

# 16 SEER TOP-DIACHARGE UNIT TECHNICAL MANUAL



<b>Part 1. General Information</b>	<b>3</b>
1. Nomenclature	4
2. Model Names of Indoor/Outdoor Units	6
3. External Appearance	7
4. Features	8
<b>Part 2 Outdoor Unit</b>	<b>9</b>
1. Specification	10
2. Dimensions	10
3. Service Space	12
4. Wiring Diagrams	13
5. Electric Characteristics	14
6. Operation Limits	14
7. Sound Levels	15
8. Exploded View	16
9. Troubleshooting	17
<b>Part 3 Floor &amp; ceiling</b>	<b>23</b>
1. Specification	24
2. Dimensions	25
3. Service Space	26
4. Wiring Diagrams	27
5. Electric Characteristics	29
6. The Specification of Power	29
7. Exploded View	30
8. Troubleshooting	32
<b>Part 4 Installation</b>	<b>33</b>
1. Precaution on Installation	34
2. Vacuum Dry and Leakage Checking	35
3. Additional Refrigerant Charge	37
4. Insulation Work	38
5. Test Operation	40

## **R410A 60Hz Universal Outdoor series**

### Part 1. General Information

1. Model Names of Indoor/Outdoor Units	4
2. External Appearance	5
3. Features	6

## 1. Model Names of Indoor/Outdoor Units

### 1.1 Indoor Units

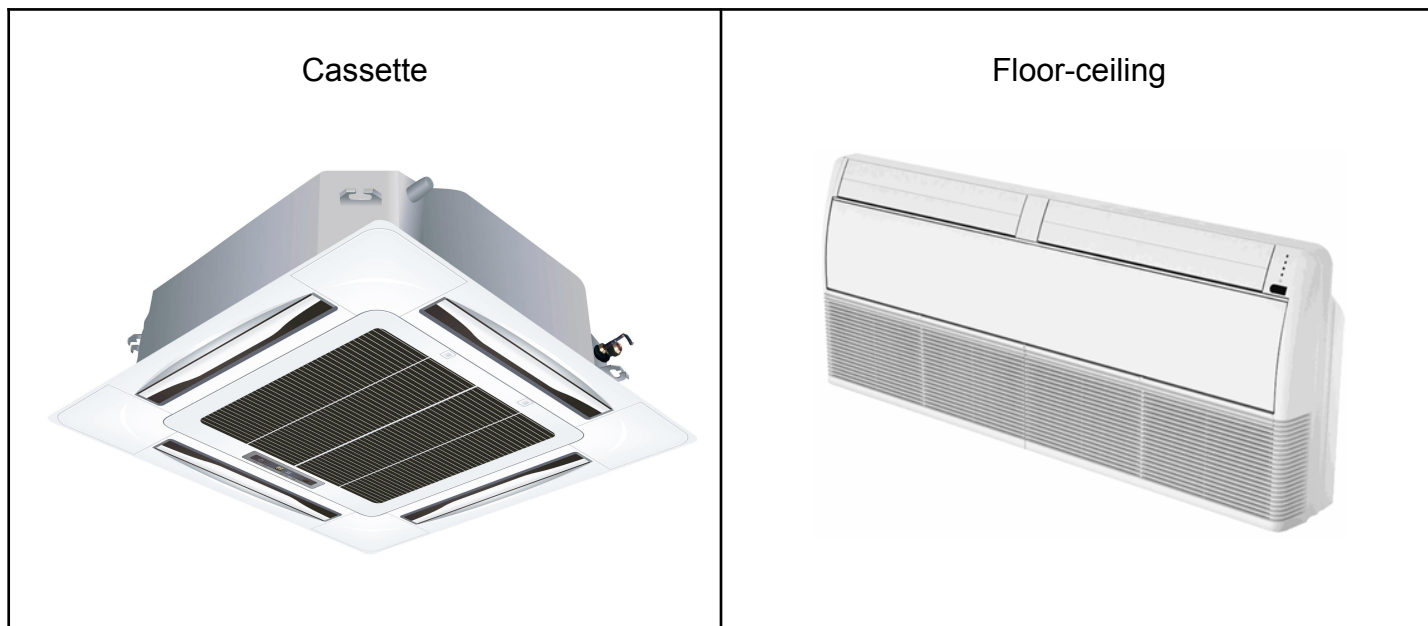
Model name	Dimension(W×H×D) (mm)	Power supply
<b>SEER 16 Cooling Only</b>		
T16CU16VT36S	1250×675×235	208~230V-1Ph-60Hz
T16CU16VT60S	1670×750×235	208~230V-1Ph-60Hz

### 1.2 Outdoor Units

Model name	Dimension (W×H×D) (mm)	Power supply
<b>Cooling Only</b>		
T16CROVT36AS	740×622×740	208~230V-1Ph-60Hz
T16CROVT60AS	740×835×740	208~230V-1Ph-60Hz
<b>24V control</b>		
T16CROVT36AS	740×633×740	208~230V-1Ph-60Hz
T16CROVT60AS	740×835×740	208~230V-1Ph-60Hz

## 2. External Appearance

### 2.1 Indoor unit



### 2.2 Outdoor unit



**Note:** Standard outdoor unit is using metal grill, and plastic grill can be customized.

### **3. Features**

**3.1 Capacity range : 36k/60k, cooling only type.**

**3.2 Well known brand inverter compressor: Mitsubishi & GMCC, reliable quality.**

**3.3 Can be matched with cassette\floor-ceiling and air-handler units.**

**3.4 Coils constructed with enhanced aluminum fins, golden fins/ blue fins are available.**

**3.5 Integrated circuit with refrigerant cooling design**

**3.6 R410A environment friendly refrigerant.**

**3.7 Flexible installation, ceiling suspended and floor standing .**

**3.8 New panel for cassette units,simple and vogueish appearance suit for different.**

## Part 2 Outdoor Unit

1. Specification	8
2. Dimensions	9
3. Service Space	10
4. Wiring Diagrams	11
5. Electric Characteristics	12
6. Operation Limits	12
7. Sound Levels	13
8. Exploded View	14
9. Troubleshooting	15

# 1. Specification

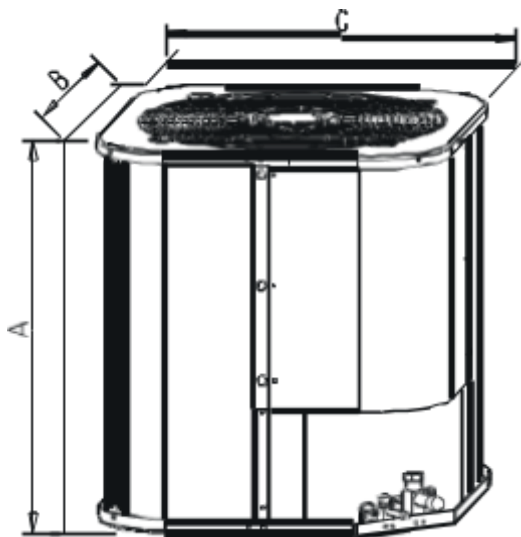
Model name		Unit	COT-36CNVR1-16	COT-60CNVR1-16
Code		Outdoor code	821039000041	821039000042
Power supply		V/Ph/Hz	208~230-1-60	208~230-1-60
Input consumption		W	600-4000	600-5500
Current		A	2.5-19	2.5-30
Outdoor coil	Number of row		1	2
	Fin spacing	mm	1.4	1.4
	Fin material		Hydrophilic aluminum foil	Unhydrophilic aluminum foil
	Tube outside diameter	mm	φ7	φ7
	Tube material		Inner grooved	Inner grooved
	Coil length x height x width	mm	2148×588×13.37	2148×798×26.76
	Number of circuit		2	4
Compressor	Brand		GMCC	Mitsubishi
	Model		ATM240D57UMT	MNB40FEQMC
	Type		Twin-rotary	Twin-rotary
	Capacity	W/h	7235	12900
	Input	W	1945	3960
	Rated current(RLA)	A	8.85	14.8
	Refrigerant oil	ml	670	1100
Outdoor fan motor	Brand		Lvzhi	Lvzhi
	Model		YDK-110-8P2	YDK-230-6P2
	Input	W	207	331
	Running current	A	0.9	1.5
	Capacitor	μF	6μF/450V	12μF/450V
	Speed	r/min	850	1110
Outdoor air flow		m³/h	4500	6000
Outdoor noise level		dB(A)	57	60
Outdoor dimension	Unit (WxHxD)	mm	740×740×633	740×740×835
	Packing (WxHxD)	mm	760×760×660	760×760×875
Net/Gross weight		kg	66/70	80/85
Refrigerant	Type		R410A	R410A
	Charge	kg	2.2	3.8
Refrigerant pipe	Liquid side/ Gas side	mm(inch)	Φ9.52/Φ19.05(3/8"/3/4")	Φ9.52/Φ19.05(3/8"/3/4")
	Max. refrigerant pipe length	m	25	30
	Max. difference in level	m	20	20
Operation temperature range		°C	16~32	16~32
Ambient temperature range		°C	16~50	16~50



## 2 .Dimensions

All dimensions are in mm. They are subject to change without notice.

