DAIKIN Service Instructions

Inverter (DVH Series) 7.5-10 Ton Commercial Packaged Units with R-32 Refrigerant

WARNING

ONLY PERSONNEL THAT HAVE BEEN TRAINED TO INSTALL, ADJUST, SERVICE, MAINTENANCE OR REPAIR (HEREINAFTER, "SERVICE") THE EQUIPMENT SPECIFIED IN THIS MANUAL SHOULD SERVICE THE EQUIPMENT.

THIS EQUIPMENT IS NOT INTENDED FOR USE BY PERSONS (INCLUDING CHILDREN) WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES, OR LACK OF EXPERIENCE AND KNOWLEDGE, UNLESS THEY HAVE BEEN GIVEN SUPERVISION OR INSTRUCTION CONCERNING USE OF THE APPLIANCE BY A PERSON RESPONSIBLE FOR THEIR SAFETY.

CHILDREN SHOULD BE SUPERVISED TO ENSURE THAT THEY DO NOT PLAY WITH THE EQUIPMENT.

THE MANUFACTURER WILL NOT BE RESPONSIBLE FOR ANY INJURY OR PROPERTY DAMAGE ARISING FROM IMPROPER SUPERVISION, SERVICE OR SERVICE PROCEDURES. IF YOU SERVICE THIS UNIT, YOU ASSUME RESPONSIBILITY FOR ANY INJURY OR PROPERTY DAMAGE WHICH MAY RESULT. IN ADDITION, IN JURISDICTIONS THAT REQUIRE ONE OR MORE LICENSES TO SERVICE THE EQUIPMENT SPECIFIED IN THIS MANUAL, ONLY LICENSED PERSONNEL SHOULD SERVICE THE EQUIPMENT. IMPROPER SUPERVISION, INSTALLATION, ADJUSTMENT, SERVICING, MAINTENANCE OR REPAIR OF THE EQUIPMENT SPECIFIED IN THIS MANUAL, OR ATTEMPTING TO INSTALL, ADJUST, SERVICE OR REPAIR THE EQUIPMENT SPECIFIED IN THIS MANUAL WITHOUT PROPER SUPERVISION OR TRAINING MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

WARNING

DO NOT BYPASS SAFETY DEVICES.

This manual is to be used by qualified, professionally trained HVAC technicians only. Daikin does not assume any responsibility for property damage or personal injury due to improper service procedures or services performed by an unqualified person.

TABLE OF CONTENTS

D-Checker Service Tool Part # 999482P3 is required to verify system operation and troubleshooting the refrigeration system.

QUEBEC DISCLOSURE REGARDING AVAILABILITY OF REPLACEMENT PARTS, REPAIR SERVICES AND INFORMATION FOR MAINTENANCE AND REPAIR: Daikin Comfort Technologies Manufacturing, Inc. (Daikin) does not guarantee the availability of (1) replacement parts; (2) repair services; and (3) information necessary to maintain or repair products, within the meaning of section 39.1 of the Consumer Protection Act, CQLR, c P-40.1 and section 79.18 of the Regulation respecting the application of the Consumer Protection Act, CQLR, c P-40.1, r. 3.

AVIS POUR LE QUÉBEC CONCERNANT LA DISPONIBILITÉ DES PIÈCES DE RECHANGE, DES SERVICES DE RÉPARATION ET DES RENSEIGNEMENTS POUR L'ENTRETIEN ET LA RÉPARATION : Daikin Comfort Technologies Manufacturing, Inc. (Daikin) ne garantit pas la disponibilité (1) des pièces de rechange, (2) des services de réparation et (3) des renseignements pour l'entretien et la réparation, au sens de l'article 39.1 de la Loi sur la protection du consommateur, RLRQ c P-40.1 et de l'article 79.18 du Règlement d'application de la Loi sur la protection du consommateur, RLRQ c P-40.1, r 3.

RSD6432301
May 2026

IMPORTANT INFORMATION

IMPORTANT NOTICES

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS

WARNING

To prevent the risk of property damage, personal injury, or death, do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance.

WARNING

HIGH VOLTAGE
Disconnect all power and lockout/tagout before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

WARNING

This unit should not be connected to, or used in conjunction with, any devices that are not listed in the applicable product specifications as acceptable for use with this unit or have not been tested and approved by the manufacturer. Serious property damage or personal injury, reduced unit performance and/or hazardous conditions may result from the use of devices that have not been approved or certified by the manufacturer.

WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.) Do not pierce or burn. Be aware that refrigerants may not contain an odor.

WARNING

Only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

SAFE REFRIGERANT HANDLING

While these items will not cover every conceivable situation, they should serve as a useful guide.

WARNING

Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 700°C and electric switching devices.

WARNING

The compressor POE oil for R-32 units is extremely susceptible to moisture absorption and could cause compressor failure. Do not leave system open to atmosphere any longer than necessary for installation.

WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space. To avoid possible difficulty in breathing or death:

- Never purge refrigerant into an enclosed room or space. By law, all refrigerant must be reclaimed.
- If an indoor leak is suspected, thoroughly ventilate the area before beginning work.
- Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact with refrigerant and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, seek medical help immediately.
- Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.

WARNING

To avoid possible injury, explosion or death, practice safe handling of refrigerants.

WARNING

To avoid possible explosion:

- Never apply flame or steam to a refrigerant cylinder. If you must heat a cylinder for faster charging, partially immerse it in warm water.
- Never fill a cylinder more than 80% full of liquid refrigerant.
- Never add anything other than R-22 to an R-22 cylinder or R-410A to an R-410A cylinder. The service equipment used must be listed or certified for the type of refrigerant used.
- Store cylinders in a cool, dry place. Never use a cylinder as a platform or a roller.

IMPORTANT INFORMATION

WARNING

To avoid possible explosion, use only returnable (not disposable) service cylinders when removing refrigerant from a system.

- **Ensure the cylinder is free of damage which could lead to a leak or explosion.**
- **Ensure the hydrostatic test date does not exceed 5 years.**
- **Ensure the pressure rating meets or exceeds 400 lbs.**

When in doubt, do not use cylinder.

QUALIFICATION OF WORKERS

Personnel must be certified to service, work, and/or repair units with FLAMMABLE REFRIGERANTS. A certificate should document the competence and qualification achieved through training that included the substance of the following:

• Information about the explosion potential of FLAMMABLE REFRIGERANTS to show that flammables may be dangerous when handled without care.

• Information about POTENTIAL IGNITION SOURCES, especially those that are not obvious, such as lighters, light switches, vacuum cleaners, electric heaters.

• Information about the different safety concepts, including ventilated and unventilated areas.

• Information about refrigerant detectors, including function, operation, and service measures.

• Information about the concept of sealed components and sealed enclosures according to IEC 60079-15:2010.

• Information about the correct working procedures, including commissioning, maintenance, repair, decommissioning, and disposal procedures.

SPECIFICATIONS

Model	DVH0903D000001S	DVH0904D000001S	DVH0903W000001S	DVH0904W000001S
Cooling Capacity				
Total BTU/H	90,000	90,000	90,000	90,000
IEER / EER	22.0/12.4	22.0/12.4	22.0/12.4	22.0/12.4
SEER2 / EER2	N/A	N/A	N/A	N/A
AHRI Reference #				
Evaporator Motor / RTPF (Round Tube Plate Fin)				
Motor Type	Direct Drive	Direct Drive	Direct Drive	Direct Drive
External Static Pressure (ESP)	Standard	Standard	High	High
Wheel Dia. X Width	15x12	15x12	15x12	15x12
Indoor Nominal CFM	2950	2950	2950	2950
RPM	300-1600	300-1600	300-1600	300-1600
Indoor Horsepower	3.5	3.5	3.5	3.5
Filter Size (in)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)
Drain Size (NPT)	3/4	3/4	3/4	3/4
R-32 Refrigerant Charge (oz.)	335	335	335	335
Evaporator Coil Face Area (ft^2)	16.6	16.6	16.6	16.6
Rows Deep/ Fins per Inch	4/16	4/16	4/16	4/16
Condenser Fan / RTPF (Round Tube Plate Fin)				
Quantity of Condenser Fan Motors	2	2	2	2
RPM (max-min)	1324-200	1324-200	1324-200	1324-200
Outdoor Horsepower	7/8	7/8	7/8	7/8
Fan Diameter/ # Fan Blades	21.3 / 3	21.3 / 3	21.3 / 3	21.3 / 3
Face Area (ft^2)	27.0	27.0	27.0	27.0
Rows Deep / Fins per Inch	3/16	3/16	3/16	3/16
Compressor				
Quantity / Type / Stages	1/ Scroll / Inverter	1/ Scroll / Inverter	1/ Scroll / Inverter	1/ Scroll / Inverter
Electrical Data				
Voltage-Phase-Frequency	208/230-3-60	460-3-60	208/230-3-60	460-3-60
Inverter Drive Input (Compressor(s) and Condensor fan(s))	27.3/24.7	12.0	27.3/24.7	12.0
Indoor Blower FLA	11.7	7.2	11.7	7.2
Max External Static (In. W.C.)	1.4	1.4	2.0	2.0
Min. Circuit Ampacity[1]	49.9/49.9	24.8	49.9/49.9	24.8
Max. Overcurrent Protection (A)[2]	60/60	30	60/60	30
Power Supply Conduit Hole Dia. (in)	1.375	1.375	1.375	1.375
Low-Voltage Conduit Hole Dia. (in)	0.5	0.5	0.5	0.5
Operating Weight (lbs)	1293	1293	1293	1293
Ship Weight (lbs)	1365	1365	1365	1365

SPECIFICATIONS

Model	DVH1023D000001S	DVH1024D000001S	DVH1023W000001S	DVH1024W000001S
Cooling Capacity				
Total BTU/H	102,000	102,000	102,000	102,000
IEER / EER	21.0/12.3	21.0/12.3	21.0/12.3	21.0/12.3
SEER2 / EER2	N/A	N/A	N/A	N/A
AHRI Reference #				
Evaporator Motor / RTPF (Round Tube Plate Fin)				
Motor Type	Direct Drive	Direct Drive	Direct Drive	Direct Drive
External Static Pressure (ESP)	Standard	Standard	High	High
Wheel Dia. X Width	15x12	15x12	15x12	15x12
Indoor Nominal CFM	3100	3100	3100	3100
RPM	300-1600	300-1600	300-1600	300-1600
Indoor Horsepower	3.5	3.5	5.0	5.0
Filter Size (in)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)
Drain Size (NPT)	3/4	3/4	3/4	3/4
R-32 Refrigerant Charge (oz.)	335	335	335	335
Evaporator Coil Face Area (ft^2)	16.6	16.6	16.6	16.6
Rows Deep/ Fins per Inch	4/16	4/16	4/16	4/16
Condenser Fan / RTPF (Round Tube Plate Fin)				
Quantity of Condenser Fan Motors	2	2	2	2
RPM (max-min)	1324-200	1324-200	1324-200	1324-200
Outdoor Horsepower	7/8	7/8	7/8	7/8
Fan Diameter/ # Fan Blades	21.3 / 3	21.3 / 3	21.3 / 3	21.3 / 3
Face Area (ft^2)	27.0	27.0	27.0	27.0
Rows Deep / Fins per Inch	3/16	3/16	3/16	3/16
Compressor				
Quantity / Type / Stages	1/ Scroll / Inverter	1/ Scroll / Inverter	1/ Scroll / Inverter	1/ Scroll / Inverter
Electrical Data				
Voltage-Phase-Frequency	208/230-3-60	460-3-60	208/230-3-60	460-3-60
Inverter Drive Input (Compressor(s) and Condensor fan(s))	32.1/29.2	14.2	32.1/29.2	14.2
Indoor Blower FLA	11.7	7.2	15.1	10.6
Max External Static (In. W.C.)	1.4	1.4	2.0	2.0
Min. Circuit Ampacity[1]	52.7/52.7	26.0	56.5/56.5	29.7
Max. Overcurrent Protection (A)[2]	60/60	30	70/70	35
Power Supply Conduit Hole Dia. (in)	1.375	1.375	1.375	1.375
Low-Voltage Conduit Hole Dia. (in)	0.5	0.5	0.5	0.5
Operating Weight (lbs)	1293	1293	1293	1293
Ship Weight (lbs)	1365	1365	1365	1365

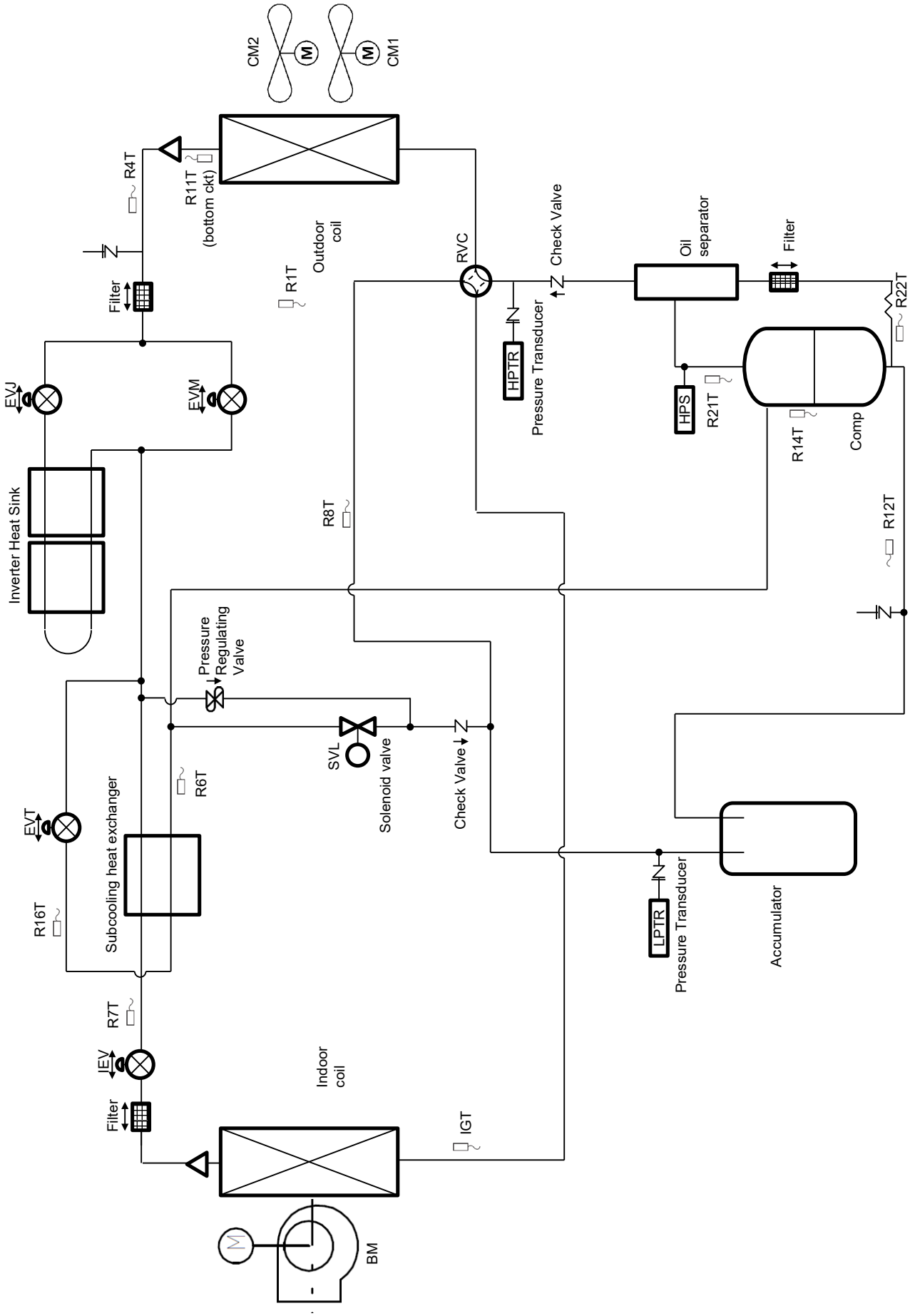
SPECIFICATIONS

Model	DVH1203D000001S	DVH1204D000001S	DVH1203W000001S	DVH1204W000001S
Cooling Capacity				
Total BTU/H	114,000	114,000	114,000	114,000
IEER / EER	21.5/12.1	21.5/12.1	21.5/12.1	21.5/12.1
SEER2 / EER2	N/A	N/A	N/A	N/A
AHRI Reference #				
Evaporator Motor / RTPF (Round Tube Plate Fin)				
Motor Type	Direct Drive	Direct Drive	Direct Drive	Direct Drive
External Static Pressure (ESP)	Standard	Standard	High	High
Wheel Dia. X Width	15x12	15x12	15x12	15x12
Indoor Nominal CFM	3600	3600	3600	3600
RPM	300-1600	300-1600	300-1600	300-1600
Indoor Horsepower	3.5	3.5	5	5
Filter Size (in)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)	20 X 25 X 2 (2) 25 X 25 X 2 (2)
Drain Size (NPT)	3/4	3/4	3/4	3/4
R-32 Refrigerant Charge (oz.)	335	335	335	335
Evaporator Coil Face Area (ft^2)	16.6	16.6	16.6	16.6
Rows Deep/ Fins per Inch	4/16	4/16	4/16	4/16
Condenser Fan / RTPF (Round Tube Plate Fin)				
Quantity of Condenser Fan Motors	2	2	2	2
RPM (max-min)	1324-200	1324-200	1324-200	1324-200
Outdoor Horsepower	7/8	7/8	7/8	7/8
Fan Diameter/ # Fan Blades	21.3 / 3	21.3 / 3	21.3 / 3	21.3 / 3
Face Area (ft^2)	27.0	27.0	27.0	27.0
Rows Deep / Fins per Inch	3/16	3/16	3/16	3/16
Compressor				
Quantity / Type / Stages	1/ Scroll / Inverter	1/ Scroll / Inverter	1/ Scroll / Inverter	1/ Scroll / Inverter
Electrical Data				
Voltage-Phase-Frequency	208/230-3-60	460-3-60	208/230-3-60	460-3-60
Inverter Drive Input (Compressor(s) and Condensor fan(s))	32.7/29.6	14.5	32.7/29.6	14.5
Indoor Blower FLA	11.7	7.2	15.1	10.6
Max External Static (In. W.C.)	1.4	1.4	2.0	2.0
Min. Circuit Ampacity[1]	54.0/54.0	26.5	57.8/57.8	30.3
Max. Overcurrent Protection (A)[2]	70/70	35	70/70	35
Power Supply Conduit Hole Dia. (in)	1.375	1.375	1.375	1.375
Low-Voltage Conduit Hole Dia. (in)	0.5	0.5	0.5	0.5
Operating Weight (lbs)	1293	1293	1293	1293
Ship Weight (lbs)	1365	1365	1365	1365

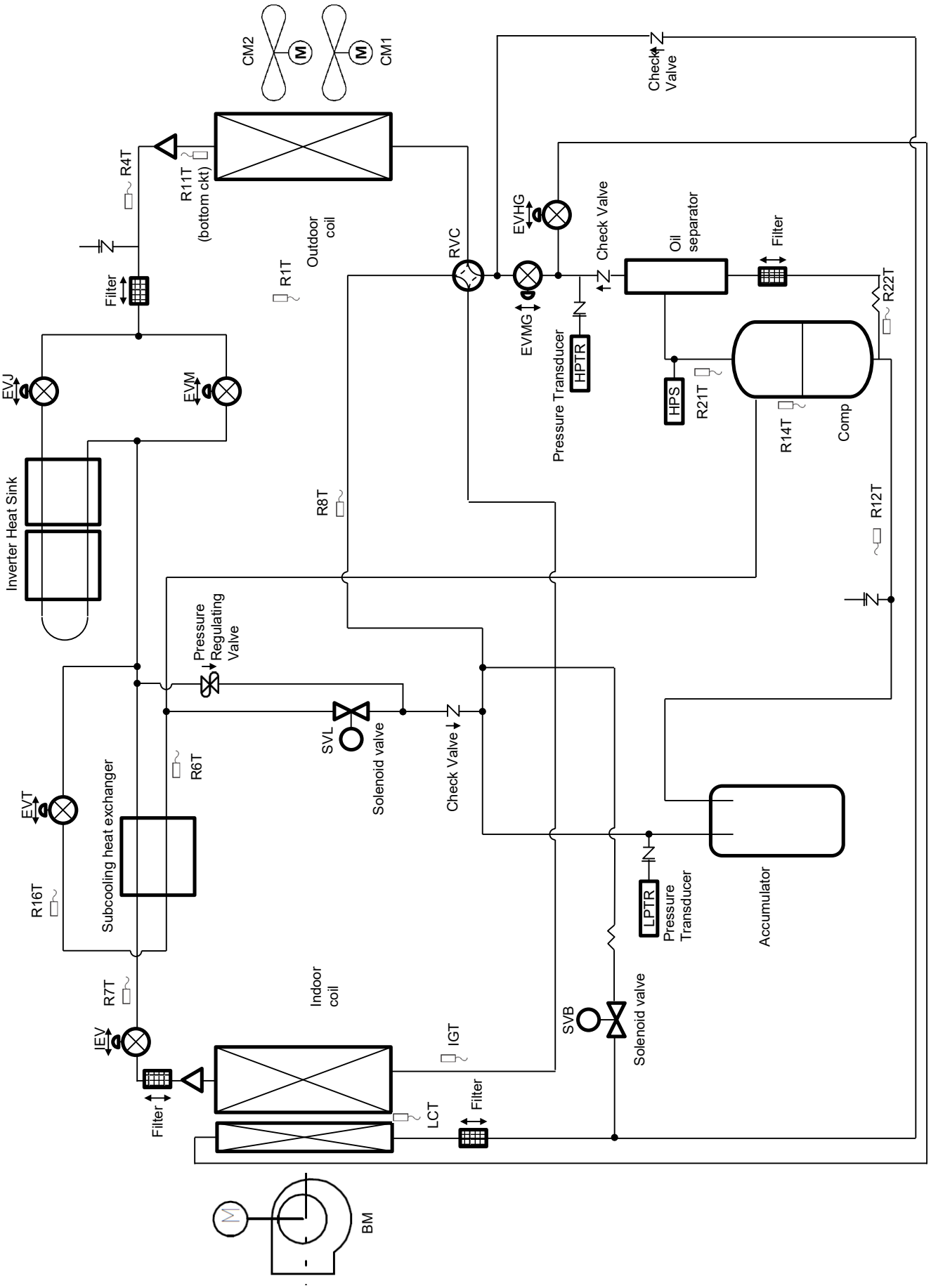
REFRIGERANT CIRCUIT
Components

Electric symbol	Name	Function
COMP	Compressor 1	Compresses the refrigerant to circulate it through the system. Supports variable-speed operation via inverter control.
CM1	Fan motor 1	Forces air across the outdoor coil to enhance heat transfer between the refrigerant and ambient air.
CM2	Fan motor 2	
EVM	Electronic expansion valve (Outdoor coil)	Regulates the superheat at the outdoor coil outlet during heating mode.
EVJ	Electronic expansion valve (Refrigerant cooling IPM)	Controls the heat sink temperature on the INVERTER PCB.
EVT	Electronic expansion valve (Subcooling heat exchanger)	Regulates the superheat at the low-pressure refrigerant of the subcooling heat exchanger outlet.
IEV	Electronic expansion valve (Indoor coil)	Regulates the superheat at the indoor heat exchanger outlet during cooling mode.
EVMG	Electronic expansion valve (Main circuit) (Only for HGRH model)	Adjust reheat capacity based on the target discharge air temperature.
EVHG	Electronic expansion valve (Reheat coil) (Only for HGRH model)	
SVL	Solenoid valve (Injection)	Switch Compressor Injection ON/OFF
SVC	Solenoid valve (Bleed) (Only for HGRH model)	Open to recover oil and refrigerant accumulated in the reheat coil while reheat coil doesn't work.
RVC	Reversing Valve	Switch the Heating and Cooling/Defrost operation.
HPTR	High-pressure Transducer	Detect the refrigerant pressure at the compressor discharge.
SPTR	Suction pressure Transducer	Detect the refrigerant pressure at the compressor suction.
HPS	High pressure switch	Activates and stops compressor operation when the pressure exceeds the design limit for safety.
—	Pressure regulating valve (Liquid pipe)	Opens to relieve excessive refrigerant pressure in the liquid line to protect components when abnormal pressure buildup occurs (e.g., during shutdown or transport).
R1T	Thermistor (Outdoor ambient air)	Detect outdoor air temperature.
R4T	Thermistor (Outdoor coil liquid)	Detects the liquid line temperature at the outdoor coil.
R6T	Thermistor (Subcool heat exchanger gas)	Detects the gas line temperature at the subcooling heat exchanger outlet.
R7T	Thermistor (Subcool heat exchanger liquid)	Detects the high-pressure liquid line temperature at the subcooling heat exchanger.
R8T	Thermistor (Accumulator inlet)	Detects the gas line temperature at the accumulator inlet.
R11T	Thermistor (Defrost)	Detects the liquid line temperature at the bottom circuit of the outdoor coil.
R12T	Thermistor (Compressor suction)	Detect the gas line temperature at the compressor suction.
R14T	Thermistor (Compressor body)	Detect the compressor surface temperature.
R16T	Thermistor (Subcool heat exchanger injection)	Detects the low-pressure liquid line temperature at the subcooling heat exchanger inlet.
R21T	Thermistor (Compressor discharge)	Detect the gas line temperature at the compressor discharge.
R22T	Thermistor (Oil return circuit)	Detect temperature of the oil return circuit from the oil separator to ensure the proper oil retention.
IGT	Thermistor (Indoor coil gas)	Detects the gas line temperature at the indoor coil.
LCT	Thermistor (Indoor coil leaving air) (Only for HGRH model)	Detect the air temperature between indoor coil and the reheat coil.
BM	Blower Motor	Provide the conditioned air to the customer area.

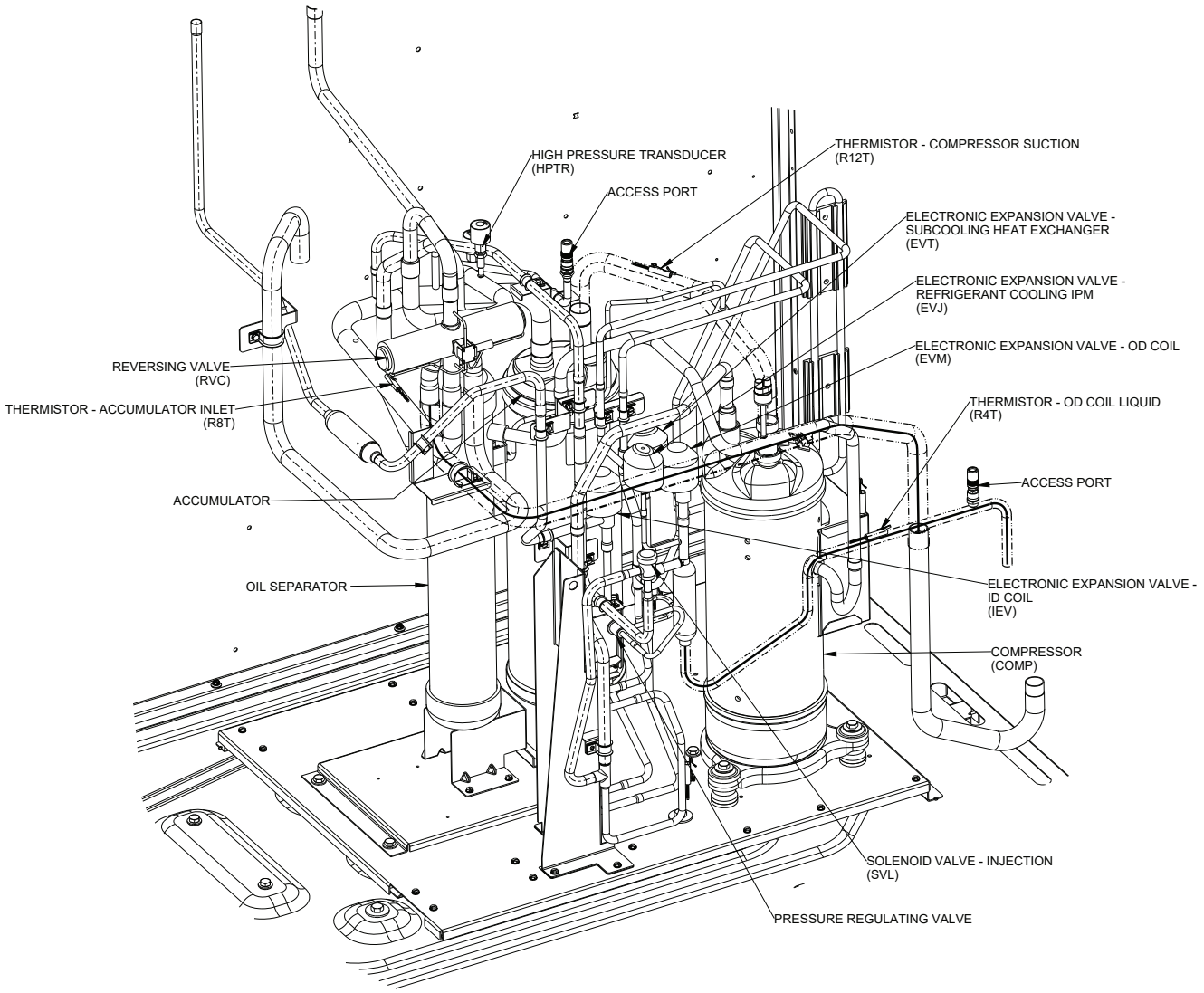
REFRIGERANT CIRCUIT



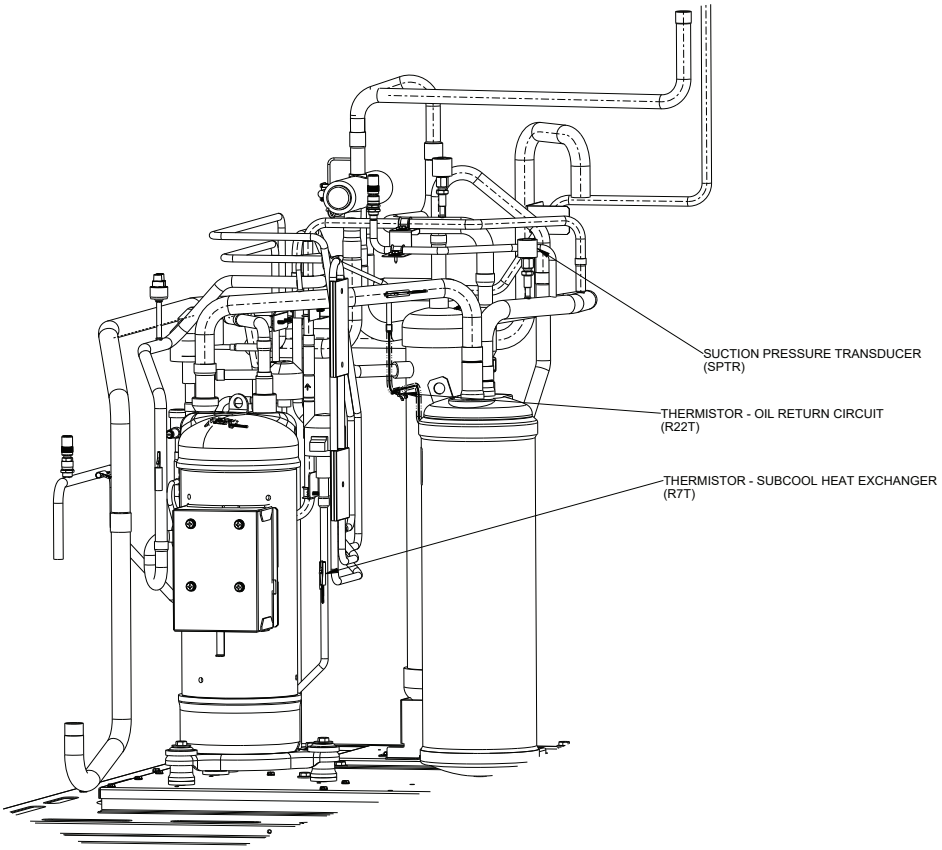
REFRIGERANT CIRCUIT (HOT GAS REHEAT MODEL)

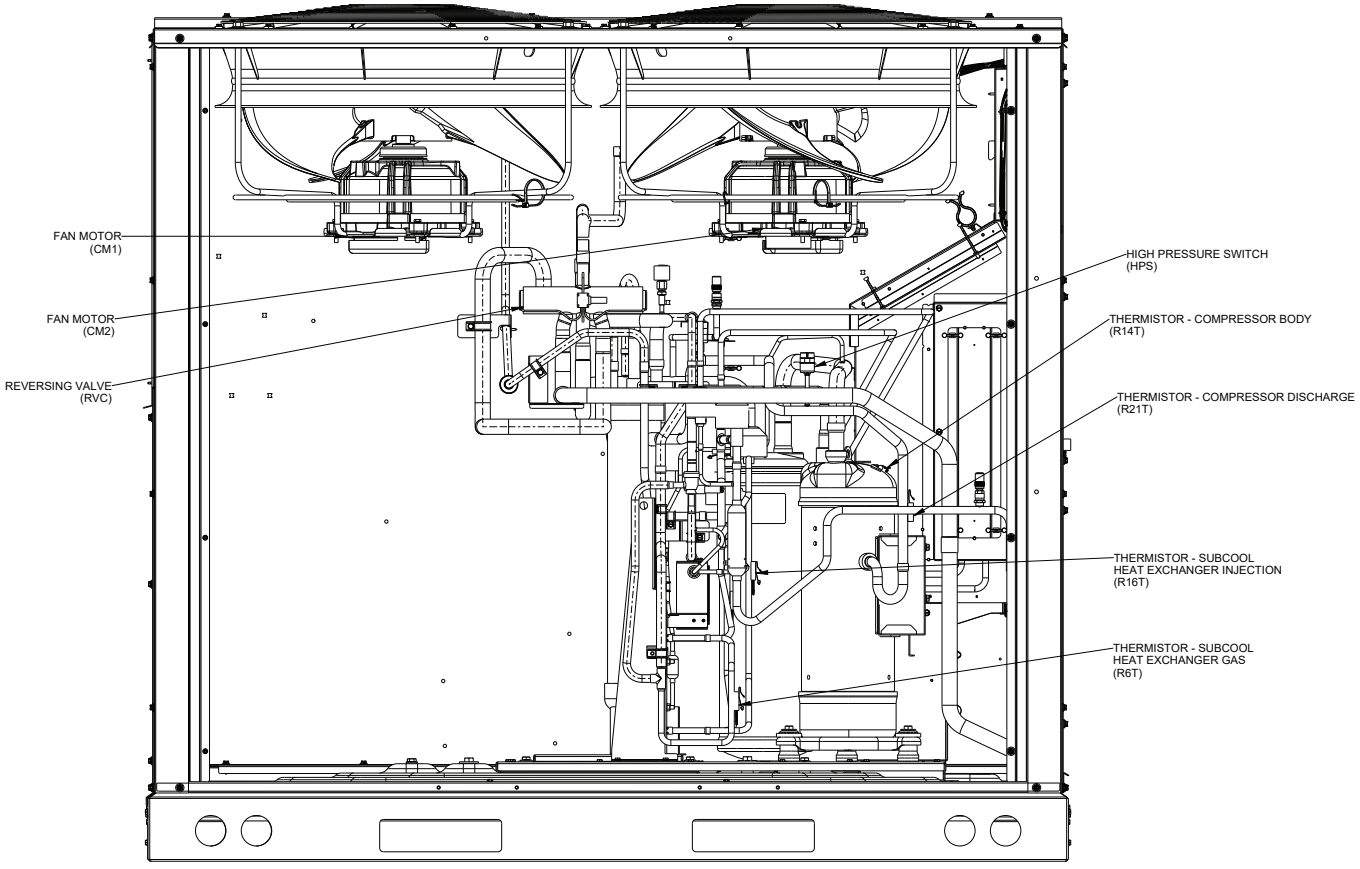


FUNCTIONAL PARTS LAYOUT
7.5 - 10 TON



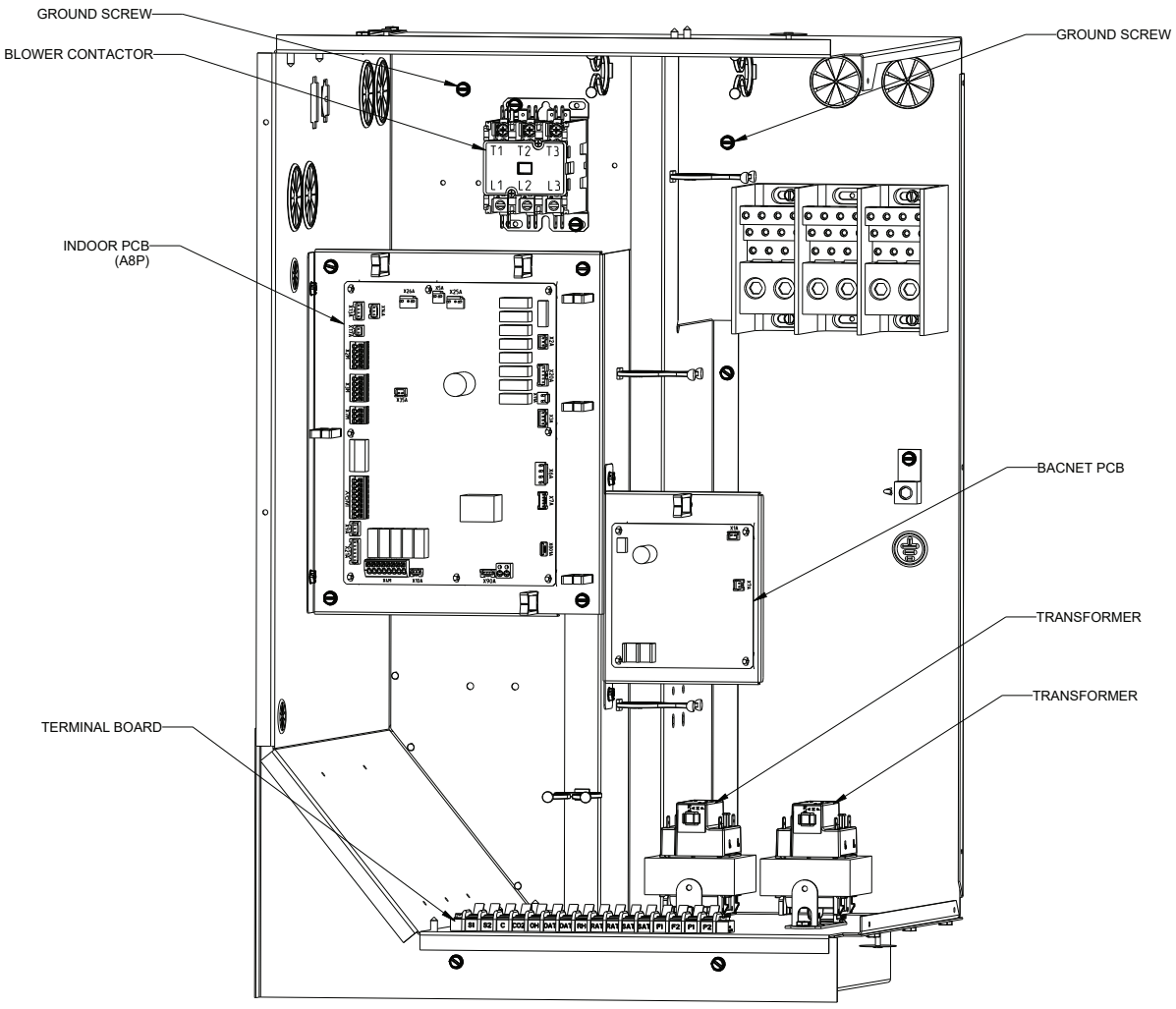
FUNCTIONAL PARTS LAYOUT
7.5 - 10 TON





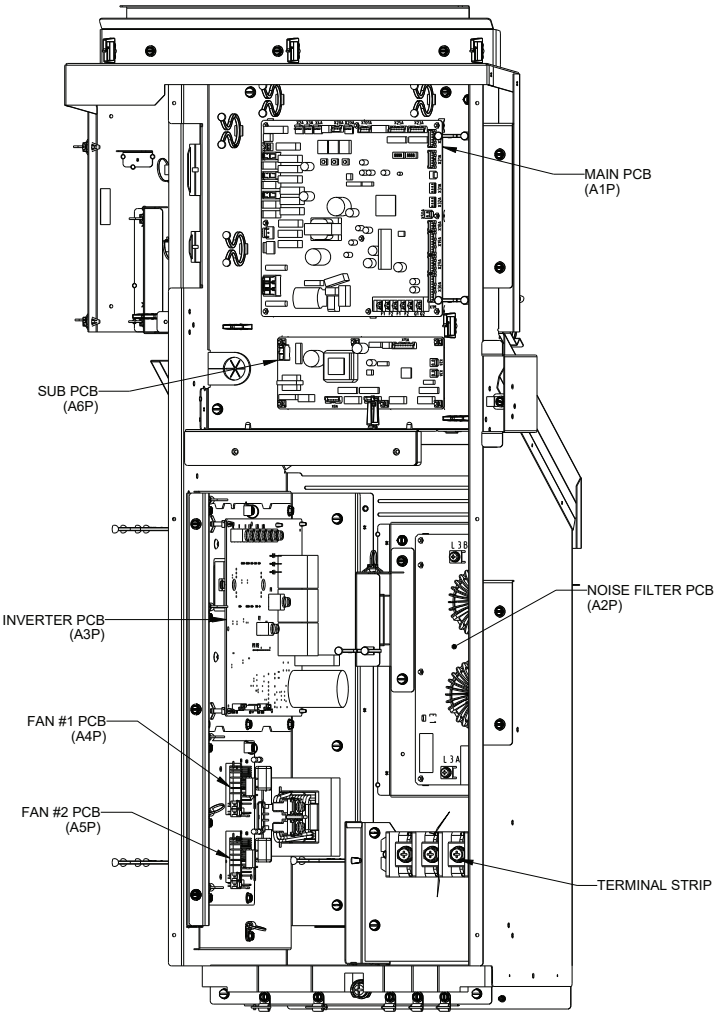
FUNCTIONAL PARTS LAYOUT
7.5 - 10 TON

INDOOR SECTION CONTROL PANEL



FUNCTIONAL PARTS LAYOUT
7.5 - 10 TON

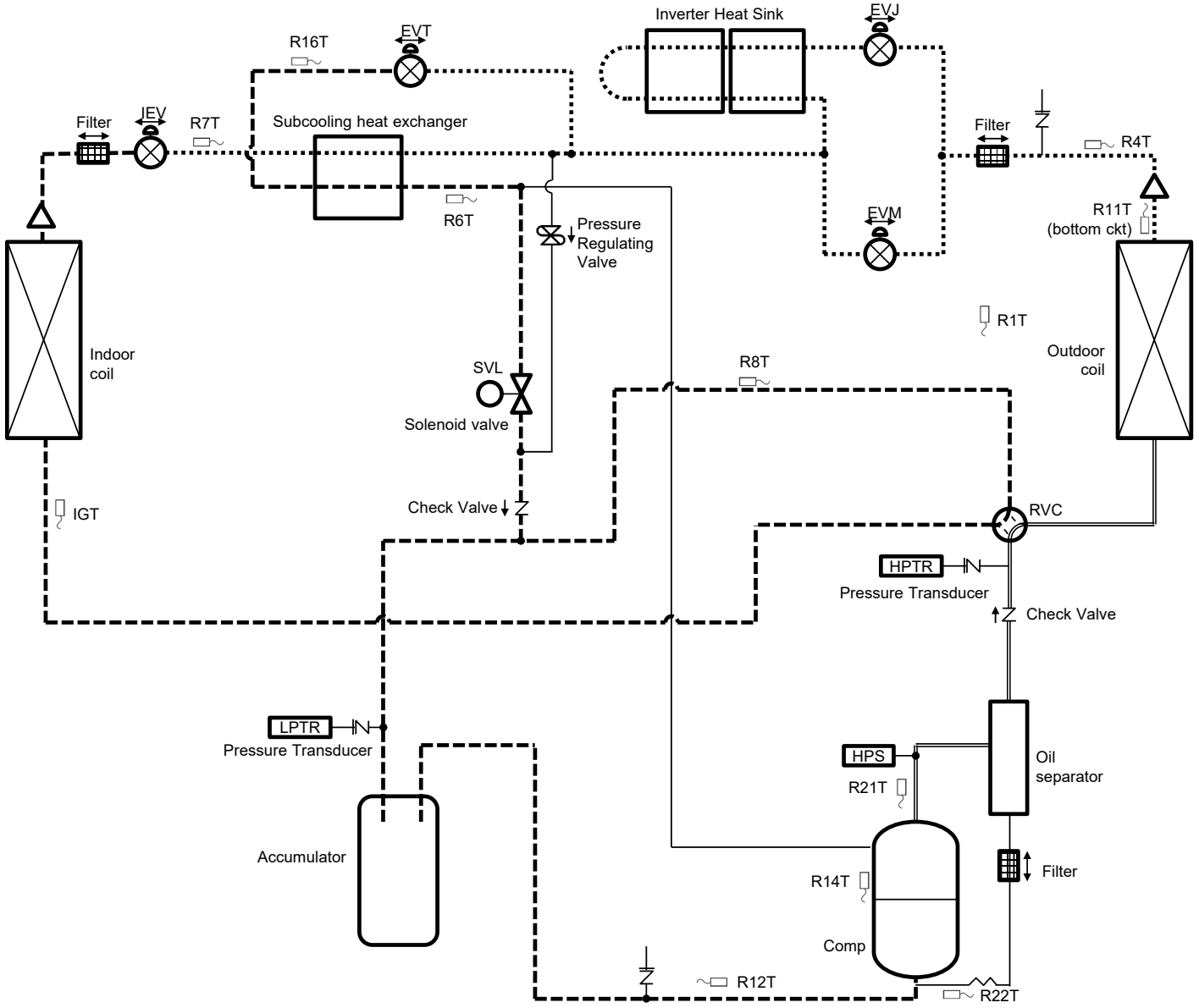
OUTDOOR SECTION CONTROL PANEL



REFRIGERANT FLOW FOR EACH OPERATION MODE

Cooling Operation / Cooling Oil Return Operation / Heating Oil Return Operation / Defrost Operation

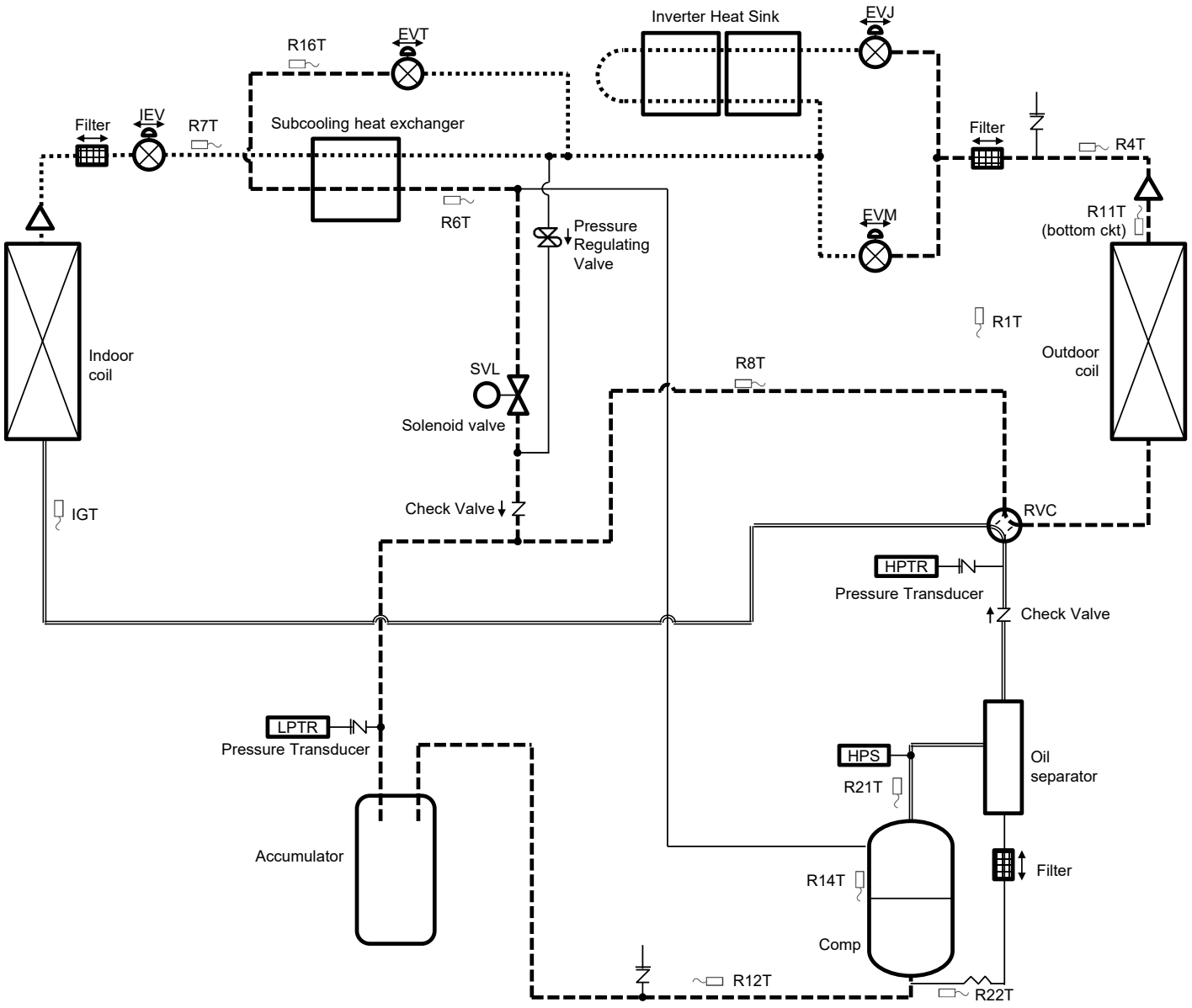
High temperature, high pressure, gas
High temperature, high pressure, liquid
Low temperature, low pressure



REFRIGERANT FLOW FOR EACH OPERATION MODE

Heating Operation

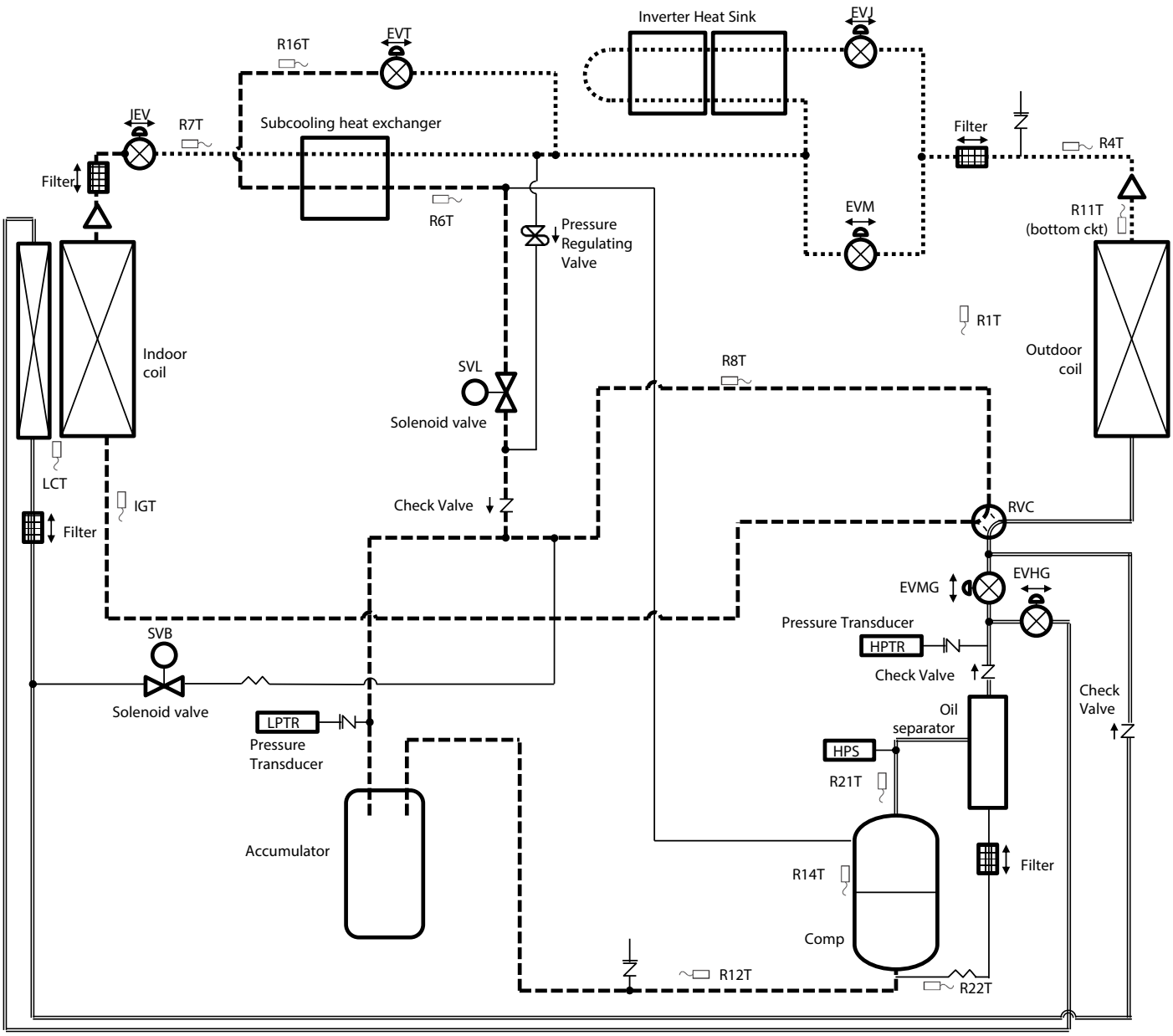
High temperature, high pressure, gas
High temperature, high pressure, liquid
Low temperature, low pressure



REFRIGERANT FLOW FOR EACH OPERATION MODE (HOT GAS REHEAT MODEL)

Cooling Operation / Cooling Oil Return Operation / Heating Oil Return Operation / Defrost Operation

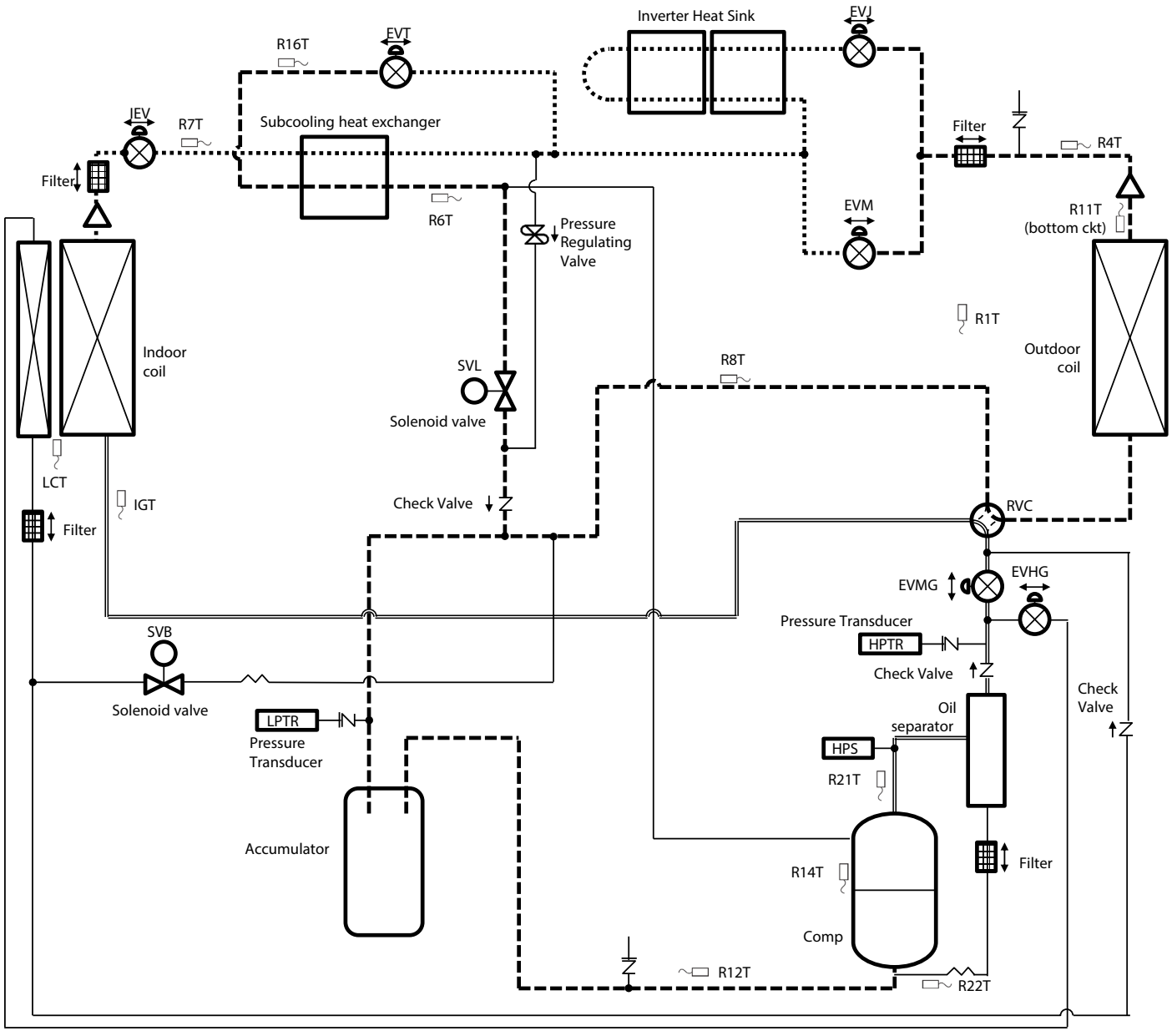
High temperature, high pressure, gas
High temperature, high pressure, liquid
Low temperature, low pressure



REFRIGERANT FLOW FOR EACH OPERATION MODE (HOT GAS REHEAT MODEL)

Heating Operation

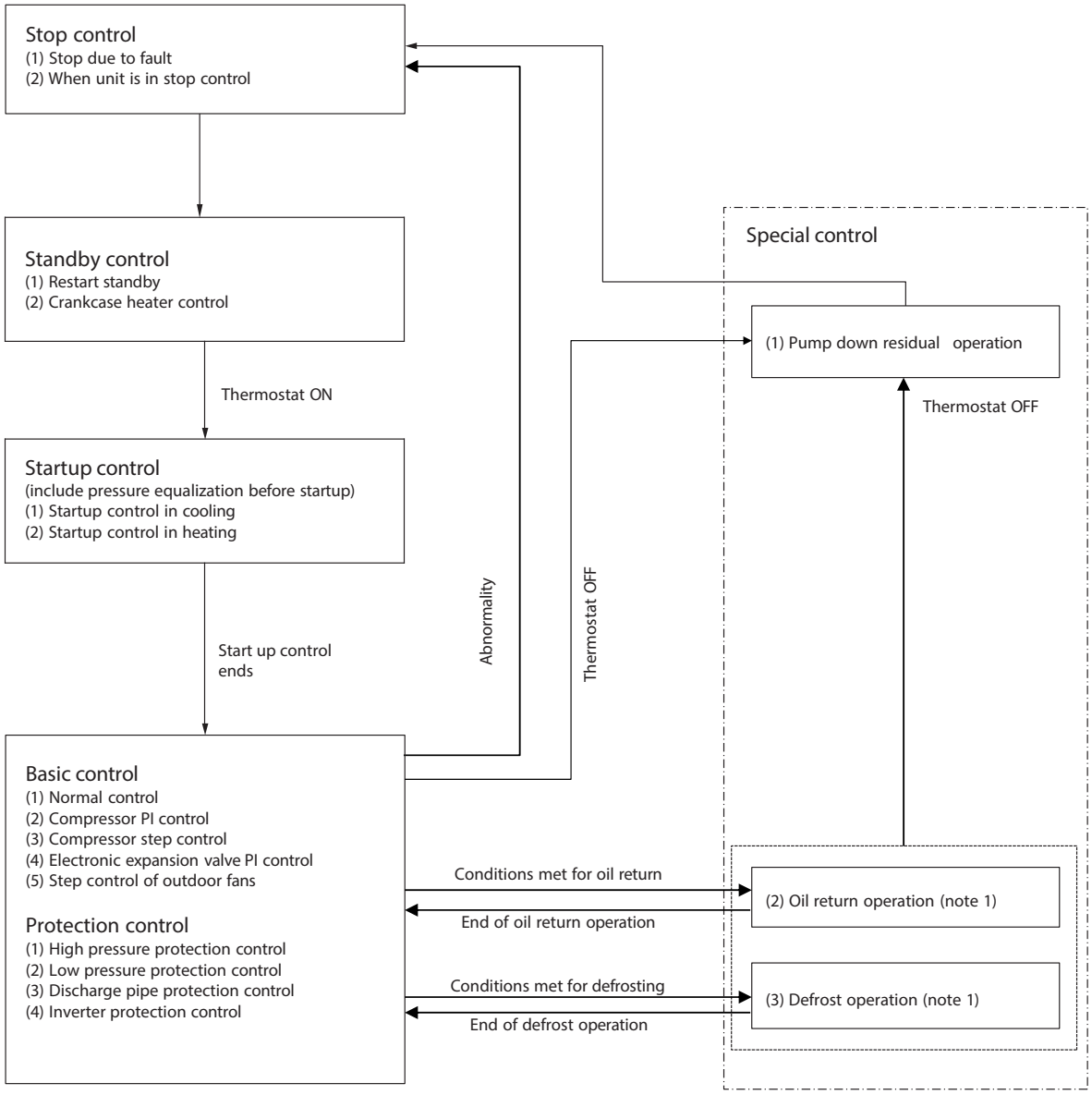
High temperature, high pressure, gas
High temperature, high pressure, liquid
Low temperature, low pressure



FUNCTIONS AND CONTROLS

1. Operation Flowchart of MAIN PCB (A1P)

For detailed description of each function in the flow below, refer to the details on related function on the following pages.



NOTE: 1. If the indoor unit stops or the thermostat turns OFF while in oil return operation or defrost operation, pump down residual operation is performed on completion of the oil return operation or defrost operation.

FUNCTIONS AND CONTROLS

2. Stop Control

2.1 Stop Due to Error
In order to protect components, when any of the abnormal state is detected, the unit will stop.

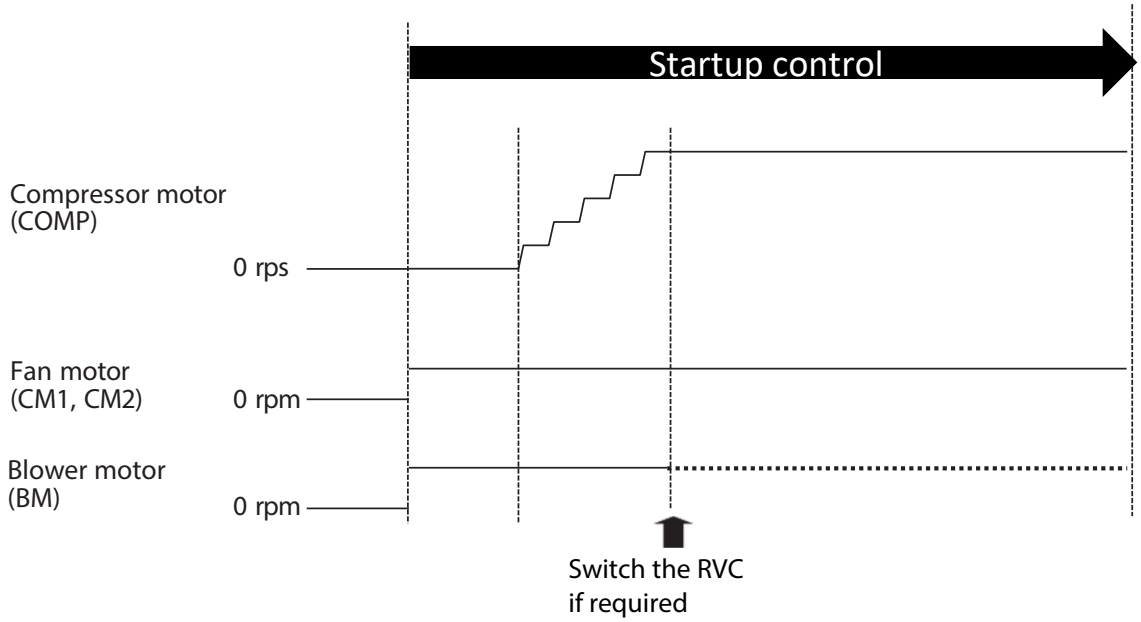
2.2 When System is in Stop Control
The four way valves retain the condition (ON) when heating operation is stopped.

3. Standby Control

3.1 Restart Standby
Used to stop the compressor for 2 minutes to prevent short cycling and equalize system pressure. The outdoor fan continues operating briefly to assist pressure equalization and prevent refrigerant migration.

3.2 Crankcase Heater Control
In order to prevent the refrigerant from migrating into the compressor oil while not operating, the crankcase heater is controlled based on the outdoor air temperature and the compressor surface temperature.

4. Startup Control
By running only the outdoor fan and the blower before compressor startup, the pressure difference between the compressor discharge and suction is reduced, which helps lower the compressor motor load during startup.
The inverter is turned ON to charge its capacitor.
To avoid stress for the compressor after starting, increase the compressor speed gradually until reliable compressor operation is ensured.
If circuit switching is required, the reversing valve (RVC) is switched once a sufficient pressure differential between suction and discharge is established.



