

VRF AIR-CONDITIONER
「HEAT RECOVERY」

Service Handbook

CHV6 MINI URBAN HYPER HEAT
SERIES R32

BASIC MODELS

- CHV6-RS36URBMHH
- CHV6-RS48URBMHH
- CHV6-RS60URBMHH



VRF AIR-CONDITIONER [HEAT RECOVERY]

Dear user:

Thank you for choosing and using our products. For your better understanding and use of this product, be sure to read and comply with the following related matters before use.

IMPORTANT NOTICE

Signal words (danger, warning and caution) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words:



: A hazardous situation which, if not avoided, will result in death or serious injury.



: A hazardous situation which, if not avoided, could result in death or serious injury .



: Used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTE

: Useful information for operation and/or maintenance.

- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.
- This manual gives a common description and information for this air conditioner which you operate as well for other models.
- Cooper&Hunter pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- Cooper&Hunter cannot anticipate every possible circumstance that might involve a potential hazard. This air conditioner is designed for standard air conditioning only. Do not use this heat recovery air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process. Do not install the unit in the following places. It may cause a fire, deformation, corrosion or failure.
 - * Places where oil (including machinery oil) sprays
 - * Places where inflammable gas may generate or flow
 - * Places where a lot of sulfide gas drifts such as in hot spring.
 - * Places where strong salty wind blows such as coast regions, or places with high acidity or alkalinity.
- Do not install the unit in the place where silicon gas drifts. If the silicon gas attaches to the surface of heat exchanger, the fin surface repels water. As a result, drain water splashes outside of the drain pan and splashed water runs inside of electrical box. In the end, water leakage or electrical devices failure may occur.
- Do not install the unit in the place where the breeze directly catches the animals and plants. It could adversely affect the animals and plants.
- Installation and service engineering must comply with local standards, laws and regulations.
- As the "public inaccessible appliances", the indoor units are required to be installed at a height of no lower than 2.5m.
- The installation of the air conditioner can only be carried out by dealer or professional, and self installation by user may cause water leakage, electric shock or a fire.
- If you have any questions, contact your dealer or designated service center of Cooper&Hunter.
- To prevent the environment, please do not discard the product at will, and Cooper&Hunter can provide recycling services in accordance with the relevant provisions of the country and provide replaceable parts in accordance with national standard requirements.
- This air conditioner has been designed for the following temperatures. Operate the air conditioner within this range.

Temperature

°F(°C)

DX Indoor Unit		Maximum	Minimum
Space Cooling	Indoor	89(32) DB / 73(23) WB	69(21) DB / 59(15) WB
	Outdoor	126(52) DB*	23(-5) DB***
Space Heating	Indoor	86(30) DB	59(15) DB
	Outdoor	78(25.6) DB**	-13(-25) DB
DHW (Only Heating)	DHW Tank	109(43) DB	-13(-25) DB

DB: Dry Bulb, WB: Wet Bulb

*126(52) DB: 118(48)~126(52) intermittent operation

**78(25.6) DB: 73(23)~78(25.6) intermittent operation

***23(-5) DB: Installation of the Wind Guard (optional part) allows the system to operate at 5 °F(-15°C).

DANGER

- Do not perform installation work, refrigerant piping work, drain pump, drain piping and electrical wiring connection without referring to installation manual. If the instructions are not followed, it may result in a water leakage, electric shock or a fire. In case of a fire, cut off the power at the first time; do not touch the electrical parts by hand to avoid electric shock.
- These products are equipped with electrical parts. Do not pour water into the indoor or outdoor unit. Otherwise, it will cause a serious electrical failures.
- Do not open the service cover of the indoor or outdoor units without turning OFF the main power supply, otherwise it may cause a serious safety accident. (In any cases, users of the equipment are not allowed to open the service cover).
- Do not touch or adjust safety devices inside the indoor unit or outdoor units. If these devices are touched or readjusted, it may cause a serious accident.
- Refrigerant safety leakage standards for construction and operation systems are determined in accordance with local regulations or standards.
- Use an ELB (Earth Leakage Breaker, with an actuation time of 0.1 second or less) at or above medium induction speed, otherwise it may cause an electric shock or a fire.
- For installation, firmly connect the refrigerant pipe before the compressor starts operating.
- For maintenance, relocation and disposal, remove the refrigerant pipe after the compressor stops.
- Do not perform a short-circuit of the protection device such as a pressure switch when operating. It may cause a fire and explosion.

WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately 3.3ft. (1m) from the system.
- If circuit breaker is often activated, stop the system and contact your dealer or service contractor.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it leads electric shock. Do not connect the ground wiring to gas piping, water piping, lighting conductor or ground wiring for telephone.
- Before performing any brazing work, check to ensure that there is no flammable material around. When charging refrigerant be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts and the like from rats or other small animals. If not, rats may gnaw at unprotected parts, which may lead to a fire.
- Fix the cables securely. External forces on the terminals could lead to a fire.
- Provide a sufficiently strong foundation. If not, the unit may fall down and it may lead to injuries.
- Perform electrical work according to Installation Manual and all the relevant regulation and standards.
- If the instructions are not followed, an electrical failure and fire may occur due to insufficient capacity and inadequate performance. Use specified cables between units, otherwise, an electrical failure or a fire may occur.
- Ensure that the outdoor unit is not covered with ice and snow before use.
- This appliance is not intended for use by persons (including children aged under 8) with reduced physical, sensory or mental capacities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and maintenance shall not be made by children without supervision.
- The A-weighted emission sound pressure level at workstations does not exceed 70 dB(A).
- Cancer and reproductive harm-www.P65Warnings.ca.gov.
- Take measures to ensure that the refrigerant limitations in ASHRAE Standard 15 (Canada: 852) or other local codes, are followed. If refrigerant gas has leaked during the installation work, ventilate the room immediately.

⚠ CAUTION

- Do not step on or put any objects on the product.
- Do not put any foreign matters on the unit or inside the unit.
- Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 9.8ft. (3m) from strong electromagnetic wave radiators such as medical equipment.
- Starting the unit after longtime idleness requires the compressor temperature to meet the starting requirements or reach a certain heating time.

NOTE:

- It is recommended that the room will be ventilated every 3 to 4 hours.
- In some cases, the heat pump air conditioner may not operate properly in the following cases.
 - * In case that the power supplied by the power transformer is less than or equal to the electric power of the air conditioner.
 - * In case that the large power-consuming equipment is too close to the power supply wiring for the air conditioner, so that large surge voltage may be inducted in the power supply wiring of the air conditioner.
- The heating capacity of the heat pump unit is decreased according to the outdoor air temperature. Therefore, auxiliary heating equipment is recommended on the job site when the unit is installed in a low temperature region.
- The repair and maintenance of this air conditioner can only be carried out by the professionals.

CHECKING UPON DELIVERY

- Upon receiving this product, inspect it for any shipping damage.
Claims for damage in a written form, either apparent or concealed, should be filled immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct. The standard utilization of the unit shall be explained in these instructions. Please contact your local agent, as the occasion arises.
- Cooper&Hunter's liability shall not cover defects arising from the alteration performed by a customer without Cooper&Hunter's consent in a written form.

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APPENDIX

INSTALLATION

SUBMITTAL DATA SHEET

Service

1. Troubleshooting

1.1 Initial Troubleshooting

1.1.1 Checking of Electrical Wiring and Power Supply

Check the following items for any abnormality in the activation of the system.

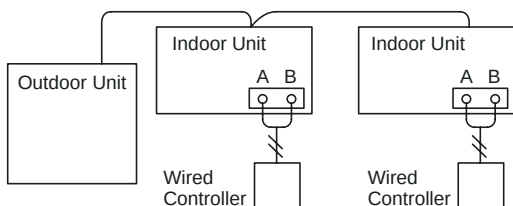
No.	Check Item	Check Method
1	Is power supply breaker or fuse blown out?	Check the voltage (secondary side) of the breaker and also check the conductivity of fuse by a tester.
2	Is voltage at secondary side of transformer correct?	Disconnect connection at the secondary side of the transformer and measure voltage by a tester.
3	Is wiring firmly fixed or correctly connected?	Check that the following wiring connection on O.U./I.U. printed circuit boards (PCBs) is not loosened. • The connection for thermistors. • The connection for the wired controller cable. • The connection for communication cable. • Each connection for power supply line. Check that the wiring connection on O.U./I.U. PCBs is not loose or misconnected on the site according to the "Electrical Wiring Diagram" of the Engineering Manual.

NOTE:

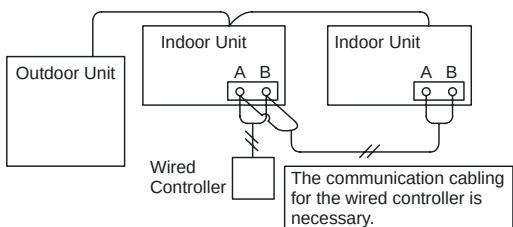
If the fuse(s) on an I.U. PCB blows out, diagnose the cause of overcurrent and recover the fuse(s).

In addition, check the power supply of optional parts because the fuse may blow out because of the power supply failure.

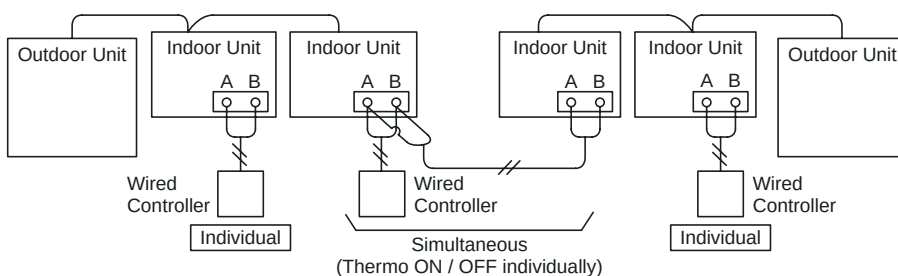
- For Indoor Unit
Refer to the Service Manual for Indoor Unit.
- Wired Controller Connecting Diagram
 - (a) Wired Controllers to each Unit for Individual Operation Setting



- (b) One Wired Controller for Individual Operation Setting



- (c) Connecting Wired Controller if Connecting between Individual Systems



NOTE:

Thermo-ON: The outdoor unit and some indoor units are running.

Thermo-OFF: The outdoor unit and some indoor units stay on, but don't run.

1.1.2 Checking of Rotary Switch and Dip Switch Setting

The following diagram indicates the factory settings of DSWs on PCBs in the indoor and outdoor units.

- (1) Outdoor Unit (factory setting)

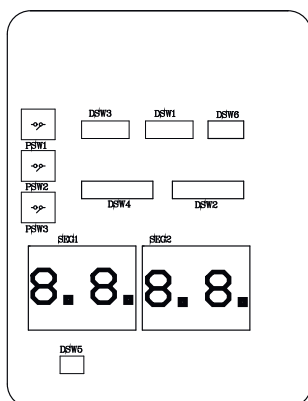
Turn OFF all power supplies before performing settings.

DIP switch settings cannot be changed without first disconnecting from the power supply.

(However, No.1, 2, and 4, pins of DSW1, No.5 and 6 pin of DSW2 and push switches can be operated when power supply is ON.)

The darkened square "■" indicates the position of DIP switches.

Arrangement of DIP Switches and Push Switches



DSW1 Test Run

Setting is required.
Setting Before Shipment



	Setting Item	Pin No.
1	Test Cooling Operation	ON OFF 
2	Test Heating Operation	ON OFF 

DSW2 Function Setting

Setting is required.
Setting Before Shipment



	Setting Item	Pin No.
1	Function Setting	ON OFF 
2	External Input/Output Setting	ON OFF 
3	Function Setting for Wind Guard	ON OFF 

DSW3 Capacity and Power Supply Setting

Setting is required. Setting Before Shipment

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DSW4 Ref. System No. Setting(0~63)

Setting is required. Example:

Setting Before Shipment In Case of Setting Ref. System No.25



Calculation in binary: $25 = 2^{(1-1)} + 2^{(4-1)} + 2^{(5-1)}$
Set the unit number of outdoor unit at each refrigerant system.
(Setting before shipment is unit 0.)

DSW5 Communication Setting

Setting is required. For End Terminal Resistance Cancellation

Setting Before Shipment Cancellation



If there is more than one refrigerant system in the same communication line, set all No.1 pins of DSW10 to the "OFF" position except one outdoor unit.

DSW6 Piping Setting

Setting is required.
Setting Before Shipment

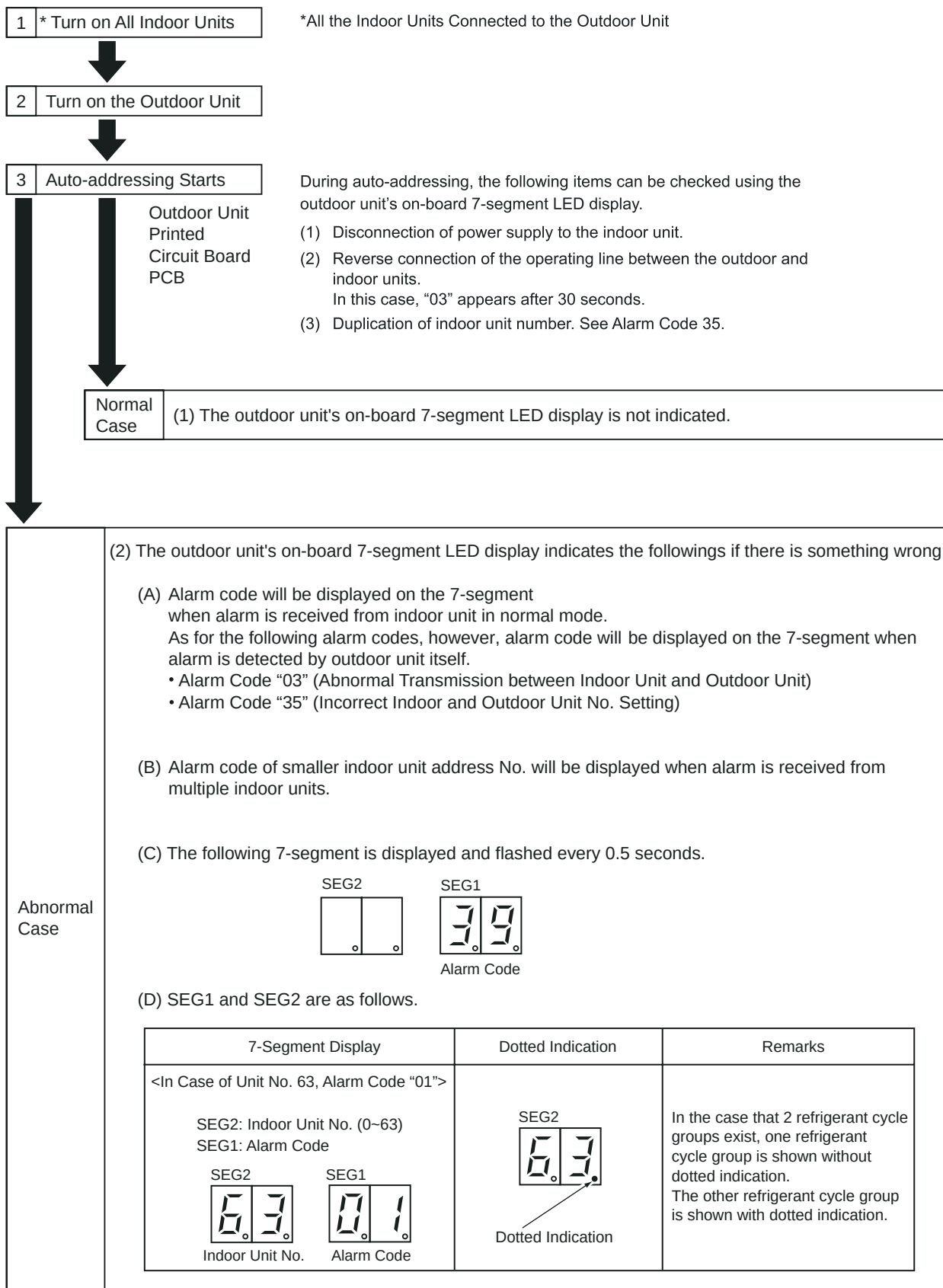


	Setting Item	Pin No.
1	I.U. is located higher than O.U. ≥ 20m	ON OFF 
2	O.U. is located higher than I.U. ≥ 25m	ON OFF 
3	DHW Priority Mode	ON OFF 

1.2 Initial Troubleshooting

1.2.1 Checking Of Using 7-Segment Display

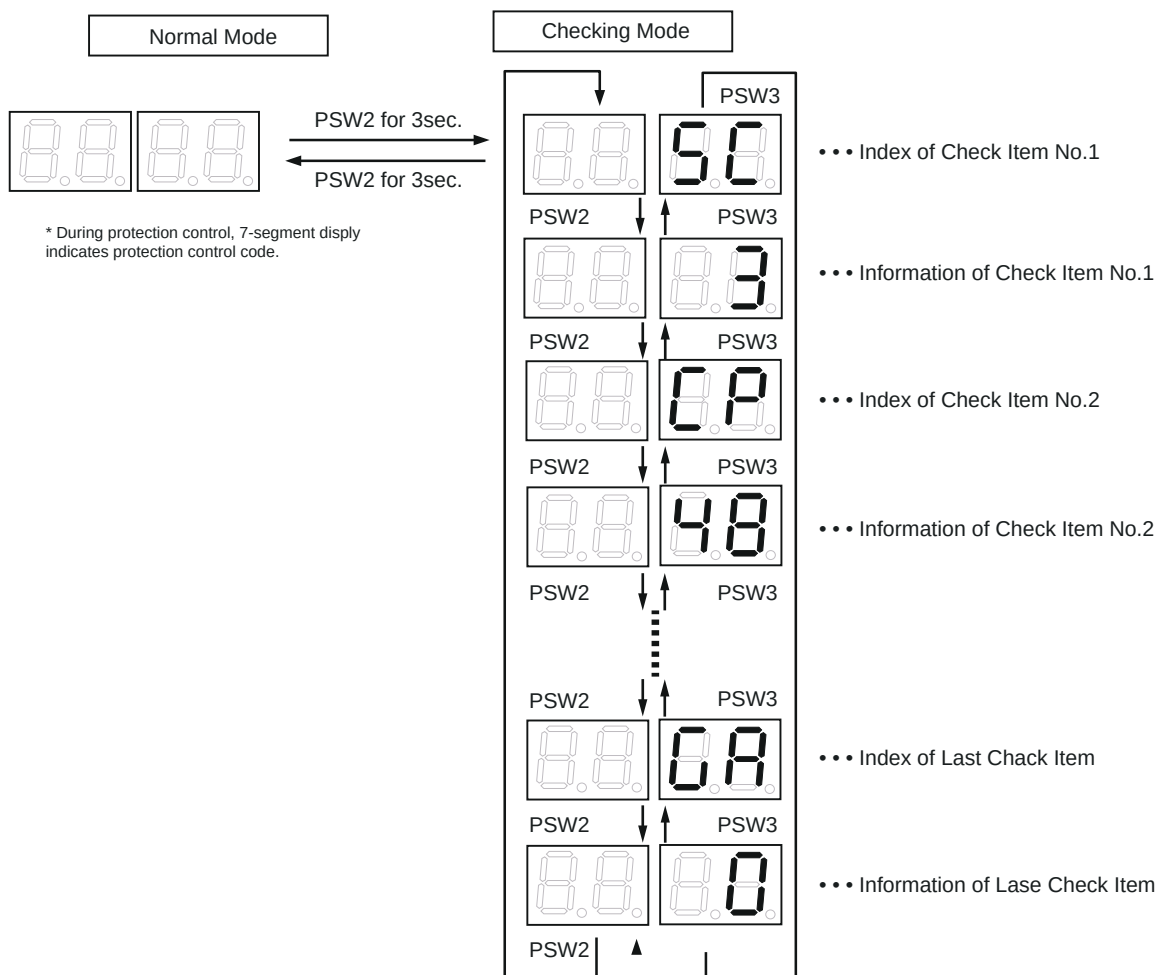
- Simple Checking by 7-Segment Display



Only an authorized person can check using this method.

- Before Checking
- (1) Turn ON the main power supply. Wait for more than 20 seconds to start checking.
- (2) Checking Items
 - * Expansion Valve Opening
 - * Temperature Readings from Thermistors
 - * Number of Indoor Units Connecting in the Same System
- (3) Check the locations of 7-segment and push switches.
- (4) High voltage is applied to the PCB and electrical parts. Never touch electrical parts and wires without appropriate personal protective equipment (PPE) when checking.

To cancel the checking mode: Press PSW2 for 3 seconds



Details of 7-Segment Display

Check No.	Item	Indication Data	
		Index	Contents
01	Input/Output State of Outdoor Micro-Computer	88 50	Outdoor chip output state, this show the status of relays on PCB
02	Capacity of Outdoor Unit	88 00	0~999 Refer to "(1) Outdoor unit Capacity Table"
03	Total Capacity of Operating Indoor Unit	88 00	0~999 Refer to "(2) Indoor unit Capacity Table"
04	Inverter Order Frequency to Compressor	88 88	0~115 [Hz]
05	Number to Running Compressor	88 00	0~1 [pc]
06	Outdoor Fan Step	88 00	0~15 [step]
07	Outdoor Electronic Expansion Valve Opening	88 00	0~100 [%]
08	High Pressure (Discharge Pressure)	88 88	-0.55~5.52 [MPa] (-80~800[psi])*1 Indication of Sensor Open Circuit: 5.62 MPa (815 psi) Indication of Sensor Short Circuit: -0.62 MPa (-90 psi)
09	Low Pressure (Suction Pressure)	88 85	-0.22~2.21 [MPa] (-32~320[psi])*1 Indication of Sensor Open Circuit: 2.25 MPa (326 psi) Indication of Sensor Short Circuit: -0.25 MPa (-36 psi)
10	Discharge Temperature (at the Discharge Pipe near the Compressor)	88 00	1~142 [°C] (34~288[°F])*1 Indication of Sensor Open Circuit: 255 °C (491°F) Indication of Sensor Short Circuit: 0°C (32 °F)
11	Evaporating Temperature (at Outdoor Unit Heat Exchanger)	88 00	-46~80 [°C] (-50~176[°F])*1 Indication of Sensor Open Circuit: 127 °C (260°F) Indication of Sensor Short Circuit: -127°C (-197 °F)
12	Ambient Air Temperature	88 00	-46~80 [°C] (-50~176[°F])*1 Indication of Sensor Open Circuit: 127 °C (260°F) Indication of Sensor Short Circuit: -127°C (-197 °F)
13	Temperature of Refrigerant Cooler	88 50	-46~80 [°C] (-50~176[°F])*1 Indication of Sensor Open Circuit: 127 °C (260°F) Indication of Sensor Short Circuit: -127°C (-197 °F)
14	Inverter Primary Current	88 88	0~255 [A]
15	Indoor Electronic Expansion Valve Opening (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ No. 63 Indoor Unit 0~100 [%]
16	Liquid Pipe Temperature of Indoor Unit (0~63)	88 00 ~ 88 66	No. 0 Indoor Unit ~ No. 63 Indoor Unit -62~127 [°C](-80~260[°F])*1
17	Gas Pipe Temperature of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ No. 63 Indoor Unit -62~127 [°C](-80~260[°F])*1
18	Inlet Air Temperature of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ No. 63 Indoor Unit -62~127 [°C](-80~260[°F])*1
19	Outlet Air Temperature of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ No. 63 Indoor Unit -62~127 [°C](-80~260[°F])*1
20	Water Temperature of the DHW Tank	88 88	-62~127 [°C] (-80~260[°F])*1
21	Cause Code of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ No. 63 Indoor Unit 0~999 Refer to "(2) Indoor Unit Capacity Table"
22	Cause Code of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ No. 63 Indoor Unit 0~99 Refer to "(3) Cause Code of I.U. or O.U. Stoppage"
23	The Degeneration Control of Pressure Ratio Decrease Protection	88 88	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated

Check No.	Item	Indication Data	
		Index	Contents
24	The Degeneration Control of High Pressure Increase Protection	88 83	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated
25	The Degeneration Control of Inverter Temp. Increase Protection	88 88	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated
26	The Degeneration Control of Discharge Temp. Increase Protection	88 85	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated
27	The Degeneration Control of TdSH Decrease Protection TdSH : Superheat of Discharge Gas	88 86	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated
28	The Degeneration Control of Overcurrent Protection	88 88	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated
29	Accumulated Operating Time of Compressor	88 88	0~9999 (x 10 hours) If it exceeds 9999, it is displayed as: 0
30	Accumulated Operating Time of Compressor (Restorable *4)	88 88	0~9999 (x 10 hours)
31	Outdoor Unit Alarm Code	88 88	0~99 Refer to "(4) Alarm Code Table"
32	Cause Code of Inverter Stoppage	88 88	0~16 Refer to "(5) Cause Code of Inverter/Fan Stoppage"
33	Abnormal Data Record (No.1~No.15)	88 88 ~ 88 85	No. 1 Abnormal Data Record (Latest) ~ No. 15 Abnormal Data Record *Refer to "(6) Abnormal Data Record"
34	Total Capacity of Indoor Unit Connected	88 88	0~9999 1: Refer to "(2) Indoor Unit Capacity Table"
35	Connected Indoor Unit Number	88 88	0~64 (Pc)
36	Refrigerant System Address	88 88	0~63

*1 If Function Setting "Fd"=1, indication unit is converted to [°F] or [psi] from [°C] or [MPa].

(1) Outdoor Unit Capacity Table

Indication	Capacity (kW)	Capacity (RT)
32	10.6	3.0
40	14.1	4.0
52	17.6	5.0

(2) Indoor Unit Capacity Table

Indication	Capacity (HP)	Model (kBtu/h)
4	0.5	05
6	0.8	06
8	1.0	09
10	1.3	12
11	1.5	14
13	1.8	15
14	2.0	17
16	2.3	19

Indication	Capacity (HP)	Model (kBtu/h)
18	2.5	22
20	2.8	24
22	3.0	27
26	3.3	30
32	4.0	38
40	5.0	48
48	6.0	54

(3) Cause Code of I.U., DHW Tank or O.U. Stoppage

Code	Item
00	Operation OFF, Power OFF
01	Thermo-OFF
02	Alarm
03	Freeze Protection Overheating Protection
05	Instantaneous Power Failure at the Outdoor Unit
06	Instantaneous Power Failure at the Indoor Unit
07	Stoppage of Cooling Operation due to High/Low Outdoor Air Temperature Stoppage of Heating Operation due to High Outdoor Air Temperature
10	Demand. Forced Stoppage
11	Retry due to Pressure Ratio Decrease
12	Retry due to Ps Increase
13	Retry due to Pd Increase
15	Retry due to Discharge Gas Temperature Increase Retry due to Low Pressure Decrease

Code	Item
16	Retry due to Discharge Gas SUPERHEAT Decrease
17	Instantaneous Overcurrent to Inverter Retry Electronic Thermal Activation of Inverter Retry Abnormal Current Sensor on Inverter Retry
18	Retry due to Inverter Voltage Decrease Retry due to Inverter Overvoltage
19	Electronic Expansion Valve Opening Difference Protection
20	Operation Mode Clash with Other Indoor Unit
21	Forced Thermo-OFF for Oil Return
22	The Outdoor Unit Hot Start
23	Refrigerant leak or recovery
26	Retry due to High Pressure Decrease
28	Cooling Air Discharge Temperature Decrease
27 (199)	Indoor Unit Stoppage due to shut-off valve close on Refrigerant Shut-off Box

1. The cause code of indoor unit stoppage is not always "02" (Alarm) during stoppage by the abnormality. If the unit is under Thermo-OFF by other cause of stoppage before "02" (Alarm) occurs, the previous cause code of indoor unit stoppage remains.
2. When the communication between the inverter PCB and the outdoor unit PCB is disconnected for 30 seconds, the outdoor micro-computer will be reset. Accordingly when the alarm code "04" (Communication Failure between Inverter PCB and Outdoor Unit PCB) occurs, the cause code of indoor unit stoppage may be indicated "05".
3. When the communication between the indoor unit/DHW Tank and the outdoor unit is disconnected for 3 minutes, the indoor micro-computer will be reset. Accordingly when the alarm code "03" (Communication Failure between Indoor Unit/ DHW Tank and Outdoor Unit) occurs, the cause code of indoor unit/DHW Tank stoppage may be indicated "06".

(4) Alarm code

Code	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Activation of Protection Device (Float Switch)	Activation of Float Switch(High Water Level in Drain Pan,Abnormality of Drain Pipe, Float Switch or Drain Pan)
02	Outdoor Unit	Activation of Protection Device (High Pressure Cut)	Activation of PSH (Pipe Clogging, Excessive Refrigerant, Inert Gas Mixing)
03	Transmission	Abnormal transmission between the Indoor unit and Outdoor unit	Incorrect Wiring, Loose Terminals, Disconnect Wire, Blowout of Fuse, Outdoor or Indoor Unit Power OFF
04		Abnormality between Inverter PCB and Outdoor Unit PCB	Inverter PCB - Outdoor Unit PCB Transmission Failure (Loose Connector, Wire Breaking, Blowout of Fuse)
05	Supply Phase	Abnormality Power Supply Phases	Incorrect Power Supply, Connection to Reversed Phase, Open-Phase
06	Voltage	Abnormal Inverter Voltage	Outdoor Voltage Drop, Insufficient Power Capacity
06.		Abnormal Fan Controller Voltage	Outdoor Voltage Drop, Insufficient Power Capacity
07	Cycle	Decrease in Discharge Gas Superheat	Excessive Refrigerant Charge, Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Opened Position (Disconnect Connector)
08		Increase in Discharge Gas Temperature	Insufficient Refrigerant Charge, Pipe Clogging Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Closed Position (Disconnect Connector)
11	Sensor on Indoor Unit/ DHW Tank and Controller	Inlet Air Thermistor/ Inlet Water Thermistor	Incorrect Wiring, Disconnecting Wiring Breaking Wire, Short Circuit
12		Outlet Air Thermistor/ Outlet Water Thermistor	
13		Abnormality of Liquid Pipe Thermistor (TL)	
14		Abnormality of Gas Pipe Thermistor (Tg)	
15		Abnormality of Indoor Air Thermistor (Total Heat Exchanger)	
16		Abnormality of DHW Thermistor (TDHW)	
17		Abnormality of Thermistor in Wire Controller	
19	Fan Motor	Activation of Protection Device for Indoor Fan	Fan Motor Overheat, Locking
21	Sensor on Outdoor Unit	High Pressure Sensor	Incorrect Wiring, Disconnecting Wiring, Breaking Wire, Short Circuit
22		Outdoor unit Ambient Thermistor (Ta)	
23		Compressor Discharge Gas Thermistor (Td)	
24		Heat Exchanger Liquid Pipe Thermistor (Te)	
25		Heat Exchanger Liquid Pipe Thermistor (Tsc)	
27		Subcooling Bypass Pipe Inlet/Outlet (Ts1/Tbg) Thermistor	
29		Low Pressure Sensor	
31	System	Incorrect Capacity Setting of Outdoor Unit and Indoor Unit/water module	Incorrect Capacity Code Setting of Combination Excessive or Insufficient Indoor Unit /Water Module Total Capacity Code
35		Abnormal Transmitting between Outdoor Units	Duplication of Indoor Unit No. in same Ref. Gr.
36		Incorrect Setting of Indoor Unit No.	Indoor Unit is Designed for R22
38		Incorrect of Indoor Unit Combination	Failure of Protection Detecting Device (Incorrect Wiring of Outdoor Unit PCB)
43	Protection Device	Activation of Low Compression Ratio Protection Device	Defective Compression (Failure of Compressor or Inverter, Loose Power Supply Connection)
44		Activation of Low Pressure Increase Protection Device	Overload at Cooling, High Temperature at Heating, Expansion Valve Locking (Loose Connector)
46		Activation of High Pressure Decrease Protection Device	Insufficient Refrigerant, Blow-by of the Reversing Valve
47		Activation of Low Pressure Decrease Protection Device (Vacuum Operation Protection)	Insufficient Refrigerant, Refrigerant Piping, Clogging, Expansion Valve Locking at Open Position (Loose Connector)
48		Activation of Inverter Overcurrent Protection Device	Overload Operation, Compressor Failure
51	Sensor	Abnormal Inverter Current Sensor	Current Sensor Failure
53	Inverter	Inverter Error Signal Detection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short Circuit)
54		Abnormality of Inverter Fin Temperature	Abnormal Inverter Fin Thermistor, Heat Exchanger Clogging, Fan Motor Failure
55		Inverter Failure	Inverter PCB Failure

57	O.U. Fan Controller	Activation of O.U. Fan Controller Protection	Incorrect Wiring between PCB, Driver IC and O.U. Fan-motor (Broken, wrong wiring); Overload Operation, Fan Motor controller Failure
5A		Activation of O.U. Fan Controller Protection Device	
5B		Overcurrent of O.U. Fan Controller	
5C		Abnormality of Picking up Circuit for O.U. Fan Controller	
71	Indoor Unit	Protection Thermostat of DHW Electric Heater Activation	High temperature is detected in DHW Electric Heater
80	Indoor Unit	Transmission failure between unit and Master Controller	No Transmission for a continuous period of 5 minutes between Unit and Master Controller, failed wiring (breaking, wiring error, etc.).
EE	Compressor	Compressor Protection Alarm (It is can not be reset from remote controller)	This alarm code appears when the following alarms* occurs three times within 6 hours. *02, 07, 08, 43 to 45, 47"
F1	Indoor Unit	Alarm sent by Outdoor unit (Outdoor unit alarm 21-29)	-
F2	Indoor Unit	Alarm sent by Outdoor unit (Outdoor unit alarm except 21-29 and EE)	-
F3	Indoor Unit	Alarm sent by Outdoor unit (Outdoor unit alarm EE)	-
A6	Inverter	Abnormality of Refrigerant Cooling Module Temperature	Insufficient Refrigerant, or Abnormal EVO
b1	Outdoor Unit No. Setting	Incorrect Setting of Unit and Refrigerant Cycle No.	Over 64 Number is Set for Address or Refrigerant Cycle.
b5	Indoor Unit No. Setting	Incorrect Indoor Unit Connection Number Setting	More than 17 Non-Corresponding to H-NET Units are Connected to One System.
d1	Indoor unit	Refrigerant leakage	The refrigerant in DHW has leaked.
0E	DHW Tank leakage protector	Leakage protector protection	Activation of leakage protector
03	Refrigerant Shut-off Box	Abnormal of Refrigerant Shut-off Box transmission	Abnormal transmission between Refrigerant Shut-off Box and outdoor unit. Abnormal transmission between Refrigerant Shut-off Box and indoor unit.
C1		Incorrect Refrigerant Shut-off Box Connection	There are 2 or more Refrigerant Shut-off Boxes connected seriesly between the outdoor and indoor units.
C2		Incorrect Indoor Unit Connection No. Setting	There are 18 or more indoor units connected to one branch of Refrigerant Shut-off Box. There are 37 or more indoor units connected to one Refrigerant Shut-off Box PCB.
C6		Abnormal backup charging power board	The voltage of the backup charging power board is abnormal, Press and hold PSW1, 3 on Refrigerant Shut-off Box PCB at the same time for 6s to release alarm code.
1d		I.U. Fan Controller Alarm	I.U. fan controller is damaged
1b	I.U. Fan Controller	I.U. Fan Controller Software Over-current or Electronic Thermal Protection	The duct static pressure does not meet the requirements; speed-up mode selection of the wired controller is incorrect; I.U. fan controller is damaged
1C		I.U. Fan Controller Current Detection Circuit Abnormality	The I.U. fan motor is not connected; the I.U. fan motor is damaged; I.U. fan controller is damaged
1E		I.U. Fan Controller Under-voltage Protection	The power supply voltage of the I.U. fan controller is too low.
B6		Abnormal Transmission between I.U. PCB and I.U. Fan Controller	The transmission cable is not connected properly.
18		I.U. Fan motor non-action or out-of-step detected by indoor unit fan controller	The I.U. fan motor wiring is not connected; the I.U. fan motor is faulty; I.U. fan controller is damaged

NOTES:

When the RUN indicator flashes every 4 seconds, the communication failure between the indoor unit and the wired controller (Loosening at connector, Incorrect Wiring, Disconnecting Wiring, Breaking Wire) occurs.

(5) Cause Code of Inverter Stoppage (iTC)

Code (SEG1)	Cause	Corresponding of Cause Code of I.U. or O.U. Stoppage	Remark	
			Indication during Retry	Alarm Code
1	IPM Error	17	P17	53
2	Instantaneous Overcurrent	17	P17	48
3	Inverter Fin Thermistor Protection Activation	17	P17	54
4	Electronic Thermal Protection	17	P17	48
5	Inverter Voltage Decrease	18	P18	06
6	Overvoltage	18	P18	06
7	Abnormal Communication	18	-	04
8	Abnormal Current Detection	17	P17	51
9	Instantaneous Power Failure Detection	18	-	-
11	Reset of Micro-Computer for Inverter	18	-	-
12	Ground Fault Detection from Compressor	17	P17	53
13	Open Phase Detection	18	-	-
16	Inverter Malfunction	18	P18	55
17	Communication Error	18	-	55
18	Protection Device Actuation (PSH)	-	-	02
19	Abnormal Protective Device	-	-	38
20	Early Return Protective Device	18	-	-
21	Step-Out Detection	17	P17	53
22	Abnormal PCB setup	-	-	31
23	EERPOM Error	-	-	55

(6) Abnormal Data Record

“Abnormal Data Record”(No.01 ~ No.15) in checking item can record recent abnormal stoppages.

(The maximum number of recordable is 15. No. 01 is the latest one.)

In case of abnormal stoppage in following table, accumulated operation time when abnormal happened, alarm code/cause code of I.U. or O.U. stoppage, and cause code of inverter stoppage are recorded.

Example:

No. of Abnormal Data	NO.01
Accumulated Operation Time	1278 h
Alarm Code	48
Cause Code of Inverter Stoppage	2



Alarm Code or Cause Code of I.U. or O.U. Stoppage	Contents	Cause code of inverter stoppage	
		ITC	FTC
02	Activation of the safety device (high pressure switch) in the outdoor unit	--	--
03	Abnormal Transmitting between Indoor and Outdoor Units	--	--
04	Abnormal Transmitting between Inverter PCB and Outdoor Unit PCB	--	--
05	Abnormal Power Supply Phase	--	--
06	Abnormal Inverter Voltage (Insufficient Inverter Voltage or Overvoltage)	5,6	5,6
d1-18			
07	Activation of discharge gas superheat decrease protection	--	--
d1-16			
08	Activation of discharge gas temperature increase protection	--	--
d1-15			
21	Abnormality of high pressure sensor (Pd)	--	--
22	Abnormality of thermistor for outdoor air temperature (Ta)	--	--
23	Abnormality of thermistor for discharge gas temp. (Td)	--	--
24	Abnormality of thermistor for outdoor unit heat exchanger liquid pipe (Te)	--	--
25	Abnormality of thermistor for sub cooling main pipe inlet temp. (Tsc)	--	--
27	Abnormality of thermistor for sub cooling bypass pipe outlet temp. (Tbg)	--	--
29	Abnormality of Low Pressure Sensor for outdoor unit (Ps)	--	--
31	Incorrect capacity ratio with indoor unit and outdoor unit	--	--
32	Abnormal communication of other indoor units	--	--
35	Incorrect indoor unit No. setting	--	--
36	Incorrect indoor unit combination	--	--
38	Abnormality of picking up circuit for protection in outdoor unit	--	--
43	Abnormality of low compression ratio	--	--
d1-11			
—	Activation of low pressure increase protection	--	--
d1-12			
46	Activation of high-pressure decrease protection device (Vacuum operation protection)	--	--
d1-26			
47	Activation of low pressure decrease protection	--	--
d1-15			
48	Activation of overcurrent protection	2,4	--
d1-17			
51	Abnormality of current sensor for inverter	8	--
d1-17			
53	Activation of inverter module protection device	1,12	--
d1-17			
54	Activation of inverter fin temperature increase protectio	3	--
d1-17			
55	Inverter failure	0,9,10,11,13,14,15,16	--
d1-18			
57	Abnormality of Outdoor Fan Motor	--	--
5A	Activation of O.U. Fan Controller Protection Device	--	--
5B	Overcurrent of O.U. Fan Controller	--	--
5C	Abnormality of Picking up Circuit for O.U. Fan Controller	--	--
b5	Incorrect setting of indoor unit connection number	--	--
EE	Compressor protection alarm	--	--
d1-05	Instantaneous power failure at the outdoor unit	--	--
d1-13	Activation of high pressure increase protection	--	--
A6	Abnormality of refrigerant cooling module temperature	--	--
d1-42		--	--
1d	Abnormality of I.U. Fan Controller	--	--
1b			
1C			
1E			
B6			
18			

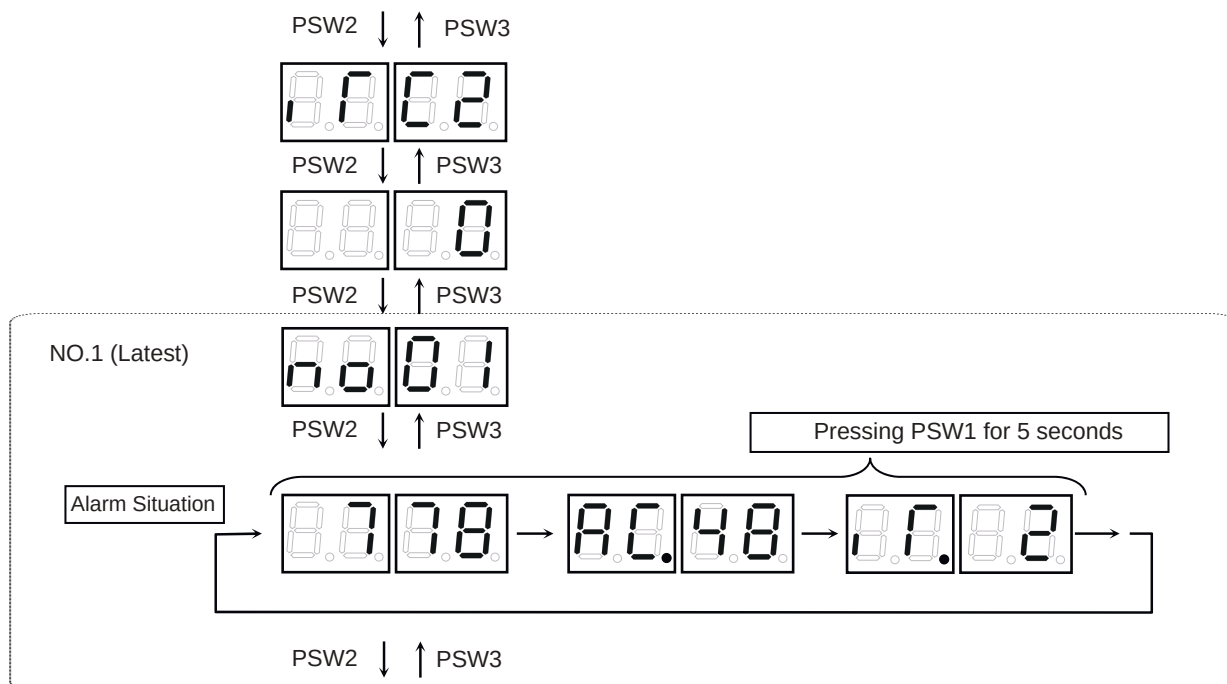
ITC: Inverter Stoppage Code

d1: Cause Code of I.U. or O.U. Stoppage

NOTE:

All History will be erased by pressing PSW1 for 5 seconds when Abnormal Data Record is displayed.

* Deletion of Alarm Code History



1.2.2 Checking of Protection Control Information

Protection control code is displayed on 7-segment display while a protection control is activated. It is turned OFF when the protection control is canceled. If several protection controls are activated, the code of the protection control with highest priority will be displayed. Also if several retry control is activated, the code of the latest retry control will be displayed.

Rank Order.	Indication	Protection Control Performed
1	P01	Pressure Ratio Protection Control
2	P02	High Pressure Increase Protection Control
3	P03	Inverter Current Protection Control
4	P04	Inverter Fin Temperature Increase Protection Control
5	P05	Discharge Temperature Increase Protection Control
6	P06	Low Pressure Decrease Protection Control
7	P0A	Demand Current Control
8	P0d	Low Pressure Increase Protection Control
9	P09	High Pressure Decrease Protection Control

		② Lower Rank Order of Protection Control Function			
		Forced Decrease	Forced Increase	Prohibition of Increase	Prohibition of Decrease
①	Forced Decrease	①	①	①	①
Higher Rank Order of Protection Control Function	Forced Increase	①	①	①	①
	Prohibited Increase	②	②	② * ¹	①
	Prohibited Decrease	②	②	②	②

*1: Discharge Temperature Increase Protection Control (P05) is higher than the following protection controls.

- a) Low Pressure Decrease Protection Control (P06)
b) Demand Current Control (P0A)

Indication	Protection Control	Remark
P01	Pressure Ratio Protection Control	To control the compressor frequency for prevention of operation with high/low pressure ratio.
P02	High Pressure Increase Protection Control	To control the compressor frequency for prevention of high pressure increase.
P03	Inverter Current Protection Control	To control the compressor frequency for prevention of inverter current increase in the outdoor unit during operation.
P04	Inverter Fin Temperature Increase Protection Control	To control the compressor frequency for prevention of inverter fin temperature increase. The inverter fin temperature is detected at the inverter PCB.
P05	Discharge Temperature Increase Protection Control	To control the compressor frequency for prevention of discharge gas temperature increase during operation.
P06	Low pressure Decrease Protection Control	To control the compressor frequency for prevention of low pressure decrease.
P09	High Pressure Decrease Protection Control	To control the compressor frequency for prevention of high pressure decrease, which would interrupt smooth refrigerant distribution to indoor units with different height and oil supply to the compressor.
P0A	Demand Current Control	To control the compressor frequency for fixing the inverter primary current around the set value (60~100% of rated current for cooling).
P0d	Low Pressure Increase Protection Control	To control the compressor frequency for prevention of low pressure increase.

1.2.3 Check Mode by Remote Control Switch

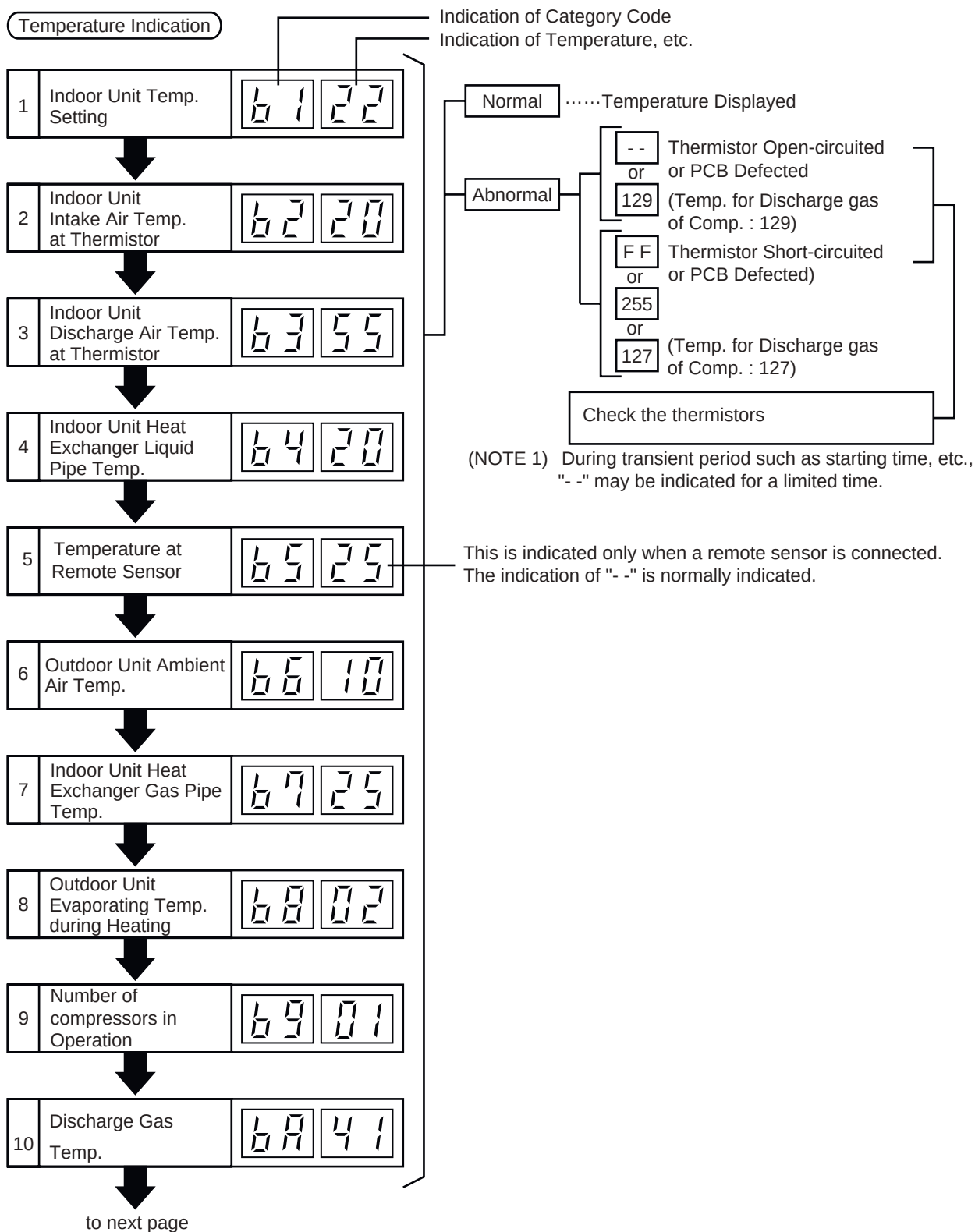
1.2.3.1 Check mode

Each “Check Menu” item and its function are explained in the following table.

Check Menu Item	Function
Check 1	Sensor condition of air conditioner will be monitored and indicated.
Check 2	Sensor data of air conditioner prior to alarm occurrence will be indicated.
Alarm History Display	Previous alarm record (date, time, alarm code) will be indicated.

For Setting Method, please refer to the manual of the wired controller.

(1) Contents of Check Mode 1



11	Thermo Temp. of Remote Control Switch	66 23
----	---------------------------------------	-------

Indication on Micro-Computer Input/Output

12	Micro-Computer Input/Output in Indoor Unit	E1 4
----	--	------

13	Micro-Computer Input/Output in Outdoor Unit	E2 -
----	---	------

Indication of Unit Stoppage Cause

14	Cause of Stoppage	d1 01
----	-------------------	-------

Refer to "1.2.1 (3) Cause Code of I.U. or O.U. Stoppage"

Abnormality Occurrence Counter

15	Abnormality Occurrence Times	E1 01
----	------------------------------	-------

16	Instantaneous Power Failure Occurrence Times in Indoor Unit	E2 00
----	---	-------

17	Transmission Error Occurrence Times between Remote Control Switch and Indoor Unit	E3 00
----	---	-------

18	Abnormality Occurrence Times on Inverter	E4 00
----	--	-------

Indication of Automatic Louver Condition

19	Louver Sensor	F1 00
----	---------------	-------

Countable up to 99.

Over 99 times, "99" is always indicated.

(NOTE 1) If a transmitting error continues for 3 minutes, one is added to the occurrence times.

to next page

Compressor Pressure/Frequency Indication

20 Discharge Pressure (High) (x 0.1 MPa) H 1 1 8

21 Suction Pressure (Low) (x 0.01 MPa) H 2 0 4

22 Control Information H 3 4 4

This is an indication for internal information for the remote control switch. This does not have any specific meaning.

23 Operation Frequency (Hz) H 4 4 4

This is an indication for frequency of Inverter.

Indoor Unit Capacity Indication

24 Indoor Unit Capacity U 1 0 8

Refer to "1.2.1 (2) Capacity of Indoor Unit Table"

25 Outdoor Unit Code U 2 F n

26 Refrigerant Cycle Number U 3 0 1

27 Refrigerant Cycle Number U 4 0 0

"n" indicates total number of indoor units;

$n = 1-9, A, b, C, d, E, F, U$
(10) (11) (12) (13) (14) (15) (16)

Expansion Opening Indication

28 Indoor Unit Expansion Valve Opening (%) L 1 2 0

29 Outdoor Unit Expansion Valve MV1 Opening (%) L 2 9 9

30 Outdoor Unit Expansion Valve MV2 Opening (%) L 3 9 9

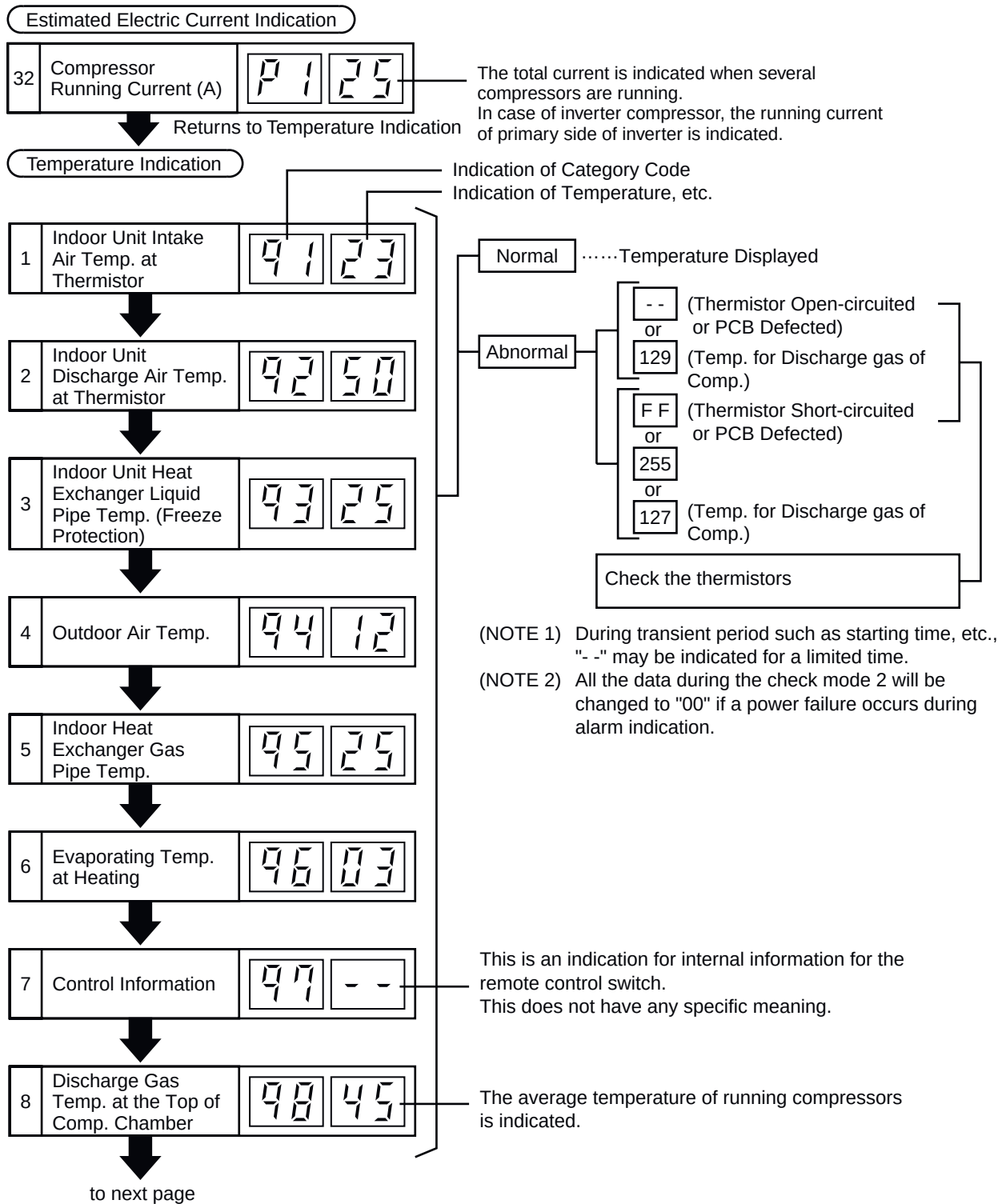
31 Outdoor Unit Expansion Valve MVB Opening (%) L 4 0 0

J3: 01 to 16
(01: when shipment (DSW5), Decimal Indication)
J4: 00 to 0F
(00: when shipment (DSW5), Indication with 16 numbers)

In case of models without Expansion Valve (MV2,MVB), the same figure is indicated.

