APRI Series
Rooftop Inverter Unit
16 SEER Technical Manual

230V/1/60Hz

10/28/2023

Content

1. Rooftop package unit introduction

1.1 Modules Range

2 models: Heat pumb:3 TR ， 4TR ， 5TR

3/4 TR

5TR

1.2 Adopt high reliable Copland compressor

- Better Liquid Handling

  Radial compliance allows the scroll members to separate in the presence of liquid refrigerant, thus, providing protection against liquid damage.

- Greater Efficiency

  With axial compliance, optimized force between two scrolls can be obtained, leading to high efficiency over the entire operating range.

  Word famous scroll compressor with quick reactivity and operation stable. Compressor staging is controlled directly by the control temperature , high EER.

1.3 Provide easy access to system components for maintenance and service.

1.4 Flexible installation, on rooftop or ground are available. Anywhere removable as requirement with

2. Nomenclature

■ Model Number Nomenclature

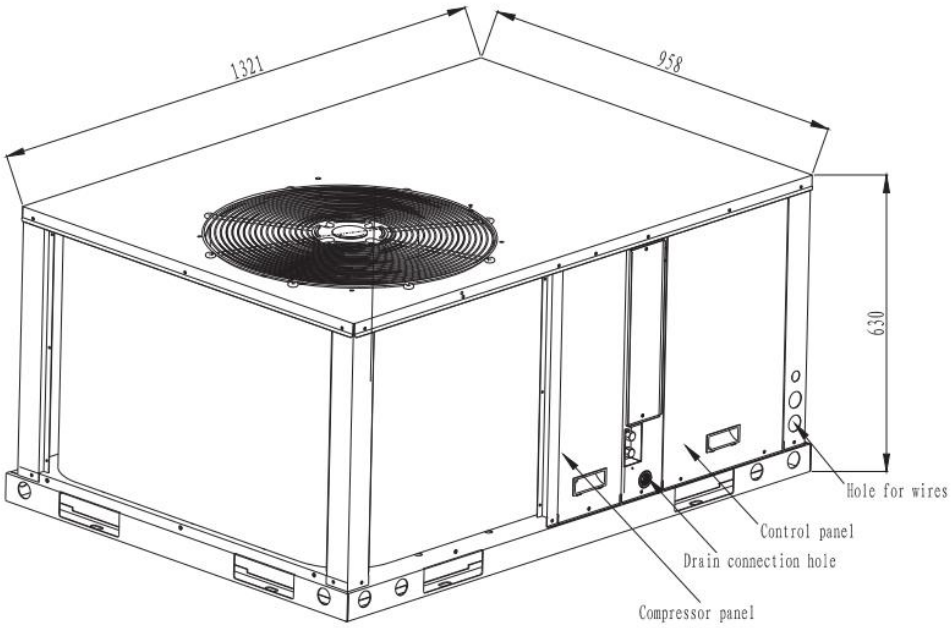
CODE	NAME
C/O	Cooling Only
Hor.& Dow.	Horizontal & Downflow Units (Optional)
Hor.	Horizontal Units
Dow.	Downflow Units
H/P	Heat Pump

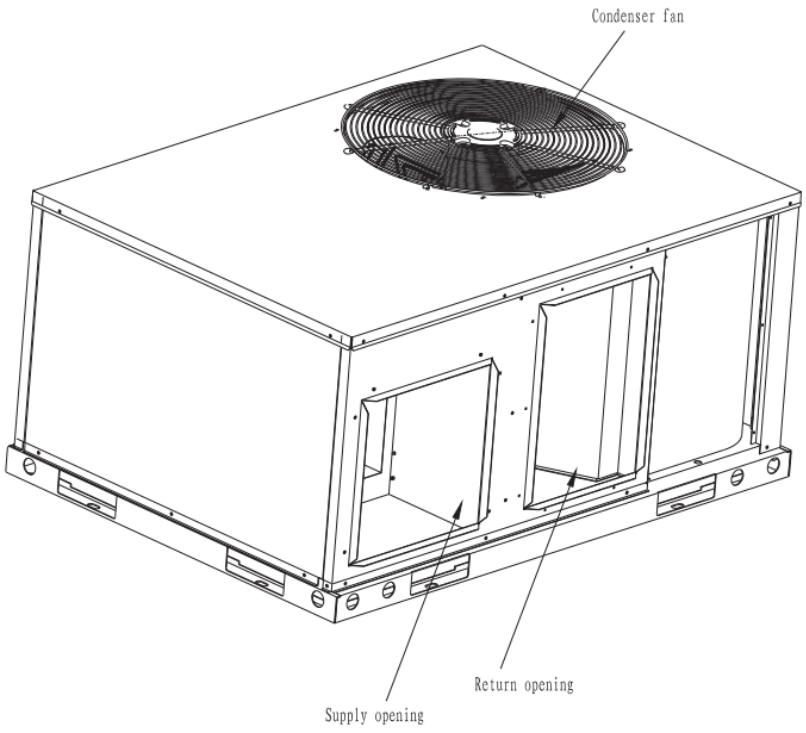
3. Specifications

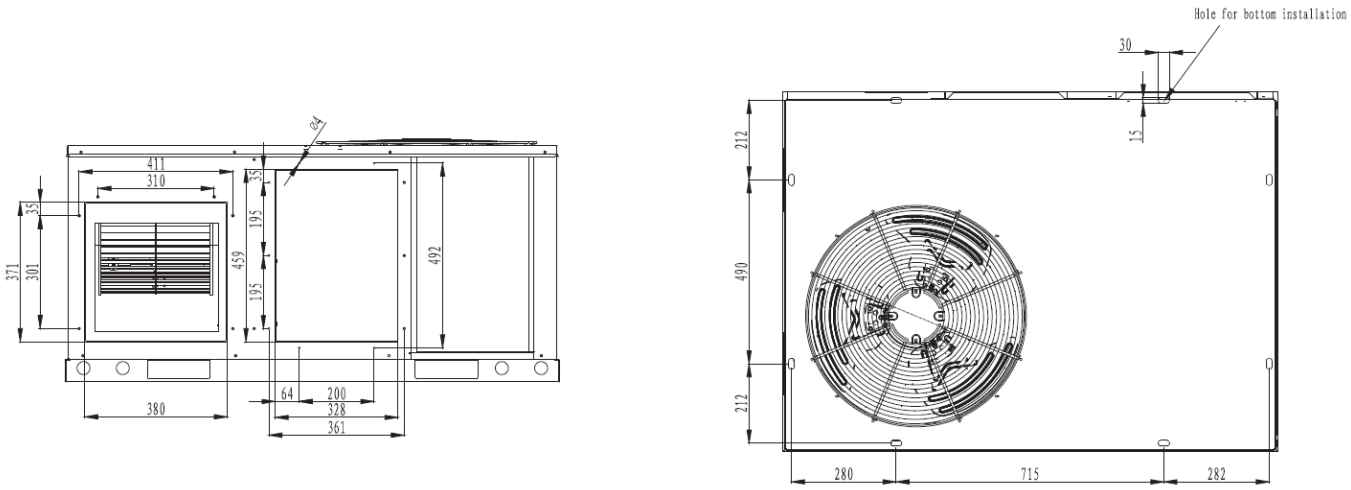
Series	SEER	16		
Nominal ton		3Tons	4Tons	5Tons
Model type		APRI636J2A-GTG105	APRI648J2A-GMG140	APRI660J2A-GMG160
Power	voltage/phase/frequency	230V/1/60	230V/1/60	230V/1/60
Applicable voltage	Max.	253	253	253
	Min.	187	187	187
Capacity	Cooling(Btu/h)	36000	48000	56000
	Input （W）	3430	4450	5600
	Heating(Btu/h)	36500	49000	56500
	Input （W）	3130	4100	5050
Performance	EER(Btu/h W)	10.5	10.5	10.0
	SEER	16.0	16.0	16.0
Performance	COP(Btu/h W)	11.7	11.7	11.2
	HSPF	8.5	8.5	8.5
Dimensions	Length(mm)	1321	1486	1486
	Width(mm)	958	1086	1086
	Height (mm)	630	840	840
Net weigt (Kg)		136	190	196
Gross weight (Kg)		140	194	200
Packing dimension: LxWxH		1323*950*660	1491*1056*865	1491*1056*865
Refrigerant type		R410A	R410A	R410A
Charged refrigerant	g	2600	3900	3900
Compressor	Model	ATM240D57UFT	MNB40FEQMC	MNB40FEQMC
	Brand	GMCC	Mitsubishi	Mitsubishi
	Type	Twin-rotary DC Inverter	Twin-rotary DC Inverter	Twin-rotary DC Inverter
	Refrigerant oil （ml）	670	1100	1100