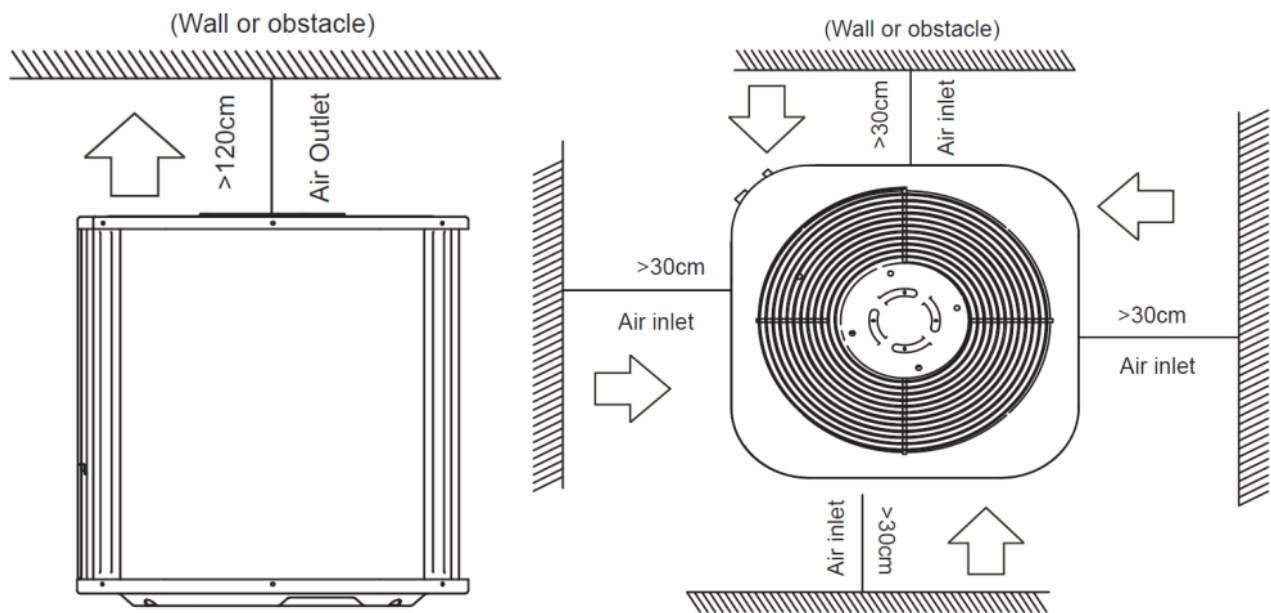
Certified dimensions will be provided upon request.



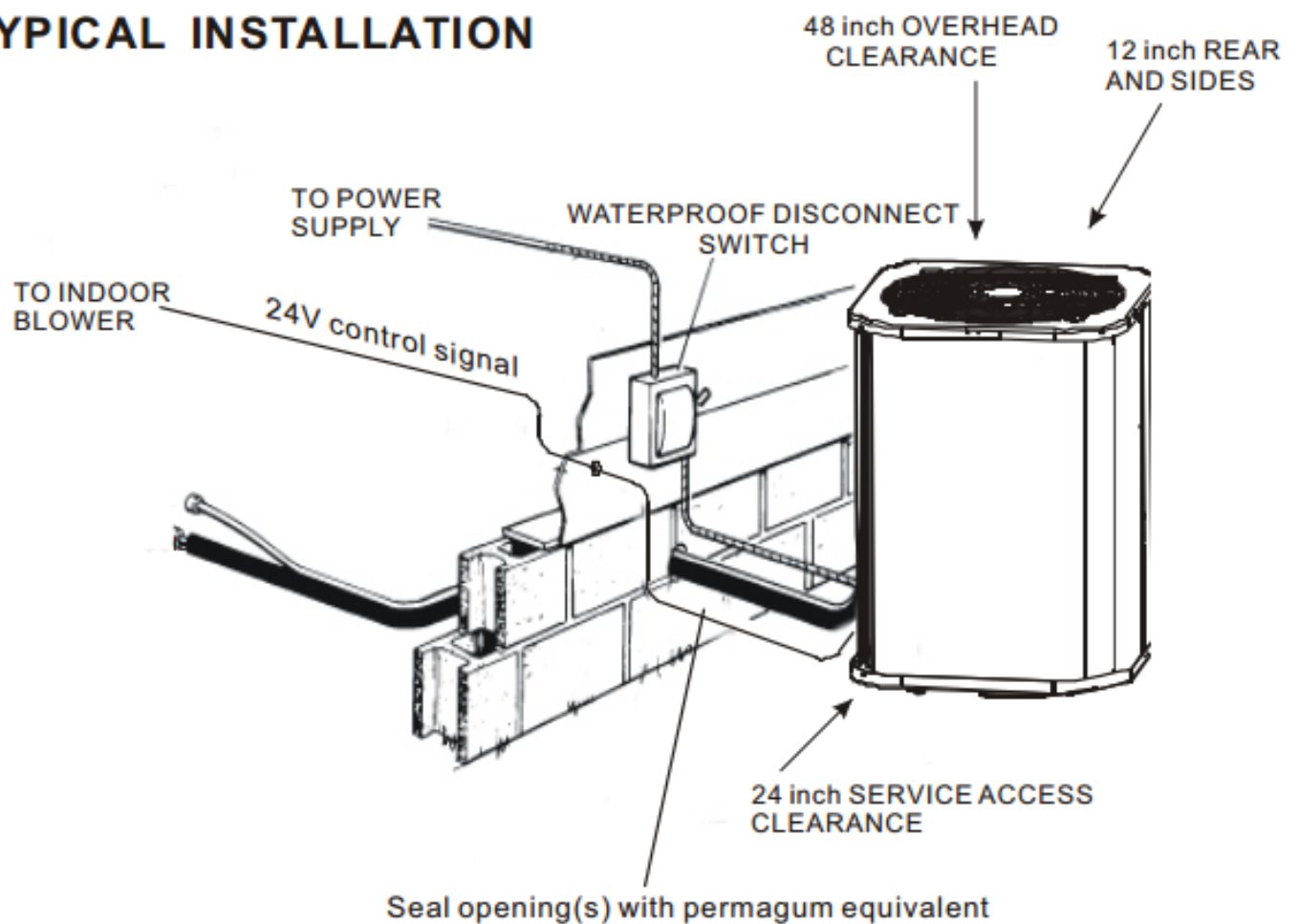
Model	Dimensions(mm)			Refrigerant Connection pipe Size(mm)		
	A	B	C	Liquid( $\phi$ )		Vapor( $\phi$ )
				LF	RF	
36K	633	740	740	9.52	12.7	19.05
60K	835	740	740	9.52	12.7	19.05

NOTE: LF means cooling only model; RF means heat pump model.

### 3. Service Space

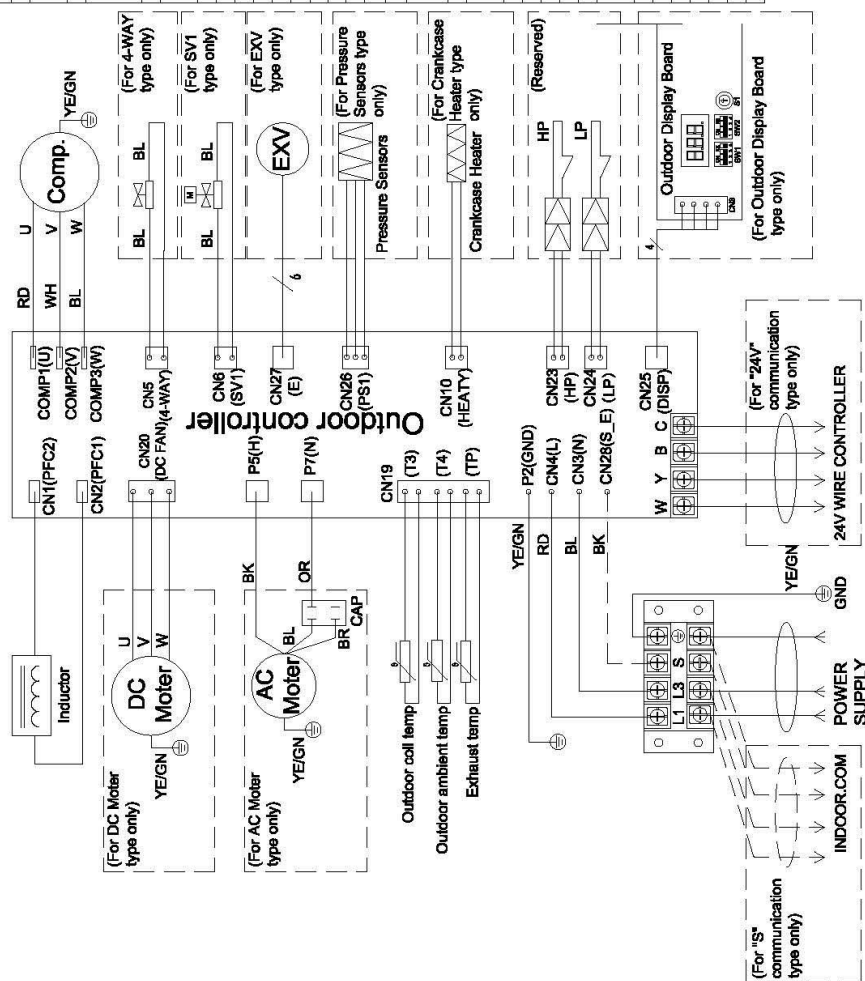


### TYPICAL INSTALLATION



## 4. Wiring Diagrams

## ELECTRICAL WIRING DIAGRAM



VAM

802039090172

V.4

Check Table

NUM	Contents (Remark)	Expansion valve opening degree (Real opening degree=display value*4, if throttling device is capillary, it will show 0.)		
00	Normal display (Compressor frequency or error code)	19		
01	Unit capacity (36K or 60K)	32	T28 temperature (°C)	
02	Running mode (0-Standby, 2-Cooling mode, 3-Heating mode, 4-Force cooling mode)		Frequency lock reason: 1=Current lock, 2=Voltage lock, 4=Discharge temperature lock, 8=T3 temperature lock, 16=T2 temperature lock, 32=IPM temperature lock	
05	Compressor target frequency (Hz)	33		
06	Fan speed (AC motor: 1= low speed, 2= high speed, DC motor: current speed)			
07	T2 temperature (°C)		34 IPM modular board error reason (L0,L1,L2,L4, L5,L7)	
08	T3 temperature (°C)		35 SOFTWARE edition	
09	T4 temperature (°C)		EEPROM edition	
10	T5 temperature (°C)		38	
11	AC current (A)		37 Last error code	
12	DC current (A)			
13	AC voltage (V)			
14	DC voltage (Display value=Real voltage÷2)			
16	IPM modular temperature (60-120°C)			
17	Td setting temperature (°C)			
18	T1 temperature (°C)			

Error code description

Code	Error code description	Code	Error code description
E2	Communication error between indoor unit and outdoor unit		
E4	T4(Ambient) temperature sensor error		
E5	Discharge temperature sensor error		
E6	T3(Condenser) temperature sensor error		
E9	AC voltage too high or to low		
E10	EEPROM error		
H0	Communication error between main chip and IPM modular chip		
P1	High pressure protection		
P2	Low pressure protection		
P3	Over current error		
P4	Discharge temperature too high		
P6	IPM modular board error		

