Installation, Operation and Maintenance

CXAU Air-Cooled Modular Chiller / Heat Pump

R410A

CXAU065/130



690914770002

⚠ SAFTY WARNING

Only qualified personal should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed,adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

May 2023

PKGP-SVX19A-EN

Confidential and proprietary Trane information

Preface

Read this manual thoroughly and fully understand all functions of the unit before operating or servicing this unit. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

Please strictly follow the content of this manual together with unit and other relevant materials at installation and operation.

The “Installation Completion Check Sheet” in the manual will be used to check that all required installation steps are completed. Do not read “Log and Check Sheets” only instead of reading the IOM manual thoroughly. The IOM manual should be read carefully before unit installation.

This manual may not fully cover all situations encountered in the installation of this air conditioning units, please contact your local Trane sales office if you need more detailed information or encounter a specific question from a customer that is not described in detail in this manual. The contents of the manual are subject to change without notification.

All the installation processes of the air conditioner unit must be completed by professionals complying with national and local regulations. In this manual, “ ⚠WARNING” and “ ⚠CAUTION” marks are given where appropriate, and it is extremely important to read them carefully and strictly follow them to ensure personal safety and proper operation of the unit.

Modular Air-Cooled Chiller (Heat Pump) Installation Completion Check Sheet for Application of Trane Service

Installation Company:	
Installation Company Address:	
Owner Name/Company:	
Contact:	Telephone:
Unit Installation Address:	
Unit Model:	
IDU Barcode:	
ODU Barcode:	
Dealer:	Contact:
Telephone :	Fax:
Installation Company :	Contact:
Telephone :	Fax:

Check List

Please read the installation manual and relevant installation specifications before installation

1. Confirmation of the installation

a) Ventilation of the outdoor unit meets the distance requirements in the manual	Yes ( ) No ( )
b) Installation meets platform requirements and isolation pads installed for outdoor unit	Yes ( ) No ( )
c) Isolation pads installed for indoor unit	Yes ( ) No ( )
d) Enough service clearance around the unit	Yes ( ) No ( )
e) Not installed in abnormal acidity or alkaline places such as seaside (except for relevant customized units)	Yes ( ) No ( )

2. Confirmation of the installation of the unit's electrical system

a) Air switch capacity and power cable diameter meet the requirements of the unit	Yes ( ) No ( )
b) Wiring is correct and terminal blocks are pressed tightly without false connections	Yes ( ) No ( )
c) Connection of the neutral wire to the ground wire complies with the relevant electrical specifications	Yes ( ) No ( )
d) Wiring connection between the control line and the power line meets the anti-interference requirements	Yes ( ) No ( )
e) "ON-OFF" warning label is affixed to the air switch box of the power supply	Yes ( ) No ( )
f) Terminal of external water pump overload protection is connected to the pump overload protection terminal of the host water pump	Yes ( ) No ( )

3. Confirmation of the installation of the chilled water system Yes ( ) No ( )

a) Prohibited to used in direct heating systems application (external continuous water replenishment)	Yes ( ) No ( )
b) Designed by professional engineers (e.g. water pipe diameter calculation, etc.)	Yes ( ) No ( )
c) The actual chilled water system resistance matches the pump head, and the water flow of the unit reaches the rated value	Yes ( ) No ( )

Modular Air-Cooled Chiller (Heat Pump) Installation Completion Check Sheet for Application of Trane Service

d) The unit-equipped water filter is installed at the water entering of the unit with correct installation method	Yes ( )	No ( )
e) Equipped with an entering and leaving pressure gauge and a shockproof hose	Yes ( )	No ( )
f) Setting for water system make-up valve and exhaust are reasonable	Yes ( )	No ( )
g) Equipped with gravity expansion tanks or pressure expansion tanks	Yes ( )	No ( )
h) Meet the requirements of the system water capacity by adding an energy storage tank	Yes ( )	No ( )
i) The hydroelectric heater installation meets the requirements in this manual	Yes ( )	No ( )
j) The chilled water system is cleaned and discharged from the unit	Yes ( )	No ( )
k) The chilled water system installed with an automatic exhaust valve and the air is completely dischared	Yes ( )	No ( )
l) The chilled water system has been tested by water pressure and ensure that the system does not leak	Yes ( )	No ( )
m) Antifreeze protection measures after installing the water system in winter	Yes ( )	No ( )
n) Closed-looped water system application only, and NO open water system	Yes ( )	No ( )
o) The water flow switch of the unit (except for the unit without flow switch) is closed, or the temperature difference between the entering and leaving water meets the requirements for unit without water flow switch	Yes ( )	No ( )
4. Confirmation of the installation of the indoor fan-coil system		
a) The entering and leaving water valves/2-way valves/3-way valves of the fan coil are designed and installed correctly and intact	Yes ( )	No ( )
b) Pour water into the condensate tray, the condensate discharge is smooth and there is any leakage	Yes ( )	No ( )
c) The condensate pipe insulation is tightly bandaged to prevent condensation on the outer wall	Yes ( )	No ( )
5. Confirmation of pre-commissioning preparations		
a) The power supply voltage is within the normal range and the three-phase imbalance is less than 2%	Yes ( )	No ( )
b) The power supply should not be temporary power supply	Yes ( )	No ( )
c) The customer and Party A's acceptance personnel can be in place in time	Yes ( )	No ( )
d) Enough facilities (ladders, lifting tables, etc.) to ensure the normal operation of the operator	Yes ( )	No ( )
e) The unit has been powered on for 24 hours before start-up and commissioning	Yes ( )	No ( )

6. Other Information

Require Comissioning Date: Before _____

The company applying for commissioning (stamp)

Signature: Date:

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Introduction

Read this manual thoroughly before operating or servicing this unit.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

ATTENTION: Warnings, Cautions and Notices appear at appropriate sections throughout this literature. Read these carefully:

⚠WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

⚠ WARNING

- **All the installation procedures of the units must comply with national and local regulations.**
- **Please contact the local sales when installation. The unit should be installed by professional technicians with qualified certificate. Customers do not install, repair or change installation position of the air conditioner by themselves. Otherwise, it may cause water leakage, electric shock or fire damage.**
- **Before installation or maintenance, lock the power supply and cut-off switch of the unit to avoid personal injury or death caused by electric shock or contact with moving parts.**
- **Please install a separate power supply. The voltage fluctuation of power supply cannot exceed ±10% of the rated voltage, and the power supply cables must be separated from the welding transformer, which will cause large voltage fluctuations.**
- **The installation should be carried out by professional electrician with qualified certificate and in accordance with the national power standards and the regulations of the local power department. Electrician also need to check whether the line capacity meets the requirements, and whether the power supply cable is loose or damaged.**
- **The cover plate of the electric control box must be installed tightly to prevent dust, water, etc. from entering. The electrical parts must be moisture-proof and enough far away from water sources. Otherwise, it will cause electric shock, fire and other accidents.**
- **Make sure to install fuse with suitable current intensity. Never use temporary substitutes, such as a stretch of electrical wire. This may not only damage the unit itself, but also lead to fire damage.**
- **The power supply of the unit and the auxiliary electrical heater must be equipped with electricity leakage protection devices, and the ground wire must be connected. Otherwise, there may be injuries and even casualties without protection.**
- **All auxiliary electric heater should be connected according to the wiring diagram, and direct energization of auxiliary electric heater will cause the unit loss part of control functions, even damage the unit.**
- **Please strictly follow the wiring diagram in this manual, incorrect wiring or arbitrarily change the wiring will cause unit failure, damage of unit or even person.**
- **All power supply must be cut off before contacting wiring equipment or parts.**
- **Please confirm that the unit is in a power-off state before servicing.**
- **Maintenance should only be carried out by professional maintenance personnel. If maintenance and repair are required, please contact Trane Sales. Improper maintenance and repair may result in water leakage, electric shock or fire.**
- **Do not use flammable materials near this product. Do not use organic solvents, such as paint diluent to clean this product.**
- **Don't use organic solvents to avoid cracks, electric shock or fire.**

⚠ WARNING

- **Optional parts mush be installed by professionals. Be sure to use the optional parts provided by TRANE. Improper installation can lead to water leakage, electric shock and fire.**
- **Please do not charge unqualified refrigerants, refrigerant substitutes or refrigerant additives. Incorrect charge methods or charge of unqualified refrigerants, refrigerant substitutes or refrigerant additives will cause unit damage and safety hazards. Please select qualified refrigerants. All technicians charging refrigerants must be qualified and must be familiar with and strictly comply with the relevant technical requirements, laws and regulations regarding the use, treatment, recovery and recycling of refrigerants**
- **Smoking and fire are strictly prohibited when refrigerant leaks. If the unit does not produce cool or heat properly, there may be refrigerant leakage and please contact TRANE after-sales**
- **The refrigerant used in the unit is safe and usually the leaks possibility is very low. If the refrigerant leaks into indoors, and the refrigerant gets contact with pyrotechnics of heaters, electric stoves, and heaters, toxic gases will be generated. Please make sure to extinguish the fire of burning appliances or other appliances that may cause fire, ventilate the room and contact Trane after-sales.**
- **Please confirm that the leakage repair is actually completed before running the unit.**
- **Do not turn on the unit when the panel or protective net is removed. Rotating parts in the unit may cause injure of human body or other objects.**
- **Avoid objects such as sticks, sands, or stones to enter the inlet or outlet of grilles. The fan rotating at high speed is very dangerous.**
- **The strength of ordinary unit bracket may not be suitable for this product, please choose suitable bracket according to the design weight. Using of brackets with insufficient supporting strength may bring hidden dangers or even cause safety accidents.**
- **In winter, when the unit was stopped for a short time, make sure to keep the unit powered on to protect the unit free of frozen. Otherwise, the unit may freeze out.**
- **Make sure the unit is powered on at least for 24 hours before the unit is start up at the first time or re-energized after long time power off. Otherwise, it may cause the compressor to burn.**
- **In the season when the unit will not run for a long time, please drain the water and cut off the power supply to save electric energy and extend service life.**

⚠ CAUTION

- **Do not touch the fins of the heat exchanger. It may damage the fins, cause machine performance degradation or scratch fingers.**
- **After installation, air leakage for the pipeline needs to be tested to make sure there's no leak for the pipeline.**
- **During running or short period after unit stops, do not touch refrigerant pipes. The pipes can be too hot or too cold to cause burns or cold injury.**
- **Do not block or cover the inlet or outlet of grilles. The blockage will result in degraded performance or impact unit operation.**
- **There should be a defrost drainage port to ensure the smooth drainage.**
- **It is recommended to install an outdoor snow shelter to ensure that the unit can run well on snowy days**

Unit Model Number

C	X	A	U	1	3	0	5	B	V	S	A	E	N	N	N
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Digit 1 **C = Chiller**

Digit 2 **X = Heat Pump**

Digit 3 **A = Air-source**

Digit 4 **U = Modular**

Digit 5,6,7 **Nominal Cooling Capacity/Heating Capacity**
065 = 65 kW
130 = 130 kW

Digit 8 **Unit Voltage**
5 = 380V/50Hz/3Ph
6 = 380V/60Hz/3Ph
7 = 460V/60Hz/3Ph

Digit 9 **Refrigerant**
B = R410A

Digit 10 **Application**
V = VFD unit

Digit 11 **Efficiency**
S = Super-efficiency

Digit 12 **Design Sequence**
A = Factory Assigned

Digit 13 **Interface**
N = Chinese
E = English

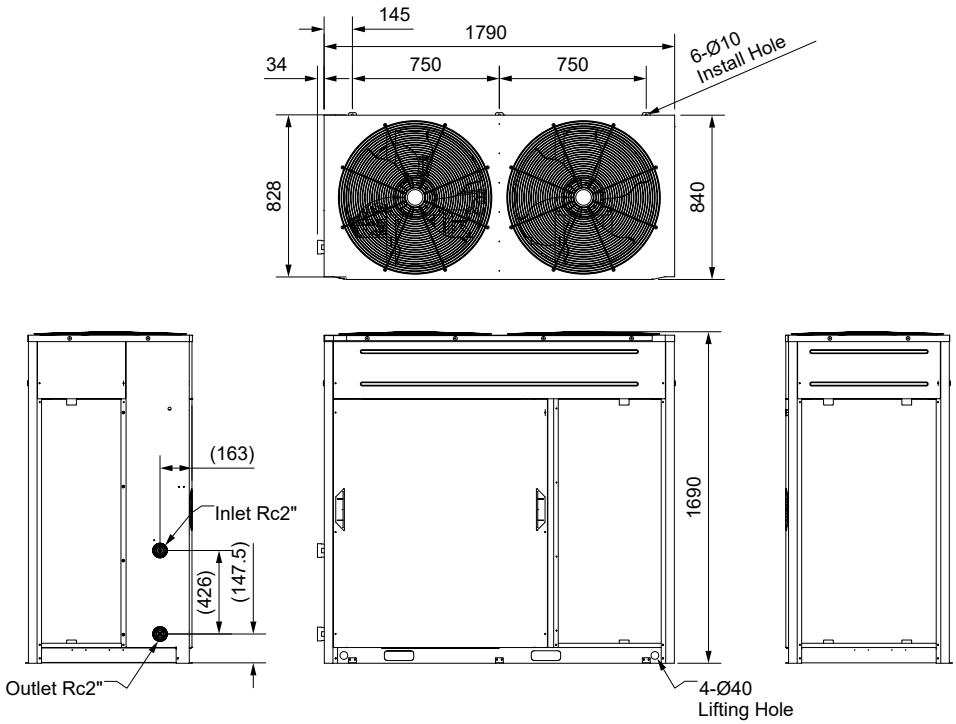
Digit 14 **Option**
N = None

Digit 15 **Controller**
N = Without controller
1 = With Controller, 380V
2 = With Controller, 460V