4. Dimensions

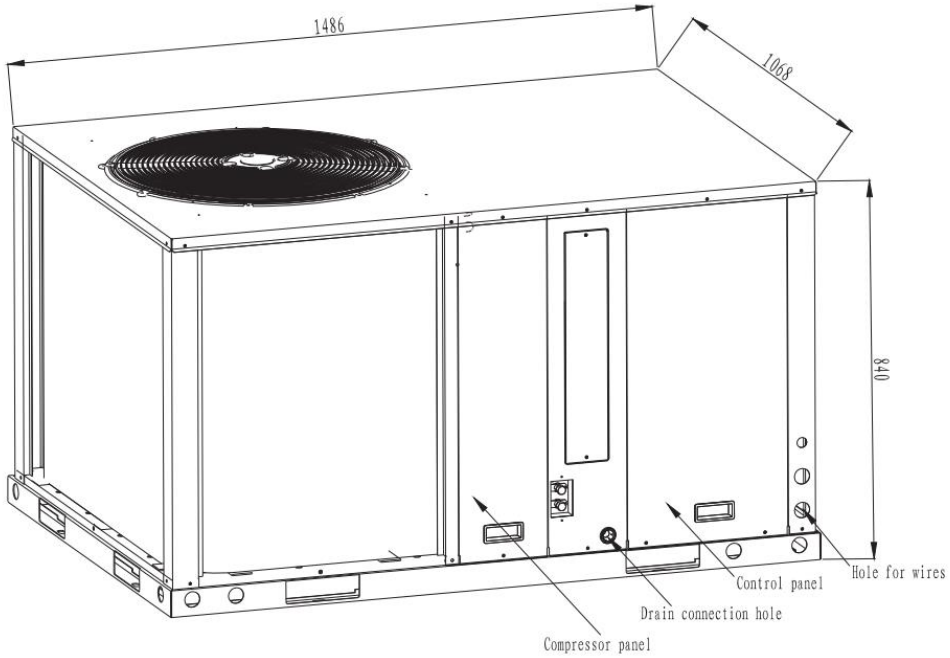
4.1 3Tons H/P Units

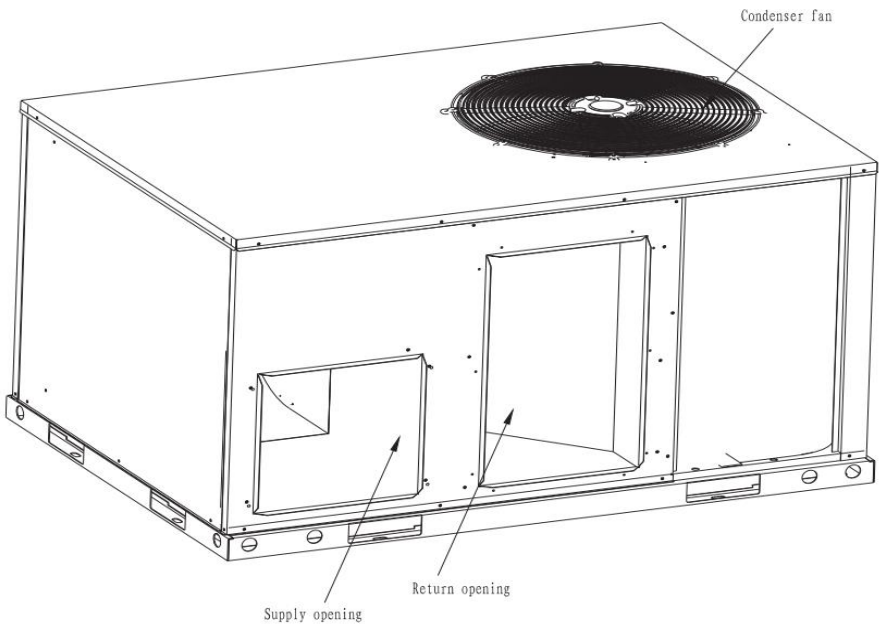


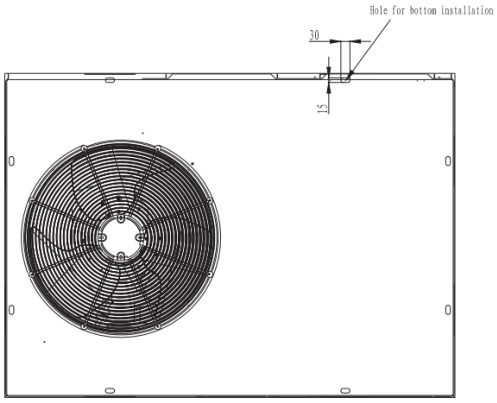


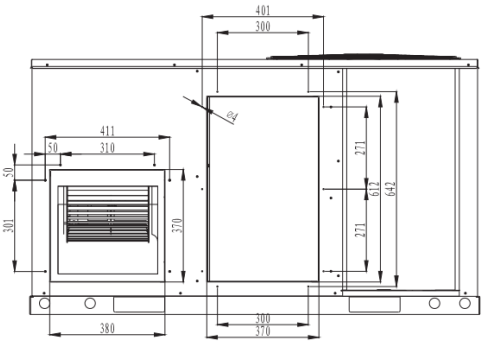


5Tons H/P Units

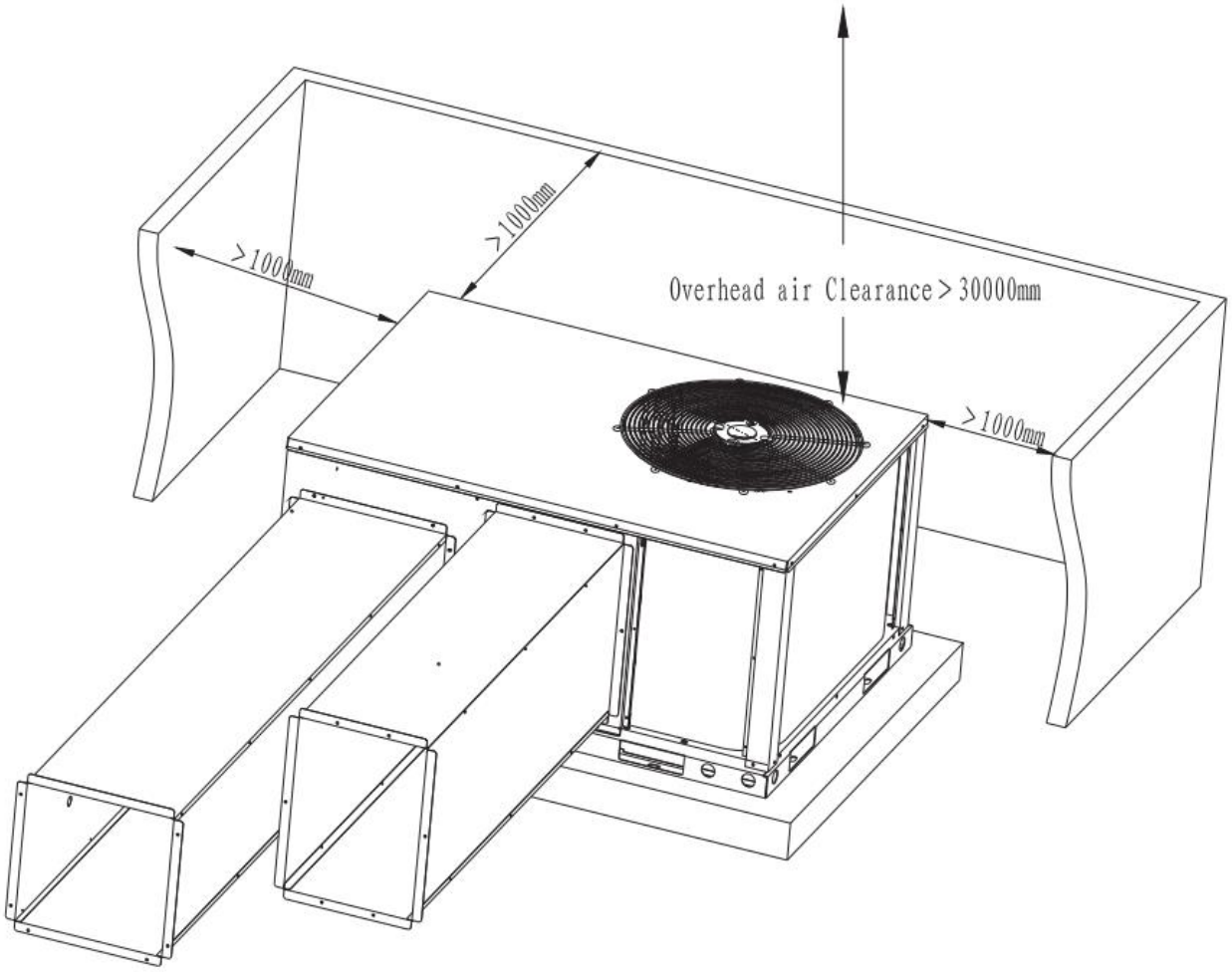








4.2 Installation base dimension



5. Electric characteristics

Nominal ton		3TONS	5TONS
Model type		H/P	H/P
Type of flow		Hor.	Hor.
Unit main power	VOL	208-230V	208-230V
	Hz	60	60
Applicable voltage	Max.	253	253
	Min.	187	187
Compressor motor	STC	15	21
	RNC	8.85	14.8
	IPT	1.94	3.96
Evaporator fan motor	RNC	1.3	2.8
	IPT	0.18	0.35
Condenser fan motor	RNC	0.9	1.5
	IPT	0.11	0.23

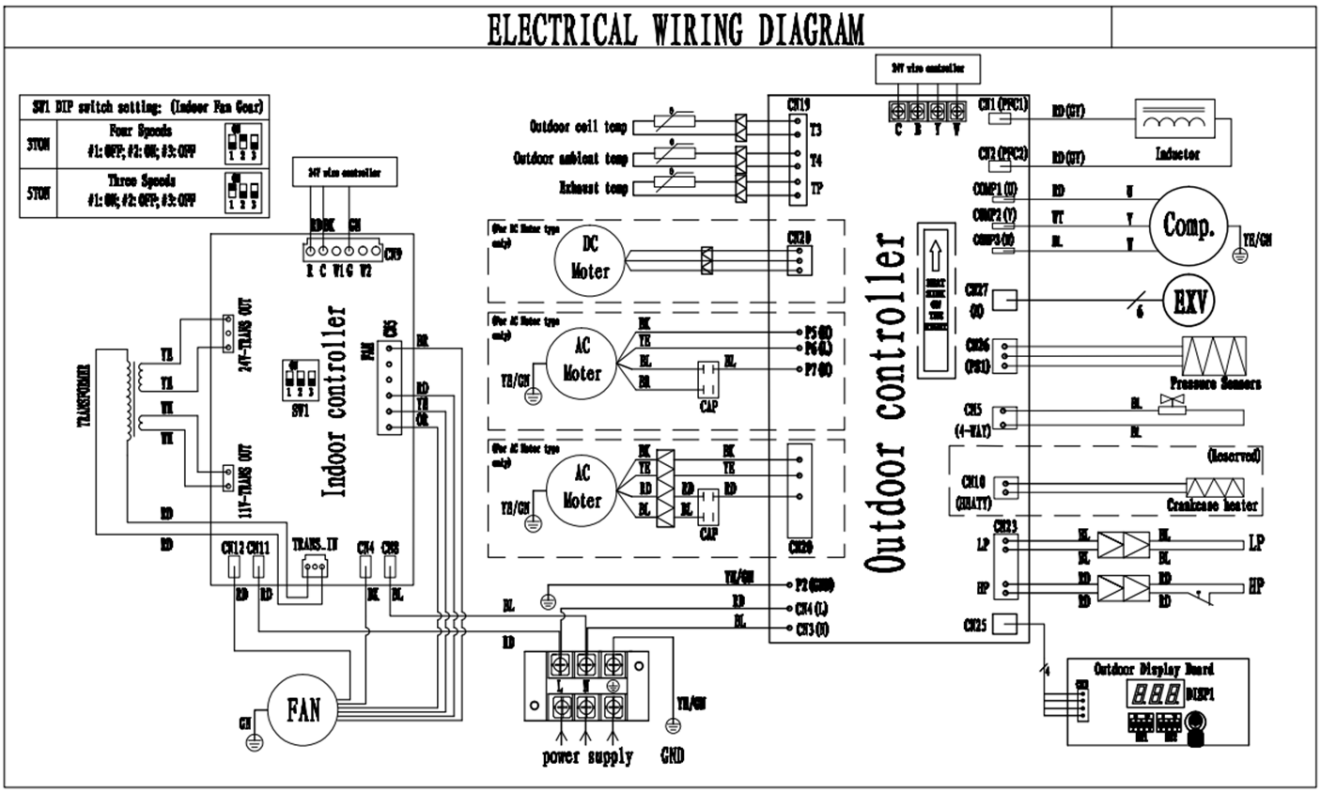
- VOL: Unit Power Supply Rated Voltage (V)
- HZ: Frequency (HZ)
- STC: Starting Current (A)
- RNC: Running Current (A)
- IPT: Input (kw)

