GREE

evo+

DUCTLESS SYSTEM

Installation, Service & Troubleshooting

Models:

GWH09AB-A3DNA2B
GWH12AB-A3DNA2B
GWH09AB-D3DNA2D
GWH12AB-D3DNA2D
GWH18AB-D3DNA2D
GWH24AB-D3DNA2D

Table of Contents

Safety Precautions & Warnings

Warning

Installing, starting up, and servicing air conditioner can be hazardous due to system pressure, electrical components, and equipment location, etc. Only trained, qualified installers and service personnel are allowed to install, start-up, and service this equipment. Untrained personnel can perform basic maintenance functions such as cleaning coils. All other operations should be performed by trained service personnel. When handling the equipment, observe precautions in the manual and on tags, stickers, and labels attached to the equipment. Follow all safety codes. Wear safety glasses and work gloves. Keep quenching cloth and fire extinguisher nearby when brazing. Read the instructions thoroughly and follow all warnings or cautions in literature and attached to the unit. Consult local building codes and current editions of national as well as local electrical codes.

Recognize the following safety information:

Warning: Incorrect handling could result in personal injury or death.

Caution: Incorrect handling may result in minor injury, or damage to product or property.

Warning

All electrical work must be performed by a qualified, licensed electrician according to local and national codes as well mas the instructions provided in the manual.

- Before installing, modifying, or servicing the system, the main electrical disconnect must be off. There may be more than one disconnect switch. Lock out and tag switch with a suitable warning label.
- Never supply power to the unit unless all wiring and tubing are completed, reconnected and checked.
- This system adopts highly dangerous electrical voltage. Incorrect connections or inadequate grounding can cause personal injury or death. Refer to your local and national codes for proper grounding.
- Have the unit properly grounded with all connections tight. Loose connections can cause overheating and a possible fire hazard.

Caution

- Never install the unit in a place where a combustible gas might leak, or it may lead to fire or explosion.
- Make a proper provision against noise when the unit is installed at a telecommunication center or hospital.
- Provide a GFIC circuit when the local or national electric code requires it.
- Never wash the unit with water.
- Handle unit transportation with care. Use two people when the weight exceeds the capacity for one person.
- Never touch the heat exchanger fins with bare hands, sharp edges could cause personal injury.
- Never touch the compressor or refrigerant tubing without proper hand protection.
- Do not operate th unit without the air filters in place.
- Should any emergency occur, stop the unit and disconnect the electrical supply.
- Properly insulate tubing running inside the room to prevent water damage from condensation.

Warning

All installation or repair work shall be performed by your dealer or a specialized subcontractor as there is the risk of fire, electric shock, explosion or injury

Warning

Pressurized Refrigerant

Personal injury could result in failure to follow this warning. Systems contain oil and refrigerant under high pressure, proper refrigerant handling techniques should be completed by a qualified technician.

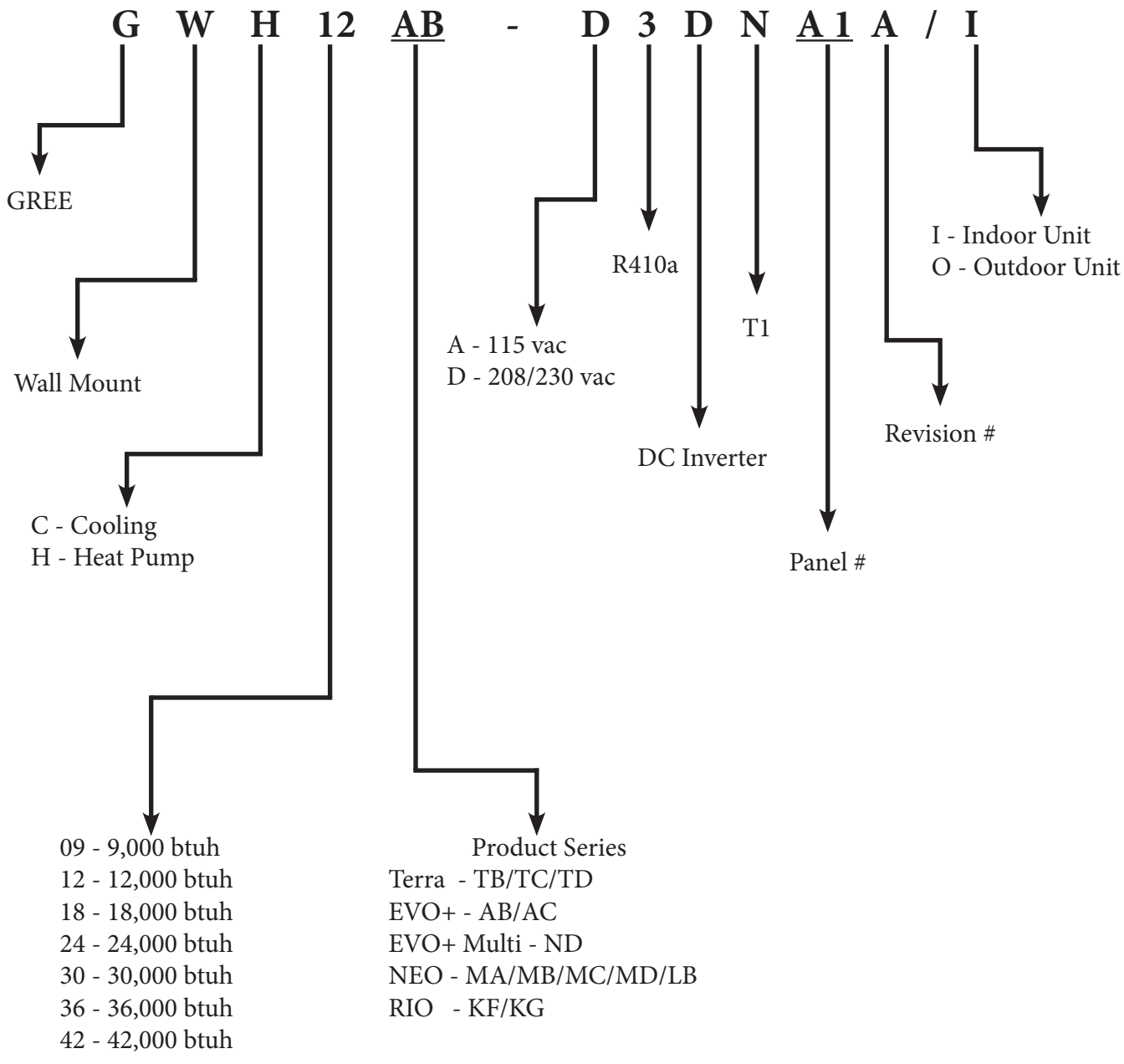
Warning

Live Electrical Components

Personal injury, property damage, or death could result in failure to follow this warning.

Follow all electrical precautions when servicing this system, it may be necessary to service or troubleshoot with live electrical circuits. All work should be completed by a qualified technician.

Product Catalog Number-Nomenclature



Physical & Electrical Data, cont.

Model		GWH09AB-A3DNA2B	GWH12AB-A3DNA2B
System Type		Heat Pump	
Power Supply		115v / 60Hz	115V / 60Hz
Rated Current Cooling	Amps	5.3	8.7
Rated Current Heating	Amps	6.0	10.0
System Performance			
Cooling Cap (Min/Max)	Btu/h	9,000 (4,000-11,950)	12,000 (4,500-13,000)
Heating Cap (Min/Max)	Btu/h	9,500 (3,412-12,500)	11,700 (3,200-14,000)
Operating Range - Cooing	deg F	23 - 118.4	23 - 118.4
Operating Range - Heating	deg F	5 - 86	5 - 86
System Specifications			
Compressor Type		DC Inverter-driven Twin Rotary	
Sound Level	db	56	56
Net/Gross Weight Indoor	lb	26 / 33	26 / 33
Net/Gross Weight Outdoor	lb	88 / 97	90 / 99
Condenser Coil Type		Gold Fin Coated	
Refrigerant/Charge	oz	R410a / 48.2	R410a / 48.2
Line Set Size Liq. - Suction		1/4” - 3/8”	1/4” - 1/2”
Pre-Charged Lineset Ft.	Feet	25	25
Additional Refrigerant charge/additional feet	oz	0.22	0.22
Max. Total Piping Length	Feet	50	66
Max. Elevation	Feet	33	33
MCA	Amps	14	18
MOCP/Breaker Size	Amps	20	25
Wire Size to Outdoor Unit, # of Wires per Local Code	awg	12	10
Wire Size and # of Conductors from Indoor to Outdoor unit		14awg/4c	

Note: The manufacturer reserves the right to modify the design and/or change the specifications without notice. Please refer to specific installation manual for current information.

Physical & Electrical Data, cont.

Model		GWH09AB-D3DNA2D	GWH12AB-D3DNA2D
System Type		Heat Pump	
Power Supply		208-230v / 60Hz	208-230V / 60Hz
Rated Current Cooling	Amps	2.8	4.5
Rated Current Heating	Amps	3.5	5.5
System Performance			
Cooling Cap (Min/Max)	Btu/h	9,000 (3,100-9,600))	12,000 (3,100-13,000)
Heating Cap (Min/Max)	Btu/h	9,800 (2,200-11,000)	13,000 (2,400-14,000)
Operating Range - Cooing	deg F	23 - 118.4	23 - 118.4
Operating Range - Heating	deg F	5 - 86	5 - 86
System Specifications			
Compressor Type		DC Inverter-driven Twin Rotary	
Sound Level	db	53	55
Net/Gross Weight Indoor	lb	24 / 33	24 / 33
Net/Gross Weight Outdoor	lb	80 / 90	90 / 99
Condenser Coil Type		Gold Fin Coated	
Refrigerant/Charge	oz	R410a / 45.9	R410a / 47.6
Line Set Size Liq. - Suction		1/4” - 3/8”	1/4” - 1/2”
Pre-Charged Lineset Ft.	Feet	25	25
Additional Refrigerant charge/additional feet	oz	0.22	0.22
Max. Total Piping Length	Feet	50	66
Max. Elevation	Feet	33	33
MCA	Amps	10	10
MOCP/Breaker Size	Amps	15	15
Wire Size to Outdoor Unit, # of Wires per Local Code	awg	14	14
Wire Size and # of Conductors from Indoor to Outdoor unit		14awg/4c	

Note: The manufacturer reserves the right to modify the design and/or change the specifications without notice. Please refer to specific installation manual for current information.

Physical & Electrical Data, cont.

Model		GWH18AB-D3DNA2D	GWH24AB-D3DNA2D
System Type		Heat Pump	
Power Supply		208-230v / 60Hz	208-230V / 60Hz
Rated Current Cooling	Amps	6.7	9.1
Rated Current Heating	Amps	7.3	13.4
System Performance			
Cooling Cap (Min/Max)	Btu/h	18,000 (6,210-22,000)	22,000 (7,800-26,200)
Heating Cap (Min/Max)	Btu/h	19,800 (4,100-22,000)	23,000 (6,000-26,000)
Operating Range - Cooing	deg F	23 - 118.4	23 - 118.4
Operating Range - Heating	deg F	5 - 86	5 - 86
System Specifications			
Compressor Type		DC Inverter-driven Twin Rotary	
Sound Level	db	56	58
Net/Gross Weight Indoor	lb	29 / 40	35 / 46
Net/Gross Weight Outdoor	lb	99 / 110	132 / 146
Condenser Coil Type		Gold Fin Coated	
Refrigerant/Charge	oz	R410a / 49.4	R410a / 56.4
Line Set Size Liq. - Suction		1/4” - 1/2”	1/4” - 5/8”
Pre-Charged Lineset Ft.	Feet	25	25
Additional Refrigerant charge/additional feet	oz	0.22	0.54
Max. Total Piping Length	Feet	82	82
Max. Elevation	Feet	50	50
MCA	Amps	15	15
MOCP/Breaker Size	Amps	25	25
Wire Size to Outdoor Unit, # of Wires per Local Code	awg	10	10
Wire Size and # of Conductors from Indoor to Outdoor unit		14awg/4c	

Note: The manufacturer reserves the right to modify the design and/or change the specifications without notice. Please refer to specific installation manual for current information.

Product Introduction

System Overview

The EVO+ Ductless split heat pumps are single zone units available in size from 9000 btuh to 24,000 btuh providing heating and cooling. All comfort settings are controlled by a remote control. The EVO+ unit has many features to enhance comfort and efficiency. The operation of these features will be explained later in this service manual.

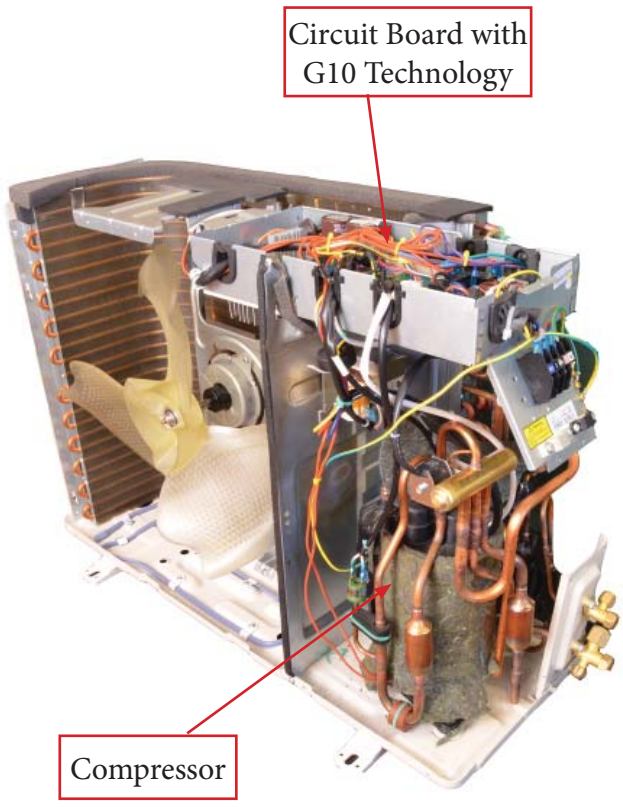
Superior inverter technology is used to control capacity while maintaining maximum efficiency. The EVO+ systems are equipped with G10 inverter technology providing precise control over the compressor frequency based on operating pressures and temperatures. Should an abnormal condition occur, the software will adjust the compressor frequency or shut down the system indicating the appropriate fault.

The indoor unit contains a digital display, which will indicate the current fault. The evaporator, swing motors, fan motors and circuit board are also components of the indoor unit. The indoor units have a bypass switch to bypass the remote control if lost or batteries fail. This will be explained later in this service manual.

The systems require R410A and are pre-charged for 25' of lineset. Please refer to your installation manual for additional charge for linesets longer than 25'.

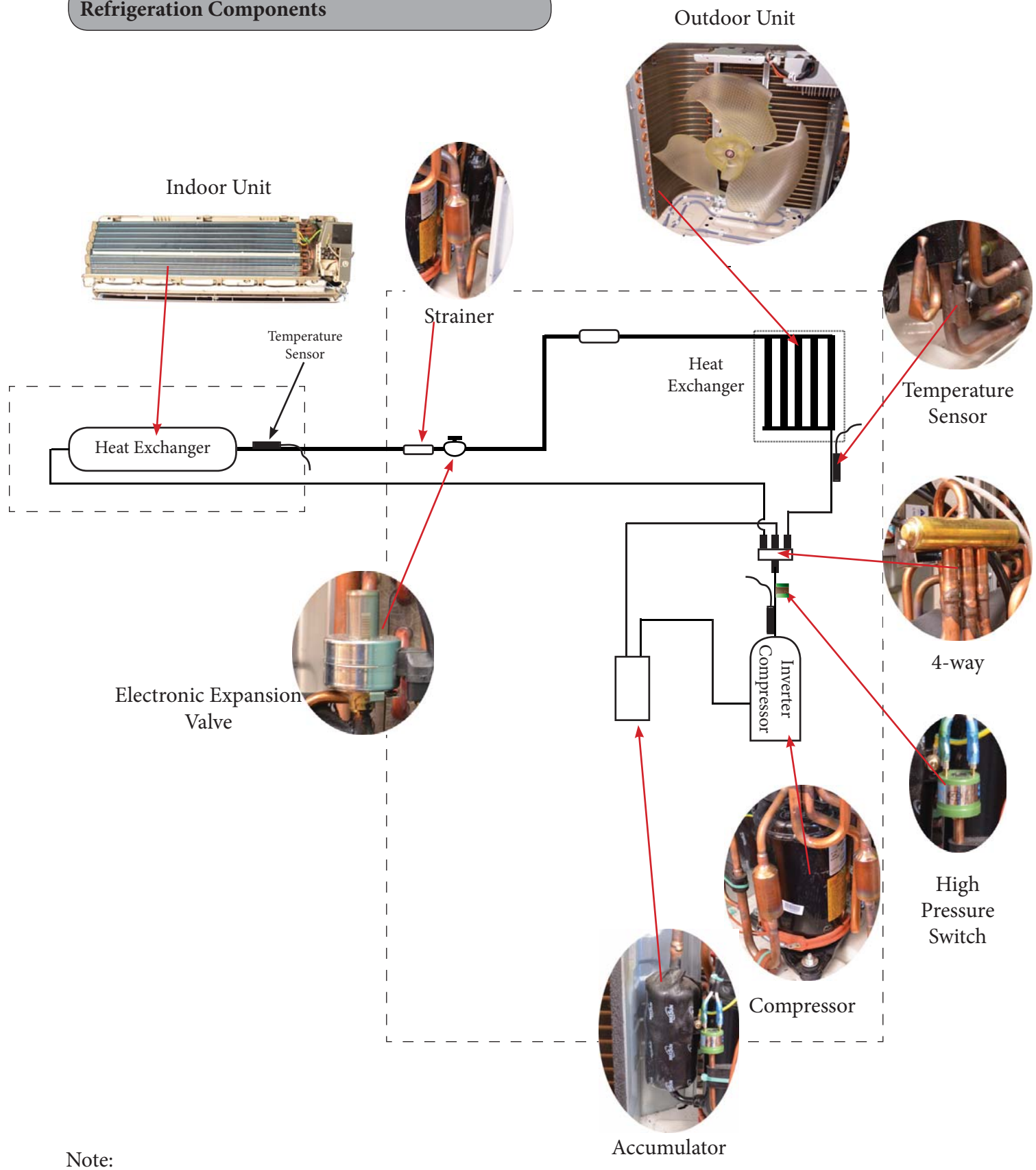
The maximum allowable line lift and distances vary by model, please refer to the charts in the manual for proper lineset applications.

The systems use a PVE oil and should require no additional oil. All EVO+ units utilize an Oil Return Mode which will return oil to the compressor should the need arise.



Product Introduction

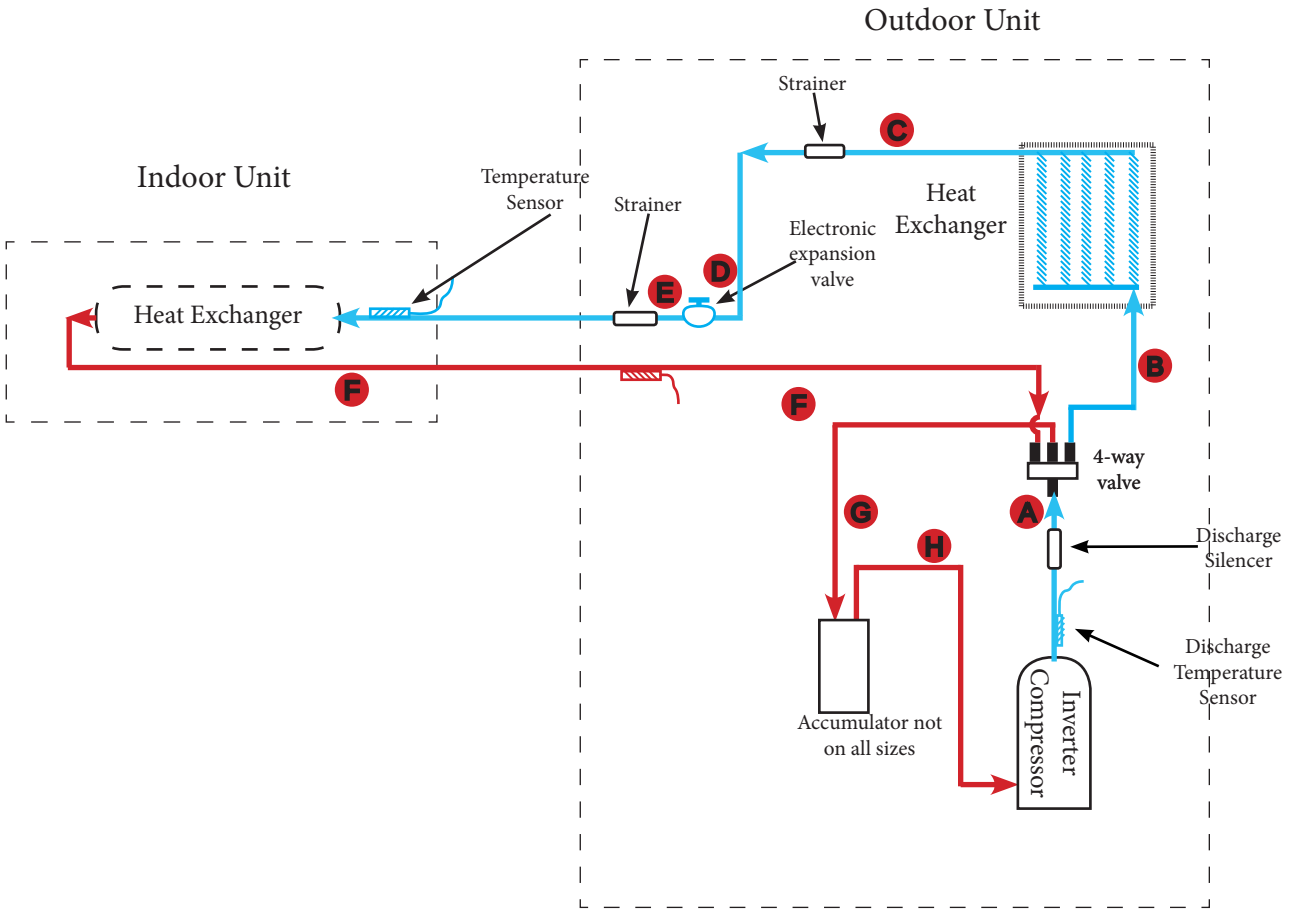
Refrigeration Components



Note:
Component locations may vary depending on models.

Product Introduction

Cooling Mode



Product Introduction

Cooling Mode

A. Hot gas is discharged from the compressor. The temperature of the gas is monitored by the Discharge Temperature sensor and sent to the outdoor control panel.

B. The hot gas is directed through the 4-way valve, then enters the outdoor coil. The hot gas will be slightly subcooled, however there are no pressure ports to take measurements.

C. The subcooled liquid will enter the filter to remove contaminates.

D. The subcooled liquid will enter the Electronic Expansion Valve (EEV) and will regulate to about a 10 degree superheat level. The EEV will adjust its flow based upon the temperature sensor readings. The adjustment process and compressor speed are controlled by the outdoor circuit board.

E. The refrigerant leaving the EEV will be in a low pressure/temperature saturated state. This cold saturated refrigerant will move through the coil absorbing heat. This liquid will flash to a vapor and will be superheated to about 10 degrees F. Since this tubing is cold, it must be insulated.

F. The superheated vapor will be returned to the outdoor unit's 4-way valve.

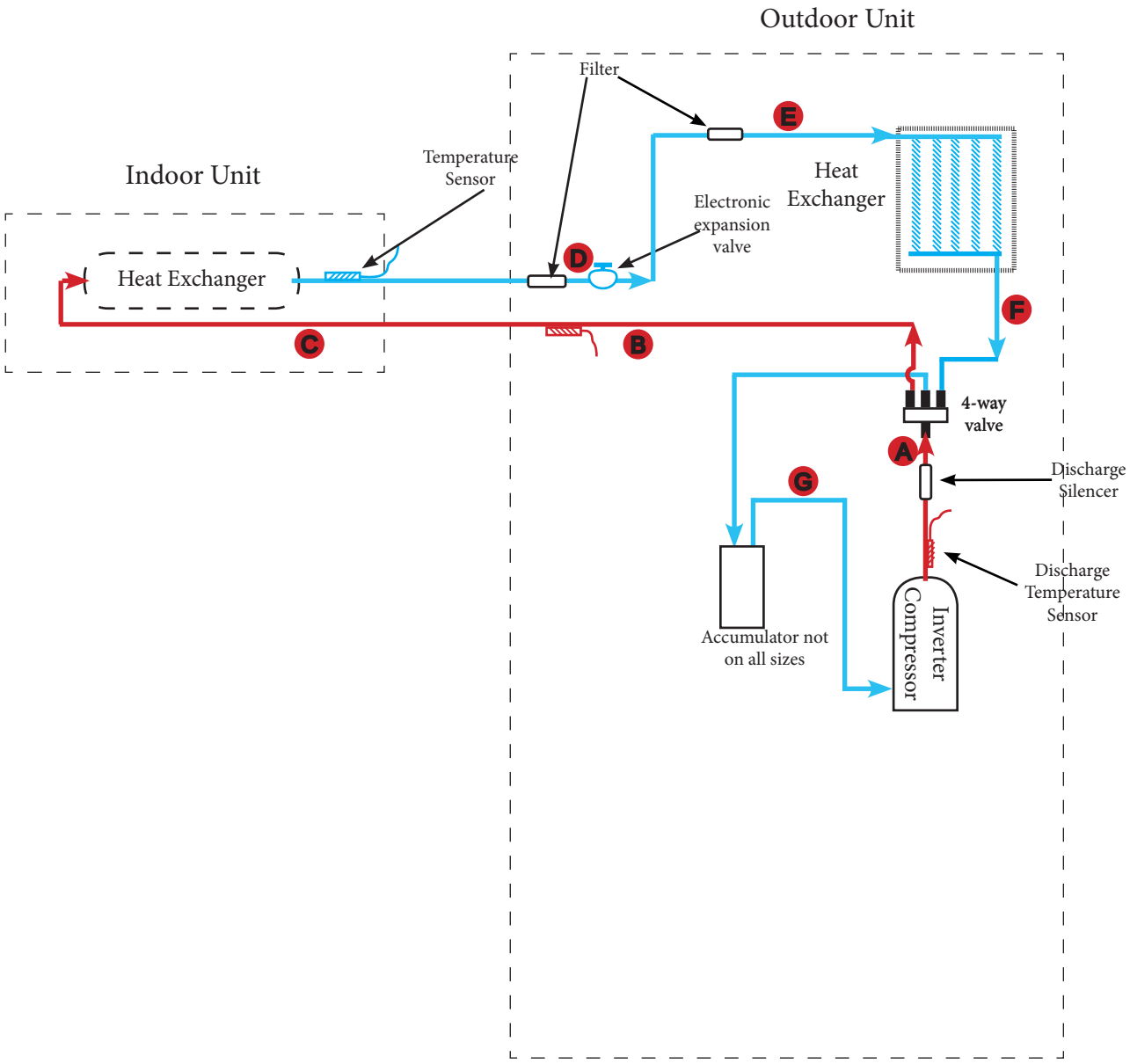
G. The refrigerant will flow to the accumulator (not all models will have an accumulator) where liquid and vapor are separated.

H. The refrigerant will flow to the compressor and complete another refrigeration cycle.

The control board will monitor the temperature and pressures and adjust the frequency of the compressor and flow rate of the EEV as needed. There are no pressure charts to evaluate temperature or pressures.

Product Introduction

Heating Mode



Product Introduction

Heating Mode

A. Hot gas is discharged from the compressor. The temperature of the gas in monitored by the Discharge Temperature sensor and sent to the outdoor control panel.

B. The hot gas is directed through the 4-way valve to the appropriate indoor coil making the line a hot gas line.

C. The hot gas will enter the indoor coil and condense to a saturated mix as it travel through the coil and will be slightly subcooled.

D. The refrigerant returns to the outdoor unit through the filter, then through the EEV reducing the refrigerant to a low pressure liquid and will maintain 10 degrees F of superheat.

E. The cold refrigerant will travel through the outdoor coil (evaporator) and will pickup heat from the outdoor air. This will cause the cold saturated refrigerant to flash to a saturated mixture which will be superheated to 10 degrees F.

F. The superheated vapor will travel through the 4-way valve to the accumulator which will prevent liquid floodback.

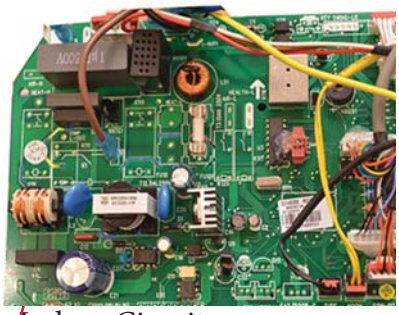
G. The superheated gas will enter the compressor for another refrigeration cycle.

The control board will monitor the temperature and pressures and adjust the frequency of the compressor and flow rate of the EEV as needed. There are no pressure charts to evaluate temperature or pressures.

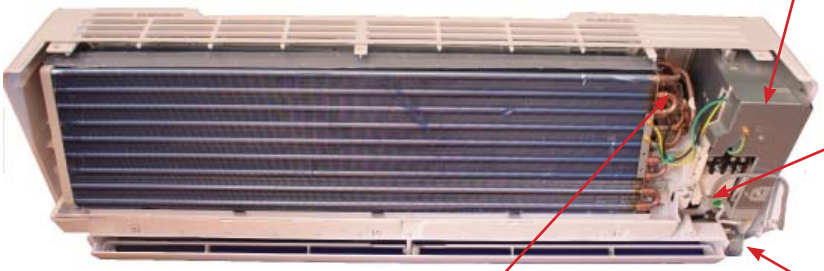
Product Introduction

Indoor Unit Components

Evo+ 12,000 btuh model
Other Evo+ models may very slightly.



Indoor Circuit Board



Fan Motor

Indoor Tube Thermistor

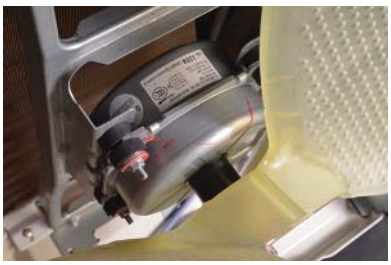
Swing Motor

Ambient Temperature Sensor

Product Introduction

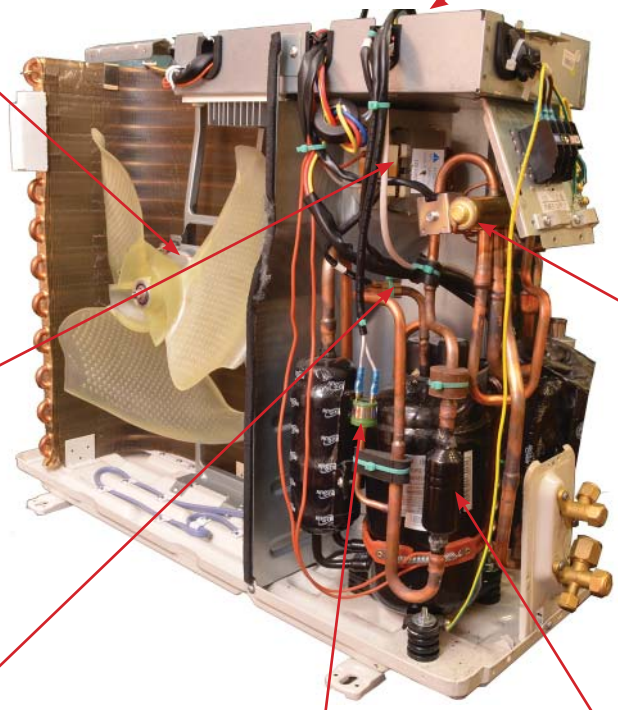
Outdoor Unit Components

EVO+ 12,000 btuh Outdoor Unit
Other EVO+ models may very slightly.



Outdoor Fan

AP1 Board



Reactor

4-Way Valve

Exhaust Temp Sensor

High Pressure Switch

Compressor

Note:
Component locations may vary depending on models.

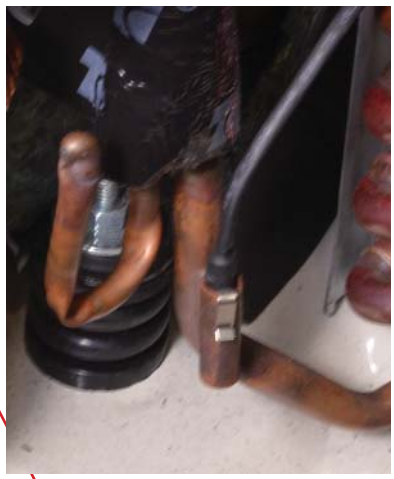
Product Introduction

Outdoor Unit Components

AP1 Board

Outdoor Air Sensor

Electronic Expansion Valve



Outdoor tube Sensor

Product Introduction

Basic Functions

The compressor should stay off for at least 3 minutes before starting the unit. The compressor circuit has a 3 minute delay if the compressor is de-energized during a run cycle. If the compressor starts from a de-energized cycle, there will be no time delay. The compressor has a minimum runtime of 6 minutes regardless of room temperature.

1) Cooling Mode

Cooling Process

When the indoor ambient rises 2º F above the preset temperature from a stopped state, the unit will start the cooling cycle. The outdoor fan and compressor will start. The indoor fan will run continuously at the selected speed. The outdoor unit will monitor the appropriate temperatures and pressure and adjust the compressor speed and the EEV as required. If the indoor ambient is > 2º F than the preset temperature, the compressor will increase the frequency; < 2º F the compressor will begin reducing the frequency. The EEV will be closed on indoor units with no cooling requirement. The G10 technology will control compressor speed based on indoor load and compressor amperage. When the indoor temperature is satisfied, the compressor will stop, then 60 seconds later the outdoor fan will stop. When the cooling mode transfers to heating mode, the 4-way valve will be energized after a two minute compressor delay.

Evaporator Freeze Protection

The software will monitor the indoor evaporator coil form freezing.
The following will occur 6 minutes after the compressor has been operating in the cooling or dry mode:
If the evaporator temperature drops below 36º F, the compressor will operate at a reduced frequency. If the evaporator is below 30º F for 3 minutes, the compressor will stop, 30 seconds later the outdoor fan will stop. In cooling mode, the indoor fan and swing motor will remain on. If the evaporator temperature is >= 50º F and the compressor is off for at least 3 minutes, the compressor will resume its normal operation state.

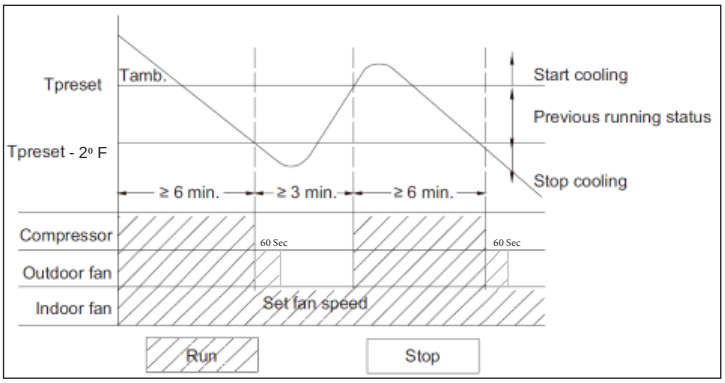
Overcurrent Protection

The software will monitor the compressor current to maintain it in a safety and reliable operating range.
If the total current is greater than the rating, the compressor will stop; the outdoor fan will continue to run for 60 seconds, then stop.

2) Dry Mode

Drying Process

This feature will not take the place of a dehumidifier, it is intended to dry the filter and slightly cool the air. If the indoor ambient temperature is greater than the preset temperature, the unit will enter the cooling and drying mode, in which case the compressor will operate and the indoor fan will run at a low speed. When the indoor ambient temperature is at or below the preset temperature, the unit will operate in it previous running state. When the indoor ambient drops to more than 2º F below the preset temperature the compressor will stop running, then 30 seconds later the outdoor fan will stop, the indoor fan will run at low speed.



3)Heating Mode

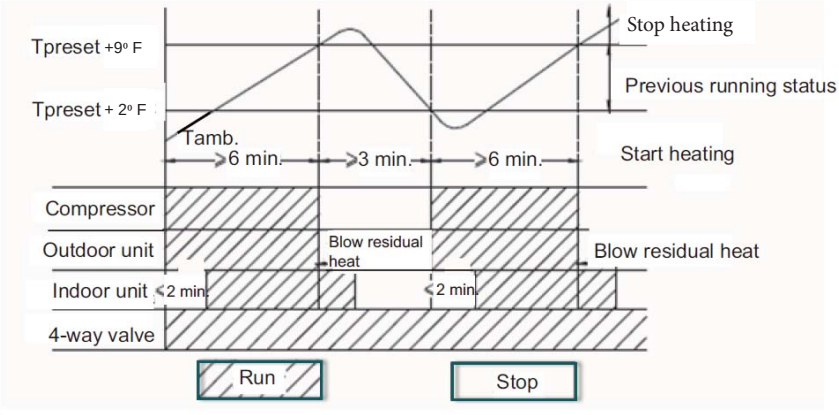
Heating Process

When the indoor ambient drops 2º F below the preset temperature, the unit will start the heating cycle. The outdoor fan, compressor and 4-way valve will operate. The indoor fan will operate in the **"Cold Air Prevention"** mode in which the indoor fan will have a 2 minute delay after the call for heating. The indoor evaporator coil temperature must reach 104º F before the indoor fan will start, this will prevent cold air from discharging from the indoor coil. When the indoor evaporator coil temperature is > 104º F, the indoor fan will operate at low speed for 1 minute. With 1 minute of operation or 2 minutes of no fan operation and the indoor evaporator coil temperature is > 108º F, the indoor fan will operate at its preset condition.

If the indoor ambient temperature is < 9º F and > 2º F of the preset temperature, the unit will run in its original mode of operation.

If the compressor is running and the mode is changed from heating to cooling, the compressor will stop, the 4-way valve will be de-energized 2 minutes later, the outdoor fan will stop after a 1 minute delay.

If the indoor ambient temperature is >= 9º F than the preset temperature, the compressor will stop and the outdoor fan will stop after a 60 second delay. The indoor fan will continue to operate at its preset mode.
The G10 technology will determine compressor frequency based on ambient temperatures.



Basic Functions

Defrost Process

You may force a defrost in heat mode by pressing the "+" and "-" buttons alternately three times within 5 seconds.

1) The unit will enter defrost when the following conditions are met:

A. Outdoor ambient <= 41º F
B. Compressor had accumulated more than 3 hours of operation in heating mode
C. The outdoor coil <= 32º F

Note: The compressor runtime will be cleared when the outdoor ambient is > 41º F or when the compressor has started up after changing to cooling or drying mode and defrost has finished. The runtime will not be cleared when the unit has stopped after reaching the setpoint temperature, a protection fault or changing to fan mode.

There are 3 perimeters used in the defrost algorithms, Outdoor ambient($T_{outdoor}$ambient), Outdoor tube($T_{outdoor}$tube) and a calculated $T_{compensation}$

$T_{compensation}$ is calculated by the following:

D. After power-up, for the first defrost $T_{compensation}$ = 32º F
E. $T_{outdoor}$tube > 36º F then $T_{compensation}$ = 32º F
F. $T_{outdoor}$tube <= 36º F then $T_{compensation}$ = 37º F

2) When heating has operated continuously for 45 minutes, or accumulated for 90 minutes, the unit will enter defrost mode in 3 minutes after meeting any of the conditions below:

A. Outdoor ambient >= 41º F and outdoor coil <= 28º F
B. 28º F <= $T_{outdoor}$ambient< 41º F, $T_{outdoor}$tube <= 21º F
C. 23º F <= $T_{outdoor}$ambient < 28º F <= $T_{outdoor}$tube <= 18º F
D. 14º F <= $T_{outdoor}$ambient < 23º F , $T_{outdoor}$tube -$T_{compensation}$ <= ($T_{outdoor}$ambient - 37º F)

3) During defrost, if run time for the compressor does not reach 3 minutes, the defrost cycle will not start for the next 2 hours. At that time the compressor stops operation and 30 seconds later the outdoor fan will stop. 30 seconds after this the 4-way reversing valves will de-energized. Following another 30 second delay, the compressor will increase its compressor speed for defrosting. Defrosting will last for 450 seconds or until the $T_{outdoor}$tube >= 50º F, at this temperature the compressor will decrease it compressor speed for 30 seconds, then will stop. In another 30 seconds the 4-way valve will energize, the 60 seconds later the compressor and outdoor fan will start. The compressor speed for defrosting will be 85hz.
During Defrost mode, a "H1" will be displayed on the indoor front panel display indicating the user selected mode has been overridden and the system is performing a outdoor coil defrost operation.

4) Defrost Sequence:
When a defrost condition has been met, the compressor will stop, all expansions valves will open fully, the outdoor fan will stop 40 seconds after the compressor stops. The 4-way valve will reverse direction (cooling mode) , then the compressor will start and enter the defrost frequency. The control, board along with ambient sensors will calculate defrost time.

5) Oil Return:
Oil return condition can be met if the unit operates at a low frequency for an extended time. The indoor display will indicate "H1" for this condition and is a normal procedure.

