

## NORDIC MULTI LIGHT series

### **Service manual**

Outdoor units multy split air conditioning system

Models:

CHML-U36NK4

CHML-U42NK5

Thank you for choosing Cooper&Hunter multy split air conditioning system, please read this service manual carefully before operation and retain it for future reference.

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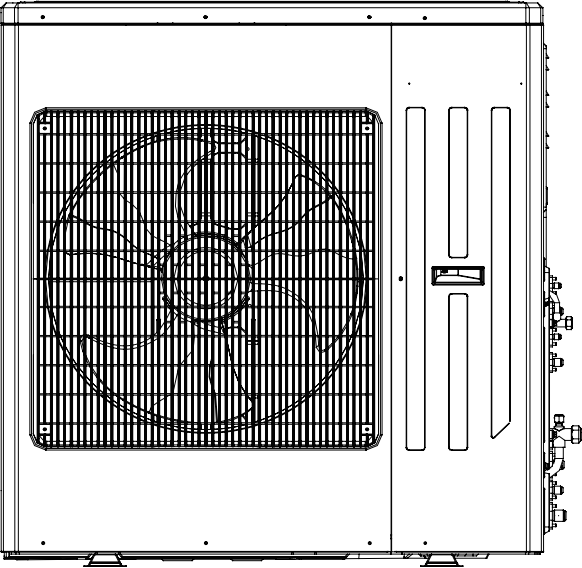
# Part I : Technical Information

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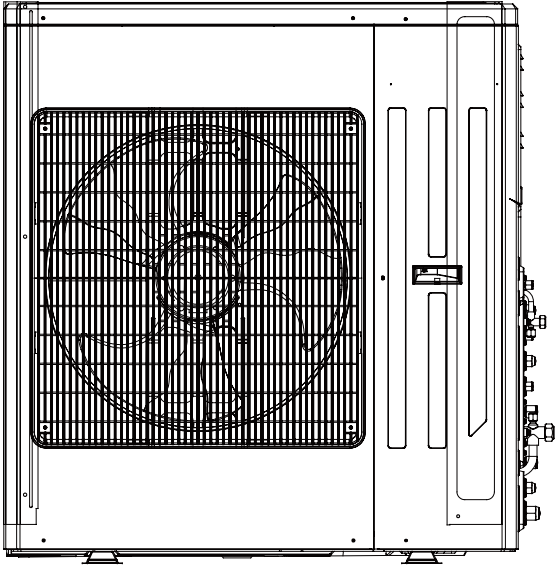
## 1. Summary

### Outdoor Unit

CHML-U36NK4



CHML-U42NK5



## 2. Specifications

Model			CHML-U36NK4	CHML-U42NK5
Power supply	Rated Voltage	V~	220-240V	220-240V
	Rated Frequency	Hz	50	50
	Phases		1	1
Cooling capacity(max~min)		W	10500(2100~11000)	12100(2100~13600)
Heating capacity(max~min)		W	12000(2600~13000)	13000(2600~14000)
Cooling Power Input		W	3500	3760
Heating Power Input		W	3750	3450
Cooling Current Input		A	15.42	17.21
Heating Current Input		A	15.20	15.79
Rated Power Input		W	4880	5020
Rated Current		A	21.65	22.97
SEER		W/W	5.5	/
SCOP		W/W	3.8	/
Outdoor Unit	Compressor Trademark		ZHUHAI LANDA COMPRESSOR CO.,LTD	ZHUHAI LANDA COMPRESSOR CO.,LTD
	Compressor Model		QXAS-D32zX090A	QXAS-D32zX090A
	Compressor Refrigerant Oil Type		RB68ER	RB68ER
	Compressor Type		Inverter Rotary	Inverter Rotary
	L.R.A	A	/	/
	Compressor Rated Load Amp (RLA)	A	14	14
	Compressor Power Input	W	3300	3300
	Compressor Thermal Protector		Internal	Internal
	Throttling Method		Electron expansion valve	Electron expansion valve
	Cooling Operation Ambient Temperature Range	°C	-15~48	-15~48
	Heating Operation Ambient Temperature Range	°C	-15~27	-15~27
	Condenser Material		Copper tube-Aluminum fin	Copper tube-Aluminum fin
	Condenser Pipe Diameter	mm	Φ7.94	Φ7.94
	Rows-Fin Gap(mm)	mm	2-1.4	2-1.4
	Coil length (l) X height (H) X coil width (L)	mm	1009.4X38.1X1056	1009.4X38.1X1056
	Fan Motor Speed (rpm) (H/M/L)	rpm	820	820
	Output of Fan Motor	W	170	170
	Fan Motor RLA	A	/	/
	Fan Motor Capacitor	μF	/	/
	Air Flow Volume of Outdoor Unit	m³/h	5200	5200
	Fan Type-Piece		Axial-flow	Axial-flow
	Fan Diameter	mm	Φ570-152	Φ570-152
	Defrosting Method		Automatic Defrosting	Automatic Defrosting
	Climate Type		T1	T1
	Isolation		I	I
	Moisture Protection		IPX4	IPX4
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	2.5
	Dimension (WXHXD)	mm	1015X440X1103	1015X440X1103
	Dimension of Package (LXWXH)	mm	1155X490X1220	1155X490X1220
	Dimension of Package(LXWXH)	mm	1158X493X1235	1158X493X1235
	Net Weight	kg	94	95

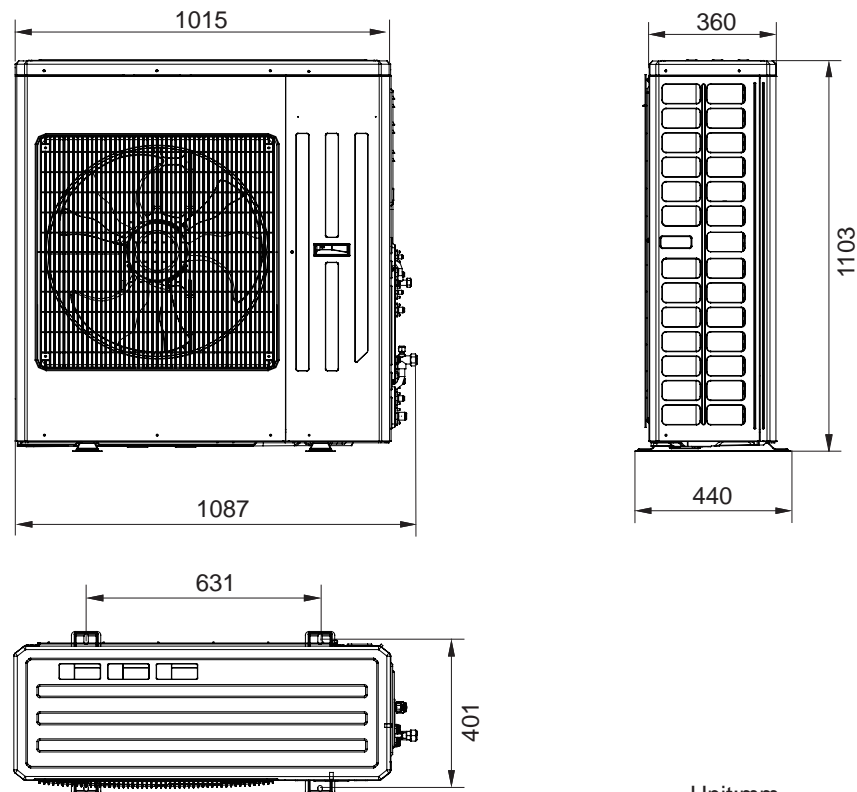


Outdoor Unit	Gross Weight	kg	104	105
	Refrigerant Charge		R410A	R410A
	Refrigerant Charge	kg	4.3	4.8
	Cross-sectional Area of Power Cable Conductor	mm <sup>2</sup>	4.0	4.0
	Recommended Power Cable(Core)	N	3	3
	Connection Pipe Connection Method	-	Flare Connection	Flare Connection
	Not Additional Gas Connection Pipe Length	m	40	50
	Connection Pipe Gas Additional Charge	g/m	22	22
	Outer Diameter of Liquid Pipe(C&H Allocation)(Metric)1	mm	Φ6	Φ6
	Outer Diameter of Gas Pipe(C&H Allocation)(Metric)1	mm	Φ9.52	Φ9.52
	Outer Diameter of Liquid Pipe(C&H Allocation)(Metric)2		Φ6	Φ6
	Outer Diameter of Gas Pipe(C&H Allocation)(Metric)2		Φ9.52	Φ9.52
	Outer Diameter of Liquid Pipe(C&H Allocation)(Metric)3		Φ6	Φ6
	Outer Diameter of Gas Pipe(C&H Allocation)(Metric)3		Φ12	Φ12
	Outer Diameter of Liquid Pipe(C&H Allocation)(Metric)4		Φ9.52	Φ6
	Outer Diameter of Gas Pipe(C&H Allocation)(Metric)4		Φ16	Φ12
	Outer Diameter of Liquid Pipe(C&H Allocation)(Metric)5		/	Φ9.52
	Outer Diameter of Gas Pipe(C&H Allocation)(Metric)5		/	Φ16
	Connection Pipe Max. Height Distance(indoor and indoor)	m	7.5	7.5
	Max. equivalent connection pipe length(outdoor to last indoor)	m	20	25
	Connection Pipe Max. Length Distance(total length)	m	70	80

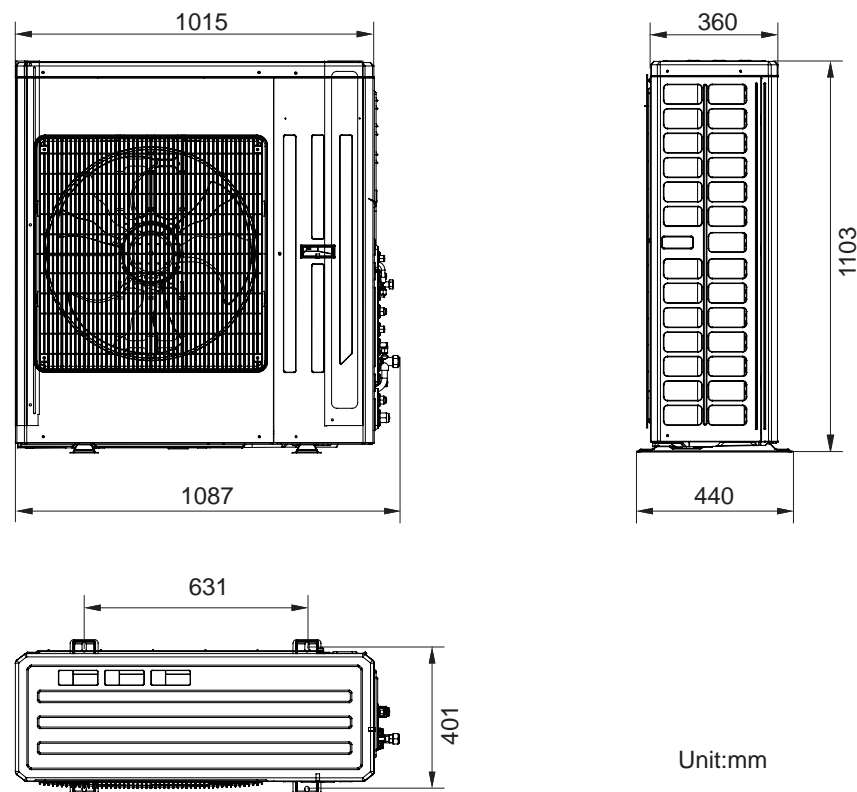
The above data is subject to change without notice. Please refer to the nameplate of the unit.

# 3. Outline Dimension Diagram

CHML-U36NK4

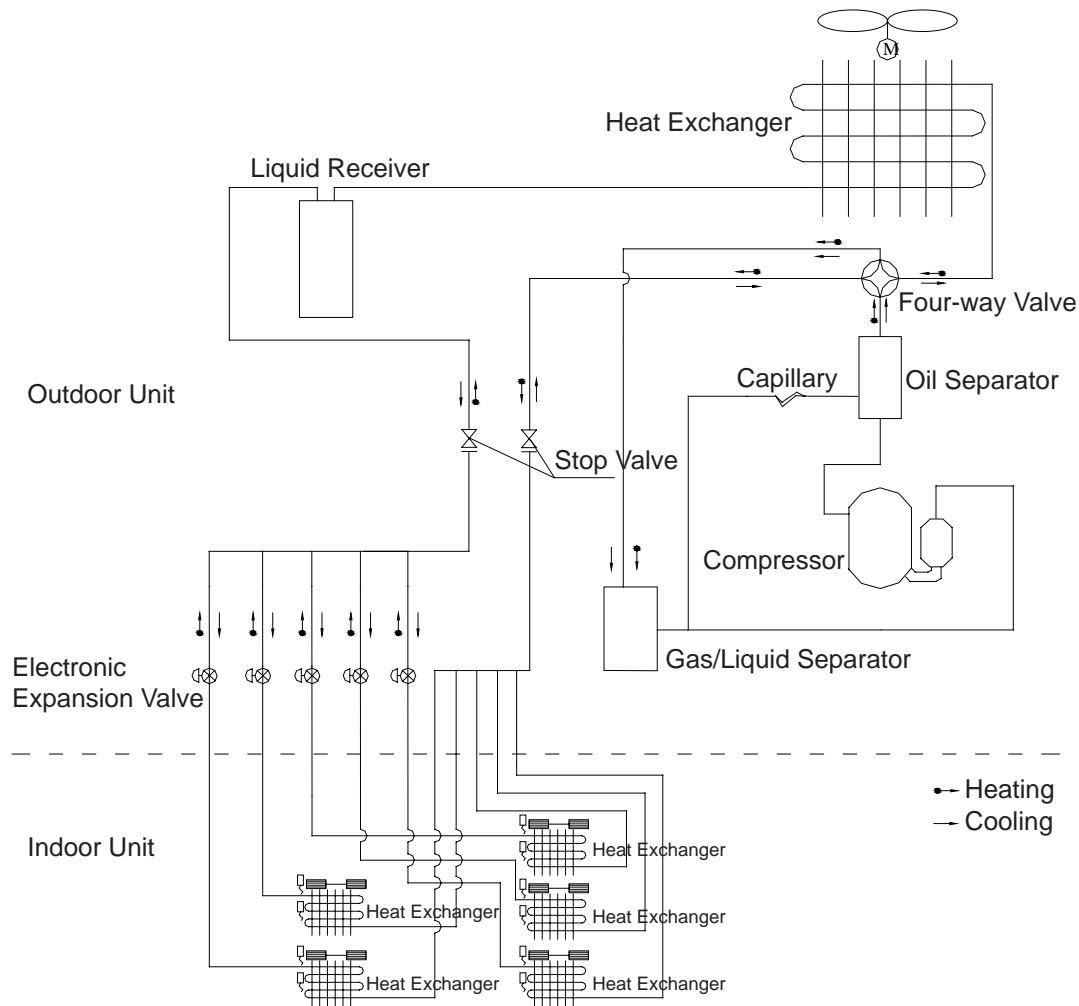


CHML-U42NK5



## 4. Refrigerant System Diagram

Models:CHML-U36NK4, CHML-U42NK5



The outdoor and indoor units start to work once the power is switched on. During the cooling operation, the low temperature, low pressure refrigerant gas from the heat exchanger of each indoor unit gets together and then is taken into the compressor to be compressed into high temperature, high pressure gas, which will soon go to the heat exchanger of the outdoor unit to exchange heat with the outdoor air and then is turned into refrigerant liquid. After passing through the throttling device, the temperature and pressure of the refrigerant liquid will further decrease and then go the main valve. After that, it will be divided and go to the heat exchanger of each indoor unit to exchange heat with the air which needs to be conditioned. Consequently, the refrigerant liquid become low temperature, low pressure refrigerant gas again. Such a refrigeration cycle goes round and round to achieve the desired cooling purpose. During the heating operation, the four-way valve is involved to make the refrigeration cycle run reversely. The refrigerant radiates heat in the heat exchanger of the indoor unit (so do the electric heating devices) and absorb heat in the heat exchanger of the outdoor unit for a heat pump heating cycle so as to achieve the desired heating purpose.