FUNCTIONS AND CONTROLS

5. Basic Control

5.1 Normal Control

Part name	Electric symbol	Function	
		Normal cooling	Normal heating
Compressor motor	COMP	PI control, High pressure protection, Low pressure protection, Td protection, Inverter protection	PI control, High pressure protection, Low pressure protection, Td protection, Inverter protection
Fan motor	CM1, CM2	Cooling fan control	Maximum step
Electronic expansion valve (Outdoor coil)	EVM	Fully open	Superheating degree control
Electronic expansion valve (Refrigerant cooling IPM)	EVJ	Cooling refrigerant control	Cooling refrigerant control
Electronic expansion valve (Subcooling heat exchanger)	EVT	Superheating degree control (discharge pipe protection)	Superheating degree control (discharge pipe protection)
Electronic expansion valve (Indoor coil)	IEV	Superheating control	Fully open
Electronic expansion valve (Main circuit) (Only for HGRH model)	EVMG	Discharge air temperature control	Fully open
Electronic expansion valve (Reheat coil) (Only for HGRH model)	EVHG		0 pls
Solenoid valve (Reversing valve)	RVC	ON	OFF
Solenoid valve (Injection)	SVL	Compressor injection control	Compressor injection control
Solenoid valve (Bleed) (Only for HGRH model)	SVC	When EVHG = 0pls, ON Otherwise, OFF.	ON

5.2 Compressor PI Control

In order to provide a steady capacity, the compressor speed is controlled to achieve temperature **Te**, which is evaporator saturation temperature during cooling operation, or **Tc**, which is condenser saturation temperature during heating operation.

During cooling (or heating) operation

The compressor capacity is controlled so that Te (or Tc) approaches TeS (or TcS) (target value of each temperature).

VRT Control

The inverter compressor adjusts the unit's capacity according to the building load. Internally, it calculates the optimal TeS and TcS based on the current building load. When the room temperature approaches the setpoint, the unit modulates capacity by raising TeS during cooling operation and lowering TcS during heating operation, thereby reducing unit power consumption and stabilizing the room temperature.

Cooling Mode

Room temperature - SetPoint	TeS	Compressor speed
↑	↓	↑
↓	↑	↓

Heating Mode

SetPoint - Room temperature	TcS	Compressor speed
↑	↑	↑
↓	↓	↓

The following Comfort Setting allows adjustment of how quickly the indoor temperature approaches the setpoint by TeS and TcS calculation.

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-81	Cooling Comfort Setting	Adjust how quickly the temperature approaches the setpoint.	0:Eco 1:Mild 2:Quick 3:Powerful Higher numbers reach the set temperature faster, but decrease energy efficiency.
RC	4A-81			
PCB	2-82	Heating Comfort Setting	Adjust how quickly the temperature approaches the setpoint.	0:Eco 1:Mild 2:Quick 3:Powerful Higher numbers reach the set temperature faster, but decrease energy efficiency.
RC	4A-82			

FUNCTIONS AND CONTROLS

- **[Powerful]**

Allows overshoot during heating or undershoot during cooling relative to the target refrigerant temperature, enabling rapid achievement of the desired room temperature. Overshoot is permitted immediately from unit startup.

-During cooling operation, TeS may temporarily drop to 37°F (3°C), depending on conditions.

-During heating operation, TcS may temporarily rise to 120°F (49°C), depending on conditions.

- **[Quick]**

Allows overshoot during heating or undershoot during cooling relative to the target refrigerant temperature, supporting fast room temperature adjustment. Overshoot is permitted immediately from unit startup.

-During cooling operation, TeS may temporarily drop to 43°F (6°C), depending on conditions.

-During heating operation, TcS may temporarily rise to 115°F (46°C), depending on conditions.

- **[Mild]**

Overshoot during heating or undershoot during cooling is allowed within limited conditions to achieve the target room temperature. However, overshoot is not permitted at unit startup.

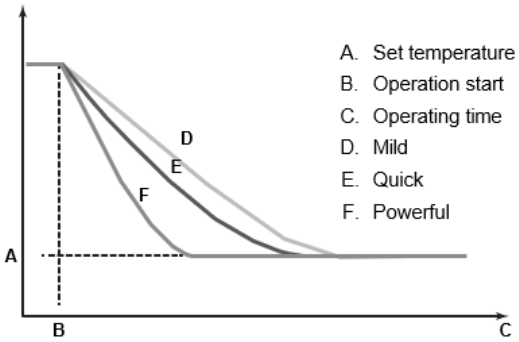
-During cooling operation, TeS may temporarily drop to 43°F (6°C), depending on conditions.

-During heating operation, TcS may temporarily rise to 115°F (46°C), depending on conditions.

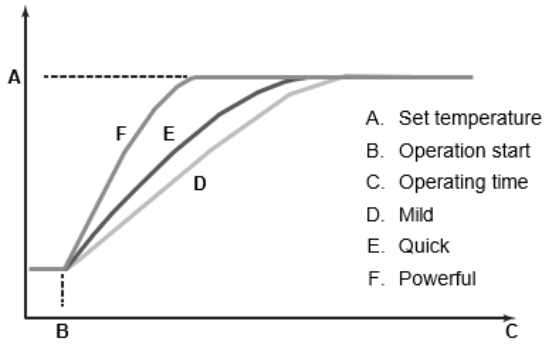
- **[Eco]**

Operates to minimize overshoot during heating and undershoot during cooling, aiming to maintain a stable temperature around the setpoint. While this mode helps reduce power consumption to a minimum, it may result in slower response to sudden changes in building load.

Cooling



Heating



NOTE: THE ABOVE DIAGRAMS ARE FOR REFERENCE ONLY AND DO NOT GUARANTEE ACTUAL UNIT OPERATION. THE ACTUAL PERFORMANCE MAY VARY DEPENDING ON BUILDING LOAD CONDITIONS AND PROTECTIVE FUNCTIONS OF THE UNIT.

The following setting allows the upper limit of TeS to be adjusted.

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-92	Te Target Temperature Upper Limit	Set the target evaporating temperature upper limit for cooling operation	0:L **1:M** 2:H
RC	4A-92			

NOTE: SETTING THE VALUE TO [L] HELPS MAINTAIN DEHUMIDIFICATION PERFORMANCE UNDER LOW-LOAD CONDITIONS; HOWEVER, ENERGY EFFICIENCY MAY BE REDUCED DUE TO FREQUENT COMPRESSOR START/STOP OPERATION. SETTING THE VALUE TO [H] MAXIMIZES ENERGY EFFICIENCY, BUT MAY DEGRADE LOAD-FOLLOWING PERFORMANCE AND DEHUMIDIFICATION CAPABILITY WHEN THE LOAD INCREASES.

Dew Point Control (Only for Hot Gas Reheat model)

When the unit is configured as HGRH, TeS is determined so that the indoor coil leaving air temperature reaches its target value. Normally, the indoor coil leaving temperature target is based on the dew point temperature calculated from the target room temperature and humidity, with an additional adjustment applied as needed. If **HGRH Humidity Control Target** is configured [Leaving coil temperature], the dew point calculation is bypassed, and TeS is determined solely based on **Leaving Coil Temperature Setpoint** and the current leaving coil temperature.

FUNCTIONS AND CONTROLS

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-39	HGRH Humidity Control Target	Determines the basis for Te control during dehumidification operation.	1: Relative Humidity 2: Leaving coil temperature
RC	42-07			
PCB	6-45	Leaving Coil Temperature Setpoint	Defines the target leaving coil temperature.	1: 5°C(41°F) ~ 6:10°C(50°F) ~ 15:19°C(66.2°F) (In 1°C(1.8°F) increments)
RC	42-13			

Supply Air Temperature Control (Only for Multizone-VAV Model)

When the unit is configured as Multizone-VAV and [Supply air temperature] is selected as **Temperature Control Object**, TeS for cooling and TcS for heating are adjusted so that the supply air temperature meets **Supply Air Setpoint.**

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-33	Temperature Control Object (Multizone VAV)	Select the temperature reference (indoor or supply air) for compressor control during Multizone VAV operation.	1: Indoor air temperature 2: Supply air temperature
RC	42-01			
PCB	6-34	Supply Air Setpoint (Cooling)	Set the cooling supply air temperature setpoint of multizone VAV configuration	1: 10°C(50°F) ~ 8:13.9°C(57°F) ~ 14:17.2°C(63°F) (In 0.56°C(1°F) increments) 15: BACnet[AV36]
RC	42-02			
PCB	6-35	Supply Air Setpoint (Heating)	Set the heating supply air temperature setpoint of multizone VAV configuration	1: The same setpoint as cooling 2: 24.4°C(76°F) ~ 14:37.8°C(100°F) (In 1.1°C(2°F) increments)15: BACnet[AV37]
RC	42-03			

5.3 Electronic Expansion Valve PI Control

Outdoor coil electronic expansion valve (EVM) control

When the unit is performing the cooling operation (RVC = ON), EVM is normally fully open.
When the unit is performing the heating operation (RVC = OFF), EVM is controlled to stabilize the outdoor coil SH to avoid flooding on the compressor suction.

SH = Tg – Te

SH: Evaporator outlet superheat degree
Tg: Suction pipe temperature before accumulator (R8T)Te: Suction pressure saturated temperature

Subcool electronic expansion valve (EVT) control

To utilize the subcooling heat exchanger and vapor injection, this function is used to exert PI control on the electronic expansion valve (EVT) so that the evaporator-side gas pipe superheating degree (SH) becomes constant.

SH = Tsh – Tm

SH: Outlet superheating degree of subcool heat exchanger (Low pressure side)
Tsh: Gas pipe temperature detected by the thermistor (R6T)
Tm: Low or middle pressure equivalent saturated temperature detected by thermistor (R16T)

Indoor coil electronic expansion valve (IEV) control

When the unit is performing the heating operation (RVC = OFF), IEV is normally fully open.
When the unit is performing the cooling operation (RVC = ON), IEV is controlled to stabilize the indoor coil SH to avoid flooding on the compressor suction.

SH = IGT – Te

SH: Indoor coil outlet superheat degree
IGT: Indoor coil gas thermistor (IGT) reading
Te: Suction pressure saturated temperature

Refrigerant cooling IPM electronic expansion valve (EVJ) control

When the unit is performing the cooling operation (RVC = ON), EVJ is normally fully open.
When the unit is performing the heating operation (RVC = OFF), EVJ is controlled to prevent overheating of the inverter power module (IEV) on INVERTER PCB while preventing condensation on INVERTER PCB.

Reheat and main circuit electronic expansion valve (EVHG,EVMG) control (Only for HGRH model)

When the unit is performing the heating operation (RVC = OFF) or cooling operation without dehumidification, EVMG is fully open, and EVHG is closed.
When the unit is performing the cooling operation (RVC = ON) and dehumidification is required, EVMG and EVHG is controlled to stabilize the supply air temperature (SAT).
The SAT setpoint is selected based on the configuration setting: it is either automatically calculated to maintain the room temperature or set to a fixed, user-defined value.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-40	SA Adjustment	Select the method for determining the HGRH supply air temperature	1: Auto 2: Fixed
RC	42-08			
PCB	6-43	SA Setpoint	Set the supply air temperature setpoint of HGRH or HGRH + multizone-VAV configuration	1: 12°C(53.6°F) ~ 9: 20°C(68°F) ~ 15:26°C(78.8°F) (In 1°C(1.8°F) increments)
RC	42-11			

5.4 Step Control of Outdoor Fans

The outdoor fan speed is determined based on the following:
- Power consumption optimization
- Compressor protection (maintaining appropriate operating pressure and discharge–suction differential pressure)

FUNCTIONS AND CONTROLS

5.5 Blower Motor Control

- For non-multizone VAV model

When the blower tap is set to Auto on the controller, the blower speed is automatically selected from Low, Medium, or High based on the difference between the room temperature and the setpoint.

ΔT Cooling : Room temperature - Setpoint Heating : Setpoint - Room temperature	Blower Tap
ΔT>3C(5.4F)	High
3C(5.4F)≥ΔT>1C(1.8F)	Medium
1C(1.8F)≥ΔT	Low

In addition to the basic logic described above, the blower tap is adjusted based on the rate of room temperature change and compressor speed to optimize unit efficiency and maintain comfort.

When the blower tap is set to anything other than Auto on the controller, the blower simply operates at the selected tap.

The blower speed at the High tap can be set via the field setting on both Main PCB and BRC controller, or service setting menu on BRC controller. The Medium and Low tap speeds are automatically calculated so that their CFMs are set to the following percentages relative to the High tap.

Tap	7.5 ton	8.5 ton	10 ton
Medium	78.6%	78.6%	78.6%
Low	64.8%	64.8%	64.8%

- For multizone VAV model

Blower speed is adjusted so that the supply duct static pressure meets Static Pressure Setpoint.

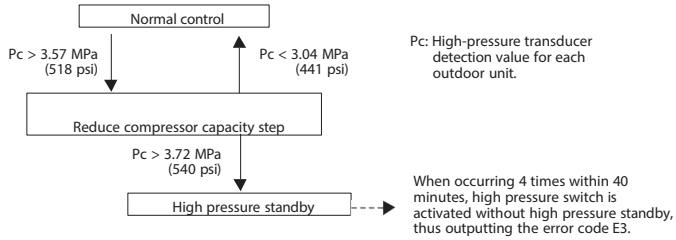
Setting address		Setting contents	Descriptions	Setting Details
PCB	6-32	Static Pressure Setpoint	Set the duct static pressure as the target value for Multizone VAV blower operation.	2: 0.8" ~ 14: 2.0" (in 0.2" increments) 15: BACnet[AV45]
RC	42-00			

6. Protection Control

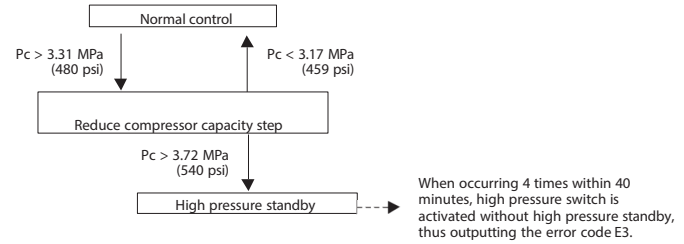
6.1 High Pressure Protection Control

The high pressure protection control is used to prevent the activation of the high-pressure switch due to abnormal increase of the compressor discharge pressure and to protect compressors against the transient increase of discharge pressure.

Cooling



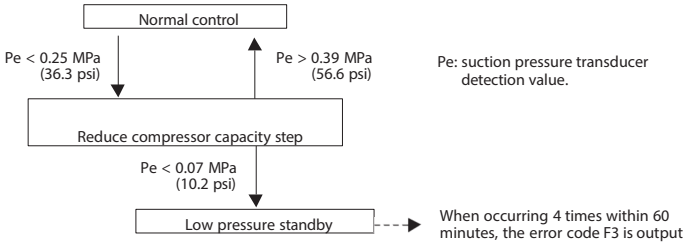
Heating



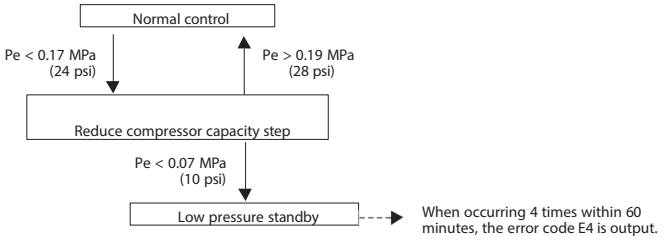
6.2 Low Pressure Protection Control

The low pressure protection control is used to protect compressors against the transient decrease of suction pressure.

Cooling



Heating



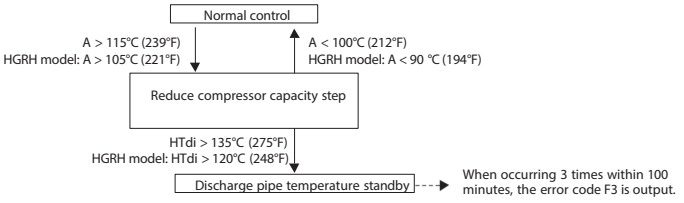
6.3 Discharge Pipe Protection Control

The discharge pipe protection control is used to protect the compressor internal temperature against an error or transient increase of discharge pipe temperature.

HTdi: Value of compressor discharge pipe temperature (Tdi) compensated with outdoor air temperature

Ti: Compressor body temperature

A: Maximum of HTdi and Ti



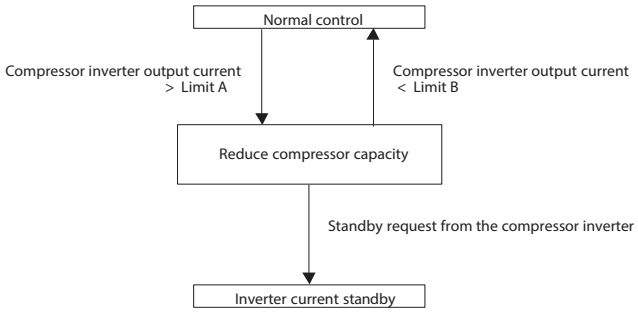
FUNCTIONS AND CONTROLS

6.4 Inverter Protection Control

Inverter current protection control and radiation fin temperature control are performed to prevent tripping due to an abnormality, or transient inverter overcurrent, and fin temperature increase.

Inverter Overcurrent Protection Control

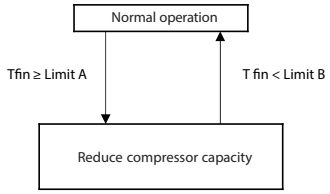
This control is performed for each compressor.



Limits A, B vary depending on the voltage and unit tonnage.

Radiation Fin Temperature Control

This control is performed for each compressor.



Tfin: Detected temperature by the thermistor embedded in the compressor INVERTER PCB.

Limits A, B vary depending on the voltage and unit tonnage.

7. Special Control

7.1 Pump Down Residual Operation

If the liquid refrigerant stays in the evaporator at the startup of a compressor, this liquid refrigerant enters the compressor, thus resulting in diluted oil in the compressor and then degraded lubrication performance.

Consequently, in order to recover the refrigerant in the evaporator before the compressor stops, the pump down residual operation is conducted.

Part name	Electric symbol	Action of functional part
Compressor motor	COMP	Cooling: Fixed speed
Fan motor	CM1, CM2	Same as normal control
Electronic expansion valve (Outdoor coil)	EVM	Same as normal control
Electronic expansion valve (Refrigerant cooling IPM)	EVJ	Same as normal control
Electronic expansion valve (Subcooling heat exchanger)	EVT	Normally closed
Electronic expansion valve (Indoor coil)	IEV	Cooling: Close Heating: Fixed position
Electronic expansion valve (Main circuit) (Only for HGRH)	EVMG	Hold
Electronic expansion valve (Reheat coil) (Only for HGRH)	EVHG	Hold
Solenoid valve (Four way valve)	RVC	Hold
Solenoid valve (Injection)	SVL	ON
Blower motor	BM	Same as normal control

7.2 Oil Return Operation

In order to prevent the compressor from running out of oil, the oil return operation is conducted to recover oil that has flowed out from the compressor to the unit side.

7.2.1 Oil Return Operation in Cooling Operation

Part name	Electric symbol	Action of functional part
Compressor motor	COMP	Operate at the compressor speed required for oil return.
Fan motor	CM1, CM2	Same as normal control
Electronic expansion valve (Outdoor coil)	EVM	Same as normal control
Electronic expansion valve (Refrigerant cooling IPM)	EVJ	Same as normal control
Electronic expansion valve (Subcooling heat exchanger)	EVT	Normally closed
Electronic expansion valve (Indoor coil)	IEV	Same as normal control
Electronic expansion valve (Main circuit) (Only for HGRH)	EVMG	0%→100% → Position at before oil return
Electronic expansion valve (Reheat coil) (Only for HGRH)	EVHG	100% →0%→ Position at before oil return
Solenoid valve (Four way valve)	RVC	Hold
Solenoid valve (Injection)	SVL	ON
Blower Motor	BM	Same as normal control

7.2.2 Oil Return Operation in Heating Mode

Same as Defrost Operation

7.3 Defrost Operation

The accumulation of the ice on the outdoor coil during heating operation will cause insufficient heating capacity. To recover the heating capacity, the unit enters the defrost operation and melts the ice when an excessive amount of ice is detected. The unit switches to the cooling cycle, using the outdoor coil as a condenser to raise its temperature and melt the ice.

This operation also serves as oil return during heating operation, so it may start even when there is no ice on the outdoor coil.

FUNCTIONS AND CONTROLS

Part name	Electric symbol	Action of functional part
Compressor motor	COMP	Run at the specific speed
Fan motor	CM1, CM2	Normally stop. If discharge pressure is high, it runs to lower the pressure accordingly.
Electronic expansion valve (Outdoor coil)	EVM	Fully open
Electronic expansion valve (Refrigerant cooling IPM)	EVJ	Same as normal control
Electronic expansion valve (Subcooling heat exchanger)	EVT	Close → Fixed position
Electronic expansion valve (Indoor coil)	IEV	Fixed position → SH control
Electronic expansion valve (Main circuit) (Only for HGRH)	EVMG	Hold
Electronic expansion valve (Reheat coil) (Only for HGRH)	EVHG	Hold
Solenoid valve (Four way valve)	RVC	ON
Solenoid valve (Injection)	SVL	ON
Blower Motor	BM	Follow the field setting
Electric Heater (If installed)	EH	Follow the field setting

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-50	Blower Tap During Defrost	Change the blower speed during the defrost operation	0:OFF 1:Minimum 2:Low 3:Medium 4:High 5:Speed set by the controller
RC	4A-50			

It is possible to select the blower tap during defrost operation. The higher the blower speed, the faster the defrost process is completed; however, since the unit operates in a cooling cycle during defrost, cold air may be blown out, causing the room temperature to drop. As a feature of inverter models, defrosting can be carried out with the blower stopped, and this is the factory default setting. If the setting to operate the heater during defrost (described later) is enabled, the blower will operate at H tap regardless of this setting.

NOTE: When the outside temperature is extremely low (below 5°F), the blower may operate even if the above setting is set to [OFF]. This occurs because the unit uses indoor air heat to assist defrosting when outdoor capacity is insufficient. In such cases, cold air may blow during defrost. Installing an electric heater and setting Heat Operation During Defrost to [Permitted] is recommended for use under these conditions.

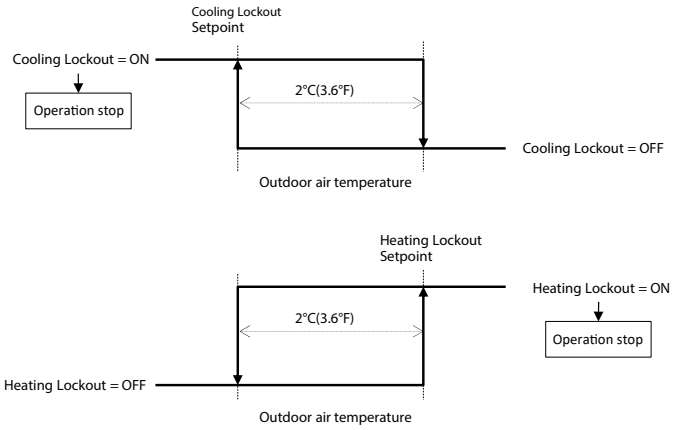
Setting address		Setting contents	Descriptions	Setting Details
PCB	4-19	Heating Type / Heat Operation During Defrost	Define the heater operation type and the operation of electric heat during defrost.	Heating type | 1&3 : Backup only 2&4: Auxiliary and Backup Heat Operation During Defrost | 1&2: Prohibited 3&4: Permitted
RC	21-03			

8. Other Operation

8.1 Cooling / Heating Lockout

Compressor and electric heater operation can be locked out when the outdoor temperature is too low during cooling or too high during heating.

When the detected outdoor temperature falls below Cooling Lockout Setpoint during cooling or rises above Heating Lockout Setpoint during heating, the unit enters lockout and stops operation.
Lockout is automatically released when the detected outdoor temperature rises 2°C(3.6°F) above the setpoint during cooling or falls 2°C(3.6°F) below the setpoint during heating.



Setting address		Setting contents	Descriptions	Setting Details
PCB	2-38	Heating Lockout Setpoint	Set the Heating Lockout Setpoint	0:26.1°C(79 °F) ~ 29: 10°C (50°F)(in 0.56°C(1°F) increments)
RC	4A-38			
PCB	2-39	Cooling Lockout Setpoint	Set the Cooling Lockout Setpoint	0:Lockout disabled 1: -6.67°C(20°F) ~ 41:15.56°C(60°F)(in 0.56°C(1°F) increments)
RC	4A-39			

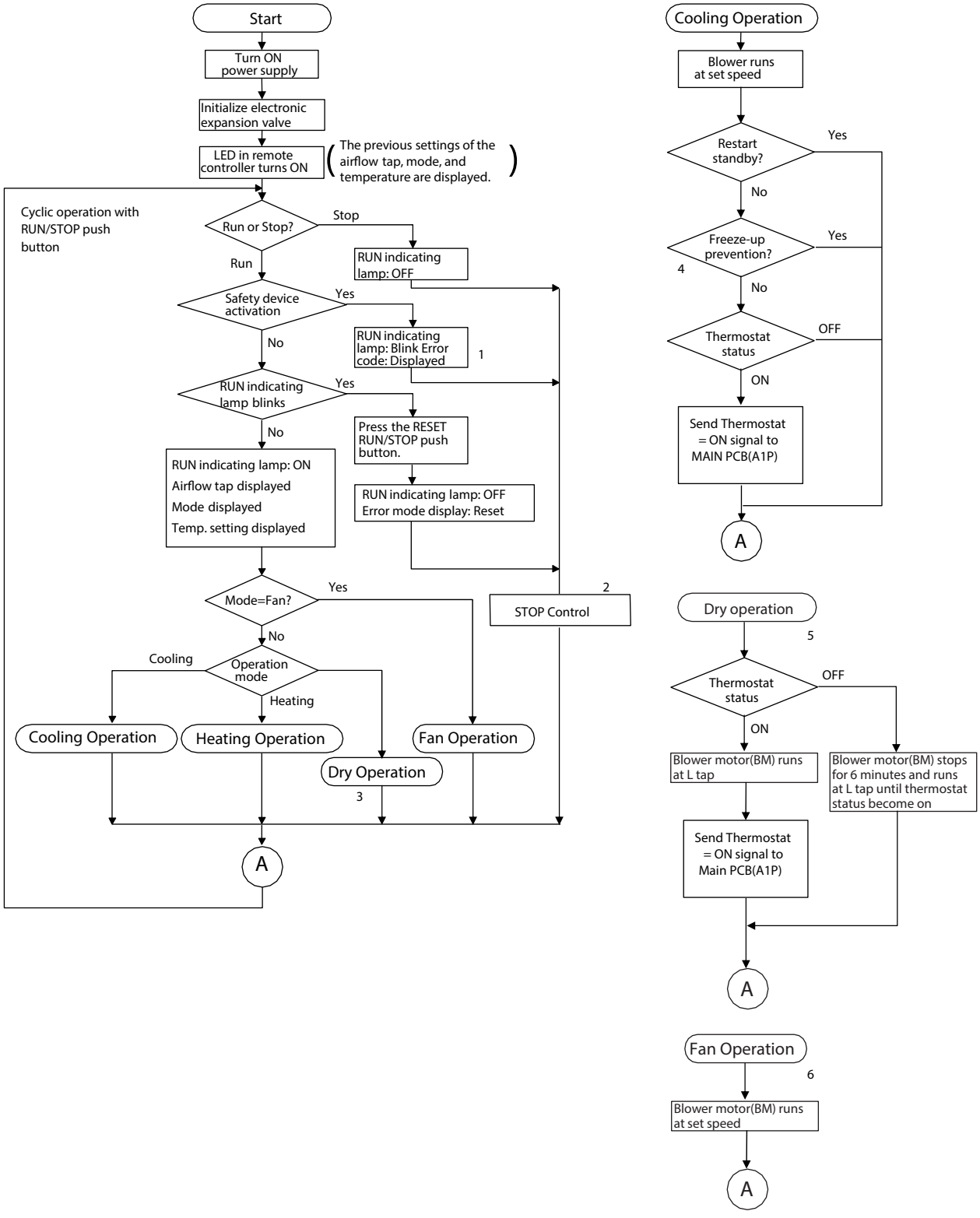
During lockout, the blower operates according to the Blower tap setting during thermo-off. In addition, the outdoor fan operates intermittently to ensure accurate outdoor temperature detection.
Lockout Setpoint can also be configured via BACnet.
[AW88] Cooling Lockout Setpoint
[AW90] Heating Lockout Setpoint
Between the field setting and the BACnet setting, the most recently updated value will be applied

9. Outline of Control (INDOOR PCB:A8P)

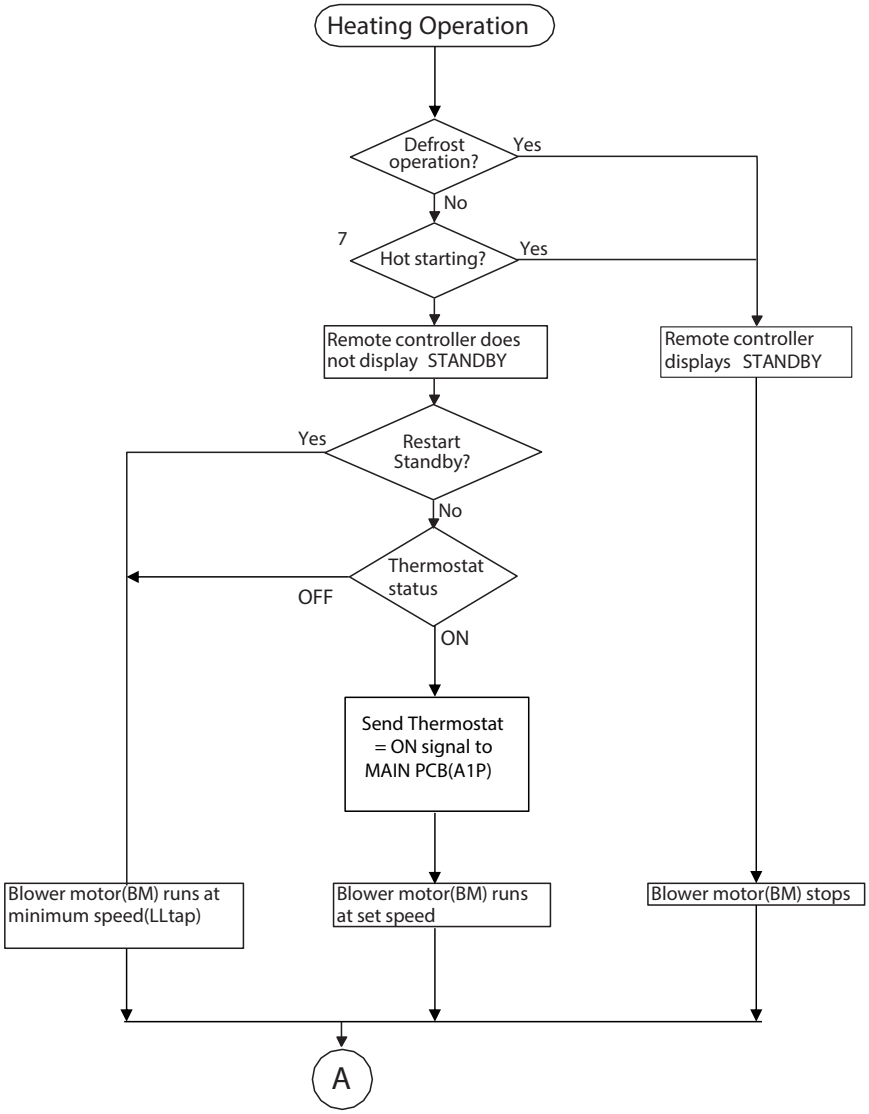
The following flowchart shows the basic operation of the unit with default settings. If the settings are changed, the operation will vary accordingly.

FUNCTIONS AND CONTROLS

9.1 Operation Flowchart



FUNCTIONS AND CONTROLS



- 1. If any error occurs, the relevant error code will be displayed according to the error code display of the remote controller.
- 2. When the auxiliary electric heater turns ON, the fan will stop after it conducts the blower run-on operation.
- 3. DRY mode isn't selectable when the unit is HGRH model or Multizone VAV model.
- 4. If, during cooling operation, Te (compressor suction pressure–equivalent saturated temperature) stays below the specified threshold for a defined duration, freeze-up prevention operation will be conducted. Then, if the indoor coil temperature rises to a level sufficient to melt ice and remains at or above that level for a certain period, the freeze-up prevention operation will be reset.
- 5. No set temperature and airflow rate of the remote controller are displayed.
- 6. Fan operation
  By setting the remote controller to Fan, the fan will operate with thermostat OFF in set temperature control operation mode.
- 7. Hot start
  After the start of heating operation or the end of defrost operation, the hot start control will be performed to prevent customers from feeling cold air. During hot start, the blower motor (BM) runs either stopped or at a lower speed than the set speed until Tc (Compressor discharge pressure saturation temperature) rises to a sufficiently high temperature. The blower tap can be changed by ***Blower Tap During Hot Start*** setting.

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-49	Blower Tap During Defrost	Change the blower speed during the defrost operation	0:OFF 1:Minimum 2:Low 3:Medium 4:High 5:Speed set by the controller
RC	4A-49			

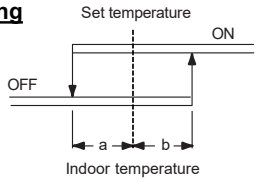
FUNCTIONS AND CONTROLS

9.2 Thermostat Status Control

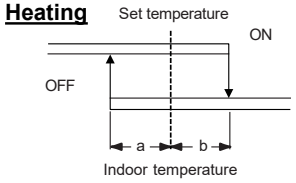
Whether the thermostat is turned ON or OFF is determined by the difference between the remote controller set temperature and the actual detected indoor temperature.

Normal Operation

Cooling



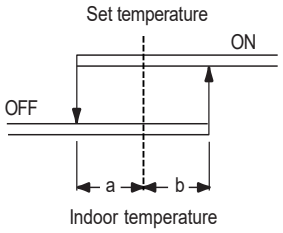
Heating



When setting 1, a=b=1°C(1.8°F)
When setting 2, a=b=0.5°C(0.9°F)

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-34	Thermostat ON/OFF Differential	Defines the temperature deviation from the setpoint at which the thermostat turns ON or OFF.	1: 1°C(1.8°F) 2: 0.5°C(0.9°F)
RC	22-02			

Dry Operation



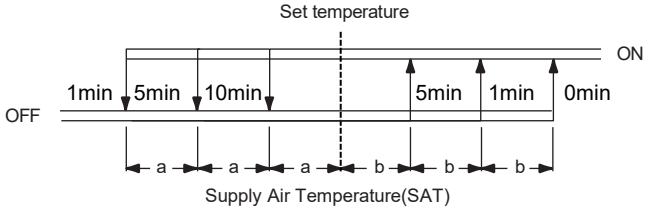
When Tro < 24.5°C (76.1°F),
→ a=1.0˚C (1.8˚F), b= 0.5 ˚C (0.9˚F)
When Tro ≥ 24.5°C (76.1°F),
→ a=1.5˚C (2.7˚F), b= 0.5 ˚C (0.9˚F)
Tro: Room temperature at the start of dry operation

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-28	Dry Setpoint	Defines how the set temperature is determined in Dry mode.	1: Indoor temperature when dry mode starts2: The same setpoint as cooling mode
RC	21-12			

This setting allows the method for determining the set temperature during Dry mode operation to be changed.
When set to [1], the indoor temperature at the moment Dry mode is selected is used as the set temperature. When set to [2], the set temperature is the same as the cooling set temperature.

Supply air temperature control (Only for Multizone-VAV model)

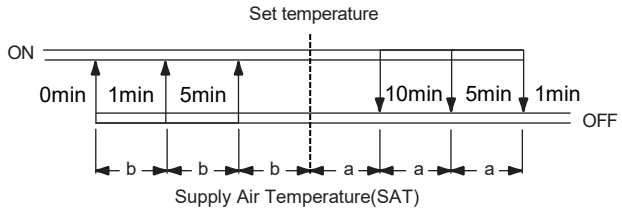
Cooling



Change from thermostat ON to OFF when,
- SAT < Setpoint – 3a for 1 minutes or
- SAT < Setpoint – 2a for 5 minutes or
- SAT < Setpoint – a for 10 minutes

Change from thermostat OFF to ON when,
- SAT > Setpoint + 3b for 0 minutes or
- SAT > Setpoint + 2b for 1 minutes or
- SAT > Setpoint + b for 5 minutes

Heating



Change from thermostat ON to OFF when,
- SAT > Setpoint + 3a for 1 minutes or
- SAT > Setpoint + 2a for 5 minutes or
- SAT > Setpoint + a for 10 minutes

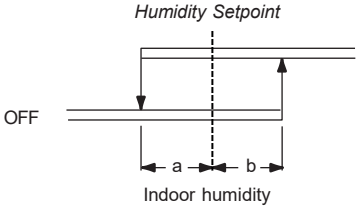
Change from thermostat OFF to ON when,
- SAT < Setpoint - 3b for 0 minutes or
- SAT < Setpoint - 2b for 1 minutes or
- SAT < Setpoint - b for 5 minutes

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-36	Thermostat ON/OFF Differential for SAT Control	Sets the differential for switching the thermostat ON and OFF during SAT control.	a | 1~3:0.6°C(1°F) 4~6:1.1°C(2°F) 7~9:1.7°C(3°F)b | 1,4,7:0.6°C(1°F) 2,5,8:1.1°C(2°F) 3,6,9:1.7°C(3°F)
RC	42-04			

Dehumidification Operation (Only for HGRH model)

In the HGRH model, when the operating mode is set to Cooling, compressor operation starts when either the normal cooling thermostat is ON or the dehumidification thermostat described below is ON.

■ When **HGRH Dehumidification Condition** is set to [1:Humidity Differential]



"a" and "b" can be changed by Dehumidification Differential setting

FUNCTIONS AND CONTROLS

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-41	HGRH Dehumidify Condition	Defines the conditions for initiating reheat dehumidification operation in the hot gas reheat model.	1: Humidity Differential2: Always 3: When the cooling thermostat ON
RC	42-09			
PCB	6-42	Humidity Setpoint	Set the HGRH humidity setpoint	1: 40% ~ 8: 75% (In 5% increments)9: Setting value on the controller 10: BACnet [AV33]
RC	42-10			
PCB	6-44	Dehumidification Differential	Defines how far the indoor humidity must deviate from the setpoint to trigger dehumidification ON or OFF.	a | 1~3: 5% 4~6:10%b | 1,4: 5% 2,5:10% 3,6:0%
RC	42-12			

If the remote controller is equipped with a Humidity Setpoint function, use it to set the target humidity. If not, it can be set via the field setting described above.
For detailed instructions on how to set from the remote controller, refer to the remote controller's operation manual.

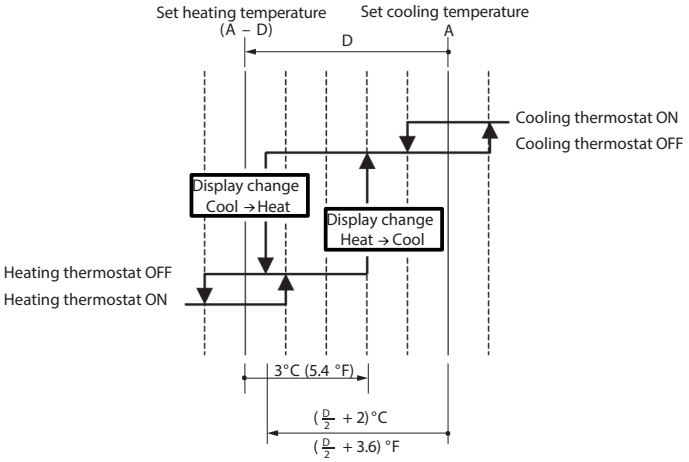
■ When HGRH Dehumidification Condition is set to [2:Always]
When the operating mode is set to Cooling and operation is ON on the controller (Run indicating lamp is ON), the dehumidification thermostat is always set to ON.

■ When HGRH Dehumidification Condition is set to [3:When the cooling thermostat ON]
When the cooling thermostat is ON, the dehumidification thermostat is always set to ON.

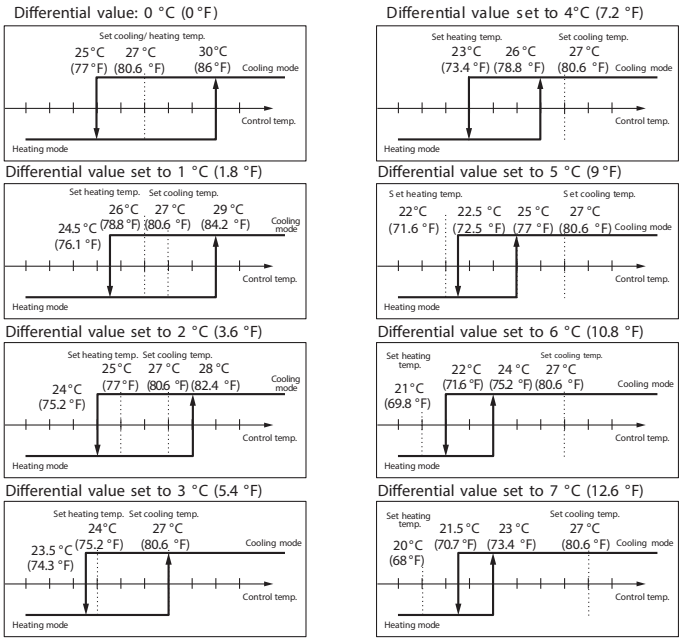
9.3 Thermostat Control with Operation Mode Set to AUTO

The unit will conduct this temperature control shown below, only when any central remote controller is connected.
Furthermore, setting changes of the differential value (**D**) can be made.

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-36	Setting of Operation Mode to AUTO	Sets the differential for switching between heating and cooling when the operating mode is set to Auto.	1: 0°C(0°F) ~ 8:7°C(12.6°F) (In 1°C(1.8°F) increments)
RC	22-04			



(Ex.) When automatic cooling temperature is set to 27°C (80.6°F):



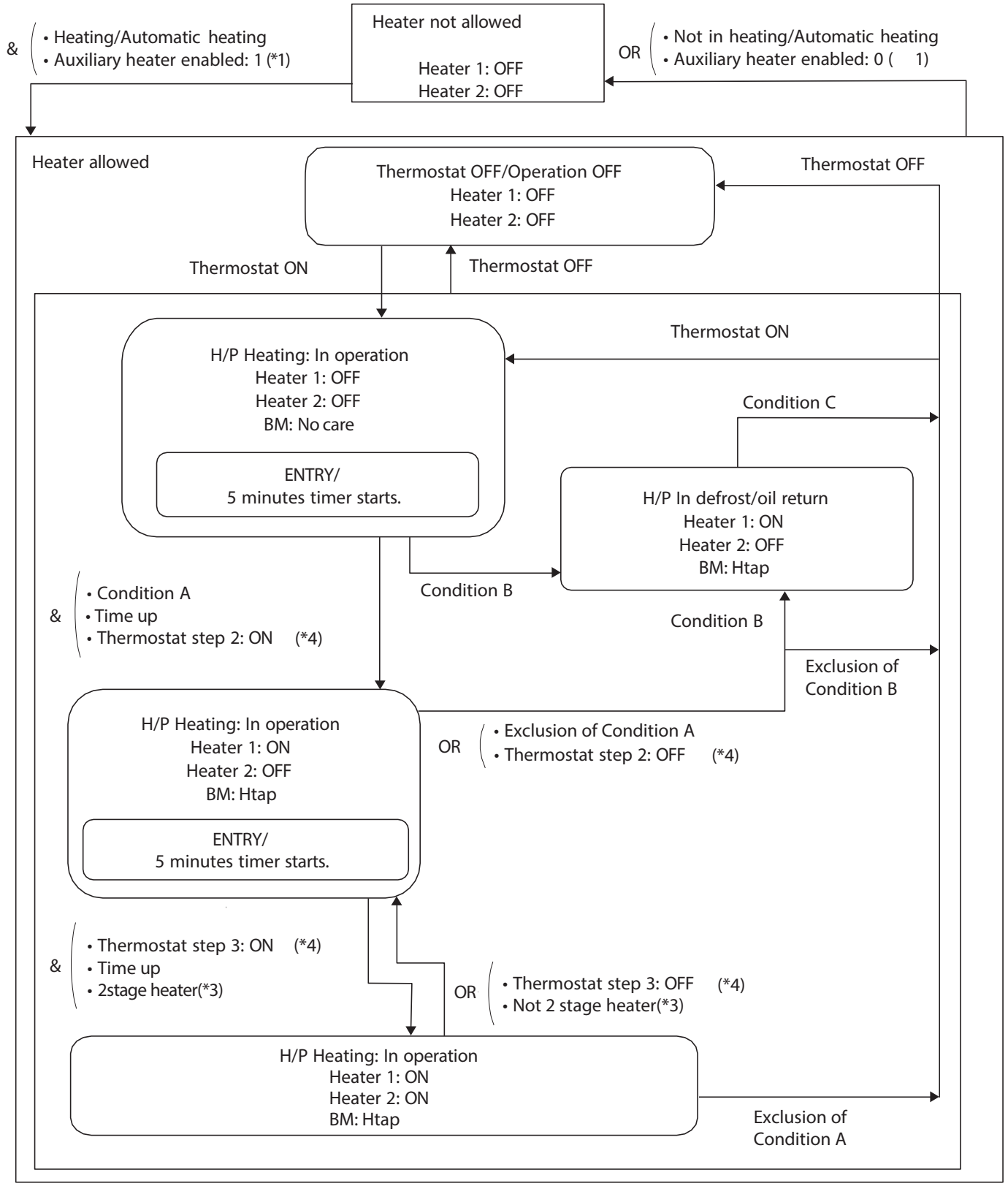
9.4 Electric Heater Control

NOTE: Optional heater kit is required.
If the Heating Type is set to [Backup], the electric heat will be energized only during Heat Pump Lockout, as described later. If [Auxiliary] is selected, the electric heat will be energized not only during Heat Pump Lockout, but also when the heat pump's heating capacity is insufficient.

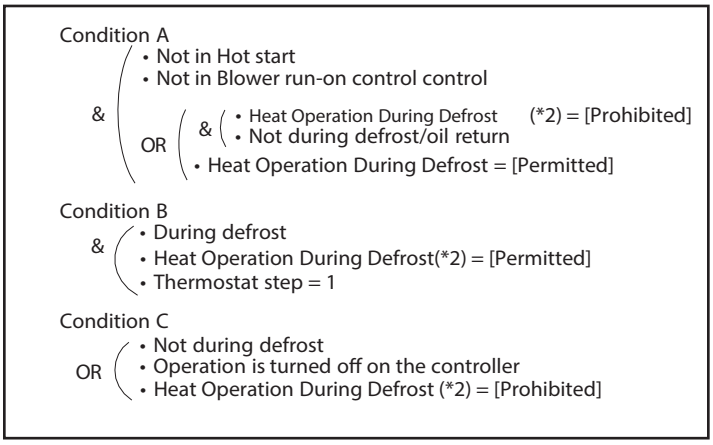
FUNCTIONS AND CONTROLS

9.4.1 Auxiliary Electric Heater Control

If heating is insufficient in heat pump system alone, an electric heater is used as the auxiliary heater. The following shows the ON/OFF conditions for the electric heater.



FUNCTIONS AND CONTROLS



NOTES:

1. Auxiliary heater enabled

Auxiliary Heater Enable = TRUE when all of the following conditions are satisfied:

-Not in Electric Heat Lockout
-Not a Multizone VAV model
-Heating Type(*2) = [Auxiliary]
-Heater use is not disabled by demand control
-Electric Heat stage(*3) ≠ [No Electric Heat]

2. Heating type and Heat Operation During Defrost.

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-19	Heating Type / Heat Operation During Defrost	Define the heater operation type and the operation of electric heat during defrost.	Heating type | 1&3 : Backup only 2&4: Auxiliary and Back-up Heat Operation During Defrost | 1&2: Prohibited 3&4: Permitted
RC	21-03			

3. Electric Heat Stage

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-22	Electric Heat Stage	Set the electric heat type	1: No electric heat 4: 1stage 5: 2stage 6:Modulating
RC	21-06			

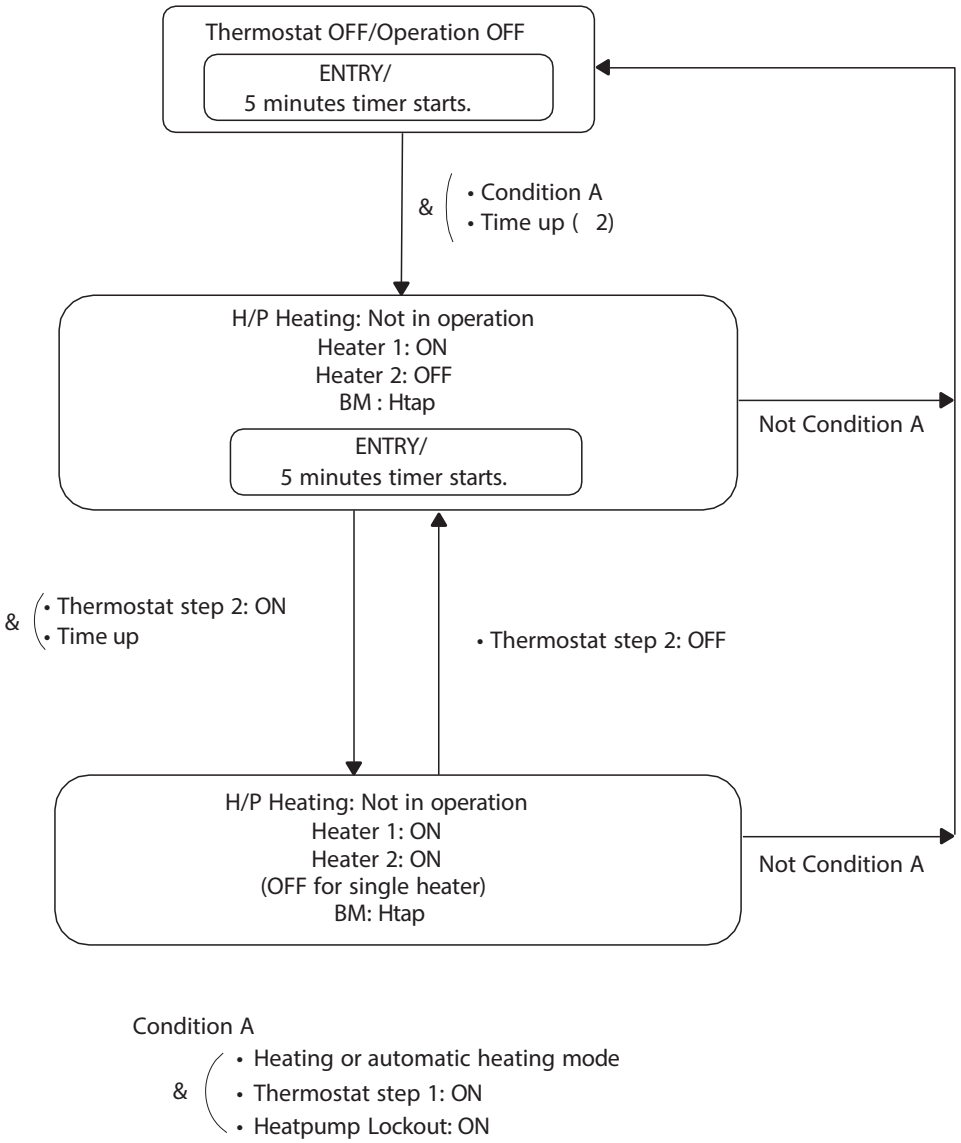
4. Thermostat Step

When the thermostat status is ON, Thermostat step is set to 1 and increases to 2 and 3 based on the required load, determined by the temperature deviation from the setpoint and the room temperature change rate.

FUNCTIONS AND CONTROLS

9.4.2 Backup Electric Heater Control

The ON/OFF conditions for the electric heater are shown below.



Regardless of the above, backup heat operation is not allowed if any of the following conditions are met:

- A fault related to the room temperature sensor is present
- A fault that prevents the indoor fan from operating is present
- The unit is an MZ VAV model
- Electric Heat stage = [No Electric Heat]

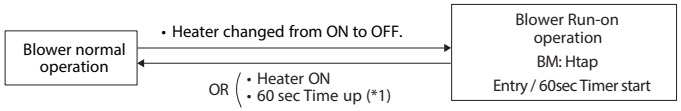
Setting address		Setting contents	Descriptions	Setting Details
PCB	4-20	Backup Heater Operation During Demand Control	Define the operation of the backup heater during demand control.	1: Permitted 2:Prohibited
RC	21-04			

This setting defines whether the backup heater operates during energy-saving demand operation via Hero Cloud. When set to [Permitted], the backup heater operates even during demand operation. When set to [Prohibited], backup heater operation is inhibited during demand operation. However, if the indoor temperature falls below 15.6°C (60°F), the backup heater will operate even when set to [Prohibited].

FUNCTIONS AND CONTROLS

9.5 Blower run-on control

If the electric heater turned OFF from ON during heating operation, the blower will keep operating for a further period of time to cool the heater.

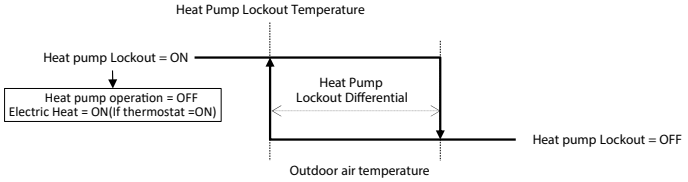


1. Run-on operation will continue, even if the unit is turned off with the remote controller operation button.

9.6 Heat pump Lockout / Electric Heat Lockout

When Heat pump Lockout is [Enable] and the outdoor temperature sensor, located next to the outdoor control box, detects a temperature below the Heat Pump Lockout Temperature, the system enters Heat Pump Lockout mode. During Heating Thermo-ON, only the electric heater operates in this mode.

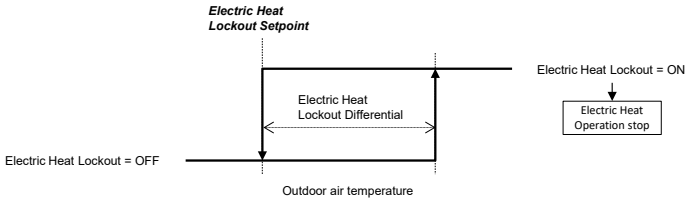
Heat Pump Lockout will be cleared when the outdoor temperature rises above the **Heat Pump Lockout Temperature + Heat Pump Lockout Differential.**



Setting address		Setting contents	Descriptions	Setting Details
PCB	2-37	Heat Pump Lockout	Set the Heat Pump Lockout to Enabled or Disabled	0:Disabled1:Enabled
RC	4A-37			
PCB	2-78	Heat Pump Lockout Temperature	Set the activation temperature for the Heat Pump Lockout	0:-26.1°C(-15 °F) ~ 65: 10°C(50°F) (in 0.56°C(1°F) increments) 66: Always heat pump lockout
RC	4A-78			
PCB	2-79	Heat Pump Lockout Differential	Adjust the temperature differential to release the Heat Pump Lockout	0:2.8°C(5 °F) 1: 5.6°C(10°F) 2: 8.3°C(15°F)
RC	4A-79			

When the outdoor temperature sensor, located next to the outdoor control box, detects a temperature above Electric Heat Lockout Setpoint + Electric Heat Lockout Differential, the system enters Electric Heat Lockout mode. Electric heat will not be energized in this mode. Electric Heat Lockout will be cleared when the outdoor temperature drops below the Electric Heat Lockout Setpoint.

Electric Heat Lockout Setpoint + Electric Heat Lockout Differential must be higher than Heat Pump Lockout Temperature.



Setting address		Setting contents	Descriptions	Setting Details
PCB	2-97	Electric Heat Lockout Setpoint	Set the outdoor temperature to release Electric Heat Lockout	0:-17.8°C(0°F) ~ 7: 1.7°C(35°F) ~ 13: 18.3°C(65°F)(in 2.8°C(5°F) increments)14: Forced Lockout 15: Disabled
RC	4A-97			
PCB	2-98	Electric Heat Lockout Differential	Set the temperature differential for activating Electric Heat Lockout.	0:2.8°C(5 °F) 1: 5.6°C(10°F) 2: 8.3°C(15°F)
RC	4A-98			

9.7 Ventilation damper control

Note: Optional motorized damper or economizer damper kit is required.

There are two main types of motorized ventilation dampers available as optional accessories for this unit: a 2-position motorized damper, which opens to a fixed position, and a variable economizer damper.

9.7.1 Motorized damper control

Damper will be energized to open when [Damper presence] = YES, blower motor (BM) is running, and Ventilation Lockout = OFF.

9.7.2 Economizer modulating damper control

When Damper Type is set to [Economizer damper] and the damper is open, the unit performs one of the following three main operations:

- Fixed Minimum Position

Maintains the damper at the specified minimum open position.

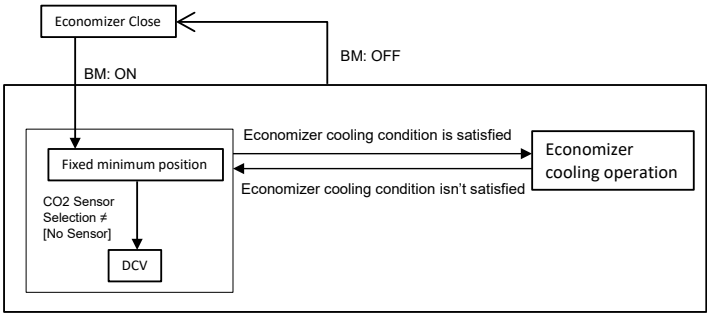
- Demand Control Ventilation (DCV)

Adjusts damper opening based on CO2 concentration to prevent excessive ventilation.

- Economizer Cooling

Increases the intake of outdoor air by opening the damper when the outdoor temperature or enthalpy is sufficiently low for cooling, thereby reducing compressor power consumption.

FUNCTIONS AND CONTROLS



Setting address		Setting contents	Descriptions	Setting Details
PCB	6-16	Damper Presence / Type / Economizer Cooling Trigger	Configure damper presence, damper type, and the activating condition for economizer cooling.	Presence | 1: No 2~7: YesType | 2: 2-Position damper 3~7: Economizer damper Economizer cooling trigger | 3: Always disabled 4:Fixed DB 5: Differential DB 6: Fixed Enthalpy 7: Differential Enthalpy
RC	41-00			

Economizer Damper Position Limit

Upper and lower limits can be set for both the configured and calculated economizer damper positions. These limits are applied in all operating modes described later, ensuring that the damper never closes below Low Limit Position or opens beyond High Limit Position.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-22	Low Limit Position	Define the lower limit of the damper opening.	1: 0% ~ 6: 10% (in 2% increments)
RC	41-06			
PCB	6-23	High Limit Position	Define the higher limit of the damper opening.	1: 100% ~ 10: 10% (in 10% increments)
RC	41-07			

Fixed Minimum Position Operation

The damper will open to the Minimum position under the following conditions:

-Damper presence is set to YES

-The indoor blower is operating

-Not in Ventilation lockout, DCV, Economizer cooling, or Optimum start mode

The Minimum position can be configured individually for each blower tap. For the Medium and Low blower taps, the Minimum position can be configured by selecting either:

-Automatic calculation, or

-Manual setting based on an offset from the Minimum position of a higher airflow tap.

This selection allows the system to be adapted to site-specific ventilation requirements.

The automatic calculation estimates the required damper opening to maintain the same ventilation airflow as the High tap, by considering the relative airflow ratio.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-19	High Tap Minimum Position (HMP)	Set the minimum position of the damper when the blower is operating in Htap	1: 5% ~ 4:20% ~ 14:70% (in 5% increments) 15:BACnet(AV42)
RC	41-03			
PCB	6-20	Medium Tap Minimum Position (MMP)	Set the minimum position of the damper when the blower is operating in Mtap	1: Calculation, 2: HMP+5% ~ 14:HMP+65%, (in 5% increments)15:BACnet(AV43)
RC	41-04			
PCB	6-21	Low Tap Minimum Position (LMP)	Set the minimum position of the damper when the blower is operating in Ltap	1: Calculation, 2: MMP+5% ~ 14:MMP+65%, (in 5% increments)15:BACnet(AV44)
RC	41-05			

Demand Control Ventilation (DCV)

In DCV mode, when the CO2 concentration is low, the damper position can be reduced below the Minimum position, thereby decreasing ventilation load.

DCV will be enabled under the following conditions:

- **Damper type** = [Economizer damper]
- The indoor blower is operating
- **CO2 Sensor Selection** ≠ [No Sensor]
- Not in Ventilation lockout, Economizer cooling, Optimum start mode or CO2 sensor alarm

The damper position control in DCV mode can be defined using the following three settings:

DCV Ratio

Defines how much the damper can close relative to the Minimum position when DCV is active.

The actual damper position (referred to as Minimum DCV) is calculated as:

Minimum Position of the current blower tap × DCV Ratio

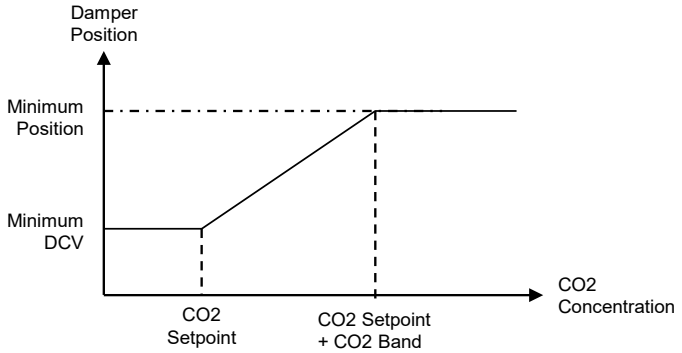
CO2 Setpoint

When the CO2 concentration is below this value, the damper position will be held at Minimum DCV.

CO2 Band

When the CO2 concentration exceeds CO2 Setpoint + CO2 Band, the damper position returns to the Minimum position.

If the CO2 concentration is between the CO2 Setpoint and CO2 Setpoint + CO2 Band, the damper position is adjusted linearly between Minimum DCV and Minimum Position.



FUNCTIONS AND CONTROLS

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-24	CO2 Setpoint	Define the target CO2 concentration at which the system maintains minimum DCV.	1: 300ppm ~ 4: 600ppm ~ 14:1600ppm (in 100ppm increments)15: BACnet [AV34]
RC	41-08			
PCB	6-25	CO2 Band	Define the range above the setpoint over which the damper gradually opens to increase ventilation.	1: 50ppm ~ 8: 400ppm ~ 14:700ppm (in 50ppm increments)15: BACnet [AV35]
RC	41-09			
PCB	6-26	DCV Ratio	Define the ratio between the Minimum Position and the Minimum DCV position.	1: 0% ~ 6: 25% ~ 15: 70% (in 5% increments)
RC	41-10			

Economizer Cooling Operation

Economizer cooling, which utilizes outdoor air as a cooling source, will be initiated when all the following conditions are met:

- **Damper type** = [Economizer damper]
- **Economizer Cooling Trigger** is not [Always disabled]
- Cooling Thermo-on
- Not in Ventilation lockout, Dehumidification mode or Outdoor air temperature sensor error
- Economizer Cooling Enable is TRUE.

When using economizer cooling, if the sensor located inside the return duct is used as the indoor temperature sensor, the actual indoor air temperature may not be accurately detected when the economizer damper is fully open. It is recommended to use either the space temperature sensor or the sensor built into the remote controller.

The conditions for Economizer Cooling Enable to become TRUE depend on the selected **Economizer Cooling Trigger**,

When Economizer Cooling Trigger is 'Fixed Dry Bulb':

- Economizer Cooling Enable becomes TRUE when the outdoor air temperature is 0.5°C(1°F) lower than the Fixed Dry Bulb Setpoint.
- It becomes FALSE when the outdoor air temperature is 0.5°C(1°F) higher than the Fixed Dry Bulb Setpoint.

When Economizer Cooling Trigger is 'Differential Dry Bulb':

- Economizer Cooling Enable becomes TRUE when the outdoor air temperature is lower than the indoor air temperature by at least the Differential Dry Bulb Setpoint.
- It becomes FALSE when the outdoor air temperature is higher than the indoor air temperature.

When Economizer Cooling Trigger is 'Fixed Enthalpy':
Economizer Cooling Enable becomes TRUE when:

- The outdoor air temperature is 0.5°C(1°F) lower than the Fixed Dry Bulb Setpoint, and
- The outdoor air enthalpy is 0.5 Btu/lb lower than the Fixed Enthalpy Setpoint.

It becomes FALSE when:

- The outdoor air temperature is 0.5°C(1°F) higher than the Fixed Dry Bulb Setpoint, or• The outdoor air enthalpy is 0.5 Btu/lb higher than the Fixed Enthalpy Setpoint.

Additionally, if there is an failure with the outdoor humidity sensor used for enthalpy calculation, Economizer Cooling Enable will be set to FALSE.

When Economizer Cooling Trigger is 'Differential Enthalpy':
Economizer Cooling Enable becomes TRUE when:

- The outdoor air temperature is 0.5°C(1°F) lower than the Fixed Dry Bulb Setpoint, and
- The outdoor air enthalpy is lower than the indoor enthalpy by at least the Differential Enthalpy Setpoint.

It becomes FALSE when:

- The outdoor air temperature is 0.5°C(1°F) higher than the Fixed Dry Bulb Setpoint, or
- The outdoor air enthalpy is higher than the indoor enthalpy.

