

VRF AIR-CONDITIONER
「HEAT PUMP」

Service Handbook

CHV6 URBAN MINI

BASIC MODELS

- CHV6-28URBM
- CHV6-36URBM
- CHV6-48URBM
- CHV6-60URBM



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:



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



: Indicates 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)

		Maximum	Minimum
Cooling Operation	Indoor	89(32) DB/ 73(23) WB	69(21) DB/ 59(15) WB
	Outdoor	114(46) DB	23(-5) DB
Heating Operation	Indoor	86(30) DB	59(15) DB
	Outdoor	60 (15.5) WB	-4(-20) WB

DB: Dry Bulb, WB: Wet Bulb

DANGER

- Do not perform installation work, refrigerant piping work, drain pump, drain piping and electrical wiring connection without referring to our 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 hazard.
- 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 R410A for this unit is incombustible, non-toxic and odorless; however if the refrigerant is leaked and is contacted with fire, toxic gas will generate. Also because the R410A is heavier than air, the floor surface will be filled with it, which could cause difficulty with breathing due to insufficient air. Turn OFF the main switch, extinguish any naked flames and contact your service contractor, if refrigerant leakage occurs. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases can cause an explosion. It is recommended that nitrogen be used for these types of tests.
- Refrigerant safety leakage standards for construction and operation systems are determined in accordance with local regulations or standards.
- Use an GLB (Ground 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, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and 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 and choose the cables correctly. If not, an electrical failure or a fire may break out.
- 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 by a responsible person concerning use of the appliance and hazard involved to ensure that they can use it safely. 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 PRODUCT RECEIVED

- 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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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.

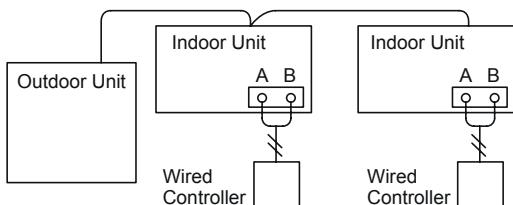
No.	Check Item	Check Method
1	Is power supply breaker or fuse blown out?	Check the voltage (secondary side) of the breaker and also check the conductivity of fuse by a tester.
2	Is voltage at secondary side of transformer correct?	Disconnect connection at the secondary side of the transformer and measure voltage by a tester.
3	Is wiring firmly fixed or correctly connected?	Check that the following wiring connections on O.U./I.U. PCBs are 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:

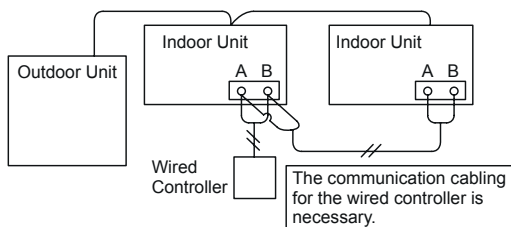
If the fuse(s) on an I.U. PCB blows out, diagnose the cause of overcurrent and recover the fuse(s).

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

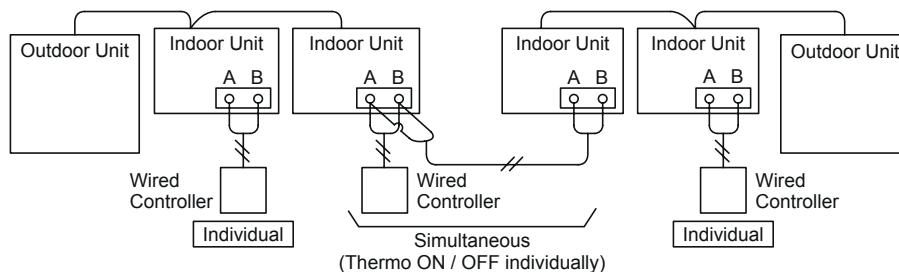
- For Indoor Unit
Refer to the Service Manual for Indoor Unit.
- Wired Controller Connecting Diagram
(a) Wired Controllers to each Unit for Individual Operation Setting



- (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 Settings

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

- (1) Outdoor Unit (factory setting)

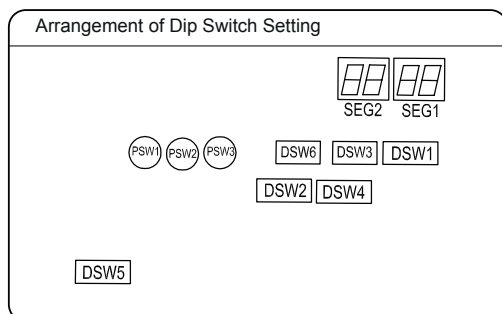
Turn OFF all power supplies before performing settings.

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 
		3	Compressor Forced Stop	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 

DSW3 Capacity and Power Supply Setting

Setting is required. Setting Before Shipment	
CHV6-28URBM2	CHV6-36URBM
	
CHV6-48URBM	CHV6-60URBM
	

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

Setting is required. Setting Before Shipment	Example: 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.	

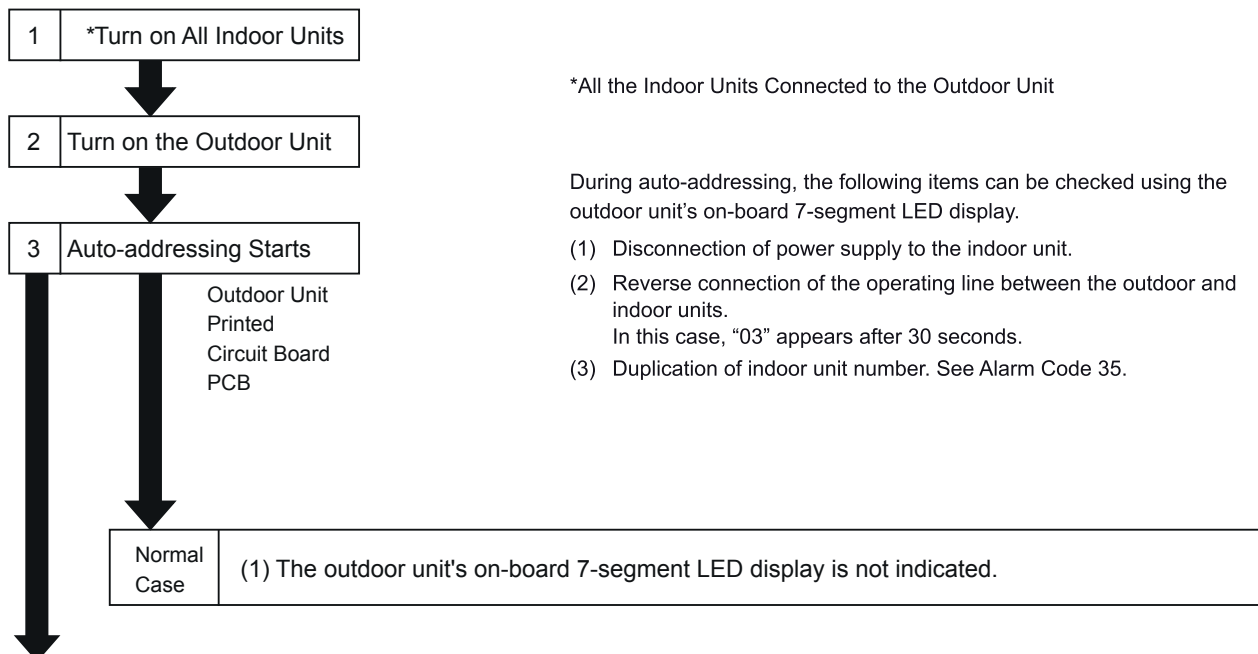
DSW6 Piping Setting

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 

1.2 Initial Troubleshooting

1.2.1 Checking Of Using 7-Segment Display

- Simple Checking by 7-Segment Display



*All the Indoor Units Connected to the Outdoor Unit

During auto-addressing, the following items can be checked using the outdoor unit's on-board 7-segment LED display.

- (1) Disconnection of power supply to the indoor unit.
- (2) Reverse connection of the operating line between the outdoor and indoor units.
In this case, "03" appears after 30 seconds.
- (3) Duplication of indoor unit number. See Alarm Code 35.

Abnormal Case

(2) The outdoor unit's on-board 7-segment LED display indicates the followings if there is something wrong.

(A) Alarm code will be displayed on the 7-segment when alarm is received from indoor unit in normal mode.
As for the following alarm codes, however, alarm code will be displayed on the 7-segment when alarm is detected by outdoor unit itself.
Alarm Code "03" (Abnormal Transmission between Indoor Unit and Outdoor Unit)
Alarm Code "35" (Incorrect Indoor and Outdoor Unit No. Setting)

(B) Alarm code of smaller indoor unit address No. will be displayed when alarm is received from multiple indoor units.

(C) The following 7-segment is displayed and flashed every 0.5 seconds.

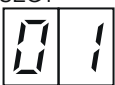
SEG2

SEG1



Alarm Code

(D) SEG1 and SEG2 are as follows.

7-Segment Display	Dotted Indication	Remarks
<In Case of Unit No. 63, Alarm Code "01"> SEG2: Indoor Unit No. (0~63) SEG1: Alarm Code SEG2  Indoor Unit No. SEG1  Alarm Code	SEG2  Dotted Indication	In the case that 2 refrigerant cycle groups exist, one refrigerant cycle group is shown without dotted indication. The other refrigerant cycle group is shown with dotted indication.

⚠ WARNING

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.

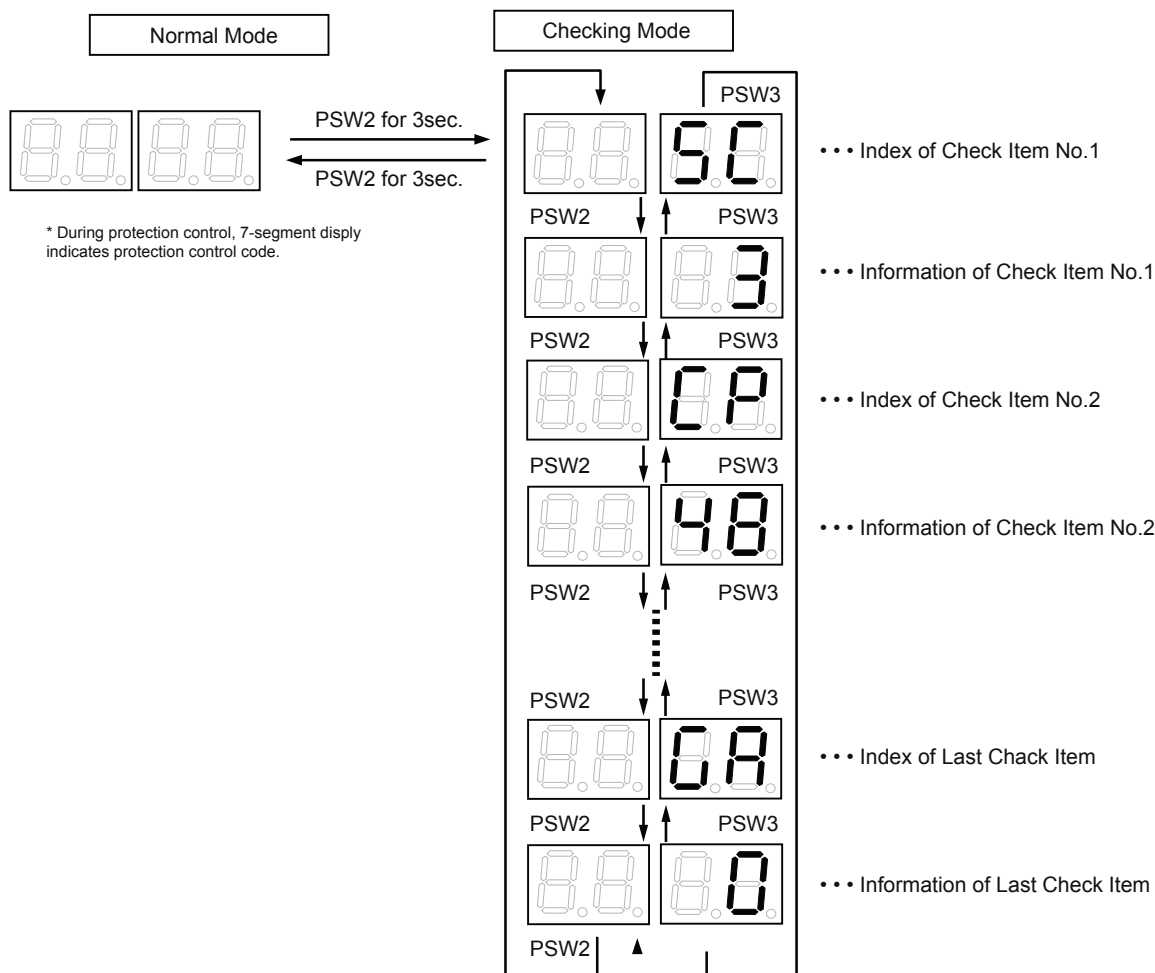
You can check the operating conditions and each part of the refrigerant system temperature condition by 7-segment display (SEG1,2) on the outdoor unit PCB and push switches (PSW).

To start the checking mode: Press PSW2 for 3 seconds

To move the checking item forward: Press PSW2

To move the checking item backward: Press PSW3

To cancel the checking mode: Press PSW2 for 3 seconds



Details of 7-Segment Display

Check No.	Item	Index	Indication Data	
			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 00	-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 00	-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 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)	
14	Inverter Primary Current	88 00	0~255 [A]	
15	Indoor Electronic Expansion Valve Opening (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ 0~100 [%] No. 63 Indoor Unit	
16	Liquid Pipe Temperature of Indoor Unit (0~63)	88 00 ~ 88 66	No. 0 Indoor Unit ~ -62 ~ 127 [°C](-80 ~ 260 [°F]) *1 No. 63 Indoor Unit	
17	Gas Pipe Temperature of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ -62 ~ 127 [°C](-80 ~ 260 [°F]) *1 No. 63 Indoor Unit	
18	Inlet Air Temperature of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ -62 ~ 127 [°C](-80 ~ 260 [°F]) *1 No. 63 Indoor Unit	
19	Outlet Air Temperature of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ -62 ~ 127 [°C](-80 ~ 260 [°F]) *1 No. 63 Indoor Unit	
20	Capacity of Outdoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ 0~999 Refer to "(2) Indoor Unit Capacity Table" No. 63 Indoor Unit	
21	Cause Code of Indoor Unit (0~63)	88 00 ~ 88 63	No. 0 Indoor Unit ~ 0~99 Refer to "(3) Cause Code of I.U. or O.U. Stoppage" No. 63 Indoor Unit	
22	The Degeneration Control of Pressure Ratio Decrease Protection	88 00	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated	
23	The Degeneration Control of High Pressure Increase Protection	88 00	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated	
24	The Degeneration Control of Inverter Temp. Increase Protection	88 00	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated	
25	The Degeneration Control of Discharge Temp. Increase Protection	88 00	0: The Degeneration Control is not Activated 1: The Degeneration Control is Activated	

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

(1) Outdoor Unit Capacity Table

Indication	Capacity(HP)	Model(kBtu/h)
24	3	28
32	4	36
40	5	48
48	6	60

(2) Indoor Unit Capacity Table

Indication	Capacity (HP)	Model (kBtu/h)	Indication	Capacity (HP)	Model (kBtu/h)	Indication	Capacity (HP)	Model (kBtu/h)
4	0.5	05	13	1.8	15	22	3.0	27
6	0.8	07	14	2.0	17	26	3.3	30
8	1.0	09	16	2.3	19	32	4.0	38
10	1.3	12	18	2.5	22	40	5.0	48
11	1.5	14	20	2.8	24	48	6.0	54

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

Code	Item	Code	Item
00	Operation OFF, Power OFF	15	Retry due to Discharge Gas Temperature Increase Retry due to Low Pressure Decrease
01	Thermo-OFF	16	Retry due to Discharge Gas SUPERHEAT Decrease
02	Alarm	17	Instantaneous Overcurrent of Inverter Retry Electronic Thermal Activation of Inverter Retry Abnormal Current Sensor of Inverter Retry
03	Freeze Protection Overheating Protection	18	Retry due to Inverter Voltage Decrease Retry due to Inverter Overvoltage
05	Instantaneous Power Failure at the Outdoor Unit	19	Electronic Expansion Valve Opening Difference Protection
06	Instantaneous Power Failure at the Indoor Unit	20	Operation Mode Clash With Other Indoor Unit
07	Stoppage of Cooling Operation due to High/Low Outdoor Air Temperature Stoppage of Heating Operation due to High Outdoor Air Temperature	21	Forced Thermo-OFF for Oil Return
10	Demand. Forced Stoppage	22	The Outdoor Unit Hot Start
11	Retry due to Pressure Ratio Decrease	26	Retry due to High Pressure Decrease
12	Retry due to Ps Increase	28	Cooling Air Discharge Temperature Decrease
13	Retry due to Pd Increase		

- 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.
- 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".
- When the communication between the indoor unit 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 and Outdoor Unit) occurs, the cause code of indoor unit 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	Abnormality between Indoor and Outdoor	Incorrect Wiring, Loose Terminals, Disconnect Wire, Blowout of Fuse, Outdoor 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 and Controller	Inlet Air Thermistor/ Inlet Water Thermistor	Incorrect Wiring, Disconnecting Wiring Breaking Wire, Short Circuit
12		Outlet Air Thermistor/ Outlet Water Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
15		Abnormality of Indoor Air Thermistor (Total Heat Exchanger)	
16		Abnormality of Remote Control Thermistor	
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 Air Thermistor	
23		Discharge Gas Thermistor on Top of Compressor	
24		Heat Exchanger Liquid Pipe Thermistor or Tsc 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		Incorrect Setting of Indoor Unit No.	Duplication of Indoor Unit No. in same Ref. Gr.
36		Incorrect of Indoor Unit Combination	Indoor Unit is Designed for R22
38		Abnormality of Picking up Circuit for Protection in Outdoor Unit	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 of 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	Fan Controller	Activation of Fan Controller Protection	Incorrect Wiring between PCB,Driver IC and Fan-motor (Broken,wrong wiring)
EE	Compressor	Compressor Protection Alarm (It 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
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.

NOTES:

1. 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.
2. The outdoor unit is designed for single phase. Accordingly, the alarm code "05" is not available.

(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)	--	--
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 protection	3	--
d1-17			
55	Inverter failure	0,9,10,11,13,14,15,16	--
d1-18			
57	Abnormality of Outdoor Fan Motor	--	--
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		--	--

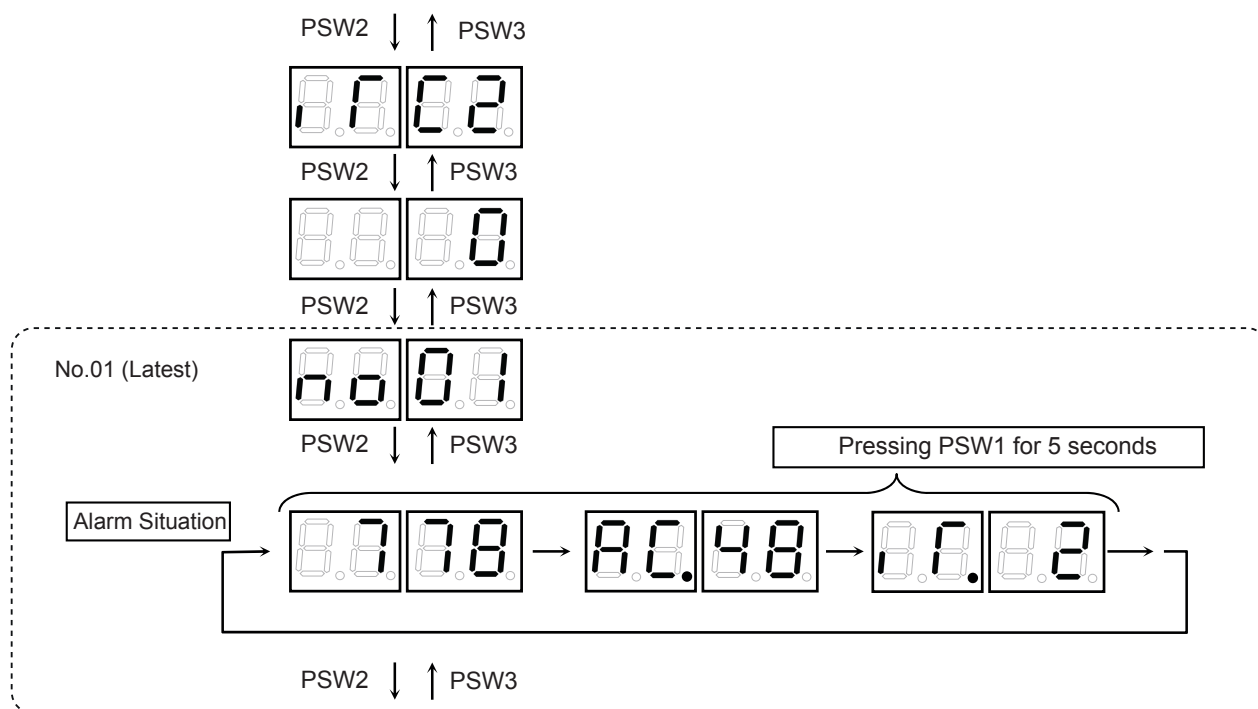
ITC: Inverter Stoppage Code

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 Higher Rank Order of Protection Control Function	Forced Decrease	①	①	①	①
	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.

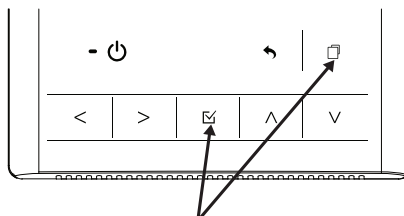
1.2.3 Check Mode by Remote Control Switch

1.2.3.1 Check mode

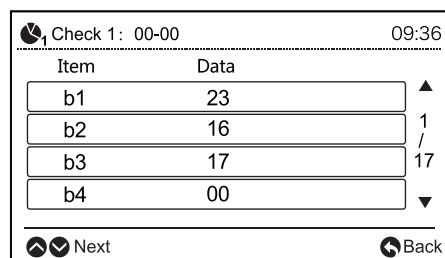
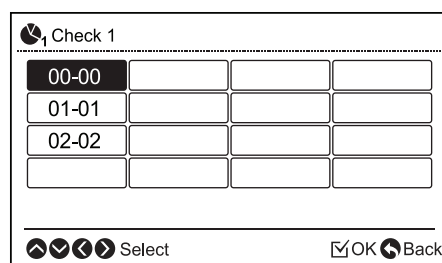
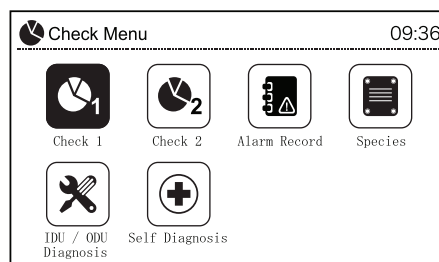
Each “Check Menu” item and its function are explained in the following table.

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.

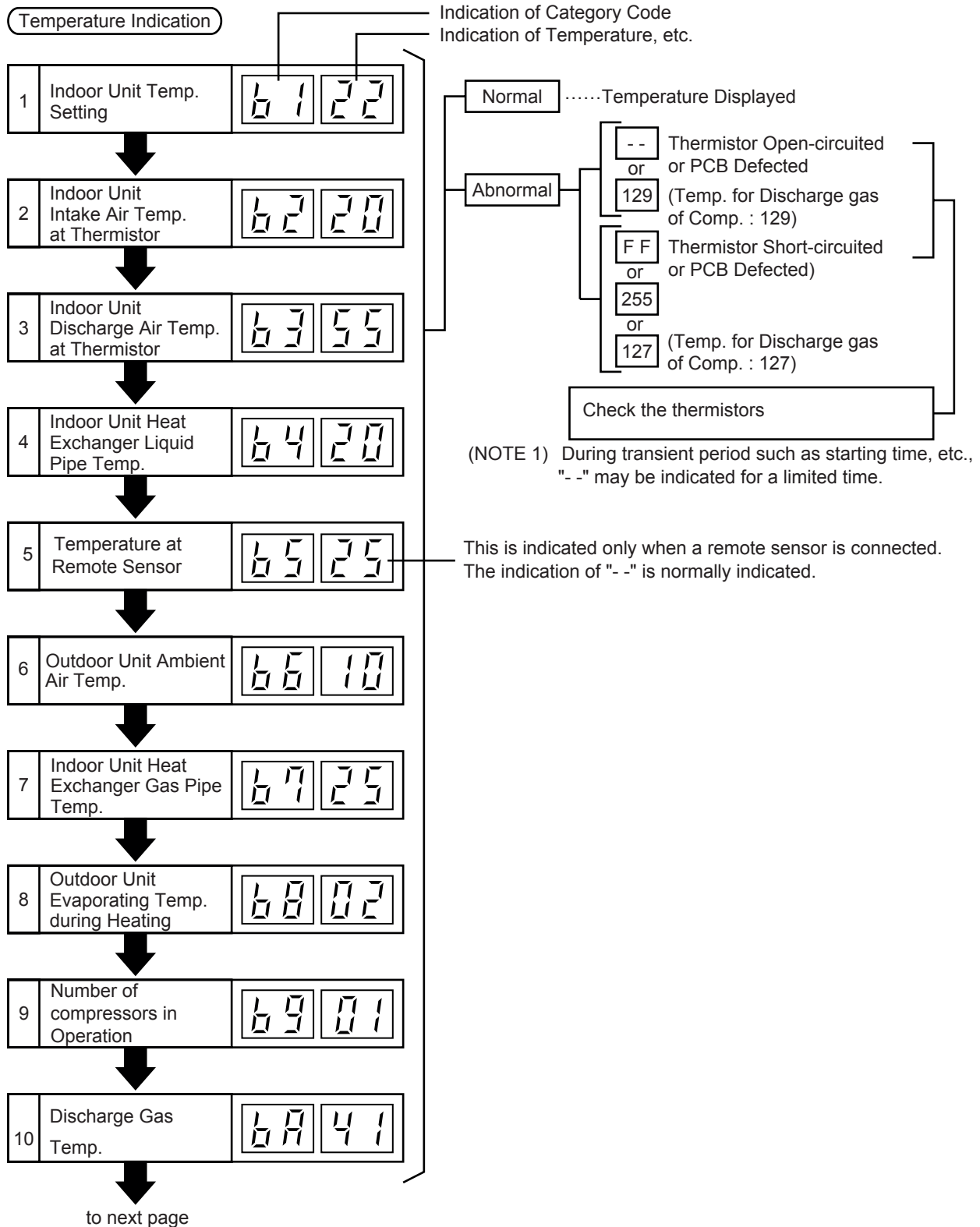
- Setting Method :



Press and hold “” (menu) and “” simultaneously for at least 3 seconds during the normal mode . The check menu will be displayed.



(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
----	---------------	----	----

to next page

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.

Compressor Pressure/Frequency Indication

20 Discharge Pressure (High) (x 0.1 MPa) H118

21 Suction Pressure (Low) (x 0.01 MPa) H204

22 Control Information H344

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

23 Operation Frequency (Hz) H444

This is an indication for frequency of Inverter.

Indoor Unit Capacity Indication

24 Indoor Unit Capacity J100

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

25 Outdoor Unit Code J2Fn

26 Refrigerant Cycle Number J301

27 Refrigerant Cycle Number J400

"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 (%) L120

J3: 01 to 16

(01: when shipment (DSW5), Decimal Indication)

J4: 00 to 0F

(00: when shipment (DSW5), Indication with 16 numbers)

29 Outdoor Unit Expansion Valve MV1 Opening (%) L299

30 Outdoor Unit Expansion Valve MV2 Opening (%) L399

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

31 Outdoor Unit Expansion Valve MVB Opening (%) L400

Estimated Electric Current Indication

32 Compressor Running Current (A) P125

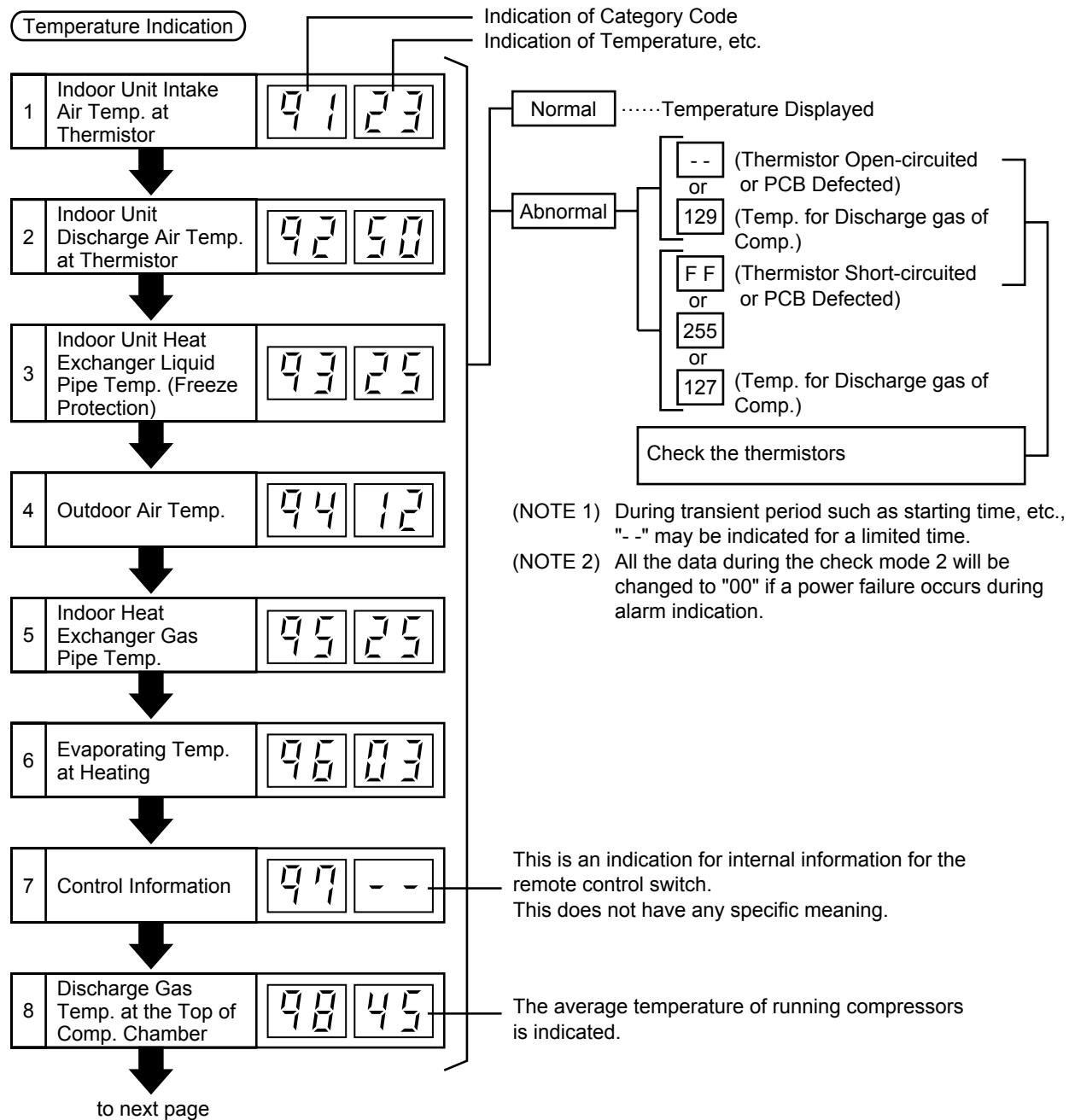
The total current is indicated when several compressors are running.

