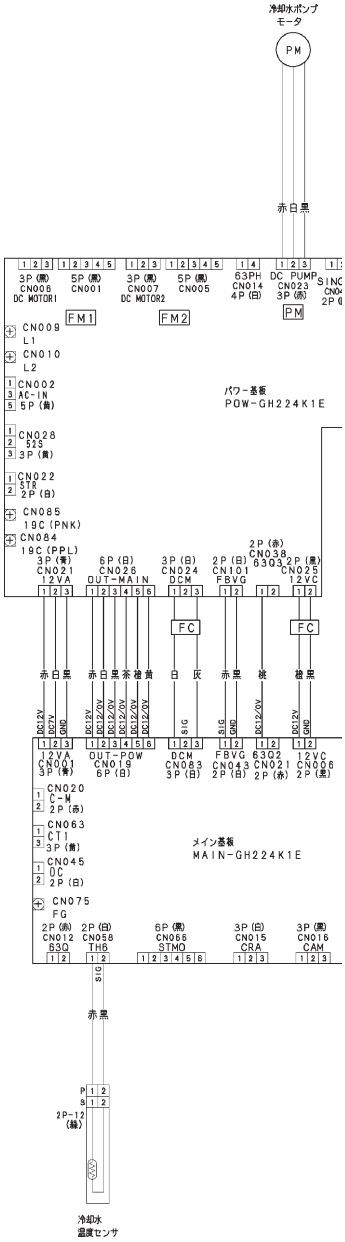
When the reason for engine shutdown is this abnormality flag, occurring 5 times continuously.

② Troubleshooting

1 Pump rotation	1-1	Is the cooling water pump rotating during operation?	Yes	2-1
			No	See A22
2 Cooling water circuit	2-1	Is the wax valve by the engine outlet operating properly?	Yes	2-2
			No	Repair/replace wax valve
	2-2	Are there signs that the cooling water overflowed?	Yes	2-4
			No	2-3
	2-3	Is there air in the cooling water?	Yes	Discharge air
			No	3-1
	2-4	Is cooling water leaking or seeping from the cooling water hose?	Yes	Repair, then discharge air
			No	Bleed air
3 Check sensor	3-1	Disconnect the cooling water temperature sensor relay connector 2P-12 (green) and measure the resistance value. Measure the surface temperature and compare. (See “4. Reference Material” for thermistor characteristics.)	OK	3-2
			NG	Replace cooling water temperature sensor
	3-2	After resetting the abnormality and operating again, measure the surface temperature of the cooling water circuit. Does the temperature increase?	Yes	Reinvestigate
			No	3-3
	3-3	Is there water etc. on relay connector 2P-12 (green)?	Yes	Repair
			No	3-4
	3-4	If A20 reoccurs, replace control board.		

● For work procedure for replacing outdoor control board, see “4. Reference Material”.

Abnormality input is structured as shown below.



- 2-1
  Wax valve inspection
  ❶ Operate engine, and measure the surface temperature of tubing flowing to the 2F outdoor heat exchanger.
  ❷ Confirm that cooling water temperature is rising, and that cooling water is flowing toward 2F.
  First opened: 70°C Fully open: 80°C

- 2-3
  Air discharge hose should not emit large amounts of bubbles.
  ❶ Engine discharge part (cooling water sensor attachment)
  Air bleed cock: E120 and 150 types
  Piping after engine discharge (before wax valve)
  Air bleed cock: E70, 90, 190 and 240 types
  ❷ Outdoor heat exchanger

- 3-1
  Cooling water 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 Cooling Water Level Trouble

① Abnormality detection method

- The start-up sequence or engine operation is halted and an abnormality 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).
- Cooling water level (float) switch: Setting value Reserve tank remainder 0.5 liter (contact OFF when remainder decreases)

② Troubleshooting

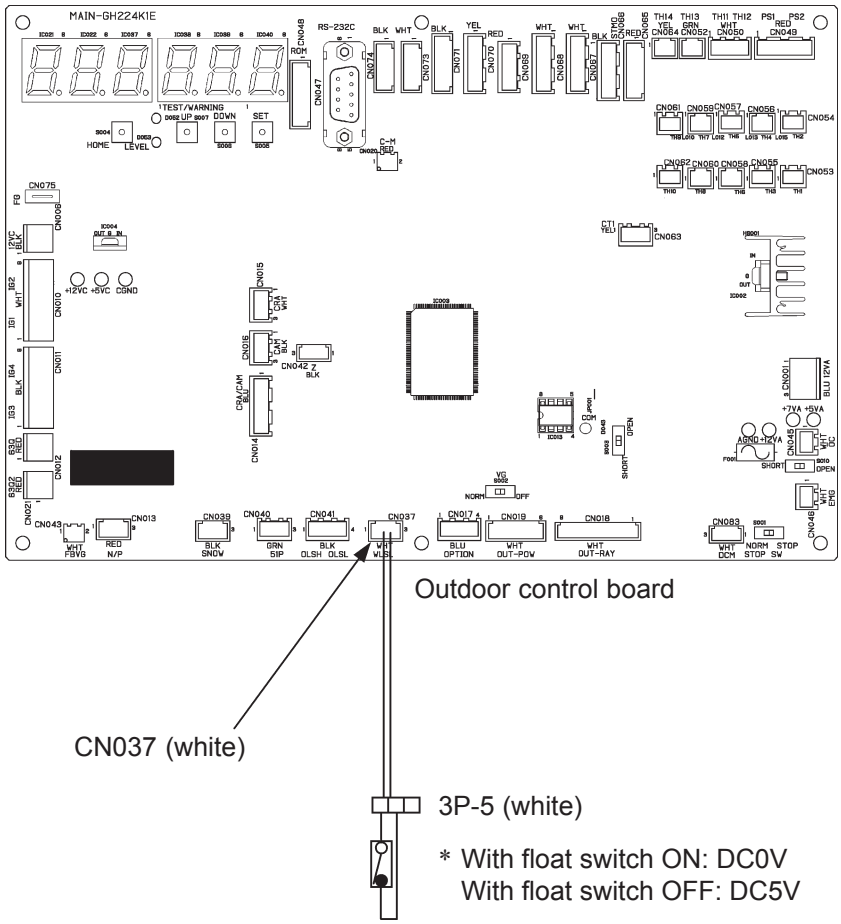
1 Check cooling water level	1-1	Is there cooling water in the reserve tank?	Yes	3-1
			No	2-1
2 Check for cooling water leaks	2-1	Any external signs of cooling water leaks? Check visually.	Yes	Repair
			No	2-2
	2-2	Any cooling water in the oil pan?	Yes	Replace engine head or gasket
			No	2-3
	2-3	Remove drain hose for exhaust gas heat exchanger, and operate pump → Does the drain emit cooling water?	Yes	Replace exhaust gas heat exchanger
			No	Refill cooling water
3 Check float switch	3-1	Voltage of about DC0V across control board connector 3P (white) CN037 No.1 and No. 3?	Yes	Replace control board
			No	3-2
	3-2	Disconnection or poor contact/crimping in wiring between control board connector 3P (white) CN037 and relay connector 3P-5 (white)?	Yes	Repair wiring
			No	Replace float switch

● For work procedure for replacing outdoor control board, see "4. Reference Material".

- 2-1
  Visually inspect all portions of the cooling water system while stopped
  Any cooling water leaks, or evidence of cooling water 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 cooling water pump. Press again to stop the pump and turn off the key light. (Displays " P u n P ")
  ❶ Hoses and connections
  ❷ Flange connections
  ❸ Threaded connections
  ❹ Tubing/welds

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

• 3-1


MAIN-GH224K1E
Outdoor control board
CN037 (white)
3P-5 (white)
* With float switch ON: DC0V
With float switch OFF: DC5V

A22 Cooling Water Pump Overload

① Abnormality detection method

When the cooling water pump rotation and drive meet the following conditions, an abnormality is determined on the first occurrence.

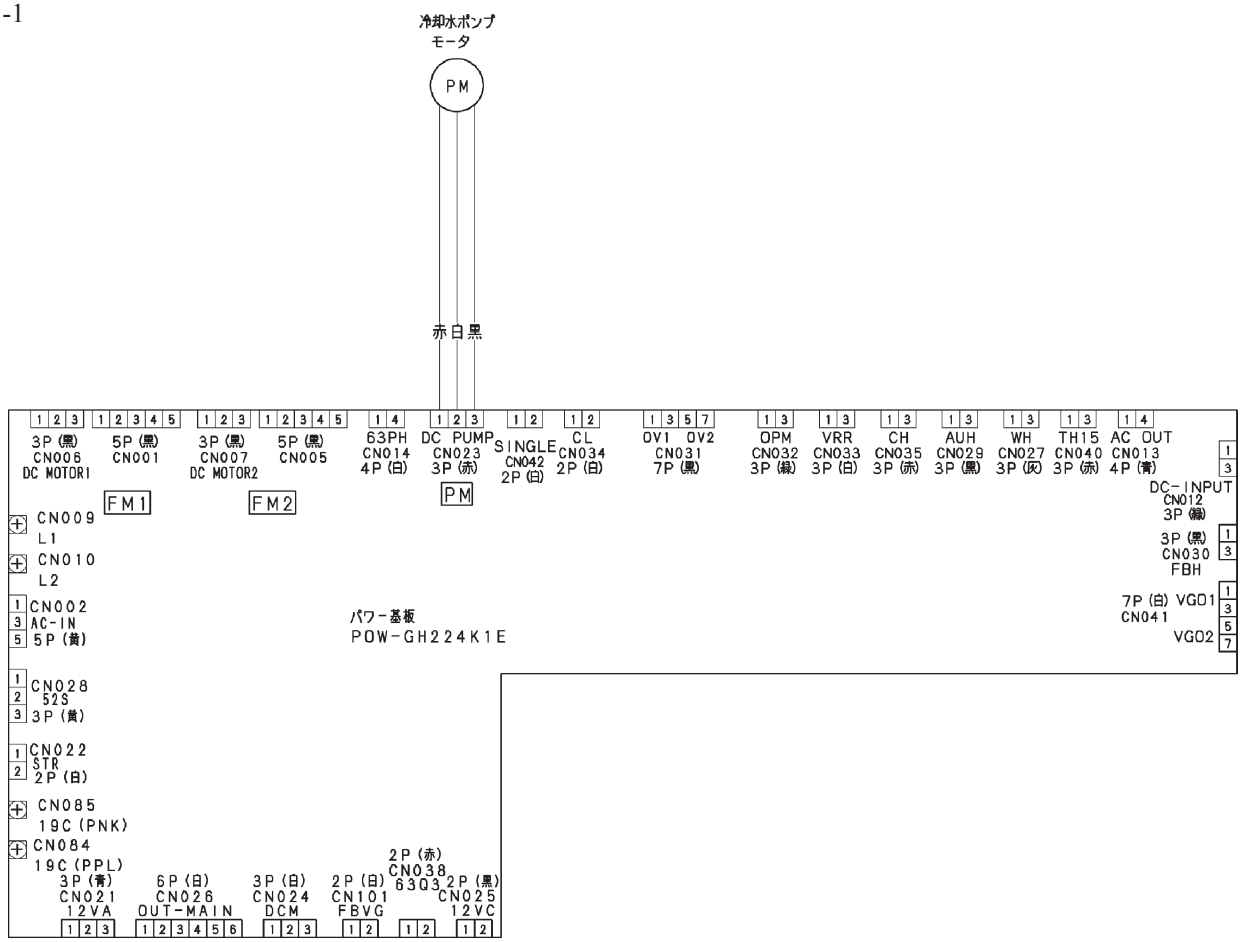
- When cooling water pump rotation is not detected upon startup.
- When the cooling water pump current exceeds 5.3A.

② Troubleshooting

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

- When replacing the power board on single-phase models, be sure to move the 2P (white) CN042 jumper wire from the old board.

• 1-1



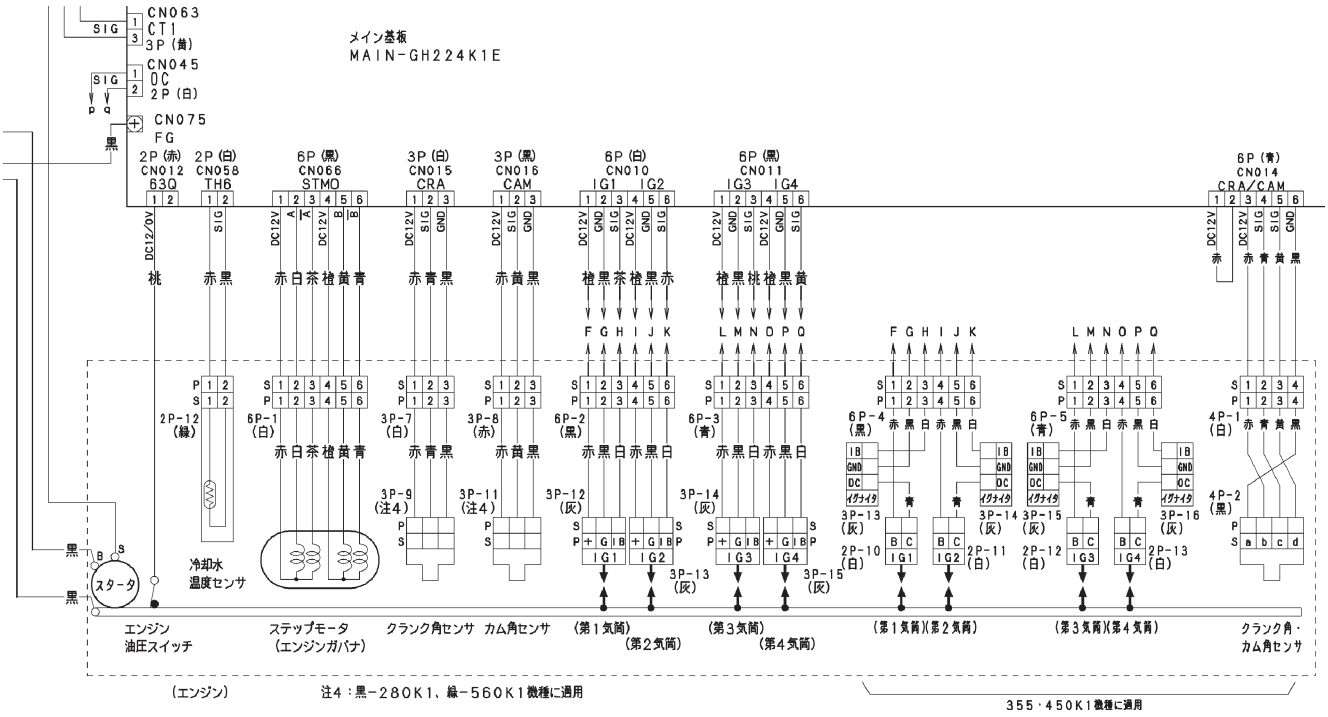
A23 Crank Angle Sensor Trouble
A24 Cam Angle Sensor Trouble

① Abnormality detection method

When input from the sensor meets the following conditions, an abnormality 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.
- When the revolution speeds of the crankshaft angle sensor and the camshaft angle sensor are compared, with a difference of 100 revolutions or more for 10 continuous seconds.
  * This abnormality can only be reset from the outdoor control board.

Abnormality input is structured as shown below.

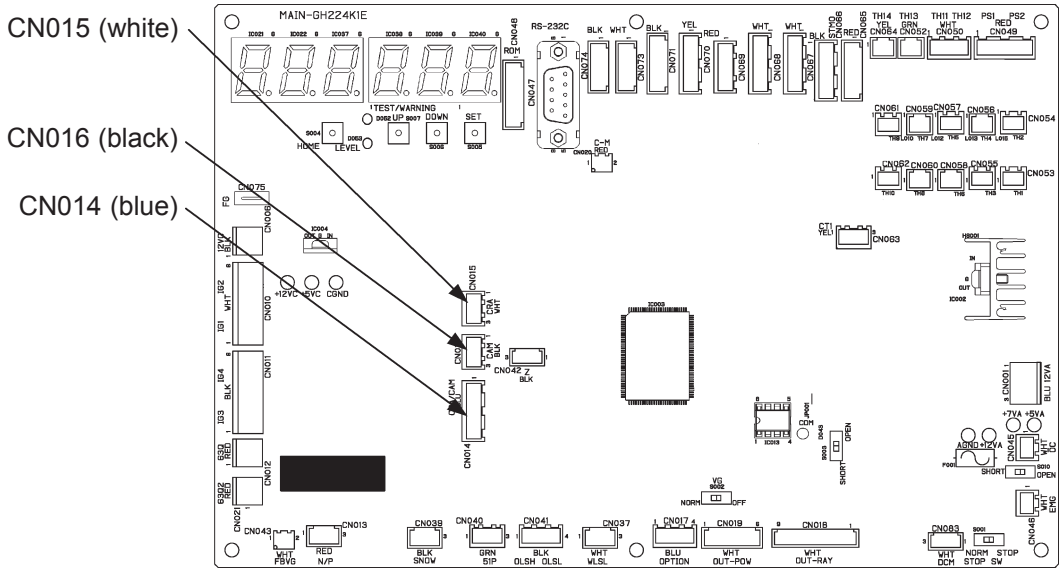


② Troubleshooting

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 control board. If NG, replace sensor. (The E120 and E150 models have an integrated crank rotation and cam angle 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 control board. If NG, replace sensor. (The E120 and E150 models have an integrated crank rotation and cam angle sensor.)		

● For work procedure for replacing outdoor control board, see “4. Reference Material”.

• 1-3, 2-1



Outdoor control board

A25 Clutch Trouble (Does not occur on model 70 or 90)

① Abnormality detection method

Detected when the clutch coil temperature exceeds 110°C continuously for 1 minute.

Note) • Abnormality is detected with one occurrence.

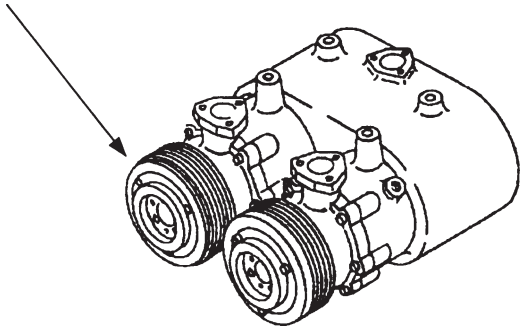
② Troubleshooting

1 Compressor lock	1-1	Rotate the compressor pulley by hand while stopped, to check for compressor lock. Locked? (The clutch is OFF, so make 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	Measure the temperature of the back of the clutch pulley with a contact thermometer. Is the temperature nearly identical (within 10°C) to the control board clutch coil temperature reading?	Yes	Investigate further
			No	2-2
	2-2	Ground fault or short circuit in wiring between control board connector 2P (blue) CN060 and clutch coil sensor?	Yes	Repair wiring
			No	Replace clutch coil sensor

• 1-1, 2-1

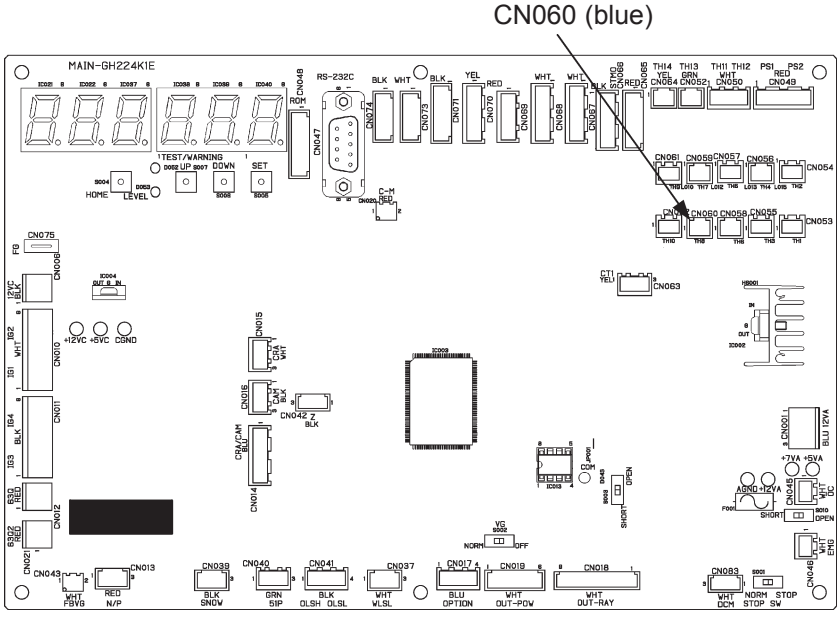
Compressor pulley

* The clutch is on the side with the hex bolt.



• 2-1 See Chapter 3 (4) for procedure to view the clutch coil temperature on the control board.

• 2-2



Outdoor control board

A26 Misfire

① Abnormality detection method

- An abnormality is determined when the engine revolution speed fluctuates widely during engine operation. The engine is stopped and an abnormality flag is set.
- When the reason for engine shutdown is this abnormality flag, occurring 5 consecutive times in 1 hour.

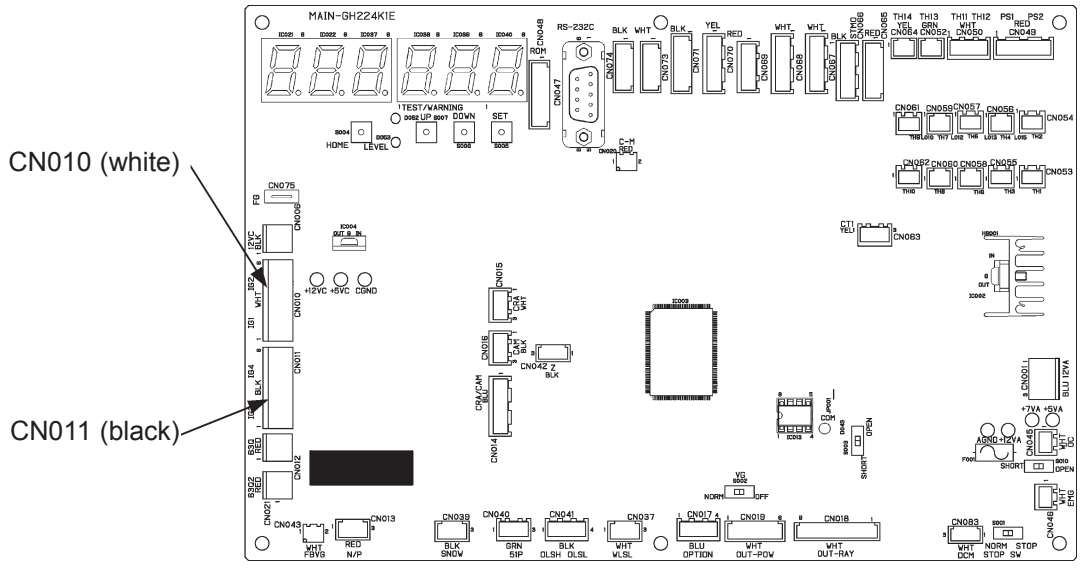
② Troubleshooting

- In self-diagnosis mode, use forced self-diagnosis mode 3 (misfire cylinder detection) to determine the misfiring cylinder.

1 Ignition system abnormality	1-0	Exchange the ignition coil on the detected cylinder with another cylinder, and conduct a self-diagnosis again. Was the same cylinder detected again?	Yes	1-1
			No	Replace ignition coil
	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 for wiring from control board connector 6P (white)/CN010 and 6P (black)/CN011 to each ignition 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 ignition coil (igniter). If NG after replacement, replace control board.		
2 Engine unit abnormality	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 abnormality	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 control board, see "4. Reference Material".

- 1-2 See Chapter 4 (8) for timing adjustment.
- 1-3



Outdoor control board

A27 Catalyst Temp. Trouble

① Abnormality detection method

- When a catalyst temperature exceeding 700°C is detected continuously for 10 seconds during engine operation, the engine is stopped and an abnormality flag is set.
- When the reason for engine shutdown is this abnormality flag, occurring 5 consecutive times in 1 hour.

② Troubleshooting

1 Unit abnormality	1-1	Check the wiring and connectors. Everything OK?	Yes	1-2
			No	Repair
	1-2	Thermistor operating properly?	OK	1-3
			NG	Replace thermistor
	1-3	Inspect ignition timing. Everything OK?	Yes	1-4
			No	Adjust

- 1-2 Thermistor resistor values

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

A30 Fuel Gas Pressure Low

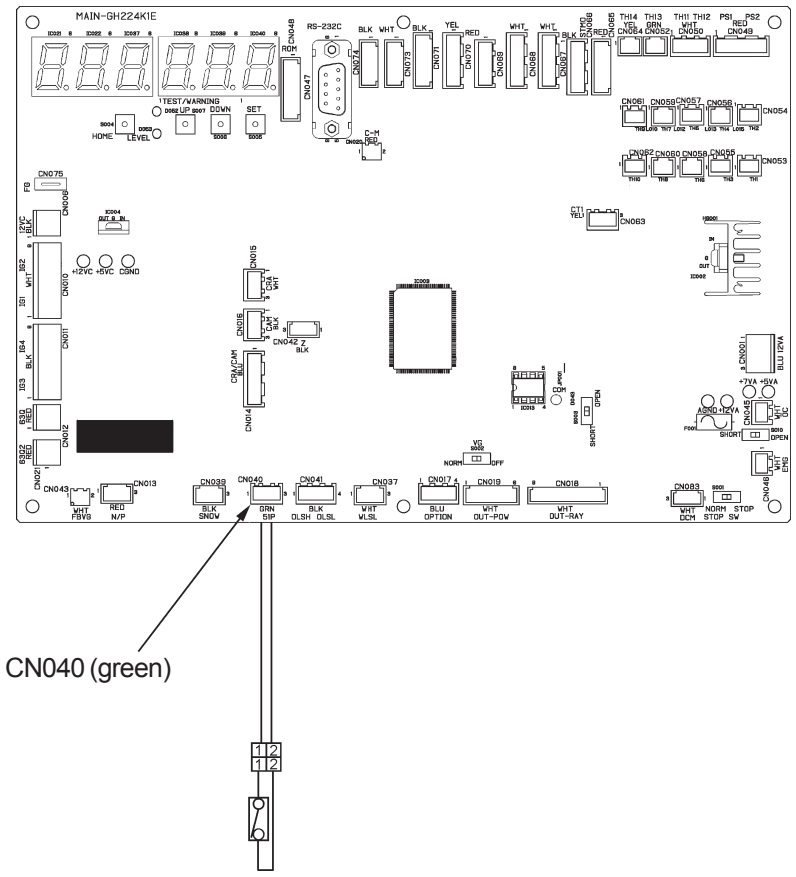
① Abnormality detection method

An abnormality 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.		



E01 Remote Controller Receive Failure

① Abnormality detection method

❶ With indoor unit connected

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

- When 9 or more indoor units are wired into the remote control 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

❷ With water heat exchanger unit connected

* The following determinations are made when using remote controls (controllers) other than RCS-WE170J.

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

- When power is not supplied to the water heat exchanger unit.
- When parallel addresses are not set or mistakenly set.
- When terminal resistor is not set or mistakenly set.
- When remote control wiring includes a broken wire, short circuit, ground fault, or wrong polarity.
- When a noise source is nearby.
- Fault in water heat exchanger unit control board, or in surrounding equipment

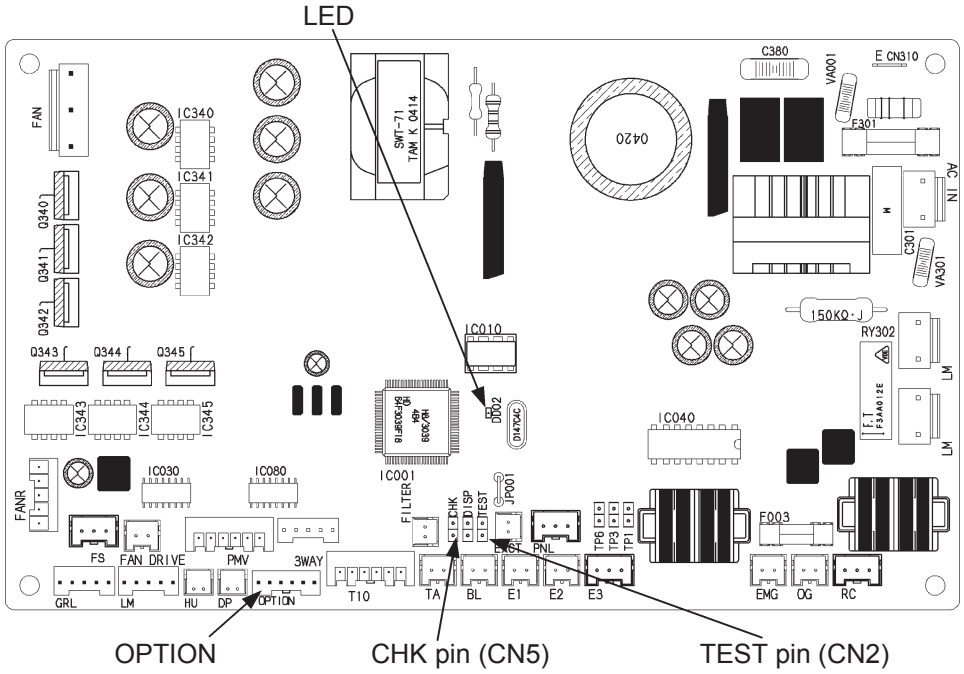
② Troubleshooting

❶ With indoor unit connected

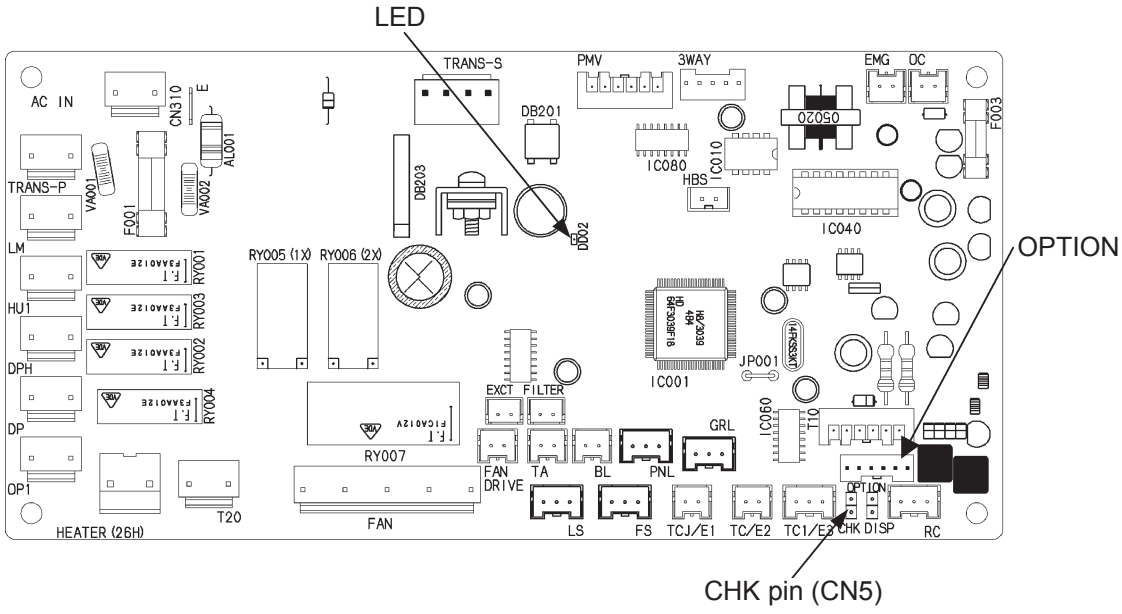
1 Auto-address	1-1	Is auto-addressing complete?	Yes	1-2
			No	1-3
	1-2	Has auto-addressing failed (warning displayed on outdoor unit)?	Yes	1-3
			No	2-1
	1-3	Perform pre-check before auto-addressing. (See “4. Reference Material”)		
2 Group control wiring	2-1	Is this indoor unit group-controlled?	Yes	2-2
			No	3-1
	2-2	Are any indoor units wired into the remote control group turned OFF?	Yes	Turn power ON
			No	2-3
	2-3	Are 9 or more indoor units connected to one remote control group wiring?	Yes	Repair wiring
			No	2-4
	2-4	Was the remote control group wiring modified after auto-addressing was complete? Or, were group settings changed using the remote control properties setting mode?	Yes	2-5
			No	3-1
	2-5	No parent unit present in remote control 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 remote control (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 remote controls and the wireless remote control is the parent, set the other remote control as the parent).	Yes	3-4
			No	3-5
	3-4	Replace the removed option board or wireless remote control 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	Non-volatile memory (EEPROM) on indoor control board is not inserted, poorly inserted, or defective → Repair, or replace non-volatile memory and write model information using remote control properties setting mode.		
	3-7	Short-circuit or misrouting in indoor unit remote control wiring?	Yes	Repair wiring
			No	Replace indoor control board

- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See “4. Reference Material” for checking remote control.
- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM) and replacing indoor control board.

• 3-1, 3-2, 3-5, 3-6



Indoor control board for DC motor models



Indoor control board for AC motor models

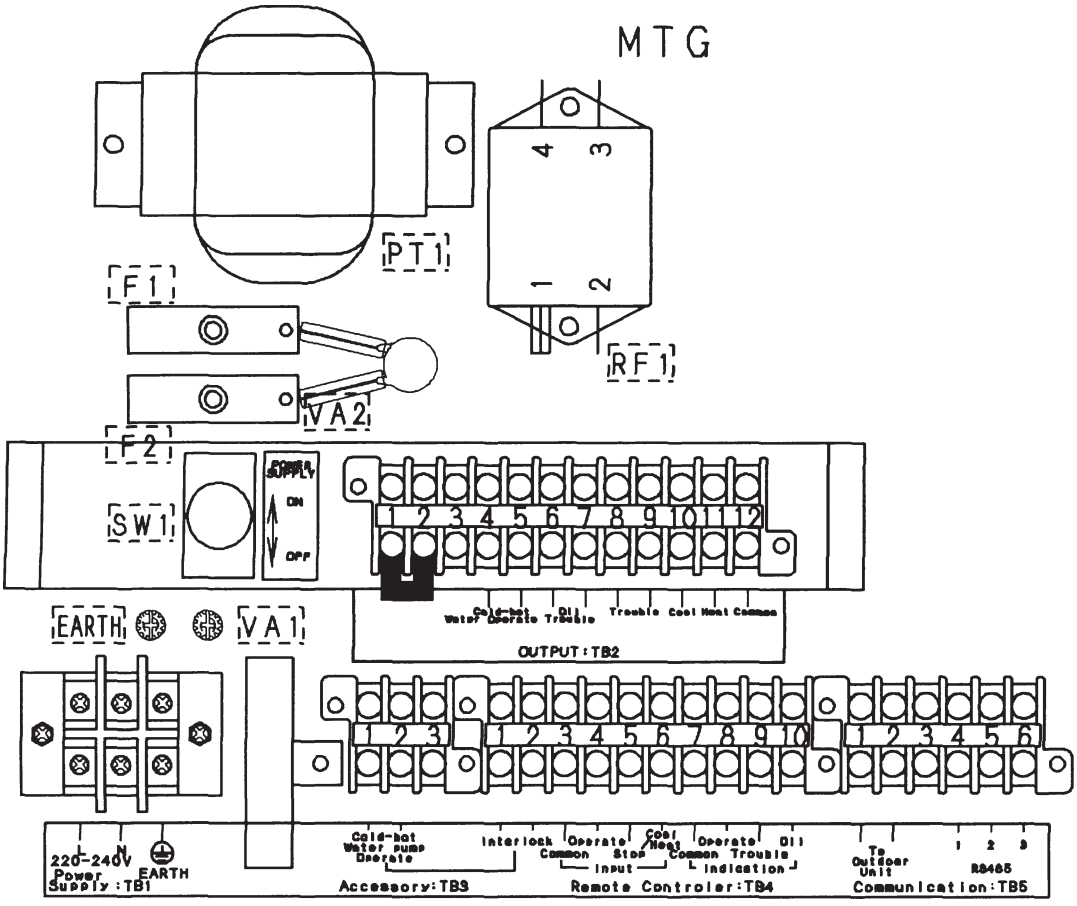
❷ With water heat exchanger unit connected

1 Unit power source	1-1	Power supplied to water heat exchanger unit?	Yes	2-1
			No	Turn power ON
2 Remote control (parallel) address	2-1	Are address settings complete on the remote control?	Yes	2-2
			No	Set address
	2-2	Are address settings sequential on the remote control?	Yes	2-3
			No	Set sequentially
	2-3	Matching address for remote control and water heat exchanger unit?	Yes	2-4
			No	Match addresses
	2-4	Does the number of addresses on the remote control match the number of water heat exchanger units?	Yes	2-5
			No	Match number of connected units
	2-5	Water heat exchanger unit parallel address other than “0”?	Yes	2-6
			No	Set parallel address to number other than “0”
	2-6	Water heat exchanger unit parallel address between 1 and 5?	Yes	3-1
			No	Set parallel address between 1 and 5
3 Terminal resistor	3-1	For remote controls located at both ends of the remote control - water heat exchanger unit link wiring, are the terminal resistor switches turned ON on the water heat exchanger unit control boards?	Yes	4-1
			No	Turn ON terminal resistors on both ends of link wiring.
4 Remote control wiring (Link wiring from remote control to water heat exchanger unit)	4-1	Broken wires in remote control wiring? (Unplugged connectors, detached terminals, etc.)	Yes	Repair broken wires
			No	4-2
	4-2	Remote control wiring short-circuited?	Yes	Repair short-circuit
			No	4-3
	4-3	Ground fault in remote control wiring?	Yes	Repair ground fault
			No	4-4
	4-4	Backwards polarity (+, –) in remote control wiring?	Yes	Reverse wiring
			No	4-5
	4-5	Are the remote control wiring (TB5-4, TB5-5) and outdoor wiring (TB1-①, ②) connected backwards?	Yes	Repair wiring
			No	5-1
5 Noise	5-1	Is a noise source nearby?	Yes	Noise countermeasures
			No	6-1
6 Water heat exchanger unit, control board, and surrounding area	6-1	Is AC200V±10% applied across TB1 R-S?	Yes	Request improvement to power source facilities manager
			No	Check wiring and terminals before and after TB1. If correct, go to 6-2
	6-2	Ground fault or considerable deterioration for varistor (VA1)?	Yes	Replace varistor (VA1)
			No	6-3
	6-3	Is the power switch (SW1) ON?	Yes	Check wiring before and after SW1, then go to 6-4
			No	Turn SW1 ON
	6-4	Is proper DC voltage applied across board circuits? (Proper DC voltage between TP1 and 2: about 5V; TP3 and 4: about 7V; and TP5 and 6: about 5V)	Yes	6-8
			No	6-5
	6-5	Phase short-circuit or considerable deterioration for varistor (VA2)?	Yes	Replace varistor (VA2)
			No	6-6
	6-6	Power source voltage on secondary side of fuses (F1, F2)?	Yes	6-7
			No	Check wiring and terminals before and after fuses. If correct, replace fuses.

6 Water heat exchange unit, control board, and surrounding area	6-7	Power source voltage on secondary side of noise filter (RF1)?	Yes	6-8
			No	Check wiring and terminals before and after RF1. If correct, replace RF1.
	6-8	Power source voltage on secondary side of power source trans. (PT1)?	Yes	Replace water heat exchanger unit control board
			No	Check wiring and connectors before and after PT1. If correct, replace PT1.

- For work procedure for replacing water heat exchanger unit control board, see “4. Reference Material”.

• 6-1 to 6-8



E02 Remote Controller Sending Failure (Not detected when water heat exchanger unit is connected)

① Abnormality detection method

When the remote control (controller) itself cannot transmit. Or, when a self-transmitted signal cannot be self-received or changes, an abnormality is determined.

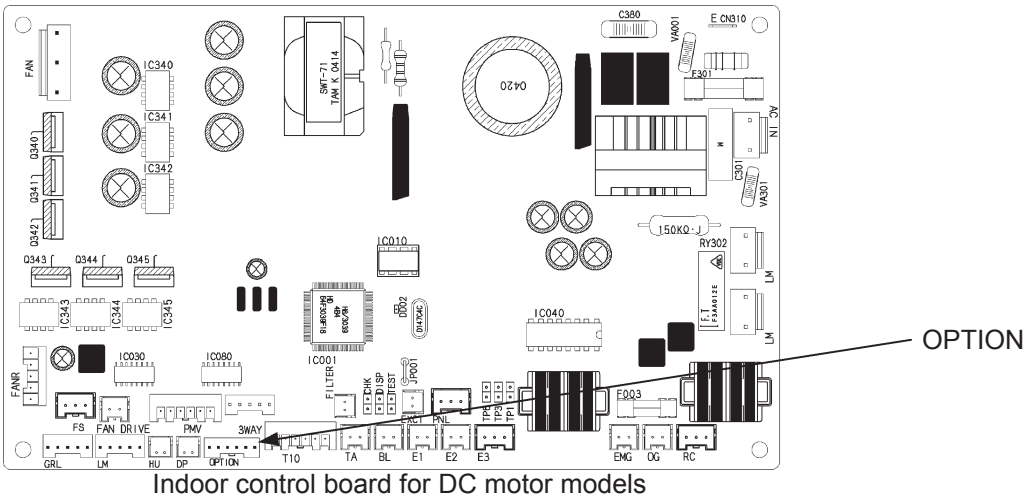
- Breakdown of remote control itself

② Troubleshooting

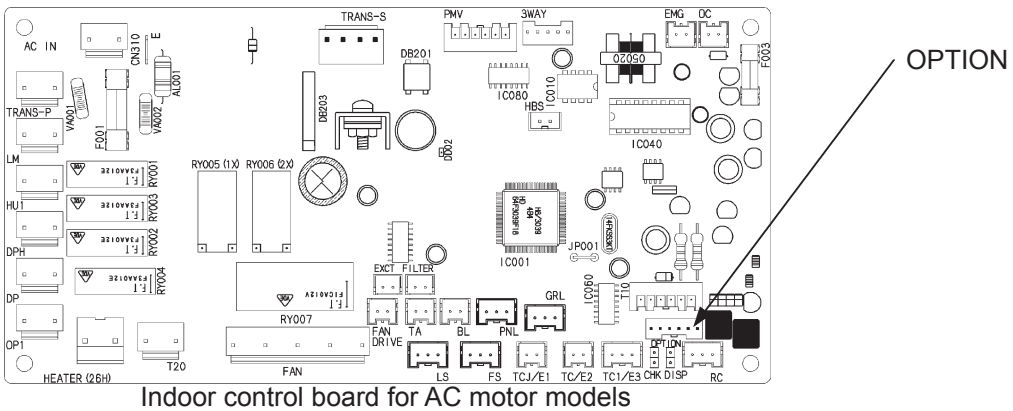
1 Remote control group wiring	1-1	Is this indoor unit group-controlled?	Yes	1-2
			No	2-1
	1-2	Any short-circuit or broken wires for remote control group link wiring 1 (white) and 2 (black)?	Yes	Repair wiring
			No	2-1
2 Indoor control board	2-1	Is an option board (CN060) or wireless remote control (CN041) 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 remote controls and the wireless remote control is the parent, set the other remote control as the parent).	Yes	2-3
			No	2-4
	2-3	Replace the removed option board or wireless remote control operating unit, wiring and all.		
	2-4	Short-circuit or misrouting in indoor unit remote control wiring?	Yes	Repair wiring
			No	Replace indoor control board

- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See "4. Reference Material" for checking remote control.
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

• 3-1



Indoor control board for DC motor models



Indoor control board for AC motor models

E03 Indoor Unit (Water Heat Exchanger Unit) Failed to Receive Signal from Remote Controller (Central)

① Abnormality detection method

❶ With indoor unit connected

An abnormality 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 remote control wiring became broken or misrouted.
- Broken indoor and outdoor operating wiring to central control equipment.
- Only child remote control is set.
- No remote control, with central control equipment power OFF.
- No remote control, and only child remote control is set.

❷ With water heat exchanger unit connected

* The following determinations are made when using remote controls (controllers) other than RCS-WH500G.

An abnormality is determined when the water heat exchanger unit receives no remote control transmission for three minutes.

- When power is not supplied to remote control.
- When parallel addresses are not set or mistakenly set.
- When terminal resistor is not set or mistakenly set.
- When remote control wiring includes a broken wire, short circuit, ground fault, or wrong polarity.
- When a noise source is nearby.
- When remote control or surrounding equipment is defective.