Main Power Supply

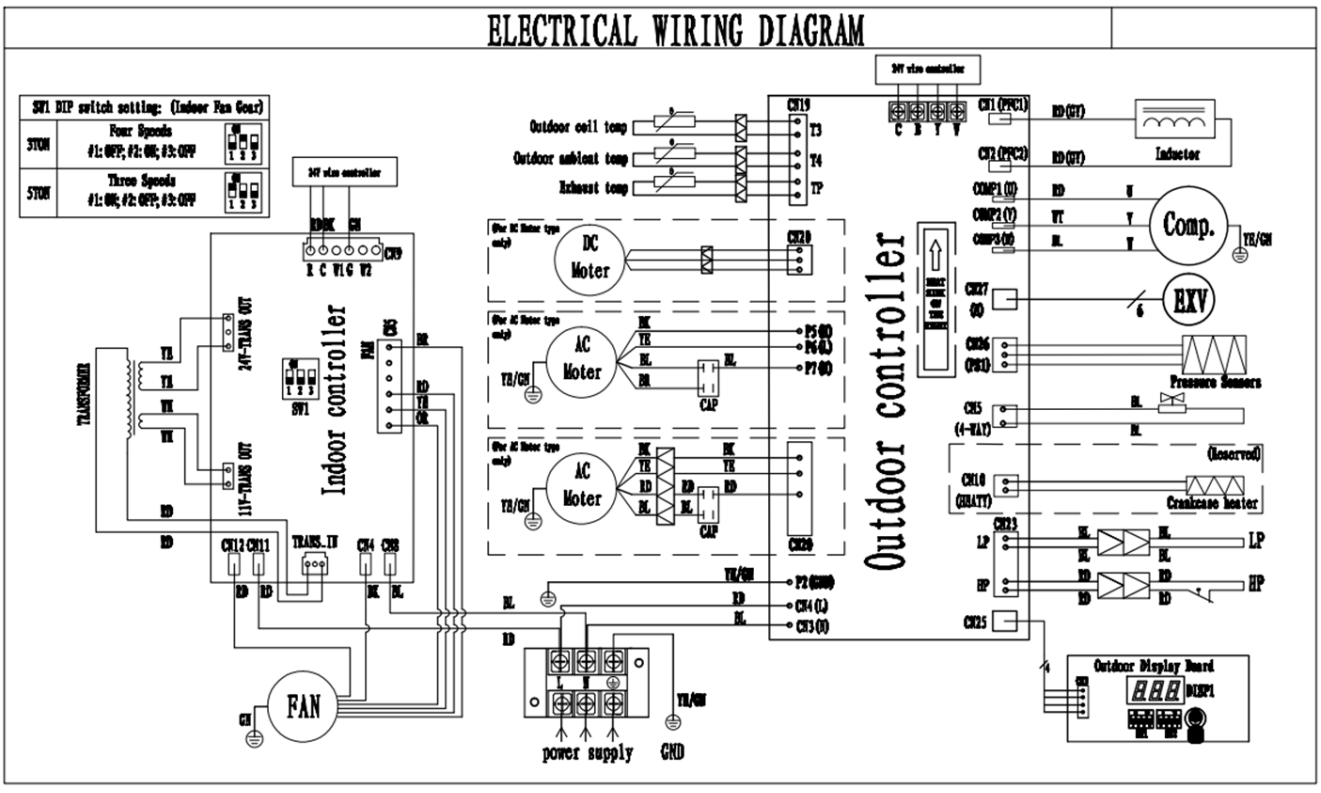
Model type		Unit main power	Main power switch	Fuse	Wires for power supplies	Type of wires
3Tons	C/O H/P	220V 1N ~ 60Hz	50A	40A	3×16mm²+2×10mm²	3×UL1015 5AWG 2×UL1015 7AWG
4Tons	C/O H/P	220V 1N ~ 60Hz	50A	40A	3×16mm²+2×10mm²	3×UL1015 5AWG 2×UL1015 7AWG
5Tons	C/O H/P	220V 1N ~ 60Hz	63A	50A	3×16mm²+2×10mm²	3×UL1015 5AWG 2×UL1015 7AWG

6. Wiring diagrams and field wiring

APRI836J0A-GTG140



APRI860J0A-GMG160



Field wiring

●Power supply(For Inverter Units)

220V 1N ～ 60Hz
3/4/5 Tons H/P

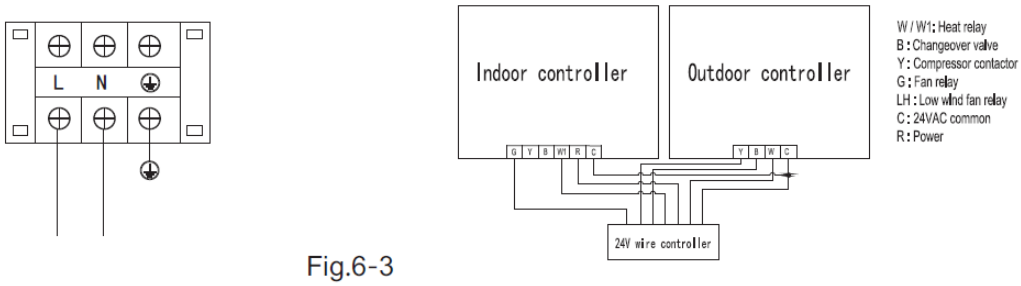


Fig.6-3

●Suggestion: Thermostat choose eletrical thermostat series of honeywell, such as RTH111、RTH2300/RTH221、 TH5220D.

7. Accessories

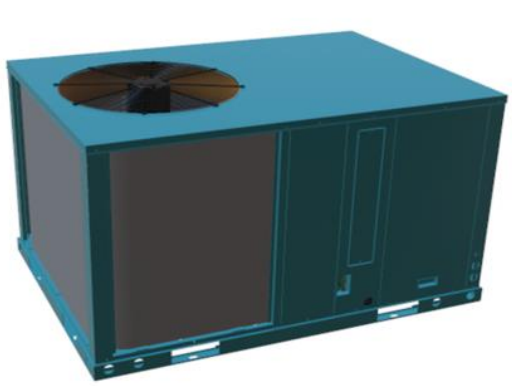
Name of accessories	Qty	Shape
Manual	1	———
Drain pipe	1	
Snap ring	1	
Drain joint	1	