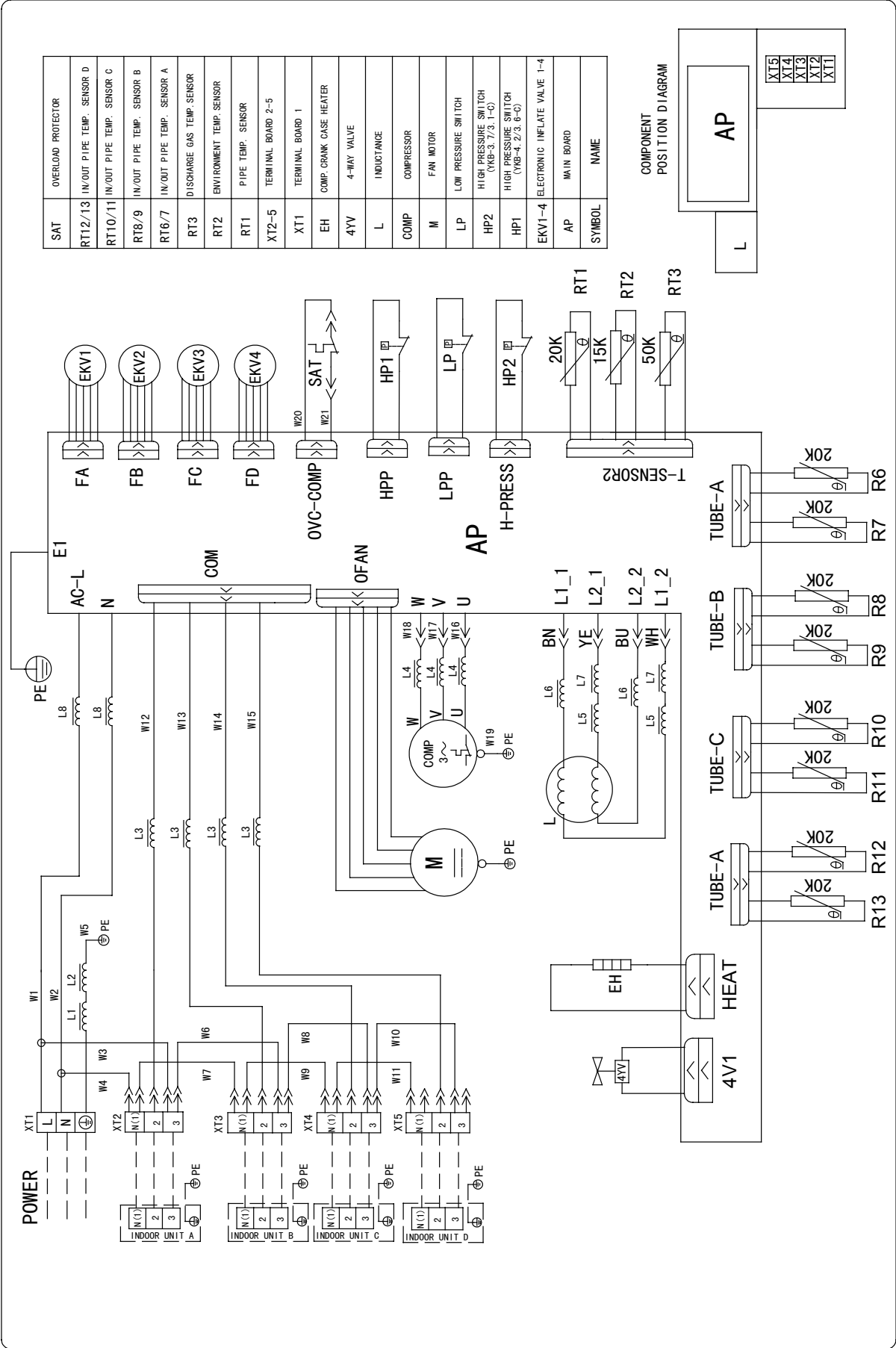
# 5. Electrical Part

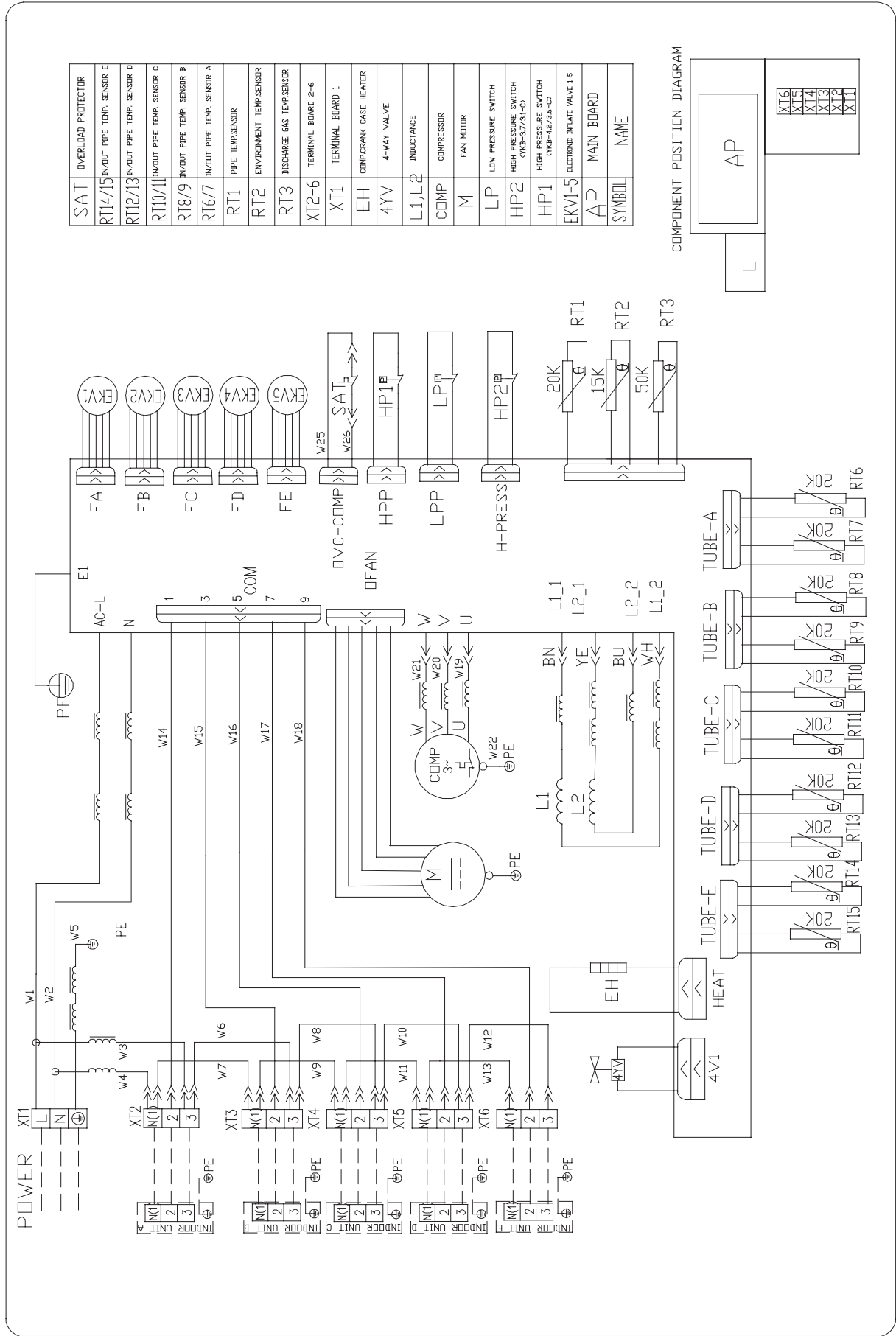
## 5.1 Wiring Diagram

### ●Instruction

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	GREEN	COMP	Compressor
YE	Yellow	BN	Brown		Grounding wire
RD	Red	BU	Blue		
YEGN	Yellow/Green	BK	Black		
VT	Violet	OG	Orange		

CHML-U36NK4



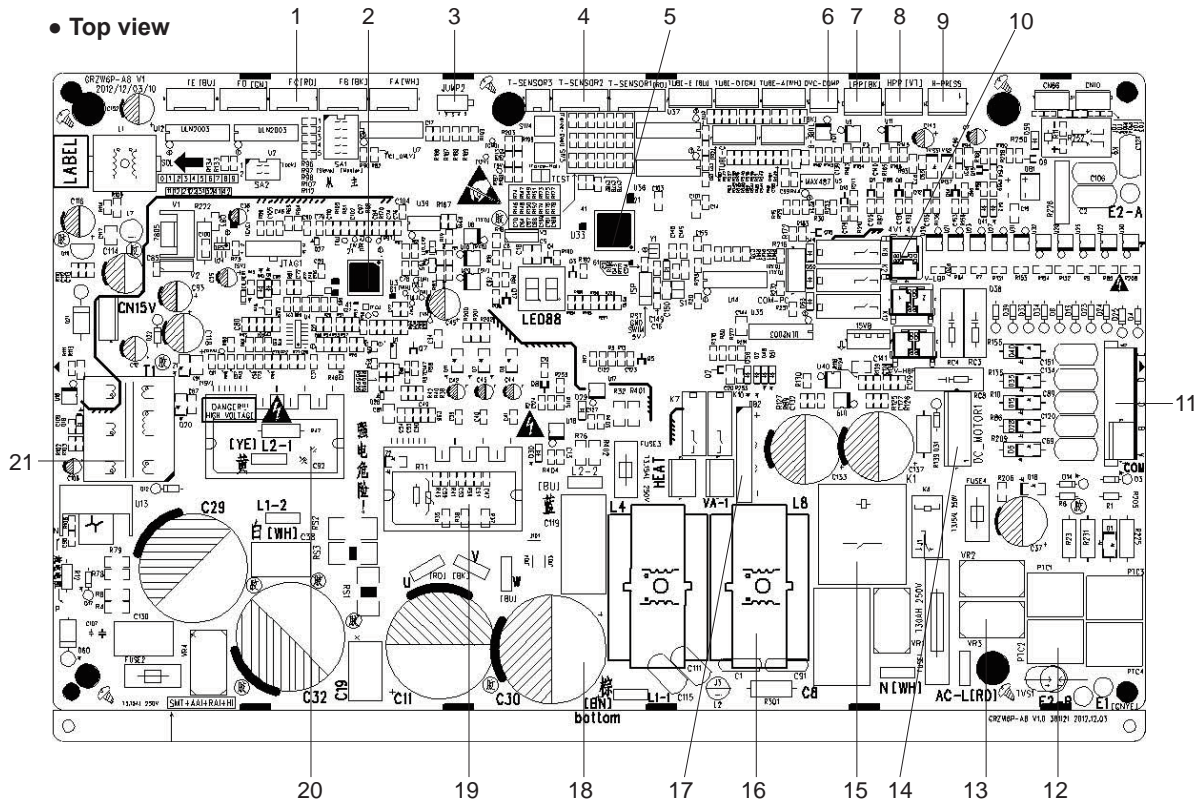


These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

5.2 PCB Printed Diagram

CHML-U36NK4 CHML-U42NK5

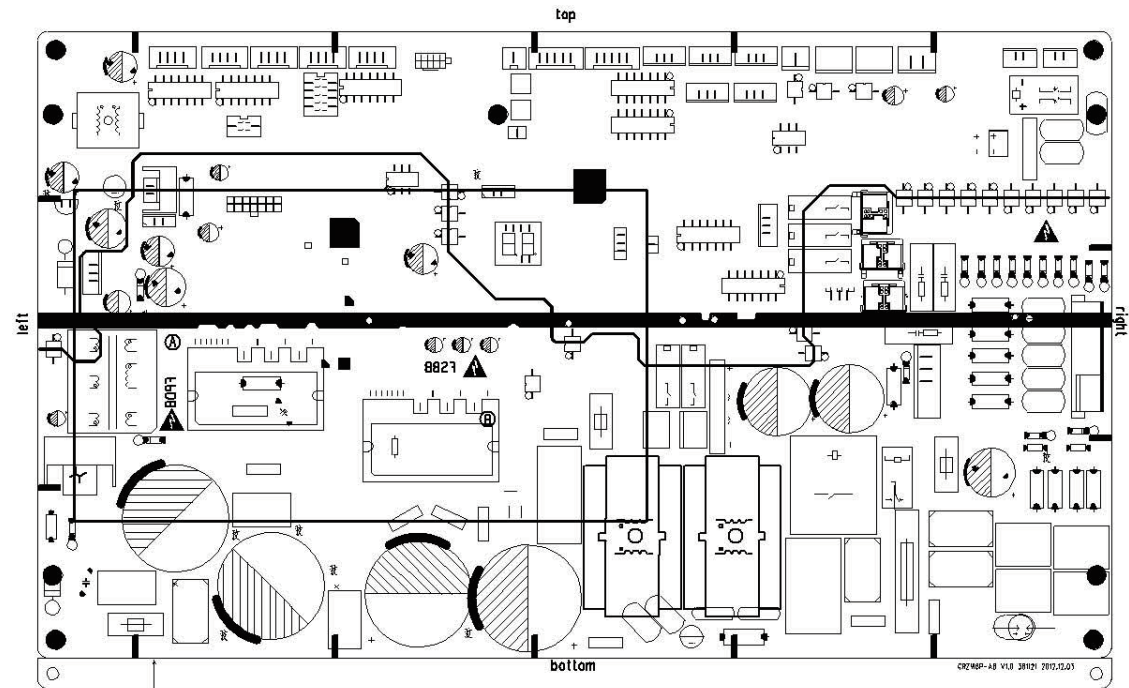
• Top view



1	Terminal of expansion valve
2	G-MatrikII chip
3	Jumper cap
4	Terminal of temperature sensor
5	STM8S207 chip
6	Overload protection terminal of compressor
7	Low-pressure protection terminal
8	Low-pressure switch 1
9	High-pressure switch 2
10	Terminal of 4-way valve

11	Communication interface between indoor unit and outdoor unit
12	PTC resistance
13	Piezoresistor
14	DC fan terminal
15	Relay
16	Common-mode induction
17	Rectifier
18	Electrolytic capacitor
19	IPM module
20	PFC module
21	Transformer

• Bottom view



## 6. Function and Control

### 1.Function Control

#### 1) Cooling mode

- a. Turning on the unit for cooling operation, and if any one of the indoor units satisfy the cooling operation condition, the system will start for cooling operation; and the electronic expansion valve, the outdoor fan and the compressor start operation.
- b. When some of the indoor units satisfy the stop-condition while some indoor units does not satisfy the stop-condition, the compressor does not stop, the compressor adjust the frequency according to demand. For the indoor unit with stop-condition satisfies, the corresponding electronic expansion valve will be closed.
- c. Change Cooling mode to heating mode

When change the unit to heating mode from cooling mode, the whole system will stop first. Then the system will restart in heating mode after the compressor stops.

#### d. 4-way valve

In this mode, the 4-way valve is closed.

#### e. Outdoor fan control in cooling mode

The outdoor fan starts before 5s of the starting of compressor. The outdoor fan will run in middle speed after starting and then it will run in set speed.

#### 2) Dry mode (dehumidification mode)

this mode is the same as cooling mode;

#### 3) Heating mode

- a. Turning on the unit for heating operation, If any one of the indoor unit satisfy the heating condition, the system will start to run in heating mode
- b. If all the indoor units satisfy the stop-condition, the compressor stops and the outdoor fan stops after 1min;
- c. If only part of the indoor units satisfy the stop-condition, the compressor decrease the frequency immediately and operates according to demand.
- d. Change Heating mode to cooling mode or dehumidification mode, the whole system will stop first, then restart under the required mode.

#### e. Defrosting function

When the defrosting condition is satisfied, the 4-way valve reverses the direction, the outdoor fan stop. After the 4-way valve reverses the direction, the frequency of compressor rises, and the unit will start defrosting under cooling cycle.

#### f. Oil-return control in heating mode

a) If the whole system runs in low frequency for a long time, the system will run a oil-return operation in high frequency, the indoor unit displays "H1", the oil-return operation will runs for 3 minutes.

#### 4) Fan mode

Only indoor fan run. Compressor, outdoor fan and 4-way valve are closed .

### 2.Protection Function

#### 1) Mode conflict protection of indoor units

When the setting mode is different of different indoor unit, the unit runs in below status:

- a. The system mode is determined by the first turning on indoor unit except indoor unit is in fan mode. Cooling mode (dry mode) is in conflict with heating mode.
- b. If the first turning on unit is fan mode, and the second turning on unit is cooling or heating mode, then the system will run in cooling or heating mode

#### 2) Overload protection

If the tube temperature at the high pressure side is higher than normal, the compressor frequency is restricted or decreased to normal operation frequency.

#### 3) High exhaust temperature protection

If the exhaust temperature is higher than protection value, the compressor stops running.

If the exhaust temperature protection continuously appears for 6 times, the compressor can't resume running. In this case, only by cutting off the power and then reenergize that the compressor can restart. If the running duration of the compressor is longer than 7min, the protection times will be cleared to zero time.

#### 4) Communication malfunction



Detection of the quantity of installed indoor units: after 3min of energizing, if the outdoor unit does not receive the communication data of certain indoor unit, the outdoor unit will judge that indoor unit is not installed. If the outdoor unit receives the communication data of that indoor unit later, the communication malfunction will be cleared.

### 5) System high-pressure protection

- a. When the high-pressure switch detects the system pressure higher than limit ,then the high-pressure switch cuts off, the system will stop to run.
- b.If high-pressure protection is detected for two times within one hour, only by cutting off the power and then reenergize that the compressor can restart.

### 6)System low-pressure protection

- a. When the low-pressure switch detects the system pressure lower than limit ,then the los-pressure switch cuts off , the system will stop to run.
- b. If low-pressure protection is detected for two times within one hour, only by cutting off the power and then reenergize that the compressor can restart.

### 7) Compressor overload protection

No matter the compressor is on or off, when the compressor overload switch is detected activated, the system will stop and indoor unit will display H3. If the compressor overload protection appears for more than 6 times, in this case, only by cutting off the power and then reenergize that the compressor can restart. If the running duration of the compressor is longer than 30min, the protection times will be cleared to zero.

## 3.Other function

### 1) Refrigerant Recovery

When the unit is powered on and runs under the COOL mode, it is available within five minute to go the refrigerant recovery mode by pressing three times the “LIGHT” button on the wireless controller in three seconds with “Fo”displayed.

How to quit the refrigerant recovery:

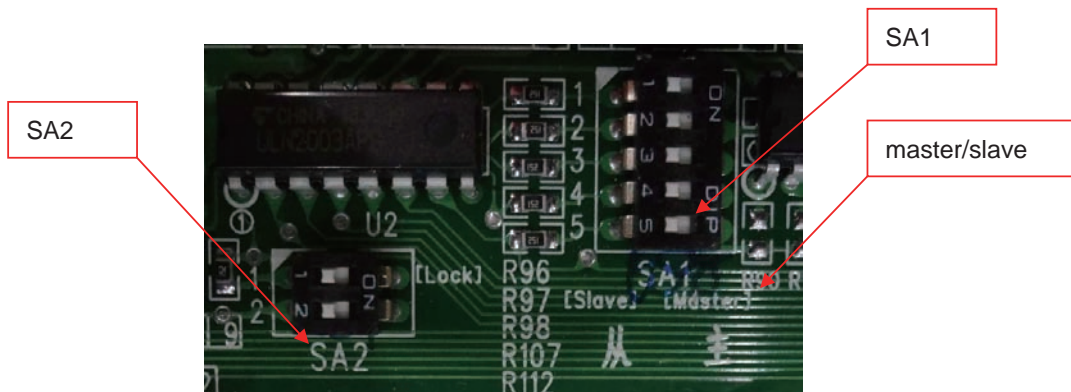
When the refrigerant recovery has started, it will quit when there is a signal from the wireless controller or it has run for ten minutes.

### 2) Setting function of master/slave indoor unit

Picture of DIP switch on outdoor mainboard :

SA1(5-bit): dial-switch for master/slave indoor unit,

SA2(2-bit): dial-switch for mode locking (not for wall mounted indoor units)



5-bit dial-switch to set master/slave indoor unit: it is corresponding to indoor units of no.1 to no.5. Dial the switch to ON(master side. Right side) to set that indoor unit as master indoor unit , and dial the switch to slave side(left side) to set indoor unit as slave indoor unit. There can be only one master unit in a system, If more than one indoor units are set as master unit, the unit with biggest number is the master unit. (biggest number here means number 1 to number 5 on the switch)

2-bit dial-switch to set mode locking

(note:

1.only use no.1 bit. no.2 bit is for future use

2.this function is only for duct and cassette unit, not for wall mounted unit:

Locked mode: Switch no.1 bit to “ON”side(lock side, or right side on the picture): even the master indoor unit is off, the system will run according to the mode before the master unit off.

Unlocked mode: Switch no.1 bit to left side on the picture: If the master indoor unit is off , the system will not care what the master unit mode was, it will run according to the mode of the first turning on slave indoor unit.

Note: For wall-mounted indoor unit, unlocked model is default, and locked mode is invalid.



# Part II : Installation and Maintenance

## 7. Notes for Installation and Maintenance

### Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.

The following contents are very important for installation and maintenance.

Please follow the instructions below.

- The installation or maintenance must accord with the instructions.
- Comply with all national electrical codes and local electrical codes.
- Pay attention to the warnings and cautions in this manual.
- All installation and maintenance shall be performed by distributor or qualified person.
- All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.
- Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.