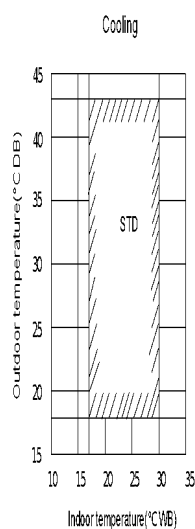
**$\Delta$  “S” communication and “24V” communication can’t exist at the same time.**

## 5. Electric Characteristics

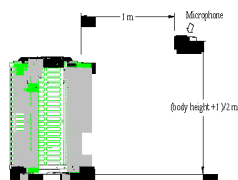
Model	Outdoor Unit				
	Hz	Voltage	Min.	Max.	Outdoor motor (kw)
COT-36CNVR1-1 6	60	208~230V	198V	242V	0.21
COT-60CNVR1-1 6	60	208~230V	198V	242V	0.36

## 6. Operation Limits

Operation mode	Outdoor temperature(°C)	Room temperature(°C)
Cooling operation	18~47	16~32



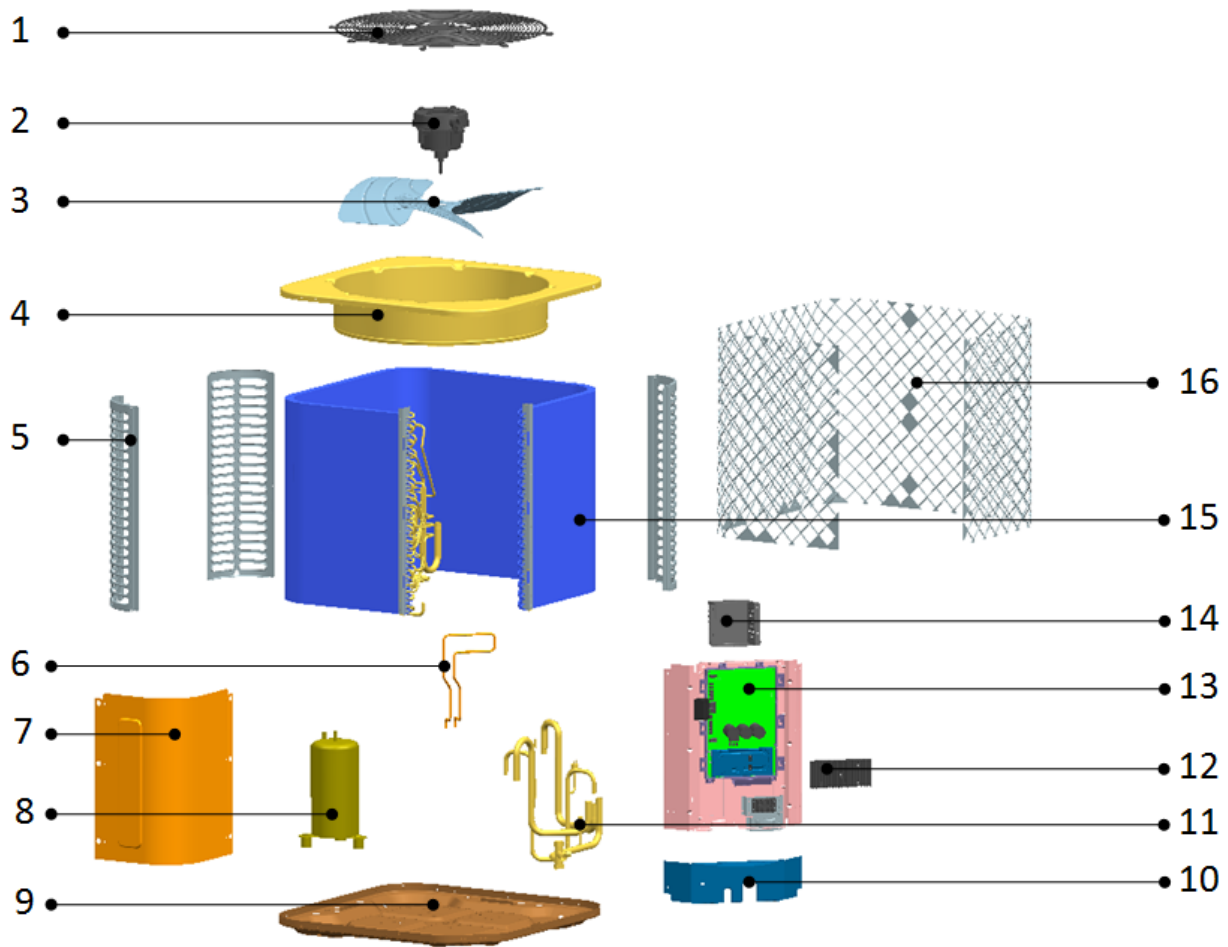
## 7. Sound Levels



Model	Noise level dB(A)
COT-36CNVR1-16	57
COT-60CNVR1-16	60

Note: Sound level is measured at a point 1 m in front of the unit, at a height of  $(\text{Unit body height} + 1) / 2 \text{ m}$ .

## 8. Exploded View



No.	Part Name	Qty	No.	Part Name	Qty
1	Cover net	1	11.3	Gas outlet pipes welded assy	1
2	Outdoor motor	1	11.3.1	Gas outlet pipe	1
3	Axial-flow fan	1	11.3.2	Gas concentration filter pipe	1
4	Top cover assy	1	12	Cooler cover	1
5	Support board	3	13	Electronic components	1
6	Refrigerant cooling tubes assy	1	13.1	Terminal block	1
7	Top panel	1	13.2	Outdoor display board	1
8	Compressor	1	13.3	Outdoor integrated E-board	1
9	Chassis assy	1	13.4	Reactor	1
10	Bottom side panel	1	13.5	Inserted fan motor capacitor	1
11	Refrigerant flow tubes assy	1	13.6	E-parts installation board welded assy	1
11.1	High pressure valve welded assy	1	13.7	Main control board installation base	1
11.1.1	High pressure valve connecting pipe	1	13.8	Communication board installation base	1
11.1.2	Square valve	1	13.9	Terminal block installation board	1

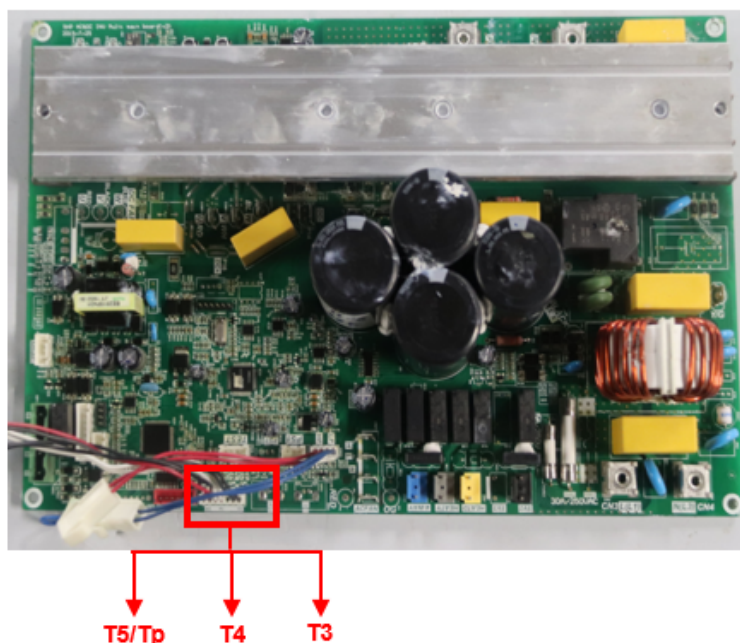
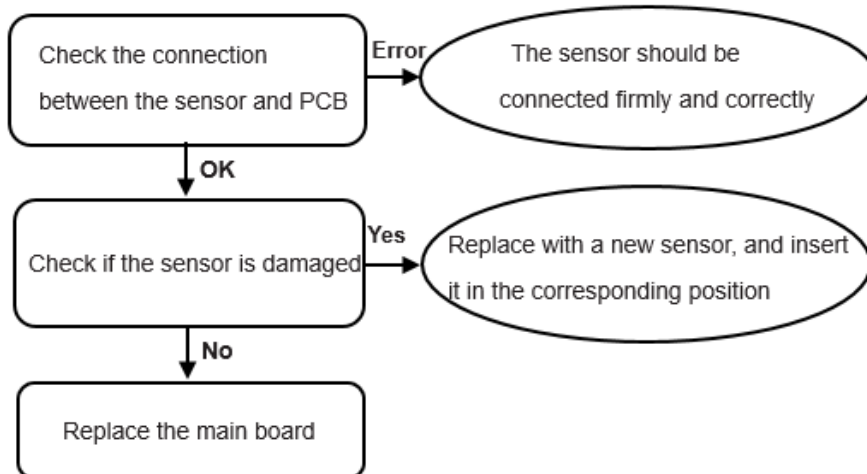
11.2	Low pressure valve welded assy	1	14	Reactor installation lid	1
11.2. 1	Square valve	1	15	Condenser	1
11.2. 2	Low pressure valve connecting pipe	1	16	Outdoor unit protecting net	1

## 9. Troubleshooting

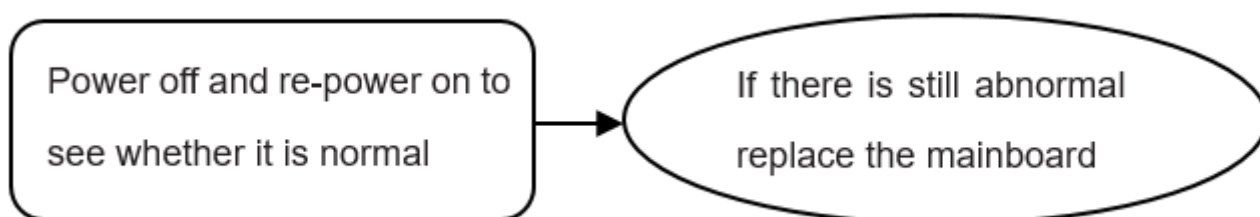
The fault codes for outdoor unit as follows:

CODE	FAULT DESCRIPTION
E2	Communication error between indoor unit and outdoor unit
E4	T4 Outdoor ambient temperature sensor error
E5	T5 Discharge temperature sensor error
E6	T3 Condenser temperature sensor error
E9	AC under voltage protection
E10	EEPROM error
H0	Communication error of main chip and IPM chip
P1	High pressure protection
P2	Low pressure protection
P3	DC over current protection
P4	T5 Discharge temperature abnormal error
P6	IPM module protection

**1.E4/E5/E6 (T4/T5/T3 temperature sensors error)**

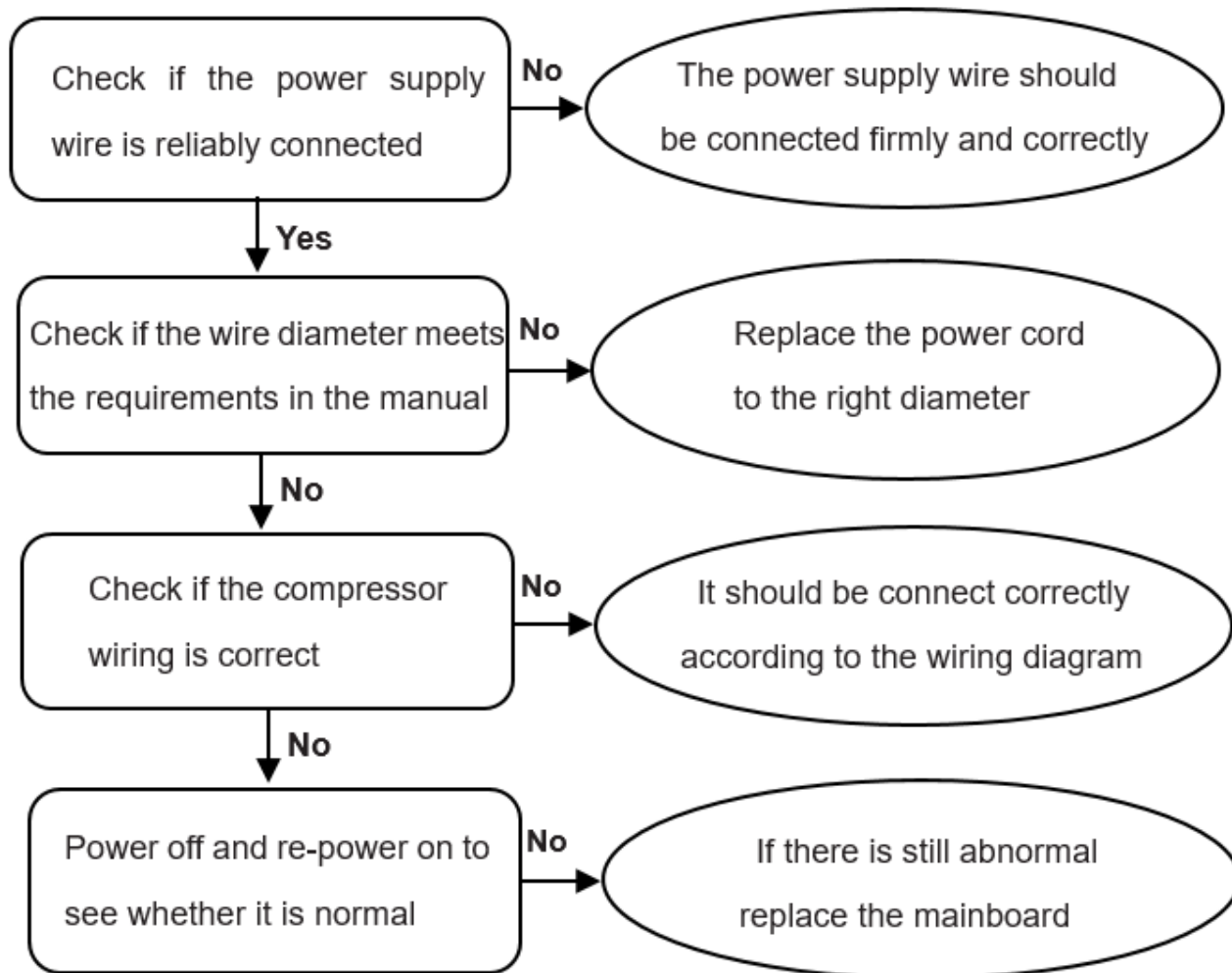


## 2. E10 (EEPROM failure)

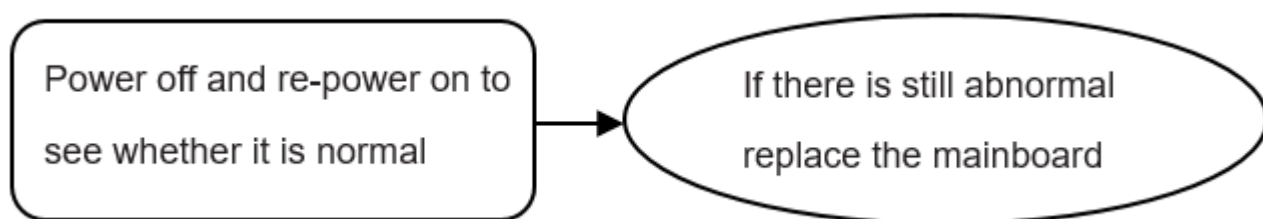


## 3. E9 ( AC under voltage protection )

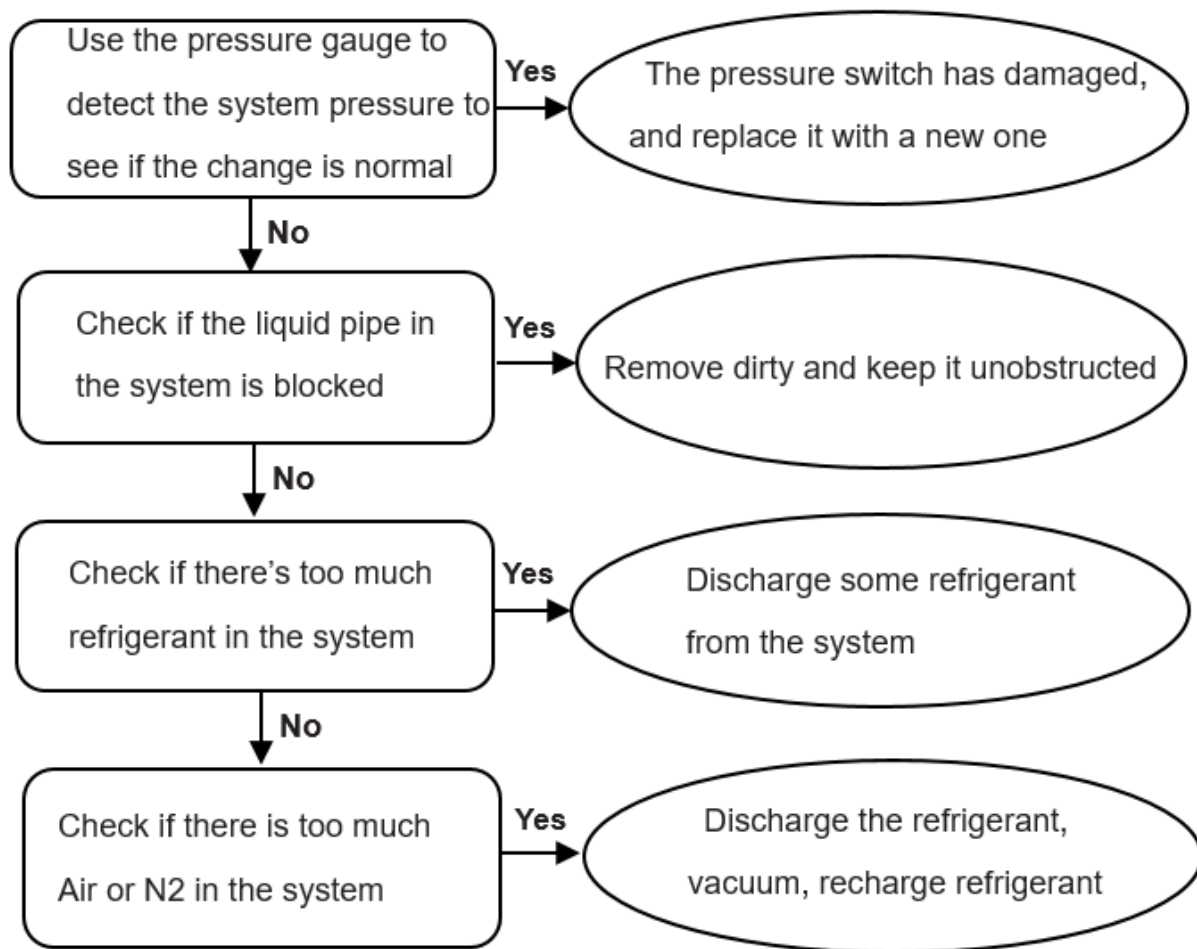




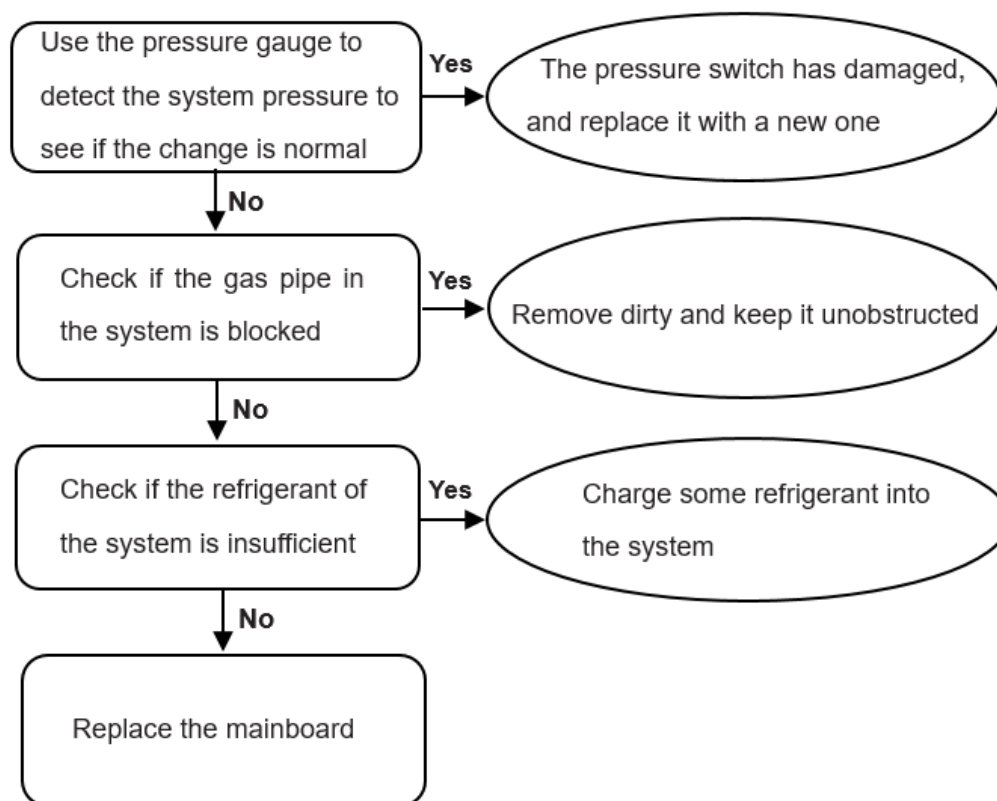
#### **4. H0 (Communication error of main chip and IPM chip )**