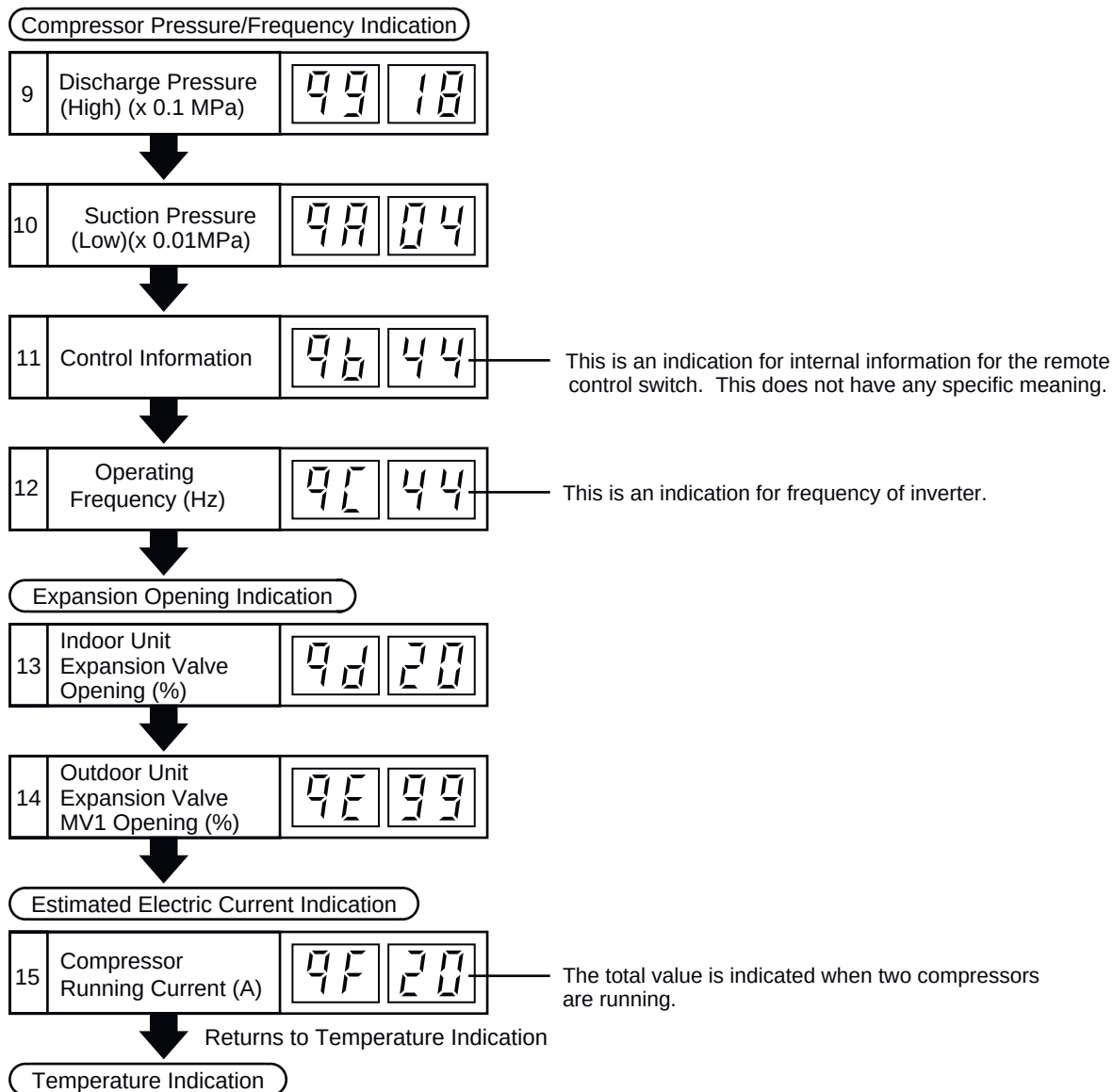
Estimated Electric Current Indication

(2) Contents of Check Mode 2



(NOTE 1) During transient period such as starting time, etc., "- -" may be indicated for a limited time.

(NOTE 2) All the data during the check mode 2 will be changed to "00" if a power failure occurs during alarm indication.



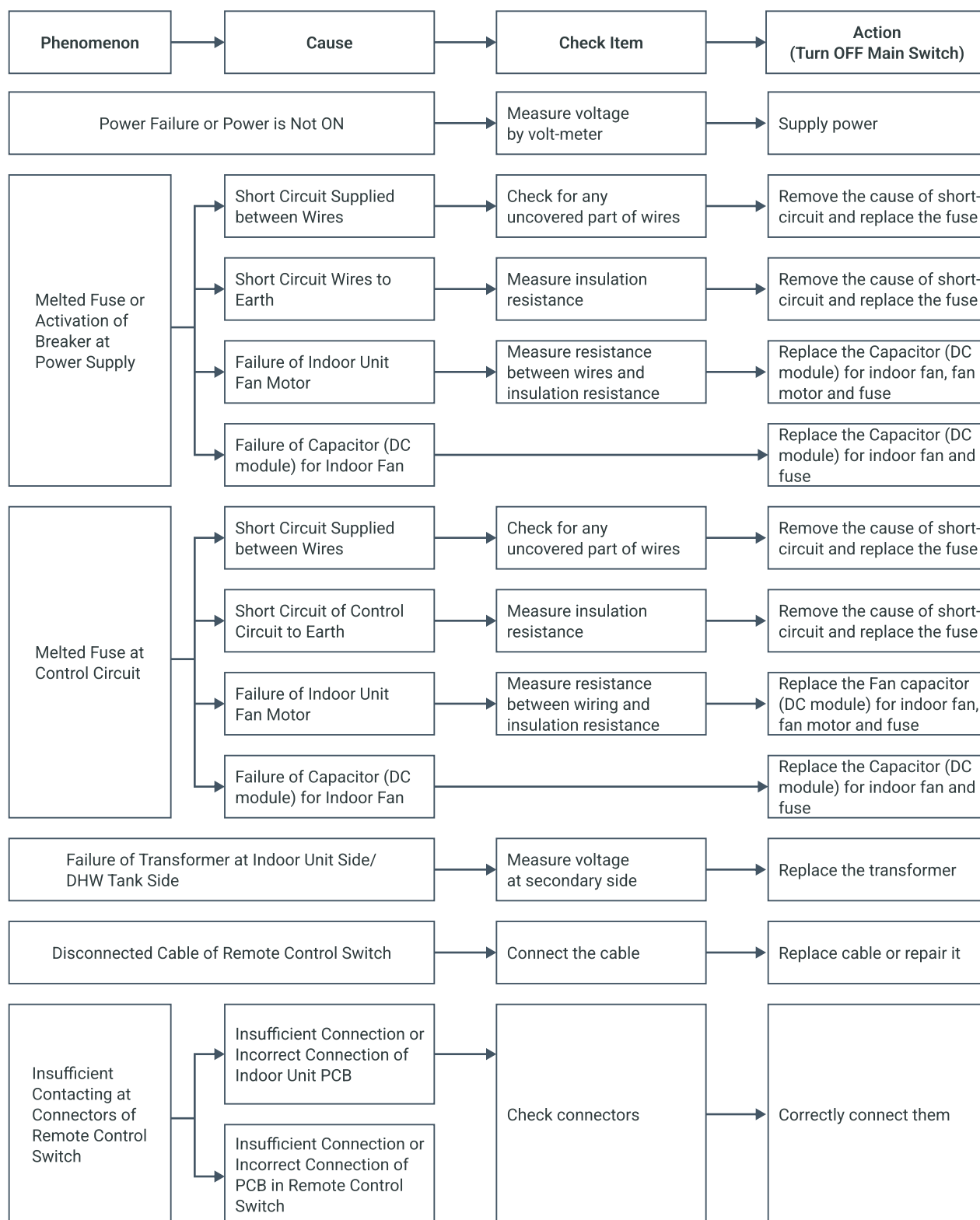
1.2.3.2 Alarm History Display

The alarm history display is available to be set from the check menu. For detailed setting method, please refer to the manual of the wired controller.

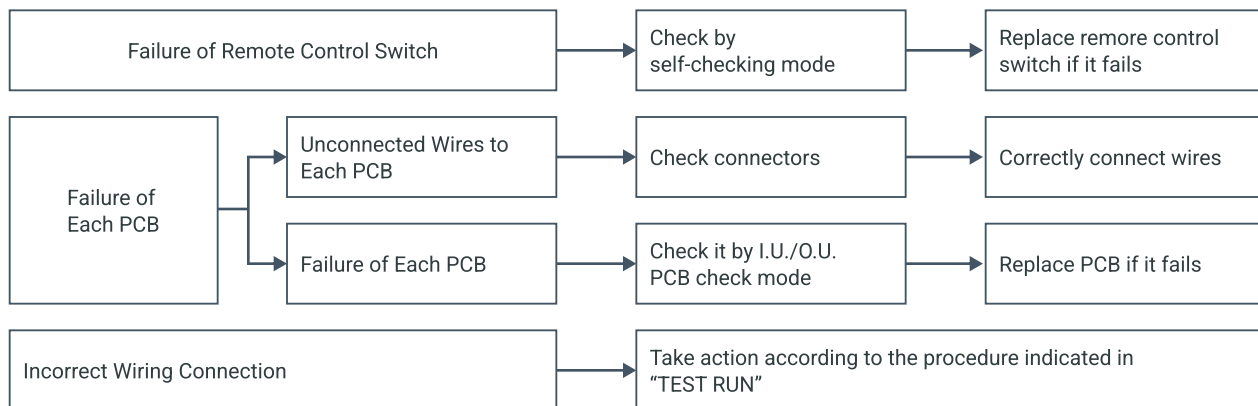
1.2.4 Failure of Power Supply to Indoor Unit/DHW Tank and Remote Control Switch

- Lights and LCD are not Indicated.
- Not Operated

If fuses are melted or a breaker is activated, investigate the cause of over current and take necessary actions.

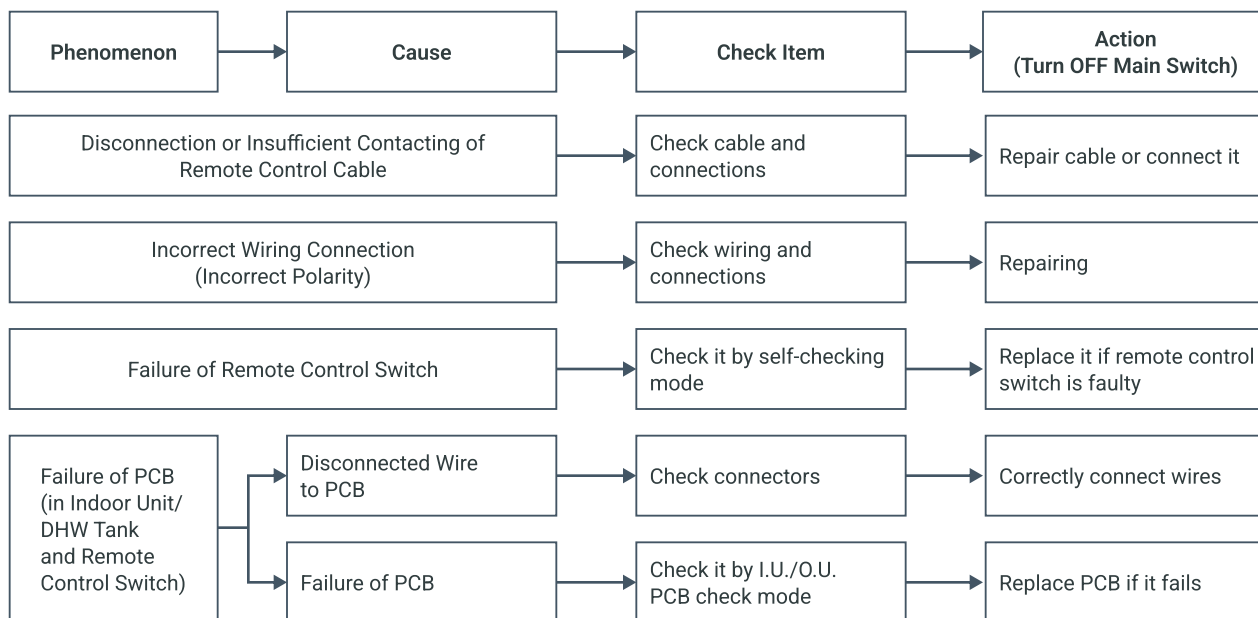


(1.2.4 Failure of Power Supply to Indoor Unit and Remote Control Switch)



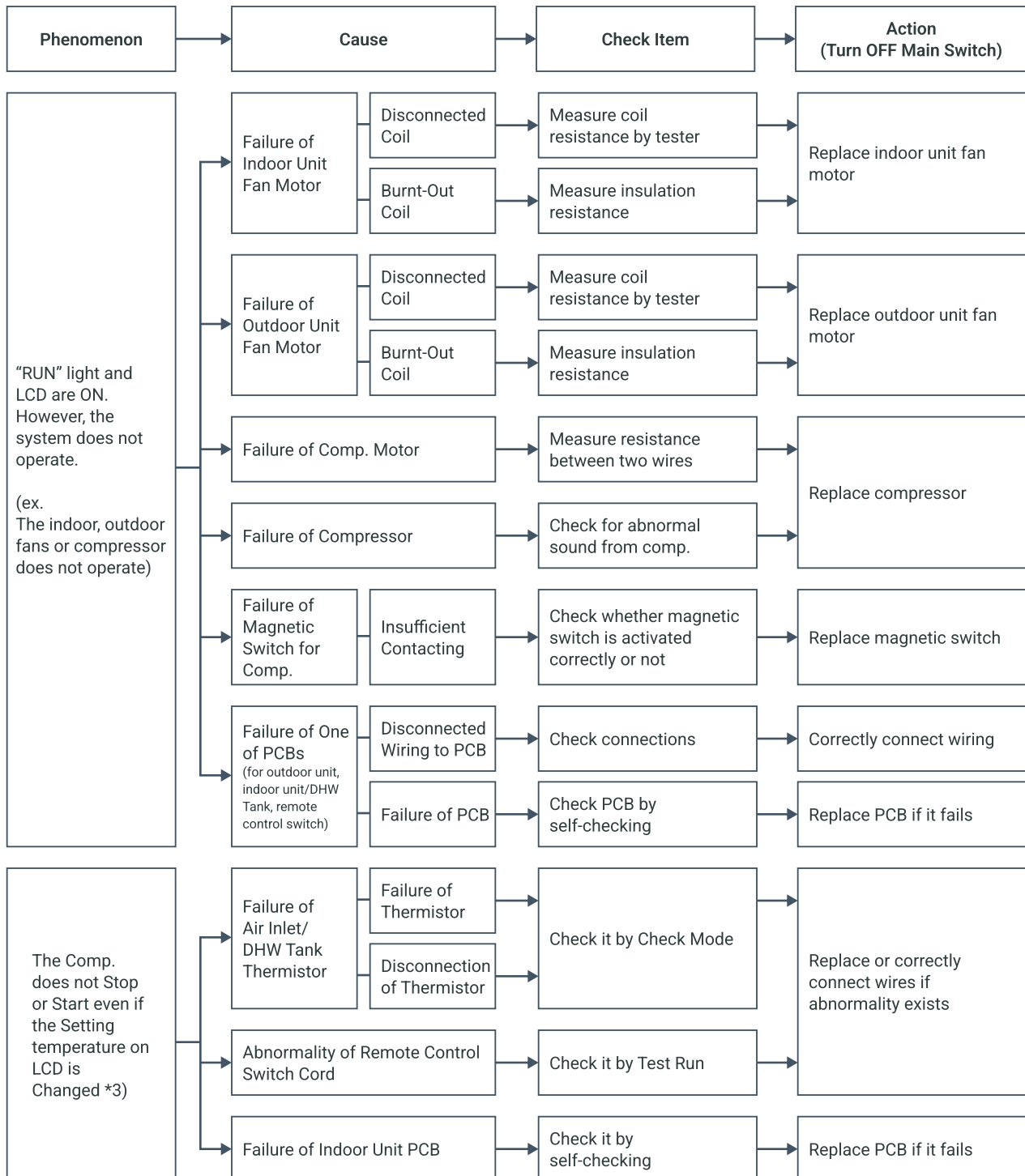
1.2.5 Abnormal Transmission between Remote Control Switch and Indoor Unit/DHW Tank

- "RUN" Lamp on Remote Control Switch: Flashing every 2 seconds

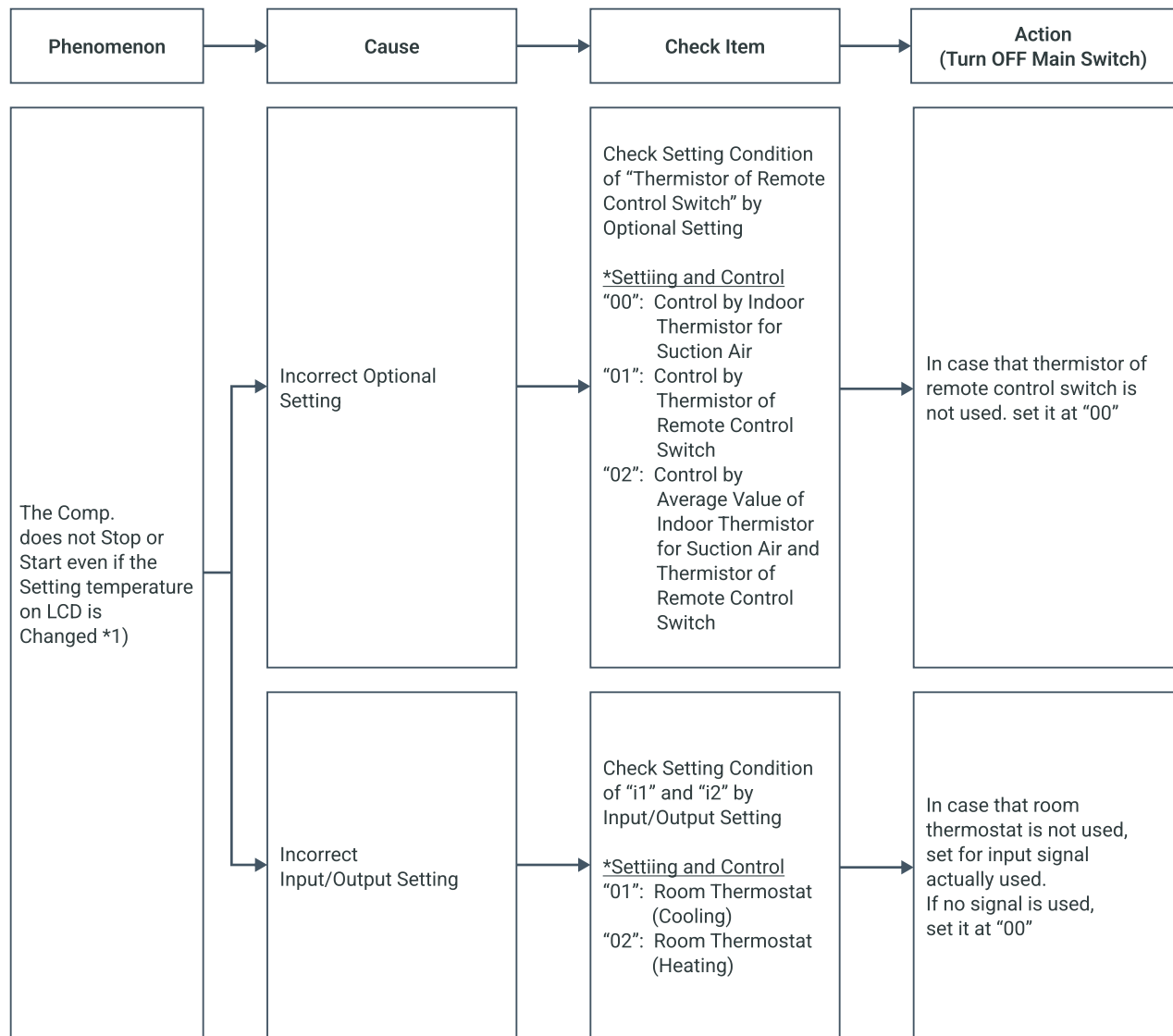


1.2.6 Abnormalities of Devices

- In the case that no abnormality (Alarm Code) is indicated on the remote control switch, and normal operation is not available, take necessary actions according to the procedures mentioned below.



(1.2.6 Abnormalities of Devices)



*1) Even if controllers are normal, the compressor does not operate under the following conditions.

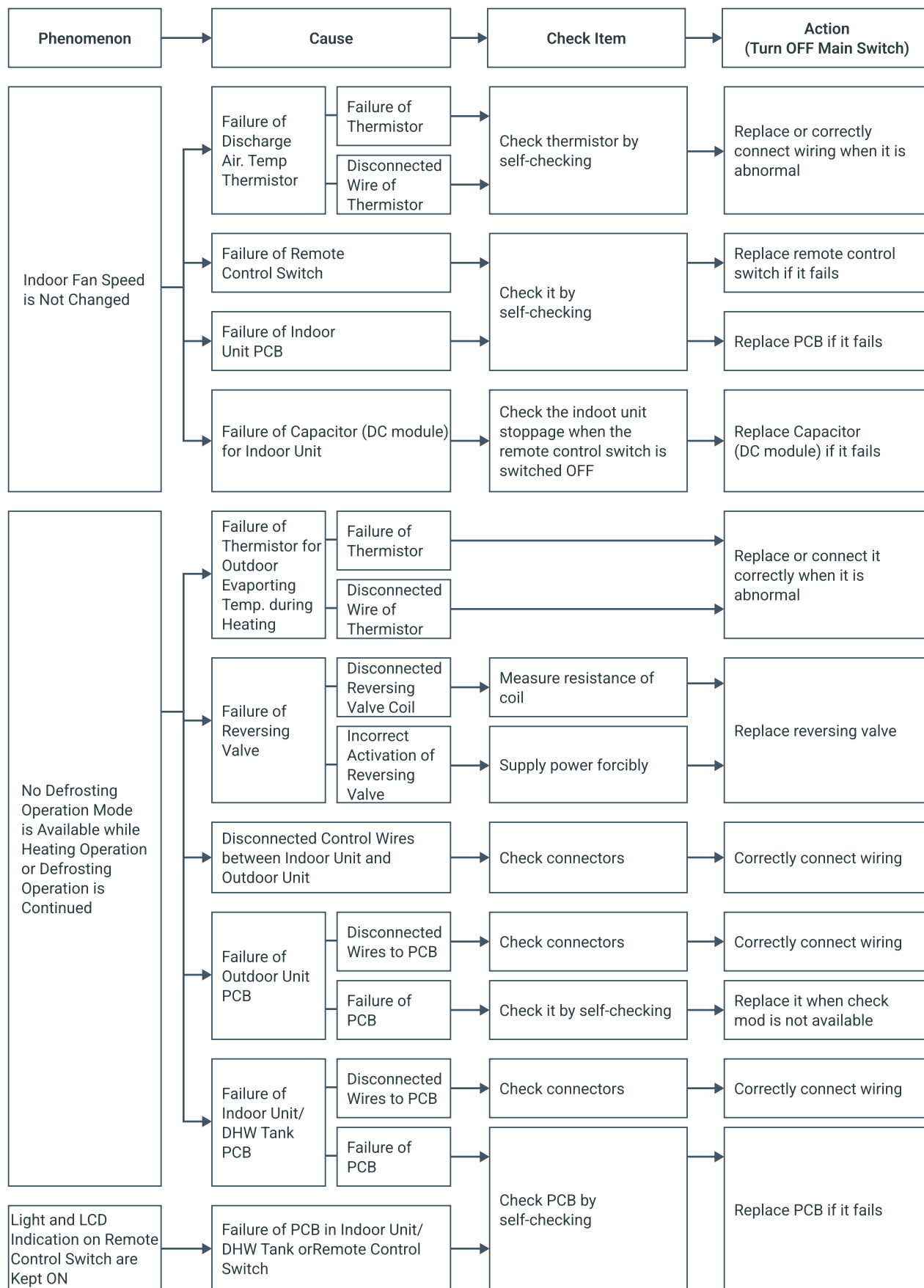
* Indoor Air Temp. is lower than 21 °C or Outdoor Air Temp. is lower than -5°C during cooling operation.

* Indoor Air Temp. is higher than 30°C or Outdoor Air Temp. is higher than 26°C during heating operation.

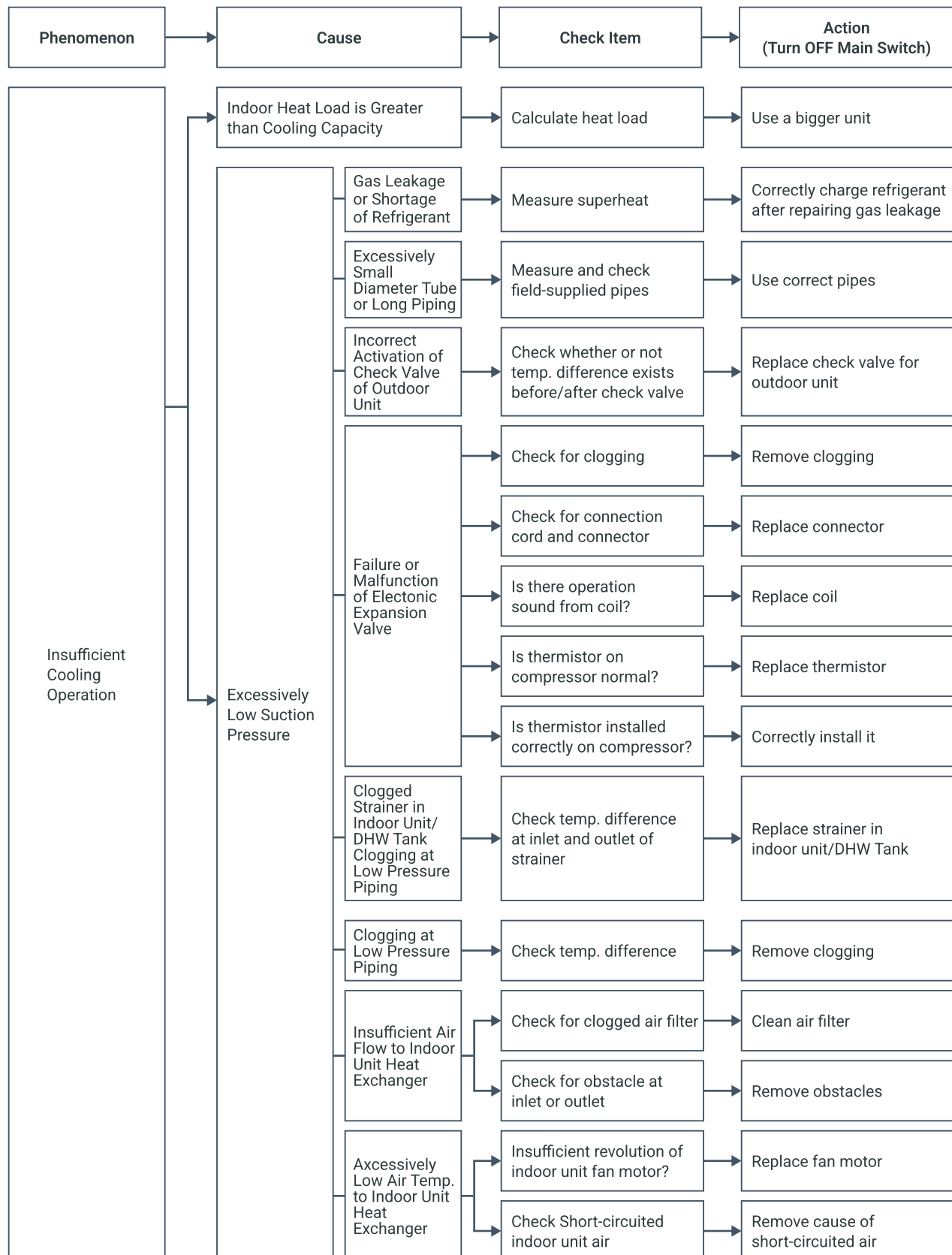
* When a cooling (or heating) operation signal is given to the outdoor unit and a different operation signal is given to indoor units.

* When demand signal or emergency stop signal is given to outdoor unit.

(1.2.6 Abnormalities of Devices)



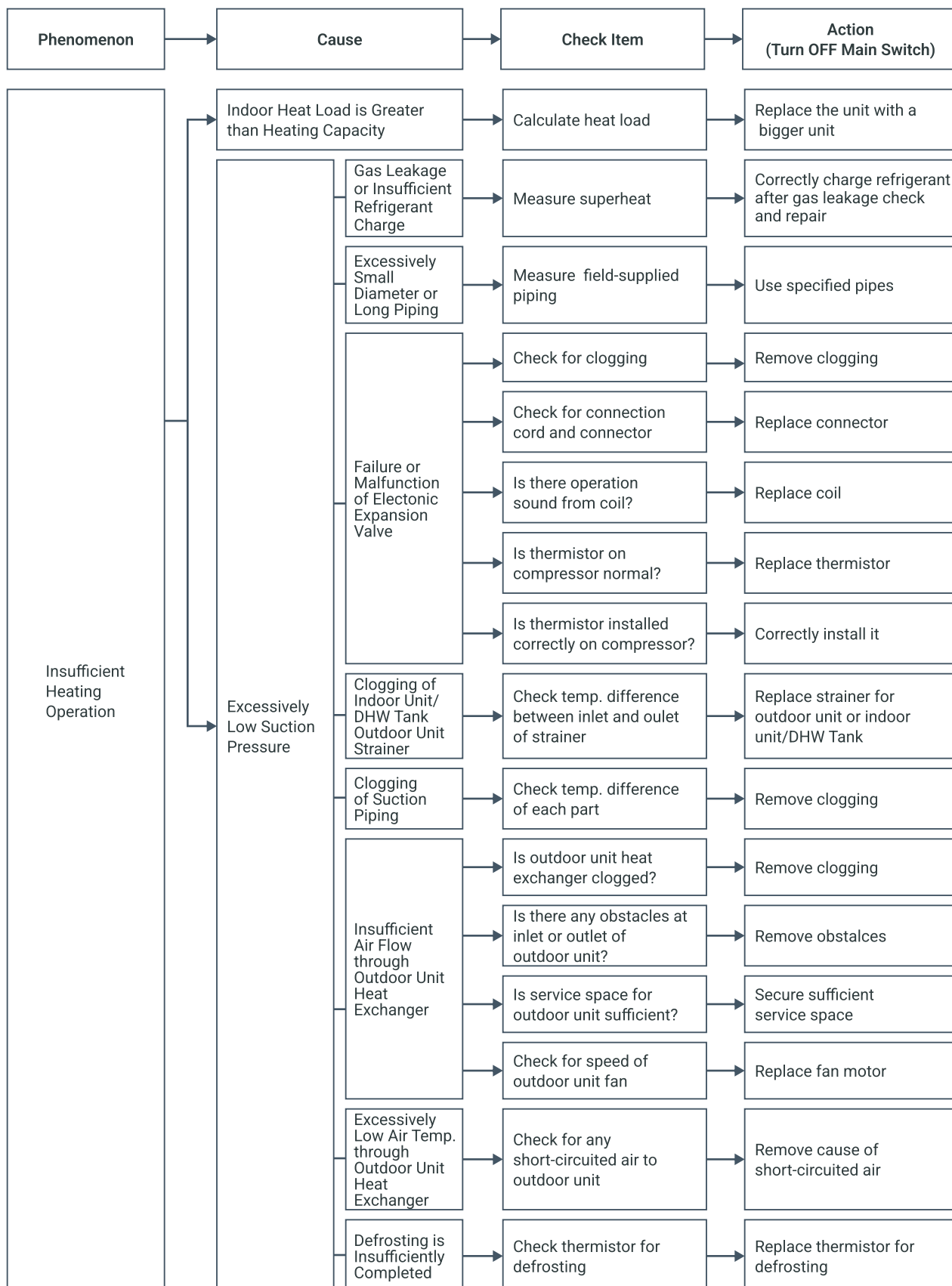
(1.2.6 Abnormalities of Devices)



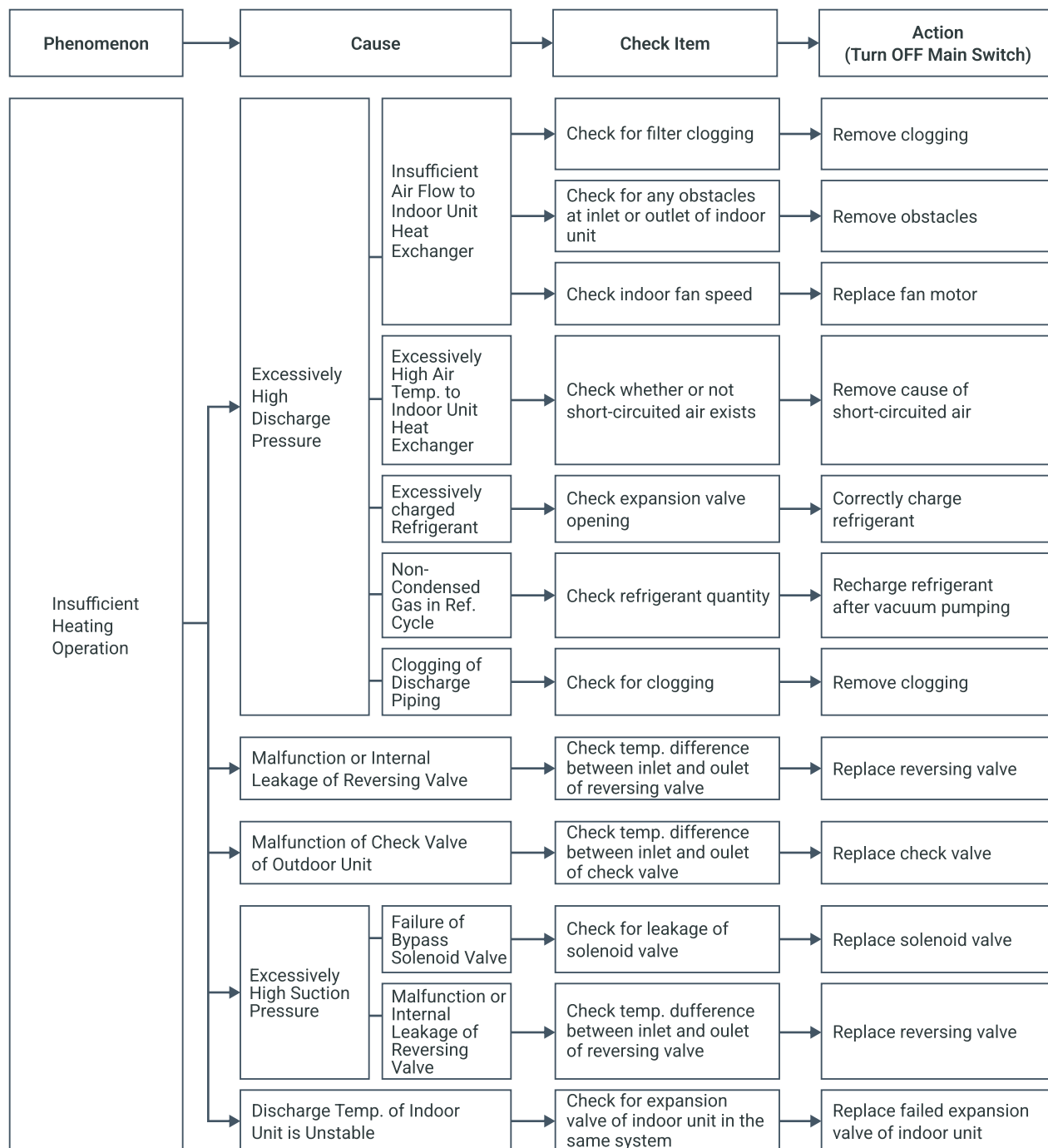
(1.2.6 Abnormalities of Devices)

Phenomenon	Cause		Check Item	Action (Turn OFF Main Switch)
Insufficient Cooling Operation	Excessively High Discharge Pressure	Insufficient Air Flow to Outdoor Unit Heat Exchanger	Check Clogging of Outdoor Unit Heat Exchanger	Remove clogging
			Obstacles at inlet or outlet of outdoor unit heat exchanger?	Remove obstacles
			Is service space of outdoor unit sufficient?	Secure service space
			Correct Fan Speed?	Replace fan motor
		Excessively High Air Temp. to Outdoor Unit Heat Exchanger	Short-Circuited Air to Outdoor Unit?	Remove cause of short-circuited air
			Any Other Heat Load near Outdoor Unit?	Remove heat source
		Excessively charged Refrigerant	Check expansion valve opening	Correctly charge refrigerant
		Non-Condensed Gas in Cycle	Check each temp. and pressure	Charge refrigerant after vacuum pumping
		Clogging of Discharge Piping	Check for clogging	Remove clogging
		Failure or Malfunction of Expansion Valve	Check for clogging	Remove clogging
			Check for connecting cord and connector	Replace connector
			Is there operation sound from coil?	Replace coil
			Is thermistor on compressor normal?	Replace thermistor
			Is thermistor installed correctly on compressor?	Correctly install it
		Malfunction or Internal Leakage of Reversing Valve	Check temp. difference between inlet and outlet of reversing valve	Replace reversing valve
	Excessively Low Suction Pressure	Failure of Bypass Solenoid Valve	Check for leakage of solenoid valve	Replace solenoid valve
		Malfunction or Internal Leakage of Reversing Valve	Check temp. difference between inlet and outlet of reversing valve	Replace reversing valve
	Discharge Temp. of Indoor Unit is Unstable		Check for expansion valve of indoor unit in the same system	Replace failed expansion valve of indoor unit

(1.2.6 Abnormalities of Devices)



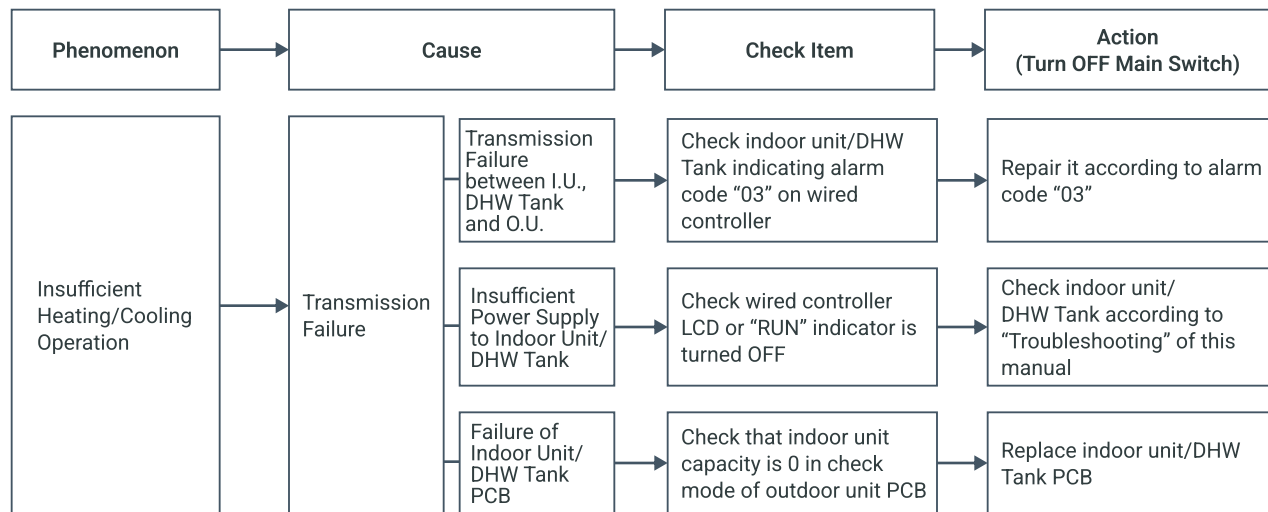
(1.2.6 Abnormalities of Devices)



(1.2.6 Abnormalities of Devices)

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Cooling or Heating Operation with Abnormal Sound	Foreign Particles Inside of Fan Casing	Check it by viewing	Remove foreign particles
	Indoor Unit Fan Runner is Hitting Casing	Check it by viewing	Adjust position of fan runner
	Outdoor Unit Propeller Fan is Hitting Casing	Check it by viewing	Adjust position of fan propeller fan
	Abnormal Sound from Compressor	Faulty Installation	Check each part is tightly fixed
		Liquid Ref. Compression	Check expansion valve opening
		Wear or Breakage of Internal Comp.Parts	Abnormal Sound from Inside of Compressor
		No Heating by Crankcase Heater	Check resistance (Crankcase Heater, Fuse)
	Hamming Sound from Magnetic Contactor	Check surface of contacts	Replace magnetic switch
	Abnormal Vibration of Cabinets	Check each fixing screws	Tightly fix it
Outdoor Fan is Not Operated When Compressor is Operated	Obstacle at Outdoor Fan	Check obstacles	Remove obstacles
	Watching Condition for Heating Operation	Wait fr switching of reversing valve (1 to 3 minutes)	In case that reversing valve is not switched, check for insufficient refrigerant
Indoor Fan is Not Operated When Compressor is Operated	Discharge Pressure Does Not Increase Higher than 1.5MPa due to unsufficient refrigerant	Check operation pressure	Add refrigerant
	Disconnected Wiring for Indoor Fan	Check wiring	Connect wiring correctly
	Failure of Fan capacitor (DC module)	Check Fan capacitor (DC module)	Replace Fan capacitor (DC module)

(1.2.6 Abnormalities of Devices)

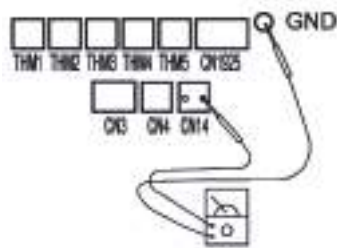
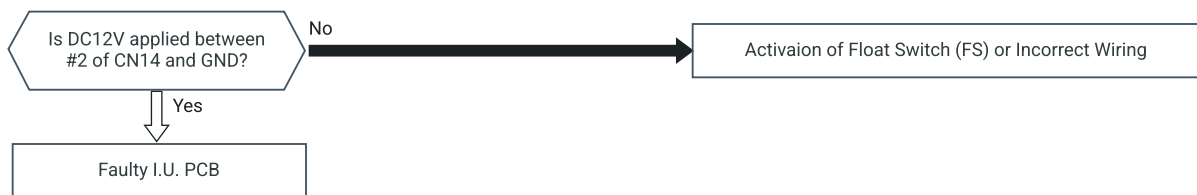


1.2.7 Troubleshooting by Alarm Code

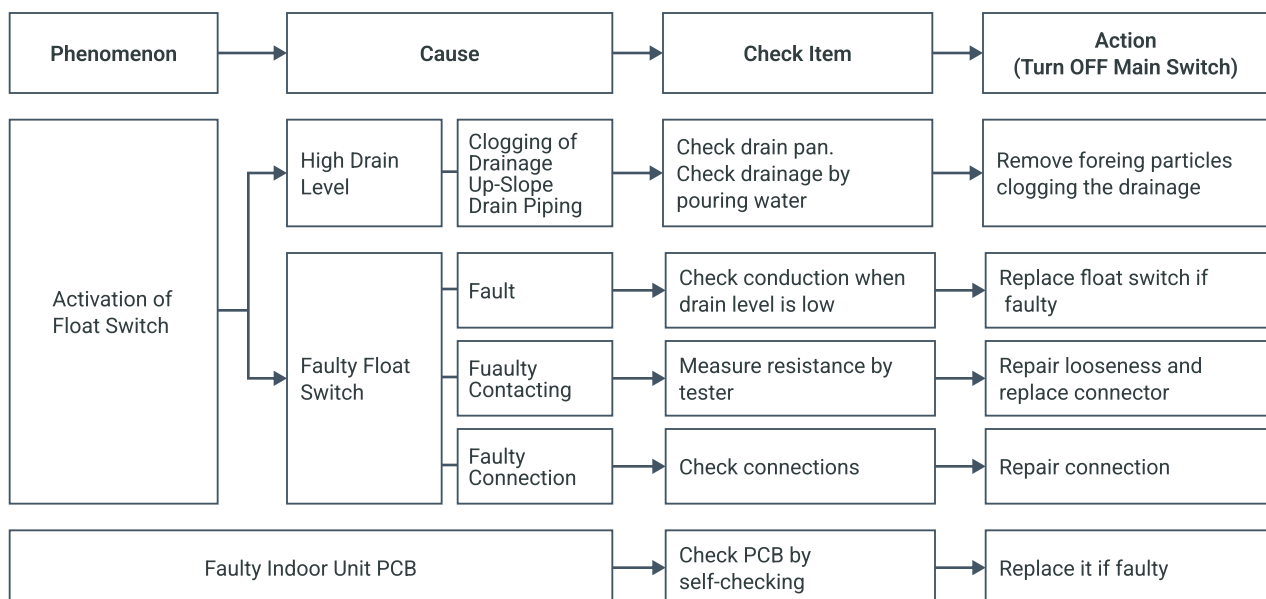
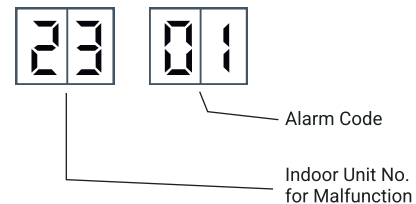
Alarm Code	01	Activation of Protection Device (Float Switch)in Indoor Unit
------------	----	--

- The RUN indicator (Red) is flashing.
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ H This alarm code is indicated when the contact between #1 and #2 of CN14 is opened for over 120 seconds during the cooling, dry, fan or heating operation

I.U. PCB: Outdoor Unit PCB

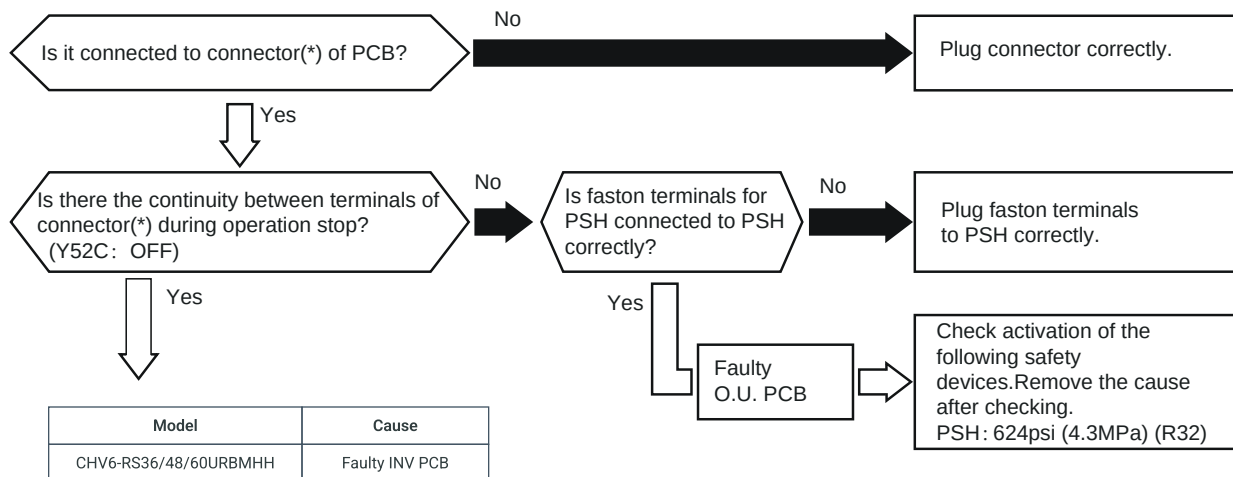


Indication of Outdoor Unit PCB



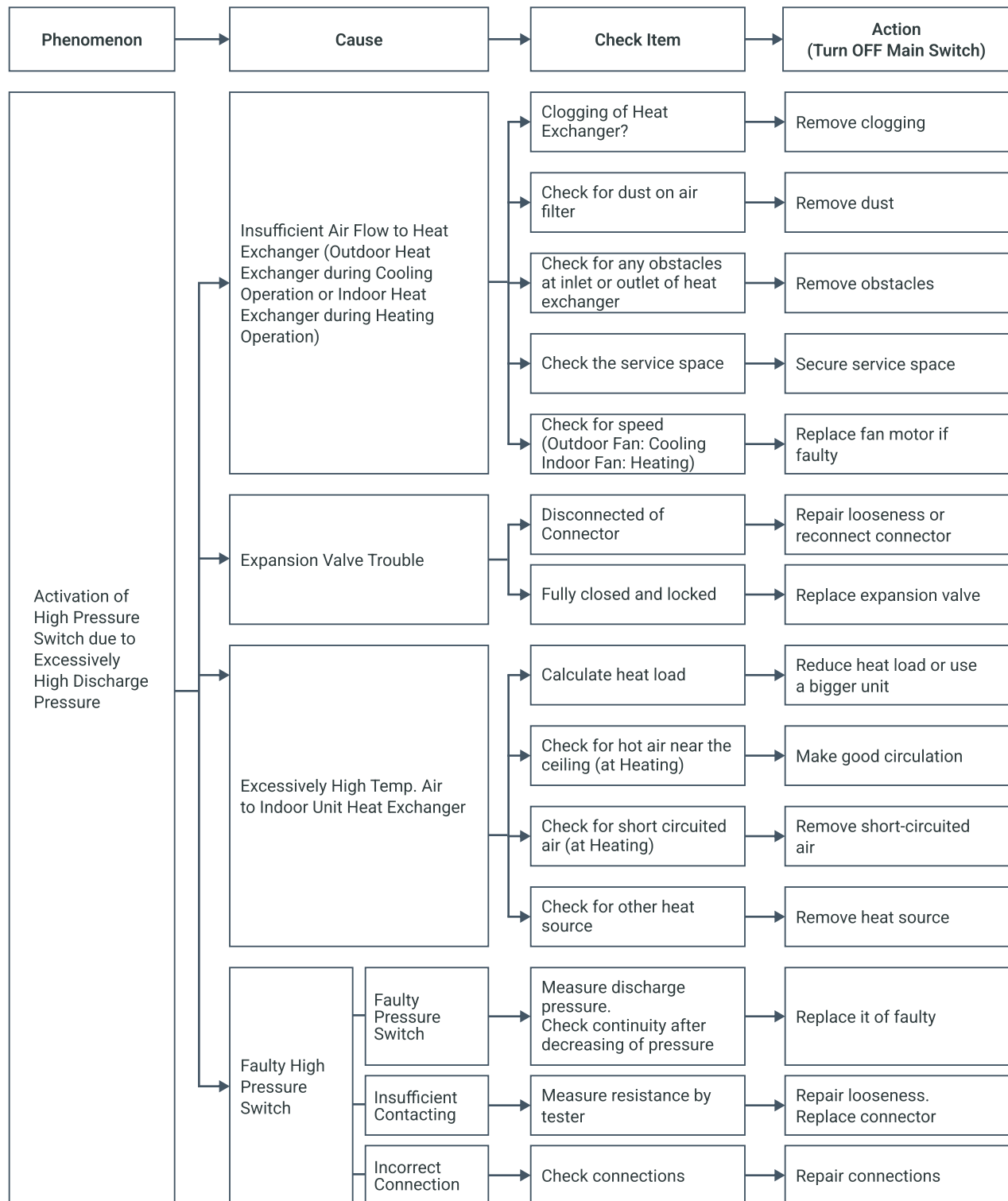
Alarm Code	02	Activation of the safety device (high pressure switch) in the outdoor unit
------------	----	--

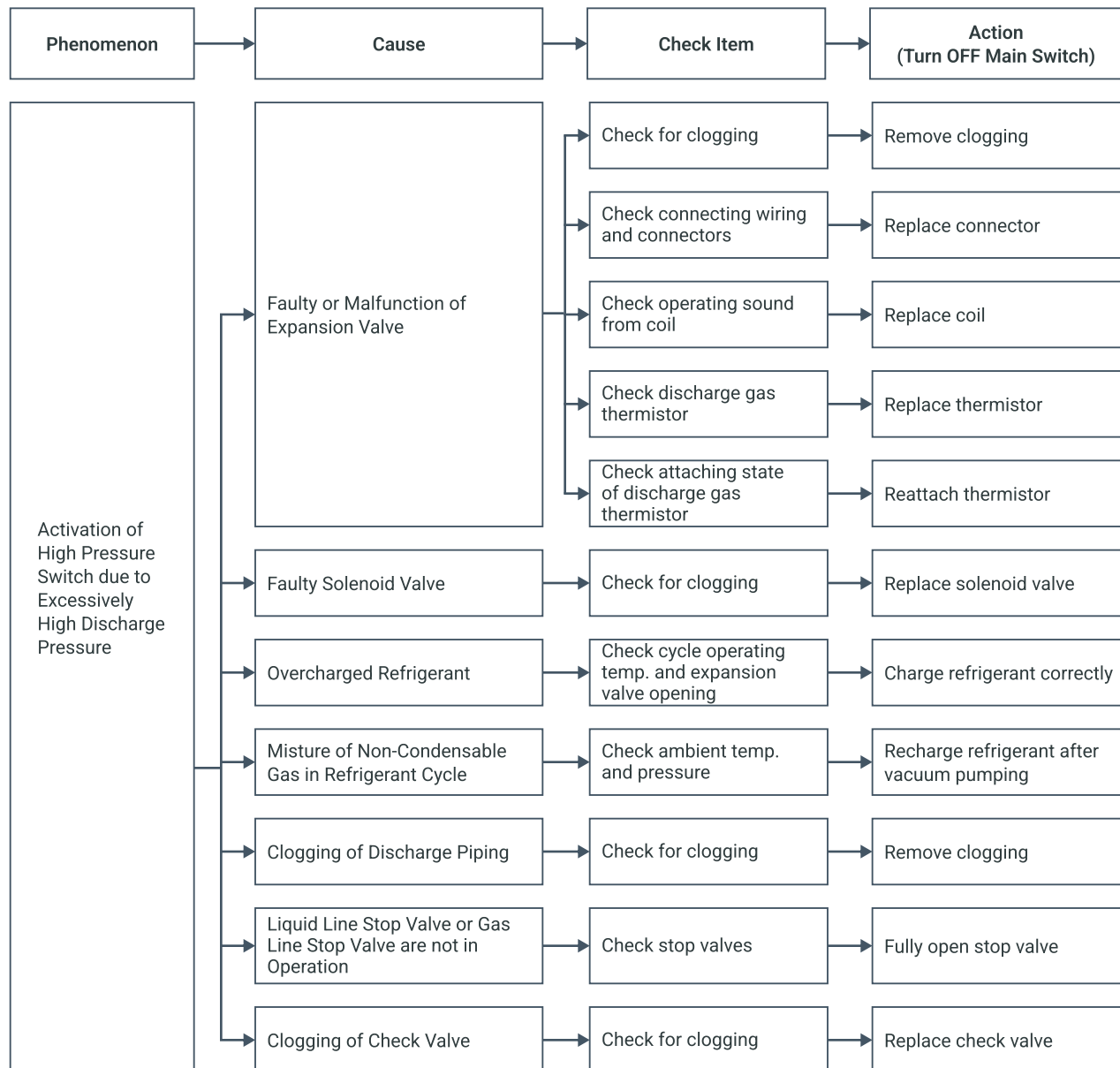
- The RUN LED flickers and "ALARM" is displayed on the remote control switch
 - The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB.
- ★ This alarm code is indicated when the high pressure switch (PSH) is activated during the compressor operation.