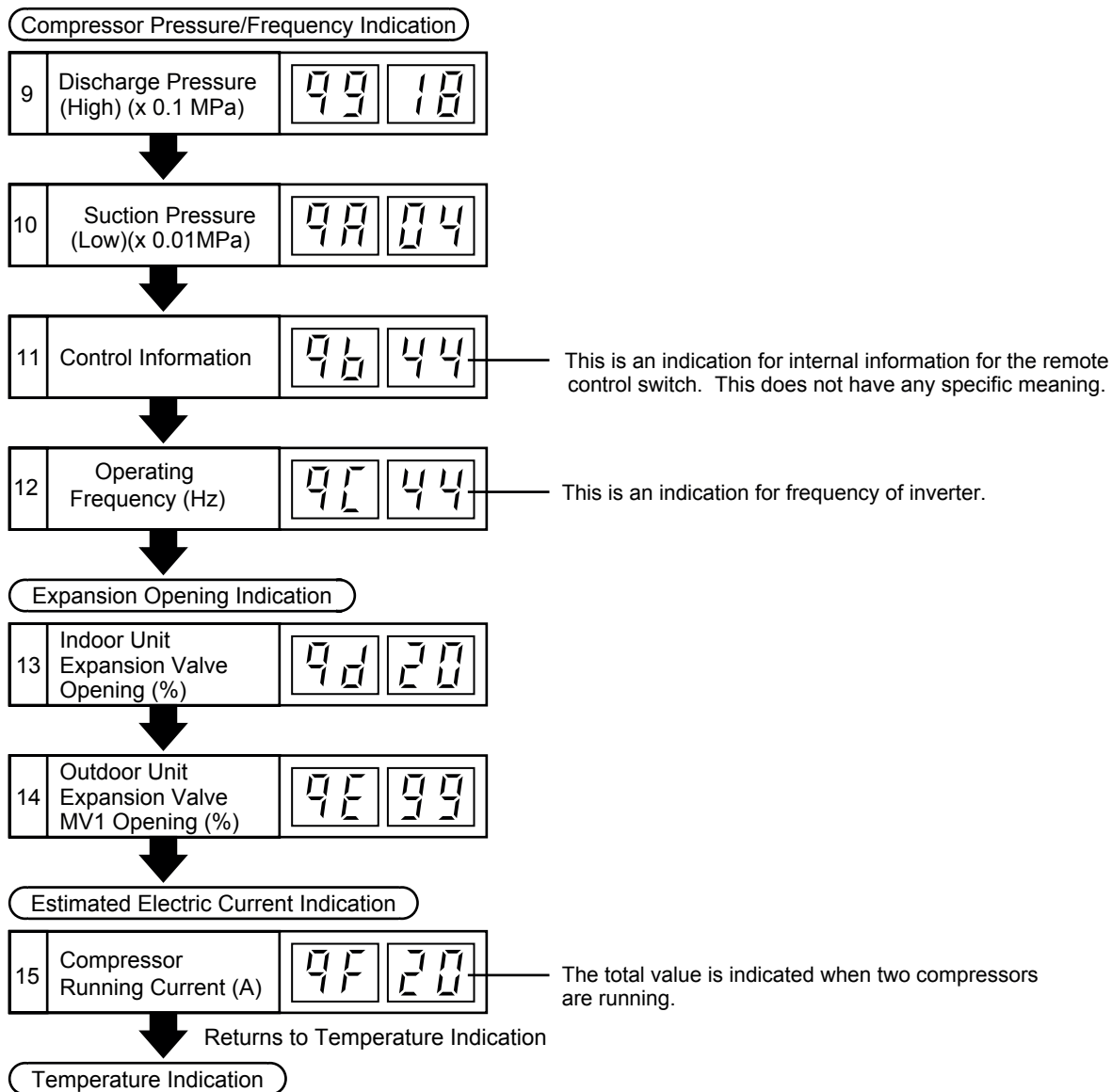
In case of inverter compressor, the running current of primary side of inverter is indicated.

Returns to Temperature Indication

Temperature Indication

(2) Contents of Check Mode 2

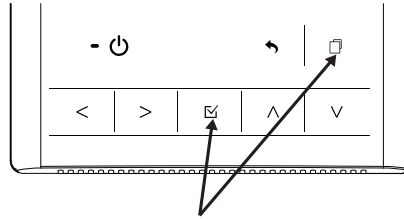




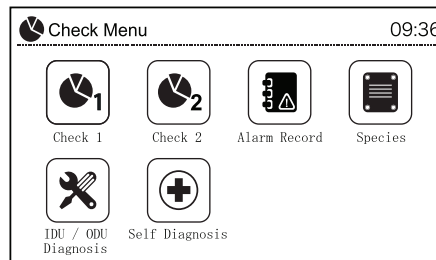
1.2.3.2 Alarm History Display

The alarm history display is available to be set from the check menu.

- Setting Method



Press and hold “” (menu) and “” simultaneously for at least 3 seconds during the normal mode . The check menu will be displayed.



- Select “Alarm Record”

※ To Erase Alarm Record

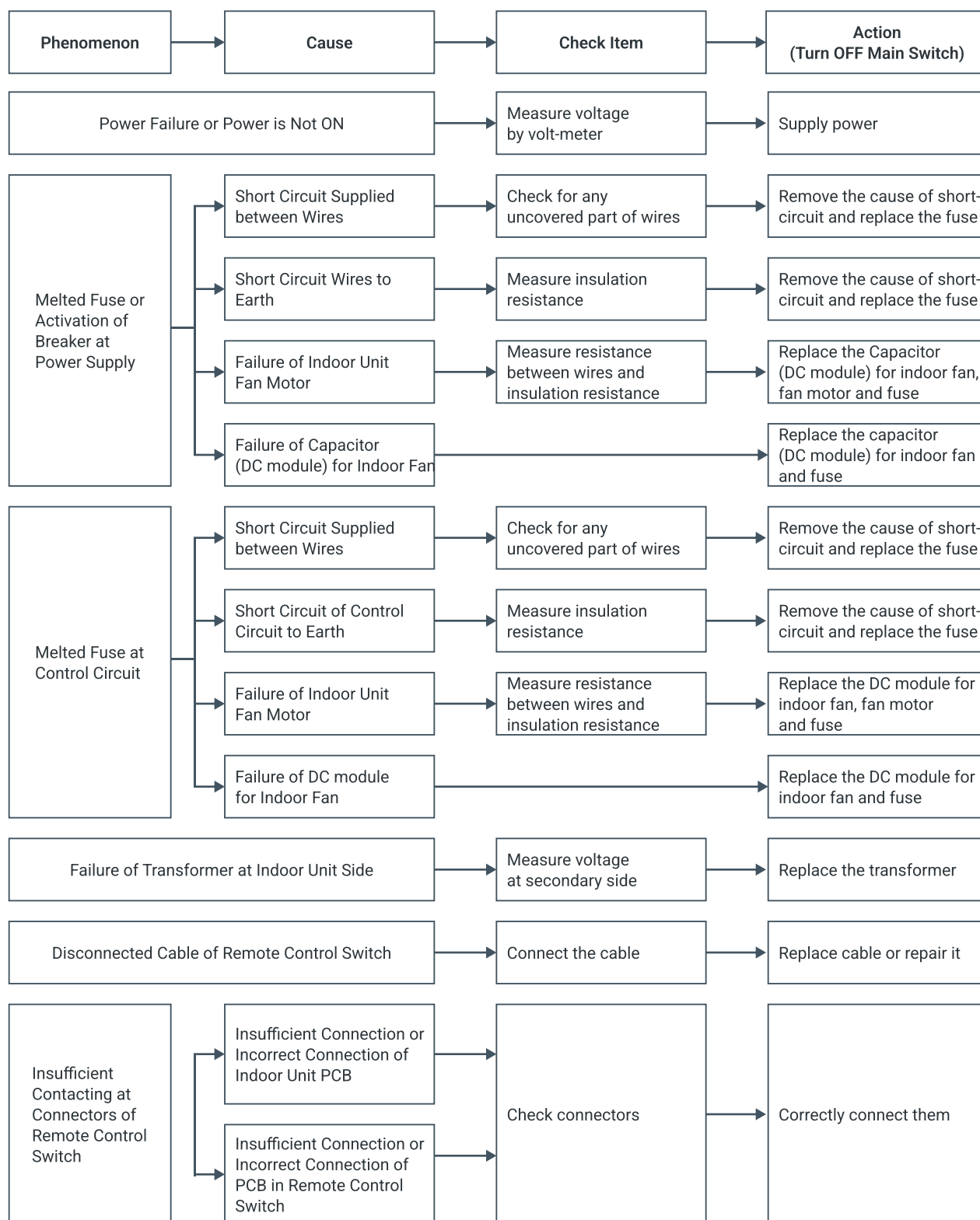
Press “” when the abnormality record is indicated. After that, the confirmation interface will be displayed.

Select “Yes” and press “” so that the alarm record will be deleted.

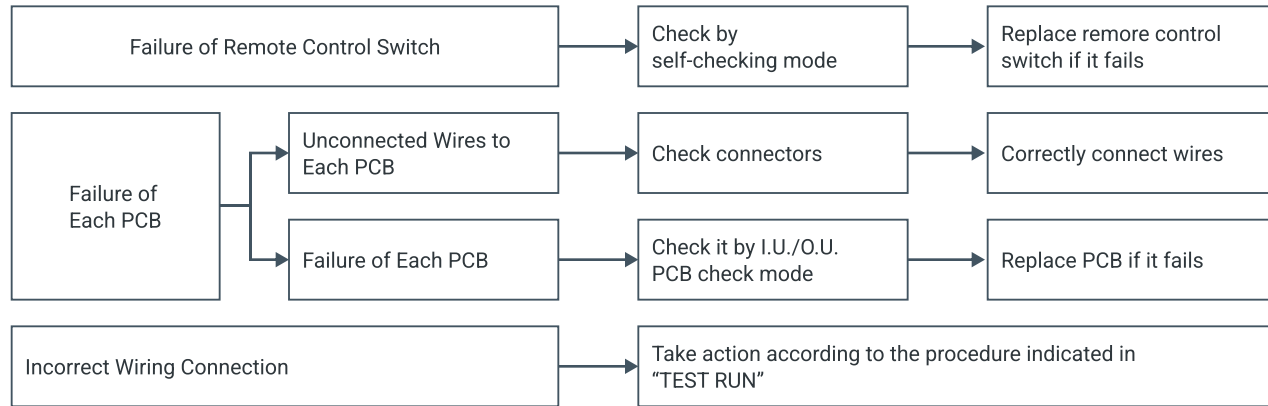
1.2.4 Failure of Power Supply to Indoor Unit and Remote Control Switch

- 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.

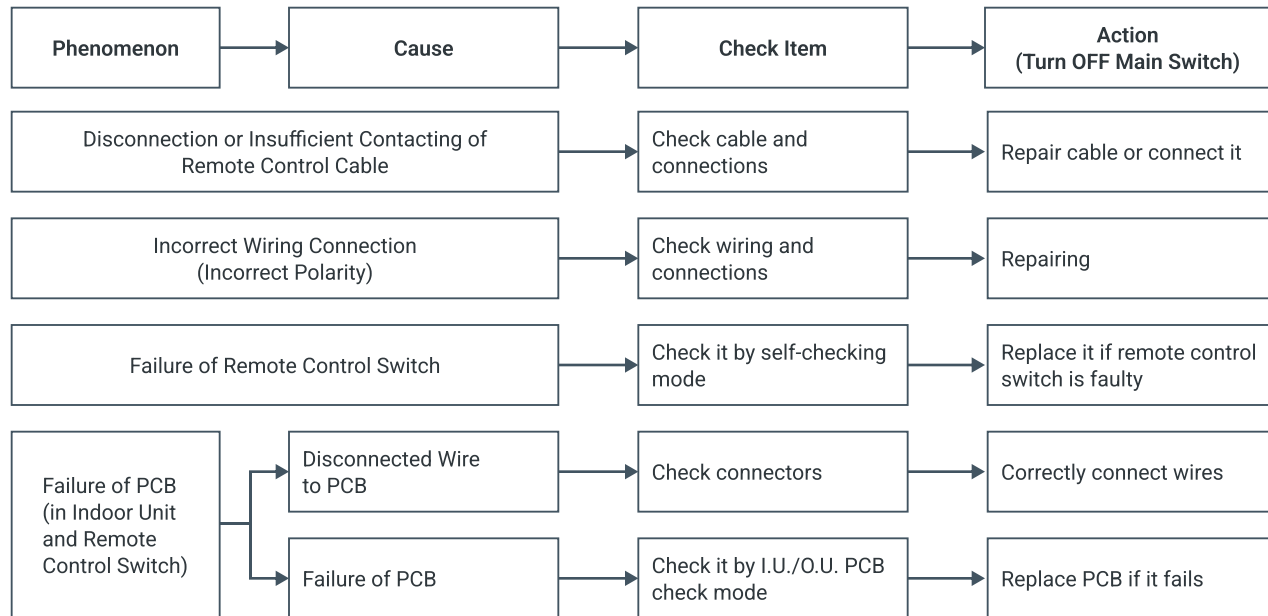


(1.2.4 Failure of Power Supply to Indoor Unit and Remote Control Switch)



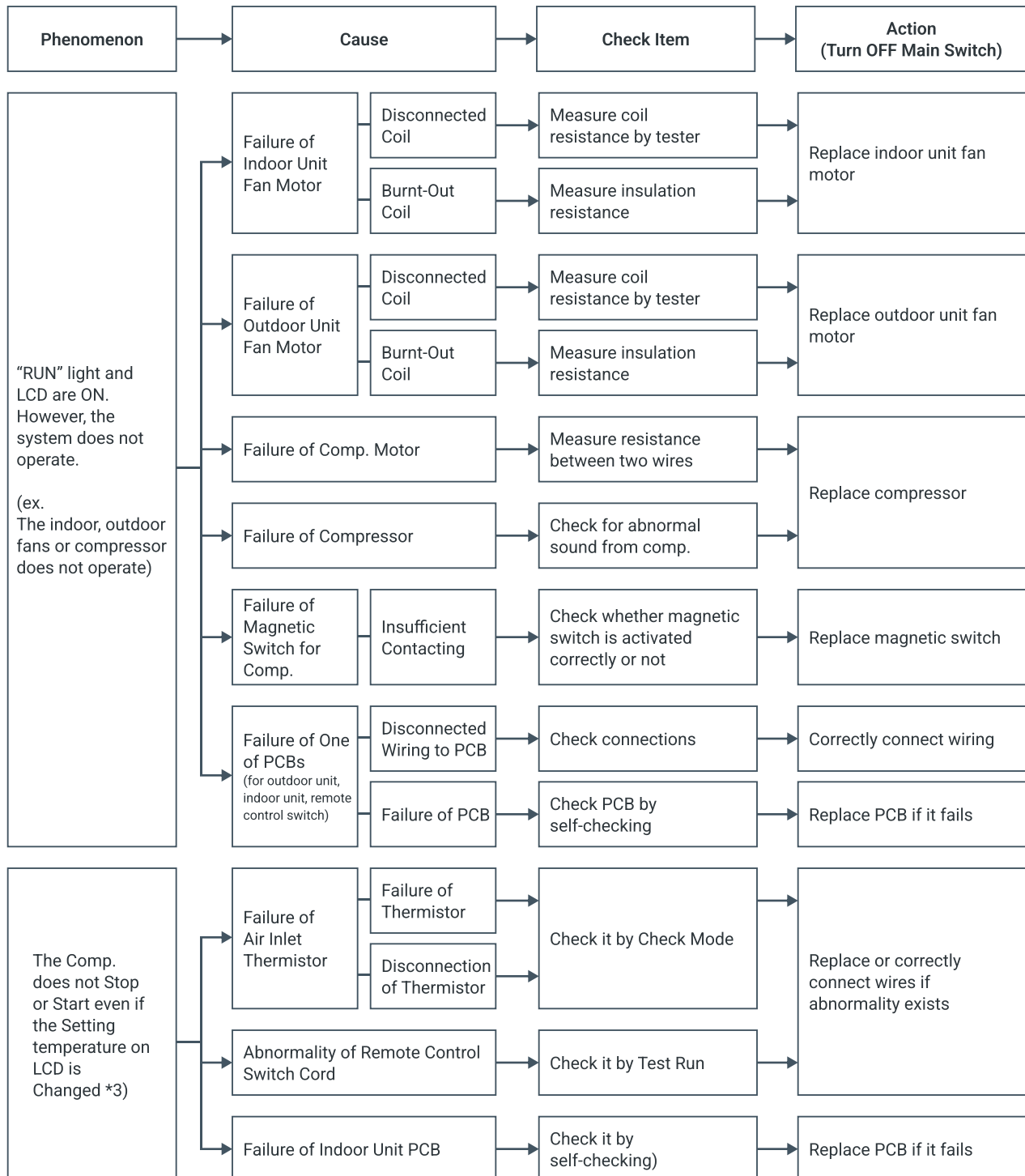
1.2.5 Abnormal Transmission between Remote Control Switch and Indoor Unit

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

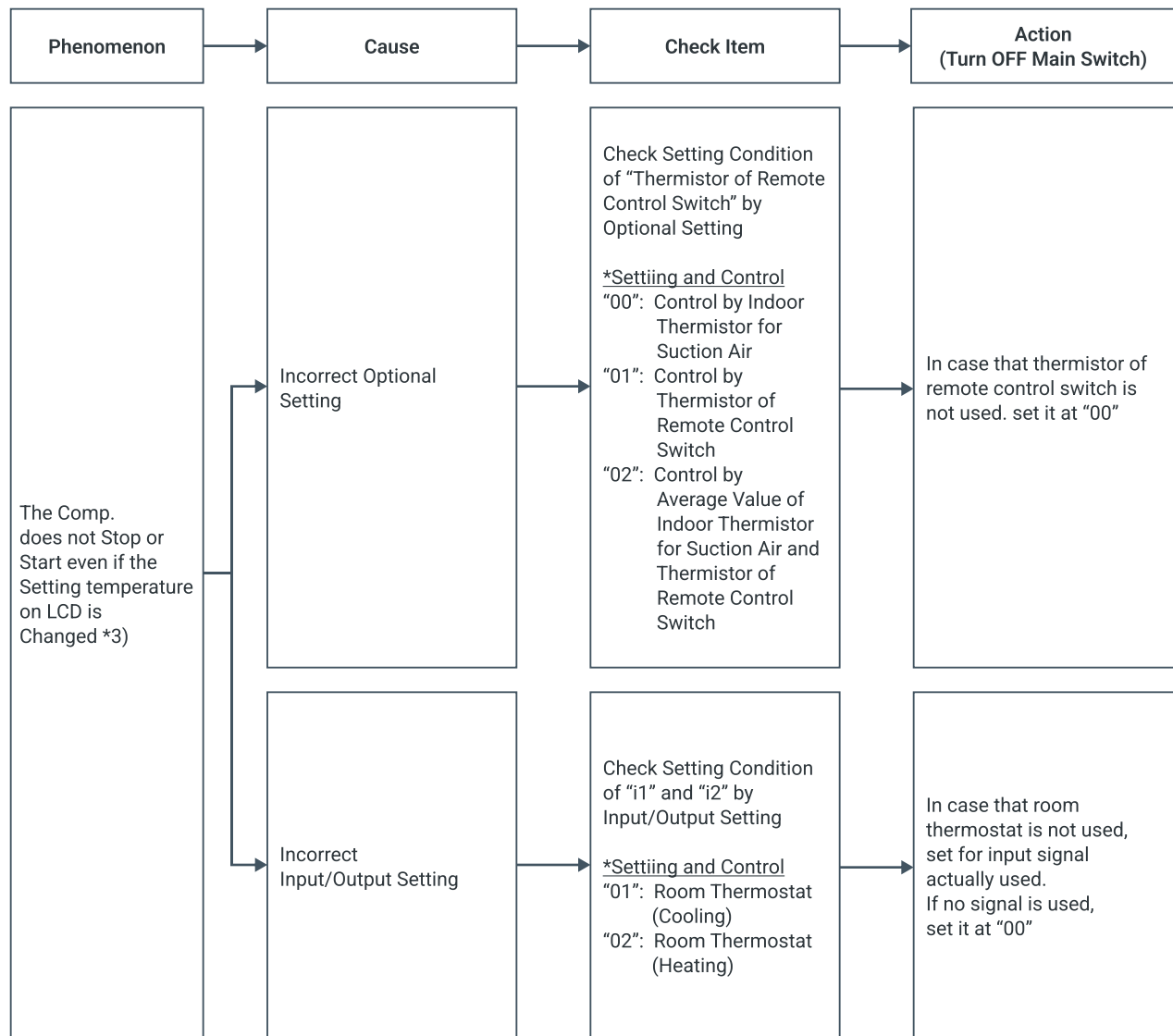


1.2.6 Abnormalities of Devices

- 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 following procedures.



(1.2.6 Abnormalities of Devices)



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

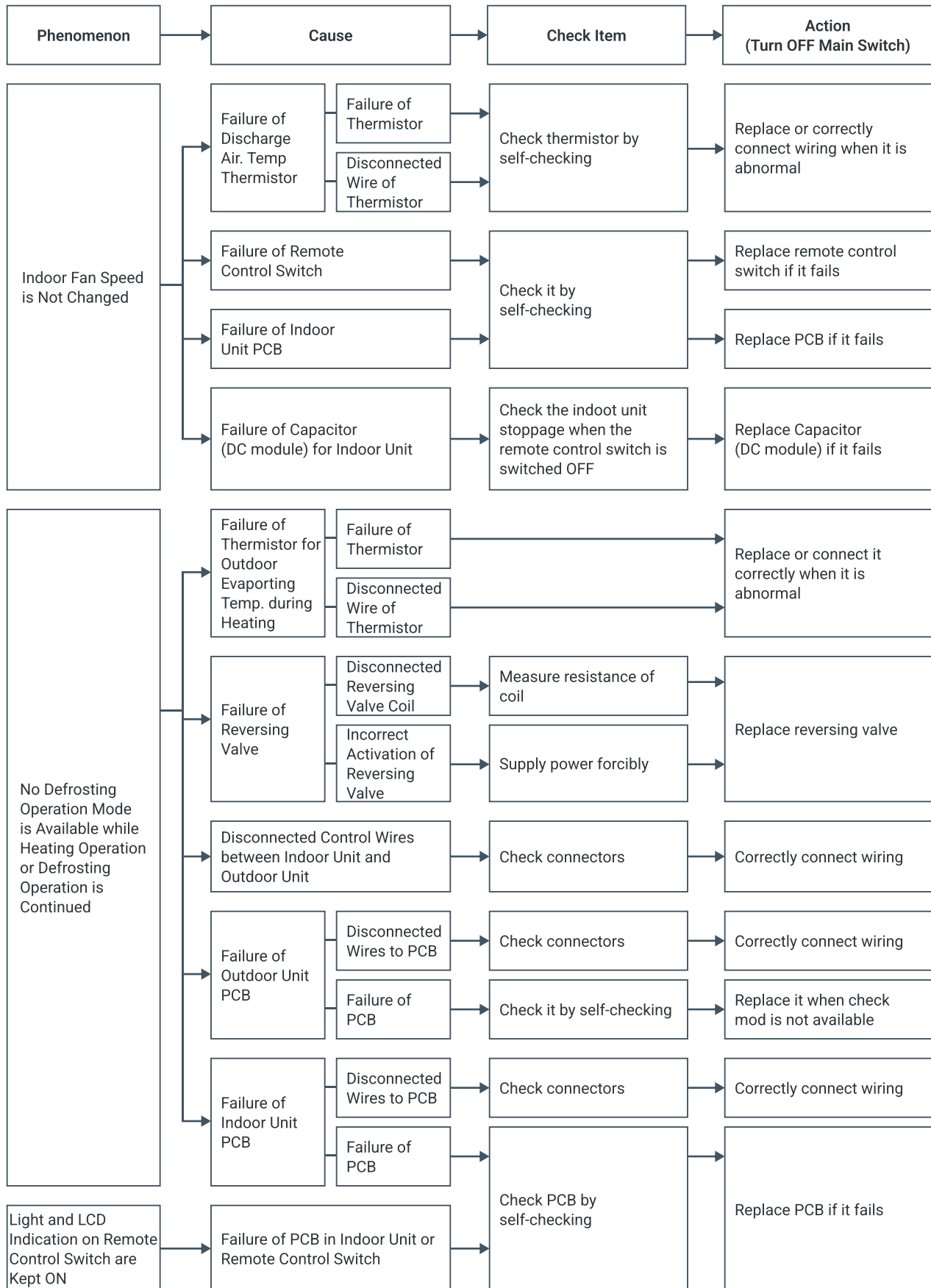
* Indoor Air Temp. is lower than 21 °C or Outdoor Air Temp. is lower than -5°C during cooling operation.

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

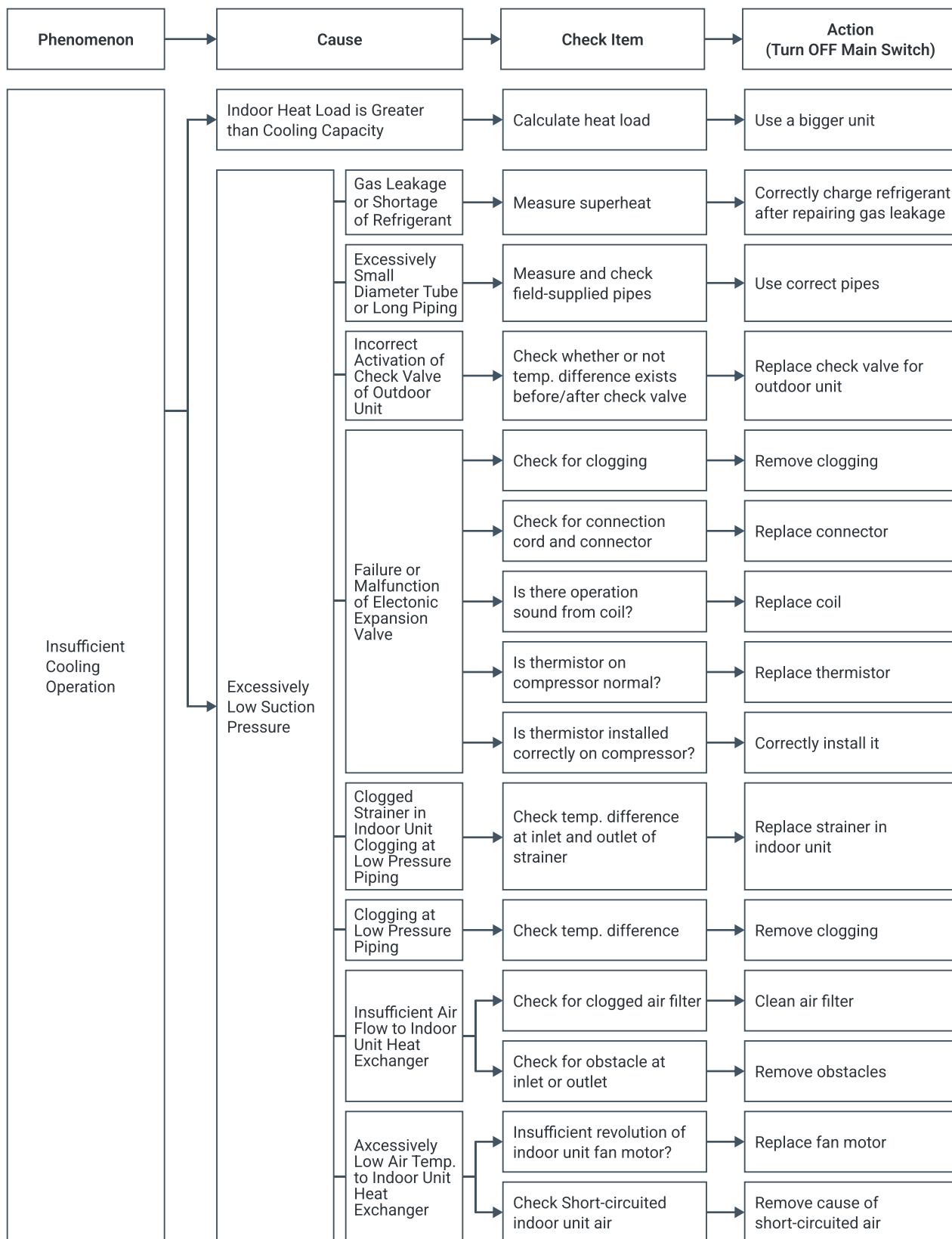
* When a cooling (or heating) operation signal is given to the outdoor unit and a different operation signal is given to indoor units.