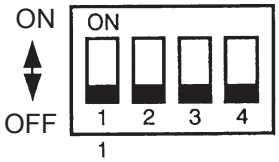
② Troubleshooting

❶ With indoor unit connected

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 parent-child switches on the connected central control equipment set to “child”?	Yes	1-4
			No	1-5
	1-4	Of the connected central control equipment, set only the highest-ranking central control unit to “parent”, and set the remaining units to “child”. 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 “4. Reference Material”)	Yes	Repair wiring
			No	2-1
2 Remote control	2-1	Is this indoor unit group-controlled?	Yes	2-2
			No	3-1
	2-2	Any broken wires for remote control 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 remote control (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 remote controls and the wireless remote control is the parent, set the other remote control as the parent).	Yes	3-3
			No	3-4
	3-3	Replace the removed option board or wireless remote control operating unit, wiring and all.		
	3-4	Short-circuit, misrouting, or broken wires in indoor unit remote control wiring?	Yes	Repair wiring
			No	Replace indoor control board

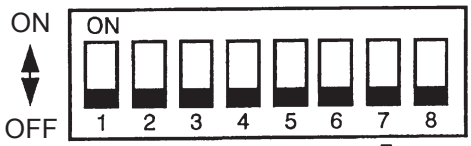
- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See “4. Reference Material” for checking remote control.
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

• 1-4



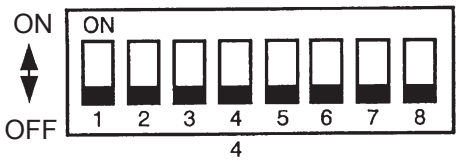
Central control, parent/child switch
Parent: OFF
Child: ON

Intelligent Controller



Central control, parent/child switch
Parent: OFF
Child: ON

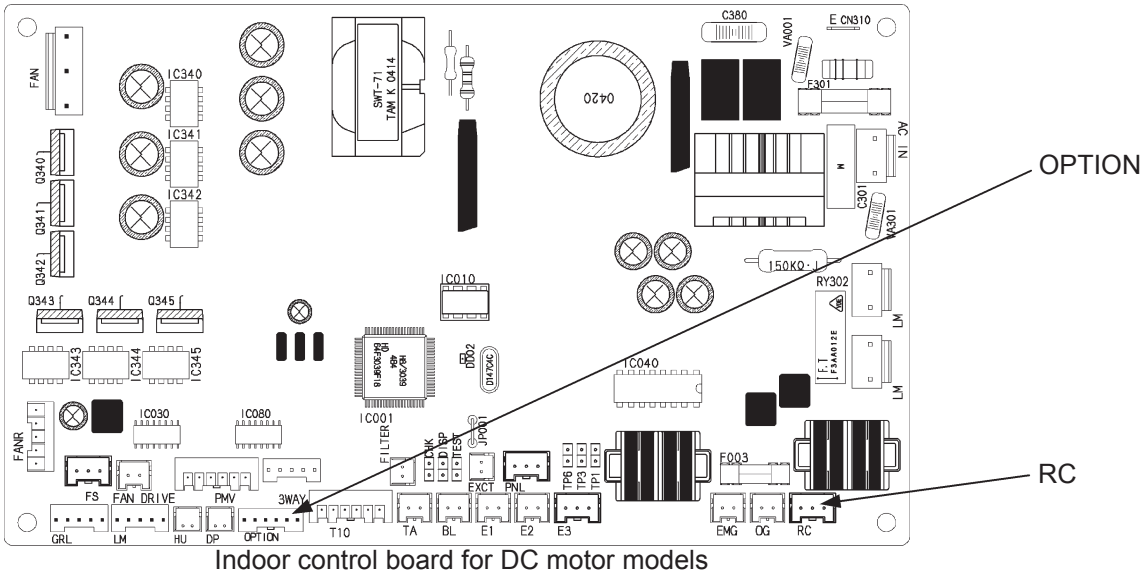
System Controller



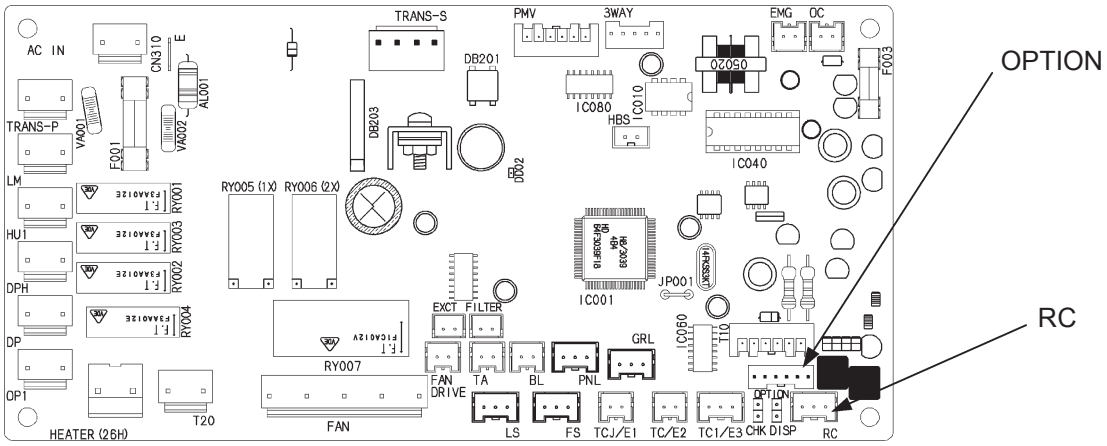
Central control, parent/child switch
Parent: OFF
Child: ON

Multi-Controller

• 3-1



Indoor control board for DC motor models



Indoor control board for AC motor models

❷ With water heat exchanger unit connected

1 Remote control power source	1-1	Power supplied to remote control?	Yes	2-1
			No	Turn power ON
2 Remote control (parallel) address	2-1	Are address settings complete on the remote control?	Yes	2-2
			No	Set address
	2-2	Are address settings sequential on the remote control?	Yes	2-3
			No	Set sequentially
	2-3	Matching address for remote control and water heat exchanger unit?	Yes	2-4
			No	Match addresses
	2-4	Does the number of addresses on the remote control match the number of water heat exchanger units?	Yes	2-5
			No	Match number of connected units
	2-5	Water heat exchanger unit parallel address other than “0”?	Yes	2-6
			No	Set parallel address to number other than “0”
	2-6	Water heat exchanger unit parallel address between 1 and 5?	Yes	3-1
			No	Set parallel address between 1 and 5
3 Terminal resistor	3-1	For remote controls located at both ends of the remote control - water heat exchanger unit link wiring, are the terminal resistor switches turned ON on the water heat exchanger unit control boards?	Yes	4-1
			No	Turn ON terminal resistors on both ends of link wiring.
4 Remote control wiring (Link wiring from remote control to water heat exchanger unit)	4-1	Broken wires in remote control wiring? (Unplugged connectors, detached terminals, etc.)	Yes	Repair broken wires
			No	4-2
	4-2	Remote control wiring short-circuited?	Yes	Repair short-circuit
			No	4-3
	4-3	Ground fault in remote control wiring?	Yes	Repair ground fault
			No	4-4
	4-4	Backwards polarity (+, –) in remote control wiring?	Yes	Reverse wiring
			No	4-5
	4-5	Are the remote control wiring (TB5-4, TB5-5) and outdoor wiring (TB1-①, ②) connected backwards?	Yes	Repair wiring
			No	5-1
5 Noise	5-1	Is a noise source nearby?	Yes	Noise countermeasures
			No	6-1
6 Remote control and surrounding area	6-1	Do settings follow the remote control owner’s manual?	Yes	6-2
			No	Correct settings to match owner’s manual
	6-2	Any reparable abnormalities in remote control or around remote control board?	Yes	Restore
			No	Replace remote control

E04 Indoor Unit (Water Heat Exchanger Unit) Failed to Receive Signal from Outdoor Unit

① Abnormality detection method

❶ With indoor unit connected

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

- Outdoor unit power is OFF.
- With link wiring, when outdoor control 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 remote control detailed settings mode, the indoor address is "undetermined".
- Indoor unit addresses duplicated
- Indoor/outdoor operation wiring is short-circuited or broken.
- Abnormality 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

❷ With water heat exchanger unit connected

An abnormality is determined when no regular transmission is received from the outdoor unit for the water heat exchanger unit.

- Outdoor unit power is OFF.
- When outdoor control board terminal resistor switch (S7) is set to "OFF".
- When the outdoor control board setting is No. 10, and the indoor unit count setting is not 2 units.
- When the outdoor unit address switches on the water heat exchanger unit and the outdoor unit do not match.
- Indoor/outdoor operation wiring abnormality (short-circuited, broken, ground fault)
- When power source voltage is applied to indoor/outdoor operation wiring.
- Breakdown of outdoor unit
- Effect of noise

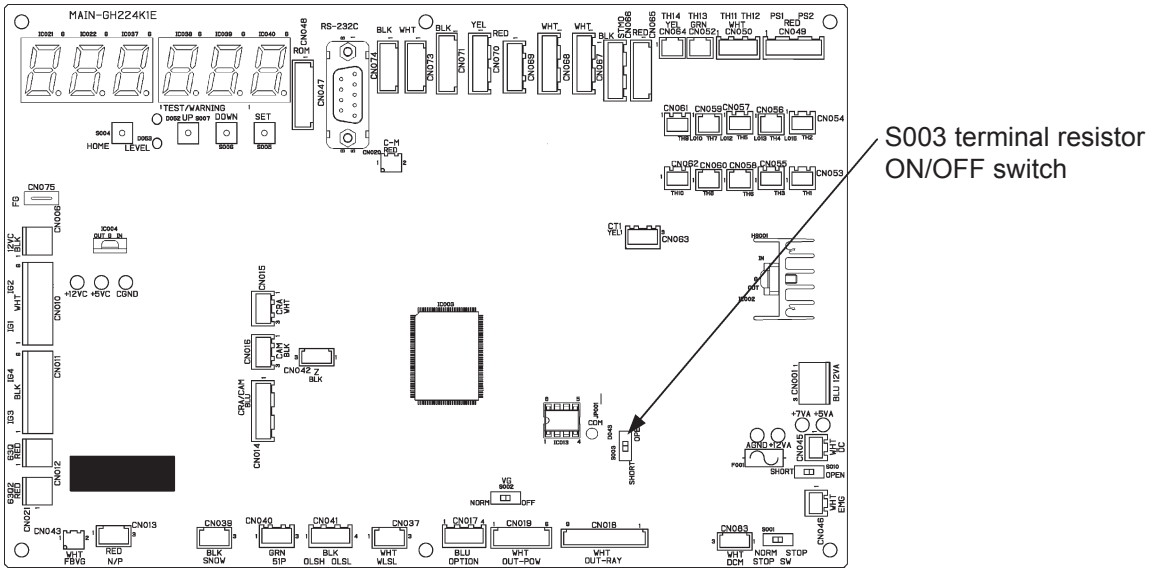
② Troubleshooting

❶ With indoor unit connected

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 “4. Reference Material”)	Yes	Repair wiring
			No	2-2
	2-2	With link wiring, is the outdoor control board terminal resistor switch (S003) 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 “4. Reference Material”)		
	3-3	In the remote control 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 remote control (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 remote controls and the wireless remote control is the parent, set the other remote control as the parent).	Yes	4-4
			No	4-5
	4-4	Replace the removed option board or wireless remote control 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	Non-volatile memory (EEPROM) on indoor control board is not inserted, poorly inserted, or defective → Repair, or replace non-volatile memory and write model information using remote control properties setting mode.		
	4-7	Is E4 displayed on all remote controls for other indoor units connected to this outdoor unit?	Yes	Replace outdoor control board
			No	Replace indoor control board

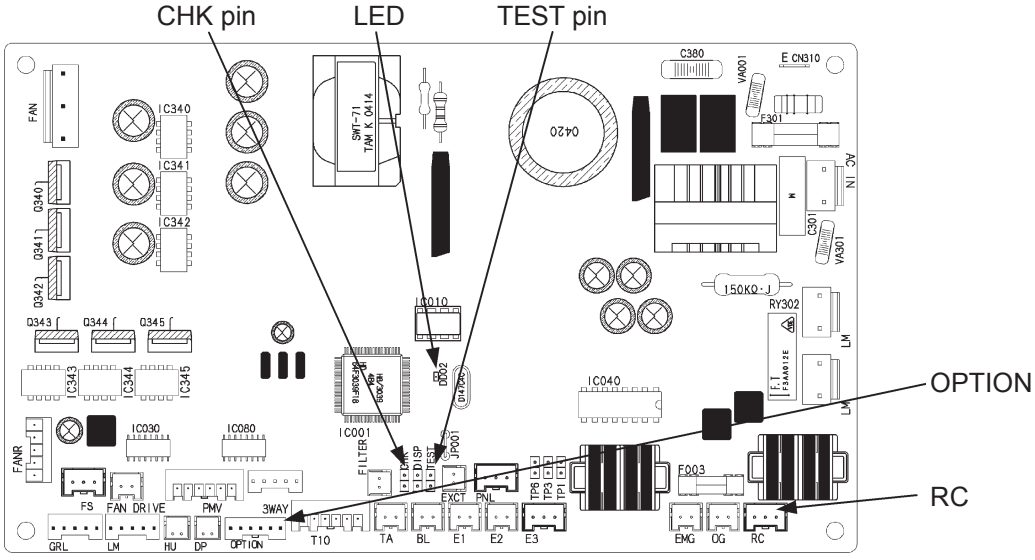
- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM) and replacing indoor control board.
- See “4. Reference Material” for checking remote control.

• 2-2

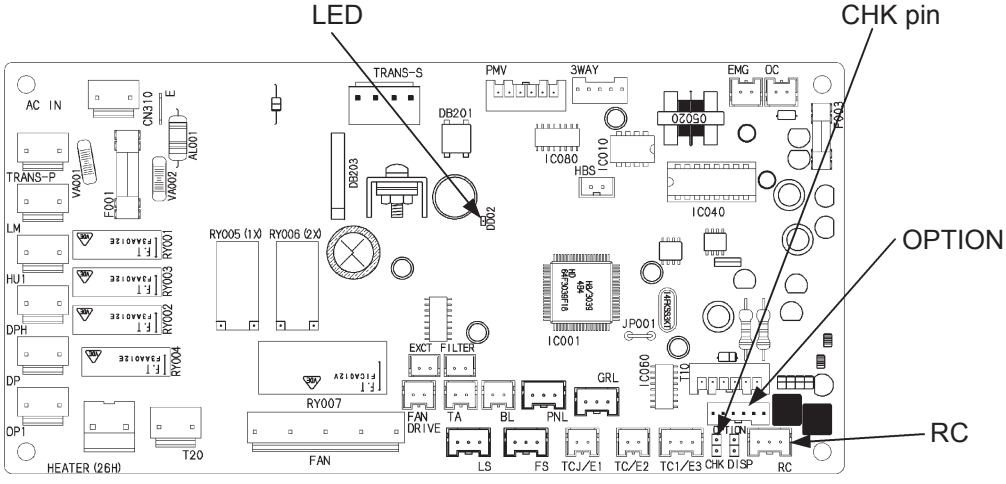


Outdoor control board

• 4-1, 4-2, 4-5, 4-6



Indoor control board for DC motor models



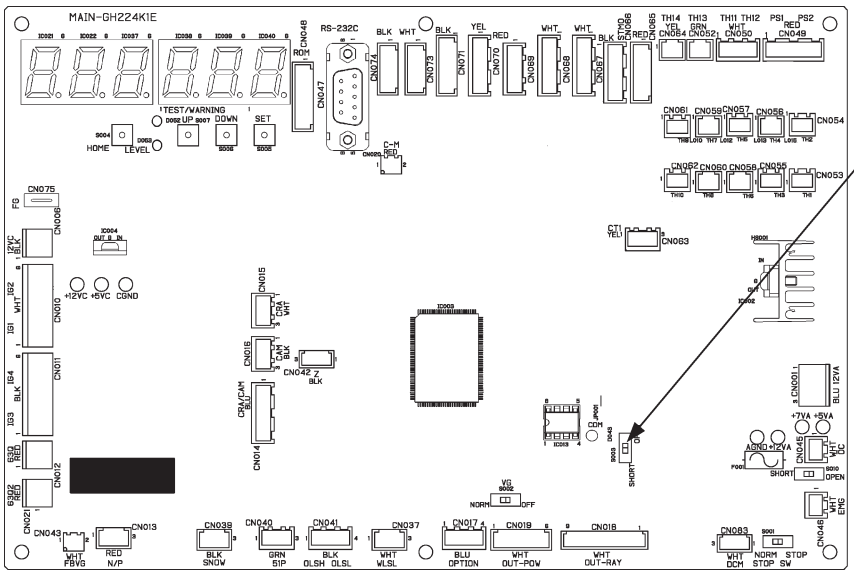
Indoor control board for AC motor models

❷ With water heat exchanger unit connected

1 Power supply	1-1	Is/was the outdoor unit power OFF?	Yes	Turn power ON and wait 3 minutes
			No	2-1
2 Setting switch	2-1	Is the outdoor control board terminal resistor switch (S003) set to “ON”?	Yes	2-2
			No	Switch to “ON”
	2-2	Is the indoor unit count set to 2 units?	Yes	2-3
			No	Set to 2 units
	2-3	Do the system addresses match on the water heat exchanger unit and the outdoor unit?	Yes	3-1
			No	Match the settings of the water heat exchanger switch SW14 to the outdoor unit
3 Indoor/outdoor operation wiring	3-1	Broken wires in indoor/outdoor operation wiring? (Unplugged connectors, detached terminals, etc.)	Yes	Repair broken wires
			No	3-2
	3-2	Indoor/outdoor operation wiring short-circuited?	Yes	Repair short-circuit
			No	3-3
	3-3	Indoor/outdoor operation wiring ground fault?	Yes	Repair ground fault
			No	3-4
	3-4	Is the indoor/outdoor operation wiring of the water heat exchanger unit electrical box connected between terminal plates TB5-1 and 2?	Yes	3-5
			No	Repair
	3-5	Is power source voltage applied to indoor/outdoor operation wiring? (If so, the outdoor control board fuse (F1) is blown.)	Yes	3-6
			No	4-1
	3-6	Correct wiring to prevent applying power source voltage. Is the outdoor control board CN046 already used?	Yes	Replace outdoor control board
			No	Move outdoor control board connector (CN045 → CN046)
4 Outdoor unit breakdown	4-1	Breakdown of outdoor unit?	Yes	Repair faults
			No	5-1
5 Noise	5-1	Is a noise source near the outdoor unit?	Yes	Noise countermeasures
			No	Replace outdoor control board

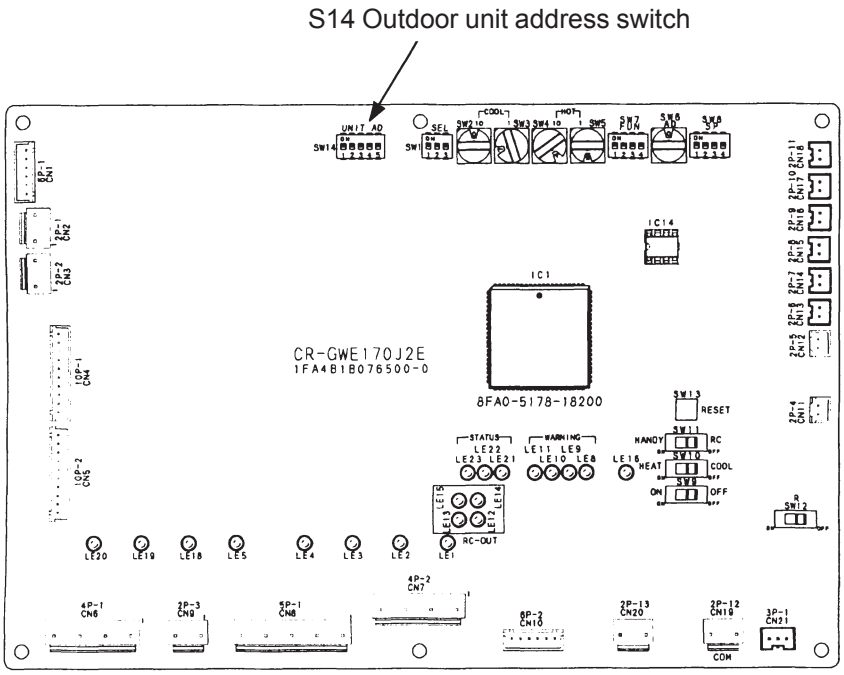
● For work procedure for replacing outdoor control board, see “4. Reference Material”.

• 2-1, 2-2, 2-3



Outdoor control board

• 2-3



Water heat exchanger unit control board

E05 Indoor Unit (Water Heat Exchanger Unit) Failed to Send Signal to Outdoor Unit

① Abnormality detection method

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

- Indoor (water heat exchanger unit) control board is defective.
- Outdoor control 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 S003 (terminal resistor) switch on one outdoor control board set to “ON” and the remainder to “OFF”?	Yes	1-4
			No	Set only one unit to “ON”
	1-3	Is the outdoor control board S003 (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		

- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.
- For work procedure for replacing water heat exchanger unit control board, see “4. Reference Material”.

E06 Outdoor Unit Failed to Receive Signal from Indoor Unit (Water Heat Exchanger Unit)

① Abnormality detection method

❶ With indoor unit connected

An abnormality 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.

❷ With water heat exchanger unit connected

An abnormality is determined when no transmission (response) from the water heat exchanger unit to the outdoor unit is received for 3 minutes.

- Water heat exchanger unit power is OFF.
- When the outdoor unit address settings on the water heat exchanger unit and the outdoor unit do not match.
- Indoor/outdoor operation wiring abnormality (short-circuited, broken, ground fault)
- When power source voltage is applied to indoor/outdoor operation wiring.
- When affected by noise
- Fault in water heat exchanger unit control board, or in surrounding equipment

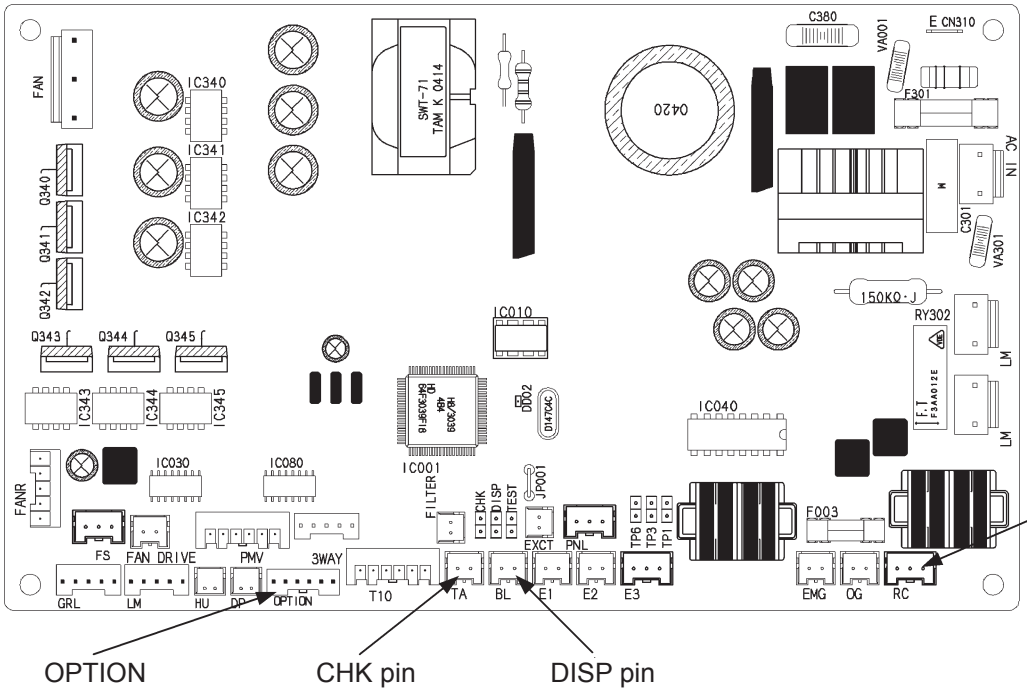
② Troubleshooting

❶ With indoor unit connected

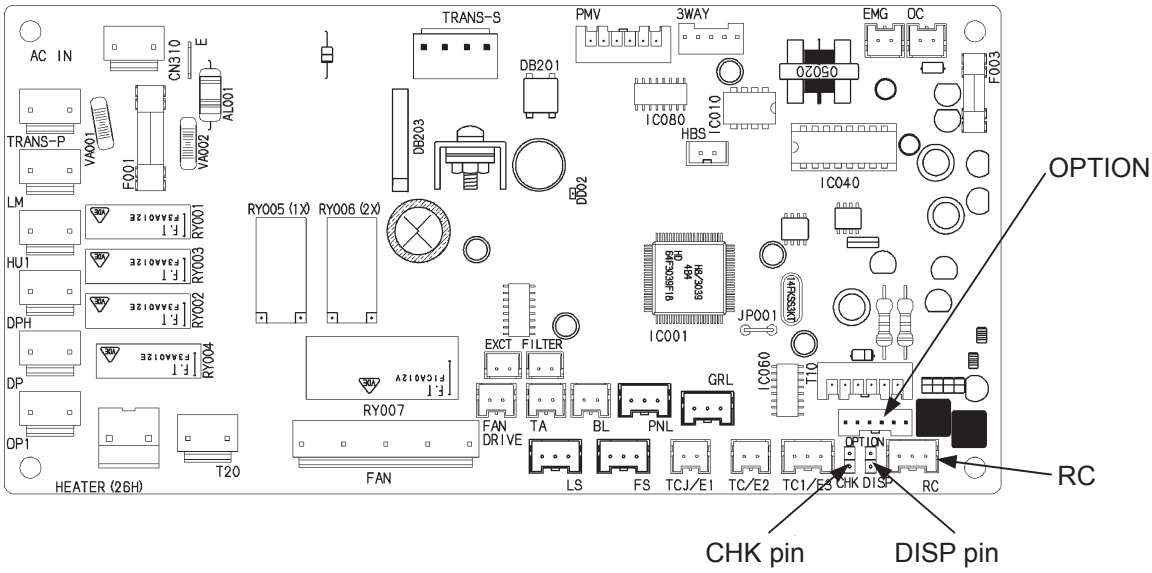
1 Indoor power source	1-1	Is the indoor unit power OFF?	Yes	Turn power ON
			No	2-1
2 Indoor/outdoor operation wiring	2-1	Indoor/outdoor operation wiring broken or short-circuited? (See “4. Reference Material”)	Yes	Repair wiring
			No	3-1
3 Indoor control board	3-1	Is the DISP pin (CN063/CN071) or inspection 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 remote control (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 remote controls and the wireless remote control is the parent, set the other remote control as the parent).	Yes	3-4
			No	3-5
	3-4	Replace the removed option board or wireless remote control operating unit, wiring and all.		
	3-5	Indoor control board failure → Replace board		

- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

• 3-1, 3-2



Indoor control board for DC motor models



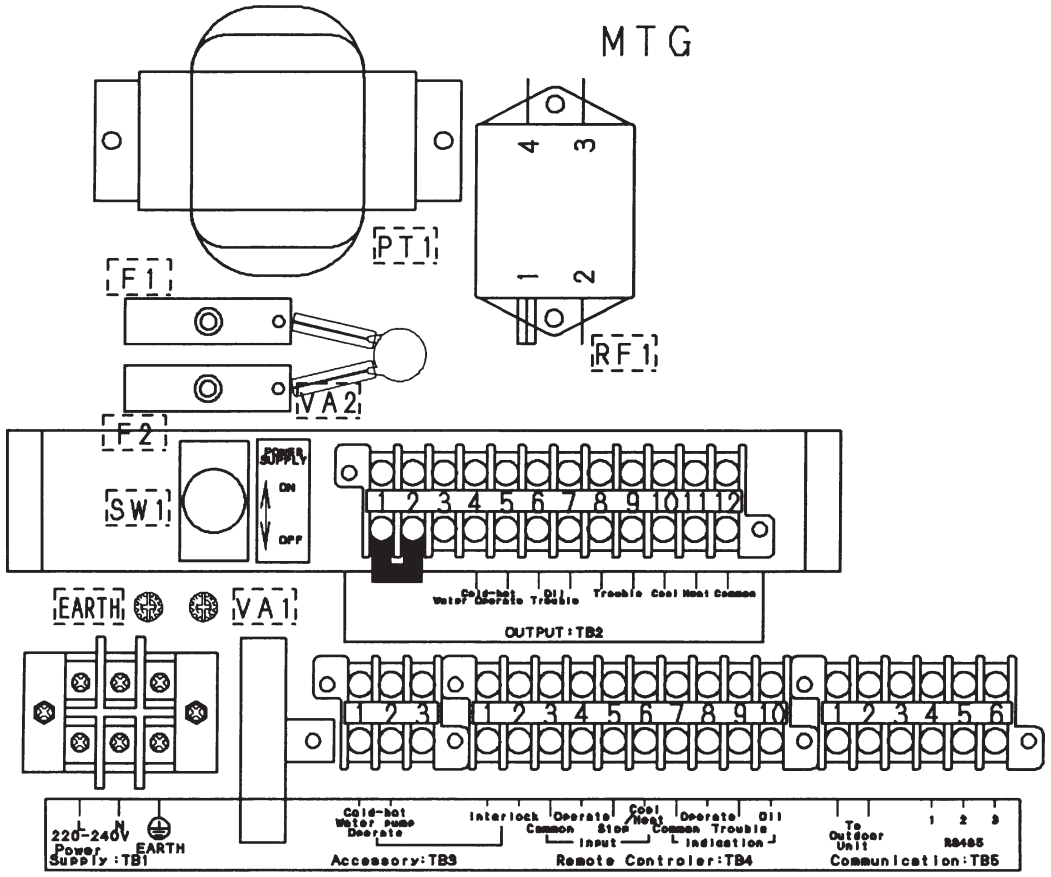
Indoor control board for AC motor models

❷ With water heat exchanger unit connected

1 Unit power source	1-1	Power supplied to water heat exchanger unit?	Yes	2-1
			No	Turn power ON
2 Setting switch	2-1	Do the outdoor unit address settings match on the water heat exchanger unit and the outdoor unit?	Yes	3-1
			No	Match the settings of the water heat exchanger switch SW14 with the outdoor unit
3 Remote control wiring (Link wiring from remote control to water heat exchanger unit)	3-1	Broken wires in indoor/outdoor operation wiring? (Un-plugged connectors, detached terminals, etc.)	Yes	Repair broken wires
			No	3-2
	3-2	Indoor/outdoor operation wiring short-circuited?	Yes	Repair short-circuit
			No	3-3
	3-3	Indoor/outdoor operation wiring ground fault?	Yes	Repair ground fault
			No	3-4
	3-4	Is power source voltage applied to indoor/outdoor operation wiring? (If so, the outdoor control board fuse (F1) is blown.)	Yes	3-5
			No	4-1
	3-5	Correct wiring to prevent applying power source voltage. Is the water heat exchanger unit control board 2P-13 already used?	Yes	Replace water heat exchanger unit control board
			No	Reconnect water heat exchanger unit control board connector (2P12 → 2P-13)
4 Outdoor unit breakdown	4-1	Breakdown of outdoor unit?	Yes	Repair faults
			No	5-1
5 Noise	5-1	Is a noise source nearby?	Yes	Noise countermeasures
			No	6-1
6 Water heat exchanger unit, control board, and surrounding area	6-1	Is AC200V±10% applied across TB1 R-S?	Yes	Check wiring and terminals before and after TB1. If correct, go to 6-2
			No	Request improvement from power source facilities manager
	6-2	Ground fault or considerable deterioration for varistor (VA1)?	Yes	Replace varistor (VA1)
			No	6-3
	6-3	Is the power switch (SW1) ON?	Yes	Check wiring before and after SW1. If correct, then go to 6-4
			No	Turn SW1 ON
	6-4	Is proper DC voltage applied across board circuits? (Proper DC voltage between TP1 and 2: about 5V; TP3 and 4: about 7V; and TP5 and 6: about 5V)	Yes	6-8
			No	6-5
	6-5	Phase short-circuit or considerable deterioration for varistor (VA2)?	Yes	Replace varistor (VA2)
			No	6-6
	6-6	Power source voltage on secondary side of fuses (F1, F2)?	Yes	6-7
			No	Check wiring and terminals before and after fuses. If correct, replace fuses.
	6-7	Power source voltage on secondary side of noise filter (RF1)?	Yes	6-8
			No	Check wiring and terminals before and after RF1. If correct, replace RF1.
	6-8	Power source voltage on secondary side of power source trans. (PT1)?	Yes	Replace water heat exchanger unit control board
			No	Check wiring and connectors before and after PT1. If correct, replace PT1.

● For work procedure for replacing water heat exchanger unit control board, see “4. Reference Material”.

• 6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-7, 6-8



E07 Outdoor Unit Failed to Send Signal to Indoor Unit (Water Heat Exchanger Unit)

① Abnormality detection method

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

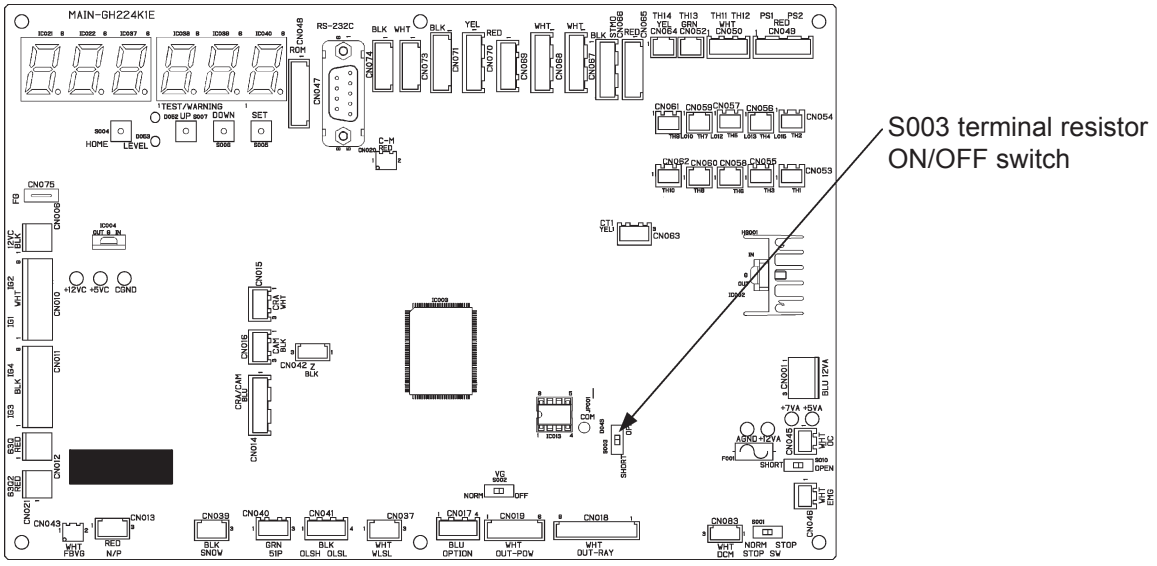
- Outdoor control board is defective
- Outdoor control board terminal resistor switch setting is incorrect

② Troubleshooting

1 Outdoor control 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 S003 (terminal resistor) switch on one outdoor control board set to “ON” and the remainder to “OFF”?	Yes	1-4
			No	Set only one unit to “ON”
	1-3	Is the outdoor control board S003 (terminal resistor) switch set to “OFF”?	Yes	Set to “ON”
			No	1-4
	1-4	Indoor/outdoor operation wiring broken or short-circuited? (See “4. Reference Material”)	Yes	Repair wiring
			No	1-5
	1-5	Replace outdoor control board		

- For work procedure for replacing outdoor control board, see “4. Reference Material”.

• 1-2, 1-3



Outdoor control board

E08 Duplicated Indoor Unit Address

① Abnormality detection method

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

- In the remote control 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.
- When link wiring is attempted while a water heat exchanger unit is connected.
  (When using a water heat exchanger unit, the indoor unit address is fixed.)

② Troubleshooting

1 Link wiring	1-1	Is link wiring attempted with a water heat exchanger unit connected?	Yes	Undo link wiring
			No	2-1
2 Indoor control board	2-1	Is the DISP pin (CN063/CN072) on the indoor control board short-circuited?	Yes	Eliminate short-circuit
			No	2-2
	2-2	Perform pre-check before auto-addressing. (See “4. Reference Material”) E08 remains after repeating auto-addressing?	Yes	2-3
			No	2-4
	2-3	Non-volatile memory (EEPROM) on indoor board is defective → Replace		
	2-4	To change indoor unit address, instead of the remote control detailed settings, use remote control address change mode.		

- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM).

E09 Multiple Units Set as Master Remote Controller (Not detected with water heat exchanger unit connected)

① Abnormality detection method

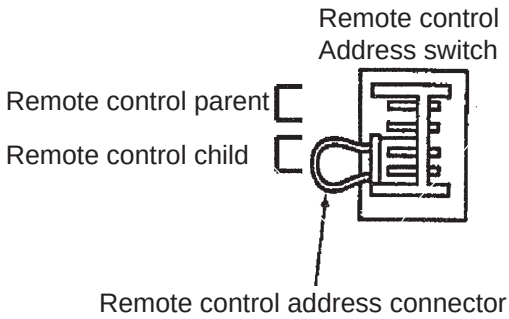
An abnormality is determined when multiple parent remote controls exist within a remote control group.

- Forgot to set a remote control "child" when controlling with two remote controls.
- Forgot to set a remote control "child" when controlling with a wireless remote control and a wired remote control.

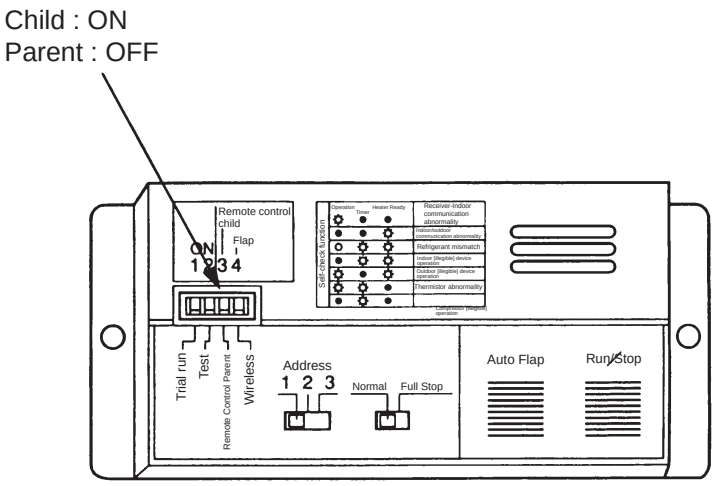
② Troubleshooting

1 Remote control	1-1	Set one of the two remote controls to "Child".

- 1-1



Wired remote control



Wireless remote control

E11 Indoor Board Failed to Receive Signal from Signal Output Board (Not detected with water heat exchanger unit connected)

① Abnormality detection method

After confirming existence of the signal output board, an abnormality 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

● 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 (Not detected with water heat exchanger unit connected)

① Abnormality detection method

An abnormality is determined when an auto-addressing startup command is received from another unit during auto-addressing.

- In a system with multiple outdoor units, with indoor/outdoor operation wiring connected (with link wiring), an auto-addressing startup command was issued by another unit during auto-addressing.

② Troubleshooting

1 Auto-address	1-1	Cannot start auto-addressing while another unit within the link wiring is auto-addressing. Wait until current auto-addressing is complete.

E13 Indoor Unit (Water Heat Exchanger Unit) Failed to Send Signal to Remote Control

① Abnormality detection method

When a signal transmitted from the indoor unit (water heat exchanger unit) to the remote control cannot be self-received, an abnormality is determined.

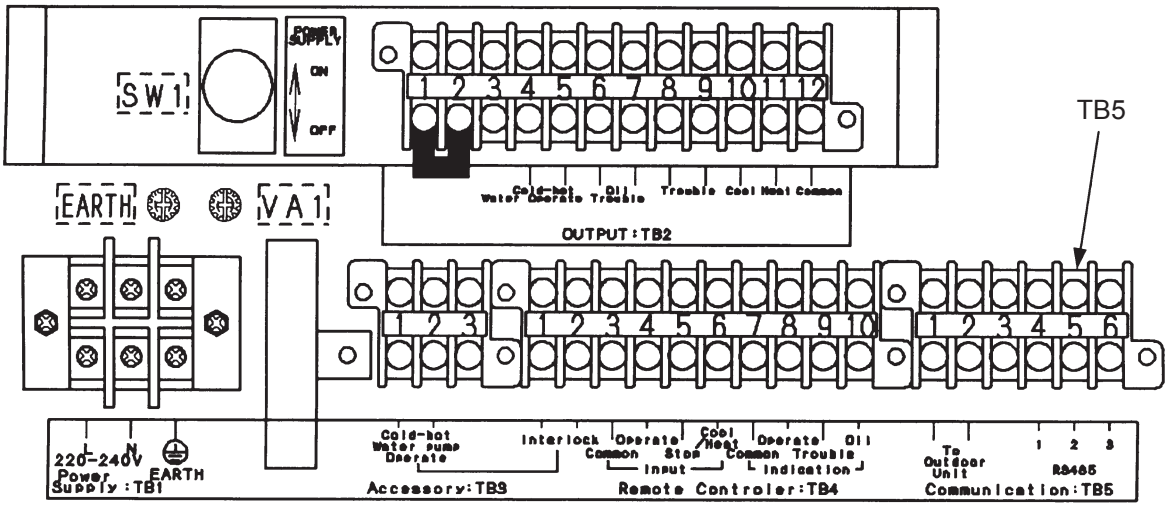
- Indoor unit (water heat exchanger unit) control board is defective.
- Short-circuit or broken wires in remote control wiring 1 (white) and 2 (black) (with indoor unit connected)
- Remote control wiring connected to terminal plate TB5-4/TB5-5 is short-circuited or misrouted. (With water heat exchanger unit connected)

② Troubleshooting

1 Equipment check	1-1	What unit is connected?	Indoor unit	2-1
			Water heat exchanger unit	3-1
2 Indoor control board	2-1	Any short-circuit or broken wires in remote control wiring 1 (white) and 2 (black)?	Yes	Repair wiring
			No	2-2
	2-2	Replace indoor control board		
3 Water heat exchanger unit control board	3-1	Any short-circuit or misrouted wires in remote control wiring TB5-4 and TB5-5?	Yes	Repair wiring
			No	3-2
	3-2	Replace water heat exchanger unit control board		

- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.
- For work procedure for replacing water heat exchanger unit control board, see "4. Reference Material".

• 3-1



E15 Automatic Address Setting Warning (Too Few Units)

① Abnormality detection method

❶ With indoor unit connected

An abnormality 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.

❷ With water heat exchanger unit connected

An abnormality is determined when an error is detected in the indoor unit connection settings on the outdoor unit, the connected equipment, or units remaining OFF.
(With a water heat exchanger unit connected, the indoor unit connection count setting on the outdoor unit is 2 units.)

- The indoor unit connection count setting on the outdoor unit is 3 or more units.
- Connected water heat exchanger unit power is OFF.
- High voltage (AC200V, etc) applied across indoor/outdoor operation wire circuit

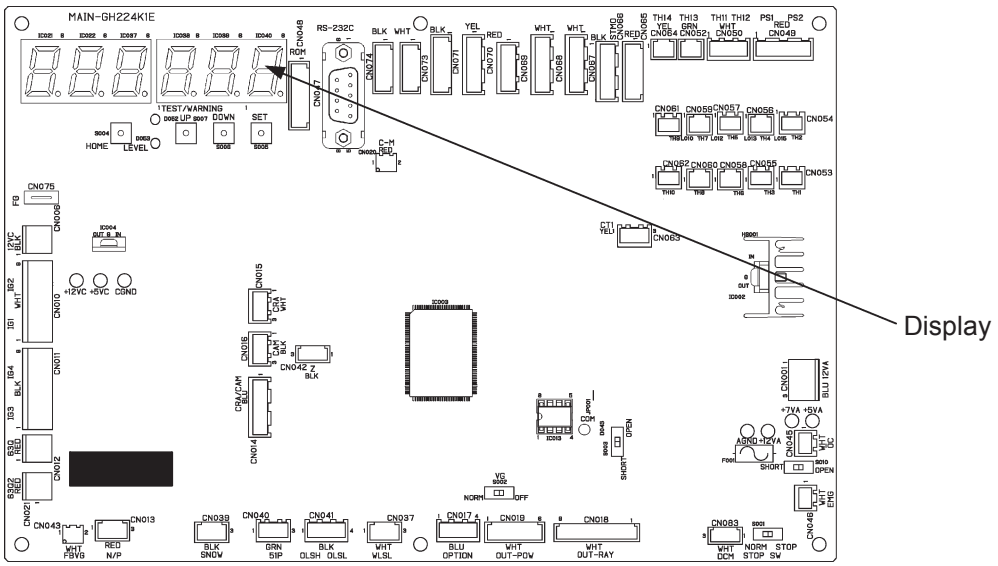
② Troubleshooting

❶ With indoor unit connected

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 “4. Reference Material”)	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 auto-addressing? Or, was the indoor unit count setting changed on the outdoor control board?	Yes	3-2
			No	4-1
	3-2	Perform pre-check before auto-addressing. (See “4. Reference Material”)		
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 remote control (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 remote controls and the wireless remote control is the parent, set the other remote control as the parent).	Yes	4-4
			No	4-5
	4-4	Replace the removed option board or wireless remote control operating unit, wiring and all.		
	4-5	Is the LED blinking on the indoor control board?	Yes	4-6
			No	5-1
	4-6	Non-volatile memory (EEPROM) on indoor control board is not inserted, poorly inserted, or defective → Repair, or replace non-volatile memory and write model information using remote control properties setting mode.		
5 Outdoor control board	5-1	On the outdoor control 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.		