(*)

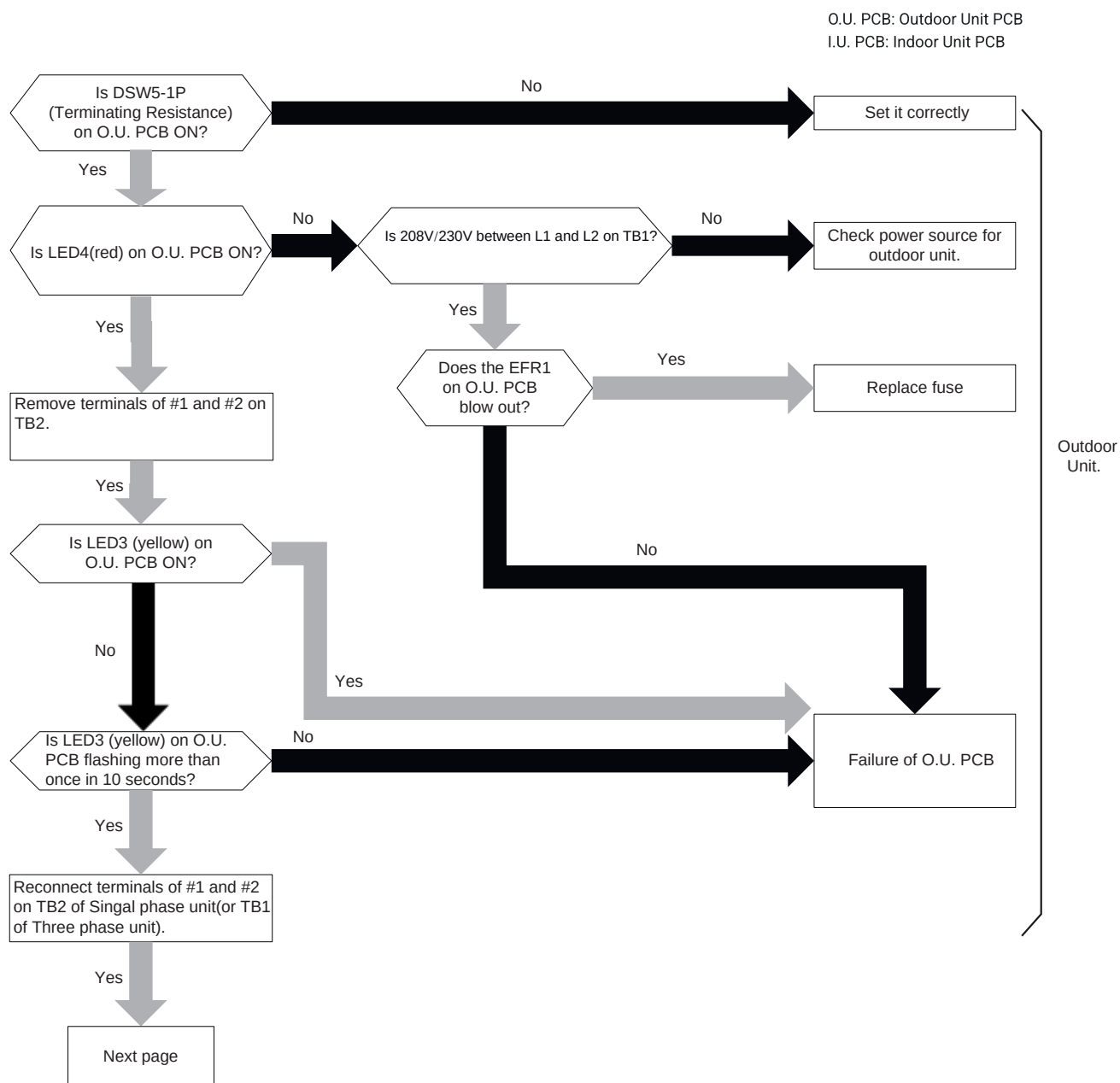
Model	PCB connector	Pin
CHV6-RS36/48/60URBMHH	PCN401 (INV PCB)	#1 - #3

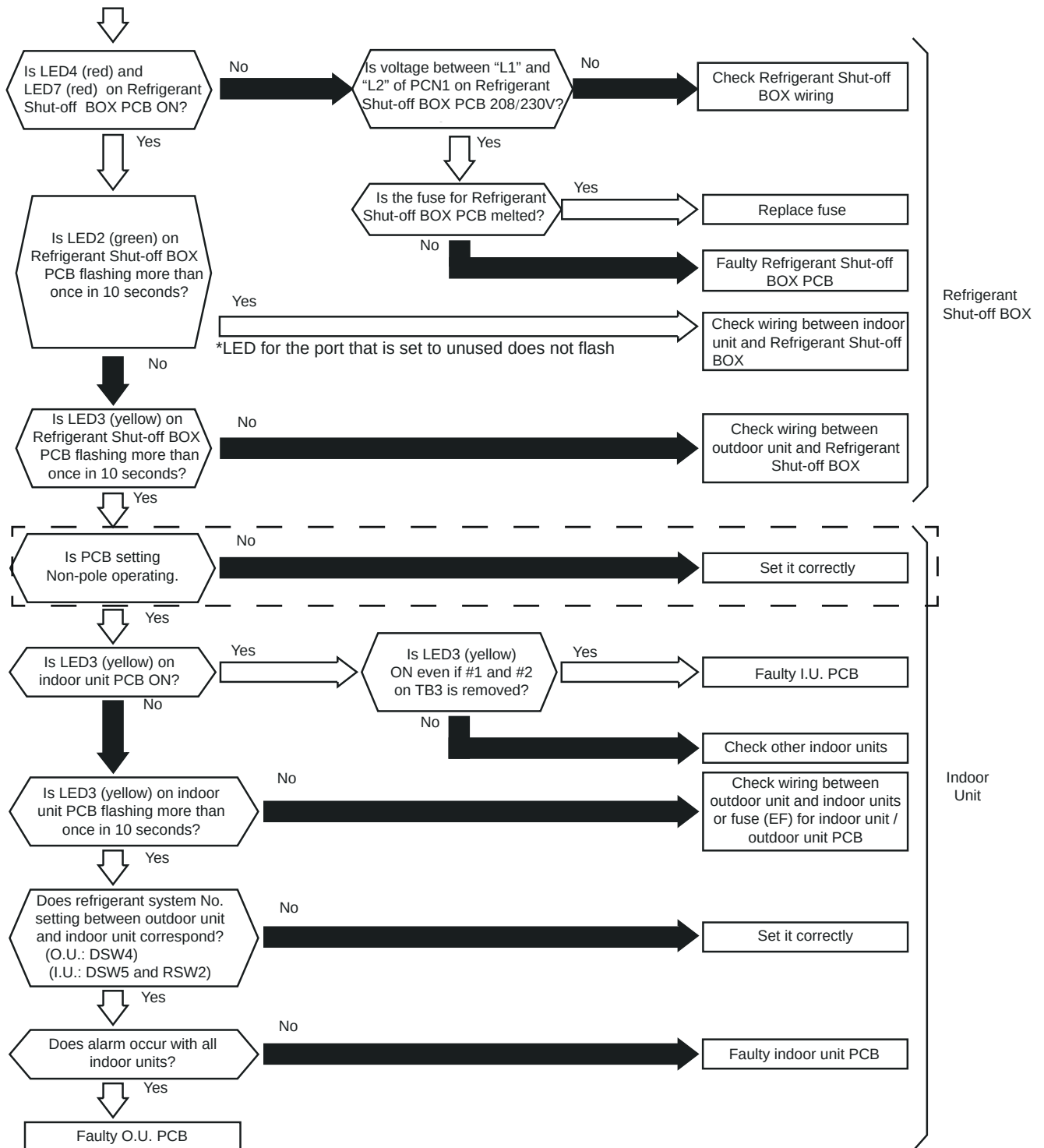




Alarm Code	03	Abnormal Transmitting between Indoor Units/DHW Tank/ Refrigerant Shut-off and Outdoor Units
------------	----	---

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
 - The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
 - The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
- ★ This alarm is displayed when an abnormal operation is maintained for three minutes after the normal transmission between the indoor units and the outdoor unit. Also, an abnormal operation is maintained for 30 seconds after the micro-computer is automatically reset.
- ★ The alarm is displayed when the abnormal transmission is maintained for 30 seconds from the starting of the outdoor unit.
- ★ Investigate the cause of the overcurrent and take the necessary action when the fuses are blown out or the breaker for the outdoor unit is activated





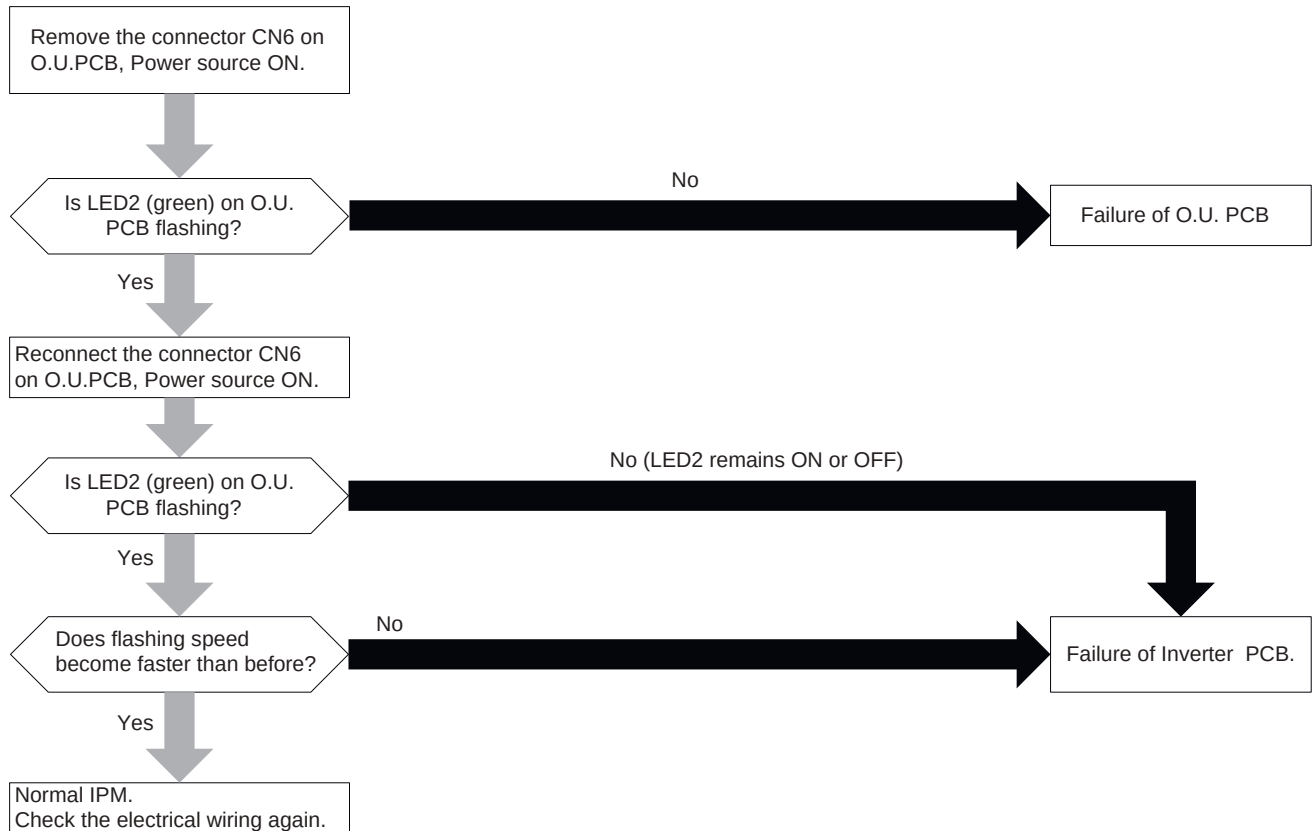
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Power Failure of No Power Supply		Measure voltage by tester	Supply power
Melted Fuse for Power Supply or Activation of Breaker (Outdoor Unit)	Short Circuit between Wires	Check for breakage of insulation	Remove cause of short circuit. Replace fuse and/or I.U./O.U. PCB if faulty
	Short Circuited Wire to Ground	Measure insulation resistance	Remove cause of short circuit to ground. Replace fuse and/or I.U./O.U. PCB if faulty
	Faulty Comp. Motor	Measure resistance between wires and insulation resistance	Remove comp. and fuse. (O.U.) Replace inverter PCB and/or PCB if faulty. (O.U.)
	Faulty Outdoor Unit Fan Motor	Measure resistance between wires and insulation resistance	Remove outdoor unit fan motor and fuse. Replace O.U. PCB if faulty
Melted Fuse on PCB (Outdoor Unit)	Short Circuit between Wires	Check for breakage of insulation	Remove cause of short circuit and replace fuse
	Short Circuited (to Ground)	Measure insulation resistance	Remove cause of short circuit and replace fuse
	Faulty Solenoid Coil for Magnetic Switch (CMC) for comp. Motor	Measure resistance of coil	Replace magnetic switch (CMC) and fuse
	Failure of Outdoor Unit Fan Motor	Measure resistance between wires and insulation resistance	Replace fan motor and fuse
Incorrect Power Supply Circuit of O.U. PCB		Measure O.U. PCB output	Replace O.U. PCB
Disconnected Wires Insufficient Contacting or Incorrect Connection	Between Outdoor Unit and Indoor Unit/DHW Tank	Check continuity of wires. Check for looseness of connection screws. Check terminal Nos.	Replacing wires, repairing and tightening screws
	Power Supply Wiring for Outdoor Unit		Correctly connect wires
Faulty PCB (Outdoor Unit, Indoor Unit, DHW Tank)	Disconnected Wires to I.U./DHW Tank/O.U. PCB	Check connections	Correctly connect wires
	Faulty I.U./DHW Tank/O.U. PCB		Replace it if faulty
Incorrect Wiring	Disconnected Wire Insufficient contacting	Check continuity and looseness of connection screws	Replacing wires, repairing and tightening screws
	Incorrect Wiring	Check terminal Nos.	Correctly connect wires

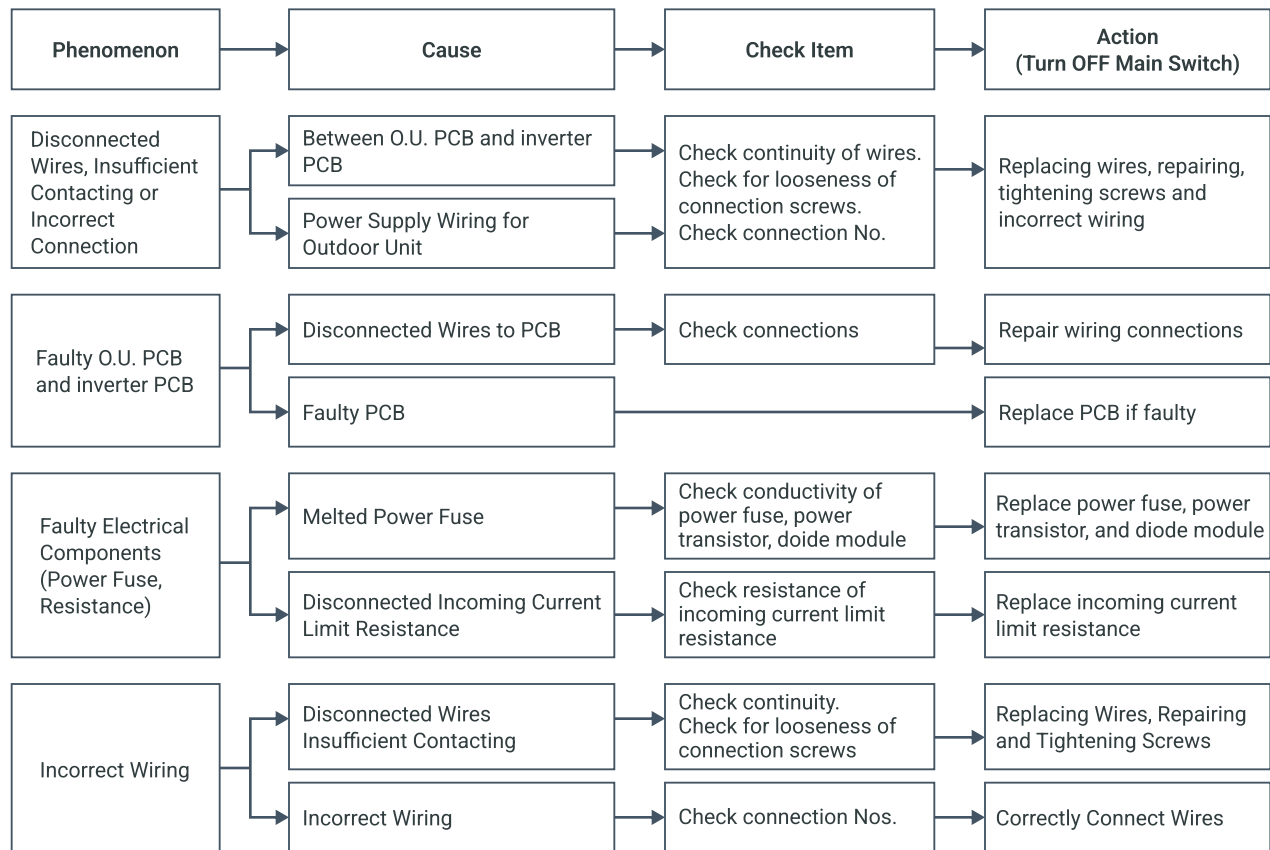
O.U. PCB: Outdoor Unit PCB

I.U. PCB: Indoor Unit PCB

Alarm Code	04	Abnormal Transmitting between Inverter PCB and Outdoor Unit PCB
------------	----	---

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB.
- ★ This alarm code is indicated when abnormality continues for 30 seconds after normal transmitting between the outdoor unit PCB and inverter PCB, and also abnormality continues for 30 seconds after the microcomputer is automatically reset. The alarm is indicated when the abnormal transmitting continues for 30 seconds from starting of the outdoor unit.



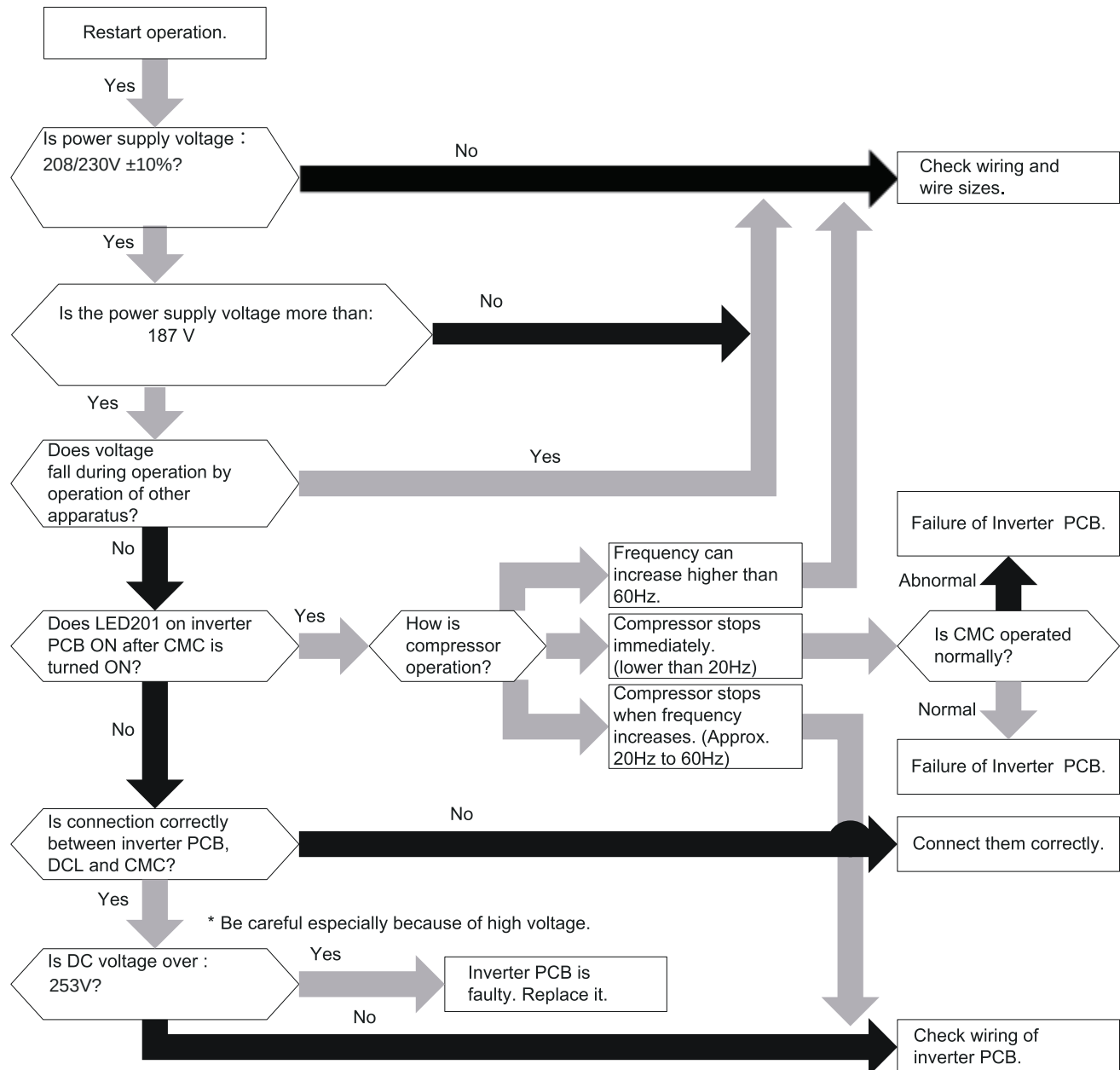


Alarm
Code

06

Abnormal Inverter Voltage (Insufficient Inverter Voltage or Overvoltage)

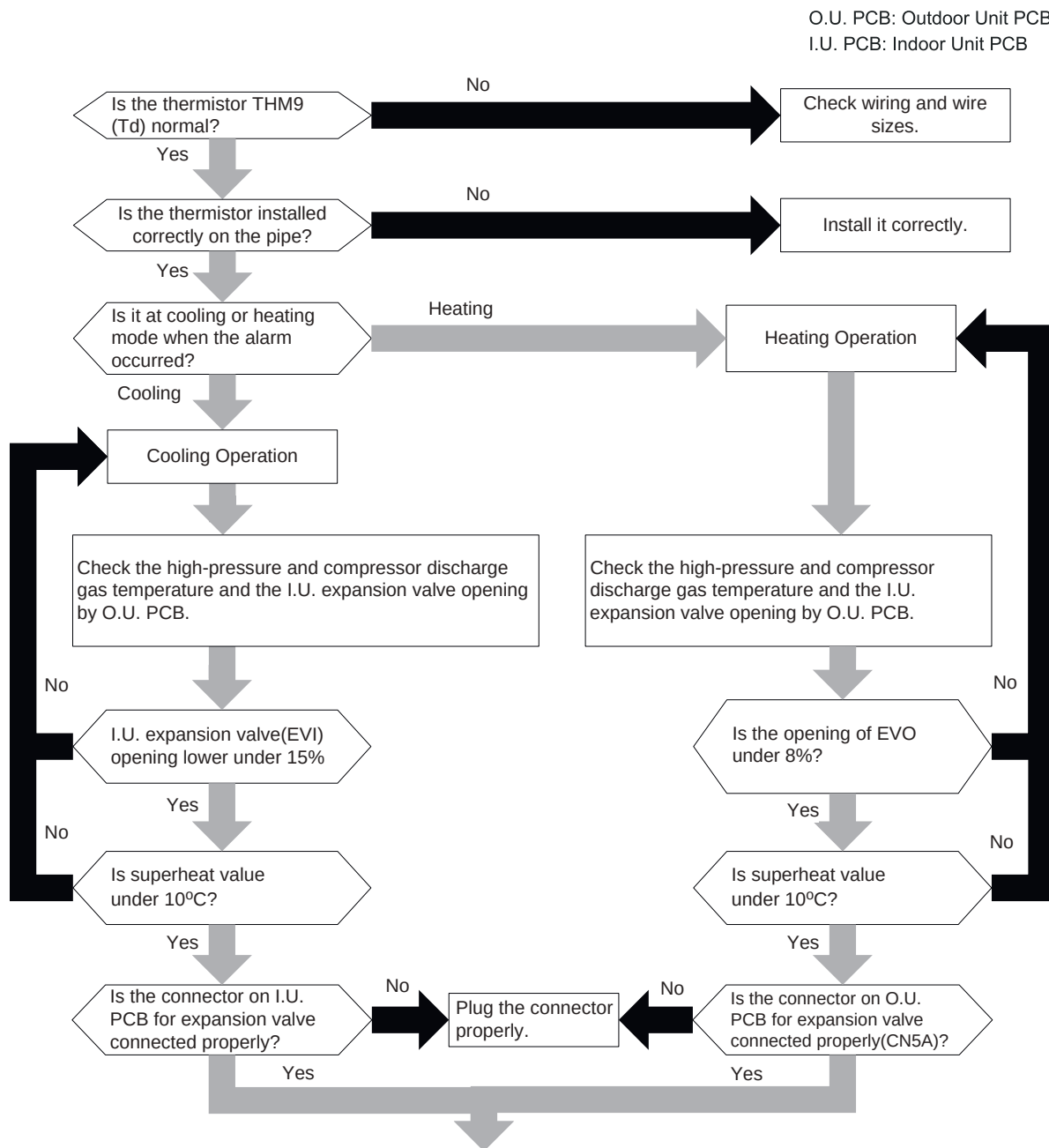
- The RUN indicator (Red) is flashing
 - The indoor unit number (Ref. system number - I.U. number), the alarm code, the model code*1), the model name*1) and the number of connected indoor units are displayed on the LCD. The alarm code is flashed on the 7-segment display on the outdoor unit PCB. *1) Except for some models.
- ★ When either insufficient voltage or overvoltage is detected between the terminal R-S on the inverter PCB three times in 30 minutes, the operation stops and this alarm code is displayed. If this occurs less than three times in 30 minutes, the operation is automatically retried.



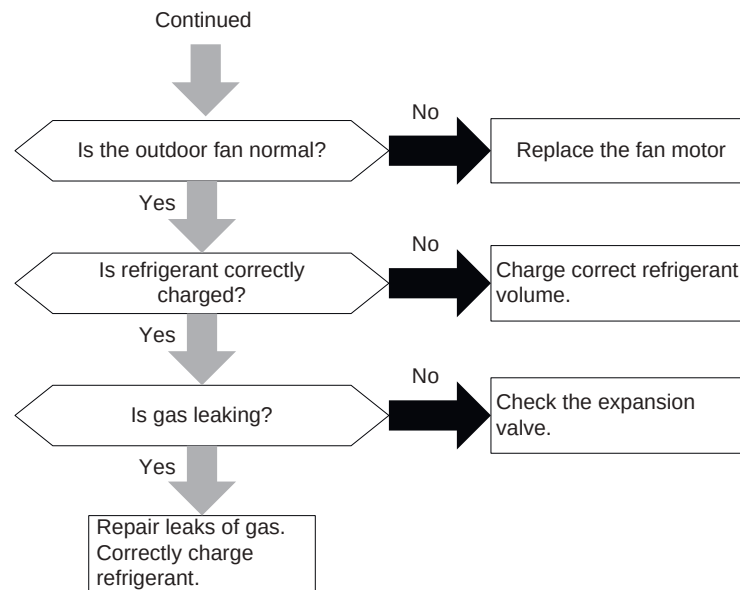
CMC: Magnet Switch for Compressor
DCL: Reactor

Alarm Code	07	Decrease in Discharge Gas Superheat
------------	----	-------------------------------------

- The RUN indicator (Red) is flashing
- The indoor unit number (Ref. system number - I.U. number), the alarm code, the model code*1), the model name*1) and the number of connected indoor units are displayed on the LCD. The alarm code is flashed on the 7-segment display on the outdoor unit PCB. *1) Except for some models.
- ★ If the temperature of compressor discharge gas is below the estimated condensing temperature for 30 minutes during operation, the compressor stops and then the operation is automatically retried after three minutes. If this occurs again twice in the next 120 minutes, this alarm code is displayed.
- ★ This alarm code is displayed when an abnormality cannot be detected by the step-out detection, caused by locking of compressor shaft.



The next page.

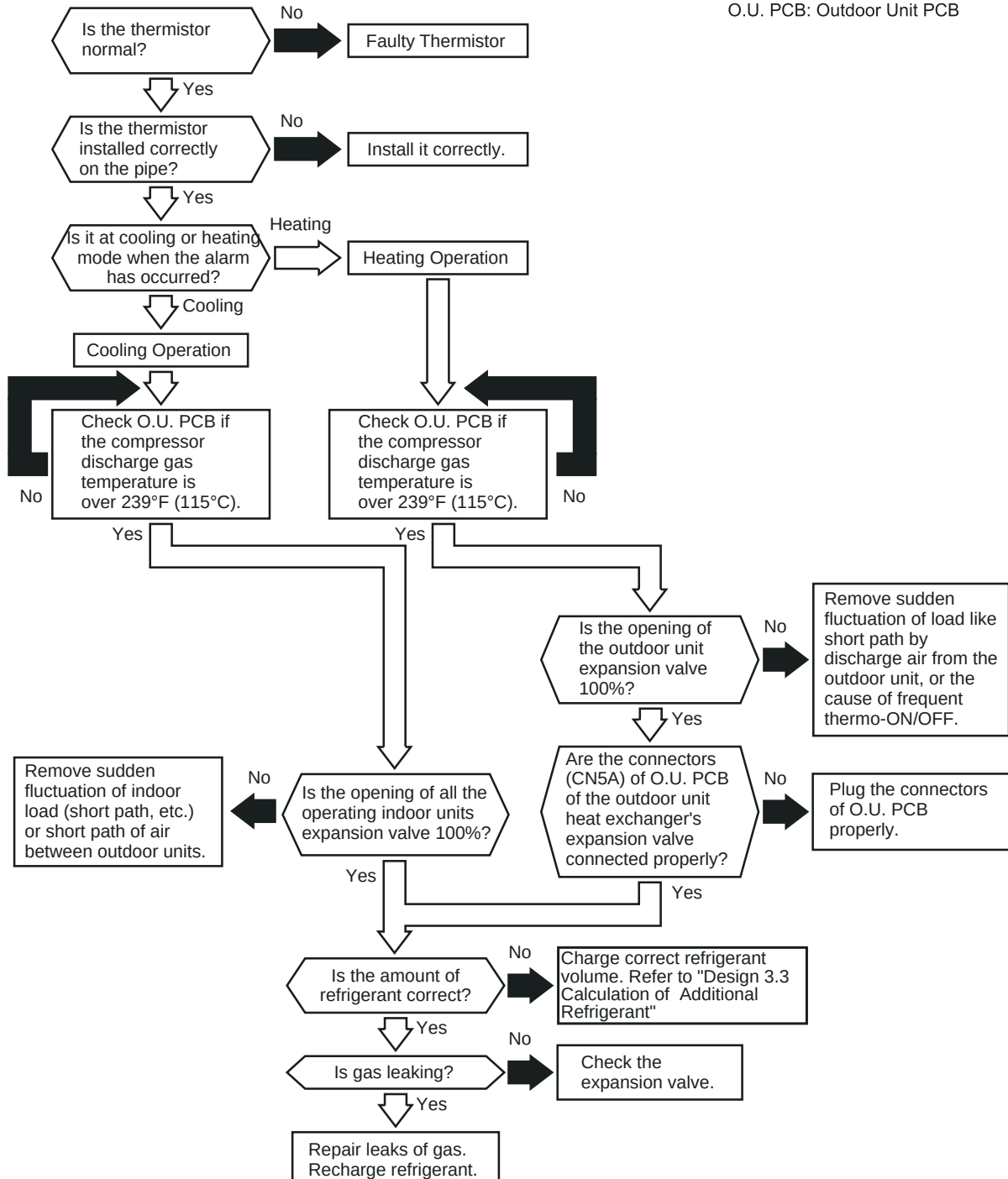


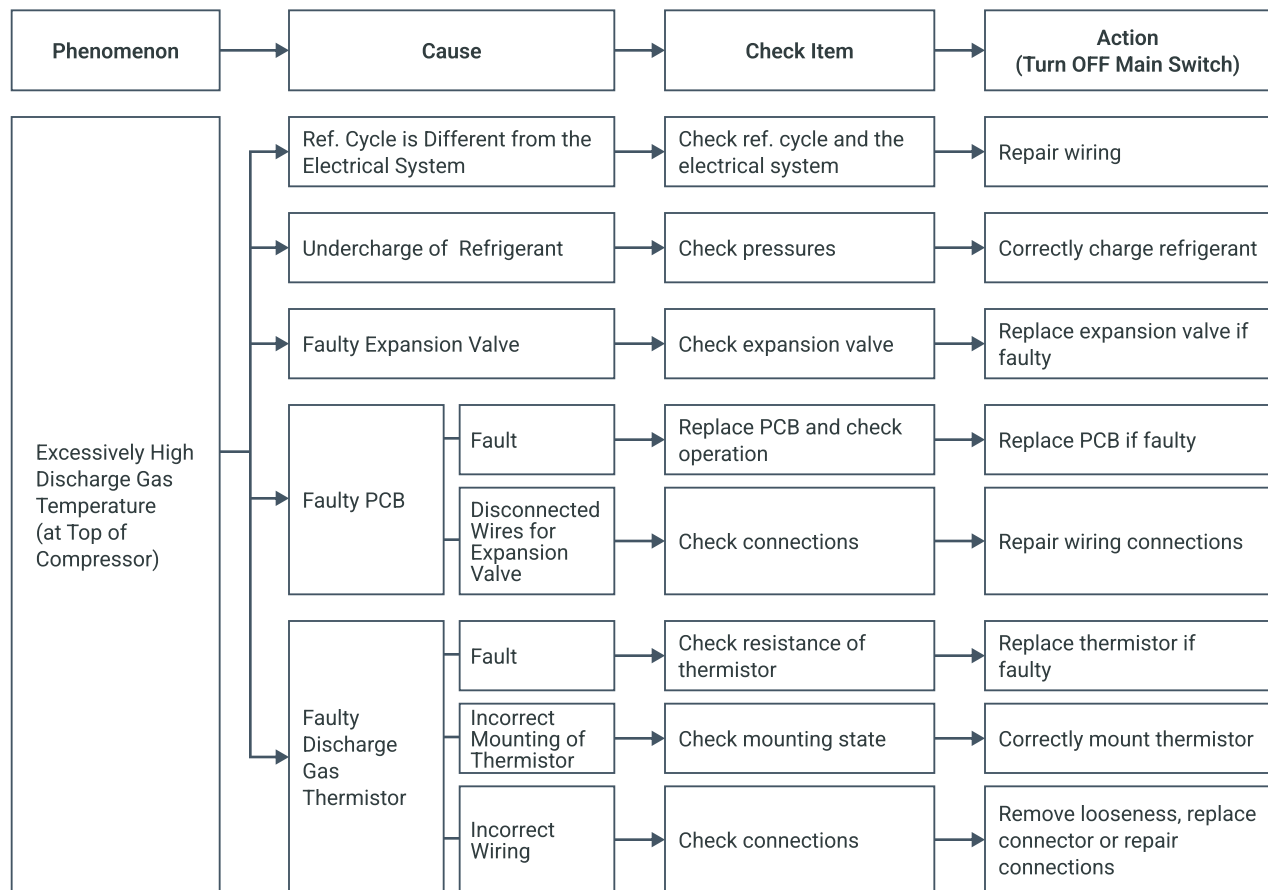
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Decrease of Discharge Gas Superheat	Ref. Cycle is Different from the Electrical System	Check ref. cycle and the electrical system	Repair wiring
	Overcharged Refrigerant	Check pressures	Correctly charge refrigerant
	Faulty Expansion Valve	Check expansion valve	Replace expansion valve if faulty
	Faulty PCB	Fault	Replace PCB and check operation
		Disconnected Wires for Expansion Valve Control	Check connections
	Faulty Discharge Gas Thermistor	Fault	Check resistance of thermistor
		Incorrect Mounting	Check mounting state
		Incorrect Connection	Check connections
			Remove looseness, replace connector or repair connections

Alarm Code	08	Increase in Discharge Gas Temperature at the Top of Compressor
------------	----	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ When either of the following conditions occurs, retry operation is performed. However, if it occurs three times within one hour, this alarm code is indicated;
 - (1) The temperature of the thermistor on the top of the compressor is kept higher than 235°F(113°C) for 10 minutes.
 - (2) The temperature of the thermistor on the top of the compressor is kept higher than 248°F(120°C) for 5 seconds.

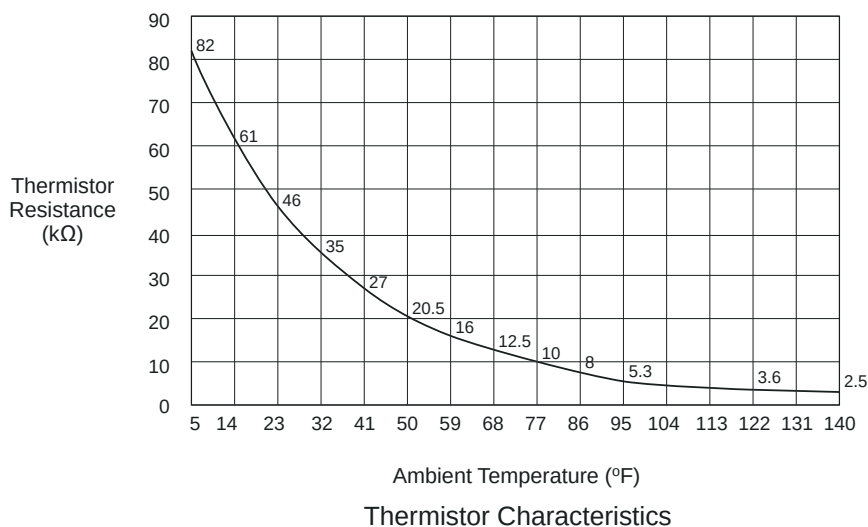
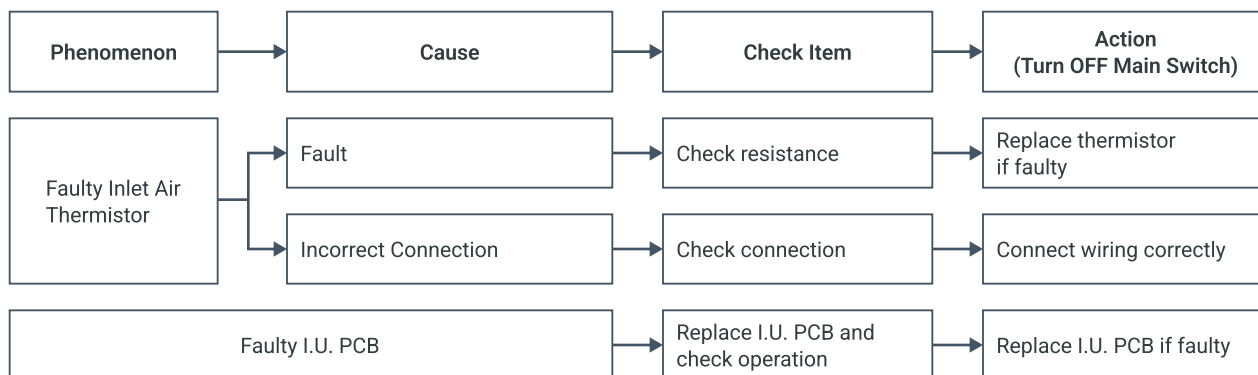
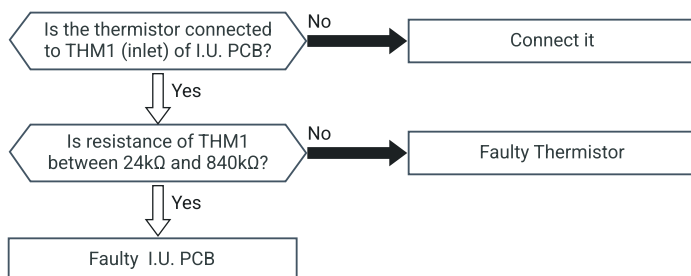
O.U. PCB: Outdoor Unit PCB



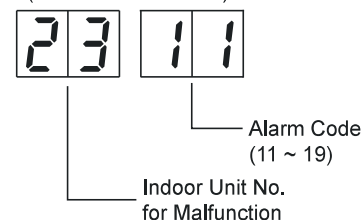


Alarm Code	11	Abnormality of Thermistor for Indoor Unit Inlet Air Temperature (Inlet Air Thermistor)
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- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when a short circuit (less than 0.24kΩ) or disconnection (more than 840kΩ) of the thermistor is detected during the heating or cooling operation. The operation is automatically restarted when the malfunction is removed.



Indication of Outdoor Unit PCB
(Alarm Code 11 ~ 19)

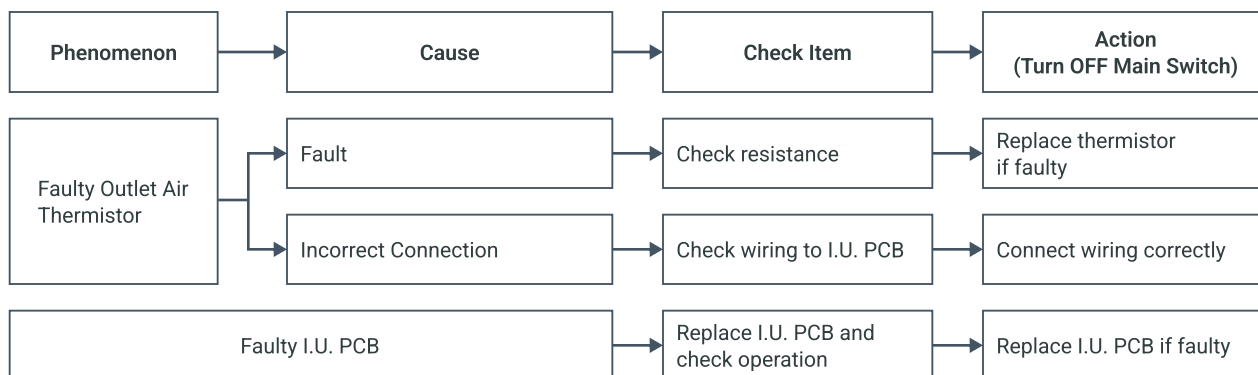
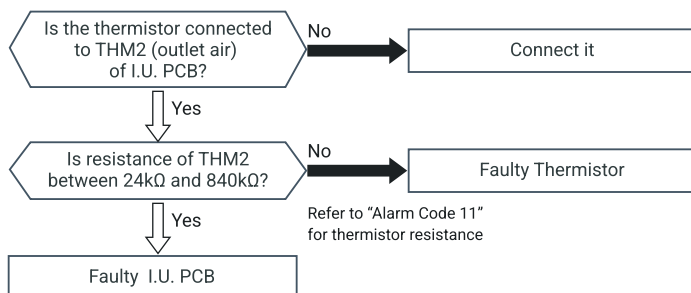


This figure is applicable to the following thermistors.

1. Inlet Air Thermistor (THM1)
2. Liquid Pipe Thermistor (Freeze Protection) (THM3)
3. Gas Pipe Thermistor (THM5)
4. Outlet Air Thermistor (THM2) (Some indoor units are not. Please refer to the technical manual of indoor units.)

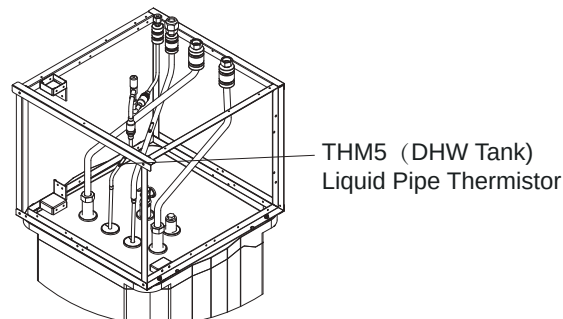
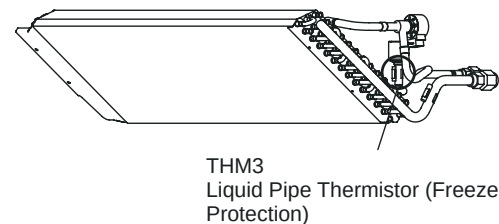
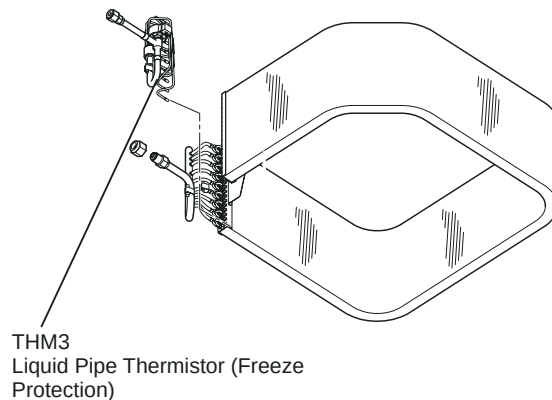
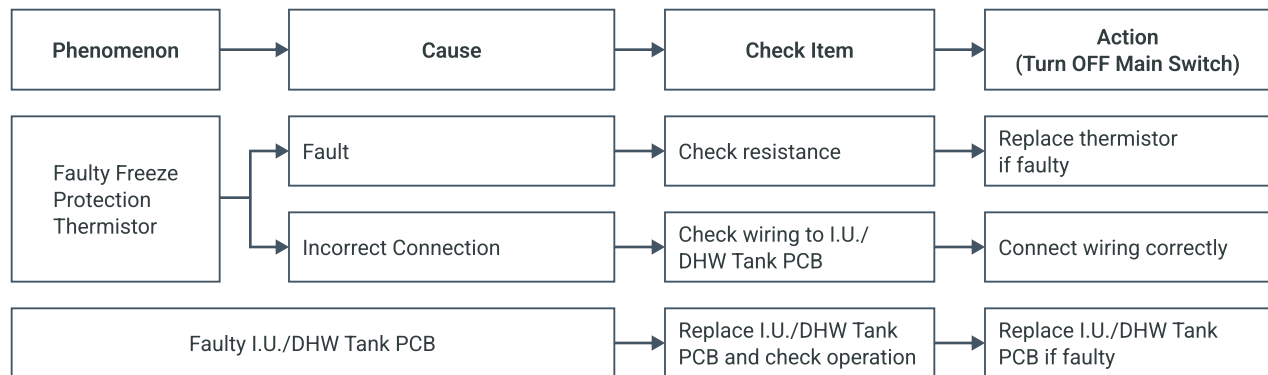
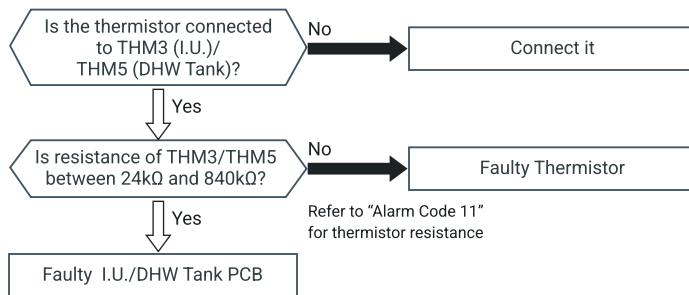
Alarm Code	12	Abnormality of Thermistor for Indoor Unit Outlet Air Temperature (Outlet Air Thermistor)
------------	----	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when a short circuit (less than 0.24kΩ) or disconnection (more than 840kΩ) of the thermistor is detected during the heating or cooling operation. The operation is automatically restarted when the malfunction is removed.
- ★ Some indoor units are not outlet air thermistor. Please refer to the technical manual of indoor units.



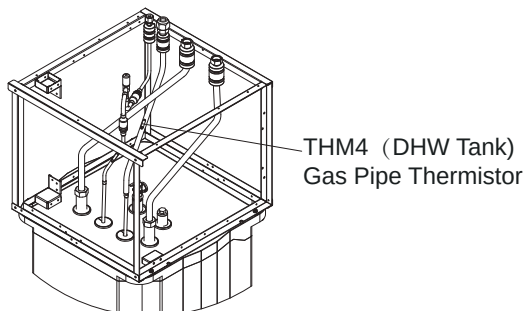
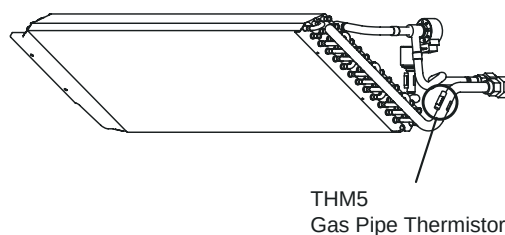
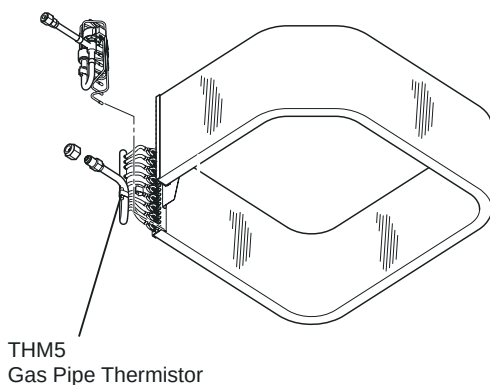
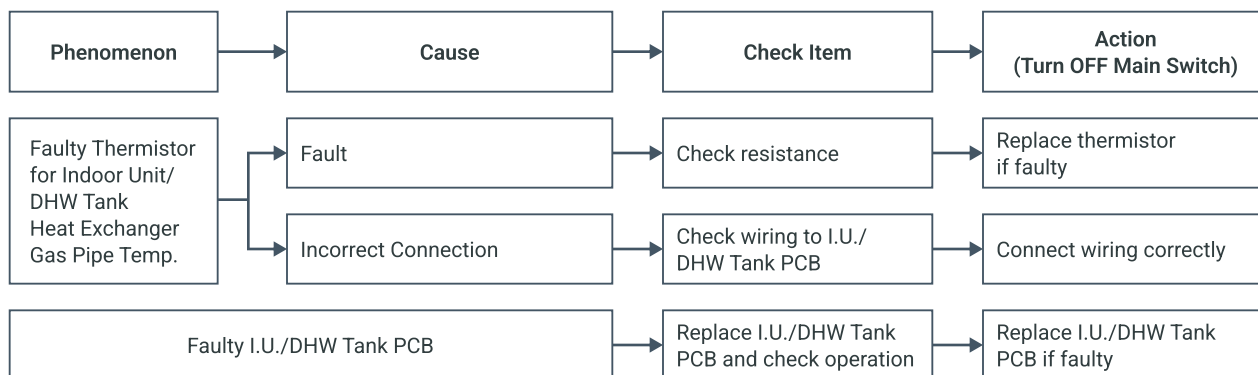
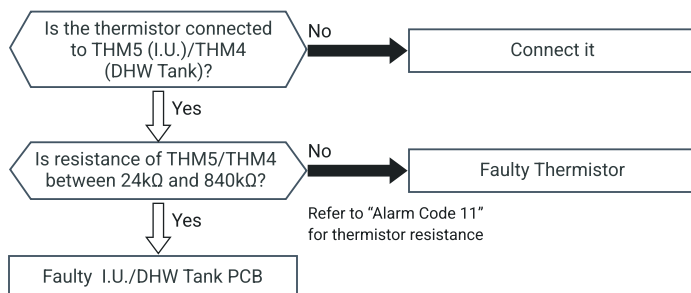
Alarm Code	13	Abnormality of Thermistor for Liquid Refrigerant Pipe Temperature
------------	----	---

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units/DHW Tank are displayed on LCD. Meanwhile, the indoor unit/DHW Tank number and the alarm code are displayed on the 7- segment of outdoor unit PCB
- ★ This alarm code is indicated when a short circuit (less than 0.24kΩ) or disconnection (more than 840kΩ) of the thermistor is detected during the heating or cooling operation. The operation is automatically restarted when the malfunction is removed.



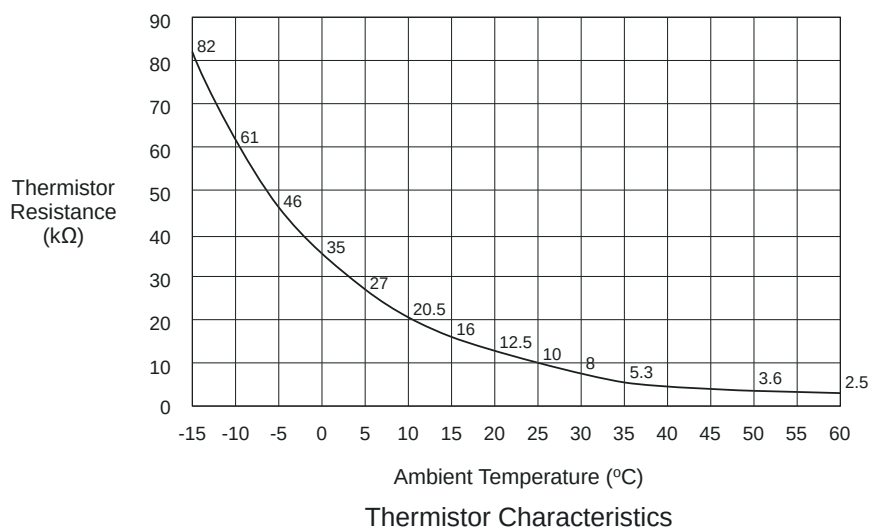
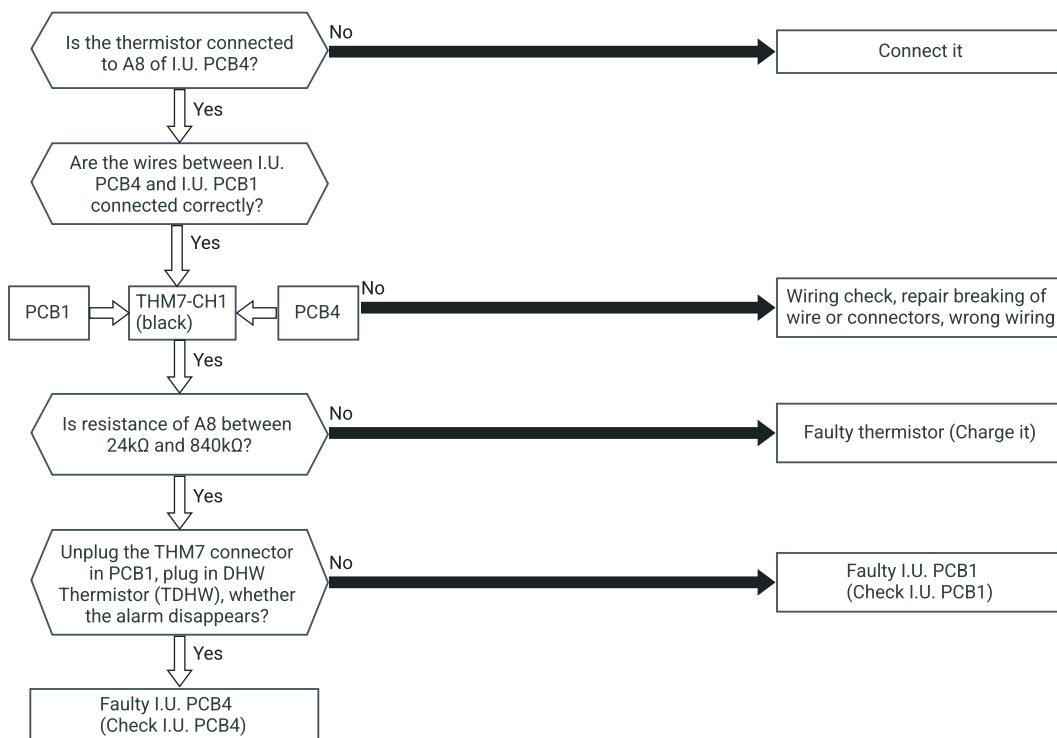
Alarm Code	14	Abnormality of Thermistor for Gas Refrigerant Pipe Temperature
------------	----	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units/DHW Tank are displayed on LCD. Meanwhile, the indoor unit/DHW Tank number and the alarm code are displayed on the 7- segment of outdoor unit PCB.
- ★ This alarm code is indicated when a short circuit (less than 0.24kΩ) or disconnection (more than 840kΩ) of the thermistor is detected during the heating or cooling operation. The operation is automatically restarted when the malfunction is removed.



Alarm Code	16	DHW Thermistor (TDHW) abnormality
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- Alarm code is displayed on the master controller/ the 7-segment of O.U. display PCB / the 7-segment of I.U. PCB1.
- This alarm code is indicated when a short circuit (less than 0.24k Ω) or disconnection (more than 840k Ω) of the thermistor is detected during the heating or cooling operation. The operation is automatically restarted when the malfunction is removed.
- Reset the unit to release the alarm.