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

(1.2.6 Abnormalities of Devices)



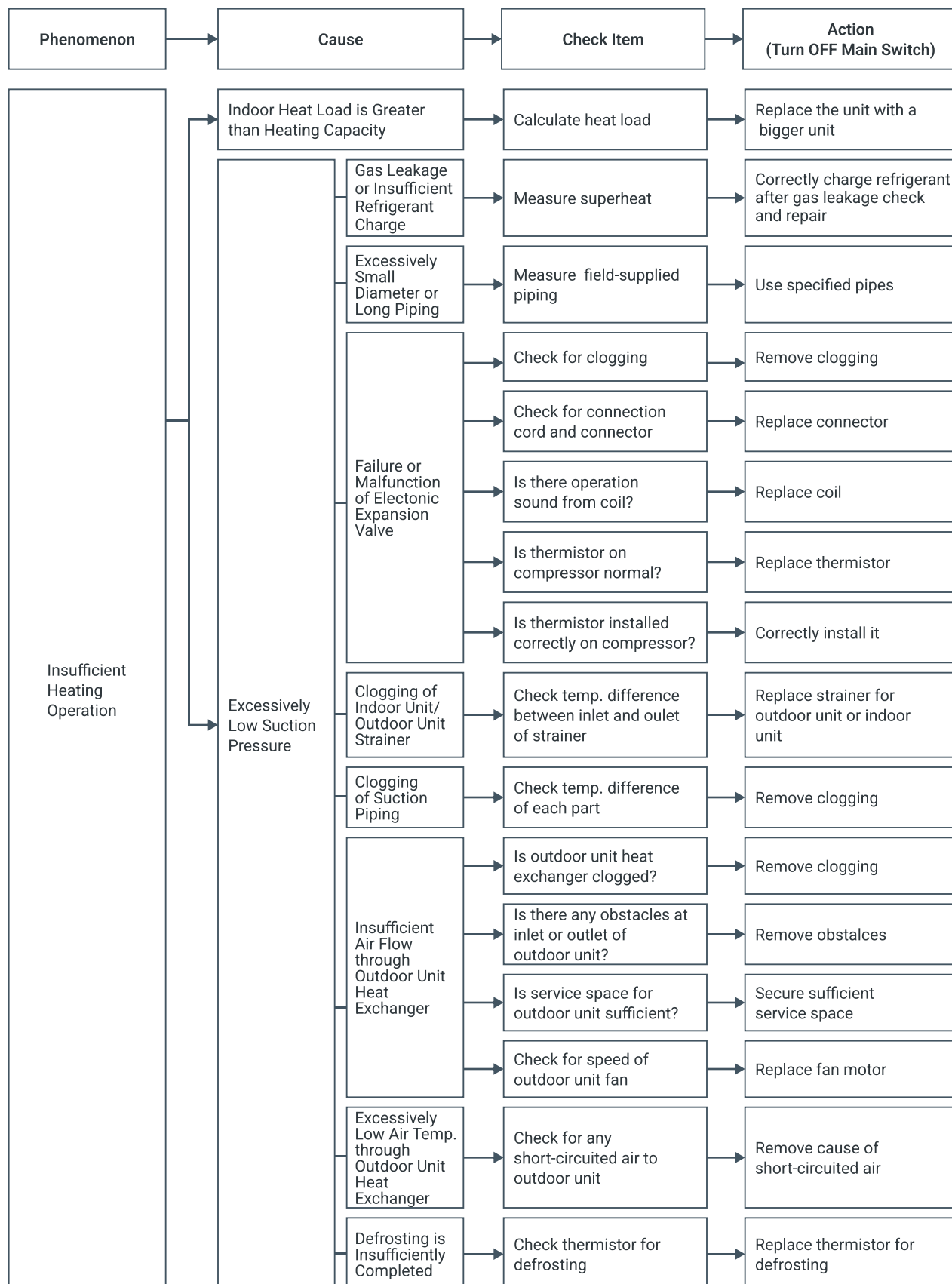
(1.2.6 Abnormalities of Devices)



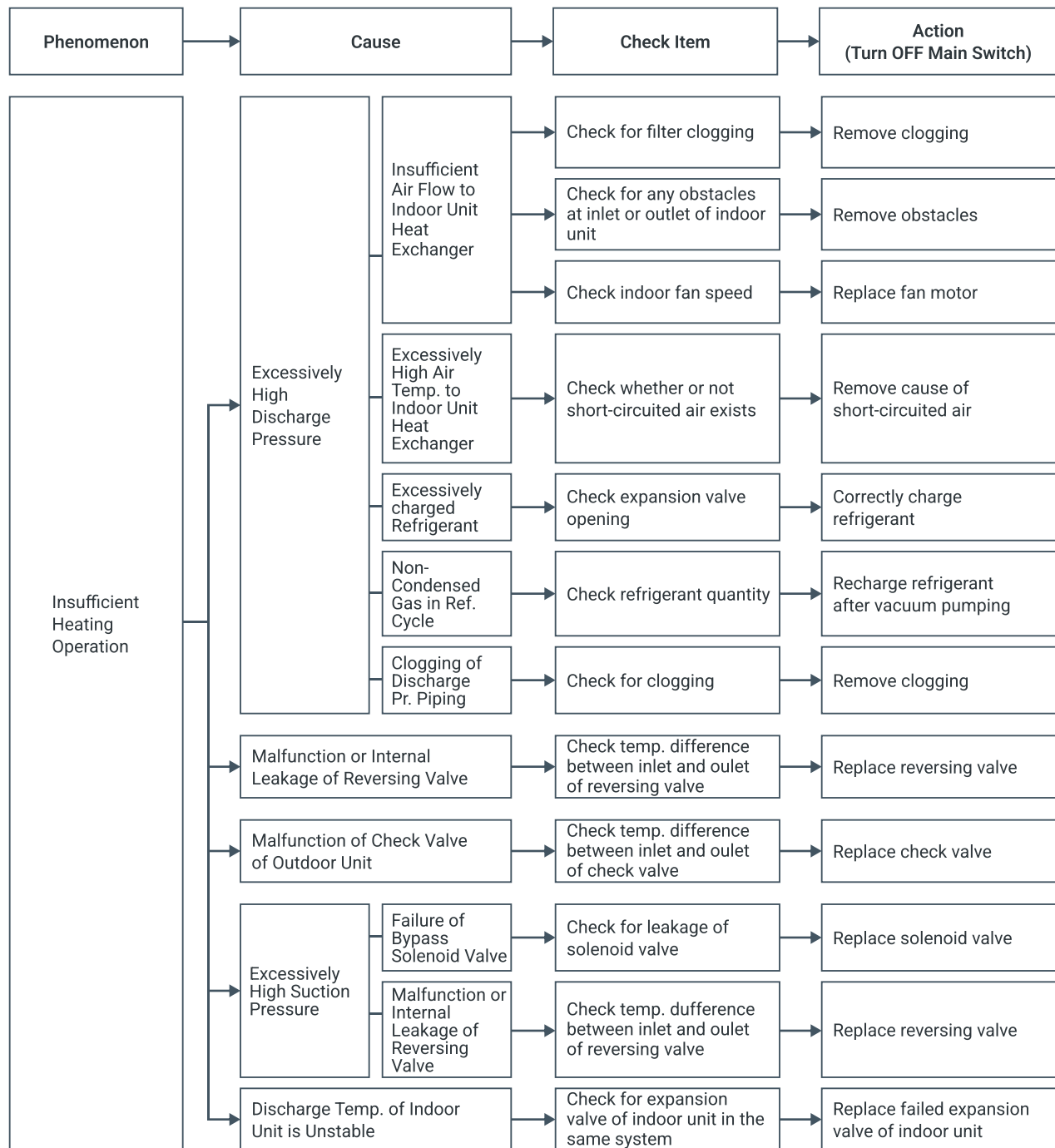
(1.2.6 Abnormalities of Devices)

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)



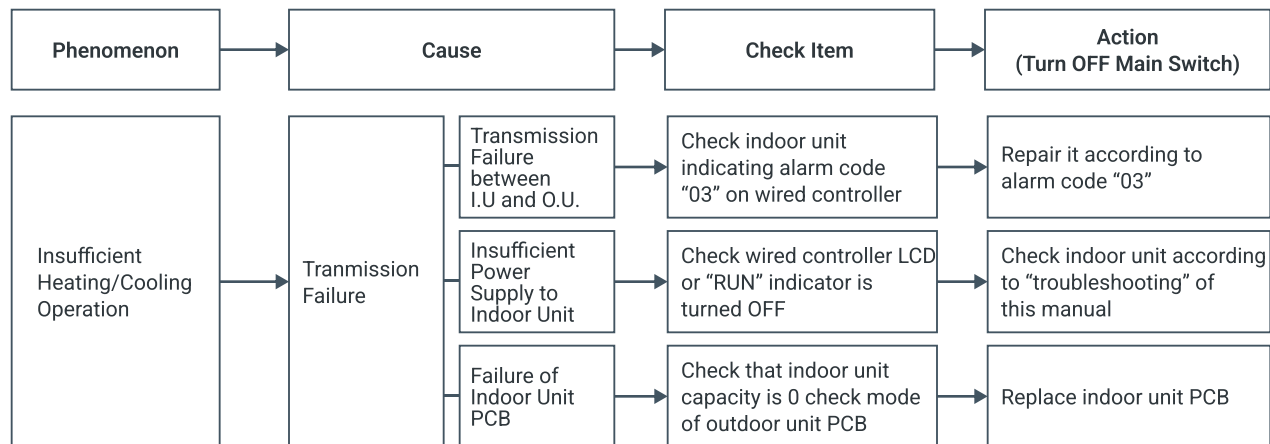
(1.2.6 Abnormalities of Devices)



(1.2.6 Abnormalities of Devices)

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Insufficient Heating Operation	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)

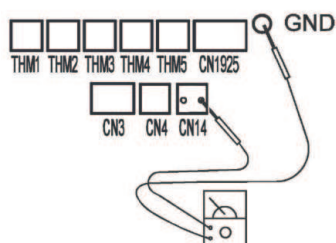
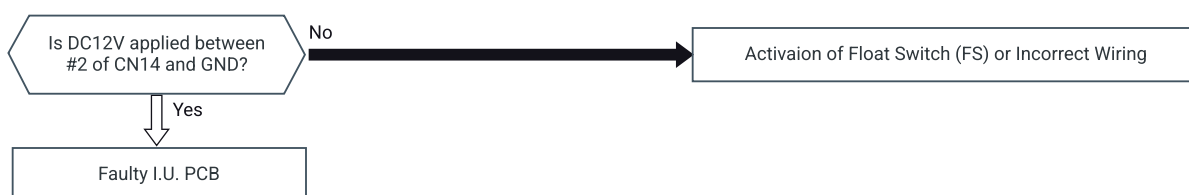


1.2.7 Troubleshooting by Alarm Code

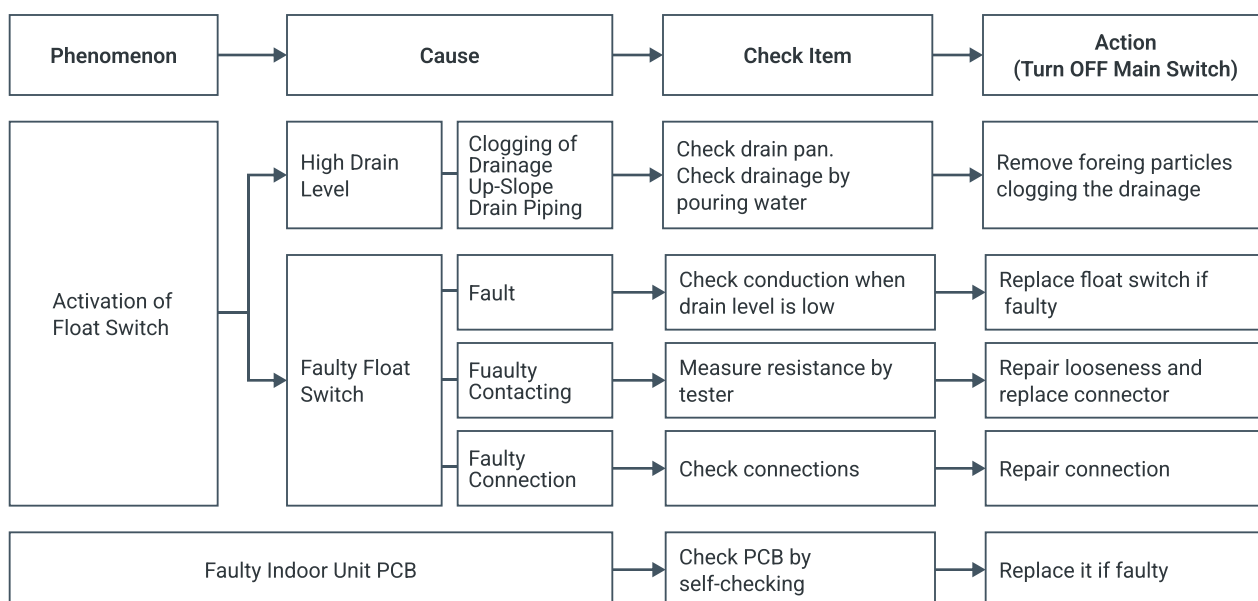
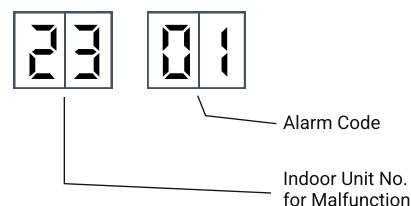
Alarm Code	01	Activation of Protection Device (Float Switch) in Indoor Unit
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- The RUN indicator (Red) is flashing.
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, 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 contact between #1 and #2 of CN14 is opened for over 120 seconds during the cooling, dry, fan or heating operation.

O.U. PCB: Outdoor Unit PCB

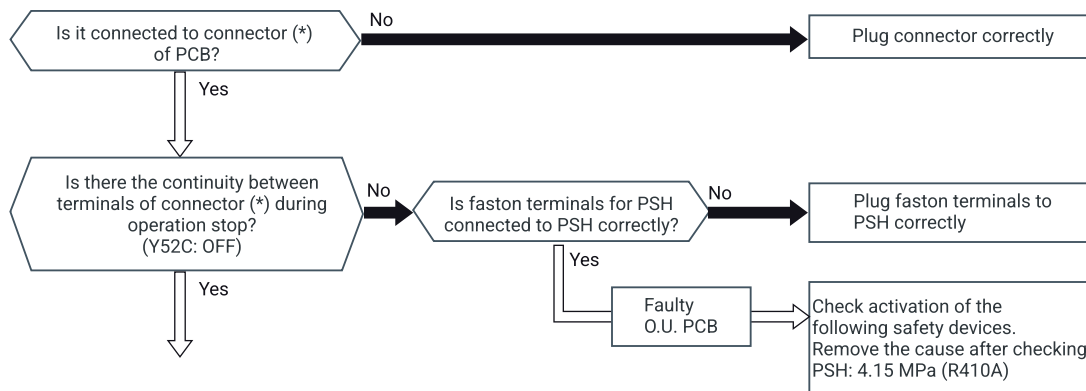


Indication of Outdoor Unit PCB



Alarm Code	02	Activation of Protection Device in Indoor Unit
------------	----	--

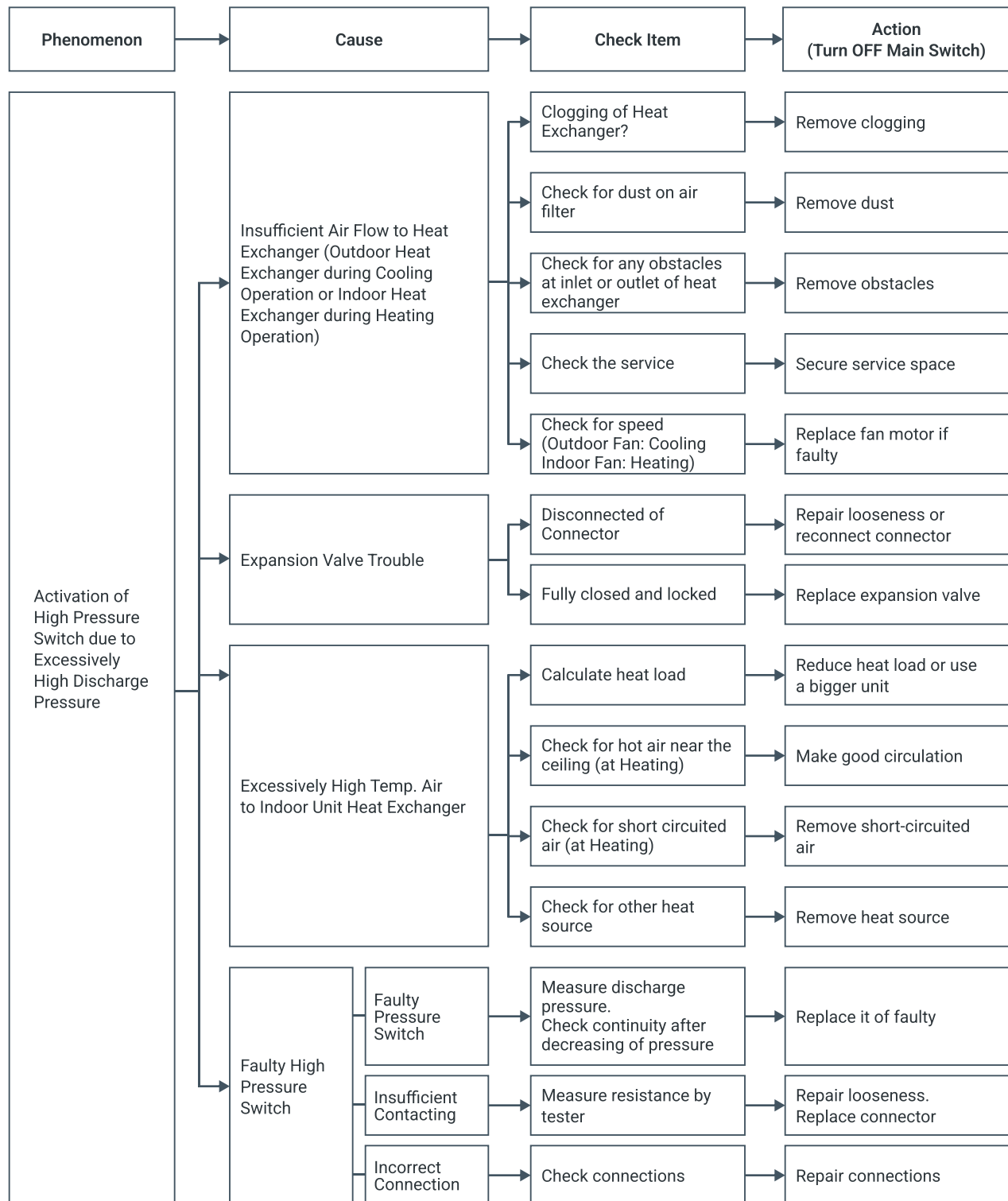
- The RUN indicator (Red) is flashing.
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated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

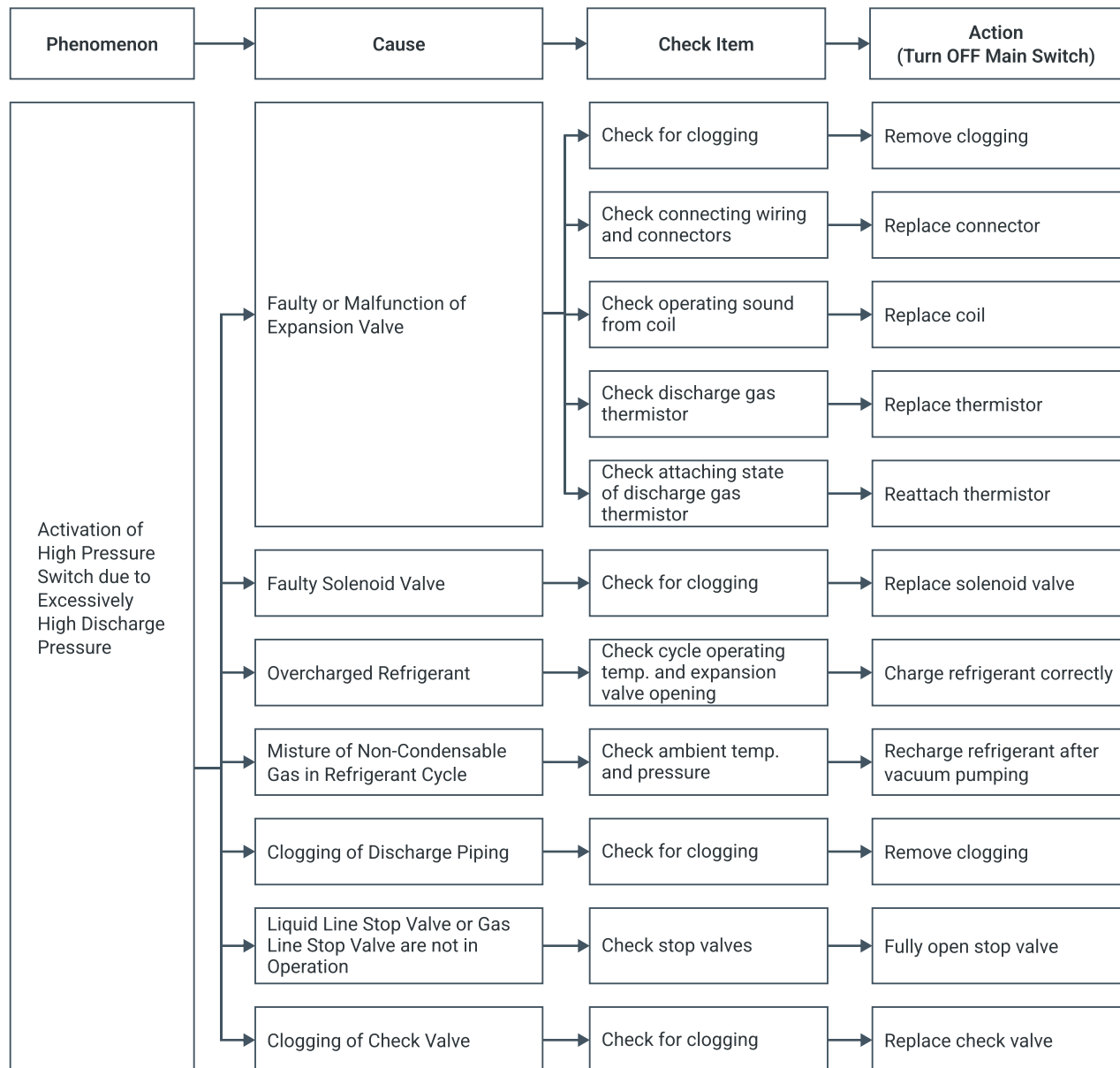


Model	Cause
CHV6-36/48/60URBM	Faulty O.U.PCB
CHV6-28URBM	Faulty INV PCB

(*)

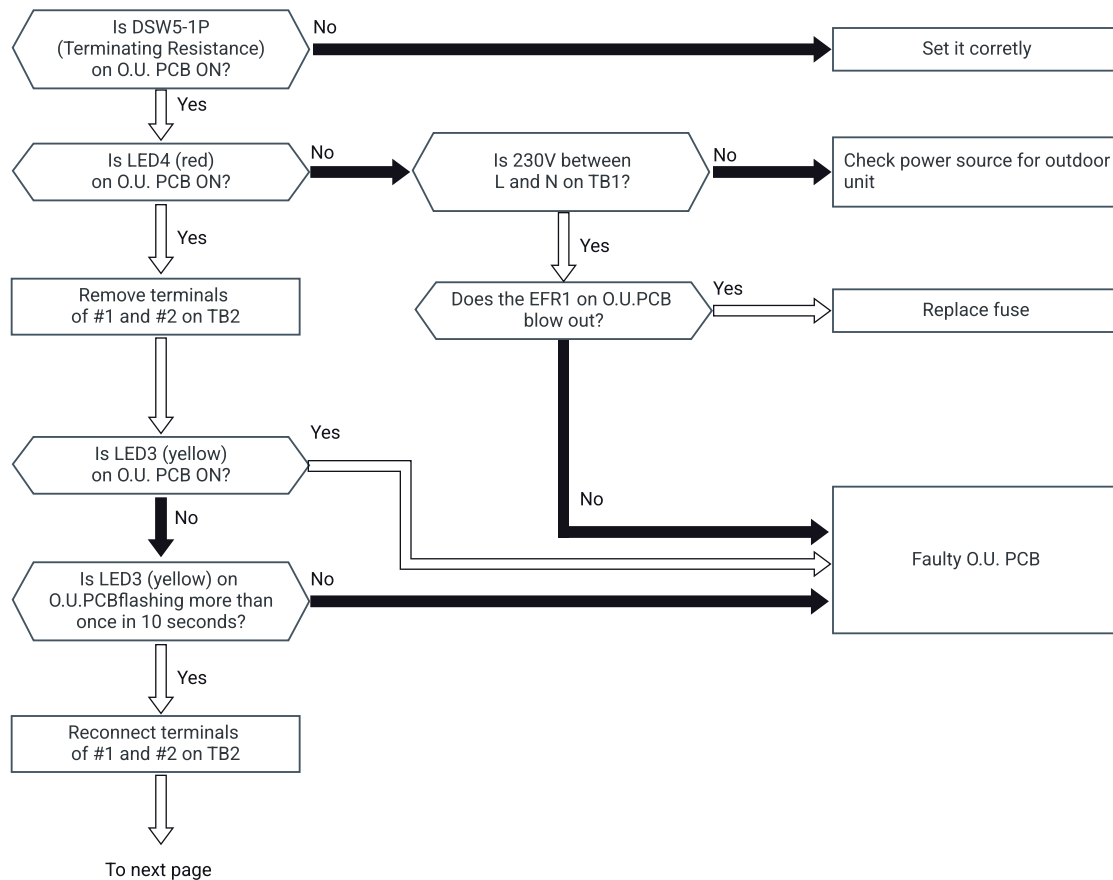
Model	PCB connector	Pin
CHV6-28URBM	PCN401 (INV PCB)	#1-#3
CHV6-36/48/60URBM	PCN8 (O.U.PCB)	#1-#3

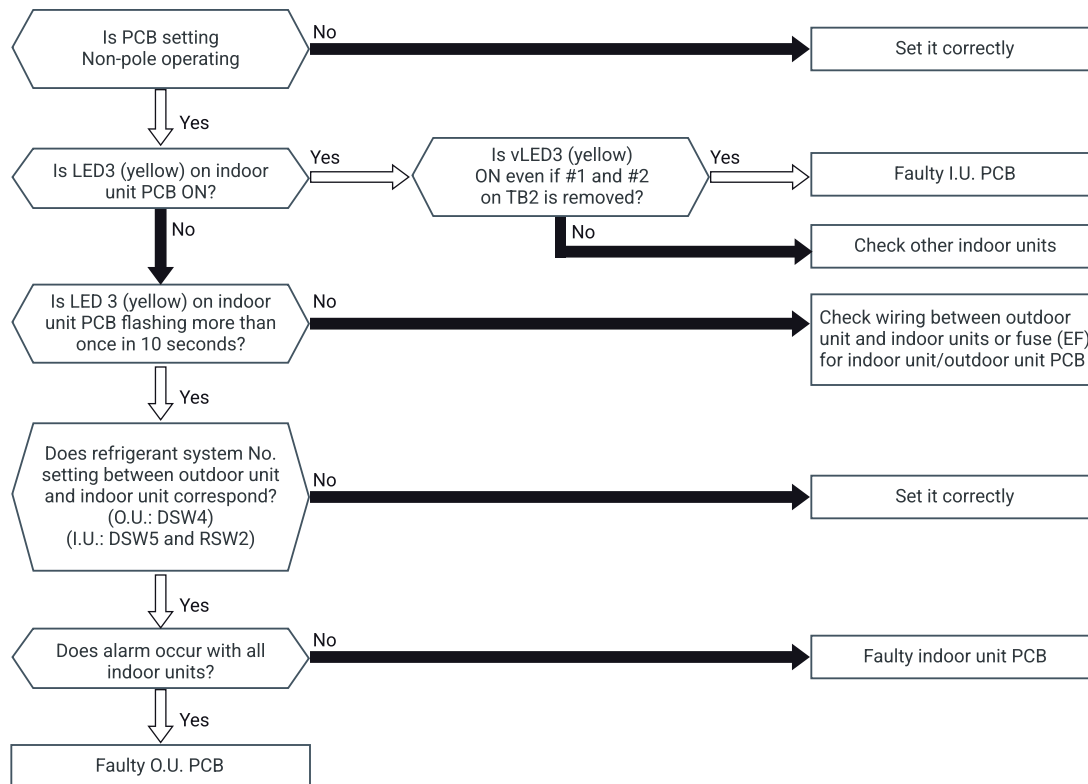




Alarm Code	03	Abnormal Transmitting between Indoor Units/Water Module and Outdoor Units
------------	-----------	---

- 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.





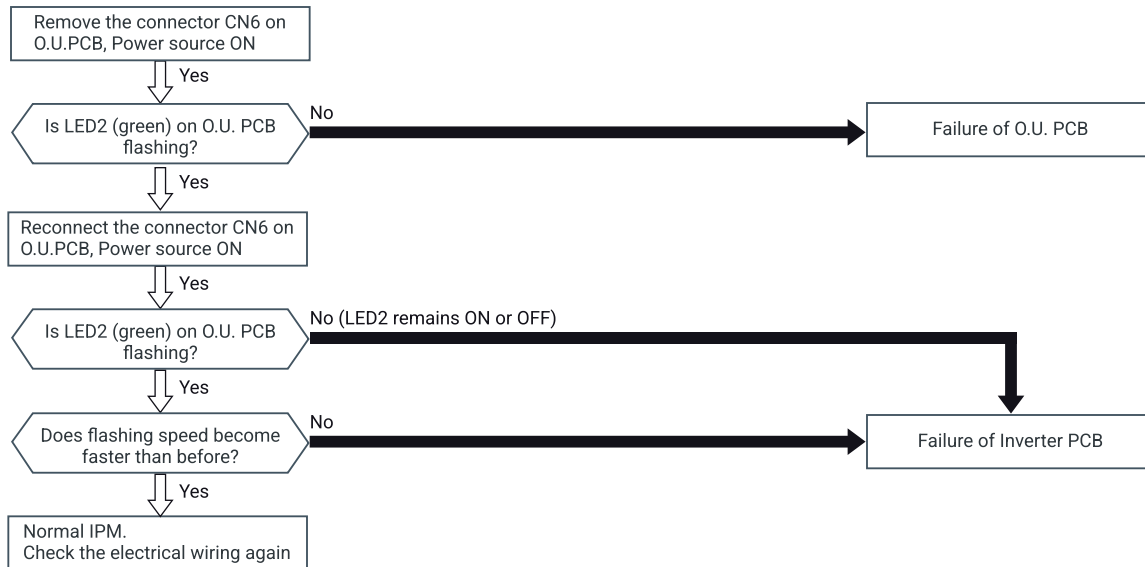
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Power Failure of No Power Supply		Measure voltage by tester	Supply power
Melted Fuse for Power Supply or Activation of Breaker (Outdoor Unit)	Short Circuit between Wires	Check for breakage of insulation	Remove cause of short circuit. Replace fuse 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	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)	Disconnected Wires to I.U./O.U. PCB	Check connections	Correctly connect wires
	Faulty I.U./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
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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 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 micro-computer is automatically reset. The alarm is indicated when the abnormal transmitting continues for 30 seconds from starting of the outdoor unit.



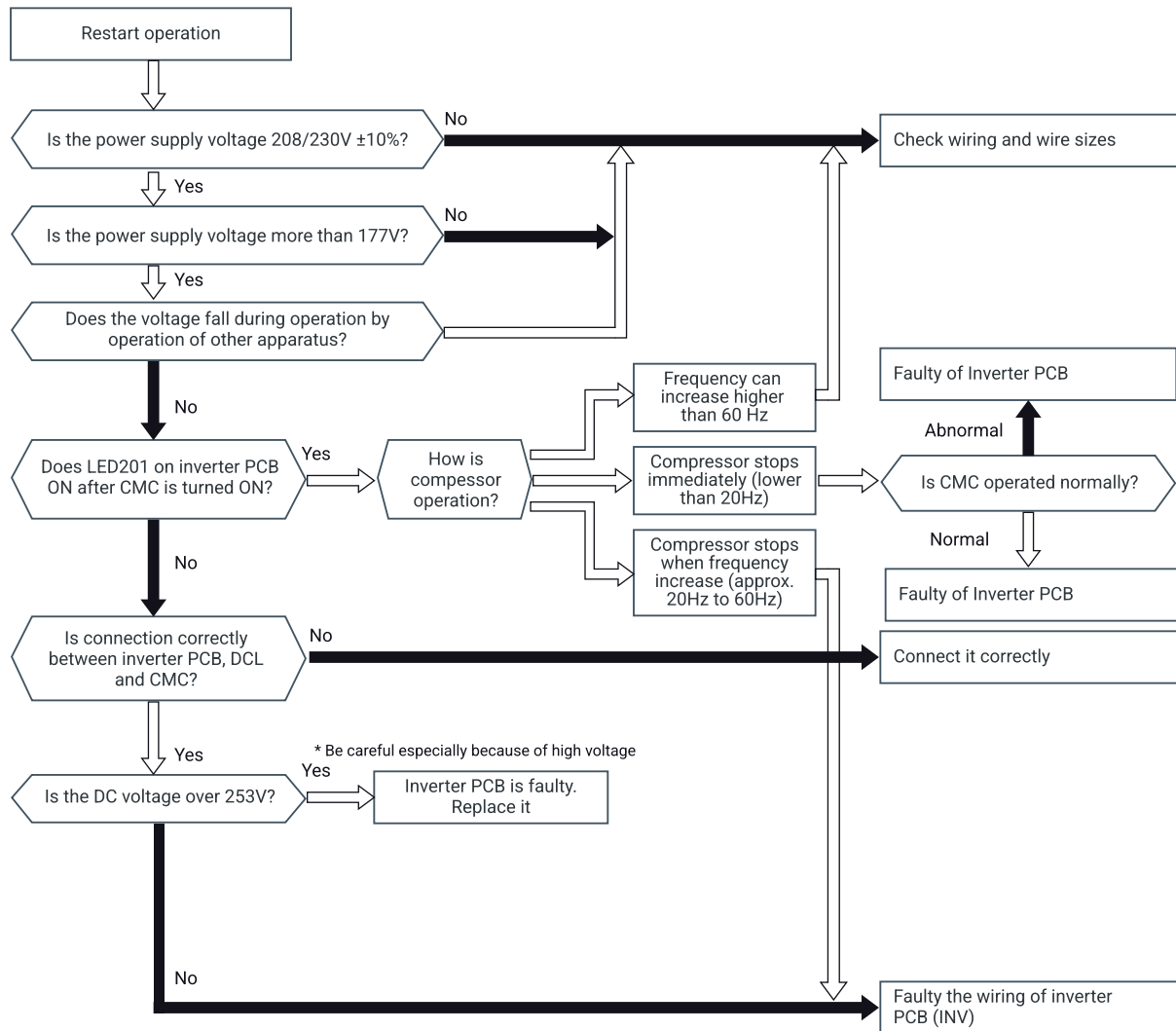
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Disconnected Wires, Insufficient Contacting or Incorrect Connection	Between O.U. PCB and inverter PCB	Check continuity of wires. Check for looseness of connection screws. Check connection No.	Replacing wires, repairing, tightening screws and incorrect wiring
	Power Supply Wiring for Outdoor Unit		
Faulty O.U. PCB and inverter PCB	Disconnected Wires to PCB	Check connections	Repair wiring connections
	Faulty PCB		Replace PCB if faulty
Faulty Electrical Components (Power Fuse, Resistance)	Melted Power Fuse	Check conductivity of power fuse, power transistor, diode module	Replace power fuse, power transistor, and diode module
	Disconnected Incoming Current Limit Resistance	Check resistance of incoming current limit resistance	Replace incoming current limit resistance
Incorrect Wiring	Disconnected Wires Insufficient Contacting	Check continuity. Check for looseness of connection screws	Replacing Wires, Repairing and Tightening Screws
	Incorrect Wiring	Check connection Nos.	Correctly Connect Wires

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.