### Warnings

#### Electrical Safety Precautions:

1. Cut off the power supply of air conditioner before checking and maintenance.
2. The air condition must apply specialized circuit and prohibit share the same circuit with other appliances.
3. The air conditioner should be installed in suitable location and ensure the power plug is touchable.
4. Make sure each wiring terminal is connected firmly during installation and maintenance.
5. Have the unit adequately grounded. The grounding wire can't be used for other purposes.
6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.
7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.
8. The power cord and power connection wires can't be pressed by hard objects.
9. If power cord or connection wire is broken, it must be replaced by a qualified person.

10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.

11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3m.

12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.

13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.

14. Replace the fuse with a new one of the same specification if it is burnt down; don't replace it with a cooper wire or conducting wire.

15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

#### Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual.(See the requirements in installation part)
2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.
3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.
4. Wear safety belt if the height of working is above 2m.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

#### Refrigerant Safety Precautions:

1. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.
2. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.
3. Make sure no refrigerant gas is leaking out when installation is completed.
4. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.
5. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

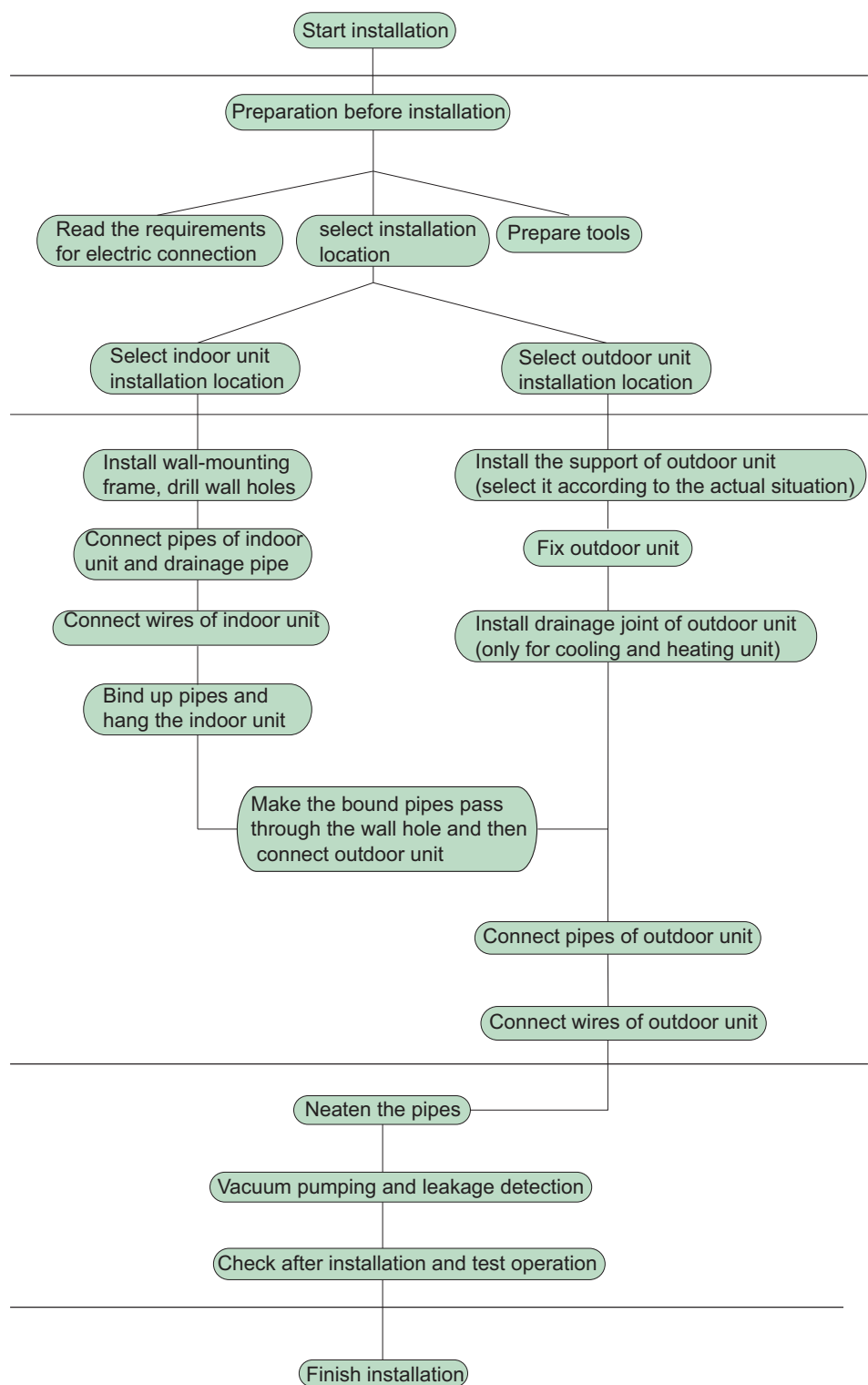
Improper installation may lead to fire hazard, explosion, electric shock or injury.

## Main Tools for Installation and Maintenance

<p>1. Level meter, measuring tape</p> 	<p>2. Screw driver</p> 	<p>3. Impact drill, drill head, electric drill</p> 
<p>4. Electroprobe</p> 	<p>5. Universal meter</p> 	<p>6. Torque wrench, open-end wrench, inner hexagon spanner</p> 
<p>7. Electronic leakage detector</p> 	<p>8. Vacuum pump</p> 	<p>9. Pressure meter</p> 
<p>10. Pipe pliers, pipe cutter</p> 	<p>11. Pipe expander, pipe bender</p> 	<p>12. Soldering appliance, refrigerant container</p> 

## 8. Installation Manual

### Installation procedures



Note: this flow is only for reference; please find the more detailed installation steps in this section.


## Safety Precautions


Please read this manual carefully before using and operating correctly as instructed in this manual.  
Please especially take notice of the following two symbols:


 **Warning! It indicates improper operation which will lead to human casualty or severe injury.**








 **Caution! It indicates improper operation which will lead to injury or property damage.**

 **Warning!**

 The installation should be committed to the appointed service center; otherwise it will cause water leakage, electric shock or fire etc.


 Please install the unit in a place where is strong enough to withstand the weight of the unit; otherwise, the unit would fall down and cause injury or death.


 The drain pipe should be installed as instructed in the manual to guarantee the proper drainage; meanwhile it should be insulated to prevent condensing; otherwise the improper installation would cause water leakage and then wet the household wares in the room.


-  Do not use or place any inflammable or explosive substance near the unit.
-  Under the occurrence of an error (like burning smell etc.), please cut off the main power supply of the unit.
-  Keep good ventilation in the room to avoid oxygen deficit.
-  Never insert your finger or any other object into the air outlet/inlet grille.
-  Please take notice of the supporting frame of the unit to see if it is damaged over the long time period of use.
-  Never refit the unit and contact the sales agent or the professional installation personnel for the repair or relocation of the unit.
-  Non-professional personnel are prohibited to dismantle the electric box owing to the high voltage of the outdoor unit.









**An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.**

 **Caution!**

 Before installation, please check if the power supply corresponds with the requirement specified on the nameplate and also check its security.

 Before using the unit, please check if the piping and wiring are correct to avoid water leakage, refrigerant leakage, electric shock, or fire etc.

 The main power supply must be earthed to avoid the hazard of electric shock and never connect this earth wire to the gas pipe, running water pipe, lightening rod or phone cable's earth lead.

-  Turn off the unit after it runs at least five minutes; otherwise its service life will be shortened.
-  Do not allow children operate this unit.
-  Do not operate this unit with wet hands.
-  Cut off the main power supply prior to the cleaning of the unit or the replacement of the air filter.
-  When the unit is not to be used for a long time, please cut off the main power supply of the unit.
-  Do not expose the unit to the moist or corrosive circumstances.
-  Never step on the unit or place any object on it.
-  It is suggested to have a power-on test annually.

## Installation Location and Matters Needing Attention

The installation of the unit must comply with the national and local safety regulations. The installation quality directly affects the normal use, so the user should not carry out the installation personally, instead, the installation and debugging should be done by technician according to this manual. Only after that, can the unit be energized.

### a. How to select the installation location for the indoor unit

- 1) Where there is no direct sunlight.
- 2) Where the top hanger, ceiling and the building structure are strong enough to withstand the weight of the unit.
- 3) Where the drain pipe can be easily connected to outside.
- 4) Where the flow of the air inlet/outlet is not blocked
- 5) Where the refrigerant pipe of the indoor unit can be easily led to outside.
- 6) Where there is not inflammable, explosive substances or their leakage.
- 7) Where there is no corrosive gas, heavy dust, salt mist, smog or moisture.

### b. How to select the installation location for the outdoor unit

- 1) The outdoor unit must be installed where the bearing surface is stable and secure enough.
- 2) The outdoor unit and indoor unit should be placed as close as possible to minimize the length and bends of the refrigerant pipe.
- 3) Do not install the outdoor unit under the window or between the buildings to prevent the normal running noise entering the room.
- 4) Where the flow of the air inlet/outlet is not blocked.
- 5) The outdoor unit should be installed where ventilation is in good condition so that the unit can take in and discharge enough air.
- 6) Do not install the unit where there are inflammable and explosive substances and where there is heavy dust, salt fog and other severely polluted air.

No air guiding pipe is allowed to be installed at the air inlet/outlet of the outdoor unit. Under the heating mode, the condensate water would drip down from the base frame and would be frozen when the outdoor ambient temperature is lower than 0°C (32 °F) . Besides, the installation of the outdoor unit should not affect the heat radiation of the unit.

## ⚠CAUTION!

The unit installed in the following places is likely to run abnormally. If unavoidable, please contact the professional personnel at the C&H appointed service center . ① where is full of oil; ② alkaline soil off the sea; ③ where there is sulfur gas (like Sulfur hot spring) ; ④ where there are devices with high frequency (like wireless devices, electric welding devices, or medical equipments); ⑤ special circumstances.

### c. Electric Wiring

- 1) The installation must be done in accordance with the national wiring regulations.
- 2) Only the power cord with the rated voltage and exclusive circuit for the air conditioning can be used.
- 3) Do not pull the power cord by force.
- 4) The electric installation should be carried out by the professional personnel as instructed by the local laws, regulations and also this manual.
- 5) The diameter of the power cord should be large enough and once it is damaged it must be replaced by the dedicated one.
- 6) The earthing should be reliable and the earth wire should be connected to the dedicated device of the building by the professional personnel. Besides, the air switch coupled with the leakage current protection switch must be equipped, which is of enough capacity and of both magnetic and thermal tripping functions in case of the short circuit and overload.

Table 1

Models	Power Supply	Capacity of the Air Switch	Recommended Cord (pieces× sectional area)
36/42K	220-240V~ 50Hz	32A	4mm <sup>2</sup> ×3

#### d. Earthing Requirements

- 1) The air conditioner is classified into the Class I appliances, so its earthing must be reliable.
- 2) The yellow-green line of the air conditioner is the earth line and can not be used for other purpose, cut off or fixed by the tapping screw; otherwise it would cause the hazard of electric shock.
- 3) The reliable earth terminal should be provided and the earth wire can not be connected to any of the following places.
  - ① Running water pipe;
  - ② Coal gas pipe;
  - ③ Sewage pipe;
  - ④ Other places where the professional personnel think unreliable.

CHML-U36NK4

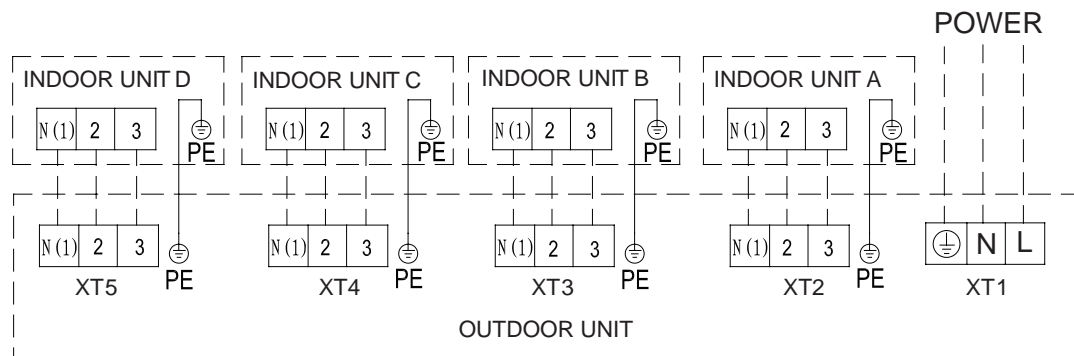


Fig.1

CHML-U42NK5

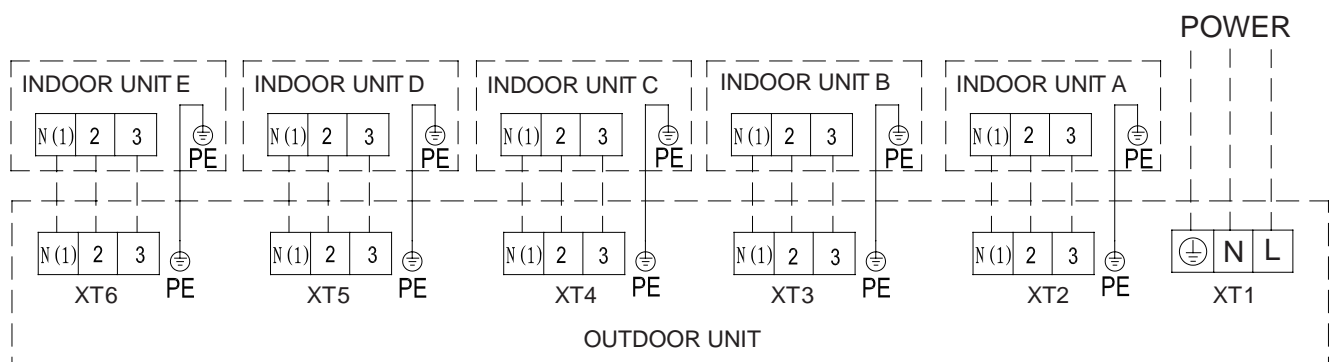


Fig.2

a. Noise Precautions

- 1) The air conditioning unit should be installed where ventilation is in good condition, otherwise the working capability of the unit would be reduced or working noise would be increased.
- 2) The air conditioning unit should be installed on the base frame which is stable and secure enough to withstand the weight of the unit; otherwise it would incur vibration and noise.
- 3) During the installation, a consideration should be taken that the produced hot air or noise should not affect neighbors or surroundings.
- 4) Do not stack obstacles near the air outlet of the outdoor unit; otherwise it would reduce the working capability of the unit or increase the working noise.
- 5) In the event of the occurrence of abnormal noise, please contact the sales agent as soon as possible.

b. Accessories for Installation

Refer to the packing list for the accessories of the indoor and outdoor units respectively.

## Installation of the Outdoor Unit

a. Precautions for the Installation of the Outdoor Unit

The following rules should be followed when the installation location is being considered so as to let the unit run well enough.

- 1) The discharged air from the outdoor unit won't return back and enough space should be left for maintenance around the unit.
- 2) The installation location should be in good condition so that the unit is able to take in and discharge enough air. Besides, make sure there is no obstacle at the air inlet/outlet of the unit. If there is, remove it.
- 3) The unit must be installed where it is secure enough to support the weight of the unit and capable of reducing to some extent noise and vibration to make sure they do not bother your neighbors.
- 4) The designated lifting hole must be used for lifting the unit and protect the unit carefully during lifting to prevent damaging the metal sheet which would result in rusting in future.
- 5) The unit should be installed where there is as little as direct sunlight.
- 6) The unit must be installed where the rain water and defrosting water can be drained.
- 7) The unit must be installed where the unit won't be covered by the snow and won't be affected by rubbish and oil fog.
- 8) Rubber or spring shock absorbers should be used during the installation of the outdoor unit to meet the noise and vibration requirements.
- 9) The installation dimensions should meet the requirement covered in this manual and the outdoor unit must be fixed securely.
- 10) For the Free Match system, Do not install only one indoor unit for the outdoor unit.
- 11) The installation should be carried out by the professionally skilled personnel.

b. Installation of the Outdoor Unit

- 1) Outline dimension of the outdoor unit.

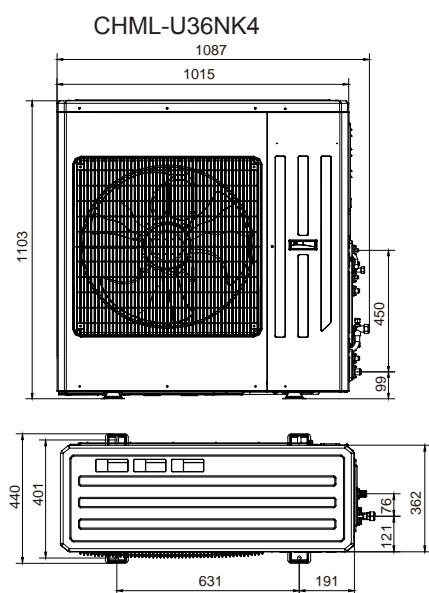


Fig.3

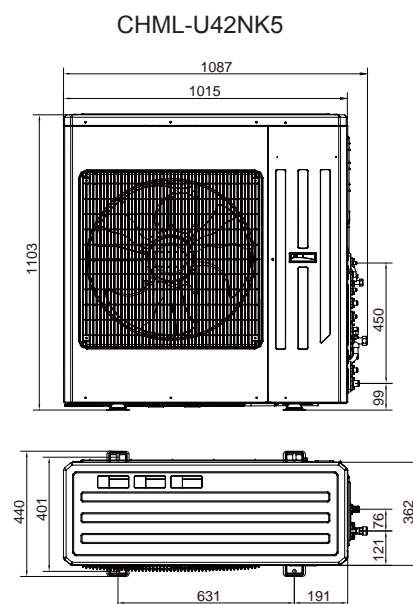


Fig.4



- 2) During the transportation of the outdoor unit, two lifting ropes long enough must be used in four directions and the included angle must be less than 40° prevent the center of unit deviating.
- 3) During the installation, M12 screws should be used to fix the support leg and base frame of the unit.
- 4) The unit should be installed on a concrete base frame with a height of 10cm.
- 5) The installation space of the unit should be as required in Fig.5.

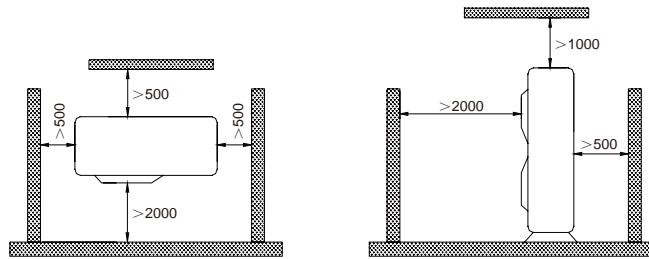


Fig.5

### Connection between Indoor and Outdoor Units

#### a. Wiring of the Power Cord

#### ⚠CAUTION!

A breaker must be installed, capable of cutting off the power supply for the whole system.