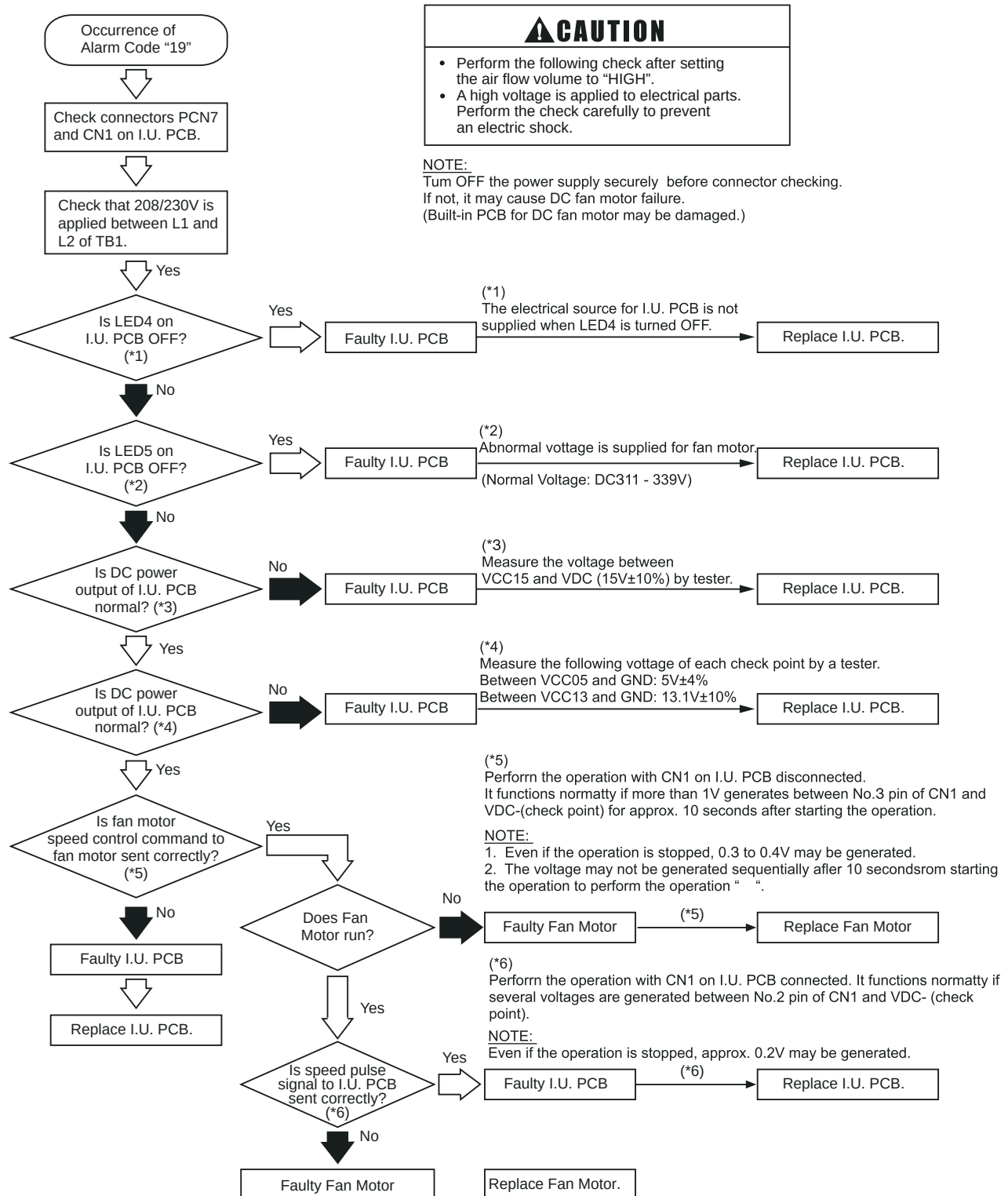


Alarm
Code

19

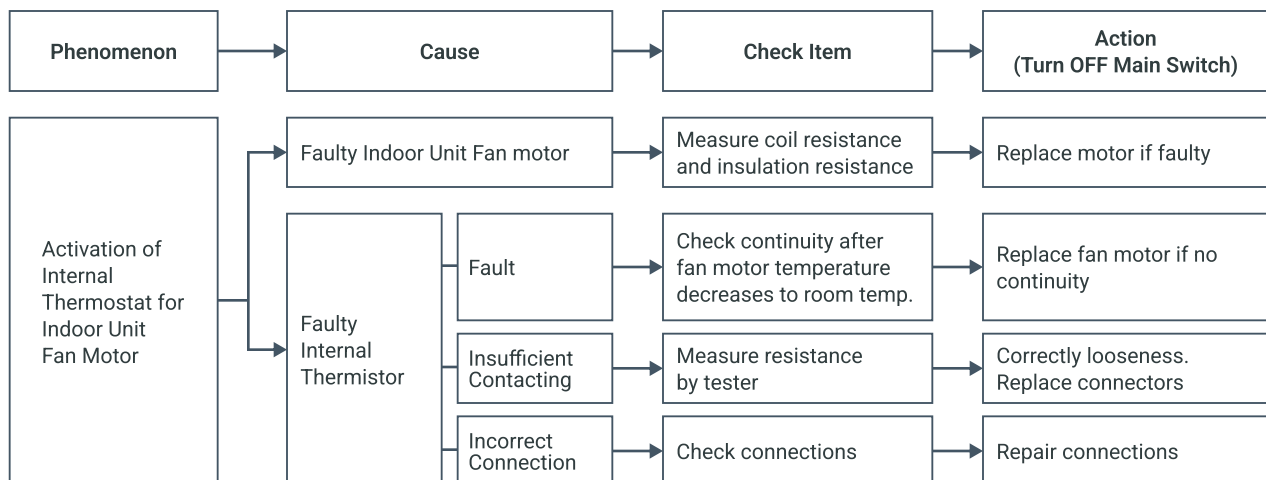
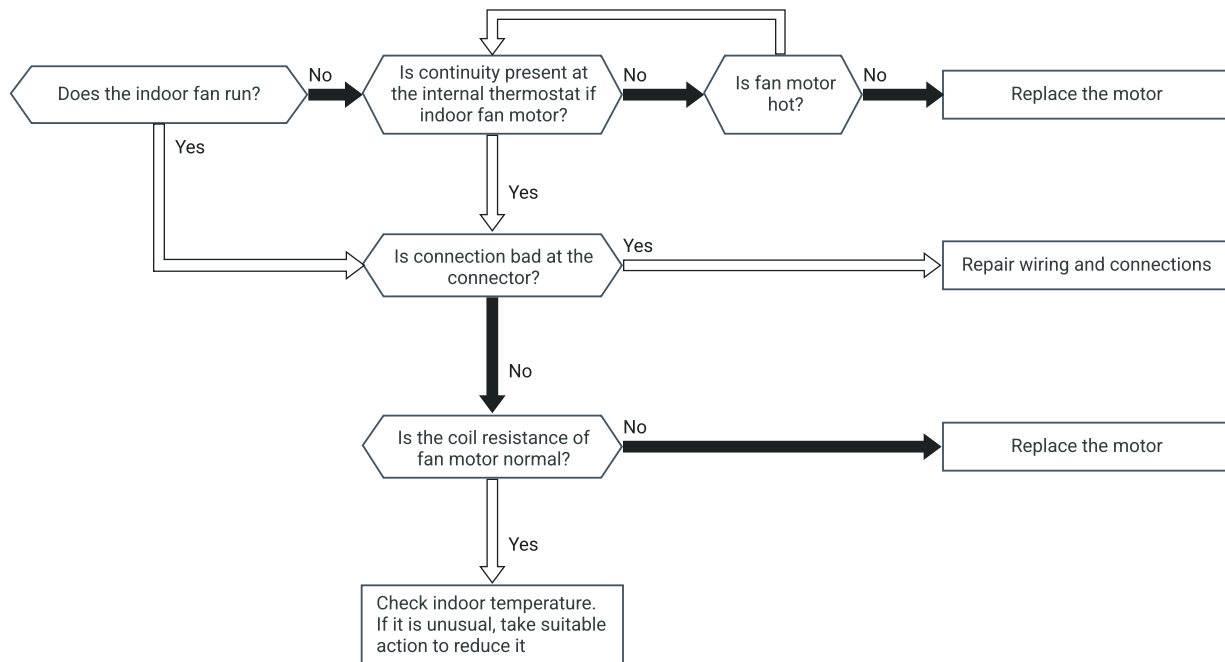
Activation of Protection Device for Indoor Fan Motor
(Indoor Unit with DC Motor)

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when the indoor fan motor rotates at less than 70rpm for 5 seconds three times in 30 minutes during the operation.



Alarm Code	19	Activation of Protection Device for Indoor Fan Motor (Indoor Unit with AC Motor)
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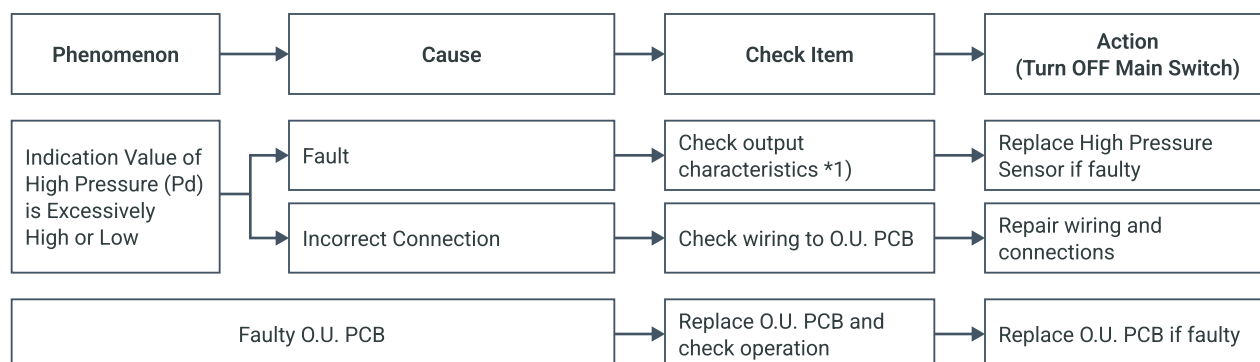
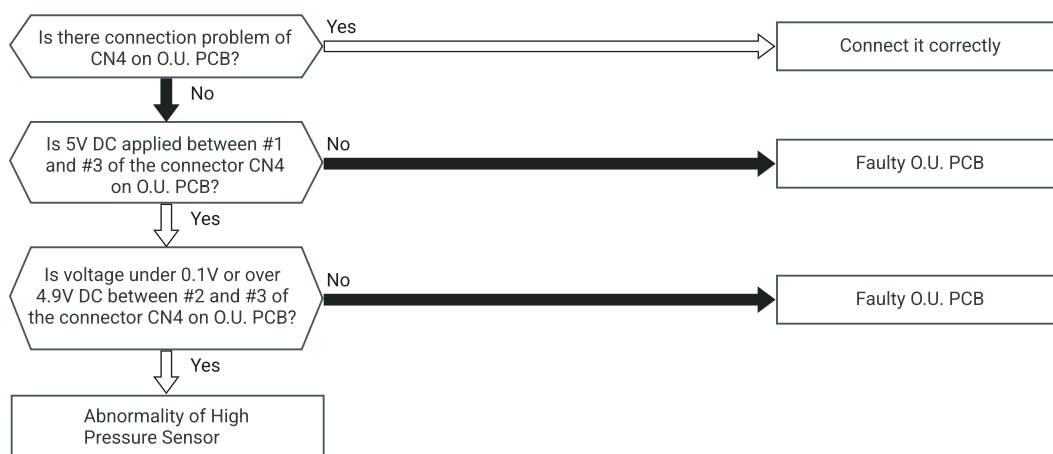
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when over approximately 1A is applied to the indoor unit fan motor.



Alarm Code	21	Abnormality of High Pressure Sensor for Outdoor Unit (Pd)
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- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when the pressure sensor voltage decreases to 0.1V or less or increases to 4.9V or more during running.

O.U. PCB: Outdoor Unit PCB

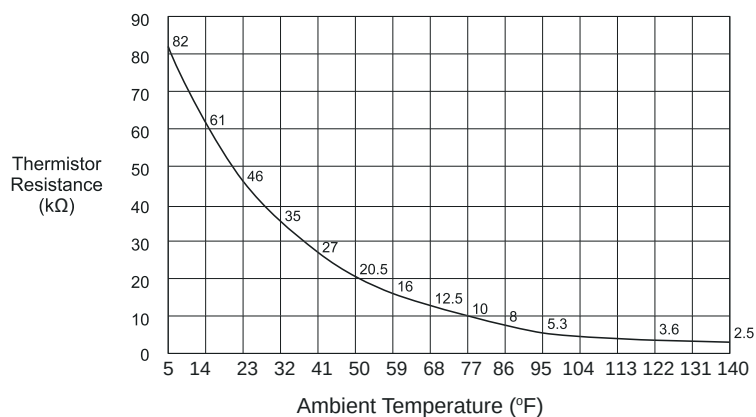
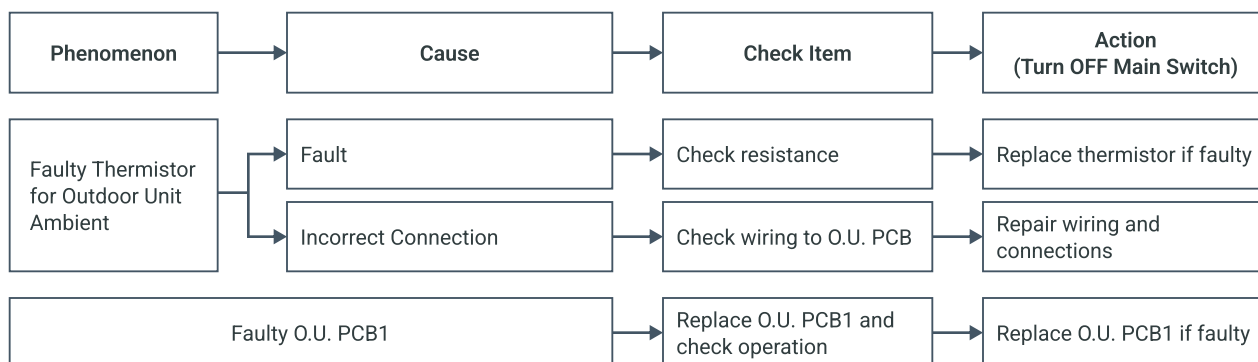
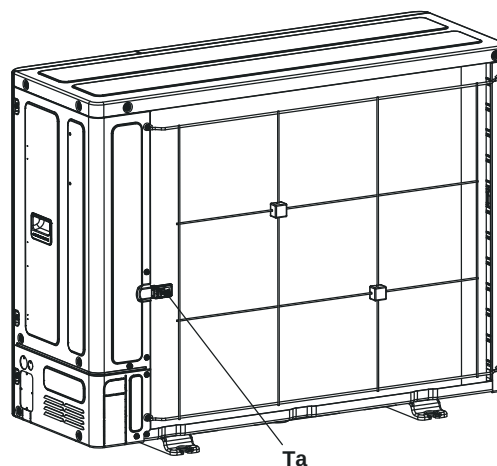
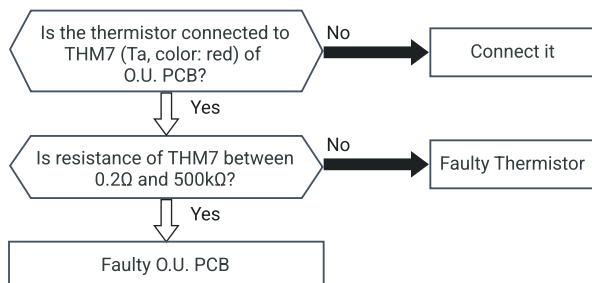


*1) Check output characteristics refer to “2.5.3 pressure sensor”

Alarm Code	22	Abnormality of Thermistor for Outdoor Air Temperature (Ta)
------------	----	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when a short circuit (less than 0.2kΩ) or disconnection (more than 500kΩ) of the thermistor is detected during the operation.

O.U. PCB: Outdoor Unit PCB



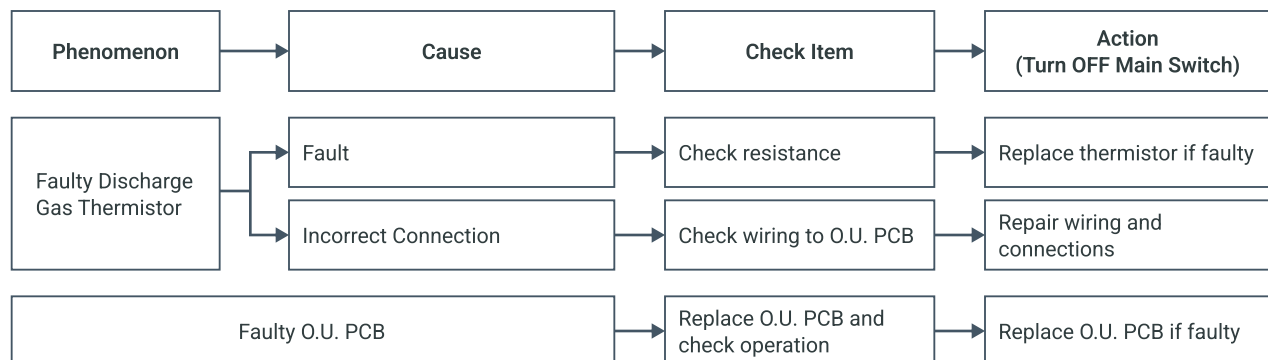
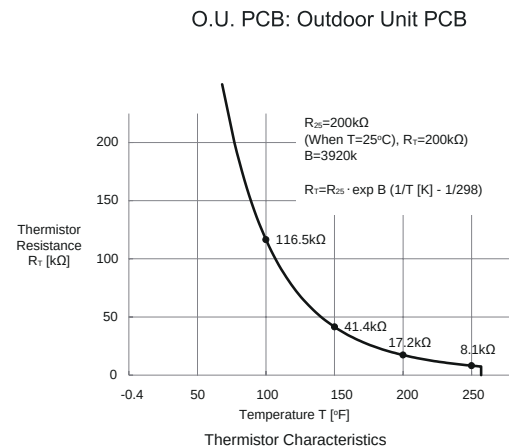
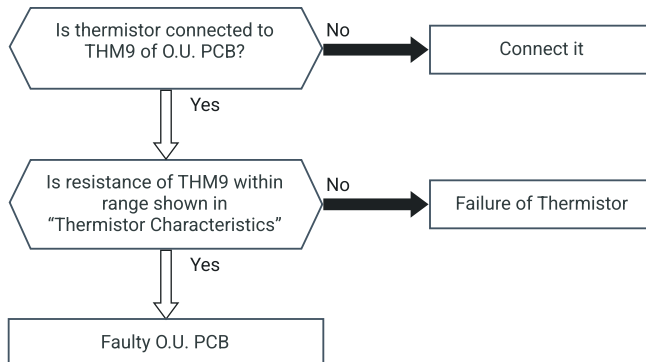
NOTE:
This figure is applicable to the following thermistors.

1. Ta (THM7),
2. Te (THM8)

Thermistor Characteristics

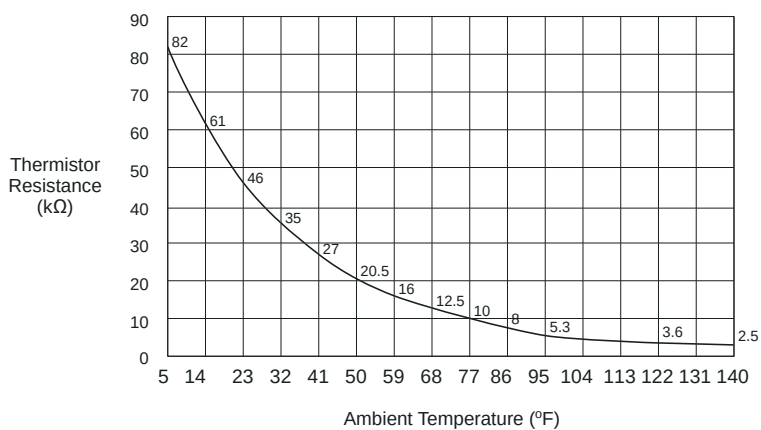
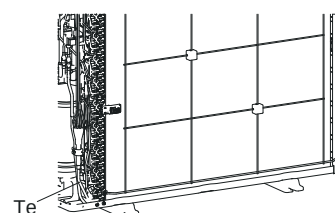
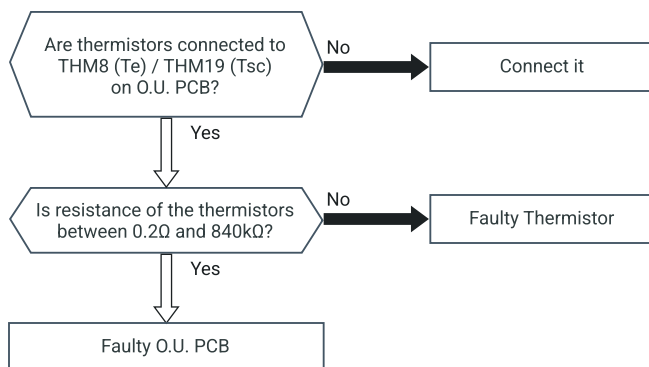
Alarm Code	23	Abnormality of Thermistor for Discharge Gas (Td)
------------	----	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB. (For the combination of outdoor units, the alarm code is displayed on PCB of outdoor unit A.) Additionally for the outdoor unit number and compressor number with abnormal thermistor, check the alarm code history.
- ★ This alarm code is indicated when a short circuit (less than 0.9kΩ) for a second or disconnection (more than 5946kΩ) of the thermistor is detected during the operation.



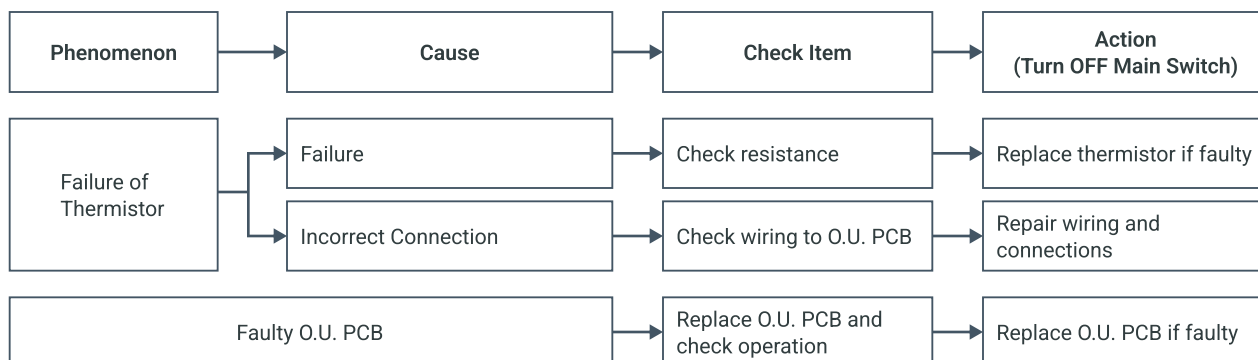
Alarm Code	24	Abnormality of Thermistor for Evaporating Temperature during Heating Operation (Te)
------------	-----------	---

- The RUN indicator (Red) is flashing
- The indoor unit number (Ref. system number - I.U. number), the alarm code and the number of connected indoor units are displayed on the LCD. The alarm code is flashed on the 7-segment display of the outdoor unit PCB.
- ★ This alarm code is indicated when a short circuit (less than 0.24kΩ) or disconnection (more than 840kΩ) of the thermistor is detected during heating or cooling operation.



O.U. PCB: outdoor unit PCB

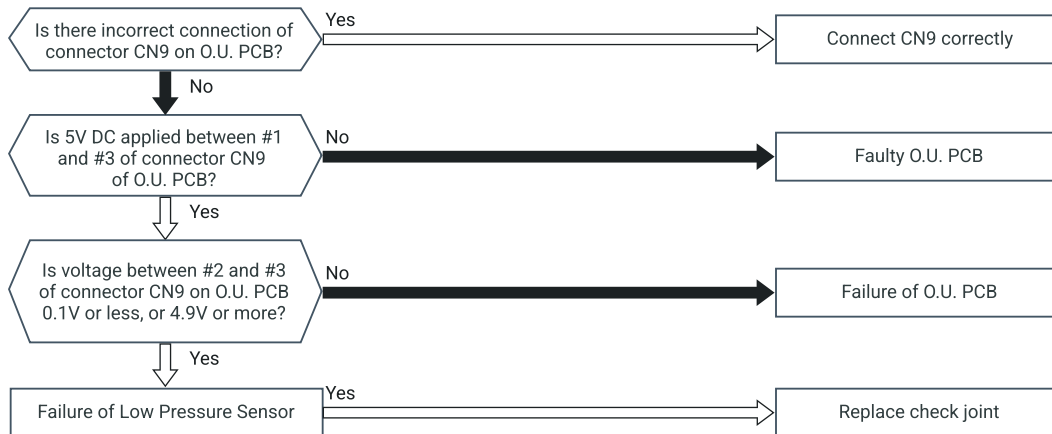
Thermistor Characteristics



Alarm Code	29	Abnormality of Low Pressure Sensor for Outdoor Unit (Ps)
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- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when the pressure sensor voltage decreases to 0.1V or less or increases to 4.9V or more during running.

O.U. PCB: Outdoor Unit PCB

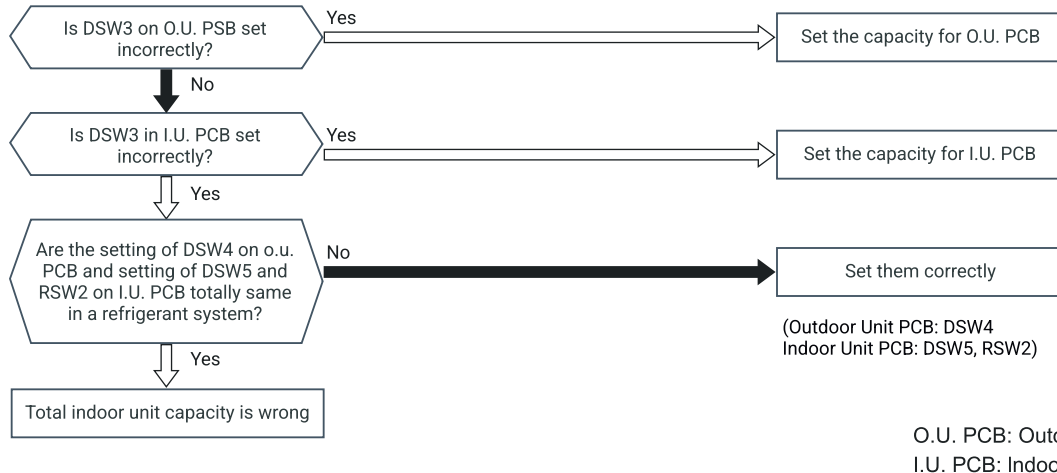


Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Indicated Value of Pressure Value is Excessively High or Low	Fault	Check output characteristics *1)	Replace Low Pressure Sensor if faulty
	Incorrect Connection	Check wiring to O.U. PCB	Repair wiring and connections
Faulty O.U. PCB		Replace O.U. PCB and check operation	Replace O.U. PCB if faulty

*1) Check output characteristics refer to "2.5.3 pressure sensor"

Alarm Code	31	Incorrect Capacity Setting of Indoor Unit and Outdoor Unit
------------	----	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when the capacity setting dip switch, DSW3 on the outdoor unit PCB, is not set (all the settings from #1 to #4 are OFF) or set incorrectly.
- ★ This alarm code is indicated when the total indoor unit capacity is smaller than 50% or greater than 150% of the combined outdoor unit capacity.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Incorrect Capacity Setting of Indoor Unit		Check combination of indoor units and capacity setting on I.U. PCB	Correctly set dip switch, DSW3
Incorrect Capacity Setting of Outdoor Unit		check capacity setting on O.U. PCB	Correctly set DIP switch, DSW3
Total Indoor Unit Capacity Connected to the Outdoor Unit is Beyond Permissible Range		Check outdoor unit model by calculating total indoor units capacity	Ensure that total indoor unit capacity is from 50% to 150%
Refrigeration Cycle Setting of Outdoor Unit and Indoor Unit is Different		Check refrigeration cycle setting on O.U. PCB and I.U. PCB	Set them correctly

Alarm Code	35	Incorrect Indoor Unit no. Setting
------------	----	-----------------------------------

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is displayed when the duration of automatic addressing of indoor unit exceeds 5 minutes after power-on of outdoor unit.
- ★ This alarm code is displayed when the number of connected indoor units exceeds the maximum allowed .(*1)
- ★ This alarm code is displayed when refrigerant system No. set by DSW4 on O.U. PCB in the same H-NET system duplicates.
*1) The value of maximum number of connectable I.U. is refer to "Design 1.2 Application Case"

NOTE:

- In the case of H-NET system, this alarm code may be displayed when DSW4 (for refrigerant system No. setting) on the outdoor unit PCB and DSW5 and RSW2 (for refrigerant system No. setting) on the indoor unit PCB are not set correctly. In this case, turn OFF the power supply and set them correctly, and turn ON the power supply again. (The rotary switch RSW2 is not available depending on the indoor unit model.)

Alarm Code	36	Incorrect Indoor Unit Combination
------------	----	-----------------------------------

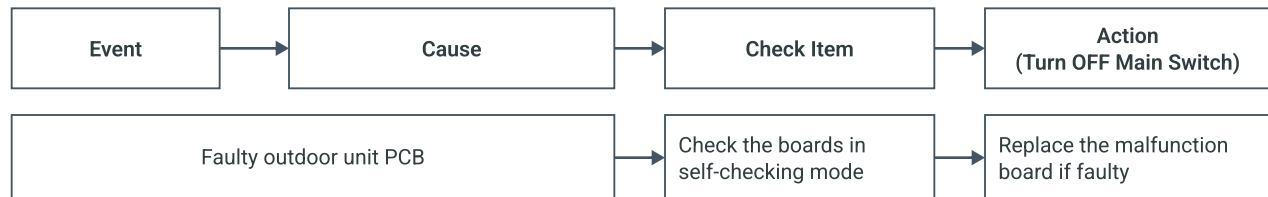
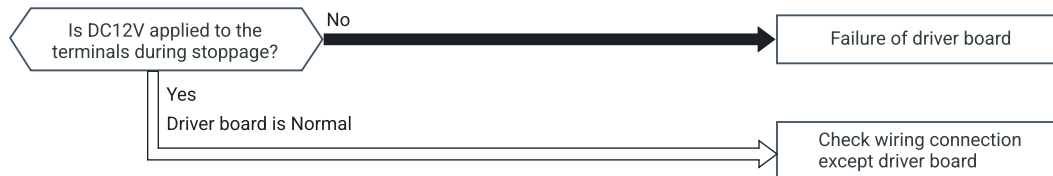
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB.
- ★ This alarm code is indicated when the indoor unit connected to the outdoor unit is for other refrigerants (R22 or R407C).

Alarm Code	38	Abnormality of Picking up Circuit for Protection in Outdoor Unit
------------	----	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.

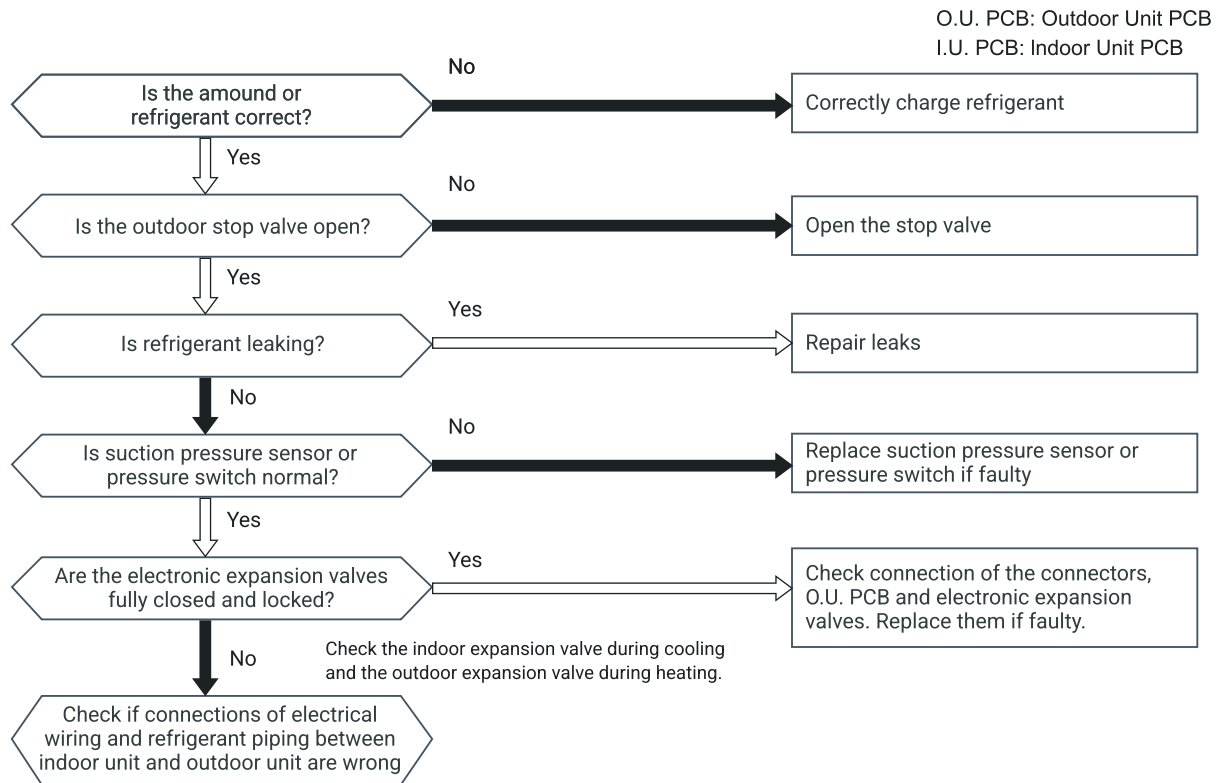
CHV6-RS32/48/60URBMHH

- This alarm code is displayed when the outdoor unit PCB detects that the protection device (PSH) is activated



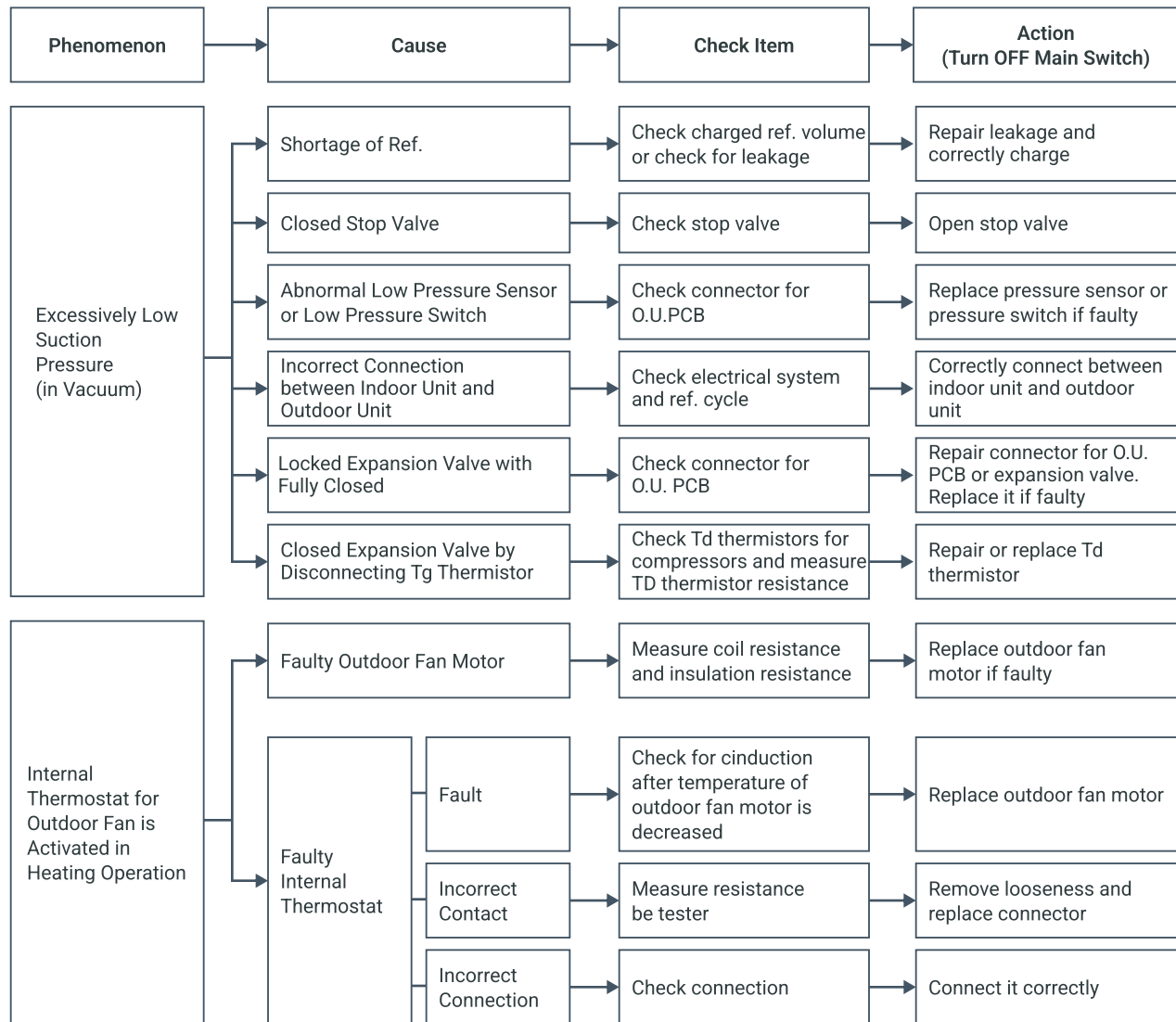
Alarm Code	47	Activation of Low Pressure Decrease Protection Device (Vacuum Operation Protection)
------------	----	---

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when a suction pressure (Ps) is lower than 0.09MPa for over 12 minutes and the same condition occurs twice or more within one hour.



NOTE:

In the case of H-NET system, check the refrigerant system setting of O.U. PCB and I.U. PCB.

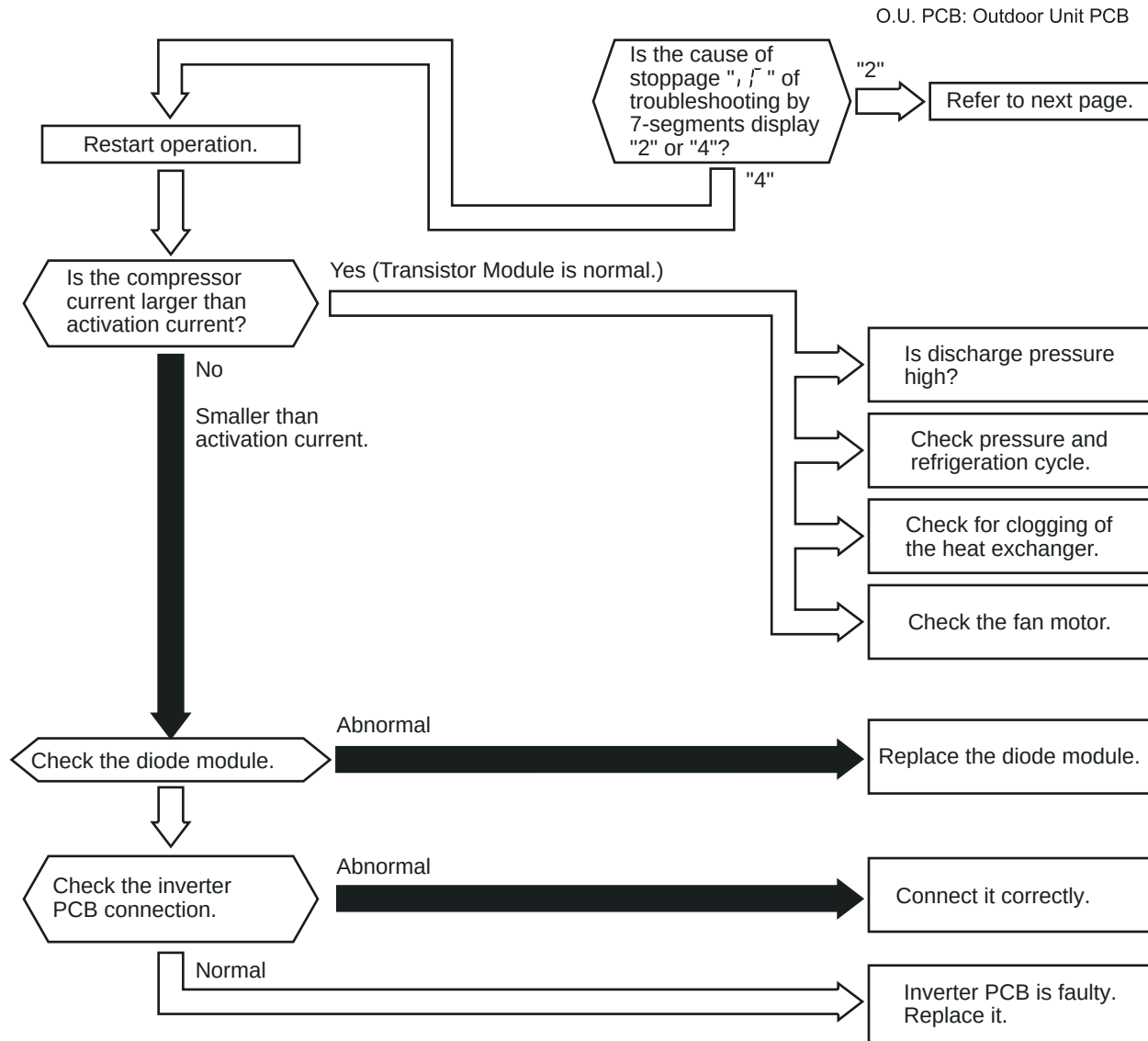


Alarm
Code

48

Activation of Inverter Overcurrent Protection Device (1)

- The RUN indicator (Red) is flashing
 - The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
 - ★ This alarm code is indicated when inverter electronic thermal protection is activated six times within 30 minutes. (Retry operation is performed up to the occurrence of five times.)
- Conditions of Activation:
- (1) Inverter current with 105% of the rated current runs for 30 seconds continuously.
 - (2) Inverter current runs intermittently and the accumulated time reaches up to 3 minutes, in 10 minutes.



iTC	Cause of inverter stoppage
2	Instantaneous overcurrent
4	Inverter overcurrent

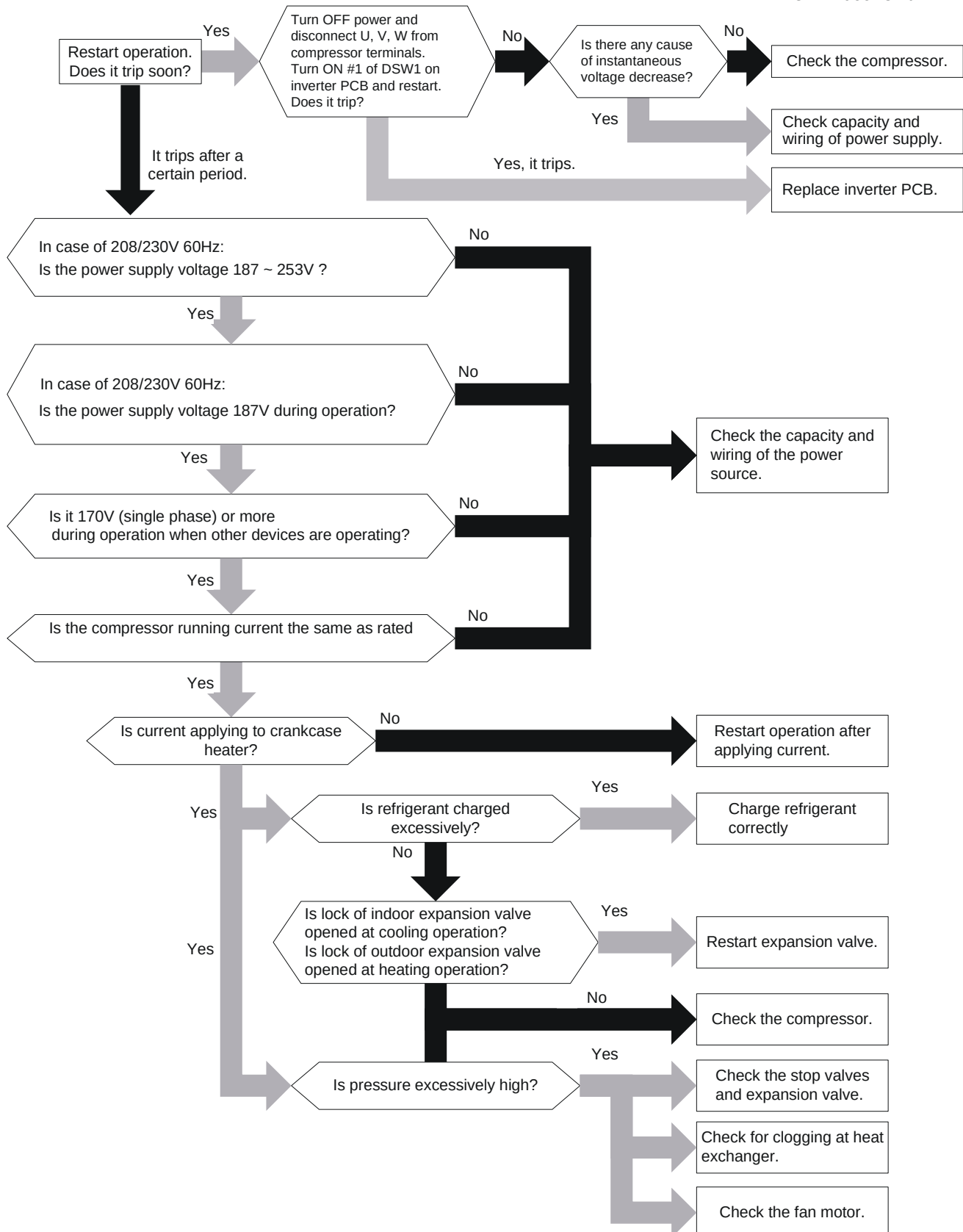
Alarm Code	48	Activation of Inverter Overcurrent Protection Device (2)
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- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when instantaneous overcurrent occurs six times within 30 minutes.
(Retry operation is performed up to the occurrence of five times.)
If instantaneous overcurrent or electronic thermal protection occurs on inverter as follows, the compressor stops. The operation automatically restarts after three minutes. If this occurs again five times in the next 30 minutes, this alarm code is displayed.

Condition of Activation:

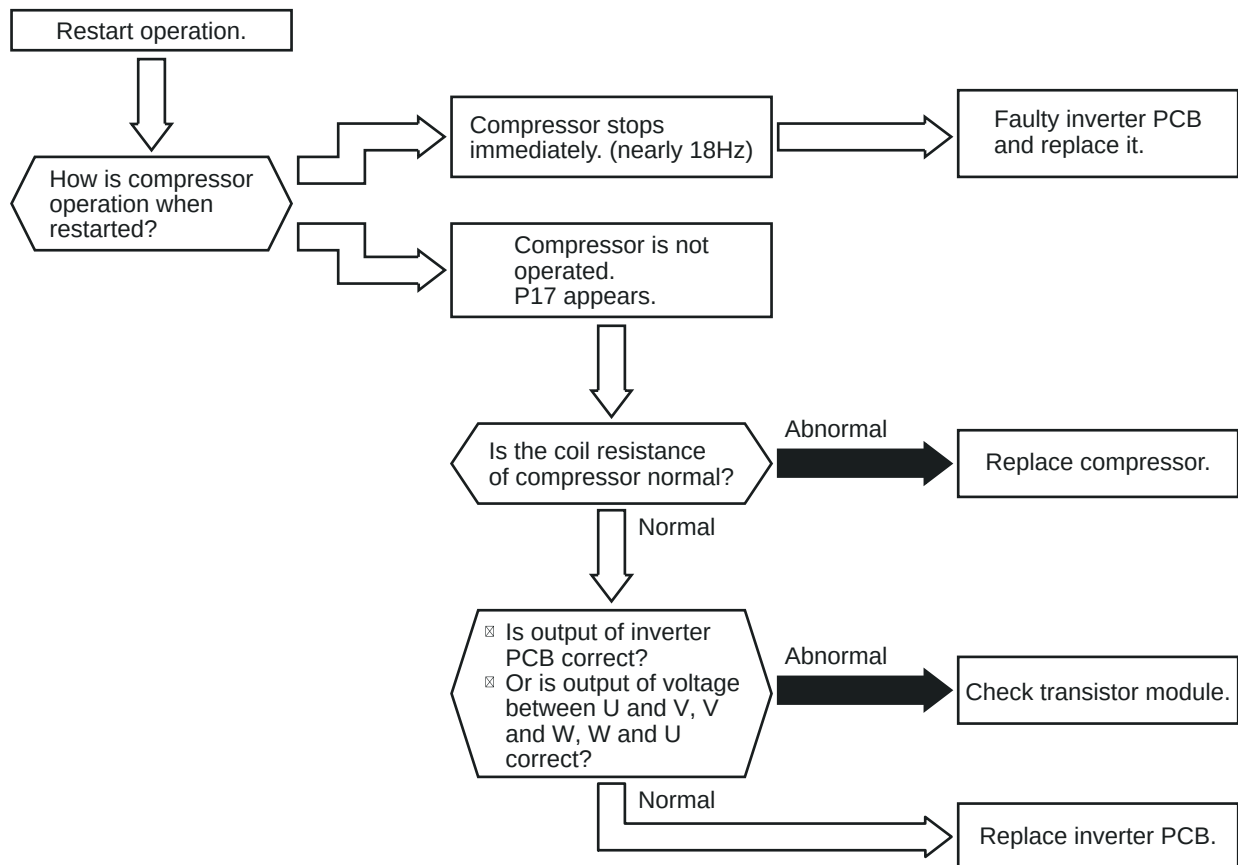
- (1) Instantaneous overcurrent (Cause code of inverter stoppage = 2) Inverter secondary current is higher than 150% of the rated current instantaneously.
- (2) Inverter electronic thermal protection (Cause code of inverter stoppage = 4) Inverter primary/secondary current is higher than 105% of the rated current for 30 seconds continuously, or Inverter primary/secondary current is higher than 105% of the rated current intermittently for 3 minutes per 10 minutes

O.U.: Outdoor Unit
I.U.: Indoor Unit



Alarm Code	51	Abnormality of Current Sensor
------------	-----------	-------------------------------

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ In case that the abnormality of current transformer (0A detecting) occurs three times within 30 minutes, this alarm code is indicated at the third time. (Retry operation is performed for the first two times.)
Condition of Activation:
 - (1) When the frequency of compressor is maintained at 15 to 18Hz after compressor is started, one of the absolute value of running current detected by the current transformer at each phase U+, U-, V+ and V- is less than 1.5A (including 1.5A).
 - (2) The wave height value of running current for the phase positioning is less than 5A before the compressor is started (at completing the phase positioning).



iTC	Cause of inverter stoppage
8	Abnormal current sensor or imbalance of U/V/W

Alarm Code	53	Inverter Error Signal Detection
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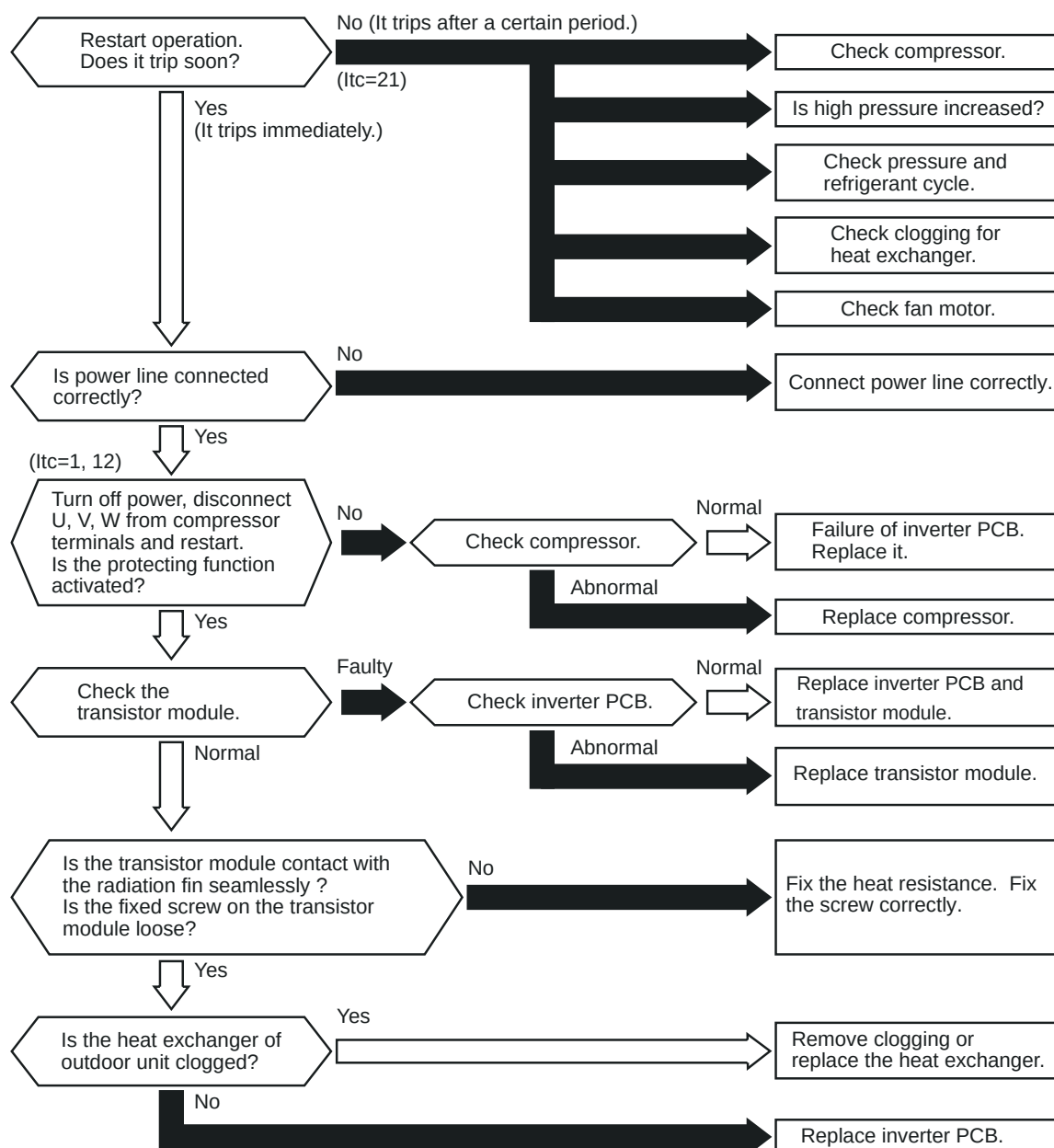
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.

★ IPM (Transistor Module) has abnormality-detecting function.

This alarm code is indicated when the abnormality is detected seven times within 30 minutes. (Retry operation is performed for the first 6 times.)

Condition of Activation:

- (1) IPM Error (Cause code of inverter stoppage = 1) Inverter PCB detects IPM fault signal due to abnormal current, control voltage decrease or etc.
- (2) Ground Fault Detection from Compressor (Cause code of inverter stoppage = 12) Inverter PCB detects overcurrent when checking ground fault before compressor starts operation.
- (3) Step-Out Detection (Cause code of inverter stoppage = 21) The angle difference between the shaft in compressor and the shaft in the control program exceeds 60°.

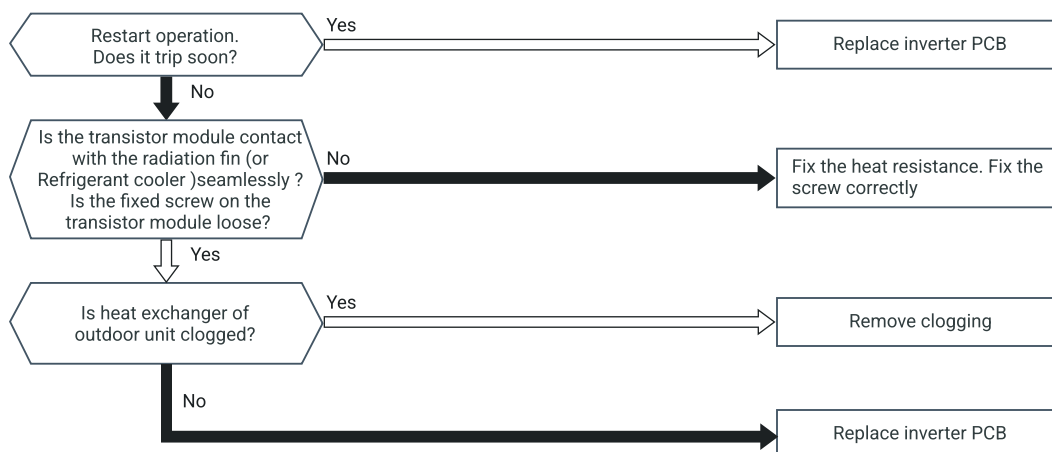


Alarm Code	54	Abnormality of Inverter Fin Temperature
------------	----	---

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ When the following condition occurs three times in 30 minutes, the operation stops and this alarm code is displayed. If this occurs less than three times in 30 minutes, the operation automatically restarts.

Condition of Activation:

(1) Inverter fin thermistor protection a. ctivation (Cause code of inverter stoppage = 3) The temperature of inverter fin exceeds 80°C.



* The maintenance and replacement for inverter PCB should be performed after performing surely the voltage discharge.

Alarm Code	55	Inverter Failure
------------	----	------------------

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated when the following phenomenon occurs three times in 30 minutes. (Retry operation is performed for the first two times.)
Actual frequency from inverter PCB is less than 10Hz (after inverter frequency output from outdoor unit PCB).
Conditions of Activation: Inverter PCB does not operate normally.