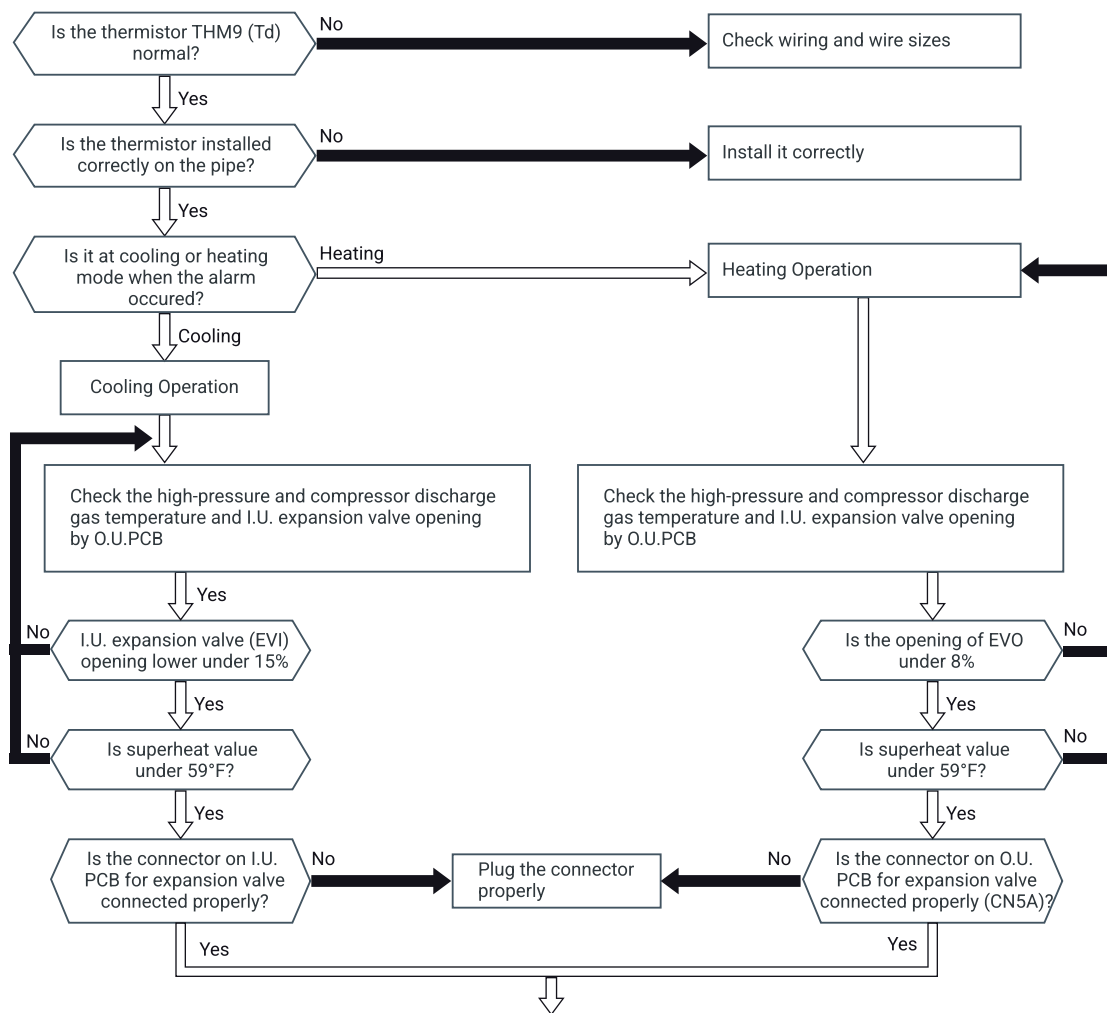
CMC: Magnet Switch for Compressor
DCL: Reactor

Alarm
Code

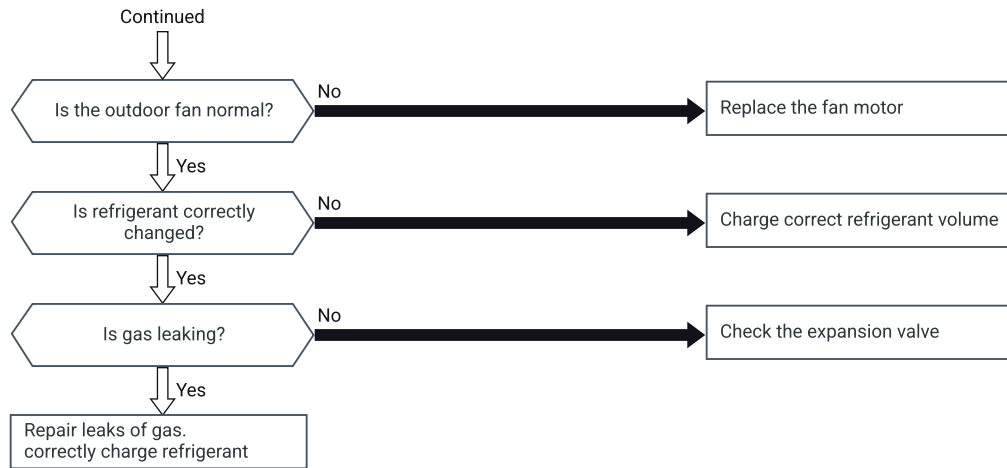
07

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.



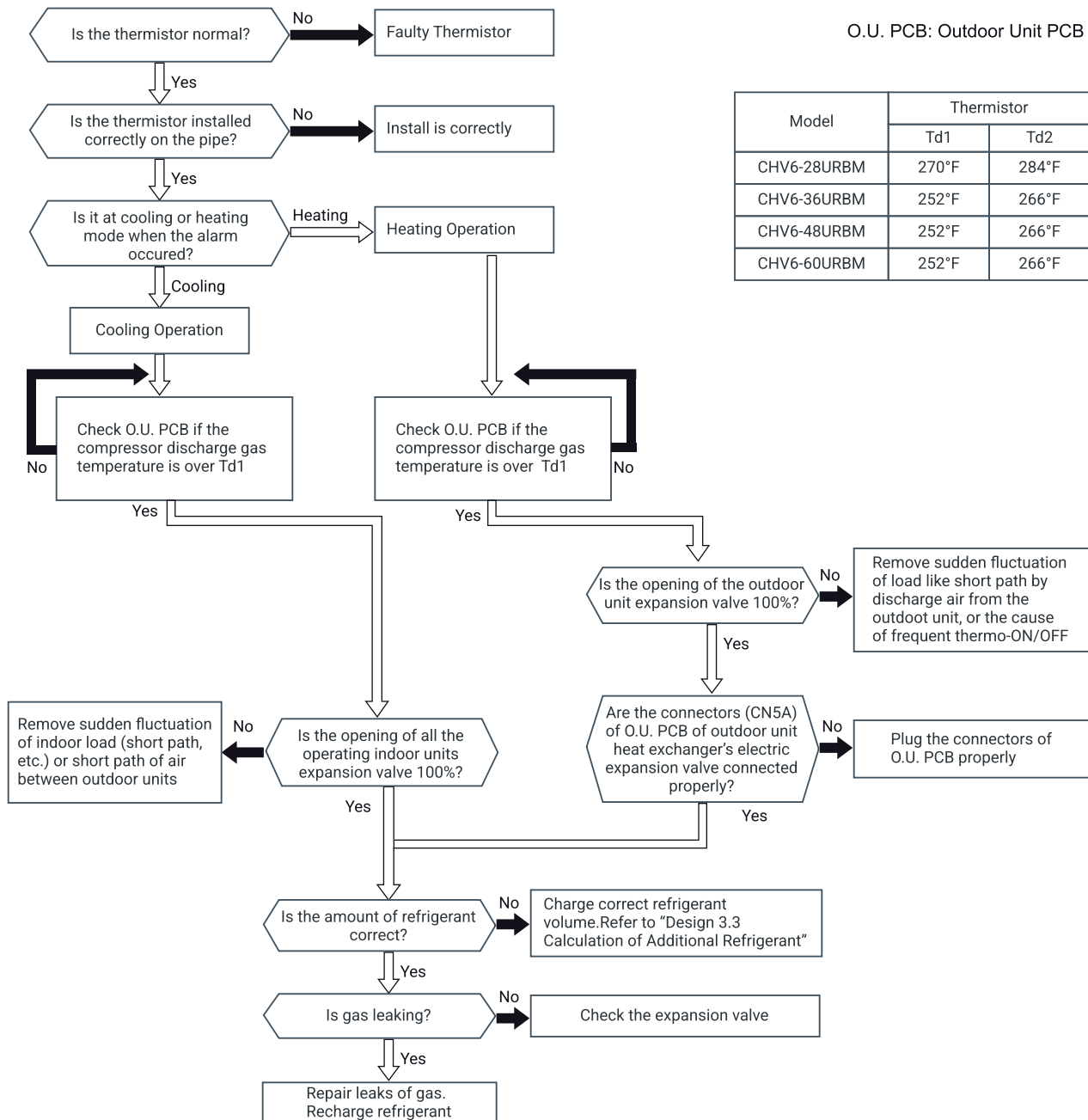
The next page

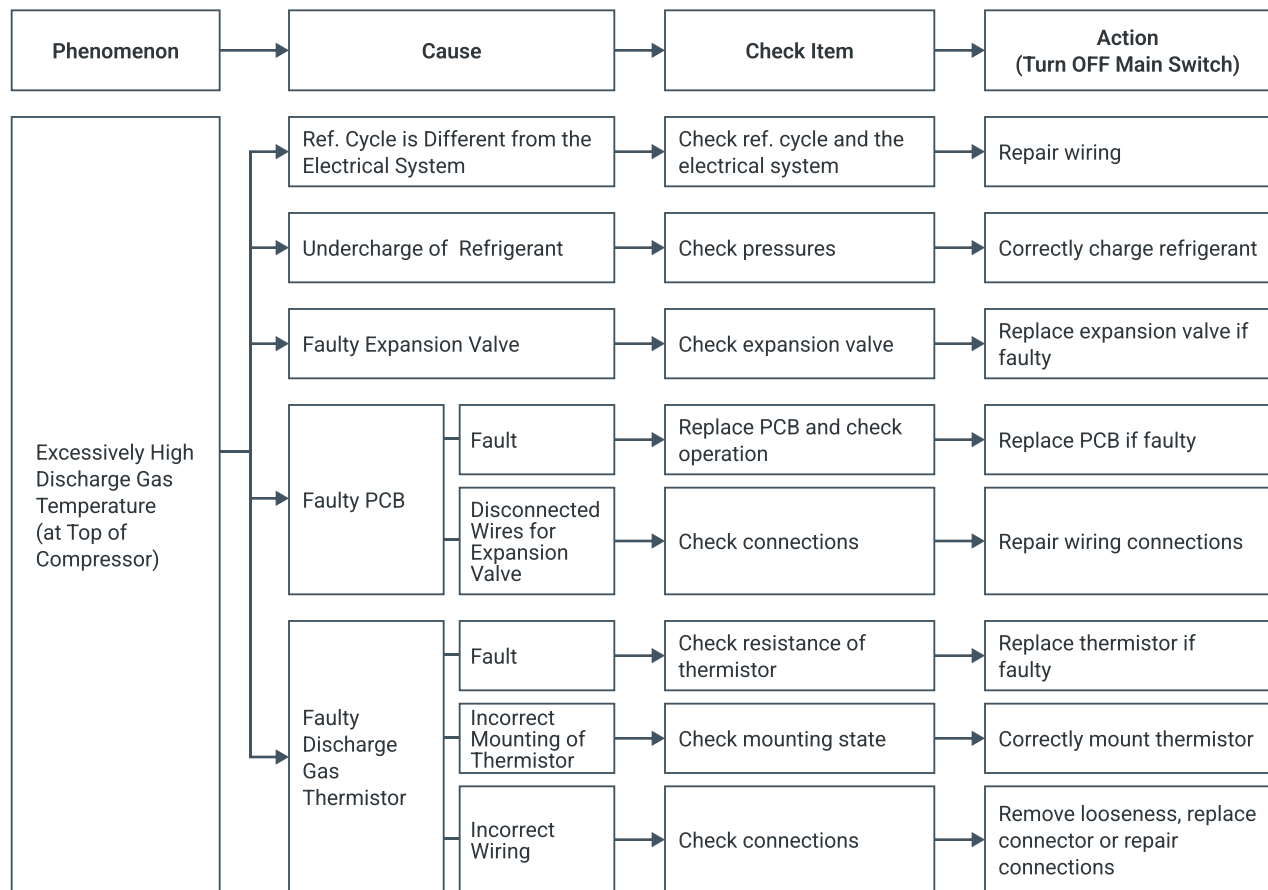


Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Decrease of Discharge Gas Superheat	Ref. Cycle is Different from the Electrical System	Check ref. cycle and the electrical system	Repair wiring
	Overcharged Refrigerant	Check pressures	Correctly charge refrigerant
	Faulty Expansion Valve	Check 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 of Compressor
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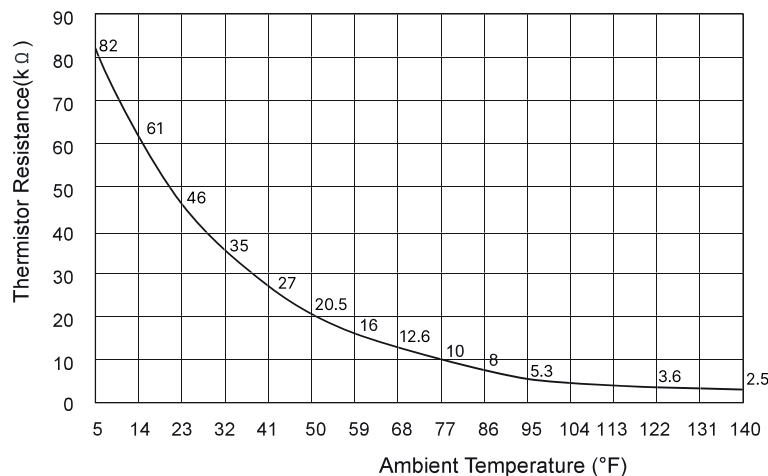
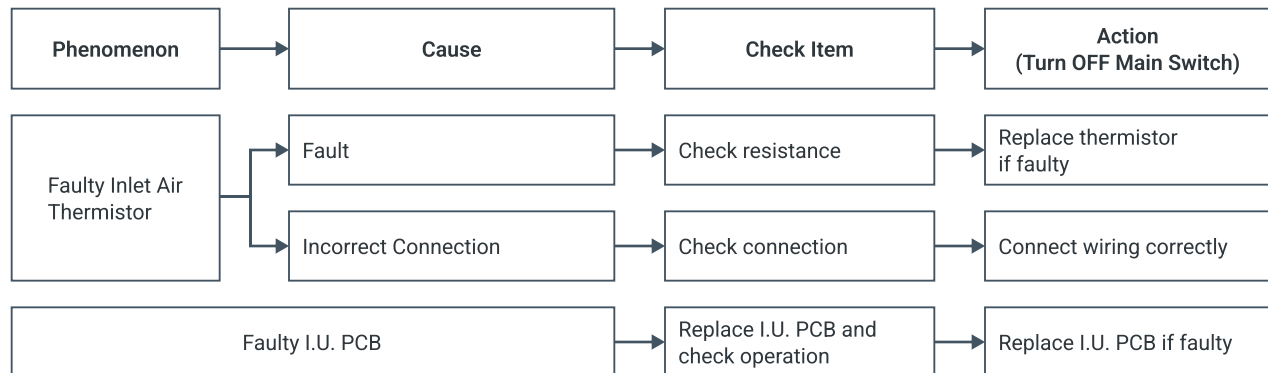
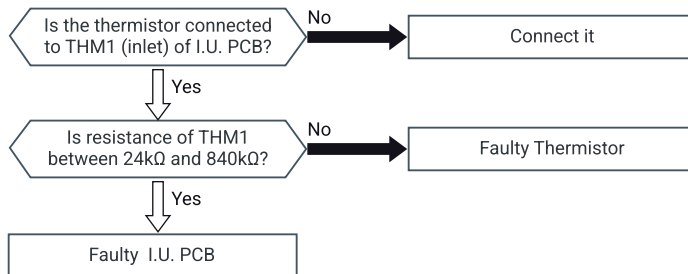
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ ★ When either of the following 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 Td1 for 10 minutes.
 - (2) The temperature of the thermistor on the top of the compressor is kept higher than Td2 for 5 seconds.





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.



Thermistor Characteristics

NOTE:

This figure is applicable to the following thermistors.

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.)

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

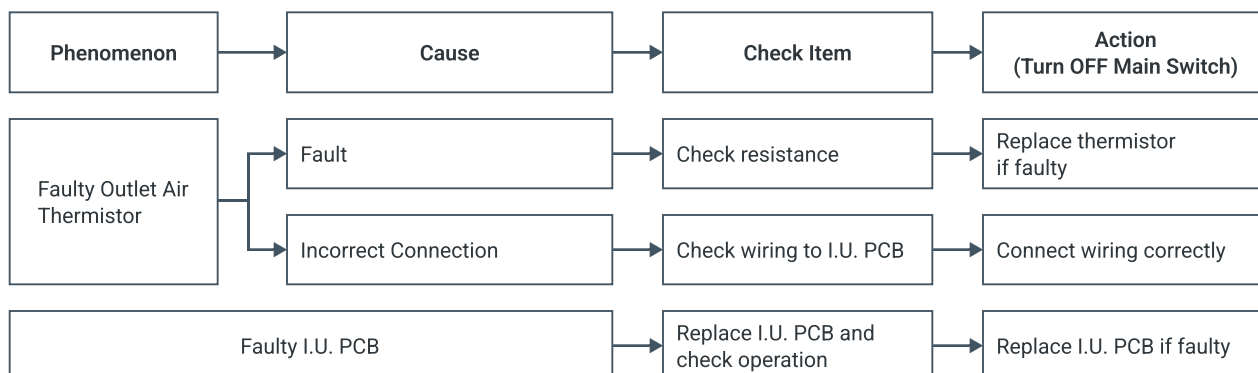
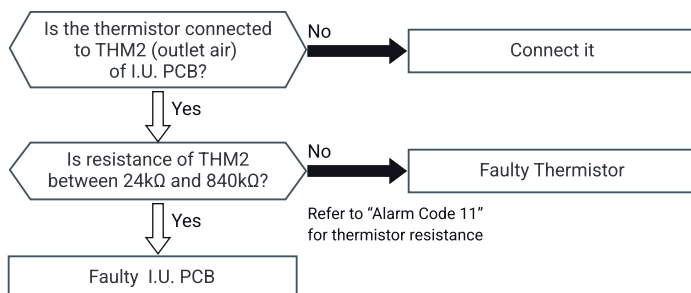


Alarm Code
(11 ~ 19)

Indoor Unit No.
for Malfunction

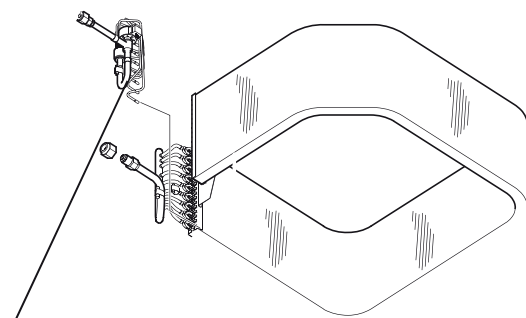
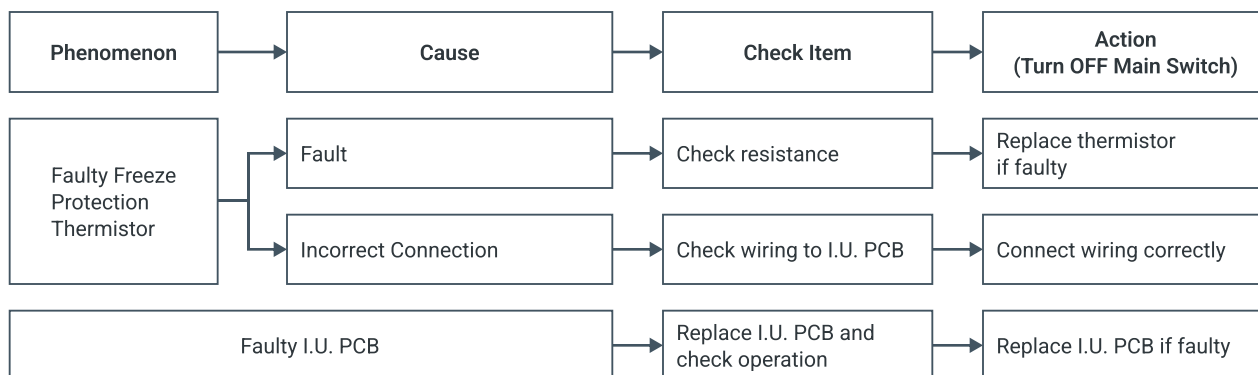
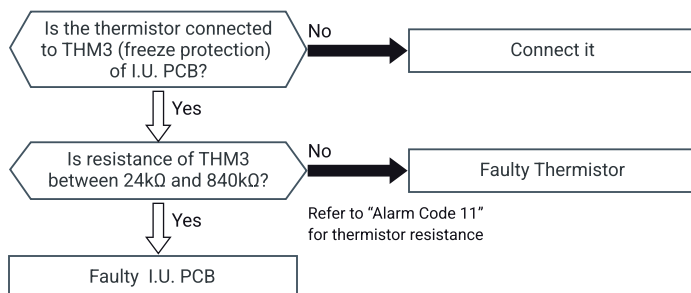
Alarm Code	12	Abnormality of Thermistor for Indoor Unit Outlet Air Temperature (Outlet Air Thermistor)
------------	----	--

- 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.

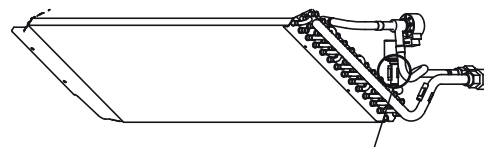


Alarm Code	13	Abnormality of Thermistor for Liquid Refrigerant Pipe Temperature at Indoor Unit Heat Exchanger (Freeze Protection Thermistor)
------------	----	--

- 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.



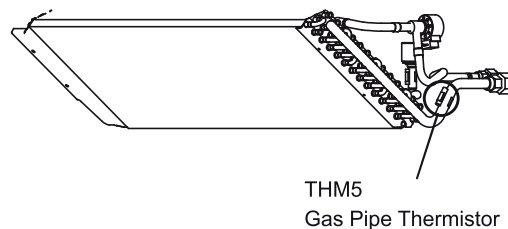
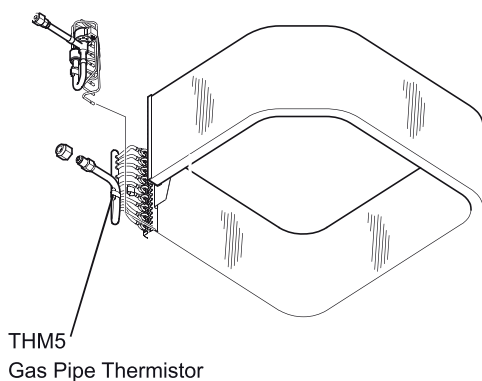
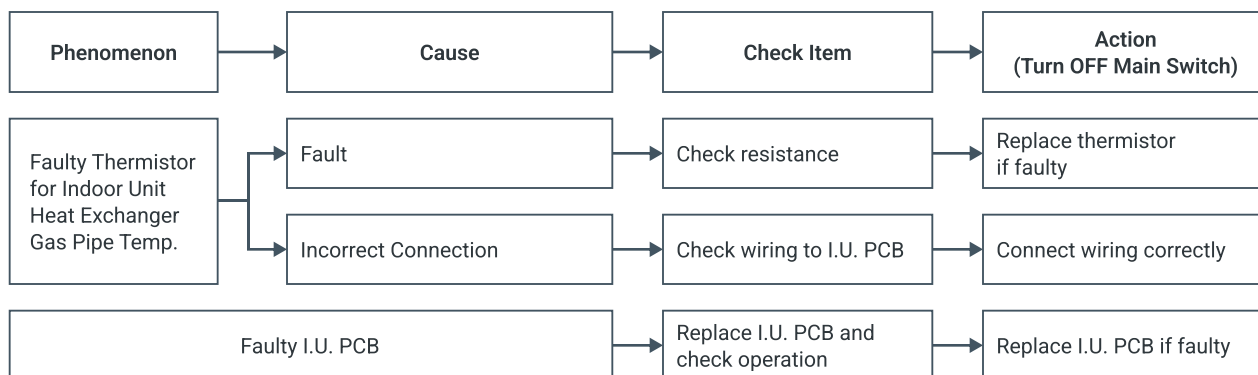
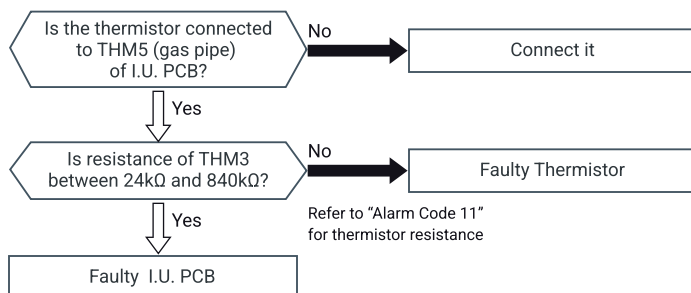
THM3
Liquid Pipe Thermistor
(Freeze Protection)



THM3
Liquid Pipe Thermistor
(Freeze Protection)

Alarm Code	14	Abnormality of Thermistor for Gas Refrigerant Pipe Temperature at Indoor Unit Heat Exchanger (Gas Pipe 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.

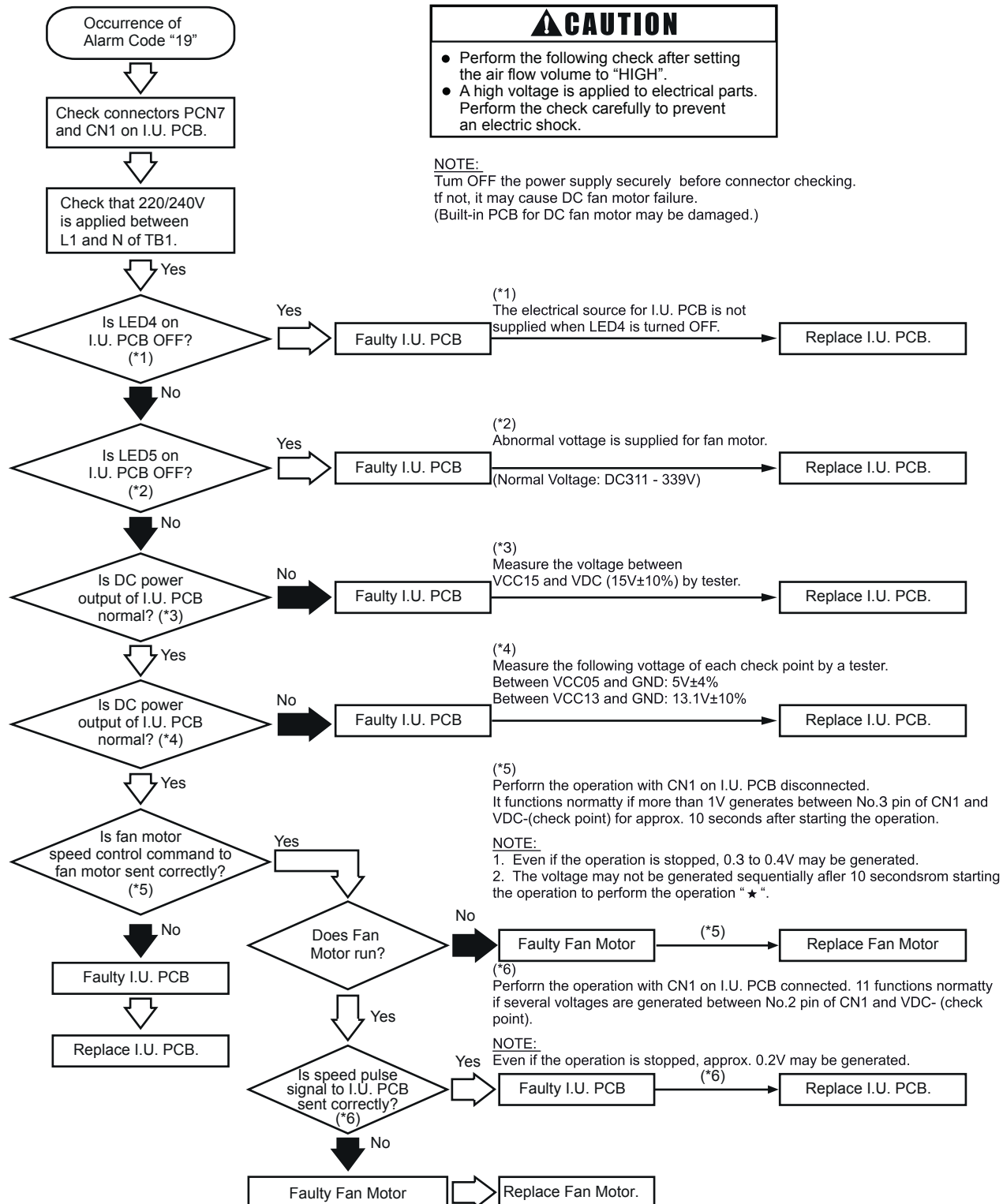


Alarm
Code

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.

