Cardiff®
Air Conditioning

Air-cooled Mini-Chiller

Owner's Manual

Commercial Air Conditioners

Thank you for choosing Commercial Air Conditioners, please read this owner’s manual carefully before operation and retain it for future reference.

User Notice

Dear Users:

Thank you for choosing our Air-cooled Mini Chiller. Please read this manual carefully before installation, and conduct installation and usage by following the process instructed in this manual, so that you can comprehensively know and correctly use this unit.

Specially remind you the meaning of following label:

⚠**Warning!**

Means incorrect operation may cause injuries and deaths or badly hurt.

⚠**Notice!**

Means incorrect operation may cause injuries or property loss.

⚠**Warning!**

When using this unit in winter, if outer ambient temp. is lower than 0℃ , or if there is no people in the room for long-time, indoor temperature will approach to outer ambient temperature:

(1) Add antifreeze in water system. Refer the actual outdoor ambient temperature for add proportion.

(2) When it is not used in winter, drain out water in the unit and pipe to present pipe heat exchanger, pipeline and water pump from breaking; if it is not sure whether water in pipeline is drained clearly, do add antifreeze into the system pipeline. And all of these must be done by professional personnel.

(3) Don't cut off power when unit is off, otherwise auto antifreeze operation protection will be ineffective.

⚠**Warning!**

(1) Please have the unit installed by authorized service center. For improper installation may cause water leakage, electric shock and fire etc.

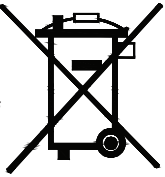
(2) Don't use or store flammable and explosive products near the unit.

(3) Please cut off power supply immediately when malfunction (such as burning odor is smelled) occurs.

(4) Don't insert finger or things into exhaust vent or air-in grille.

(5) Don't turn on or cut off the unit by turn on or cut off the power supply.

(6) Don't refit the unit. Please contact with dealer or professional installation personnel when it is going to repair or move the unit.



(7) The appliance shall not be used for children without supervisor.

(8) This product must not be disposed together with the domestic waste. This product has to be disposed at an authorized place for recycling of electrical and electronic appliances.

(9) For appliances not accessible to the general public and which are intended to permanently connected to fixed wiring and which may have leakage currents exceeding 10 the installation instructions shall specify the rating of the residual current device (RCD) to installed.

(10) This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person

responsible for their safety. Children should be supervised that they do not play with the appliance.

⚠**Note!**

(1) Before installation, please check if the supply power is the same with that listed on nameplate, and check the safety of power.

(2) Before using, please check and confirm if wires and water pipes are connected correctly to present occurrence of water leakage, electric shock or fire etc. Make sure it must be done by professional of central air conditioning installation.

(3) There must be earth wire at power supply to prevent electric shock. Don't connect earth to gas pipe, water pipe, lightning rod or connection wire of telephone.

(4) Don't operate the unit with wet hand, and don't allow children to operate the unit.

(5) The On/off in Owner's Manual is for the operation to "on and off" button of control panel for users; cut off power means to stop supplying power to the unit. Don't directly expose the unit under the corrosive ambient with water or dampness.

(6) Don't directly expose the unit under the corrosive ambient with water or dampness.

(7) Do conduct electric leakage detect after installation by professional of central air conditioning installation.

(8) Operation conditions: Ambient outdoor temperature for heat pump operation must be from -15℃ to 28℃ ; At the same time, Ambient outdoor temperature range for cooling operation must be from 16℃ to 48℃ ; Furthermore, water temperature must be under 50℃ . In order to avoid freezing the Tube-in-tube heater exchanger, water temperature must be beyond 5℃ .

(9) To be in compliance EN 61000-3-11,the product shall be connected only to a supply of the system impedance:|Zsys|=0.391 ohms or less. Before connect the product to public power network, please consult your local power supply authority to ensure the power network meet above requirement.

(10) Electric supply tolerances: 380V±10%, (50±1)Hz.

(11) Humidity range:30%~95%.

(12) Installation altitude: max 1000m.

(13) Transport/storage temperature range:-10~55℃ . And for short period not exceeding 24h, the temperature is up to 70℃ .

(14) Main switch provided by end user: main switch handle should be black or gray, it can be locked in "OFF" position with padlock.

(15) The main disconnection device should be installed at a height of 0.6~1.7m. Over current protection is required (EN 60947-3, EN60947-2).

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

Contents

1 System Instruction

Air-cooled mini-chiller is a kind of small central air conditioning unit usually installed in high-grade flats, combination buildings, high-grade townhouse, and unitary office, restaurants, department stores, entertaining places and other places that have special air conditioning requirements.

Working principle of Air-cooled mini-chiller: Firstly, the unit produces cooled (or heated) water, after being press by water pump, this cooled (heated) water will be transferred to every indoor fan coil by water pipe (or other terminal facilities), then through fan coil to conduct heat exchange with indoor air circle and make indoor air temperature lower (or higher), thus, indoor air conditioning can achieved. Meanwhile, fresh air unit can be installed in the system, lead certain quantity of fresh air in and blow it into rooms after filtering or lowering (or heating up) temperature, then the indoor air can still remain fresh and comfortable.

Air-cooled mini-chiller System consists three parts:

(1) Air-cooled mini-chiller: The units are placed at outdoor balcony ,roof or special flat roof.

(2) Terminal facilities: It is usually fan coil, it is recommended to adopt horizontal type invisible fan coil under common circumstance, for it can be easily combined with indoor decoration, and will always produce satisfying effect.

(3) Water system: For connecting host and terminal fan coil and work for transferring cool and heat. It is commonly made with galvanized pipe or seamless copper pipe, it can also adopt new type pipes such as PVC pipes, PPR pipes, or aluminum-plastic pipe etc..

2 Product Specifications

(1) Adopting junction box heat exchanger, unit performance, antifreeze ability and reliability can be enhanced greatly.

(2) System realized trinity

A set of heat pump system can both cool and heat, it saves gas system, and also collocate with household fireplace, water boiler or city heating net. Thus, cooling, heating, and water heating become trinity.

(3) Large range of cool water and heat water supply

When cooling, supply range for cool water is 7~12℃ ; when heating, supply range for heat water is 45~51℃ .