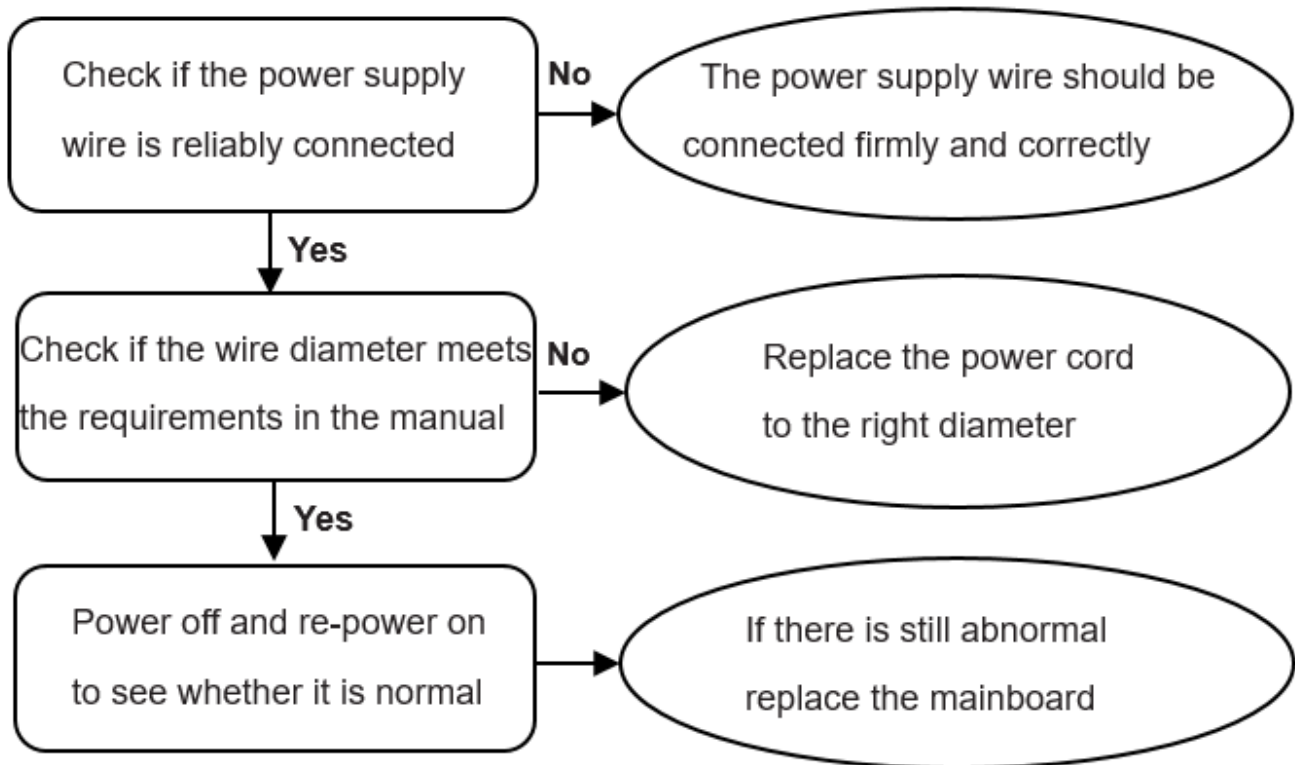
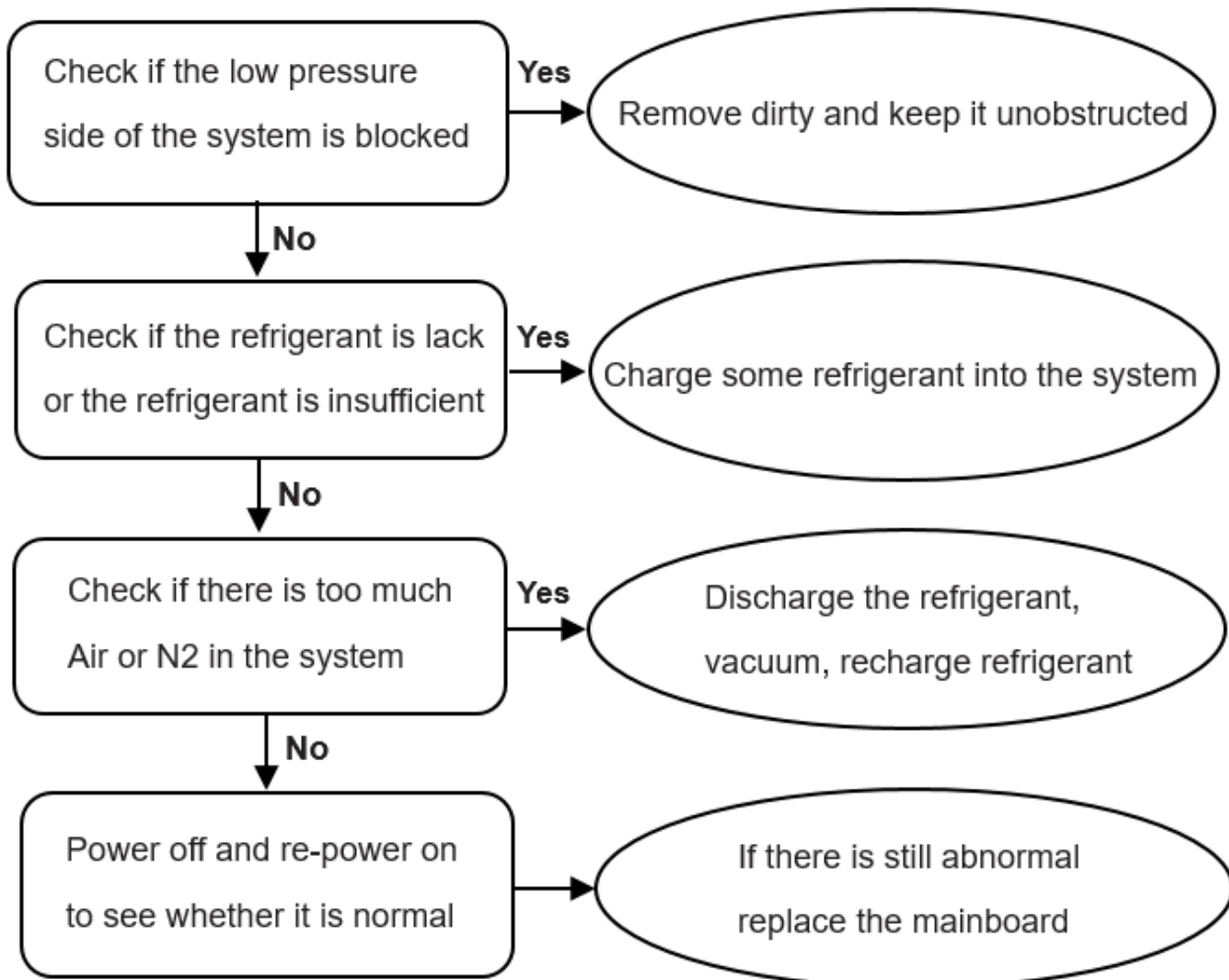