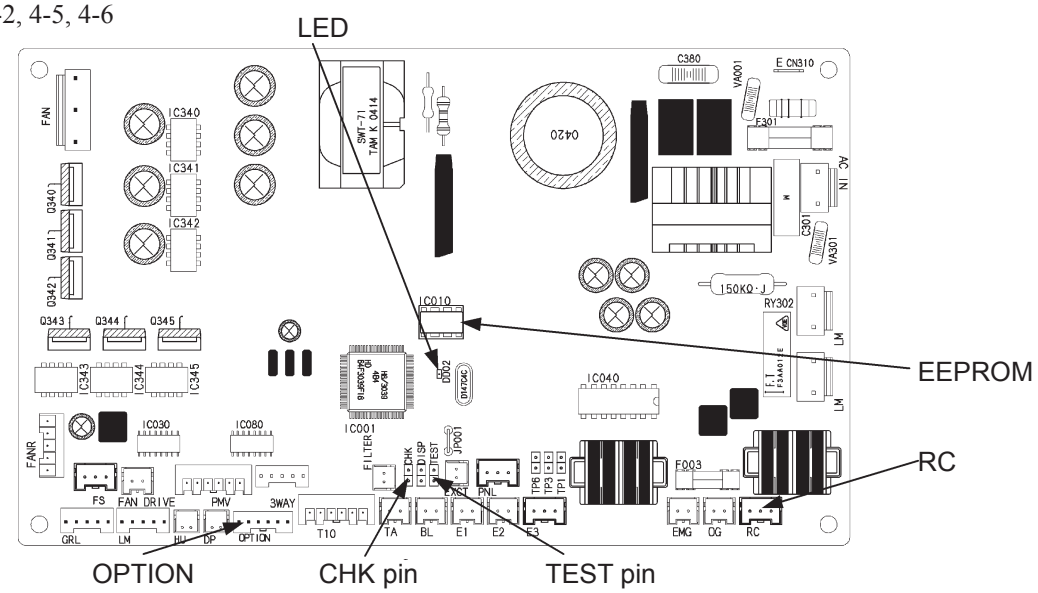
- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM).
- See “4. Reference Material” for detailed remote control settings.

• 3-1

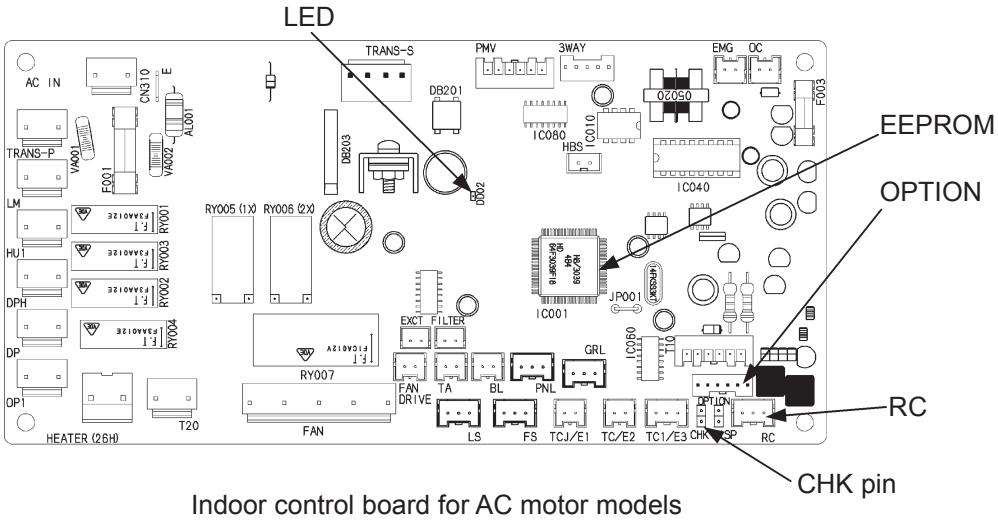


Outdoor control board

• 4-1, 4-2, 4-5, 4-6



Indoor control board for DC motor models



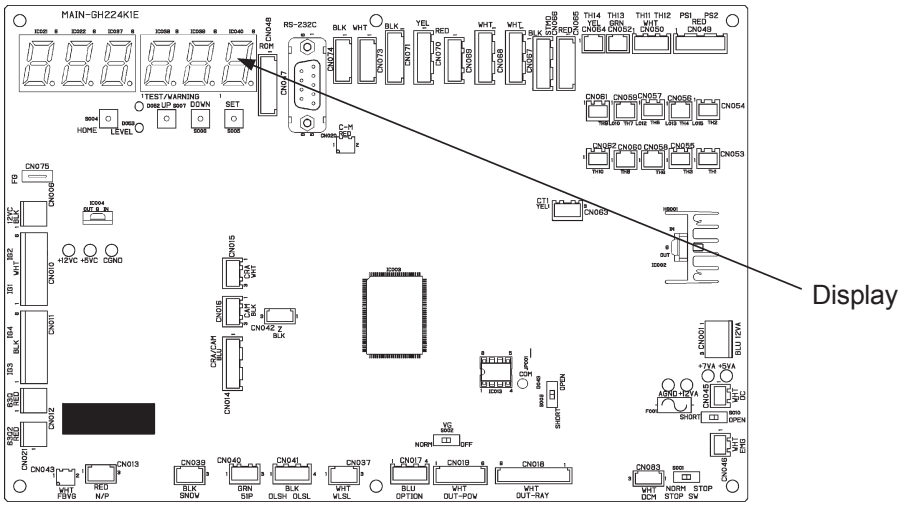
Indoor control board for AC motor models

❷ With water heat exchanger unit connected

1 Power supply	1-1	Is the water heat exchanger 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?	Yes	Repair wiring
			No	2-2
	2-2	High voltage (AC200V, etc) applied across indoor/ outdoor operation wire circuit?	Yes	4-1
			No	3-1
3 Water heat exchanger unit count	3-1	On the outdoor control board, in Setting No. 10, was the indoor unit connection count changed from 2 units?	Yes	3-2
			No	Reset outdoor unit power.
	3-2	On the outdoor control board, in Setting No. 10, set the indoor unit connection count to 2 units.		
4 Remote control wiring (Link wiring from remote control to water heat exchanger unit)	4-1	Is the water heat exchanger unit control board 2P-13 already used?	Yes	Replace water heat exchanger unit control board
			No	Reconnect water heat exchanger unit control board connector (2P-12 → 2P-13)

● For work procedure for replacing water heat exchanger unit control board, see "4. Reference Material".

• 3-1



Outdoor control board

E16 Automatic-Address Setting Warning (Too Many Units)

① Abnormality detection method

An abnormality 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 auto-addressing.)

- The actual number of indoor units exceeds the number of indoor units set on the outdoor unit (with indoor unit connected).
- The number of units set on the outdoor unit is 1 unit (with water heat exchanger unit connected).

② Troubleshooting

❶ With indoor unit connected

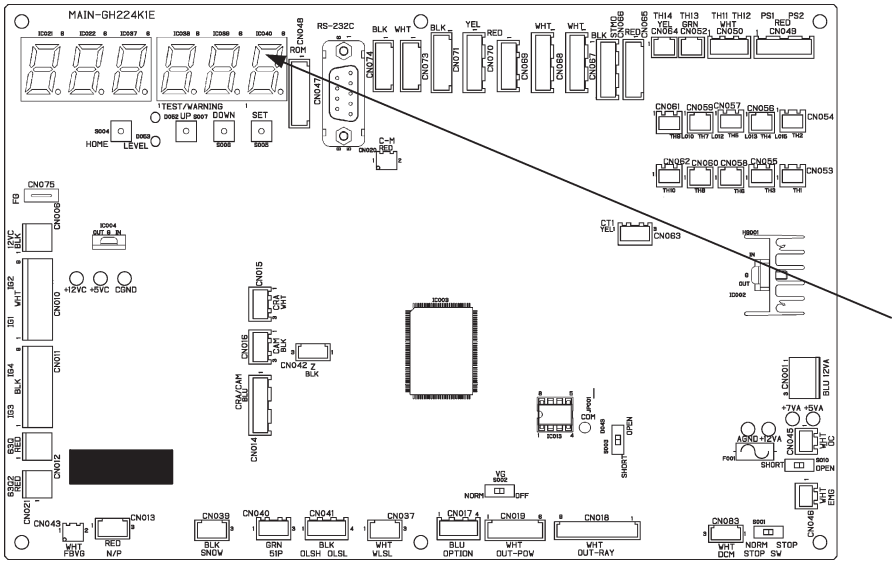
1 Auto-address	1-1	Perform pre-check before auto-addressing. (See “4. Reference Material”)	

❷ With water heat exchanger unit connected

1 Power supply	1-1	Is the water heat exchanger 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?	Yes	Repair wiring
			No	2-2
	2-2	High voltage (AC200V, etc.) applied across indoor/ outdoor operation wire circuit?	Yes	4-1
			No	3-1
3 Water heat exchanger unit count	3-1	On the outdoor control board, in Setting No. 10, was the indoor unit connection count changed from 2 units?	Yes	3-2
			No	Reset outdoor unit power
	3-2	On the outdoor control board, in Setting No. 10, set the indoor unit connection count to 2 units		
4 Remote control wiring (Link wiring from remote control to water heat exchanger unit)	4-1	Is the water heat exchanger unit control board 2P-13 already used?	Yes	Replace water heat exchanger unit control board
			No	Reconnect water heat exchanger unit control board connector (2P-12 → 2P-13)

● For work procedure for replacing water heat exchanger unit control board, see “4. Reference Material.”

• 3-1



Outdoor control board

E18 Group Control Cable Communication Failure (Not detected with water heat exchanger unit connected)

① Abnormality detection method

When remote control group control parent unit cannot communicate with child unit. An abnormality is determined when the remote control group control child unit has not communicated with the parent unit for 3 minutes.

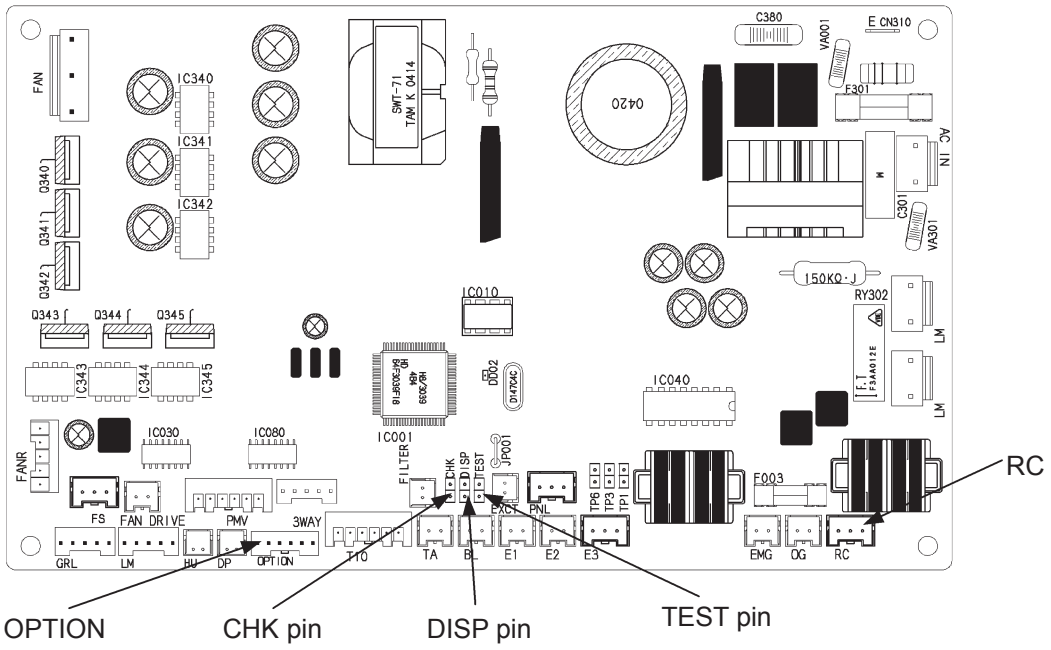
- An indoor unit within group control is not powered ON.
- Inspection pin (CN062/CN071) or TEST pin (CN064) is short-circuited on an indoor unit within group control.
- Indoor unit DISP pin (CN063/CN072) is short-circuited on a child indoor unit within group control.
- Remote control group wiring is broken.
- Multiple indoor units within group control are set as "parent."
- An indoor unit within group control is set as "independent."

② Troubleshooting

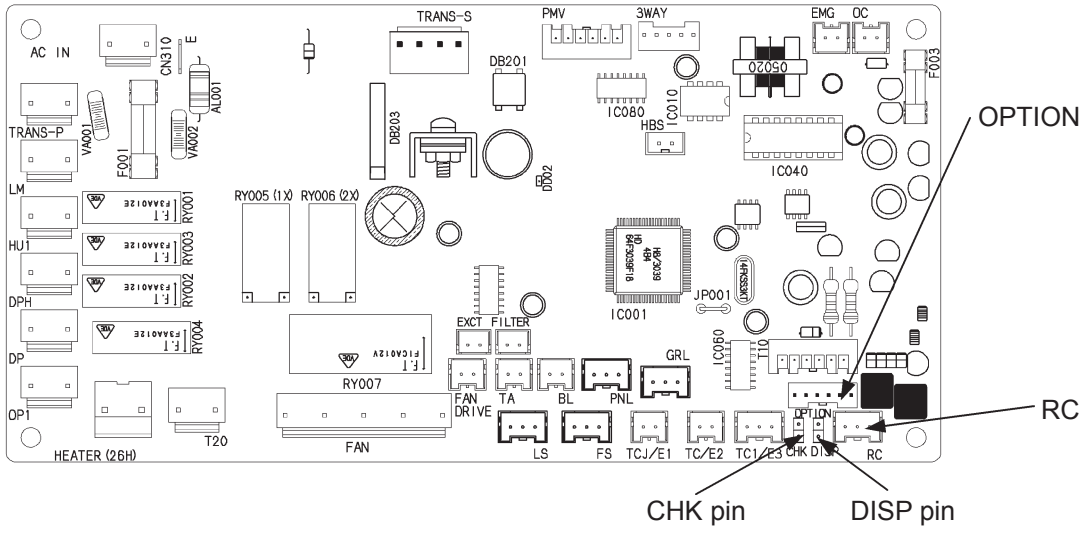
1 Indoor unit	1-1	Is the indoor unit power OFF?	Yes	Turn power ON
			No	1-2
	1-2	Is the inspection pin (CN062/CN071) or TEST pin (CN064) or DISP pin (CN063/CN072) on the indoor control board short-circuited?	Yes	Eliminate short-circuit
			No	2-1
2 Remote control group wiring	2-1	Remote control group wiring broken?	Yes	Repair wiring
			No	2-2
	2-2	In the remote control detailed settings mode, check the group settings (item code 14). Multiple parent units (1), or any independent (0) settings?	Yes	2-3
			No	3-1
	2-3	Remote control group wiring routed as intended?	Yes	2-4
			No	2-5
	2-4	Repeat auto-addressing process.		
	2-5	After repairing remote control group wiring, repeat auto-addressing process.		
3 Indoor control board	3-1	Is an option board (CN060) or wireless remote control (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 remote controls and the wireless remote control is the parent, set the other remote control as the parent).	Yes	3-3
			No	3-4
	3-3	Replace the removed option board or wireless remote control operating unit, wiring and all.		
	3-4	Replace indoor control board.		

- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- There is no TEST pin on the indoor board for AC motor models.
- See "4. Reference Material" for detailed remote control settings.
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

• 1-2, 3-1



Indoor control board for DC motor models



Indoor control board for AC motor models

E20 Indoor Unit Not Found (Not detected with water heat exchanger unit connected)

① Abnormality detection method

An abnormality 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 operation wiring may not be connected between the indoor unit and outdoor unit. Check wiring connections on indoor/outdoor operation wiring.		

E21 PCB (Outdoor Control Board) Trouble

① Abnormality detection method

An abnormality is determined when a board function problem is detected.

* In some cases, this can only be reset from the outdoor control board.

② Troubleshooting

1 Outdoor board	1-1	Replace outdoor control board, replace power board

E22 Thermistor (Outdoor Control Board Sensor) Trouble

① Abnormality detection method

An abnormality is determined when a board analog function problem is detected.

② Troubleshooting

1 Outdoor board	1-1	Replace outdoor control board, replace power board

E31 Unit Internal Communication Failure

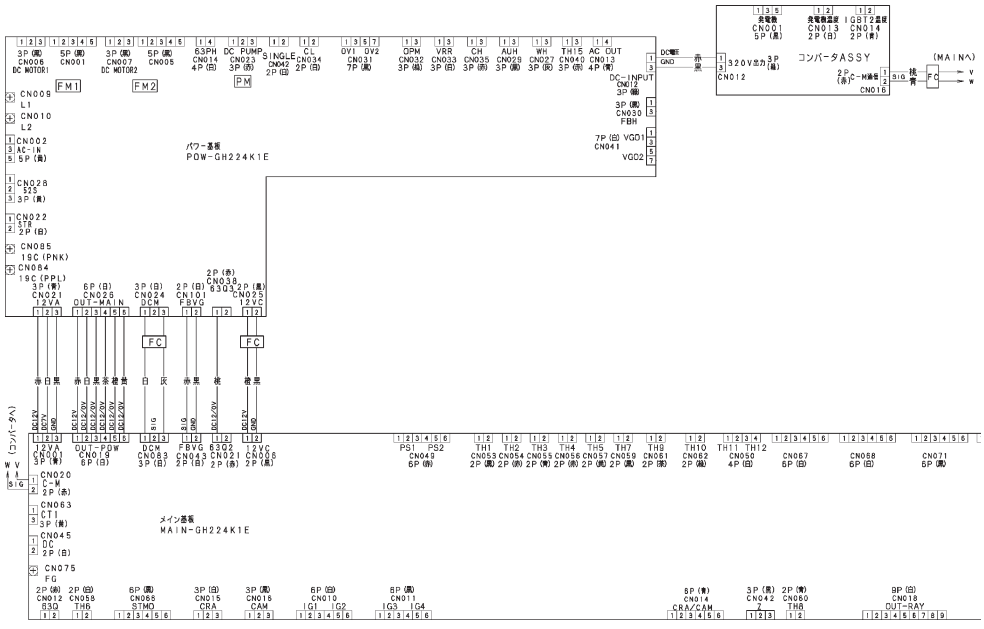
① Abnormality detection method

- When control board internal communication fails 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 abnormality history	3-1	Check abnormality 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	Wiring connection/contact/crimping poor or broken between power board connector 3P (white) CN024 and control board connector 3P (white) CN083?	Yes	Repair wiring
			No	4-4
	4-4	Is the LED : D044 on the converter assembly lighting?	Yes	4-5
			No	4-7
	4-5	Is there poor connection, contact, or crimping, or a broken connection, between converter assembly 3P (green) CN012 and power board 3P (green) CN012?	Yes	Repair wiring
			No	4-6
	4-6	Is there poor connection, contact, or crimping, or a broken connection, between converter assembly 2P (red) CN016 and control board 2P (red) CN020?	Yes	Repair wiring
			No	4-5
	4-7	Is there at least 250 V DC between power board 3P (green) CN012 pins 1 and 3?	Yes	4-8
			No	4-9
	4-8	Replace the power board and check operation. If E31 occurs again, replace the control board.		
	4-9	Replace converter assembly and check operation.		

- 4-3



F01/02/03/10/11 Indoor Unit (Water Heat Exchanger Unit) Temp. Sensor Trouble

① Abnormality detection method

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

Abnormality conditions are given below.

❶ 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
F02	Indoor heat exchanger intermediate temperature sensor (E2)	330kΩ or more	Less than 30Ω
F03	Indoor heat exchanger outlet temperature sensor (E3)	330kΩ or more	Less than 30Ω
F10	Indoor unit intake air temperature sensor (room temperature)	270kΩ or more	Less than 24Ω
F11	Indoor unit discharge air temperature sensor	270kΩ or more	Less than 24Ω

❷ 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 (1F, 2F)	330kΩ or more	less than 30Ω
F02	Water heat exchanger anti-freeze sensor (1F, 2F)	330kΩ or more	less than 30Ω
F03	Water heat exchanger refrigerant outlet temperature sensor (1F, 2F)	330kΩ or more	less than 30Ω
F10	Hot and cold water inlet sensor	2684.8kΩ or more	less than 1743.2Ω
F11	Hot and cold water outlet sensor	2684.8kΩ or more	less than 1743.2Ω

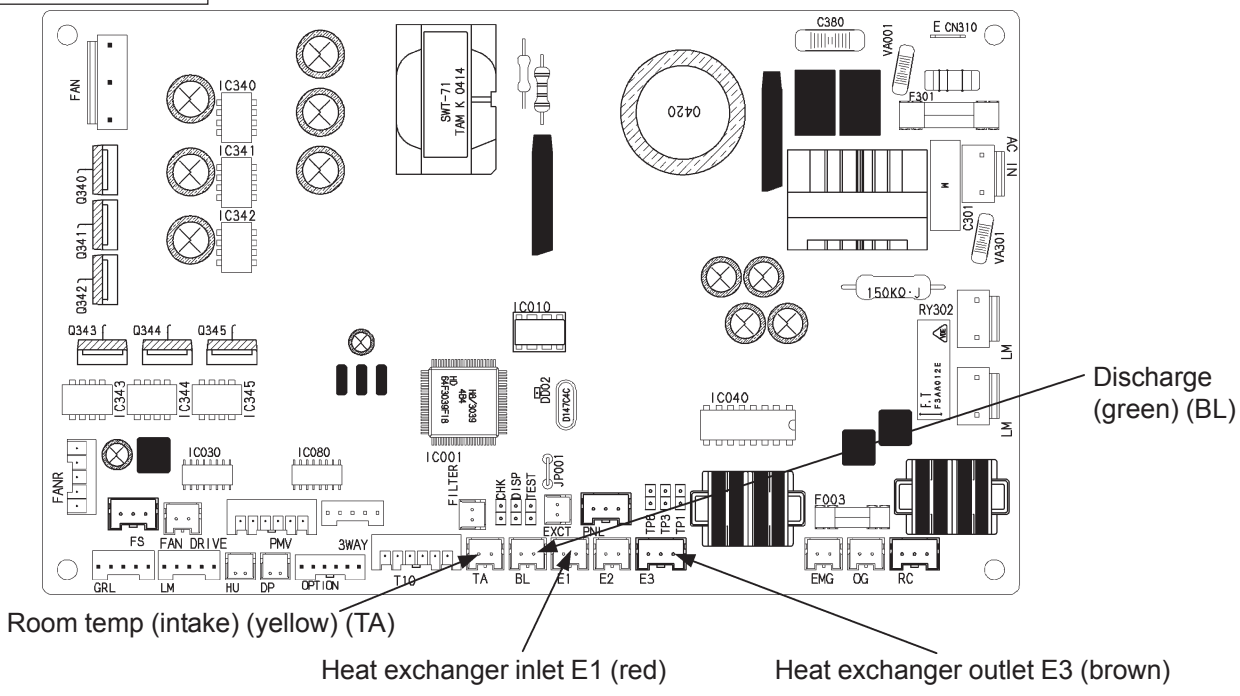
② Troubleshooting

❶ With indoor unit connected

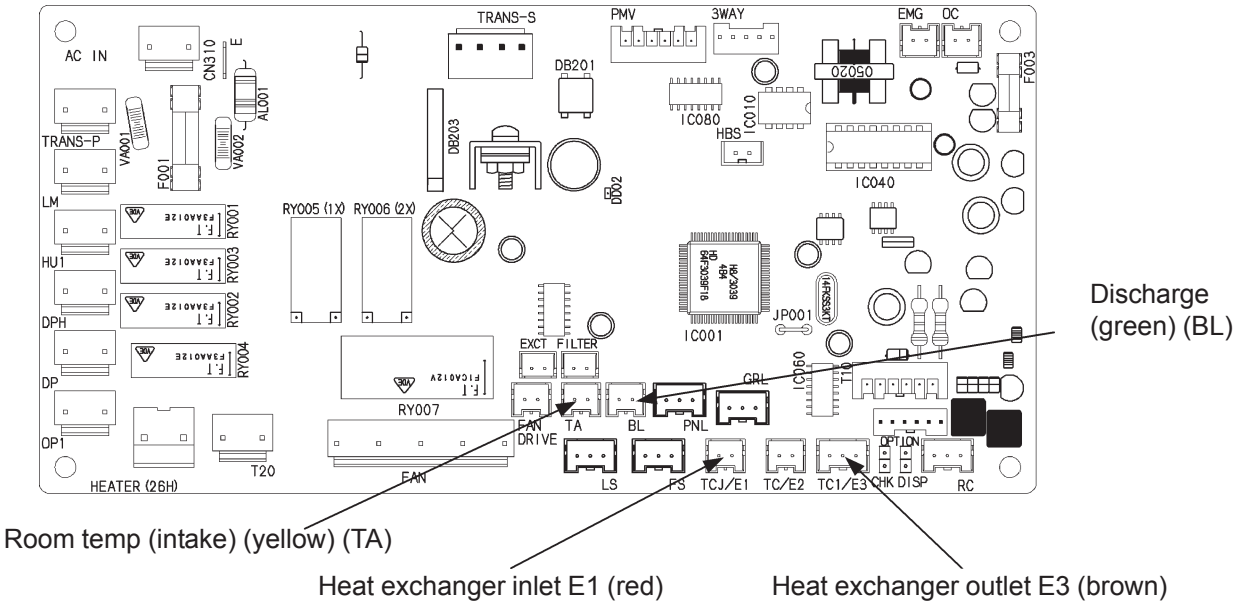
1 Check wiring	1-1	Poor connection/contact/crimping or broken wire or pinched wire in sensor connector and wiring?	Yes	Repair wiring
			No	2-1
2 Check temperature sensor	2-1	Disconnect the sensor connector and measure the resistance value. Is the resistance between the broken wire detection value and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

● See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

DC motor models



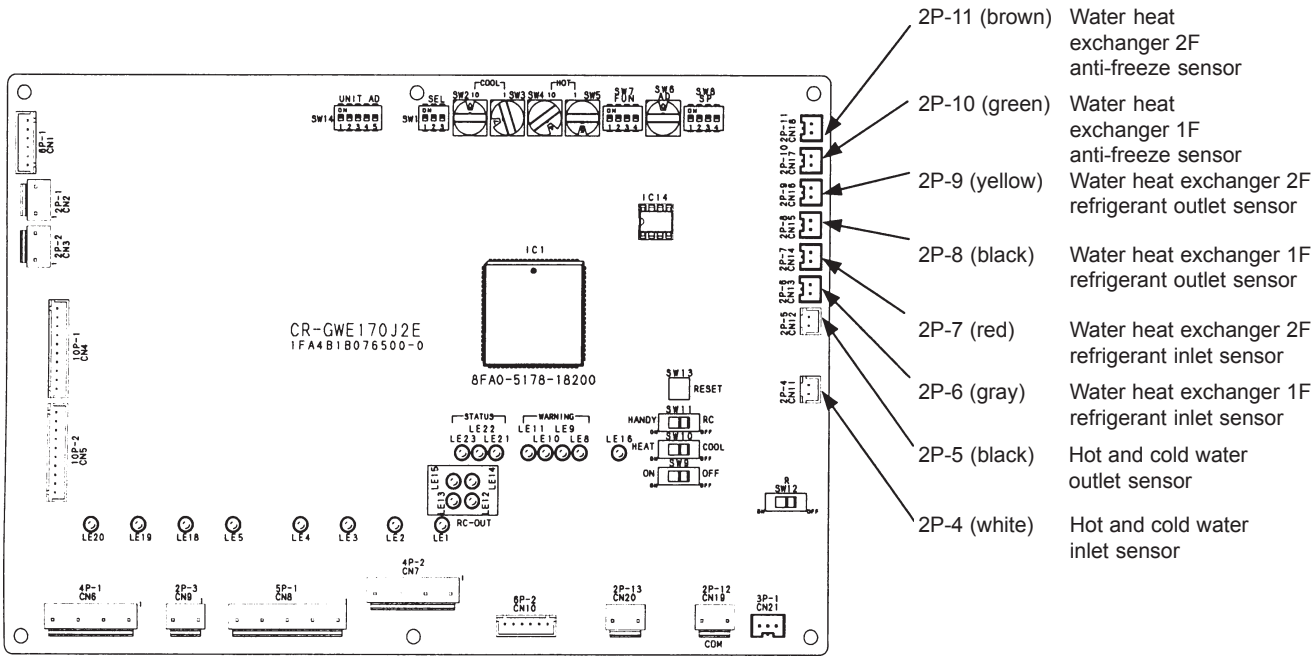
AC motor models



❷ With water heat exchanger unit connected

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 water heat exchanger unit control board
			No	Replace temperature sensor

● For work procedure for replacing water heat exchanger unit control board, see "4. Reference Material."



Water heat exchanger unit control board

F04/06/07/08/12/13/18 Outdoor Unit Temp. Sensor Trouble

① Abnormality detection method

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

Abnormality 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
F07	Outdoor heat exchanger outlet temperature sensor	400kΩ or more	Less than 130Ω
F08	Outside air temperature sensor	400kΩ or more	Less than 130Ω
F12	Compressor inlet temperature sensor	400kΩ or more	Less than 130Ω
F13	Cooling water temperature sensor	62kΩ or more	Less than 22Ω
F18	Exhaust temperature sensor	(Note 2)	Less than 130Ω

Note 1: Detects broken wire for compressor outlet temperature sensor.

- When compressor outlet temperature < compressor inlet temperature continuously for 3 minutes, during engine operation (complete combustion).

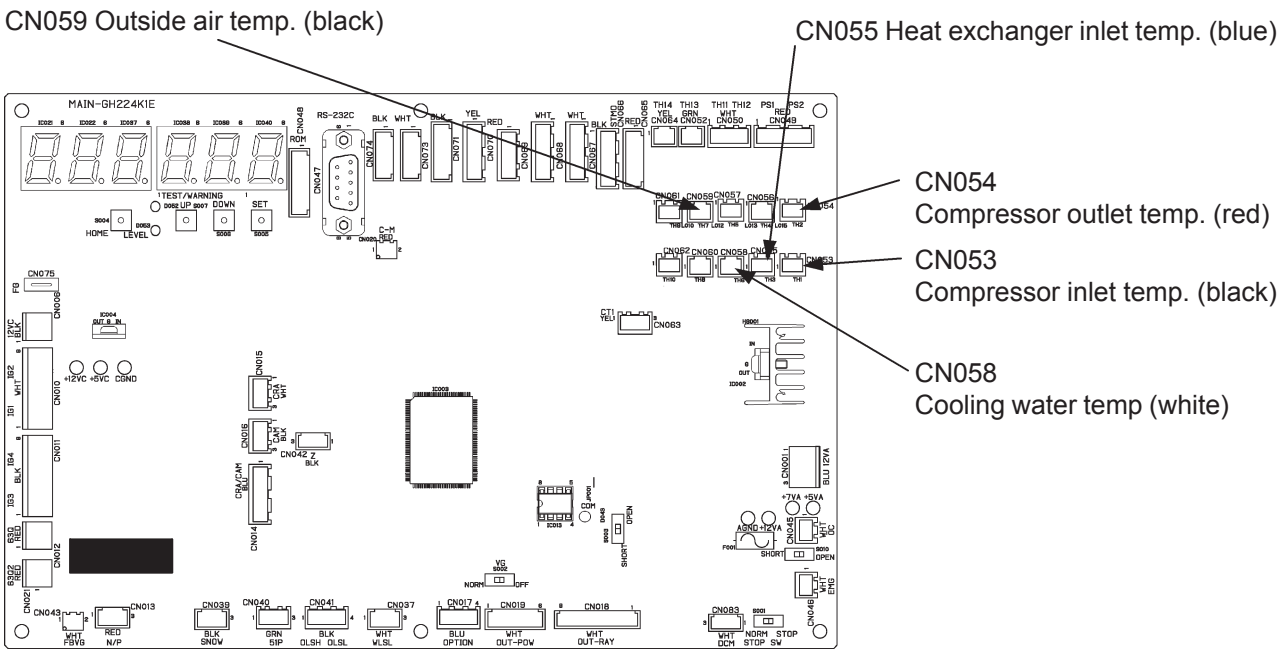
Note 2: Detects broken wire for exhaust temperature sensor.

- During complete combustion, when cooling water temperature ≥ 80°C and exhaust temperature ≤ 30°C.

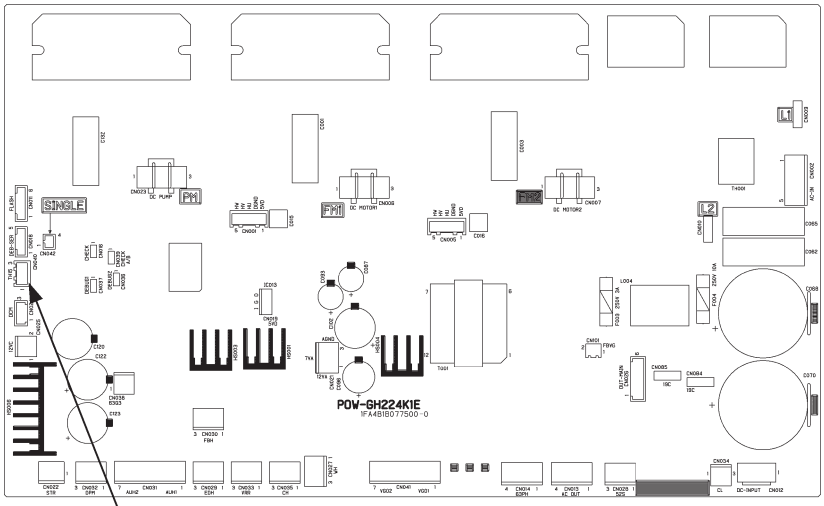
② Troubleshooting

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 control board
			No	Replace temperature sensor

- For work procedure for replacing outdoor control board, see "4. Reference Material".
- When replacing the power board on single-phase models, be sure to move the 2P (white) CN042 jumper wire from the old board.



Outdoor control board



Outdoor power board

CN040 Exhaust temp. (red)

F16 Compressor Inlet/Outlet Pressure Sensor Trouble

① Abnormality detection method

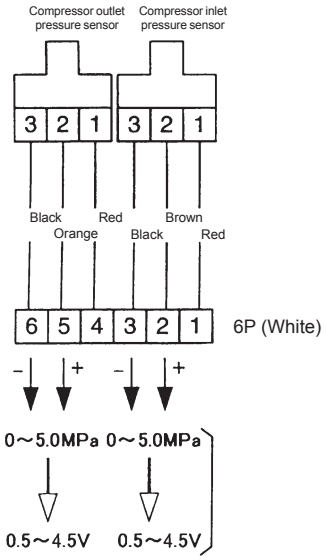
When pressure in the following chart is detected.

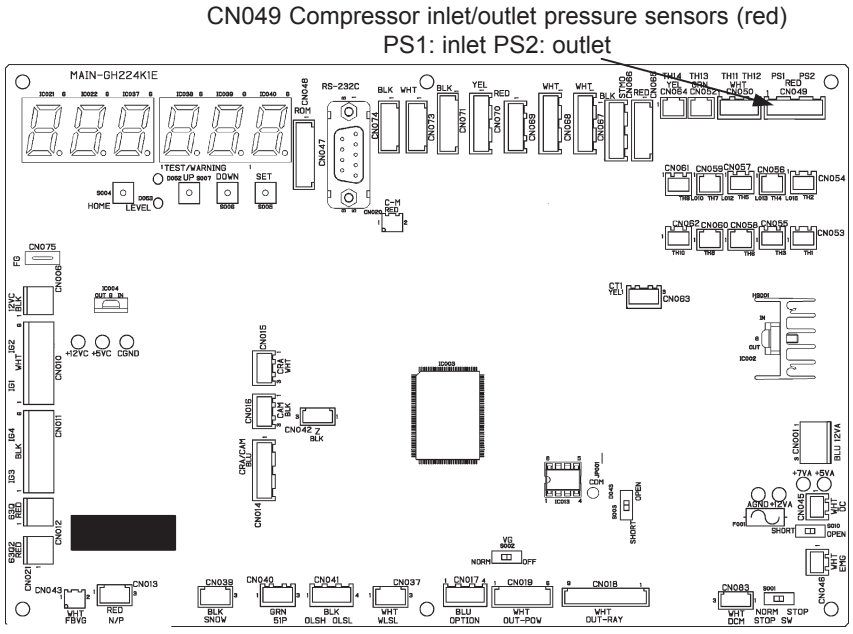
Detect Open		Detect Short Circuit	
Low pressure (MPa)	High pressure (MPa)	Low pressure (MPa)	High pressure (MPa)
–0.5	–0.5	5.5	5.5

② Troubleshooting

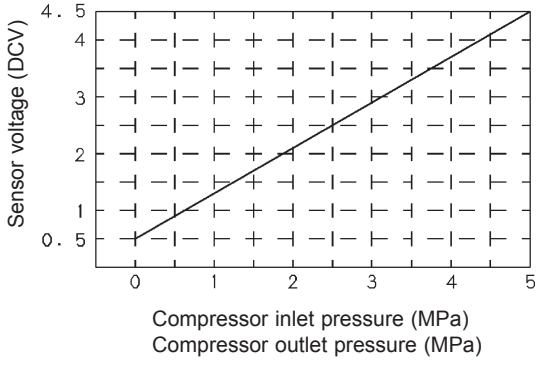
1 Check pressure sensor	1-1	Install gauge on large tube and small tube service port, and open valve (see *1 below for procedure) to equalize pressure within refrigeration circuit. Gauge display nearly identical to control board display?	Yes	Operate again
			No	2-1
2 Check wiring	2-1	Is there DC5V between the following terminals of control board connector 6P (red) CN049? • No. 1 (+) and No. 3 (–), and No. 4 (+) and No. 6 (–)	Yes	2-2
			No	Replace control board
	2-2	Is the voltage between the following terminals of control board connector 6P (red) CN049 appropriate for the pressure? • No. 2 (+) and No. 3 (–), and No. 5 (+) and No. 6 (–)	Yes	Replace control board
			No	2-3
	2-3	Wiring connection/contact poor, or wire broken, between control board connector 6P (red) CN049 and compressor inlet/outlet pressure sensors?	Yes	Repair wiring
			No	Replace pressure sensor

* 1 Perform from outdoor control 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.





Outdoor control board



F20 Clutch Coil Temp. Sensor Trouble (Does not occur on model 70 or 90)

① Abnormality detection method

- Detected in the following situations.

  Broken wire detected: Sensor resistance exceeds 1800kΩ

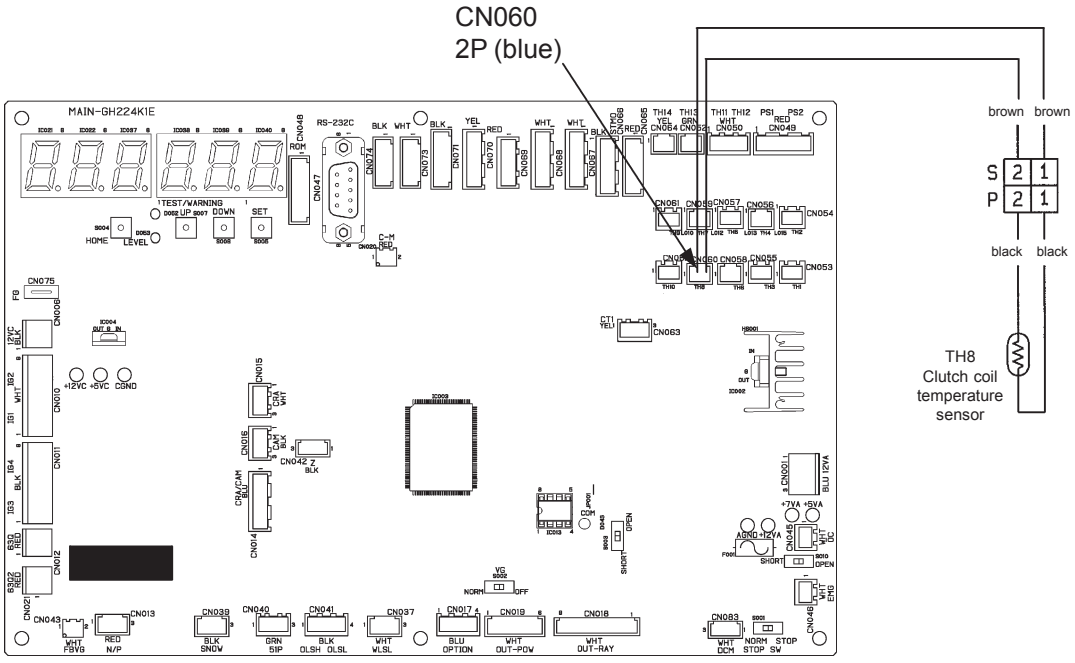
  Short circuit detected: Less than 850Ω

② Troubleshooting

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

● For work procedure for replacing outdoor control board, see "4. Reference Material".

- 1-2



Outdoor control board

F29 Indoor (Water Heat Exchanger Unit) Nonvolatile Memory (EEPROM) Trouble

① Abnormality detection method

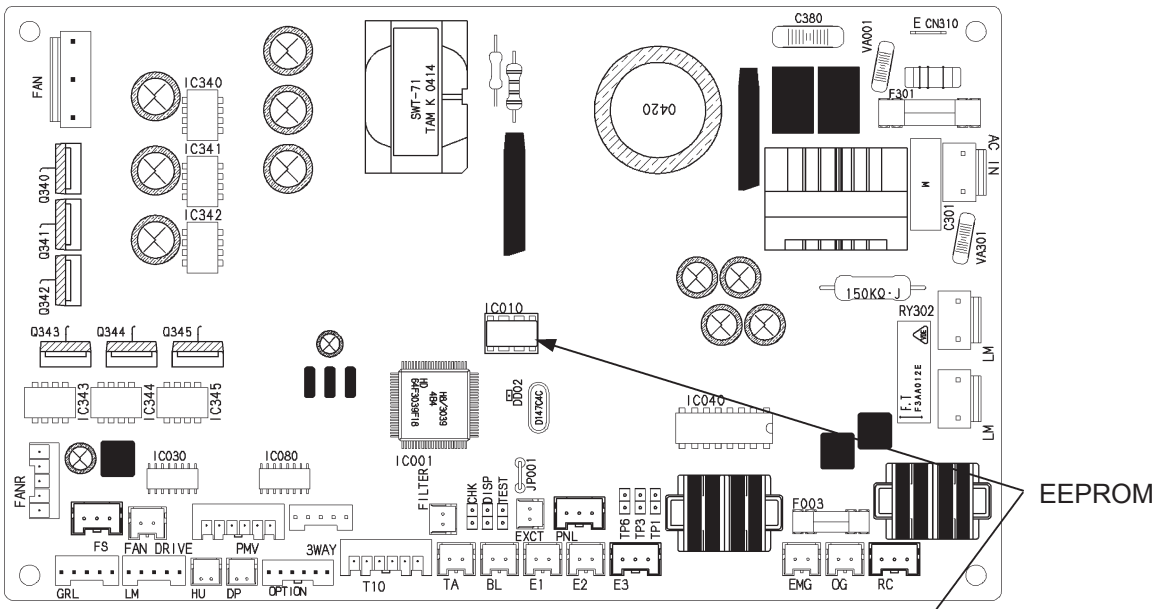
- An error is determined when the nonvolatile memory (EEPROM) on the indoor (water heat exchanger unit) control board cannot be read or written.