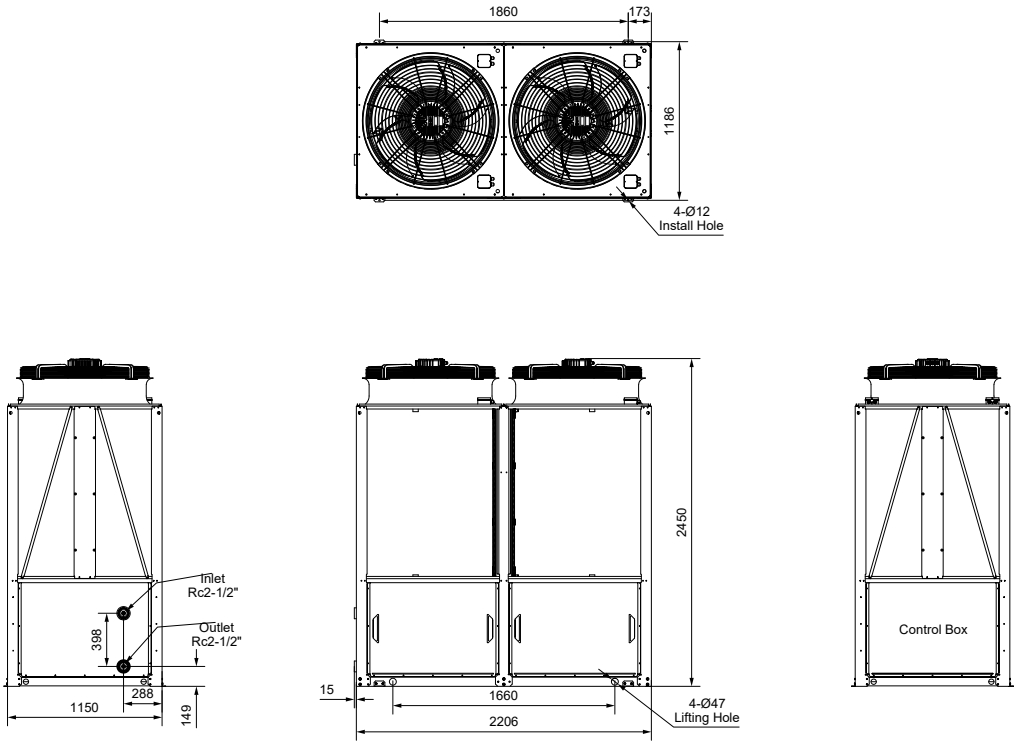
Digit 16 **Option (reserved)**
N = None

Unit Dimension

CXAU065-VS



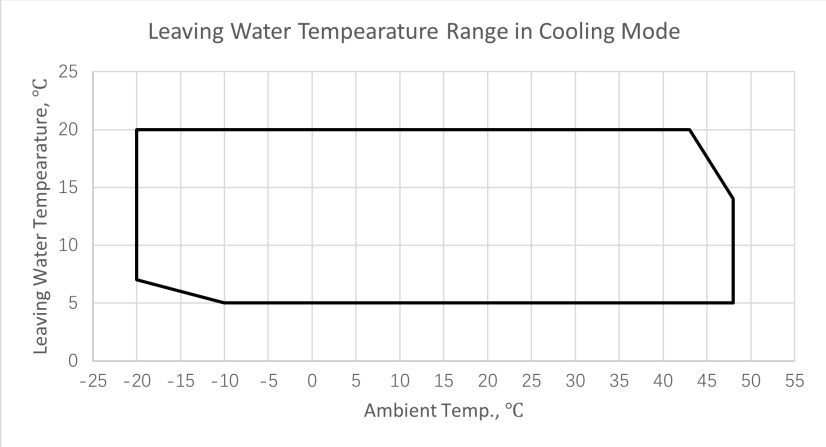
CXAU130-VS

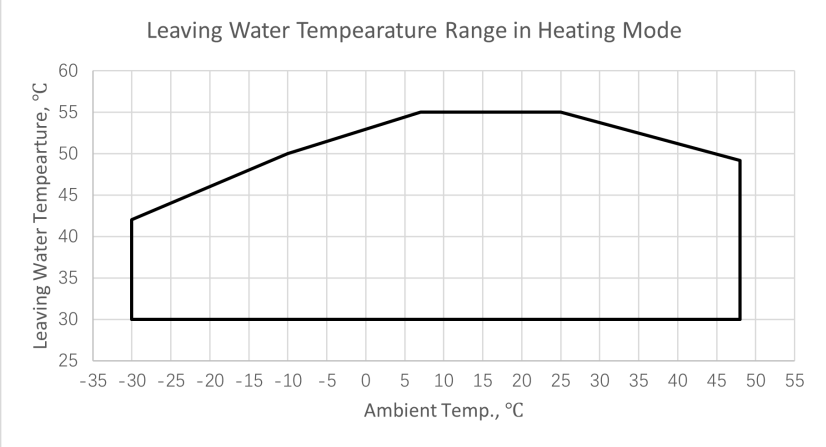


Operation Map

CXAU065/130-VS

Description	Scope of application
The ambient temperature range of the unit operation	Cooling: -20~48°C Heating: -30~48°C
The outlet water temperature range of the unit operation	Cooling: 5~20°C Heating: 30~55°C
The ambient temperature range of the controller operation	-10~60°C
The relative humidity range of the controller operation	<90%





Note: *The cooling or heating operation of the unit needs to meet the above operating map. Exceeding the operating range will cause alarm and shutdown or even damage to the unit. Failure or damage of the unit caused by exceeding operating map will result in paid services in accordance with relevant policies.*

Installation - Mechanical

Pre-Installation Inspection

To protect against loss due to damage incurred in transit, perform inspection immediately upon receipt of the unit.

- Whether the nameplate is consistent with the order model.
- Whether the documents along with the unit are complete.
- Whether the accessories along with the unit are consistent with the items listed in the packing list.
- When receiving the unit, please carefully check whether damage has been caused during shipping. If so, please record it on the delivery note and notify the carrier's terminal within 72 hours, and at the same time notify the local Trane sales office.

Lifting and Moving Instructions

Ensure that all the lifting equipment used is properly rated for the weight of the unit being lifted. Each of the cables(chains or slings), hooks and shackles used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables(chains or slings) may not be of the same length. Adjust as necessary for even unit lift.

Failure to properly lift unit in a LEVEL position could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and equipment or property-only damage.

Lift Configuration

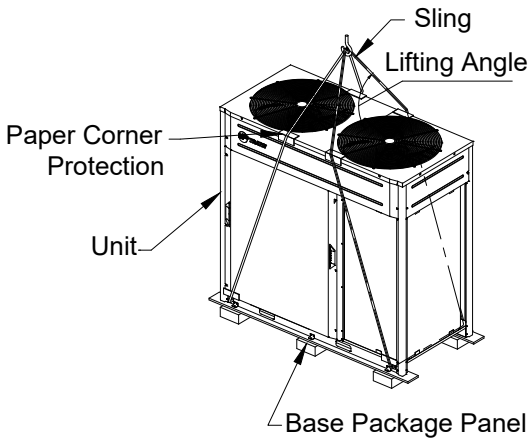
Inspection before lifting:

1. Check whether the appearance and fixing parts of the unit are intact.
2. Check whether the unit and the packaging base plate are well fixed.

Recommendation: *Remove the package base plate when lifting to avoid unit falling.*

When lifting:

1. Personnel with lifting qualifications is required.
2. Thread 2 lifting slings into the hoisting hole at the bottom of the unit.
   - At least 5mm thick paper corner protection between the rope and the unit panel is required.
   - The length of the sling is suitable, and the rope lifting angle larger than 60°.



⚠ WARNING

Before lifting, special attention should be paid to ensure that the outdoor unit lifts evenly. Special attention should be paid when weight distribution of the unit is not even, and the center of gravity is inclined on the compressor side. Pre-lifting should be made to observe whether the sling is tight and whether there's possibility the unit will tilts when lifting. Rise slowly and evenly when lifting to prevent the unit from tipping and protect the safety of surrounding personnel!

Mounting Locations

1. The unit can be installed on the roof, on the ground or other places where easy to install and can reliably support the weight.
2. It should not be installed near any heat sources that may affect the normal operation of the unit, and there should be no obstacles near the air exhaust port.
3. It should not be installed in any locations near corrosive or flammable gases.
4. The operating noise and exhaust air should not have an impact on the surroundings.
5. If the unit is installed in a place where non-professionals can reach, it is needed to set up protection isolation.
6. The unit should be installed in places with sufficient ventilation and maintenance space.
7. The unit must be installed on an even, horizontal plane, and the installation platform should meet the requirement of the weight of the unit and the dimension.

⚠ WARNING

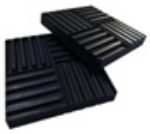
- **CXAU series products are commercial-used units. They should not be installed close to noise-sensitive areas such as residential houses/villas/homestays/nursing homes. If they are needed to install in this kind of place, please do your own sound insulation treatment.**
- **The unit should not be installed close to doors and windows. For special requirements, please consult Trane technical support or after-sales department.**

Platform

1. The platform can be steel frame structure, such as channel steel.
2. The platform can be reinforced concrete structure.
3. The platform should be completely horizontal to ensure uniform contact of the unit.
4. The platform should be strong enough to support the weight of the unit.
5. Drainage ditches should be set up around the platform to collect and drain the condensate water generated by the operation or maintenance and prevent water accumulation around the unit.

Isolators

1. A vibration absorbing isolator should be installed between the platform and the unit, and the thickness of the vibration absorbing isolator should not be less than 10mm.
2. The type of vibration absorbing isolator is shown in the figure below or a similar type.



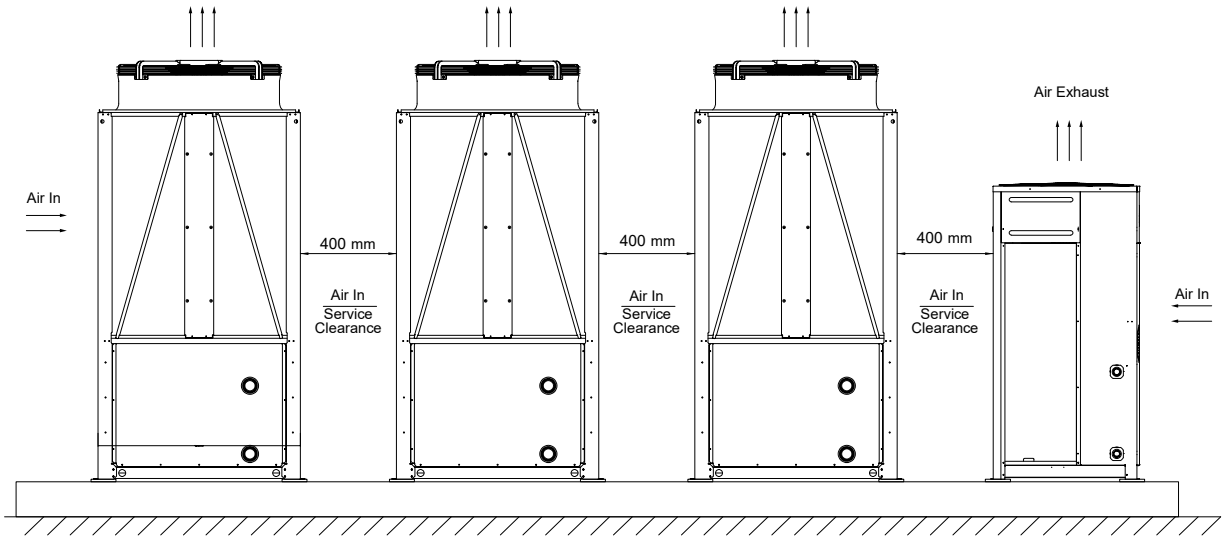
Installation Clearance

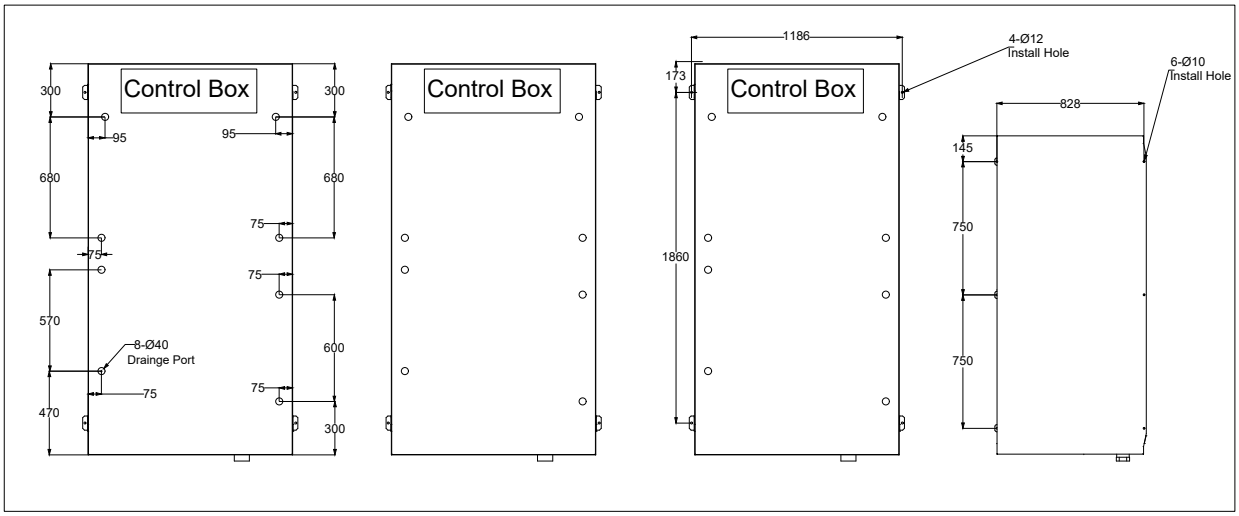
Please consider drainage, ventilation, and operation clearance when installation to ensure stable operation and maintenance and repair of the unit. The minimum installation clearance should be met, otherwise there may be problems such as performance degrade, noise rising, operation failure and hard to maintenance.

⚠ CAUTION

If the specified installation space requirements can’t be met, consult TRANE engineering team or after-sales.

CXAU065/130 Installation Platform and Clearance

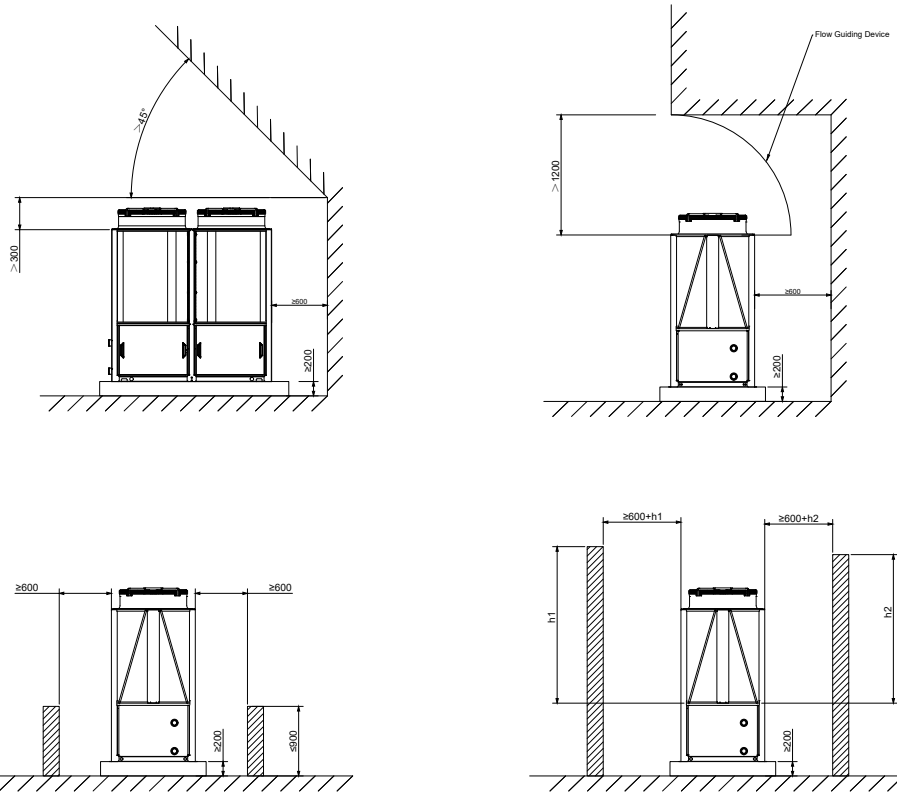




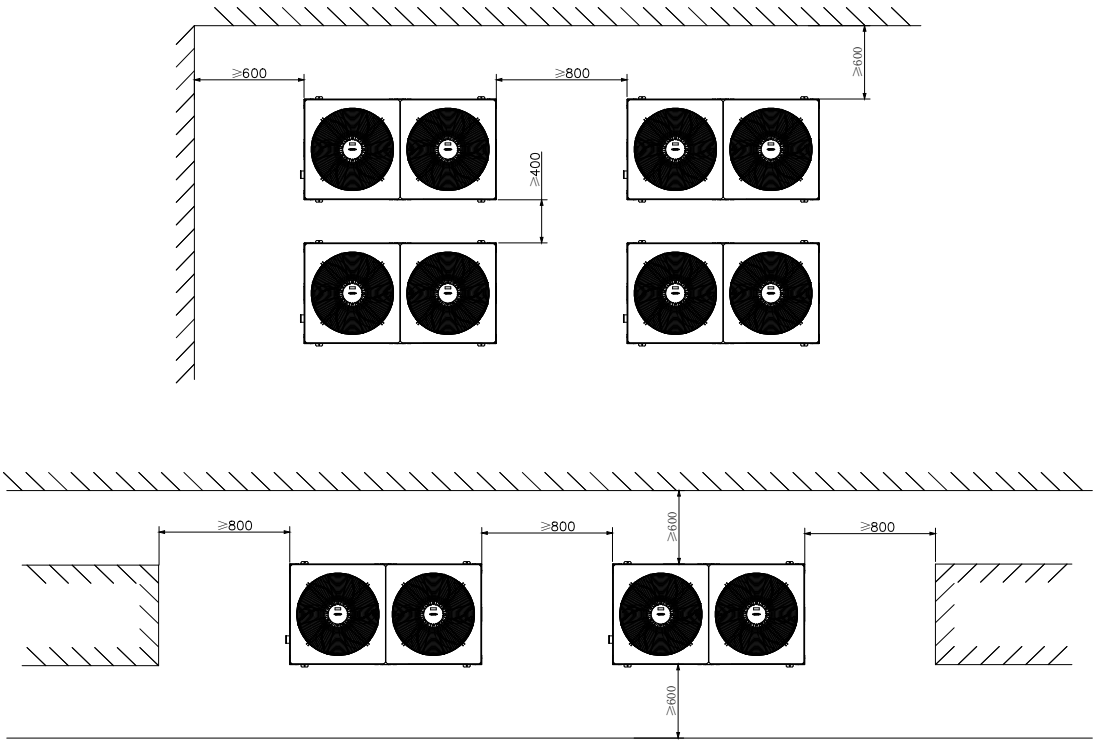
Note:

1. Enough maintenance clearance need to be reserved around the unit.
2. The exaust air at the top of the unit should not be obstructed.
3. The unit should be located outdoors, and the inlet air volume should meet the air volume parameters in the technical parameter table in this manual.
4. The inlet air temperature should be within the allowable range.
5. The support height of the unit recommended not lower than 200mm.