#### **5. P1( High pressure switch protection )**

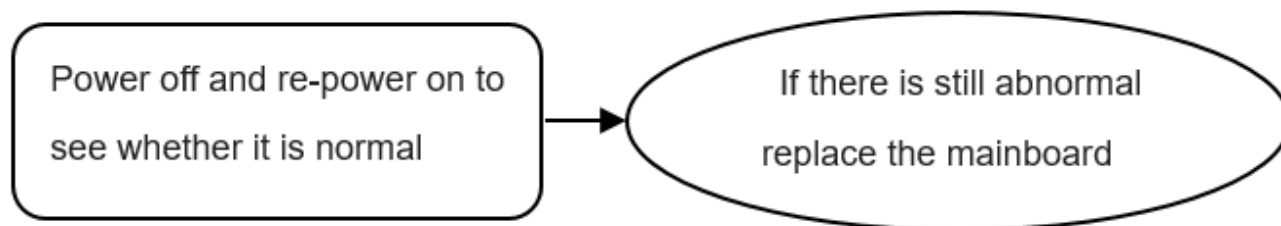


#### **6. P2 (Low pressure switch protection)**



**7. P3 ( Inverter over current protection )****8. P4 (T5 Discharge temperature abnormal error)**

**9. P6 (IPM module protection)**



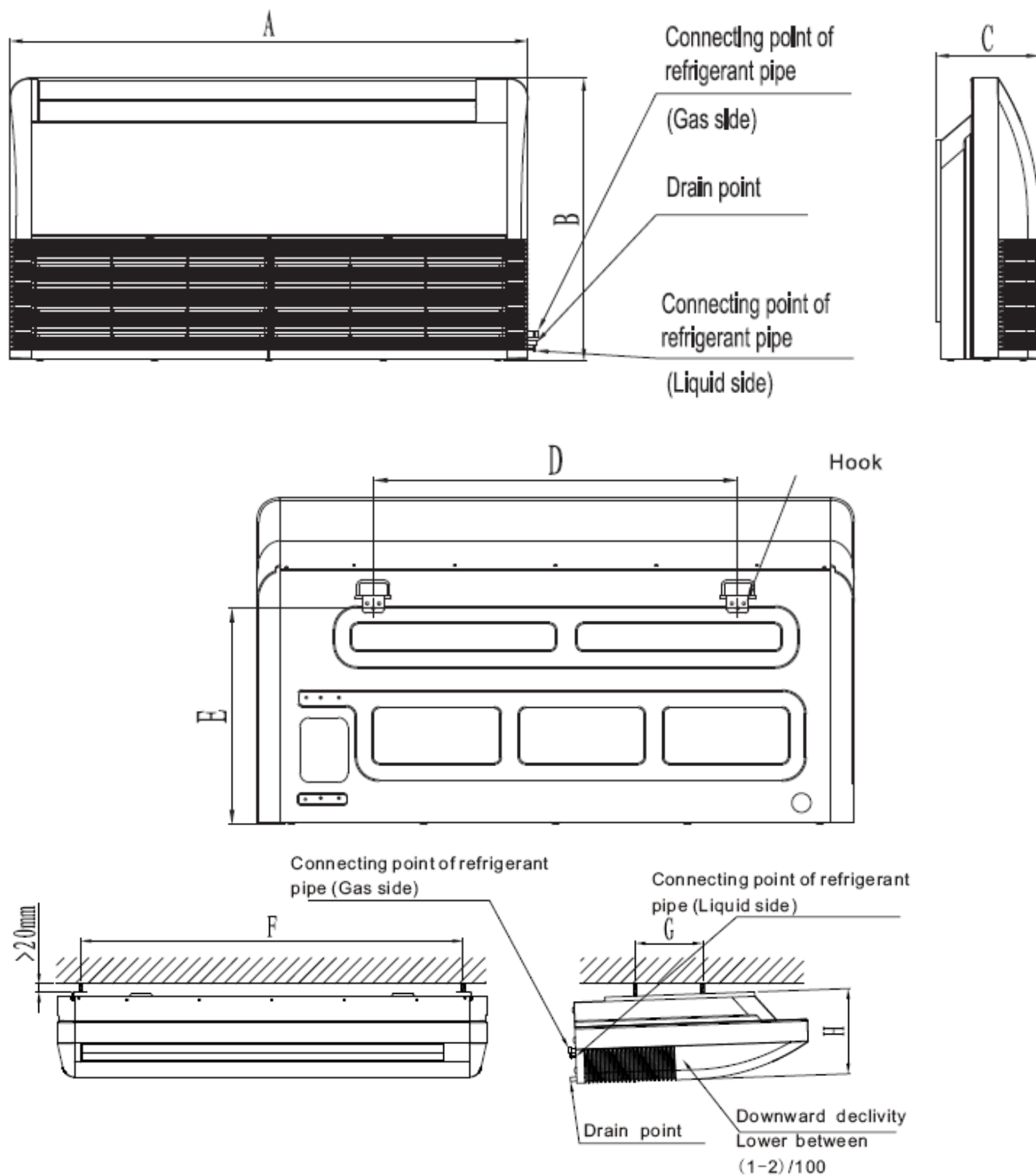
## Part 3 Floor & Ceiling

1. Specification
2. Dimensions
3. Service Space
4. Wiring Diagrams
5. Electric Characteristics
6. The Specification of Power
7. Exploded View
8. Troubleshooting

# 1. Specification

Model name		Unit	CUAi-36CNVR1-16	CUAi-60CNVR1-16
		Indoor code	821039700028	821039700029
Power supply		V/Ph/Hz	208~230-1-60	208~230-1-60
Cooling	Capacity	Btu/h	36000	60000
	Capacity	W	10500(3500~10500)	16000(6200~16000)
	Input(indoor)	W	240	420
	Rated current(indoor)	A	1.09	1.90
Max. input consumption		W	260	462
Max. current		A	1.31	2.33
Operation Control			Wireless control	
Indoor coil	Number of row		3	4
	Fin spacing	mm	1.7	1.7
	Fin material		Hydrophilic Aluminium Fin	Hydrophilic Aluminium Fin
	Tube outside diameter	mm	9.52	Φ7.94
	Tube material		Inner grooved tube	Inner grooved tube
	Coil length x height x width	mm	1000x250x70	1382x242x76.2
	Number of circuit		5	4
Indoor fan motor	Brand		Weiling	Weiling
	Model		YSK110-180LD-4P2	YSK110-85LD-4P2*2
	Qty		1	2
	Output	W	180	85
	Capacitor	μF	5UF/450V	5UF/450V
	Speed (Hi/Me/Lo)	r/min	1330/1230/1130	1560/1430/1300
Indoor air flow (Hi/Me/Lo)		m <sup>3</sup> /h	1500/1350/1150	2400/2100/1700
Indoor noise level (Hi/Me/Lo)		dB(A)	50/47/45	57/54/51
Indoor dimension	Unit (WxHxD)	mm	1245x680x244	1675x680x240
	Packing (WxHxD)	mm	1325x770x325	1750x770x325
Indoor weight	Net/Gross	kg	37/43	50/57
Design pressure		MPa	4.5	4.5
Drainage water pipe diameter		mm	φ25	φ25
Refrigerant piping	Liquid side/Gas side	mm(inch)	Φ9.52/Φ19.05(3/8"/3/4")	Φ9.52/Φ19.05(3/8"/3/4")
Operation temperature	Cooling	°C	16~32	16~32

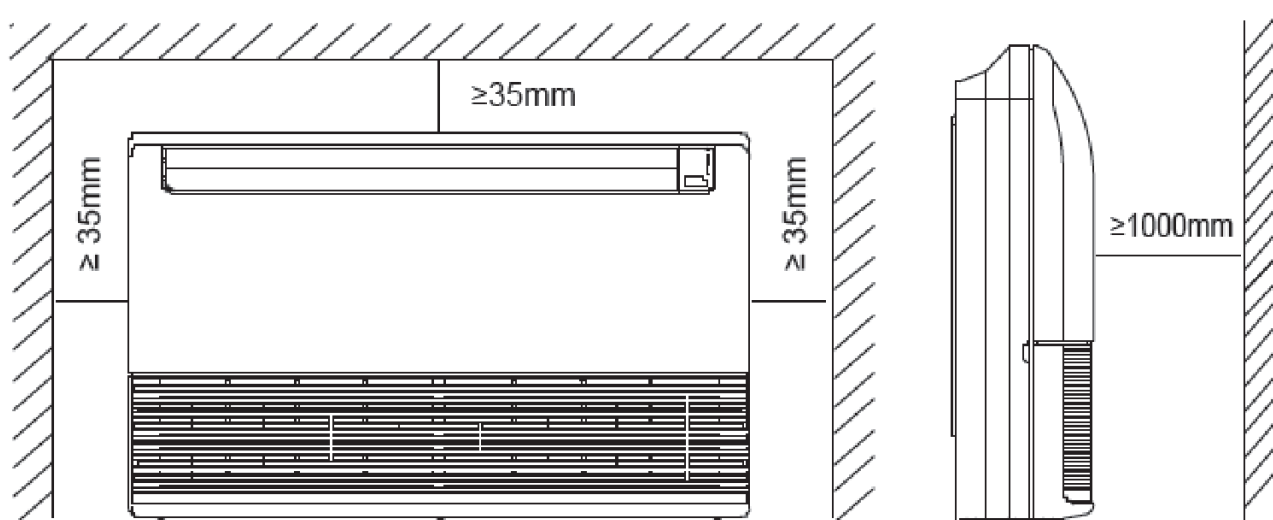
## 2. Dimensions



Model (kBtu/h)	A	B	C	D	E	F	G	H
24~36	1245	680	244	760	450	1119	200	240
48~60	1670	680	244	1070	450	1542	200	240

**NOTE:** The dimension of 24 kBtu/h and 36 kBtu/h are the same  
The dimension of 48 kBtu/h and 60 kBtu/h are the same

### 3. Service Space



### 4. Wiring Diagrams

36K



60K

**NOTE:**

Indoor models Select bits		power-down memory	
SW2 NO.1,2	Indoor models	SW2 NO.5	No power-down memory
ON OFF 1 2		ON OFF 5	
Floor&Ceiling Unit			

Receive and display light board		Heating temperature compensation	
SW2 NO.4	LED	SW2 NO.6	6°C
ON OFF 4		ON OFF 6	
Digital tube		2°C	
ON OFF 4		ON OFF 6	

FACTORY DEFAULT		Reserved	
SW2	1 2 3 4 5 6 7 8	SW2 NO.7	Reserved
ON OFF		ON OFF 7	Reserved
		ON OFF 8	Reserved

FACTORY DEFAULT		Outdoor fan	
SW2	9 10 11 12	SW2 NO.8	Outdoor fan
ON OFF		ON OFF 9	AC fan
		ON OFF 10	DC fan

**Note1:**When there is no water pump installation, WATER-SW needs to be short circuit  
The power (PH) of indoor units can be set through DIP switch SW1(16-bit disc DIP) on the indoor control panel before delivery, the detailed information is as follows:

HP	0.8	1	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5			
MODEL	reserved	7K	9K	12K	18K	24K	27K	30K	36K	40K	45K	48K	54K	60K		
SW1	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
POWER	22	26	35	53	70	80	90	105	120	130	140	150	160			

**Electrical wiring diagram**

802039790086V.0



## 5. Electric Characteristics

el	Indoor Units			
	Hz	Voltage	Min.	Max.
CUAi-24CR1	60	208-230V	187V	244V
CUAi-36CR1	60	208-230V	187V	244V
CUAi-48CR1	60	208-230V	187V	244V
CUAi-60CR1	60	208-230V	187V	244V