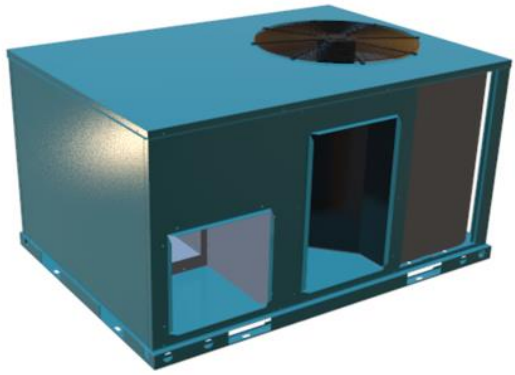
8. Static pressure and air flow

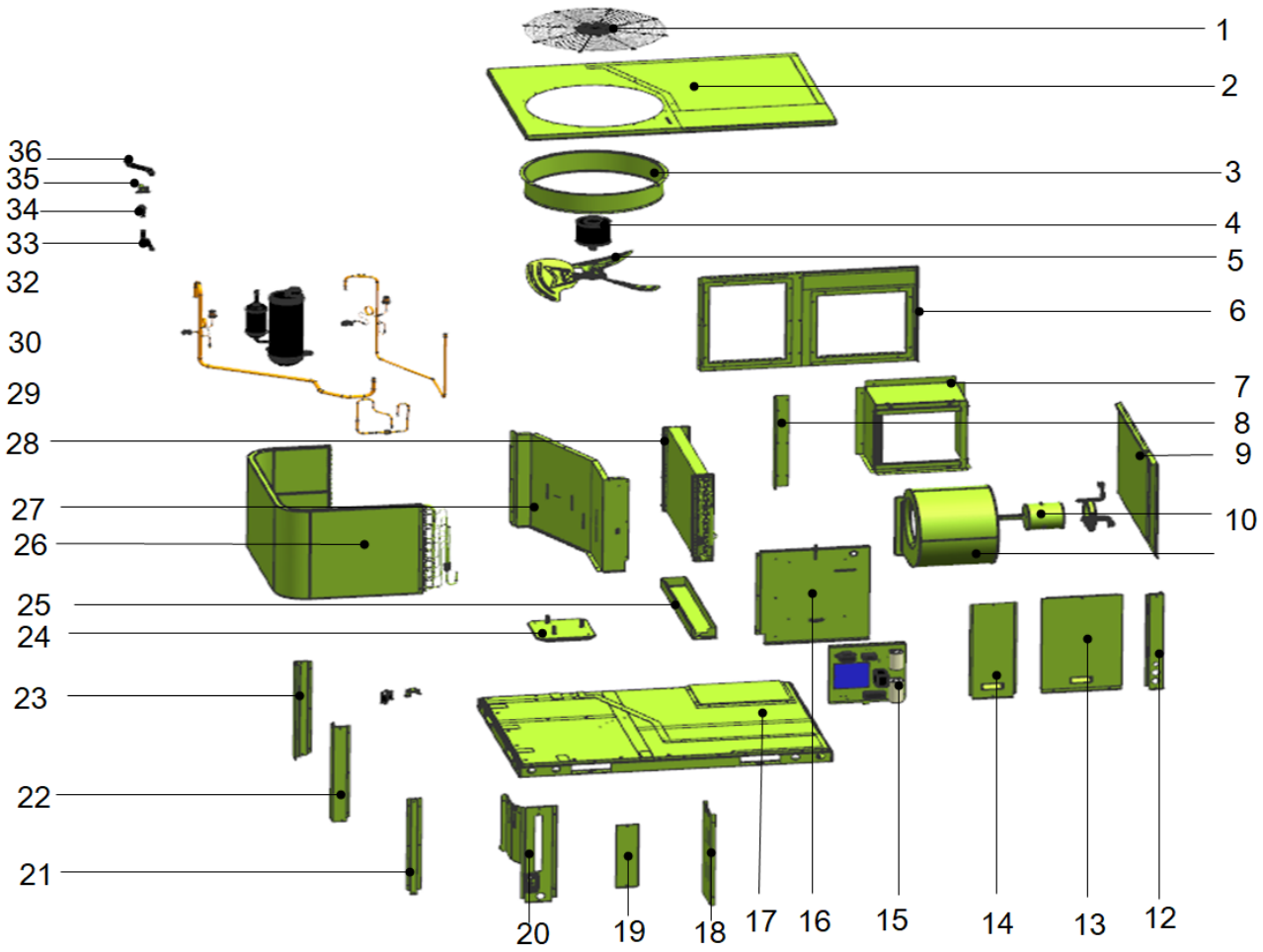
Air flow

9. Exploded view

APRI636J2A-GTG105

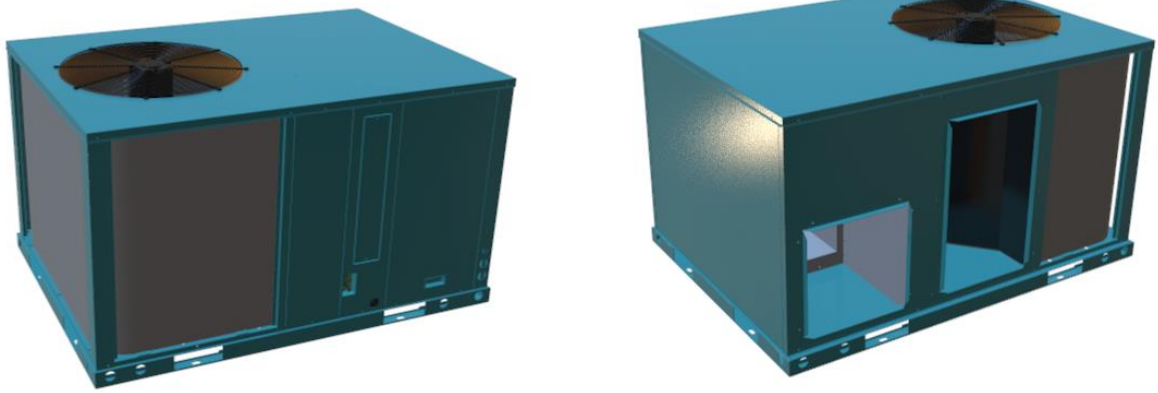


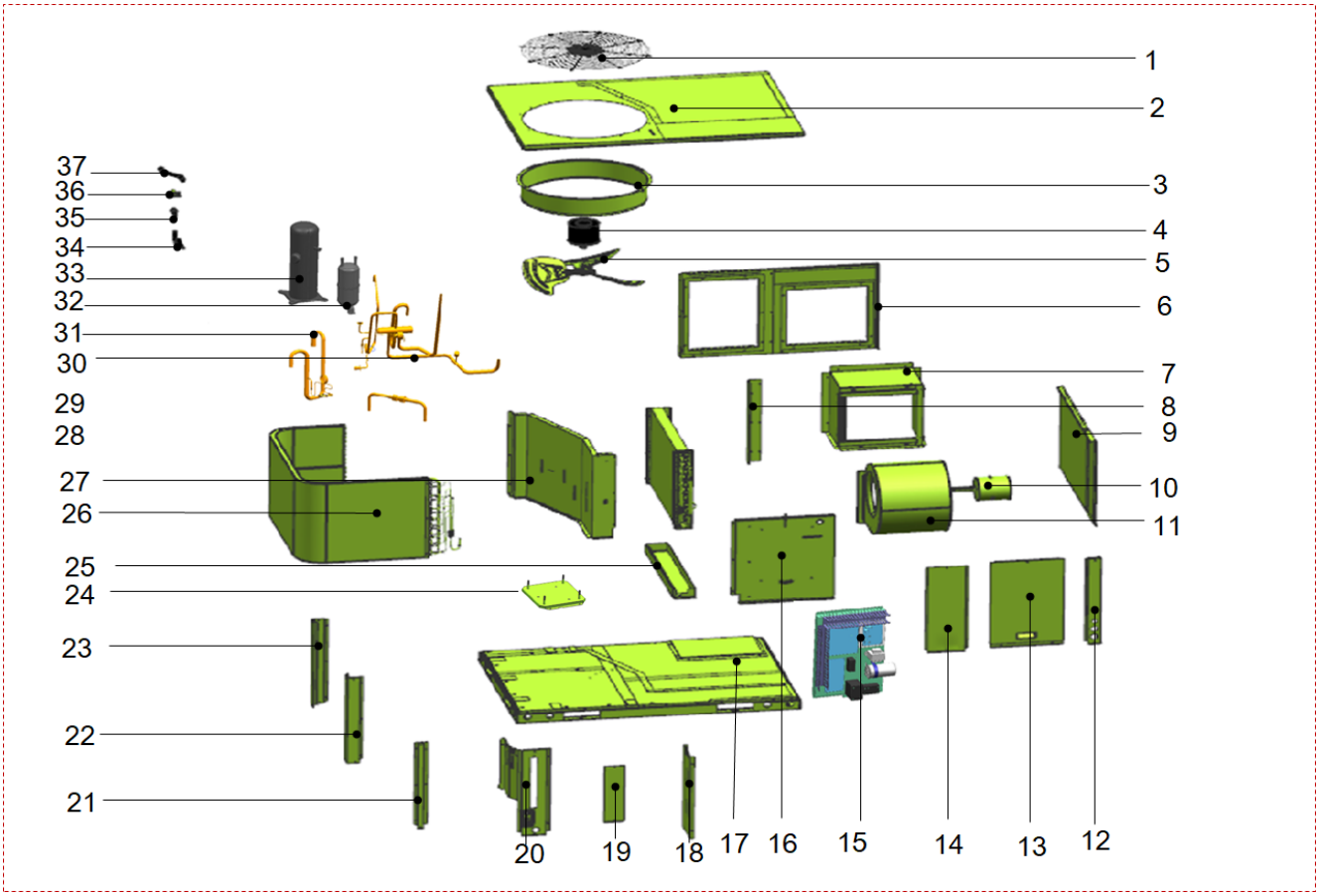




No.	Part Name	Quantity	No.	Part Name	Quantity
1	Outer fan grille	1	21	Bottom plate with cotton component	1
2	Top cover cotton component	1	22	Electronically controlled sealing plate welding parts	1
3	Air guide ring assembly	1	23	Sealing plate cotton assembly	1
4	Outdoor fan motor	1	24	Front column applicator assembly 2	1
5	Outdoor fan motor pedestal	1	25	Front column 1	1
6	Axial fan blade	1	26	Left column 1	1
7	Air outlet side panel cotton assembly	1	27	Left column 2	1
8	Air duct component	1	28	Compressor base weldment	1
8.1	Air duct side plate 1	1	29	Water tray cotton assembly	1
8.2	Air duct side plate 2	1	30	Condenser unit	1
8.3	Indoor fan motor upper plate	1	31	Middle partition cotton assembly 1	1
8.4	Indoor fan motor down plate	1	32	Evaporator component	1
8.5	Indoor fan motor rear plate	1	33	TXV component	1
9	Evaporator sealing plate with cotton component	1	33.1	Electronic expansion valve	1
10	Right side panel cotton component	1	34	Piston component	1
11	Indoor fan motor fixed ring	1	34.1	One way piston	1
12	Indoor fan motor fixed girder components	3	35	Four way valve weilding components	1
13	Indoor fan motor	1	35.1	Discharge pipe components	1
14	Indoor fan motor volute	1	35.1.1	Needle valve	1
15	Front column applicator assembly 3	1	35.1.2	High Pressure Switch	1
16	Inner cover cotton assembly	1	35.2	Air return pipe	1
17	Outer cover	1	35.2.1	Needle valve assembly	1
18	Electric control box components	1	35.3	Four way valve component	1
18.1	Main PCB pedestal	1	35.3.1	4-way valve	1
18.2	Transformer	1	35.4	Pressure sensor	1
18.3	Electric control board assembly(Outdoor PCB)	1	36	Inverter compressor	1
18.4	Display board	1	37	Drainage elbow	1
18.5	Indoor PCB	1	38	Water outlet port	1
18.6	Reactor	1	39	Drain connector	1
19	Middle partition cotton assembly 2	1	40	Rubber tube	1
20	Bottom girder component	1			

APRI660J2A-GMG160





No.	Part Name	Quantity	No.	Part Name	Quantity
1	Outer fan grille	1	21	Bottom plate with cotton component	1
2	Top cover cotton component	1	22	Electronically controlled sealing plate welding parts	1
3	Air guide ring assembly	1	23	Sealing plate cotton assembly	1
4	Outdoor fan motor	1	24	Front column applicator assembly 2	1
5	Outdoor fan motor pedestal	1	25	Front column 1	1
6	Axial fan blade	1	26	Left column 1	1
7	Air outlet side panel cotton assembly	1	27	Left column 2	1
8	Air duct component	1	28	Compressor base weldment	1
8.1	Air duct side plate 1	1	29	Water tray cotton assembly	1
8.2	Air duct side plate 2	1	30	Condenser unit	1
8.3	Indoor fan motor upper plate	1	31	Middle partition cotton assembly 1	1
8.4	Indoor fan motor down plate	1	32	Evaporator component	1
8.5	Indoor fan motor rear plate	1	33	TXV component	1
9	Evaporator sealing plate applicator assembly	1	33.1	Electronic expansion valve	1
10	Right side panel cotton component	1	34	Piston component	1
11	Indoor fan motor fixed ring	1	34.1	One way piston	1
12	Indoor fan motor fixed girder components	3	35	Four way valve weilding components	1
13	Indoor fan motor	1	35.1	Discharge pipe components	1
14	Indoor fan motor volute	1	35.1.1	Needle valve	1
15	Front column applicator assembly 3	1	35.1.2	High Pressure Switch	1
16	Inner cover cotton assembly	1	35.2	Four way valve component	1
17	Outer cover	1	35.2.1	4-way valve	1
18	Electric control box components	1	35.3	Pressure sensor	1
18.1	Main PCB pedestal	1	36	Suction pipe	1
18.2	Transformer	1	36.1	Needle valve	1
18.3	Electric control board assembly(Outdoor PCB)	1	37	Gas-liquid seperator	1
18.4	Display board	1	38	Inverter compressor	1
18.5	Indoor PCB	1	39	Drainage elbow	1
18.6	Reactor	1	40	Water outlet port	1
19	Middle partition cotton assembly 2	1	41	Drain connector	1
20	Bottom girder component	1	42	rubber tube	1