(4) High reliability

Heat transfer media of this unit is water and with no distance limitation, only considering enough water pump lift can realize long-distance heating and cooling.

(5) Control function in subrooms

It is available to conduct on or off control to host in rooms, that is, when order of turning on from only a single room, host on; when all rooms send unit off order, host off; general control spot can be set at living room to conduct prior control to unit.

(6) Easy operation

Adopting advanced total computer control system, main control system can conduct complete control to the unit. Since it is very easy and quick to reset the operation, it can satisfy users' requirements. With multi-point control function, it is available to control on/off of host from several rooms, i.e. when order of unit on from only a single room, host on; when all rooms send unit off

order, host off; general control spot can be set at living room to conduct prior control to unit.

(7) Easy dialogue interface

Host displays in English, and every operation data can be find. When malfunction occur, unit will displays error informational automatically, thus, repair and maintenance is very easy.

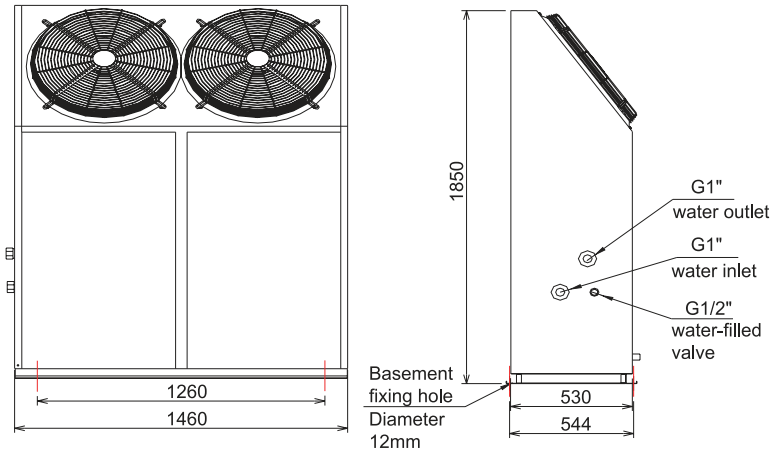
3 Unit Introduction

3.1 Outline Sketch of Unit

3.1.1 Outline Dimension of Outdoor Unit

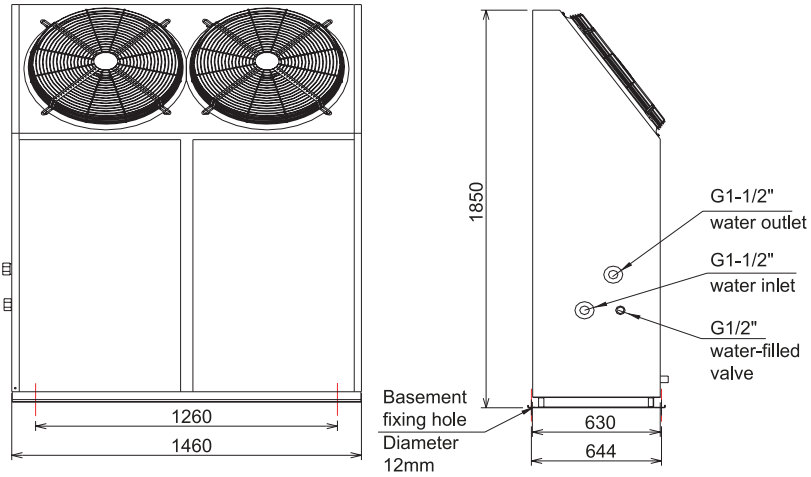
Outline dimension diagram of CHLR19S/A-M, CHLR25S/A-M

Unit: mm



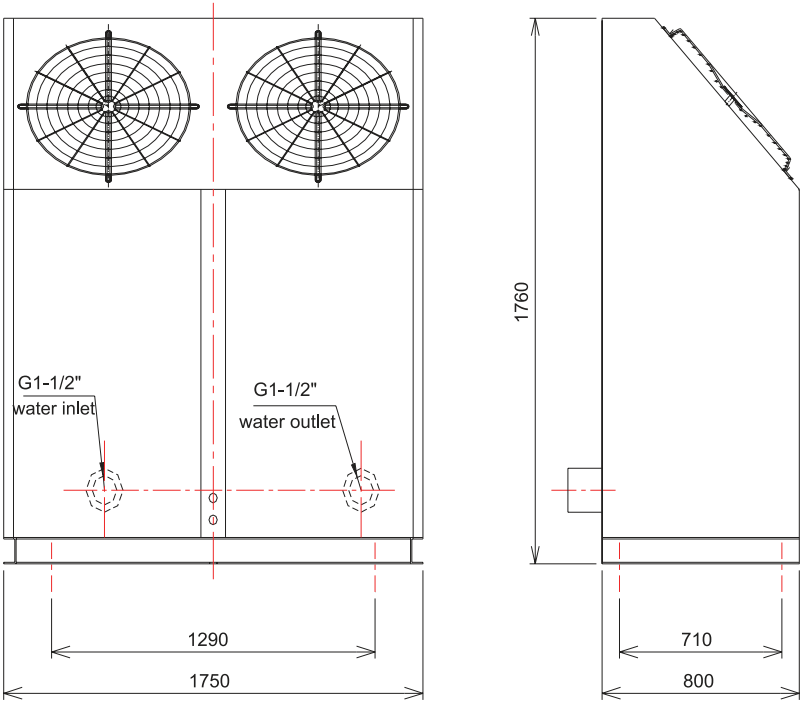
Outline dimension diagram of CHLR32S/A-M

Unit: mm



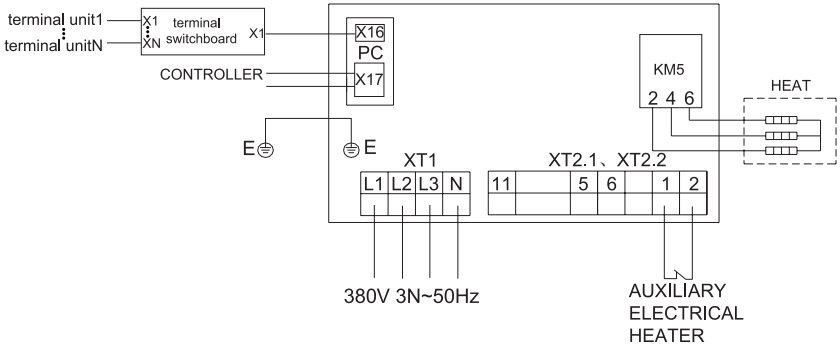
Outline dimension diagram of CHLR35S/A-M,CHLR45S-M