- 1) Open the side plate.
- 2) Let the power cord go through the rubber ring.
- 3) Connect the power cord to the terminals “L”, “N” and also the earthing bolt, and then connect the wiring terminals “N(1),2,3” of the indoor unit to those of the outdoor unit correspondingly.
- 4) Fix the power cord with wire clips.

#### b. Energy Level and Capacity Code of the Indoor and Outdoor Units

Table 2

	Energy Level	Capacity Code
Indoor Unit	09	25
	12	35
	18	50
	21	60
	24	71
Outdoor Unit	36	100
	42	120

- 1) The outdoor unit with energy level 36 can drive up to four sets of indoor units, while the outdoor unit 42 can drive up to five.
- 2) The sum of the capacity codes of the indoor units should be among 50%-150% of that of the outdoor unit.

#### c. Allowable Length and Height Fall of the Refrigerant Pipe

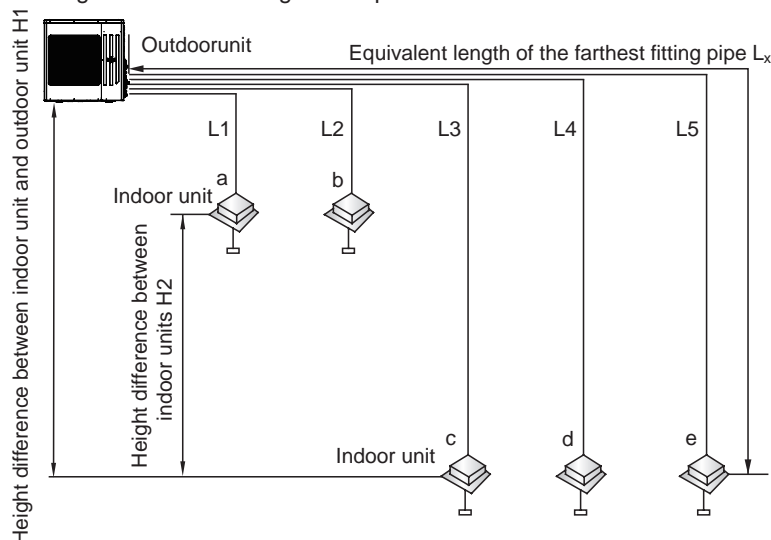




Table 3

		Allowable Length		Refrigerant Pipe	
		36	42	36	42
Total Length(m)		70	80	$L_1+L_2+L_3+L_4$	$L_1+L_2+L_3+L_4+L_5$
Max. Length for Single Unit(m)		20	25	$L_x$	
Max. installation altitude	Outdoor unit and indoor unit	15	15	H1	
	Indoor unit and indoor unit	7.5	7.5	H2	

Table 4: Dimension of the Refrigerant Pipe of the Indoor Unit unit: mm

Capacity Level of the Indoor Unit	Gas Pipe	Liquid Pipe
09,12	9.52	6.35
18	12.7	6.35
21,24	15.9	9.52

## d.Piping between the Indoor and Outdoor Units

1) Refer to Fig.6 for the moments of torque for tightening screws.

2) Let the flare end of the copper pipe point at the screw and then tighten the screw by hand.

3) After that, tighten the screw by the torque wrench unit it clatters (as shown in Fig.6).

4) The bending degree of the pipe can not be too small; otherwise it will crack. And please use a pipe tube bender to bend the pipe.

5) Wrap the exposed refrigerant pipe and the joints by sponge and then tighten them with the plastic tape.

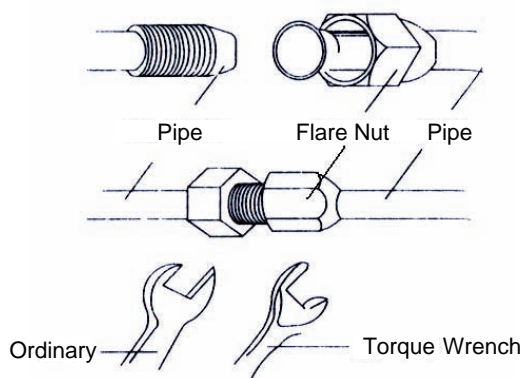
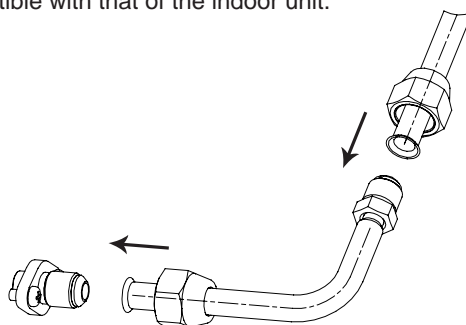


Fig.6

Table 5: Moments of Torque for Tightening Screws

Diameter	Wall Thickness (mm)	Moment of Torque
6.35mm	0.5	15-30(N·m)
9.52mm	0.71	30-40(N·m)
12.7mm	1	45-50(N·m)
15.9mm	1	60-65(N·m)

If the specification of the outdoor unit pipe joint does not conform to that of the indoor unit, then the joint specification of the outlet pipe of the indoor unit takes precedence. A reducing nipple shall be installed at the joint of the outdoor unit so as to make the joint of the outdoor unit compatible with that of the indoor unit.



### ⚠CAUTION!

- ① During the connection of the indoor unit and the refrigerant pipe, never pull any joints of the indoor unit by force; otherwise the capillary pipe or other pipe may crack, which then would result in leakage.
- ② The refrigerant pipe should be supported by brackets, that is, don't let the unit withstand the weight of it.

### ⚠CAUTION!

For the Free match system, each pipe should be labeled to tell which system it belongs to avoid mistaken inaccurate piping.

#### e. Installation of the Protection Layer of the Refrigerant Pipe

- 1) The refrigerant pipe should be insulated by the insulating material and plastic tape in order to prevent condensation and water leakage.
- 2) The joints of the indoor unit should be wrapped with the insulating material and no gap is allowed on the joint of the indoor unit, as shown in Fig.7.

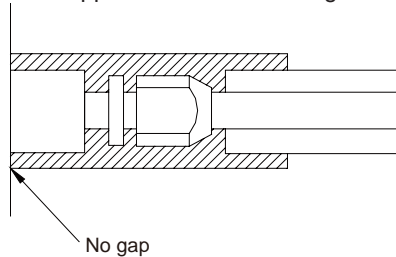


Fig.7

### ⚠CAUTION!

After the pipe is protected well enough, never bend it to form a small angle; otherwise it would crack or break.

#### f. Wrapping the Pipe with Tape

- 1) Bundle the refrigerant pipe and electric wire together with tape, and separate them from the drain pipe to prevent the condensate water overflowing.
- 2) Wrap the pipe from the bottom of the outdoor unit to the top of the pipe where it enters the wall. During the wrapping, the later circle should cover half of the former one.
- 3) Fix the wrapped pipe on the wall with clamps.

### ⚠CAUTION!

- ① Do not wrap the pipe too tightly; otherwise the insulation effect would be weakened. Additionally, make sure the drain hose is separated from the pipe.
- ② After that, fill the hole on the wall with sealing material to prevent wind and rain coming into the room.

## Refrigerant Charging and Trial Running

#### a. Refrigerant Charging

- 1) The refrigerant has been charged into the outdoor unit before shipment, while additional refrigerant still need be charged into the refrigerant pipe during the field installation.
- 2) Check if the liquid valve and the gas valve of the outdoor unit are closed fully.
- 3) As shown in the following figure (Fig.8), expel the gas inside the indoor unit and refrigerant pipe out by the vacuum pump. (2 purposes of outdoor unit's main valve: 1. vacuum pumping 2. Control the on /off of outdoor unit refrigerant)

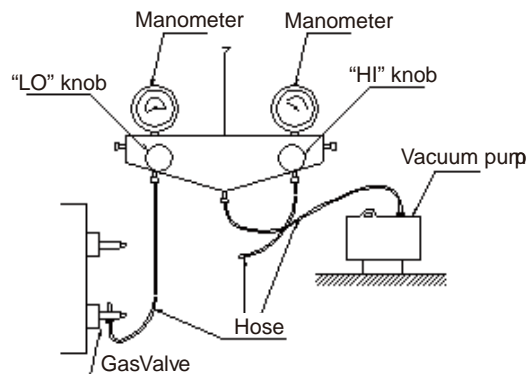


Fig.8

4) Make sure the system has no leakage. When compressor is not working, fill a set amount of R410a refrigerant into the unit through outdoor unit's liquid valve. If the inner tube pressure rises and the set amount of refrigerant can't be filled inside quickly, you can turn on the unit to make it start cooling, then fill the refrigerant inside through outdoor unit's gas valve.

a. Calculation of the Additional Refrigerant Charging

1) Refrigerant Charge in the Outdoor Unit before

ShipmentTable

Model	CHML-U36NK4	CHML-U42NK5
Refrigerant Charge (kg)	4.3	4.8

Notes:

① The refrigerant charge mentioned in the table above is not included those charged additionally in the indoor unit and the refrigerant pipe.

② The amount of the additional refrigerant charge is dependent on the diameter and length of the liquid refrigerant pipe which is decided by the actual yield installation requirement.

③ Record the additional refrigerant charge for future maintenance.

2) Calculation of the Additional Refrigerant Charge

If the total refrigerant pipe length (liquid pipe) is smaller than that listed in the table below, no additional refrigerant will be charged.

Table 7

Model	Total Liquid Pipe Length (a+b+c+d+e)
CHML-U36NK4	≤40m
CHML-U42NK5	≤50m

Additional Refrigerant Charge<sub>2</sub>=ΣExtra Liquid Pipe Length×22g/m(liquid pipe 1/4").

Note: if the total refrigerant pipe length is larger than that listed in the table above, the additional refrigerant for the extra length of the pipe needs to be charged as per 22g/m.

3) Example : C

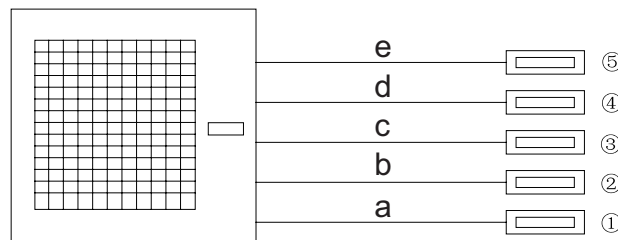


Fig.9

Table 8 Indoor Unit

Serial No.	Model
Indoor Unit ⑤	Ducted Type CHML-ID09NK
Indoor Unit ④	Ducted Type CHML-ID09NK
Indoor Unit ③	Ducted Type CHML-ID09NK
Indoor Unit ②	Ducted Type CHML-ID09NK
Indoor Unit	Ducted Type CHML-ID09NK

Table 9 Liquid Refrigerant Pipe

Serial No.	e	d	c	b	a
Diameter	Φ6.35	Φ6.35	Φ6.35	Φ6.35	Φ9.52
Length	20m	20m	15m	5m	5m

The total length of each liquid refrigerant pipe is: e+d+c+b+a=20+20+15+5+5=65m. Thus, the minimum additional refrigerant charge=(65-50)×0.022=0.33kg (Note: no additional refrigerant is needed for the liquid pipe within 50m).

#### 4) Additional Refrigerant Charge Record

Table 10 Indoor Unit

No.	Indoor Unit Model	Additional Refrigerant Charge(kg)
1		
2		
.....		
N		
Total		

Table 11 Refrigerant Pipe

Diameter	Total Length(m)	Additional Refrigerant Charge(kg)
15.9		
12.7		
9.52		
6.35		
Total		

#### c. Items to be checked after the Installation

Table 12

Items to be Checked	Possible Errors	Check Results
Has each part and component of the unit been installed securely?	The unit may fall off, vibrate or generate noise.	
Has the gas leakage test been taken?	The cooling (heating) capacity may be poor.	
Is the thermal insulation sufficient?	Dews and water drops may be generated.	
Does the drainage go well?	Dews and water drops may be generated.	
Is the actual power voltage in line with the value marked on the nameplate?	The unit may break down or some components may be burnt out.	
Are the wiring and the piping correct?	The unit may break down or some components may be burnt out.	
Has the unit been earthed reliably?	There may be a danger of electric shock.	
Does the wire meet the regulated requirement?	The unit may break down or the component may be burnt out.	
Is there any obstacle at the air inlet/outlet of the indoor/outdoor unit?	The cooling (heating) capacity may be poor	
Have the length of the refrigerant pipe and the refrigerant charge been recorded?	It may be hard to know the exact refrigerant charge.	

#### d. Trial Running

##### 1) Check before the Trial Running

- ① Check if the appearance of the unit and the piping system are damaged during the transportation.
- ② Check if the wiring terminals of the electronic component are secure.
- ③ Check if the rotation direction of the fan motor is right.
- ④ Check if all valves in the system are fully opened.

##### 2) Trial Running

① The trial running should be carried out by the professionally skilled personnel on the premise that all items listed above are in normal conditions.

- ② Let the unit energized and switch the wired controller or the remoter controller to "ON".
- ③ The fan motor and compressor of the outdoor unit will run automatically in one minute.
- ④ If there is some unusual sound after the compressor is started, turn off the unit for an immediate check.

## 9. Maintenance

### 9.1 Precautions before Performing Inspection or Repair

#### 1. Trouble Table

##### **WARNING!**

a. In the event of abnormal conditions (like, stinky smell), please shut off the main power supply immediately and then contact the C&H appointed service center; otherwise the continuous abnormal running would damage the air conditioning unit and also would cause electric shock or fire hazard etc.

b. Do not repair the air conditioning personally but instead contact the professionally skilled personnel at the C&H appointed service center, as the incorrect repair would cause electric shock or fire hazard etc.

#### 1.1 Check before Contacting Service Center

Please check the following items before contacting the maintenance serviceman.

Conditions	Causes	Corrective Actions
The unit does not run	Broken fuse or opened breaker	Change the fuse or close the breaker
	Power off	Restart the unit when power on
	Loosened power supply plug.	Plug the power supply properly.
	Insufficient batteries voltage of the remote controller	Change new batteries
	Remoter controller out of the control scope	Keep the control distance within 8 meters.
The unit stops soon after it starts	Clogged inlet/outlet of the indoor/outdoor unit	Clear the obstacle
Cooling/Heating is abnormal	Clogged inlet/outlet of the indoor/outdoor unit	Clear the obstacle
	Improperly set temperature	Adjust the setting of the remote or wired controller.
	Too low set fan speed	Adjust the setting of the remote or wired controller.
	Improper airflow direction	Adjust the setting of the remote or wired controller.
	Opened door and window	Close the door and window
	Direct sunlight	Hang a curtain or blinds over the window.
	Too much people in the room	
	Too much heat sources in the room	Reduce the heat sources
	Dirty filter screen	Clean the filter screen


Note: If the air conditioner still runs abnormally after the above check and handling, please contact the maintenance serviceman at the local appointed service center and also give a description of the error occurred as well as the model of the unit


#### 1.2 Problem Handling

The conditions listed below are not classified into errors.

Conditions	Causes
The unit does not run	When restart the unit soon after it is stopped.
	As soon as power is on.
The unit blows out mist	When the cooling operation starts.
The unit generates noise	The unit "clatters" as soon as it starts running.
	The unit "swishes" during the cooling operation.
	The unit "swishes" when it is started or stopped.
	The unit "swishes" when it is in and after the running.
	The unit "squeaks" when it is in and after the running.
The unit blows out dust.	When the unit restarts after it is not used for a long time.
The unit emits odors.	When the unit is running.

### 1.3 Error Description


If some error occurs when the unit is running, the error code will be displayed on the wired controller and the main board  of the outdoor unit. See the table below for more details about the meaning of each error.

Error Item	Outdoor Unit 88 Display	Indicating LED Flashing Times			88 Display	Wired Controller Display	Error Type
		Running LED	Cooling LED	Heating LED			
High Pressure Protection	E1	Flash once	/	/	E1	E1	Outdoor
Shutdown for Whole Unit Anti-Freeze Protection	E2	Flash twice	/	/	E2	E2	System Error
Low Pressure Protection	E3	Flash 3 times	/	/	E3	E3	Outdoor
High Discharge Temp Protection	E4	Flash 4 times	/	/	E4	E4	Outdoor
Communication Error	E6	Flash 6 times	/	/	E6	E6	Outdoor & Indoor
Indoor Unit Water Full Error	E9	Flash 9 times	/	/	E9	E9	Indoor
Refrigerant Recovery Mode	Fo	Quick Flashing	Quick Flashing	/	Fo	Fo	Special Mode
Outdoor Ambient Temp Sensor Error	F3	/	Flash 3 times	/	F3	F3	Outdoor
Outdoor Mid-Coil Temp Sensor Error	F4	/	Flash 4 times	/	F4	F4	Outdoor
Outdoor Discharge Air Temp Sensor Error	F5	/	Flash 5 times	/	F5	F5	Outdoor
Oil Return for Cooling	F7	/	/	/	/	/	Special Mode
Forced Defrosting	H1	Quick Flashing	/	/	H1	H1	Special Mode
Oil Return for Heating or Defrosting	H1	/	/	Flash once	H1		Special Mode
Compressor Overheat Protection	H3	/	/	Flash 3 times	H3	H3	Drive Error
IPM Protection	H5	/	/	Flash 5 times	H5	H5	Drive Error
Motor Desynchronizing	H7	/	/	Flash 7 times	H7	H7	Drive Error
PFC Error	Hc	/	/	Flash 6 times	Hc	Hc	Drive Error
Startup Failure	Lc	/	/	Flash 11 times	Lc	Lc	Drive Error
DC Fan motor Error	LA	/	/	/	/	/	Outdoor
No indoor fan motor	H6	Flash 11 times	/	/	/	/	Indoor
Compressor phase circuit detection error	U1	/	/	Flash 12 times	/	/	Outdoor
DC link voltage drop error	U3	/	/	Flash 20 times	/	/	Outdoor
Zero detection circuit error	U8	Flash 17 times	/	/	/	/	Outdoor
Phase Loss	Ld	Flash 3 times	Flash 3 times	Flash 3 times	Ld	Ld	Drive Error
Compressor Stalling	LE	Flash 3 times	Flash 3 times	Flash 3 times	LE	LE	Drive Error
Over-Speed	LF	Flash 3 times	Flash 3 times	Flash 3 times	LF	LF	Drive Error
IPM Reset	P0	Flash 3 times	Flash 3 times	Flash 3 times	P0	P0	Drive Error
Compressor Current Protection	P5	/	/	Flash 15 times	P5	P5	Drive Error
Communication Error between the Inverter Drive and the Main Controller	P6	Flash 16 times	/	/	P6	P6	Drive Error
Radiator Temp Sensor Error	P7	/	/	Flash 18 times	P7	P7	Drive Error
Radiator Overheat Protection	P8	/	/	Flash 19 times	P8	P8	Drive Error