CXAU065/130 Single Unit Installation Clearane

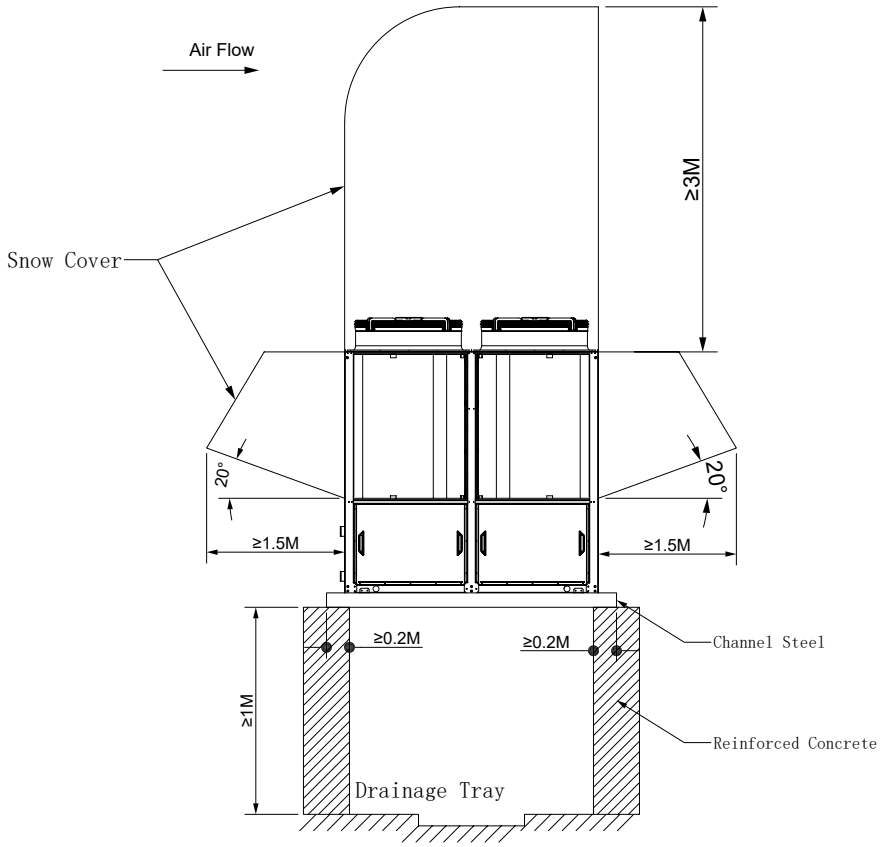


CXAU065/130 Multi-Units Installation Clearance



Snow Protection

1. For the installation in the area where there is more snow, it is necessary to raise the unit, and install snow covers to make sure unit running normally.
2. During heavy snowfall, please check the round-tube-plate-fin heat exchanger, if the heat exchanger is covered by heavy snow, manually clean the snow is needed.



Water System Installation

Pipeline Prefabrication Requirements

1. The pipe diameter of the inlet and outlet of the water system should not be smaller than the size of the joints to the unit.
2. The connections between the pipeline and water pump or air conditioning unit must use flexible pipes to avoid the transmission of vibration.

Pipeline Installation Requirements

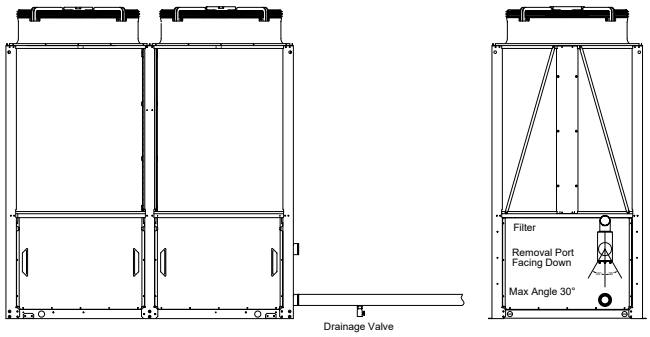
Water pipeline connections should comply with relevant installation procedures, and all water pipes must comply with local piping codes and regulations. Please refer to the schematic diagram for the installation of typical accessories for water systems. Please strictly abide by the following water system pipeline installation requirements, otherwise it may affect the normal operation of the unit, even warning occurs or unit damaged.

1. **Water flowrate:** The water flowrate of the water system must be designed by professionals, to guarantee the water flowrate through the water-side heat exchanger of the unit matches the water flowrate required by the unit, otherwise the heat exchange performance will degrade and affect the performance of unit or even bring to unit alarm or shutdown. When all the terminal FCUs are shut off or only one FCU is running, keep the unit running stably for some time to check whether the water flowrate meets requirements. If not, adjust the piping resistance or water pump heads until requirements are met.

2. **Water system capacity:** The water system capacity will affect the number of starts/stops of the compressor, as well as the defrosting effect in heating mode. The minimum water system capacity volume should be met, if not, an energy storage water tank needs to be installed at the suction port of the water pump to meet requirement.
3. **Piping size:** It is not allowed to determine the actual pipeline diameter according to the size of the water pipe joint of the unit ports. The water piping diameter must be designed to ensure the water flowrate of the unit.
4. **Terminal FCU water flowrate:** The water flowrate at the airside terminal FCUs must be designed by professionals, to guarantee the water flowrate through airside FCUs matches the cooling capacity of the airside terminals.
5. **Inlet and outlet pipes:** The pipeline must have independent supports and should not be supported by the unit. To avoid damage to the unit, make sure the inlet and outlet pipes are not installed reversely. The unit inlet pipe must be connected to the water inlet connector marked “entering water”; The outlet pipe must be connected to the outlet connector marked “leaving water”.
6. **Anti-vibration hose:** The connection of the inlet and outlet pipes of the unit must be connected by anti-vibration hoses to avoid long-distance transmission of noise. If there is an external water pump, the inlet and outlet pipes of the pump must also be installed with anti-vibration hoses, and make sure water flows into the unit.
7. **Water pressure gauge:** Pressure gauge and shut-off valve should be installed at the inlet of the entering water pipe and the outlet of the leaving water pipe. If external water pump is installed, the pressure gauge and shut-off valve are also needed to install at the inlet of the pump. In this way, it will help to understand the resistance of the water system and the pump head, monitor and adjust water flowrate, and also convenient to cut off the water flow during maintenance.
8. **Water filter:** A water filter must be installed within 50cm of the water entering pipe of the unit to prevent impurities in the pipeline from blocking water-side heat exchanger and causing unit failure. The water filter must also be installed at the inlet of the water pump, and the number of filter mesh holes is 20~40 mesh, to avoid damage to the pump. The water filter should be installed with the filter screen removal port facing down (the angle between it and the vertical direction shall not be greater than 30°), to prevent the debris in the filter screen from falling into the filter.
9. **Water flow switch:** If there is a built-in water flow switch, there is no need to install additional water flow switch. Otherwise, The water flow switch should be installed on site. The water flow switch must be installed at the water outlet of the unit with straight distance at least 5 times of the pipe diameter at both the front and rear ends of the water flow switch.
10. **Exhaust valve:** An automatic exhaust valve should be installed at the highest place of the main supply pipeline and the main return pipeline of the water system to discharge the air in the water system. The exhaust valve could help the water flowrate of the unit meet the product requirements and avoid noise and damage to the water pump caused by cavitation. The exhaust valve is generally installed at the top of the connection of between the vertical pipe of the water system and the horizontal pipeline, and at least 0.5 meters higher than FCU at the highest position. When the exhaust valve is installed in the horizontal main pipeline, it should be installed on a section of pipe section 2 to 3 times larger than the main pipe, and there should be at least 4 times the pipe diameter on both sides of the straight pipe, so that the water and air are easy to separate before discharged through the exhaust valve.
11. **Exhaust valve water anti-leakage:** Shut off measure for the exhaust device should be considered so that the exhaust valves are easy to be replaced when they are damaged, or function fails. All the exhaust pipes are recommended to be connected to the pool and floor drain to avoid leaking water damaging room appliances when function failure or water leakage of the exhaust device.
12. **Expansion water tank:** An expansion water tank needs to be installed in the water system to compensate the water pressure fluctuation caused by water temperature change in the water supply system. The gravity expansion tank needs to be installed at the top of the vertical main pipe of water pump. The water make-up pipe should be connected to the return pipe of the pump, and there should be an overflow device. Alternatively, a pressure-type expansion tank with an automatic make-up valve and an automatic pressure relief valve can be installed on the main return pipe. The capacity volume of the expansion tank can be 3% of the total water volume of the air conditioning water system.
13. **Operating water pressure:** The water pressure of the water-side heat exchanger shall not exceed the maximum working pressure 1MPa (except for specially designed products) to avoid damage to the water side parts.
14. **Two-way/three-way valve installation:** Two-way valve or three-way solenoid valve must be installed at the outlet of the FCU to avoid customer’s complaints of water vibration noise.
15. **Two-way valve installation:** The water system cannot use two-way solenoid valve only. If two-way valves need to be

used, they can be used with combination of three-way valves, and the quantity of two-way valve could be 1/3 of total valves and the quantity of three-way valves could be 2/3 of total valves. Two-way valves should be installed for the FCUs which are near to the unit, and three-way valves be installed for the FCUs which are far from the unit. If only 2-way valves used, a differential pressure bypass valve should be added between the main pipes of the supply line and return line.

16. **Differential pressure bypass valve:** When differential pressure bypass valve is used in the system, it must be ensured that an energy storge water tank should be included in the bypassed short circulation circuit, and the water flowrate in the short circulation circuit must also meet water requirements. When all the FCUs are shut off and the two-way valve is shut off, the opening degree and bypass flowrate of the differential pressure bypass valve can meet the water flow requirement.
17. **Connect of multiple units in parallel:** When two or more units are installed in parallel, it is recommended to install a water collector and distributor on the main return water pipeline to ensure the correct flow distribution of return and supply water. When units with different capacities are connected in parallel in a water system (not recommended), hydraulic balancing valves must be installed to ensure the different water flowrate for different units met requirement. The units in parallel should be installed with reversed return water system.
18. **Check valve:** If the unit locate in a lower position of the entire water system, a check valve should be installed on the outlet of the unit to prevent unit damage from water hammer.
19. **Bypass pipeline:** Bypass pipelines and bypass valve should be installed between the water inlet and outlet of the unit. All external water supply piping should be thoroughly flushed before the unit connected to the pipelines. It is strictly forbidden to mix impurities in the water system, otherwise it may cause serious consequences. When flushing, the bypass valve should be open to bypass the unit and the heat exchanger. After flushing, close the bypass valve and open the drain valves on the inlet and outlet pipes of the unit.
20. **Drainage:** The lowest point of the water system and other lower part of the equipment that needs to be drained should be installed with drainage pipes and drainage valves, and be connected to the drain or funnel to facilitate the cleaning and maintenance of the water system. The schematic diagram of the installation of the drain valve and filter (inlet) is as follows:
21. **Insulation:** The chilled water pipeline should be insulated to prevent the loss of cooling and heating capacity and dripping water due to condensation on the surface of the pipeline. The water side part of the water system that is in contact with air should be insulated to prevent condensation and dripping. All the water system components that may be damaged by freezing in winter should be insulated, and insulation thickness should prevent freezing even at the lowest local ambient temperature. The water make-up pipelines of the gravity expansion tank or the automatic water supplement valve pipelines of the pressure expansion tank should be sufficiently insulated or installed in a suitable place indoors to avoid freezing damage.



22. **Anti-freeze:** When the ambient temperature is low and the unit is not used for a long time, please drain the water inside the unit to avoid freezing water-side parts. If the water is not drained, DO NOT cut off the power supply, and ensure that the unit can operate normally, so that the unit can automatically operate with antifreeze function. If there is a fault alarm that cannot be repaired in a short time, then be sure to drain the water. The cooling-only chiller unit must drain the water in the system in winter to prevent water in the system from freezing components such as the water pipes, water pump and heat exchanger. Ethylene glycol must be added to cooling-only chiller at low ambient temperature (below 0 °C). Other antifreeze methods are not recommended, and any damage caused by non-recommended antifreeze methods is not covered by warranty. For schematic diagram of the installation of antifreeze drain valves, see No. 20 of the pipeline installation requirements.
23. **Supply water temperature control:** If the unit adopts supply temperature control, there must be a position for installing

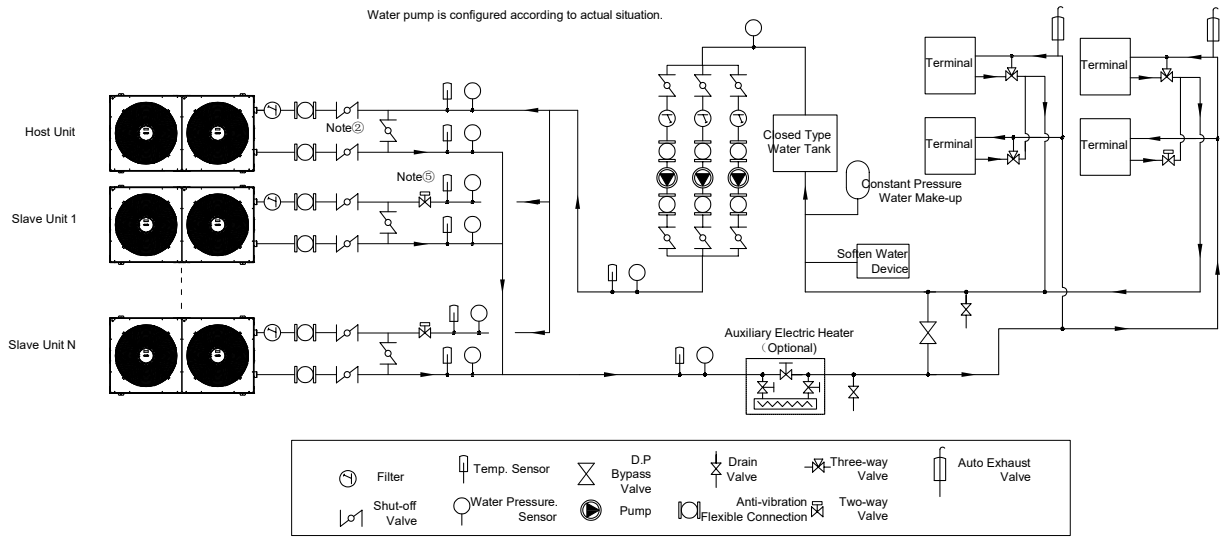
a temperature sensor on the main supply pipe of the water system so that the supply water temperature sensor of the system can be installed.

24. **Hydraulic Test:** After the installation and connection of the water system pipeline, hydraulic test should be carried out. The accuracy of the pressure gauge should be higher than 0.01MPa, and the test pressure is 1.5 times the highest working pressure. If the hydraulic test is done together with the heat exchanger of the unit, the maximum test pressure must not exceed 1.0MPa (except for specially designed products) to avoid damage to the components on the chilled-water side of the unit. The exhaust valve must be opened when filling water, and then closed after the air fully exhausted and water fully filled. If a leakage occurs in the hydraulic test, it must be repaired immediately, and then do the hydraulic test again until no leakage happens.

25. **Cleaning:** The water system must be cleaned before the unit is started or debugged. When cleaning, the water system must be separated from the unit, and the water system must be circulated and cleaned separately to ensure that the water system is free of impurities. Then the water system can be connected to the unit for start-up and debugging. The water filter needs to be cleaned regularly depending on the cleanliness of the water system during the operation of the unit to avoid the performance degrade of the unit caused by water flow being too small, or even the stop of the unit caused by water flow alarm or antifreeze protection alarm of the unit.

26. **Control wiring of external water pump:** The external water pump needs to be equipped with a starter, for which the control wiring must be connected to the output of the water pump of the host unit. The water pump control should be linked with host unit to ensure the automatic protection function of the unit.