Unit: mm



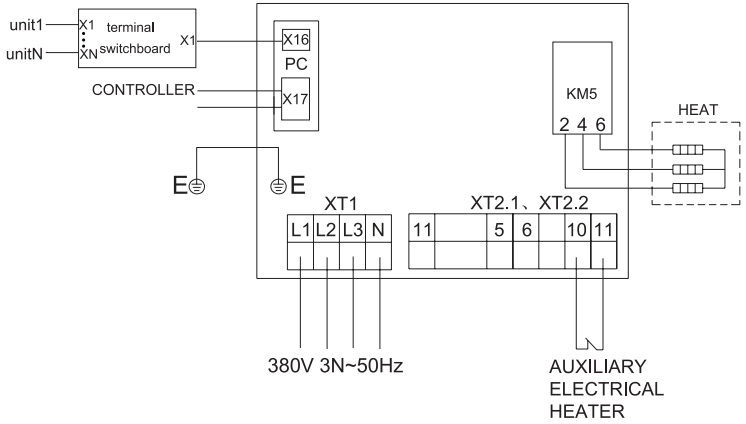
3.2 Outer Wiring Diagram of Unit

Wiring Diagram of CHLR19S/A-M, CHLR25S/A-M, CHLR32S/A-M



If the chiller is connected with fancoil units, please remove the wire between "6" on XT2 patching board and X16 on PC , then connect X16 to X1 on fancoil unit patching board.

Wiring Diagram of CHLR35S/A-M, CHLR45S-M



If the chiller is connected with fancoil units, please remove the wire between "6" on XT2 patching board and X16 on PC, then connect X16 to X1 on fancoil unit patching board.

Selection of power supply wiring and air switch

Model	Power supply type	Air switch (A)	Power supply cord
CHLR45S-M	380V 3Ph~ 50Hz	50	H07RN-F 5G10.0mm^2
CHLR35S/A-M	380V 3Ph~ 50Hz	32	H07RN-F 5G4.0mm^2
CHLR32S/A-M	380V 3Ph~ 50Hz	32	H07RN-F 5G4.0mm^2
CHLR25S/A-M	380V 3Ph~ 50Hz	25	H07RN-F 5G4.0mm^2
CHLR19S/A-M	380V 3Ph~ 50Hz	25	H07RN-F 5G2.5mm^2

Note:

① The specifications of the breaker and power cable listed in the table above are determined based on the maximum power (maximum amps) of the unit. The specifications of the power cable listed in the table above are applied to the conduit-guarded multi-wire copper cable (like, YJV XLPE insulated power cable) used at 40℃ and resistible to 90℃ (see GB/T 16895.15). If the working condition changes, they should be modified according to the related national standard.

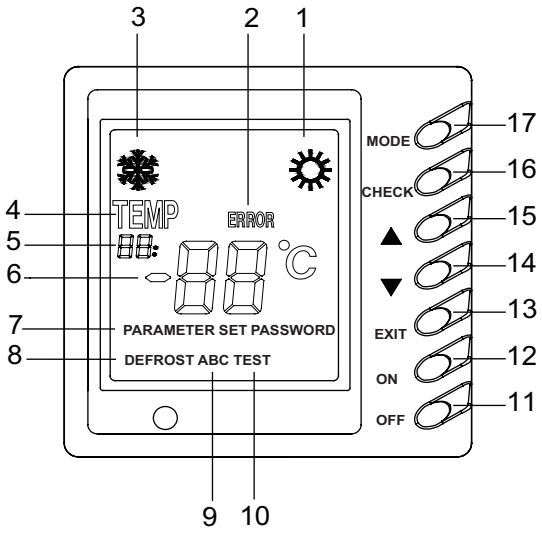
② If the length of power supply wire is longer than 15meters, do please increase the section area to avoid any accident due to over-load.

③ The capacity of the air switch and the size of the power cable both take no account of the application of the external auxiliary electric heater.

④ The specifications of the breaker listed in the table above are applied to the breaker with the working temperature at 40℃ . If the working condition changes, they should be modified according to the instruction book of this breaker.

4 Operation Instructions of Controller

4.1 Display Function on Display Board



4.2 LCD displaying panel

(1) HEAT: It displays when unit is heating, otherwise it would not display.

(2) ERROR CODE: It shows the error code displayed on **Main Display Area**. It displays when there is error at system or communication.

(3) COOL: It displays when cooling is running, otherwise it would not display.

(4) TEMP: It shows temperature value displays at **main display area**.

(5) Auxiliary display area: It contains 2 numbers and a comma, for showing temperature and number of parameter at main display area. It only displays when under **Check mode** and **Parameter checking mode**.

(6) Main display area: It contains a minus, 2 numbers and 1 temperature unit, for displaying value of temperature and parameter (temperature or time value) and error code. When temperature value is displayed, it shows value in algorism and temperature unit; when time is displayed, it shows algorism value but no temperature unit (default unit is min); when it is code, it displays specific error (refer to **Malfunction Error List**) but no temperature unit. Individual temperature or parameter may exceed 99, then adopt AX for 100~109, bX for 110~119, CX for 120~129, dX for 130~139, EX for 140~149, FX for 150~159, and X stands for a number between 0~9. Under normal state, it shows temperature for back water.

(7) Parameter list: It means the value shown at present main display area is parameter. It shows onlyunder Parameter Check mode.

(8) DEFROST: It displays when defrosting, otherwise it doesn't displays.

(9) ABC: It displays when system or compressor orders, for showing which system is defrosting.

(10) TEST: For testing, it displays under compel operation.

(11~17) Buttons: Functions and contents are shown in instructions for buttons function below.

When unit is off, it displays only temperature of out water. When unit is on, under normal state, if there is no error, it displays temperature of out water, if there is error, it displays error code; when there is no operation after 60s of pressing the button, it quit back to normal state display automatically.

Auto antifreeze operation display (only for heat pump unit) .