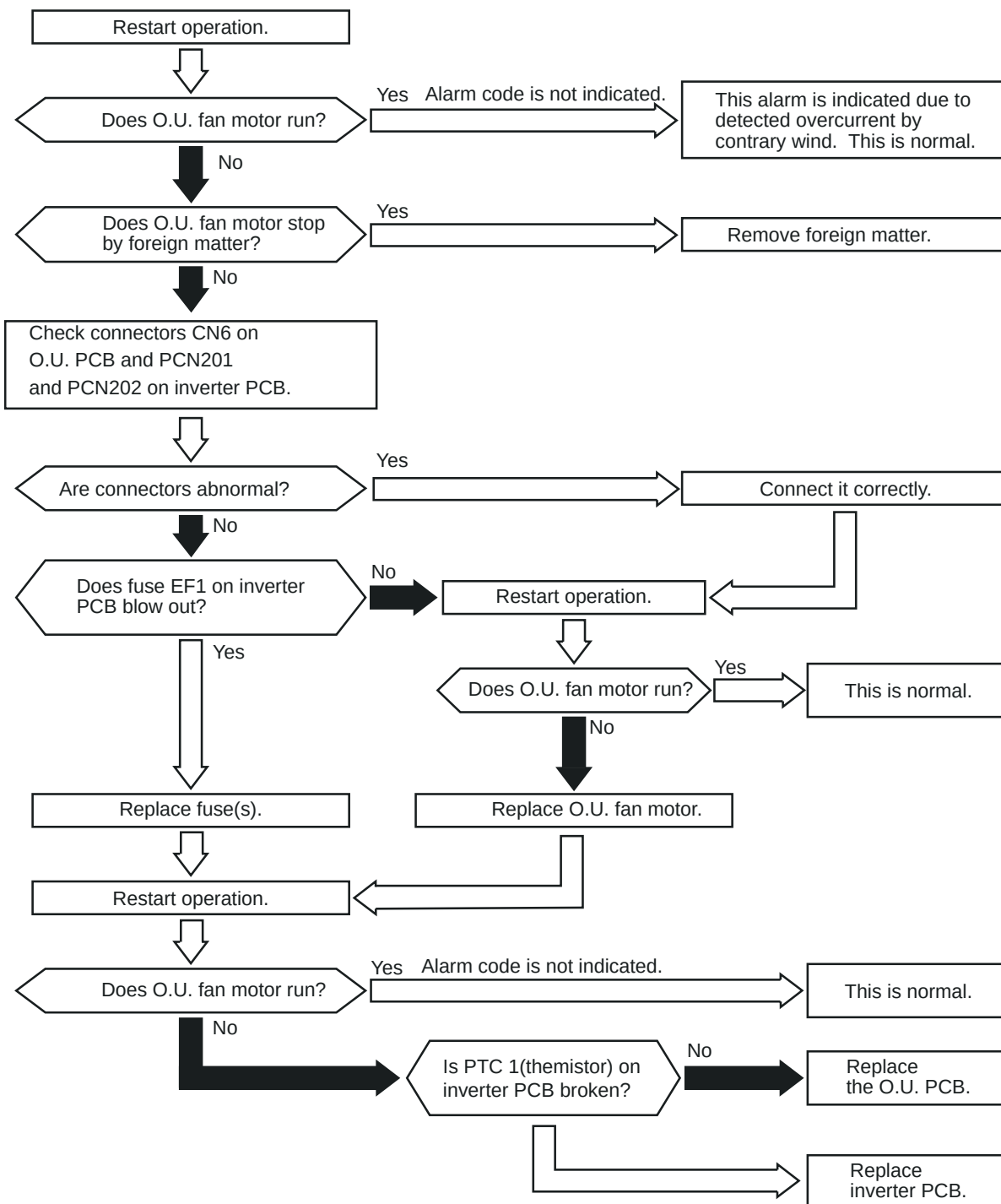
- *1) When the excessive surge current is applied to the unit due to lightning or other causes, this alarm code or the cause code of inverter stoppage (lrc=11) will be displayed on the 7-segment display on O.U. PCB and the unit can not be operated. In this case, check to ensure the surge absorber (SA) on the noise filter. The surge absorber may be damaged if the inner surface of the surge absorber is changed to black. If the surge absorber is damaged, replace the noise filter. If the surge absorber does not have abnormality, turn OFF the power supply once and wait until LED201 (red) goes off on inverter PCB in approx. 5 min. Then, turn ON again.

Alarm
Code

57

Abnormality of O.U. Fan Motor

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ If the revolution of the O.U. fan motor is less than 10rpm 10 seconds after the O.U. fan motor starts operation, the O.U. fan motor stops. The O.U. fan motor restarts operation automatically after 10 seconds (During this, the compressor continues to operate). If this occurs again nine times in the next five minutes, this alarm code is displayed. This alarm is caused by locking or electrical abnormality of the O.U. fan motor.



Alarm Code b1	Incorrect Setting of Unit and Refrigerant Cycle Number
----------------------	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the number of connected indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB.
- ★ This alarm code is displayed in the following conditions. Check the settings of the DIP switches (DSW) and the rotary switches (RSW) after turning OFF the power supply

Conditions	Action
The unit No. setting (DSW6 and RSW1) or the refrigerant system No. setting (DSW5 and RSW2) on I.U. PCB is set as "64" or more, or more than 2 pins of DSW5 or DSW6 are set.	a. Unit No. Setting / Ref. System No. Setting Starting from "1" (recommended) Set the unit No. and the refrigerant system No. from "1" to "63". (Setting No. for the 64th unit is "0".) b. Unit No. Setting / Ref. System No. Setting Starting from "0" Set the unit No. and the refrigerant system No. from "0" to "63." (Setting No. for the 64th unit is "63".)
The unit No. setting and the refrigerant system No. setting are set between "16" and "63," and the indoor unit does not support H-NET.	Set the unit No. and the refrigerant system No. between "0" and "15."

Alarm Code b5	Incorrect Setting of Indoor Unit Number for H-NET Type
----------------------	--

- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code*1), the unit model code and the number of connected indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB.
 *1): The alarm code indicated on the remote control switch is "35".

Conditions	Action
The number of the connected indoor units not supporting H-NET is 20 and after.	The number of the connected indoor units shall be 19 and before.

Alarm Code	EE	Compressor Protection
------------	----	-----------------------

- ★ This alarm code appears when one of the following alarms occurs three times within 6 hours, which may result in serious compressor damages, if the outdoor unit is continuously operated without removing the cause.

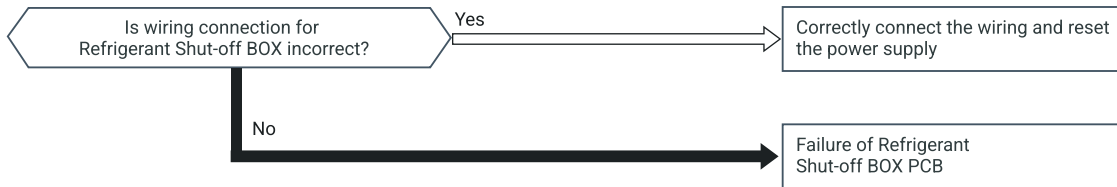
Alarm Code	Content of Abnormality
02	Activation of Protection Device (High Pressure Switch) in Outdoor Unit
07	Decrease in Discharge Gas Superheat
08	Excessively High Discharge Gas Temperature at Top of Compressor
43	Activation of Pressure Ratio Decrease Protection
44	Activation of Low Pressure Increase Protection
45	Activation of High Pressure Increase Protection Device
47	Activation of Low Pressure Decrease Protection

These alarms are able to be checked by the CHECK Mode. Follow the action indicated in each alarm chart. These alarms are cleared only by turning OFF the main power supply to the system. Do not restart the operation without taking any necessary action, since there is a possibility of causing serious damages to the compressors.

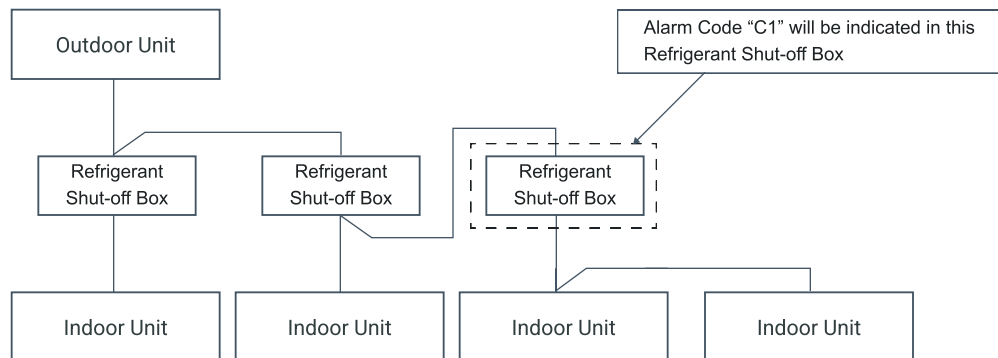
Alarm Code	C1	Incorrect Indoor Unit Connection (Refrigerant Shut-off Box)
------------	-----------	---

★ <Heat Recovery System>

This alarm code is indicated when two or more Refrigerant Shut-off Boxes are connected between outdoor unit and indoor unit.



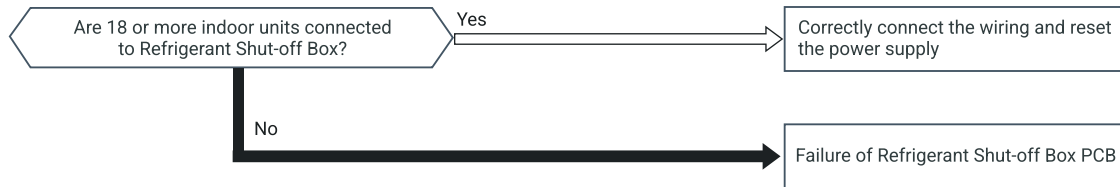
- Alarm Code "C1" will be indicated when the units are connected as follows.



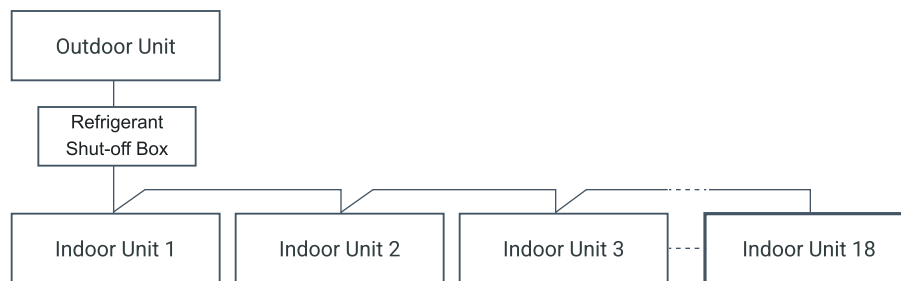
Alarm Code	C2	Incorrect Indoor Unit Connection No. Setting (Refrigerant Shut-off Box)
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★ <Heat Recovery System>

This alarm code is indicated when 18 or more indoor units are connected to Refrigerant Shut-off Box.

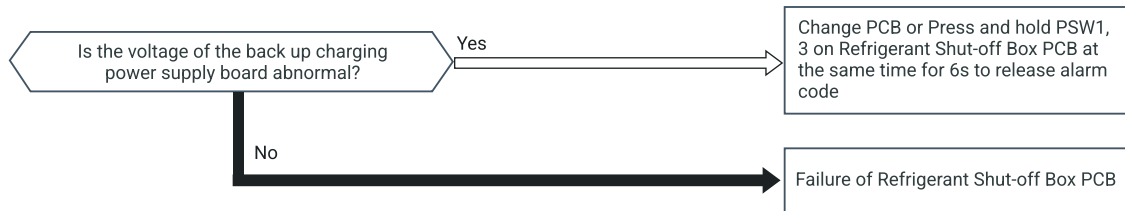


- Alarm Code "C2" will be indicated when the units are connected as follows.



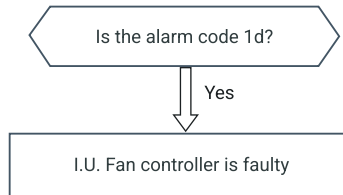
Alarm Code	06	Abnormal backup charging power board (Refrigerant Shut-off Box)
------------	-----------	---

- ★ The voltage of the back up charging power supply board is abnormal



Alarm Code	1d	Abnormality of I.U. Fan Controller
------------	----	------------------------------------

★ This alarm code is indicated when the fault signal from the I.U. fan controller IC is detected more than 3 times within 30 minutes.



Phenomenon	Cause	Check items	Action
I.U. fan controller failure		Check the I.U. fan controller	Replace it if faulty
The I.U. fan controller alarms as soon as it is activated	Short circuit protection	Check whether the I.U. fan motor is faulty	Replace the I.U. fan motor

Alarm Code	1b	I.U. Fan controller Software Overcurrent/Electronic Thermal Protection
------------	-----------	--

- ★ This alarm code is indicated when the current processed by the software exceeds the maximum current limit more than 3 times within 30 minutes. This alarm code can also be triggered by I.U. fan motor current exceeding the “Electronic thermal protection value” continuously for 30 seconds, or by exceeding the “Electronic thermal protection value” for 3 minutes in total within 30 minutes.



Phenomenon	Cause	Check items	Action
The I.U. fan motor runs for a period of time and shuts down and alarms	Software over-current protection	Check whether the speed-up mode selection of the wired controller is correct	Set the correct speed-up mode of the wired controller
I.U. fan controller failure		Check the I.U. fan controller	Replace it if faulty

Alarm Code	IE	I.U. Fan Controller Under-Voltage
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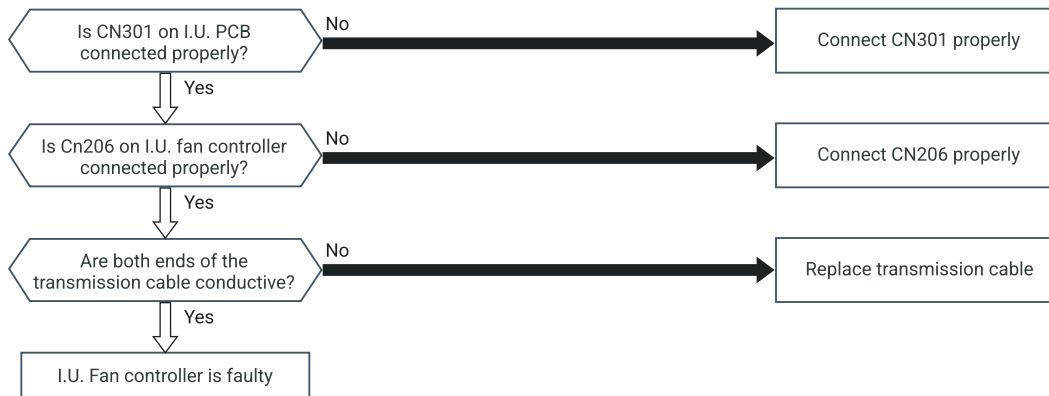
- ★ This alarm is indicated when the bus voltage amplitude on the I.U. fan controller is detected less than 140V more than 3 times within 30 minutes.



Phenomenon	Cause	Check items	Action
The I.U. fan controller alarms as soon as it is activated	Under-voltage protection	Check if the input voltage is too low	Adjust the input voltage to the normal range
I.U. fan controller failure		Check the fan controller	Replace it if faulty

Alarm Code	66	Abnormal Transmission between I.U. PCB and I.U. Fan controller
------------	-----------	--

- ★ This alarm is indicated when transmission between I.U. PCB and I.U. Fan controller is abnormal, and after reset, no signal reception nor normal transmission was completed within 30 seconds.



Phenomenon	Cause	Check items	Action
The I.U. fan controller alarms as soon as it is activated	Abnormal transmission	Check whether both CN206 and CN301 are correctly connected	Connect the transmission cable properly
		Check if the transmission cable itself is damaged	Replace the transmission cable
I.U. fan controller failure		Check the I.U. fan controller	Replace it if faulty

Alarm Code	1C	Abnormality of I.U. Fan Controller Current Detection Circuit
------------	----	--

- ★ This alarm is indicated when I.U. fan motor lacking phase or unconnected I.U. fan motor is detected more than 3 times; or before the I.U. fan motor is started, the detection value of the current detection circuit is detected as incorrect more than 3 times within 30 minutes



Phenomenon	Cause	Check items	Action
The I.U. fan controller alarms as soon as it is activated	The I.U. fan motor lacks phase	Check whether U, V, W are correctly connected	Connect the I.U. fan motor wires
I.U. fan controller failure		Check the I.U. fan controller	Replace it if faulty

Alarm Code	18	I.U. Fan motor non-action or Out-of-step
------------	----	--

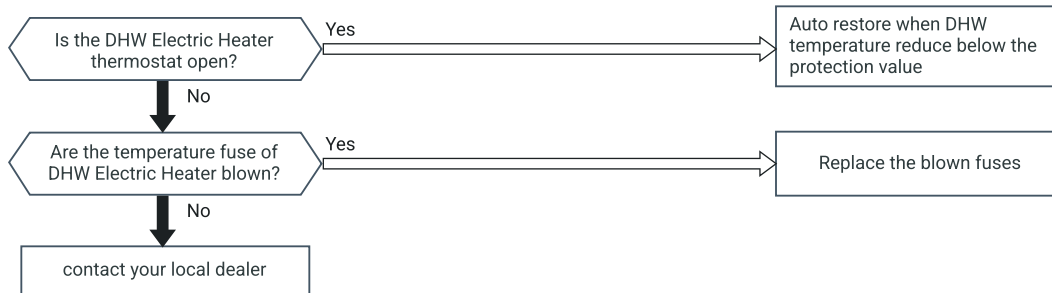
- ★ This alarm code is indicated when the I.U. fan motor rotation speed command is above 60 rpm and the actual rotation speed is below 30 rpm for 30 seconds. Or this alarm code is indicated when the I.U. fan motor has lost its synchronization.



Phenomenon	Cause	Check items	Action
I.U. fan controller failure		Check the I.U. fan controller	Replace it if faulty
I.U. fan motor failure		Check the I.U. fan motor	Replace it if faulty

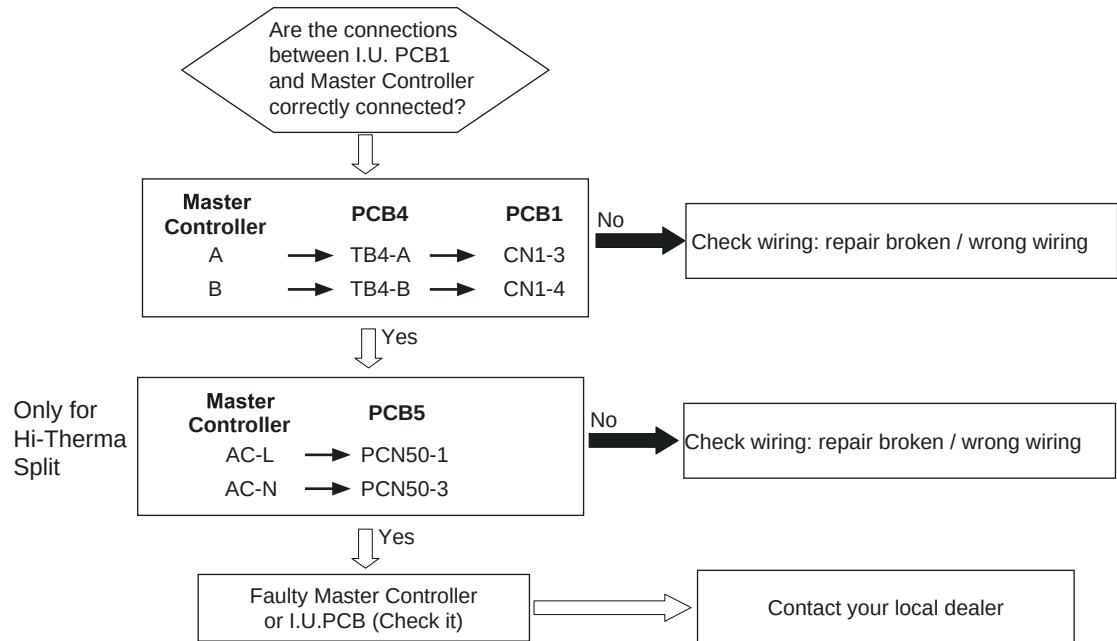
Alarm Code	71	Protection Thermostat of DHW Electric Heater activation
------------	----	---

- Alarm code is displayed on the master controller/ the 7-segment of O.U. display PCB / the 7-segment of I.U. PCB1.
- This alarm is displayed when the temperature inside the DHW tank exceeds the safety temperature and protection thermostat is activated (field supplied).
- Reset the unit to release the alarm.



Alarm Code	88	Protection Thermostat of DHW Electric Heater activation
------------	----	---

- Alarm code is displayed on the master controller/ the 7-segment of O.U. display PCB / the 7-segment of I.U. PCB1.
- Alarm code is displayed when there is no communication between indoor unit PCB1 and the Master Controller for 5 minutes.
- Reset the unit to release the alarm.



Alarm Code	d1	DHW Refrigerant leakage
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- ★ This alarm is indicated when the refrigerant sensor detects refrigerant leakage in DHW tank.



Alarm Code	0E	DHW Electric leakage
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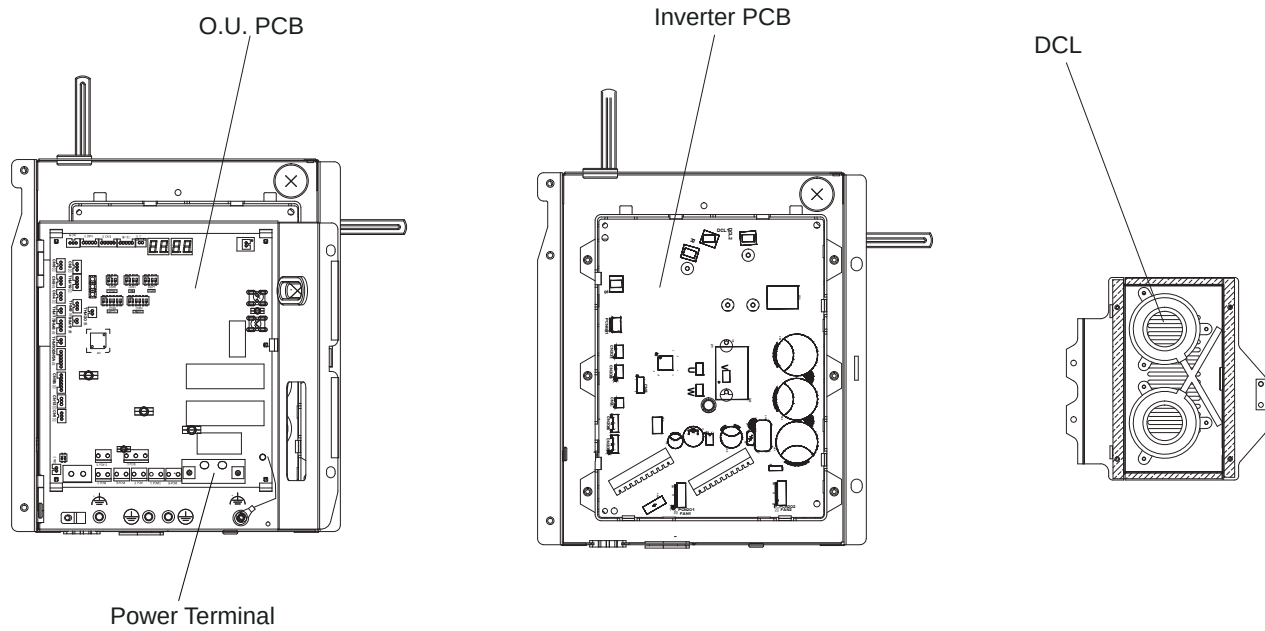
- ★ This alarm is indicated when the Electric Heater in DHW has leaked.



1.2.8 Function On DSWs and LEDs

1.2.8.1 Arrangement Inside Electrical Box

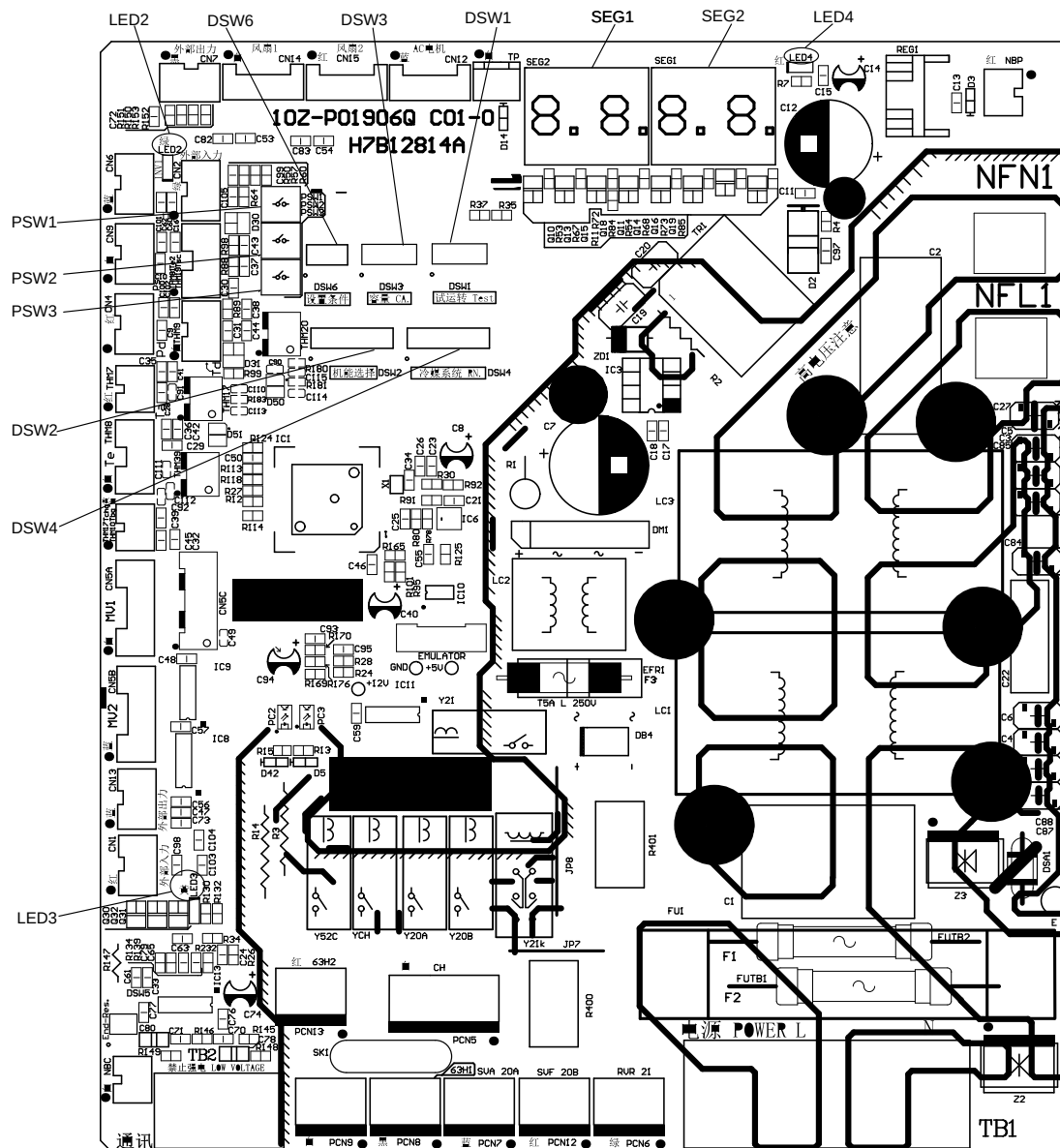
- CHV6-RS36/48/60URBMHH



1.2.8.2 LEDS and SEGs on PCB

Part Name		Contents of Functions
LEDs	LED4 (Red)	Power Supply Indication for Outdoor Unit PCB (Low Voltage) Normal Condition: Activated Abnormal Condition: Deactivated
	LED2 (Green)	This LED2 indicates the transmission state between the outdoor unit PCB and inverter PCB. Normal Condition: . Flashing Abnormal Condition: Activated or Deactivated
	LED3 (Yellow)	This LED3 indicates the transmission state between the indoor unit and outdoor unit. Normal Condition: . Flashing Abnormal Condition: Activated or Deactivated
SEGs	SEG1, SEG2	These indicate the following "Alarm", "Protective Safety Device has Tripped" or "Checking Items".

CHV6-RS36/48/60URBMHH



<Procedure>

High Voltage Discharge Work for Replacing Parts

⚠ CAUTION

Safely perform this high voltage discharge work to prevent electric shock.

- Check whether the high voltage still exists in the inverter PCB after power is disconnected. When the unit is operated, LED201 is turned ON on inverter PCB. At the time of power off the unit, LED201 is turned OFF. In this case, the residual voltage is less than DC50V.
- Plug connecting wires to a soldering iron (field-supplied).
- Connect the wires to P and N (soldering portion) on inverter PCB. (The discharge voltage can perform even when connecting the wires to terminals #1(P) and #3(N) of connector "PCN202".)
- Measure the residual voltage again after 2 or 3 minutes. Check to ensure that no high voltage is remaining.

Discharging is started, and the soldering iron is warmed up.
Do not contact or short-circuit P (⊕) and N (⊖), when performing the discharge work.

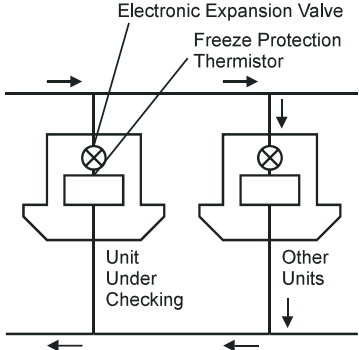
Measure the each checking element by a tester. The checking result shall be as following table.

Tester Probe	Result
(-)DM2, (+)R	More than 1 kΩ
(-)DM2, (+)S	More than 1 kΩ
(+)DM2, (-)R	More than 100 kΩ
(+)DM2, (-)S	More than 100 kΩ
(+)P, (-)U or V or W	More than 1 kΩ
(-)P, (+)U or V or W	More than 30 kΩ
(-)N, (+)U or V or W	More than 1 kΩ
(+)N, (-)U or V or W	More than 30 kΩ
(+)DCL2, (-)P	More than 100 kΩ
(-)DCL2, (+)P	More than 1 kΩ
(+)DCL2, (-)N	More than 100 kΩ
(-)DCL2, (+)N	More than 1 kΩ
(+)DM2, (-)DCL1	around 500Ω(normal)
	0Ω or infinity Ω(abnormal)
EF1(+)(-)	0Ω (normal)

NOTE:

The polar character of tester probes are as follows. Red(+), Black(-)

1.2.10 Checking Method Of Electronic Expansion Valve

	Indoor Unit Electronic Expansion Valve	Outdoor Unit Electronic Expansion Valve
Locked (Fully Closed)	Check for the liquid pipe temperature during heating operation. It is abnormal if the temperature does not increase	It is abnormal if the liquid pipe pressure does not increase during cooling operation
Locked (Slightly Open)	It is abnormal under the following conditions; The temperature of freeze protection thermistor becomes lower than the suction air temperature when the unit under checking is stopped and the other units are in cooling operation. 	It is abnormal if the liquid pipe pressure does not increase and the outlet temperature of the expansion valve decreases after the cooling operation is started.
Locked (Fully Open)		It is abnormal under the following conditions; After heating operation for more than 30 min., the discharge gas temperature of compressor is not 10°C higher than the condensing temperature and there is no other faults such as excessive charge of refrigerant, etc.

1.2.11 Checking of DC Fan motor

When INV PCB is faulty and Alarm 03, 04 or 53 appears, the fan motor may also be damaged. To prevent INV PCB damage which may result from operation combined with a faulty fan motor, check also if the fan motor is not damaged when IPM is replaced.

Procedure in case of error diagnosis

- Remove fan motor connectors for DC fan motor from the INV PCB and turn the fan motor shaft by hand.
Normal: The fan motor shaft turns smoothly.
Faulty: No continuous rotary torque movement felt when turning the motor by hand. This occurs because the internal magnet of the fan motor breaks the movement when the internal electronic circuit of the fan motor has a short-circuit fault.
- Measure the fan motor resistance:
 - Disconnect the connector of DC fan motor from INV PCB.
 - Connect the black test lead wire to the pin terminal of black wiring for the connector of DC fan motor.
 - Connect the red test lead wire to each measuring pin terminal for the connector of DC fan motor.

Wiring Color for Measurement (Normal Value)			
Model	Red-Black	White-Black	Red-White
CHV6-RS36/48URBMHH	150Ω±15%		
CHV6-RS60URBMHH	51Ω±15%		

NOTE:

If the wires are connected other way around the resistance can not be measured correctly.

It is normal when the resistance is the same or closed as the normal values in the table up.

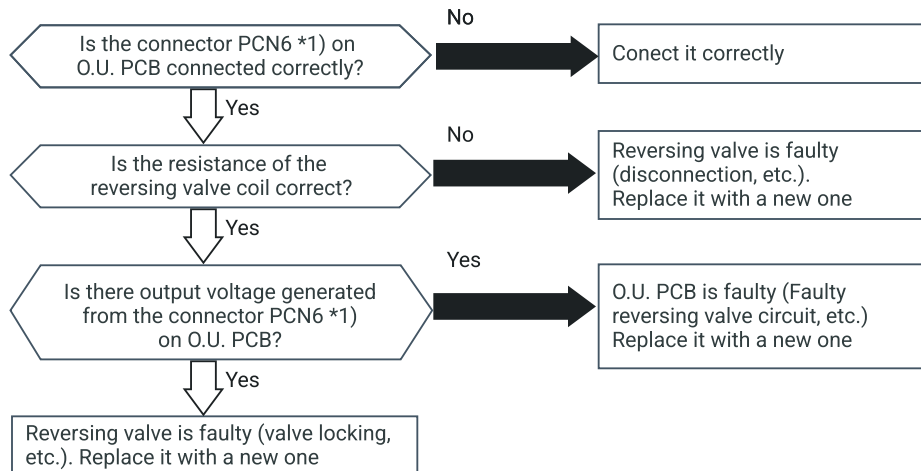
It is abnormal if the resistance is completely different from the normal values in the table up. (Open fault: infinity; Short-circuit fault: several Ω to several kΩ) The condition of open fault and short-circuit fault in the electronic circuit of DC fan motor can be checked if the value shows abnormality.

1.2.12 Checking of Electrical Coil Resistance for Each Electrical Components

Parts	Type	Resistance	Unit models
Reversing Valve Coil	SQ-A2720K-000522	2780Ω±10% at 20°C	CHV6-RS36/48/60URBMHH
Solenoid Valve Coil	FDFX02-0293	2350Ω±10% at 20°C	CHV6-RS36/48/60URBMHH
Electronic expansion valve coil	CAM-MD12HS-2	46Ω±4Ω at 20°C	CHV6-RS36/48/60URBMHH
	PQ-M10012-001006	46Ω±3.7Ω at 20°C	
Compressor	WHP23000GEKPC8FQC	0.295 at 20°C	CHV6-RS36/48/60URBMHH

1.2.12 Checking of Reversing Valve

If outdoor unit does not start the heating operation or defrosting operation, there may be a malfunction of the reversing valve. The troubleshooting is indicated below.



2. Maintenance

⚠ DANGER

Ensure that there is no refrigerant inside the outdoor unit during brazing work and disassembly of refrigeration system pipe components. Ensure that the system pressure is not greater than the external atmospheric pressure.

2.1 Outdoor Unit - CHV6-RS36/48/60URBMHH

⚠ WARNING

TURN OFF all power supply switches.

NOTICE

Removing main parts should be performed according to the following procedures.

To attach new parts after replacement, reverse the removal procedure.

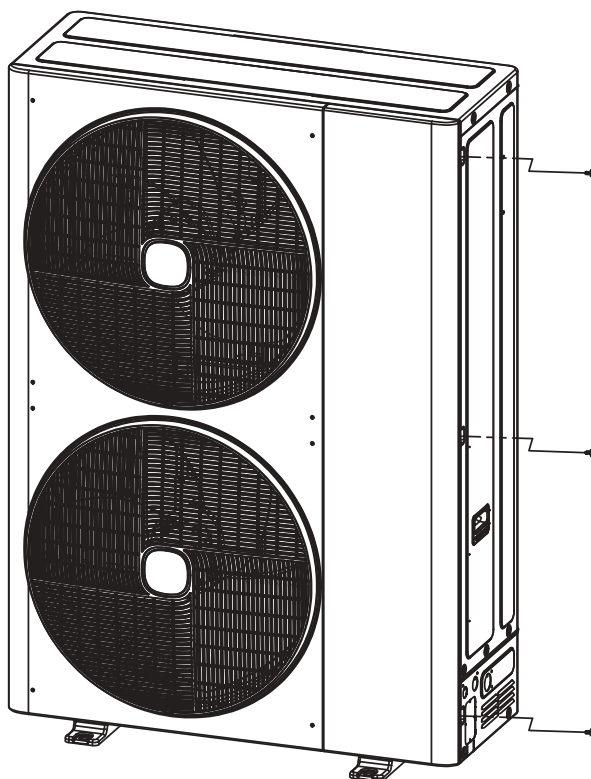
To prevent contamination of the refrigerant by water or foreign materials, do not expose the refrigerant parts open to atmosphere for long periods. If necessary, seal pipe ends using caps or tape.

2.1.1 Removing Service Cover

Remove the service cover drawing it upward after removing three securing screws for the service cover. When removing the service cover, take special care not to drop it.

Tool

Gloves, Phillips Screwdriver



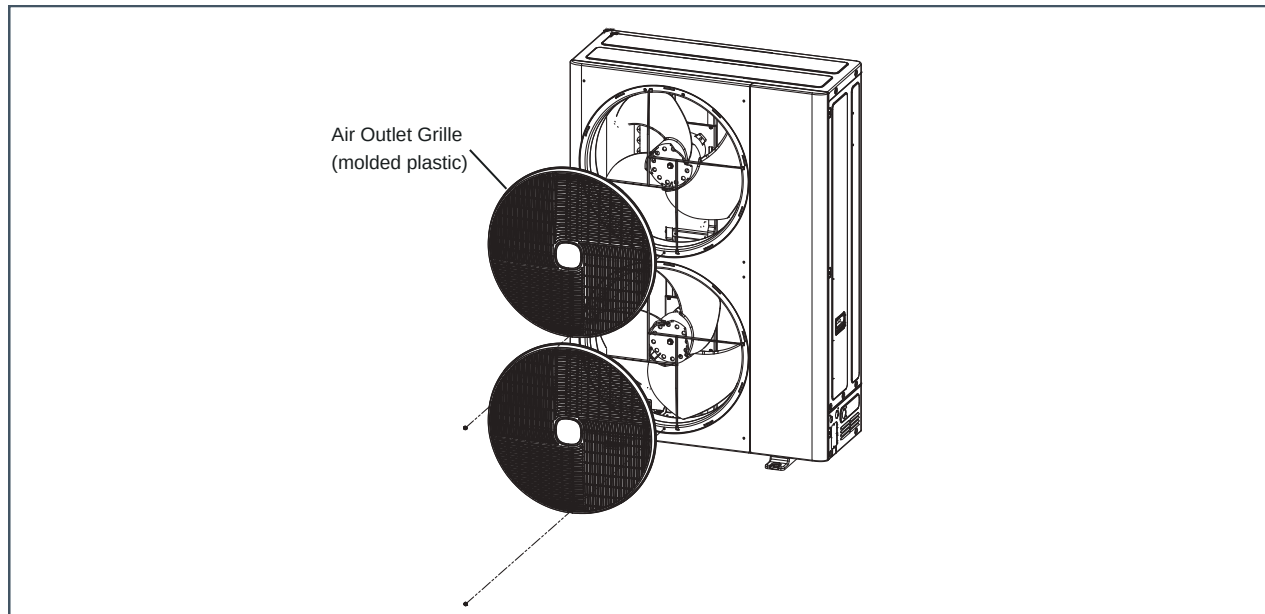
⚠ WARNING

TURN OFF all power supply switches.

2.1.1 Removing Air Outlet Grille

- (1) Remove one securing screw for the air outlet grille (molded plastic).
- (2) Rotate the air outlet grille counterclockwise slightly to the left and remove air outlet grille.

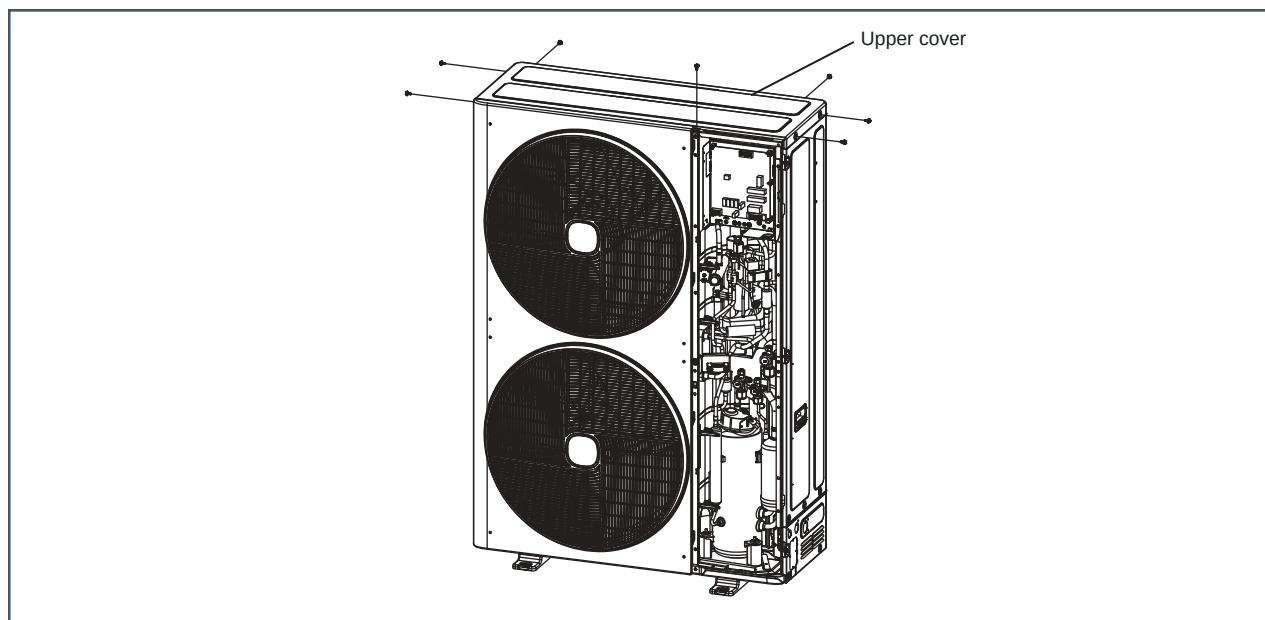
Tool	Gloves, Phillips Screwdriver
------	------------------------------



2.1.3 Removing Upper Cover

After removing seven securing screws for the upper cover, lift the upper cover up.

Tool	Gloves, Phillips Screwdriver
------	------------------------------



⚠ WARNING

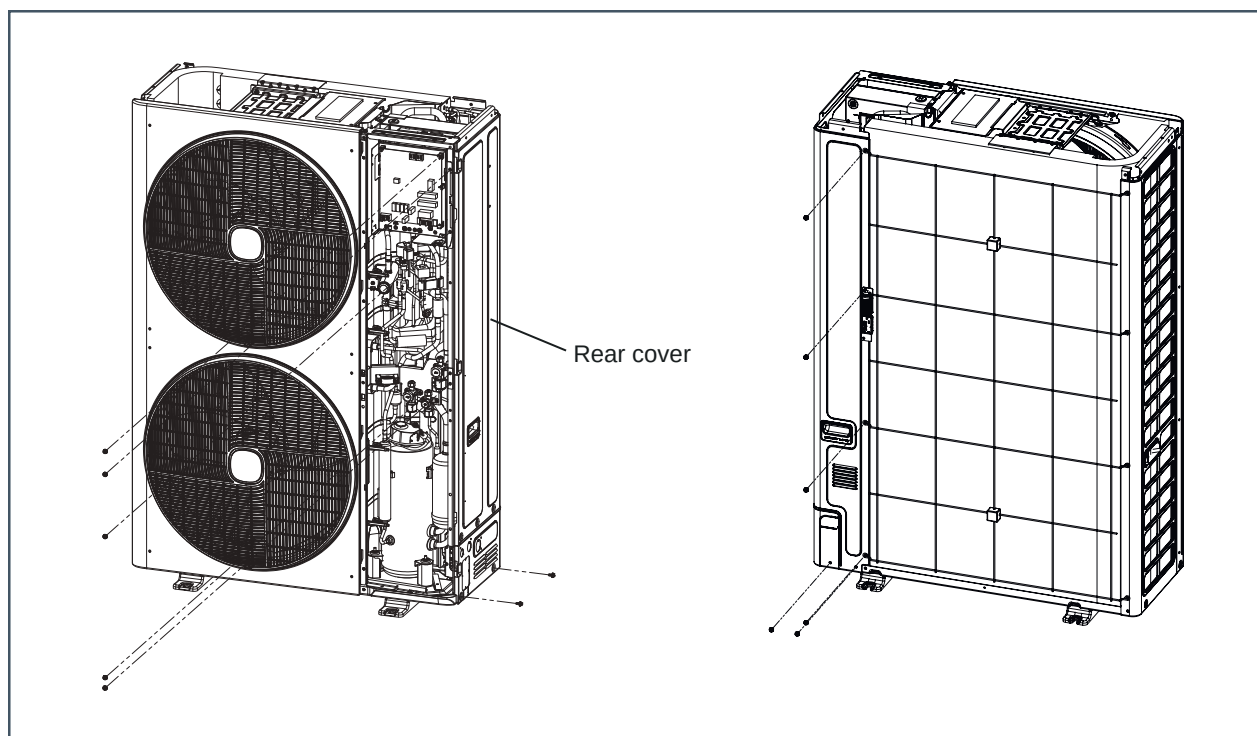
TURN OFF all power supply switches.

2.3 Removing Top Cover

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover".
- (2) Remove the upper cover according to Section 2.1.3 "Removing Upper Cover."
- (3) Remove thirteen securing screws for rear cover.
- (4) Remove the rear cover by pulling it backward.

Tool

Gloves, Phillips Screwdriver



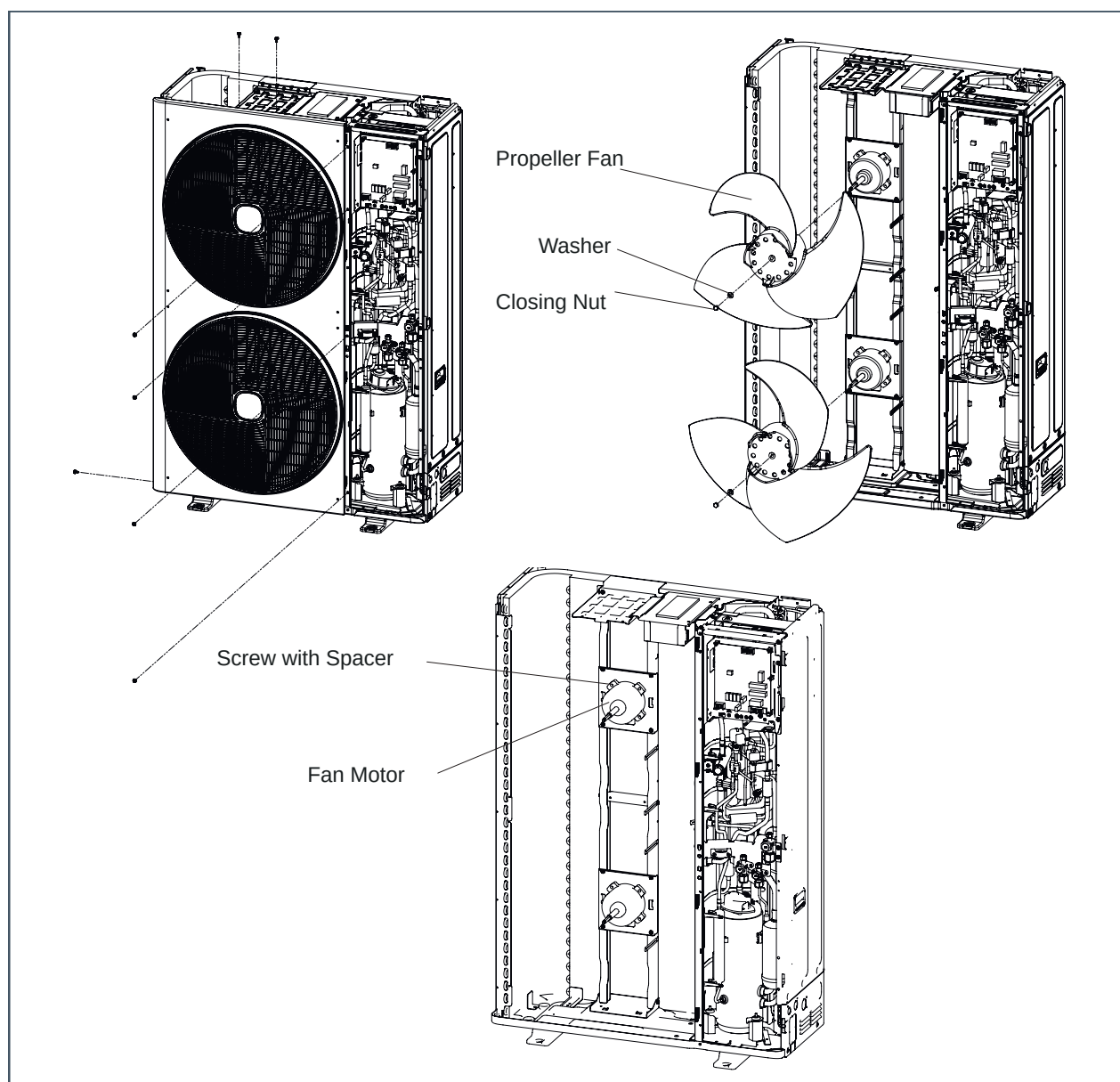
⚠ WARNING

TURN OFF all power supply switches.

2.1.5 Removing Outdoor Fan Motor

- (1) Remove the air outlet grille according to Section 2.1.2 "Removing Air Outlet Grille."
- (2) Remove the upper cover according to Section 2.1.3 "Removing Upper Cover."
- (3) Remove the seven screws for front cover.
- (4) Remove the closing nut and the washer securing the propeller fan to the motor shaft with a socket wrench. Then remove the propeller fan from the motor shaft. (If it is difficult to remove, a corrosion or puller may be needed.)
- (5) Removing Fan Motor
 - (a) Disconnect the connectors for the fan motors from the outdoor unit PCB in the electrical box.
 - (b) Remove four spacer screws securing the fan motor.

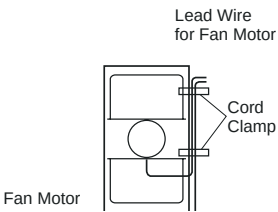
Tool	Gloves, Phillips Screwdriver, Adjustable Wrench, Puller, Nipper
------	---



⚠ WARNING

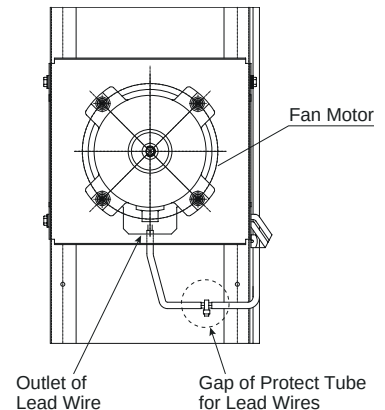
TURN OFF all power supply switches.

Model: CHV6-RS36/48/60URBMHH

Fan Motor Qty	Connector	Securing Screw for Fan Motor	Securing Positions of Motor Clamp and Wired
	Fan Motor	Fan Motor	
1	INV PCB CN202 (red) PCN202 (red)	M4 (Screw with Spacer) x 4	

NOTES:

- Mount the fan motor so that the wiring harness is at the bottom.
(Adjust the position not to touch the propeller fan to shroud).
- Secure the wiring for the motor with the provided clamp taking care to route and secure the wiring away from the propeller fan.
- Mount the fan motor so that the gap of wiring harness is at lowest position.
- Reinstalling Propeller Fan
Carefully align the D cut hole of propeller fan to match the shaft and slide on slowly. Once the propeller fan hits the stop on motor shaft, finger start closing nut and tighten to approximately 20 Nm.
- After carefully routing and securing the wiring harness, reconnect motor connectors at the main PCB.
Ensure motor connectors are color matched at the PCB connections.
- Once motor(s) have been installed, reinstall metal and plastic air outlet grilles being careful to not over tighten.



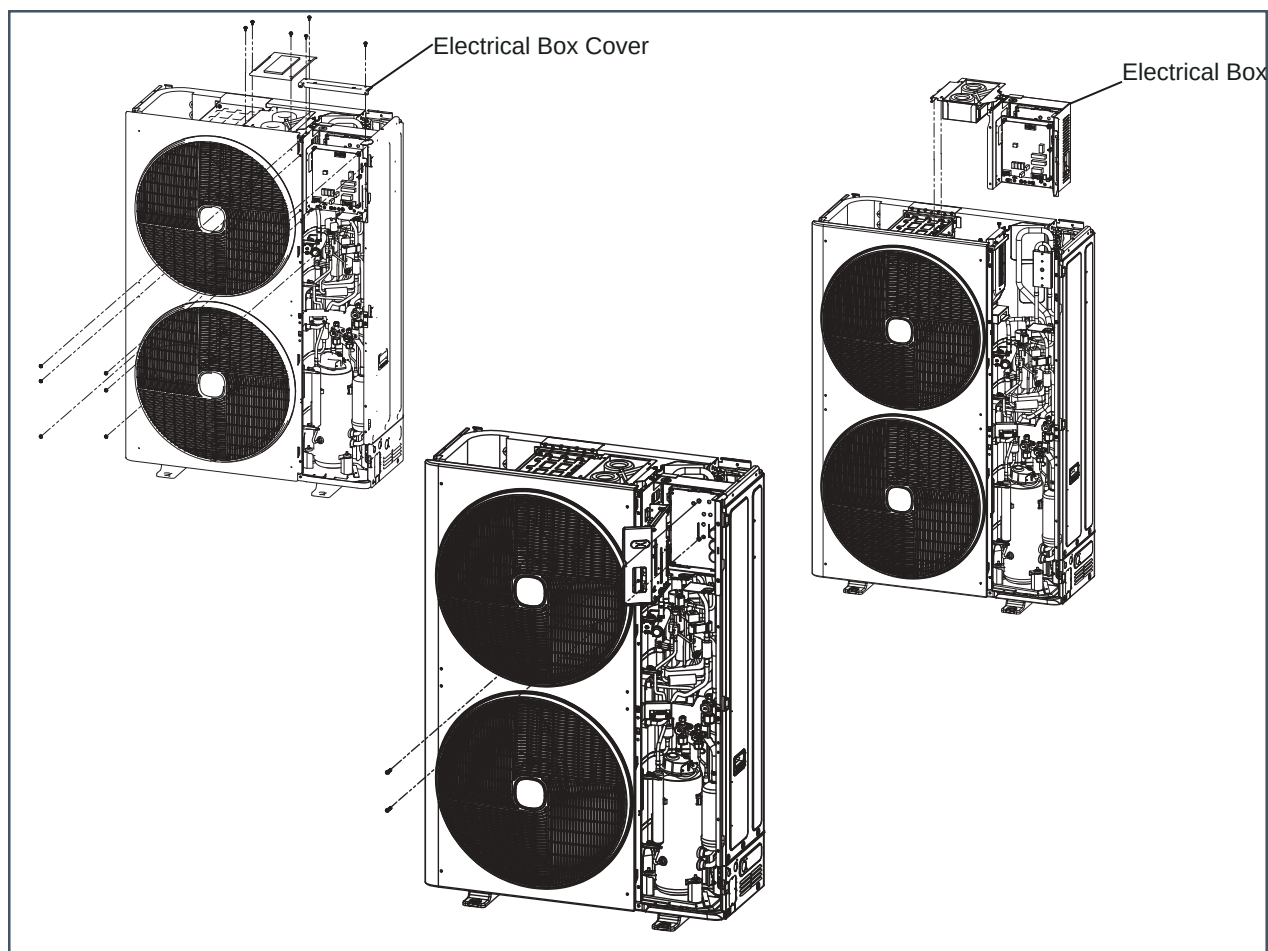
⚠ WARNING

TURN OFF all power supply switches.

2.1.6 Removing Electrical Box

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Remove the upper cover according to Section 2.1.3 "Removing Upper Cover."
- (3) Remove electrical box cover.
- (4) Remove the three screws connecting the refrigerant cooler.
- (5) Remove the electrical box lifting it upward.

Tool	Phillips Screwdriver
------	----------------------



NOTES:

Remove the electrical box after disconnecting wires.

1. Remove the reversing valve coil according to Section 2.1.10 "Removing Reversing Valve Coil."
2. Remove the expansion valve coil according to Section 2.1.11 "Removing Electronic Expansion Valve Coil."
3. Remove the solenoid valve coil according to Section 2.1.12 "Removing Solenoid Valve Coil."
4. Disconnect the faston terminals from high pressure switch and pressure sensor.
5. Disconnect both fan motor connectors and thermistors from the outdoor unit PCB.
6. Disconnect the compressor wires in the terminal box of compressor.
7. Loosen all cord clamps.
8. When mounting the electrical box, join and fit the electrical box and the partition plate into the outdoor unit.
(Position the electrical box to latch it onto the partition plate, the motor clamp and the refrigerant cooler.)