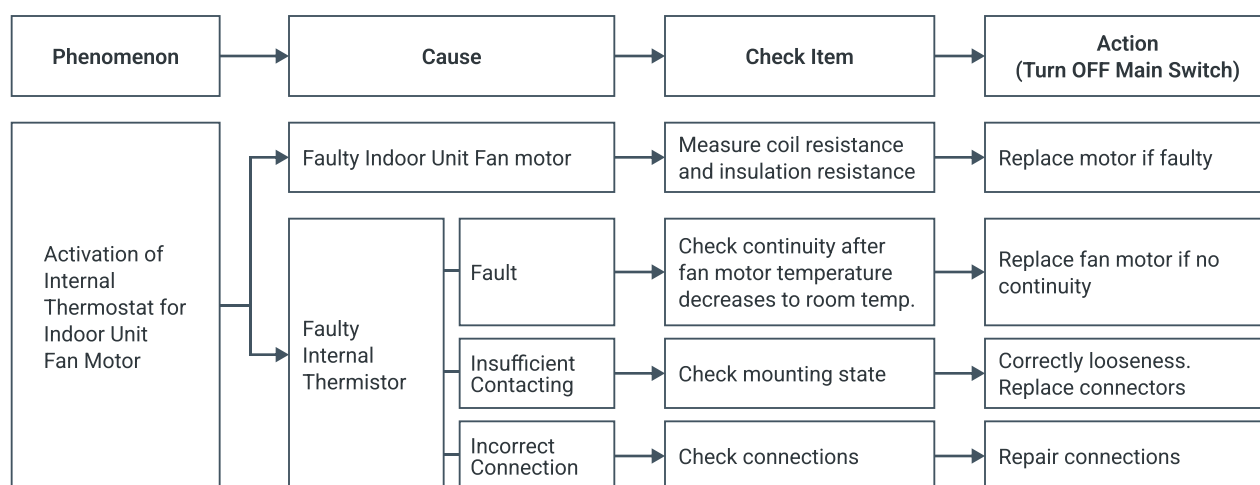
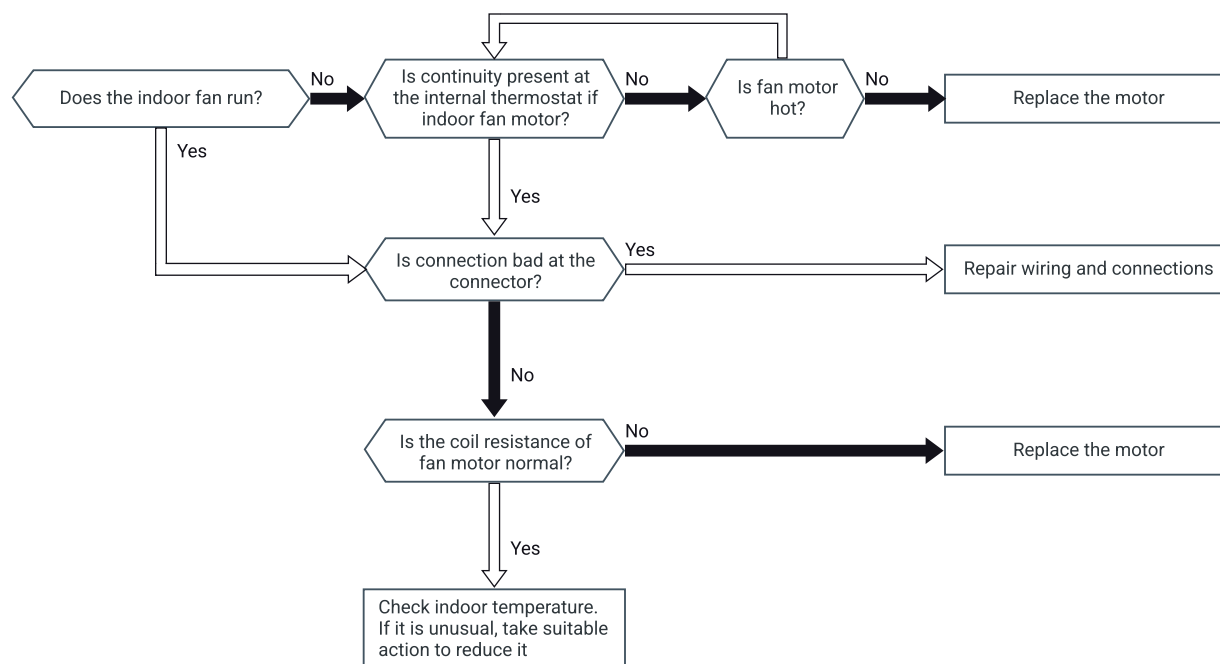


Alarm
Code

19

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

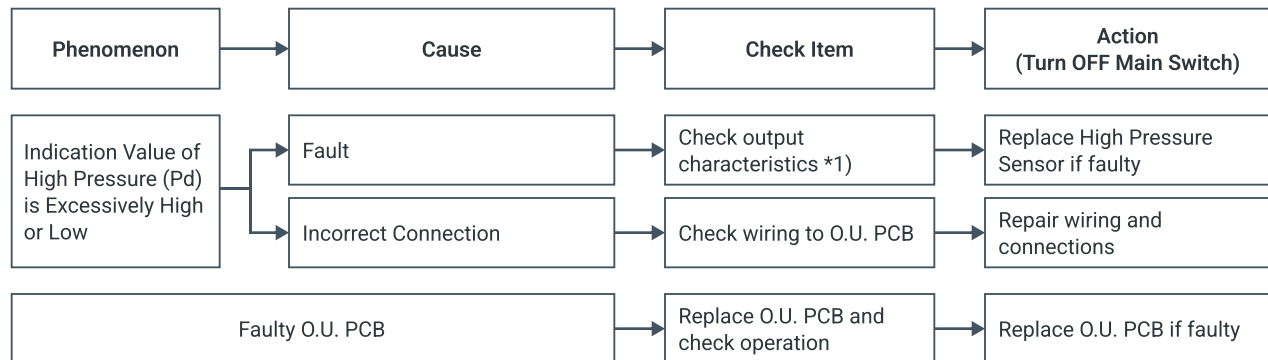
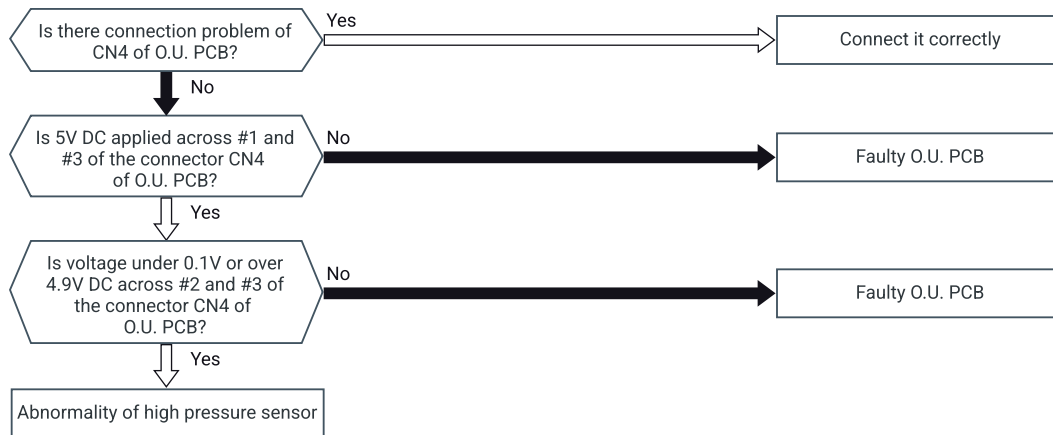
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ This alarm code is indicated 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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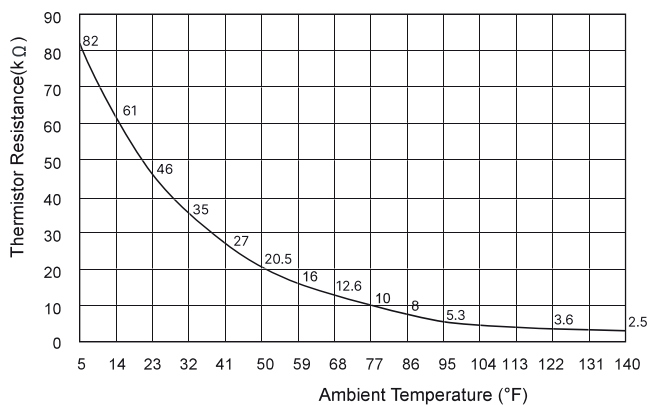
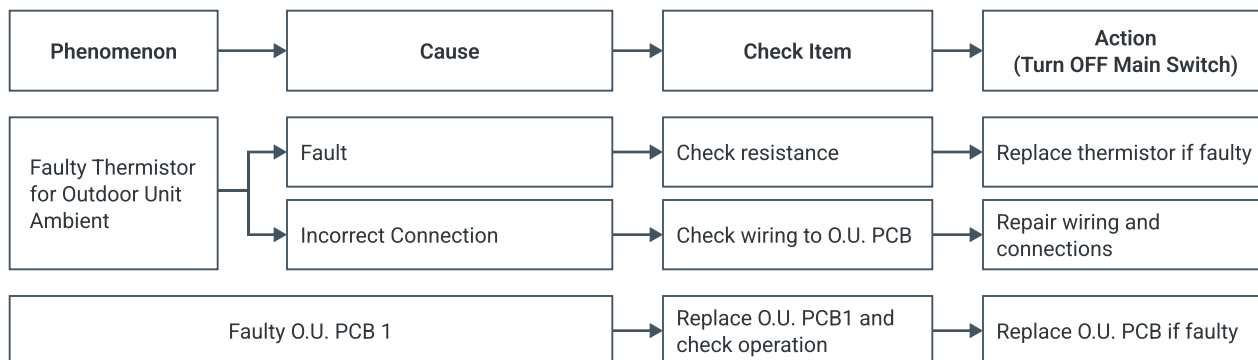
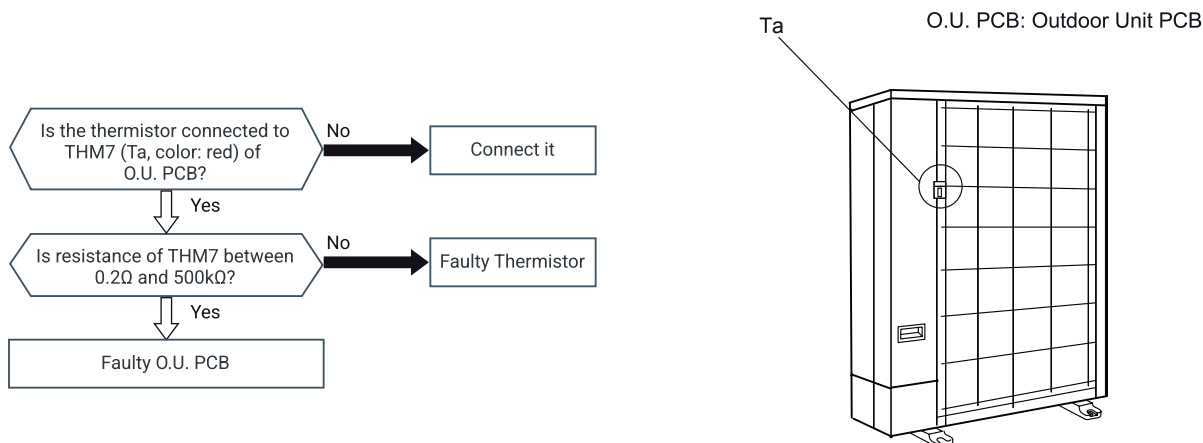
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB.
- * 1) Only for AVW-36-60H3FH.
- ★ 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



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 0.2k Ω) or disconnection (more than 500k Ω) of the thermistor is detected during the operation.



Thermistor Characteristics

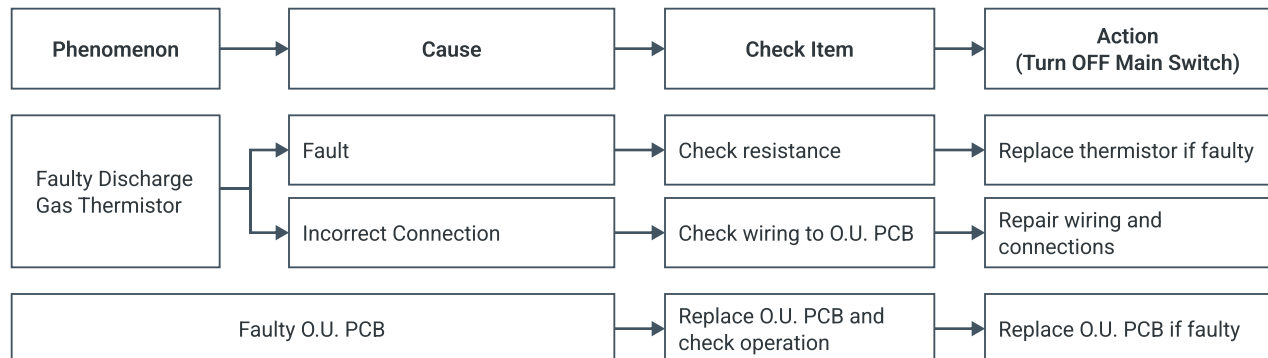
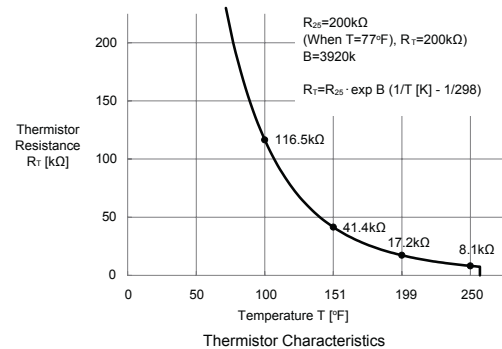
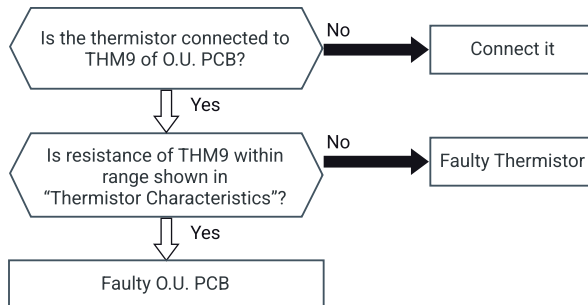
NOTE:
This is applicable to the following thermistors.

1. Ta (THM7)
2. Te (THM8)
3. Tsc (THM19)

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

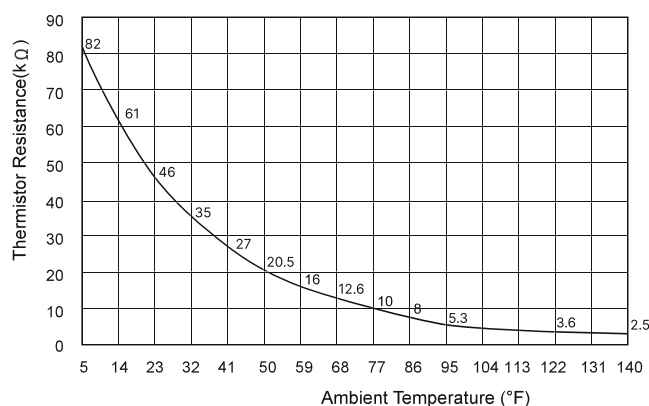
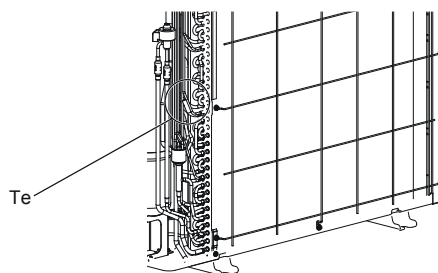
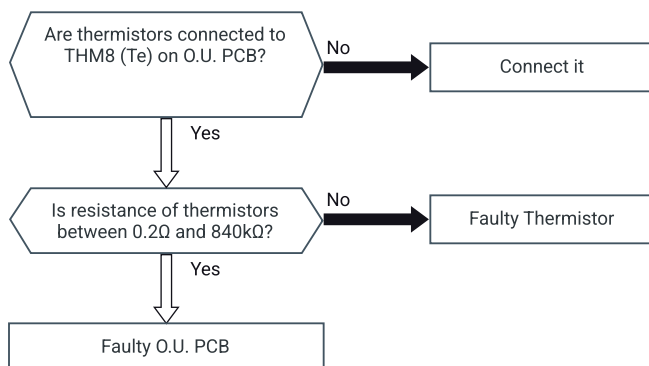
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB. (For the combination of outdoor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

O.U. PCB: Outdoor Unit PCB



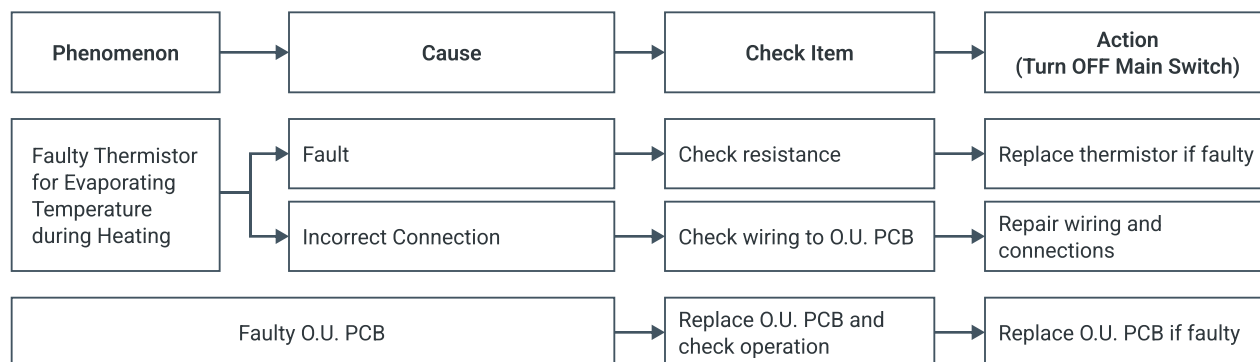
Alarm Code	24	Abnormality of Thermistor for Evaporating Temperature during Heating Operation (Te)
------------	----	---

- 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 on the outdoor unit PCB.
- ★ This alarm code is displayed when a short circuit ($0.24\text{k}\Omega$ or less) or disconnection ($840\text{k}\Omega$ or more) of the thermistor is detected during heating or cooling operation.



O.U. PCB: Outdoor Unit PCB

Thermistor Characteristics

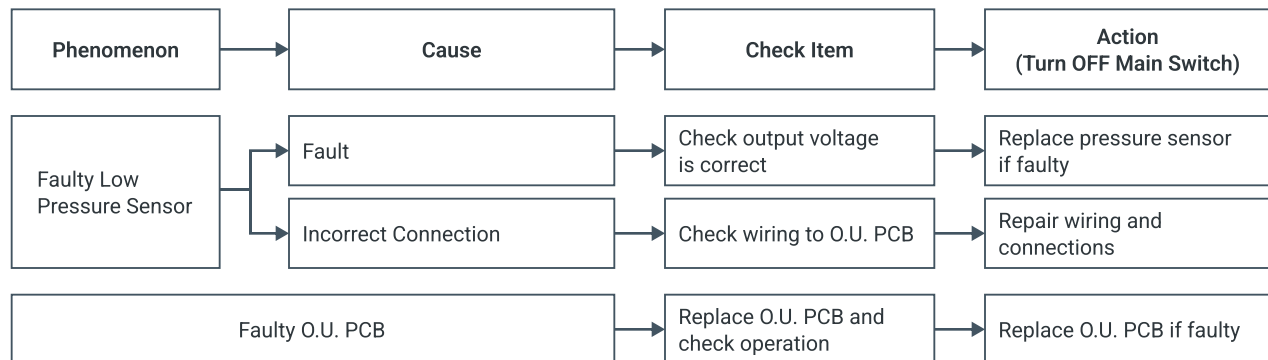
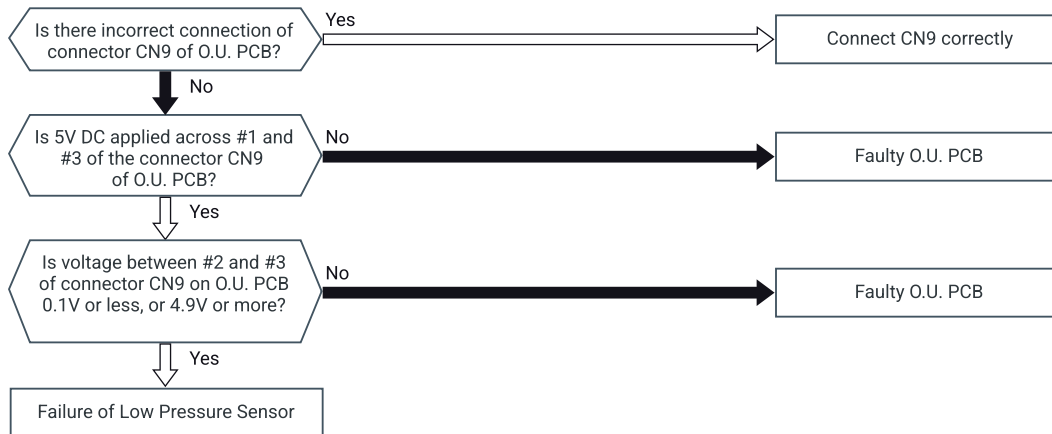


Alarm Code	29	Abnormality of Low Pressure Sensor for Outdoor Unit (Ps)
------------	-----------	--

- 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. *
1) Only for CHV6-36~60URBM

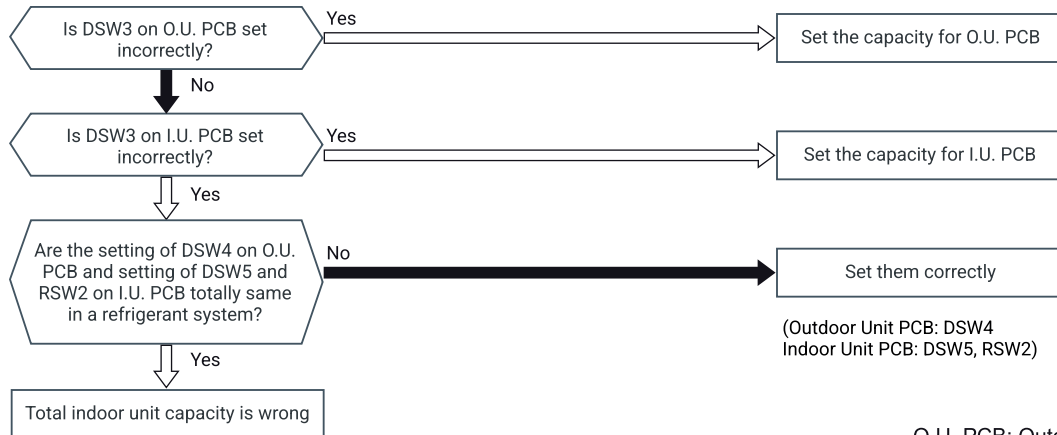
★ This alarm code is indicated when the pressure sensor voltage decreases to 0.1V or less or increases to 4.9V or more during running.

O.U. PCB: Outdoor Unit PCB



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



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

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
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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 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) For the value of maximum number of connectable I.U., 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
------------	----	-----------------------------------

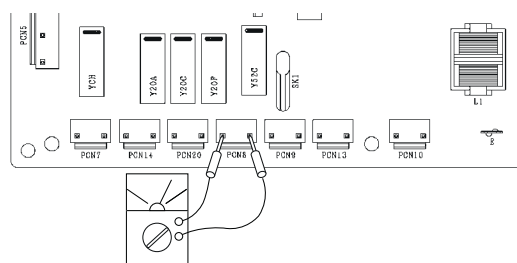
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7- segment of outdoor unit PCB.
- ★ This alarm code is indicated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

- 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.

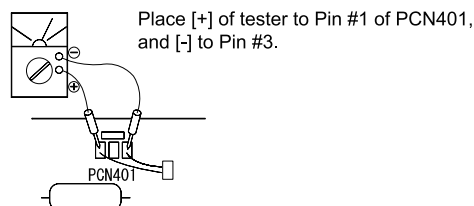
- The alarm code appears if AC 200V or AC 240V is supplied to the connector on the outdoor unit PCB (see table below) while Y52C is OFF or CMC is open.



	Connector No. for Check
Connector	PCN8
Pin No.	#1 and #3



- The alarm code appears if approx. DC12V is supplied to the Inverter PCB connector (see table below) when the inverter operation is commanded (after five seconds following activation of the remote control switch). Place the tester as shown in the diagram below to check the connector of PCN401. The connector shall remain inserted. DC12V will constantly be detected and disturb the diagnosis if the connector of PCN401 is pulled out.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Activation of Picking up Circuit for Protection	Starting Outdoor Unit at Activation of Picking up Circuit for Protection	Alarm Code History "02" before "38"	Refer to Alarm Code "02"
Abnormally of Picking up Circuit for Protection	Incorrect Connection	Check voltage supplied to connectors	Repair wiring connections
Faulty O.U. PCB			Replace O.U. PCB

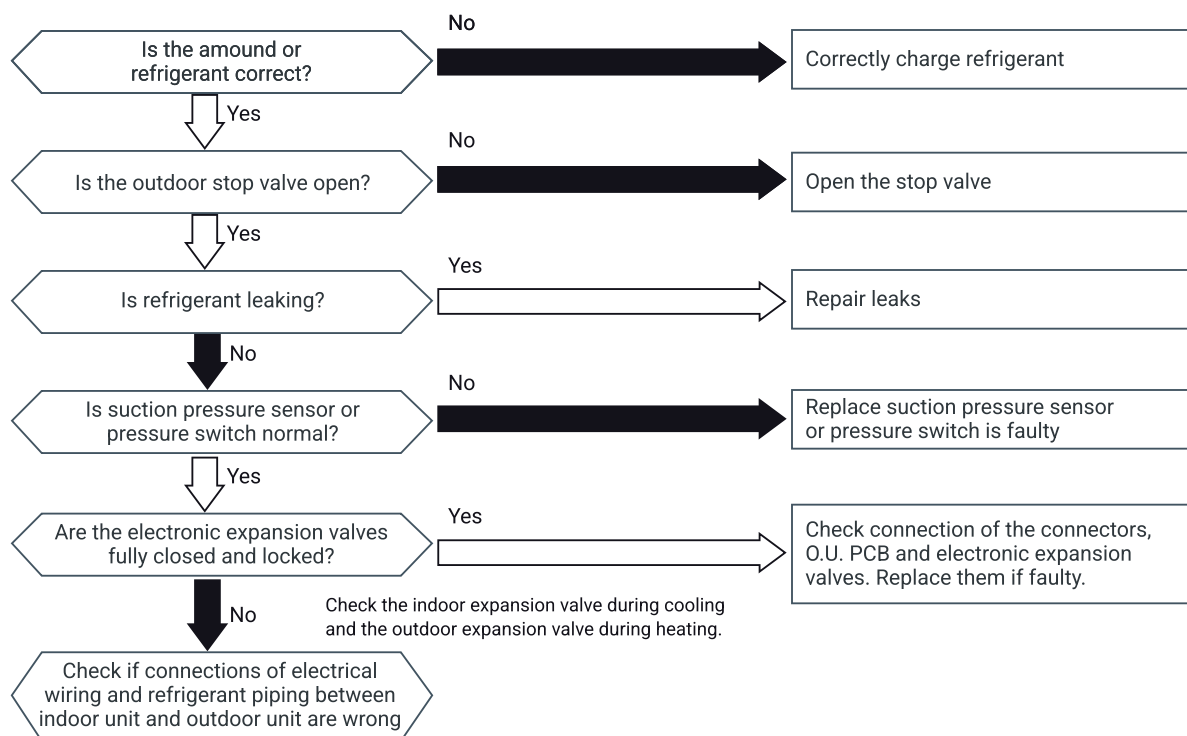
123

Alarm Code	47	Activation of Low Pressure Decrease Protection Device (Vacuum Operation Protection)
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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 suction pressure (Ps) is lower than 0.09MPa for over 12 minutes and the same condition occurs twice or more within one hour.
- ★ This alarm code is indicated when The action of low pressure switch(PSL) lasts for 30 seconds and the same condition occurs twice or more within one hour.

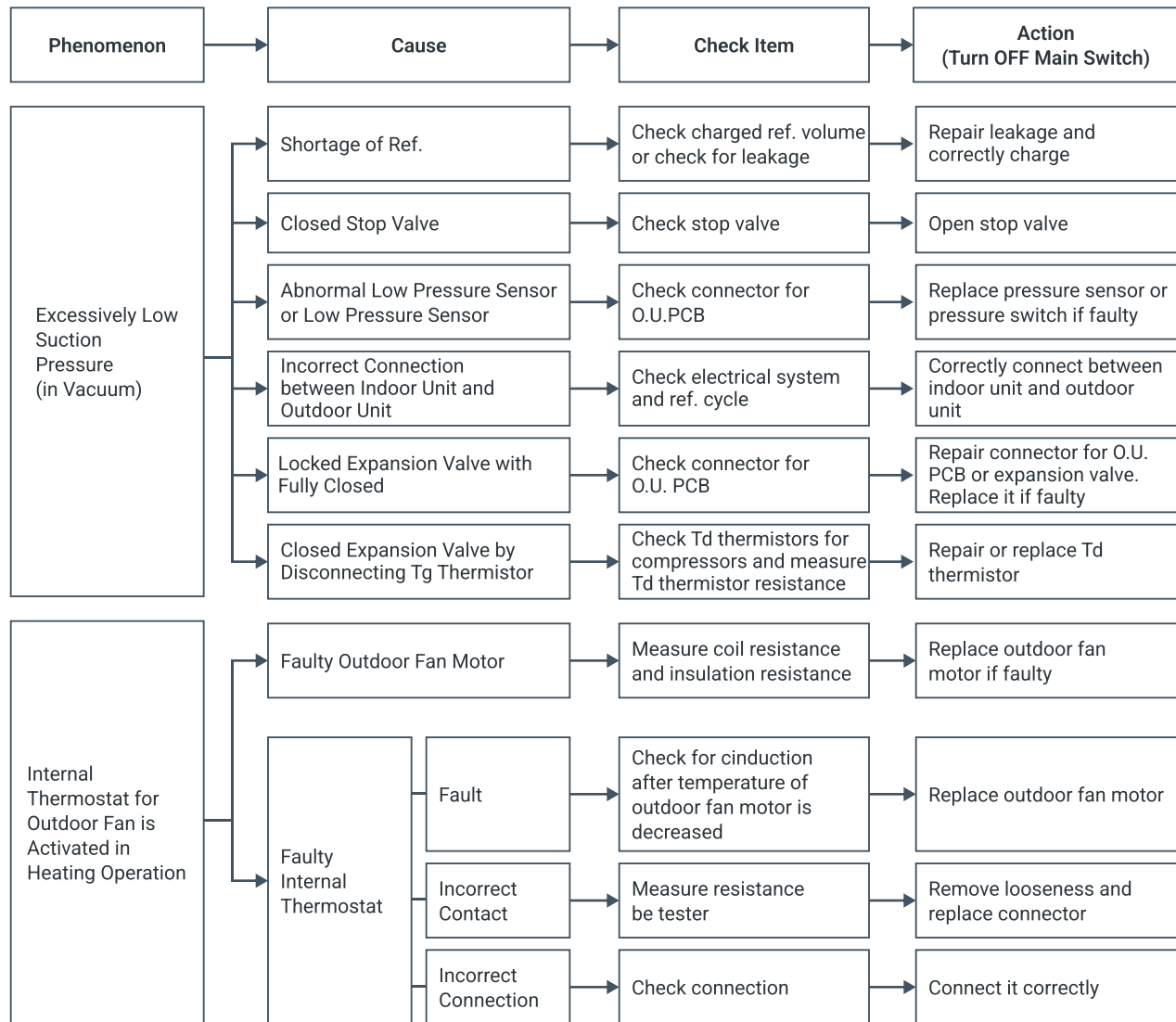
Low pressure switch	CHV6-28URBM
Low pressure sensor	CHV6-36/48/60URBM

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



NOTE:

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



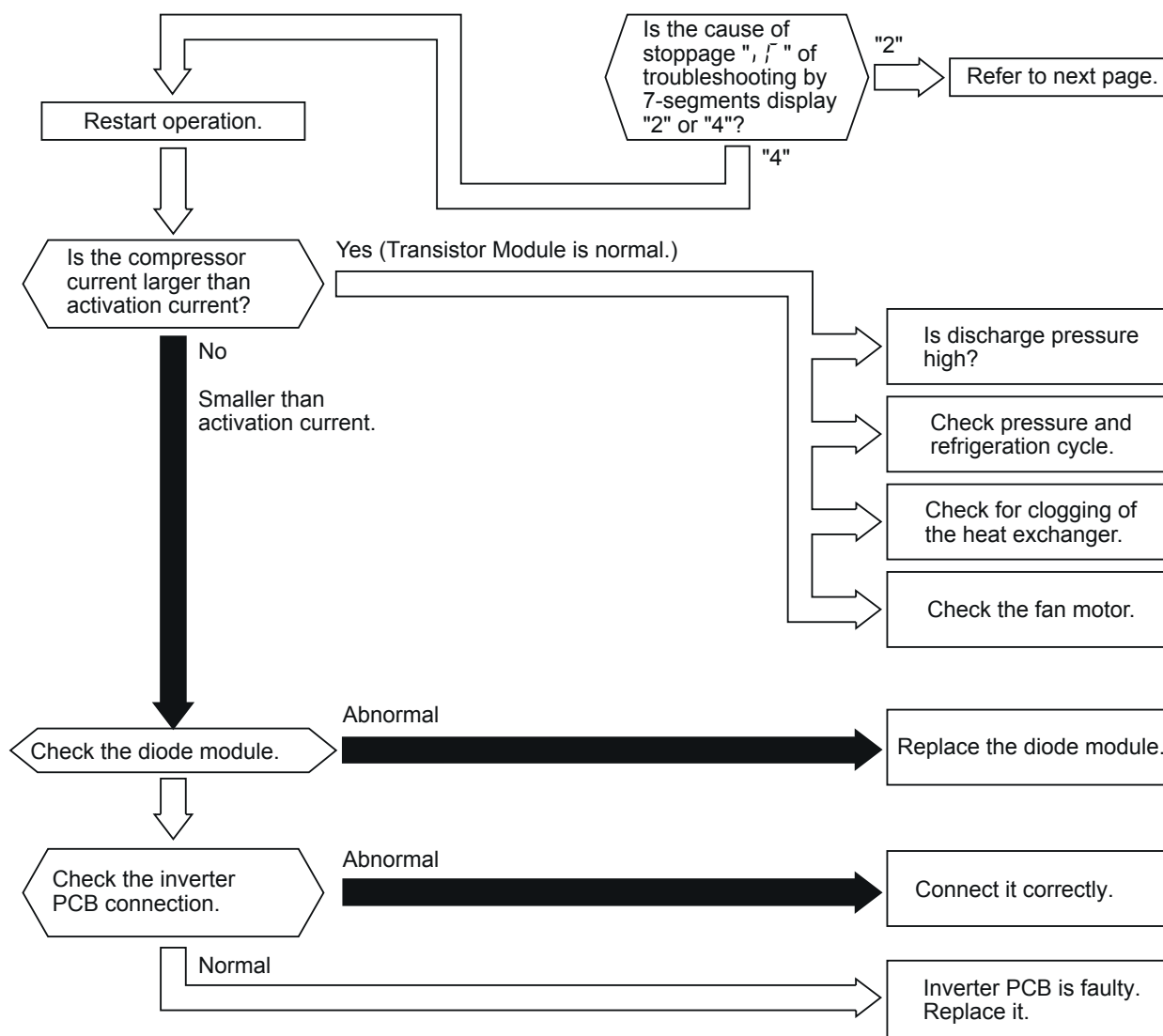
Alarm
Code

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.