If there is an error with either the outdoor or indoor humidity sensor used for enthalpy calculation, Economizer Cooling Enable will also be set to FALSE.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-17	Fixed / Differential Dry Bulb Setpoint	Define the Fixed Dry Bulb Setpoint and Differential Dry Bulb Setpoint	Fixed DB | 1:15.6°C(60°F) ~ 5: 17.8°C(64°F) ~ 14: 22.8°C(73°F) (in 0.56°C(1°F) increments) 15: BACnet [AV38]Differential DB | 1:1.1°C(2°F) ~ 5:2.2°C(4°F) ~ 14:4.7°C(8.5°F)(in 0.28°C(0.5°F) increments) 15: BACnet [AV39]
RC	41-01			
PCB	6-18	Fixed / Differential Enthalpy Setpoint	Define the Fixed Enthalpy Setpoint and Differential Enthalpy Setpoint	Fixed Enthalpy | 1: 25.2 Btu/lb ~ 8:26.6 Btu/lb ~14: 27.8 Btu/lb(in 0.2Btu/lb increments) 15: BACnet [AV40]Differential Enthalpy | 1: 0.5Btu/lb ~ 8:4.0Btu/lb ~ 7.0Btu/lb(in 0.5Btu/lb increments) 15: BACnet [AV41]
RC	41-02			

9.8 Power Exhaust Control

Note: Optional power exhaust kit is required.

Power Exhaust prevents an increase in building static pressure caused by the intake of outdoor air during economizer operation by exhausting a portion of the return air to the outside. The operating conditions of Power Exhaust can be configured using Power Exhaust Activation Condition setting.

[None]: Power Exhaust does not operate.

[Economizer Cooling]: It operates only during economizer cooling.

[Minimum Position]: It operates when the damper position is at or above the minimum position.

[Always]: Power Exhaust operates whenever the damper is open.

FUNCTIONS AND CONTROLS

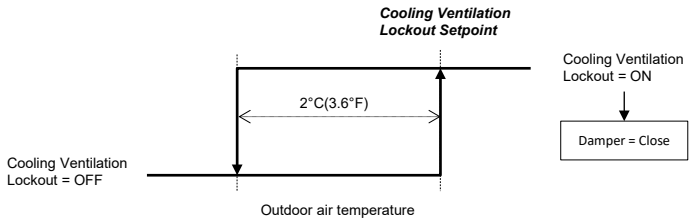
Setting address		Setting contents	Descriptions	Setting Details
PCB	6-31	Power Exhaust Activation Condition	Define the operating conditions for the optional power exhaust.	1: None 2: During Economizer cooling 3: During minimum position or higher 4:Always
RC	41-15			

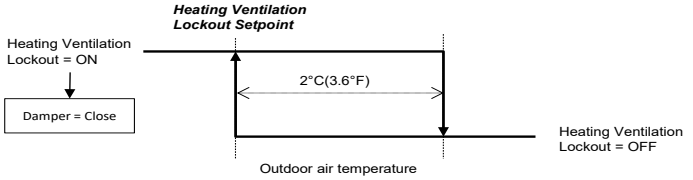
9.9 Ventilation Lockout

A lockout function is provided to close the damper under outdoor temperature conditions that would significantly increase the ventilation load or cause operation outside the operation range—such as heating under low outdoor temperatures or cooling under high outdoor temperatures.

During cooling, the ventilation lockout becomes active when the outdoor air temperature rises above Cooling Ventilation Lockout Setpoint. It is deactivated when the temperature drops to 2°C(3.6°F) below the setpoint.

During heating, the ventilation lockout becomes active when the outdoor air temperature falls below **Heating Ventilation Lockout Setpoint**. It is deactivated when the temperature rises to 2°C(3.6°F) above the setpoint.

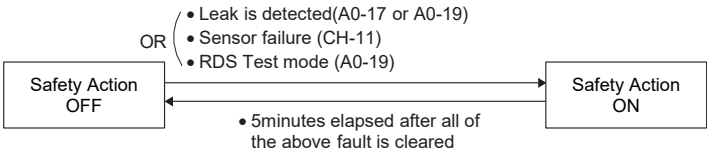




Setting address		Setting contents	Descriptions	Setting Details
PCB	6-28	Cooling Ventilation Lockout Setpoint	Determine the outdoor air temperature threshold above which the damper closes during cooling.	1: Heating Ventilation Lockout disabled2: 51.7°C(125°F) ~ 12: 21.1°C(70°F) (In 2.8°C(5°F) increments)
RC	41-12			
PCB	6-29	Heating Ventilation Lockout Setpoint	Determine the outdoor air temperature threshold below which the damper closes during heating.	1: Heating Ventilation Lockout disabled2: -23.3°C(-10°F) ~ 14: 10°C(50°F) (In 2.8°C(5°F) increments)15: 15.6°C(60°F)
RC	41-13			

9.10 Refrigerant Detection System (RDS) function

The unit is equipped with a Refrigerant Detection System (RDS) to detect refrigerant leaks and refrigerant sensor failures. Upon detection of a leak or sensor failure, the unit initiates the safety actions listed in the table below to mitigate the risk of fire. The actions remain active for 5 minutes after the leak is no longer detected.



Part name	Electric symbol	Action of functional part
Compressor motor	COMP	Stop
Fan motor	CM1, CM2	Stop
Electronic expansion valve (Outdoor coil)	EVM	Close
Electronic expansion valve (Refrigerant cooling IPM)	EVJ	Close
Electronic expansion valve (Subcooling heat exchanger)	EVT	Close
Electronic expansion valve (Indoor coil)	IEV	Close
Electronic expansion valve (Main circuit) (Only for HGRH)	EVMG	Close
Electronic expansion valve (Reheat coil) (Only for HGRH)	EVHG	Close
Solenoid valve (Four way valve)	RVC	Hold
Solenoid valve (Injection)	SVL	ON
Blower motor	BM	Run at Htap
Electric Heater (If installed)	EH	OFF
Refrigerant Alarm output contact (INDOOR PCB-X4M-7,8 pin)	REF ALARM	ON (See NOTE)

Note: To comply with safety standards, perform wiring using REF ALARM contacts so that, in the event of a safety action, optional kits and related equipment operate safely (e.g., dampers fully open and potential ignition sources shut down).

RDS Test Mode

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-95	RDS Leak Operation Test Mode	Start the test operation for system response when a refrigerant leak is detected.	1: OFF 2: ON
RC	25-15			

A leak operation test mode is available to simulate the operation when a refrigerant leak is detected. Setting the above setting to [ON] will initiate the test mode, while setting it to [OFF] will perform mitigation for 5 minutes before stopping the test mode. Use this mode to check the operation of zoning dampers and other components. If any other fault is detected in the unit during the test mode, the corresponding operation will take priority.

FIELD SETTINGS

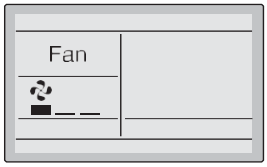
Field Settings

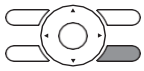
Various functions of the unit can be changed from the remote controller or BS buttons on the PCB (A1P) in the outdoor control box. At the time of installation or after service inspection/repair, make the field setting in accordance with the following description. The wrong setting may cause an error.

Field Setting From BRC1NRV

<Basic screen>

(1)

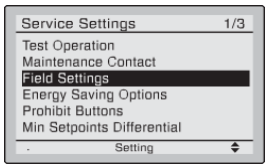


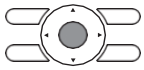


Press and hold **Cancel** button for 4 seconds or more during backlight lit.

<Service Settings menu screen>

(2)

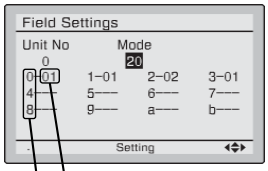




Press **Menu/OK** button.

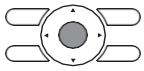
<Service Settings screen>

(3)
(4)



SECOND CODE NO.

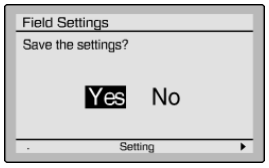
FIRST CODE NO.

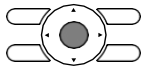


Press **Menu/OK** button.

<Setting confirmation screen>

(5)
(6)





Press **Menu/OK** button.

Setting confirmation

1. Press and hold **Cancel** button for 4 seconds or more. Service settings menu is displayed.
2. Select **Field Settings** in the Service Settings menu, and press **Menu/OK** button. Field settings screen is displayed.
3. Highlight the mode, and select desired **Mode No.** by using ▲▼ (Up/Down) button.
   [SECOND CODE NO. " - " means no function.]
4. Highlight SECOND CODE NO. of the FIRST CODE NO. to be changed, and select desired **SECOND CODE NO.** by using ▲▼ (Up/Down) button. Multiple identical mode number settings are available.
5. Press **Menu/OK** button Setting confirmation screen is displayed.
6. Select **Yes** and press **Menu/OK** button. Setting details are determined and field settings screen returns.
7. In the case of multiple setting changes, repeat **(3)** to **(6)**.
8. After all setting changes are completed, press **Cancel** button twice.
9. Backlight goes out, and **Checking the connection. Please standby.** is displayed for initialization. After the initialization, the basic screen returns.

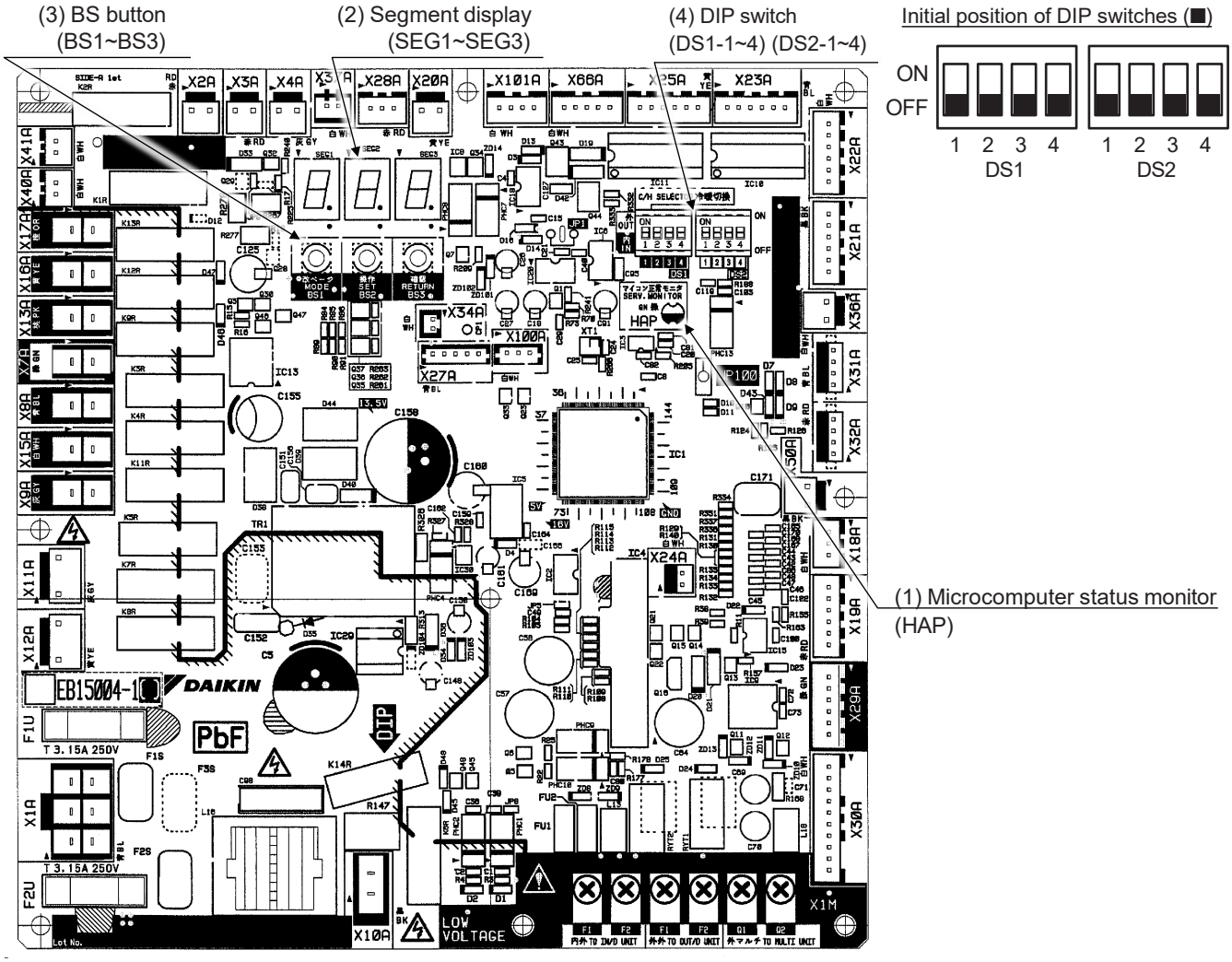
FIELD SETTINGS

Field Setting from MAIN PCB

This chapter explains how to perform field settings using the BS buttons and DIP switches on MAIN PCB, and how to read feedback from the 7-segment display.

DIP Switch Setting when Mounting a Spare PCB

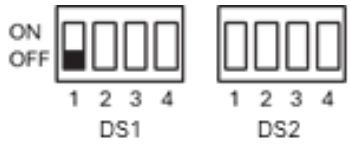
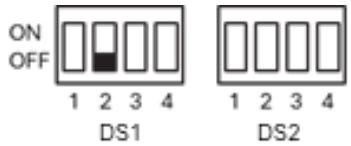
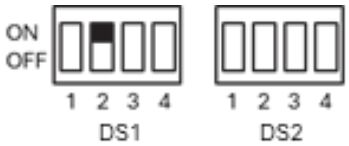
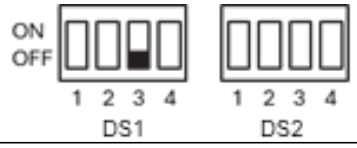
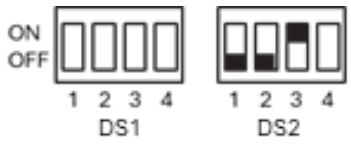
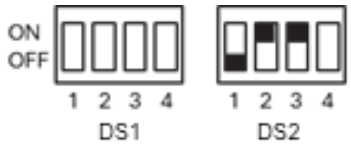
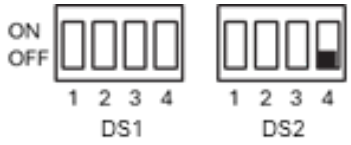
After replacing MAIN PCB with a spare, configure the settings according to the table on the following page. The setup procedure for a spare PCB differs from the factory default settings described above.



1. Microcomputer status monitor
   Blinks green during normal operation. Turns ON or OFF to indicate a fault condition.
2. Segment display
   Displays the communication status between PCBs, error codes, and field setting parameters.
3. BS button
   Used to change field settings or check the unit status.
4. DIP switch
   Used to set the configuration (e.g., tonnage) when replacing the PCB.

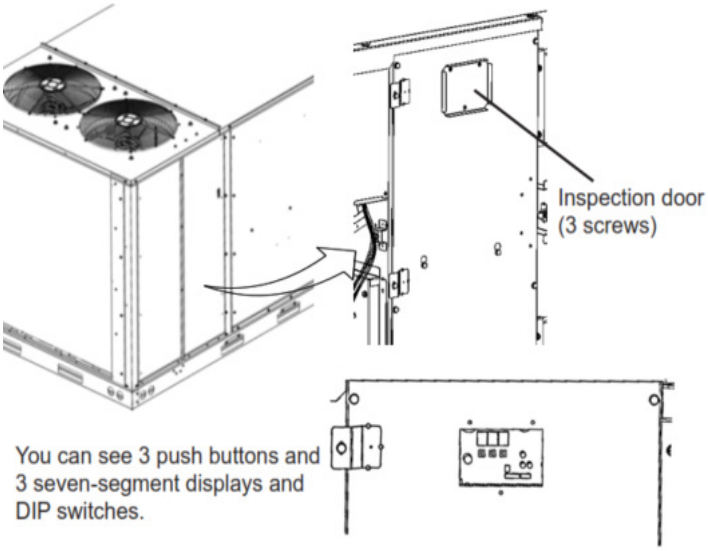
FIELD SETTINGS

The figures below shows the required position of the DIP switches on the spare MAIN PCB.
Be sure to change the DIP switch settings only when the power is turned off.

DIP switch no.	Description	The setting method (■ represents the position of switches)
DS1-1	Do not change.	Do not change. 
DS1-2	Set according to the power supply.	208/230V model  460V model 
DS1-3	Do not change.	Do not change. 
DS1-4	Set according to the refrigerant circuit.	Standard Model  Hot Gas Reheat Model 
DS2-1~3	Set according to the tonnage.	7.5 tons  8.5 tons  10 tons 
DS2-4	Do not change.	Do not change. 

FIELD SETTINGS

Accessing the BS Buttons on the PCB
It is not required to open the complete electronic component box to access the BS buttons on the PCB and read out the seven-segment display(s).



You can see the 3 BS buttons and the 3 seven-segment displays and DIP switches.

Operate the switches and BS buttons with an insulated stick (such as a closed ballpoint pen) to avoid touching of live parts.

OPERATING THE BS BUTTONS AND DIP SWITCHES ON THE PCB

Operating the BS buttons
By operating the BS buttons it is possible to:
- Perform special actions (Evacuation mode, test operation, etc.).
- Perform field settings (Sensor configuration, demand operation, etc.).

Below procedure explains how to operate the BS buttons to reach the required mode in the menu, select the correct setting and modify the value of the setting. This procedure can be used any time special settings and regular field setting are discussed in this manual.

Setting definition: [A-B] → C
A: mode
B: setting
C: setting value
A, B and C are numerical values for field settings.
Parameter C has to be defined. It can be a chosen from a set (0, 1, 2, 3, 4, 5,…) or regarded as an ON/OFF (1 or 0) depending on the contents. This is informed when the field setting is explained.

IMPORTANT NOTE: DURING SPECIAL OPERATION (E.G., TEST OPERATION, ETC.) OR WHEN A FAULT OR ALARM HAPPENED, INFORMATION WILL CONTAIN LETTERS AND NUMERICAL VALUES.

Initialization: default Situation
Turn ON the power supply of the unit.
When the communication between all PCBs is established and normal, the segment indication state will be as below (default situation when shipped from factory).

When turning ON the power supply, the display blinks ON and OFF. First checks of the power supply are executed (1 - 2 minutes).

When no trouble occurs: lighted as indicated (8~10 minutes).

Ready for operation: blank display indication as indicated.

When above situation cannot be confirmed after 12 minutes, the error code can be checked on the indoor unit user interface and the outdoor unit segment display. Solve the error code accordingly. The communication wiring should be checked at first.

IMPORTANT NOTE: BE SURE TO TURN THE POWER ON AT LEAST 6 HOURS BEFORE OPERATION IN ORDER TO HAVE POWER RUNNING TO THE CRANKCASE HEATER.

Accessing modes
The MODE (BS1) button is used to change the mode you want to access.
- Access mode 1
  Press the MODE (BS1) button once. Segment indication changes to:

- Access mode 2
  Press the MODE (BS1) button for at least 5 seconds. Segment indication changes to:

IMPORTANT NOTE: IF YOU GET CONFUSED IN THE MIDDLE OF THE PROCESS, PRESS THE MODE (BS1) BUTTON. THEN IT RETURNS TO IDLE SITUATION (NO INDICATION ON SEGMENT DISPLAYS: BLANK).

FIELD SETTINGS

Mode 1
Mode 1 is used to set basic settings and to monitor the status of the unit.

- Changing and access the setting in mode 1:
  Once mode 1 is selected (press the **MODE (BS1)** button once), you can select the wanted setting. It is done by pressing the **SET (BS2)** button. Accessing the selected setting's value is done by pressing the **RETURN (BS3)** button once.
- To quit and return to the initial status, press the **MODE (BS1)** button.

Example:
Checking the content of parameter [1-10] (to know how many indoor units are connected to the system).

Mode: 1
Setting: 10

- Make sure the segment indication is displayed in operational default mode as shipped from factory.
- Press the **MODE (BS1)** button once; result segment display:

Result: mode 1 is accessed.

Press the **SET (BS2)** button 10 times; result segment display:

Result: mode 1 setting 10 is addressed.

- Press the **RETURN (BS3)** button once; the value which is returned (depending on the actual field situation), is the amount of indoor units which are connected to the system. In VRV system, multiple indoor units are detected, whereas a package unit always displays 1.

Result: mode 1 setting 10 is addressed and selected, return value is monitored information.

- To leave the monitoring function, press the **MODE (BS1)** button once, you will return to the default situation when shipped from factory

Mode 2
Mode 2 is used to set field settings of the unit.

- Changing and access the setting in mode 2:
  Once mode 2 is selected (press the **MODE (BS1)** button for more than 5 seconds), you can select the wanted setting. It is done by pressing the **SET (BS2)** button.
  Accessing the selected setting's value is done by pressing the **RETURN (BS3)** button once.
- To quit and return to the initial status, press the **MODE (BS1)** button.
- Changing the value of the selected setting in mode 2:
  - Once mode 2 is selected (press the **MODE (BS1)** button for more than 5 seconds) you can select the wanted setting. It is done by pressing the **SET (BS2)** button.
  - Accessing the selected setting's value is done by pressing the **RETURN (BS3)** button once.
  - Now the **SET (BS2)** button is used to select the required value of the selected setting.
  - When the required value is selected, you can define the change of value by pressing the **RETURN (BS3)** button once.
  - Press the **RETURN (BS3)** button again to start operation according to the chosen value.

Example:
Checking the content of parameter [2-81] (to define the eco comfort setting under cooling operation).

Mode: 2
Setting: 81

Make sure the segment indication is as during normal operation (default situation when shipped from factory).

- Press the **MODE (BS1)** button for over 5 seconds; result segment display:

Result: mode 2 accessed.

- Press the **SET (BS2)** button 81 times; result segment display:

Result: mode 2 setting 81 is addressed.

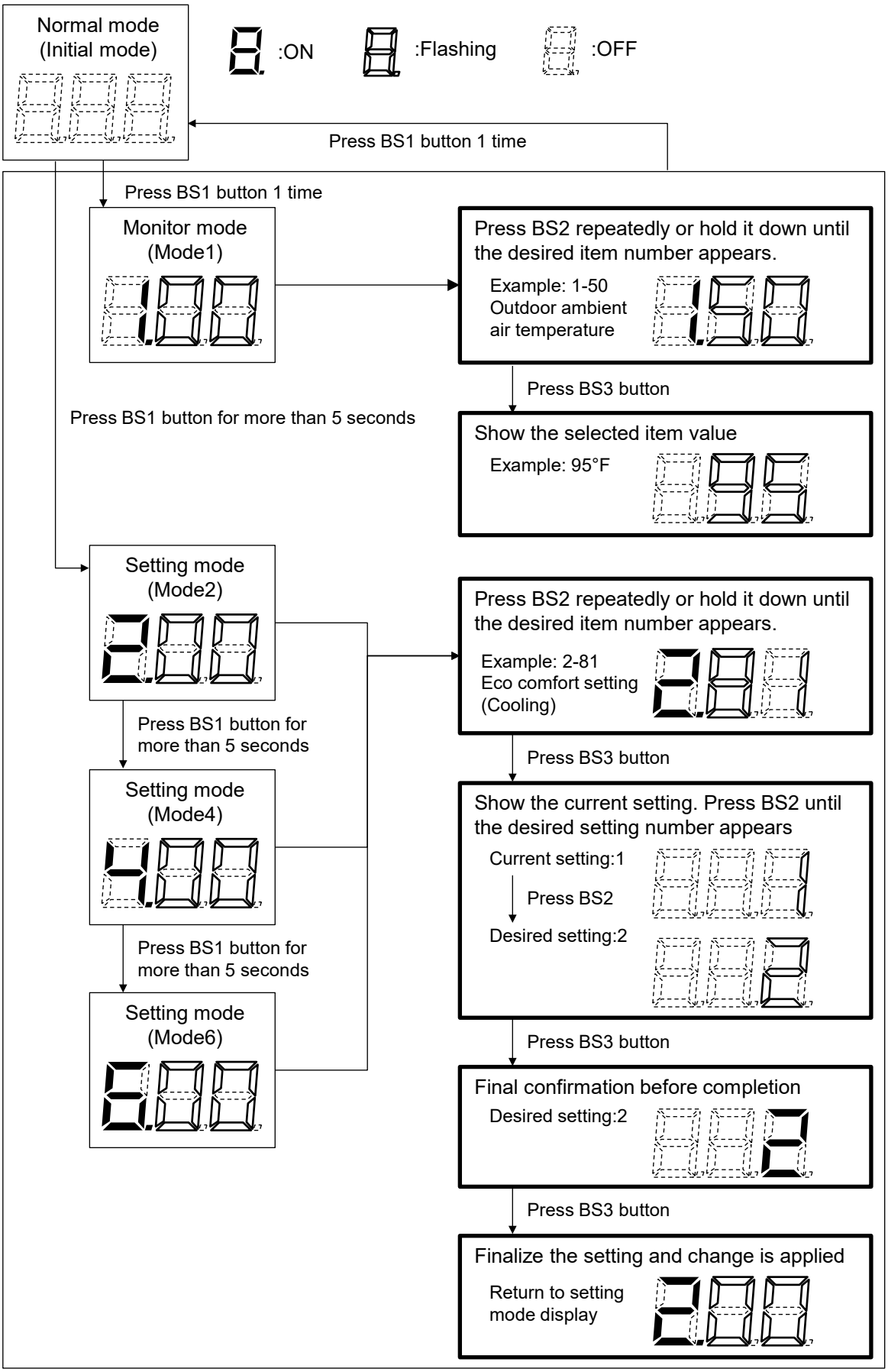
- Press the **RETURN (BS3)** button once; the value which is returned (depending on the actual field situation), is the status of the setting. In the case of [2-81], default value is "1", which means ‘Mild’.

Result: mode 2 setting 81 is addressed and selected, return value is the current setting situation.

- To change the value of the setting, press the **SET (BS2)** button until the required value appears on the segment indication. When achieved, define the setting value by pressing the **RETURN (BS3)** button once. To start operation according to the chosen setting, confirm again by pressing the **RETURN (BS3)** button.
- To leave the field setting, press the **MODE (BS1)** button once, you will return to the default situation when shipped from factory.

Mode 4 and 6
Mode 4 and 6 are also used to set field settings of the unit.
When in mode2, pressing BS1 for more than 5 seconds allows access to mode4.
When in mode4, pressing BS1 for more than 5 seconds allows access to mode6.
For selecting setting and changing value, refer to the description of mode2.

FIELD SETTINGS



FIELD SETTINGS

Monitoring Function

Mode 1 on MAIN PCB (A1P) can be used to monitor the current status and some field settings of the unit. The following shows what is displayed on the segment display in each setting address.

[1-2] shows the status of power consumption limitation operation.
0: unit is currently not operating under power consumption limitations
1: unit is currently operating under power consumption limitation

Power consumption limitation reduces the power consumption of the unit compared to nominal operating conditions.
Power consumption limitation can be activated via Hero Cloud.

[1-5]: shows the current Te target parameter position.
[1-6]: shows the current Tc target parameter position.
[1-9]: shows the AIRNET address.
[1-17]: shows the most recent error code.
[1-18]: shows the 2nd most recent error code.
[1-19]: shows the 3rd most recent error code.
When the most recent error codes were reset by accident on the unit user interface, they can be checked again through these monitoring functions.

[1-40]: shows the current cooling comfort setting.
[1-41]: shows the current heating comfort setting.
[1-42]: shows the High-pressure transducer (HPTR) reading (psi).
[1-43]: shows the Suction pressure transducer (SPTR) reading(psi).
[1-47]: shows the compressor 1 discharge thermistor reading (°F).
[1-48]: shows the compressor 2 discharge thermistor reading (°F).
[1-49]: shows the compressor body thermistor reading (°F).
[1-50]: shows the outdoor ambient air thermistor reading (°F).
[1-51]: shows the compressor suction thermistor reading (°F).
[1-52]: shows the subcool heat exchanger gas thermistor reading (°F).
[1-53]: shows the accumulator inlet thermistor reading (°F).
[1-55]: shows the defrost thermistor reading (°F).
[1-56]: shows the compressor run time (hour divided by 100).

FIELD SETTINGS

Field Settings

The unit configuration can be changed through the field settings.
Field settings can be configured via either the Outdoor Control Box PCB or a remote controller equipped with setting functions (e.g., BRC1NRV series). Ensure that the unit is in the “Ready for operation” state, as indicated on the segment display of the Outdoor Control Box, before proceeding with the configuration. The following section outlines the unit operation and provides detailed information on each configurable setting.
If the field settings are changed from a device other than the BRC controller, please reset the main power after completing the setting. If the main power is not reset, the changes may not be applied.

Field Setting List

This overview shows the available settings.

Example

Setting address		Setting contents	Description	Setting details
PCB	2-05	Indoor blower forced H tap	Force the blower speed at H tap	**0:Normal operation**
RC	4A-05			1:Forced H tap

Setting address
PCB : Outdoor control box PCB (A1P)
RC : Remote controller (e.g., BRC1NRV series)

Explanation of setting numbers and their meanings.
Bold and underlined means the default setting

Setting address		Setting contents	Description	Setting details
PCB	2-05	Indoor blower forced H tap	Force the blower speed at H tap	0:Normal operation 1:Forced H tap
RC	4A-05			
PCB	2-06	Forced operation	When Forced ON, the unit starts operation forcefully.	0:Normal operation 1:Forced ON
RC	4A-06			
PCB	2-13	AIRNET address	The AIRNET address is set to the specified number	0 ~ 63
RC	4A-13			
PCB	2-21	Refrigerant Recovery / Evacuation Mode	When ON, all valves are opened without compressor running.	0:OFF 1:ON
RC	-			
PCB	2-28	Power transistor check	Used to troubleshoot the DC compressor by outputting inverter waveforms without compressor connection to identify whether The fault is in the compressor or INVERTER PCB.	0:OFF 1:ON (10Hz)
RC	4A-28			
PCB	2-37	Heat pump Lockout	Set the Heat Pump Lockout to Enabled or Disabled	0:Disabled 1:Enabled
RC	4A-37			
PCB	2-39	Heating Lockout Setpoint	Set the Heating Lockout Setpoint	0:26.1°C(79 °F) ~ 29: 10°C(50°F) Increasing the setting by 1 lowers the setpoint by 0.56°C(1 °F)
RC	4A-39			
PCB	2-40	Cooling Lockout Setpoint	Set the Cooling Lockout Setpoint	0:Lockout disabled1: -6.67°C(20°F) ~ 41:15.56°C(60°F)Increasing the setting by 1 increase the setpoint by 0.56°C(1 °F)
RC	4A-40			
PCB	2-49	Blower Tap During Hot Start	Change the blower speed during the hot start operation	0:OFF 1:Minimum 2:Low 3:Medium 4:High 5:Speed set by the controller
RC	4A-49			
PCB	2-50	Blower Tap During Defrost	Change the blower speed during the defrost operation	0:OFF 1:Minimum 2:Low 3:Medium 4:High 5:Speed set by the controller
RC	4A-50			
PCB	2-62	Cooling/Heating Capacity Learning	Adjust cooling and heating capacity learning control	0:OFF 1:Cooling adjustment 2: Heating adjustment 3: Both Cooling and Heating adjustment
RC	4A-62			

FIELD SETTINGS

Setting address		Setting contents	Description	Setting Details
PCB	2-78	Heat Pump Lockout Temperature	Set the activation temperature for the Heat Pump Lockout	0:-26.1°C(-15 °F) ~ 65: 10°C(50°F) (in 0.56°C(1°F) increments) 66: Always heat pump lockout
RC	4A-78			
PCB	2-79	Heat Pump Lockout Differential	Adjust the temperature differential to release the Heat Pump Lockout	0:2.8°C(5 °F) 1: 5.6°C(10°F) 2: 8.3°C(15°F)
RC	4A-79			
PCB	2-81	Cooling Comfort Setting	Adjust how quickly the temperature approaches the setpoint.	0:Eco 1:Mild 2:Quick 3:Powerful Higher numbers reach the set temperature faster, but decrease energy efficiency.
RC	4A-81			
PCB	2-82	Heating Comfort Setting	Adjust how quickly the temperature approaches the setpoint.	0:Eco 1:Mild 2:Quick 3:Powerful Higher numbers reach the set temperature faster, but decrease energy efficiency.
RC	4A-82			
PCB	2-89	Intermittent Fan Operation	Activate the outdoor fan (CM1,2) intermittent operation	0:OFF 1:ON at medium speed 2:ON at high speed If ON, the outdoor fan operates for 1 minute following a 30-minute stop while the compressor is off.
RC	4A-89			
PCB	2-92	Te Target Temperature Upper Limit	Set the target evaporating temperature upper limit for cooling operation	0:L 1:M 2:H
RC	4A-92			
PCB	2-97	Electric Heat Lockout Setpoint	Set the outdoor temperature to release Electric Heat Lockout	0:-17.7°C(0°F) ~ 7: 1.6°C(35°F) ~ 13: 18.3°C(65°F) (in 2.8°C(5°F) increments) 14: Forced Lockout 15: Disabled
RC	4A-97			
PCB	2-98	Electric Heat Lockout Differential	Set the temperature differential for activating Electric Heat Lockout.	0:2.8°C(5 °F) 1: 5.6°C(10°F) 2: 8.3°C(15°F)
RC	4A-98			
PCB	4-02	Indoor Temperature Selection	Select the indoor temperature reference used for unit control	2: Space/Return temperature sensor 3: Temperature sensor on remote controller 4: BACnet [AV69]
RC	20-02			
PCB	4-03	Trigger Of Filter Cleaning Sign	Determine the conditions for displaying a filter cleaning notification on the controller.	1: Timer 2:Dirty filter switch (Accessory needed) 3: Either timer or switch 4:Function disabled
RC	20-03			
PCB	4-04	Filter Cleaning Sign Timer	Set the timer duration when Timer is selected.	1: 500 hours ~ 4:2000 hours ~ 10:5000 hours (in 500 hours increments)
RC	20-04			
PCB	4-12	Blower Speed % Tens Place Value	Set the tens digit of the blower speed percentage.	1:1 ~ 9:9 The setting number corresponds to the value set.
RC	20-12			
PCB	4-13	Blower Speed % Ones Place Value	Set the ones digit of the blower speed percentage.	1:1 ~ 9:9, 10:0 For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	20-13			
PCB	4-14	Blower Speed % First Decimal Place Value	Set the first decimal digit of the blower speed percentage.	1:1 ~ 9:9, 10:0 For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	20-14			
PCB	4-19	Heating Type / Heat Operation During Defrost	Define the heater operation type and the operation of electric heat during defrost.	Heating type | 1&3 : Backup only 2&4: Auxiliary and Backup Heat Operation During Defrost | 1&2: Prohibited 3&4: Permitted
RC	21-03			
PCB	4-20	Backup Heater Operation During Demand Control	Define the operation of the backup heater during demand control.	1: Permitted 2:Prohibited
RC	21-04			
PCB	4-22	Electric Heat Stage	Set the electric heat type	1: No electric heat 4: 1stage 5: 2stage 6:Modulating
RC	21-06			

FIELD SETTINGS

Setting Address		Setting Contents	Description	Setting details
PCB	4-24	Heater Capacity Tens Place Value	Set the tens digit of the Electric heat capacity	1:1 ~ 9:9, 10:0 For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	21-08			
PCB	4-25	Heater Capacity Ones Place Value	Set the ones digit of the Electric heat capacity	1:1 ~ 9:9, 10:0 For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	21-09			
PCB	4-26	Heater Capacity First Decimal Place Value	Set the first decimal digit of the Electric heat capacity	1:1 ~ 9:9, 10:0 For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	21-10			
PCB	4-33	External On/Off Input	Define the unit response when an external input is received at the T1/T2 terminals.	1: Forced OFF 2: ON/OFF Operation3:System/Equipment protection
RC	22-01			
PCB	4-34	Thermostat ON/OFF Differential	Defines the temperature deviation from the setpoint at which the thermostat turns ON or OFF.	1: 1°C(1.8°F) 2: 0.5°C(0.9°F)
RC	22-02			
PCB	4-35	Blower Tap At Heating Thermo-Off	Set the blower tap when the thermostat-OFF (Heating mode).	1: Minimum(LLtap) 2:Setting tap on the controller 3: OFF
RC	22-03			
PCB	4-36	Setting of Operation Mode to AUTO	Sets the differential for switching between heating and cooling when the operating mode is set to Auto.	1: 0°C(0°F) ~ 8:7°C(12.6°F) (In 1°C(1.8°F) increments)
RC	22-04			
PCB	4-37	Auto Restart after Power Restore	Defines whether the unit automatically restarts operation after power is restored.	1: Not restart 2: Automatically restart
RC	22-05			
PCB	4-38	Blower Tap At Cooling Thermo-Off	Set the blower tap when the thermostat-OFF (Cooling mode).	1: Minimum(LLtap) 2:Setting tap on the controller 3: OFF
RC	22-06			
PCB	4-75	Maximum Optimum Start Time	Define how many minutes in advance of the scheduled ON time Optimum Start can begin.	1:15minutes ~ 4:60 minutes ~ 8:120 minutes(in 15 minutes increments)
RC	24-11			
PCB	4-77	Maximum Optimum Stop Time	Define how many minutes in advance of the scheduled OFF time Optimum Stop can begin.	1:5minutes ~ 2:10 minutes ~ 8:40 minutes(in 5 minutes increments)
RC	24-13			
PCB	4-78	Comfortable Range	Define the allowable deviation of the room temperature from the setpoint during Optimum Stop.	1: 0.56°C(1°F), 2: 1.1°C(2°F) ~ 8: 4.4°C(8°F)(in 0.56°C(1°F) increments)
RC	24-14			
PCB	4-95	RDS Leak Operation Test Mode	Start the test operation for system response when a refrigerant leak is detected.	1: OFF 2: ON
RC	25-15			
PCB	6-00	Supply Air Temperature Offset	Offset the sensor reading based on this setting	1: -3.9°C(-7 °F) ~ 8: 0°C(0 °F) ~ 15: +3.9°C(+7 °F)(in 0.56°C(1°F) increments)
RC	40-00			
PCB	6-01	Outdoor Air Temperature Offset	Offset the sensor reading based on this setting	1: -3.9°C(-7 °F) ~ 8: 0°C(0 °F) ~ 15: +3.9°C(+7 °F)(in 0.56°C(1°F) increments)
RC	40-01			
PCB	6-02	Outdoor Air Humidity Offset	Offset the sensor reading based on this setting	1: -7 % ~ 8: 0% ~ 15: +7%(in 1% increments)
RC	40-02			
PCB	6-03	Space/Return Air Temperature Offset1	Offset the sensor reading based on this setting	1: -3.9°C(-7 °F) ~ 8: 0°C(0 °F) ~ 15: +3.9°C(+7 °F)(in 0.56°C(1°F) increments)
RC	40-03			
PCB	6-04	Space/Return Air Temperature Offset2	Offset the sensor reading based on this setting	1: 0°C(0 °F) ~ 6: +0.5°C(+0.28 °F)(in 0.1°C(0.056°F) increments)
RC	40-04			
PCB	6-05	Space/Return Air Humidity Offset	Offset the sensor reading based on this setting	1: -7 % ~ 8: 0% ~ 15: +7%(in 1% increments)
RC	40-05			
PCB	6-06	Duct Static Pressure Offset	Offset the sensor reading based on this setting	1: -0.14" ~ 8: 0" ~ 15: +0.14"(in 0.2" increments)
RC	40-06			
PCB	6-07	CO2 Sensor Offset	Offset the sensor reading based on this setting	1: -140 ppm ~ 8: 0 ppm ~ 15: +140ppm(in 20ppm increments)
RC	40-07			

FIELD SETTINGS

Setting address		Setting contents	Description	Setting details
PCB	6-08	Outdoor Temperature / Humidity Selection	Select the source for outdoor temperature and humidity	Temperature / Humidity 1: default ambient sensor / None 2: default ambient sensor / BACnet [AV72] 3: Economizer inlet sensor / None 4: Economizer inlet sensor / Economizer inlet sensor 5: Economizer inlet sensor / BACnet [AV72] 6: BACnet [AV71] / None 7: BACnet[AV71] / BACnet [AV72]
RC	40-08			
PCB	6-09	Indoor Humidity Selection	Select the indoor humidity reference used for controlling HGRH and the economizer.	1: Sensor connected to PCB(A8P) 2: BACnet [AV70]
RC	40-09			
PCB	6-10	CO2 Sensor Selection	Select CO2 concentration reference used for controlling the economizer.	1: No Sensor 2: Sensor connected to PCB(A8P) 3: BACnet [AV73]
RC	40-10			
PCB	6-11	Supply Air Temperature Sensor	Select supply air temperature reference used for controlling multizone VAV.	1: No Sensor 2: Sensor connected to PCB(A8P)
RC	40-11			
PCB	6-16	Damper Presence / Type / Economizer Cooling Trigger	Configure damper presence, damper type, and the activating condition for economizer cooling.	Presence | 1: No 2~7: Yes Type | 2: 2-Position damper 3~7: Economizer damper Economizer cooling trigger | 3: Always disabled 4:Fixed DB 5: Differential DB 6: Fixed Enthalpy 7: Differential Enthalpy
RC	41-00			
PCB	6-17	Fixed / Differential Dry Bulb Setpoint	Define the Fixed Dry Bulb Setpoint and Differential Dry Bulb Setpoint	Fixed DB | 1:15.6°C(60°F) ~ 5: 17.8°C(64°F) ~ 14: 22.8°C(73°F) (in 0.56°C(1°F) increments) 15: BACnet [AV38] Differential DB | 1:1.1°C(2°F) ~ 5:2.2°C(4°F) ~ 14:4.7°C(8.5°F) (in 0.28°C(0.5°F) increments) 15: BACnet [AV39]
RC	41-01			
PCB	6-18	Fixed / Differential Enthalpy Setpoint	Define the Fixed Enthalpy Setpoint and Differential Enthalpy Setpoint	Fixed Enthalpy | 1: 25.2 Btu/lb ~ 8:26.6 Btu/lb ~14: 27.8 Btu/lb (in 0.2Btu/lb increments) 15: BACnet [AV40] Differential Enthalpy | 1: 0.5Btu/lb ~ 8:4.0Btu/lb ~ 7.0Btu/lb (in 0.5Btu/lb increments) 15: BACnet [AV41]
RC	41-02			
PCB	6-19	High Tap Minimum Position (HMP)	Set the minimum position of the damper when the blower is operating in Htap	1: 5% ~ 4:20% ~ 14:70% (in 5% increments) 15:BACnet(AV42)
RC	41-03			
PCB	6-20	Medium Tap Minimum Position (MMP)	Set the minimum position of the damper when the blower is operating in Mtap	1: Calculation, 2: HMP+5% ~ 14:HMP+65%, (in 5% increments) 15:BACnet(AV43)
RC	41-04			
PCB	6-21	Low Tap Minimum Position (LMP)	Set the minimum position of the damper when the blower is operating in Ltap	1: Calculation, 2: MMP+5% ~ 14:MMP+65%, (in 5% increments) 15:BACnet(AV44)
RC	41-05			
PCB	6-22	Low Limit Position	Define the lower limit of the damper opening.	1: 0% ~ 6: 10% (in 2% increments)
RC	41-06			
PCB	6-23	High Limit Position	Define the higher limit of the damper opening.	1: 100% ~ 10: 10% (in 10% increments)
RC	41-07			
PCB	6-24	CO2 Setpoint	Define the target CO2 concentration at which the system maintains minimum DCV.	1: 300ppm ~ 4: 600ppm ~ 14:1600ppm (in 100ppm increments) 15: BACnet [AV34]
RC	41-08			
PCB	6-25	CO2 Band	Define the range above the setpoint over which the damper gradually opens to increase ventilation.	1: 50ppm ~ 8: 400ppm ~ 14:700ppm (in 50ppm increments) 15: BACnet [AV35]
RC	41-09			
PCB	6-26	DCV Ratio	Define the ratio between the Minimum Position and the Minimum DCV position.	1: 0% ~ 6: 25% ~ 15: 70% (in 5% increments)
RC	41-10			

FIELD SETTINGS

Setting address		Setting contents	Description	Setting details
PCB	6-27	CO2 Concentration Alarm Enable / Offset	Configure the CO2 alarm enable/disable and the threshold above CO2 Setpoint for alarm activation.	Enable/Disable | 1: Disable 2~15: Enable Offset | 2: 50 ppm ~ 15: 700 ppm (in 50ppm increments)
RC	41-11			
PCB	6-28	Cooling Ventilation Lockout Setpoint	Determine the outdoor air temperature threshold above which the damper closes during cooling.	1: Heating Ventilation Lockout disabled 2: 51.7°C(125°F) ~ 12: 21.1°C(70°F) (In 2.8°C(5°F) increments)
RC	41-12			
PCB	6-29	Heating Ventilation Lockout Setpoint	Determine the outdoor air temperature threshold below which the damper closes during heating.	1: Heating Ventilation Lockout disabled 2: -23.3°C(-10°F) ~ 14: 10°C(50°F) (In 2.8°C(5°F) increments) 15: 15.6°C(60°F)
RC	41-13			
PCB	6-30	Economizer Test Mode	Enable / disable the test mode and set the economizer damper position to a specified value while the test mode is enabled and blower runs.	1: Test mode OFF 2: Test mode ON at 5% ~ 15:Test mode ON at 70% (in 5% increments)
RC	41-14			
PCB	6-31	Power exhaust activation condition	Define the operating conditions for the optional power exhaust.	1: None 2: During Economizer cooling 3: During minimum position or higher 4:Always
RC	41-15			
PCB	6-32	Static Pressure Setpoint	Set the duct static pressure as the target value for Multizone VAV blower operation.	2: 0.8" ~ 14: 2.0" (in 0.2" increments) 15: BACnet[AV45]
RC	42-00			
PCB	6-33	Temperature Control Object (Multizone VAV)	Select the temperature reference (indoor or supply air) for compressor control during Multizone VAV operation.	1: Indoor air temperature 2: Supply air temperature
RC	42-01			
PCB	6-34	Supply Air Setpoint (Cooling)	Set the cooling supply air temperature setpoint of multizone VAV configuration	1: 10°C(50°F) ~ 8:13.9°C(57°F) ~ 14:17.2°C(63°F) (In 0.56°C(1°F) increments) 15: BACnet[AV36]
RC	42-02			
PCB	6-35	Supply Air Setpoint (Heating)	Set the heating supply air temperature setpoint of multizone VAV configuration	1: The same setpoint as cooling 2: 24.4°C(76°F) ~ 14:37.8°C(100°F) (In 1.1°C(2°F) increments) 15: BACnet[AV37]
RC	42-03			
PCB	6-36	Thermostat ON/OFF Differential for SAT Control	Sets the differential for switching the thermostat ON and OFF during SAT control.	a | 1~3:0.6°C(1°F) 4~6:1.1°C(2°F) 7~9:1.7°C(3°F) b | 1,4,7:0.6°C(1°F) 2,5,8:1.1°C(2°F) 3,6,9:1.7°C(3°F)
RC	42-04			
PCB	6-39	HGRH Humidity Control Target	Determines the basis for evaporating temperature control during dehumidification operation in the hot gas reheat mode.	1: Relative Humidity 2: Leaving coil temperature
RC	42-07			
PCB	6-40	SA Adjustment	Select the method for determining the HGRH supply air temperature.	1: Auto 2: Fixed
RC	42-08			
PCB	6-41	HGRH Dehumidify Condition	Defines the conditions for initiating reheat dehumidification operation in the hot gas reheat model.	1: When the humidity is higher than the humidity setpoint 2: Always 3: When the cooling thermostat ON
RC	42-09			
PCB	6-42	Humidity Setpoint	Set the HGRH humidity setpoint	1: 40% ~ 8: 75% (In 5% increments) 9: Setting value on the controller 10: BACnet [AV33]
RC	42-10			
PCB	6-43	SA Setpoint	Set the supply air temperature setpoint of HGRH or HGRH + multizon-VAV configuration	1: 12°C(53.6°F) ~ 9: 20°C(68°F) ~ 15:26°C(78.8°F) (In 1°C(1.8°F) increments)
RC	42-11			
PCB	6-44	Dehumidification Differential	Defines how far the indoor humidity must deviate from the setpoint to trigger dehumidification ON or OFF.	a | 1~3: 5% 4~6:10% b | 1,4: 5% 2,5:10% 3,6:0%
RC	42-12			
PCB	6-45	Leaving Coil Temperature Setpoint	Defines the target air temperature between the indoor coil and the reheat coil.	1: 5°C(41°F) ~ 6:10°C(50°F) ~ 15:19°C(66.2°F) (In 1°C(1.8°F) increments)
RC	42-13			
PCB	6-48	High SAT Alarm Setpoint	Define the supply air temperature (SAT) threshold for the High SAT alarm.	1: 60°C(140 °F) ~ 8: 79.4°C(175 °F) ~ 13: 93.3°C(200 °F) (In 2.8°C(5°F) increments)
RC	43-00			

FIELD SETTINGS

Setting address		Setting contents	Descriptions	Setting details
PCB	6-49	High SAT Alarm Operation / Release Differential	Set the unit response to High SAT alarm and the reset differential from the alarm setpoint.	Response | 1: No alarm 2: Thermostat-Off 3 ~ 11: Continue operation Release Differential | 3: 2.8°C(5 °F) ~ 11:25°C(45 °F) (In 2.8°C(5°F) increments)
RC	43-01			
PCB	6-50	Low SAT Alarm Setpoint	Define the supply air temperature (SAT) threshold for the Low SAT alarm.	1: 4.4°C(40 °F) ~ 3: 0°C(32 °F) ~ 6: -6.7°C(20 °F) (In 2.2°C(4°F) decrements)
RC	43-02			
PCB	6-51	Low SAT Alarm Operation / Release Differential	Set the unit response to Low SAT alarm and the reset differential from the alarm setpoint.	Response | 1: No alarm 2 ~ 10: Continue operation Release Differential | 2: 1.1°C(2 °F) ~ 10:10°C(18 °F) (In 1.1°C(2°F) increments)
RC	43-03			
PCB	6-52	High Humidity Alarm Setpoint	Define the indoor humidity threshold for the High Humidity alarm.	1: 100% ~ 9: 55% (In 5% decrements) Setting 1 effectively disables this alarm function.
RC	43-04			
PCB	6-53	High Humidity Alarm Delay Timer	Set the duration above the setpoint that triggers the High Humidity alarm.	1: 10 minutes ~ 6: 60 minutes ~ 9: 90 minutes (In 10minutes increments)
RC	43-05			
PCB	6-54	High Humidity Alarm Release Differential	Set the humidity differential below the alarm setpoint for alarm reset.	1: 5%, 2:10% ~ 5:25% (In 5% increments)
RC	43-06			
PCB	6-55	IAT Alarm Enable / Offset	Configure the IAT alarm enable/disable and the threshold above temperature setpoint for alarm activation.	Enable/Disable | 1: Disable 2 ~ 15: Enable IAT Alarm Offset | 2: 2.2°C(4 °F) ~ 15: 16.7°C(30 °F) (In 1.1°C(2°F) increments)
RC	43-07			
PCB	6-56	IAT Alarm Delay Timer	Set the duration that triggers the IAT alarm.	1: 10 minutes ~ 6: 60 minutes ~ 9: 90 minutes (In 10minutes increments)
RC	43-08			

NOTE:

1. Do not make settings other than those described above. Nothing is displayed for functions the indoor unit is not equipped with.
2. **Checking the connection. Please stand by.** may be displayed to indicate the remote controller is resetting when returning to the normal mode.

FIELD SETTINGS

Details of Field Settings

In general, normal operation can be resumed without special intervention after changing field settings.
For some field settings, the value transmitted via BACnet is used when [BACnet] is selected on the field setting. For details, refer to the “Submittal Data Sheet of BACnet communication”.

NOTE: Field settings described in the Functions and Controls section are not included in this section.

Special Operations

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-05	Indoor Blower Forced H Tap	Force the blower speed at H tap	0:Normal operation 1:Forced H tap
RC	4A-05			

Setting [1] will force the indoor blower to operate at high tap.

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-06	Forced Operation	When Forced ON, the unit starts operation forcefully.	0:Normal operation 1:Forced ON
RC	4A-06			

Setting [1] will force the unit to operate.
Ensure to return the setting to the default value when the forced thermostat ON needs to be ended.

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-21	Refrigerant Recovery / Evacuation Mode	When ON, all valves are opened without compressor running.	0:OFF 1:ON
RC	-			

To allow refrigerant recovery, removal of residual substances, or system evacuation, setting [1] fully opens the required valves in the refrigerant circuit to create a clear path for proper recovery or vacuuming.
To stop the Refrigerant Recovery / Evacuation Mode, press the RETURN (BS3) button. If the RETURN (BS3) button is not pressed, the system will remain in Refrigerant Recovery / Evacuation Mode.
This setting cannot be changed from the controller but only from MAIN PCB (A1P)

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-89	Intermittent Fan Operation	Activate the outdoor fan (CM1,2) intermittent operation	0:OFF 1:ON at medium speed 2:ON at high speed If ON, the outdoor fan operates for 1 minute following a 30-minute stop while the compressor is off.
RC	4A-89			

Outdoor fan speed would be increased for assisting to discharge snow on outdoor fan when outdoor fan is stop or low speed.
When set to [ON], the outdoor fan operates for 1 minute following a 30-minute stop while the compressor is off.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-30	Economizer Test Mode	Enable / disable the test mode and set the economizer damper position to a specified value while the test mode is enabled and blower runs.	1: Test mode OFF 2: Test mode ON at 5% ~ 15:Test mode ON at 70%(in 5% increments)
RC	41-14			

To determine the minimum position of the economizer, a test operation mode is provided to check the damper position and ventilation volume on site.
By turning on the Economizer Test Mode and setting the position to a desired value, the damper will open to the specified position when the blower motor is running.

Service / Maintenance

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-28	Power Transistor Check	Used to troubleshoot the DC compressor by outputting inverter waveforms without compressor connection to identify whether The fault is in the compressor or INVERTER PCB.	0:OFF1:ON (10Hz)
RC	4A-28			

Use this function in case error code is displayed related to defective INVERTER PCB or compressor is locked to evaluate the output of the power transistors.

Function:

- INVERTER PCB outputs a 10 Hz sequence through all six transistors. Remove the U/V/W terminals of the compressor and connect them to the inverter checker module. If all six LEDs blink, the transistors are switching correctly.
- When the power transistor check mode is interrupted, two LEDs will light up after the internal power circuit of INVERTER PCB is disconnected, indicating the discharge of DC voltage. Wait until the LEDs turn off before reconnecting the compressor terminals.

Minimum requirements to refer to the result on the inverter checker module:

- All 3 phases and neutral are available.
- INVERTER PCB control is active. Verify that the green LED labeled “HAP” on INVERTER PCB is blinking normally (approximately once per second).
- Disconnect and reconnect power supply control PCB, or
- Forced thermostat ON condition
- Once the LED is blinking on INVERTER PCB, change related setting immediately back to set 0 to deactivate related function.

FIELD SETTINGS

- Diode module generates the required 260 VDC for 208/230V model or 600 VDC for 460V model.

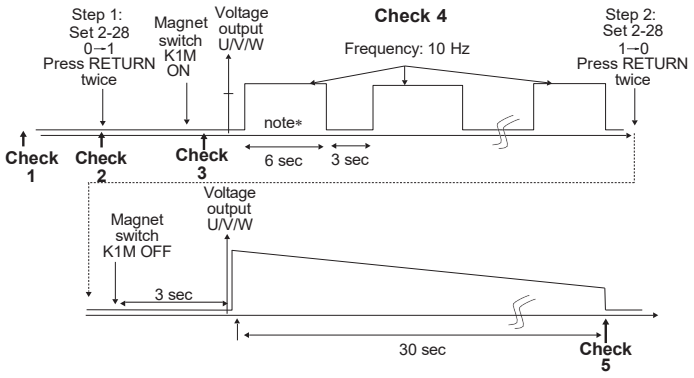
Cautions:

- If the system has more than one compressor, all compressor INVERTER PCBs will perform the power transistor check. In this case, disconnect the U/V/W terminals on all compressors. Avoid accidental contact between the terminals, which could cause a short circuit or ground leakage to the casing.
- To stop the power transistor check mode, return the setting to its default value.
- Output to U/V/W will also stop when MAIN PCB decides standby mode of inverter circuit.

SERVICE / MAINTENANCE

Switching sequence during power transistor check mode:

Power transistor check mode
Disconnect fasten U/V/W from compressor.



Check 1 : AC power input:
at terminal L1B, L2B, L3B for 208/230 V model (Imbalance ≤ 2%.)
at terminal L1B, L2B, L3B for 460 V model (Imbalance ≤ 2%.)
Check 2 : DC voltage:
at connector X3A increases to ±260 VDC for 208/230V model
at connector X3A increases to ±600 VDC for 460V model
Check 3 : DC = 1.42 x VAC power supply at connector X3A.
Check 4 : AC U/V/W 10 Hz intermediate:
check difference within 10 V (at fasten terminal U/V/W)
Check 5 : Voltage drop (discharge capacitors DC)
at connector X3A increases to ±260 VDC for 208/230V model
at connector X3A increases to ±600 VDC for 460V model.

NOTE: ACTUAL VOLTAGE VALUE DEPENDS ON MULTIMETER CHARACTERISTICS: ±57 VAC FOR 208/230V MODEL AND ±115 VAC FOR 460V MODEL.

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-03	Trigger Of Filter Cleaning Sign	Determine the conditions for displaying a filter cleaning notification on the controller.	1: Timer 2:Dirty filter switch (Accessory needed)3: Either timer or switch 4:Function disabled
RC	20-03			
PCB	4-04	Filter Cleaning Sign Timer	Set the timer duration when Timer is selected.	1: 500 hours ~ 4:2000 hours ~ 10:5000 hours(in 500 hours increments)
RC	20-04			

To prevent performance issues or unit failure due to a dirty filter, a reminder for cleaning or replacement is displayed on the remote controller.
The trigger condition can be selected from timer, switch(if installed), or both.

- [Timer]: Sign appears when the indoor blower's accumulated operating time reaches Filter Cleaning Sign Timer.
- [Switch]: Sign appears when the dirty filter switch is activated if it's installed.
- [Both]: Sign appears when either condition is met.

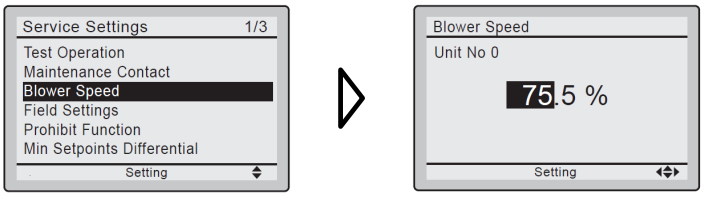
Blower Settings

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-12	Blower Speed % Tens Place Value	Set the tens digit of the blower speed percentage.	1:1 ~ 9:9The setting number corresponds to the value set.
RC	20-12			
PCB	4-13	Blower Speed % Ones Place Value	Set the ones digit of the blower speed percentage.	1:1 ~ 9:9, 10:0For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	20-13			
PCB	4-14	Blower Speed % First Decimal Place Value	Set the first decimal digit of the blower speed percentage.	1:1 ~ 9:9, 10:0For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	20-14			

Blower speed % for High tap can be set.
First, refer to BLOWER PERFORMANCE DATA and select the target blower speed %. A percentage value can be set with three significant figures using the following three field setting parameters.

Example:
If 20-12 = [5], 20-13 = [2], and 20-14 = [8], then the Blower speed % will be 52.8%.
If the above parameters are all set to '1', the value will not be 11.1%, but rather the factory default airflow setting.
Regarding the setting of the units place and the first decimal place, if the field setting is set to 10, the number will be recognized as 0.
If BRC1NRV72 or newer is used as the remote controller blower speed % can be directly adjusted from the service setting menu. Refer to Installation manual of the controller for the detail.

FIELD SETTINGS



Setting address		Setting contents	Descriptions	Setting Details
PCB	4-35	Blower Tap At Heating Thermo-Off	Set the blower tap when the thermostat-OFF (Heating mode).	1: Minimum(LLtap) 2:Setting tap on the controller 3: OFF
RC	22-03			
PCB	4-38	Blower Tap At Cooling Thermo-Off	Set the blower tap when the thermostat-OFF (Cooling mode).	1: Minimum(LLtap) 2:Setting tap on the controller 3: OFF
RC	22-06			

When the system is turned ON, but compressor operation is not required due to no cooling or heating demand(e.g., the indoor temperature is lower than the setpoint during cooling mode), this state is referred to as Thermo-OFF. It is possible to select the blower tap during this state.

On default setting, the blower operates at a selected tap even during cooling thermo-OFF, serving as a circulator to provide a sense of coolness. On the other hand, in heating mode, the default setting is to minimize the blower tap during Thermo-OFF to avoid cold draft.
It is also possible to set the blower airflow to OFF during Thermo-OFF; however, this setting is not recommended if the unit uses the return air temperature as the indoor temperature because turning off the blower may delay the detection of indoor temperature changes while thermo-off, potentially causing the unit to fail to respond appropriately to temperature variations. Caution is advised in such cases. When the unit is used as a multizone VAV system, the blower is turned OFF during Thermo-OFF regardless of the above settings, in order to avoid blower operation while the zoning dampers are closed.

Sensor configuration settings

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-02	Indoor Temperature Selection	Select the indoor temperature reference used for unit control	2: Space/Return temperature sensor 3: Temperature sensor on remote controller 4: BACnet [AV69]
RC	20-02			

The indoor temperature which is mainly used to determine unit operation can be selected.
Depending on the setting, it is possible to switch between the sensor built into the remote controller or the sensor connected to the indoor control box.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-08	Outdoor Temperature / Humidity Selection	Select the source for outdoor temperature and humidity	Temperature / Humidity 1: default ambient sensor / None 2: default ambient sensor / BACnet [AV72] 3: Economizer inlet sensor / None 4: Economizer inlet sensor / Economizer inlet sensor 5: Economizer inlet sensor / BACnet [AV72] 6: BACnet [AV71] / None 7: BACnet[AV71] / BACnet [AV72]
RC	40-08			

The default ambient sensor is installed near the outdoor control box. The economizer inlet sensor refers to the sensor mounted at the outdoor air intake section of the economizer damper. If high-precision control based on the actual temperature of the incoming outdoor air is required, install the economizer inlet sensor and select it accordingly.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-09	Indoor Humidity Selection	Select the indoor humidity reference used for controlling HGRH and the economizer.	1: Sensor connected to PCB(A8P) 2: BACnet [AV70]
RC	40-09			

The indoor humidity is used when controlling dehumidification with the hot gas reheat system or economizer cooling based on air enthalpy. By default, the system is set to use the sensor connected to A8P inside the indoor control box.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-10	CO2 Sensor Selection	Select CO2 concentration reference used for controlling the economizer.	1: No Sensor 2: Sensor connected to PCB(A8P) 3: BACnet [AV73]
RC	40-10			

The space CO2 sensor is mainly used to control the economizer in Demand Control Ventilation (DCV).

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-11	Supply Air Temperature Sensor	Select supply air temperature reference used for controlling HGRH or multizone VAV.	1: No Sensor 2: Sensor connected to PCB(A8P)
RC	40-11			

The supply air temperature sensor is used to control HGRH model or the multizone VAV with supply air temperature control. Set to [2] when using supply air temperature sensor.

FIELD SETTINGS

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-00	Supply Air Temperature Offset	Offset the sensor reading based on this setting	1: -3.9°C(-7 °F) ~ 8: 0°C(0 °F) ~ 15: +3.9°C(+7 °F)(in 0.56°C(1°F) increments)
RC	40-00			
PCB	6-01	Outdoor Air Temperature Offset	Offset the sensor reading based on this setting	1: -3.9°C(-7 °F) ~ 8: 0°C(0 °F) ~ 15: +3.9°C(+7 °F)(in 0.56°C(1°F) increments)
RC	40-01			
PCB	6-02	Outdoor Air Humidity Offset	Offset the sensor reading based on this setting	1: -7 % ~ 8: 0% ~ 15: +7%(in 1% increments)
RC	40-02			
PCB	6-03	Space/Return Air Temperature Offset1	Offset the sensor reading based on this setting	1: -3.9°C(-7 °F) ~ 8: 0°C(0 °F) ~ 15: +3.9°C(+7 °F)(in 0.56°C(1°F) increments)
RC	40-03			
PCB	6-04	Space/Return Air Temperature Offset2	Offset the sensor reading based on this setting	1: 0°C(0 °F) ~ 6: +0.5°C(+0.28 °F)(in 0.1°C(0.056°F) increments)
RC	40-04			
PCB	6-05	Space/Return Air Humidity Offset	Offset the sensor reading based on this setting	1: -7 % ~ 8: 0% ~ 15: +7%(in 1% increments)
RC	40-05			
PCB	6-06	Duct Static Pressure Offset	Offset the sensor reading based on this setting	1: -0.14" ~ 8: 0" ~ 15: +0.14"(in 0.2" increments)
RC	40-06			
PCB	6-07	CO2 Sensor Offset	Offset the sensor reading based on this setting	1: -140 ppm ~ 8: 0 ppm ~ 15: +140ppm(in 20ppm increments)
RC	40-07			

The sensor reading value can be adjusted on site.
If there is a discrepancy between the reading of a field-installed sensor and the sensor connected to the unit's PCB, please use the following offset setting to make adjustments.
The value that defines the unit's operation is calculated as:
[Operation value] = [Sensor reading] + [Offset value]

NOTE: The space /return air temperature has two offset values: Offset1 for coarse adjustment and Offset2 for fine adjustment. The sum of these two values is used as the Offset value.