Cold Air Prevention (Heating mode with compressor running)
The system guards against discharging cold air in heating mode. It will delay the indoor fan until the evaporator coil has warmed up to discharge warm, comfortable air into the room.
1) When the T_{indoor}ambient < 75º F and the T_{indoor}tube <= 104º F with the fan in a stopped state, the indoor fan will begin to run at low speed after a 2 minute delay. This will reduce cold air upon heating startup. Within 2 minutes, if T_{indoor}tube > 104º F, the indoor fan will run at low speed. After 1 minute of operation, the fan will run at the preset fan mode. Within 1 minute of low speed operation or 2 minutes of no fan operation, with the T_{indoor}tube > 108º F, the fan will run at the preset mode.

2) If the T_{indoor}ambient >= 75º F and the T_{indoor}tube <= 108º F the indoor fan will run at low speed for 1 minute than run at the preset mode. After 1 minute of low speed operation, if the and the T_{indoor}tube > 108º F the fan will operate at its preset mode.

Note:
The T_{indoor}ambient in 1 & 2 above refers to the unit going into the heating mode coming out of defrost.

Overcurrent and Speed Protection (Total Current = I_{total})
The software will monitor the compressor current draw and adjust the compressor speed in order to maintain the inverter and compressor in a safety and reliable operating range.

A. If I_{total} <= 6, an increase in frequency will be allowed
B. If I_{total} >= 7, increasing the frequency is not allowed.
C. If I_{total} >= 8, the compressor will decrease its frequency
D. If I_{total} >= 9, the compressor will stop and the indoor fan will stop after 30 seconds.

4)Fan Mode

Under this mode, the fan will run at the preset speed and the outdoor fan, compressor and 4-way valve will stop.

5)Auto Mode

Auto Mode Process
Setting the auto mode will run the unit in heat or cool automatically depending on T_{indoor}ambient
1)Operating Parameters

A. If the T_{indoor}ambient >= 79º F the unit will operate in cooling mode. The set temperature is 77º F.
B. If the T_{indoor}ambient <= 72º F the unit will operate in heat mode. The set temperature is 68º F.
C. When the T_{indoor}ambient <= 73º F and >= 77º F, the unit will operate in the previous state. If it is energized for the first time, it will run in Fan mode
D. In auto mode, the cooling frequency will be the same as the cooling only mode and the heating frequency will be the same as the heating only mode.

2) Protection

A. In cooling operation, protection is the same as the cooling only mode
B. In heating operation, protection is the same as the heating only mode
C. When the indoor ambient temperature changes, the operation mode will be automatically selected. Once started the compressor will have a 6 minute runtime.

Common Protection Functions and Fault Displays

Coil High Temperature Protection
T_{tube} = measured temperature of outdoor coil in cooling mode, measured temperature of indoor coil in heating mode.
1) Outdoor Coil High Temperature Protection - *In cooling mode the software will monitor the outdoor coil for an abnormal high temperature condition.*

A. If T_{tube} <= 126º F, the unit will return to its original operation state
B. If T_{tube} >= 131º F, frequency rise is not allowed
C. If T_{tube} >= 136º F, the compressor will run at reduced frequency
D. If T_{tube} >= 144º F, the compressor will stop and the indoor fan will operate at preset speed

2) Indoor Coil Temperature Protection - *In heating mode the software will monitor the indoor coil for an abnormal high temperature condition.*

A. If T_{tube} <= 122º F, the unit will return to its original operation state
B. If T_{tube} >= 127º F, frequency rise is not allowed
C. If T_{tube} >= 133º F, the compressor will run at reduced frequency
D. If T_{tube} >= 140º F, the compressor will stop and the indoor fan will blow residual heat and then stop

3) Compressor Discharge Temperature Protection
The software will monitor the compressor discharge for an abnormal high temperature condition.

A. If T_{tube} >= 208º F, frequency rise is not allowed
B. If T_{tube} >= 217º F, the compressor will run at reduced frequency
C. If T_{tube} >= 230º F, the compressor will stop
D. If T_{tube} <= 194º F and the compressor has been off for at least 3 minutes, the compressor will resume operation

4) Compressor High Pressure Protection
When the high pressure switch is detected for 6 seconds or more, the compressor will stop and can only be started by powering off the unit. Dirty coils, refrigerant overcharge and outdoor fan problems can cause this fault.

5) Compressor Phase-lacking Protection
If one of the compressor phases are detected open before startup, the compressor will enter phase-locking protection. The malfunction will be cleared after 1 min, then the unit will try a restart. If an error has been detected for 6 times continuously, the compressor will lock out and will need to have power cycled. The errors will be cleared after the compressor has run for 7 minutes continuously.

6) Module Protection (IPM)
Under module protection mode, the compressor will stop. When the compressor remains off for 3 minutes, the compressor will resume operation. If the module protection occurs six time in succession, the compressor will remain off. Power will need to be cycled to start unit. This is a thermal protection for the indoor module.

7) DC Buss Voltage Protection
The software will monitor the DC bus voltage.
If voltage on the DC Bus is below 150 or over 420v, the compressor will stop and the outdoor fan will stop in 30 seconds. When the voltage on the DC bus returns to normal and the compressor has been off for 3 minutes, the compressor will resume its operation.

Protection Functions

8) Communication Fault
If the unit fails to receive correct signals for a 3 minutes, communication fault will occur and the whole system will stop and a “E6” will be displayed on the front panel of the indoor unit.

Remote Control Operation

Remote Buttons

Note:
This remote control is used in other models and some features may or may not be available. Consult the owners manual for specific features for your model. There should be no obstructions between the remote control and the indoor unit for proper operation. Keep the remote from direct sunlight or any source that generates heat, keep clean and dry. Change batteries frequently.

Note:
For detailed explanation of the functions, refer to the "Other Controls" section of this manual for your model.

Button Identification

The function and operation of each button will be explained later in this manual under Product Functions.

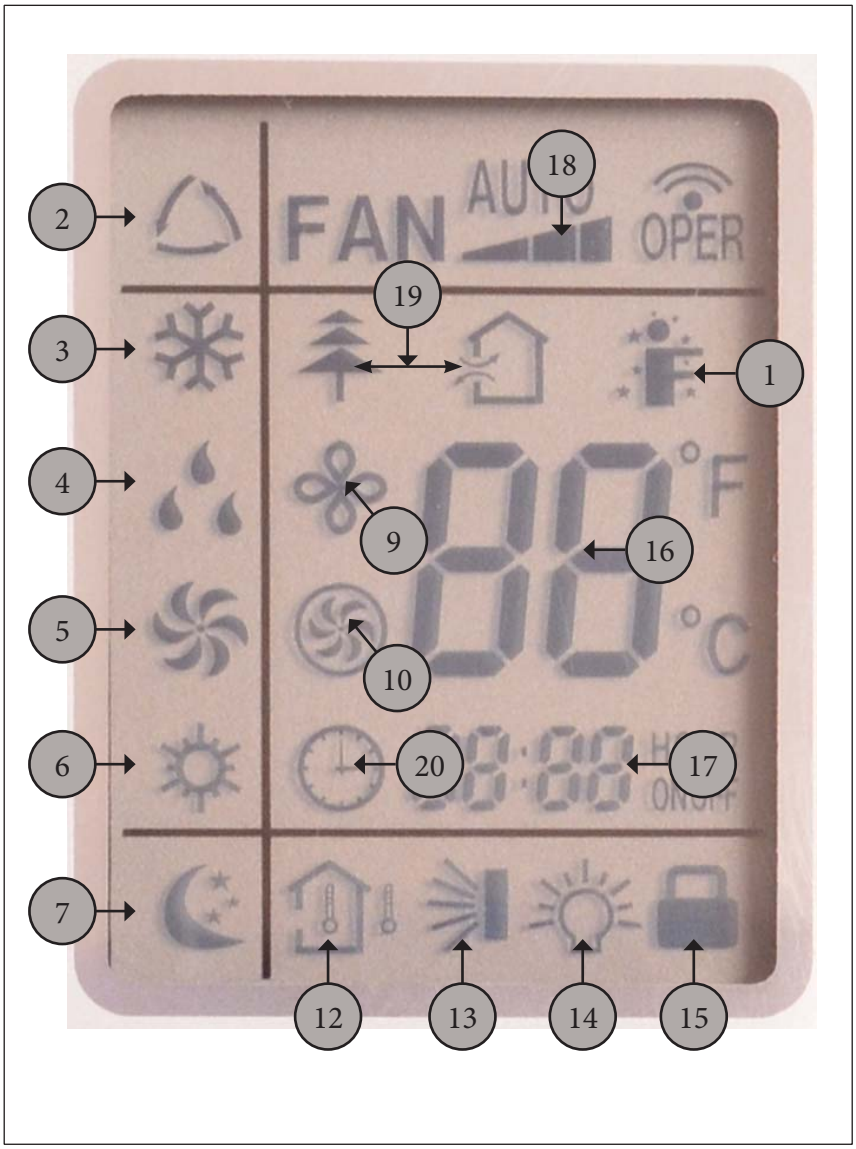
1. **On/Off button**
2. **Lower Temperature Setting**
3. **Raise Temperature Setting**
4. **Fan Button**
5. **Mode Button**
6. **IFeel Button, Senses ambient temperature at remote control location.**
7. **Function Not Available**
8. **Function Not Available**
9. **Clock Button**
10. **X-Fan Button**
11. **Turbo Fan Button**
12. **Timer On Button**
13. **Temp Button**
14. **Sleep Button**
15. **Swing Angle Button**
16. **Timer Off Button**
17. **Light Button**

Press 9 & 10 for Energy Saving Mode
Press - & + to lock control

Remote Control Operation

Display Icons

1. IFeel
2. Auto Mode
3. Cool Mode
4. Dry Mode
5. Fan Mode
6. Heat Mode
7. Sleep Mode
8. Quiet Mode
9. X-Fan Mode
10. Turbo Mode
11. Timer On
12. Temperature Setting Display
13. Swing Display
14. Light Display
15. Lock Display
16. Digital Display
17. Set Time Display
18. Fan Speed Display
19. Not Used
20. Clock Icon



Replacing Batteries:

1. Locate the battery cover on the back of the remote.
2. Remove the small screw at the bottom of the cover.
3. Slide the cover downward.
4. Replace with two “AAA” batteries.
5. Replace cover and screw.

Product Introduction

Remote Control Functions

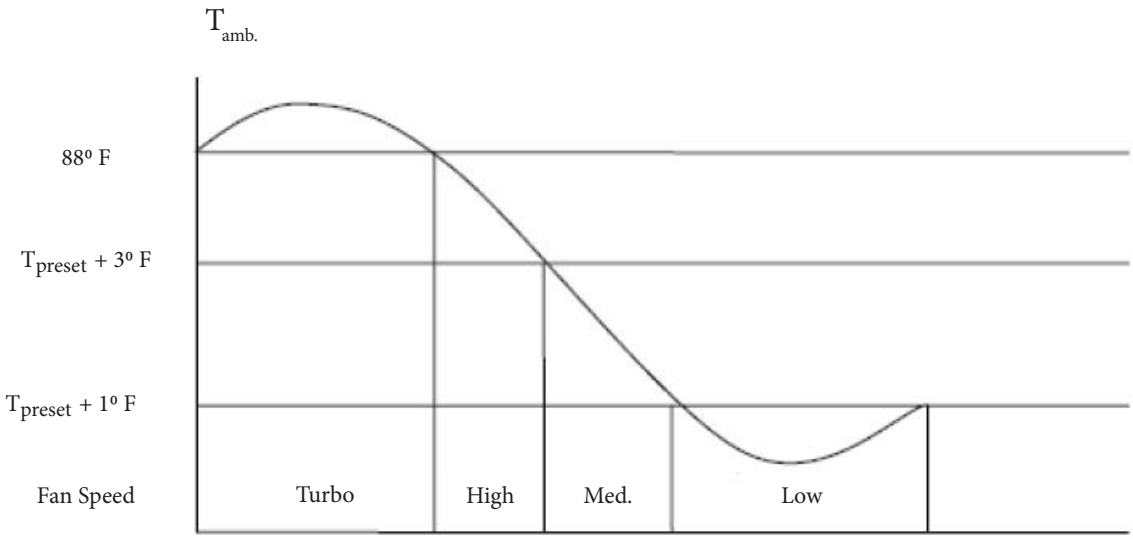
1)On/Off
The on-off state will change with each button press.

2) Lower Temperature Setting
Each time you press the "TEMP-" button the temperature setting will decrease by 1⁰ F. The temperature range is 61⁰ F - 86⁰ F. In Auto Mode this button will not function.

3)Raise Temperature Setting
Each time you press the "TEMP+" button the temperature setting will raise by 1⁰ F. The temperature range is 61⁰ F - 86⁰ F. In Auto Mode this button will not function.

4)Fan Switch
The fan switch will adjust the fan speed between Auto, Low, Medium and High.

5) Mode Selection
Press the "Mode" button to change from Auto, Cool, Dry, Fan or Heat Pump



6) IFeel
IFeel button senses the room temperature surrounding the remote every 10 minutes, adjusting the airflow and indoor temperature for maximum comfort and energy savings.

7) Function Not Used

8) Function Not Used

9) Clock
Press once to set clock. 24-hour format, use the "+" or "-" button to increase or decrease the time.

Product Introduction

Remote Control Functions

10) X-Fan
Allows fan to run after cooling cycle to dry off the coil and inhibit the growth of bacteria and mildew. Works with "Auto" mode.

11) Turbo Fan
Boost the cooling or heating airflow, allowing the unit to reach the preset temperature in the shortest amount of time.

12) Timer On Button
Press the "Timer-On" button once to set mode on time, press again to save setting. Holding the "+" or "-" button down will rapidly change the time in 10 minute intervals.

13) Temp Button
Toggles the display between set temperature, indoor temperature and outdoor temperature.

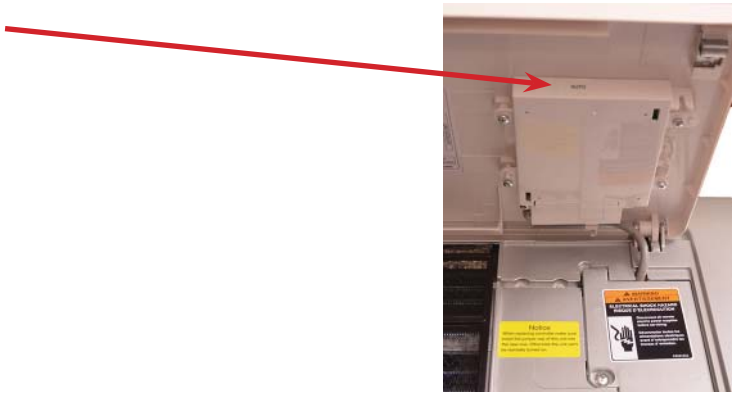
14) Sleep Button
Sets sleep mode function, see owners manual for specific model information

15) Swing Angle Button
Controls the angle of the louvers for the convenient adjustment of airflow

16) Timer Off Button
Press the "Timer-Off" button once to set mode off time, press again to save setting. Holding the "+" or "-" button down will rapidly change the time in 10 minute intervals.

17) Light Button
Turns the light on the indoor display on and off.

18) Auto Button (Manual Override) - *Located on indoor unit.*
In the event the controller is missed placed or the batteries are defective, this will override the remote controller. If the controller is on, pressing this button will stop it, if it is off, pressing the button will turn the controller on. When turning the controller on, the swing and light will be on and the unit will run in Auto Mode.

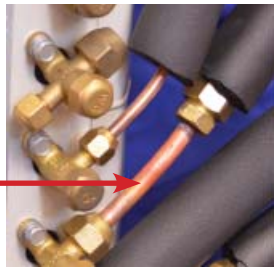


Refrigerant Lines Preparation & Connection

The refrigerant lines should be kept sealed until ready to be connected. Follow the following steps to insure a quality leak proof installation:

Step 1. Refrigerant Line Connection

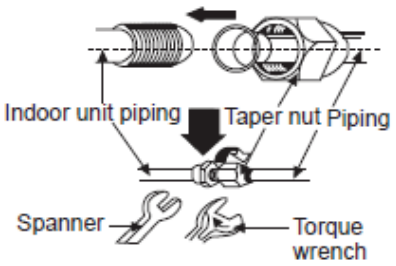
Carefully bend and cut the tubing to prepare for flaring. Use a flaring tool designed for R410a, following the recommended manufacturer's procedure. Tighten the flare nut to the indicated torque by using a spanner wrench and a toque wrench. Connect the indoor unit first, then the outdoor unit. Use the 3/8" to 1/2" flare adapter if needed.



Note:

Over tightening flare nuts may damage flare connections and may cause leaks.

Tubing Size	Torque (foot-pounds)	Torque (inch-pounds)
1/4"	10-13	124-159
3/8"	25-31	301-372
1/2"	36-45	434-540
5/8"	50-60	602-726



Step 2. System Leak Check

Refrigerant lines should be pressurized prior to evacuating system to check for leaks.

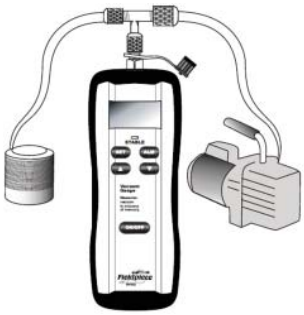
Use only dry nitrogen with a pressure regulator for pressurizing unit. Pressurize with 150 psi of dry nitrogen. Apply soap and water to check whether the joints are leaky. A leak detector may also be used for a leakage test.

Hint:

You may want to perform leak testing and evacuation before wiring to save time, electrical connections can be completed while your vacuum pump is running.

Step 3. System Evacuation

Note: The outdoor unit contains a refrigerant charge, leave liquid and gas valves closed.



1. After no leaks have been detected, connect a vacuum pump to the outdoor unit.
2. Connect appropriate hoses to manifold gauge, vacuum pump and unit refrigeration connections.
3. Evacuate the system until the micron gauge reads no higher than 350 microns.
4. Close valve to vacuum pump; if pressure does not rise above 500 microns after one minute, the evacuation should be complete.
5. If it does rise, check for leaks and/or evacuate longer.
6. For refrigerant lines longer than 25 feet, refer to installation instructions chart included with the unit installation manual for additional charge.

Refrigerant Charging Procedure

Please refer to your units installation manual for proper charge. If your lineset exceeds the chart below for your model, additional charge may be required. The charge must we weighed in with a refrigerant charging scale. ***You can only add additional refrigerant to a new installation. If a low or high charge is suspected, you must reclaim the refrigerant, then weigh in the correct amount per specifications including any additional for long linesets.*** **It is important to check for leaks before adding refrigerant.**

1. Determine addition refrigerant charge.

The EVO+ single zone units contain a factory charge adequate for up to a total length of refrigerant line as indicated in the chart below. Additional refrigerant will need to be added for total lengths over the listed length. Confirm the following chart with your installation manual for additional charge amounts:

	GWH09AB-A3NA2B	GWH12AB-A3NA2B	GWH09AB-D3DNA2D	GWH12AB-D3DNA2D
Additional Charge	**0.22 oz./ft.**	**0.22 oz./ft.**	**0.22 oz./ft.**	**0.22 oz./ft.**
Max Length without Additional Charge	**25 ft.**	**25 ft.**	**25 ft.**	**25 ft.**
Factory Charge	**48 oz.**	**48 oz.**	**46 oz.**	**48 oz.**
Max. Total Piping Length	**50 ft.**	**66 ft.**	**50 ft.**	**66 ft.**
Max. Elevation	**33 ft.**	**33 ft.**	**33 ft.**	**33 ft.**
	GWH18AB-D3DNA2D	**GWH24AB-D3DNA2D**		
Additional Charge	**0.22 oz./ft.**	**0.54 oz./ft.**		
Max Length without Additional Charge	**25 ft.**	**25 ft.**		
Factory Charge	**49 oz.**	**56 oz.**		
Max. Total Piping Length	**82 ft.**	**82 ft.**		
Max. Elevation	**50 ft.**	**50 ft.**		

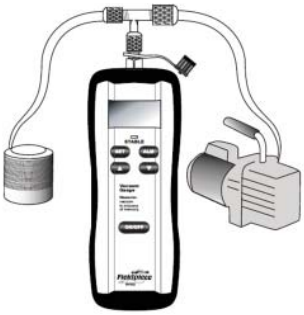
Refrigerant Charging Procedure

2. Leak Testing

Follow the procedures for leak testing with nitrogen prior to adding charge on a new installation or existing one suspected for leaks. See preceding page.

3. Attach hoses to the unit and vacuum pump

5/16" x 1/4" adapter may be required to connect hose to port.
Check to insure that the liquid and gas valves are closed on the unit. Close all valves on your gauge set, then connect the vacuum pump to your gauge set. Pump down lineset and indoor unit. This step will be repeated for all zones.



4. Zero charging scale

Place the refrigerant tank on the charging scale. Open the tank valve, turn on the scale, then zero the scale.

Refrigerant Charging Procedure, cont.

5. Begin adding additional refrigerant

Charging should be completed with the unit off (not running) and through the liquid side with liquid refrigerant. If there are no ports on the liquid side, use the gas side port connection, charging with liquid. ***Record the amount of additional charge for future reference.***

6. Charge to the correct weight

If the scale was zeroed with the refrigerant tank on the scale, the amount added to the system will be a negative amount since it was removed from the tank. After the proper amount of refrigerant has been weighed in, close the manifold valve.

7. Remove refrigerant tank

Close the tank valve, then carefully remove the hose and adapter. Replace the charging port cap back on the outdoor unit valves. On new installations, open all liquid and vapor service valves.

Installation

Proper installation site is vital for correct and efficient operation of the unit. Avoid the following sites where:

- Strong heat sources, vapors, flammable gas or volatile liquids are emitted.
- High-frequency electro-magnetic waves are generated by radio equipment, welders and medical equipment.
- The air is contaminated with industrial vapors and oils.
- The air contains sulfurous gas such as in hot spring zones.
- Poor air quality exists.

Indoor Unit

The air inlet and outlet should be away from any obstructions. Ensure the air will easily circulate through the entire room.

1. Select a site where the condensate can be easily routed or consider a condensate removal pump.
2. Select a place where it is out of reach of children.
3. Select a place that has adequate mounting structure, strong enough to withstand the full weight and vibration of the unit.
4. Be sure to leave enough space to allow access for routine maintenance. Refer to unit installation specifications for clearances. Select a place more than 3 feet away from any TV or other electrical appliances

Outdoor Unit

1. Select a suitable site where proper drainage will occur.
2. Select a site where there is sufficient ventilation.
3. Select a site where there is no obstruction blocking the inlet and outlet.
4. The site should be able to withstand the full weight of the unit.
5. Try to limit expose to direct sunlight or strong winds.
6. Make sure that the outdoor unit is installed in accordance with the installations instructions, and is convenient for maintenance and repair.
7. Refer to your outdoor unit installation manual for maximum lineset lengths and heights. This could be a factor in determining outdoor location.
8. Select a place where it is out of reach of children.
9. Install Heat Pump legs to allow for proper drainage.
10. Install drain fitting in bottom of outdoor unit

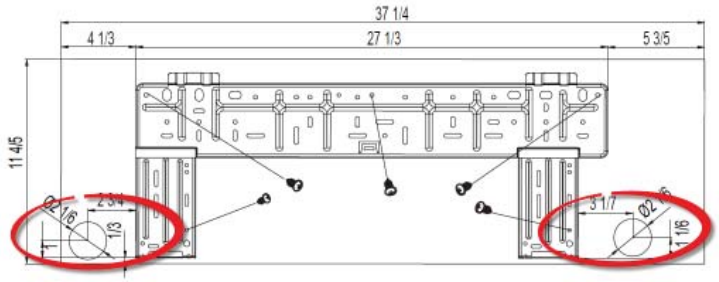
Installation

Mounting Plate Installation

1. The mounting plate should be installed horizontally and level.
2. Measure the center of the indoor unit. Please note, that depending on model, the center of the bracket may not correspond with the center of the unit.
3. Attach the mounting plate on the wall with screws.
4. Be sure that the mounting plate has been attached firmly enough to withstand approximately 132 pounds.
5. Refer to specific models for dimensional data.

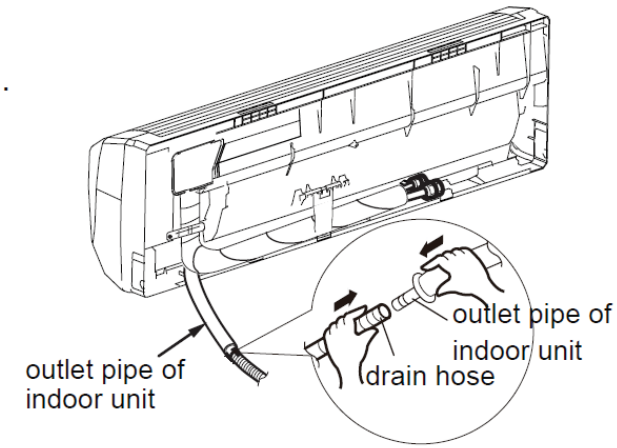
Locate and Drill Hole

1. The piping can exit the indoor unit from either side, see pictured below.
2. Drill a 2-1/2" diameter hole at a slightly downward angle to the outdoor side.
3. Note: The outdoor hole should be approximately 1/4" lower than the indoor hole.
4. Insert the piping-hole sleeve into the hole to prevent the piping and wiring from being damaged when passing through the hole.

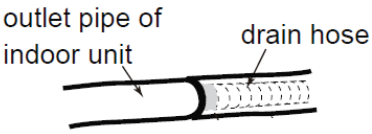


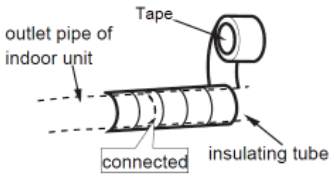
Installation

Install Drain Hose



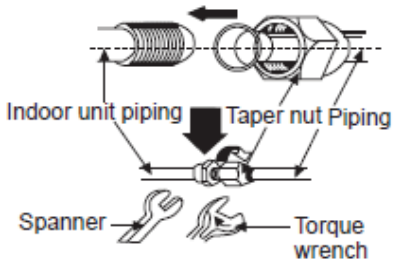
1. Connect the drain hose to the outlet pipe of the indoor unit using appropriate connections.
2. Insulate the condensate to prevent condensation.
3. Fasten the condensate, lineset and wring together to prevent damage and movement. Slant the drain hose downward for smooth drainage.





Install Line Set

1. Install lineset and wiring from the outside through the wall sleeve.
2. Bend the indoor lineset. Note: a tube bender will speed up the process.
3. Carefully remove flare nut from indoor coil. Listen for holding charge from indoor unit. No charge may indicate a leak and should be tested.
4. Use a flaring tool if necessary to create the flare, connect tubing tightening to the torque listed below.



Tubing Size	Torque (foot-pounds)	Torque (inch-pounds)
1/4”	10-13	124-159
3/8”	25-31	301-372
1/2”	36-45	434-540
5/8”	50-60	602-726

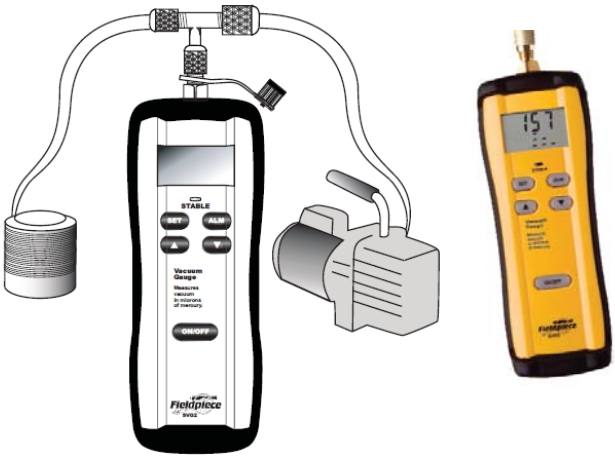
Installation

Pressure and Leak Test

1. Use only dry nitrogen with a pressure regulator for pressurizing unit. Pressurize with 150 psi of dry nitrogen.
2. Apply soap and water to check whether the joints are leaky. A leak detector can also be applied for a leakage test.

Hint: You may want to perform leak testing and evacuation before wiring to save time, electrical connections can be completed while your vacuum pump is running.

Evacuating the System



Note: The outdoor unit contains a refrigerant charge, leave liquid and gas valves closed.

1. After no leaks have been detected, connect a vacuum pump to the outdoor unit.
2. Connect appropriate hoses to manifold gauge, vacuum pump and unit refrigeration connections.
3. Evacuate the system until the micron gauge reads no higher than 350 microns.
4. Close valve to vacuum pump; if pressure does not rise above 500 microns after one minute, the evacuation should be complete.
5. If it does rise, check for leaks and/or evacuate longer.
6. For refrigerant lines longer than 25 feet, refer to installation instructions chart included with the unit installation manual for additional charge.

Installation

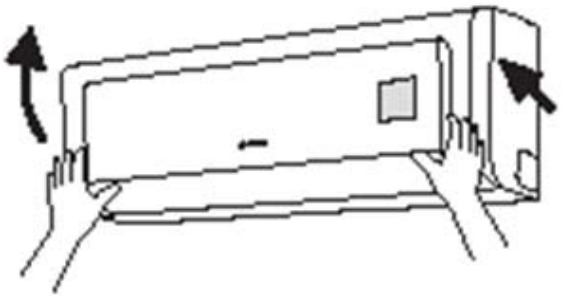
Connect the Outdoor Wiring

1. Remove the handle on the right side plate of the outdoor unit.
2. Connect wiring from indoor unit to 1,2,3 & ground, being careful to match color code of indoor connections. Repeat this for each indoor unit.
3. Connect power wiring form outdoor disconnect to L1, L2 and ground.
4. Check all connections to tightness.
5. Reinstall the cover/handle.

Note: Follow all local electrical codes for electrical wiring.

Filter Maintenance and Emergency Operation

Cleaning Air Filter



Titanium Dioxide filter
(2nd Stage Filter)

1. Remove the front panel as shown on the picture in the left.
2. The first stage filter can be cleaned with a vacuum cleaner or by washing with a mild soap and < 113º F water.
3. The second stage filter cannot be washed, use a vacuum cleaner to clean any dust, lint, etc. The filter is made up of Titanium Dioxide.
4. Recharge the Titanium Dioxide filter by placing it in the Sun for 3-4 hours every 3-6 months.

Missing or Inoperative Remote Control

Emergency Operation:
When the remote controller is lost or damaged, please use the auto switch on the indoor unit.

Press the AUTO/STOP button to enter AUTO mode.
Press the AUTO/STOP button again to turn the unit off.

Electrical Schematics

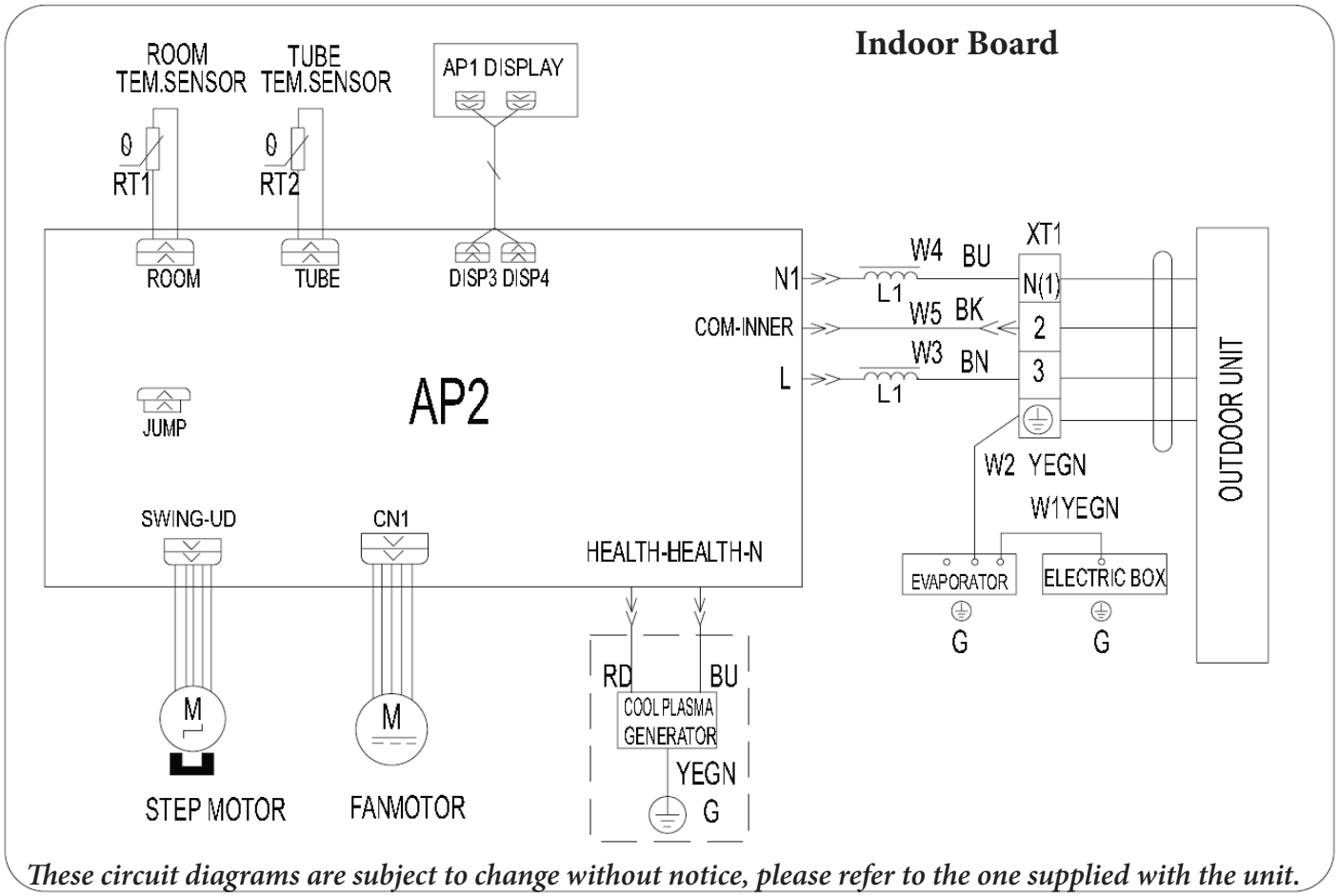
GWH09AB-A3DNA2B
GWH12AB-A3DNA2B

- **Indoor Unit**

Symbol	Color symbol	Symbol	Color symbol
WH	WHITE	**BN**	BROWN
YE	YELLOW	**BU**	BLUE
RD	RED	**BK**	BLACK
YEGN	YELLOW GREEN	⏚	PROTECTIVE EARTH

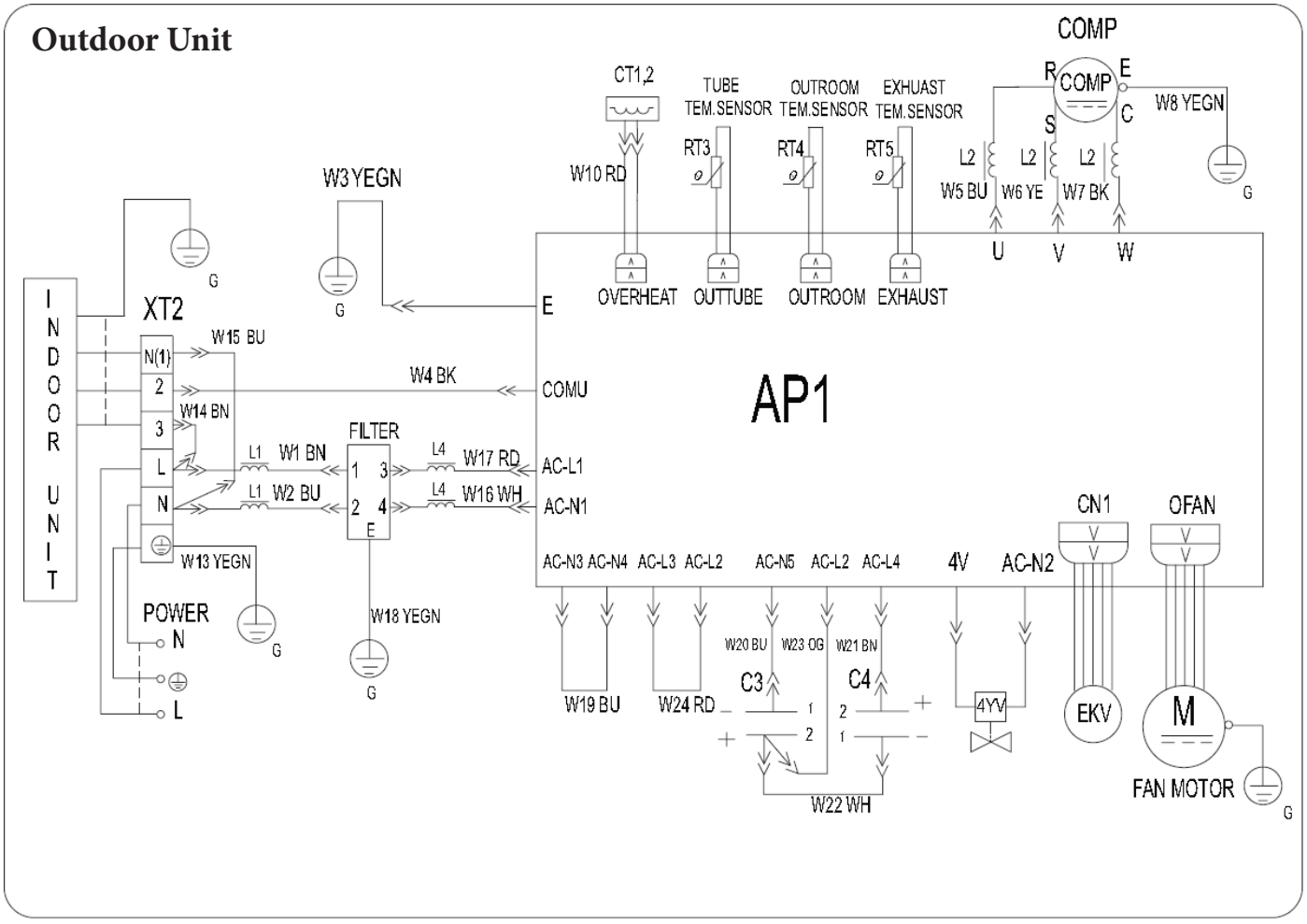
- **Outdoor Unit**

Symbol	Parts name	Symbol	Color symbol
L1 L2	NEUTRAL WIRE, LIVE WIRE	**WH**	WHITE
4YV	4-WAY VALVE	**YE**	YELLOW
EKV	ELETRIC EXPANSION VALVE	**RD**	RED
L	REACTOR	**BN**	SAT OVERLOAD BN BROWN
COMP	COMPRESSOR	**BU**	BLUE
⏚	PROTECTIVE EARTH	**BK**	BLACK
		YEGN	YELLOW GREEN



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

GWH09AB-A3DNA2B
GWH12AB-A3DNA2B

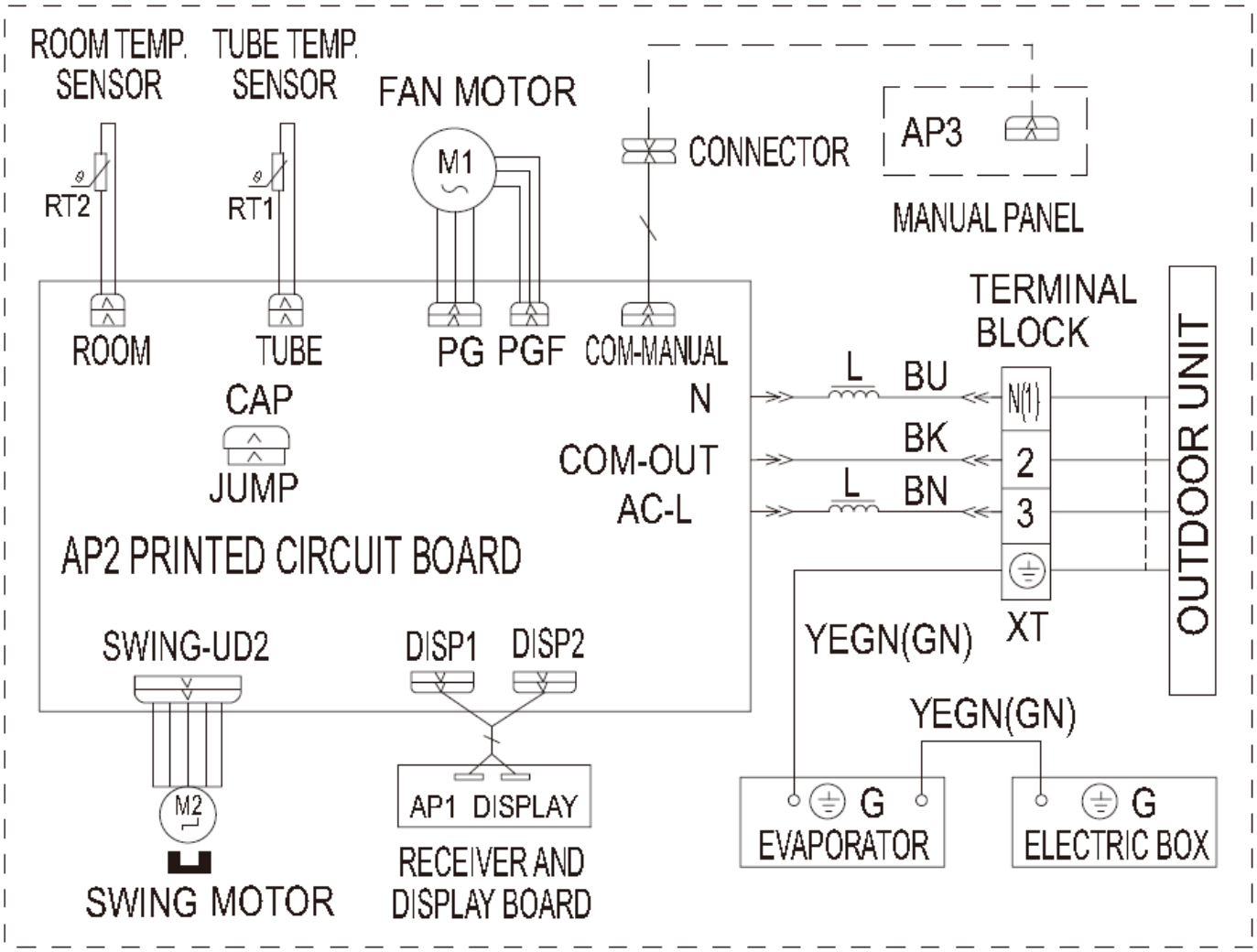


These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

D3DNA2D Indoor Units (220 vac)