② Troubleshooting

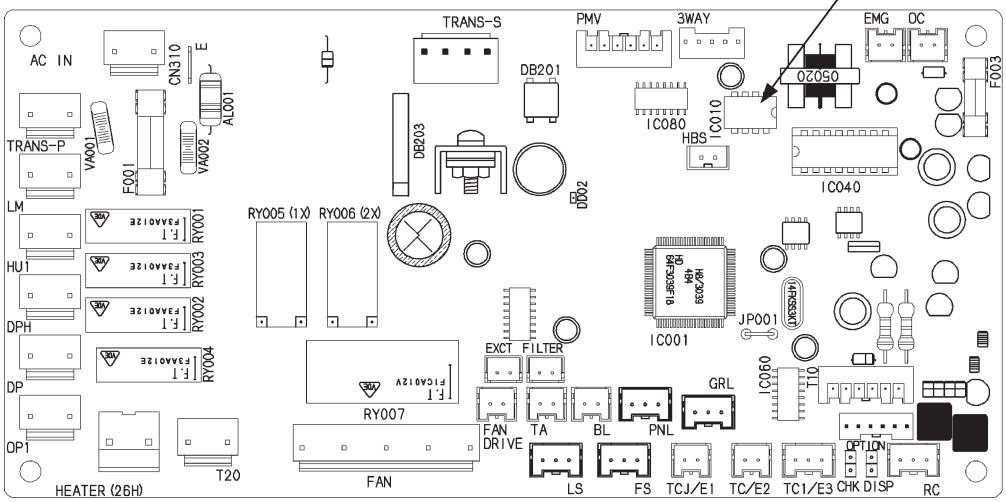
1 Nonvolatile memory	1-1	Is the nonvolatile memory on the indoor (water heat exchanger unit) control board correctly oriented in the IC socket, and inserted firmly?	Yes	1-2
			No	Repair
	1-2	Replace the nonvolatile memory (provided with the servicing board). Does this eliminate the abnormality?	Yes	Defective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

- See instructions packaged with servicing indoor board for procedure on replacing indoor non-volatile memory (EEPROM) and replacing indoor control board.
- For EEPROM defects upon connecting a water heat exchanger unit, please replace the board.
- For work procedure for replacing water heat exchanger unit control board, see "4. Reference Material."

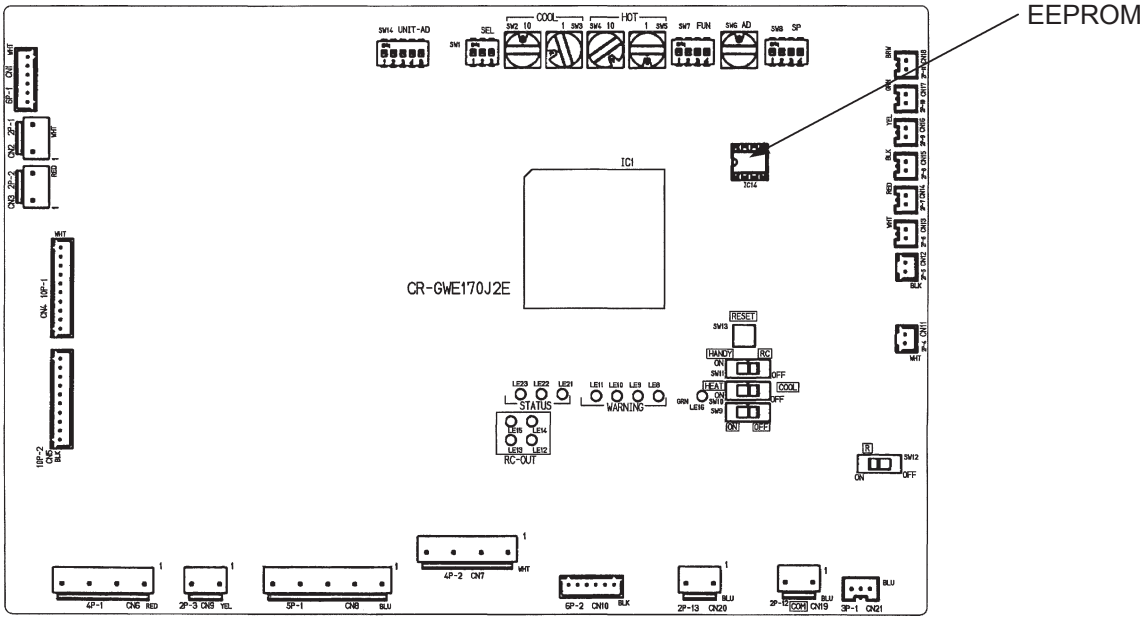
• 1-1



Indoor control board for DC motor models



Indoor control board for AC motor models



Water heat exchanger unit control board

F30 Clock Function (RTC) Trouble

① Abnormality detection method

- An error is determined when the standard pulse (every 1 second) from the outdoor control 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 abnormality recurs, replace outdoor control board

- For work procedure for replacing outdoor control board, see “4. Reference Material”.

F31 Outdoor Nonvolatile Memory (EEPROM) Trouble

① Abnormality detection method

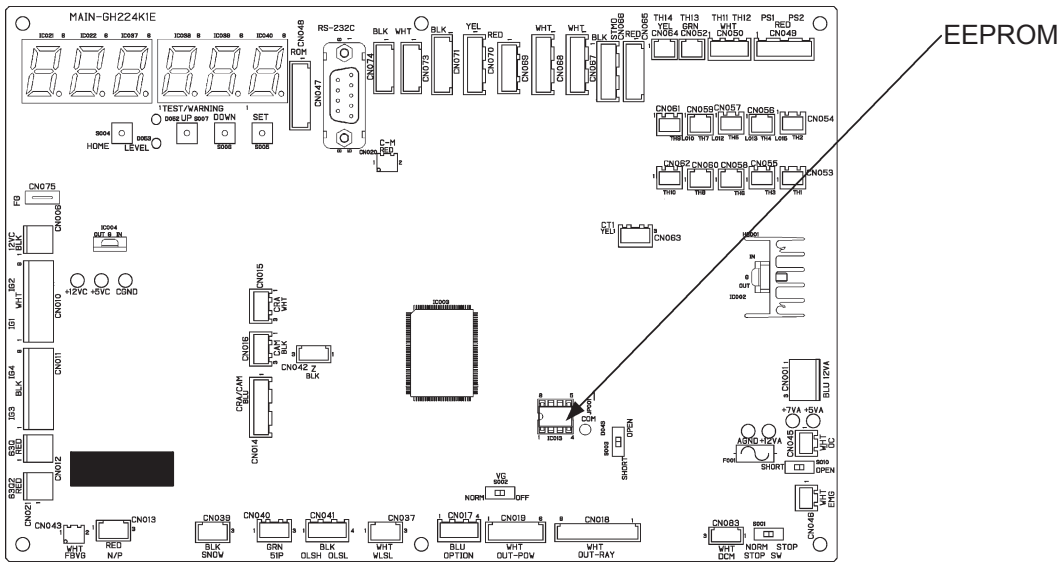
- An error is determined when the nonvolatile memory (EEPROM) on the outdoor control board cannot be written.

② Troubleshooting

1 Nonvolatile memory	1-1	Is the nonvolatile memory on the outdoor control 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 abnormality recurs, replace nonvolatile memory (provided with service board). Does this eliminate the abnormality?	Yes	Defective EEPROM
			No	Replace outdoor control board

- For procedure on replacing non-volatile memory (EEPROM) and replacing outdoor control board, see "4. Reference Material".

• 1-1



Outdoor control board

L02 Mismatch of Indoor/Outdoor Unit Types

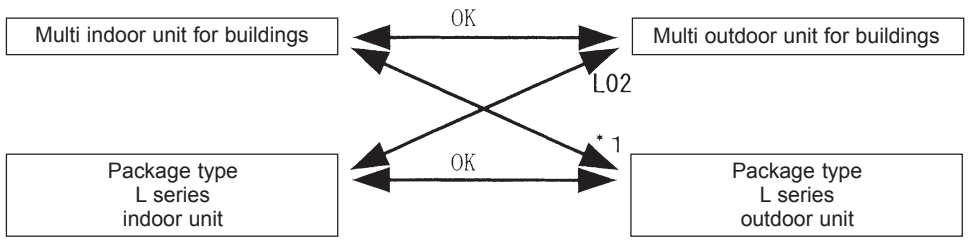
① Abnormality detection method

- An abnormality is determined when a non-GHP indoor unit is connected.
- An abnormality is determined when a package type L-series indoor unit is connected to a multi outdoor unit for buildings.

② Troubleshooting

1 Indoor unit	1-1	Check the following, and replace or remove non-GHP units. Indoor unit model (SPW-…GH56) Indoor control board (CR-TJ50T)

- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

2 Multi for buildings connected to package-type L-series	2-1	Check the following, and repair or replace connection. Check indoor unit and outdoor unit models. Is a multi for buildings connected to a package-type L-series unit?
		Indoor/outdoor unit combination warning detected • L02 is detected by the indoor unit by “model”. • The indoor/outdoor unit combinations accepted by the indoor unit are as follows:  ∗1 This combination triggers an L13 warning.

L03 Multiple Master Units Set for Group Control (Not detected with water heat exchanger unit connected)

① Abnormality detection method

An abnormality is determined when multiple parent (master) units exist within a remote control group control.

- When remote control group wiring is changed after auto-addressing is complete.
- When multiple parent units are set in remote control detailed settings mode.

② Troubleshooting

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

- See “4. Reference Material” for detailed remote control settings.

L04 Duplicate System (Outdoor Unit) Address Settings

① Abnormality detection method

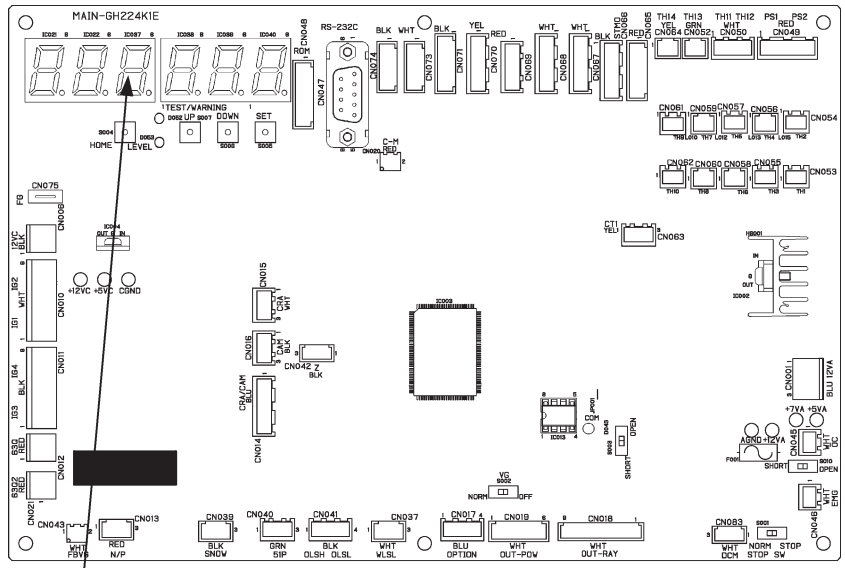
An abnormality is determined when identical system (outdoor unit) addresses exist within the same link wiring.

- When system (outdoor unit) address settings were forgotten during link wiring.
- When system (outdoor unit) address settings were accidentally duplicated during link wiring.
- When link wiring is attempted while a water heat exchanger unit is connected.

② Troubleshooting

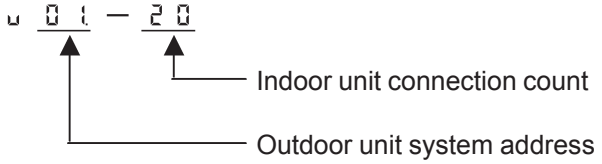
1 System (outdoor unit) address	1-1	In system address settings in No. 10 Initial Settings, check that the system (outdoor unit) addresses are set sequentially for outdoor units connected to the same link wiring (indoor/outdoor operation wiring). After correcting settings, repeat auto-addressing process.
2 Link wiring prohibited	2-1	Link wiring is prohibited when a water heat exchanger is connected. Undo link wiring.

- 1-1



Outdoor control board

During operation display, the following display alternates with the operation time.



L05/06 Duplicate Indoor Unit Priority Setting (Not detected when water heat exchanger unit is connected)

① Abnormality detection method

An abnormality 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 remote control simple settings mode.

② Troubleshooting

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

- See “4. Reference Material” for simple remote control settings.

L07 Group Control Cable Present for Individual-Control Indoor Unit (Not detected when water heat exchanger unit is connected)

① Abnormality detection method

An abnormality is determined when remote control group wiring includes an indoor unit set for independent operation.

- When remote control group wiring is set up after auto-addressing is complete.
- When group settings for an indoor unit wired into a remote control group are changed to “Independent” in remote control detailed settings mode.

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

- See “4. Reference Material” for detailed remote control settings.

L09 Indoor Unit Capacity Not Set (Not detected when water heat exchanger unit is connected)

① Abnormality detection method

An abnormality 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 remote control detailed settings mode, the indoor unit capacity is "invalid".

② Troubleshooting

1 Indoor unit capacity setting	1-1	In the remote control detailed settings mode, check the indoor unit capacity setting (item code 11). If set to "Invalid" (0), set the correct indoor unit capacity.

- See "4. Reference Material" for detailed remote control settings.

L10 Outdoor Unit Capacity Not Set

① Abnormality detection method

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

- When the outdoor unit model setting was forgotten after installing a new nonvolatile memory (EEPROM).
- When the outdoor unit model setting is "Invalid".

② Troubleshooting

1 Outdoor unit model setting	1-1	On the outdoor control board, use menu item No. 10 to check the outdoor unit model display. When the model is not displayed, change the settings.

- Display the outdoor unit model using the outdoor control board menu item No. 3.
- For model settings and clearing internal memory using outdoor control board menu item No. 10, see "4. Reference Material".

- 1-1

  After changing the model, the nonvolatile memory (EEPROM) is cleared (memory clear).
  - Outdoor unit model display (menu item No. 03)

    ———— Undetermined
    224.2 SGP-E70K1
    280.2 SGP-E90K1
    355.2 SGP-E120K1
    450.2 SGP-E150K1
    560.2 SGP-E190K1
    710.2 SGP-E240K1

L13 Indoor Unit Type Setting Failure (Not detected when water heat exchanger unit is connected)

① Abnormality detection method

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

- When the indoor unit model or capacity is set incorrectly in remote control detailed settings mode.
- When package type L series and building multi indoor units and outdoor units are mixed together.

② Troubleshooting

<table>
<tr><td rowspan="8">1
Indoor unit model setting</td><td rowspan="2">1-1</td><td rowspan="2">Does the outdoor unit warning display show L02?</td><td>Yes</td><td>1-2</td></tr>
<tr><td>No</td><td>1-3</td></tr>
<tr><td>1-2</td><td colspan="3">A package type L series indoor unit is mixed in.
This model cannot be connected. Change to a compatible unit.</td></tr>
<tr><td rowspan="2">1-3</td><td rowspan="2">Is the outdoor unit package type L series?</td><td>Yes</td><td>1-5</td></tr>
<tr><td>No</td><td>1-4</td></tr>
<tr><td rowspan="2">1-4</td><td rowspan="2">Does the model (item code 10) and capacity (item code 11) in remote control detailed settings mode match the actual indoor unit?</td><td>Yes</td><td>1-5</td></tr>
<tr><td>No</td><td>1-6</td></tr>
<tr><td>1-5</td><td colspan="3">This model cannot be connected. Change to a compatible indoor/outdoor unit.</td></tr>
<tr><td>1-6</td><td colspan="3">In the remote control detailed settings mode, set the correct model and capacity.</td></tr>
</table>

- See “4. Reference Material” for detailed remote control settings.

L16 Water Heat Exchanger Unit Setting Failure (Detected only when water heat exchanger is connected)

① Warning detection method

When the settings on the water heat exchanger unit control board are incorrect as listed below, an error is determined with one occurrence.

- SW4, 5 heating temperature setting is out of range
- SW1~3 cooling (water) temperature setting is out of range
- SW1~3 cooling (brine) temperature setting is out of range
- SW8-1 anti-freeze control switch setting is wrong

② Troubleshooting

1 Check heating temperature setting	1-1	Are SW4 and SW5 set between 35°C and 55°C?	Yes	2-1
			No	Change settings
2 Check cooling (water) temperature setting	2-1	Used as water chiller?	Yes	2-2
			No	3-1
	2-2	Is SW1-2 OFF?	Yes	2-3
			No	Set to OFF, then go to 2-3
	2-3	Is SW1-3 OFF?	Yes	2-4
			No	Set to OFF, then go to 2-4
	2-4	Are SW2 and SW3 set between 5°C and 15°C? (If either 2-2 or 2-3 is No, end troubleshooting even if 2-4 is Yes.)	Yes	4-1
			No	Change settings
3 Check cooling (brine) temperature setting	3-1	Is SW1-2 ON?	Yes	2-2
			No	Set to ON, then go to 2-2
	3-2	Are SW1, SW2 and SW3 set between -15°C and 15°C? (If 3-1 is No, end troubleshooting even if 3-2 is Yes.)	Yes	4-2
			No	Change settings
4 Check anti-freeze control switch setting	4-1	Is SW8-1 OFF?	OK	5-1
			NG	Switch to “OFF”
	4-2	Is SW8-1 ON?	OK	5-1
			NG	Switch to “ON”
5 Other	5-1	Reverse the dipswitches (SW1-2, SW1-3, SW8-1) once (switch to opposite), then switch them back. Problem eliminated?	Yes	End troubleshooting
			No	5-2
	5-2	Shift position of rotary switches (SW2~SW5), then move them back within the setting range. Problem eliminated?	Yes	End troubleshooting
			No	Replace control board

- For work procedure for replacing water heat exchanger unit control board, see “4. Reference Material”.
- **1-1**

  Set SW4 as the 10 digit, and SW5 as the 1 digit. The temperature setting range is +35 - +55°C.
  (Example: Set SW2 to “4” and SW3 to “5” for a temperature setting of +45°C.)

· **2-4**

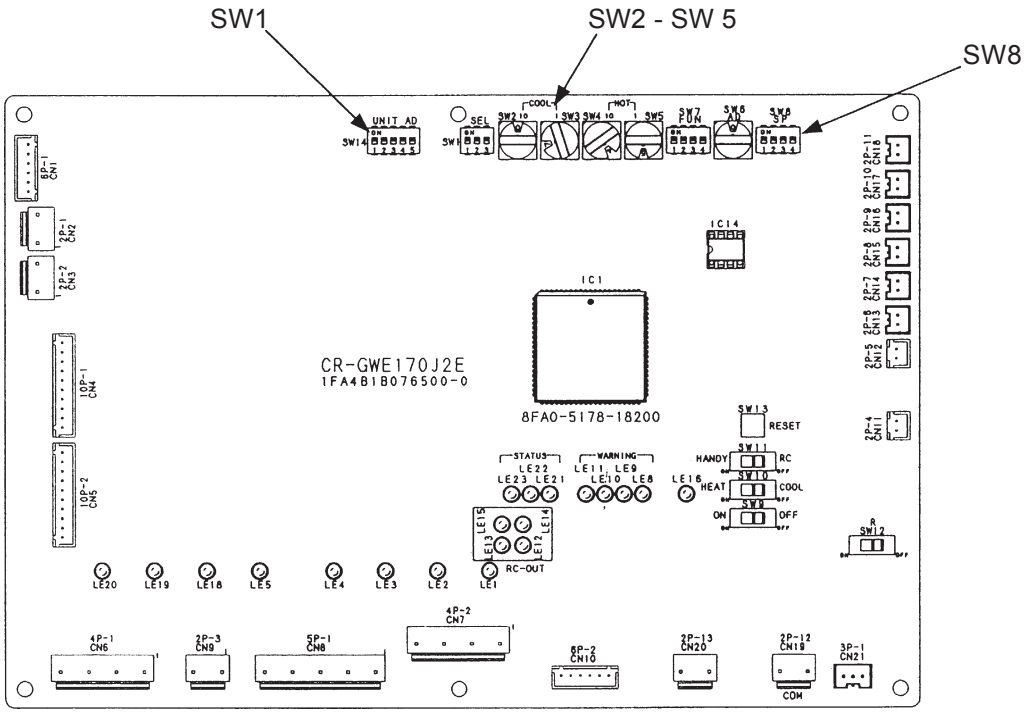
  Use SW2 and SW3 (green rotary switches) to set the cooling water temperature.
  Set SW2 as the 10 digit, and SW3 as the 1 digit. The temperature setting range is +5 - +15°C.
  (Example: Set SW2 to “0” and SW3 to “7” for a temperature setting of +7°C.)

- 3-2

Use the SW1 (3P dipswitch) No. 3 to select positive or negative temperature.

Temperature setting	SW1, No. 3
Negative (-)	ON (knob upward)
Positive (+)	OFF (knob downward)

Set SW2 as the 10 digit, and SW3 as the 1 digit. The temperature setting range is -15 ~ +5°C.
(Example: Set SW1 No. 3 ON, SW2 to “0” and SW3 to “5” for a temperature setting of -5°C.)
+5 ~ +15°C settings are also available. For these, set the SW8 (4P dipswitch) No. 1 OFF (knob downward).



Water heat exchanger unit control board

L19 Duplicate Water Heat Exchanger Unit Parallel Address (Detected only when water heat exchanger is connected)

① Warning detection method

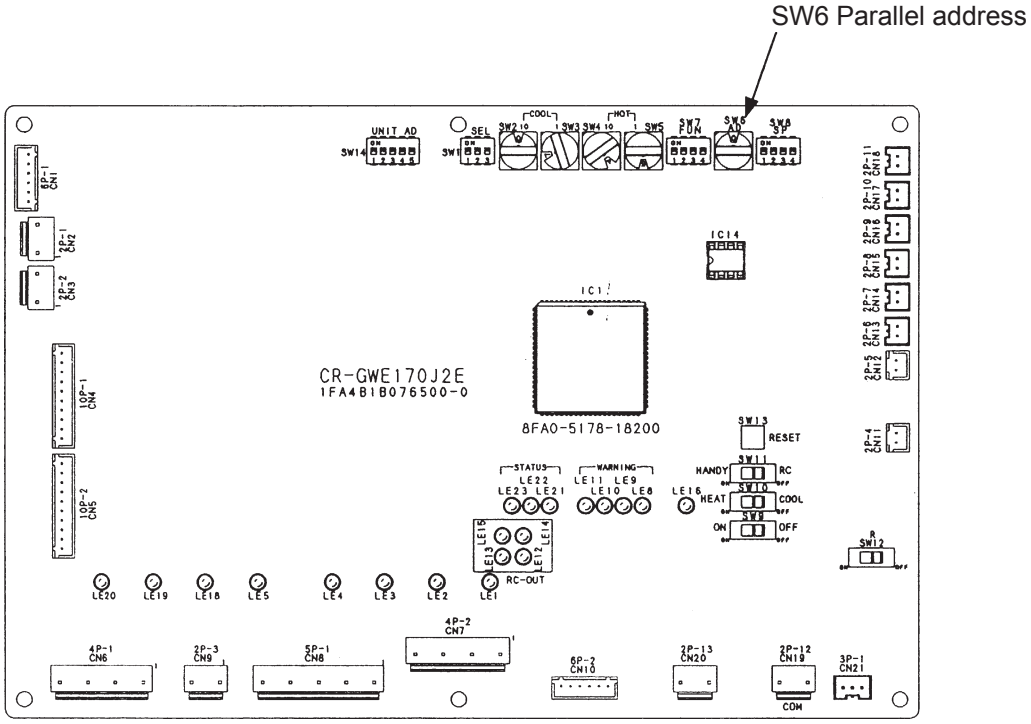
An abnormality is determined when a water heat exchanger unit parallel address duplication is detected according to the condition below.

- While using RS-485 line for the purpose of using a remote control (TECS-610 or RCS-SW15GX), when water heat exchanger units with the same parallel address (SW6) are in the same link wiring system. Determined as duplicate with one occurrence. (However duplicate parallel addresses of 0 are not detected.)

② Troubleshooting

1 Check connected unit count	1-1	Controlling two or more water heat exchanger units with a remote control (TECS-610 or RCS-SW15GX)?	Yes	2-1
			No	1-2
	1-2	Set SW6 to 0 on the water heat exchanger unit control board, and do not connect anything to terminal plate TB5-4/5.		
2 Check for duplicate parallel address	2-1	Within RS-485 link wiring, eliminate duplicate parallel addresses (SW6) on the water heat exchanger unit control board.		

- 2-1



Water heat exchanger unit control board

L21 Gas Type Setting Failure

① Abnormality detection method

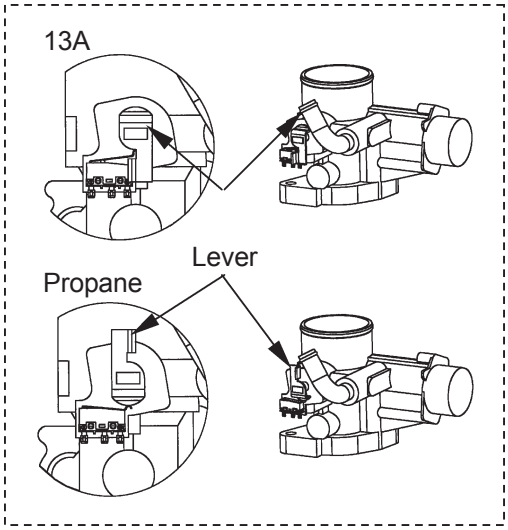
An abnormality is determined after one occurrence when a gas type setting mismatch is detected according to the conditions below.

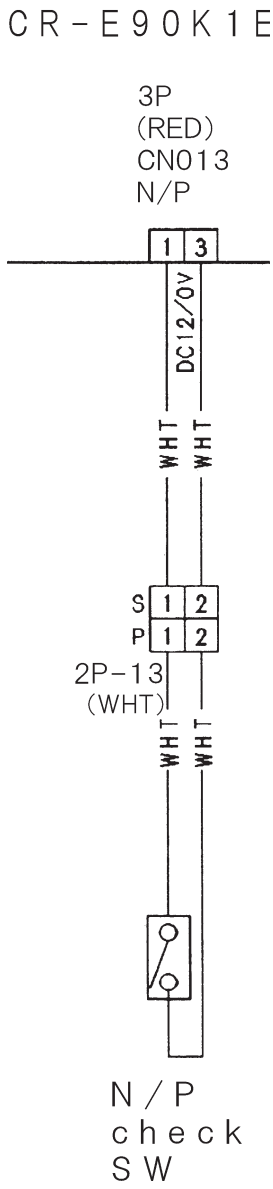
- Startup : Control board gas setting and mixer fuel select switch setting mismatch.
- During operation : Detects mismatch when the supply gas type is set to 1-5 and the supplied gas is propane. However, a mismatch is not detected after the gas type is confirmed.

* The outdoor unit power supply breaker remains OFF.

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.

Abnormality input circuit is structured as shown below.





② Troubleshooting

1 Occurrence status	1-1	Abnormality detected upon startup (before operation)?	Yes	2-1
			No	3-1
2 Gas type setting Fuel change switch	2-1	Does the gas type setting match the supplied gas type classification? • Control board menu 10 (initial settings) gas type setting • Mixer fuel change switch	Yes	2-2
			No	Change settings
	2-2	Disconnect control board connector 3P (red) CN013, 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 control board
			No	2-3
	2-3	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	2-4
			No	Replace N/P change confirmation switch
	2-4	Correct the wiring between control 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		
3	3-1	Is gas for 13A, 13A (propane), 12A (1) and 12A(2) being supplied?	Yes	3-2
			No	Change gas type setting
	3-2	Check for any air in supply gas. (Note)		

- For work procedure for replacing outdoor control board, see “4. Reference Material”.

Note:

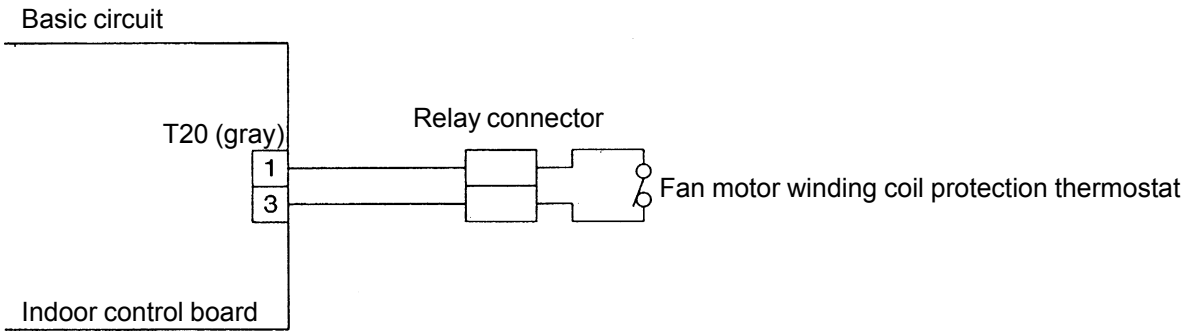
- Although not common, even if the outdoor board settings, mixer N/P switch, and supply gas type are set correctly, an incorrect determination sometimes results depending on the gas supply (such as whether air is mixed in) and the operation load.
- Check to make sure the settings are correct and retry several times.
- For cooling, increase the load somewhat. One way to do this is increase the number of indoor units operating (with all units on test operation mode).

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

① Abnormality detection method

- Detects when indoor control board connector T20 (gray) CN076 1-3 are open, and determines an abnormality.
- 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.



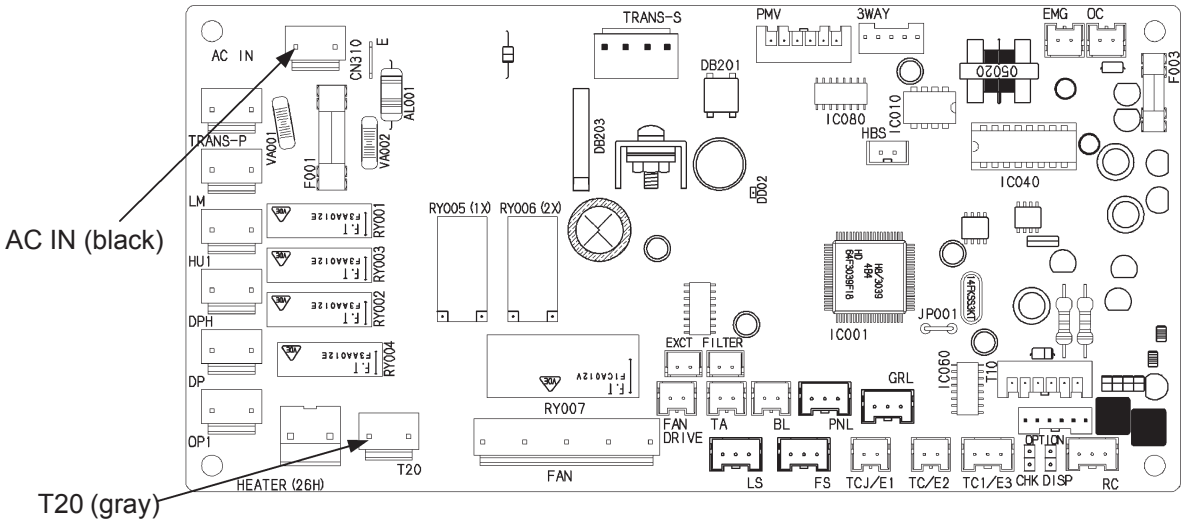
- Models not listed below have one fan motor, with an internal thermostat contact connected between No.1 and No.3 of T20 (gray) CN076.
- Models with two fan motors, with the internal thermostat contacts connected in-line between No.1 and No.3 of T20 (gray) CN076.
- Models where the magnetic switch thermostat is connected to numbers 1 to 3 of T20 (gray) CN076.
- There are two fan motor and indoor control boards. The internal thermostat connections are connected to numbers 1 to 3 of T20 (gray) CN076 on the boards.
- 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 AC200V between indoor control board connector RS1 (black) CN73 No.3 and connector T20 (gray) CN81 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) CN81?	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 abnormality upon operation?	Yes	Replace indoor control board
			No	1-3

- See instructions packaged with servicing indoor control board for procedure on replacing indoor control board.

- 1-1, 1-2


AC IN (black)
T20 (gray)
AC IN
CN310
E
AL001
TRANS-S
PMV
3WAY
EMG
OC
F003
DB201
IC080
IC010
HBS
IC040
TRANS-P
VA001
VA002
F001
DB203
DB02
LM
HU1
DPH
DP
OP1
RY001
RY003
RY002
RY004
RY005 (1X)
RY006 (2X)
RY007
IC001
JP001
EXCT FILTER
GRL
IC060
FAN DRIVE
TA
BL
PNL
OPTION
HEATER (26H)
T20
FAN
LS
FS
TCJ/E1
TC/E2
TC1/E3
CHK
DISP
RC

P03 Compressor Discharge Temp. High

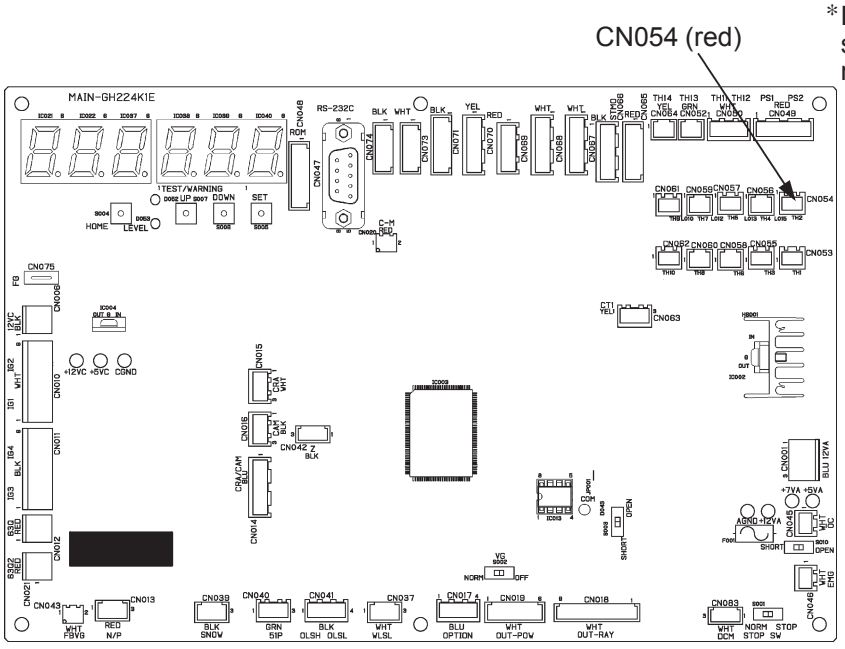
① Abnormality detection method

- When the compressor discharge temperature ≧ 130°C during engine operation (complete combustion), the engine is stopped and an abnormality flag is set.
  When the reason for engine shutdown is this abnormality flag, occurring five 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 “4. Reference Material” 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 Piping	3-1	Any symptoms of pump down? Determine with indoor coil temperature.	Yes	Inspect indoor unit piping
			No	Inspect outdoor unit piping

- 1-1



Outdoor control board

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 Activated

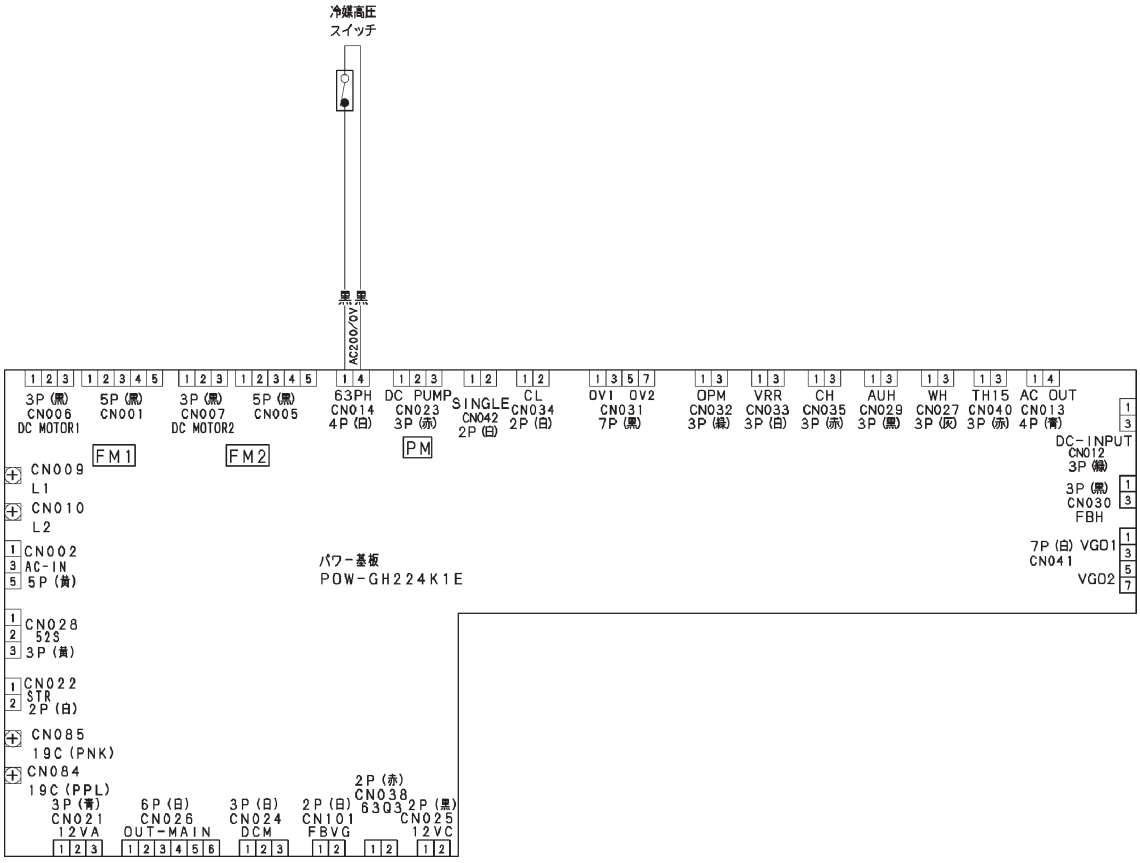
① Abnormality detection method

- 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 mal-functions?	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

- When replacing the power board on single-phase models, be sure to move the 2P (white) CN042 jumper wire from the old board.



P05 Power Trouble

① Abnormality detection method

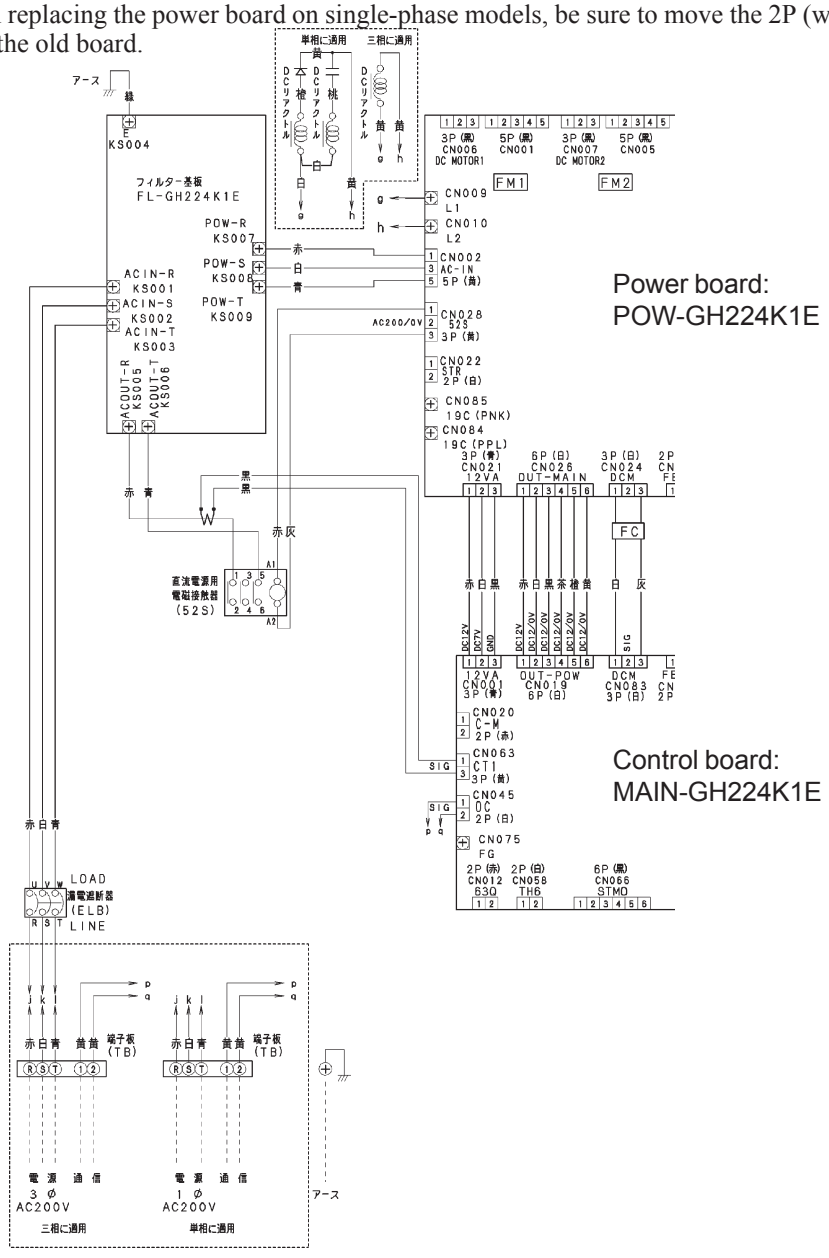
An abnormality is determined when the power source status meets the following condition.

- Instant power failure exceeding 100ms (5 times/h)

② Troubleshooting

1 Power supply	1-1	Are the power supply voltages each 200 V AC? (Measure across terminal board R-S, S-T, and T-R.)	Yes	1-2
			No	Check the power supply.
	1-2	Is 200 V AC applied across each of the filter board connectors (KS001-KS003)?	Yes	1-4
			No	1-3
	1-3	Is the power supply wiring connection poor, or is there a bad component, between the terminal board and the filter board → If so, repair or replace.		
	1-4	Turn on the power again, check to see if the error occurs again. Does it occur again?	Yes	Replace the power board.
			No	1-5
	1-5	There may have been a momentary power outage. Check the power supply wiring connections (check for poor connections). If no trouble is found, keep under observation.		

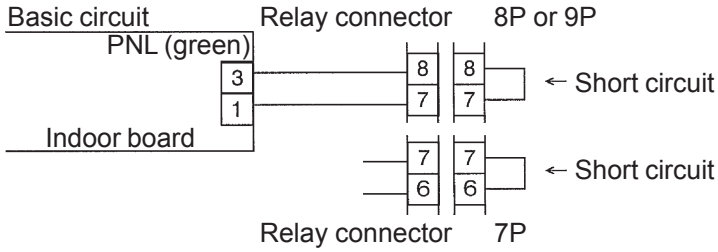
- When replacing the power board on single-phase models, be sure to move the 2P (white) CN042 jumper wire from the old board.