10. Troubleshooting

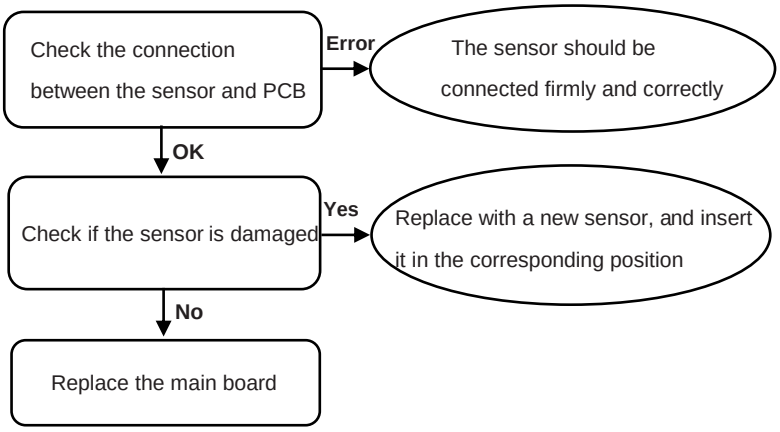
The fault codes as follows:

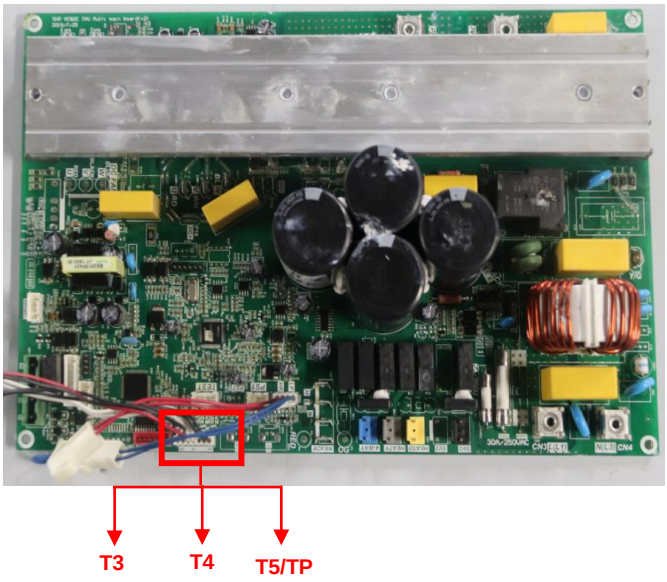
Digital display	Fault or protect definition
E4	Failure in temperature sensor T4
E6	Failure in temperature sensor T3 in condenser
E8	Failure in temperature sensor T5 on exhaust pipe
E9	AC over voltage / under voltage.
E10	Failure in EEPROM of outdoor unit
E12	Failure in sensor on IPM
E13	Failure in pressure sensor of HLP
E14	T3/T5 condenser sensor disconnected
E15	Malfunction of HPS high pressure switch
H0	Failure in communication between outdoor main control and branch control
H1	Abnormal turn-off or failure in rebooting due to the high temperature of T3 in condenser (Cooling)
H2	Abnormal turn-off or failure in rebooting due to malfunction of high pressure switch
H3	Abnormal turn-off or failure in rebooting due to high pressure in condenser (heating)
H4	Abnormal turn-off or failure in rebooting due to high temperature in IPM modules
H5	Abnormal turn-off or failure in rebooting due to low pressure of refrigerant
H6	Abnormal turn-off or failure in rebooting due to high temperature in T5 exhaust pipe
H7	Abnormal turn-off or failure in rebooting due to abnormal refrigerant status in compressor
H8	T3 condenser sensor disconnected
H12	TP condenser sensor disconnected
P1	Protection of high pressure switch
P2	Protection of running of refrigerant in low pressure (cooling)
P3	Overcurrent protection
P4	Protection of T5 exhaust pipe for high temperature
P5	Protection of T3 condenser for high temperature (cooling)
P6	Protection of IPM
P8	Excessive IPM temperature protection
P9	Failure in DC motor and fan
P12	standby due to abnormal refrigerant status in compressor
P13	standby due to abnormal high pressure in condenser (heating)
P14	high compression ratio protection
P15	low compression ratio protection
P16	Failure in starting due to inadequate ambient temperature

L1	DC cable bus low/high voltage protection
L2	DC High Voltage rotation
L4	Problems of MCE / synchronization / starting of compressor
L5	no speed
L7	Protection of compressor due to phase loss
L8	Compressor stalling
L9	Restriction on frequency for high pressure in condensation
LA	Restriction on frequency for problems of electrical pressure
LC	Restriction on frequency for inadequate temperature of condenser T3
LD	Restriction on frequency for inadequate exhaust temperature of sensor T5
LE	Restriction on frequency of IPM for high temperature or inadequate temperature
LF	Current frequency limiting
dO	oil return
dF	Defrosting
dH	Forced running

E4/E6/E8 (T4/T3/T5 temperature sensors error)

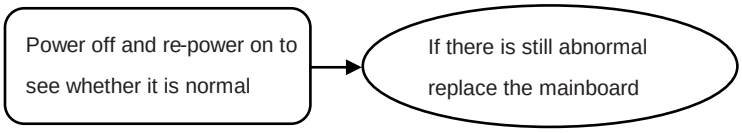
Diagnosis	Handling





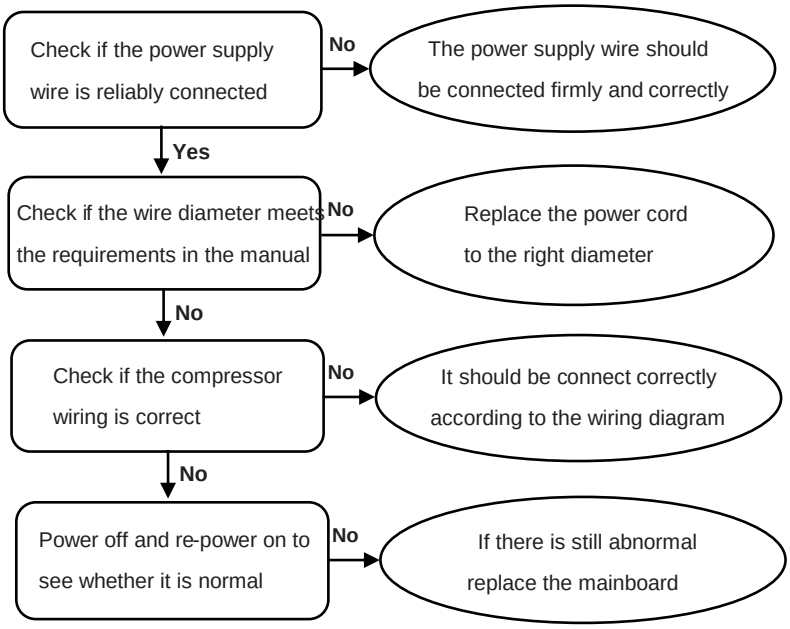
E10 (EEPROM failure）

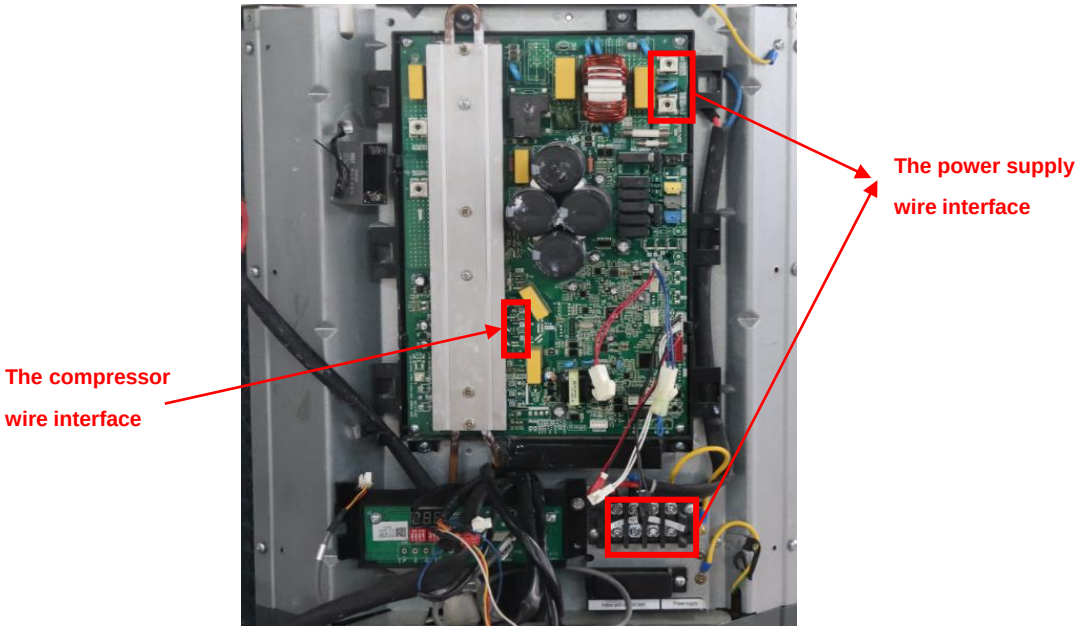
Diagnosis	Handing



E9 (AC overvoltage/undervoltage protection)