Symbol	Color symbol	Symbol	Parts name
OG	ORANGE	⏚	PROTECTIVE EARTH
WH	WHITE	COMP	COMPRESSOR
YE	YELLOW	SAT	OVERLOAD
RD	RED	4YV	4-WAY VALVE
YEGN	YELLOW GREEN	XT	TERMINAL BLOCK
BN	BROWN		
BU	BLUE		
BK	BLACK		

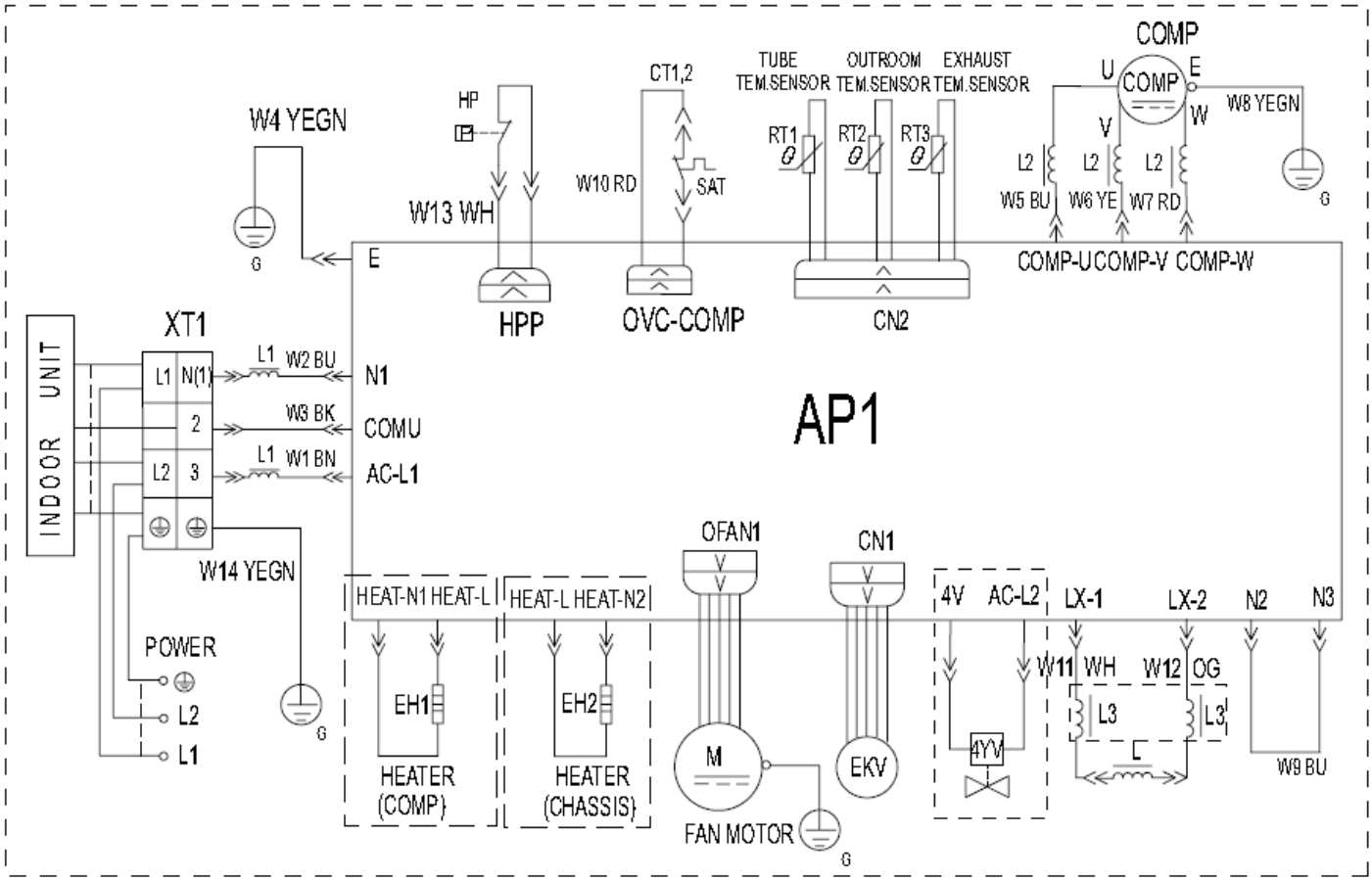
Indoor Unit 220 vac models



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

Electrical Schematics

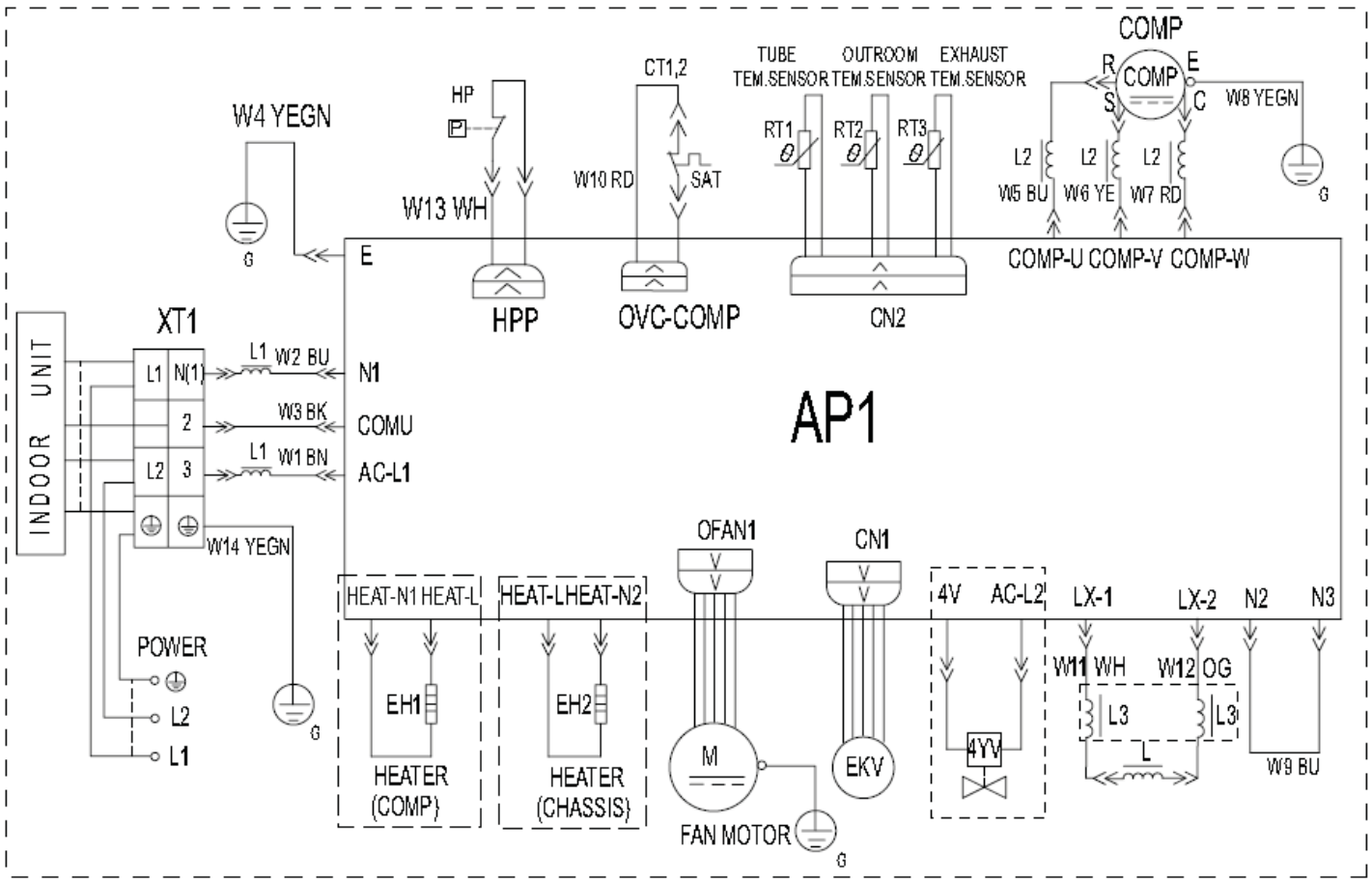
GWH09AB-D3DNA2D



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

Electrical Schematics

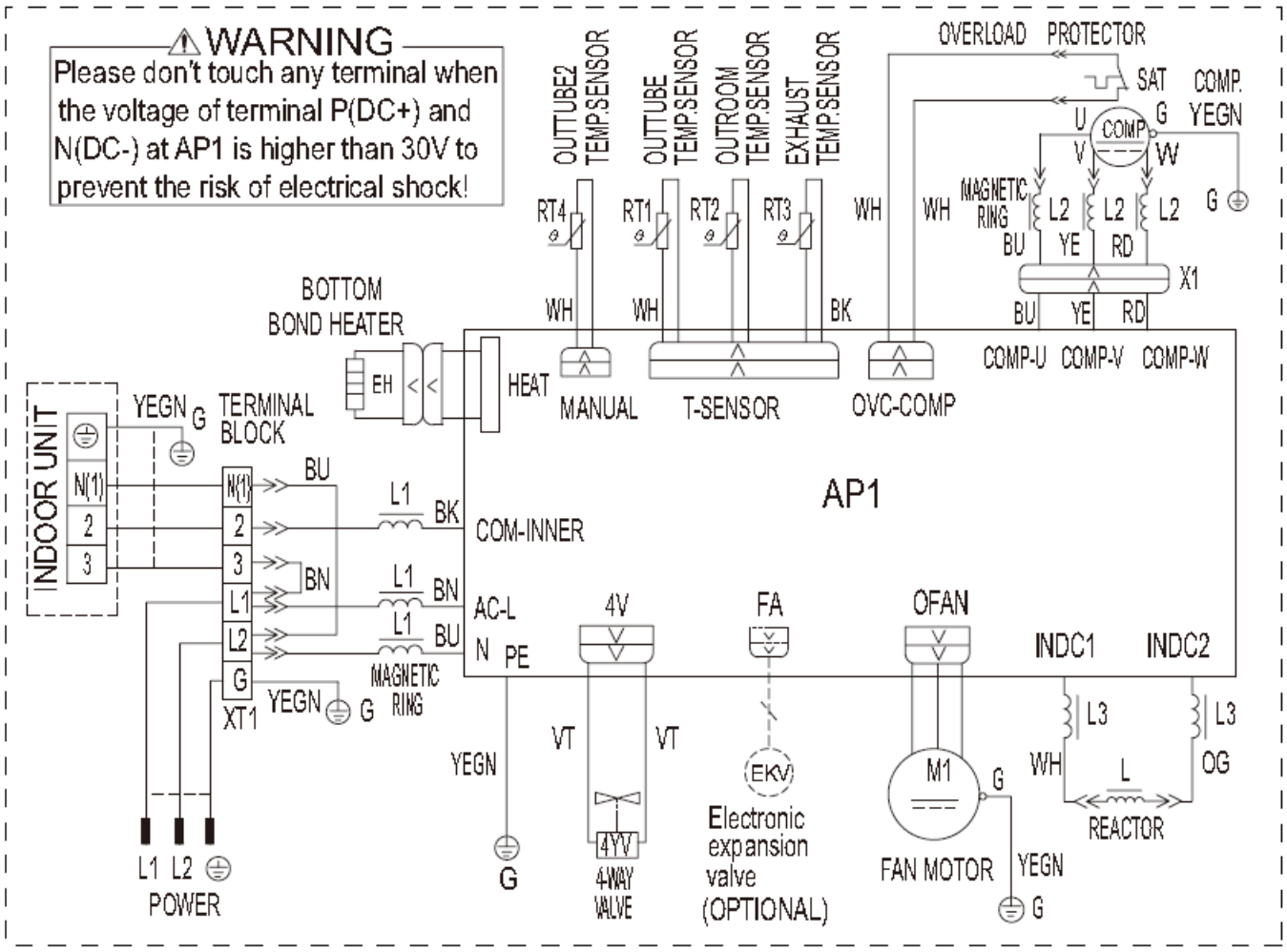
GWH12AB-D3DNA2D



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

Electrical Schematics

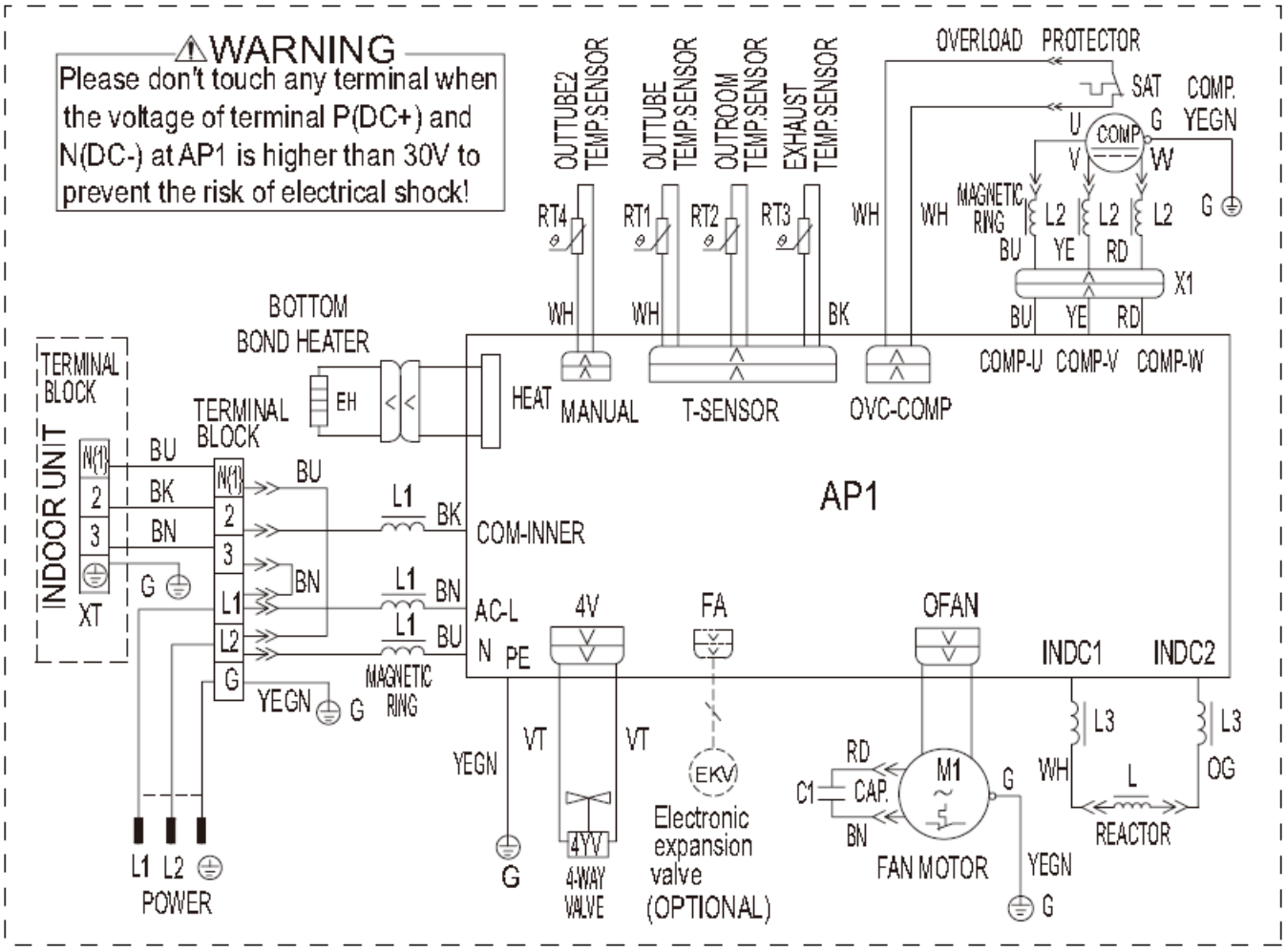
GWH18AB-D3DNA2D



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

Electrical Schematics

GWH24AB-D3DNA2D



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

Printed Circuit Boards

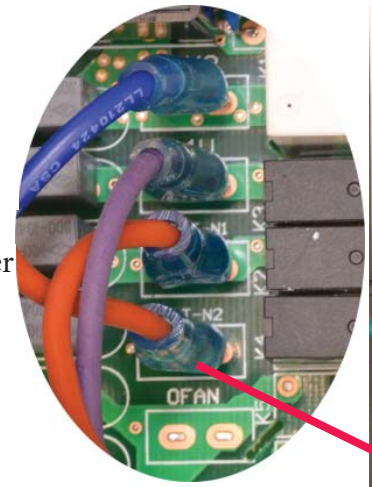
AP-1 Circuit Board

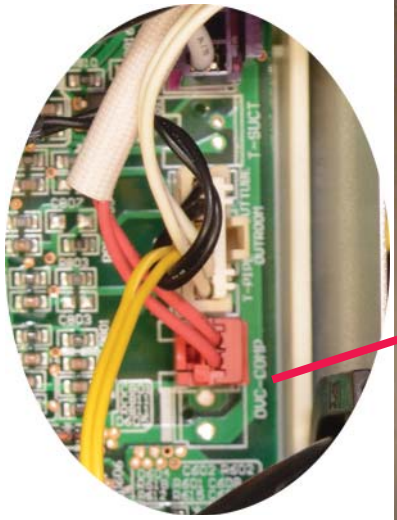
Fault indicator LEDs

N2 - Voltage Terminal

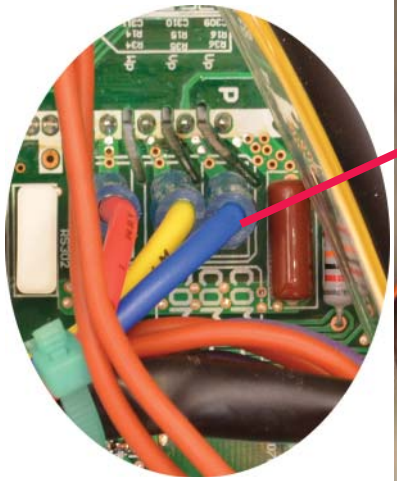
4-Way Valve

Compressor Heater Band

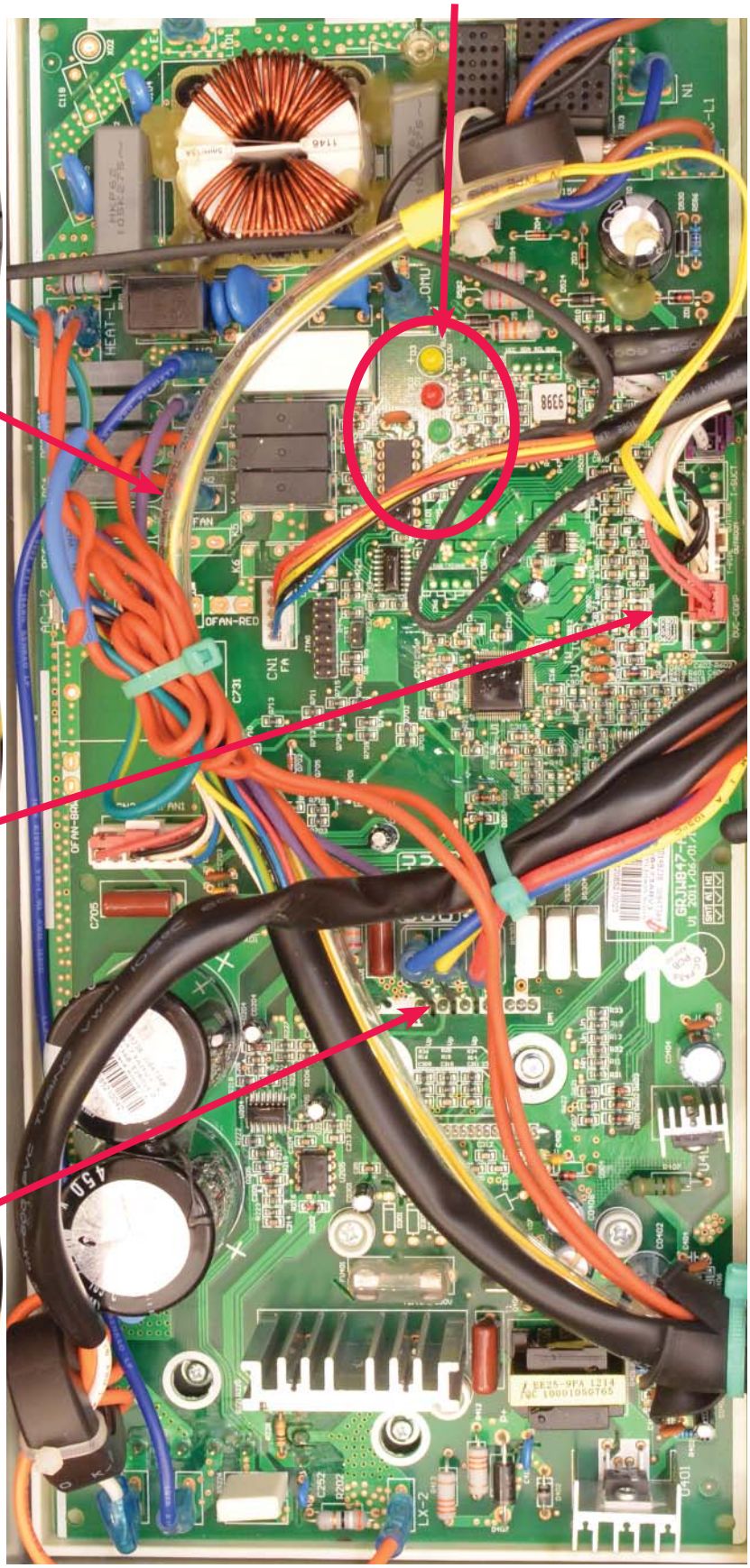




Thermistor wires

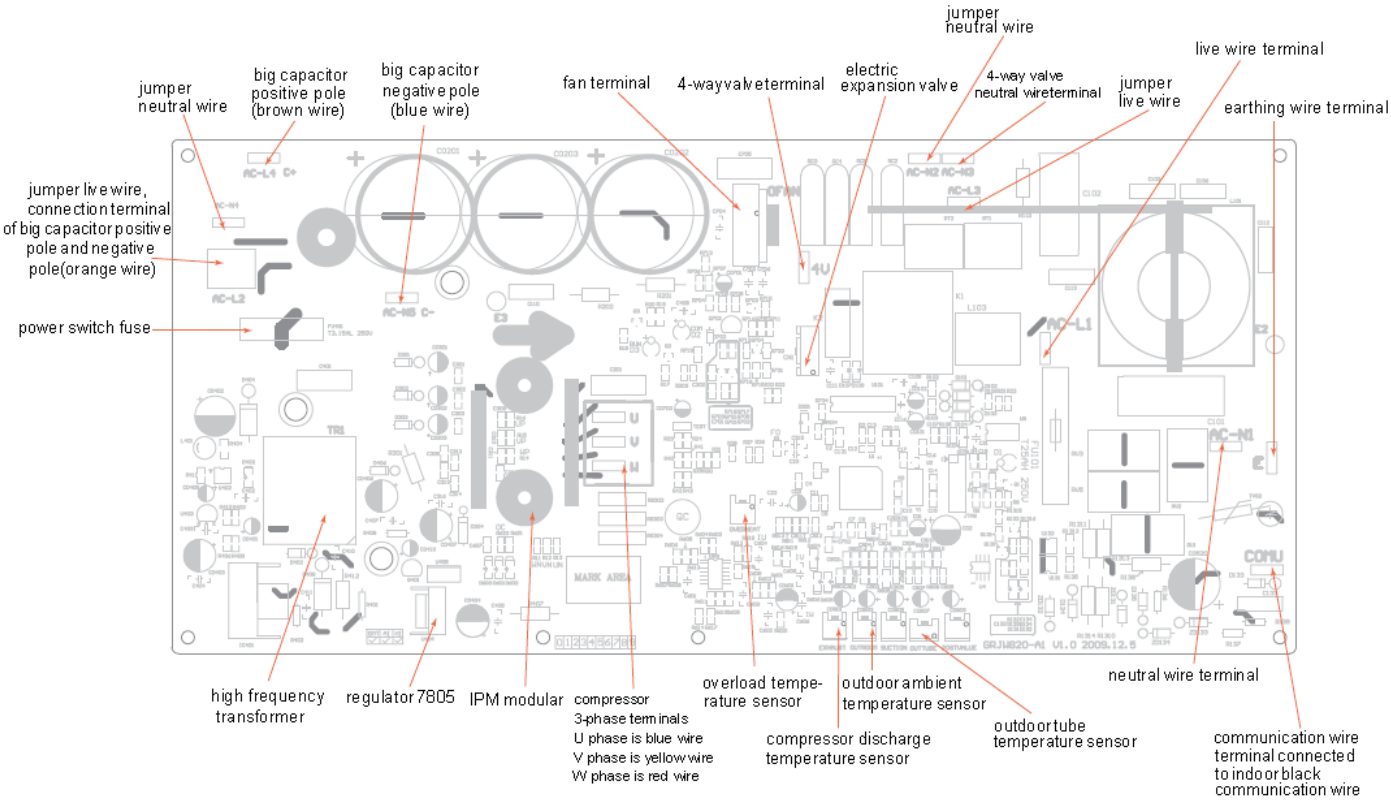


Compressor Wires



GWH09AB-A3DNA2B
GWH12AB-A3DNA2B

Outdoor Unit AP1 Board Top View



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

Troubleshooting Indoor Components

Indoor Fan Motor Troubleshooting

To check the condition of the indoor fan motor voltage measurements and resistance measurements can be compared to the following charts. Care must be taken when checking voltage measurements, all wires and terminals must be isolated for safety. Resistance measurements must be taken with power off and "PG" connector removed from the circuit board.

The following chart indicates approximate voltage measurements, readings may vary slightly depending on models and should be used as a reference only. Voltages should be taken with unit running.

PG Wire Connector	Low	Medium	High	Turbo
Brown - White	130 vac	147 vac	161 vac	225 vac
Brown - Red	148 vac	184 vac	210 vac	340 vac
White - Red	123 vac	150 vac	180 vac	205 vac

The following chart indicates approximate resistance measurements, readings may vary slightly depending on models and should be used as a reference only. Turn power off and remove connector from circuit board before reading measurements.

PG Wire Connector	Resistance (ohms)
Brown - White	160 Ω
Brown - Red	400 Ω
White - Red	240 Ω

Troubleshooting Indoor Components

Step Motor Troubleshooting

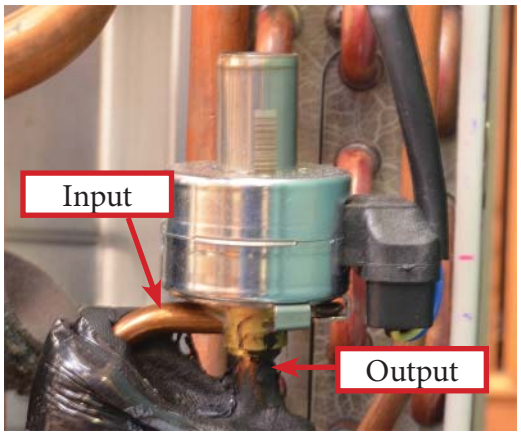
To check the condition of the indoor step (swing) motor resistance measurements may be compared to the following chart. Resistance measurements must be taken with power off and the connector removed from the board. The following charts indicates approximate readings and may vary with different models. ***Turn power off and remove connector from circuit board.***

Connector	Blue	Pink	Yellow	Orange	Red
Blue		390 Ω	390 Ω	390 Ω	195 Ω
Pink			390 Ω	390 Ω	195 Ω
Yellow				390 Ω	195 Ω
Orange					195 Ω
Red					

Troubleshooting Outdoor Components

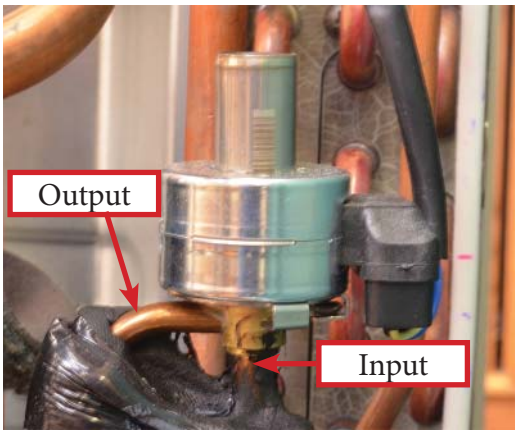
EEV Troubleshooting

Cooling Mode



To check the operation of the EEV Valve in cooling mode, using a digital thermometer record the temperature of the input line and the output line of the valve as indicated in the picture above. With the compressor running, the input side of the valve should have a higher reading then the output side indicating that the valve is metering. If the temperature readings are the same, the valve is fully open and the valve is not metering. Since the pressures and frequency are controlled by the G10 technology of the outdoor circuit board, there are no pressure checks that can be made.

Heating Mode



To check the operation of the EEV Valve in heating mode, using a digital thermometer record the temperature of the input line and the output line of the valve as indicated in the picture above. With the compressor running, the input side of the valve should have a higher reading then the output side indicating that the valve is metering. If the temperature readings are the same, the valve is fully open and the valve is not metering. Since the pressures and frequency are controlled by the G10 technology of the outdoor circuit board, there are no pressure checks that can be made.

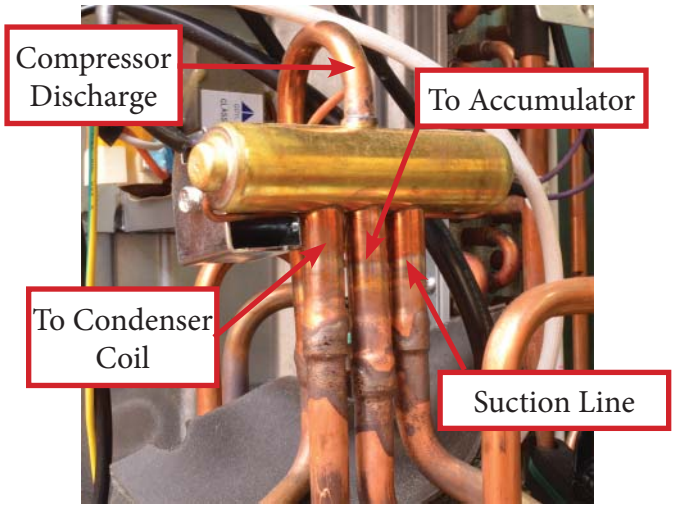
Resistance readings of EEV valve with wire plug disconnected from circuit board. Power to unit should be off when making resistance readings. Readings below are approximate values and may vary slightly with different outdoor models.

EEV Ω	Orange	Red	Yellow	Black	Blue
Orange		94.6 Ω	94.8 Ω	94.4 Ω	47.0 Ω
Red			94.7 Ω	94.4 Ω	47.5 Ω
Yellow				94.6 Ω	47.7 Ω
Black					47.4 Ω
Blue					

Troubleshooting Outdoor Components

4-Way Valve Troubleshooting

Cooling Mode

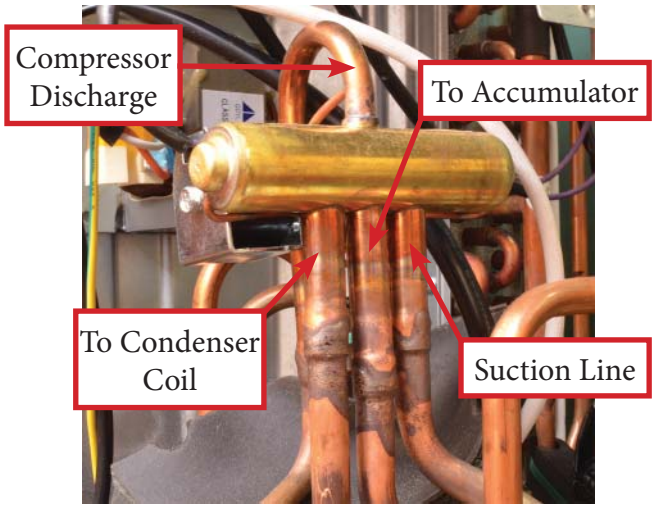


Checking the 4-way valve in cooling mode requires the measurement of 4 readings. First record the temperature of the compressor discharge tubing, secondly record the temperature of the tubing going to the condenser. There should be no more than a 10 degrees difference between the two readings.

The next set of readings will require recording the temperature of the tubing going to the suction line and the temperature of the tubing going to the accumulator. Again, if there should be less than 10 degrees difference between these readings.

A temperature reading higher than 10 degrees may indicate a leaky valve (not fully shifter) or a blockage in the valve.

Heating Mode



Checking the 4-way valve in heating mode requires the measurement of 4 readings. First record the temperature of the compressor discharge tubing, secondly record the temperature of the suction line tube. There should be no more than a 10 degrees difference between the two readings.

The next set of readings will require recording the temperature of the tubing going to the condenser coil and the temperature of the tubing going to the accumulator. Again, if there should be less than 10 degrees difference between these readings.

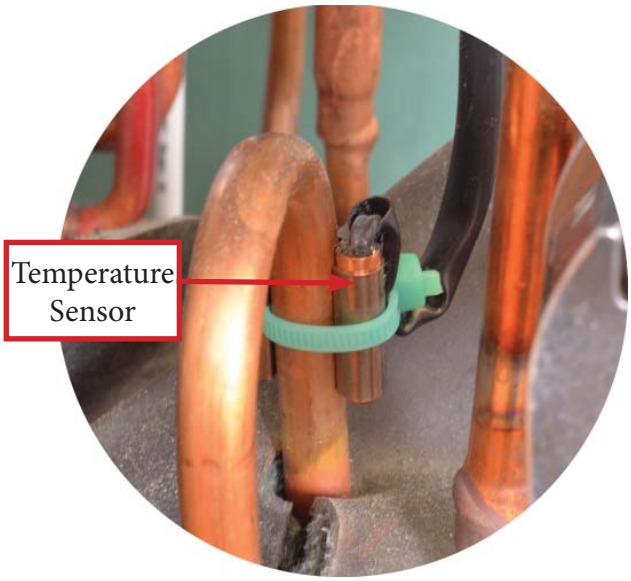
A temperature reading higher than 10 degrees may indicate a leaky valve (not fully shifter) or a blockage in the valve.

4-Way valve solenoid resistance check:

Be sure all power is off to the unit. Remove the plug connecting the 4-way vale to the circuit board. Check the resistance with an ohmmeter. The reading should indicate 1.8k Ω. If the reading is infinite, replace the solenoid coil.

Troubleshooting Outdoor Components

Temperature Sensor Check

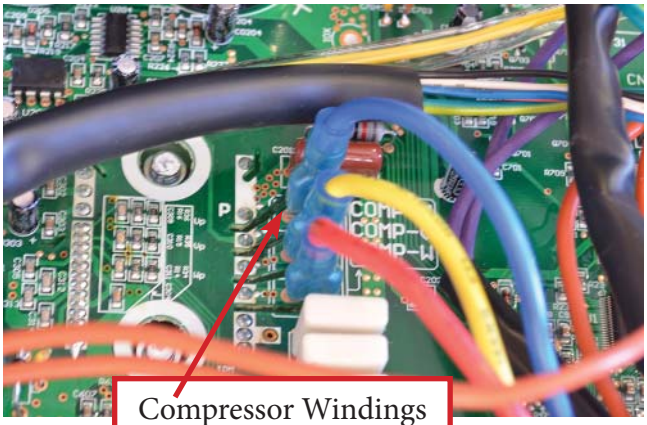


Using a glass of ice water, place the sensor into the glass with a digital thermometer. Wait a few minutes for the reading to stabilize. Compare the readings to the sensor tables in Appendix "A", it the reading are not comparable, replace the sensor. When replacing the sensor, be sure to fasten the sensor securely if it is attached to a tube.

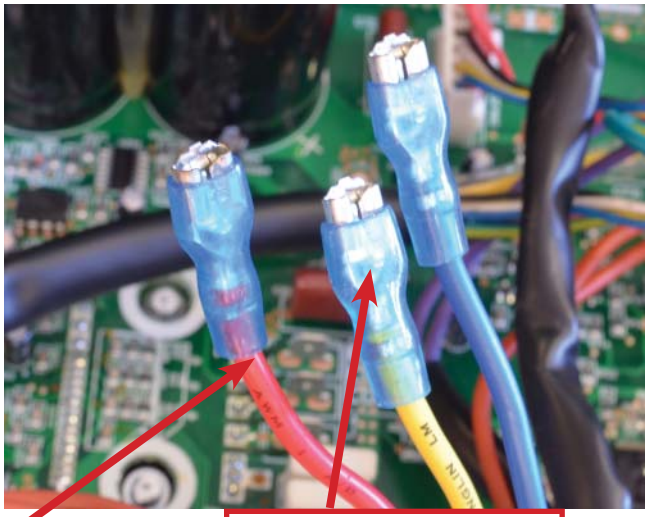
Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)
0	32.0	49.02		52	125.6	4.986		104	219.2	0.898
1	33.8	46.6		53	127.4	4.802		105	221.0	0.873
2	35.6	44.31		54	129.2	4.625		106	222.8	0.848
3	37.4	42.14		55	131.0	4.456		107	224.6	0.825
4	39.2	40.09		56	132.8	4.294		108	226.4	0.802
5	41.0	38.15		57	134.6	4.139		109	228.2	0.779
6	42.8	36.32		58	136.4	3.99		110	230.0	0.758
7	44.6	34.58		59	138.2	3.848		111	231.8	0.737
8	46.4	32.94		60	140.0	3.711		112	233.6	0.717
9	48.2	31.38		61	141.8	3.579		113	235.4	0.697

Troubleshooting Outdoor Components

Compressor Windings



Compressor Windings
Red, Yellow & Blue Wires

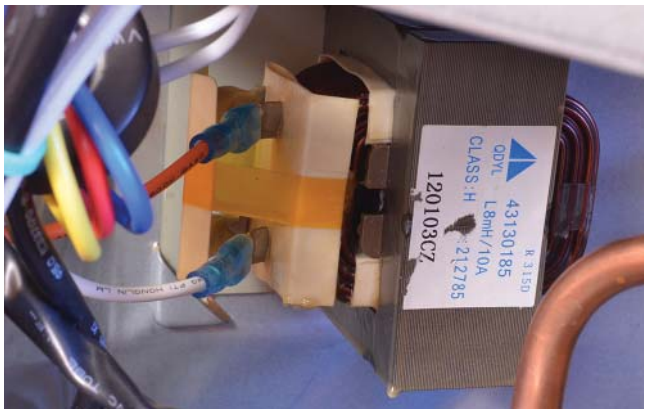


Slightly depress tab for easy removal

Compressor Winding Resistance Check:

Remove the compressor wires from the AP1 circuit board. The wires red to yellow, yellow to blue & red to blue should have readings from 2 - 4 ohms. There should be no reading from any wire to chassis ground. If the readings between the windings differ greatly, the windings are bad. If there is a reading from any wire to the chassis, there is leakage in the windings.

Reactor



The reactor filters out electrical noise and transient voltage spikes to the control board. There will be a reading of less than 1 Ω after the wires are removed. There should be no reading from either reactor terminal to ground.

Troubleshooting Outdoor Components

Outdoor Fan Motor

Outdoor Motor Winding Resistance Check:

Disconnect power to the unit, all reading are made with no power and fan motor wires disconnected from circuit board.
Remove the white and orange wire from the reactor and then disconnect the plug from the circuit board. The chart below will indicate the approximate resistance values in ohms. Readings may vary slightly for different models. This is a DC brush-less motor, resistance readings may vary with meters. Plugging a know good motor in the board would provide a quick troubleshooting technique.