**Remark:**

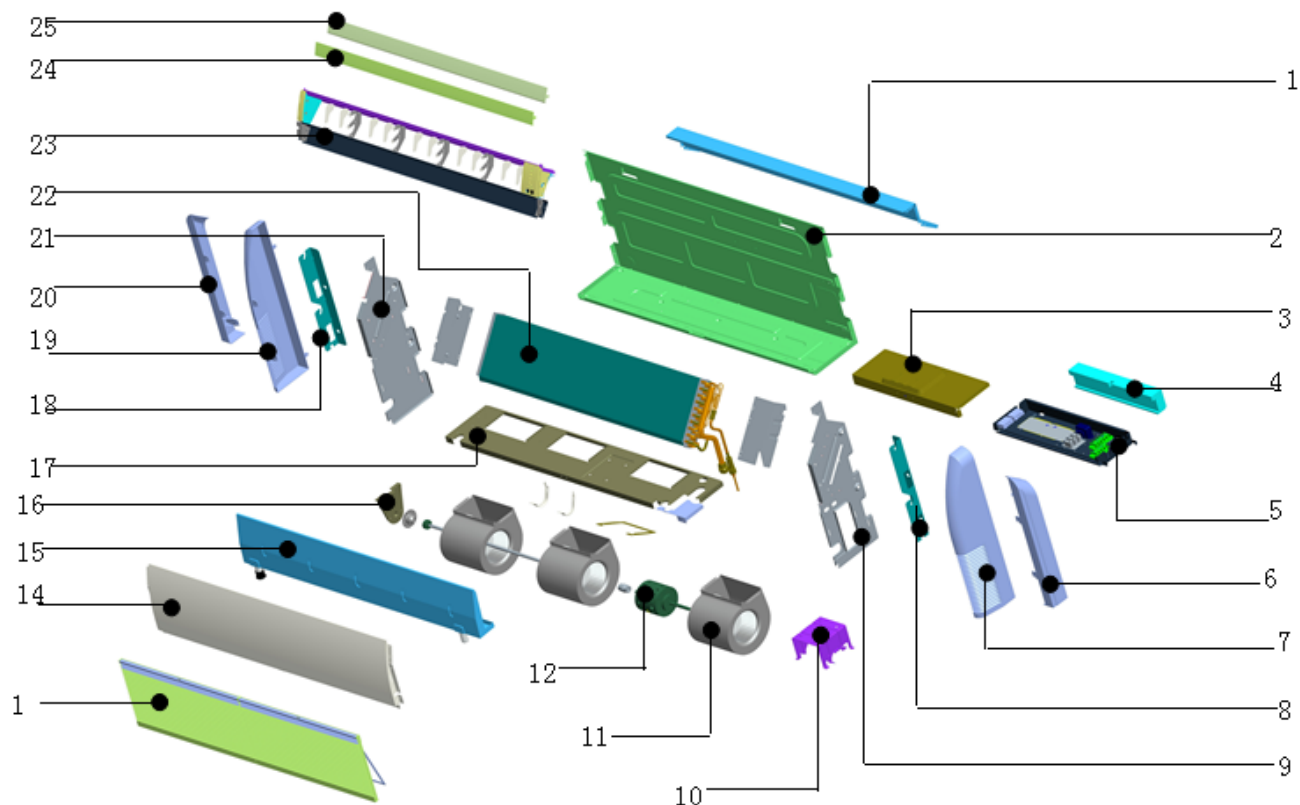
MCA: Min. Current Amps. (A)

MFA: Max. Fuse Amps. (A)

## 6. The Specification of Power

Type (cooling only)		36	60
Power	Phase	1-phase	1-phase
	Frequency and Voltage	208-230V, 60Hz	208-230V, 60Hz
Indoor Unit Power Wiring (mm <sup>2</sup> )		3×1.0	3×1.0
Indoor/Outdoor Connecting Wiring (mm <sup>2</sup> )	Ground Wiring	0.75	0.75
	Outdoor Unit Power Wiring	3×4.0	3×6.0
	Strong Electric Signal	-	-
	Weak Electric Signal	3×0.75	3×0.75

## 7. Exploded View



No.	Part Name	Quantity	No.	Part Name	Quantity
1	Rear cover	1	20	Right sealplate	1
2	Chassis assembly	1	21	Right separating board	1
3	E-part box cover	1	22	Evaporator component	1
4	E-part box mat	1	22.1	Left mounting plate of evaporator	1
5	Indoor PCB assembly	1	22.2	Shunt capillary assembly	1
5.1	E-part box	1	22.3	Distributor	1
5.2	Indoor PCB	1	22.4	Air inlet header pipe assembly of evaporator	1
5.3	Fan capacitor	1	22.5	Single Connector	1
5.4	Transformer	1	22.6	Evaporator assembly	1
5.5	Temperature sensors (indoor )	1	22.7	Right mounting plate of evaporator	1
5.6	Terminal	1	22.8	Temperature sensors (evaporator )	1
6	Left sealplate	1	23	Air-out frame component	1
7	Left cover	1	23.1	Fixing board assembly for air-out frame	1
8	Left hoisting pate	1	23.2	Display film	1
9	Lelf separating board I	1	23.3	Display lamp panel	1
10	Motor separating board	1	23.4	Vertical step motor	1
11	Wheel volute for slim type	3	23.5	Horizontal step motor	1
12	Indoor fan motor	1	23.6	Endbearing of louver	2
13	Air inlet grille	2	23.7	Intermediate bearing of louver	8
14	Top Cover assembly	1	23.8	Driving lever for louver	1
15	Weld assembly of Water drain pan	1	23.9	Follower lever for louver	1
15.1	Water outlet rubber cover	1	23.10	Louver holder	1
16	Supporting board for motor	1	23.11	Guard vane	10
17	Weld assembly for intermediate transverse girder	1	24	Upper horizontal louver	1
18	Right mounting plate of evaporator	1	25	Down horizontal louver	1
19	Right cover	1			

## 8. Troubleshooting

### Fault code

<b>4LED Faults</b>	<b>Digital display</b>	<b>Failure description</b>
Timer light flashing	E2	Ambient temperature sensor (T1) failure
Running light flashing	E3	Evaporator pipe temperature sensor (T2) failure
Defrost light flashing	E5	Condenser pipe temperature sensor (T3) failure
Warning light flashing	F5	Water full protection
Running light, defrost light flashing	E1	Indoor unit and wire controller communication failure
Running light, timer light flashing	P6	Indoor unit EEPROM failure
Defrost light, timer light flashing	F0	Indoor fan stall protection (DC Motor)
Defrost light, warning light flashing	F2	Outdoor protection (220V Communication control)
	F7	outdoor unit over-current protection (Reserve)
Timer light, warning light flashing	E0	Indoor unit and outdoor unit communication failure (RS485 Communication control)
Running light, defrost light, timer light flashing	F3	High pressure protection (RS485 Communication control)
Defrost light, timer light, warning light flashing	F4	Low pressure protection (RS485 Communication control)
Running light, timer light, warning light flashing	F8	Outdoor unit exhaust temperature over-high protection (RS485 Communication control)
Running light, defrost light, timer light, warning light flashing	F9	Three-phase electricity phase sequence failure (RS485 Communication control)
Note: the flashing frequency for all above indication lights is 1HZ.		

## Part 4 Installation

1 Precaution on Installation	31
2. Vacuum Dry and Leakage Checking	32
3. Additional Refrigerant Charge	34
4. Insulation Work	35
5. Test Operation	37



# 1. Precaution on Installation

## 1.1. Measure the necessary length of the connecting pipe, and make it by the following way.

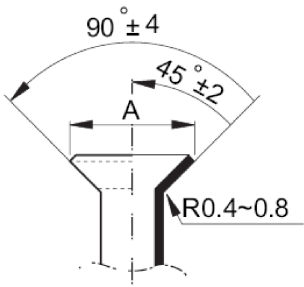
a. Connect the indoor unit at first, then the outdoor unit.

Bend the tubing in proper way. Do not harm them.

### CAUTIONS:

- Daub the surfaces of the flare pipe and the joint nuts with frozen oil, and wrench it for 3~4 rounds
- With hands before fasten the flare nuts.

Be sure to use two wrenches simultaneously when you connect or disconnect the pipes.

Pipe gauge	Tightening torque	Flare dimension A		Flare shape
		Min (mm)	Max	
Φ6.35	15~16N.m (153~163 kgf.cm)	8.3	8.7	
Φ9.52	25~26N.m (255~265kgf.cm)	12.0	12.4	
Φ12.7	35~36N.m (357~367kgf.cm)	15.4	15.8	
Φ15.9	45~47N.m (459~480 kgf.cm)	18.6	19.1	
Φ19.1	65~67N.m (663~684kgf.cm)	22.9	23.3	

b. The stop value of the outdoor unit should be closed absolutely (as original state). Every time you connect it, first loosen the nuts at the part of stop value, then connect the flare pipe immediately (in 5 minutes). If the nuts have been loosened for a long time, dusts and other impurities may enter the pipe system and may cause malfunction later. So please expel the air out of the pipe with refrigerant before connection.

c. Expel the air after connecting the refrigerant pipe with the indoor unit and the outdoor unit. Then fasten the nuts at the repair-points.

## 1.2. Locate The Pipe

- Drill a hole in the wall (suitable just for the size of the wall conduit), then set on the fittings such as the wall conduit and its cover.
- Bind the connecting pipe and the cables together tightly with binding tapes. Do not let air in, which will cause water leakage by condensation.
- Pass the bound connecting pipe through the wall conduit from outside. Be careful of the pipe allocation to do no damage to the tubing.

## 1.3. Connect the pipes.

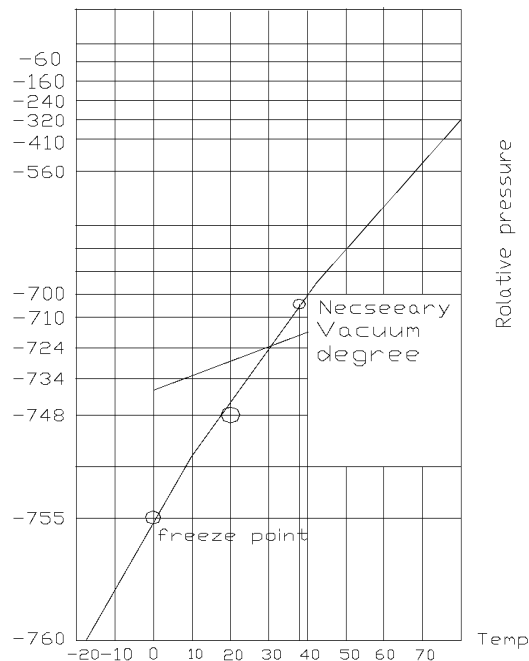
1.4. Then, open the stem of stop values of the outdoor unit to make the refrigerant pipe connecting the indoor unit with the outdoor unit in fluent flow.