When auto antifreeze function is started and relevant conditions are satisfied, unit begins auto antifreeze operation. At this time, LCD main displaying area displays code d2 (if there is error it displays error code).

4.3 Button Function on Display Board

(1) MODE: It can switch between cooling and heating, this button is available only on cooling and heating unit.

(2) Turn On: To turn on the unit; when under compel operation, press once to quid compel operation.

(3) Turn Off: To turn off the unit; press it once to quit compel operation when the unit is under compel operation.

(4) ▲ : To increase present set value or change set/check object.

(5) ▼: To decrease present set value or change set/check object.

(6) Check: Press it once under normal state to enter check mode, under check mode, press this button when “17” is displayed can change the value of “17”. Under parameter set mode, press this once can switch the adjusting objection between parameter and value, press this button for long (about 5s) to save and quit this parameter setting.

(7) EXIT: Under Set and Check mode, press it once to quit this mode. Under parameter set mode, this set value would not be saved. Press this button for long (about 5s) to set sound, and make sound switches between always on and always off.

(8) EXIT +▲: 20s after electrify, press this two buttons simultaneity for about 3s (**EXIT** first, and then ▲, the interval between pressing the two buttons should not be longer than 4s), to enter parameter check mode.

4.4 Buzzer

When unit is always off, buzzer will not sound under any circumstance. When unit is always on, buzzer sounds once when electrified reset and quick test. It also sounds when button is pressed and when there is key error under unit on state. When unit is operating in anti-high temperature or antifreeze, buzzer doesn’t sounds.

4.5 Basic Operation

(1) Turn On: Press **On** once when unit is off then unit be in waiting state, and LCD displays temperature of water back and operation mode (cooling or heating). When it detected there is terminal on, unit operates automatically and operation mode blinks; if it detected there is no terminal on, unit turns off after delaying for certain time, then system back to waiting state.

(2) Turn Off: Press **OFF** once when unit is on to stop the unit from working and make it in off state. At that time, LCD only displays temperature for back water.

(3) Mode Switch: It is only available to heat pump unit, cooling only unit only contains cooling

mode. To heat pump unit, press **Mode** once, then system mode switches to cool from the previous heating, or to heat from present cooling. When there is error, this button doesn't work.

(4) Check system temperature point and state: Press **Check** once to enter check mode. Under check mode, **Auxiliary display area** shows checking object, **main display area** shows the value of the object. Press ▲ and ▼ to change the check object, press **EXIT** to quit from check mode. The content that can be check are as follow:

0: Temperature for back water
1: Temperature for out water
2: Outdoor ambient temperature
3: Antifreeze temperature 1
4: Antifreeze temperature 2
5: Defrost temperature 1 (This temperature has no meaning to cooling only unit)
6: Defrost temperature 2 (This temperature has no meaning to cooling only unit)
7: Exhaust temperature 1
8: Exhaust temperature 2
9: Unidentified
10: Unidentified
11: Real time error code
12: Defrost and terminal=0XH is no defrosting; =FXH is defrosting;
=X0H means no terminal is on; =XFH means there is terminal on.
13: Outdoor unit operation state: 0x01=Turn off unit when cooling, 0x02= Turn off unit when heating
0x11=Turn on unit when cooling, 0x12= Turn on unit when heating
0xd2=Auto antifreeze is running, 0xF1= Compel cooling, 0xF2= Compel heating
14: Outdoor unit operation state
15: Indoor unit operation state :
0x01= Turn off unit when cooling, 0x02=Turn off unit when heating
0x11= Turn on unit when cooling, 0x12=Turn on unit when heating
0xd2= Auto antifreeze is running, 0xF1=Compel cooling, 0xF2=Compel heating
16: Indoor unit operation state
17: **=00** is stopping auxiliary heating, stopping antifreeze; **=01** is turning on auxiliary heating, stopping antifreeze;**=02** is stopping auxiliary heating, turning on antifreeze; =03 is turning only auxiliary heating, turning on antifreeze (it has no meaning to cooling only unit).
18: Communication state.
19: Error in history.

(5) Turn On/Off Auxiliary Heater: It is only available for heat pump unit. Press **Check** once to enter **Check** mode. Press ▲ and ▼ to change check object, press Check again till the present check object becomes "17", value "17" switches between 01/03 (auxiliary heater on) and 00/02 (auxiliary heater off). That is 00 Off →01 On →00 Off, or 02 Off →03 On →02 Off.

(6) Check Parameter: After electrify for 20s, press **EXIT** then ▲ to enter parameter checking mode. Under this mode, **Auxiliary display area** shows the checking object, **Main display**

area displays the value for the checking object. Press ▲ and ▼ to change the checking object. Press **EXIT** to quit from the check mode. Content that can be checked are shown below: Name for Parameter:

NO.	Name for Parameter
0	If auxiliary heater is on
1	Set temperature for cooling water out
2	Set temperature for heating water out
3	Begin temp. for defrost
4	End temp. for defrost
5	Set interval between defrost
6	Duration for defrost
7	Antifreeze temp.
8	End temp. for antifreeze
9	Anti overheated temp.
10	Temp. to quit from anti overheated
11	Deviation to set temp.
12	Outdoor ambient temp. for defrost
13	Exhaust pipe high-temp. protect temp.
14	Interval between terminals off and host stops

4.6 Error Code List

Error code	Meaning for Error	Method of Clearing Error
E1	Compressor 1 high-pressure protection	Press OFF to clear
E2	System-antifreeze protection	Resumes automatically
E3	Compressor 1 low-pressure protection	Press OFF to clear
E4	Compressor 1 exhaust temp. protection	Press OFF to clear
E5	Compressor 1 overload protection	Press OFF to clear
E6	Water pump overload protection	Press OFF to clear
E7	Water-flow on/off error	Press OFF to clear
E8	Fan 1 overload protection	Press OFF to clear
E9	System 1 anti high-temp.	Resumes automatically
b1	Compressor 2 high-pressure protection	Press OFF to clear
b2	System 2 antifreeze protection	Resumes automatically
b3	Compressor 2 low-pressure protection	Press OFF to clear
b4	Compressor 2 exhaust temp. protection	Press OFF to clear
b5	Compressor 2 overload protection	Press OFF to clear
b8	Fan 2 overload protection	Press OFF to clear
b9	System 2 anti-high temp.	Resumes automatically
F1	Antifreeze temp. sensor 1 error	Resumes automatically
F2	Antifreeze temp. sensor 2 error	Resumes automatically
F3	Defrost temp. sensor 1 error	Resumes automatically
F4	Defrost temp. sensor 2 error	Resumes automatically
F5	Exhaust temp. sensor 1 error	Resumes automatically
F6	Exhaust temp. sensor 2 error	Resumes automatically
F7	Outdoor ambient temp. sensor error	Resumes automatically
F8	Water-in temp. sensor	Resumes automatically
F9	Water-out temp. sensor	Resumes automatically
EC	Communication malfunction	Resumes automatically

(1) Auto reset: It means after error is cleared and compressor stop protection time is satisfied, unit resumes running automatically.