Motor Leads (Negative Meter Lead this color)	Blue	Yellow	Black	White	Red
Blue		6.6M Ω	6.2M Ω	6.3M Ω	~ Ω
Yellow			51K Ω	260K Ω	~ Ω
Black				27M Ω	~ Ω
White					~ Ω
Red					

Troubleshooting Outdoor Components

Reactor

Reactor Resistance Check:

The line reactor helps to smooth the inrush current , reduce harmonics and noise, and buffers the system, protecting the electronics from transient voltage noise. The resistance between the coils will be very low, approximately .3 ohms and should not have any resistance to ground. You should disconnect the wires from the reactor before taking any readings.

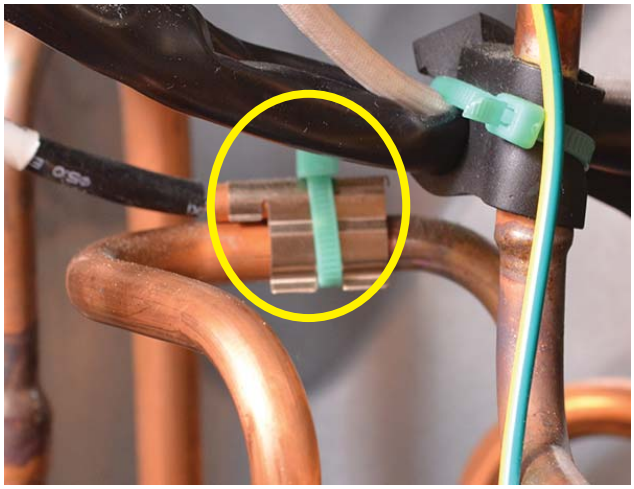
Compressor Crankcase Heater Check

Compressor Crankcase Heater Resistance Check:

Unplug the wire connector from the circuit board. The resistance should read approximately 2.15K ohms. There should be no reading from either wire to ground. If readings vary from these measurements, replace the heater.

Troubleshooting Outdoor Components

Gas Line Temperature Sensors Motor



These sensors are a negative coefficient thermistor that decrease in resistance as the temperature increases. The sensors are used to monitor the temperature of the refrigerant leaving the indoor coil to maintain a correct superheat operation. Please refer to the troubleshooting section for error codes generated by a sensor fault.

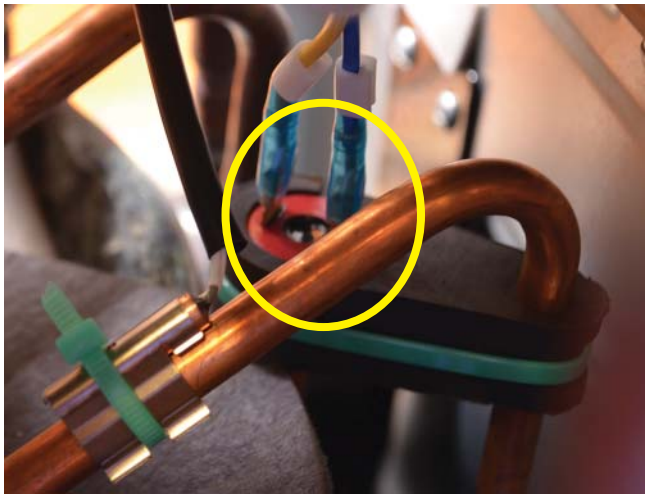
Troubleshooting Outdoor Components

Liquid Line Temperature Sensors

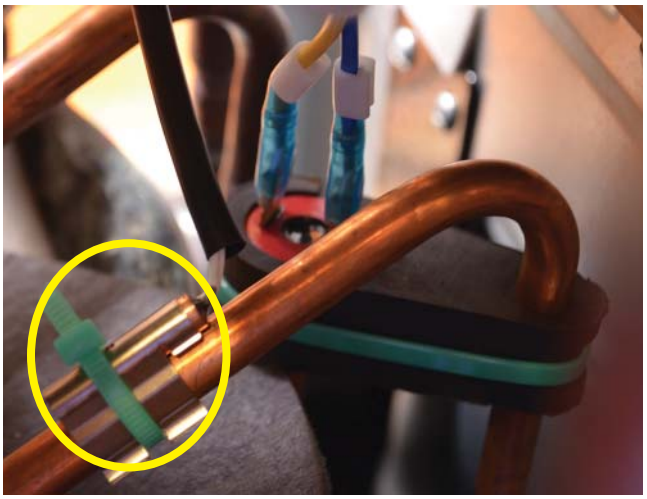
These sensors are a negative coefficient thermistor that decrease in resistance as the temperature increases. The sensors are used to monitor the temperature of the refrigerant leaving the EEV to maintain a correct superheat operation. Please refer to the troubleshooting section for error codes generated by a sensor fault.

Troubleshooting Outdoor Components

High Pressure Protection Switch & Exhaust Temperature Sensor



The high pressure switch monitors the refrigerant discharge pressure and will shut down the unit if pressures are higher abnormal. If this is detected, an E1 error code will be generated. Please refer to the troubleshooting section for more detailed information.

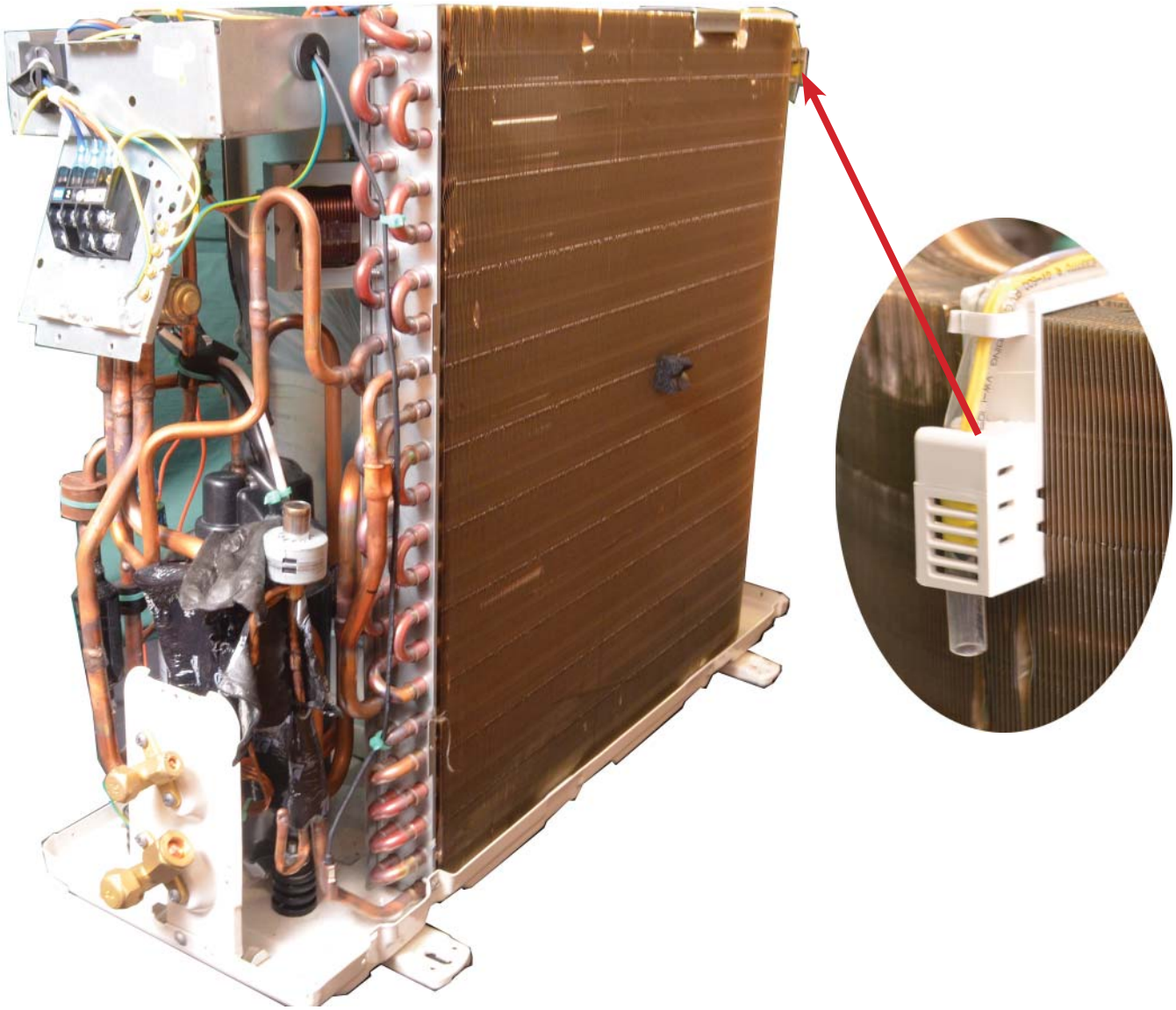


The exhaust temperature sensor monitors the refrigerant discharge temperature and will send information to the inverter control board for system operation.
The following actions can occur:
Exhaust Temperature > 208 F - Compressor will not rise above present level
Exhaust Temperature > 217 F - Compressor will run at reduced frequency
Exhaust Temperature < 194 F - Compressor off for 3 minutes minimum, the compressor will restart

Error Code F5 will be generated if the sensor is open or shorted. Please refer to the troubleshooting section for more detailed information.

Troubleshooting Outdoor Components

Outdoor Temperature Sensor



This sensor is a negative coefficient thermistor that will decrease in resistance as the temperature increases. This sensor will monitor the temperature of the outdoor air. The reading will be used by the inverter board to adjust frequency calculations.

Error Code F3 will be generated if the sensor is open or shorted. Please refer to the troubleshooting section for more detailed information.

Fault Displays

Models GWH09AB-A3DNA2B & GWH12AB-A3DNA2B Table 1

Error Item	Indoor Unit Display	State of Outdoor Unit LEDs F Flashing Times			Possible Cause of Fault
		Green LED	Red LED	Yellow LED	
Stop for anti-freezing protection of indoor coil	E2	-	Flash 4 times	Flash 3 times	Refrigerant leak, low indoor air flow, dirty filter
Stop for exhaust protection	E4	-	-	Flash 7 times	Low refrigerant, expansion valve problem, abnormal ambient temperature
Stop for low voltage protection	E5	-	-	Flash 5 times	Low voltage, abnormal ambient temperature
Communication Malfunction	E6	-	-	-	Communication line failure, main PCB failure, Incorrect wiring
Compressor overload protection	H3	-	-	Flash 8 times	Compressor shell overheat, low refrigerant, EEV failure
Overload protection	E8	-	-	Flash 6 times	Ambient air temperature abnormal, blocked heat exchanger
Stop for IPM module protection	H5	-	-	Flash 4 times	IPM module overheated, low voltage, poor heat sink
Indoor fan motor inoperative	H6	-	-	-	PCB board damaged, incorrect or loose wiring, damaged fan blade
Indoor ambient temperature sensor fault	F1	-	-	-	Loose wiring, poor terminal connection, faulty sensor
Indoor tube temperature sensor fault	F2	-	-	-	Loose wiring, poor terminal connection, faulty sensor
Outdoor ambient temperature sensor fault	F3	-	Flash 6 times	-	Loose wiring, poor terminal connection, faulty sensor
Outdoor tube temperature sensor fault	F4	-	Flash 5 times	-	Loose wiring, poor terminal connection, faulty sensor
Outdoor exhaust temperature sensor fault	F5	-	Flash 7 times	-	Loose wiring, poor terminal connection, faulty sensor
Automatic defrost	H1	-	-	Flash 2 times	H1 is not an error code, normal indication of defrost cycle
Jumper wire fault	C5	-	-	-	Insert correct jumper wire in PCB

Models GWH09AB-A3DNA2B & GWH12AB-A3DNA2B , continued

Table 1 Remarks:

1. Some Error codes may only be indicated on Indoor Display
2. Normal communication will be indicated by outdoor unit green LED flashing 1 second on, 1 second off
3. On single errors the red and yellow led will flash .5 second on and off, two errors will have a 2 second off.

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
High pressure protection of system	E1	OFF 3S and blink once						During cooling and drying operation, except indoor fan operates, all loads stop operation. During heating operation, the complete unit stops.	Possible reasons: 1. Refrigerant was superabundant; 2. Poor heat exchange (including filth blockage of heat exchanger and bad radiating environment); Ambient temperature is too high
Anti freezing protection	E2	OFF 3S and blink twice			OFF 3S and blink 3 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates.	1. Poor air return in indoor unit; 2. Fan speed is abnormal; 3. Evaporator is dirty.
System block or refrigerant leakage	E3	OFF 3S and blink 3 times				OFF 3S and blink 9 times		The Dual-8 Code Display will show E3 until the low pressure switch stop operation.	1. Low pressure protection; 2. Low pressure protection of system; 3. Low pressure protection of compressor
High discharge temperature protection of compressor	E4	OFF 3S and blink 4 times			OFF 3S and blink 7 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	Please refer to the malfunction analysis (discharge protection, overload).
Over-current protection	E5	OFF 3S and blink 5 times			OFF 3S and blink 5 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	1. Supply voltage is unstable; 2. Supply voltage is too low and load is too high; 3. Evaporator is dirty.

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Communication malfunction	E6	OFF 3S and blink 6 times					OFF	During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the corresponding malfunction analysis
High temperature resistant protection	E8	OFF 3S and blink 8 times			OFF 3S and blink 6 times			During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant).
EEPROM malfunction	EE			OFF 3S and blink 15 times	OFF 3S and blink 11 times			During cooling and drying operation, compressor will stop while indor fan will operate; During heating operation, the complete unit will stop.	Replace outdoor control panel AP1
Limit/ decrease frequency due to high temperature of module	EU		OFF 3S and blink 6 times	OFF 3S and blink 6 times				All loads operate normally, while operation frequency for compressor is decreased	Discharging after the complete unit is de-energized for 20 mins, check whether the thermal grease on IPM Module of outdoor control panel PA1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
Malfunction protection of jumper cap	C5	OFF 3S and blink 15 times						Wireless remote receiver and button are effective, but can not dispose the related command	1. No jumper cap insert on mainboard; 2. Incorrect insert of jumper cap; 3. Jumper cap damaged; 4. Abnormal detecting circuit of mainboard

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Gathering refrigerant	F0	OFF 3S and blink 1 times	OFF 3S and blink 1 times					When the outdoor unit receives signal of Gathering refrigerant, the system will be forced to run under cooling mode for gathering refrigerant	Normal cooling mode
Indoor ambient temperature sensor is open/short circuited	F1		OFF 3S and blink once					During cooling and drying operation, indoor unit operates while other loads will stop; during heating operation, the complete unit will stop operation.	1. Loosening or bad contact of indoor ambient temp sensor and mainboard terminal; 2. Components in mainboard fell down leads short circuit; 3. Indoor ambient temp sensor damaged (check with sensor resistance value chart); 4. Mainboard damaged
Indoor evaporator temperature sensor is open/short circuited	F2		OFF 3S and blink twice					AC stops operation once reaches the setting temperature. Cooling, drying; internal fan motor stops operation while other loads stop operation; heating, AC stop operation	1. Loosening or bad contact of indoor ambient temp sensor and mainboard terminal; 2. Components in mainboard fell down leads short circuit; 3. Indoor ambient temp sensor damaged (check with sensor resistance value chart); 4. Mainboard damaged
Outdoor ambient temperature sensor is open/short circuited	F3		OFF 3S and blink 3 times			OFF 3S and blink 6 times		During cooling and drying operating, compressor stops while indoor fan operates; During heating operation the complete unit will stop operation	Outdoor temperature sensor hasn't been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor
Outdoor condenser temperature sensor is open/short circuited	F4		OFF 3S and blink 4 times			OFF 3S and blink 5 times		During cooling and drying operating, compressor stops while indoor fan operates; During heating operation the complete unit will stop operation	Outdoor temperature sensor hasn't been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Outdoor discharge temperature sensor is open/short circuited	F5		OFF 3S and blink 5 times			OFF 3S and blink 7 times		During cooling and drying operation, compressor will stop after operating for about 3 mins, while indoor fan will operate; During heating operating, the complete unit will stop after operating for about 3 mins.	1. Outdoor temperature sensor hasn't been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor; 2. The head of temperature sensor hasn't been inserted into the copper tube
Limit/ decrease frequency due to overload	F6		OFF 3S and blink 6 times			OFF 3S and blink 3 times		All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
Decrease frequency due to overcurrent	F8		OFF 3S and blink 8 times			OFF 3S and blink once		All loads operate normally, while operation frequency for compressor is decreased.	The input supply voltage is too low; System pressure is too high and overload
Decrease frequency due to high air discharge	F9		OFF 3S and blink 9 times			OFF 3S and blink twice		All loads operate normally, while operation frequency for compressor is decreased	Overload or temperature is too high; Refrigerant is insufficient; Malfunction of electric expansion valve (EKV).
Limit/ decrease frequency due to anti freezing	FH		OFF 3S and blink 2 times	OFF 3S and blink 2 times		OFF 3S and blink 4 times		All loads operate normally, while operation frequency for compressor is decreased	Poor air-return in indoor unit or fan speed is too low

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Voltage for DC bus-bar is too high	PH		OFF 3S and blink 11 times		OFF 3S and blink 13 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265VAC, turn on the unit after the supply voltage is increased to the normal rang; 2. If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
Voltage of DC bus-bar is too low	PL			OFF 3S and blink 21 times	OFF 3S and blink 12 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265VAC, turn on the unit after the supply voltage is increased to the normal rang; 2. If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
Compressor Min frequency in test state	P0		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during min cooling or min heating test
Compressor rated frequency in test state	P1		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during nominal cooling or nominal heating test

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Compressor maximum frequency in test state	P2		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during max cooling or max heating test
Compressor intermediate frequency in test state	P3		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during middle cooling or middle heating test
Overcurrent protection of phase current for compressor	P5		OFF 3S and blink 15 times					During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation the complete unit will stop operation	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
Charging malfunction of capacitor	PU			OFF 3S and blink 17 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation the complete unit will stop operation	Refer to the part three charging malfunction analysis of capacitor
Malfunction of module temperature sensor circuit	P7			OFF 3S and blink 18 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation the complete unit will stop operation	Replace outdoor control panel AP1

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Module high temperature protection	P8			OFF 3S and blink 19 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation the complete unit will stop operation	After the complete unit is de-energized for 20 mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1
Decrease frequency due to high temperature resistant during heating operation	H0			OFF 3S and blink 10 times				All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
Static dedusting protection	H2			OFF 3S and blink twice					
Overload protection for compressor	H3			OFF 3S and blink 3 times	OFF 3S and blink 8 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	1. Wiring terminal OVC-COMP is loosened. In normal state, the resistance for this terminal should be less than 1 ohm; 2. Refer to the malfunction analysis (discharge protection, overload)
System is abnormal	H4			OFF 3S and blink 4 times	OFF 3S and blink 6 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	Refer to the malfunction analysis (overload, high temperature resistant)

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
IPM protection	H5			OFF 3S and blink 5 times	OFF 3S and blink 4 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor)
Module temperature is too high	H5			OFF 3S and blink 5 times	OFF 3S and blink 10 times				
Internal motor (fan motor) do not operate	H6	OFF 3S and blink 11 times						Internal fan motor, external fan motor, compressor and electric heater stop operation, guide louver stops at present location.	1. Bad contact of DC motor feedback terminal; 2. Bad contact of DC motor control end; 3. Fan motor is stalling; 4. Motor malfunction; 5. Malfunction of mainboard rev detecting circuit
Desynchronizing of compressor	H7			OFF 3S and blink 7 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor)
PFC protection	HC			OFF 3S and blink 6 times	OFF 3S and blink 14 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	Refer to the malfunction analysis

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Module temperature is too high	H5			OFF 3S and blink 5 times	OFF 3S and blink 10 times				
Internal motor (fan motor) do not operate	H6	OFF 3S and blink 11 times						Internal fan motor, external fan motor, compressor and electric heater stop operation, guide louver stops at present location.	1. Bad contact of DC motor feedback terminal; 2. Bad contact of DC motor control end; 3. Fan motor is stalling; 4. Motor malfunction; 5. Malfunction of mainboard rev detecting circuit
Desynchronizing of compressor	H7			OFF 3S and blink 7 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor)
PFC protection	HC			OFF 3S and blink 6 times	OFF 3S and blink 14 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	Refer to the malfunction analysis
Outdoor DC fan motor malfunction	L3	OFF 3S and blink 23 times				OFF 3S and blink 14 times		Outdoor DC fan motor malfunction lead to compressor stop operation.	DC fan motor malfunction or system blocked or the connector loosened

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Power protection	L9	OFF 3S and blink 20 times			OFF 3S and blink 9 times			Compressor stop operation and Outdoor fan motor will stop 30s later, 3 minutes later, fan motor and compressor will restart	To protect the electronic components when detect high power
Indoor unit and outdoor unit doesn't match	LP	OFF 3S and blink 19 times			OFF 3S and blink 16 times			Compressor and Outdoor fan motor can't work	Indoor unit and outdoor unit doesn't match
Failure start-up	LC			OFF 3S and blink 11 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation	Refer to the malfunction analysis
Malfunction of phase current detection circuit for compressor	U1			OFF 3S and blink 13 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation the complete unit will stop	Replace outdoor control panel AP1
Malfunction of voltage dropping for DC bus-bar	U3			OFF 3S and blink 20 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation the complete unit will stop	Supply voltage is unstable

Fault Displays

Models GWH09AB-D3DNA2D & GWH12AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit				Outdoor Unit			A/C Status	Possible Causes
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
		Operation	Cool	Heating	Yellow	Red	Green		
Malfunction of complete units current detection	U5		OFF 3S and blink 13 times					During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation the complete unit will stop	Theres circuit malfunction on outdoor units control panel AP1, please replace the outdoor units control panel AP1
The four-way valve is abnormal	U7		OFF 3S and blink 20 times					If this malfunction occurs during heating operation, the complete unit will stop operation	1. Supply voltage is lower than AC175V; 2. Wiring terminal 4V is loosened or broken; 3. 4V is damaged, please replace 4V.
Zero-crossing malfunction of outdoor unit	U9	OFF 3S and blink 18 times						During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation the complete unit will stop	Replace outdoor control panel AP1
Frequency limiting (power)						OFF 3S and blink 13 times			
Compressor is open-circuited					OFF 3S and blink once				
The temperature for turning on the unit is reached						OFF 3S and blink 8 times			
Frequency limiting (module temperature)						OFF 3S and blink 11 times			

Fault Displays

Models GWH18AB-D3DNA2D & GWH24AB-D3DNA2D

Malfunction Name	Indoor Unit Displaying Method				Outdoor Unit Display (LED)				A/C Status	Malfunctions
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s					
		Running LED	Cooling LED	Heating LED	D40/D5	D41/D6	D42/D16	D43/D30		
System high pressure protection	E1	OFF 3S and blink once			□	☆	☆	☆	Cooling dehumidifying expect the indoor fan motor is running, others will stop to run. Heating all stop running	1. Refrigerant is too much; 2. Poor heating exchanging for units (including heat exchanger is dirty and unit heating radiating ambient is poor); Ambient temp is too high
Anti-freezing protection	E2	OFF 3S and blink twice			■	□	■	□	Cooling dehumidifying compressor outdoor fan motor will stop running, indoor fan motor will keep running	1. Poor indoor unit air returning; 2. Indoor fan motor rotating speed abnormal; 3. Evaporator is dirty
Compressor air exhaust high temp. protection	E4	OFF 3S and blink 4 times			■	□	■	☆	Cooling dehumidifying expect the indoor fan motor is running, others will stop to run. Heating all stop running	Please refer to trouble shoot (air exhaust protection, overload)
AC overload protection	E5	OFF 3S and blink 5 times			□	■	☆	□	Cooling dehumidifying expect the indoor fan motor is running, others will stop to run. Heating all stop running	1. Power supply is stable, fluctuation is too much; 2. Power supply is too low, overload is too much

Fault Displays

Models GWH18AB-D3DNA2D & GWH24AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit Displaying Method				Outdoor Unit Display (LED)				A/C Status	Malfunctions
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s					
		Running LED	Cooling LED	Heating LED	D40/D5	D41/D6	D42/D16	D43/D30		
Indoor and outdoor units communication malfunction	E6	OFF 3S and blink 6 times			□	□	□	☆	Cooling compressor will stop, indoor fan motor works; Heating all will stop	Please refer to troubleshooting
Anti-high temp. protection	E8	OFF 3S and blink 8 times			■	□	■	■	Cooling compressor will stop, indoor fan motor works; Heating all will stop	Please refer to troubleshooting
Indoor unit motor no feedback	H6	OFF 3S and blink 11 times							Whole unit will stop to run	1. Poor insert for GPF; 2. Indoor control board AP1 malfunction; 3. Indoor motor M1 malfunction
Jump wire cap malfunction protection	C5	OFF 3S and blink 15 times							Whole unit will stop to run	Indoor control board AP1 jump cap poor connected, please reinsert or replace the jump cap
Indoor ambient sensor open circuit, short circuit	F1		OFF 3S and blink once						Cooling dehumidifying; indoor fan motor is running other overloads will stop. Heating whole unit will stop to run	1. Room temp sensor is not connected with the control panel AP1. 2. Room temp sensor is damaged

Fault Displays

Models GWH18AB-D3DNA2D & GWH24AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit Displaying Method				Outdoor Unit Display (LED)				A/C Status	Malfunctions
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s					
		Running LED	Cooling LED	Heating LED	D40/D5	D41/D6	D42/D16	D43/D30		
Overload limit/descending frequency	F6		OFF 3S and blink 6 times		■	□	☆	☆	Overload normal operation, compressor is running, frequency descending	Please refer to troubleshooting
Over current need frequency descending	F8		OFF 3S and blink 8 times		■	■	□	■	Overload normal operation, compressor is running, frequency descending	1. Input power supply is too low; 2. System voltage is too high, over is too much
Air exhaust over high need frequency descending	F9		OFF 3S and blink 9 times		■	■	□	□	Overload normal operation, compressor is running, frequency descending	1. Overload is too much, ambient temp is too high; 2. Refrigerant is short; 3. Electric expansion malfunction
DC bus-bar voltage is too high	PH		OFF 3S and blink 11 times		□	■	□	☆	Cooling dehumidifying compressor stop running, Fan motor works; Heating all will stop	1. Testing wire terminal L and N position. If higher than 265VAC, please cut off the power supply and restart until back to normal; 2. If input voltage is normal, testing the voltage of electrolytic capacitor on AP1 after turn on the unit. There may be some problem and replace the AP1 if the electrolytic capacitor voltage range at 200-280V

Fault Displays

Models GWH18AB-D3DNA2D & GWH24AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit Displaying Method				Outdoor Unit Display (LED)				A/C Status	Malfunctions
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s					
		Running LED	Cooling LED	Heating LED	D40/D5	D41/D6	D42/D16	D43/D30		
Whole unit's current testing malfunction	U9		OFF 3S and blink 13 times		□	■	☆	■	Cooling dehumidifying compressor stop running, Fan motor works; Heating all will stop	The circuit on AP1 has malfunction, replace the outdoor unit AP1
Compressor current overcurrent protection	P5		OFF 3S and blink 15 times		□	☆	□	□	Cooling dehumidifying compressor stop running, Fan motor works; Heating all will stop	Please refer to troubleshooting
Defrosting	H1			OFF 3S and blink once					Under the heating mode, compressor running, indoor/outdoor fan motor stop working	It is normal function
Electrostatic dedusting protection	H2			OFF 3S and blink 2times						
Compressor overload protection	H3			OFF 3S and blink 3 times	□	☆	☆	□	Cooling dehumidifying compressor stop running, Fan motor works; Heating all will stop	1. Wire terminal OVC-COMP loosen or circuit has problem, the resistance of SAT should be lower than 1 ohm; 2. Please refer to troubleshooting (exhaust/overload protection)

Fault Displays

Models GWH18AB-D3DNA2D & GWH24AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit Displaying Method				Outdoor Unit Display (LED)				A/C Status	Malfunctions
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s					
		Running LED	Cooling LED	Heating LED	D40/D5	D41/D6	D42/D16	D43/D30		
System abnormal	H4			OFF 3S and blink 4 times					Cooling dehumidifying compressor stop running, Fan motor works; Heating all will stop	Please refer to trouble-shooting
IPM protection	H5			OFF 3S and blink times	■	□	■	■	Cooling dehumidifying compressor stop running, Fan motor works; Heating all will stop	Please refer to trouble-shooting
PFC protection	HC			OFF 3S and blink 6 times	□	■	☆	☆		
Compressor lose steps	H7			OFF 3S and blink 7 times	□	☆	■	☆		
Heating, anti-high temp declines	H0			OFF 3S and blink 10 times	■	□	★	☆		
Startups fail	Lc			OFF 3S and blink 11 times	□	☆	□	☆		
Compressor current testing circuit malfunction	U1			OFF 3S and blink 13 times	□	☆	■	□		
EEPROM malfunction	EE			OFF 3S and blink 15 times	□	□	□	■		
Capacitor charge malfunction	PU			OFF 3S and blink 17 times	□	■	□	■		

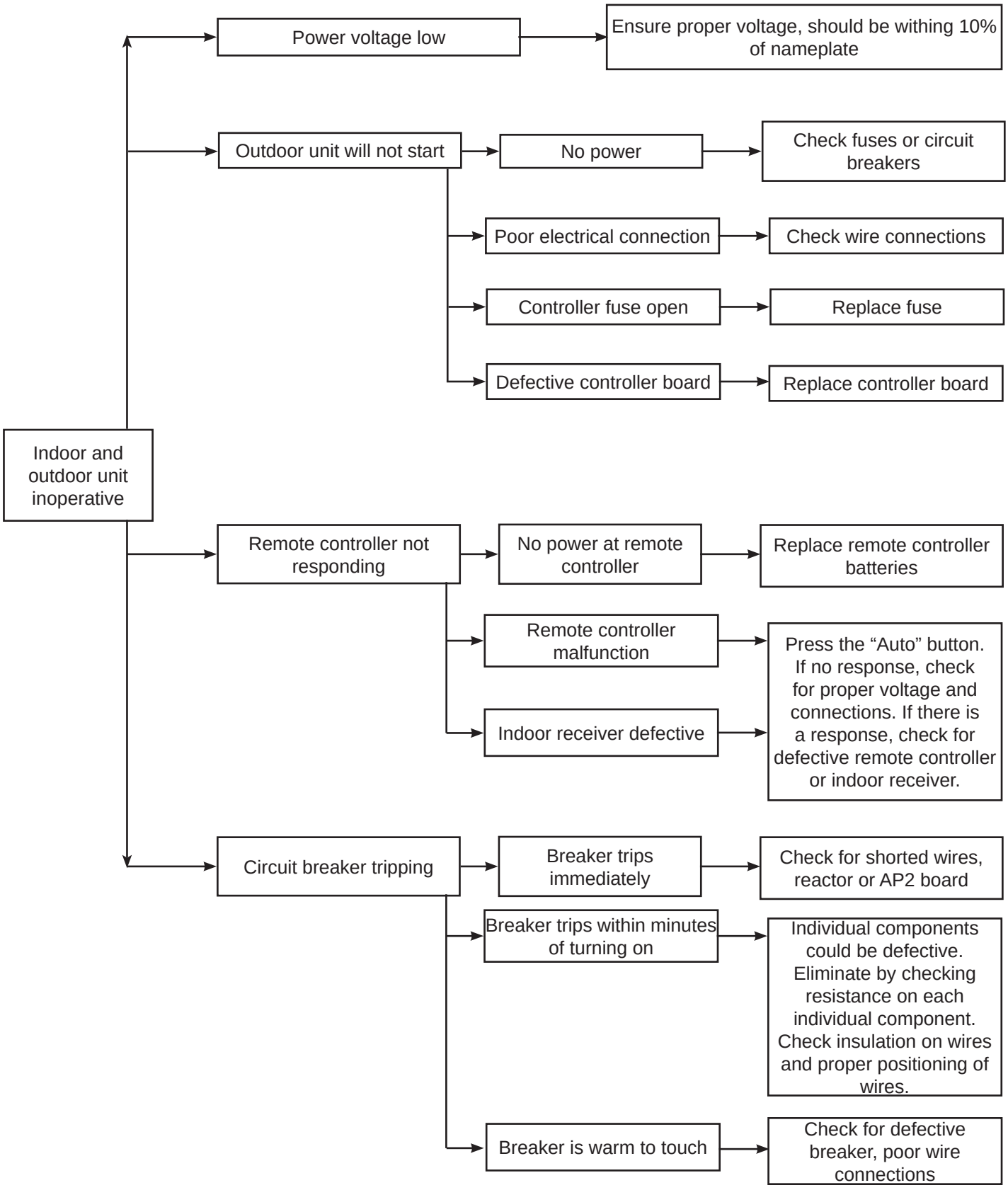
Fault Displays

Models GWH18AB-D3DNA2D & GWH24AB-D3DNA2D, cont.

Malfunction Name	Indoor Unit Displaying Method				Outdoor Unit Display (LED)				A/C Status	Malfunctions
	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s					
		Running LED	Cooling LED	Heating LED	D40/D5	D41/D6	D42/D16	D43/D30		
Module sensor circuit diagram	**P7**			**OFF 3S and blink 18 times**	□	□	■			
Module temp over high protection	**P8**			**OFF 3S and blink 19 times**	■	□	☆	■		
DC Bus voltage dips	**U3**			**OFF 3S and blink 20 times**	□	■	■	■		
Low DC Bus voltage protection	**PL**			**OFF 3S and blink 21 times**	□	■	■	□		
IPM temp is too high limit/decrease frequency	**EU**				■	■	■	☆		
Four-way valve abnormal	**U7**				■	□	☆	□		
Outdoor unit zero-cross detecting error	**U9**				■	■	☆	□		
Anti-freezing limit/decrease frequency	**FH**				■	■	■	□	All loads work normally but the running frequency limited or decrease	Indoor unit air return is poor or fan speed is too low
Fan mode protection	**L3**				■	□	□	□	Cooling: outdoor fan motor, compressor stop running; indoor fan works. Heating: outdoor fan, compressor, indoor fan motor stop running.	1. The wire terminal of outdoor fan motor is loose, repair connection 2. Motor damaged, replace the motor. 3. Fan motor module on mainboard is defective, replace the main board AP1

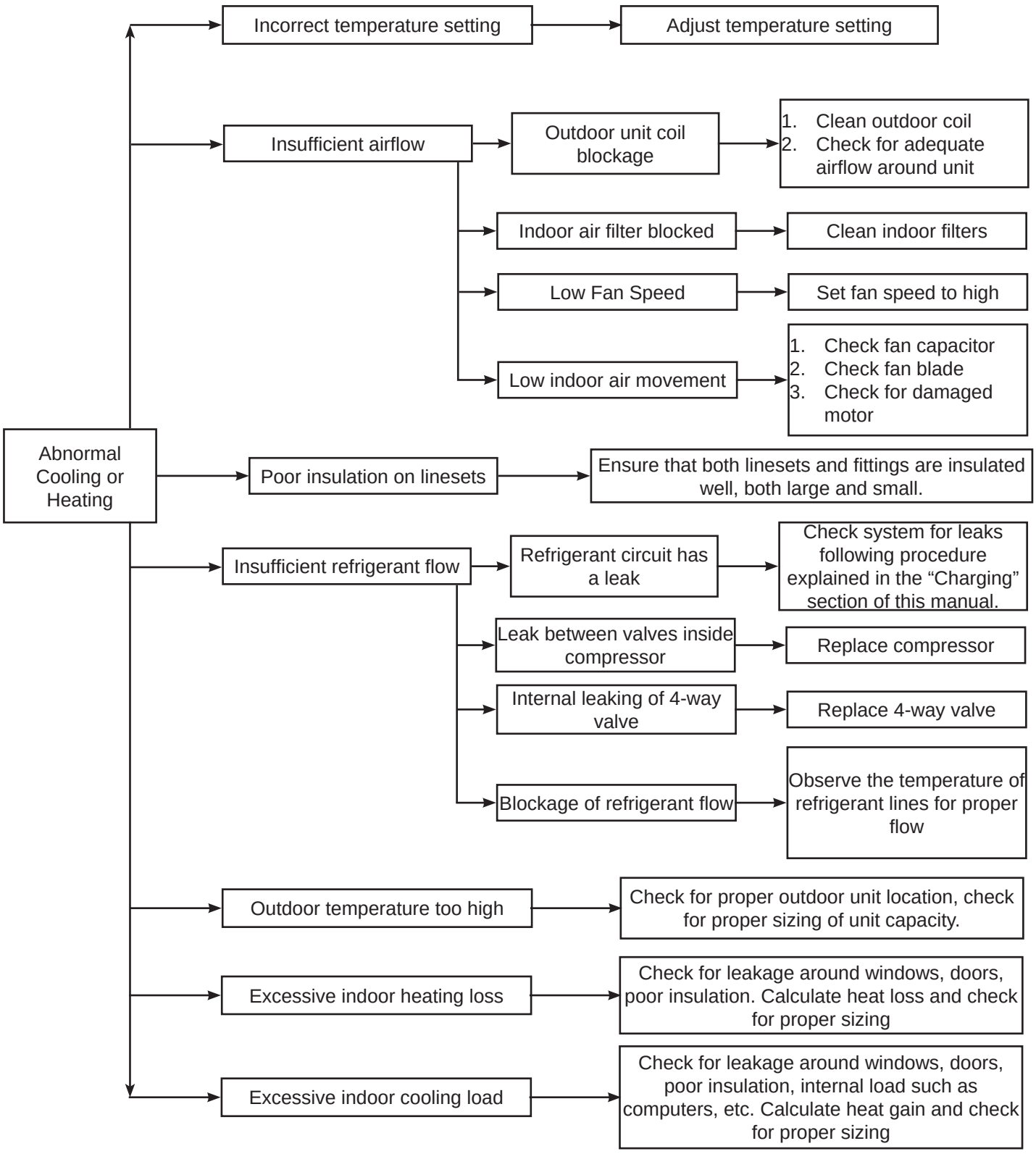
Troubleshooting

Unit Will Not Start



Troubleshooting

Inadequate Cooling or Heating



Troubleshooting

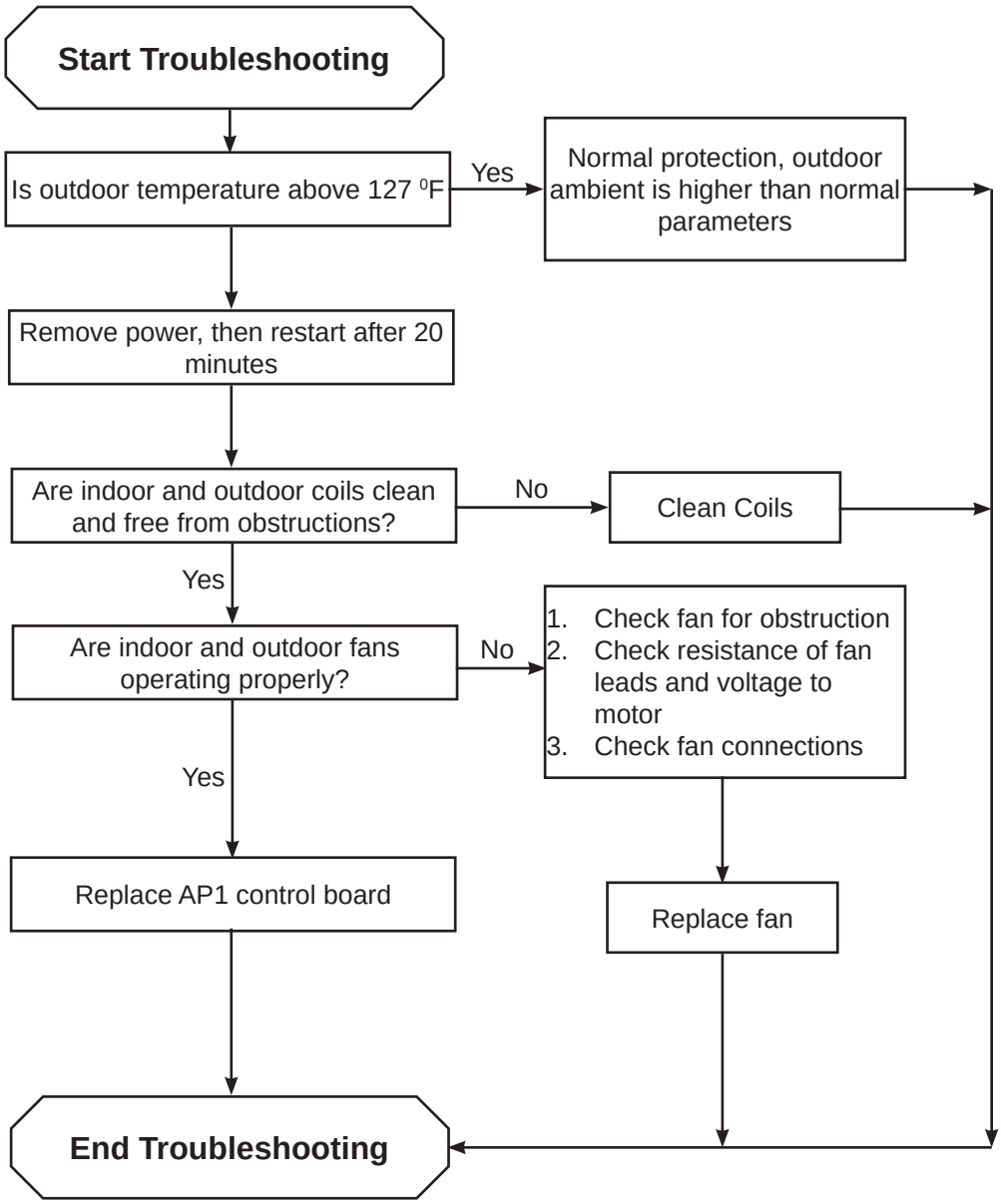
Anti-high temperature and overload malfunction

High Discharge Temperature Protection of Compressor.