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

① Abnormality detection method

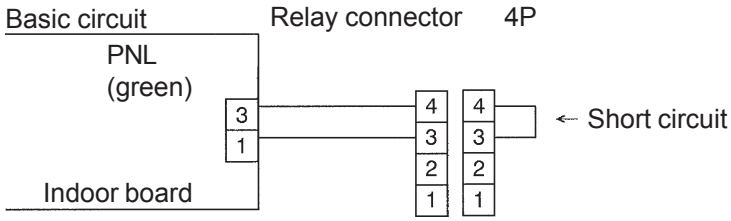
- Detects when indoor control board connector PNL (3P green) CN080 1 and 3 are open, and determines an error.
- The wiring method and connectors differ among indoor units. For details, see the electric wiring diagrams for each indoor unit.
- This input short-circuits on the following models when a ceiling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



Applicable models

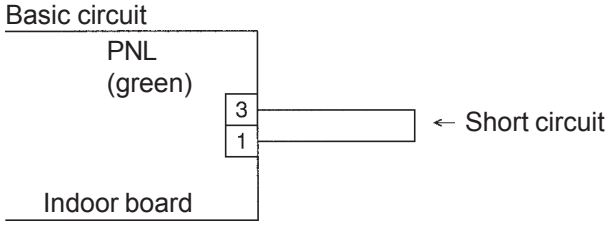
SR7/9/12/18/25	8P (ceiling panel)
SLR9/12/18/25	7P (ceiling panel)
XR9/12/18/25/36/48	7P (ceiling panel)

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



Applicable models

TR12/18/25/36/48	(ceiling panel)
FR9/12/18/25	(front 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		

- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

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

① Abnormality detection method

- Detects when indoor control board connector FS (red) CN034/CN030 1-3 are open, and determines an abnormality.
- 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

  SR7/9/12/18/25 SLR9/12/18/25
  UR7/9/12/18/25/36/48
  XR9/12/18/25/36/48
  AS7/9/12 DR25/36/48

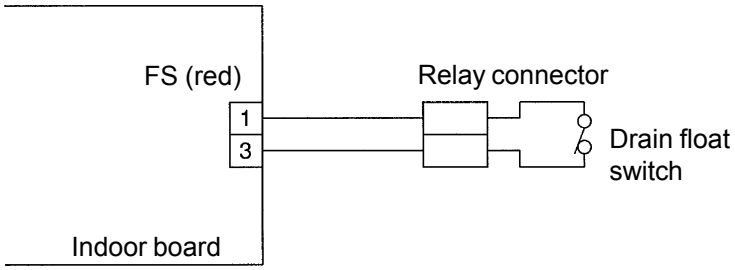
- Models shipped with connector FS (red) CN034/CN030 No.1 and No.3 short-circuited with a wire
- Models not listed above

② Troubleshooting

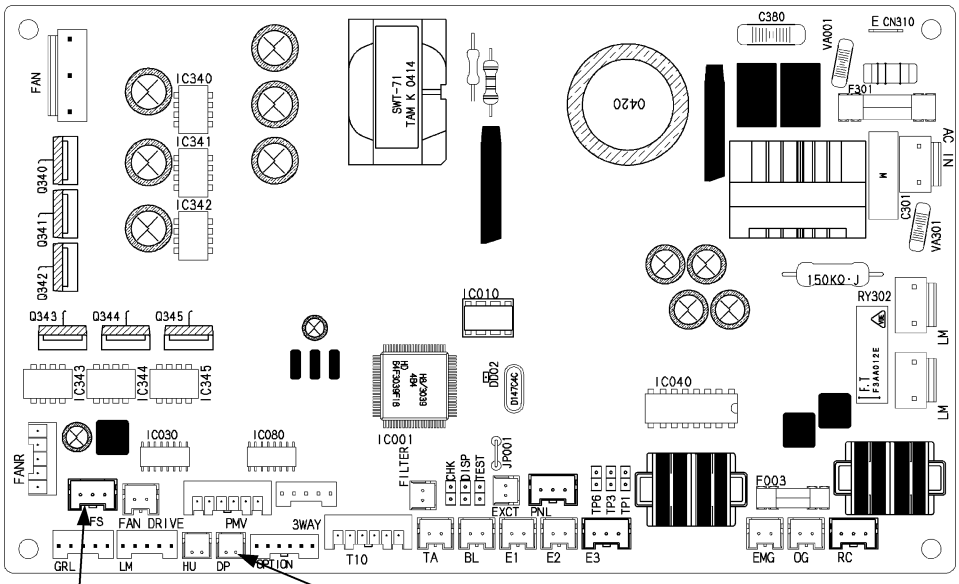
1	1-1	Model with drain float switch built in?	Yes	1-3
			No	1-2
	1-2	Check for poor contact or broken wire in Indoor control board connector FS (red) CN034/CN030 1-3 wiring (connector) → Repair		
	1-3	Drain water overflowed?	Yes	1-4
			No	1-8
	1-4	Drain pump operating?	Yes	1-10
			No	1-5
	1-5	Is AC200V 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 connection, broken wire, etc. in drain float switch connector and between No. 1 and No. 3 indoor control board connectors FS (red) CN034/CN030.		
	1-10	Check and repair draining etc. of drain hose/pipes (On DR, clean/replace filter)		

- The designation (CNxxx/CNxxx) is used in the table. The first number indicates the pin number on the indoor board for DC motor models, and the second indicates the pin number on the indoor board for AC motor models.
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.

Basic circuit



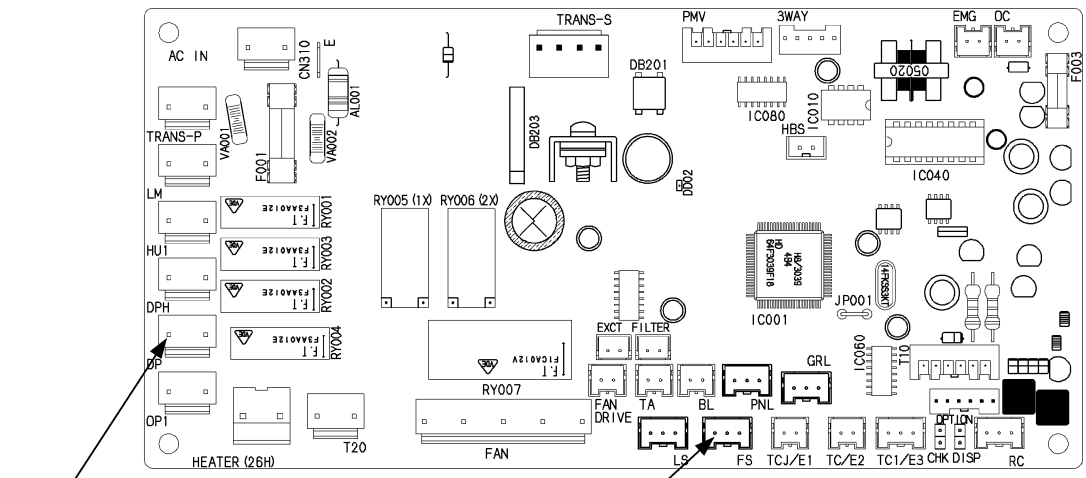
DC motor models



CN034
FS (blue)

CN078
DP (red)

AC motor models



CN068
DP (blue)

CN030
FS (red)

P11 Water Heat Exchanger Unit Freezing Trouble (Detected only when water heat exchanger is connected)

① Abnormality detection method

An abnormality is detected as follows:

- When anti-freeze temperature is detected, and recovery temperature is not reached within 3 minutes.
- When anti-freeze temperature is detected and recovery temperature is reached within 3 minutes, but anti-freeze temperature had been detected within the past 1 hour.

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

	Water chiller	Brine chiller
Hot and cold water outlet temperature	Less than +2°C	Hot and cold water temperature setting: Less than -4°C
Anti-freeze temperature	Less than +2°C	Hot and cold water temperature setting: Less than -4°C
Coil output temperature	Less than -15°C	Hot and cold water temperature setting: Less than -20°C

＊ Recovery temperature (when all conditions below are met)

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

② Troubleshooting

1 Check water heat exchanger unit	1-1	Is a brine chiller using water chiller settings? (When using as a water chiller, go to 1-2)	Yes	Switch to “OFF” and correct
			No	1-2
	1-2	Is the hot and cold water pump stopped?	Yes	Operate hot and cold water pump
			No	1-3
	1-3	Is the flow volume too small?	Yes	Secure flow volume
			No	1-4
	1-4	Are sensors correctly installed in correct positions?	Yes	Replace water heat exchanger unit control board
			No	Repair

- For work procedure for replacing water heat exchanger unit control board, see “4. Reference Material”.

P15 Refrigerant Gas Completely Absent

① Abnormality detection method

- When compressor inlet pressure ≦0.1MPa continuously for 10 minutes during engine start-up.
- During engine operation (complete combustion), when (Compressor inlet pressure≦ 0.1MPa) or ((Outdoor heat exchanger outlet temperature – saturation temperature) ≧30deg) ∗1 or (intake temperature ≧ 70°C) ∗2 continues for 3 minutes, the engine is stopped and an abnormality flag is set. When the reason for engine shutdown is this abnormality flag for 5 consecutive times.

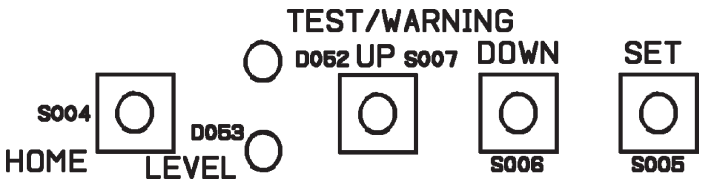
∗1 : Only during cooling (heat exchange outlet temperature is the outdoor heat exchanger outlet during cooling)
∗2 : During cooling and heating

- Not detected for 7 minutes from complete combustion. If the compressor inlet pressure is less than or equal to 0.01 MPa for a three-minute interval, an abnormality will be detected even within seven minutes of complete combustion.
- Not detected when bypass valve is closed.

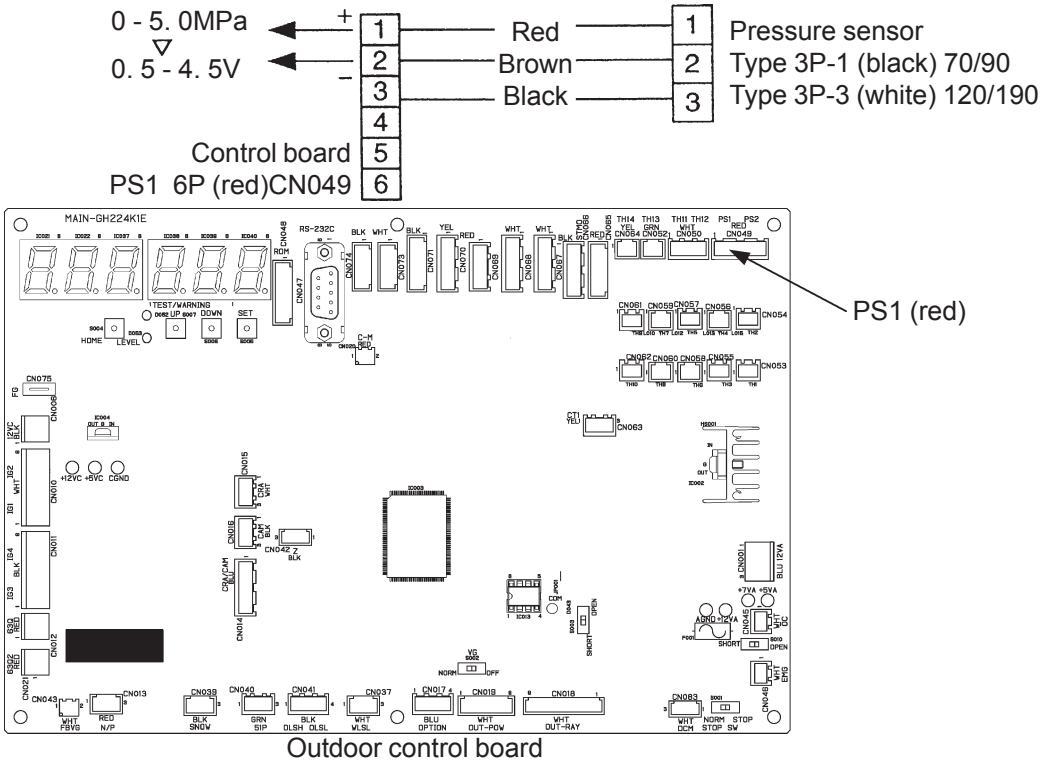
② Troubleshooting

<table>
<tr><td rowspan="6">1
Check pressure sensor</td><td rowspan="2">1-1</td><td rowspan="2">Install gauge on large tube and small tube service port, and open valve (Open valve using outdoor control board No.4 trial operation/forces settings) to equalize pressure within refrigeration circuit.
Is control board display nearly equal to gauge display, and is the value 0.1MPa or less?</td><td>Yes</td><td>Repair leak and charge gas.</td></tr>
<tr><td>No</td><td>1-2</td></tr>
<tr><td rowspan="2">1-2</td><td rowspan="2">Install low pressure gauge to low pressure outlet service port. Is the pressure during operation nearly identical to the control board compressor inlet pressure display, and is the value 0.01MPa or less?</td><td>Yes</td><td>Repair leak and charge gas.</td></tr>
<tr><td>No</td><td>2-1</td></tr>
<tr><td rowspan="2">2
Check wiring</td><td rowspan="2">2-1</td><td rowspan="2">Check compressor inlet pressure sensor wiring. OK?</td><td>Yes</td><td>Replace pressure sensor</td></tr>
<tr><td>No</td><td>Repair wiring</td></tr>
<tr><td rowspan="5">3
Compressor relief valve</td><td>3-1</td><td colspan="3">Check the compressor relief valve. If it is leaking or there are signs of leaking, go to 3-2.</td></tr>
<tr><td rowspan="2">3-2</td><td rowspan="2">Is the piping clogged?</td><td>Yes</td><td>Unclog</td></tr>
<tr><td>No</td><td>3-3</td></tr>
<tr><td rowspan="2">3-3</td><td rowspan="2">Are there any other places with leakage?</td><td>Yes</td><td>Fix them</td></tr>
<tr><td>No</td><td>Replace the compressor</td></tr>
</table>

- 1-1
  Use outdoor control board menu item No. 04 to open valve with trial operation/forced settings. Press the set key to light the TEST/WARNING LED, which opens the valve. Press again to turn off the TEST/WARNING LED to close the valve.



- 2-1


0 - 5. 0MPa
0. 5 - 4. 5V
+
–
1
2
3
4
5
6
Control board
PS1 6P (red)CN049
Red
Brown
Black
1
2
3
Pressure sensor
Type 3P-1 (black) 70/90
Type 3P-3 (white) 120/190
PS1 (red)
MAIN-GH224K1E
Outdoor control board

P18 Bypass Valve Abnormality

① Abnormality 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 ($\Delta P \leqq 0.1$ MPa) between the high and low pressure (ΔP = high pressure - low pressure) 90 seconds after stopping the engine stops, a suspected abnormality 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 abnormality. If a pre-trip abnormality was detected (when the suspected abnormality 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, close the bypass valve with no. 4 test mode "v_close" (20 steps). Check to make sure no coolant escapes pass the bypass valve.	OK	1-2
			NG	Replace the bypass valve unit
	1-2	• Bypass valve inspection ② After 1-1, stop the engine and open the bypass valve with no. 4 test mode "v_open". Then check to make sure the bypass valve operates correctly even when there are temperature changes in front and behind it.	OK	2-1
			NG	1-3
	1-3	• Outdoor control board inspection Is there approximately 12 V of pressure at bypass valve output ports 5 (positive) and 1 to 4 (negative) when the power is on?	Yes	1-4
			No	Replace the outdoor control 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 and outdoor solenoid valve inspection	2-1	Is the outdoor unit a three-way multi-device?	Yes	2-3
			No	2-2
	2-2	Is the four-way valve free from leakage?	Yes	3-1
			No	Replace the 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 is to be closed when current flows through it. The others are to be open.	Yes	3-1
			No	Replace the leaking valve
3 Liquid valve inspection	3-1	• Liquid valve inspection ① Is there any coolant leakage past the liquid valve when the liquid valve is completely open (20 steps) during operation?	No	4-1
			Yes	Replace the liquid valve unit

4 Expansion valve inspection	4-1	Is the operation mode heating? * Note: If you are operating with a three-way 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 to make sure there is no coolant leakage past the outdoor expansion valve when stopped in heating mode (outdoor expansion valve open to 20 steps).	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 the outdoor control board
			NG	Correct

- For work procedure for replacing outdoor control board, see “4. Reference Material”.

P19 4 Way Valve Lock Trouble

① Abnormality detection method

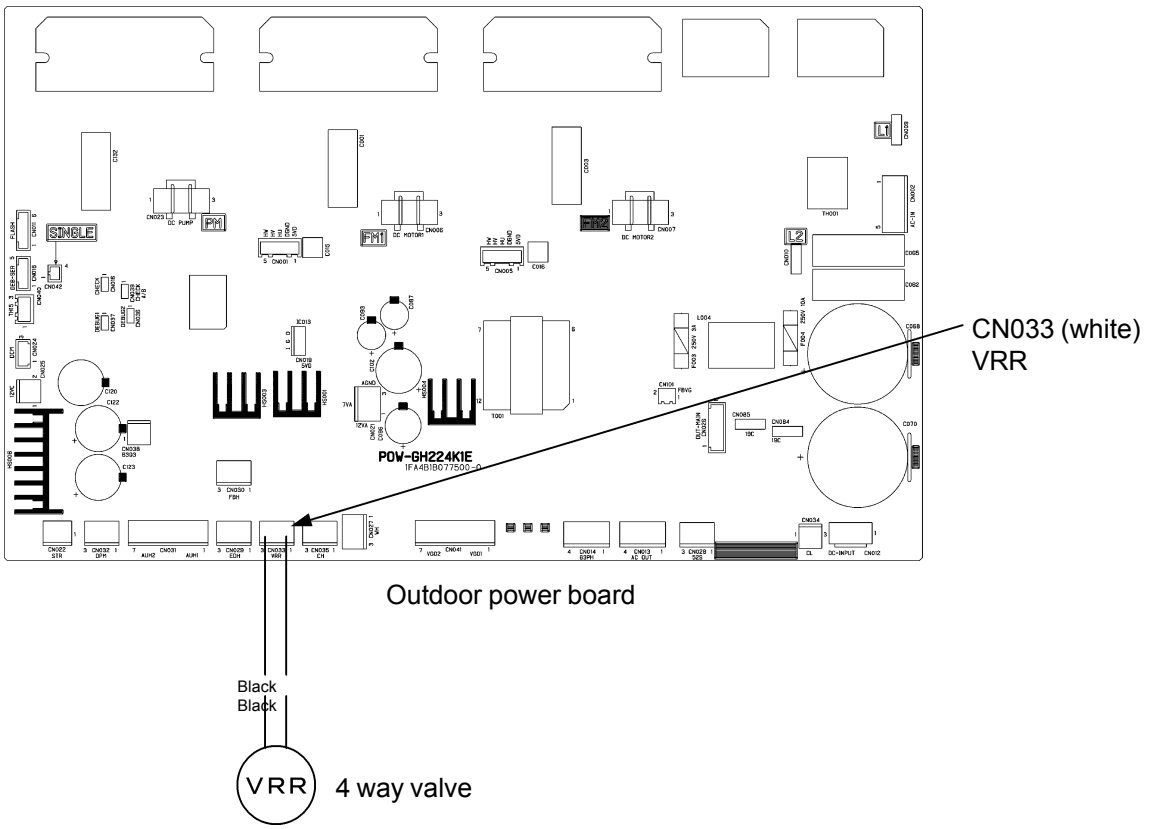
- Determined after 6 minutes of complete combustion time has passed during heating operation.
- An abnormality is determined in thermostat ON indoor units, when the highest indoor heat exchanger outlet (E3) temperature is detected to be lower than the outdoor heat exchanger inlet for 5 minutes continuously.

② Troubleshooting

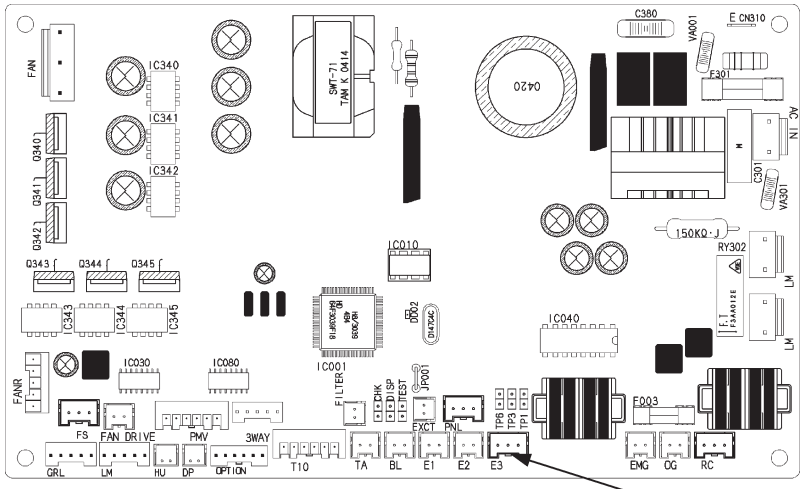
1 Check four-way valve	1-1	Check the 4 way valve temperature during heater operation. Switched to heater side?	Yes	2-1
			No	1-2
	1-2	During heater operation, is the control board VRR connector (CN033) voltage about AC0V?	Yes	2-2
			No	1-3
	1-3	After stopped, turn OFF outdoor unit. Disconnect control 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.		

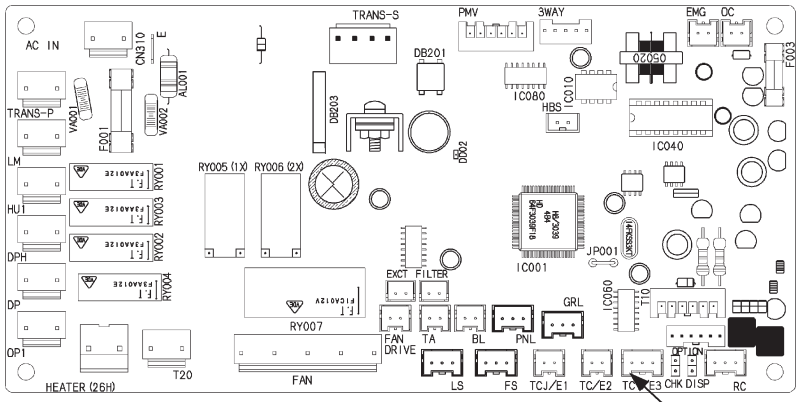
- When replacing the power board on single-phase models, be sure to move the 2P (white) CN042 jumper wire from the old board.

- 1-2, 1-3



- 2-1


FAN
Q340
Q341
Q342
Q343
Q344
Q345
IC340
IC341
IC342
IC343
IC344
IC345
IC010
IC001
IC030
IC080
IC040
FANR
FS
FAN DRIVE
PMV
3WAY
OPTION
T10
TA
BL
E1
E2
E3
EMG
OG
RC
GRL
LM
HU
DP
FILTER
CHK
DISP
TEST
JP001
EXCT
PNL
TP6
TP3
TP1
F003
C380
VA001
E CN810
F301
AC IN
C301
VA301
150KΩ J
RY302
F.I
Indoor control board for DC motor models
E3 (brown) Heat exchanger outlet


AC IN
CN310
E
AL001
TRANS-P
VA001
F001
VA002
LM
HU1
DPH
DP
OP1
HEATER (26H)
T20
TRANS-S
DB201
DB203
DB202
PMV
3WAY
IC080
HBS
IC010
IC040
EMG
OC
F003
RY005 (1X)
RY006 (2X)
RY001
RY003
RY002
RY004
RY007
IC001
JP001
EXCT
FILTER
GRL
IC060
T10
FAN
FAN DRIVE
TA
BL
PNL
OPTION
LS
FS
TC1/E1
TC/E2
TC/E3
CHK
DISP
RC
Indoor control board for AC motor models
E3 (brown) Heat exchanger outlet

P20 Refrigerant Pressure Too High

① Abnormality detection method

- When the high pressure sensor value ≧ 3.80MPa during engine operation (complete combustion), the engine is stopped and an abnormality flag is set.When the reason for engine shutdown is this abnormality flag, occurring five times continuously in one hour.
- Revolution speed setting > minimum revolution speed is not included in pre-trip. Fan frequency < 50% of maximum limit frequency is not included in pre-trip.

② Troubleshooting

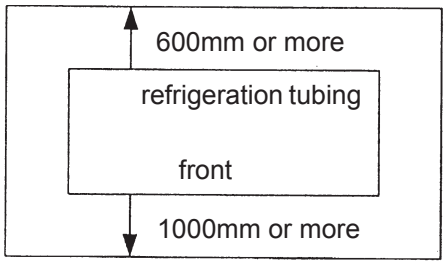
1 Cooling/Heating mode	1-1	Cooling mode? Heating mode?	Cooling	2-1
			Heating	3-1
2 Check outdoor heat exchanger	2-1	Visually, any debris etc. clogging heat exchanger?	Yes	Remove
			No	2-2
	2-2	Any air shortage?	Yes	Change installation
			No	2-3
	2-3	Does the outdoor fan turn?	Yes	12-1
			No	See P22
3 Piping	3-1	Any crushed pipes, 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 exchanger	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 heater 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	Check electric valve coil (Resistance between electric valve connector 5P (white) or 6P (white) No. 5 and No. 1-4 about 46Ω?)	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	Hot and cold water (brine) flow volume secured? e secured?	Yes	Secure required flow volume
			No	8-2
	8-2	Does the hot and cold water (brine) pump turn?	Yes	9-1
			No	Repair

9 Check water heat exchanger unit electric valve	9-1	Check water heat exchanger unit electric valve. Does electric valve open? (Check water heat exchanger unit coil temperature during heating operation)	Yes	10-1
			No	9-2
	9-2	Check water heat exchanger unit control board (When turning power ON, is there voltage between water heat exchanger unit control board 10P-1 (white)/10P-2 (black) No. 5 (+) and No. 1-4 (-), and No. 10 (+) and No. 6-9 (-)?)	Yes	9-3
			No	Replace water heat exchanger unit control board
	9-3	Check electric valve coil (Resistance between electric valve connector 6P-1 (white) No. 5 and No. 1-4 about 46Ω?)	Yes	Replace valve unit
			No	Replace valve coil
10 Water heat exchanger unit coil sensor	10-1	Are water heat exchanger unit coil sensors TH1-4 detached from their measurement points? Determine by displaying the water heat exchanger unit coil temperature on the outdoor unit.	Yes	Repair
			No	11-1
11 Check outdoor electric valve	11-1	Check outdoor electric valve.	OK	12-1
			NG	Repair
12 High pressure sensor	12-1	Check high pressure sensor.	OK	13-1
			NG	Repair
13 Bypass valve	13-1	Bypass valve activating properly? (wiring and coil unit)	Yes	14-1
			No	Repair
14 Engine	14-1	Engine throttle sticking?	Yes	Repair
			No	Investigate further

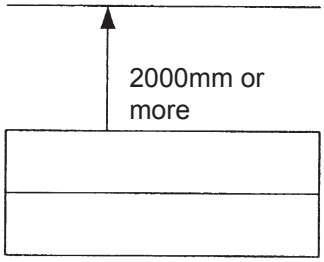
- See instructions packaged with servicing indoor board for procedure on replacing indoor control board.
- For work procedure for replacing water heat exchanger unit control board, see "4. Reference Material."

- 2-2
  Any air shortage?
  An air shortage is likely if the installation conditions pictured below are not met.

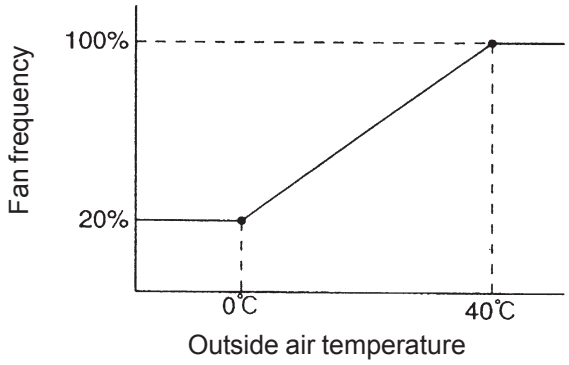
Unit perimeter



Unit top

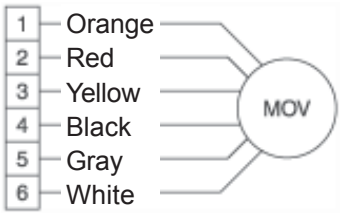


- Check the following when the outdoor control board No. 0 operation data display shows an outdoor fan output display (Data code 31) other than 0% (outdoor fan motor operation).
- During normal operation, the outdoor fan motor operation may be stopped (outdoor fan frequency display: 0%).
  Initial frequency value during engine operation (complete combustion) = outside air temperature × 2 + 20% (if outside air < 0°C, then outside air = 0°C)
  During heating, when the outside air temperature is less than 2°C, this may be less than 20%



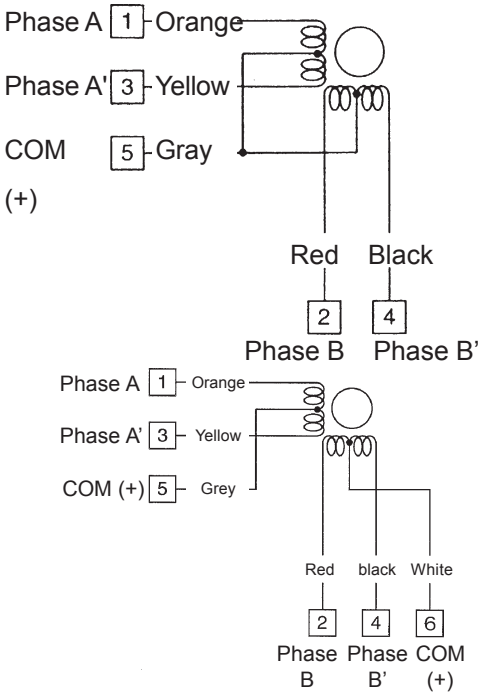
- 6-1
  Indoor electric valve check
  Electric valve opening determination standards: During heating operation, after 30 minutes have passed in complete combustion, the indoor coil outlet temperature must exceed 40°C.

  Check using No.0 Operation data display.

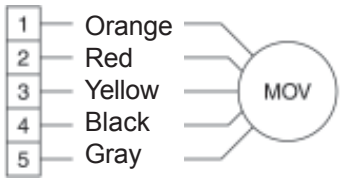


- 6-2
  Normal if a pulse voltage is applied across indoor control board connector PMV 6P (white) CN082 No. 5 and No. 1-4 after turning power ON. (About DC4V measured on tester)

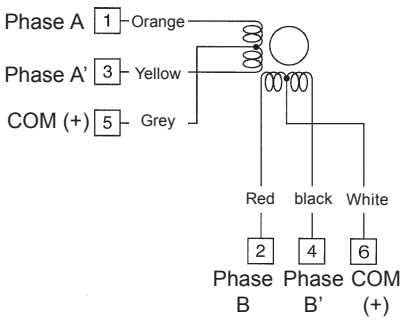
- 6-3
  Unplug indoor electric valve connector 6P (white), and measure resistance of electric valve coil between No.5 and No.1~4 using a tester. Replace coil if 0Ω or ∞ (46Ω is normal).



- 9-1
  Check water heat exchanger unit electric valve
  Electric valve opening determination standard :
  During heating operation, after 30 minutes have passed in complete combustion, the water heat exchanger unit coil outlet temperature must exceed 40°C.
  Check using No.0 Operation data display.



- 9-2
  Normal if, after turning power ON, a pulse voltage is applied across water heat exchanger unit control board connector 10P-1 (white)/10P-2 (black) No. 5 and No. 1-4, and No. 10 and No. 6-9.
  (About DC4V measured on tester)



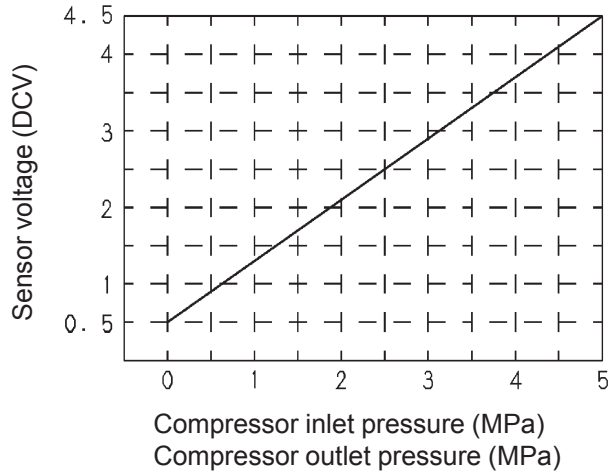
- 9-3
  Unplug water heat exchanger unit electric valve connector 6P-1 (white), and use tester to measure between No. 5 and No. 1 to 4, measuring electric valve coil resistance.
  Replace coil if 0Ω or ∞. (About 40Ω is normal)

- 11-1
  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 Abnormality 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. Change display data with up and down keys, and compare outdoor heat exchanger inlet temperature (data code 14) and outdoor heat exchanger outlet temperature (data code 15). If the outlet is lower, the outdoor electric valve may not be closed.

- 12-1
  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 control 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 control 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 control board voltage	a. Is the voltage between the control board connector 6P (red) CN049 No.4 and No.6 DC5V?	Yes	To b
		No	Replace outdoor control board
	b. Is the voltage between the control board connector 6P (red) CN049 No.5 and No.6 a voltage equivalent to gauge pressure?	Yes	Replace outdoor control 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

- Refer to “4. Reference Material” for the operating procedure used when replacing the outdoor control board.



- 13-1

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 control 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 (Inverter) Trouble

① Abnormality detection method

When the outdoor fan (fan motor) revolutions and drive meet the following conditions, an abnormality is determined after 5 times/h.

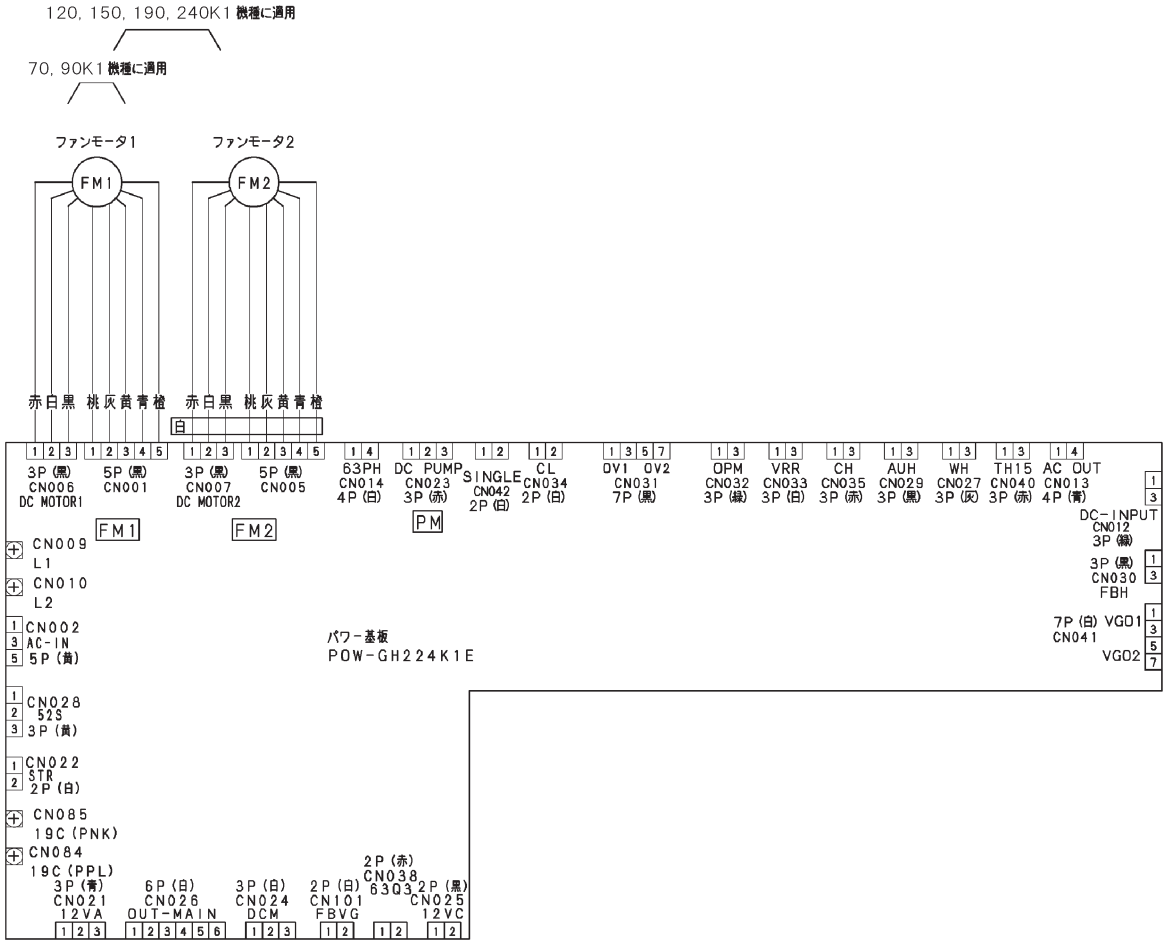
- When outdoor fan (fan motor) revolution is not detected.
- When an outdoor fan (fan motor) circuit short-circuit current (18A or more) is detected.

② Troubleshooting

1 Outdoor fan motor	1-1	Any outdoor fan motor locking, broken wires, poor contact, or short circuits? (Coil resistance should be around 5-15Ω for each phase.)	Yes	Replace outdoor fan motor
			No	1-2
	1-2	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.) • Are mid-sized units (with one FM1) connected to FM1?	OK	1-3
			NG	Correct the connection
	1-3	Replace power board and keep under observation. If P22 reoccurs, replace outdoor fan motor.		

1-1 Note: For high static pressure models, the resistance values will be about 5Ω lower than the values given above.

- Refer to “4. Reference Material” for the operating procedure used when replacing the outdoor control board.
- When replacing the power board on single-phase models, be sure to move the 2P (white) CN042 jumper wire from the old board.



P23 Water Heat Exchanger Unit Interlock Trouble (Detected only when water heat exchanger unit is connected)

① Abnormality detection method

An abnormality 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 30 seconds.
- 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 hot and cold water pump operation command wiring connected to the auxiliary equipment hot and cold water pump relay? (Note 1, 3)	Yes	1-2
			No	Request equipment wiring
	1-2	Does the hot and cold water pump have interlock wiring? (Note 2, 3)	Yes	1-3
			No	Request equipment wiring
	1-3	Any signal line broken, with poor contact, or short-circuited?	Yes	Repair
			No	1-4
	1-4	Is the auxiliary equipment control board power OFF?	Yes	Turn power ON
			No	1-5
	1-5	Any chattering in the auxiliary equipment hot and cold water pump relay and the hot and cold water flow switch? (Note 4)	Yes	Request equipment repair
			No	Replace water heat exchanger unit board

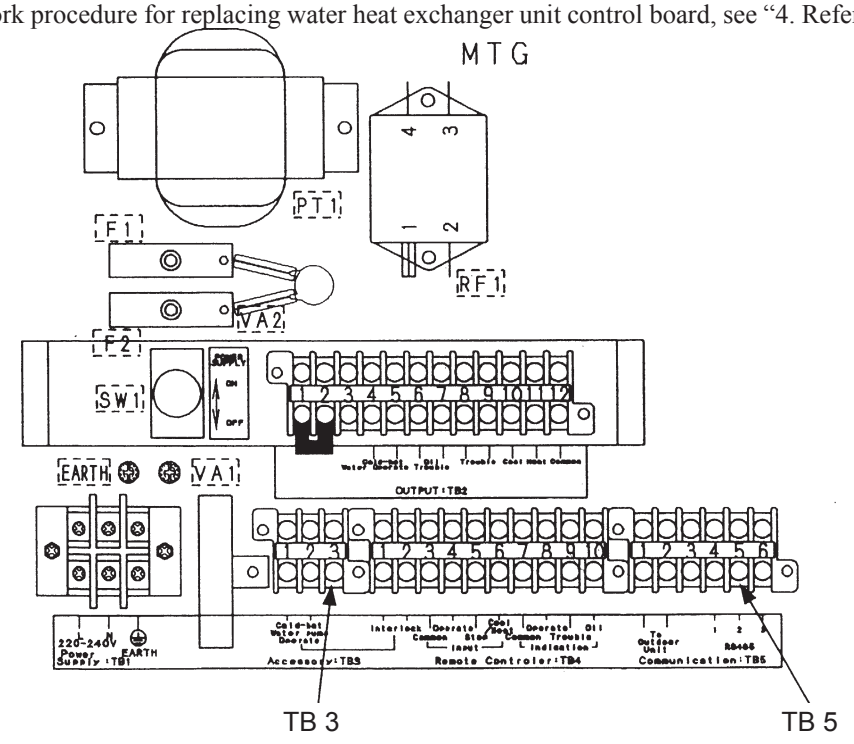
Note 1) Hot and cold water pump operation order.....TB3: Between No.1 and No.2 (No voltage, "a" contact output)

Note 2) Hot and cold water pump interlock.....TB3: Between No.3 and No.4 (No voltage, "a" contact input)

Note 3) When TB3 No.3 and No.4 on the terminal plate are short-circuited, operation becomes possible. However, this can cause cold water freezing caused by decreased flow volume. Therefore, always provide interlock wiring.

Note 4) Provide a flow switch in line with the cold water pump operation signal to confirm that the flow volume is secured. Check the settings of the flow switch.

- For work procedure for replacing water heat exchanger unit control board, see "4. Reference Material."



P30 Group Slave Unit Trouble

∗ Warning only displayed on system controller. Not detected when water heat exchanger unit is connected.

① Abnormality detection method

When an abnormality occurs on a group control slave unit (for all abnormalities), the system controller displays P30.

② Troubleshooting

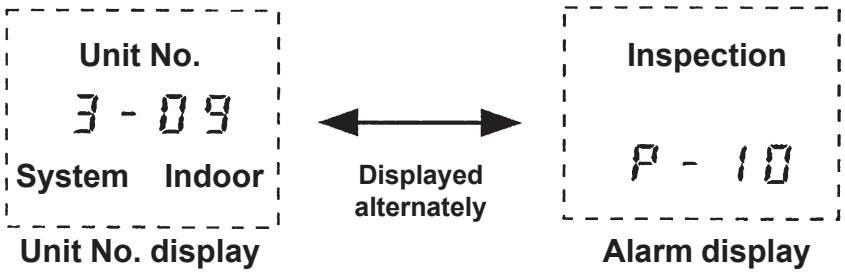
1	1-1	Confirm abnormality details using one of the following methods. ① Check warning display on wired remote control. ② Check warning history in system controller servicing check mode.
	1-2	Troubleshoot the warning found in 1-1.

- 1-1 ②

System controller servicing check mode (warning history)

Indoor unit/outdoor unit warning history monitoring mode (also clears warning history)

① Press the Check and Set button continuously for 4 seconds or more.
② Service Check lights, and the item code [ ] [ ] 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 Switch Zone , Switch Group ◀ or ▶, 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 Check button.

P31 Group Control Trouble (Not detected when water heat exchanger unit is connected)

① Abnormality detection method

Under the following conditions, all non-master units in the remote control group display this abnormality and stop.

- When remote control linking wiring is connected to an indoor unit independently controlled by a remote control (L07)
- When multiple master units exist within remote control group wiring (L03).
- When indoor unit fails to receive from remote control (central) (E03).

② Troubleshooting

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

- See “4. Reference Material” for detailed setting of remote control.

oiL Oil Change Time Warning

① Abnormality detection method

❶ 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 remote control display.

② Troubleshooting

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

4. Reference Material

(1) Outdoor Control Board Replacement Sequence and Remote Control Service Function

① Outdoor Control Board Replacement Sequence

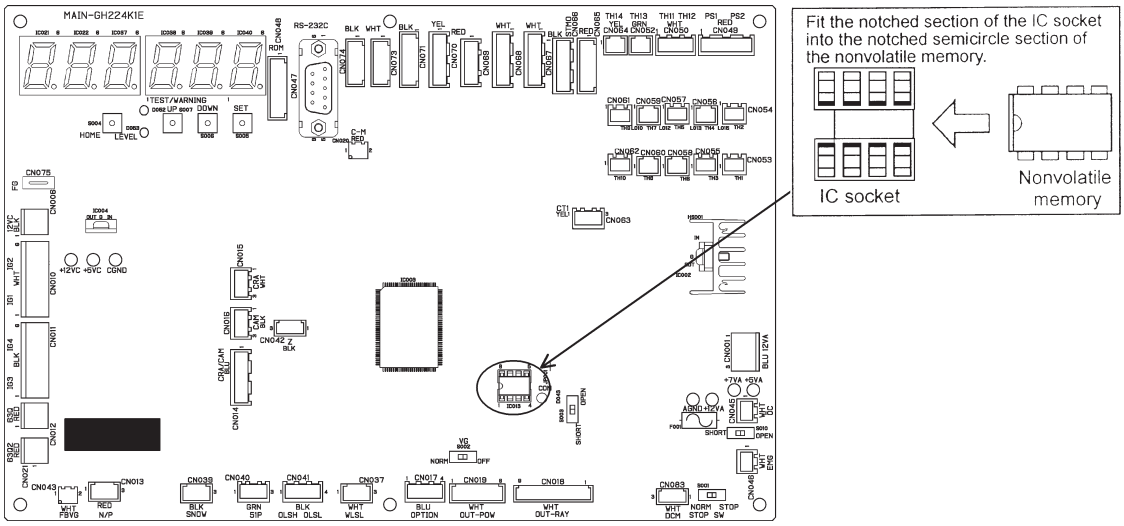
To replace the outdoor control board, perform the work through the following sequence.

❶ Turn off the power supply, and replace the outdoor control board.

❷ 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 control board, when replacing the outdoor control 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 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.

Fit the notched section of the IC socket into the notched semicircle section of the nonvolatile memory.



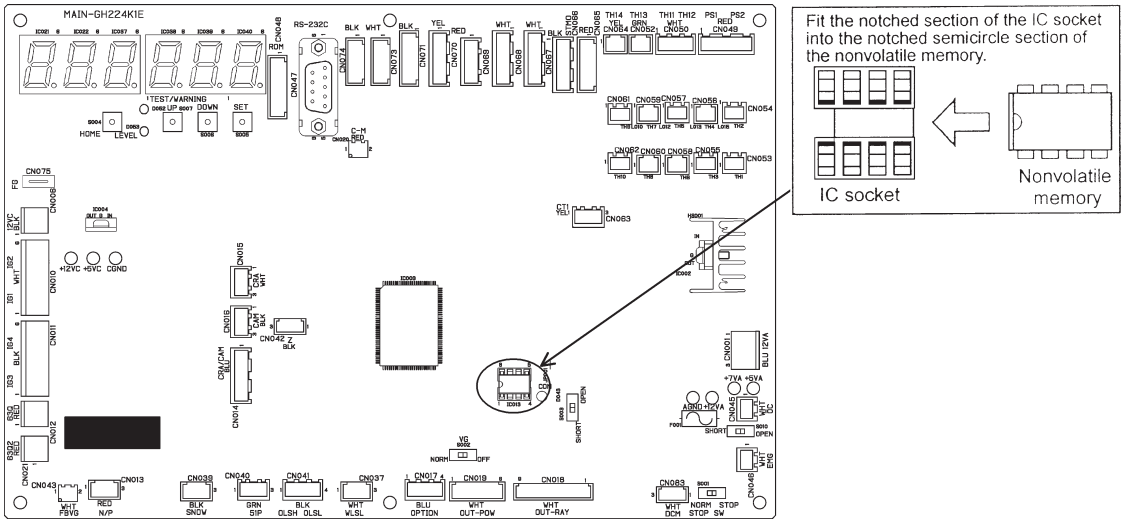
❸ Turn on the power supply, and confirm operation.