(2) Manual reset: It means manually press OFF to clear error code first, and then press ON to make the unit operates after malfunction is cleared.

(3) When low-pressure protection is detected for 3 times in consecutive 30min, reset mode changes to manual mode from auto mode. When overload at compressor and fan motor is detected for 3 times in consecutive 30min, reset mode changes to manual mode from auto mode.

Note：The installation of the controller must be done by professionals.

5 Daily Operation and Maintenance

When adjustment and test had completed, daily operation such as turn on/off unit, switch cooling and heating, and set parameter etc. are to be done through the manual control that installed indoor.

(1) All safety protection settings in the unit are set well before outgoing, please don't modify them to avoid damaging the unit.

(2) The on/off control to fan coil in every room should be operated individually by temp. controller and the 3-speed switch installed in every room. When there is no connect control between host and fan coil, after the last fan coil is turned off, host should stop.

(3) Don't cut off power immediately after unit had stopped. If the unit stopped and disconnected to power supply for more than 2 days, please switch on the power supply for more than 6h before restart the unit. Otherwise, the unit may not be able to operate normally.

(4) Don't put things on the unit or its accessories, keep all around dry, clean and well ventilation. Clean it on time by professional personnel when there is much dust on fin of condenser to prevent the dust from affecting the performance.

(5) Don't block the air outlet and air intake vents of indoor fan coil, filter at air intake vent should be disassembled and cleaned regularly. (it shall be done by professional)

(6) Do add antifreeze into water system of heat pump unit, the additional proportion is shown in this manual on page 26. Please let the professional to add the antifreeze. Please cut off the power supply before adding the antifreeze. For cooling only unit, when it is not used in winter, do drain out all water in the unit and pipeline to prevent the tube-in-tube heat exchanger, pipes and pump from breaking; when it is not sure water in pipeline had drained completely, do add antifreeze into system pipeline. Don't cut off power supply when turn off the unit, otherwise auto antifreeze operation protection will be useless.

(7) heat pump unit, if not for use for a long time, water in the pipeline will be the same temperature as ambient water. In that case, cool air may blow out in winter when unit begins to operate in heating mode. If there is no connected control system between host and fan coil, it is better to turn on host 5~10min before turning on the unit for heating, then turn on indoor fan coil to heating mode directly after water in pipeline become warmer; if there is connected control between host and fan coil, turn on a fan coil first and turn on host for 5~10min, then turn on the fan coil in room that needs heating after water in pipeline become warmer. These can prevent cool wind from blowing out in the first few minutes when fan coil is just turned on.

6 Common Malfunction and Solution

When there is problem occur during operation, please contact with our nearest local dealer or office.

The following phenomena are not malfunctions:

(1) When cooling (heating in winter), load is small (i.e. little fan coils operate), temperature of system water is lowered (raising) rapidly, antifreeze (anti high-temp) protection will work and will stop when water temperature back to set point.

(2) When heating, since the surface temperature of heat exchanger is lower than outer ambient temperature, and when surface temperature of heat exchanger lower than 0℃ , there will

be frost on the surface and affect heat exchanging effect, thus the control system would conduct defrost regularly to melt the frost on the surface of heat exchanger.

(3) If unit is used at area where temperature at winter will below 0℃ , when system is in waiting state (don't cut off power), and when ambient temp. and system water temp. are about 0℃ , in order to prevent water system from freezing and damaging equipments, control system will conduct auto antifreeze operation, start water pump and compressor until water temperature reach safe point.

When dealing with problems, professional personnel can remove malfunctions according to following list:

Common error	Reason	Solution (done by professionals)
1.Compressor doesn't work	A.Error on power B.Wire loose C.Error on relay or insurance D.Temp. is set too high E.Error on compressor	●Check and re-tighten ●Check error reason and repair ●Reset ●Change compressor
2.Fan noise is large	A.Fan fixing bolts are loose B.Fan louver touched outer case or net cover C.Operation of fan is not steady	●Retighten fan fixing bolt ●Check reason and adjust ●Change fan
3.Compressor noise is large	A.Liquid hit produced when liquid refrigerant flows in compressor B.Components inside compressor are damaged	●Check is expand value is ineffective, temp. sensor is loose, and repair ●Changer compressor
4.Water pump doesn't operate or operate abnormally	A.Error on power or wiring B.Error on relay C.There is gas in water pipe	●Check reason and repair ●Exchanger relay ●Exhaust all gas
5.Cooling effect is bad	A.Freon in cooling system leaks B.Heat preservation of water pipe is bad C.Water flow quantity is not enough D.Heavy dust on condenser E.Cooling system blocked	●Check and repair and recharge Freon ●Strengthen heat preservation ●Clean water filter ●Clean condenser ●Check or change dry filter
6.Compressor frequently on and off	A.Too much refrigerant B.Circulation of water system is bad. C.Low load	●Exhaust some refrigerant ●Water system is blocked or there is air. Check water pump, valve, pipeline, clean water filter or exhaust air ●Adjust load or increase energy store facility
7.Refrigerate system low-pressure switch on/off is working frequently	A.Freon leakage on system and refrigerant shortage B.Dry filter is blocked C.Error on heat expand valve D.Water system circulation is bad	●Check and repair and recharge refrigerant ●Change dry filter ●Check if expanse valve is blocked, temp. sensor is leaking, then repair or change ●Check water system and solve
8.Compressor operates but unit doesn't cool	A.All refrigerant is leaked B.Freeze evaporator is freeze C.Compressor error	●Check, repair and charge refrigerant ●Check reason and remove freezing ●Change compressor