27. **Installation schematic diagram of closed-type constant-flow water system (air conditioning application)**



Technical Notes:

When multiple units are connected, reversed return water system should be applied to ensure the uniformity of the water flow of the unit.

1). When multiple units are connected, reversed return water system should be applied to ensure the uniformity of the water flow of the unit

2). when cleaning the water system, it is necessary to shut off all the shut-off valves at entering and leaving the unit, and open the bypass valve to avoid impurities in the water system from entering the unit and affecting the life of the unit.

3). The default control of the unit is entering water temperature control, in-build flow switch exists in most models.

4). For those unit with a three-way valve or two-way valve installed on terminals, the water flow through the operating unit should meet the requirement of the unit at any running time.

5). For variable water flow system, two-way valve should be installed at entering port the unit and connected to the PCB board of the corresponding unit, refer to the electrical diagram interface of the unit. The two-way valve is not requested for constant water flow system.

6). The flow speed of the water of the unit should not be too large, otherwise the friction resistance is too large. The general friction resistance range is 100~300Pa/m, and the optimal range is 150~200Pa/m. Piping size is recommended according to the following speed.

Diameter	25	32	40	50	70	80	100	125	150	200	250	300	350	>400
Speed (m/s)	<0.5	0.5-0.6	0.5-0.7	0.5-0.9	0.6-1	0.7-1.2	0.8-1.4	0.9-1.6	1.0-1.8	1.2-2.1	1.4-2.3	1.6-2.4	1.8-2.6	1.9-2.8

7). The water capacity of the unit should meet the minimum water capacity, refer to the following table. Minimum capacity of the water storage tank = minimum water capacity of the unit - water pipeline capacity - water capacity of the airside terminals. When only single unit is running, the minimum effective water capacity should be multiplied by the coefficient: rated water flow / actual water flow.

Unit	Entering Temp. Setting (°C)	Minimum Water Volume (L)
CXAU130	15	480
	14	545
	13	630
	12	740
	11	740*
	10	740*

Unit	Entering Temp. Setting (°C)	Minimum Water Volume (L)
CXAU065	15	680
	14	820
	13	1020
	12	1360
	11	1360*
	10	1360*

* When the setting value of entering water temperature is lower than the default value, the antifreeze protection temperature needs to be decreased accordingly.

⚠ CAUTION

- **The automatic exhaust valve should be installed at the highest point of the pipeline, and the water pipe diameter at the installation point should be expanded.**
- **The drain valve should be installed at the lowest point of the pipeline to facilitate the drainage.**
- **The reversed return water system design facilitate uniform distribution of water flow.**
- **The FCU near the inlet and outlet of the unit should be equipped with a two-way valve to avoid short circuit.**
- **The appropriate working water capacity can ensure the normal defrosting in winter and the minimum operating time of the unit.**
- **The system must be equipped with an automatic water make-up valve. The system should be equipped with an automatic exhaust valve at the highest point of the pipeline.**
- **A three-way valve should be installed at every far end FCU (except the largest FCU) to avoid low water flow alarm.**

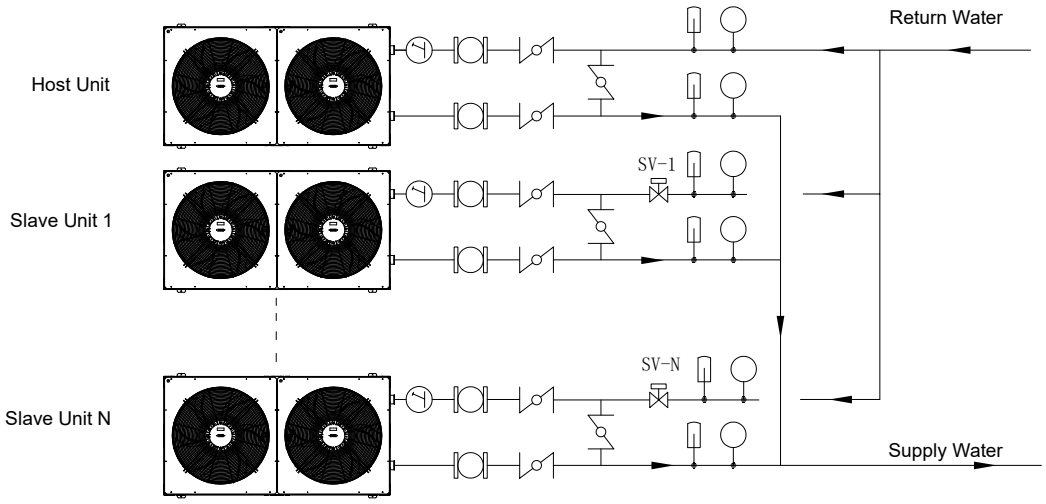
⚠ WARNING

All external water piping systems should be thoroughly flushed before the main unit is connected to the external water piping system. Any impurities are strictly forbidden in the water piping system. Otherwise, any failure or damage of the unit will cause the customer paid services in accordance with the company's relevant policies.

28. Variable Water Flow Control

If variable water pump is equipped, the water system needs to control the variable water flow rate. It is necessary to install the water solenoid valve only for the slave units and connect it to the SV2 point in OUT6 of the unit control board (active).No water 2-way valve is needed for the host unit. A differential pressure bypass valve should be installed in the main water pipeline to ensure that the water flow through the running unit meet requirements.

The frequency could be controlled according to the number of units, water pressure drop, etc. And the switch of the variable water pump needs to be connected to the MP point in OUT1 of the host unit control board (passive).



29. **Installation of total leaving water temperature sensor**

a). The total leaving water temperature sensor should be placed in the straight pipe section at a distance of more than 2m from the water outlet, not on the elbow, and more than 1m away from the elbow to ensure uniform temperature mix at the water outlet; For hot water application, the probe needs to be installed lower than the hot water tank.

b). When the total leaving water temperature probe sleeve is installed in the water pipeline, the depth of the inserted water pipe should be 2/3 of the diameter of the water pipe, and it should be installed in the horizontal of the water pipe; When the total leaving water temperature probe sleeve is installed in the hot water tank, the probe sleeve needs to be inserted in the lower position of the side of the tank.

c). After the total leaving water temperature probe is inserted, the sleeve should be filled with heat transfer silica gel and covered with waterproof material to prevent water from entering the sleeve.

30. **Waterway auxiliary electric heater (customer-installed)**

When unit is in heating mode, if the leaving water temperature is less than the setting by 8°C, turn on the electric heater. When the leaving water temperature increases higher than setting valve minus 2.5°C, turn off the electric heater.

Circulating water treatment requirements

Water quality requirement

	Items	Unit	Allowable Value	Trend	
				Corrosion	Fouling
Benchmark	PH Value (25°C)		7.5-9.0	○	
	Conductivity (25°C)	μS/cm	<800	○	
	Chloridion Cl-	mg/L	<200	○	
	Sulfate ion SO_4^{2-}	mg/L	<200	○	
	Acid Consumption (PH=4.8)	mg(CaCO3)/L	<100		○
	Full Hardness	mg(CaCO3)/L	<200		○
References	Ferrum Fe	mg/L	<1.0	○	○
	Ammonium Ion NH_4+	mg/L	<1.0	○	
	Silicon Oxide SiO_2	mg/L	<50		○
	Residual Chlorine Cl_2	mg/L	<1.0	○	

Dirt, Oil, grease and other impurities will affect the heat transfer and unit performance. Foreign substances in the chilled water will increase the water pressure drop, reduce the water flow, and cause blockage or mechanical damage of the heat exchanger. Please test water quality strictly according to the water quality requirements to ensure that the water quality entering the water system meets the requirements in the above table.

⚠ CAUTION

- **The user needs to regularly test the water quality before the installation and during the operation to ensure that the water quality meets the requirements of the above table. Once the water quality exceeds the allowable range for a long time, there's possibility corrosion leakage and serious scaling for the heat exchanger.**
- **Any item with corrosion tendency show that long-term water quality exceeding the allowable range can lead to corrosion leakage of the heat exchanger, even lower the performance or affect normal operation.**
- **Any item with a tendency to scale down indicates that the water quality exceeds the allowable range for a long time, which will lead to serious scaling of the heat exchanger, affect the heat exchange performance, and directly lead to the decrease of the cooling (heating) capability of the unit.**
- **The loss caused by the user's water quality problem shall be borne by the user.**

Ethylene glycol antifreeze to the circulating water

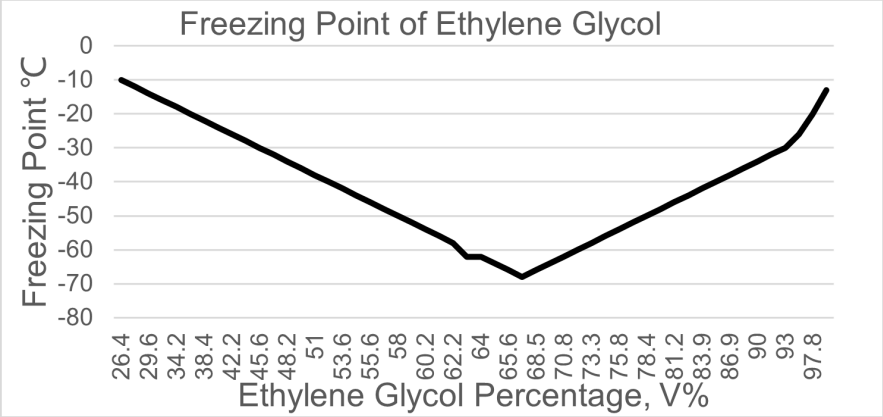
For chiller units, when the local minimum environment temperature is lower than 0°C, ethylene glycol antifreeze must be added to the circulating water for the low ambient temperature unit, and the freezing point of the antifreeze must be 2-5 °C lower than the local minimum environment temperature. The concentration of the antifreeze ethylene glycol must be checked regularly to prevent the unit from being damaged.

The concentration of ethylene glycol should be higher than 20% to prevents hydrolytic corrosion at low concentrations.

When replenishing circulating water, the make-up water should be containing the same concentration of ethylene glycol. And it is required to weekly test the concentration.

The relation between the concentration of ethylene glycol and the freezing point shows in the following table & chart.

Properties of ethylene glycol liquid					
Density (20°C)	Ethylene glycol precentage (V%)	Freezing Point (°C)	Density (20°C)	Ethylene glycol precentage(V%)	Freezing Point (°C)
1.034	26.4	-10	1.084	64	-62
1.038	27.2	-12	1.085	64.8	-64
1.041	29.6	-14	1.086	65.6	-66
1.044	32	-16	1.087	66.3	-68
1.048	34.2	-18	1.039	68.5	-66
1.051	36.4	-20	1.09	69.6	-64
1.053	38.4	-22	1.091	70.8	-62
1.056	40.4	-24	1.092	72.1	-60
1.059	42.2	-26	1.094	73.3	-58
1.061	44	-28	1.095	74.5	-56
1.063	45.6	-30	1.096	75.8	-54
1.064	47	-32	1.097	77	-52
1.066	48.2	-34	1.098	78.4	-50
1.068	49.6	-36	1.1	79.6	-48
1.07	51	-38	1.101	81.2	-46
1.071	52.1	-40	1.102	82.5	-44
1.073	53.6	-42	1.103	83.9	-42
1.074	54.6	-44	1.104	85.4	-40
1.075	55.6	-46	1.105	86.9	-38
1.077	56.8	-48	1.107	88.4	-36
1.078	58	-50	1.108	90	-34
1.079	59.1	-52	1.109	91.5	-32
1.08	60.2	-54	1.11	93	-30
1.081	61.2	-56	1.111	95.5	-26
1.082	62.2	-58	1.112	97.8	-20
1.084	64	-62	1.113	100	-13.1



⚠ CAUTION

- **The user needs to regularly test the water quality before the installation and during the operation to ensure that the water quality meets the requirements of the above table. Once the water quality exceeds the allowable range for a long time, it's possibility of corrosion leakage and serious scaling for the heat exchanger.**
- **Any item with corrosion tendency show that long-term water quality exceeding the allowable range can lead to corrosion leakage of the heat exchanger, even lower the performance or affect normal operation.**
- **Any item with a tendency to scale down indicates that the water quality exceeds the allowable range for a long time, which will lead to serious scaling of the heat exchanger, affect the heat exchange performance, and directly lead to the decrease of the cooling (heating) capability of the unit.**
- **The loss caused by the user's water quality problem shall be borne by the user.**

Water flow and pressure drop

The water flow through the unit must meet the requirements of the unit. If the water flow rate entering the heat exchanger is lower than rated water flow, the heat transfer effect will be reduced, resulting in the loss of control of the expansion valve or unit shutoff by low-pressure limit. Conversely, if the water flow rate is higher than rated water flow, it will erode the evaporator.

Model	Rated Water Flow(m3/h)	Water Pressure Drop (with filter)/kPa	Connection
CXAU065	9.7	55	Rc 2
CXAU130	19.4	39	Rc 2-1/2

Notes:

1. Rated water flow rate of the unit in chiller application
2. Without built-in flow switch. If the temperature difference of the inlet and outlet water reaches 5 °C when running at full frequency, the rated water flow meets requirements.
3. The water flow can be checked according to whether the built-in flow switch of the unit is on or off.

⚠ CAUTION

The water flow rate of the unit should not be lower than the rated water flow, and the water flow rate should be checked to reach the rated water flow during commissioning. Low water flow rate than request will affect the performance of the unit and reduce the reliability of the unit. During operation, water filter needs to be cleaned regularly to avoid lower water flow rate, which could result in lower unit performance, low water rate warning, leaving water temperature exceeds the allowable range, freezing of the heat exchanger and even the unit damage.

Installation - Electrical

General Recommendations

The following is about safety, please follow it strictly!

⚠ WARNING

- **All field-installation wiring and grounding must conform to local electrical codes.**
- **Wiring preparation and wiring connection should be done with reference to electrical parameters and wiring diagram. Make sure the wirings firmly connected.**
- **Independent power supply should be equipped with a circuit breaker that matches the voltage of the unit, do not share power supply with other electrical products to avoid the danger of overload.**
- **The wire should not contact with the sharp edge of sheet metal, screw tip, copper tube, compressor, motor or other moving parts to avoid damage to the wire or other danger.**
- **The manufacturer will be free of responsibility for any problems caused by unauthorized changes to the internal wiring of the unit.**
- **After the wiring is completed, it must be fixed with a wire clamp to prevent the wire damage or danger caused by falling and colliding with other components.**
- **When wiring the unit, be sure to separate the high voltage and low voltage wirings to avoid communication and operation issues.**
- **All units should be safely grounded. Please ensure that the grounding wire is firmly connected with the grounding terminal and grounding electrode of the unit. Improper grounding may cause electric shock.**
- **The unit electric control box is connected with high voltage electricity. Please disconnect power before the installation of the electrical wiring of the unit is completed, to avoid casualties.**
- **Please do not touch any control components and terminal parts before cutting off the power supply of the unit at any time, to avoid electric damage.**
- **Only copper wires can be used for the connection of the terminals to avoid corrosion or overheating.**
- **The water flow switch and the water pump should be connected by referring to the circuit diagram of the unit.**

Power Supply Wiring

1. Connect the power wiring to the main terminal block (TB) of the unit's control box.
2. CN2 is the slave connection port, which is connected hand in hand.
3. Termination resistor is not needed for the host unit. It could be installed for slave units as needed.
4. CN3 is the connection port of the centralized controller which is only connected to the host unit.
5. CN24 is the connection port for DTU (not applicable for exported CXAU).
6. The control signal for the external water pump should be connected between the active terminals 50 and 51.
7. The reserved floor heating three-way valve control signal should be connected between terminals 52 and 53.
8. The control signal of the reserved water circuit auxiliary electric heating should be connected between terminals 58 and 59.
9. The reserved waterway solenoid valve control signal should be connected between terminals 60 and 61.
10. The operating signal should be connected between passive terminals 40 and 41.
11. The fault signal should be connected between passive terminals 42 and 43.
12. Remote switch/end interlocking signal is short connected by factory default.