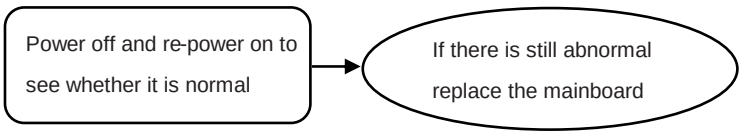
Diagnosis	Handling





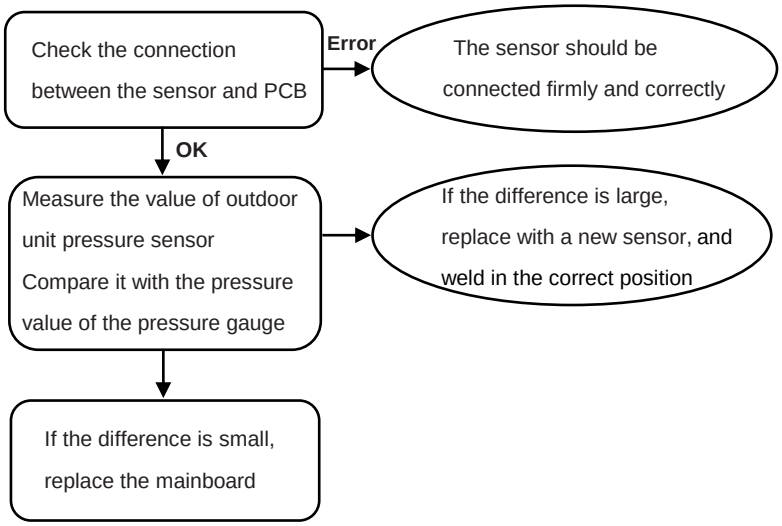
E12 (IPM modular sensor error）

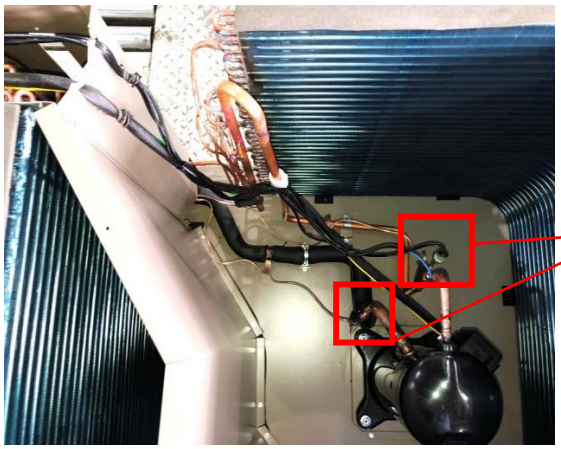
Diagnosis	Handing



E13 (HP/LP Pressure sensor error)

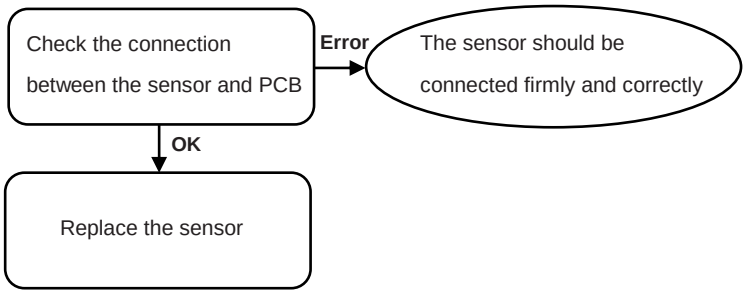
Diagnosis	Handling





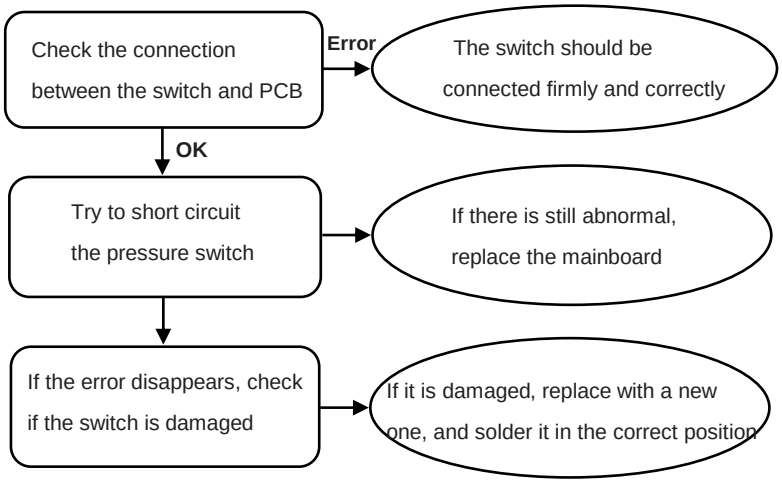
E14/H8/H12 (T3 or T5 sensor disconnect error)

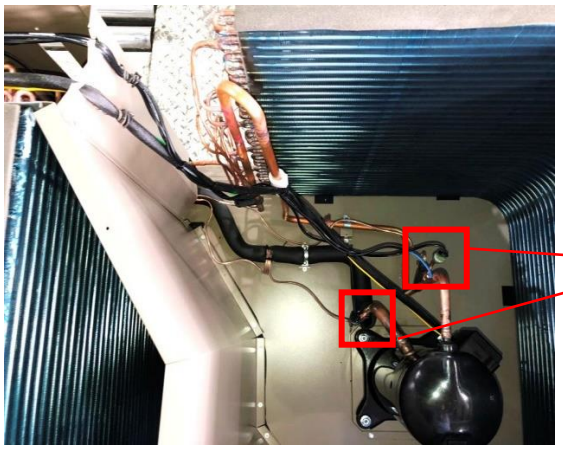
Diagnosis	Handing



E15 (High pressure switchcondenser sensor disconnected)

Diagnosis	Handling

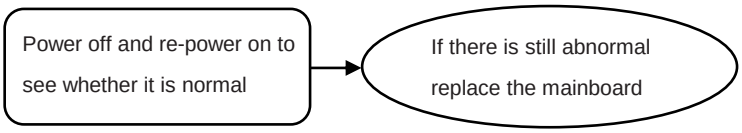




The high pressure switch should be soldered in the correct position

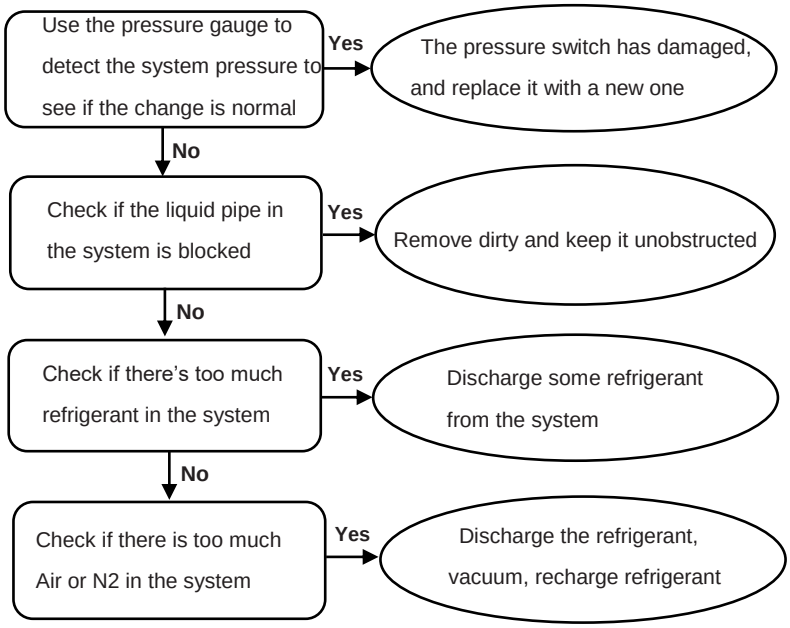
H0 (Communication error of main chip and IPM DSP)

Diagnosis	Handing



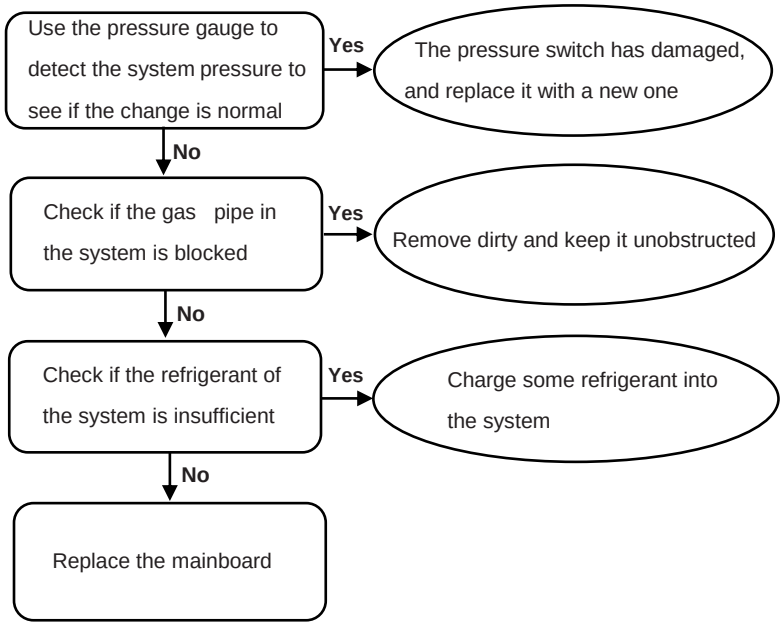
P1/H2 (High pressure switch protection)