7 Terminal Facilities and Selection Guideline

Air-cooled mini-chiller's Terminal Facilities are mainly for the heat exchanger facilities installed indoor, Usually it is fan coil with several models. Such as horizontal invisible fan coil, horizontal visible fan coil, vertical visible fan coil, suspending fan coil and so on. User can select different type of fan coil according to house structure and indoor decoration style. Normally, we recommend selecting horizontal invisible fan coil, because it is in smaller dimension and can be concealed well, it is easy for indoor decoration. At the same time, its noise is lower, and it is relatively cheaper. Suggestions are as following:

Models	FP-34	FP-51	FP-68	FP-85	FP-102	FP-136
Room area m^2	8~12	10~18	15~25	20~30	25~35	30~45

Control to the fan coil at every room is conducted by the temperature control on wall and the 3-speed switch. Temperature control is for setting room temperature, 3-speed switch, with high, medium, and low speeds, for adjusting airflow and cooling capacity of the fan coil.

8 System Installation

Do have the unit installed by the authorized company or professional central air conditioning installation project company, don't try to install it by yourself.

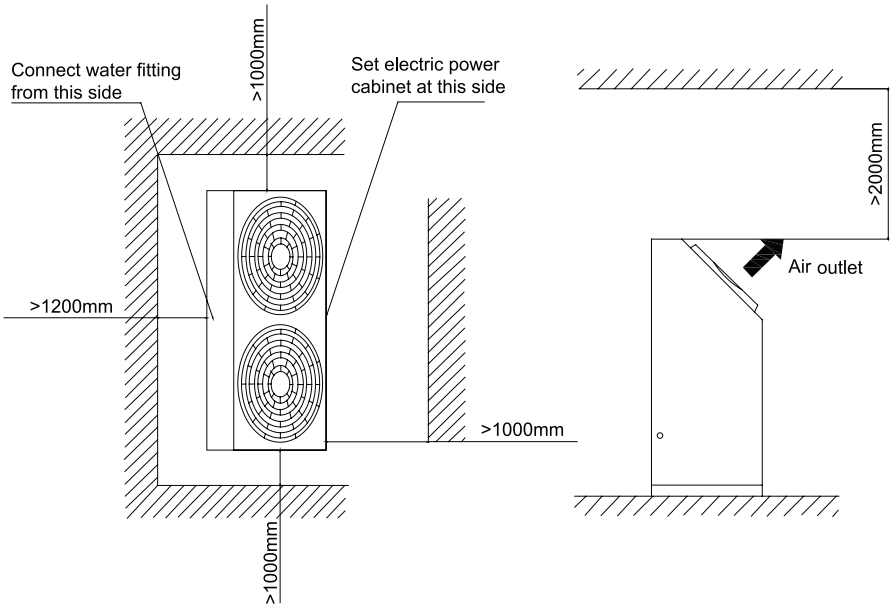
8.1 Unit Installation

8.1.1 Select of installation location

(1) This unit can be installed on roof, ceiling, special flat or other place that is easy for installation and be able to stand its weight.
(2) Select a place with well ventilation and smooth exhausting, and the place will not produce short-circuit circulation, and where exhausted air from the unit will not bother neighbors.
(3) When placing the unit at roof, pay attention to wind direction to prevent direct up wind; when placing it on ground, avoid placing it at where there is strong wind.
(4) There should be no heat source, exhaust vent of other facilities, strong steam and flammable gas around the unit.
(5) When installing several units, ensure there is enough suction space to prevent short-circuit circulation.
(6) Place where there is no large snow in winter.
(7) There should be no obstruction near air intake vent or air outlet vent.
(8) Place where with drainage pipe around the unit to drain cooling or heating water.
(9) Place that near power for easy wiring.
(10) Place that near supply water source for convenient pipe construction.
(11) There should be open space around the unit.

8.1.2 Installation space requirement for outdoor unit

Unit: mm



8.1.3 Move and disassembly

(1) It is better to use forklift or crane when moving the unit.

(2) When suspending, please adopt canvas gallus, round the gallus at base of the unit and bundle it tightly, meanwhile, ensure that the gallus would not tough heat exchanger.

(3) When moving the unit, the slant angle should be smaller than 30° .

8.1.4 Installation mode

(1) Fix the unit on separated concrete base with expand bolts directly.

(2) It is also available to adopt angle iron or steel supporter that make off channel steel, add shake-absorbing gaskets, and then place the unit on floor or roof. Ensure to keep the unit horizontally.

8.2 Installation of Terminal Facilities

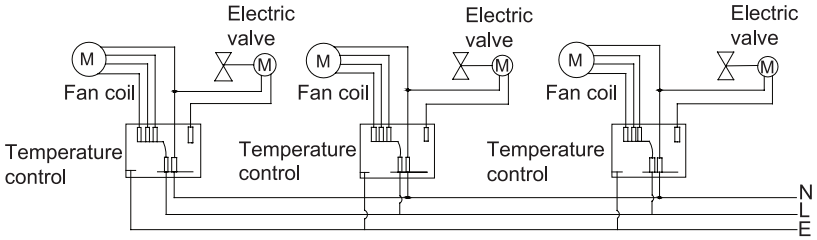
Installation of indoor terminal fan coil should obey the installation regulation for air conditioning facilities.

(1) Suspend the fan coil according to the elevation shown on air conditioning project construction chart, and please be aware to keep it horizontally.

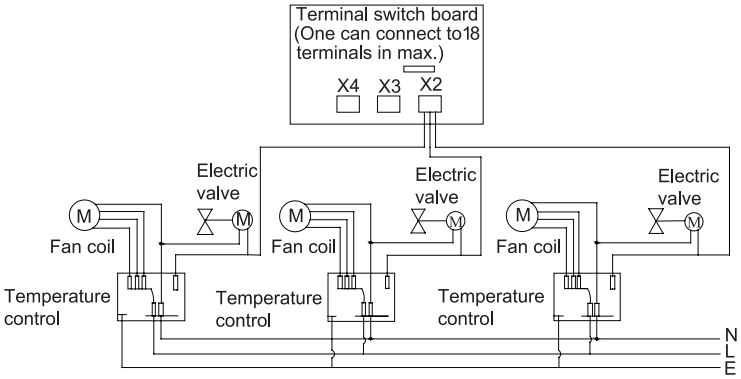
(2) Connect water in/out and water in/out joint of fan coil by soft joint; connect condensate water out pipe on water tray and condensate water drainage hose by plastic host.