O.U. PCB: Outdoor Unit PCB



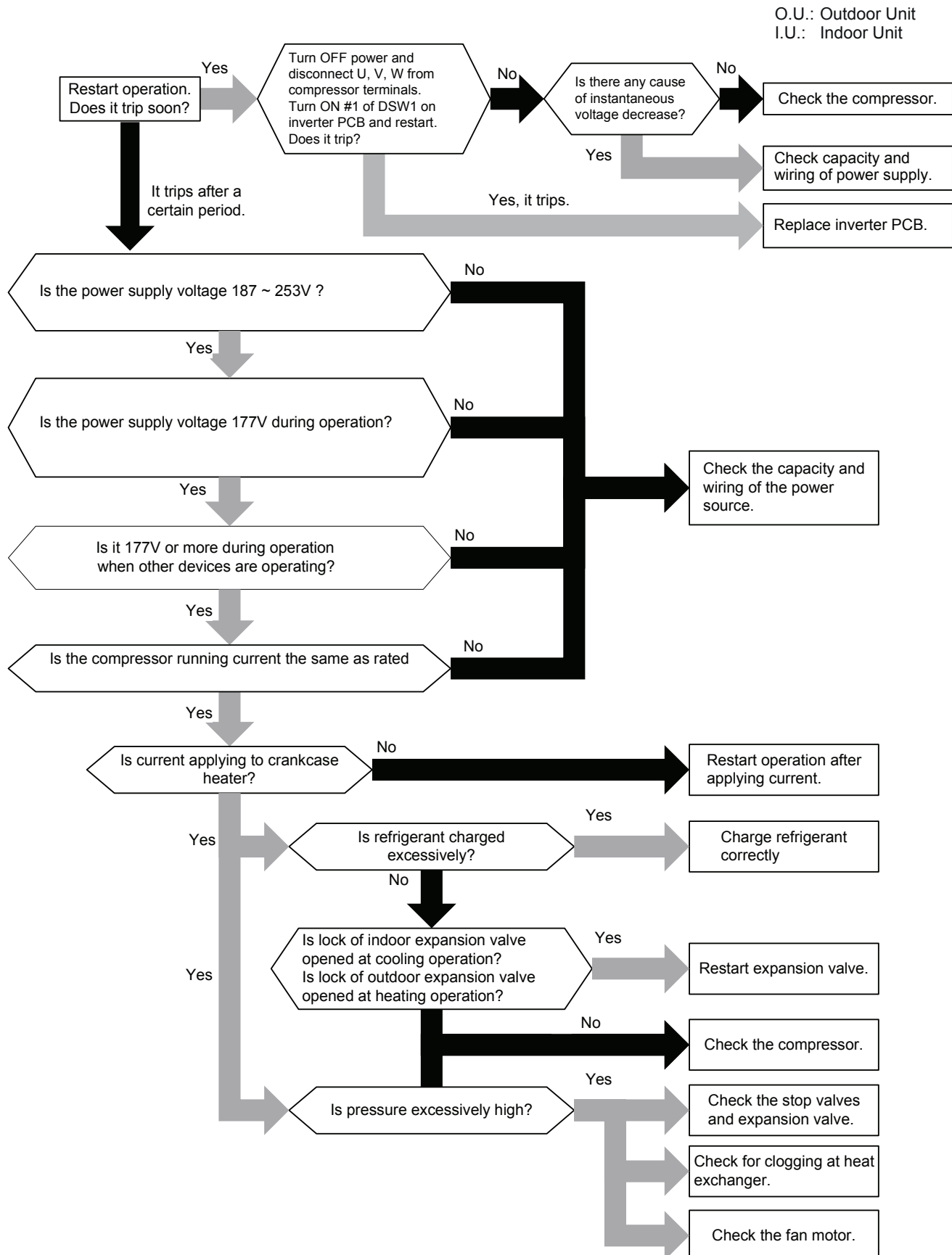
iTC	Cause of inverter stoppage
2	Instantaneous overcurrent
4	Inverter overcurrent

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.)
Conditions of Activation: Inverter current with 150% of the rated current

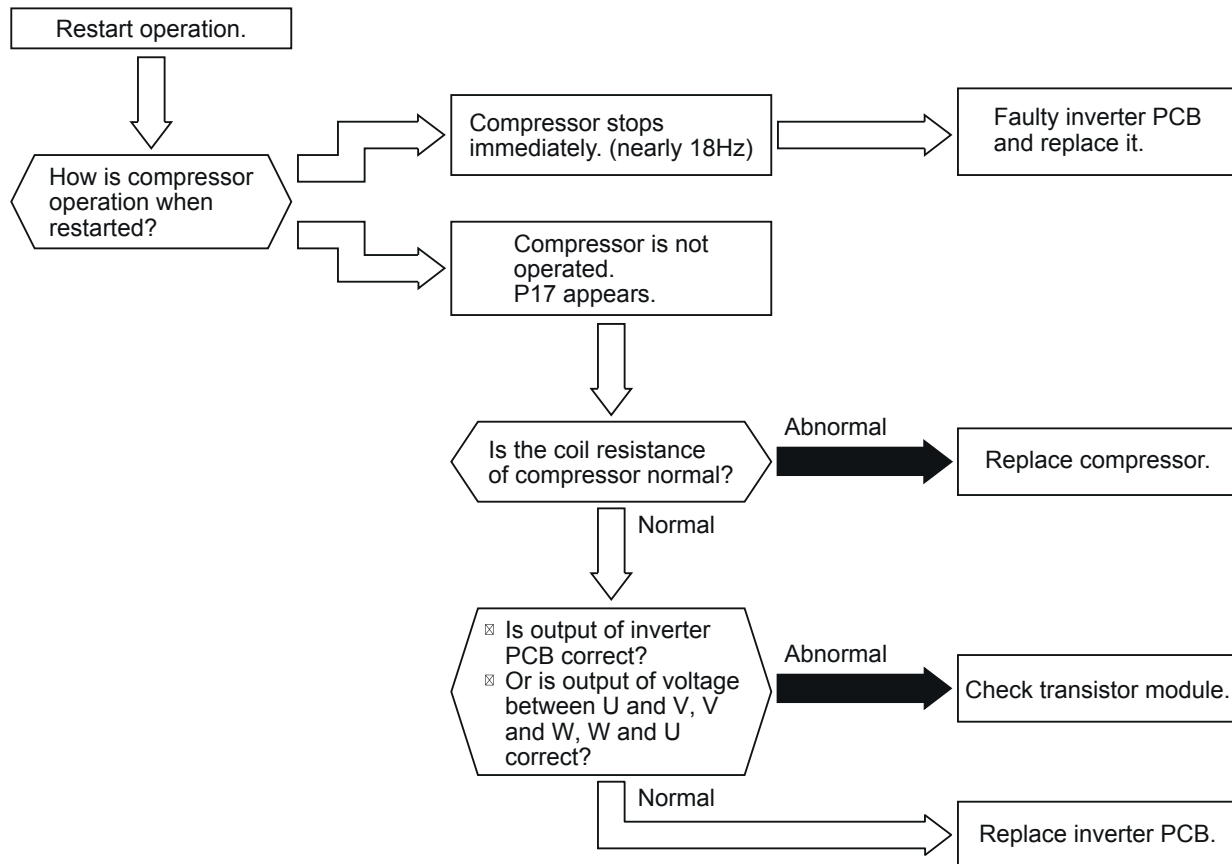
Condition of Activation:

- (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.



Alarm Code	51	Abnormality of Current Sensor
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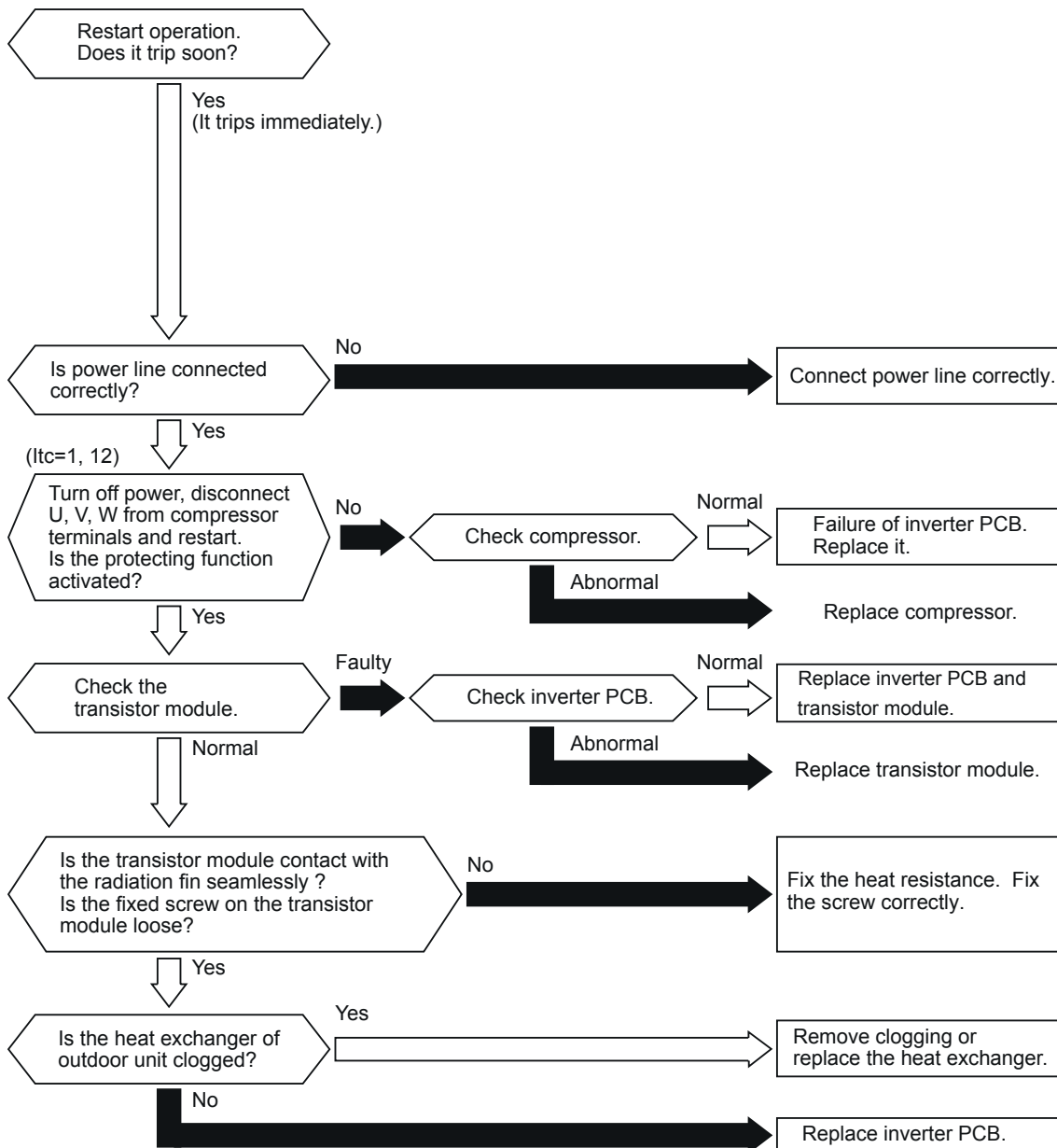
- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ In case that the abnormality 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.

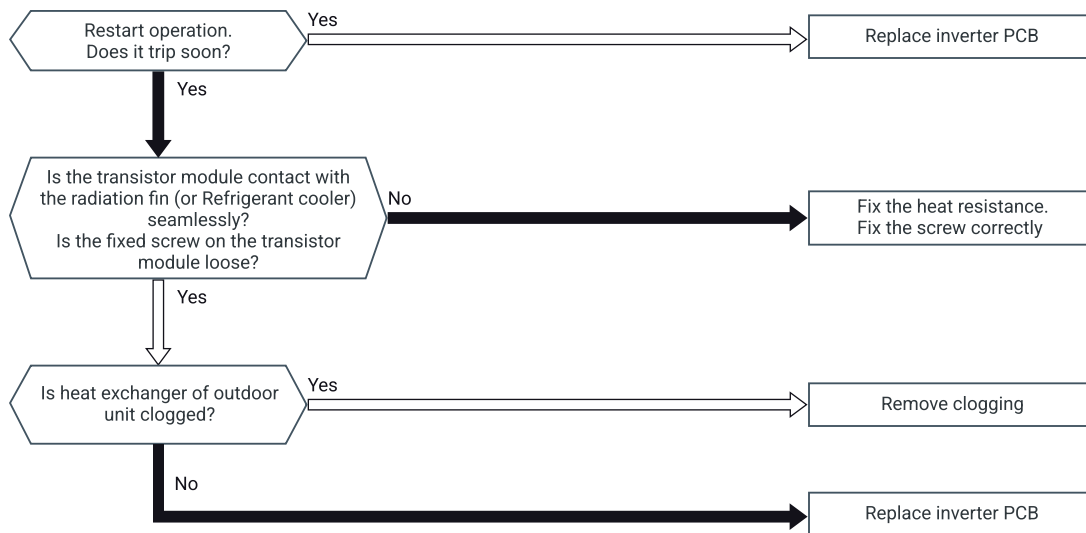


Alarm Code	54	Abnormality of Inverter Fin Temperature
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- The RUN indicator (Red) is flashing
- The indoor unit number, the alarm code, the unit model code and the connected number of indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- ★ 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 activation (Cause code of inverter stoppage = 3)
The temperature of inverter fin exceeds 80°C. (Note: For Model AVW-76/96/114HKFHH2, the value is 100°C)



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

Alarm Code	55	Inverter Failure
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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 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.



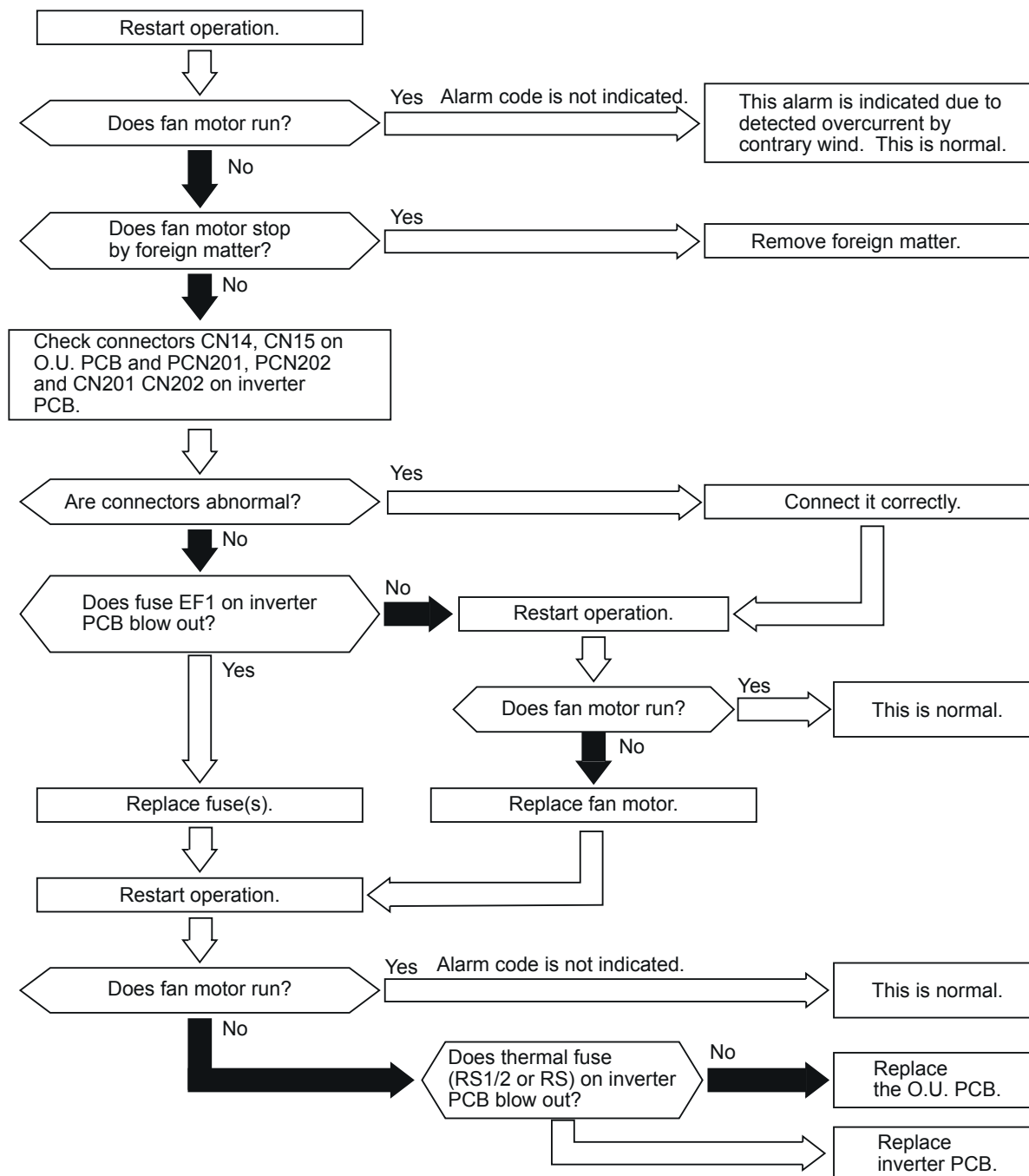
- *1) When the excessive surge current is applied to the unit due to lightning or other causes, this alarm code or the cause code of inverter stoppage (lrc=11) will be displayed on the 7-segment display on O.U. PCB and the unit can not be operated. In this case, check to ensure the surge absorber (SA) 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

Activation of Fan Controller 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.
- ★ IPM (Transistor Module) has abnormality-detecting function.
This alarm code is indicated when the abnormality is detected ten times within 30 minutes. (Retry operation is performed for the first nine times.)
Condition of Activation:
 - (1) The abnormal current such as a short-circuit current, a ground-fault current or the overcurrent occurs at the transistor module.
 - (2) The control voltage decreases.



Alarm Code	b1	Incorrect Setting of Unit and Refrigerant Cycle Number
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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 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
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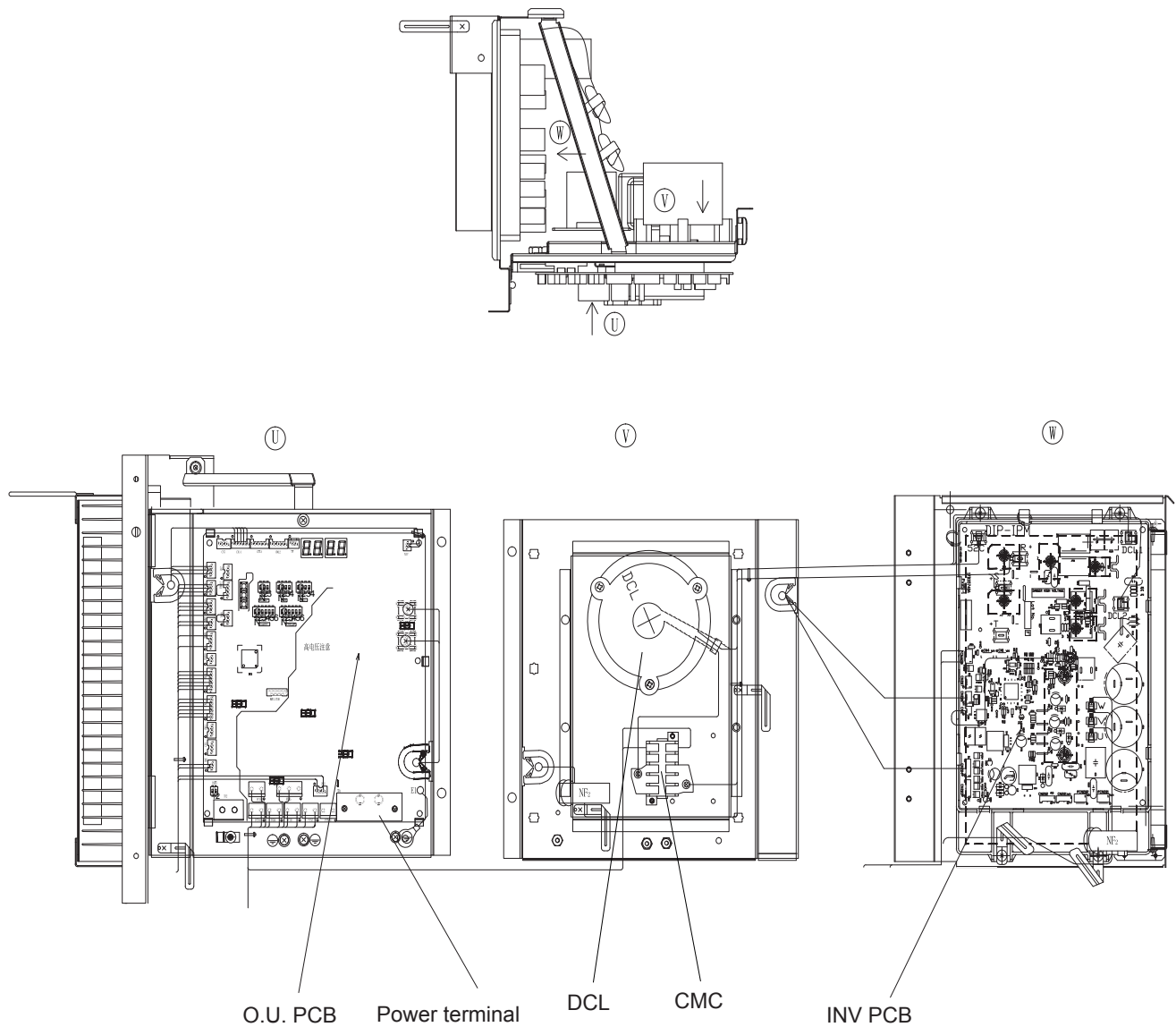
- The RUN indicator (Red) is flashing
 - The indoor unit number, the alarm code*), the unit model code and the number of connected indoor units are displayed on LCD. Meanwhile, the indoor unit number and the alarm code are displayed on the 7-segment of outdoor unit PCB.
- *1): The alarm code indicated on the remote control switch is "35".

Conditions	Action
The number of the connected indoor units not supporting H-NET II is 17 and after.	The number of the connected indoor units shall be 16 and before.

1.2.8 Function Of RSW, DSWs And LEDs

1.2.8.1 Arrangement Inside Electrical Box

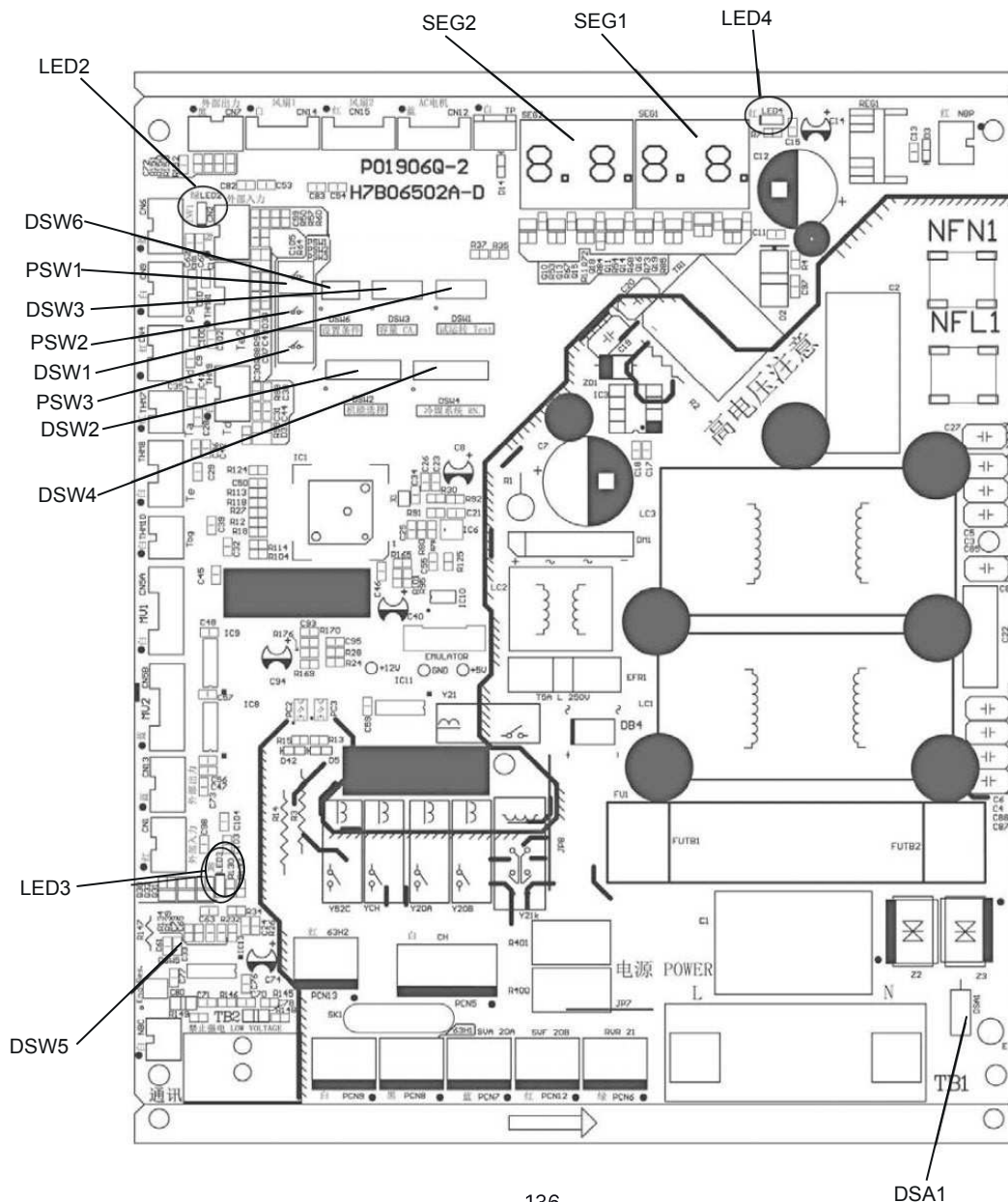
- CHV6-28URBM, CHV6-36/48/60URBM



1.2.8.2 LEDS And SEGs On PCB

Part Name		Contents of Functions
LEDs	LED1 (Red) or 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".

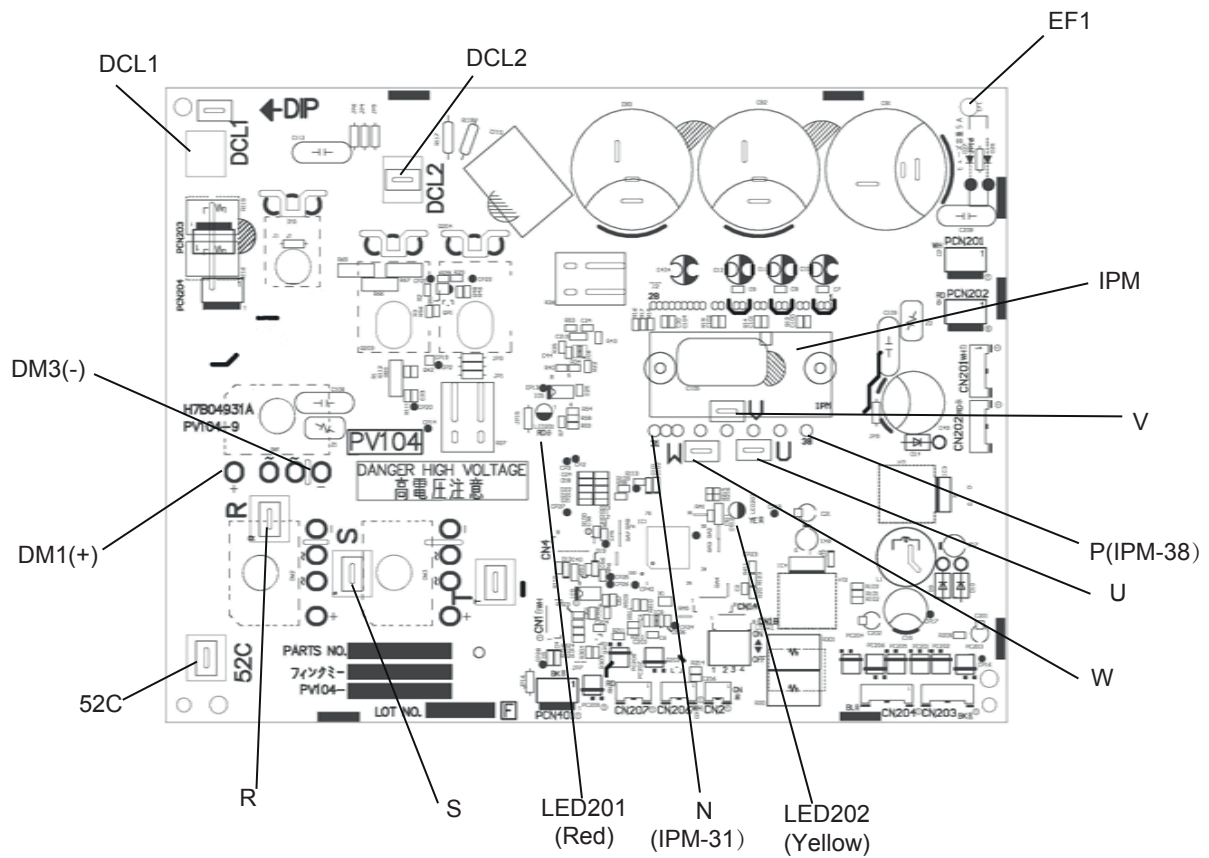
CHV6-28URBM, CHV6-36/48/60URBM



1.2.9 Checking Of Inverter PCB

<Procedure>

CHV6-28URBM, CHV6-36/48/60URBM



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.

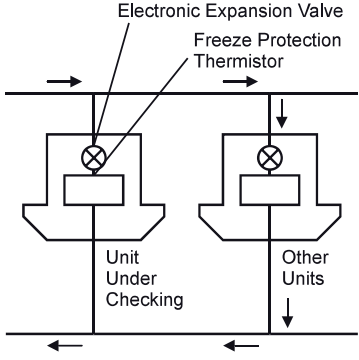
Measure the each checking element by a tester. The checking result shall be as following table.

Tester Probe	Result
(+)52C, (-)R	More than 1 kΩ
(+)52C, (-)S	More than 1 kΩ
(-)52C, (+)S	More than 100 kΩ
(-)52C, (+)S	More than 100 kΩ
(-)DM3, (+)R	More than 1 kΩ
(-)DM3, (+)S	More than 1 kΩ
(+)DM3, (-)R	More than 100 kΩ
(+)DM3, (-)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
(+)DM3, (-)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)			
Red-Black	White-Black	Yellow-Black	Blue-Black
1MΩ or greater	about 40kΩ	about 220kΩ	∞

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.

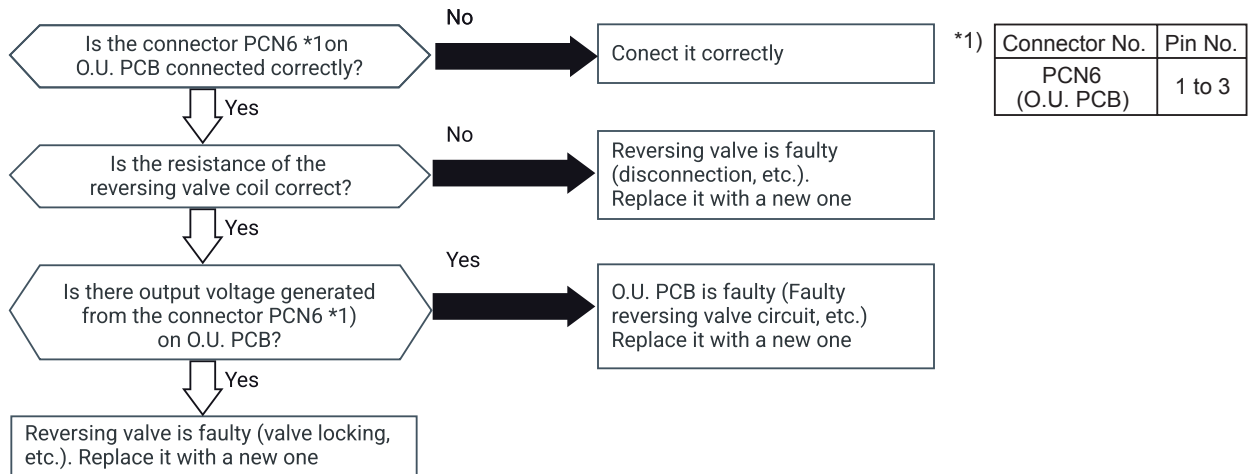
It is abnormal if the resistance is completely different from the normal values in the table up.