AC Contactor Protection	P9	Flash 3 times	Flash 3 times	Flash 3 times	P9	P9	Drive Error
Current Sensor Error	Pc	/	/	Flash 12 times		U1	Drive Error
Sensor Connection Protection	Pd	Flash 3 times	Flash 3 times	Flash 3 times	Pd	Pd	Drive Error
Over Voltage Protection	PH	/	Flash 11 times	/	PH	PH	Drive Error
Low Voltage Protection	PL	/	/	Flash 21 times	PL	PL	Drive Error
Temp Drift Protection	PE	Flash 3 times	Flash 3 times	Flash 3 times	PE	PE	Drive Error
Drive Board Ambient Temp Sensor Error	PF	Flash 3 times	Flash 3 times	Flash 3 times	PF	PF	Drive Error
AC Current Protection	PA	Flash 5 times	/	/	E5	E5	Drive Error
Charging Circuit Error	PU	/	/	Flash 17 times	PU	PU	Drive Error
AC Input Voltage Anomaly	PP	Flash 3 times	Flash 3 times	Flash 3 times	PP	PP	Drive Error
Unit communication error	See Table 16	Flash 6 times	/	/	E6	E6	Indoor
Unit n indoor pipe midway temperature sensor error	See Table 16	/	Flash twice	/	E2	E2	Indoor
Indoor Evaporator Temp Sensor Short/Open-Circuit	See Table 16	/	Flash twice	/	F2	F2	Indoor
(Air Valve) Unit n indoor unit pipe outlet temperature sensor error	See Table 16	/	Flash 22 times	/	b7	b7	Indoor
(Liquid Valve) Unit n indoor pipe inlet temperature sensor error	See Table 16	/	Flash 19 times	/	b5	b5	Indoor
Unit n mode conflict	See Table 16	/	Flash once	/	F1	F1	Indoor
Mode Conflict	See Table 16	Flash 7 times	/	/	E7	E7	Indoor

The error codes for wall mounted type unit are shown in the following table):

Error Item	Outdoor Unit 88 Display	Indicating LED Flashing Times			88 Display	Wired Controller Display	Error Type
		Running LED	Cooling LED	Heating LED			
High Pressure Protection	E1	Flash once	/	/	E1	E1	Outdoor
Shutdown for Whole Unit Anti-Freeze Protection	E2	Flash twice	/	/	E2	E2	System Error
Low Pressure Protection	E3	Flash 3 times	/	/	E3	E3	Outdoor

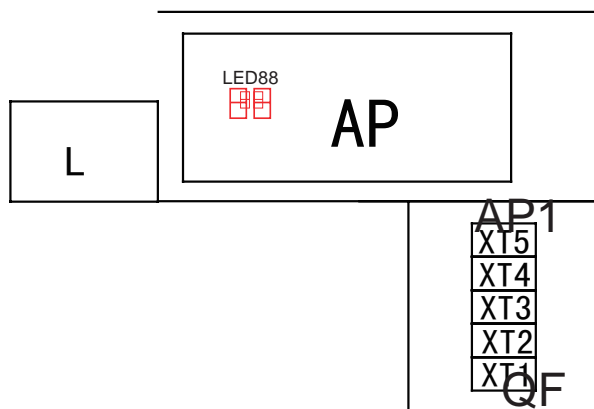
High Discharge Temp Protection	E4	Flash 4 times	/	/	E4	E4	Outdoor
Communication Error	E6	Flash 6 times	/	/	E6	E6	Outdoor & Indoor
Indoor Unit Water Full Error	E9	Flash 9 times	/	/	E9	E9	Indoor
Refrigerant Recovery Mode	Fo	Flash once	Flash once	/	Fo	Fo	Special Mode
Outdoor Ambient Temp Sensor Error	F3	/	Flash 3 times	/	F3	F3	Outdoor
Outdoor Mid-Coil Temp Sensor Error	F4	/	Flash 4 times	/	F4	F4	Outdoor
Outdoor Discharge Air Temp Sensor Error	F5	/	Flash 5 times	/	F5	F5	Outdoor
Oil Return for Cooling	F7	/	Flash 7 times	/	/	/	Special Mode
Forced Defrosting	H1	Quick Flashing	/	/	H1	H1	Special Mode
Oil Return for Heating or Defrosting	H1	/	/	Flash once	H1		Special Mode
Compressor Overheat Protection	H3	/	/	Flash 3 times	H3	H3	Drive Error
IPM Protection	H5	/	/	Flash 5 times	H5	H5	Drive Error
Motor Desynchronizing	H7	/	/	Flash 7 times	H7	H7	Drive Error
PFC Error	Hc	/	/	Flash 6 times	Hc	Hc	Drive Error
Startup Failure	Lc	/	/	Flash 11 times	Lc	Lc	Drive Error
DC Fan motor Error	LA	Flash 24 times	/	/	LA	LA	Outdoor
Phase Loss	Ld	/	/	/	Ld	Ld	Drive Error
Compressor Stalling	LE	/	/	/	LE	LE	Drive Error
Over-Speed	LF	/	/	/	LF	LF	Drive Error
IPM Reset	P0	/	/	/	P0	P0	Drive Error
Compressor Current Protection	P5	/	/	Flash 15 times	P5	P5	Drive Error
Communication Error between the Inverter Drive and the Main Controller	P6	Flash 16 times	/	/	P6	P6	Drive Error
Radiator Temp Sensor Error	P7	/	/	Flash 18 times	P7	P7	Drive Error
Radiator Overheat Protection	P8	/	/	Flash 19 times	P8	P8	Drive Error
AC Contactor Protection	P9	/	/	/	P9	P9	Drive Error
Sensor Connection Protection	Pd	/	/	/	Pd	Pd	Drive Error
Low Voltage Protection	PL	/	/	Flash 21 times	PL	PL	Drive Error



Temp Drift Protection	PE	/	/	/	PE	PE	Drive Error
Drive Board Ambient Temp Sensor Error	PF	/	/	/	PF	PF	Drive Error
Charging Circuit Error	PU	/	/	Flash 17 times	PU	PU	Drive Error
Unit n communication error	See Table 16	Flash 6 times	/	/	E6	E6	Indoor
Unit n indoor pipe midway temperature sensor error	See Table 16	/	Flash twice	/	E2	E2	Indoor
Indoor Evaporator Temp Sensor Short/Open-Circuit	See Table 16	/	Flash twice	/	F2	F2	Indoor
(Air Valve) Unit n indoor unit pipe outlet temperature sensor error	See Table 16	/	Flash 22 times	/	b7	b7	Indoor
(Liquid Valve) Unit n indoor pipe inlet temperature sensor error	See Table 16	/	Flash 19 times	/	b5	b5	Indoor
Unit n mode conflict	See Table 16	/	Flash once	/	F1	F1	Indoor
Mode Conflict	See Table 16	Flash 7 times	/	/	E7	E7	Indoor

Error Code	Error Description	Error Code	Error Description	Error Code	Error Description
11	Unit A communication error	21	Unit B communication error	31	Unit C communication error
12	Unit A indoor pipe midway temperature sensor error	22	Unit B indoor pipe midway temperature sensor error	32	Unit C indoor pipe midway temperature sensor error
13	Unit A indoor unit pipe outlet temperature sensor error	23	Unit B indoor unit pipe outlet temperature sensor error	33	Unit C indoor unit pipe outlet temperature sensor error
14	Unit A indoor pipe inlet temperature sensor error	24	Unit B indoor pipe inlet temperature sensor error	34	Unit C indoor pipe inlet temperature sensor error
15	Unit A indoor ambient temperature sensor error	25	Unit B indoor ambient temperature sensor error	35	Unit C indoor ambient temperature sensor error
16	Unit A mode conflict	26	Unit B mode conflict	36	Unit C mode conflict
17	Unit A anti-freezing protection	27	Unit B anti-freezing protection	37	Unit C anti-freezing protection
41	Unit D communication error	46	Unit D mode conflict	54	Unit E indoor pipe inlet temperature sensor error
42	Unit D indoor pipe midway temperature sensor error	47	Unit D anti-freezing protection	55	Unit E indoor ambient temperature sensor error
43	Unit D indoor unit pipe outlet temperature sensor error	51	Unit E communication error	56	Unit E mode conflict

Error Code	Error Description	Error Code	Error Description	Error Code	Error Description
44	Unit D indoor pipe inlet temperature sensor error	52	Unit E indoor pipe midway temperature sensor error	57	Unit E anti-freezing protection
45	Unit D indoor ambient temperature sensor error	53	Unit E indoor unit pipe outlet temperature sensor error	C5	Jumper terminal error



Outdoor Unit: CHML-U36NK4,CHML-U42NK5

(Note: Refer to the real products for the exact position of each component.)

Once errors are displayed on the controller, please shut off the air conditioning unit and contact the professionally skilled personnel for troubleshooting.

## 1.4 After-Sales Service

If there is any quality or other issue, please contact the C&H after-sales service center.

## Flow Chart of Troubleshooting

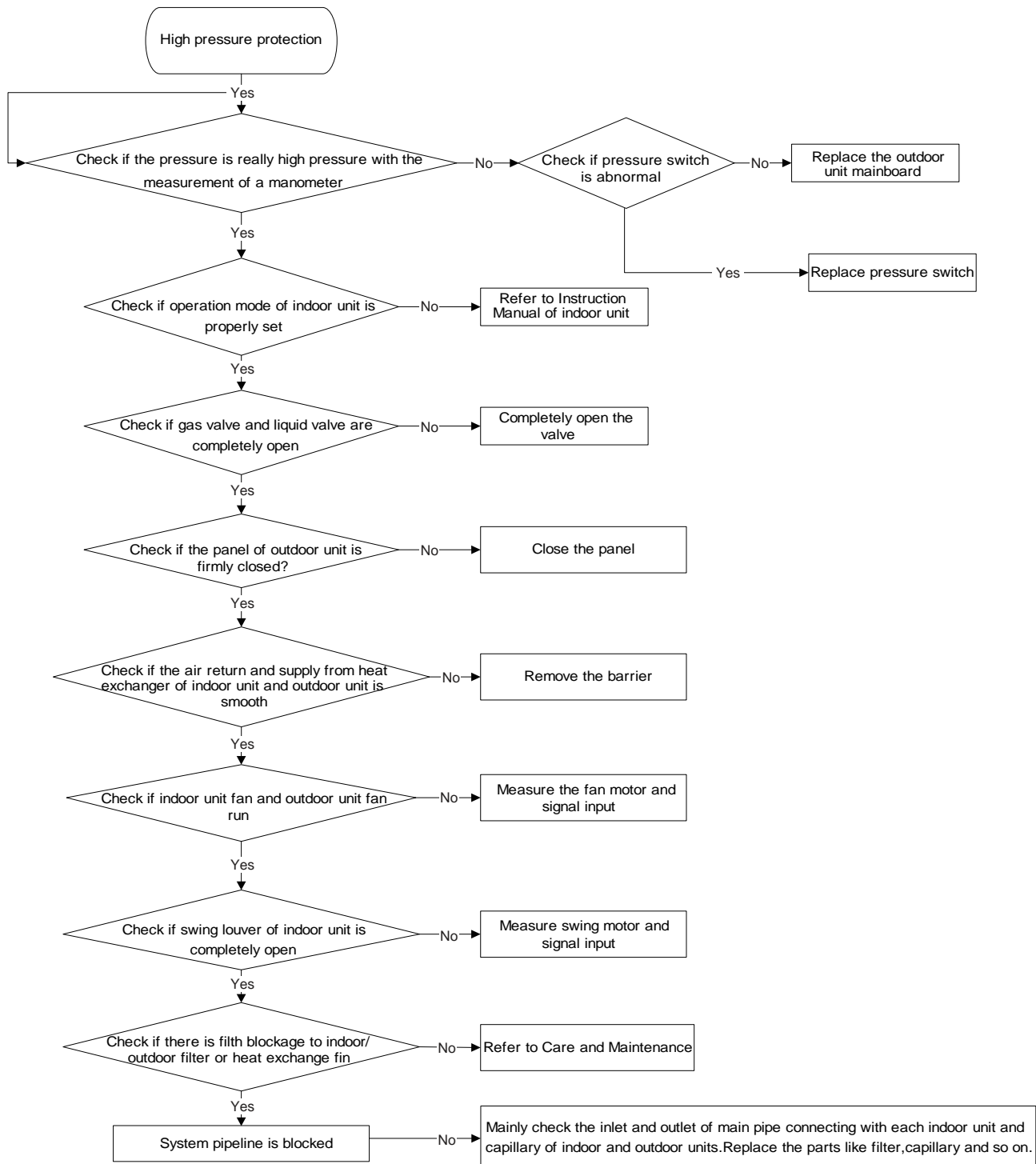
Service personnel shall collect the malfunction information as much as possible and research them thoroughly, list these electrical parts which may cause malfunction, service personnel shall be able to determine the specific reason and solve the faulted parts.

Observe the status of the complete device and do not observe the partial

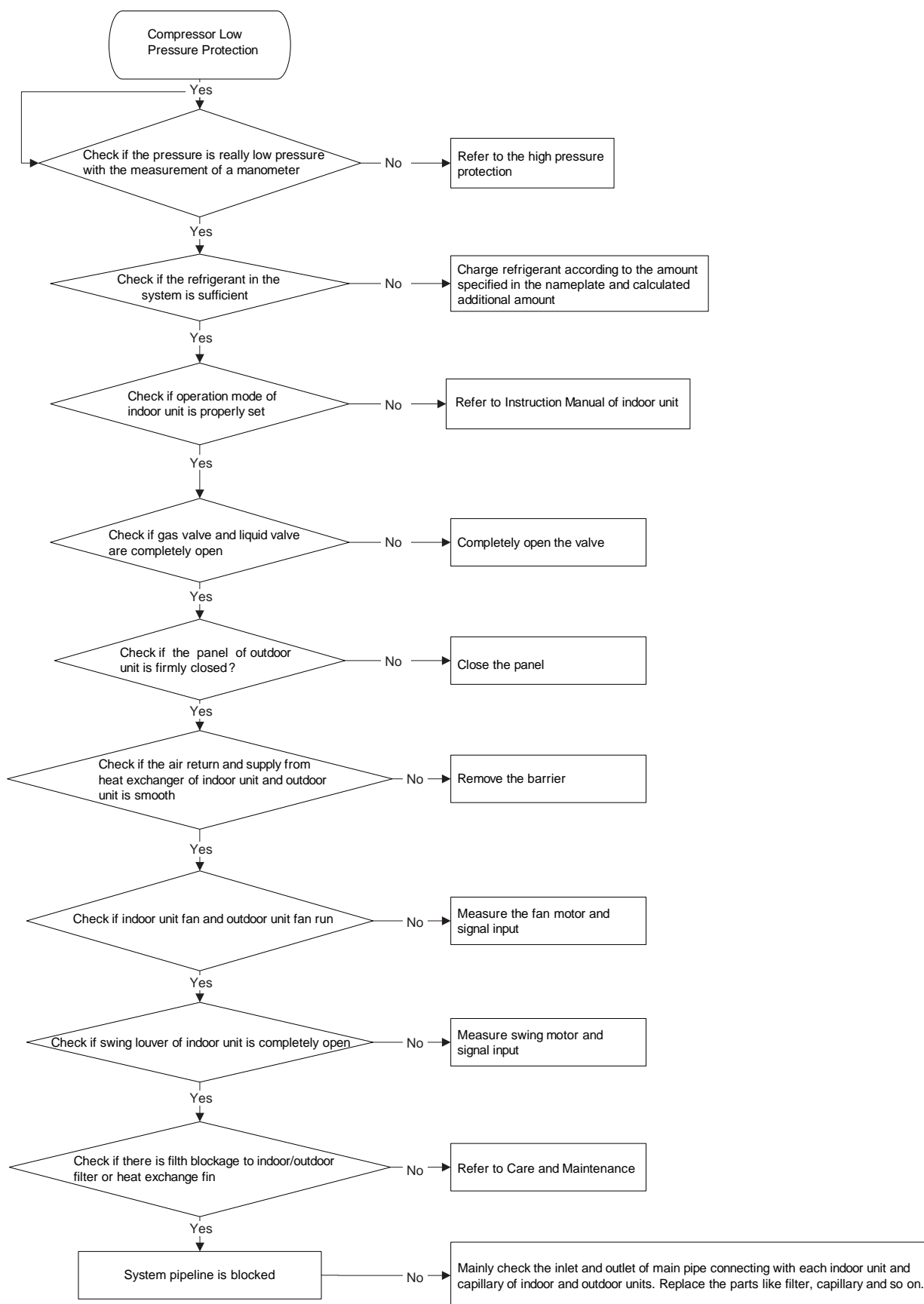
It is advised to start from the simple operation during analyzing, judging and confirming malfunction reason, then conduct the complicated operations such removal of device, part replacement and refrigerant filling.

Find the malfunction reason carefully as unit may occur several malfunction at the same time and one malfunction may develop into several malfunction, so entire system analysis shall be established to make the judged result exact and credible.