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-33	External On/Off Input	Define the unit response when an external input is received at the T1/T2 terminals.	1: Forced OFF 2: ON/OFF Operation 3:System/Equipment protection
RC	22-01			

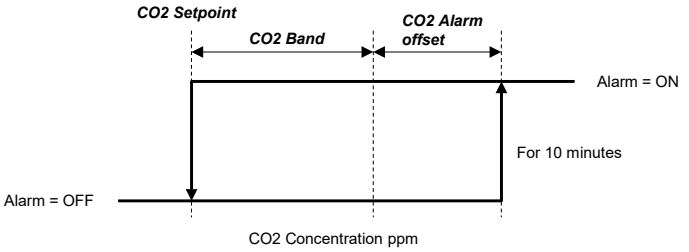
When [Forced OFF] is selected, the unit will be forcibly stopped by connecting the EXTERNAL ON/OFF terminals (A8P-X5M). This forced stop takes the highest priority and will override any required Mitigation Action from the RDS.

When [ON/OFF Operation] is selected, connecting the EXTERNAL ON/OFF terminals (A8P-X5M) will turn the operation ON, and releasing the connection will turn it OFF. This ON/OFF operation is equivalent to the ON/OFF control from the remote controller. Whether the compressor operates depends on the setpoint and the status of the unit.

When [System/Equipment Protection] is selected, connecting the EXTERNAL ON/OFF terminals (A8P-X5M) enables the unit to be operable. If the terminals are released while the unit is ON, the unit will enter a fault state and display Error Code A0-00. In this mode, Mitigation Actions from the RDS take priority.

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-27	CO2 Concentration Alarm Enable / Offset	Configure the CO_2 alarm enable/disable and the threshold above CO_2 Setpoint for alarm activation.	Enable/Disable | 1: Disable 2~15: Enable Offset | 2: 50 ppm ~ 15: 700 ppm (in 50ppm increments)
RC	41-11			

CO2 concentration alarm will be triggered, and Alarm Code A0-21 will be displayed when all the following conditions are met:
-**CO2 Concentration Alarm Enable** = [Enable]
-**CO2 Sensor Selection** ≠ [No Sensor]
-No CO2 Concentration Alarm (CH-07) is active
-CO2 concentration detected by the sensor remains higher than
CO2 Setpoint + CO2 Band + CO2 Alarm Offset
for more than 10 minutes.
This alarm will be cleared when the CO2 concentration drops below the **CO2 Setpoint.**

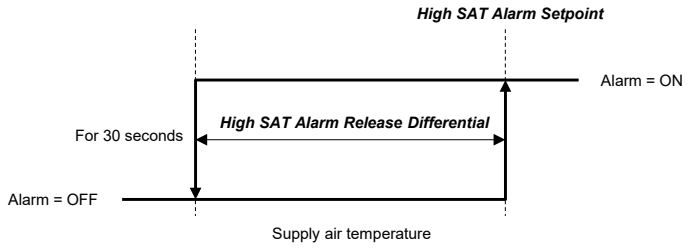


Setting address		Setting contents	Descriptions	Setting Details
PCB	6-48	High SAT Alarm Setpoint	Define the supply air temperature (SAT) threshold for the High SAT alarm.	1: 60°C(140 °F) ~ 8: 79.4°C(175 °F) ~ 13: 93.3°C(200 °F)(In 2.8°C(5°F) increments)
RC	43-00			
PCB	6-49	High SAT Alarm Operation / Release Differential	Set the unit response to High SAT alarm and the reset differential from the alarm setpoint.	Response | 1: No alarm 2: Thermostat-Off 3 ~ 11: Continue operation Release Differential | 3: 2.8°C(5 °F) ~ 11:25°C(45 °F) (In 2.8°C(5°F) increments)
RC	43-01			

If the Supply Air Temperature Sensor detects a value above [High SAT Alarm Setpoint] during heating, the unit operates based on [High SAT Alarm Operation] setting:
[No Alarm]: No action.
[Alarm + Thermo-off]: Displays an alarm and enters Thermo-OFF. The alarm clears when the unit is turned off.
[Alarm + Continue Operation]: Displays an alarm and continues operation.

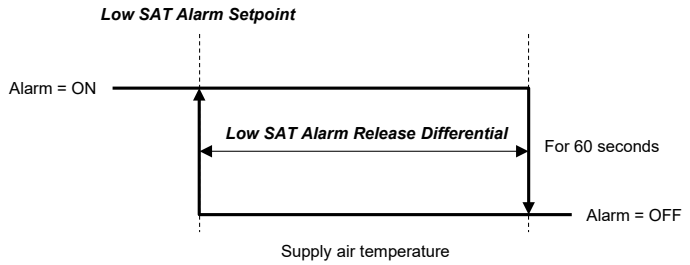
FIELD SETTINGS

The alarm clears when the sensor reads below [High SAT Alarm Setpoint] − [High SAT Alarm Release Differential] for 30 consecutive seconds. Alarm code is A0-22.



Setting address		Setting contents	Descriptions	Setting Details
PCB	6-50	Low SAT Alarm Setpoint	Define the supply air temperature (SAT) threshold for the Low SAT alarm.	1: 4.4°C(40 °F) ~ 3: 0°C(32 °F) ~ 6: -6.7°C(20 °F)(In 2.2°C(4°F) increments)
RC	43-02			
PCB	6-51	Low SAT Alarm Operation / Release Differential	Set the unit response to Low SAT alarm and the reset differential from the alarm setpoint.	Response | 1: No alarm 2 ~ 10: Continue operation Release Differential | 2: 1.1°C(2 °F) ~ 10:10°C(18 °F)(In 1.1°C(2°F) increments)
RC	43-03			

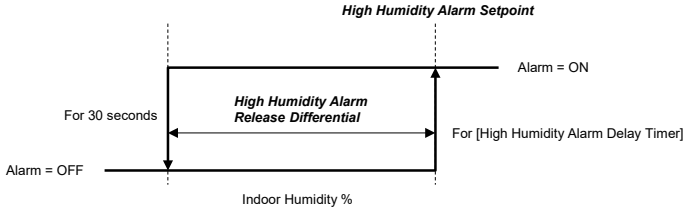
If the Supply Air Temperature Sensor detects a value below [Low SAT Alarm Setpoint] during cooling, the unit operates based on the [Low SAT Alarm Operation] setting:
[No Alarm]: No action.
[Alarm + Continue Operation]: Displays an alarm and continues operation. The alarm clears when the sensor reads above [Low SAT Alarm Setpoint] + [Low SAT Alarm Release Differential] for 60 continuous seconds. Alarm code is A0-23.



Alarm Setting

Setting address		Setting contents	Descriptions	Setting Details
PCB	6-52	High Humidity Alarm Setpoint	Define the indoor humidity threshold for the High Humidity alarm.	1: 100% ~ 9: 55% (In 5% increments) Setting 1 effectively disables this alarm function.
RC	43-04			
PCB	6-53	High Humidity Alarm Delay Timer	Set the duration above the setpoint that triggers the High Humidity alarm.	1: 10 minutes ~ 6: 60 minutes ~ 9: 90 minutes(In 10minutes increments)
RC	43-05			
PCB	6-54	High Humidity Alarm Release Differential	Set the humidity differential below the alarm setpoint for alarm reset.	1: 5%, 2:10% ~ 5:25%(In 5% increments)
RC	43-06			

If the indoor humidity sensor detects a value above [High Humidity Alarm Setpoint] for [High Humidity Alarm Delay Timer] continuous minutes, High Humidity Alarm(A0-24) will be displayed. The alarm clears when the sensor reads below [High Humidity Alarm Setpoint] – [High Humidity Alarm Release Differential] for 30 continuous seconds.



Setting address		Setting contents	Descriptions	Setting Details
PCB	6-55	IAT Alarm Enable / Offset	Configure the IAT alarm enable/disable and the threshold above temperature setpoint for alarm activation.	Enable/Disable | 1: Disable 2 ~ 15: EnableIAT Alarm Offset | 2: 2.2°C(4 °F) ~ 15: 16.7°C(30 °F)(In 1.1°C(2°F) increments)
RC	43-07			
PCB	6-56	IAT Alarm Delay Timer	Set the duration that triggers the IAT alarm.	1: 10 minutes ~ 6: 60 minutes ~ 9: 90 minutes(In 10minutes increments)
RC	43-08			

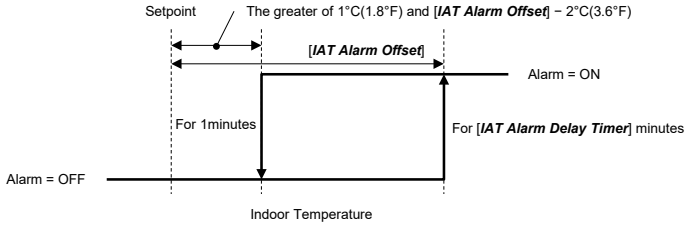
If the indoor temperature deviates from the setpoint on the remote controller for a certain period, the system triggers an Indoor Temperature Alarm and displays Error Code A025 unless IAT Alarm Enable is set to [Disable].
The alarm activates when the indoor temperature stays outside the following threshold range for a duration set by [IAT Alarm Delay Timer]:

- Cooling Mode: Above Setpoint + [IAT Alarm Offset]
- Heating Mode: Below Setpoint − [IAT Alarm Offset]

The alarm is cleared when the indoor temperature returns to within either of the following recovery conditions and remains stable for 1 minute:

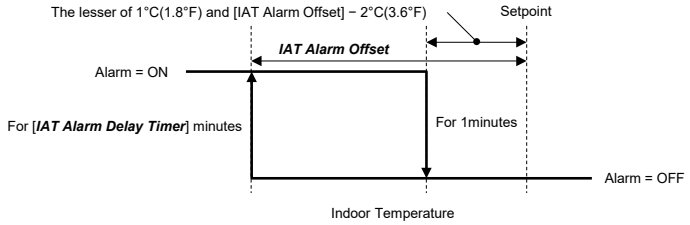
- Cooling Mode: Below Setpoint + 1°C(1.8°F) or Setpoint + [IAT Alarm Offset] − 2°C(3.6°F)
- Heating Mode: Above Setpoint − 1°C(1.8°F) or Setpoint − [IAT Alarm Offset] + 2°C(3.6°F)

Cooling mode



FIELD SETTINGS

Heating mode



Setting address		Setting contents	Descriptions	Setting Details
PCB	4-75	Maximum Optimum Start Time	Define how many minutes in advance of the scheduled ON time Optimum Start can begin.	1:15minutes ~ 4:60 minutes ~ 8:120 minutes(in 15 minutes increments)
RC	24-11			
PCB	4-77	Maximum Optimum Stop Time	Define how many minutes in advance of the scheduled OFF time Optimum Stop can begin.	1:5minutes ~ 2:10 minutes ~ 8:40 minutes(in 5 minutes increments)
RC	24-13			
PCB	4-78	Comfortable Range	Define the allowable deviation of the room temperature from the setpoint during Optimum Stop.	1: 0.56°C(1°F), 2: 1.1°C(2°F) ~ 8: 4.4°C(8°F)(in 0.56°C(1°F) increments)
RC	24-14			

This unit has Optimum start / stop function if BRC1NRV72 or newer is used as remote controller.
The optimum start function will start the unit operation prior to the scheduled occupancy time to ensure that the space/return temperature is close to the setpoint at the scheduled occupancy time. This is intended to reduce energy consumption by removing the need to set the time schedule to be occupied at a fixed time prior to actual expected occupancy. During optimum start operation, the unit operates to maintain the setpoint. The economizer damper will stay closed unless the economizer cooling mode is active.

The parameter **[Maximum Optimum Start Time]** should be set to a value equal to the typical fixed start-ahead time for the space (the time the system normally starts before occupancy). The calculated start time considers the current indoor temperature, setpoint, and the Outdoor air temperature.

The optimum stop function will stop Cooling, Heating and Dehumidification operation prior to the scheduled unoccupied time to reduce energy consumption. The amount of time is calculated so that the Space Temperature remains in **[Comfortable Range]** until the scheduled unoccupied time. During this time, the blower operates according to **Blower Tap Setting During Thermo-off** setting. **Maximum Optimum Stop Time** is the earliest that the unit will be allowed to stop. The calculated stop time considers the current indoor temperature, setpoint, and the outdoor air temperature.

Additionally, the unit improves the calculation by adjustment based on the evaluation of the difference between calculated start/stop time and actual time.

Refer to the operation manual of the remote controller for more detail.

Comfortable range is used to define the allowable space temperature during Optimum Stop. In cooling mode, the target temperature is set to setpoint + **[Comfortable range]**, and in heating mode, it is set to setpoint - **[Comfortable range]**. The Optimum Stop time is calculated so that this target temperature is reached at the start of the scheduled unoccupied time. If the space temperature reaches this level during the Optimum Stop period, the unit will resume normal operation.

Setting address		Setting contents	Descriptions	Setting Details
PCB	2-13	AIRNET Address	The AIRNET address is set to the specified number	0 ~ 63
RC	4A-13			

When an AIRNET system is used, the unit needs an AIRNET address. Also to facilitate the recognition of a system in the map layout of the service checker type III, set each system a unique address between 1 and 63.
When duplicating the AIRNET address, UC error code will appear.

Setting address		Setting contents	Descriptions	Setting Details
PCB	4-37	Auto Restart after Power Restore	Defines whether the unit automatically restarts operation after power is restored.	1: Not restart 2: Automatically restart
RC	22-05			

When set to [Not restart], the unit will remain OFF after the power supply is restored.
When set to [Automatically restart], the units that were operating before the power failure will automatically restart operation with the last setting after the power supply is restored.

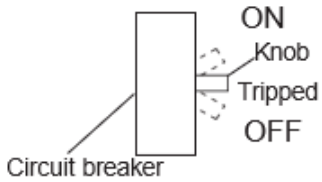
Setting address		Setting contents	Descriptions	Setting Details
PCB	4-24	Heater Capacity Tens Place Value	Set the tens digit of the Electric heat capacity	1:1 ~ 9:9, 10:0For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	21-08			
PCB	4-25	Heater Capacity Ones Place Value	Set the ones digit of the Electric heat capacity	1:1 ~ 9:9, 10:0For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	21-09			
PCB	4-26	Heater Capacity First Decimal Place Value	Set the first decimal digit of the Electric heat capacity	1:1 ~ 9:9, 10:0For settings 1 through 9, the setting number corresponds to the value set. To set 0, enter 10.
RC	21-10			

The unit can transmit its total power consumption to Hero Cloud. If an electric heater is installed, its output capacity need to be configured.
Use the three settings above to set the heater output. For example, when using a 15.0 kW heater, set the tens digit to [1], the ones digit to [5], and the first decimal place to [10].

SERVICE DIAGNOSIS

Symptom-based Troubleshooting

General Troubleshooting

	Symptom		Supposed Cause	Countermeasure
1	The unit does not start operation at all.		Blowout of fuse(s)	Turn OFF the power supply and then replace the fuse (s).
			Cutout of breaker(s)	•If the knob of any breaker is in its OFF position, turn ON the power supply. •If the knob of any circuit breaker is in its tripped position, do not turn ON the power supply. 
			Power failure	After the power failure is reset, restart the unit.
			The connector loose or not fully plugged in	Turn off the power supply to verify the connection of the connector.
2	The unit starts operating but immediately stops.		Blocked air inlet or outlet of indoor or outdoor coils	Remove obstacle(s).
			Clogged air filter(s)	Clean the air filter(s).
3	The unit does not cool or heat the air well.		Blocked air inlet or outlet of indoor or outdoor coils	Remove obstacle(s).
			Clogged air filter(s)	Clean the air filter(s).
			Enclosed unit(s)	Remove the enclosure.
			Improper set temperature	Set the temperature to a proper degree.
			Blower speed set to Low tap	Set it to a proper airflow rate.
			Open window(s) or door(s)	Shut it tightly.
			Ventilation is too much.	Adjust economizer damper position. Utilize Ventilation Lockout if the ambient is extreme condition.
			IN COOLING mode Direct sunlight received	Hang curtains or shades on windows.
			IN COOLING mode Too many persons staying in a room	The model must be selected to match the cooling load.
			IN COOLING mode Too many heat sources (e.g. OA equipment) located in a room	
			IN DRY mode The reason is that the dry operation serves not to reduce the room temperature where possible.	Change to cooling operation.
4	The unit does not operate.	The unit stops and immediately restarts operation.	If the operation lamp on the remote controller turns ON, the unit is normal. These symptoms indicate that the unit is controlled to avoid overloads on the components.	Normal operation. The unit will automatically start operation after a lapse of five minutes.
		Pressing the temperature setting button immediately resets the operation.		
		The unit stops immediately after turning ON the power supply.	The unit is in preparation for the control system.	Wait for a period of approximately one minute.
5	The unit makes intermittent stops.	The remote controller displays error codes U4 or U5, and the unit stops but restarts after a lapse of several minutes.	The unit stops due to an interruption in communication between PCBs caused by electrical noises.	Remove causes of electrical noises. If these causes are removed, the unit will automatically restart operation.

SERVICE DIAGNOSIS

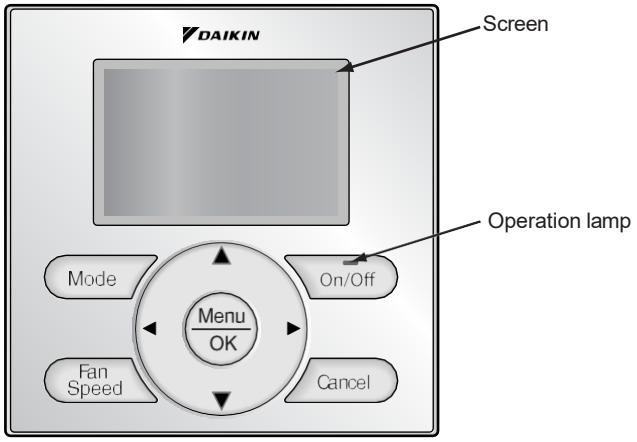
6	COOL/HEAT selection is disabled.	The remote controller displays CENTRAL CONTROL.	This remote controller has no option to select cooling operation.	Use a remote controller with option to select cooling operation.
7	The unit conducts fan operation but not cooling or heating operation.	This symptom occurs immediately after turning ON the power supply.	The system is in preparation mode of operation.	Wait for a period of approximately 10 minutes.
8	The airflow rate is not reproduced according to the blower tap setting.	Even pressing the airflow rate setting button makes no changes in the airflow rate.	In heating, when the room temperature reaches the setpoint, the compressor and the outdoor fans stop while the indoor blower is running at minimum speed to avoid cold air.	Normal operation.
9	A white mist comes out from the unit.	The ambient humidity is high when cooling mode.	Uneven refrigerant distribution in the indoor coil due to heavy stain.	Clean the indoor coil.
		Immediately after the cooling operation stops, the indoor air temperature and humidity are low.	Hot refrigerant that has flowed in the indoor coil results in vapor from the unit.	Normal operation.
		After the completion of defrost operation, the system is switched to heating operation.	Defrosted moisture turns to be vapor and comes out from the units.	Normal operation.
10	The unit produces noise.	Immediately after turning ON the power supply, indoor unit produces ringing sounds.	These are operating sounds of the electronic expansion valve of the indoor unit.	Normal operation. This sound becomes low after a lapse of approximately one minute.
		Hissing sounds are continuously produced while in cooling or defrost operation.	These sounds are produced by the refrigerant flowing through the units.	Normal operation.
		Hissing sounds are produced immediately after the startup or stop of the system, or the startup or stop of defrost operation.	These sounds are produced when the refrigerant stops or changes flow.	Normal operation.
		Pitch of operating sounds changes.	The reason is that the compressor changes the operating frequency.	Normal operation.
11	Dust comes out from the unit.	Dust comes out from the unit when it restarts after the stop for a long time.	Dust, which has deposited on the inside of unit or duct, is blown out from the unit.	Normal operation.
12	Odors come out from the unit.	In operation	Odors of room, cigarettes or else adsorbed to the indoor coil are blown out.	Clean the indoor coil.
13	Outdoor fan does not rotate.	In operation	The reason is that fan speed are controlled to put the operation to the optimum state.	Normal operation.
14	LCD display Checking the connection. Please stand by. appears on the remote controller.	Immediately after turning ON the power supply	The reason is that the system is checking to be sure the remote controller is normal.	Normal operation. This code is displayed for a period of approximately one minute at maximum.
15	The compressor or the outdoor fan does not stop.	After the operation stops	It keeps running to secure the reliable operation at the next startup.	Normal operation. It stops after a lapse of approximately 5 to 10 minutes.
16	The compressor is hot.	While the operation stops	Immediately after the unit stops, residual heat of the compressor may remain, and the crankcase heater warms the compressor to ensure smooth operation at the next startup.	Normal operation.

SERVICE DIAGNOSIS

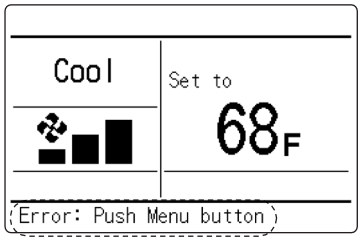
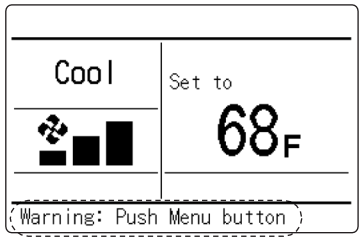
Troubleshooting with Remote Controller

BRC1NRV series

The following will be displayed on the screen when an error (or a warning) occurs during operation. Check the error code and take the corrective action.



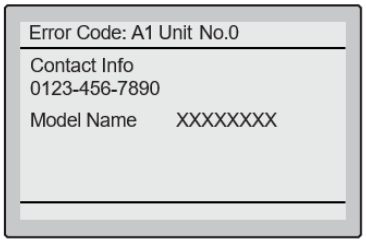
(1) Checking an error or warning.

	Operation Status	Display	
Abnormal shutdown	The unit stops operating.	The operation lamp (green) starts to blink. The message Error: Push Menu button will blink at the bottom of the screen.	
Warning	The unit continues its operation.	The operation lamp (green) remains on. The message Warning: Push Menu button will blink at the bottom of the screen.	

(2) Taking corrective action.

Press the **Menu/OK** button to check the error code.

Take the corrective action specific to the code.



SERVICE DIAGNOSIS

Troubleshooting by Error Code

Error Codes list

Fault: A condition that stops unit operation and is displayed on the controller.
Alarm: A condition that is displayed on the controller while the unit continues operation.
Notice: A condition that is logged in the history without being displayed.

Error code		Error level	Error Description
Main	Sub		
A0	0	Fault	External protection device activated
	1	Fault	Force shutdown device (e.g. smoke detector) activated
	17	Fault	A2L refrigerant leakage detected
	19	Fault	A2L refrigerant leakage evaluation and mitigation
	21	Alarm	High CO2 concentration
	22	Fault/Alarm	High supply air temperature
	23	Alarm	Low supply air temperature
	24	Alarm	High indoor humidity
	25	Alarm	High indoor temperature
A1	0	Fault	INDOOR PCB(A8P) failure
A3	0	Fault	Drain pan overflow
A6	21	Fault	Insufficient indoor airflow
	31	Alarm	Economizer feedback missing
	32	Alarm	Economizer damper opening alarm
	33	Alarm	Economizer supply air temperature alarm
A9	1	Fault	Electronic expansion valve (IEV) coil disconnected
	11	Fault	Electronic expansion valve (IEV) coil driver failure
	12	Fault	Electronic expansion valve (IEV) coil overcurrent
AJ	1	Fault	Capacity setting fault
C0	11	Fault	High duct static pressure fault
	12	Fault	Duct static pressure sensor failure
	13	Fault	Undefined duct static pressure setpoint via BACnet
C5	0	Fault	Indoor gas thermistor (IGT) failure
C9	0	Fault/Alarm	Indoor temperature thermistor failure
CA	1	Fault	Supply air temperature sensor (SAT) failure
	2	Alarm	Supply air temperature sensor (SAT) alarm
	10	Fault	Indoor coil leaving air thermistor (LCT) failure(Only for HGRH model)
CC	1	Alarm	Indoor humidity sensor failure
	2	Alarm	Outdoor humidity sensor failure
CH	7	Alarm	CO2 sensor failure
	11	Fault	A2L Refrigerant detection sensor failure
CJ	0	Fault/Alarm	Remote controller thermistor faulure
E1	1	Fault	MAIN PCB (A1P) failure
	5	Fault	MAIN PCB (A1P) circuit failure
	8	Fault	SUB PCB (A6P) failure
E2	1	Fault	Ground leakage detection fault
	6	Fault	Missing of ground leakage detection core
E3	1	Fault	Activation of high-pressure switch (HPS)
	2	Fault	High pressure transducer (HPTR) failure
E4	1	Fault	Low pressure transducer (LPTR) failure
E5	1	Fault	Compressor1 (COMP) lock

SERVICE DIAGNOSIS

Error code		Error level	Error Description
Main	Sub		
E6	11	Fault	Compressor1 (COMP) damage fault
	17	Alarm	Compressor1 (COMP) damage alarm
E7	5	Fault	Fan motor 1 (CM1) momentary overcurrent
	6	Fault	Fan motor 2 (CM2) momentary overcurrent
E9	1	Fault	Electronic expansion valve coil (EVMG) failure (Only for HGRH model)
	3	Fault	Electronic expansion valve coil (EVT) failure
	4	Fault	Electronic expansion valve coil (EVHG) failure (Only for HGRH model)
	20	Alarm	Electronic expansion valve coil (EVM) alarm
	23	Alarm	Electronic expansion valve coil (EVT) alarm
	29	Fault	Electronic expansion valve coil (EVJ) failure
	31	Fault	Electronic expansion valve coil (EVM) failure
	48	Fault	MAIN PCB (A1P) overcurrent detected
	57	Fault	SUB PCB (A6P) overcurrent detected
F3	1	Fault	Discharge pipe high temperature fault
	20	Fault	Compressor overheat error (6ton ~)
F4	2	Alarm	Floodback alarm for Compressor 1 (COMP)
	8	Fault	Floodback fault for Compressor 1 (COMP)
	14	Alarm	Electronic expansion valve (IEV) alarm
H3	2	Fault	Wiring fault (A1P - A3P)
H7	21	Fault	FAN PCB (A4P) failure
	22	Fault	FAN PCB (A5P) failure
H9	1	Fault	Outdoor air thermistor (R1T) failure
	4	Alarm	Outdoor air thermistor (OAT) alarm
J3	16	Fault	Compressor discharge thermistor (R21T) failure: Open
	17	Fault	Compressor discharge thermistor (R21T) failure: Short
	47	Fault	Compressor body thermistor (R14T) failure : Open
	48	Fault	Compressor body thermistor (R14T) failure : Short
	56	Notice	Compressor discharge thermistor (R21T) improperly installed notice
J5	1	Fault	Compressor suction thermistor (R12T) failure
	24	Fault	Oil return circuit thermistor (R22T) failure
J6	1	Fault	Defrost thermistor (R11T) failure
	8	Fault	Accumulator inlet thermistor (R8T) failure
	14	Alarm	Reading alarm: Accumulator inlet thermistor (R8T)
J7	6	Fault	Subcool heat exchanger liquid thermistor (R7T) failure
	18	Fault	Subcool heat exchanger injection thermistor (R16T) failure
J8	1	Fault	Outdoor coil liquid thermistor (R4T) failure
J9	1	Fault	Subcool heat exchanger gas thermistor (R6T) failure
	8	Alarm	Reading alarm: subcool heat exchanger gas thermistor (R6T)
JA	6	Fault	High pressure transducer (HPTR) failure: Open
	7	Fault	High pressure transducer (HPTR) failure: Short
JC	6	Fault	Suction pressure transducer (SPTR) failure : Open
	7	Fault	Suction pressure transducer (SPTR) failure : Short

SERVICE DIAGNOSIS

Error code		Error level	Error Description
Main	Sub		
L1	1	Fault	Overcurrent protection activated : INVERTER PCB (A3P)
	2	Fault	Current sensor 1 failure : INVERTER PCB (A3P)
	3	Fault	Current sensor 2 failure : INVERTER PCB (A3P)
	4	Fault	IGBT error: INVERTER PCB (A3P)
	5	Fault	Jumper settings error: INVERTER PCB (A3P)
	36	Fault	INVERTER PCB (A3P) EEPROM failure
	47	Fault	IPM failure : INVERTER PCB (A3P)
L4	1	Fault	Heat sink fin overtemperature: INVERTER PCB (A3P)
	6	Fault	Heat sink fin overtemperature: FAN PCB (A4P)
	7	Fault	Heat sink fin overtemperature: FAN PCB (A5P)
L5	3	Fault	Compressor1 (COMP) momentary overcurrent
L8	3	Fault	Compressor1 (COMP) overcurrent
L9	1	Fault	Compressor1 (COMP) startup fault
	13	Fault	Inverter phase loss: INVERTER PCB(A3P)
LC	14	Fault	Communication fault: MAIN PCB(A1P) - INVERTER PCB(A3P)
	19	Fault	Communication fault: MAIN PCB(A1P) - FAN PCB(A4P)
	24	Fault	Communication fault: MAIN PCB(A1P) - FAN PCB(A5P)
	33	Fault	Communication fault: MAIN PCB(A1P) - SUB PCB(A6P)
P1	1	Notice	Unbalanced power supply voltage: INVERTER PCB(A3P)
P4	1	Fault	INVERTER PCB (A3P) fin thermistor failure
	2	Fault	FAN PCB (A4P) fin thermistor failure
	3	Fault	FAN PCB (A5P) fin thermistor failure
PJ	4	Fault	Incorrect type of INVERTER PCB (A3P)
	9	Fault	Incorrect type of FAN PCB (A4P)
	10	Fault	Incorrect type of FAN PCB (A5P)
U0	5	Fault/Alarm	Refrigerant shortage warning (cooling)
	6	Fault/Alarm	Refrigerant shortage warning (heating)
U1	19	Fault	Power supply frequency issue
U2	1	Fault	Shortage of INVERTER PCB (A3P) power supply voltage
U4	1	Fault	Communication fault between MAIN PCB(A1P) and INDOOR PCB (A8P)
U5	0	Fault	Communication fault between remote controller and unit
UC	0	Notice	Address duplication of centralized controller
UE	0	Fault	Centralized controller communication fault
UF	10	Fault	Unidentified automatic address
UH	0	Fault	Unidentified automatic address
	1	Fault	Unidentified automatic address
	24	Fault/Alarm	Communication fault between BACnet PCB and INDOOR PCB(A8P)

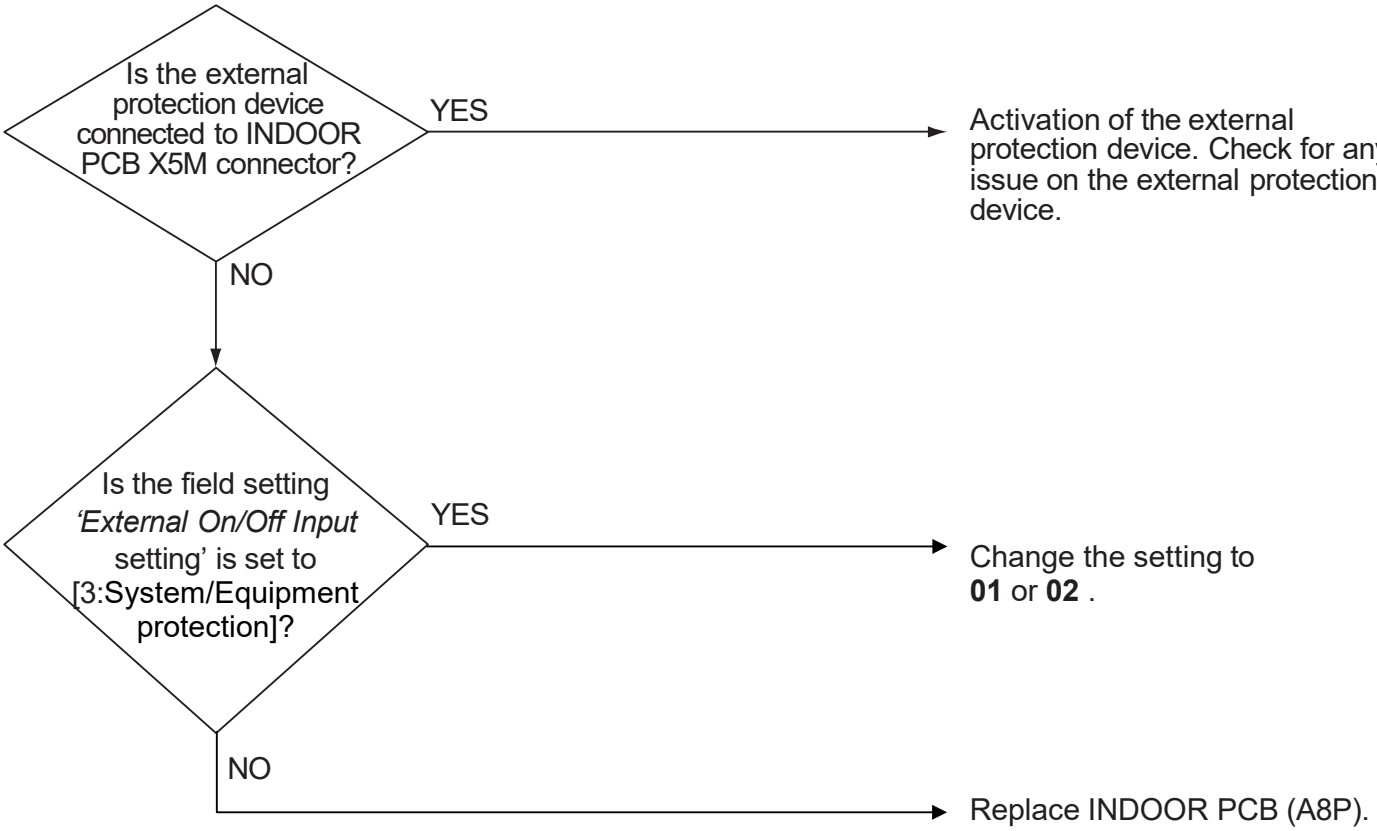
SERVICE DIAGNOSIS

DIAGNOSIS FLOWCHART

Error Code	**A0-00**
Fault/Alarm Condition	The fault is triggered if the unit operates with the external input connected to INDOOR PCB (A8P) X5M left open.
Probable Cause	• Activation of external protection device • Improper field setting • Defective INDOOR PCB (A8P)

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



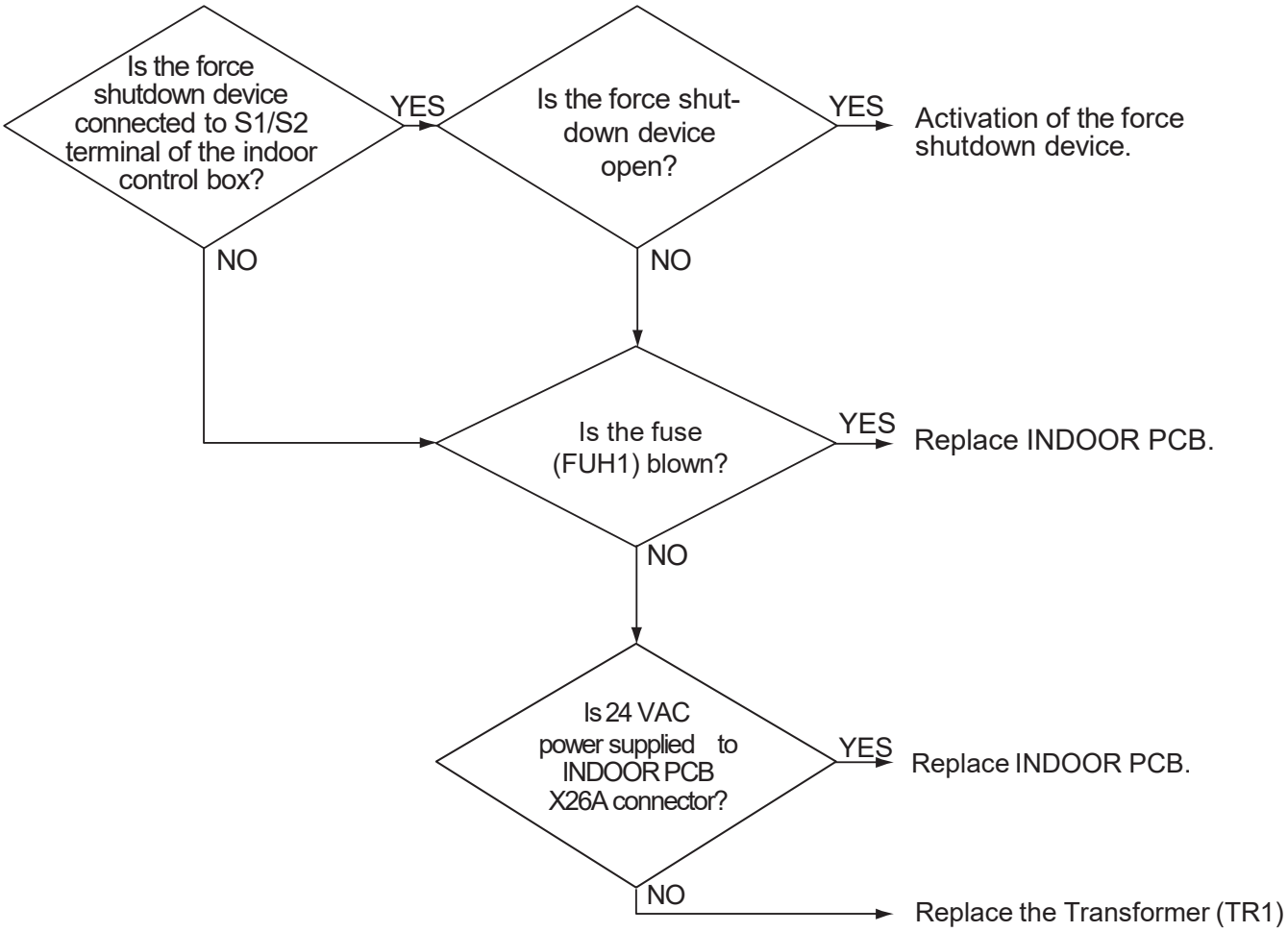
SERVICE DIAGNOSIS

DIAGNOSIS FLOWCHART

Error Code	**A0-01**
Fault/Alarm Condition	The fault is triggered if the forced stop device (e.g., Smoke detector) connected to the S1–S2 terminals on the terminal block in the indoor control box is in the open state.
Probable Cause	• Activation of the force shutdown device(e.g. Smoke Detector) • Defective INDOOR PCB (A8P) • Indoor unit fuse is blown. • 24 VAC power is not supplied to X26A.

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CAUTION CONNECTORS, OR PARTS MAY BE DAMAGED.



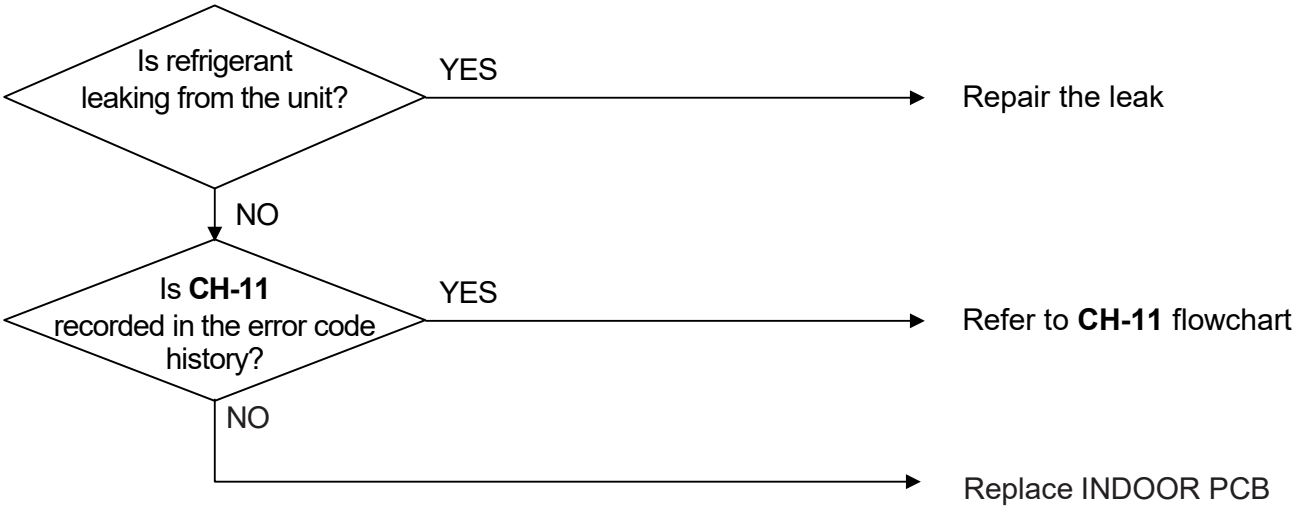
SERVICE DIAGNOSIS

Error Code	**A0-17**
Fault/Alarm Condition	The fault is triggered if A0-19 fault repeats multiple times or continues for 5 minutes
Probable Cause	• Refrigerant leak from the unit • Refrigerant sensor failure • INDOOR PCB failure

Troubleshooting

- Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.
- Refrigerant may be leaking.
- Please check the refrigerant leaking in a well-ventilated environment to prevent accumulation.
- Be careful to avoid generating fire or sparks.
- While this error is being detected, the unit will operate blower motor to disperse the refrigerant. Be sufficiently careful not to injure yourself.
- Even if no refrigerant leak is confirmed after detection, the indoor blower motor will continue running for 5 minutes.

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CAUTION CONNECTORS, OR PARTS MAY BE DAMAGED.



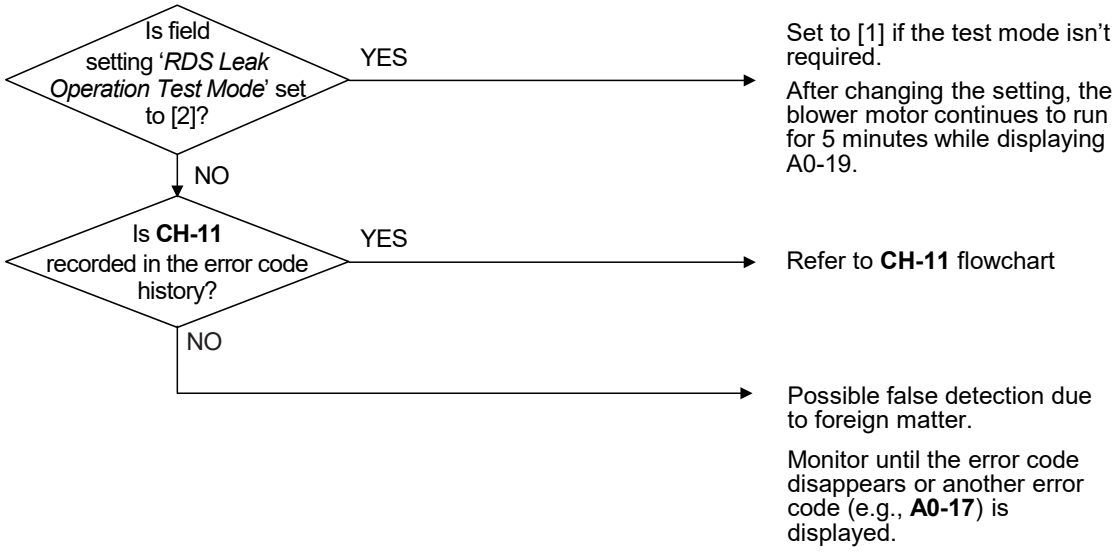
SERVICE DIAGNOSIS

Error Code	**A0-19**
Fault/Alarm Condition	The fault is triggered if refrigerant sensor detects a certain concentration of A2L refrigerant.
Probable Cause	• Refrigerant leak from the unit • Refrigerant sensor failure • INDOOR PCB failure

Troubleshooting

- Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.
- Refrigerant may be leaking.
- Please check the refrigerant leaking in a well-ventilated environment to prevent accumulation.
- Be careful to avoid generating fire or sparks.
- While this error is being detected, the unit will operate blower motor to disperse the refrigerant. Be sufficiently careful not to injure yourself.
- Even if no refrigerant leak is confirmed after detection, the indoor blower motor will continue running for 5 minutes.

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CAUTION CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A0-21**

Fault/Alarm Condition

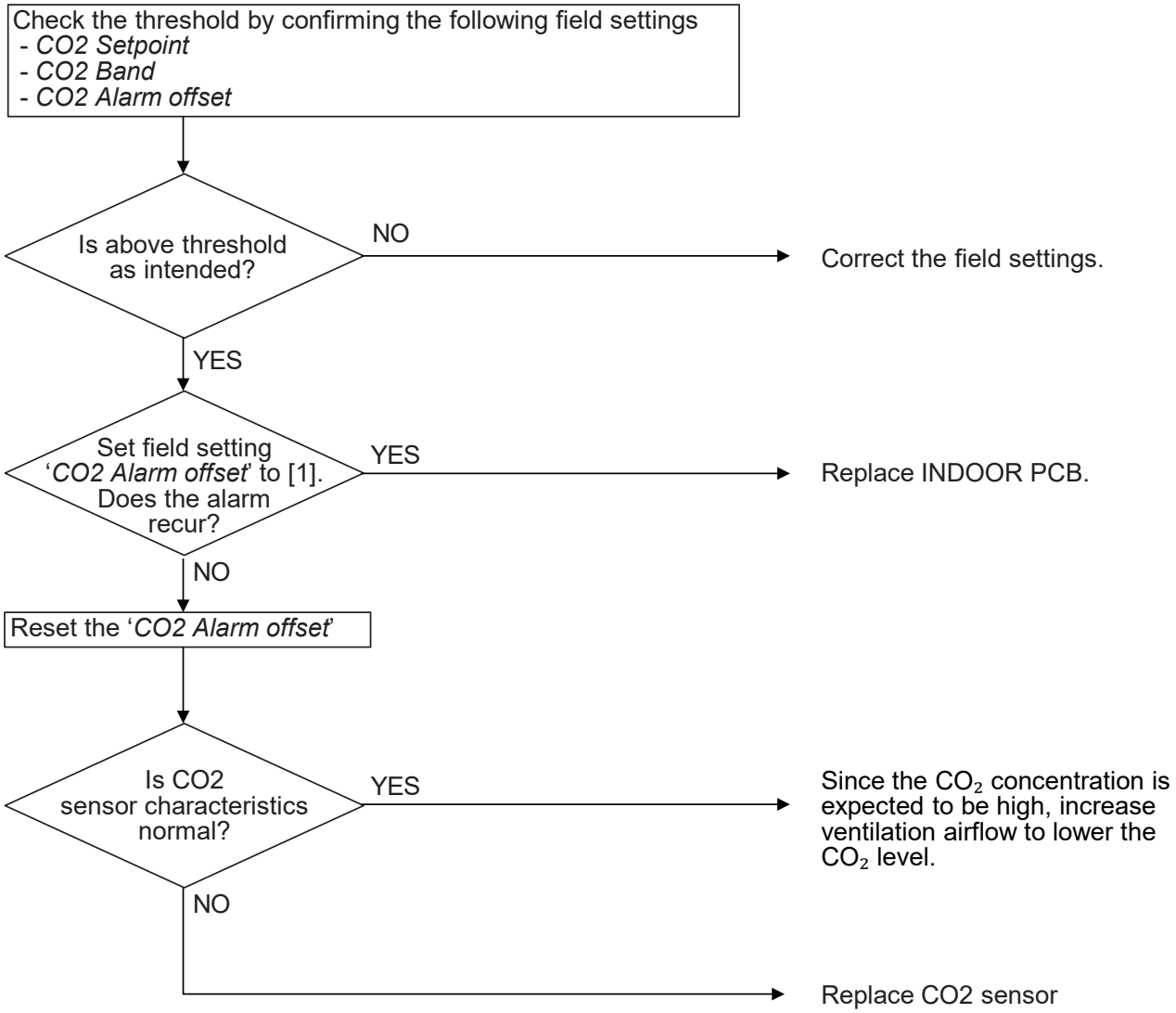
The alarm is triggered if CO2 concentration is higher than the threshold below for 10 minutes.
Threshold: 'CO2 Setpoint' + 'CO2 Band' + 'CO2 Alarm offset'
Unit continues operation during alarm

Probable Cause

- High CO2 concentration
- Incorrect field settings
- INDOOR PCB failure
- CO2 sensor failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A0-22**

Fault/Alarm Condition

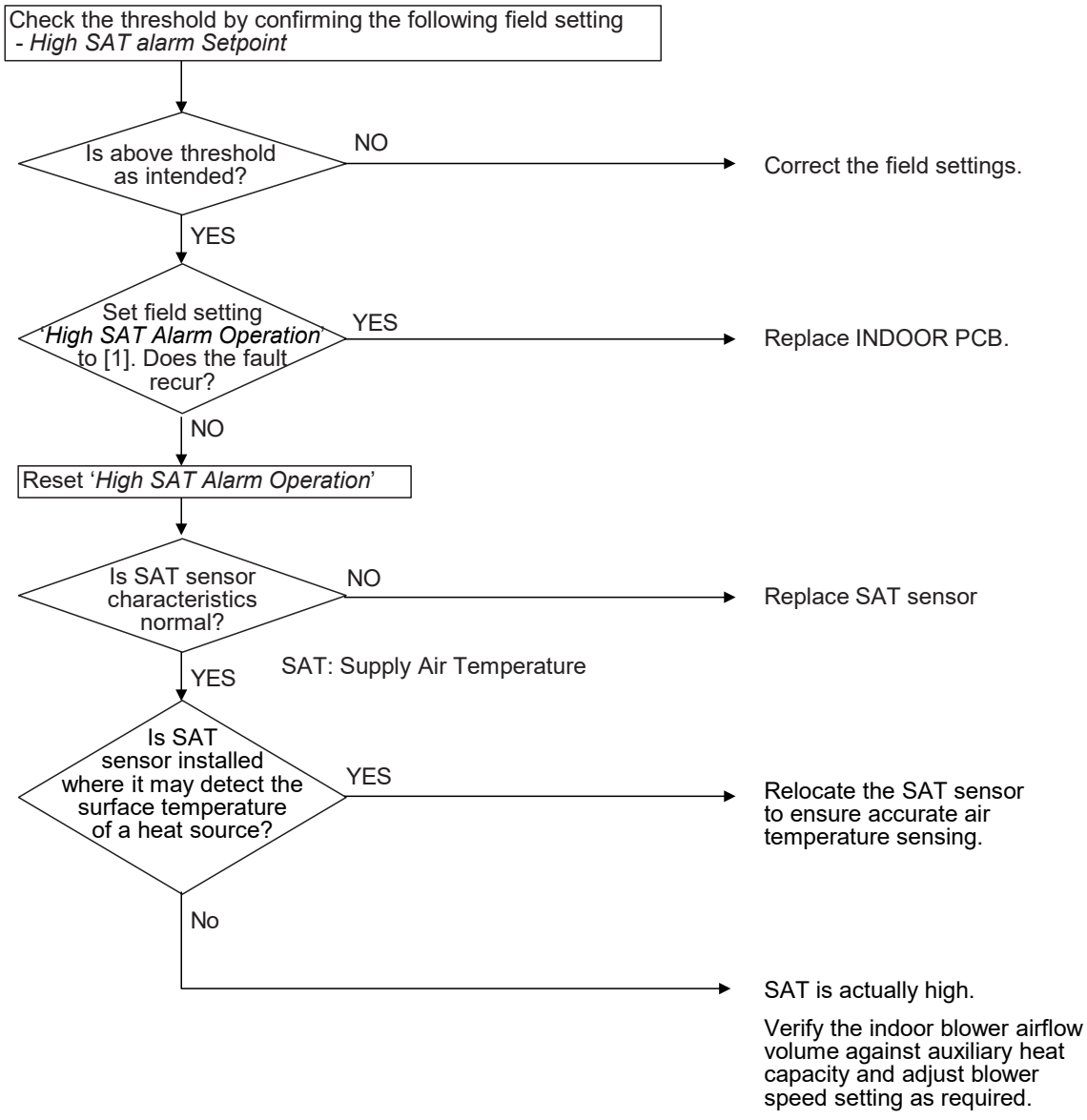
The fault is triggered if the supply air temperature is higher than 'High SAT Alarm Setpoint' during Heating operation. Whether the unit continues operation when this alarm occurs depends on 'High SAT Alarm Operation' setting.

Probable Cause

- High supply air temperature
- Incorrect field settings
- INDOOR PCB failure
- Supply air temperature sensor failure
- Improper location of the supply air temperature sensor
- Insufficient air flow through the supplemental heat

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

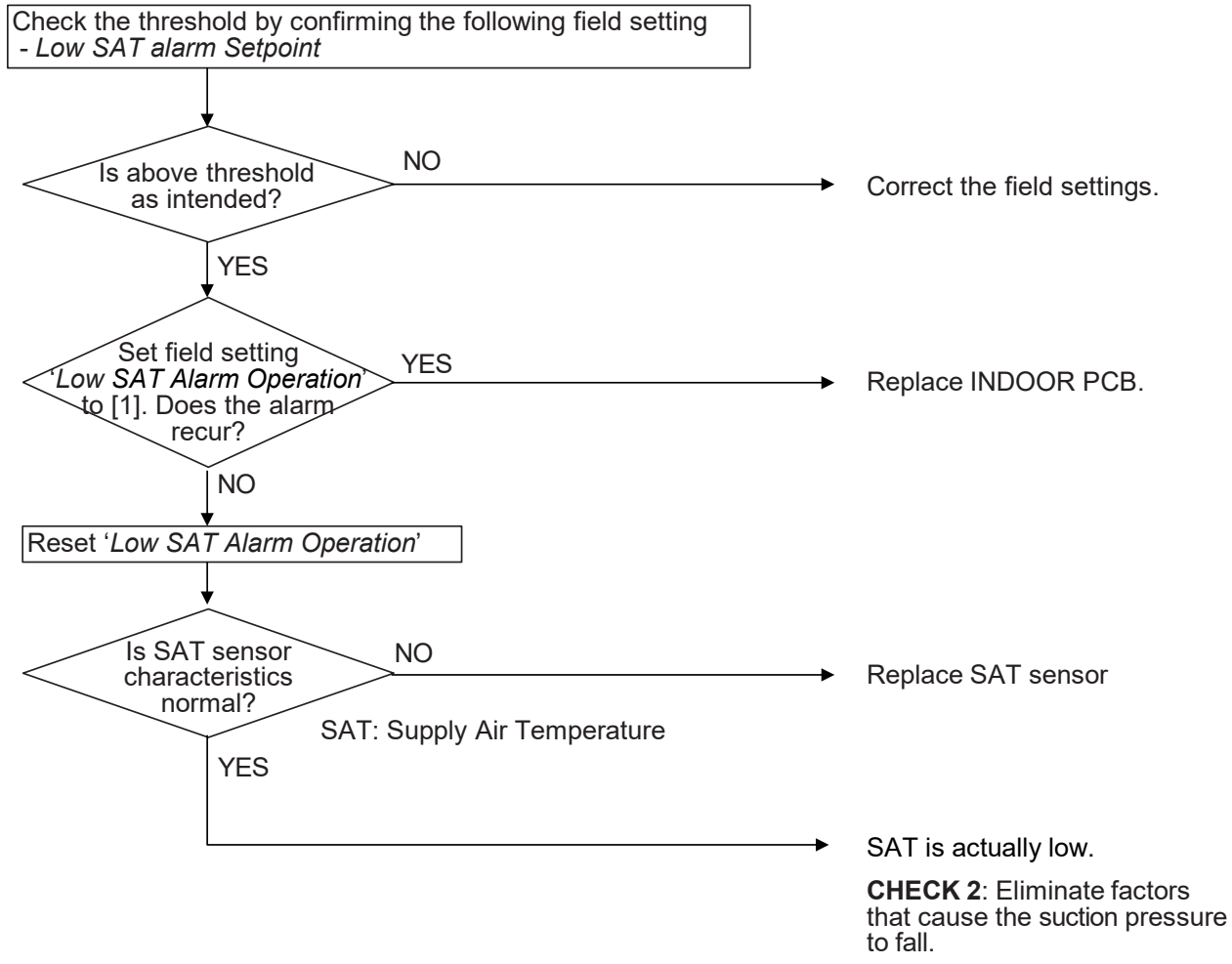


SERVICE DIAGNOSIS

Error Code	**A0-23**
Fault/Alarm Condition	The alarm is triggered if the supply air temperature is lower than 'Low SAT Alarm Setpoint' during cooling operation. Unit continues operation during alarm
Probable Cause	• Low supply air temperature • Incorrect field settings • INDOOR PCB failure • Supply air temperature sensor failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A0-24**

Fault/Alarm Condition

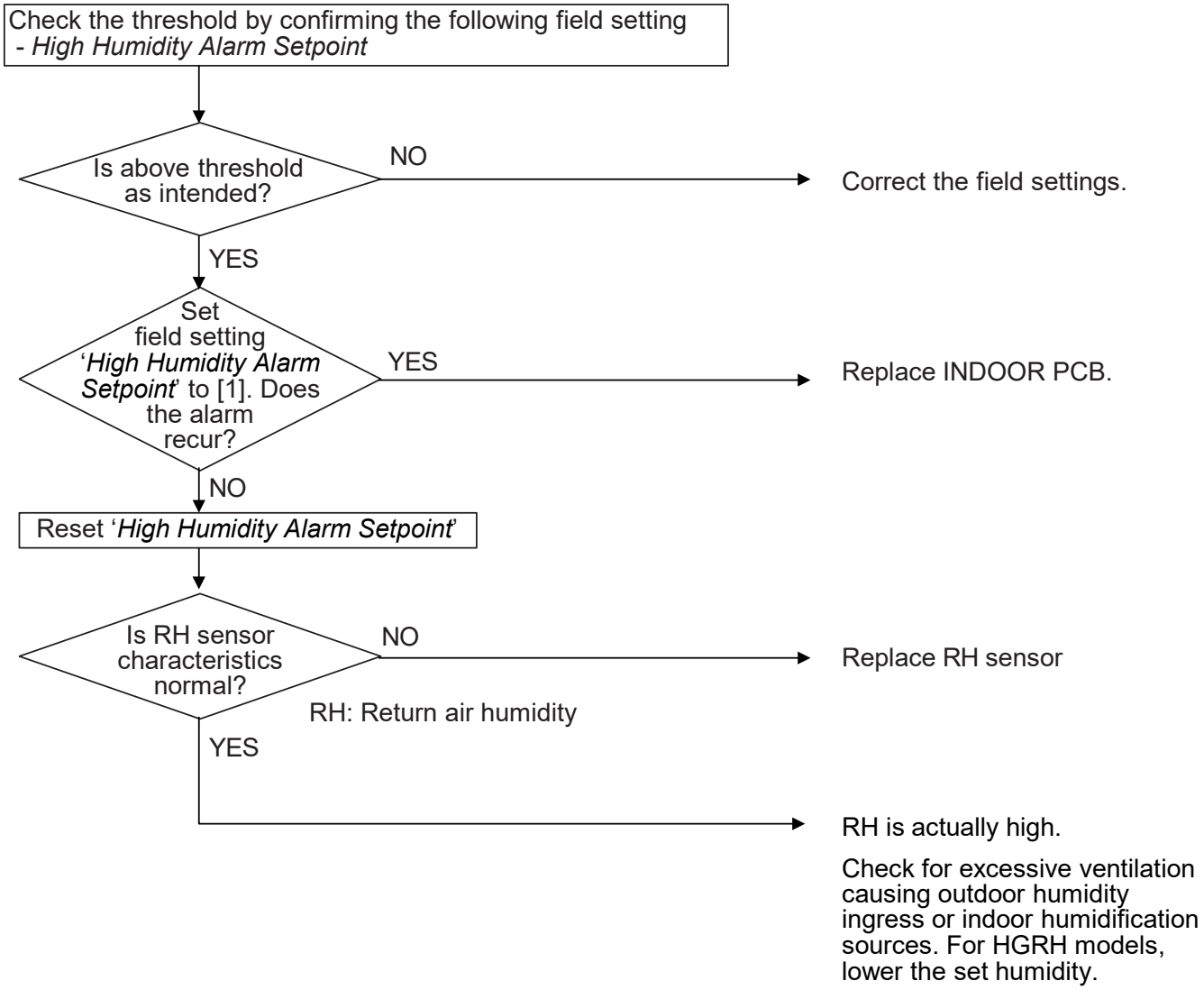
The alarm is triggered if the return air humidity is higher than 'High Humidity Alarm Setpoint' for the duration of 'High Humidity Alarm Delay Timer'.
Unit continues operation during alarm

Probable Cause

- High indoor humidity
- Incorrect field settings
- Return air humidity sensor failure
- INDOOR PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A0-25**

Fault/Alarm Condition

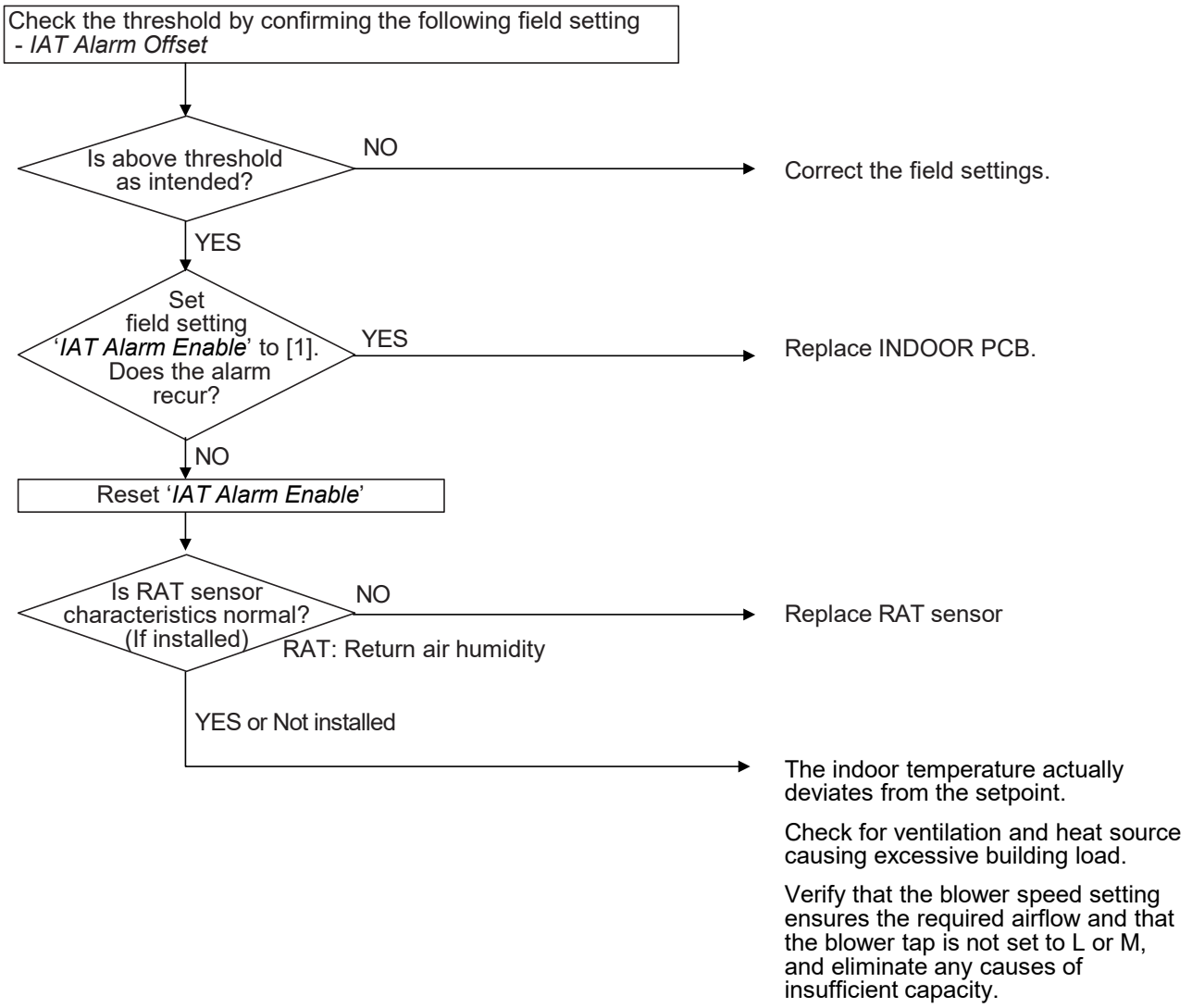
The alarm is triggered if the indoor temperature deviates from the setpoint on the remote controller for a certain period.
Unit continues operation during alarm

Probable Cause

- High building load
- Insufficient cooling/heating capacity
- Return air temperature sensor failure
- INDOOR PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

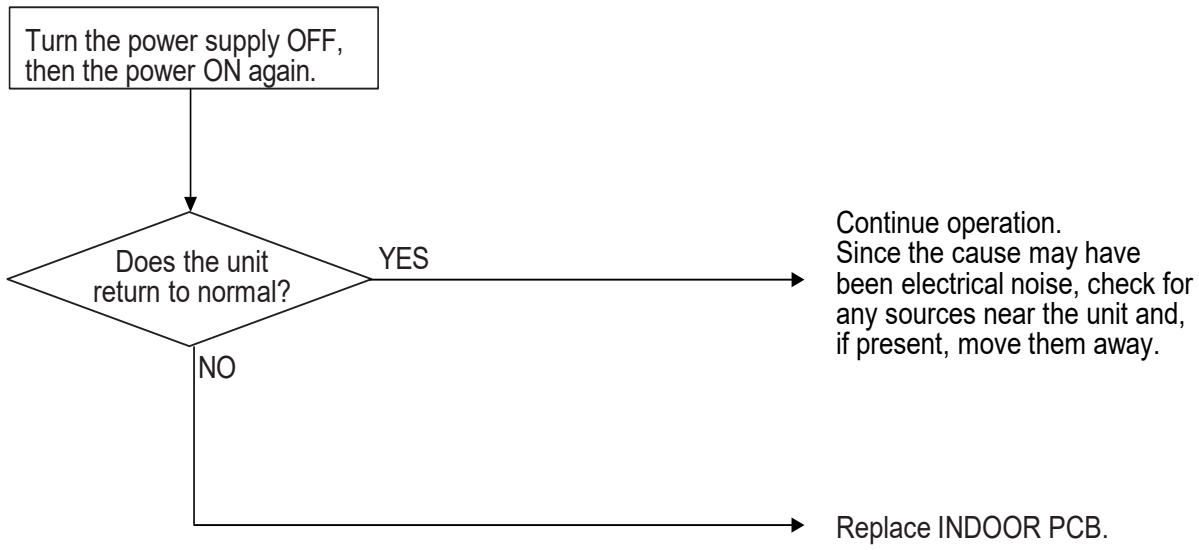


SERVICE DIAGNOSIS

Error Code	**A1-00**
Fault/Alarm Condition	The fault is triggered if the control program stored in the INDOOR PCB microcontroller is corrupted.
Probable Cause	• INDOOR PCB failure • External factor (Noise, etc.)