Status:

Cooling operation, compressor stops while indoor fans runs. Heating operation, complete unit stops

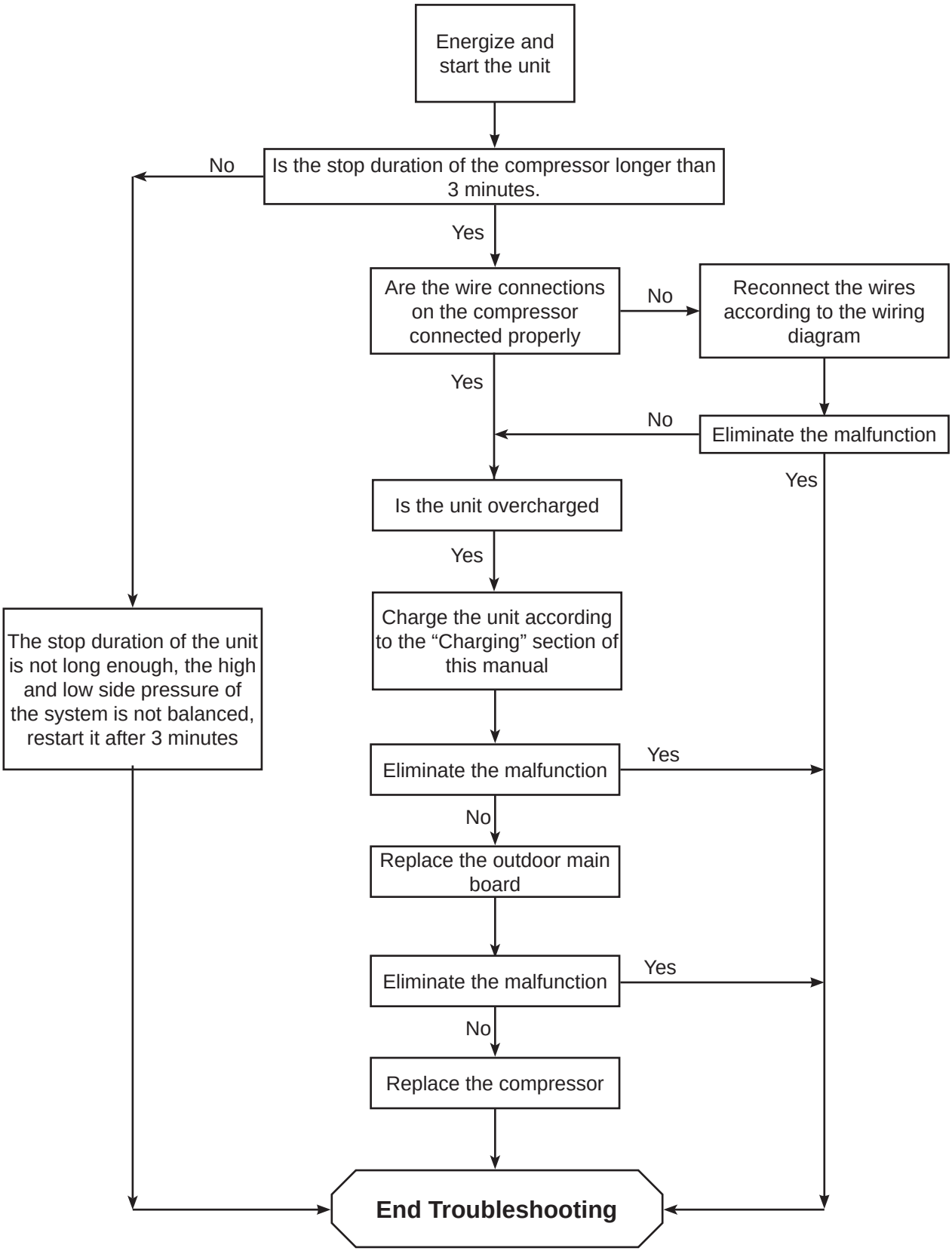
1. Is unit running in proper outdoor ambient range
2. Faulty outdoor temperature sensor
3. Refrigerant leak
4. Poor airflow of outdoor unit
5. Follow Troubleshooting procedure



Outdoor Fan Connection

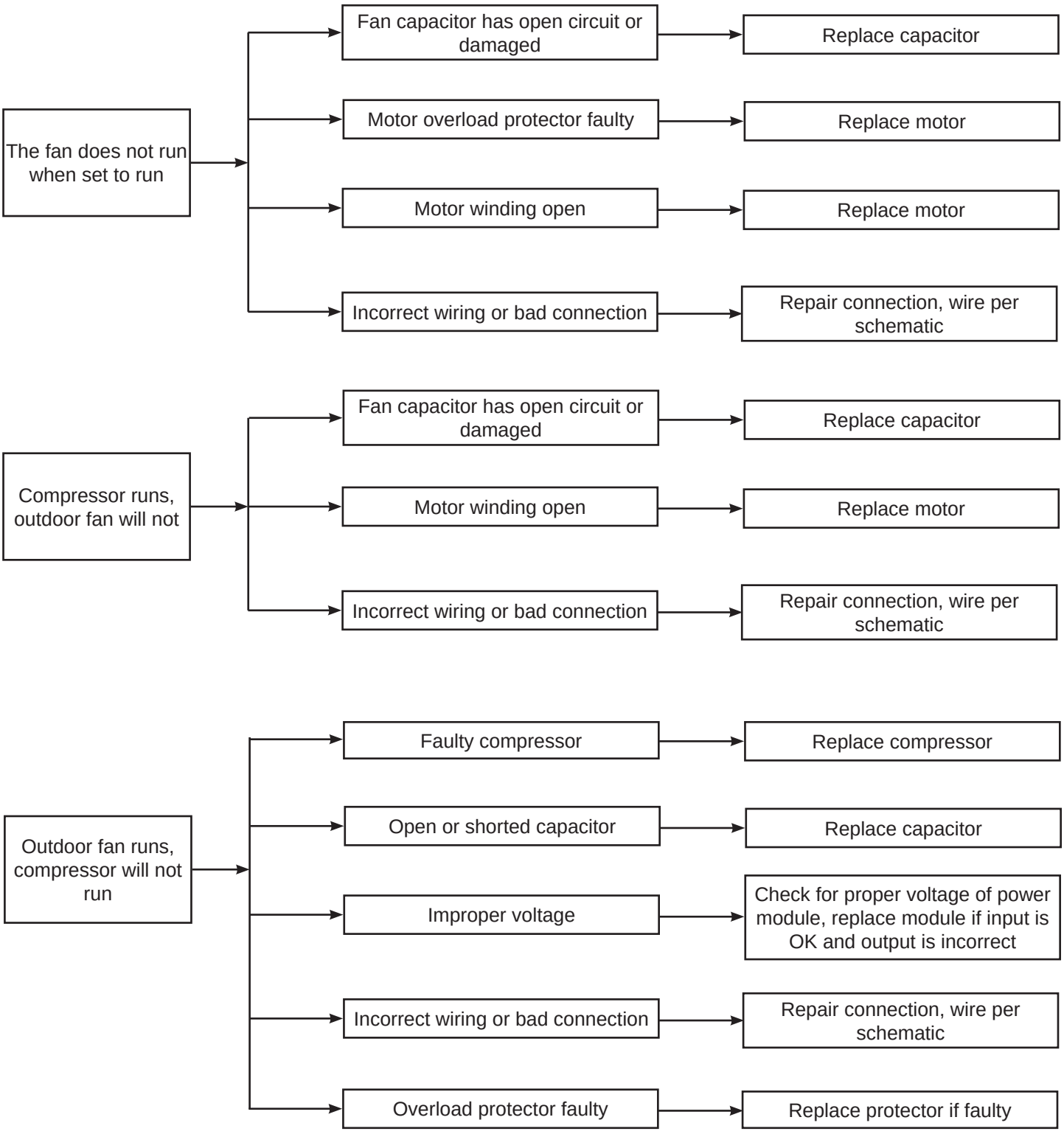
Troubleshooting

Start Failure Malfunction

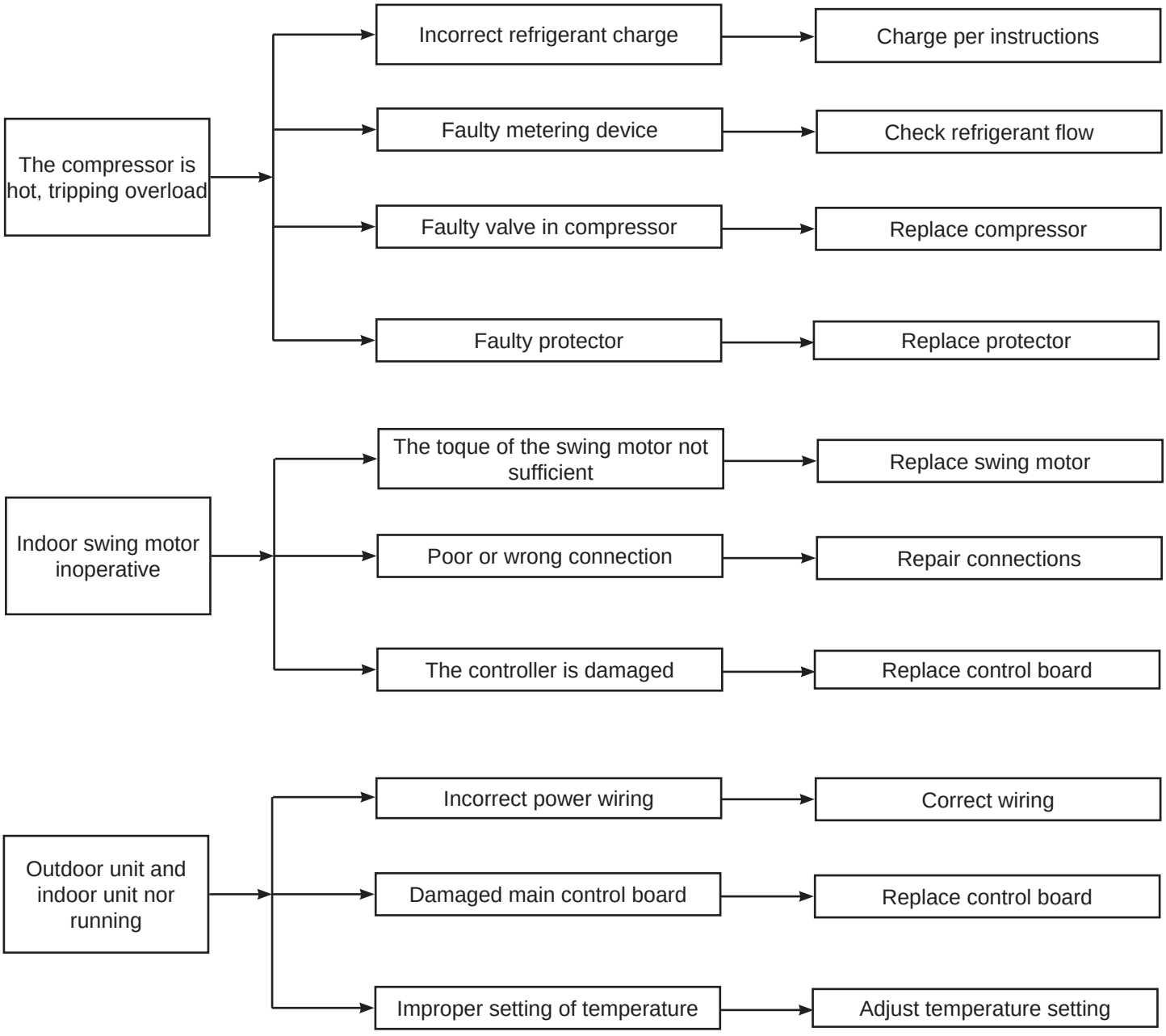


Troubleshooting

Miscellaneous Malfunctions

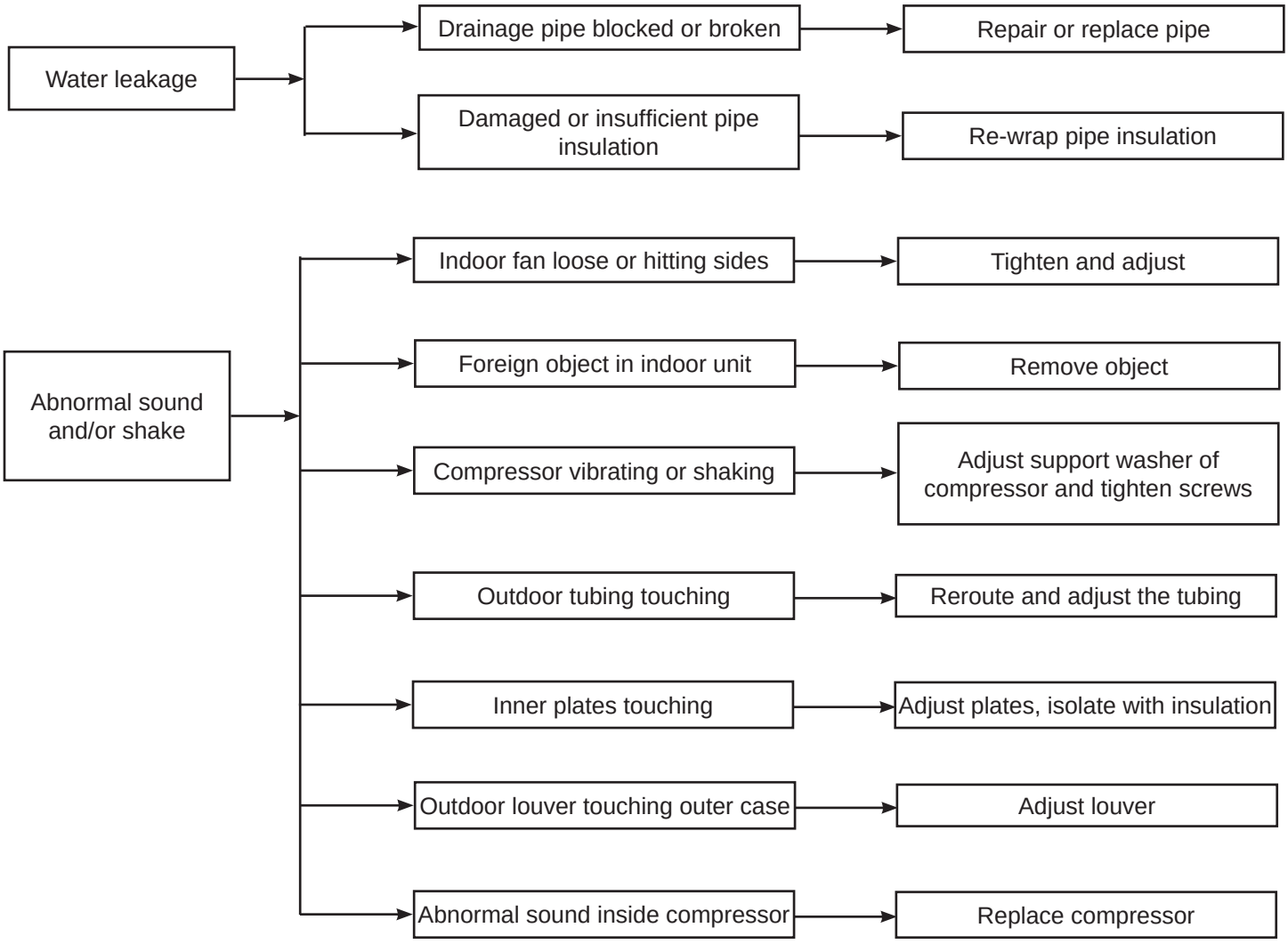


Miscellaneous Malfunctions, cont.



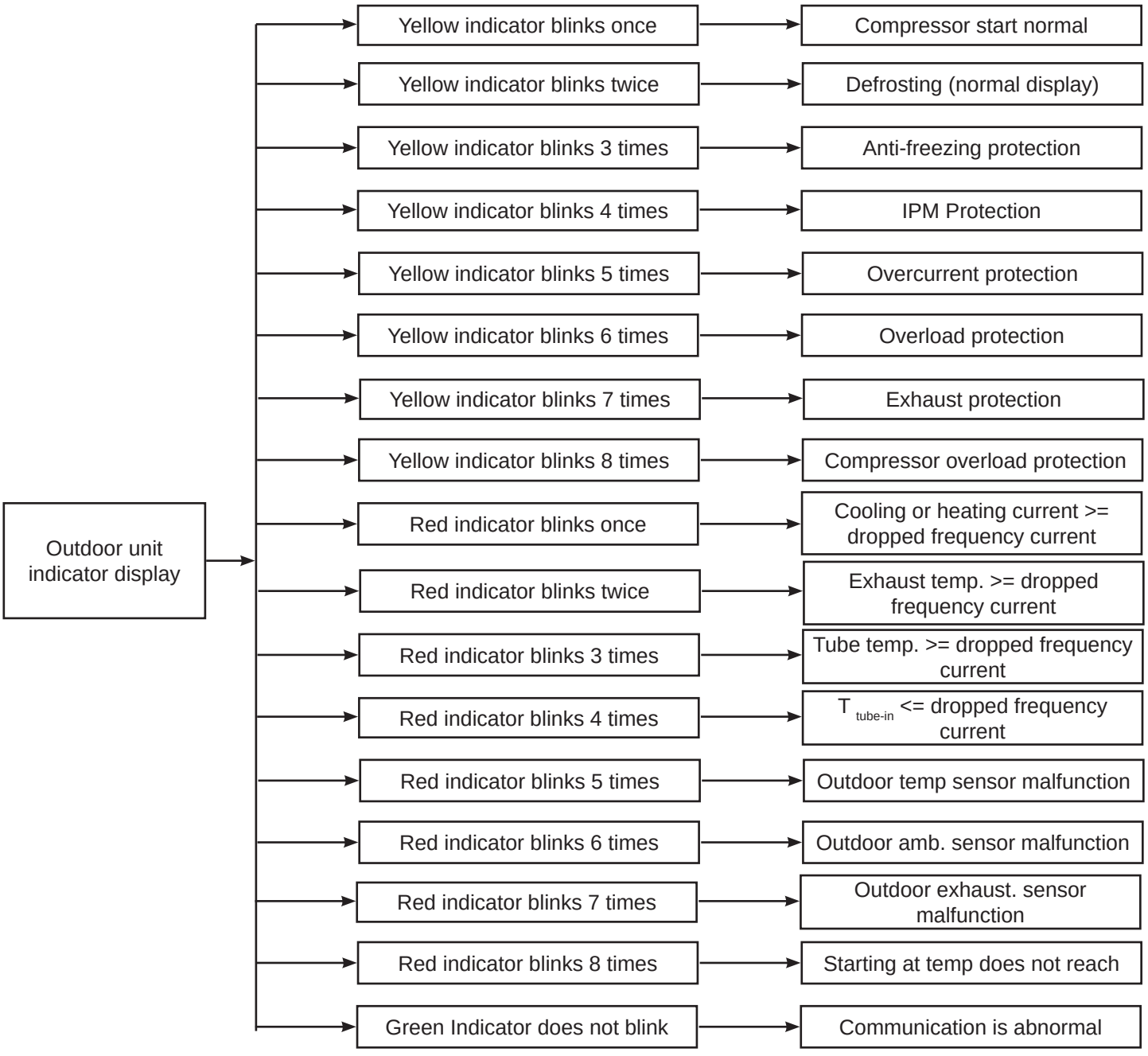
Troubleshooting

Miscellaneous Malfunctions, cont.



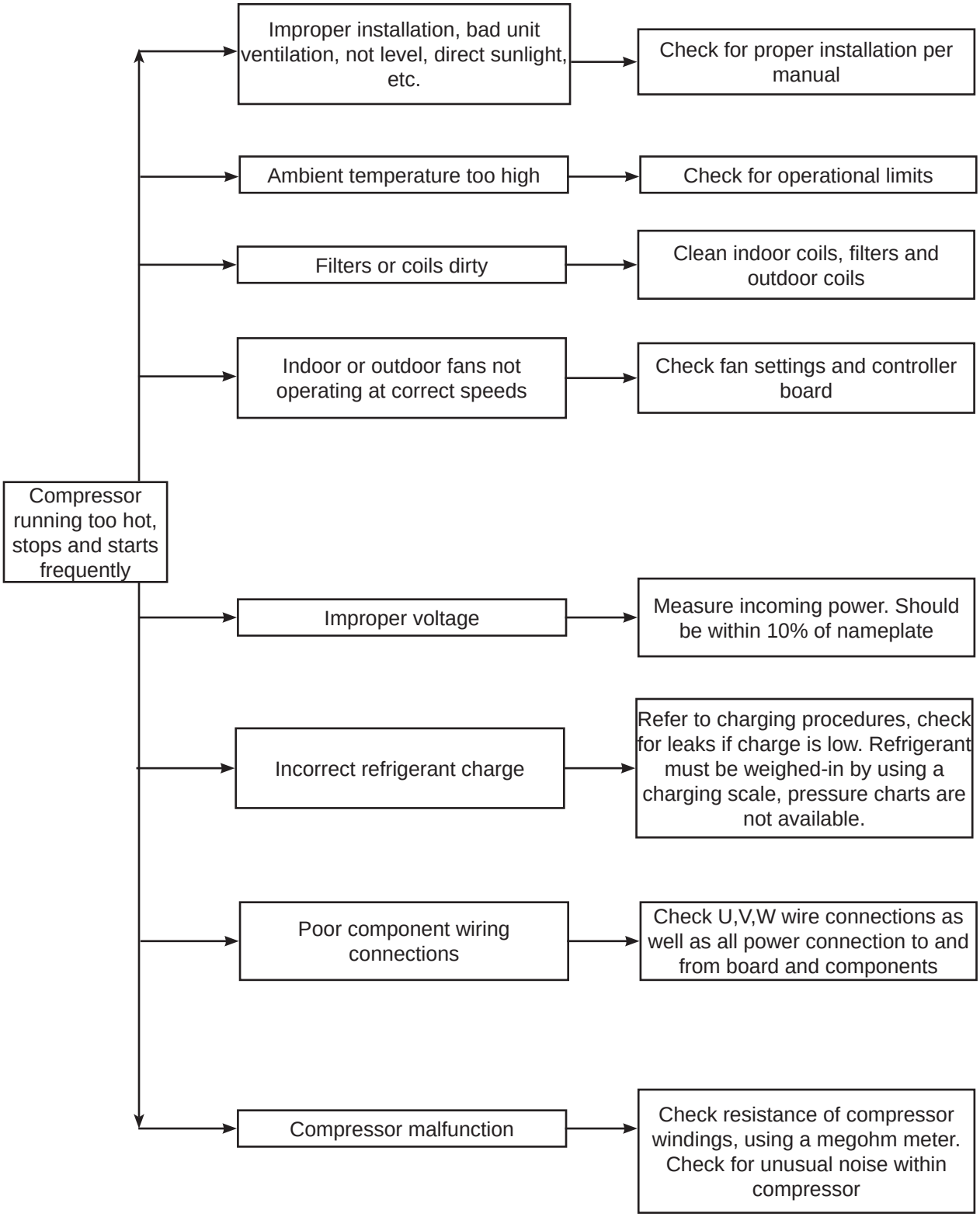
Troubleshooting

Miscellaneous Malfunctions, cont.

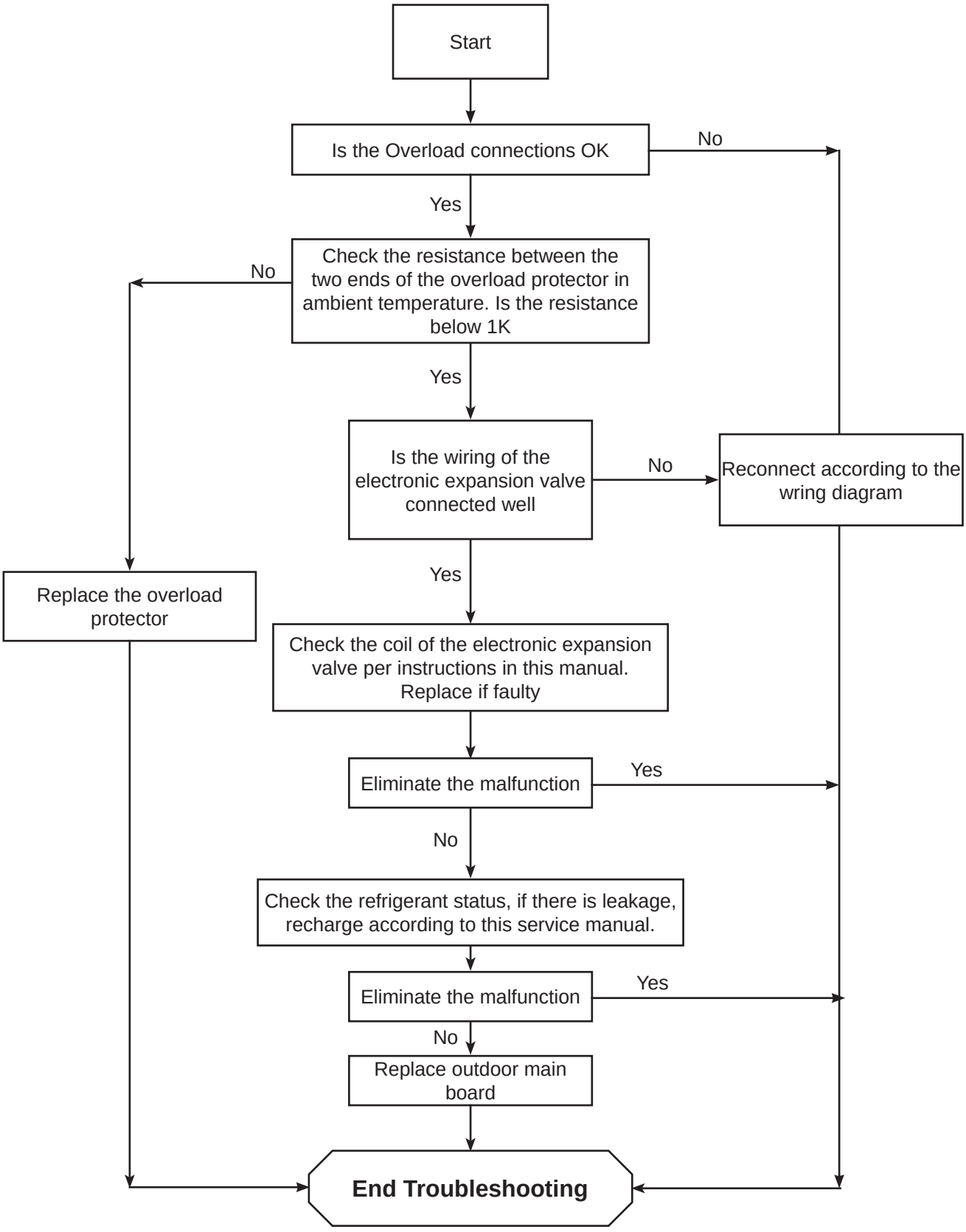


Troubleshooting

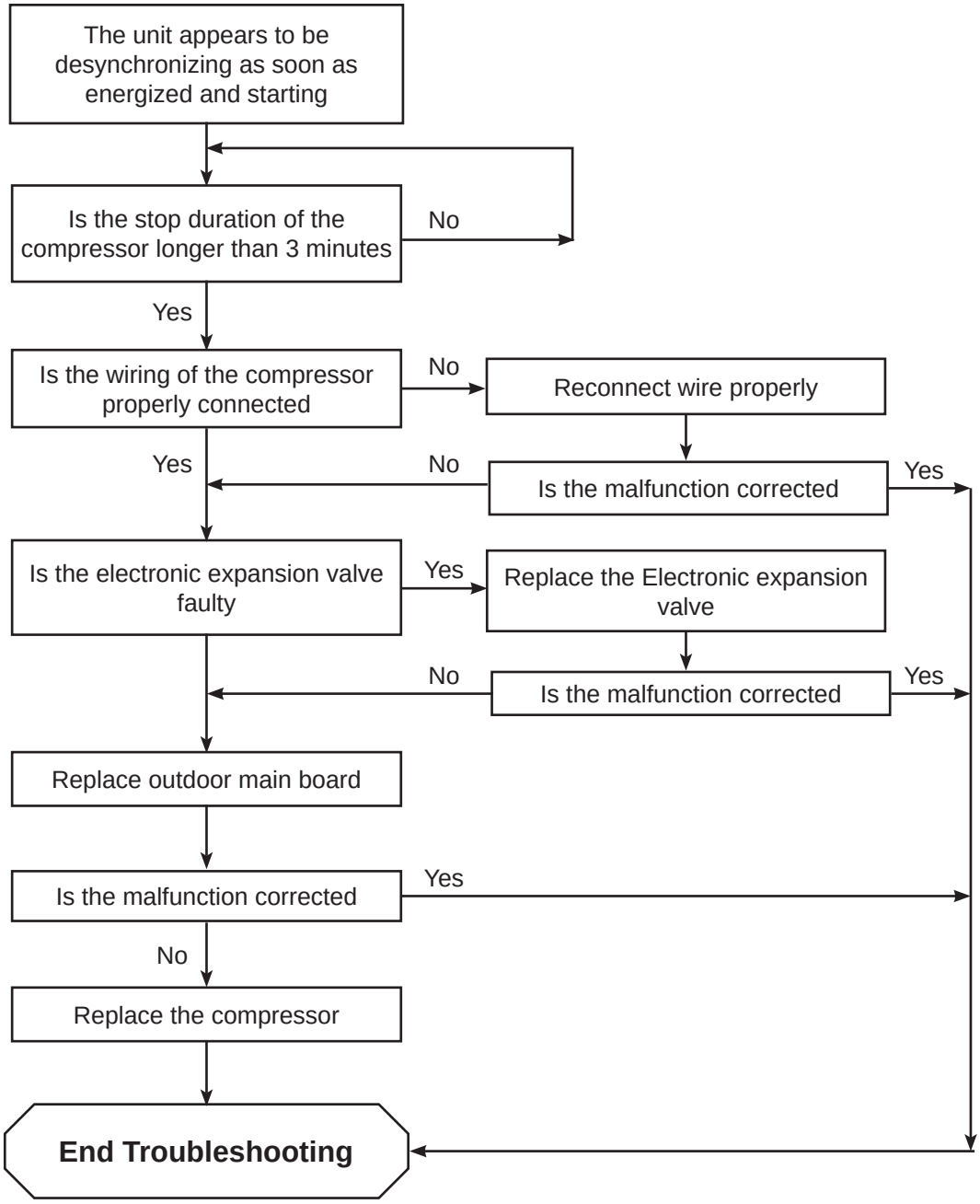
Compressor Running Hot



Compressor Overload, Discharge protection malfunction



Compressor Desynchronizing Malfunction

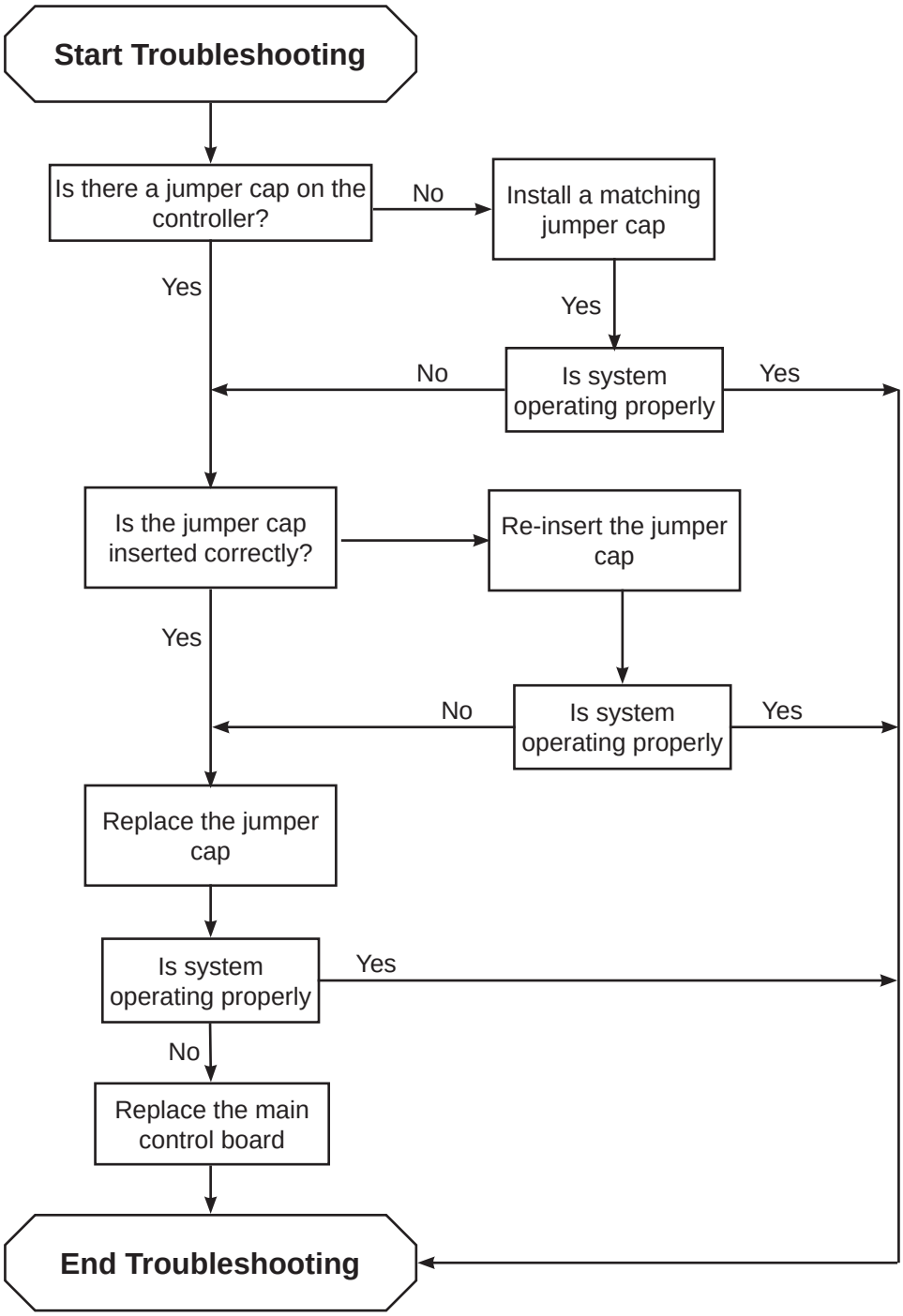


C5 Error Code

C5

Jumper Cap Malfunction
Status:
Wireless remote will not send command to indoor unit.

1. No jumper cap inserted on board
2. Jumper cap not fully seated
3. Jumper cap damaged
4. Bad control board



Error Code Diagnostics

EE, EU, FH, E2 Error Codes

	Fault & Status	Possible Causes
EE 	*EEProm Malfunction* **Status:** During cooling & dehumidifying, indoor unit operates while other functions stop; During heating operation, complete unit stops	1. Faulty outdoor control board, replace AP1
EU 	*Decrease in Frequency due to over heating of Module* **Status:** All units operate with decrease in capacity	1. After the unit is off for 20 minutes, check for sufficient thermal grease on IPM module of the outdoor control board and that is seated tightly. 2. Faulty control board, replace
FH 	*Decrease frequency due to anti-freezing* **Status:** All units operate with decrease in capacity	1. Poor air return in indoor unit 2. Fan speed too slow
E2 	*Antifreeze Protection* **Status:** Cooling operation, compressor stops while indoor fans runs. Heating operation, complete unit stops	1. Poor air return in indoor unit 2. Fan speed abnormal 3. Indoor coil dirty

E1 Error Codes

Compressor High Pressure Protection

E1

Fault & Status

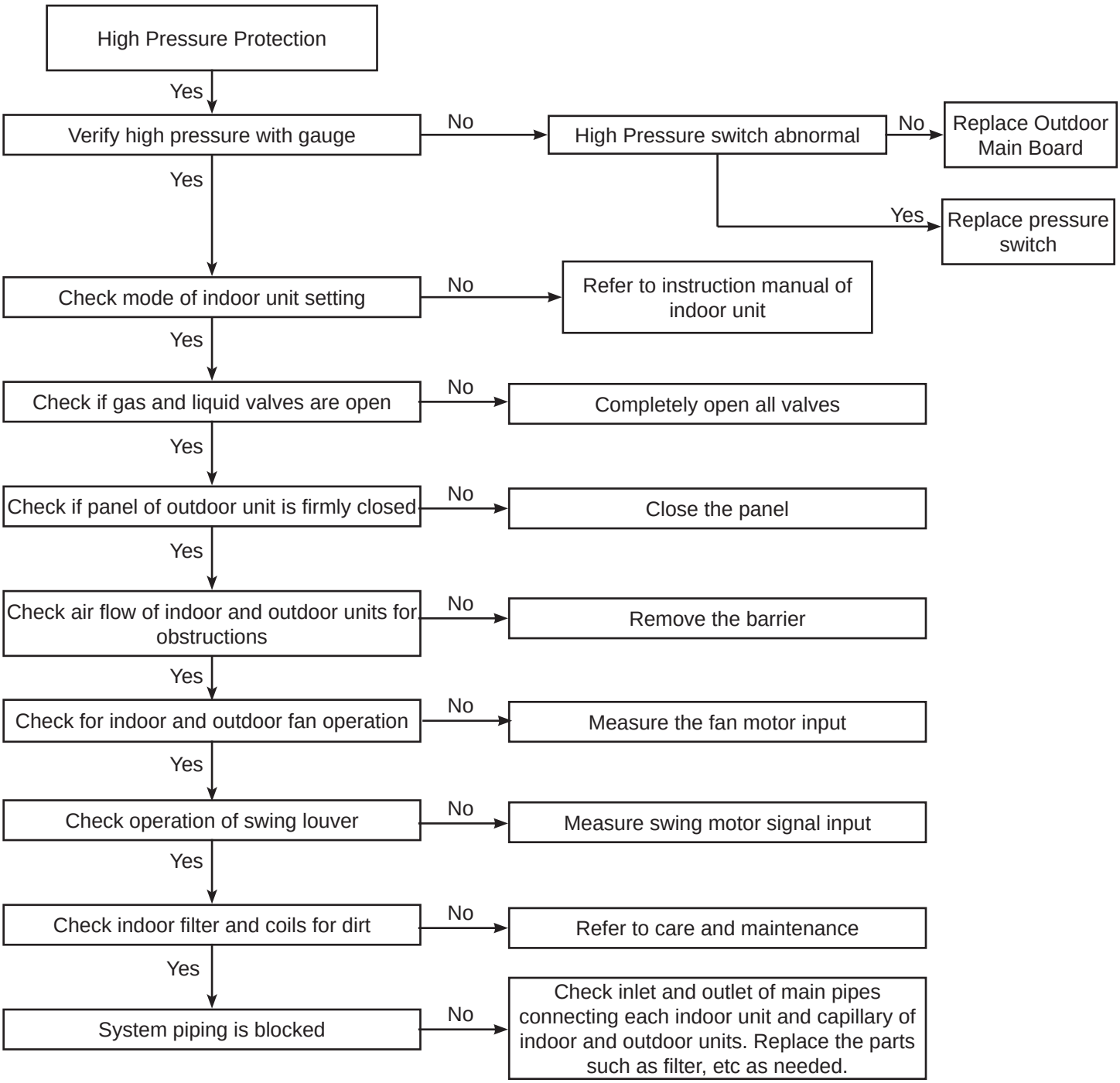
High Pressure Protection of System

Status:

During cooling & dehumidifying, indoor unit operates while other functions stop; During heating operation, complete unit stops

Possible Causes

1. Refrigerant overcharge
2. Dirty outdoor coil
3. Blockage of airflow
4. Outdoor ambient too high



E3 Error Codes

Compressor Low Pressure Protection

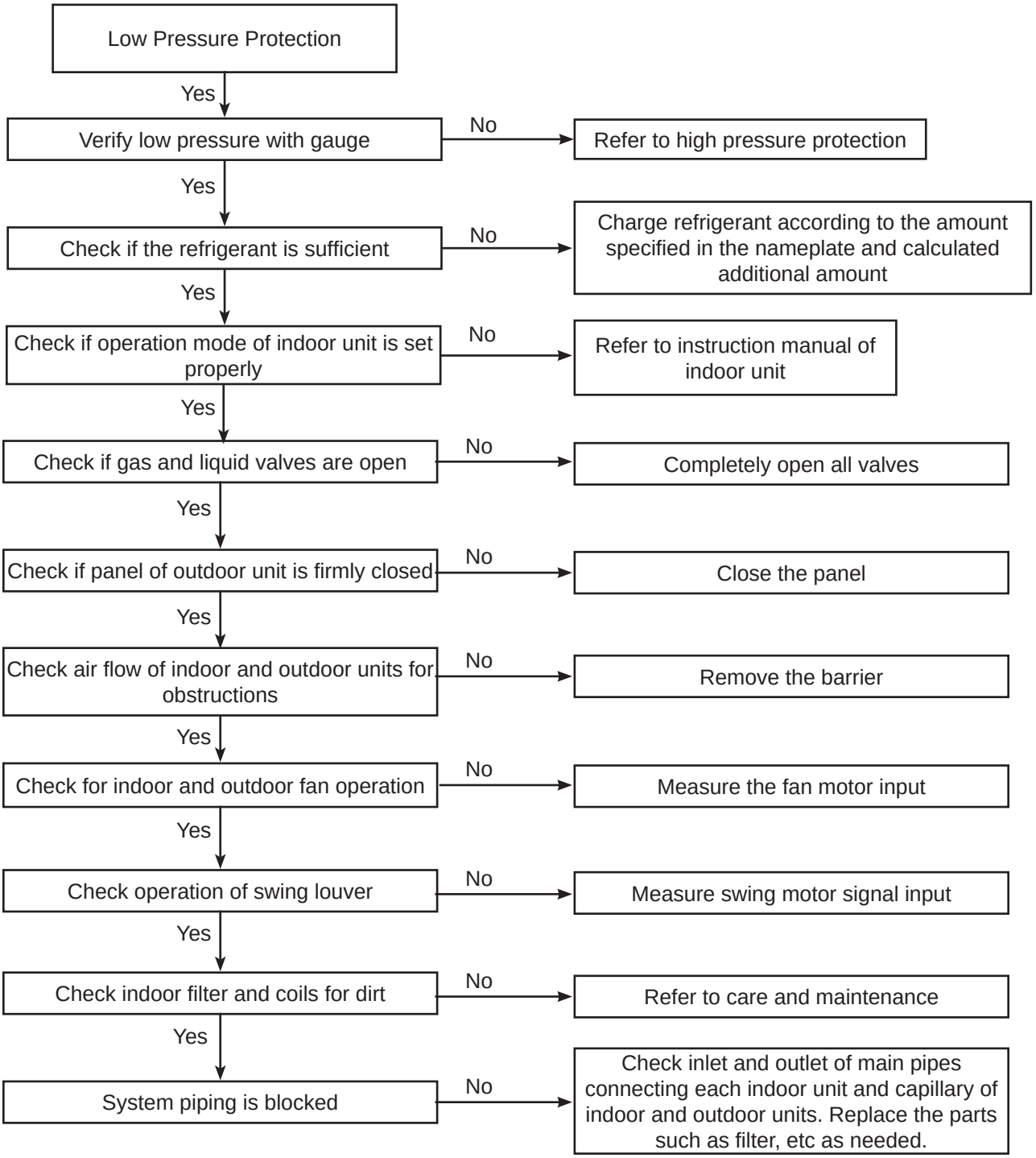
E3

Fault & Status

Low Pressure Protection
Status:
Cooling operation, compressor stops while indoor fans runs. Heating operation, complete unit stops

Possible Causes

1. Low refrigerant charge
2. Improper indoor mode setting
3. Improper fan operation
4. Refrigerant valve not fully opened



E4 Error Code

High Discharge Temperature Protection of Compressor.