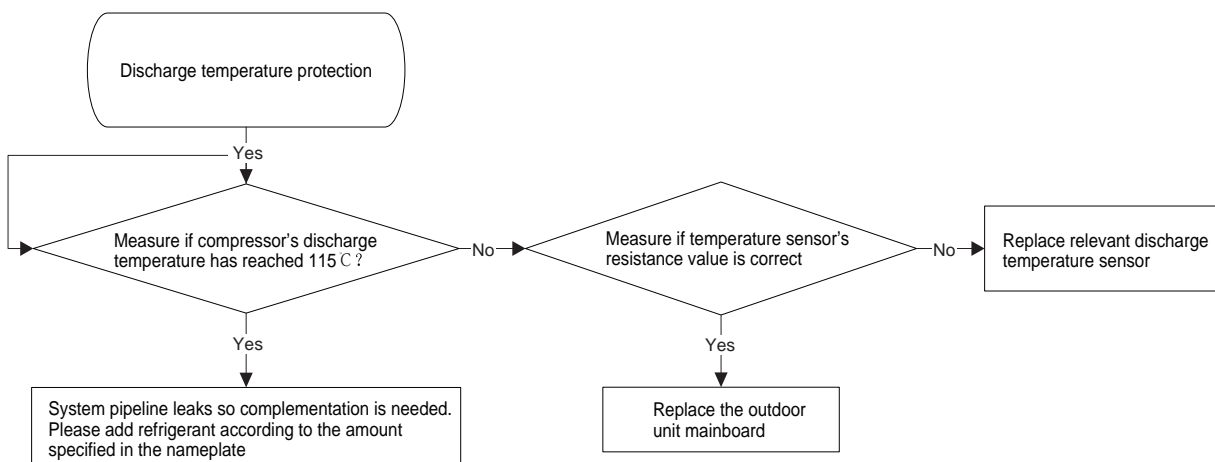
### ◆ Malfunction display: E1 Compressor High Pressure Protection



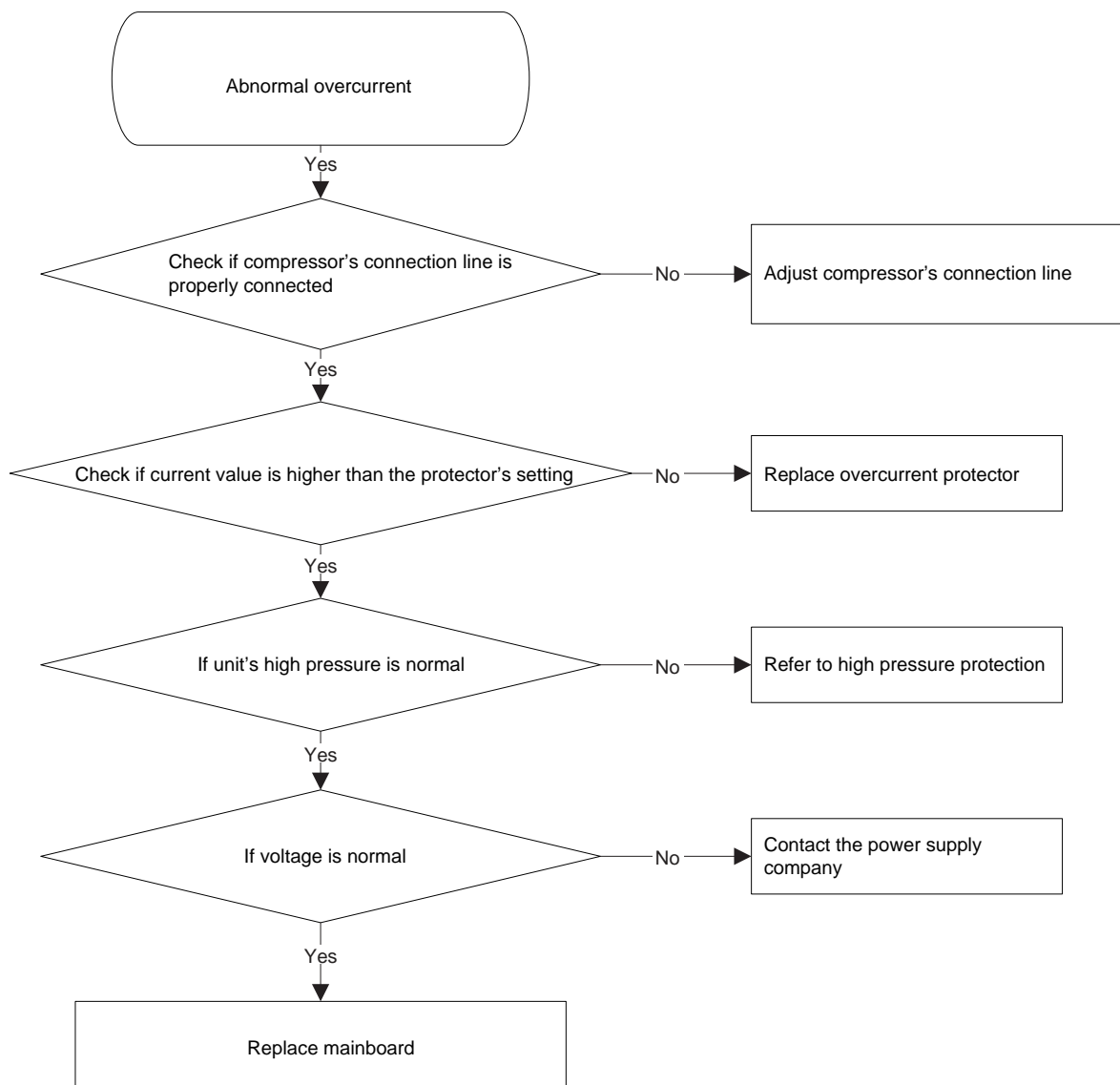
◆ Malfunction display: E3 Compressor Low Pressure Protection



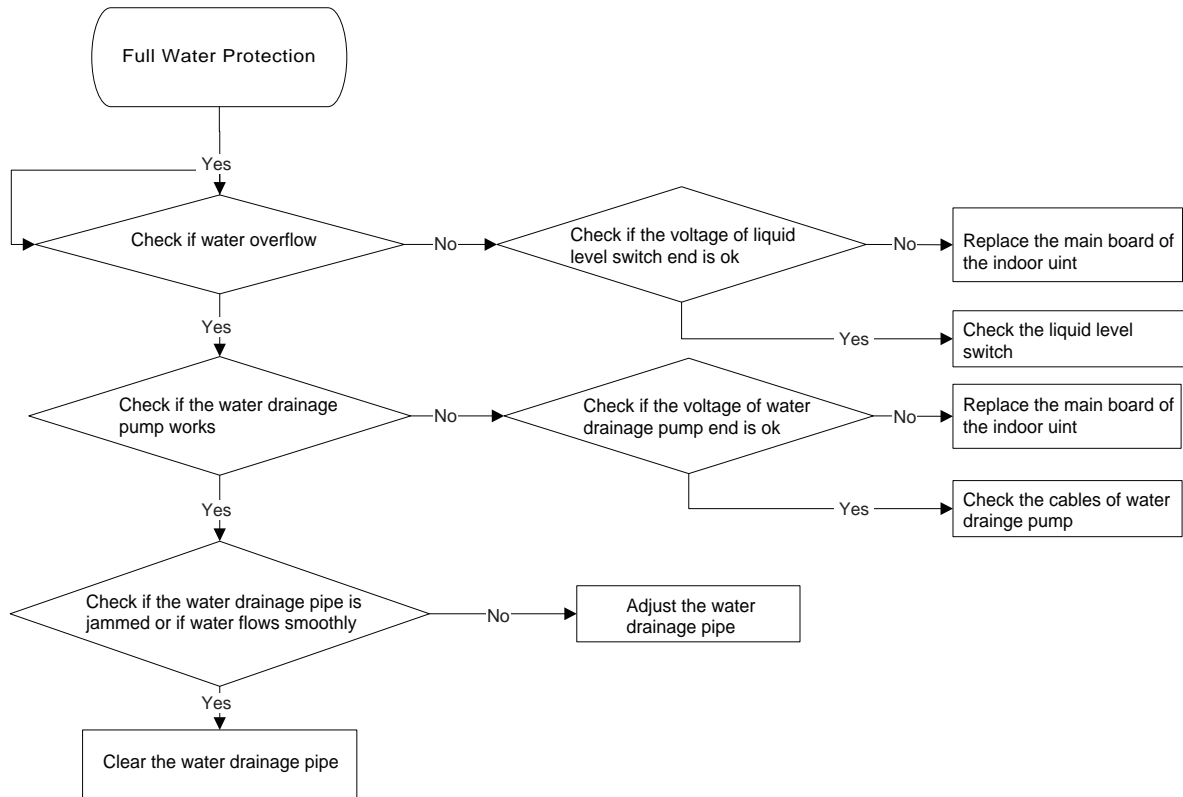
◆ Malfunction display: E4 Compressor Exhaust High Temperature Protection



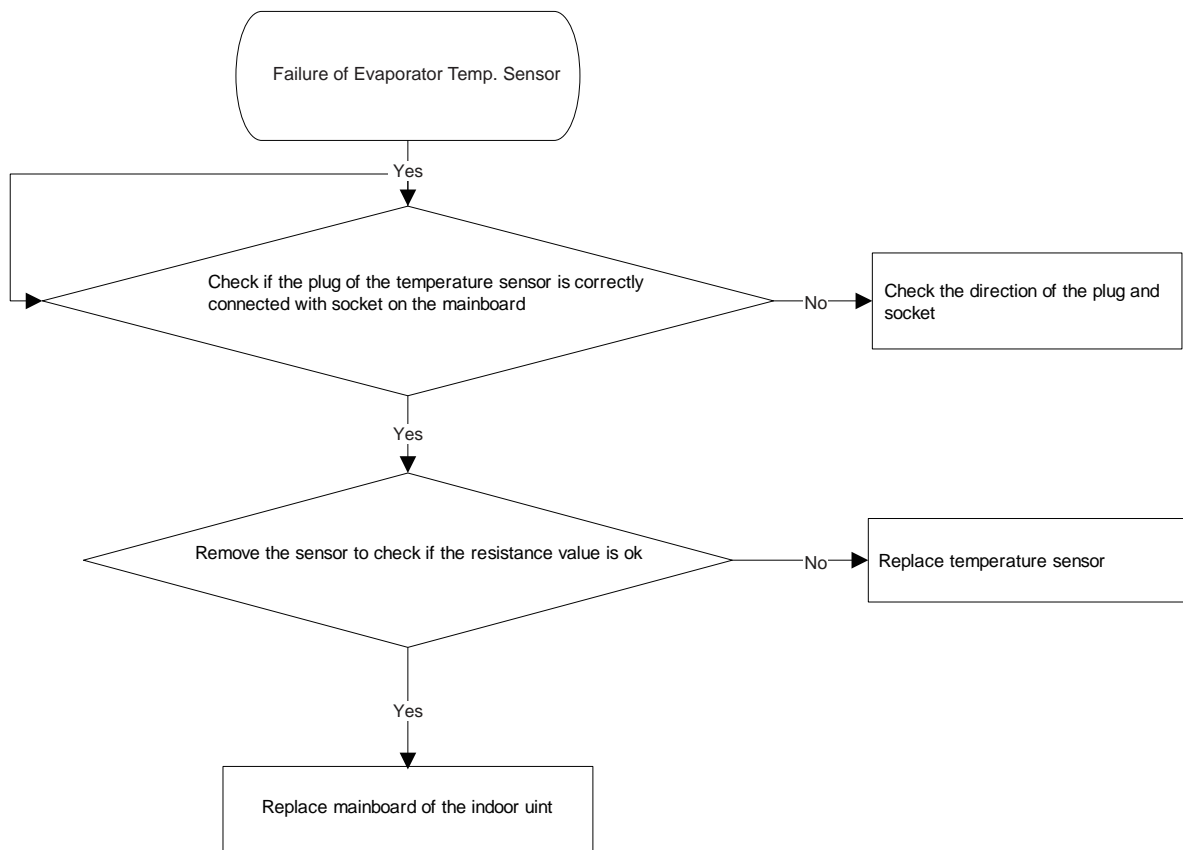
◆ Malfunction display: E5 Compressor Overheat



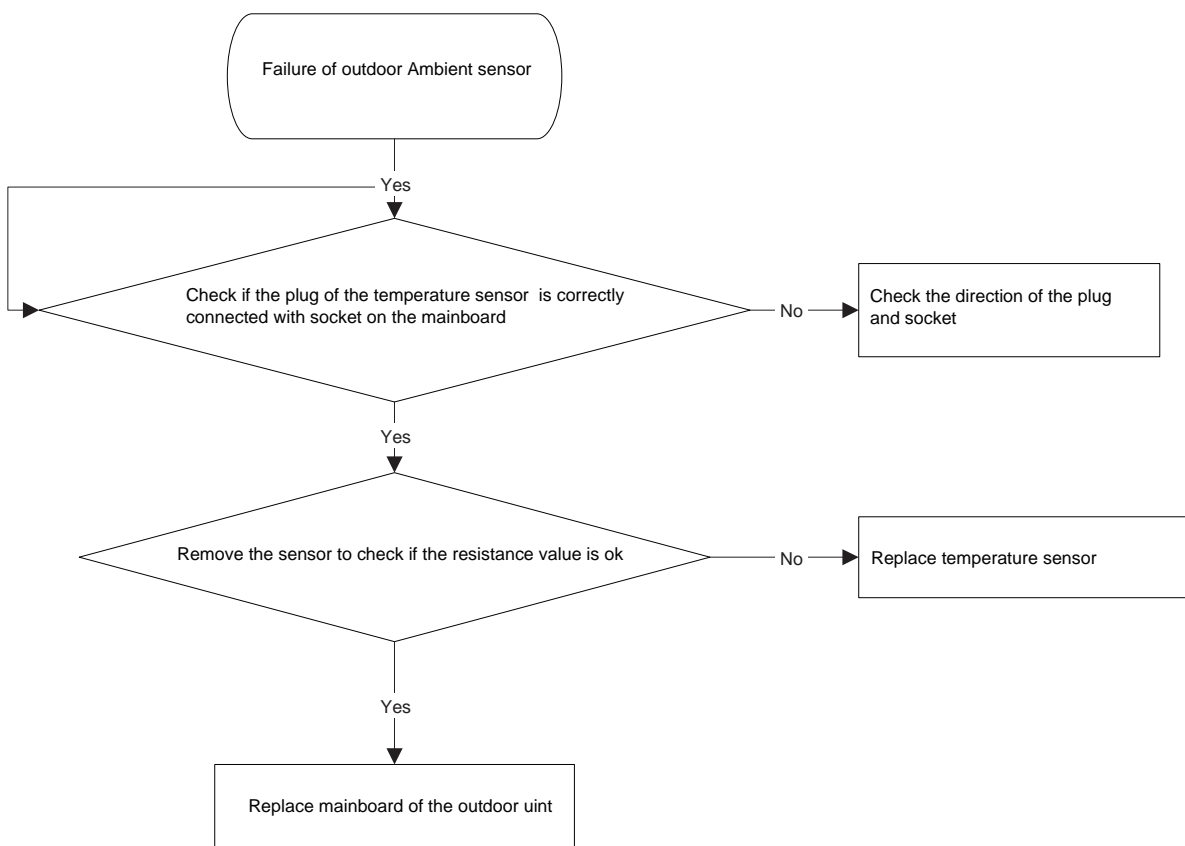
◆ Malfunction display: E9 Full Water Protection



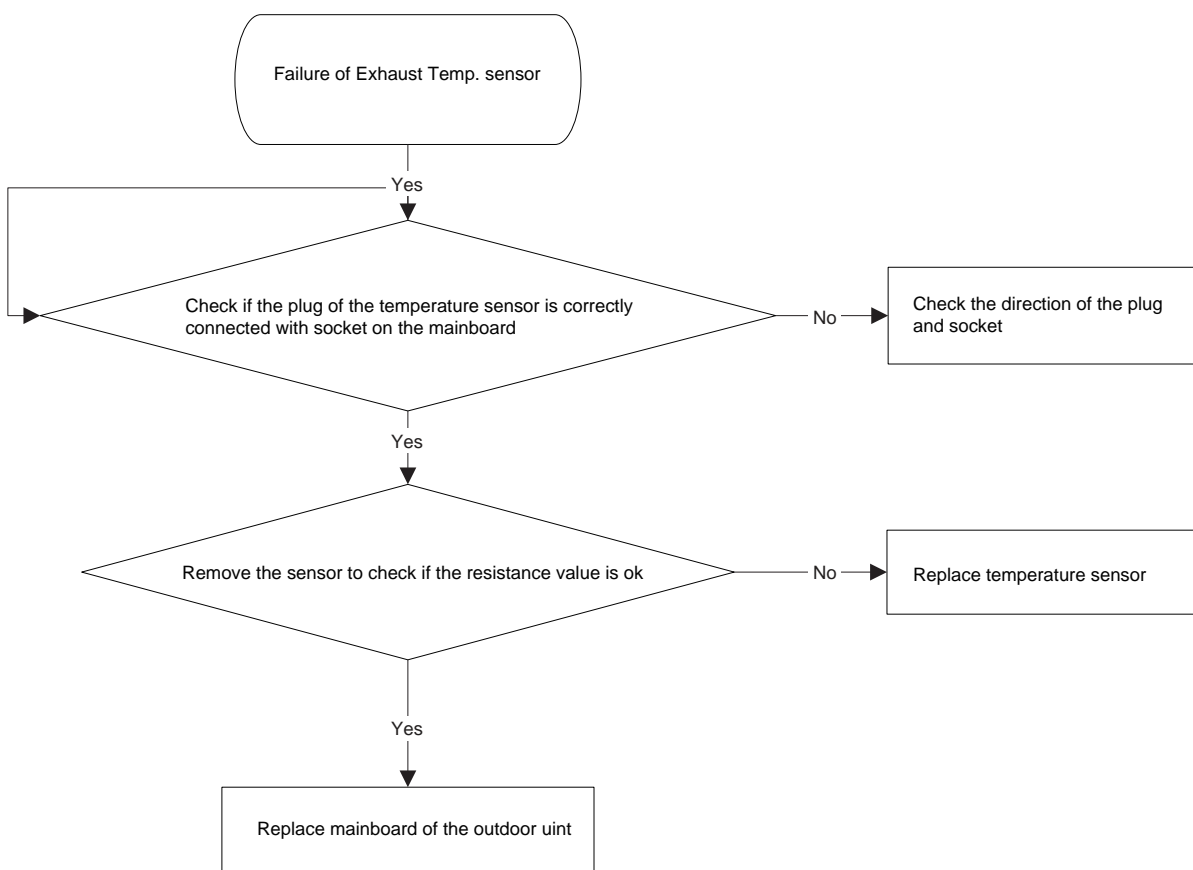
◆ Malfunction display: F2 Failure of Evaporator Temp. Sensor



◆ **Malfunction display: F3 Failure of Outdoor Ambient Sensor**



◆ **Malfunction display: F5 Failure of Exhaust Temp. Sensor**



## 9.1 Maintenance Method for Normal Malfunction

### 1. Air Conditioner Can't be Started Up

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
No power supply, or poor connection for power plug	After energization, operation indicator isn't bright and the buzzer can't give out sound	Confirm whether it's due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well.
Wrong wire connection between indoor unit and outdoor unit, or poor connection for wiring terminals	Under normal power supply circumstances, operation indicator isn't bright after energization	Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly
Electric leakage for air conditioner	After energization, room circuit breaker trips off at once	Make sure the air conditioner is grounded reliably Make sure wires of air conditioner is connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord.
Model selection for air switch is improper	After energization, air switch trips off	Select proper air switch
Malfunction of remote controller	After energization, operation indicator is bright, while no display on remote controller or buttons have no action.	Replace batteries for remote controller Repair or replace remote controller

### 2. Poor Cooling (Heating) for Air Conditioner

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Set temperature is improper	Observe the set temperature on remote controller	Adjust the set temperature
Rotation speed of the IDU fan motor is set too low	Small wind blow	Set the fan speed at high or medium
Filter of indoor unit is blocked	Check the filter to see it's blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation position is proper according to installation requirement for air conditioner	Adjust the installation position, and install the rainproof and sunproof for outdoor unit
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range	Find out the leakage causes and deal with it. Add refrigerant.
Malfunction of 4-way valve	Blow cold wind during heating	Replace the 4-way valve
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	The pressure of valves is much lower than that stated in the specification	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