Diagnosis	Handling



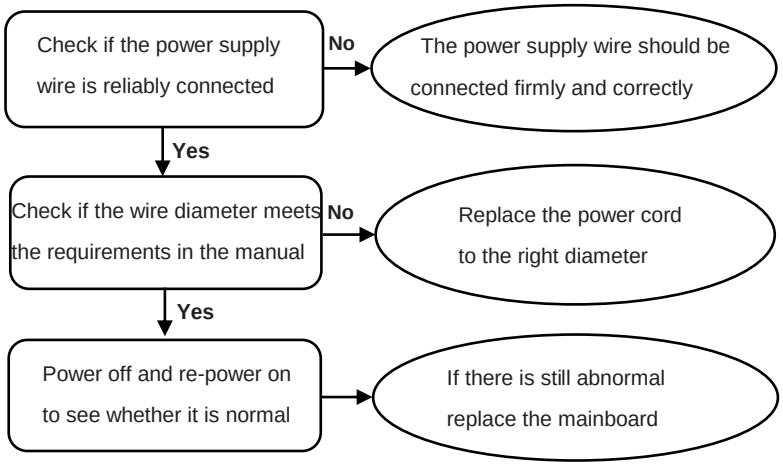
P2/H5 (Low pressure switch protection）

Diagnosis	Handing



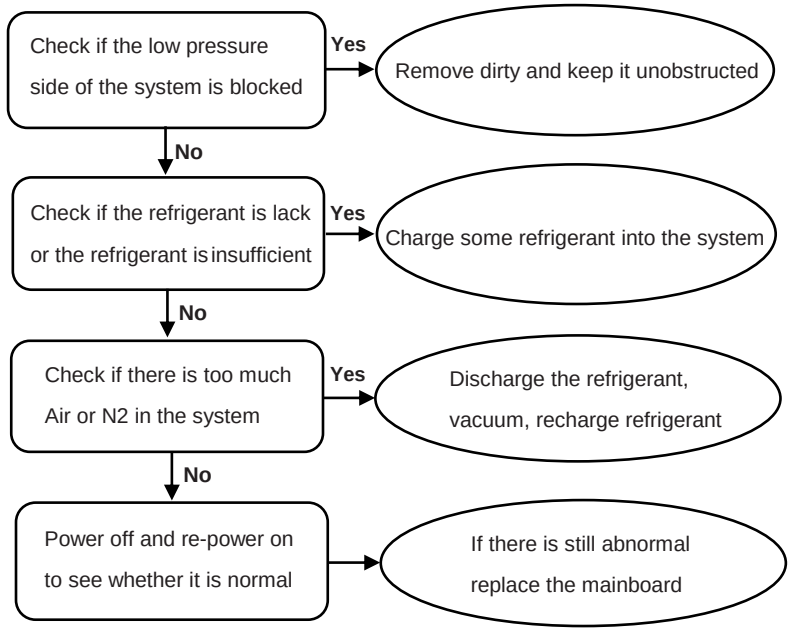
P3(Inverter over current protection)

Diagnosis	Handling



P4/H6 (T5 Discharge temperature abnormal error）

Diagnosis	Handing



P5/H1(T3 condenser sensor high temp protection)

Diagnosis	Handling

Check if the liquid side of outdoor system is blocked → No → Remove dirty and keep it unobstructed

Yes ↓

Check if there is too much Air or N2 in the system → No → Discharge the refrigerant, vacuum, recharge refrigerant

Yes ↓

Power off and re-power on to see whether it is normal → If there is still abnormal replace the mainboard

P6 (IPM module protection）

Diagnosis	Handing

Power off and re-power on to see whether it is normal → If there is still abnormal replace the mainboard

P8/H4 (IPM high temperature protection）

Diagnosis	Handing

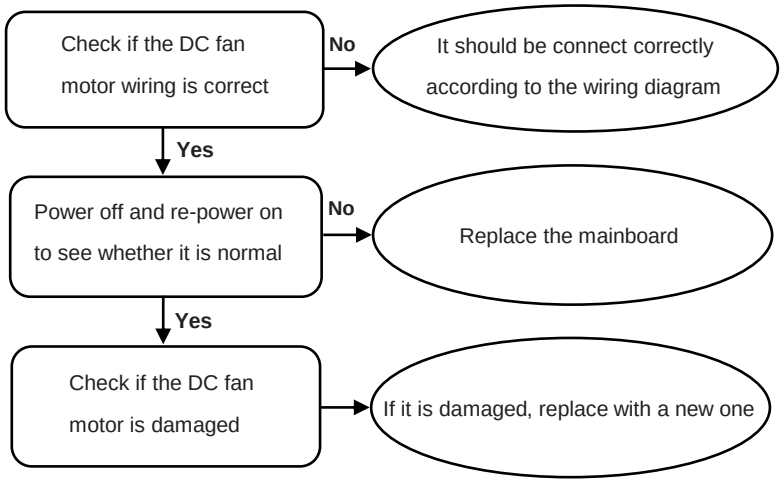
Re-power on to measure the temperature of the IPM board Observe the temperature change → If the temperature changes normally, but the final temperature is too high, remove the IPM heat sink cover plate, apply heat dissipation slicone grease evenly again, then tighten the screws to fasten the cover plate

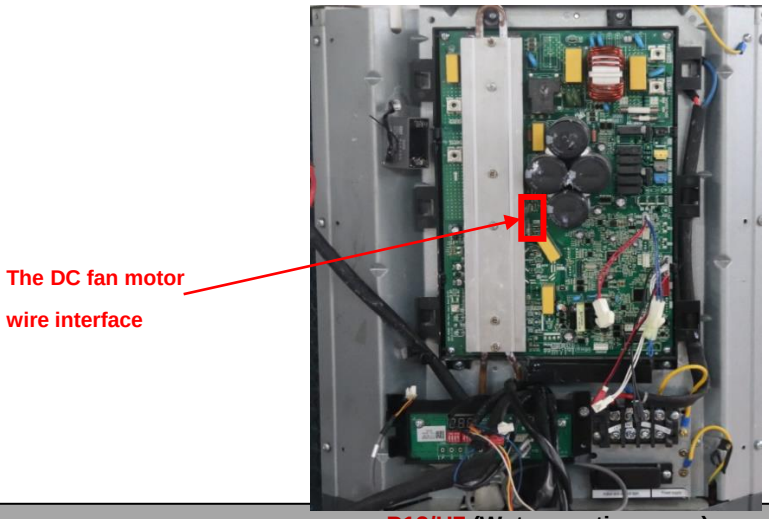
No ↓

Replace the mainboard

P9 (DC fan motor error)

Diagnosis	Handling





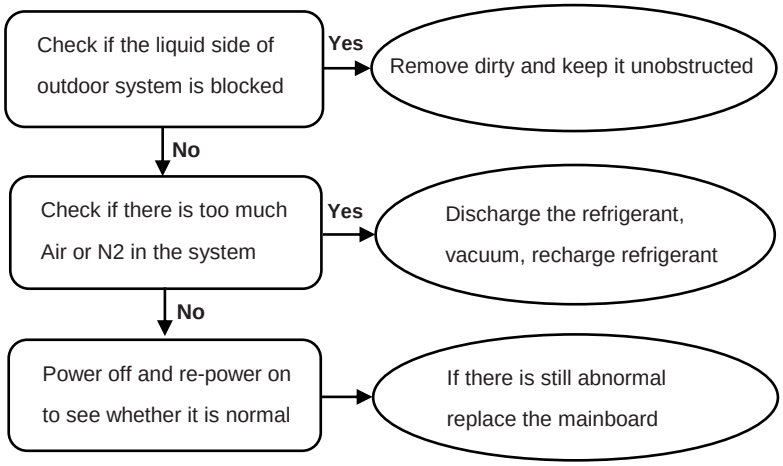
P12/H7 (Wet operation error)

Diagnosis	Handing

Power off and re-power on to see whether it is normal

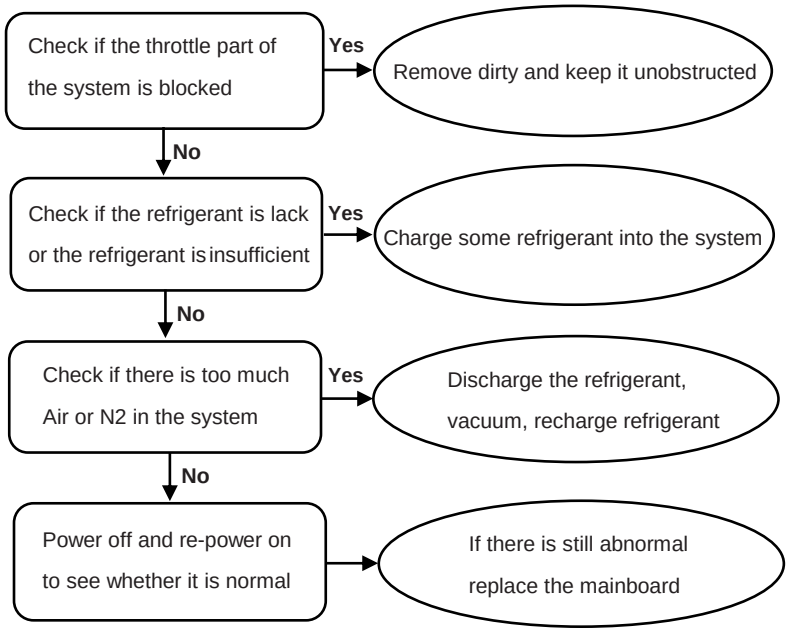
P13/H3(High pressure abnormal error(In heating mode))

Diagnosis	Handling



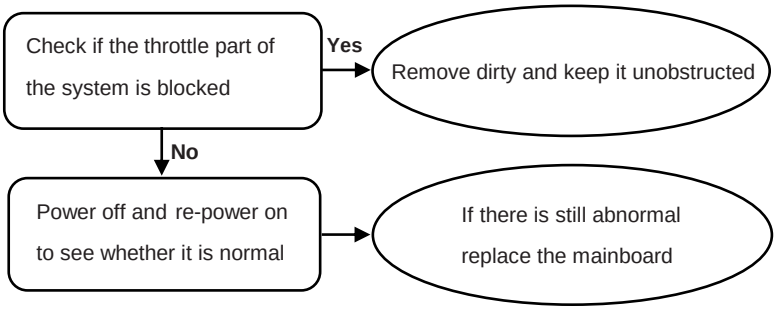
P14 (High compression ratio protection)

Diagnosis	Handing



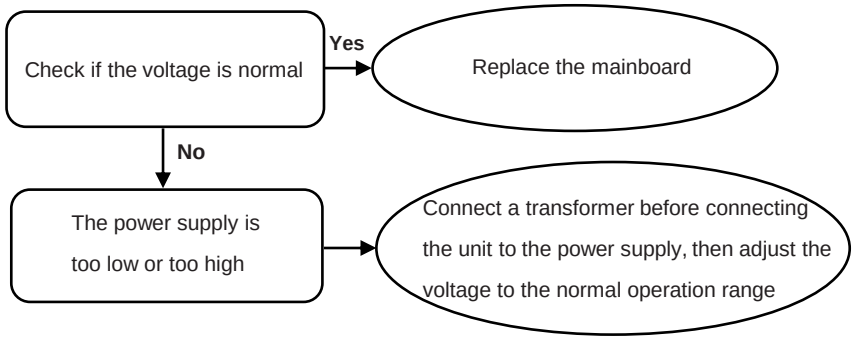
P15 (Low compression ratio protection)

Diagnosis	Handing



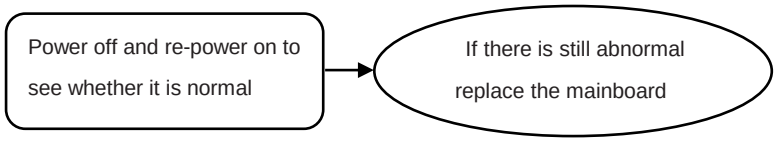
L1/L2(DC cable bus low/high voltage protection)