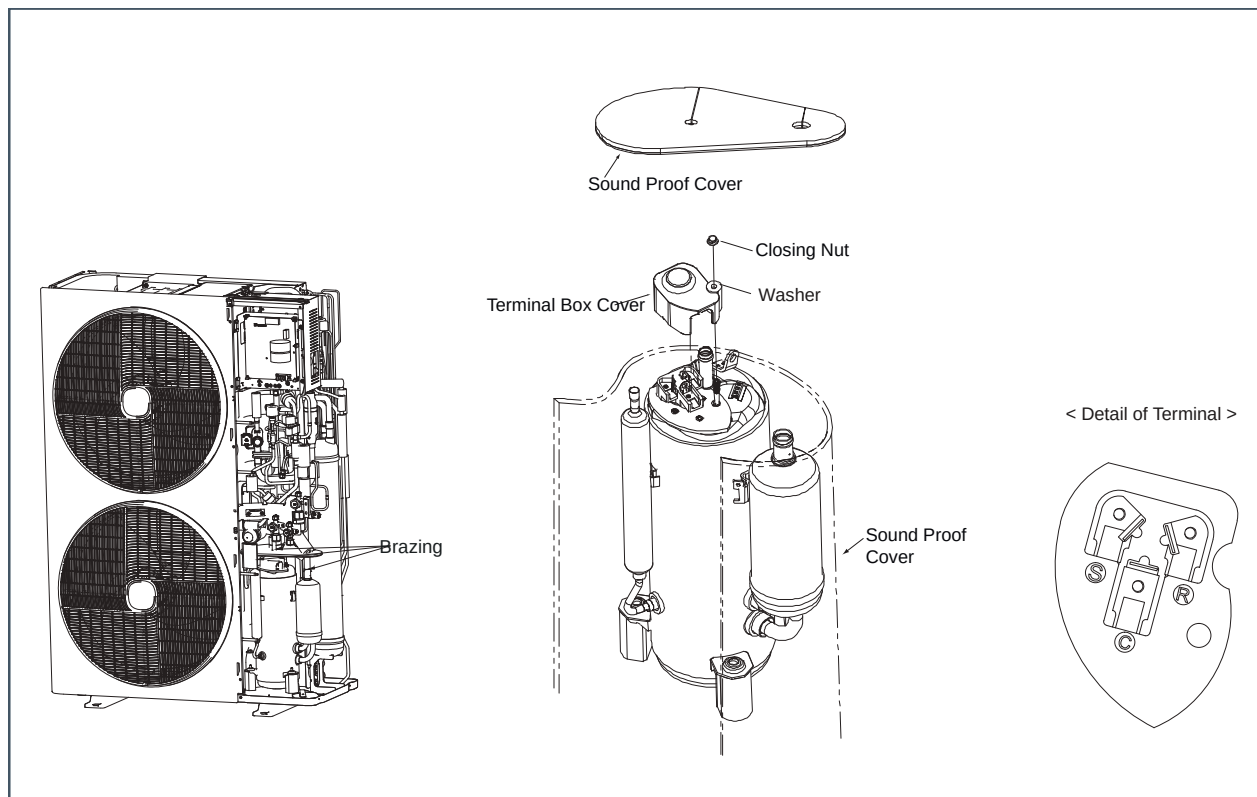
⚠ WARNING

TURN OFF all power supply switches.

2.1.7 Removing Compressor

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Remove the lower service cover and the rear cover according to Section 2.1.4 "Removing Lower Service Cover and Rear Cover."
In the case that the outdoor unit is located near the wall, remove refrigerant piping and move the outdoor unit away from the wall.
- (3) Recover the refrigerant from stop valve.
- (4) Remove the stop valve mounting plate.
- (5) Open the sound proof cover wrapped around the compressor, remove the terminal box cover for the compressor and disconnect the lead wiring.
NOTE:
Write down or photograph wiring and terminal designations to prevent mis-wiring of replacement compressor as shown below.
If the lead wiring is connected incorrectly to the terminal, the compressor may be damaged due to reverse rotation.
- (6) Remove the rubber cap.
- (7) Remove the sound proof cover.

Tool	Phillips Screwdriver, Charging Hose, Refrigerant Recovery Machine and Cylinder
------	---



NOTES:

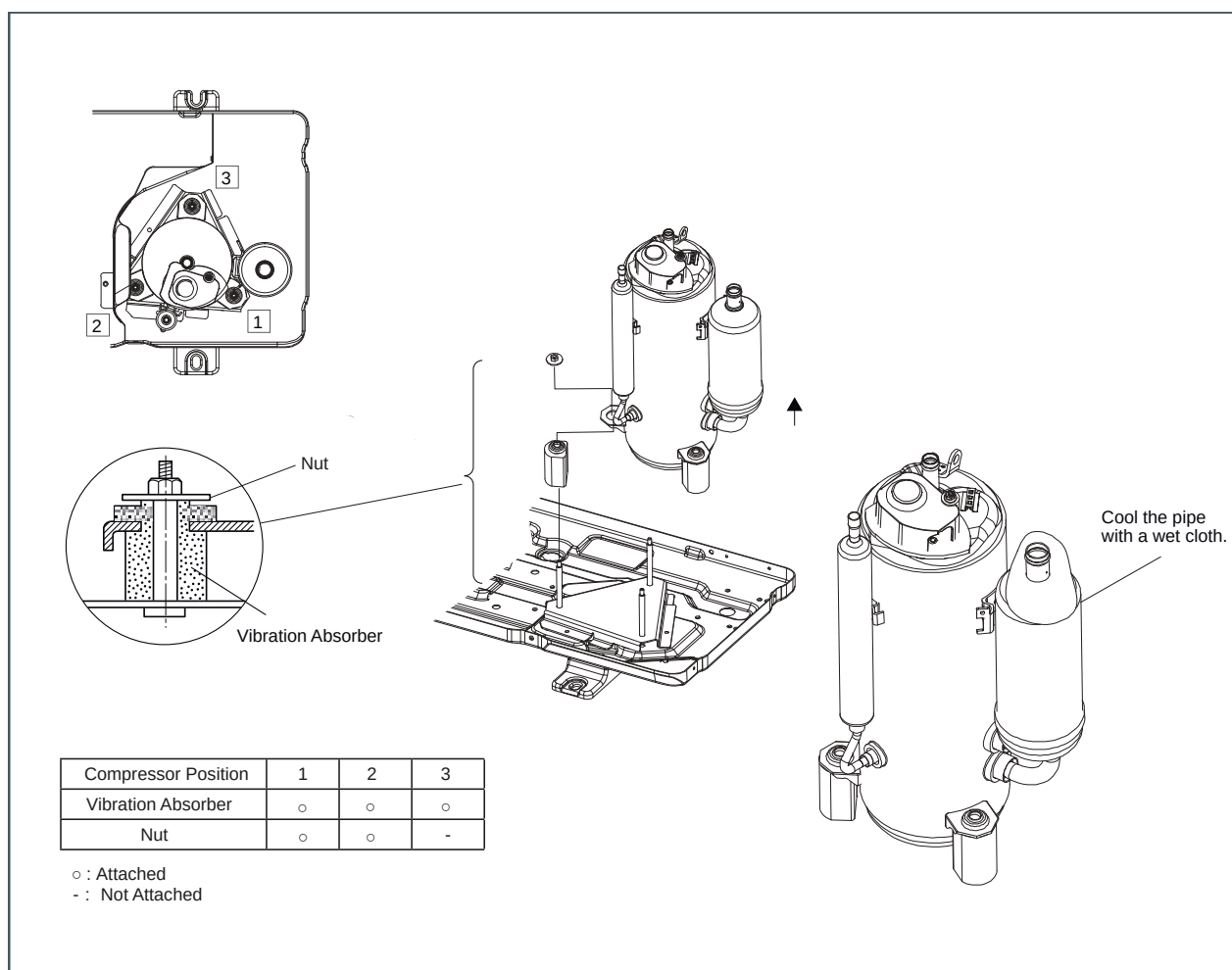
1. The compressor and piping are connected by brazing. Before brazing work, ensure that there is no flammable material nearby, as remaining oil inside the piping may ignite.
2. To prevent contamination of the refrigerant by water or foreign materials, do not expose the refrigerant parts to atmosphere for long periods. If necessary, seal the pipe ends using caps or tape.
3. Remove the caps for piping of the new compressor right before replacement. When replacing the compressor, seal the suction and discharge pipes with tape to prevent water and foreign particles from entering the compressor, and remove it right before brazing work.

⚠ WARNING

TURN OFF all power supply switches.

- (8) Disconnect the suction pipe and discharge pipe from the compressor with a torch.
Ensure that wiring and electrical parts are kept away from the brazing area.
If not, they may catch fire at brazing work
- (9) Remove all the bolts that hold the compressor. Tilting the compressor forward, lift it up and remove it.
NOTE:
When removing the compressor, the discharge refrigerant line will have to be moved out of the way.
Take care to not damage or kink this line.
- (10) When performing the brazing work for the replaced compressor, work quickly and do not overheat piping and fittings. Cool area with a wet cloth to help prevent oxidation. Carefully not let the solder or dust flows into the compressor.

Tool	Spanner or Adjustable Wrench, Torch, Wet Cloth
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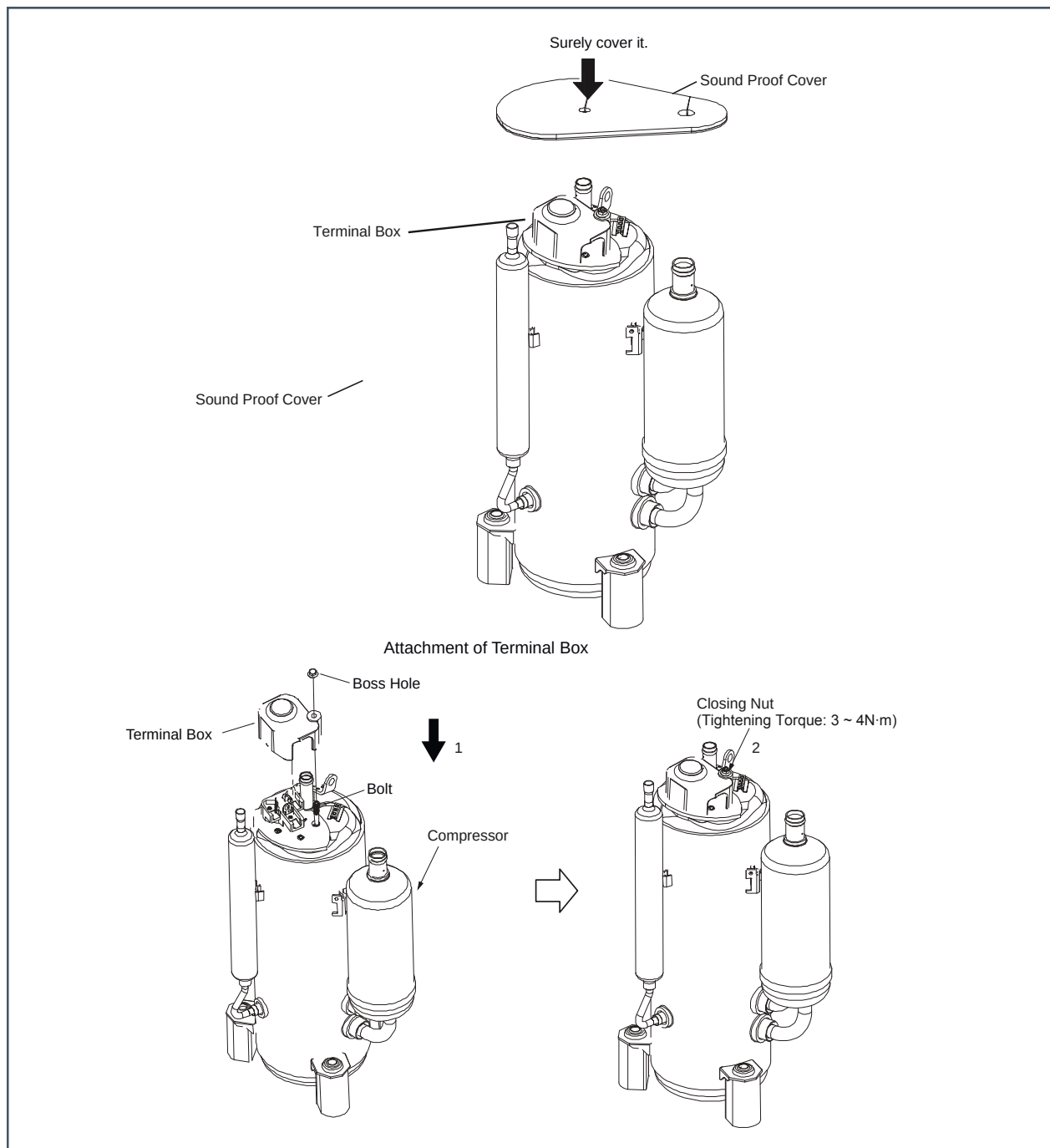


⚠ WARNING

TURN OFF all power supply switches.

- (11) To mount the new compressor after replacement, reverse the removal procedure.
- (a) Ensure the terminals of the compressor wiring are not loose or damaged. If burned or otherwise damaged they must be replaced.
 - (b) Tightly secure the terminal box by tightening the closing nut (Tightening Torque: 3~4 N·m).
 - (c) Attach the sound proof cover to the top of the compressor.
 - (d) Wrap the sound proof cover around the terminal box and the discharge pipe.

Tool	Adjustable Wrench, Torch, Wet Cloth
------	-------------------------------------



⚠ WARNING

TURN OFF all power supply switches.

2.1.8 Removing Pressure Switch and Pressure Sensor

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Recover the refrigerant from check joints according to Section 2.1.7 "Removing Compressor."

[Removing High Pressure Switch and Pressure Sensor]

- (3) Disconnect the connector (PCN8) on the O.U. PCB for the high pressure switch.
- (4) Carefully unsolder the high pressure switch and the high pressure sensor from the discharge pipe (if necessary).

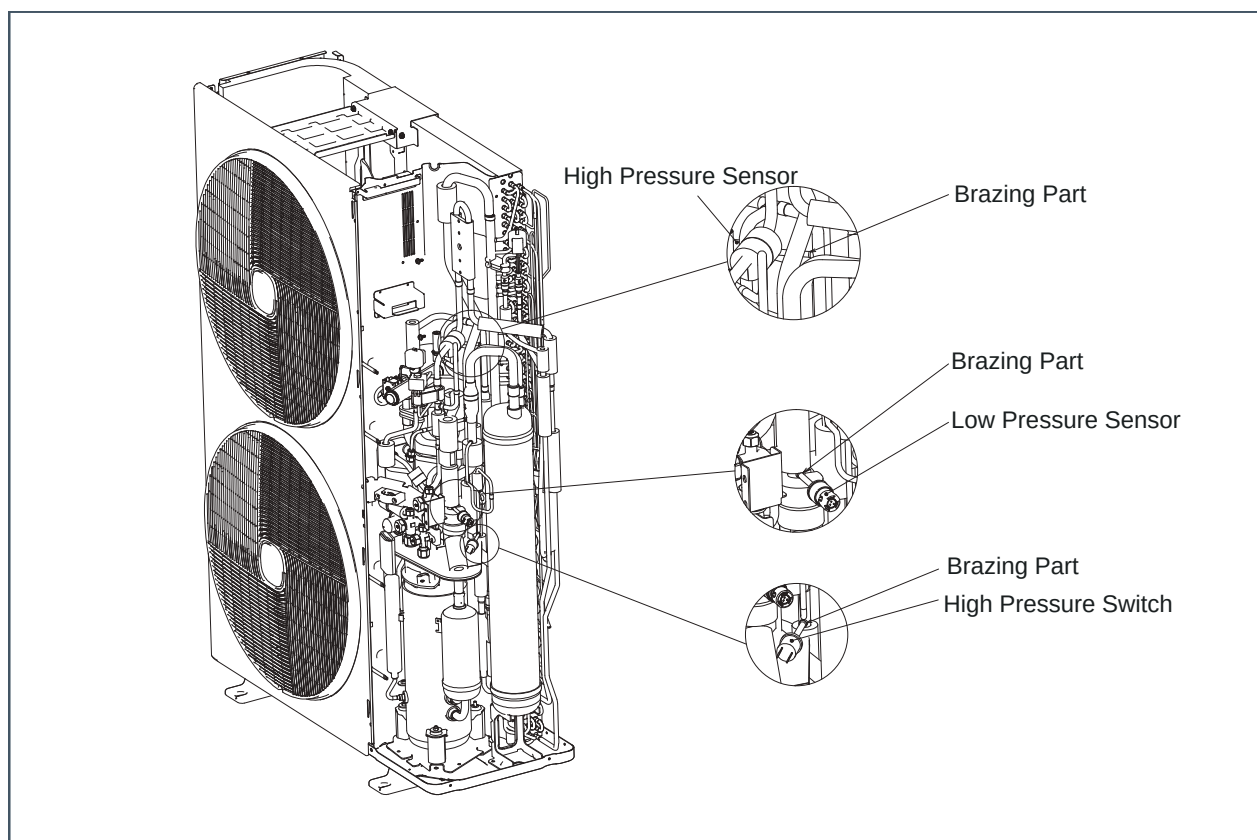
NOTE:

When removing the high/low pressure sensor. Check to ensure that the connector (CN4 and CN9) on the outdoor unit PCB is disconnected.

[Removing Low Pressure Switch]

- (5) Carefully unsolder the low pressure sensor from the discharge pipe.

Tool	Phillips Screwdriver, Charging Hose, Torch
------	--



⚠ DANGER

- Do not touch any electrical components when LED201 (red) on the inverter PCB and LED4 (red) on the outdoor unit PCB are turned ON. It may cause an electric shock.
- Check to ensure that LED201 (red) on inverter PCB is turned OFF when opening the Attaching P-Plate.

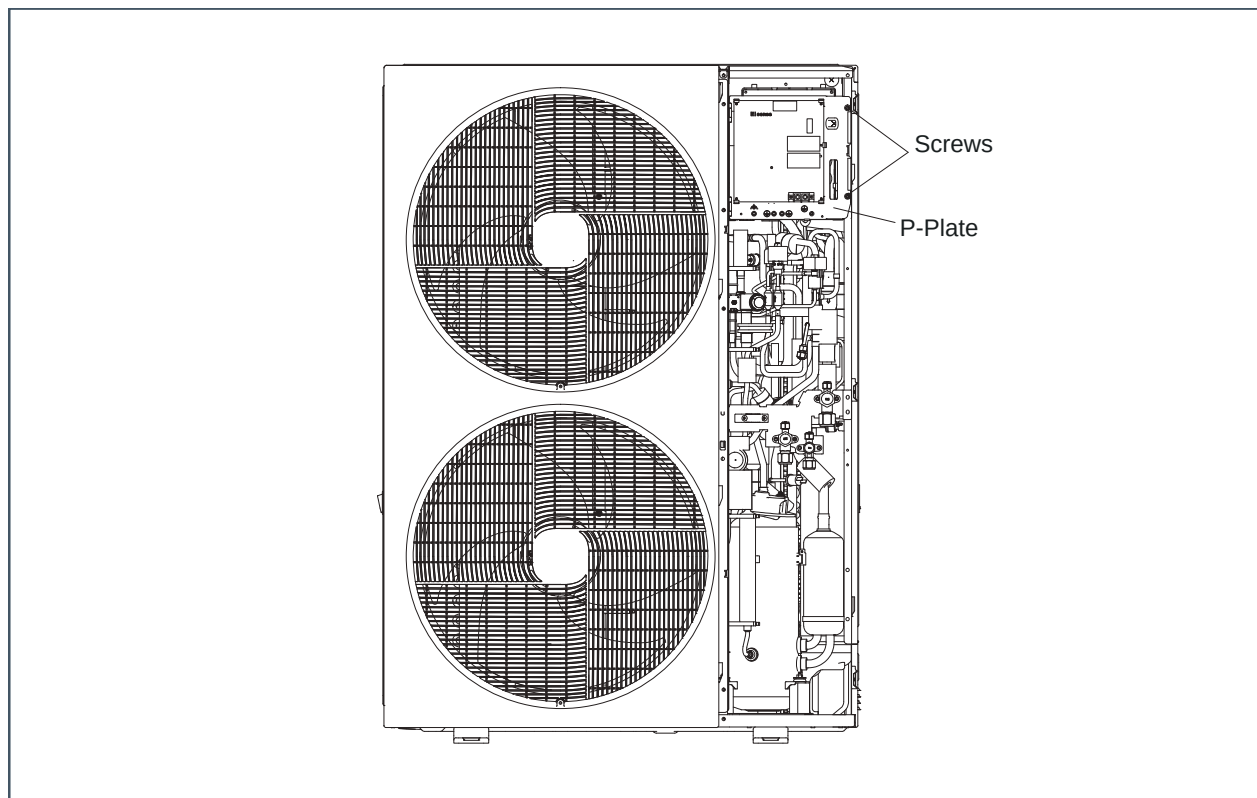
⚠ WARNING

TURN OFF all power supply switches.

2.1.9 Opening Electrical Box (Attaching P-Plate)

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Remove harness of compressor from edge saddle.
- (3) Disconnect all the connectors of the display PCB.
- (4) Remove two securing screws for P-Plate.
- (5) Open the Attaching P-Plate rotating it approximately 90o counterclockwise

Tool	Phillips Screwdriver (Long)
------	-----------------------------



⚠ DANGER

- Do not touch the electrical components when LED201 (red) on the inverter PCB and LED4 (red) on the outdoor unit PCB are turned ON. It may cause an electric shock.
- Check to ensure that LED201 (red) on inverter PCB is turned OFF when opening the Attaching P-Plate.

⚠ WARNING

TURN OFF all power supply switches.

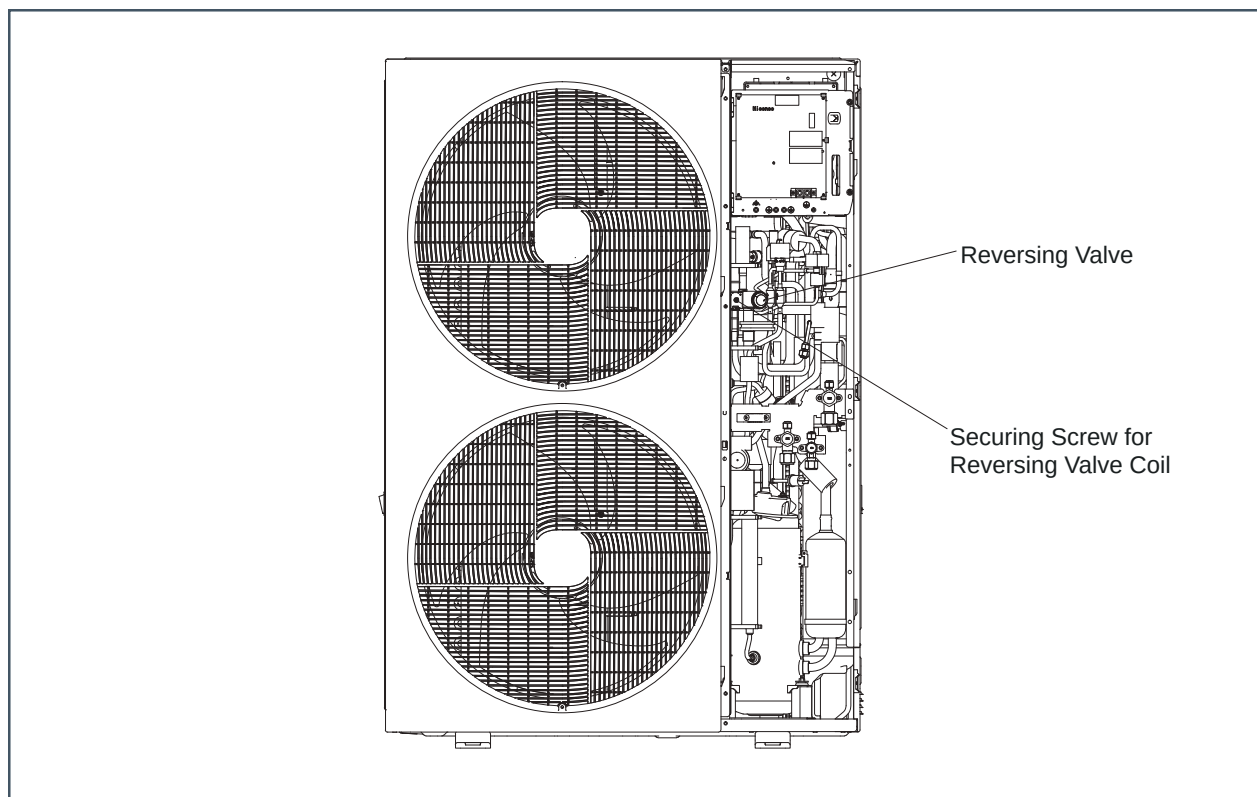
2.1.10 Removing Reversing Valve Coil

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Disconnect the connector (PCN6) on the outdoor unit PCB in the electrical box.
- (3) Remove the reversing valve coil by removing one securing screw for reversing valve.
- (4) To replace the reversing valve coil, reverse the removal procedure.

NOTE:

- ★ Return all wiring to the original position
- ★ The screws for fixing the coil shall not be discarded. After maintenance, the same type of screws must be used to fix the coil.

Tool	Phillips Screwdriver, Stubby Phillips Screwdriver
------	---



⚠ DANGER

- Do not touch the electrical components when LED201 (red) on the inverter PCB and LED4 (red) on the outdoor unit PCB are turned ON. It may cause an electric shock.
- Check to ensure that LED201 (red) on inverter PCB is turned OFF when opening the Attaching P-Plate.

⚠ WARNING

TURN OFF all power supply switches.

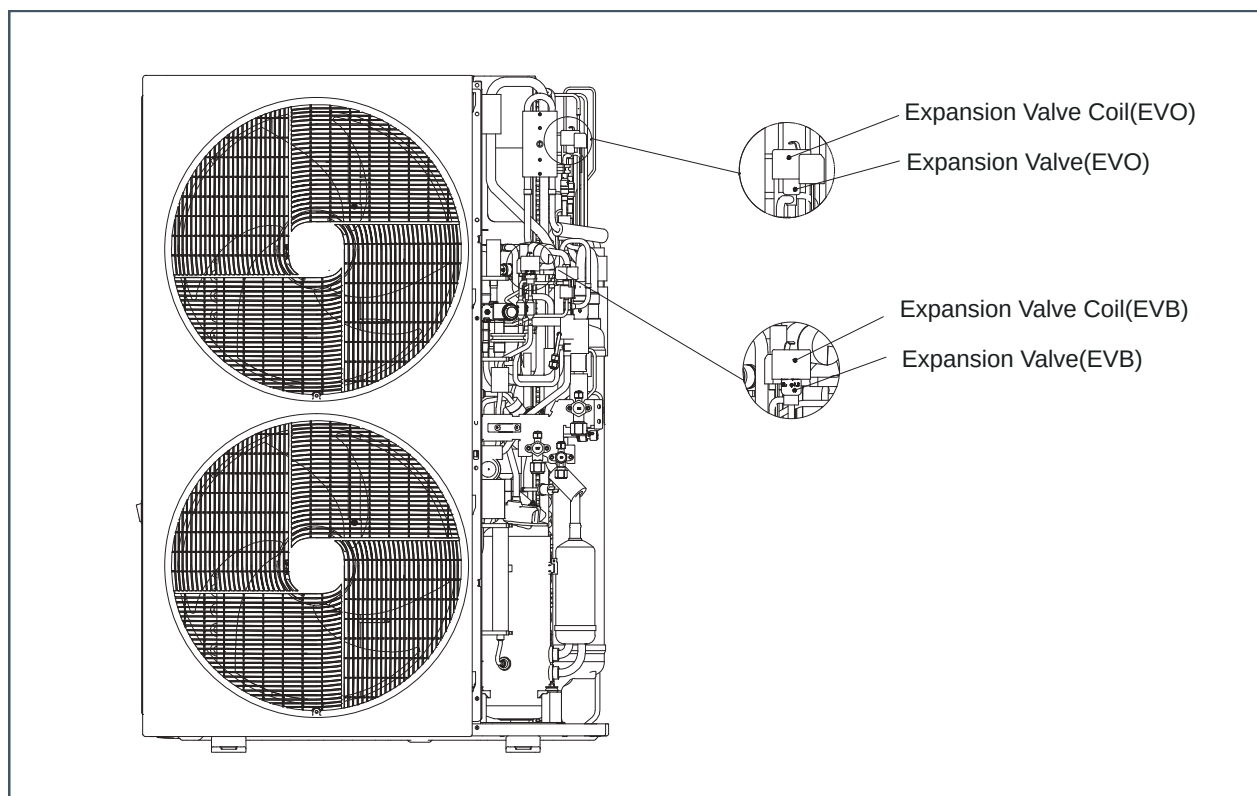
2.1.11 Removing Electronic Expansion Valve Coil

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Remove the lower service cover and the rear cover according to Section 2.1.4 "Removing Lower Service Cover and Rear Cover."
- (3) Disconnect the connector on the outdoor unit PCB, connector CN5A is for EVO, connector CN5B is for EVB.
- (4) Pull the expansion valve coil upward until it slides off of valve body. (It may be easier to remove the expansion valve coil by pulling it upward while rotating it.)
- (5) To attach the new expansion valve coil, reverse the removal procedure. Ensure the orientation of the expansion valve is as shown below. The expansion valve coil has a lock mechanism. After attaching the expansion valve coil, rotate it until it clicks.

NOTE:

Return and secure all wiring to original positions after replacing coil.

Tool	Phillips Screwdriver, Nipper, Band
------	------------------------------------



⚠ DANGER

- Do not touch the electrical components when LED4 (red) on the outdoor unit PCB is turned ON. It may cause an electric shock.

⚠ WARNING

TURN OFF all power supply switches.

2.1.12 Removing Solenoid Valve Coil (SVA)

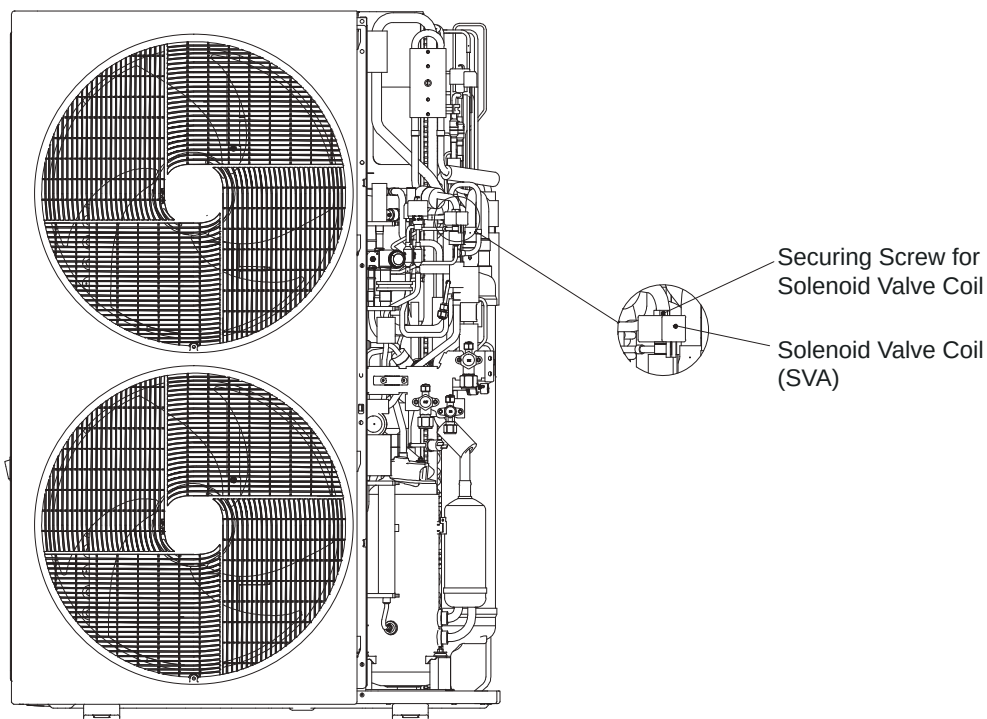
- Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- Disconnect the connector (PCN7 (SVA)) on the outdoor unit PCB.
- Remove one securing screw for solenoid valve coil (SVA) and slide the solenoid valve coil (SVA) upward.
- To install a new solenoid valve coil, reverse the removal procedure.

NOTE:

Return and secure all wiring to original positions after replacing coil.

Tool

Phillips Screwdriver



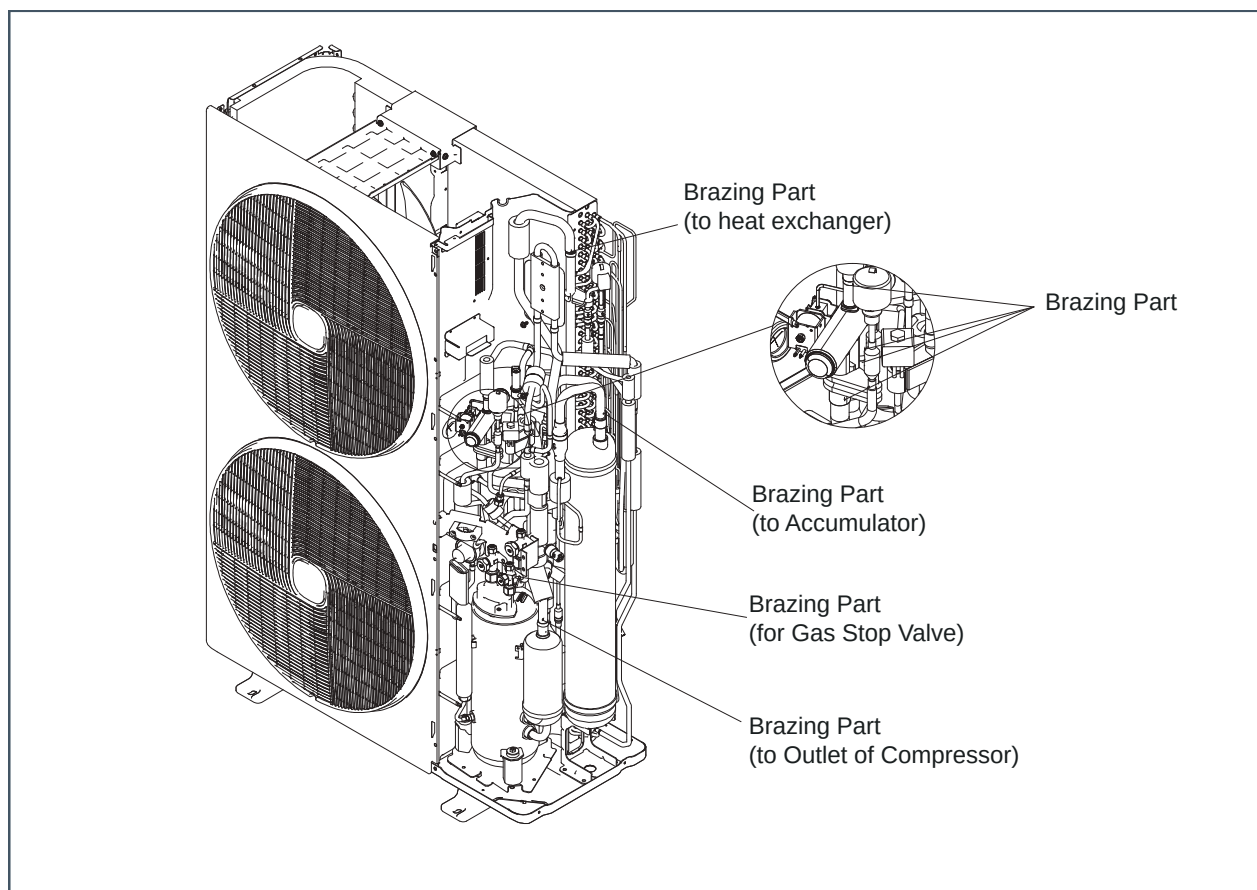
⚠ WARNING

TURN OFF all power supply switches.

2.1.13 Removing Reversing Valve

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Remove the upper cover according to Section 2.1.3 "Removing Upper Cover."
- (3) Remove the lower service cover and the rear cover according to Section 2.1.4 "Removing Lower Service Cover and Rear Cover."
- (4) Recover the refrigerant from check joints according to Section 2.1.7 "Removing Compressor."
- (5) Remove the reversing valve coil according to Section 2.1.10 "Removing Reversing Valve Coil."
- (6) Remove the reversing valve assemblies from the secured positions (four brazed parts).
 - (a) Remove the reversing valve and the gas stop valve while cooling the valve bodies with a wet cloth.
 - (b) Perform the brazing work while keeping the flame away from electrical wiring and piping insulation
- (7) Remove the reversing valve from the assemblies. (four parts).
Remove/Attach the reversing valve while cooling the valve bodies with a wet cloth.
- (8) To attach the new reversing valve after replacement, reverse the removal procedure.
Route and secure all wiring to original position.

Tool	Phillips Screwdriver, Charging Hose, Torch, Wet Cloth, Adjustable Wrench
------	---



⚠ WARNING

TURN OFF all power supply switches.

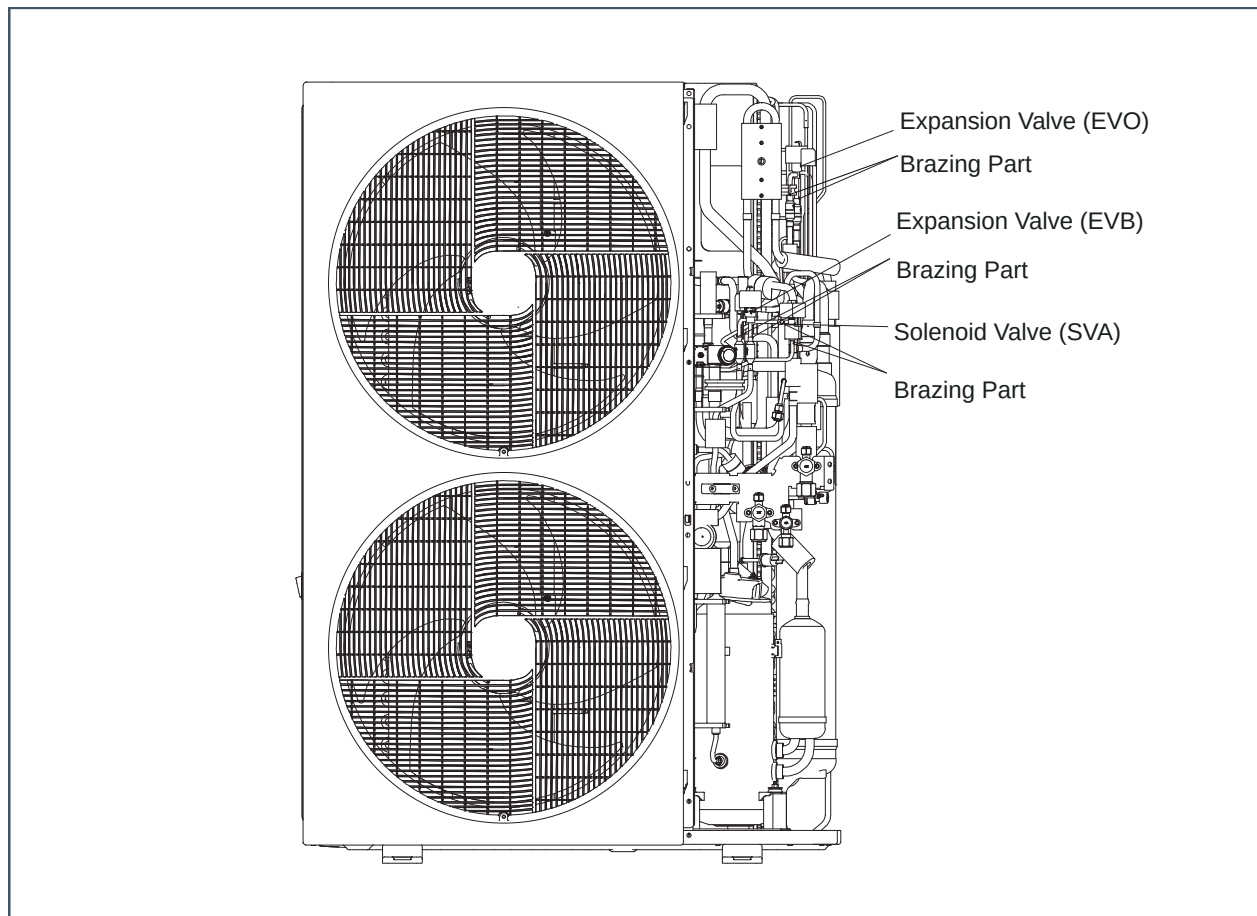
2.1.14 Removing Electronic Expansion Valve and Solenoid Valve

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Remove the front piping cover and the rear cover according to Section 2.1.4 "Removing Lower Service Cover and Rear Cover."
- (3) Recover the refrigerant from check joints according to Section 2.1.7 "Removing Compressor."
- (4) Remove the coils according to Section 2.1.11 "Removing Electronic Expansion Valve Coil" and Section 2.1.12 "Removing Solenoid Valve Coil."
Remove the brazed parts as shown in the figures
Electronic Expansion Valve (EVO) Brazed Parts: 2
Electronic Expansion Valve (EVB) Brazed Parts: 2
Solenoid Valve (SVA) Brazed Parts: 2
 - (a) Remove the electronic expansion valve and the solenoid valve after cooling the valve bodies with a wet cloth.
 - (b) Perform the brazing work while keeping the flame away from electrical wiring and piping insulation.
- (5) To attach the new valves after replacement, reverse the removal procedure.

NOTE:

After valve replacement, route and secure all wiring to original position.

Tool	Phillips Screwdriver, Charging Hose, Torch, Wet Cloth, Adjustable Wrench
------	---



⚠ DANGER

- Do not touch the electrical components when LED4 (red) on the outdoor unit PCB is turned ON. It may cause an electric shock.
- Do not touch the electrical components on the outdoor unit PCB. The outdoor unit PCB may be damaged if stressed or mishandled.

⚠ WARNING

TURN OFF all power supply switches.

2.1.15 Removing Printed Circuit Board (Outdoor Unit PCB)

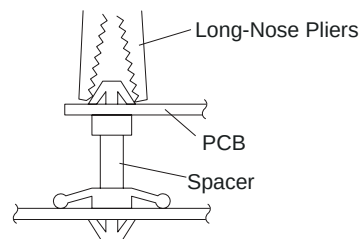
- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Disconnect all connectors from the outdoor unit PCB.
- (3) Remove the outdoor unit PCB by squeezing the spacer ends

Tool	Phillips Screwdriver, Long-Nose Pliers, Stubby Phillips Screwdriver
------	---

Printed Circuit Board (Outdoor Unit PCB)



Securing Screws (6 pcs)



NOTE:

Replacement PCB will have all DIP switches set to factory default. Refer to "Service: 1.1.2 Checking of Rotary Switch and DIP Switch Settings" for correct outdoor unit setup.

⚠ DANGER

- Do not touch the electrical components when LED201 (red) on the inverter PCB and LED4 (red) on the outdoor unit PCB are turned ON. It may cause an electric shock.
- Check to ensure that LED201 (red) on inverter PCB is turned OFF when opening the Attaching P-Plate.

⚠ WARNING

TURN OFF all power supply switches.

2.1.16 Removing Inverter PCB

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Open the power plate rotating it approximately 90o counterclockwise according to Section 2.1.9 "Opening Electrical Box (Attaching P-Plate)."
- (3) Disconnect all connectors connected to the inverter PCB.
- (4) Remove six securing screws for inverter PCB.
- (5) The inverter PCB can be removed by pulling toward right. (The plastic case and the radiation fin are also removed together.)

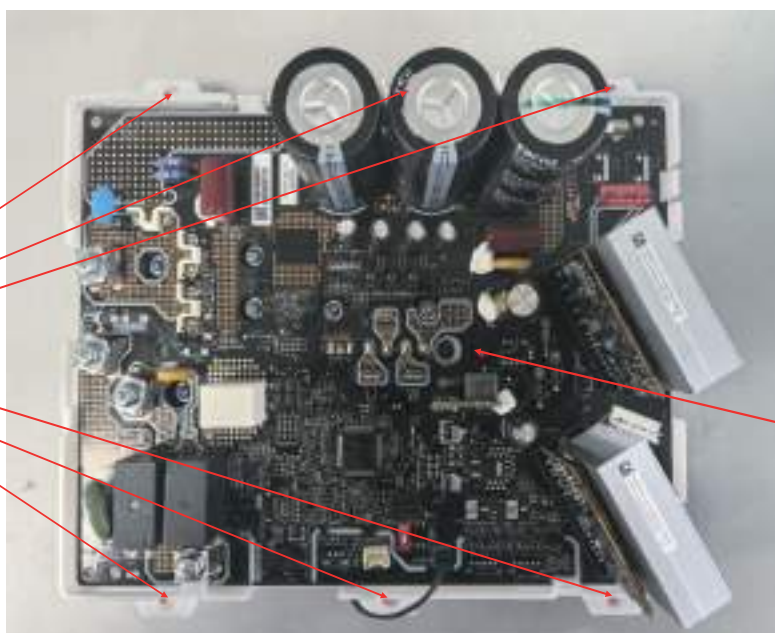
NOTE:

When attaching the inverter PCB, connect the wiring to the correct terminals of the new board or damage will occur.

Tool	Phillips Screwdriver, Long-Nose Pliers, Stubby Phillips Screwdriver
------	--

Securing
Screws
(6 pcs)

Inverter
PCB



*1) When tightening the INV PCB and refrigerant cooler again, please use a torque screwdriver (torque requirement: 3 N.m), otherwise the INV PCB or refrigerant cooler will be damaged.

⚠ DANGER

- Do not touch the electrical components when LED201 (red) on the inverter PCB and LED4 (red) on the outdoor unit PCB are turned ON. It may cause an electric shock.
- Check to ensure that LED201 (red) on inverter PCB is turned OFF when opening the Attaching P-Plate .

⚠ WARNING

TURN OFF all power supply switches.

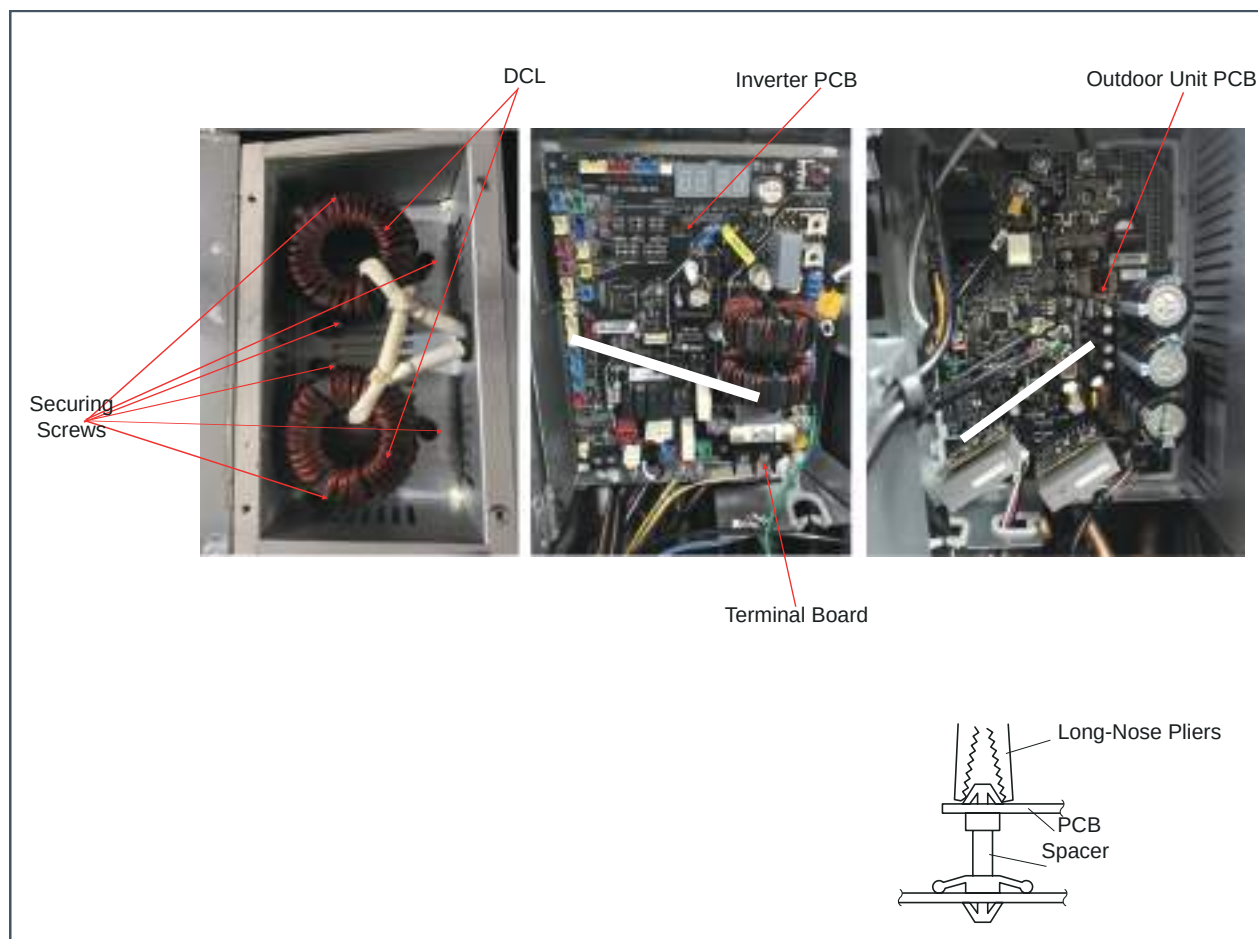
2.1.17 Removing Other Electrical Components

- (1) Remove the service cover according to Section 2.1.1 "Removing Service Cover."
- (2) Open the power plate rotating it approximately 90o counterclockwise according to Section 2.1.9 "Opening Electrical Box (Attaching P-Plate)."
- (3) Removing Electrical Components.
 - (a) Remove six securing screws for the reactor and remove the reactor (DCL).
 - (b) Remove the Terminal Board. (two places)
 Disconnect all wiring connected to terminal board.

NOTE:

After a component has been replaced, ensure all wiring has been reconnected to the correct terminals or connectors. Failure to do so will result in damaged or possible injury.

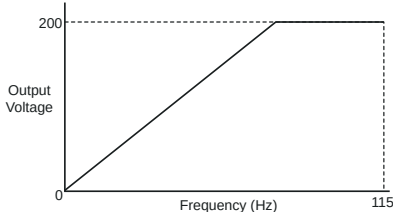
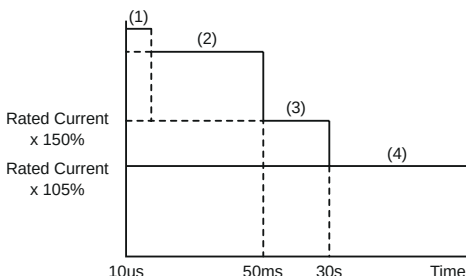
Tool	Phillips Screwdriver, Long-Nose Pliers, Stubby Phillips Screwdriver
------	---



2.2 Inverter

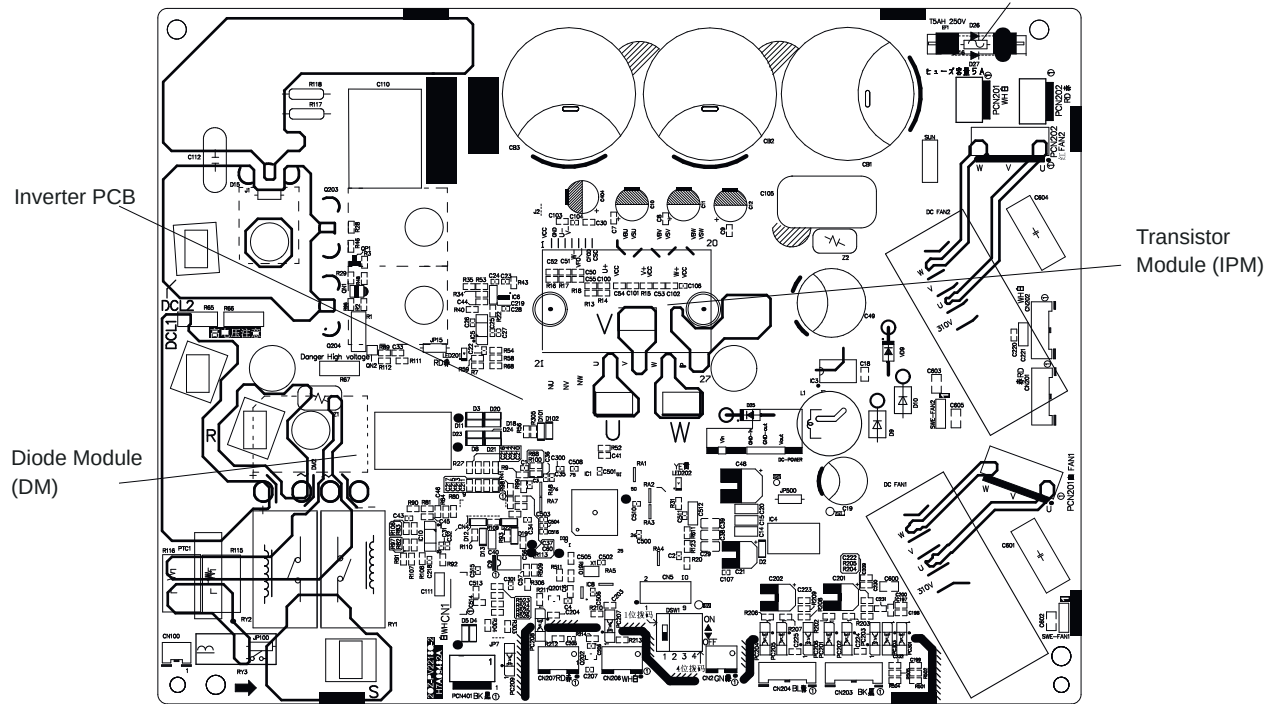
2.2.1 Specifications of Inverter

(1) Specifications of Inverter

Applicable Model	CHV6-RS36/48/60URBMHH
Power Supply	208/230V, 60Hz
Output Voltage (Maximum)	240V
Output Current (Maximum)	24A
Control Method	Vector Control
Range of Output Frequency	21 to 100 Hz
Accuracy of Frequency	1 Hz at Applicable Frequency Range
Output / Characteristics	
Soft Start / Stop	0.125Hz/S, 0.25Hz/S, 0.5Hz/S, 1Hz/S, 3Hz/S (5 Steps)
Protection Function Excessive High or Low Voltage for Inverter	Voltage output is stopped, when voltage is lower than 196V DC or higher than 400V DC. Cause of Abnormality: Failure of Inverter PCB, Decreasing Capacity of Condenser, Incorrect Wiring
Abnormality of Current Sensor (0A Detection)	(1) When the compressor operating frequency is between 15Hz and 18Hz after compressor is started, one of the effective value of running current at each phase is less than 1.5A (including 1.5A). (2) The wave height value of running current for the phase positioning in less than 5A before the compressor is started (at completing the phase positioning). Cause of Abnormality: Failure of Current Sensor (on Inverter PCB) Failure of IPM, Failure of Compressor, Disconnected Wiring.
Overcurrent Protection for Inverter (Electronic Thermal/Instantaneous Overcurrent)	 (1) Short-Circuit Trip of Arm Internal Protection of IPM (2) Instantaneous Overcurrent Trip (3) Instantaneous Overcurrent Trip: It is detected when current value is over rated x 150%. (4) Electronic Thermal Trip: Condition is maintained longer than 30 seconds or accumulated longer than 3 minutes during 10 minutes sampling time.
Protection of Dip IPM of Inverter PCB	The transistor module has three protection functions for self-protection. (1) Some of the output terminals "U", "V" or "W" are short-circuited. (2) Running current of Dip IPM of Inverter PCB reaches the maximum rated current. (3) Control voltage of Dip IPM of Inverter PCB abnormally decreases.
Overload Control	Overload control is cancelled when Current Value > Rated Current x 105% Current Value < Rated Current x 88%
Fin Temperature Increase	The unit is stopped when the fin temperature is higher than 80°C.
Ground-Fault Detection	The unit is stopped when the compressor shorts to ground at start-up.

(2) Arrangement of Inverter Power Unit

CHV6-RS36/48/60URBMHH



- (3) Protective Function
 - (A) Excessive High or Low Voltage for Inverter
 - (a) Level of Detection
 - When the voltage of direct current is greater than 424V, abnormalities are detected.
 - When the voltage of direct current is smaller than 196V, abnormalities are detected.
 - (b) Function
 - When an abnormality is detected, the inverter compressor is stopped and the cause code of inverter stoppage is communicated to outdoor unit PCB.
 - (c) Cancellation of Protection Function
 - Communication the cause code of inverter stoppage is canceled when the wired controller is off or main power supply is cut off.
 - (B) Abnormality of Current Sensor
 - (a) Level of Detection
 - ① When the compressor's operating frequency reaches 15 to 18Hz after the compressor starts, the effective value of running current at each phase is 1.5A or less.
 - ② The wave height value of running current for the phase positioning is less than 5A before the compressor is started (at completing the phase positioning).
 - (b) Function
 - When an abnormality is detected, the inverter compressor is stopped, and the cause code of inverter stoppage is communicated to outdoor unit PCB.
 - (c) Cancellation of Protection Function
 - Communication the cause code of inverter stoppage is canceled when the wired controller is off or main power supply is cut off.
 - (C) Overcurrent Protection for Inverter
 - (a) Level of Detection
 - ① When the current detected by current sensor reaches 150% of the rated current, overcurrent is detected. (Instantaneous Overcurrent)
 - ② When the current detected by current sensor exceeds 105% of the rated current continuously for 30 seconds or for more than 3 minutes in total during a 10 minutes period, overcurrent is detected. (Electric Thermal Relay)
 - (b) Function
 - When an abnormality is detected, the inverter compressor is stopped and the cause code of inverter stoppage is communicated to outdoor unit PCB.
 - (c) Cancellation of Protection Function
 - Communication the cause code of inverter stoppage is canceled when the wired controller is off or main power supply is cut off.
 - (D) Protection of Dip IPM of Inverter PCB
 - (a) Level of Detection
 - ① When some of the output terminals between "U" and "V", "V" and "W", "W" and "U" of Dip IPM of inverter PCB are short-circuited, an abnormality is detected.
 - ② When the running current of Dip IPM of inverter PCB reaches the maximum rated current, an abnormality is detected.
 - ③ When the control voltage of Dip IPM of inverter PCB abnormally decreases, an abnormality is detected.
 - (b) Function
 - When an abnormality is detected, the inverter compressor is stopped and the cause code of inverter stoppage is communicated to outdoor unit PCB.
 - (c) Cancellation of Protection Function
 - Communication the cause code of inverter stoppage is canceled when the wired controller is off or main power supply is cut off.
 - (E) Fin Temperature Increase
 - (a) Level of Detection
 - When the temperature of internal thermistor exceeds more than 80°C, an abnormality is detected.
 - (b) Function
 - When an abnormality is detected, the inverter compressor is stopped and the cause code of inverter stoppage is communicated to outdoor unit PCB.
 - (c) Cancellation of Protection Function
 - Communication the cause code of inverter stoppage is canceled when the wired controller is off or main power supply is cut off.