### 3. Horizontal Louver Can't Swing

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Stepping motor is damaged	Stepping motor can't operate	Repair or replace stepping motor
Main board is damaged	Others are all normal, while horizontal louver can't operate	Replace the main board with the same model



#### 4. ODU Fan Motor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of the ODU fan motor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the capacity of fan
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Motor of outdoor unit is damaged	When unit is on, cooling/heating performance is bad and ODU compressor generates a lot of noise and heat.	Change compressor oil and refrigerant. If no better, replace the compressor with a new one

#### 5. Compressor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of compressor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the compressor capacitor
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Coil of compressor is burnt out	Use universal meter to measure the resistance between compressor terminals and it's 0	Repair or replace compressor
Cylinder of compressor is blocked	Compressor can't operate	Repair or replace compressor

#### 6. Air Conditioner is Leaking

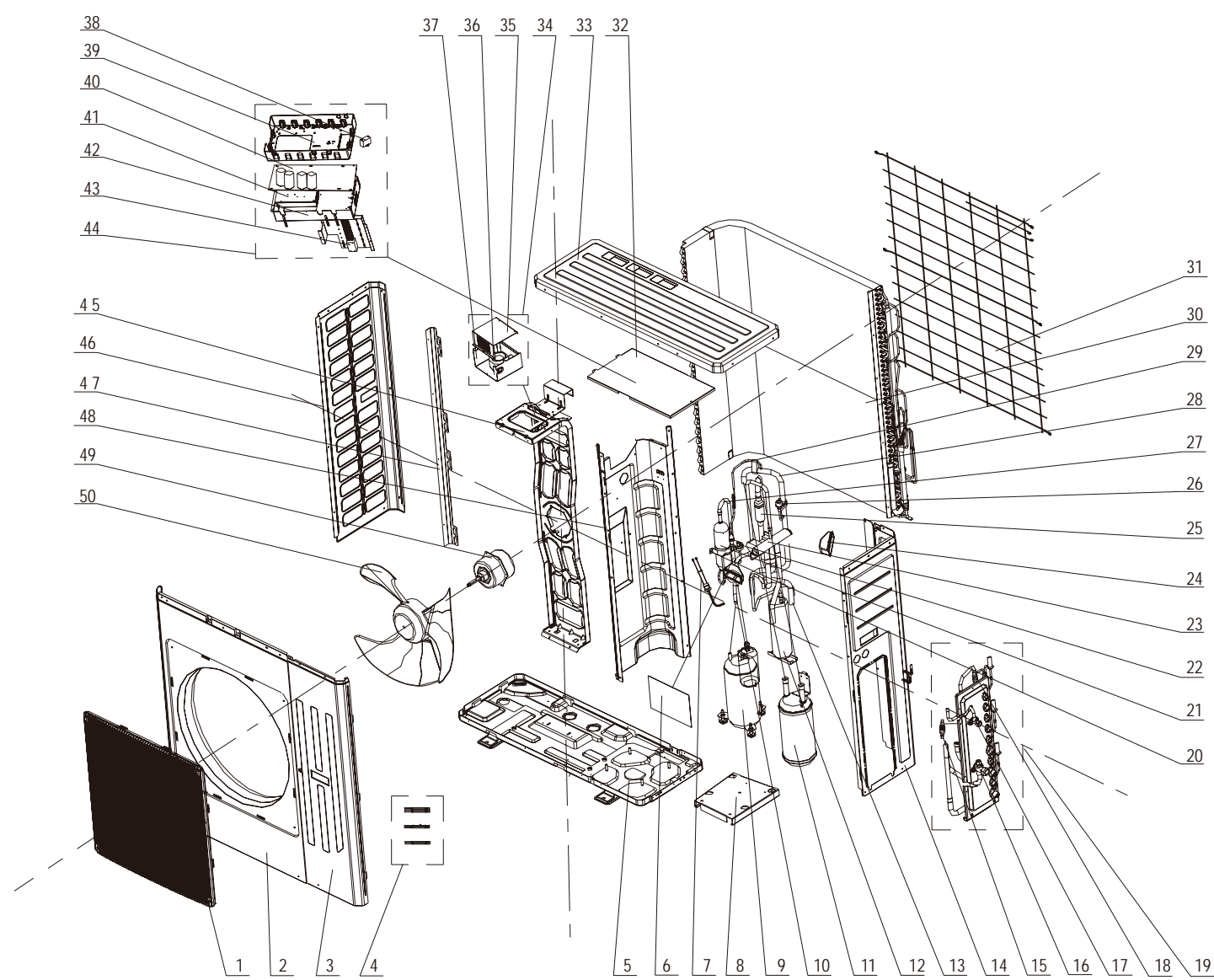
Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Drain pipe is blocked	Water leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Drain pipe is broken	Water leaking from drain pipe	Replace drain pipe
Wrapping is not tight	Water leaking from the pipe connection place of indoor unit	Wrap it again and bundle it tightly

#### 7. Abnormal Sound and Vibration

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the indoor unit or there're parts touching together inside the indoor unit	There's abnormal sound fro indoor unit	Remove foreign objects. Adjust all parts' position of indoor unit, tighten screws and stick damping plaster between connected parts
Foreign objects inside the outdoor unit or there're parts touching together inside the outdoor unit	There's abnormal sound fro outdoor unit	Remove foreign objects. Adjust all parts' position of outdoor unit, tighten screws and stick damping plaster between connected parts
Short circuit inside the magnetic coil	During heating, the way valve has abnormal electromagnetic sound	Replace magnetic coil
Abnormal shake of compressor	Outdoor unit gives out abnormal sound	Adjust the support foot mat of compressor, tighten the bolts
Abnormal sound inside the compressor	Abnormal sound inside the compressor	If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

# 10. Exploded View and Parts List

Models:CHML-U36NK4 CHML-U42NK5



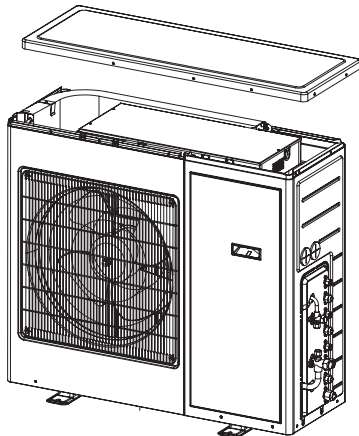
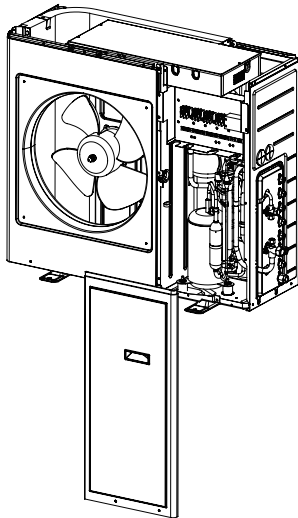
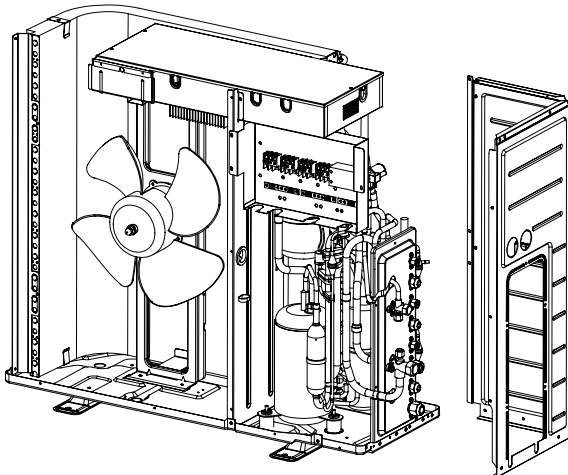
NO.	Description	Part Code		Qty
		CHML-U36NK4	CHML-U42NK5	
1	Front Grill	22415005	22415005	1
2	Cabinet	01435007P	01435007P	1
3	Front Side Plate Sub-Assy	01305508	01305508	1
4	Sensor sub-assy	39008000055G	39008000055G	1
5	Chassis Sub-assy	01194141P	01194141P	1
6	Insulated board (cover of electric box)	01425200068	01425200068	1
7	Pressure Protect Switch	4602001573	4602001573	1
8	Compressor Mounting Plate Sub-Assy	01324100026P	01324100026P	1
9	Compressor and fittings	00205200003	00205200003	1
10	Connection Pipe	05034330	05034330	1
11	Gas-liquid Separator Sub-Assy	0722501801	0722501801	1
12	Bidirection Accumulator	07228741	07228741	1
13	connecting pipe of "U"shape	05034296	05034296	1
14	Right Side Plate Sub-Assy	01314304P	01314304P	1
15	StrainerA	07210031	07210031	1
16	Cut-off Valve	07334402	07334402	1
17	Cut-off Valve	07334402	07334402	1
18	StrainerA	07415200002	07415200002	1
19	Valve support assy	01804100228P	01804236P	1
20	Oil Separator	07228302	07228302	1
21	Tube Clip	0214000521	0214000521	1
22	StrainerA	07415200002	07415200002	1
23	4-way Valve	4300008201	4300008201	1
24	Handle	26235253	26235253	2
25	4-way Valve Assy	04044100026	04044100026	1
26	Pressure Protect Switch	04044100027	04044100027	1
27	Discharge Tube Sub-Assy	04534100059	04534100059	1
28	Inhalation Tube Sub-Assy	04554100057	04554100057	1
29	Capillary Sub-Assy(Oil Separator)	04024100068	04024100068	1
30	Condenser Assy	0112417902	011241790	1
31	Rear Grill	01475012	01475012	1
32	Electric Box Cover	01425200068	01425200068	1
33	Top Cover	0125500901P	0125500901P	1
34	Reactor Sub-Assy	01394100122	01394100122	1
35	Cover of Reactor box	01424260	01424260	1
36	PFC Inductance	43128003	43128003	1
37	Reactor Box	01424258	01424258	1
38	Capacitor	33010053	33010009	1
39	Electric Box	26905211	26905211	1
40	Main Board	30226000047	30226000047	1
41	Radiator	49010252	49010252	1
42	Electric Box Sub-Assy	01395200266	01395200266	1
43	Terminal Board	420111041	420111041	1

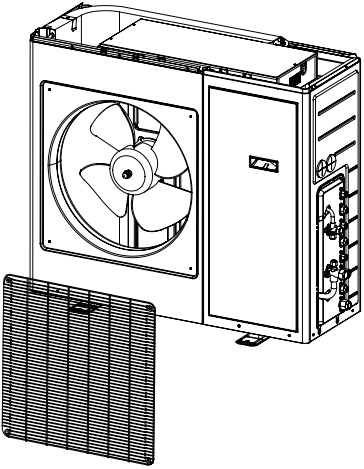
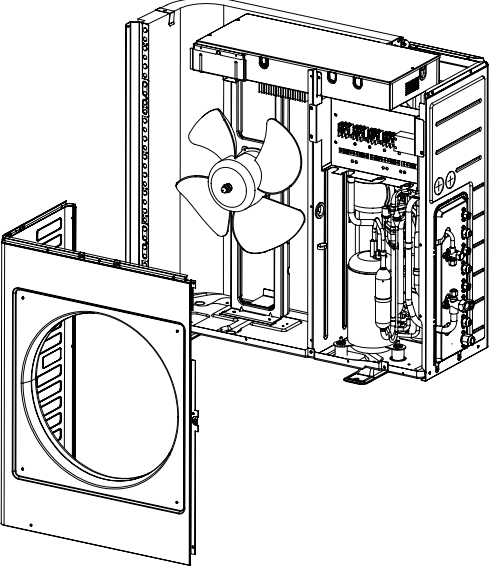
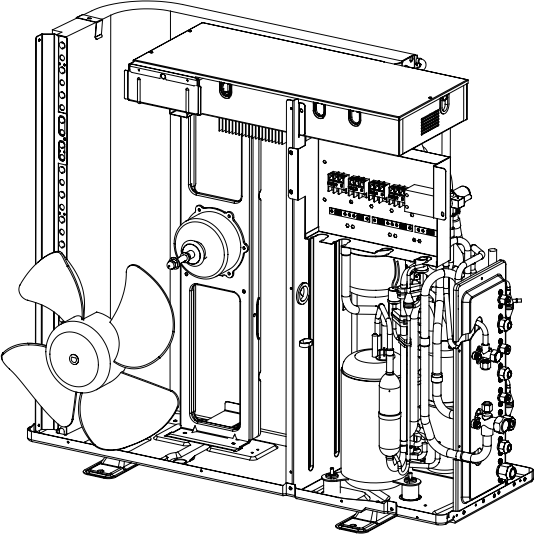
44	Electric Box Assy	01395200266	01395200266		1
45	Motor Support Sub-Assy	01804100229	01804100229		1
46	Left Side Plate	01305064P	01305064P		1
47	Condenser support plate	01895309	0189530		1
48	Clapboard	01244141	01244141		1
49	Fan Motor	1570280201	1570280201		1
50	Axial Flow Fan	10335010	10335010		1

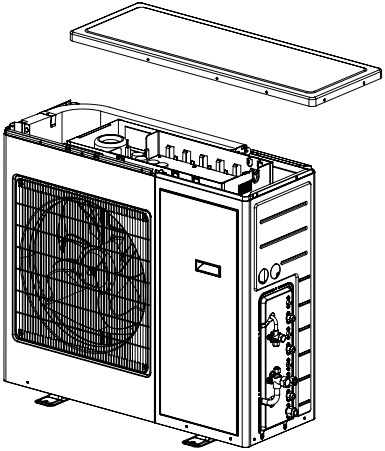
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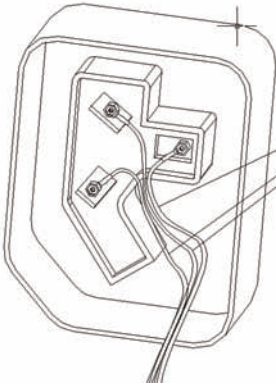
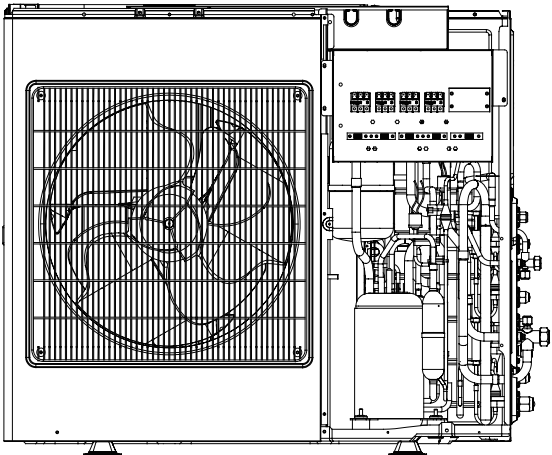
# 11. Removal Procedure

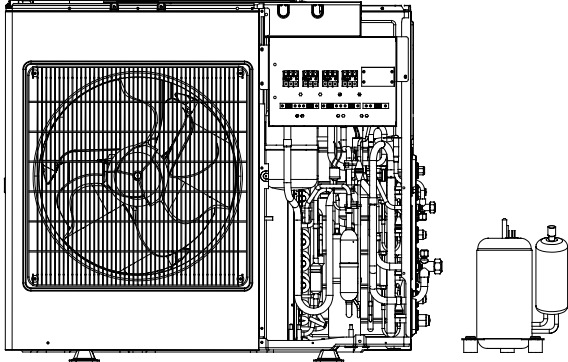
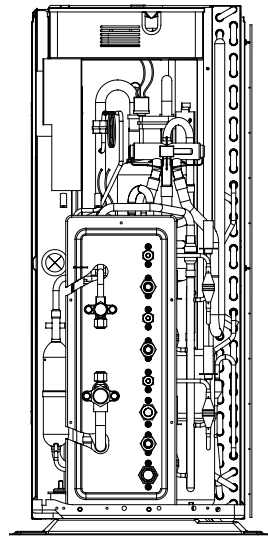
Models: CHML-U36NK4,CHML-U42NK5

Disassembly and Assembly of Outer Casing		
Steps	Procedure	
1. Disassemble the cover plate		
<div><div><div>① Remove the fixed screws on the cover plate by using a screwdriver.</div><div>② Remove the cover plate.</div></div></div>		
2. Disassemble the front panel		
<div><div><div>① Remove the fixed screws on the front panel by using a screwdriver.</div><div>② Remove the front panel.</div></div></div>		
3. Disassemble the panel on the right side		
<div><div><div>① Remove the fixed screws on the panel by using a screwdriver.</div><div>② Remove the panel on the right side.</div></div></div>		

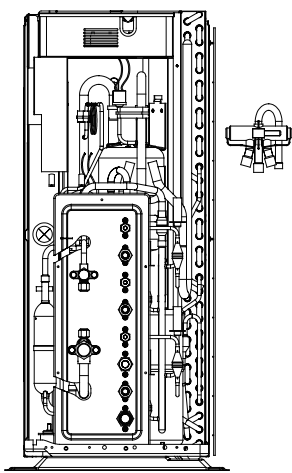
Steps	Procedure
<p>4. Dismount the grille</p>	 <p>① Remove the fixed screws on the grille by using a screwdriver. ② Remove the grille.</p>
<p>5. Disassemble the outer casing</p>	 <p>① Remove the fixed screws on the outer casing by using a screwdriver. ② Remove the outer casing.</p>
<p>6. Disassemble the fan blades</p>	 <p>① Remove the fixed screws on the fan blades by using a spanner. ② Remove the fan blades.</p>

Steps	Procedure
7. Assemble the disassembled main parts as per the reverse disassembly order mentioned above	
	<p>Assemble the disassembled main parts as per the reverse disassembly order mentioned above and energize the unit for trial test.</p>

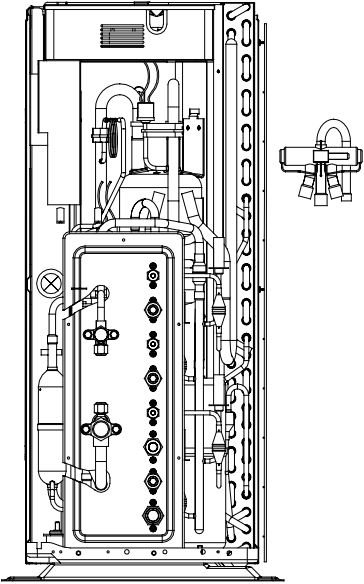
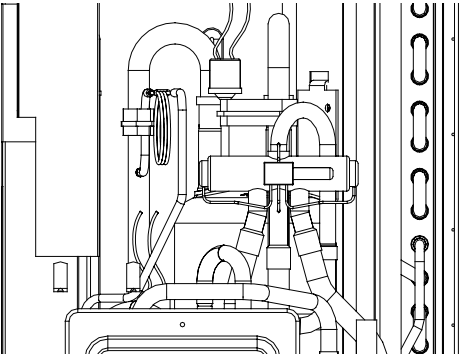
Disassembly and Assembly of Compressor	
<b>Remark:</b> Make sure that there is no refrigerant in pipe system and the power supply is cut off before disassembling the compressor.	
Steps	Procedure
1. Disconnect the power cord	 <p>Note the colour of each power cord and also the corresponding terminal</p>
<p>① Remove the fixed screws on the power cord by using a screwdriver.</p> <p>② Draw out the power cord;</p> <p>Note: Please note the color of each power cord and also the corresponding terminal number when removing the power cord in case of misconnection.</p>	
2. Disassemble the pipeline connected with compressor	
	<p>Disconnect the pipeline connected with compressor.</p>

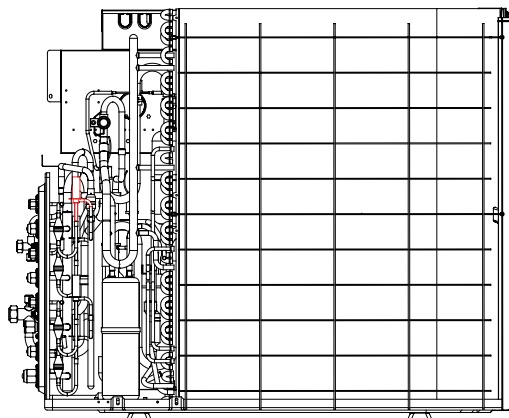
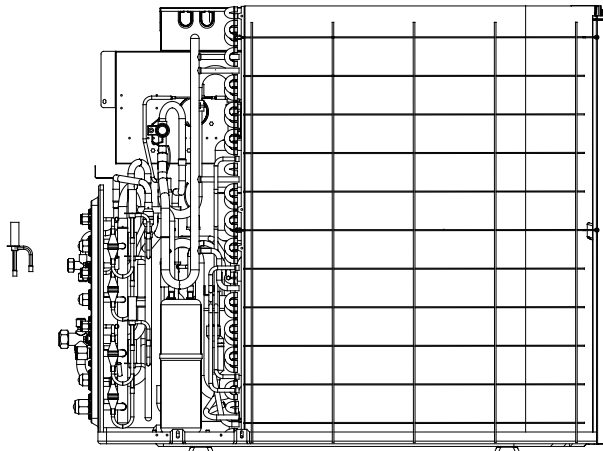
Steps	Procedure
3. Take down the bad compressor	
① Remove the bolts on the compressor by using a tool. ② Take down the bad compressor from the bottom plate.	
4. Place the new compressor on the bottom plate and connect the suction inlet and discharge outlet with the pipe system	
① Place the compressor on the bottom plate. ② Tighten the nuts by using a tool.	