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A3-00**

Fault/Alarm Condition

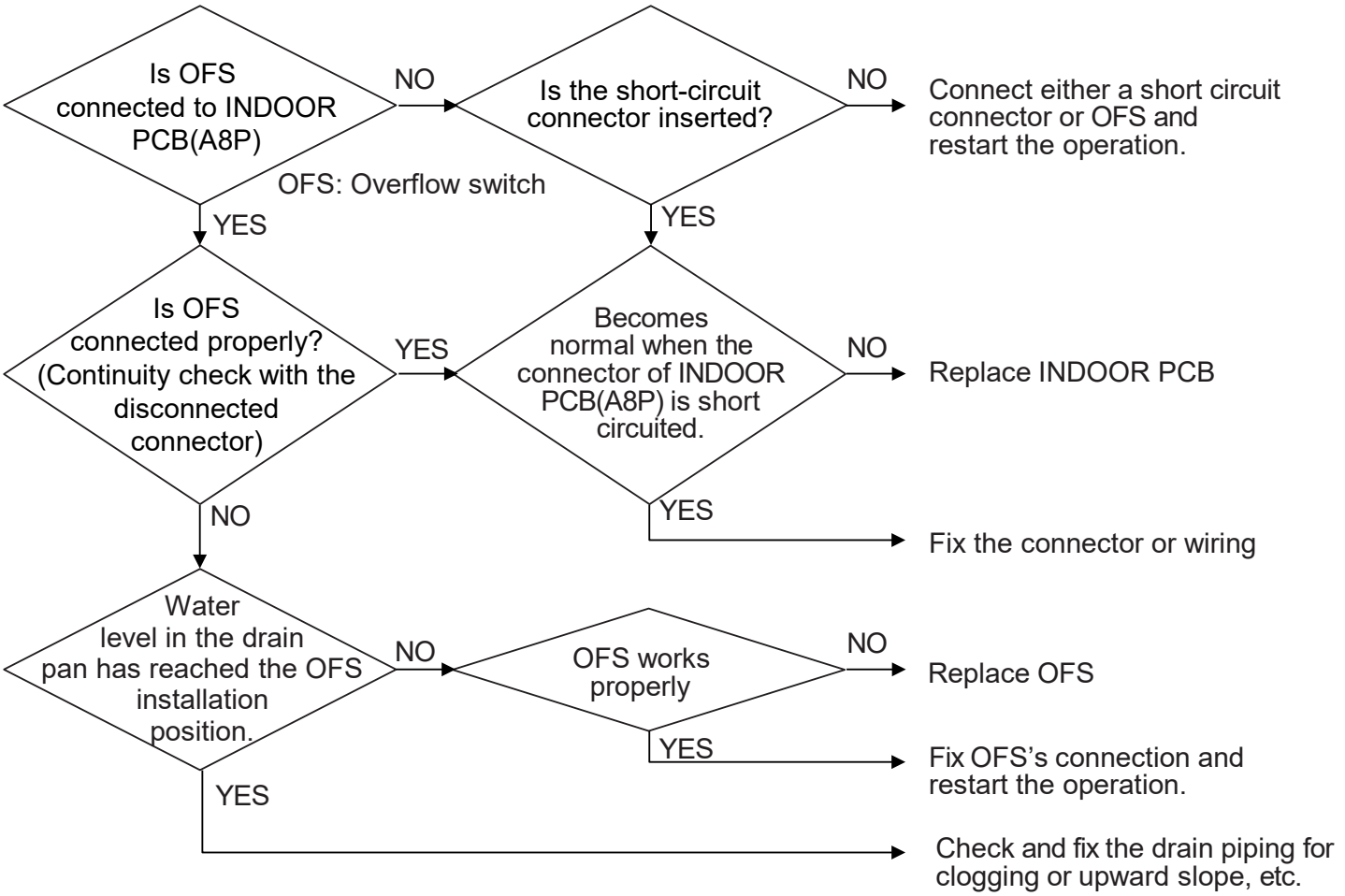
The water level is excessively high to activate the overflow switch.

Probable Cause

- Defective overflow switch or short circuit connector
- Drain clogging, upward slope, etc.
- Defective INDOOR PCB(A8P)
- Loose connection of the connector

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



Model	Drain pan overflow switch
DVH090-120	A8P-X6M-3,4pin

SERVICE DIAGNOSIS

Error Code **A6-21**

Fault/Alarm Condition

The blower proving switch keeps OPEN for 60 seconds while the blower is commanded ON due to insufficient airflow.

Probable Cause

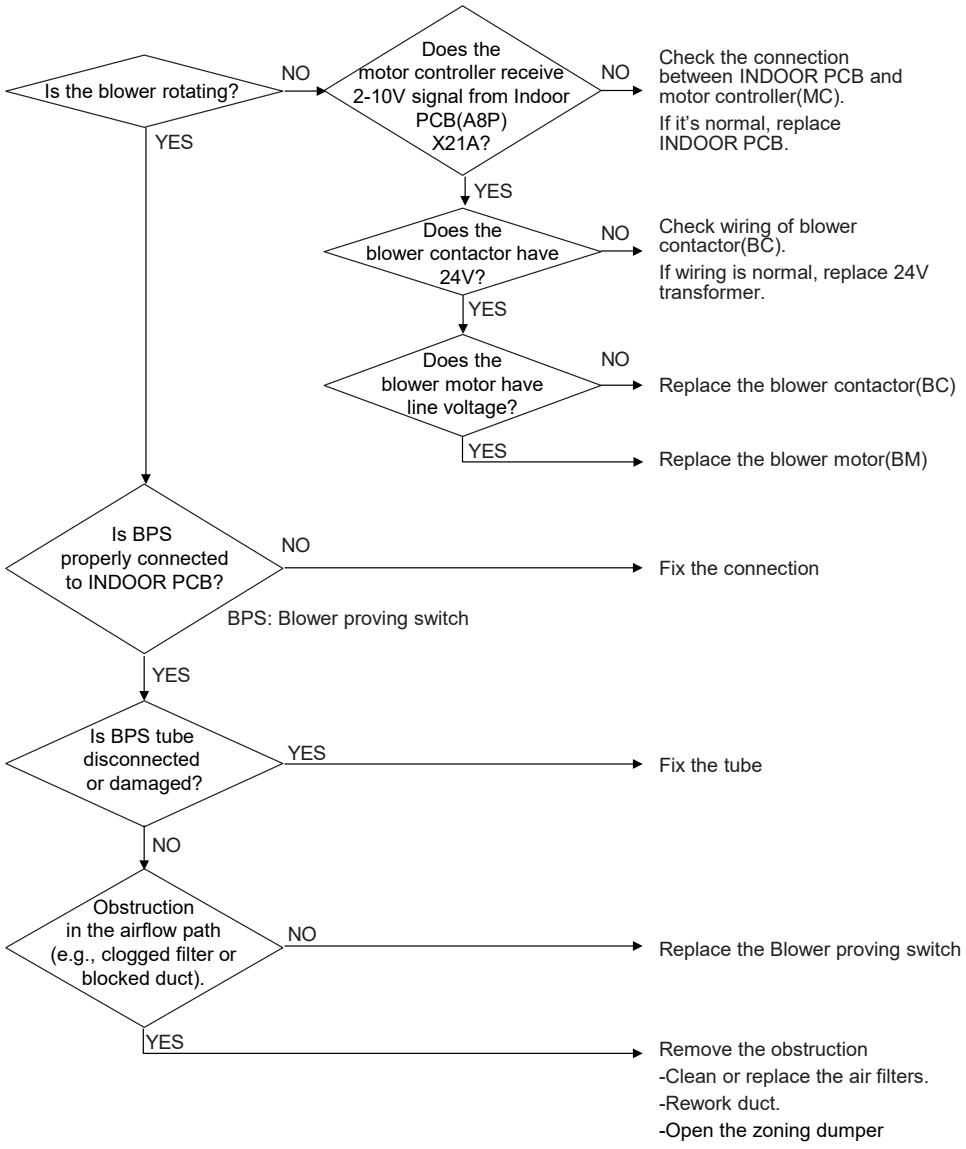
- Blower or motor isn't rotating
- Clogged filters
- Restrictive, undersized ductwork or closed zoning dumper
- Blower proving switch disconnected

Error Reset Conditions

- The unit operation turns off
- Blower proving switch is CLOSE for 10 seconds

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A6-31**

Fault/Alarm Condition

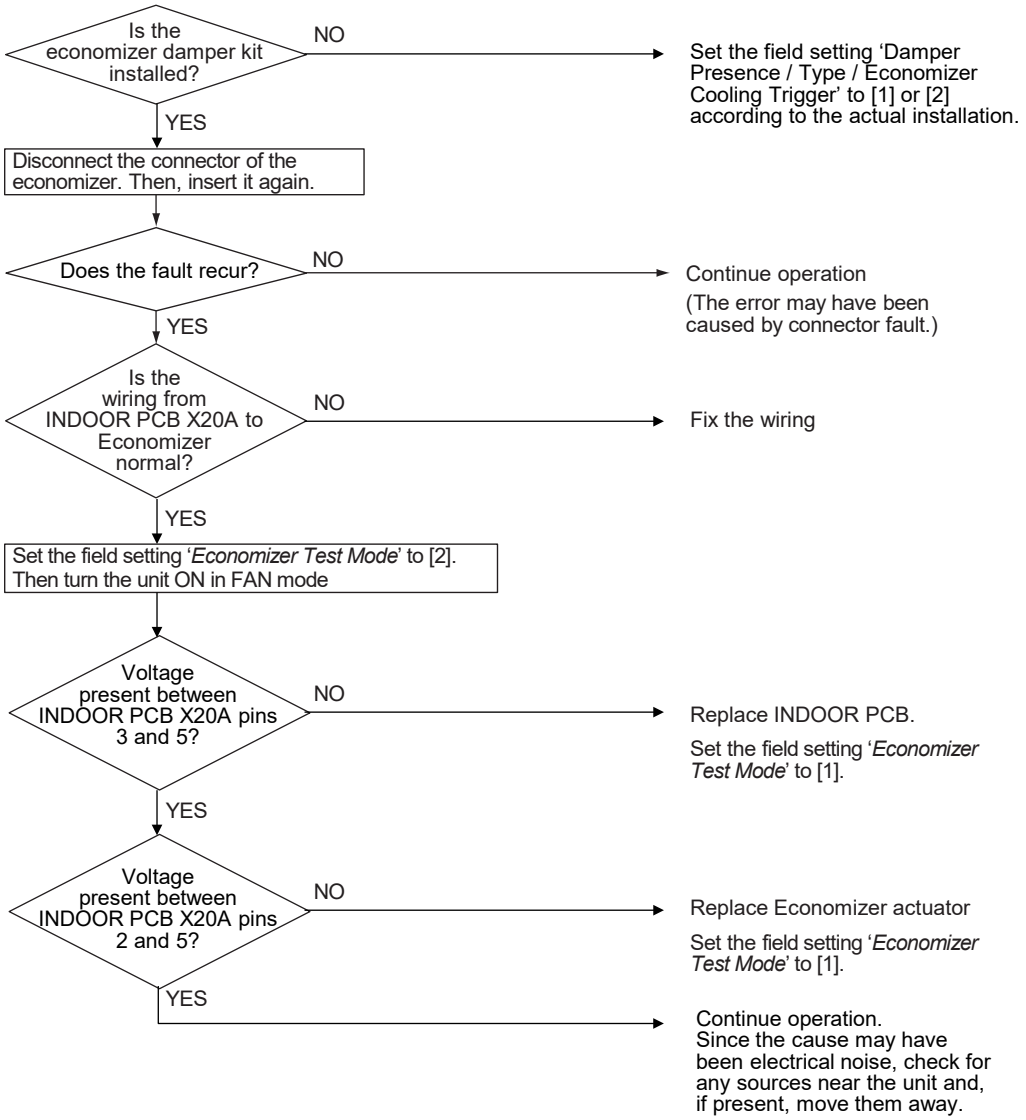
The alarm is triggered if open, short circuit, or miswiring is detected on the economizer feedback wire. Unit continues operation during alarm.

Probable Cause

- Economizer damper actuator failure
- Economizer wiring failure (Disconnected, miswiring)
- INDOOR PCB failure
- External factor (Noise, etc.)

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A6-32**

Fault/Alarm Condition

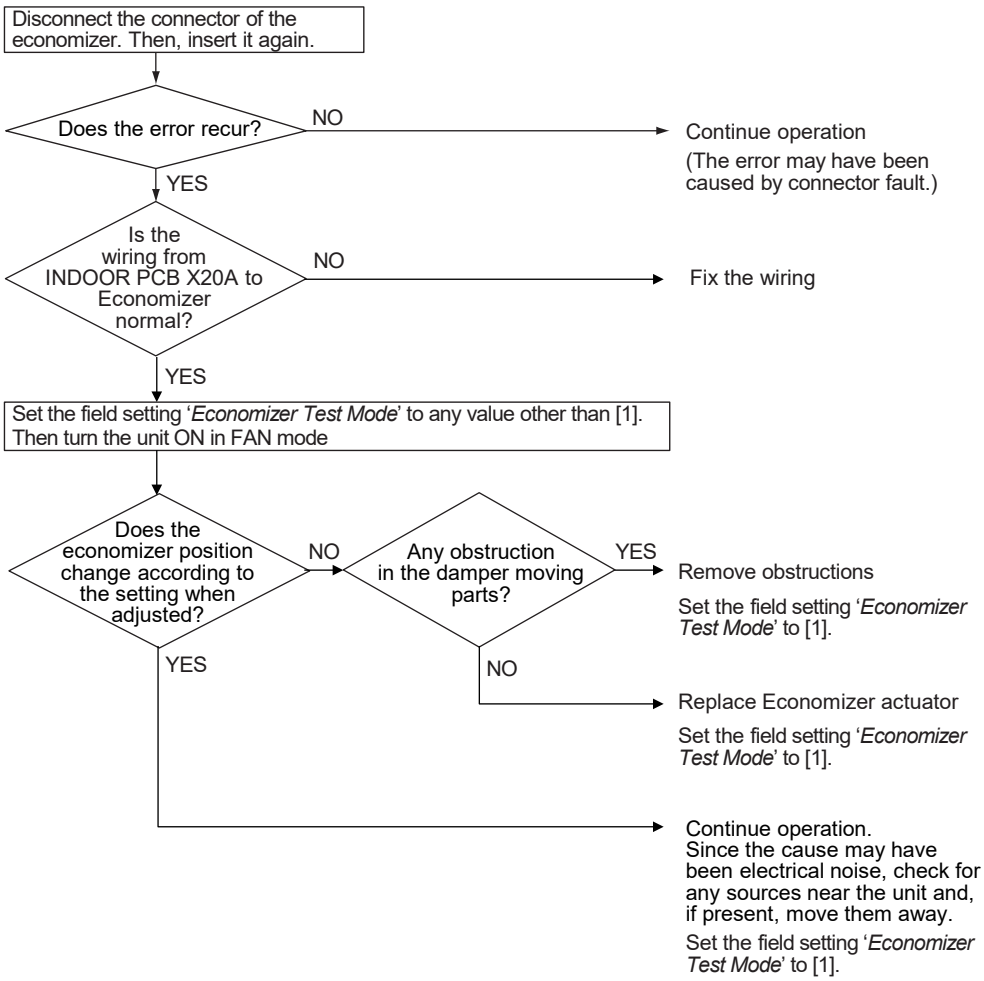
The alarm is triggered if the difference of 10% or more between the commanded and feedback economizer positions persists for 150 seconds. Unit continues operation during alarm.

Probable Cause

- Economizer damper actuator failure
- Economizer damper mechanically stuck
- External factor (Noise, etc.)

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

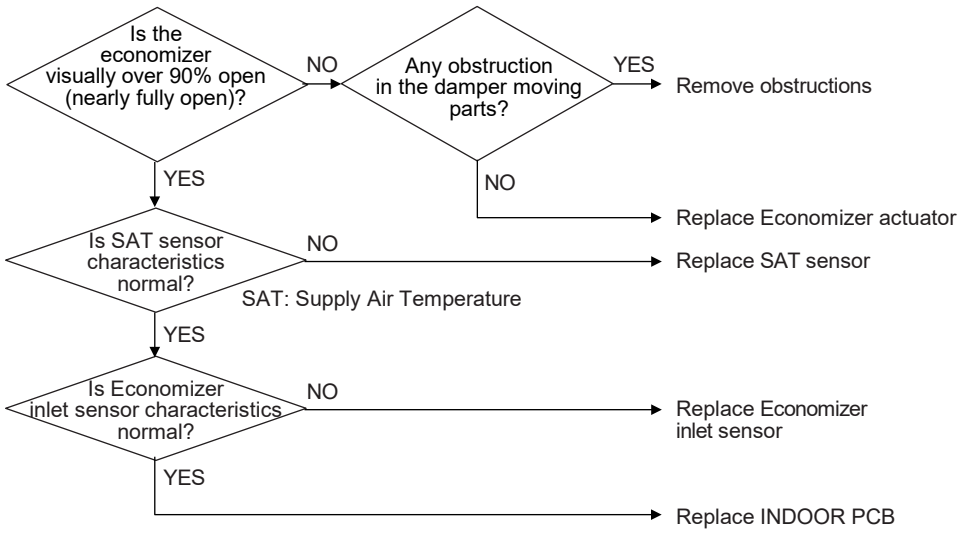


SERVICE DIAGNOSIS

Error Code	**A6-33**
Fault/Alarm Condition	The alarm is triggered if, during economizer cooling, the damper is over 90% open and the supply air temperature differs from the economizer inlet temperature by 15°F (8.3°C) or more for 10 minutes. Unit continues operation during alarm.
Probable Cause	• Economizer damper actuator failure • Economizer damper mechanically stuck • INDOOR PCB failure • Supply air temperature sensor failure • Economizer inlet sensor failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A9-01**

Fault/Alarm Condition

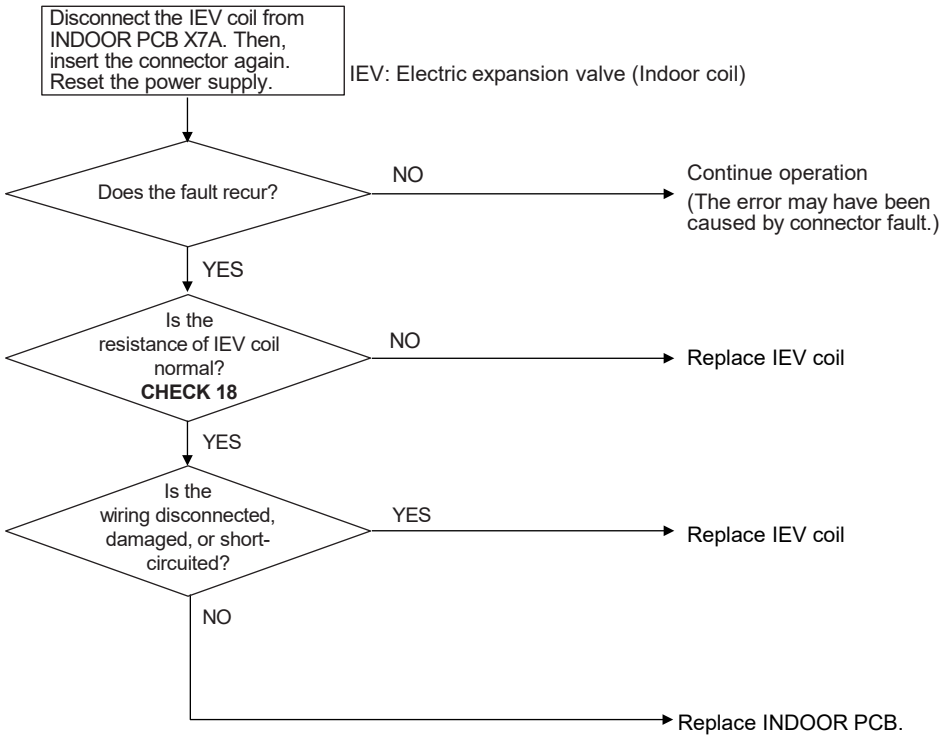
The alarm is triggered if the indoor coil electric expansion valve (IEV) coil is not connected to the INDOOR PCB.

Probable Cause

- IEV - Electronic expansion valve coil (Indoor coil) failure
- Disconnected or miswired wiring
- INDOOR PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A9-11**

Fault/Alarm Condition

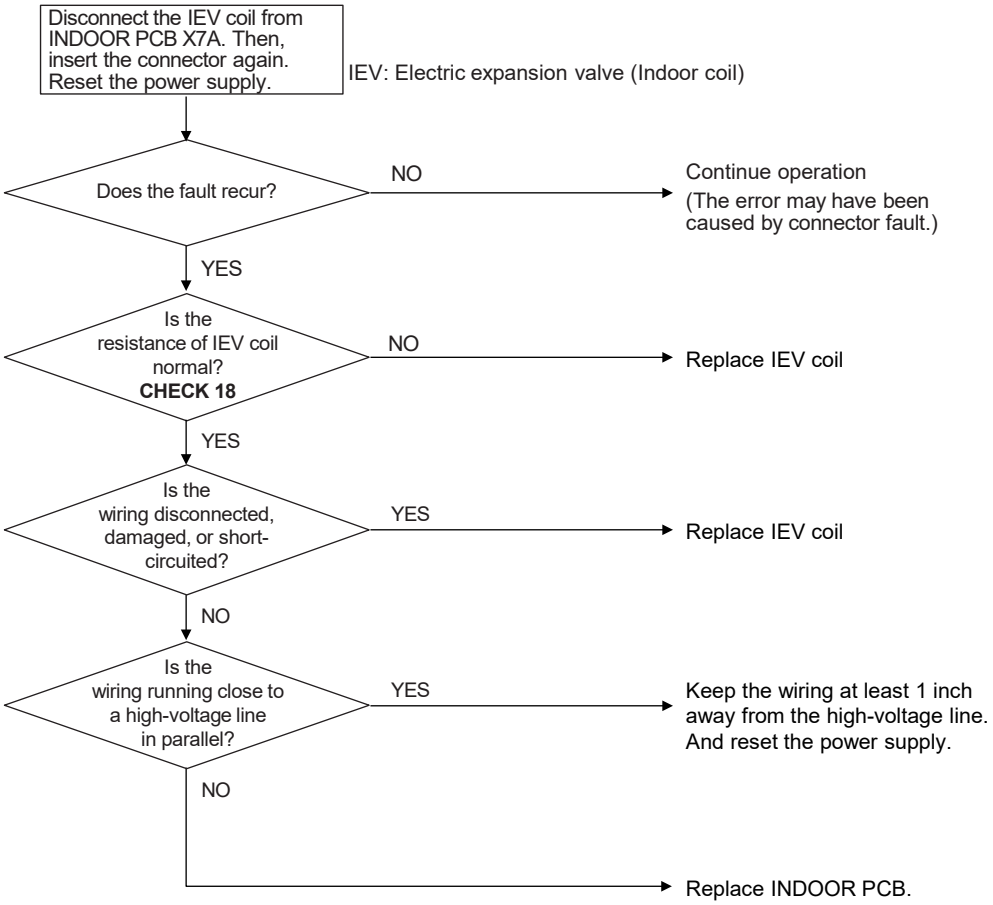
The alarm is triggered if a driver failure is detected on the indoor coil electric expansion valve (IEV) coil when the power is turned on.

Probable Cause

- INDOOR PCB failure
- Disconnected or short-circuited wiring
- Indoor coil electric expansion valve (IEV) coil failure
- Electrical noise

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **A9-12**

Fault/Alarm Condition

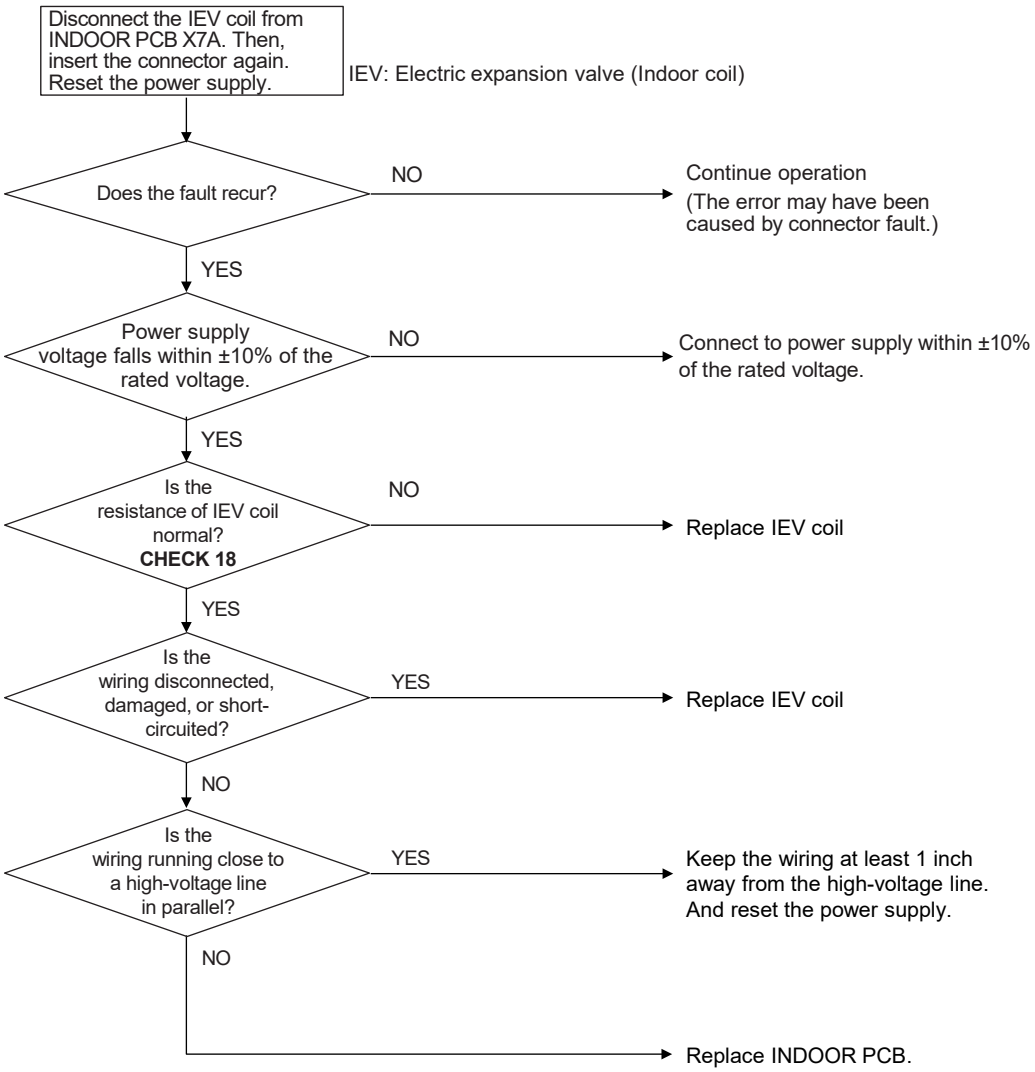
The alarm is triggered if the overcurrent is detected on the indoor coil electric expansion valve (IEV) coil.

Probable Cause

- INDOOR PCB failure
- Disconnected or short-circuited wiring
- Indoor coil electric expansion valve (IEV) coil failure
- Electrical noise

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **AJ-01**

Fault/Alarm Condition

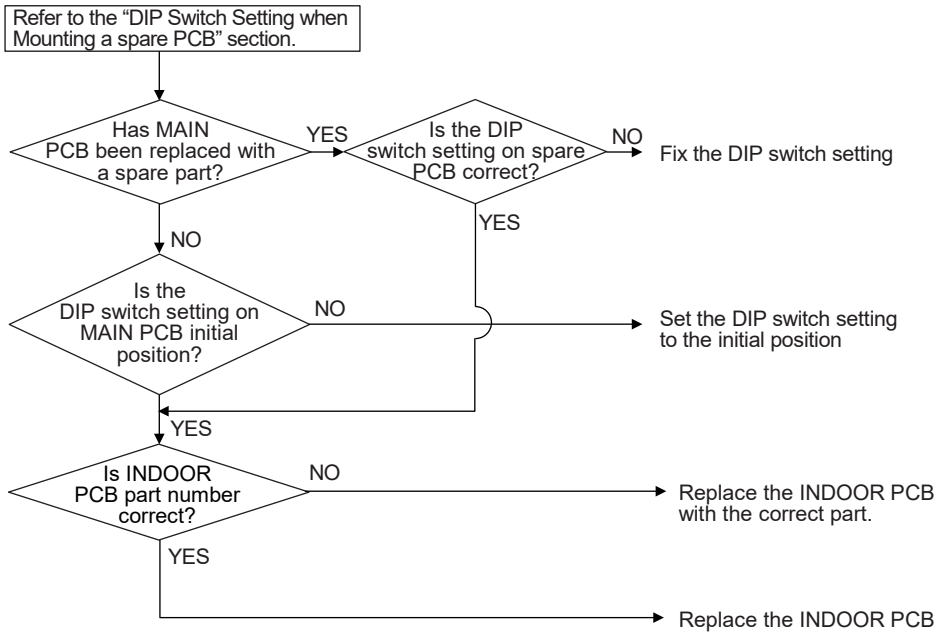
The fault is triggered if a tonnage value that is not permitted for the INDOOR PCB is configured.

Probable Cause

- Incorrect part number for INDOOR PCB
- Incorrect tonnage setting for MAIN PCB
- INDOOR PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **C0-11**

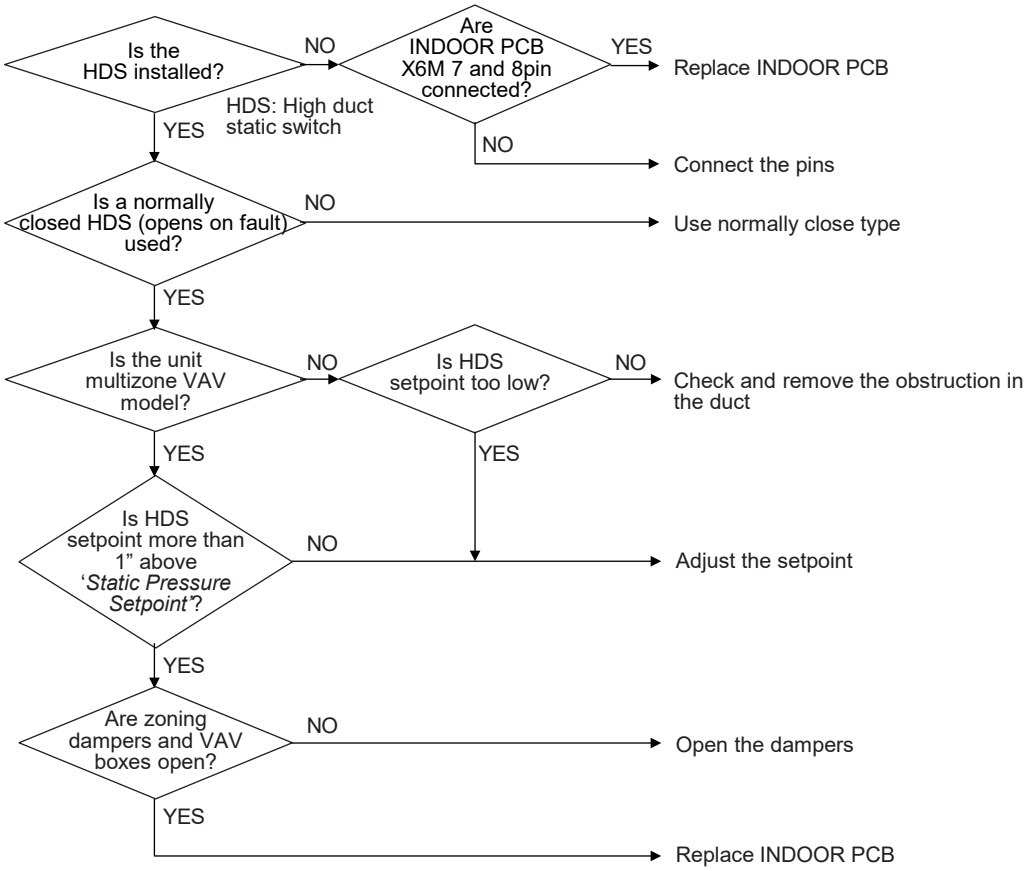
Fault/Alarm Condition The fault is triggered if the High duct static switch is activated 3times within 40 minutes.

Probable cause

- High Duct Static Switch Setpoint is too low
- Incorrect Static Pressure Setpoint
- Closed duct
- Shorting connector failure
- INDOOR PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

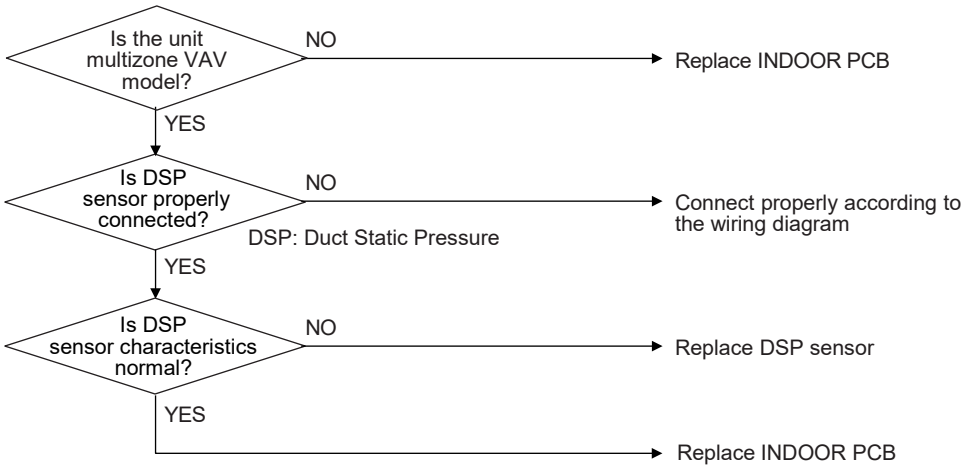


SERVICE DIAGNOSIS

Error Code	**C0-12**
Fault/Alarm Condition	The fault is triggered if the duct static pressure sensor is open, shot circuit, or mis wired.
Probable Cause	• Duct static pressure sensor disconnected • Duct static pressure sensor failure • INDOOR PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

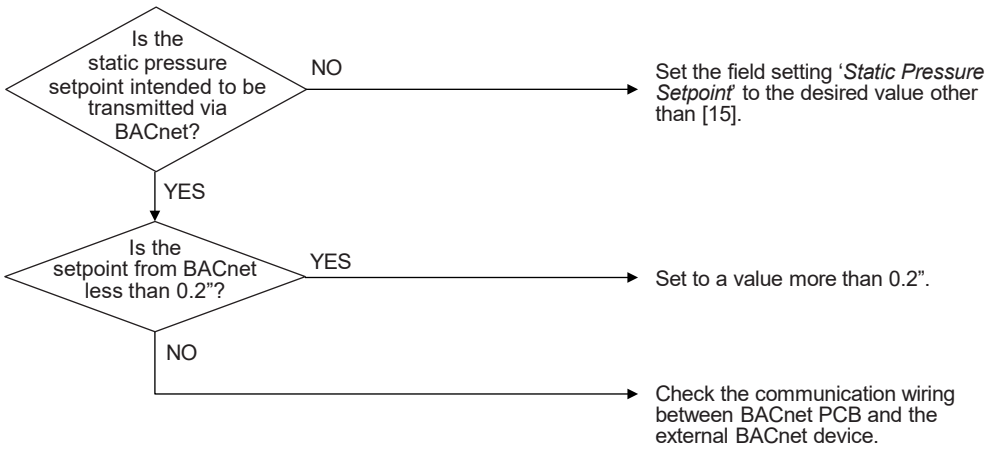


SERVICE DIAGNOSIS

Error Code	**C0-13**
Fault/Alarm Condition	The fault is triggered if a static pressure setting via BACnet is less than 0.2”.
Probable Cause	• Undefined duct static pressure setpoint via BACnet • Disconnect or miswiring between BACnet PCB and the external BACnet device.

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **C5-00, CA-01/02/10**

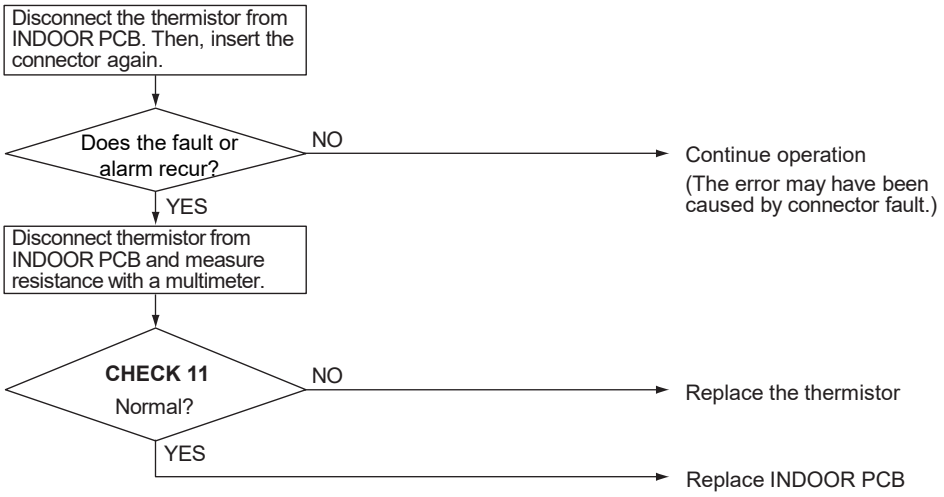
Fault/Alarm Condition The fault or alarm is triggered if the thermistor is open or short-circuited

Probable Cause

- Thermistor failure
- INDOOR PCB(A8P) failure
- Disconnected connector
- Broken or disconnected wire

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



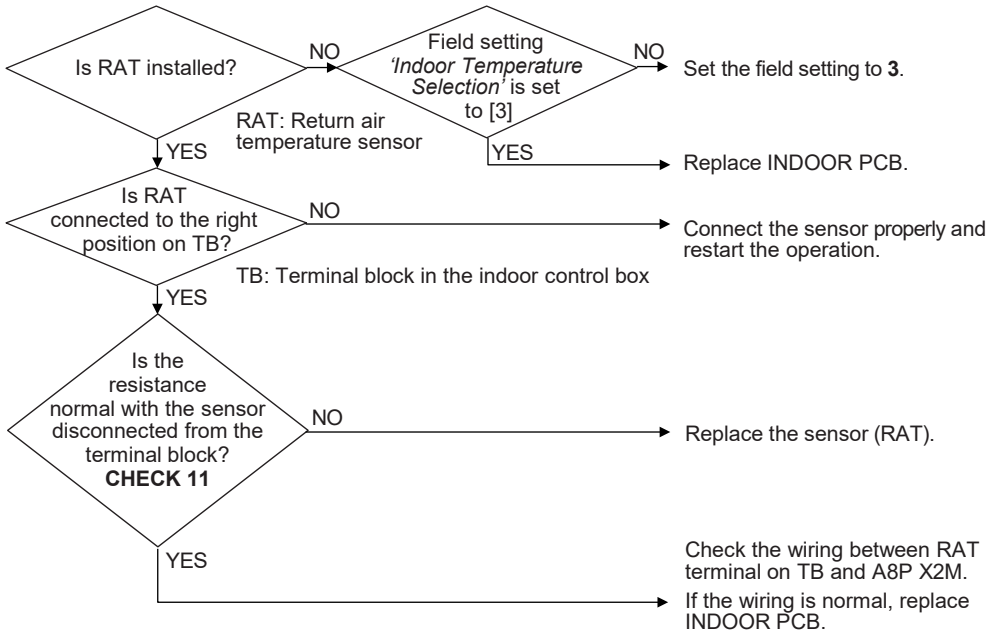
Error Code	Thermistor	Electric symbol
C5-00	Indoor coil gas thermistor (fault)	IGT
CA-01	Supply air temperature sensor (fault)	SAT
CA-02	Supply air temperature sensor (alarm)	SAT
CA-10	Indoor coil leaving air thermistor (fault)	LCT

SERVICE DIAGNOSIS

Error Code	**C9-00**
Fault/Alarm Condition	The fault is triggered if the sensor is in an open or short-circuit condition.
Probable Cause	• The return air temperature sensor (RAT) failure • INDOOR PCB (A8P) failure • Connection is lost between indoor control box terminal block and INDOOR PCB(A8P)

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

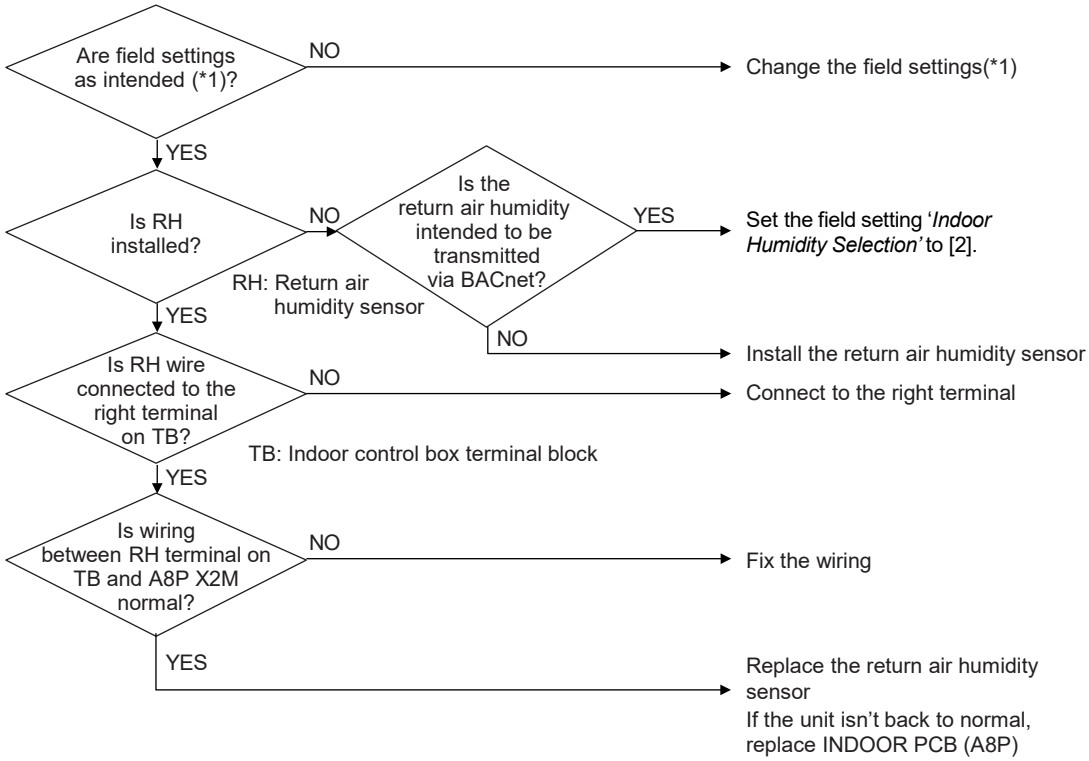


SERVICE DIAGNOSIS

Error Code	**CC-01**
Fault/Alarm Condition	The fault is triggered if the return air humidity sensor is in an open, short-circuit or miswired.
Probable Cause	• Humidity sensor fault • Disconnection or miswiring of the humidity sensor

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



NOTE:

THIS ALARM IS GENERATED DURING COOLING OPERATION WHEN A SENSOR ERROR OCCURS WHILE THE FIELD SETTINGS ARE AS FOLLOWS.

- ECONOMIZER COOLING TRIGGER = [7: DIFFERENTIAL ENTHALPY]

- HIGH HUMIDITY ALARM SETPOINT = [2:95%] ~ [9: 55%]

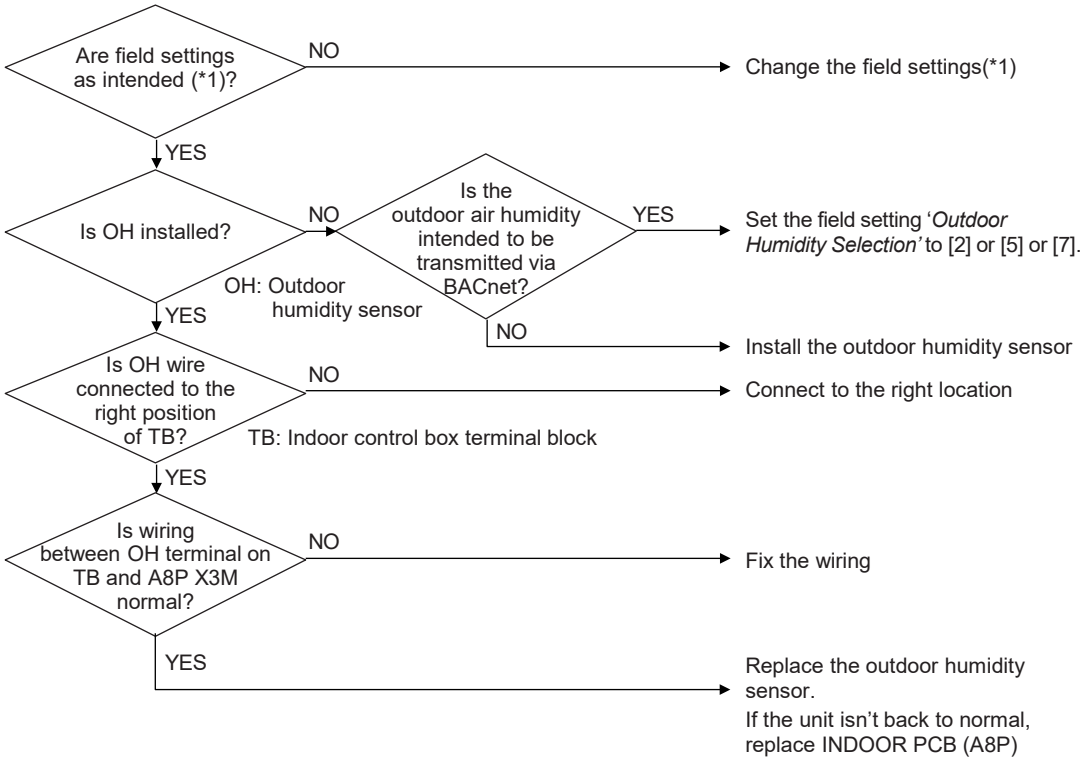
IF THESE SETTINGS WERE CONFIGURED UNINTENTIONALLY, CORRECT THEM TO THE APPROPRIATE FIELD SETTINGS.

SERVICE DIAGNOSIS

Error Code	**CC-02**
Fault/Alarm Condition	The fault is triggered if the outdoor air humidity sensor is in an open, short-circuit or miswired.
Probable Cause	• Defective sensor • Disconnection or miswiring

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



NOTE:

THIS ALARM IS GENERATED WHEN A SENSOR ERROR OCCURS WHILE THE FIELD SETTINGS ARE AS FOLLOWS.

- OUTDOOR HUMIDITY SELECTION = [4: ECONOMIZER INLET SENSOR]

- ECONOMIZER COOLING TRIGGER = [6: FIXED ENTHALPY]

- ECONOMIZER COOLING TRIGGER = [7: DIFFERENTIAL ENTHALPY]IF THESE SETTINGS WERE CONFIGURED UNINTENTIONALLY, CORRECT THEM TO THE APPROPRIATE FIELD SETTINGS.

SERVICE DIAGNOSIS

Error Code **CH-07**

Fault/Alarm Condition

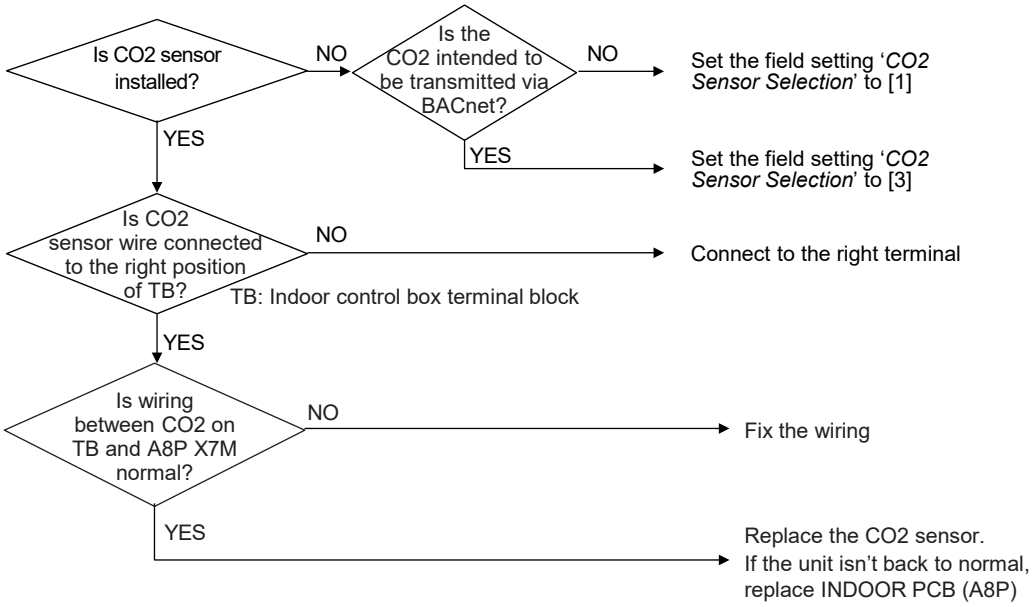
The alarm is triggered if the CO2 sensor is in an open, short-circuit, or mis wired.
*Error code is displayed but the unit operates continuously.

Probable Cause

- Remote controller thermistor fault
- Remote controller PCB fault

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **CH-11**

Fault/Alarm Condition

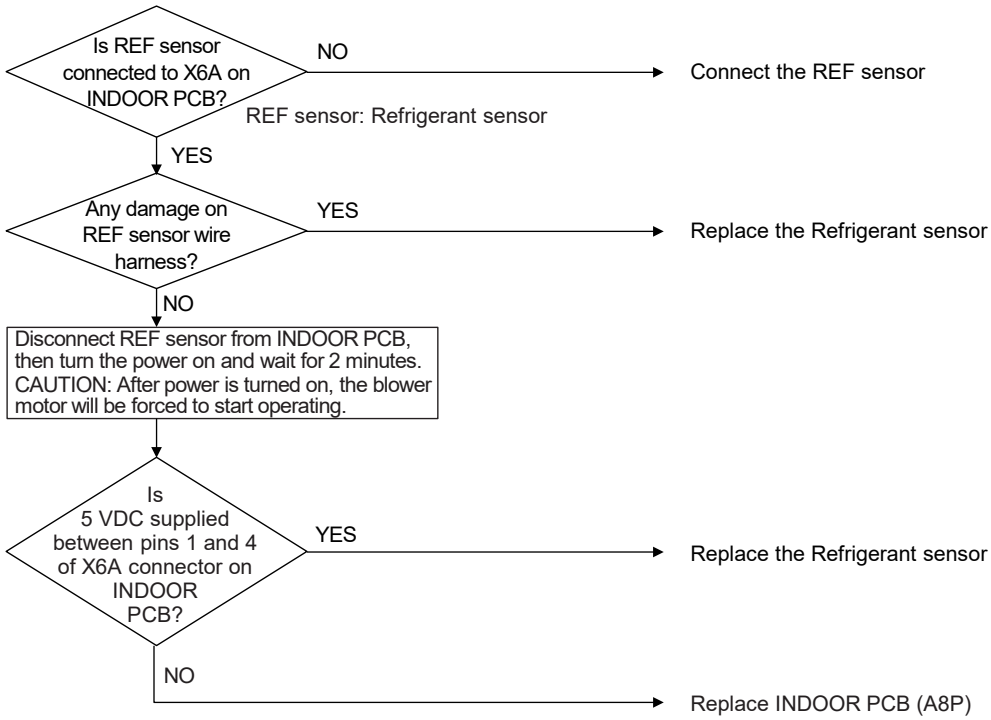
The fault is triggered if the INDOOR PCB receives the fault status signal from the refrigerant sensor or loses the communication with the sensor.

Probable Cause

- Refrigerant sensor failure
- Disconnected wiring
- INDOOR PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

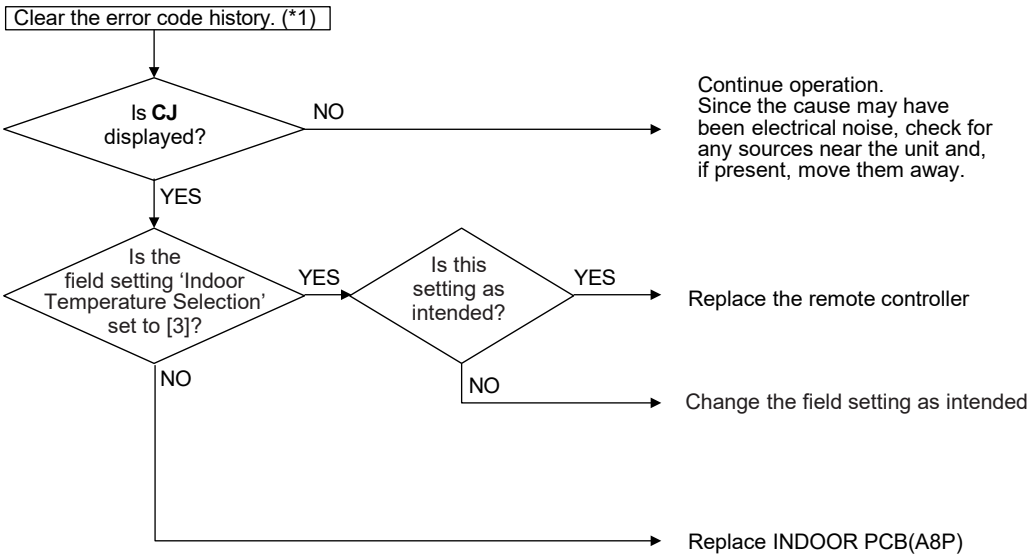


SERVICE DIAGNOSIS

Error Code	**CJ**
Fault/Alarm Condition	The fault is triggered if the remote controller thermistor is in an open, short-circuit while the unit is running. *Error code is displayed but the unit operates continuously.
Probable Cause	• Remote controller thermistor fault • Remote controller PCB fault

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



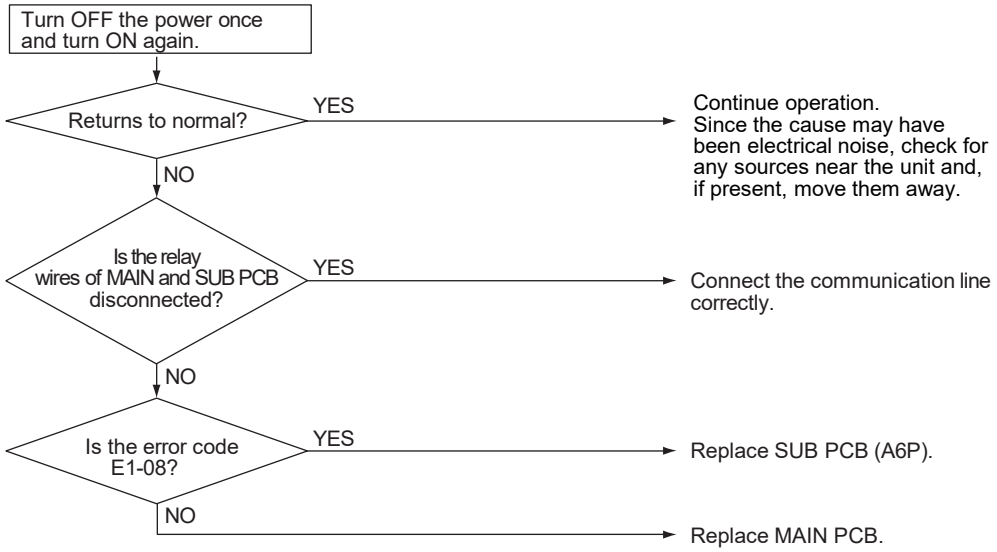
NOTE:
HOW TO DELETE THE ERROR CODE HISTORY.
PRESS THE ON/OFF BUTTON FOR 4 SECONDS OR MORE WHILE THE ERROR CODE IS DISPLAYED IN THE INSPECTION MODE.

SERVICE DIAGNOSIS

Error Code	**E1**
Fault/Alarm Condition	The fault is triggered if the communication between MAIN PCB and other PCBs isn't properly established.
Probable Cause	• MAIN PCB failure • SUB PCB (A6P) failure • Communication failure between MAIN PCB and INDOOR PCB

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

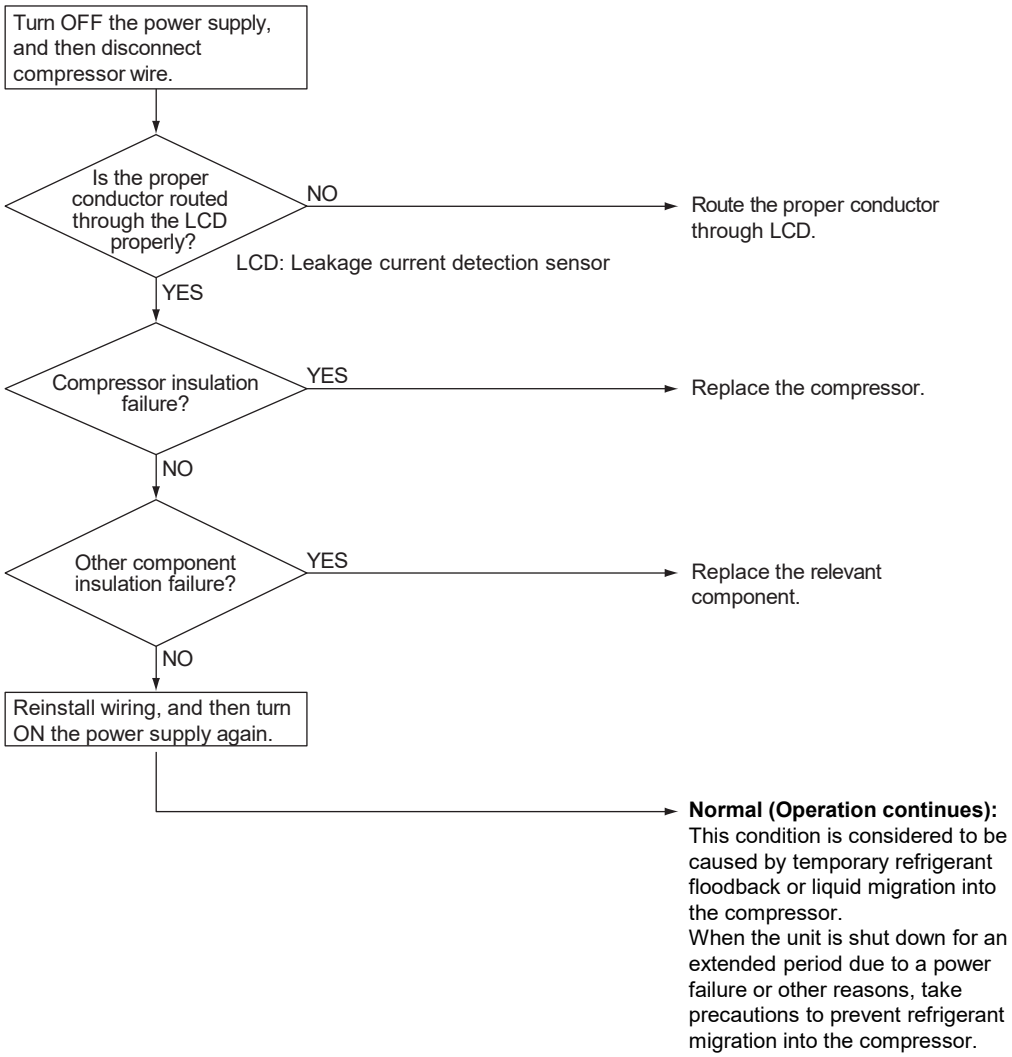


SERVICE DIAGNOSIS

Error Code	**E2-01**
Fault/Alarm Condition	The fault is triggered if the ground leakage detection circuit detects the leakage current.
Probable Cause	• Ground fault • The wrong conductor is routed through the leakage current sensor (LCD). • Temporary floodback in the compressor(s)

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

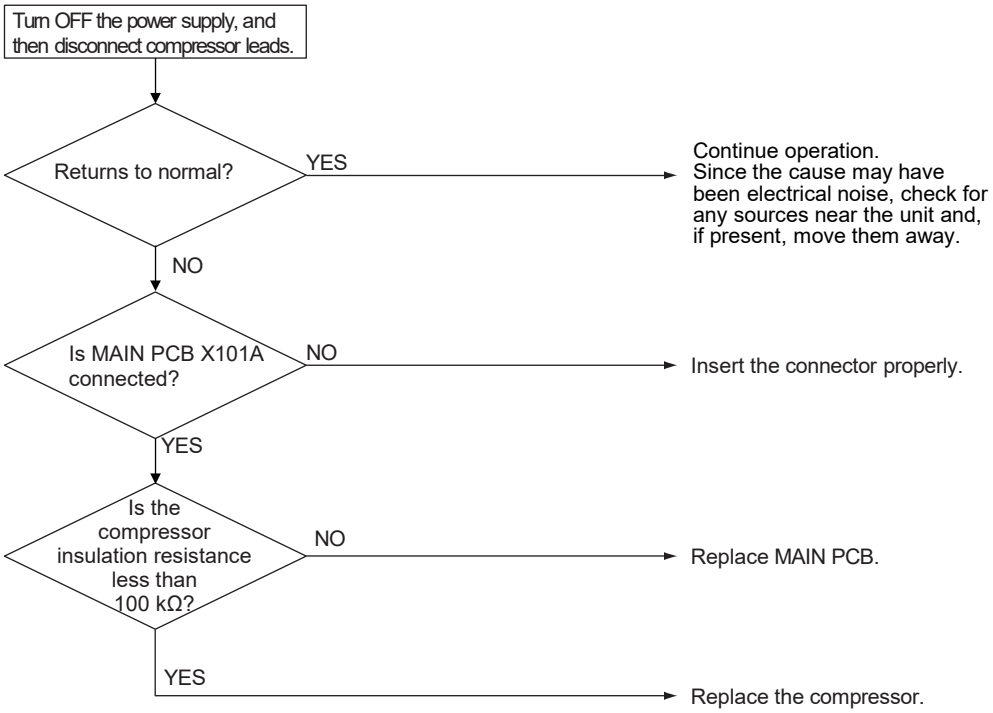


SERVICE DIAGNOSIS

Error Code	**E2-06**
Fault/Alarm Condition	The fault is triggered if the ground leakage detection circuit is missing.
Probable Cause	• Disconnected X101A connector • Disconnected wiring • MAIN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **E3**

Fault/Alarm Condition

The fault is triggered if the high pressure switch is open due to high refrigerant pressure.
(Reference) Operating pressure of the high-pressure switch:

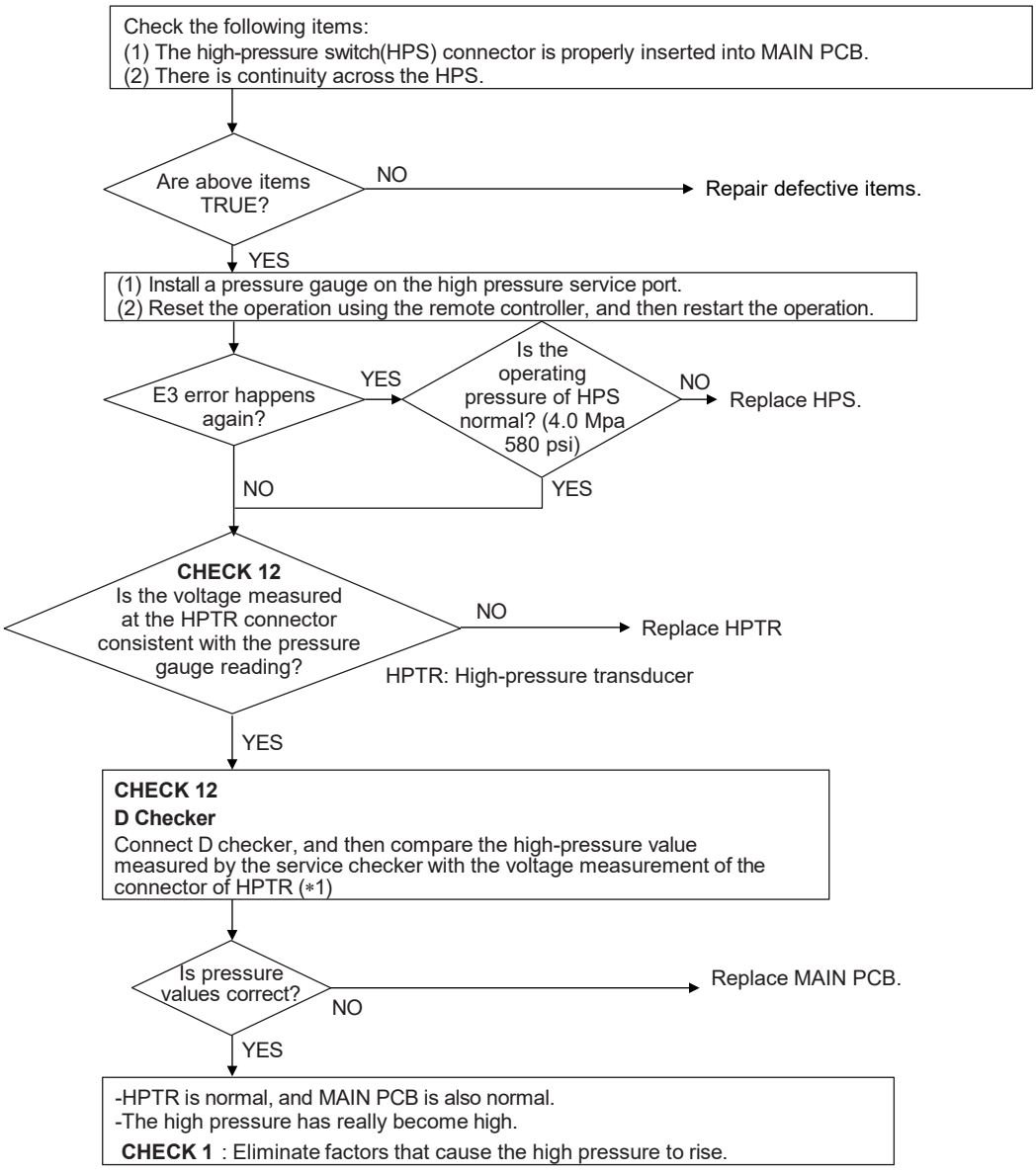
- Operating pressure: 4.0 MPa (580 psi)
- Resetting pressure: 3.0 MPa (435 psi)

Probable Cause

- Activation of high-pressure switch (HPS)
- High-pressure switch (HPS) failure
- MAIN PCB failure
- Momentary power failure
- High-pressure transducer (HPTR) failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

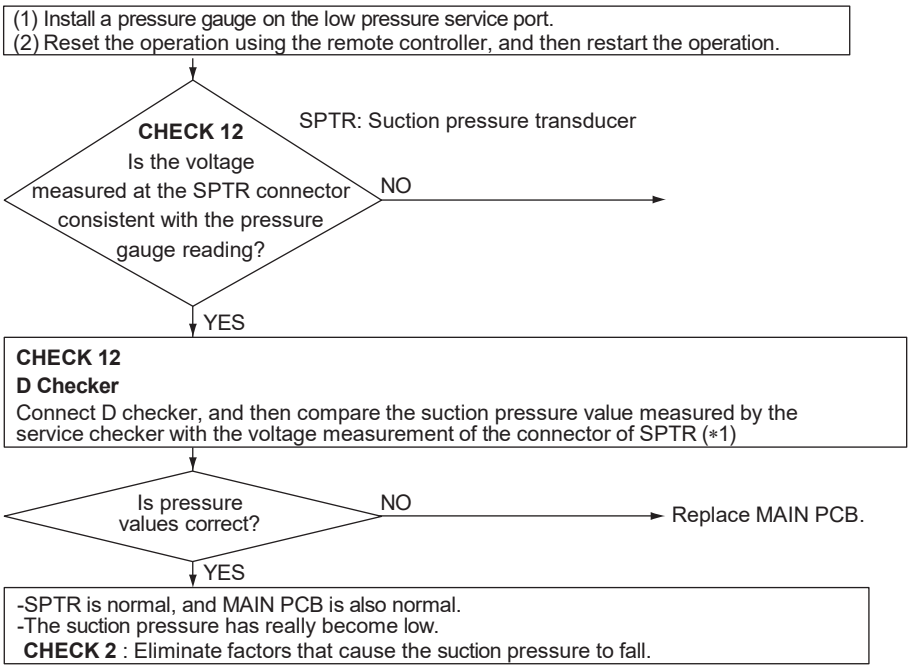


SERVICE DIAGNOSIS

Error Code	**E4**
Fault/Alarm Condition	The fault is triggered if the suction pressure is lower than the threshold while the compressor is running. • Operating pressure: Below 0.07 MPa (10.2 psi)
Probable Cause	• Abnormal drop in suction pressure • Suction pressure transducer failure • MAIN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **E5**

Fault/Alarm Condition

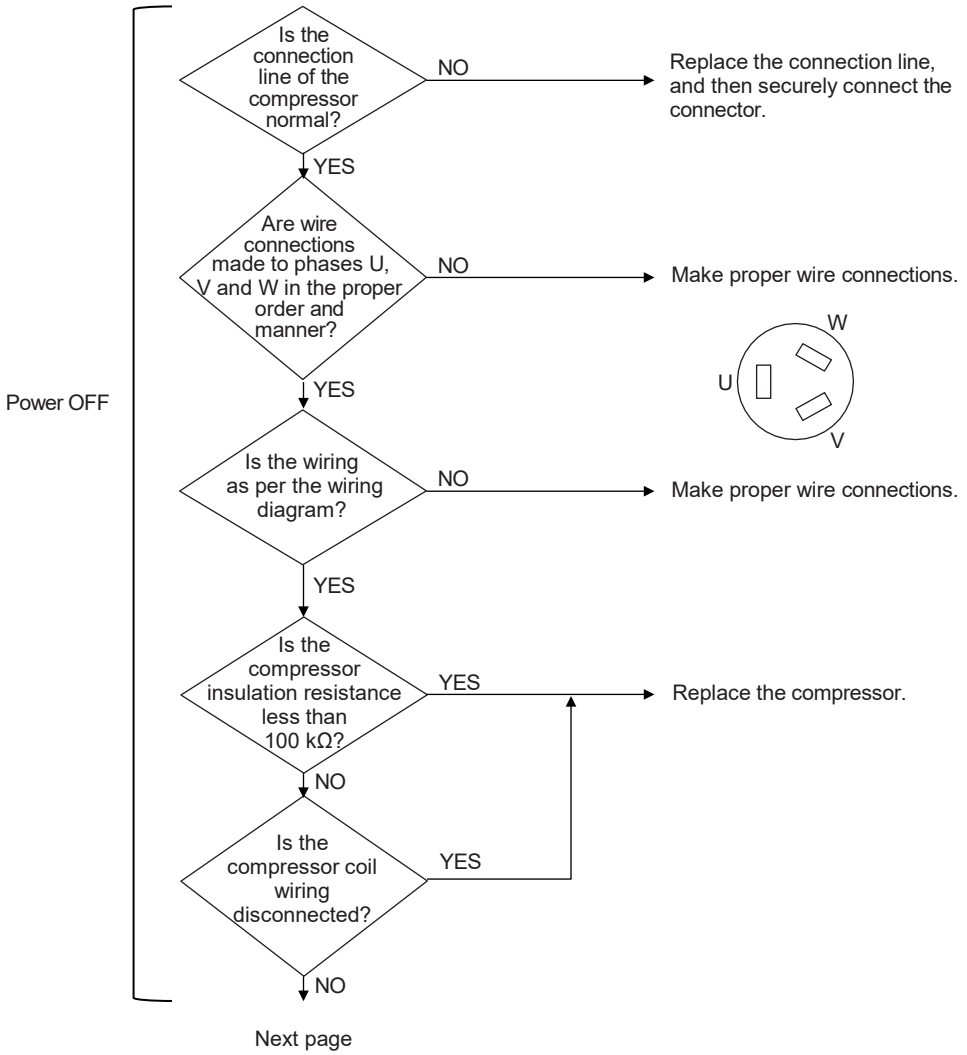
The fault is triggered if any abnormality is detected in the phase current waveform of the position signal received via the U/V/W lines between the INVERTER PCB and the compressor.