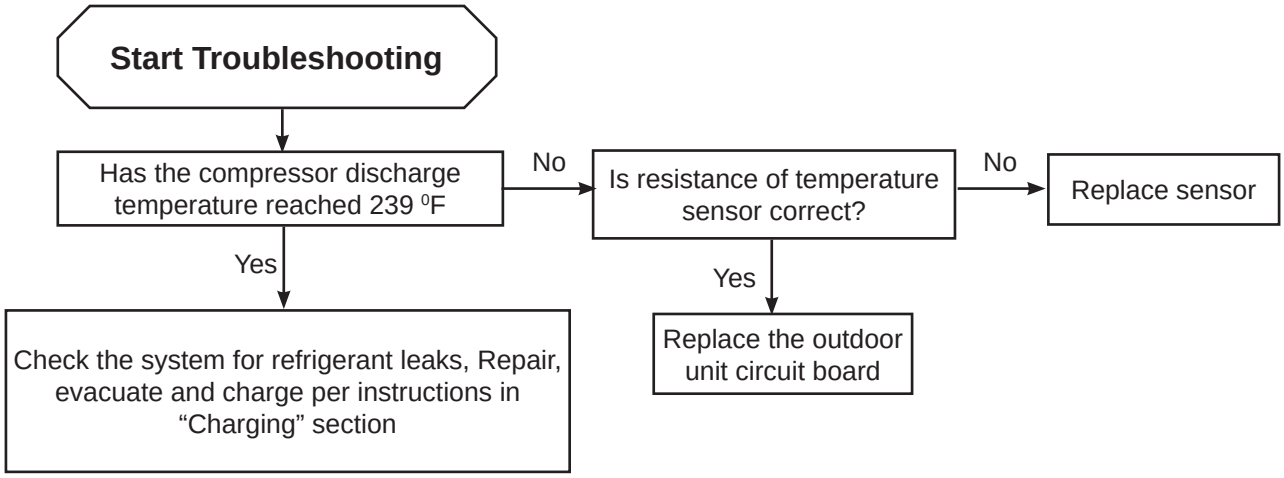
E4

High Discharge Temperature Protection of Compressor.

Status:

Cooling operation, compressor stops while indoor fans runs. Heating operation, complete unit stops

1. Faulty outdoor temperature sensor
2. Refrigerant leak
3. Poor airflow of outdoor unit
4. Follow Troubleshooting procedure



Error Code Diagnostics

E5 Error Code
Overcurrent Protection

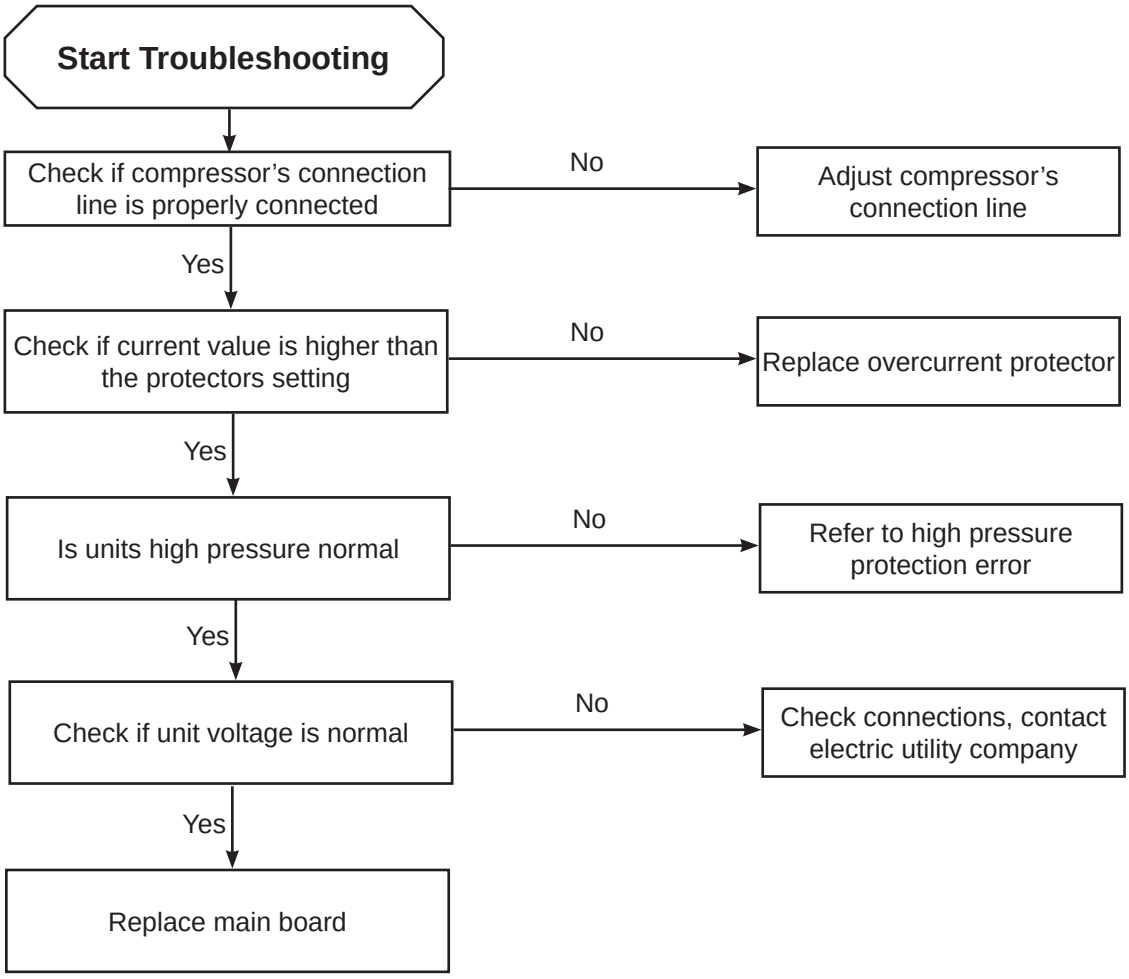
E5

Fault & Status

Overcurrent Protection
Status:
During cooling & dehumidifying, indoor unit operates while other functions stop; During heating operation, complete unit stops

Possible Causes

1. Supply voltage is unstable
2. Supply voltage is too low
3. Coils are dirty
4. Improper refrigerant charge

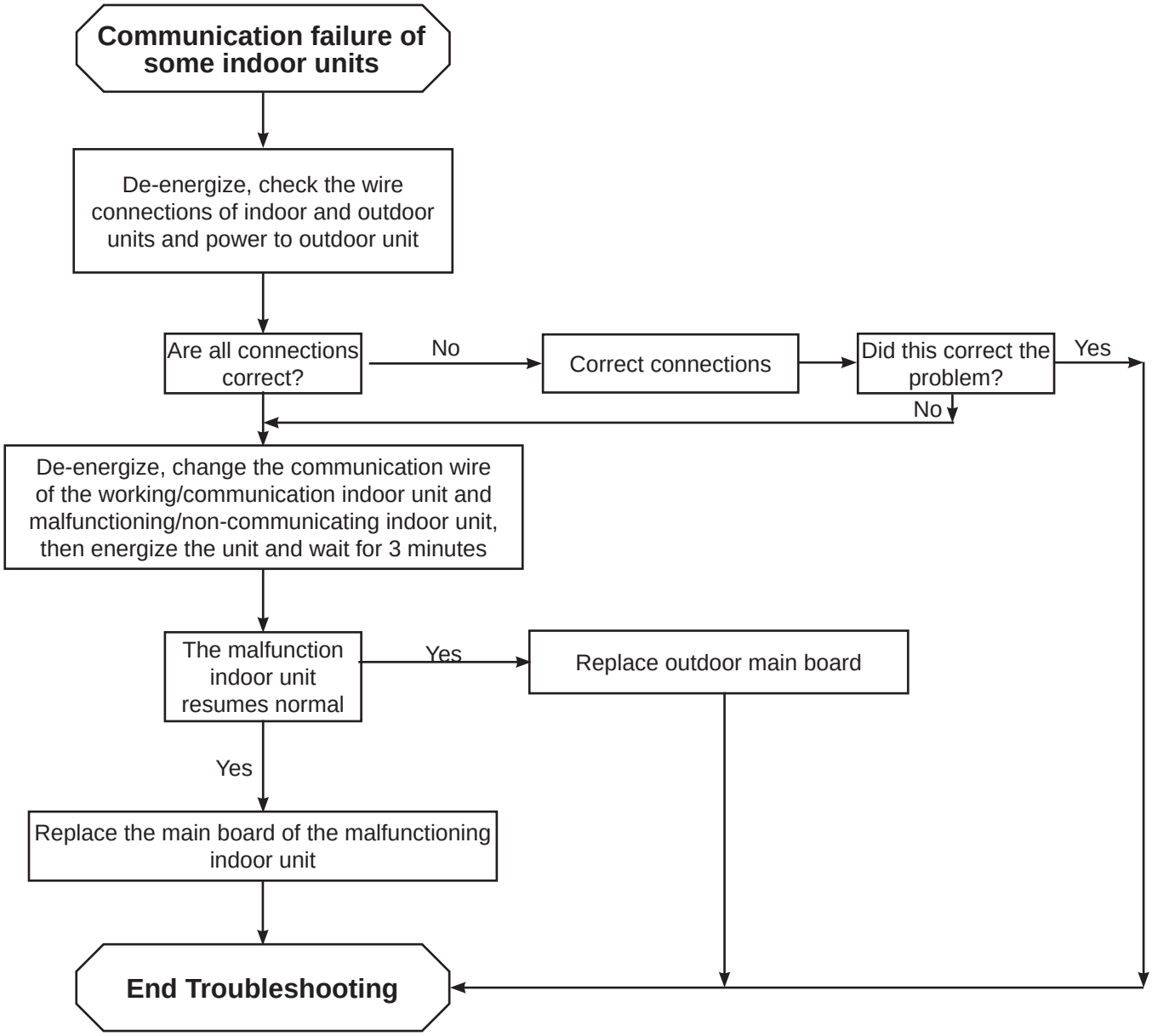


E6 Error Code
Communication Failure of Some Indoor Units

E6

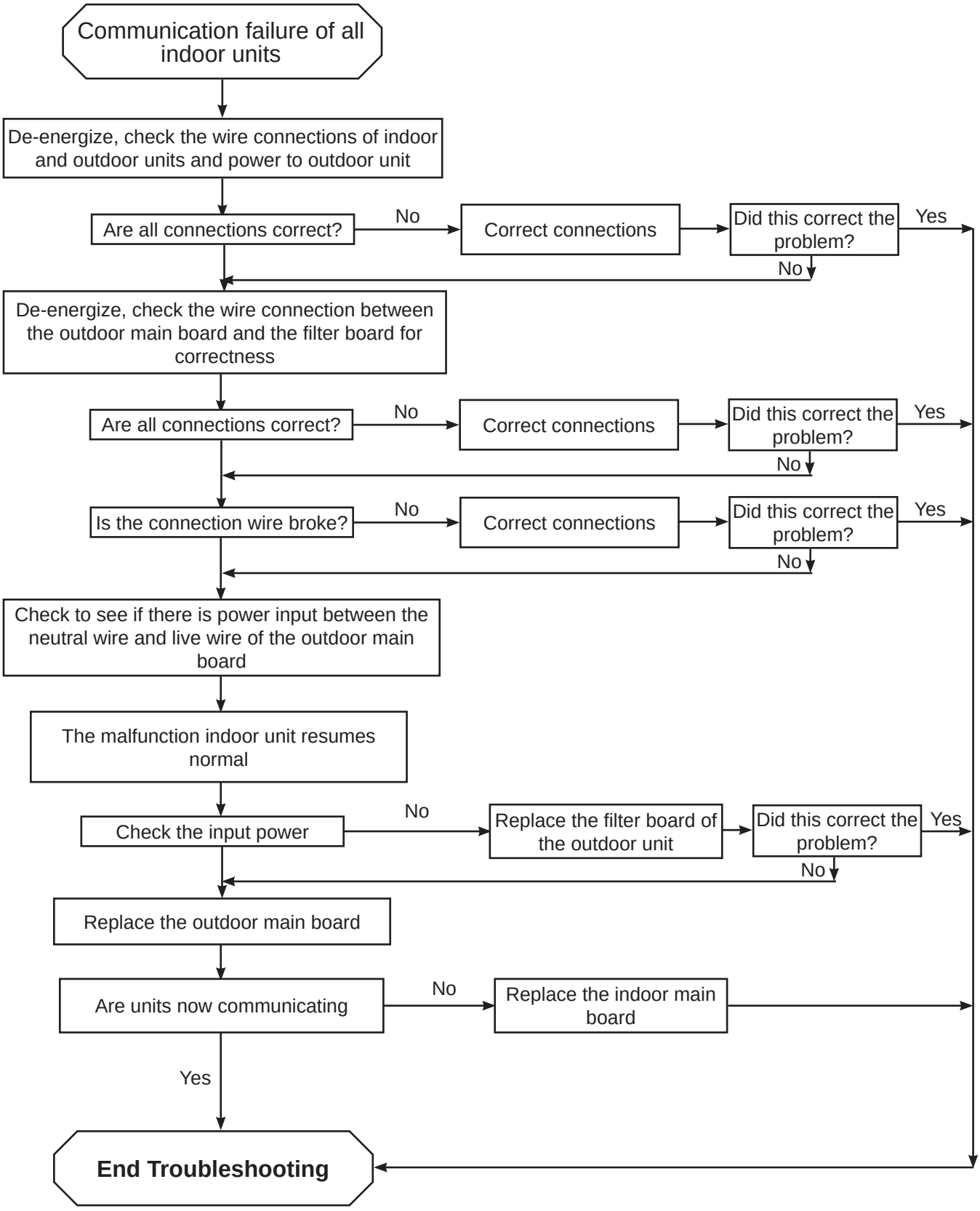
Communication Failure
Status:
Cooling operation, compressor stops while indoor fans runs. Heating operation, complete unit stops

1. Improper voltages
2. Mis-matched indoor and outdoor units
3. Improper wiring between indoor and outdoor units



E6 Error Code, continued

Communication Failure of All Indoor Units



Error Code Diagnostics

E8 Error Code

Overload System Protection Problem

E8

Overload System Protection Problem

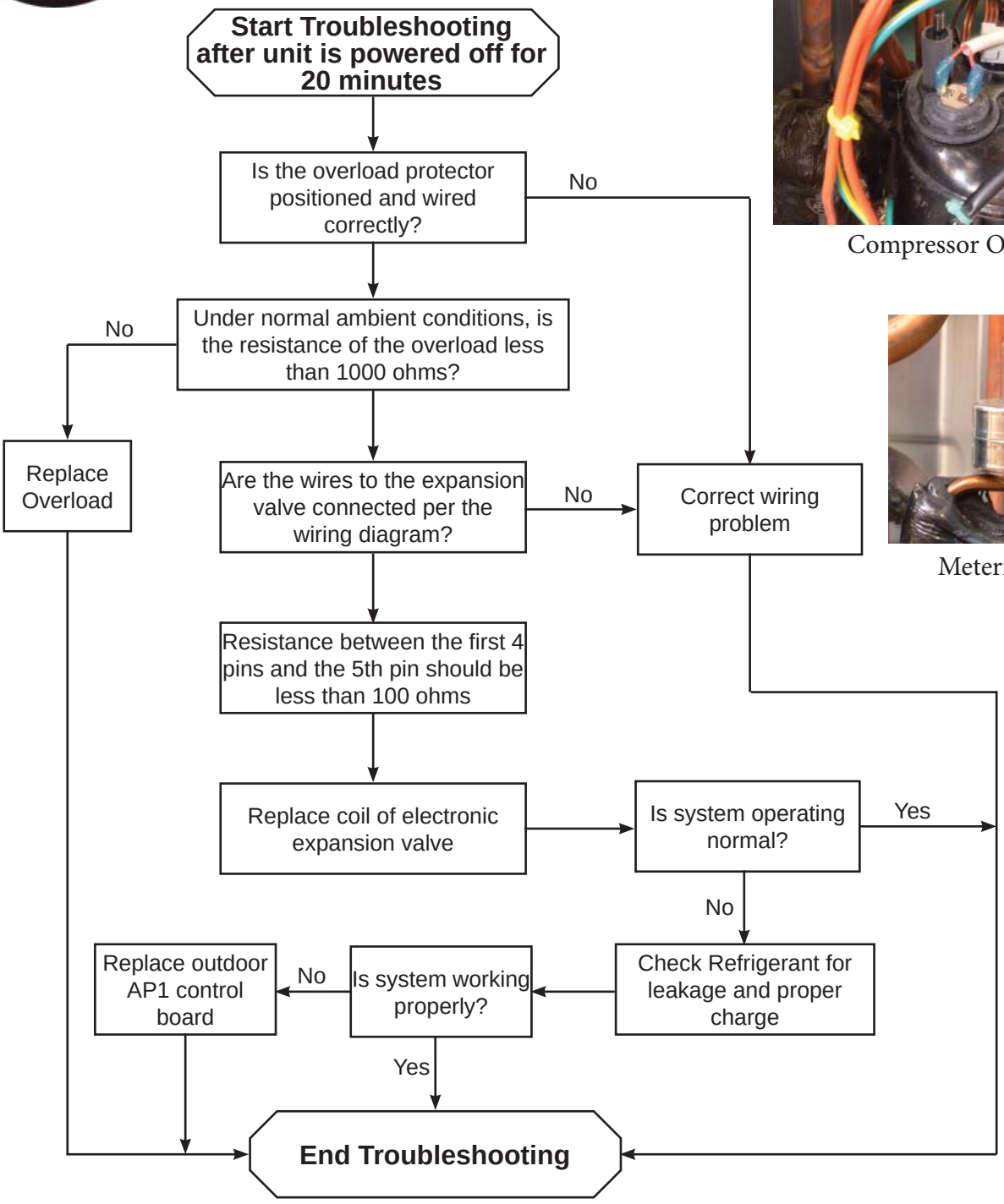
Status:

Cooling operation, compressor stops while indoor fans runs. Heating operation, complete unit stops

1. Incorrect refrigerant charge
2. Metering device problem
3. Compressor failure

Compressor Overload

Metering Device



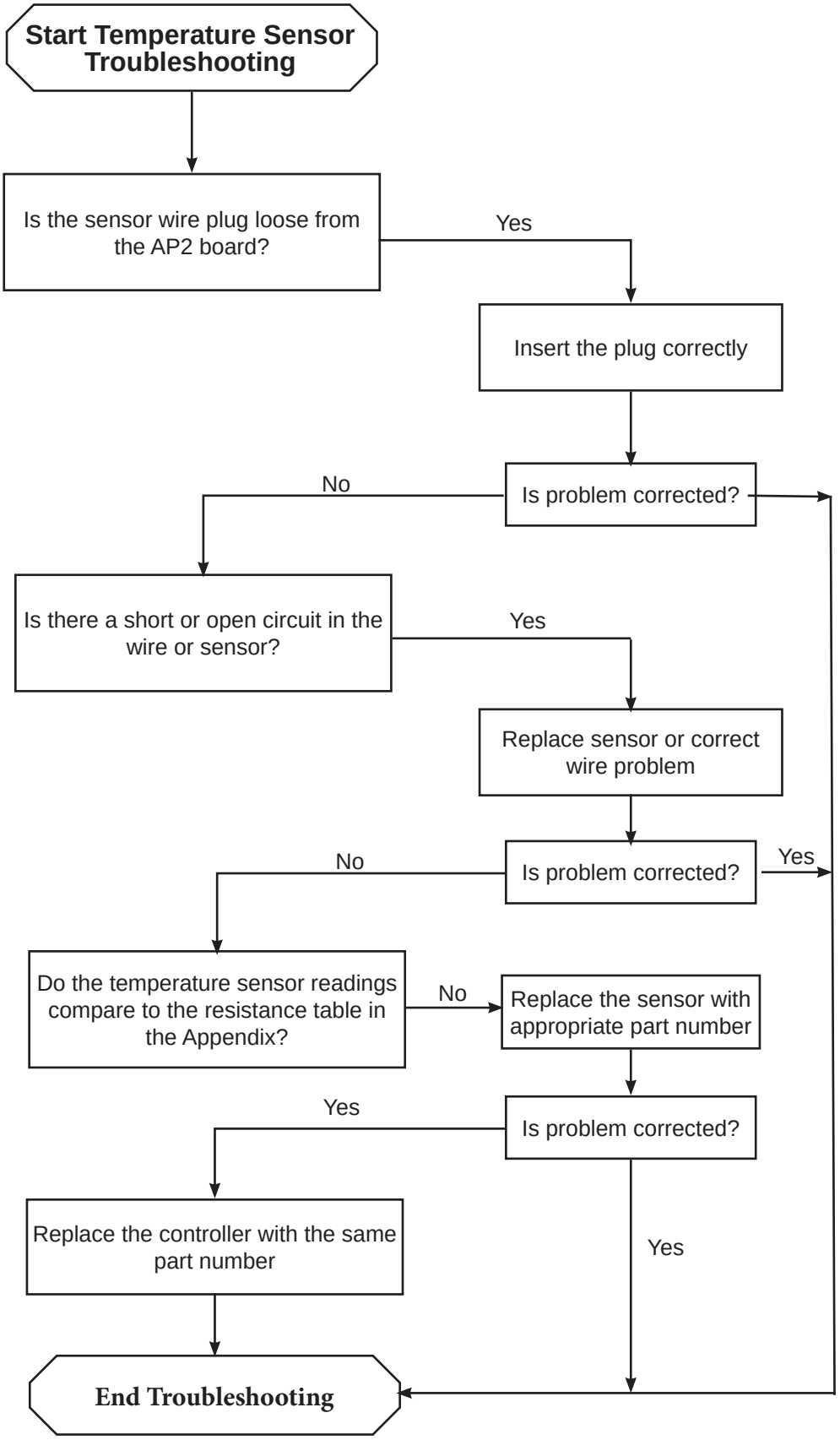
Error Code Diagnostics

F1 - F5 Temperature Sensor Codes

See troubleshooting chart next page

	Fault & Status	Possible Causes
F1 	*Indoor ambient temperature sensor is open or short circuited.* **Status:** During cooling & dehumidifying, indoor unit operates while other functions stop; During heating operation, complete unit stops	1. Loose or bad contact of indoor temperature sensor 2. Sensor wire leads not properly connected 3. Faulty sensor, check readings with charts 4. Main circuit board defective
F2 	*Indoor evaporator temperature sensor is open or short circuited.* **Status:** After reaching set-point, all components stop operation, cooling and heating modes	1. Loose or bad contact of indoor temperature sensor 2. Sensor wire leads not properly connected 3. Faulty sensor, check readings with charts 4. Main circuit board defective
F3 	*Outdoor ambient temperature sensor is open or short circuited.* **Status:** Cooling operation, compressor stops while indoor fans runs. Heating operation, complete unit stops	1. Loose or bad contact of outdoor temperature sensor 2. Sensor wire leads not properly connected 3. Faulty sensor, check readings with charts 4. Main circuit board defective
F4 	*Outdoor Mid-Coil condenser temperature sensor is open or short circuited.* **Status:** Cooling operation, compressor stops while indoor fans runs. Heating operation, complete unit stops	1. Loose or bad contact of outdoor temperature sensor 2. Sensor wire leads not properly connected 3. Faulty sensor, check readings with charts 4. Main circuit board defective
F5 	*Outdoor discharge temperature sensor is open or short circuited.* **Status:** Cooling operation, compressor stops after 3 minutes while indoor fans runs. Heating operation, complete unit stops after operating for 3 minutes	1. Loose or bad contact of outdoor temperature sensor, head of sensor should be inserted into the copper tubing 2. Sensor wire leads not properly connected 3. Faulty sensor, check readings with charts 4. Main circuit board defective

Temperature Sensor Troubleshooting



Error Code Diagnostics

F6, F8, F9 Temperature Sensor Codes

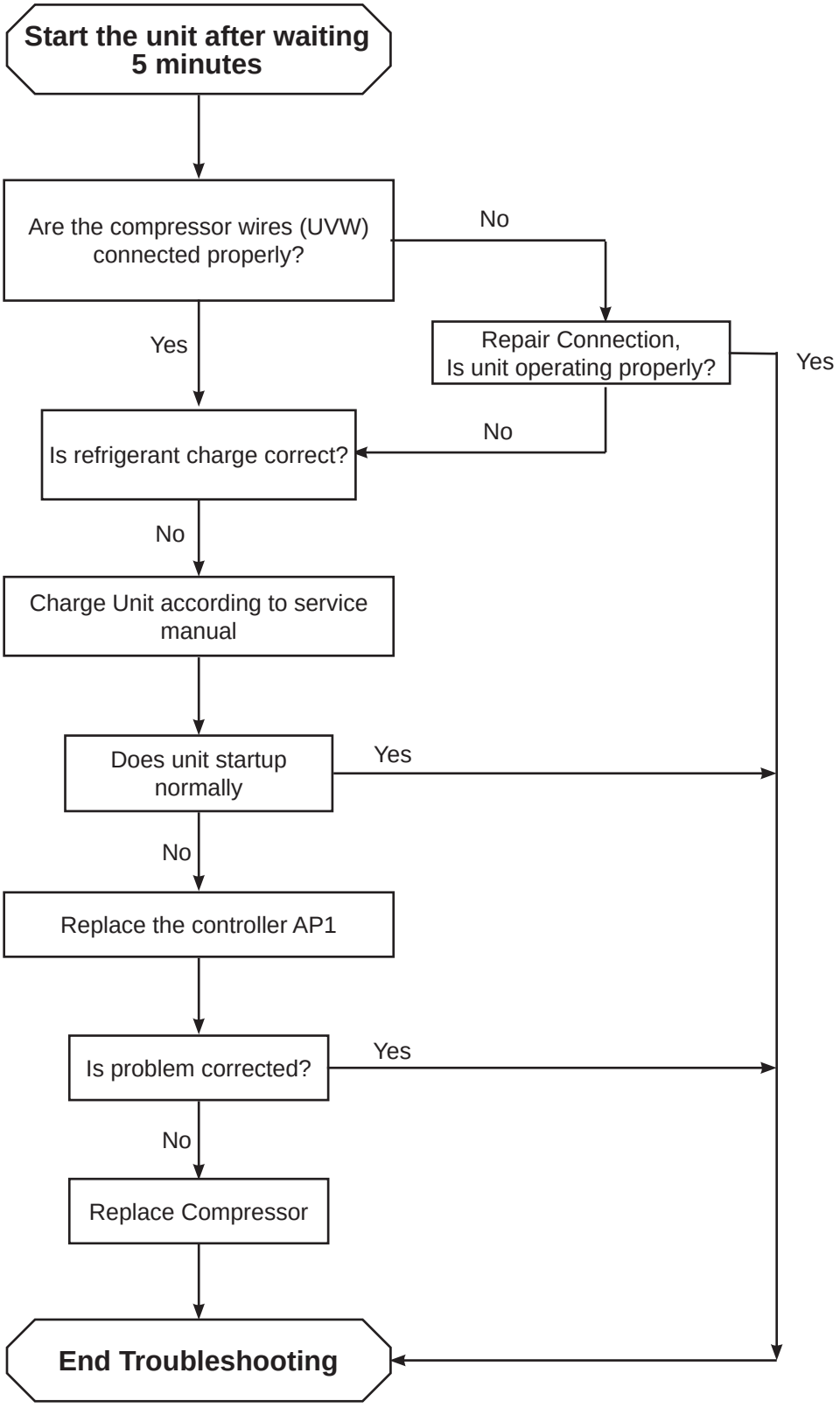
See troubleshooting chart preceding page

	Fault & Status	Possible Causes
F6 	*Decrease frequency due to overload.* **Status:** All systems operate normal with decrease in capacity	1. Refer to “E8” troubleshooting procedures
F8 	*Decrease frequency due to overcurrent.* **Status:** All systems operate normal with decrease in capacity	1. Input voltage too low. 2. System pressure is too high
F9 	*Decrease frequency due to high discharge air.* **Status:** All systems operate normal with decrease in capacity	1. Cooling load is too great 2. Outdoor ambient too high 3. Refrigerant undercharge 4. Electronic expansion valve fault

Start-up Failure Troubleshooting

Lc - Start-up Failure

Compressor Wires



HC

PFC (Power Factor Correction) Protection

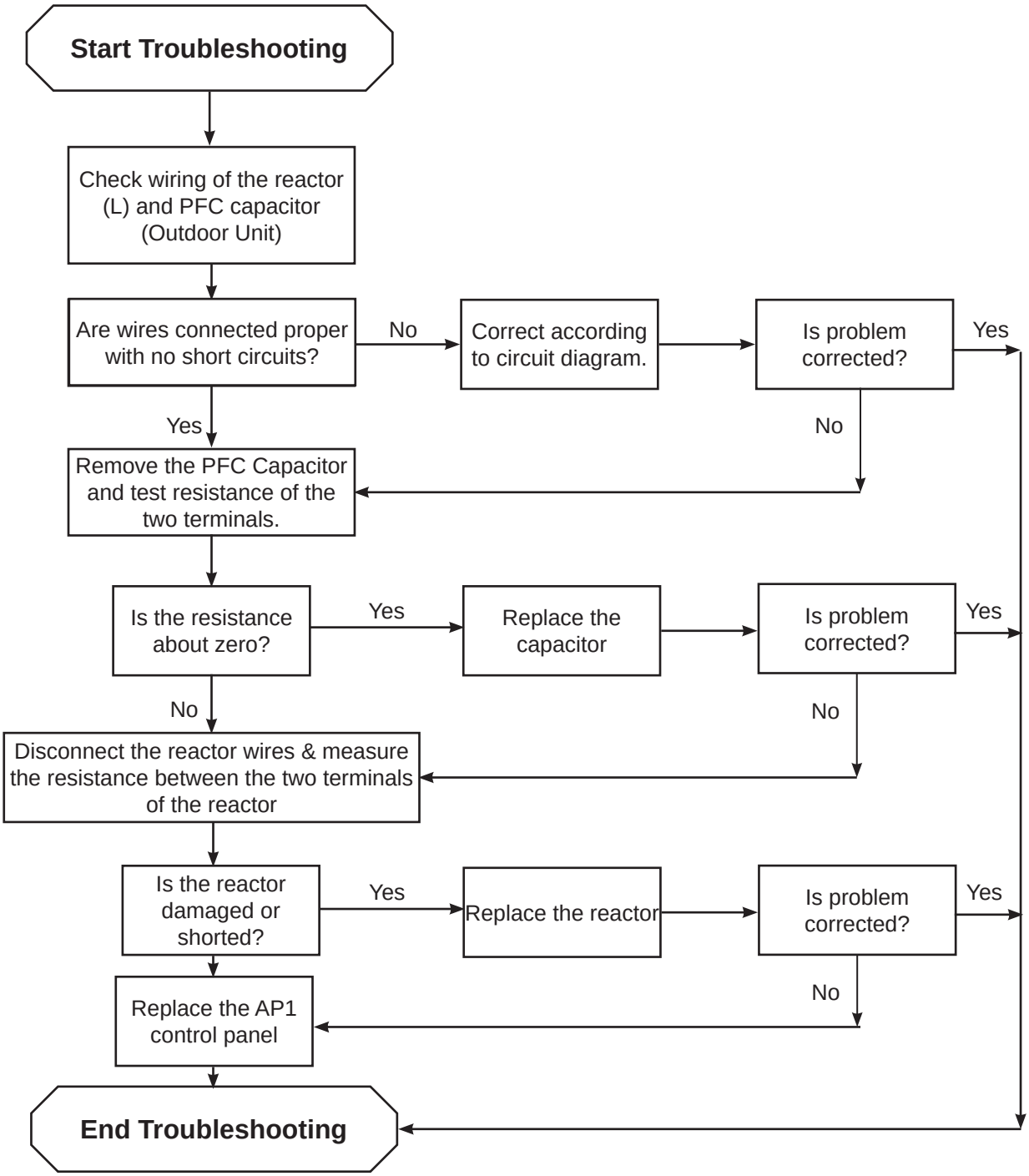
HC

PFC (Power Factor Correction) Protection

Status:

During cooling & dehumidifying, indoor unit operates while other functions stop; During heating operation, complete unit stops

1. Check for damage to the reactor and PFC capacitor of the outdoor unit
2. Refer to troubleshooting procedure below



Error Code Diagnostics

H0 - H3 Error Codes

	Fault & Status	Possible Causes
H0 	*Decrease frequency due to overload.* **Status:** All systems operate normal with decrease in capacity	1. Refer to “E8” troubleshooting procedures
H1 	*Defrosting* **Status:** Defrosting will occur in heating mode. Compressor will operate while indoor fan stops.	Normal function
H3 	*Overload Protection for Compressor* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. Wiring terminal OVC-COMP is loose. In normal state the resistance should be less than 1 ohm, 2. Refer to “E4” troubleshooting procedures.

H5 Error Code
IPM Protection

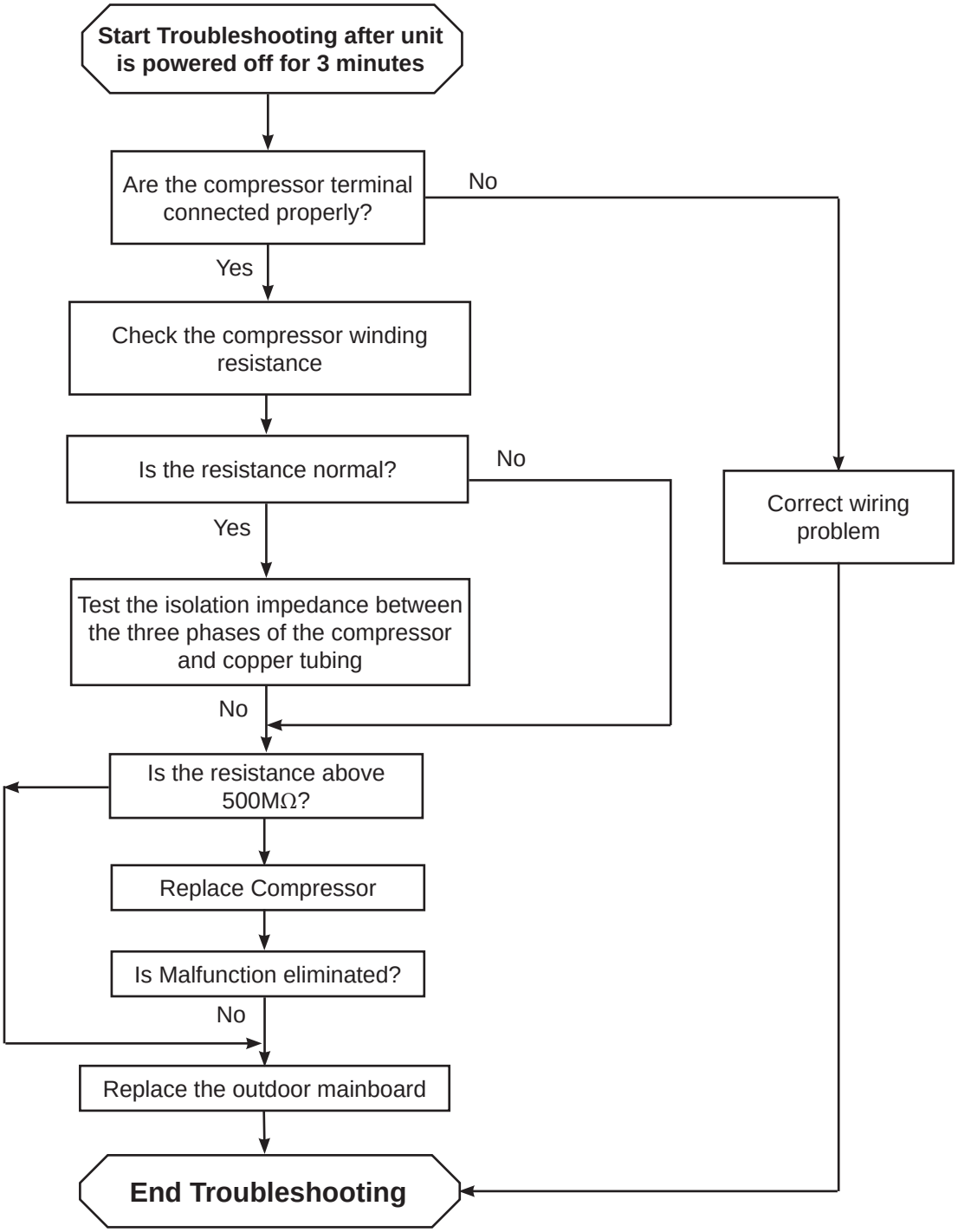
H5

Fault & Status

IPM Protection
Status:
During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.