(F) Earth Detection

(a) Level of Detection

When the starting current of the compressor reaches 80% of the overcurrent protection value, an abnormality is detected.

(b) Function

When an abnormality is detected, the inverter compressor is stopped and the cause code of inverter stoppage is communicated to outdoor unit PCB.

(c) Cancellation of Protection Function

Communication the cause code of inverter stoppage is canceled when the wired controller is off or main power supply is cut off.

(5) Overload Protection Control

(a) Level of Detection

When the output current exceeds 105% of the maximum output current, an abnormality is detected.

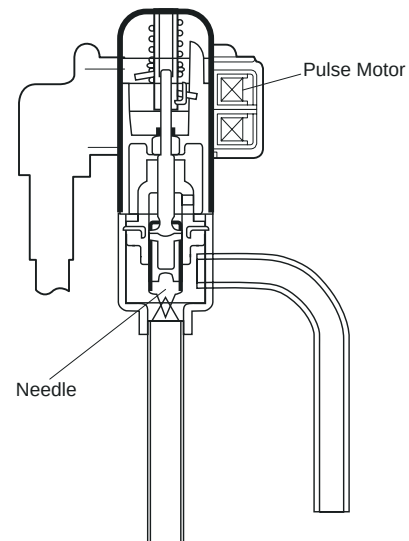
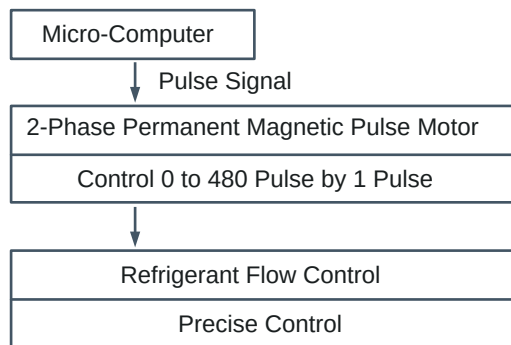
(b) Function

An overload signal is issued when output current exceeds 105% of the maximum output current, and the frequency decreases. For 10 seconds after the output current decreases lower than 88% of the rated current, the compressor maximum frequency is limited to the specified value. However, if the frequency order is smaller than the maximum value, the operation is performed according to the order.

(c) Cancellation of Protection Function

After the operation described in the above item (b) is performed for 10 seconds, this control is canceled.

2.2.2 Electronic Expansion Valve For Outdoor Units

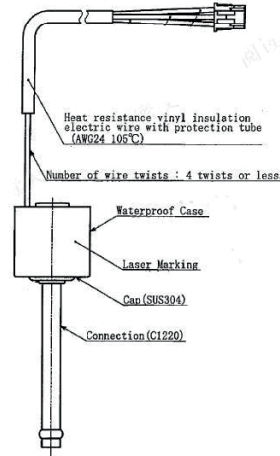


Specification

Items	Specification	
Models to be Applied	For Main Cycle (EVO)	For Bypass Line (EVB)
Type	DPF (TS1) Series	CAM Series
Refrigerant Used	R32	
Working Temperature Range	-22 - 158°F (-30°C - 70°C)	
Mounting Direction	Vertical axial angle within $\pm 15^\circ$, coil upright	Motor upside or to vertical (within $\pm 90^\circ$)
Flow Direction	Reversible	
Rated Voltage	DC12V $\pm 10\%$	DC12V $\pm 15\%$
Drive Condition	30 - 90 PPS 1-2 Phase Excitation	
Coil Resistance	46 $\Omega \pm 3.7\Omega$ (at 20°C)	46 $\Omega \pm 4\Omega$ (at 20°C)
Wiring Diagram, Drive Circuit and Activation Mode	The wiring diagram shows a 2-phase excitation circuit. It includes four coils labeled $\phi 1$, $\phi 2$, $\phi 3$, and $\phi 4$. A motor symbol 'M' is also present. The diagram illustrates the electrical connections for the valve's operation.	

2.2.3 Pressure Sensor

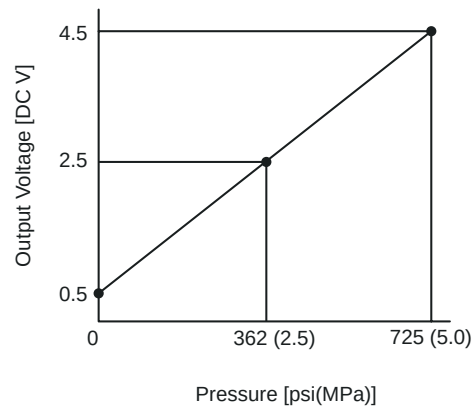
(1) Position of Pressure Sensor



(2) High Pressure Sensor

The high pressure during operation is detected by a high pressure sensor, and compressor frequencies are controlled by the proportional controlling method with operating capacity of indoor units (or PID Control for Compressor Frequency) so that the high pressure is controlled in an appropriate range.

The output characteristics of the high pressure sensor are as follows.

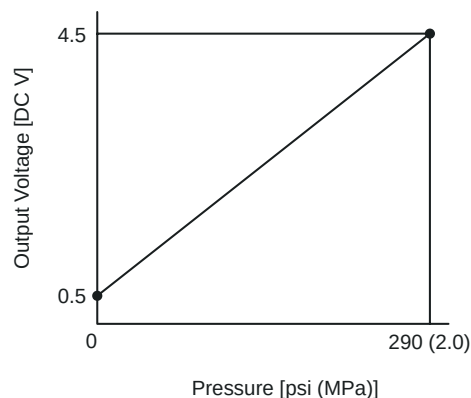


Output Characteristics of High Pressure Sensor

(3) Low Pressure Sensor

The low pressure during operation is detected by a low pressure sensor for protecting excessive increase/decrease.

The output characteristics of the low pressure sensor are as follows.

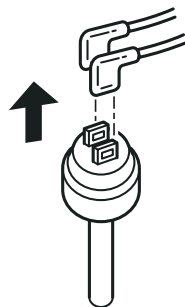


Output Characteristics of Low Pressure Sensor

2.2.4 Pressure Switch

High Pressure Switch (for Protection)

When the high pressure reaches 624psi (4.30MPa), compressor is stopped to protect the refrigerant cycle components.



High Pressure Switch (PSH)

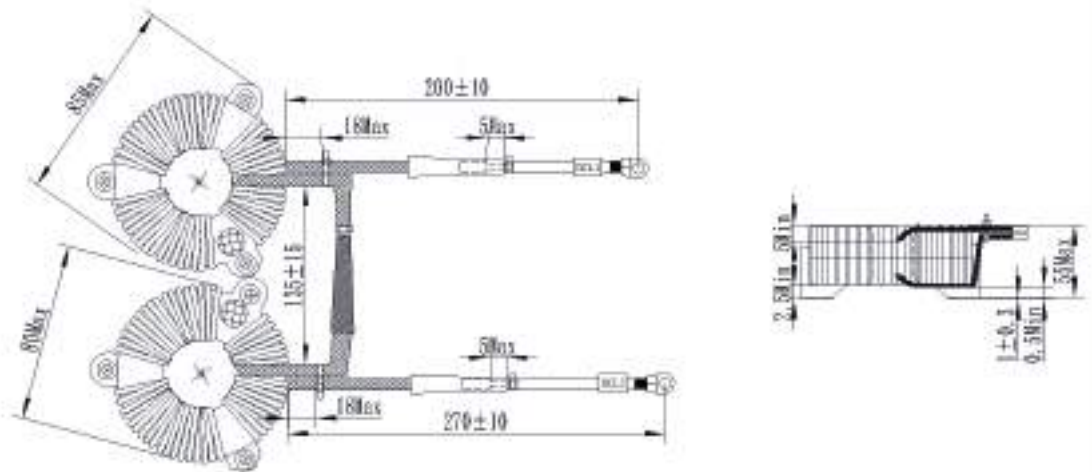
2.2.5 Reactor (DCL)

This part is used for changing the alternative current to the direct current for the inverter.

Model	CHV6-RS36/48/60URBMHH
Items	Specification
Character	540 uH $\pm$ 15% (at 25 kHz)
Rated Current	AC 32A
Direct Current Resistance	42m Ω (at 20°C)
Permissible Temperature Range	-30°C to 70°C

CHV6-RS36/48/60URBMHH

(mm)



3. External Input/Output And Function Setting

3.1 DIP Switch Settings of Outdoor Unit

TURN ON the power supply before setting.

External input/output and function setting by the No.5 and 6 pins of DSW2 and push switches operated.

The “■” mark indicates the positions of DIP switches.

● Initial Setting

DSW2 Function Setting

Setting is required. Setting Before Shipment		
		
	Setting Item	Pin No.
1	Function Setting	ON  OFF 
2	External Input/Output Setting	ON  OFF 
3	Function Setting for Wind Guard	ON  OFF 

DSW2-4 Function Setting for Wind Guard

Setting is required.

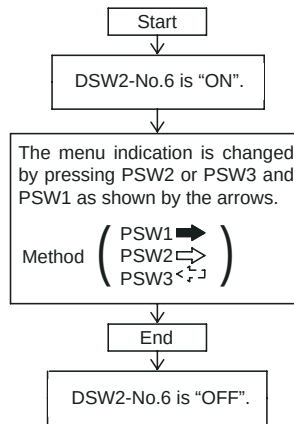
Setting Before Shipment.

ON						
OFF						
	1	2	3	4	5	6

3.2 External Input / Output Setting Method

The setting should be performed during the outdoor unit stoppage.

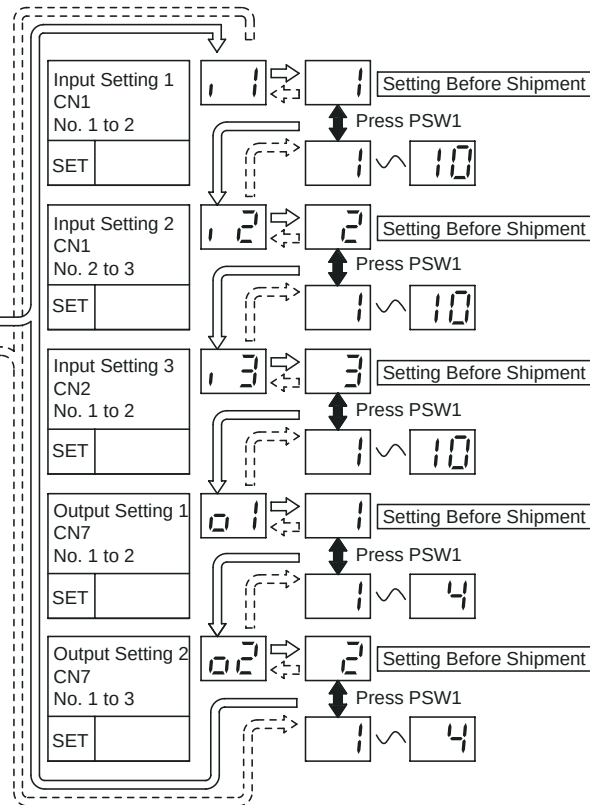
This setting is not available during the operation, the check mode and the function setting.



NOTES:

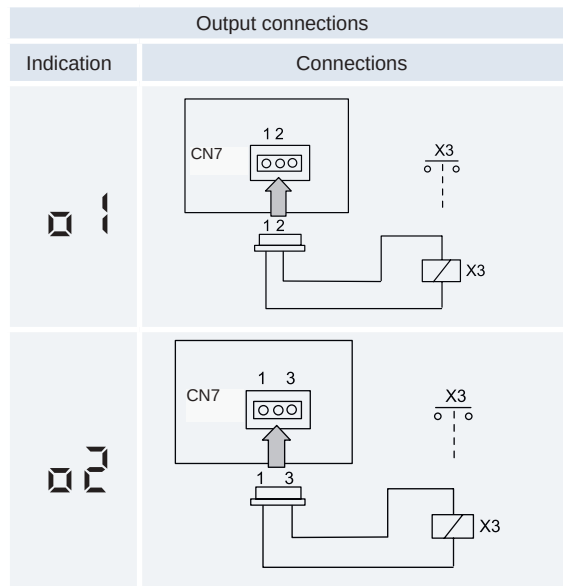
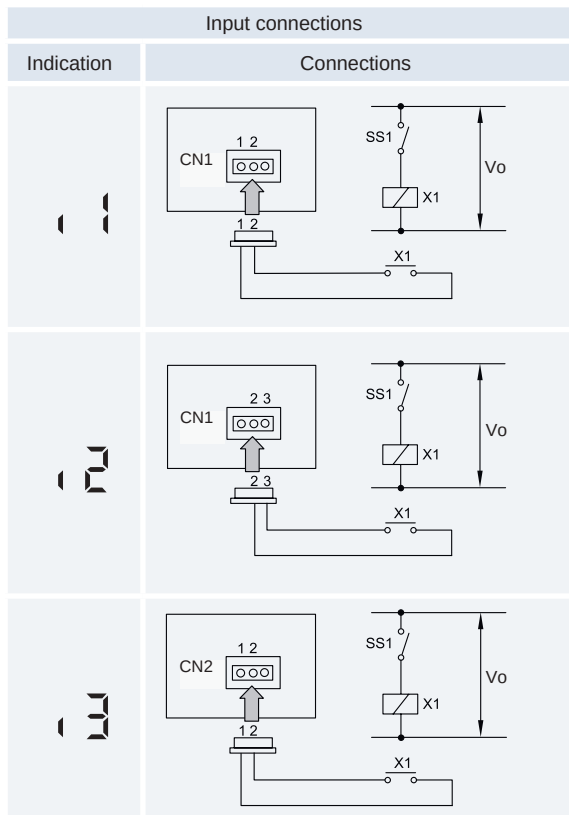
1. Record the function No. of each setting when setting the optional function. The example is for setting 1.
2. The same function cannot be set to a different input terminal. If it is set, the setting of the larger input No. is not available. Record the setting No. on the nameplate "External Input/Output and Function Setting" attached to the reverse surface of the service cover as well.

Example
SET 1



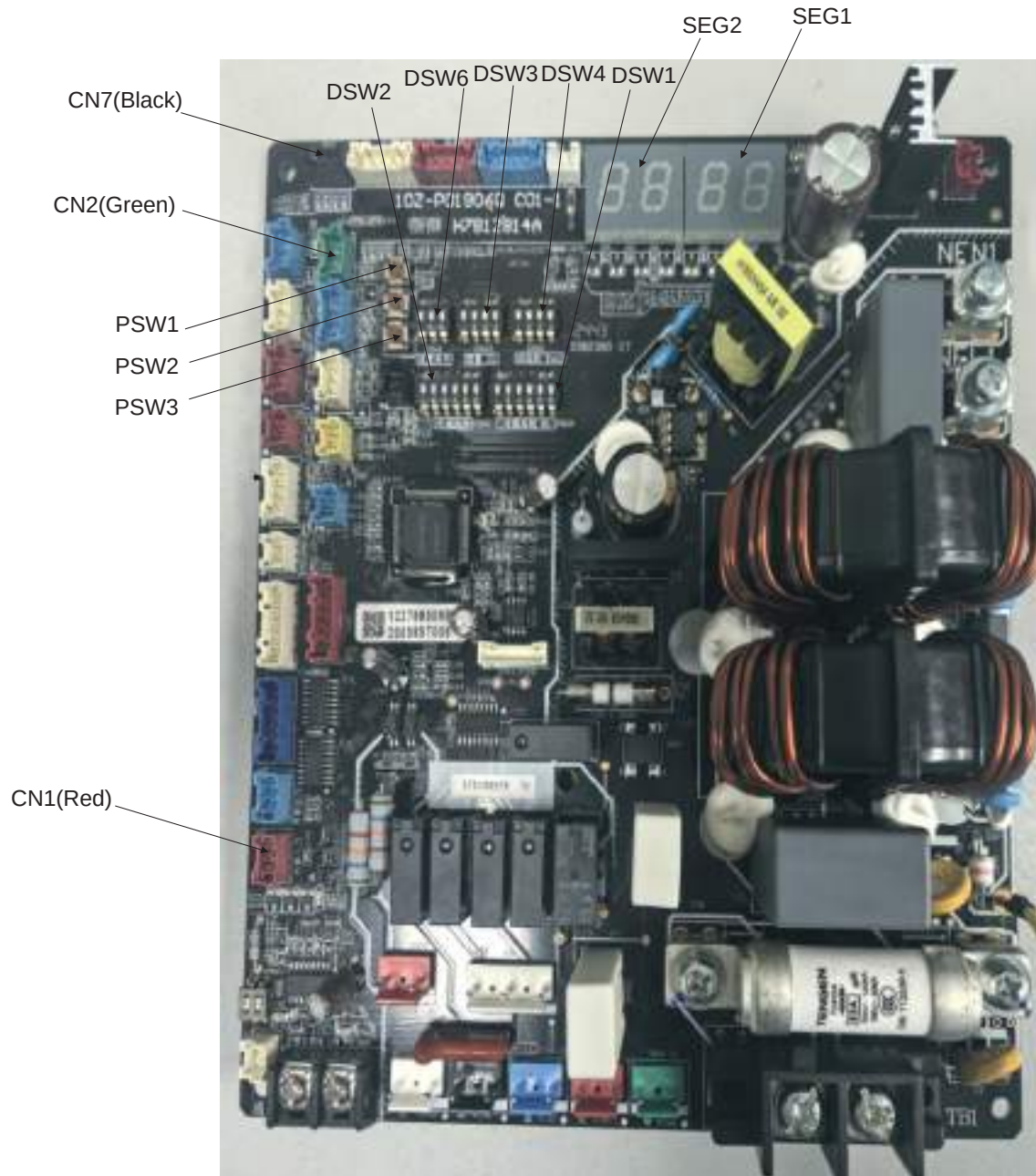
Connection

The system has the following connections: Vo=208/230V



Arrangement of Push Switches on O.U. PCB

CHV6-RS36/48/60URBMHH



3.3 External Input and Output Setting

On the outdoor unit Printed Circuit Board (O.U.PCB), there are three input terminals (CN1, CN2 as shown below) to receive external signals and two output terminals (CN7 as shown below) to send signals out. Control functions shown in these tables are available when setting input and output terminals.

<Input>

Control Function No.	Setting Function for Input
1	Fixing Heating Operation Mode
2	Fixing Cooling Operation Mode
3	Demand Stoppage
4	Outdoor Fan Motor Start/Stop
5	Forced Stoppage
6	Demand Current Control 60%
7	Demand Current Control 70%
8	Demand Current Control 80%
9	Demand Current Control 100%
0	No Setting

<Output>

Control Function No.	Setting Function for Output
1	Operation Signal
2	Alarm Signal
3	Compressor ON Signal
4	Defrosting Signal
0	No Setting

The following functions have been already set before shipment.

<Input/Output Terminal>

Input Terminal Name	Connector (Pin No.)	Factory Setting	
		Control Function No.	Setting Function
Input Setting 1	CN1 (1-2)	1	Fixing Heating Operation Mode
Input Setting 2	CN1 (2-3)	2	Fixing Cooling Operation Mode
Input Setting 3	CN2 (1-2)	3	Demand Stoppage
Output Setting 1	CN7 (1-2)	1	Operation Signal
Output Setting 2	CN7 (1-3)	2	Alarm Signal

Note:

The same function cannot be set for different input terminals. If the function has been set, the setting with large function number will be cleared.

For example, if the setting contents of "Input Setting 1" and "Input Setting 2" are repeated, the setting contents of "Input Setting 2" will be cleared.

External Input Function Setting

The following signals can be received by the outdoor unit PCB. Refer to Table 3.1 below for the required main parts.

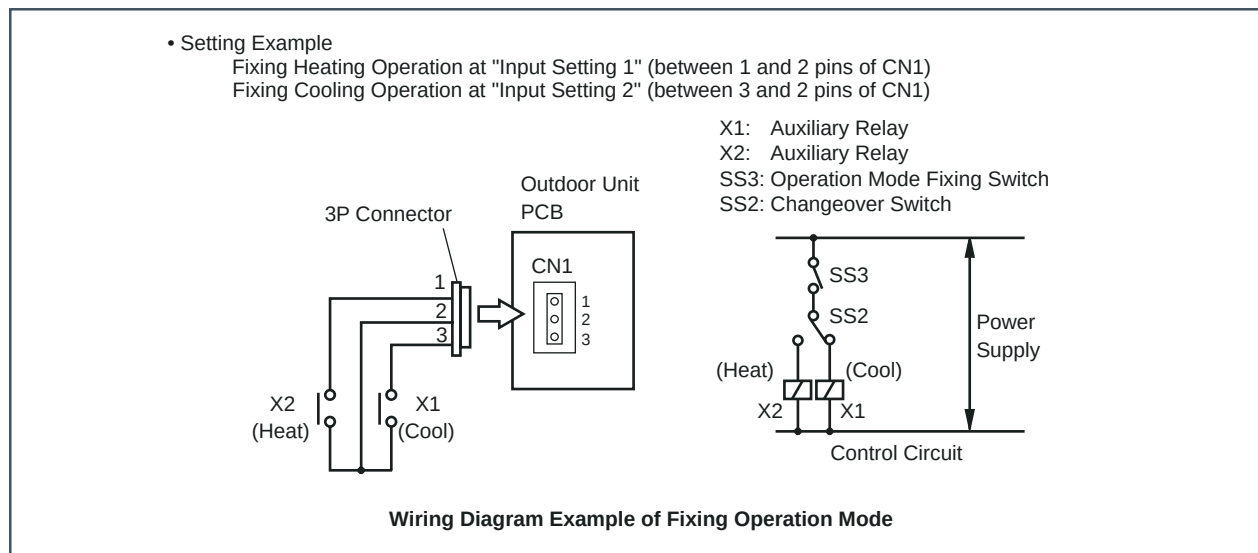
3.3.1 **Input** Fixing Heating Operation Mode (Control Function No.1), **Input** Fixing Cooling Operation Mode (Control Function No.2)

When the input terminals for the setting operation mode on the outdoor unit PCB are short-circuited, the operation mode can be fixed at the cooling or heating mode.

Short Circuit between Terminals 1 and 2 of CN1: Fixed Heating Operation Mode.

Short Circuit between Terminals 2 and 3 of CN1: Fixed Cooling Operation Mode.

During this set heating (or cooling) mode, no cooling (or heating) operation is possible. The indoor units under the cooling or dry operation (or heating operation) will be changed to the Thermo-OFF condition during this mode, and stoppage code No. "20" is given.



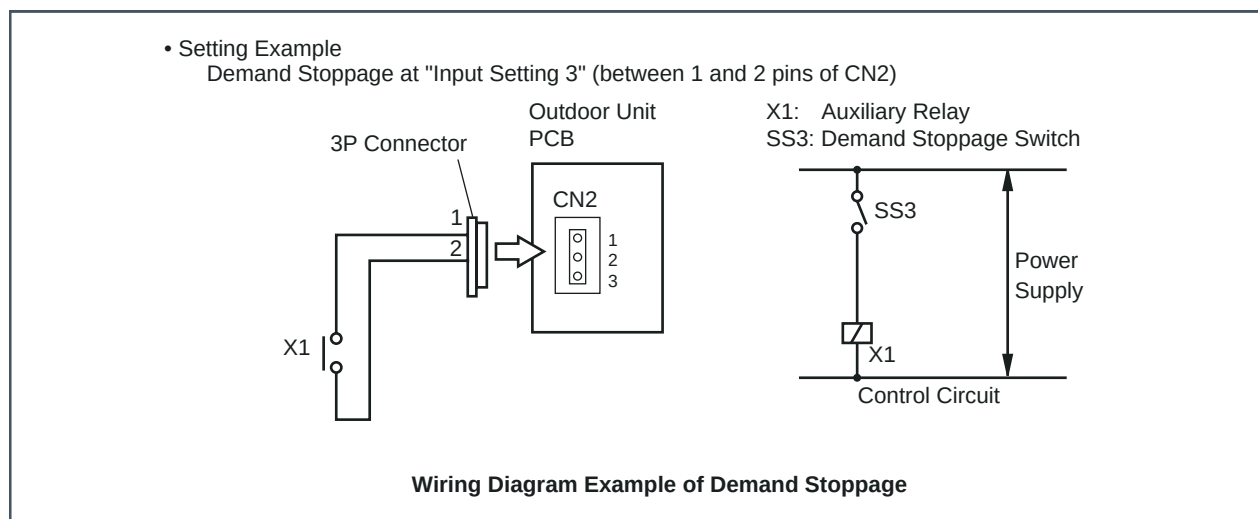
3.3.2 **Input** Demand Stoppage (Control Function No.3)

When the input terminals for Demand Stoppage on the outdoor unit PCB are short-circuited while running, the compressor is stopped. (In this case, the indoor unit(s) is put under Thermo-OFF condition. Cooling operation: Air-flow setting, Heating operation: Lo setting).

The stoppage code No. "10" is given. In this case, if the input terminals are opened, operation is resumed.

NOTE:

When demand control (ON/OFF) is performed, it is recommended that the control (ON/OFF) time is set appropriately according to the heat load. Also, set the demand control time approximately once in 15 minutes at the minimum in consideration of saving energy.



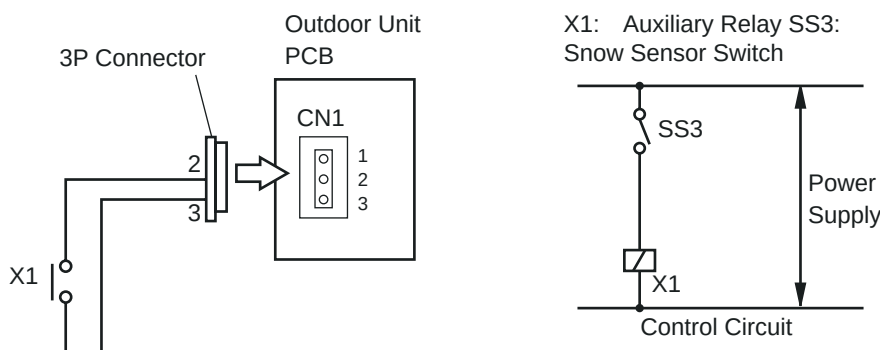
3.3.3 Input Outdoor Fan Motor Start/Stop (Control Function No.4)

This is an auxiliary function to protect the outdoor unit from snow. When the input terminals for Outdoor Fan Motor Start/ Stop on the outdoor unit PCB are short-circuited during the compressor stoppage, if outdoor ambient temperature is 10°C or less, all the outdoor fan motors start operating. If the compressor restarts operating, the outdoor fan motors will be restored to normal operation. If the input terminals of Outdoor Fan Motor Start/Stop are opened during the outdoor fan motor operation following the short circuit of these terminals, the outdoor fan motor will stop.

This function is possible only during the compressor stoppage (during the compressor power-OFF or thermo-OFF of the compressor power-ON). Therefore, this function will not be possible even if the input signal is sent during the normal cooling or heating operation.

An example of a basic wiring when "the Outdoor Fan Motor Start/Stop"(Control Function No.4) is set at "Input Setting 2"(between 2 and 3 pins of CN1) by an external signal is shown below.

- Setting Example
Outdoor Fan Motor Start/Stop at "Input Setting 2" (between 2 and 3 pins of CN1)



Wiring Diagram Example of Outdoor Fan Motor Start/Stop

NOTE:

1. This is an auxiliary function to protect the unit from snow. In snowy regions, make sure to protect the unit with a snow-prevention roof, fence (field-supplied) or snow protection hood (optional). Otherwise, abnormal vibrations because of an imbalanced propeller fan will be caused.
2. This function can NOT operate the outdoor fan when outdoor ambient temperature is higher than (10°C).
3. If the fan motor fails during this function, stop all the outdoor fans to suspend this function. Check the alarm code and deal properly with the failure next time the compressor is operated.
4. When setting the snow sensor switch for Outdoor Fan Motor Start/Stop, make sure that the continuous operating time is 30 seconds or more. Also Outdoor Fan Motor Start/Stop intervals shall be at least 10 minutes. Otherwise, malfunction of the outdoor fan motors will be caused by frequent starts and stops.

⚠ WARNING

Because of this setting, the outdoor fan can operate even while the outdoor unit (compressor) stops. Display a notice to that effect on a readily visible part of the unit body, in order to avoid injuries caused by an unintended outdoor fan operation.

3.3.4 **Input** Forced Stoppage (Control Function No.5)

When the input terminals for the forced stoppage on the outdoor unit PCB are short-circuited during running, the compressor and the indoor fan motor are stopped. The stoppage code No. "10" is given.

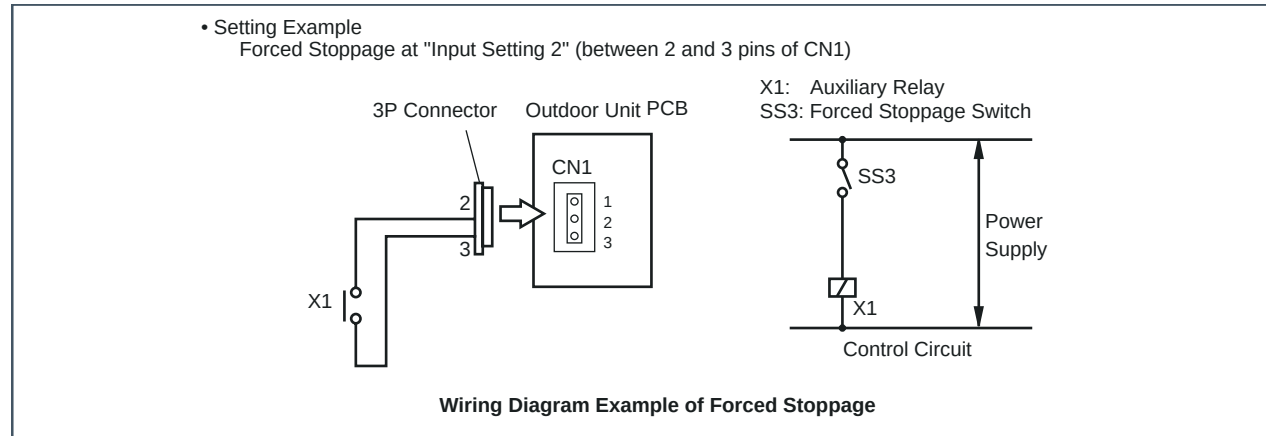
In this case, if the input terminals are opened, operation is resumed.

NOTE:

When demand control (ON/OFF) is performed, it is recommended that the control (ON/OFF) time is set appropriately according to the heat load. Also, set the demand control time approximately once in 15 minutes at the minimum in consideration for saving energy.

*Thermo-ON: The outdoor unit and some indoor units are running.

Thermo-OFF: The outdoor unit and some indoor units stay on, but don't run.



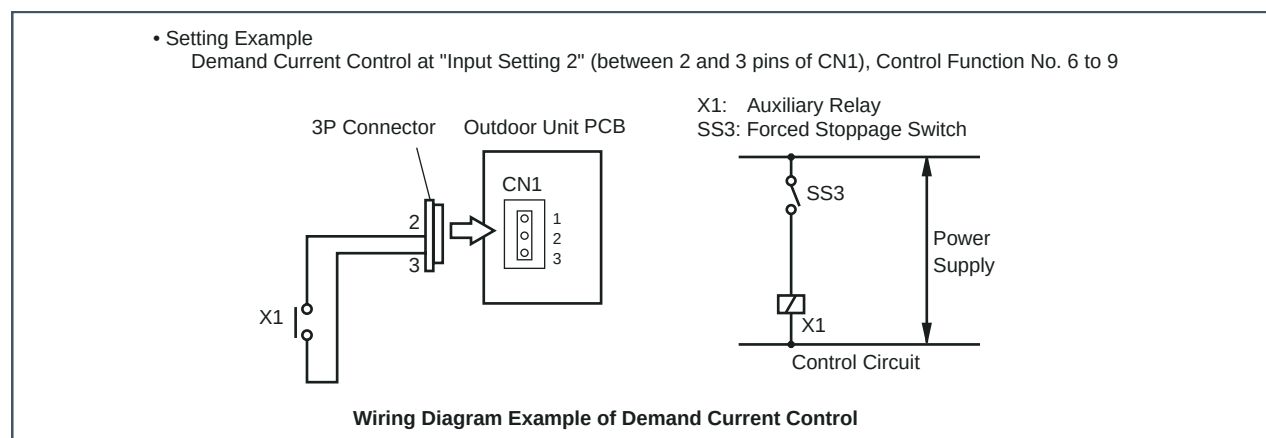
3.3.5 **Input** Demand Current Control 60, 70, 80, 100% (Control Function No.6 to 9)

When the input terminals for Demand Current Control on the outdoor unit PCB are short-circuited, the compressor frequency is controlled so that the maximum limit of the outdoor running current is set to 100%, 80%, 70%, or 60% of the reference power consumption. If the outdoor unit running current exceeds the maximum limit for twenty minutes, the indoor unit is put under Thermo-OFF condition. In this case, the stoppage code No. "10" is given. When the input terminal is opened during the demand current control, its control is released.

NOTE:

Thermo-ON: The outdoor unit and some indoor units are running.

Thermo-OFF: The outdoor unit and some indoor units stay on, but don't run.



NOTE:

1. The Demand Current Control (%) is value criterion. The value used for this control is calculated from the current, and therefore is different from the value indicated by a wattmeter. If it is required that the maximum power consumption is managed precisely, a field-supplied demand controller should be used.
2. The actual value may temporarily be higher than the indicated value (by 60% to 100%) depending on the operating control conditions such as protection control.

< The value of the control current >

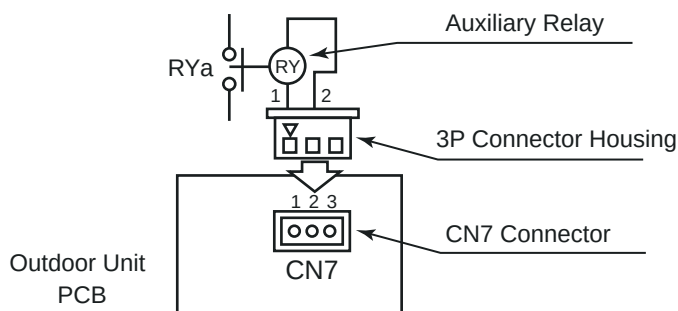
Model	The value (100%) / A
CHV6-RS36URBMHH	27.0
CHV6-RS48URBMHH	36.0
CHV6-RS60URBMHH	38.0

3.3.6 **Output** Operation Signal (Control Function No.1)

This function is utilized to receive the operation signal.

Auxiliary relay contacting (RYa) is closed during the operation. The operation signal will be sent to output terminals when the indoor units are operating. (Even when one indoor unit is operating, the signal will be sent.) This function can be used for circulator or humidifier operation.

- Setting Example
Operation Signal at "Output Setting 1" (between 1 and 2 pins of CN7)

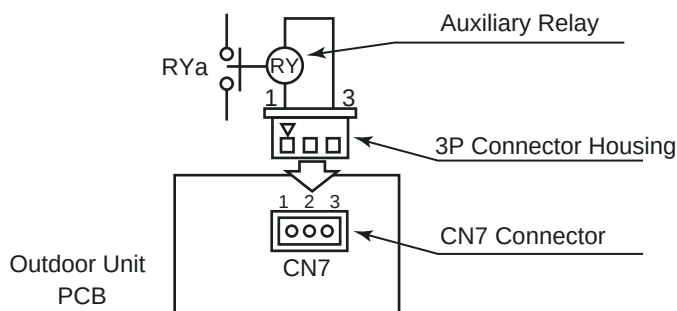


Wiring Diagram Example of Operation Signal

3.3.7 **Output** Alarm Signal (Control Function No.2)

This function is utilized to receive the alarm signal. Auxiliary relay contacting (RYa) is closed when the alarm occurs. The alarm signal will be sent to output terminals when the alarm occurs from the indoor units. (The signal will be sent even when the alarm occurs from one indoor unit.)

- Setting Example
Alarm Signal at "Output Setting 2" (between 1 and 3 pins of CN7)

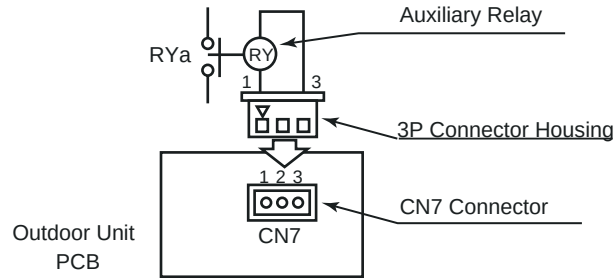


Wiring Diagram Example of Alarm Signal

3.3.8 **Output** Compressor ON Signal (Control Function No.3)

This function is utilized to receive the compressor operation signal. Auxiliary relay contacting (RYa) is closed during the compressor operation.

- Setting Example
Compressor ON Signal at "Output Setting 2" (between 1 and 3 pins of CN7)

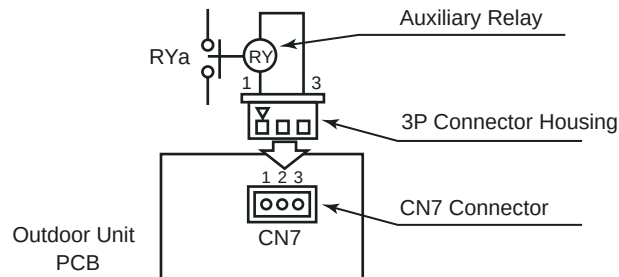


Wiring Diagram Example of Compressor ON Signal

3.3.9 **Output** Defrosting Signal (Control Function No.4)

This function is utilized to receive the defrosting signal. Auxiliary relay contacting (RYa) is closed during the defrosting.

- Setting Example
Defrosting Stoppage at "Output Setting 2" (between 1 and 3 pins of CN7)



Wiring Diagram Example of Defrosting Signal

Table 3.2 Specifications of Required Auxiliary Relay

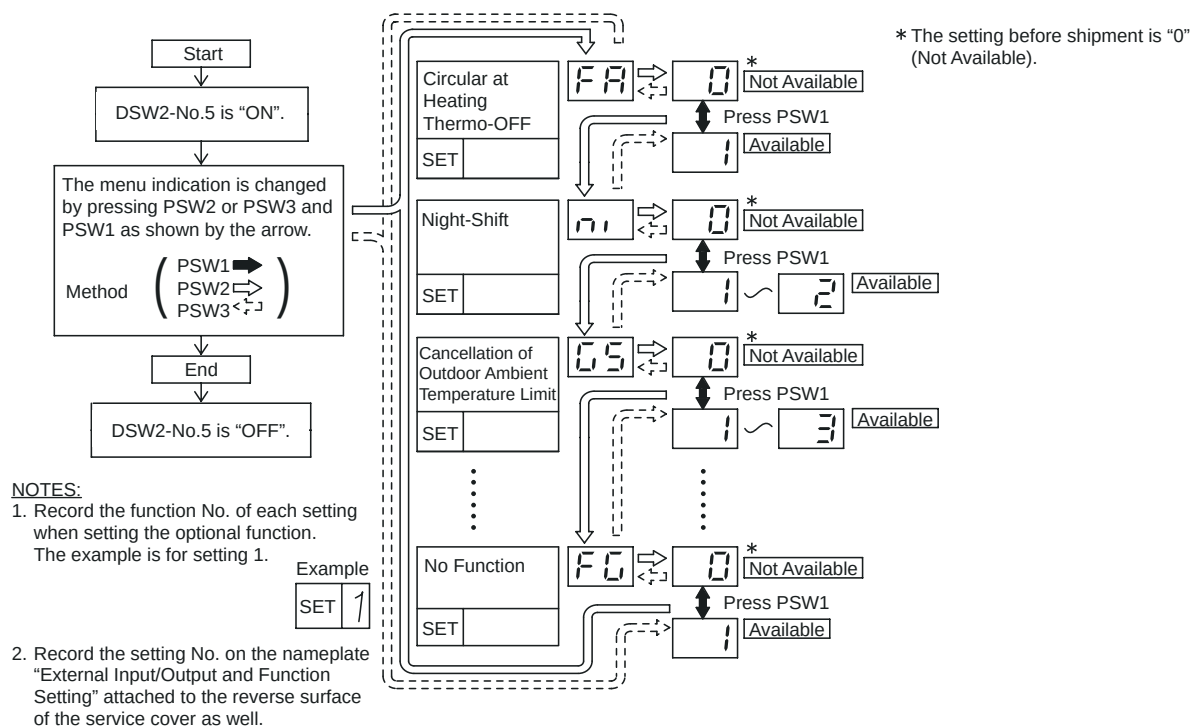
Parts	Specification
Auxiliary Relay*	High-Power Relay, LY2F DC12V made by OMRON

*Do not use the relay with diode built-in.

*Refer to table 3.1 for the connector parts.

3.4 Function Setting

The function setting should be performed during the outdoor unit stoppage. This setting is not available during External Input / Output Setting.



3.4.1 Function Setting Item

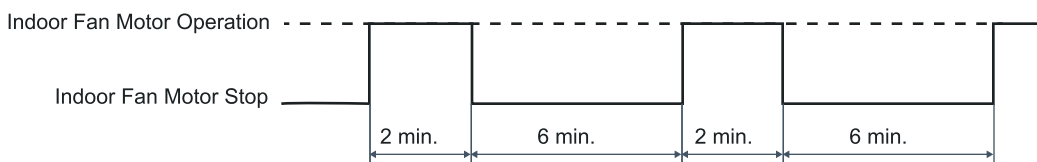
No.	Setting Item	7-Segment Display		Contents
		Item	No.	
1	Circulator Function at Heating Thermo-OFF	FA	00	No setting (continuously operation)
			01	Indoor fan forced ON and OFF (2min. ON/6min. OFF)
2	Night Shift (Low Noise)	Ni	00	No setting
			01	Setting night shift
			02	Setting of auto night shift
3	Cancellation of Outdoor Ambient Temperature Limit for Heating	GH	00	No setting
			01	Outdoor ambient temperature limit is ineffective
4	Cancellation of Outdoor Ambient Temperature Limit for cooling	GC	00	No setting
			01	Outdoor ambient temperature limit is ineffective
5	Defrost for Cold Area (Change of Defrost Condition)	Jo	00	No setting
			01	Condition 2 of defrost operation for cold area
6	SLo (IU Fan Speed) Defrost Setting	bJ	00	No setting (Indoor fan stoppage during defrost operation)
			01	Indoor fan SLo operation when heating operation is activated/during defrost operation
7	Cancellation of Hot Start	HT	00	No setting (Hot start control is available)
			01	Cancellation of hot start
8	Priority Capacity Mode for Cooling	cU	00	No setting
			01	Adjust the opening of the EVI and compressor speed to improve the cooling capacity
			02	Adjust the compressor speed to improve the cooling capacity for high ambient temperature
9	Priority Capacity Mode for Heating	hU	00	No setting
			01	Adjust the compressor speed to improve the heating capacity
10	Energy Saving Mode for Cooling	SC	00	No setting
			01	Energy saving mode is effective
11	Energy Saving Mode for Heating	SH	00	No setting
			01	Energy saving mode is effective
12	Low Noise Setting	dB	00	No setting
			01	Low noise setting mode 1 (The noise reduce 5dB)
			02	Low noise setting mode 2 (The noise reduce 7dB)
			03	Low noise setting mode 3 (The noise reduce 10dB)
13	Demand Function Setting	dE	00	No setting
			01	When input demand control setting,set value 100%.
			02	When input demand control setting,set value 80%.
			03	When input demand control setting,set value 60%.
14	Wave Function Setting	UE	00	No setting
			01	Rated current ratio 100% for 20 minutes / demand set rated current ratio (100% 80% / 60%) for 10 minutes.
15	Low Outlet Temperature Protection In Cooling Mode1	Fb	00	No setting
			01	Outlet temperature of indoor units $\geq$ 15°C
16	Low Outlet Temperature Protection In Cooling Mode2	Fc	00	No setting
			01	Outlet temperature of indoor units $\geq$ 10°C
17	Outlet air Temperature Control(Fresh Air Unit or AHU)	F2	00	No setting
			01	The mode setting is effective
18	Restrained Capacity Control(Fresh Air Unit or AHU)	F3	00	No setting
			01	The mode setting is effective
19	Cooling of High Ambient Temperature	F4	00	Initial value
			01	The mode setting is effective.
20	Convert Unit in Checking Mode	Fd	00	No setting (Convert indication unit: [°C] or [MPa])
			01	Convert Indication Unit: [°F] or [psi]
21	One key open valve	F8	00	No setting
			01	The mode setting is effective
22	Set Address for VIP Indoor Unit	U1	0	Indoor unit address 00
~		~	~	Indoor unit address **
26		U5	63	Indoor unit address 63

3.4.2 Circulator Function at Heating Thermo-OFF (Function Setting “FA”)

Press “PSW1” and select the setting conditions “0” or “1” in Circulator Function at Heating Thermo-OFF “FA”. Normally (“FA”=0), the fan speed is changed to “LOW” at heating Thermo-OFF. (It is possible for the room temperature to be too high at the heating Thermo-OFF.) However, the indoor fan motor is operated at “LOW” and stopped repeatedly by setting this function (“FA”=1).

NOTE:

When the compressor is stopped, the indoor fan motor operates at “LOW” speed continuously.
The action when the indoor fan motor operates at the circulator function is indicated as follows.



*In this section, Thermo-ON/Thermo-OFF mean for the indoor unit.

Thermo-ON: The indoor unit is running.

Thermo-OFF: The indoor unit stays on, but doesn't run.

3.4.3 Night Shift (Function Setting “Ni”)

Press “PSW1” and select the setting condition “0” to “2” for the Night Shift or Auto Night Shift “ni”. Then, this function can be set.

“ni”=1 reduces the upper limit of the outdoor fan rotation and the compressor frequency as shown below in cooling operation.

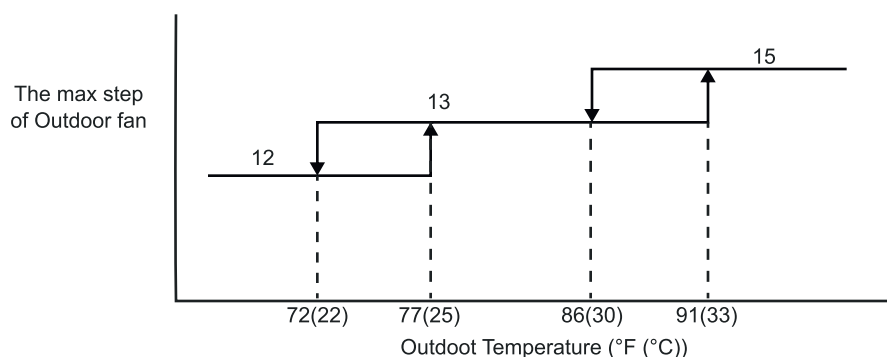
“ni”=2 reduces the upper limit of the outdoor fan rotation in cooling and heating operation.

When “ni”=2 is setted, the unit can automatically enter and exit the auto night shift mode at night and select the lower fan rotation according to the calculated time, outdoor temperature (Ta) and indoor temperature (Ti). According to the calculated time, the unit will automatically enter the auto night shift mode at night after 10:00 p.m., and enter the default fan rotation according to the value of (Ta), and automatically exit the auto night shift mode after 8:00 a.m..

The Night Shift operation should be used if the capacity has the margin to be allowed for the capacity decrease and the low sound operation is required especially in the nighttime.

Night Shift ni=1

(1) Outdoor Fan



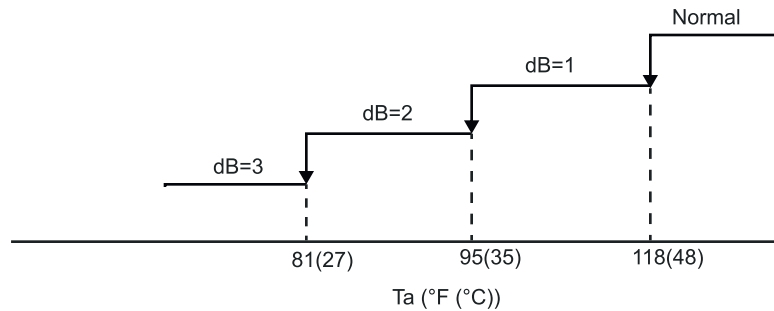
(2) Frequency Range (Cooling Operation)

Outdoor Unit Capacity (kBtu/h)		Maximum Frequency (Hz)		Maximum Frequency (Hz)	Target Operating Noise (dB)
CHV6-RS36URBMHH	When Night Shift is not Set ni=0	50	When Night Shift is Set ni=1	39	40
CHV6-RS48URBMHH		55		48	42
CHV6-RS60URBMHH		61		56	47

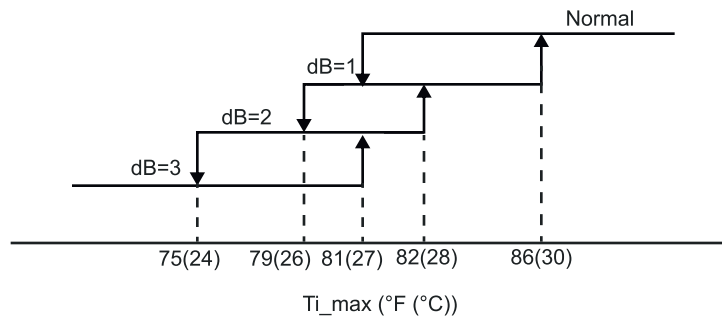
Auto Night Shift(ni=2)

According to the estimated time, it will automatically enter low noise setting *1) at 10:00 pm, and enter the initial low noise setting according to the value of Ta. After running for 30 minutes, the low noise setting will be automatically adjusted according to Ti_max *2). And then according to the estimated time, it will automatically exit low noise setting after 8:00 am.

Cooling operation Initial low noise setting:



After running for 30 minutes, the low noise setting will be automatically adjusted according to Ti_max.



NOTE:

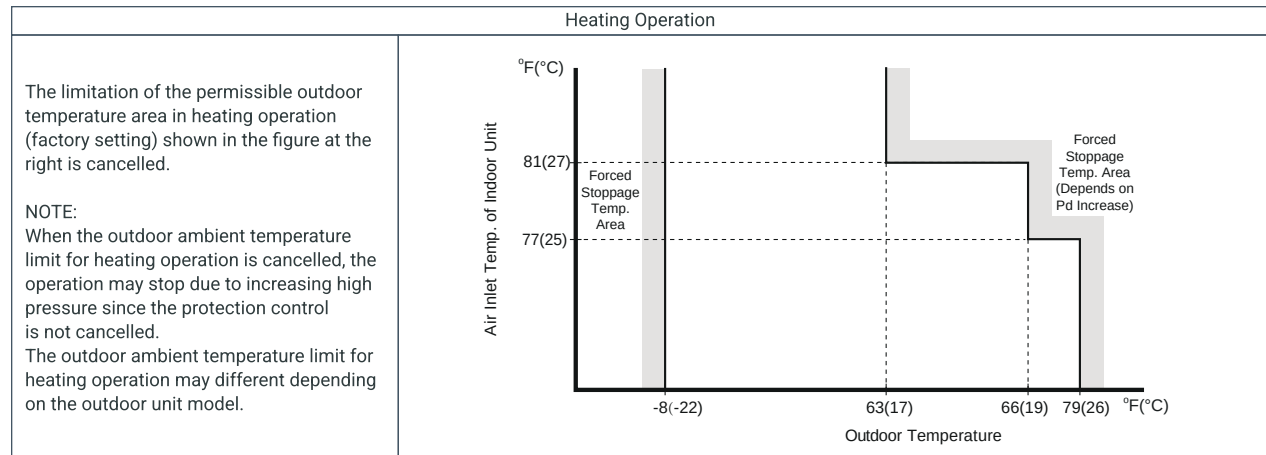
- For the details of low noise setting, refer to the Low Noise Setting (Function Setting "dB") (Chapter 3.4.10).
If the [ni] and [dB] settings exist at the same time, the [dB] setting takes precedence.
- Ti_max: Ti_max is the maximum value of the return air temperature of all running indoor units.

3.4.4 Cancellation of Outdoor Ambient Temperature Limit for heating (Function Setting "GH")

Press "PSW1" and select the setting condition "0" or "1" for Cancellation of Outdoor Ambient Temperature limit "GH". Then, this function can be set.

The heating operation is continued even under a high outdoor temperature.

"GH" Setting Condition	Operation Mode for Cancellation
0	Not Available (Default Setting)
1	Outdoor ambient temperature limit is ineffective



NOTE:

If this function is set and the outdoor unit operates in the operation stoppage area shown in the above figure for a long time, some alarm codes by abnormal operation may occur and the outdoor unit may be damaged since outdoor ambient temperature limit control is cancelled.

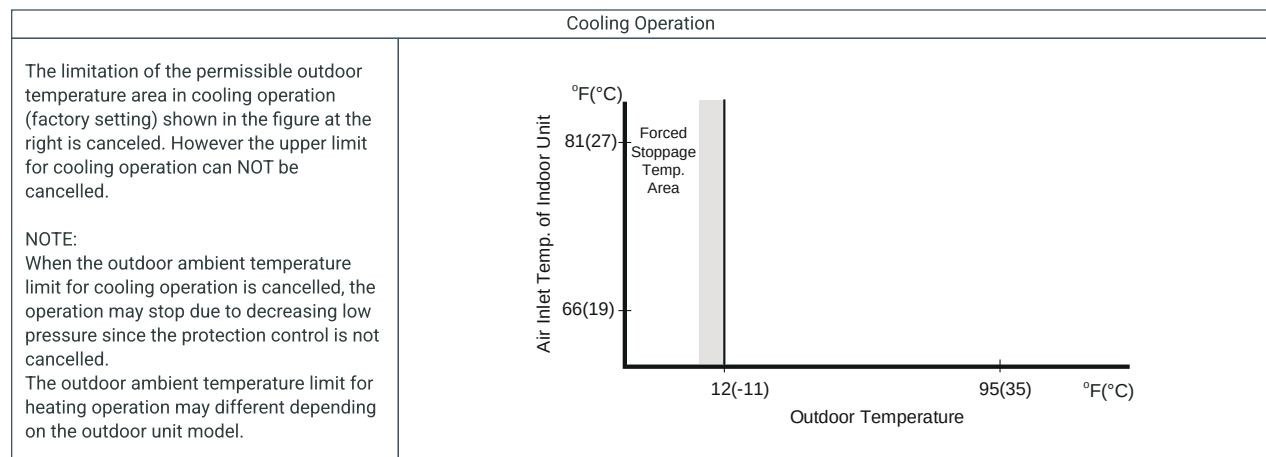
If the alarm codes occur frequently, contact your distributor or contractor.

3.4.5 Cancellation of Outdoor Ambient Temperature Limit for cooling (Function Setting "GC")

Press "PSW1" and select the setting condition "0" or "1" for Cancellation of Outdoor Ambient Temperature limit "GC". Then, this function can be set.

The cooling operation is continued even under a low temperature.

"GC" Setting Condition	Operation Mode for Cancellation
0	Not Available (Default Setting)
1	Outdoor ambient temperature limit is ineffective



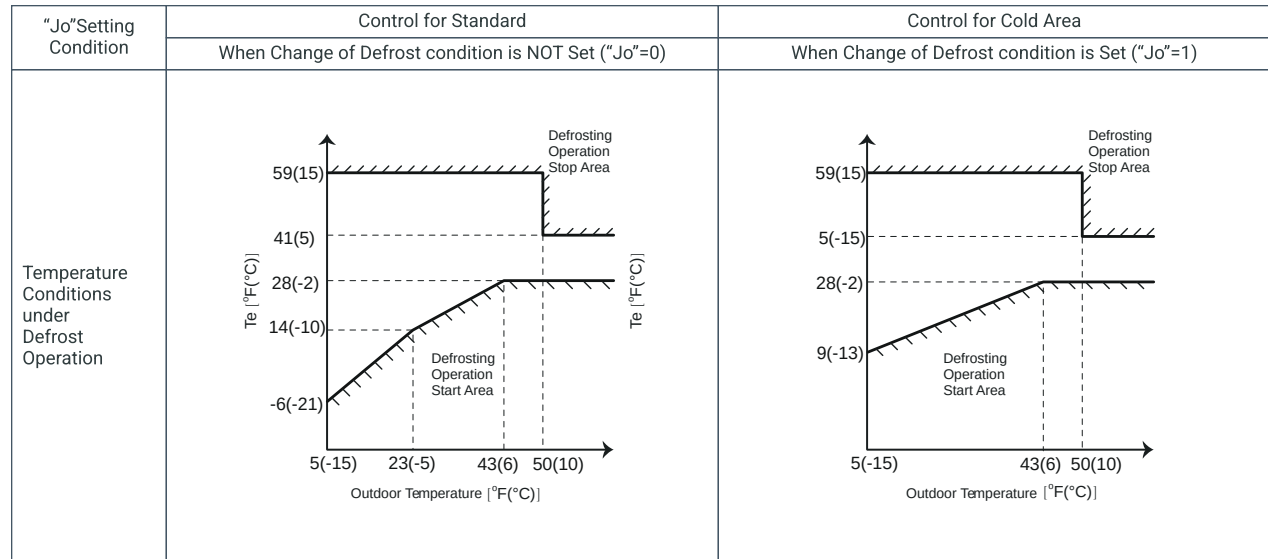
NOTE:

If this function is set and the outdoor unit operates in the operation stoppage area shown in the above figure for a long time, some alarm codes by abnormal operation may occur and the outdoor unit may be damaged since outdoor ambient temperature limit control is cancelled.