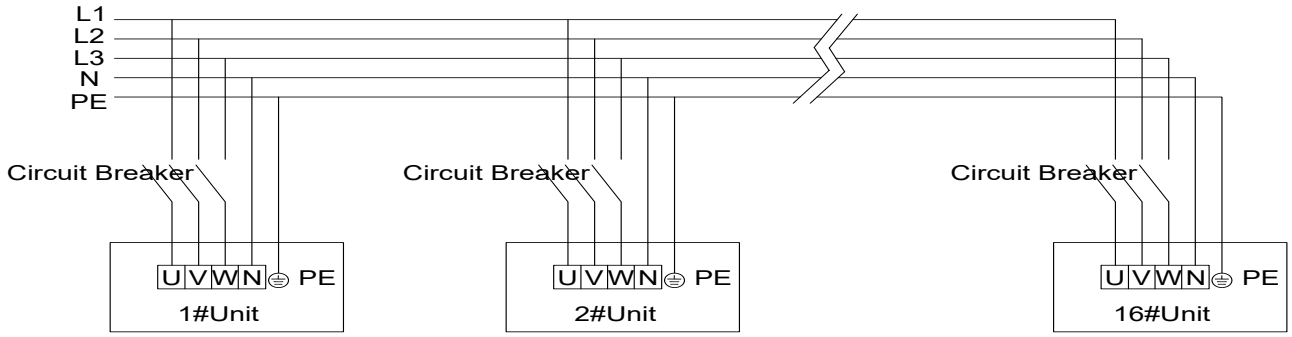
13. When using the remote switch, connect the remote switch between terminals 10 and 11, press the power on button of the centralized control screen, and set the power-off memory function to be effective, and then control the unit by on/off signal.
14. When not using the remote switch, please short-circuit and turn on/off the unit by the centralized control screen.
15. The reserved remote mode switching signal should be connected between terminals 12 and 13.
16. The reserved pump overload signal should be connected between terminals 16 and 17.
17. The reserved water circuit electric heating overload signal should be connected between terminals 18 and 19.
18. External water flow switch for units not equipped with water flow switch could be connected between terminals 14 and 15.
19. For specific wiring, refer to the unit circuit diagram.

Wiring Sizing

The minimum current, fuse specifications, and motor electrical specifications are shown in the following table:

Model	Power Supply	Maximum Operation Current MOC(A)	Recommended minimum fuse size REC(A)	Recommended minimum breaker In(A)	Minimum size of copper core power wiring(AWG)
CXAU0655BVS	380/50/3	65	91	82	4 AWG
CXAU1305BVS	380/50/3	115	161	144	1 AWG
CXAU0656BVS	380/60/3	65	91	82	4 AWG
CXAU1306BVS	380/60/3	15	161	144	1 AWG
CXAU0657BVS	460/60/3	55	77	69	6 AWG
CXAU1307BVS	460/60/3	96	135	120	2 AWG

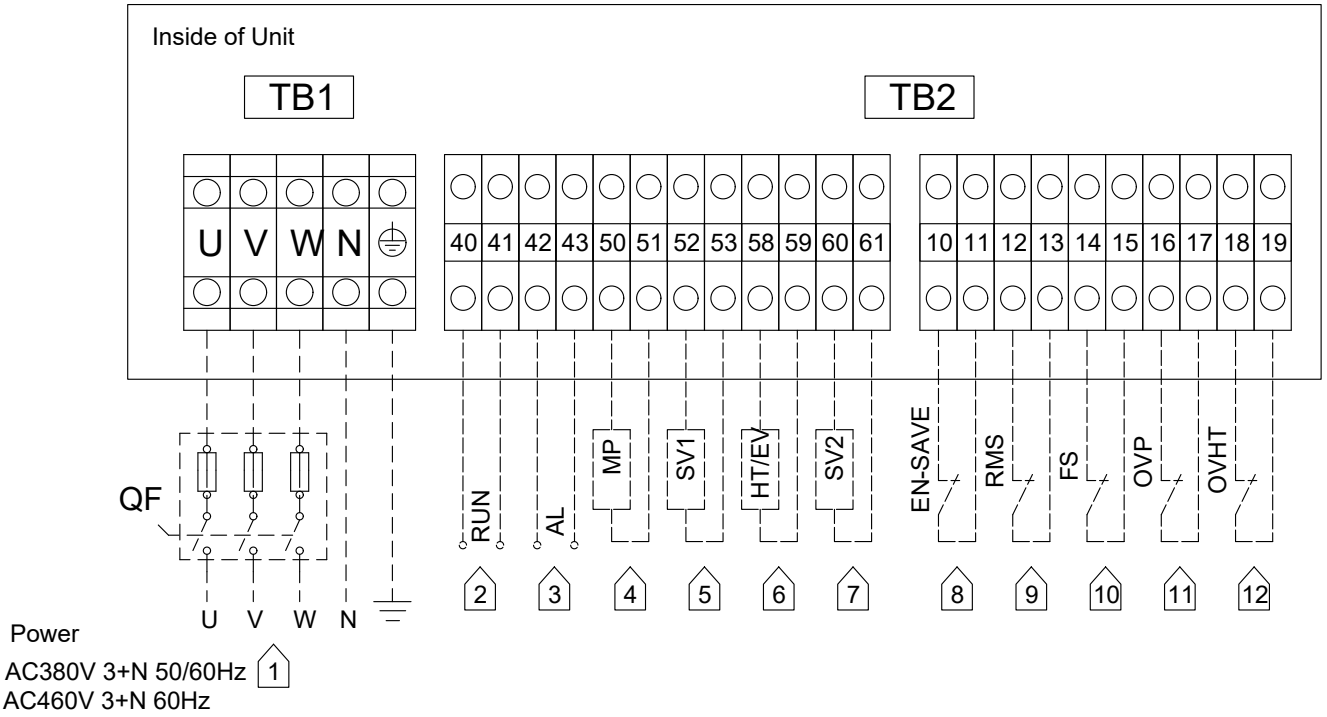
Unit Power Connection Diagram



⚠ WARNING

- **The installation site should provide power supply that meets the requirements of the unit and a suitable circuit breaker, and the power supply voltage fluctuates within ±10% of the rated voltage.**
- **Before the completion of electrical wiring, please do not energize to avoid casualties.**
- **The unit with 380V/460V scroll compressor is equipped with controller protection of power inverter and phase loss. The protection function should be checked before starting the unit. Green light indicates normal; red light indicates inversion; yellow light indicates phase loss. In the case of phase inverting or phase loss, the unit will be automatically prohibited to start-up. The phase inverting or phase loss protection is only for the power supply of the unit.**

Field Wiring Instructions



1 Customer's power line, recommended that each unit equipped with speatate circuit breaker;

2 Passive dry contact output for signal RUN, specification 220/230VAC/2A, terminals 40 and 41. Connected when running and disconnected when shutdown;

3 Passive dry contact output for single AL fault, specification 220/230VAC/2A, terminals 42 and 43 connected when unit fails and disconnected when no fault;

4 Active output, specification 220/230VAC/2A, MP start and stop control signal of external water pump. AC220V voltage between terminals 50 and 51 when output, connected to the external pump contactor coil when used, and cannot be connected to the power supply;

5 Active output, specification 220/230VAC/2A, SV1 is for external floor heating three-way valve control signal. When output there's AC220V voltage between terminals 52 and 53. External connected with intermediate relay coil when used, control output through intermediate relay contacts;

6 Active output, specification 220/230VAC/2A, HT/EV is for control single of external water circuit electric heating. There is AC220V voltage between terminals 58 and 59 when output. Terminals 58 and 59 are connected to external electric heating circuit contactor coils when used;

7 Active output, specification 220/230VAC/2A, SV2 is control signal for external waterway solenoid valve / electric valve. There is AC220V voltage between terminals 60 and 61 when output. Connected with external intermediate relay coil when used, and control through intermediate relay contacts;

8 External passive switch input, EN-SAVE is for remote switch/terminal interlock, closed when start-up, and open when stop. In series used with centralized controller. Factory short connection;

9 External passive switch input, RMS remote mode switch, cooling mode when disconnected and heating mode when connected. Need to set remote mode enabled on the centralized controller before control activated;

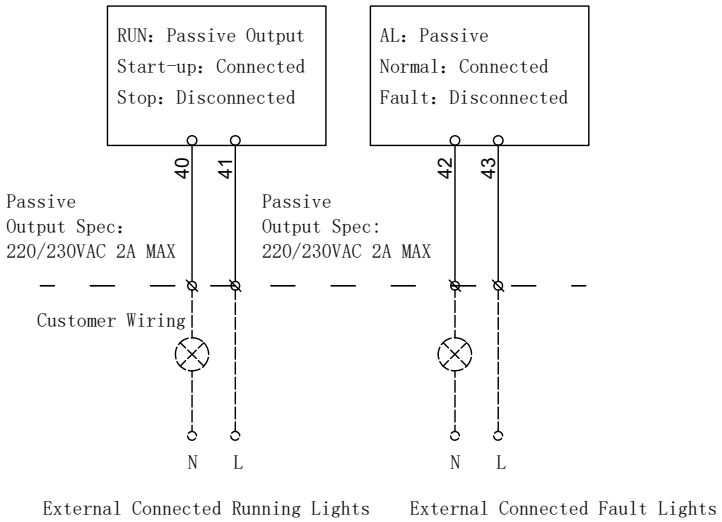
10 External passive switch input, FS is signal for water differential switch or water flow switch. Access between terminals 14 and 15, normally when connected and fault when disconnected. External water differential pressure switch should be connected here;

11 External passive switch input, OVP is signal for water pump overload access between terminals 16 and 17. Normally when connected and fault when disconnected. Factory short circuit;

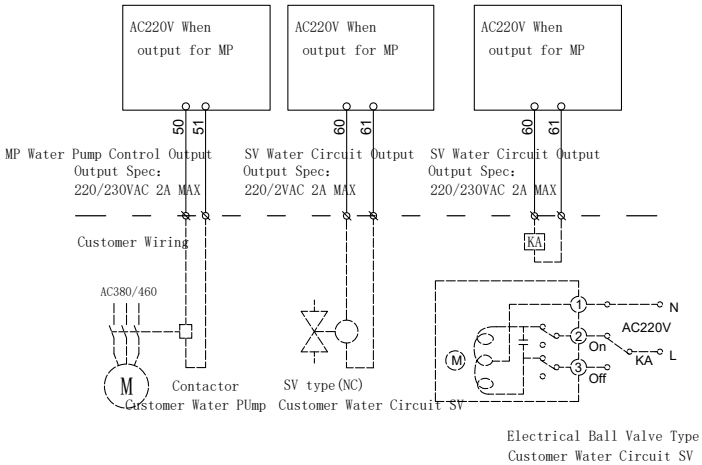
12 External passive switch input, OVHT is single for water circuit electrical heater overload access between terminals 18 and 19. Normally when connected and fault when disconnected. Factory short circuit.

Field Wiring Example

CXAU Passive Control Field Wiring Example



CXAU Active Contact Field Wiring Example



Pre-Start

Check List Before Start

1. Check the connection of all wiring, all electrical contacts should be clean and firmly locked.
2. Check whether power supply voltage is normal.
3. Fill the chilled water system, keep the exhaust valve of the system open when filling, and close it when water filling completed.
4. Ensure that the water flowrate meets the water flowrate requirements of the unit, and there is no water flow switch alarm.
5. Turn on the main power supply, start the unit by pressing the switch button on the control panel. The water pump should start, the water circulates in the chilled water system, and check whether there is leakage at any piping connections.
6. Adjust the water flow in the chilled water circuit and check the external water pressure of the unit (standard model) or evaporator pressure drop (model without built-in pump) meet requirement.
7. Stop the pump and turn off all the power.

Voltage Range

The power supply of the unit must comply with the operating power supply indicated on the nameplate of the unit, and the imbalance between the power supply voltage and the nameplate voltage and the imbalance between each phase must be within the following range. The voltage between the phases should be measured, and the reading must be within the allowable tolerance (±10%). If the voltage imbalance between any two phases is not within this tolerance, please contact power company to improve before starting the unit. Improper voltage can cause abnormal control functions and shorten the life of various electrical components and compressor motors.

Voltage Imbalance

Too large voltage imbalance between the phases in the three-phase power system will cause motor to overheat or failure. The maximum allowable unbalanced voltage is 2%, and voltage imbalance is defined as follows:

$$\%\ \text{Imbalance} = \frac{(V_x - V_{ave}) \times 100}{V_{ave}}$$

$$V_{ave} = \frac{(V_1 + V_2 + V_3)}{3}$$

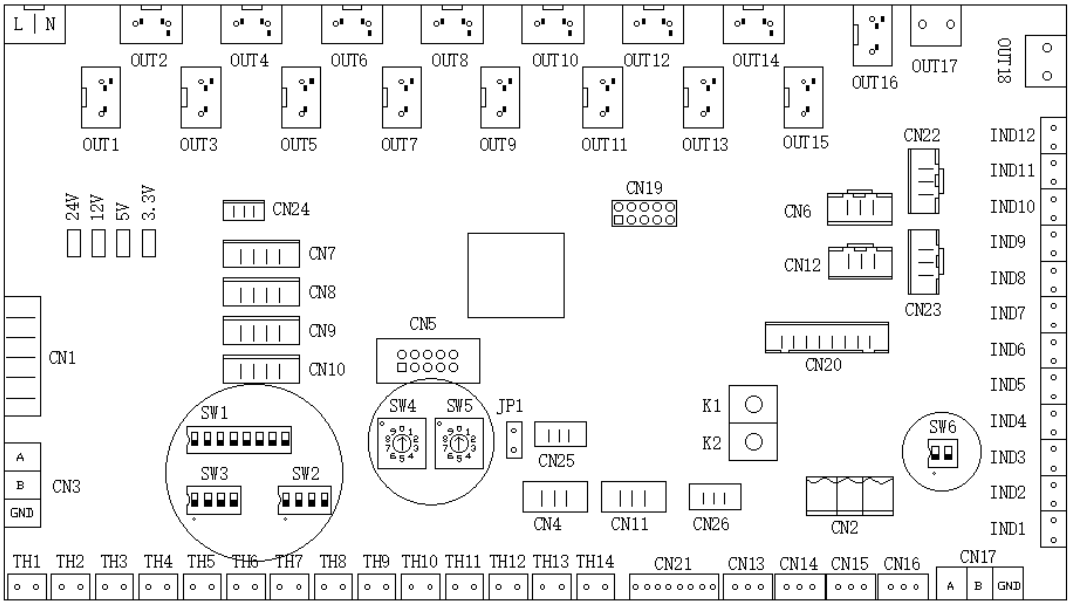
V_x = phase with greatest difference from V_{ave} (without regard to the sign)

Unit Settings

Please set the function and operating parameters of the unit according to the installation operation manual before starting or commissioning the unit. The settings include connection jumpers, define of DIP switches and system bits. Incorrect settings can lead to undesired function or even non-operation of the unit.

Unit Dial Switch Setting/Host and Slave Unit Dial Switch Setting

Unit PCB arrangement is as follows:



SW1 is reserved

SW2 is number of slave units :0000~1111, binary, corresponding to 0~15;

SW3 is external address :0000~1111, binary, corresponding to 0~15;

SW2 and SW3 are both binary. Weight calculation rules: counting from right to left based on 0, and the weight of the nth bit is 2n;

The correspondence of the 16 numbers is:

0000	- 0	1000	- 8
0001	- 1	1001	- 9
0010	- 2	1010	- 10
0011	- 3	1011	- 11
0100	- 4	1100	- 12
0101	- 5	1101	- 13
0110	- 6	1110	- 14
0111	- 7	1111	- 15

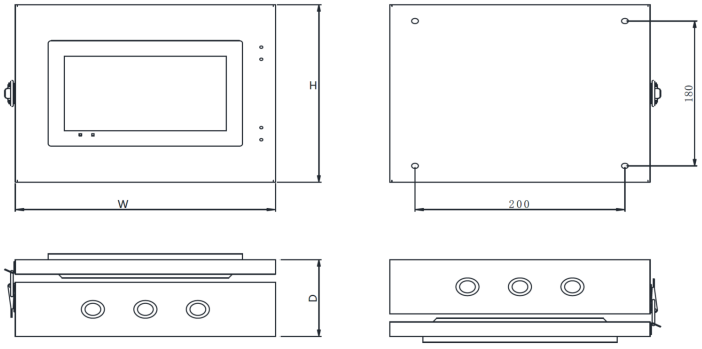
SW4 and SW5 are used in combination for 2 bits, which is the address of the unit in the combination model: 01~16, where the unit with address 01 is the host, that is, SW4 is 0 and SW5 is 1. 02-16 is used for slave units.