② Outdoor Nonvolatile Memory (EEPROM) Replacement Sequence

- When replacing the outdoor control board, in the event of nonvolatile memory breakage or F31 abnormality, 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.

❶ 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, 7 and oil change time.

❷ Install the nonvolatile memory package in the service board in the outdoor control 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.



❸ Turn on the power supply.

❹ At the initial setting, match outdoor unit capacity (model types, etc.) to the outdoor models.

❺ For subsequent outdoor unit settings, set the other parameters to the best of your knowledge.

❻ Confirm operation.

❼ Always be sure to readjust engine ignition timing.

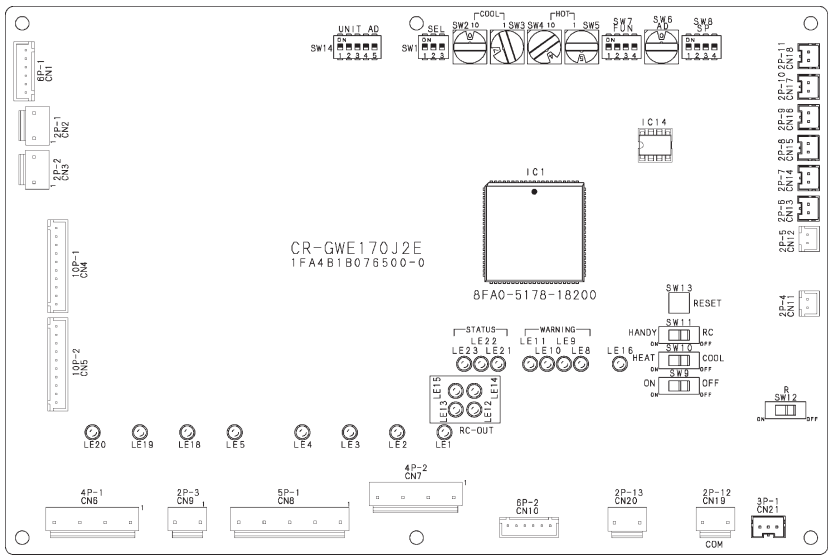
③ Procedure for Replacing Water Heat Exchanger Unit Control Board

❶ Setting of the SET switch
Set the SET switches on the new board to the same settings as that of the replaced board.

❷ Replacement of the board
- Precautions when removing the board
  Make sure that all connectors are removed.
  Press the spacer hooks and carefully pull the board forward without applying force to each of the holes on the board.
- Precautions when installing the board
  Make sure that the spacers fit in all of the holes on the board.
  Carefully slide the board into the back of the case without applying force to each of the holes on the board. Make sure that the wires and connectors are not trapped.

❸ Replacement of connectors
- Replace all connectors. Make sure that the number of poles, colors, and types of the connectors are correct.
- Be careful, 2P-12 and 2P-13 are the same connector.
  Unless otherwise specified, use the 2P-12 connector. Only use the 2P-13 connector if the fuse (F1) has blown as a result of, for instance, accidentally applying a power voltage to the operating wire between the outdoor and indoor units.

❹ Return of the failure board
Return the failure board to the factory for examination of the cause of failure.



Water heat exchanger unit control board (CR-GWE170J2E)

④ Remote Control Simple Setting Mode

- You can make changes to settings that need to be changed frequently to optimize the operation of the indoor unit.
- For a list of the setting items you can change, refer to the next page.

- Setting Procedure

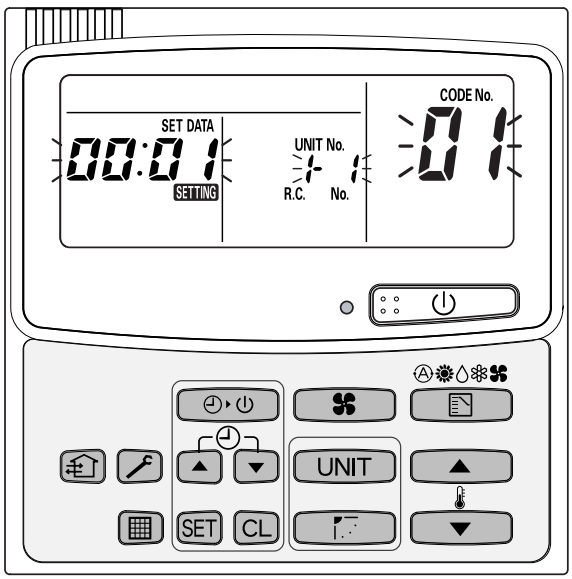
1. Press the [🔧] and [SET] button simultaneously for 4 seconds or more.

2. To set all indoor units on the group operation control network, leave the unit number as `R L L`. To set individual indoor units on the network, select the number of the unit you want to set using the [UNIT] button.
   (The fan of the selected indoor unit runs)

3. Select the item code with the temperature setting [▲] and [▼] buttons.

4. Select setting data with the timer [▲] and [▼] buttons.

5. Press the [SET] button to set.



6. Repeat Steps 2 to 5 until settings for all indoor units have been made. Then, press the [🔧] button to end Simple Setting mode.

- List of Simple Setting Items

Item Code	Item	Setting Data		
01	Filter sign lighting time (filter life)	0	No display (standard value preset individually for each model at the time of shipment)	
		1	150 hours	
		2	2500 hours	
		4	10000 hours	
		5	Use of clogging sensor	
02	Filter contamination level	0	Standard (default)	
03	Central control address	1	Central control address 1	
		2	Central control address 2	
		3	Central control address 3	
		•	•	
		•	•	
		64	Central control address 64	
		99	Central control address not yet assigned (default)	
04	Operation mode priority switching	0	Normal (default)	
		1	Priority	
05	Air speed when heating thermostat is off		Compressor on	Compressor off
		0	L air 1 min., LL air 3 min. (default)	LL air (default)
		1	L air	LL air
		2	LL air	LL air
		4	L air 1 min., LL air 3 min.	L air
		5	L air	L air
		6	LL air	L air
06	Intake temperature downshift while heating	0	No shift (standard value preset individually for each model at the time of shipment)	
		1	Intake temperature down by 1 degree	
		2	Intake temperature down by 2 degrees	
		3	Intake temperature down by 3 degrees	
		4	Intake temperature down by 4 degrees	
		5	Intake temperature down by 5 degrees	
		6	Intake temperature down by 6 degrees	
08	Humidification when thermostat is off	0	Off (default)	
		1	On	
09	Humidification when in blower mode	0	Off (default)	
		1	On	
0C	Heating standby display	0	Normal	
		1	No display	
0D	Auto heating/cooling mode	0	Permitted (when possible)	
		1	None	
0F	Dedicated cooling	0	Normal (default)	
		1	Dedicated cooling	

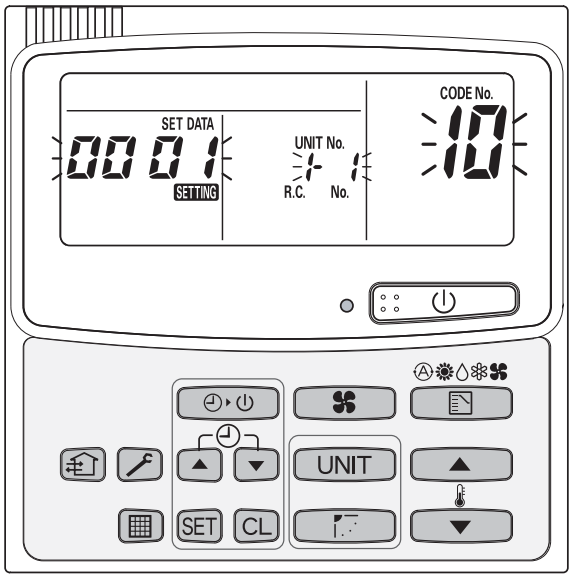
Notes

- Do not set 'Humidification when thermostat is off' and 'Humidification when in blower mode' except for the evaporation humidifier. Doing so may cause a water leak or blower malfunction.
- Before changing the settings, consider whether the change is appropriate to the application purpose and model of the unit. Incorrect settings may cause a problem.
- Do not change any settings that are not mentioned in this list.

⑤ Remote Control Advanced Setting Mode

- Advanced settings mode allows you to configure settings that are critical for system operation, for example, the indoor unit address, group, or system (outdoor unit) address of standalone or group operation control network indoor units that are connected to the advanced settings remote control.
- You can also change the setting items of Simple Setting mode.
- For a list of setting items you can change, refer to the next page.
- Setting Procedure

1. Press the SET , CL and buttons simultaneously for 4 seconds or more.
2. Select the number of the unit you want to set using the UNIT button.
   (The fan of the selected indoor unit runs)
3. Select the item code with the temperature setting and buttons.
4. Select setting data with the timer and buttons.
5. Press the SET button and confirm that the "SETTING" display changes from the flashing to steady-on state.
6. Repeat Steps 2 to 5 until settings for all indoor units have been completed. Then, press the button to end Advanced Setting mode.



- List of Advanced Setting Items

Item Code	Item	Setting Data					
		No.	Content	No.	Content	No.	Content
10	Type	0	ASR	1	XR	2	SR
		3	SLR	4		5	UR
		6	DR	7	TR	8	KR
		9		10	FR	11	FMR
		12		20		21	
		22		25		26	
		27		28		29	
		30		31	DR(76, 96)	34	
11	Indoor unit capacity	1	7	3	9	5	12
		7		9	18	11	25
		12	48	13		15	36
		17	96	18		21	76
		23		25		26	
		27		28			
	Indoor unit airflow	3		7		9	
		17		21		23	
12	System (outdoor unit) address	1	Unit 1 (System [outdoor unit] address of outdoor unit is “1.”)				
		2	Unit 2 (System [outdoor unit] address of outdoor unit is “2.”)				
		3	Unit 3 (System [outdoor unit] address of outdoor unit is “3.”)				
		•	•				
		•	•				
		30	Unit 30 (Do not set a number of units that exceeds this number.)				
		99	No system (outdoor unit) address setting (In this case, the system (outdoor unit) address needs to be set.)				
13	Indoor unit address	1	Unit 1				
		2	Unit 2				
		3	Unit 3				
		•	•				
		•	•				
		20	Unit 20 (Do not set a number of units that exceeds this number.)				
		99	Indoor unit address not yet assigned (In this case, you need to set the indoor unit address.)				
14	Group operation control address	0	Standalone (Indoor unit is not connected to group operation control network.)				
		1	Parent unit (One of the group operation control network indoor units.)				
		2	Child unit (One of the non-parent group operation control network indoor units)				
IC	Cooling exhaust temperature shift	–10	–10				
		–9	–9				
		:					
		10	10				
ID	Heating exhaust temperature shift	–10	–10				
		–9	–9				
		:					
		10	10				
2E	HA terminal select	0	Use T10 as HA.				
		1	Use T10 as CARD.				
31	Fan	0	absent				
		1	present				
32	Remote control sensor	0	Body sensor				
		1	Remote control sensor				

Notes

- Advanced settings are critical for system operation. Be sufficiently careful when changing these settings because incorrect settings may cause a serious problem.
- Item codes not mentioned in this list also appear. Do not change the setting data for these item codes because the optimal settings were set individually for each model at the time of shipment.
- Do not change any settings that are not mentioned in this list.

⑥ Display of Engine Operation Time on the Remote Control

- The engine operation time of the outdoor unit can be displayed on the remote control.

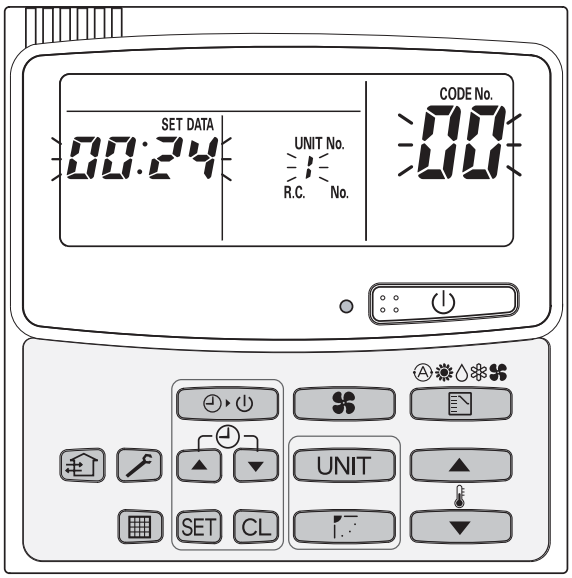
- Setting Procedure

1. Press the timer ▲ and ▼ buttons simultaneously for 4 seconds or more.

2. The cumulative operating time is displayed in the sequence of system (outdoor unit) addresses 1 to 30 in intervals of several seconds.

3. The cumulative operating time for the unconnected system (outdoor unit) address is displayed like this: " - - - - - - ".

4. Press the button to return to the normal remote control display.

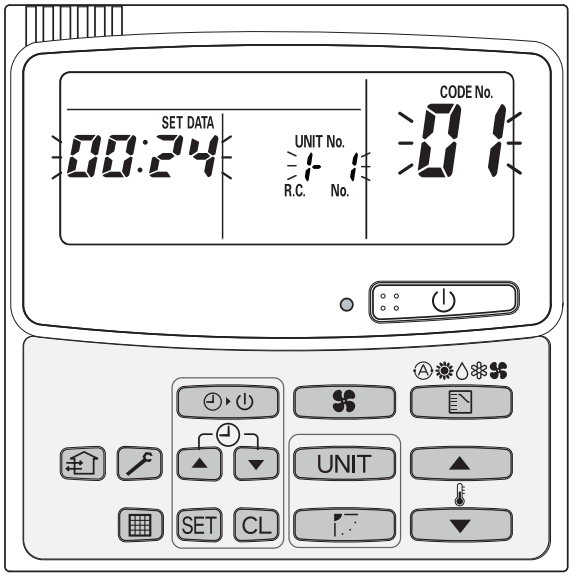


⑦ Display of Sensor Data on the Remote Control

- Data such as indoor/outdoor sensor temperature and pressure can be displayed on the remote control.

- Display Procedure

1. Press the CL button and button simultaneously for 4 seconds or more.
2. For group operation control, press the UNIT button and select an indoor unit address.
3. Press the temperature setting ▲ and ▼ buttons to change the item code (refer to the table below for details on item codes).
4. Press the button to return to the normal remote control display.



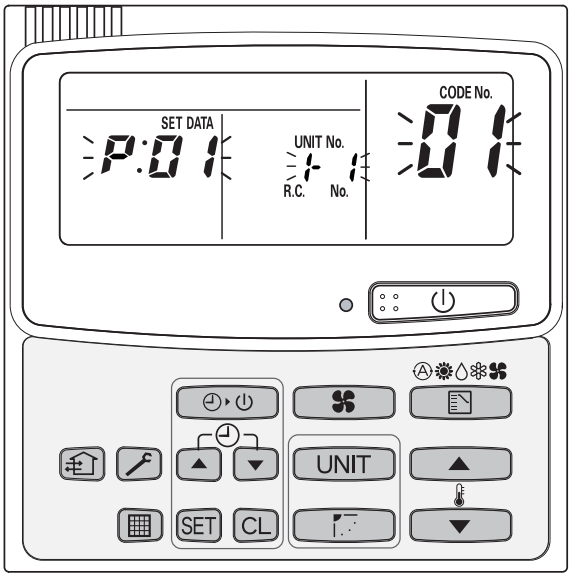
• List of Display Items

Item Code	Display Item	Unit	Remarks
01	Remote control sensor temperature	℃	In 1°C increments
02	Room temperature (intake) sensor temperature	℃	In 1°C increments
03	Discharge sensor temperature	℃	In 1°C increments
04	Indoor heat exchanger inlet sensor temperature (E1)	℃	In 1°C increments
05	Indoor heat exchanger outlet sensor temperature (E3)	℃	In 1°C increments
06	Indoor electric valve opening	Step	
07	Engine speed	1/10 min^{-1}	Multiplying by a factor of 10 to get the unit [min^{-1}]
08	Compressor inlet pressure	100 MPa	Multiplying by a factor of 1/100 to get the unit [MPa]
09	Compressor outlet pressure	100 MPa	Multiplying by a factor of 1/100 to get the unit [MPa]
10	Indoor heat exchanger sensor intermediate temperature (E2)	℃	In 1°C increments

⑧ Service Check (Fault Log Monitor) Procedure

- Details of faults that occurred in the past can be called up on the remote control.
- Display Procedure

1. Press the SET button and button simultaneously for 4 seconds or more.
2. Press the temperature setting and buttons to change the item code.
3. The item code 01 shows the latest warning, 02 the second latest, 03 the third latest, and so on.
4. Press the button to return to the normal remote control display.
5. Memory clear operation
   If you press the CL button during a service check session, the warning log is cleared.



⑨ Remote Control Check Function

- The remote control is equipped with a self-diagnosis function.

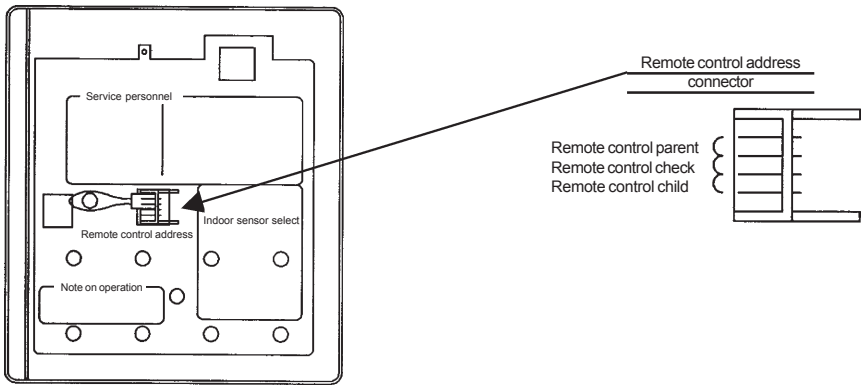
- Check Procedure

1. Perform remote control check.
   Remove the jumper (2P) inserted into the socket (4P white) on the back of the remote control board.
   Move it from pins 3 and 4 to pins 2 and 3 to check the remote control (see the figure below).

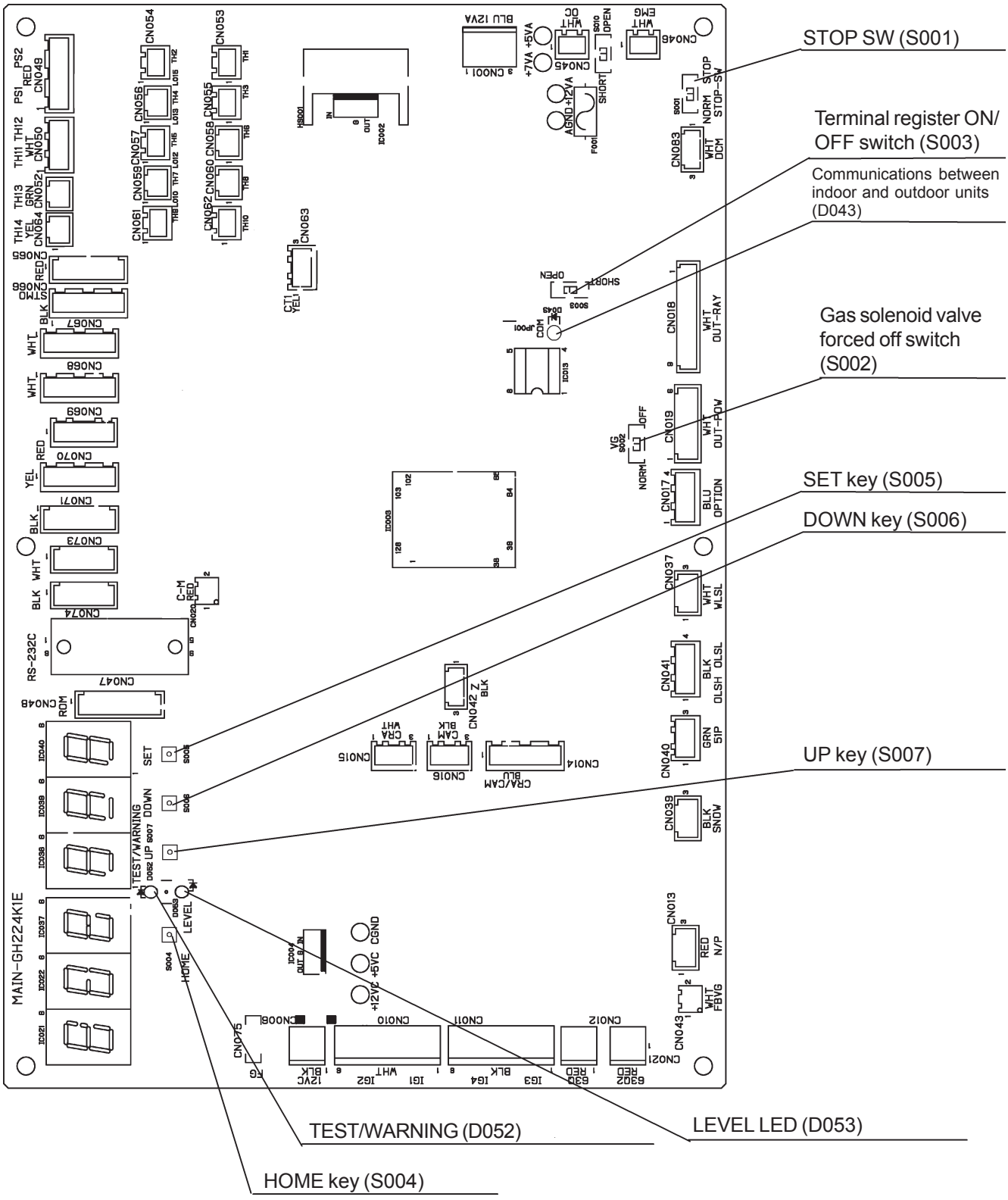
2. Complete the remote control check.
   Return the jumper to its original position. (Return to remote control parent or remote control child setting.)

3. Input/output check
   After the serial communication check (10 seconds) is complete, operate each remote control button to make sure that the corresponding display appears on the LCD.

- Serial communication check
  Move the jumper to check the remote control's own serial communication send and receive systems.
  Normal: The whole display lights up
  Abnormal: The whole display flashes
  } Display lights up for approximately 10 seconds and then turns off.



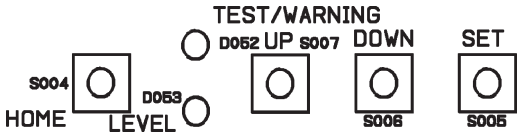
(2) Outdoor Unit Control Boards Switch/LED Configuration Diagram



(3) Outdoor Unit Control Boards Switch/LED Configuration Diagram

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

- 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.

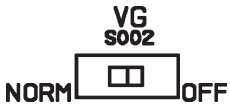


② S001 (All stop switch)

- 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 “All stop” at the factory before shipment, and thus needs to be switched to the “Normal” side for test operation.

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 “Forced Off” side causes the forced shutdown of the gas solenoid valve, and is thus used to carry out cranking with the gas valve closed when measuring engine compression or for other purposes.



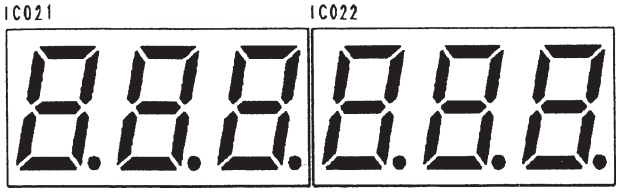
④ S003 (Terminal resistor On/Off switch)

- This switch is used for matching on communication lines.
- When only 1 outdoor unit is connected to a single communication line, confirm that the setting is on the “On” side.
- The factory setting is “On.”
- When more than 1 outdoor unit is connected to a single communication line, always set 1 unit on the On” side and the rest of the outdoor units on the “Off” side.

Note: Setting the terminal resistor switch for a multiple number of outdoor units on the “On” side can cause communication flaws.

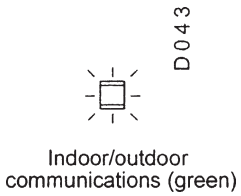
⑤ 7-segment LED

- 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.

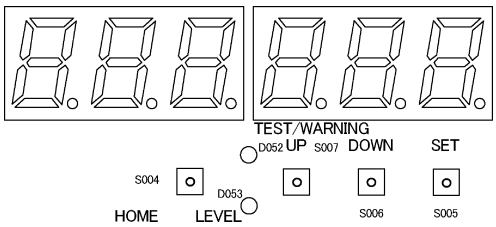


⑥ Indoor/Outdoor communications LED (D043•Eindoor/outdoor communications)

- 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.

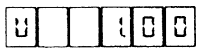
② Forced setting display (red)
Upon forced settings during normal display, the TEST/WARNING LED (D052) flashes.
During display of forced settings on the menu item display, the TEST/WARNING LED (D052) flashes.
(This may be used to search for forced setting items during setting.)

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 lit, Level 2 is flashing.
For further details, see the "Troubleshooting" chapter in the service engineering manual.

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)

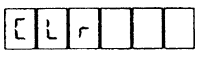
Example:  (All segments lit)

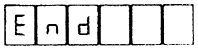
Example:  (Model name display)

Example:  (Version display)

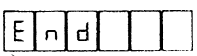
When the power supply is turned on while pressing the SET (S005) key, the contents of the nonvolatile memory can be cleared.

* Memory clear procedure

1. Turn on the power supply while pressing the SET (S005) key. After 1 second or more,  will be displayed.

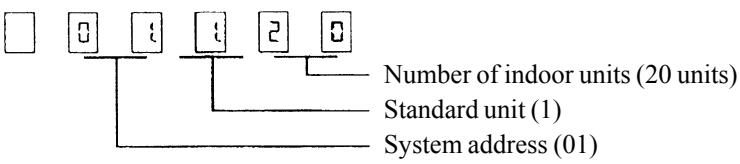
2. Press the SET (S005 key) again. Activating the nonvolatile memory erase function at this time will display  .

3. Check for power on display

(If the  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 rest to the initial state.

⑤ Outdoor unit normal display
Example:



(5) Operation Unit Specifications

① Operation
Three keys DOWN (S006), UP (S007) and SET (S005) are basically used to perform all display and setting operations.
Pushing the HOME (S004) for 1 second activates return to the normal display at any time (this key is installed in a slightly separated position).

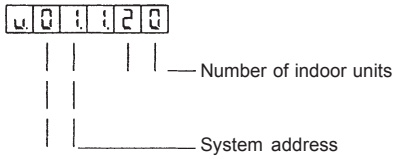
② Unified operation sequence
Category selection is performed with the DOWN (S006) and UP (S007) keys, and then set with the SET (S005) key.
Setting changes are performed with the DOWN (S006) and UP (S007) keys, and confirmed with the SET (S005) key.
The HOME (S004) key is used to display the normal display (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.
Pushing the SET (S005) key for 1 second while operation data is displayed (No. 0) releases 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)

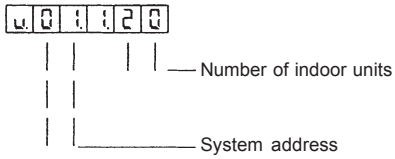
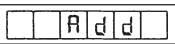
The normal display appears after passing through the display subsequent to turning the power supply ON, when selecting menu No. 0, or when no key operation occurs for 10 minutes.

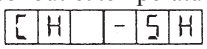
① Normal Display (Level 0)

Display sequence	Display contents	Display examples	Remarks
1	Number of indoor units System address		Indoor units - 20 units System 01
2	Engine operation time		12345 hours

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

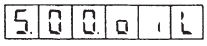
When conducting automatic addressing, in place of engine operation time, the display will indicate that automatic addressing is in progress.

Display sequence	Display contents	Display examples	Remarks
1	Number of indoor units System address		Indoor units - 20 units 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.

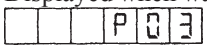
③ 3-Minute Off Display (Level 0)
Conditions: Engine startup forcibly delayed by 3 minutes.
Display: 7-segment display flashes at 1-second cycles.
Excluded when the No. 9 indoor unit status is displayed.

④ Warning Display (Level 0)
Conditions: Warning being issued
Display: TEST/WARNING LED flashing. Warning contents displayed on 7-segment LED.
 : Oil check warning

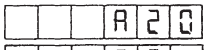
⑤ Abnormality Display (Level 0)
Conditions: Abnormality alert being issued
Display: TEST/WARNING LED flashing. Warning contents displayed on 7-segment LED.
When a multiple number of abnormalities occur, each abnormality will be displayed in approx. 1-second cycles, in the sequence of: Outdoor abnormality → Outdoor warning → Indoor abnormality.

⑥ Forced Setting Activated Display (Level 0)
Conditions: Forced setting effective.
Display: TEST/WARNING LED flashing.
(When pushing the SET (S005) key under these conditions during the normal display for 1 second, all forced settings will be released.)

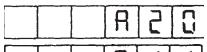
⑦ Startup Wait Display (Level 0)
Displayed when waiting for startup.

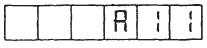

: High compressor outlet temperature

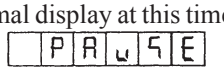

: Complete gas depletion check underway


: High cooling water temperature

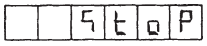

: Low cooling water level


: Depending on unequalized pressure


: High engine oil level

⑧ Total OFF Display (Level 0)
Setting the Total OFF switch to Total OFF activates CCU automatic identification control.
The normal display at this time is PAuSE
Example  During Total OFF display (when turning Total OFF switch to Total OFF)

⑨ System OFF Display (Level 0)
The following display occurs during automatic addressing.
When the system is off, all key operations are invalidated other than the Version Display.



⑩ Version Display (Level 0)
Simultaneously pressing the HOME key and DOWN key for about 1 second causes the following display to appear.

⑪ Other
If the home key and up arrow key are held down together for about a second, the following screens will be displayed for about one second each.
OS version

Display / settings / communications version

Remarks: When display devices overlap, displays will occur in the following sequence.

High ↑ Order of priority ↓ Low	03-minute off display (Excluded when No. 9 indoor unit status is displayed.)
	Version display
	System OFF display
	Total OFF display
	Startup wait display
	Forced setting activated display
	Abnormality display
	Warning display
	Heater remaining power-on time
	Normal display

(7) Menu Display (Level 0)

Menu items are selected by pushing the DOWN (S006) and UP (S007) keys.
During and after item changes, the menu number display appears for about 1 second (0.7 seconds), followed by the letter display.
After selecting the item and pushing the SET (S005) key, that item is selected.
The HOME (S004) key will display the item at any time (contents will not change during setting).
When no operations occur for 10 minutes in areas other than the item, the item will be displayed (contents will not change during setting).

	Menu item	Letter display	Description
↑ DOWN	no00	u01120	Operation data display (normal display)
	no01	000A00	Abnormality data display (Abnormality reset, log display)
	no02	o100000	Oil use time display (use time clear, refill)
	no03	d 5602	Model type display (double-speed setting)
	no04	tEStt	Test operation/outdoor unit forced setting
	no05	SEtout	Outdoor unit setting
UP ↓	no06	SEt in	Indoor unit setting
	no07	SEtEnG	Engine setting
	no08	SEtrPn	Forced engine rpm setting
	no09	in Stt5	Indoor unit status display
	no10	Frst	Initial setting (address, number of indoor units, gas type)
	no11	030401	Date display (time display, clock setting)

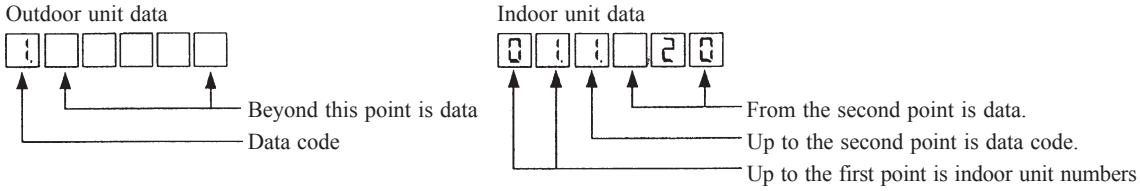
① Operation Data Display: No. 0 (Level 0)
The normal (or special) display usually appears, with key operation used to display current data.

❶ Normal display (Level 0)
On this outdoor unit system, the following data display is repeated at 10-second intervals.

Display sequence	Display contents	Display example	Remarks
1	System address, number of indoor units	u.01.148	System 01, 48 indoor units
2	Engine operation time	1.12345	12345 hours

❷ Total OFF Setting Display (Level 0)
In normal display status, moving the outdoor board Total OFF switch to the "Total OFF" side causes a shutdown of all units. In the normal display status, Total OFF is normally displayed in PAuSE (PAuSE).
Pushing the SET (S005) key (changing to Level 1) activates the display of operation data.

❸ Operation Data Display (Level 1θ)
In normal display status, pushing the SET (S005) key activates the display of the system data.
Example: u01.120 -Pushing the SET (S005) key → 1.12345
Pushing the HOME (S004) key for 1 second or more, or with no operation for 10 minutes, activates the normal display.
Example: 1.12345 -Pushing the HOME (S004) key for 1 second or more → u01.120
Data is displayed by selecting with the DOWN (S006) and UP (S0005) keys.
Data display example



❹ Forced Setting Release
Pushing the SET (S005) key in the normally displayed status for 1 second causes all forced set items to be released.

The following data is displayed.

	Indoor/ Outdoor	Data code	Data name	Display Example	Remarks
Down →	Outdoor unit	1	Engine operation time	12345	12345 hours
		2	Engine operations	2345	2345 times
		3	Starter operation time	234	234 seconds
		4	Starter operations	1234	1234 times
		5	Existing warning (All warnings displayed when warning issued)	0	No outdoor unit warning
		6	Clutch-on time	2000	2000 hours
		7	Clutch-on operations	200	200 times
		8	Set engine rpm	2200	2200 rpm setting
		9	Engine rpm	2200	2200 rpm
		10	Compressor inlet pressure	0.10	0.10 Mpa
		11	Compressor outlet pressure	1.00	1.00 Mpa
		12	Compressor inlet temperature	35.0	35.0 °C
		13	Compression outlet temperature	110.0	110.0 °C
		14	Outdoor heat exchanger 1 inlet temperature	45.0	45.0 °C (at inlet, using evaporator standard)
		15		-35.0	Unused
		16		-35.0	Unused
		17		-35.0	Unused
		18	Outdoor heat exchanger outlet temperature	45.0	45.0 °C (before accumulator)
		19	Outside air temperature	32.0	32.0 °C
		20	Exhaust gas temperature	65.0	65.0 °C
		21	Cooling water temperature	65.0	65.0 °C
		22	Starter electric current	0.0	0.0A
		23	Clutch coil temperature	32.0	32.0 °C
		24	Hot water outlet temperature (option)	-35.0	-35.0 °C (hot water dispensing use)
		25		-35.0	Unused
		26		33.0	Unused
		27		33.0	Unused
		28		:	Unused
		29		0	Unused
		30		0	Unused
		31	Outdoor fan output (setting)	20	20%
		32	Throttle output	330	330 step
		33	Fuel gas adjustment valve output	330	330 step
		34	Outdoor electric valve 1 output	330	330 step
		35	Outdoor electric valve 2 output	330	330 step
		36	Liquid valve output	220	220 step
		37	Bypass valve output	100	100 step
		38	Cooling water 3-way electric valve output	1000	1000 step
		39	Hot water dispensing 3-way electric valve output (option)	1000	1000 step (hot water dispensing use)
		40	Engine load rate	20	20%
		41	Engine ignition timing	10	10 degrees
		42		0	
		50	Thermostat-on units	20	20 units
		51	Thermostat-on average intake temperature	19.4	19.4 °C
		52	Thermostat-on average blow out temperature	15.0	15.0 °C
		53	Thermostat-on average E1 temperature	5.0	5.0 °C
		54	Thermostat-on average E2 temperature	6.0	6.0 °C
		55	Thermostat-on average E3 temperature	7.0	7.0 °C
↓ Up	Indoor unit	1	Indoor No. 1 unit electric valve opening	180	No. 1 unit 180 step (data received from indoor unit)
		2	Indoor No. 1 unit intake temperature	29.0	No. 1 unit 29.0 °C
		3	Indoor No. 1 unit blow out temperature	15.0	No. 1 unit 15.0 °C
		4	Indoor No. 1 unit heat exchanger inlet temperature	3.5	No. 1 unit 3.5 °C
		5	Indoor No. 1 unit heat exchanger interim temperature	35.0	No. 1 unit 35.0 °C
		6	Indoor No. 1 unit heat exchanger outlet temperature	4.5	No. 1 unit 4.5 °C

Indoor unit data displays show the data of connected indoor units.
(However, after completion of initial communications)

② Abnormality Data Display: No. 1 (Level 0)
Abnormality data displays and abnormality resets are conducted.
Abnormality data, including pretrips, are stored in the nonvolatile memory for the three most recent incidents.
When an abnormality occurs for the fourth time and beyond, the oldest abnormality data is erased and the three most recent incidents are stored.
A profile of abnormality data is as follows.
< Abnormality code
< Abnormality occurrence date
< Outdoor unit operation data at occurrence of abnormality
< Indoor unit operation data at occurrence of abnormality
< Outdoor unit warning data 5 seconds before occurrence of abnormality
< Outdoor unit warning data 10 seconds before occurrence of abnormality
< Outdoor unit warning data 15 seconds before occurrence of abnormality

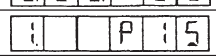
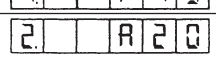
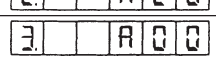
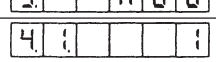
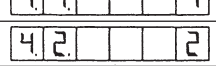
❶ Display at time of no abnormality (Level 0)
The following display appears.

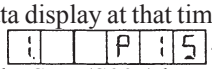
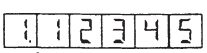
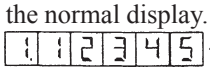
❷ Display at occurrence of abnormality (Level 0)
Displays current abnormality code.

 (Example of engine oil abnormality)

❸ Abnormality reset operation sequence
During display of current abnormality code, pushing the SET (S005) key for 1 second activates the outdoor unit abnormality rest. When the cause of the abnormality has yet to be removed, an abnormality will occur again immediately after reset.
Resetting cannot be performed under the following circumstances.
Reset cannot be conducted under the following situations:
< Indoor unit abnormalities cannot be reset. Indoor unit abnormality reset requires that the indoor unit be turned off.
< Oil use time cannot be reset. Oil use time reset must be conducted with the "Oil Use Time Display."
< A11 (high engine oil level) abnormalities cannot be reset. (Abnormalities continue until the oil level recedes)

❹ Abnormality code, temporary stop cause code display (Level 1)
During displays with no abnormality and displays when abnormality incidents occur, pushing the SET (S005) key causes the abnormality code and temporary stop cause code to be displayed.
Select and display the data with the DOWN (S006) and UP (S007) keys.

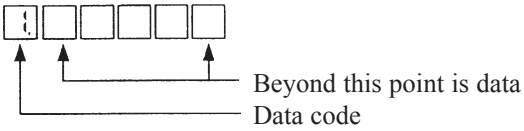
	Data code	Data name	Display example	Remarks
↑ Down	0	Current abnormality code		No abnormality
	1	Most recent abnormality log code		P15
	2	Second most recent abnormality log code		A20
	3	Third most recent abnormality log code		No abnormality
Up ↓	4.1	Most recent temporary stop cause code		Cause 1
	4.2	Second most recent temporary stop cause code		Cause 2
	5	Abnormality log clear		Abnormality log clear

❺ Abnormal Data Display (Level 2)
During abnormality log code display, pushing the SET (S005) key for 1 second or more activates the abnormality data display at that time.
Example:  -Pushing the SET (S005) key → 
Pushing the SET (S005) key again for 1 second or more, or when there are no operations for 10 minutes, returns to the normal display.
Example:  -Pushing the SET (S005) key → 

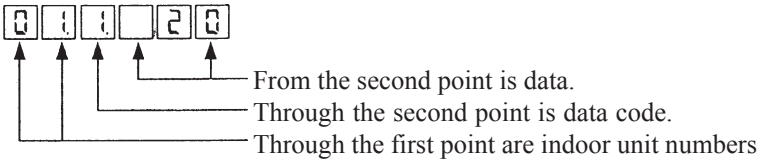
Select and display the data with the DOWN (S006) and UP (S007) keys.

Data display example

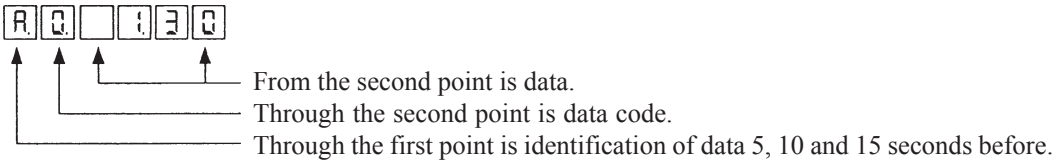
Outdoor unit data



Indoor unit data



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



The following data is displayed.

	Indoor/ Outdoor	Data code	Data name	Display Example	Remarks
Down → ↓ Up		None	Abnormality incident data	03:09	October 9, 2003
		None	Abnormality incident time	08:94:	8 hours, 49 min., 41 sec.
	Outdoor unit	1	Engine operation time	:::2345	12345 hours
		2	Engine operations	2:2345	2345 times
		3	Starter operation time	3::234	234 seconds
		4	Starter operations	4::234	1234 times
		5	Existing warning	50008000	No outdoor unit warning
		6	Clutch-on time	6:2000	2000 hours
		7	Clutch-on operations	7::200	200 times
		8	Set engine rpm	8:2200	2200 rpm setting
		9	Engine rpm	9:2200	2200 rpm
		10	Compressor inlet pressure	:00::0	0.10Mpa
		11	Compressor outlet pressure	:::::00	1.00Mpa
		12	Compressor inlet temperature	:2::350	35.0 °C
		13	Compression outlet temperature	:3:::00	110.0 °C
		14	Outdoor heat exchanger inlet temperature	:4::450	45.0 °C (at inlet, using evaporator standard)
		15		:5:-350	Unused
		16		:6:-350	Unused
		17		:7:-350	Unused
		18	Outdoor heat exchanger outlet temperature	:8::450	45.0 °C (before accumulator)
		19	Outside air temperature	:9::320	32.0 °C
		20	Exhaust gas temperature	20::650	65.0 °C
		21	Cooling water temperature	2::::650	65.0 °C
		22	Starter current	22::::00	0.0A
		23	Clutch coil temperature	23::320	32.0 °C
		24	Hot water outlet temperature (option)	24:-350	-35.0 °C (hot water dispensing use)
		25		25:-350	Unused
		26		26:----	Unused
		27		27:----	Unused
		28		28:----	Unused
		29		29:----	Unused
		30		30:----	Unused

	Indoor/ Outdoor	Data code	Data name	Display Example	Remarks
Down →	Outdoor unit	31	Outdoor fan output	31 : 200	20%
		32	Throttle output	32 330	330 step
		33	Fuel gas adjustment valve output	33 330	330 step
		34	Outdoor electric valve 1 output	34 330	330 step
		35	Outdoor electric valve 2 output	35 330	330 step
		36	Liquid valve output	36 220	220 step
		37	Bypass valve output	37 : 00	100 step
		38	Cooling water 3-way electric valve output	38 : 000	1000 step
		39	Hot water dispensing 3-way electric valve output (option)	39 : 000	1000 step (hot water dispensing use)
		40	Engine load rate	40 20	20%
		41	Engine ignition timing	41 : 0	10 degrees
		42		42 0.0	0.0
		50	Thermostat-on units	43 20	20 units
		51	Thermostat-on average intake temperature	44 : 94	19.4 °C
		52	Thermostat-on average blow out temperature	45 : 50	15.0 °C
		53	Thermostat-on average E1 temperature	46 50	5.0 °C
		54	Thermostat-on average E2 temperature	47 60	6.0 °C
		55	Thermostat-on average E3 temperature	48 70	7.0 °C
	Indoor unit (*1)	1	Indoor No. 1 unit electric valve opening	0 : : :60	No. 1 unit 180step (data received from indoor units)
		2	Indoor No. 1 unit intake temperature	0 :229.0	No. 1 unit 29.0 °C
		3	Indoor No. 1 unit blow out temperature	0 :3 :5.0	No. 1 unit 15.0 °C
		4	Indoor No. 1 unit heat exchanger inlet temperature	0 :4 3.5	No. 1 unit 3.5 °C
		5	Indoor No. 1 unit heat exchanger interim temperature	0 :5.35.0	No. 1 unit 35.0 °C
		6	Indoor No. 1 unit heat exchanger outlet temperature	0 :6 4.5	No. 1 unit 4.5 °C
			(Displays for connected indoor units)		
	Outdoor unit data 5 sec. before	1	Compressor inlet pressure	A1 : 0.:0	0.10MPa
		2	Compressor outlet pressure	A2 : 00	1.00MPa
		3	Compressor inlet temperature	A3 34 0	34.0 °C
		4	Compressor outlet temperature	A4 : 00	110.0 °C
		5	Throttle output	A5 330	330 step
		6	Fuel gas adjustment valve output	A6 220	220 step
		7	Outdoor electric valve 1 output	A7 : 00	100 step
		8	Outdoor electric valve 2 output	A8 : 00	100 step
		9	Liquid valve output	A9 20	20 step
		A	Bypass valve output	AA 20	20 step
		B	Set engine rpm	Ab2200	2200 rpm set
		C	Engine rpm	AC2200	2200 rpm
		D	Engine load rate	Ad 20	20%
		E	Rotating speed variation value (F-rpm)	AE 0.0	0.0
	Outdoor unit data 10 sec. before	1 ~ E	Same as 5 sec. before outdoor unit data name	b1 : 0.:0 ~ bE 100	Same as 5 sec. before outdoor unit remarks
↑ Up	Outdoor unit data 15 sec. Before	1 ~ E	Same as 5 sec. before outdoor unit data name	C1 : 0.:0 ~ CE 00	Same as 5 sec. before outdoor unit remarks

*1: Data from the connected indoor units is shown when the most recent abnormality 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.