(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 Reversing Valve

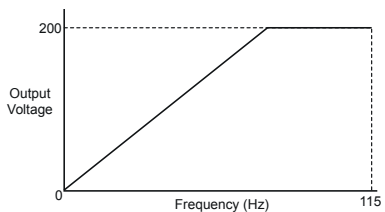
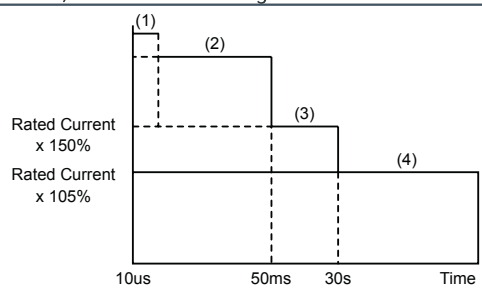
If outdoor unit does not start the heating operation or defrosting operation, there may be a malfunction of the reversing valve. The troubleshooting is indicated below.



2. Main Parts

2.1 Inverter

(1) Specifications of Inverter

Applicable Model	CHV6-28~60URBM
Applicable Power Supply	208/230V, 60Hz
Output Voltage (Maximum)	230V
Output Current (Maximum)	21.5A
Control Method	Vector Control
Range Output Frequency	10 to 115Hz
Accuracy of Frequency	0.01Hz 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 194V DC or higher than 400V DC. Cause of Abnormality: Failure of Inverter PCB, Decreasing Capacity of Condenser, Incorrect Wiring.
Abnormality of Current Sensor	(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 is 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 (2) Instantaneous Overcurrent Trip (3) Instantaneous Overcurrent Trip: It is detected when current value is over rated current 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 194°F.
Ground-Fault Detection	The unit is stopped when the compressor shorts to ground at start-up.

(3) Protective Function

(A) Excessive High or Low Voltage for Inverter

(a) Level of Detection

When the voltage of direct current is greater than (A) V, an abnormality is detected.

When the voltage of direct current is smaller than (B) V, an abnormality is detected.

Power supply	380~415V 50Hz	220~240V 50Hz
(A)	750	440
(B)	350	194

(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.

(Main Parts)

(E) Fin Temperature Increase

(a) Level of Detection

When the temperature of internal thermistor exceeds more than 194°F, 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

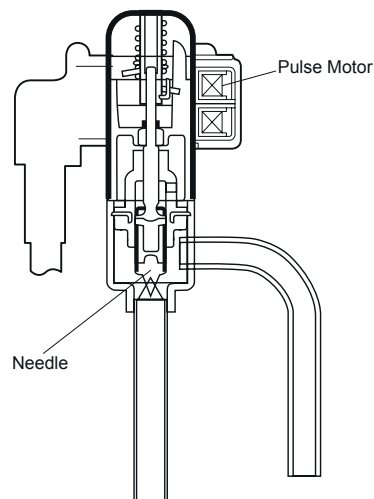
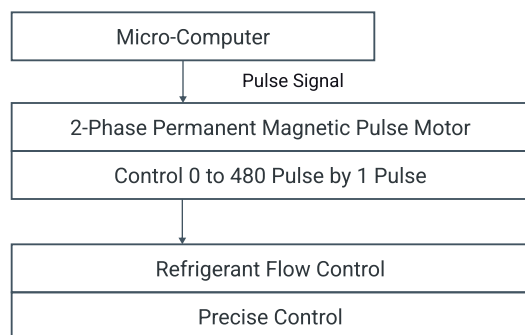
An overload signal is issued when output current exceeds 105% of the maximum output current, and the frequency decreases.

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.

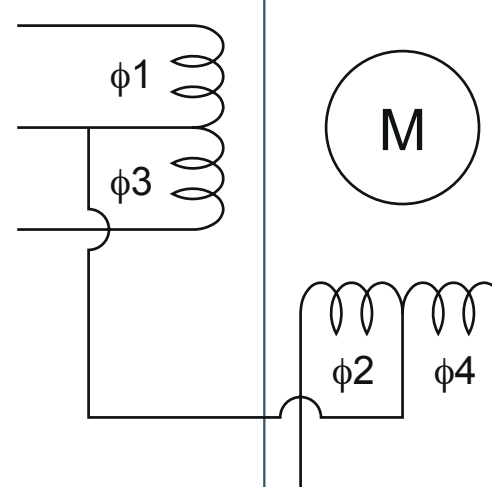
(c) Cancellation of Protection Function

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

2.2 Electronic Expansion Valve For Outdoor Units

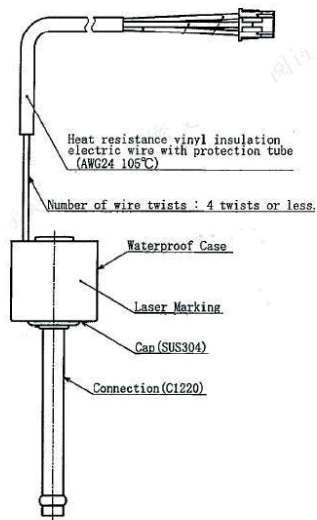


Specification

Items	Specification	
Models to be Applied	For Main Cycle (EVO)	
Type	CAM Series	UKV Series
Refrigerant Used	R410A	
Working Temperature Range	-22 - 158°F	
Mounting Direction	Drive shaft in Vertical Direction within an Angle of 45° as Maximum	Drive shaft in Vertical Direction within an Angle of 45° as Maximum
Flow Direction	Reversible	
Rated Voltage	DC12V±15%	DC12V±10%
Drive Condition	30 - 90 PPS 1-2 Phase Excitation	63 PPS 1-2 Phase Excitation
Coil Resistance	46Ω±4Ω (at 68°F)	46Ω ± 3Ω (at 68°F)
Wiring Diagram, Drive Circuit and Activation Mode		

2.3 Pressure Sensor

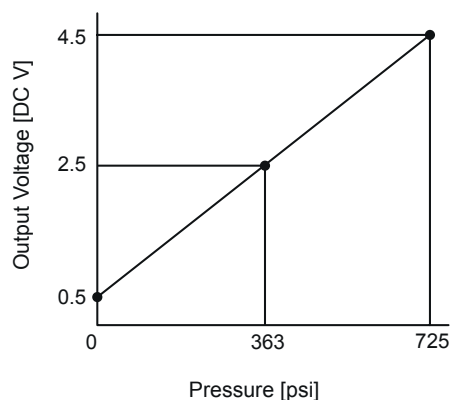
(1) Position of Pressure Sensor



(2) High Pressure Sensor(Black)

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.

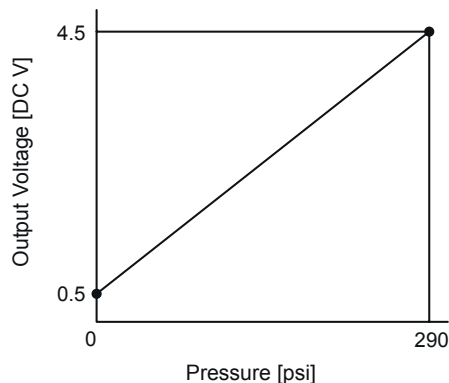
The output characteristics of the high pressure sensor are as follows.



Output Characteristics of High Pressure Sensor

(3) Low Pressure Sensor(Green)

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.

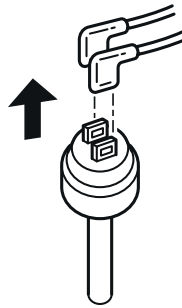


Output Characteristics of Low Pressure Sensor

2.4 Pressure Switch

High Pressure Switch (for Protection)

When the high pressure reaches 601 psi, compressor is stopped to protect the refrigerant cycle components.

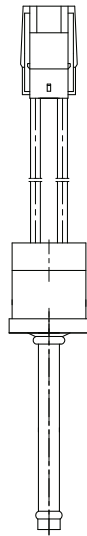


High Pressure Switch(PSH)

Low Pressure Switch (for Protection)

However, if the low pressure is lower than 7 psi, the pressure switch will be OFF, and the system will operate under protection, but if the low pressure is higher than 22 psi, the pressure switch will return to on, and the system will return to normal operation again.

If the low pressure switch is off for 30 seconds, the compressor will be stopped to protect the refrigerant cycle components.



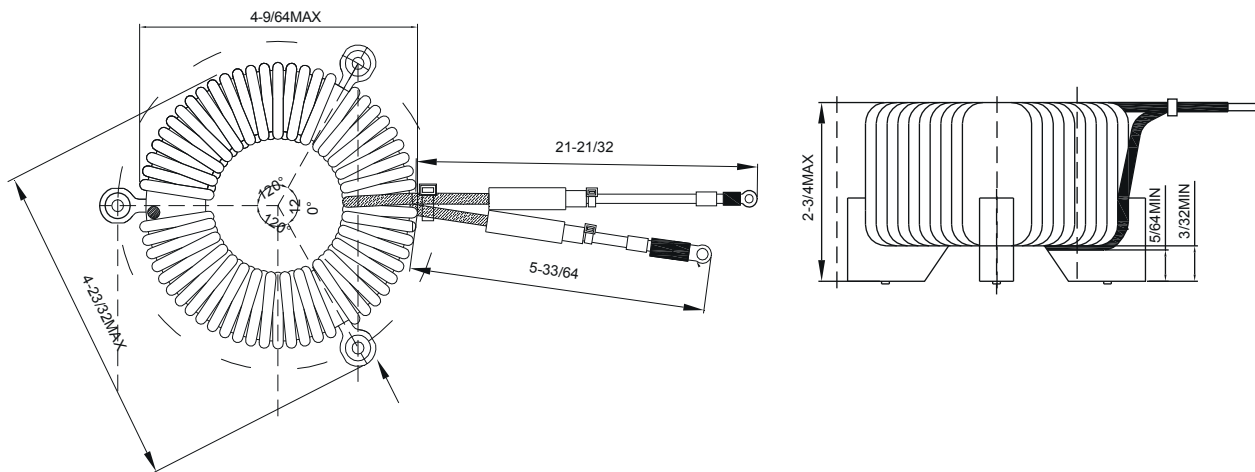
Low Pressure Switch(PSL)

2.5 Reactor (DCL)

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

Model	CHV6-28~60URBM
Items	Specification
Character	0.625mH±10% (at 1 kHz)
Rated Current	AC 30A
Direct Current Resistance	35mΩ (at 77°F)
Permissible Temperature Range	-13°F to 140°F

unit: in.



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

ON

OFF

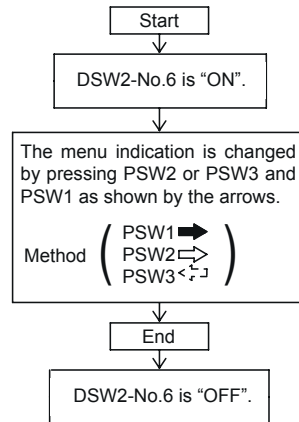
1 2 3 4 5 6

	Setting Item	Pin No.
1	Function Setting	ON OFF
2	External Input/Output Setting	ON OFF

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.

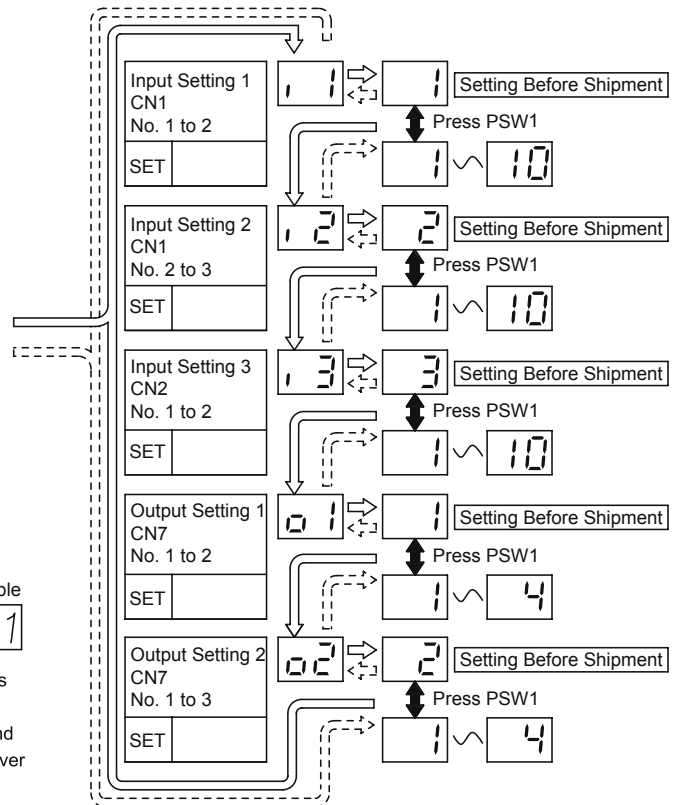


NOTES:

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.

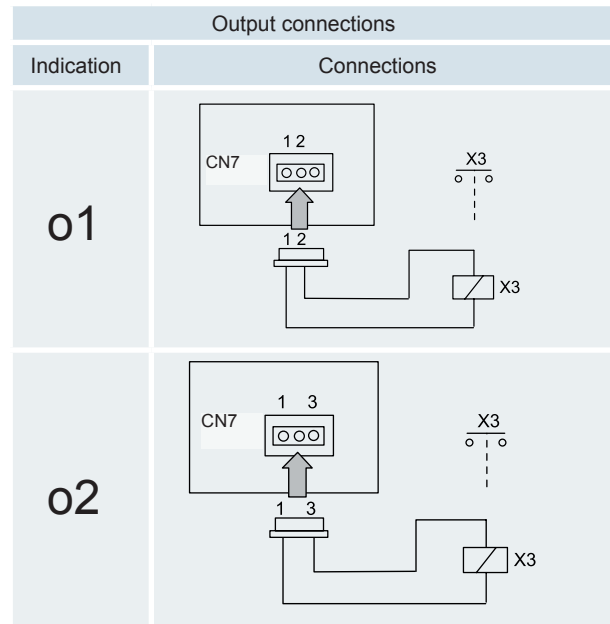
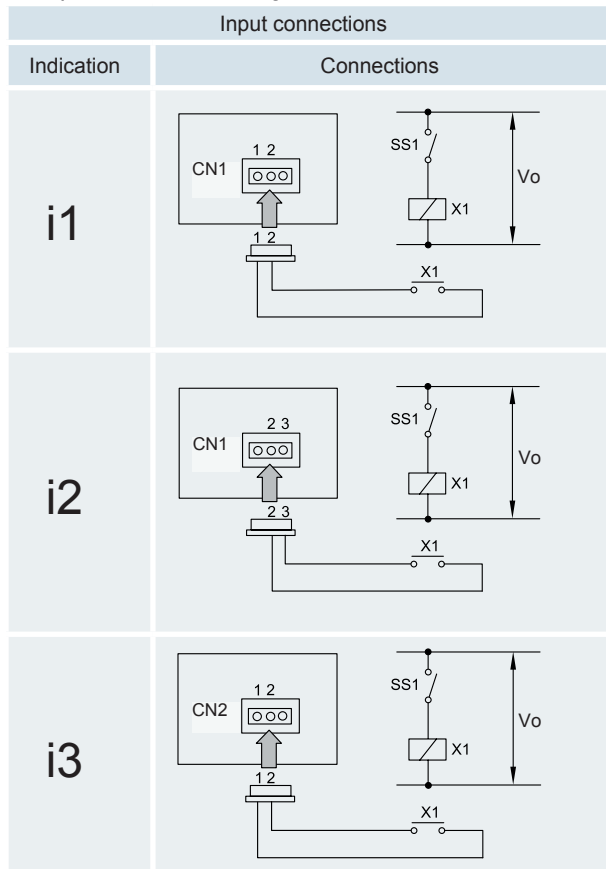
Example

SET	1
-----	---



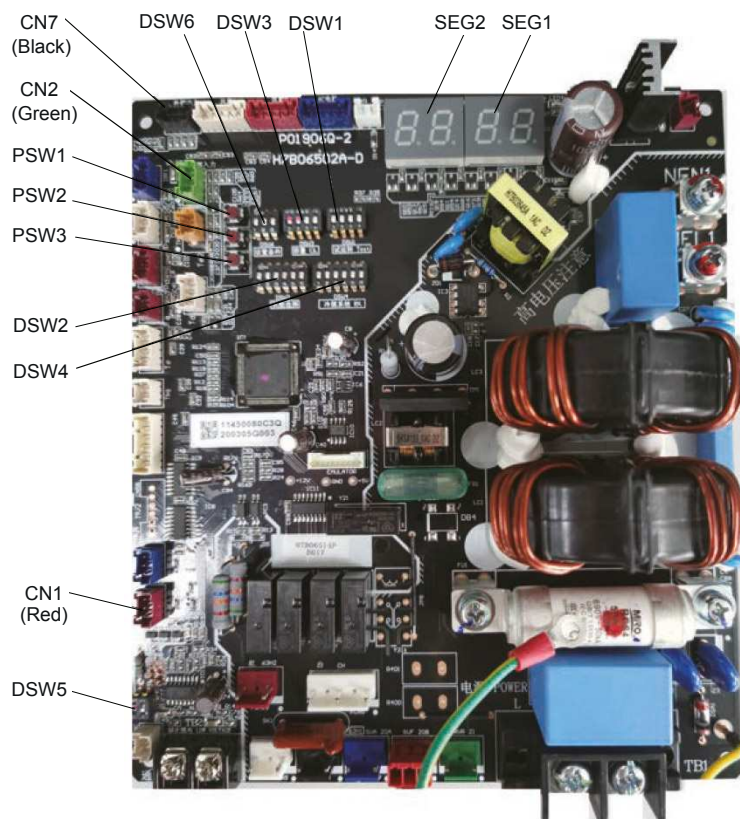
Connection

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



Arrangement of Push Switches on PCB1

CHV6-28~60URBM



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.)	Setting Function	Control Function No.
Input Setting 1	CN1 (1-2)	Fixed Heating Operation Mode	1
Input Setting 2	CN1 (2-3)	Fixed Cooling Operation Mode	2
Input Setting 3	CN2 (1-2)	Demand Stoppage	3
Output Setting 1	CN7 (1-2)	Operation Signal	1
Output Setting 2	CN7 (1-3)	Alarm Signal	2

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 fixing 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 CN17: Fixed Heating Operation Mode.

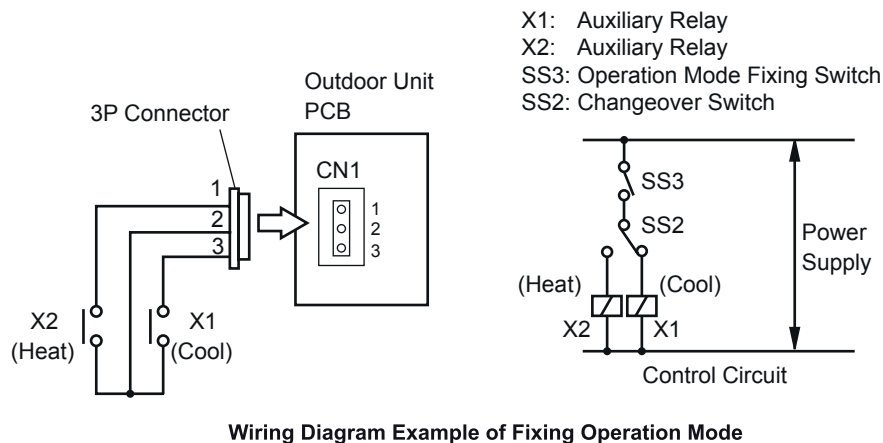
Short Circuit between Terminals 2 and 3 of CN17: Fixed Cooling Operation Mode.

During this fixed heating (or cooling) mode, no cooling (or heating) operation is available. 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.

- Setting Example

Fixing Heating Operation at "Input Setting 1" (between 1 and 2 pins of CN1)

Fixing Cooling Operation at "Input Setting 2" (between 3 and 2 pins of CN1)



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)

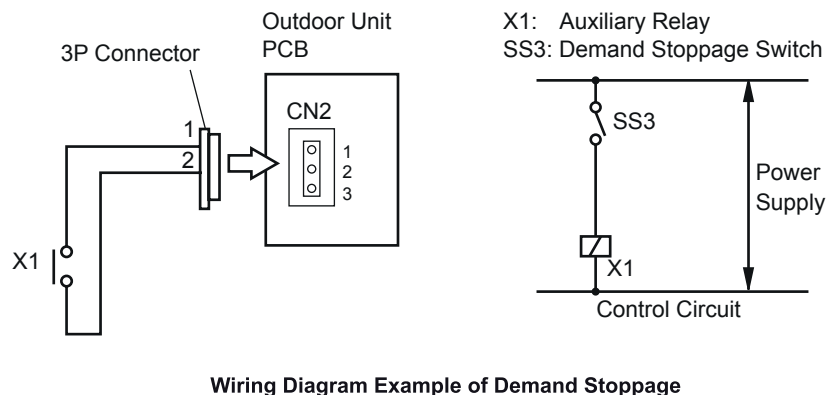
The stoppage code No. "10" is given. In this case, if the input terminals are opened, operation is resumed.

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 for saving energy.

- Setting Example

Demand Stoppage at Input 3 (between 1 and 2 pins of CN18)



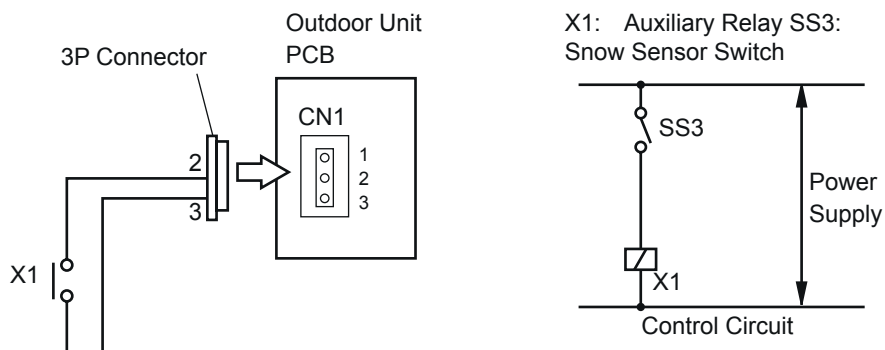
3.3.3 Input Outdoor Fan Motor Start/Stop (Control Function No.4)

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 50°F 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 (50°F).
- (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 Forced Stoppage on the outdoor unit PCB are short-circuited while running, the compressors and the indoor fan motors are stopped. The stoppage code No. "10" is given.

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

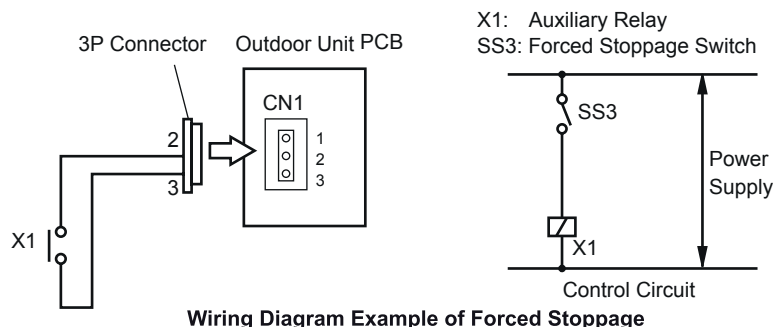
NOTE:

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.

- Setting Example
Forced Stoppage at "Input Setting 2" (between 2 and 3 pins of CN1)



3.3.5 **Input** Demand Current Control 60, 70, 80, 100% (Control Function No.6 to 10)

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.

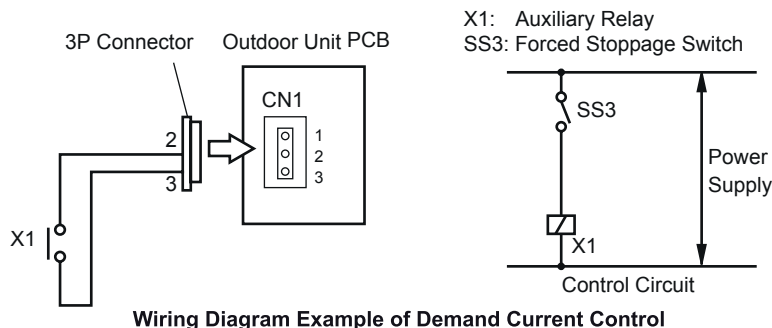
If the outdoor unit running current exceeds the maximum limit for twenty minutes, the indoor unit is put under Thermo-OFF condition. In this case, the stoppage code No. "10" is given. When the input terminal is opened during the demand current control, its control is released.

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.

- Setting Example
Demand Current Control at Input 2 (between 2 and 3 pins of CN17), Control Function No. 6 to 10



NOTE:

- 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.
- 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
CHV6-36URBM	13
CHV6-48URBM	17
CHV6-60URBM	20

External Output Function Setting

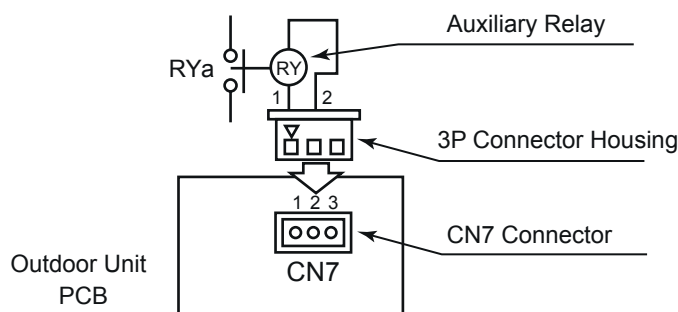
The following signals can be picked up from the outdoor unit PCB. Refer to Table 3.2 for the required auxiliary relay.

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 2 and 3 pins of CN7)



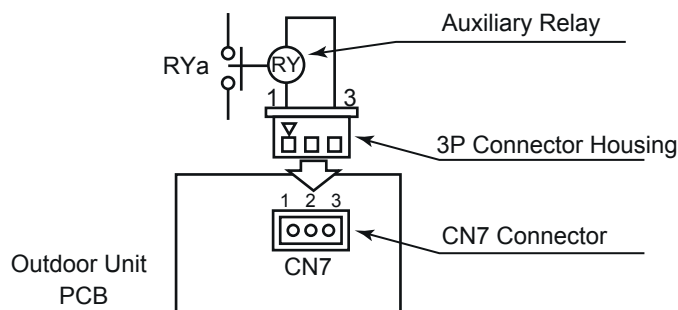
Wiring Diagram Example of Operation Signal

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)

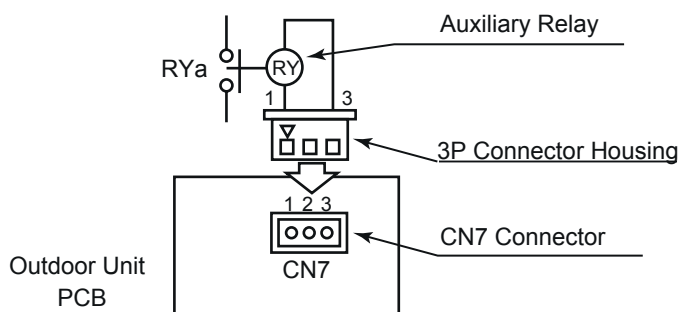


Wiring Diagram Example of Alarm Signal

3.3.8 **Output** Operation 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)

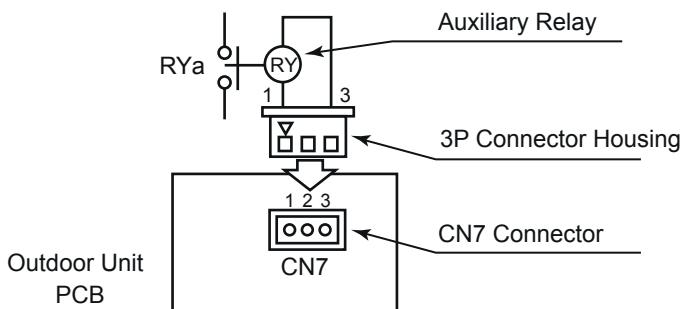


Wiring Diagram Example of Compressor ON Signal

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

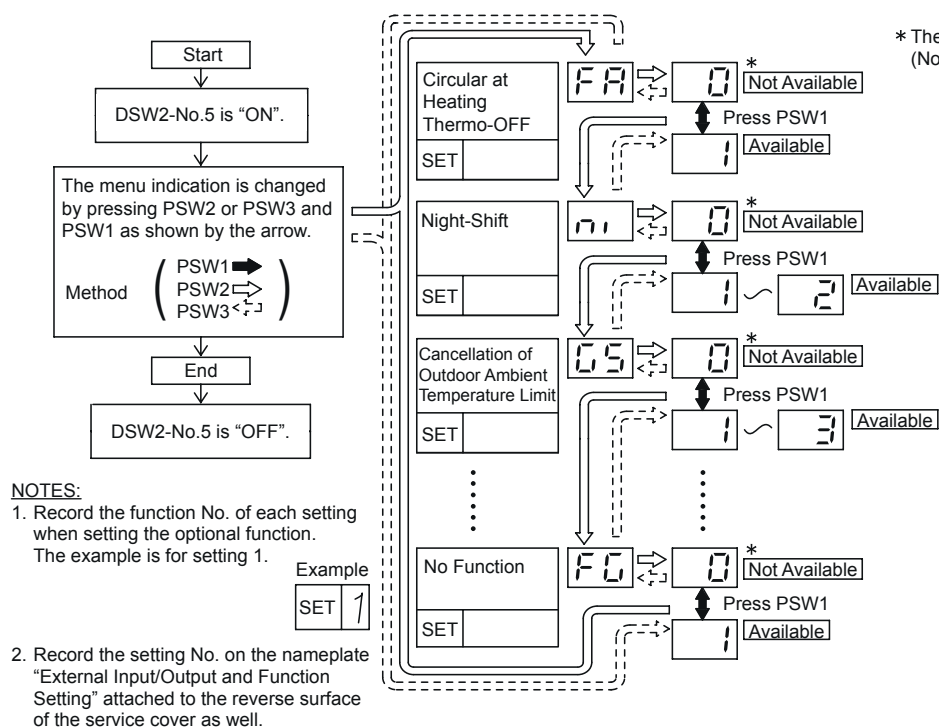
Parts	Specification
Auxiliary Relay*	High-Power Relay, LY2F DC12V made by OMRON

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

*Refer to table 4.1 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 Ite,

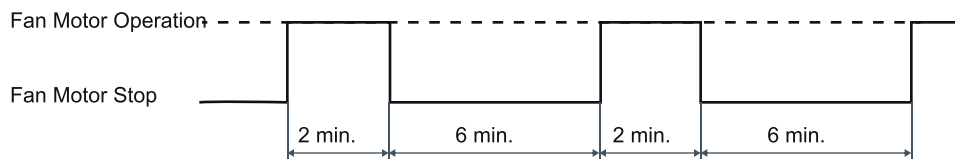
No.	Setting Item	7-Segment Display		Contents
		Item	No.	
1	Circular Function at Heating Thermo-OFF	FA	00	Not Available (Default Setting)
			01	Indoor fan forced ON and OFF (2 min, ON 16 min, OFF)
2	Night Shift	Ni	00	No Setting
			01	Setting of night mode
			02	Setting of auto night shift
3	Cancellation of Outdoor Ambient Temperature Limit for Heating	GS	00	No setting
			01	Outdoor ambient temperature limit is ineffective for heating
			02	Outdoor ambient temperature limit is ineffective for cooling
			03	Outdoor ambient temperature limit is ineffective for both cooling and heating
4	Defrost for Cold Area (Change of Defrost Condition)	Jo	00	Not setting
			01	Condition 2 of defrost operation for cold area
5	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
6	Cancellation of Hot Start	HT	00	No setting (Hot start control is available)
			01	Cancellation of hot start
7	Priority Capacity Mode	nU	00	No setting
			01	Cooling mode capability improvement
			02	Heating mode capability improvement
			03	Both cooling and heating mode capability improvement
8	Energy Saving Mode for Cooling	Sc	00	No setting
			01	Energy saving mode is effective
9	Energy Saving Mode for Heating	Sh	00	No setting
			01	Energy saving mode is effective
10	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 6dB)
			03	Low noise setting mode 3 (The noise reduce 8dB)
11	Demand Function Setting	dE	00	No setting
			01	When input demand control setting,set value 60%.
			02	When input demand control setting,set value 70%.
			03	When input demand control setting,set value 80%.
			04	When input demand control setting,set value 100%
12	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.
13	Low Outlet Temperature Protection In Cooling Mode1	Fb	00	No setting
			01	Outlet temperature of indoor units≥59°F
14	Low Outlet Temperature Protection In Cooling Mode2	Fc	00	No setting
			01	Outlet temperature of indoor units≥50°F
15	Outlet air Temperature Control	FT	00	No setting
			01	Restrain Capacity Control (Fresh Air Unit or AHU)
			02	Outlet air Temperature Control (Fresh Air Unit or AHU)
			03	Both "FT=1" and "FT=2" setting is effective
16	Convert Unit in Checking Mode	n4	00	No setting (Convert indication unit: [°F] or [psi])
			01	Convert Indication Unit: [oF] or [psil]

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 “1” for the Night Shift or Auto Night Shift “ni”.