SW6: ON for host unit and OFF for slave units, factory default.

Controller

Application and Dimension

- The device is used for centralized control of Trane air conditioning modular CXAU products, and up to 16 CXAU units can be connected to one device;
- Working power supply: 220/230VAC;
- Working environment: temperature -10~60°C, humidity < 90% RH;
- Storage environment: temperature -20~70°C, humidity < 90% RH;
- Mounting: 4 x 7mm mounting holes;
- Overall dimensions (W x H x D): 250 x 220 x 90 (mm);



Installation Guide

Dos and Don’ts

- The equipment should be installed indoors, far away from heat sources, such as vapors or flammable gases, and far away from converter substations.
- Do not install the device in a location exposed to direct sunlight.
- Do not install the device in a location with strong wind or heavy dust.
- Do not install the device in a location prone to rain or high moisture.
- Do not install the device in a location where acids, alkaline substances, or corrosive gases (such as sulfur dioxide, hydrogen sulfide, etc.) are present.
- Do not install the device in a location where combustible gases or volatile combustibles may leak into.
- Do not install the device in a location where small animal nests are likely to occur.
- Do not install the device in a location easily accessible to movable people.

Wiring Instructions

485 Ground:

- DO NOT ground 485 to the 220/230V ground end of the iron sheet metal of the electric control box.
- 485 Ground Port G is the ground terminal of the DC power supply of the electronic control board.

485 communication cable installation requirements:

- Communication line requirements: RS485 wiring must use AWG # 18 ~ 22, the wire diameter must be greater than 0.75mm2,

twisted pair with shielding, and the twisting distance should not be more than 5cm.

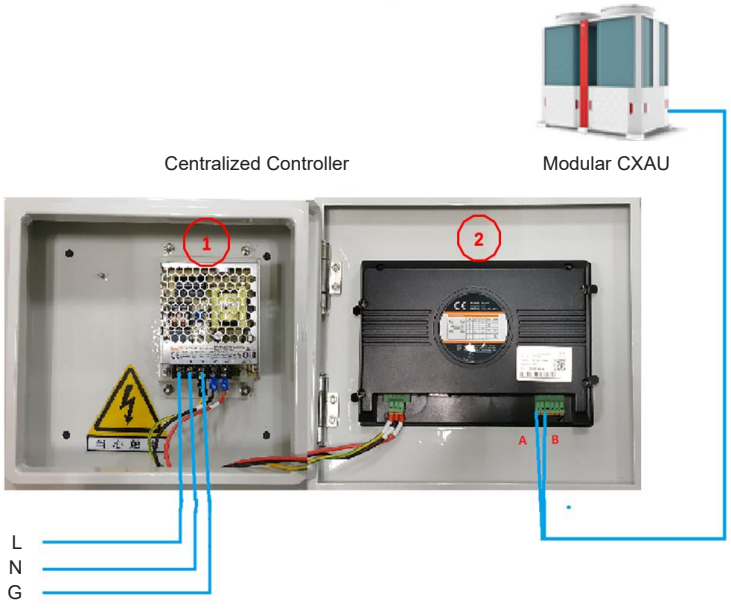
- Hand-in-hand wiring requirements: each system module has two terminals A and B for RS485 connection, and the external module has additional terminal G used to connect the shielding layer for the communication line except for terminals A and B. The shielded twisted pair must be wired hand-in-hand, and star-shaped wiring is not allowed. That is, 1 connected to 2, 2 connected to 3, 3 connected to 4. Other connection is not correct, for example, 1 is connected to 2, 2 is connected to 3, and 2 is connected back to 4, it is not correct.
- Shielding wiring requirements: the shielding layer is wrapped with adhesive tape after twisting to prevent it from being connected to the ground of 220V, and one end of the shielding layer is connected to the grounding point G of the external control cabinet. When connecting an external module, the shield is connected to terminal G. It is forbidden to connect to the 220/230V ground end of the iron sheet metal of the electric control box.
- When the network is unstable, add the network termination resistance of 120 ohms and 1uF in series, and install the resistors between communication port A and port B of the last unit.
- When the power cable is wired parallel to the communication cable, certain distance must be maintained.

Installation Procedures

Power cable connection and communication cable connection, as follows:

1. Power cable connection: open the cover of the electric control box, make the power cable through the left wire entry hole under the electric control box, connect the power cable live wire L and the switching power terminal L, the power supply neutral line N and the switching power supply terminal N, and the grounding wire is connected to the grounding terminal. Be sure to connect correctly according to the unit wiring diagram and make sure all connections are firm.
2. Communication cable connection: make the communication cable from the external unit through the right side of the wire entry hole below, and connect it to the COM2 terminal block on the touch screen according to the following correspondence:

RS485 Line	COM2 Terminal
A	A
B	B
Shielding layer	No shielding layer

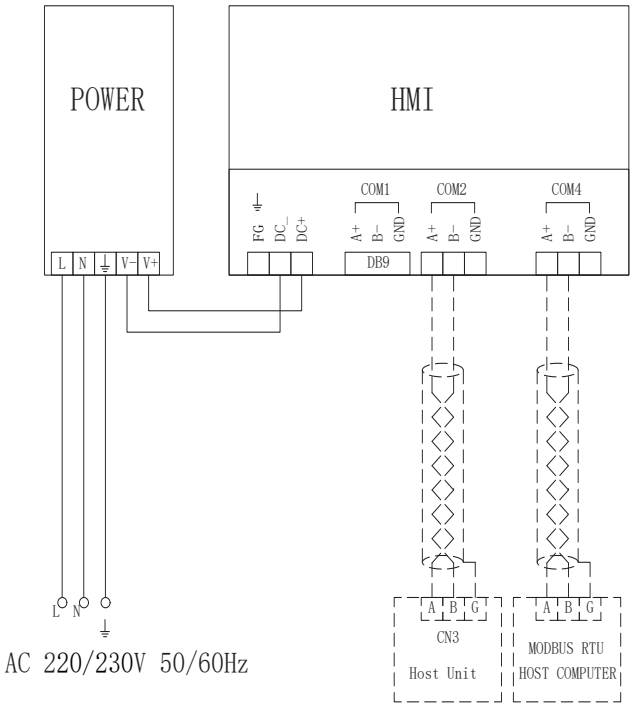


Components Description:

1). The left side is the switching power supply

2). The right side is the touch screen

Centralized Controller Diagram

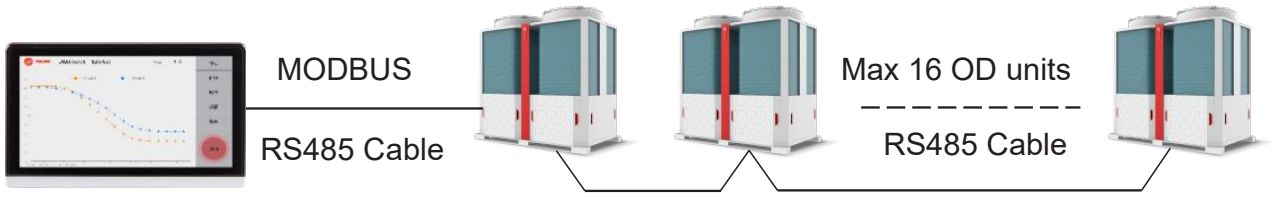


Centralized Controller with Touch Screen

The centralized controllers can control up to 16 units.

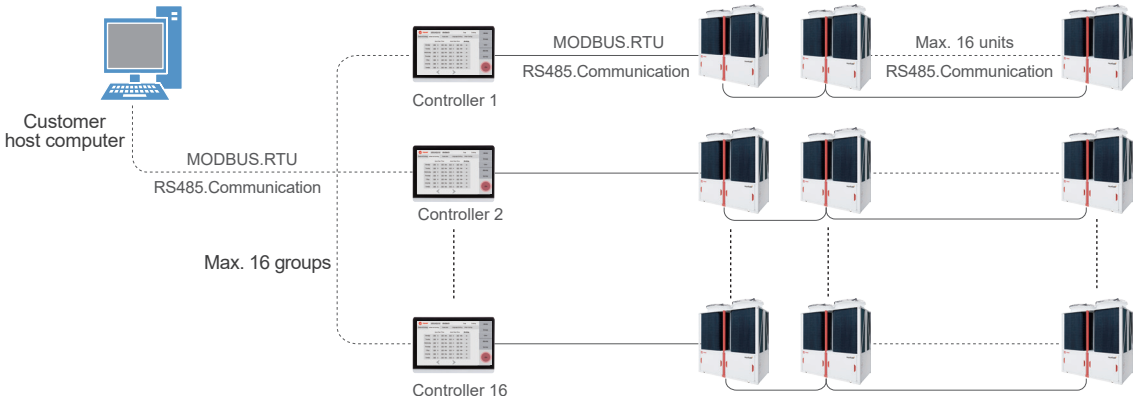
Wiring Diagram of single-group centralized control systems

A bus can connect up to 16 modules (including host unit).



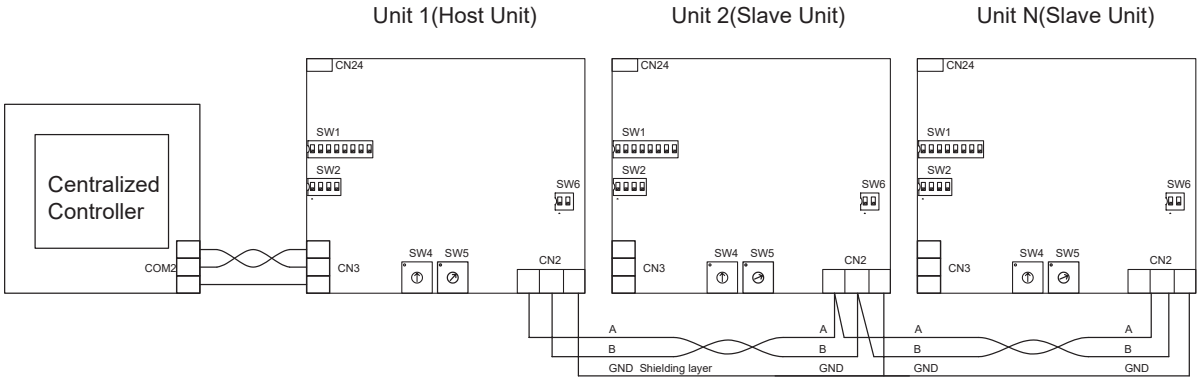
Controller

Customers can connect up to 16 centralized controllers by the host computer (the host computer needs to be controlled by customers).



- RS485 communication cables must use twisted pair shielded wire RVSP, and must not use other cables instead.
- The RS485 bus must be connected by hand-in-hand and must not use a star connection.
- RS485 communication cables should be as far away as possible from high-voltage wires, not parallel to power lines, and cannot be tied together.

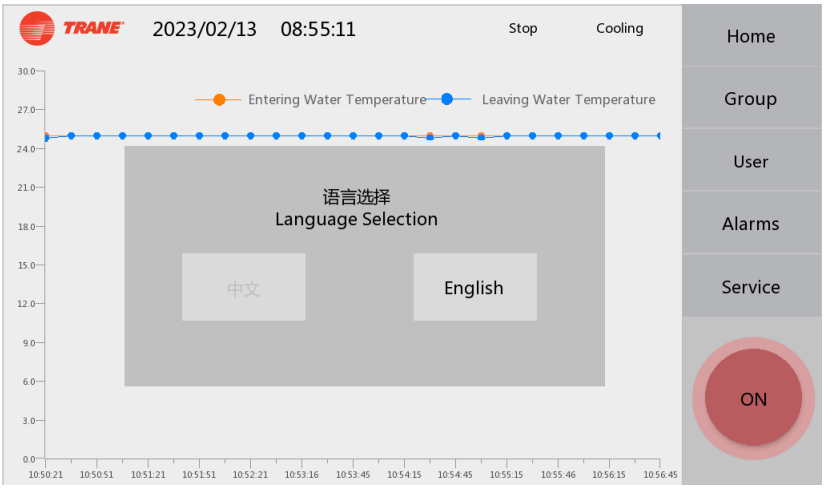
Wiring Diagram of host, slave, centralized controller



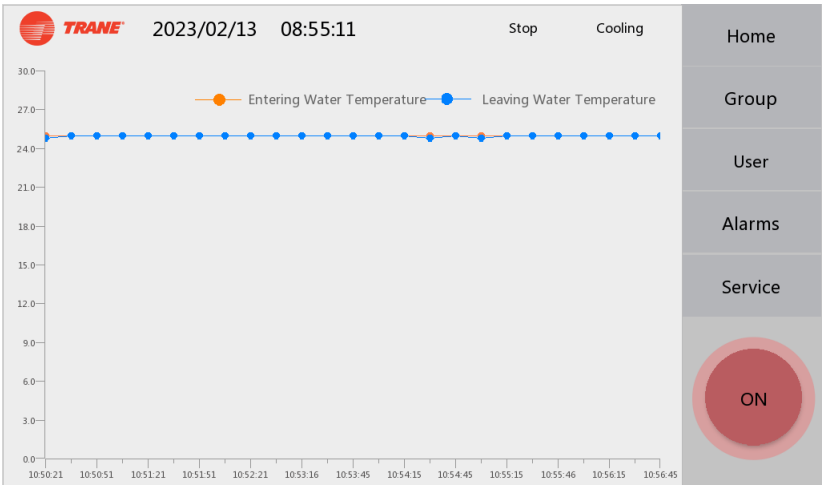
User Operation Guide

Home Page

- After the controller is powered on, the language selection page is displayed, and then Home page shows after language selected.



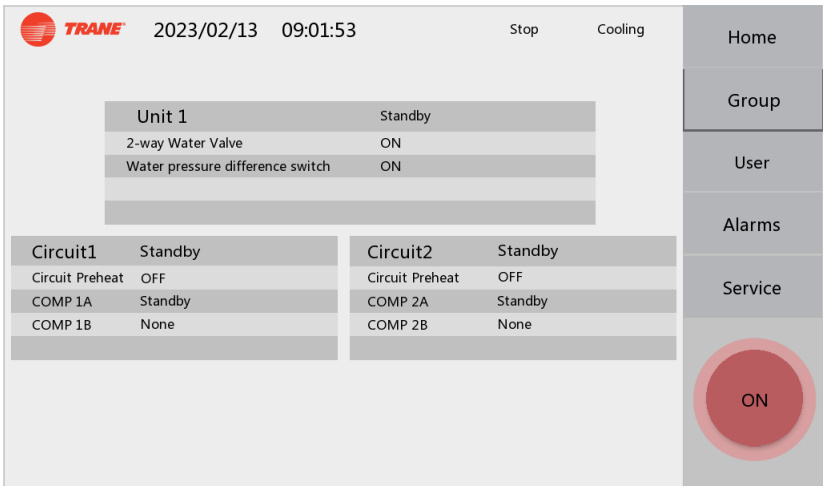
- The Home page is as follows, showing the general operating status. Press the button on the right menu to enter the Group page.



- The Group page is shown as below, displaying the status of each connected unit.

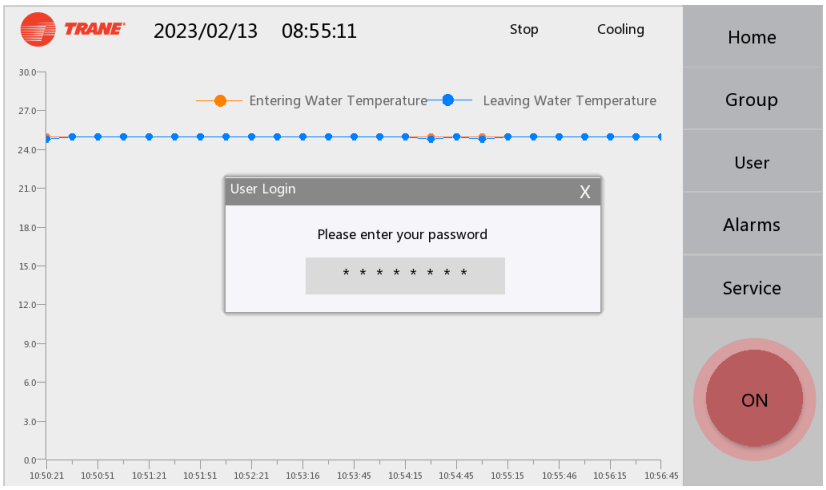


- In the Group page, press a unit area to display the operating status of the main components of the selected unit.