Possible Causes

1. Dirty indoor and outdoor coils
2. Faulty indoor or outdoor fans
3. High system pressure
4. Over charge of refrigerant



Error Code Diagnostics

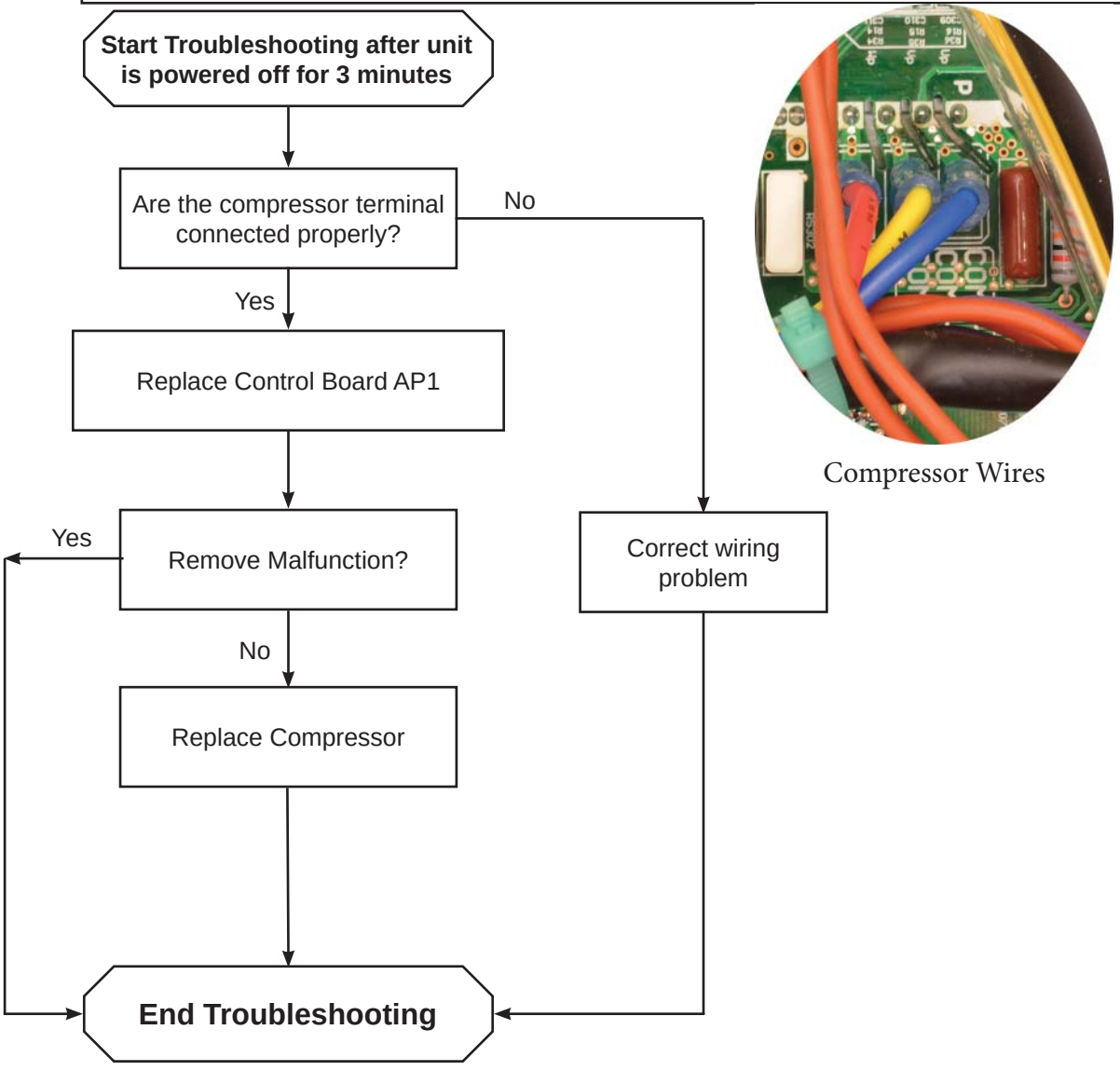
H7 Error Code, continued on next page

H7

Desynchronizing of compressor
Status:
During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.

1. Check the resistance of the compressor terminals and connections to the compressor
2. Check for overcharge of refrigerant
3. Check for correct voltage
4. Check for dirty coils and filters

Troubleshooting Procedure for Synchronizing Fault after Unit is Started



Compressor Wires

H7 Error Code, continued

H7

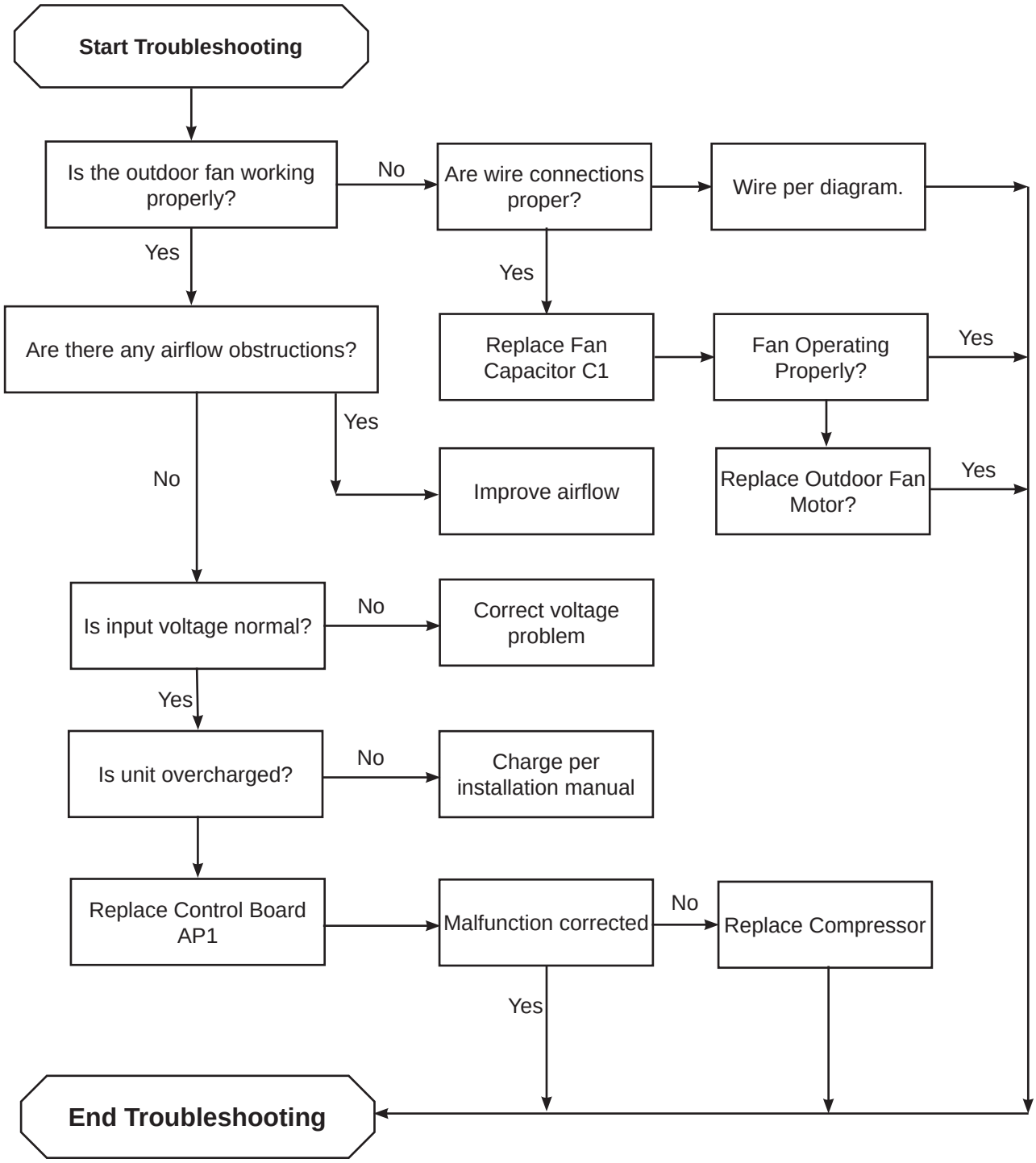
Desynchronizing of compressor

Status:

During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.

1. Check the resistance of the compressor terminals and connections to the compressor
2. Check for overcharge of refrigerant
3. Check for correct voltage

Troubleshooting Procedure for Synchronizing Fault During Operation



Error Code Diagnostics

U1, U3, U5, U7, U9 Error Codes

	Fault & Status	Possible Causes
U1 	*Compressor Phase Detection Error* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. Replace outdoor control panel AP1
U3 	*DC Bus-Bar Voltage Unstable* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. Supply voltage is unstable
U5 	*Circuit Board Malfunction on Outdoor Unit* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. Replace outdoor control panel AP1
U7 	*Reversing Valve Malfunction* **Status:** During heating mode, complete unit will stop	1. Supply voltage is too low 2. Wiring terminal on reversing valve is loose or broken 3. Replace reversing valve
U9 	*Zero crossing, malfunction of Outdoor Unit* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. Replace outdoor control panel AP1

Error Code Diagnostics

PH, PL, P5, P7, P8 Error Codes

	Fault & Status	Possible Causes
PH 	*High DC Bus-Bar Voltage* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. Measure the voltage on “L” & “N” on line voltage, if it is higher then 265vac, correct high voltage. 2. If AC voltage is normal, measure the voltage on the electrolytic capacitor on control panel AP1, if it is normal replace the AP1 board.
PL 	*Low DC Bus-Bar Voltage* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. Measure the voltage on “L” & “N” on line voltage, if it is lower then 200vac, correct incoming voltage. 2. If AC voltage is normal, measure the voltage on the electrolytic capacitor on control panel AP1, if it is normal replace the AP1 board.
P5 	*Overcurrent Protection of Compressor Phase Current* **Status:** During heating mode, complete unit will stop	1. Refer to “H7” troubleshooting
P7 	*Module Temperature Sensor Circuit Failure* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. Replace outdoor control panel AP1
P8 	*Module High Temperature Protection* **Status:** During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.	1. After unit is de-energized for 20 minutes, check for proper thermal grease on IPM module of outdoor control panel AP1 and contact is good. If this is OK, replace AP1 control module of outdoor unit.

PU Error Code
Capacity Charging Malfunction

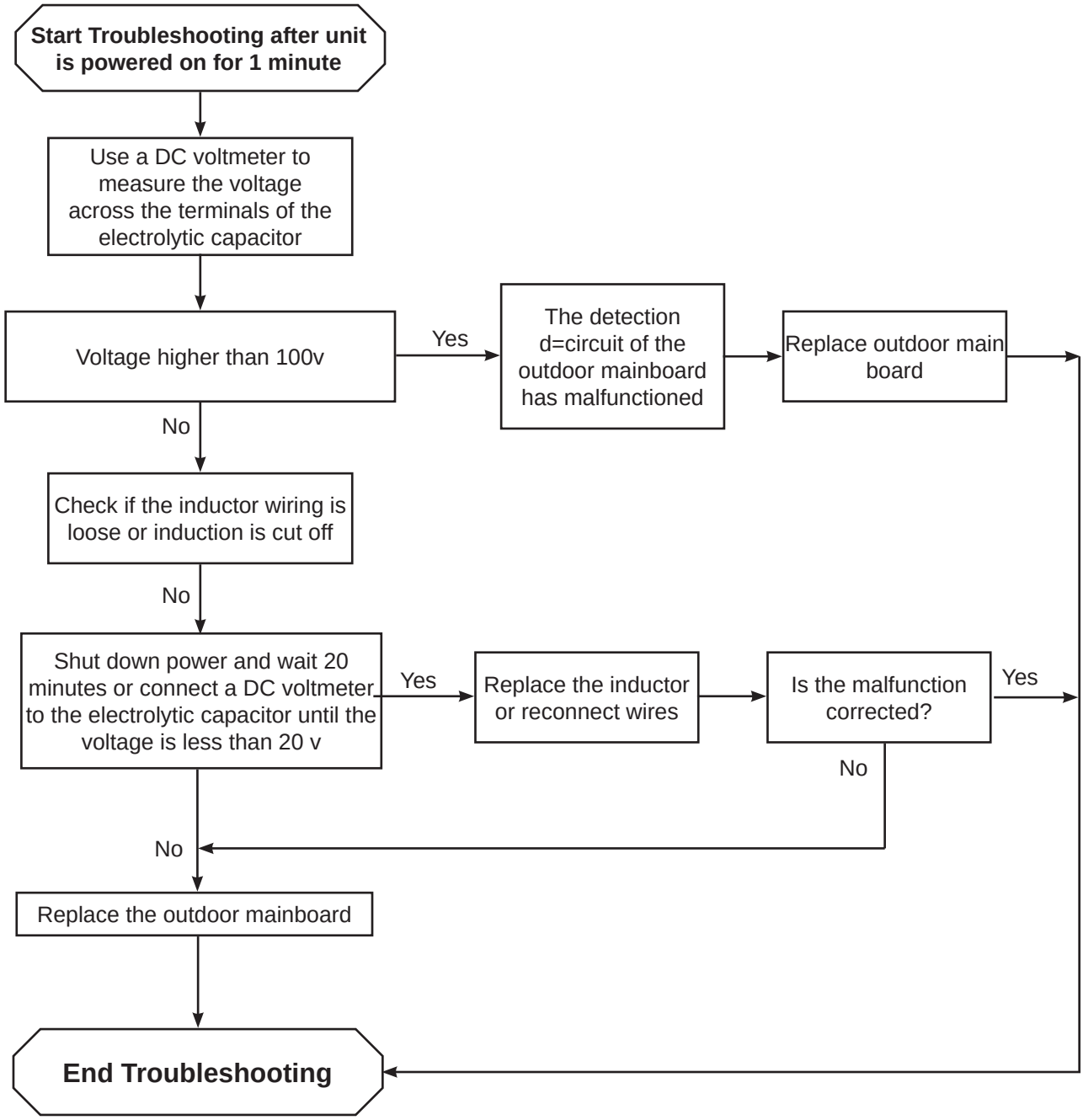
PU

Charging Malfunction of Capacitor

Status:

During cooling mode, compressor will stop, indoor fan will run. Heating mode all units stop.

1. Improper input voltage
2. Poor connection on reactor
3. Reactor damaged
4. Bad AP1 control board



Disassembly of EVO+ Indoor Unit
12,000 btuh Other models may vary slightly
Warning - Wait 10 minutes after power is disconnected before starting disassembly.

1. Before disassembly of indoor unit

Before disassembly of indoor unit

2. Remove filter

Step 1. Open the panel

Step 2. Loosen the clasps on the filter, push the filter inward, then pull upward, removing the filters.

3. Remove guide louver

Step 1. Remove screws near filter
Step 2. Remove screws under hinged cover

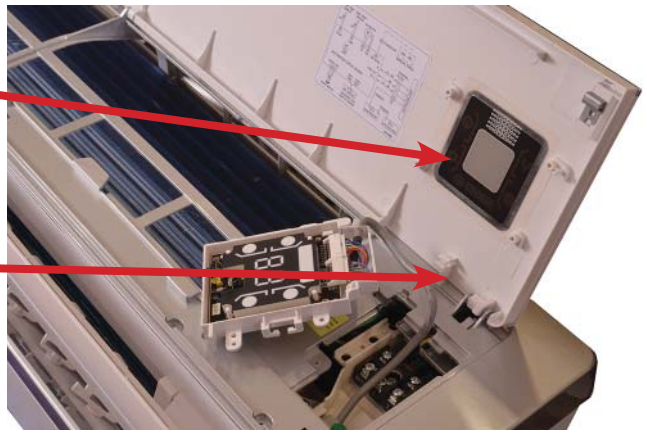
Disassembly of EVO+ Indoor Unit
12,000 btuh Other models may vary slightly
Warning - Wait 10 minutes after power is disconnected before starting disassembly.

4. Remove guide louver, continued

Small guide louver

Step 1. Remove the four srews holding the display. Carefully set to the side.

Step 2. Very carefully un-snap the cover and remove it.



5. Remove panel

Step 1. Carefully remove the cover by slightly rotating up and un-snap from the back.

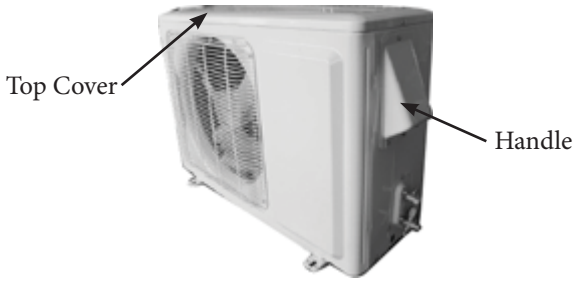
Disassembly of Outdoor Unit

9,000 & 12,000 btuh 120 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

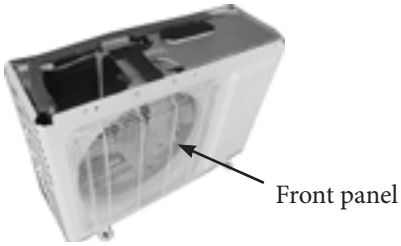
1. Remove top cover and handles

Remove screws holding handle, then remove screws holding top cover. Lift top cover off.



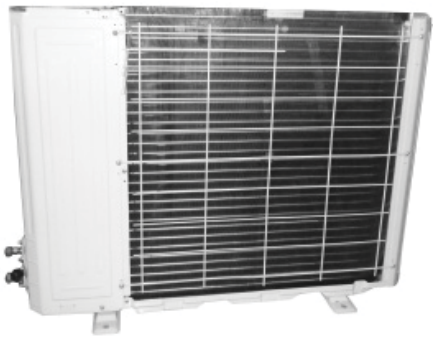
2. Remove front panel

Remove top screw holding the front panel,. then remove panel



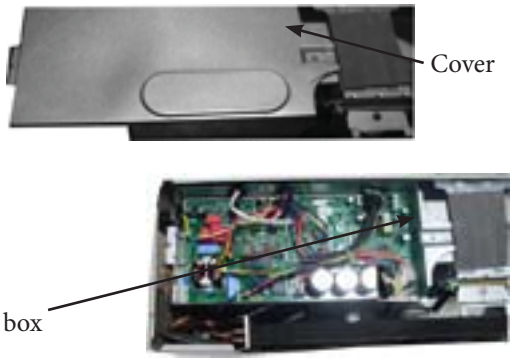
3. Remove front grille and right side panel

Remove the screws holding the front grille, then remove the grille. Remove the screws holding the right side plate from rear of condenser and valve support. Lift plate upwards to remove.



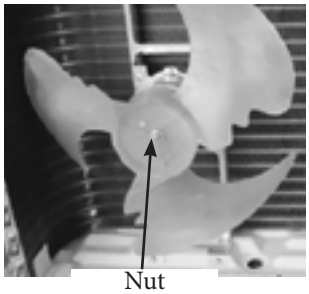
4. Remove electric box sub-assembly

Remove the screws holding the cover, then remove cover. Remove the screws holding the electric box, disconnect the compressor and fan motor wires. Lift the box upwards to remove it.



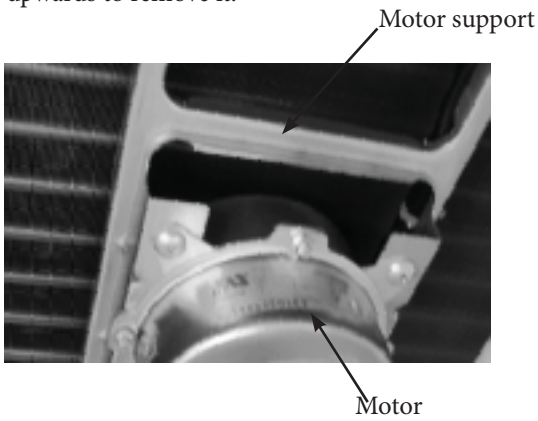
5. Remove axial fan blade

Loosen the nut to remove nut, washer and cushion. Remove the fan blade.



6. Remove motor and motor support

Remove the screws holding the motor, then remove the motor. Remove the screws holding the motor support, then lift motor support upwards to remove it.



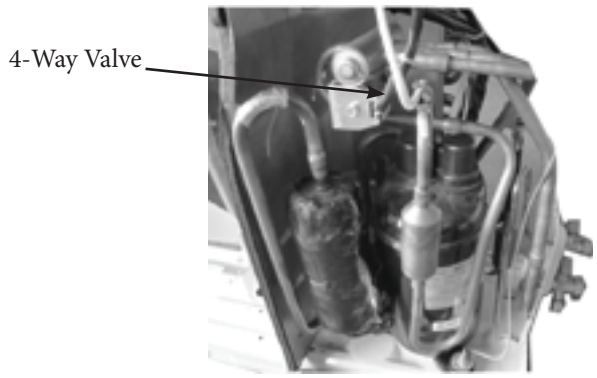
Disassembly of Outdoor Unit

9,000 & 12,000 btuh 120 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

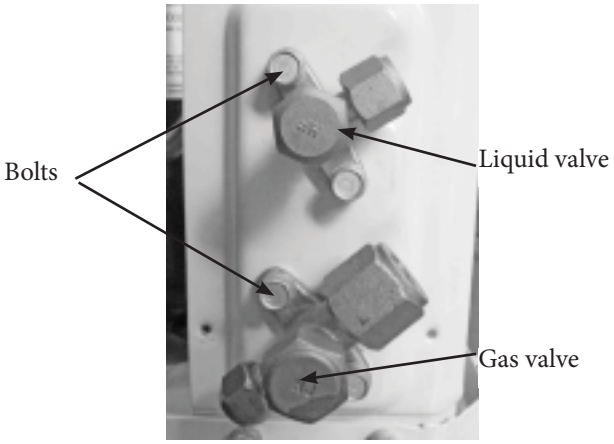
7. Remove 4-way valve assembly

Follow proper procedures to remove refrigerant. Unscrew the nut holding the coil and remove the coil from the valve. Unsolder the 4 joints holding the valve assy. with the compressor and tubing. Remove the 4-way valve. Use care not to damage valve, wires, etc.



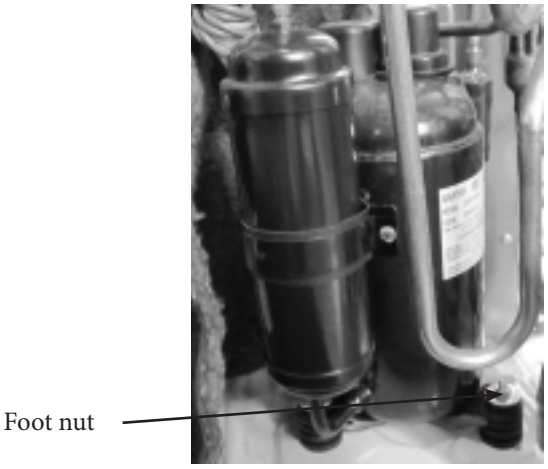
8. Remove gas valve and liquid valve

Remove the two bolts holding the gas valve, unsolder the joints holding the valve assy. Wrap the valve with a damp cloth to avoid damaging the valves. Remove the two bolts holding the liquid valve, unsolder the joints holding the valve assy.



9. Remove compressor

Loosen the front nuts of the compressor, (reclaim all refrigerant properly) unsolder the tubing joints, remove the wire connections, then remove the compressor.



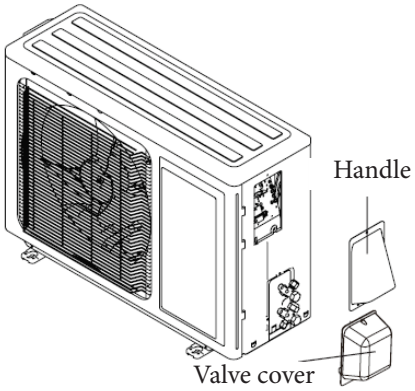
Disassembly of Outdoor Unit

9,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

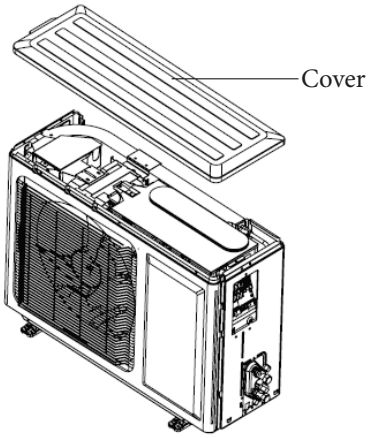
1. Remove electrical and valve covers

Remove screws holding handle and valve cover, then remove covers.



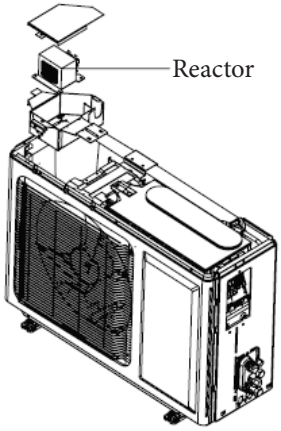
2. Remove top cover

Remove screws holding the top cover,. then remove cover



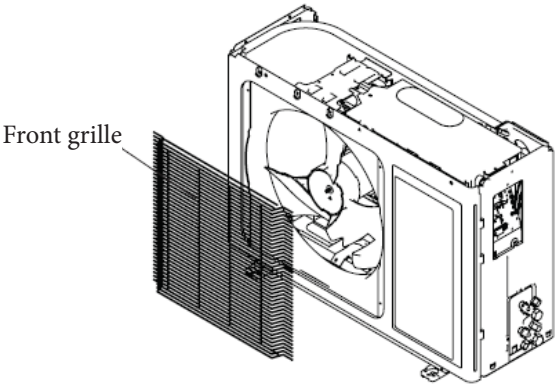
3. Remove reactor sub-assembly

Remove the screws holding the reactor sub-assembly, then lift the sub-assembly upward to remove. Remove screws holding reactor. then remove reactor.



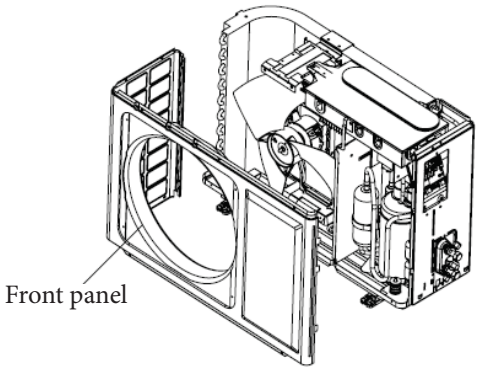
4. Remove front grille

Remove the screws between the front grille and front panel, then remove the grille.



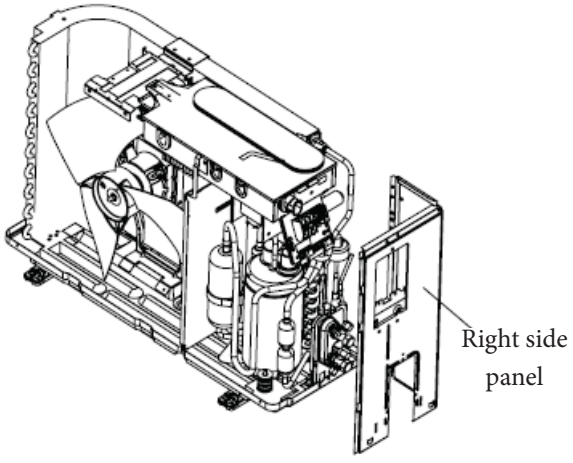
5. Remove front panel

Remove the screws holding the front panel to the chassis and motor support, then remove panel



6. Remove right side panel

Remove the screws holding the panel from the valve support and electric box, then remove right panel.



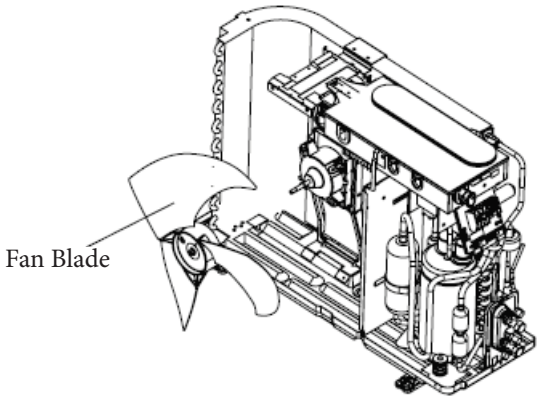
Disassembly of Outdoor Unit

9,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

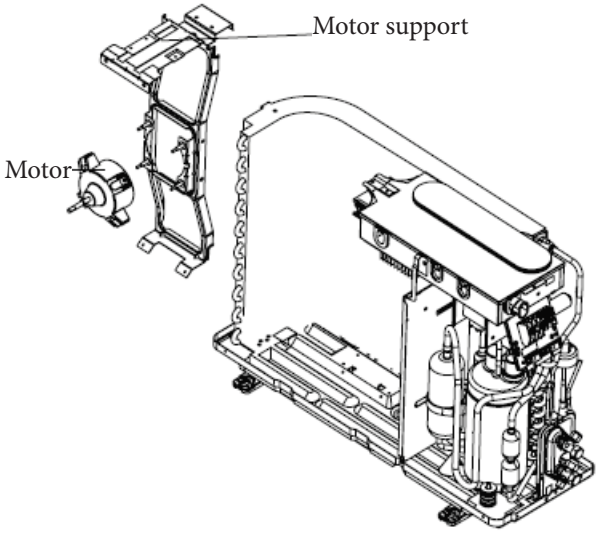
7. Remove axial fan blade

Loosen the nut to remove nut, washer and cushion. Remove the fan blade.



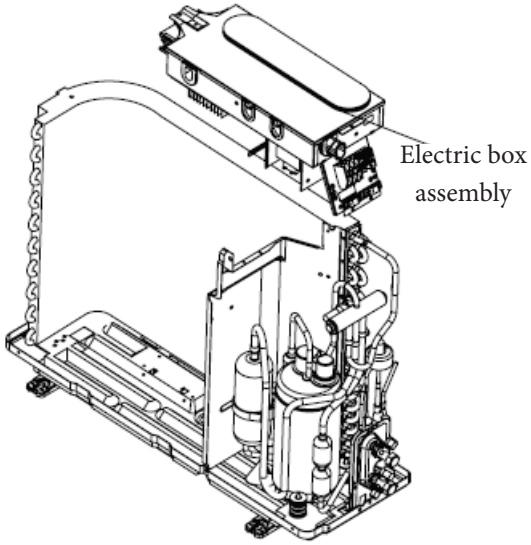
8. Remove motor and motor support

Remove the screws holding the motor, then remove the motor. Remove the screws holding the motor support, then lift motor support upwards to remove it.



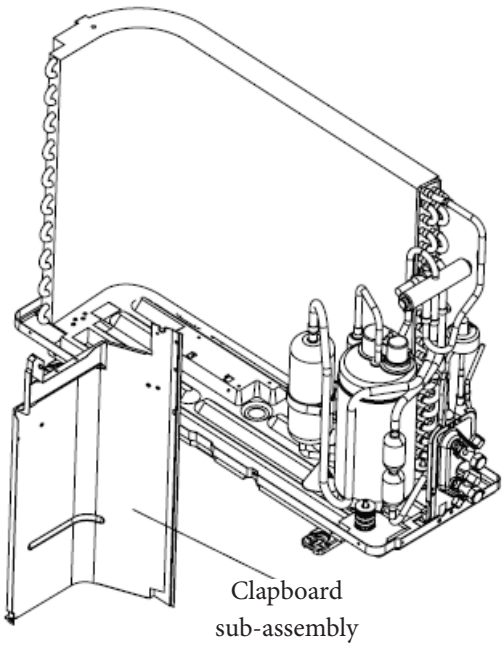
9. Remove electric box assembly

Remove the screws holding the cover, then remove cover. Remove the screws holding the electric box, disconnect the compressor and fan motor wires. Lift the box upwards to remove it.



10. Remove clapboard sub-assembly

Loosen the screws of the clapboard sub-assembly. The clapboard sub-assembly has a hook on the lower side, lift and pull the clapboard sub-assembly to remove..



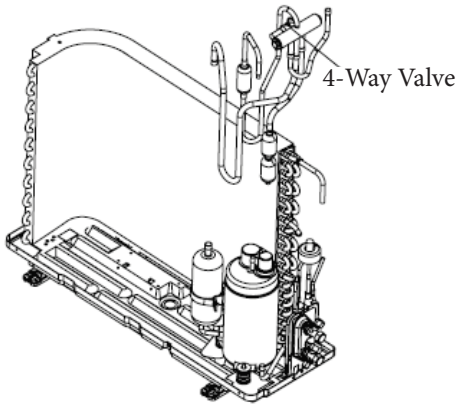
Disassembly of Outdoor Unit

9,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

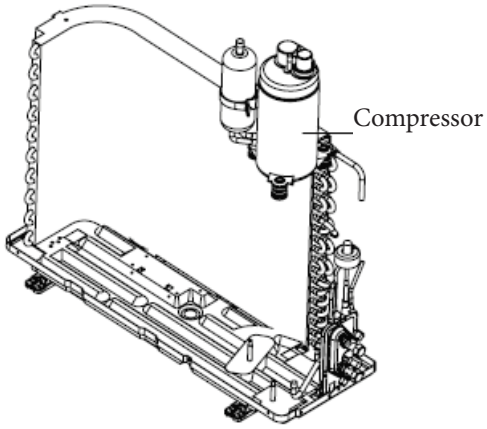
11. Remove 4-way valve assembly

Follow proper procedures to remove refrigerant. Unscrew the nut holding the coil and remove the coil from the valve. Unsolder the 4 joints holding the valve assy. with the compressor and tubing. Remove the 4-way valve. Use care not to damage valve, wires, etc.



12. Remove compressor

Loosen the front nuts of the compressor, (reclaim all refrigerant properly) unsolder the tubing joints, remove the wire connections, then remove the compressor.



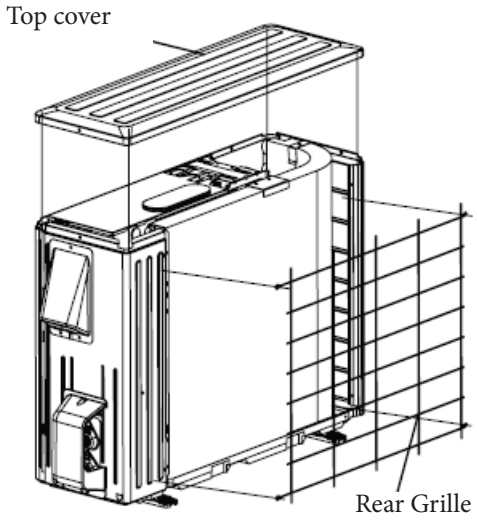
Disassembly of Outdoor Unit

12,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

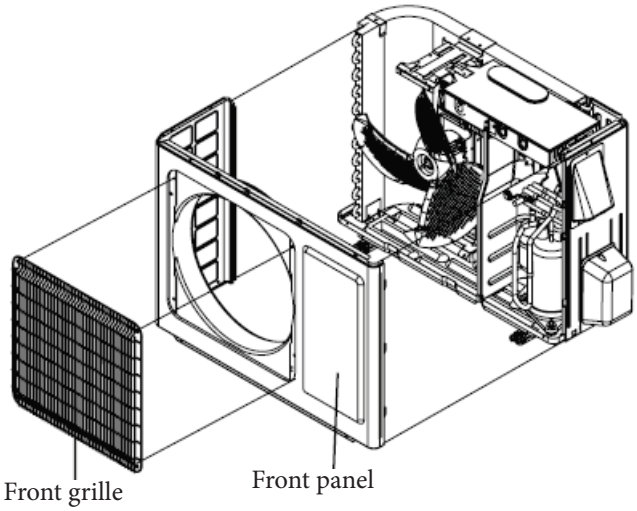
1. Remove top cover and rear grille

Remove the screws holding the top cover and rear grille. Lift the top cover off, then remove the grille



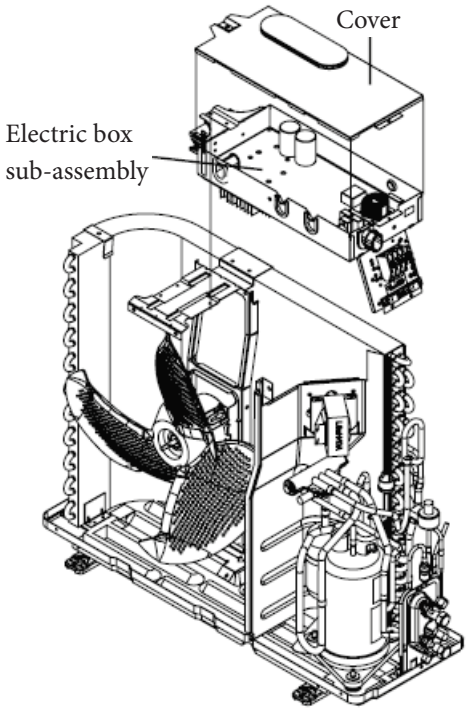
2. Remove front grille and front panel

Remove the screws holding the front grille and front panel. Remove the grille. Remove the remaining screws holding the panel, then loosen the clasp on the right side, rotate the panel to the left, then remove the panel.



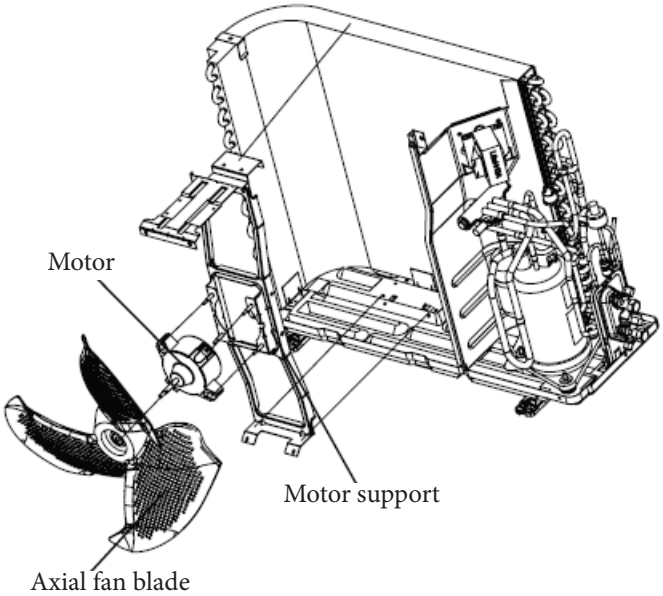
3. Remove electric box sub-assembly

Remove the screws holding the cover, then remove cover. Remove the screws holding the electric box, disconnect the compressor and fan motor wires. Lift the box upwards to remove it.



4. Remove the axial fan blade and motor

Loosen the nut to remove nut, washer and cushion. Remove the fan blade. Remove the screws holding the motor, then remove the motor. Remove the screws holding the motor support, then lift motor support upwards to remove it.



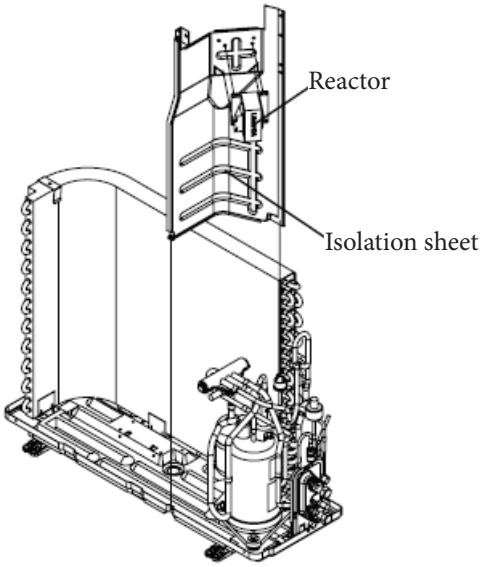
Disassembly of Outdoor Unit

12,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

5. Remove reactor and isolation sheet

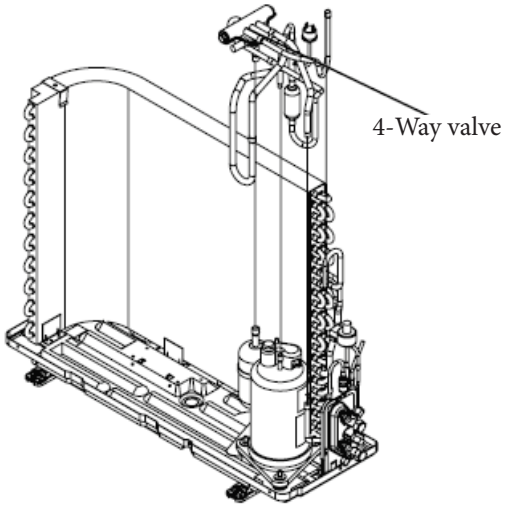
Remove screws holding the reactor, then remove. Remove the screws holding the isolation sheet then remove the isolation sheet.

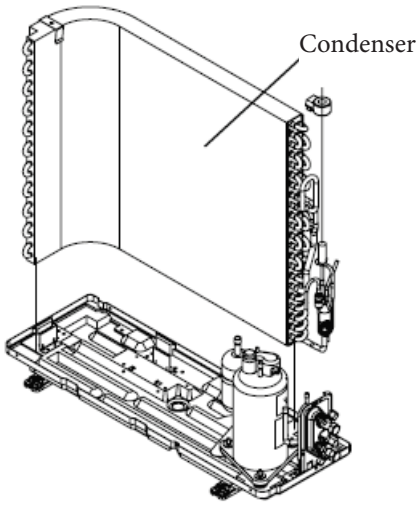


6. Remove 4-way valve assembly and condenser.

Follow proper procedures to remove refrigerant. Unscrew the nut holding the coil and remove the coil from the valve. Unsolder the 4 joints holding the valve assy. with the compressor and tubing. Remove the 4-way valve. Use care not to damage valve, wires, etc.

Remove the screws holding the condenser and chassis sub-assembly, then remove condenser.





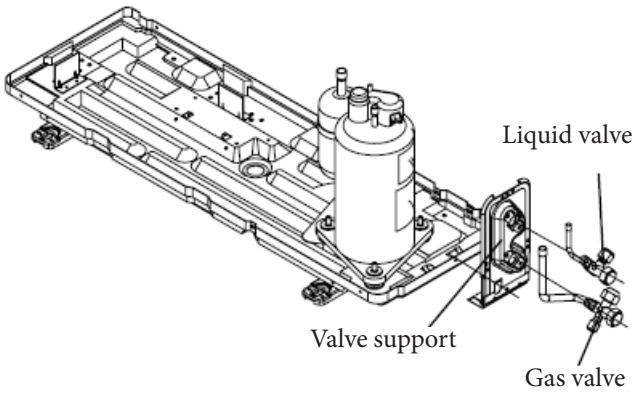
Disassembly of Outdoor Unit

12,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

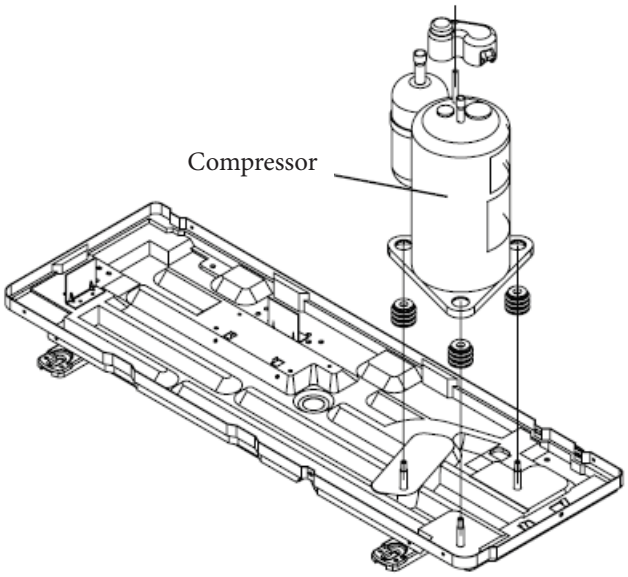
7. Remove gas & liquid valves and valve support

Remove the two bolts holding the gas valve, unsolder the joints holding the valve assy. Wrap the valve with a damp cloth to avoid damaging the valves. Remove the two bolts holding the liquid valve, unsolder the joints holding the valve assy.