❻ Abnormality log clear

Clears all of the abnormality log and temporary stop causes for this outdoor unit.

Operation method: Push the SET (S005) key for 1 second.

❽ Abnormality (warning) code list
When connected to indoor units

Abnormality code	Abnormality (warning) contents	Abnormality code	Abnormality (warning) contents
A 00	No abnormality alert	E 26	Inconsistent number of outdoor units
		E 31	Defective communications between units
	(A system: Activation of engine system protection devices)		(F system: Failure of sensor, memory, and other components)
A 01	Engine oil pressure abnormality		
A 02	Engine oil abnormality	F 01	Indoor heat exchanger inlet temperature sensor abnormality
A 03	High engine speed abnormality	F 02	Indoor heat exchanger interim temperature sensor abnormality
A 04	Low engine speed abnormality	F 03	Indoor heat exchanger outlet temperature sensor abnormality
A 05	Ignition power source abnormality	F 04	Compressor outlet temperature sensor abnormality
A 06	Engine startup failure	F 06	Outdoor heat exchanger inlet temperature sensor abnormality
A 07	Fuel gas valve abnormality	F 07	Indoor heat exchanger outlet temperature sensor abnormality
A 08	Engine stall	F 08	External air temperature sensor abnormality
A 10	High exhaust gas temperature	F 10	Indoor heat exchanger intake temperature sensor abnormality
A 11	Engine oil level abnormality	F 11	Indoor heat exchanger blow out temperature sensor abnormality
A 12	Throttle (step motor) abnormality	F 12	Compressor inlet temperature sensor abnormality
A 13	Fuel gas regulating valve abnormality	F 13	Cooling water temperature sensor abnormality
A 14	Engine oil pressure switch abnormality	F 16	Compressor inlet/outlet pressure sensor abnormality
A 15	Short-circuit of starter power source output	F 17	Optional sensor abnormality
A 16	Starter lock	F 18	Exhaust gas temperature sensor abnormality
A 17	CT abnormality (starter current detection failure)	F 20	Clutch coil temperature sensor abnormality
A 19	Three-way wax valve abnormality	F 29	Indoor nonvolatile memory (EEPROM) abnormality
A 20	High cooling water temperature	F 30	Clock function (RTC) abnormality.
A 21	Cooling water level abnormality	F 31	Outdoor nonvolatile memory (EEPROM) abnormality
A 22	Cooling water pump abnormality		
A 23	Crank angle sensor abnormality		(H system: W-multi only)
A 24	Cam angle sensor abnormality	H 07	Compressor oil depletion abnormality
A 25	Clutch abnormality	H 08	Oil level measuring use temperature sensor abnormality
A 26	Accidental fires		
A 27	Catalyst temperature abnormality		(L system: Address overlap and other setting defects)
A 30	Low fuel gas pressure abnormality	L 02	Inconsistencies in indoor/outdoor unit models (machines other than GHP connected)
	(E system: Communications system abnormalities)	L 03	Multiple master unit set for group control
E 01	Remote control reception failure	L 04	System (outdoor unit) address setting overlap
E 02	Remote control transmission failure	L 05	Duplicate water heat exchanger unit priority setting (priority water heat exchanger unit)
E 03	Indoor unit reception failure of remote control transmission (central)	L 06	Duplicate water heat exchanger unit priority setting (other than priority water heat exchanger unit)
E 04	Indoor unit reception failure of outdoor unit transmission	L 07	Group control cable present for individual-control water heat exchanger unit
E 05	Indoor unit transmission failure to outdoor unit	L 09	Indoor unit capacity not set
E 06	Outdoor unit reception failure of indoor unit transmission	L 10	Outdoor unit capacity not set
E 07	Outdoor unit transmission failure to indoor unit	L 13	Defective indoor unit model type setting
E 08	Multiple addresses set in indoor unit	L 15	Defective indoor unit pairing
E 09	Multiple parent remote control units set	L 16	Water heat exchanger unit setting failure
E 11	Defective indoor board reception from signal output board	L 17	Inconsistent outdoor unit combinations
E 12	Automatic addressing startup halted due to automatic addressing	L 19	Duplicate water heat exchanger unit parallel address
E 13	Indoor unit transmission failure to remote control	L 21	Gas type setting failure
E 15	Automatic address warning (too few units)		
E 16	Automatic address warning (too many units)		
E 18	Defective group control wiring transmission		
E 20	No indoor unit during automatic addressing		
E 21	Outdoor control board abnormality		
E 22	Outdoor control board sensor abnormality		
E 24	Communications abnormality with outdoor unit		

Abnormality code	Abnormality (warning) contents	Abnormality code	Abnormality (warning) contents
	(P system: Indoor/outdoor safety device operation)	P 18	Bypass value lock trouble
P 01	Indoor blower abnormality	P 19	4-way valve lock abnormality
P 03	High compressor discharge temperature	P 20	Refrigerant high-pressure abnormality
P 04	Refrigerant high-pressure switch operation	P 22	Outdoor blower abnormality
P 05	Interruption of power source phase	P 23	Water heat exchanger unit interlock abnormality
P 09	Defective indoor unit ceiling panel connector connection	P 30	Other group slave unit trouble (trouble detected by system controller)
P 10	Indoor unit float switch operation	P 31	Group control abnormality
P 11	Water heat exchanger unit freezing abnormality		
P 13	Refrigerant circuit abnormality		(Warning)
P 14	O2 sensor operation	oiL	Oil change time (level) warning
P 15	Complete refrigerant gas depletion		

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

③ Oil Use Time Display: No. 2 (Level 0)
This function displays oil use time.
Key operation is used to perform oil use time display/clear setting and forced oil refill setting.

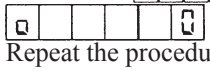
❶ Oil use time display (Level 0)
This display indicates current oil use time.
Example: (Example: 1,234 hours)

❷ Oil setting selection operation (Level 1)
Pushing the SET (S005) key in the oil use time display mode activates the following display.
Pushing the DOWN (S006) and UP (S007) keys in this mode makes it possible to select the oil use time display/clear setting or the forced oil refill setting.

	Display	Function
↑ DOWN		Oil use time display/clear setting
↓ UP		Forced oil refill setting

❸ Oil use time display/clear setting (Level 1)
Pushing the SET (S005) key for 1 second or more in the oil use time display/clear setting mode activates the following display.

 Pushing the SET (S005) key for 1 second or more →
When the display appears, temporarily release the SET (S005) key, and then quickly continue to press the same SET (S005) key.
When the following display appears, oil use time will be 0.

 -When quickly pushing the SET (S005) key again for 1 second or more →
After the display appears, oil use time will be displayed.
 (0 hours)
Repeat the procedure if the use time does not return to 0.

❹ Forced oil refill setting (Level 1)
Pushing the SET (S005) key with the forced oil refill setting selected causes oil solenoid valves 1 and 2 to open when the oil level is low, with the oil being refilled. The forced setting in progress display appears during this time. When the oil level becomes full the oil forced setting is automatically released, returning to oil setting select operation. To interrupt the refilling process while the forced oil refilling setting is in progress, push the SET (S005) key for 1 second. This releases the forced oil refill setting, returning to oil setting select operation.

④ Model Type Display: No. 3 (Level 0)

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 DOWN (S006) and UP (S007) keys causes the menu to change.

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

< Building Use Multi

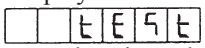
Model Name	Display
Not set	- - - - - -
70K1 (22.4kW)	2 2 4 2
90K1 (28.kW)	2 8 0 2
120K1 (35.5kW)	3 5 5 2
150K1 (45.0kW)	4 5 0 2
190K1 (56.0kW)	5 6 0 2
240K1 (71.0kW)	7 1 0 2

❷ Double-speed setting (Level 0)
Operating method: Pushing the SET (S005) key for 1 second in the model type display mode moves to the double-speed setting display.
(Forced/Abnormal LED lit)
Releasing method: Push the SET (S005) key for 1 second in the double-speed setting mode.
(Forced/Abnormal LED off)

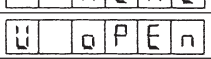
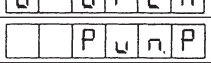
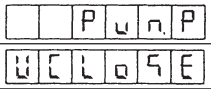
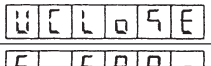
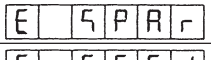
Operation: The 3-minute off time timer counts at 10 times or greater speed than normal. The forced setting in progress display appears during the speed-up setting.

⑤ Test Operation and Forced Settings: No. 4 (Level 0)
Key operation is used to determine the settings for forced test operation, forced bypass valve closing, forced water circuit and forced valve opening.

❶ Test operation and forced setting display (Level 0)
Displays of the test operation and forced settings selected with the menu.



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

	Display	Function
↑ DOWN ↓ UP		Forced cooling test operation setting
		Forced heating test operation setting
		Forced valve opening setting
		Forced water circuit setting
		Forced bypass valve closing
		Forced engine distributor mode
		Forced engine feedback
		Forced engine adjustment valve closing

❸ Forced cooling test operation setting (Level 2)
Rejection conditions : Heating test operation in progress, valve open, all stop operation in progress, automatic addressing in progress, indoor unit operation in progress.
No CCU function with Double-Multi.
Operation method : Push the SET (S005) key for 1 second while forced cooling test operation is not in progress.
(TEST/WARNING lit)
Operation details : Cooling test operation is activated.
Forced setting in progress display is showed during this time.
Releasing method : Push the SET (S005) key for 1 second during forced cooling test operation.
The forced-setting used in forced cooling test operation will be disengaged at this time.
(TEST/WARNING off)

❹ Forced heating test operation setting (Level 2)
Rejection conditions : Cooling test operation underway, valve open, all stop operation in progress, automatic addressing in progress, indoor unit operation in progress.
No CCU function with Double-Multi.
Operation method : Push the SET (S005) key for 1 second while forced heating test operation is not set.
(TEST/WARNING lit)
Operation details : Heating test operation is activated.
Forced setting in progress display is showed during this time.
Releasing method : Push the SET (S005) key for 1 second during forced cooling heating operation.
The forced setting used in forced heating test operation will be disengaged at this time.
(TEST/WARNING off)

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

Rejection conditions : Forced cooling test operation in progress, forced heating test operation in progress, bypass valve closed, all stop in progress.
No CCU function with Double-Multi. Bypass valve closed on other outdoor unit of Double-Multi system.

Operation method : Push the SET (S005) key for 1 second while forced valve opening is not been set.
(TEST/WARNING lit)

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 appears during this time.

Releasing method : Push the SET (S005) key for 1 second in forced valve open setting mode. The forced setting in progress display will be disengaged at this time, returning to forced setting select operation.
(TEST/WARNING off)

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

Rejection conditions : None

Operation method : Push the SET (S005) key for 1 second while forced water circuit is not been set.
(TEST/WARNING lit)

Operation details : Cooling water pump operating.
The cooling water 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 30 seconds, and 1950 steps for 46 seconds.
The forced setting in progress display appears during this time.

Releasing method : Push the SET (S005) key for 1 second in forced water circuit mode. The forced setting in progress display will be disengaged, returning to forced setting select operation.
(TEST/WARNING off)

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

Rejection conditions : Valve is open

Operation method : Push the SET (S005) key for 1 second while forced bypass valve closing is not set.

Operation details : Bypass valve fully close.
Forced setting in progress display appears during this time.

Releasing method : Push the SET (S005) key for 1 second while forced bypass valve is closed. The forced setting in progress display will be disengaged, returning to forced setting select operation.
(TEST/WARNING off)

❽ Forced engine distributor mode setting ‰ Used when fixing ignition timing. (Level 2)

Rejection conditions : None

Operation method : Push the SET (S005) key for 1 second while forced engine distributor mode is not set.
(TEST/WARNING lit)

Operation details : Activates forced engine distributor mode. Forced setting in progress display appears during this time.

Releasing method : Push the SET (S005) key for 1 second while in forced engine ƒfƒXƒrmode. The forced setting in progress display will be disengaged, returning to forced setting select operation.
(TEST/WARNING off)

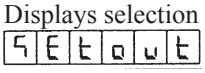
❾ Forced engine feedback setting (Level 2)

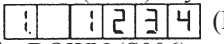
Rejection conditions	:	None
Operation method	:	Push the SET (S005) key for 1 second while forced engine feedback is not set. (TEST/WARNING lit)
Operation details	:	Activates feedback control. Forced setting in progress display appears during this time.
Releasing method	:	Push the SET (S005) key for 1 second during forced engine feedback. The forced setting in progress display will be disengaged, returning to forced setting select operation. (TEST/WARNING off)

❿ Forced engine fuel regulator valve closing (Level 2)

Rejection conditions	:	Indoor unit operation in progress.
Operation method	:	Push the SET (S005) key for 1 second while the forced engine adjustment valve closing is not set. (TEST/WARNING lit)
Operation details	:	Full closing of fuel gas adjustment valve. Forced setting in progress display appears during this time.
Releasing method	:	Push the SET (S005) key for 1 second with the forced engine adjustment valve closed. The forced setting in progress display will be disengaged, returning to forced setting select operation. (TEST/WARNING off)

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

❶ Outdoor unit setting display (Level 0)
Displays selection of outdoor unit setting mode at the menu.


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

❸ Outdoor unit setting operation (Level 2)

Setting start operation method	:	Push the SET (S005) key for 1 second in the setting data code select mode. This activates the forced setting in progress display. (TEST/WARNING lit)
Setting change operation method	:	After entering the setting start operation mode, operating the DOWN (S006) and UP (S007) 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, push the SET (S005) key for 1 second. This releases the forced setting in progress display, making it possible to once again enter the outdoor unit setting item selection operation mode. (TEST/WARNING off)
Setting cancel operation method	:	Press the HOME (S004) key for 1 second before confirming setting. This returns operation to normal. (TEST/WARNING off)

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

❹ Outdoor Unit Setting List (Data code: 1 to 50)

	Data code	Date name	Initial value	Remarks
	1	Engine operation time	0	0 = 0 ··· 999999 = 999999
	2	Engine rpm	0	0 = 0 ··· 999999 = 999999
	3	Starter operation time	0	0 = 0 ··· 999999 = 999999
	4	Starter rpm	0	0 = 0 ··· 999999 = 999999
	5	Present oil change time	0	0 = 0 ··· 16000 = 16000
	6	Clutch operation time	0	0 = 0 ··· 60000 = 60000
	7	Clutch rpm	0	0 = 0 ··· 999999 = 999999
	8	Number of compressor oil refills	0	0 = 0 ··· 999999 = 999999
	9	Number of compressor oil supplies	0	0 = 0 ··· 999999 = 999999
	10			
	11	Silent mode	0	Time range Engine Fan (○ : Setting made ● : No setting) 0: None ● ● 1: Setting ○ ● 2: All day ○ ● 3: Setting ○ ○ 4: All day ○ ○ (0 - 4)
	12	Silent start time	19	0 = 0 ··· 23=23 hours
	13	Silent end time	7	0 = 0 ··· 23=23 hours
	14	Cooling/heating automatic mode	0	0 = Possible with 1 indoor unit connected ;
			1	1 = Possible with all indoor units in a single group using 1 system
	15	Thermostat-off diff (other than GUF)	1	-10 = -10 ··· 10 = 10deg
Down →	16	Thermostat-on diff (other than GUF)	4	-10 = -10 ··· 10 = 10deg
	17	Cooling/heating select diff (other than GUF)	-4	-10 = -10 ··· 10 = 10deg
	18	GUF thermostat-off diff	6	-10 = -10 ··· 10 = 10deg
	19	GUF thermostat-on diff	6	-10 = -10 ··· 10 = 10deg
	20	GUF cooling/heating select diff	0	-10 = -10 ··· 10 = 10deg
	21	α1	0	-100 = -1. 00 ··· 100 = 1. 00M Pa
	22	α2	0	-100 = -1. 00 ··· 100 = 1. 00M Pa
	23	α3	0	-100 = -1. 000 ··· 100 = 0. 100M Pa
	24	α4	0	Unavailable with H and J models.
	25	α5	0	-100 = -0. 100 ··· 100 = 0. 100M Pa
	26	α6	0	-100 = -0. 100 ··· 100 = 0. 100M Pa
	27	Antifreeze temperature	0	-40 = -40 ··· 5 = 5 °C
← Up	28	Antifreeze timer	10	0 = 0 ··· 20 = 20 minutes
	29	Outdoor electric valve heater thermostat on initial aperture	20	0=0 1=4 … 120=480 steps
	30	Outdoor electric valve heater operation lower limit aperture	0	0=80 or 85 1=4 … 120=480 steps
	31			
	32			
	33			
	34			
	35			
	36	Oil recovery cooling accumulative period timer	8	0=0 1=30 minutes … 16=8 hours
	37	Oil recovery heating accumulative period timer	8	0=0 1=30 minutes … 16=8 hours
	38			
	39			
	40			
	41	Water heat exchanger entrance differential temperature	0	0=5 (set less than 0° C to 3) 1=1 … 9=9deg
	42	Water heat exchanger bypass valve cooling upper limit	0	0=200 1=4 … 120 = 480 steps
	43	Indoor electric valve open when heating stop	0	0=lowest addressed unit 1=1 … 48=48 (unit address)
	44	Reference system	0	0=none 1=1 … 30=30 (unit address)
	45	Cooling / heating automatic reference	0	0=none 1=mode 2= mode and thermostat Note: 3WAY has no effect
	46	Rotation speed difference reference	0	0=none 1=50 … 10=500 rotations
	47			
	48			
	49			
	50			

(Initial values are for reference, and subject to change without notice.)

❺ Outdoor Unit Setting List (Data code: 51 to 99)

	Data code	Date name	Initial value	Remarks
	51			
	52			
	53			
	54			
	55			
	56	Ignore pressure sensor	0	0 = Normal 1 = Low pressure 0.7 High pressure 2.8 MPa
	57	Indoor electric valve opening and closing	0	0=off 1=12 hours 2=24 hours 3=48 hours (interval)
	58	Indoor drain pump on/off	0	0=off Time after setting: 1=12 hours, 2=24 hours, 3=48 hours (interval)
	59	Warm water output thermostat off temperature	0	0=no function 1=1° C … 100=100° C
	60	Indoor liquid accumulation relief control	0	Refer to ❼ Indoor liquid accumulation relief control setting. (0-7)
	61	Exhaust differential temperature thermostat off decision time	0	0=6 minutes 1=1, 2=2, …, 21=21 minutes
	62			
	63			
	64			
	65			
	66			
	67			
	68			
	69			
	70			
Down →	71			
	72			
	73			
	74			
	75			
	76			
	77			
	78			
	79			
	80			
	81	Snowfall sensor connection setting	0	0=no control 1=10% 2=20% … 10=100%
	82			
	83			
	84			
	85			
	86			
	87			
	88			
	89			
	90			
	91			
	92			
	93			
	94			
	95			
	96			
	97			
← Up	98			
	99			

(Initial values are for reference, and subject to change without notice.)

❻ Energy-Saving Mode Setting

Date code 10 (Energy-Saving mode setting) details (○ : Setting made, ● : No setting)

Setting value	Outdoor fan for cooling Ignore standard conditions	Cooling rpm Fix to upper limit standard	Heating Energy-saving mode	Cooling low-pressure Energy-saving mode	Cooling Energy-saving mode
0	●	●	●	●	●
1	○	●	●	●	●
2	●	○	●	●	●
3	○	○	●	●	●
4	●	●	○	●	●
5	○	●	○	●	●
6	●	○	○	●	●
7	○	○	○	●	●
8	●	●	●	○	●
9	○	●	●	○	●
10	●	○	●	○	●
11	○	○	●	○	●
12	●	●	○	○	●
13	○	●	○	○	●
14	●	○	○	○	●
15	○	○	○	○	●
16	●	●	●	●	○
17	○	●	●	●	○
18	●	○	●	●	○
19	○	○	●	●	○
20	●	●	○	●	○
21	○	●	○	●	○
22	●	○	○	●	○
23	○	○	○	●	○
24	●	●	●	○	○
25	○	●	●	○	○
26	●	○	●	○	○
27	○	○	●	○	○
28	●	●	○	○	○
29	○	●	○	○	○
30	●	○	○	○	○
31	○	○	○	○	○

❼ Indoor liquid accumulation relief control setting

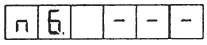
Data code 60
(Indoor liquid accumulation relief control setting) details
(○ : Setting made, ● : No setting)

Setting value	Indoor liquid accumulation relief control	Soft start	Heating small-load operation refrigerant noise reduction
0	●	●	●
1	○	●	●
2	●	○	●
3	○	○	●
4	●	●	○
5	○	●	○
6	●	○	○
7	○	○	○

⑦ Indoor Unit Setting: No. 6 (Level 10)
Key operation is used for indoor unit settings (operation impossible when connecting the water heat exchanger).

❶ Indoor unit setting display (Level 0)
Displays selection of the indoor unit setting at the menu.

❷ Indoor unit setting item select operation (Level 1)
Pushing the SET (S005) key in the indoor unit setting display mode activates the following display.
(Occurs only upon completion of initial communication)
Example:  (Example: Indoor No. 1 unit, data code 1, with gas pipe valve)
Operating the DOWN (S006) and UP (S007) keys in this mode makes it possible to select setting categories.
The data code appears as the following display, after the final category. 
Pushing the SET (S005) key for 1 second during this display mode copies the nonvolatile memory address 0x0400 to 0x07BF to the indoor units in the same system.

After this, operation moves to Level 2. Copying, meanwhile, cannot be cancelled.
The following display appears during copying. 

The following display appears when copying is completed. 

The following display appears when copying malfunctions. 

Pushing the DOWN (S006) key returns to the indoor unit setting mode. (Level 1)
Pushing the HOME (S004) key or conducting no operations for 10 minutes activates a return to the HOME display.

❸ Indoor unit setting operation (Level 2)
Setting start operation method:
Push the SET (S005) key for 1 second in the setting data code select mode.
This activates the forced setting in progress display.
(TEST/WARNING lit)

Setting change operation method : After entering the setting start operation mode, operating the DOWN (S006) and UP (S007) keys makes 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, push the SET (S005) key for 1 second. This releases the forced setting in progress display, returning to the indoor unit setting item select operation mode.
(TEST/WARNING 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.)

❹ Reflecting indoor unit setting
When conducting the setting operation for indoor unit setting data code L (cooling blow-out temperature setting) or data code N (heating blow-out temperature setting), returning to the normal display activates an indication to reboot to the indoor unit in question, with the indoor unit initial communication used to reflect the blow-out temperature setting. (The setting will not be reflected without temporarily returning to the normal display.)

❺ Indoor Unit Setting List (Data code: 1 to T)

	Data code	Date name	Initial value	Remarks
↑ Down	1	Gas pipe valve present/absent	0	0 = Absent 1 = Present
	2	Priority	0	0 = Lowest priority — 4=Highest priority
	3	Drain pump intermittent control	0	0 = Absent 1 = Intermittent on 4-way valve cooling side
	4	Drain pump continuous control	0	0 = Absent 1 = Continuous on 4-way valve cooling side
	5	Cool air prevention control with heater thermostat-on	0	0 = Present 1 = Absent (normal setting air speed)
	6	Air speed control with heater thermostat-on	0	0 = Present 1 = Absent (air speed setting)
	7	Heater high-pressure avoidance control	0	0 = Present 1 = Absent
	8	Heater stop indoor frost prevention control	0	0 = Absent 1 = 3-minute LL air per hour (1 unit at 5-minute intervals)
	9	Refrigerant discharge control with heater thermostat-on	0	0 = Present 1 = Absent
	A	Air speed lower limit with heater thermostat-on	0	0 = L air 1 = LL air
	B	Cooling indoor fan odor compensation	0	0=none 1 = air speed when thermostat on LL 45 seconds 2 = 1 + air speed when thermostat off LL 3 = 2 + air speed when thermostat on 45 seconds 4 = 3 + air speed when thermostat off LL 5 = 4 + air speed when thermostat on LL 60 seconds 6 = 5 + air speed when thermostat off LL 7 = 6 + air speed when thermostat on no air 60 seconds 8 = 7 + air speed when thermostat off LL
↓ Up	C	Air speed select when dry thermo-stat off	0	0=LL 1=LL <=> stop 4 minutes 15 seconds
	D	Indoor electric valve maximum when the heating thermostat is on	120	0=0 1=4 … 120=480 steps
	E	Indoor electric valve minimum when the heating thermostat is on.	30	0=0 1=4 … 120=480 steps
	F	Initial degree of opening made by the indoor electric valve heating discharge control	Depends on capacity	0=0 1=4 … 120=480 steps
	G	Initial degree of opening when the indoor electric valve cooling thermostat is on	20	0=0 1=4 … 120=480 steps
	H	Degree of opening when avoiding indoor electric valve heating high pressure	Depends on capacity	0=0 1=4 … 120=480 steps
	I	Indoor electric valve minimum when the cooling thermostat is on.	Depends on capacity	0=0 1=4 … 120=480 steps
	J	Degree of opening when the indoor electric valve heating thermostat is off	20 25	0=0 1=4 … 120=480 steps 0=0 1=4 … 120=480 steps
	K	Degree of opening when recovering oil with the indoor electric valve cooling thermostat off	0	0=model dependent –35=-35 … 92=92
	L	Cooling exhaust temperature setting		
	M		0	0=model dependent –35=-35 … 92=92
	N	Heating exhaust temperature setting		
	O			
	P			
	Q			
	R			
	S			
	T			

(Initial values are for reference, and subject to change without notice.)

⑧ Engine Setting: No. 7 (level 0)

❶ Engine setting display (Level 0)
Displays selection of the indoor unit setting at the menu.

❷ Engine setting data code select operation (Level 1)
Pushing the SET (S005) key in the unit setting display mode activates the following display.
Example :  (Example: Data code 1, rpm lower limit 800 rpm)
Operating the DOWN (S006) and UP (S007) keys in this mode makes it possible to select setting categories.

The engine setting contains no copy function. (the setting values vary depending on the unit).

❸ Indoor unit setting operation (Level 2)

Setting start operation method	:	Push the SET (S005) key for 1 second in the setting data code select mode. This activates the forced setting in progress display. (TEST/WARNING lit)
Setting change operation method	:	After entering the setting start operation mode, operating the DOWN (S006) and UP (S007) keys makes 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, push the SET (S005) key for 1 second. This releases the forced setting in progress display, returning to the indoor unit setting item select operation mode. (TEST/WARNING 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.)

❹ Engine setting list (Data code: 1-32)

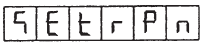
	Data code	Date name	Initial value	Remarks
	1	Setting engine rpm lower limit	0	-2 = 700 ··· 0 = 800 ··· 14 =1500
	2	Setting engine rpm upper limit	By model type	280 = 10, 560 = 14, 0 = 1500 ··· 30 = 3000
	3			
	4			
	5	Oil change time warning conversion	0	Oil warning display / Oil abnormality 0 : Yes / No 1 : No / No 2 : No / Yes 3 : Yes / No
	6	Oil change abnormal interval	5	0 = 0 ··· 100 = 1000 hours
	7	Oil change time setting	100	0 = 0 1 =100 ··· 120 = 12000 hours
	8		0	
	9		0	
Down →	10		0	
	11		0	
	12	Ignition timing off set	0	-20 = ··· 20 degrees ··· 20=20 degrees
	13		0	
	14	Catalyst temperature sensor effective	0	0 = Ineffective 1 = Effective
	15	Cooling water pump rpm	38	0 = 0 50 = 5000 [l / min]
	16	Overseas setting	1	0 = Domestic 1 = Overseas (engine classification differs from that of domestic products)
	17			
	18			
	19	Mixer offset	0	value / mixer marking* -2 Blue -1 Red 0 White 1 Yellow 2 Green * Painted on the mixer body. When replacing the mixer, re-set this value according to the mark painted on the new mixer.
↓ Up	20	Gas demand flow standard value	20	Refer to ❺ Gas Demand Control. Note 1 Active only when gas type is set between 1 and 5. Note 2 Not active when setting value = 20 Note 3 “rating” indicates the rating flow from the heating standard.
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			

(Initial values are reference values, and subject to change without notice.)
(Adjustments on certain items made at shipping.)

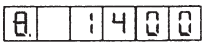
⑨ Forced Engine Rpm Setting: No. 8 (Level 10)

Forced setting of setting engine rpm is possible.

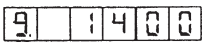
❶ Forced engine rpm setting display (Level 0)
Displays selection of the forced engine rpm setting at the menu.



❷ Forced engine rpm setting (Level 1)
Pushing the SET (S005) key in the forced engine rpm setting display mode activates the following display cycle, which is repeated at 1-second intervals.

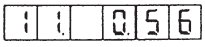


(Example: Forced engine rpm)



(Example: Engine rpm)

(Example: Compressor inlet pressure)



(Example: Compressor outlet pressure)

❸ Forced engine rpm setting operation (Level 2)

Forced engine rpm start operation method	:	Push the SET (S005) key for 1 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 lit)
Forced engine rpm change operation method	:	Operating the DOWN (S006) and UP (S007) keys makes it possible to change the setting values.
Forced engine rpm end operation method	:	Push the SET (S005) key for 1 second when the forced engine rpm is set. This releases the forced setting in progress display, returning to forced setting select operation. (TEST/WARNING off)

❹ Other

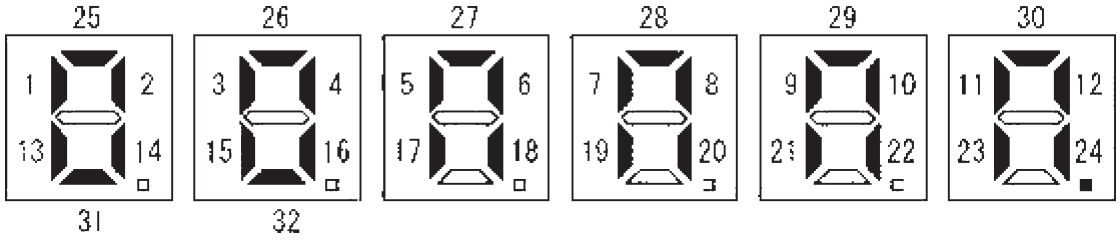
Setting range	:	From the lowest to the highest rpm in that machine's control status. Measured in 100 rpm units.
Clutch	:	Moves to clutch engaged rpm during clutch work, conducting clutch engaged operation.

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.

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

❷ Indoor unit thermostat status display (Level 1)
In the indoor unit display mode, pushing the SET (S005) key displays the indoor unit thermostat status.



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

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

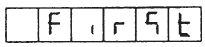
Operation method for selecting unit numbers to be set :
Operate the DOWN (S006) and UP (S007) keys.

Method for setting forced thermostat-off setting unit numbers :
With the forced thermostat- setting off, push the SET (S005) key for 1 second.
(TEST/WARNING lights)

Method for releasing forced thermostat-off set unit numbers :
With the forced thermostat-off setting on, press the SET (S005) key for 1 second.
(With all indoor units released, the TEST/WARNING turns off)

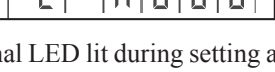
⑪ Initial Setting: No. 10 (Level 0)
Key operation is used to perform the initial setting.
Initial setting details are as follows.

❶ Initial setting display (Level 0)
Displays selection of the initial setting at the menu.



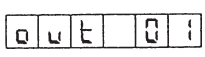
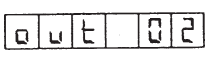
❷ Initial setting item select operation (Level 1)
Pushing the SET (S005) key in the initial setting display mode activates the following display.
Example:  (Example: With system address 1)

Operating the DOWN (S006) and UP (S007) keys in this mode makes it possible to select the settings for system address, number of indoor units connected, gas type, and power supply.

	Status/setting display	Function
↑ DOWN ↓ UP		System address setting
		Outdoor units address setting (only display)
		Number of connected outdoor units setting (only display)
		Number of connected water heat exchanger setting
		Model setting (cannot change the setting)
		Gas type setting
		(cannot change the setting)
		(cannot change the setting)
		Engine type setting (cannot change the setting)
		Confirmation of piping work connection (only display)
		Heat automatic address setting
		Cool automatic address setting

Forced/Abnormal LED lit during setting and change operations of each item.

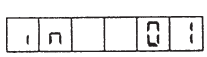
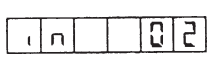
❸ System address setting (Level 2)
Rejection conditions : Indoor unit operation in progress.
Setting start operation method : Push the SET (S005) key for 1 second.
Setting change operation method : After entering the setting start operation mode, operating the DOWN (S006) and UP (S007) keys makes it possible to change the setting values. (TEST/WARNING lit)

Example:  ‰ When pushing the UP (S007) key → ← When pushing the DOWN (S006) key ‰ 

Setting confirm operation method : After entering the setting start operation or setting change operation mode, push the HOME (S004) key for 1 second.(Forced/Abnormal LED off)
Setting cancel operation method : Press the HOME (S004) key for 1 second before entering setting confirm operation. (TEST/WARNING off)

Setting range: 1-30

❹ Number of connecting indoor units setting (Level 2)
Rejection conditions : Indoor unit operation in progress.
Setting start operation method : Push the SET (S005) key for 1 second.
Setting change operation method : After entering the setting start operation mode, operating the DOWN (S006) and UP (S007) keys makes it possible to change the setting value. (TEST/WARNING lit)

Example:  ‰ When pushing the UP (S007) key → ← When pushing the DOWN (S006) key ‰ 

Setting confirm operation method : After entering the setting start operation or setting change operation mode, push the HOME (S004) key for 1 second.(Forced/Abnormal LED off)

Setting cancel operation method : Press the HOME (S004) key for 1 second before entering setting confirm operation. (TEST/WARNING off)

Setting range: 1 - 48

❺ Model type setting (Level 2)

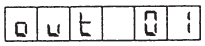
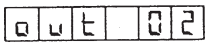
Rejection conditions : Indoor unit operation in progress, capacity setting already completed.

Setting start operation method : Push the SET (S005) key for 1 second.

Setting change operation method : After entering the setting start operation mode, operating the DOWN (S006) and UP (S007) keys makes it possible to change the setting value. (TEST/WARNING lit)
However, the following setting value limits exist.
When no setting made before change (unset): Possible to select and set preferred capacity model.
When setting performed before change : Model selection cannot be made. (Because the desire is to perform memory clear operation, setting change operation itself is made possible)

Setting confirm operation method : After entering the setting start operation or setting change operation mode, push the HOME (S004) key for 1 second.
This operation clears the memory area, with the exception of the nonvolatile memory 0x0300 to 0x032F.
(Operating time and other information is to be retained) (TEST/WARNING off)

Setting cancel operation method : Press the HOME (S004) key for 1 second before entering setting confirm operation. (TEST/WARNING off)

Example:  ‰ When pushing the UP (S007) key → ← When pushing the DOWN (S006) key ‰ 

❻ Gas type setting (Level 2)

Rejection conditions : Indoor unit operation in progress.

Setting start operation method : Push the SET (S005) key for 1 second.

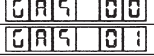
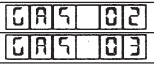
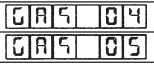
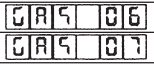
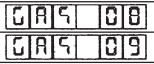
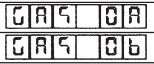
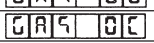
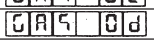
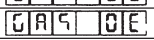
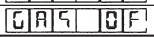
Setting change operation method : After entering the setting start operation mode, operating the DOWN (S006) and UP (S007) keys makes it possible to change the setting value.
(TEST/WARNING lit)

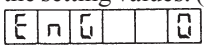
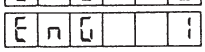
Setting confirm operation method : After entering the setting start operation or setting change operation mode, push the HOME (S004) key for 1 second.
This operation cancels the N/P determination. (Repeat the gas type determination procedure)
(TEST/WARNING off)

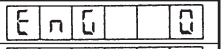
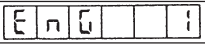
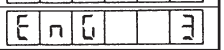
Setting cancel operation method : Press the HOME (S004) key for 1 second before entering setting confirm operation. (TEST/WARNING off)

Setting range: 00 to 0

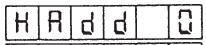
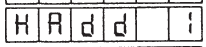
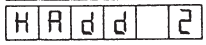
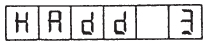
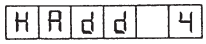
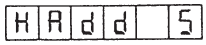
Gas Type List

Data code	Gas Group	Display Example
00	P	
01	No Use	
02	H	
03	L	
04	E	
05	No Use	
06	No Use	
07	No Use	
08	No Use	
09	No Use	
0A	No Use	
0B	No Use	
0C	No Use	
0D	B	
0E	LNG	
0F	No Use	

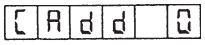
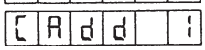
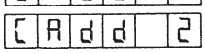
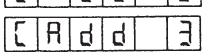
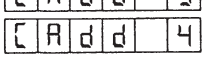
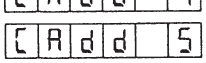
❼ Engine setting (Level 2)
Rejection conditions: Indoor unit operation in progress.
Setting start operation method: Push the SET (S005) key for 1 second.
Setting change operation method: After entering the setting start operation mode, operating the DOWN (S006) and UP (S007) keys makes it possible to change the setting values. (TEST/WARNING LED lit)
Example: When pushing the UP (S007) key: → 
When pushing the DOWN (S006) key: → 
Setting confirm operation method: After entering the setting start operation or setting change operation mode, push the SET (S005) key for 1 second. (TEST/WARNING LED lit)
Setting cancel operation method: Before entering setting confirm operation, push the HOME (S004) key for 1 second.
Setting range: 0-3

0	No use	
1	CG13	
3	K25	

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 board or nonvolatile memory, etc., confirm the engine type and make sure not to make a false setting.

❽ Heating automatic address setting (Level 2)
Rejection conditions : Indoor unit operation in progress, cooling automatic addressing in progress, no CCU function with Double-Multi, initial communication between outdoor units not complete with Double-Multi.
Setting start operation method : Push the SET (S005) key for 1 second. (TEST/WARNING lit)
Setting completion operation method : Automatic completion. Push the SET (S005) key for 1 second when turning off.
(TEST/WARNING 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 

❾ Cooling automatic address setting (Level 2)
Rejection conditions : Indoor unit operation in progress, cooling automatic addressing in progress, no CCU function with Double-Multi, initial communication between outdoor units not complete with Double-Multi.
Setting start operation method : Push the SET (S005) key for 1 second. (TEST/WARNING lit)
Setting completion operation method : Automatic completion. Push the SET (S005) key for 1 second when turning off. (TEST/WARNING off)

Automatic address progress 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)

The display of the current date.
Key operation is used to display the time and set the date.

❶ Date display (Level 0)
Displays the date.
Example : 06.0401 (Example: April 1, 2006)

❷ Date display (Level 1)
In the date display mode, pushing the SET (S005) key activates the next display.
Example : 06.0401 (Example: April 1, 2006)

In this status, pushing the DOWN (S006) and UP (S007) keys toggles between the dates and time displays.

	Display	Function
↑ DOWN	06.0401	Date display
↓ UP	11.0525	Time display

❸ Clock setting (Level 2)
In the date display or time display mode, pressing the SET (S005) key for 1 second or more activates the clock setting function.
Example : 1 06 (Example: April 1, 2003)

Item	Datae name	Display example	Remarks
1	Year	1 06	2006
2	Month	2 04	April
3	Day	3 01	1
4	Hour	4 11	11:00 a.m.
5	Minutes	5 06	6

∗ The second value is always 0.

Each time the SET (S005) key is pushed, 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 DOWN (S006) and UP (S007) keys makes it possible to change the value settings.
For Item 5, the number of seconds is always 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).
Data processing is not impacted by the sequence of dates and times. Accordingly, data for year 2000 will not be mistaken for that of year 1900 (the so-called "Y2K problem" will not occur).

Example: 11.0525 (Example: 11:05:25)

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

Safety Precautions

Stopping only the indoor unit is extremely dangerous because the engine may suddenly start if the customer operates the remote control on the indoor unit. When working on internal parts of the outdoor unit, make sure to cut the power to the outdoor unit at the circuit breaker before starting work. (However, if a centralized control device such as an intelligent controller is used, an abnormal communications error may occur.) Otherwise, perform a “All Stop” operation on the outdoor unit.

① Preparation for work

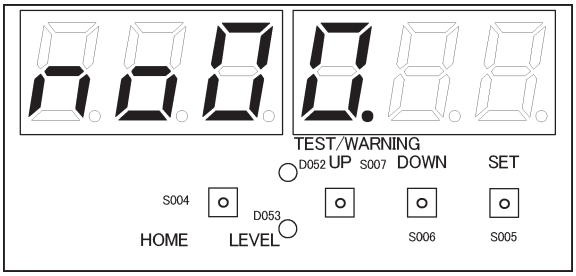
❶ Turn off remote controls for all indoor units.

❷ Stop outdoor unit.

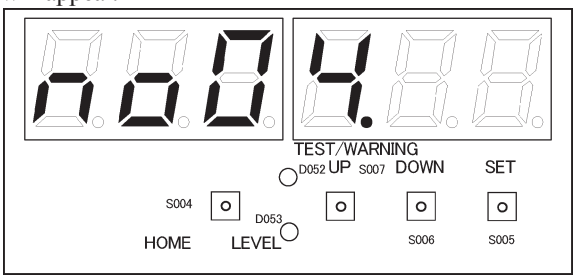
② Distributor mode setting

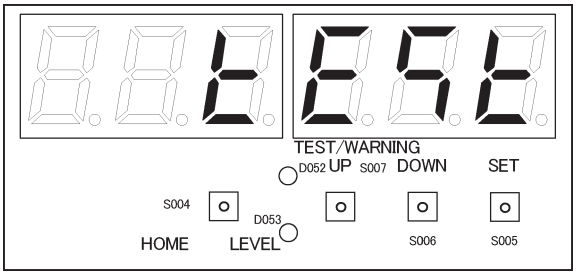
Set the distributor mode by selecting “E SPAr” from the “no04.” test operation forced setting display.

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

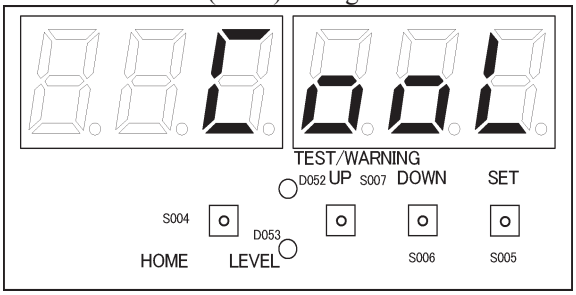


❷ Next, press the UP (S007) or DOWN (S006) key,
displaying the menu item numbers. Select menu item “ no04.” in the figure below. The display “tESt” (below) will appear.