Probable Cause

- Compressor locked
- High pressure difference between suction and discharge(0.5 MPa (72.5 psi) or more)
- UVW connection error
- INVERTER PCB failure

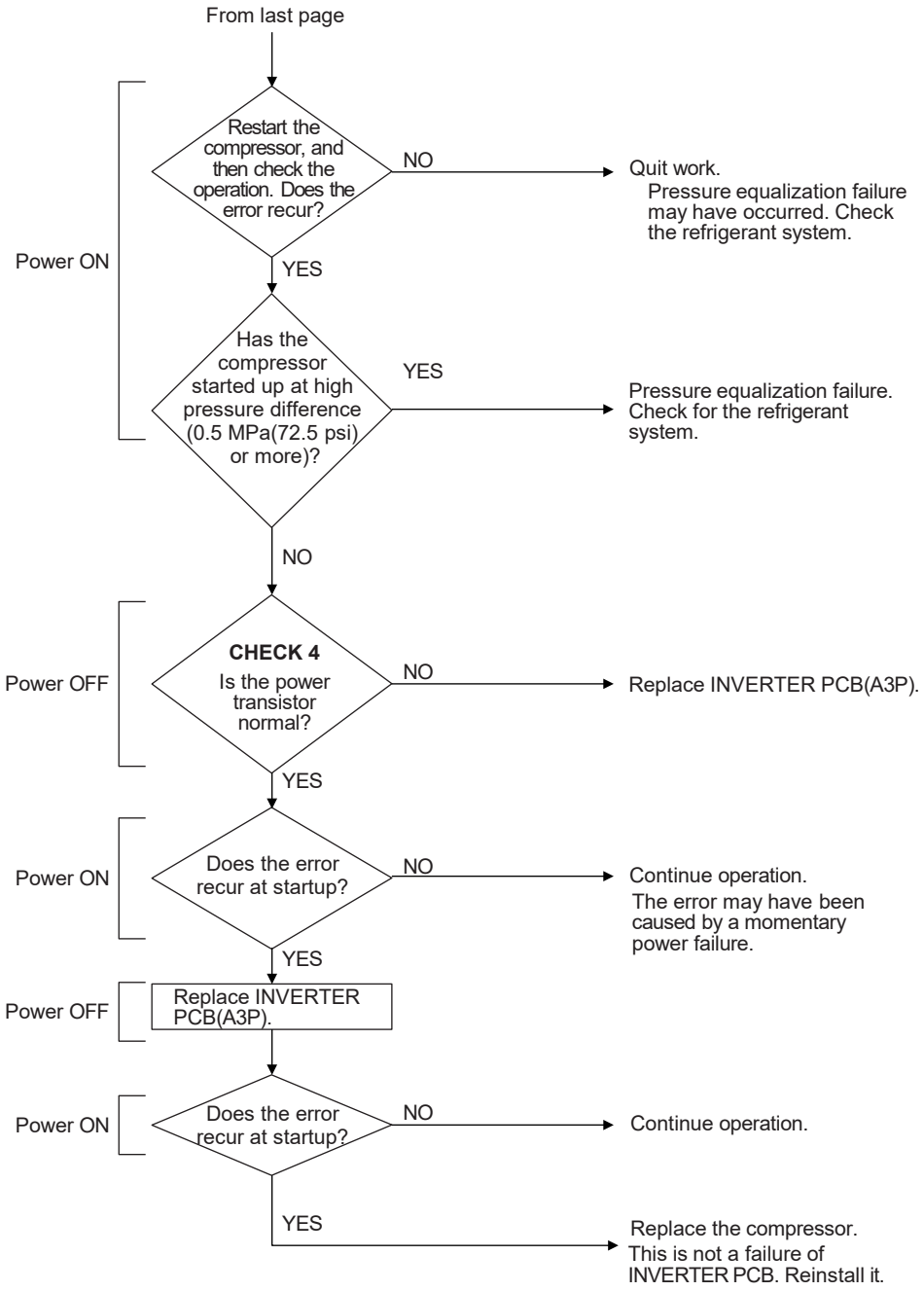
Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



Next page

SERVICE DIAGNOSIS



SERVICE DIAGNOSIS

Error Code **E6**

Fault/Alarm Condition

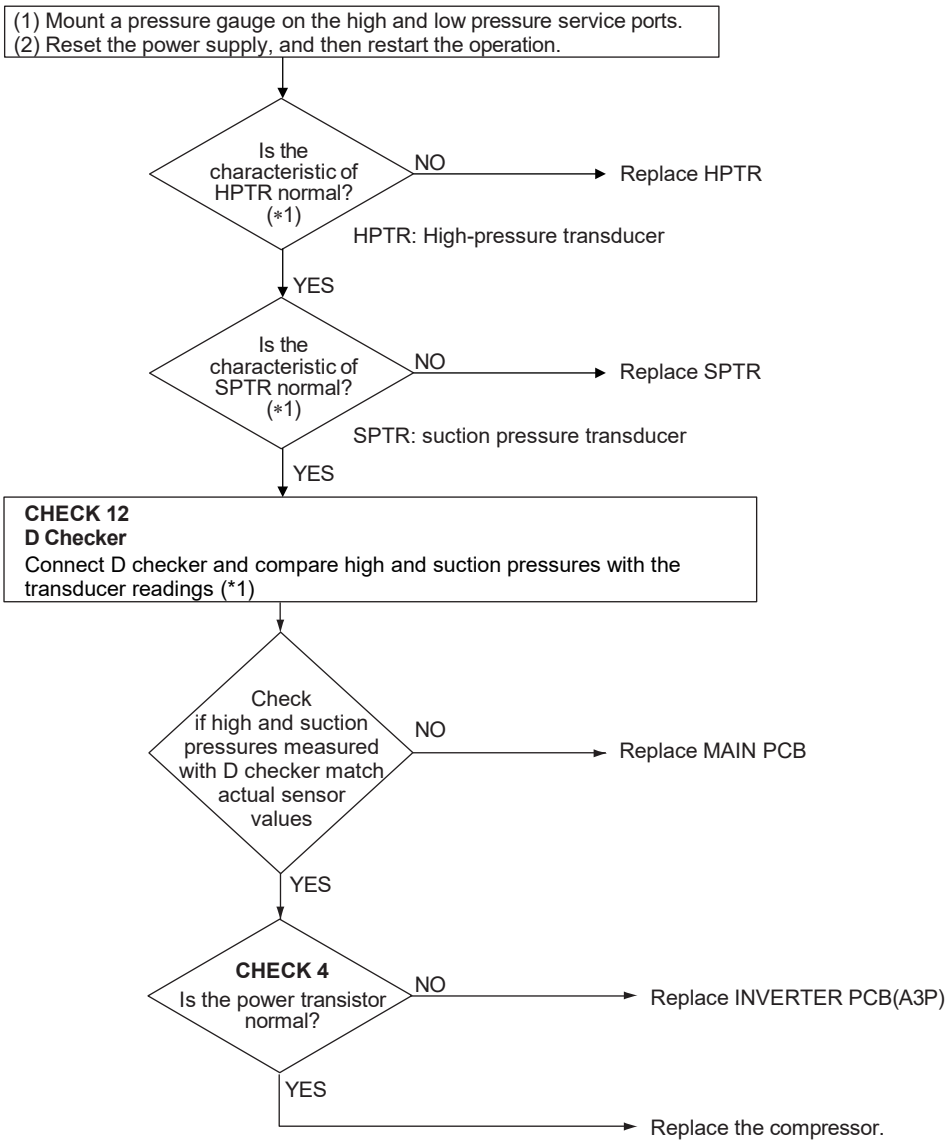
The fault is triggered if the actual compressor input current remains at 130% or more of the calculated theoretical input current for 30 minutes, as determined from the detected compressor speed and high- and suction-pressure values.

Probable Cause

- Compressor failure
- Defective high-pressure transducer (HPTR) failure
- MAIN PCB failure
- INVERTER PCB (A3P) failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

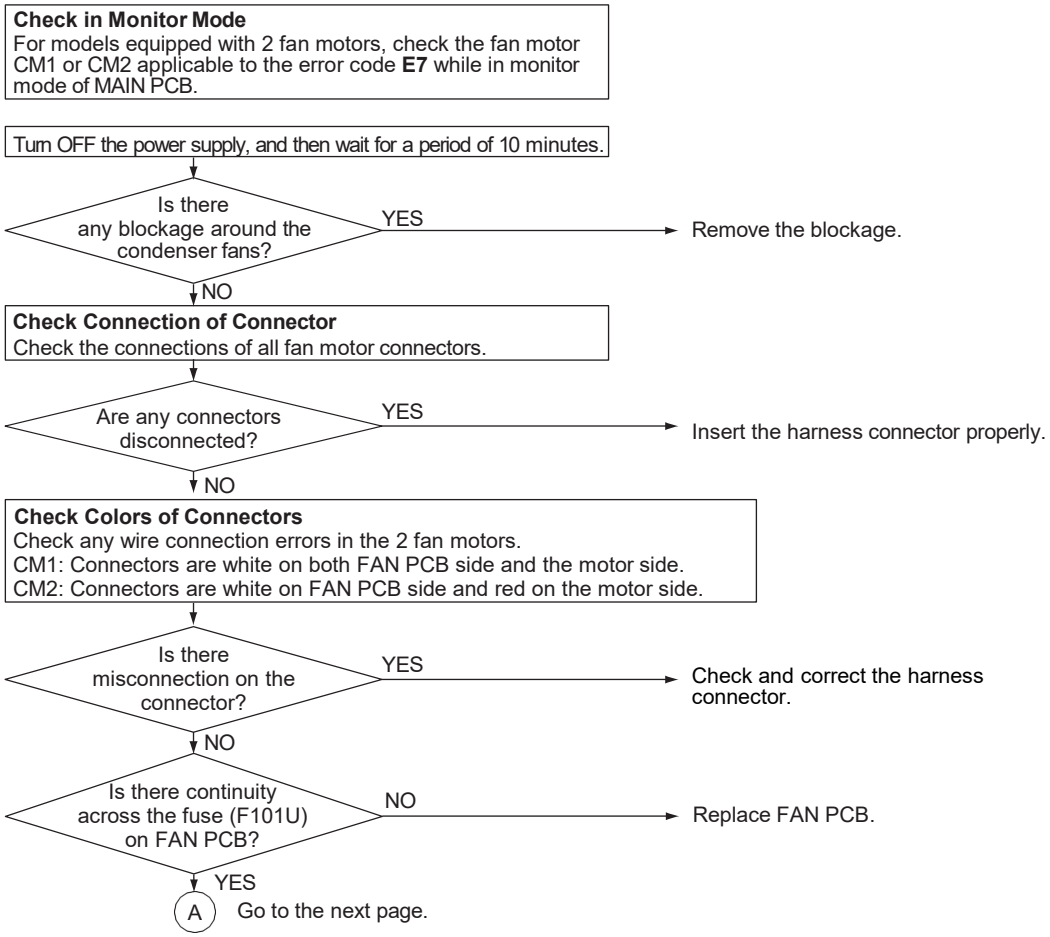


SERVICE DIAGNOSIS

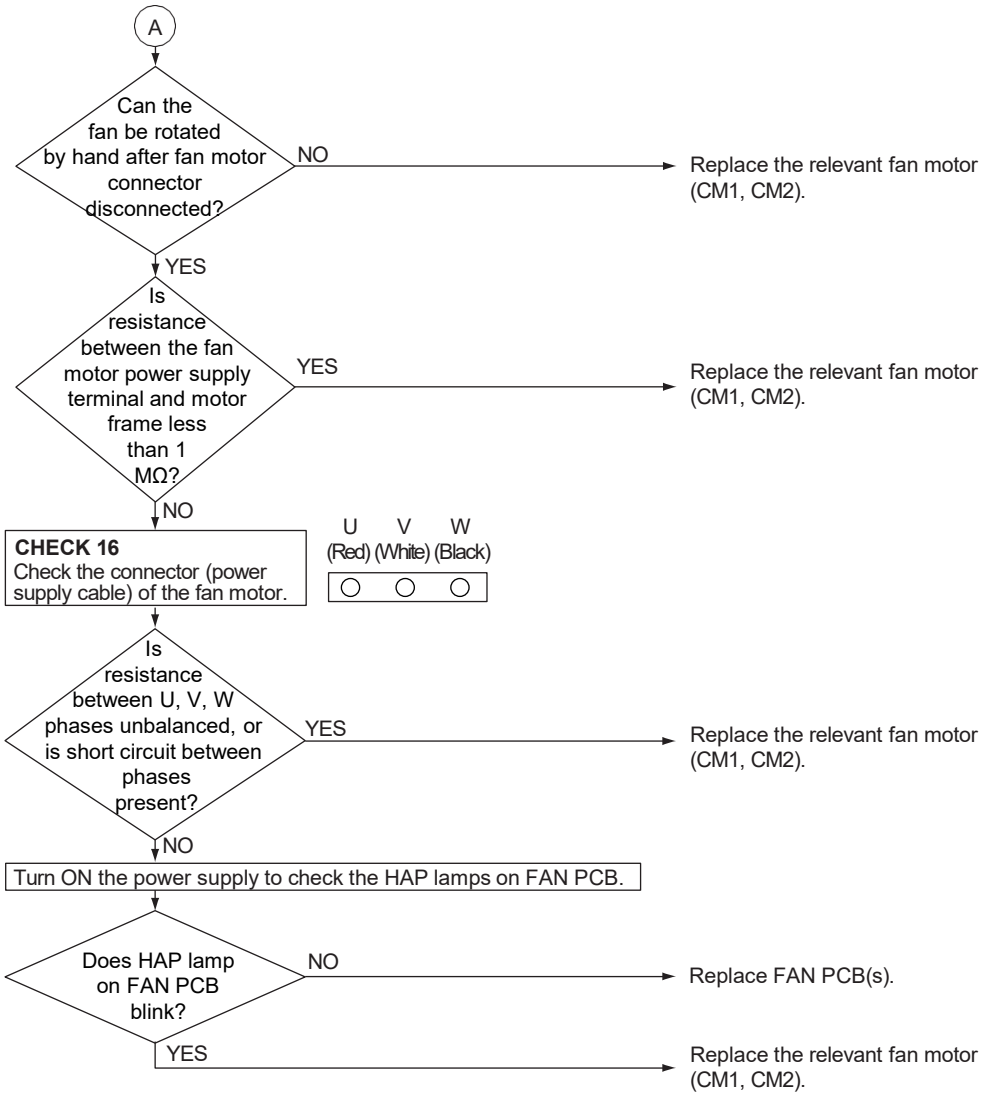
Error Code	**E7**
Fault/Alarm Condition	The fault is triggered if the FAN PCB detects overcurrent four times, or if no increase in fan motor current is detected at startup or during operation four times, resulting in unit shutdown.
Probable Cause	• Fan motor failure • A disconnected or defective harness/connector between the fan motors and FAN PCBs. • Fan does not rotate due to blockage.

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

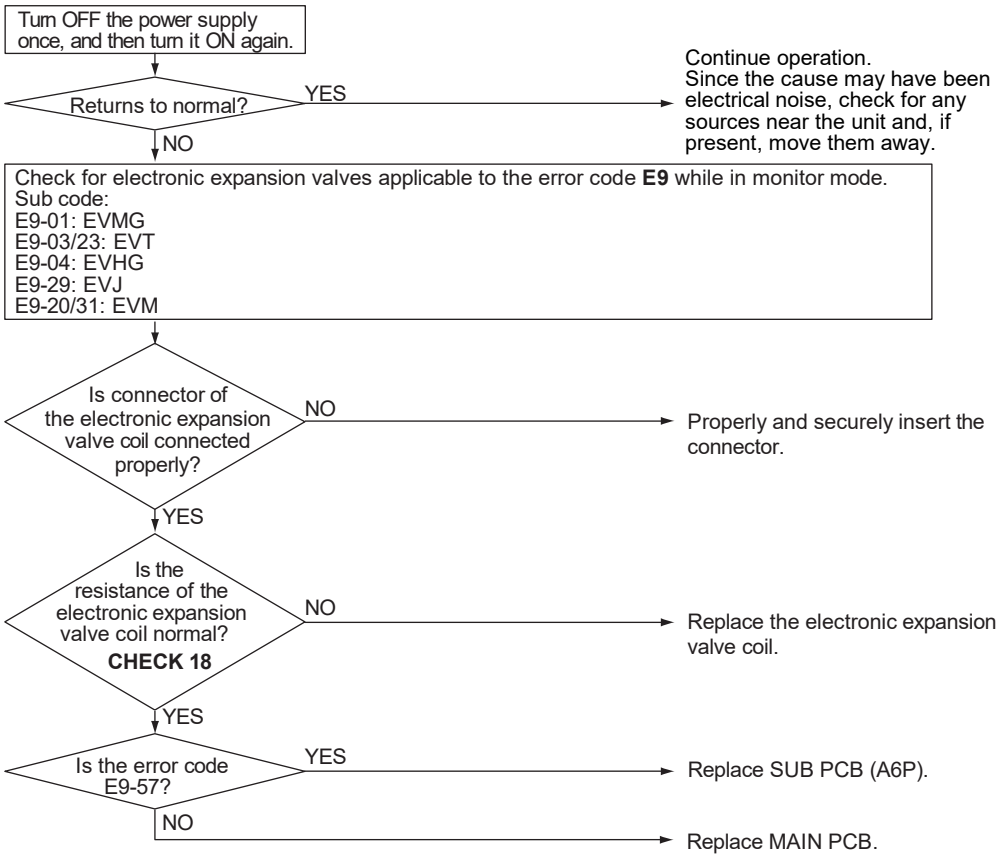


SERVICE DIAGNOSIS

Error Code	**E9**
Fault/Alarm Condition	The fault is triggered when no current is detected at the common terminal (COM[+]) of the electric expansion valve coils during power-on.
Probable Cause	• Disconnection of connectors from electronic expansion valve coils • Defective electronic expansion valve coils failure • MAIN PCB failure • SUB PCB(A6P) momentary overcurrent

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **F3**

Fault/Alarm Condition

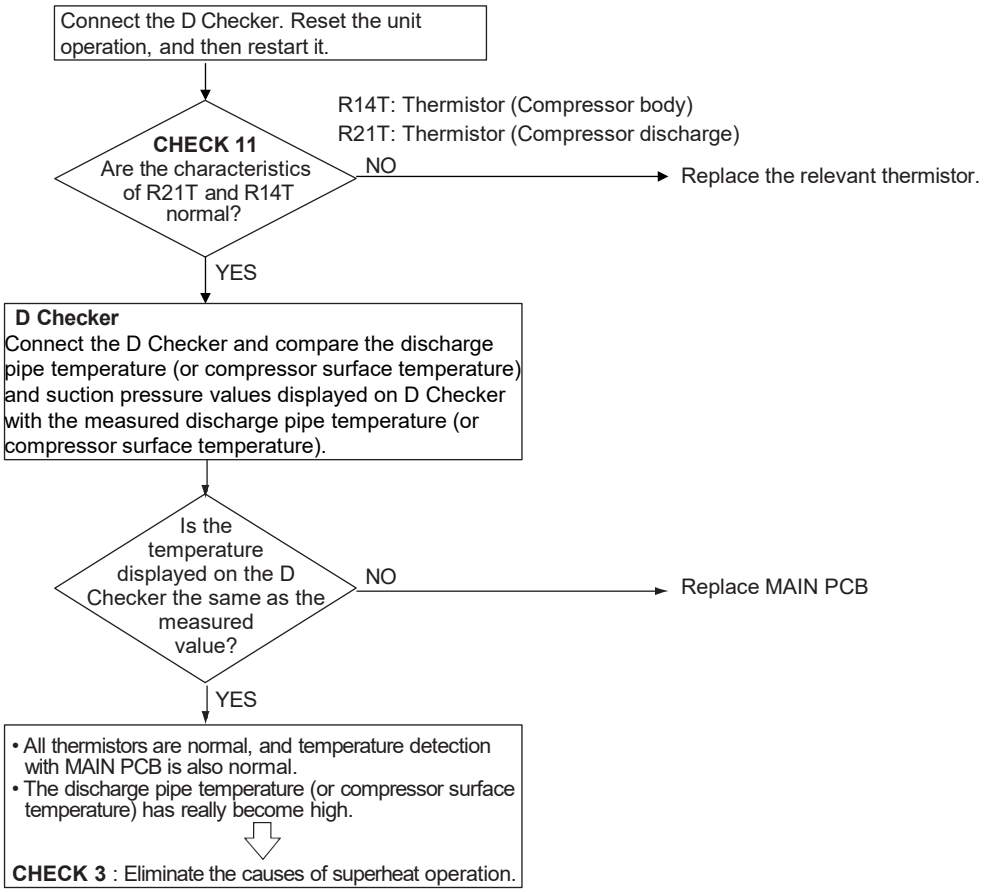
The fault is triggered
- when discharge pipe temperature becomes abnormally high (i.e., 135°C (275°F) or more)
- When discharge pipe temperature sharply rises
  (remains at 120°C (248°F) or more for 10 minutes)

Probable Cause
- when compressor surface temperature becomes abnormally high (i.e., 120°C (248°F) or more)
- when compressor surface temperature sharply rises
  (remains at 115°C (239°F) or more for 10 minutes)

- Abnormal discharge pipe temperature
- Compressor discharge thermistor failure
- Abnormal compressor surface temperature
- Compressor body thermistor failure
- MAIN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **F4**

Fault/Alarm Condition

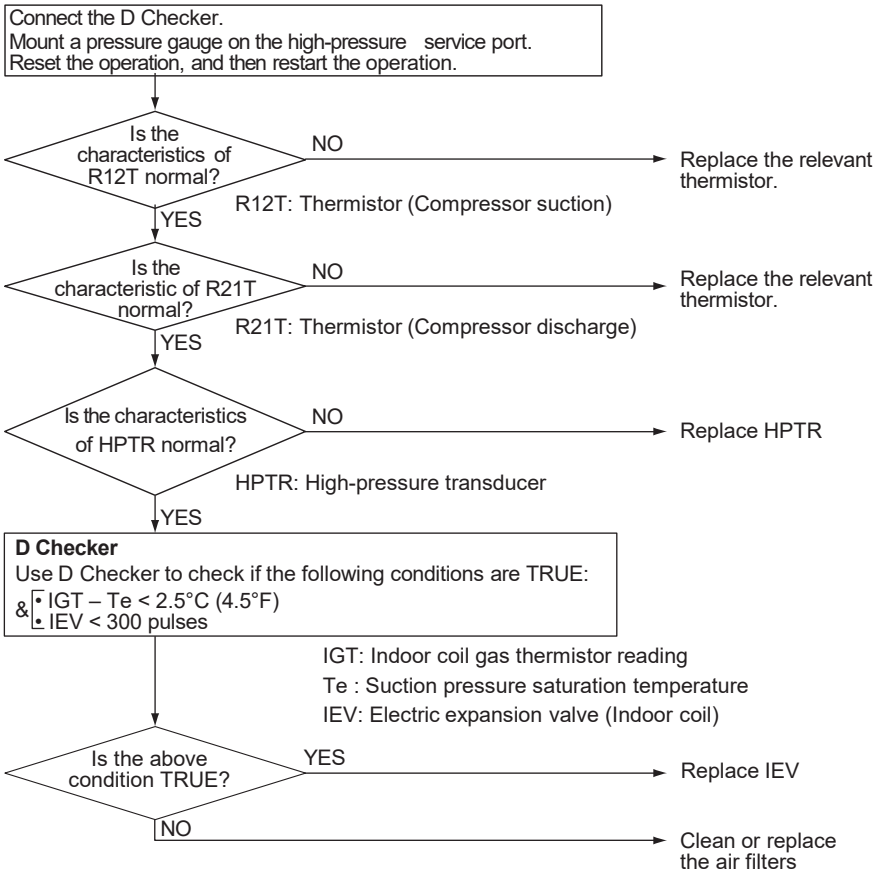
The alarm is triggered if the compressor discharge pipe superheat remains below the specified threshold for 60 minutes. If the condition persists for 120 minutes, a fault is generated and the unit stops operation.
Likewise, if the indoor coil superheat remains below the specified threshold for 45 minutes, an alarm is generated.

Probable Cause

- Defective compressor suction thermistor failure
- Discharge pipe thermistor failure
- Defective high-pressure sensor failure
- Indoor coil electronic expansion valve (IEV) failure
- Dirty air filter

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

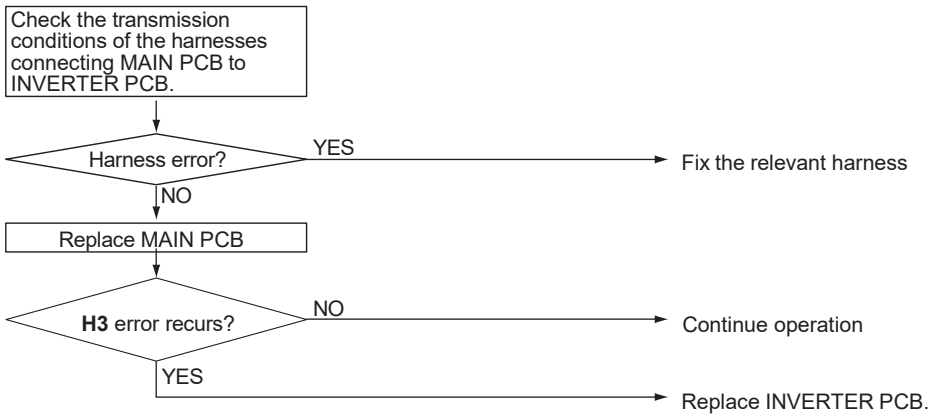


SERVICE DIAGNOSIS

Error Code	**H3**
Fault/Alarm Condition	The alarm is triggered if the transmission between MAIN PCB and INVERTER PCB isn't properly established.
Probable Cause	• Connection failure of jumpers between PCB • MAIN PCB failure • INVERTER PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

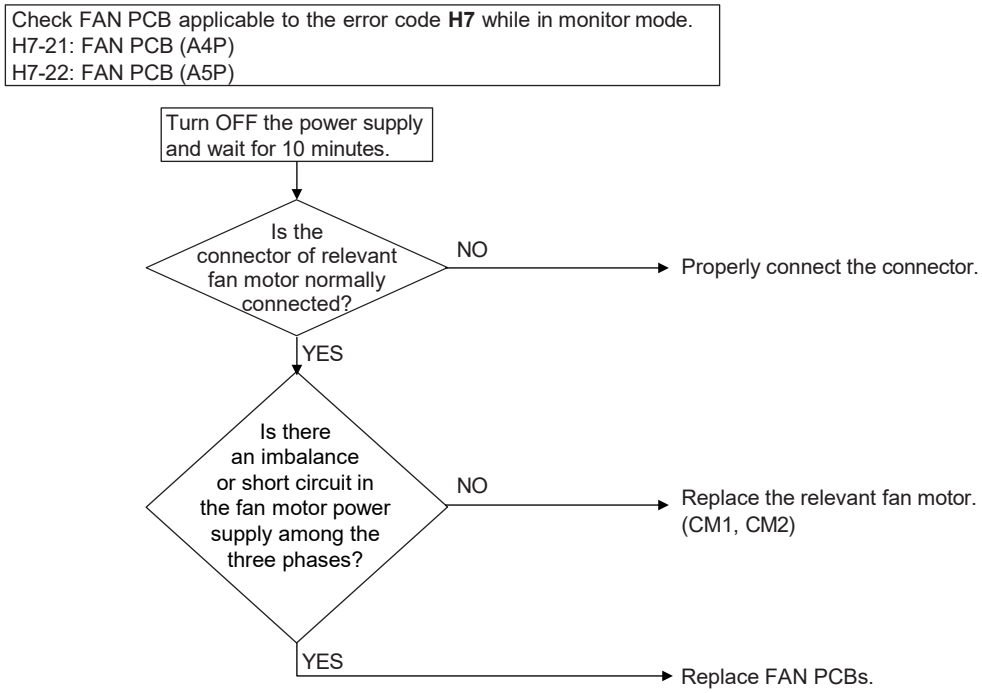


SERVICE DIAGNOSIS

Error Code	**H7**
Fault/Alarm Condition	The fault is triggered if the current sensor on FAN PCBs shows an abnormality.
Probable Cause	• FAN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

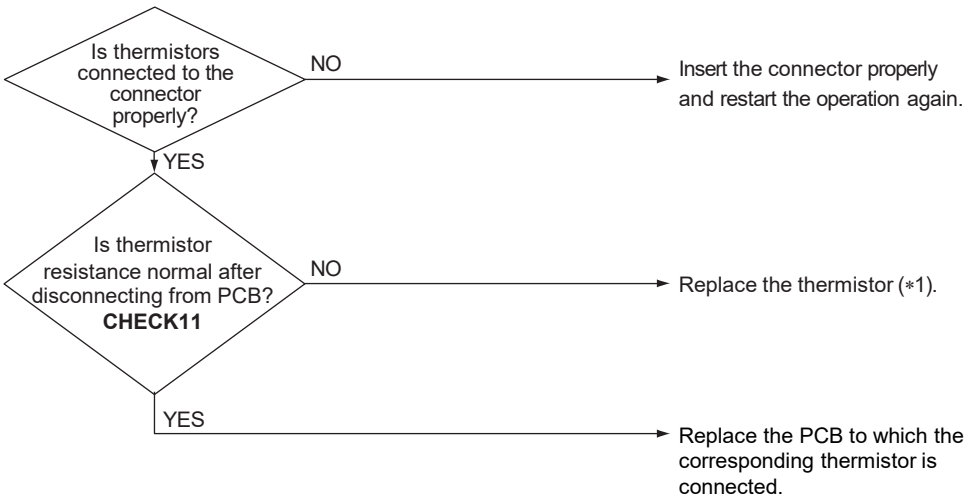


SERVICE DIAGNOSIS

Error Code	**H9, J3, J5, J6, J7, J8, J9**
Fault/Alarm Condition	The fault is triggered if the thermistors are in open or short-circuit
Probable Cause	• Connection failure of the thermistor • Thermistor failure • MAIN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



NOTE:
CHECK THE ERROR CODE AND SUB CODE, AND REPLACE THE CORRESPONDING THERMISTOR.

SERVICE DIAGNOSIS

Error Code **JA**

Fault/Alarm Condition

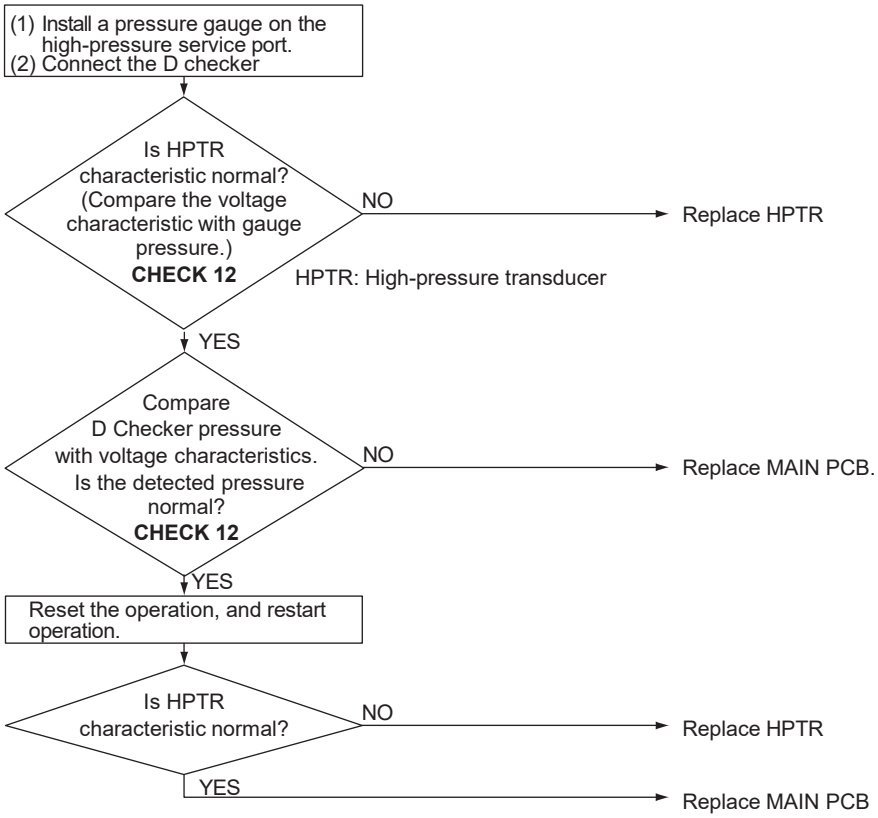
The fault is triggered if the high-pressure transducer is open or short circuit.

Probable cause

- High-pressure transducer failure
- Connection of suction pressure transducer in mistake for High-pressure transducer
- MAIN PCB failure
- Connection failure of High-pressure transducer

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **JC**

Fault/Alarm Condition

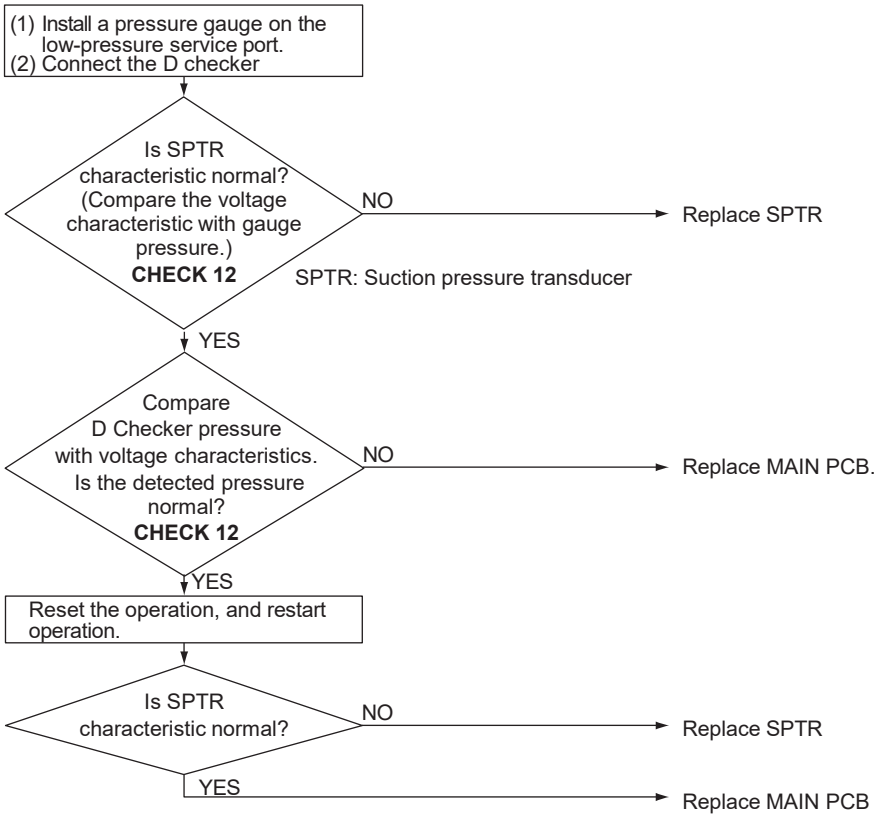
The fault is triggered if the suction pressure transducer is open or short circuit.

Probable Cause

- Suction pressure transducer failure
- Connection of High-pressure transducer in mistake for suction pressure transducer
- MAIN PCB failure
- Connection failure of suction pressure transducer

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **L1**

Fault/Alarm Condition

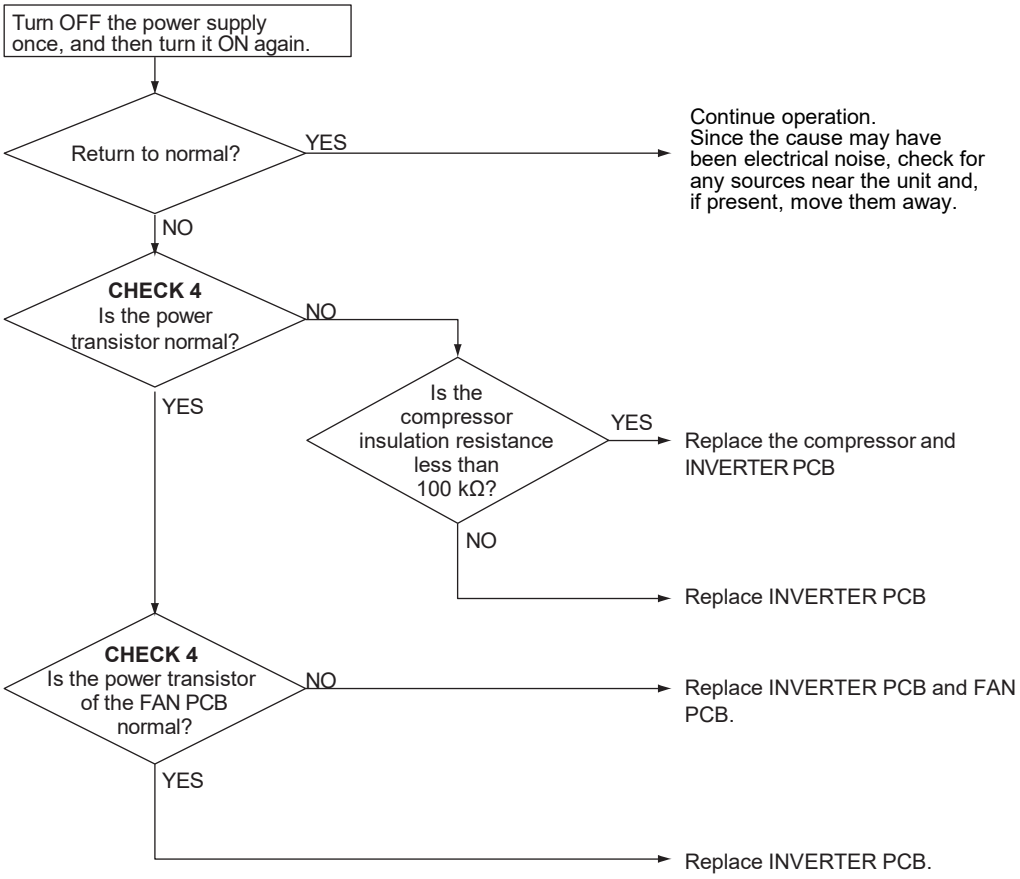
The fault is triggered if the current sensor on INVERTER PCB detects
- the overcurrent flows during the output of waveform
- the current sensor failure during synchronous operation
- IPM failure

Probable Cause

- INVERTER PCB
- IPM failure
- Current sensor failure
- Drive circuit failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **L4**

Fault/Alarm Condition

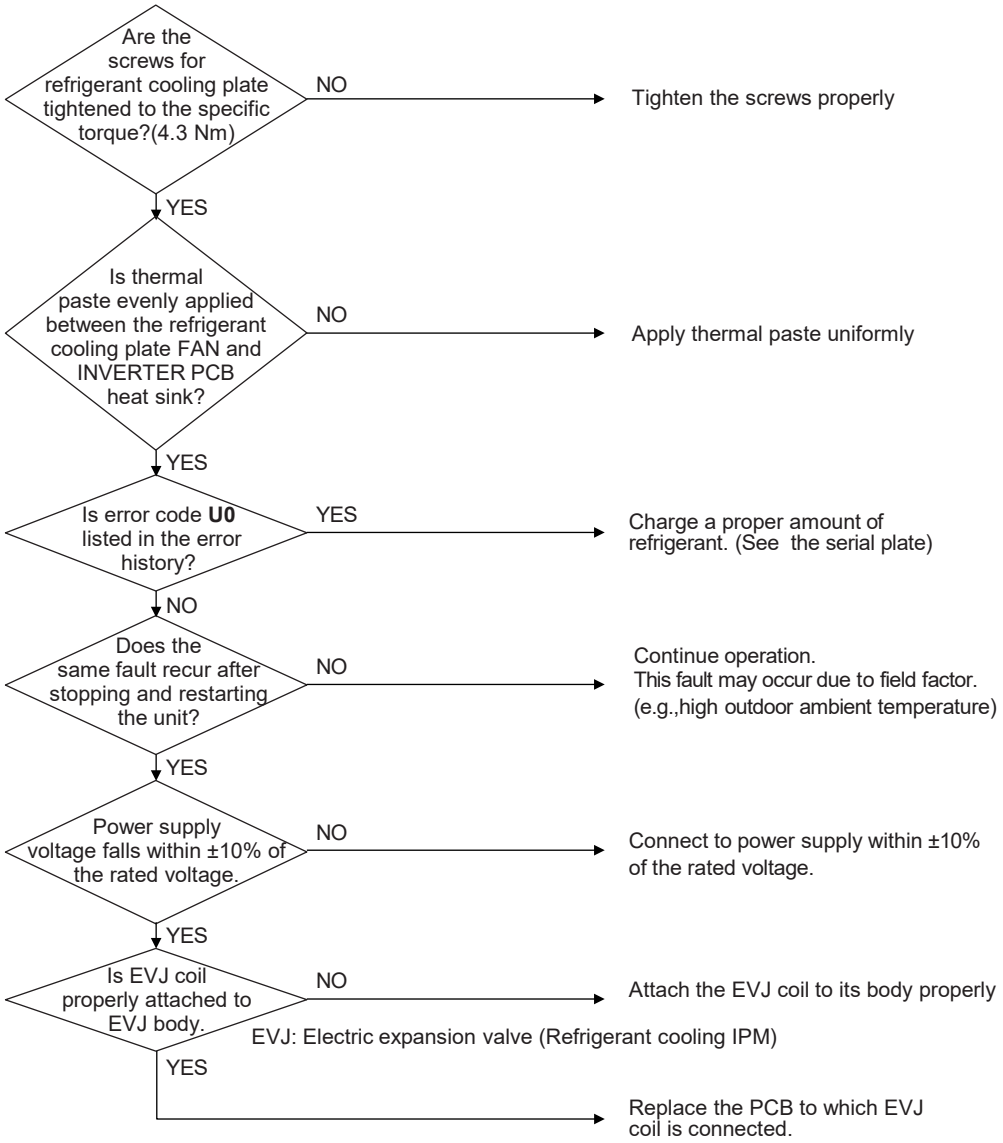
The fault is triggered if overtemperature is detected by the thermistor located inside the inverter power module of INVERTER PCB and FAN PCB.

Probable Cause

- Refrigerant cooling plate not properly contacting INVERTER PCB heat sink
- Insufficient refrigerant charge
- INVERTER PCB failure
- High outdoor ambient temperature
- Abnormal power supply voltage (over/under)
- Electronic expansion valve failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



EVJ: Electric expansion valve (Refrigerant cooling IPM)

SERVICE DIAGNOSIS

Error Code **L5**

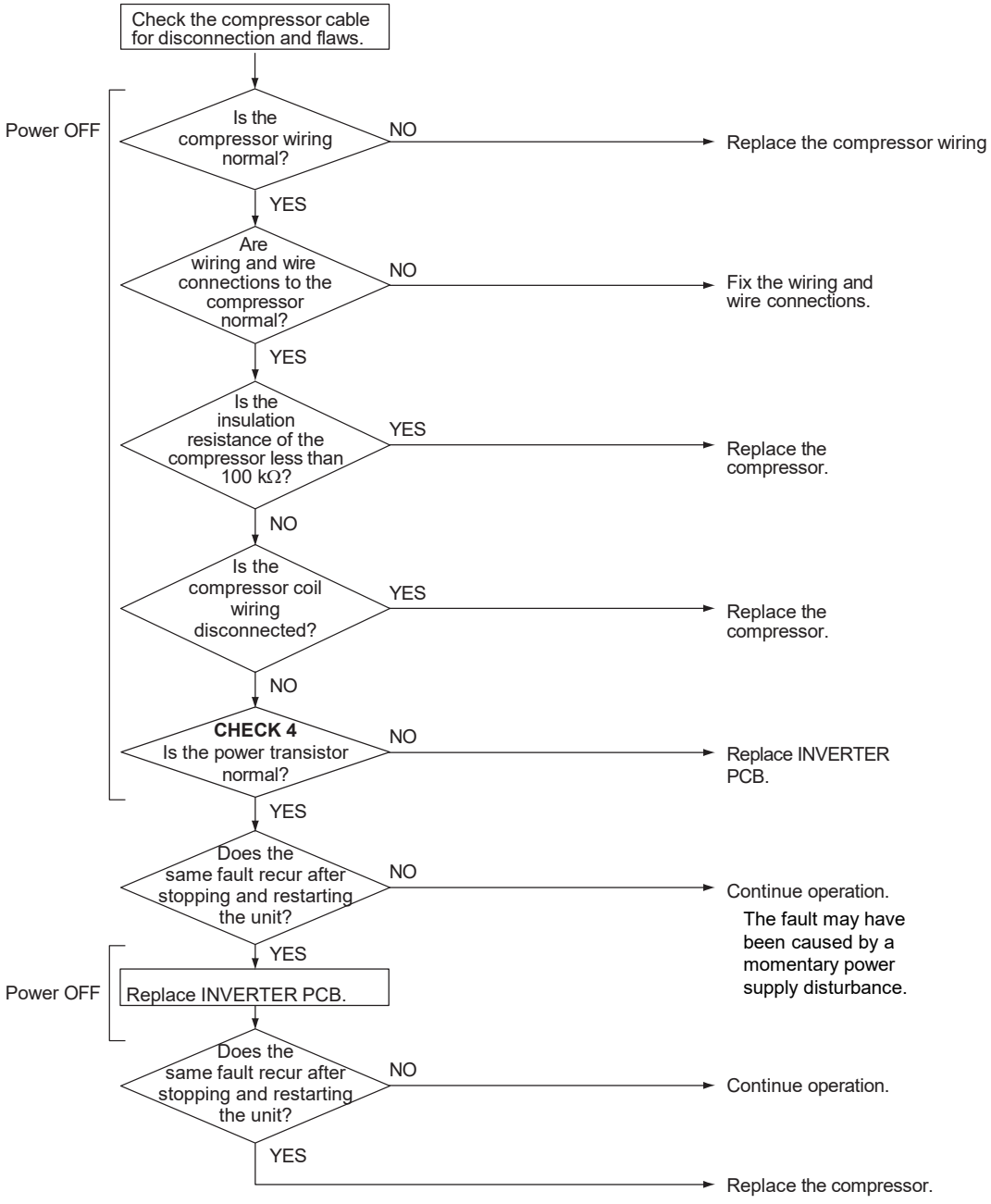
Fault/Alarm Condition The fault is triggered a momentary overcurrent is detected through the power transistor.

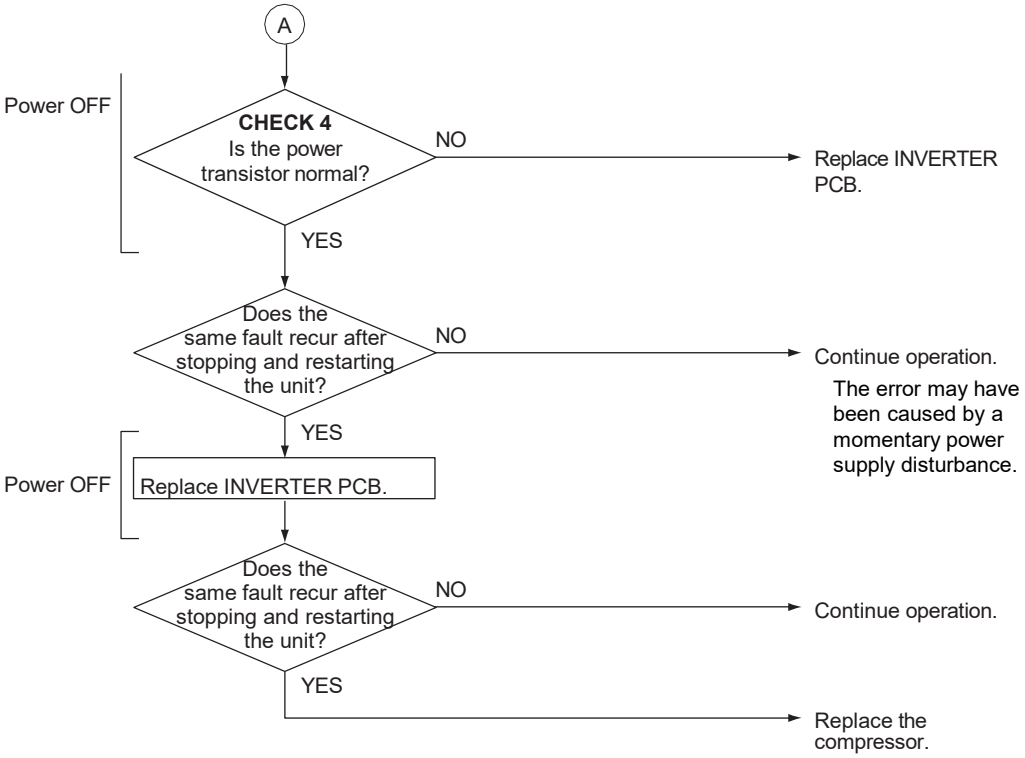
Probable Cause

- Compressor coil failure (e.g., wiring disconnection or insulation failure)
- Compressor startup failure (mechanical lock)
- INVERTER PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.




A
Power OFF
CHECK 4
Is the power transistor normal?
NO
Replace INVERTER PCB.
YES
Does the same fault recur after stopping and restarting the unit?
NO
Continue operation.
The error may have been caused by a momentary power supply disturbance.
YES
Power OFF
Replace INVERTER PCB.
Does the same fault recur after stopping and restarting the unit?
NO
Continue operation.
YES
Replace the compressor.

SERVICE DIAGNOSIS

Error Code **L8**

Fault/Alarm Condition

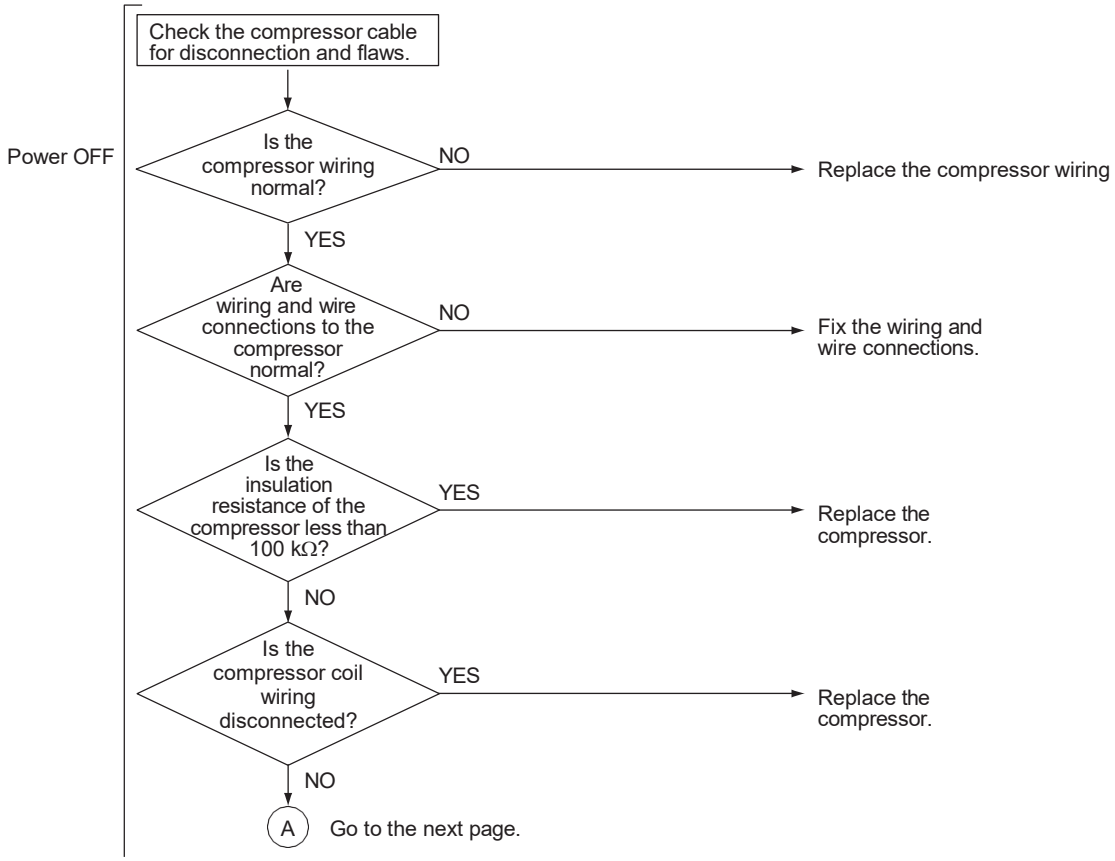
The fault is triggered if the inverter output current exceeds a threshold.

Probable Cause

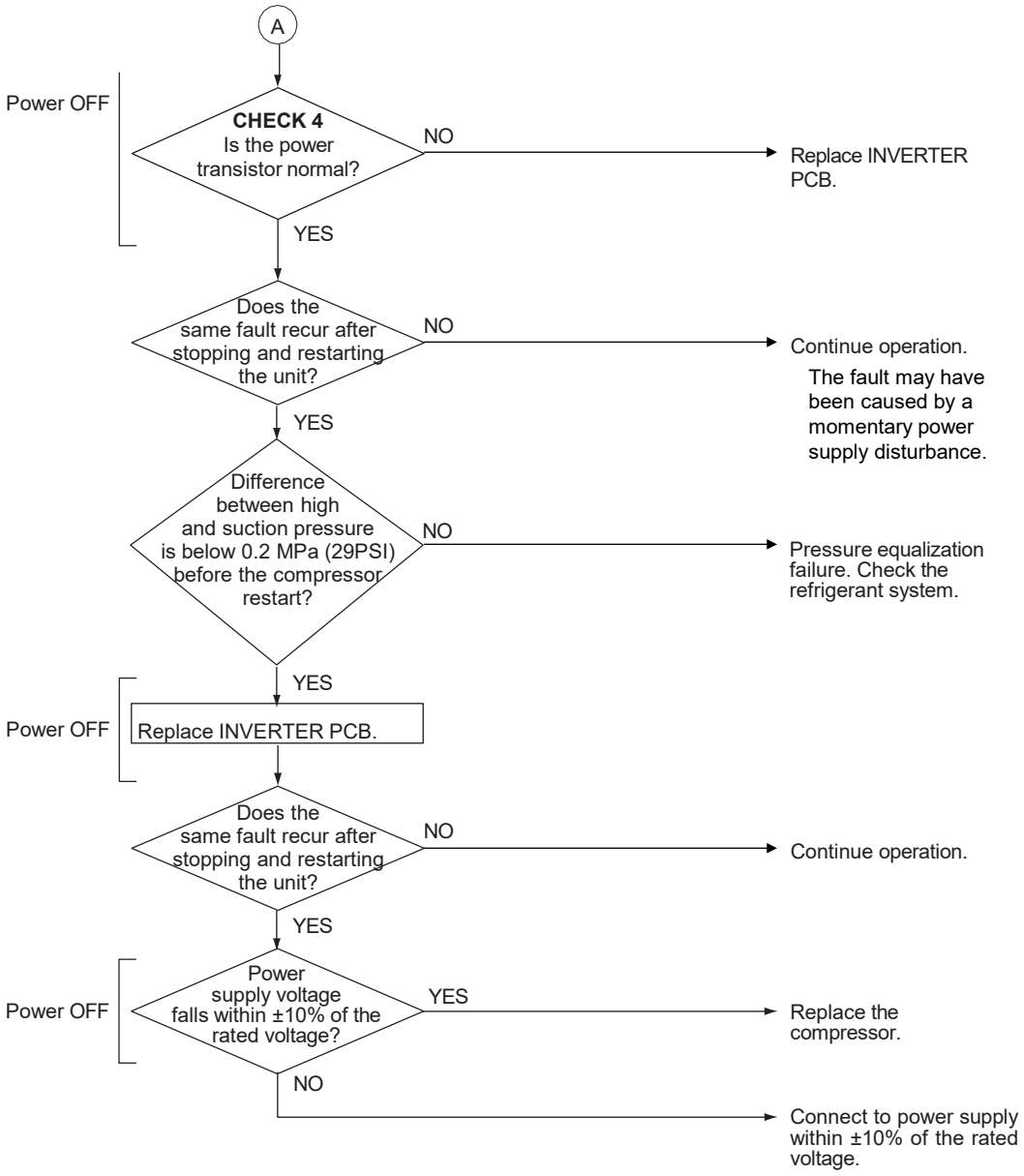
- Compressor overloaded
- Wiring disconnection in compressor coil
- Disconnection of compressor wiring
- INVERTER PCB failure
- Incorrect power supply voltage

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS



SERVICE DIAGNOSIS

Error Code **L9**

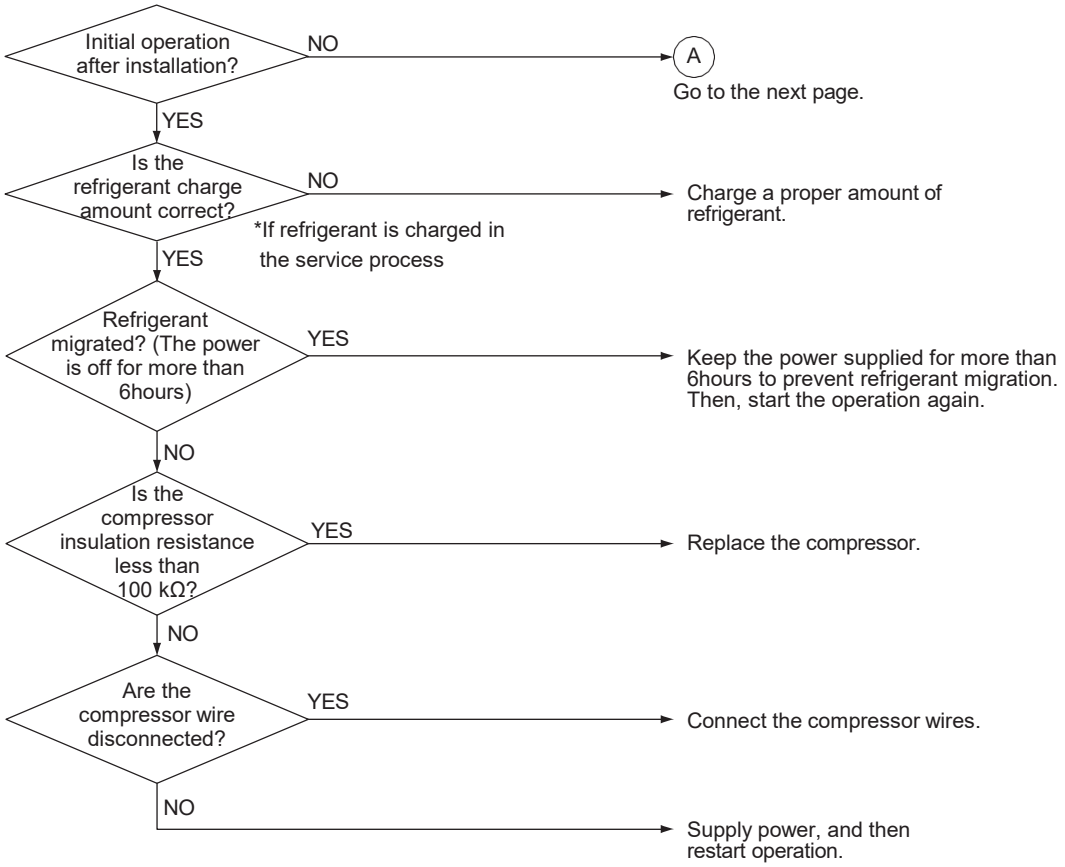
Fault/Alarm Condition The fault is triggered if the compressor startup operation has not been completed.