(3) Electric wiring of fan coil, 3-speed switch and temperature control are as following:

Electric wiring diagram for no connection control between fan coil and host:



Electric wiring diagram for connected control between fan coil and host Special notice:



(1) When connected the control wire between fan coil and host, connect the live wire of fan coil controller to the port X2~X7 on terminal switch board inside electric case through the switch of temperature control; Meanwhile, disconnect the original connecting wire between main controller and end-switch. Then connect the port X1 at switch board to end-switch at main board of indoor unit.

(2) When connect control is not conducted between fan coil and host, please connect the end-switch at main board with live wire (short connected when outgoing). it shall be done by professional.

(3) Method of shutting off the power is cutting off the air switch. Contact distance between the electrodes of the air switch must be beyond 3mm.

(4) Installation should conform to the local electric standard.

(5) The appliance shall be installed in accordance with national wiring regulations.

(6) Before obtaining access to terminals, all supply circuits must be disconnected.

(7) If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.

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

(9) The appliance shall not be used by children without supervisor.

8.3 Water Pipe Connection

When connecting water pipe, please screw off the plug at water in pipe and water out pipe, connect the water-in hose and water-out hose separately with the water-in pipe and water-out pipe of the unit. Please note the following points when constructing:

(1) Water connect pipes must be new, do not use old pipes instead of new ones.

(2) Construction must be correctly designed and conducted according to the water and heat pipeline design criteria and standard.

(3) Select corresponding pipe diameter according to the given dimensi on of pipes.

(4) There is expand can set in the unit, water flow switch, auto water filling valve, safety valve, and water system adopts our Unit standard installation sketch (as shown in the next page).

(5) The proportion of electric 2-way valve and electric 3-way valve in water system should refer to technical criteria (the recommended value is 2:1). And electric 3-way valve must be assembled at the furthest end6) Try to decrease the pressure difference between indoor fan coil or main hos t with water in or out port of the unit.

(6) Do install water filter at water-in pipe of the unit to prevent block at heat exchanger inside the unit.

(7) After piping water system, according to relevant criteria for HVAC, conduct leakage test with hydraulic pressure of 0.6MPa. and maintain the pressure for 24h. Ensure that there is no leakage in the whole pipeline system, then wrap heat preservation layer.

(8) After completed piping of water system, do drain out contamination inside water system. Ensure th at inside of water pipe is clean without contaminations such as rust dregs, so that there will be no blockage in pipeline and sleeve heat exchanger in the unit and water pump, which will damage the unit.

(9) Exhaust air inside water system with auto exhaust valve. Auto exhaust valve must be installed at the highest point at water return pipe.

(10) Drainage valve should be installed at the lowest point of water pipe.

(11) Thermometer and hydraulic pressure meter must be set at water-in and water-out pipe of unit for convenient check when unit is operating.

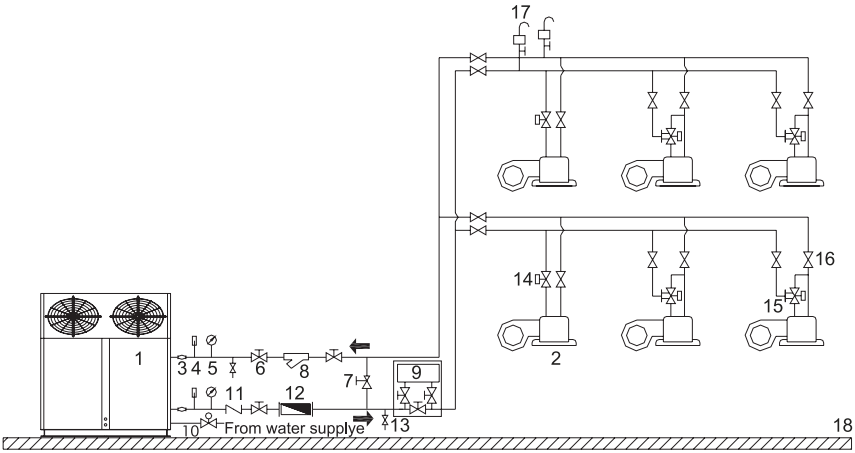
(12) Water pipe must conduct heat preservation and moisture proof, to prevent loss of cooling or heating capacity and forming condensation water.

(13) Inlet water pipe pressure must be lower than 0.62MPa., otherwise safety valve will open automatically release pressure. At the same time, its minimal pressure must be beyond 0.15MPa..

(14) Cleaning and maintenance must be done by professionals.

Warning:

Water filter with at least 60 meshes must be installed on water-in pipeline system of the unit to avoid blocking the sleeve heat exchanger in the unit and causing damage. Do clean it regularly. It must be down by professionals.



1	Host air conditioner	10	Auto water fill valve
2	Fan coil	11	Check valve
3	Rubber soft contact	12	Flowmeter
4	Thermometer	12	Water drainage valve
5	Manometer	14	Electric 2-way valve
6	Cut-off valve	15	Electric 3-way valve
7	By-pass control valve	16	Ball valve
8	Y-type filter	17	Auto exhaust valve
9	Auxiliary electric heater/hot-water boiler	18	Base

Standard Installation Sketch for this Mini chiller.

8.4 Anti-frozen Notice

(1) To heat pump unit, when it is used at where temperature in winter would below 0℃, do conduct heat preservation with insulation material, and add antifreeze according actual situation.

(2) On control system there is auto antifreeze operation set for a ssisting system. Its principle is: When unit is at standby state (don't cut off power), and ambient temperature and system water temperature is at about 0 degree, control system will start water pump and compressor till water temperature reaches safety point.

Thickness of glycol liquid—freezing point list:

Thickness %	Freezing point ℃	Thickness %	Freezing point ℃	Thickness %	Freezing point ℃
4.6	-2	19.8	-10	35	-21
8.4	-4	23.6	-13	38.8	-26
12.2	-5	27.4	-15	42.6	-29
16	-7	31.2	-17	46.4	-33

In the list: Thickness of glycol is mass thickness.