User Page

- Press the User button on the right of any pages, enter the password “11111111”, and then enter the User page.



- In User page, there are options for General Setting, Advanced Setting, Parameter, Language Setting, Other Settings.



Change Operation Modes and Temperature Settings

- On the User >> General Setting page, press the Running Mode, and the operating mode will be switched cyclically.



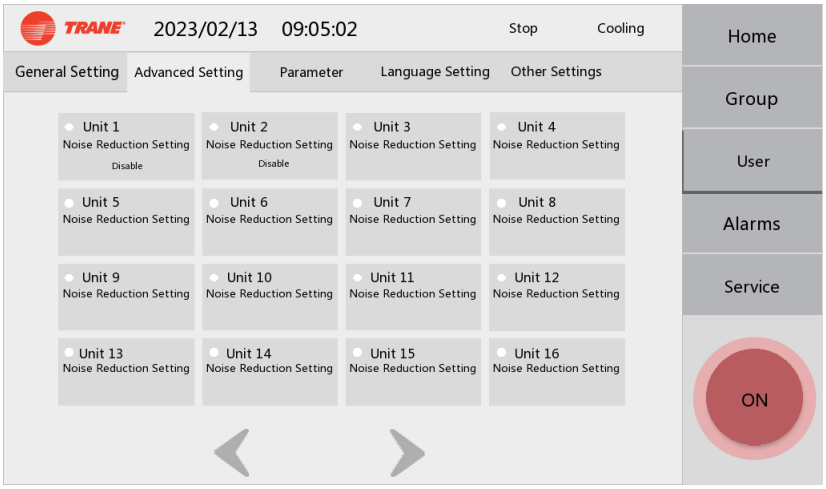
- On the User >> General Setting page, press the Entering Water Temperature Setpoint(cooling) or Entering Water Temperature Setpoint(heating) to set the temperature. Generally, run with default parameters (Entering Water Temperature Setpoint(cooling) 12°C, Entering Water Temperature Setpoint(heating) 40°C).



Note: *The temperature setting must be supported by the current unit, otherwise it is an invalid setting.*

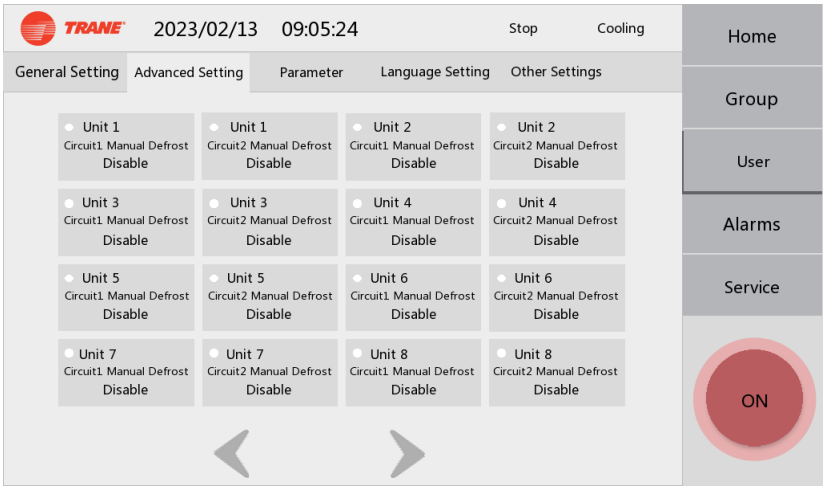
User >> Advanced Setting

- On the User >> Advanced Setting page, you can modify the Noise Reduction Setting of each unit and press the Noise Reduction Setting to switch the noise reduction mode cyclically.
- Pressing the right arrow below will take you to the manual defrosting page.



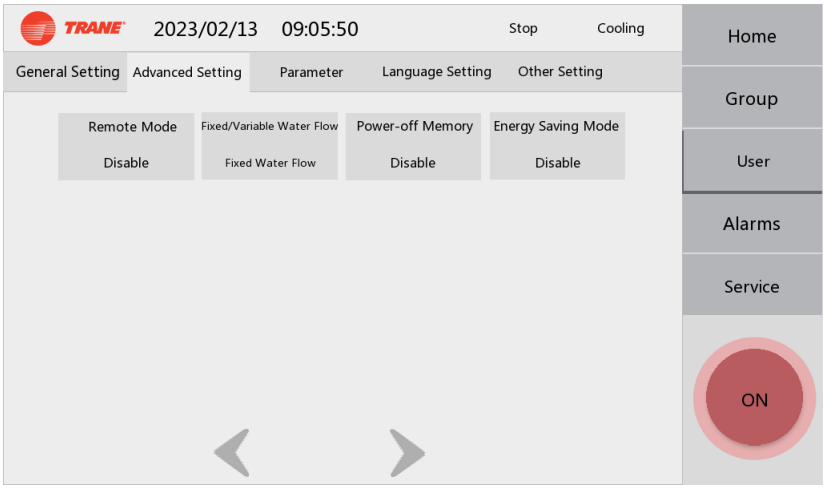
Note: *The selected mode must be supported by the current unit, otherwise it is an invalid mode.*

- On the Manual Defrost page, pressing the text below Manual Defrost will trigger manual defrost. Pressing the right arrow below will take you to the next page.



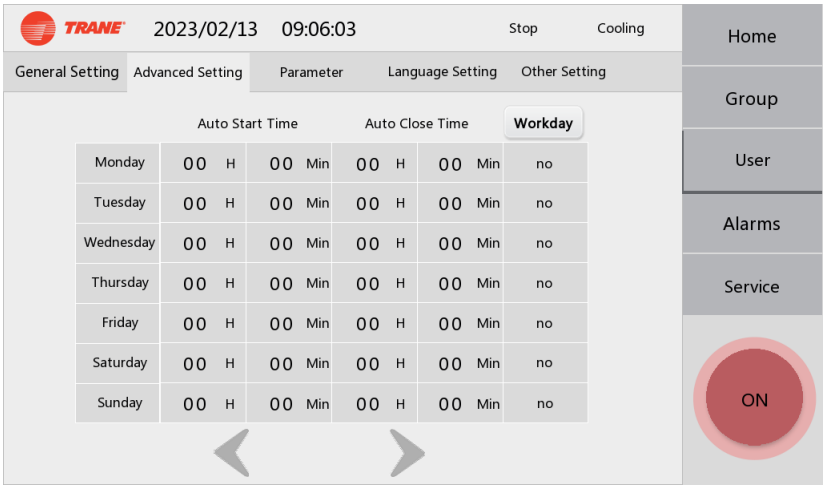
Note: *Please change these settings under guidance of maintenance personnel.*

- Press the right arrow to enter the Power-off Memory settings.



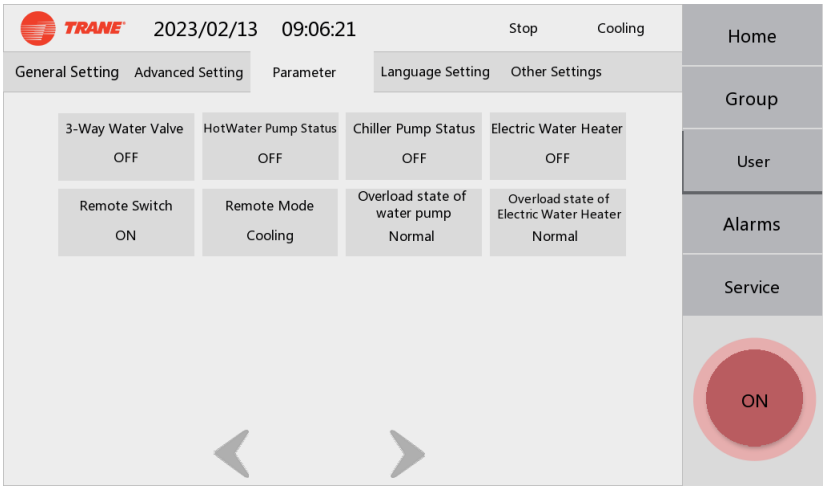
Note: *Please perform these settings under guidance of maintenance personnel.*

- On the Power-off Memory page, set the fixed time for ON and OFF every day of the week, and select whether to enable it in the Working Day column. Pressing on the Workday text will quickly set whether the Monday to Friday schedule is enabled. After setting, a timer icon will appear on the page header.

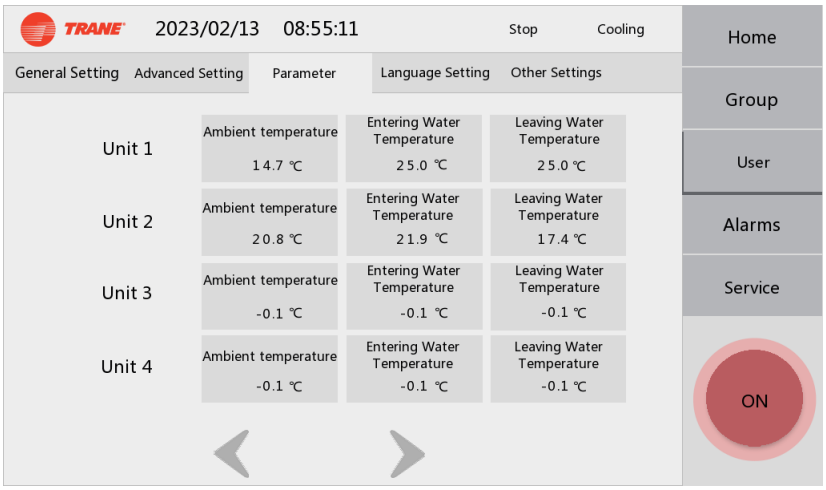


User >> Parameter

- Status of the components of the air conditioning system are shown in the Parameter page.
- Press the right arrow to enter the single unit parameter browsing.



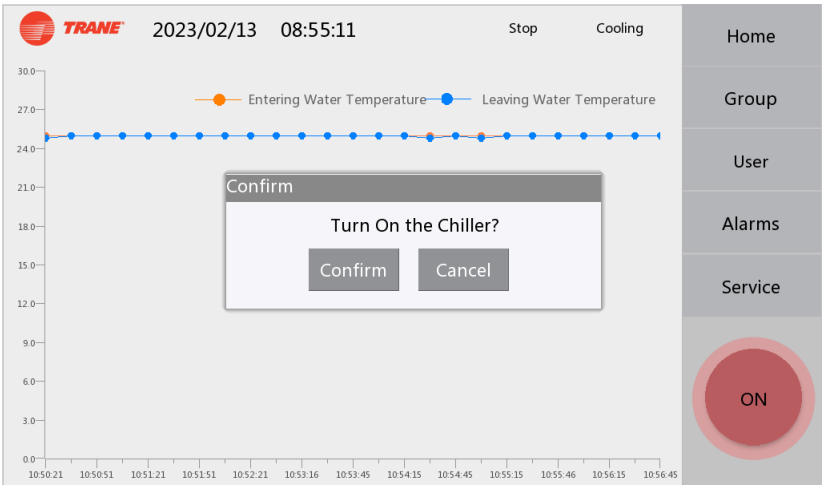
- Entering Water Temperature, Leaving Water Temperature and Ambient Temperature of a single unit are shown in this page.



Start and Stop the Unit

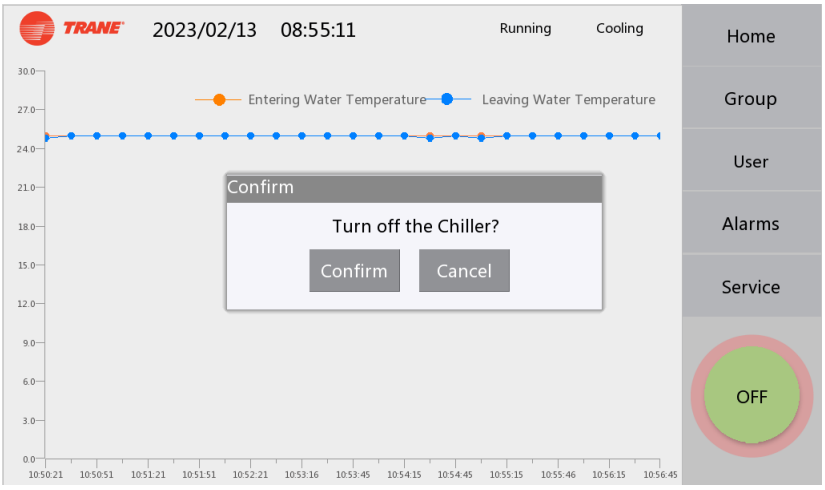
- Start

  Press the ON button at the bottom right of any page during the shutdown state, and the Confirm message box will pop up, and the module group will enter the start process. The ON button will turn to OFF in green after start.



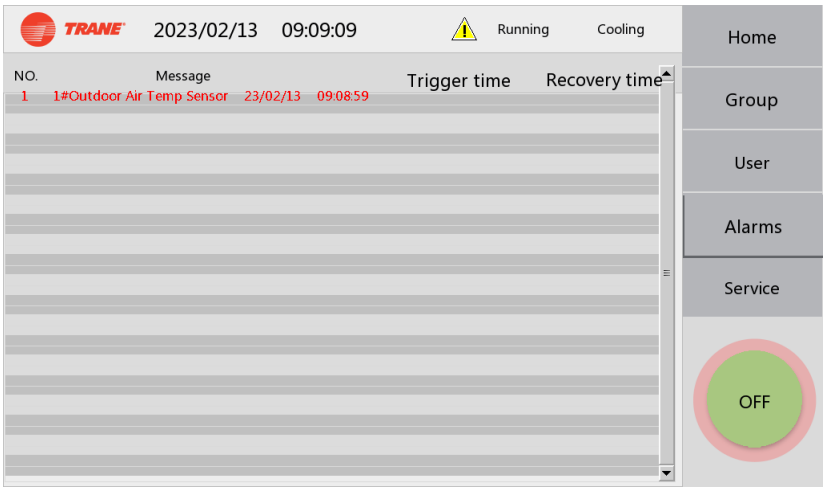
- Shutdown

  Press the OFF button at the bottom right of any page during the running status, and the confirm message box will pop up, and the module group will enter the shutdown process after confirmation. At the end of the shutdown process, the OFF button will turn to ON in red.



Alarms

- Press the Alarms button to display the alarm messages. The text is red when alarm occurs, and the time of occurrence is displayed.
- After the alarm is solved, the text of the alarm message turns black and the alarm resolution time is displayed.



Service

- A password is required to access the service features and can only be used by professionals.

Alarms and Troubleshooting

Items	Alarms Description	Possible causes	Actions
1	The controller cannot query the connected air conditioning system	1) Port A and port B connected reversely	Check the wiring
		2) SW3 address not set	Set SW3 address correctly
2	The controller cannot some connected air conditioning system	1) Duplicated addresses	1) Check the address of each unit in the system
		2) Port A and port B of the units connected reversely	2) Check the wiring
3	Some units in the system are lost during normal operation	The centralized controller is disconnected, or the outdoor unit is disconnected	Check whether the external unit of the centralized controller is powered off

Unit Operation

Start Up Procedures

Turn on the power supply of the unit, select cooling or heating mode on the control panel, and then press the start button on the control panel to start the unit. Check the following items to ensure the normal operation of the unit after running for more than 30 minutes and the system is running stably.

1. Check whether the temperature difference between the entering and leaving water temperature and water pressure of the unit are stable and within the normal range.
2. Check the high and low pressure of the unit.
3. Check the compressor current.
4. Check the power supply.

Long-term Shutdown

If the system will be OFF for a long time, the following steps should be implemented before shutdown.

1. Check whether there is any leakage in the refrigerant piping, if yes, be sure to repair it.
2. Drain off the circulating water in the system and screw off the drain port in the leaving and entering water circuit to ensure circulating water totally drained off.
3. Turn off the power supply of the unit and water pump

⚠ WARNING

- **The power must be cut off after the circulating water in the system is drained off, otherwise the unit and water pump will be damaged.**
- **For heat pump unit, the unit and the water pump must power on when there's water in the water circuit. For chiller unit, power must be cut off when no water in the circuit, otherwise it will freeze the unit and water pipeline.**

Start the System after Long-time Shutdown

1. Open the valves in the entering water and leaving water pipeline, and fill clean water to the chilled water pipeline. Be sure to discharge in the system when filling water and close the exhaust valve when the system is filled with water.
2. Turn on the power supply switch of the unit to check whether there is an alarm.
3. Press the power on button on the control panel to start the unit.
4. After starting all the compressors in the unit, open just one airside terminal to check whether the temperature difference between the entering and leaving water of is between 4~6 degrees C. Otherwise, it is necessary to check and rectify the water system.