Diagnosis	Handling



L4-L8 (IPM module subdivision protection）

Diagnosis	Handing

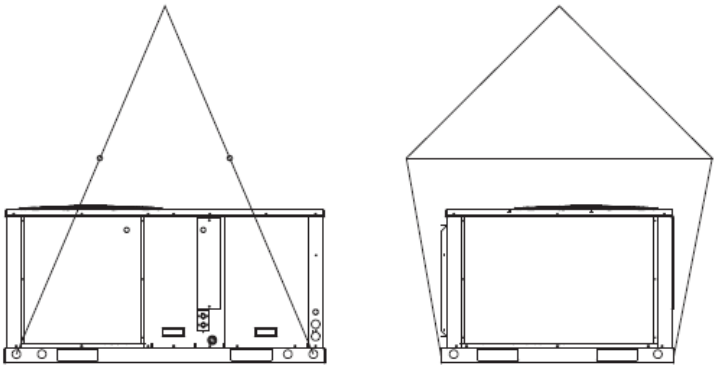


L9-LE (Frequency limitation protection, not error）

11. Installation

1. Lifting

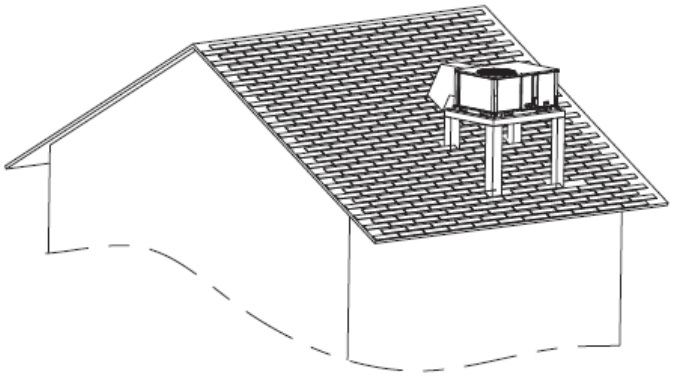
- Rigging cables should have adequate capability to resist 3 times weight of unit. Before lift, please check and ensure that hooks are holding tightly to unit and lifting angles are no less than 60°.
- Cloth material or hard-paper should be padded in the contact place between unit and rigging cable. Rigging cable should be entwined a round at the hook for prevent danger by cable slip because of weight unbalance.
- During lifting, anyone forbidden lingering under the lifting unit.



2. Rooftop unit

- For roof top applications using a field fabricated frame and ducts, use the following procedure:
- The frame must be located and secured by bolting or welding to the roof. Flashing is required.
- The hole in the roof must be prepared in advance of installing the unit.
- Secure the ducts to the roof.
- Place the unit on the frame or roof curb.
- Secure the unit to the frame or roof curb.
- Insulate any ductwork outside of the structure with at least two (2) inches of insulation and then weatherproof. There must be a weatherproof seal where the duct enters the structure.
- Complete the installation according to the instructions in the following sections of this manual.

Typical rooftop application with frame



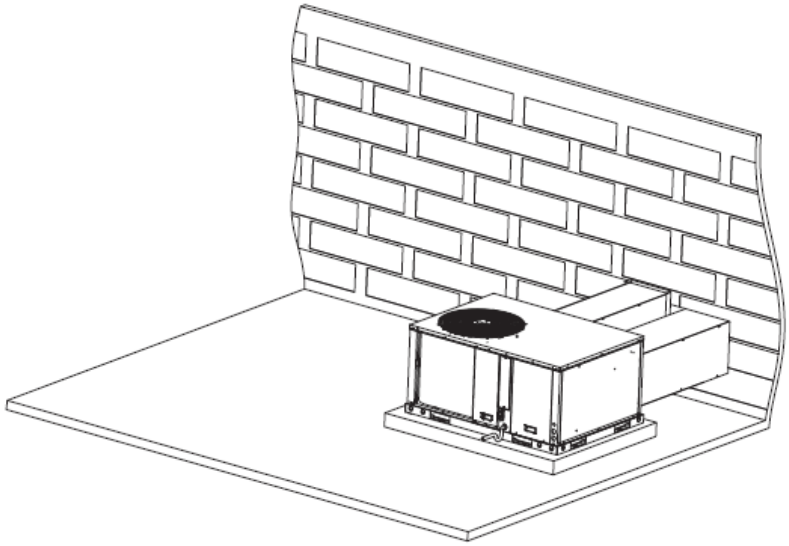
3. Ground level-horizontal unit

- For ground level installations, the unit should be positioned on a pad in the size of the unit or larger. The unit must be level on the pad. The pad must not come in contact with the structure. Be sure the outdoor portion of the supply and return air ducts are as short as possible.

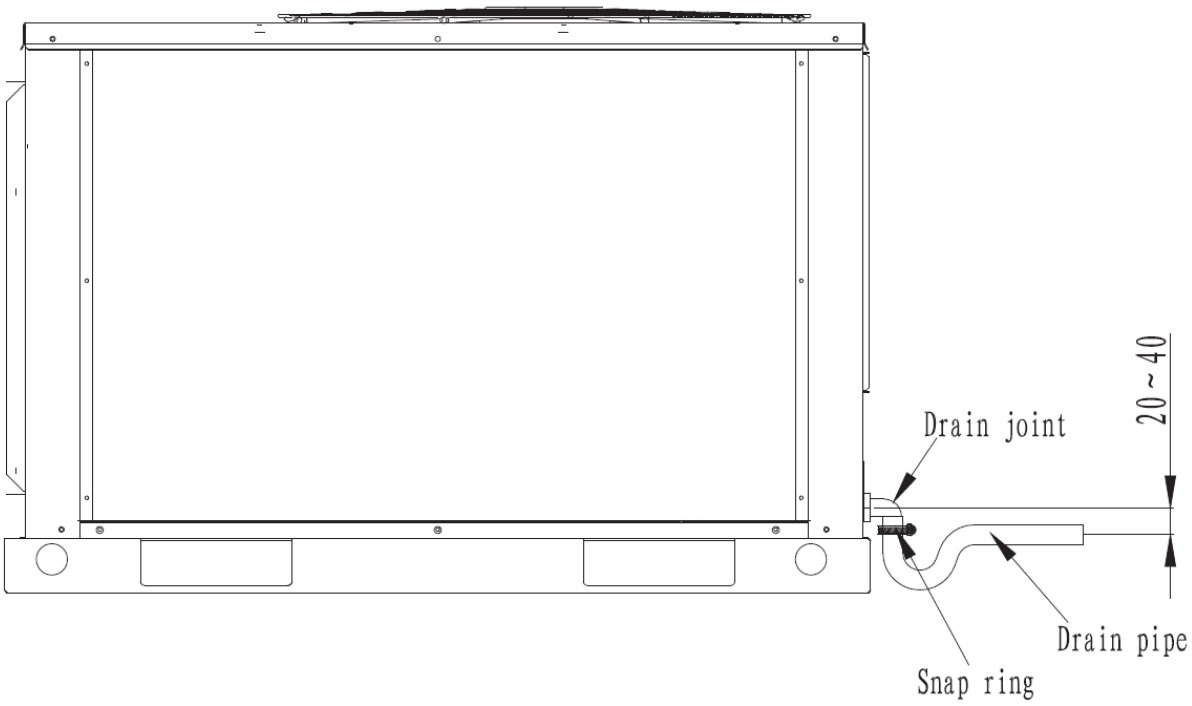
1

- Proceed with the installation as follows:
- Place the unit on the pad.
- Attach the supply and return air ducts to the unit.
- Insulate any ductwork outside of the structure with at least 2 inches of insulation and weatherproof. There must be a weatherproof seal where the duct enters the structure.

Typical ground level application



4. Condensate drain piping



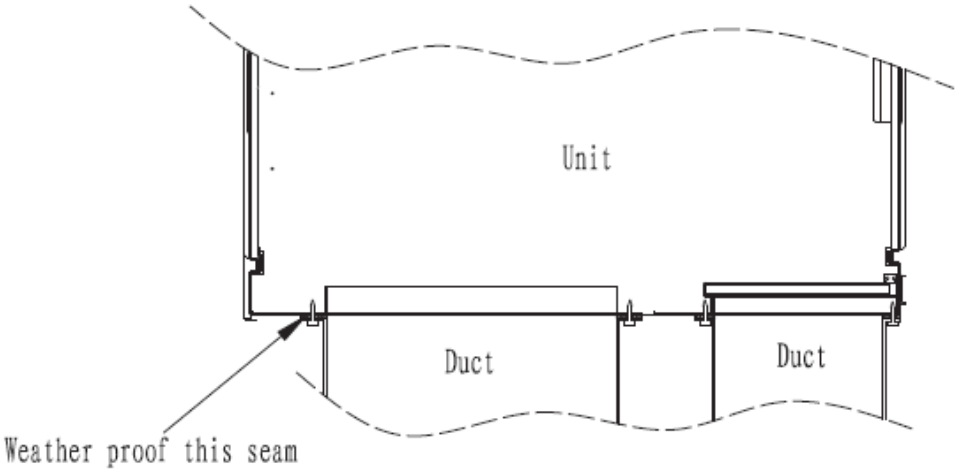
5. Ductwork

●Attaching horizontal ductwork to unit

●All conditioned air ductwork should be insulated to minimize heating and cooling duct losses. Use a minimum of two (2) inches of insulation with a vapor barrier. The outside ductwork
●must be weatherproofed between the unit and the building.
●When attaching ductwork to a horizontal unit, provide a flexible watertight connection to

NOTE

Do not draw the canvas taut between the solid ducts.



12. Controller

- **24V conventional thermostat\wire controller**
  - **Required components**
  - The following components are required: main power fuses, conduit coupling, and field supplied room thermostat.

Suggestion:Thermostat choose Non programmed electrical thermostat series of Honeywell such as RTH111, RTH2300/RTH221, TH5220D.

ENVIRONMENTAL
TECHNOLOGIES LLC.

17702 Mitchell North, #101
Irvine, CA. 92614 .USA
Tel: 714 795 2830
Fax: 714 966 1646
info@omegavrf.com
www.omegavrf.com

AIR CONDITIONING

Showroom & Technology Center
11380 Interchange Circle North
Miramar,FL 33025 .USA
Tel: 305 901 1270
Fax: 954 212 8280
info@otecvrf.com
www.otecvrf.com