9 System Adjustment (it shall be done by professional)

9.1 Discharge Water to Water System

Fill water to the water pipe, meanwhile, conduct auto gas exhaust from exhaust valve till the whole pipe filled with water, and confirm air in pipe ad completely be exhausted.

9.2 Check Before Trial Run

Check Before Trial Run Checking must be done by professional personnel.

9.2.1 Check indoor fan coil

Check if power cord connection of all indoor fan coils is correct, and rotation direction of fan motor is correct. Check if the valve on entrance and exit pipes of fan coil is completely open. Exhaust it from exhaust valve when there is gas inside fan coil.

9.2.2 Check unit

Check if the outer appearance of unit and pipeline system is damaged during transportation. Check if wiring terminals for electric components inside unit is loose, if phase sequence is correct. Check if vane of fan motor would touch the outer case and grille when rotating. Check if temperature sensor had inserted well.

9.2.3 Check pipeline system

Check if valves at pipeline system had open completely. Check if water had filled the whole pipeline system, if air is exhausted completely.Check if heat preservation to pipeline system is well.

9.3 Trial Run

Trial run can only be conducted after passing all above checking, then do it under the guideline of professional personnel.

(1) Switch on the power supply and turn on the unit. To the unit that uses 3-phase power, when power sequence is reverse, phase sequence protection works, then fan motor, compressor and water pump will not operate At that time, cut off power first, exchange the two phases among the 3-phase power, then switch on the power supply again and turn on the unit.

(2) During operation, circle water pump should operates steadily. If it operates unsteadily, and indicator of pressure meter swings a lot, it means there is air inside water system. At that time, exhaust air completely through exhaust valve and then turn on the unit. After turning on the unit for 3 minutes, fan and compressor start automatically.

(3) After compressor had started, when abnormal sound is heard, stop the unit immediately and check.

(4) When cooling in summer, when temperature of water -out Tout≥15℃ , compressor starts; when Tout≤7℃ , compressor stops, and water pump keeps on running.

(5) To heat pump unit, when it is operating heating in winter, and if water-out temperature Tout≤45℃ , compressor starts running; when Tout≥50℃ , compressor stops, and water pump continues running.

(6) Obverse if water temperature for in and out is normal, when the temperature difference between water in and out ΔT>5℃ , it means water flow in the system is small, at this time, check that whether there is blockage in water filter, air in the pipe had not been exhausted, resistance in pipeline system is too great etc. when ΔT is between 3-5℃ , it can achieve best performance.

(7) After trial run, clean the filter on pi peline first, and then the unit can begin normal operation. It is necessary to assembly and cleans the filter after a certain period (say, 3 months) to remain normal operation.

Note:

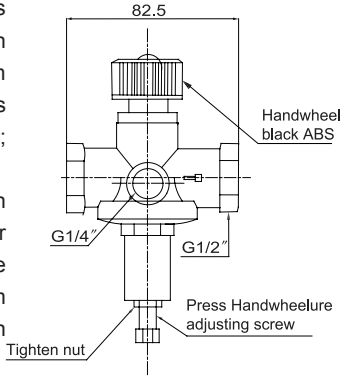
Since the unit adopts total hermetic scroll compressor, phase sequence of power must be correct, and it is forbidden for operate with reverse power supply for long time.

10 Usage Instruction for Accessories

10.1 Auto Water Fill Valve

Application specification The auto water fill valve contains pressure regulation and pressure decreasing settings, it can automatically maintain pressure in system, remain system hydraulic pressure to a steady value. When system pressure is lowered, valve turns on automatically and fills water into system; when it reaches set pressure, valve closes automatically.

When auto water fill valve is under normal operation, when system hydraulic pressure is larger than the set pressure, water fill valve contains inverted function, i.e., even if system pressure increased, water in the system will not flow back. When system repairing or draining, screw manual cut-off valve tightly and turn off water source.



Pressure setting Setting for auto water fill valve is determined by system working pressure, and it is able to adjust automatically. When adjusting, auto water fill valve is in working state. Connect pressure meter to joint of G1/4", loosen tightened nut and adjust the pressure adjusting screw, when adjusted pressure to system working pressure, tighten nut.

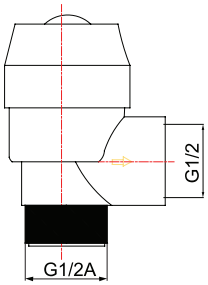
Note: if pressure of water source is lower than the set pressure of auto water fill valve for a long time (abnormal working state), add a one-way valve or cut-off handwheel of manual-closed auto water fill valve at the exit of auto water fill valve. Dimension of joint of water fill pipe is G1/2";

Note:

This accessory had been installed inside the unit, t esting p ersonnel m ust conduct pressure setting when water fill p ressure is lower than 0.15MPa and must according to actual situation. It shall be done by professional

10.2 Safety Valve

Safety valve is for preventing system pressure from raising suddenly, such as water hummer, over filled, open/close or ineffective of valve and fluctuation of system water temperature with the change of ambient and load, and fluctuation of system pressure with the change cubage of water for temperature. When pressure exceeds the setting for safety valve, the valve will open automatically to release pressure and prevent system pressure from going too high and system breaking.



Working pressure of valve should be set about 10% larger than system

operation pressure normally, and it should be installed at place that is easy to product pressure convergence, such as near expand water case or water pump.

Note:

This accessory had been installed inside the unit, unprofessional personnel p lease don't turn or assemble it.

10.3 Auto Exhaust Valve

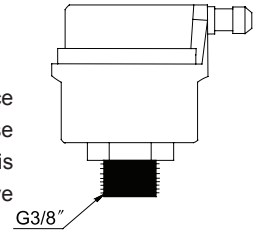
If air in water system is not exhausted, it would cause effects:

(1) Temperature at some parts will be uneven.

(2) Noise is produced.

(3) Oxygen contain in the air would cause metaloxygenation.

(4) Too much air would damage water pump.



Auto exhaust valve should be installed at the top of pipeline, the place that gas is easily gathered, and it should be installed vertically; self-close valve or cut-off valve should be installed at bottom of exhaust valve, it is convenient for system water fill or is used when repairing; exhaust valve cannot be installed at place that is easy to be frozen.