Probable Cause

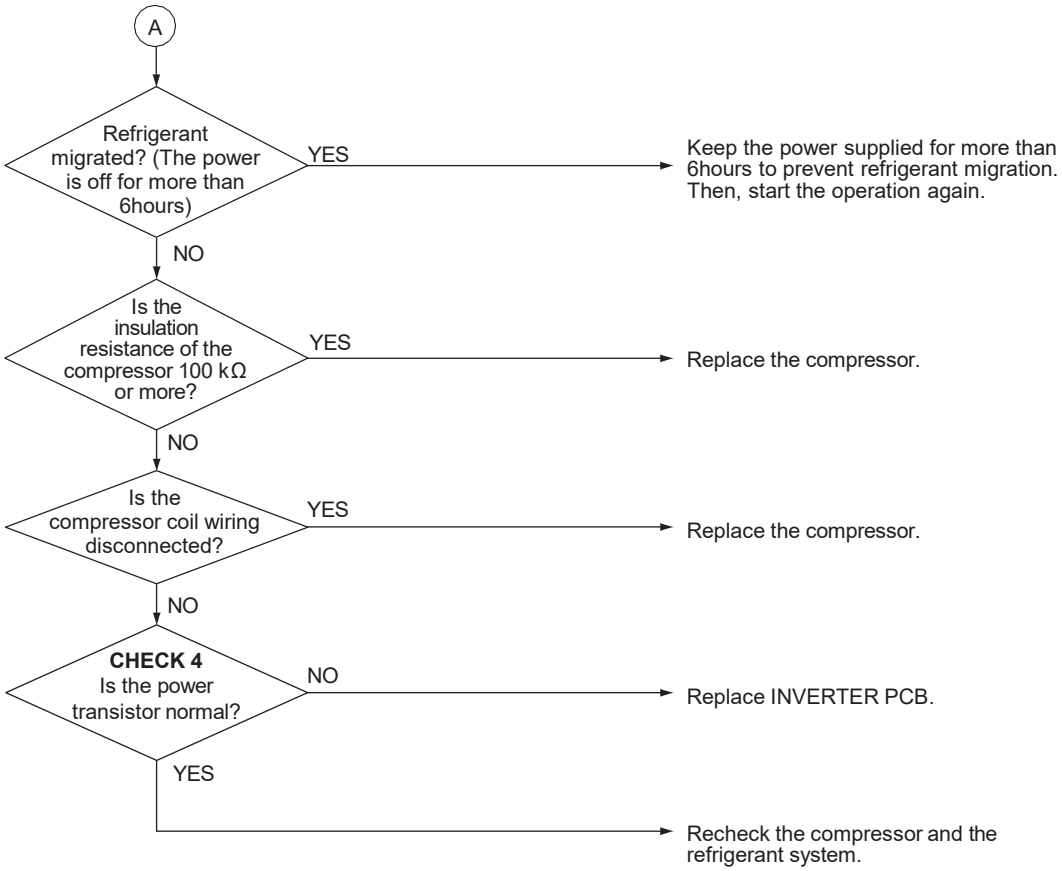
- Compressor failure
- Failure in wire connections to the compressor
- Large pressure difference before compressor startup
- INVERTER PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS



SERVICE DIAGNOSIS

Error Code **LC**

Fault/Alarm Condition

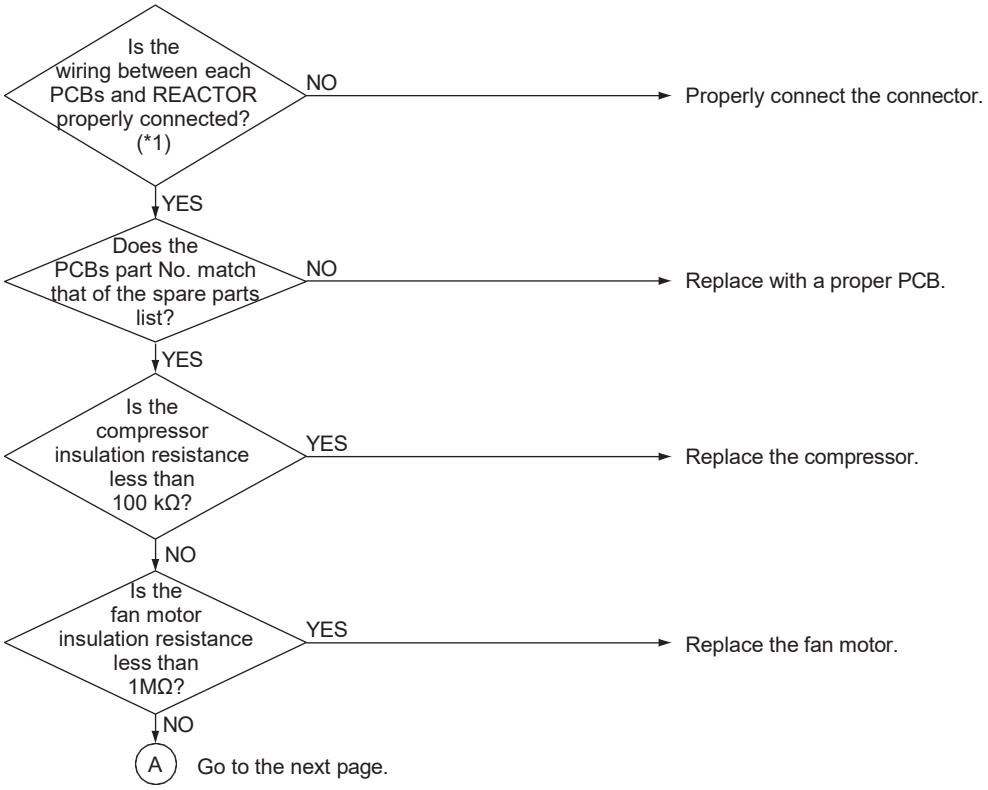
The fault is triggered if the normal transmission between MAIN and INVERTER PCB is disabled for a specific period.

Probable Cause

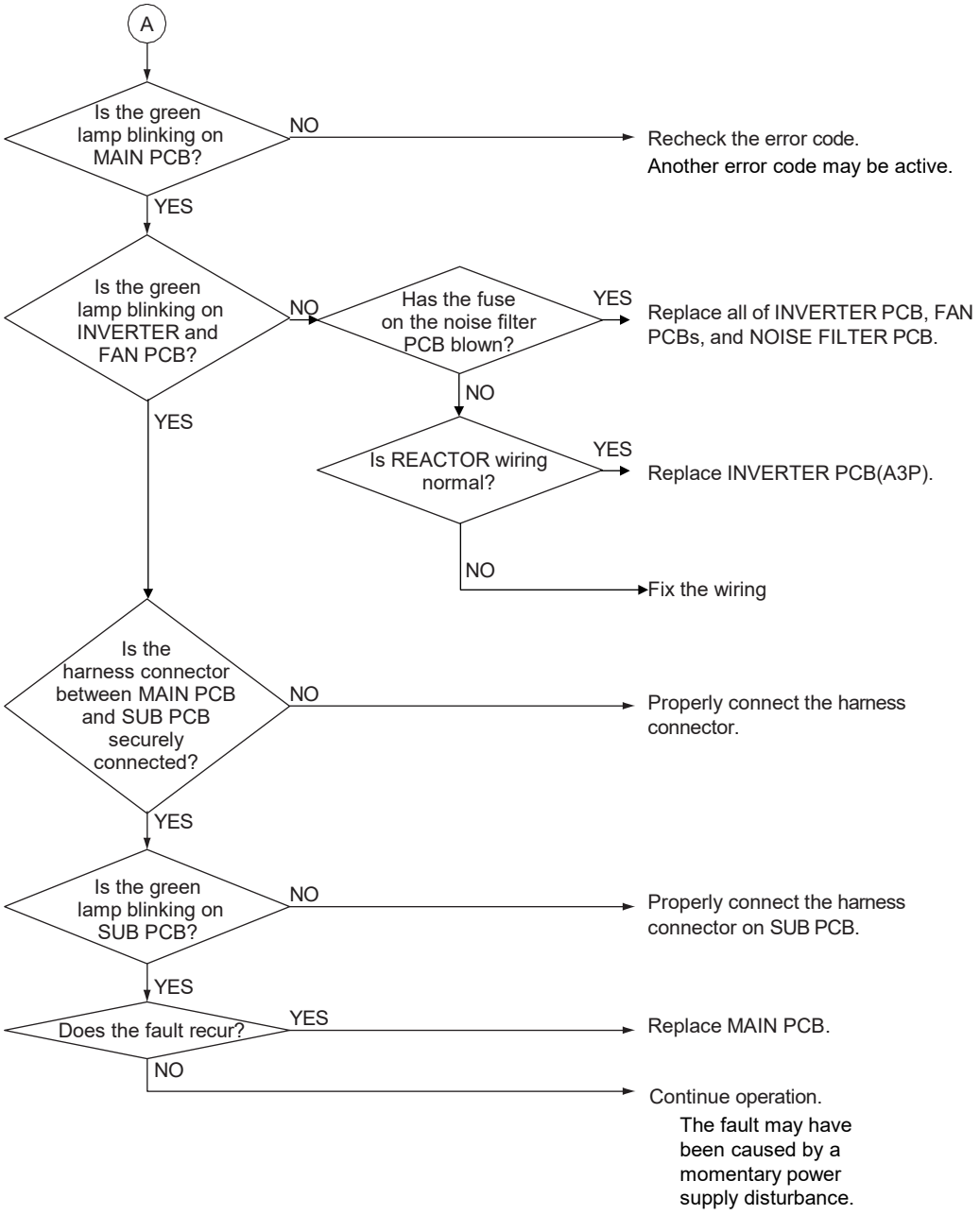
- Connection failure between INVERTER PCB and MAIN PCB
- MAIN PCB failure
- Failure of noise filter, compressor or fan motor
- External factors (e.g. noise)
- Failure of INVERTER PCB or FAN PCB

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS



NOTE:

CONNECT AND DISCONNECT THE CONNECTOR ONCE TO ENSURE THAT IT IS SECURELY CONNECTED.

SERVICE DIAGNOSIS

Error Code **P1**

Fault/Alarm Condition

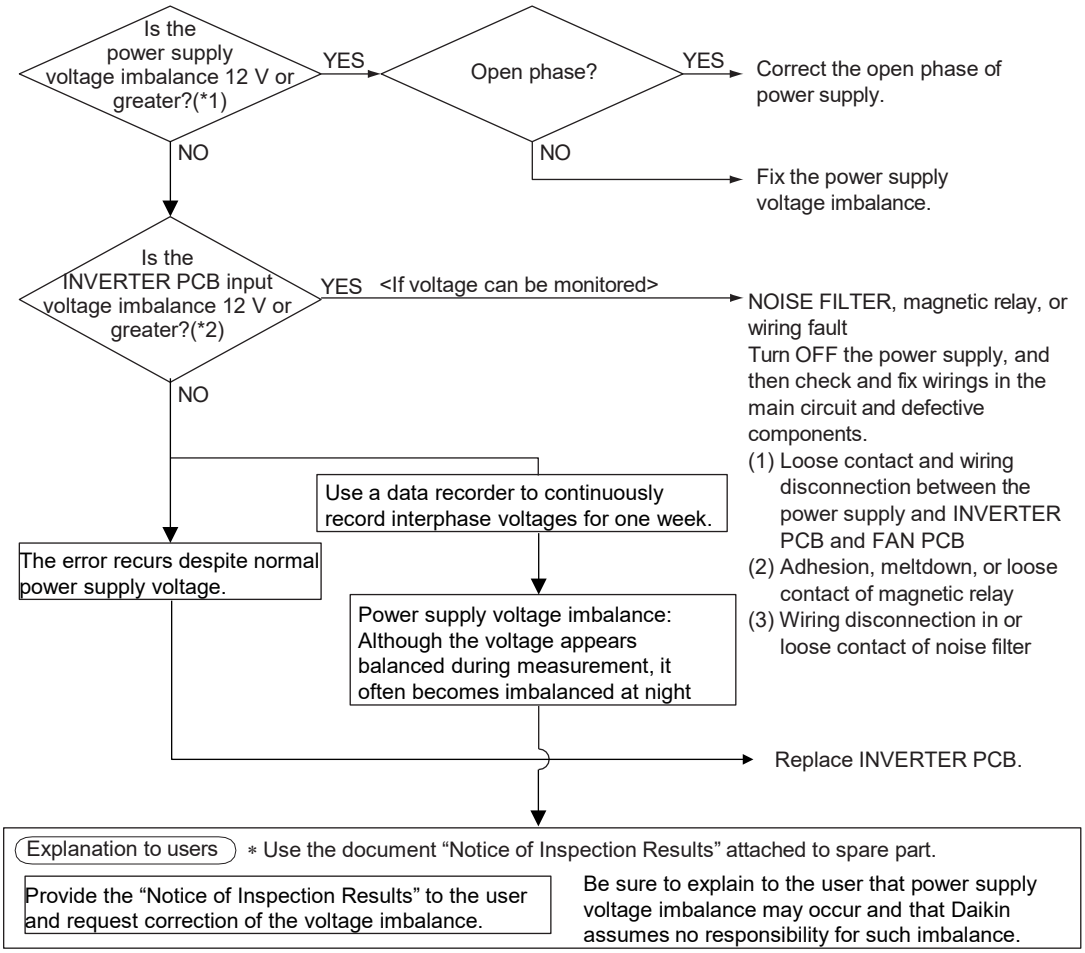
The fault is triggered if the power supply voltage imbalance exceeds approximately 12 V.
Fault is not decided while the unit operation is continued.
P1 will be displayed by pressing the inspection button.

Probable Cause

- Open phase
- Interphase voltage imbalance
- The capacitor in the main circuit failure
- INVERTER PCB failure
- Magnetic relay failure
- Wiring in the high-voltage line

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



NOTE:
MAKE MEASUREMENT OF VOLTAGE AT THE POWER SUPPLY TERMINAL BLOCK (MAIN PCB-X1M).
MAKE MEASUREMENT OF VOLTAGE AT THE L1, L2 AND L3 TERMINALS OF DIODE MODULE LOCATED ON INVERTER PCB DURING THE COMPRESSOR IS IN OPERATION.

SERVICE DIAGNOSIS

Error Code **P4-01**

Fault/Alarm Condition

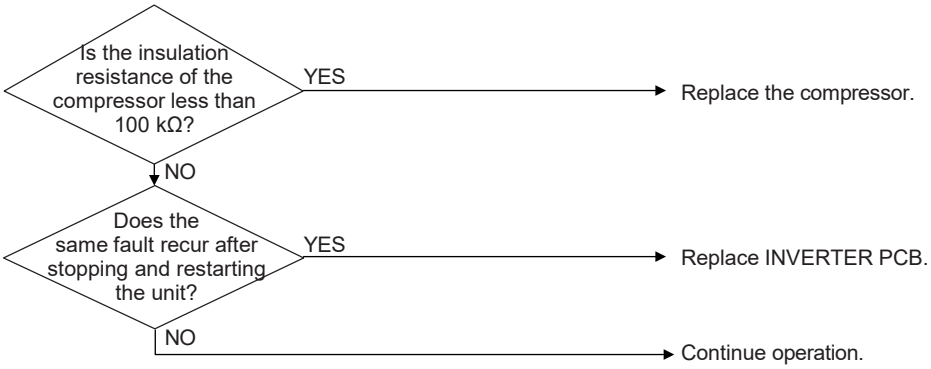
The fault is triggered if open or short is detected for the thermistor inside INVERTER PCB.
Fault is not detected while the unit operation is continued.
P4 will be displayed by pressing the inspection button.

Probable Cause

- Radiation fin temperature thermistor failure
- INVERTER PCB failure
- Compressor failure
- Fan motor failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

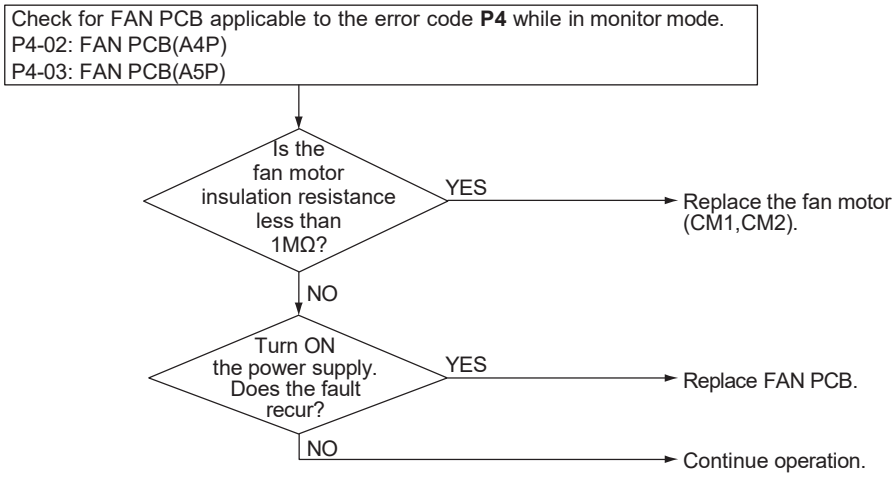


SERVICE DIAGNOSIS

Error Code	**P4-02, 03**
Fault/Alarm Condition	The fault is triggered if open or short is detected for the thermistor inside FAN PCB.
Probable Cause	• FAN PCB failure • Fan motor failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

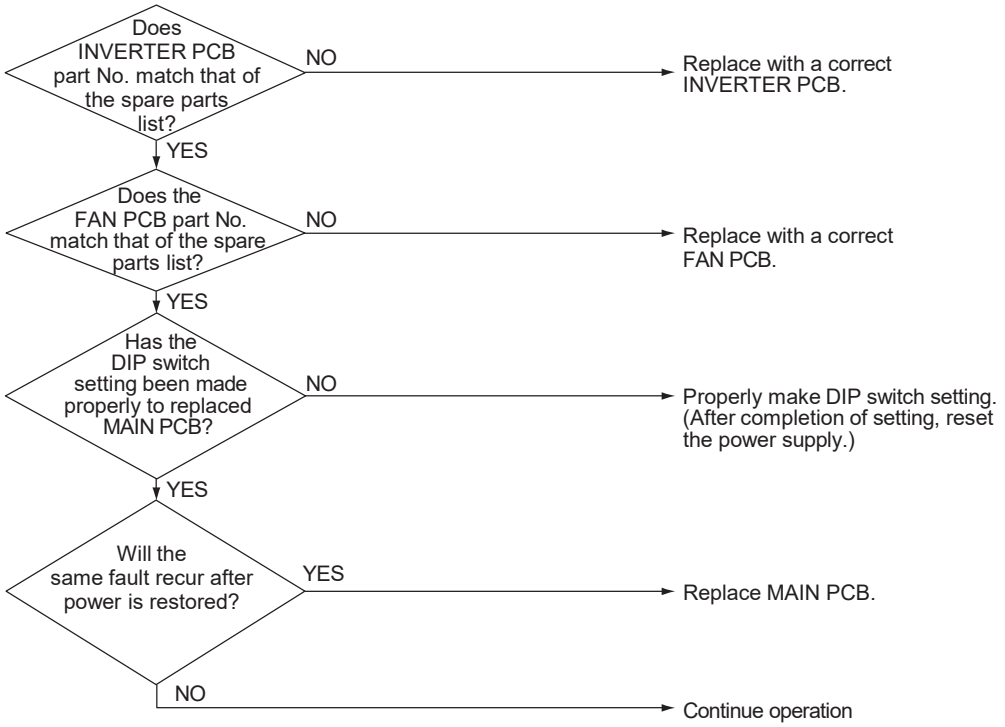


SERVICE DIAGNOSIS

Error Code	**PJ**
Fault/Alarm Condition	The fault is triggered if INVERTER PCB or FAN PCB that is not intended for the model is connected.
Probable Cause	• Mismatching of type of PCBs • Improper (or no) field setting after replacing MAIN PCB

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

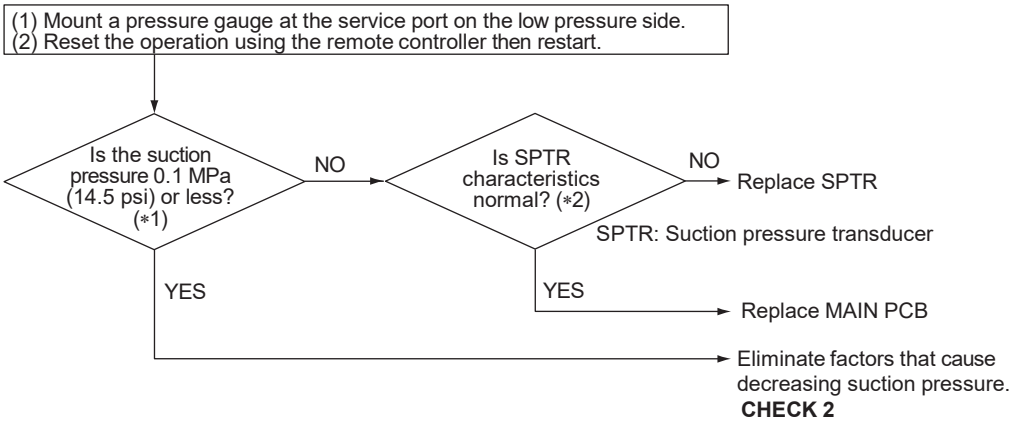


SERVICE DIAGNOSIS

Error Code	**U0**
Fault/Alarm Condition	The alarm is triggered if the suction pressure becomes below 0.1 MPa (14.5 psi). The unit continues the operation.
Probable Cause	• Refrigerant shortage • Thermistor failure • Suction pressure transducer failure • MAIN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



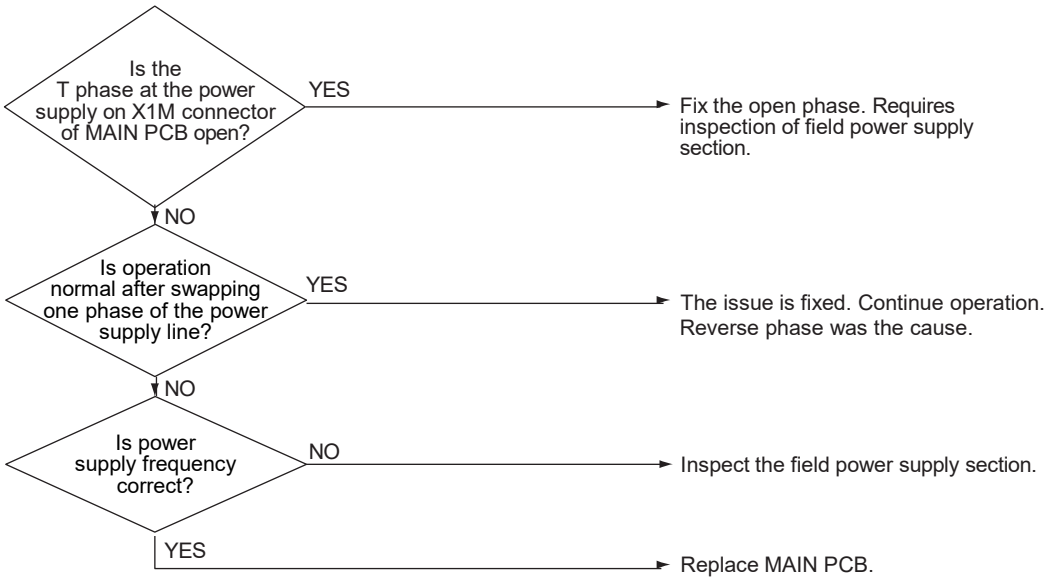
NOTE:
CHECK THE SUCTION PRESSURE VALUE BY USING PRESSURE GAUGE IN OPERATION.
COMPARE THE PRESSURE SENSOR VALUE WITH THE PRESSURE GAUGE VALUE.
(TO GAIN PRESSURE SENSOR VALUE, MEASURE THE VOLTAGE AT THE CONNECTOR [BETWEEN (2)-(3)] AND THEN CONVERT THE VALUE INTO PRESSURE. CHECK 12)

SERVICE DIAGNOSIS

Error Code	**U1**
Method of Error Detection	The phase of each line is detected by the reverse phase detection circuit, which determines whether the phase sequence is correct or reversed.
Error Decision Conditions	When a power supply is reverse phase, or T-phase is open phase
Supposed Causes	• Power supply reverse phase • T phase open • MAIN PCB failure • Incorrect power supply frequency

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.

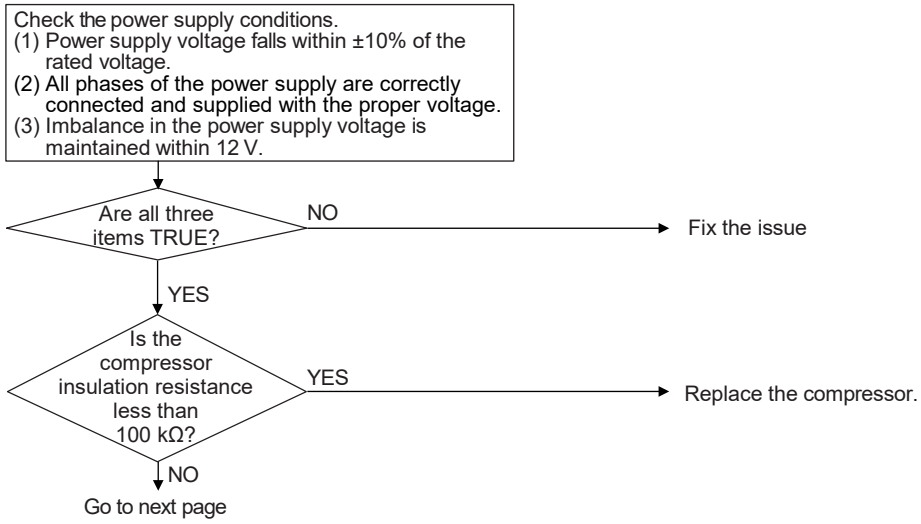


SERVICE DIAGNOSIS

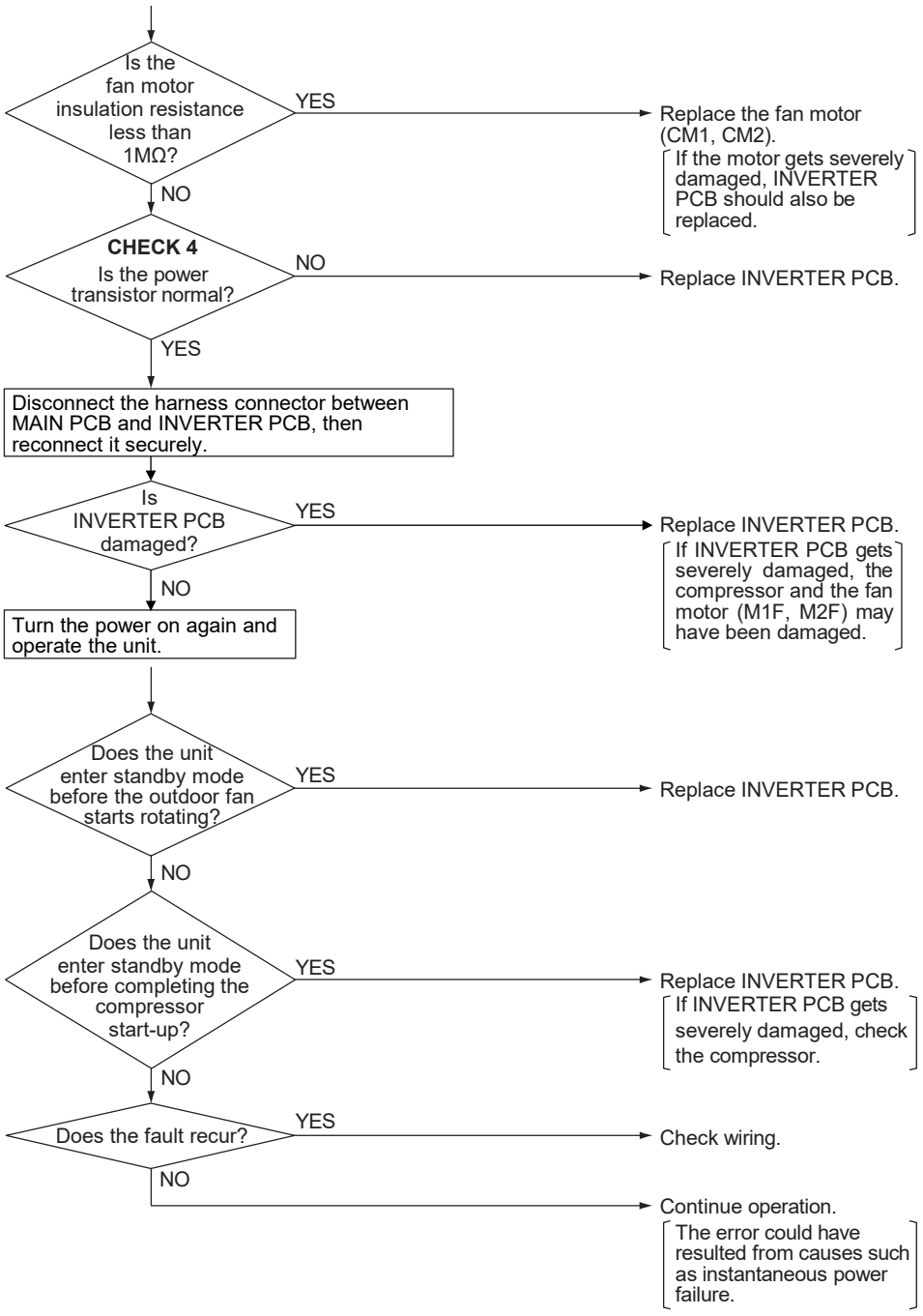
Error Code	**U2**
Fault/Alarm Condition	The fault is triggered if the voltage in the DC circuit (between diode module and power module) falls below 190 VDC (for 208/230 V models) or 380 VDC (for 460 V models).
Probable Cause	• Abnormal power supply voltage • Instantaneous power failure • Open phase • INVERTER PCB failure • MAIN PCB failure • Compressor failure • Main circuit wiring failure • Fan motor failure • Misconnection of communication wiring

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS



SERVICE DIAGNOSIS

Error Code **U4**

Fault/Alarm Condition

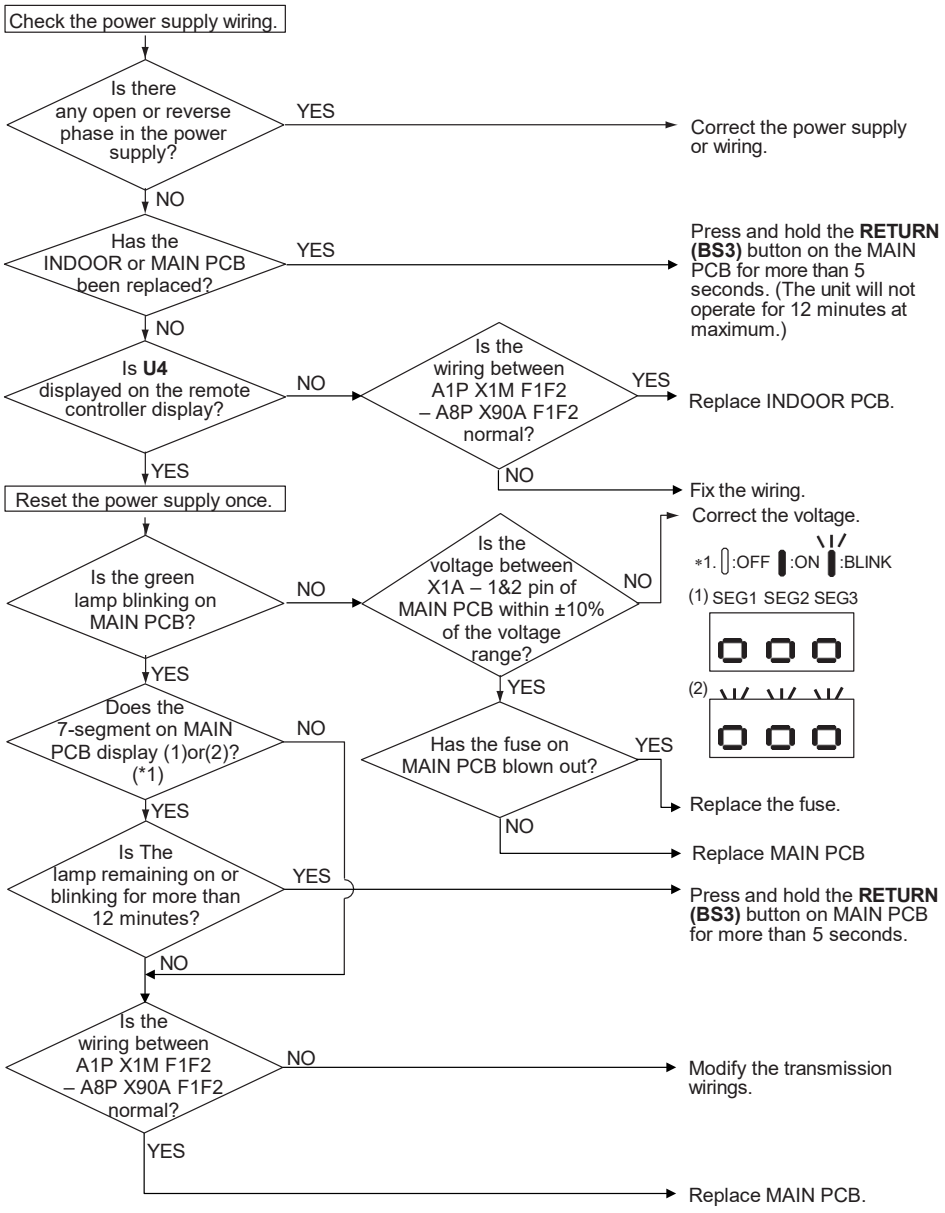
The fault is detected if no communication is detected for a specified period.

Probable Cause

- Open phase in power supply wiring
- Short circuit in transmission wiring (F1/F2), or wrong wiring
- Power supply wiring to the outdoor control box is disconnected.
- unit address does not match
- INDOOR PCB failure
- MAIN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **U5**

Fault/Alarm Condition

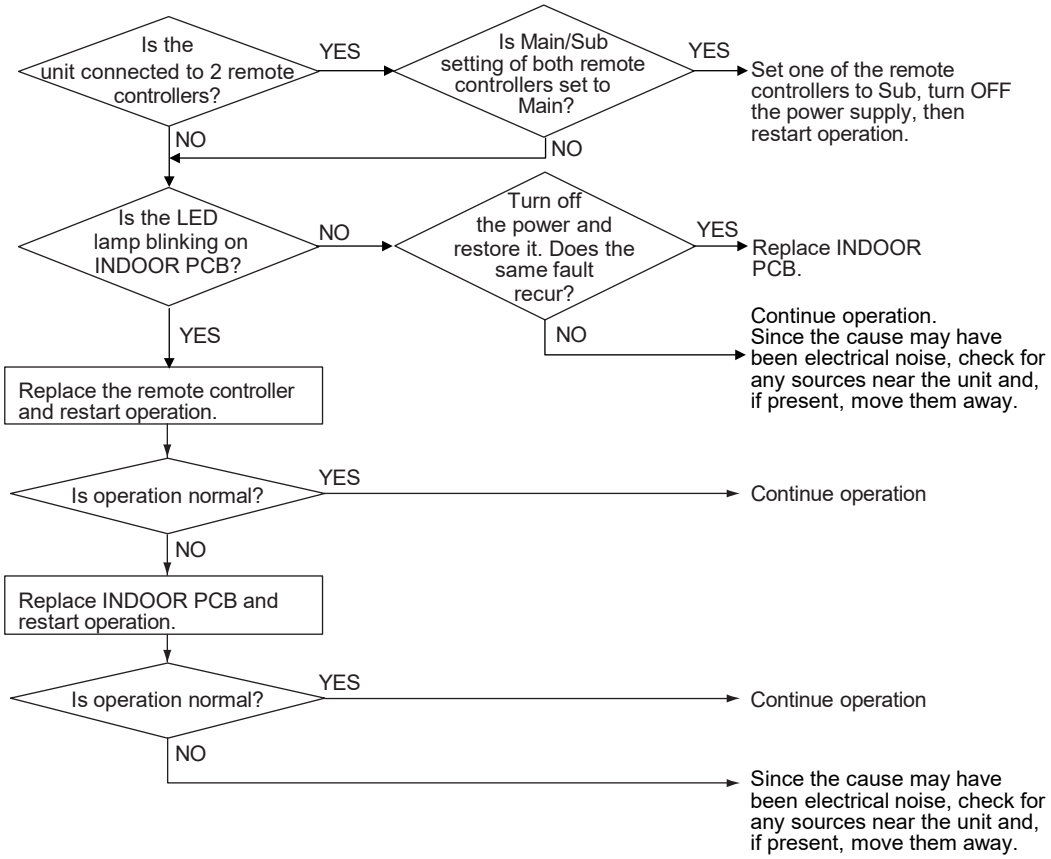
The fault is triggered if no communication is detected for a specified time.

Probable Cause

- Transmission error between the unit and the remote controller
- INDOOR PCB failure
- Remote controller failure
- Transmission error caused by noise

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **UE**

Fault/Alarm Condition

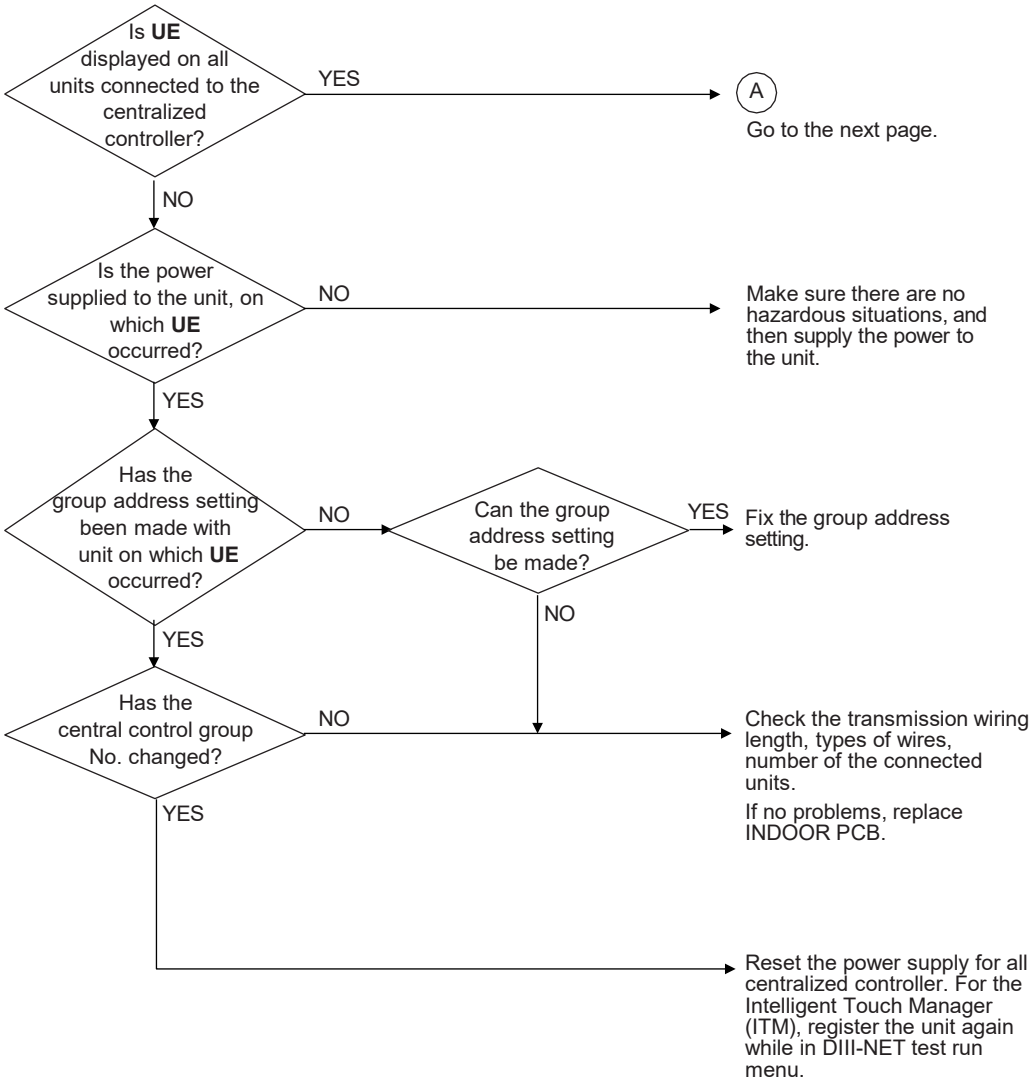
The fault is triggered if the communication between INDOOR PCB and the centralized controller is missing for a specific time.

Probable Cause

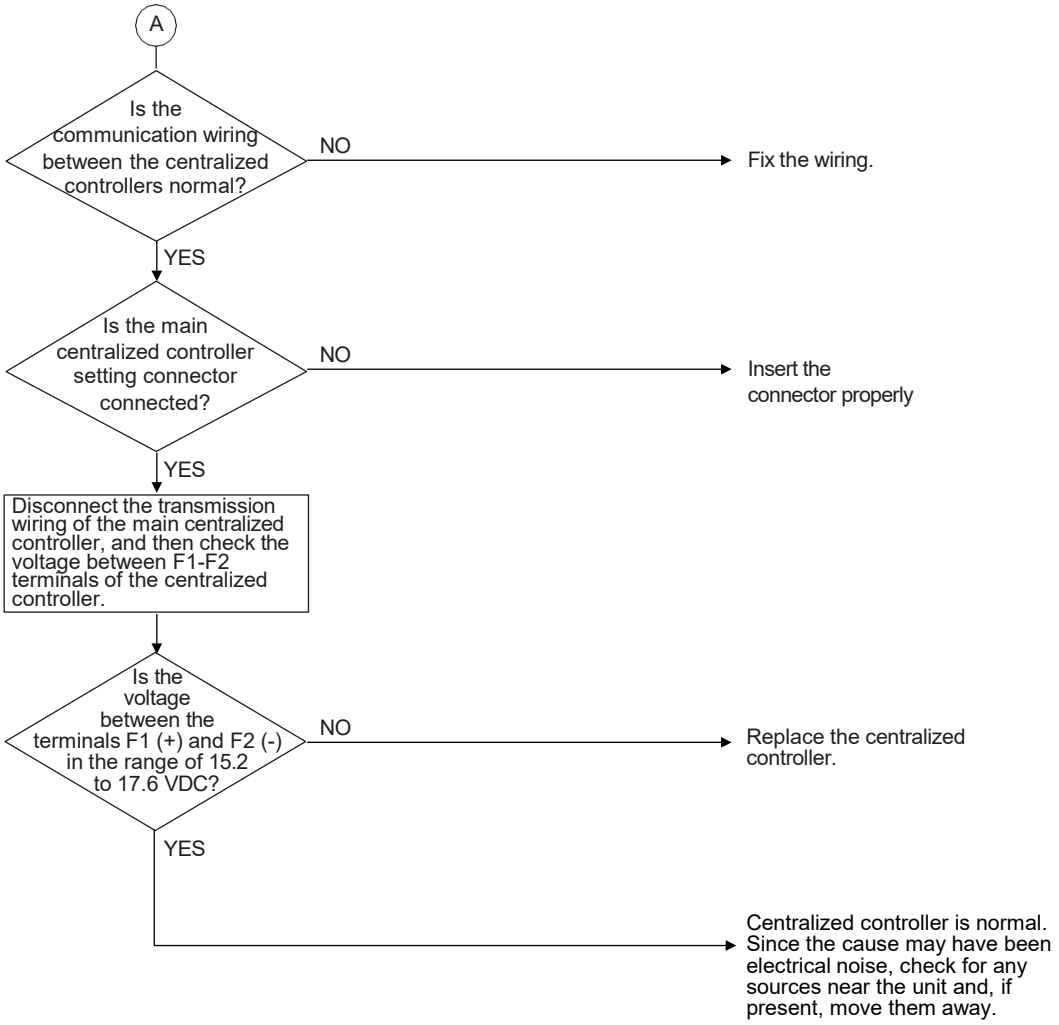
- Transmission error between the centralized controller and the unit
- Connector for setting main controller is disconnected.
- (or disconnection of connector for independent / combined use changeover switch)
- Centralized controller failure
- INDOOR PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

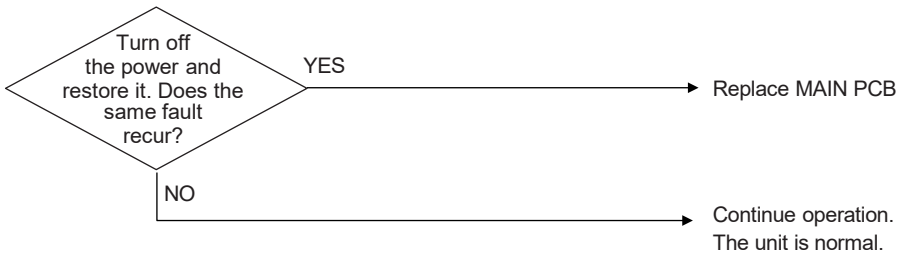


SERVICE DIAGNOSIS

Error Code	**UF-10**
Fault/Alarm Condition	The fault is detected if the automatic address is not defined. *The automatic address is defined as the address assigned when communication between PCBs or the centralized controller is first established.
Probable Cause	• MAIN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **UH-00,01**

Fault/Alarm Condition

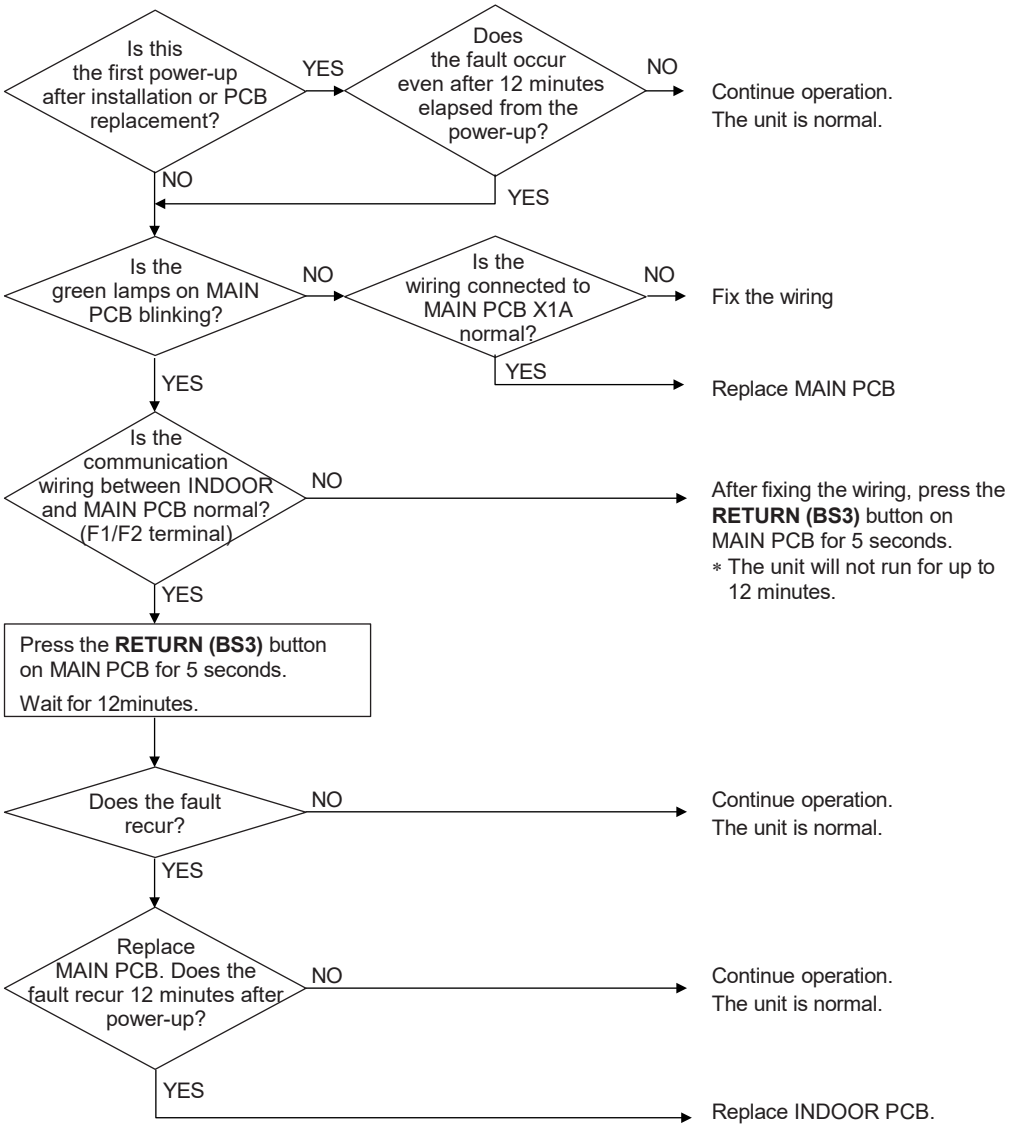
The fault is detected if the automatic address is not defined.
*The automatic address is defined as the address assigned when communication between MAIN PCB and INDOOR PCB is first established.

Probable Cause

- Automatic address is not yet defined after the PCB is replaced with spare parts
- PCB communication hasn't been established.
- Power is not supplied for MAIN PCB
- INDOOR PCB failure
- MAIN PCB failure

Troubleshooting

NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



SERVICE DIAGNOSIS

Error Code **UH-24**

Fault/Alarm Condition

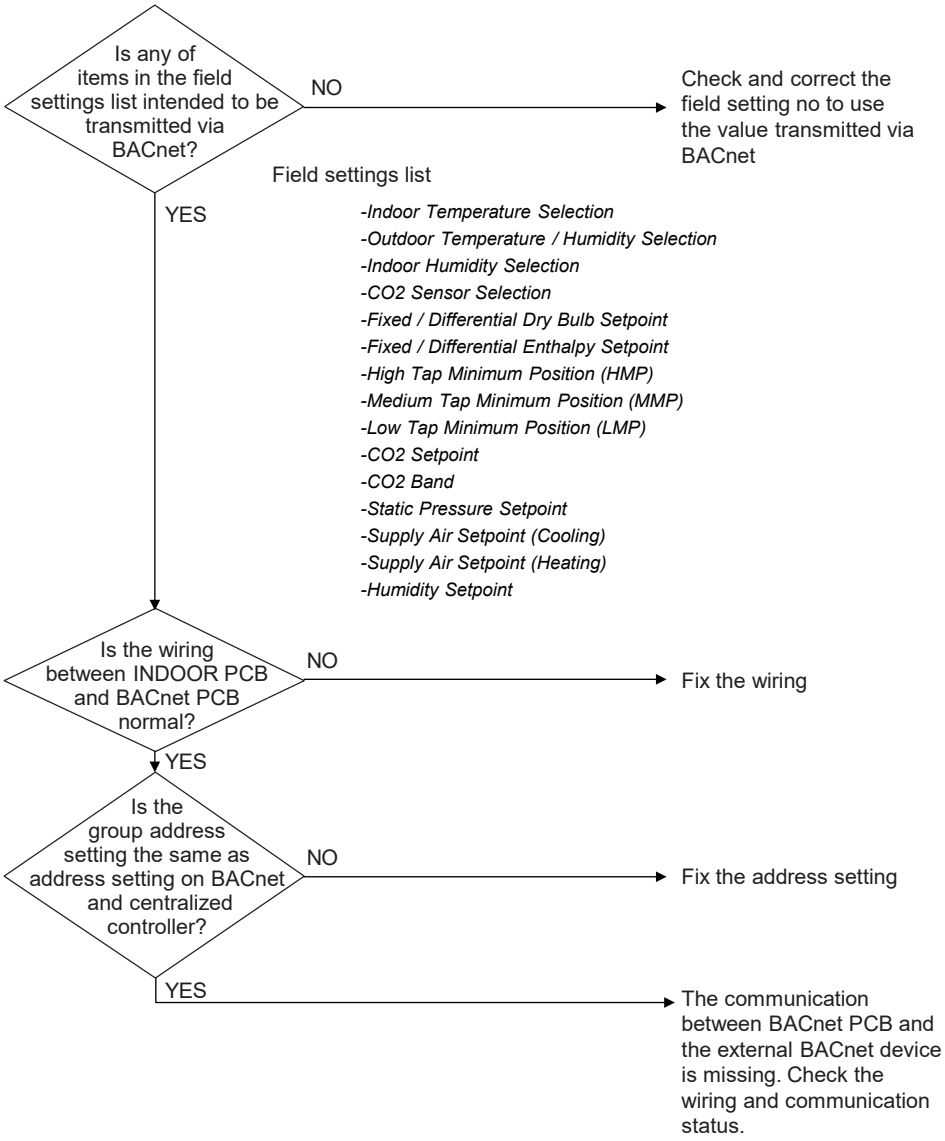
The fault is triggered if the communication between INDOOR PCB and BACnet device is missing.

Probable Cause

- Incorrect field setting
- Disconnect or miswired wiring between INDOOR PCB and BACnet PCB
- Disconnect or miswired wiring between BACnet PCB and the external BACnet device
- Incorrect group address setting

Troubleshooting

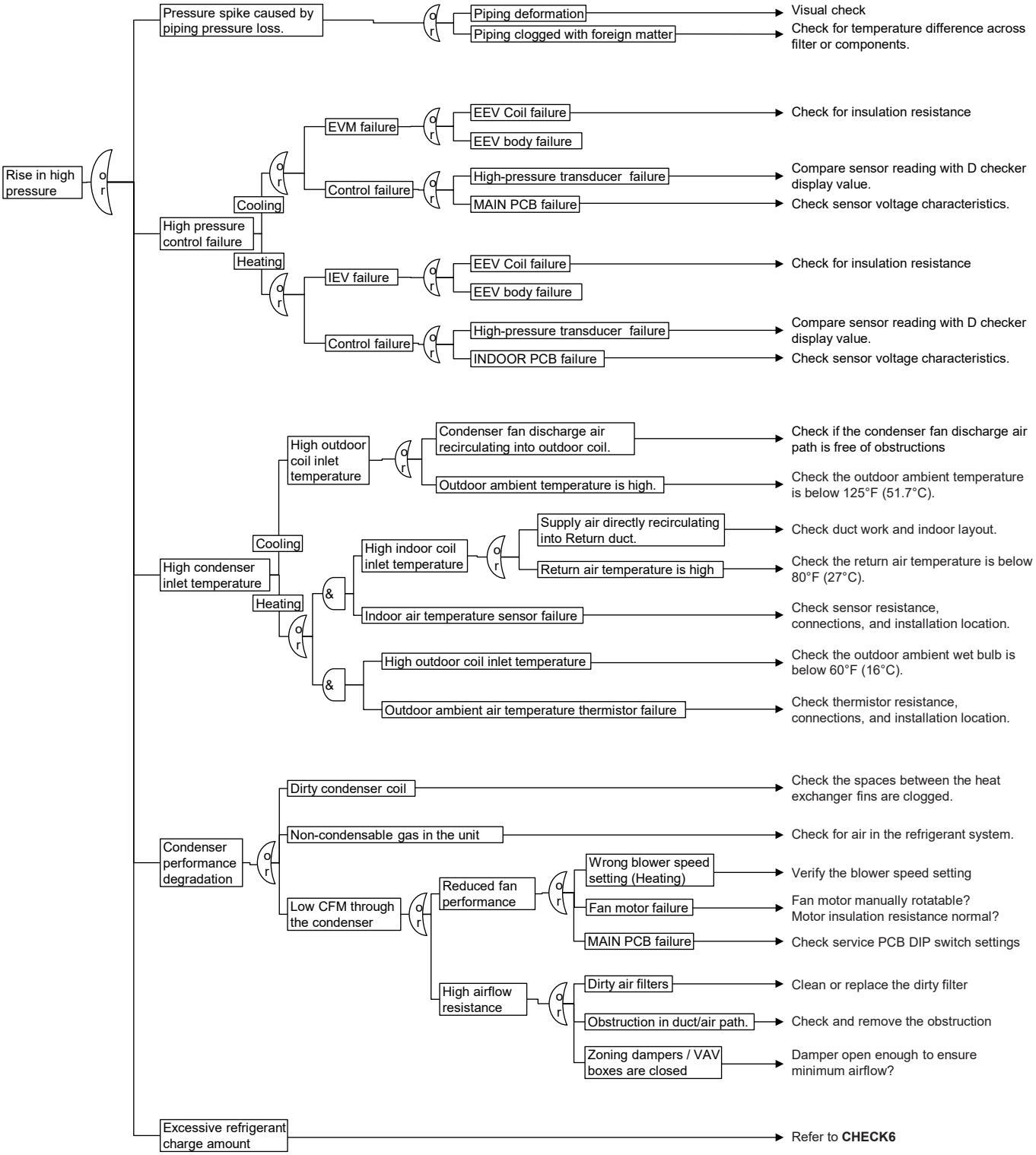
NOTE: BE SURE TO TURN OFF THE POWER SWITCH BEFORE CONNECTING OR DISCONNECTING CONNECTORS, OR PARTS MAY BE DAMAGED.



CHECK

HIGH PRESSURE CHECK

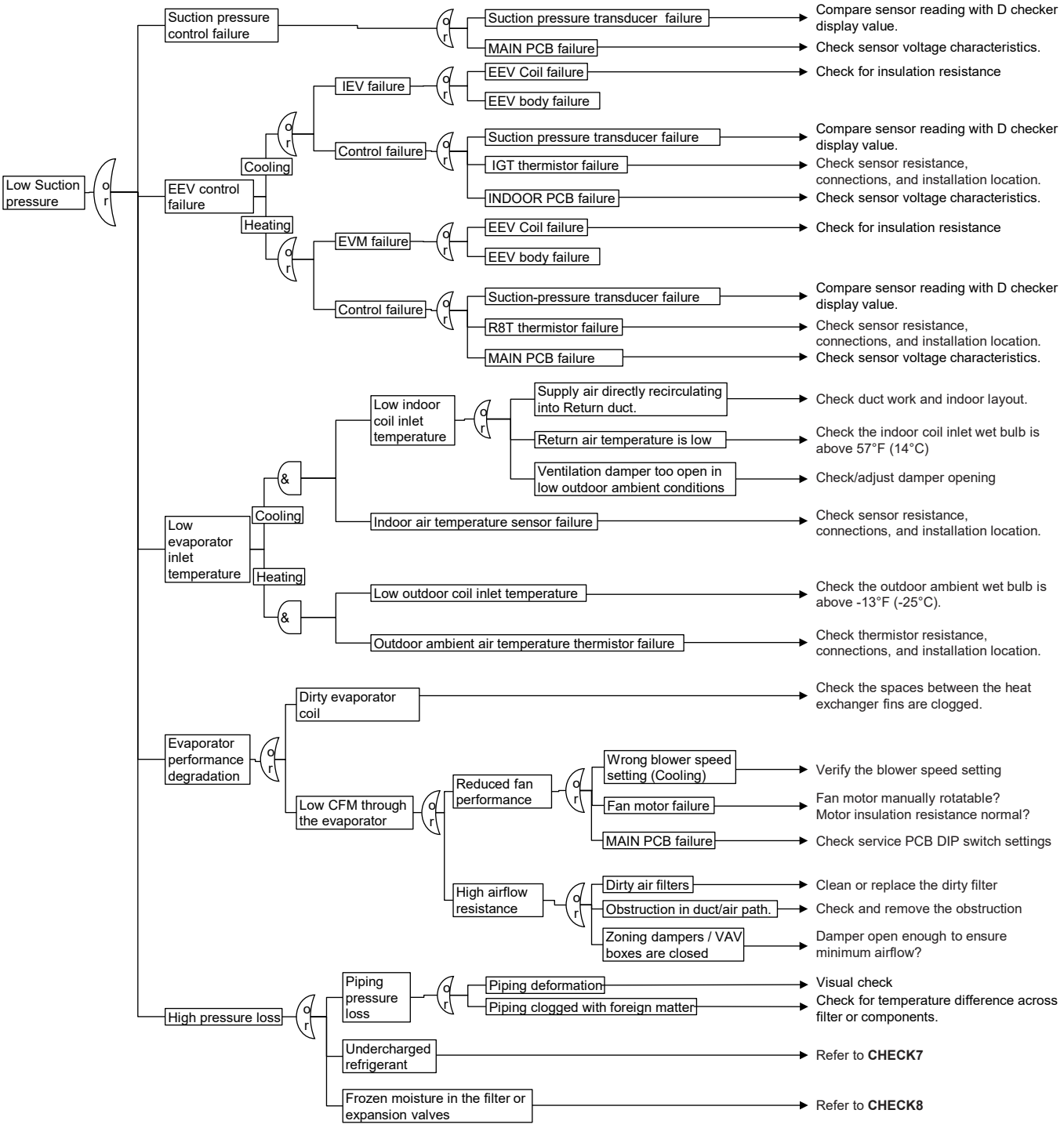
CHECK 1 Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points.



CHECK

Low Pressure Check

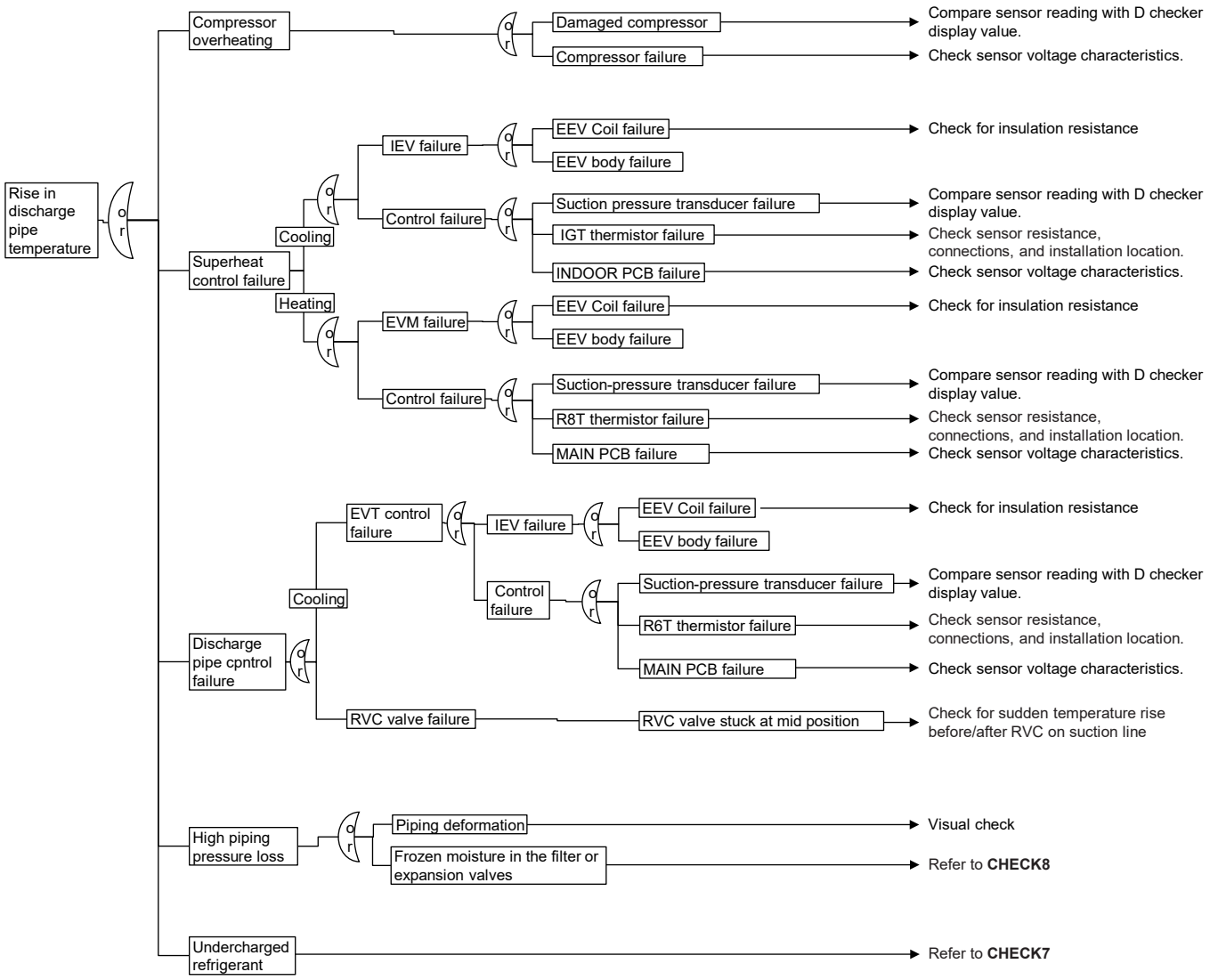
CHECK 2 Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points.