### Disassembly and Assembly of 4-way Valve

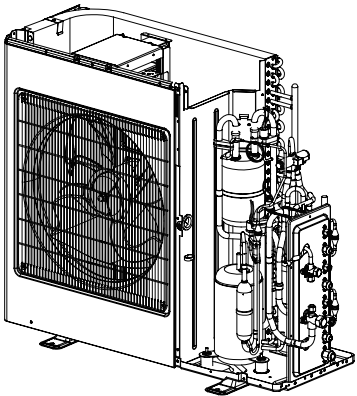
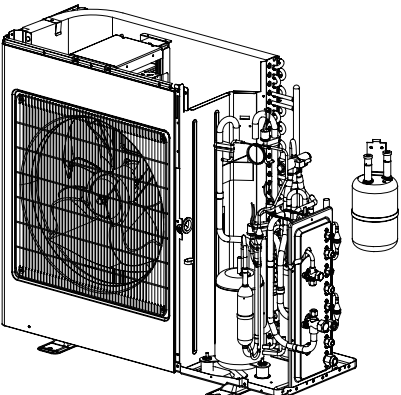
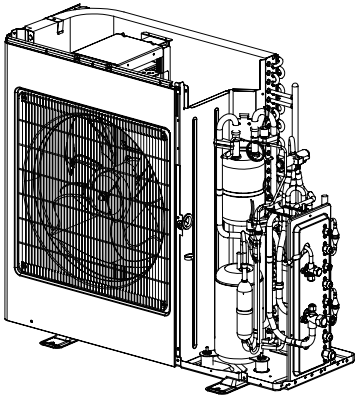
Steps	Procedure
1. Remove the 4-way valve coil	
① Remove the screws on the fixed coil by using a screwdriver. ② Remove the 4-way valve coil.	



Steps	Procedure	
2. Disconnect the 4-way valve and the connected pipe by soldering. Take down the bad 4-way valve.		
	<p>Disconnect the 4-way valve and the connected pipe by a welding gun. Take down the bad 4-way valve.</p>	
3. Replace the 4-way valve and reconnect it with the pipeline.		
	<p>① Place the new 4-way valve in the right place. ② Rewelding the new 4-way valve with the pipeline.</p>	
4. Install the 4-way valve coil		
	<p>① Set the 4-way valve coil soundly. ② Tighten the screws by a screwdriver.</p>	

Disassembly and Assembly of Electronic Expansion Valve		
Steps	Procedure	
1. Remove the electronic expansion valve coil		
	Remove the electronic expansion valve coil by rotating it until the lock is unfixed.	
2. Disconnect the electronic expansion valve and the connected pipe by soldering		
	Disconnect the electronic expansion valve and the connected pipe by a welding gun.	
3. Replace the electronic expansion valve		
	Place the new electronic expansion valve in the right place.	
4. Reconnect the electronic expansion valve with the pipeline		
	Reconnect the electronic expansion valve with the pipeline by welding.	
5. Install the electronic expansion valve coil		
	Set the electronic expansion valve coil on the valve body and adjust the lock to the right place.	

## Disassembly and Assembly of Vapour Liquid Separator

Steps	Procedure
1. Disconnect the liquid separator and the connected pipeline	
<p>Disconnect the liquid separator and the connected pipeline.</p>	
2. Remove the liquid separator	
<p>① Remove the bolt fixing the liquid separator by a tool. ② Remove the liquid separator from the middle baffle.</p>	
3. Fix the new liquid separator and connect it with the pipeline	
<p>① Fix the new liquid separator on the middle baffle soundly. ② Tighten the bolt by tool and reconnect the new liquid separator with the pipeline by welding.</p>	

# Appendix:

## Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree:  $T_f = T_c \times 1.8 + 32$

Set temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
61	60.8	16	69/70	69.8	21	78/79	78.8	26
62/63	62.6	17	71/72	71.6	22	80/81	80.6	27
64/65	64.4	18	73/74	73.4	23	82/83	82.4	28
66/67	66.2	19	75/76	75.2	24	84/85	84.2	29
68	68	20	77	77	25	86	86	30

Ambient temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
32/33	32	0	55/56	55.4	13	79/80	78.8	26
34/35	33.8	1	57/58	57.2	14	81	80.6	27
36	35.6	2	59/60	59	15	82/83	82.4	28
37/38	37.4	3	61/62	60.8	16	84/85	84.2	29
39/40	39.2	4	63	62.6	17	86/87	86	30
41/42	41	5	64/65	64.4	18	88/89	87.8	31
43/44	42.8	6	66/67	66.2	19	90	89.6	32
45	44.6	7	68/69	68	20	91/92	91.4	33
46/47	46.4	8	70/71	69.8	21	93/94	93.2	34
48/49	48.2	9	72	71.6	22	95/96	95	35
50/51	50	10	73/74	73.4	23	97/98	96.8	36
52/53	51.8	11	75/76	75.2	24	99	98.6	37
54	53.6	12	77/78	77	25			

## Appendix 2: Configuration of Connection Pipe

1. Standard length of connection pipe

- 16.4ft, 24.6ft, 26.2ft.

2. Min. length of connection pipe is 9.84ft.

3. Max. length of connection pipe and max. high difference.

4. The additional refrigerant oil and refrigerant charging required after prolonging connection pipe

- After the length of connection pipe is prolonged for 32.8ft at the basis of standard length, you should add 5ml of refrigerant oil for each additional 16.4ft of connection pipe.
- The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

Cooling capacity	Max length of connection pipe	Max height difference
5000 Btu/h(1465 W)	49.2 ft	16.4 ft
7000 Btu/h(2051 W)	49.2 ft	16.4 ft
9000 Btu/h(2637 W)	49.2 ft	32.8 ft
12000 Btu/h(3516 W)	65.6 ft	32.8 ft
18000 Btu/h(5274 W)	82.0 ft	32.8 ft
24000 Btu/h(7032 W)	82.0 ft	32.8 ft
28000 Btu/h(8204 W)	98.4 ft	32.8 ft
36000 Btu/h(10548 W)	98.4 ft	65.6 ft
42000 Btu/h(12306 W)	98.4 ft	65.6 ft
48000 Btu/h(14064 W)	98.4 ft	65.6 ft

- When the length of connection pipe is above 16.4ft, add refrigerant according to the prolonged length of liquid pipe. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.

- Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

Additional refrigerant charging amount for R22, R407C, R410A and R134a			
Diameter of connection pipe		Outdoor unit throttle	
Liquid pipe(inch)	Gas pipe(inch)	Cooling only(oz/ft)	Cooling and heating(oz/ft)
Φ0.23	Φ0.37 or Φ0.47	0.53	0.71
Φ0.23 or Φ0.37	Φ0.63 or Φ0.75	0.53	0.71
Φ0.47	Φ0.75 or Φ0.84	1.06	4.23
Φ0.63	Φ1.0 or Φ1.25	2.12	4.23
Φ0.75	/	8.82	8.11
Φ0.84	/	12.34	12.34

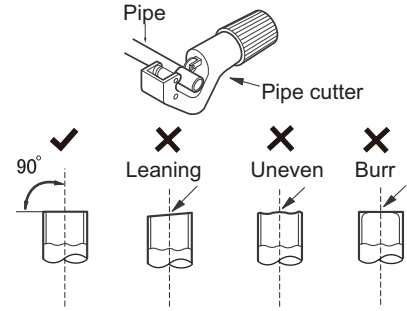
## Appendix 3: Pipe Expanding Method

### ⚠ Note:

**Improper pipe expanding is the main cause of refrigerant leakage. Please expand the pipe according to the following steps:**

#### A: Cut the pip

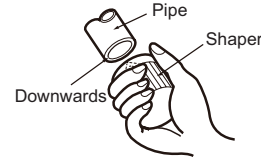
- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.



#### B: Remove the burrs

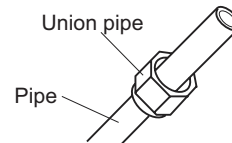
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.

#### C: Put on suitable insulating pipe



#### D: Put on the union nut

- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



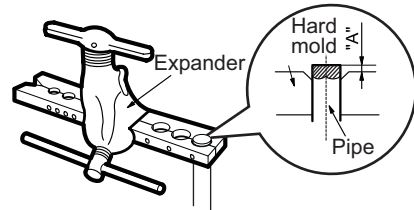
#### E: Expand the port

- Expand the port with expander.

### ⚠ Note:

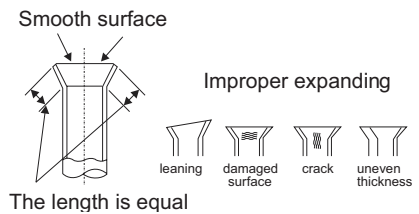
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter(inch)	A(inch)	
	Max	Min
Φ0.23 - 0.25 (1/4")	0.051	0.028
Φ9.52 (3/8")	0.063	0.039
Φ0.37 - 0.5 (1/2")	0.071	0.039
Φ0.63 (5/8")	0.095	0.087



#### F: Inspection

- Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.



## Appendix 4: List of Resistance for Temperature Sensor

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

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-19	138.1	20	18.75	59	3.848	98	1.071
-18	128.6	21	17.93	60	3.711	99	1.039
-17	121.6	22	17.14	61	3.579	100	1.009
-16	115	23	16.39	62	3.454	101	0.98
-15	108.7	24	15.68	63	3.333	102	0.952
-14	102.9	25	15	64	3.217	103	0.925
-13	97.4	26	14.36	65	3.105	104	0.898
-12	92.22	27	13.74	66	2.998	105	0.873
-11	87.35	28	13.16	67	2.896	106	0.848
-10	82.75	29	12.6	68	2.797	107	0.825
-9	78.43	30	12.07	69	2.702	108	0.802
-8	74.35	31	11.57	70	2.611	109	0.779
-7	70.5	32	11.09	71	2.523	110	0.758
-6	66.88	33	10.63	72	2.439	111	0.737
-5	63.46	34	10.2	73	2.358	112	0.717
-4	60.23	35	9.779	74	2.28	113	0.697
-3	57.18	36	9.382	75	2.206	114	0.678
-2	54.31	37	9.003	76	2.133	115	0.66
-1	51.59	38	8.642	77	2.064	116	0.642
0	49.02	39	8.297	78	1.997	117	0.625
1	46.6	40	7.967	79	1.933	118	0.608
2	44.31	41	7.653	80	1.871	119	0.592
3	42.14	42	7.352	81	1.811	120	0.577
4	40.09	43	7.065	82	1.754	121	0.561
5	38.15	44	6.791	83	1.699	122	0.547
6	36.32	45	6.529	84	1.645	123	0.532
7	34.58	46	6.278	85	1.594	124	0.519
8	32.94	47	6.038	86	1.544	125	0.505
9	31.38	48	5.809	87	1.497	126	0.492
10	29.9	49	5.589	88	1.451	127	0.48
11	28.51	50	5.379	89	1.408	128	0.467
12	27.18	51	5.197	90	1.363	129	0.456
13	25.92	52	4.986	91	1.322	130	0.444
14	24.73	53	4.802	92	1.282	131	0.433
15	23.6	54	4.625	93	1.244	132	0.422
16	22.53	55	4.456	94	1.207	133	0.412
17	21.51	56	4.294	95	1.171	134	0.401
18	20.54	57	4.139	96	1.136	135	0.391
19	19.63	58	3.99	97	1.103	136	0.382

**Resistance Table of Tube Temperature Sensors for Indoor and Outdoor (20K)**

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-19	181.4	20	25.01	59	5.13	98	1.427
-18	171.4	21	23.9	60	4.948	99	1.386
-17	162.1	22	22.85	61	4.773	100	1.346
-16	153.3	23	21.85	62	4.605	101	1.307
-15	145	24	20.9	63	4.443	102	1.269
-14	137.2	25	20	64	4.289	103	1.233
-13	129.9	26	19.14	65	4.14	104	1.198
-12	123	27	18.13	66	3.998	105	1.164
-11	116.5	28	17.55	67	3.861	106	1.131
-10	110.3	29	16.8	68	3.729	107	1.099
-9	104.6	30	16.1	69	3.603	108	1.069
-8	99.13	31	15.43	70	3.481	109	1.039
-7	94	32	14.79	71	3.364	110	1.01
-6	89.17	33	14.18	72	3.252	111	0.983
-5	84.61	34	13.59	73	3.144	112	0.956
-4	80.31	35	13.04	74	3.04	113	0.93
-3	76.24	36	12.51	75	2.94	114	0.904
-2	72.41	37	12	76	2.844	115	0.88
-1	68.79	38	11.52	77	2.752	116	0.856
0	65.37	39	11.06	78	2.663	117	0.833
1	62.13	40	10.62	79	2.577	118	0.811
2	59.08	41	10.2	80	2.495	119	0.77
3	56.19	42	9.803	81	2.415	120	0.769
4	53.46	43	9.42	82	2.339	121	0.746
5	50.87	44	9.054	83	2.265	122	0.729
6	48.42	45	8.705	84	2.194	123	0.71
7	46.11	46	8.37	85	2.125	124	0.692
8	43.92	47	8.051	86	2.059	125	0.674
9	41.84	48	7.745	87	1.996	126	0.658
10	39.87	49	7.453	88	1.934	127	0.64
11	38.01	50	7.173	89	1.875	128	0.623
12	36.24	51	6.905	90	1.818	129	0.607
13	34.57	52	6.648	91	1.736	130	0.592
14	32.98	53	6.403	92	1.71	131	0.577
15	31.47	54	6.167	93	1.658	132	0.563
16	30.04	55	5.942	94	1.609	133	0.549
17	28.68	56	5.726	95	1.561	134	0.535
18	27.39	57	5.519	96	1.515	135	0.521
19	26.17	58	5.32	97	1.47	136	0.509

Resistance Table of Discharge Temperature Sensor for Outdoor(50K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-29	853.5		10	98		49	18.34		88	4.75
-28	799.8		11	93.42		50	17.65		89	4.61
-27	750		12	89.07		51	16.99		90	4.47
-26	703.8		13	84.95		52	16.36		91	4.33
-25	660.8		14	81.05		53	15.75		92	4.20
-24	620.8		15	77.35		54	15.17		93	4.08
-23	580.6		16	73.83		55	14.62		94	3.96
-22	548.9		17	70.5		56	14.09		95	3.84
-21	516.6		18	67.34		57	13.58		96	3.73
-20	486.5		19	64.33		58	13.09		97	3.62
-19	458.3		20	61.48		59	12.62		98	3.51
-18	432		21	58.77		60	12.17		99	3.41
-17	407.4		22	56.19		61	11.74		100	3.32
-16	384.5		23	53.74		62	11.32		101	3.22
-15	362.9		24	51.41		63	10.93		102	3.13
-14	342.8		25	49.19		64	10.54		103	3.04
-13	323.9		26	47.08		65	10.18		104	2.96
-12	306.2		27	45.07		66	9.83		105	2.87
-11	289.6		28	43.16		67	9.49		106	2.79
-10	274		29	41.34		68	9.17		107	2.72
-9	259.3		30	39.61		69	8.85		108	2.64
-8	245.6		31	37.96		70	8.56		109	2.57
-7	232.6		32	36.38		71	8.27		110	2.50
-6	220.5		33	34.88		72	7.99		111	2.43
-5	209		34	33.45		73	7.73		112	2.37
-4	198.3		35	32.09		74	7.47		113	2.30
-3	199.1		36	30.79		75	7.22		114	2.24
-2	178.5		37	29.54		76	7.00		115	2.18
-1	169.5		38	28.36		77	6.76		116	2.12
0	161		39	27.23		78	6.54		117	2.07
1	153		40	26.15		79	6.33		118	2.02
2	145.4		41	25.11		80	6.13		119	1.96
3	138.3		42	24.13		81	5.93		120	1.91
4	131.5		43	23.19		82	5.75		121	1.86
5	125.1		44	22.29		83	5.57		122	1.82
6	119.1		45	21.43		84	5.39		123	1.77
7	113.4		46	20.6		85	5.22		124	1.73
8	108		47	19.81		86	5.06		125	1.68
9	102.8		48	19.06		87	4.90		126	1.64