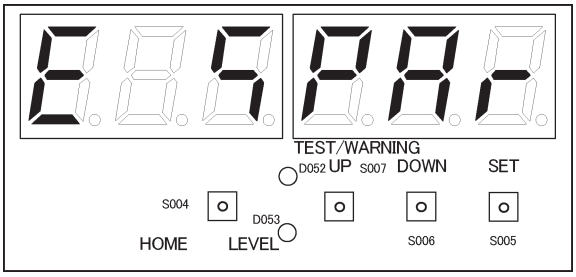




❸ Press the SET key (S005). “CooL” (right) will be displayed. The LEVEL LED (D053) will light.



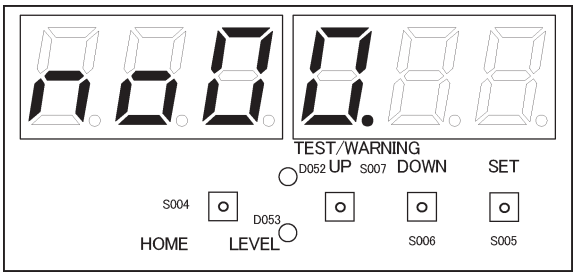
❹ Press the UP (S007) or DOWN (S006) key to display “E SPAr” (right). Press the SET key (S005) for one second or more. The TEST/WARNING LED (D052) will light, and the distributor mode will be set.



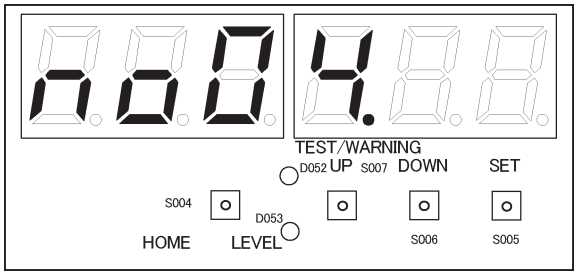
③ Start test operation and set engine rotational speed
Start test operation, and select “no08.” forced engine rotational speed setting, and set “800 [min-1].

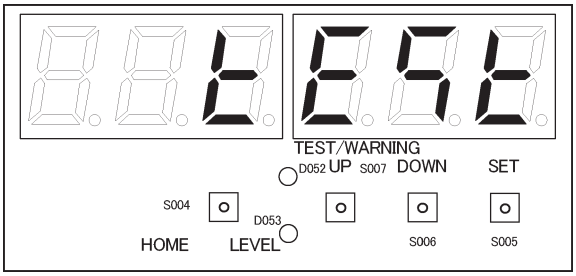
Start test operation.

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

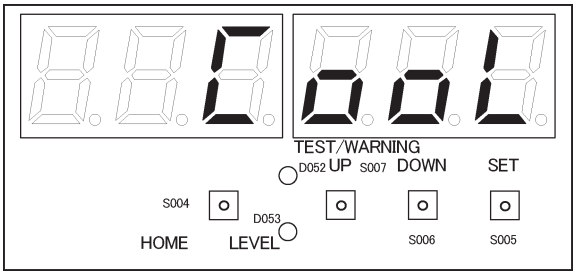


❷ Next, press the UP (S007) or DOWN (S006) key, displaying the menu item numbers. Select menu item “no04.” in the figure below. The display “tESt” (below) will appear.



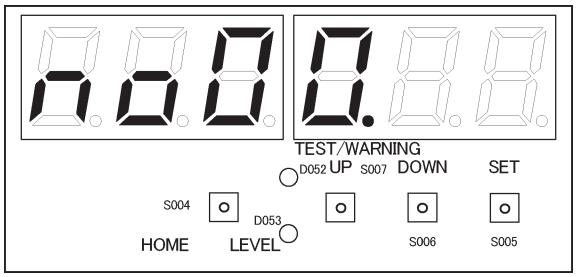


❸ Press the SET key (S005). “CooL” (right) will be displayed. The LEVEL LED (D053) will light. In this status, press the SET key (S005) for one second or more. The TEST/WARNING (D052) will light, and test operation will start.

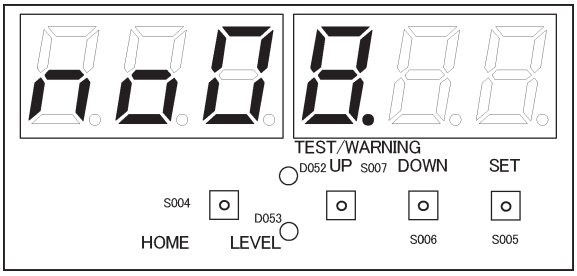


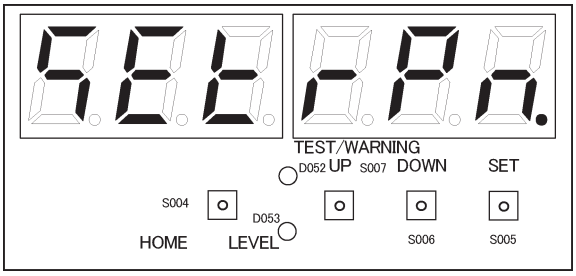
Set the engine rotational speed to 800 min^{-1}.

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



❺ Next, press the UP (S007) or DOWN (S006) key, displaying the menu item numbers. Select menu item “no08.” in the figure below. The display “SEtrPn.” (below) will appear.





❻ Press the SET key (S005). 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
8. 1400 (8. 1400)	Forced engine rotational speed (example: 1400 min^{-1})
9. 1400 (9. 1400)	Engine rotational speed (example: 1400 min^{-1})
10. 0.56 (10. 0.56)	Compressor inlet pressure (example 0.56 MPa)
11. 0.56 (11. 0.56)	Compressor outlet pressure (example 0.56 MPa)

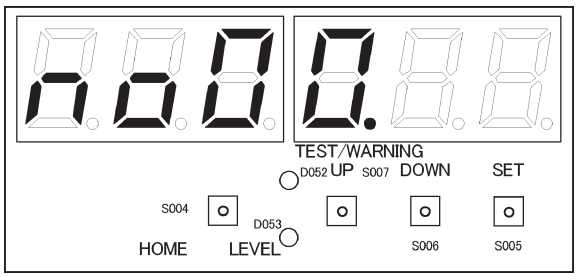
❼ In this situation, press the UP (S007) or DOWN (S006) key to set the engine rotational speed to 800 min^{-1}. Press the SET key (S005) for one second or more, to confirm the set engine rotational speed. The TEST/WARNING LED (D052) will light.

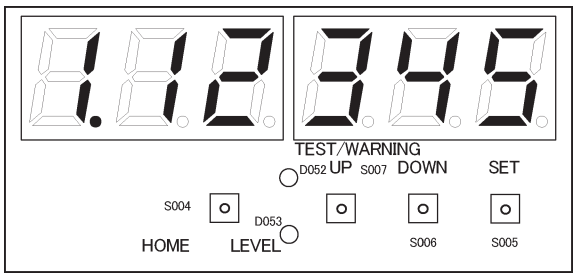
Caution: The forced engine rpm can be set within the range from the minimum speed to the maximum speed governed by the engine, in units of 100 revolutions.

④ Ignition timing check

When the operation conditions stabilize, select "no00." operation data display, and display "41." (engine ignition timing). Check that this value is the value shown in table 1.

❶ Press the HOME key (S004) for one second or more. Menu item number "no00." (below) will be displayed. The TEST/WARNING LED (D052) will light. After that, "1. 12345" (as in the example below where the engine has 12,345 operating hours) will be displayed. The TEST/WARNING LED (D052) will light. In this status, press the SET key (S005).
The LEVEL LED (D053) will light.





❷ Press the UP (S007) or DOWN (S006) key to display "41." (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}.

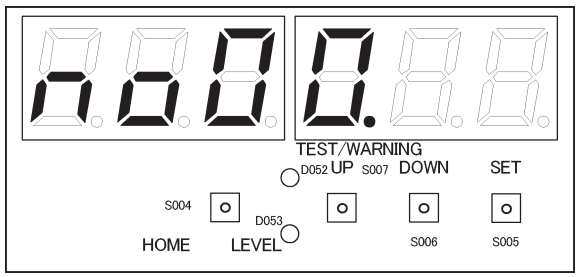
Group	P	H	L	E	B
Standard gas	G31	G20	G25	G25	B
CG13 engine (E70, 90K1 types)	10° BTDC	10° BTDC	10° BTDC	10° BTDC	10° BTDC
K25 engine (E120, 150, 190, 240 K1 types)	10° BTDC	10° BTDC	10° BTDC	10° BTDC	5° BTDC

❸ 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 "41." (engine ignition timing) value displayed in (2) above.

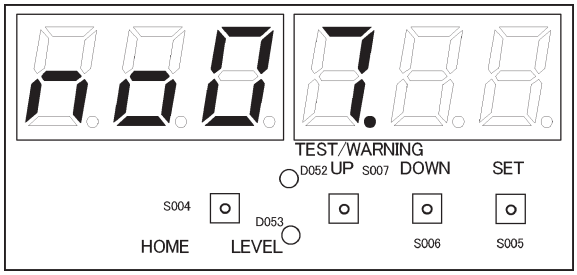
⑤ Correction for timing error

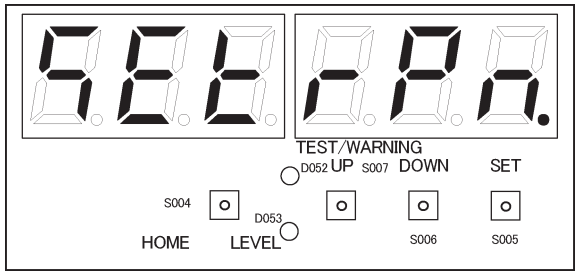
If the value is different than that displayed by “41.” (engine ignition timing) set in item 3. above, select “E12” (ignition timing offset) in “no07.” engine settings, and correct for the amount of error.

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

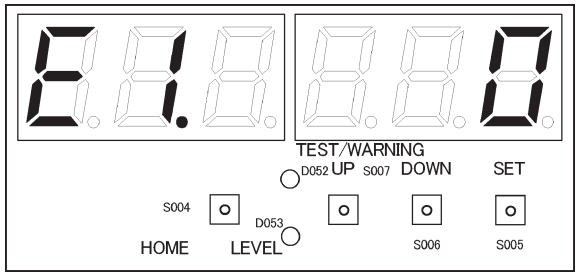


❷ Next, press the UP (S007) or DOWN (S006) key, displaying the menu item numbers. Select menu item “no07.” in the figure below. “SEtEnG” (below) will be displayed.





❸ In this status, press the SET key (S005).
The display will change to “E1. 0” and the LEVEL LED (D053) will light.



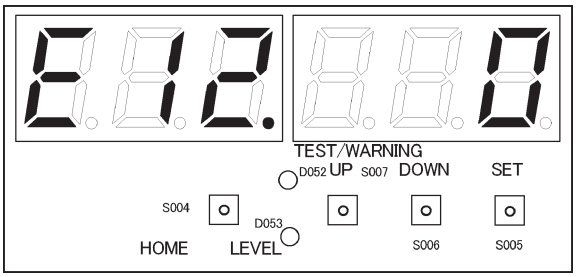
❹ Next, press the UP (S007) or DOWN (S006) key, to display “E12.” (ignition timing offset).

❺ Make the correction

Correction example ①

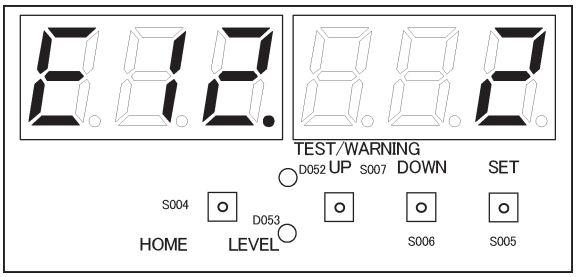
The adjustment value is 10° BTDC, but the observed value was 8°. Press the UP (S007) or DOWN (S006) key to set a correction of +2 in relation to the current "E12." (ignition timing offset) value.

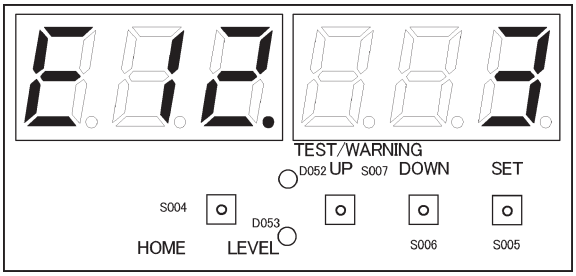
(1) Display the current "E12" (ignition timing offset) value, and check it. If the current value is zero (0). The display for "E12. 0" will be as shown at right.



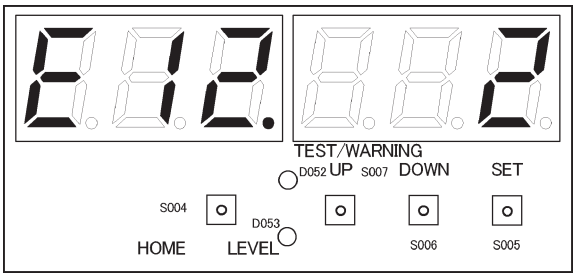
(2) With "E12." (ignition timing offset) displayed, press the SET key (S005) for one second or more.
The TEST/WARNING (D052) will light, and LEVEL LED (D053) will flash.

(3) Press the UP (S007) or DOWN (S006) key to set a correction of +2 in relation to the current value checked in "(1)."
The display will show "E12. 2" (right).
Caution : The display example at right is an example for when the current value checked in "(1)" 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 "E12. 3" (below right).





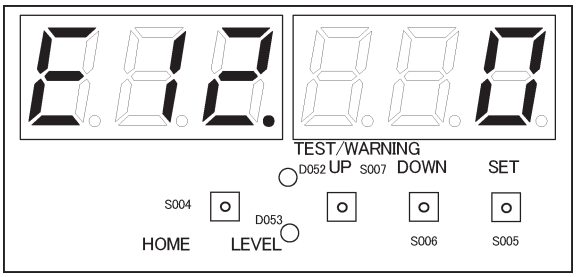
(4) With "E12. 2" (right) displayed, press the SET key (S005) for one second or more. The TEST/WARNING LED (D052) will go out, and LEVEL LED (D053) will light. The ignition timing offset mode will be cancelled, and the setting process will be ended.



Correction example ②

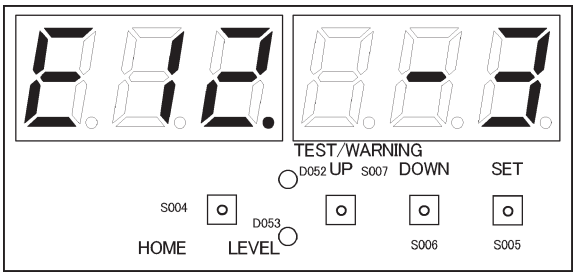
The adjustment value was 10° BTDC, but the observed value was 13° BTDC. Press the UP (S007) or DOWN (S006) key to set a correction of -3 in relation to the current "E12." (ignition timing offset) value.

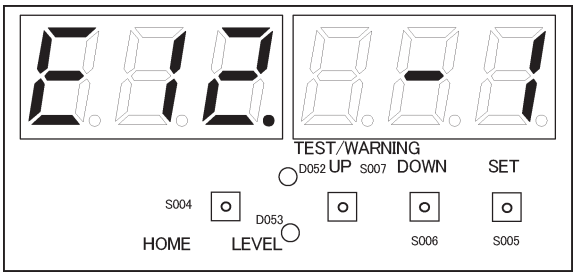
(1) Display the current "E12." (ignition timing offset) value, and check it. If the current value is zero (0). The display for "E12. 0" will be as shown at right.



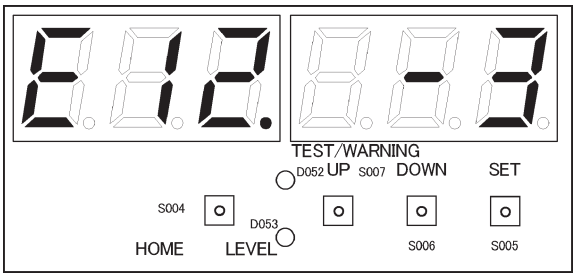
(2) With "E12." (ignition timing offset) displayed, press the SET key (S005) for one second or more.
The TEST/WARNING LED (D052) will light, and LEVEL LED (D053) will flash.

(3) Press the UP (S007) or DOWN (S006) key to set a correction of -3 in relation to the current value checked in " (1) ."
The display will show "E12. -3" (right).
Caution : The display example at right is an example for when the current value checked in "(1)" 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 "E12. -1" (figure below right).





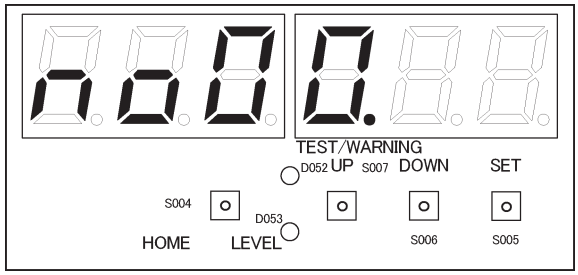
(4) With "E12. -3" (right) displayed, press the SET key (S005) for one second or more. The TEST/WARNING LED (D052) will go out, and LEVEL LED (D053) will light. The ignition timing offset mode will be cancelled, and the setting process will be ended.



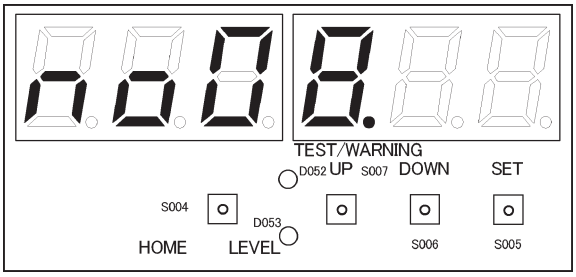
⑥ Cancel settings

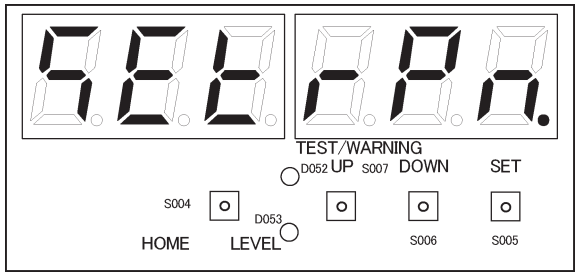
When ignition timing correction is finished, cancel the forced rotational speed setting and the distributor mode. Make sure to do this.

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



❷ Next, press the UP (S007) or DOWN (S006) key, displaying the menu item numbers. Select menu item “no08.” in the figure below. “SEtrPn.” (below) will be displayed.



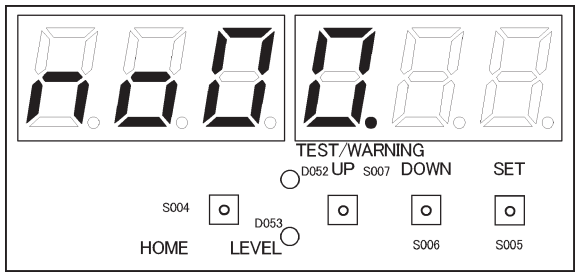


❸ Press the SET key (S005). The LEVEL LED (D053) and the TEST/WARNING LED (D052) will light, and the status with the engine rotating at the forced (set) speed will be displayed at one-second intervals, as shown below.

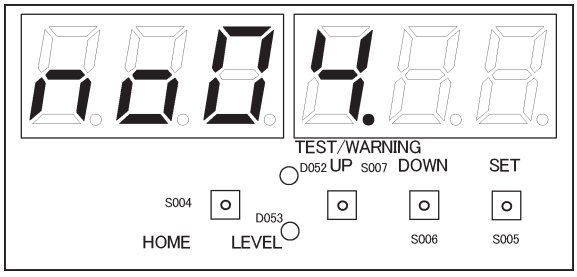
Display	Item
8. 1400 (8. 1400)	Forced engine rotational speed (example: 1400 min^{-1})
9. 1400 (9. 1400)	Engine rotational speed (example: 1400 min^{-1})
10. 0.56 (10. 0.56)	Compressor inlet pressure (example 0.56 MPa)
11. 0.56 (11. 0.56)	Compressor outlet pressure (example 0.56 MPa)

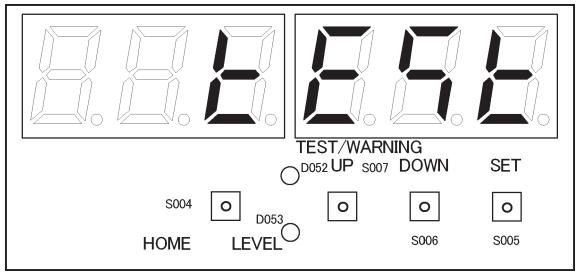
❹ Press the SET key (S005) for one second or more. The TEST/WARNING LED (D052) will go out, and the forced rotational speed setting mode will be cancelled.

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

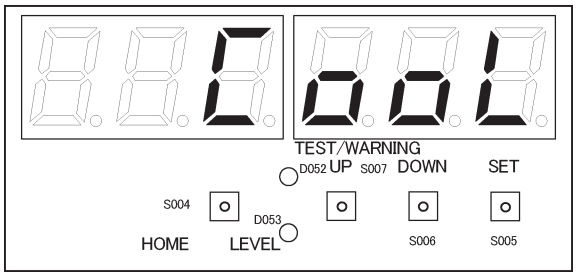


❻ Press the UP (S007) or DOWN (S006) key and select menu item number “no04.” The display “tESt” (below) will appear.

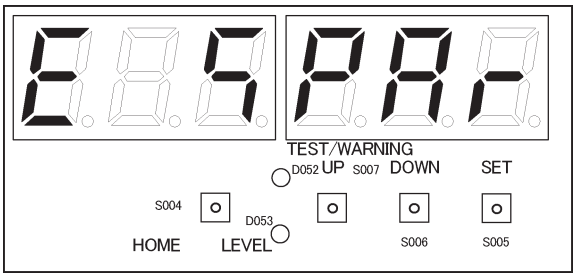




❼ Press the SET key (S005). “CooL” (right) will be displayed. The LEVEL LED (D053) and TEST/ WARNING LED (D052) will light.

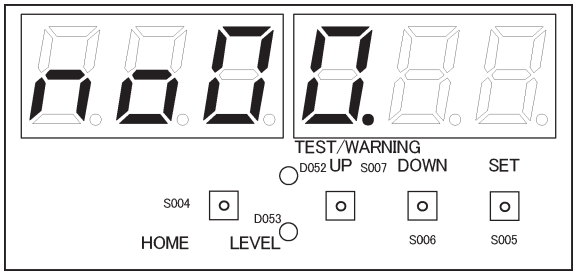


❽ Press the UP (S007) or DOWN (S006) key, to display “E SPAr” (right). Press the SET key (S005) for one second or more. The TEST/WARNING LED (D052) will go out, and distributor mode will be cancelled.

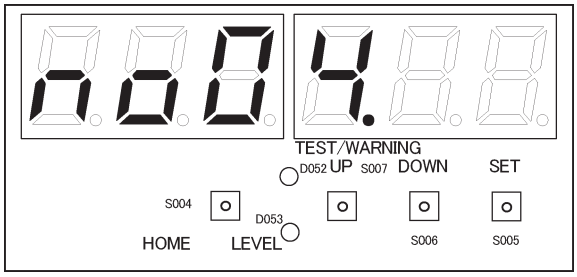


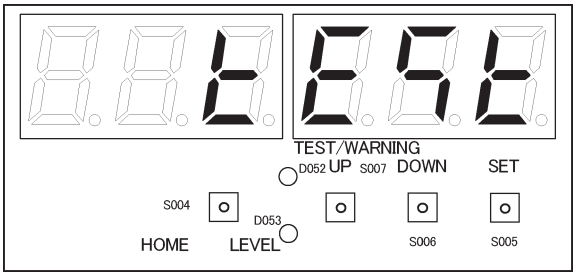
⑦ Stop operation

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



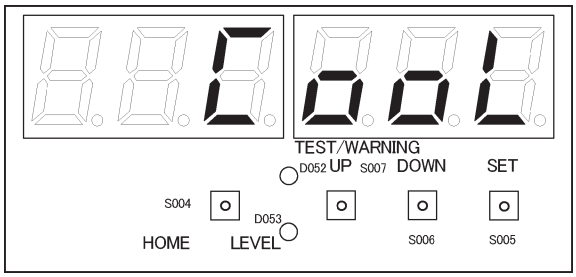
❷ Press the UP (S007) or DOWN (S006) key and select menu item number “no04.” The display “tESt” (below) will appear.





❸ Press the SET key (S005). “CooL” (right) will be displayed. The LEVEL LED (D053) and TEST/ WARNING LED (D052) will light.

❹ Press the SET key (S005) for one second or more. The TEST/WARNING LED (D052) will go out, and test operation will be stopped.



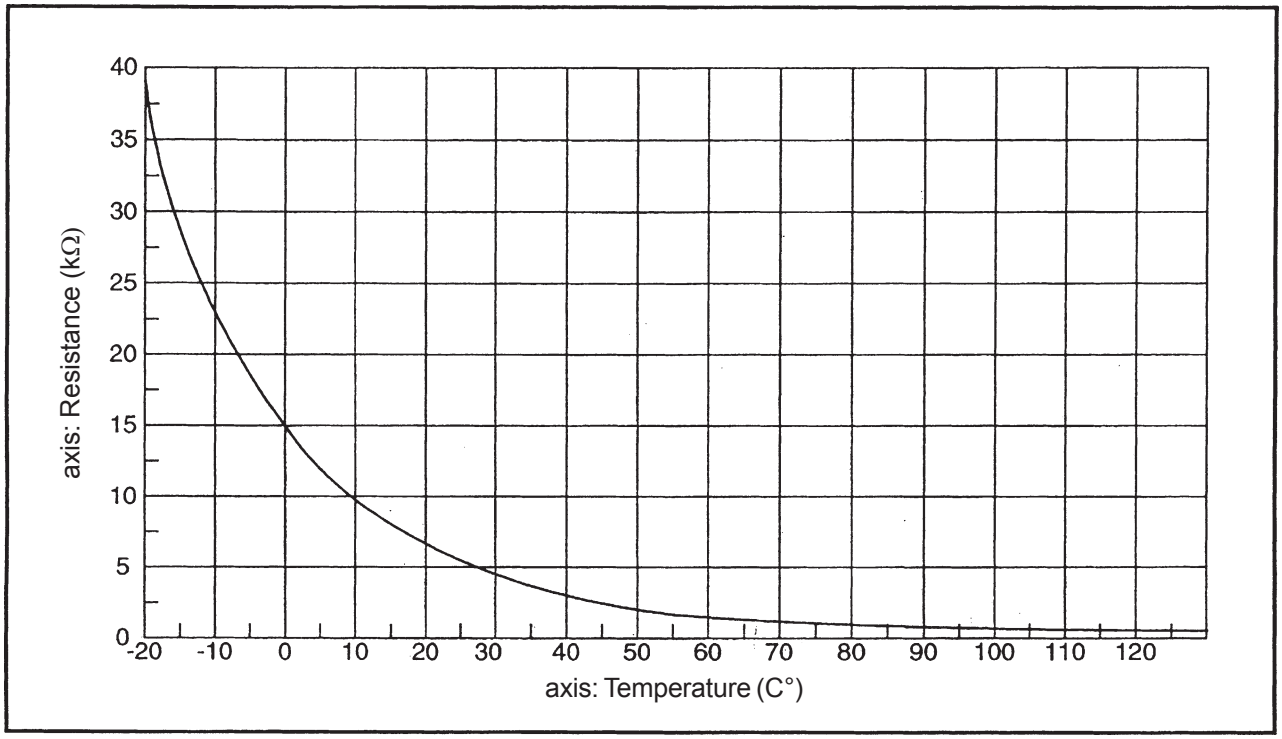
⑧ Running condition check

❶ Make sure that no abnormal noise or vibration occurs.

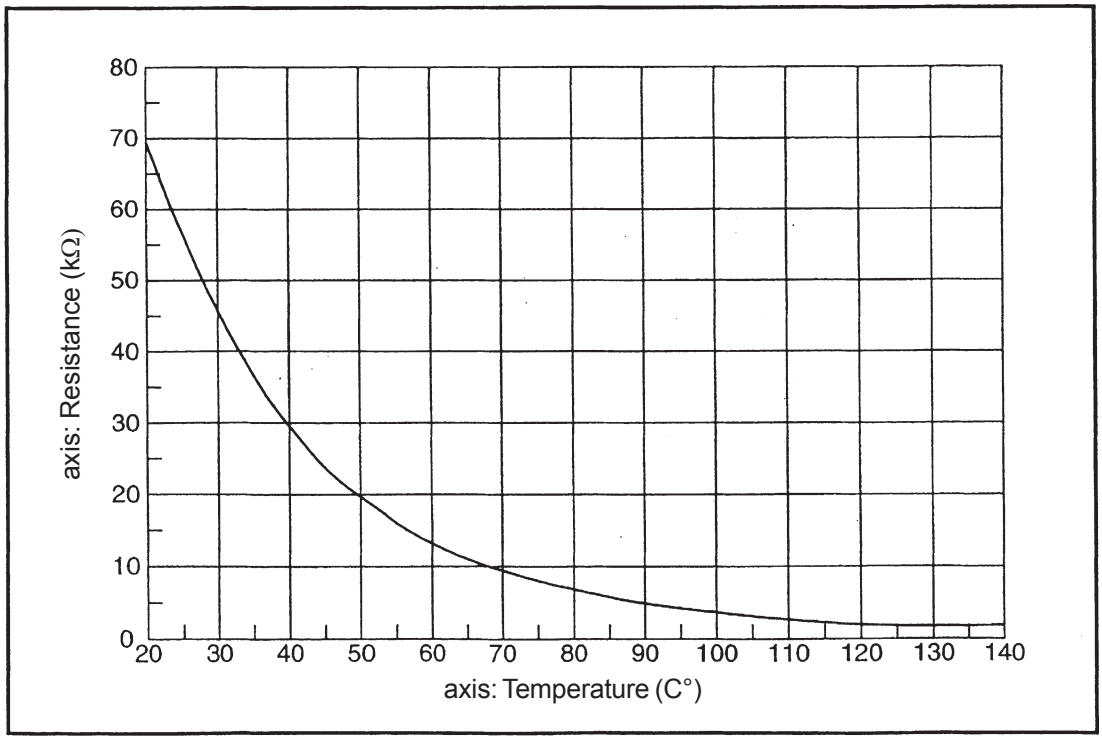
❷ Make sure there is no looseness in the fastening parts for each unit.

(9) Thermistor Specifications

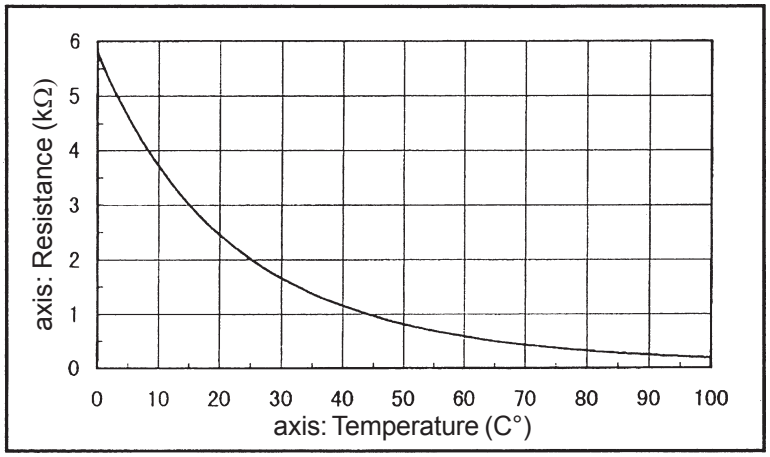
① Indoor unit heat exchanger inlet temperature sensor, indoor unit heat exchanger outlet temperature sensor, outside air temperature sensor, compressor inlet temperature sensor, outdoor unit heat exchanger inlet temperature sensor, outdoor unit heat exchanger outlet temperature sensor



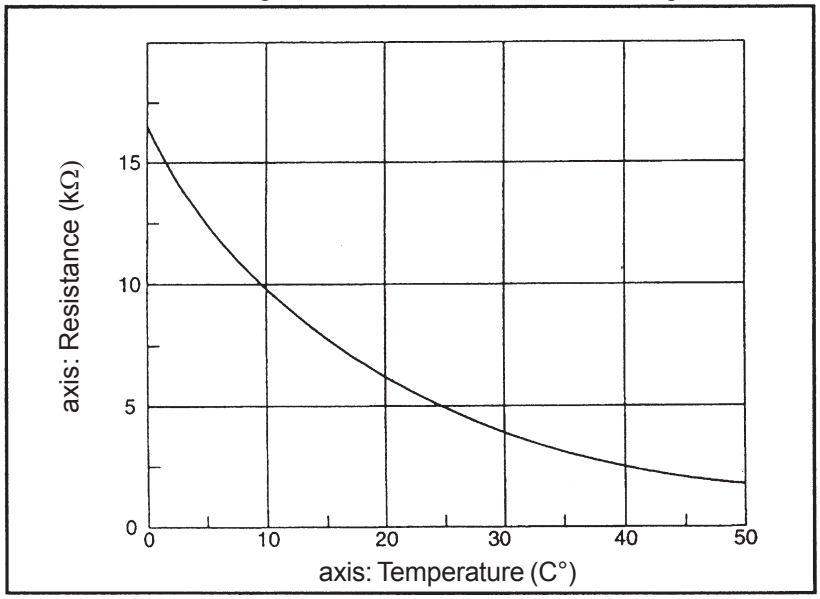
② Compressor outlet temperature sensor, exhaust gas temperature sensor



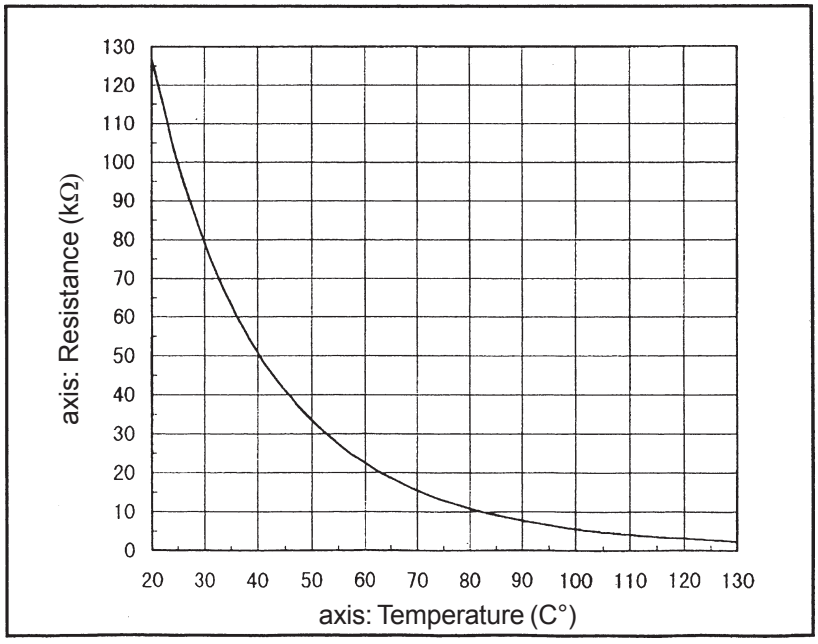
③ Cooling water temperature sensor



④ Indoor unit inlet temperature sensor, indoor unit outlet temperature sensor



⑤ Clutch coil temperature sensor



(10) Checks Prior to Automatic Addressing

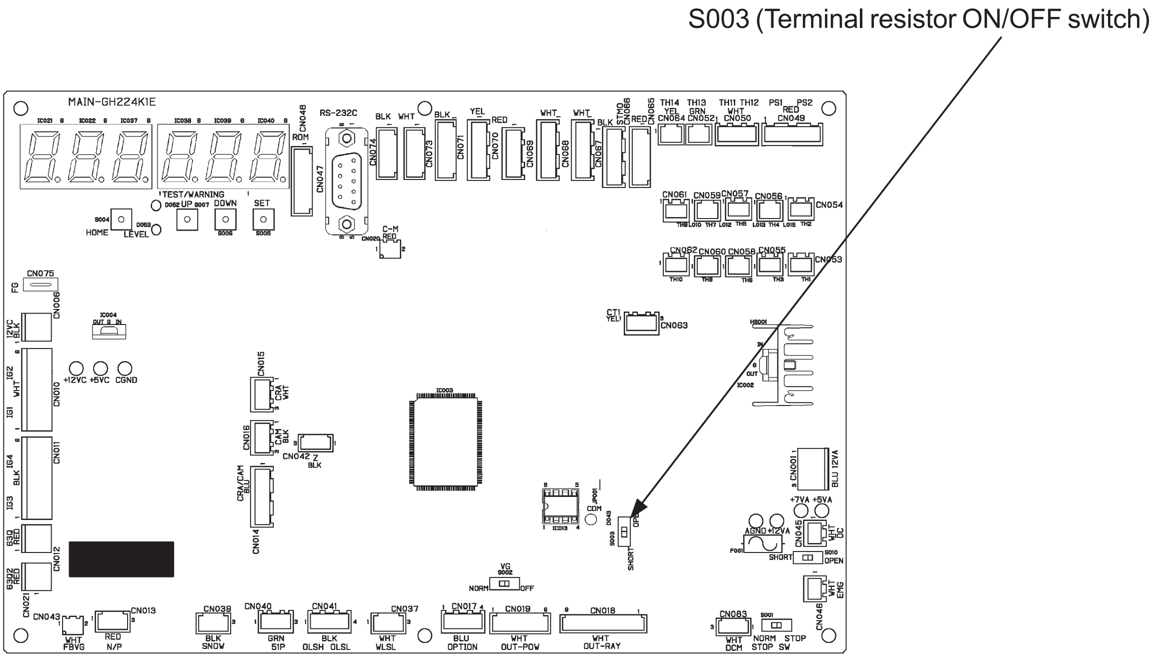
- When an outdoor unit warning is displayed, perform the following checks after troubleshooting.

1. Indoor/outdoor	1-1	indoor and outdoor units turned on?	Yes	2-1
			No	Turn on the power
2. Indoor/outdoor operating wires	2-1	Have the inside/outside operating wires been laid? Is there a break or disconnection of wires? Was a high voltage (200 V AC), etc. applied to the operating wire circuit? Has a fuse on the control board blown? Check the fuse of each outdoor and indoor unit.	Yes	2-2
			No	Wiring and connection
	2-2	There is a problem with the wiring of the power cable and indoor/outdoor operating wires. Turn off the power, check and repair faulty wiring, and then connect all indoor/outdoor operating wires to the backup controller board and controller.	Yes	2-3
			No	3-1
	2-3	Does the setting of connected indoor unit count (No.10) on the outdoor control board match the actual count of connected indoor units?		
3. Outdoor settings	3-1	Are the indoor/outdoor operating wires connected to multiple outdoor units? (Wire-linked?)	Yes	3-2
			No	Correct the setting
	3-2	Are the indoor/outdoor operating wires connected to multiple outdoor units? (Wire-linked?)	Yes	3-3
			No	3-6
	3-3	Is S003 (terminal resistor ON/OFF switch) on the outdoor control board set to ON for only one outdoor unit and set to OFF for all other outdoor units?	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.		

- 2-3 Backup connectors and terminals for indoor/outdoor operating wires (for communication)

Equipment	Primary	Backup
Outdoor unit	CN045 (for communication)	CN046 (EMG)
Indoor unit	CN40 (0C)	CN44 (EMG)
System controller	Terminal block No. A7 and B7	Terminal plate No. 3 (Indoor/outdoor backup operating 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

• 3-3

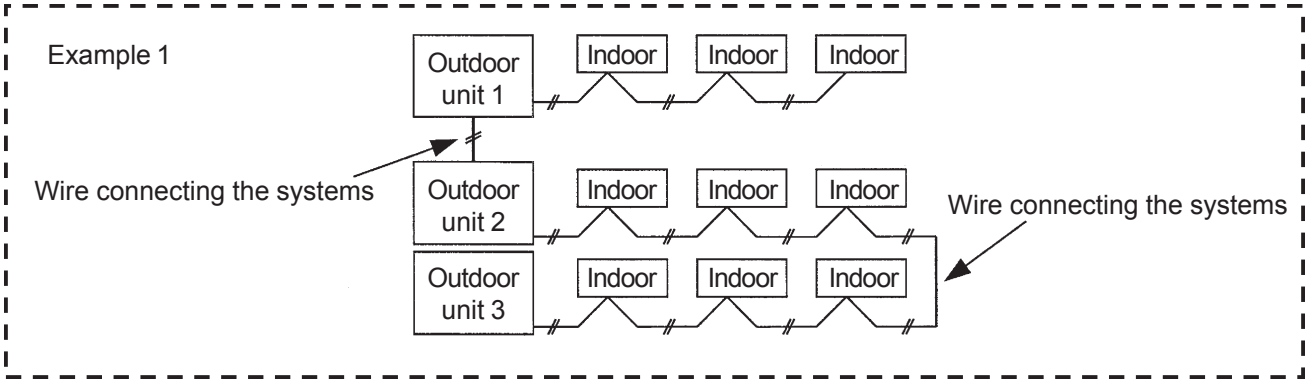

S003 (Terminal resistor ON/OFF switch)
MAIN-GH224K1E
RS-232C
ROM
TEST/WARNING
UP
DOWN
SET
HOME
LEVEL
+12VC
+5VC
CGND
+7VA
+5VA
AGND
+12VA
SHORT
OPEN
NORM
OFF
STOP SW
FBVG
N/P
SNOW
51P
OLSH OLSL
WLSL
OPTION
OUT-POW
OUT-RAY
DCM
EMG

(11) Procedure for Checking the Operating Wire Connection between the Indoor and Outdoor Units

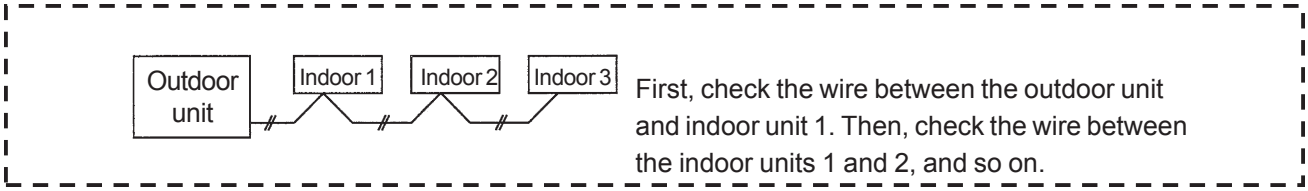
Check the operating wire connection after installation, regardless of whether there is a warning or not. Before performing the check, turn off the power of all equipment, including controllers, that are connected to the indoor/outdoor operating wire.

1 Ground fault check	1-1	Measure the resistance between one end of the indoor/outdoor operating wire and the point of FG (ground screw), as well as the resistance between the other operating line end and the point of FG. The measured resistance values are in milliohms (MΩ)?	Yes	2-1
			No	1-2
	1-2	The wiring 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 operating wires on the terminal board of the outdoor unit. The measured resistance value is around 100Ω ?	Yes	3-1
			No	2-2
	2-2	The terminal resistor switch is set to ON only for one outdoor unit that is connected to the indoor/outdoor operating line?	Yes	2-4
			No	2-3
	2-3	Set the terminal resistor switch to ON for one outdoor unit and to OFF for all other units.		
	2-4	The wiring has a short circuit. Search for the location of the short circuit.		
3 Wire break or disconnection check	3-1	Measure the resistance between the indoor/outdoor operating wires on the boards of all equipment that is connected to the operating wires. The measured resistance values are in milliohms (M Ω)?	Yes	3-2
			No	4-1
	3-2	The wiring has a break or disconnection. Search for the location of the break or disconnection.		
4 Shield wire check	4-1	A shield wire is used as an indoor/outdoor operating 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.		

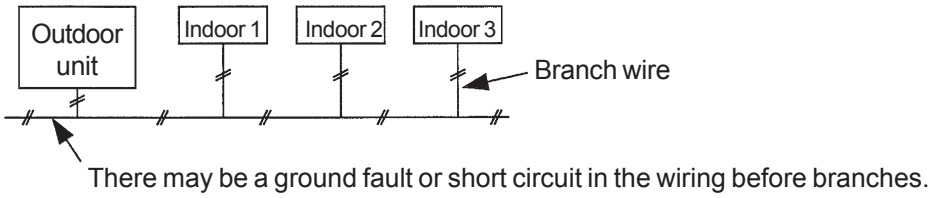
- If an abnormality is found in the wiring connections, the following check procedure allows you to quickly identify the location of the abnormality. When performing the check procedure, it is convenient if you have a drawing showing the layout of equipment and wiring routes to refer to.
  - In systems that are comprised of multiple wiring systems linked together, you can quickly identify the location of the abnormality 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 abnormality is in that system. Check the 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.



- When units are connected with a branch wire to the operating wire, also check the wiring before branches.



5. Outdoor Unit Electrical Wiring Diagram