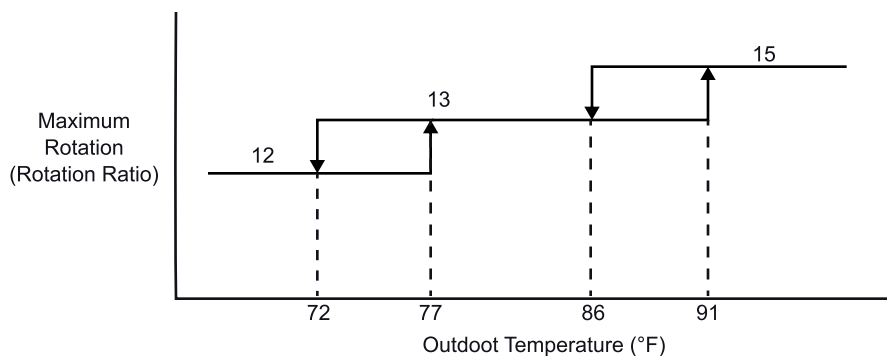
Then, this function can be set.

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

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

(1) Outdoor Fan



(2) Frequency Range (Cooling Operation)

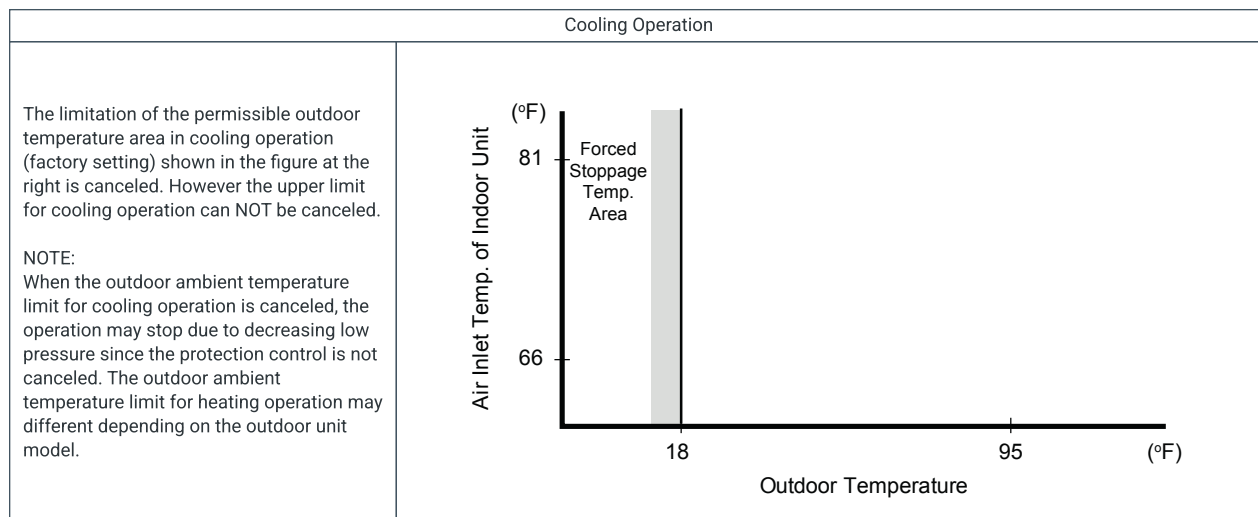
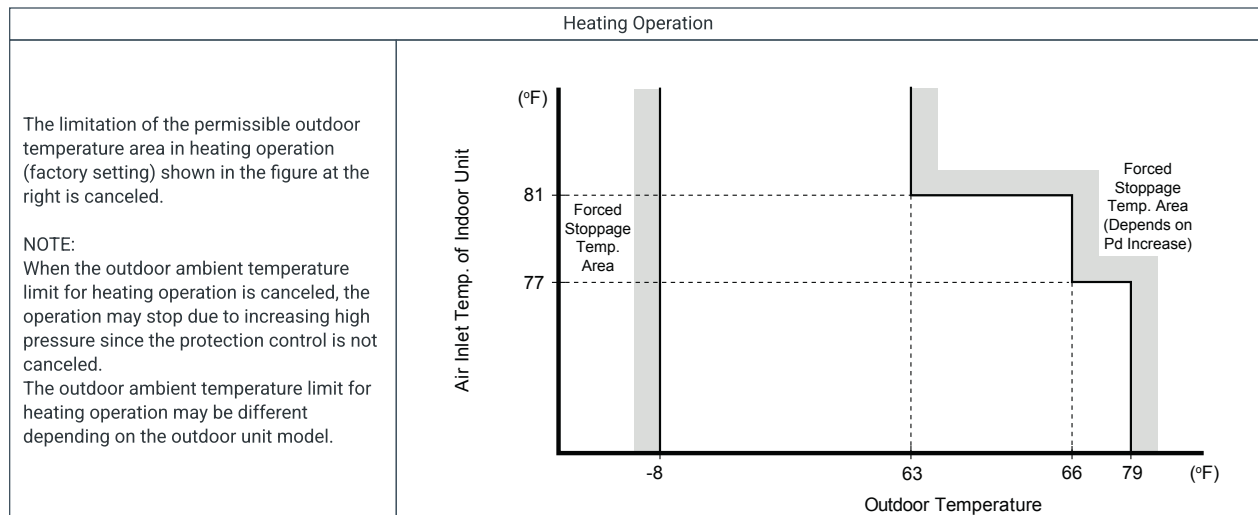
Outdoor Unit Capacity (kBtu/h)		Maximum Frequency (Hz)		Maximum Frequency (Hz)	Target Operating Noise (dB)
CHV6-28URBM	When Night Shift is not Set ni=0	90	When Night Shift is Set ni=1	60	42
CHV6-36URBM		80		65	42
CHV6-48URBM		90		65	44
CHV6-60URBM		100		65	56

3.4.4 Cancellation Of Outdoor Ambient Temperature Limit (Function Setting “GS”)

Press “PSW1” and select the setting condition “0” or to “2” for Cancellation of Outdoor Ambient Temperature limit “GS”. Then, this function can be set.

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

“GS” Setting Condition	Operation Mode for Cancellation
00	Not Setting
01	Outdoor ambient temperature limit is ineffective for heating.
02	Outdoor ambient temperature limit is ineffective for cooling.
03	Outdoor ambient temperature limit is ineffective for both cooling and heating.



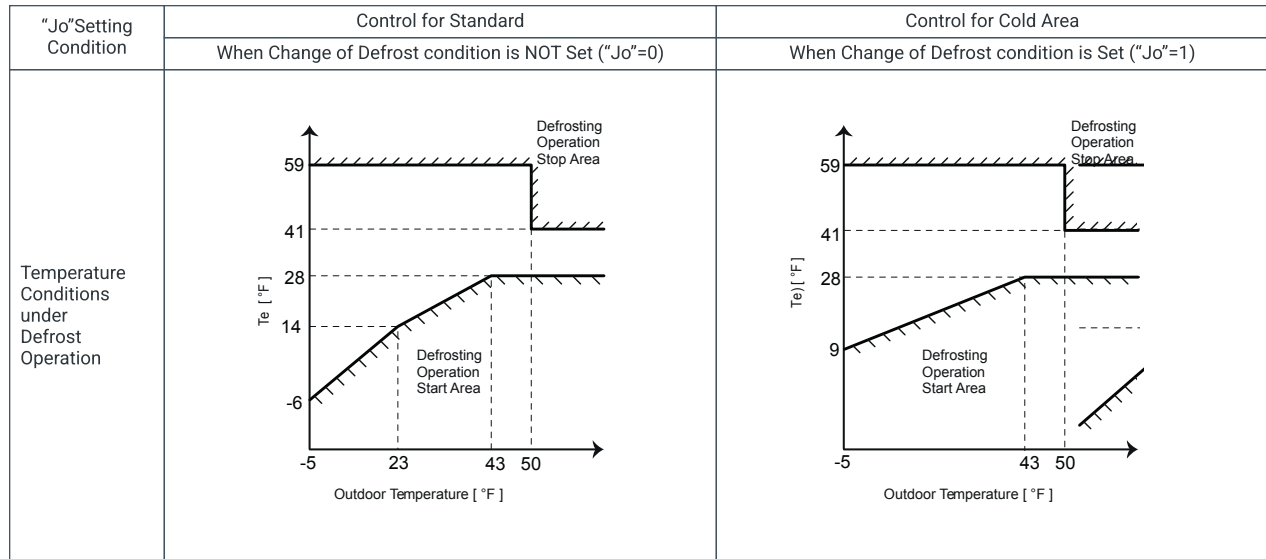
NOTE:

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 canceled.

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

3.4.5 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.



3.4.6 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.

3.4.7 Priority Capacity Mode

If the capacity seems insufficient during the normal operation, press “PSW1” and select the setting condition “0” to “3” Priority Capacity Mode Setting “nU”. By setting this function, the target frequency of the compressor or the target Pd becomes higher, so as to improve the cooling capacity or heating capacity.

“nU” Setting Condition	Target Frequency of Compressor or target Pd
00	Not Setting
01	Target frequency of compressor +10% only for cooling mode
02	Target frequency of compressor +20% and target Pd becomes maximum target Pd only for heating mode
03	Both “nU=01” setting and “nU=02” setting are effective.

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. The maximum target Pd for heating mode may decrease depending on the temperature difference between inlet temperature of indoor unit and setting temperature.

3.4.8 Low Noise Setting (Function Setting “dB”)

Press “PSW1” and select the setting condition “0” to “1” 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.

“dB” Setting Condition		Reduction Rate of Upper Limit
		Outdoor Fan Rotation
0	No Setting (Default)	100%
1	Low Noise Setting 1	80%

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)
CHV6-28URBM	48	70%	47	65%	45	60%
CHV6-36URBM	49	70%	48	65%	46	60%
CHV6-48URBM	49	80%	48	75%	46	70%
CHV6-60URBM	47	70%	46	65%	44	60%

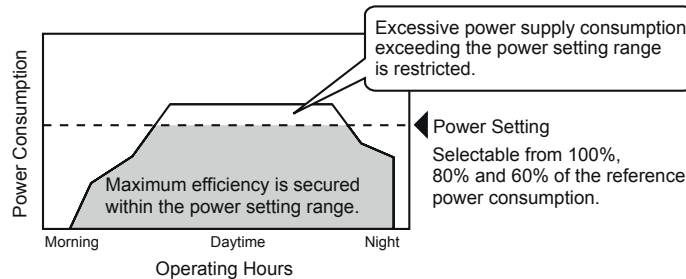
3.4.9 Demand Function Setting (Function Setting “dE”)

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.



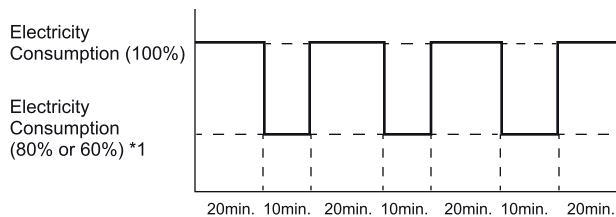
NOTES for Facility:

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”.

3.4.10 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.

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

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

When the indoor unit outlet air temperature is less than 54°F 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 of High/Low Pressure Bypass
0 (Default Setting)	-	-
1	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 59°F for 3min., besides “NOTE” 1 above, the solenoid valve for high/low pressure bypass is opened to reduce refrigerant flow.

3.4.12 Low Outlet Temperature Protection In Cooling Mode2 (Function Setting “Fc”)

Press “PSW1” and select the setting condition “0” or “1”, so that Low Outlet Temperature Protection In Cooling Mode2 “ Fc ” can be set.

When the indoor unit outlet air temperature is less than 54°F at cooling operation, the compressor frequency forcibly decreases to prevent a drop in outlet air temperature.

“Fc” Setting Condition	Low Outlet Temperature Protection In Cooling Mode1	
	Compressor Frequency	Solenoid Valve of High/Low Pressure Bypass
0 (Default Setting)	-	-
1	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 50°F for 3min., besides “NOTE” 1 above, the solenoid valve for high/low pressure bypass is opened to reduce refrigerant flow.

4. Field Work Instructions

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

In the room where the packaged air conditioner is installed, the refrigerant gas should be controlled not to exceed the limit concentration in case of the refrigerant leakage.

The incombustible and non-toxic refrigerant R410A is adopted for this unit. If by any chance the refrigerant gas leaks and fills the room, it may lead to suffocation.

Accordingly, the refrigerant charging quantity is larger than general individual unit. **Before the indoor unit installation, confirm that the room can keep the lower gas concentration than the limit value in order to take the emergency countermeasures when the gas leakage occurs.**

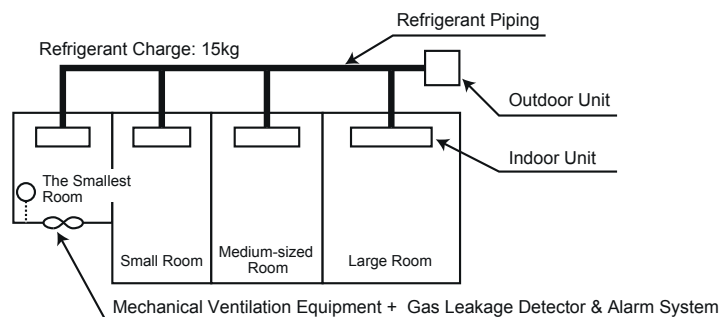
The limit concentration is calculated according to the following formula:

$$\frac{\text{Totally Charged Refrigerant Quantity in System (kg)}}{\text{Room Space for each Indoor Unit (m}^3\text{)}} \leq \text{Critical Concentration} *$$

*This value should be decided according to the each country's regulation

If the room to install this unit is not able to keep the gas concentration lower than the limit value, please take the following actions.

- Make the effective opening for ventilation (such as opening without door or opening with over 0.15% of the floor area at the upper and lower part of the door) between one room and the next in order to keep the lower gas concentration than the limit.



NOTES:

1. The gas leakage quantity for each room (large, medium-sized, small and the smallest) should be calculated as 15kg.
2. The gas concentration of each room should not exceed the limit value. *

⚠ 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 sounds or 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 Lubricant - 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 sounds or 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 check 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:

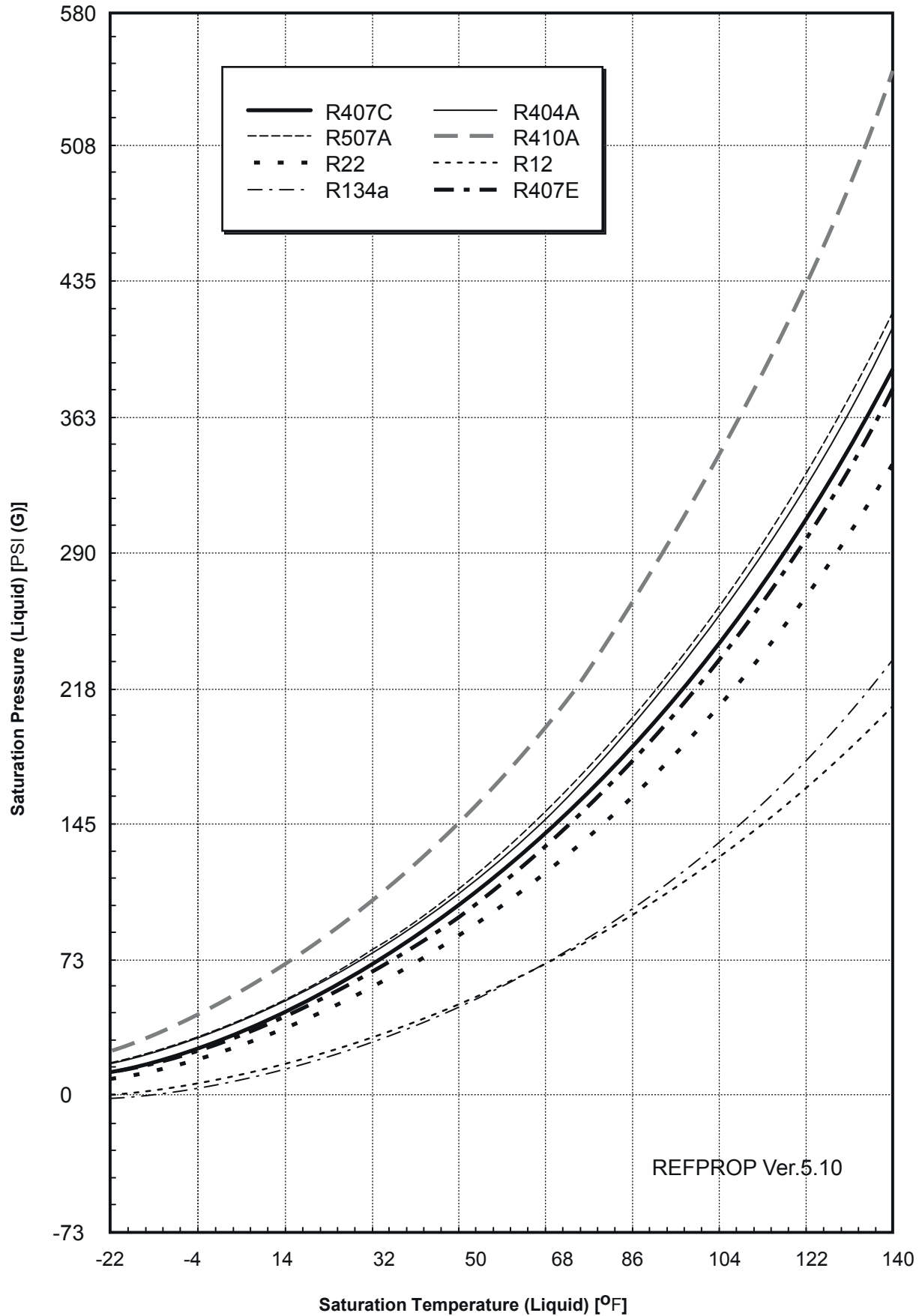
Refer to Section "Service 1.2.3 Check Mode by Remote Control Switch---1.2.3.1 check mode" for items of check mode.

4.5 Saturation Curve for Refrigerant

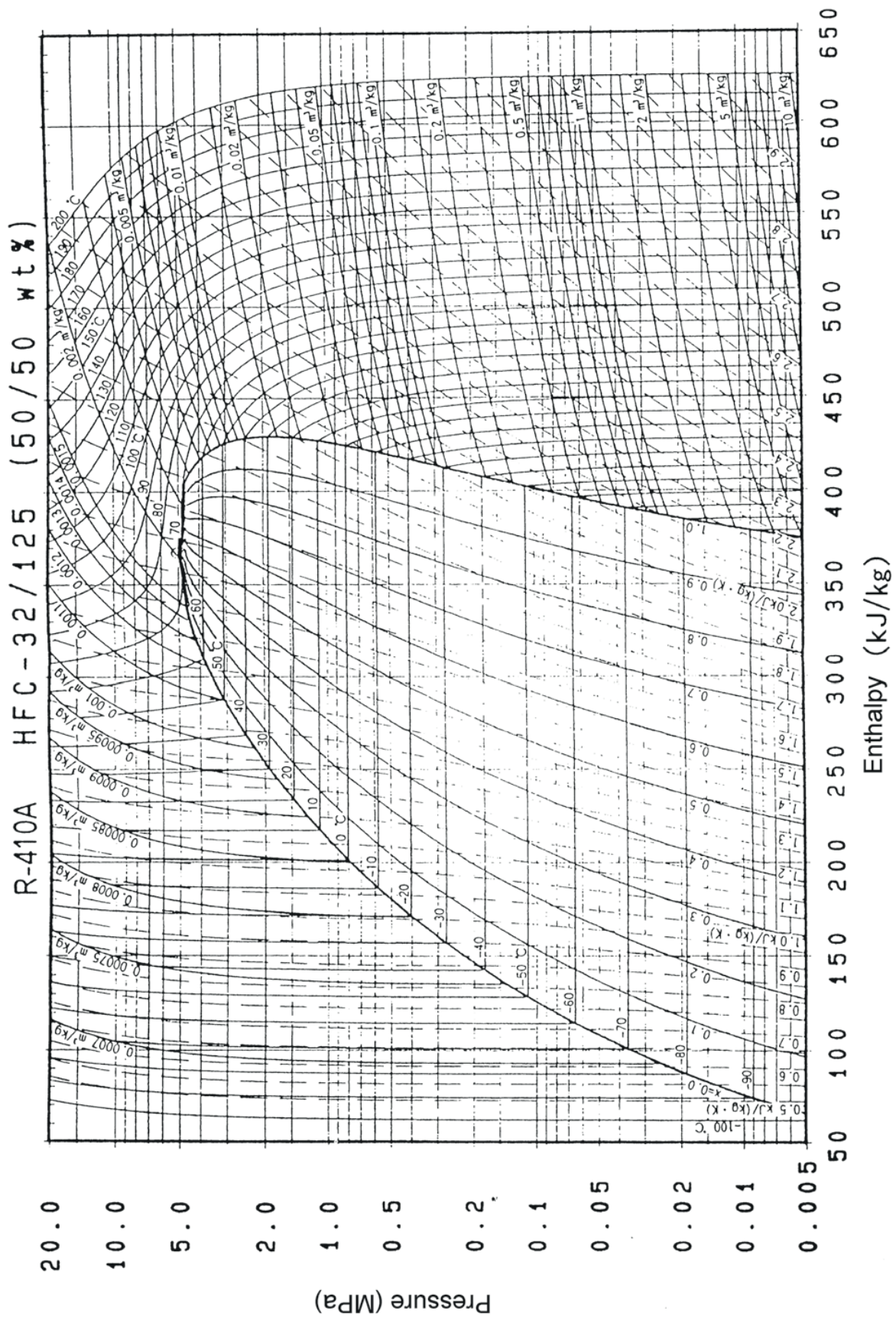
Service and Maintenance Record

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 Pressure-Enthalpy Diagram for R410A



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 DB81°F 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 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.

- a. Disconnect the cables of the compressor and measure the insulation resistance of the compressor itself. If the resistance is 1MΩ and over, insulation failure of other electrical charge part has occurred.
- b. If the resistance is 1MΩ 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.

<* 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 14°F). 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 canceled 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 .

5.2 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.

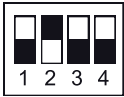
Setting Before Shipment



	Setting Item	Pin No.
1	Test Cooling Operation	1
2	Test Heating Operation	1,2
3	High Static Pressure Function	4
4	Compressor Forced Stop	2,3

⚠ 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.

	Dip Switch Setting	Operation	Remarks
Test Run	1. Setting of Operation Mode Cool: Set DSW1-2 OFF  Heat: Set DSW1-2 OFF  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 operating when the test run of the outdoor unit is set. 2. The ON/OFF operation can be performed from the wired controller or DSW1-1 of the outdoor unit. 3. The operation continues for two hours without Thermo-OFF.	* Note that the indoor units 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  ON OFF 2. Reset *Compressor ON: Set DSW1-2,3 OFF  ON 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 50°F, high pressure is higher than 464psi or the unit is Thermo-OFF.	* Do not continuously repeat defrosting operation. * When manual defrosting operation is 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 at Test Run

(1) Indoor and Outdoor Fan

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

(2) Power Supply Voltage

Check the power supply.

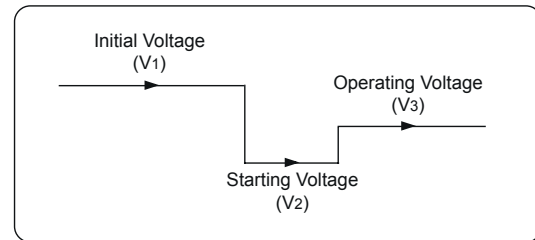
If the power supply is abnormal, contact the electric power company. Usually, voltage drop will occur when starting the operation as shown in the figure (V2).

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 $\leq \pm 10\%$
- Starting Voltage (V2): Rated Voltage $\geq -15\%$
- Operating Voltage (V3): Rated Voltage $\leq \pm 10\%$

< Voltage Change >



(3) Normal Operating Pressure

Normal operating low pressure is 29 to 160 psi and normal operating high pressure (Pd) is 145 to 508 psi when the refrigerant charge quantity is correct. Check the operation pressure in the test run mode.

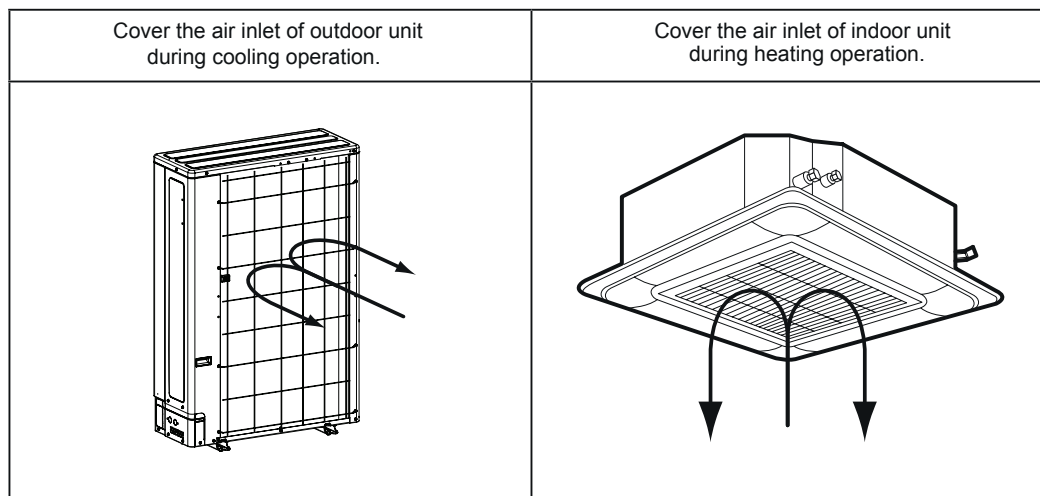
(4) High Pressure Switch

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

Refrigerant	Operation Pressure
R410A	601 psi

(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.

5.4 Checklist for Refrigerant Cycle

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 correct?	
2	Are the power supply 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 TdSH +59 ~ 113°F	
3	Is Ps 22 to 189 psi?	
4	Is Pd 145 to 522 psi? (If the outdoor temperature is high, Pd becomes high.)	

(3) Check Item after Sampling Data

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

No.	Check Item	Standard	Causes	Result
1	Is fan actually running when Fo (Airflow 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 (Inlet Air Temp. of I.U.)?	It is normal when $TL - Ti < 23^{\circ}F (-5^{\circ}C)$.	- 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 (Inlet Air Temp. of I.U.)? (It is applicable when Inlet Air Temp. is 37°F. higher than Setting Temp.)	It is normal when $TG - Ti < 23^{\circ}F (-5^{\circ}C)$.	- 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 Inlet Air Temp. 37°F. higher than Setting Temp.)	It is normal if the difference among units is within 45°F.	- 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 En (I.U. Ex. Valves Opening) lower than "5%"?	It is normal if SH of the unit is up to 27°F 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 higher than the other units' value and is En (I.U. Ex. Valves Opening) lower than "100%"?	It is normal if SH of the unit is up to 37°F 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? * The temperature difference between I.U. means the following; in (Inlet Air Temp.) - on (Outlet Air Temp.) indicated on 7-segment display by check mode.	45°F and over	-	

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

No.	Check Item	Standard	Causes	Result
1	Is Eo (O.U. Ex. Valves Opening) abnormally low or high when TdSH is +59°F to +113°F?	-	- Low ----> Excessive Refrigerant - High ----> Insufficient Refrigerant	
2	Is Pd "232" to "522" psi?	232psi to 522psi) (Pd is high when the indoor temperature is high)	- Low ----> Solenoid Valve SVA Leakage - High ----> Excessive Gas Pipe Pressure Loss	
3	Is Ps "22" to "189" psi?	22psi to 189psi	- Low----> O.U. Short-circuit - Low/High ----> O.U. Fan - Motor Failure, - Fan Module Failure or Outdoor Ambient Thermistor Failure	
4	Is the temperature difference between I.U.s* more than 50°F when iE (I.U. Ex. Valve) is 100% ? * The temperature difference between I.U. mean 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.	50°F and above	- Failure in PCB, Wiring, I. U. Ex. Valve and Coil - Excessive Pipe Pressure Loss - Thermistor Failure for Discharge Air	

Table 7.2 Test Run and Maintenance Record

MODEL:	SERIAL. No.	COMPRESSOR MFG. No.
CUSTOMER'S NAME AND ADDRESS:	DATE:	

1. Is the rotation direction of the indoor coil fan correct? ☐
2. Is the rotation direction of the outdoor coil fan correct? ☐
3. Are there any abnormal compressor sounds? ☐
4. Has the unit been operated at least twenty (20) minutes? ☐
5. Check Room Temperature

Inlet:	No. 1 DB	/WB	°F,	No. 2 DB	/WB	°F,	No.3 DB	/WB	°F,	No.4 DB	/WB	°F
Outlet:	DB	/WB	°F,	DB	/WB	°F,	DB	/WB	°F,	DB	/WB	°F
6. Check Outdoor Ambient Temperature

Inlet:	DB	°F,	WB	°F
Outlet:	DB	°F,	WB	°F
7. Check Refrigerant Temperature

Liquid Temperature:	°F
Discharge Gas Temperature:	°F
8. Check Pressure

Discharge Pressure:	psi
Suction Pressure:	psi
9. Check Voltage

Rated Voltage:	V
Operating Voltage:	V,
Starting Voltage:	V
10. Check Compressor Input Running Current

Input: Running	kW
Current:	A
11. Is the refrigerant charge adequate? ☐
12. Do the operation control devices operate correctly? ☐
13. Do the safety devices operate correctly? ☐
14. Has the unit been checked for refrigerant leakage? ☐
15. Is the unit clean inside and outside? ☐
16. Are all cabinet panels fixed? ☐
17. Are all cabinet panels free from rattles? ☐
18. Is the filter clean? ☐
19. Is the heat exchanger clean? ☐
20. Are the stop valves open? ☐
21. Does the drain water flow smoothly from the drain pipe? ☐

8. Safety And Control Device Setting

- Compressor Protection
High Pressure Switch: This switch cuts out the operation of the compressor when the discharge pressure exceeds the setting.
- Fan Motor Protection
When the thermistor temperature is reached to the setting, motor output is decreased. The other way, when the temperature becomes lower, limitation is canceled.

Model		CHV6-28URBM
For Compressor Pressure Switch High Pressure Cut-Out	psi (MPa)	Automatic Reset, Non-Adjustable 601 (4.15)
Cut-In	psi (MPa)	464 (3.2)
Fuse on Main Circuit	A	40
Compressor Crank Heat Power	A	60+28
CCP Timer Set Time	Min	Non-Adjustable 3
Control Circuit Fuse	A	5

Model		CHV6-36/48/60URBM
For Compressor Pressure Switch High Pressure Cut-Out	psi (MPa)	Automatic Reset, Non-Adjustable 601 (4.15)
Cut-In	psi (MPa)	464 (3.2)
Fuse on Main Circuit	A	50
Compressor Crank Heat Power	A	60+28
CCP Timer Set Time	Min	Non-Adjustable 3
Control Circuit Fuse	A	5