CHECK

Superheat Operation Check

CHECK 3 Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points.



Superheat Operation Guidelines:

Suction gas superheat: 10°C (18°F) or higher

Discharge gas superheat: 45°C (81°F) or higher, except immediately after compressor start-up or during protection control operation

Use these guidelines as a reference. Depending on other conditions, the unit may still operate normally even if the superheat is within these ranges.

CHECK

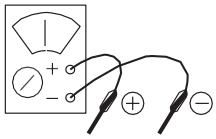
POWER TRANSISTOR CHECK

CHECK 4 Perform the following procedures prior to check.

1. Power OFF.
2. Remove all the wiring connected to the PCB where power transistors are mounted on

Preparation

Multimeter



Prepare the analog type of multimeter or the digital type multimeter with the diode check function.

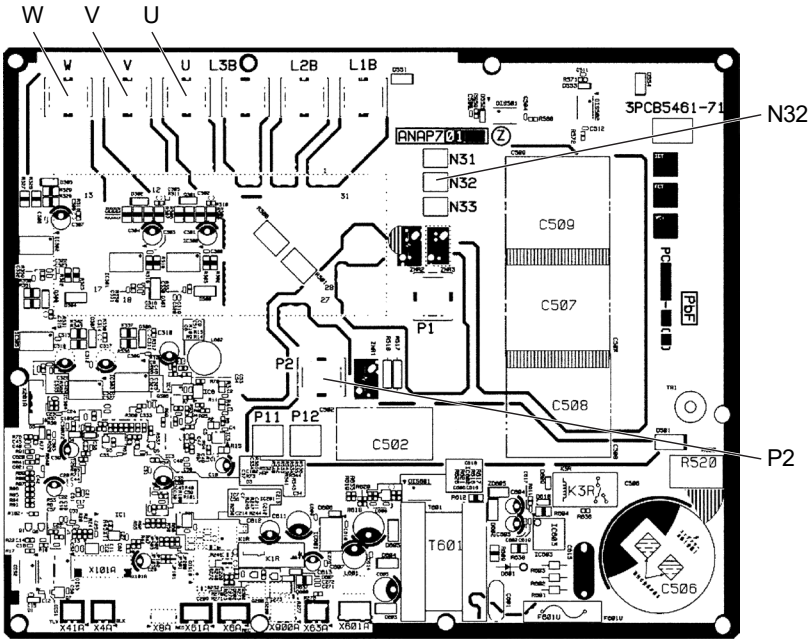
Measurement Point and Acceptance Criteria

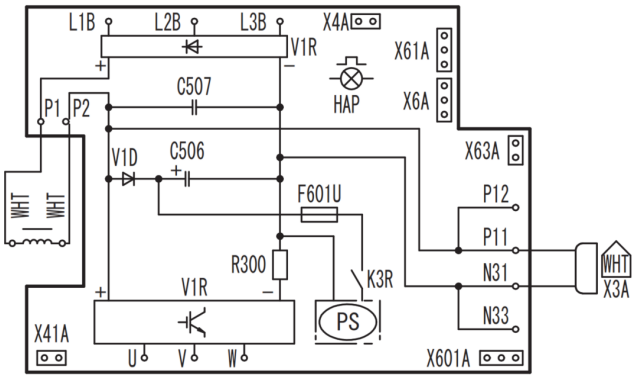
- Start measurement more than 10 minutes after turning OFF the power supply.

No.	Measuring point		When using the analog type of multimeter, measure in the resistance measurement mode in the x1 kΩ range.		When using the digital type of multimeter, measure in diode check mode (→|←).	
	+	–	Acceptance Criteria	Remarks	Acceptance Criteria	Remarks
1	P2	U	50 kΩ ~ 500 kΩ	—	OL	Due to condenser charge and so on, resistance measurement may require some time.
2	P2	V				
3	P2	W				
4	U	P2	50 kΩ and more (including ∞)	Due to condenser charge and so on, resistance measurement may require some time.	0.3 ~ 0.7 V	—
5	V	P2				
6	W	P2				
7	N31	U				
8	N31	V				
9	N31	W				
10	U	N31	50 kΩ ~ 500 kΩ	—	OL	Due to condenser charge and so on, resistance measurement may require some time.
11	V	N31				
12	W	N31				

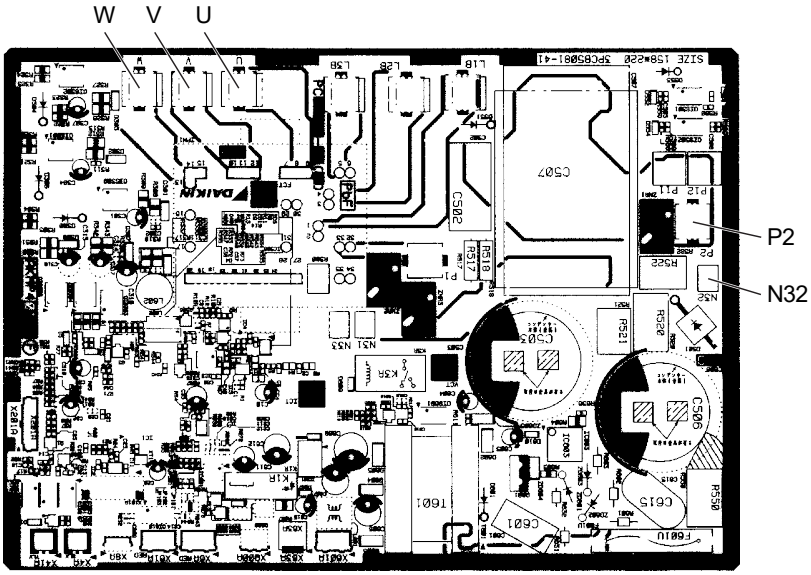
CHECK

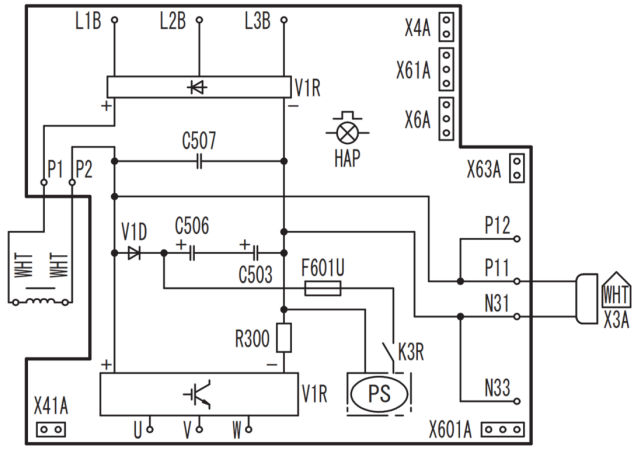
■ **208/230V**





■ **460V unit**





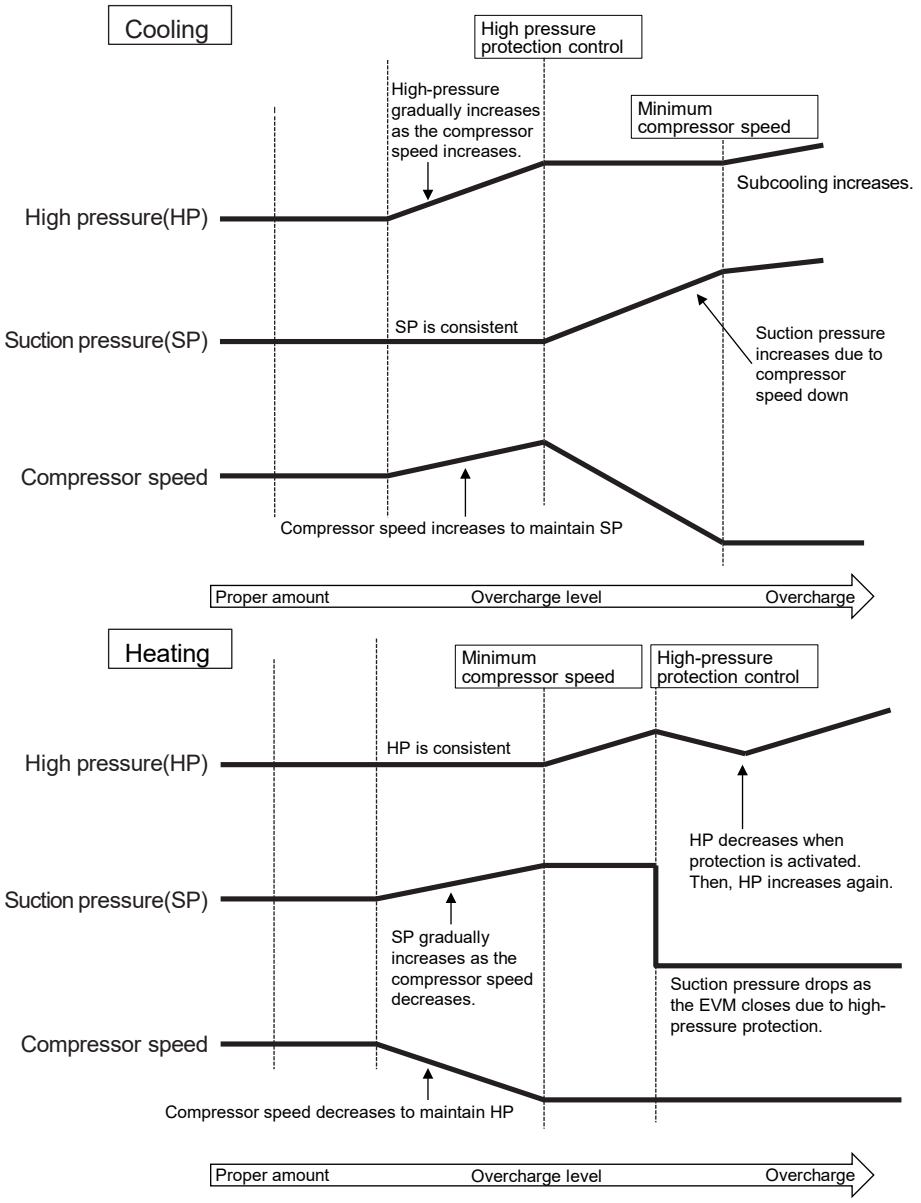
CHECK

Refrigerant Overcharge Check

CHECK 6

Diagnosis of Refrigerant Overcharge

High-pressure increases, resulting in protection control and insufficient cooling capacity.
Suction gas superheat decreases (floodback may occur).As a result, the discharge pipe temperature may be lower than expected despite high pressure load.
Subcooling increases. In heating mode, the discharge air temperature through the subcooled section becomes lower.

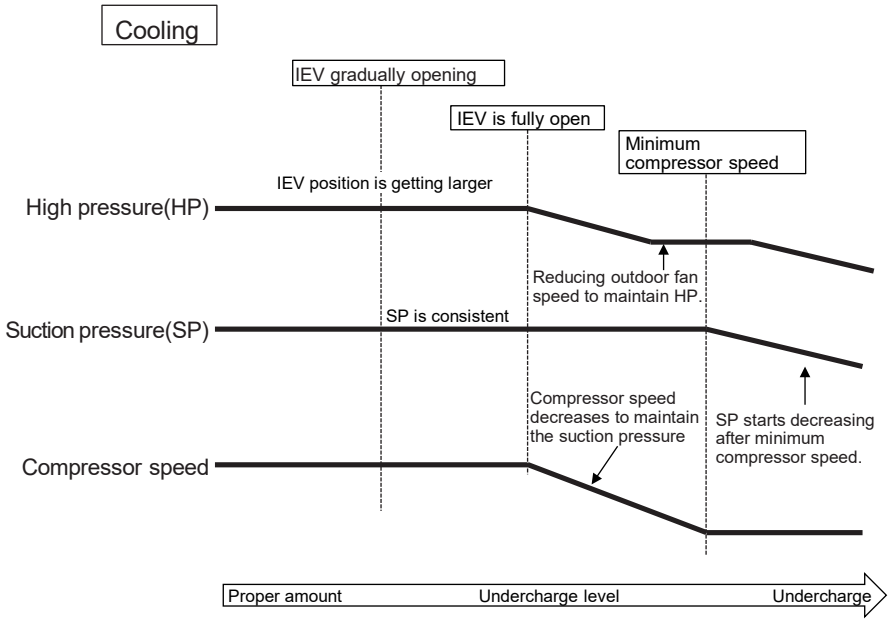


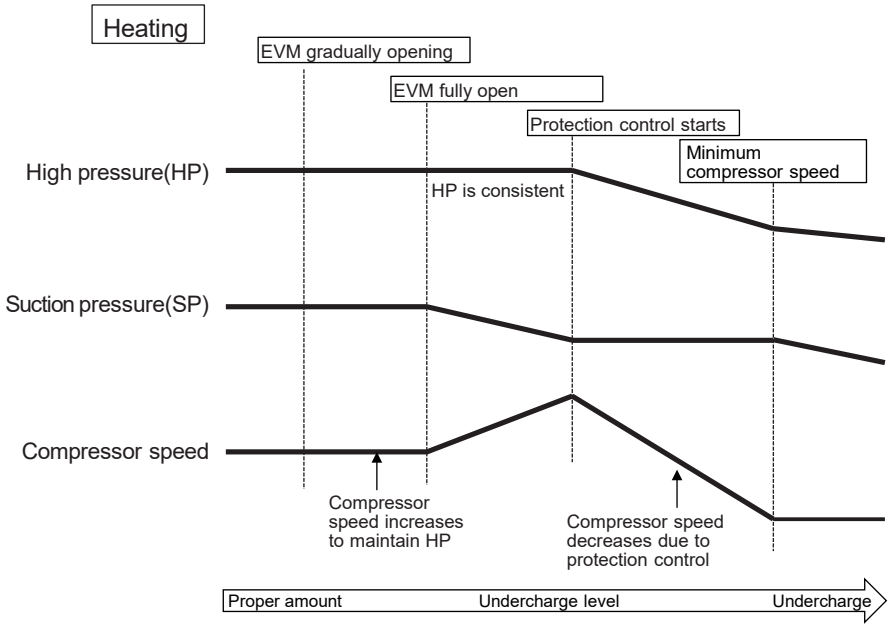
CHECK

Refrigerant Undercharge Check

CHECK 7 **Diagnosis of Refrigerant Shortage**

1. Suction superheat increases, increasing compressor discharge temperature.
2. Suction superheat increases, causing the EEV to open further.
3. Low pressure decreases, leading to insufficient cooling or heating capacity.





CHECK

Evacuation and Dehydration Procedure

CHECK 8 Perform evacuation and dehydration in the piping according to the Normal Evacuation and Dehydration procedure described below. If there is a possibility that moisture may have entered the piping, follow the Special Evacuation and Dehydration procedure instead.

Normal Evacuation and Dehydration

1. Evacuation

- Use a vacuum pump capable of reaching 500 microns.
- Connect manifold gauges to the service ports on both the liquid and gas lines.
- Operate the vacuum pump for at least 2 hours to evacuate the system to 500 microns.

Troubleshooting insufficient Evacuation

- If the vacuum level does not reach 500 microns after 2 hours, moisture may be present in the unit or refrigerant leakage may have occurred. Continue evacuation for an additional 1 hour.
- If the vacuum still does not reach 500 microns after a total of 3 hours, perform a leak test before proceeding.

2. Holding the evacuation

Maintain the unit at 500 microns or lower for at least 1 hour.
Confirm that the pressure reading does not rise during this period.
If the reading rises, moisture may still be present, or a leak point may exist.

3. Charging refrigerant

Purge any air from the manifold gauge hoses before charging the required amount of refrigerant into the unit.

Special Evacuation and Dehydration

Use this procedure when there is a higher risk of moisture entering the piping, such as during rainy-season construction (e.g., dew condensation or rainwater ingress).

1. Evacuation

Follow the same steps as in the Normal Evacuation and Dehydration procedure.

2. Vacuum break

Pressurize the unit with nitrogen up to 375,000 microns.

3. Repeated evacuation

Conduct evacuation and dehydration for at least 1 hour.
If the vacuum level does not reach 500 microns after 2 hours or more, repeat the vacuum break and evacuation procedure until the desired vacuum is achieved.

4. Holding the vacuum

Maintain the unit at 500 microns or lower for at least 1 hour.
Verify that the vacuum gauge reading remains stable.
If the reading rises, moisture may still be present, or a refrigerant leak may exist.

5. Charging refrigerant

Purge any air from the manifold gauge hoses, then charge the required amount of refrigerant.

CHECK

THERMISTOR CHECK

CHECK 8

Thermistor type

Thermistor		Type
R1T	Outdoor ambient air	Type N
R4T	Outdoor coil liquid	Type A
R6T	Subcool heat exchanger gas	
R7T	Subcool heat exchanger liquid	
R8T	Accumulator inlet	
R11T	Defrost	
R12T	Compressor suction	
R14T	Compressor body	Type H
R16T	Subcool heat exchanger injection	Type A
R21T	Compressor discharge	Type H
R22T	Oil return circuit	Type A
IGT	Indoor coil gas	
LCT	Indoor coil leaving air (Only for HGRH model)	Type N

Resistance characteristics

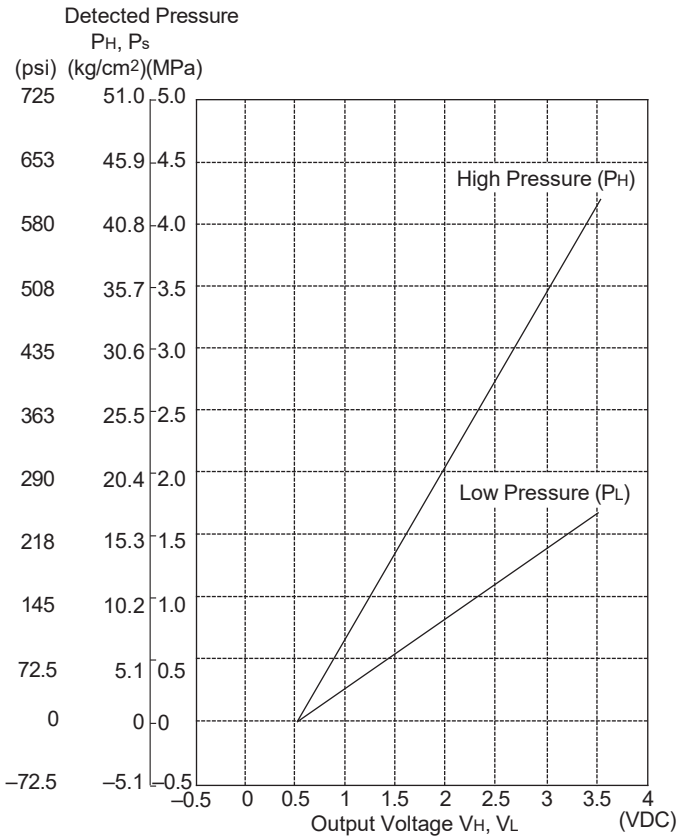
Thermistor temperature		Resistance (kΩ)		
(°C)	(°F)	Type A	Type H	Type N
–30	–22	363.8	3407	363.4
–25	–13	266.8	2540	266.7
–20	–4	197.8	1910	197.8
–15	5	148.2	1449	148.2
–10	14	112.0	1108	112.1
–5	23	85.52	853.8	85.51
0	32	65.84	662.7	65.80
5	41	51.05	517.9	51.11
10	50	39.91	407.4	40.01
15	59	31.44	322.5	31.54
20	68	24.95	256.9	25.04
25	77	19.94	205.7	20.00
30	86	16.04	165.7	16.09
35	95	12.99	134.3	13.02
40	104	10.58	109.4	10.60
45	113	8.669	89.58	8.685
50	122	7.143	73.73	7.153
55	131	5.918	60.98	5.923
60	140	4.928	50.67	4.929
65	149	4.123	42.29	4.122
70	158	3.467	35.45	3.463
75	167	—	29.84	—
80	176	—	25.21	—
85	185	—	21.38	—
90	194	—	18.21	—
95	203	—	15.57	—
100	212	—	13.36	—
105	221	—	11.49	—
110	230	—	9.92	—
115	239	—	8.594	—
120	248	—	7.465	—
125	257	—	6.499	—
130	266	—	5.675	—
135	275	—	4.968	—
140	284	—	4.360	—
145	293	—	3.836	—
150	302	—	3.384	—

∗This data is for reference purposes only.

CHECK

PRESSURE SENSOR CHECK

CHECK 12



$P_H\ (MPa) = \frac{4.15}{3.0} \times V_H - \frac{4.15}{3.0} \times 0.5$

$P_s\ (MPa) = \frac{1.7}{3.0} \times V_L - \frac{1.7}{3.0} \times 0.5$

1 MPa = 145 psi

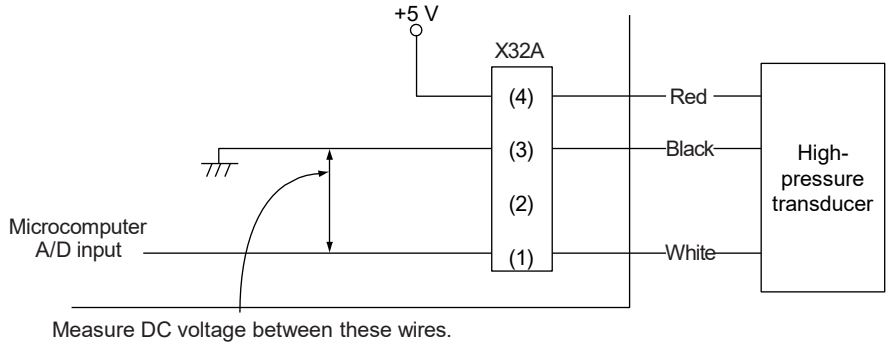
P_H : High pressure (MPa)

P_s : Suction pressure (MPa)

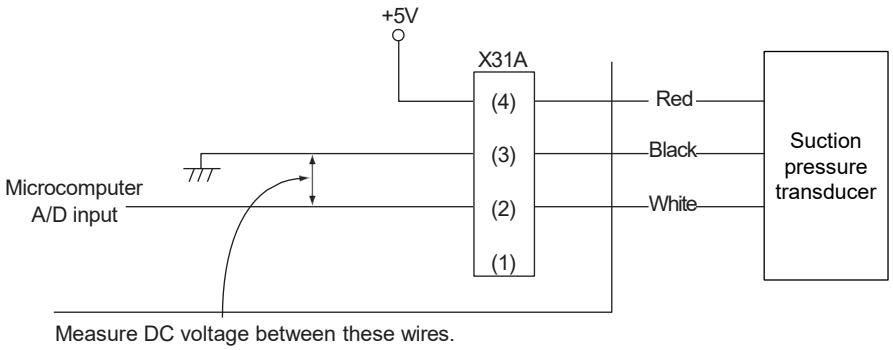
V_H : Output Voltage (High Side) (VDC)

V_s : Output Voltage (Suction Side) (VDC)

Voltage Measurement Point of the High-pressure transducer



Voltage Measurement Point of the suction pressure transducer



CHECK

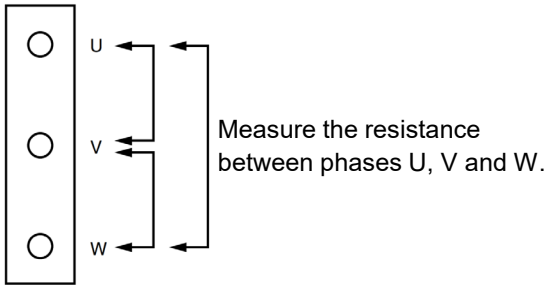
Fan Motor Connector Check (Power Supply Cable)

CHECK 16

Check the fan motor (CM1,CM2) connector according to the following procedure.

- Turn OFF the power supply
- Measure the resistance between phases U, V, and W at the motor-side connector (3-core wire) with the connector or relay connector disconnected.

  Confirm that the measured values are balanced and that no short circuit is present.

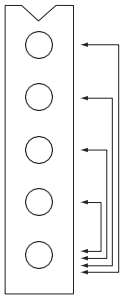


CHECK

Electronic Expansion Valve Coil Check

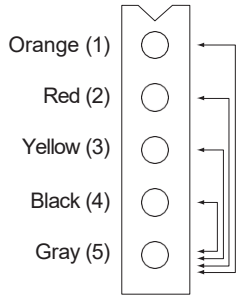
CHECK 16 Determine the type by the connector wire color, then measure the pin-to-pin resistance and confirm it falls within the range shown in the table below.

EVM, IEV



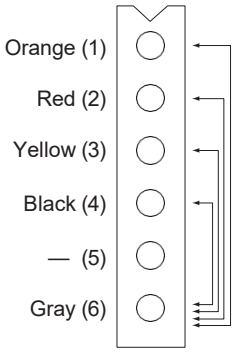
Measuring points	Judgment criteria
1 - 5	120-180 Ω
2 - 5	
3 - 5	
4 - 5	

EVJ



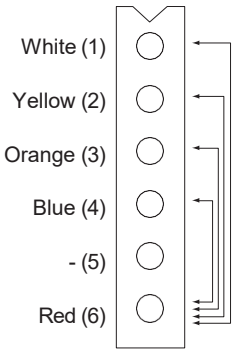
Measuring points	Judgment criteria
1 - 5	35-55 Ω
2 - 5	
3 - 5	
4 - 5	

EVT



Measuring points	Judgment criteria
1 - 6	35-55 Ω
2 - 6	
3 - 6	
4 - 6	

EVHG,EVMG(Only for HGRH model)



Measuring points	Judgment criteria
1 - 6	120-180 Ω
2 - 6	
3 - 6	
4 - 6	

SERVICING

S-1 Checking Voltage

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

WARNING

HIGH VOLTAGE
PRIOR TO SERVICING THE UNIT OR REMOVING THE COMPRESSOR TERMINAL PLUG OR TERMINAL COVER, DISCONNECT ALL ELECTRICAL POWER FROM THE UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT.

WARNING

DO NOT OPERATE THE COMPRESSOR(S) WITHOUT THE TERMINAL PLUG FULLY ENGAGED OR THE TERMINAL COVER PROPERLY INSTALLED. GET AWAY IF UNUSUAL SOUNDS ARE HEARD FROM WITHIN THE COMPRESSOR. DISCONNECT ELECTRICAL POWER FROM THE COMPRESSOR / UNIT.

WARNING

A TRIPPED CIRCUIT BREAKER OR BLOWN FUSE MAY INDICATE THAT AN ELECTRICAL PROBLEM EXISTS. DO NOT RESET A CIRCUIT BREAKER OR REPLACE FUSES WITHOUT FIRST PERFORMING THOROUGH ELECTRICAL TROUBLESHOOTING AND TESTING PROCEDURES.

WARNING

HERMETIC COMPRESSOR ELECTRICAL TERMINAL VENTING CAN BE DANGEROUS. IN CERTAIN CIRCUMSTANCES, THE TERMINAL MAY BE EXPELLED, VENTING THE REFRIGERANT VAPOR AND COMPRESSOR OIL CONTAINED WITHIN THE COMPRESSOR HOUSING AND SYSTEM. BE ALERT FOR SOUNDS OF ARCING (SIZZLING, SPUTTERING, OR POPPING) INSIDE THE COMPRESSOR. IMMEDIATELY GET AWAY IF YOU HEAR THESE SOUNDS AND DISCONNECT ELECTRICAL POWER FROM THE COMPRESSOR / UNIT.

Never operate the compressor without the terminal cover secured and properly in place or without the electrical plug fully seated and engaged to the terminal posts.

If a terminal is damaged, electrically overloaded, or short circuits to ground, there is a remote possibility that the terminal can be suddenly expelled from the terminal housing thereby venting the refrigerant and compressor oil mixture to atmosphere.

This discharge can be ignited from electrical arcing, or other open sources of ignition, and can cause potentially severe or fatal injury. This event is known as “Terminal Venting.”

To reduce the possibility of external ignition, all open flames or other heat sources must be extinguished, and all electrical power must be turned off prior to opening the terminal cover or removing the electrical plug and servicing the system.

Proper sealed system evacuation is required during servicing to maintain adequate internal system cleanliness while eliminating contaminates.

Be alert for sounds of arcing (sizzling, sputtering, or popping) inside the compressor. IMMEDIATELY GET AWAY from the unit if you hear these sounds and disconnect electrical power.

Pre-Startup Check

1. Remove doors, control panel cover, etc. from unit being tested.

With power ON:

WARNING

Line voltage now present.

2. Using a voltmeter, measure the voltage across terminals L1 and L2 of the contactor for single phase units, and L3, for 3 phase units.
3. No reading - indicates open wiring, open fuse(s) no power or etc. from unit to fused disconnect service. Repair as needed.
4. With ample voltage at line voltage connectors, energize the unit.
5. Measure the voltage with the unit starting and operating.
6. Voltmeter should read within the voltage tabulation as shown. If the voltage falls below the minimum voltage, check the line wire size. Long runs of undersized wire can cause low voltage. If wire size is adequate, notify the local power company in regards to either low or high voltage.

SERVICING

Unit Supply Voltage		
Voltage	Min.	Max.
208/230	198	253
460	437	506
575	546	604

Three phase units require a balanced 3 phase power supply to operate. If the percentage of voltage imbalance exceeds 2% the unit must not be operated until the voltage condition is corrected.

$$\text{\% Voltage Imbalance} = \frac{\text{Max. Voltage Deviation From Average Voltage}}{\text{Average Voltage}} \times 100$$

To find the percentage of imbalance, measure the incoming power supply.

L1 - L2 = 240V
L1 - L3 = 232V
L2 - L3 = 238V
Total 710V

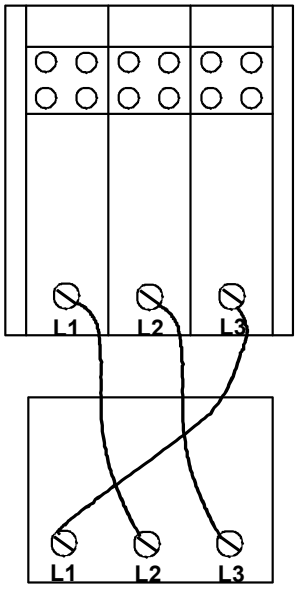
Avg. V = 710 / 3 = **236.7**

To find Max. deviation:
240 - 236.7 = +3.3
232 - 236.7 = **-4.7**
238 - 236.7 = +1.3

Max deviation was 4.7V

% Voltage Imbalance = 4.7 / 236.7 = **1.99%**

If the percentage of imbalance had exceeded 2%, it must be determined if the imbalance is in the incoming power supply or the equipment. To do this rotate the legs of the incoming power and retest voltage as shown below.



By the voltage readings we see that the imbalance rotated or traveled with the switching of the incoming legs.

Therefore the imbalance lies within the incoming power supply.

If the imbalance had not changed then the problem would lie within the equipment. Check for current leakage, shorted motors, etc.

S-2 Checking Wiring

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Check wiring visually for signs of overheating, damaged insulation and loose connections.
2. Use an ohmmeter to check continuity of any suspected open wires.
3. If any wires must be replaced, replace with comparable gauge and insulation thickness.

S-4 Checking Transformer and Control Circuit

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

A step-down transformer (either 208-240, 460 or 575 volt primary to 24 volt secondary) is provided with each unit. This allows ample capacity for use with resistance heaters.

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

1. Remove control panel cover to gain access to transformer.

SERVICING

With power ON:

WARNING

LINE VOLTAGE NOW PRESENT.

2. Using a voltmeter, check voltage across secondary voltage side of transformer (R to C).
3. No voltage indicates faulty transformer, bad wiring, or bad splices.
4. Check transformer primary voltage at incoming line voltage connections and/or splices.
5. If line voltage available at primary voltage side of transformer and wiring and splices good, transformer is inoperative. Replace.

S-8 Checking Contactor Contacts

WARNING

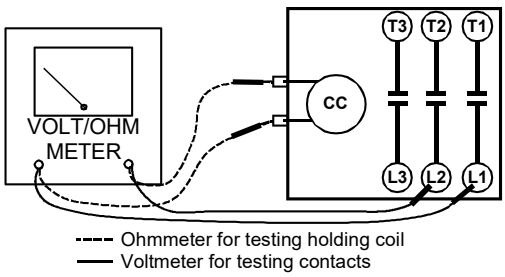
HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Disconnect the wire leads from the terminal (T) side of the contactor.
2. With power ON, energize the contactor.

WARNING

LINE VOLTAGE NOW PRESENT.

3. Using a voltmeter, test across terminals.
   A. L1-L2, L1-L3, and L2-L3 - If voltage is present, proceed to B. If voltage is not present, check breaker or fuses on main power supply..
   B. T1-T2, T1-T3, and T2-T3 - If voltage readings are not the same as in “A”, replace contactor.



TESTING BLOWER CONTACTOR (Three Phase)

S-17 Checking Compressor Windings

WARNING

Hermetic compressor electrical terminal venting can be dangerous. When insulating material which supports a hermetic compressor or electrical terminal suddenly disintegrates due to physical abuse or as a result of an electrical short between the terminal and the compressor housing, the terminal may be expelled, venting the vapor and liquid contents of the compressor housing and system.

If the compressor terminal PROTECTIVE COVER and gasket (if required) are not properly in place and secured, there is a remote possibility if a terminal vents, that the vaporous and liquid discharge can be ignited, spouting flames several feet, causing potentially severe or fatal injury to anyone in its path.

This discharge can be ignited external to the compressor if the terminal cover is not properly in place and if the discharge impinges on a sufficient heat source.

Ignition of the discharge can also occur at the venting terminal or inside the compressor, if there is sufficient contaminant air present in the system and an electrical arc occurs as the terminal vents.

Ignition cannot occur at the venting terminal without the presence of contaminant air, and cannot occur externally from the venting terminal without the presence of an external ignition source.

Therefore, proper evacuation of a hermetic system is essential at the time of manufacture and during servicing.

To reduce the possibility of external ignition, all open flame, electrical power, and other heat sources should be extinguished or turned off prior to servicing a system.

S-18 Testing crankcase heater (Optional Item)

The crankcase heater must be energized a minimum of four (4) hours before the condensing unit is operated.

Crankcase heaters are used to prevent migration or accumulation of refrigerant in the compressor crankcase during the off cycles and prevents liquid slugging or oil pumping on start up.

A crankcase heater will not prevent compressor damage due to a floodback or over charge condition.

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

SERVICING

1. Disconnect the heater lead in wires.
2. Using an ohmmeter, check heater continuity - should test continuous. If not, replace.

The condition of the scroll flanks is checked in the following manner.

1. Attach gauges to the high and low side of the system.
2. Start the system and run a “Cooling Performance Test.

If the test shows:

A. Below normal high side pressure.
B. Above normal low side pressure.
C. Low temperature difference across coil.
D. Low amp draw at compressor.

And the charge is correct. The compressor is faulty - replace the compressor.

S-21 Checking Reversing Valve And Solenoid

Occasionally the reversing valve may stick in the heating or cooling position or in the mid-position.

When stuck in the mid-position, part of the discharge gas from the compressor is directed back to the suction side, resulting in excessively high suction pressure. An increase in the suction line temperature through the reversing valve can also be measured. Check operation of the valve by starting the system and switching the operation from COOLING to HEATING cycle.

If the valve fails to change its position, test the voltage (24V) at the valve coil connector on MAIN PCB terminals, while the system is on the COOLING cycle.

If no voltage is registered at the connector, replace the MAIN PCB.

If voltage is registered at the coil, tap the valve body lightly while switching the system from HEATING to COOLING, etc. If this fails to cause the valve to switch positions, remove the coil connector cap and test the continuity of the reversing valve solenoid coil. If the coil does not test continuous - replace it.

If the coil test continuous and 24 volts is present at the coil terminals, the valve is inoperative - replace it.

TROUBLESHOOTING

THE FOLLOWING INFORMATION IS FOR USE BY QUALIFIED SERVICE AGENCY ONLY: OTHERS SHOULD NOT ATTEMPT TO SERVICE THIS EQUIPMENT.

Common Causes of Unsatisfactory Operation of Heat Pump on the Heating Cycle.

Inadequate Air Volume Through Indoor Coil

When a heat pump is in the heating cycle, the indoor coil is functioning as a condenser. The return air filter must always be clean, and sufficient air volume must pass through the indoor coil to prevent excessive discharge pressure, and high pressure cut out.

Outside Air into Return Duct

Do not introduce cold outside air into the return duct of a heat pump installation. For units with 2-speed motors, do not allow air entering the indoor coil to drop below 50° F. Air below this temperature will cause low discharge pressure, thus low suction pressure, and excessive defrost cycling resulting in low heating output. It may also cause false defrosting.

Undercharge

An undercharged heat pump on the heating cycle will cause low discharge pressure resulting in low suction pressure and frost accumulation on the outdoor coil.

Poor Defrost Thermistor Contact and Insulation

The unit’s defrost thermistor (R11T) must make good thermal contact with the outdoor coil tubing. The insulation must be properly installed to prevent inaccurate thermistor readings caused by exposure to ambient air. If this is not properly implemented, the defrost operation may not start and terminate at the appropriate timing, which could result in insufficient heating capacity.

Malfunctioning Reversing Valve - This may be due to:

1. **Solenoid not energized** - In order to determine if the solenoid is energized, touch the nut that holds the solenoid cover in place with a screwdriver. If the nut magnetically holds the screwdriver, the solenoid is energized and the unit is in the cooling cycle.
2. **No voltage at unit’s solenoid** - Check unit voltage. If no voltage, check wiring circuit.
3. **Valve will not shift**:
   - **A. Undercharged** - check for leaks;
   - **B. Valve Body Damaged** - Replace valve;
   - **C. Unit Properly Charged** - If it is on the heating cycle, raise the discharge pressure by restricting airflow through the indoor coil. If the valve does not shift, tap it **lightly** on both ends with a screwdriver handle. **DO NOT TAP THE VALVE BODY**. If the unit is on the cooling cycle, raise the discharge pressure by restricting airflow through the outdoor coil. If the valve does not shift after the above attempts, cut the unit off and wait until the discharge and suction pressure equalize, and repeat above steps. If the valve does not shift, replace it.

SERVICING

S-50 Checking Heater Limit Control(s) (OPTIONAL ELECTRIC HEATERS)

Each individual heater element is protected with an automatic rest limit control connected in series with each element to prevent overheating of components in case of low airflow. This limit control will open its circuit at approximately 150°F. to 160°F and close at approximately 110°F.

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

1. Remove the wiring from the control terminals.
2. Using an ohmmeter test for continuity across the normally closed contacts. No reading indicates the control is open - replace if necessary. Make sure the limits are cool before testing.

IF FOUND OPEN - REPLACE - DO NOT WIRE AROUND.

S-52 Checking Heater Elements

Optional electric heaters may be added, in the quantities shown in the spec sheet for each model unit, to provide electric resistance heating. Under no condition shall more heaters than the quantity shown be installed.

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Disassemble and remove the heating element(s).
2. Visually inspect the heater assembly for any breaks in the wire or broken insulators.
3. Using an ohmmeter, test the element for continuity - no reading indicates the element is open. Replace as necessary.

S-201 Checking Temperature Rise

Temperature rise is related to the BTUH output of the unit and the amount of air (CFM) circulated over the heat exchanger.

All units are designed for a given range of temperature increase. This is the temperature of the air leaving the unit minus the temperature of the air entering the unit.

The more air (CFM) being delivered through a given unit the less the rise will be; so the less air (CFM) being delivered, the greater the rise. The temperature rise should be adjusted in accordance to a given unit specifications and its external static pressure.

1. Check BTUH input to unit do not exceed input rating stamped on rating plate.
2. Take entering and leaving air temperatures.
3. Select the proper speed tap or dip switch setting for direct drive units.
4. For gas heat units, the airflow must be adjusted so that the air temperature rise falls within the ranges given stated on Data Plate by adjusting the variable pitch sheave on the motor (see Blower Performance section in appropriate Specifications Sheet Manual for correct pulley adjustment).
5. Take motor amperage draw to determine that the motor is not overloaded during adjustments.

S-206 Indoor Fan Rotation Check

Evaporator Fan Rotation Check (Three Phase Models Only)

Check that fan rotates clockwise when viewed from the drive side of unit and in accordance with rotation arrow shown on blower housing. If it does not, reverse any two incoming power cables at Single Point Power Block. In this case, repeat bearing check.

Do not attempt to change load side wiring. Internal wiring assures all motors and compressors will rotate in correct direction once evaporator fan motor rotation check has been made.

SERVICING

Air Conditioning Diagnostic Chart					
Issue	Discharge Pressure	Suction Pressure	(Orifice) Superheat	(TXV) Subcooling	Temperature Split
Liquid Line Restriction	↓	↓	↑	↑	↓
System Undercharge	↓	↓	↑	↓	↓
System Overcharge	↑	↑	↓	↑	↓
Non Condensible	↑	↑	↑	↑	↓
Low Indoor Airflow	↓	↓	↓	↑	↑
Inefficient Compressor	↓	↑	↑	↓	↓

Heat Pump Diagnostic Chart					
Issue	Discharge Pressure	Suction Pressure	(Orifice) Superheat	(TXV) Subcooling	Temperature Split
Liquid Line Restriction	↑	↓	↑	↑	↓
System Undercharge	↓	↓	↑	↓	↓
Leaking Reversing Valve	↓	↑	Normal	↓	↓
Low Indoor Airflow	↑	↑	Normal	Normal	↑
Inefficient Compressor	↓	↑	Normal	↓	↓

NOTE: Superheat and Subcooling is determined by the system metering device.

SERVICING

S-100 Refrigeration Repair Practice

SAFETY CHECKS AND WORK PROCEDURES

Prior to beginning work on a unit, safety checks are necessary to ensure that the risk of ignition is minimized.

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

NOTE: Sealed electrical and intrinsically safe components shall be replaced. These components are not to be repaired.

NOTE: "Intrinsically safe" refers to equipment and wiring that are incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition.

NOTE: "Sealed electrical components" are designed to prevent the ingress of dust, moisture, and other contaminants. Examples include hermetically sealed relays, sealed capacitors, etc.

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/ extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

Check any markings to the equipment continue to be visible and legible. Markings and signs (ex. serial plate, labels) that are illegible shall be corrected.

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:
• that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
• that no live electrical components and wiring are exposed while charging, recovering or purging the system;
• that there is continuity of earth bonding.

Check that cabling/wiring will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

SERVICING

DANGER

ALWAYS REMOVE THE REFRIGERANT CHARGE IN A PROPER MANNER BEFORE APPLYING HEAT TO THE SYSTEM.

When repairing the refrigeration system:

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

1. Never open a system that is under vacuum. Air and moisture will be drawn in.
2. Plug or cap all openings.
3. Remove all burrs and clean the brazing surfaces of the tubing with sand cloth or paper. Brazing materials do not flow well on oxidized or oily surfaces.
4. Clean the inside of all new tubing to remove oils and pipe chips.
5. When brazing, sweep the tubing with dry nitrogen to prevent the formation of oxides on the inside surfaces.
6. When brazing around functional components such as the EEV or reversing valve, wrap a wet towel around the component body to prevent the internal temperature from rising. Ensure that the flame does not directly contact the component.
7. Complete evacuation and charge.

BRAZING MATERIALS

Copper to Copper Joints - Sil-Fos used without flux (alloy of 15% silver, 80% copper, and 5% phosphorous). Recommended heat 1400°F.

Copper to Steel Joints - Silver Solder used without a flux (alloy of 30% silver, 38% copper, 32% zinc). Recommended heat - 1200°F.

S-101 LEAK TESTING (NITROGEN OR NITROGEN-TRACED)

WARNING

TO AVOID THE RISK OF FIRE OR EXPLOSION, NEVER USE OXYGEN, HIGH PRESSURE AIR OR FLAMMABLE GASES FOR LEAK TESTING OF A REFRIGERATION SYSTEM.

WARNING

TO AVOID POSSIBLE EXPLOSION, THE LINE FROM THE NITROGEN CYLINDER MUST INCLUDE A PRESSURE REGULATOR AND A PRESSURE RELIEF VALVE. THE PRESSURE RELIEF VALVE MUST BE SET TO OPEN AT NO MORE THAN THE MAX ALLOWABLE PRESSURE. REFER TO THE SERIAL PLATE.

Pressure test the system using dry nitrogen and soapy water to locate leaks. If leaks are found, repair them. After repair, repeat the pressure test. If no leaks exist, proceed to system evacuation.

S-102 EVACUATION

WARNING

REFRIGERANT UNDER PRESSURE!
FAILURE TO FOLLOW PROPER PROCEDURES MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

This is the most important part of the entire service procedure. The life and efficiency of the equipment is dependent upon the thoroughness exercised by the serviceman when evacuating air (non-condensables) and moisture from the system.

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

SERVICING

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Air in a system causes high condensing temperature and pressure, resulting in increased power input and reduced performance.

Moisture chemically reacts with the refrigerant oil to form corrosive acids. These acids attack motor windings and parts, causing breakdown.

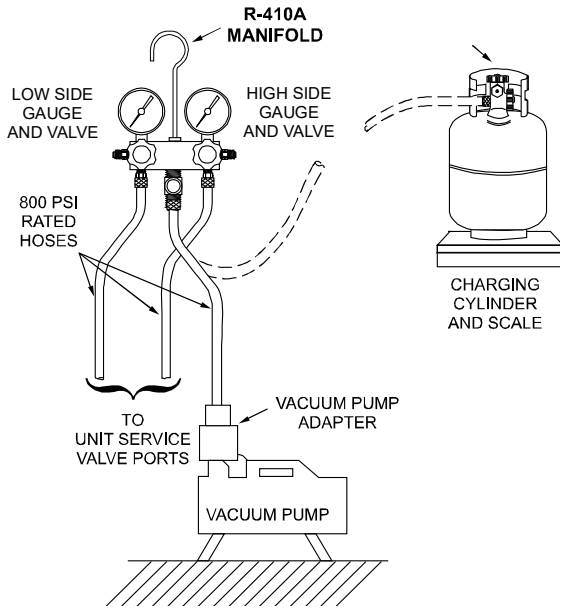
The equipment required to thoroughly evacuate the system is a high vacuum pump, capable of producing a vacuum equivalent to 25 microns absolute and a thermocouple vacuum gauge to give a true reading of the vacuum in the system

NOTE: Never use the system compressor as a vacuum pump or run when under a high vacuum. Motor damage could occur.

WARNING

DO NOT FRONT SEAT THE SERVICE VALVE(S) WITH THE COMPRESSOR OPEN, WITH THE SUCTION LINE OF THE COMPRESSOR CLOSED OR SEVERELY RESTRICTED.

1. Change the field setting "Refrigerant Recovery / Evacuation Mode" to [1] to open all the valves.
2. Connect the vacuum pump, vacuum tight manifold set with high vacuum hoses, thermocouple vacuum gauge and charging cylinder as shown.
3. Start the vacuum pump and open the shut off valve to the high vacuum gauge manifold only. After the compound gauge (low side) has dropped to approximately 29 inches of vacuum, open the valve to the vacuum thermocouple gauge. See that the vacuum pump will blank-off to a maximum of 25 microns. A high vacuum pump can only produce a good vacuum if its oil is non-contaminated.



EVACUATION

4. If the vacuum pump is working properly, close the valve to the vacuum thermocouple gauge and open the high and low side valves to the high vacuum manifold set. With the valve on the charging cylinder closed, open the manifold valve to the cylinder.
5. Evacuate the system to at least 29 inches gauge before opening valve to thermocouple vacuum gauge.
6. Continue to evacuate to a maximum of 500 microns. Close valve to vacuum pump and watch rate of rise. If vacuum does not rise above 500 microns in three to five minutes, system can be considered properly evacuated.
7. If thermocouple vacuum gauge continues to rise and levels off at about 500 microns, moisture and non-condensables are still present. If gauge continues to rise a leak is present. Repair and re-evacuate.
8. Close valve to thermocouple vacuum gauge and vacuum pump. Shut off pump and prepare to charge.

S-103 CHARGING

WARNING

REFRIGERANT UNDER PRESSURE!

- **DO NOT OVERCHARGE SYSTEM WITH REFRIGERANT.**
- **DO NOT OPERATE UNIT IN A VACUUM OR AT NEGATIVE PRESSURE.**

FAILURE TO FOLLOW PROPER PROCEDURES MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

SERVICING

CAUTION

Only use refrigerant certified to AHRI standards. Used refrigerant may cause compressor damage. The manufacturer is not responsible for damage or the need for repairs resulting from the use of unapproved refrigerant types or used or recycled refrigerant. Most portable machines cannot clean used refrigerant to meet AHRI standards.

In addition to conventional charging procedures, the following requirements shall be followed.

• Ensure that contamination of different refrigerants does not occur when using charging equipment.
• Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
• Cylinders shall be kept in an appropriate position according to the instructions.
• Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
• Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

NOTE: "Earthing" is defined as achieving an earth ground by connecting the equipment's supplied grounding lug to the earth. This should be verified by a certified technician.

Charge the system with the exact amount of refrigerant.

Refer to the specification section or check the unit nameplates for the correct refrigerant charge.

An inaccurately charged system will cause future problems.

1. Using a quality set of charging scales, weigh the proper amount of refrigerant for the system. Allow liquid refrigerant only to enter the high side.
2. Check if the "Refrigerant Recovery / Evacuation Mode" is set to [1]. If not, set to [1].
3. After the system will take all it will take, close the valve on the high side of the charging manifold.
4. Start the system and charge the balance of the refrigerant through the low side.
5. With the system still running, close the valve on the charging cylinder. At this time, you may still have some liquid refrigerant in the charging cylinder hose and will definitely have liquid in the liquid hose. Reseat the liquid line core. Slowly open the high side manifold valve and transfer the liquid refrigerant from the liquid line hose and charging cylinder hose into the suction service valve port. CAREFUL: Watch so that liquid refrigerant does not enter the compressor.
6. With the system still running, remove hose and reinstall both valve caps.
7. Check system for leaks.

Due to their design, Scroll compressors are inherently more tolerant of liquid refrigerant.

NOTE: Even though the compressor section of a Scroll compressor is more tolerant of liquid refrigerant, continued floodback or flooded start conditions may wash oil from the bearing surfaces causing premature bearing failure.

The condition of the valves or scroll flanks is checked in the following manner.

1. Attach gauges to the high and low side of the system.
2. Start the system and run a Cooling Performance Test.

If the test shows-

- Below normal high side pressure.
- Above normal low side pressure.
- Low temperature difference across coil.
- Low amp draw at compressor.

- and the charge is correct. The compressor is faulty - replace the compressor.

S-108 Checking Superheat

Refrigerant gas is considered superheated when its temperature is higher than the saturation temperature corresponding to its pressure. The degree of superheat equals the degrees of temperature increase above the saturation temperature at existing pressure. See Temperature - Pressure Chart.

CAUTION

To prevent personal injury, carefully connect and disconnect manifold gauge hoses. Escaping liquid refrigerant can cause burns. Do not vent refrigerant to atmosphere. Recover during system repair or final unit disposal.

1. Run system at least 1 hour to allow pressure to stabilize.
2. Connect D checker to check the discharge superheat.
3. Recover charge if discharge superheat is below 18 °F (°C).

S-109 Checking Subcooling

Refrigerant liquid is considered subcooled when its temperature is lower than the saturation temperature corresponding to its pressure. The degree of subcooling equals the degrees of temperature decrease below the saturation temperature at the existing pressure.

Connect D checker to check the subcooling. Then, add charge to raise subcooling. Recover charge to lower subcooling.

SERVICING

S-114 Non-Condensables

If non-condensables are suspected, shut down the system and allow the pressures to equalize. Wait at least 15 minutes. Compare the pressure to the temperature of the coldest coil since this is where most of the refrigerant will be. If the pressure indicates a higher temperature than that of the coil temperature, non-condensables are present.

Non-condensables are removed from the system by first removing the refrigerant charge, evacuating and recharging.

S-115 Compressor Burnout

When a compressor burns out, high temperature develops causing the refrigerant, oil and motor insulation to decompose forming acids and sludge.

If a compressor is suspected of being burned-out, attach a refrigerant hose to the liquid line dill valve and properly remove and dispose of the refrigerant.

NOTICE

Violation of EPA regulations may result in fines or other penalties.

CAUTION

Do not allow the sludge or oil to contact the skin. Severe burns may result.

NOTICE: Regardless, the cause for burnout must be determined and corrected before the new compressor is started.

S-200 Checking External Static Pressure

The minimum and maximum allowable duct static pressure is found in the Specifications Sheet Manual.

NOTE: False ceilings or drop ceilings may be used as a return air plenum.

Too great of an external static pressure will result in insufficient air that can cause icing of the coil, whereas too much air can cause poor humidity control, and condensate to be pulled off the evaporator coil causing condensate leakage. Too much air can cause motor overloading and in many cases this constitutes a poorly designed system. To determine proper air movement, proceed as follows:

1. Using a draft gauge (inclined manometer) measure the static pressure of the return duct at the inlet of the unit, (Negative Pressure).
2. Measure the static pressure of the supply duct, (Positive Pressure).
3. Add the two readings together.

NOTE: Both readings may be taken simultaneously and read directly on the manometer if so desired.

4. Consult proper table for quantity of air.

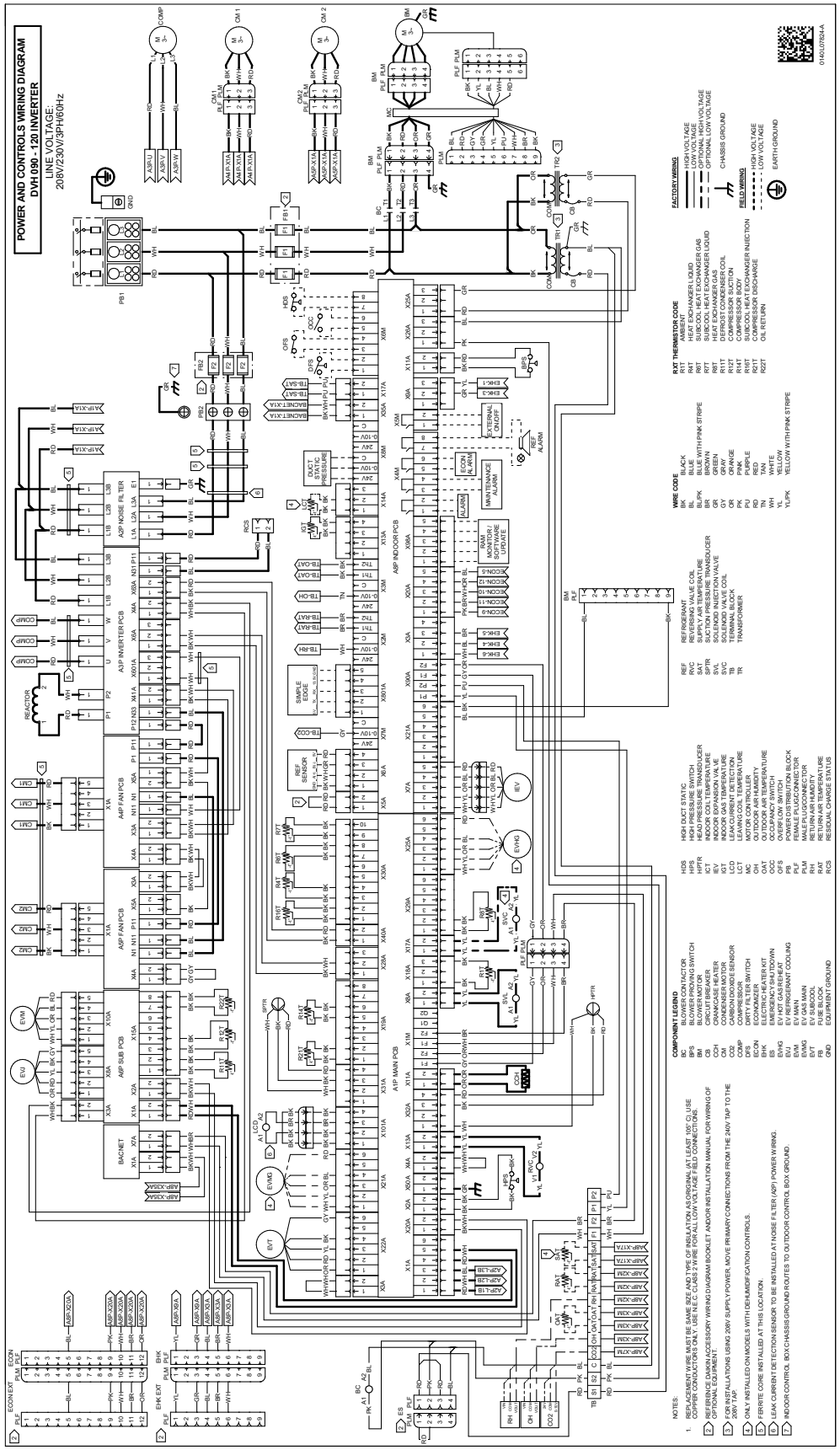
If the external static pressure exceeds the minimum or maximum allowable statics, check for closed dampers, dirty filters, undersized or poorly laid out ductwork.

SERVICING

SATURATED SUCTION PRESSURE -TEMPERATURE CHART				
R-32				
SUCTION PRESSURE (PSIG)	SATURATED SUCTION TEMPERATURE (°F)		SUCTION PRESSURE (PSIG)	SATURATED SUCTION TEMPERATURE (°F)
50	1		130	44
52	2		140	48
54	4		150	52
56	5		160	55
58	6		170	59
60	8		200	68
62	9		210	71
64	10		220	74
66	12		230	77
68	13		240	80
70	14		250	82
72	15		260	85
74	17		270	87
76	18		280	90
78	19		290	92
80	20		300	94
82	21		320	99
84	22		340	103
86	23		360	107
88	24		380	111
90	25		400	115
92	26		420	118
94	27		440	122
96	28		460	125
98	29		480	128
100	30		500	132
102	31		520	135
104	32		540	138
106	33		560	141
108	34		580	143
110	35		600	146
120	40		620	149

WARNING

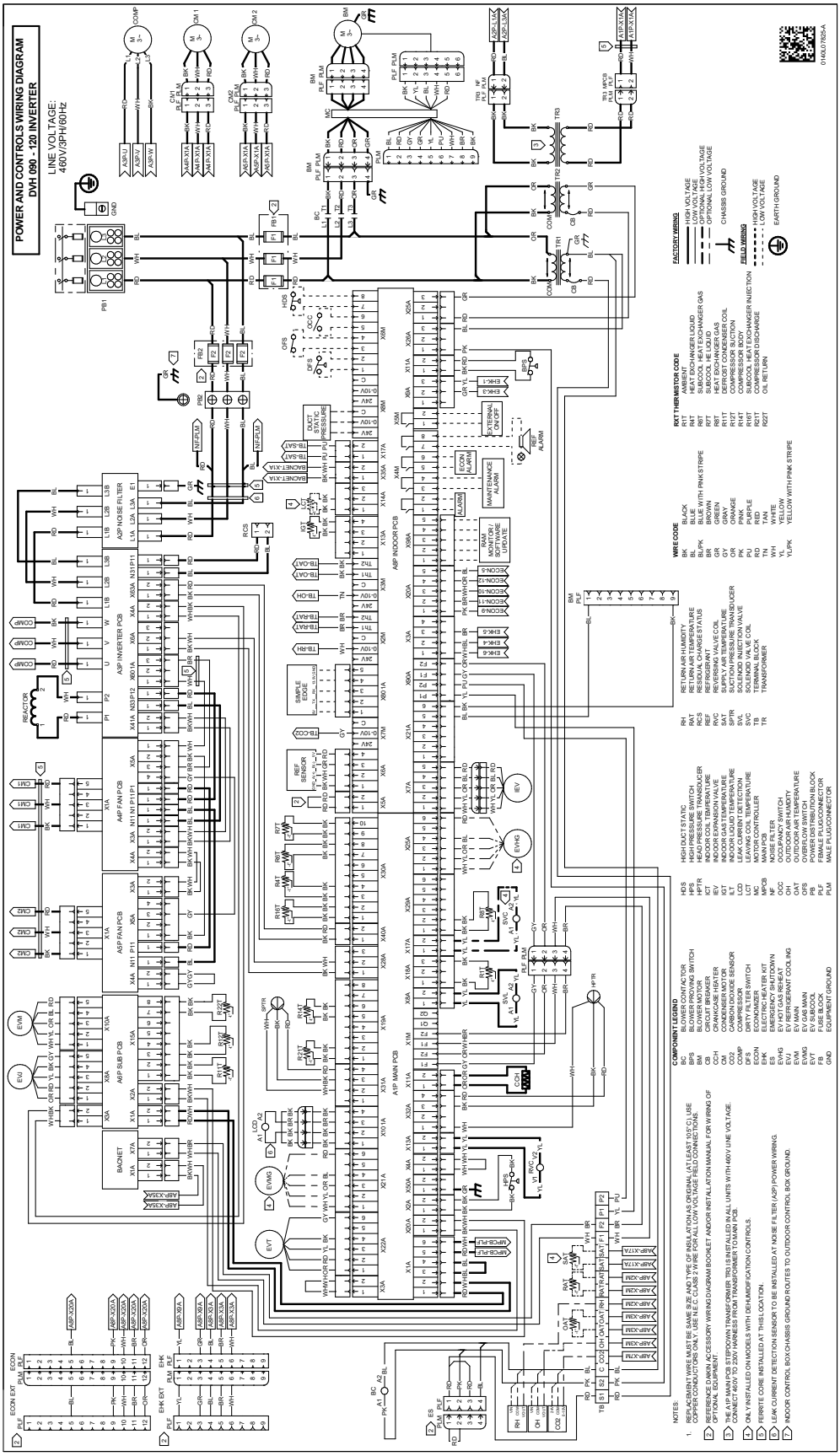
HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

WARNING

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEDULED MAINTENANCE

WARNING

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD
Failure to follow safety warnings exactly could result in dangerous operation, serious injury, death or property damage.
Improper servicing could result in dangerous operation, serious injury, death or property damage.

- **Before servicing, disconnect all electrical power to furnace.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.**
- **Verify proper operation after servicing.**

WARNING

HIGH VOLTAGE!
Disconnect all power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

WARNING

To prevent personal injury or death due to improper installation, adjustment, alteration, service or maintenance, refer to this manual. For additional assistance or information, consult a qualified installer, servicer agency or the gas supplier.

CAUTION

Sheet metal parts, screws, clips and similar items inherently have sharp edges, and it is necessary that the installer and service personnel exercise caution.

Preventive maintenance is the best way to avoid unnecessary expense and inconvenience. Have this system inspected at regular intervals by qualified service personnel, at least twice a year. Routine maintenance should cover the following items:

1. Tighten all, set screws, and wire connections.
2. Clean evaporator and condenser coils mechanically or with cold water, if necessary. Usually any fouling is only matted on the entering air face of the coil and can be removed by brushing.
3. Replace filters as needed (see Filters section).
4. Check for blockage of condensate drain.
5. Check power and control voltages.
6. Check running amperage.
7. Check operating temperatures and pressures.
8. Check and adjust damper linkages.
9. Check operation of all safety controls.
10. Check condenser fans and tighten set screws.

Filters

CAUTION

To prevent property damage due to fire and loss of equipment efficiency or equipment damage due to dust and lint build up on internal parts, never operate unit without an air filter installed in the return air system.

Every application may require a different frequency of replacement of dirty filters. Filters must be replaced at least every three (3) months during operating seasons.

Dirty filters are the most common cause of inadequate heating or cooling performance. Filter inspection should be made at least every two months; more often if necessary because of local conditions and usage.
Dirty throwaway filters should be discarded and replaced with a new, clean filter.

Disposable return air filters are supplied with this unit. See the unit Specification Sheet or Technical Manual for the correct size and part number. To remove the filters, remove the filter access panel on return side of the unit.

Cabinet Finish Maintenance

Use a fine grade automotive wax on the cabinet finish to maintain the finishes original high luster. This is especially important in installations with extended periods of direct sunlight.

Clean Outside Coil (Qualified Servicer Only)

The coil with the outside air flowing over it should be inspected annually and cleaned as frequently as necessary to keep the finned areas free of lint, hair and debris.

Clean Indoor Coil (Qualified Servicer Only)

Before cleaning the indoor coil, A2L sensor must be removed from the unit to avoid damage and contamination. Air filters should also be removed before performing maintenance. The coil with the filtered air flowing over it should be inspected and cleaned as frequently as necessary to keep the finned areas free of debris. Coil cleaning should be performed, utilizing an approved cleaning method and cleaning agent, from inside-out (opposite operating airflow direction) to prevent damage to the tube, fin coil, and any other components. Prior to resuming unit operation, ensure to reinstall the A2L sensor.

Condenser Fan Motors

Bearings on the condenser fan motors and the combustion fan motor are permanently lubricated. No additional oiling is required.

Lubrication

The fan shaft bearings, the supply fan motors, the condenser fan motors and compressors are permanently lubricated.

SCHEDULED MAINTENANCE

Functional Parts

Refer to the unit Parts Catalog for a list of functional parts. Parts are available from your distributor.

Servicing Measures for the Refrigerant Detection System:

REFRIGERANT SENSORS shall only be replaced with sensors specified by the manufacturer. If REFRIGERANT SENSOR requires replacement, please replace with Sensata R32 Sensor PN#RGD-00ML12 (Daikin PN#SER2A08011).

	warning; flammable materials
	service indicator; read technical manual
	operator's manual; operating instructions
	warning; low burning velocity material
	UN GHS flame symbol

Marking Symbol Table

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

A. Become familiar with the equipment and its operation.
B. Isolate system electrically.
C. Before attempting the procedure, ensure that:
   - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
   - all personal protective equipment is available and being used correctly;
   - the recovery process is supervised at all times by a competent person;
   - recovery equipment and cylinders conform to the appropriate standards.
D. Pump down refrigerant system, if possible.
E. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
F. Make sure that cylinder is situated on the scales before recovery takes place.
G. Start the recovery machine and operate in accordance with instructions.
H. Do not overfill cylinders (no more than 80 % volume liquid charge).
I. Do not exceed the maximum working pressure of the cylinder, even temporarily.
J. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
K. Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.