1.5. Be sure of no leakage by checking it with leak detector or soap water.

1.6. Cover the joint of the connecting pipe to the indoor unit with the soundproof / insulating sheath (fittings), and bind it well with the tapes to prevent leakage.

## 2. Vacuum Dry and Leakage Checking

**2.1 Vacuum Dry:** use vacuum pump to change the moisture (liquid) into steam (gas) in the pipe and discharge it out of the pipe to make the pipe dry. Under one atmospheric pressure, the boiling point of water(steam temperature) is 100°C. Use vacuum pump to make the pressure in the pipe near vacuum state, the boiling point of water falls relatively. When it falls under outdoor temperature, the moisture in the pipe will be vaporized.



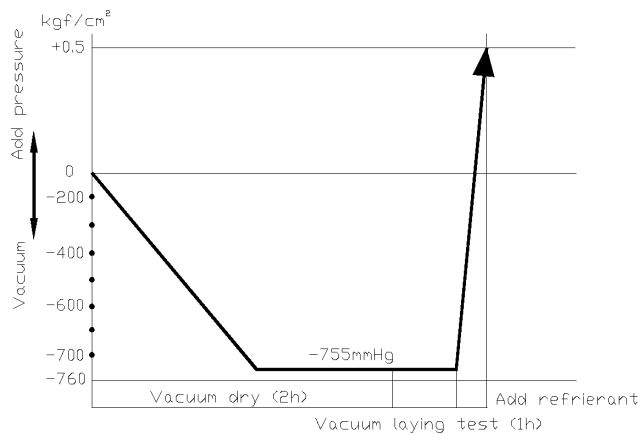
### 2.2 Vacuum dry procedure

There are two methods of vacuum dry due to different construction environment: common vacuum dry, special vacuum dry.

#### ①. Common vacuum dry procedure

- Vacuum dry (for the first time)---connect the all-purpose detector to the inlet of liquid pipe and gas pipe, and run the vacuum pump more than two hours (the vacuum pump should be below -755mmHg)
- If the pump can't achieve below -755mmHg after pumping 2 hours, moisture or leakage point will still exist in the pipe. At this time, it should be pumped 1 hour more.
- If the pump can't achieve -755mmHg after pumping 3 hours, please check if there are some leakage points.
- Vacuum placement test: place 1 hour when it achieves -755mmHg, pass if the vacuum watch shows no rising. If it rises, it shows there's moisture or leakage point.
- Vacuuming from liquid pipe and gas pipe at the same time.
- Sketch map of common vacuum dry procedure.





②. Special vacuum dry procedure

- This vacuum dry method is used in the following conditions:
- There's moisture when flushing the refrigerant pipe.
- Rainwater may enter into the pipe.
- Vacuum dry for the first time ..... 2h pumping

③. Vacuum destroy for the second time ..... Fill nitrogen to  $0.5\text{Kgf/cm}^2$

Because nitrogen is for drying gas, it has vacuum drying effect during vacuum destroy. But if the moisture is too much, this method can't dry thoroughly. So, please pay more attention to prevent water entering and forming condensation water.

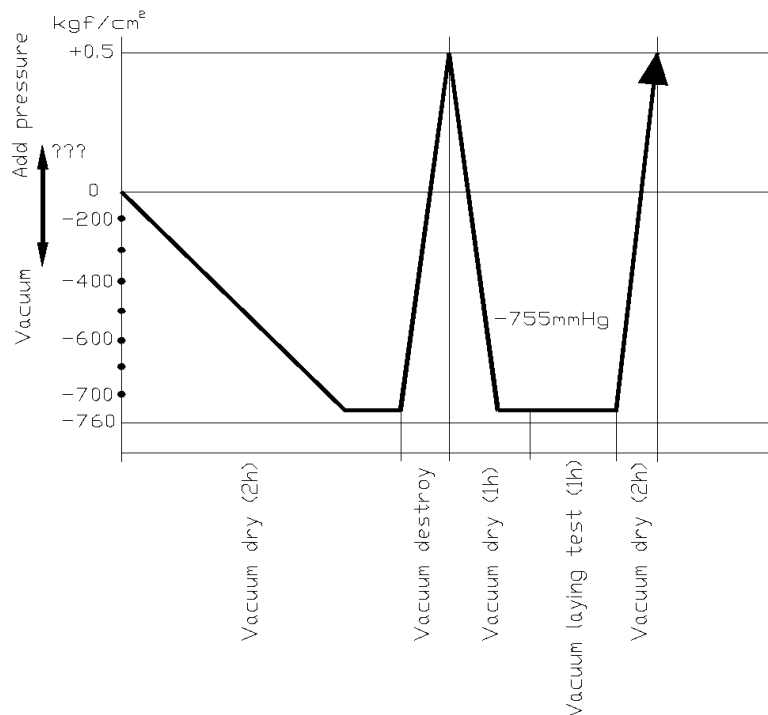
④. Vacuum dry for the second time.....1h pumping

Determinant: Pass if achieving below -755mmHg. If -755mmHg can't be achieved in 2h, repeat procedure

③ and ④.

⑤. Vacuum placing test ..... 1h

⑥. Sketch map of special vacuum dry procedure



### 3. Additional Refrigerant Charge

#### Caution

- Refrigerant cannot be charged until field wiring has been completed.
- Refrigerant may only be charged after performing the leak test and the vacuum pumping.
- When charging a system, care shall be taken that its maximum permissible charge is never exceeded, in view of the danger of liquid hammer.
- Charging with an unsuitable substance may cause explosions and accidents, so always ensure that the appropriate refrigerant is charged.
- Refrigerant containers shall be opened slowly.
- Always use protective gloves and protect your eyes when charging refrigerant.

The outdoor unit is factory charged with refrigerant. Calculate the added refrigerant according to the diameter and the length of the liquid side pipe of the outdoor unit/indoor unit

R(g) L(m) D(mm)	φ6.35	Φ9.52	Φ12.7
Less than 5m (One-way)	—	—	—
Added Refrigerant When Over 5m(One-way)	20g/m×(L-5)	40g/m×(L-5)	60g/m×(L-5)

#### Remark:

R (g): Additional refrigerant to be charged

L (m): The length of the refrigerant pipe (one-way)

D (mm): Liquid side piping

## 4. Insulation Work

### 4.1 Insulation material and thickness

#### 4.1.1. Insulation material

Insulation material should adopt the material which is able to endure the pipe's temperature: no less than 70℃ in the high-pressure side, no less than 120℃ in the low-pressure side (For the cooling type machine, no requirements at the low-pressure side.)

- ◆ Example: Heat pump type----Heat-resistant Polyethylene foam (withstand above 120℃)  
Cooling only type----Polyethylene foam (withstand above 100℃)

#### 4.1.2. Thickness choice for insulation material

Insulation material thickness is as follows:

	Pipe diameter (mm)	Adiabatic material thickness
Refrigerant pipe	Φ6.4—Φ25.4	10mm
	Φ28.6—Φ38.1	15mm
Drainage pipe	Inner diameter Φ20—Φ32	6mm

### 4.2 Refrigerant pipe insulation

#### 4.2.1. Work Procedure

- ① Before laying the pipes, the non-jointing parts and non-connection parts should be heat insulated.
- ② When the gas proof test is eligible, the jointing area, expanding area and the flange area should be heat insulated.

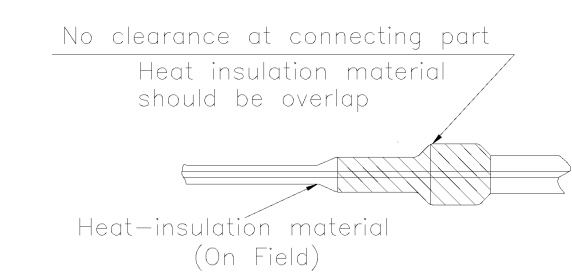
#### 4.2.2. Insulation for non-jointing parts and non-connection parts

wrong	right	
Gas pipe and liquid pipe should not be put together to insulate	Insulate the gas pipe (cooling only)	Insulate the gas pipe and liquid pipe

For construction convenience, before laying pipes, use insulation material to insulate the pipes to be deal with, at the same time, at two ends of the pipe, remain some length not to be insulated, in order to be welded and check the leakage after laying the pipes.

### 4.2.3. Insulate for the jointing area, expanding area and the flange area

- ① Insulate for the jointing area, expanding area and the flange area should be done after checking leakage of the pipes
- ② Make sure there's no clearance in the joining part of the accessorial insulation material and local preparative insulation material.



## 4.3 Drainage pipe insulation

The connection part should be insulated, or else water will be condensing at the non-insulation part.

### 4.4 Note

5.4.1 The jointing area, expanding area and the flange area should be heat insulated after passing the pressure test.

4.4.2 The gas and liquid pipe should be heat insulated individually, the connecting part should be heat insulated individually.

4.4.3 Use the attached heat-insulation material to insulate the pipe connections (pipes' tie-in ,expand nut ) of the indoor unit.

## 5. Test Operation

**(1) The test operation must be carried out after the entire installation has been completed.**

**(2) Please confirm the following points before the test operation.**

- The indoor unit and outdoor unit are installed properly.
- Tubing and wiring are correctly completed.
- The refrigerant pipe system is leakage-checked.
- The drainage is unimpeded.
- The ground wiring is connected correctly.
- The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- The power voltage fits the rated voltage of the air conditioner.
- There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- The gas-side and liquid-side stop valves are both opened.
- The air conditioner is pre-heated by turning on the power.

**(3) According to the user's requirement, install the remote controller when the remote controller's signal can reach the indoor unit smoothly.**

**(4) Test operation**

Set the air conditioner under the mode of "COOLING" with the remote controller, and check the following points.

### Indoor unit

- Whether the switch on the remote controller works well.
- Whether the buttons on the remote controller works well.
- Whether the air flow louver moves normally.
- Whether the room temperature is adjusted well.
- Whether the indicator lights normally.
- Whether the temporary buttons works well.
- Whether the drainage is normal.
- Whether there is vibration or abnormal noise during operation.

### Outdoor unit

- Whether there is vibration or abnormal noise during operation.
- Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerant is leaked.