8. Remove compressor

Loosen the front nuts of the compressor, (reclaim all refrigerant properly) unsolder the tubing joints, remove the wire connections, then remove the compressor.



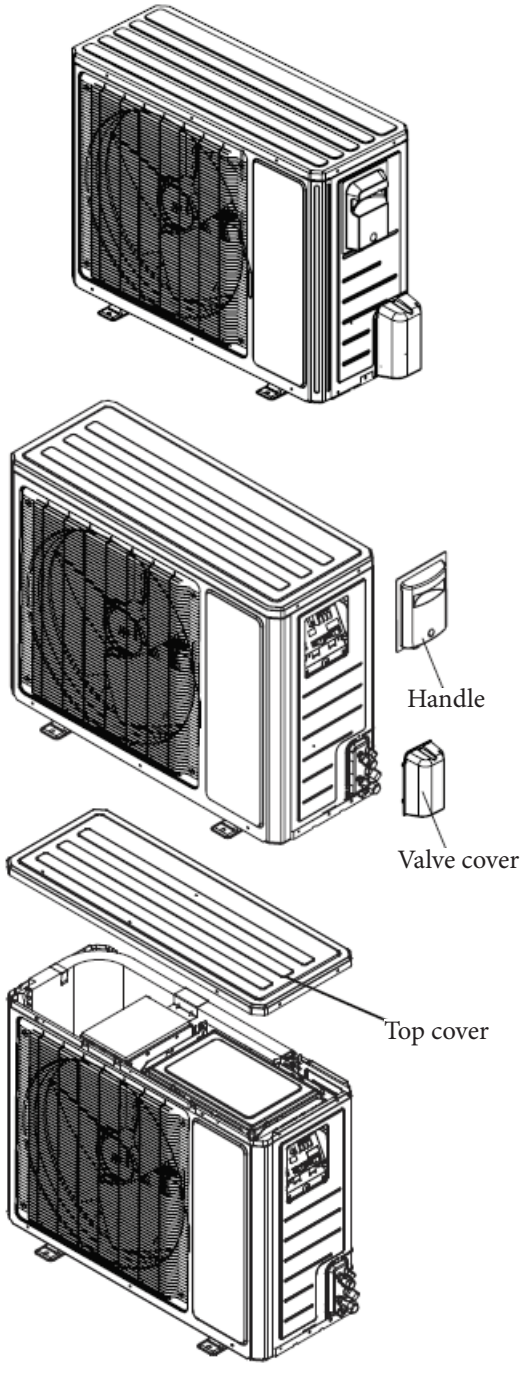
Disassembly of Outdoor Unit

18,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

1. Remove top cover and handle

Remove screws holding handle, then lift handle upward and remove. Remove screws holding the valve cover, then remove the valve cover



Remove screws holding the top cover, then remove the cover

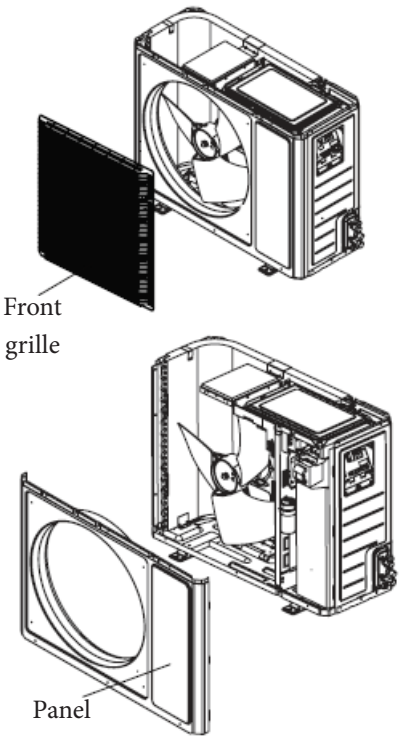
Disassembly of Outdoor Unit

18,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

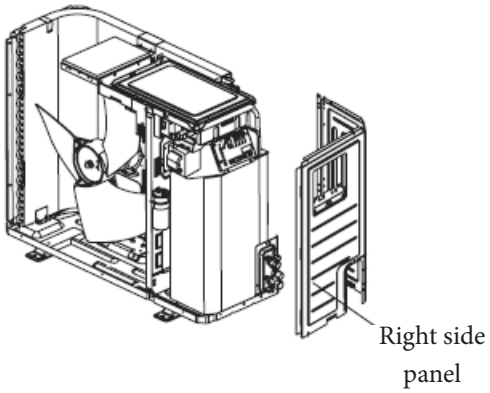
2. Remove front grille and front panel

Remove the screws holding the front grille and front panel. Remove the grille. Remove the remaining screws holding the panel, then loosen the clasp on the right side, rotate the panel to the left, then remove the panel.

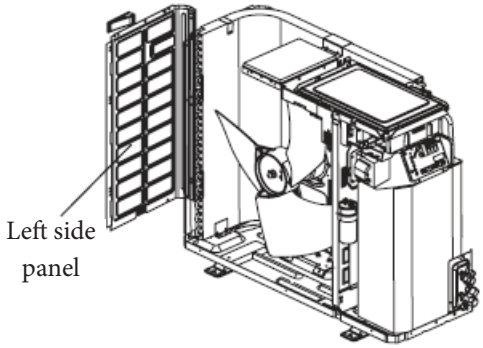


3. Remove right and left side panel

Remove screws holding the right side panel with the chassis, valve support and electric box, then remove the right side panel.



Remove screws holding the left side panel with the chassis, then remove the left side panel.



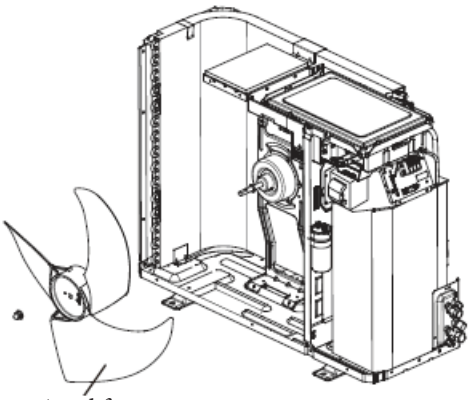
Disassembly of Outdoor Unit

18,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

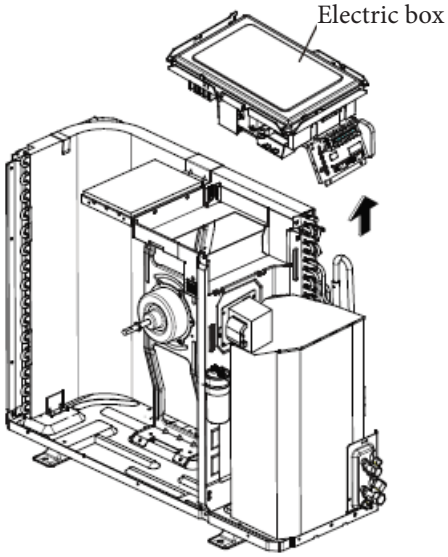
4. Remove axial flow fan

Remove the nuts and washers holding the fan blade on, then remove the blade.

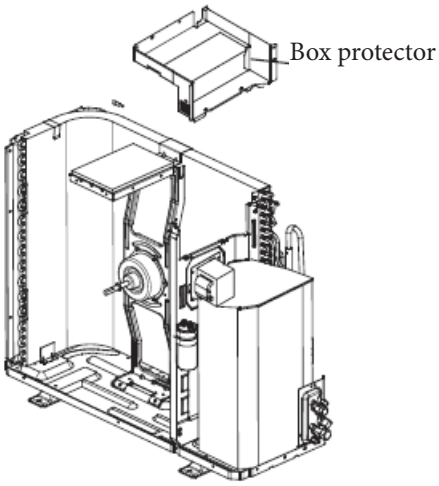


5. Remove electric box and box protector

Remove the screws holding the electric box sub-assembly, loosen the wire bundle, disconnect the wire terminals, then remove the box sub-assembly.



Remove the screws on the box protector, then remove the protector.



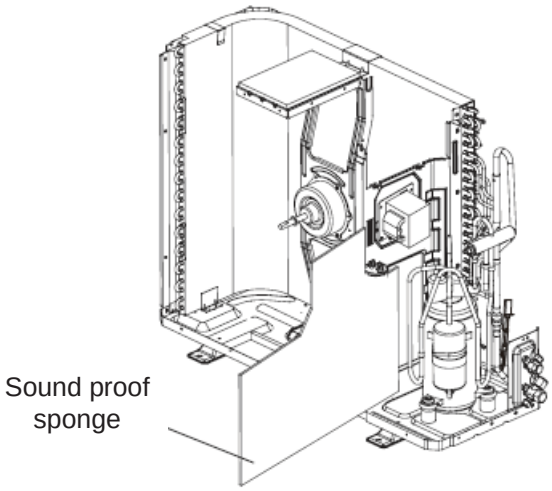
Disassembly of Outdoor Unit

18,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

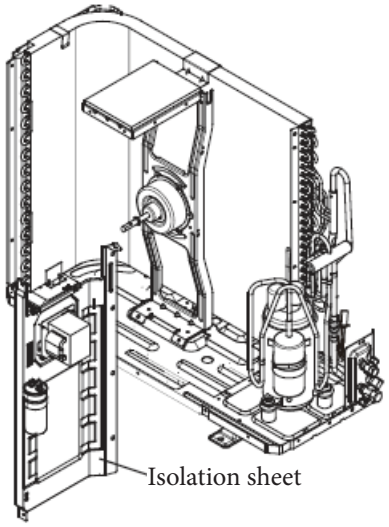
6. Remove sound proof sponge

Remove the sound proof sponge protecting the compressor



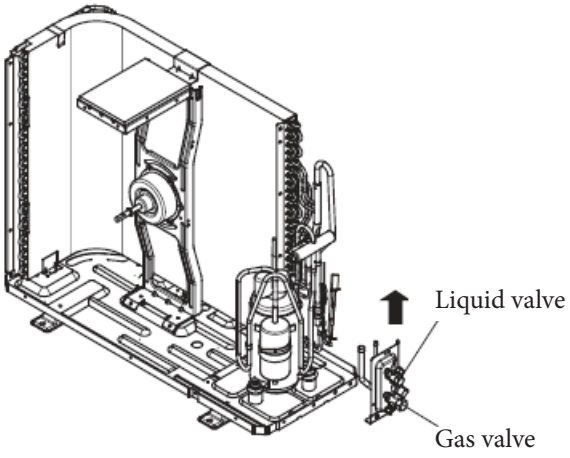
7. Remove isolation sheet

Remove screws holding the isolation sheet then remove the isolation sheet.



8. Remove gas and liquid valves

Remove the two bolts holding the gas valve, unsolder the joints holding the valve assy. Wrap the valve with a damp cloth to avoid damaging the valves. Remove the two bolts holding the liquid valve, unsolder the joints holding the valve assy.



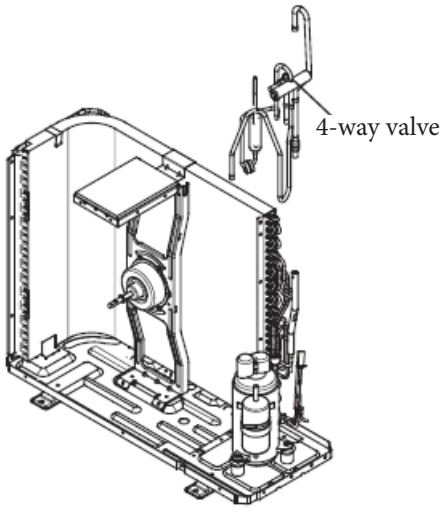
Disassembly of Outdoor Unit

18,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

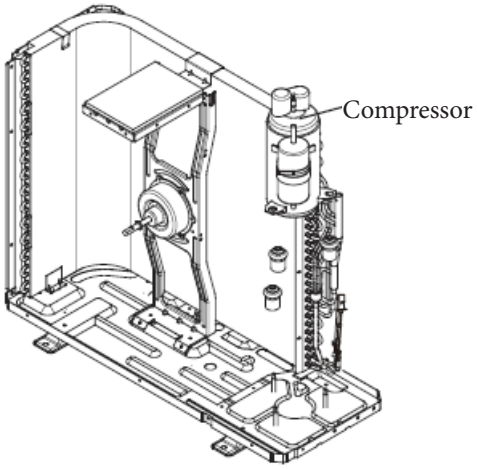
9. Remove 4-way valve

Follow proper procedures to remove refrigerant. Unscrew the nut holding the coil and remove the coil from the valve. Unsolder the 4 joints holding the valve assy. with the compressor and tubing. Remove the 4-way valve. Use care not to damage valve, wires, etc.



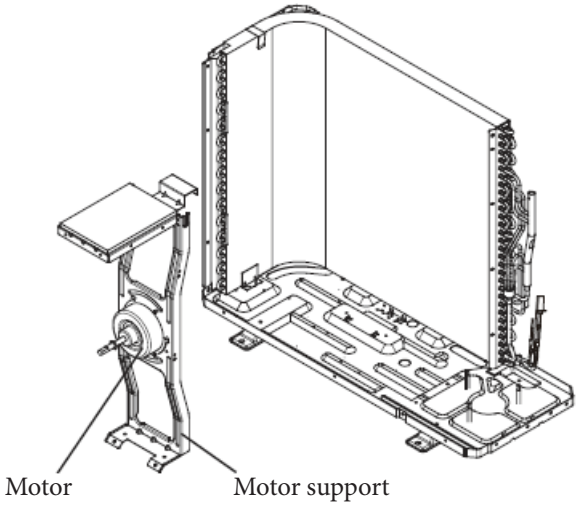
10. Remove compressor

Loosen the front nuts of the compressor, (reclaim all refrigerant properly) unsolder the tubing joints, remove the wire connections, then remove the compressor.



11. Remove motor and motor support

Loosen the nut to remove nut, washer and cushion. Remove the fan blade. Remove the screws holding the motor, then remove the motor. Remove the screws holding the motor support, then lift motor support upwards to remove it.



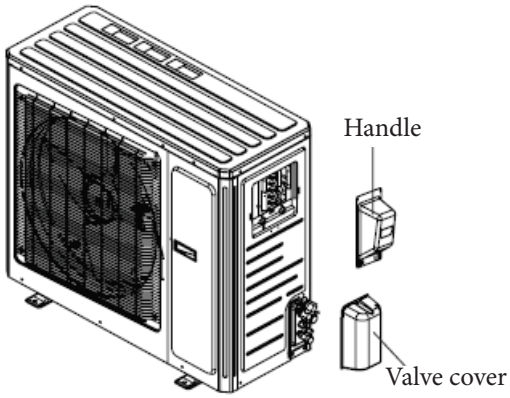
Disassembly of Outdoor Unit

24,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

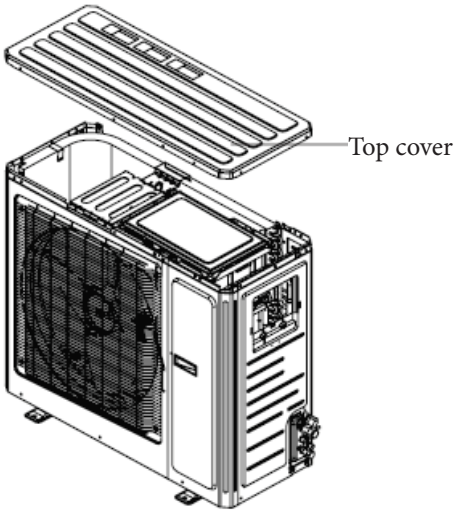
1. Remove handle and valve cover

Remove screws holding handle, then lift handle upward and remove. Remove screws holding the valve cover, then remove the valve cover



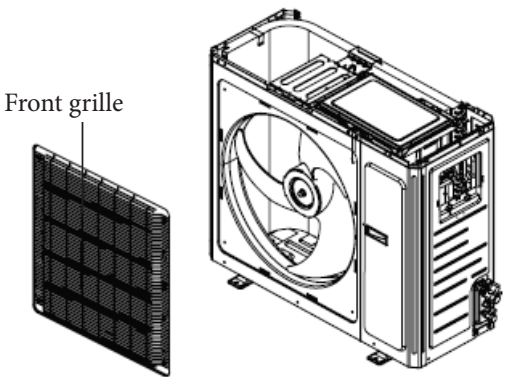
2. Remove top cover

Remove screws holding the top cover, then remove the cover



3. Remove front grille

Remove screws holding the front grille, then remove the grille



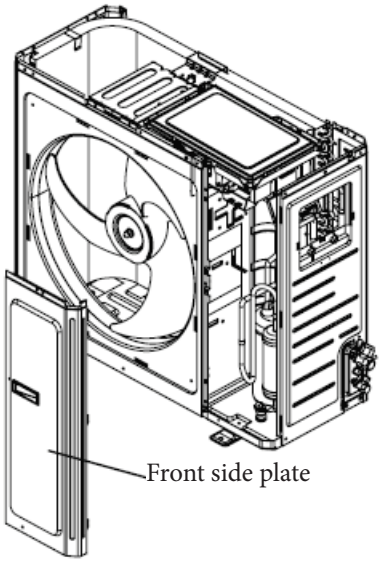
Disassembly of Outdoor Unit

24,000 btuh 240 volt unit

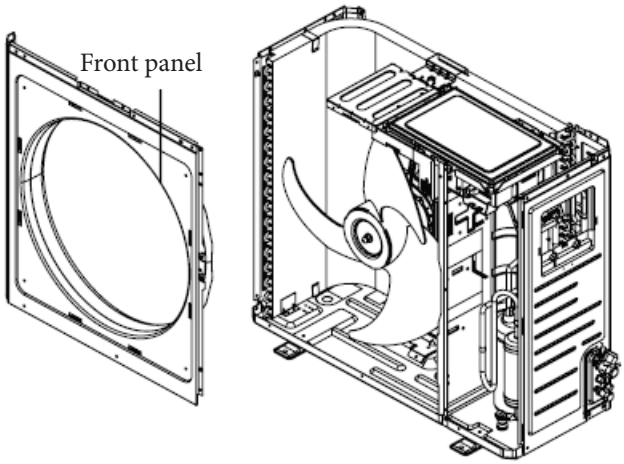
Warning - Wait 10 minutes after power is disconnected before starting disassembly.

4. Remove front side plate and front panel

Remove screws connecting the front side plate, outer case and chassis, then remove the front side plate.

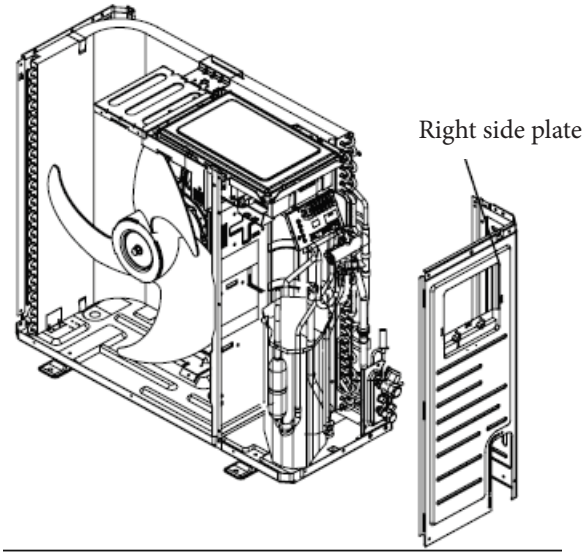


Remove screws holding the front panel, chassis and motor support, then remove the front panel.



5. Remove right side plate

Remove screws connecting right side plate and chassis, valve support and condenser, then remove the right side plate.



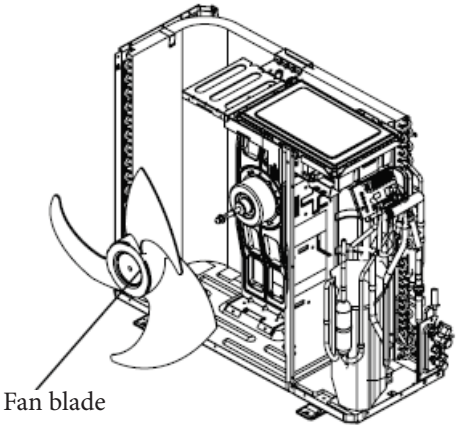
Disassembly of Outdoor Unit

24,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

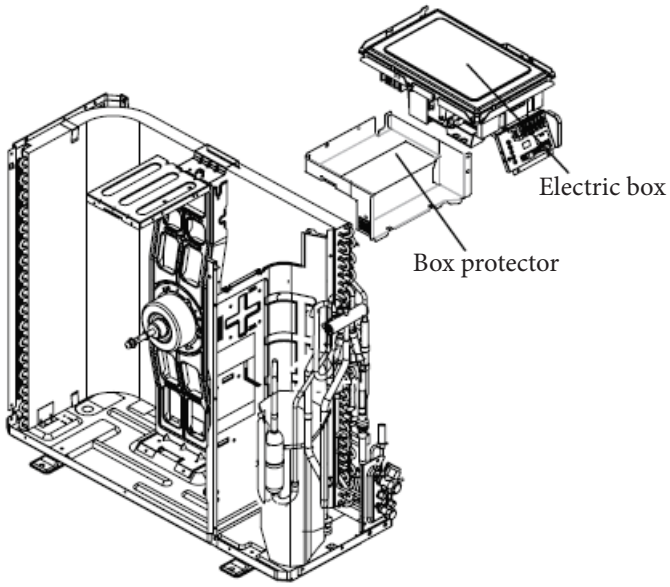
6. Remove axial flow blade

Remove the nuts and washers holding the fan blade on, then remove the blade.



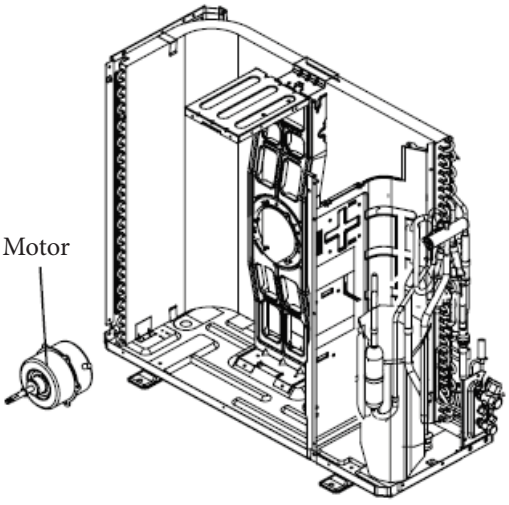
7. Remove electric box and box protector

Remove the screws holding the electric box sub-assembly, loosen the wire bundle, disconnect the wire terminals, then remove the box sub-assembly.



8. Remove motor and motor support

Loosen the nut to remove nut, washer and cushion. Remove the fan blade. Remove the screws holding the motor, then remove the motor. Remove the screws holding the motor support, then lift motor support upwards to remove it.



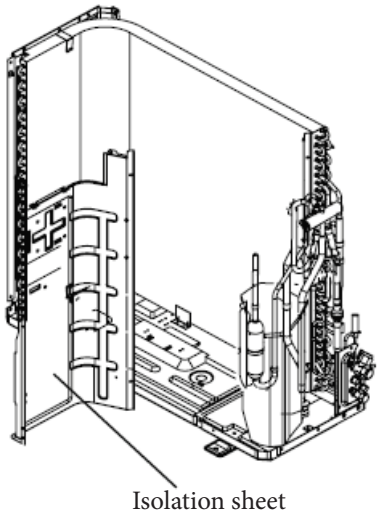
Disassembly of Outdoor Unit

24,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

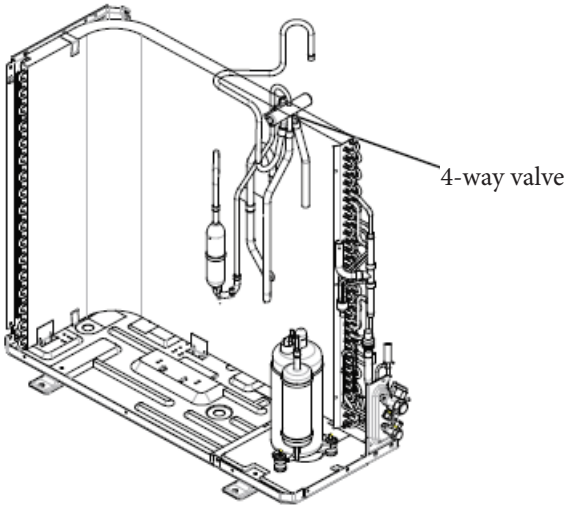
9. Remove isolation sheet

Remove screws holding the isolation sheet then remove the isolation sheet.



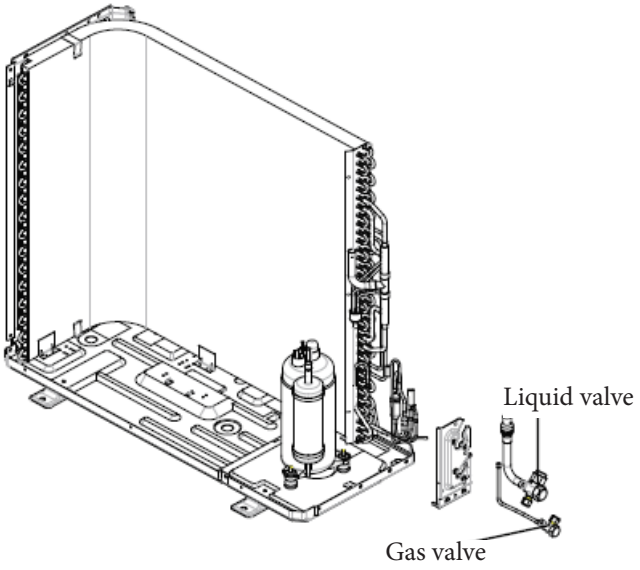
10. Remove 4-way valve

Follow proper procedures to remove refrigerant. Unscrew the nut holding the coil and remove the coil from the valve. Unsolder the 4 joints holding the valve assy. with the compressor and tubing. Remove the 4-way valve. Use care not to damage valve, wires, etc.



11. Remove liquid and gas valves

Remove the two bolts holding the gas valve, unsolder the joints holding the valve assy. Wrap the valve with a damp cloth to avoid damaging the valves. Remove the two bolts holding the liquid valve, unsolder the joints holding the valve assy.



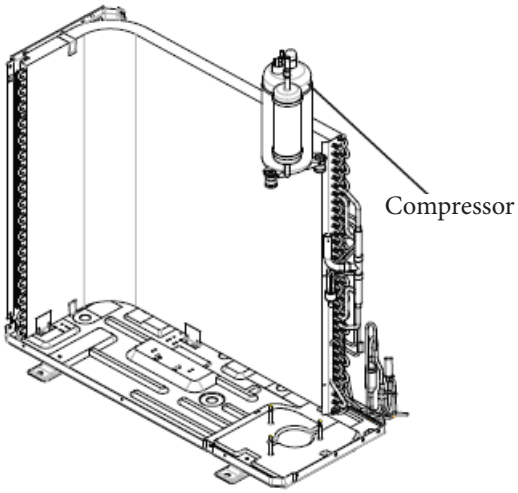
Disassembly of Outdoor Unit

24,000 btuh 240 volt unit

Warning - Wait 10 minutes after power is disconnected before starting disassembly.

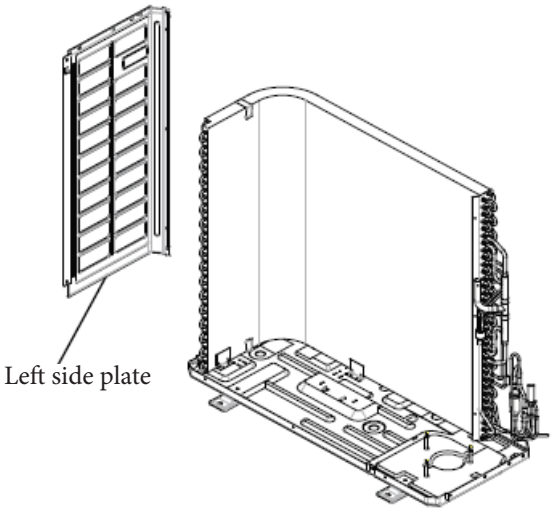
12. Remove compressor

Loosen the front nuts of the compressor, (reclaim all refrigerant properly) unsolder the tubing joints, remove the wire connections, then remove the compressor.



13. Remove left side plate

Remove screws holding the left side plate and chassis, then remove left side plate.



Appendix 1: Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units (15K)

Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)
-19	-2.2	138.1		33	91.4	10.63		85	185.0	1.594
-18	-0.4	128.6		34	93.2	10.2		86	186.8	1.544
-17	1.4	121.6		35	95.0	9.779		87	188.6	1.497
-16	3.2	115		36	96.8	9.382		88	190.4	1.451
-15	5.0	108.7		37	98.6	9.003		89	192.2	1.408
-14	6.8	102.9		38	100.4	8.642		90	194.0	1.363
-13	8.6	97.4		39	102.2	8.297		91	195.8	1.322
-12	10.4	92.22		40	104.0	7.967		92	197.6	1.282
-11	12.2	87.35		41	105.8	7.653		93	199.4	1.244
-10	14.0	82.75		42	107.6	7.352		94	201.2	1.207
-9	15.8	78.43		43	109.4	7.065		95	203.0	1.171
-8	17.6	74.35		44	111.2	6.791		96	204.8	1.136
-7	19.4	70.5		45	113.0	6.529		97	206.6	1.103
-6	21.2	66.88		46	114.8	6.278		98	208.4	1.071
-5	23.0	63.46		47	116.6	6.038		99	210.2	1.039
-4	24.8	60.23		48	118.4	5.809		100	212.0	1.009
-3	26.6	57.18		49	120.2	5.589		101	213.8	0.98
-2	28.4	54.31		50	122.0	5.379		102	215.6	0.952
-1	30.2	51.59		51	123.8	5.197		103	217.4	0.925
0	32.0	49.02		52	125.6	4.986		104	219.2	0.898
1	33.8	46.6		53	127.4	4.802		105	221.0	0.873
2	35.6	44.31		54	129.2	4.625		106	222.8	0.848
3	37.4	42.14		55	131.0	4.456		107	224.6	0.825
4	39.2	40.09		56	132.8	4.294		108	226.4	0.802
5	41.0	38.15		57	134.6	4.139		109	228.2	0.779
6	42.8	36.32		58	136.4	3.99		110	230.0	0.758
7	44.6	34.58		59	138.2	3.848		111	231.8	0.737
8	46.4	32.94		60	140.0	3.711		112	233.6	0.717
9	48.2	31.38		61	141.8	3.579		113	235.4	0.697

Appendix 1: Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units (15K)

Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)
10	50.0	29.9		62	143.6	3.454		114	237.2	0.678
11	51.8	28.51		63	145.4	3.333		115	239.0	0.66
12	53.6	27.18		64	147.2	3.217		116	240.8	0.642
13	55.4	25.92		65	149.0	3.105		117	242.6	0.625
14	57.2	24.73		66	150.8	2.998		118	244.4	0.608
15	59.0	23.6		67	152.6	2.896		119	246.2	0.592
16	60.8	22.53		68	154.4	2.797		120	248.0	0.577
17	62.6	21.51		69	156.2	2.702		121	249.8	0.561
18	64.4	20.54		70	158.0	2.611		122	251.6	0.547
19	66.2	19.63		71	159.8	2.523		123	253.4	0.532
20	68.0	18.75		72	161.6	2.439		124	255.2	0.519
21	69.8	17.93		73	163.4	2.358		125	257.0	0.505
22	71.6	17.14		74	165.2	2.28		126	258.8	0.492
23	73.4	16.39		75	167.0	2.206		127	260.6	0.48
24	75.2	15.68		76	168.8	2.133		128	262.4	0.467
25	77.0	15		77	170.6	2.064		129	264.2	0.456
26	78.8	14.36		78	172.4	1.997		130	266.0	0.44
27	80.6	13.74		79	174.2	1.933		131	267.8	0.433
28	82.4	13.16		80	176.0	1.871		132	269.6	0.422
29	84.2	12.6		81	177.8	1.811		133	271.4	0.412
30	86.0	12.07		82	179.6	1.754		134	273.2	0.401
31	87.8	11.57		83	181.4	1.699		135	275.0	0.391

Appendix 2: Resistance Table of Outdoor and Indoor Tube Temperature Sensors (20K)

Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)
-19	-2.2	181.4		33	91.4	14.18		85	185.0	2.125
-18	-0.4	171.4		34	93.2	13.59		86	186.8	2.059
-17	1.4	162.1		35	95.0	13.04		87	188.6	1.996
-16	3.2	153.3		36	96.8	12.51		88	190.4	1.934
-15	5.0	145		37	98.6	12		89	192.2	1.875
-14	6.8	137.2		38	100.4	11.52		90	194.0	1.818
-13	8.6	129.9		39	102.2	11.06		91	195.8	1.736
-12	10.4	123		40	104.0	10.62		92	197.6	1.71
-11	12.2	116.5		41	105.8	10.2		93	199.4	1.658
-10	14.0	110.3		42	107.6	9.803		94	201.2	1.609
-9	15.8	104.6		43	109.4	9.42		95	203.0	1.561
-8	17.6	99.13		44	111.2	9.054		96	204.8	1.515
-7	19.4	94		45	113.0	8.705		97	206.6	1.47
-6	21.2	89.17		46	114.8	8.37		98	208.4	1.427
-5	23.0	84.61		47	116.6	8.051		99	210.2	1.386
-4	24.8	80.31		48	118.4	7.745		100	212.0	1.346
-3	26.6	76.24		49	120.2	7.453		101	213.8	1.307
-2	28.4	72.41		50	122.0	7.173		102	215.6	1.269
-1	30.2	68.79		51	123.8	6.905		103	217.4	1.233
0	32.0	65.37		52	125.6	6.648		104	219.2	1.198
1	33.8	62.13		53	127.4	6.403		105	221.0	1.164
2	35.6	59.08		54	129.2	6.167		106	222.8	1.131
3	37.4	56.19		55	131.0	5.942		107	224.6	1.099
4	39.2	53.46		56	132.8	5.726		108	226.4	1.069
5	41.0	50.87		57	134.6	5.519		109	228.2	1.039
6	42.8	48.42		58	136.4	5.32		110	230.0	1.01
7	44.6	46.11		59	138.2	5.13		111	231.8	0.983
8	46.4	43.92		60	140.0	4.948		112	233.6	0.956
9	48.2	41.84		61	141.8	4.773		113	235.4	0.93

Appendix 2: Resistance Table of Outdoor and Indoor Tube Temperature Sensors (20K)

Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)
10	50.0	39.87		62	143.6	4.605		114	237.2	0.904
11	51.8	38.01		63	145.4	4.443		115	239.0	0.88
12	53.6	36.24		64	147.2	4.289		116	240.8	0.856
13	55.4	34.57		65	149.0	4.14		117	242.6	0.833
14	57.2	32.98		66	150.8	3.998		118	244.4	0.811
15	59.0	31.47		67	152.6	3.861		119	246.2	0.77
16	60.8	30.04		68	154.4	3.729		120	248.0	0.769
17	62.6	28.68		69	156.2	3.603		121	249.8	0.746
18	64.4	27.39		70	158.0	3.481		122	251.6	0.729
19	66.2	26.17		71	159.8	3.364		123	253.4	0.71
20	68.0	25.01		72	161.6	3.252		124	255.2	0.692
21	69.8	23.9		73	163.4	3.144		125	257.0	0.674
22	71.6	22.85		74	165.2	3.04		126	258.8	0.658
23	73.4	21.85		75	167.0	2.94		127	260.6	0.64
24	75.2	20.9		76	168.8	2.844		128	262.4	0.623
25	77.0	20		77	170.6	2.752		129	264.2	0.607
26	78.8	19.14		78	172.4	2.663		130	266.0	0.592
27	80.6	18.13		79	174.2	2.577		131	267.8	0.577
28	82.4	17.55		80	176.0	2.495		132	269.6	0.563
29	84.2	16.8		81	177.8	2.415		133	271.4	0.549
30	86.0	16.1		82	179.6	2.339		134	273.2	0.535
31	87.8	15.43		83	181.4	2.265		135	275.0	0.521
32	89.6	14.79		84	183.2	2.194		136	276.8	0.509

Appendix 3: Resistance Table of Outdoor Discharge Temperature Sensor (50K)

Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)
-29	-20.2	853.5		23	73.4	53.74		75	167.0	7.224
-28	-18.4	799.8		24	75.2	51.41		76	168.8	6.998
-27	-16.6	750		25	77.0	49.19		77	170.6	6.761
-26	-14.8	703.8		26	78.8	47.08		78	172.4	6.542
-25	-13.0	660.8		27	80.6	45.07		79	174.2	6.331
-24	-11.2	620.8		28	82.4	43.16		80	176.0	6.129
-23	-9.4	580.6		29	84.2	41.34		81	177.8	5.933
-22	-7.6	548.9		30	86.0	39.61		82	179.6	5.746
-21	-5.8	516.6		31	87.8	37.96		83	181.4	5.565
-20	-4.0	486.5		32	89.6	36.38		84	183.2	5.39
-19	-2.2	458.3		33	91.4	34.88		85	185.0	5.22
-18	-0.4	432		34	93.2	33.45		86	186.8	5.06
-17	1.4	407.4		35	95.0	32.09		87	188.6	4.904
-16	3.2	384.5		36	96.8	30.79		88	190.4	4.754
-15	5.0	362.9		37	98.6	29.54		89	192.2	4.609
-14	6.8	342.8		38	100.4	28.36		90	194.0	4.469
-13	8.6	323.9		39	102.2	27.23		91	195.8	4.334
-12	10.4	306.2		40	104.0	26.15		92	197.6	4.204
-11	12.2	289.6		41	105.8	25.11		93	199.4	4.079
-10	14.0	274		42	107.6	24.13		94	201.2	3.958
-9	15.8	259.3		43	109.4	23.19		95	203.0	3.841
-8	17.6	245.6		44	111.2	22.29		96	204.8	3.728
-7	19.4	232.6		45	113.0	21.43		97	206.6	3.619
-6	21.2	220.5		46	114.8	20.6		98	208.4	3.514
-5	23.0	209		47	116.6	19.81		99	210.2	3.413
-4	24.8	198.3		48	118.4	19.06		100	212.0	3.315
-3	26.6	199.1		49	120.2	18.34		101	213.8	3.22
-2	28.4	178.5		50	122.0	17.65		102	215.6	3.129
-1	30.2	169.5		51	123.8	16.99		103	217.4	3.04
0	32.0	161		52	125.6	16.36		104	219.2	2.955
1	33.8	153		53	127.4	15.75		105	221.0	2.872
2	35.6	145.4		54	129.2	15.17		106	222.8	2.792
3	37.4	138.3		55	131.0	14.62		107	224.6	2.715
4	39.2	131.5		56	132.8	14.09		108	226.4	2.64

Appendix 3: Resistance Table of Outdoor Discharge Temperature Sensor (50K)

Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)		Temp (°C)	Temp (°F)	Resistance (kΩ)
5	41.0	125.1		57	134.6	13.58		109	228.2	2.568
6	42.8	119.1		58	136.4	13.09		110	230.0	2.498
7	44.6	113.4		59	138.2	12.62		111	231.8	2.431
8	46.4	108		60	140.0	12.17		112	233.6	2.365
9	48.2	102.8		61	141.8	11.74		113	235.4	2.302
10	50.0	98		62	143.6	11.32		114	237.2	2.241
11	51.8	93.42		63	145.4	10.93		115	239.0	2.182
12	53.6	89.07		64	147.2	10.54		116	240.8	2.124
13	55.4	84.95		65	149.0	10.18		117	242.6	2.069
14	57.2	81.05		66	150.8	9.827		118	244.4	2.015
15	59.0	77.35		67	152.6	9.489		119	246.2	1.963
16	60.8	73.83		68	154.4	9.165		120	248.0	1.912
17	62.6	70.5		69	156.2	8.854		121	249.8	1.863
18	64.4	67.34		70	158.0	8.555		122	251.6	1.816
19	66.2	64.33		71	159.8	8.268		123	253.4	1.77
20	68.0	61.48		72	161.6	7.991		124	255.2	1.725
21	69.8	58.77		73	163.4	7.726		125	257.0	1.682
22	71.6	56.19		74	165.2	7.47		126	258.8	1.64