If the alarm codes occur frequently, contact your distributor or contractor.

3.4.6 Change of Defrost Condition (Function Setting “Jo”)

Press “PSW1” and select the setting condition “0” or “1” for Change of Defrost Condition “Jo”. This function changes the defrost condition as shown below.



3.4.7 SLo Defrost Setting (Function Setting “bJ”)

Press “PSW1” and select the setting condition “0” or “1” at SLo Defrost Setting “bJ”.

Indoor fan operation is stopped during the defrost operation, after the defrost operation and at the start of the heating operation. However, this function allows indoor fan to operate at SLo speed during the defrost operation, after the defrost operation or at the start of the heating operation.

"bJ" Setting Condition	Indoor Fan Operation		
	at Start of Compressor Operation in Heating Operation	During Defrost Operation	After Defrost Operation
0	STOP	STOP	STOP
1	SLo Speed *1)	SLo Speed	SLo Speed *1)

NOTE:

*1) The indoor fan may operate at other speed depending on outlet air temperature of the indoor unit.

3.4.8 Priority Capacity Mode for Cooling (Function Setting “cU”)

If the cooling capacity seems insufficient during the normal operation, press “PSW1” and select the setting condition “0” to “2” Priority Capacity Mode Setting “cU”. By setting this function, the target frequency of the compressor is set higher only for cooling operation.

"cU" Setting Condition	Target Frequency of Compressor
0	Not Available (Default Setting)
1	Default Setting +10%
2	Default Setting +30%

NOTE:

1. The upper limit frequency of the compressor can NOT be changed by Priority Capacity Mode Setting.
2. Increase rates are approximate, these may change slightly depending on the outdoor unit model.

3.4.9 Priority Capacity Mode for Heating (Function Setting “hU”)

If the heating capacity seems insufficient during the normal operation, press “PSW1” and select the setting condition “0” or “1” at the Compressor Frequency Control Target Value for Heating “hU”. By setting this function, the initial frequency and PID control target of the compressor are set higher for heating operation

“hU” Setting Condition	Compressor Frequency	
	Initial Frequency	Target Pd (PID control)
0	Default Setting	Depends on Ps (the maximum target Pd=3.2MPa)
1	Default Setting +20%	Always the maximum target Pd

NOTE:

1. Increase rates are approximate, these may change slightly depending on the outdoor unit model.
2. The maximum target Pd may decrease depending on the temperature difference between inlet temperature of indoor unit and setting temperature

3.4.10 Low Noise Setting (Function Setting “dB”)

Press “PSW1” and select the setting condition “0” to “3” at the Low Noise Setting “dB” to reduce the upper limit of the compressor frequency and the outdoor fan rotation.

NOTE:

1. By setting this function, the compressor frequency and the outdoor fan motor rotation frequency are forcibly reduced and so the outdoor unit capacity decreases and the unit operation range is limited.
2. Reduction rates are approximate, these may change slightly depending on the outdoor unit model.

“bB” Setting Condition		Reduction Rate of Upper Limit
		Outdoor Fan Rotation
0	No Setting (Default)	100%
1	Low Noise Setting 1	80%
2	Low Noise Setting 2	75%
3	Low Noise Setting 3	70%

Outdoor Unit Capacity (kBtu/h)	dB=1		dB=2		dB=3	
	Operating Noise (Targeted Value)	Capacity (Compared to dB=0)	Operating Noise (Targeted Value)	Capacity (Compared to dB=0)	Operating Noise (Targeted Value)	Capacity (Compared to dB=0)
CHV6-RS36URBMHH	45	70%	43	65%	40	50%
CHV6-RS48URBMHH	47	70%	45	65%	42	50%
CHV6-RS60URBMHH	52	70%	50	65%	47	50%

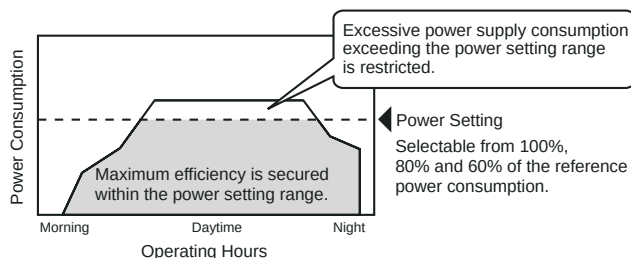
3.4.11 Demand Function Setting (Function Setting “dE”)

Press “PSW1” and select the setting condition “0” to “3”, so that Demand Function Setting “dE” can be set. This function is available by setting to “1” for the demand current control without inputting the signal to the external input terminal on the outdoor unit PCB. The table below shows the limit of the operating current for this function.

“dE” Setting Condition	Demand Running Current Control
0	Not Available (Default Setting)
1	Demand Running Current 100% Valid
2	Demand Running Current 80% Valid
3	Demand Running Current 60% Valid

● Demand Control

Adopting self-demand function, which drastically decreases power consumption, has largely improved energy saving.



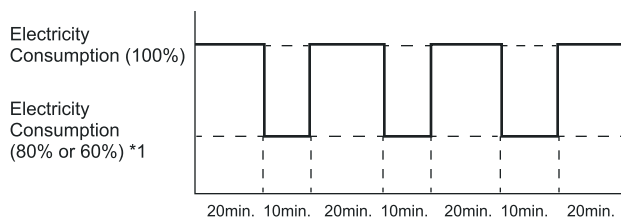
NOTES for Facility:

1. The demand current control (%) is value criterion. The value used for this control is calculated from the current, and therefore is different from the value indicated by a wattmeter. If it is required that the maximum power consumption is managed precisely, a field-supplied demand controller should be used.
2. The actual value may temporarily be higher than the indicated value shown above depending on the operating control conditions such as protection control.
3. If the outdoor unit running current exceeds the maximum limit for twenty minutes, the indoor unit is put under Thermo-OFF condition. In this case, the stoppage code No. “10” is given.
4. The 100% current value please refer to “Service 3.3.5 Input Demand Current Control”.

3.4.12 Wave Function Setting (Function Setting “UE”)

Press “PSW1” and select the setting condition “0” or “1”, so that Wave Function Setting “UE” can be set. While this function is activated, the maximum limit of running current is changed from 100% to 80% or 60% depending on the setting of Demand Function Setting “dE” as shown in the figure.

“UE” Setting Condition	Wave Function
0	Not Available (Default Setting)
1	Valid wave function



NOTES:

1. The upper maximum limit is always Demand Current Control 100%.
The lower maximum limit depends on Demand Function Setting “dE”.
2. The current limit value is targeted value. The actual current value may temporarily be higher than the value shown in the table above depending on the operating control condition.

When the scheduled operation of “Demand Function Setting” is set from the central controller, refer to the “Service Manual” or the “Installation and Maintenance Manual” for the central controller.

3.4.13 Low Outlet Temperature Protection In Cooling Mode1 (Function Setting “Fb”)

Press “PSW1” and select the setting condition “0”, “1”, “2” or “3”, so that Low Outlet Temperature Protection In Cooling Mode1 “Fb” can be set.

When the indoor unit outlet air temperature is less than 10/12/14°C at cooling operation, the compressor frequency forcibly decreases to prevent a drop in outlet air temperature.

“Fb” Setting Condition	Low Outlet Temperature Protection In Cooling Mode1	
	Compressor Frequency	Solenoid Valve for High/Low Pressure Bypass
0 (Default Setting)	-	-
1/2/3	Valid *1)	Valid *2)

NOTES:

- *1) When “Fb”=1 is set, the compressor frequency decreases depending on outlet temperature of indoor unit.
- *2) When “Fb”=1 is set, if outlet temperature has been less than 15°C for 3min., besides “NOTE” 1 above, the solenoid valve for high/low pressure bypass is opened to reduce refrigerant flow.

3.4.14 One key open valve (Function Setting “F8”)

Press “PSW1” and select the setting condition “0” or “1”, at One key open valve Setting “F8”.

When the unit stop, I.U. Electronic Exp. Valve(EVI) or O.U. Electronic Exp. Valve(EVO) may be in a closed state, It leads to an extended vacuum pumping time. This function selection can fully open the valve, thereby shortening the valve opening time. The sequence of operations is as follows:

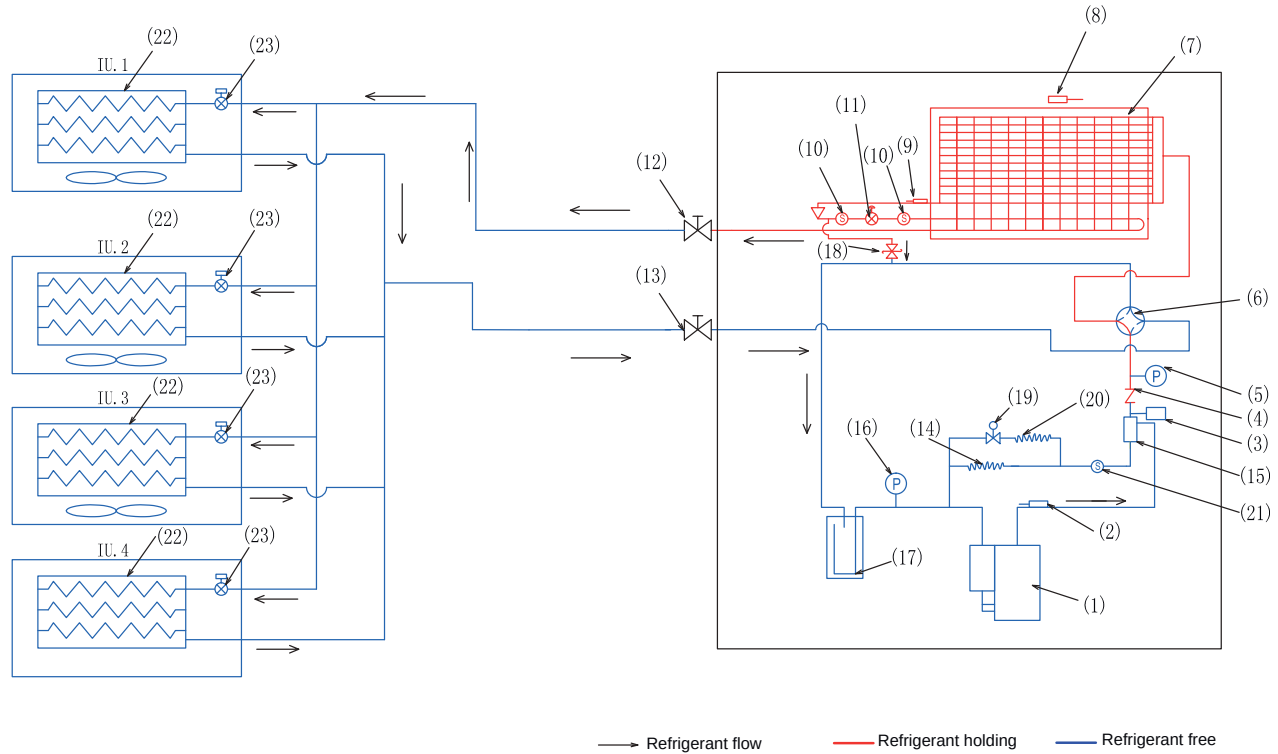
Power on → F8=1 → Vacuum pumping → F8=0 → Charge refrigerant

“F8” Setting Condition	Low Outlet Temperature Protection In Cooling Mode1			
	Cooling	Heating	Cooling	Heating
0	40pls	40pls/EVImaxpls	EVImaxpls	0
1	EVImaxpls		EVOmaxpls	

NOTE:

After vacuuming, it is important to set F8 to 0 before filling the refrigerant, otherwise the unit may be damaged.

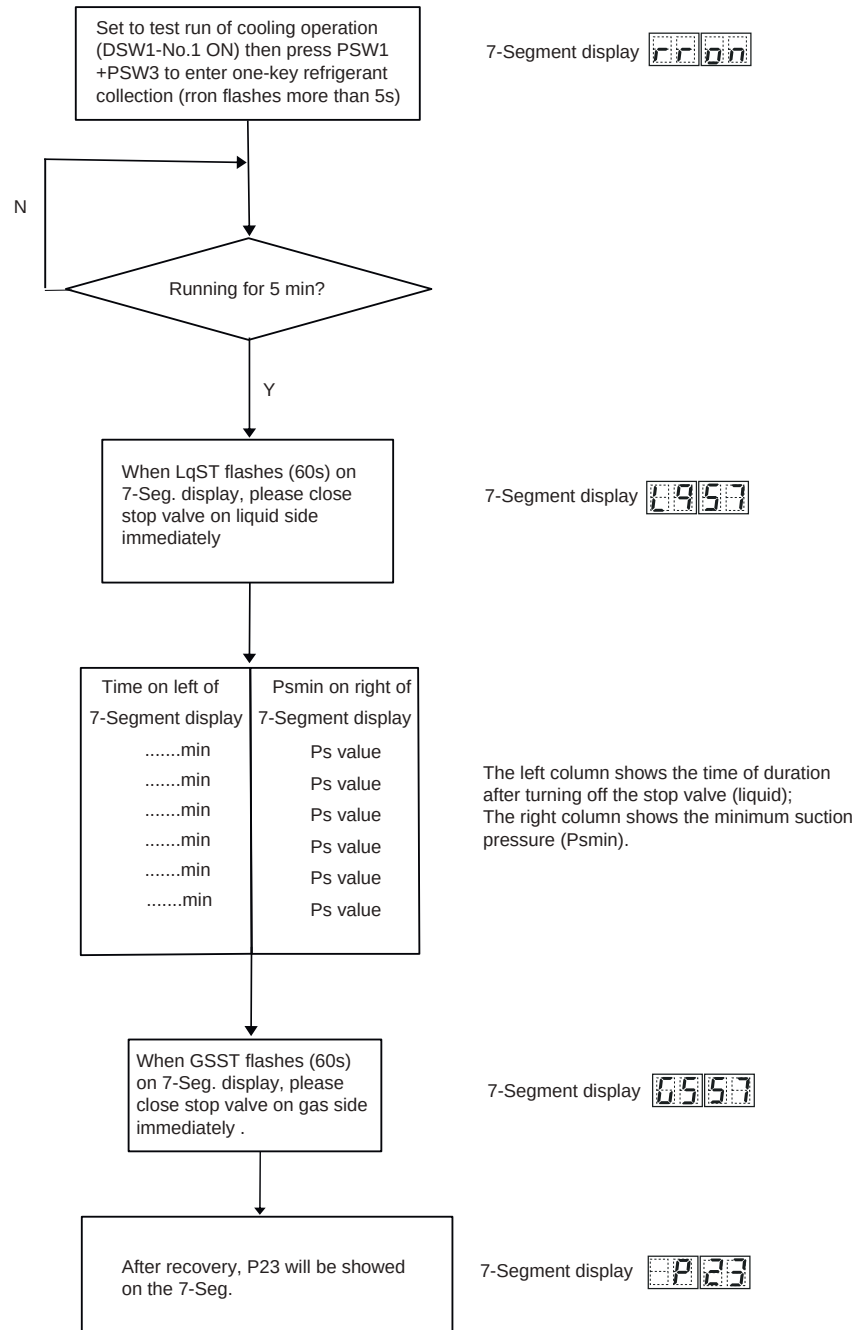
3.4.15 One-Key Refrigerant Recovery



No.	Part Name	No.	Part Name
1	Compressor	13	Stop Valve for Gas line
2	Temperature Sensor (Td)	14	Capillary Tube
3	Pressure Switch (PSH)	15	Oil Separator
4	Check valve	16	Low Pressure Sensor (Ps)
5	High Pressure Sensor (Pd)	17	Accumulator
6	Reversing Valve (RVR)	18	Pressure Relief Valve
7	Heat Exchanger (O.U.)	19	Solenoid (SVA)
8	Temperature Sensor (Ta)	20	Capillary Tube (SVA)
9	Temperature Sensor (Te)	21	Strainer
10	Strainer	22	Heat Exchanger (I.U.)
11	Expansion Valve (EVO)	23	Expansion Valve (EVI)
12	Stop Valve for Liquid line		

The indoor units are to be replaced.

- ① When performing one-key refrigerant recovery, the unit works in cooling mode.
- ② The above diagram shows the distribution of refrigerant-holding and refrigerant-free area when one-key refrigerant recovery is completed, from which we can tell that in this case the final refrigerant-holding area is between the check valve (4) and liquid side stop valve (12), while the refrigerant-free area is at indoor unit and outdoor low pressure side.



NOTE:

- One-key refrigerant recovery starts.
- Prompt to turn off stop valve on liquid side at once.
- Prompt to turn off stop valve on gas side at once.
- During refrigerant recovery, the 7-segment display shows time (minute) on the left side and pressure at right side (only value following decimal point will display, e.g. 15 represents 0.15MPa). Where pressure is greater than 1MPa, 99 will display, and 00 when less than 0MPa.
- System parameters can be checked during one-key refrigerant recovery

<Procedure>

When one-key refrigerant recovery to be performed to replace indoor unit, the operation procedure is as below:

- (1) Please prepare hexagon wrench to close gas side and liquid side stop valves.
- (2) Power on outdoor unit and set to cooling test run (DSW1-No.1 ON) , then press PSW1+PSW3 to enter one-key refrigerant recovery.
- (3) When LqST flashes on 7-segment display, please close liquid side stop valve immediately.
- (4) When LqST does not flash, 7-segment display shows the time of duration and minimum suction pressure of the system after closing the stop valve.
- (5) When GSST flashes on 7-segment display, please close gas side stop valve immediately.
- (6) After recovery, P23 will be showed on the 7-segment .
- (7) Push PSW3 more than 10 seconds and Set DSW1-No.1 at OFF after recovery, cut off power supply to indoor units and outdoor units.

⚠ WARNING

When one-key refrigerant recovery to be performed to replace indoor unit, please pay attention to the following items:

- (1) Each model of unit has its maximum refrigerant recovery quantity as shown in below table. Once exceeds 130% of the value in the table, one-key refrigerant recovery is not recommended.

Capacity (kBtu/h)	Max. Refrigerant (kg)
24-48	3.0

- (2) Amount of collected refrigerant relevant to outdoor temperature. When the outdoor temperature is above 40°C, it is suggested not to perform one-key refrigerant recovery.
- (3) During one-key refrigerant recovery, set dip switch to DSW1-No.1 OFF to exit from operation.
- (4) After recovery, please determine if it is thoroughly collected based on the pressure displayed on 7-segment display. If not, use refrigerant recovery machine to collect the remaining refrigerant.
- (5) After recovery and the replacement of indoor unit, please check refrigerant quantity by referring to 3.3 Calculation of Additional Refrigerant in Design Chapter.
- (6) After recovery, it is a must to push PSW3 more than 10 seconds and set DSW1-No.1 at OFF and cut off power supply to outdoor and indoor units. If not, the units do not start up.
- (7) After refrigerant recovery, please replace indoor unit as soon as possible. It is strictly forbidden to leave the units to high temperature outdoor area for a long term, in case of rapid ramping of refrigerant pressure inside heat exchanger of outdoor unit, which may lead to potential safety hazard.
- (8) For units to which check valve leakage incurred, it is not recommended to perform refrigerant recovery.

4. Field Work Instruction

Refer to Section 1 "Troubleshooting" when dealing with problems or difficulties. If you cannot solve the problem, contact your distributor or contractor.

4.1 Caution for Refrigerant Leakage

DANGER

Cooper&Hunter's air conditioners are designed and manufactured based on using specified refrigerants.

The applicable refrigerants are specified for each unit's models.

Using any refrigerants besides the specified refrigerants may cause mechanical problems, malfunction, and failure, and in the worst case, it endangers safety seriously and may cause a fire or an explosion. Therefore, Do not charge non-specified refrigerants or any of the following in the refrigerant system of a unit.

- Hydrocarbon Refrigerants such as Propane
- Oxygen, or Flammable Gases such as Acetylene
- Poisonous Gases

The types of refrigerants are indicated in the Installation and Maintenance Manuals, Engineering Manuals, Service Manuals, and the specification label for each unit.

Be aware that Cooper&Hunter Air Conditioning does not take any responsibility for unit failure, malfunction, or any accidents caused by charging non-specified refrigerants or others as noted above.

4.2 Maintenance Work

(1) For Outdoor Unit and Indoor Unit

- (a) Fan and Fan Motor
 - Lubrication - All fan motors are pre-lubricated and sealed at the factory. Therefore, no lubricating maintenance is required.
 - Sound and Vibration - Inspect for abnormal sound and vibration.
 - Rotation - Check that the fan rotates counterclockwise and inspect the rotating speed.
 - Insulation - Inspect for electrical insulation resistance.
- (b) Heat Exchanger
 - Clogging - Inspect for any accumulated dirt and dust and remove any at regular intervals. As for an outdoor unit, other obstacles such as growing grass and pieces of paper, which might interrupt air flow, should also be removed.
- (c) Piping Connection
 - Leakage - Inspect for refrigerant leakage at piping connections.
- (d) Cabinet
 - Stain and Lubrication - Inspect for any stain or lubricant and remove it, if any.
 - Securing Screw - Inspect for loose or missing screws and secure or replace as required.
 - Insulation - Inspect for peeling thermal insulation material on the cabinet and repair it, if any.
- (e) Electrical Equipment
 - Activation - Inspect for abnormal activation of the magnetic contractor, auxiliary relay, or printed circuit board (PCB).
 - Line Condition - Pay attention to working voltage, amperage and phase balance.
Inspect for faulty contact caused by loosened terminal connections, oxidized contacts, foreign matter, and other items.
Inspect for electrical insulation resistance.
- (f) Control and Protective Devices
 - Setting - Do not readjust the setting in the field.

(2) For Outdoor Unit Only

- (a) Compressor
 - Sound and Vibration - Inspect for abnormal sound and vibration.
 - Activation - Check that the voltage drop of the power supply line is within 16% at start and within 2% during operation.
- (b) Reversing Valve
 - Activation - Inspect for any abnormal activating sound.
- (c) Strainer
 - Clogging - Check that there is no temperature difference between the ends.
- (d) Ground Wiring
 - Ground Line - Inspect for continuity to the earth ground.

(3) For Indoor Unit Only

- (a) Air Filter
 - Cleaning - Inspect for, and remove, any accumulated dirt and dust and remove according to the "Engineering Manual".
- (b) Condensate Pan, Condensate Mechanism and Condensate Pipe
 - Condensate Line - Inspect and clean the condensate line at least twice a year.
 - Drain-Up Mechanism - Inspect for activation of drain-up mechanism.
- (c) Float Switch
 - Activation - Inspect for activation of float switch.

4.3 Service and Maintenance Record by 7-Segment Display

Customer's Name _____

DATE: _____ - _____ - _____

Outdoor Unit Model (Serial No. _____)			(Serial No. _____)						(Serial No. _____)							
(1) Operation Mode																
(2) Test Run Start Time																
(3) Data Collect Start Time																
(4) Read Out Data from 7-Segment in Outdoor Unit																
Protection Control Code																
Checking Mode	Input/Output State of Outdoor Micro-Computer	SC	Y20A	Y21	Y52C	Fan2	Fan1	YCH	Y20A	Y21	Y52C	Fan2	Fan1	YCH		
	Total Capacity of Operating Indoor Unit		oP													
	Control Software No.		-													
	Inverter Software No.		-													
	Inverter Order Frequency to Compressor		H1													
	Outdoor Fan Step		Fo													
	Outdoor Expansion Valve Opening		oE1													
	High Pressure (Discharge Pressure)		Pd.													
	Low Pressure (Suction Pressure)		Ps.													
	Discharge Temperature		Td													
	Evaporating Temperature		TE													
	Ambient Air Temperature		To													
	Refrigerant Cooler Temperature		Tsc													
	Inverter Primary Current		A1													
	Inverter Secondary Current		A2													
	Checking for Indoor Unit	Indoor Unit Address		n-												
		Indoor Expansion Valve Opening		iE												
		Liquid Pipe Temperature of Indoor Unit		TL												
		Gas Pipe Temperature of Indoor Unit		TG												
		Indoor Unit Inlet Air Temperature		Ti												
		Indoor Unit Outlet Air Temperature		To												
		Cause Code of Indoor Unit Stoppage		d1												
	Accumulated Operating Time of Compressor		UJ1													
			cUJ1													
	Outdoor Unit Alarm Code		AC													
	Cause Code of Inverter Stoppage Total		iTc													
	Capacity of Indoor Unit Connected		CP													
Connected Indoor Unit Number		AA														
Refrigerant Address		GA														

NOTE:

Refer to Section "Service 1.2.1 Detail of 7-Segment Display" for items of checking mode.

4.4 Service and Maintenance Record by Wired Controller

Data Sheet for Checking by Wired Controller

Time				:	:	:	:	:
I.U. Model								
I.U. Serial No.								
I.U. No. / Alarm Code								
	Check Mode 1	Check Mode 2		1 • 2	1 • 2	1 • 2	1 • 2	1 • 2
B Temp. Indication								
	Set Temp.	b1	--					
	Inlet Air Temp.	b2	q1					
	Discharge Air Temp.	b3	q2					
	Liquid Pipe Temp.	b4	q3					
	Remote Thermistor Temp.	b5	--					
	Outdoor Air Temp.	b6	q4					
	Gas Pipe Temp.	b7	q5					
	Evaporating Temp. at Heating	b8	q6					
	Condensing Temp. at Cooling	b9	q7					
	Comp. Top Temp.	bA	q8					
	Thermo Temp. of Wired Controller	bb	--					
	Not Prepared	bC	--					
C Micro-Computer State Indication								
	I.U. Micro-Computer	C1	--					
	O.U. Micro-Computer	C2	--					
D Stopping Cause State Indication								
	Cause Code of Indoor Unit Stoppage	d1	--					
E Alarm Occurrence								
	Times of Abnormality	E1	--					
	Times of Power Failure	E2	--					
	Times of Abnormal Communication	E3	--					
	Times of Inverter Tripping	E4	--					
F Automatic Louver State								
	Louver Sensor State	F1	--					
H Pressure, Frequency State Indication								
	Discharge Pressure	H1	q9					
	Suction Pressure	H2	qA					
	Control Information	H3	qb					
	Operating Frequency	H4	qC					
J I.U. Capacity Indication								
	I.U. Capacity	J1	--					
	O.U. Code	J2	--					
	Refrigerant System Number	J3	--					
	Refrigerant System Number	J4	--					
L Opening of Expansion Valve								
	I.U. Expansion Valve	L1	qd					
	O.U. Expansion Valve 1	L2	qE					
	O.U. Expansion Valve 2	L3	--					
	O.U. Expansion Valve B	L4	--					

NOTE:

Refer to Section "Service 1.2.3 Check Mode by Remote Control Switch---1.2.3.1 checke mode" for items of check mode.

P	Compressor Condition Indication (Reference)							
	Comp. Current	P1	qF					
	Accumulated Operation Time of Comp.	P2	--					
Q	Sensor Condition Indication							
	Motion Sensor Response Rate	q1	--					
	Radiation Sensor Temp.	q2	--					
	Motion Sensor1 Response Rate	q3	--					
	Motion Sensor2 Response Rate	q4	--					
	Motion Sensor3 Response Rate	q5	--					
	Motion Sensor4 Response Rate	q6	--					
	Setting Temp. Collected Value	q7	--					

Client: _____
 Installation Date: _____
 System No.: _____
 Date Checked: _____
 Checked by: _____

Result	

NOTE:

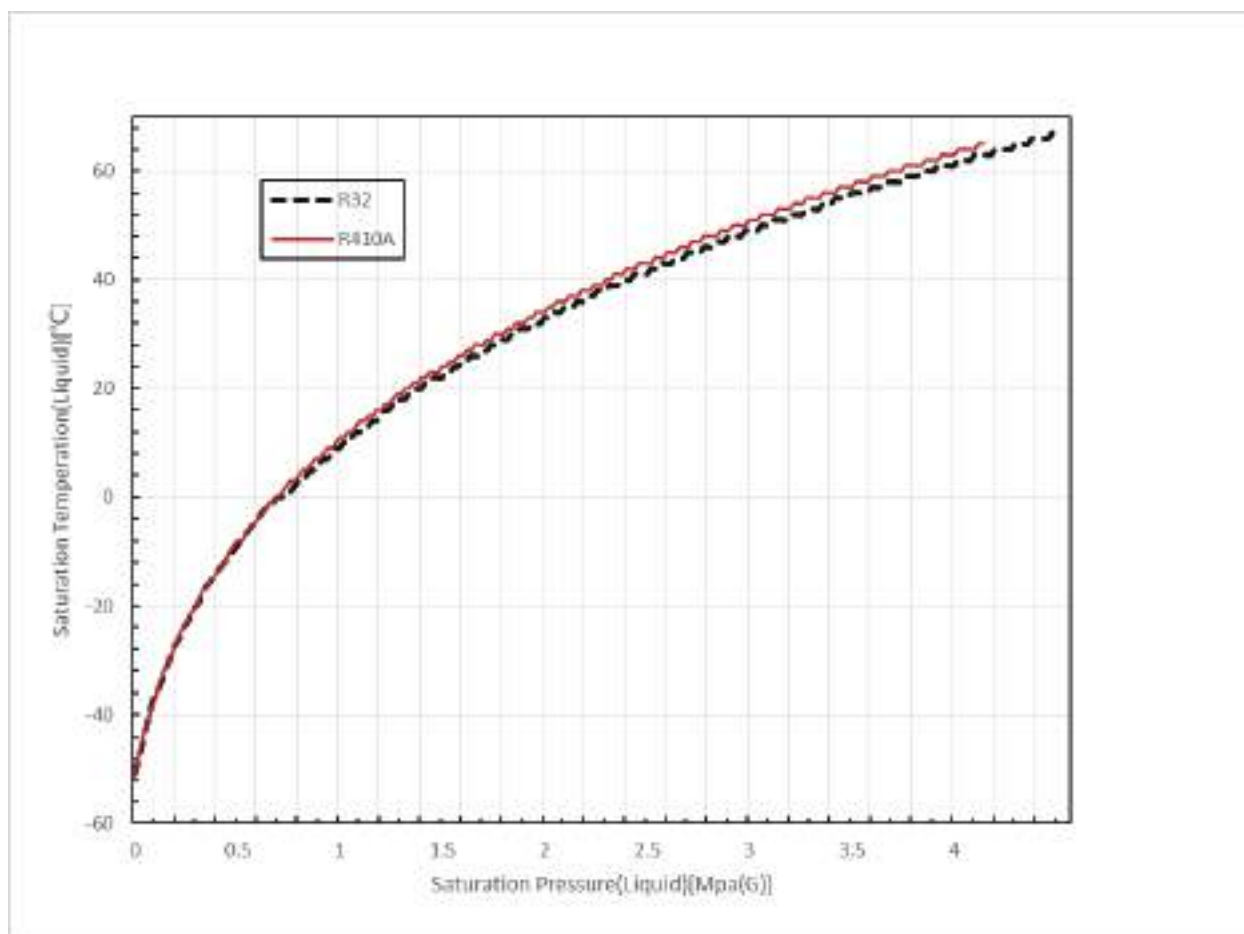
Refer to Section "Service 1.2.3 Check Mode by Remote Control Switch---1.2.3.1 check mode" for items of check mode.

4.5 Service and Maintenance Record

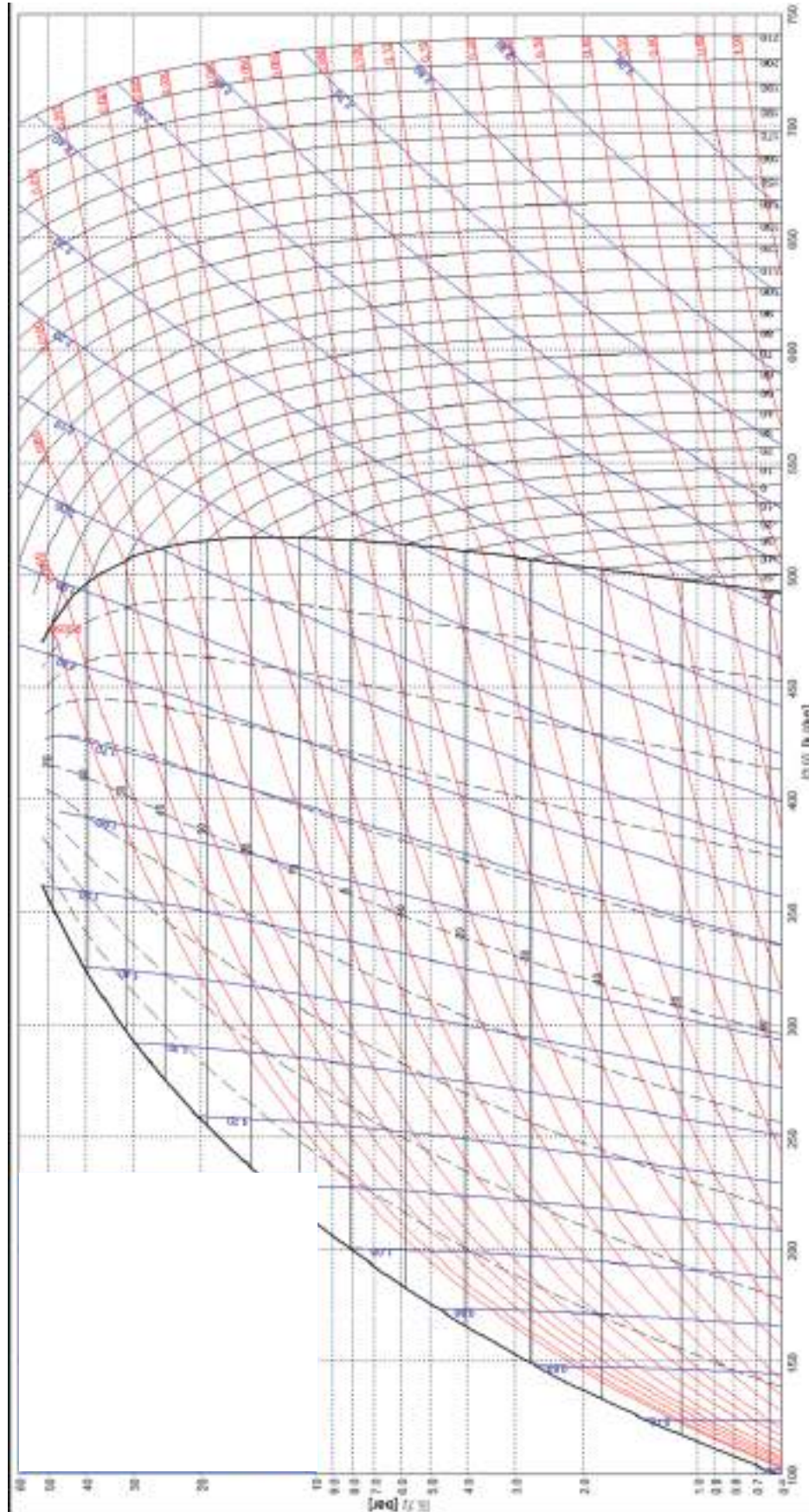
Service and Maintenance Record

No.	Check Item	Action	Judgment
1	Is service space sufficient?		YES or NO
2	Short Circuit of Discharged Air?		YES or NO
3	Any Heat Influence		YES or NO
4	Is ground wiring connected?		YES or NO
5	Refrigeration Piping		GOOD or NOT GOOD
6	Fixing of Units		GOOD or NOT GOOD
7	Any Damage on External or Internal Surface?		YES or NO
8	Checking of Screws and Bolts	Tighten them if they are loosened.	TIGHTENED or NOT TIGHTENED
9	Tightening of Terminal Screws	Tighten all terminal screws with a Phillips screwdriver.	TIGHTENED or NOT TIGHTENED
10	Are compressor terminals tightly fixed?	Check all compressor terminals are tightly fixed.	GOOD or NOT GOOD
11	Insulation Resistance	Measure insulation resistance with insulation resistance-meter. Comp. and Fan Motor: greater than 3MΩ Others: greater than 3MΩ	GOOD or NOT GOOD
12	Does condensate water smoothly flow?	Check for smooth flow of pouring water.	GOOD or NOT GOOD
13	Check for leakage at compressor.	Check for any leakage.	GOOD or NOT GOOD
14	Check for leakage at outdoor heat exchanger.	Check for any leakage.	GOOD or NOT GOOD
15	Check for leakage at indoor heat exchanger.	Check for any leakage.	GOOD or NOT GOOD
16	Check for leakage at reversing valve.	Check for any leakage.	GOOD or NOT GOOD
17	Check for leakage at check valve.	Check for any leakage.	GOOD or NOT GOOD
18	Check for leakage at accumulator.	Check for any leakage.	GOOD or NOT GOOD
19	Check for leakage at strainer.	Check for any leakage.	GOOD or NOT GOOD
20	Check for leakage at electronic expansion valve.	Check for any leakage.	GOOD or NOT GOOD
21	Check for leakage at piping.	Check for any leakage.	GOOD or NOT GOOD
22	Check direction of fans.	by Viewing or Airflow volume	GOOD or NOT GOOD
23	Voltage among each phase.	Check the voltage is within the specified range	GOOD or NOT GOOD
24	Vibration and Sound	Check fan, compressor, piping.	GOOD or NOT GOOD
25	Activation of Each Operation Mode	Check activation of COOL, HEAT, STOP and TEMP. switches.	GOOD or NOT GOOD
26	High Pressure Cut-out Switch	Check actual activation value.	GOOD or NOT GOOD
27	Check activation of drain-up mechanism.	Check it during cooling operation.	GOOD or NOT GOOD
28	Indoor Inlet Air Temp. (DB/WB)		°F DB/ °F WB
29	Indoor Outlet Air Temp. (DB/WB)		°F DB/ °F WB
30	Outdoor Inlet Air Temp. (DB/WB)		°F DB/ °F WB
31	Outdoor Outlet Air Temp. (DB/WB)		°F DB/ °F WB
32	High Pressure Sensor		psi(G)
33	Low Pressure Sensor		psi(G)
34	Operating Voltage		V
35	Operating Current		A
36	Instruction for Cleaning of Air Filter to Client		DONE or NOT YET
37	Instruction for Cleaning Method to Client		DONE or NOT YET
38	Instruction for Operation to Client		DONE or NOT YET

4.6 Saturation Curve for Refrigerant



4.7 Mollier Chart for R32



5. Test Run

Turn OFF all the power supply switches.
Use a tester and make sure that all the switches are turned OFF.

Before test run, check that the unit is appropriately installed according to Installation & Maintenance Manual. After that, inspect the following items.

Check Item		Contents
1	Damage	Are the unit appearance and inside of the unit damaged?
2	Fan Motor	Is the fan motor runner mounted in the center of the casing? Is the fan motor mounted away from the casing? (The fan motor should NOT be touched with the casing.)
3	Screw Part	Are the screws loosened due to the vibration during transportation? Check that the screw part is fixed firmly when installing, <u>especially for the screw of electrical wiring.</u>
4	Refrigerant Leakage	<u>Check that there is NO refrigerant leakage.</u> The tightening part of pipe (flared part) may be loosened due to the vibration during transportation.
5	DSW Setting	Check the DSW setting is the same as before shipping.
6	Insulation*	Measure resistance between electrical component terminal and ground with a tester. It is normal if the resistance is 1MΩ and over. If 1MΩ or less, do not perform the operation due to insulation failure of electrical charge part. <u>Do NOT apply electricity to the terminal block of operating line. (Control PCB may be damaged.)</u>
7	Stop Valve Fully Opening	Prior to test run, check that the stop valve of the outdoor unit is completely open.
8	Power Supply Phase	The operation is NOT available with the incorrect power phase order or lacking phase. • Alarm "05" will be indicated on the LCD of remote control switch. • "05" will be indicated on the 7-segment of outdoor unit. Check the power supply phase according to the caution label attached close to the outdoor unit terminal block or rear side of the service cover.
9	Turn ON Crankcase Heater*	After completion of the check item 1 to 8, turn ON the power supply of the outdoor unit. The electricity is supplied for the crankcase heater to warm the compressor. The compressor may be damaged without preheating. Therefore, the compressor should be activated after the power supply is turned ON for at least 12 hours.
10	Indoor and Outdoor Temperature	<For Use in both Cooling and Heating Operation> Is indoor temperature DB80°F(27°C) or less during heating operation? (Heating operation may not be operated due to the activation of the overload operation prevention under the ambient temperature of 66°F(19°C) or over.) To perform the test run, set the test run mode by the remote control switch.

<* Insulation Resistance>

In case that the unit has been turned OFF for long periods, insulation resistance may decrease to 1 MΩ or less because the refrigerant is retained in the compressor. Check the following points.

- Disconnect the cables of the compressor and measure the insulation resistance of the compressor itself. If the resistance is 1 MΩ and over, insulation failure of other electrical charge part has occurred.
- If the resistance is 1 MΩ or less, reconnect the compressor and turn ON the main power supply. The compressor will be warmed up automatically. Check the insulation resistance again after applying current for at least 1 hours. (Preheating time depends on the air condition, piping length or refrigerant condition.)
Before the leakage breaker is activated, check the rated capacity.

Before the leakage breaker is activated, check the rated capacity.

<* Stoppage of Compressor Operation>

The operation may not be available within 1 hours after turning ON the power supply due to the unheated crankcase (stoppage code: d1-22, the ambient temperature is below - 10oC). If the compressor should be within 1 hours, turn ON the power and wait for more than 30 seconds. Press PSW 1 on the outdoor PCB for more than 3 seconds. The forced thermo-OFF function (d1-22) is cancelled and the compressor operation is available.

5.1 Test Run by Remote Control Switch

Refer to "Installation 7. Test Run" and Operation Manual for Remote Control Switch .

5.1 Test Run from Outdoor Unit Side

The procedures for the test run from the outdoor unit side are indicated below. Setting of this DIP switch is possible with the power supply ON.

Setting of DIP Switch (Factory Setting)

DSW1 Test Run

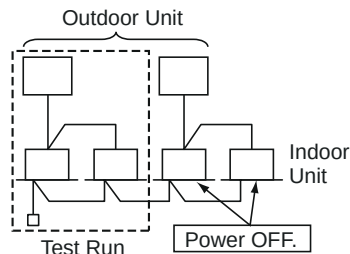
Setting is required.
Setting before Shipment.



Setting Item	Pin No.
1. Test Cooling Operation	1
2. Test Heating Operation	1,2

⚠ WARNING

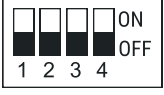
- Do not touch any other electrical part when operating switches on the PCB.
- Do not attach or detach the service cover when the power supply for the outdoor unit is supplied and the outdoor unit is operated.
- Turn all the DIP switches of DSW1 OFF when the test run operation is completed
- When the DHW Tank is connected in the system, please make sure the tank is filled with water.

	Dip Switch Setting	Operation	Remarks
Test Run	1. Setting of Operation Mode Cool: Set DSW1-2 OFF  Heat: Set DSW1-2 ON  2. Starting Test Run Set DSW1-1 ON and the operation is started after a few ~20 seconds. When heating operation, leave DSW1-2 at ON 	1. The indoor unit automatically starts to operate when the test run of the outdoor unit is set. 2. The ON/OFF operation can be performed from the remote control switch or DSW1-1 of the outdoor unit. 3. The operation continuous for two hours without Thermo-OFF.	* Note that the indoor units and DHW Tank operate in conjunction with the test run operation of the outdoor unit. * If the test run is started from the outdoor unit and stopped from the wired controller, the test run function of the wired controller is cancelled. However, the test run function of the outdoor unit is not cancelled. Check to ensure that the DSW1-1 of the outdoor unit PCB is turned OFF. * If multiple indoor units are connected with one wired controller, perform the test run operation individually for each refrigerant system one by one. Then, make sure to turn the power supply OFF for the indoor units in other refrigerant systems not included in the test run.  * The setting of DSW1 is not required for the test run from the wired controller.

NOTE:

Thermo-ON: The outdoor unit and some indoor units are running.

Thermo-OFF: The outdoor unit and some indoor units stay on, but don't run.

	Dip Switch Setting	Operation	Remarks
Manual OFF of Comp.	1. Setting *Compressor Manual OFF: Set DSW1-2,3 ON  2. Reset *Compressor ON: Set DSW1-2,3 OFF 	1. When DSW1-2,3 is ON during compressor operation, the compressor stops operating immediately and the indoor unit is under the condition of Thermo- OFF. 2. When DSW1-2,3 is OFF, the compressor starts operating after the cancellation of three-minutes guard.	* Do not repeat compressor ON/OFF frequently.
Manual Defrost	1. Manual Defrost Operation Press PSW1 for more than three seconds during heating operation, and the defrosting operation starts after two minutes. This function is not possible within five minutes after starting heating operation. 2. Manual Defrost Operation Completion Defrosting operation automatically ends and the heating operation restarts.	1. Defrosting operation is available regardless of frost condition and total time of heating operation. 2. Defrosting operation is not performed when the temperature of outdoor heat exchanger is higher than 10oC, high pressure is higher than 3.2MPa or the unit is Thermo-OFF.	* Do not continuously repeat defrosting operation. * When manual defrosting operation in accepted by PSW1, the time left before starting defrosting operation is indicated on the 7-segment display on the PCB.  Time Left (Every Four Seconds)

NOTE:

Thermo-ON: The outdoor unit and some indoor units are running.

Thermo-OFF: The outdoor unit and some indoor units stay on, but don't run.

When the test run operation is complete, turn all switches of DSW1 OFF.

- (1) If the wired controller is set to a different mode, the test run function will not start In this case, perform the following actions before the test run.
 Wired Controller: STOP
 Central Station: STOP and Wired Controller is available mode.
 COOL/HEAT Change-Over Switch: Connector (CN1) of outdoor unit PCB is open.
 During the test run mode, do not control the wired controller, the central station and cool/heat changeover switch.
 Otherwise, the operation mode will be changed or the test run will end. If necessary, control them after the test run is complete.
- (2) If an alarm code is indicated during the test run, reset the system by turning the main power supply OFF, then back ON. The system should then operate.

5.3 Checking the Test Run

(1) Indoor and Outdoor Fan

Check that the indoor fan and outdoor fan rotate correctly and the airflow is smooth.

Power Supply Voltage

(2) Check the power supply.

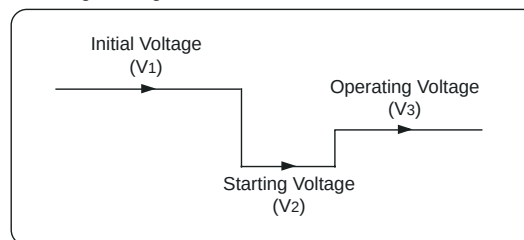
If the power supply is abnormal, contact the electric power company. Usually, voltage drop will occur when starting the operation as shown in the figure (V_2).

In order to protect the device, comply with the following normal range of the power supply voltage.

<Normal Range of Power Supply Voltage>

- Supply Voltage: Rated Voltage $\pm 10\%$
- Starting Voltage (V_2): Rated Voltage $\geq -15\%$
- Operating Voltage (V_3): Rated Voltage $\leq \pm 10\%$

< Voltage Change >



(3) Normal Operating Pressure

Normal operating low pressure is 0.2 to 1.1 MPa and normal operating high pressure (Pd) is 1.0 to 3.5 MPa when the refrigerant charge quantity is correct. Check the operation pressure in the test run mode.

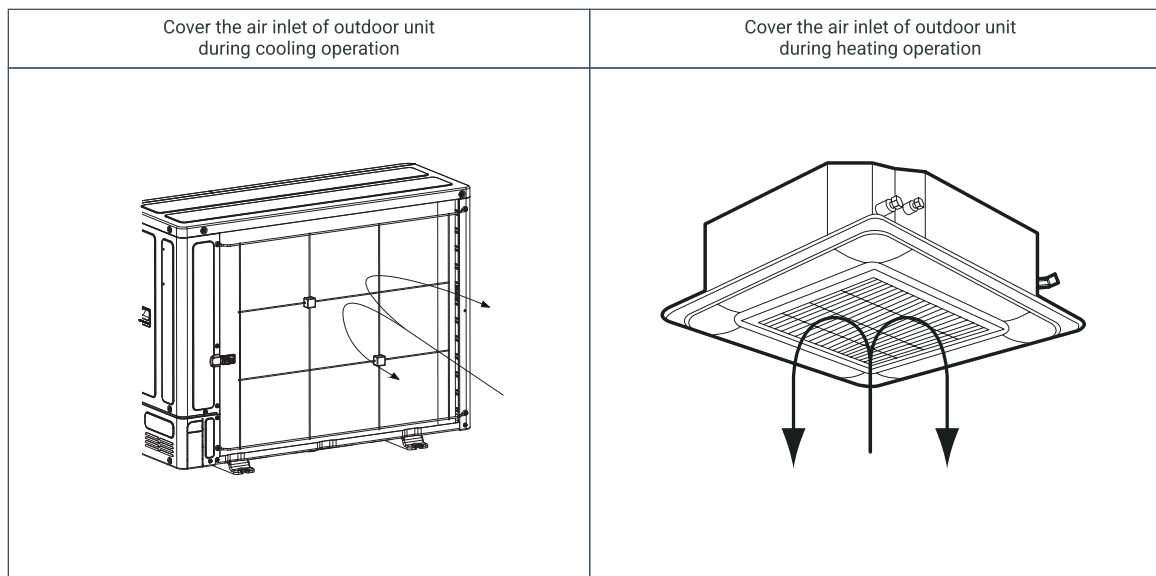
(4) High Pressure Switch

Check the operation pressure of the high pressure switch in the table below.

Refrigerant	Operation Pressure
R32	624 psi (4.3 MPa)

(5) High Pressure Increase Retry (Protection Control)

(a) High pressure will increase when the following procedure is performed.



(b) If the high pressure retry control occurs three times or more within 30 minutes, alarm code "45" is indicated on the LCD of the wired controller or the 7-segment display of the outdoor unit PCB.

NOTE:

High pressure may not increase until the high pressure retry is activated because of the temperature condition.

In test run, make sure the water temperature in the DHW tank is below 122°F, or the high pressure may be activated.

5.4 Checklist For Refrigerant System

The system data can be checked on the 7-segment display of the outdoor unit PCB during the test run and the troubleshooting. However, it may take time for checking because the operation cycle changes depending on the operating condition.

To check the quality of the refrigerant system, the following checklist shall be used at the test run, troubleshooting, and emergency check.

(1) Refrigerant System Check

The most important thing for the refrigerant system is to check that each electronic expansion valve opening and the operating frequency is within the specified range. Each item varies in the value depending on the operating frequency, indoor temperature and ambient temperature.

- (2) The service system checker (PSH-4), which automatically calculates TdSH, facilitates the refrigerant system check. If possible, record the operating cycle data using the service system tester.

CHECK LIST ON TEST OPERATION

CLIENT: _____ MODEL: _____ DATE: _____

O.U. MODEL: _____ O.U. SERIAL NO.: _____ CHECKER: _____

I.U. Model							
I.U. Serial No.							

I.U.: Indoor Unit, O.U.: Outdoor Unit

Piping Length: _____ ft. Additional Refrigerant Charge: _____ lbs

(1) General

No.	Check Item	Result
1	Is DSW setting for outdoor unit No. correct?	
2	Are the powersupply wiring and the communication cable separate from refrigerant pipings?	
3	Is a ground wiring connected?	
4	Is there any short circuit?	
5	Is power supply voltage within rated $\pm 10\%$?	

(2) Refrigerant Cycle

a. Operation (Cooling/Heating)

No.	Check Item	Result
1	Operate all the units ("TEST RUN" mode).	
2	Operate all the indoor units at "HIGH" speed.	

b. Sampling Data (Cooling/Heating, Indoor Temperature 70~86°F (21~30°C)

No.	Check Item	Result
1	Check the operating data after 20-minute operation.	
2	Check Pd and Td. Is Td-SH 59 ~ 113°F (15 ~ 45°C)	
3	Is Ps 22 to 189 psi (0.15 to 1.3 MPa)?	
4	Is Pd 145 to 522 psi (1.0 to 3.6 MPa)? (If the outdoor temperature is high, Pd becomes high.)	

(3) Check Item after Sampling Data

a. Cooling Operation (It is applicable when outdoor temperature is higher than 59°F (15°C))

No.	Check Item	Standard	Causes	Result
1	Is fan actually running when Fo (Air Flow Rate of O.U. Fan) is not "0"?	-	- Fan Motor Failure - O.U. PCB Failure - Condenser Failure	
2	Is the total of iE (I.U. Ex. Valves Opening) abnormally low or high?	-	- Low ----> Excessive Refrigerant - High ----> Insufficient Refrigerant or Excessive Pipe Pressure Loss	
3	Is TL (Liquid Pipe Temp. of I.U. Heat Exchanger) lower than Ti (Intake Air Temp. of I.U.)?	It is normal when TL-Ti < 23°F (-5°C).	- TL Thermistor Failure - I.U. Ex. Valve; Fully Closed - Short-Circuit	
4	Is TG (Gas Pipe Temp. of I.U. Heat Exchanger) lower than Ti (Intake Air Temp. of I.U.)? (It is applicable when Intake Air Temp. is 37°F (3°C) higher than Setting Temp.)	It is normal when TG-Ti < 23°F (-5°C).	- TG Thermistor Failure - I.U. Ex. Valve; Fully Closed or Slightly Open - Short-Circuit	
5	Is there any excessive difference in SH (TG-TL) of I.U. heat exchanger among I.U.s? (It is applicable when Intake Air Temp. is 37°F higher than Setting Temp.)	It is normal if the difference among units is within 45°F (7°C).	- TLfTG Thermistor Failure - I.U. Ex. Valve; Fully Open, Slightly Open or Fully Closed	
6	Is there any I.U. with the I.U. heat exchanger SH (TG-TL) excessively lower than the other units' value and is iE (I.U. Ex. Valves Opening) lower than "5%"?	It is normal if SH of the unit is up to 27°F (-3°C) lower than the other units.	- I.U. Ex. Valve; Locked and Fully Open - Mismatched Wiring and Piping	
7	Is there any I.U. with the I.U. heat exchanger SH (TG-TL) excessively lower than the other units' value and is iE (I.U. Ex. Valves Opening) lower than "100%"?	It is normal if SH of the unit is up to 37°F (3°C) higher than the other units.	- I.U. Ex. Valve; Locked and Slightly Open or Closed - Mismatched between Wiring and Piping	
8	Is the temperature difference between I.U.s* more than 45°F (7°C)? * The temperature difference between I.U.s means the following; in (Inlet Air Temp.) - on (Outlet Air Temp.) indicated on 7-segment display by check mode.	45°F (7°C) and over	-	

b. Heating Operation (It is applicable when outdoor temperature is higher than 32°F (0°C))

No.	Check Item	Standard	Causes	Result
1	Is Eo (O.U. Ex. Valves Opening) abnormally low or high when TdSH is 59°F (15°C) to 113°F (45°C)?	-	- Low ----> Excessive Refrigerant - High ----> Insufficient Refrigerant	
2	Is Pd "1.6MPa(232psi)" to "3.6MPa(522psi)"?	1.6MPa(232psi) to 3.6MPa(522psi) (Pd is high when high indoor temp.)	- Low ----> Solenoid Valve SVA Leakage - High ----> Excessive Gas Pipe Pressure Loss	
3	Is Ps "0.15MPa(22psi)" to "1.3MPa(189psi)"?	0.15MPa(22psi) to 1.3MPa(189psi)	- Low----> O.U. Short-circuit - Low/High ----> O.U. Fan - Motor Failure, Fan Module Failure or Outdoor Ambient Thermistor Failure	
4	Is the temperatur difference between I.U.s* more than 50°F (10°C) when iE (I.U. Ex. Valve) is "100%"? * The temperature difference between I.U. means the following; on (Outlet Air Temp.) - in (Inlet Air Temp.) indicated on 7-segment display by check mode. However, this is applicable only when (Inlet Air Temp.) - (Setting Temp.) is higher than 37°F (3°C).	50°F (10°C) and above	- Failure in PCB, Wiring, I. U. Ex. Valve and Coil - Excessive Pipe Pressure Loss - Thermistor Failure for Discharge Air	