System Protection

Low Pressure Protection (LP1, LP2)

The unit is monitored by a low pressure transducer, and the compressor will stop when the operating pressure is lower than the setting value. Manual reset is required.

High Pressure Protection (HP1, HP2)

The unit has a high pressure protection function, and when the protection setpoint is reached, the corresponding system will alarm and stop.

Winter Anti-Frost Protection

Heat pump unit: In winter, when the unit is in standby state and the water temperature is lower than the winter anti-freeze temperature setpoint, the unit automatically switchs to anti-freeze operation. Therefore, in winter that is prone to freezing, it is forbidden to cut off the power supply even if the unit is in standby.

Cooling only Chiller unit: there is no automatic anti-freeze program for the chiller itself. Therefore, in winter when it is prone to freeze, the unit not in operation needs to ensure that the circulating water is clean (no need to discharge water for the unit with the appropriate concentration of anti-freeze). For units in operation, anti-freeze addictive needs to be added.

During anti-freeze operation, if the pump overload occurs, immediately stop the pump operation (turn off all peripherals), exit the anti-freeze protection and display the pump overload alarm in the display screen. At this time, it is necessary to start the backup water pump system to ensure the normal operation of the water system.

Heat Exchanger Anti-freeze Protection

When the leaving water temperature is less than the “anti-freeze setpoint”, the unit will shut down for anti-freeze protection. If the entering water temperature setpoint is lower than 12 °C (units with entering water temperature control) or the leaving water temperature is lower than 7 °C (units with leaving water temperature control), it is necessary to lower the anti-freeze temperature setpoint accordingly, and the minimum value should not be less than 2.5 ℃.

Motor Overload Protection

1. Compressor motor overload, overheating protection.
2. Water pump motor overload protection.
3. Fan motor overheating protection.

Temperature Sensor Protection

When the temperature sensor fails, the system will alarm and shut down. All alarm protection is manually reset, you need to troubleshoot firstly, then press the “reset” button or reboot the unit to recover the unit.

Low Refrigerant Suction Pressure Protection

In cooling mode, if the low pressure of any system falls below the setpoint (not check during defrosting operation), the unit will shut down and an alarm occurs.

Water Pump Overload Detection

If the water pump is overloaded and stops, the unit will shut down and alarm occurs.

Abnormal Temperature of Entering and Leaving water

If the entering and leaving pipes are connected reversely, the unit will shut down and alarm occurs after unit starts.

Compressor Overload Detection

If the compressor of any system is overloaded, alarm is displayed and the unit will shut down.

High Discharge Temperature Protection

If the discharge temperature of any system is higher than the default setpoint, the discharge temperature will be considered too high, alarm is displayed and the unit will shut down.

Ambient temperature Lockout Protection

If ambient temperature is out of range when starting the unit, it is forbidden to start and report alarm; If the ambient temperature is out of range after it is powered on, it automatically shuts down and reports alarm.

⚠ WARNING

After power-on, the unit force the electric heater of compressor to preheat for 30min, during which the unit could not start.

Cooling and Heating Temperature Setpoint Automatic Adjustment Protection

When the unit is running, if the temperature setpoint exceeds the allowable operating temperature of the unit, the unit will be running according to the actual allowable temperature, and after the restriction is eliminated, the unit will operate according to customer's set temperature.

Low Water Flowrate protection

In order to avoid the evaporator freezing due to the low water flowrate, when the water flowrate is below a certain level, the unit will shut down and alarm occurs.

Alarm Troubleshooting

Item	Diagnostic or Protection Description	Category	Solution
1	1# Low Water Flow	Unit	All systems perform alarm and stop process
2	1# Flow Switch Error	Unit	The unit is prohibited from starting
3	1# Large Diff for EWT and LWT in Heating	Unit	All systems in the unit perform the system unloading process
4	1# EWT and LWT Abnormal	Unit	All systems in the unit perform the system unloading process
5	1# Anti-Freezing 1	Unit	Perform relevant actions
6	1# Anti-Freezing 2	Unit	Perform relevant actions
7	1# Outdoor Air Temp Out of Range	Unit	All systems in the unit perform the system unloading process
8	1# Entering Water Temp Sensor	Unit/air conditioning system	System alarm stop and process
9	1# Leaving Water Temp Sensor	Unit/air conditioning system	System alarm stop and process
10	1# Outdoor Air Temp Sensor	Unit	All systems of the unit perform the system offloading process
11	1# Configuration Error	Unit	Cannot start
12	1# EEPROM Error	Unit	Continue to run automatically
13	1# High Inlet Water Temp Limit	Unit	Reserved
14	1# High Outlet Water Temp Limit	Unit	Reserved
15	1# Sub Board Comm Loss	Unit	Alarm
16	1# Rem 1		Reserved
17	1# Compressor Overload Ckt1	system	System alarm stop and process
18	1# Fan Overload Ckt1	system	System alarm stop and process
19	1# Current Abnormal Comp1A	system	System alarm stop and process
20	1# Current Abnormal Comp1B	system	System alarm stop and process
21	1# High Pressure Protection Ckt1	system	System alarm stop and process
22	1# Low Pressure Protection Ckt1	system	System alarm stop and process
23	1# Discharge Temp Protection Ckt1	system	System alarm stop and process
24	1# Low Superheat Ckt1	system	System alarm stop and process
25	1# Discharge Pressure Sensor Ckt1	system	System alarm stop and process
26	1# Suction Pressure Sensor Ckt1	system	System alarm stop and process
27	1# Refrigerant Leackage Ckt1	system	System alarm stop and process
28	1# Discharge Temp Sensor Ckt1	system	System alarm stop and process
29	1# Coil Temp Sensor Ckt1	system	System alarm stop and process
30	1# Suction Temp Sensor Ckt1	system	System alarm stop and process
31	1# High Suction Temp Ckt1	system	System alarm stop and process
32	1#Rem 2		Reserved
33	1# Compressor Overload Ckt2	system	System alarm stop and process
34	1# Fan Overload Ckt2	system	System alarm stop and process
35	1# Current Abnormal Comp2A	system	System alarm stop and process
36	1# Current Abnormal Comp2B	system	System alarm stop and process
37	1# High Pressure Protection Ckt2	system	System alarm stop and process
38	1# Low Pressure Protection Ckt2	system	System alarm stop and process
39	1# Discharge Temp Protection Ckt2	system	System alarm stop and process
40	1# Low Superheat Ckt2	system	System alarm stop and process
41	1# Discharge Pressure Sensor Ckt2	system	System alarm stop and process
42	1# Suction Pressure Sensor Ckt2	system	System alarm stop and process

Alarm Troubleshooting

Item	Diagnostic or Protection Description	Category	Solution
43	1# Refrigerant Leakage Ckt2	system	System alarm stop and process
44	1# Discharge Temp Sensor Ckt2	system	System alarm stop and process
45	1# Coil Temp Sensor Ckt2	system	System alarm stop and process
46	1# Suction Temp Sensor Ckt2	system	System alarm stop and process
47	1# High Suction Temp Ckt2	system	System alarm stop and process
48	1#Rem 3		Reserved
49	1# High Bus Voltage Ckt1-Fan1	system	System alarm stop and process
50	1# Low Bus Voltage Ckt1-Fan1	system	System alarm stop and process
51	1# High IPM Temp Ckt1-Fan1	system	System alarm stop and process
52	1# High Output Power Ckt1-Fan1	system	System alarm stop and process
53	1# Other Protection Ckt1-Fan1	system	System alarm stop and process
54	1# High Bus Voltage Ckt1-Fan2	system	System alarm stop and process
55	1# Low Bus Voltage Ckt1-Fan2	system	System alarm stop and process
56	1# High IPM Temp Ckt1-Fan2	system	System alarm stop and process
57	1# High Output Power Ckt1-Fan2	system	System alarm stop and process
58	1# Other Protection Ckt1-Fan2	system	System alarm stop and process
59	1# Comm Loss	system	System alarm stop and process
60	1# Eco Inlet Rfgt Temp Ckt1	system	System alarm stop and process
61	1# Eco Outlet Rfgt Temp Ckt1	system	System alarm stop and process
62	1# Eco Inlet Rfgt Temp Ckt2	system	System alarm stop and process
63	1# Eco Outlet Rfgt Temp Ckt2	system	System alarm stop and process
64	1# High Bus Voltage Ckt2-Fan1	system	System alarm stop and process
65	1# Low Bus Voltage Ckt2-Fan1	system	System alarm stop and process
66	1# High IPM Temp Ckt2-Fan1	system	System alarm stop and process
67	1# High Output Power Ckt2-Fan1	system	System alarm stop and process
68	1# Other Protection Ckt2-Fan1	system	System alarm stop and process
69	1# High Bus Voltage Ckt2-Fan2	system	System alarm stop and process
70	1# Low Bus Voltage Ckt2-Fan2	system	System alarm stop and process
71	1# High IPM Temp Ckt2-Fan2	system	System alarm stop and process
72	1# High Output Power Ckt2-Fan2	system	System alarm stop and process
73	1# Other Protection Ckt2-Fan2	system	System alarm stop and process
74	1# AFD Over Current Ckt1	system	System alarm stop and process
75	1# AFD Over Voltage Ckt1	system	System alarm stop and process
76	1# AFD Under Voltage Ckt1	system	System alarm stop and process
77	1# AFD Overload Ckt1	system	System alarm stop and process
78	1# AFD Overheat Ckt1	system	Perform the system stop process
79	1# AFD Other Protection Ckt1	system	Perform the system stop process
80	1# AFD Over Current Ckt2	system	Perform the system stop process
81	1# AFD Over Voltage Ckt2	system	Perform the system stop process
82	1# AFD Under Voltage Ckt2	system	Perform the system stop process
83	1# AFD Overload Ckt2	system	Perform the system stop process
84	1# AFD Overheat Ckt2	system	Perform the system stop process
85	1# AFD Other Protection Ckt2	system	Perform the system stop process
86	1# AFD Comm Loss Ckt1	system	Perform the system stop process
87	1# AFD Comm Loss Ckt2	system	Perform the system stop process

Maintenance

Routine maintenance needs to be done by qualified professionals. To keep normal operation of the unit, extend the service life and reduce the possibility of failure, please regularly implement the following check items and adjust parameters and necessary maintenance, and do records, which helps maintenance personnel to diagnose.

Daily Regular Checks

1. Please check regularly whether the condenser is dusty, clean the condenser if necessary. When the round-tube-plate-fin heat exchanger is seriously dirty, it will reduce the performance of the unit.
2. Please clean the contaminated fan blades regularly.
3. Please check the vibration and sound regularly to check whether there are abnormal compressor noises and vibrations. When an abnormal sound occurs, please check the location and cause, and contact the manufacturer or distributor if when the cause is unclear.
4. Please check the host unit, such as whether the electric control box is loose, whether the pipeline leakages and abnormal vibration, etc.
5. Please check whether air is mixed in the water pipe system. Even if exhaust operation is performed, air may be mixed into the system, so please discharge the air regularly.
6. Please check and clean the water filter. Professional assistance is needed when clean the water loop.
7. Please check the water quality regularly. If the water quality is worse, replace the contaminated water in the system. Contaminated water reduces cooling capacity and corrodes heat exchangers or water pipes.
8. For unit in cooling mode in winter, ethylene glycol antifreeze is added to the circulating water, it is necessary to regularly check the concentration of ethylene glycol in the circulating water, and unsuitable concentrations will decrease the antifreeze ability or lead to antifreeze failure.
9. Please regularly check the valves and pipelines on the water loop, whether the water pipe joints are tight, and check the water pump and its related parts.
10. Please regularly check and record the pressure, temperature and other parameters to see if they are within the normal range and record the maintenance time of spot check.

⚠ WARNING

- **Be sure to cut off the main power supply before making any contact, otherwise it may result in casualties and damage to the unit.**
- **Maintenance and servicing work is very important and should be carried out at least every six months or 1000.**

Inspection and Cleaning of the Condenser

To ensure that the condenser works effectively, the outside layer must be free of any fallen leaves, cotton threads, insects, slag shells, flops and other contaminants. If there is dirt on the condenser, it will cause the operating pressure too high (high pressure alarm), and the operating current will increase (overcurrent protection) to increase power consumption. Also it'll cause low pressure too low during heating (low pressure protection), causing the unit fail and shut down.

If the condenser needs to be cleaned, the compressed air is blown parallel from the inside to the outside to the aluminum fin heat exchanger, which is exactly the opposite direction to the normal unit operating air circulation direction. When carrying out external cleaning, you can use a vacuum cleaner and never damage the aluminum fin heat exchanger sheet. Be careful not to be scratched by the fins when cleaning. The condenser can also be cleaned with a brush or water column, and the condenser should be rinsed from the inside out when cleaning with the water column. If the tubes are too dirty, contact a professional cleaning staff.

⚠ WARNING

Do not use steam to clean the condenser, otherwise it will cause the internal pressure to rise and make the refrigerant pressure higher than design pressure, refrigeration system leakage after destruction.

Inspection and cleaning of the evaporator

Please check the water temperature of the evaporator entering and leaving regularly, and compare the saturated evaporation temperature during cooling or the saturated condensation temperature during heating. For an effectively working evaporator, the difference between the average water temperature at the inlet and outlet and the refrigerant saturated evaporation temperature during cooling or the refrigerant saturated condensation temperature during heating should be between 3~8 °C. If the difference is greater than this range, it indicates that the efficiency of the heat exchanger has decreased.

Since certain chemical treatments are required during cleaning heat exchangers, cleaning must be done by professionals.

Refrigerant and Lubricating Oil Charge

Each unit is charged with the appropriate refrigerant and the corresponding lubricant. If the refrigeration circulation system is working properly and no maintenance or other maintenance work is required, do not charge or replace the refrigerant and lubricating oil at will. Under normal conditions, the refrigerant and lubricating oil in the machine can be used all the time. If the refrigerant must be recharged due to leakage, please use the refrigerant required by the nameplate, the refrigerant charge refers to the unit nameplate, it is recommended to charge 50 ml of compressor lubricating oil after each unit refrigerant leakage, the compressor lubricating oil model is as follows. Before recharging the refrigerant, be sure to vacuum the system below 46Pa.

Compressor brand	Lube oil brand/model
COPELAND	EMKARATE / RL 32-3MAF
DANFOSS	EMKARATE / RL 32H

*The above lubricants are suitable for R410A refrigeration systems

Inspection and cleaning of water flow switches

Since impurities cannot be avoided in the water, with the increase of running time impurities will accumulate, the reliable operation of the water flow switch will be affected. It is recommended that customers clean or replace the water flow switch every two years. If the water quality in the system is poor, the clean or replacement cycle should be shortened.

Name and Content of Hazardous Substances in the Product						
Part	**Hazardous Substances**					
	(Pb)	**(Hg)**	**(Cd)**	**Cr(VI)**	**(PBB)**	**(PBDE)**
Motor	×	○	×	○	○	○
Heat Exchanger	○	○	○	○	○	○
Filter	○	○	○	○	○	○
Fasteners such as screws and bolts	○	○	○	○	○	○
Sheet metal	○	○	○	○	○	○
Thermal insulation, damping block class	○	○	○	○	○	○
Plastic parts	○	○	○	○	○	○
Foam parts	○	○	○	○	○	○
Rubber parts	○	○	○	○	○	○
Power cords and cables	×	○	○	○	○	○
Printed circuit boards and electrical components	×	○	×	○	○	○
Printed copy	○	○	○	○	○	○
Controller parts (controller / battery, etc.)*	×	○	×	○	○	○
Other sealing parts	○	○	○	○	○	○
Other imprints	○	○	○	○	○	○

This form has been prepared in accordance with SJ/T 11364.

○ : Indicates that the content of the hazardous substance in all homogeneous materials of the part is below the limit requirements specified in GB/T 26572.

× : Indicates that the content of the hazardous substance in at least one of the homogeneous materials of the part exceeds the limit requirements specified in GB/T 26572. However, with the existing technical conditions, it is temporarily impossible to realize that the product parts do not contain the above harmful substances at all. The content of harmful substances will be gradually reduced with the advancement of alternative technology.

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